

# **AIRFIELD STANDARD DESIGN US STANDARDPLANUNG US**

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**JET FUEL STORAGE AND DISPENSING SYSTEMS  
FOR TACTICAL AND WIDE BODY AIRCRAFT**

**FLUGKRAFTSTOFF - BETANKUNGSANLAGEN FÜR  
TAKTISCHE UND GROSSRAUM - FLUGZEUGE**

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**HEADQUARTER  
UNITED STATES AIR FORCES EUROPE  
ENGINEERING & OPERATIONS**

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<b>8I</b>	<b>MANIFOLD/FILTER STATION</b> <b>TANK TRUCK REFUELING SYSTEM</b>  <i>VERTEILER-/FILTERSTATION</i> <i>TANKWAGEN- BETANKUNGSSYSTEM</i>		



# **TYPICAL LAYOUT PLAN**

## ***MUSTERLAGEPLAN***

# **01**

**01.1**

**TANK TRUCK REFUELING SYSTEM**  
***TANKWAGEN- BETANKUNGSSYSTEM***

**01.3**

**HYDRANT REFUELING SYSTEM, IN THE APRON**  
***HYDRANTEN- BETANKUNGSSYSTEM, IN DER FLÄCHE***

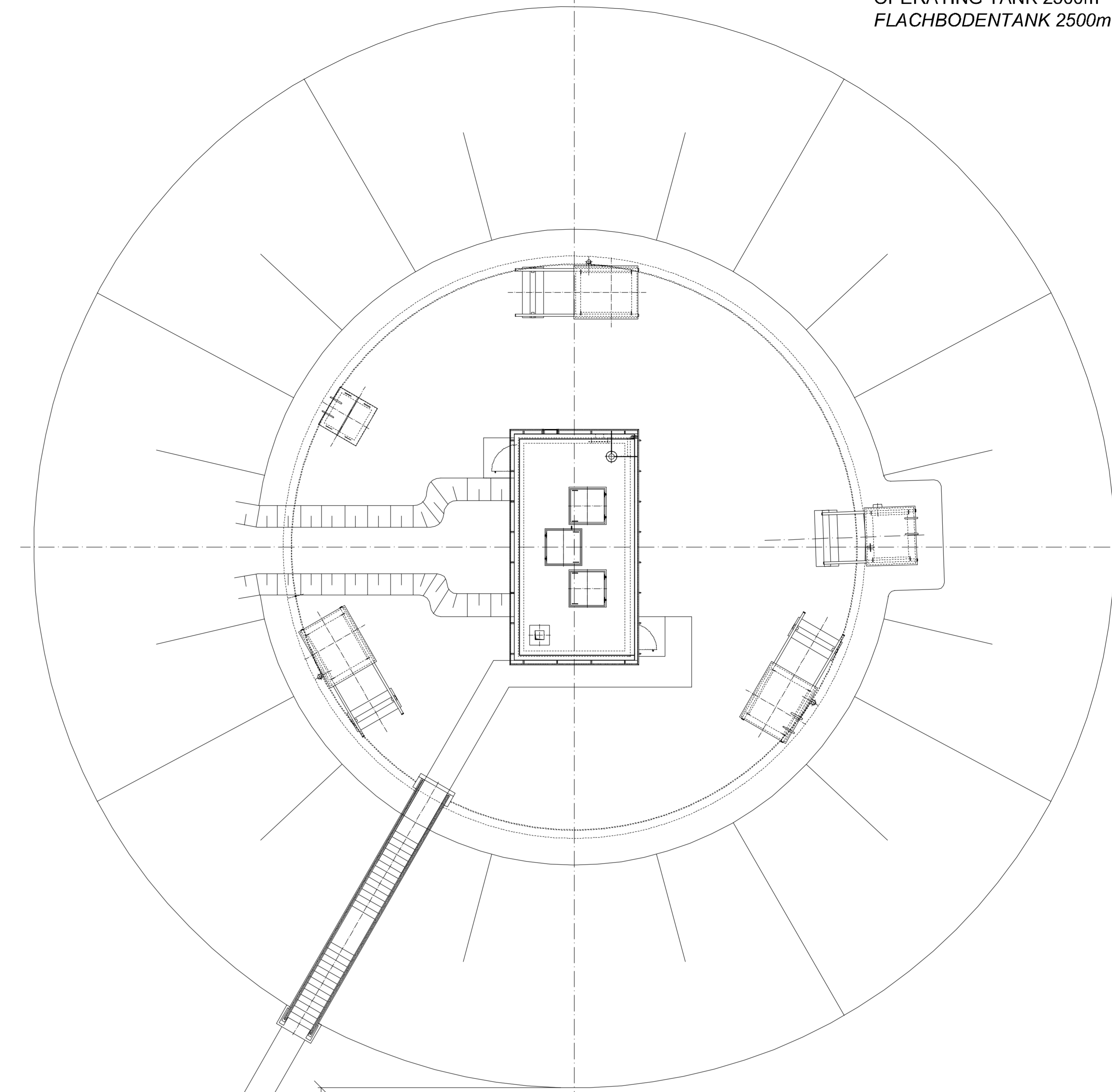
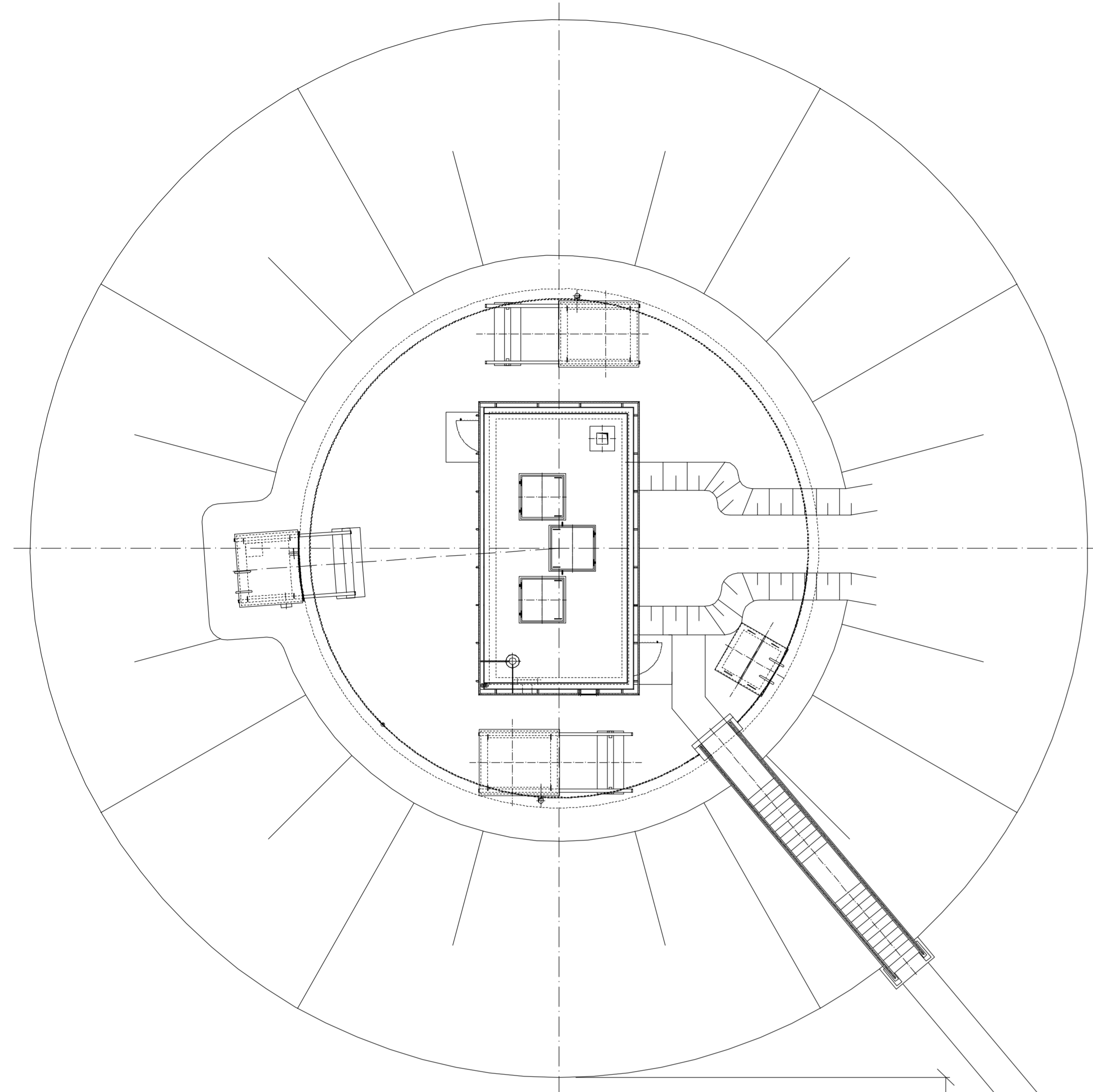
OPERATING TANK 1250m<sup>3</sup>  
FLACHBODENTANK 1250m<sup>3</sup>

BUILDING 3  
BAUWERK

MINIMUM / TANK DIAMETER (d)  
MINIMUM / TANKDURCHMESSER (d)

OPERATING TANK 2500m<sup>3</sup>  
FLACHBODENTANK 2500m<sup>3</sup>

BUILDING 2  
BAUWERK



DRAIN TANK 10m<sup>3</sup>  
ENTLEERUNGSBEHÄLTER 10m<sup>3</sup>

BUILDING 9  
BAUWERK

DIESEL STORAGE TANK 5m<sup>3</sup>  
DIESEL VORRATSBEHÄLTER 5m<sup>3</sup>

BUILDING 10  
BAUWERK

MANIFOLD / FILTER STATION  
VERTEILER- / FILTERSTATION

BUILDING 8I  
BAUWERK

TANK TRUCK REFUELING PIT, LEFT SIDE  
TANKWAGEN- BETANKUNGSSCHACHT LINKSAUSFÜHRUNG

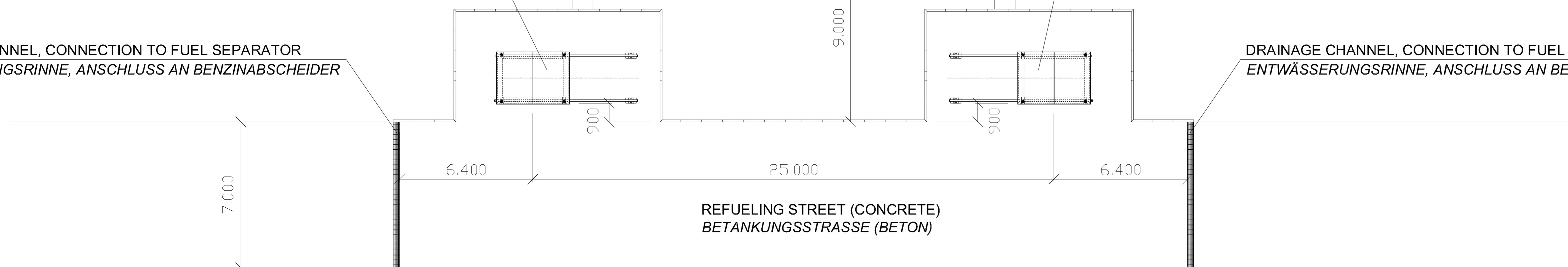
BUILDING 12  
BAUWERK

TANK TRUCK REFUELING PIT, RIGHT SIDE  
TANKWAGEN- BETANKUNGSSCHACHT RECHTSAUSFÜHRUNG

BUILDING 12  
BAUWERK

DRAINAGE CHANNEL, CONNECTION TO FUEL SEPARATOR  
ENTWÄSSERUNGSRINNE, ANSCHLUSS AN BENZINABSCHIEDER

DRAINAGE CHANNEL, CONNECTION TO FUEL SEPARATOR  
ENTWÄSSERUNGSRINNE, ANSCHLUSS AN BENZINABSCHIEDER



REFUELING STREET (CONCRETE)  
BETANKUNGSSSTRASSE (BETON)

REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
<b>HEADQUARTERS</b> UNITED STATES AIR FORCES EUROPE 				
<b>ENGINEERING &amp; OPERATIONS</b>			<b>FLUGPLATZ STANDARDPLANUNG US</b> <b>FLUGKRAFTSTOFF - VERSORGSANLAGEN</b>	
<b>TYPICAL LAYOUT PLAN MUSTERLAGEPLAN</b>				
<b>TANK TRUCK REFUELING SYSTEM TANKWAGEN-BETANKUNGSSYSTEM</b>				
WORKED/BEARBEITET	PREPARED/AUFGESTELLT	APPROVED/GENEHIGT		
LANDSCHAFTS- UND BAUVERMESSUNG L B B	AMT FÜR BUNDESBAU WALLSTR.1 55122 MAINZ	ORIGINAL SIGNED BY IN ORIGINAL SIZE NOVEMBER 2012		
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAU MASSNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED GENEHIGT	DATE DATUM	6. MAI 2015	SCALE MASSSTAB	1:100
ORIGINAL SIGNED BY IN ORIGINAL SIZE			STANDARD SHEET STANDARD PLAN	01.1
CONSTRUCTION PROJECT BAU MASSNAHME			CAD-PROJECT FILE CAD-PROJEKTE	SHEET NO. PLAN NR.
				OF VON



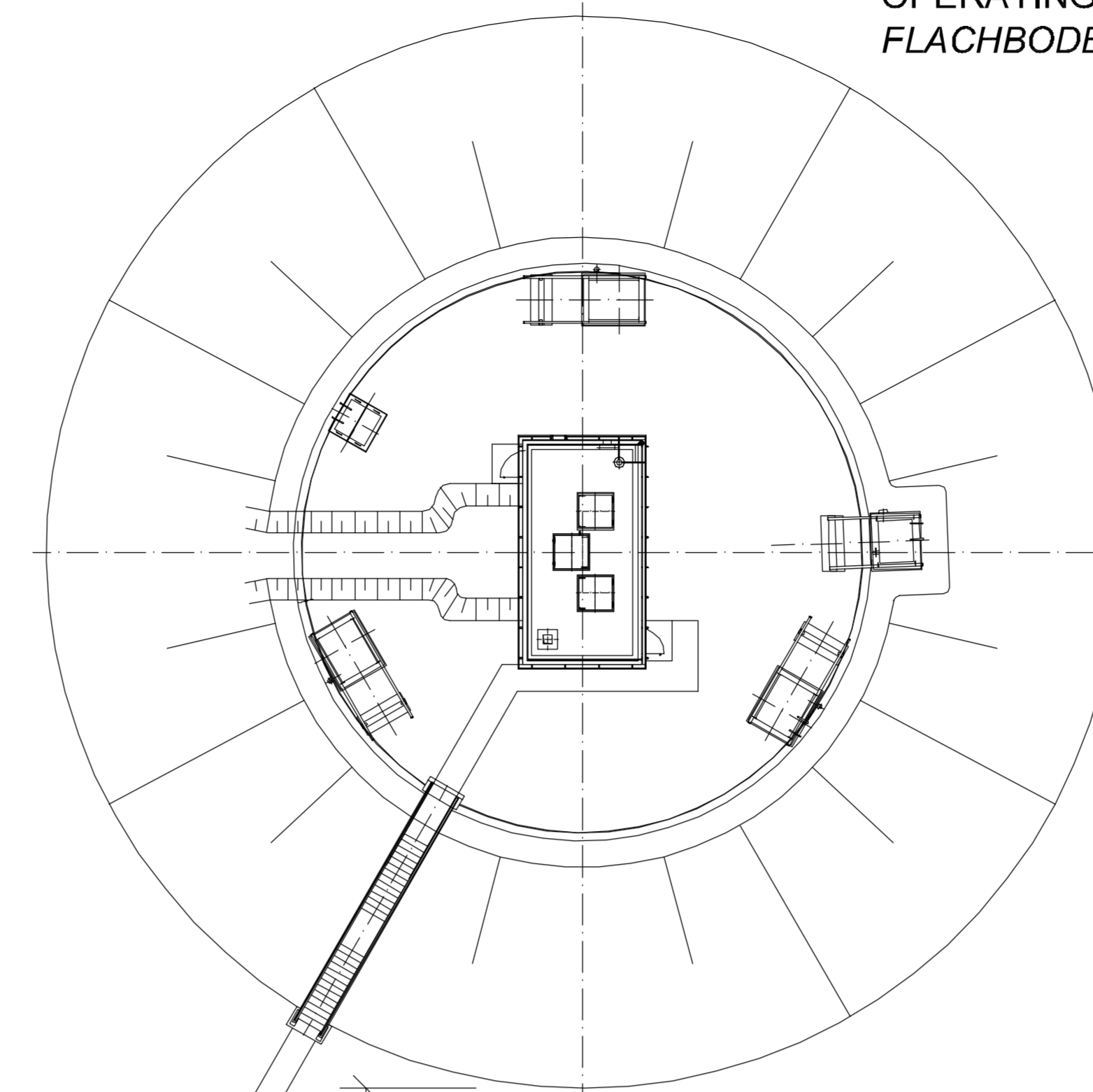
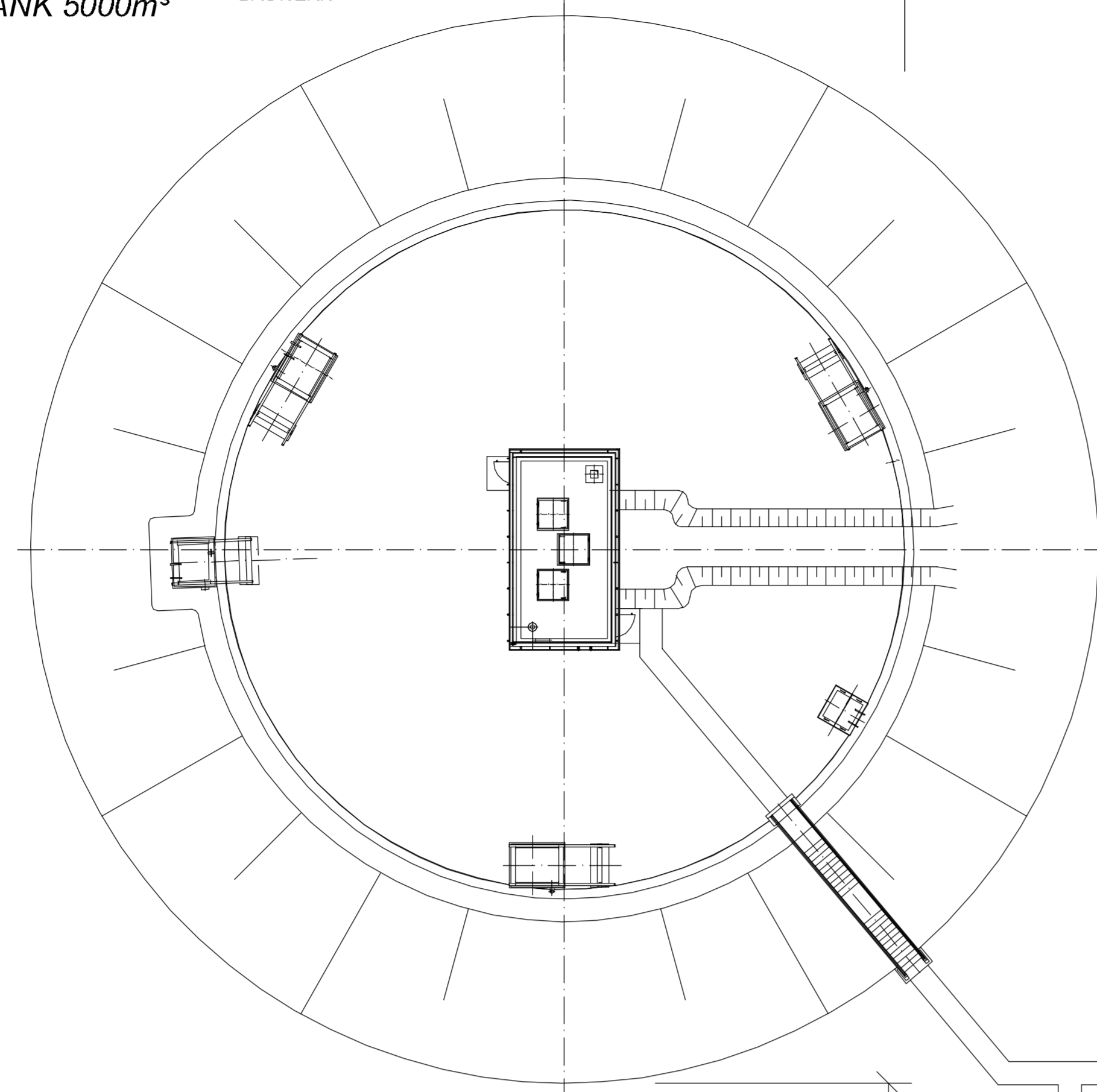
OPERATING TANK 5000m<sup>3</sup>  
FLACHBODENTANK 5000m<sup>3</sup>

BUILDING  
BAUWERK 1

MINIMUM / TANK DIAMETER (d)  
MINIMUM / TANKDURCHMESSER (d)

OPERATING TANK 2500m<sup>3</sup>  
FLACHBODENTANK 2500m<sup>3</sup>

BUILDING  
BAUWERK 2



DRAIN TANK 10m<sup>3</sup>  
ENTLEERUNGSBEHÄLTER 10m<sup>3</sup>

BUILDING  
BAUWERK 9

DIESEL STORAGE TANK 5m<sup>3</sup>  
DIESEL VORRATSBEHÄLTER 5m<sup>3</sup>

BUILDING  
BAUWERK 10

FLUSHING PIT  
SPÜLSCHACHT

BUILDING  
BAUWERK 16

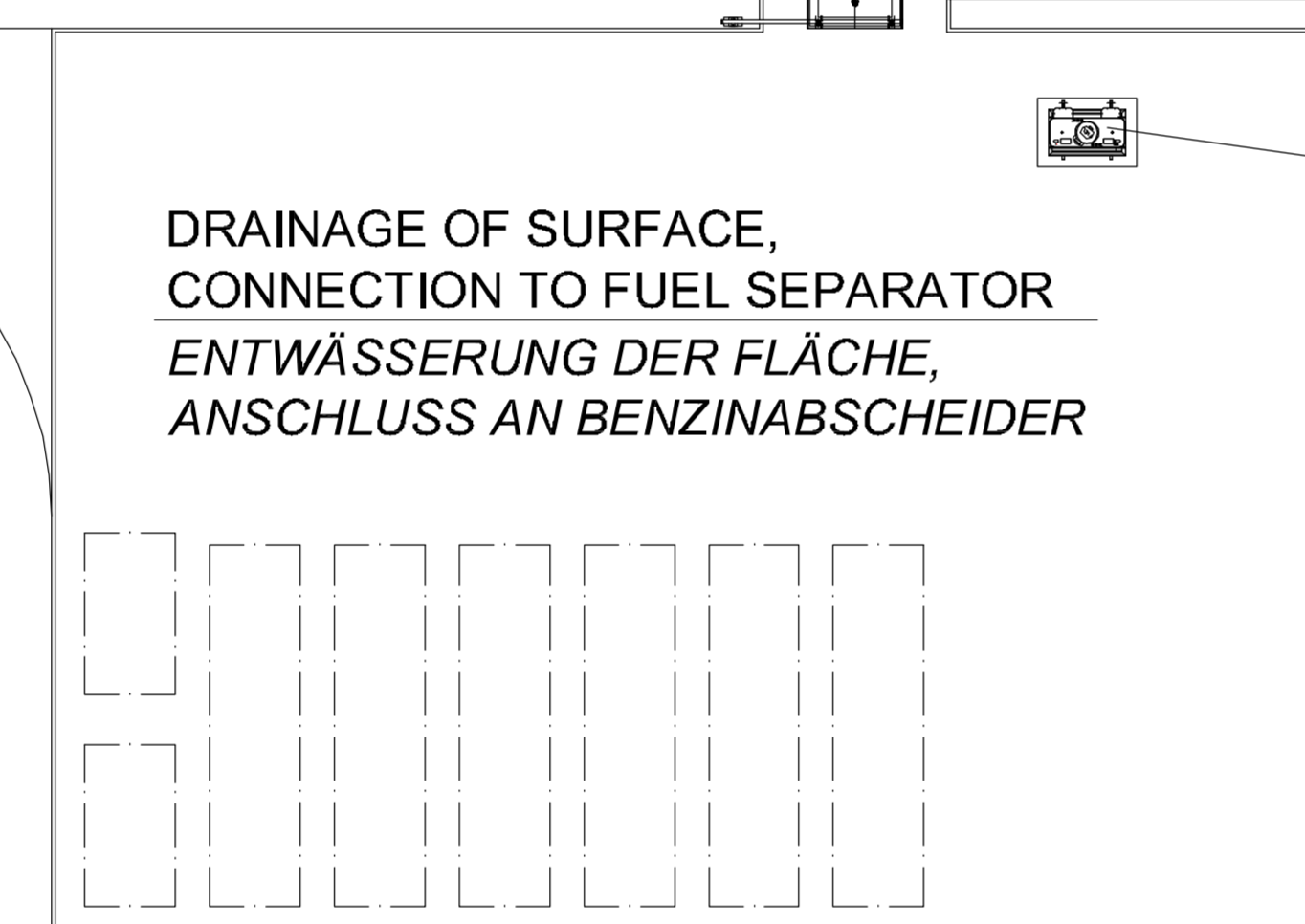
MANIFOLD / FILTER STATION  
VERTEILER- / FILTERSTATION

BUILDING  
BAUWERK 8

DRAINAGE OF SURFACE,  
CONNECTION TO FUEL SEPARATOR  
ENTWÄSSERUNG DER FLÄCHE,  
ANSCHLUSS AN BENZINABSCHIEDER

TEST PIT  
TESTSCHACHT

BUILDING  
BAUWERK 15

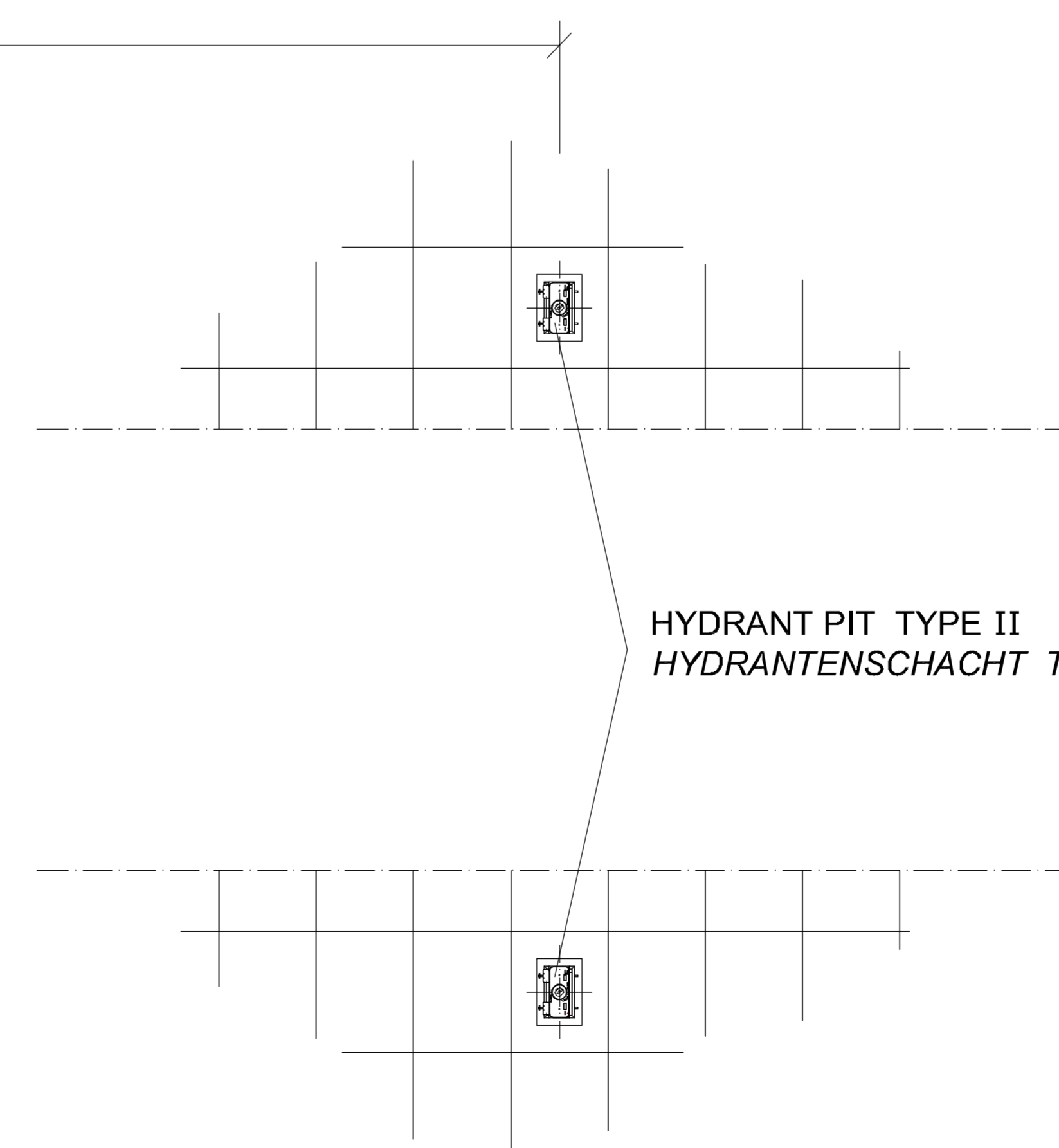
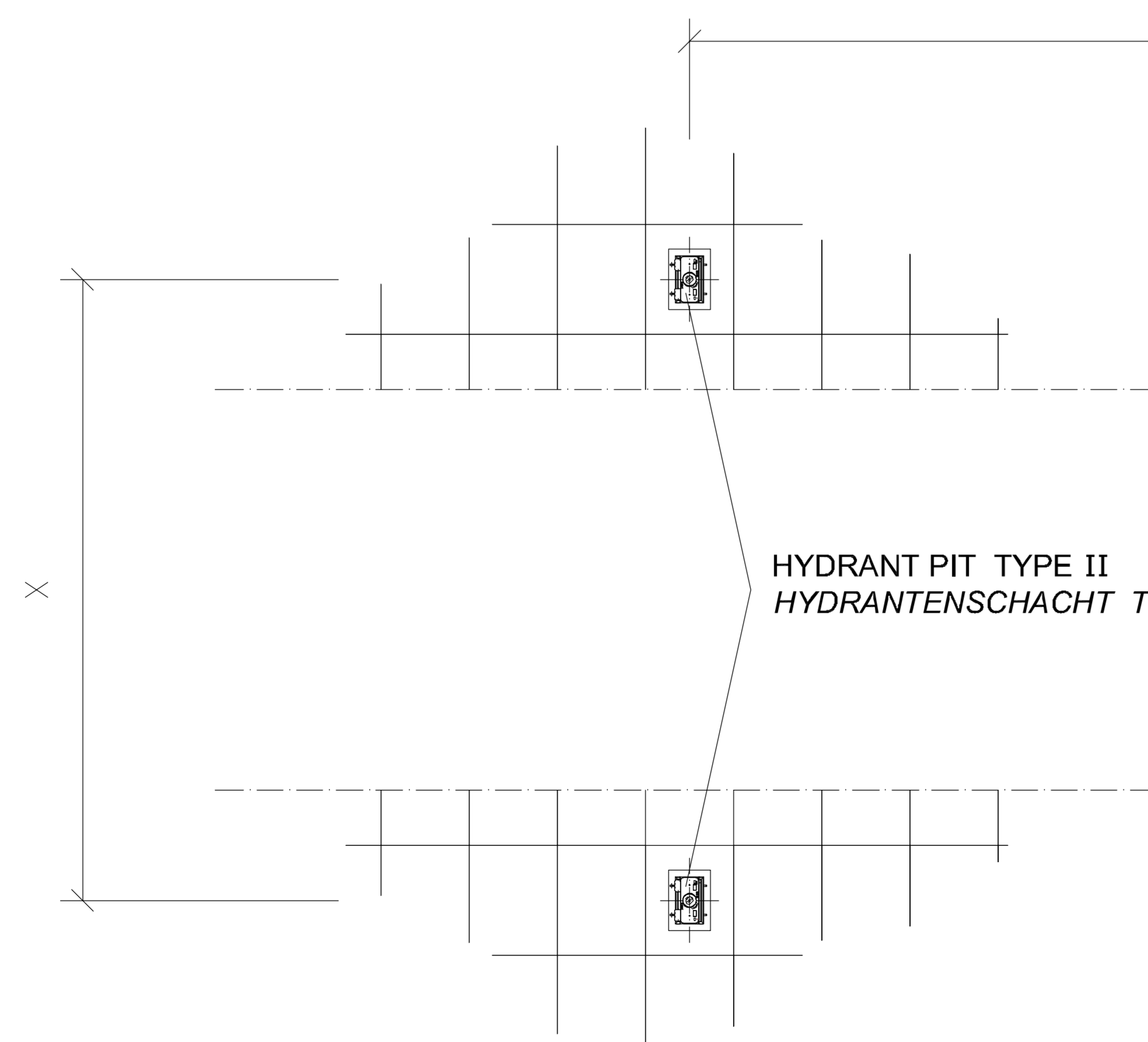


HYDRANT PIT TYPE II  
HYDRANTENSCHACHT TYPE II

BUILDING  
BAUWERK 14

HYDRANT PIT TYPE II  
HYDRANTENSCHACHT TYPE II

BUILDING  
BAUWERK 14



**NOTES**  
**BEMERKUNGEN**

X DISTANCE ACCORDING TO TYPE OF AIRCRAFT  
X ABSTAND ABHÄNGIG VOM FLUGZEUGTYP

REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
<b>HEADQUARTERS</b> UNITED STATES AIR FORCES EUROPE ENGINEERING & OPERATIONS				
AIRFIELD STANDARD DESIGN US JET FUEL STORAGE AND DISPENSING SYSTEMS		FLUGPLATZ STANDARDPLANUNG US FLUGKRAFTSTOFF - VERSORGSANLAGEN		
<b>TYPICAL LAYOUT PLAN</b> <b>MUSTERLAGEPLAN</b>				
<b>HYDRANT REFUELING SYSTEM, IN THE APRON</b> <b>HYDRANTENBETANKUNGSSYSTEM, IN DER FLÄCHE</b>				
WORKED/BEARBEITET LANDSBEREITER LIEGENSCHAFTS- UND BAUVEREINE LAN-WESENLEHRUNG LANWA AMBICHT/ UNTERSTÜTZUNG 1, 2 (NACH LANWA) TRUPPEN (SOWJEL) UND 178 (RUMÄN) (SOWJEL)	APPROVED/GENEHMIGT AMT FÜR BUNDESBAU WALLSTR.1 55122 MAINZ NOVEMBER 2012	INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAUMASSNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)		
APPROVED GENEHMIGT	DATE DATUM 6. MAI 2015	SCALE MASSSTAB 1:200	SHEET NO. PLATZNR. 01.3	
ORIGINAL DRAWN BY IN ORIGINAL DED.		CAD-DRAWN BY CAD-PROGRAMME		
CONSTRUCTION PROJECT BAU MASSNAHME		SHEET NO. PLATZNR. 01.3		

**GENERAL FLOW DIAGRAM**  
***GESAMT- FLIESS- SCHEMA***

**02**

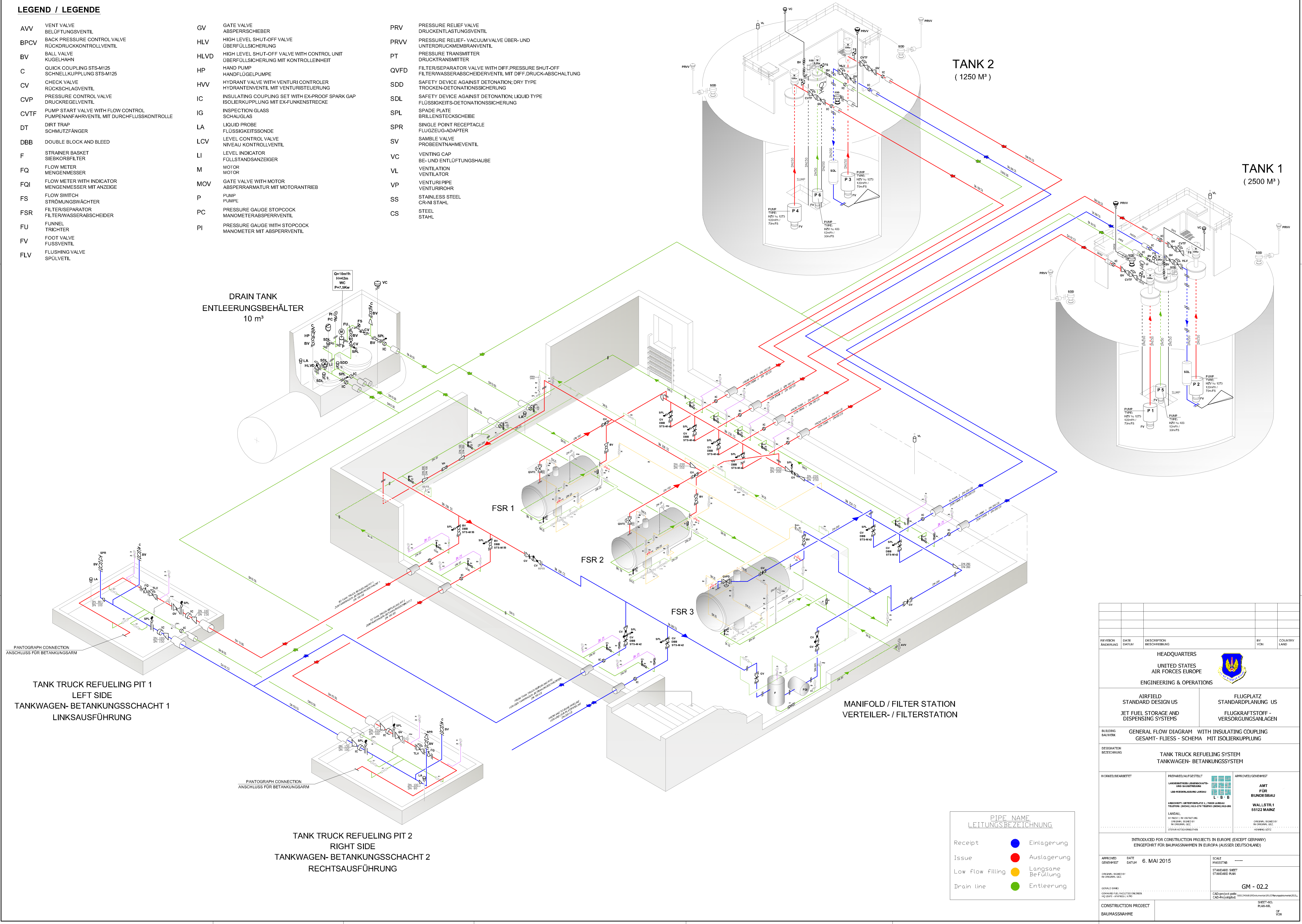
**GM 02.2** TANK TRUCK REFUELING SYSTEM  
***TANKWAGEN- BETANKUNGSSYSTEM***

**GM 02.4** HYDRANT REFUELING SYSTEM, IN THE APRON  
***HYDRANTEN- BETANKUNGSSYSTEM, IN DER FLÄCHWE***



**LEGEND / LEGENDE**

- |      |  |      |   |      |   |
|------|--|------|---|------|---|
| AVV  | VENT VALVE<br>BELÜFTUNGSVENTIL   | GV   | GATE VALVE<br>ABSPERRSCHIEBER   | PRV  | PRESSURE RELIEF VALVE<br>DRÜCKENTLASTUNGSVENTIL   |
| BPCV | BACK PRESSURE CONTROL VALVE<br>RÜCKDRUCKKONTROLLVENTIL                           | HLV  | HIGH LEVEL SHUT-OFF VALVE<br>ÜBERFÜLLSICHERUNG  | PRVV | PRESSURE RELIEF - VACUUM VALVE ÜBER- UND<br>UNTERDRUCKMEMBRANVENTIL   |
| BV   | BALL VALVE<br>KUGELHAHN  | HLVD | HIGH LEVEL SHUT-OFF VALVE WITH CONTROL UNIT<br>ÜBERFÜLLSICHERUNG MIT KONTROLLEINHEIT    | PT   | PRESSURE TRANSMITTER<br>DRUCKTRANSMITTER  |
| C    | QUICK COUPLING STS-M125<br>SCHNELLKUPPLUNG STS-M125                              | HP   | HAND PUMP<br>HANDFLÜGELPUMPE  | QVFD | FILTER/SEPARATOR VALVE WITH DIFF.PRESSURE SHUT-OFF<br>FILTERWASSERABSCHIEDERVENTIL MIT DIFF.DRUCK-ABSCHALTUNG |
| CV   | CHECK VALVE<br>RÜCKSCHLAGVENTIL  | HVV  | HYDRANT VALVE WITH VENTURI CONTROLER<br>HYDRANTVENTIL MIT VENTURISTEUERUNG              | SDD  | SAFETY DEVICE AGAINST DETONATION; DRY TYPE<br>TROCEN-DETONATIONSSICHERUNG                                     |
| CVP  | PRESSURE CONTROL VALVE<br>DRUCKREGELVENTIL                                       | IC   | INSULATING COUPLING SET WITH EX-PROOF SPARK GAP<br>ISOLIERKUPPLUNG MIT EX-FUNKENSTRECKE | SDL  | SAFETY DEVICE AGAINST DETONATION; LIQUID TYPE<br>FLÜSSIGKEITS-DETONATIONSSICHERUNG                            |
| CVTF | PUMP START VALVE WITH FLOW CONTROL<br>PUMPENANFAHRVENTIL MIT DURCHFLOSSKONTROLLE | IG   | INSPECTION GLASS<br>SCHAUGLAS   | SPL  | SPADE PLATE<br>BRILLENSTECKSCHEIBE  |
| DT   | DIRT TRAP<br>SCHMUTZFÄNGER   | LA   | LIQUID PROBE<br>FLÜSSIGKEITSSONDE   | SPR  | SINGLE POINT RECEPTACLE<br>FLUGZEUG-ADAPTER   |
| DBB  | DOUBLE BLOCK AND BLEED   | LCV  | LEVEL CONTROL VALVE<br>NIVEAU KONTROLLVENTIL  | SV   | SAMPLE VALVE<br>PROBENTNAHMEVENTIL  |
| F    | STRAINER BASKET<br>SIEBKORBFILTER  | LI   | LEVEL INDICATOR<br>FÜLLSTANDSANZEIGER   | VC   | VENTING CAP<br>BE- UND ENTLÜFTUNGSHAUBE   |
| FQ   | FLOW METER<br>MENGENMESSER   | M    | MOTOR<br>MOTOR  | VL   | VENTILATOR<br>VENTILATOR  |
| FQI  | FLOW METER WITH INDICATOR<br>MENGENMESSER MIT ANZEIGE                            | MOV  | GATE VALVE WITH MOTOR<br>ABSPERRARMATUR MIT MOTORANTRIEB                                | VP   | VENTURI PIPE<br>VENTURIROHR   |
| FS   | FLOW SWITCH<br>STRÖMUNGSWÄCHTER  | P    | PUMP<br>PUMPE   | SS   | STAINLESS STEEL<br>CR-NI STAHL  |
| FSR  | FILTER/SEPARATOR<br>FILTERWASSERABSCHIEDER                                       | PC   | PRESSURE GAUGE STOPCOCK<br>MANOMETERABSPERRVENTIL                                       | CS   | STEEL<br>STAHL  |
| FU   | FUNNEL<br>FRÜCHTER   | PI   | PRESSURE GAUGE WITH STOPCOCK<br>MANOMETER MIT ABSPERRVENTIL                             |      |   |
| FV   | FOOT VALVE<br>FUSSVENTIL   |      |   |      |   |
| FLV  | FLUSHING VALVE<br>SPÜLVETIL  |      |   |      |   |



**PIPE NAME  
LEITUNGSBEZEICHNUNG**

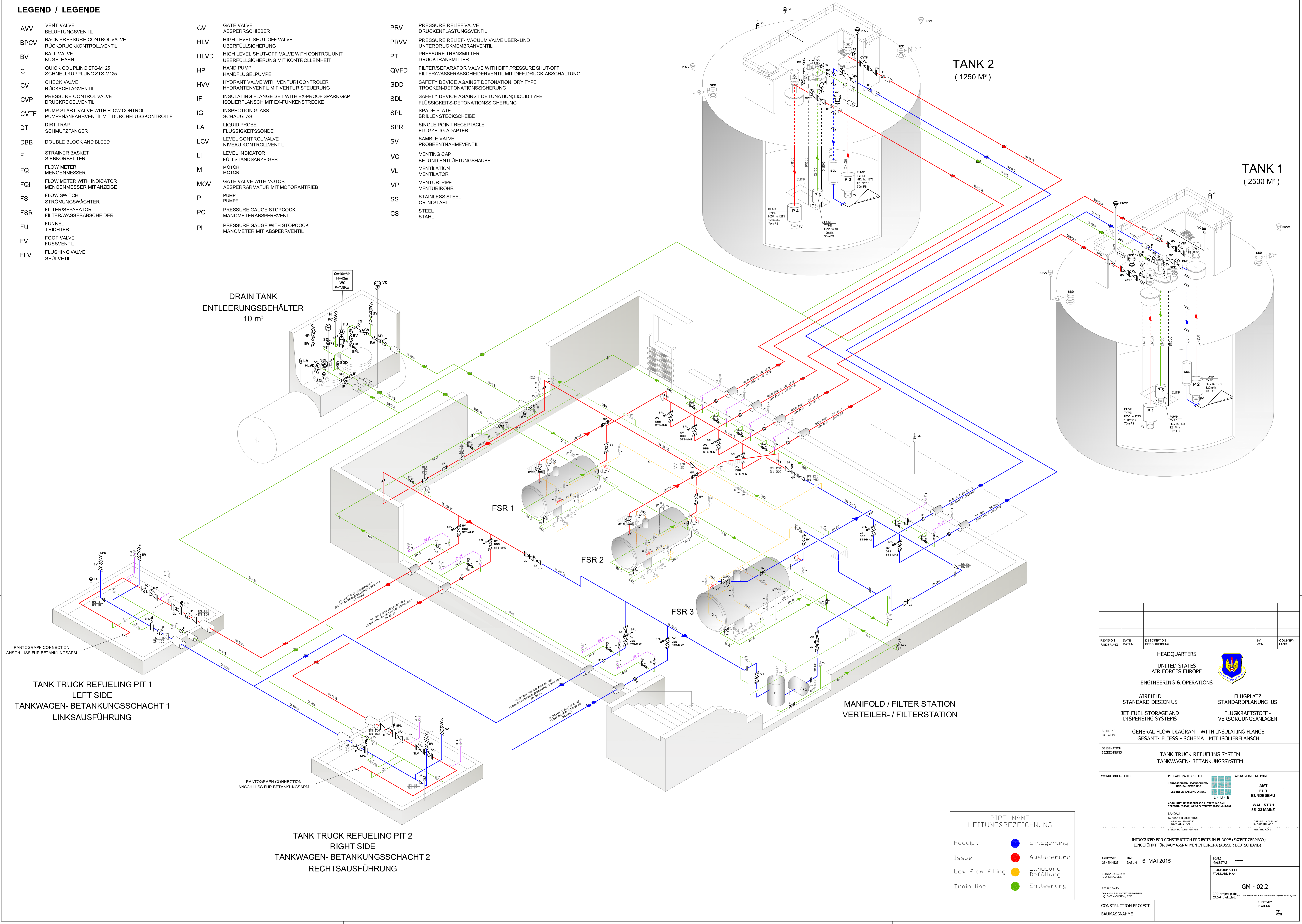
Receipt	●	Einlagerung
Issue	●	Auslagerung
Low flow filling	●	Langsame Befüllung
Drain line	●	Entleerung

REVISION	DATE	DESCRIPTION	BY	COUNTRY
ÄNDERUNG	DATUM	BESCHREIBUNG	VON	LAND
<b>HEADQUARTERS</b>				
UNITED STATES AIR FORCES EUROPE				
ENGINEERING & OPERATIONS				
AIRFIELD STANDARD DESIGN US			FLUGPLATZ STANDARDPLANUNG US	
JET FUEL STORAGE AND DISPENSING SYSTEMS			FLUGKRAFTSTOFF - VERSORGSANLAGEN	
BUILDING BAUWERK: GENERAL FLOW DIAGRAM WITH INSULATING COUPLING GESAMT- FLIESS - SCHEMA MIT ISOLIERKUPPLUNG				
DESIGNATION BEZEICHNUNG: TANK TRUCK REFUELING SYSTEM TANKWAGEN- BETANKUNGSSYSTEM				
WORKED/BEARBEITET	PREPARED/AUFGESTELLT	APPROVED/GENEHIGT		
LANDSBEREITUNGSGRUPPE UND BAUBEREICH L B B	AMT FÜR BUNDESBAU WALLSTR.1 55122 MAINZ			
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAUMASSNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED/GENEHIGT	DATE/DATUM: 6. MAI 2015	SCALE/MASSSTAB: -----		
ORIGINAL DRAWN BY/IN ORIGINAL DZG		STANDARD SHEET		
GENERAL DRAWING/GEWÄHRLEISTUNGSZEICHNUNG		CAD-PROGRAMM/PROGRAMM		
CONSTRUCTION PROJECT/BAUMASSNAHME		SHEET 443/PLATEAU	GM - 02.2	



**LEGEND / LEGENDE**

- |      |  |      |  |      |   |
|------|--|------|--|------|---|
| AVV  | VENT VALVE<br>BELÜFTUNGSVENTIL   | GV   | GATE VALVE<br>ABSPERRSCHIEBER  | PRV  | PRESSURE RELIEF VALVE<br>DRÜCKENTLASTUNGSVENTIL   |
| BPCV | BACK PRESSURE CONTROL VALVE<br>RÜCKDRUCKKONTROLLVENTIL                           | HLV  | HIGH LEVEL SHUT-OFF VALVE<br>ÜBERFÜLLSICHERUNG                                       | PRVV | PRESSURE RELIEF - VACUUM VALVE ÜBER- UND<br>UNTERDRUCKMEMBRANVENTIL   |
| BV   | BALL VALVE<br>KUGELHAHN  | HLVD | HIGH LEVEL SHUT-OFF VALVE WITH CONTROL UNIT<br>ÜBERFÜLLSICHERUNG MIT KONTROLLEINHEIT | PT   | PRESSURE TRANSMITTER<br>DRUCKTRANSMITTER  |
| C    | QUICK COUPLING STS-M125<br>SCHNELLKUPPLUNG STS-M125                              | HP   | HAND PUMP<br>HANDFLÜGELPUMPE   | QVFD | FILTER/SEPARATOR VALVE WITH DIFF.PRESSURE SHUT-OFF<br>FILTERWASSERABSCHIEDERVENTIL MIT DIFF.DRUCK-ABSCHALTUNG |
| CV   | CHECK VALVE<br>RÜCKSCHLAGVENTIL  | HVV  | HYDRANT VALVE WITH VENTURI CONTROLER<br>HYDRANTENVENTIL MIT VENTURISTEUERUNG         | SDD  | SAFETY DEVICE AGAINST DETONATION; DRY TYPE<br>TROCEN-DETONATIONSSICHERUNG                                     |
| CVP  | PRESSURE CONTROL VALVE<br>DRUCKREGELVENTIL                                       | IF   | INSULATING FLANGE SET WITH EX-PROOF SPARK GAP<br>ISOLIERFLANSCH MIT EX-FUNKENSTRECKE | SDL  | SAFETY DEVICE AGAINST DETONATION; LIQUID TYPE<br>FLÜSSIGKEITS-DETONATIONSSICHERUNG                            |
| CVTF | PUMP START VALVE WITH FLOW CONTROL<br>PUMPENANFAHRVENTIL MIT DURCHFLOSSKONTROLLE | IG   | INSPECTION GLASS<br>SCHAUGLAS  | SPL  | SPADE PLATE<br>BRILLENSTECKSCHEIBE  |
| DT   | DIRT TRAP<br>SCHMUTZFÄNGER   | LA   | LIQUID PROBE<br>FLÜSSIGKEITSSONDE  | SPR  | SINGLE POINT RECEPTACLE<br>FLUGZEUG-ADAPTER   |
| DBB  | DOUBLE BLOCK AND BLEED   | LCV  | LEVEL CONTROL VALVE<br>NIVEAU KONTROLLVENTIL   | SV   | SAMPLE VALVE<br>PROBENTNAHMEVENTIL  |
| F    | STRAINER BASKET<br>SIEBKORBFILTER  | LI   | LEVEL INDICATOR<br>FÜLLSTANDSANZEIGER  | VC   | VENTING CAP<br>BE- UND ENTLÜFTUNGSHAUBE   |
| FQ   | FLOW METER<br>MENGMESSE  | M    | MOTOR<br>MOTOR   | VL   | VENTILATOR<br>VENTILATOR  |
| FQI  | FLOW METER WITH INDICATOR<br>MENGMESSE MIT ANZEIGE                               | MOV  | GATE VALVE WITH MOTOR<br>ABSPERRARMATUR MIT MOTORANTRIEB                             | VP   | VENTURI PIPE<br>VENTURIROHR   |
| FS   | FLOW SWITCH<br>STRÖMUNGSWÄCHTER  | P    | PUMP<br>PUMPE  | SS   | STAINLESS STEEL<br>CR-NI STAHL  |
| FSR  | FILTER/SEPARATOR<br>FILTERWASSERABSCHIEDER                                       | PC   | PRESSURE GAUGE STOPCOCK<br>MANOMETERABSPERRVENTIL                                    | CS   | STEEL<br>STAHL  |
| FU   | FUNNEL<br>FRÜCHTER   | PI   | PRESSURE GAUGE WITH STOPCOCK<br>MANOMETER MIT ABSPERRVENTIL                          |      |   |
| FV   | FOOT VALVE<br>FUSSVENTIL   |      |  |      |   |
| FLV  | FLUSHING VALVE<br>SPÜLVETIL  |      |  |      |   |

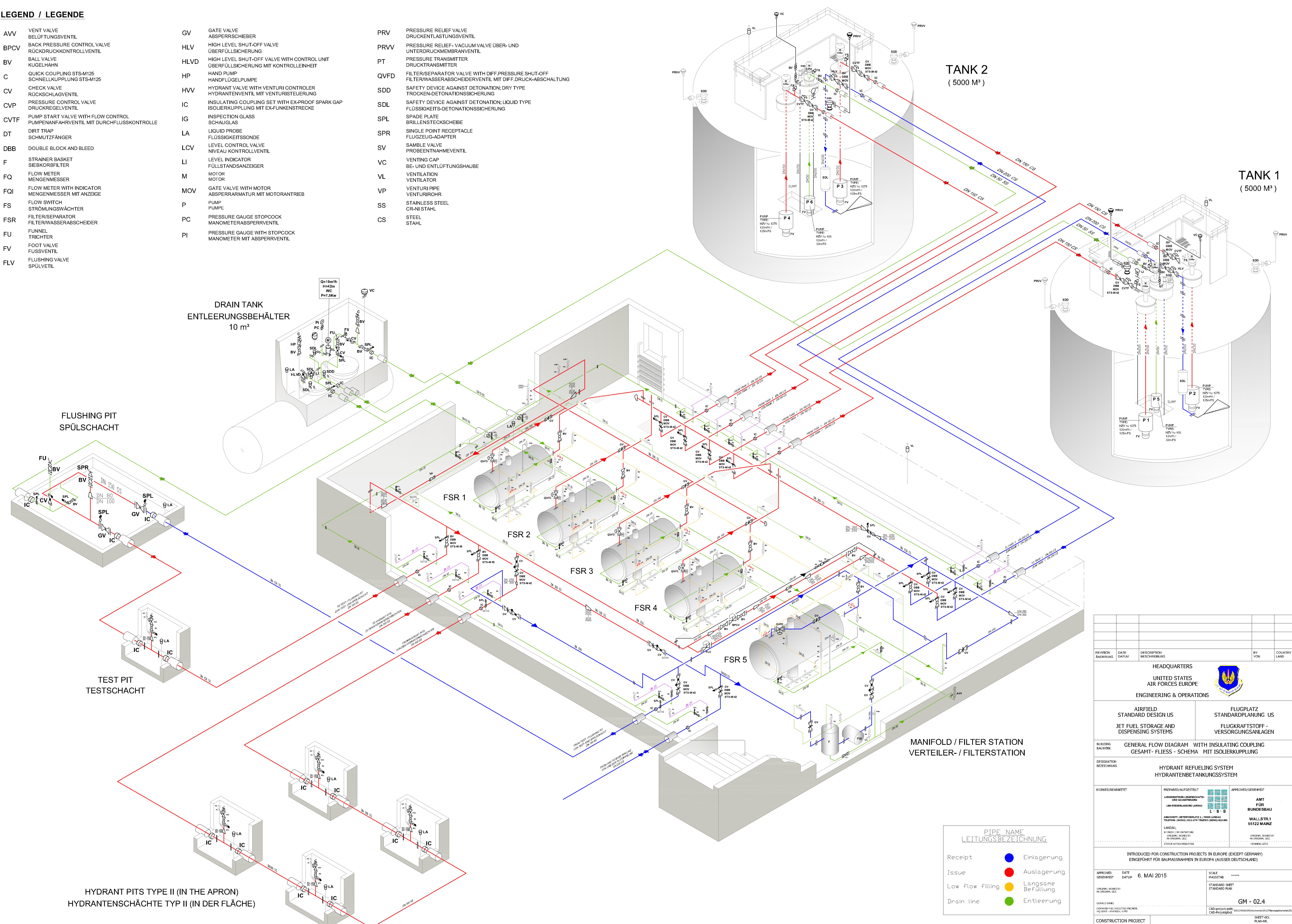


REVISION	DATE	DESCRIPTION	BY	COUNTRY
ÄNDERUNG	DATUM	BESCHREIBUNG	VON	LAND
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ENGINEERING & OPERATIONS				
AIRFIELD STANDARD DESIGN US			FLUGPLATZ STANDARDPLANUNG US	
JET FUEL STORAGE AND DISPENSING SYSTEMS			FLUGKRAFTSTOFF - VERSORGSANLAGEN	
GENERAL FLOW DIAGRAM WITH INSULATING FLANGE GESAMT-FLIESS - SCHEMA MIT ISOLIERFLANSCH				
TANK TRUCK REFUELING SYSTEM TANKWAGEN- BETANKUNGSSYSTEM				
WORKED/ARBEITET	PREPARED/AUFGESTELLT	APPROVED/GENEHIGT		
LAND/STREITKRÄFT	LAND/STREITKRÄFT	AMT		
US AIR FORCE	US AIR FORCE	FÜR		
US AIR FORCE	US AIR FORCE	BUNDESBAU		
US AIR FORCE	US AIR FORCE	WALLSTR.1		
US AIR FORCE	US AIR FORCE	55122 MAINZ		
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAU MASSNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED/GENEHIGT	DATE/DATUM	6. MAI 2015	SCALE/MASSSTAB	*****
ORIGINAL DRAWN BY/IN ORIGINAL DZG			STANDARD SHEET	
ORIGINAL DRAWN BY/IN ORIGINAL DZG			CAD-PROJ/PROJ	
CONSTRUCTION PROJECT/BAU MASSNAHME			SHEET 443	
			GM - 02.2	



**LEGEND / LEGENDE**

- |      |  |      |   |      |   |
|------|--|------|---|------|---|
| AVV  | VENT VALVE<br>BELÜFTUNGSVENTIL   | GV   | GATE VALVE<br>ABSPERRSCHIEBER   | PRV  | PRESSURE RELIEF VALVE<br>DRÜCKENTLASTUNGSVENTIL   |
| BPCV | BACK PRESSURE CONTROL VALVE<br>RÜCKDRUCKKONTROLLVENTIL                           | HLV  | HIGH LEVEL SHUT-OFF VALVE<br>ÜBERFÜLLSICHERUNG  | PRVV | PRESSURE RELIEF - VACUUM VALVE ÜBER- UND<br>UNTERDRUCKMEMBRANVENTIL   |
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| CVP  | PRESSURE CONTROL VALVE<br>DRUCKREGELVENTIL                                       | IC   | INSULATING COUPLING SET WITH EX-PROOF SPARK GAP<br>ISOLIERKUPPLUNG MIT EX-FUNKENSTRECKE | SDL  | SAFETY DEVICE AGAINST DETONATION; LIQUID TYPE<br>FLÜSSIGKEITS-DETONATIONSSICHERUNG                            |
| CVTF | PUMP START VALVE WITH FLOW CONTROL<br>PUMPENANFAHRVENTIL MIT DURCHFLOSSKONTROLLE | IG   | INSPECTION GLASS<br>SCHAUGLAS   | SPL  | SPADE PLATE<br>BRILLENSTECKSCHEIBE  |
| DT   | DIRT TRAP<br>SCHMUTZFÄNGER   | LA   | LIQUID PROBE<br>FLÜSSIGKEITSSONDE   | SPR  | SINGLE POINT RECEPTACLE<br>FLUGZEUG-ADAPTER   |
| DBB  | DOUBLE BLOCK AND BLEED   | LCV  | LEVEL CONTROL VALVE<br>NIVEAU KONTROLLVENTIL  | SV   | SAMPLE VALVE<br>PROBEENTNAHMEVENTIL   |
| F    | STRAINER BASKET<br>SIEBKORBFILTER  | LI   | LEVEL INDICATOR<br>FÜLLSTANDSANZEIGER   | VC   | VENTING CAP<br>BE- UND ENTLÜFTUNGSHAUBE   |
| FQ   | FLOW METER<br>MENGENMESSER   | M    | MOTOR   | VL   | VENTILATOR<br>VENTILATOR  |
| FQI  | FLOW METER WITH INDICATOR<br>MENGENMESSER MIT ANZEIGE                            | MOV  | GATE VALVE WITH MOTOR<br>ABSPERRARMATUR MIT MOTORANTRIEB                                | VP   | VENTURI PIPE<br>VENTURIROHR   |
| FS   | FLOW SWITCH<br>STRÖMUNGSWÄCHTER  | P    | PUMP<br>PUMPE   | SS   | STAINLESS STEEL<br>CR-NI STAHL  |
| FSR  | FILTER/SEPARATOR<br>FILTERWASSERABSCHIEDER                                       | PC   | PRESSURE GAUGE STOPCOCK<br>MANOMETERABSPERRVENTIL                                       | CS   | STEEL<br>STAHL  |
| FU   | FUNNEL<br>FRÜCHTER   | PI   | PRESSURE GAUGE WITH STOPCOCK<br>MANOMETER MIT ABSPERRVENTIL                             |      |   |
| FV   | FOOT VALVE<br>FUSSVENTIL   |      |   |      |   |
| FLV  | FLUSHING VALVE<br>SPÜLVENTIL   |      |   |      |   |



**PIPE NAME  
LEITUNGSBEZEICHNUNG**

Receipt	●	Einlagerung
Issue	●	Langsame Befüllung
Low flow filling	●	Langsame Befüllung
Drain line	●	Entleerung

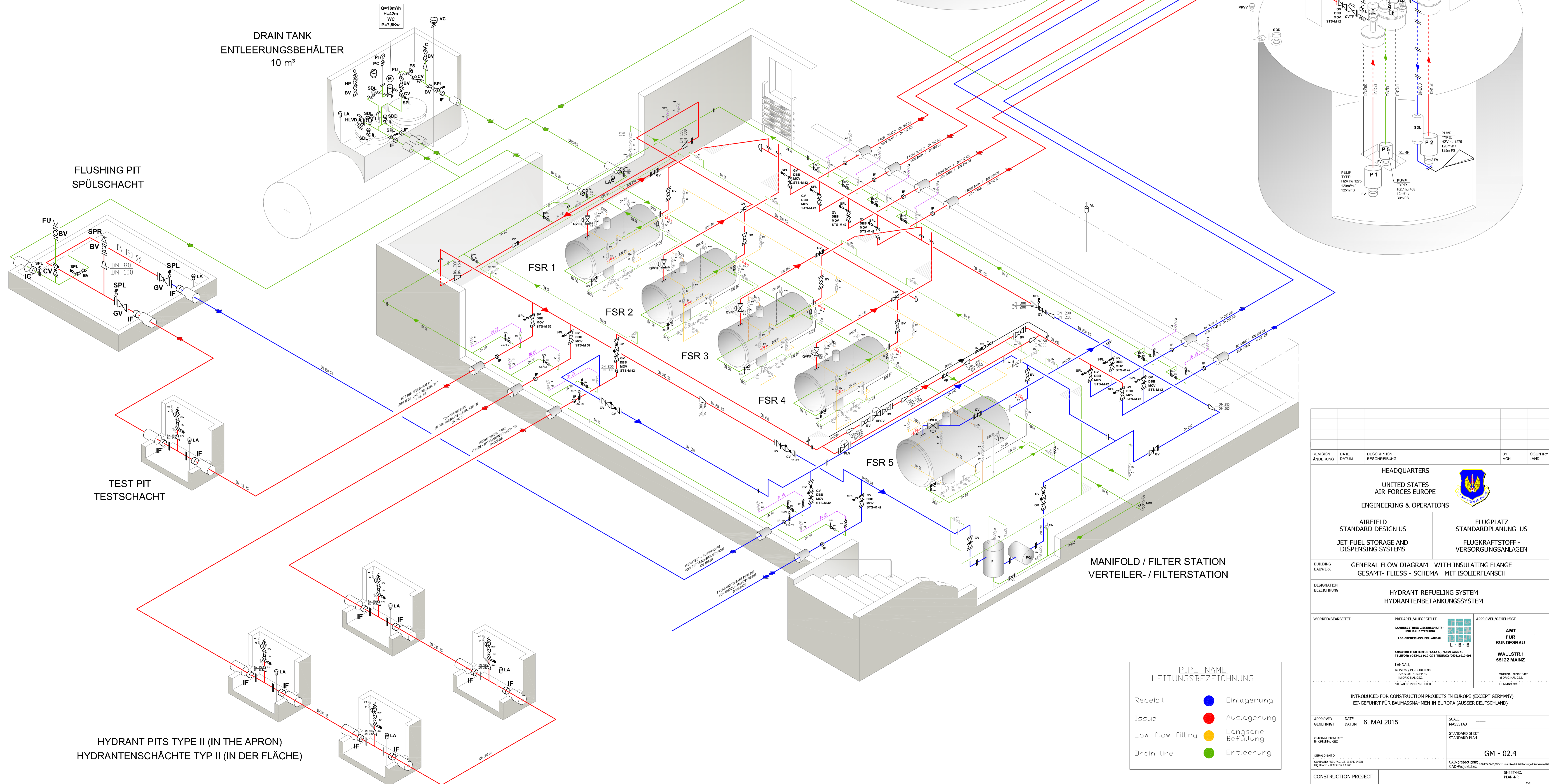
REVISION	DATE	DESCRIPTION	BY	COUNTRY
ÄNDERUNG	DATUM	BESCHREIBUNG	VON	LAND
<b>HEADQUARTERS</b>				
UNITED STATES AIR FORCES EUROPE				
ENGINEERING & OPERATIONS				
AIRFIELD STANDARD DESIGN US			FLUGPLATZ STANDARDPLANUNG US	
JET FUEL STORAGE AND DISPENSING SYSTEMS			FLUGKRAFTSTOFF - VERSORGSANLAGEN	
BUILDING BAUWERK GENERAL FLOW DIAGRAM WITH INSULATING COUPLING GESAMT- FLIESS - SCHEMA MIT ISOLIERKUPPLUNG				
DESIGNATION BEZEICHNUNG HYDRANT REFUELING SYSTEM HYDRANTENBETANKUNGSSYSTEM				
WORKED/ARBEITET		PREPARED/AUFGESTELLT	APPROVED/GENEHIGT	
LANDSCHAFTS- UND BAUEINGENIEUR		LANDSCHAFTS- UND BAUEINGENIEUR	AMT FÜR BUNDESBAU	
L 8 B		WALLSTR.1 55122 MAINZ		
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAU MASSNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED/GENEHIGT	DATE/DATUM	6. MAI 2015	SCALE/MASSSTAB	-----
ORIGINAL DESIGNED BY/IN ORIGINALE GEZ.	STANDARD SHEET/STANDARD BLATT			GM - 02.4
CONSTRUCTION PROJECT/BAU MASSNAHME	SHEET 403/BLATT 403			OF 404



**LEGEND / LEGENDE**

- |      |  |      |  |
|------|--|------|--|
| AVV  | VENT VALVE<br>BELÜFTUNGSVENTIL   | GV   | GATE VALVE<br>ABSPERRSCHIEBER  |
| BPCV | BACK PRESSURE CONTROL VALVE<br>RÜCKDRUCKKONTROLLVENTIL                           | HLV  | HIGH LEVEL SHUT-OFF VALVE<br>ÜBERFÜLLSICHERUNG                                       |
| BV   | BALL VALVE<br>KUGELHAHN  | HLVD | HIGH LEVEL SHUT-OFF VALVE WITH CONTROL UNIT<br>ÜBERFÜLLSICHERUNG MIT KONTROLLEINHEIT |
| C    | QUICK COUPLING STS-M125<br>SCHNELLKUPPLUNG STS-M125                              | HP   | HAND PUMP<br>HANDFLÜGELPUMPE   |
| CV   | CHECK VALVE<br>RÜCKSCHLAGVENTIL  | HVV  | HYDRANT VALVE WITH VENTURI CONTROLLER<br>HYDRANTENVENTIL MIT VENTURISTEUERUNG        |
| CVP  | PRESSURE CONTROL VALVE<br>DRUCKREGELVENTIL                                       | IF   | INSULATING FLANGE SET WITH EX-PROOF SPARK GAP<br>ISOLIERFLANSCH MIT EX-FUNKENSTRECKE |
| CVTF | PUMP START VALVE WITH FLOW CONTROL<br>PUMPENANFAHRVENTIL MIT DURCHFLOSSKONTROLLE | IG   | INSPECTION GLASS<br>SCHAUGLAS  |
| DT   | DIRT TRAP<br>SCHMUTZFÄNGER   | LA   | LIQUID PROBE<br>FLÜSSIGKEITSSONDE  |
| DBB  | DOUBLE BLOCK AND BLEED   | LCV  | LEVEL CONTROL VALVE<br>NIVEAU KONTROLLVENTIL   |
| F    | STRAINER BASKET<br>SIEBKORBFILTER  | LI   | LEVEL INDICATOR<br>FÜLLSTANDSANZEIGER  |
| FQ   | FLOW METER<br>MENGENMESSER   | M    | MOTOR<br>MOTOR   |
| FQI  | FLOW METER WITH INDICATOR<br>MENGENMESSER MIT ANZEIGE                            | MOV  | GATE VALVE WITH MOTOR<br>ABSPERRARMATUR MIT MOTORANTRIEB                             |
| FS   | FLOW SWITCH<br>STRÖMUNGSWÄCHTER  | P    | PUMP<br>PUMPE  |
| FSR  | FILTER/SEPARATOR<br>FILTERWASSERABSCHIEDER                                       | PC   | PRESSURE GAUGE STOPCOCK<br>MANOMETERABSPERRVENTIL                                    |
| FU   | FUNNEL<br>TRICHTER   | PI   | PRESSURE GAUGE WITH STOPCOCK<br>MANOMETER MIT ABSPERRVENTIL                          |
| FV   | FOOT VALVE<br>FUSSVENTIL   |      |  |
| FLV  | FLUSHING VALVE<br>SPÜLVENTIL   |      |  |

- |      |   |
|------|---|
| PRV  | PRESSURE RELIEF VALVE<br>DRÜCKENTLASTUNGSVENTIL   |
| PRVV | PRESSURE RELIEF - VACUUM VALVE ÜBER- UND<br>UNTERDRUCKMEMBRANVENTIL   |
| PT   | PRESSURE TRANSMITTER<br>DRUCKTRANSMITTER  |
| QVFD | FILTER/SEPARATOR VALVE WITH DIFF.PRESSURE SHUT-OFF<br>FILTERWASSERABSCHIEDERVENTIL MIT DIFF.DRUCK-ABSCHALTUNG |
| SDD  | SAFETY DEVICE AGAINST DETONATION; DRY TYPE<br>TROCKEN-DETONATIONSSICHERUNG                                    |
| SDL  | SAFETY DEVICE AGAINST DETONATION; LIQUID TYPE<br>FLÜSSIGKEITS-DETONATIONSSICHERUNG                            |
| SPL  | SPADE PLATE<br>BRILLENSTECKSCHEIBE  |
| SPR  | SINGLE POINT RECEPTACLE<br>FLUGZEUG-ADAPTER   |
| SV   | SAMPLE VALVE<br>PROBEENTNAHMEVENTIL   |
| VC   | VENTING CAP<br>BE- UND ENTLÜFTUNGSHAUBE   |
| VL   | VENTILATION<br>VENTILATOR   |
| VP   | VENTURI PIPE<br>VENTURIROHR   |
| SS   | STAINLESS STEEL<br>CR-NI STAHL  |
| CS   | STEEL<br>STAHL  |



**PIPE NAME  
LEITUNGSBEZEICHNUNG**

Receipt	● Einlagerung
Issue	● Auslagerung
Low flow filling	● Langsame Befüllung
Drain line	● Entleerung

REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
<b>HEADQUARTERS</b>				
UNITED STATES AIR FORCES EUROPE				
ENGINEERING & OPERATIONS				
AIRFIELD STANDARD DESIGN US		FLUGPLATZ STANDARDPLANUNG US		
JET FUEL STORAGE AND DISPENSING SYSTEMS		FLUGKRAFTSTOFF - VERSORGENGSANLAGEN		
BUILDING BAUWERK	GENERAL FLOW DIAGRAM WITH INSULATING FLANGE GESAMT- FLEISS - SCHEMA MIT ISOLIERFLANSCH			
DESIGNATION BEZEICHNUNG	HYDRANT REFUELING SYSTEM HYDRANTENBETANKUNGSSYSTEM			
WORKED/ARBEITET			APPROVED/GENEHIGT	
	LANDWEHRBRIGADE 100 1ST AIR FORCE SQUADRON 1ST AIR FORCE SQUADRON 1ST AIR FORCE SQUADRON		AMT FÜR BUNDESBAU WALLSTR.1 55122 MAINZ	
	INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAU MASSNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)			
APPROVED GENEHIGT	DATE DATUM	6. MAI 2015	SCALE MASSSTAB	*****
ORIGINAL DRAWN BY IN ORIGINAL DED.			STANDARD SHEET STANDARD PLAN	GM - 02.4
CONSTRUCTION PROJECT BAU MASSNAHME				SHEET 40. PLATE 40. OF 501



# OPERATING TANK 5000m<sup>3</sup> FLACHBODENTANK 5000m<sup>3</sup>

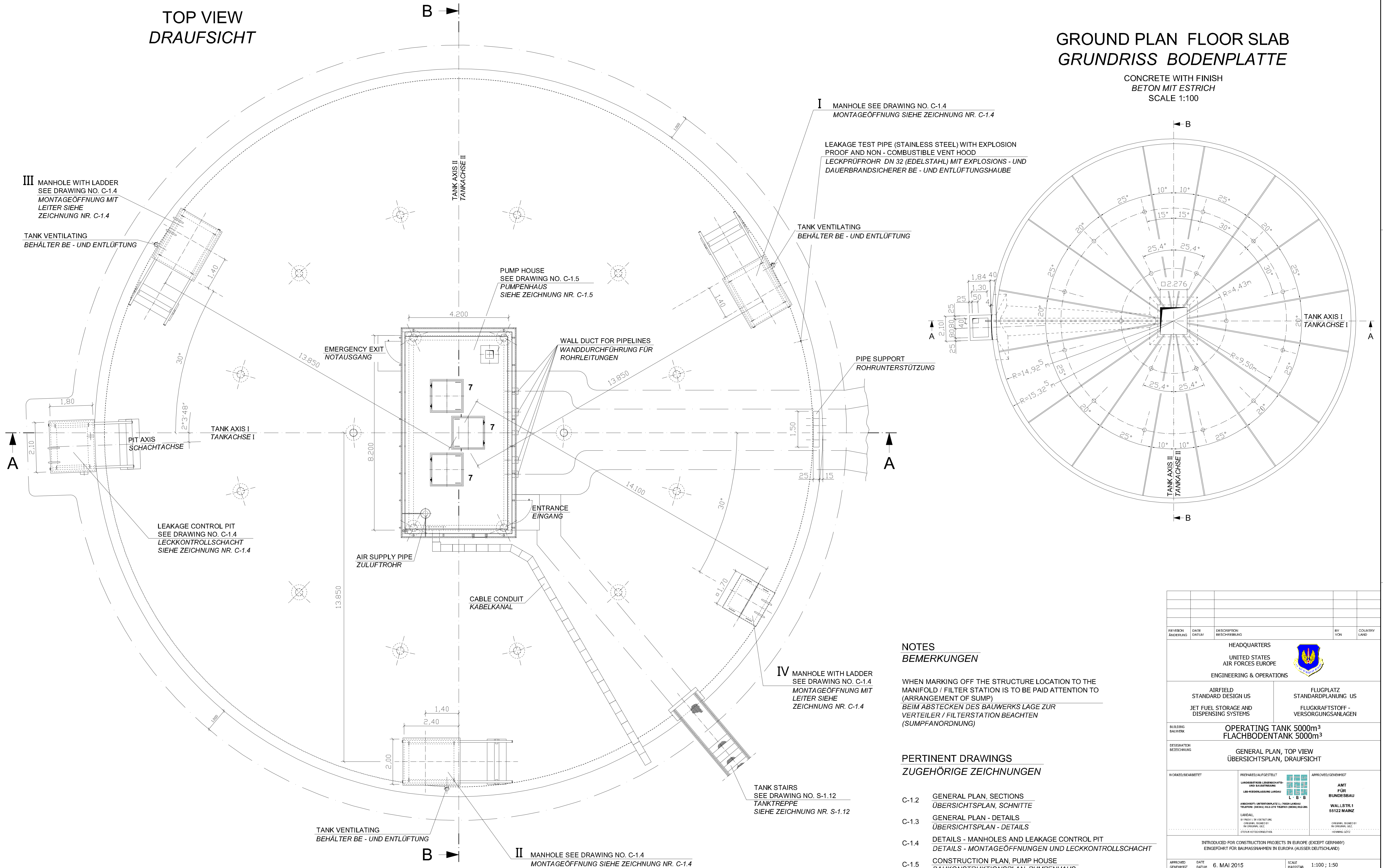
# 1

- C-1.1** GENERAL PLAN, TOP VIEW  
*ÜBERSICHTSPLAN, DRAUFSICHT*
- C-1.2** GENERAL PLAN, SECTIONS  
*ÜBERSICHTSPLAN, SCHNITTE*
- C-1.3** GENERAL PLAN, DETAILS  
*ÜBERSICHTSPLAN, DETAILS*
- C-1.3.1** GENERAL PLAN, DETAILS  
*ÜBERSICHTSPLAN, DETAILS*
- C-1.3.2** HINGED COVER  
*KLAPPDECKEL*
- C-1.4** DETAILS-MANHOLES AND LEAKAGE CONTROL PIT  
*DETAILS-MONTAGEÖFFNUNGEN UND LECKKONTROLLSCHACHT*
- C-1.5** CONSTRUCTION PLAN, PUMP HOUSE  
*BAUKONSTRUKTIONSPLAN, PUMPENHAUS*
- C-1.6** FORMWORK PLAN, PUMP HOUSE, ROOF AND WALLS  
*SCHALPLAN, PUMPENHAUS, DECKE UND WÄNDE*
- C-1.7** FORMWORK PLAN, PUMP HOUSE, SLAB AND WALL  
*SCHALPLAN, PUMPENHAUS, BODENPLATTE UND WAND*
- C-1.8** FORMWORK PLAN, ROOF SLAB  
*SCHALPLAN, DECKENPLATTE*
- C-1.9** FORMWORK PLAN, DETAILS ROOF- AND FLOOR SLAB  
*SCHALPLAN, DETAILS DECKEN- UND BODENPLATTE*
- S-1.1** COVERS, MANHOLES AND LEAKAGE CONTROL PIT  
*ABDECKUNGEN, FÜR MONTAGEÖFFNUNGEN UND LECKKONTROLLSCHACHT*
- S-1.2** LOWER REIMFORCEMENT FLOOR SLAB  
*UNTERE BEWEHRUNG BODENPLATTE*
- S-1.3** UPPER REIMFORCEMENT FLOOR SLAB  
*OBERE BEWEHRUNG BODENPLATTE*
- S-1.4** REINFORCEMENT LEAKAGE CONTROL PIT  
*BEWEHRUNG LECKKONTROLLSCHACHT*
- S-1.5** REINFORCEMENT TANK WALL  
*BEWEHRUNG TANKWAND*
- S-1.6** LOWER REIMFORCEMENT ROOF SLAB  
*UNTERE BEWEHRUNG DECKENPLATTE*
- S-1.7** UPPER REIMFORCEMENT ROOF SLAB  
*OBERE BEWEHRUNG DECKENPLATTE*
- S-1.8** REINFORCEMENT PUMP HOUSE WALLS  
*BEWEHRUNG PUMPENHAUSWÄNDE*
- S-1.9** REINFORCEMENT PUMP HOUSE ROOF SLAB  
*BEWEHRUNG PUMPENHAUSDECKE*
- S-1.10** STEEL TANK  
*STAHLTANK*
- S-1.11** DETAILS, STEEL TANK  
*DETAILS, STAHLTANK*
- S-1.12** TANK STAIRS AND SPLINTER PROTECTION DOORS  
*TANKTREPPE UND SPLITTERSCHUTZTÜREN*
- M-1.1** MECHANICAL INSTALLATION  
*MASCHINENTECHNISCH INSTALLATION*
- M-1.2** MECH. INSTALL. LEAKAGE CONTROL PIT AND DETAILS  
*MASCH. INSTALL. LECKKONTROLLSCHACHT U. DETAILS*
- E-1.1** GROUNDING- AND LIGHTNING PROTECTION PLAN  
*ERDUNGS- UND BLITZSCHUTZPLAN*
- E-1.2** ELEC. INSTALL. PUMP HOUSE A. LEAKAGE CONTROL PIT  
*ELEK. INST. PUMPENHAUS U. LECKKONTROLLSCHACHT*
- E-1.3** ELEC. DIAGRAMS PUMP HOUSE A. LEAKAGE CONTROL PIT  
*SCHALTPLÄNE PUMPENHAUS U. LECKKONTROLLSCHACHT*

TOP VIEW  
DRAUFSICHT

GROUND PLAN FLOOR SLAB  
GRUNDRISS BODENPLATTE

CONCRETE WITH FINISH  
BETON MIT ESTRICH  
SCALE 1:100



NOTES  
BEMERKUNGEN

WHEN MARKING OFF THE STRUCTURE LOCATION TO THE MANIFOLD / FILTER STATION IS TO BE PAID ATTENTION TO (ARRANGEMENT OF SUMP)  
BEIM ABSTECKEN DES BAUWERKS LAGE ZUR VERTEILER / FILTERSTATION BEACHTEN (SUMPANORDNUNG)

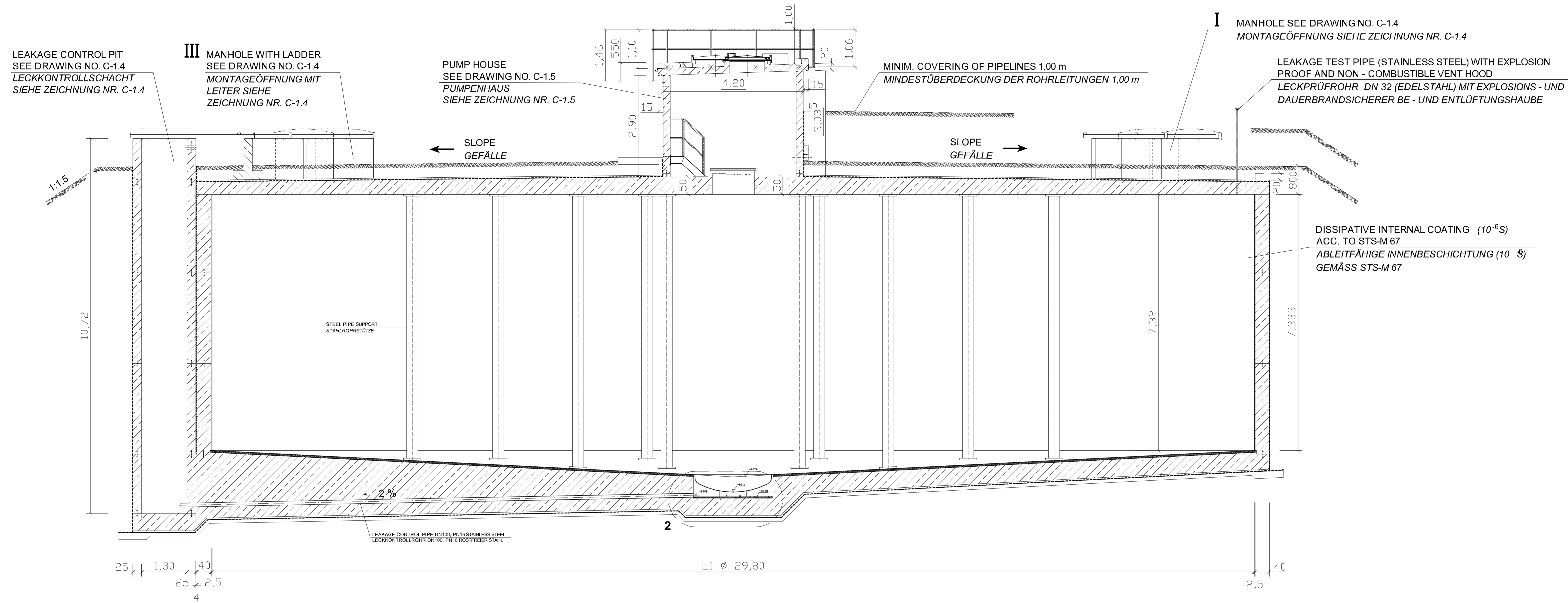
PERTINENT DRAWINGS  
ZUGEHÖRIGE ZEICHNUNGEN

- C-1.2 GENERAL PLAN, SECTIONS  
ÜBERSICHTSPLAN, SCHNITTE
- C-1.3 GENERAL PLAN - DETAILS  
ÜBERSICHTSPLAN - DETAILS
- C-1.4 DETAILS - MANHOLES AND LEAKAGE CONTROL PIT  
DETAILS - MONTAGEÖFFNUNGEN UND LECKKONTROLLSCHACHT
- C-1.5 CONSTRUCTION PLAN, PUMP HOUSE  
BAUKONSTRUKTIONSPLAN, PUMPENHAUS
- S-1.12 TANK STAIRS AND SPLINTER PROTECTION DOOR  
TANKTREPPE UND SPLITTERSCHUTZTÜR

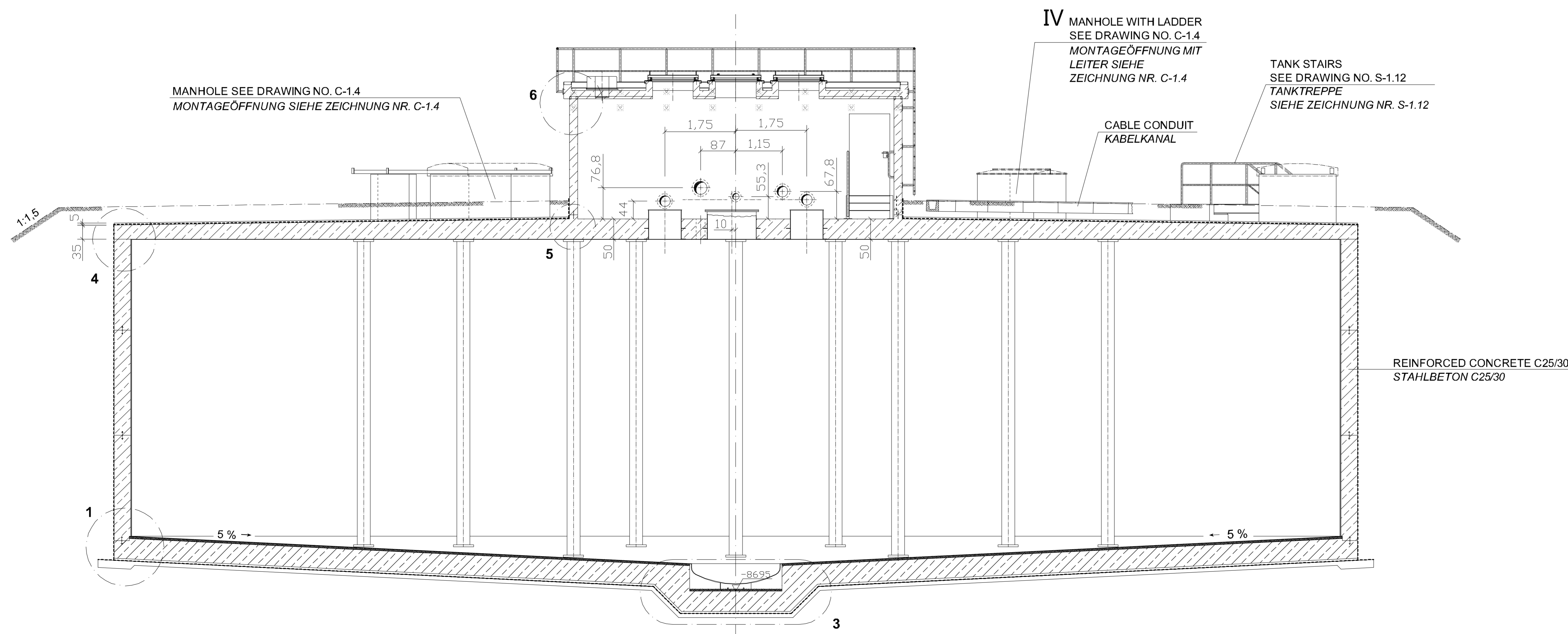
REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
HEADQUARTERS UNITED STATES AIR FORCES EUROPE				
ENGINEERING & OPERATIONS				
AIRFIELD STANDARD DESIGN US		FLUGPLATZ STANDARDPLANUNG US		
JET FUEL STORAGE AND DISPENSING SYSTEMS		FLUGKRAFTSTOFF - VERSORGUNGSANLAGEN		
BUILDING BAUWERK				
OPERATING TANK 5000m <sup>3</sup> FLACHBODENTANK 5000m <sup>3</sup>				
DESIGNATOR BEZEICHNUNG				
GENERAL PLAN, TOP VIEW ÜBERSICHTSPLAN, DRAUFSICHT				
WORKED/BEARBEITET		PREPARED/HERGESTELLT		APPROVED/GENEHMIGT
LANDSCHAFTS- UND BAUWERKE L B B		AMT FÜR BUNDESBAU WALLSTR.1 55122 MAINZ		
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAU MASSNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED GENEHMIGT	DATE DATUM	6. MAI 2015		SCALE MASSSTAB
				1:100 ; 1:50
ORIGINAL SIGNED BY IN ORIGINAL DED.		STANDARD SHEET STANDARD PLAN		
				C - 1.1
CONSTRUCTION PROJECT BAU MASSNAHME				SHEET NO. PLATZNR.
				OF VON



# SECTION A - A SCHNITT A - A



# SECTION B - B SCHNITT B - B



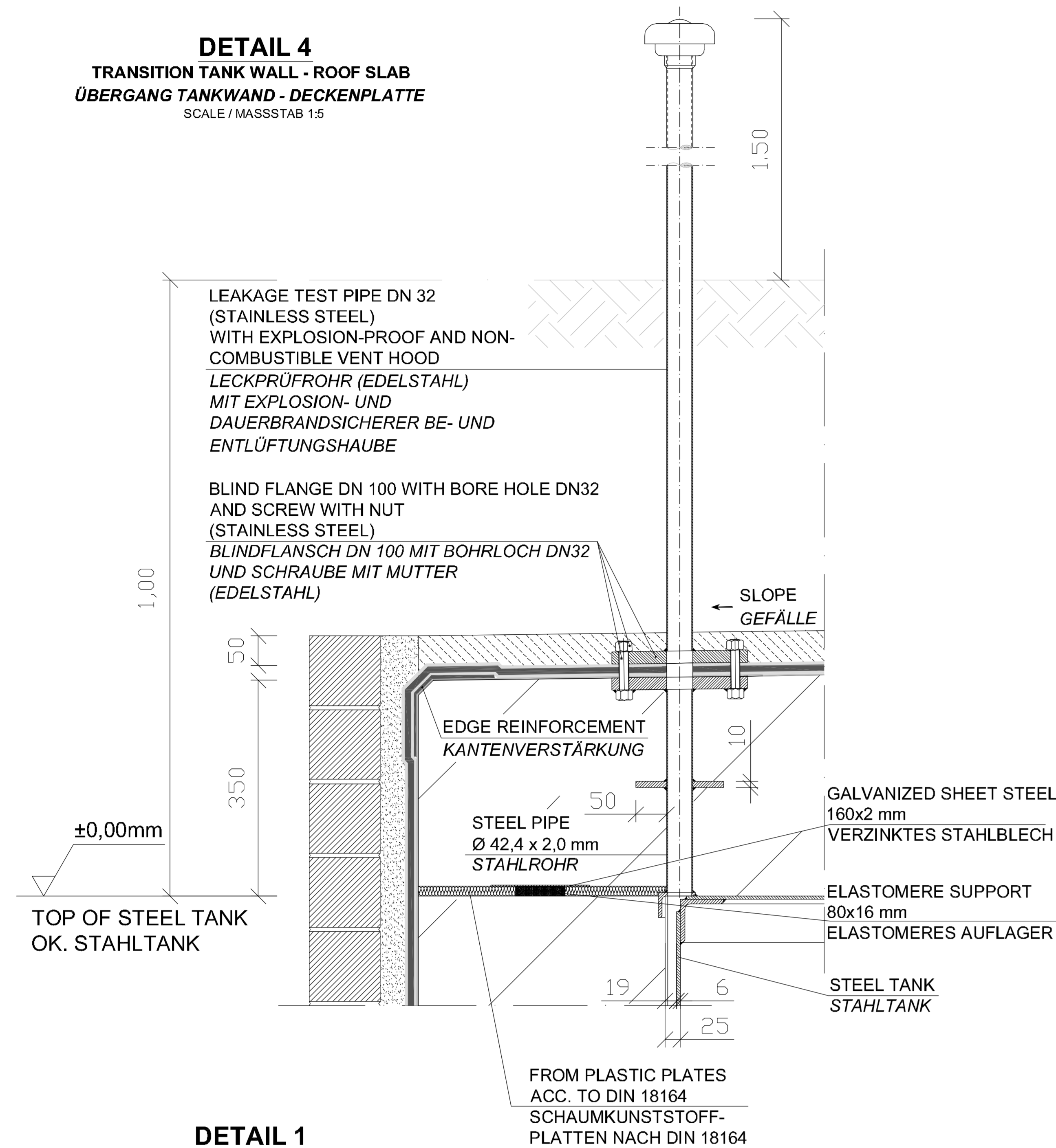
## PERTINENT DRAWINGS ZUGEHÖRIGE ZEICHNUNGEN

- C-1.1 GENERAL PLAN, TOP VIEW  
ÜBERSICHTSPLAN, DRAUFSICHT
- C-1.3 GENERAL PLAN - DETAILS  
ÜBERSICHTSPLAN - DETAILS
- C-1.3.1 HINGED COVER  
KLAPPDECKEL
- C-1.4 DETAILS - MANHOLES AND LEAKAGE CONTROL PIT  
DETAILS - MONTAGEÖFFNUNGEN UND LECKKONTROLLSCHACHT
- C-1.5 CONSTRUCTION PLAN, PUMP HOUSE  
BAUKONSTRUKTIONSPLAN, PUMPENHAUS
- S-1.1 COVERS, MANHOLES AND LEAKAGE CONTROL PIT  
ABDECKUNGEN FÜR MONTAGEÖFFNUNGEN UND LECKKONTROLLSCHACHT
- S-1.12 TANK STAIRS AND SPLINTER PROTECTION DOOR  
TANKTREPPE UND SPLITTERSCHÜTTUR

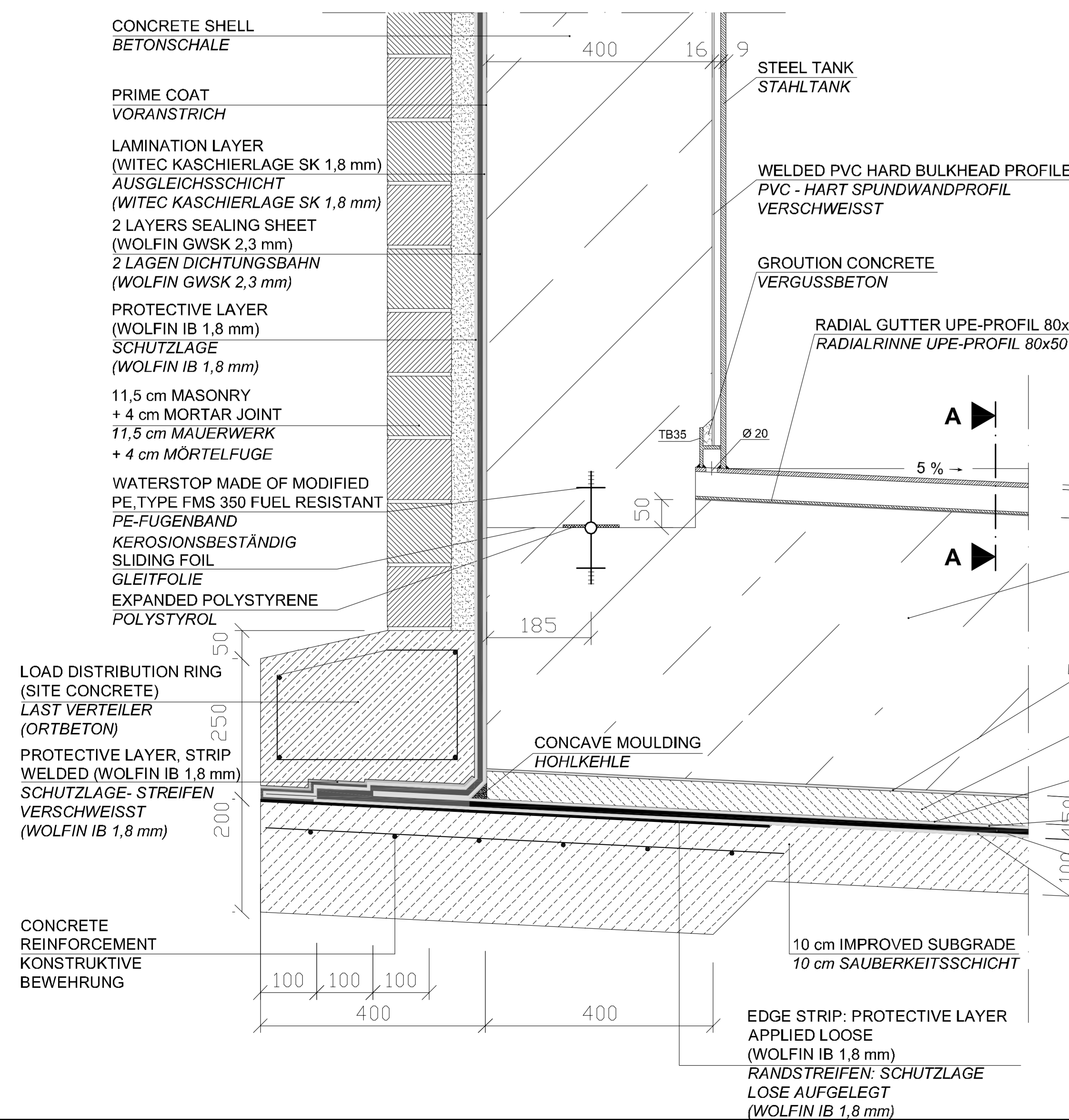
REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
<b>HEADQUARTERS</b> UNITED STATES AIR FORCES EUROPE ENGINEERING & OPERATIONS				
AIRFIELD STANDARD DESIGN US JET FUEL STORAGE AND DISPENSING SYSTEMS		FLUGPLATZ STANDARDPLANUNG US FLUGKRAFTSTOFF - VERSORGNUNGSANLAGEN		
<b>BUILDING BAUWERK</b> OPERATING TANK 5000m <sup>3</sup> FLACHBODENTANK 5000m <sup>3</sup>				
<b>DESIGNATOR BEZEICHNUNG</b> GENERAL PLAN, SECTIONS ÜBERSICHTSPLAN, SCHNITTE				
<b>WORKED/BEARBEITET</b> LANDESBÜRO LIEBIGSCHAFTS- UND BAUVERBUND LANDESBÜRO LIEBIGSCHAFTS- UND BAUVERBUND ANSCHLIESST: UNTERSTADTSTR. 1, 70401 LANGEN TELEFON: 07141 56122 FAX: 07141 56122 E-MAIL: <a href="mailto:info@liebig.de">info@liebig.de</a> INTERNET: <a href="http://www.liebig.de">www.liebig.de</a>		<b>APPROVED/GENEHMIGT</b> AMT FÜR BUNDESBAU WALLSTR. 1 55122 MAINZ		
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAUHAUPTNÄHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
<b>APPROVED GENEHMIGT</b>	<b>DATE DATUM</b> 6. MAI 2015	<b>SCALE MASSSTAB</b> 1:50		
<b>ORIGINAL DRAWN BY IN ORIGINAL DED.</b>	<b>STANDARD SHEET STANDARD PLAN</b>			
<b>DESIGNER/BAU CONTRAKT FÜR FACILITIES ENGINEER IN ORIGINAL DED.</b>	<b>CAD-PROJECT PERS. CAD-PROJEKTE</b>			<b>C - 1.2</b>
<b>CONSTRUCTION PROJECT BAUHAUPTNÄHME</b>				<b>SHEET NO. PLATZNR.</b>



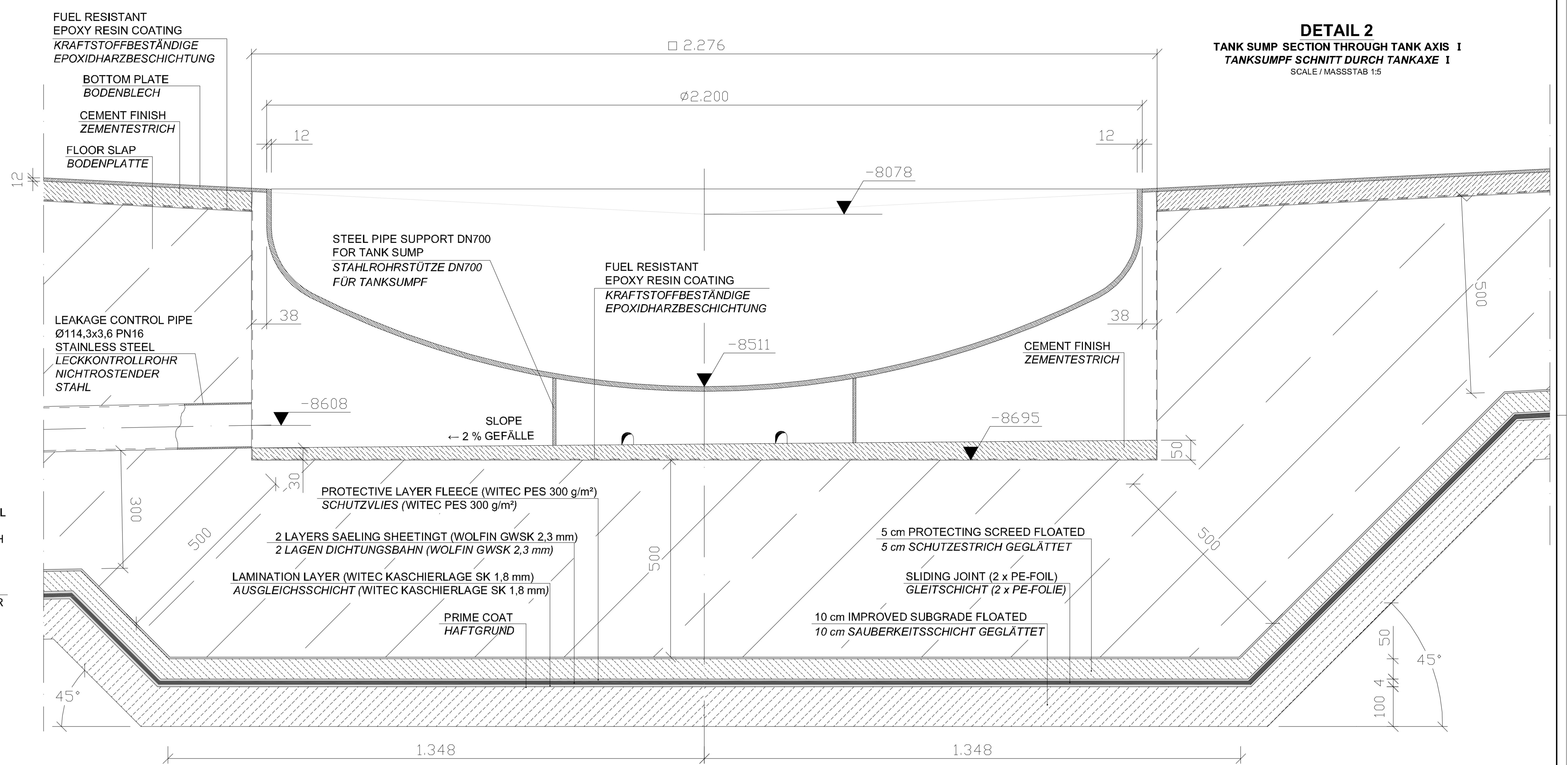
**DETAIL 4**  
**TRANSITION TANK WALL - ROOF SLAB**  
**ÜBERGANG TANKWAND - DECKENPLATTE**  
 SCALE / MASSSTAB 1:5



**DETAIL 1**  
**TRANSITION TANK WALL - FLOOR SLAB**  
**ÜBERGANG TANKWAND - BODENPLATTE**  
 SCALE / MASSSTAB 1:5



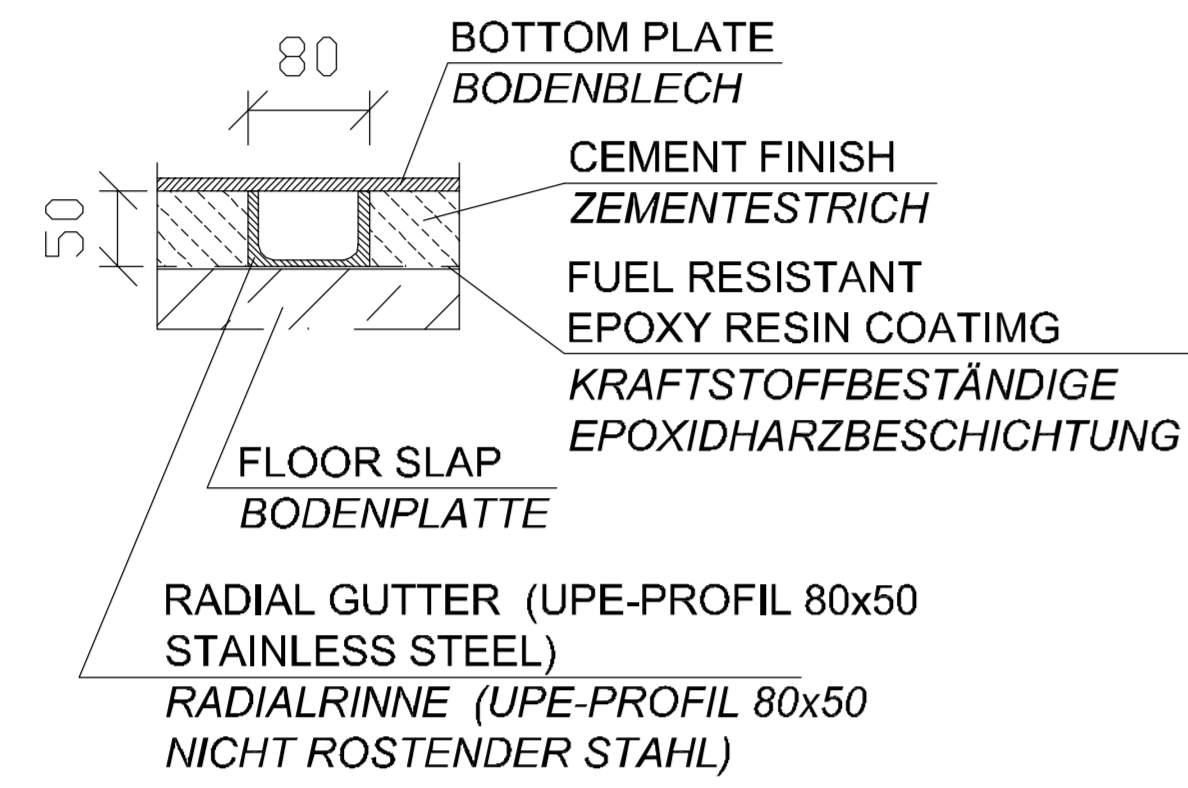
**DETAIL 2**  
**TANK SUMP SECTION THROUGH TANK AXIS 1**  
**TANKSUMPF SCHNITT DURCH TANKAXE 1**  
 SCALE / MASSSTAB 1:5



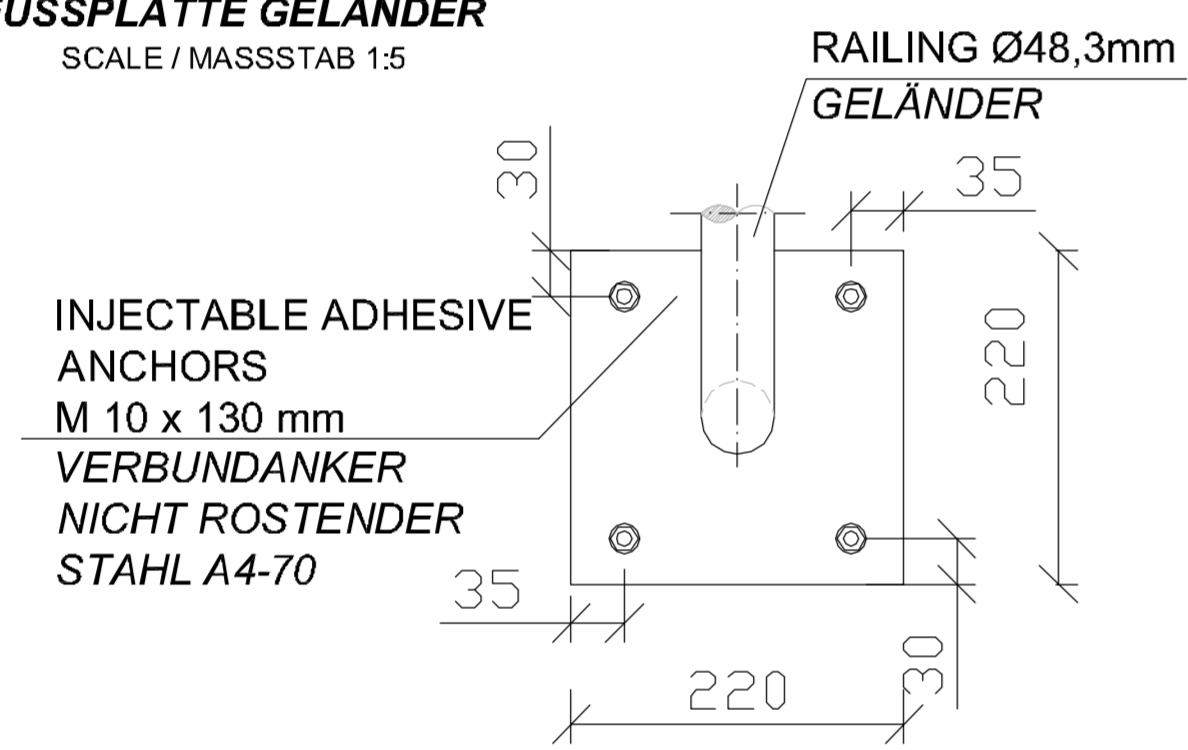
REVISION	DATE	DESCRIPTION	BY	COUNTRY
ÄNDERUNG	DATUM	BESCHREIBUNG	VON	LAND
<b>HEADQUARTERS</b>				
UNITED STATES AIR FORCES EUROPE				
ENGINEERING & OPERATIONS				
AIRFIELD STANDARD DESIGN US			FLUGPLATZ STANDARDPLANUNG US	
JET FUEL STORAGE AND DISPENSING SYSTEMS			FLUGKRAFTSTOFF - VERSORGSANLAGEN	
<b>OPERATING TANK 5000m<sup>3</sup></b>				
<b>FLACHBODENTANK 5000m<sup>3</sup></b>				
<b>GENERAL PLAN , DETAILS</b>				
<b>ÜBERSICHTSPAN , DETAILS</b>				
WORKED/BEARBEITET	PREPARED/AUFGESTELLT	APPROVED/GENEHIGT		
LANDING/FLUGPLATZ UND BAUBEREICH	LANDING/FLUGPLATZ UND BAUBEREICH	AMT FÜR BUNDESBAU		
LANDING/FLUGPLATZ UND BAUBEREICH	LANDING/FLUGPLATZ UND BAUBEREICH	WALLSTR.1 55122 MAINZ		
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY)				
EINGEFÜHRT FÜR BAU MASSNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED/GENEHIGT	DATE/DATUM	6. MAI 2015	SCALE/MASSSTAB	1:50
ORIGINAL DRAWN BY/IN ORIGINAL DZ			STANDARD SHEET/STANDARD PLAN	
GENERAL/BAU			CAD-PROJECT PATH/	C - 1.3
CONSTRUCTION PROJECT/BAU MASSNAHME			SHEET NO./PLATEAU	OF/



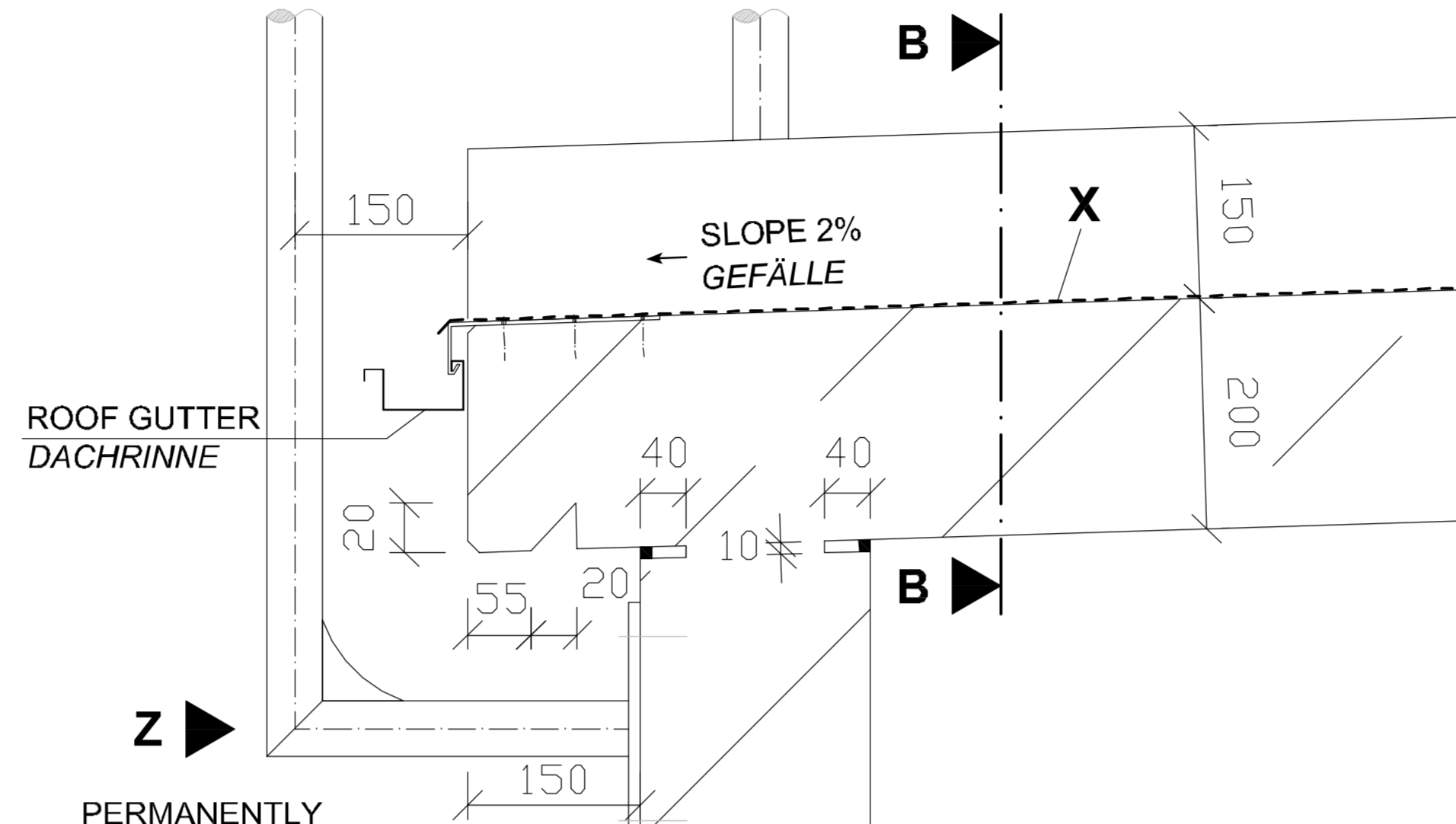
**SECTION A - A**  
**SCHNITT A - A**  
**RADIAL GUTTER**  
**RADIALRINNE**  
 SCALE / MASSSTAB 1:5



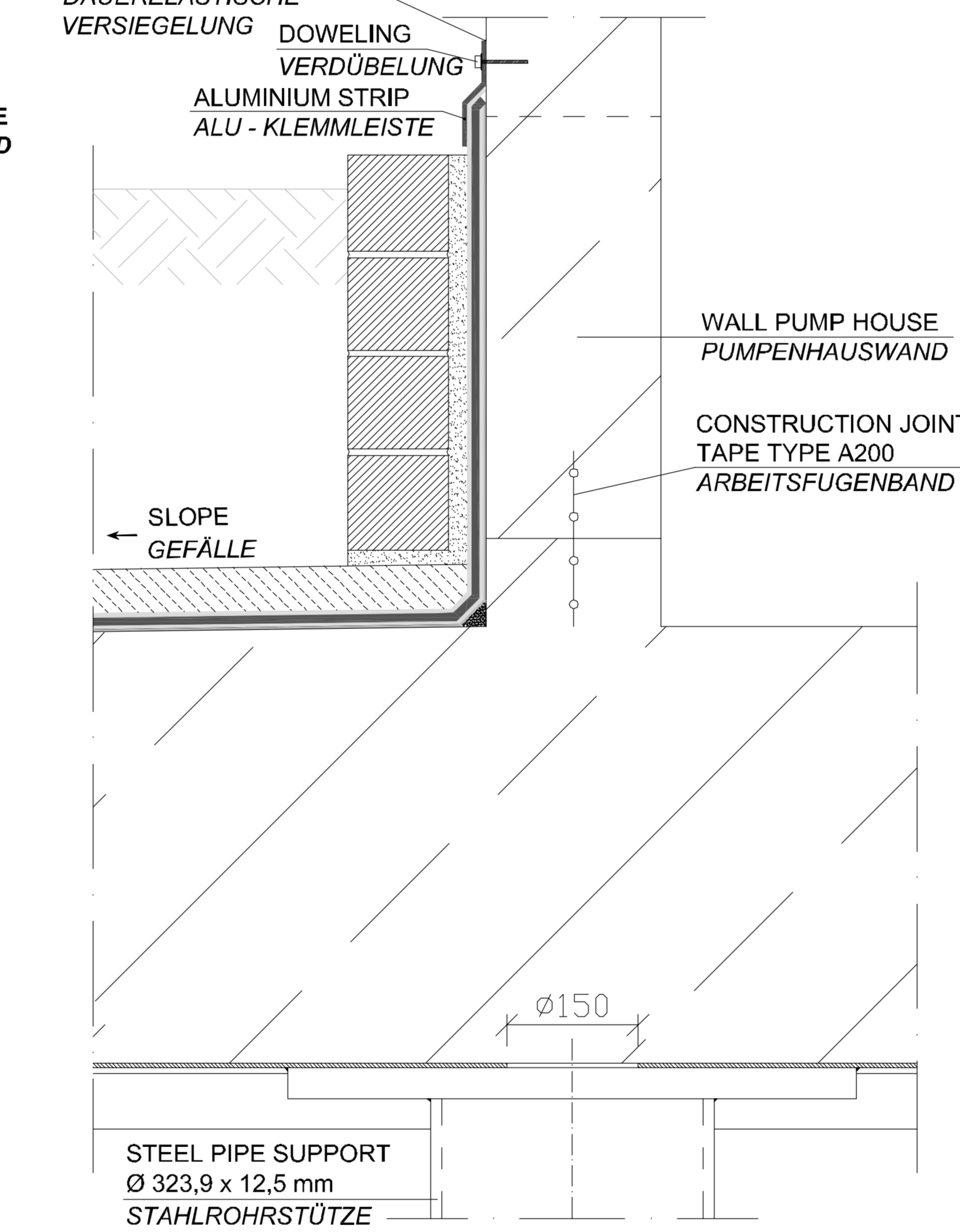
**VIEW ANSICHT Z**  
**BASE PLATE RAILING**  
**FUSSPLATTE GELÄNDER**  
 SCALE / MASSSTAB 1:5



**DETAIL 6**  
**ROOF PUMP HOUSE**  
**PUMPENHAUSDACH**  
 SCALE / MASSSTAB 1:5

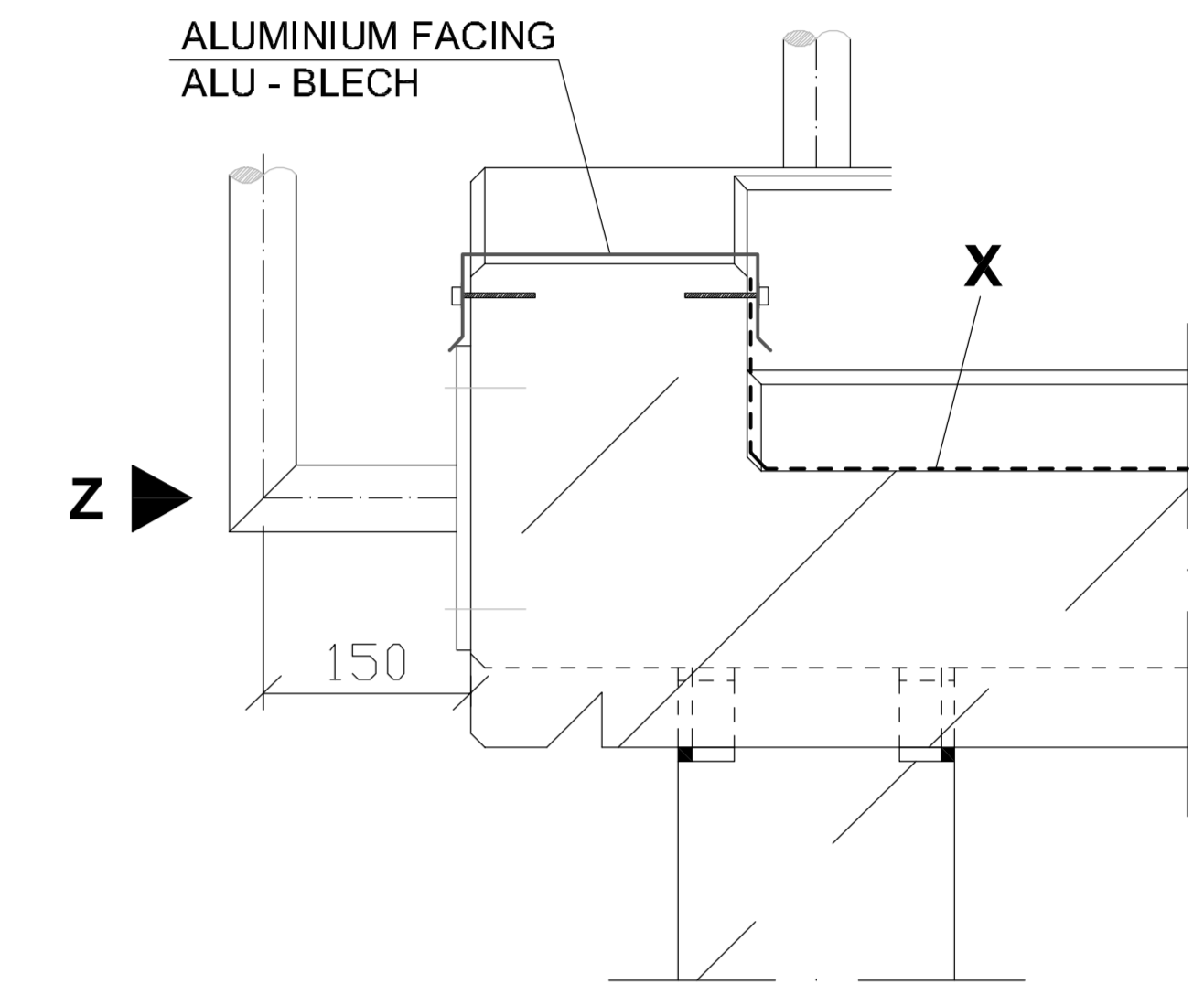


**DETAIL 5**  
**WALL PUMP HOUSE**  
**PUMPENHAUSWAND**  
 SCALE / MASSSTAB 1:5

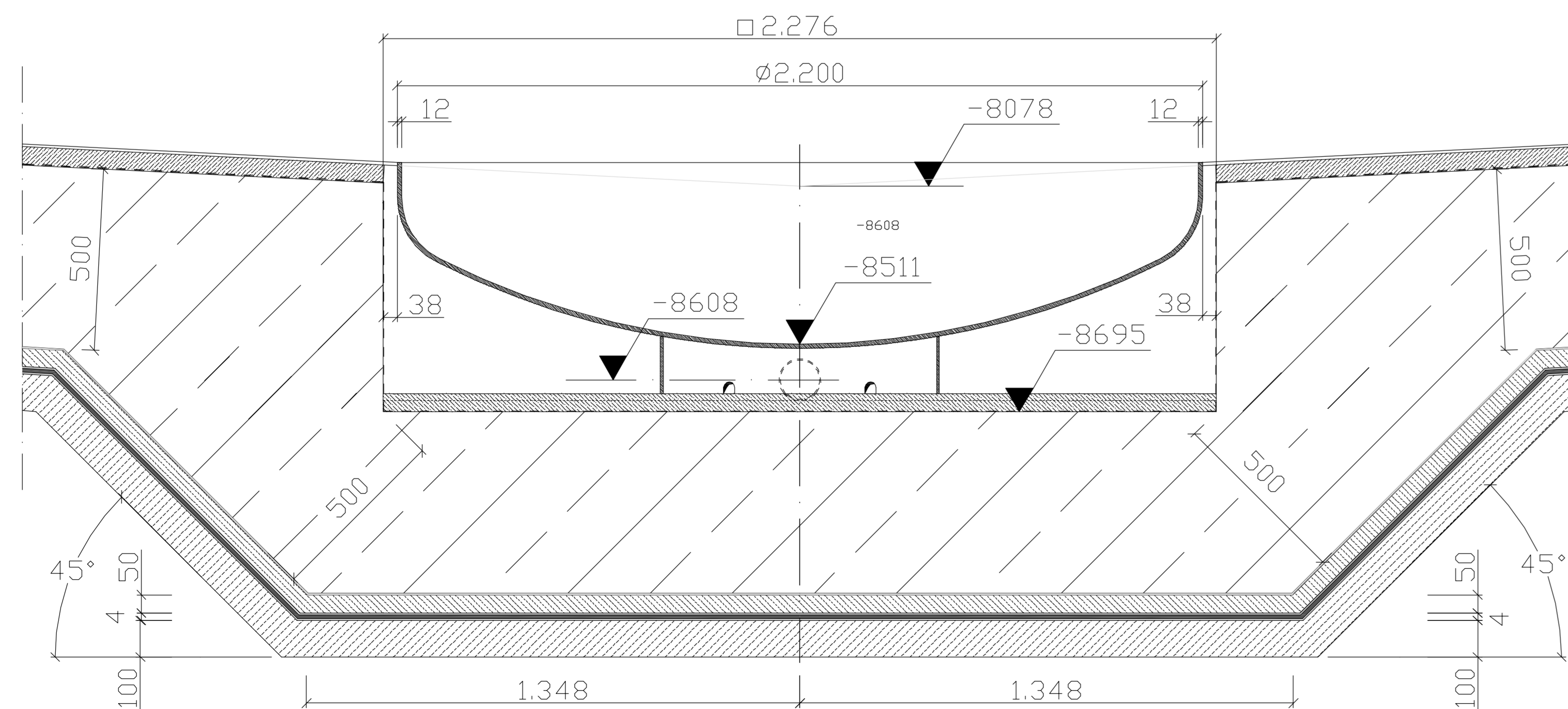


- X**
- TWO-LAYERED ROOF SEALING
  - COMPENSATION AND VAPOUR BARRIER FOR UNVENTILATED ROOF
  - SEPARATING LAYER
  - PRIME COAT BITUMINOUS SOLUTION
  - ZWEIFLÄGIGE DACHABDICHTUNG
  - AUSGLEICHS- UND DAMPFSPERRE FÜR UNBELÜFTETES DACH
  - TRENNSCICHT
  - VORANSTRICH BITUMENLÖSUNG

**SECTION B - B**  
**SCHNITT B - B**  
**ROOF PUMP HOUSE**  
**PUMPENHAUSDACH**  
 SCALE / MASSSTAB 1:5

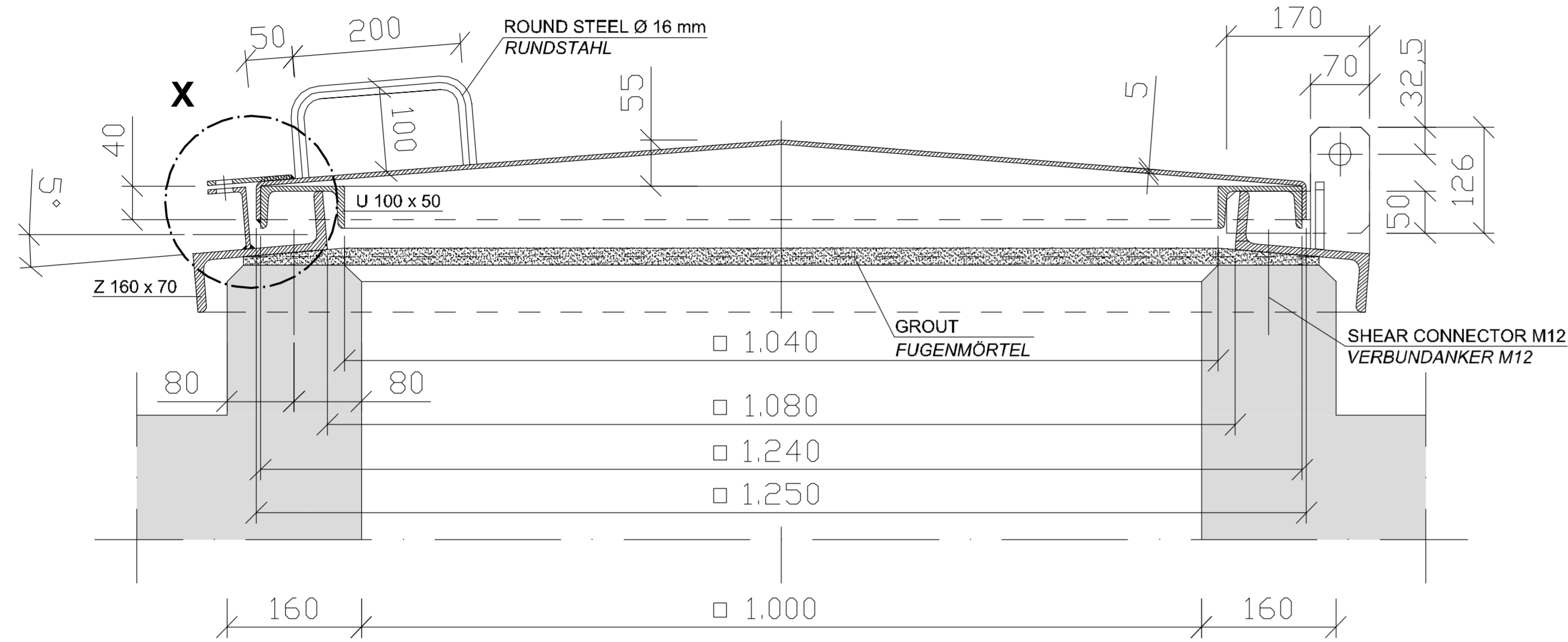


**DETAIL 3**  
**TANK SUMP SECTION THROUGH TANK AXIS II**  
**TANKSUMPF SCHNITT DURCH TANKAXE II**  
 SCALE / MASSSTAB 1:10

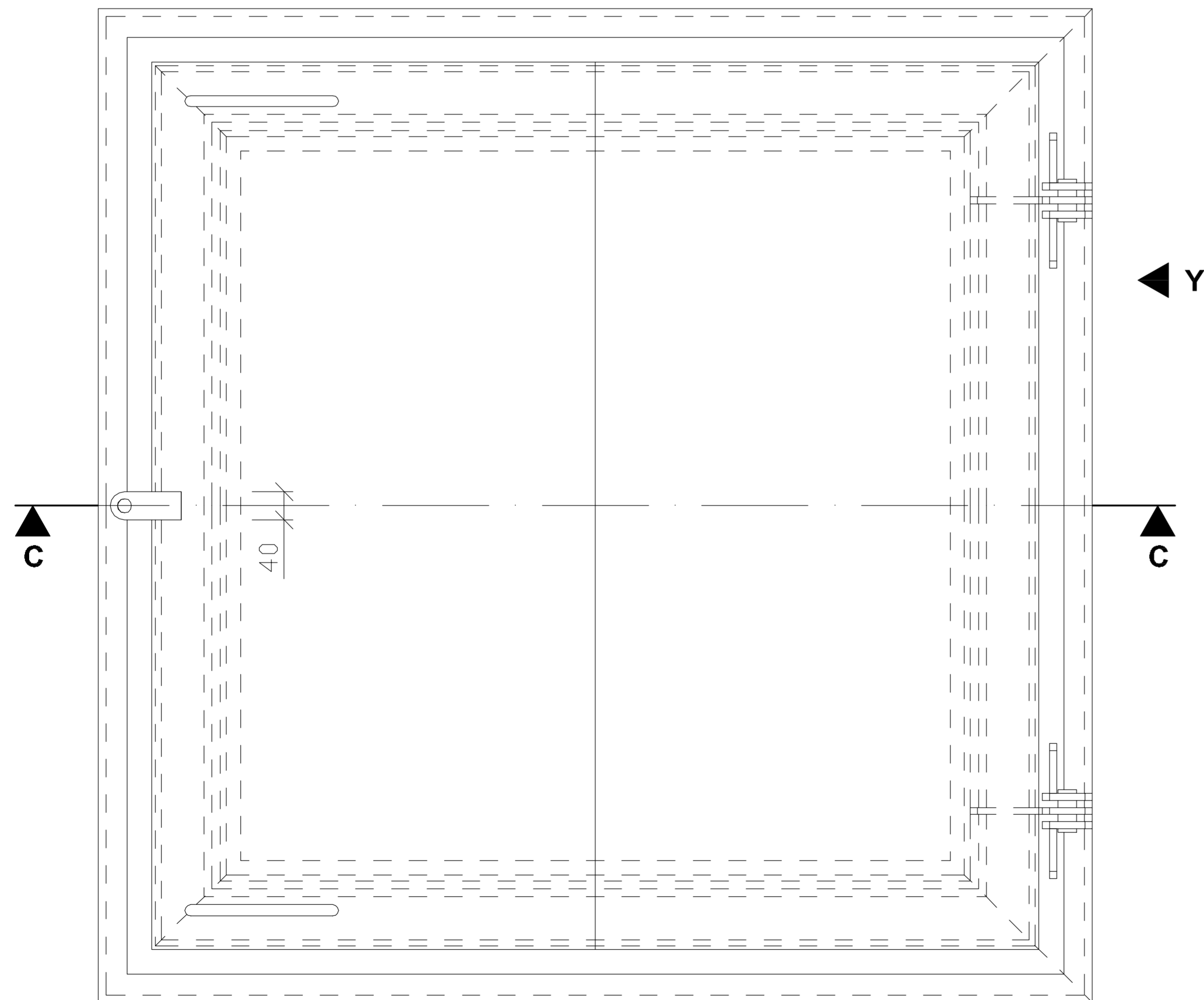


REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
<b>HEADQUARTERS</b> UNITED STATES AIR FORCES EUROPE ENGINEERING & OPERATIONS				
AIRFIELD STANDARD DESIGN US JET FUEL STORAGE AND DISPENSING SYSTEMS		FLUGPLATZ STANDARDPLANUNG US FLUGKRAFTSTOFF - VERSORGENGSANLAGEN		
<b>BUILDING</b> BAUWERK <b>DESIGNATION</b> BEZUEHUNG OPERATING TANK 5000m <sup>3</sup> FLACHBODENTANK 5000m <sup>3</sup>				
<b>WORKED/BEARBEITET</b> PREPARED/AUFGESTELLT APPROVED/GENEHMIGT				
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAU MASSNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED GENEHMIGT	DATE DATUM 6. MAI 2015	SCALE MASSSTAB 1:50	SHEET NO. PLATTEN-NR. C - 1.3.1	
CONSTRUCTION PROJECT BAU MASSNAHME				

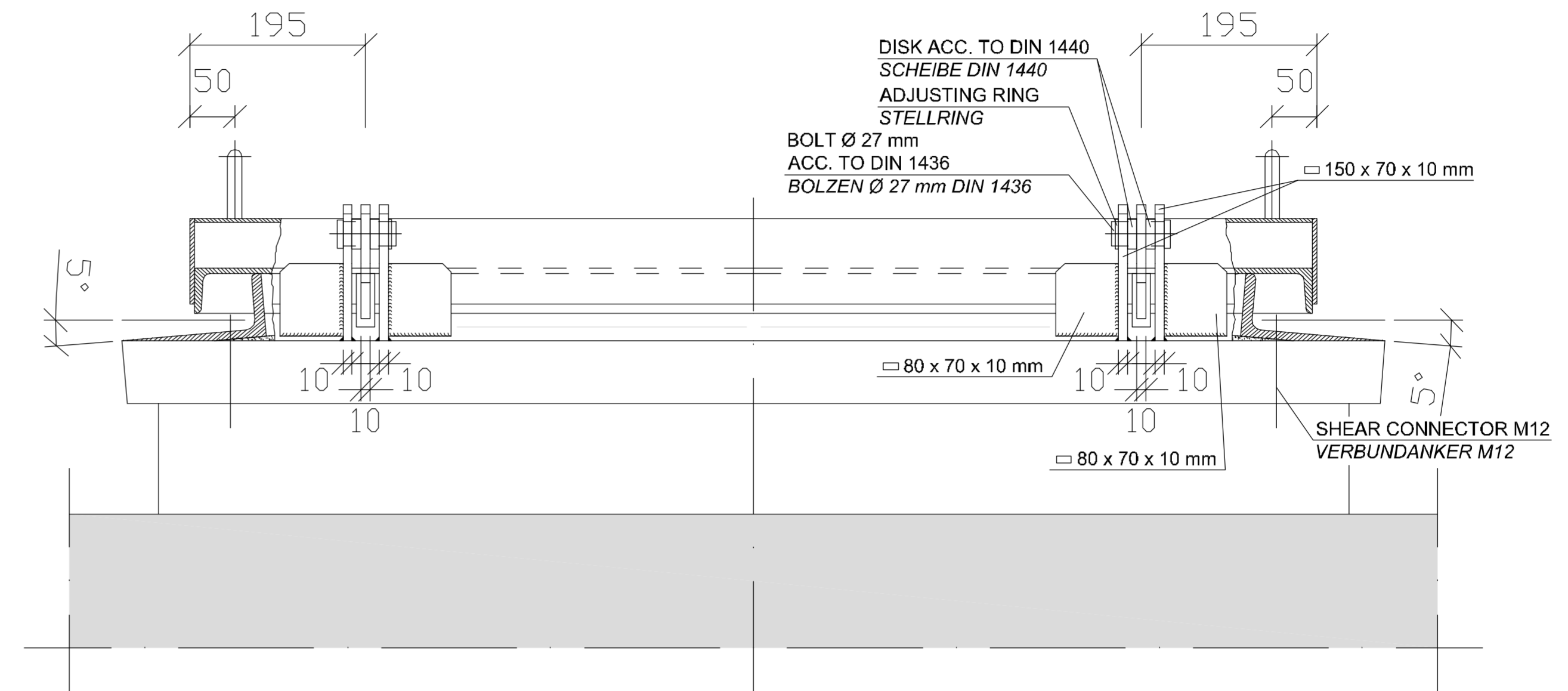
**SECTION  
SCHNITT C - C**  
SCALE / MASSSTAB 1:5



**DETAIL 7  
HINGED COVER  
KLAPPDECKEL**  
SCALE / MASSSTAB 1:5



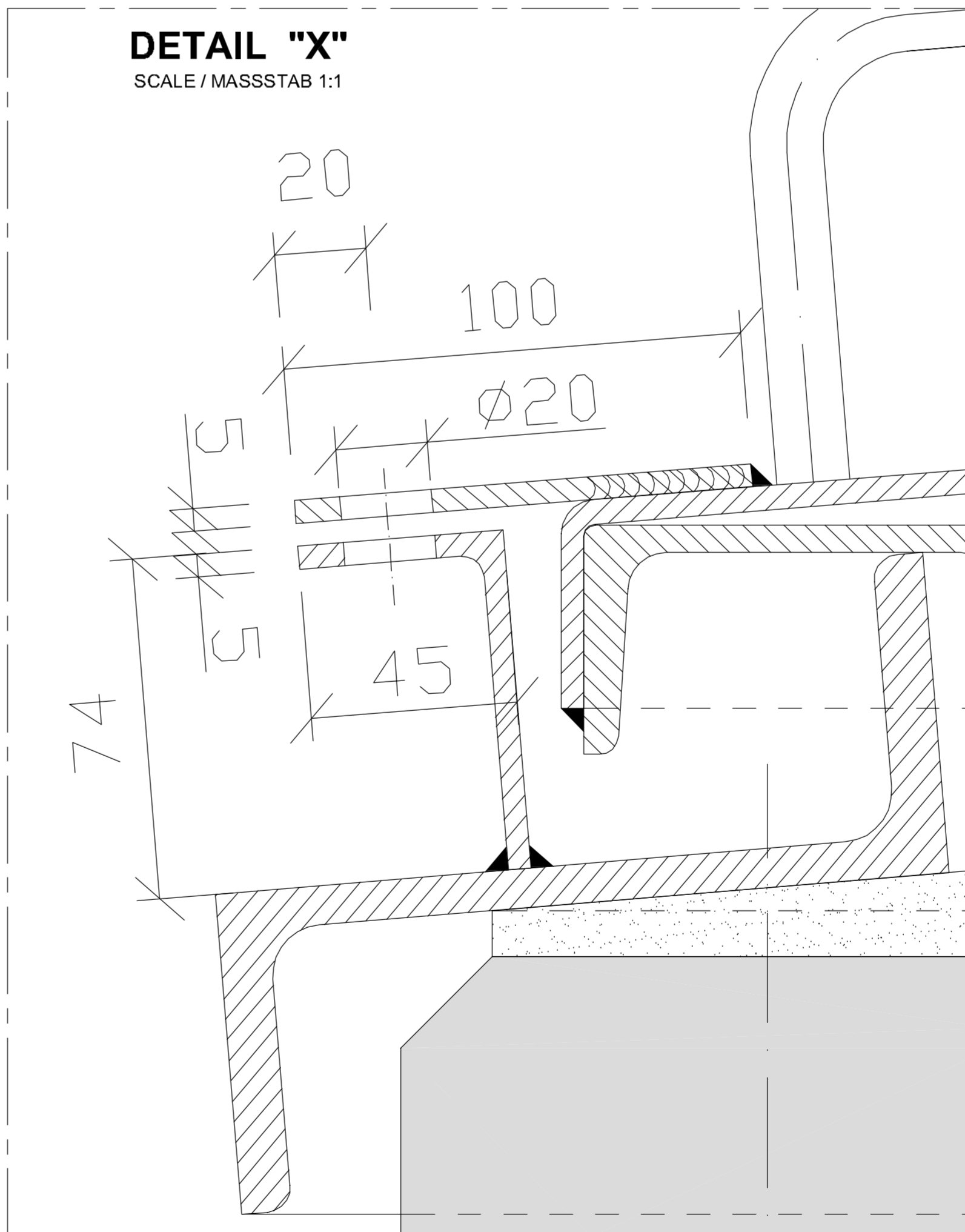
**VIEW  
ANSICHT Y**  
**HINGED COVER  
KLAPPDECKEL**  
SCALE / MASSSTAB 1:5



**NOTES  
BEMERKUNGEN**

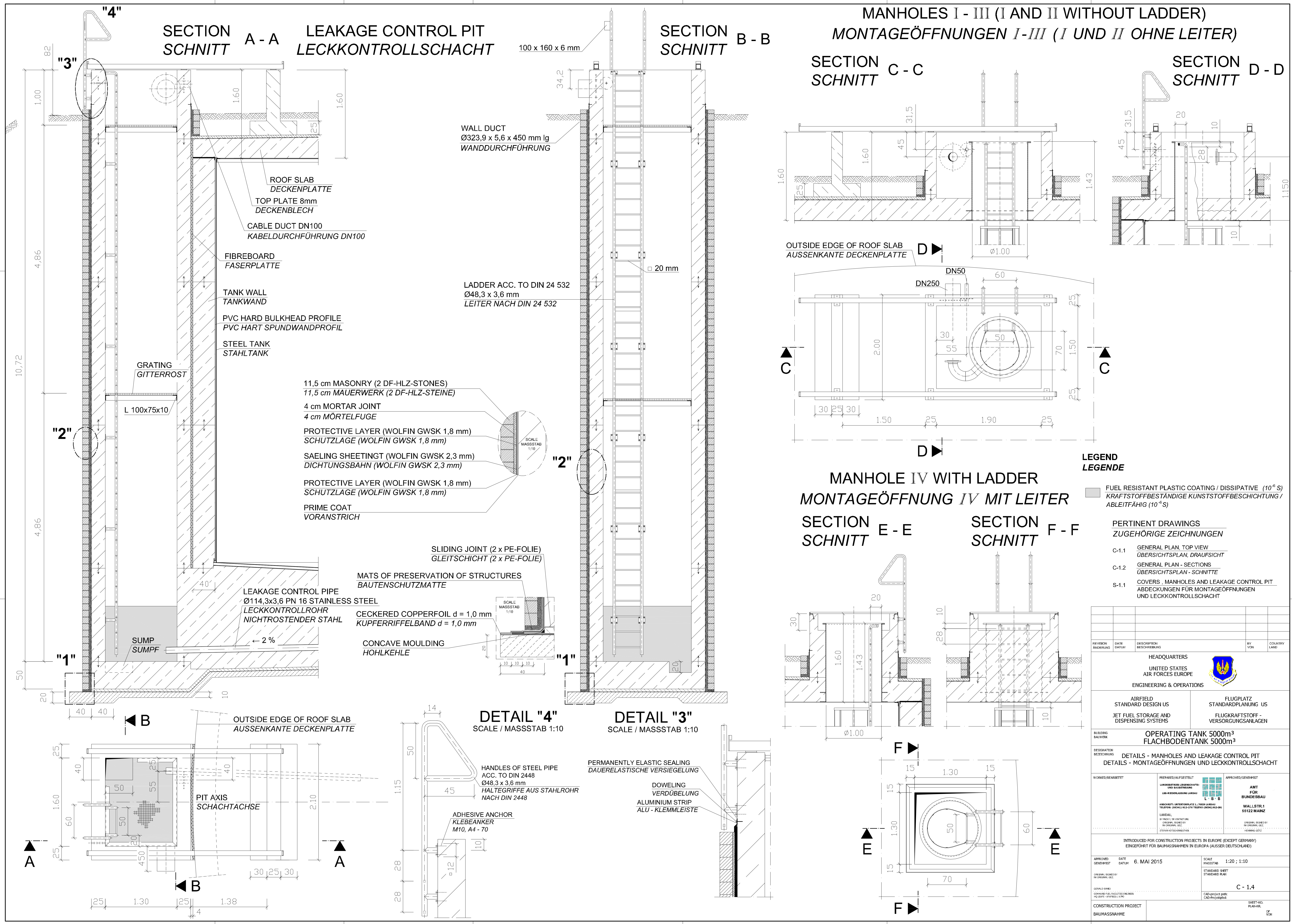
THE HINGED COVER MUST BE SECURED WITH ARMoured PADLOCKS "PANZER" OF STAINLESS STEEL, LOCKING BOLT Ø 12mm  
DIE KLAPPDECKEL SIND MIT GEPANZERTEN VORHÄNGESCHLÖSSER "PANZER" AUS EDELSTAHL, SCHLIESSBOLZEN Ø 12mm ZU SICHERN.

**DETAIL "X"**  
SCALE / MASSSTAB 1:1



REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
<b>HEADQUARTERS</b> <b>UNITED STATES AIR FORCES EUROPE</b> <b>ENGINEERING &amp; OPERATIONS</b>				
<b>AIRFIELD STANDARD DESIGN US</b> <b>JET FUEL STORAGE AND DISPENSING SYSTEMS</b>		<b>FLUGPLATZ STANDARDPLANUNG US</b> <b>FLUGKRAFTSTOFF - VERSORGENGSANLAGEN</b>		
<b>BUILDING BAUWERK</b> <b>OPERATING TANK 5000m<sup>3</sup></b> <b>FLACHBODENTANK 5000m<sup>3</sup></b>				
<b>DESIGNATION BEZEICHNUNG</b> <b>HINGED COVER KLAPPDECKEL</b>				
<b>WORKED/BEARBEITET</b>		<b>PREPARED/AUFGESTELLT</b> LANDBETRIEBER LIEGENSCHAFTS- UND BAUBETRIEBUNG LBB-III ZEDERLASSUNG LANDAU L · B · B ANSCHLUSST: UNTERTORPLATZ 1, 76229 LANDAU TELEFON: (06341) 912-276 TELEFAX: (06341) 912-291 LANDAU, BY PROXY / IM VERSTRETTUNG ORIGINAL SIGNED BY: IN ORIGINAL GEZ. STEFAN KOTSCHENREUTHER		<b>APPROVED/GENEHMIGT</b> AMT FÜR BUNDESBAU WALLSTR.1 55122 MAINZ ORIGINAL SIGNED BY: IN ORIGINAL GEZ. WERNING GÖTZ
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAUMASSNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
<b>APPROVED GENEHMIGT</b>		<b>DATE DATUM</b> 6. MAI 2015		<b>SCALE MASSSTAB</b> 1:5 ; 1:10
ORIGINAL SIGNED BY: IN ORIGINAL GEZ. GERALD SAND COMMAND FUEL FACILITIES ENGINEER HQ USAF - AFAPRNG / AFPO		STANDARD SHEET STANDARD PLAN		SHEET-NO. PLAN-NR. OF VON
<b>CONSTRUCTION PROJECT BAUMASSNAHME</b>			CAD-project path: CAD-Projektfrd: C - 1.3.2	



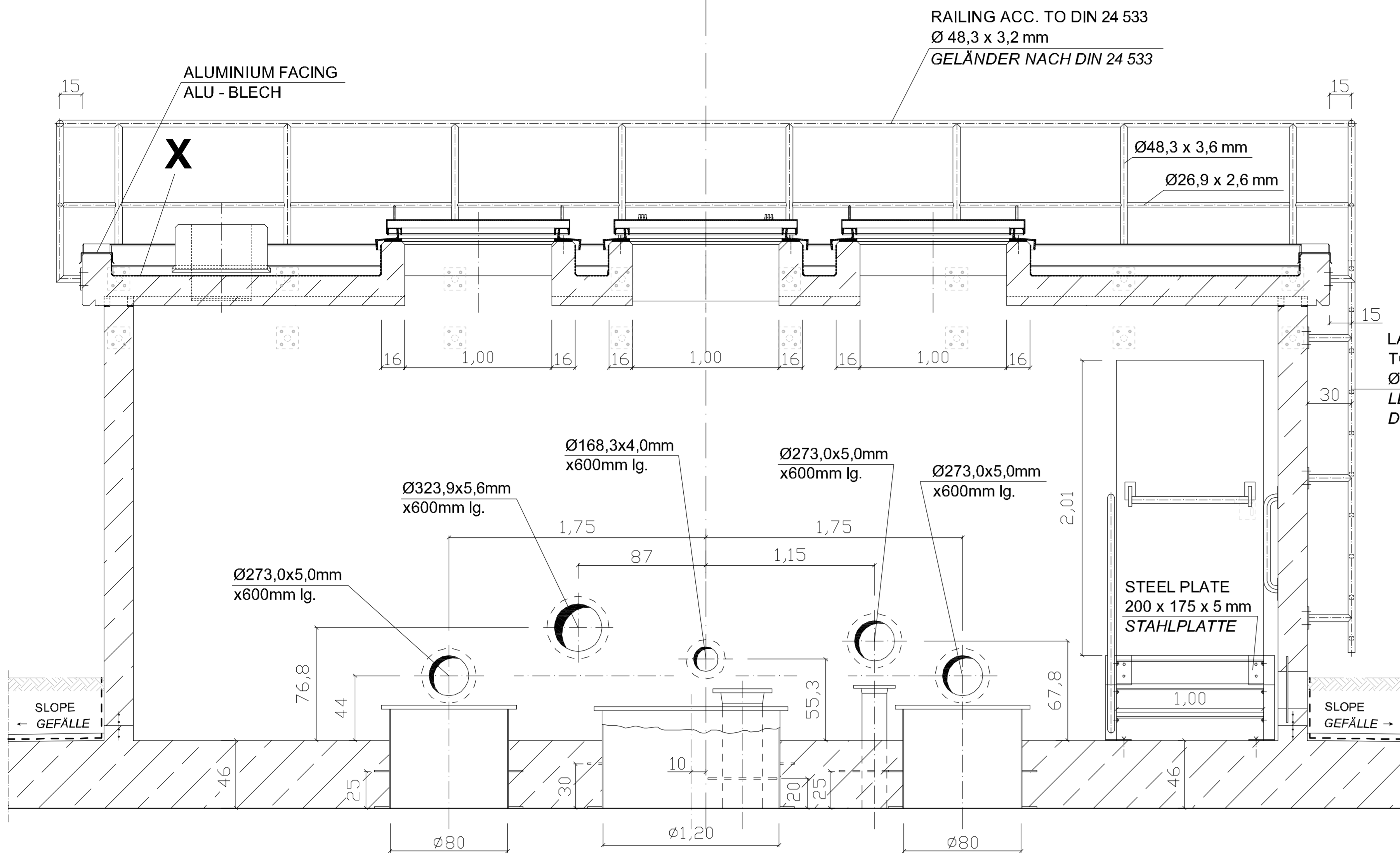


- LEGEND**  
LEGENDE
- FUEL RESISTANT PLASTIC COATING / DISSIPATIVE (10<sup>6</sup> S)  
KRAFTSTOFFBESTÄNDIGE KUNSTSTOFFBESCHICHTUNG / ABLEITFÄHIG (10<sup>6</sup> S)
- PERTINENT DRAWINGS**  
ZUGEHÖRIGE ZEICHNUNGEN
- C-1.1 GENERAL PLAN, TOP VIEW  
ÜBERSICHTSPLAN, DRAUFSICHT
  - C-1.2 GENERAL PLAN - SECTIONS  
ÜBERSICHTSPLAN - SCHNITTE
  - S-1.1 COVERS, MANHOLES AND LEAKAGE CONTROL PIT  
ABDECKUNGEN FÜR MONTAGEÖFFNUNGEN UND LECKKONTROLLSCHACHT

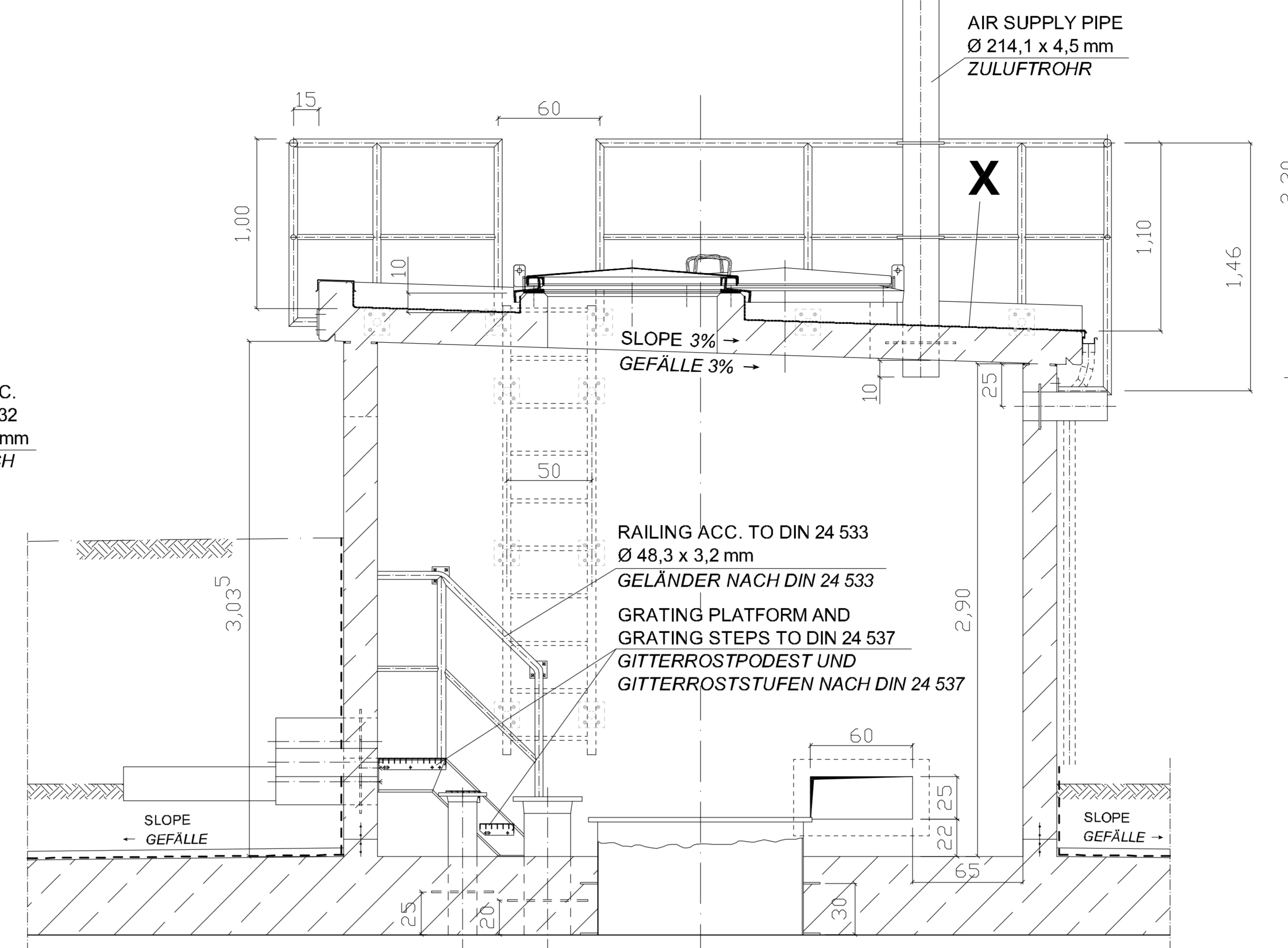
REVISION	DATE	DESCRIPTION	BY	COUNTRY
ÄNDERUNG	DATUM	BESCHREIBUNG	VON	LAND
<b>HEADQUARTERS</b>				
UNITED STATES AIR FORCES EUROPE				
ENGINEERING & OPERATIONS				
AIRFIELD STANDARD DESIGN US			FLUGPLATZ STANDARDPLANUNG US	
JET FUEL STORAGE AND DISPENSING SYSTEMS			FLUGKRAFTSTOFF - VERSORGNUNGSANLAGEN	
<b>OPERATING TANK 5000m<sup>3</sup></b> <b>FLACHBODENTANK 5000m<sup>3</sup></b>				
<b>DETAILS - MANHOLES AND LEAKAGE CONTROL PIT</b> <b>DETAILS - MONTAGEÖFFNUNGEN UND LECKKONTROLLSCHACHT</b>				
<small>INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAUMASSNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)</small>				
APPROVED GENEHEMT	DATE DATUM	6. MAI 2015		SCALE MASSSTAB
ORIGINAL DESIGNED BY IN ORIGINAL DES.	ORIGINAL DRAWN BY IN ORIGINAL DES.	CAD-PROJECT MANAGER CAD-PROJEKTLEITER		SCALE MASSSTAB
CONSTRUCTION PROJECT BAUMASSNAHME			C - 1.4	SHEET NO. PLATZNR.



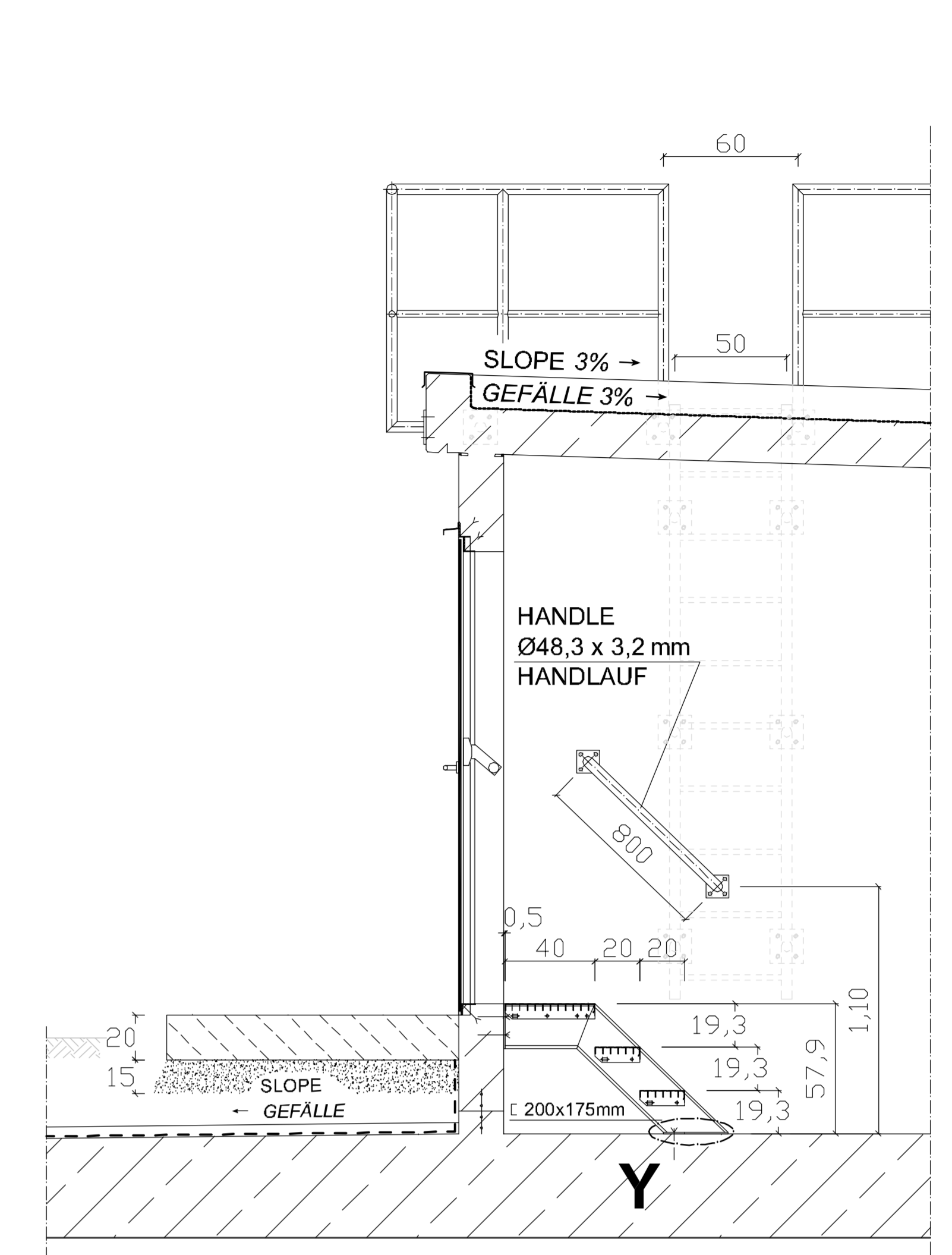
**SECTION A - A**  
**SCHNITT**



**SECTION B - B**  
**SCHNITT**

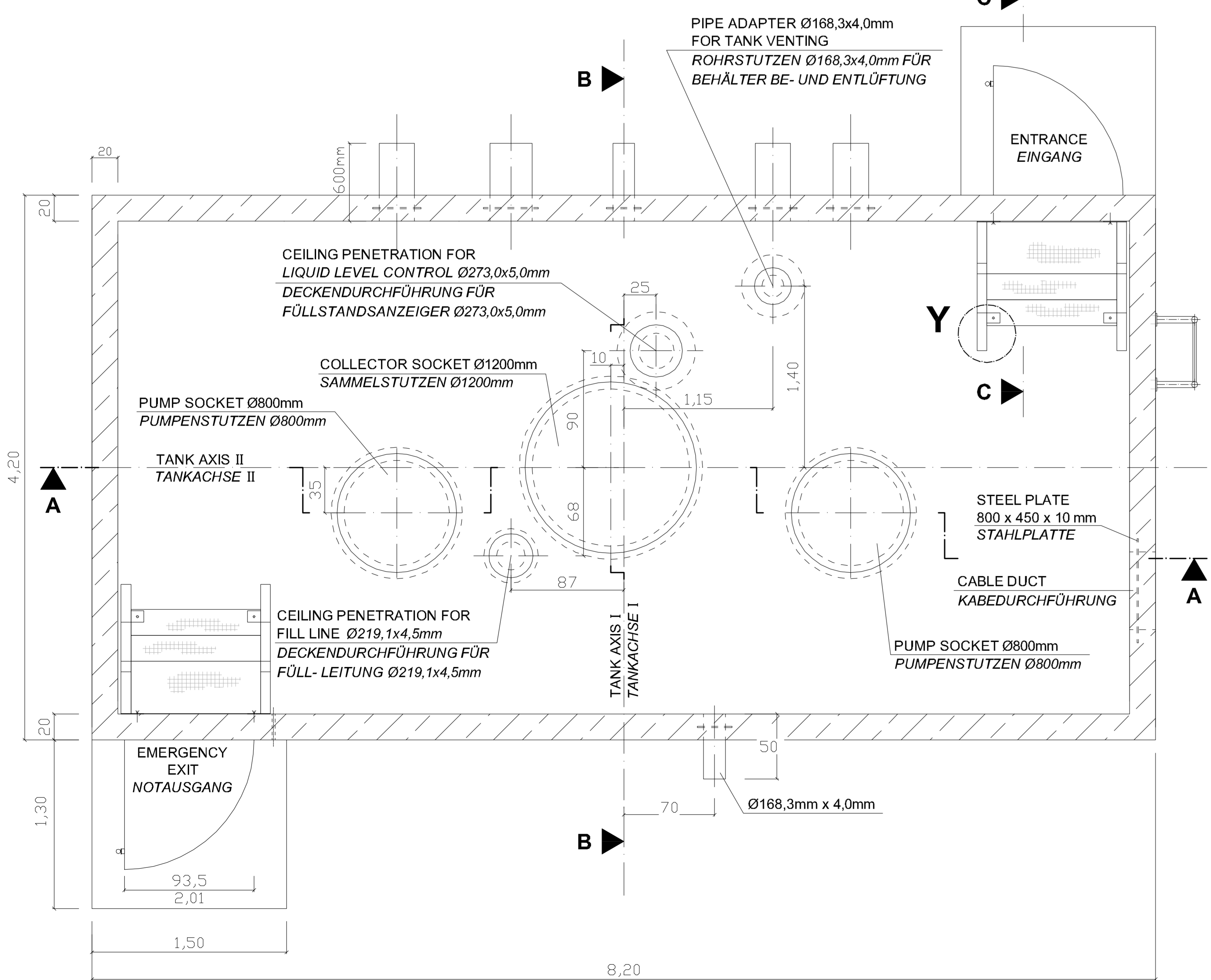


**SECTION C - C**  
**SCHNITT**

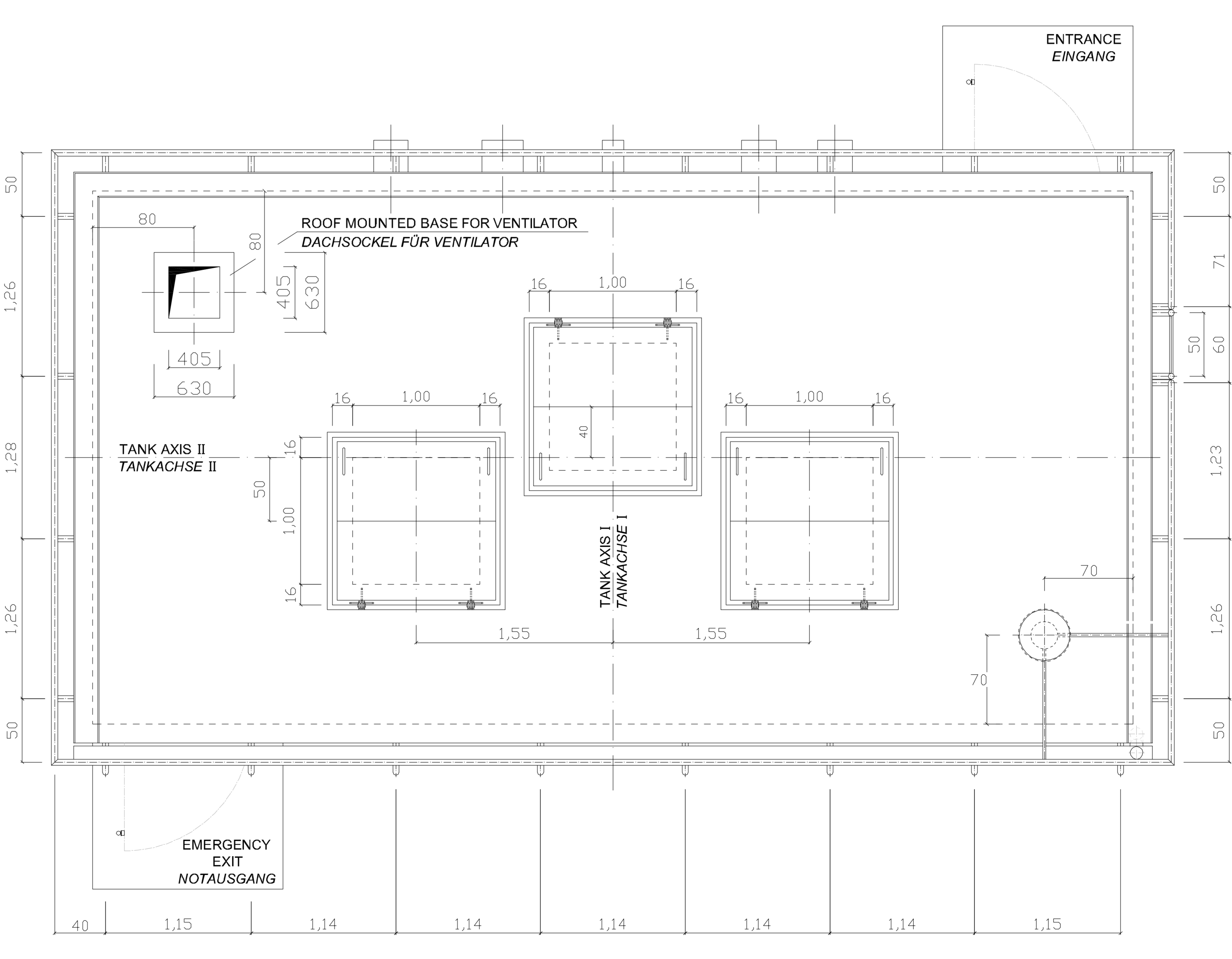


- X**
- TWO-LAYERED ROOF SEALING
  - COMPENSATION AND VAPOUR BARRIER FOR UNVENTILATED ROOF
  - SEPARATING LAYER
  - PRIME COAT BITUMINOUS SOLUTION
  - ZWEILAGIGE DACHABDICHTUNG
  - AUSGLEICHS- UND DAMPFSPERRE FÜR UNBELÜFTETES DACH
  - TRENNSCHICHT
  - VORANSTRICH BITUMENLÖSUNG

**GROUND PLAN**  
**GRUNDRISS**

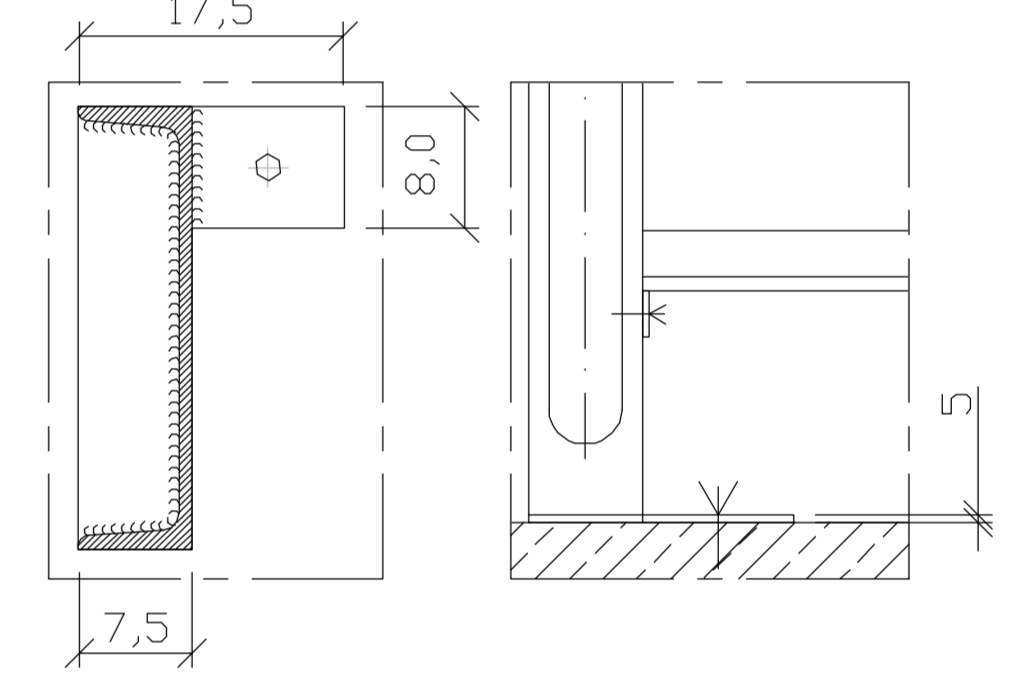


**TOP VIEW**  
**DRAUFSICHT**



**DETAIL "Y"**

SCALE / MASSSTAB 1:5



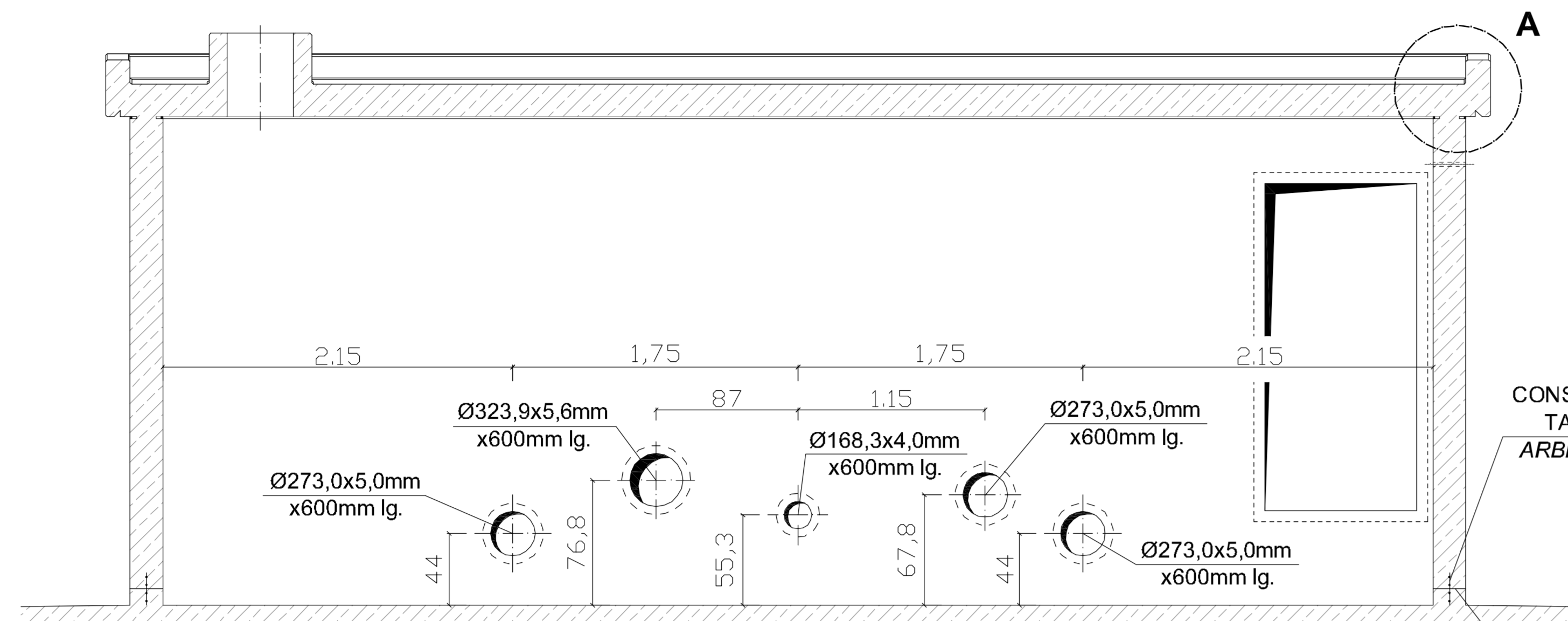
**PERTINENT DRAWINGS**  
**ZUGEHÖRIGE ZEICHNUNGEN**

- C-1.3 GENERAL PLAN - DETAILS  
ÜBERSICHTSPLAN - DETAILS
- E-1.2 ELECTRICAL INSTALLATION, PUMP HOUSE AND LEAKAGE CONTROL PIT  
ELEKTROTECHNISCHE INSTALLATION, PUMPENHAUS UND LECKKONTROLLSCHACHT

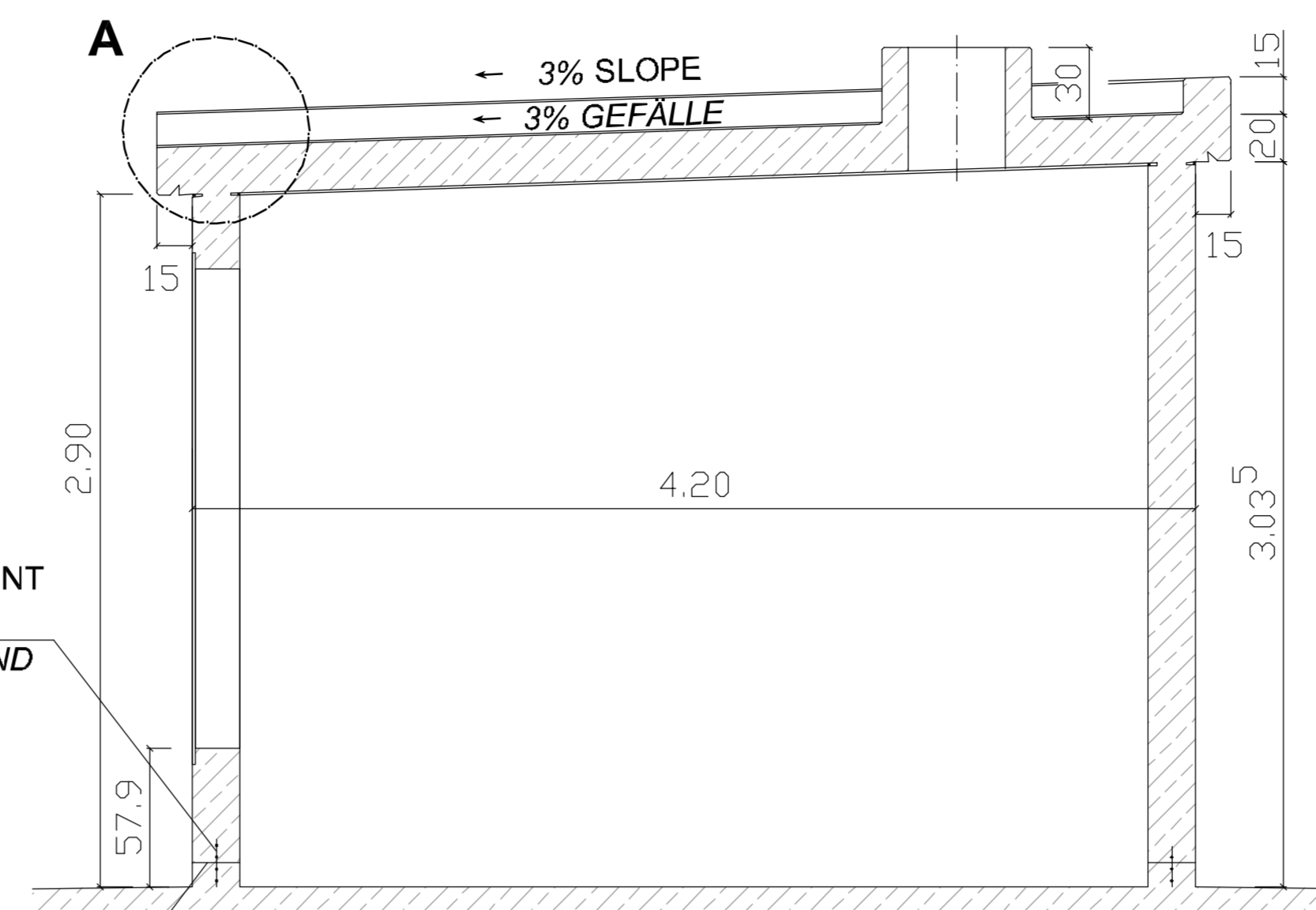
REVISION	DATE	DESCRIPTION	BY	COUNTRY		
ÄNDERUNG	DATUM	BESCHREIBUNG	VON	LAND		
<b>HEADQUARTERS</b>						
UNITED STATES AIR FORCES EUROPE						
ENGINEERING & OPERATIONS						
AIRFIELD STANDARD DESIGN US			FLUGPLATZ STANDARDPLANUNG US			
JET FUEL STORAGE AND DISPENSING SYSTEMS			FLUGKRAFTSTOFF - VERSORGENGSANLAGEN			
<b>OPERATING TANK 5000m<sup>3</sup></b> <b>FLACHBODENTANK 5000m<sup>3</sup></b>						
<b>CONSTRUCTION PLAN, PUMP HOUSE</b> <b>BAUKONSTRUKTIONSPLAN, PUMPENHAUS</b>						
<table border="1" style="width: 100%;"> <tr> <td style="width: 50%;">                 WORKED/BEARBEITET                  LANSBERGER LEBENSCHAFTS- UND BAUINGENIEUR- UND ARCHITECTURBÜRO                  LANSBERGER LEBENSCHAFTS- UND BAUINGENIEUR- UND ARCHITECTURBÜRO                  ANSCHLIESST: UNIVERSITÄT J. J. HANSEN                  TECHN. BÜRO FÜR STRUKTUR- UND TRAGWERKE                  LANDAU                  BEI: PROJEKT INZ. INZ. INZ.                  INZ. INZ. INZ.                  STRUKTUR- UND TRAGWERKE             </td> <td style="width: 50%;">                 APPROVED/GENEHMIGT                  AMT FÜR BUNDESBAU                  WALLSTR. 1                  55122 MAINZ                  ORIGINAL SIGNED BY: INZ. INZ. INZ.                  10.06.2012             </td> </tr> </table>					WORKED/BEARBEITET LANSBERGER LEBENSCHAFTS- UND BAUINGENIEUR- UND ARCHITECTURBÜRO LANSBERGER LEBENSCHAFTS- UND BAUINGENIEUR- UND ARCHITECTURBÜRO ANSCHLIESST: UNIVERSITÄT J. J. HANSEN TECHN. BÜRO FÜR STRUKTUR- UND TRAGWERKE LANDAU BEI: PROJEKT INZ. INZ. INZ. INZ. INZ. INZ. STRUKTUR- UND TRAGWERKE	APPROVED/GENEHMIGT AMT FÜR BUNDESBAU WALLSTR. 1 55122 MAINZ ORIGINAL SIGNED BY: INZ. INZ. INZ. 10.06.2012
WORKED/BEARBEITET LANSBERGER LEBENSCHAFTS- UND BAUINGENIEUR- UND ARCHITECTURBÜRO LANSBERGER LEBENSCHAFTS- UND BAUINGENIEUR- UND ARCHITECTURBÜRO ANSCHLIESST: UNIVERSITÄT J. J. HANSEN TECHN. BÜRO FÜR STRUKTUR- UND TRAGWERKE LANDAU BEI: PROJEKT INZ. INZ. INZ. INZ. INZ. INZ. STRUKTUR- UND TRAGWERKE	APPROVED/GENEHMIGT AMT FÜR BUNDESBAU WALLSTR. 1 55122 MAINZ ORIGINAL SIGNED BY: INZ. INZ. INZ. 10.06.2012					
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAU MASSNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)						
APPROVED/GENEHMIGT	DATE/DATUM	SCALE/MASSSTAB				
	6. MAI 2015	1:20 : 1:5				
ORIGINAL SIGNED BY: INZ. INZ. INZ.		STANDARD SHEET/STANDARD PLAN				
GENERAL DRAWING/BAUWERKZEUGZEICHNUNG		C - 1.5				
CONSTRUCTION PROJECT/BAU MASSNAHME		SHEET NO./BLATT NR.				
		OF/ VON				



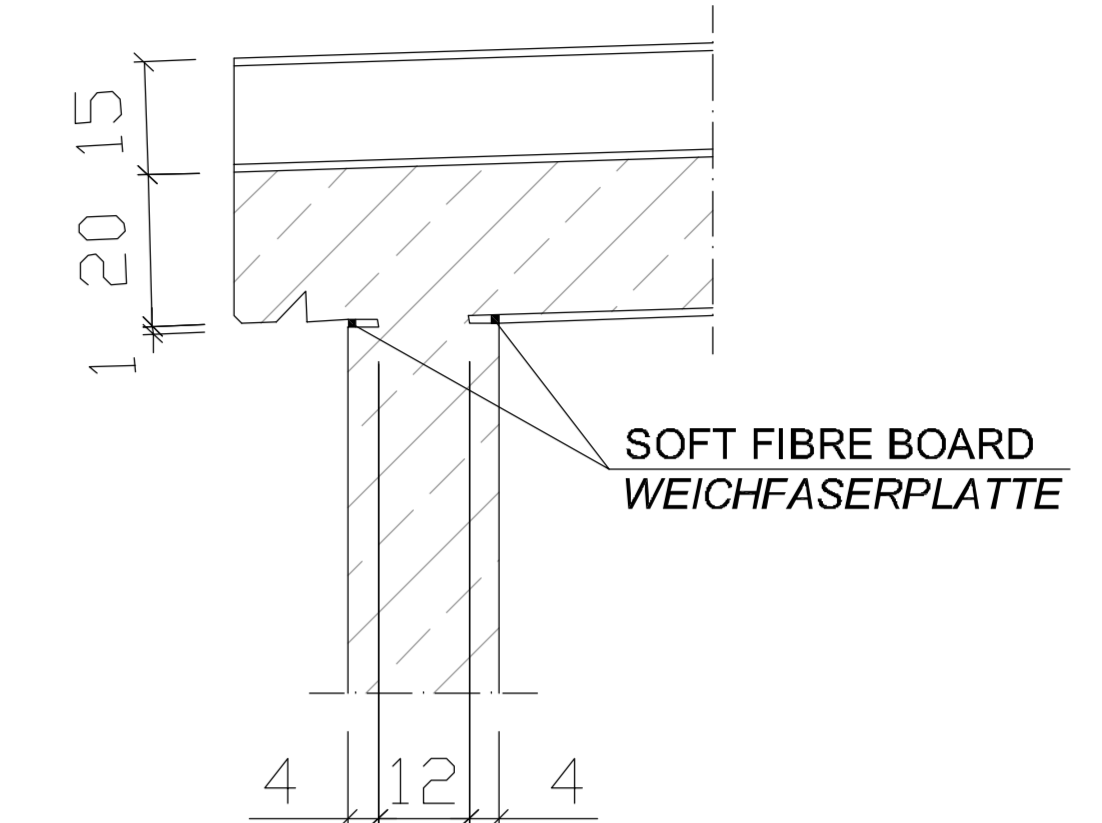
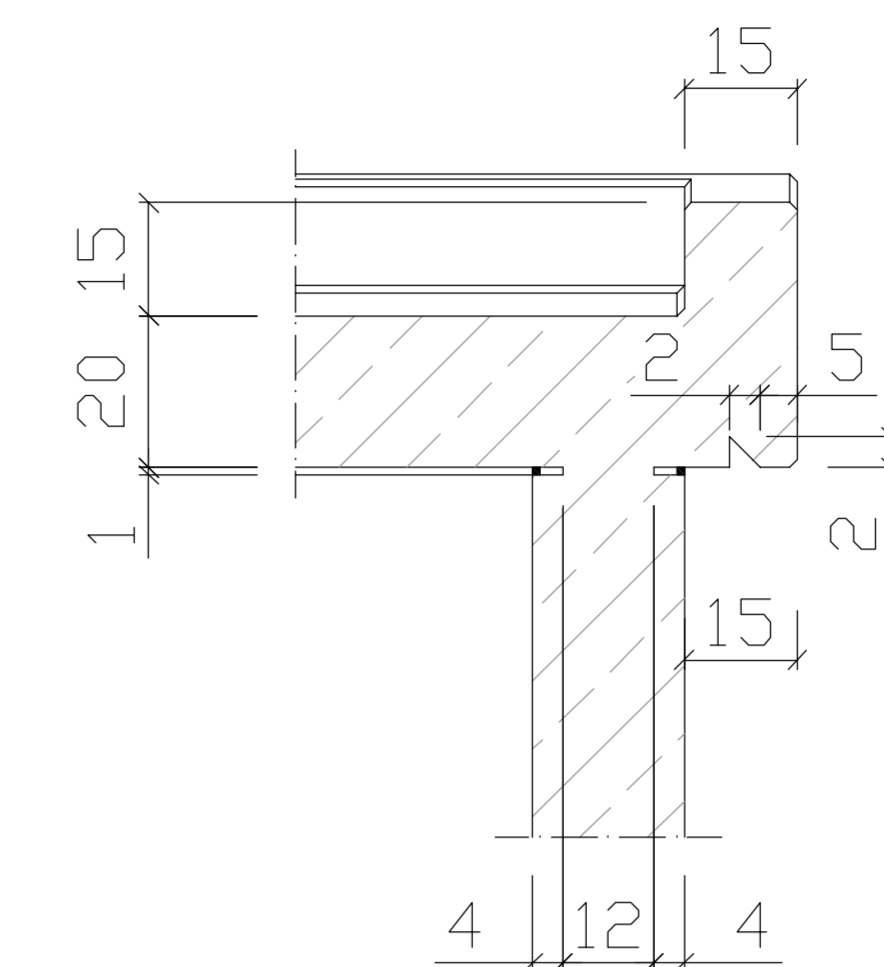
**SECTION A - A**  
**SCHNITT A - A**



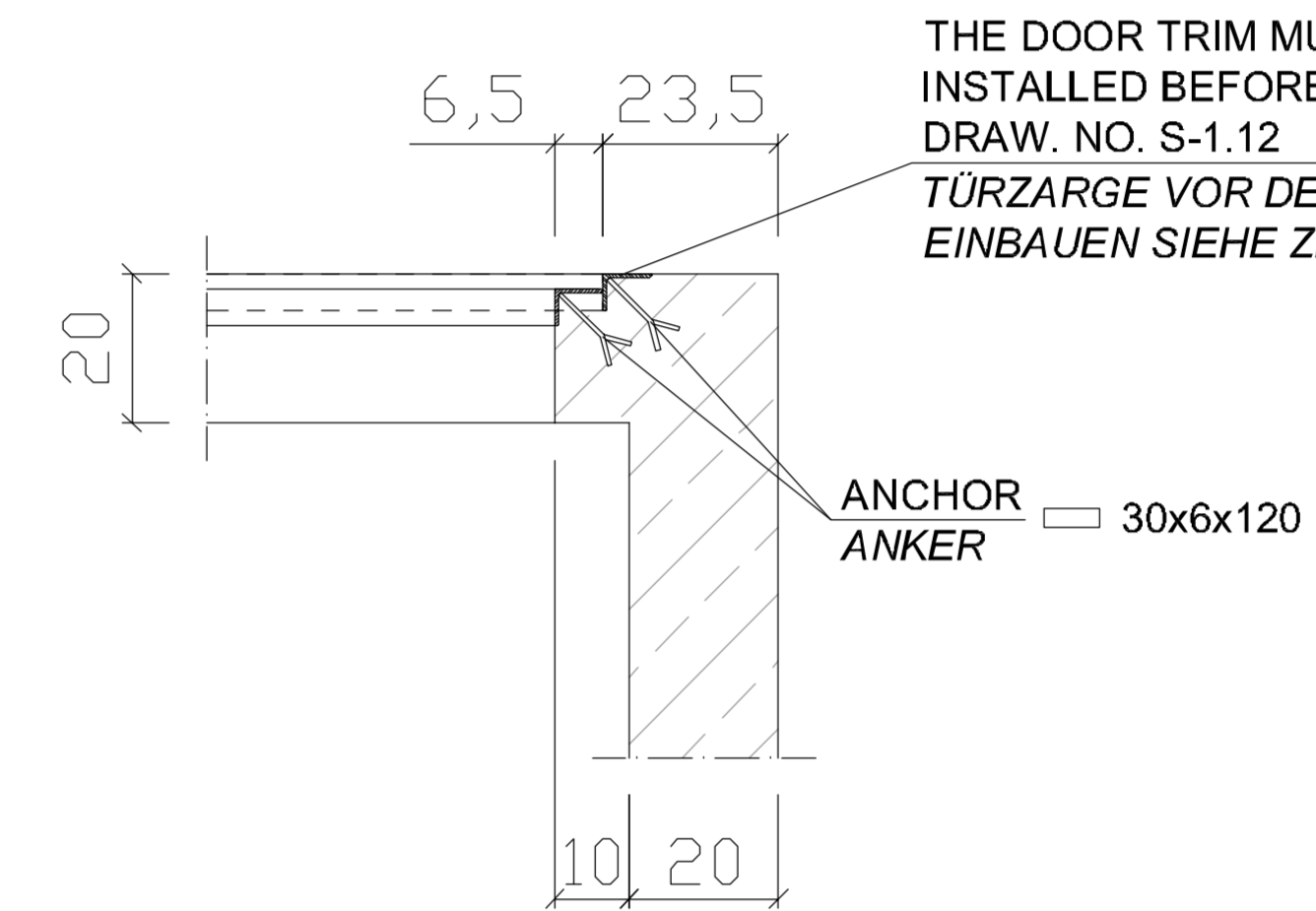
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**SCHNITT C - C**



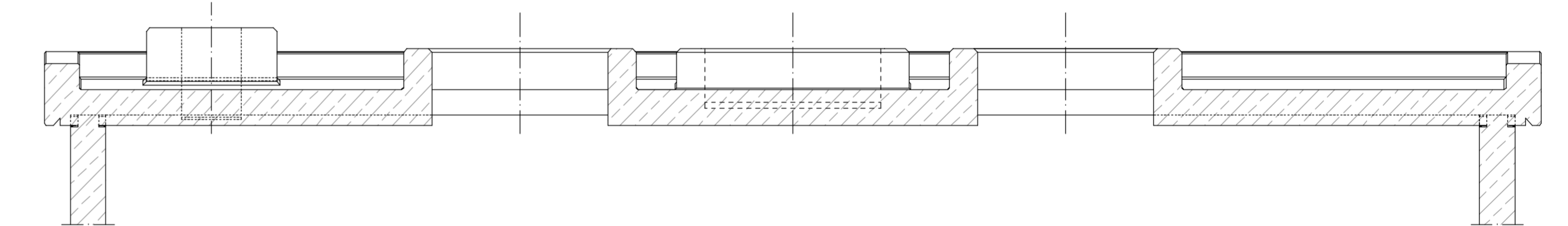
**DETAIL A**  
SCALE 1:10  
MASSSTAB 1:10



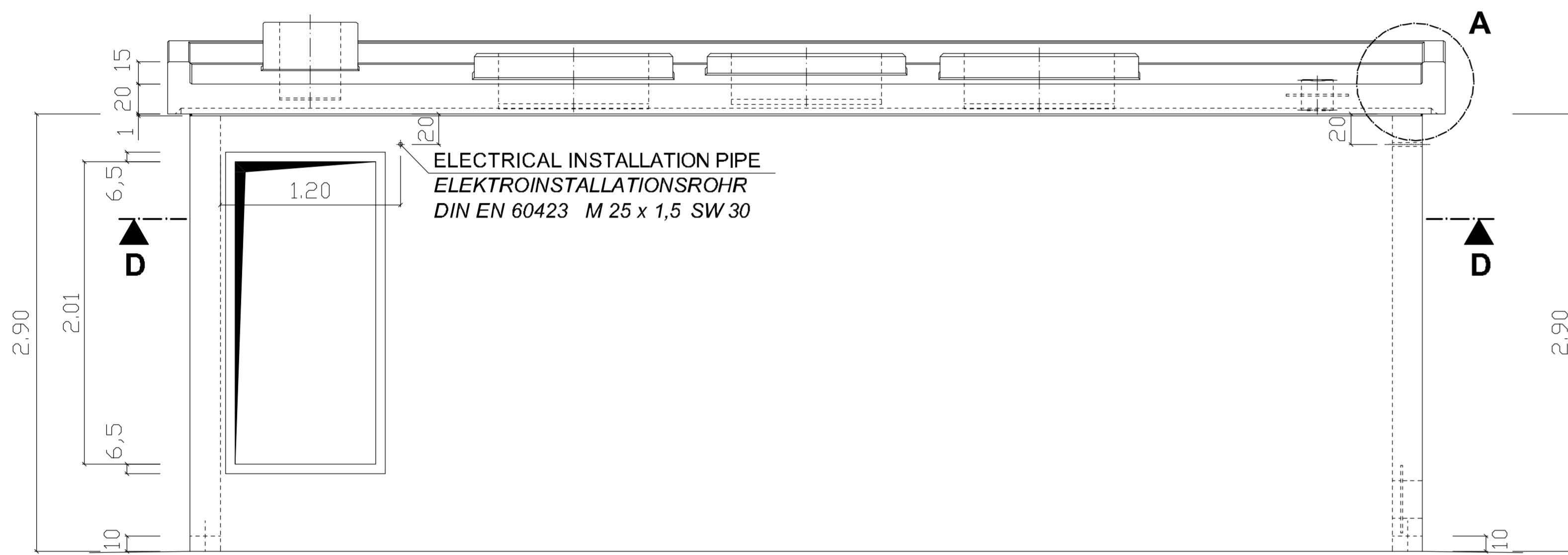
**DETAIL B**  
SCALE 1:10  
MASSSTAB 1:10



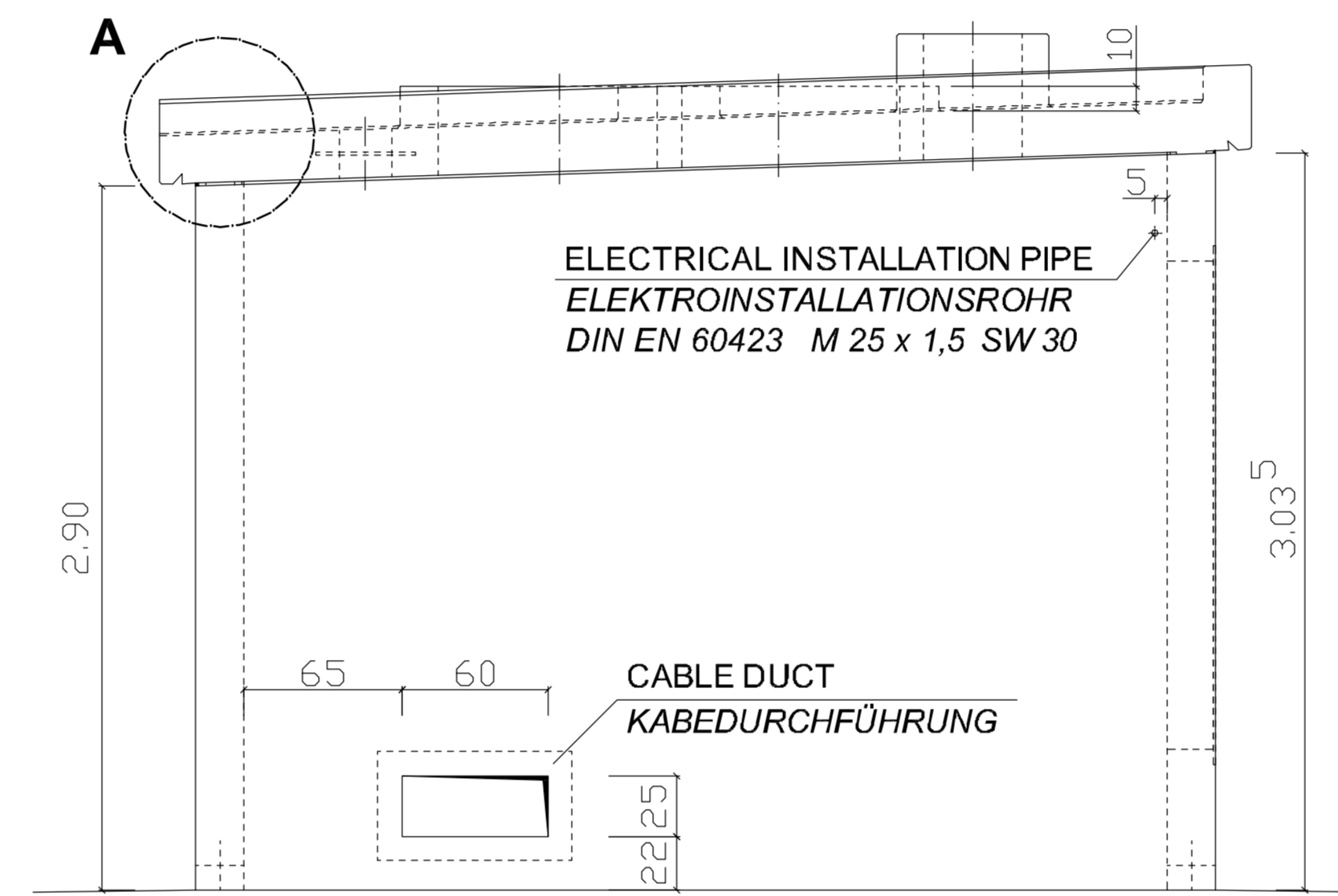
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**SCHNITT B - B**



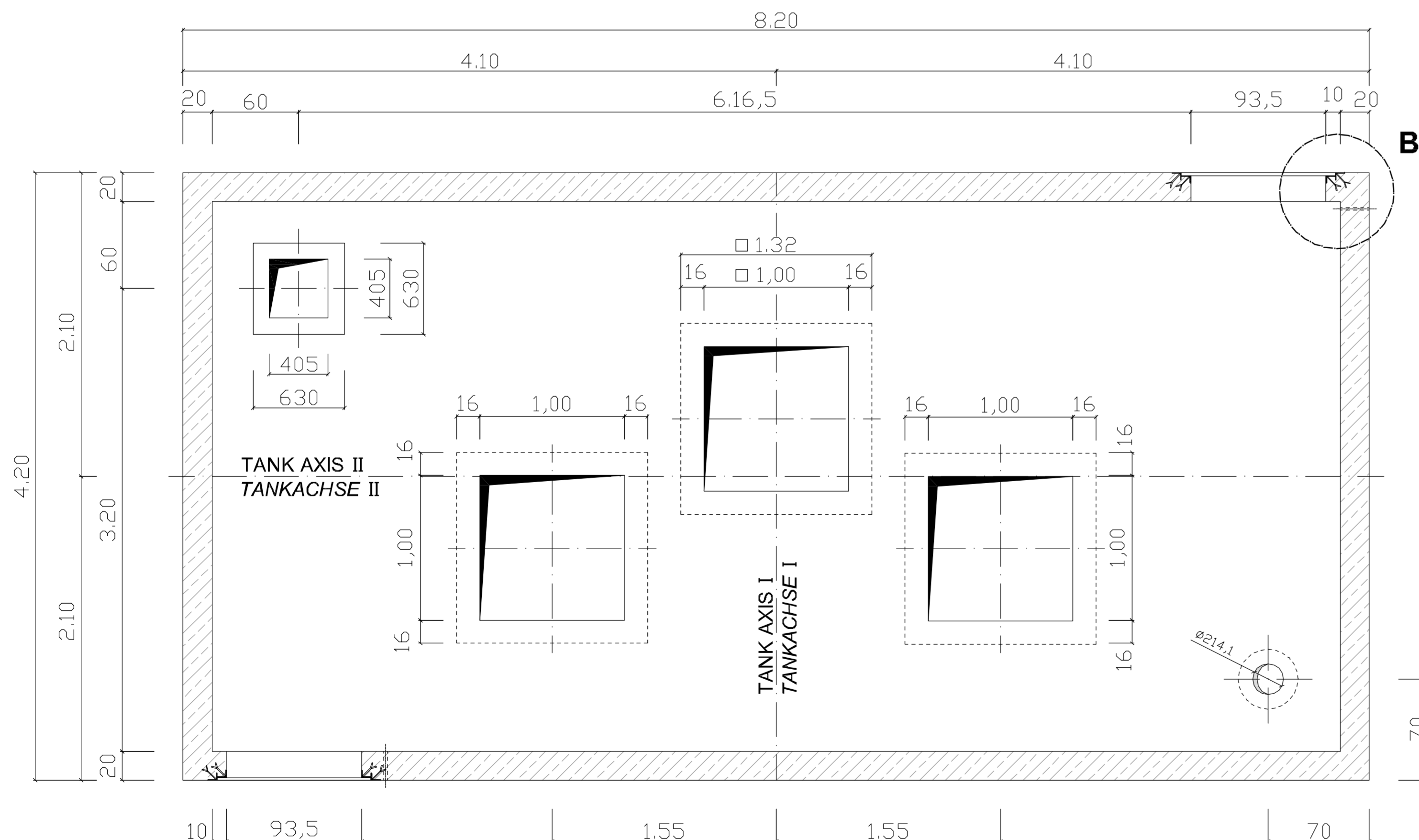
**VIEW Z**  
**ANSICHT Z**



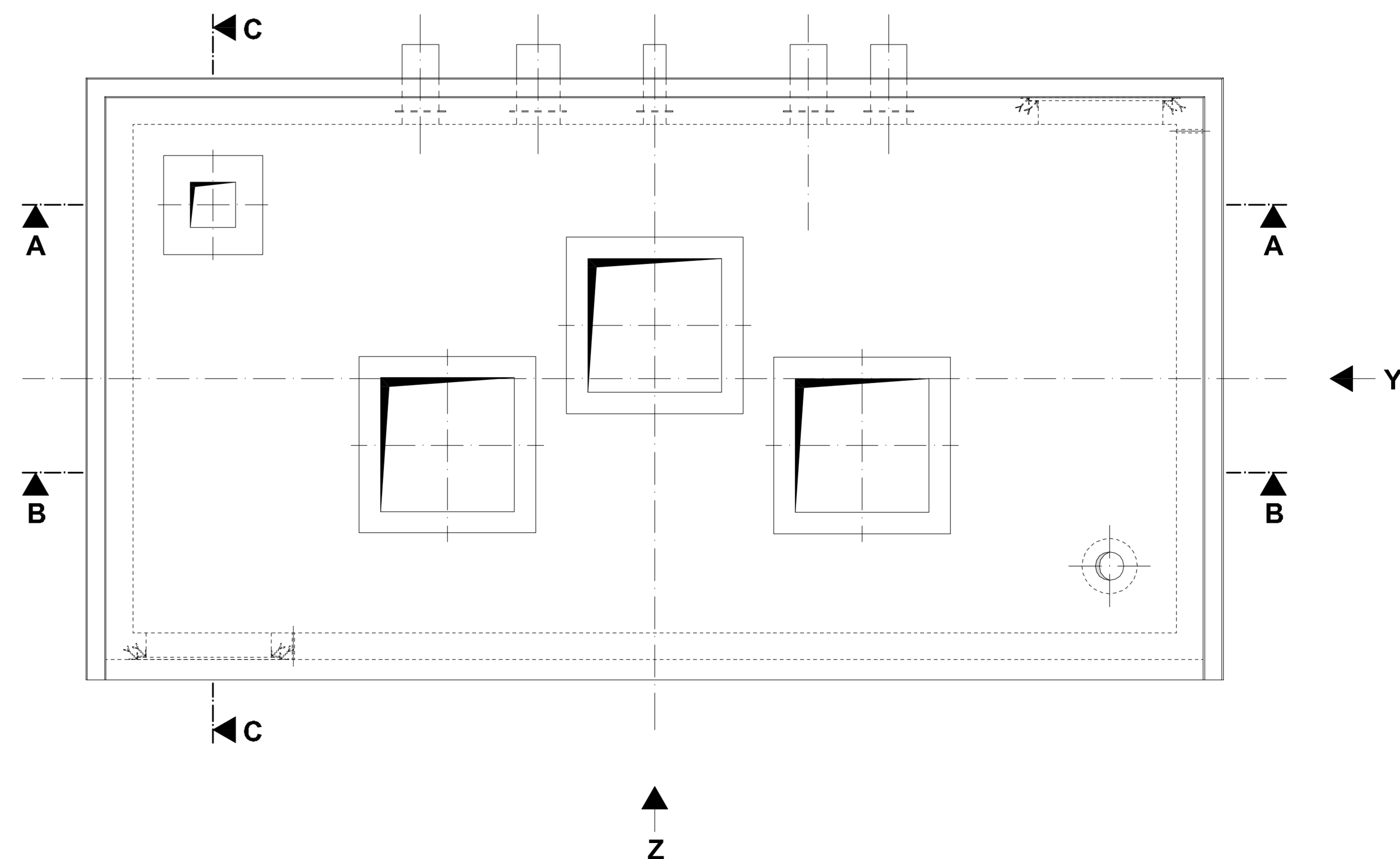
**VIEW Y**  
**ANSICHT Y**



**SECTION D - D**  
**SCHNITT D - D**



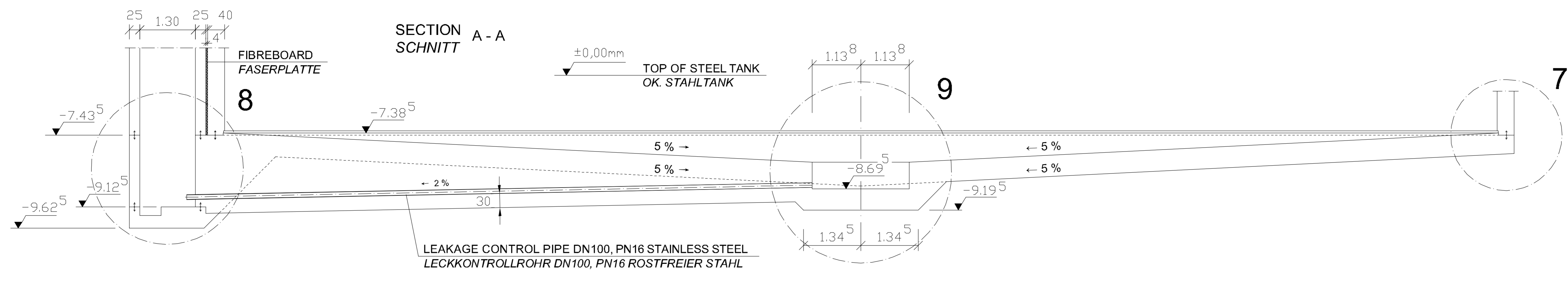
**TOP VIEW**  
**DRAUFSICHT**



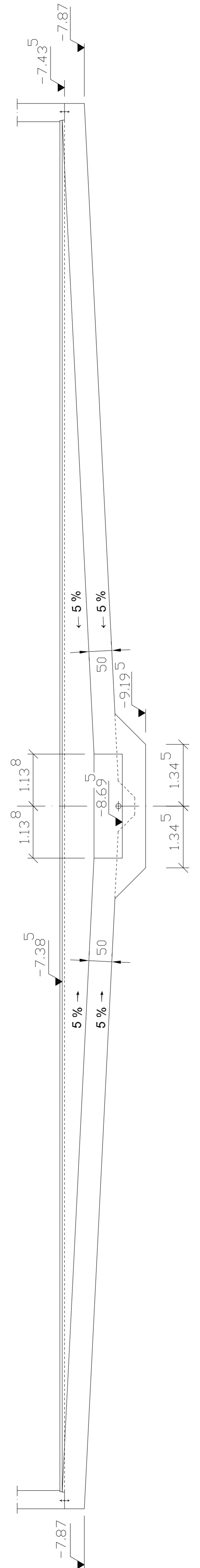
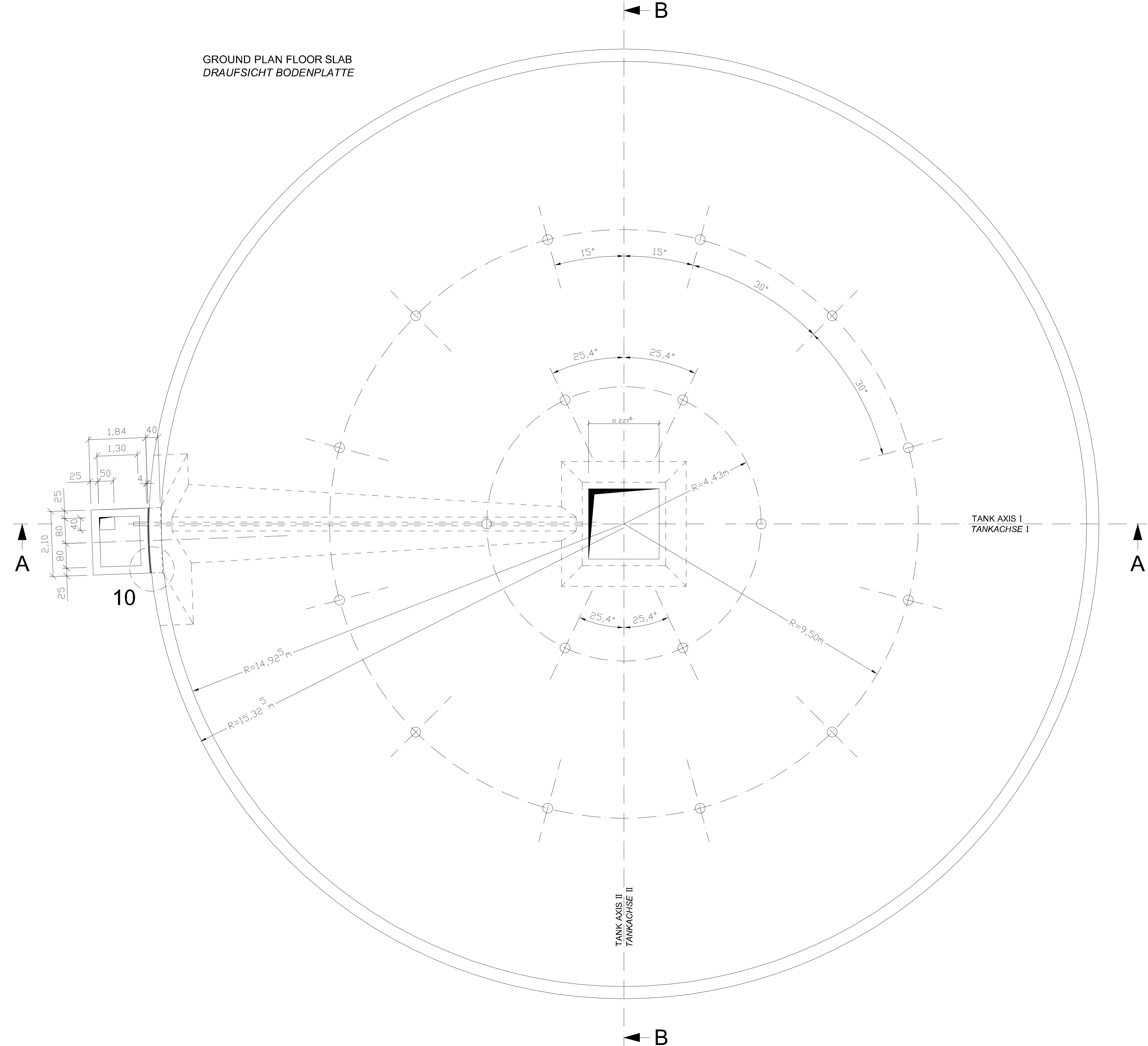
**PERTINENT DRAWINGS**  
**ZUGEHÖRIGE ZEICHNUNGEN**

- C-1.5 CONSTRUCTION PLAN PUMP HOUSE  
BAUKONSTRUKTIONSPLAN, PUMPENHAUS
- C-1.12 TANK STAIRS AND SPLINTER PROTECTION DOOR  
TANKTREPPE UND SPLITTERSCHUTZTÜR

REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
<b>HEADQUARTERS</b> UNITED STATES AIR FORCES EUROPE ENGINEERING & OPERATIONS				
AIRFIELD STANDARD DESIGN US JET FUEL STORAGE AND DISPENSING SYSTEMS		FLUGPLATZ STANDARDPLANUNG US FLUGKRAFTSTOFF - VERSORGSANLAGEN		
<b>BUILDING</b> BAUWERK <b>OPERATING TANK 5000m³</b> <b>FLACHBODENTANK 5000m³</b>				
<b>DESIGNATOR</b> BEZEICHNUNG <b>FORMWORK PLAN, PUMP HOUSE, ROOF AND WALLS</b> <b>SCHALPLAN, PUMPENHAUS, DECKE UND WÄNDE</b>				
<b>WORKED/BEARBEITET</b> LANDBAU- UND BAUWERKE UND BAUWERKE LANDBAU- UND BAUWERKE LANDBAU- UND BAUWERKE LANDBAU- UND BAUWERKE		<b>APPROVED/GENEHIGT</b> AMT FÜR BUNDESBAU WALLSTR. 1 55122 MAINZ		
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAUWERKE IN EUROPA (AUSSER DEUTSCHLAND)				
<b>APPROVED</b> GENEHIGT IN ORIGINAL, GZZ	<b>DATE</b> DATUM 6. MAI 2015	<b>SCALE</b> MASSSTAB 1:10 ; 1:25	<b>C - 1.6</b>	
<b>CONSTRUCTION PROJECT</b> BAUWERKNAME		<b>SHEET NO.</b> PLATZNR. OF VON		



GROUND PLAN FLOOR SLAB  
DRAUSICHT BODENPLATTE



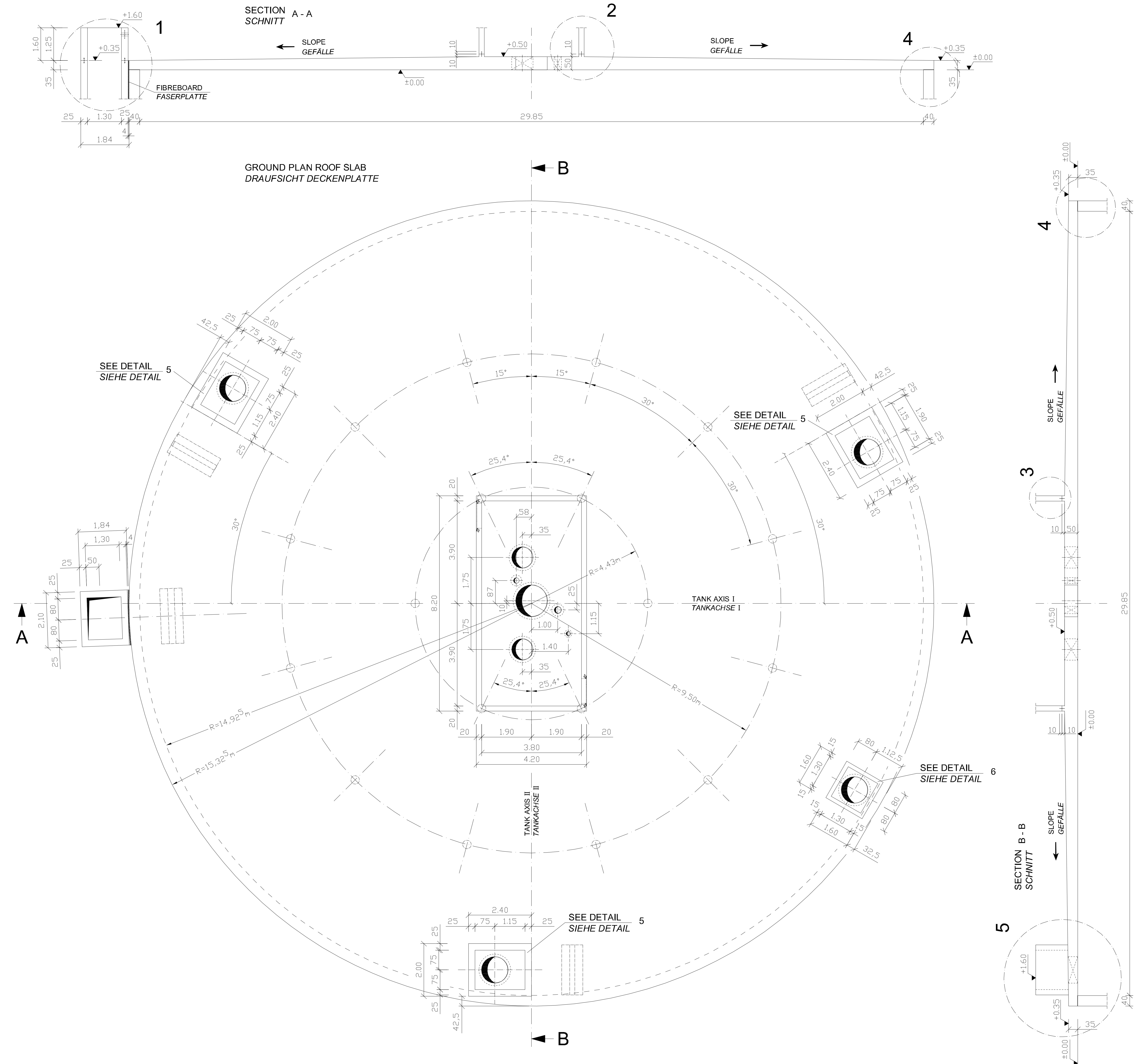
SECTION B - B  
SCHNITT

**PERTINENT DRAWINGS**  
ZUGEHÖRIGE ZEICHNUNGEN

C-1.9 FORMWORK PLAN, DETAILS ROOF - AND FLOOR SLAB  
SCHALPLAN, DETAILS DECKEN - UND BODENPLATTE

REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
<b>HEADQUARTERS</b> <b>UNITED STATES</b> <b>AIR FORCES EUROPE</b>				
<b>ENGINEERING &amp; OPERATIONS</b>				
<b>AIRFIELD</b> STANDARD DESIGN US		<b>FLUGPLATZ</b> STANDARDPLANUNG US		
<b>JET FUEL STORAGE AND DISPENSING SYSTEMS</b>		<b>FLUGKRAFTSTOFF - VERSORGSANLAGEN</b>		
<b>BUILDING</b> BAUWERK <b>OPERATING TANK 5000m³</b> <b>FLACHBODENTANK 5000m³</b>				
<b>DESIGNATOR</b> BEZEICHNUNG <b>FORMWORK PLAN, FLOOR SLAB AND WALL</b> <b>SCHALPLAN, BODENPLATTE UND WAND</b>				
WORKED/BEARBEITET LANSKRETSFÖRRE LÖSNINGS- UND SAJÄRRENINGAR LÖSNINGS- UND SAJÄRRENINGAR AMNÖRNETT, UNDERLAGOR, PLAN, SKISSAR TRÄKOR, SKISSAR, PLAN, SKISSAR, UNDERLAGOR LANDSÄLL BY FÖRRETTIG I BEHÖRNING ORIGINAL, KOPPIER IN DRÖJNING, ÖZ SKISSAR, KOPPIER, UNDERLAGOR		APPROVED/GENEHMIGT AMT FÜR BUNDESBAU WALLSTR.1 55122 MAINZ ORIGINAL, BILDER IN DRÖJNING, ÖZ NOVEMBER 2012		
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAUMASSNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
<b>APPROVED</b> GENEHMIGT ORIGINAL, BILDER IN DRÖJNING, ÖZ GERÄTE, BILDER ORIGINAL, BILDER IN DRÖJNING, ÖZ CAD-PROGRAMME CAD-PROGRAMME	<b>DATE</b> DATUM <b>6. MAI 2015</b>	<b>SCALE</b> MASSSTAB <b>1:50</b>	<b>C - 1.7</b>	
<b>CONSTRUCTION PROJECT</b> BAUMASSNAHME			<b>SHEET NO.</b> PLATZNR. <b>OF</b> VON	



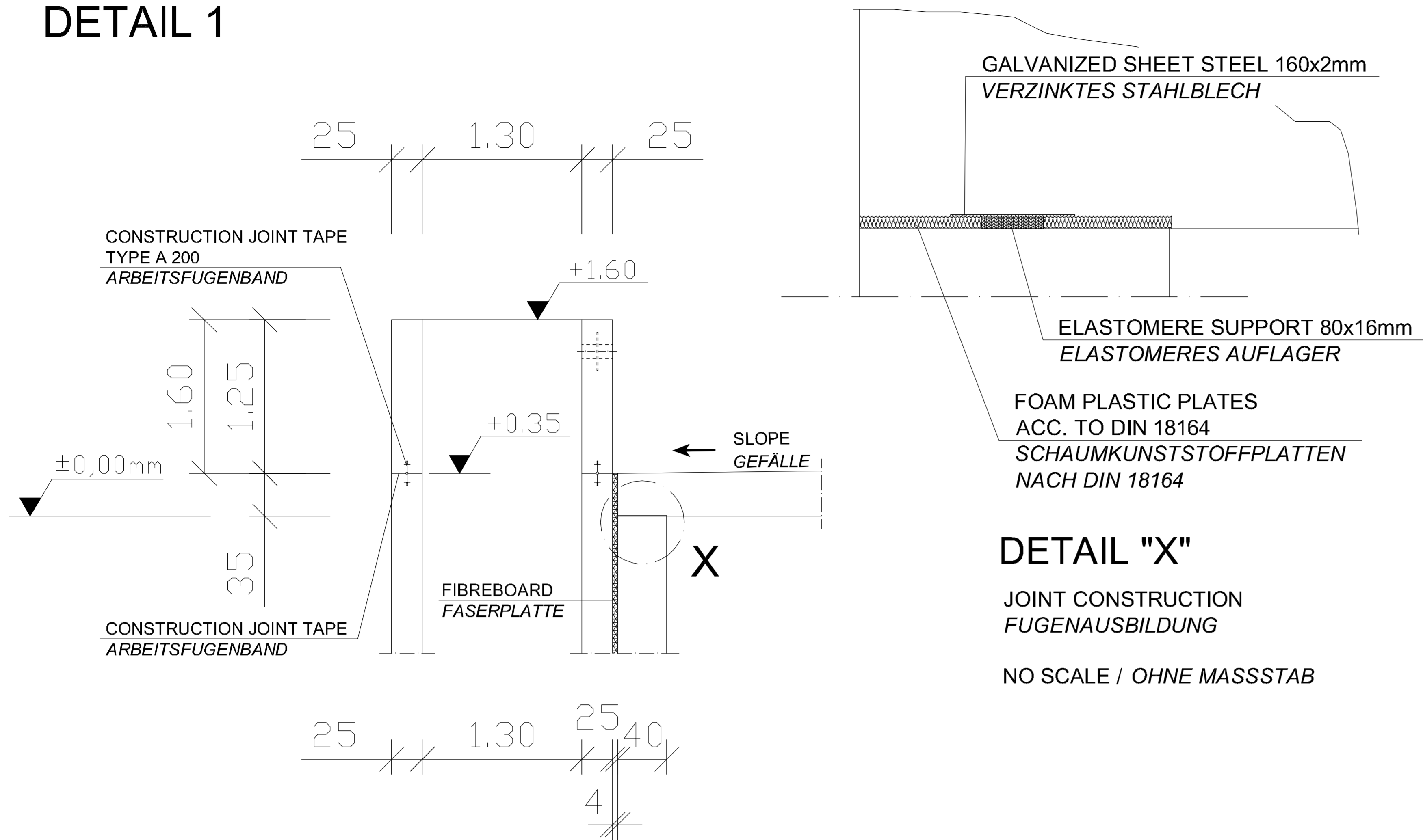


- PERTINENT DRAWINGS  
ZUGEHÖRIGE ZEICHNUNGEN**
- C-1.4 DETAILS - MANHOLES AND LEAKAGE CONTROL PIT  
DETAILS - MONTAGEÖFFNUNGEN UND LECKKONTROLLSCHACHT
  - C-1.9 FORMWORK PLAN, DETAILS ROOF - AND FLOOR SLAB  
SCHALPLAN, DETAILS DECKEN - UND BODENPLATTE

REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
<b>HEADQUARTERS</b> UNITED STATES AIR FORCES EUROPE 				
<b>AIRFIELD</b> STANDARD DESIGN US		<b>FLUGPLATZ</b> STANDARDPLANUNG US		
<b>JET FUEL STORAGE AND DISPENSING SYSTEMS</b>		<b>FLUGKRAFTSTOFF - VERSORGSANLAGEN</b>		
<b>OPERATING TANK 5000m³ FLACHBODENTANK 5000m³</b>				
<b>FORMWORK PLAN, ROOF SLAB SCHALPLAN, DECKENPLATTE</b>				
WORKED/BEARBEITET LANDSBEREITUNGSGESAMTSCHAFT UND BAUEINRICHTUNG L & B AMT FÜR BUNDESBAU WALLSTR. 1 55122 MAINZ	APPROVED/GENEHIGT ORIGINAL SIGNED BY: IN ORIGINAL DED.			
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAU MASSNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED/GENEHIGT ORIGINAL SIGNED BY: IN ORIGINAL DED.	DATE 6. MAI 2015	SCALE MASSSTAB 1:50 / 1:25	C - 1.8	
CONSTRUCTION PROJECT BAU MASSNAHME			SHEET NO. PLATZ NR.	OF VON



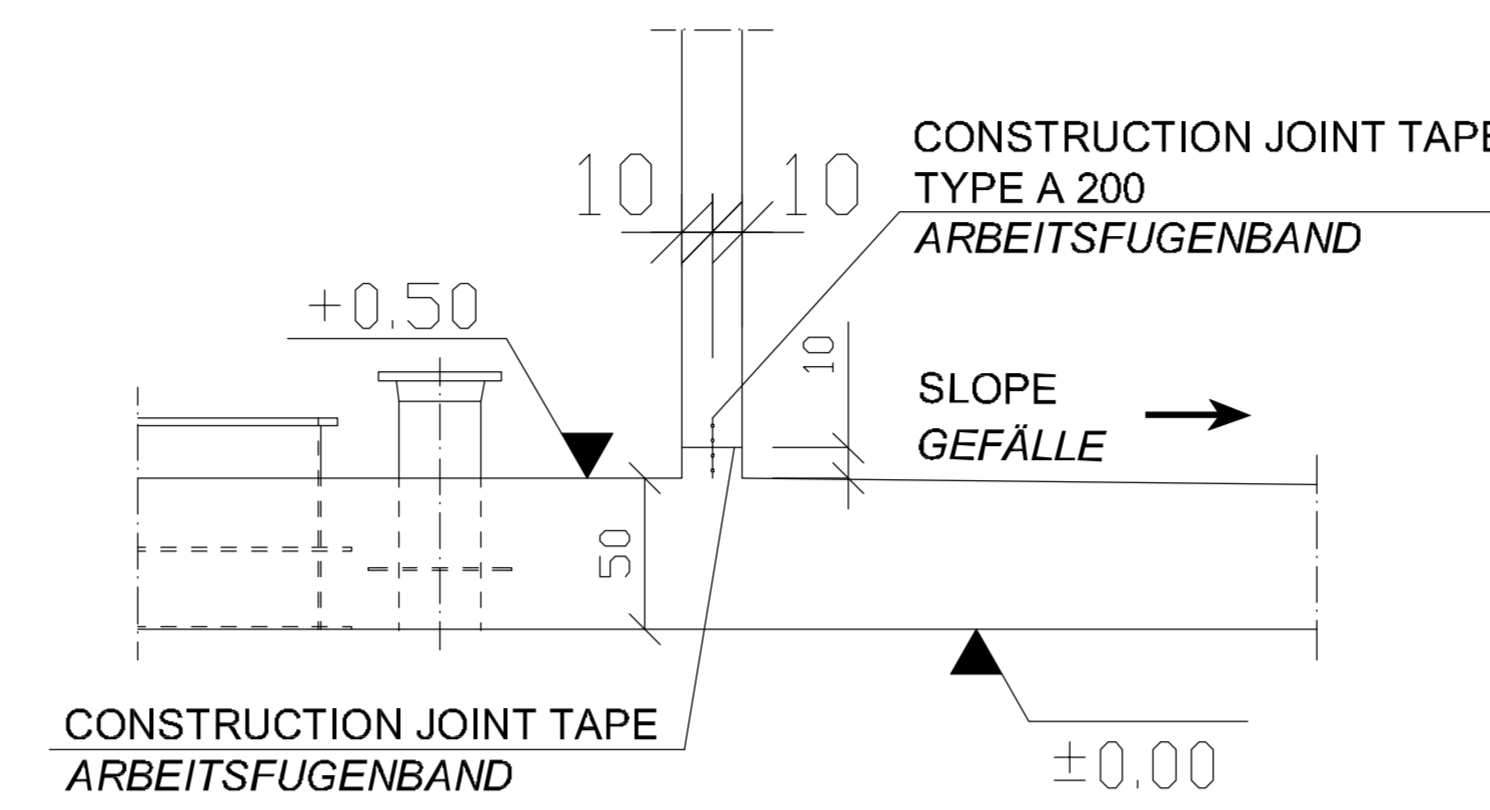
DETAIL 1



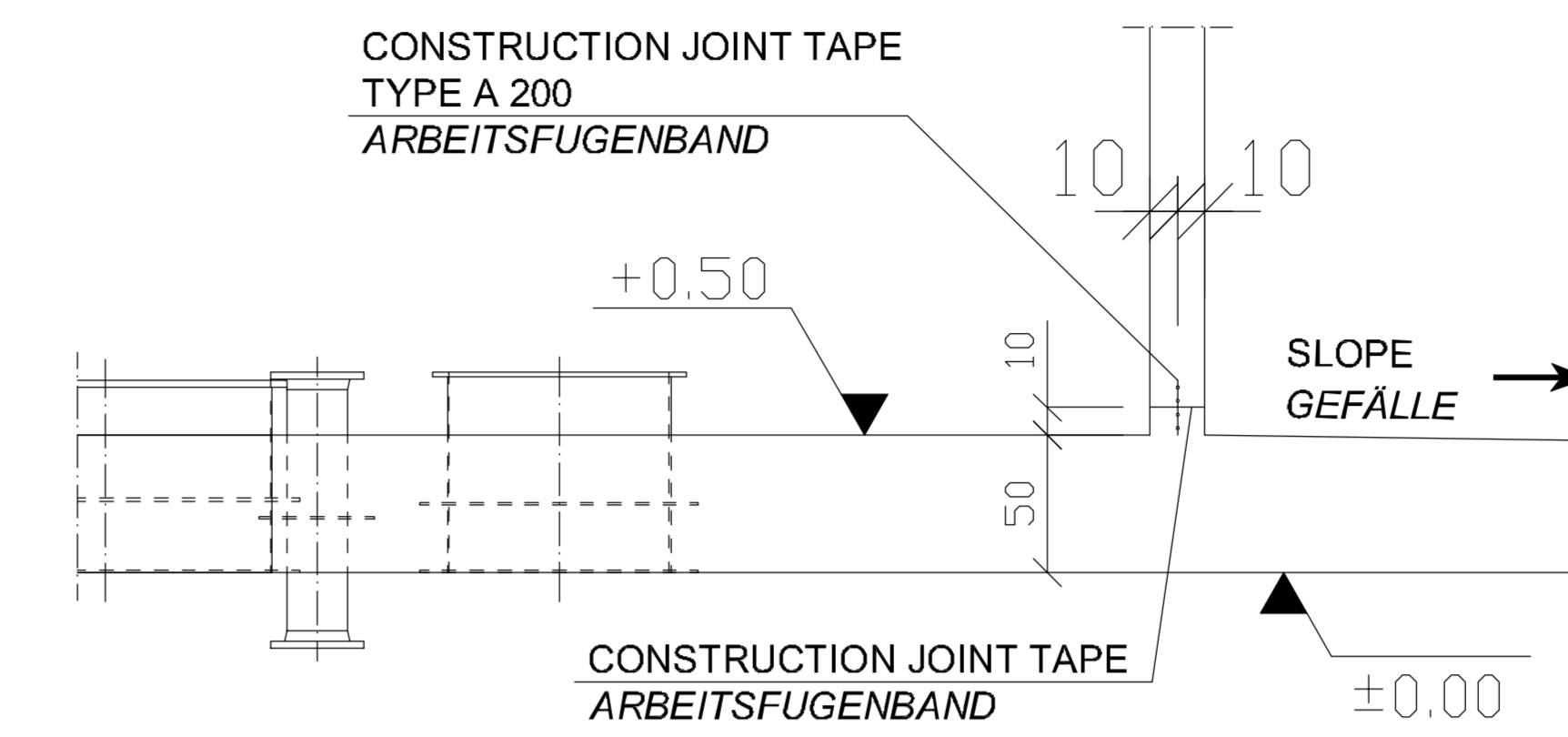
DETAIL "X"

JOINT CONSTRUCTION  
FUGENAUSBILDUNG  
NO SCALE / OHNE MASSSTAB

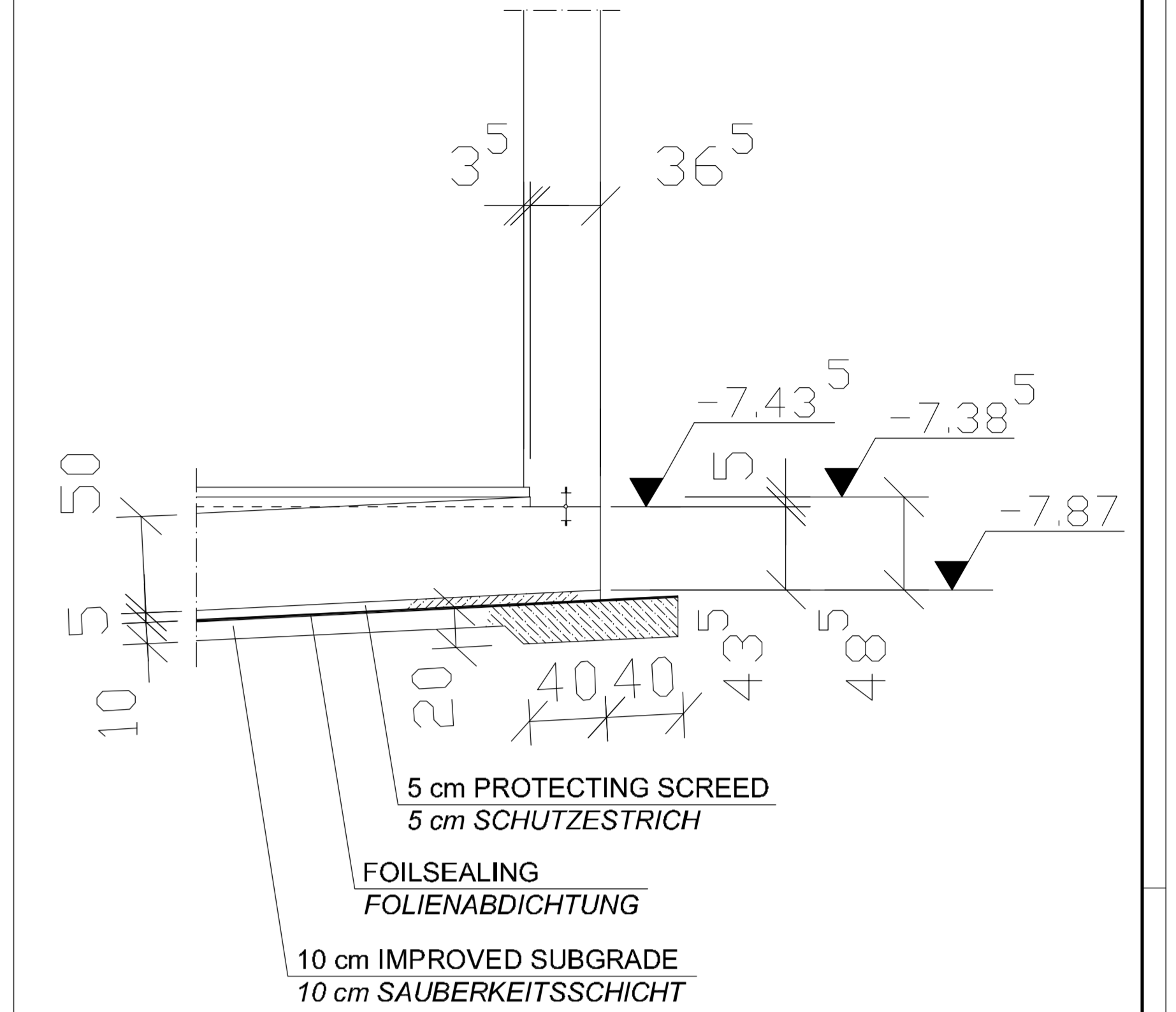
DETAIL 2



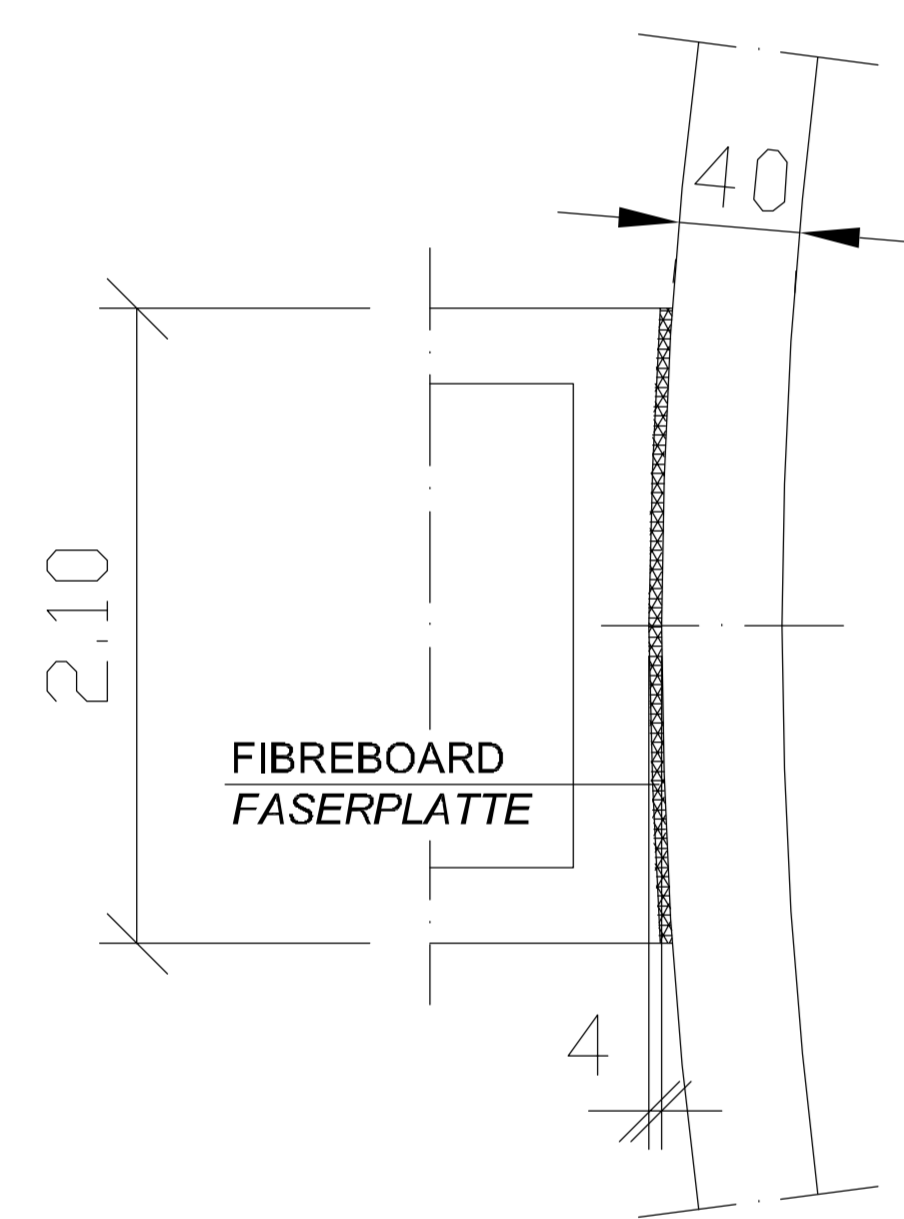
DETAIL 3



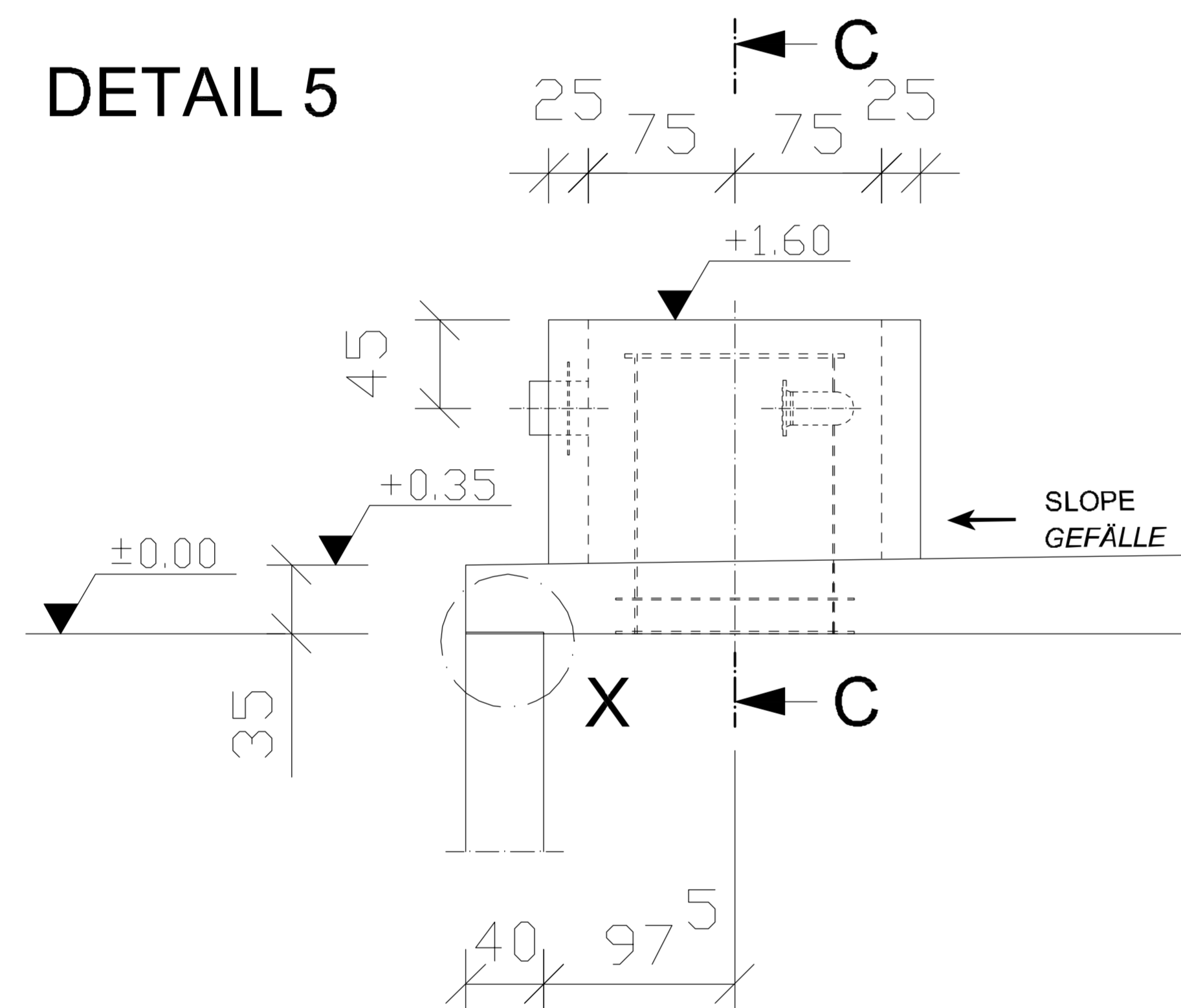
DETAIL 7



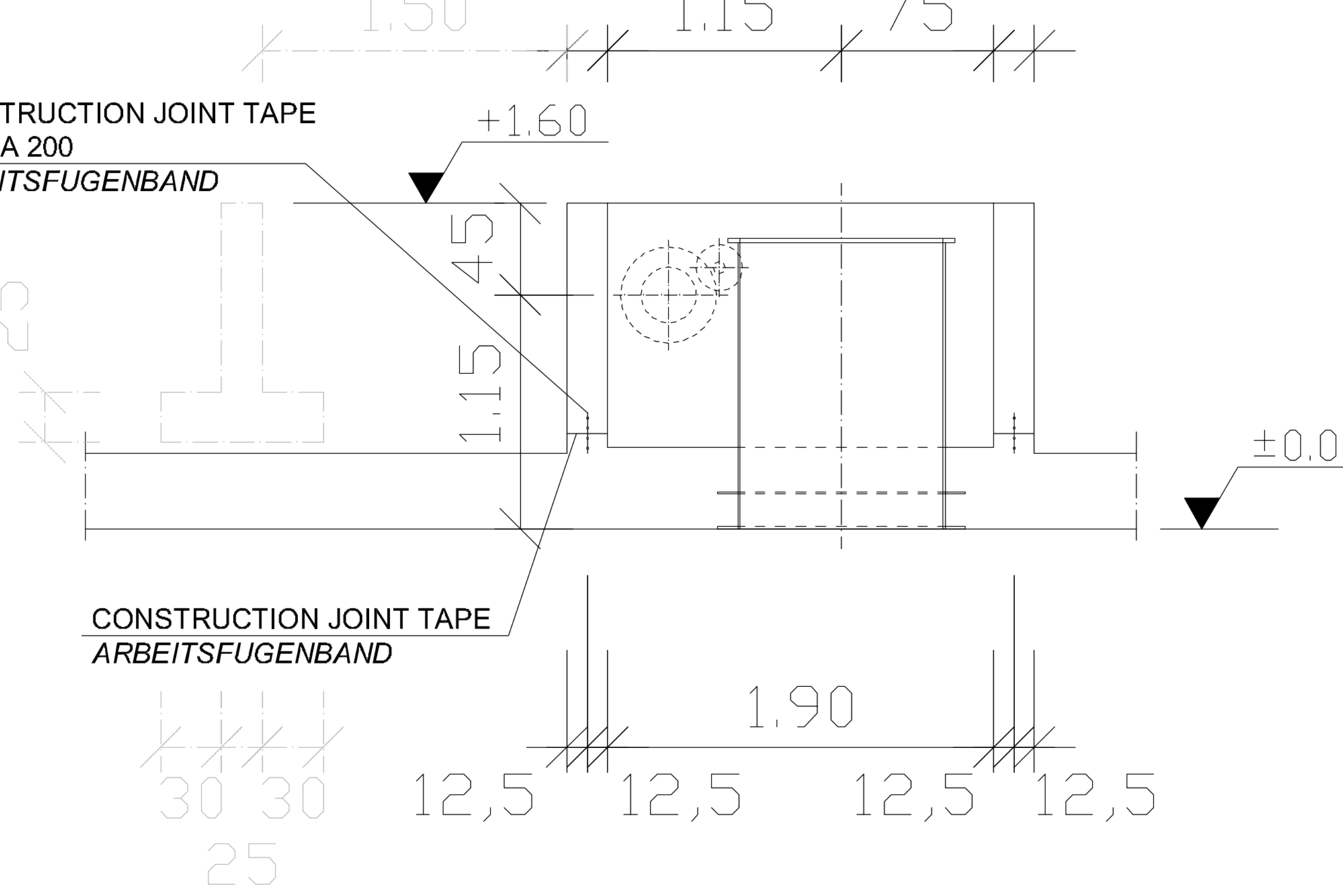
DETAIL 10



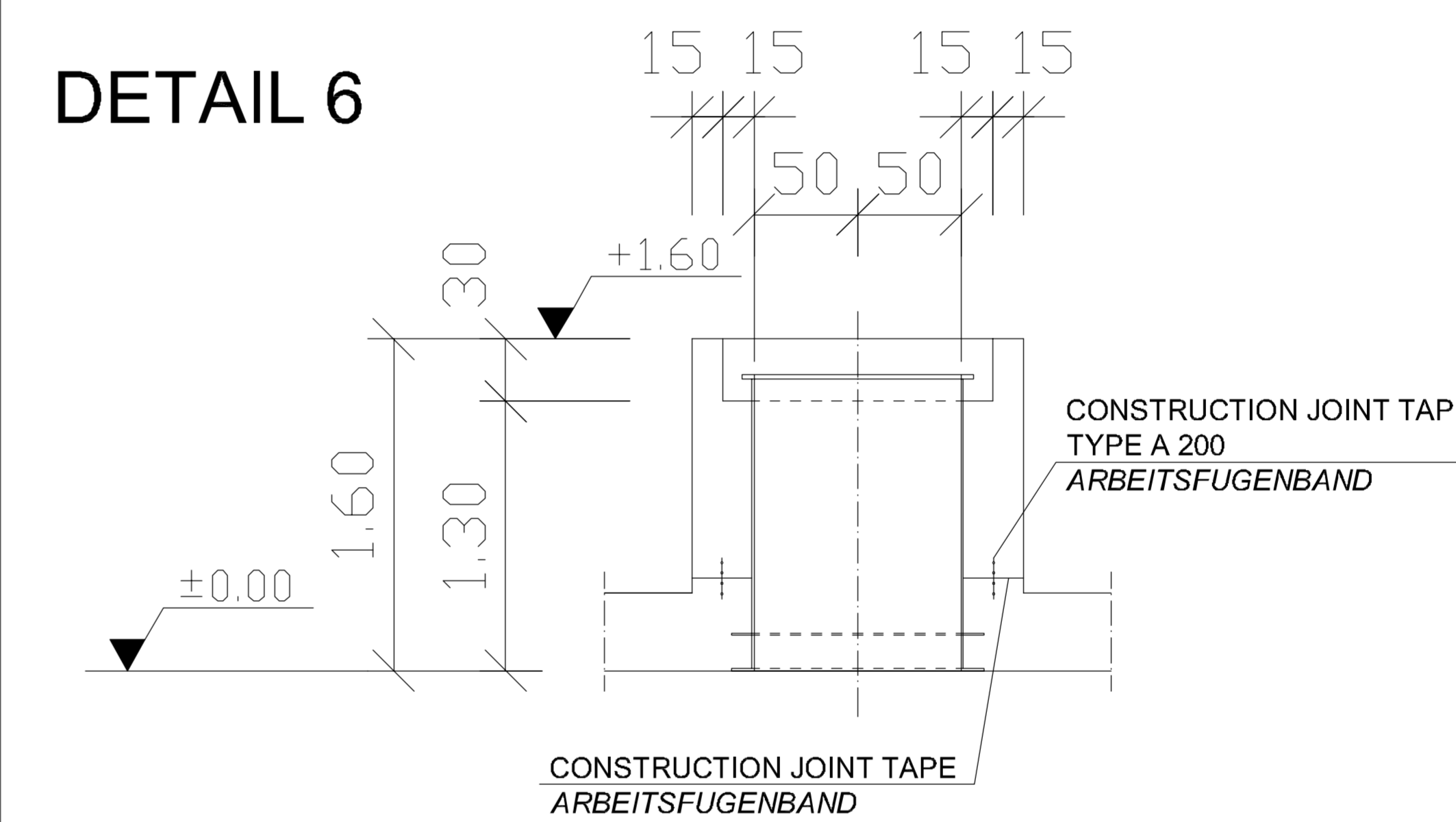
DETAIL 5



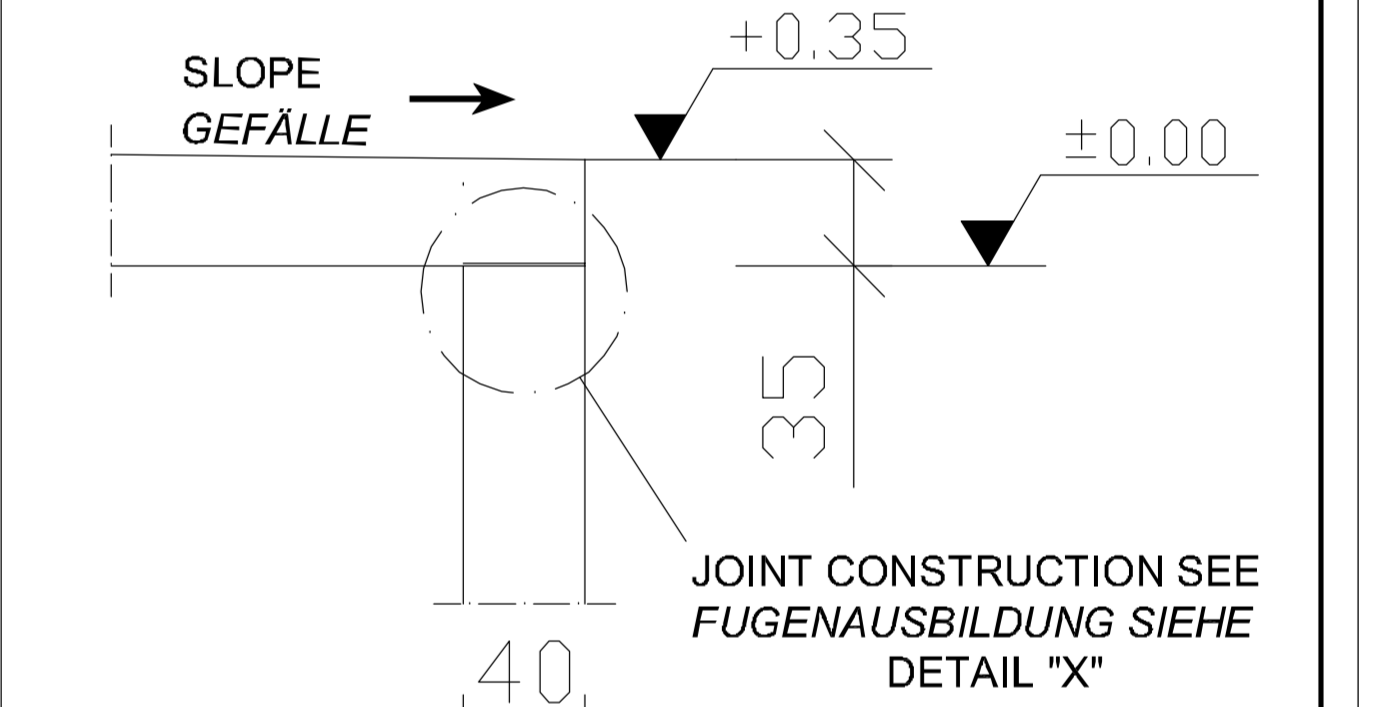
SECTION C-C



DETAIL 6

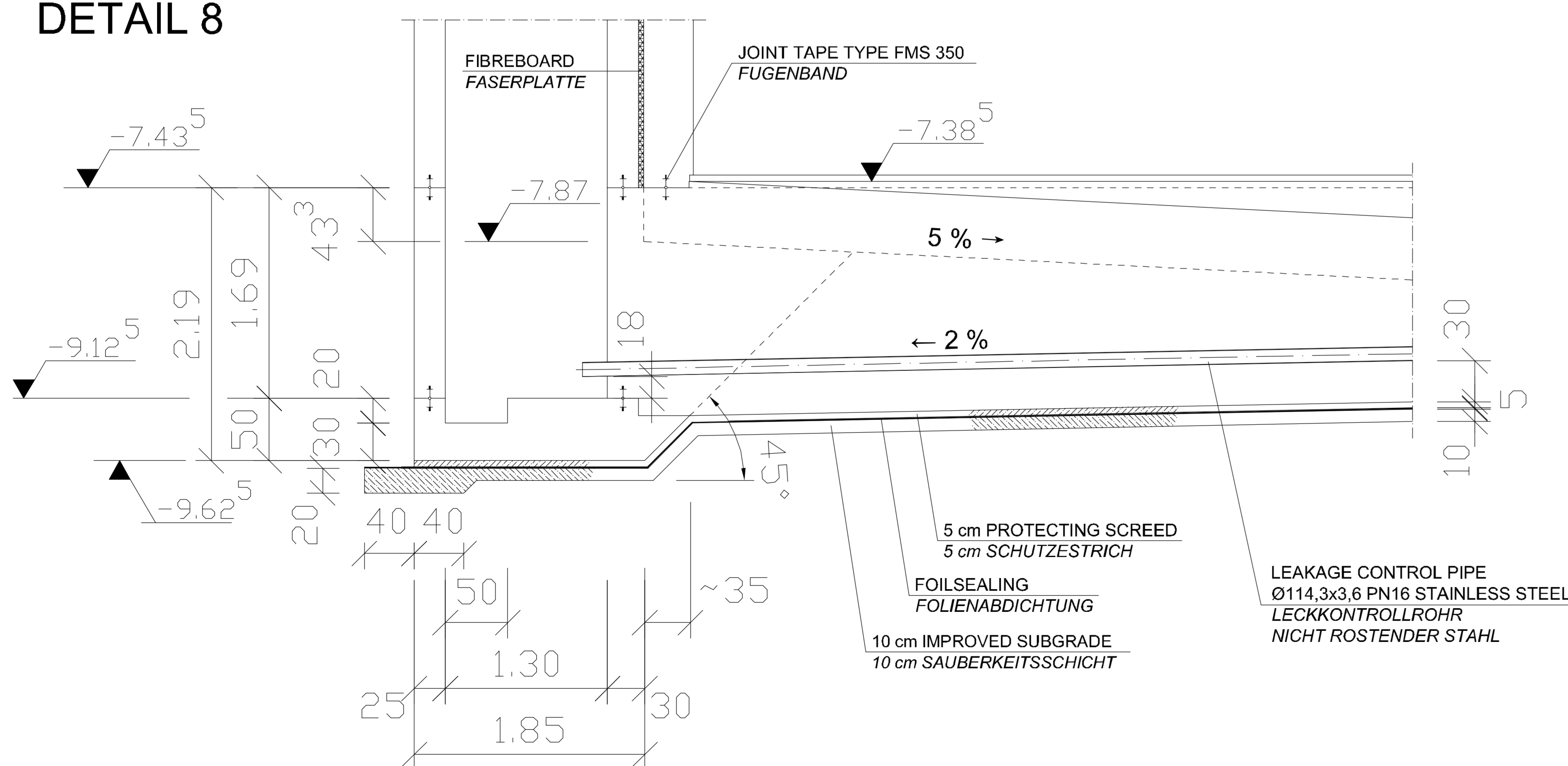


DETAIL 4

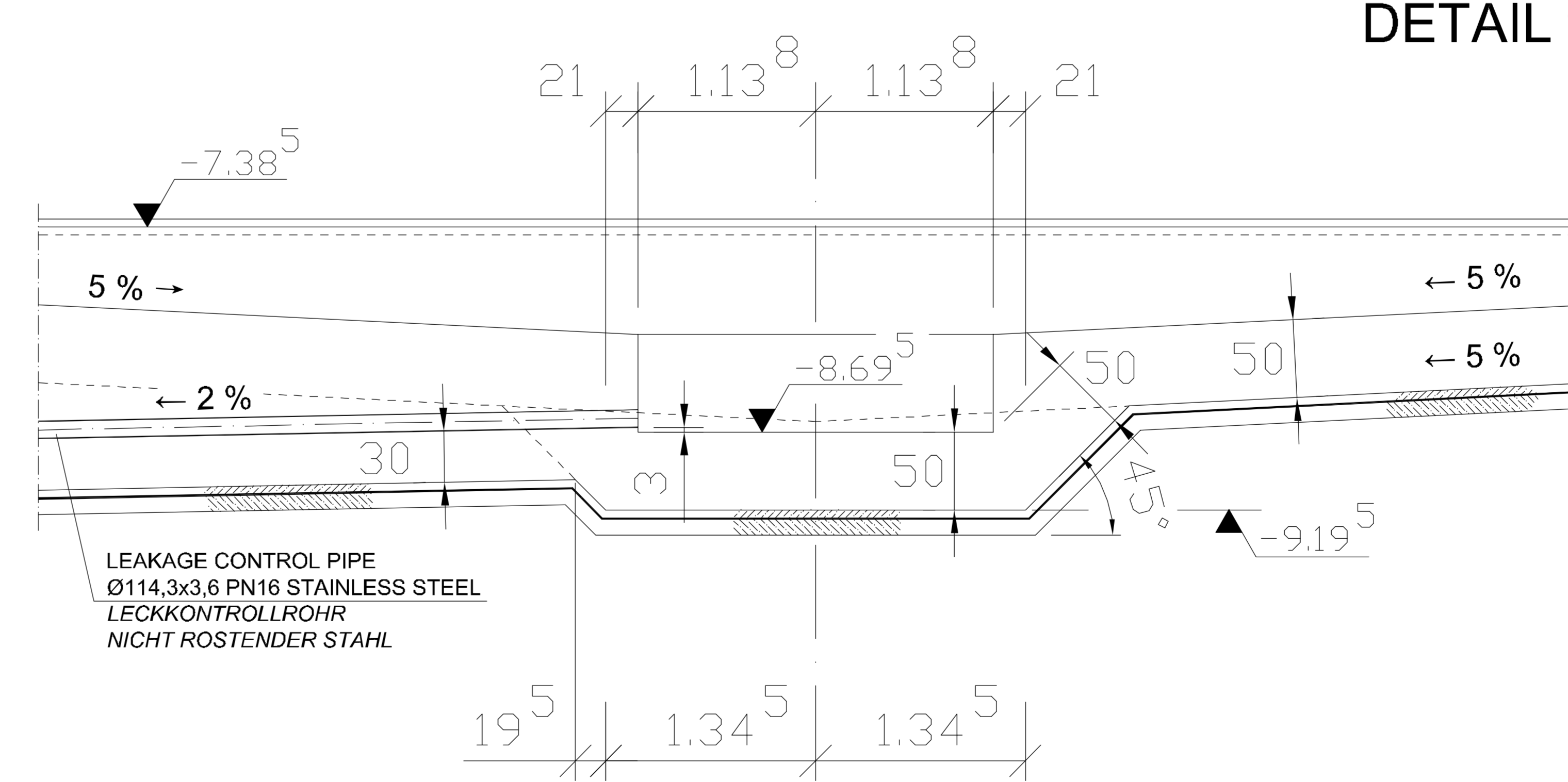


- PERTINENT DRAWINGS  
ZUGEHÖRIGE ZEICHNUNGEN
- C-1.4 DETAILS - MANHOLES AND LEAKAGE CONTROL PIT  
DETAILS - MONTAGEÖFFNUNGEN UND LECKKONTROLLSCHACHT
  - C-1.7 FORMWORK PLAN, FLOOR SLAB AND WALL  
SCHALPLAN, BODENPLATTE UND WAND
  - C-1.8 FORMWORK PLAN, ROOF SLAB  
SCHALPLAN, DECKENPLATTE

DETAIL 8



DETAIL 9



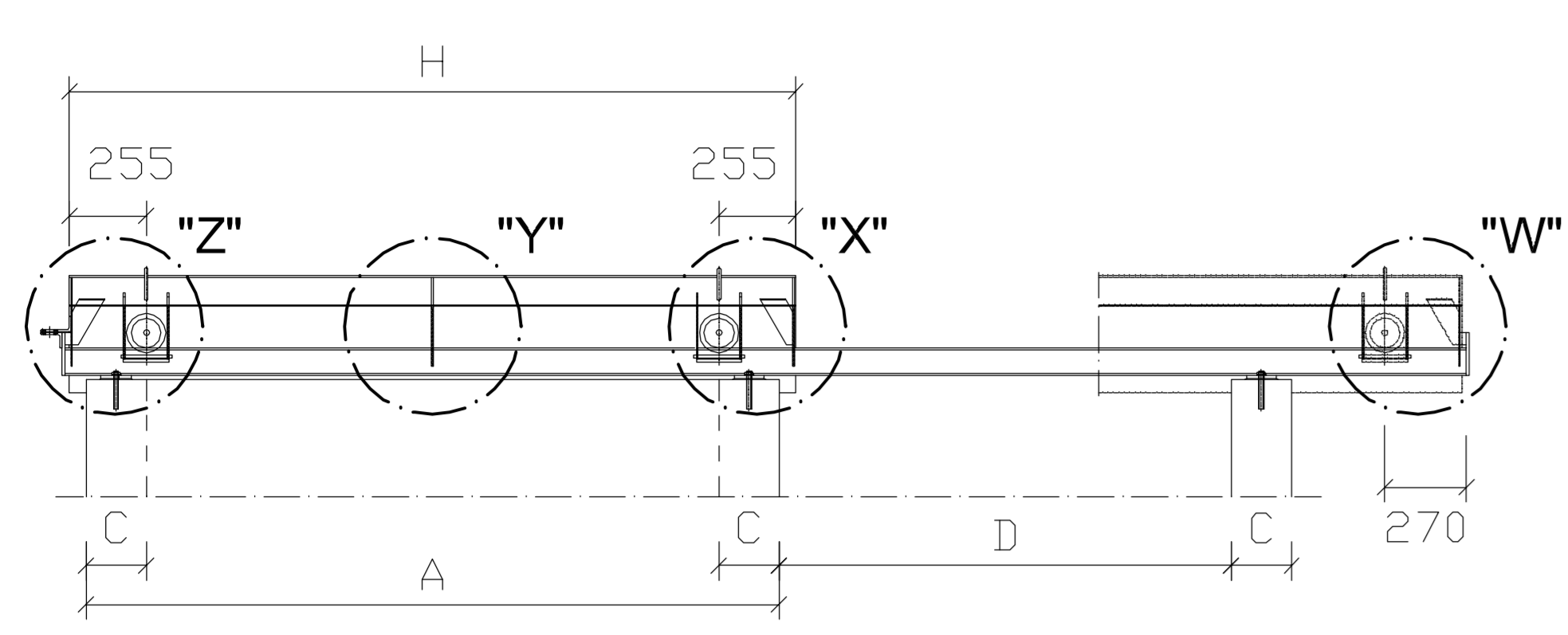
REVISION	DATE	DESCRIPTION	BY	COUNTRY
ÄNDERUNG	DATUM	BESCHREIBUNG	VON	LAND

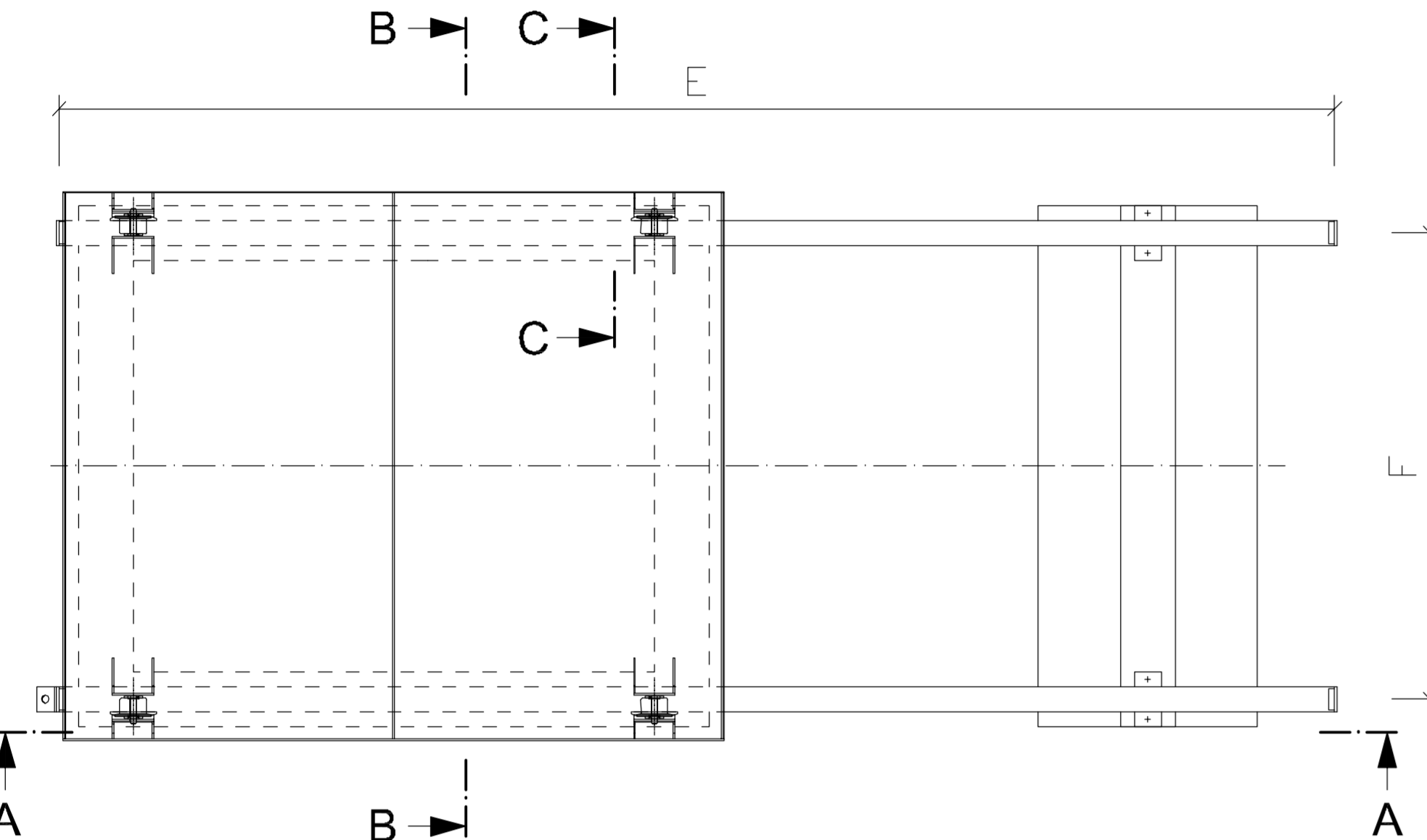
HEADQUARTERS UNITED STATES AIR FORCES EUROPE		
ENGINEERING & OPERATIONS		
AIRFIELD STANDARD DESIGN US	FLUGPLATZ STANDARDPLANUNG US	
JET FUEL STORAGE AND DISPENSING SYSTEMS	FLUGKRAFTSTOFF - VERSORGENGSANLAGEN	
BUILDING BAUWERK OPERATING TANK 5000m <sup>3</sup> FLACHBODENTANK 5000m <sup>3</sup>		
DESIGNATOR BEZEICHNUNG FORMWORK PLAN, DETAILS ROOF- AND FLOOR SLAB SCHALPLAN, DETAILS DECKEN- UND BODENPLATTE		
WORKED/ABGESTELLT	PREPARED/AUFGESTELLT	APPROVED/GENEHIGT
LANDSBEREITUNGSGESAMTSCHAFT UND BAUBETRIEB LUB-BAUBEREITUNGSGESAMTSCHAFT	L B B	AMT FÜR BUNDESBAU WALLSTR.1 56122 MAINZ
LANDSBEREITUNGSGESAMTSCHAFT UND BAUBETRIEB LUB-BAUBEREITUNGSGESAMTSCHAFT	AMT FÜR BUNDESBAU WALLSTR.1 56122 MAINZ	ORIGINAL BOUND BY IN ORIGINAL SIZE NOVEMBER 2012
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAU MASSNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)		
APPROVED GENEHIGT	DATE DATUM 6. MAI 2015	SCALE MASSSTAB 1:25
ORIGINAL BOUND BY IN ORIGINAL SIZE	GENERAL BOUND IN ORIGINAL SIZE	STANDARD SHEET STANDARD PLAN
CONSTRUCTION PROJECT BAU MASSNAHME		C - 1.9 SHEET NO. PLATZ NR. OF VON



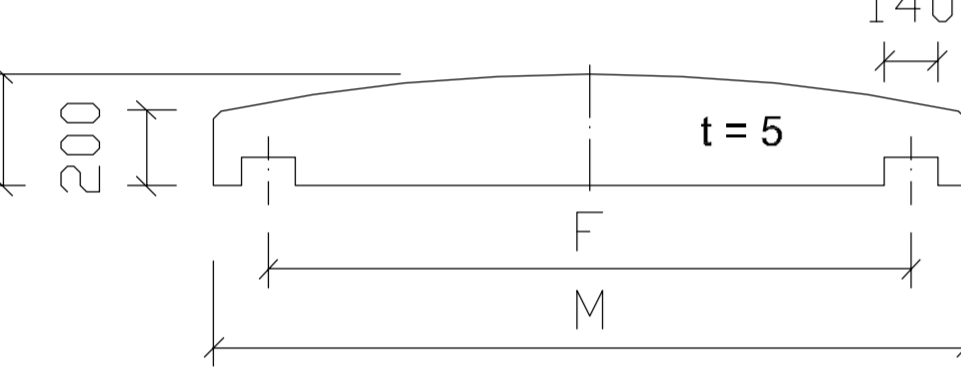
**SECTION A - A**  
**SCHNITT A - A**



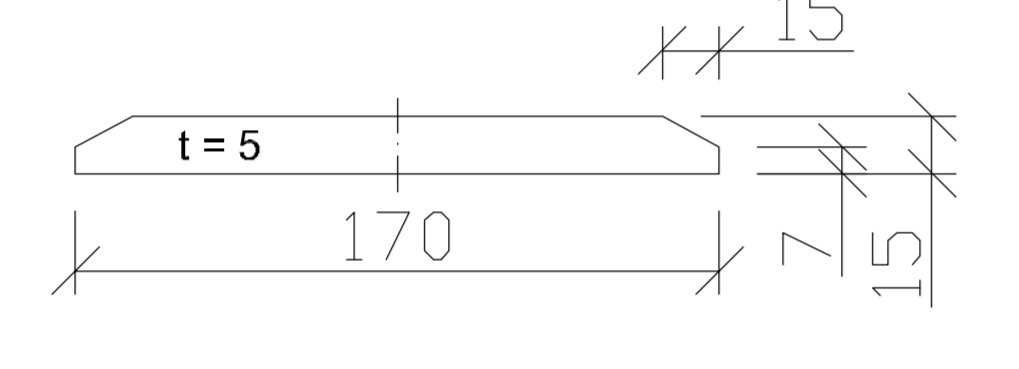
**TOP VIEW DRAUFSICHT**



**DETAIL "U"**  
GABLE PLATE AND CROSS BRACING  
STIRNBLECH UND QUERVERSTEIFUNG

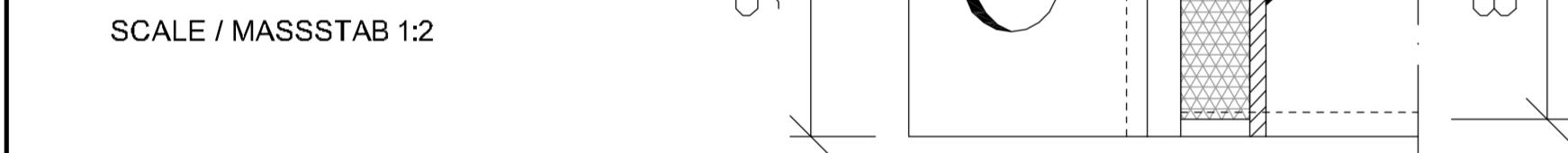


**DETAIL "V"**  
GUIDE RAIL FOR LIFT-OFF PROTECTION  
FÜHRUNGSSCHIENE FÜR ABHEBESICHERUNG



LEAKAGE CONTROL PIT LECKKONTROLLSCHACHT	A	B	C	D	E	F	G	H	J	K (5%v.J)	L	M	N	P
MANHOLE MONTAGEÖFFNUNG	2400	2000	250	1500	4800	1750	125	2510	2100	105	300	2090	192	175

**SECTION D - D**  
**SCHNITT D - D**

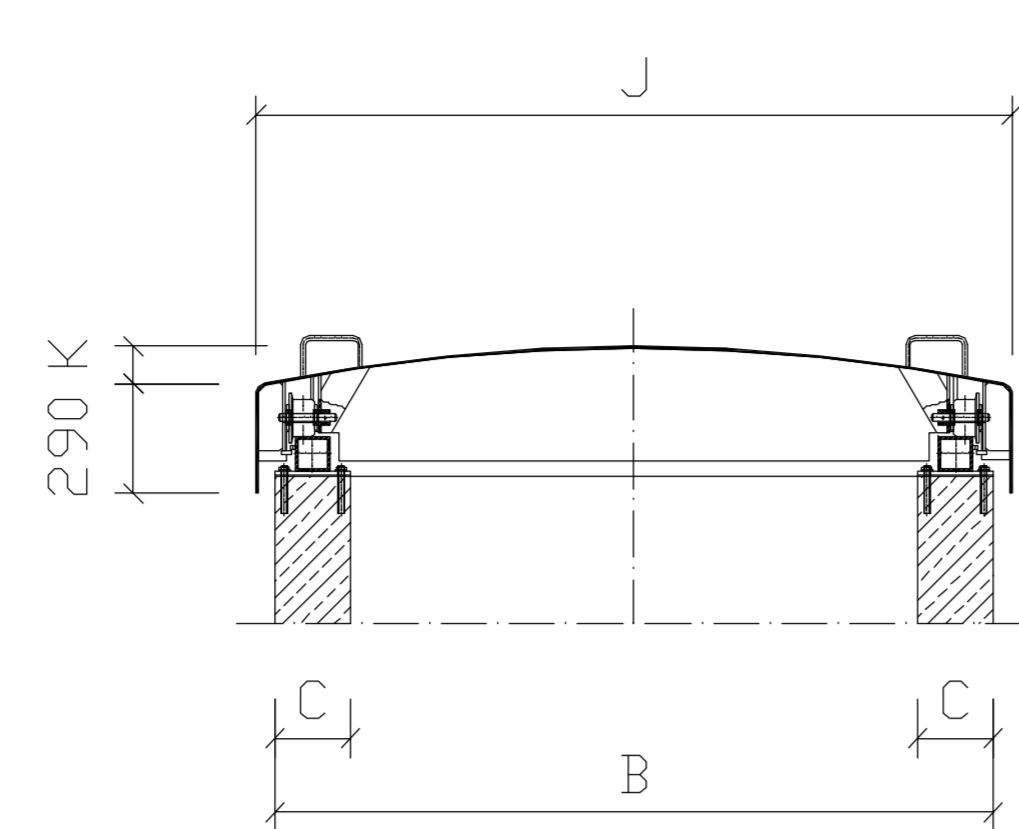


**DETAIL "Z"**

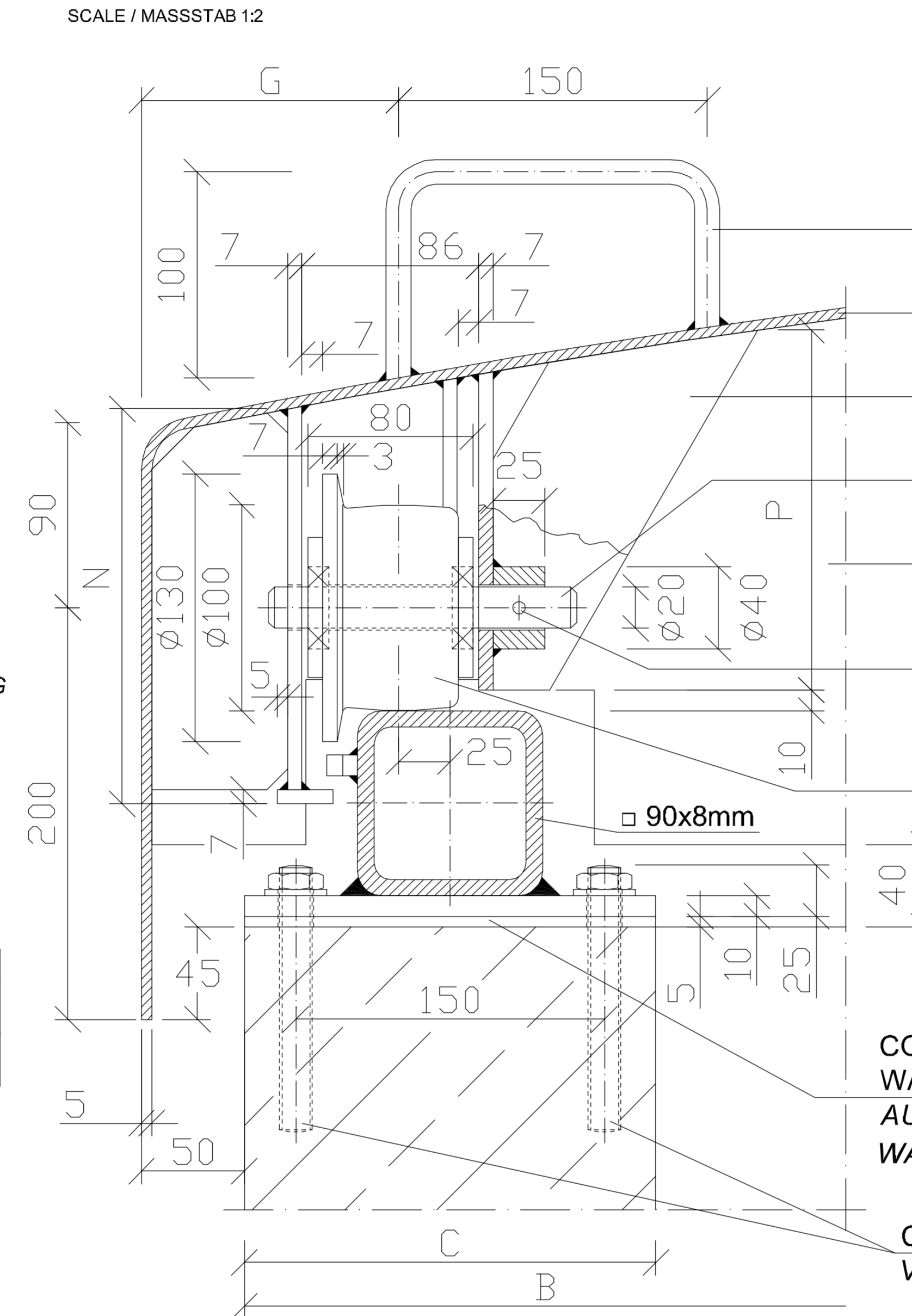
INTERLOCKING, STOP AND CASTOR  
VERRIEGELUNG, ANSCHLAG UND LAUFROLLE

SCALE / MASSSTAB 1:2

**SECTION B - B**  
**SCHNITT B - B**



**SECTION C - C**  
**SCHNITT C - C**



- HANDLE Ø12mm  
HANDGRIFF
- COVER PLATE t = 5mm  
ABDECKBLECH
- CONNECTION PLATE t = 5mm  
KNOTENBLECH
- PIN Ø20x150mm  
BOLZEN
- GABLE PLATE t = 5mm  
STIRNBLECH
- SPRING TYPE STRAIGHT Ø6x40mm  
SPANNHÜLSE
- CASTOR WITH GROOVED BALL BEARING  
LAUFROLLE MIT RILLENKUGELLAGER
- COMPENSATION LAYER OF ARTIFICIAL OR WATER RESISTANT ARTIFICIAL RESIN MORTAR  
AUSGLEICHSSCHICHT AUS KUNSTHARZ ODER WASSERDICHEM KUNSTHARZMÖRTEL
- COMPOSITE DOWEL M10x130mm  
VERBUNDANKER

**DETAIL "Y"**

CROSS BRACING  
QUERVERSTEIFUNG

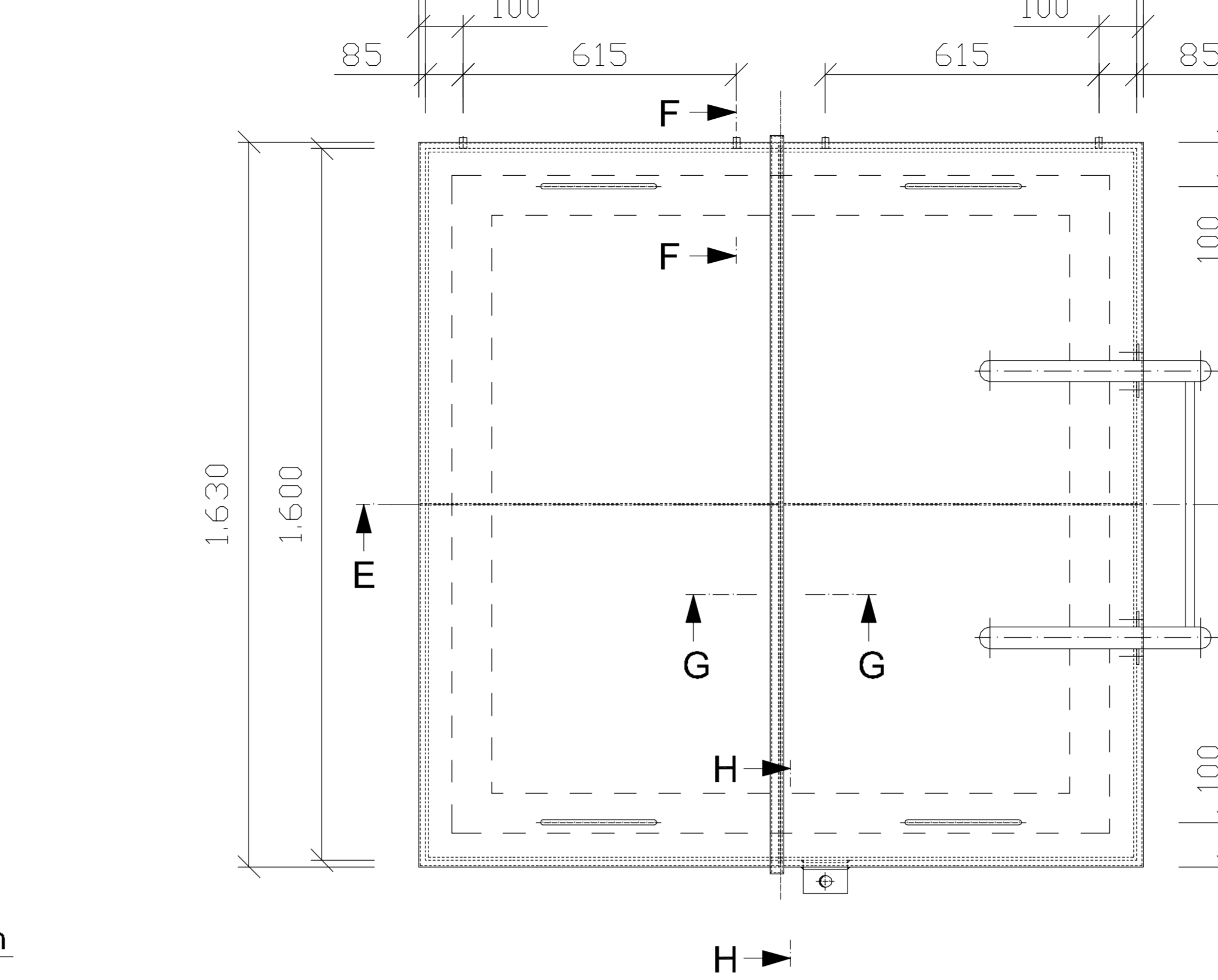
SCALE / MASSSTAB 1:2

**DETAIL "X"**

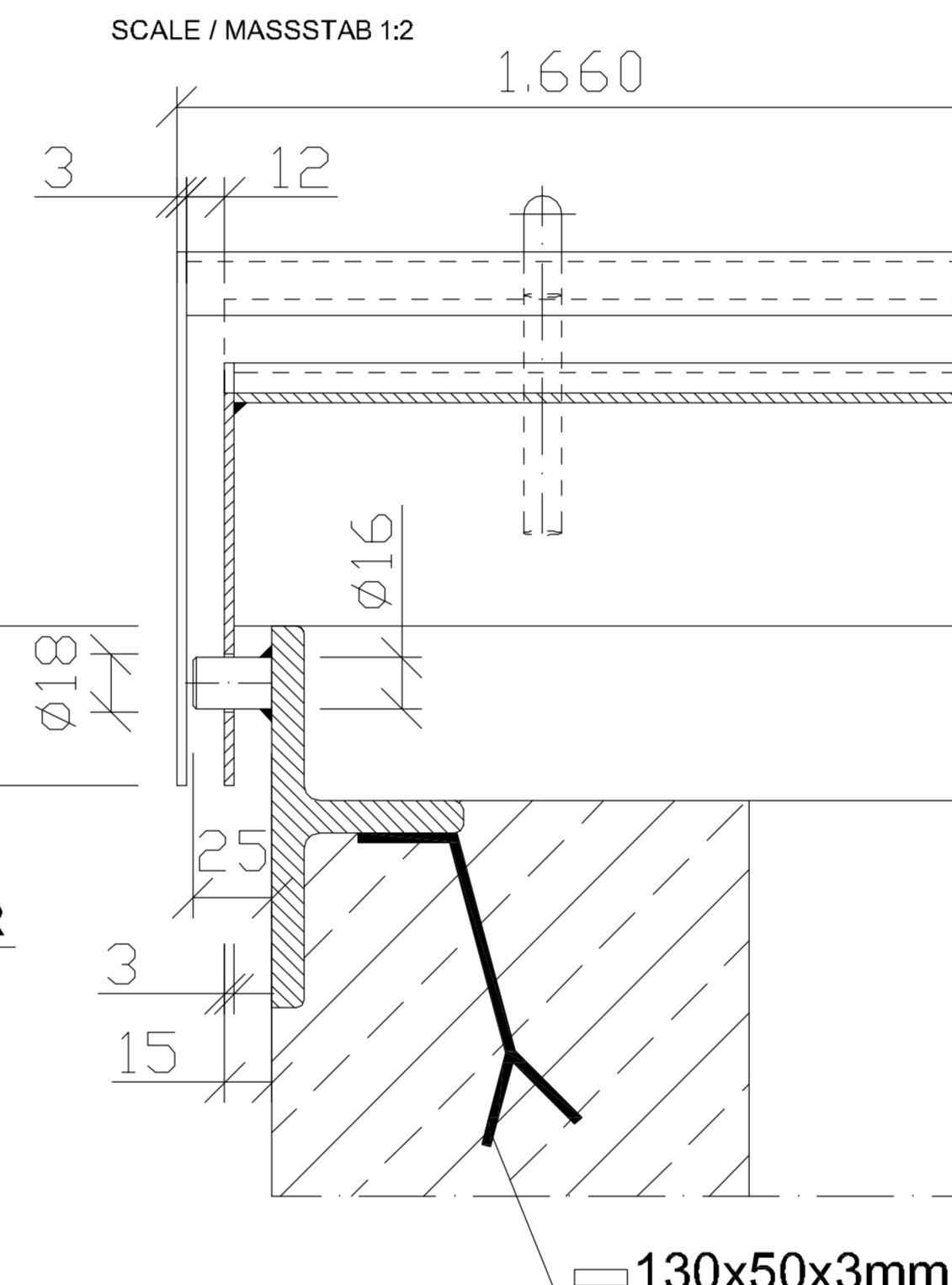
CASTOR AND RAIL HOLDING  
LAUFROLLE UND SCHIENENHALTERUNG

SCALE / MASSSTAB 1:2

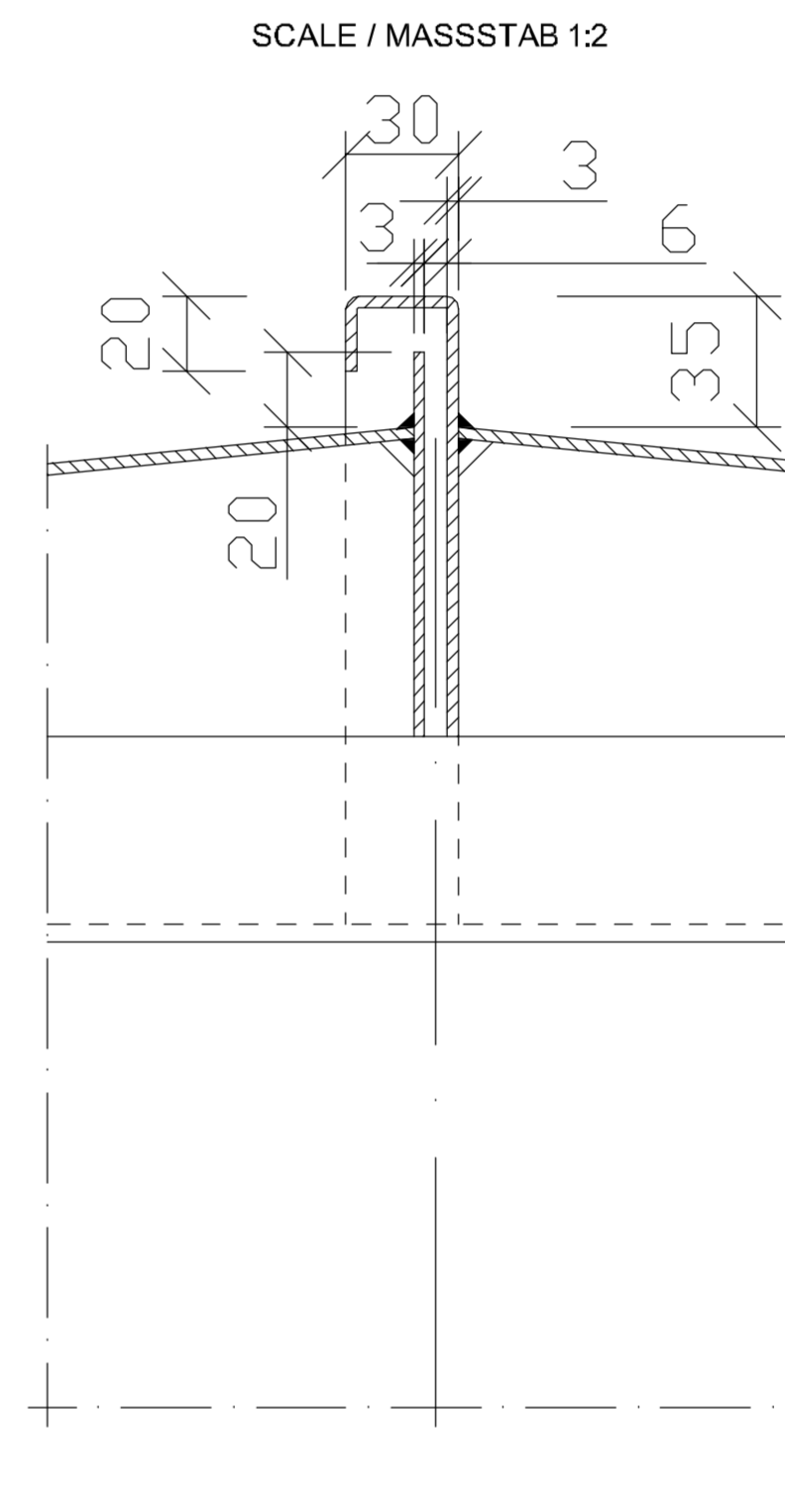
**TOP VIEW DRAUFSICHT**



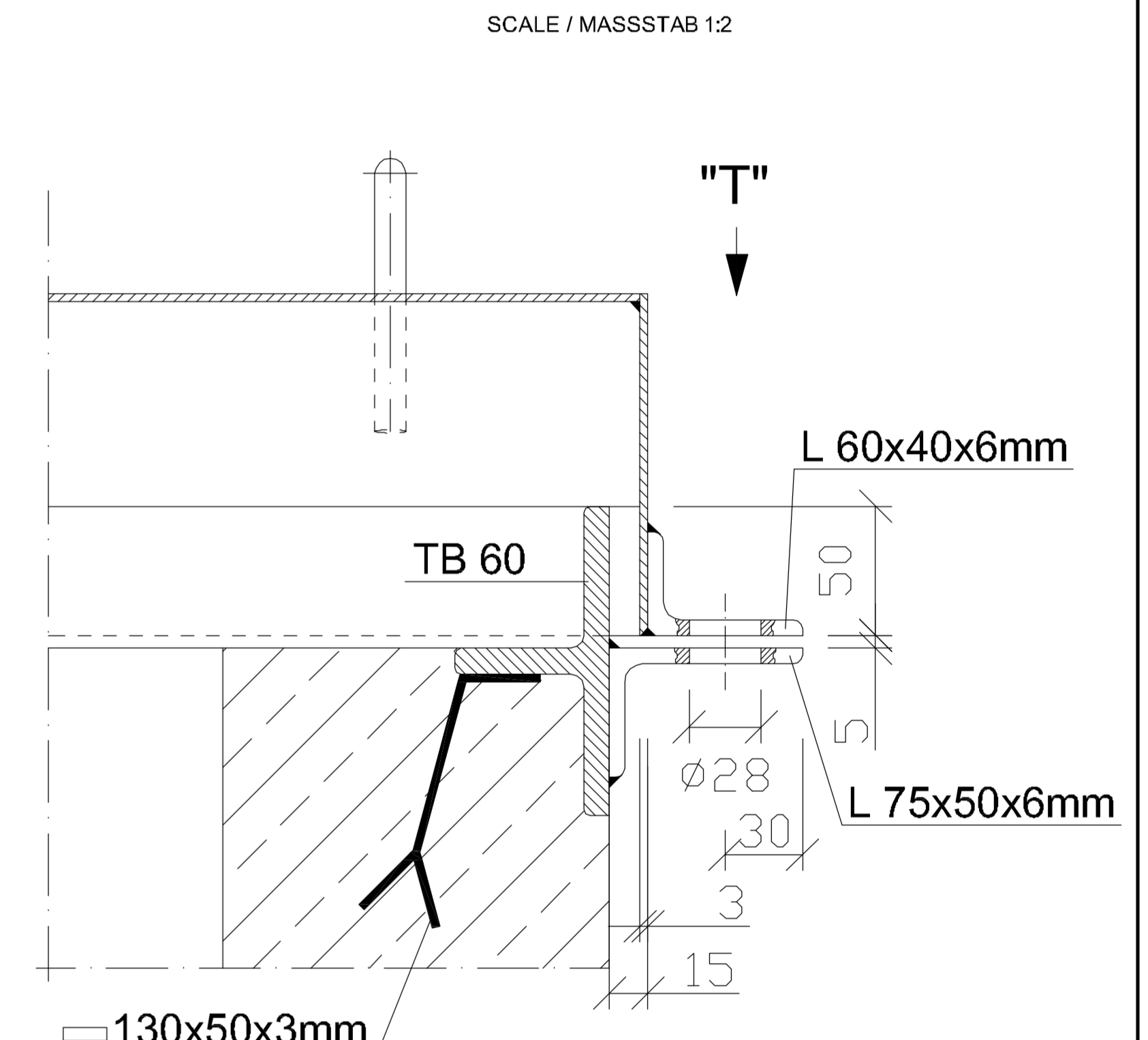
**SECTION F - F**  
**SCHNITT F - F**



**SECTION G - G**  
**SCHNITT G - G**



**SECTION H - H**  
**SCHNITT H - H**

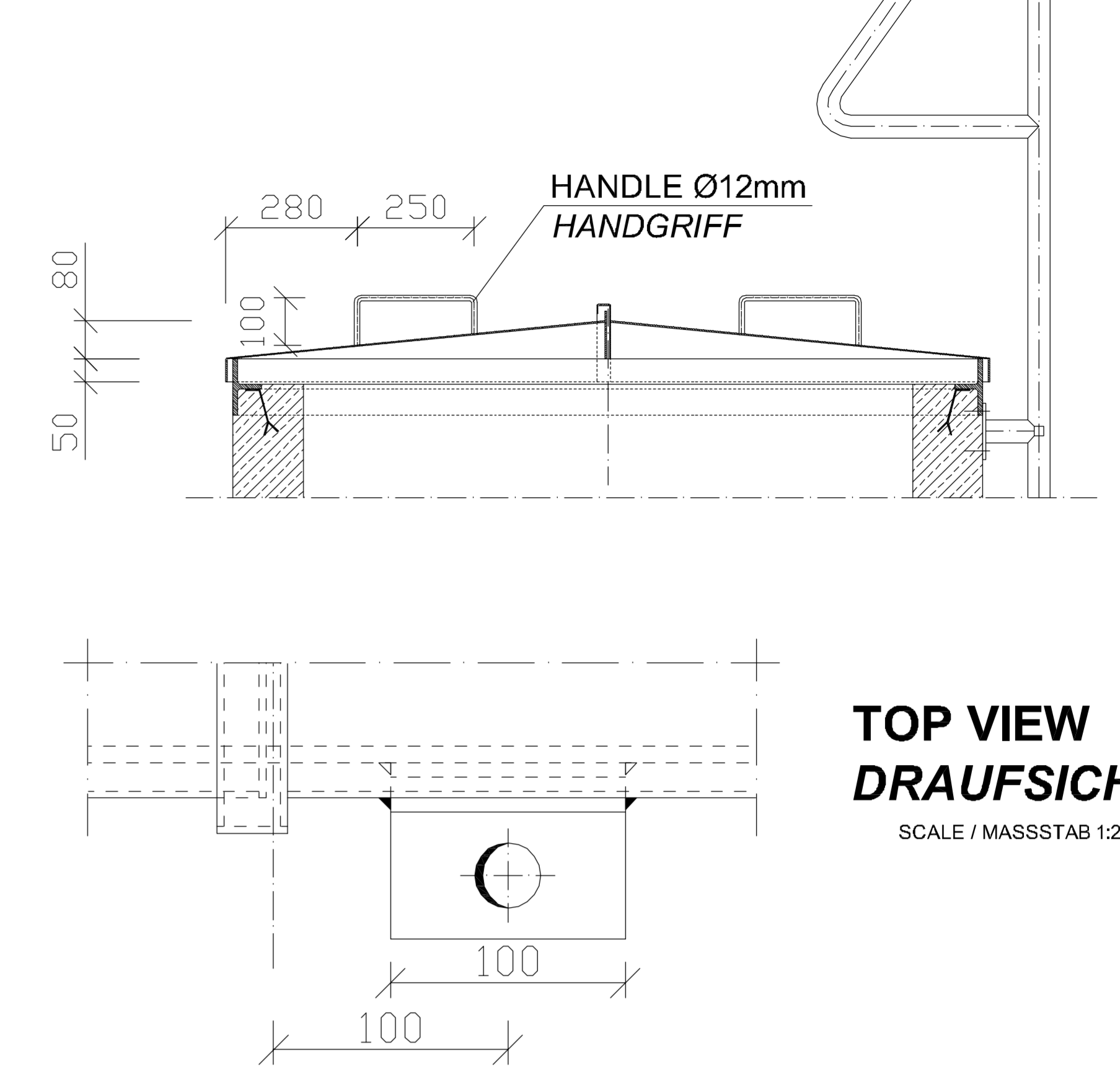


**DETAIL "W"**

STOP  
ANSCHLAG

SCALE / MASSSTAB 1:2

**SECTION E - E**  
**SCHNITT E - E**

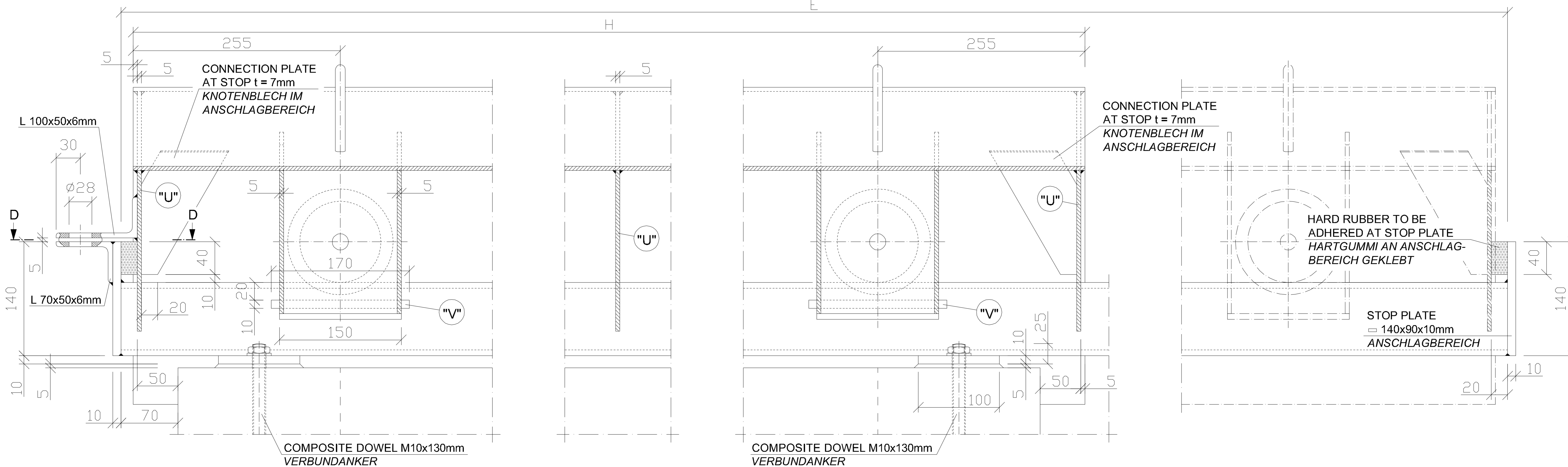


**TOP VIEW DRAUFSICHT "T"**

SCALE / MASSSTAB 1:2

**PERTINENT DRAWINGS**  
ZUGEHÖRIGE ZEICHNUNGEN

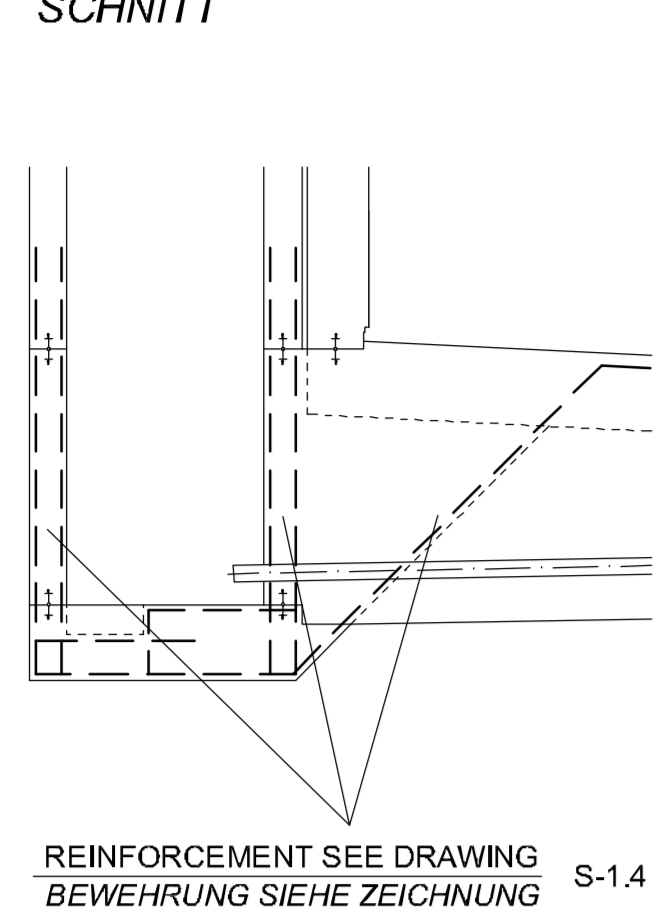
C-1.4 DETAILS - MANHOLES AND LEAKAGE CONTROL PIT  
DETAILS - MONTAGEÖFFNUNGEN UND LECKKONTROLLSCHACHT



REVISION	DATE	DESCRIPTION	BY	COUNTRY
ÄNDERUNG	DATUM	BESCHREIBUNG	VON	LAND
<b>HEADQUARTERS</b> UNITED STATES AIR FORCES EUROPE ENGINEERING & OPERATIONS				
AIRFIELD STANDARD DESIGN US		FLUGPLATZ STANDARDPLANUNG US		
JET FUEL STORAGE AND DISPENSING SYSTEMS		FLUGKRAFTSTOFF - VERSORGENGSANLAGEN		
<b>BUILDING</b> OPERATING TANK 5000m <sup>3</sup> FLACHBODENTANK 5000m <sup>3</sup>				
DESIGNATOR: COVERS, MANHOLES AND LEAKAGE CONTROL PIT ABDECKUNGEN, FÜR MONTAGEÖFFNUNGEN UND LECKKONTROLLSCHACHT				
WORKSHEET/ARBEITSTELLE LANDSCHAFTS- UND BAUVERBUNDLICHKEIT UND BAUVERBUNDLICHKEIT L & B		APPROVED/GENEBIGT AMT FÜR BUNDESBAU WALLSTR.1 55122 MAINZ		
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAUMASSNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED/GENEBIGT	DATE 6. MAI 2015	SCALE MASSSTAB 1:2 ; 1:10 ; 1:20	SHEET NO. PLATZ NR. S - 1.1	
CONSTRUCTION PROJECT BAUMASSNAHME		SHEET NO. PLATZ NR. S - 1.1		

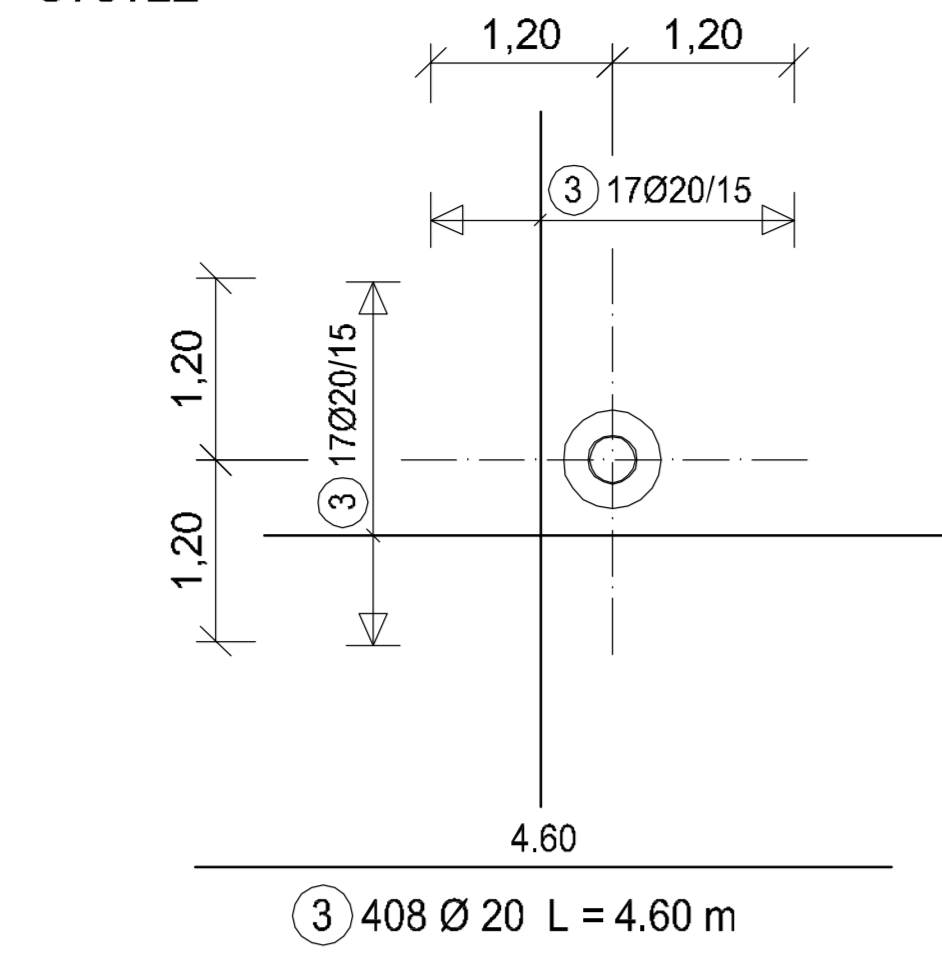


SECTION A-A  
SCHNITT

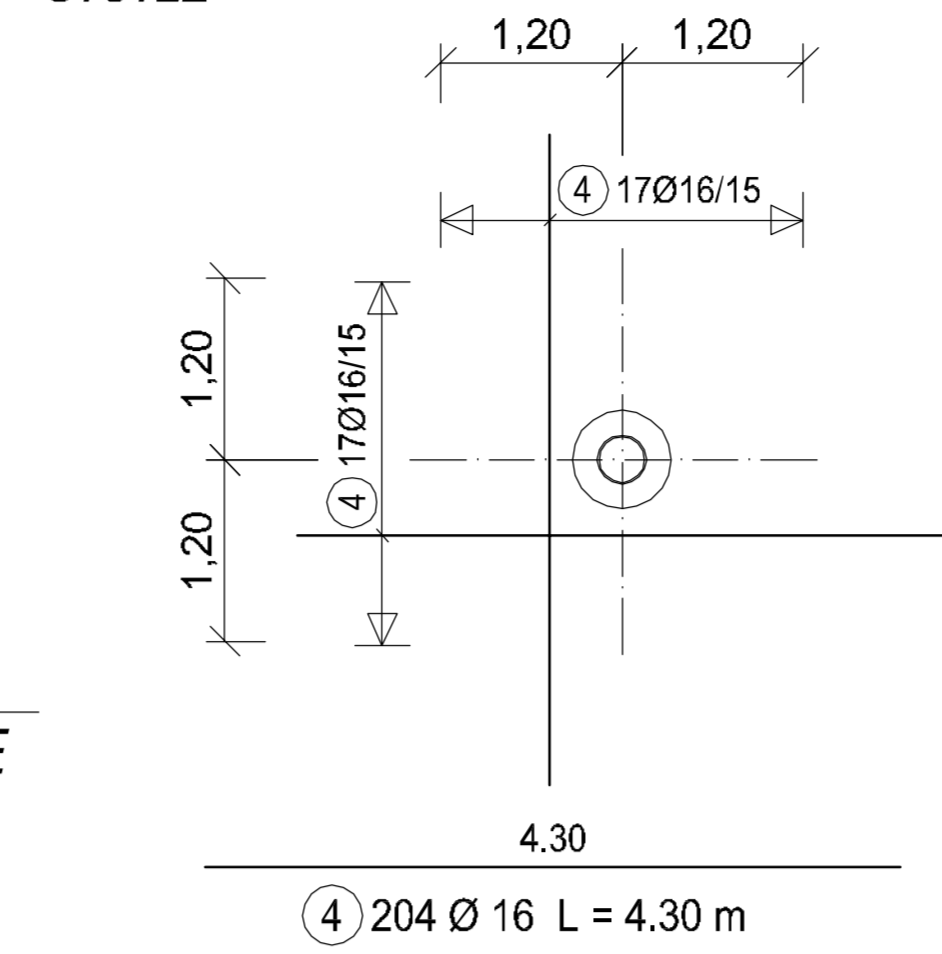


REINFORCEMENT SEE DRAWING  
BEWEHRUNG SIEHE ZEICHNUNG S-14

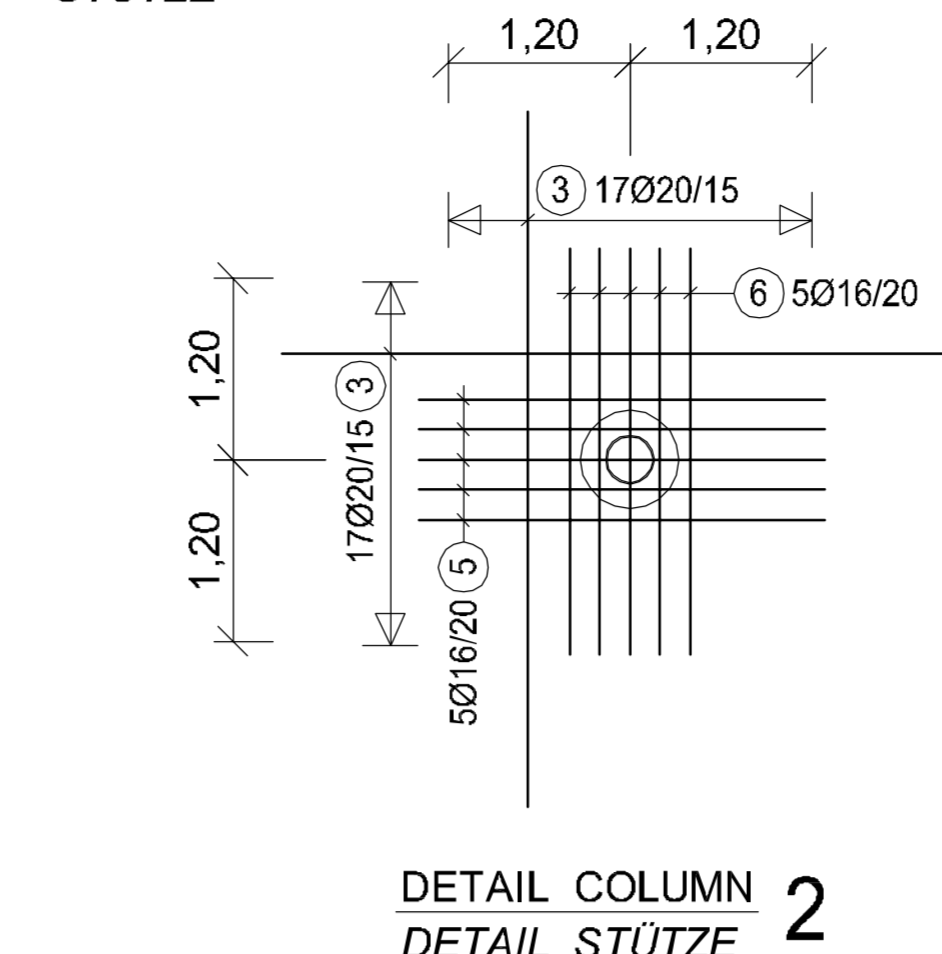
COLUMN 1  
STÜTZE 10 x



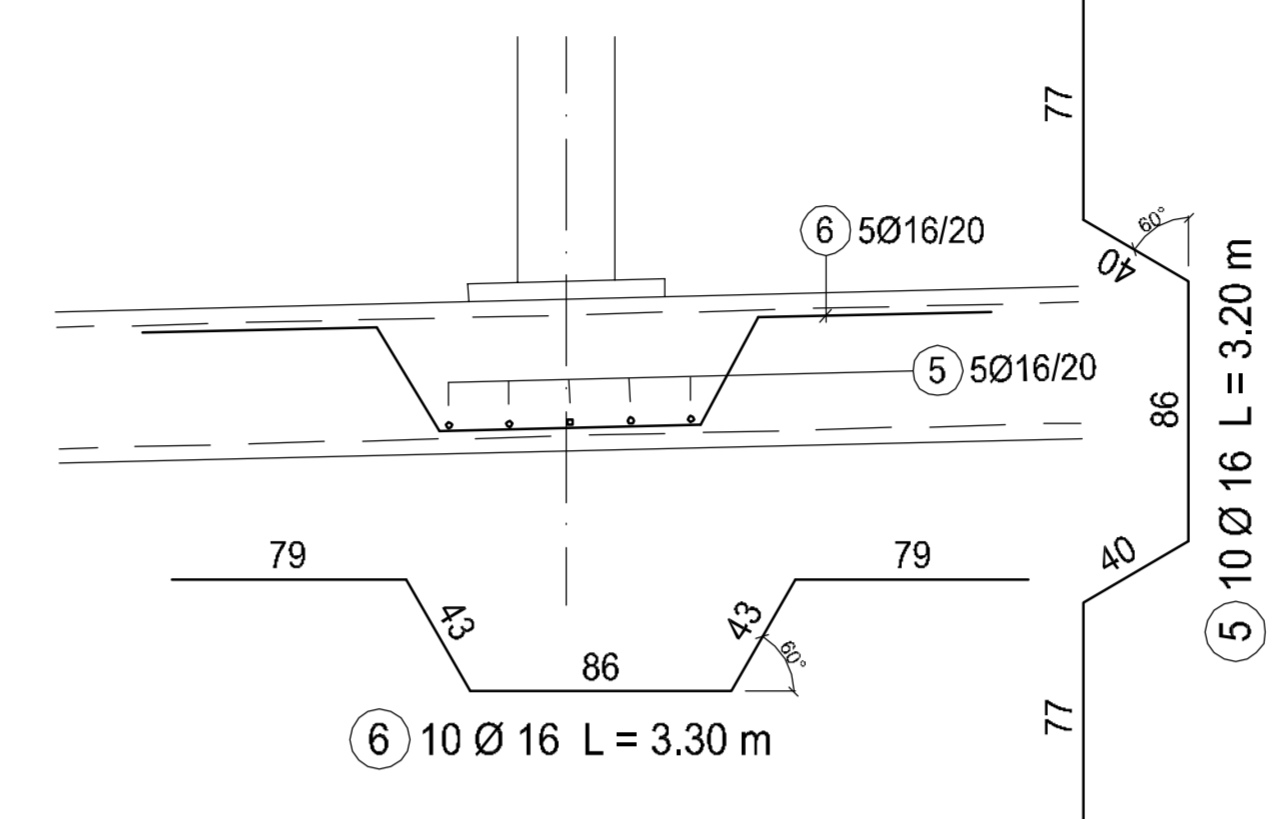
COLUMN 3  
STÜTZE 6 x



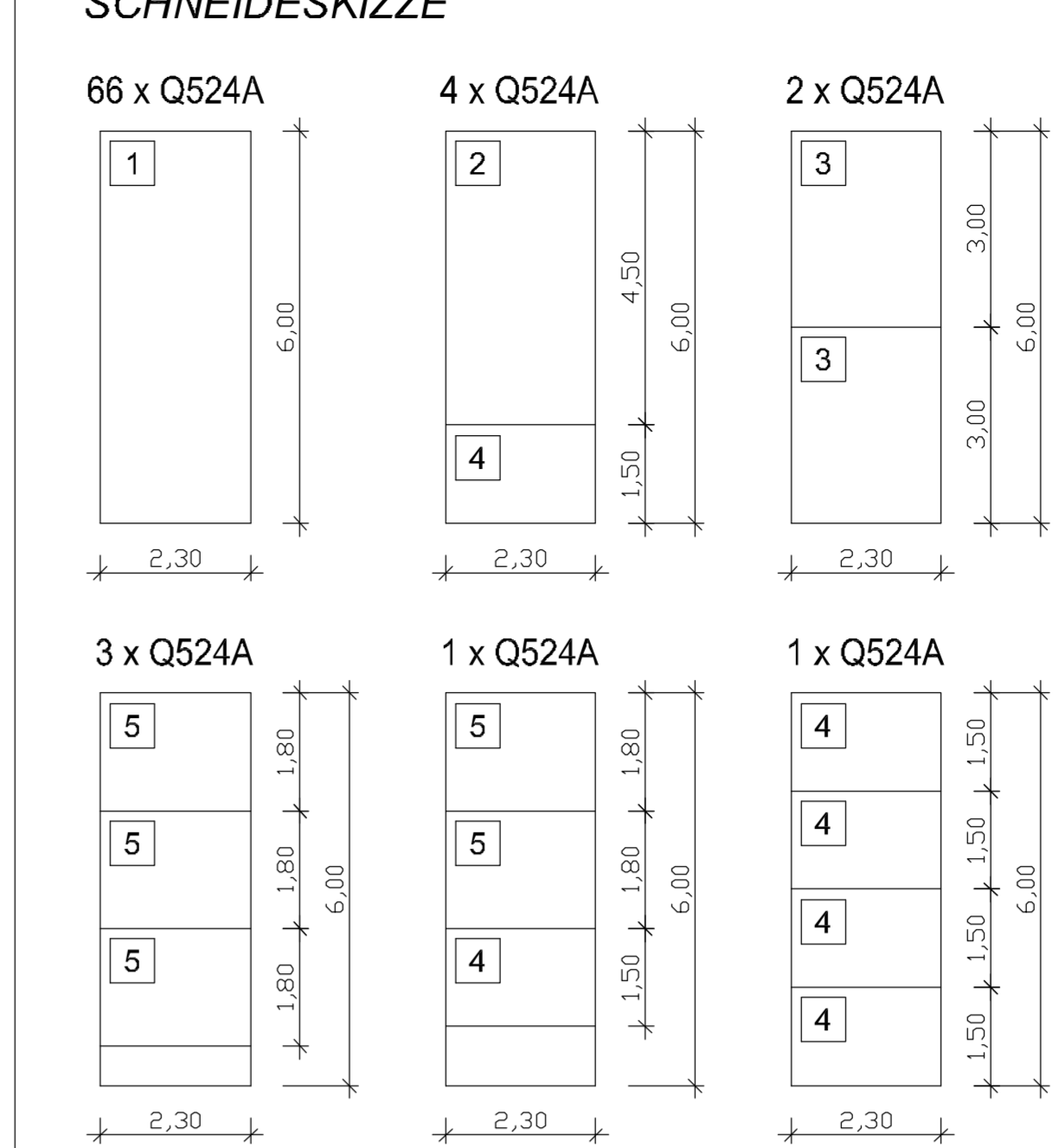
COLUMN 2  
STÜTZE 2 x



DETAIL COLUMN  
DETAIL STÜTZE 2



CUTTING SKETCH  
SCHNEIDESKIZZE



WIRE MESH REQUIRED  
MATTENBEDARF

77 x Q524A 77 x 100,9 = 7769,3 kg

BENDING SCHEDULE  
STAHLLISTE

NO. NR.	PIECES STÜCK	Ø	LENGTH LÄNGE	Ø 8	Ø 10	Ø 12	Ø 16	Ø 20
1	56	12	14.0			784.0		
2	1	12	9360.0			9360.0		
3	408	20	4.60					1876.8
4	204	16	4.30					877.2
5	10	16	3.20					32.0
6	10	16	3.30					33.0
7	626	10	1.20		751.2			
8	626	10	1.60		1001.6			
9	626	10	1.60		1001.6			
10	626	10	1.85		1158.1			
11	1	12	312.0			312.0		
12	38	16	5.10					193.8
13	60	16	1.90					114.0
14	30	16	4.70					141.0
15	30	16	3.30					99.0
16	30	16	3.30					99.0
17	16	16	3.20					51.2
18	8	16	4.20					33.6
19	8	16	3.80					30.4
20	68	10	2.40		163.2			
21	136	10	1.50		204.0			
22	1	10	264.0		264.0			
23								
24								
25								
26								
27								
28								
29								
30								
Σ				4543.7	10456.0	1704.2	1876.8	
				1 kg/m	0.617	0.888	1.58	2.47
				kg	2803.5	9284.9	2692.6	4635.7
TOTAL WEIGHT GESAMTGEWICHT						19416.7 kg		

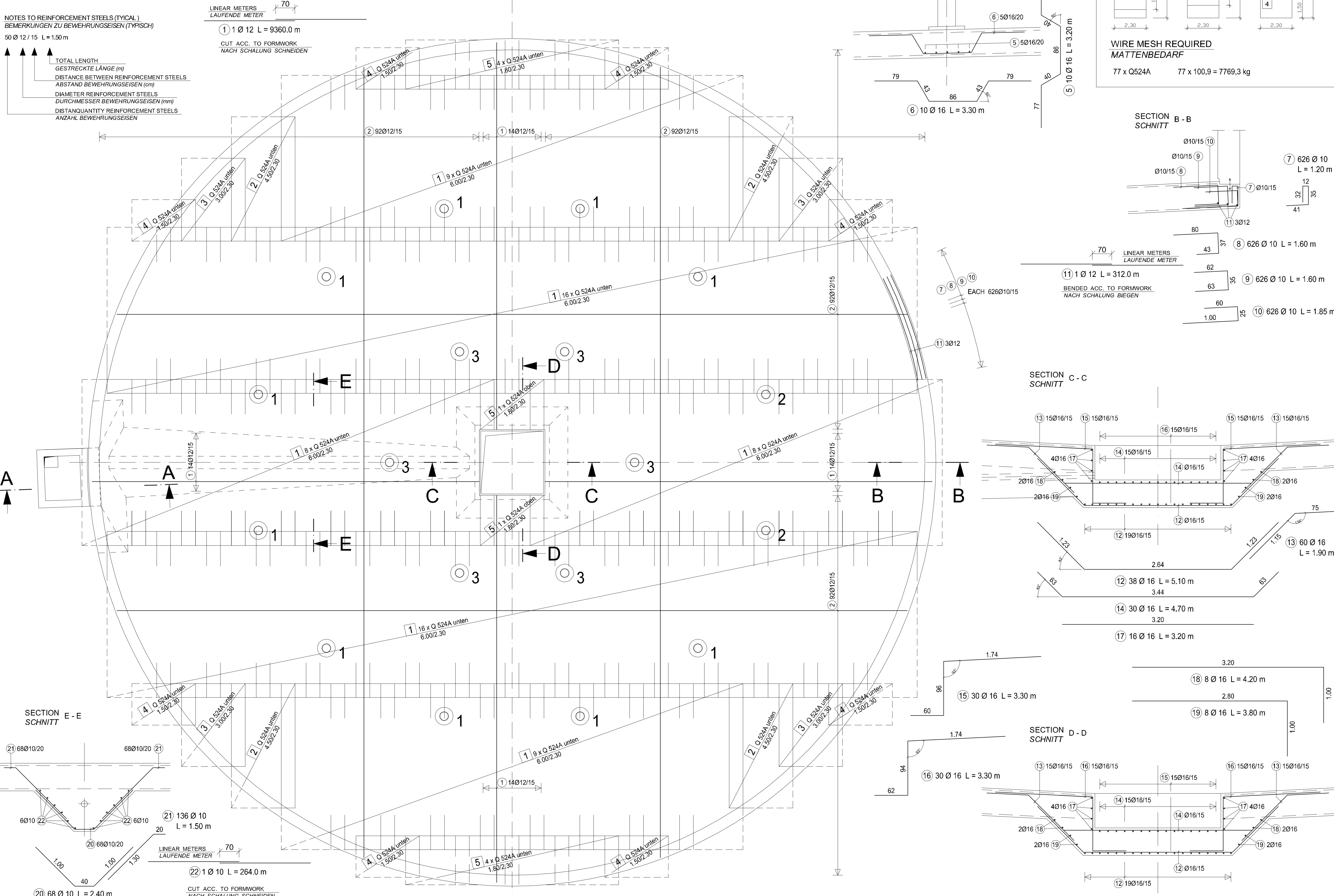
NOTES TO REINFORCEMENT STEELS (TYPICAL)  
BEMERKUNGEN ZU BEWEHRUNGSSEISEN (TYPISCH)

- 50 Ø 12 / 15 L = 1.50 m
- TOTAL LENGTH  
GESTRECKTE LÄNGE (m)
- DISTANCE BETWEEN REINFORCEMENT STEELS  
ABSTAND BEWEHRUNGSSEISEN (cm)
- DIAMETER REINFORCEMENT STEELS  
DURCHMESSER BEWEHRUNGSSEISEN (mm)
- DISTANCE QUANTITY REINFORCEMENT STEELS  
ANZAHL BEWEHRUNGSSEISEN

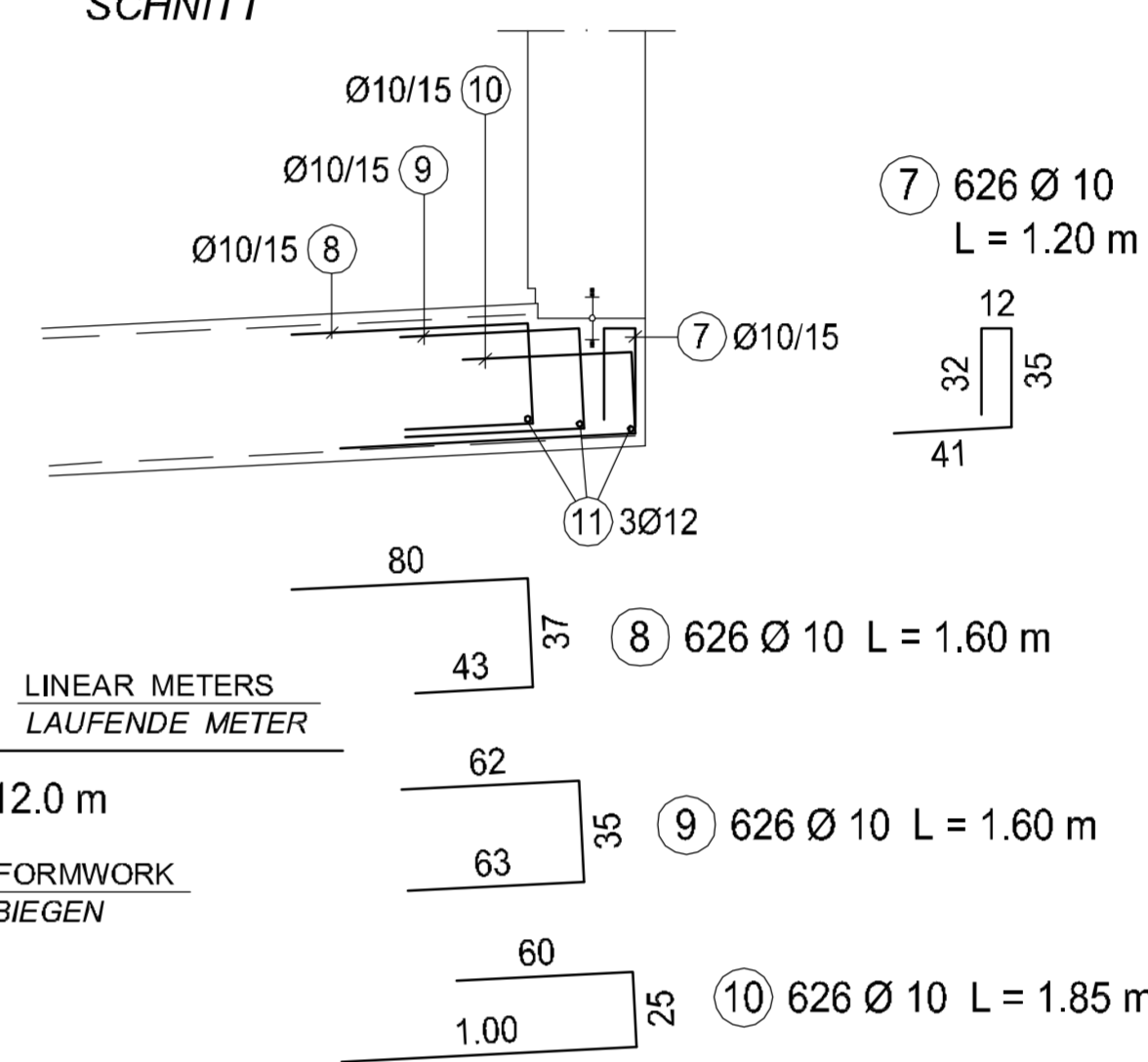
LINEAR METERS  
LAUFENDE METER

1 Ø 12 L = 9360.0 m

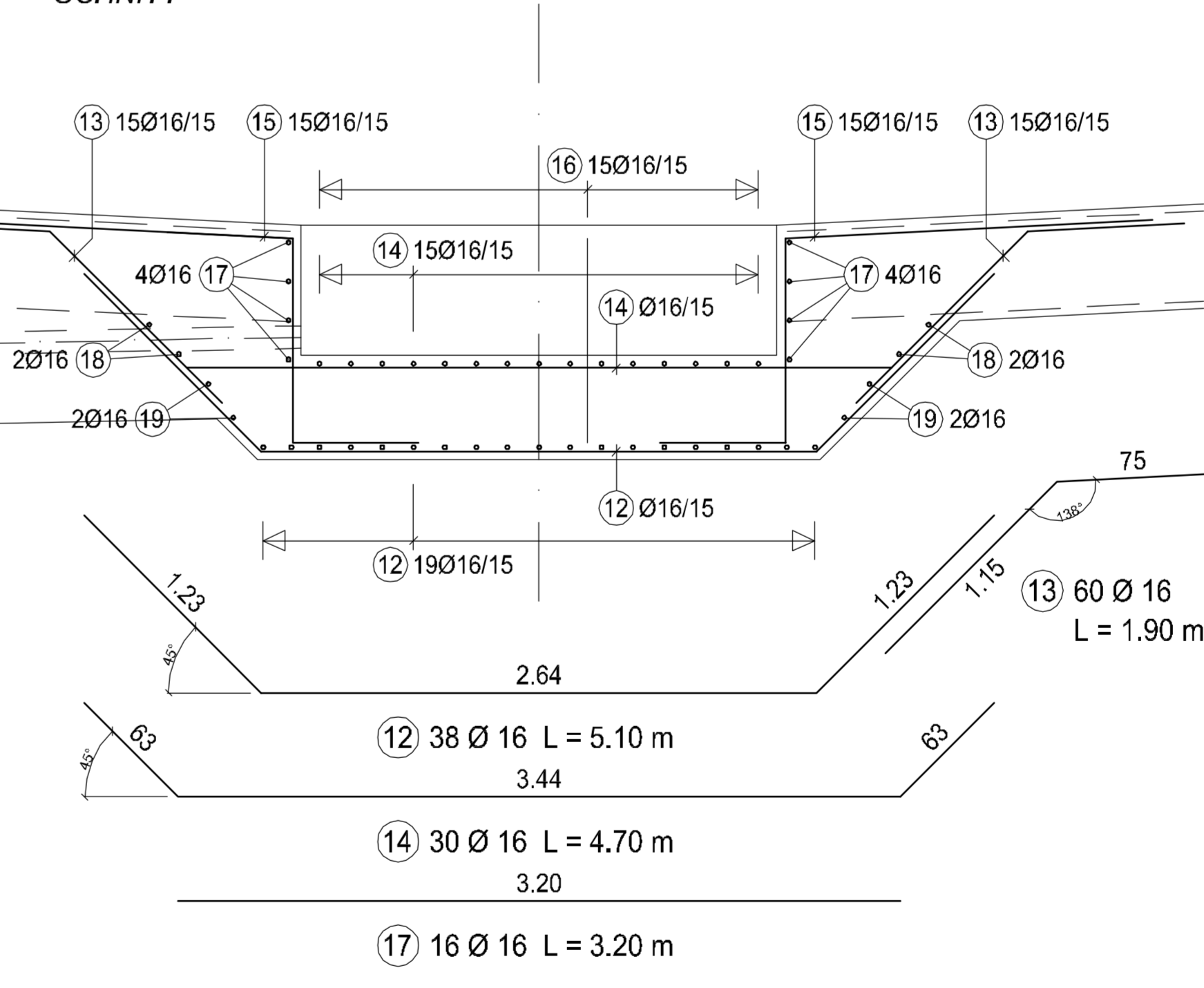
CUT ACC. TO FORMWORK  
NACH SCHALUNG SCHNEIDEN



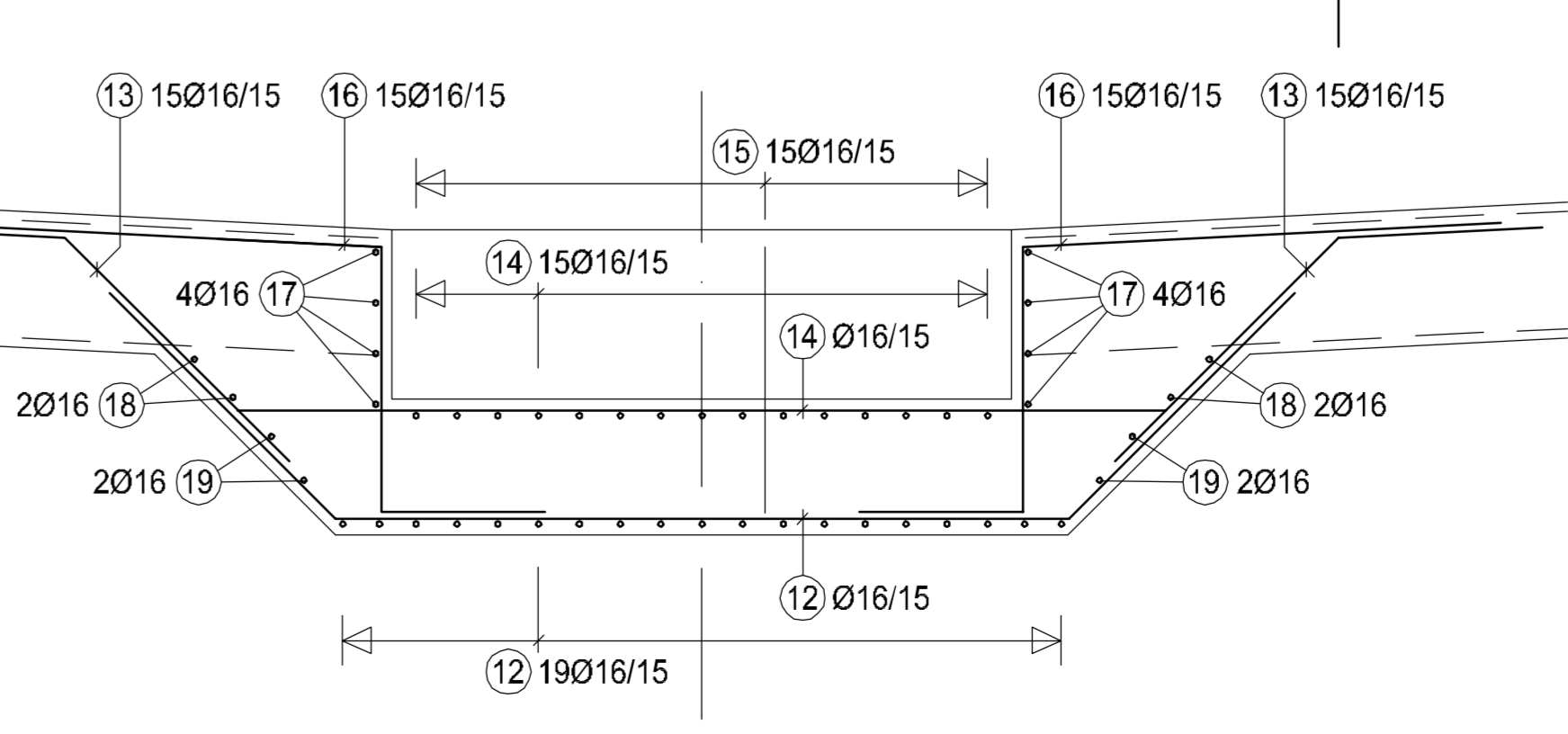
SECTION B-B  
SCHNITT



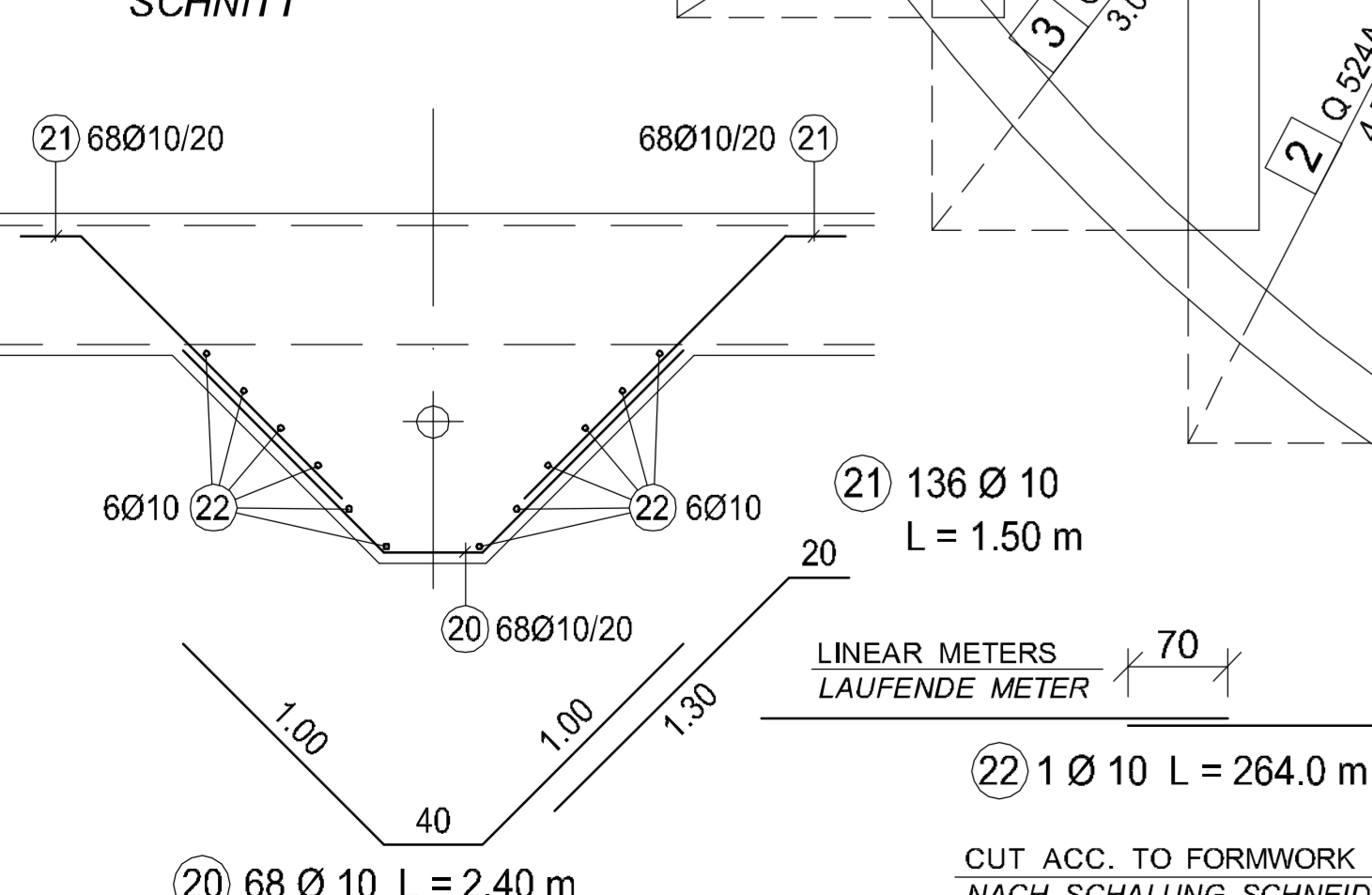
SECTION C-C  
SCHNITT



SECTION D-D  
SCHNITT



SECTION E-E  
SCHNITT



MATERIALS  
BAUSTOFFE

- CONCRETE  
BETON C25/30 XC2 WF
- REINFORCEMENT  
BETONSTAHL BS1 500 S, BS1 500 M
- CONCRETE COVER  
BETONDECKUNG nom c = 3.5 cm
- DIAMETER OF BENDING ROLL  
BIEGEROLLENDURCHMESSER ds < 20mm: dtr ≥ 4ds  
ds ≥ 20mm: dtr ≥ 7ds

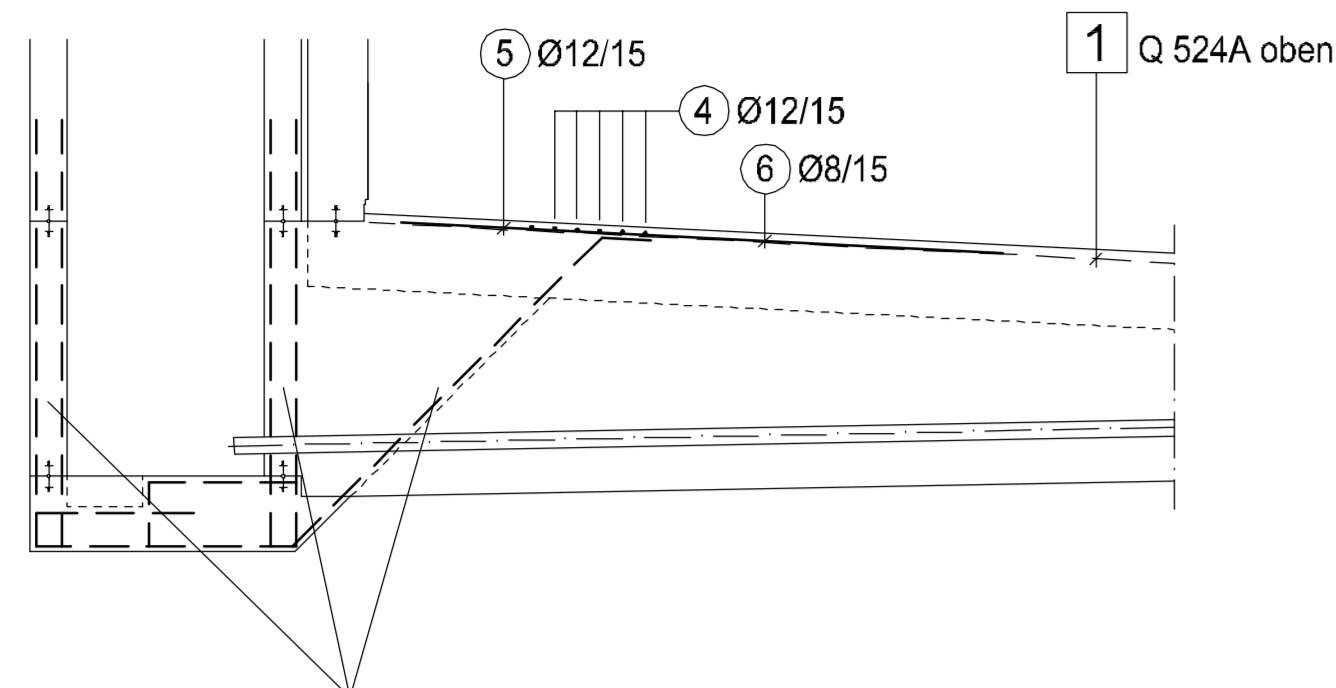
PERTINENT DRAWINGS  
ZUGEHÖRIGE ZEICHNUNGEN

- C-1.7 FORMWORK PLAN FLOOR SLAB AND WALL  
SCHALPLAN BODENPLATTE UND WAND
- S-1.3 UPPER REINFORCEMENT FLOOR SLAB  
OBERE BEWEHRUNG BODENPLATTE
- S-1.4 REINFORCEMENT LEAKAGE CONTROL PIT  
BEWEHRUNG LECKKONTROLLSCHACHT

REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
HEADQUARTERS UNITED STATES AIR FORCES EUROPE ENGINEERING & OPERATIONS				
AIRFIELD STANDARD DESIGN US		FLUGPLATZ STANDARDPLANUNG US		
JET FUEL STORAGE AND DISPENSING SYSTEMS		FLUGKRAFTSTOFF - VERSORGUNGSANLAGEN		
BUILDING BAUWERK OPERATING TANK 5000m³ FLACHBODENTANK 5000m³				
DESIGNATOR BEZEICHNUNG LOWER REINFORCEMENT FLOOR SLAB UNTERE BEWEHRUNG BODENPLATTE				
WORKED/REARBEITET	PREPARED/AUFGESTELLT	APPROVED/GENEHMIGT		
LANDGETRIEBENES LIEFERANTEN- UND BAUWERK LAW-REINFORCEMENT LAYOUT L B B	AMT FÜR BUNDESBAU WALLSTR.1 55122 MAINZ	ORIGINAL SIGNED BY DATE		
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAU MASSNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED GENEHMIGT	DATE DATUM 6. MAI 2015	SCALE MASSSTAB 1:50 / 1:25		
ORIGINAL SIGNED BY IN ORIGINAL DED.	STANDARD SHEET STANDARD BLATT	CAD-PROJECT NAME CAD-PROJEKTNAME		
CONSTRUCTION PROJECT BAU MASSNAHME			SHEET NO. BLATT NR. OF VON	

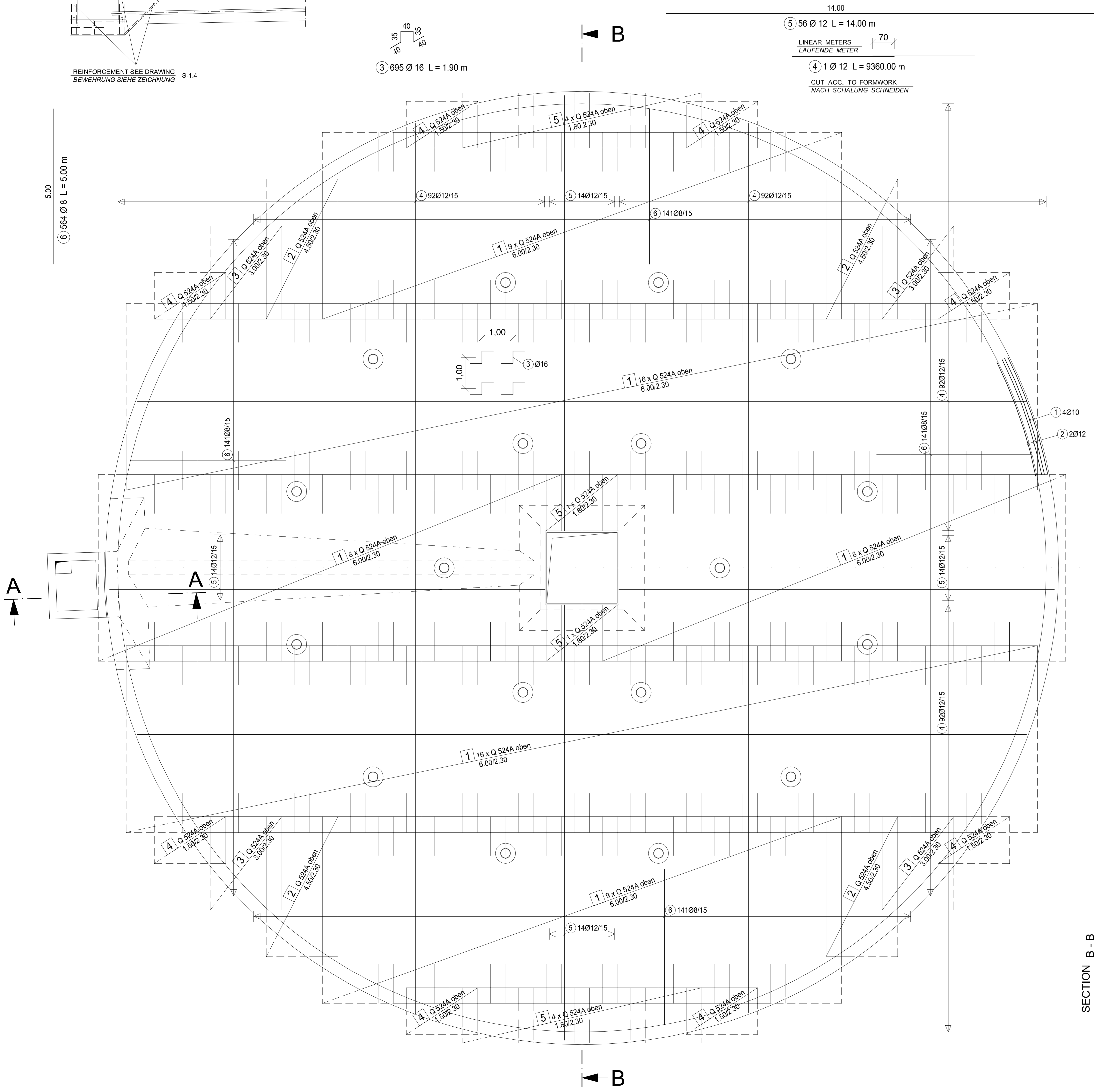


SECTION A - A  
SCHNITT

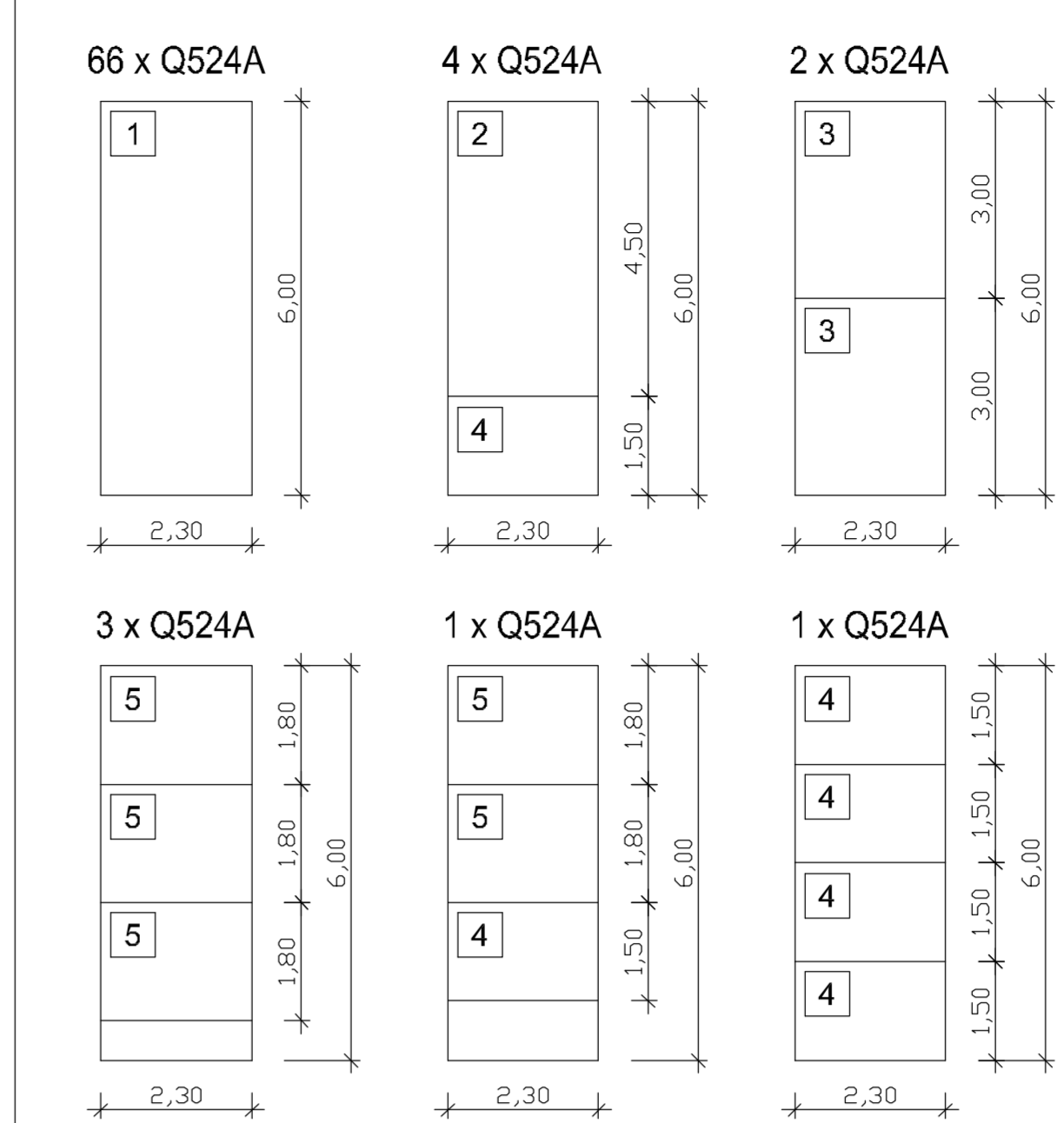


REINFORCEMENT SEE DRAWING  
BEWEHRUNG SIEHE ZEICHNUNG S-1.4

TOP VIEW FLOOR SLAB  
UPPER REINFORCEMENT  
DRAUFSICHT BODENPLATTE  
OBERE BEWEHRUNG



CUTTING SKETCH  
SCHNEIDESKIZZE

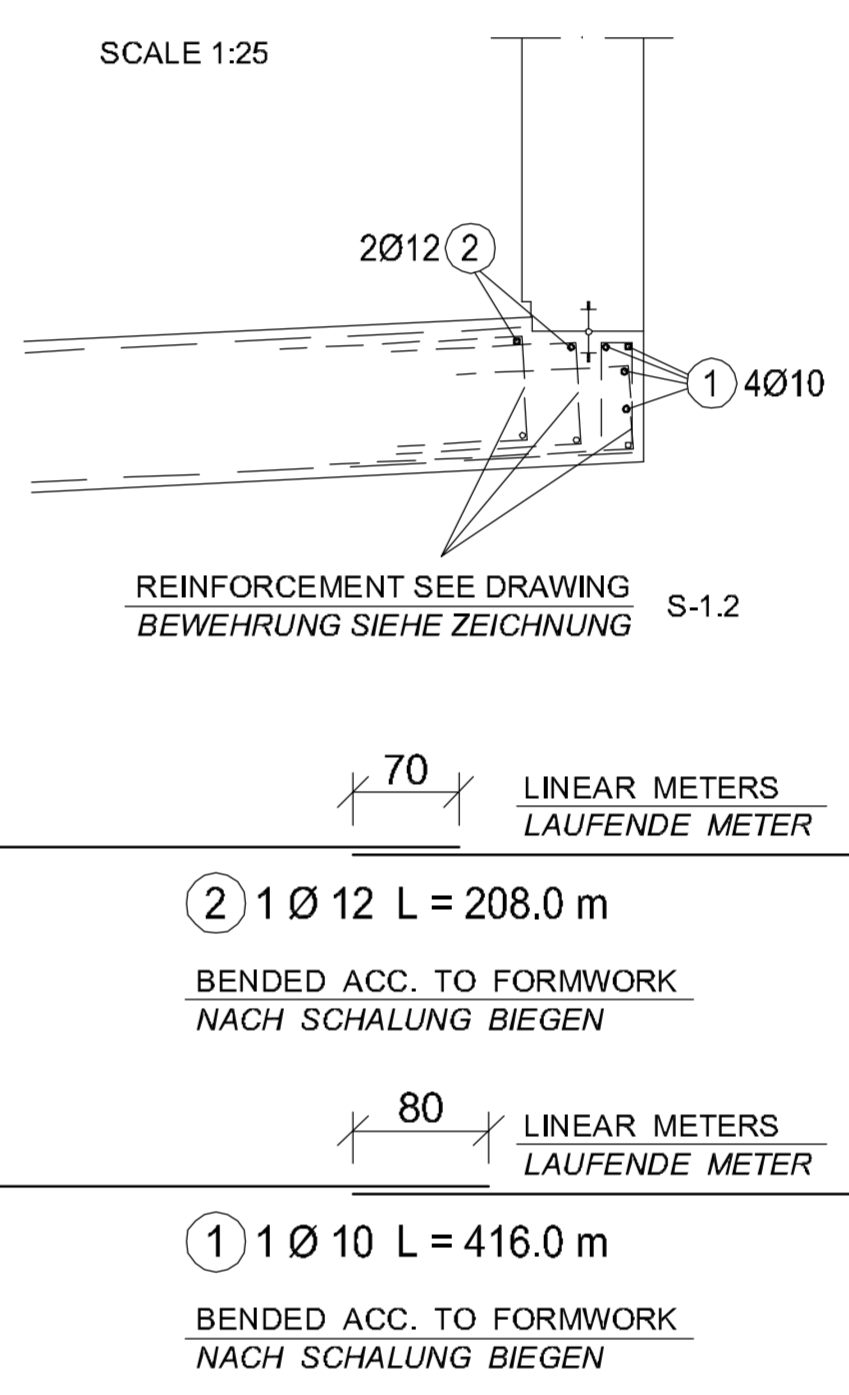


WIRE MESH REQUIRED  
MATTENBEDARF  
77 x Q524A 77 x 100,9 = 7769,3 kg

BENDING SCHEDULE  
STAHLISTE

NO. NR.	PIECES STÜCK	Ø	LENGTH LÄNGE	Ø 8	Ø 10	Ø 12	Ø 16	Ø 20	
1	1	10	416.0		416.0				
2	1	12	208.0			208.0			
3	695	16	1.90				1320.5		
4	1	12	9360.0			9360.0			
5	56	12	14.00			784.0			
6	564	8	5.00	2820.0					
7									
8									
9									
10									
				Σ	2820.0	416.0	10352.0	1320.5	
					kg	0.395	0.617	0.888	1.58
TOTAL WEIGHT				GESAMTGEWICHT					12 649.6 kg

DETAIL 1  
DETAIL



MATERIALS  
BAUSTOFFE

- CONCRETE / BETON: C25/30 XC2 WF
- REINFORCEMENT / BETONSTAHL: BSt 500 S, BSt 500 M
- CONCRETE COVER / BETONDECKUNG: nom c = 3.5 cm
- DIAMETER OF BENDING ROLL / BIEGEROLLENDURCHMESSER: ds < 20mm: dtr ≥ 4ds; ds ≥ 20mm: dtr ≥ 7ds

PERTINENT DRAWINGS  
ZUGEHÖRIGE ZEICHNUNGEN

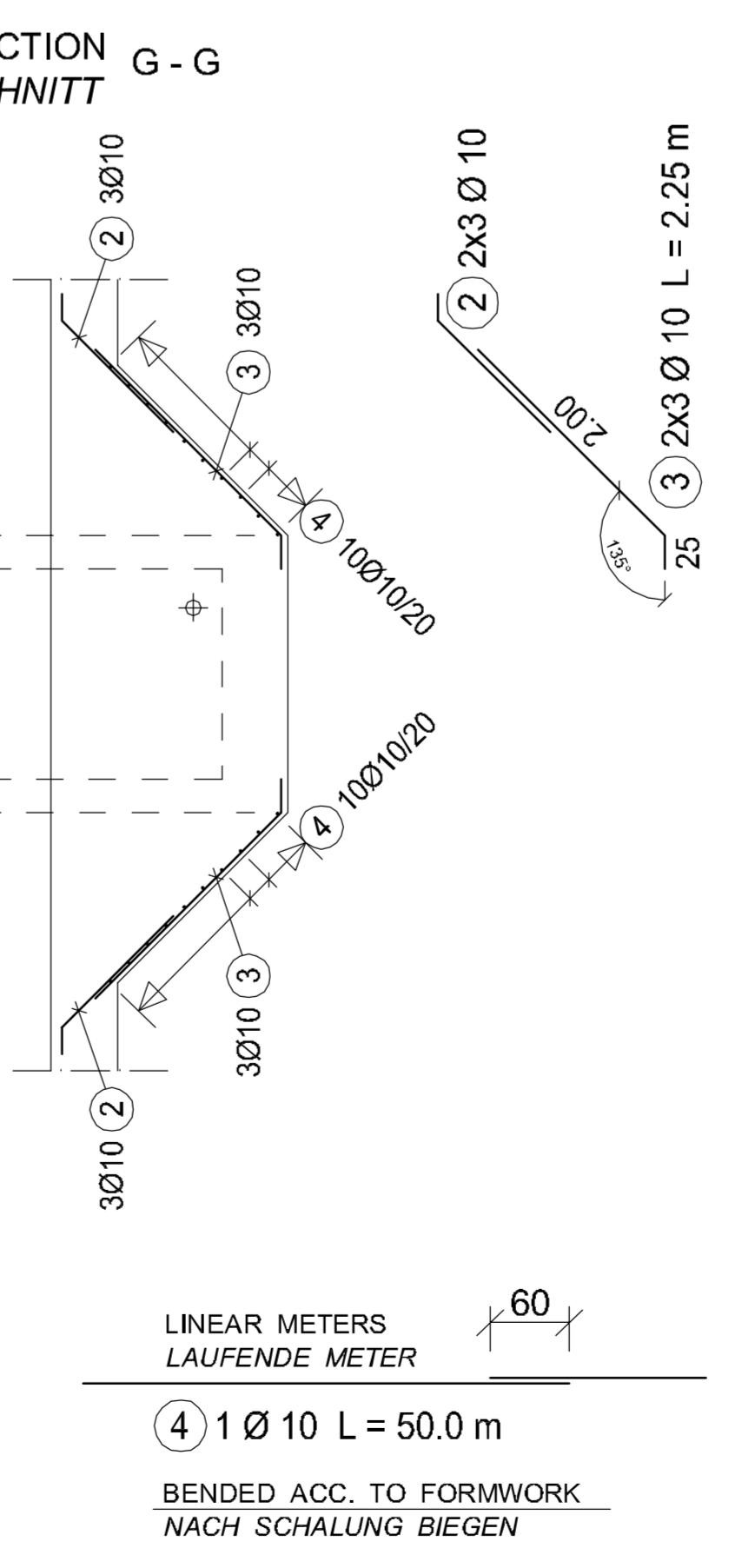
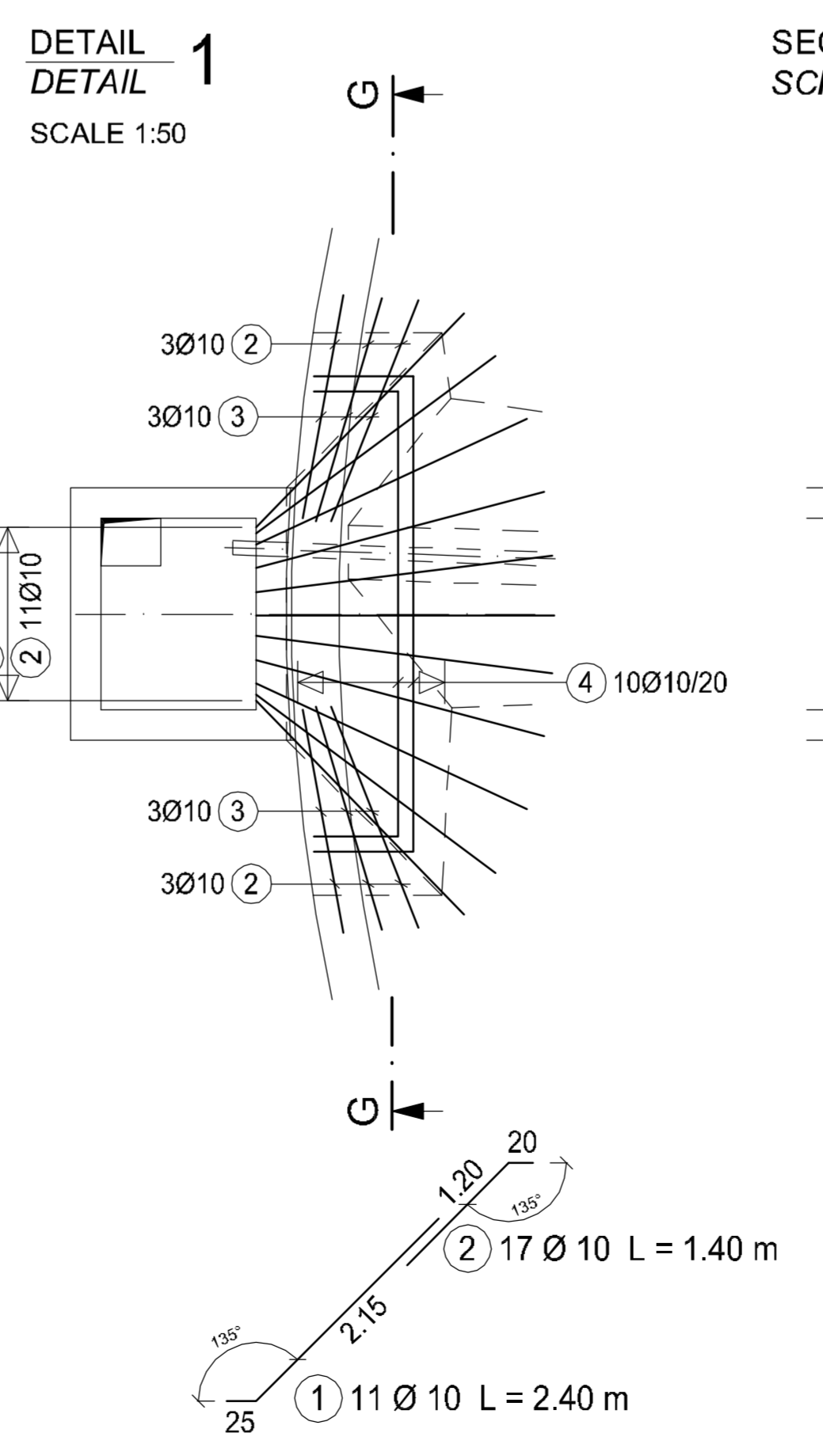
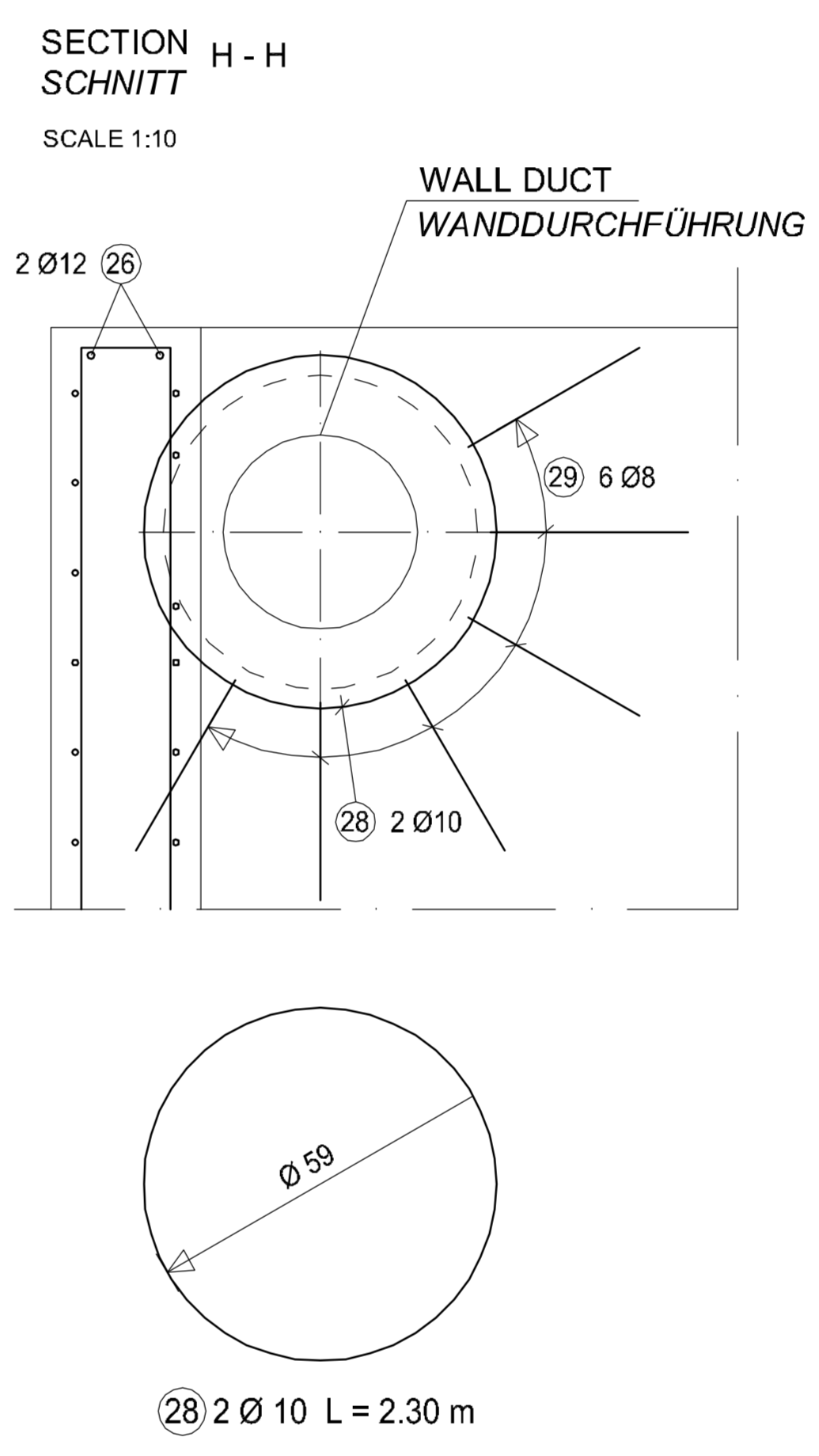
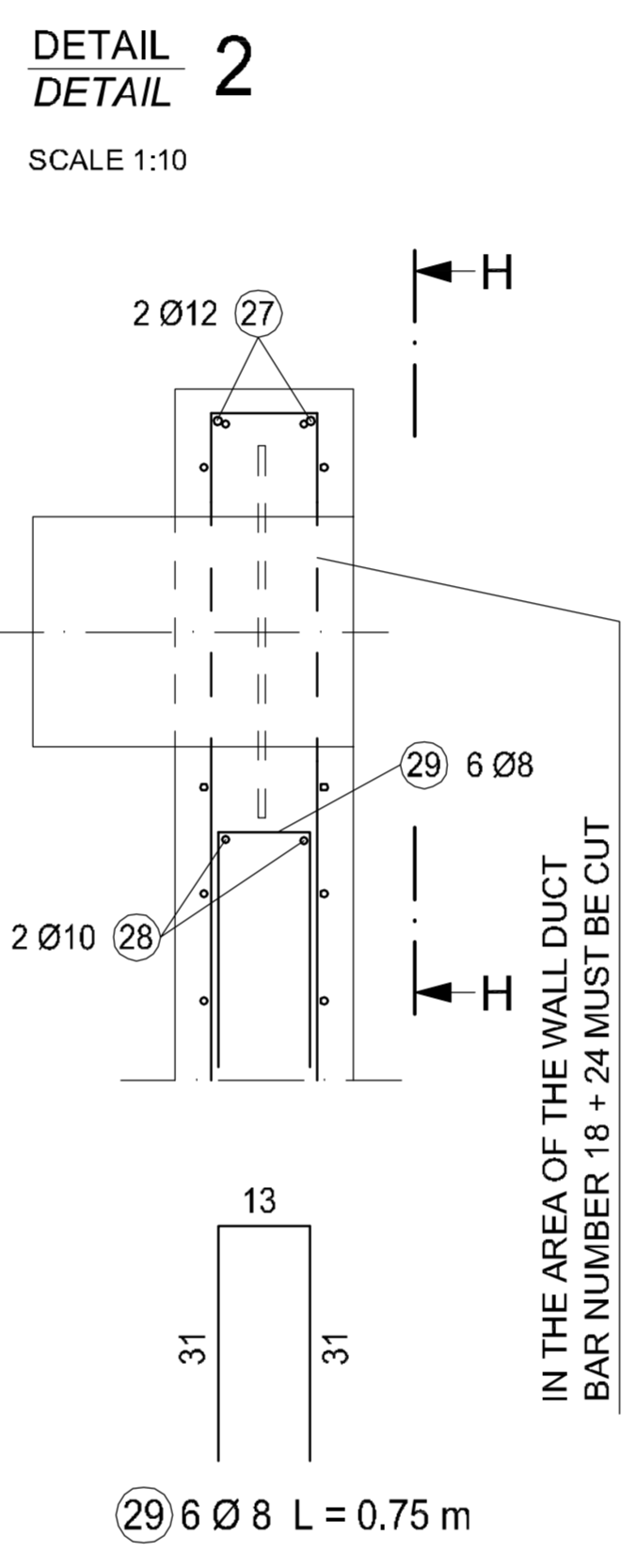
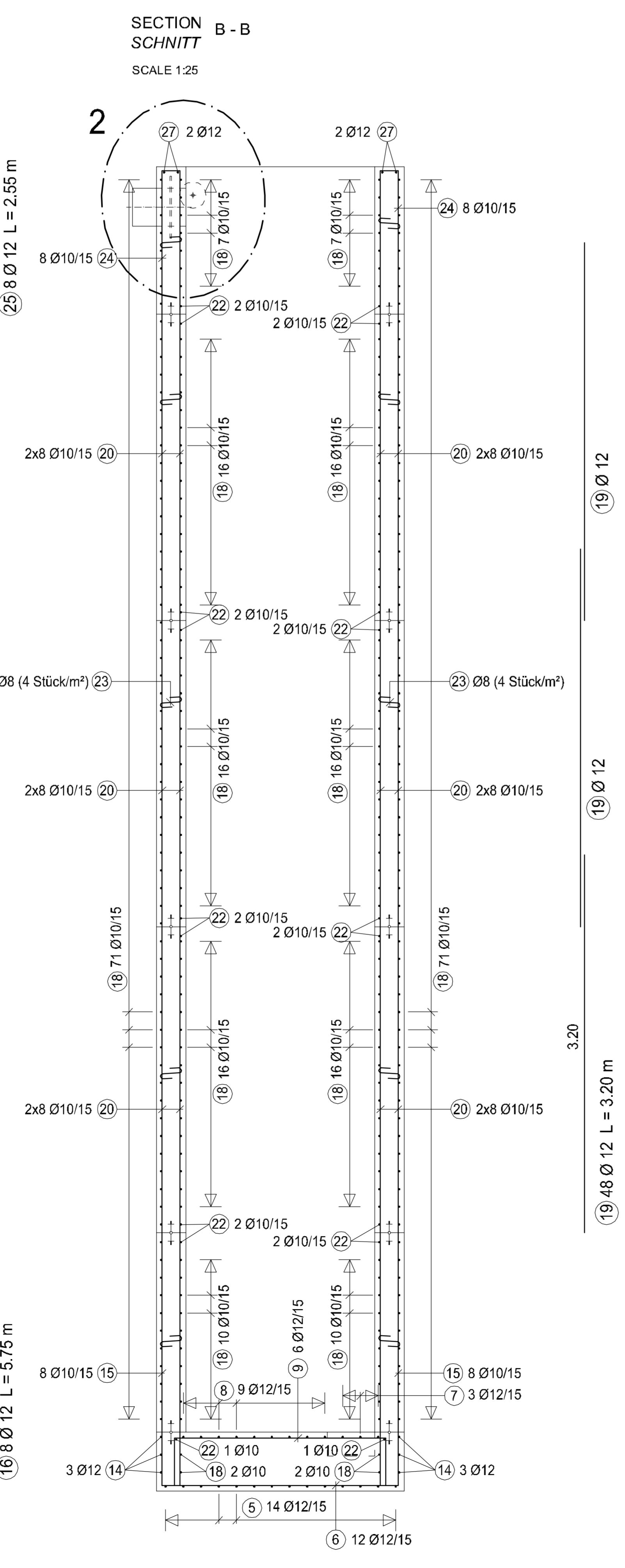
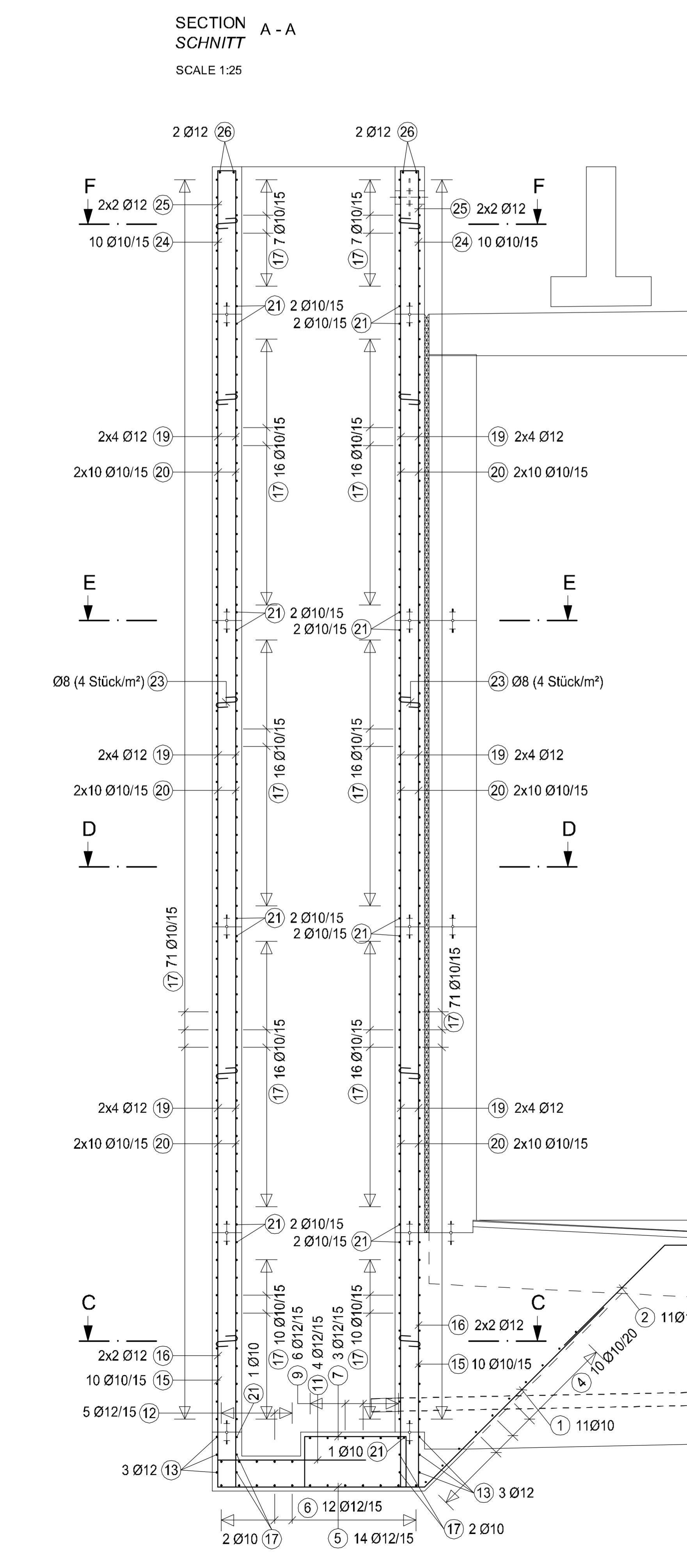
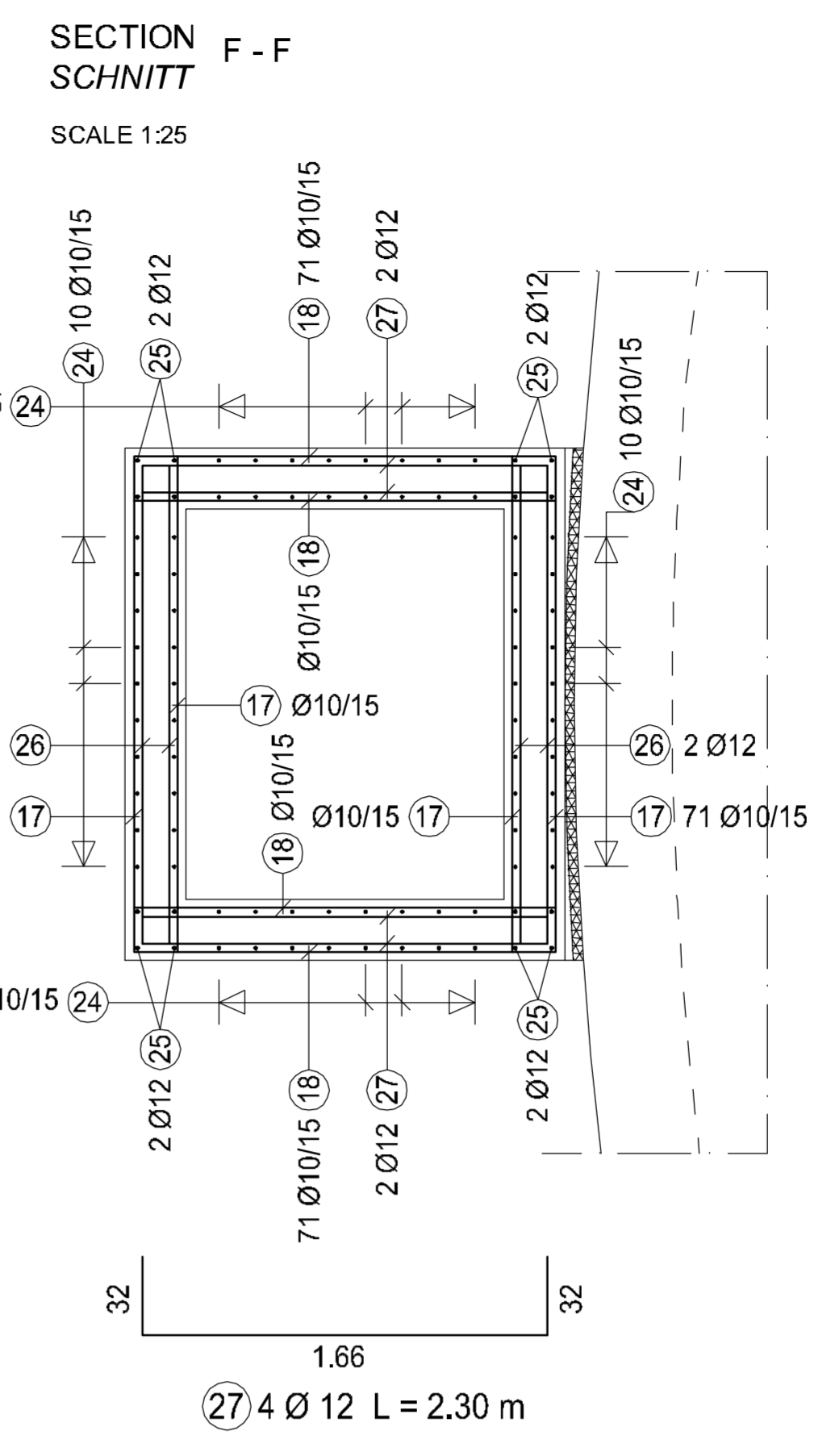
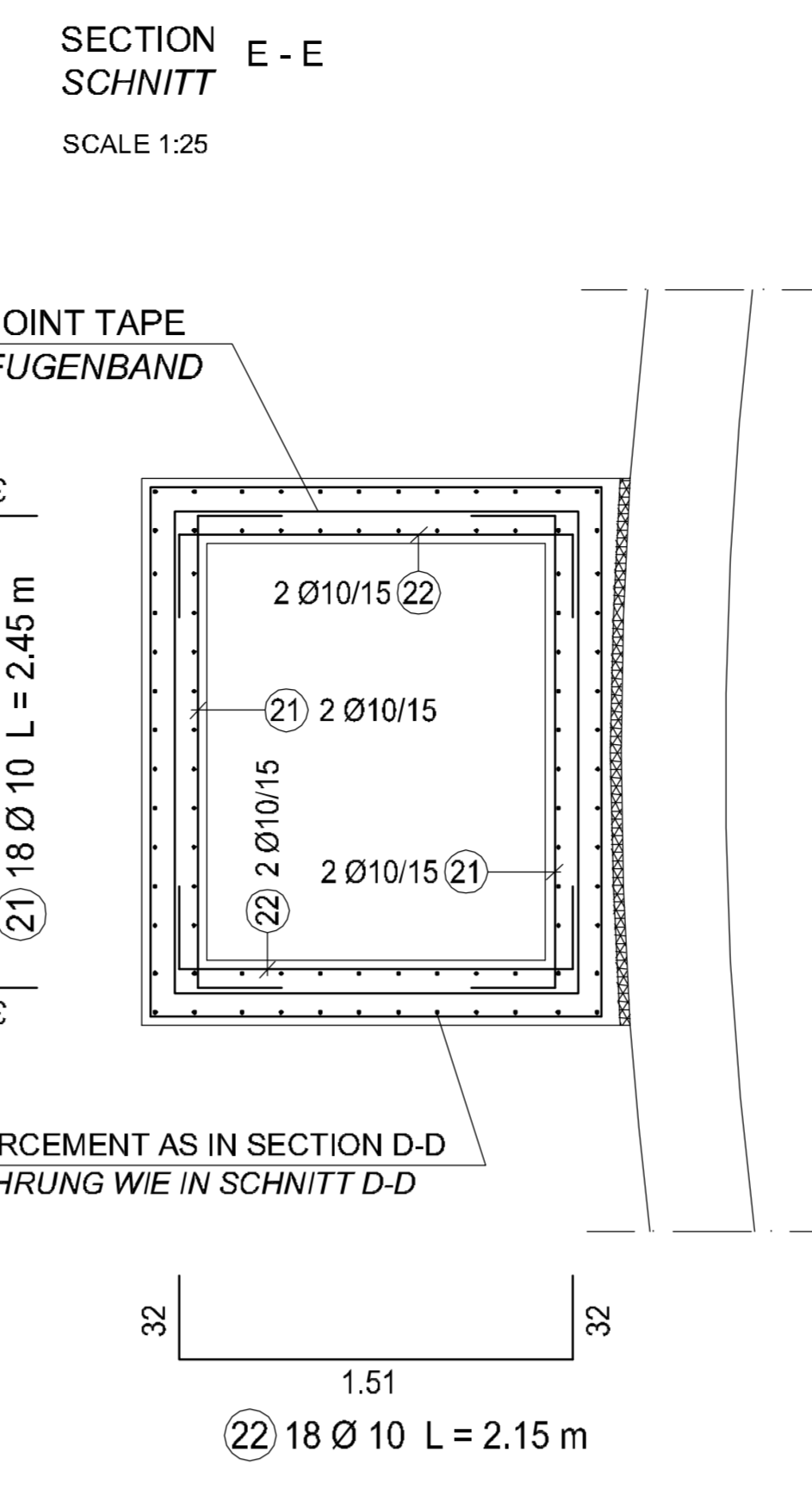
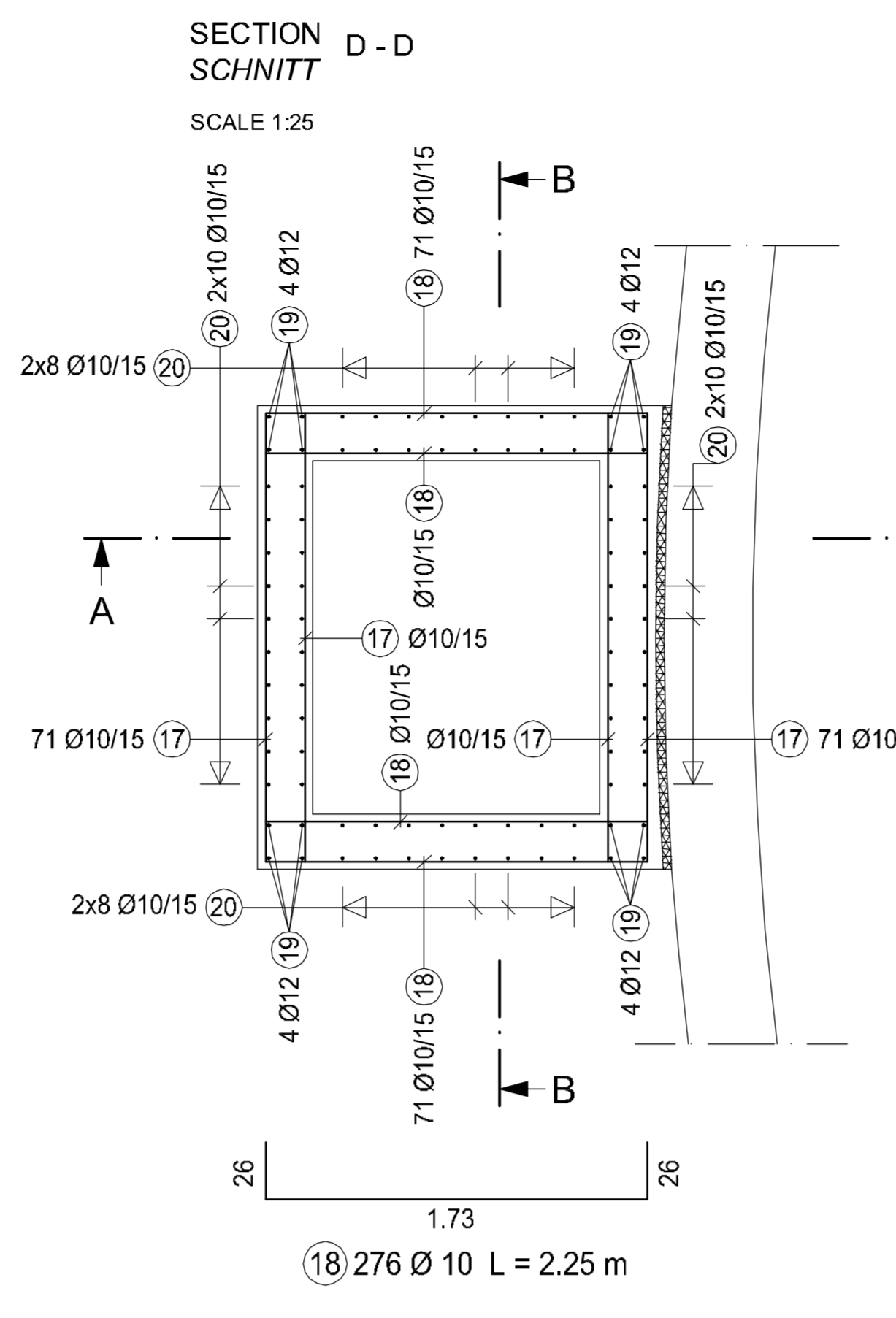
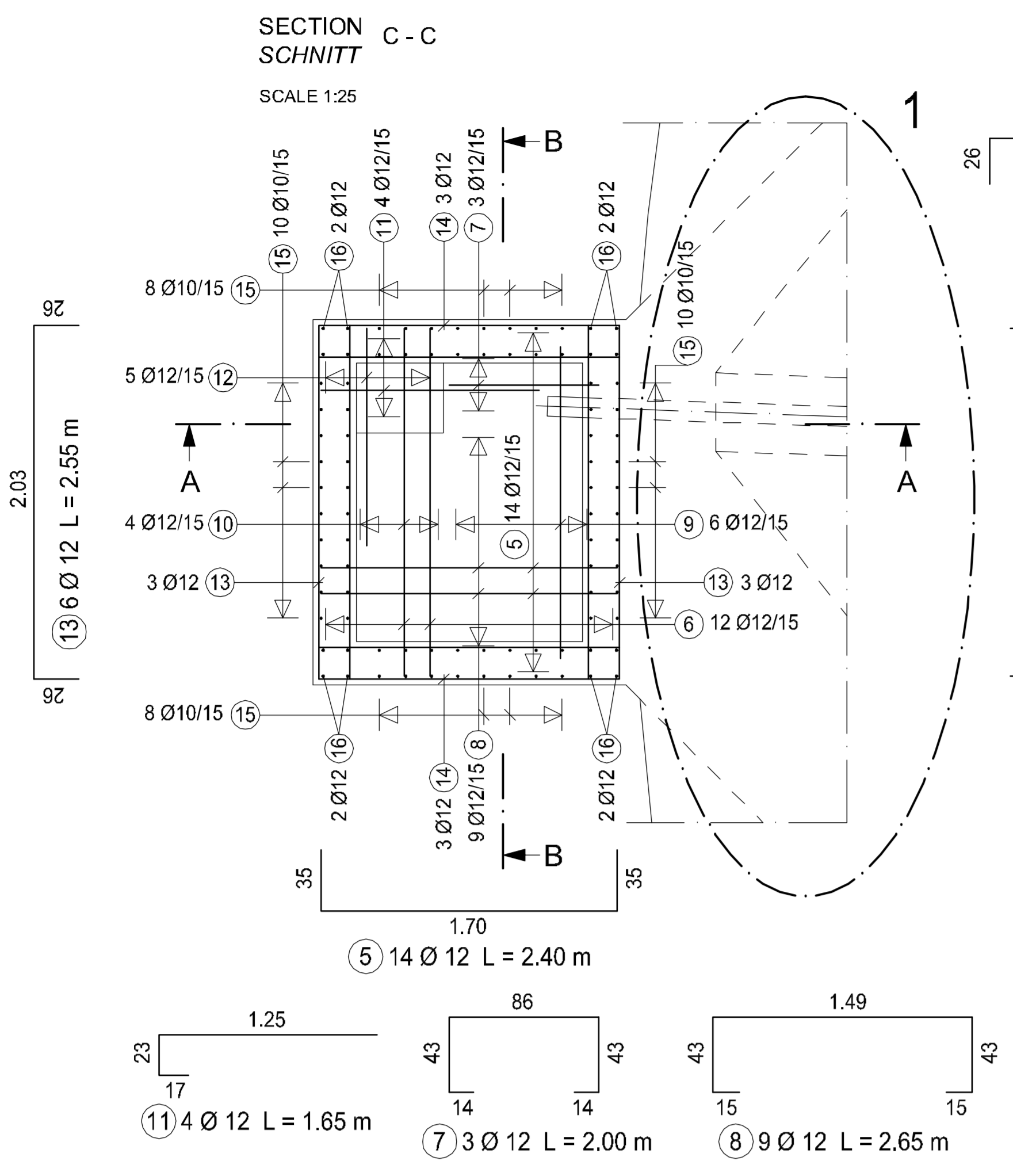
- C-1.7 FORMWORK PLAN FLOOR SLAB AND WALL / SCHALPLAN BODENPLATTE UND WAND
- S-1.2 LOWER REINFORCEMENT FLOOR SLAB / UNTERE BEWEHRUNG BODENPLATTE
- S-1.4 REINFORCEMENT LEAKAGE CONTROL PIT / BEWEHRUNG LECKKONTROLLSCHACHT

NOTES TO REINFORCEMENT STEELS (TYPICAL)  
BEMERKUNGEN ZU BEWEHRUNGSEISEN (TYPISCH)  
50 Ø 12 / 15 L = 1.50 m

- TOTAL LENGTH / GESAMTE LÄNGE (m)
- DISTANCE BETWEEN REINFORCEMENT STEELS / ABSTAND BEWEHRUNGSEISEN (cm)
- DIAMETER REINFORCEMENT STEELS / DURCHMESSER BEWEHRUNGSEISEN (mm)
- DISTANCE QUANTITY REINFORCEMENT STEELS / ANZAHL BEWEHRUNGSEISEN

REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
HEADQUARTERS UNITED STATES AIR FORCES EUROPE ENGINEERING & OPERATIONS				
AIRFIELD STANDARD DESIGN US		FLUGPLATZ STANDARDPLANUNG US		
JET FUEL STORAGE AND DISPENSING SYSTEMS		FLUGKRAFTSTOFF - VERSORGSANLAGEN		
BUILDING BAUWERK OPERATING TANK 5000m³ FLACHBODENTANK 5000m³				
DESIGNATOR BEZEICHNUNG UPPER REINFORCEMENT FLOOR SLAB OBERE BEWEHRUNG BODENPLATTE				
WORKED/BEARBEITET	PREPARED/HERGESTELLT	APPROVED/GENEHMIGT		
LANDSCHAFTS- UND BAUWERKE L B B	AMT FÜR BUNDESBAU WALLSTR.1 55122 MAINZ			
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAUPLANEN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED GENEHMIGT	DATE DATUM	SCALE MASSSTAB		
	6. MAI 2015	1:50 ; 1:25		
ORIGINAL DRAWN BY IN ORIGINAL DED.		STANDARD SHEET STANDARD PLAN		
GENERAL INFO CORPORATE FACILITIES ENGINEER PLANNING ARCHITECTURE		CAD-PROJECT MANAGER CAD-PROJEKTLEITER		
CONSTRUCTION PROJECT BAUPLANNAME			SHEET NO. PLANNR.	OF VON
			S - 1.3	





NOTES TO REINFORCEMENT STEELS (TYCAL)  
BEMERKUNGEN ZU BEWEHRUNGSEISEN (TYPISCH)

50 Ø 12 / 15 L = 1.50 m

▲ TOTAL LENGTH  
GESTRECKTE LÄNGE (m)  
▲ DISTANCE BETWEEN REINFORCEMENT STEELS  
ABSTAND BEWEHRUNGSEISEN (cm)  
▲ DIAMETER REINFORCEMENT STEELS  
DURCHMESSER BEWEHRUNGSEISEN (mm)  
▲ DISTANCE QUANTITY REINFORCEMENT STEELS  
ANZAHL BEWEHRUNGSEISEN

BENDING SCHEDULE STAHLLISTE										
NO. NR.	PIECES STÜCK	Ø	LENGTH LÄNGE	Ø 8	Ø 10	Ø 12	Ø 14	Ø 20		
1	11	10	2.40			26.4				
2	17	10	1.40			23.8				
3	6	10	2.25			13.5				
4	1	10	50.0			50.0				
5	14	12	2.40				33.6			
6	12	12	2.70				32.4			
7	3	12	2.00				6.0			
8	9	12	2.65				23.9			
9	6	12	2.85				17.1			
10	4	12	2.40				9.6			
11	4	12	1.65				6.6			
12	5	12	1.65				8.3			
13	6	12	2.55				15.3			
14	6	12	2.25				13.5			
15	36	10	5.55			199.8				
16	8	12	5.75				46.0			
17	276	10	2.55			703.8				
18	276	10	2.25			621.0				
19	48	12	3.20				153.6			
20	216	10	3.10			669.6				
21	18	10	2.45			44.1				
22	18	10	2.15			38.7				
23	248	8	0.40			99.2				
24	36	10	2.55			91.8				
25	8	12	2.55				20.4			
26	4	12	2.60				10.4			
27	4	12	2.30				9.2			
28	2	10	2.30			4.6				
29	6	8	0.75			4.5				
			Σ	103.7	2487.1	405.9				
			kg/m	0.395	0.617	0.888	1.21	1.58		
			kg	41.0	1534.5	360.4				
TOTAL WEIGHT GESAMTGEWICHT										1935.90 kg

**MATERIALS  
BAUSTOFFE**

CONCRETE  
BETON C25/30 XC3 WF

REINFORCEMENT  
BETONSTAHL BSt 500 S, BSt 500 M

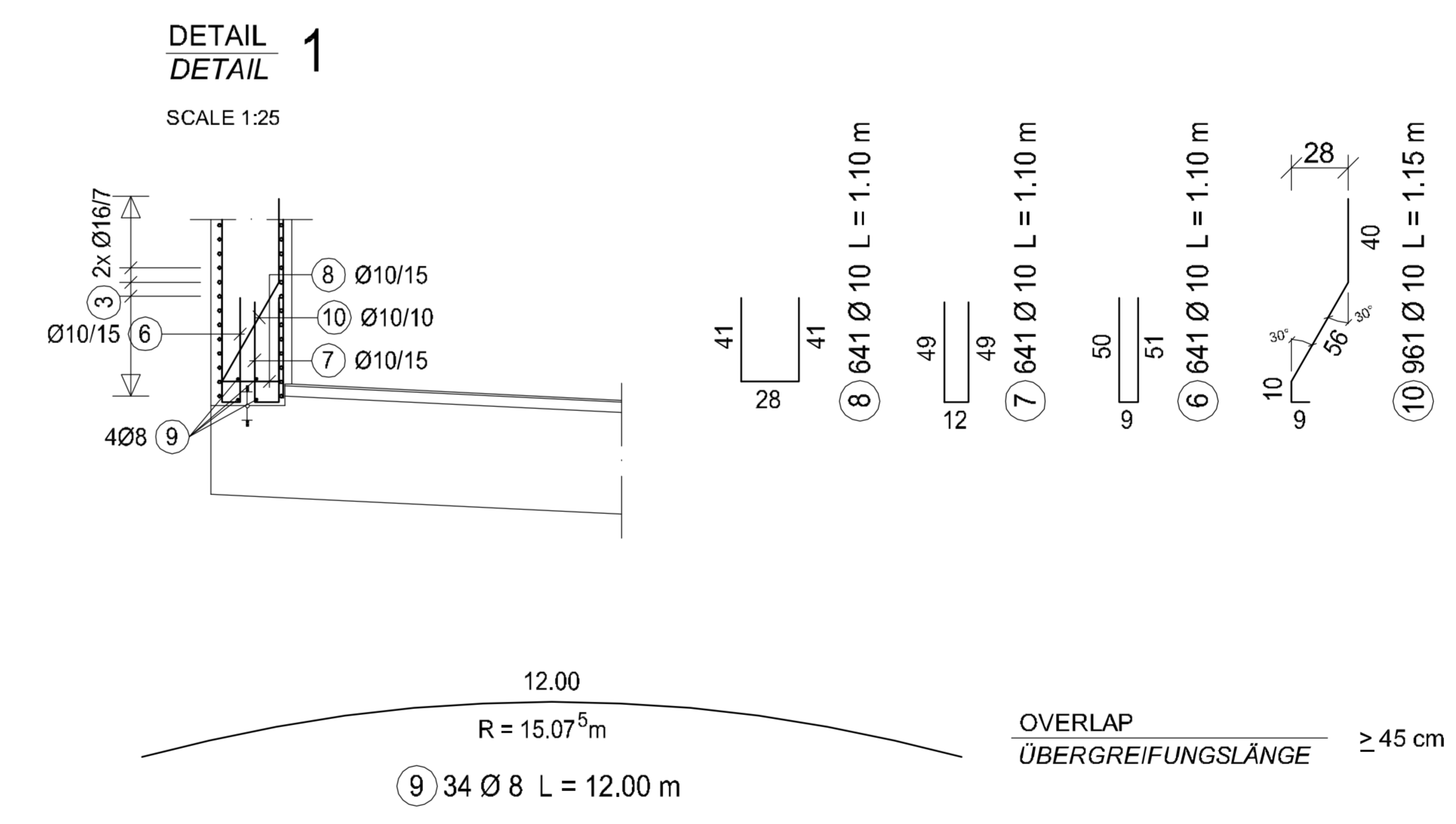
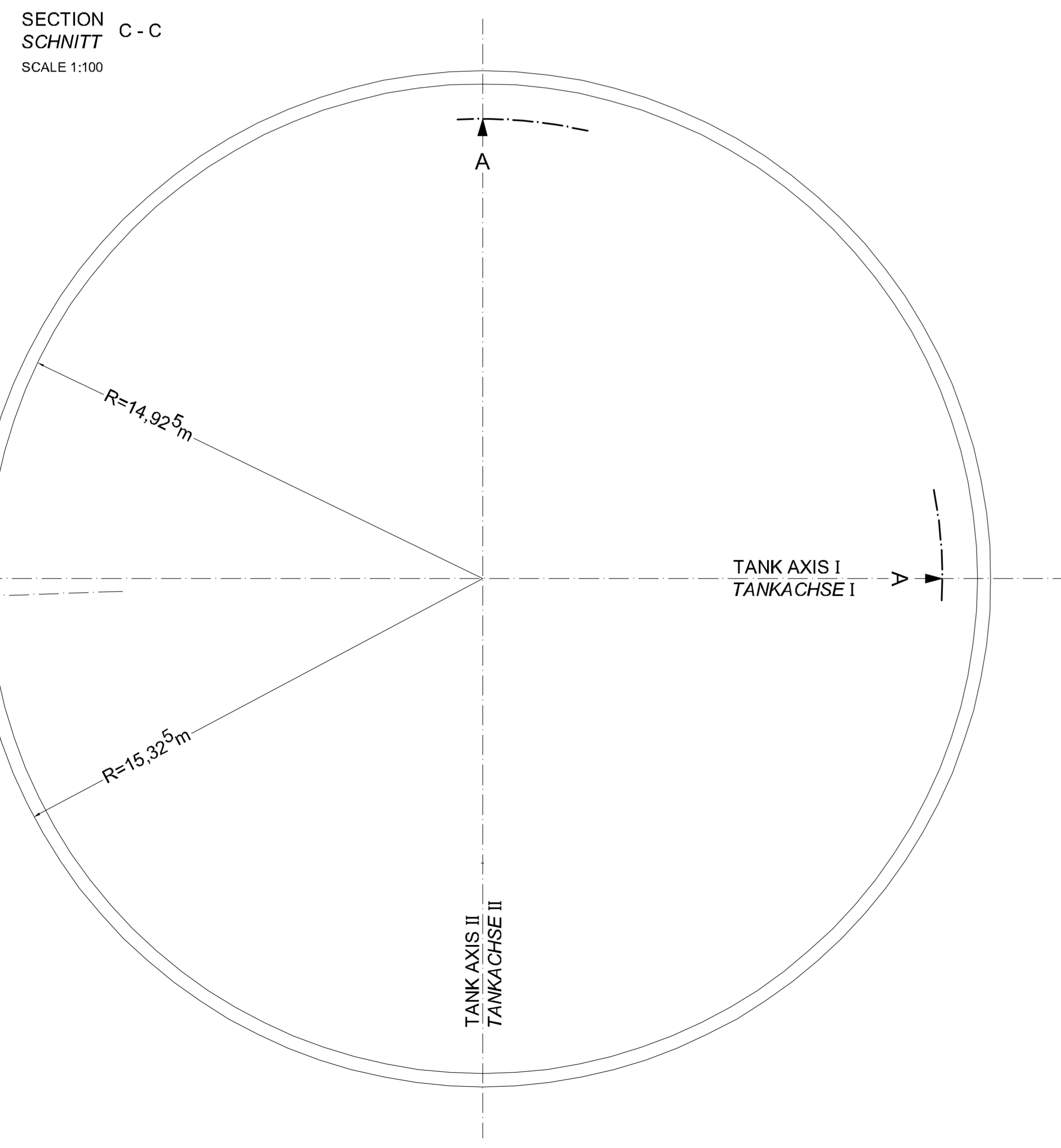
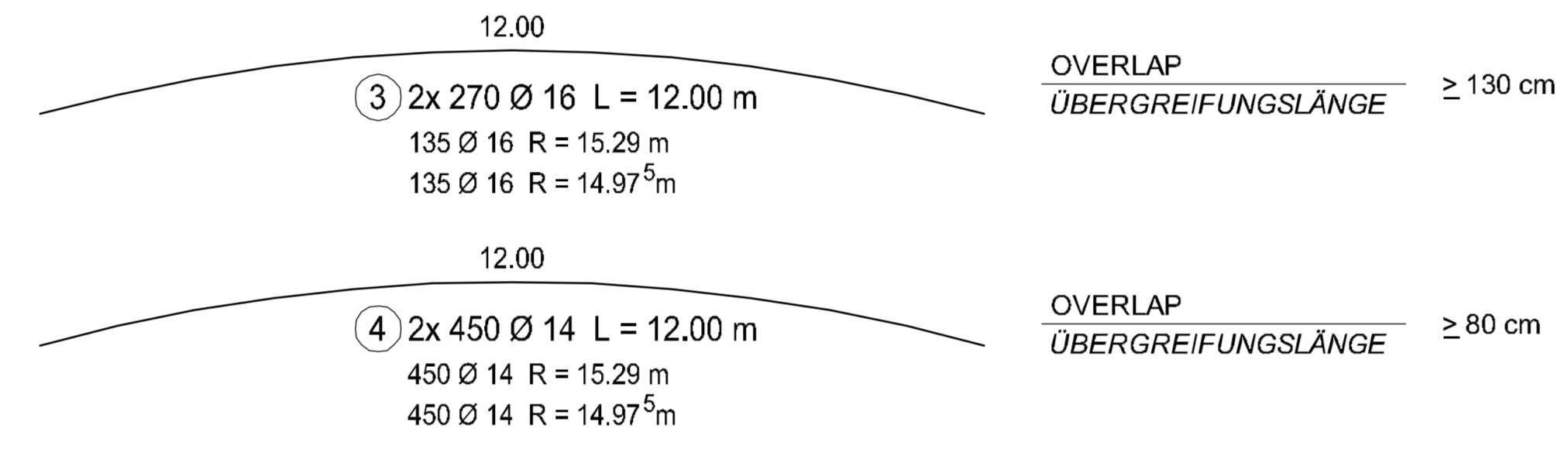
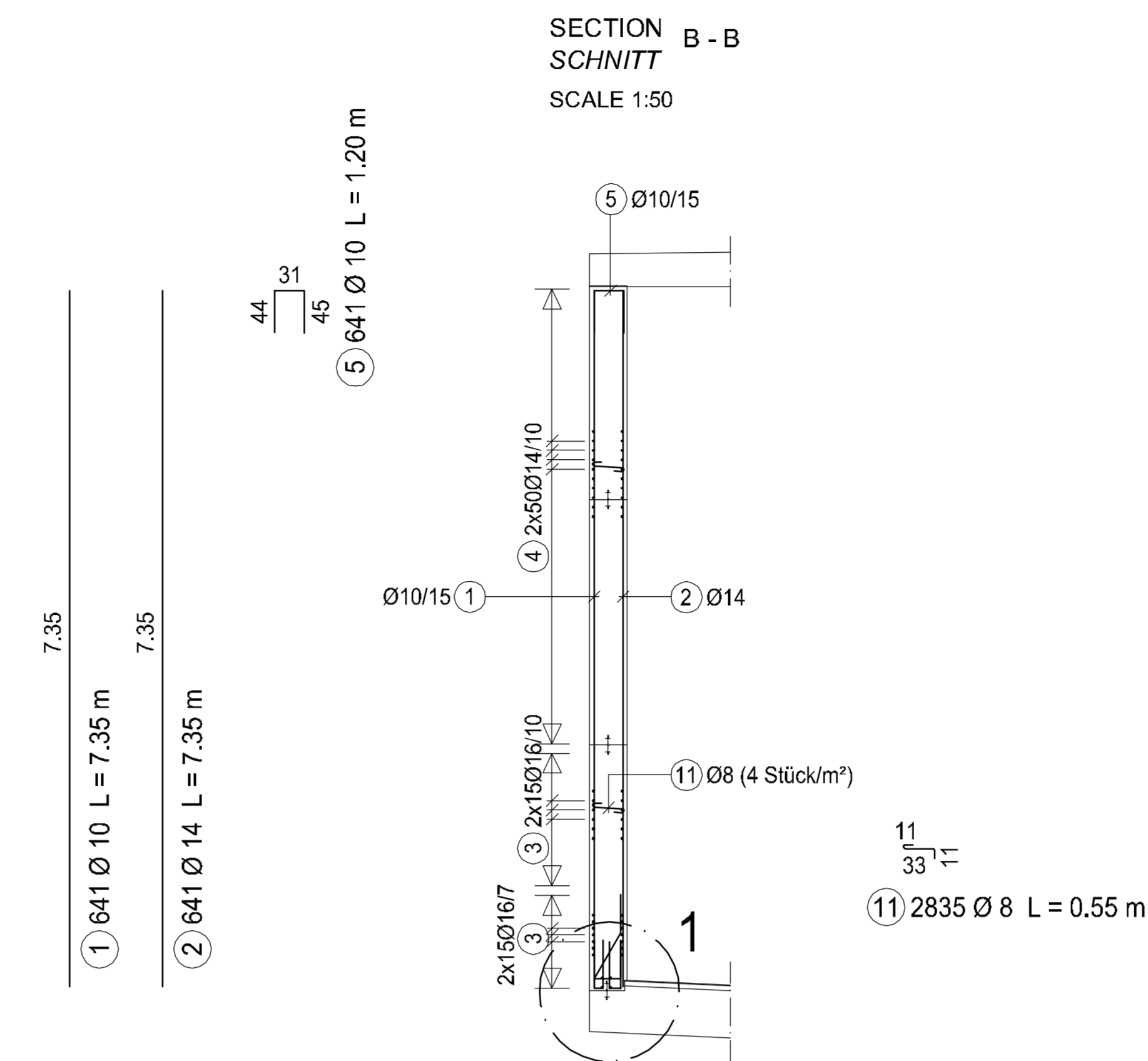
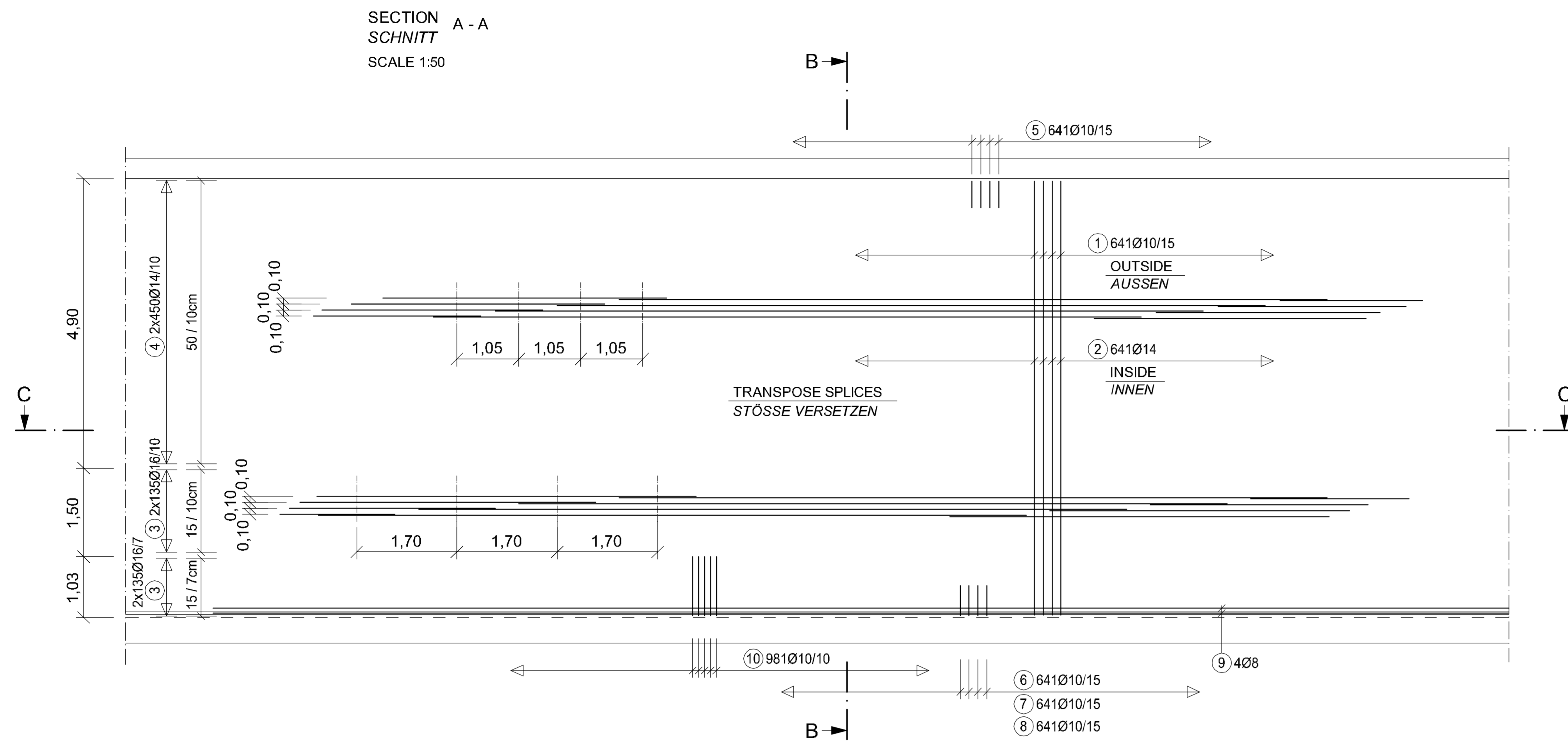
CONCRETE COVER  
BETONDECKUNG nom c = 3.5 cm

DIAMETER OF BENDING ROLL  
BIEGEROLLENDURCHMESSER ds < 20mm: d<sub>w</sub> ≥ 4d<sub>s</sub>  
ds ≥ 20mm: d<sub>w</sub> ≥ 7d<sub>s</sub>

- PERTINENT DRAWINGS  
ZUGEHÖRIGE ZEICHNUNGEN**
- C-1.7 FORMWORK PLAN FLOOR SLAB AND WALL  
SCHALPLAN BODENPLATTE UND WAND
  - C-1.8 FORMWORK PLAN ROOF SLAB  
SCHALPLAN DECKENPLATTE
  - S-1.2 LOWER REINFORCEMENT FLOOR SLAB  
UNTERE BEWEHRUNG BODENPLATTE
  - S-1.5 REINFORCEMENT TANK WALL  
BEWEHRUNG TANKWAND
  - S-1.6 LOWER REINFORCEMENT ROOF SLAB  
UNTERE BEWEHRUNG DECKENPLATTE
  - S-1.7 UPPER REINFORCEMENT ROOF SLAB  
OBERE BEWEHRUNG DECKENPLATTE

REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND		
<b>HEADQUARTERS</b>						
UNITED STATES AIR FORCES EUROPE						
ENGINEERING & OPERATIONS						
AIRFIELD STANDARD DESIGN US			FLUGPLATZ STANDARDPLANUNG US			
JET FUEL STORAGE AND DISPENSING SYSTEMS			FLUGKRAFTSTOFF - VERSORGENSANLAGEN			
<b>OPERATING TANK 5000m³ FLACHBODENTANK 5000m³</b>						
<b>REINFORCEMENT LEAKAGE CONTROL PIT BEWEHRUNG LECKKONTROLLSCHACHT</b>						
<table border="0" style="width: 100%;"> <tr> <td style="width: 50%;"> <b>WORKED/BEARBEITET</b>            LANDSCHAFTS- UND BAUVERBUND            LANDESWESEN            ANGEHEBEN            LANDSCHAFTS- UND BAUVERBUND            ANGEHEBEN         </td> <td style="width: 50%;"> <b>APPROVED/GENEHIGT</b>            AMT            FÜR            BAUWESEN            WÄLSTR.1            55122 MAINZ            ORIGINAL SIGNED BY            (NAME) (DATE)         </td> </tr> </table>					<b>WORKED/BEARBEITET</b> LANDSCHAFTS- UND BAUVERBUND LANDESWESEN ANGEHEBEN LANDSCHAFTS- UND BAUVERBUND ANGEHEBEN	<b>APPROVED/GENEHIGT</b> AMT FÜR BAUWESEN WÄLSTR.1 55122 MAINZ ORIGINAL SIGNED BY (NAME) (DATE)
<b>WORKED/BEARBEITET</b> LANDSCHAFTS- UND BAUVERBUND LANDESWESEN ANGEHEBEN LANDSCHAFTS- UND BAUVERBUND ANGEHEBEN	<b>APPROVED/GENEHIGT</b> AMT FÜR BAUWESEN WÄLSTR.1 55122 MAINZ ORIGINAL SIGNED BY (NAME) (DATE)					
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAUWERKUNGEN IN EUROPA (AUSSER DEUTSCHLAND)						
APPROVED GENEHIGT	DATE DATUM	SCALE MASSSTAB				
DESIGNED ENTWURFEN	DATE DATUM	STANDARD SHEET STANDARD PLAN				
DESIGNED ENTWURFEN	DATE DATUM	SHEET NO. BLATT NR.				
CONSTRUCTION PROJECT BAUWERKUNGEN	DATE DATUM	SHEET NO. BLATT NR.				





NOTES TO REINFORCEMENT STEELS (TYICAL)  
BEMERKUNGEN ZU BEWEHRUNGSEISEN (TYPISCH)

50 Ø 12 / 15 L = 1.50 m

- TOTAL LENGTH GESTRECKTE LÄNGE (m)
- DISTANCE BETWEEN REINFORCEMENT STEELS ABSTAND BEWEHRUNGSEISEN (cm)
- DIAMETER REINFORCEMENT STEELS DURCHMESSER BEWEHRUNGSEISEN (mm)
- DISTANCE QUANTITY REINFORCEMENT STEELS ANZAHL BEWEHRUNGSEISEN

BENDING SCHEDULE  
STAHLLISTE

NO. NR.	PIECES STÜCK	Ø	LENGTH LÄNGE	Ø 8	Ø 10	Ø 12	Ø 14	Ø 16
1	641	10	7.35		4711.4			
2	641	14	7.35				4711.4	
3	540	16	12.00					6480.0
4	900	14	12.00				10800.0	
5	641	10	1.20		769.2			
6	641	10	1.10		705.1			
7	641	10	1.10		705.1			
8	641	10	1.10		705.1			
9	34	8	12.00	408.0				
10	961	10	1.15		1105.2			
11	2835	8	0.55	1559.3				
Σ				1967.3	8701.1		15511.4	6480.0
				kg/m	0.395	0.617	0.888	1.21
				kg	777.1	5368.6	18768.8	10238.4
TOTAL WEIGHT GESAMTGEWICHT				35 152.9 kg				

MATERIALS  
BAUSTOFFE

CONCRETE BETON C25/30 XC3 WF

REINFORCEMENT BETONSTAHL BS1 500 S, BS1 500 M

CONCRETE COVER BETONDECKUNG nom c = 3.5 cm

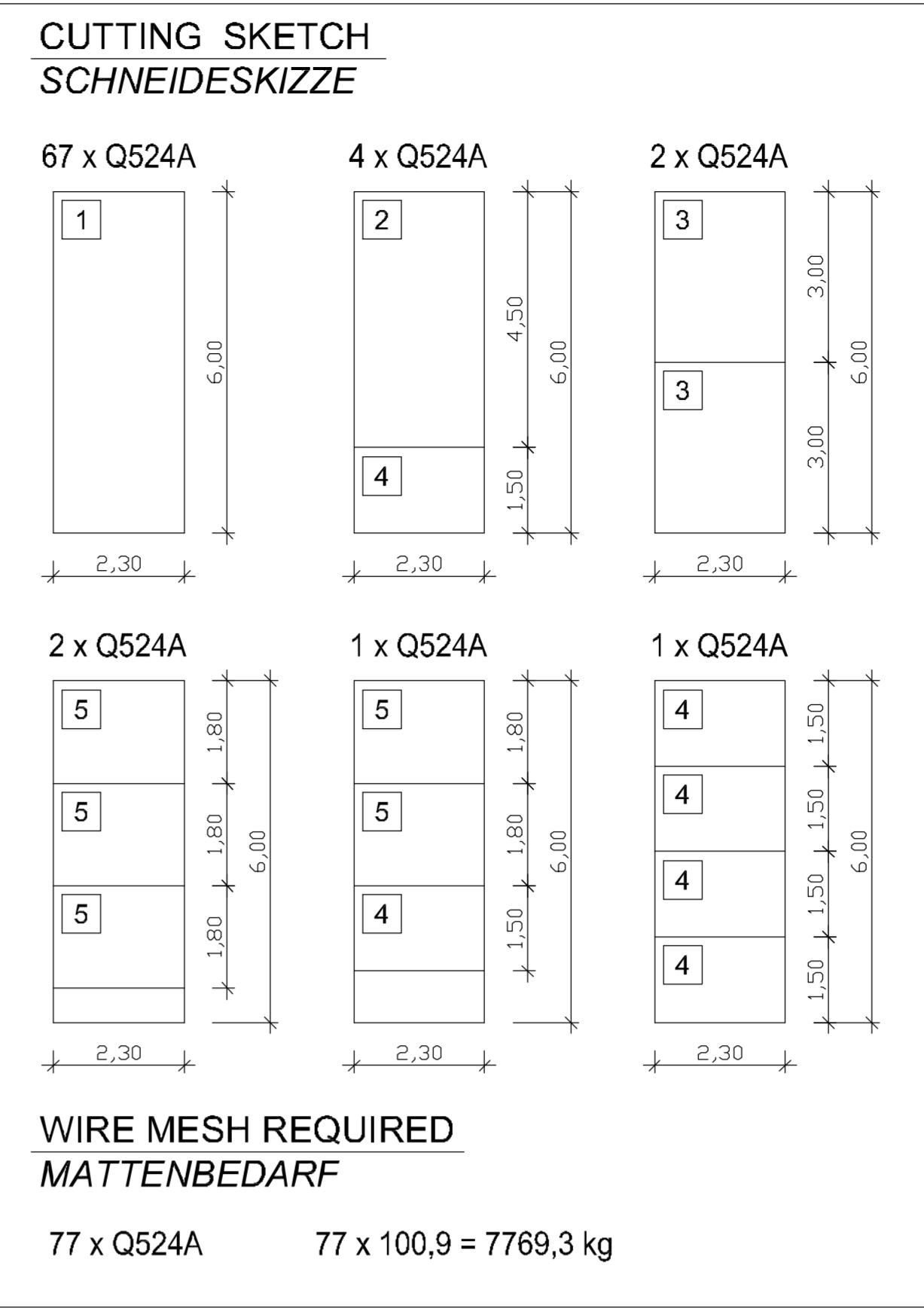
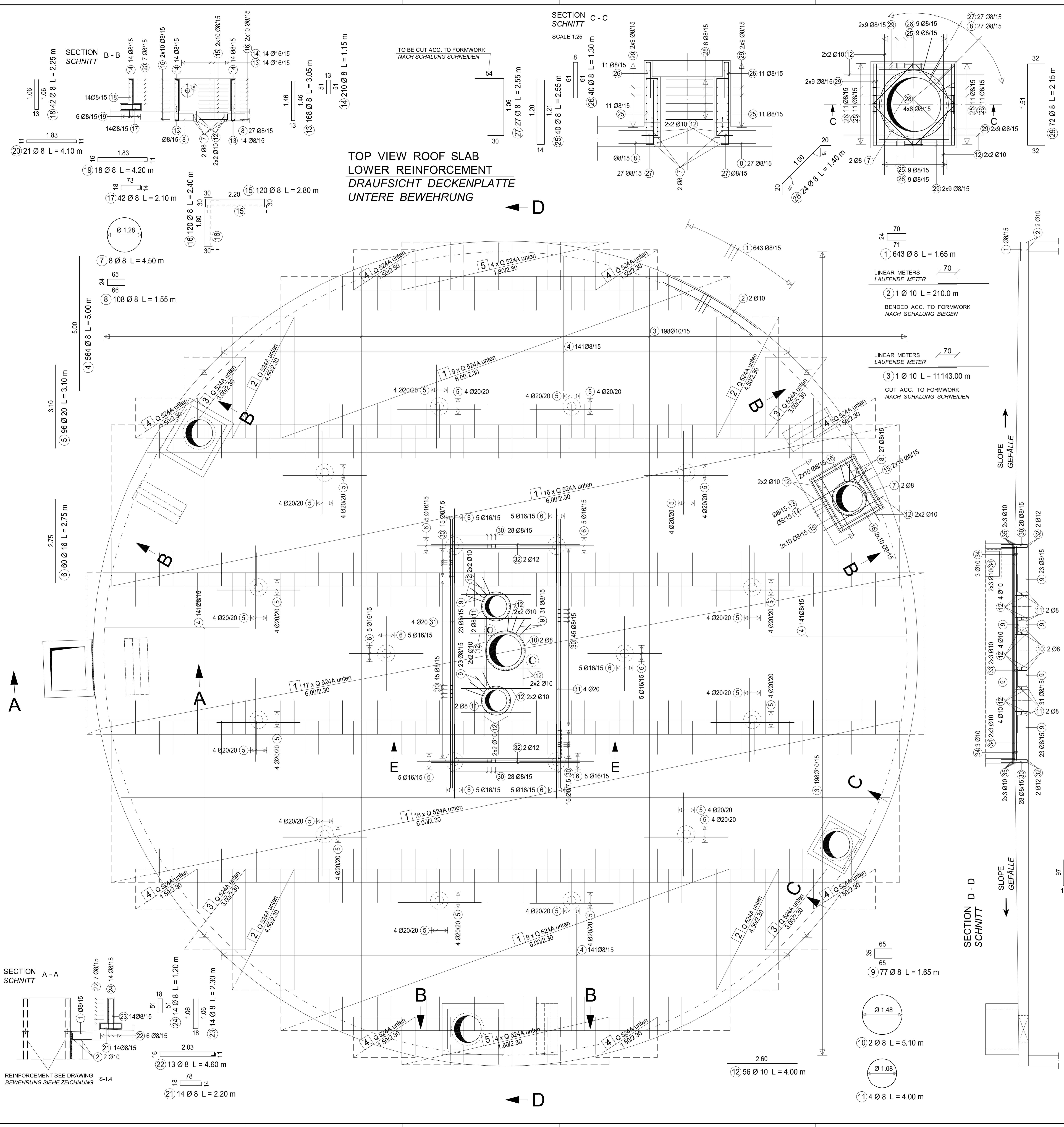
DIAMETER OF BENDING ROLL BIEGEROLLENDURCHMESSER  $d_s < 20$ mm:  $d_{tr} \geq 4d_s$   
 $d_s \geq 20$ mm:  $d_{tr} \geq 7d_s$

PERTINENT DRAWINGS  
ZUGEHÖRIGE ZEICHNUNGEN

- C-1.7 FORMWORK PLAN FLOOR SLAB AND WALL SCHALPLAN BODENPLATTE UND WAND
- S-1.4 REINFORCEMENT LEAKAGE CONTROL PIT BEWEHRUNG LECKKONTROLLSCHACHT

REVISIONSÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
HEADQUARTERS UNITED STATES AIR FORCES EUROPE ENGINEERING & OPERATIONS				
AIRFIELD STANDARD DESIGN US JET FUEL STORAGE AND DISPENSING SYSTEMS		FLUGPLATZ STANDARDPLANUNG US FLUGKRAFTSTOFF - VERSORGSANLAGEN		
BUILDING BAUWERK OPERATING TANK 5000m <sup>3</sup> FLACHBODENTANK 5000m <sup>3</sup>				
DESIGNATOR BEZEICHNUNG REINFORCEMENT TANK WALL BEWEHRUNG TANKWAND				
WORKED/BEARBEITET	PREPARED/AUFGESTELLT	APPROVED/GENEHMIGT		
LANDSCHAFTS- UND BAUWERKE L B B	AMT FÜR BUNDESBAU WALLSTR.1 55122 MAINZ	ORIGINAL SIGNED BY DATE		
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAU MASSNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED/GENEHMIGT	DATE DATUM	SCALE MASSSTAB		
ORIGINAL SIGNED BY IN ORIGINAL DES.	6. MAI 2015	1:100 ; 1:50 ; 1:25		
GENERAL INFO CONTRACT NO./VERTRAGS-NUMMER		STANDARD SHEET STANDARD PLAN		
CONSTRUCTION PROJECT BAU MASSNAHME		S - 1.5		
		SHEET NO. PLATZ-NR.		





**BENDING SCHEDULE STAHLLISTE**

NO. NR.	PIECES STÜCK	Ø	LENGTH LÄNGE	Ø 8	Ø 10	Ø 12	Ø 16	Ø 20		
1	643	8	1.65	1061.0						
2	1	10	210.0		210.0					
3	1	10	11143.0		11143.0					
4	564	8	5.00	2820.0						
5	96	20	3.10					297.6		
6	60	16	2.75				165.0			
7	8	8	4.50	360.0						
8	108	8	1.55	167.4						
9	77	8	1.55	119.4						
10	2	8	5.10	102.0						
11	4	8	4.00	160.0						
12	56	10	4.00		224.0					
13	168	8	3.05	512.4						
14	210	8	1.15	241.5						
15	120	8	2.80	336.0						
16	120	8	2.40	288.0						
17	42	8	2.10	88.2						
18	42	8	2.25	94.5						
19	18	8	4.20	75.6						
20	21	8	4.10	86.1						
21	14	8	2.20	30.8						
22	13	8	4.60	59.8						
23	14	8	2.30	32.2						
24	14	8	1.20	16.8						
25	40	8	2.55	102.0						
26	40	8	1.30	52.0						
27	27	8	2.55	68.9						
28	24	8	1.40	33.6						
29	72	8	2.15	154.8						
30	176	8	2.05	360.8						
31	8	20	10.00					80.0		
32	4	12	5.50			22.0				
33	12	10	7.95			95.4				
34	36	10	1.20			43.2				
35	12	10	3.95			47.4				
				Σ	6864.0	11763.0	22.0	165.0	377.6	
					kgm	0.395	0.617	0.888	1.58	2.47
					kg	2711.3	7257.8	19.5	260.7	932.7
				<b>TOTAL WEIGHT GESAMTGEWICHT</b>						<b>11 182.0 kg</b>

- MATERIALS BAUSTOFFE**
- CONCRETE BETON C25/30 XC3 WF
  - REINFORCEMENT BETONSTAHL BSt 500 S, BSt 500 M
  - CONCRETE COVER BETONDECKUNG nom c = 3.5 cm
  - DIAMETER OF BENDING ROLL BIEGEROLLENDURCHMESSER ds < 20mm: dbr ≥ 4ds; ds ≥ 20mm: dbr ≥ 7ds

- PERTINENT DRAWINGS ZUGEHÖRIGE ZEICHNUNGEN**
- C-1.8 FORMWORK PLAN ROOF SLAB SCHALPLAN DECKENPLATTE
  - S-1.7 UPPER REINFORCEMENT ROOF SLAB OBERE BEWEHRUNG DECKENPLATTE
  - S-1.8 REINFORCEMENT PUMP HOUSE WALLS BEWEHRUNG PUMPENHAUSWÄNDE

REVISIONSÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
<b>HEADQUARTERS UNITED STATES AIR FORCES EUROPE ENGINEERING &amp; OPERATIONS</b>				
AIRFIELD STANDARD DESIGN US		FLUGPLATZ STANDARDPLANUNG US		
JET FUEL STORAGE AND DISPENSING SYSTEMS		FLUGKRAFTSTOFF - VERSORGENGSANLAGEN		
BUILDING BAUWERK	<b>OPERATING TANK 5000m³ FLACHBODENTANK 5000m³</b>			
DESIGNATION BEZEICHNUNG	<b>LOWER REINFORCEMENT ROOF SLAB UNTERE BEWEHRUNG DECKENPLATTE</b>			
WORKPREPARED BY VORBEREITET	PREPARED/ALFGEFESTELT	APPROVED/GEPRÜFT	AMT FÜR BAUBESBAU WÄLLSTR.1 55122 MAINZ	
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAUBESBAUWERKE IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED/GEPRÜFT	DATE DATUM	6. MAI 2015	SCALE MASSSTAB	1:50 / 1:25
ORIGINAL DRAWN BY URSPRÜNGLICH GEZ.			STANDARD SHEET STANDARD PLAN	S - 1.6
CONSTRUCTION PROJECT BAUBESBAUWERKE				SHEET NO. OF TOTAL

**NOTES TO REINFORCEMENT STEELS (TYPICAL) BEMERKUNGEN ZU BEWEHRUNGSEISEN (TYPISCH)**

- TOTAL LENGTH GESTRECKTE LÄNGE (m)
- DISTANCE BETWEEN REINFORCEMENT STEELS ABSTAND BEWEHRUNGSEISEN (cm)
- DIAMETER REINFORCEMENT STEELS DURCHMESSER BEWEHRUNGSEISEN (mm)
- DISTANCE QUANTITY REINFORCEMENT STEELS ANZAHL BEWEHRUNGSEISEN



TOP VIEW ROOF SLAB  
UPPER REINFORCEMENT  
DRAUFSICHT DECKENPLATTE  
OBERE BEWEHRUNG

- ③ 385 Ø 16 L = 1.60 m
- ④ 230 Ø 16 L = 1.80 m
- ⑤ 75 Ø 16 L = 1.90 m

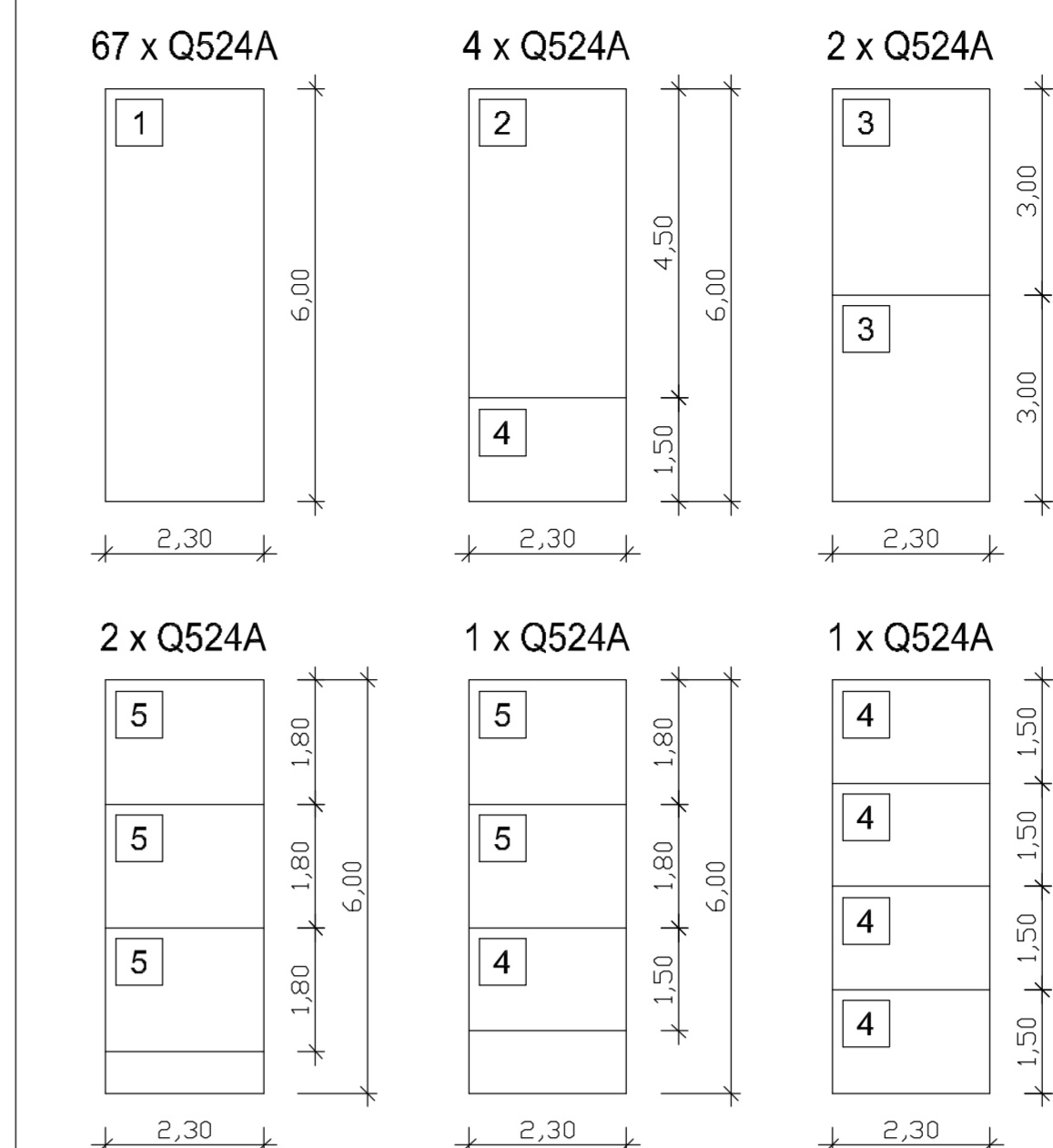
LINEAR METERS  
LAUFENDE METER

① 1 Ø 10 L = 315,0 m  
BENDED ACC. TO FORMWORK  
NACH SCHALUNG BIEGEN

LINEAR METERS  
LAUFENDE METER

② 1 Ø 10 L = 11143,00 m  
CUT ACC. TO FORMWORK  
NACH SCHALUNG SCHNEIDEN

CUTTING SKETCH  
SCHNEIDESKIZZE



WIRE MESH REQUIRED  
MATTENBEDARF

77 x Q524A 77 x 100,9 = 7769,3 kg

BENDING SCHEDULE  
STAHLLISTE

NO. NR.	PIECES STÜCK	Ø	LENGTH LÄNGE	Ø 8	Ø 10	Ø 14	Ø 16	Ø 20
1	1	10	315,0		315,0			
2	1	10	11143,0		11143,0			
3	385	16	1,60				616,0	
4	230	16	1,80				414,0	
5	75	16	1,90				142,5	
6	240	16	3,60				864,0	
7	102	20	4,00					408,0
8	120	14	3,35			402,0		
9	48	16	3,20				153,6	
10	48	16	3,80				182,4	
11	48	16	3,10				148,8	
12	48	16	3,70				177,6	
Σ					11458,0	402,0	2698,9	408,0
kg/m				0,395	0,617	1,21	1,58	2,47
TOTAL WEIGHT GESAMTGEWICHT				12 828,1 kg				

MATERIALS  
BAUSTOFFE

CONCRETE BETON C25/30 XC3 WF

REINFORCEMENT BETONSTAHL BSt 500 S, BSt 500 M

CONCRETE COVER BETONDECKUNG nom c = 3.5 cm

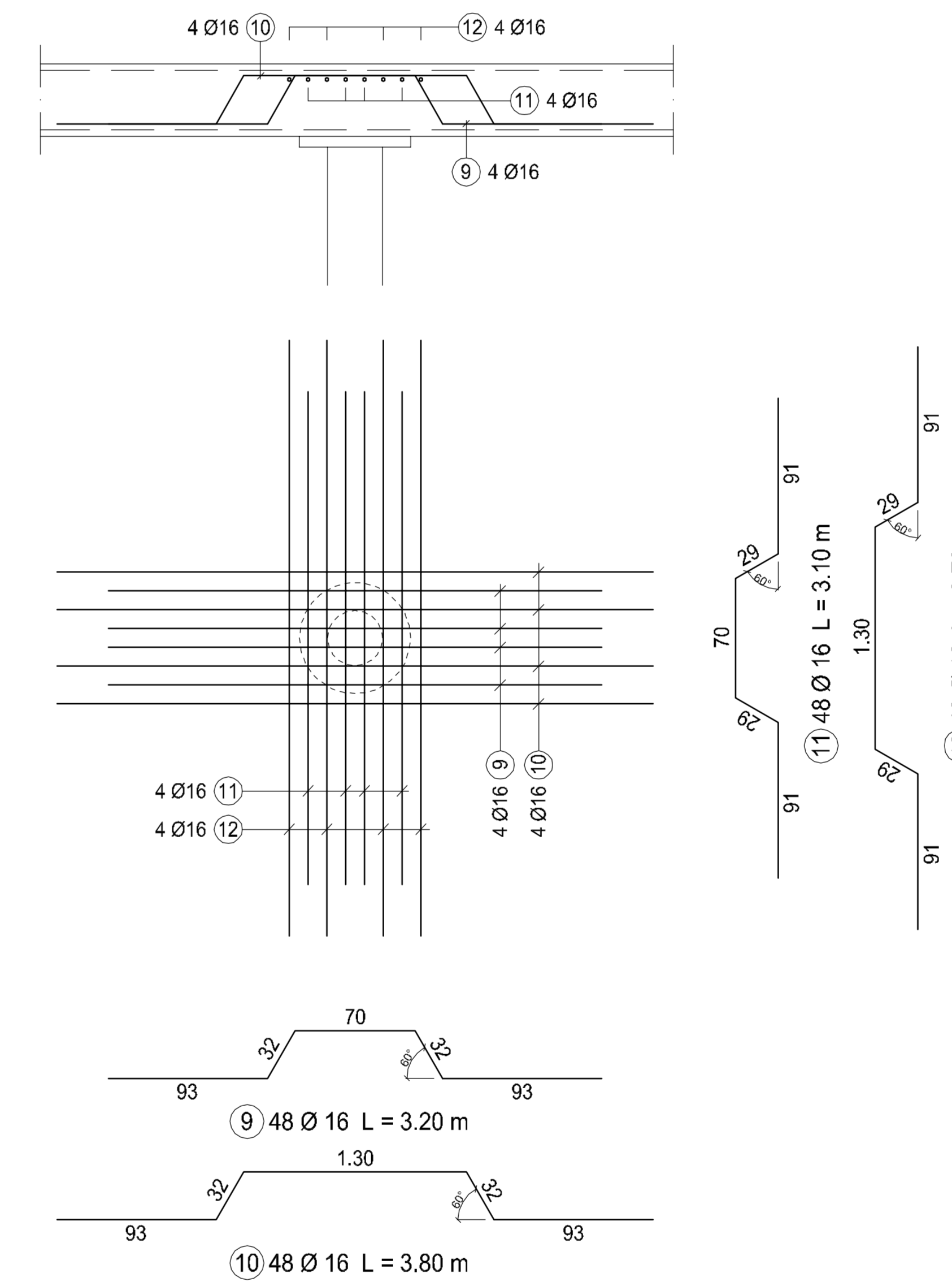
DIAMETER OF BENDING ROLL BIEGEROLLENDURCHMESSER ds < 20mm: dbr ≥ 4ds  
ds ≥ 20mm: dbr ≥ 7ds

PERTINENT DRAWINGS  
ZUGEHÖRIGE ZEICHNUNGEN

- C-1.8 FORMWORK PLAN ROOF SLAB  
SCHALPLAN DECKENPLATTE
- S-1.6 LOWER REINFORCEMENT ROOF SLAB  
UNTERE BEWEHRUNG DECKENPLATTE
- S-1.8 REINFORCEMENT PUMP HOUSE WALLS  
BEWEHRUNG PUMPENHAUSWÄNDE

DETAIL COLUMN  
DETAIL STÜTZE 1

SCALE 1:25

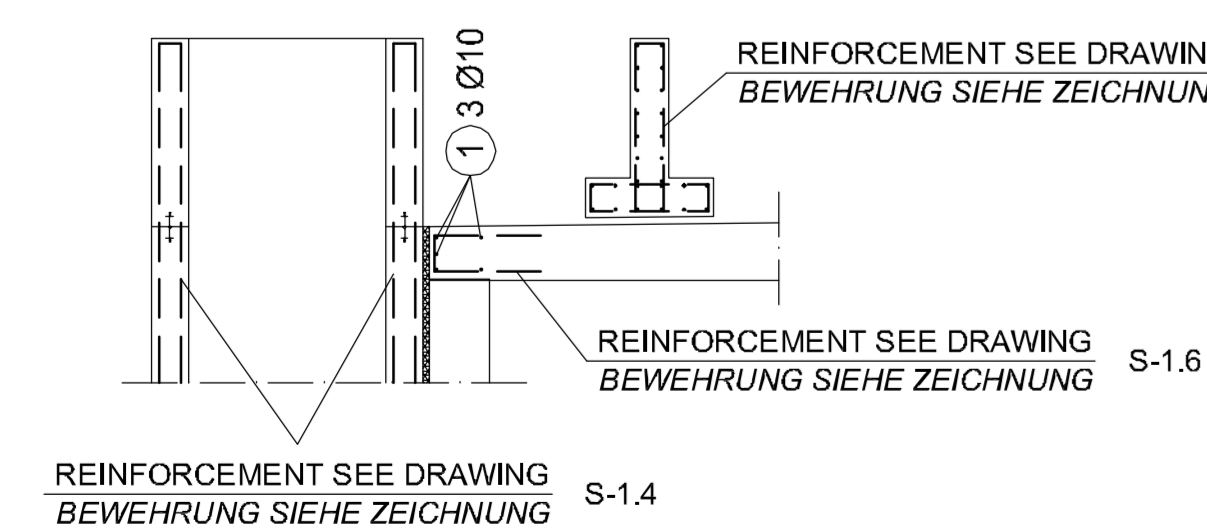


3,60  
⑥ 240 Ø 16 L = 3,60 m

4,00  
⑦ 102 Ø 20 L = 4,00 m

3,35  
⑧ 120 Ø 14 L = 3,35 m

SECTION A-A  
SCHNITT



NOTES TO REINFORCEMENT STEELS (TYPICAL)  
BEMERKUNGEN ZU BEWEHRUNGSEISEN (TYPISCH)

- 50 Ø 12 / 15 L = 1,50 m
- TOTAL LENGTH GESTRECKTE LÄNGE (m)
- DISTANCE BETWEEN REINFORCEMENT STEELS ABSTAND BEWEHRUNGSEISEN (cm)
- DIAMETER REINFORCEMENT STEELS DURCHMESSER BEWEHRUNGSEISEN (mm)
- DISTANCE QUANTITY REINFORCEMENT STEELS ANZAHL BEWEHRUNGSEISEN

REVISION	DATE	DESCRIPTION	BY	COUNTRY
ÄNDERUNG	DATUM	BESCHREIBUNG	VON	LAND

HEADQUARTERS  
UNITED STATES  
AIR FORCES EUROPE

ENGINEERING & OPERATIONS

AIRFIELD  
STANDARD DESIGN US

JET FUEL STORAGE AND  
DISPENSING SYSTEMS

FLUGPLATZ  
STANDARDPLANUNG US

FLUGKRAFTSTOFF -  
VERSORGENGSANLAGEN

BUILDING  
BAUWERK OPERATING TANK 5000m<sup>3</sup>  
FLACHBODENTANK 5000m<sup>3</sup>

DESIGNATOR  
BEZEICHNUNG UPPER REINFORCEMENT ROOF SLAB  
OBERE BEWEHRUNG DECKENPLATTE

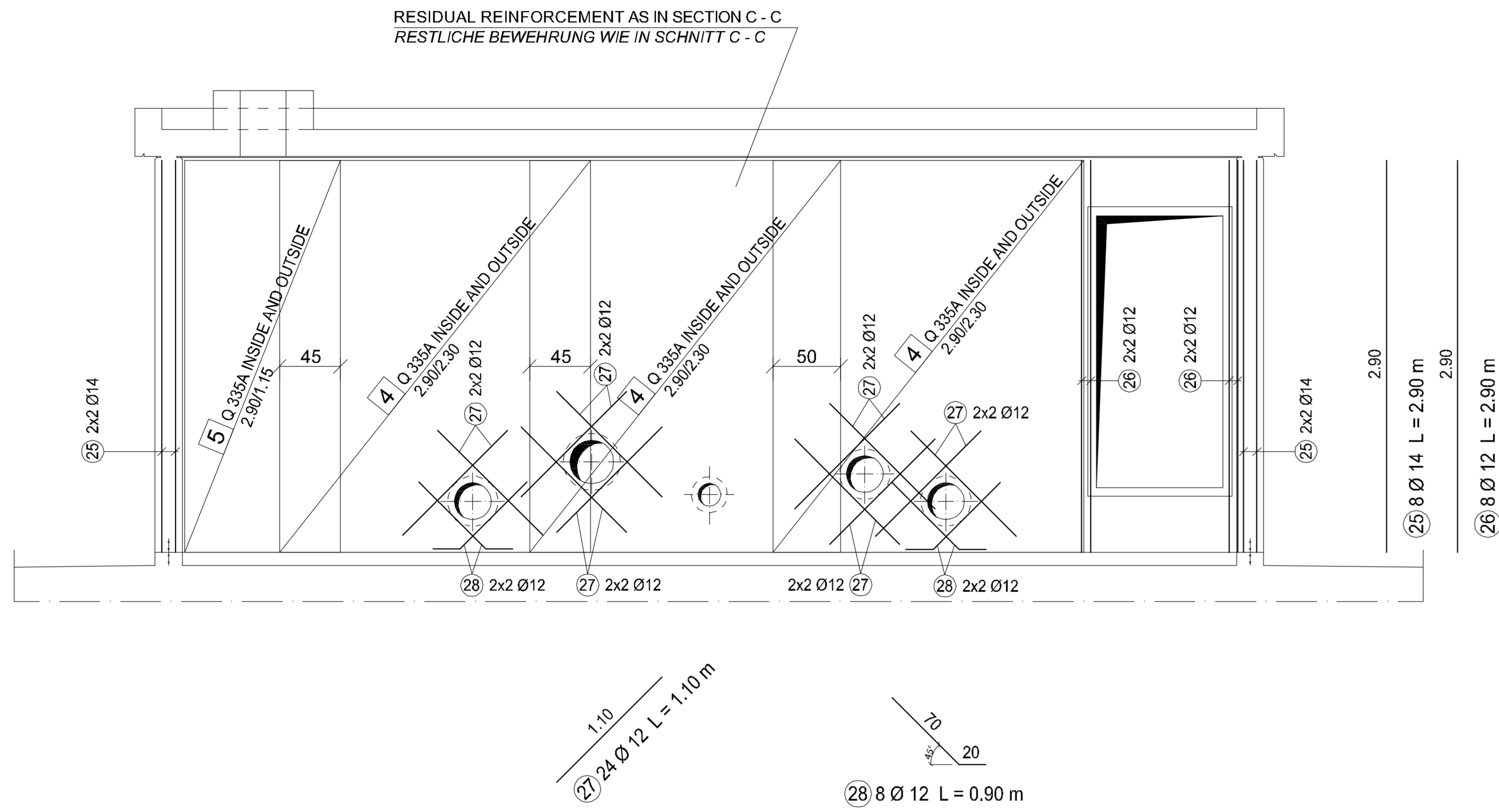
WORKED/BEARBEITET	PREPARED/AUFGESTELLT	APPROVED/GENEHIGT
LANDSCHAFTS- UND BAUWERKE L B B	AMT FÜR BAUWESEN WALLSTR.1 55122 MAINZ	ORIGINAL SIGNED BY IN ORIGINAL SIZE KONTROLLSIEGEL

INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY)  
EINGEFÜHRT FÜR BAUASSAHMEN IN EUROPA (AUSSER DEUTSCHLAND)

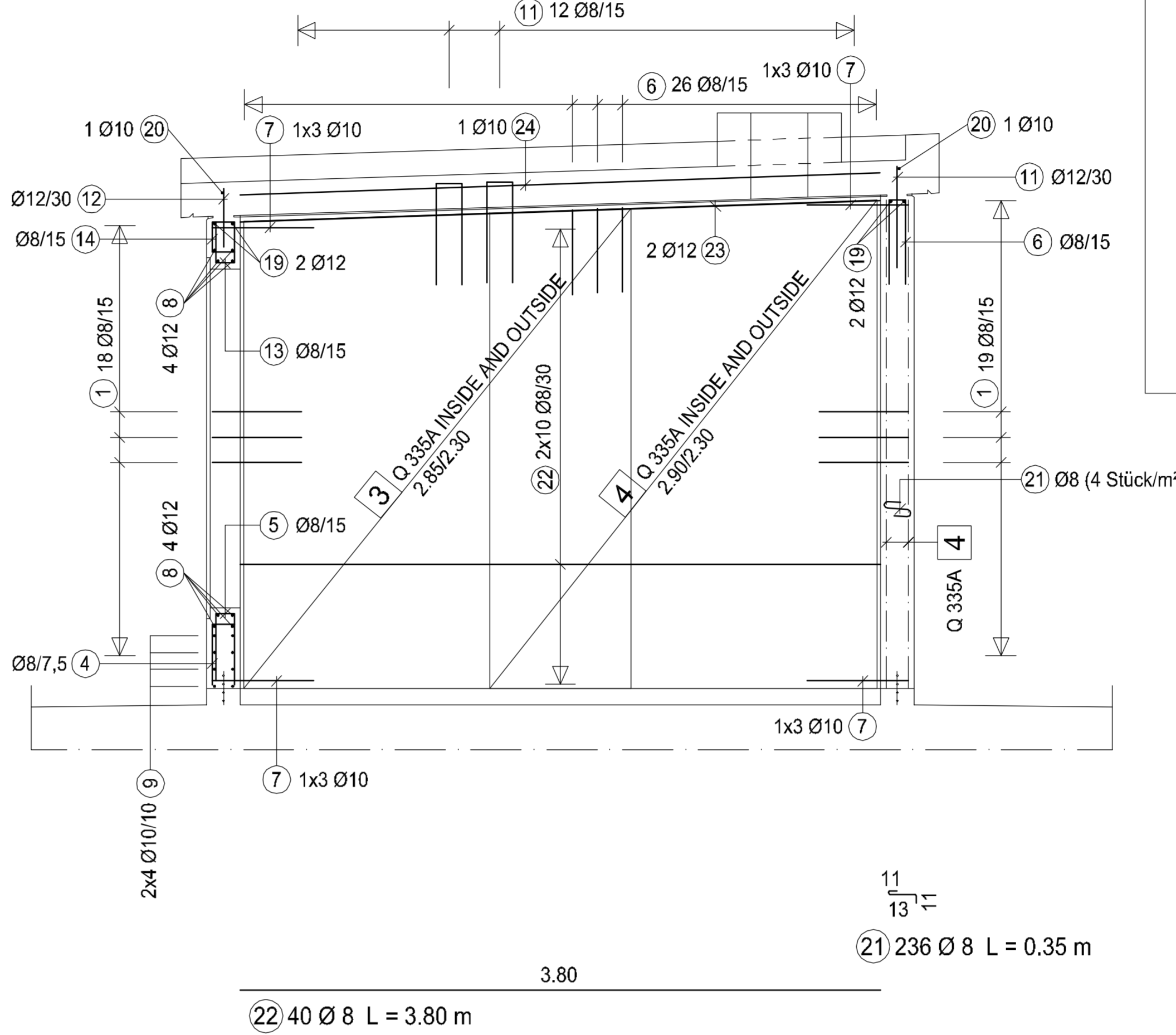
APPROVED GENEHIGT	DATE DATUM 6. MAI 2015	SCALE MASSSTAB 1:50 / 1:25
ORIGINAL SIGNED BY IN ORIGINAL SIZE	STANDARD SHEET STANDARDBLATT	S - 1.7
CONSTRUCTION PROJECT BAUASSAHME	CAD-PROJECT FILE CAD-PROJEKTDATEI	SHEET NO. BLATTNR. OF VON



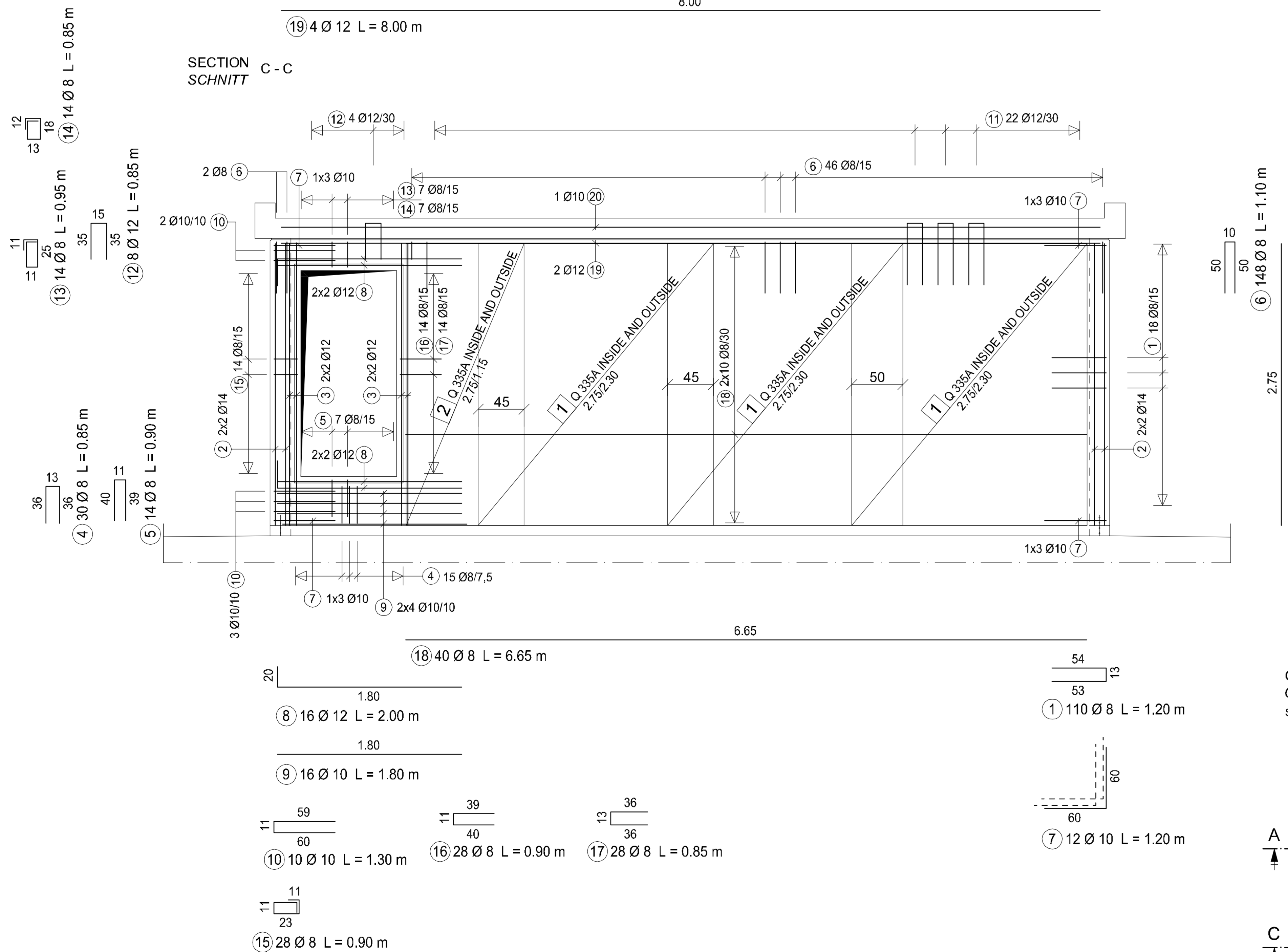
SECTION A-A  
SCHNITT



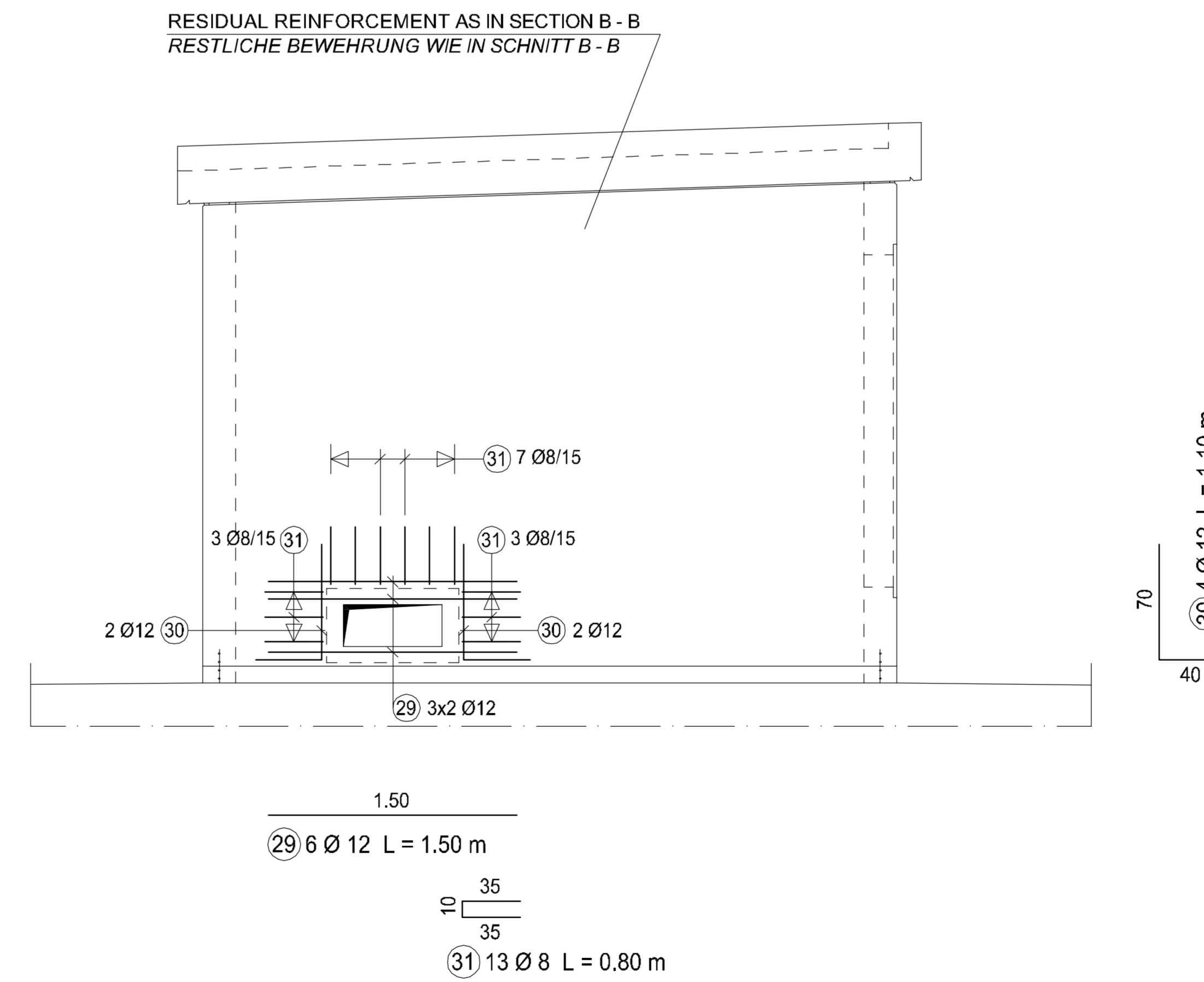
SECTION B-B  
SCHNITT



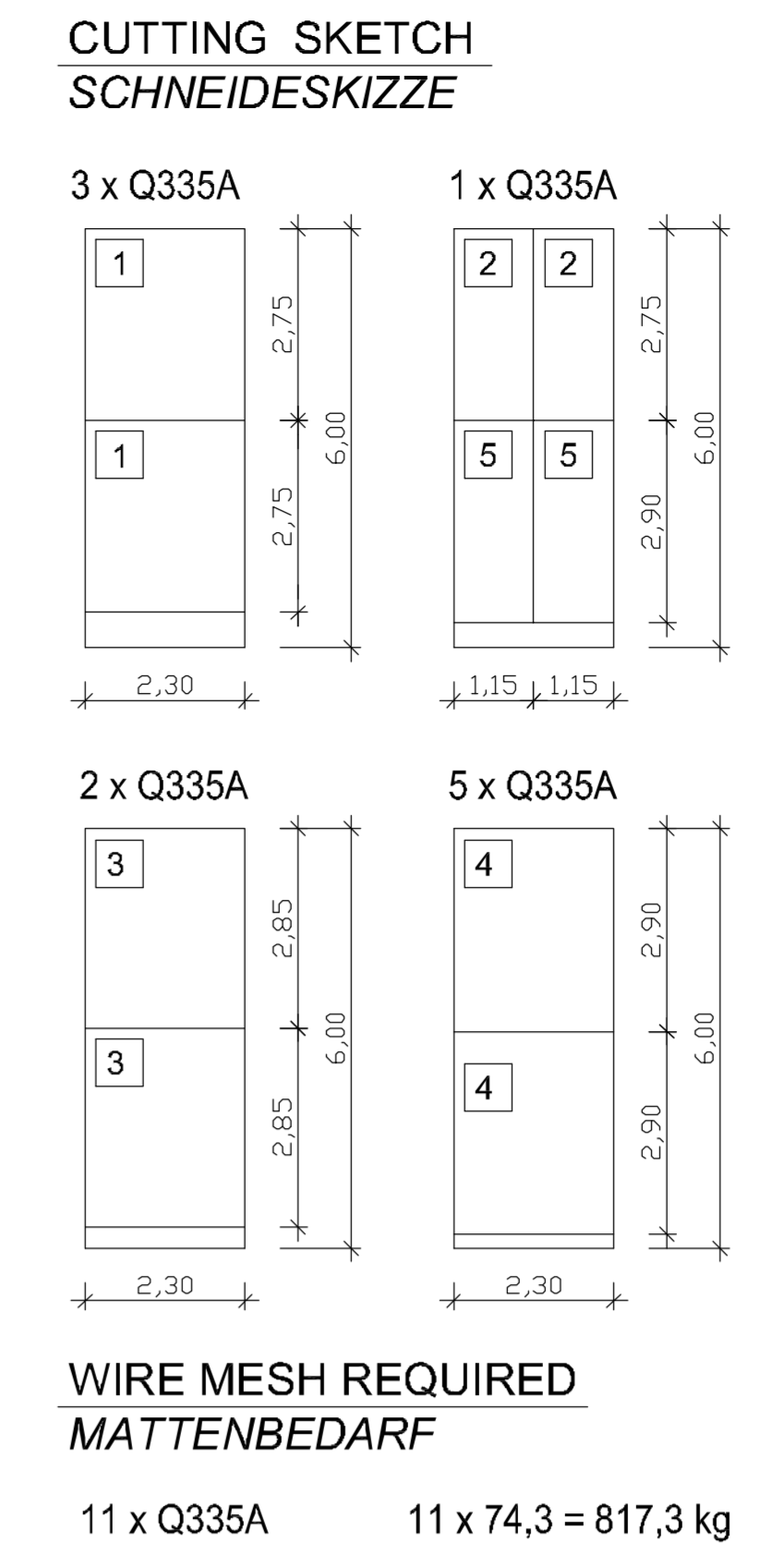
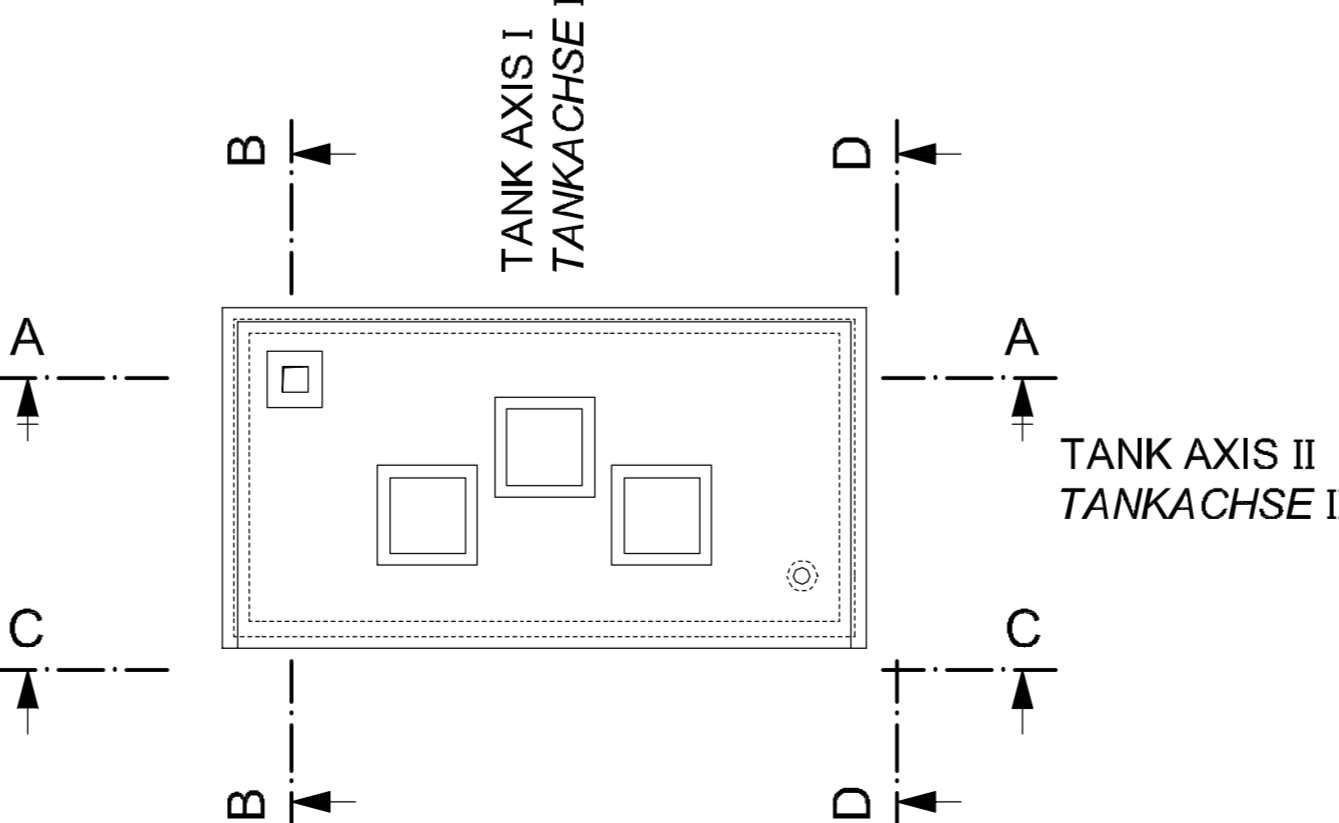
SECTION C-C  
SCHNITT



SECTION D-D  
SCHNITT



GROUND PLAN  
GRUNDRISS  
SCALE 1:100



BENDING SCHEDULE  
STAHLLISTE

NO. NR.	PIECES STÜCK	Ø	LENGTH LÄNGE	Ø 8	Ø 10	Ø 12	Ø 14	Ø 16	
1	110	8	1.20	132.0					
2	8	14	2.75				22.0		
3	8	12	2.75			22.0			
4	30	8	0.85	25.5					
5	14	8	0.90	12.6					
6	148	8	1.10	162.8					
7	12	10	1.20		14.4				
8	16	12	2.00			32.0			
9	16	10	1.80		28.8				
10	10	10	1.30		13.0				
11	68	12	1.35			91.8			
12	8	12	0.85			6.8			
13	14	8	0.95	13.3					
14	14	8	0.85	11.9					
15	28	8	0.90	25.2					
16	28	8	0.90	25.2					
17	28	8	0.85	23.8					
18	40	8	6.65	266.0					
19	4	12	8.00		32.0				
20	2	10	8.00		16.0				
21	236	8	0.35	82.6					
22	40	8	3.80	152.0					
23	4	12	3.80		15.2				
24	2	10	3.80		7.6				
25	8	14	2.90			23.2			
26	8	12	2.90			23.2			
27	24	12	1.10			26.4			
28	8	12	0.90			7.2			
29	6	12	1.50			9.0			
30	4	12	1.10			4.4			
31	13	8	0.80	10.4					
				Σ	943.3	79.8	270.0	45.2	
					0.395	0.617	0.888	1.21	
					kg	372.6	49.2	239.8	54.7
TOTAL WEIGHT GESAMTGEWICHT							716.3	kg	

- MATERIALS  
BAUSTOFFE
- CONCRETE BETON: C25/30 XC3 WF
  - REINFORCEMENT BETONSTAHL: BSt 500 S, BSt 500 M
  - CONCRETE COVER BETONDECKUNG: nom c = 3.5 cm
  - DIAMETER OF BENDING ROLL BIEGEROLLENDURCHMESSER: d<sub>s</sub> < 20mm; d<sub>sr</sub> ≥ 4d<sub>s</sub>; d<sub>s</sub> ≥ 20mm; d<sub>sr</sub> ≥ 7d<sub>s</sub>

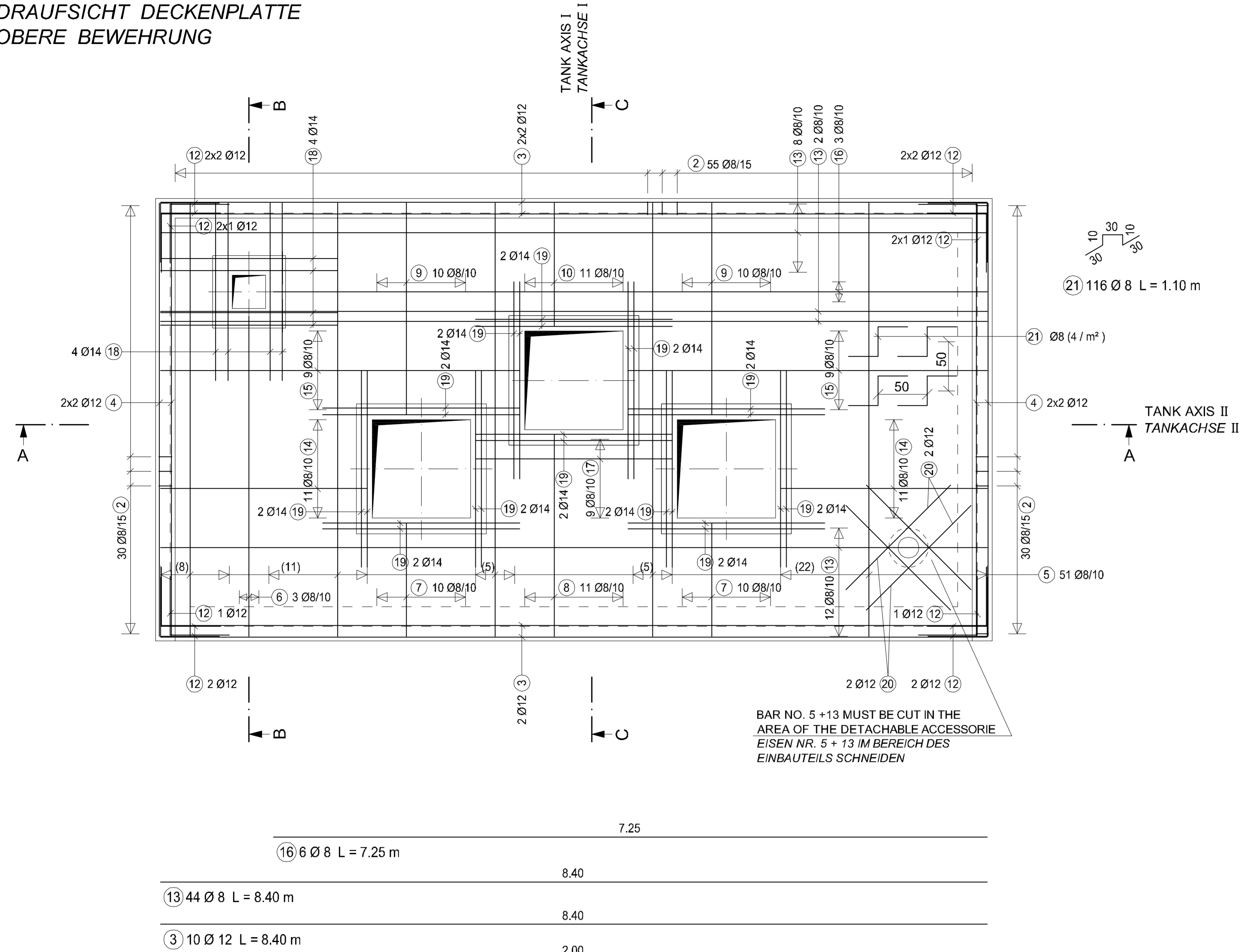
- PERTINENT DRAWINGS  
ZUGEHÖRIGE ZEICHNUNGEN
- C-1.5 CONSTRUCTION PLAN, PUMP HOUSE  
BAUKONSTRUKTIONSPLAN, PUMPENHAUS
  - S-1.9 REINFORCEMENT PUMP HOUSE ROOF SLAB  
BEWEHRUNG PUMPENHAUSDECKE

REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
<b>HEADQUARTERS</b> UNITED STATES AIR FORCES EUROPE ENGINEERING & OPERATIONS				
AIRFIELD STANDARD DESIGN US JET FUEL STORAGE AND DISPENSING SYSTEMS		FLUGPLATZ STANDARDPLANUNG US FLUGKRAFTSTOFF - VERSORGSANLAGEN		
<b>BUILDING BAUWERK</b> OPERATING TANK 5000m <sup>3</sup> FLACHBODENTANK 5000m <sup>3</sup>				
<b>DESIGNATOR BEZEICHNUNG</b> REINFORCEMENT PUMP HOUSE WALLS BEWEHRUNG PUMPENHAUSWÄNDE				
WORKED/ARBEITET	PREPARED/ALFGEFEST	APPROVED/GEPRÜFT		
LANGGESTRECKTE LIEFERUNGS- UND BAUEINRICHTUNG LANGGESTRECKTE LIEFERUNGS- UND BAUEINRICHTUNG LANGGESTRECKTE LIEFERUNGS- UND BAUEINRICHTUNG		AMT FÜR BUNDESBAU WALLSTR.1 55122 MAINZ		
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAUUNTERNEHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED GEPRÜFT	DATE DATUM	SCALE MASSSTAB		
	6. MAI 2015	1:25		
ORIGINAL DRAWN BY IN ORIGINAL DED.		STANDARD SHEET STANDARD PLAN		
GENERAL INFO GEM. ALLG. ANGABEN		CAD-DRAWING FILE CAD-PROJEKTDATENSATZ	S - 1.8	
CONSTRUCTION PROJECT BAUUNTERNEHMEN			SHEET NO. PLATZNR.	OF VON

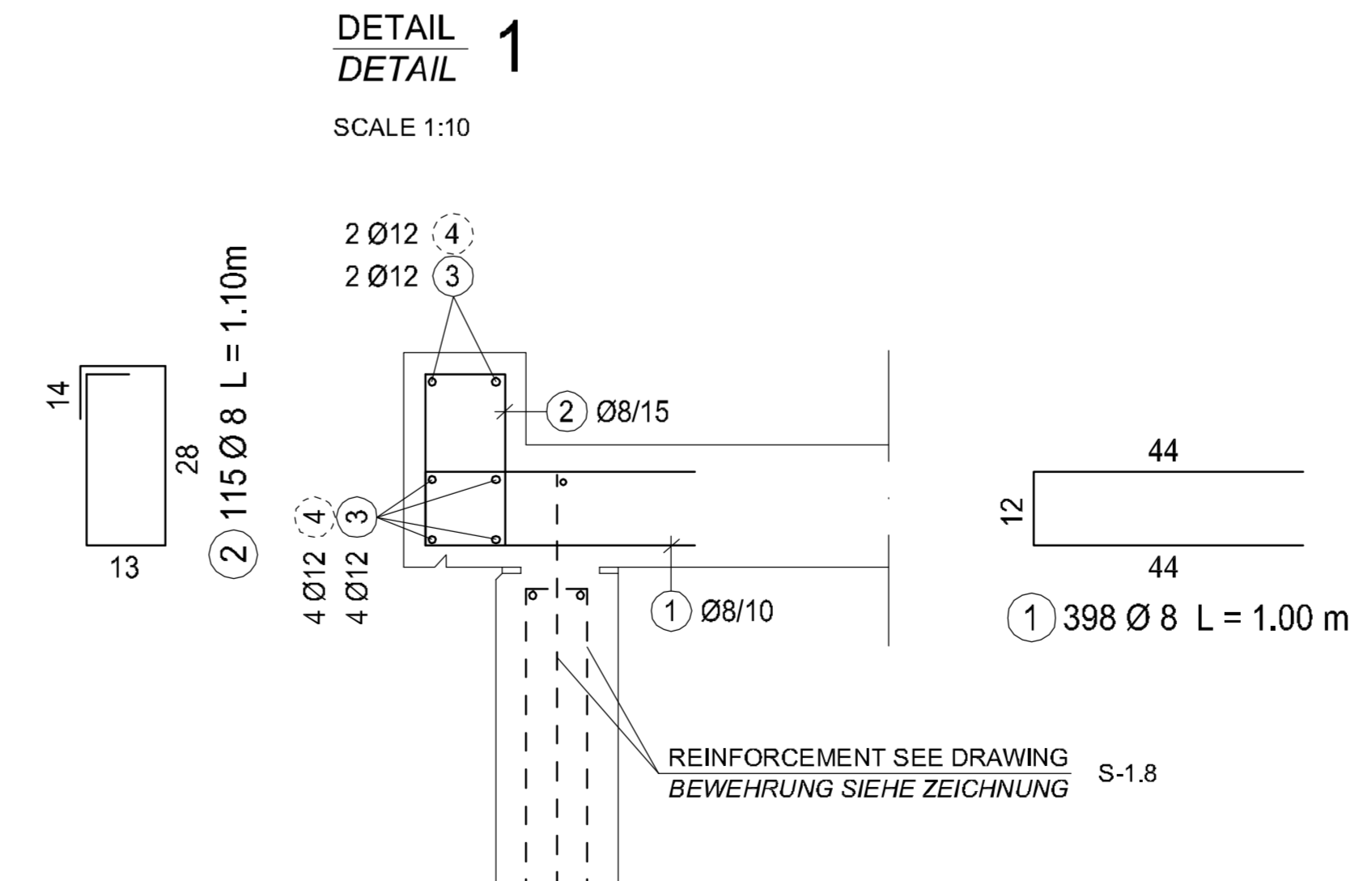
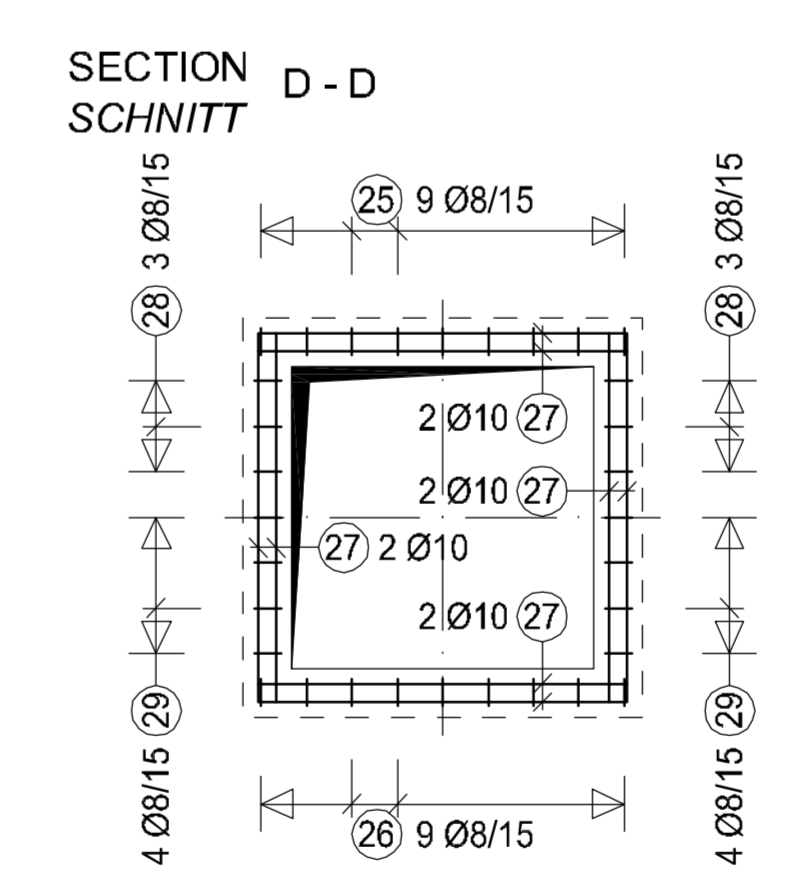
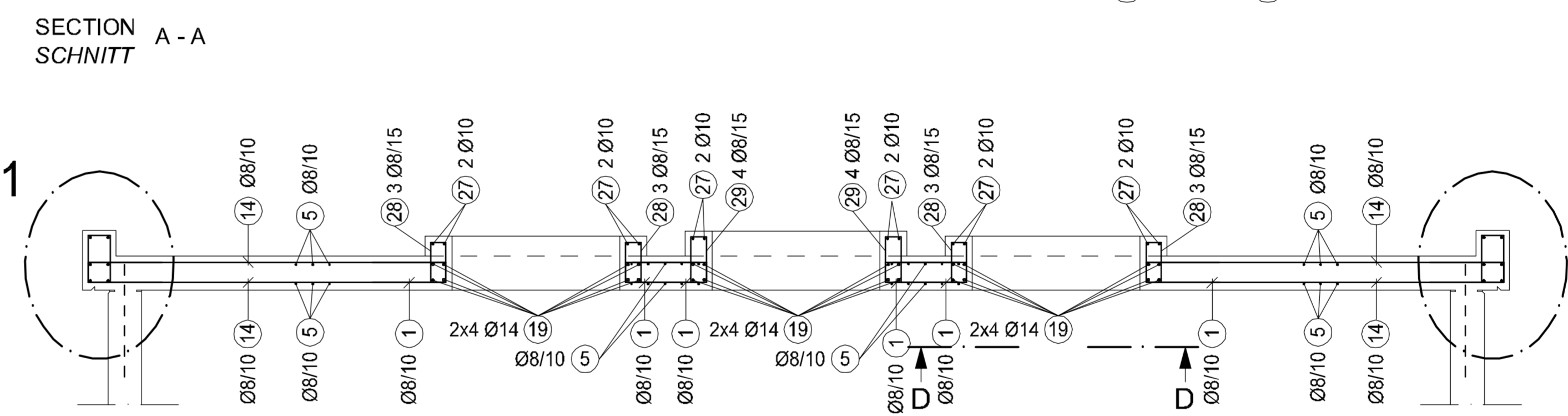
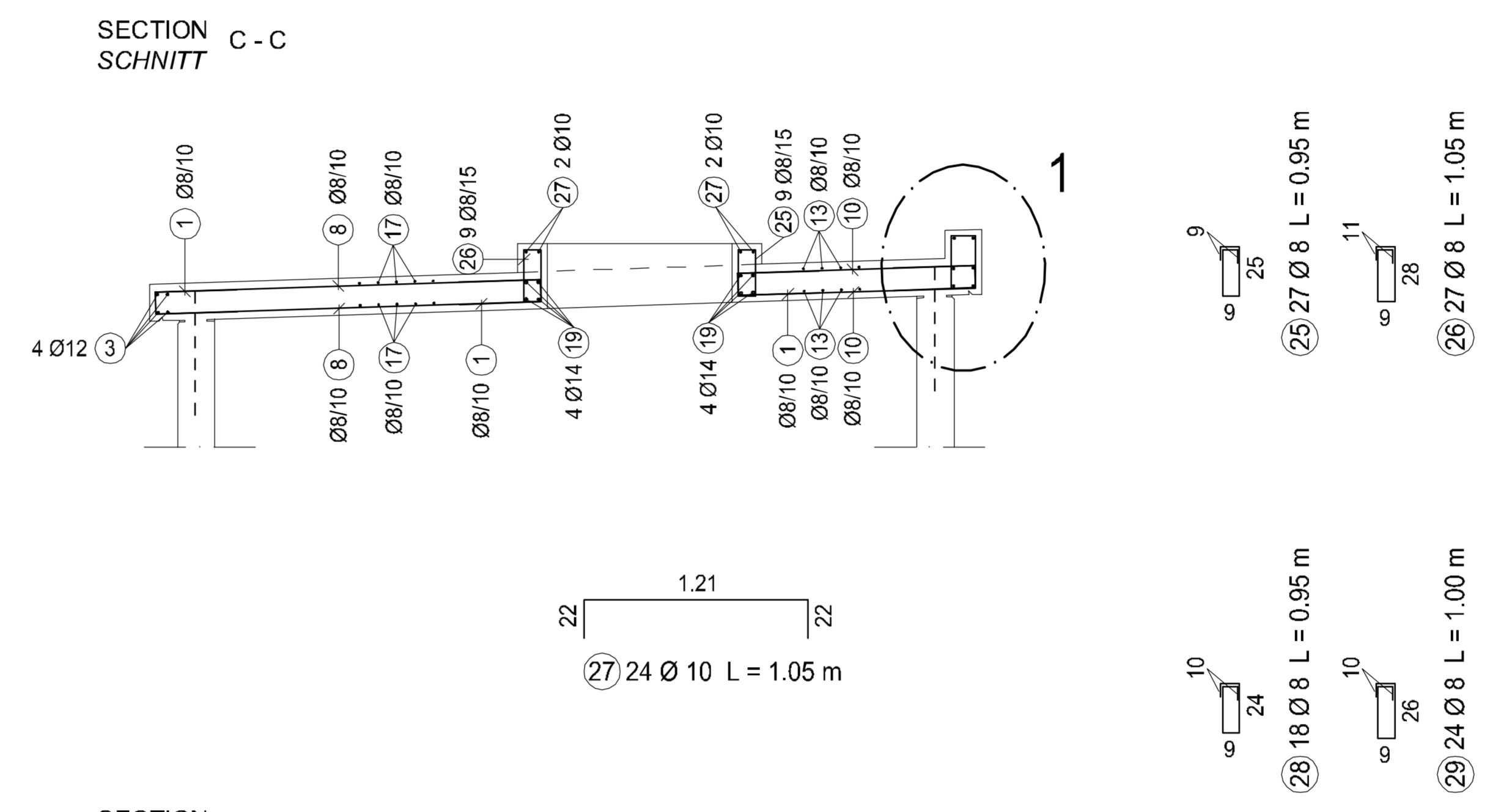
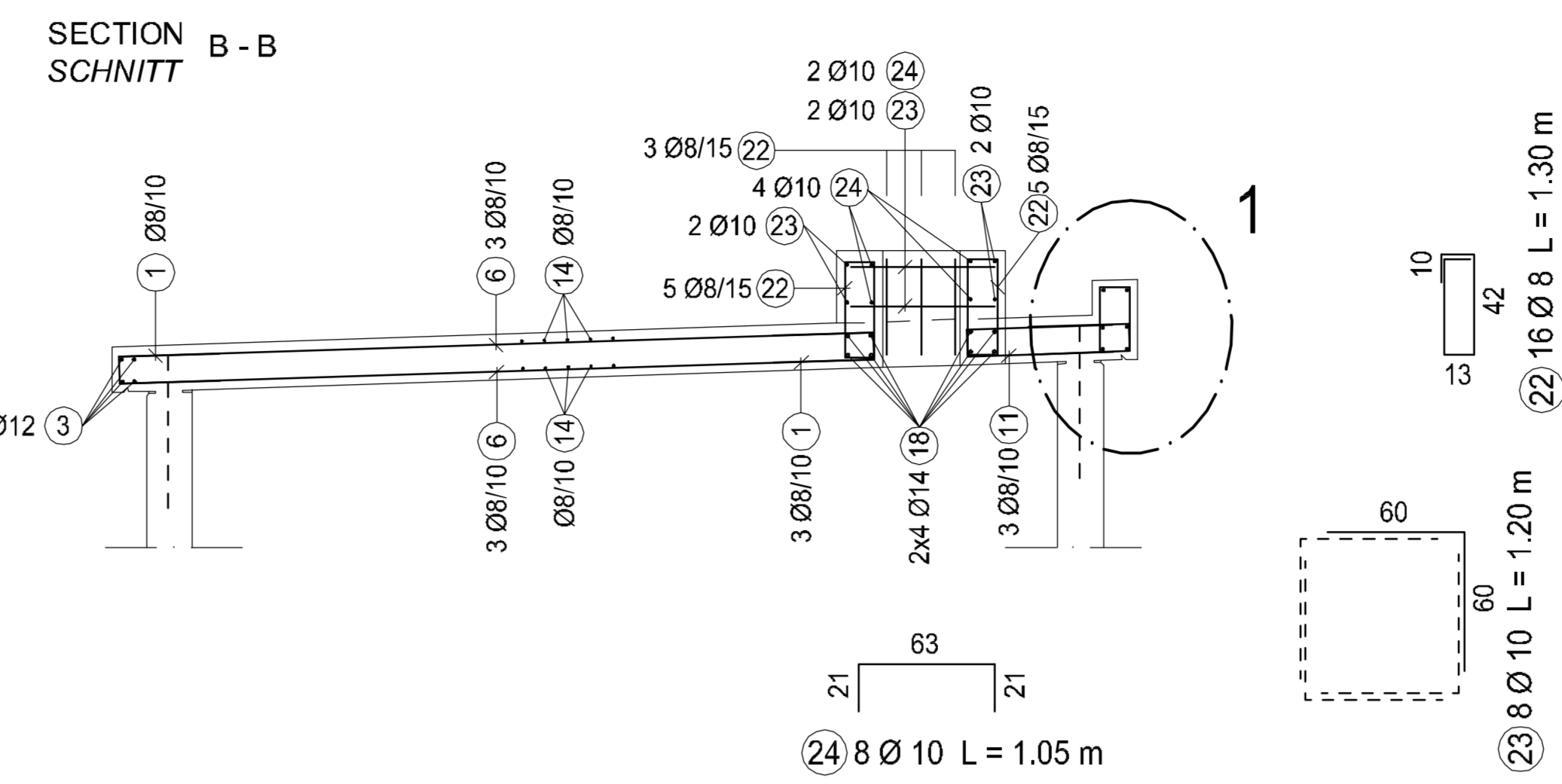
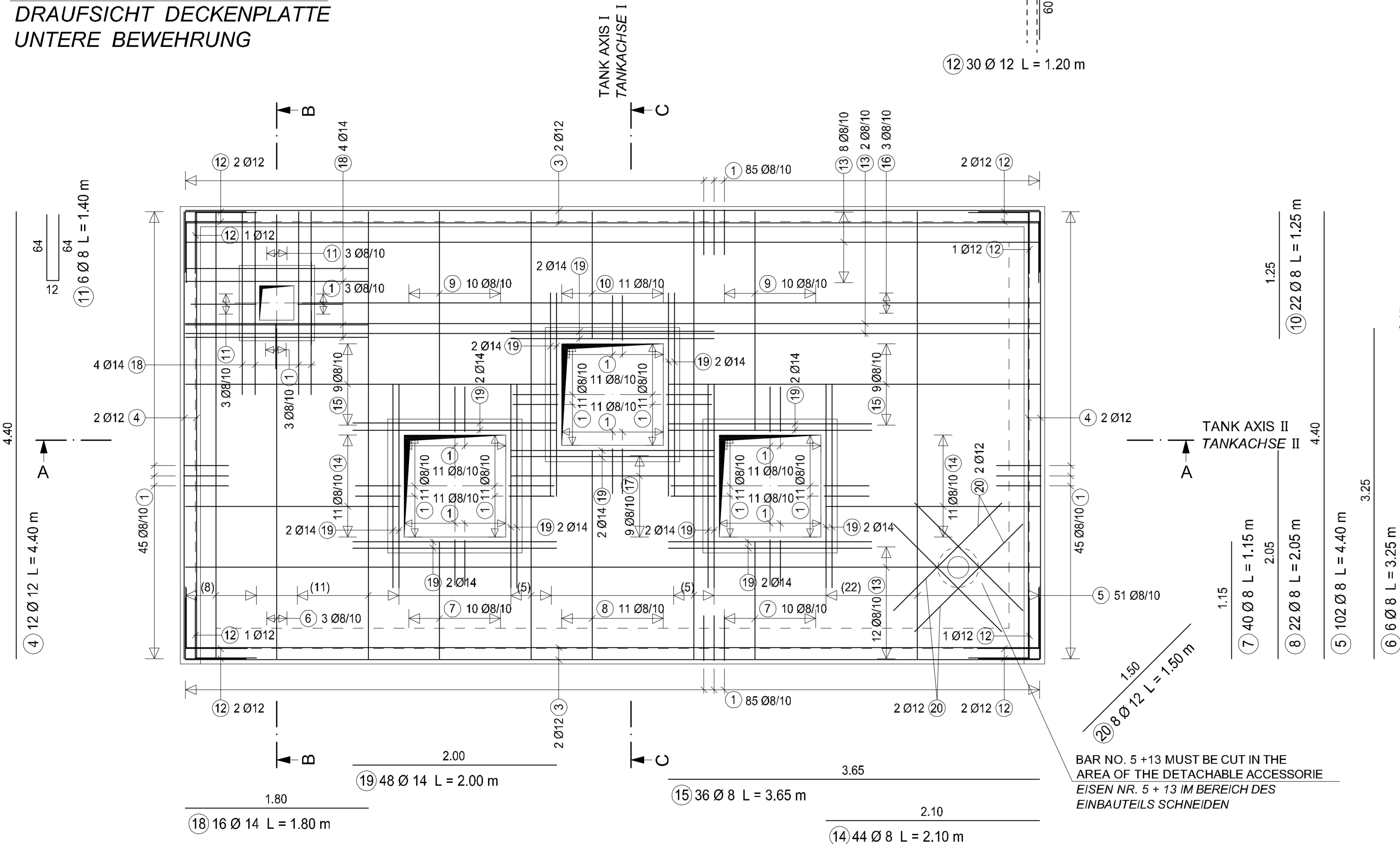
- NOTES TO REINFORCEMENT STEELS (TYPICAL)  
BEMERKUNGEN ZU BEWEHRUNGSEISEN (TYPISCH)
- 50 Ø 12 / 15 L = 1.50 m
  - TOTAL LENGTH GESTRECKTE LÄNGE (m)
  - DISTANCE BETWEEN REINFORCEMENT STEELS ABSTAND BEWEHRUNGSEISEN (cm)
  - DIAMETER REINFORCEMENT STEELS DURCHMESSER BEWEHRUNGSEISEN (mm)
  - DISTANCE QUANTITY REINFORCEMENT STEELS ANZAHL BEWEHRUNGSEISEN



TOP VIEW ROOF SLAB  
UPPER REINFORCEMENT  
DRAUFSICHT DECKENPLATTE  
OBERE BEWEHRUNG



TOP VIEW ROOF SLAB  
LOWER REINFORCEMENT  
DRAUFSICHT DECKENPLATTE  
UNTERE BEWEHRUNG



NOTES TO REINFORCEMENT STEELS (TYPICAL)  
BEMERKUNGEN ZU BEWEHRUNGSEISEN (TYPISCH)

- 1) 398 Ø 8 L = 1.00 m
- 2) 115 Ø 8 L = 1.10 m
- 3) 40 Ø 8 L = 1.15 m
- 4) 22 Ø 8 L = 2.05 m
- 5) 102 Ø 8 L = 4.40 m
- 6) 6 Ø 8 L = 3.25 m
- 7) 40 Ø 8 L = 1.15 m
- 8) 22 Ø 8 L = 2.05 m
- 9) 102 Ø 8 L = 4.40 m
- 10) 22 Ø 8 L = 1.25 m
- 11) 2 Ø 12 L = 1.50 m
- 12) 116 Ø 8 L = 1.10 m
- 13) 44 Ø 8 L = 8.40 m
- 14) 4 Ø 14 L = 2.10 m
- 15) 36 Ø 8 L = 3.65 m
- 16) 16 Ø 14 L = 1.80 m
- 17) 18 Ø 8 L = 2.00 m
- 18) 44 Ø 8 L = 8.40 m
- 19) 48 Ø 14 L = 2.00 m
- 20) 8 Ø 12 L = 1.50 m
- 21) 116 Ø 8 L = 1.10 m
- 22) 22 Ø 8 L = 1.25 m
- 23) 8 Ø 10 L = 1.20 m
- 24) 8 Ø 10 L = 1.05 m
- 25) 27 Ø 8 L = 0.95 m
- 26) 27 Ø 8 L = 1.05 m
- 27) 24 Ø 10 L = 1.05 m
- 28) 18 Ø 8 L = 0.95 m
- 29) 24 Ø 8 L = 1.00 m

BENDING SCHEDULE STAHLLISTE										
NO. NR.	PIECES STÜCK	Ø	LENGTH LÄNGE	Ø 8	Ø 10	Ø 12	Ø 14	Ø 16		
1	398	8	1.00	398.0						
2	115	8	1.10	126.5						
3	10	12	8.40			84.0				
4	12	12	4.40			52.8				
5	102	8	4.40	448.8						
6	6	8	3.25	19.5						
7	40	8	1.15	46.0						
8	22	8	2.05	45.1						
9	40	8	2.15	86.0						
10	22	8	1.25	27.5						
11	6	8	1.40	8.4						
12	30	12	1.20			36.0				
13	44	8	8.40	369.6						
14	44	8	2.10	92.4						
15	36	8	3.65	131.4						
16	6	8	7.25	43.5						
17	18	8	2.00	36.0						
18	16	14	1.80					28.8		
19	48	14	2.00					96.0		
20	8	12	1.50			12.0				
21	116	8	1.10	127.6						
22	16	8	1.30	20.8						
23	8	10	1.20			9.6				
24	8	10	1.05			8.4				
25	27	8	0.95	25.7						
26	27	8	1.05	28.3						
27	24	10	1.05			25.2				
28	18	8	0.95	17.1						
29	24	8	1.00	24.0						
Σ				2122.2	43.2	184.8	124.8			
kgm				0.395	0.617	0.888	1.21	1.58		
TOTAL WEIGHT GESAMTGEWICHT				1180.1 kg						

MATERIALS  
BAUSTOFFE

CONCRETE  
BETON C25/30 XC3 WF

REINFORCEMENT  
BETONSTAHL BSt 500 S, BSt 500 M

CONCRETE COVER  
BETONDECKUNG nom c = 3.5 cm

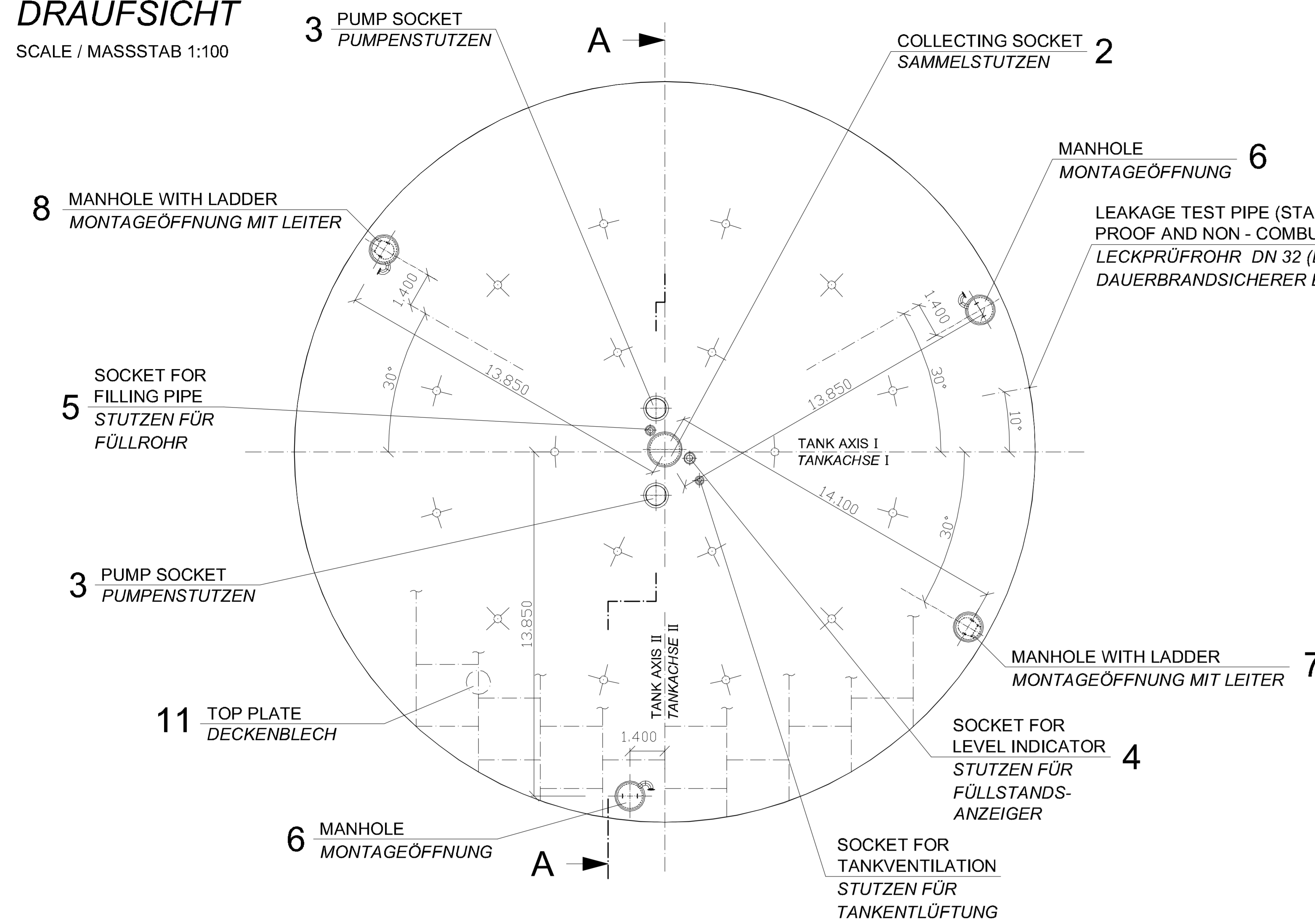
DIAMETER OF BENDING ROLL  
BIEGEROLLENDURCHMESSER  $d_s < 20\text{mm}$ ;  $d_{sr} \geq 4d_s$   
 $d_s \geq 20\text{mm}$ ;  $d_{sr} \geq 7d_s$

- PERTINENT DRAWINGS  
ZUGEHÖRIGE ZEICHNUNGEN
- C-1.5 CONSTRUCTION PLAN, PUMP HOUSE  
BAUKONSTRUKTIONSPLAN, PUMPENHAUS
  - S-1.8 REINFORCEMENT PUMP HOUSE WALLS  
BEWEHRUNG PUMPENHAUSWÄNDE

REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
HEADQUARTERS UNITED STATES AIR FORCES EUROPE ENGINEERING & OPERATIONS				
AIRFIELD STANDARD DESIGN US		FLUGPLATZ STANDARDPLANUNG US		
JET FUEL STORAGE AND DISPENSING SYSTEMS		FLUGKRAFTSTOFF - VERSORGUNGSANLAGEN		
BUILDING BAUWERK OPERATING TANK 5000m <sup>3</sup> FLACHBODENTANK 5000m <sup>3</sup>				
DESIGNATOR BEZEICHNUNG REINFORCEMENT PUMP HOUSE ROOF SLAB BEWEHRUNG PUMPENHAUSDECKE				
WORKED/REARBEITET	PREPARED/HERGESTELLT	APPROVED/GENEHMIGT		
LANDSCHAFTS- UND BAUWERKE UND BAUWERKE LANDSCHAFTS- UND BAUWERKE LANDSCHAFTS- UND BAUWERKE		AMT FÜR BUNDESBAU WALLSTR.1 55122 MAINZ		
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAUPLANEN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED GENEHMIGT	DATE DATUM 6. MAI 2015	SCALE MASSSTAB 1:25 / 1:10	SHEET NO. BLATT NR. S - 1.9	
CONSTRUCTION PROJECT BAUPLANNAME		SHEET NO. BLATT NR. OF VON		

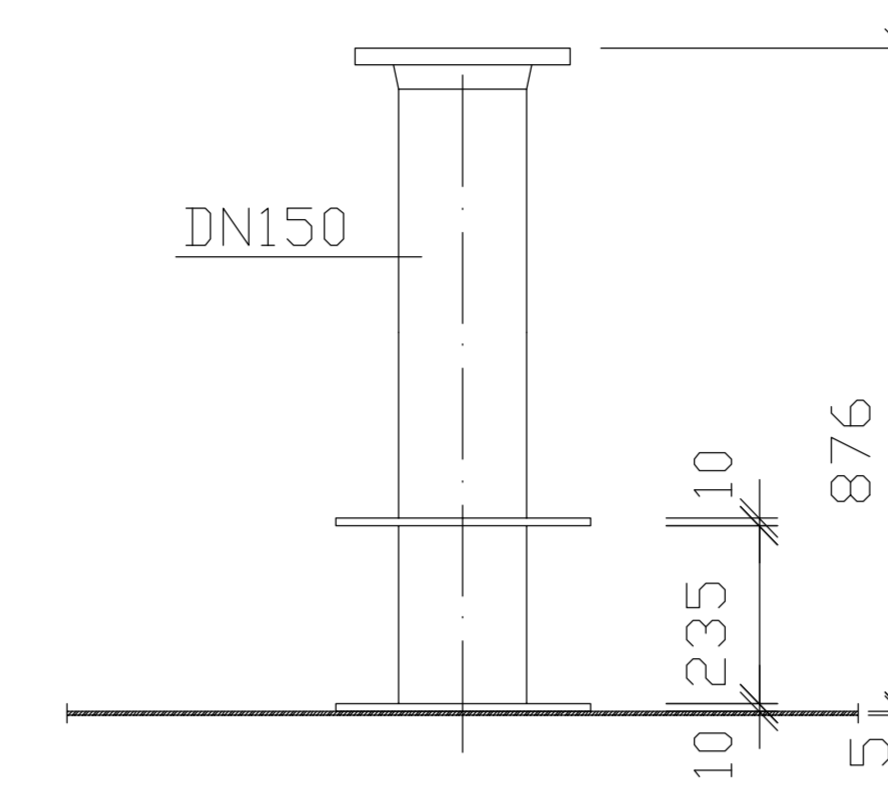


**TOP VIEW  
DRAUFSICHT**  
SCALE / MASSSTAB 1:100

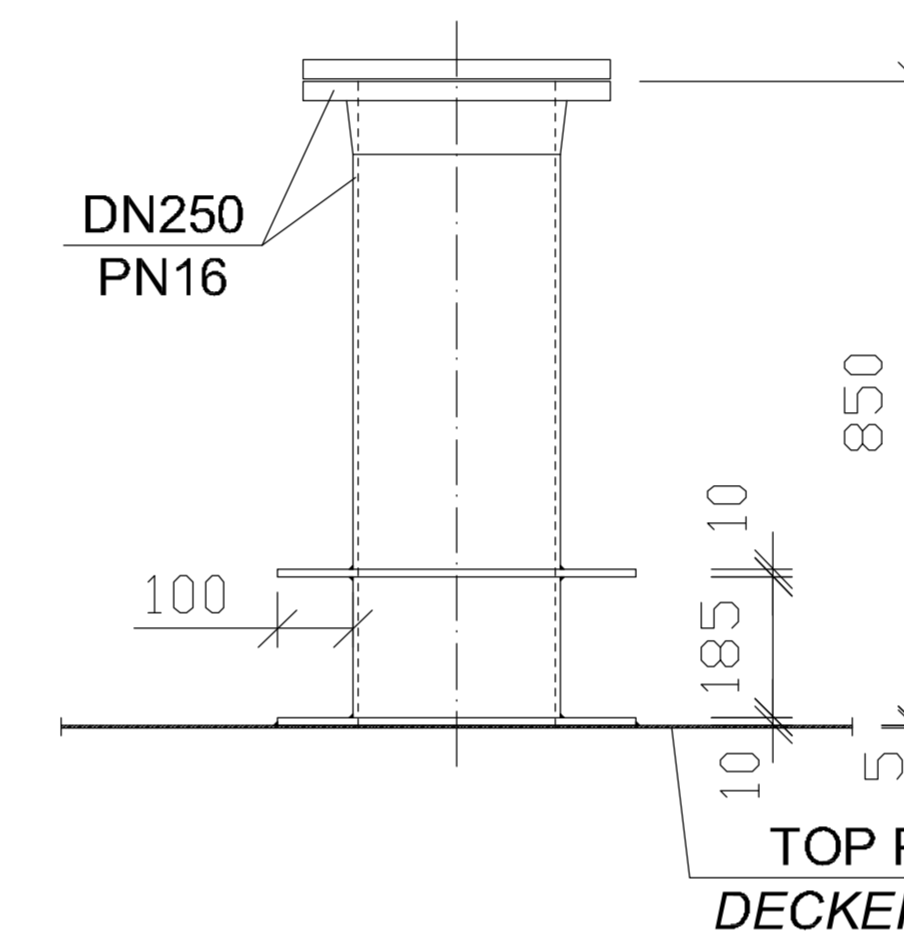


**SECTION  
SCHNITT B - B**  
SCALE / MASSSTAB 1:100

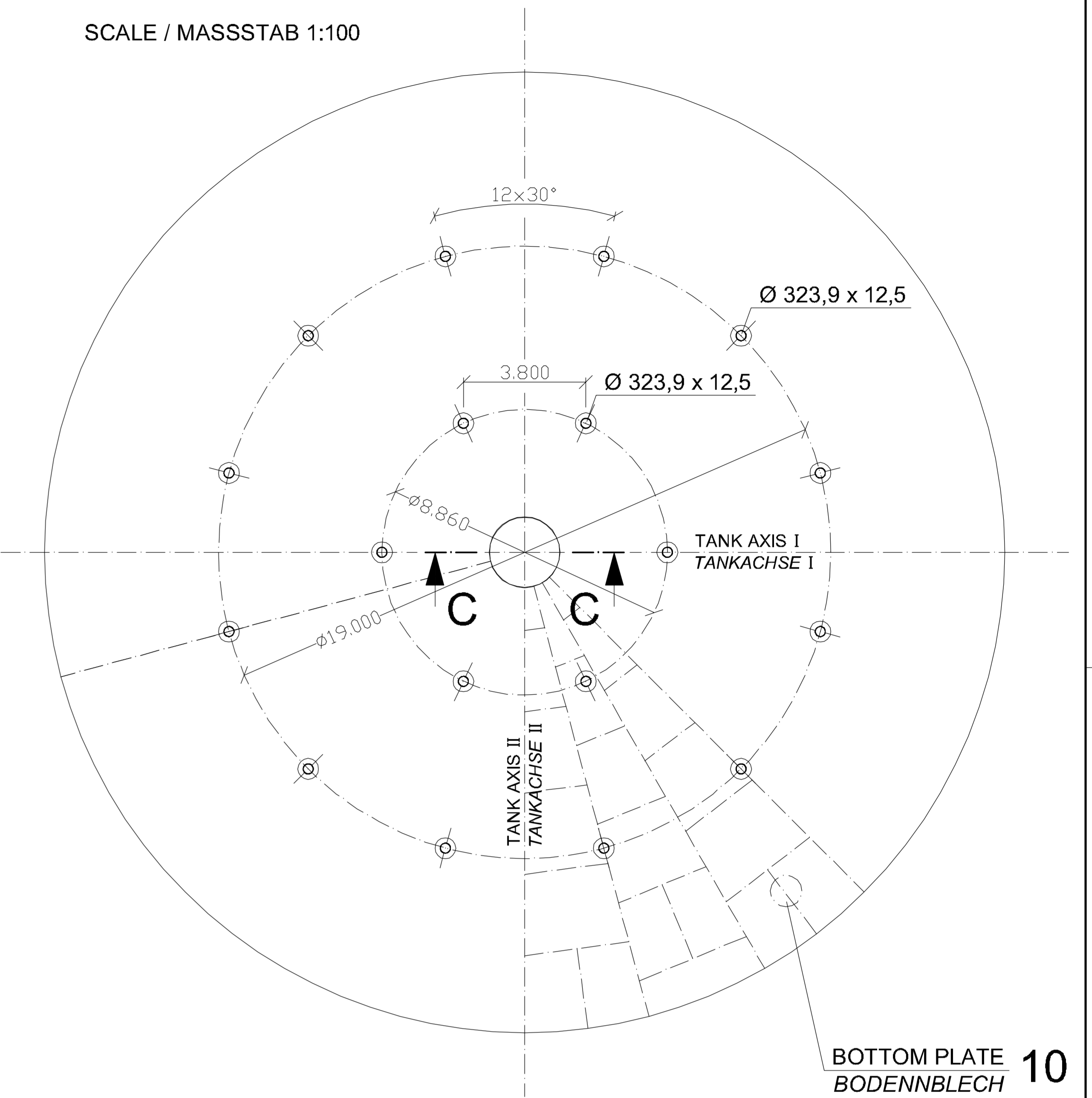
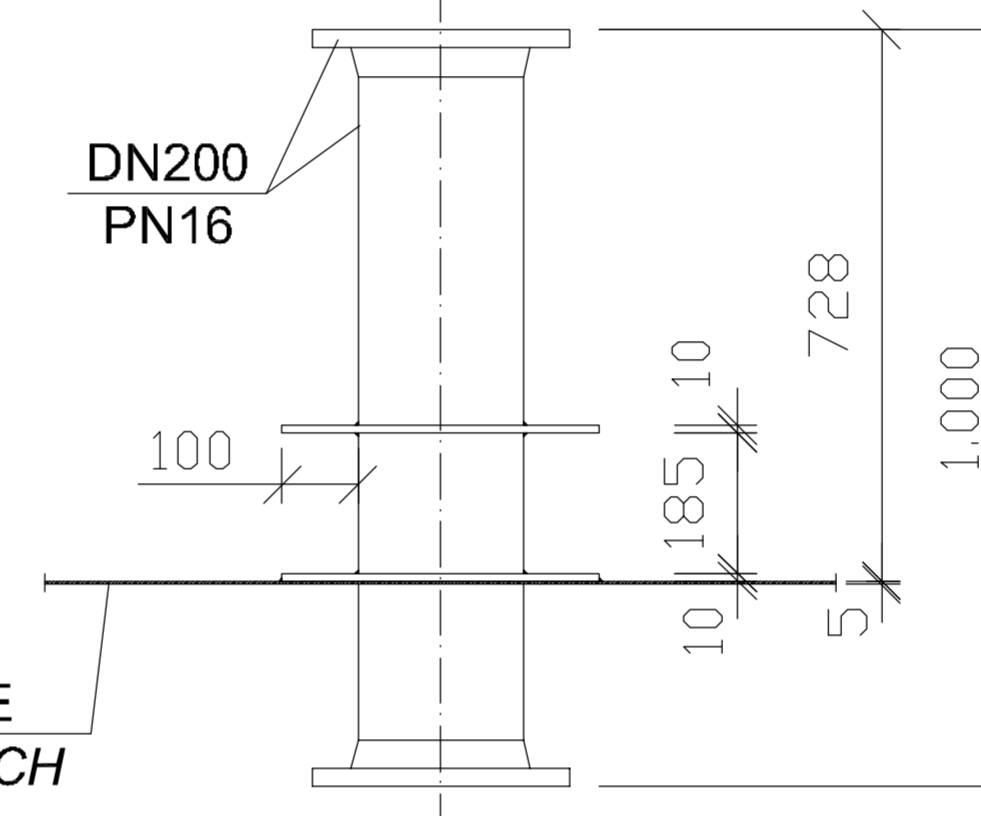
SOCKET FOR TANKVENTILATION  
STUTZEN FÜR TANKENTLÜFTUNG  
SCALE / MASSSTAB 1:10



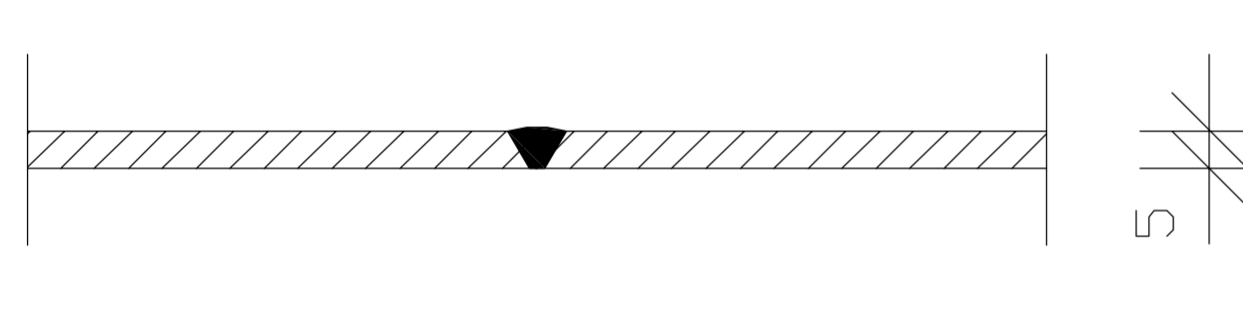
**DETAIL "4"**  
SOCKET FOR LEVEL INDICATOR  
STUTZEN FÜR FÜLLSTANDSANZEIGE  
SCALE / MASSSTAB 1:10



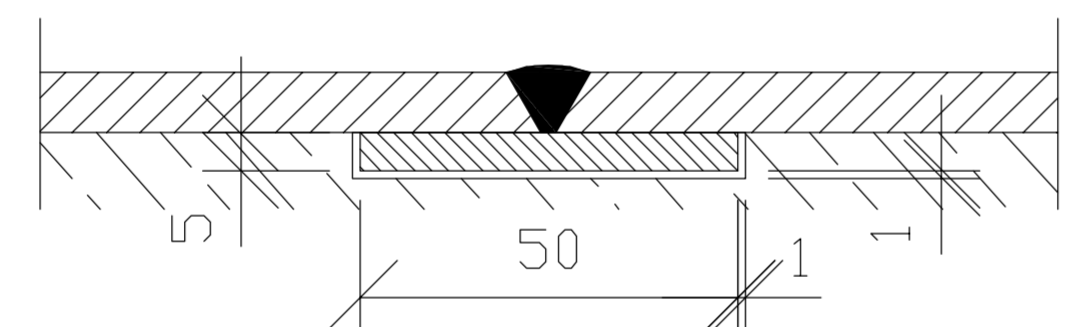
**DETAIL "5"**  
SOCKET FOR FILLING PIPE  
STUTZEN FÜR FÜLLROHR  
SCALE / MASSSTAB 1:10



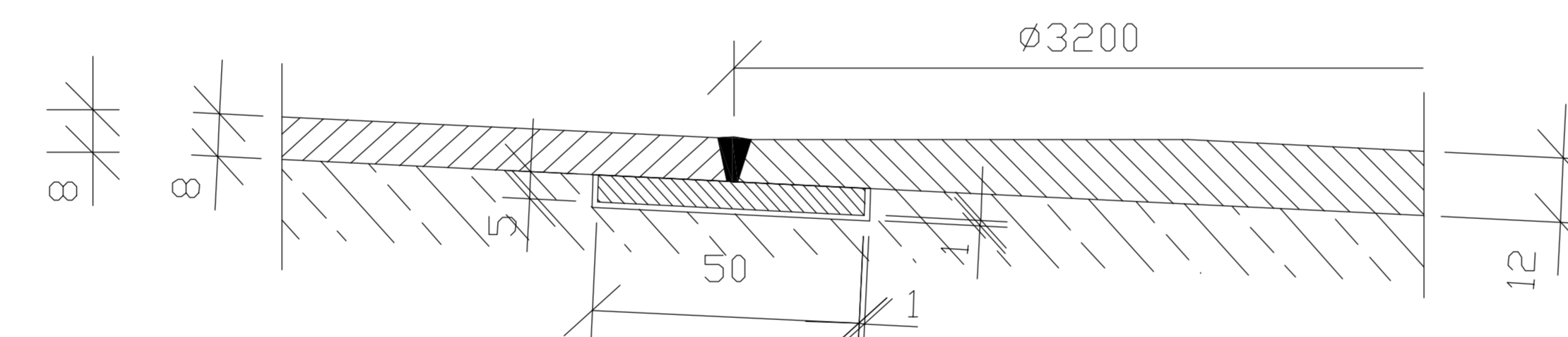
**DETAIL "11"**  
TOP PLATE  
DECKENBLECH  
SCALE / MASSSTAB 1:1



**DETAIL "10"**  
BOTTOM PLATE  
BODENBLECH  
SCALE / MASSSTAB 1:1



CONNECTION BOTTOM PLATE - SUMP  
ANSCHLUSS BODENBLECH - SUMPF  
SCALE / MASSSTAB 1:1



**NOTES  
BEMERKUNGEN**

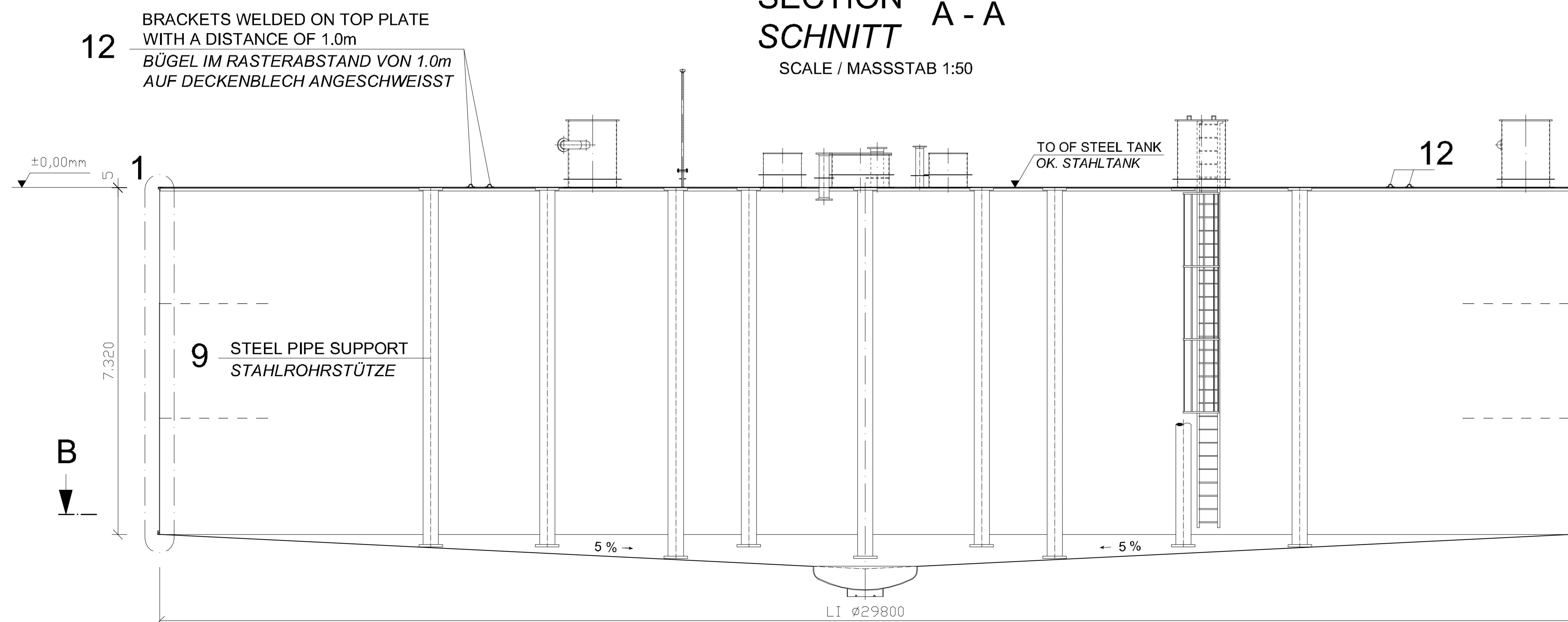
PLACING OF THE BOTTOM PLATES ACCORDING TO THE MOST FAVORABLE WELDING DESIGN AS SELECTED BY THE CONTRACTOR.  
AUFTEILUNG DER BODENBLECHE ENTSPRECHEND DER GÜNSTIGSTEN SCHWEISSTECHNISCHEN AUSFÜHRUNG NACH WAHL DES A.N.

FOR INTERIOR COATING ALL EDGES WITHIN THE TANK MUST BE ROUNDED OFF TO RADIUS OF AT LEAST 3mm AND ALL WELDING SEAMS MUST BE SMOOTHENED.  
FÜR DIE INNENBESCHICHTUNG MÜSSEN ALLE KANTEN INNERHALB DES TANKS AUF EINEN RADIUS VON MIND. 3mm ABGERUNDET UND ALLE SCHWEISSNÄHTE GLATTGESCHLIFFEN SEIN.

IN THE AREA OF PIPE SUPPORTS A DIRECT COMPRESSION CONNECTION IS FORCIBLE REQUIRED, I.E. THE BOTTOM PLATE OF THE TANK MUST BE COMPLETELY SUPPORTED ON CONCRETE FLOOR SLAB.  
IM BEREICH DER STAHLROHRSTÜTZEN IST EINE DIREKTE DRUCKVERBINDUNG ZUR BODENPLATTE ZWINGEND ERFORDERLICH, D.H. DAS BODENBLECH MUSS VOLLSTÄNDIG AUF DEM BODEN AUFLIEGEN.

COATING OUTER SURFACE STEEL TANK ACC. TO STS-M 72  
BESCHICHTUNG AUSSENFLÄCHE STAHLTANK GEMÄSS STS-M 72

**SECTION  
SCHNITT A - A**  
SCALE / MASSSTAB 1:50



**PERTINENT DRAWINGS  
ZUGEHÖRIGE ZEICHNUNGEN**

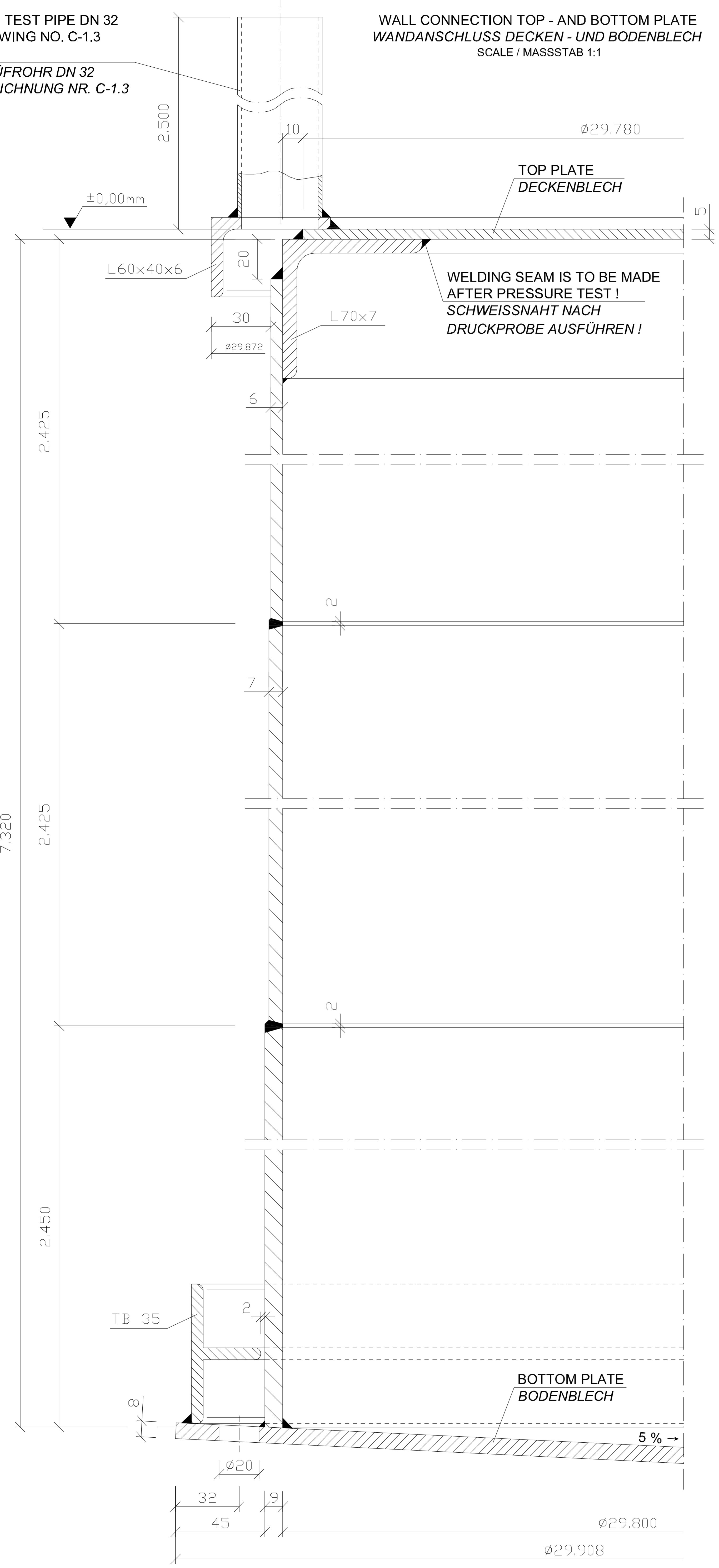
S-1.11 DETAILS - STEEL TANK  
DETAILS - STAHLTANK

REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND	
HEADQUARTERS UNITED STATES AIR FORCES EUROPE ENGINEERING & OPERATIONS					
AIRFIELD STANDARD DESIGN US		FLUGPLATZ STANDARDPLANUNG US			
JET FUEL STORAGE AND DISPENSING SYSTEMS		FLUGKRAFTSTOFF - VERSORGSANLAGEN			
BUILDING BAUWERK OPERATING TANK 5000m <sup>3</sup> FLACHBODENTANK 5000m <sup>3</sup>					
DESIGNATOR BEZEICHNUNG STEEL TANK STAHLTANK					
WORKED/REARBEITET		PREPARED/AUFGESTELLT LANDSBEREITER/BEREITEND UND BAUEITEND L B B AMCHIEF/UNTERSTÄTZL./NACHHILFEN TRÄGER/UNTERSTÜTZL./NACHHILFEN LANDM. BY/BEI/IN/BEZUG AUF ORIGINAL/URSCHRIFT IN/DRUCK/GEZ. STRICH/STRICHLEITUNG	APPROVED/GENEHMIGT AMT FÜR BUNDESBAU WALLSTR.1 55122 MAINZ ORIGINAL, SIGNED BY IN/DRUCK/GEZ. KUNNINGER/2012		
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAUMASSNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)					
APPROVED GENEHMIGT	DATE DATUM	SCALE MASSSTAB			
ORIGINAL, SIGNED BY IN/DRUCK/GEZ.	6. MAI 2015	1:100 ; 1:50 ; 1:10 ; 1:1			
GENERAL/BAU CONTRACTOR/BAUWERKSTÄTTE INGENIEUR/INGENIEUR		STANDARD SHEET STANDARD BLATT S - 1.10			
CONSTRUCTION PROJECT BAUMASSNAHME		SHEET NO. BLATT NR. OF VON			

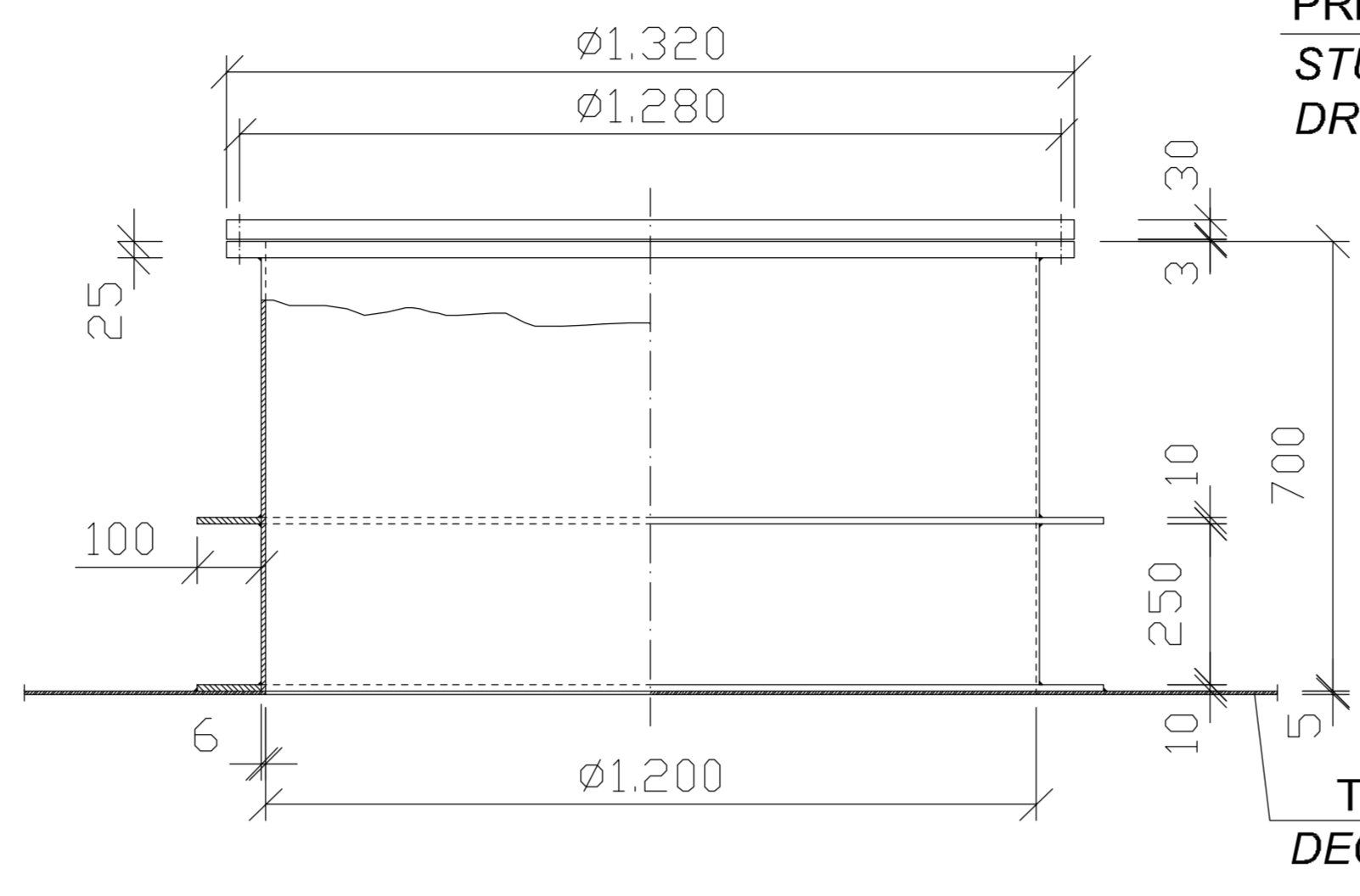


LEAKAGE TEST PIPE DN 32  
SEE DRAWING NO. C-1.3  
DETAIL 4  
LECKPRÜFROHR DN 32  
SIEHE ZEICHNUNG NR. C-1.3  
DETAIL 4

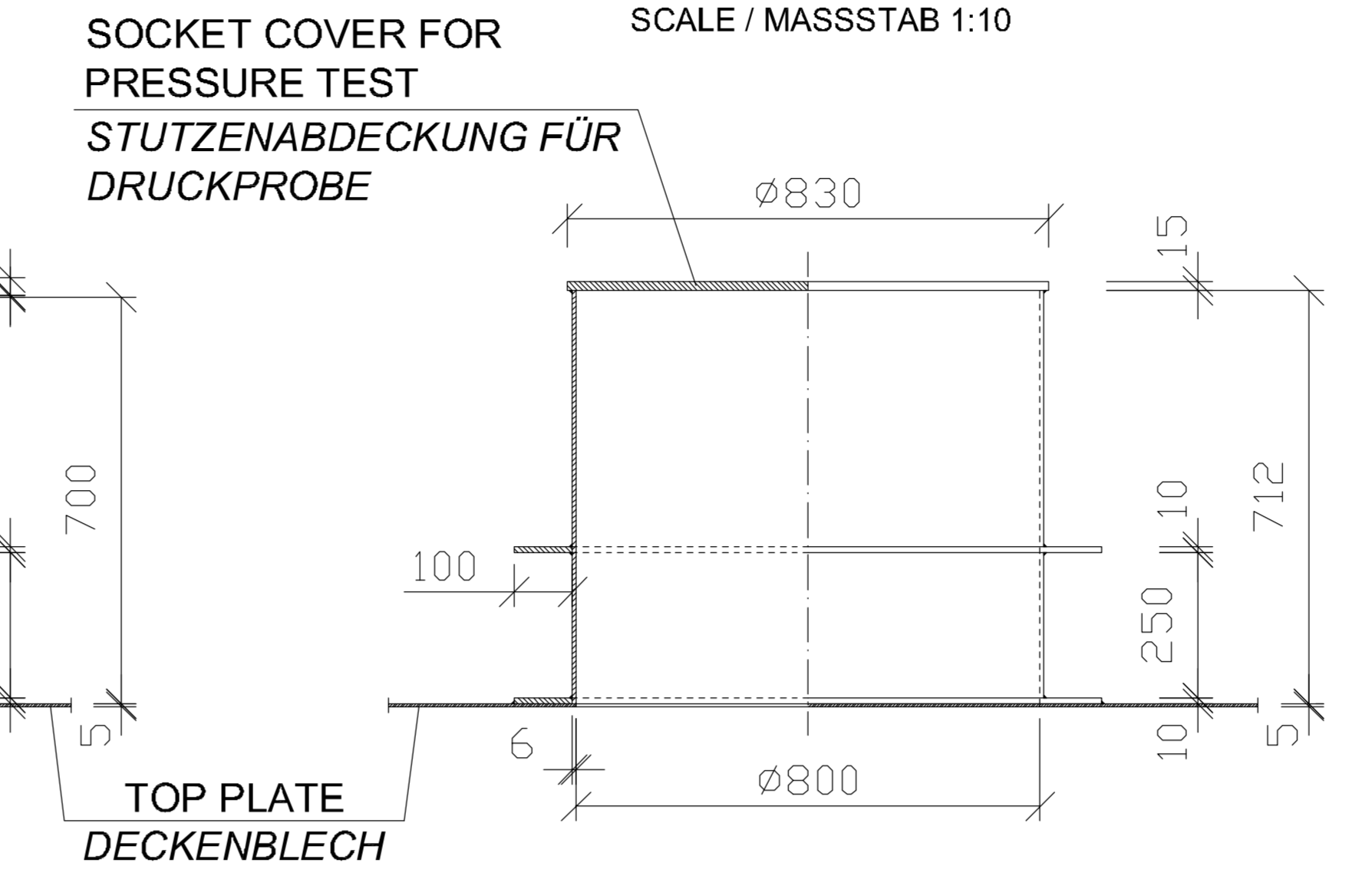
**DETAIL "1"**  
WALL CONNECTION TOP - AND BOTTOM PLATE  
WANDANSCHLUSS DECKEN - UND BODENBLECH  
SCALE / MASSSTAB 1:1



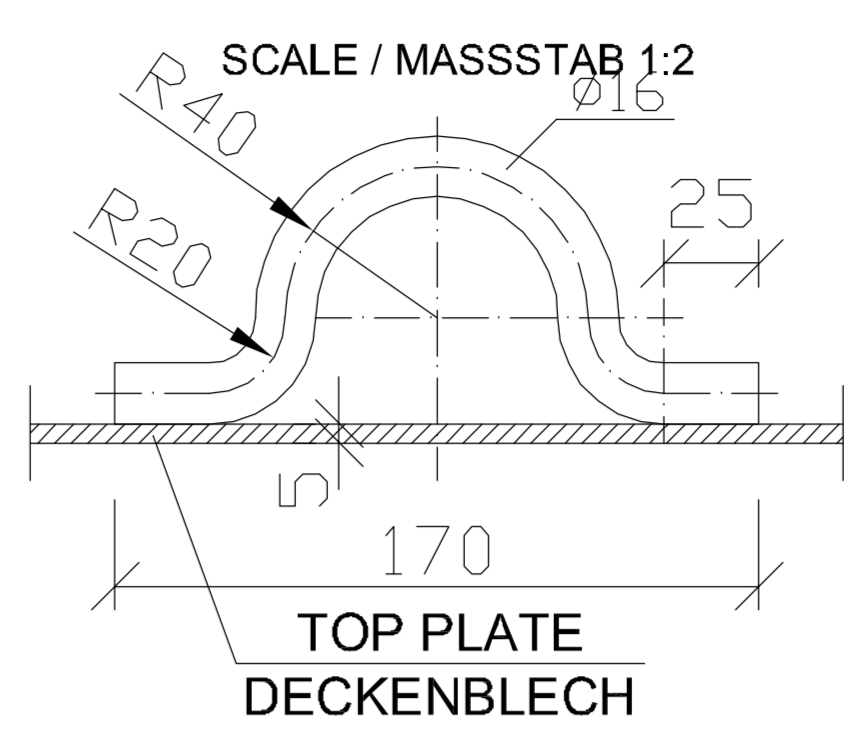
**DETAIL "2"**  
COLLECTING SOCKET  
SAMMELSTUTZEN  
SCALE / MASSSTAB 1:10



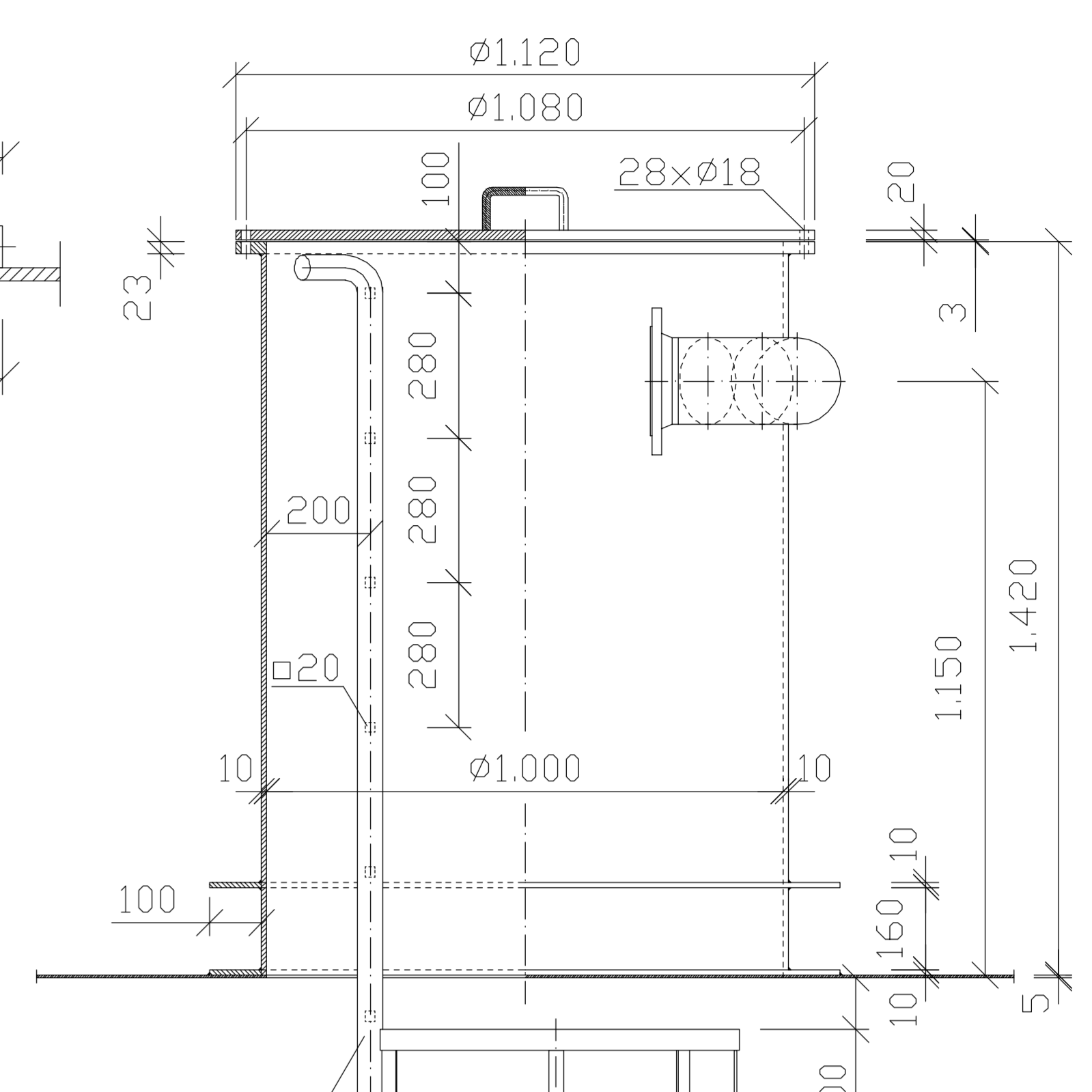
**DETAIL "3"**  
PUMP SOCKET  
PUMPENSTUTZEN  
SCALE / MASSSTAB 1:10



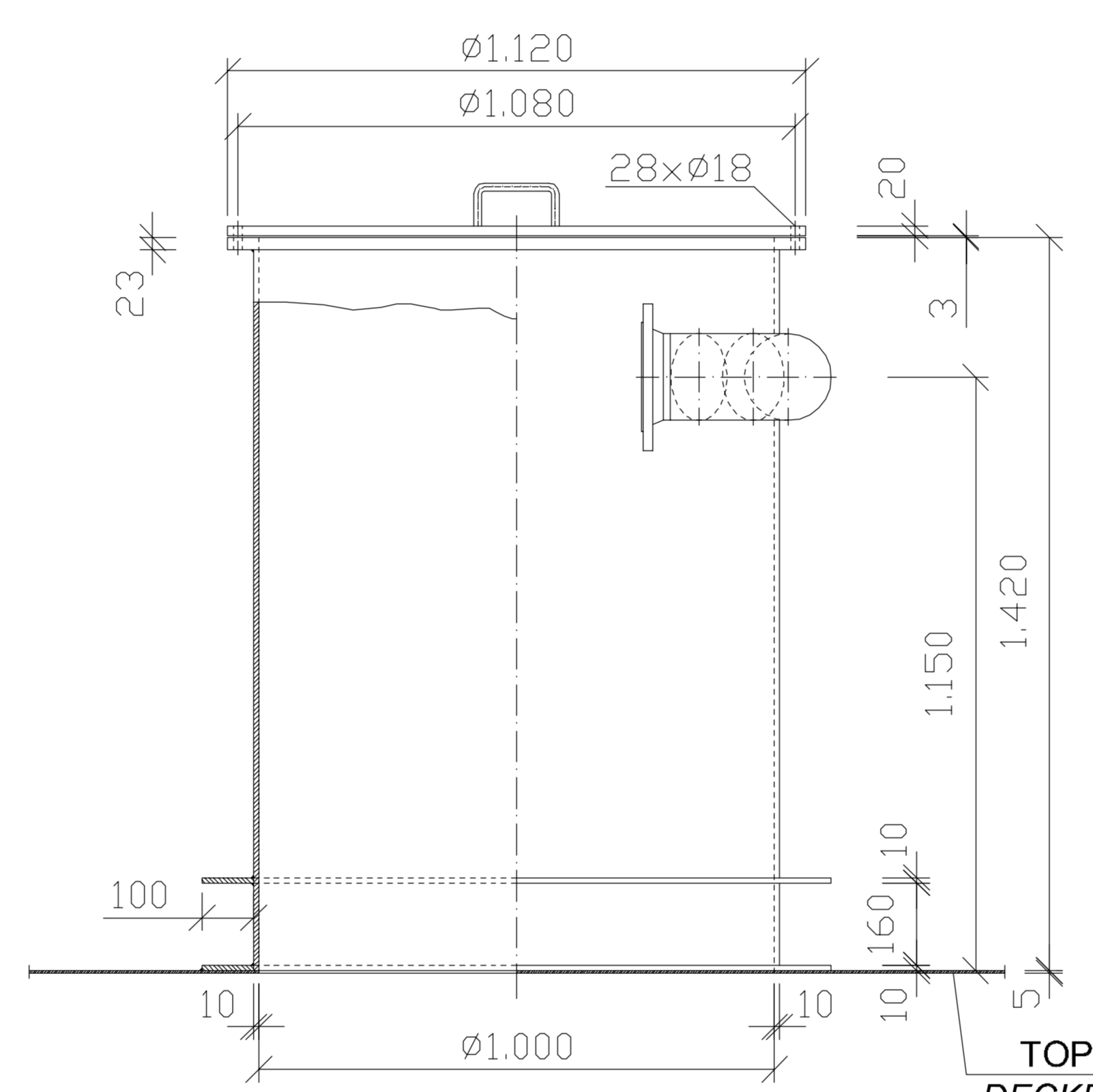
**DETAIL "12"**  
BRACKET  
BÜGEL  
SCALE / MASSSTAB 1:2



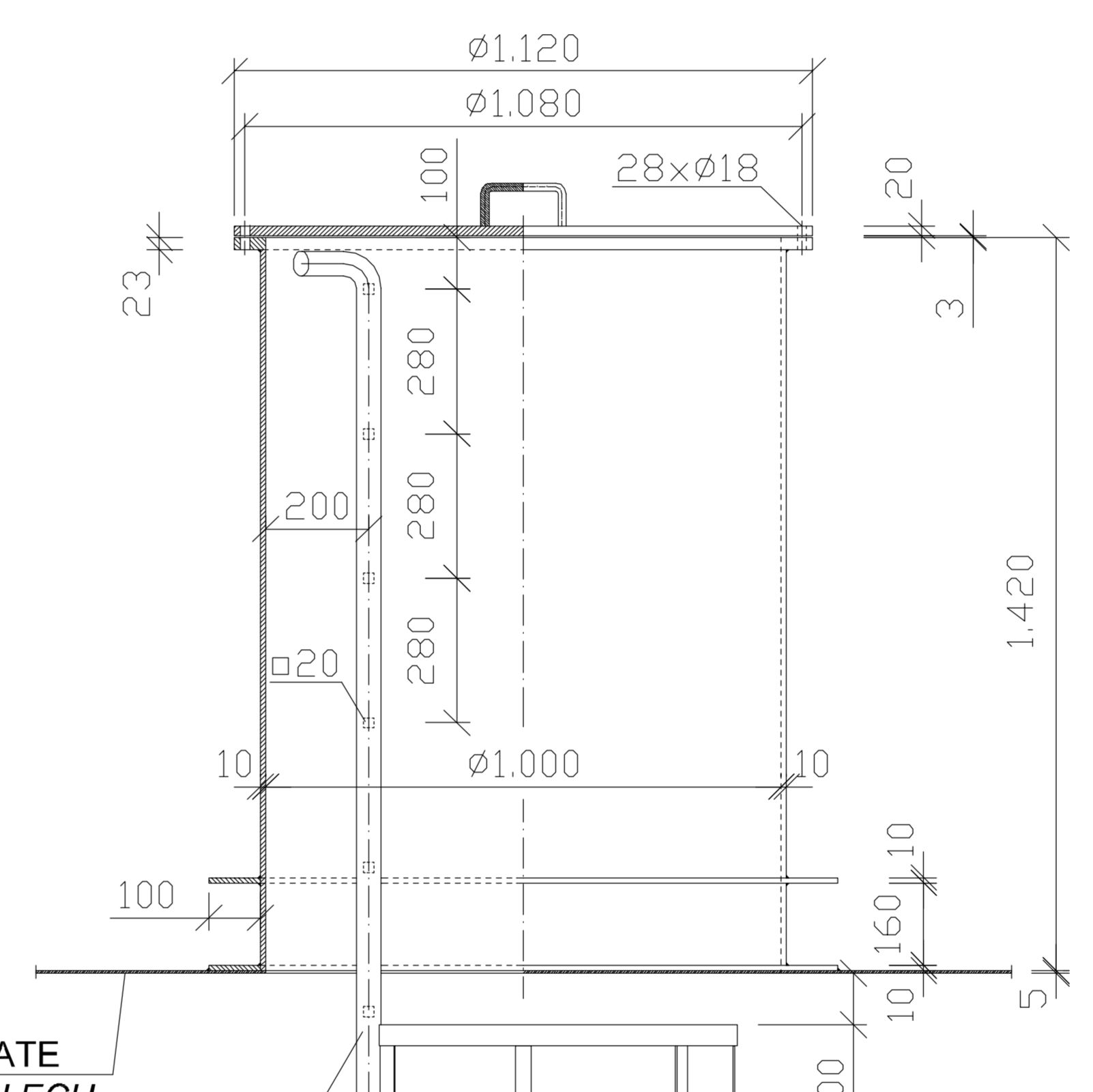
**DETAIL "8"**  
MANHOLE WITH LADDER  
MONTAGEÖFFNUNG MIT LEITER  
SCALE / MASSSTAB 1:10



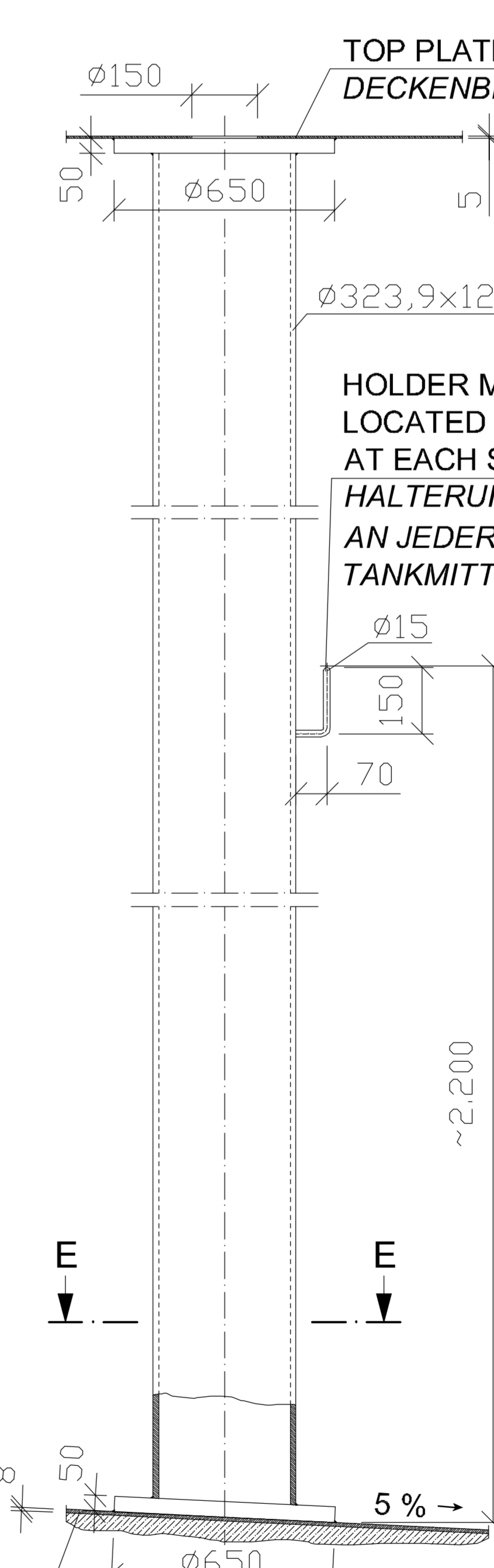
**DETAIL "6"**  
MANHOLE  
MONTAGEÖFFNUNG  
SCALE / MASSSTAB 1:10



**DETAIL "7"**  
MANHOLE WITH LADDER  
MONTAGEÖFFNUNG MIT LEITER  
SCALE / MASSSTAB 1:10



**DETAIL "9"**  
STEEL PIPE SUPPORT  
STAHLROHRSTÜTZE  
SCALE / MASSSTAB 1:10



HOLDER MADE OF SS  
LOCATED TO CENTER OF TANK  
AT EACH SUPPORT.  
HALTERUNG AUS CR-NI-STAHL  
AN JEDER ROHRSTÜTZE ZUR  
TANKMITTE ANGEORDNET.

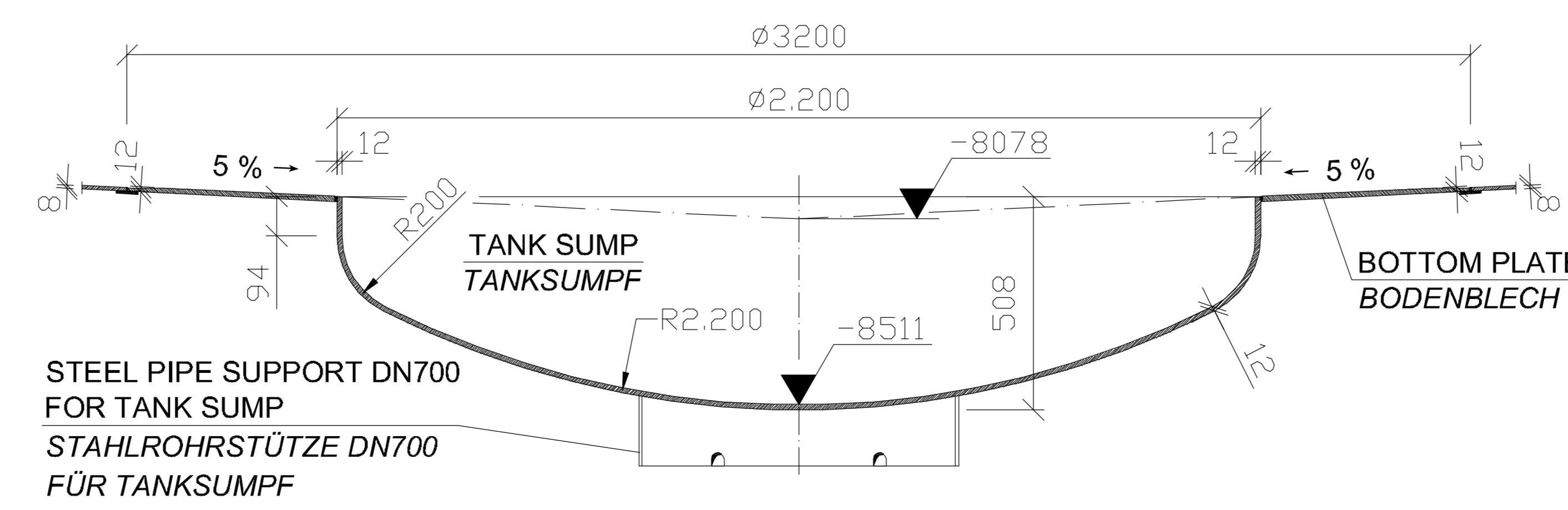
PERTINENT DRAWINGS  
ZUGEHÖRIGE ZEICHNUNGEN

S-1.10 STEEL TANK  
STAHLTANK

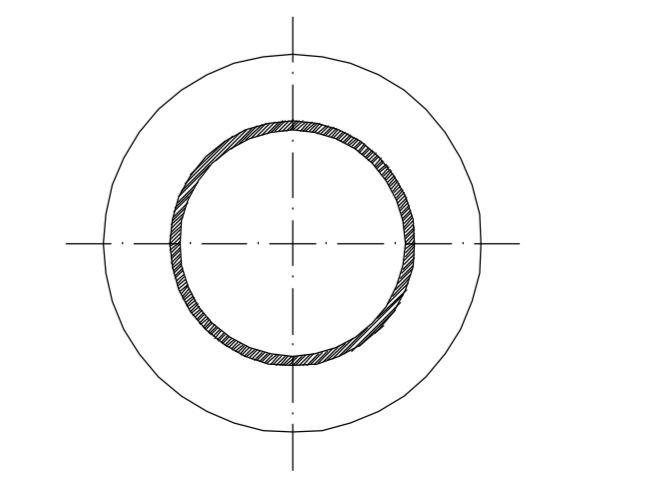
**NOTES  
BEMERKUNGEN**

IN THE AREA OF PIPE SUPPORTS A DIRECT COMPRESSION CONNECTION IS FORCIBLY REQUIRED, I.E. THE BOTTOM PLATE OF THE TANK MUST BE COMPLETELY SUPPORTED ON CONCRETE FLOOR SLAB.  
IM BEREICH DER STAHLROHRSTÜTZEN IST EINE DIREKTE DRUCKVERBINDUNG ZUR BODENPLATTE ZWINGEND ERFORDERLICH, D.H. DAS BODENBLECH MUSS VOLLSTÄNDIG AUF DEM BODEN AUFLIEGEN.

**SECTION C - C  
SCHNITT C - C**  
SCALE / MASSSTAB 1:10

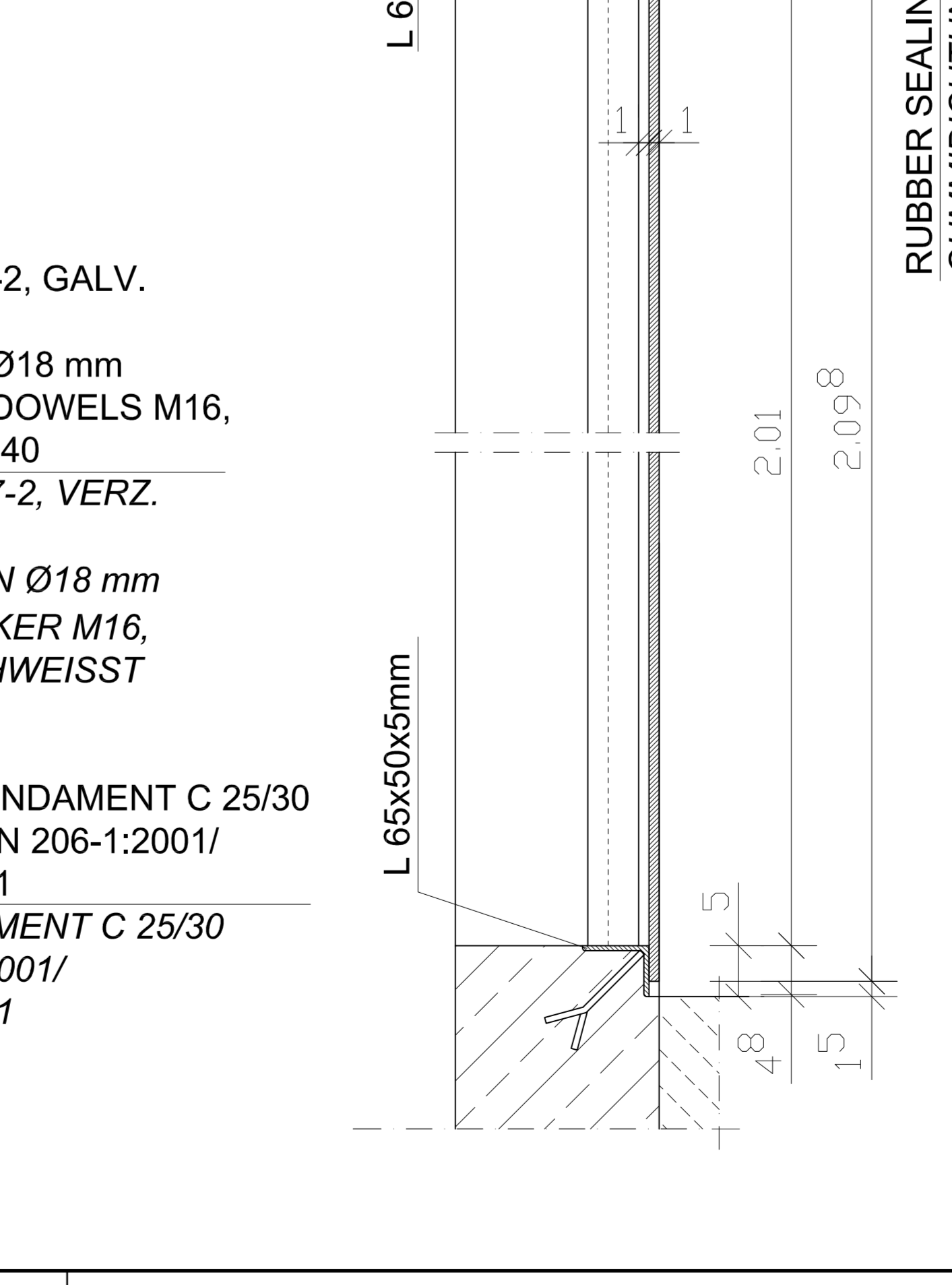
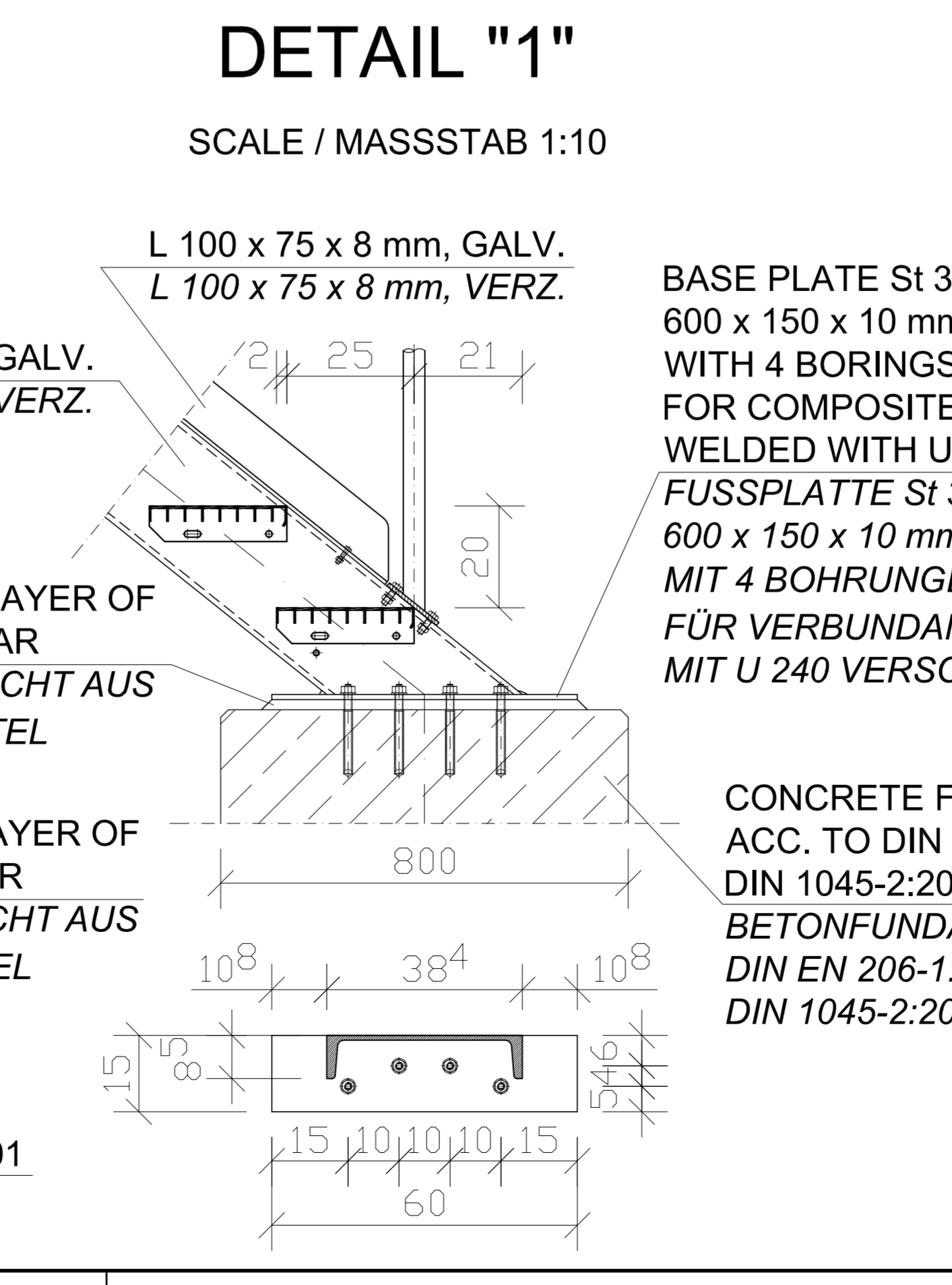
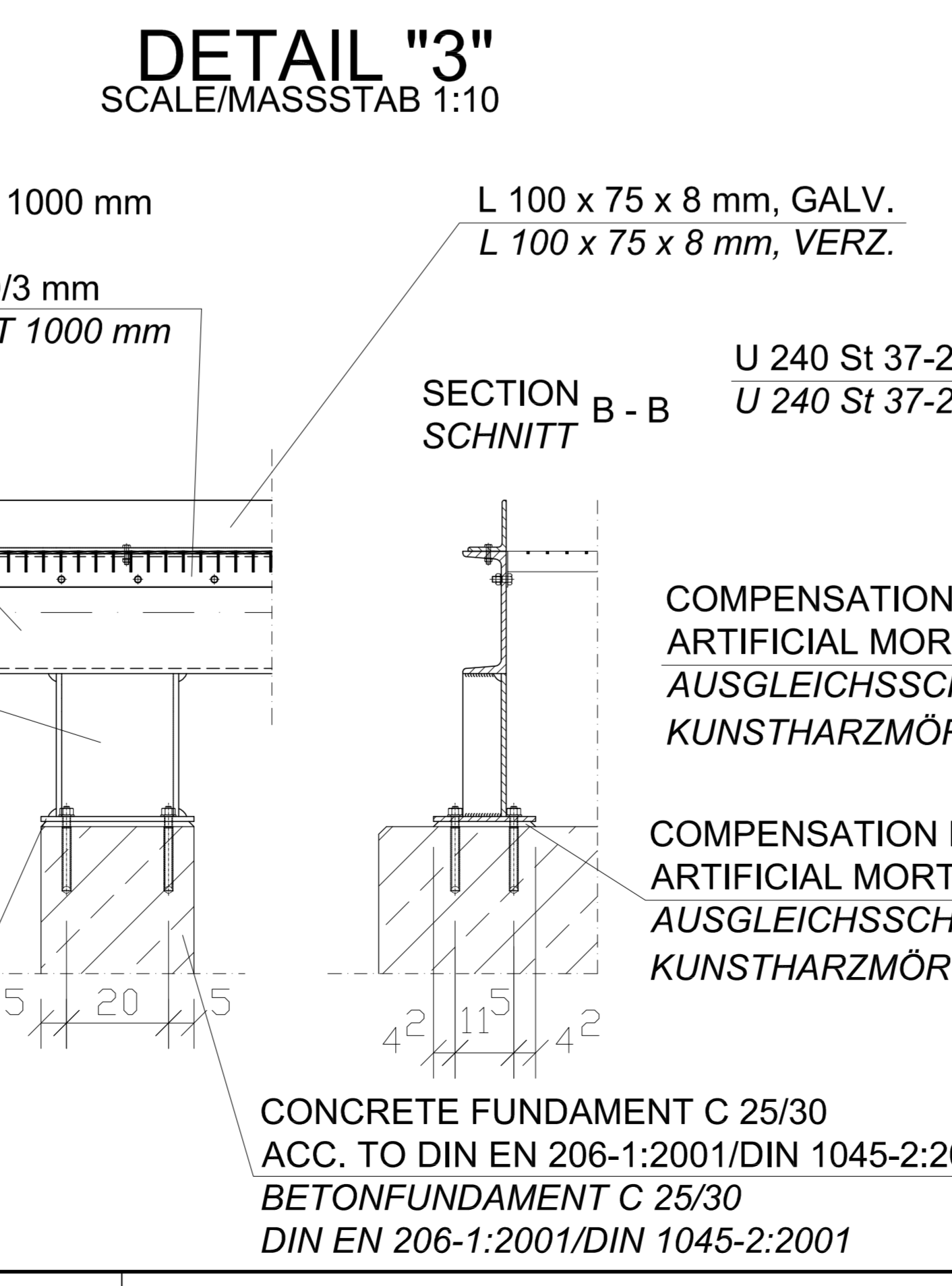
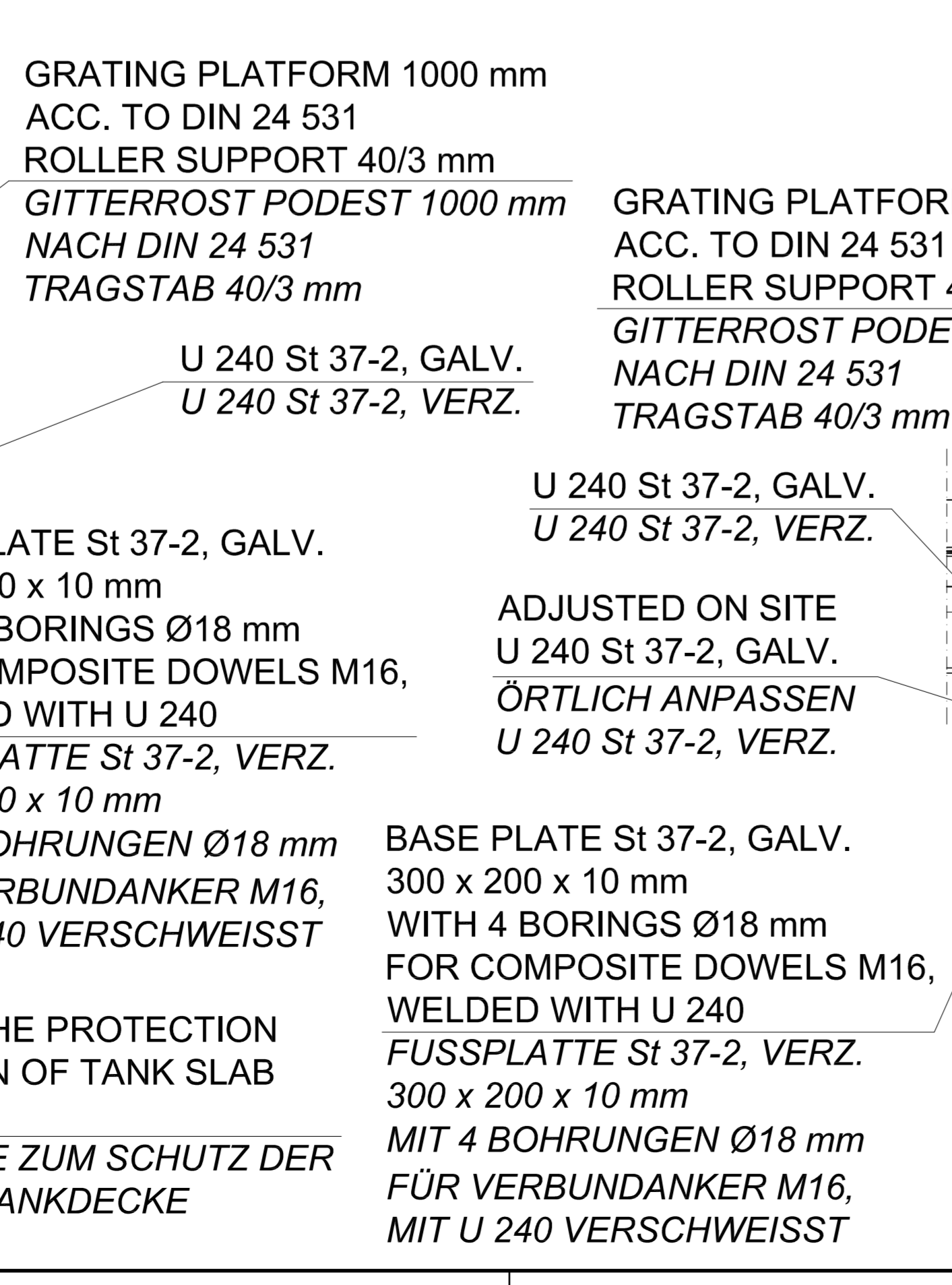
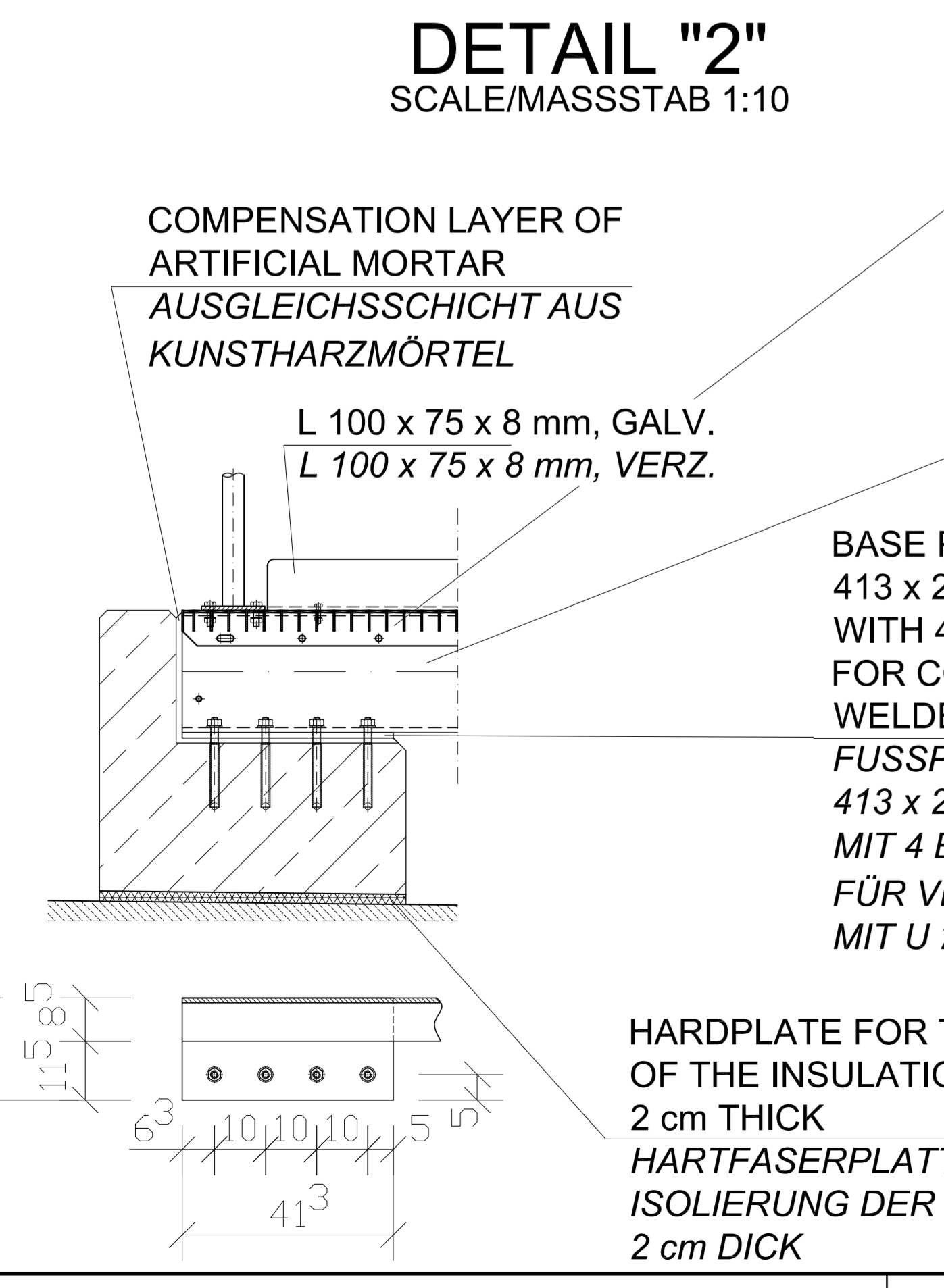
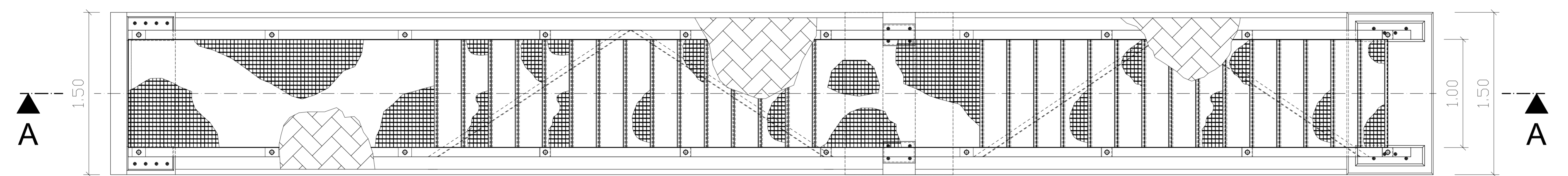
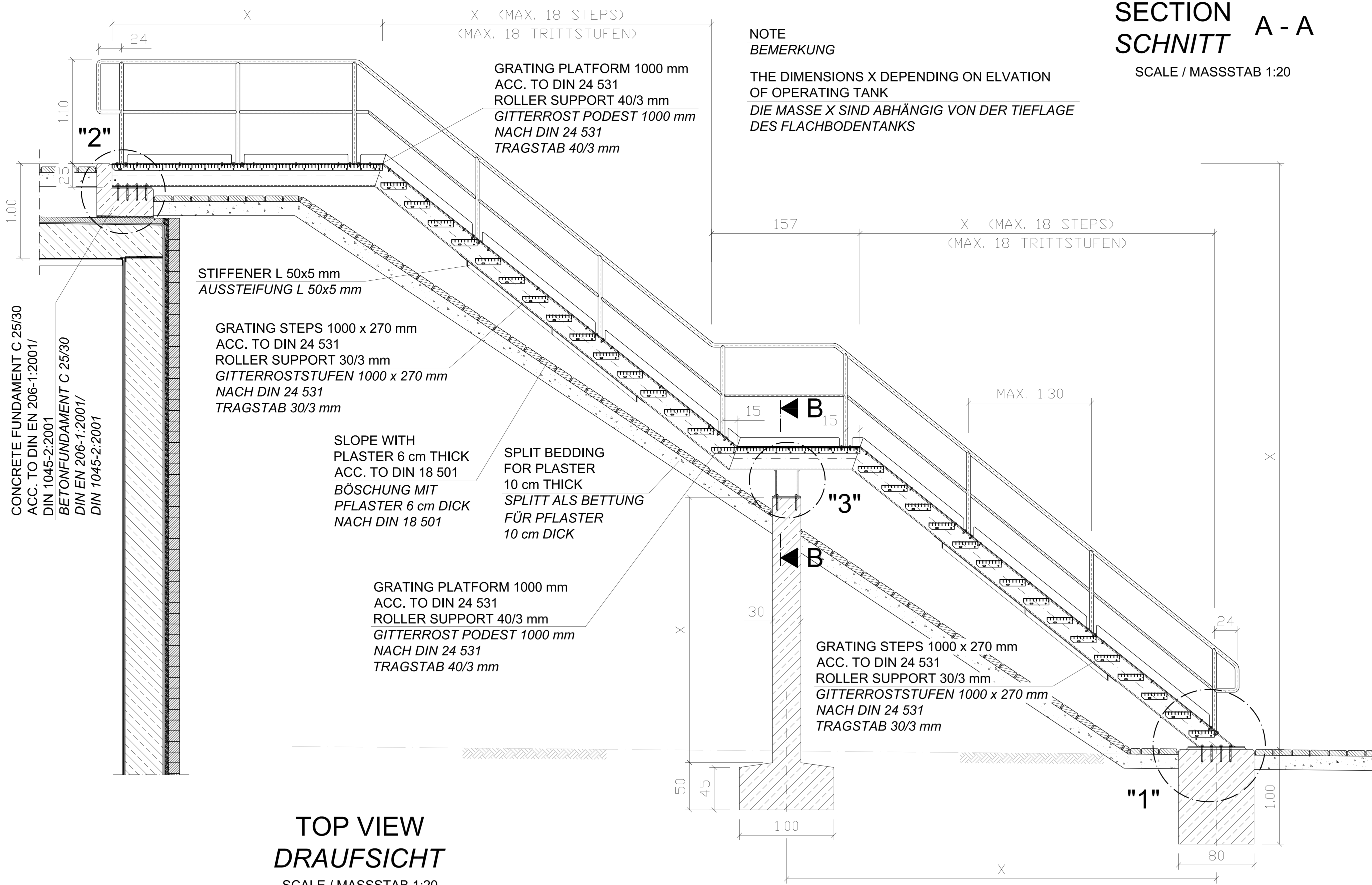


**SECTION E - E  
SCHNITT E - E**  
SCALE / MASSSTAB 1:10



REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
HEADQUARTERS UNITED STATES AIR FORCES EUROPE ENGINEERING & OPERATIONS				
AIRFIELD STANDARD DESIGN US		FLUGPLATZ STANDARDPLANUNG US		
JET FUEL STORAGE AND DISPENSING SYSTEMS		FLUGKRAFTSTOFF - VERSORGNUNGSANLAGEN		
OPERATING TANK 5000m <sup>3</sup> FLACHBODENTANK 5000m <sup>3</sup>				
DETAILS, STEEL TANK DETAILS, STAHLTANK				
WORKED/BEARBEITET		PREPARED/BEREITET		APPROVED/GEHEBET
LANDSCHAFTS- UND BAUVERBUND UND BAUVERBUND LANDSCHAFTS- UND BAUVERBUND		LANDSCHAFTS- UND BAUVERBUND UND BAUVERBUND LANDSCHAFTS- UND BAUVERBUND		AMT FÜR BUNDESBAU WALLSTR.1 55122 MAINZ
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAUWIRTSCHAFTEN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED GEHEBET	DATE DATUM	6. MAI 2015		SCALE MASSSTAB
ORIGINAL DRAWN BY IN ORIGINAL DED.	DATE DATUM	6. MAI 2015		1:1 ; 1:2 ; 1:10
GENERAL INFO CORPORATE FACILITIES ENGINEER PLANNING ARCHITECTURE	DATE DATUM	6. MAI 2015		STANDARD SHEET STANDARD PLAN
CONSTRUCTION PROJECT BAUWIRTSCHAFT	DATE DATUM	6. MAI 2015		S - 1.11
				SHEET NO. PLATZ NR.
				OF VON

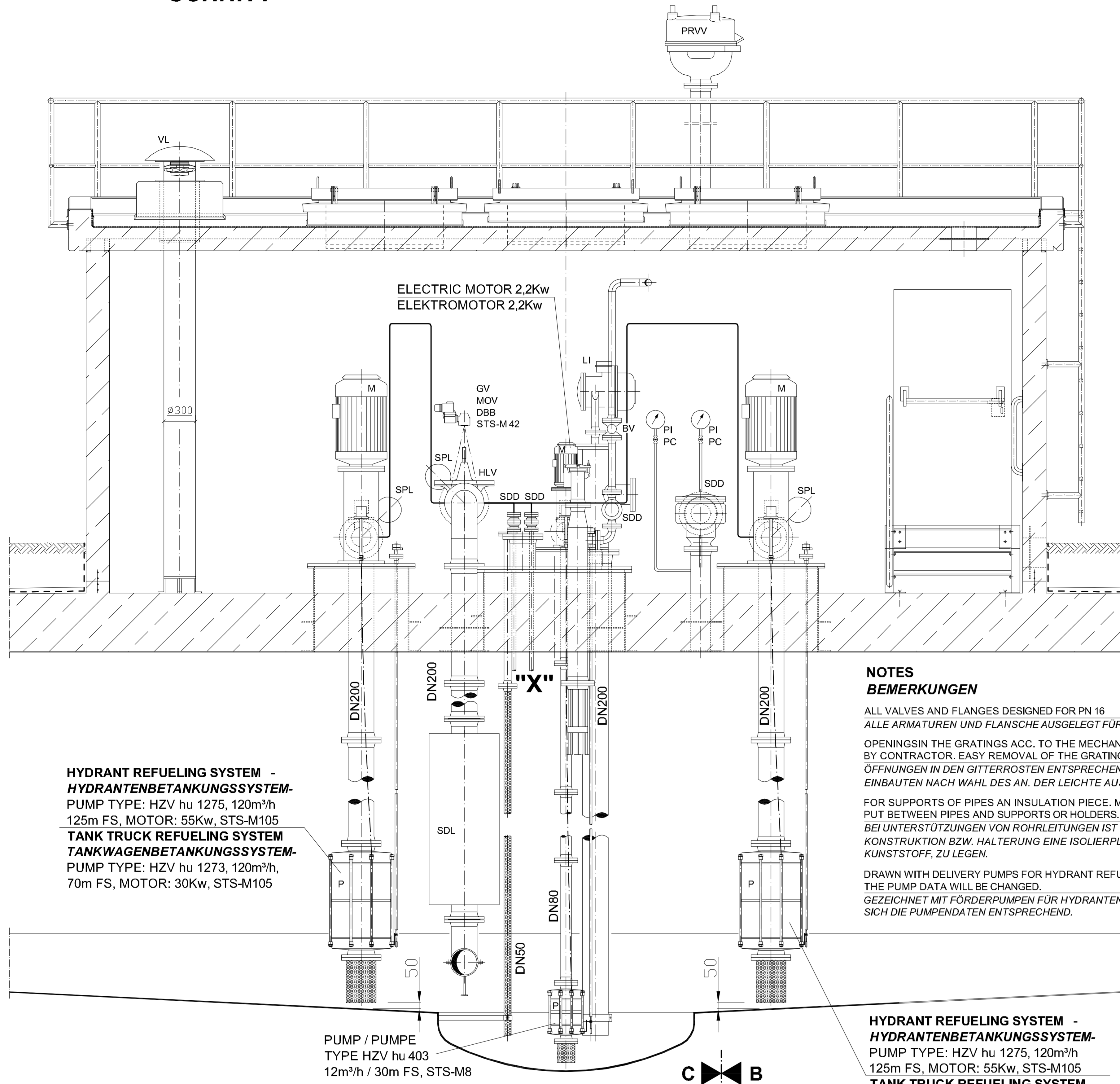




REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
HEADQUARTERS UNITED STATES AIR FORCES EUROPE ENGINEERING & OPERATIONS				
AIRFIELD STANDARD DESIGN US		FLUGPLATZ STANDARDPLANUNG US		
JET FUEL STORAGE AND DISPENSING SYSTEMS		FLUGKRAFTSTOFF - VERSORGUNGSANLAGEN		
OPERATING TANK 5000m <sup>3</sup> FLACHBODENTANK 5000m <sup>3</sup>				
TANK STAIRS AND SPLINTER PROTECTION DOORS TANKTREPPE UND SPLITTERSCHUTZTÜREN				
WORKED/BEARBEITET	PREPARED/GEZEIGNET	APPROVED/GENÜGT		
LANDSCHAFTS- UND BAUWERKE L 100 x 75 x 8 mm, GALV. L 100 x 75 x 8 mm, VERZ.		OBERFINANZDIREKTION ROSENZ ABB - ABTEILUNG BUNDESBAU WALLSTRL. 1 55122 MAINZ		
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAUMAßNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED GENÜGT	DATE DATUM	SCALE MASSSTAB	1:20 ; 1:10 ; 1:5 ; 1:1	
		STANDARD SHEET STANDARD PLAN	S - 1.12	
CONSTRUCTION PROJECT BAUMAßNAHME		CAD-project path: CAD-Programme:	SHEET NO. PLAN-NR. OF VON	



**SECTION A - A**  
**SCHNITT**



**HYDRANT REFUELING SYSTEM -  
HYDRANTENBETÄNUNGSSYSTEM-**  
PUMP TYPE: HZV hu 1275, 120m³/h  
125m FS, MOTOR: 55Kw, STS-M105  
**TANK TRUCK REFUELING SYSTEM-  
TANKWAGENBETÄNUNGSSYSTEM-**  
PUMP TYPE: HZV hu 1273, 120m³/h,  
70m FS, MOTOR: 30Kw, STS-M105

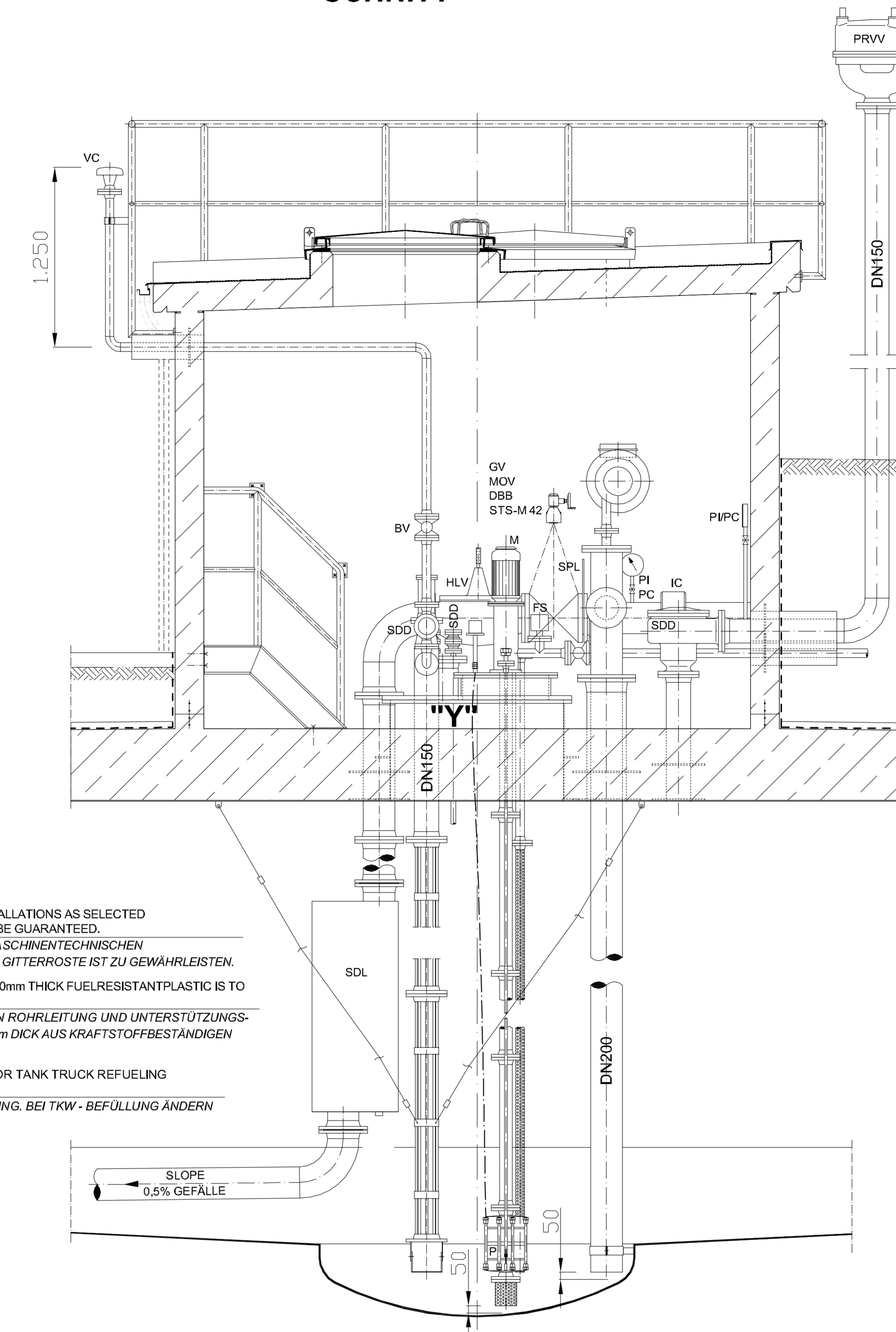
**NOTES  
BEMERKUNGEN**

ALL VALVES AND FLANGES DESIGNED FOR PN 16  
ALLE ARMATUREN UND FLANSCHS AUSGELEGT FÜR PN 16  
OPENINGS IN THE GRATINGS ACC. TO THE MECHANICAL INSTALLATIONS AS SELECTED  
BY CONTRACTOR. EASY REMOVAL OF THE GRATINGS SHALL BE GUARANTEED.  
ÖFFNUNGEN IN DEN GITTERROSTEN ENTSPRECHEND DEN MASCHINENTECHNISCHEN  
EINBAUTEN NACH WAHL DES AN. DER LEICHTE AUSBAU DER GITTERROSTE IST ZU GEWÄHRLEISTEN.  
FOR SUPPORTS OF PIPES AN INSULATION PIECE. MADE OF 10mm THICK FUELRESISTANT PLASTIC IS TO  
PUT BETWEEN PIPES AND SUPPORTS OR HOLDERS.  
BEI UNTERSTÜTZUNGEN VON ROHRLEITUNGEN IST ZWISCHEN ROHRLEITUNG UND UNTERSTÜTZUNGS-  
KONSTRUKTION BZW. HALTERUNG EINE ISOLIERPLATTE 10mm DICK AUS KRAFTSTOFFBESTÄNDIGEN  
KUNSTSTOFF, ZU LEGEN.  
DRAWN WITH DELIVERY PUMPS FOR HYDRANT REFUELING. FOR TANK TRUCK REFUELING  
THE PUMP DATA WILL BE CHANGED.  
GEZEICHNET MIT FÖRDERPUMPEN FÜR HYDRANTENBETÄNUNG. BEI TKW - BEFÜLLUNG ÄNDERN  
SICH DIE PUMPENDATEN ENTSPRECHEND.

PUMP / PUMPE  
TYPE HZV hu 403  
12m³/h / 30m FS, STS-M8

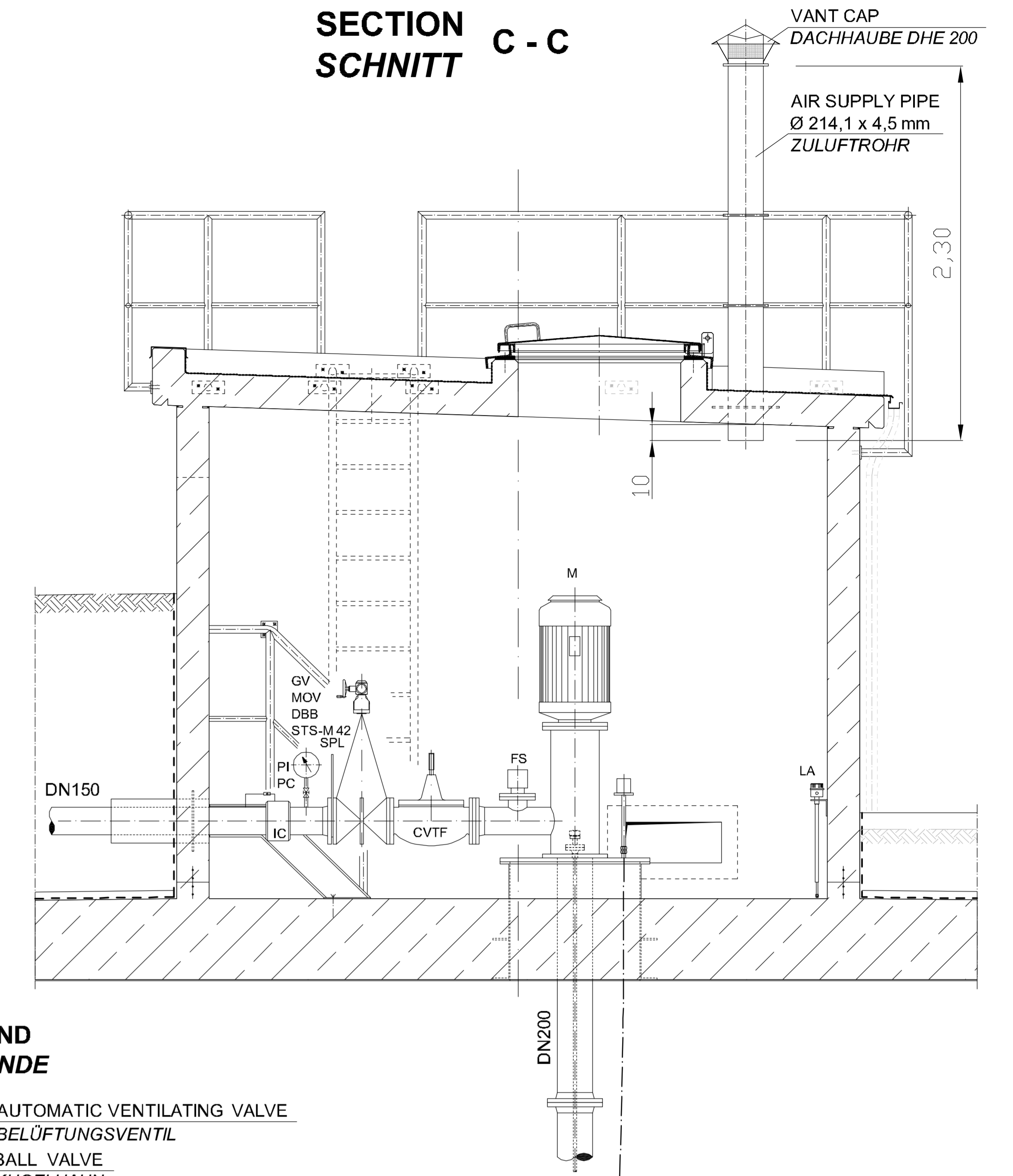
**HYDRANT REFUELING SYSTEM -  
HYDRANTENBETÄNUNGSSYSTEM-**  
PUMP TYPE: HZV hu 1275, 120m³/h  
125m FS, MOTOR: 55Kw, STS-M105  
**TANK TRUCK REFUELING SYSTEM-  
TANKWAGENBETÄNUNGSSYSTEM-**  
PUMP TYPE: HZV hu 1273, 120m³/h,  
70m FS, MOTOR: 30Kw, STS-M105

**SECTION B - B**  
**SCHNITT**



SLOPE  
0,5% GEFÄLLE

**SECTION C - C**  
**SCHNITT**



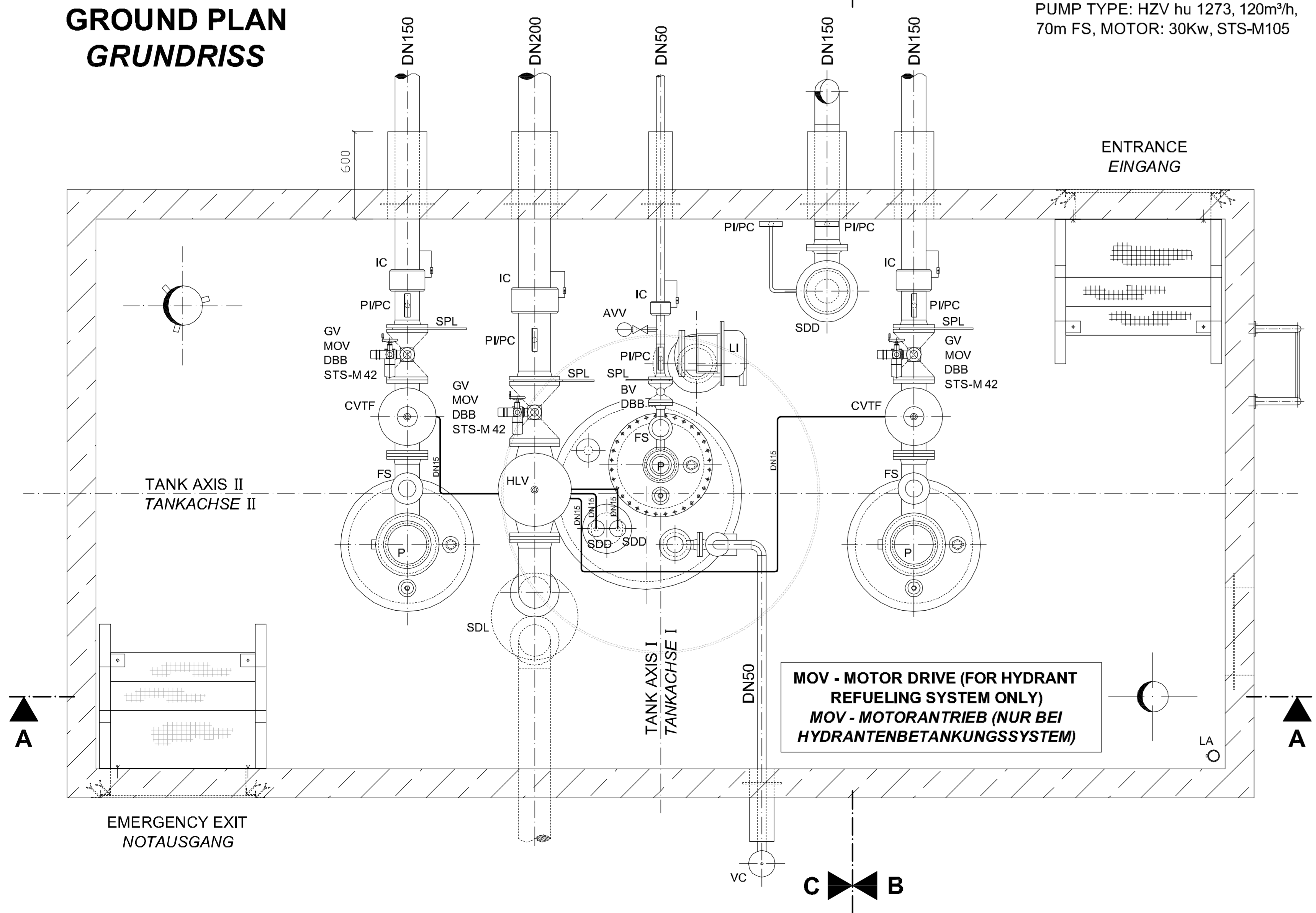
VANT CAP  
DACHHAUBE DHE 200  
AIR SUPPLY PIPE  
Ø 214.1 x 4.5 mm  
ZULUFTROHR

**LEGEND  
LEGENDE**

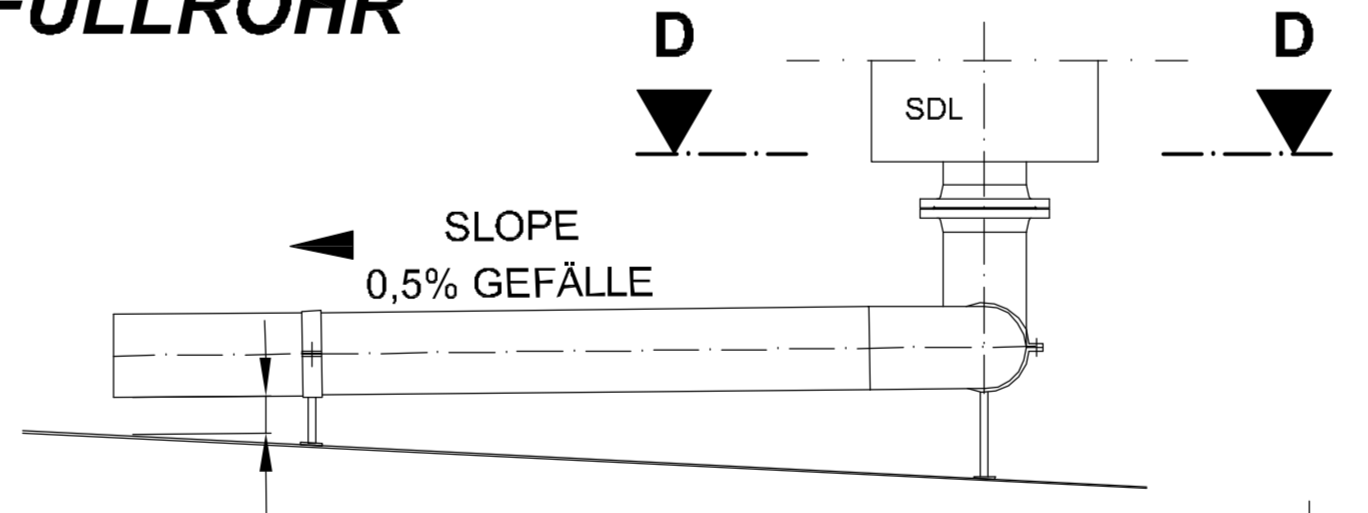
- AW AUTOMATIC VENTILATING VALVE  
BELÜFTUNGSVENTIL
- BV BALL VALVE  
KUGELHAHN
- GV GATE VALVE  
ABSPERRSCHIEBER
- CVTF PUMP START VALVE WITH FLOW LIMITATION  
PUMPENANFAHRENTIL MIT MENGENBEGRENZUNG
- FS FLOW SWITCH  
STRÖMUNGSWÄCHTER
- HLV HIGH LEVEL SHUT - OF VALVE  
ÜBERFÜLLSICHERUNG
- IC INSULATING COUPLING  
ISOLIERKUPPLUNG
- LA LIQUID PROBE  
FLÜSSIGKEITSSONDE
- LI LEVEL INDICATOR  
FÜLLSTANDSANZEIGER
- M ELECTRIC MOTOR  
ELEKTROMOTOR
- MOV GATE VALVE WITH MOTOR  
ABSPERRARMATUR MIT MOTORANTRIEB
- P PUMP  
PUMPE
- PC PRESSURE GAUGE STOPCOCK  
MANOMETER - ABSPERRVENTIL
- PI PRESSURE GAUGE  
MANOMETER
- PRVV PRESSURE RELIEF - VACUUM VALVE  
ÜBER - UNTERDRUCK MEMBRANVENTIL
- SDD TROCKEN - DETONATIONSSICHERUNG  
SAFETY DEVICE AGAINST DETONATION, DRY TYPE
- SDL FLÜSSIGKEITS - DETONATIONSSICHERUNG  
SAFETY DEVICE AGAINST DETONATION, LIQUID TYPE
- SPL SPADE PLATE  
BRILLENSTECKSCHEIBE
- VC VENTILATING CAP  
ENTLÜFTUNGSHAUBE
- VL VENTILATOR  
VENTILATOR
- DBB DOUBLE BLOCK AND BLEED

**PERTINENT DRAWINGS  
ZUGEHÖRIGE ZEICHNUNGEN**  
C-1.2 GENERAL PLAN - DETAILS  
ÜBERSICHTSPLAN - DETAILS

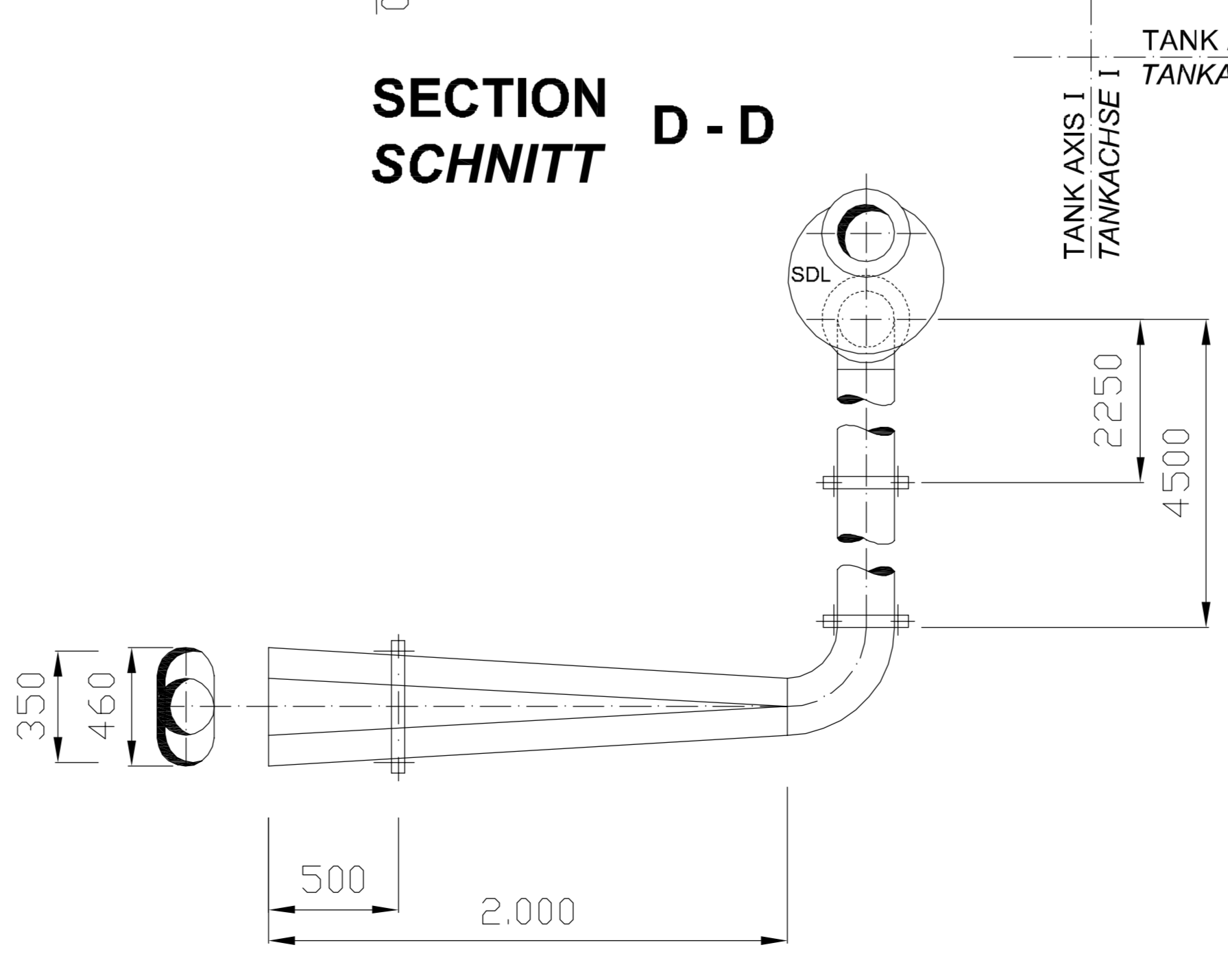
**GROUND PLAN  
GRUNDRISS**



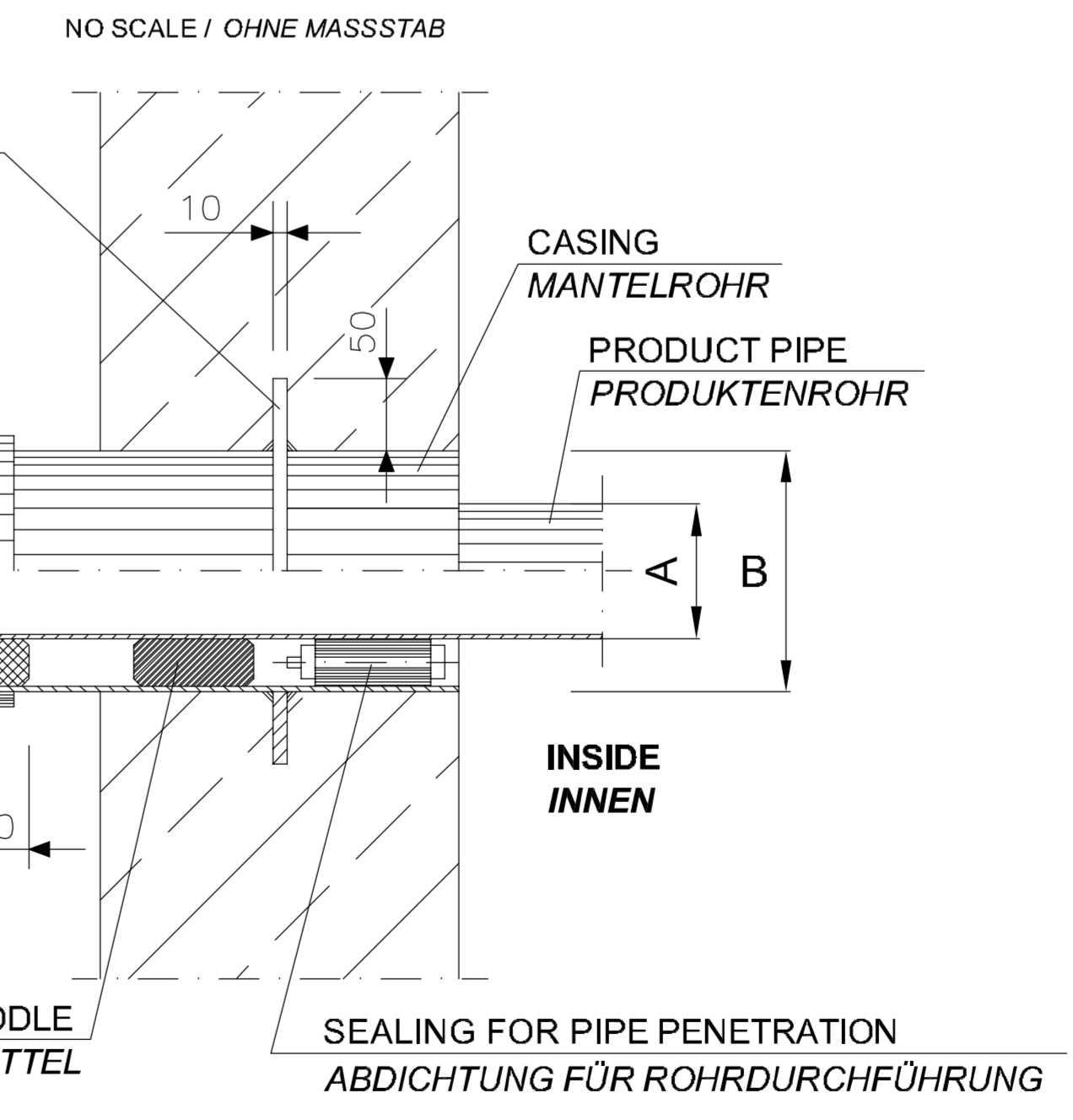
**FILLING PIPE  
FÜLLROHR**



**SECTION D - D**  
**SCHNITT**



**DETAIL PIPE PENETRATION  
DETAIL ROHRDURCHFÜHRUNG**

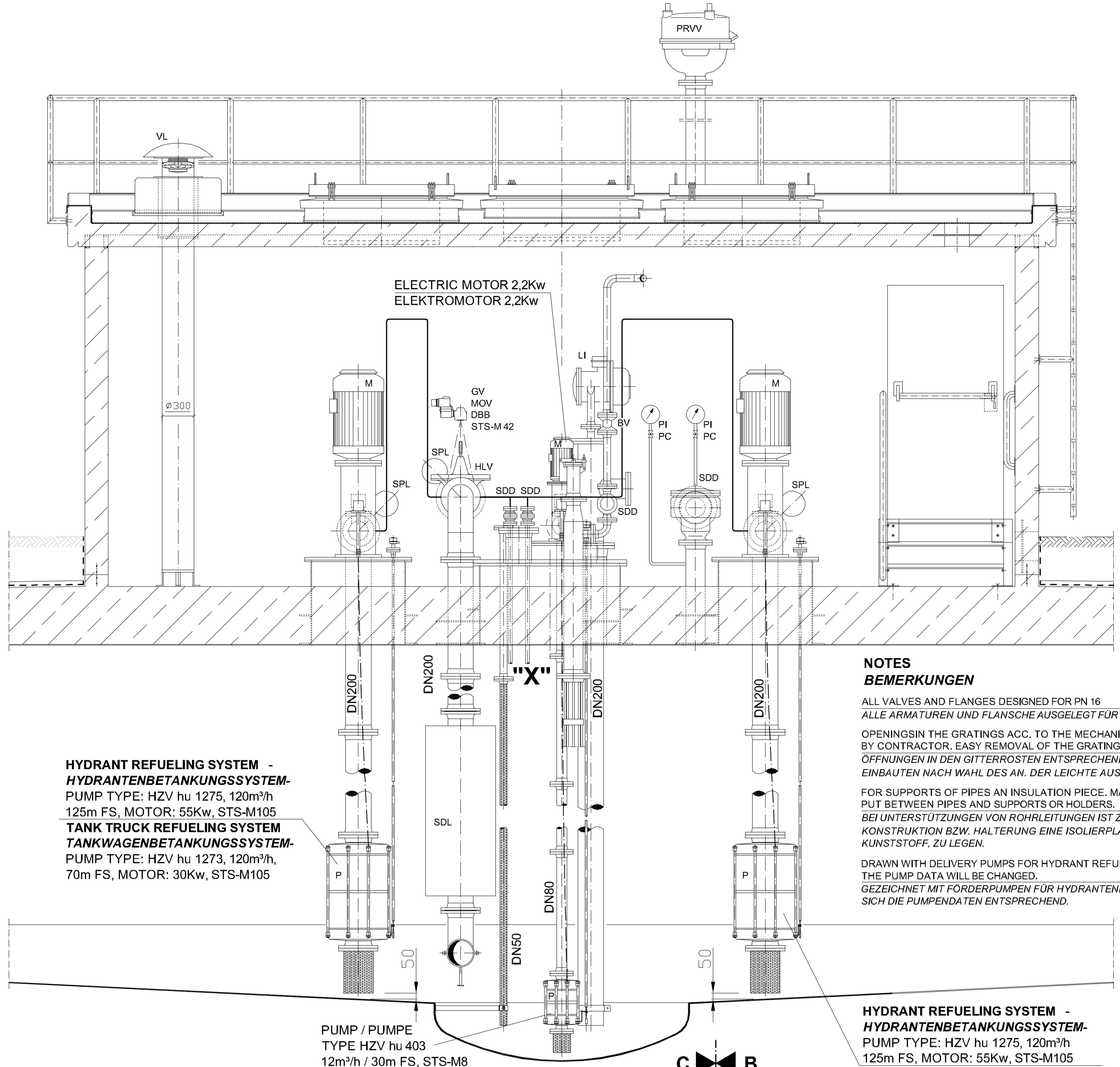


PRODUCT PIPE PRODUKTENROHR	A mm	B mm
DN 25	Ø 33,7	Ø 76,1
DN 50	Ø 60,3	Ø 168,3
DN 150	Ø 168,3	Ø 273
DN 200	Ø 273	Ø 323,9
EXAMPLE	BEISPIEL	

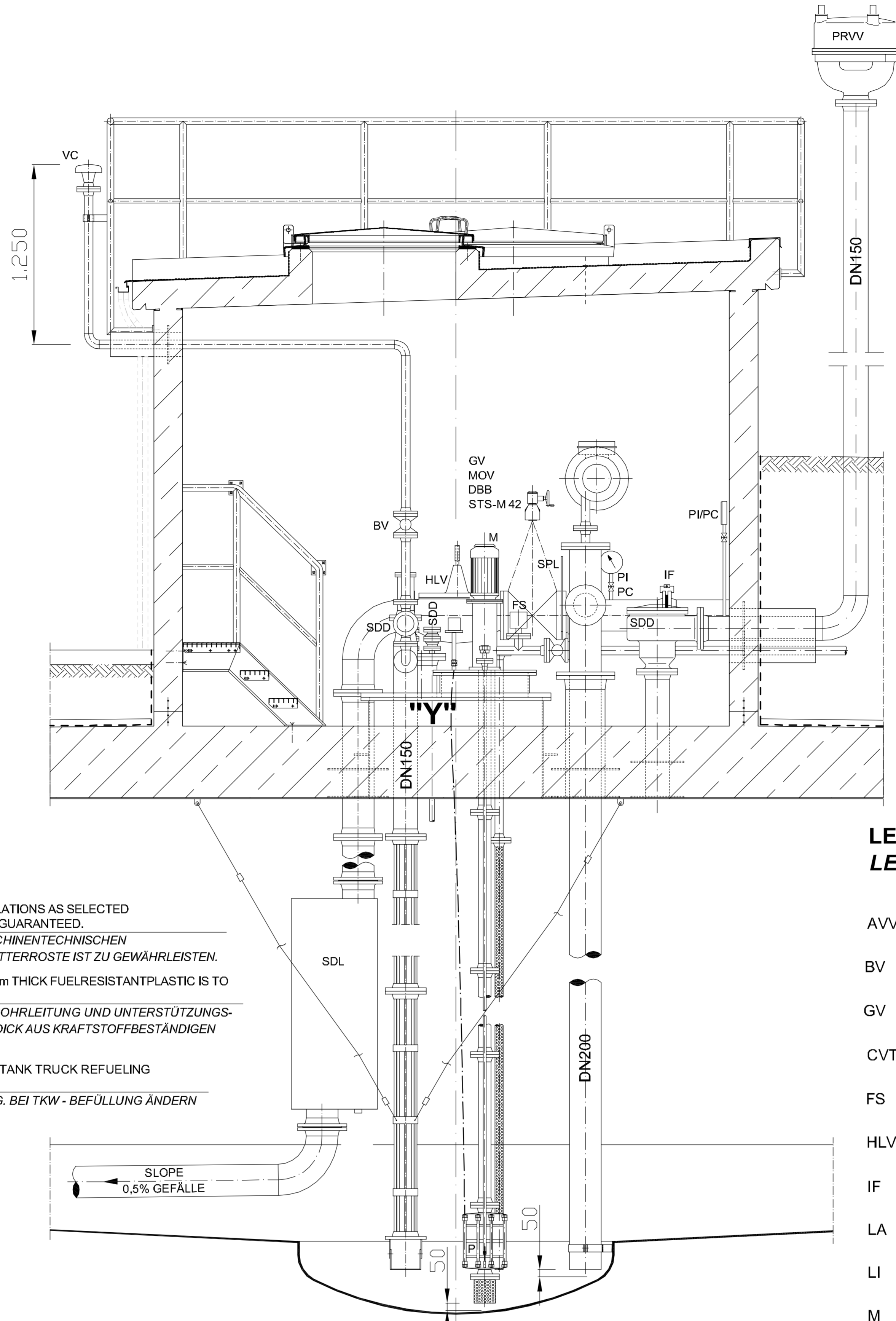
REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
<b>HEADQUARTERS</b> UNITED STATES AIR FORCES EUROPE ENGINEERING & OPERATIONS				
AIRFIELD STANDARD DESIGN US		FLUGPLATZ STANDARDPLANUNG US		
JET FUEL STORAGE AND DISPENSING SYSTEMS		FLUGKRAFTSTOFF - VERSORGSANLAGEN		
<b>BUILDING BAUWERK</b> OPERATING TANK 5000m³ FLACHBODENTANK 5000m³				
MECHANICAL INSTALLATION WITH INSULATING COUPLING MASCHINENTECHNISCHE INSTALLATION MIT ISOLIERKUPPLUNG				
WORKSHEET ARBEITSBLAU	PREPARED/GEZEICHNET VORBEREITET	APPROVED/GEPRÜFT GEPRÜFT	AMT FÜR BUNDESBAU WÄLLSTR.1 55122 MAINZ	
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAUHAUPTNÄHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED GEPRÜFT	DATE DATUM	6. MAI 2015	SCALE MASSSTAB	1:20
ORIGINAL DRAWN BY IN ORIGINAL DES. URSPRÜNGLICH GEZEICHNET IM URSPRÜNGLICHEN	DESIGNER ENTWURFER	CONTRACTOR AUFTRAGSNEHMER	CAD-DRAWING CAD-ZEICHNUNG	M - 1.1
CONSTRUCTION PROJECT BAUHAUPTNAME				SHEET NO. BLATTNR.



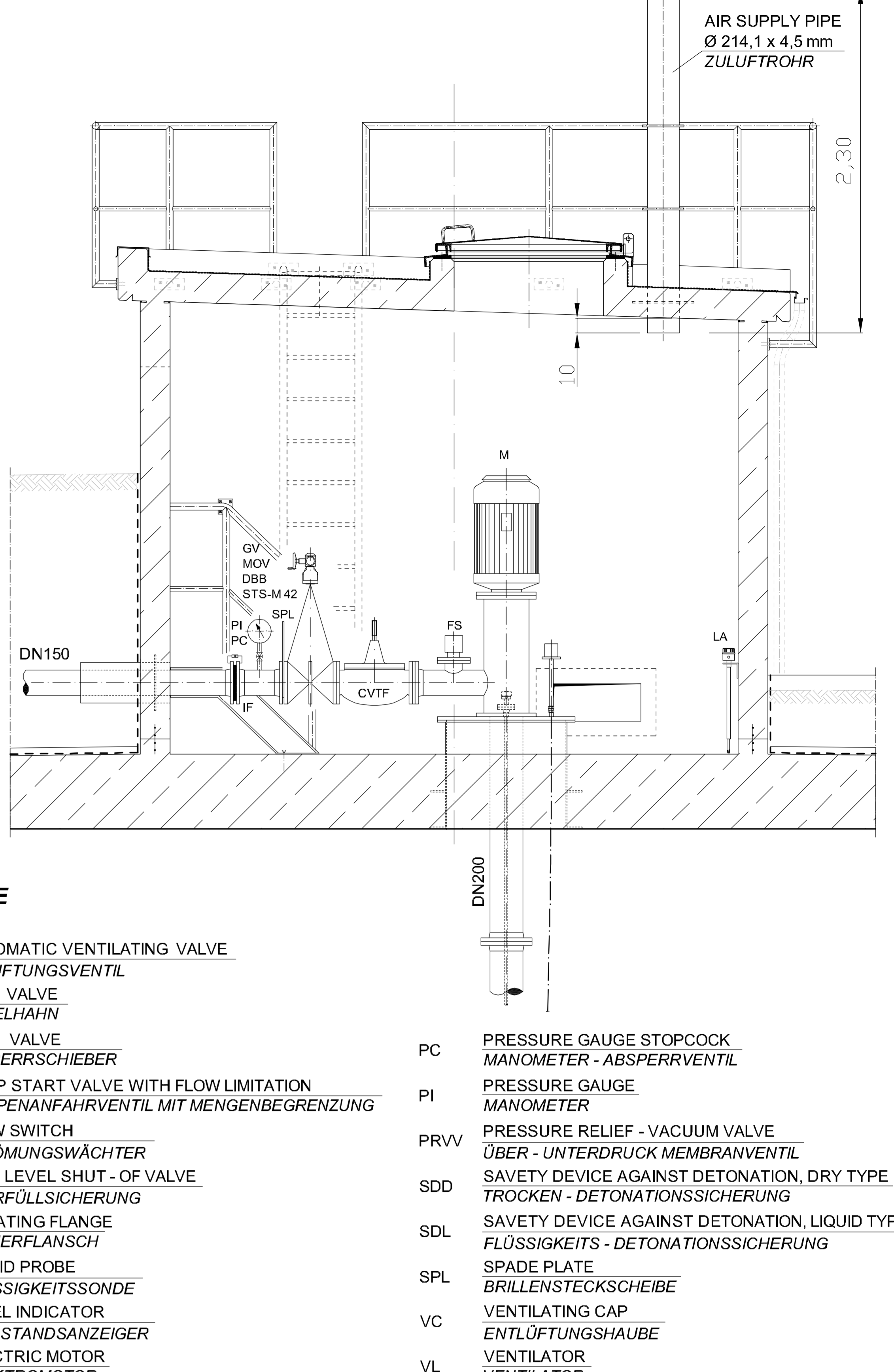
**SECTION A - A**  
SCHNITT



**SECTION B - B**  
SCHNITT



**SECTION C - C**  
SCHNITT



**LEGENDE**  
LEGENDE

- AW AUTOMATIC VENTILATING VALVE  
BELÜFTUNGSVENTIL
- BV BALL VALVE  
KUGELHAHN
- GV GATE VALVE  
ABSPERRSCHIEBER
- CVTF PUMP START VALVE WITH FLOW LIMITATION  
PUMPENANFAHRENTIL MIT MENGENBEGRENZUNG
- FS FLOW SWITCH  
STRÖMUNGSWÄCHTER
- HLV HIGH LEVEL SHUT - OFF VALVE  
ÜBERFÜLLSICHERUNG
- IF INSULATING FLANGE  
ISOLIERFLANSCH
- LA LIQUID PROBE  
FLÜSSIGKEITSSONDE
- LI LEVEL INDICATOR  
FÜLLSTANDSANZEIGER
- M ELECTRIC MOTOR  
ELEKTROMOTOR
- MOV GATE VALVE WITH MOTOR  
ABSPERRARMATUR MIT MOTORANTRIEB
- P PUMP  
PUMPE
- PC PRESSURE GAUGE STOPCOCK  
MANOMETER - ABSPERRVENTIL
- PI PRESSURE GAUGE  
MANOMETER
- PRV PRESSURE RELIEF - VACUUM VALVE  
ÜBER - UNTERDRUCK MEMBRANVENTIL
- SDD SAFETY DEVICE AGAINST DETONATION, DRY TYPE  
TROCENEN - DETONATIONSSICHERUNG
- SOL SAFETY DEVICE AGAINST DETONATION, LIQUID TYPE  
FLÜSSIGKEITS - DETONATIONSSICHERUNG
- SPL SPADE PLATE  
BRILLENSTECKSCHEIBE
- VC VENTILATING CAP  
ENTLÜFTUNGSHAUBE
- VL VENTILATOR  
VENTILATOR
- DBB DOUBLE BLOCK AND BLEED

**NOTES**  
BEMERKUNGEN

ALL VALVES AND FLANGES DESIGNED FOR PN 16  
ALLE ARMATUREN UND FLANSCHS AUSGELEGT FÜR PN 16

OPENINGS IN THE GRATINGS ACC. TO THE MECHANICAL INSTALLATIONS AS SELECTED BY CONTRACTOR. EASY REMOVAL OF THE GRATINGS SHALL BE GUARANTEED.  
ÖFFNUNGEN IN DEN GITTERROSTEN ENTSPRECHEND DEN MASCHINENTECHNISCHEN EINBAUTEN NACH WAHL DES AN. DER LEICHTE AUSBAU DER GITTERROSTE IST ZU GEWÄHRLEISTEN.

FOR SUPPORTS OF PIPES AN INSULATION PIECE, MADE OF 10mm THICK FUELRESISTANT PLASTIC IS TO PUT BETWEEN PIPES AND SUPPORTS OR HOLDERS.  
BEI UNTERSTÜTZUNGEN VON ROHRLÉITUNGEN IST ZWISCHEN ROHRLÉITUNG UND UNTERSTÜTZUNGS-KONSTRUKTION BZW. HALTERUNG EINE ISOLIERPLATTE 10mm DICK AUS KRAFTSTOFFBESTÄNDIGEN KUNSTSTOFF, ZU LEGEN.

DRAWN WITH DELIVERY PUMPS FOR HYDRANT REFUELING. FOR TANK TRUCK REFUELING THE PUMP DATA WILL BE CHANGED.  
GEZEICHNET MIT FÖRDERPUMPEN FÜR HYDRANTENBETANKUNG. BEI TW - BEFÜLLUNG ÄNDERN SICH DIE PUMPENDATEN ENTSPRECHEND.

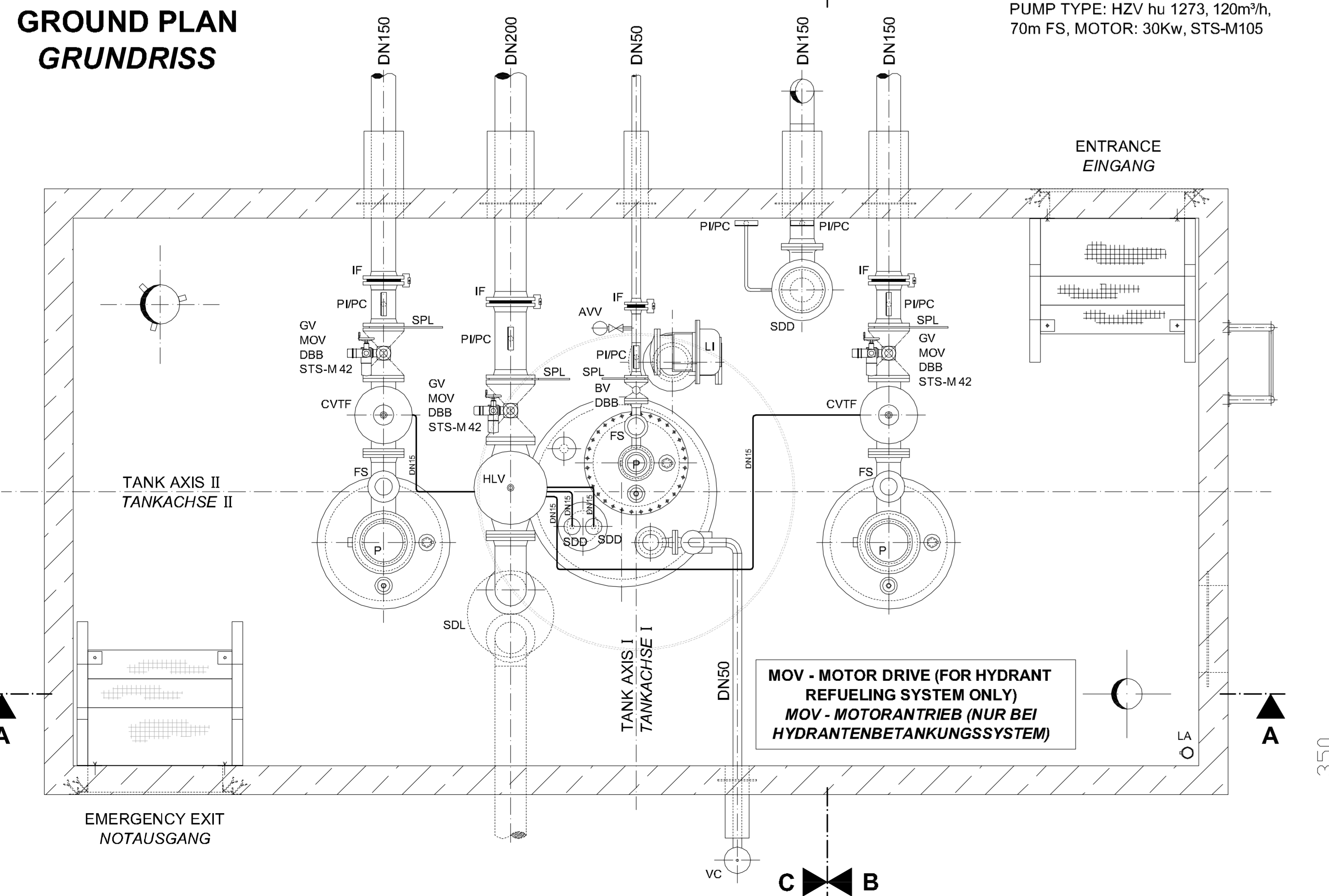
**HYDRANT REFUELING SYSTEM -**  
**HYDRANTENBETANKUNGSSYSTEM-**  
PUMP TYPE: HZV hu 1275, 120m³/h  
125m FS, MOTOR: 55Kw, STS-M105

**TANK TRUCK REFUELING SYSTEM -**  
**TANKWAGENBETANKUNGSSYSTEM-**  
PUMP TYPE: HZV hu 1273, 120m³/h,  
70m FS, MOTOR: 30Kw, STS-M105

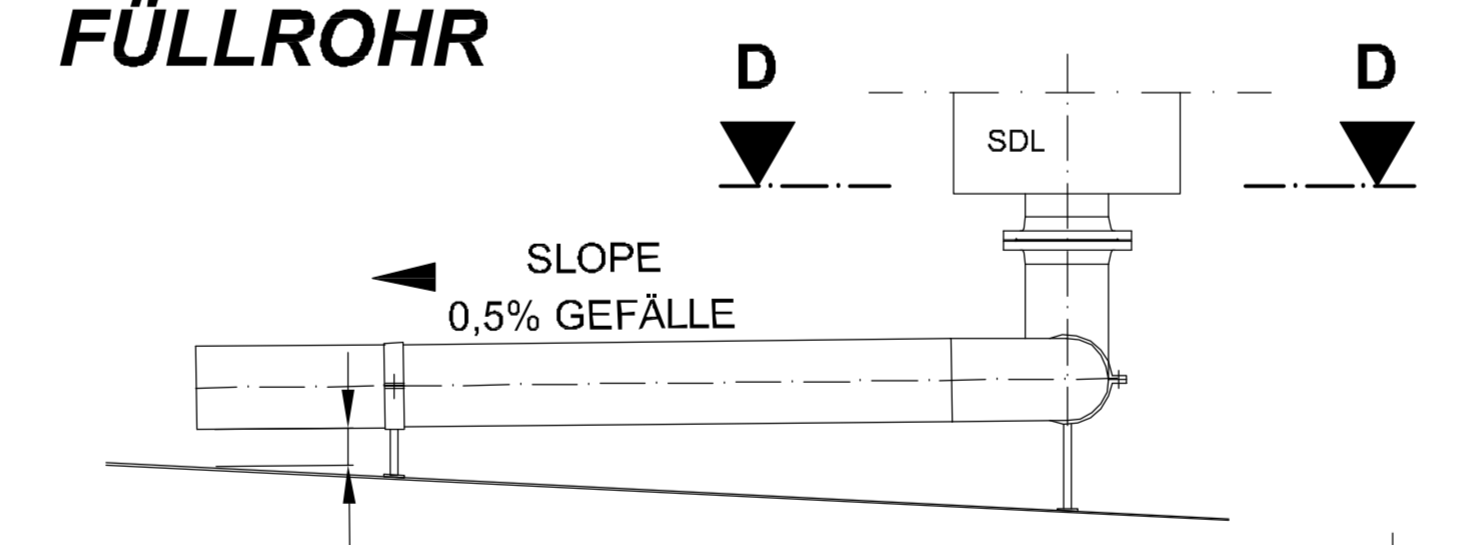
**HYDRANT REFUELING SYSTEM -**  
**HYDRANTENBETANKUNGSSYSTEM-**  
PUMP TYPE: HZV hu 1275, 120m³/h  
125m FS, MOTOR: 55Kw, STS-M105

**TANK TRUCK REFUELING SYSTEM -**  
**TANKWAGENBETANKUNGSSYSTEM-**  
PUMP TYPE: HZV hu 1273, 120m³/h,  
70m FS, MOTOR: 30Kw, STS-M105

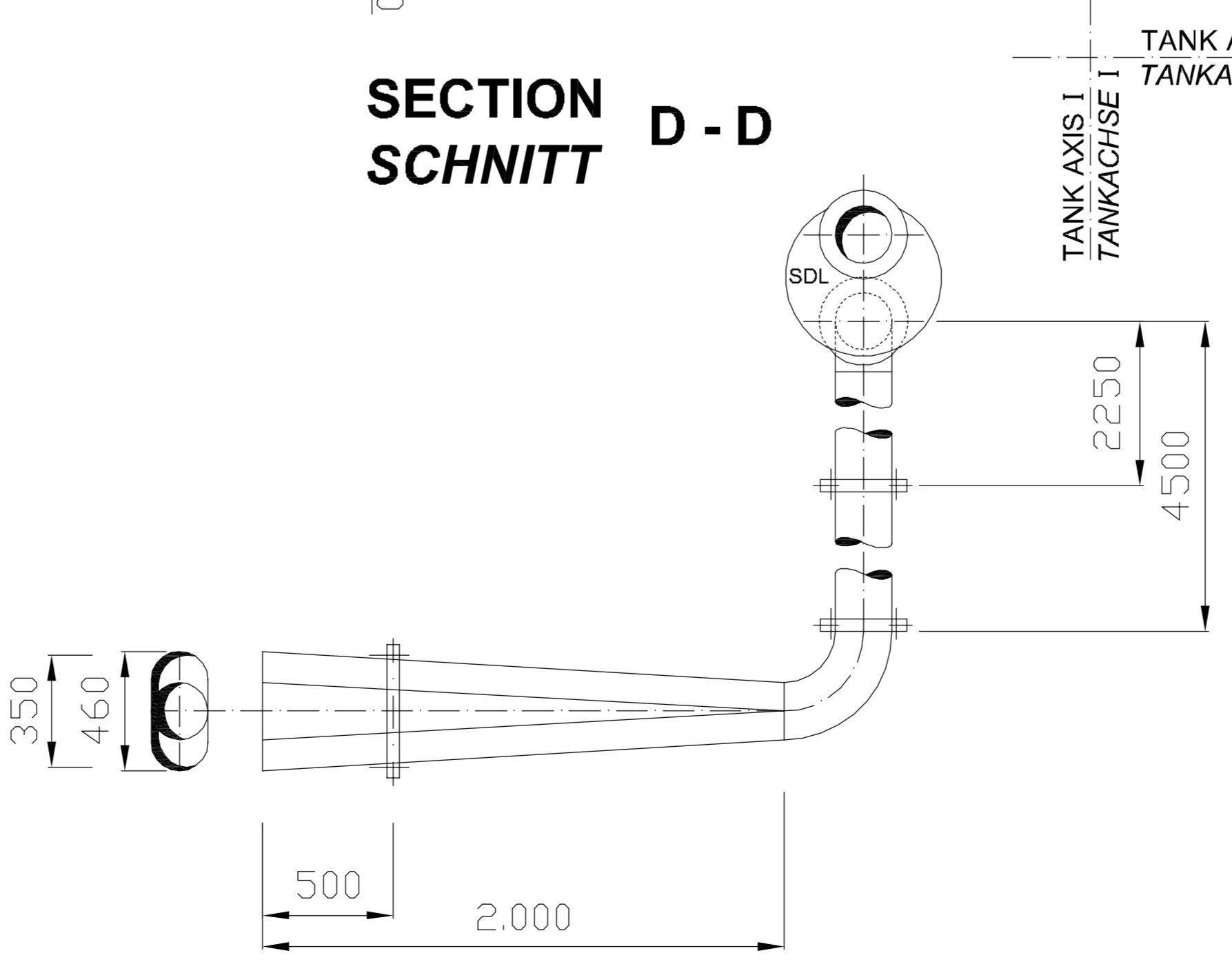
**GROUND PLAN**  
**GRUNDRISS**



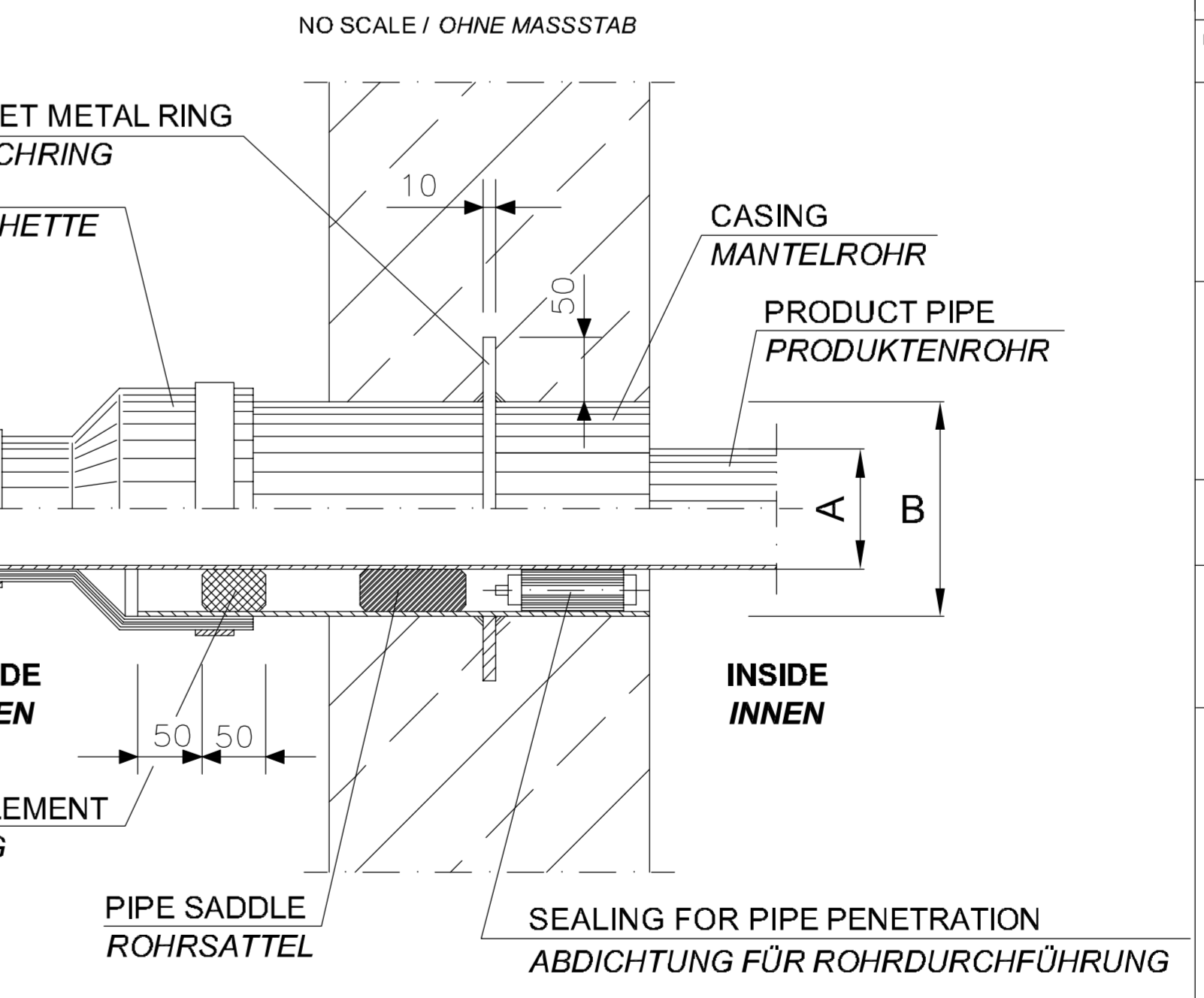
**FILLING PIPE**  
**FÜLLROHR**



**SECTION D - D**  
SCHNITT



**DETAIL PIPE PENETRATION**  
**DETAIL ROHRDURCHFÜHRUNG**



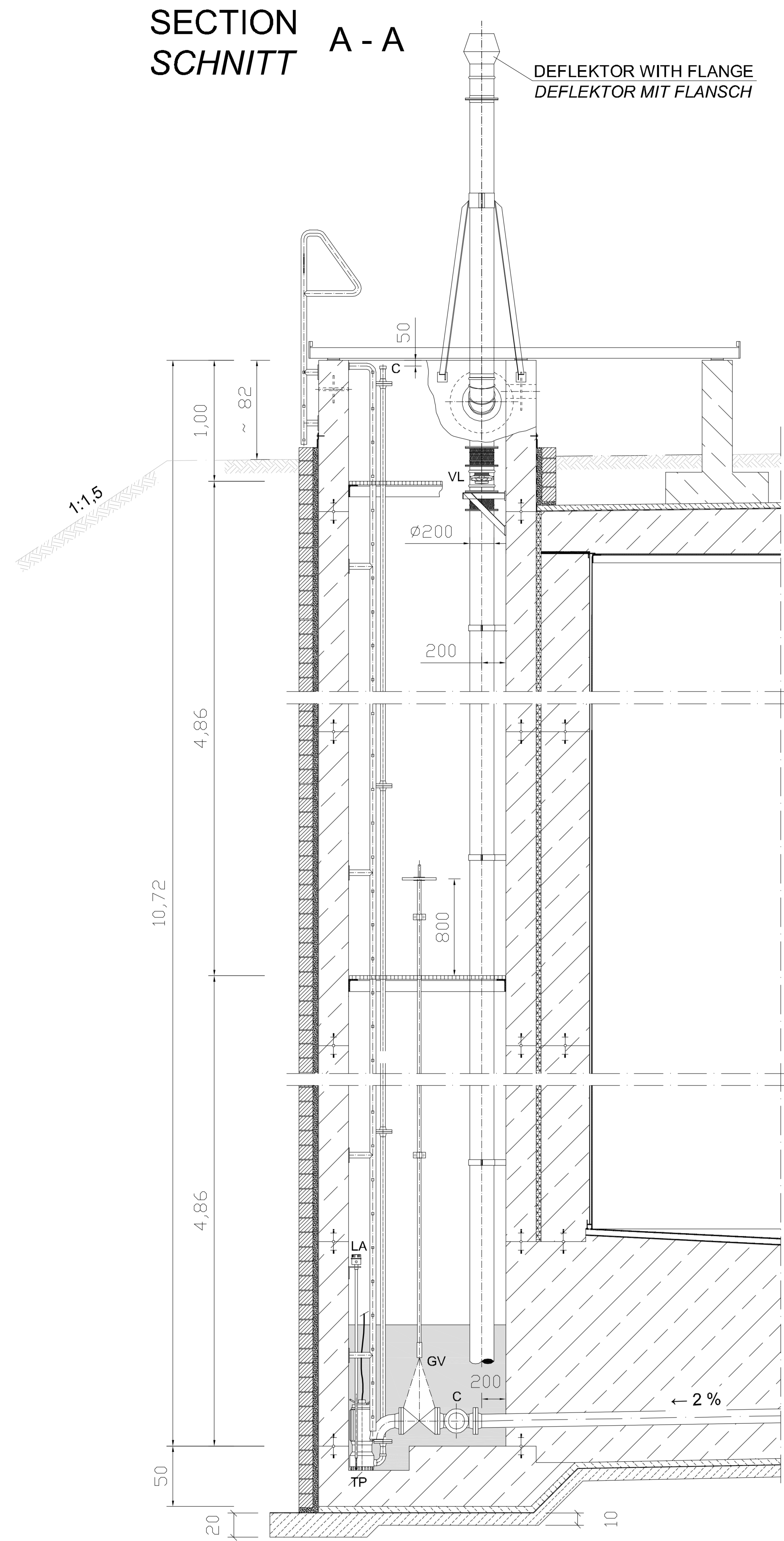
PRODUCT PIPE PRODUKTENROHR	A mm	B mm
DN 25	Ø 33,7	Ø 78,1
DN 50	Ø 60,3	Ø 168,3
DN 150	Ø 168,3	Ø 273
DN 200	Ø 273	Ø 323,9
EXAMPLE	BEISPIEL	

**PERTINENT DRAWINGS**  
**ZUGEHÖRIGE ZEICHNUNGEN**  
C-1.2 GENERAL PLAN - DETAILS  
ÜBERSICHTSPLAN - DETAILS

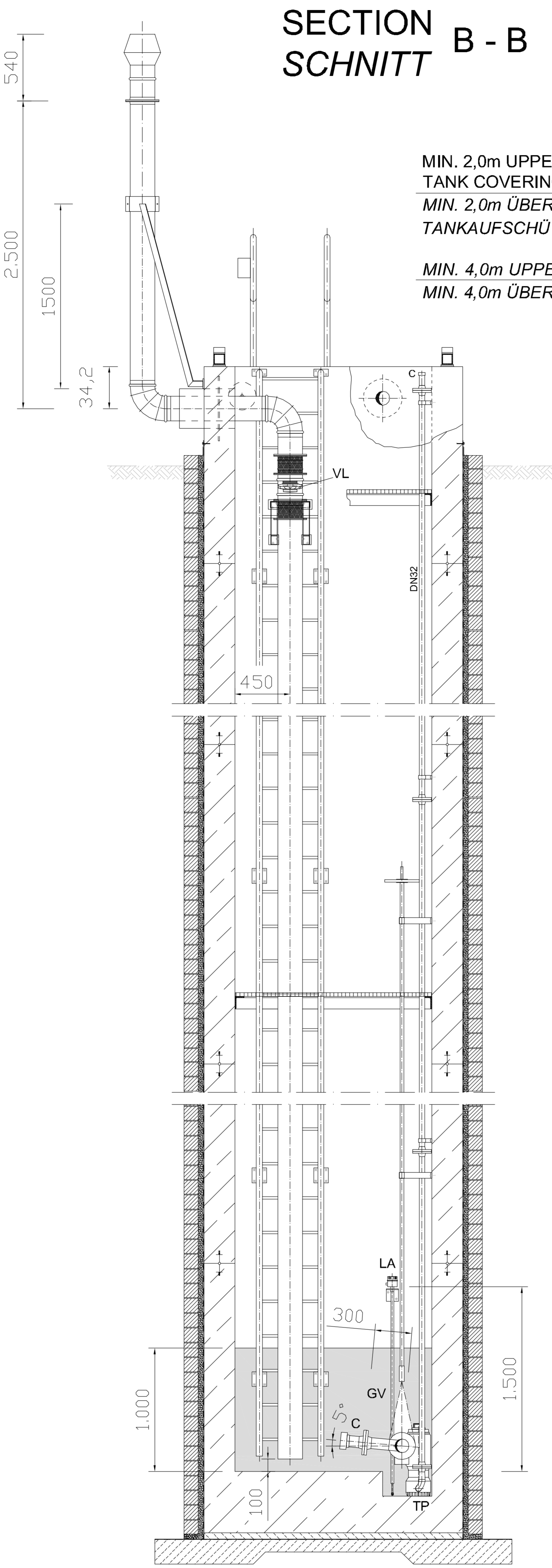
REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
<b>HEADQUARTERS</b> UNITED STATES AIR FORCES EUROPE ENGINEERING & OPERATIONS				
AIRFIELD STANDARD DESIGN US JET FUEL STORAGE AND DISPENSING SYSTEMS		FLUGPLATZ STANDARDPLANUNG US FLUGKRAFTSTOFF - VERSORGSANLAGEN		
<b>OPERATING TANK 5000m³</b> <b>FLACHBÖDENTANK 5000m³</b>				
<b>MECHANICAL INSTALLATION WITH INSULATING FLANGE</b> <b>MASCHINENTECHNISCHE INSTALLATION MIT ISOLIERFLANSCH</b>				
APPROVED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAU MASSNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED GENEHMIGT	DATE DATUM	SCALE MASSSTAB	SHEET NO. BLATT NR.	
6. MAI 2015	1:20	M - 1.1		
CONSTRUCTION PROJECT BAU MASSNAHME	SHEET NO. BLATT NR.		OF VON	



**SECTION A - A**  
**SCHNITT A - A**

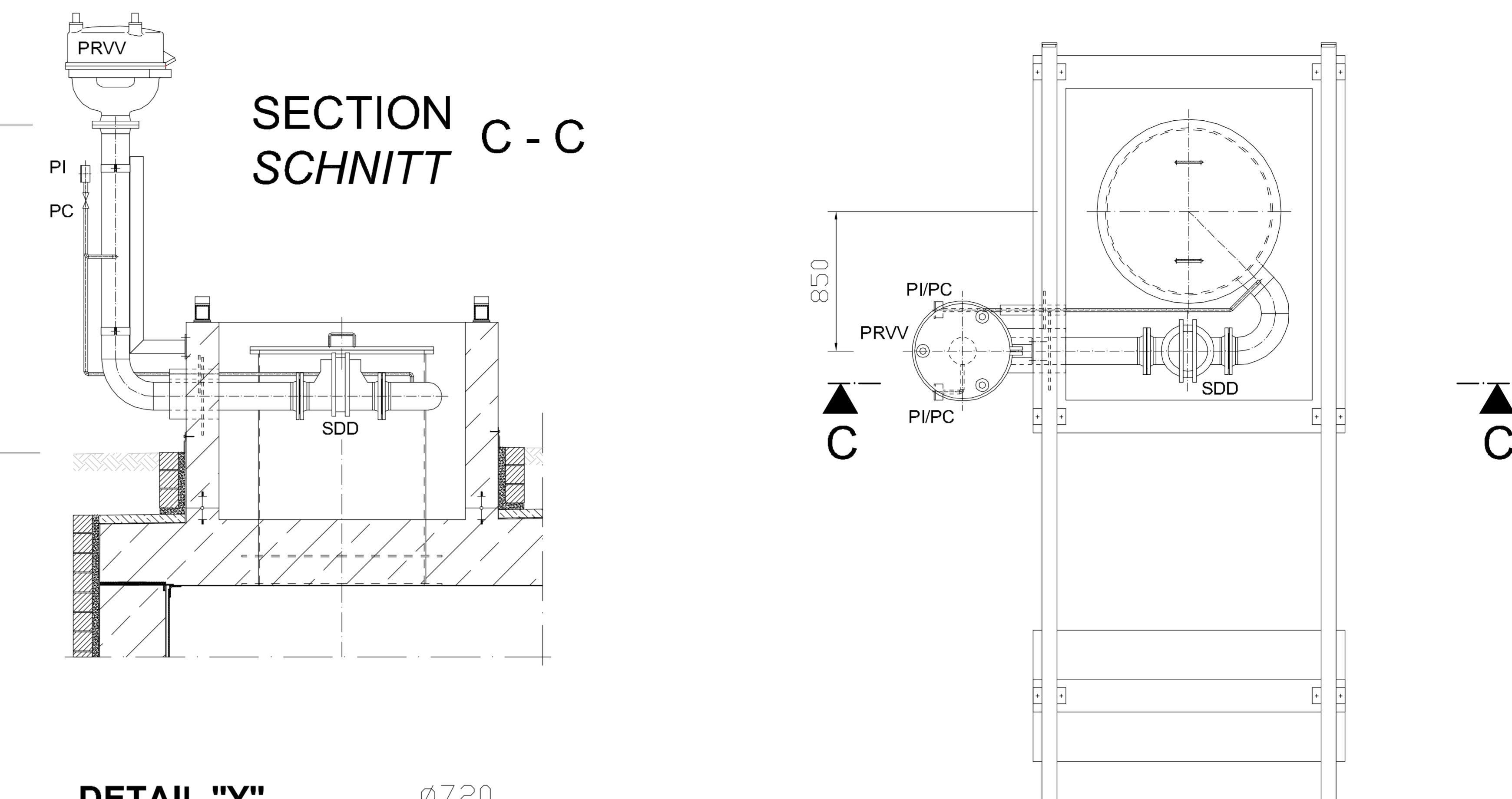


**SECTION B - B**  
**SCHNITT B - B**

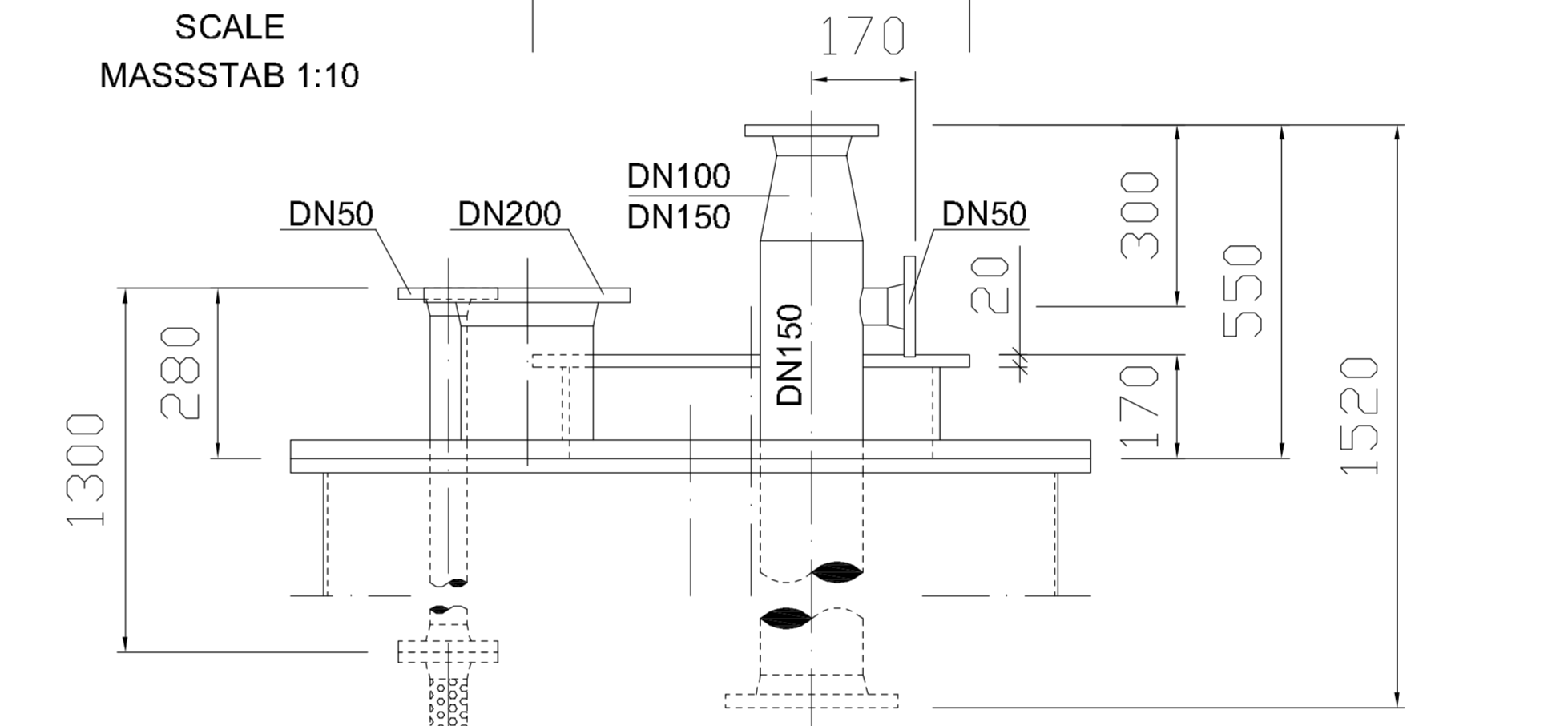


**MANHOLE WITH VENTILATING**  
**MONTAGEÖFFNUNG MIT ENTLÜFTUNG**

**SECTION C - C**  
**SCHNITT C - C**



**DETAIL "Y"**



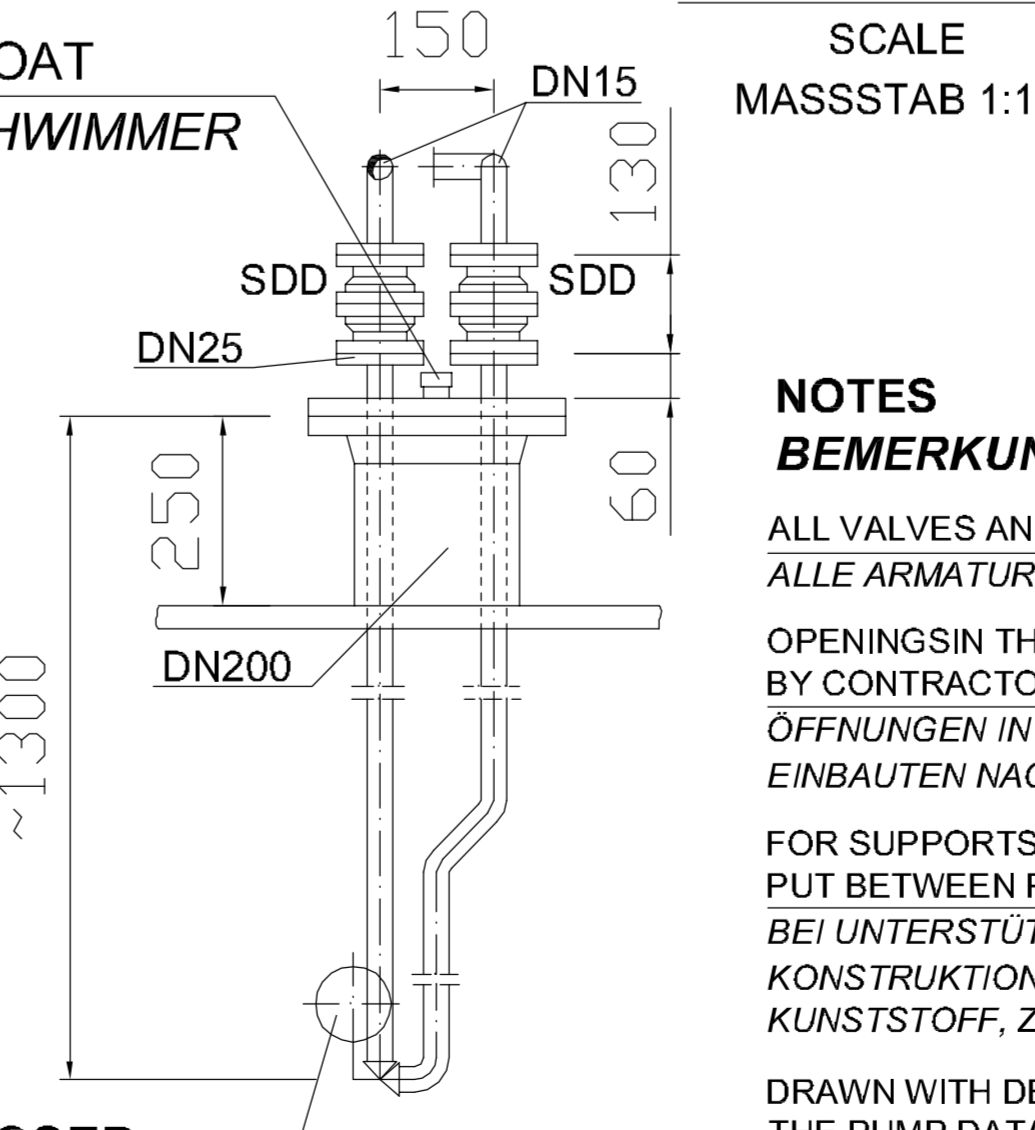
SOCKET DN50 FOR TEMPERATURE MEASURING  
STUTZEN DN50 FÜR TEMPERATURMESSUNG

SOCKET DN200 FOR CONTROLPIPE OF HIGH-LEVEL CONTROL VALVES  
STUTZEN DN200 FÜR STEUERLEITUNGEN DER ÜBERFÜLLSICHERUNG

PUMP SOCKET Ø 600  
PUMPENSTUTZEN Ø 600

SOCKET DN150/100 FOR GAUGING AND SAMPLING DEVICE  
STUTZEN DN150/100 FÜR PEIL- UND PROBEENTNAHMEROHR

**DETAIL "X"**



HANDTESTING FOR FLOAT  
HANDTESTER FÜR SCHWIMMER

**LEAKAGE CONTROL PIT**  
**LECKKONTROLLSCHACHT**

THE FLOAT OF THE HIGH-LEVEL CONTROL VALVE HAS TO BE INSTALLED IN THAT WAY THAT IN CASE OF A LIQUID LEVEL OF 230mm UNDER TANK ROOF THE HIGH-LEVEL CONTROL VALVE IS CLOSED  
DER SCHWIMMER DER ÜBERFÜLLSICHERUNG MUSS SO EINGEBAUT WERDEN, DASS BEI EINEM FLÜSSIGKEITSSTAND VON 230mm UNTER DER BEHÄLTERDECKE DIE ÜBERFÜLLSICHERUNG GESCHLOSSEN IST.

**LEGEND**  
**LEGENDE**

- GV GATE VALVE  
ABSPERRSCHIEBER
- LA LIQUID PROBE  
FLÜSSIGKEITSSONDE
- PC PRESSURE GAUGE STOPCOCK  
MANOMETER - ABSPERRVENTIL
- PI PRESSURE GAUGE  
MANOMETER
- PRVV PRESSURE RELIEF - VACUUM VALVE  
ÜBER - UNTERDRUCK MEMBRANVENTIL
- SDD SAFETY DEVICE AGAINST DETONATION DRY TYPE  
TROCEN - DETONATIONSSICHERUNG
- TP SUBMERSIBLE PUMP  
TAUCHPUMPE
- VL VENTILATOR  
VENTILATOR
- FUEL RESISTANT PLASTIC COATING / DISSIPATIVE (10<sup>-6</sup> S)  
KRAFTSTOFFBESTÄNDIGE KUNSTSTOFFBESCHICHTUNG / ABLEITFÄHIG (10<sup>-6</sup> S)

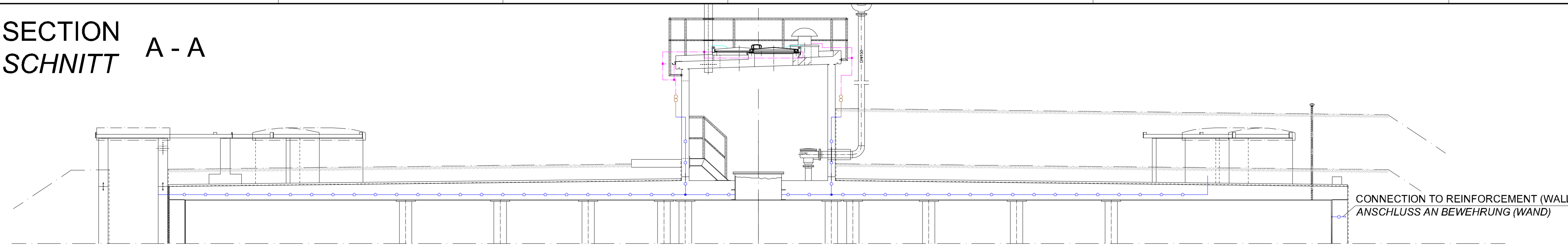
**PERTINENT DRAWINGS**  
**ZUGEHÖRIGE ZEICHNUNGEN**

M-1.1 MECHANICAL INSTALLATION  
MASCHINENTECHNISCHE INSTALLATION

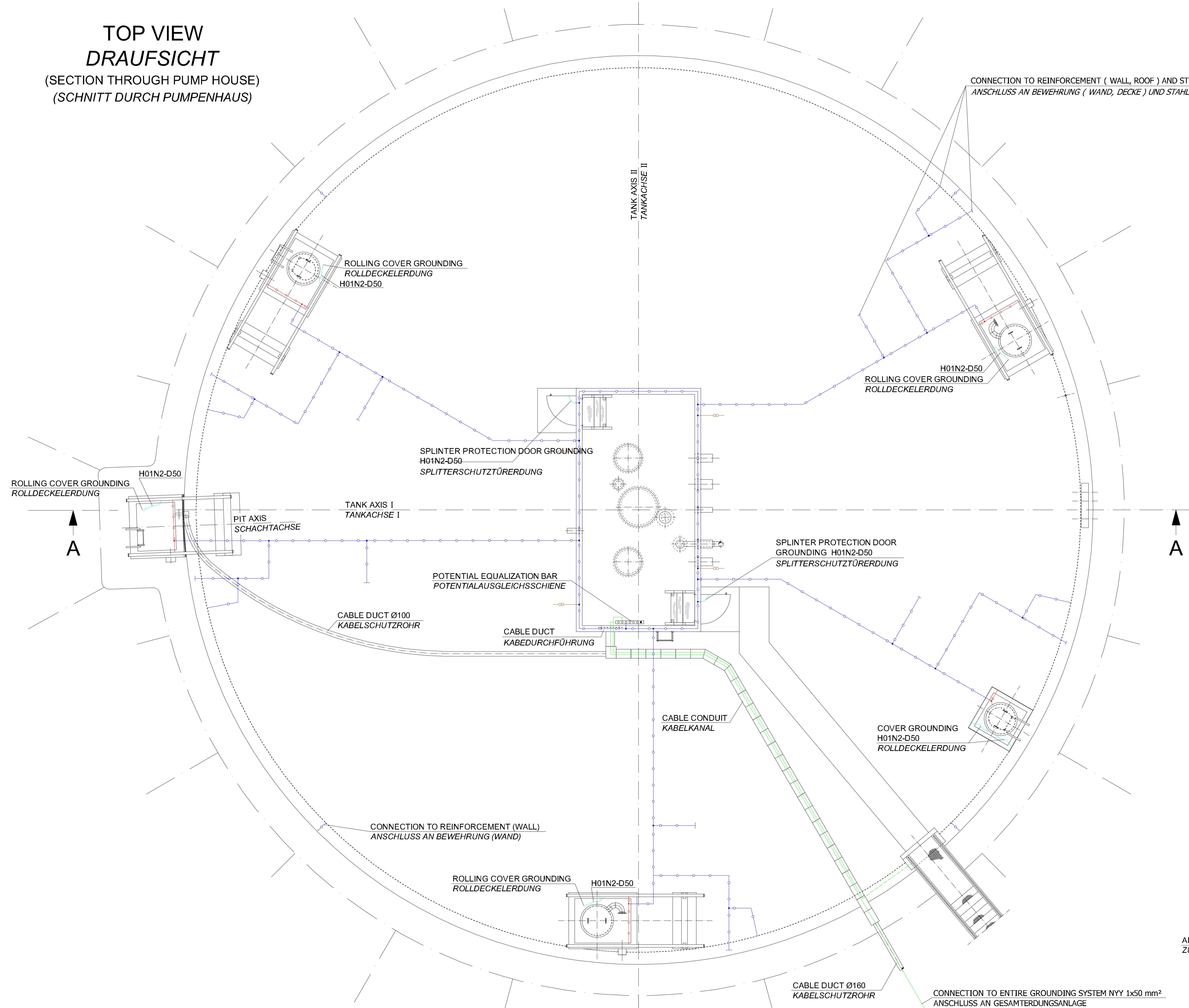
REVISION	DATE	DESCRIPTION	BY	COUNTRY
ÄNDERUNG	DATUM	BESCHREIBUNG	VON	LAND
<b>HEADQUARTERS</b>				
UNITED STATES AIR FORCES EUROPE				
ENGINEERING & OPERATIONS				
AIRFIELD STANDARD DESIGN US		FLUGPLATZ STANDARDPLANUNG US		
JET FUEL STORAGE AND DISPENSING SYSTEMS		FLUGKRAFTSTOFF - VERSORGSANLAGEN		
<b>BUILDING</b>				
OPERATING TANK 5000m <sup>3</sup> FLACHBODENTANK 5000m <sup>3</sup>				
DESIGNATOR: MECHANICAL INSTALLATION, LEAKAGE CONTROL PIT AND DETAILS MASCHINENTECHNISCHE INSTALLATION, LECKKONTROLLSCHACHT UND DETAILS				
WORKSHEET:  APPROVED/GENEHEBT				
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAU MASSNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED/GENEHEBT	DATE/DATUM	6. MAI 2015	SCALE/MASSSTAB	1:20 ; 1:10
ORIGINAL DRAWN BY/IN ORIGINAL ZEICHNUNG	DRAWN WITH DELIVERY PUMPS FOR HYDRANT REFUELING. FOR TANK TRUCK REFUELING THE PUMP DATA WILL BE CHANGED. GEZEICHNET MIT FÖRDERPUMPEN FÜR HYDRANTENBETANKUNG. BEI TKW - BEFÜLLUNG ÄNDERN SICH DIE PUMPENDATEN ENTSPRECHEND.			STANDARD SHEET/STANDARD PLAN
CONSTRUCTION PROJECT/BAU MASSNAHME				M - 1.2
				SHEET NO./PLATE NO. OF VOL.



SECTION  
SCHNITT A - A



TOP VIEW  
DRAUFSICHT  
(SECTION THROUGH PUMP HOUSE)  
(SCHNITT DURCH PUMPENHAUS)

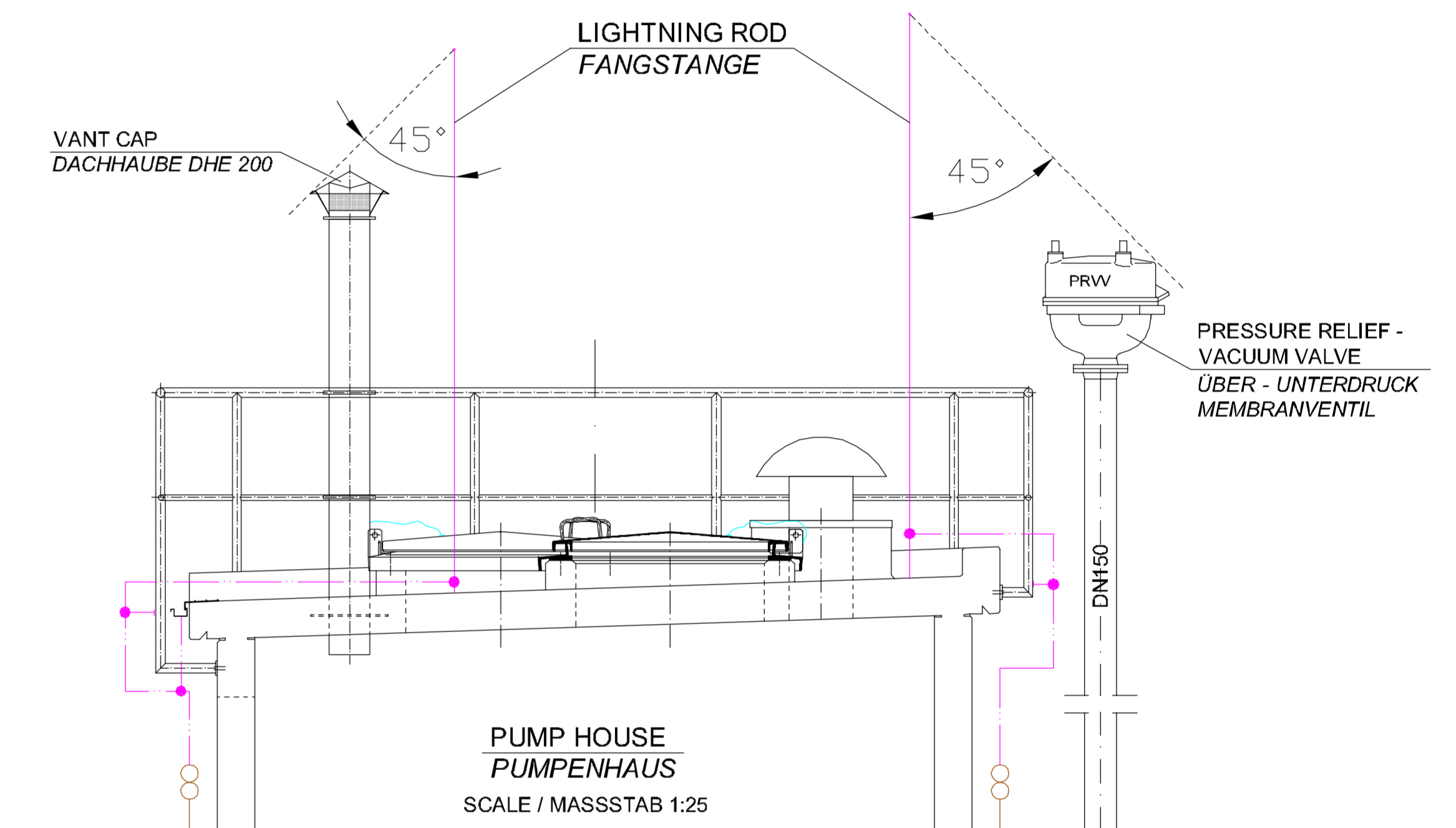


LEGEND  
LEGENDE

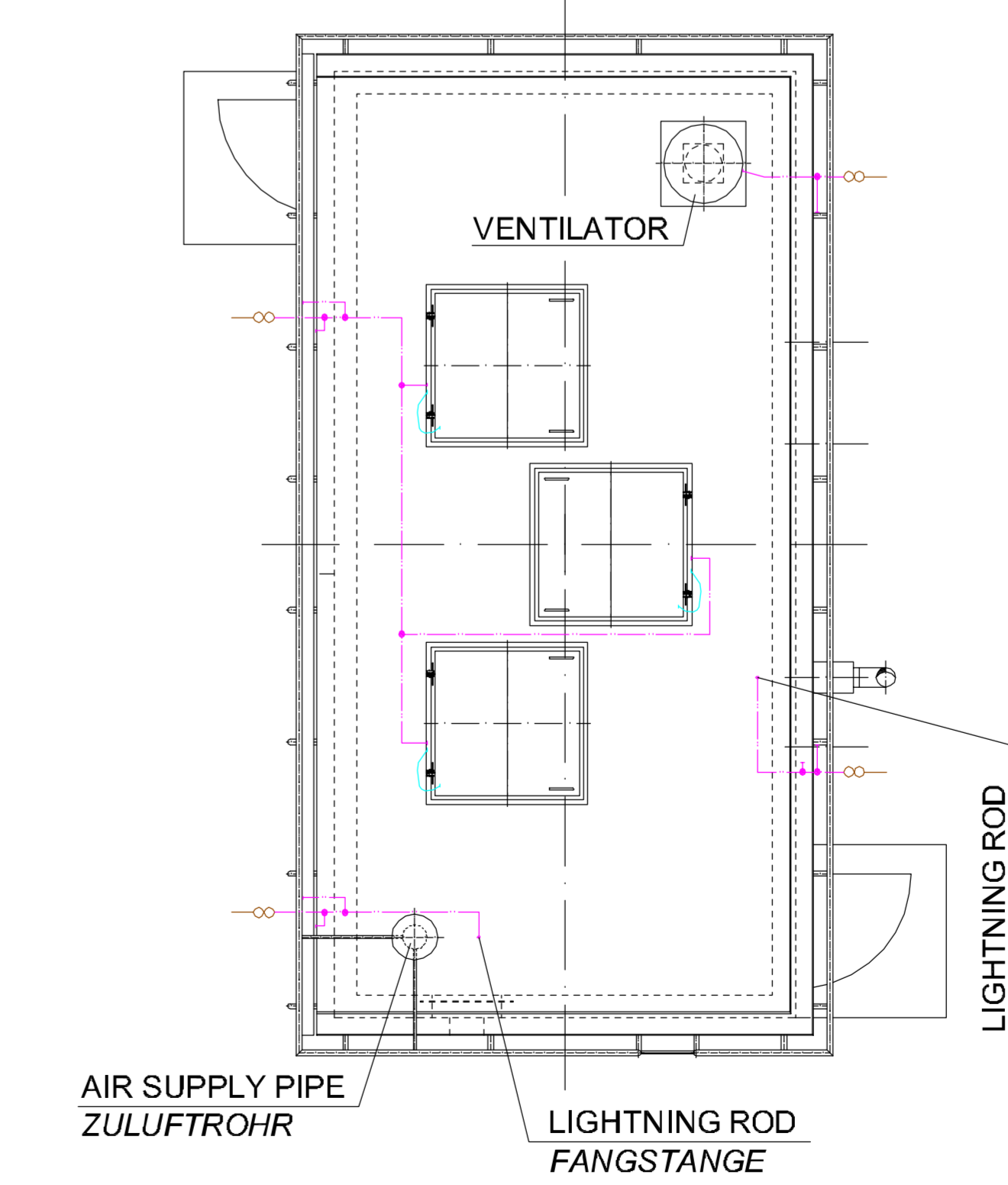
- DISCONNECTION POINT  
TRENNSTELLE
- STEEL STRIP 30 x 3.5mm IN CONCRETE  
(STAINLESS STEEL, MATERIAL NO. 1.457)  
BANDSTAHL 30 x 3,5mm IM BETON  
(EDELSTAHL, WERKSTOFF NR. 1.457)
- GALV. STEEL STRIP 30 x 3.5mm SURFACE - MOUNTED  
VERZ. BANDSTAHL 30 x 3,5mm AUF PUTZ
- GALV. ROUND STEEL Ø 8mm  
VERZ. RUNDSTAHL Ø 8mm
- NYY 1 x 50²
- H01N2 - D50

PERTINENT DRAWINGS  
ZUGEHÖRIGE ZEICHNUNGEN

- E-1.2 ELECTRICAL INSTALLATION, PUMP HOUSE AND LEAKAGE CONTROL PIT  
ELEKTROTECHNISCHE INSTALLATION, PUMPENHAUS UND  
LECKKONTROLLSCHACHT



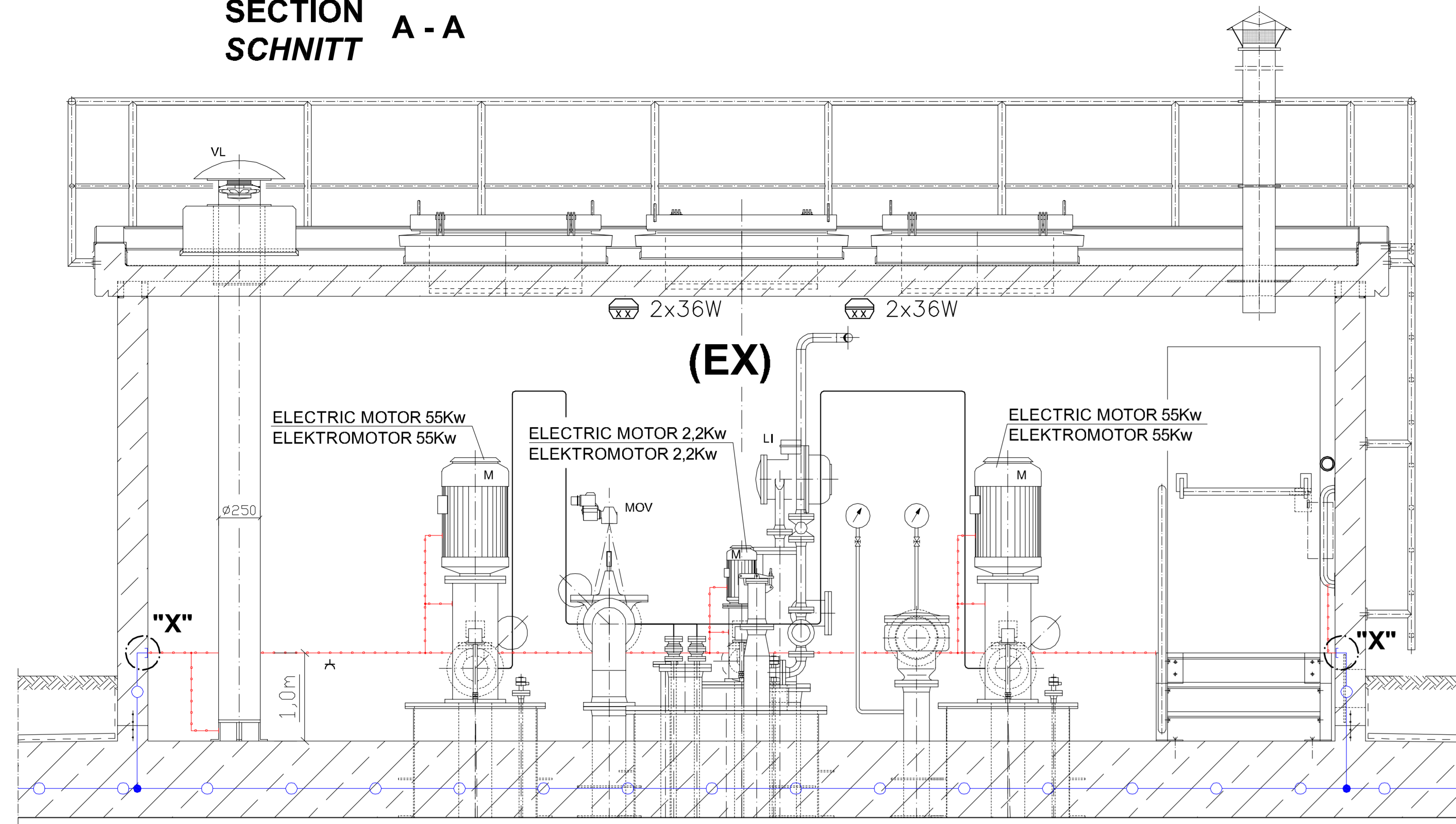
TOP VIEW  
DRAUFSICHT  
PUMP HOUSE  
PUMPENHAUS



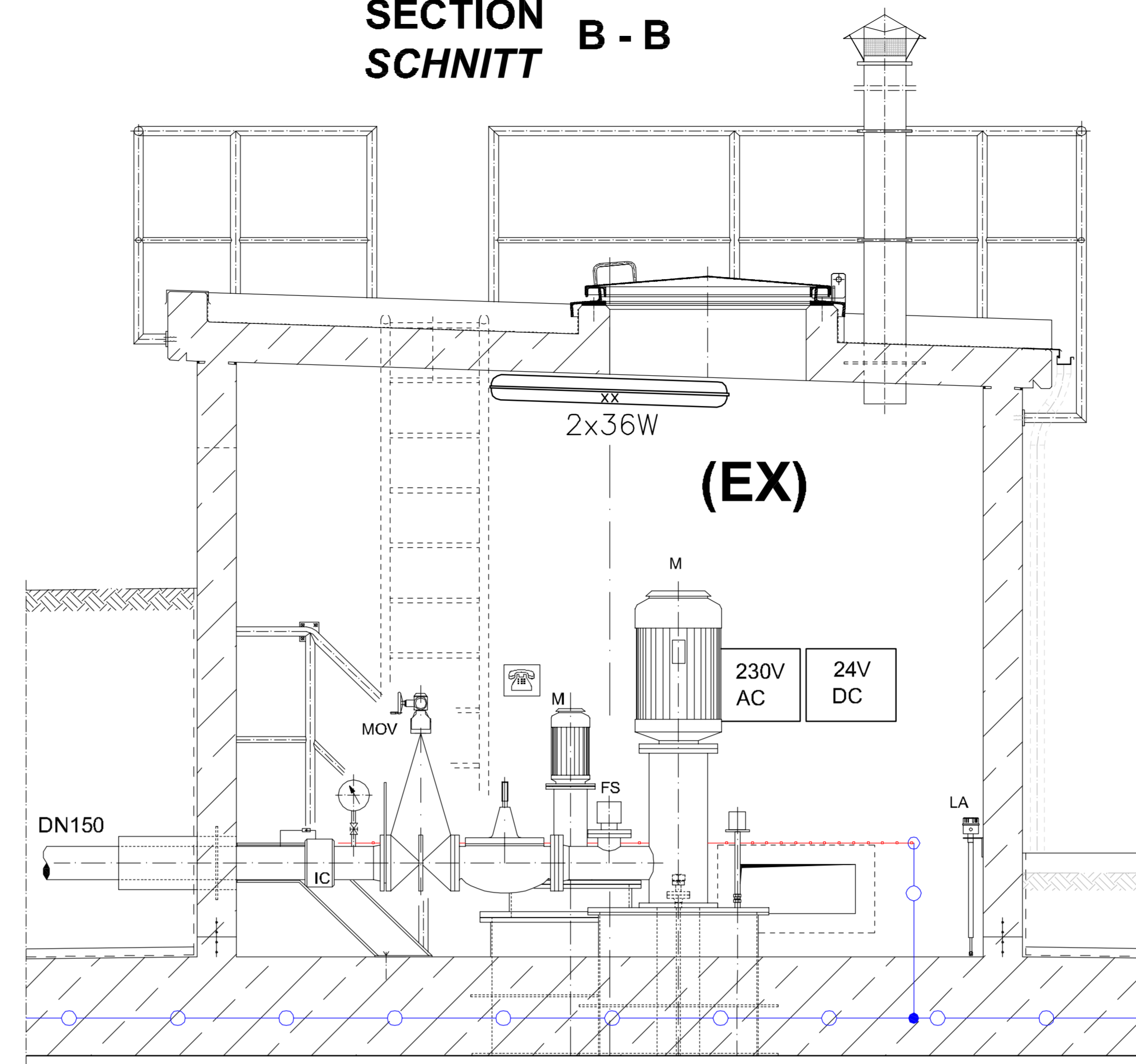
REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
HEADQUARTERS UNITED STATES AIR FORCES EUROPE				
ENGINEERING & OPERATIONS				
AIRFIELD STANDARD DESIGN US		FLUGPLATZ STANDARDPLANUNG US		
JET FUEL STORAGE AND DISPENSING SYSTEMS		FLUGKRAFTSTOFF - VERSORGNUNGSANLAGEN		
BUILDING BAUWERK OPERATING TANK 5000m³ FLACHBODENTANK 5000m³				
DESIGNATOR BEZÜGNUMM. GROUNDING - AND LIGHTNING PROTECTION PLAN ERDUNGS - UND BLITZSCHUTZPLAN				
WORKED/BEARBEITET		PREPARED/HERGESTELLT	APPROVED/GENEHMIGT	
		LANDSBEREITER LIEFERANTEN- UND BAUBETRIEB UND WERKSTÄTTEN L B B	AMT FÜR BUNDESBAU WALLSTR.1 55122 MAINZ	
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAUMASSNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED GENEHMIGT	DATE DATUM	SCALE MASSSTAB		1:50 / 1:25
ORIGINAL DRAWN BY IN ORIGINAL DED.	STANDARD SHEET STANDARD PLAN		E - 1.1	
CONSTRUCTION PROJECT BAUMASSNAHME			SHEET NO. PLATZNR.	OF VON



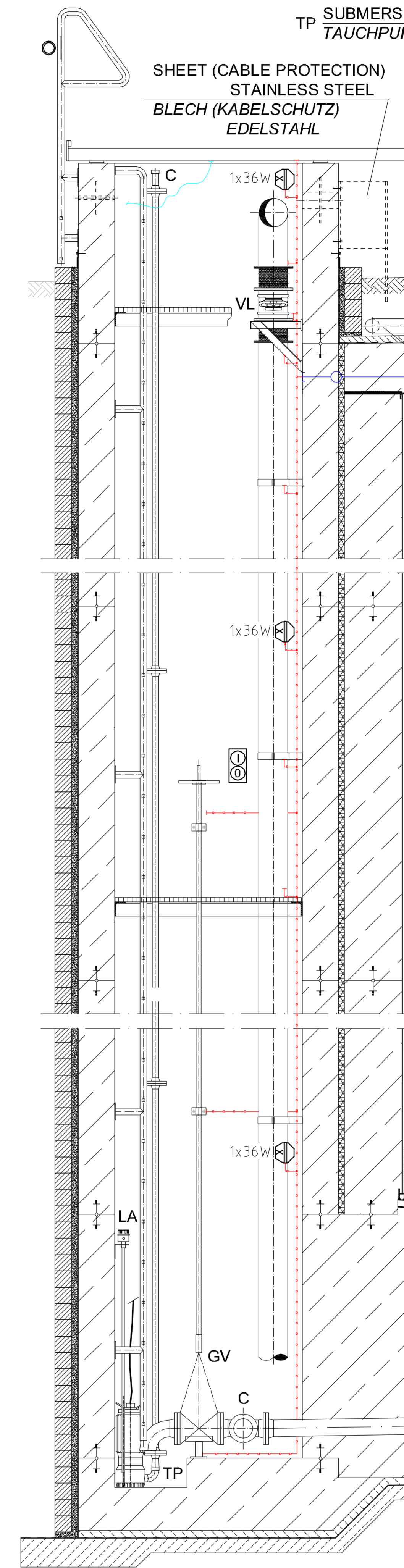
**SECTION A - A**  
**SCHNITT A - A**



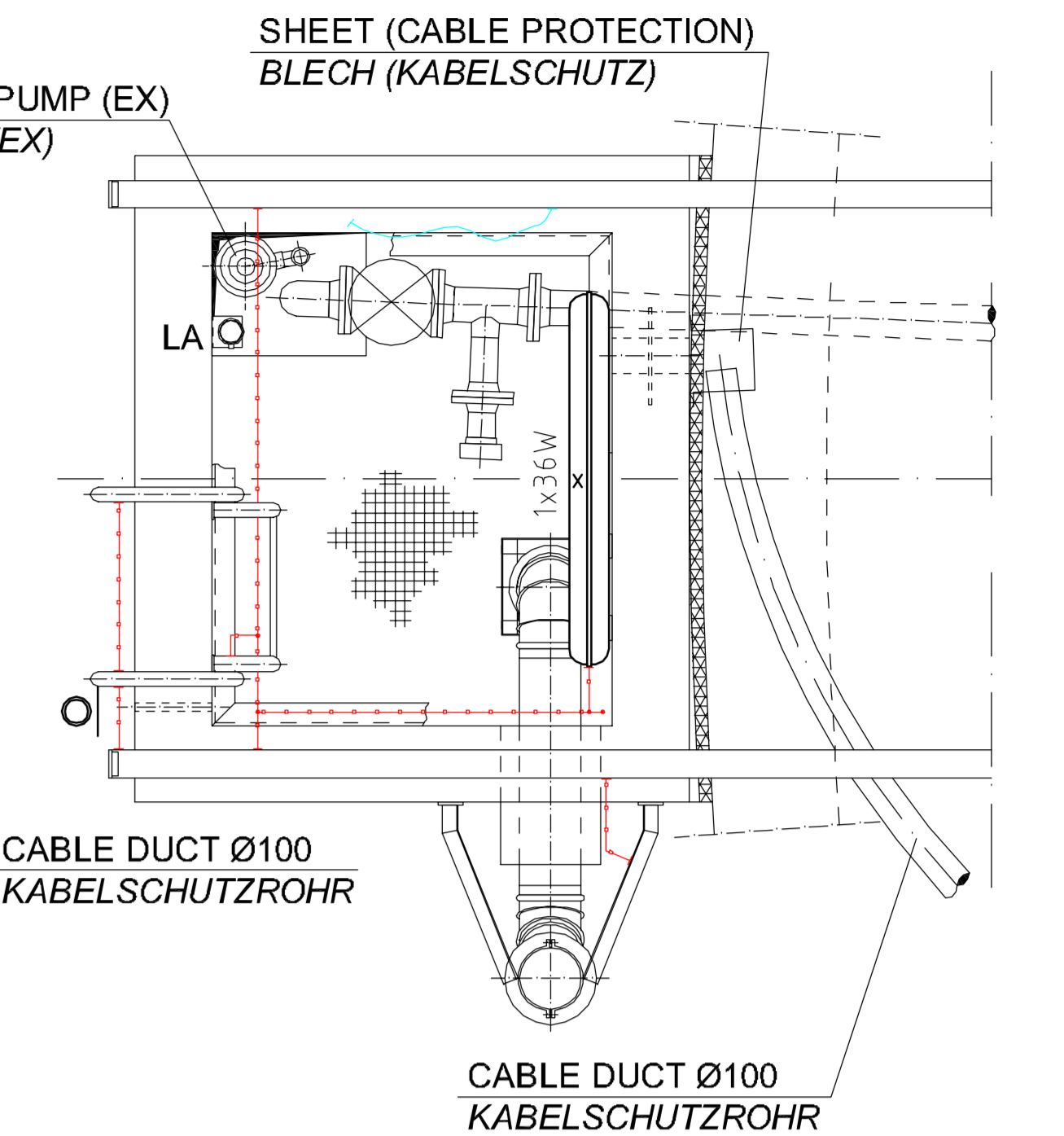
**SECTION B - B**  
**SCHNITT B - B**



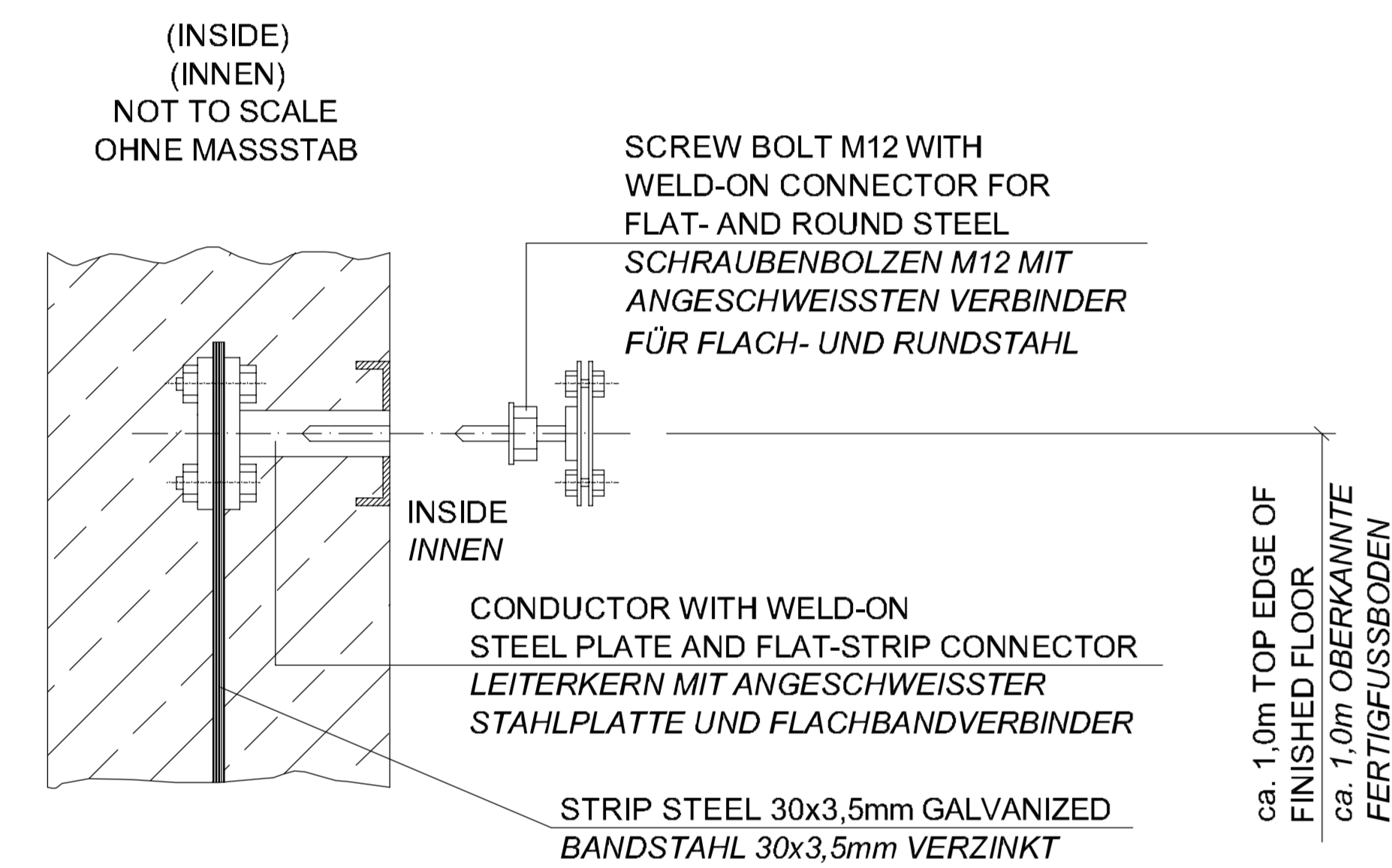
**SECTION THROUGH LEAKAGE CONTROL PIT**  
**SCHNITT DURCH LECKKONTROLLSCHACHT**



**TOP VIEW**  
**DRAUFSICHT**




**DETAIL "X"** **GROUNDING CONNECTION**  
**ERDUNGSANSCHLUSS**

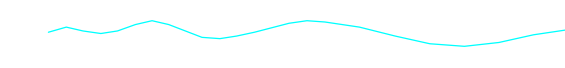


**LEGEND**  
**LEGENDE**

- BV BALL VALVE  
KUGELHAHN
- FS FLOW SWITCH  
STRÖMUNGSWÄCHTER
- IC ISULATING COUPLING  
ISOLIERKUPPLUNG
- LA LIQUID PROBE  
FLÜSSIGKEITSSONDE
- LI LEVEL INDICATOR  
FÜLLSTANDSANZEIGE
- M MOTOR  
MOTOR
- MOV GATE VALVE WITH MOTOR  
ABSPERRARMATUR MIT MOTORANTRIEB
- TP SUBMERSIBLE PUMP  
TAUCHPUMPE
- VL VENTILATOR  
VENTILATOR

 STEEL STRIP 30 x 3,5mm IN CONCRETE  
(STAINLESS STEEL, MATERIAL NO. 1.457)  
BANDSTAHL 30 x 3,5mm IM BETON  
(EDELSTAHL, WERKSTOFF NR. 1.457)

 GALV. STEEL STRIP 30 x 3,5mm SURFACE - MOUNTED  
VERZ. BANDSTAHL 30 x 3,5mm AUF PUTZ

 H01N2 - D50

 FLUORESCENT LAMP  
LEUCHTSTOFFLEUCHTE

 EXPL. PROOF SPARK GAP  
EX - FUNKENSTRECKE

 RECEPTACLE  
STECKDOSE

 SWITCH  
SCHALTER

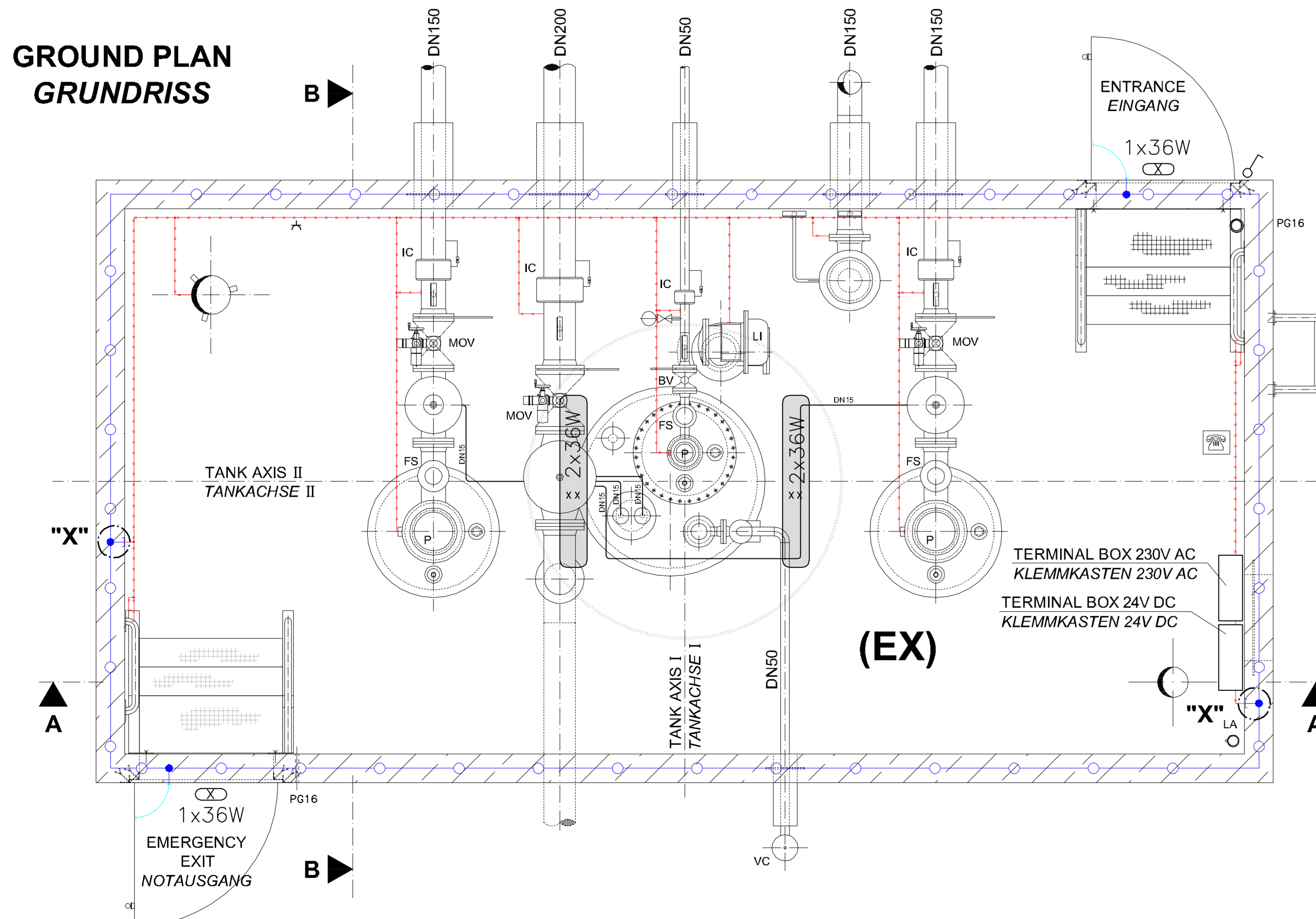
 PUSH BUTTON  
TASTER





 PTC THERMISTOR  
KALTLEITER

**GROUND PLAN**  
**GRUNDRISS**

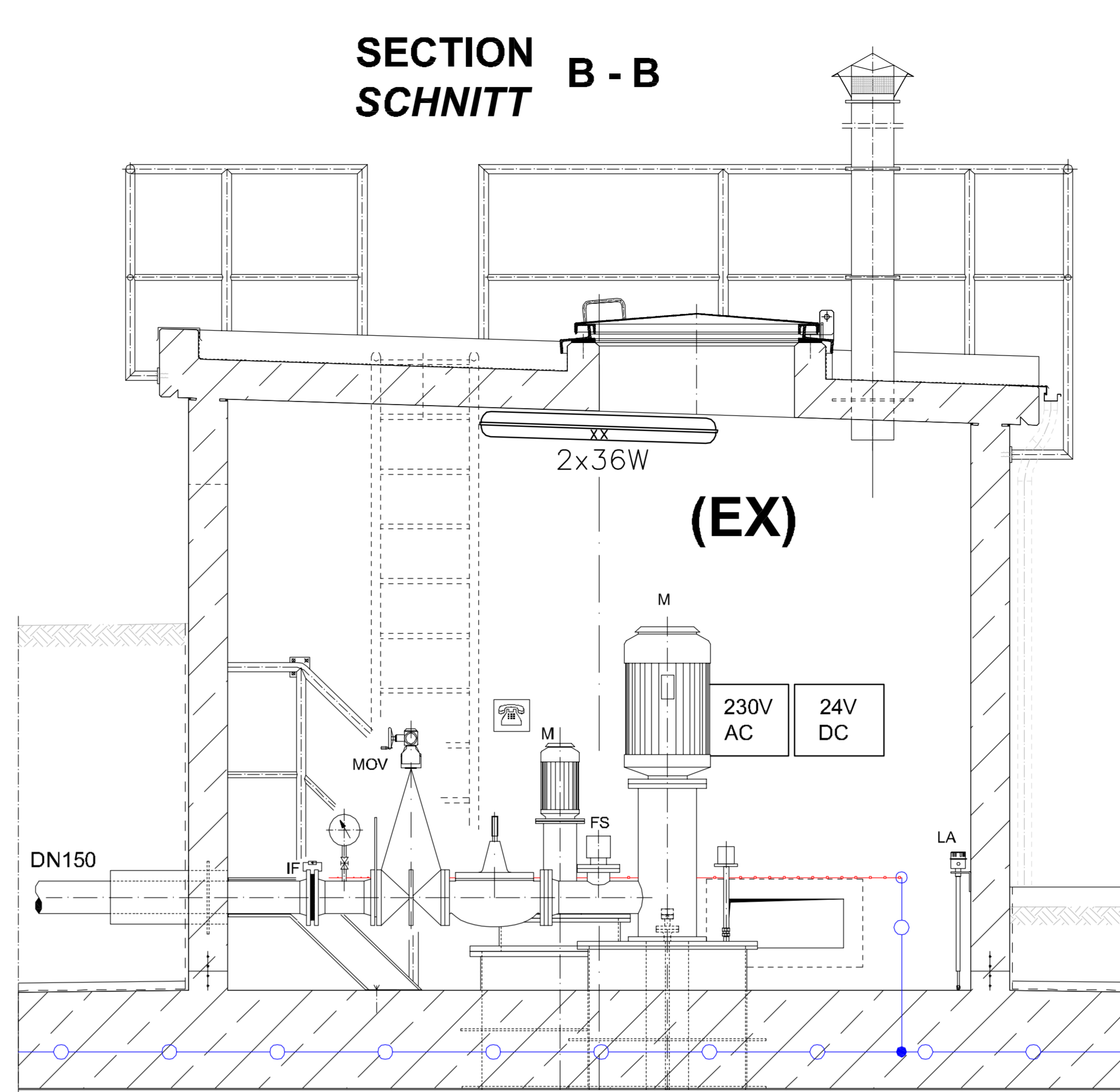
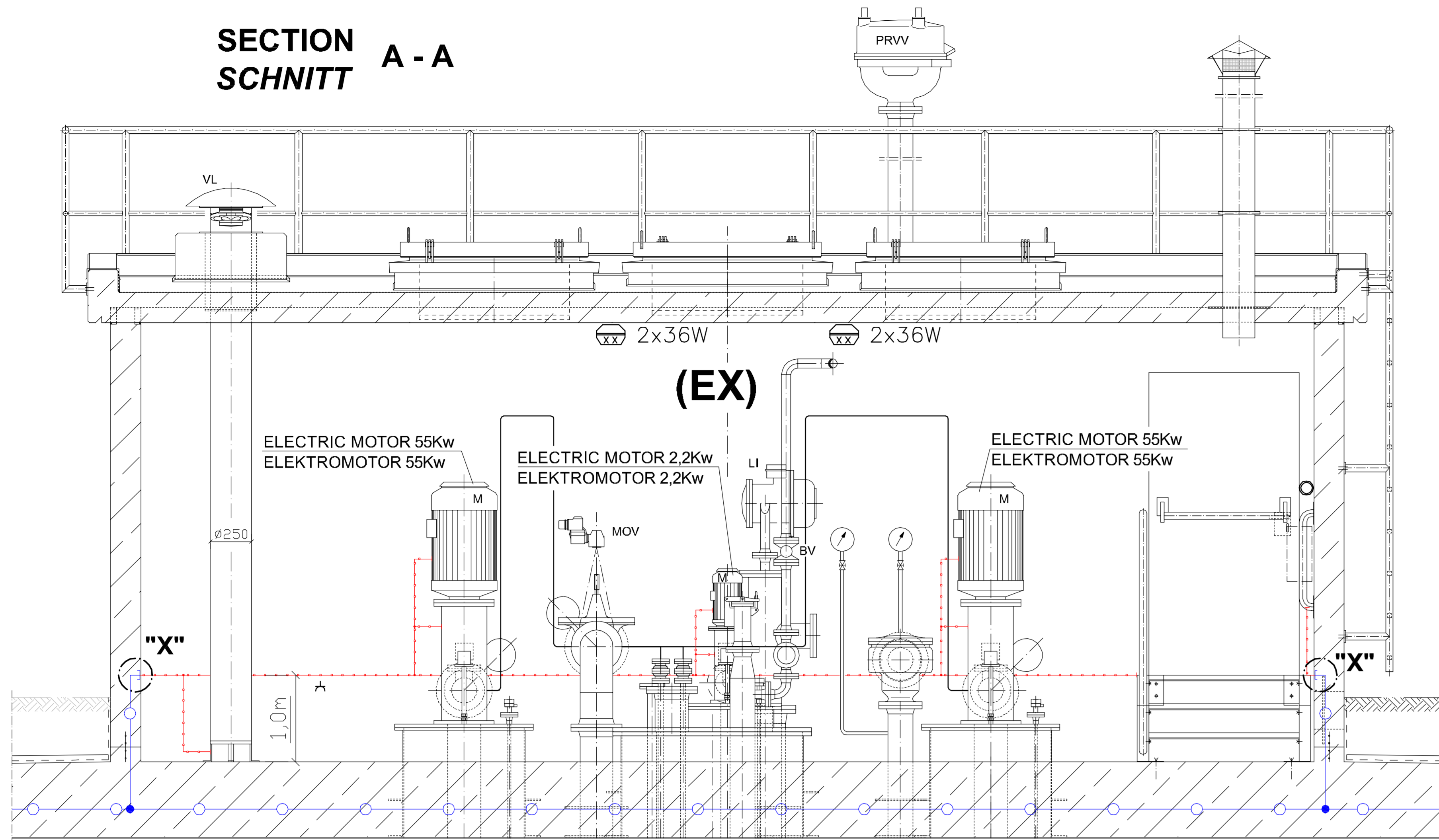


**PERTINENT DRAWINGS**  
**ZUGEHÖRIGE ZEICHNUNGEN**

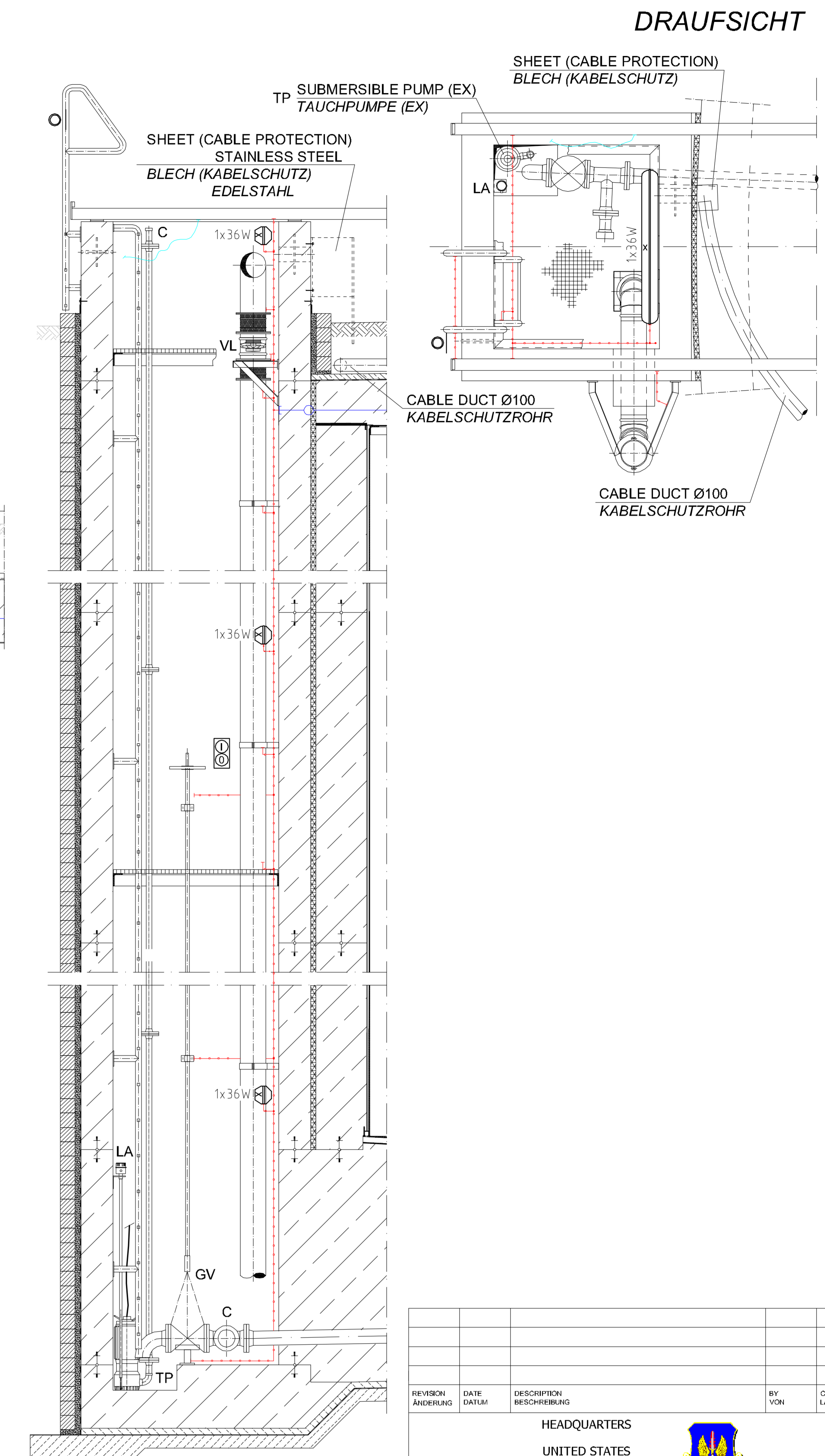
- E-1.1 GROUNDING - AND LIGHTNING PROTECTION PLAN  
ERDUNGS- UND BLITZSCHUTZPLAN
- E-1.3 ELECTRICAL DIAGRAMS, PUMP HOUSE  
AND LEAKAGE CONTROL PIT  
SCHALTPLÄNE, PUMPENHAUS  
UND LECKKONTROLLSCHACHT

REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
HEADQUARTERS UNITED STATES AIR FORCES EUROPE				
ENGINEERING & OPERATIONS				
AIRFIELD STANDARD DESIGN US		FLUGPLATZ STANDARDPLANUNG US		
JET FUEL STORAGE AND DISPENSING SYSTEMS		FLUGKRAFTSTOFF - VERSORGSANLAGEN		
BUILDING BAUWERK	OPERATING TANK 5000m³ FLACHBODENTANK 5000m³			
DRAWN BY ZEICHNER	WITH ISULATING COUPLING / MIT ISOLIERKUPPLUNG ELECTR. INSTALLATION, PUMP HOUSE A. LEAKAGE CONTROL PIT ELEKTR. INSTALLATION, PUMPENHAUS U. LECKKONTROLLSCHACHT			
WORKSHEET ARBEITSBLATT	PREPARED BY VON	DESIGNED BY GEZEIGNET VON	APPROVED BY GEBILDET VON	AMT FÜR BUNDESBAU WALLSTR.1 55122 MAINZ
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAUASSAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED GEBILDET	DATE DATUM	6. MAI 2015	SCALE MASSSTAB	1:50
ORIGINAL DRAWN BY URSPRÜNGLICH GEZEIGNET	DATE DATUM		STANDARD SHEET STANDARD PLAN	
DESIGNED BY GEZEIGNET VON	DATE DATUM		CAD-DRAWING PUBL. CAD-DRUCK	E - 1.2
CONSTRUCTION PROJECT BAUASSAHME				SHEET NO. BLATT NR.

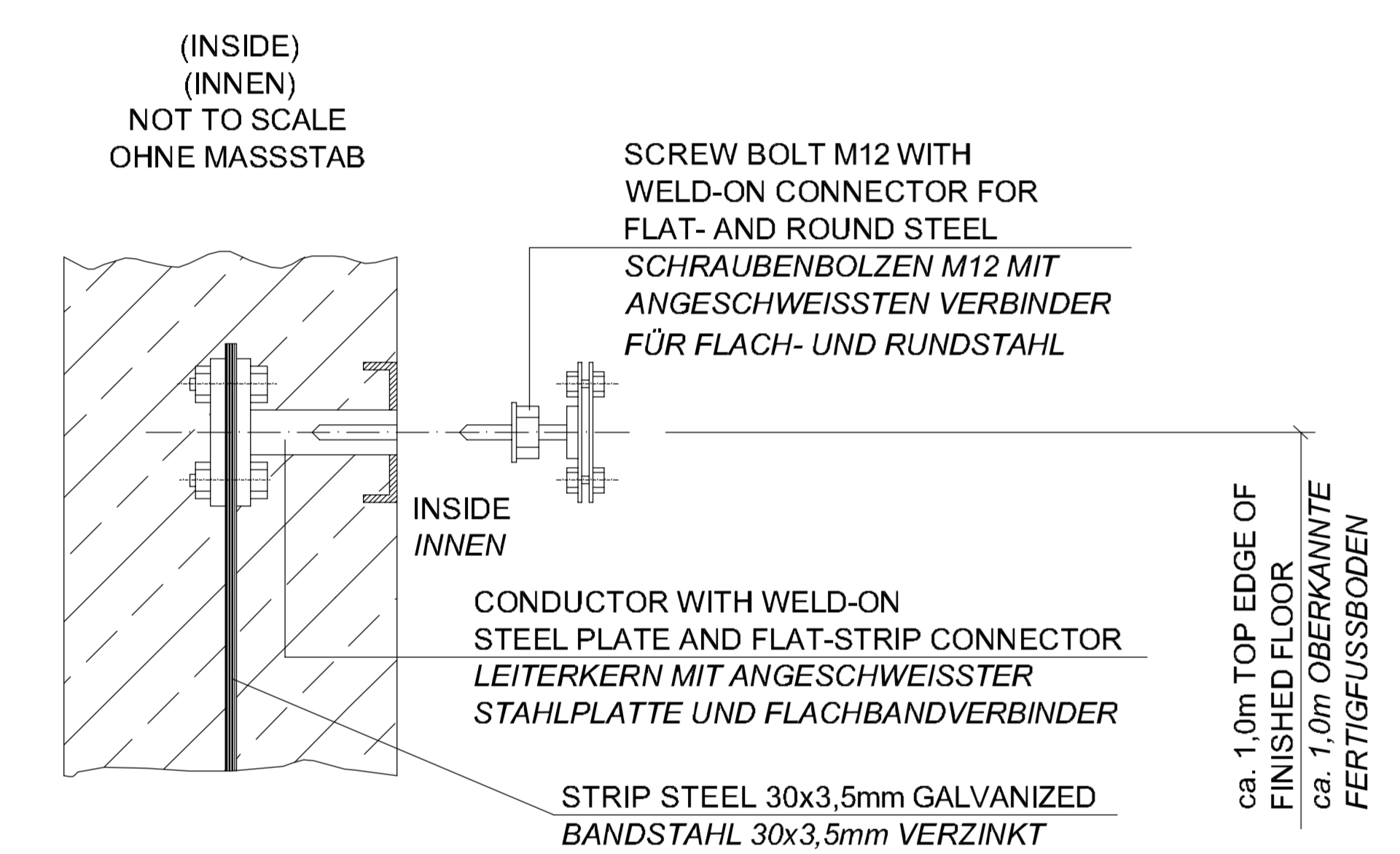




### SECTION THROUGH LEAKAGE CONTROL PIT SCHNITT DURCH LECKKONTROLLSCHACHT



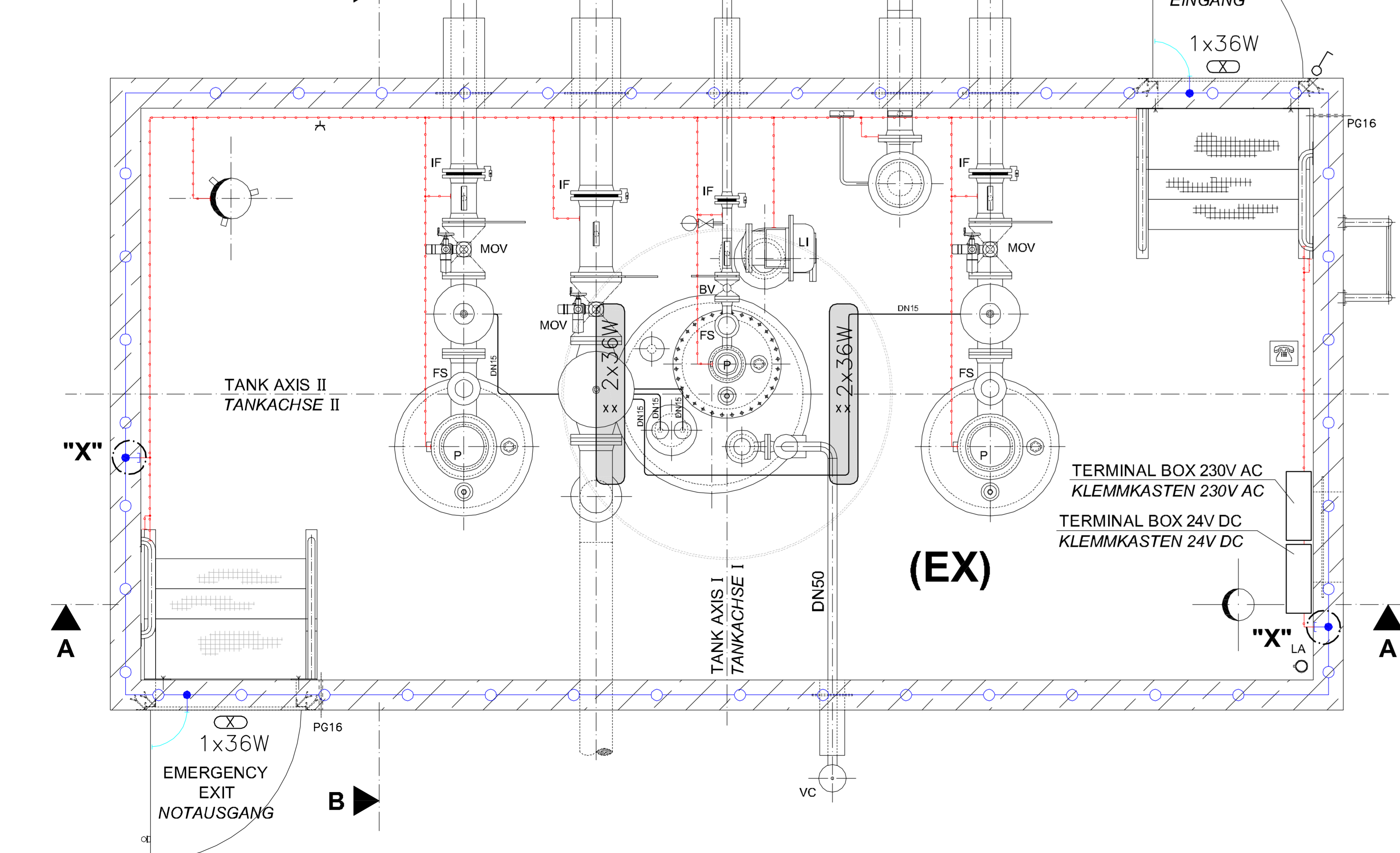
### DETAIL "X" GROUNDING CONNECTION ERDUNGSANSCHLUSS



### LEGEND LEGENDE

- BV BALL VALVE  
KUGELHAHN
- FS FLOW SWITCH  
STRÖMUNGSWÄCHTER
- IF ISULATING FLANGE  
ISOLIERFLANSCH
- LA LIQUID PROBE  
FLÜSSIGKEITSSONDE
- LI LEVEL INDICATOR  
FÜLLSTANDSANZEIGE
- M MOTOR  
MOTOR
- MOV GATE VALVE WITH MOTOR  
ABSPERRARMATUR MIT MOTORANTRIEB
- TP SUBMERSIBLE PUMP  
TAUCHPUMPE
- VL VENTILATOR  
VENTILATOR

### GROUND PLAN GRUNDRISS



- STEEL STRIP 30 x 3,5mm IN CONCRETE (STAINLESS STEEL, MATERIAL NO. 1.457)  
BANDSTAHL 30 x 3,5mm IM BETON (EDELSTAHL, WERKSTOFF NR. 1.457)
- GALV. STEEL STRIP 30 x 3,5mm SURFACE - MOUNTED  
VERZ. BANDSTAHL 30 x 3,5mm AUF PUTZ
- H01N2 - D50
- FLUORESCENT LAMP  
LEUCHTSTOFFLEUCHE
- EXPL. PROOF SPARK GAP  
EX- FUNKENSTRECKE
- RECEPTACLE  
STECKDOSE
- SWITCH  
SCHALTER
- PUSH BUTTON  
TASTER
- PTC THERMISTOR  
KALTLEITER

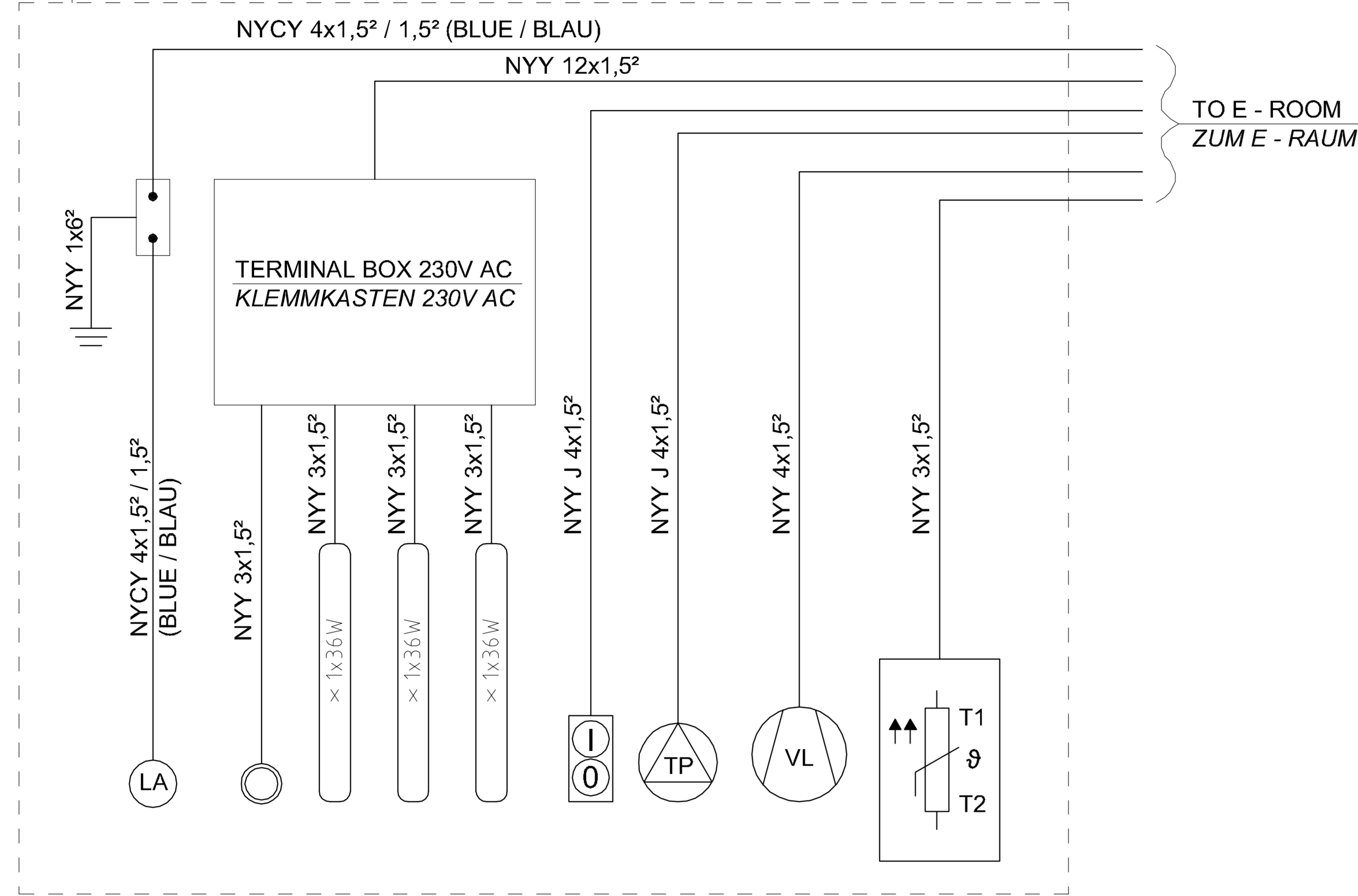
### PERTINENT DRAWINGS ZUGEHÖRIGE ZEICHNUNGEN

- E-1.1 GROUNDING - AND LIGHTNING PROTECTION PLAN  
ERDUNGS - UND BLITZSCHUTZPLAN
- E-1.3 ELECTRICAL DIAGRAMS, PUMP HOUSE AND LEAKAGE CONTROL PIT  
SCHALTPLÄNE, PUMPENHAUS UND LECKKONTROLLSCHACHT

REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND		
HEADQUARTERS UNITED STATES AIR FORCES EUROPE ENGINEERING & OPERATIONS						
AIRFIELD STANDARD DESIGN US		FLUGPLATZ STANDARDPLANUNG US				
JET FUEL STORAGE AND DISPENSING SYSTEMS		FLUGKRAFTSTOFF - VERSORGSANLAGEN				
OPERATING TANK 5000m <sup>3</sup> FLACHBODENTANK 5000m <sup>3</sup>						
WITH ISULATING FLANGE / MIT ISOLIERFLANSCH ELECTR. INSTALLATION, PUMP HOUSE A. LEAKAGE CONTROL PIT ELEKTR. INSTALLATION, PUMPENHAUS U. LECKKONTROLLSCHACHT						
<table border="1" style="width: 100%;"> <tr> <td>PREPARED/BEREITET LANDSCHAFTS- UND BAUEINGENIEUR LAW-REGISTERED ARCHITECT AMBERGSTR. 101/101A D-56122 STRAßENKREUZUNG</td> <td>APPROVED/GEHEBET AMT FÜR BUNDESBAU WALLSTR.1 56122 MAINZ ORIGINAL SIGNED BY: 10.08.2015</td> </tr> </table>					PREPARED/BEREITET LANDSCHAFTS- UND BAUEINGENIEUR LAW-REGISTERED ARCHITECT AMBERGSTR. 101/101A D-56122 STRAßENKREUZUNG	APPROVED/GEHEBET AMT FÜR BUNDESBAU WALLSTR.1 56122 MAINZ ORIGINAL SIGNED BY: 10.08.2015
PREPARED/BEREITET LANDSCHAFTS- UND BAUEINGENIEUR LAW-REGISTERED ARCHITECT AMBERGSTR. 101/101A D-56122 STRAßENKREUZUNG	APPROVED/GEHEBET AMT FÜR BUNDESBAU WALLSTR.1 56122 MAINZ ORIGINAL SIGNED BY: 10.08.2015					
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAUMASSNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)						
APPROVED GEHEBET	DATE DATUM	6. MAI 2015	SCALE MASSSTAB	1:50		
ORIGINAL SIGNED BY IN ORIGINAL DED.			STANDARD SHEET STANDARD PLAN	E - 1.2		
CONSTRUCTION PROJECT BAUMASSNAHME			CAD-PROGRAMME	SHEET NO. PLATZNR.		



**LEAKAGE CONTROL PIT  
LECKKONTROLLSCHACHT**



**LEGEND  
LEGENDE**

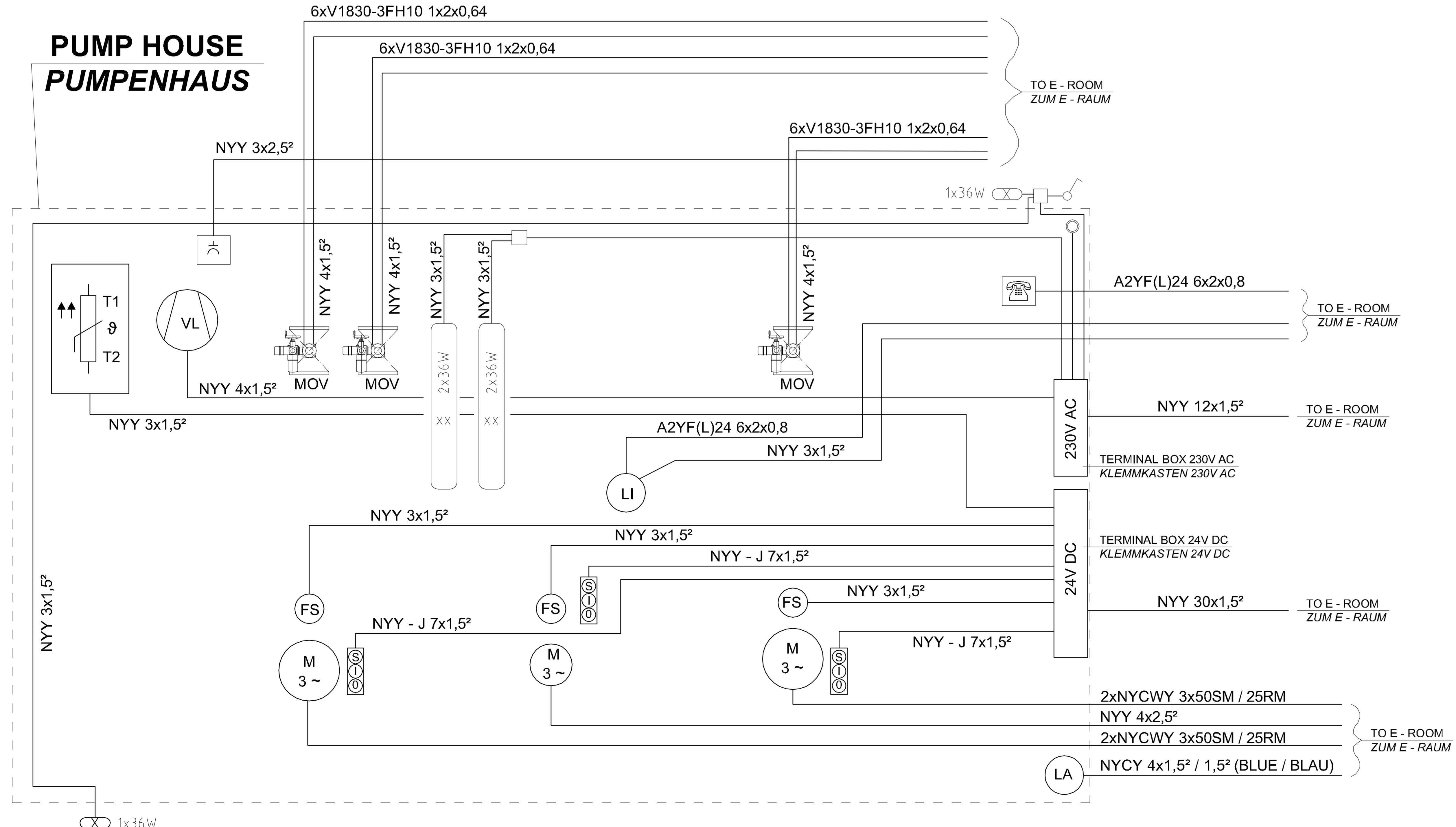
- FS FLOW SWITCH  
STRÖMUNGSWÄCHTER
- IC ISULATING COUPLING  
ISOLIERKUPPLUNG
- LA LIQUID PROBE  
FLÜSSIGKEITSSONDE
- LI LEVEL INDICATOR  
FÜLLSTANDSANZEIGE
- M MOTOR  
MOTOR
- MOV GATE VALVE WITH MOTOR  
ABSPERRARMATUR MIT MOTORANTRIEB
- TP SUBMERSIBLE PUMP  
TAUCHPUMPE
- VL VENTILATOR  
VENTILATOR

- FLUORESCENT LAMP  
LEUCHTSTOFFLEUCHTE
- EXPL. PROOF SPARK GAP  
EX- FUNKENSTRECKE
- RECEPTACLE  
STECKDOSE
- SWITCH  
SCHALTER
- PUSH BUTTON  
TASTER
- PTC THERMISTOR  
KALTLEITER

**PERTINENT DRAWINGS  
ZUGEHÖRIGE ZEICHNUNGEN**

- E-1.1 GROUNDING - AND LIGHTNING PROTECTION PLAN  
ERDUNGS - UND BLITZSCHUTZPLAN
- E-1.2 ELECTR. INSTALLATION, PUMP HOUSE A. LEAKAGE CONTROL  
ELEKTR. INSTALLATION, PUMPENHAUS U. LECKKONTROLLSCHACHT

**PUMP HOUSE  
PUMPENHAUS**



REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
<b>HEADQUARTERS</b> UNITED STATES AIR FORCES EUROPE ENGINEERING & OPERATIONS				
AIRFIELD STANDARD DESIGN US JET FUEL STORAGE AND DISPENSING SYSTEMS		FLUGPLATZ STANDARDPLANUNG US FLUGKRAFTSTOFF - VERSORGNUNGSANLAGEN		
<b>BUILDING BAUWERK</b> OPERATING TANK 5000m³ FLACHBODENTANK 5000m³				
<b>DESIGNATOR BEZEICHNUNG</b> ELECTRICAL DIAGRAMS, PUMP HOUSE A. LEAKAGE CONTROL PIT SCHALTPLÄNE, PUMPENHAUS U. LECKKONTROLLSCHACHT				
<b>WORKED/REARBEITET</b> LANDBETRIEB LIEGENSCHAFTS- UND BAUVERTRÄGE LAN-WERKSTÄTTEN LAN-BAU AMBUSHPT, UNTERSTANZPLATZ 1, MAIN LAN-BAU TELEFON, SIGNAL UND FÜR TELEFON (SIGNAL) LAN-BAU LAND-BAU BY PRODUZ. IN ÜBERSETZUNG ORIGINAL: 02/2012 IN ÜBERSETZUNG: 02/2012 STRICH: 02/2012		<b>APPROVED/GENEHMIGT</b> AMT FÜR BUNDESBAU WALTSTR.1 55122 MAINZ ORIGINAL: 02/2012 IN ÜBERSETZUNG: 02/2012		
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAU MASSNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
<b>APPROVED GENEHMIGT</b>	<b>DATE DATUM</b> 6. MAI 2015	<b>SCALE MASSSTAB</b> 1:50	<b>STANDARD SHEET STANDARD PLAN</b>	
<b>CONSTRUCTION PROJECT BAU MASSNAHME</b>		<b>SHEET NO. BLATT NR.</b> E - 1.3		



**OPERATING TANK 2500m<sup>3</sup>**  
**FLACHBODENTANK 2500m<sup>3</sup>**

**2**

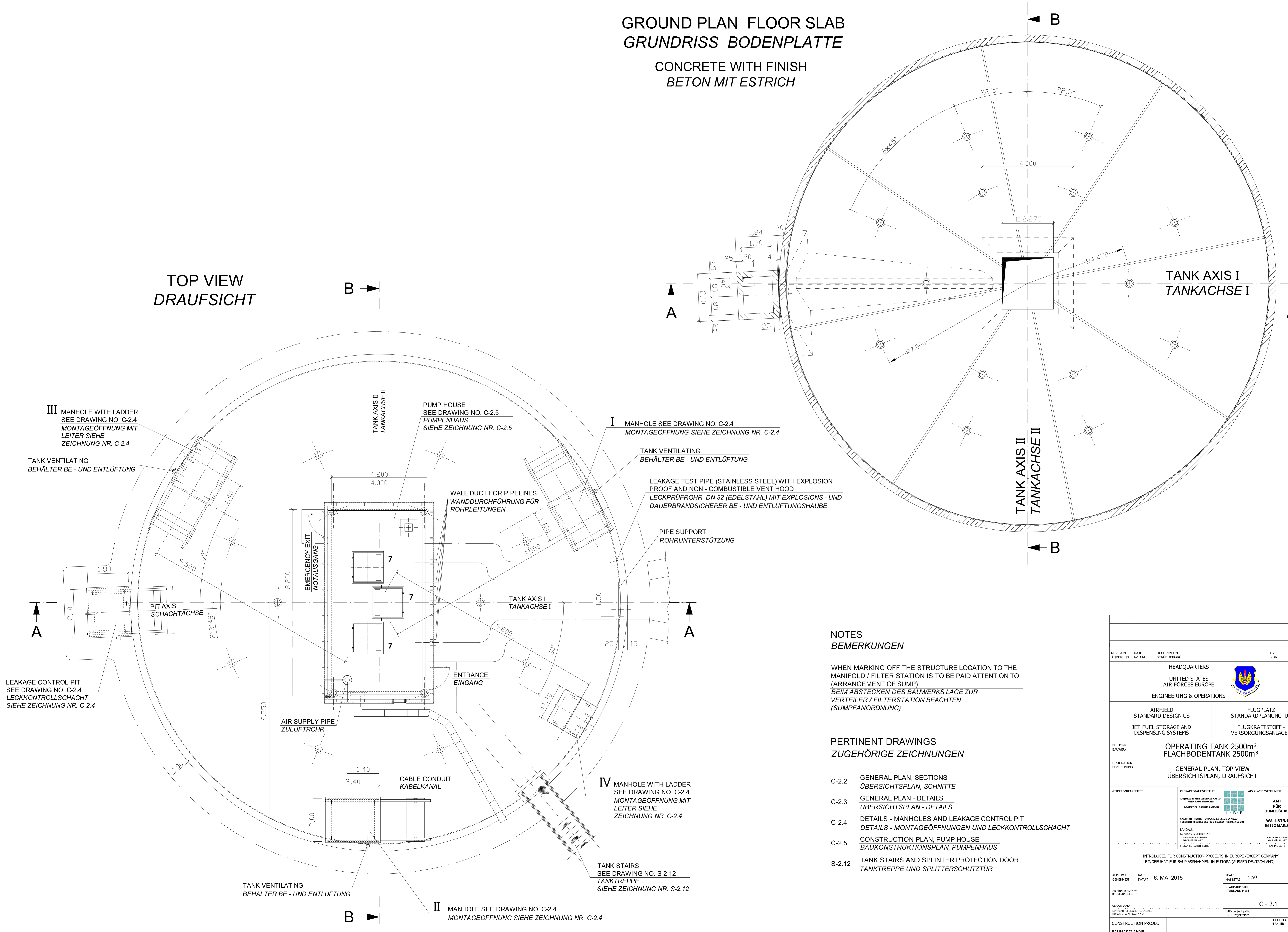
- C-2.1** GENERAL PLAN, TOP VIEW  
*ÜBERSICHTSPLAN, DRAUFSICHT*
- C-2.2** GENERAL PLAN, SECTIONS  
*ÜBERSICHTSPLAN, SCHNITTE*
- C-2.3** GENERAL PLAN, DETAILS  
*ÜBERSICHTSPLAN, DETAILS*
- C-2.3.1** GENERAL PLAN, DETAILS  
*ÜBERSICHTSPLAN, DETAILS*
- C-2.3.2** HINGED COVER  
*KLAPPDECKEL*
- C-2.4** DETAILS-MANHOLES AND LEAKAGE CONTROL PIT  
*DETAILS-MONTAGEÖFFNUNGEN UND LECKKONTROLLSCHACHT*
- C-2.5** CONSTRUCTION PLAN, PUMP HOUSE  
*BAUKONSTRUKTIONSPLAN, PUMPENHAUS*
- C-2.6** FORMWORK PLAN, PUMP HOUSE, ROOF AND WALLS  
*SCHALPLAN, PUMPENHAUS, DECKE UND WÄNDE*
- C-2.7** FORMWORK PLAN, PUMP HOUSE, SLAB AND WALL  
*SCHALPLAN, PUMPENHAUS, BODENPLATTE UND WAND*
- C-2.8** FORMWORK PLAN, ROOF SLAB  
*SCHALPLAN, DECKENPLATTE*
- C-2.9** FORMWORK PLAN, DETAILS ROOF- AND FLOOR SLAB  
*SCHALPLAN, DETAILS DECKEN- UND BODENPLATTE*
- S-2.1** COVERS, MANHOLES AND LEAKAGE CONTROL PIT  
*ABDECKUNGEN, FÜR MONTAGEÖFFNUNGEN UND LECKKONTROLLSCHACHT*
- S-2.10** STEEL TANK  
*STAHLTANK*
- S-2.11** DETAILS, STEEL TANK  
*DETAILS, STAHLTANK*
- S-2.12** TANK STAIRS AND SPLINTER PROTECTION DOORS  
*TANKTREPPE UND SPLITTERSCHUTZTÜREN*
- M-2.1** MECHANICAL INSTALLATION  
*MASCHINENTECHNISCH INSTALLATION*
- M-2.2** MECH. INSTALL. LEAKAGE CONTROL PIT AND DETAILS  
*MASCH. INSTALL. LECKKONTROLLSCHACHT U. DETAILS*
- E-2.1** GROUNDING- AND LIGHTNING PROTECTION PLAN  
*ERDUNGS- UND BLITZSCHUTZPLAN*
- E-2.2** ELEC. INSTALL. PUMP HOUSE A. LEAKAGE CONTROL PIT  
*ELEK. INST. PUMPENHAUS U. LECKKONTROLLSCHACHT*
- E-2.3** ELEC. DIAGRAMS PUMP HOUSE A. LEAKAGE CONTROL PIT  
*SCHALTPLÄNE PUMPENHAUS U. LECKKONTROLLSCHACHT*



**GROUND PLAN FLOOR SLAB  
GRUNDRISS BODENPLATTE**

CONCRETE WITH FINISH  
BETON MIT ESTRICH

**TOP VIEW  
DRAUFSICHT**



**NOTES  
BEMERKUNGEN**

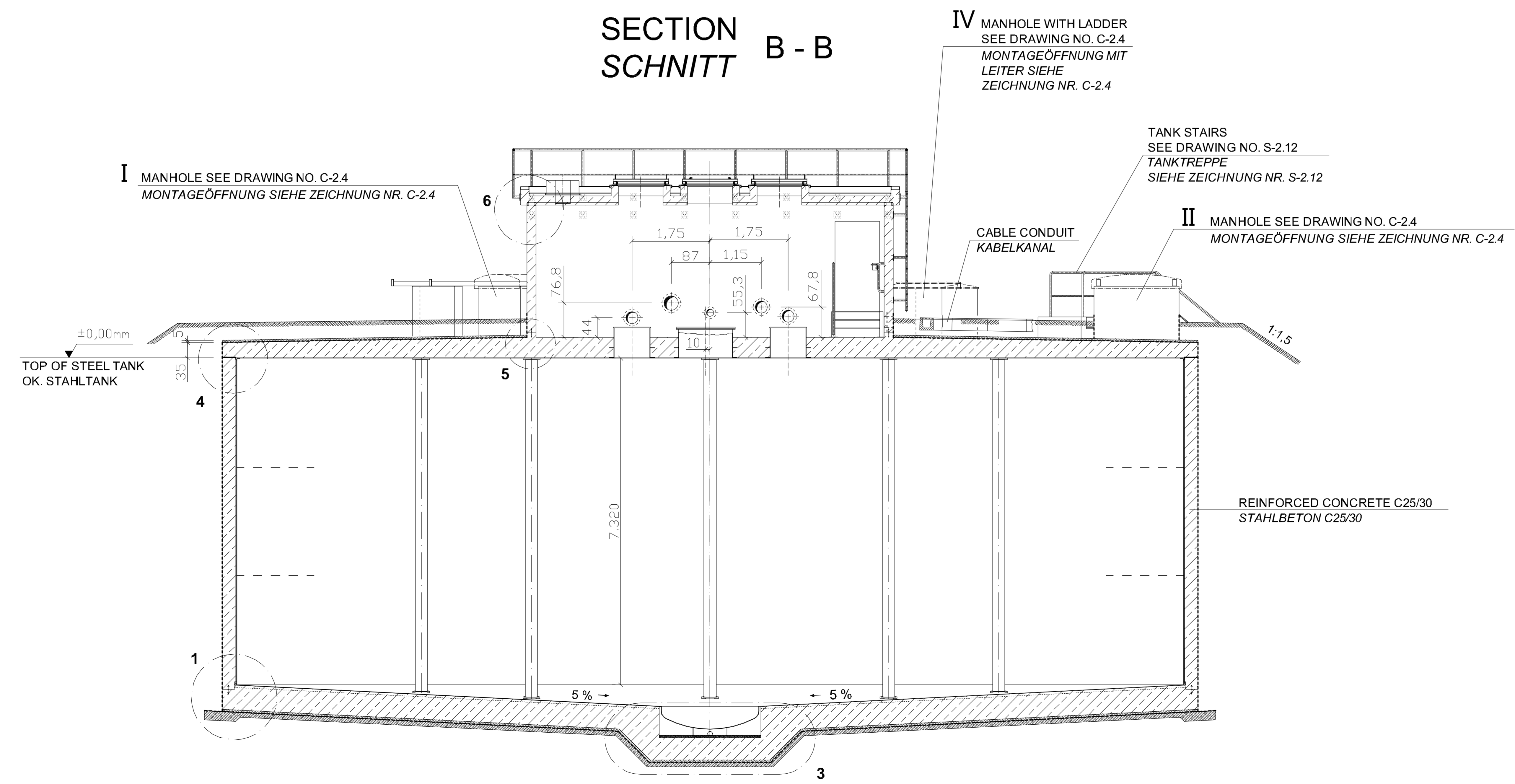
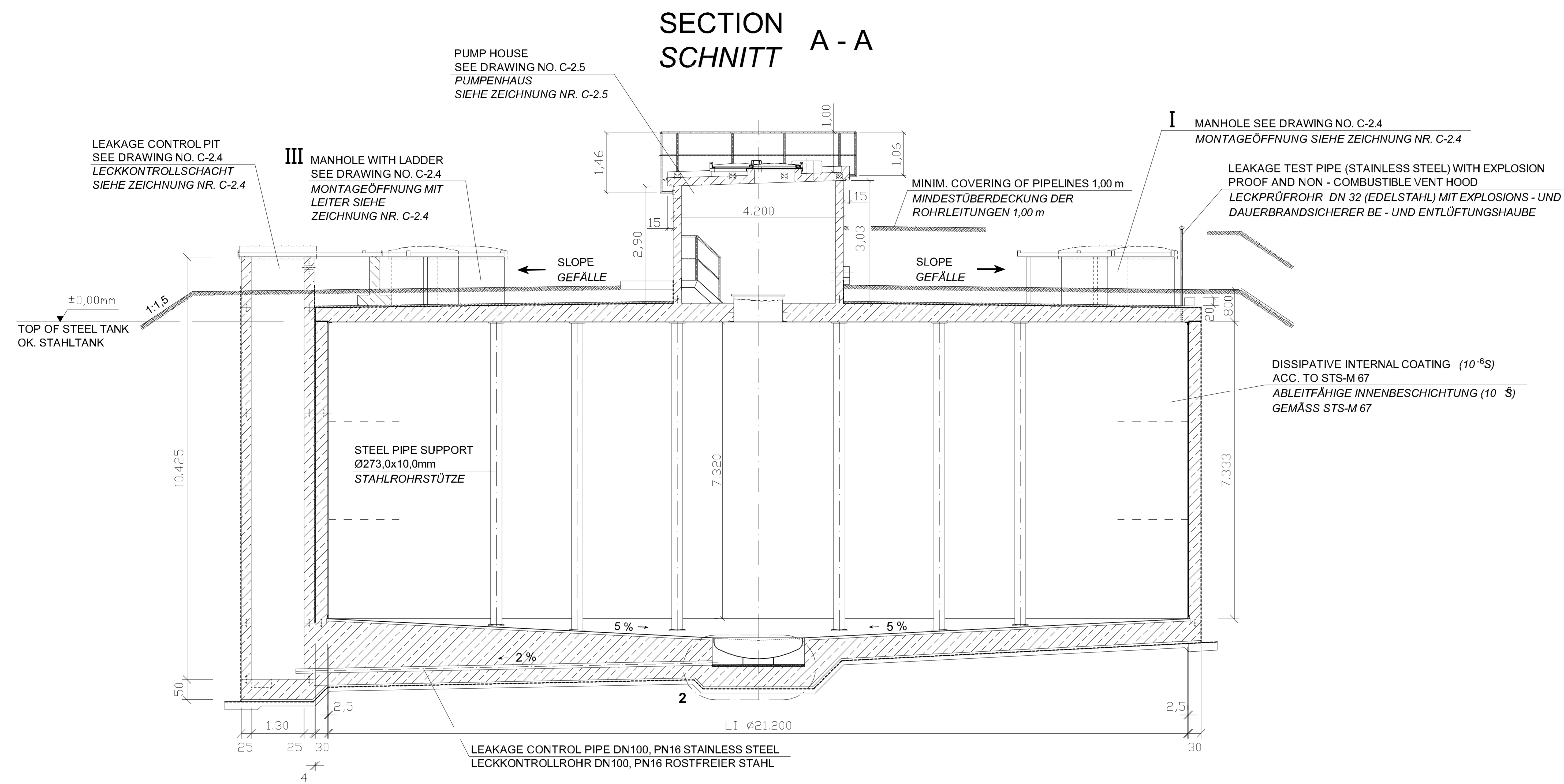
WHEN MARKING OFF THE STRUCTURE LOCATION TO THE MANIFOLD / FILTER STATION IS TO BE PAID ATTENTION TO (ARRANGEMENT OF SUMP)  
BEIM ABSTECKEN DES BAUWERKS LAGE ZUR VERTEILER / FILTERSTATION BEACHTEN (SUMPANORDNUNG)

**PERTINENT DRAWINGS  
ZUGEHÖRIGE ZEICHNUNGEN**

- C-2.2 GENERAL PLAN, SECTIONS  
ÜBERSICHTSPLAN, SCHNITTE
- C-2.3 GENERAL PLAN - DETAILS  
ÜBERSICHTSPLAN - DETAILS
- C-2.4 DETAILS - MANHOLES AND LEAKAGE CONTROL PIT  
DETAILS - MONTAGEÖFFNUNGEN UND LECKKONTROLLSCHACHT
- C-2.5 CONSTRUCTION PLAN, PUMP HOUSE  
BAUKONSTRUKTIONSPLAN, PUMPENHAUS
- S-2.12 TANK STAIRS AND SPLINTER PROTECTION DOOR  
TANKTREPPPE UND SPLITTERSCHUTZTÜR

REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
<b>HEADQUARTERS</b>				
UNITED STATES AIR FORCES EUROPE				
<b>ENGINEERING &amp; OPERATIONS</b>				
AIRFIELD STANDARD DESIGN US		FLUGPLATZ STANDARDPLANUNG US		
JET FUEL STORAGE AND DISPENSING SYSTEMS		FLUGKRAFTSTOFF - VERSORGNUNGSANLAGEN		
<b>BUILDING BAUWERK</b>				
<b>OPERATING TANK 2500m<sup>3</sup> FLACHBODENTANK 2500m<sup>3</sup></b>				
<b>DESIGNATOR BEZEICHNUNG</b>				
<b>GENERAL PLAN, TOP VIEW ÜBERSICHTSPLAN, DRAUFSICHT</b>				
WORKED/REARBEITET		PREPARED/AUFGESTELLT	APPROVED/GENEHMIGT	
			<b>AMT FÜR BUNDESSBAU</b>	
LANDMIL.		WALLSTR.1 56122 MAINZ		ORIGINAL SIGNED BY IN ORIGINAL DED.
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAUMASSNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED GENEHMIGT	DATE DATUM	6. MAI 2015		SCALE MASSSTAB
ORIGINAL DRAWN BY IN ORIGINAL DED.				1:50
GENERAL INFO CORPORAL FACILITIES ENGINEER PLANNING AND DESIGN UNIT			STANDARD SHEET STANDARD PLAN	
			<b>C - 2.1</b>	
CONSTRUCTION PROJECT BAUMASSNAHME				SHEET NO. PLATZNR.
				OF VON





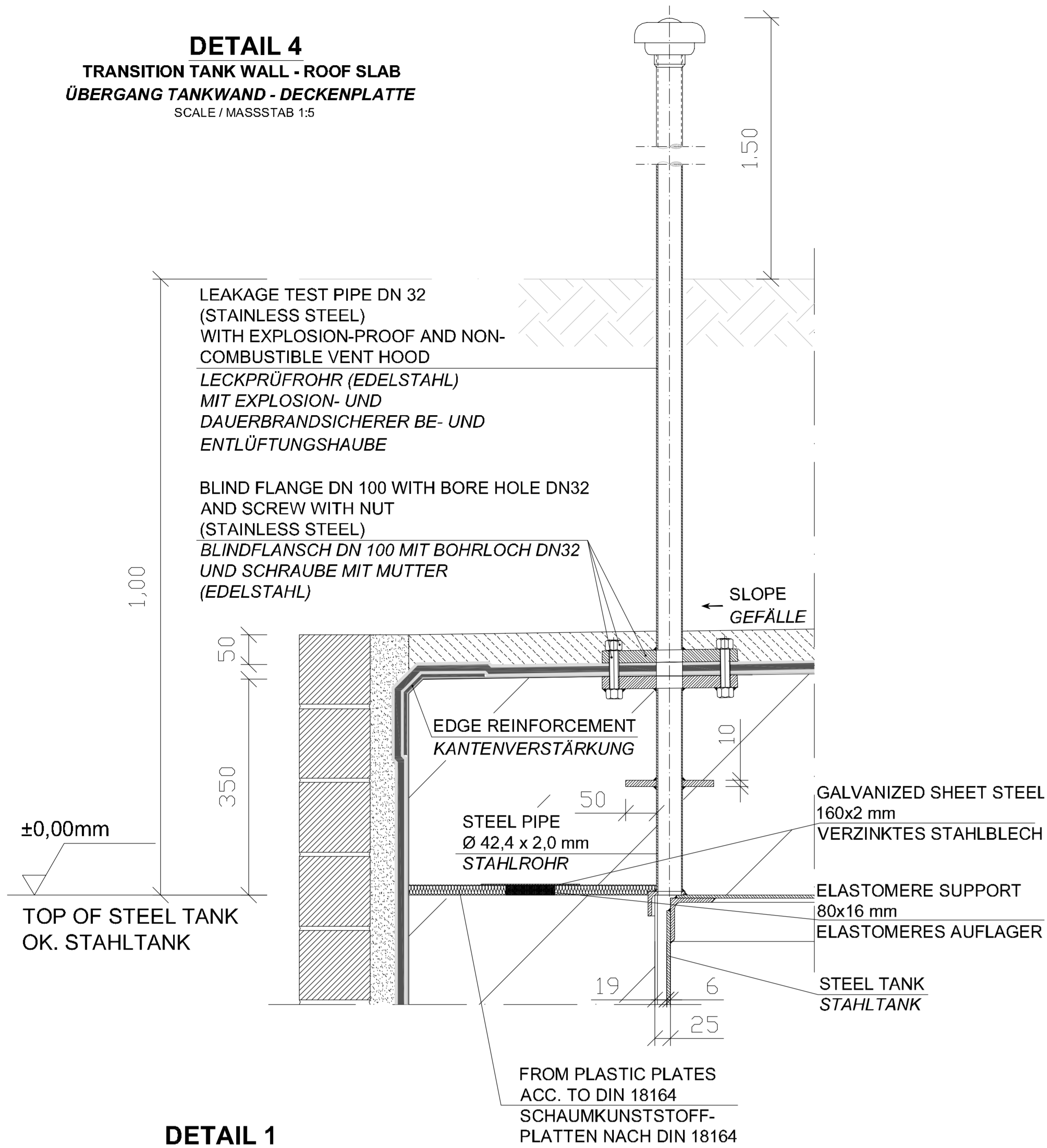
**PERTINENT DRAWINGS  
ZUGEHÖRIGE ZEICHNUNGEN**

- C-2.1 GENERAL PLAN, TOP VIEW  
ÜBERSICHTSPLAN, DRAUFSICHT
- C-2.3 GENERAL PLAN - DETAILS  
ÜBERSICHTSPLAN - DETAILS
- C-2.3.1 HINGED COVER  
KLAPPDECKEL
- C-2.4 DETAILS - MANHOLES AND LEAKAGE CONTROL PIT  
DETAILS - MONTAGEÖFFNUNGEN UND LECKKONTROLLSCHACHT
- C-2.5 CONSTRUCTION PLAN, PUMP HOUSE  
BAUKONSTRUKTIONSPLAN, PUMPENHAUS
- S-2.1 COVERS, MANHOLES AND LEAKAGE CONTROL PIT  
ABDECKUNGEN FÜR MONTAGEÖFFNUNGEN UND LECKKONTROLLSCHACHT
- S-2.12 TANK STAIRS AND SPLINTER PROTECTION DOOR  
TANKTREPPE UND SPLITTERSCHUTZTUR

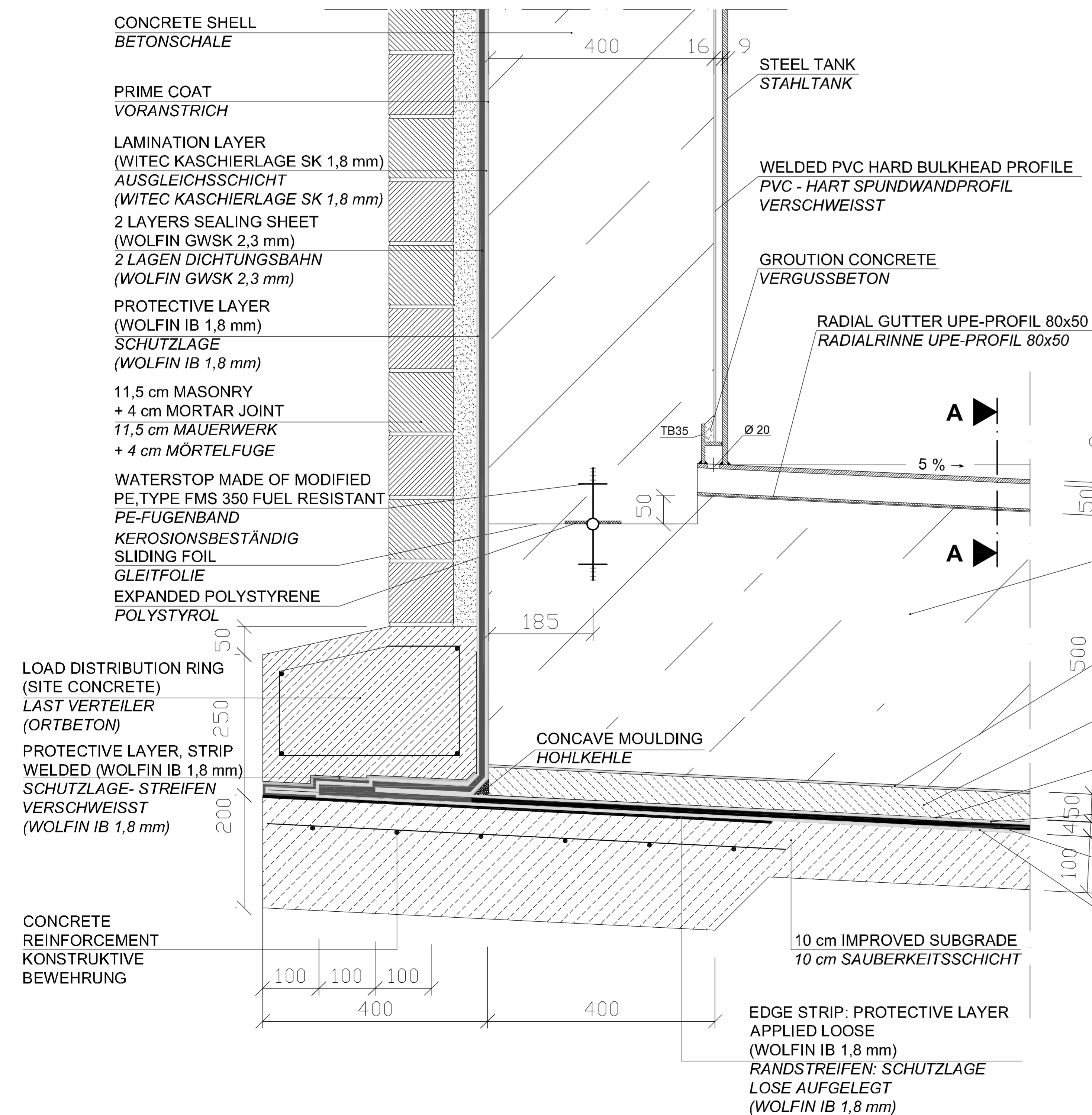
REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
<b>HEADQUARTERS</b>				
UNITED STATES AIR FORCES EUROPE				
ENGINEERING & OPERATIONS				
AIRFIELD STANDARD DESIGN US		FLUGPLATZ STANDARDPLANUNG US		
JET FUEL STORAGE AND DISPENSING SYSTEMS		FLUGKRAFTSTOFF - VERSORGUNGSANLAGEN		
<b>BUILDING BAUWERK</b>				
<b>OPERATING TANK 2500m<sup>3</sup> FLACHBODENTANK 2500m<sup>3</sup></b>				
<b>DESIGNATOR BEZEICHNUNG</b>				
<b>GENERAL PLAN, SECTIONS ÜBERSICHTSPLAN, SCHNITTE</b>				
WORKED/REARBEITET		PREPARED/AUFGESTELLT		APPROVED/GENEHMIGT
LANDSBEREICH LIEGENSCHAFTS- UND BAUVEREINBARUNG L B B		AMT FÜR BUNDESBAU WALLSTR.1 55122 MAINZ		
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAU MASSNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED GENEHMIGT	DATE DATUM	6. MAI 2015		SCALE MASSSTAB
				1:50
ORIGINAL, SIGNED BY IN ORIGINAL, GEG.				STANDARD SHEET STANDARD BLATT
DESIGNER/INGENIEUR				CAD-PROJECT PUBL. CAD-PROJEKT PUBL.
CONSTRUCTION PROJECT BAU MASSNAHME				SHEET NO. BLATT NR.
				OF VON



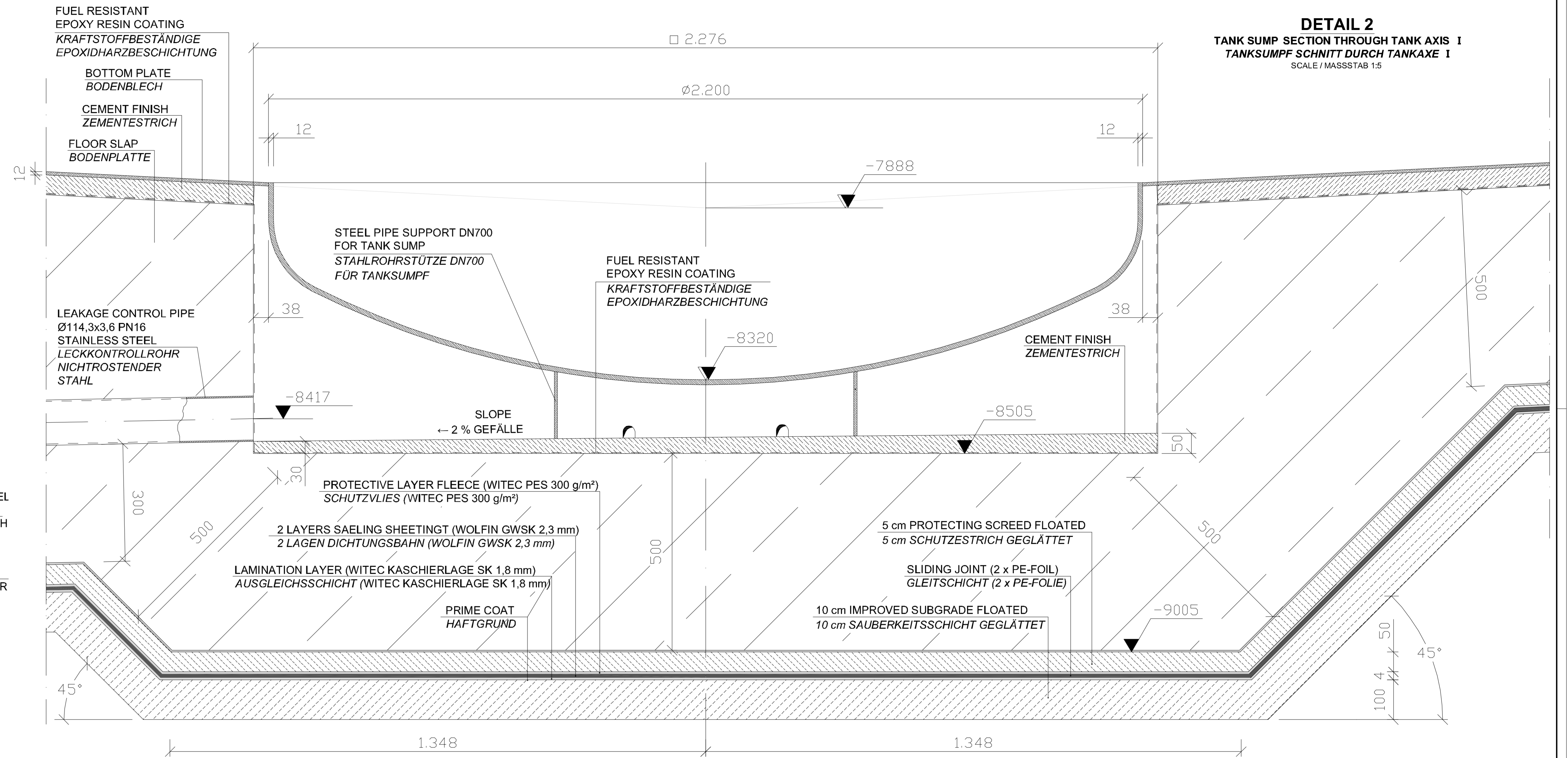
**DETAIL 4**  
TRANSITION TANK WALL - ROOF SLAB  
ÜBERGANG TANKWAND - DECKENPLATTE  
SCALE / MASSSTAB 1:5



**DETAIL 1**  
TRANSITION TANK WALL - FLOOR SLAB  
ÜBERGANG TANKWAND - BODENPLATTE  
SCALE / MASSSTAB 1:5



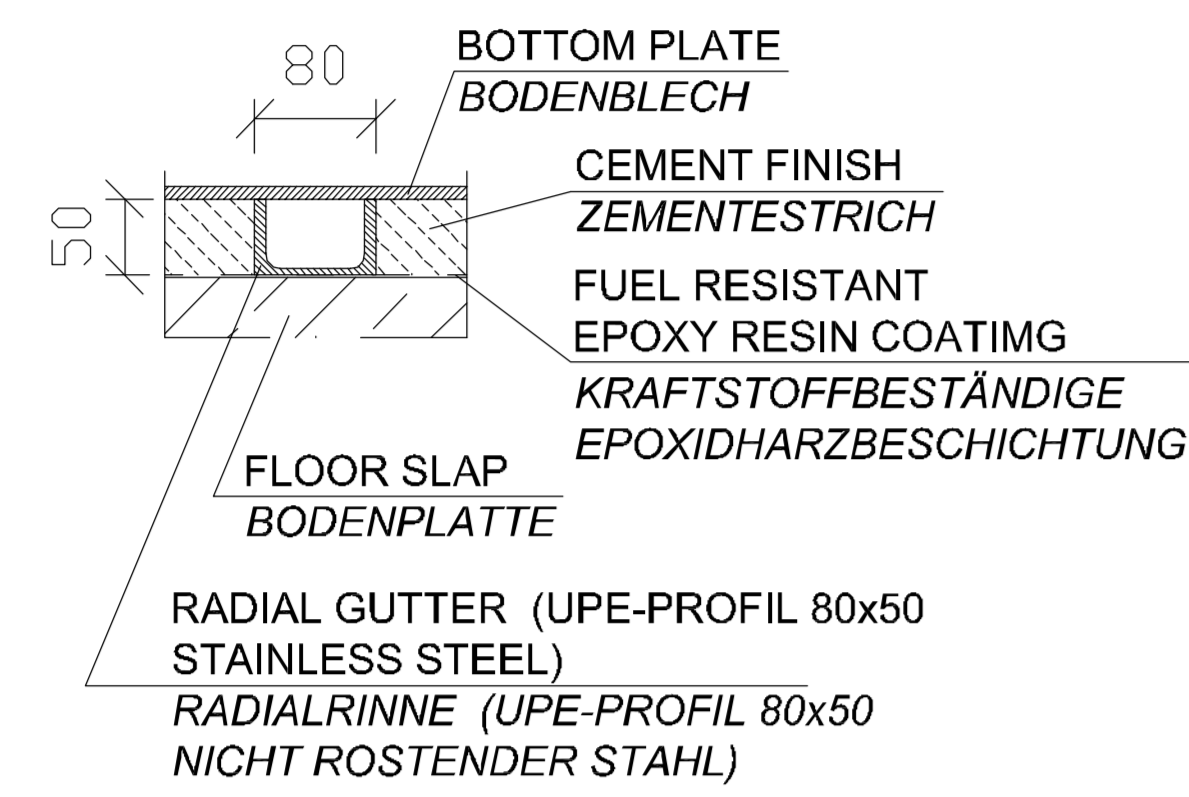
**DETAIL 2**  
TANK SUMP SECTION THROUGH TANK AXIS 1  
TANKSUMPF SCHNITT DURCH TANKAXE 1  
SCALE / MASSSTAB 1:5



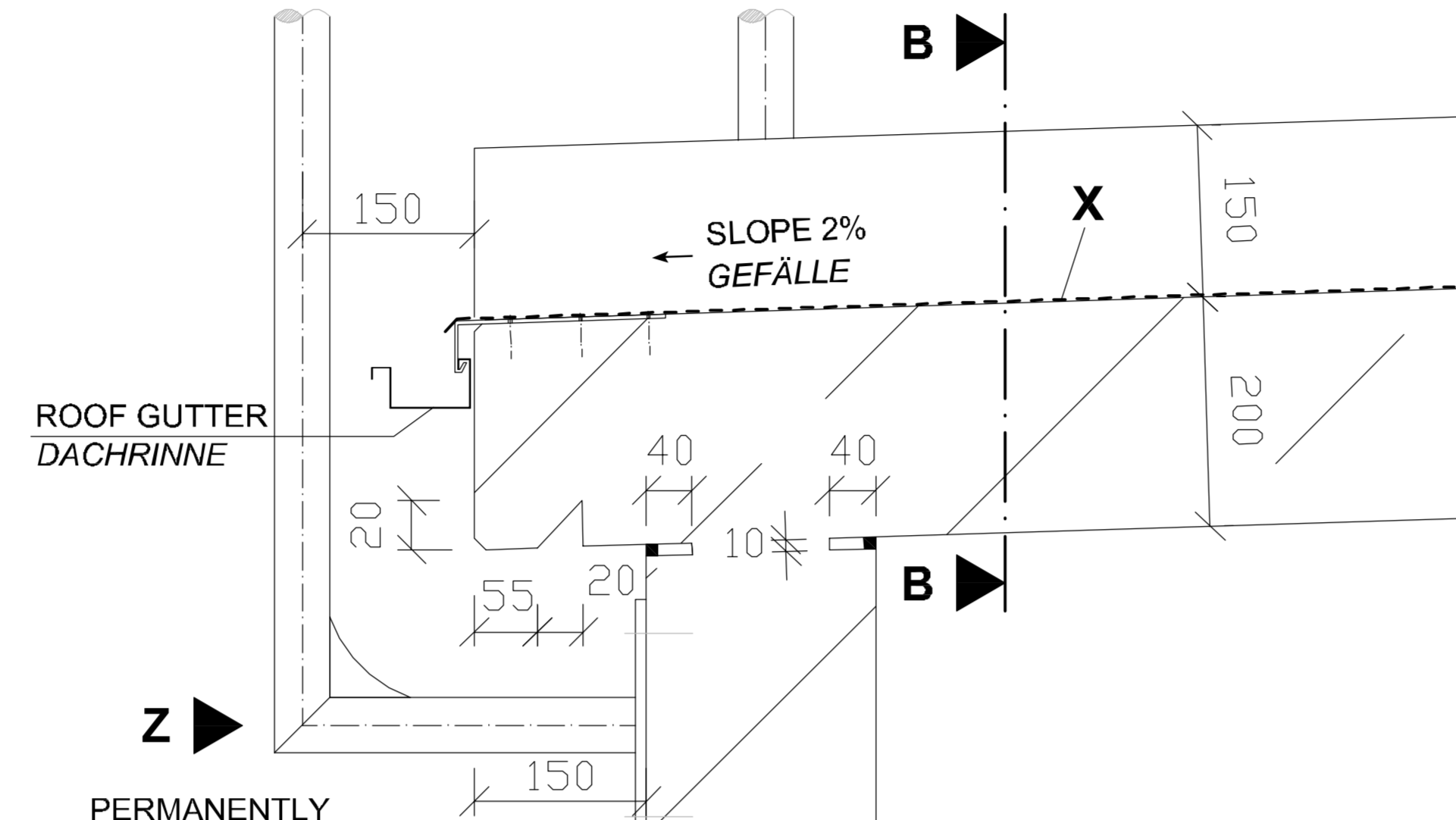
REVISION	DATE	DESCRIPTION	BY	COUNTRY
ÄNDERUNG	DATUM	BESCHREIBUNG	VON	LAND
HEADQUARTERS UNITED STATES AIR FORCES EUROPE ENGINEERING & OPERATIONS				
AIRFIELD STANDARD DESIGN US		FLUGPLATZ STANDARDPLANUNG US		
JET FUEL STORAGE AND DISPENSING SYSTEMS		FLUGKRAFTSTOFF - VERSORGENSANLAGEN		
BUILDING BAUWERK OPERATING TANK 2500m <sup>3</sup> FLACHBODENTANK 2500m <sup>3</sup>				
DESIGNATOR BEZEICHNUNG GENERAL PLAN , DETAILS ÜBERSICHTSPLAN , DETAILS				
WORKED/BEARBEITET	PREPARED/AUFGESTELLT	APPROVED/GENEHMIGT		
LANDSCHAFTS- UND BAUWERKE L B B		AMT FÜR BUNDESBAU WALLSTR.1 55122 MAINZ		
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAUMASSNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED/GENEHMIGT	DATE/DATUM	6. MAI 2015	SCALE/MASSSTAB	1:5; 1:10
ORIGINAL DRAWN BY/IN ORIGINAL DZG			STANDARD SHEET/STANDARD PLAN	C - 2.3
DESIGN/BAU	CONRAD FÜR FACILITIES ENGINEERING INGENIEURBÜRO		CAD-PROJECT NAME/ CAD-PROJEKTNAME	SHEET NO./PLATZ NR.
CONSTRUCTION PROJECT/BAUMASSNAHME				OF/ VON



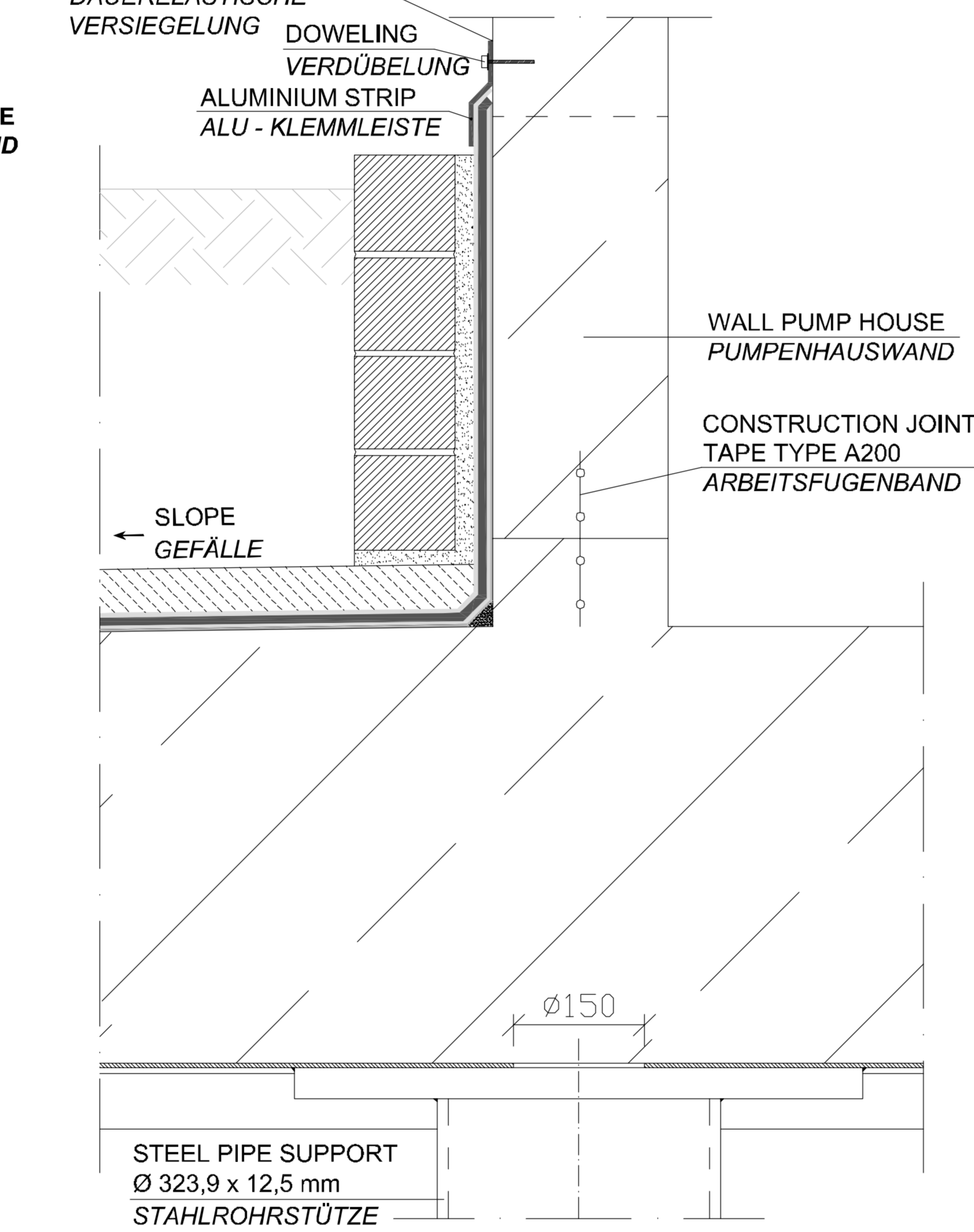
**SECTION A - A**  
**SCHNITT**  
**RADIAL GUTTER**  
**RADIALRINNE**  
 SCALE / MASSSTAB 1:5



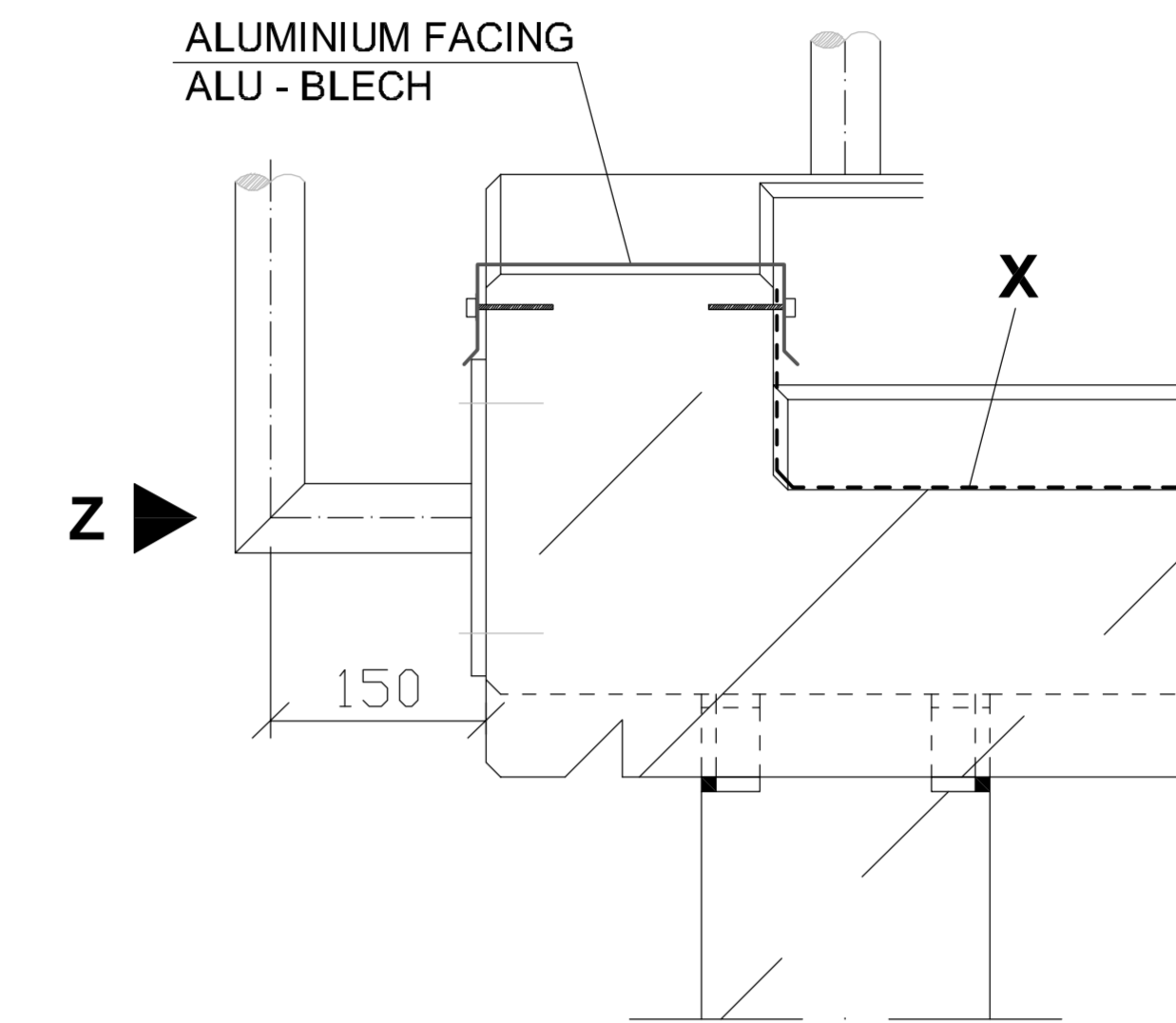
**DETAIL 6**  
**ROOF PUMP HOUSE**  
**PUMPENHAUSDACH**  
 SCALE / MASSSTAB 1:5



**DETAIL 5**  
**WALL PUMP HOUSE**  
**PUMPENHAUSWAND**  
 SCALE / MASSSTAB 1:5

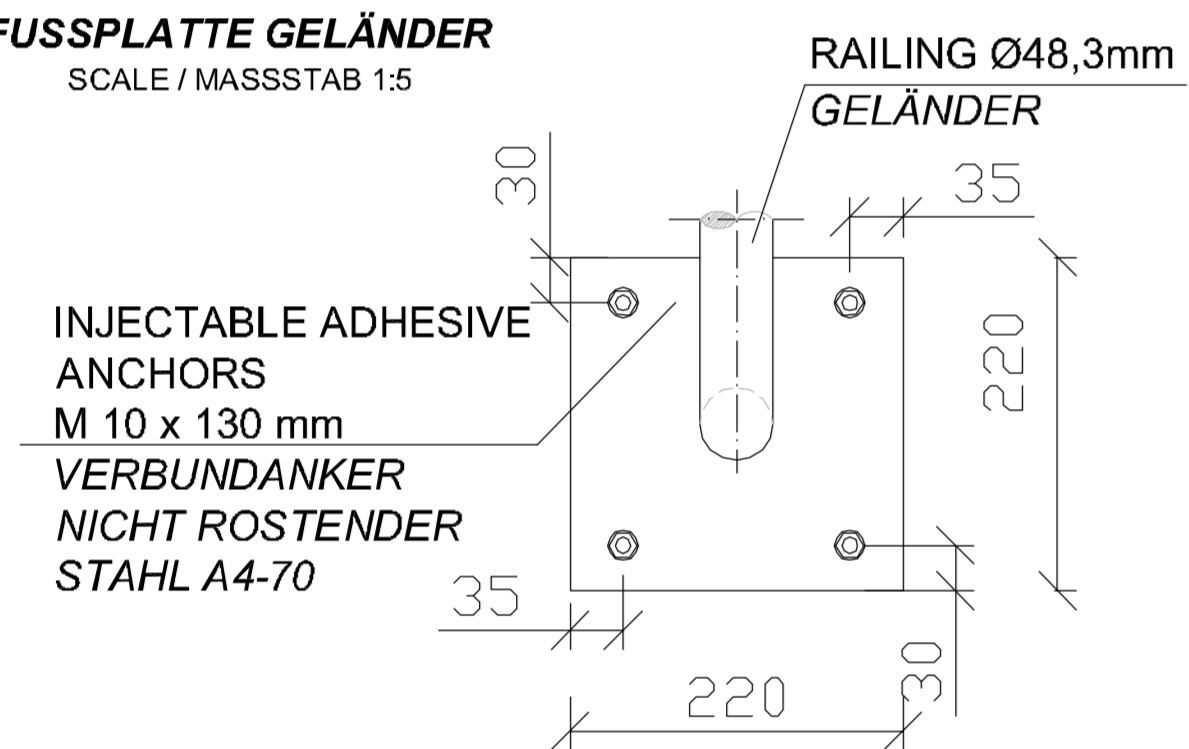


**SECTION B - B**  
**SCHNITT**  
**ROOF PUMP HOUSE**  
**PUMPENHAUSDACH**  
 SCALE / MASSSTAB 1:5

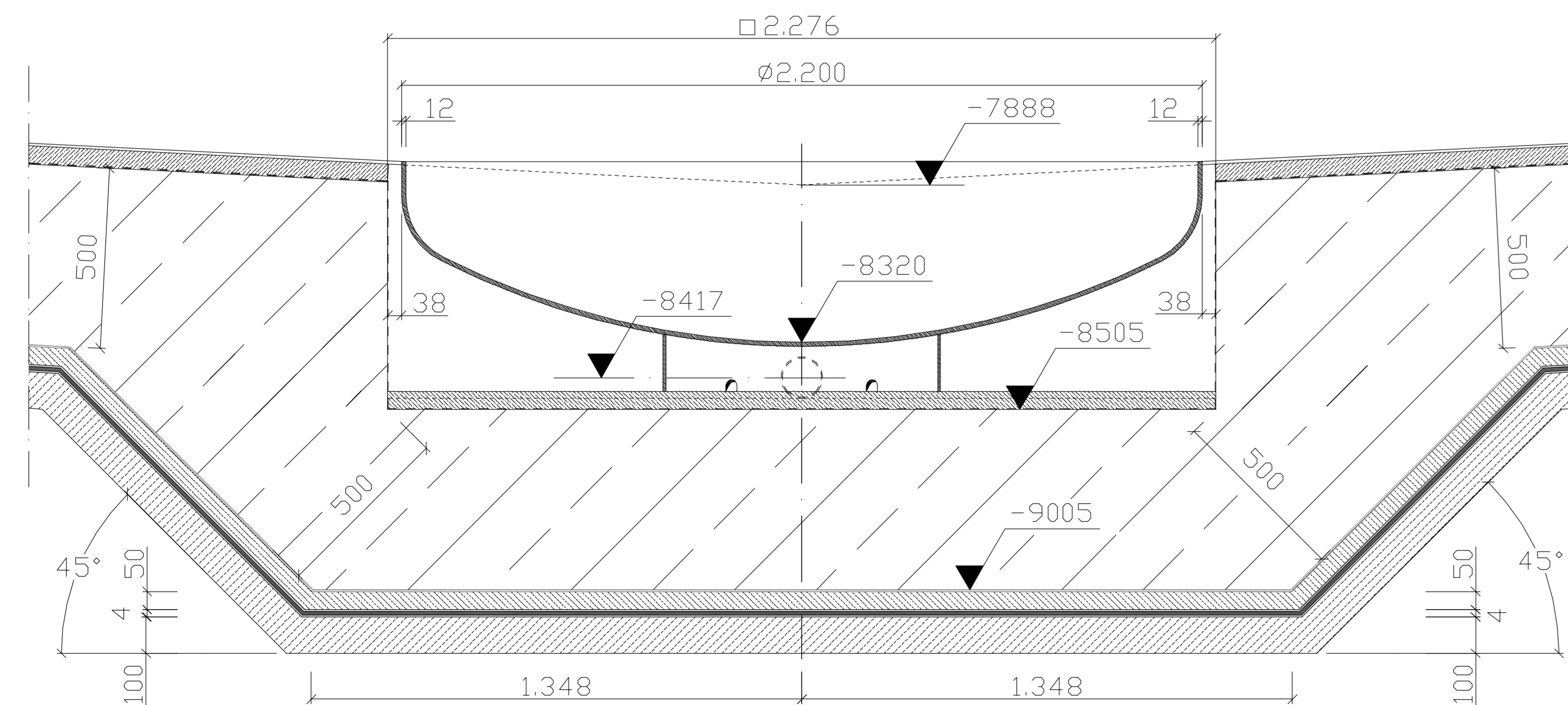


- X**
- TWO-LAYERED ROOF SEALING
  - COMPENSATION AND VAPOUR BARRIER FOR UNVENTILATED ROOF
  - SEPARATING LAYER
  - PRIME COAT BITUMINOUS SOLUTION
  - ZWEILAGIGE DACHABDICHTUNG
  - AUSGLEICHS- UND DAMPFSPERRE FÜR UNBELÜFTETES DACH
  - TRENNSCICHT
  - VORANSTRICH BITUMENLÖSUNG

**VIEW Z**  
**ANSICHT**  
**BASE PLATE RAILING**  
**FUSSPLATTE GELÄNDER**  
 SCALE / MASSSTAB 1:5



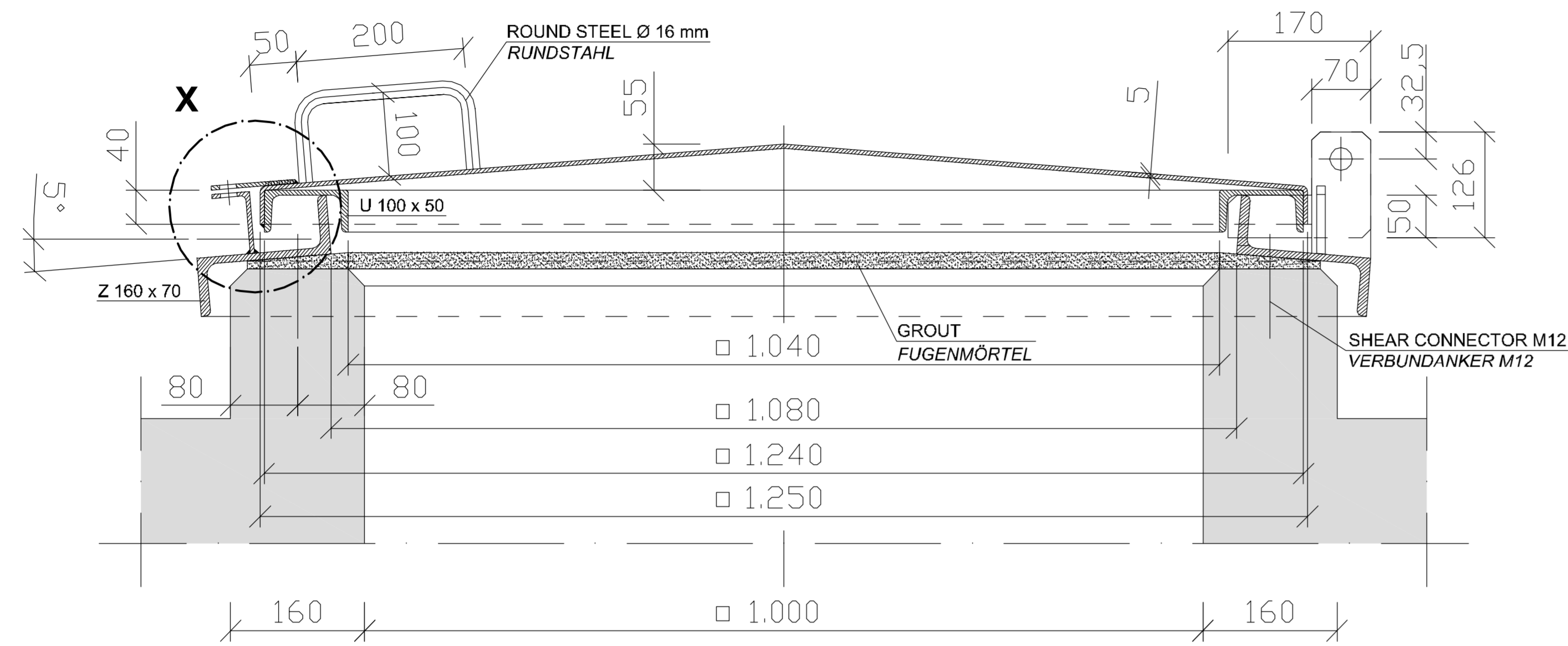
**DETAIL 3**  
**TANK SUMP SECTION THROUGH TANK AXIS II**  
**TANKSUMPF SCHNITT DURCH TANKAXE II**  
 SCALE / MASSSTAB 1:10



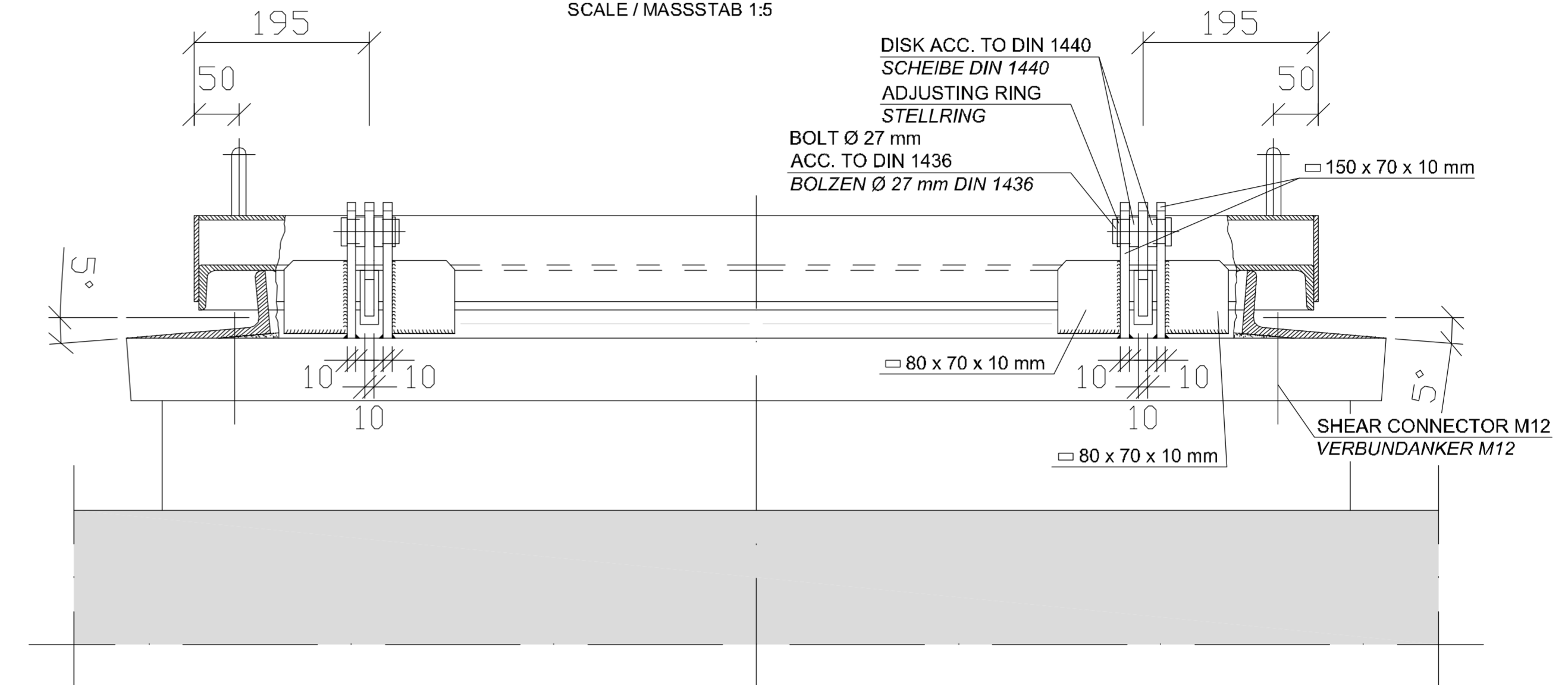
REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
<b>HEADQUARTERS</b> UNITED STATES AIR FORCES EUROPE  ENGINEERING & OPERATIONS				
AIRFIELD STANDARD DESIGN US JET FUEL STORAGE AND DISPENSING SYSTEMS		FLUGPLATZ STANDARDPLANUNG US FLUGKRAFTSTOFF - VERSORGSANLAGEN		
BUILDING BAUWERK <b>OPERATING TANK 2500m<sup>3</sup></b> <b>FLACHBODENTANK 2500m<sup>3</sup></b>				
DESIGNATOR BEZÜGUNG <b>GENERAL PLAN , DETAILS</b> <b>ÜBERSICHTSPLAN , DETAILS</b>				
WORKED/BEARBEITET LANDESBÜRO LEBENSCHAFTS- UND BAUVERBUND LEBENSCHAFTS- UND BAUVERBUND L B B AMBASSADE (UNTERSTÄTZUNG) / BÜRO LANDESBÜRO TRUPPEN (SCHAFT) UND STREITKRÄFTEN (STREITKRÄFTEN) LANDMIL. BEFÜHRT IN VEREINBARUNG ORIGINAL, GEZEICHNET IN ORIGINAL, GEZEICHNET 05/2015, 02/2015 05/2015, 02/2015		APPROVED/GENEHMIGT AMT FÜR BUNDESBAU WÄLLSTR.1 55122 MAINZ ORIGINAL, GEZEICHNET IN ORIGINAL, GEZEICHNET 05/2015, 02/2015		
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAU MASSNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED GENEHMIGT IN ORIGINAL, GEZEICHNET	DATE DATUM <b>6. MAI 2015</b>	SCALE MASSSTAB 1:5 ; 1:10	SHEET NO. PLANNR. <b>C - 2.3.1</b> OF VON	
CONSTRUCTION PROJECT BAU MASSNAHME				



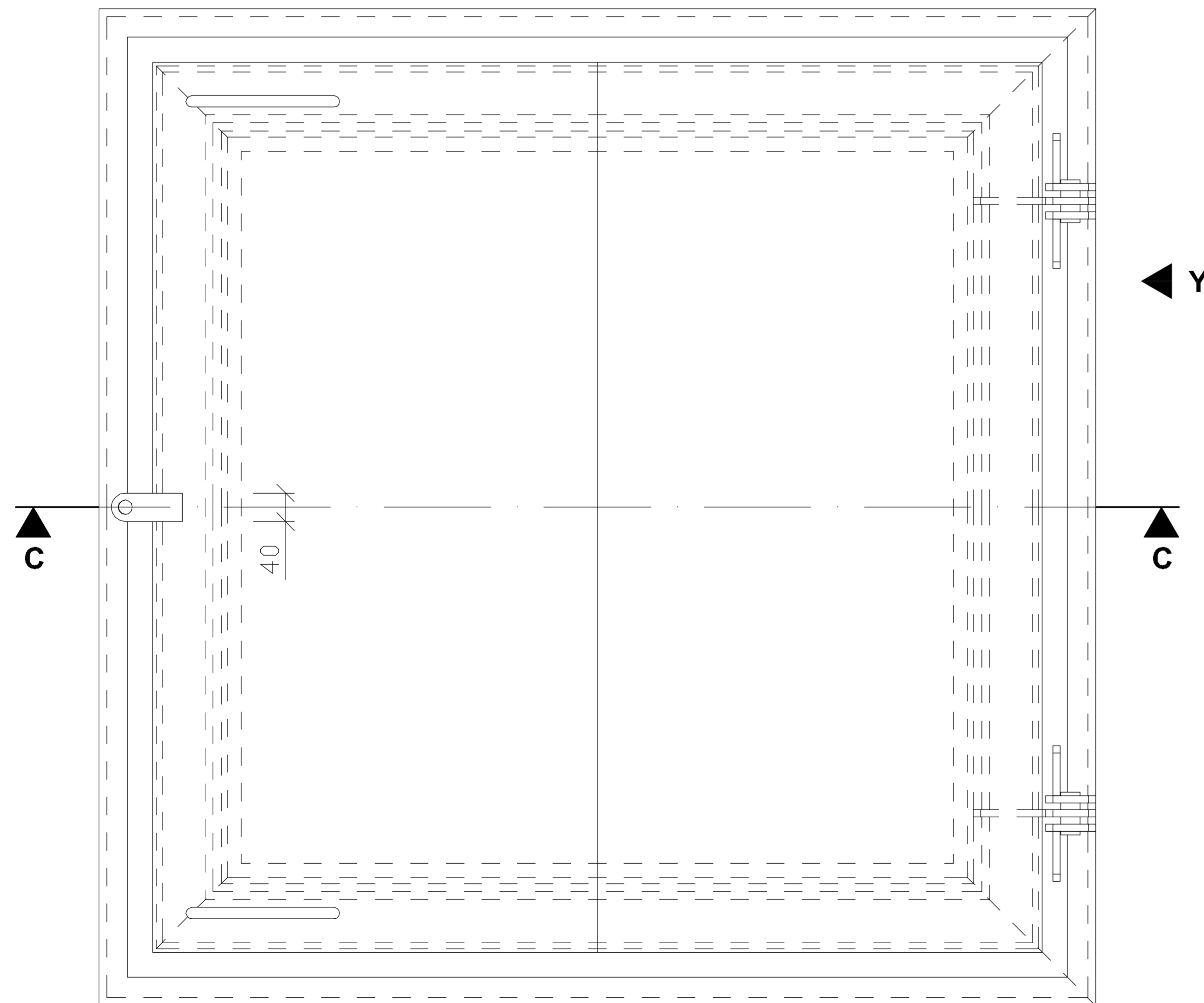
**SECTION C - C**  
**SCHNITT**  
 SCALE / MASSSTAB 1:5



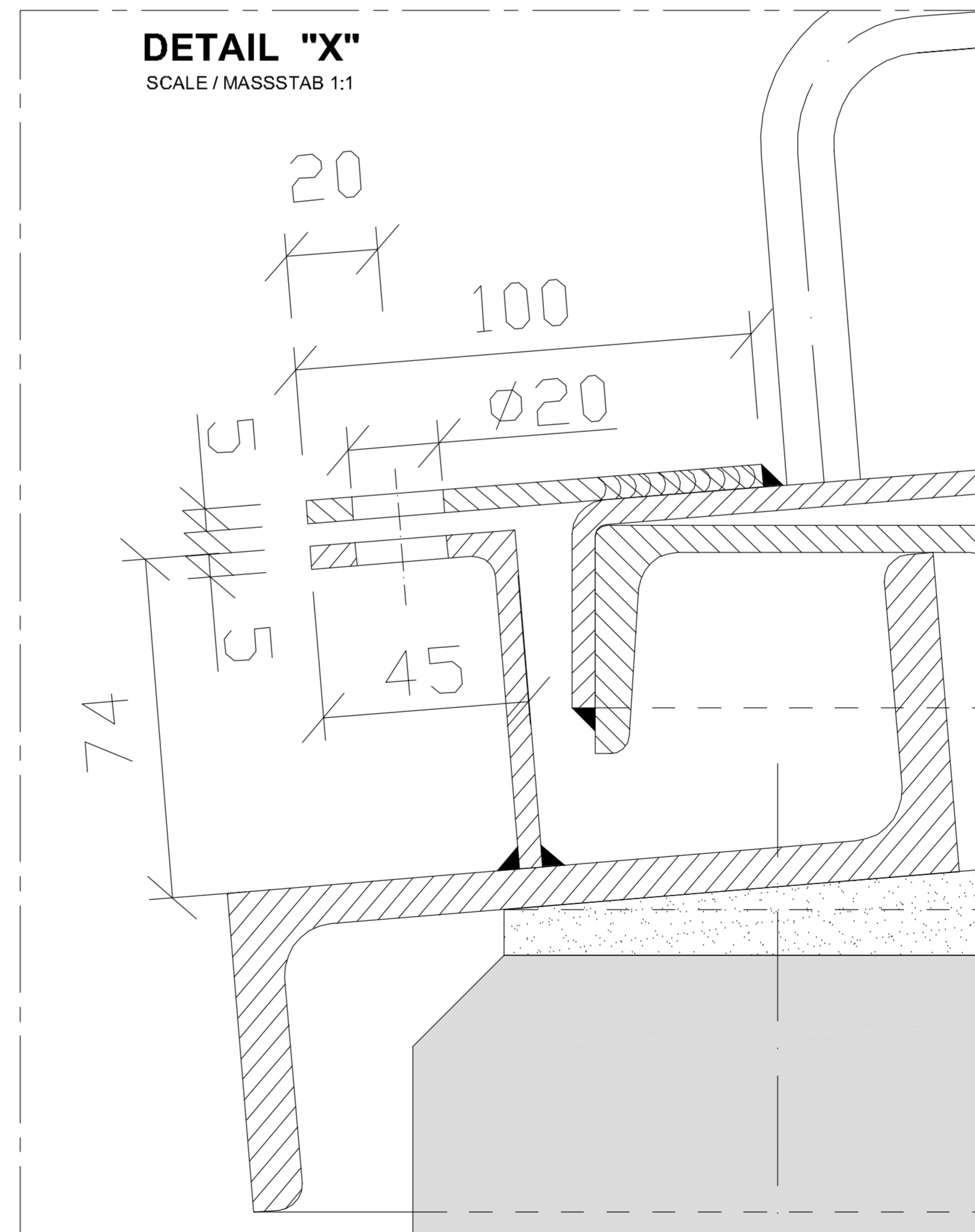
**VIEW ANSICHT Y**  
**HINGED COVER KLAPPDECKEL**  
 SCALE / MASSSTAB 1:5



**DETAIL 7**  
**HINGED COVER KLAPPDECKEL**  
 SCALE / MASSSTAB 1:5



**DETAIL "X"**  
 SCALE / MASSSTAB 1:1

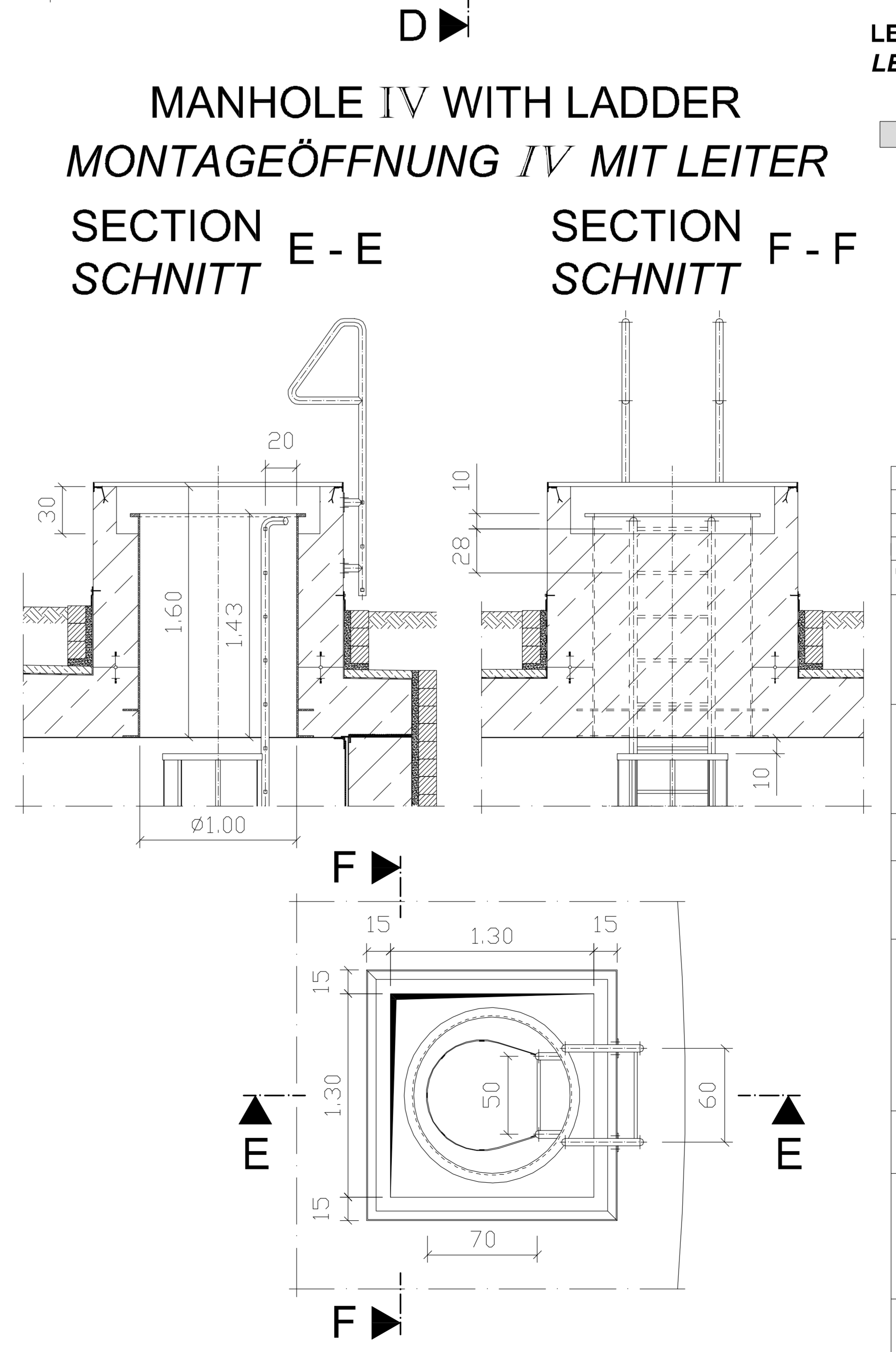
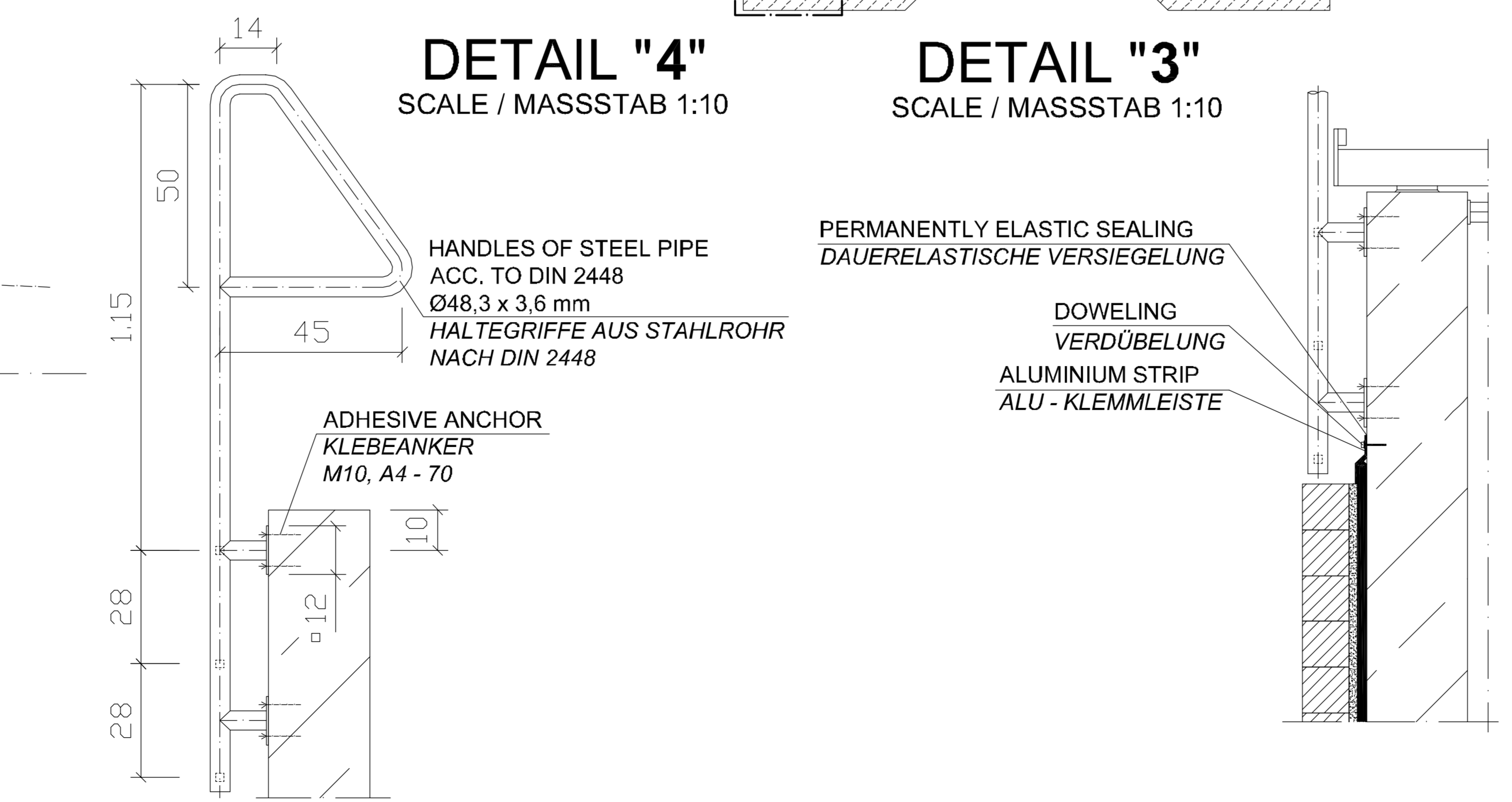
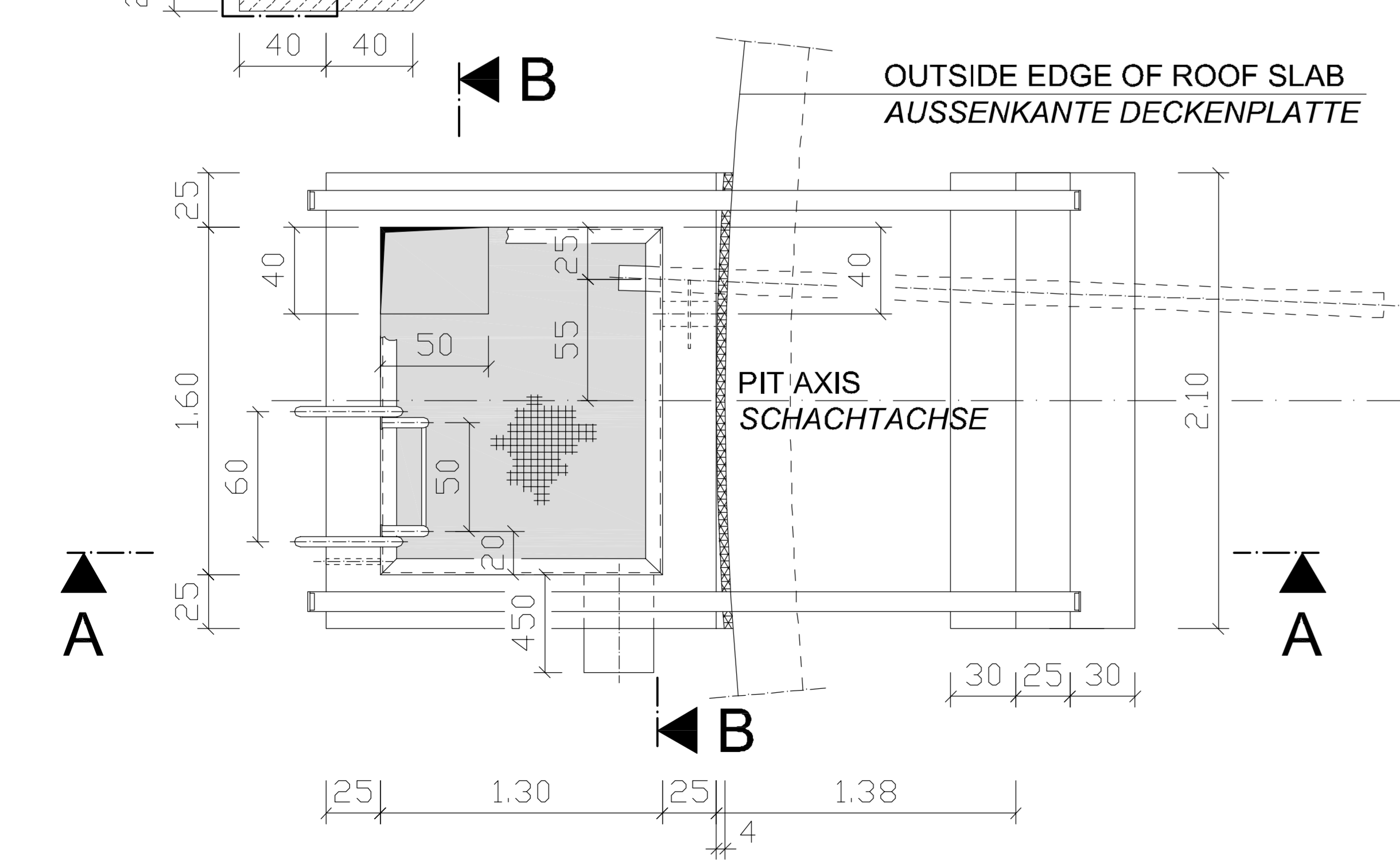
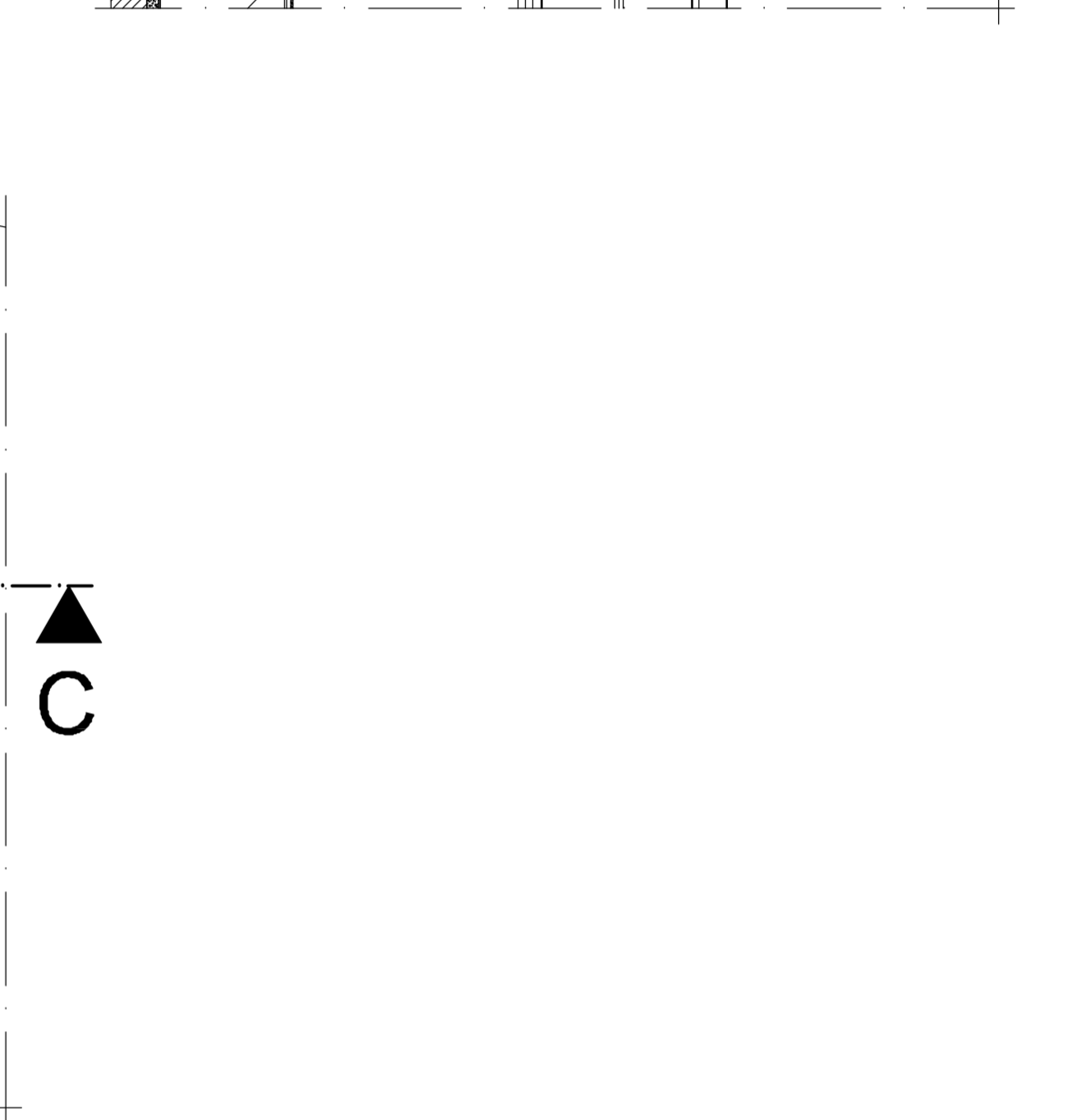
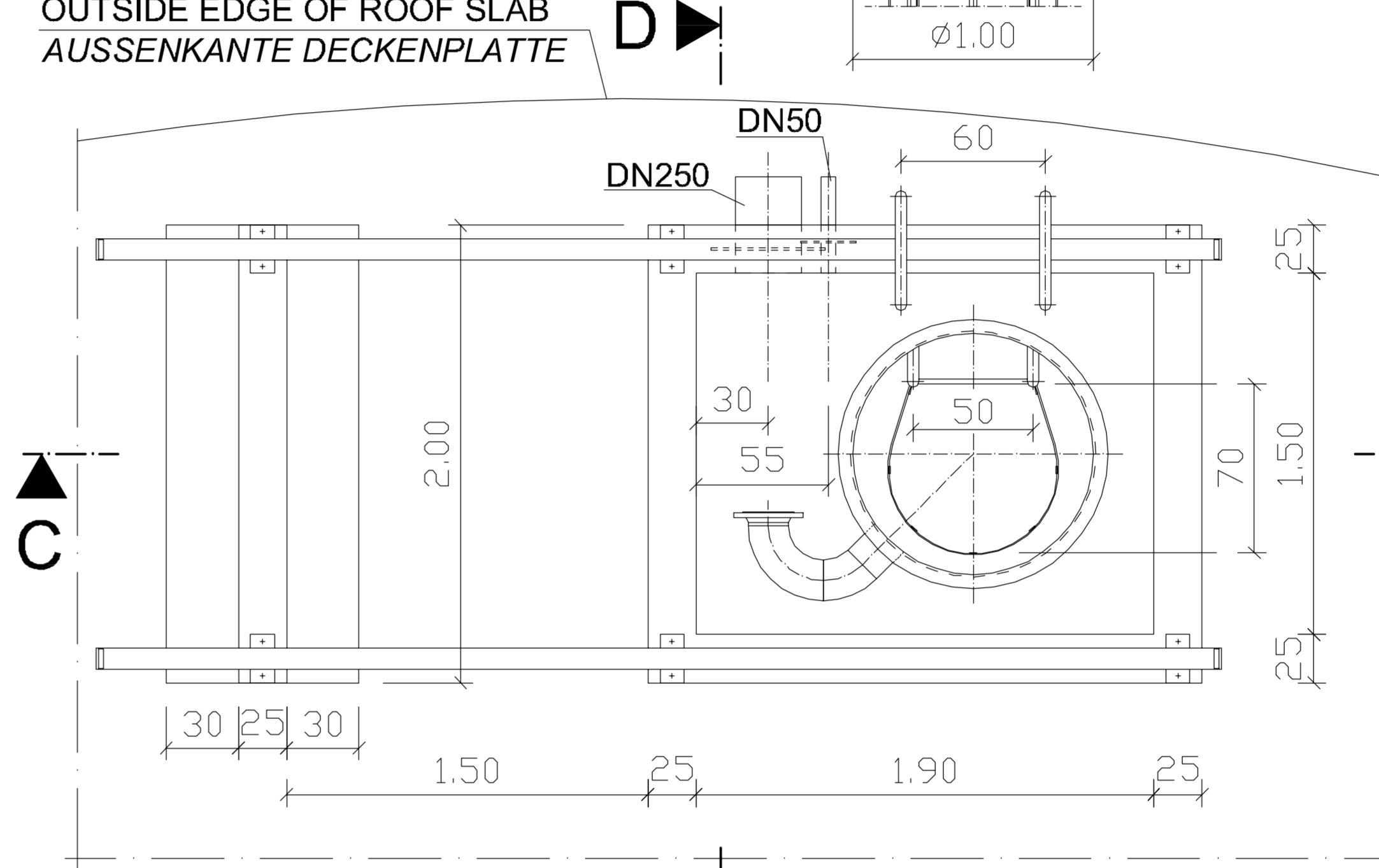
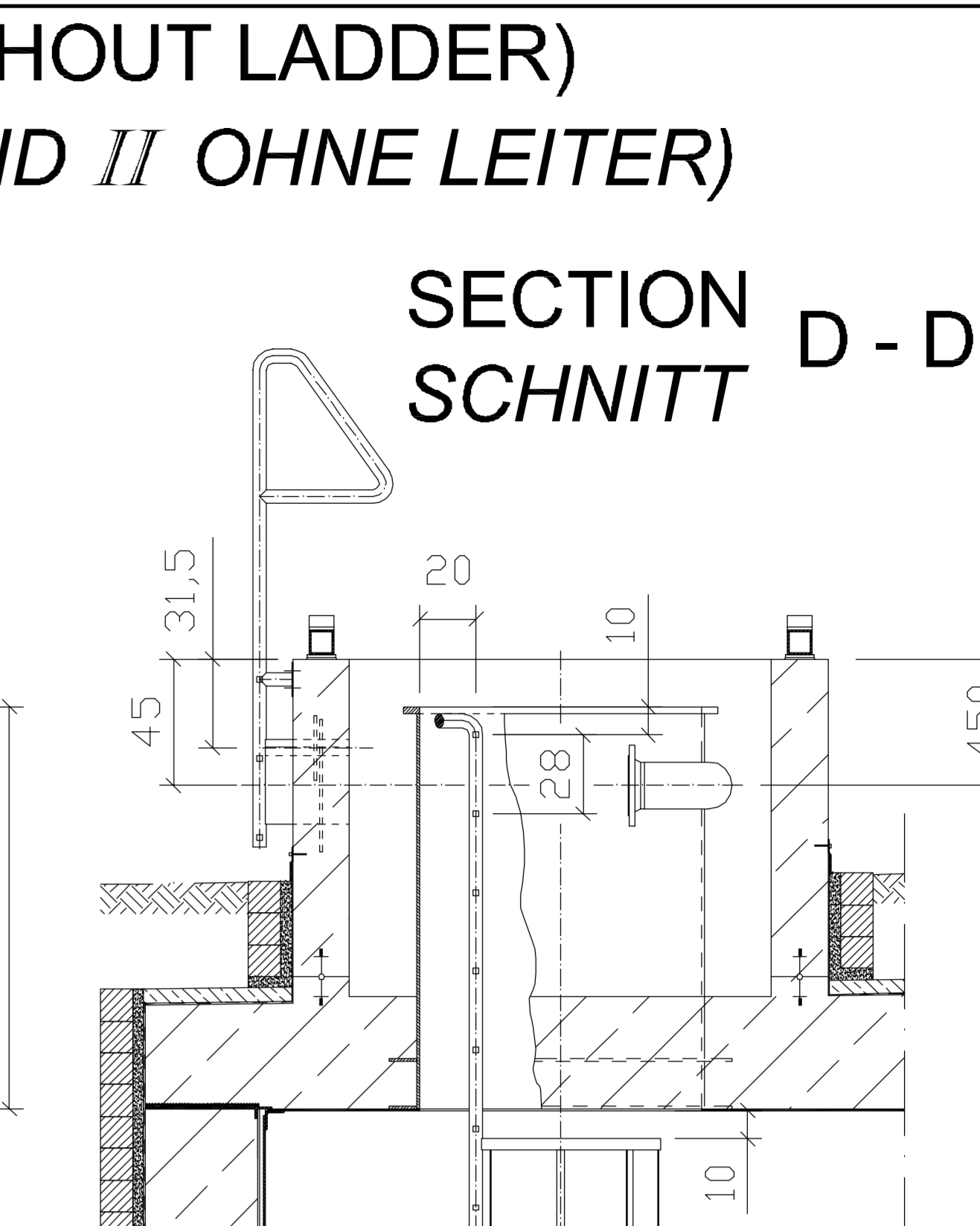
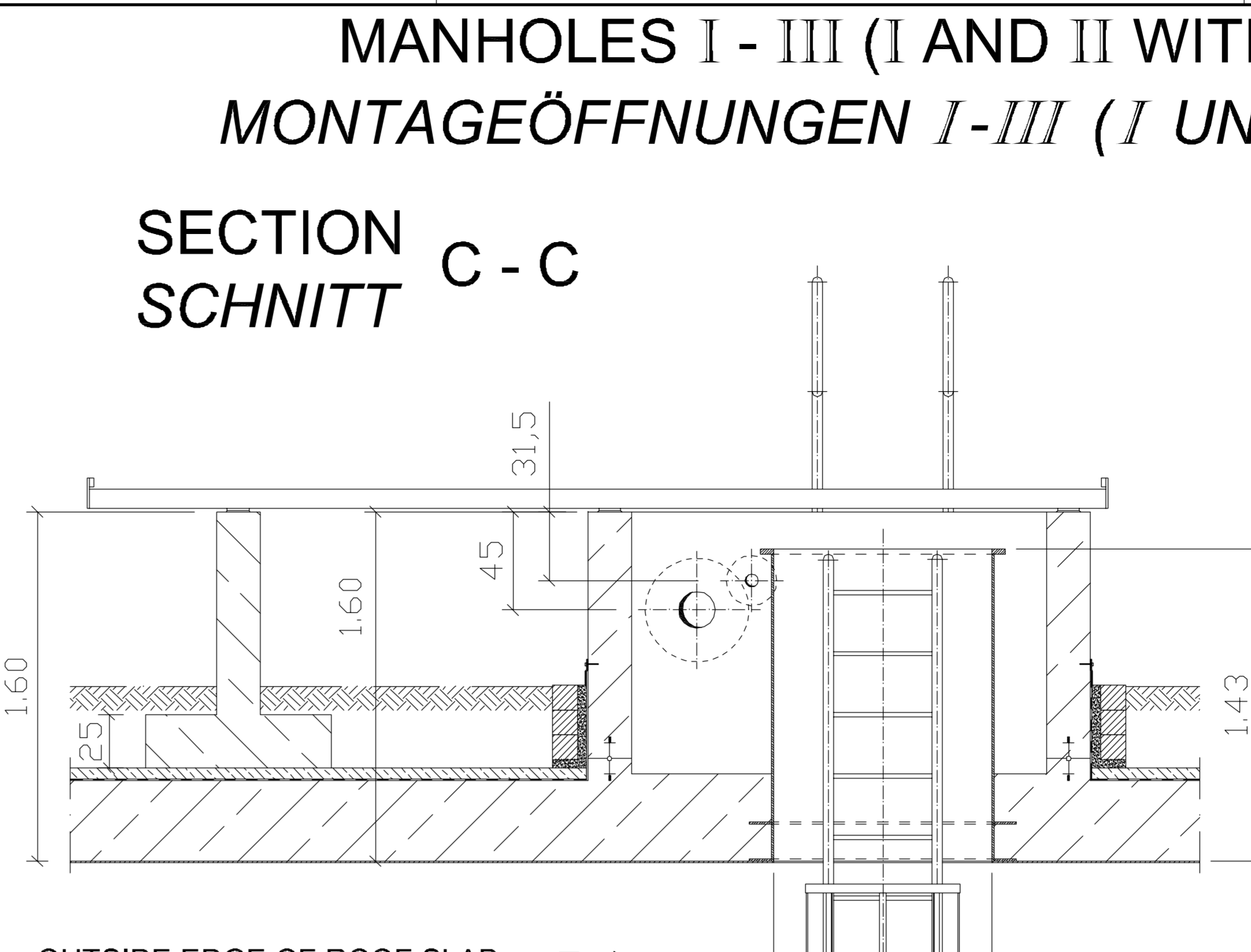
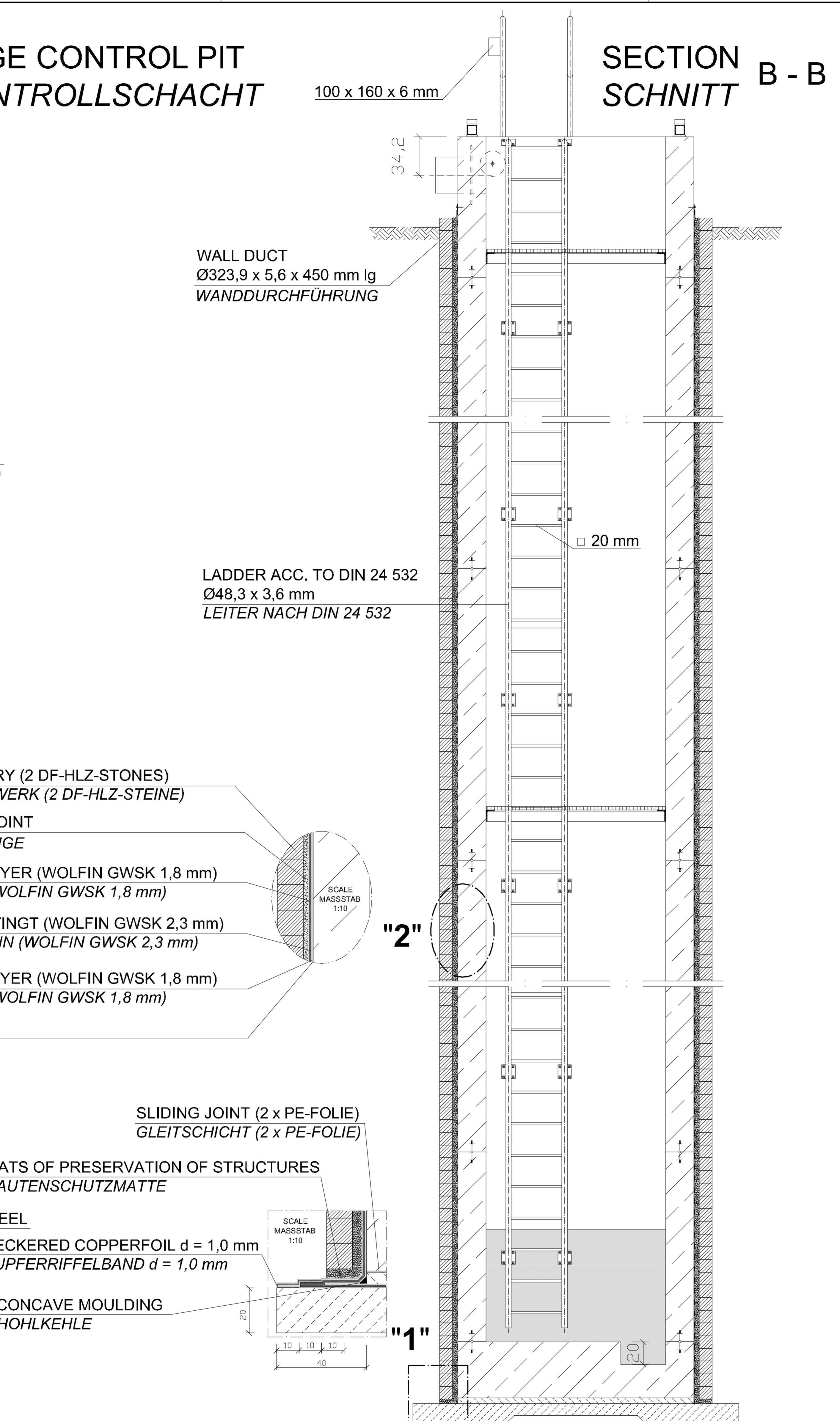
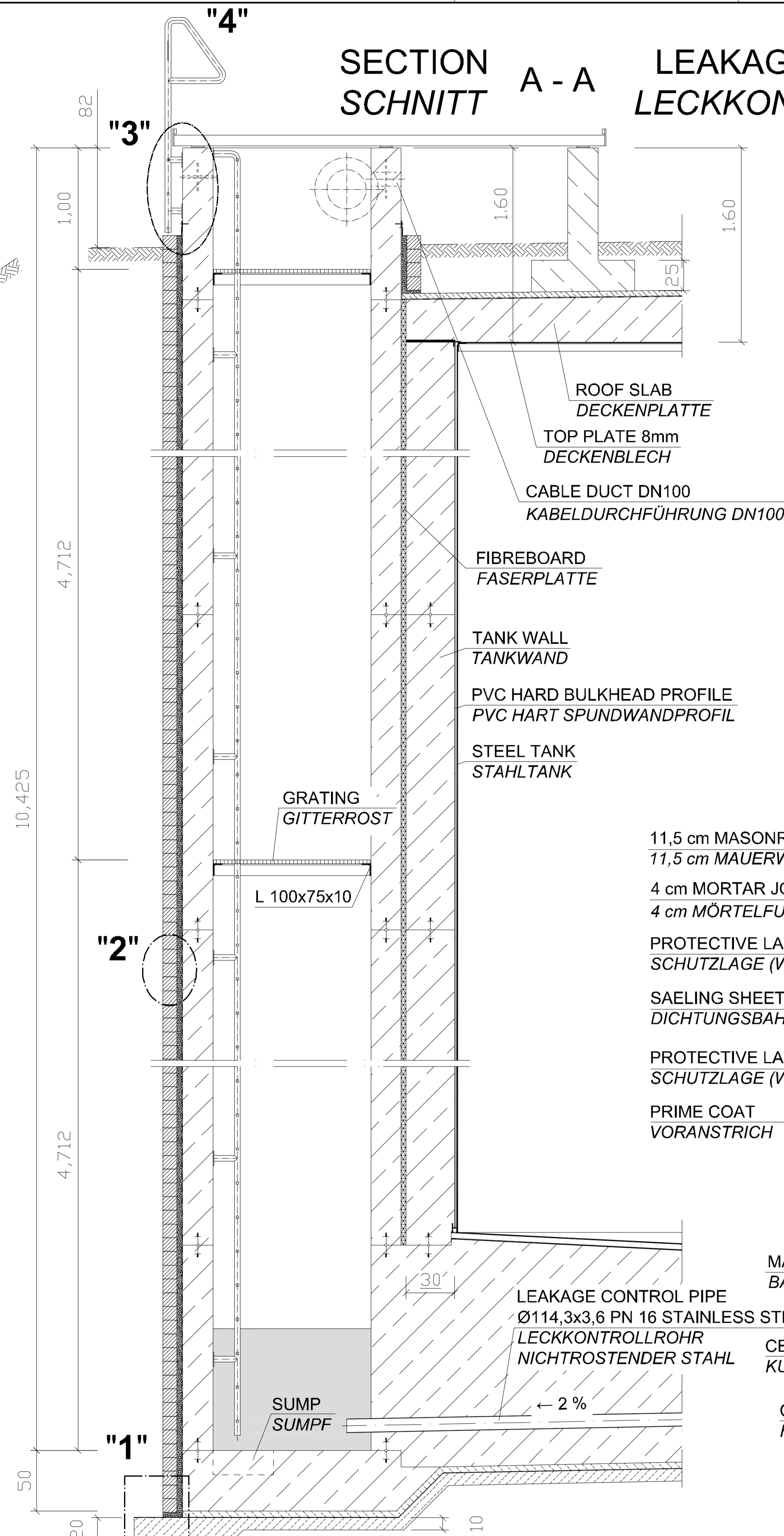


**NOTES**  
**BEMERKUNGEN**

THE HINGED COVER MUST BE SECURED WITH ARMoured PADLOCKS "PANZER" OF STAINLESS STEEL, LOCKING BOLT Ø 12mm  
 DIE KLAPPDECKEL SIND MIT GEPANZERTEN VORHÄNGESCHLÖSSER "PANZER" AUS EDELSTAHL, SCHLIESSBOLZEN Ø 12mm ZU SICHERN.

REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
HEADQUARTERS UNITED STATES AIR FORCES EUROPE ENGINEERING & OPERATIONS				
AIRFIELD STANDARD DESIGN US JET FUEL STORAGE AND DISPENSING SYSTEMS		FLUGPLATZ STANDARDPLANUNG US FLUGKRAFTSTOFF - VERSORGENGSANLAGEN		
BUILDING BAUWERK OPERATING TANK 2500m <sup>3</sup> FLACHBODENTANK 2500m <sup>3</sup>				
DESIGNATION BEZEICHNUNG HINGED COVER KLAPPDECKEL				
WORKED/BEARBEITET	PREPARED/AUFGESTELLT	APPROVED/GENEHMIGT		
	LANDBEWEISER LIEGENSCHAFTS- UND BAUVERBUNDUNG LBB-LEITERLANDAU L · B · B ANSCHLUSST: UNTERTORPLATZ 1, 76229 LANDAU TELEFON: (06341) 912-276 TELEFAX: (06341) 912-291 LANDAU, BY PROXY / IM VERSTRETTUNG ORIGINAL SIGNED BY IM ORIGINAL GEZ. STEFAN KOTSCHENREUTHER	AMT FÜR BUNDESBAU WALLSTR.1 55122 MAINZ ORIGINAL SIGNED BY IM ORIGINAL GEZ. WERNING GÖTZ		
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAUMAßNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED GENEHMIGT	DATE DATUM	SCALE MASSSTAB		
	6. MAI 2015	1:5 ; 1:10		
ORIGINAL SIGNED BY IM ORIGINAL GEZ.	STANDARD SHEET STANDARD PLAN			
GERALD SAND COMMAND FUEL FACILITIES ENGINEER HQ USAF - AFAPANG / AFPO	CAD-project path: CAD-Projektfrd:		SHEET-NO. PLAN-NR. OF VON	
CONSTRUCTION PROJECT BAUMAßNAHME	C - 2.3.2			





**LEGEND**  
LEGENDE

FUEL RESISTANT PLASTIC COATING / DISSIPATIVE (10<sup>-6</sup> S)  
KRAFTSTOFFBESTÄNDIGE KUNSTSTOFFBESCHICHTUNG / ABLEITFÄHIG (10<sup>-6</sup> S)

**PERTINENT DRAWINGS**  
ZUGEHÖRIGE ZEICHNUNGEN

C-2.1 GENERAL PLAN, TOP VIEW  
ÜBERSICHTSPLAN, DRAUFSICHT

C-2.2 GENERAL PLAN - SECTIONS  
ÜBERSICHTSPLAN - SCHNITTE

S-2.1 COVERS, MANHOLES AND LEAKAGE CONTROL PIT  
ABDECKUNGEN FÜR MONTAGEÖFFNUNGEN UND LECKKONTROLLSCHACHT

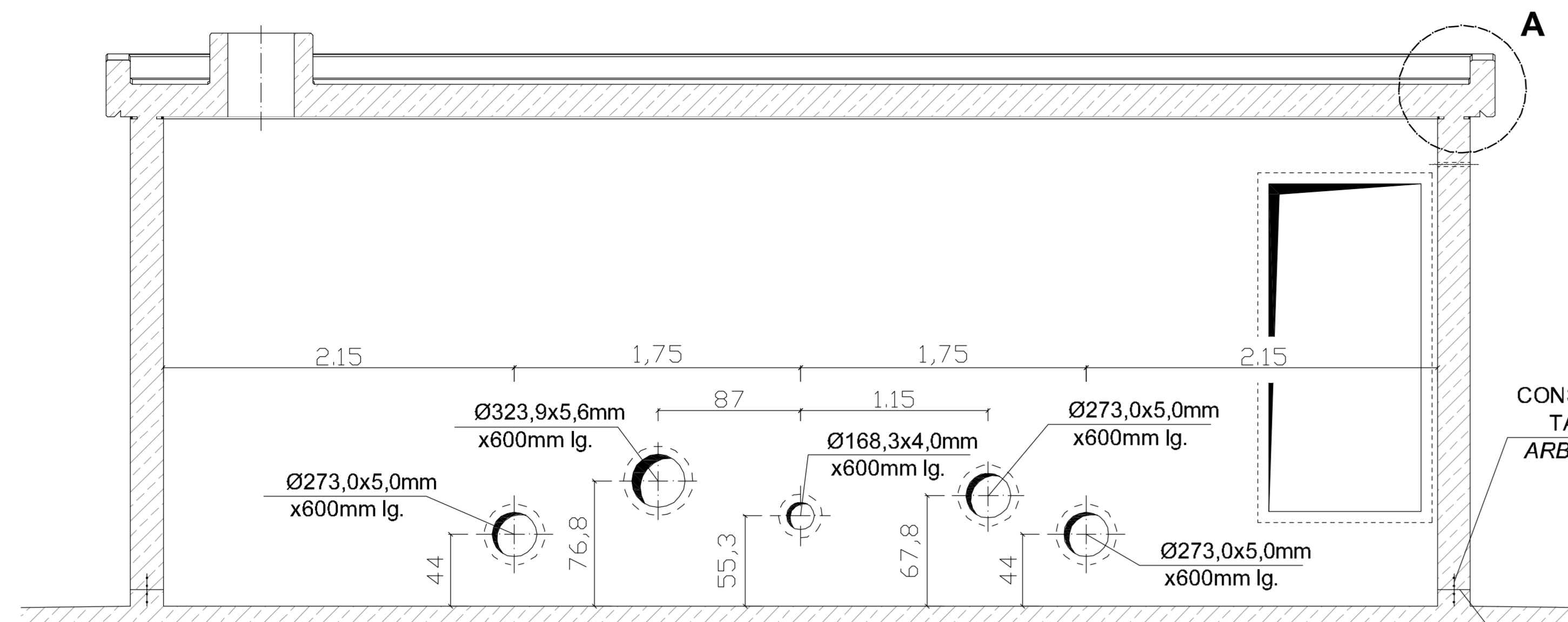
REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
<b>HEADQUARTERS</b> UNITED STATES AIR FORCES EUROPE ENGINEERING & OPERATIONS				
<b>AIRFIELD STANDARD DESIGN US</b> JET FUEL STORAGE AND DISPENSING SYSTEMS			<b>FLUGPLATZ STANDARDPLANUNG US</b> FLUGKRAFTSTOFF - VERSORGNUNGSANLAGEN	
<b>OPERATING TANK 2500m<sup>3</sup></b> <b>FLACHBODENTANK 2500m<sup>3</sup></b>				
<b>DETAILS - MANHOLES AND LEAKAGE CONTROL PIT</b> <b>DETAILS - MONTAGEÖFFNUNGEN UND LECKKONTROLLSCHACHT</b>				
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAUMASSNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED GENEHMIGT	DATE DATUM	SCALE MASSSTAB	SHEET NO. BLATT-NR.	
6. MAI 2015	1:20 : 1:10	C - 2.4		



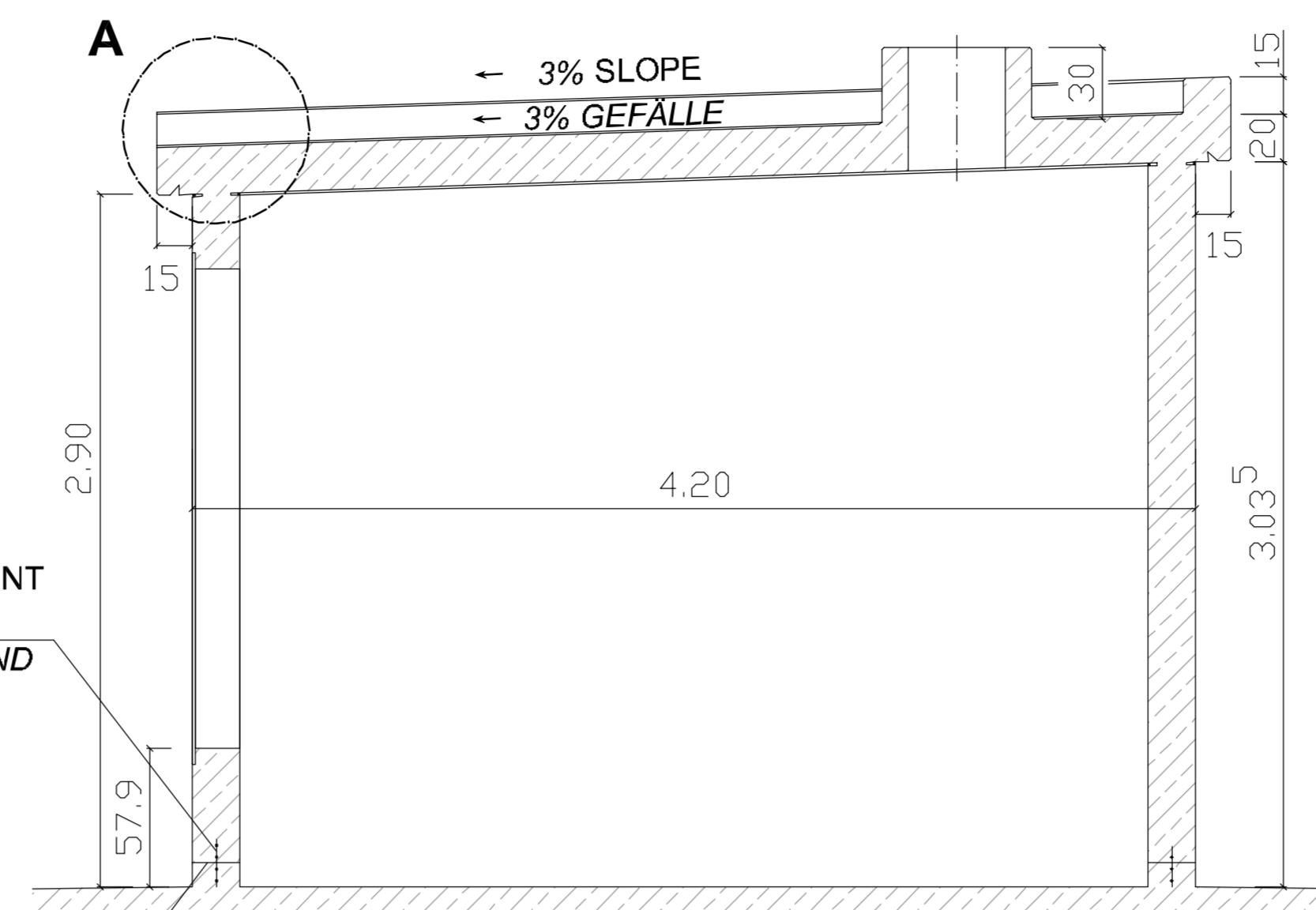




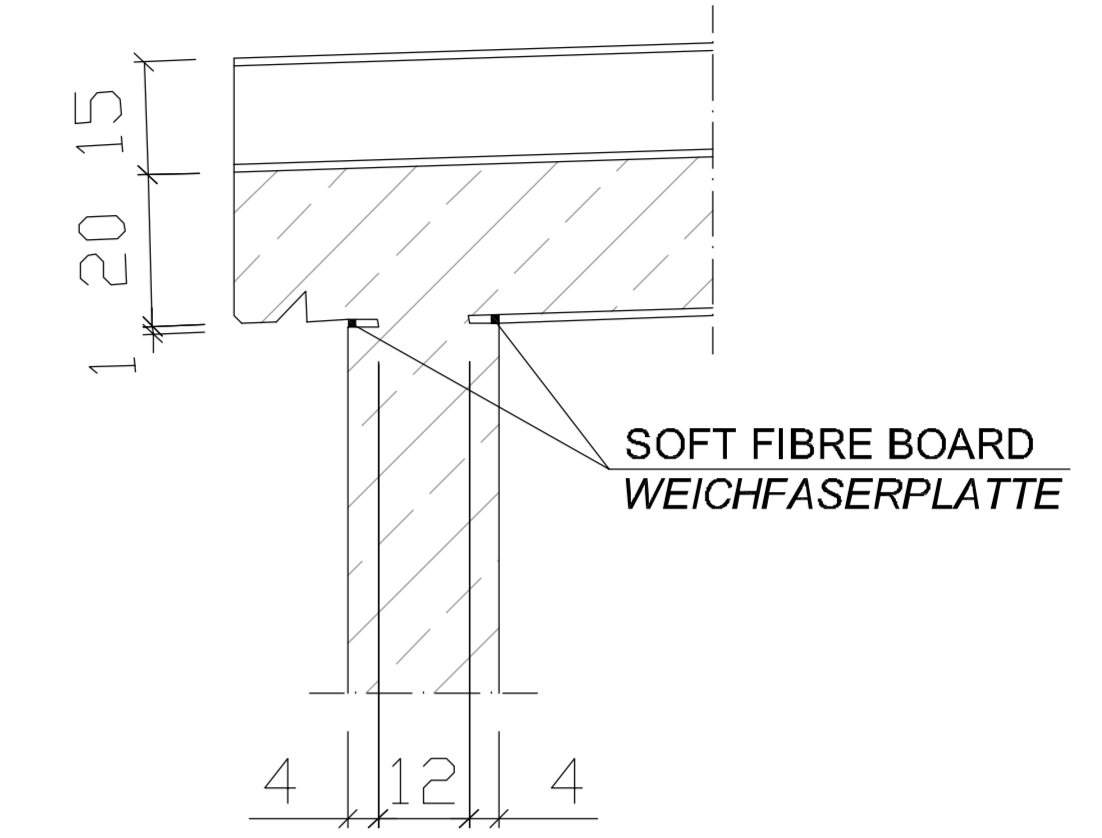
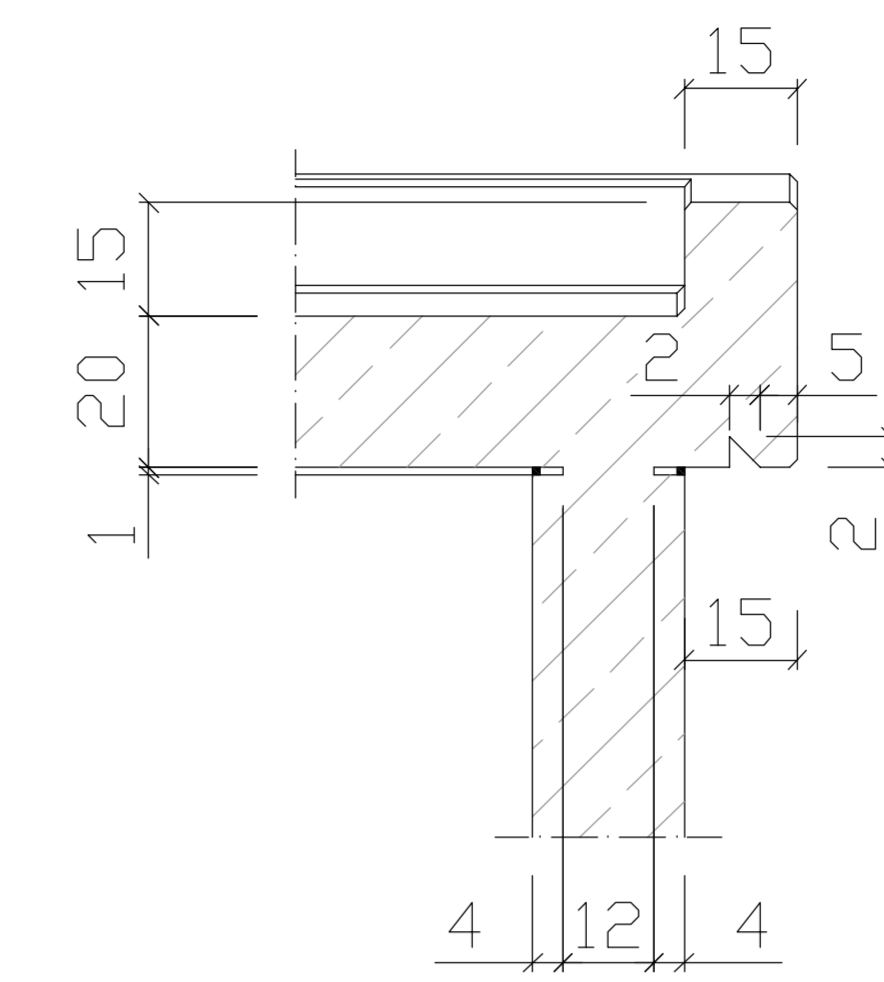
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SCHNITT A - A



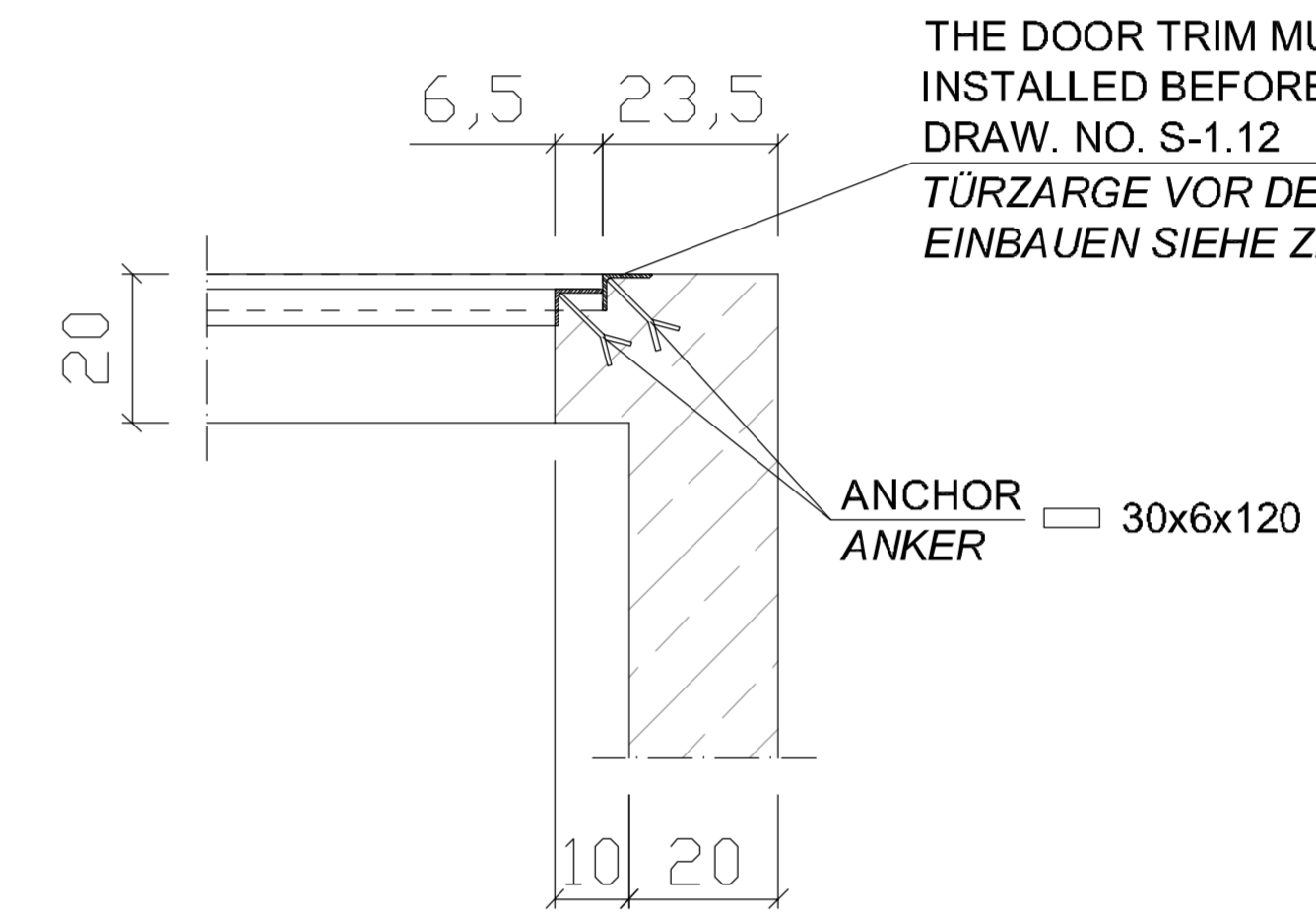
SECTION C - C  
SCHNITT C - C



DETAIL A  
SCALE 1:10  
MASSSTAB 1:10

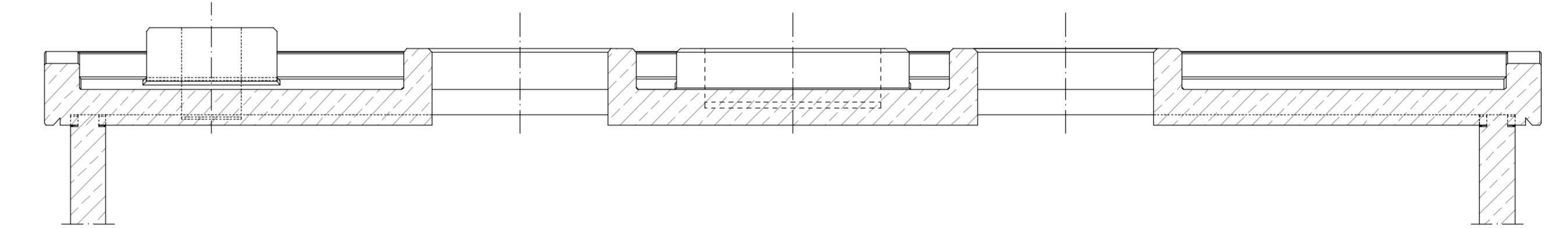


DETAIL B  
SCALE 1:10  
MASSSTAB 1:10

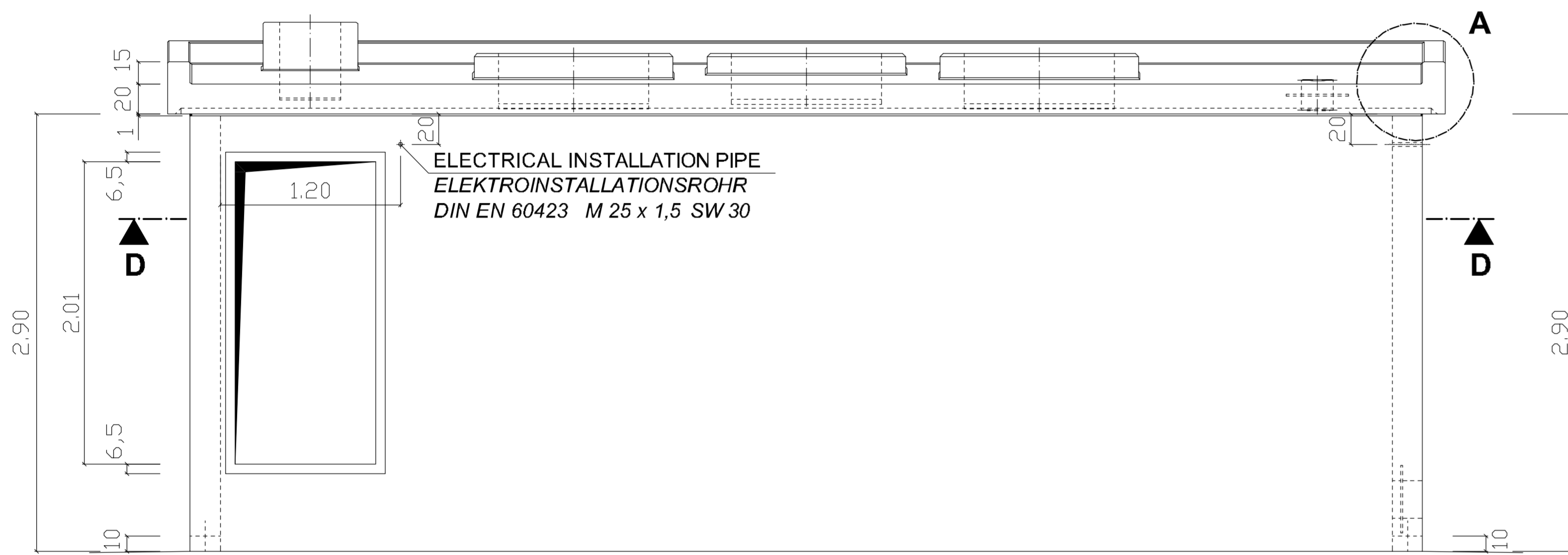


THE DOOR TRIM MUST BE INSTALLED BEFORE CONCRETING THE WALLS SEE DRAW. NO. S-1.12  
TÜRZARGE VOR DEM BETONIEREN EINBAUEN SIEHE ZEICHNUNG NR. 1.12

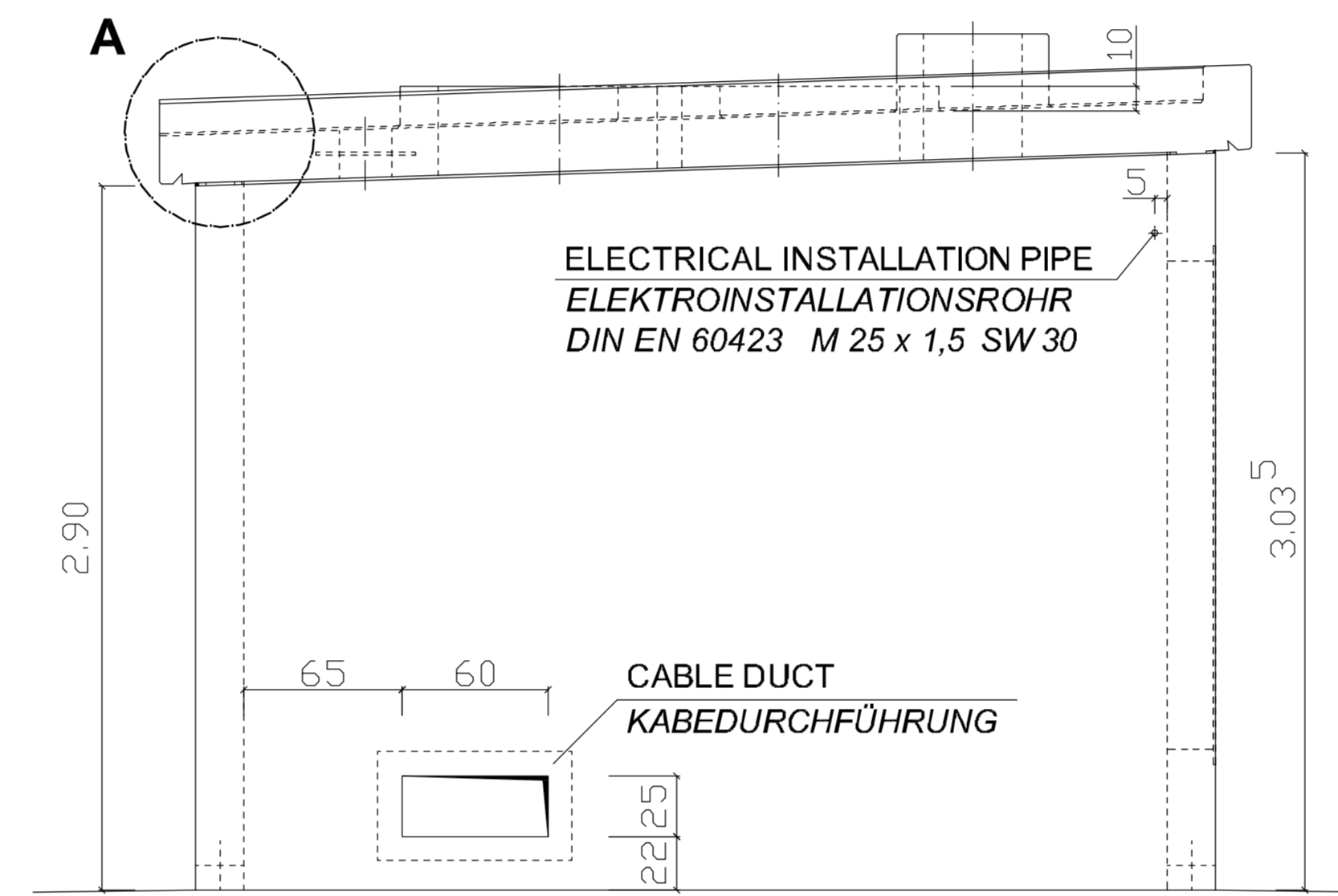
SECTION B - B  
SCHNITT B - B



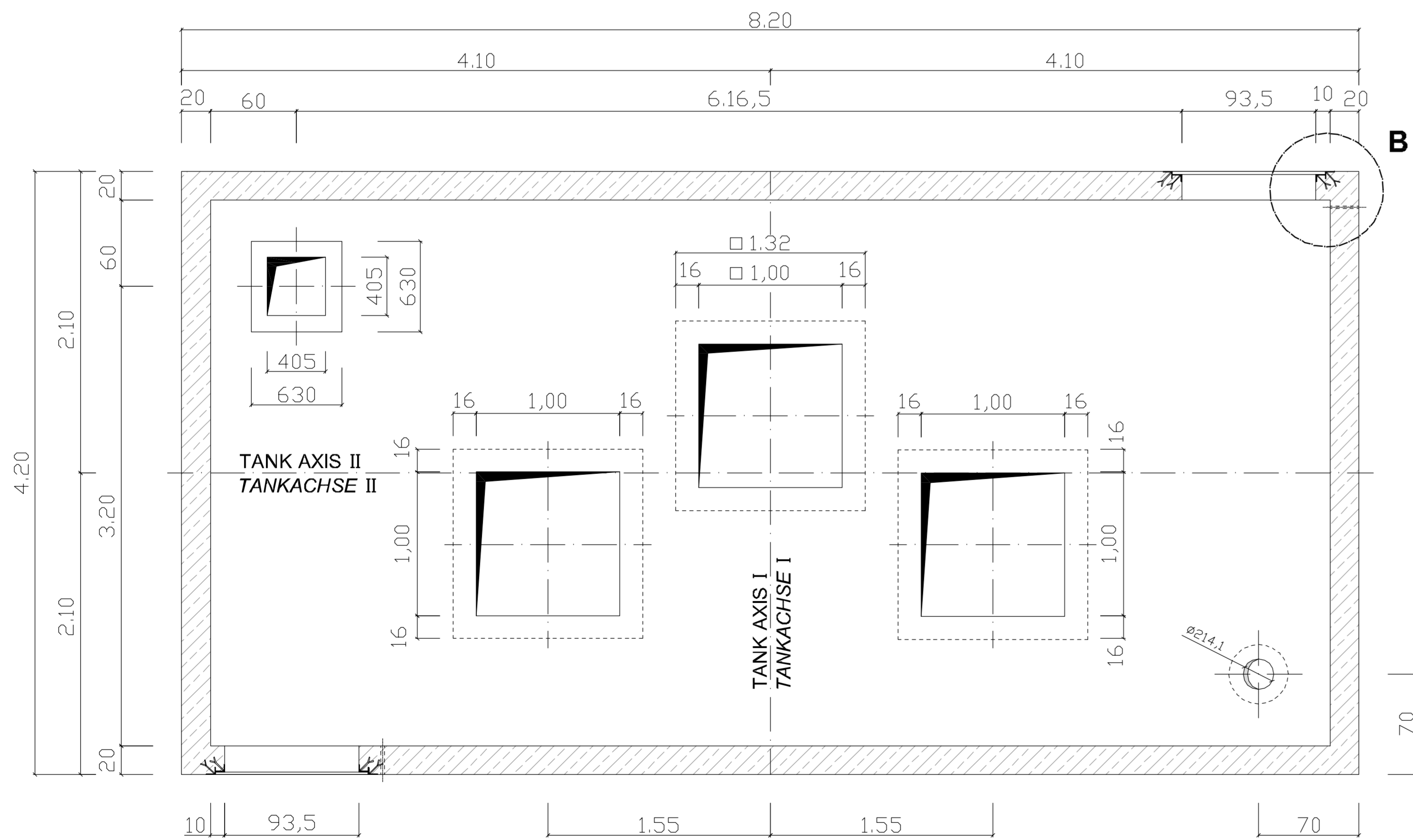
VIEW Z  
ANSICHT Z



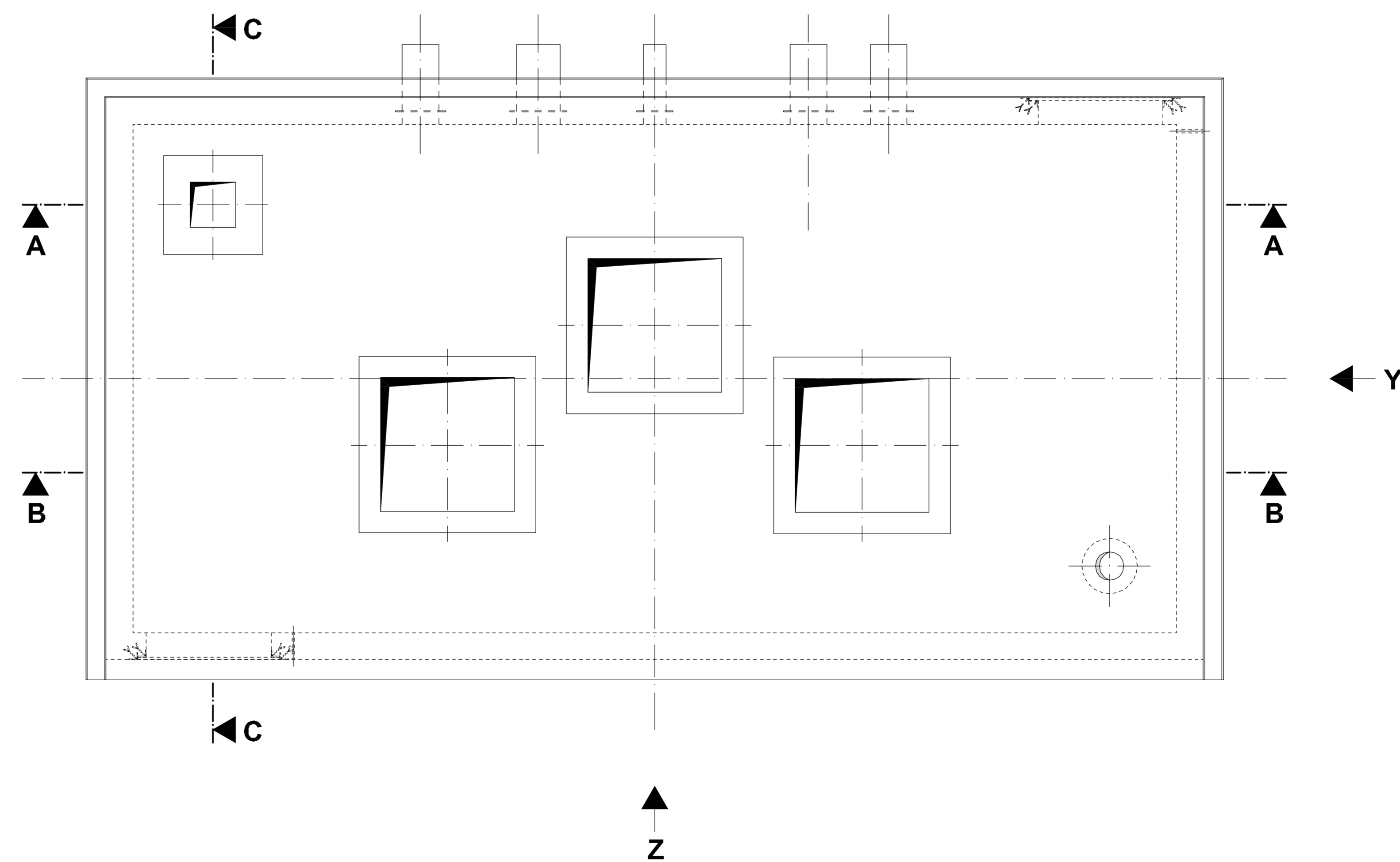
VIEW Y  
ANSICHT Y



SECTION D - D  
SCHNITT D - D



TOP VIEW  
DRAUFSICHT

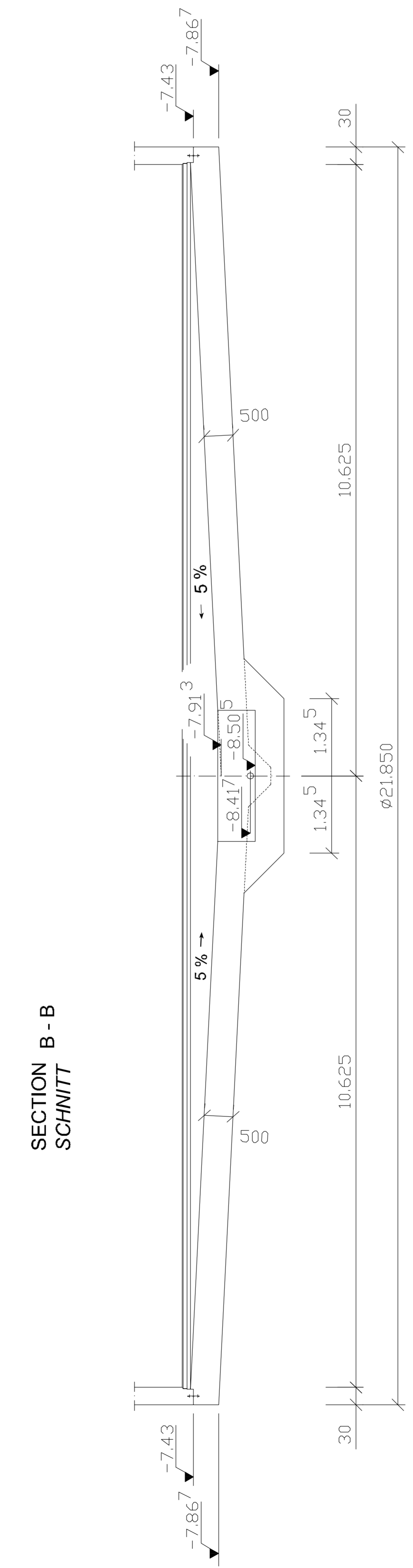
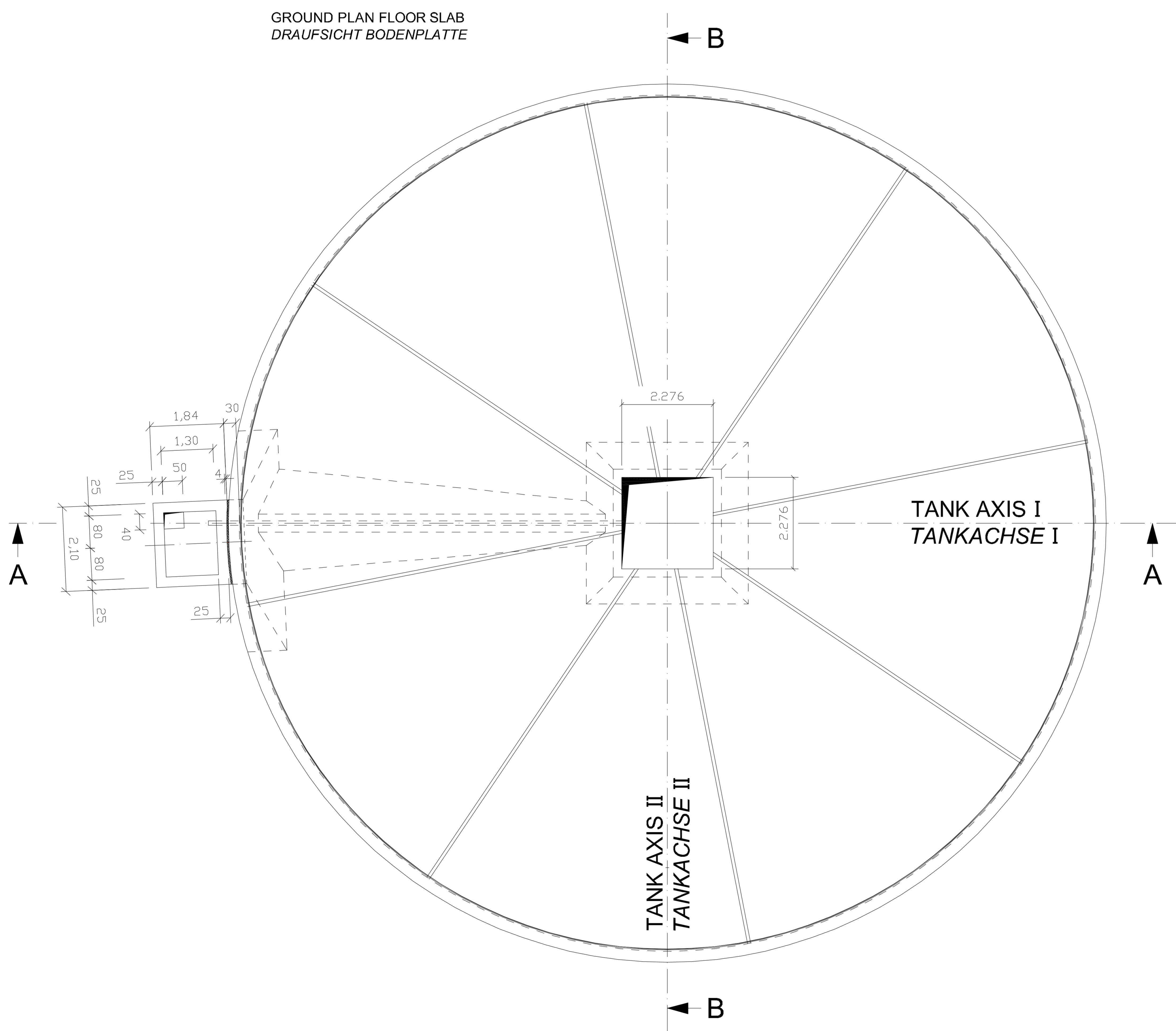
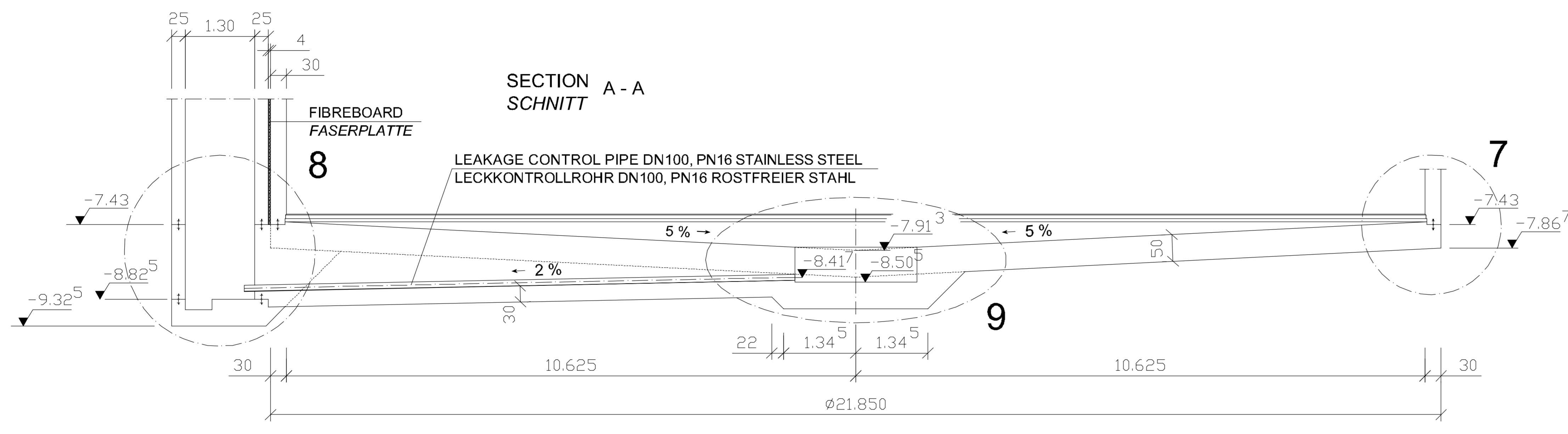


PERTINENT DRAWINGS  
ZUGEHÖRIGE ZEICHNUNGEN

- C-2.5 CONSTRUCTION PLAN PUMP HOUSE  
BAUKONSTRUKTIONSPLAN, PUMPENHAUS
- C-2.12 TANK STAIRS AND SPLINTER PROTECTION DOOR  
TANKTREPPE UND SPLITTERSCHUTZTÜR

REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
HEADQUARTERS UNITED STATES AIR FORCES EUROPE				
ENGINEERING & OPERATIONS				
AIRFIELD STANDARD DESIGN US JET FUEL STORAGE AND DISPENSING SYSTEMS			FLUGPLATZ STANDARDPLANUNG US FLUGKRAFTSTOFF - VERSORGUNGSANLAGEN	
BUILDING BAUWERK OPERATING TANK 2500m <sup>3</sup> FLACHBODENTANK 2500m <sup>3</sup>				
DESIGNATOR BEZEICHNUNG FORMWORK PLAN, PUMP HOUSE, ROOF AND WALLS SCHALPLAN, PUMPENHAUS, DECKE UND WÄNDE				
WORKED/BEARBEITET		PREPARED/HERGESTELLT	APPROVED/GENEHMIGT	
LANDSCHAFTS- UND BAUWERKE LAW-WEISSING/LANDSH		LANDSCHAFTS- UND BAUWERKE LAW-WEISSING/LANDSH	AMT FÜR BUNDESBAU WALLSTR.1 55122 MAINZ	
LANDSCHAFTS- UND BAUWERKE LAW-WEISSING/LANDSH		LANDSCHAFTS- UND BAUWERKE LAW-WEISSING/LANDSH	ORIGINAL, SIGNED BY IN ORIGINAL, GEZ. ORIGINAL, SIGNED BY IN ORIGINAL, GEZ. ORIGINAL, SIGNED BY IN ORIGINAL, GEZ.	
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAUWISSENEN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED GENEHMIGT	DATE DATUM	SCALE MASSSTAB	STANDARD SHEET STANDARDBLATT	
	6. MAI 2015	1:10 ; 1:25	C - 2.6	
CONSTRUCTION PROJECT BAUWISSENEN			SHEET NO. BLATT NR.	



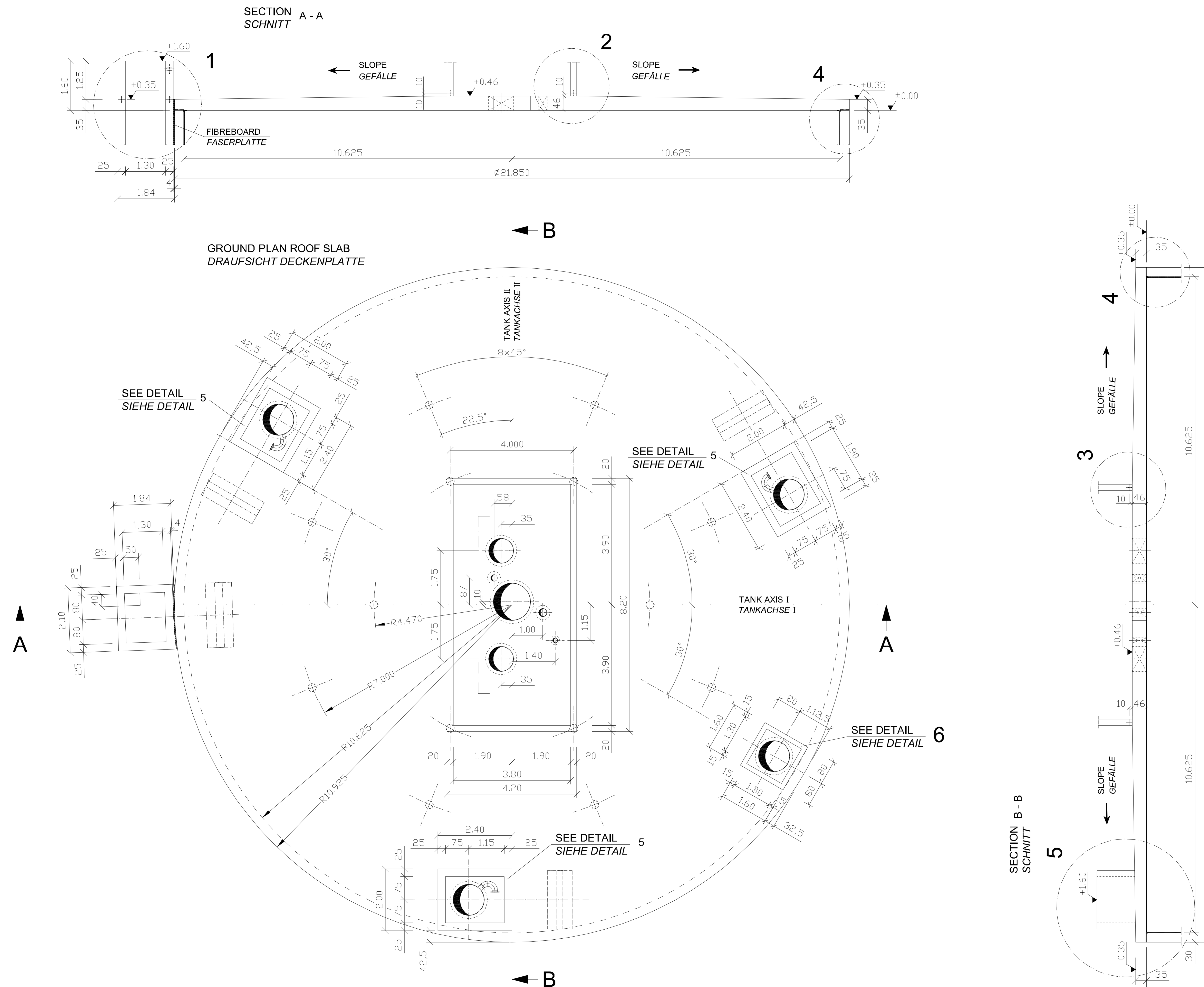


**PERTINENT DRAWINGS  
ZUGEHÖRIGE ZEICHNUNGEN**

C-2.9 FORMWORK PLAN, DETAILS ROOF - AND FLOOR SLAB  
SCHALPLAN, DETAILS DECKEN - UND BODENPLATTE

REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
<b>HEADQUARTERS</b>				
UNITED STATES AIR FORCES EUROPE				
<b>ENGINEERING &amp; OPERATIONS</b>				
AIRFIELD STANDARD DESIGN US		FLUGPLATZ STANDARDPLANUNG US		
JET FUEL STORAGE AND DISPENSING SYSTEMS		FLUGKRAFTSTOFF - VERSORGENGSANLAGEN		
<b>BUILDING BAUWERK</b>				
OPERATING TANK 2500m <sup>3</sup> FLACHBODENTANK 2500m <sup>3</sup>				
<b>DESIGNATOR BEZEICHNUNG</b>				
FORMWORK PLAN, FLOOR SLAB AND WALL SCHALPLAN, BODENPLATTE UND WAND				
WORKED/BEARBEITET		PREPARED/AUFGESTELLT	APPROVED/GENEHIGT	
LANDSCHAFTS- UND BAUVERMESSUNG L B B		AMT FÜR BUNDESBAU WALLSTR.1 55122 MAINZ		
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAU MASSNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED GENEHIGT	DATE DATUM	6. MAI 2015	SCALE MASSSTAB	1:50
ORIGINAL DRAWN BY IN ORIGINAL DED.			STANDARD SHEET STANDARD PLAN	
GENERAL INFO CONTRACTOR FACILITIES ENGINEER PLANNING ARCHITECT FIRM			CAD-PROJECT PATH: CAD-PROJECT	C - 2.7
CONSTRUCTION PROJECT BAU MASSNAHME			SHEET NO. PLATZNR.	OF VON



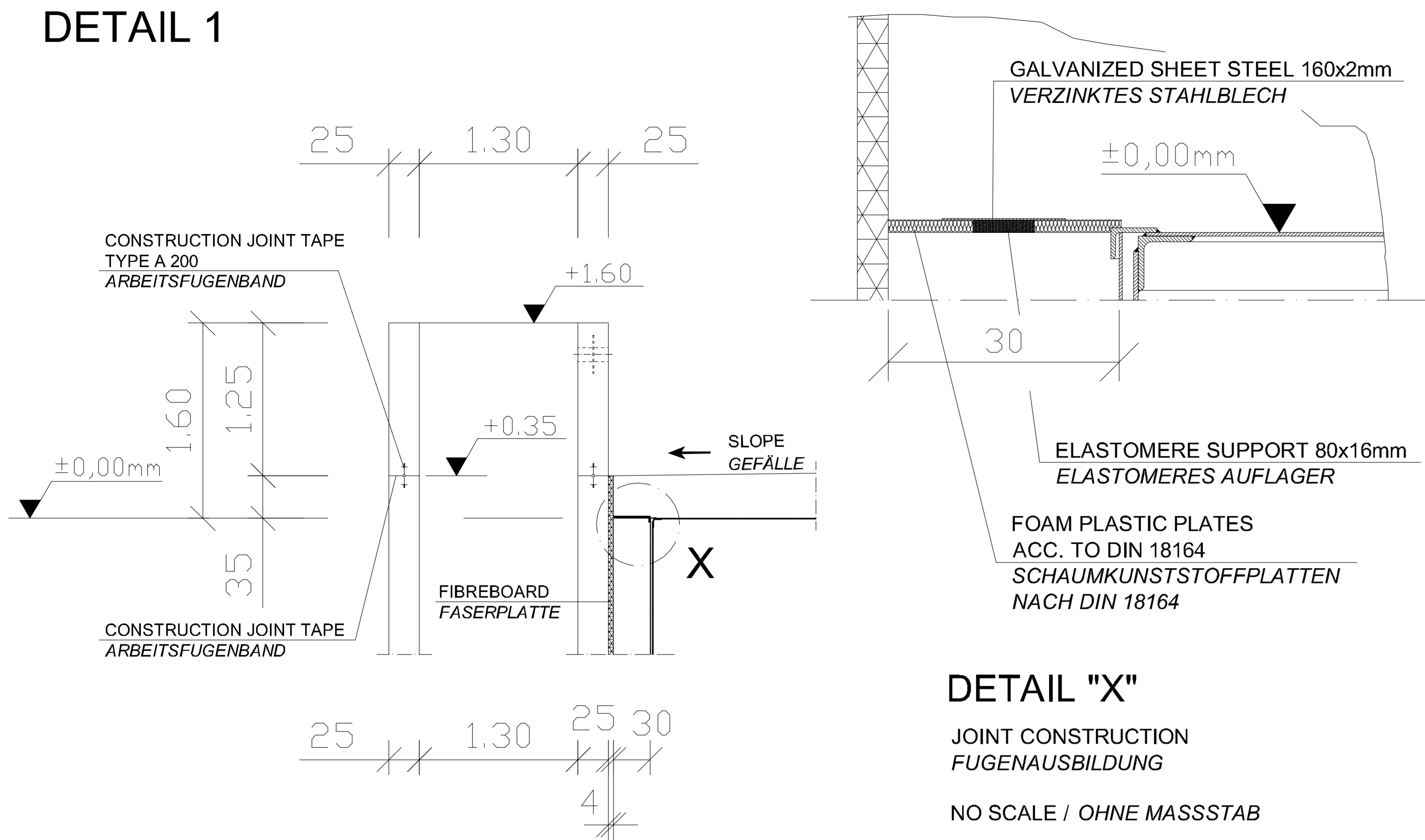


- PERTINENT DRAWINGS**  
ZUGEHÖRIGE ZEICHNUNGEN
- C-2.4 DETAILS - MANHOLES AND LEAKAGE CONTROL PIT  
DETAILS - MONTAGEÖFFNUNGEN UND LECKKONTROLLSCHACHT
  - C-2.9 FORMWORK PLAN, DETAILS ROOF - AND FLOOR SLAB  
SCHALPLAN, DETAILS DECKEN- UND BODENPLATTE

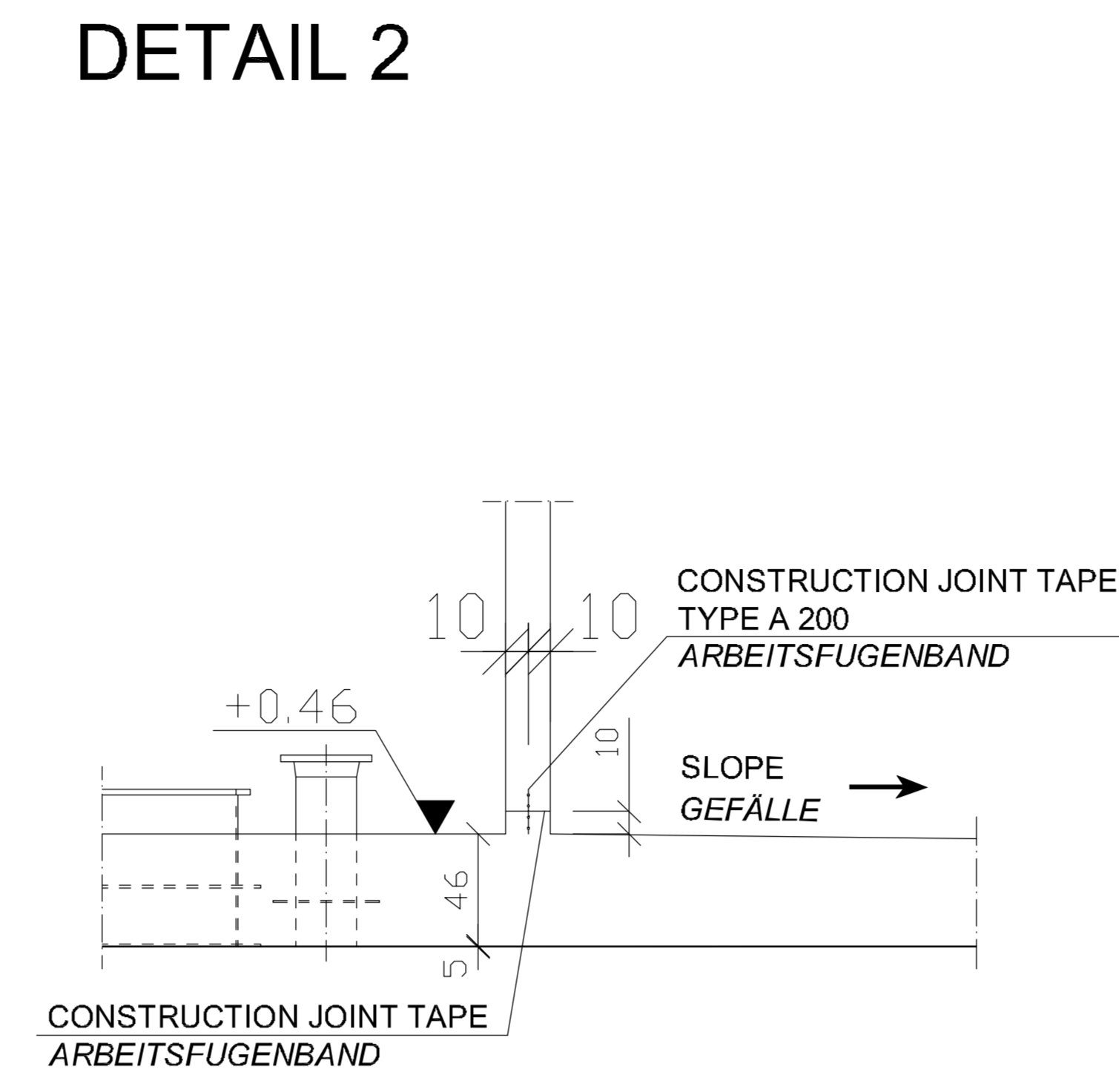
REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
<b>HEADQUARTERS</b>				
UNITED STATES AIR FORCES EUROPE				
<b>ENGINEERING &amp; OPERATIONS</b>				
AIRFIELD STANDARD DESIGN US			FLUGPLATZ STANDARDPLANUNG US	
JET FUEL STORAGE AND DISPENSING SYSTEMS			FLUGKRAFTSTOFF - VERSORGUNGSANLAGEN	
<b>BUILDING BAUWERK</b>				
<b>OPERATING TANK 2500m<sup>3</sup></b> <b>FLACHBODENTANK 2500m<sup>3</sup></b>				
<b>DESIGNATOR BEZEICHNUNG</b>				
<b>FORMWORK PLAN, ROOF SLAB</b> <b>SCHALPLAN, DECKENPLATTE</b>				
WORKED/BEARBEITET		PREPARED/AUFGESTELLT	APPROVED/GENEHMIGT	
LANDSBEREITUNGSGESAMTSCHAFT UND BAUVERBUND L B B		AMT FÜR BUNDESBAU WALLSTR.1 55122 MAINZ		
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAUMASSNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED GENEHMIGT	DATE DATUM	6. MAI 2015		SCALE MASSSTAB
ORIGINAL DRAWN BY IN ORIGINAL DED.				1:50
CONSTRUCTION PROJECT BAU MASSNAHME				STANDARD SHEET STANDARD PLAN
				C - 2.8
				SHEET NO. PLATZ NR.
				OF VON



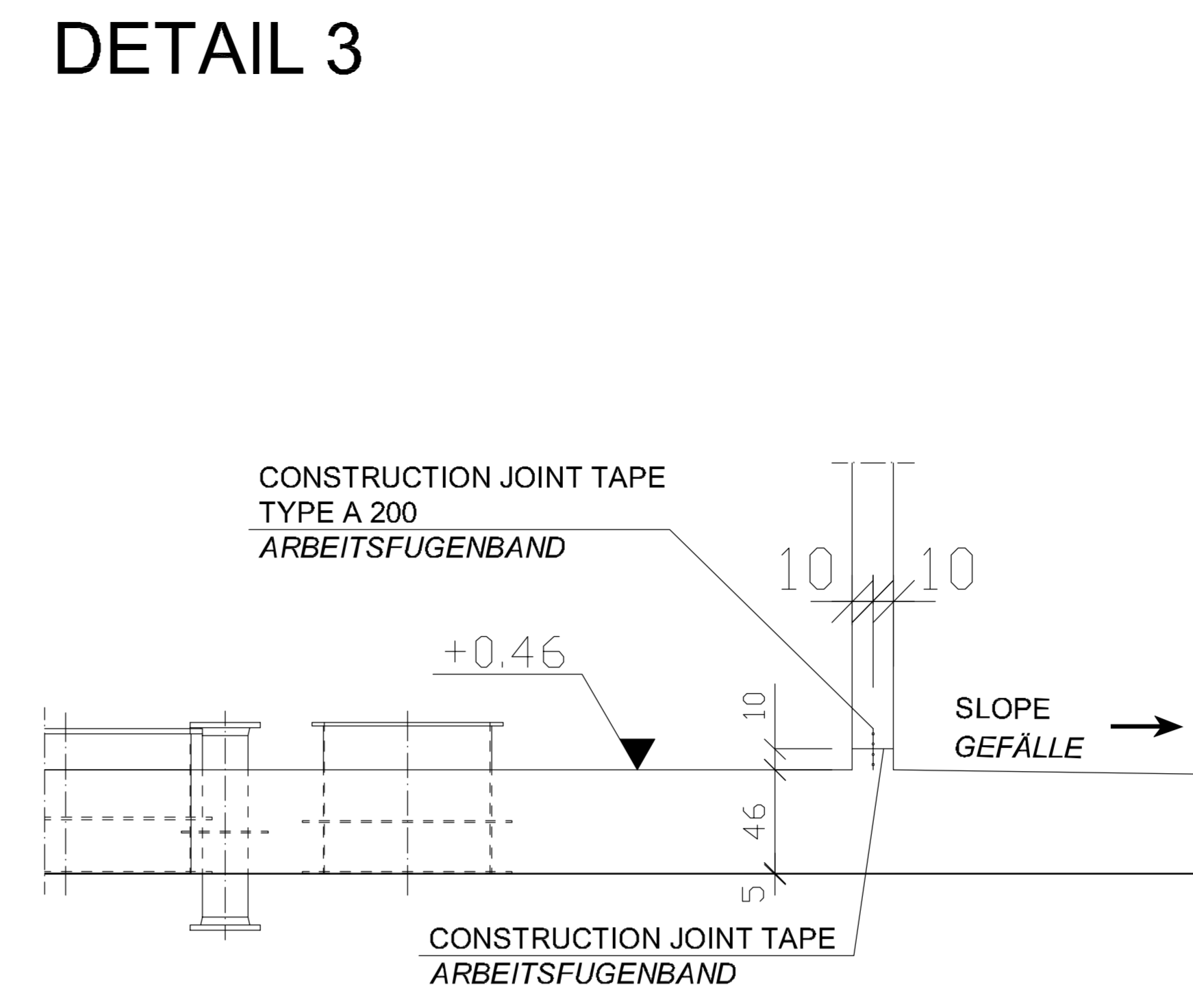
DETAIL 1



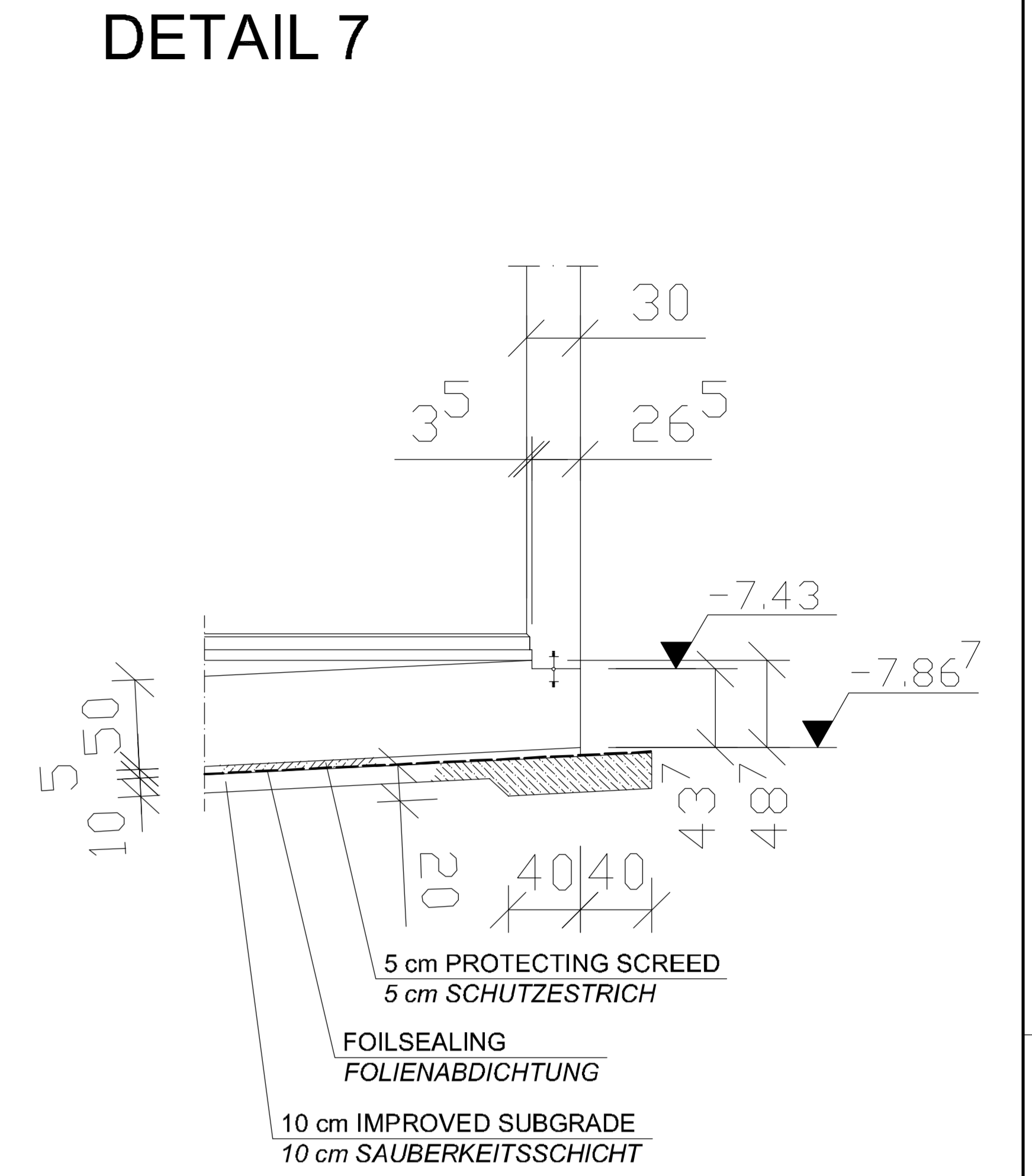
DETAIL 2



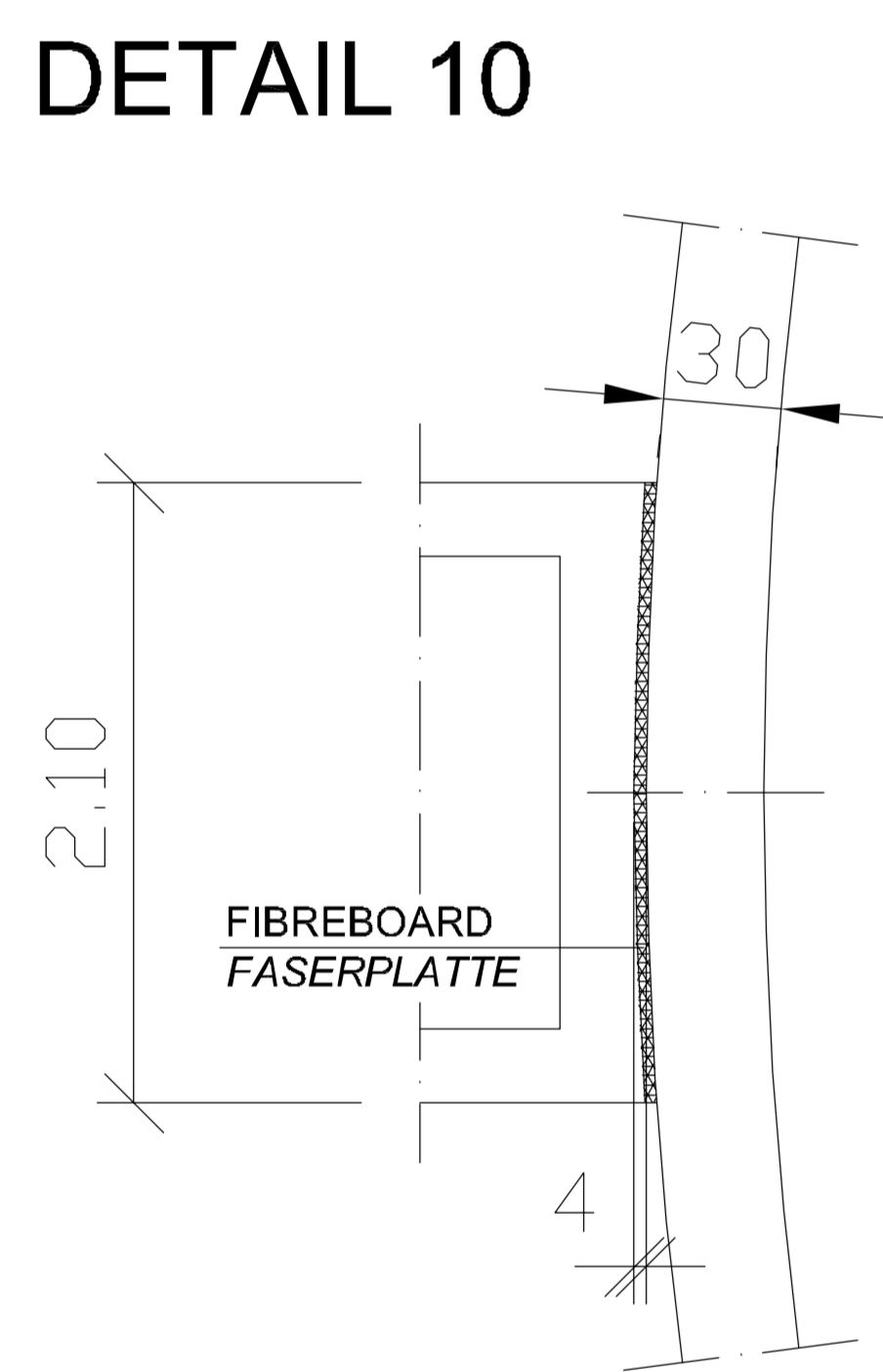
DETAIL 3



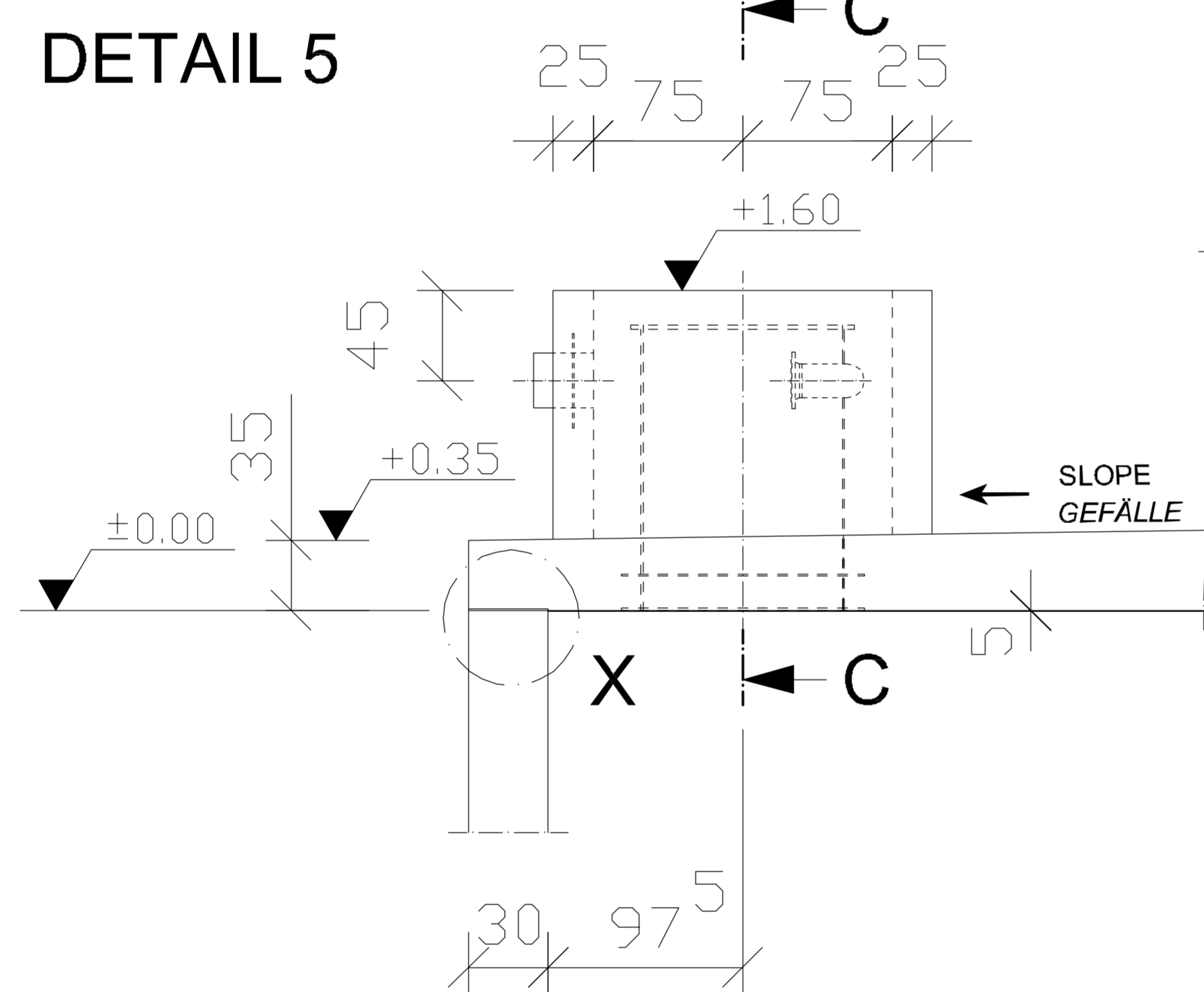
DETAIL 7



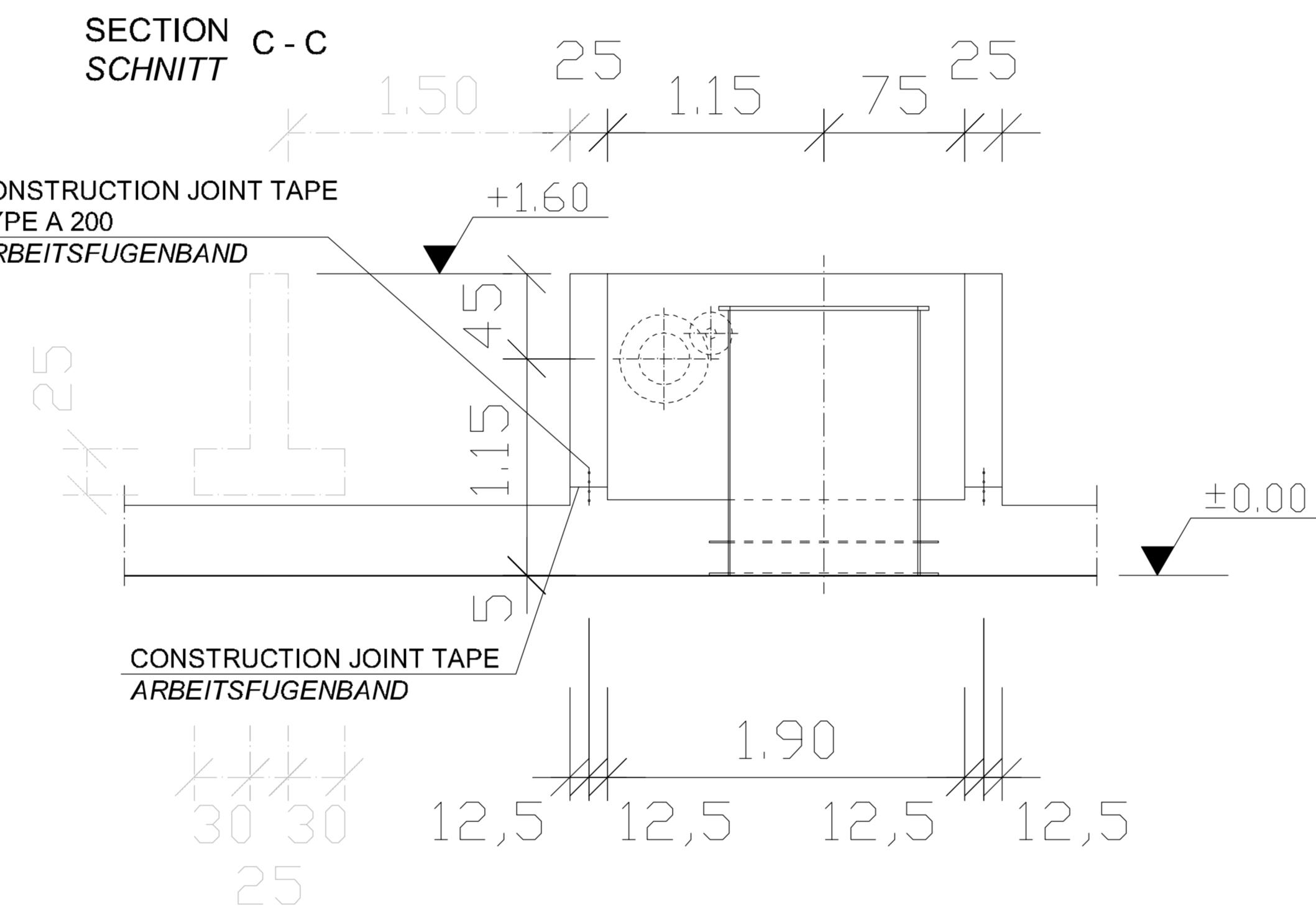
DETAIL 10



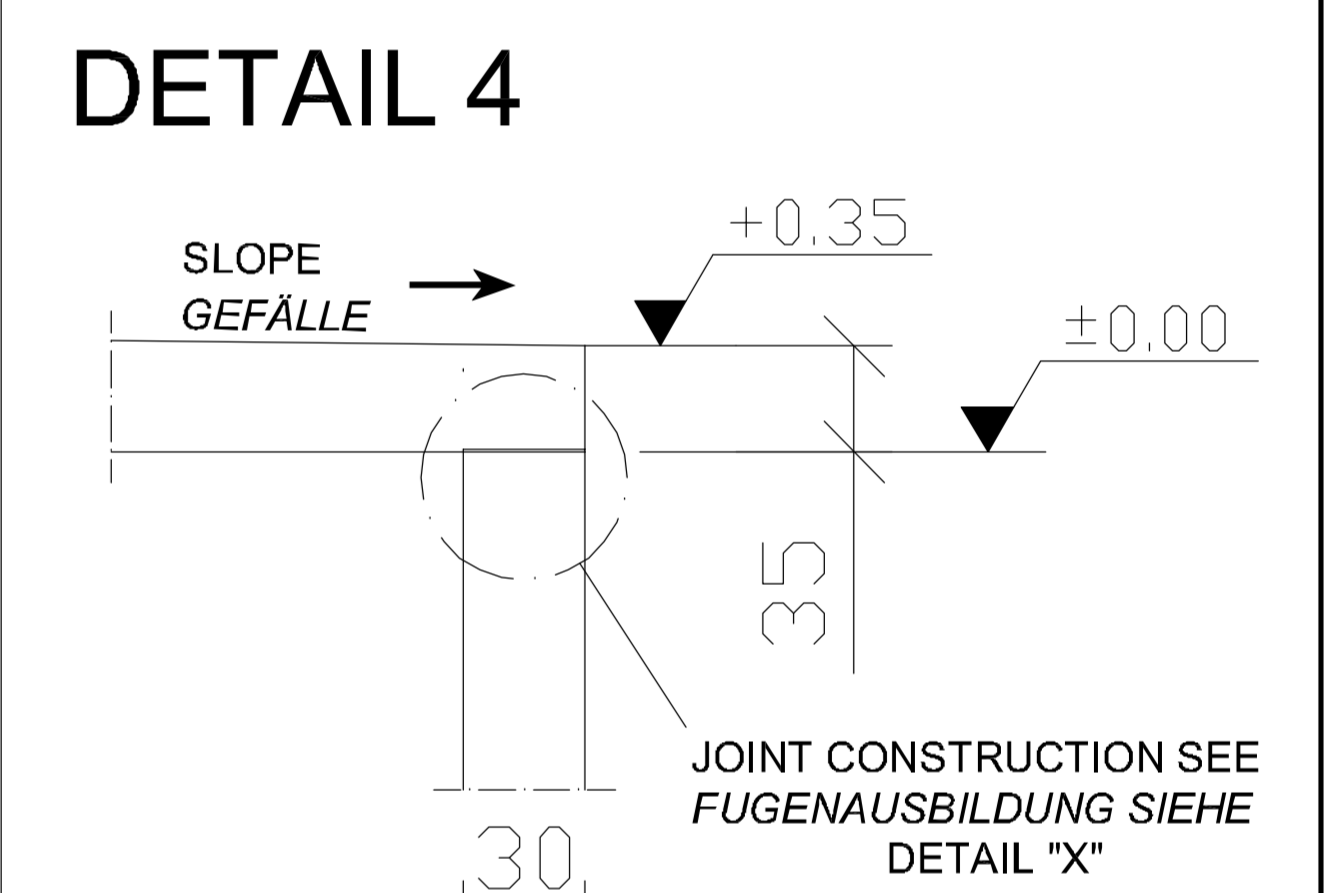
DETAIL 5



DETAIL 6

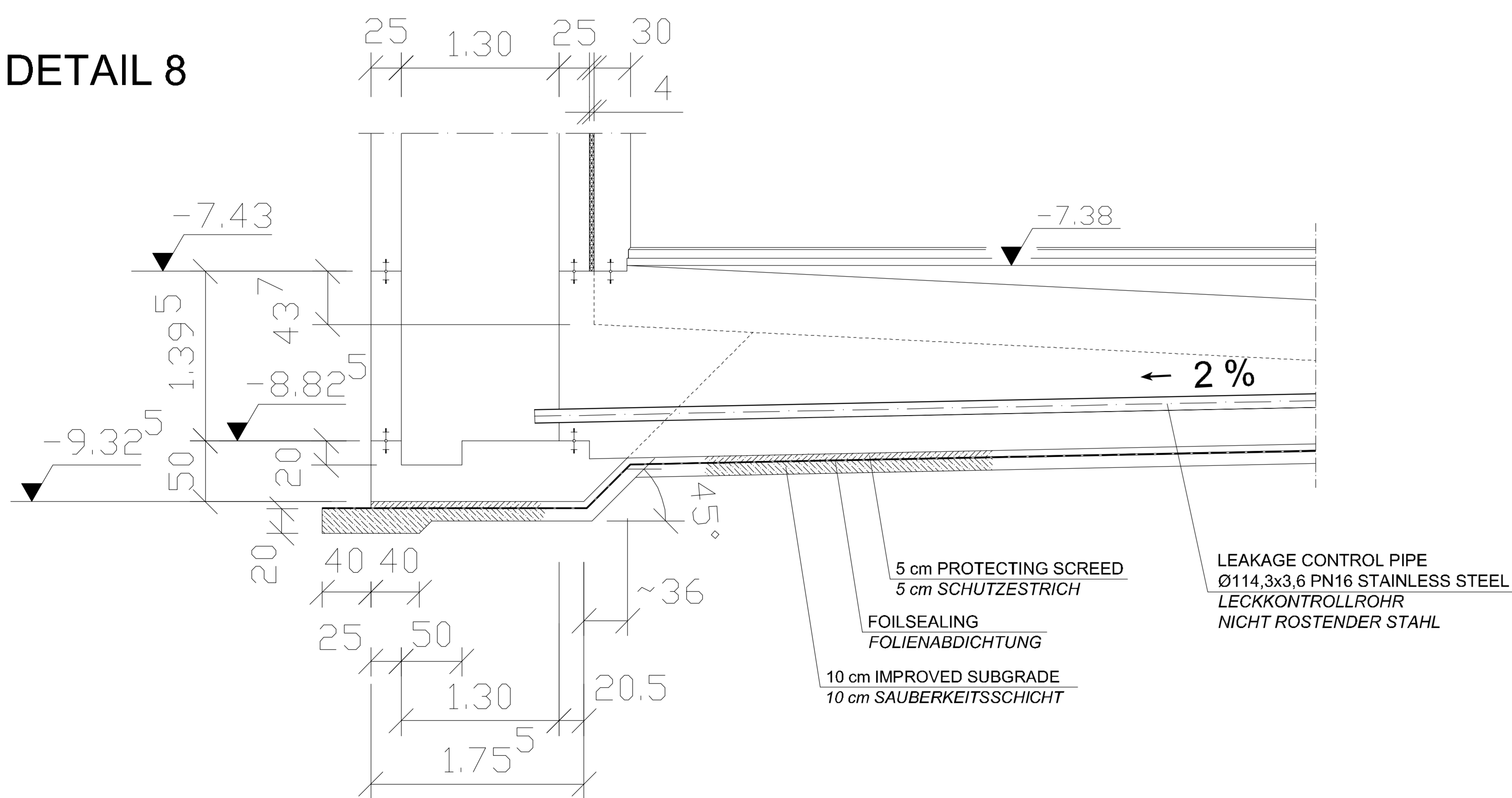


DETAIL 4

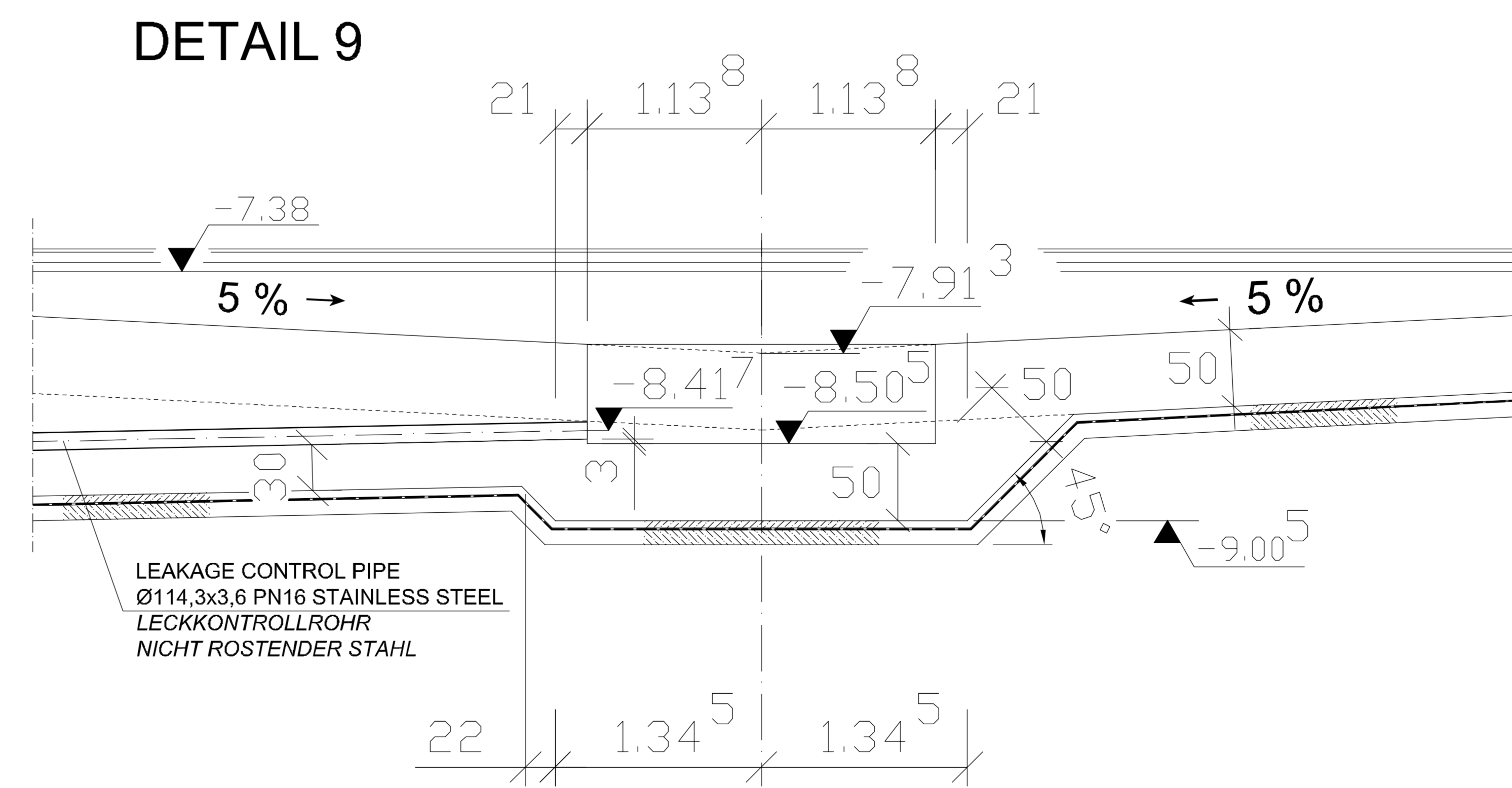


- PERTINENT DRAWINGS ZUGEHÖRIGE ZEICHNUNGEN
- C-2.4 DETAILS - MANHOLES AND LEAKAGE CONTROL PIT DETAILS - MONTAGEÖFFNUNGEN UND LECKKONTROLLSCHACHT
  - C-2.7 FORMWORK PLAN, FLOOR SLAB AND WALL SCHALPLAN, BODENPLATTE UND WAND
  - C-2.8 FORMWORK PLAN, ROOF SLAB SCHALPLAN, DECKENPLATTE

DETAIL 8



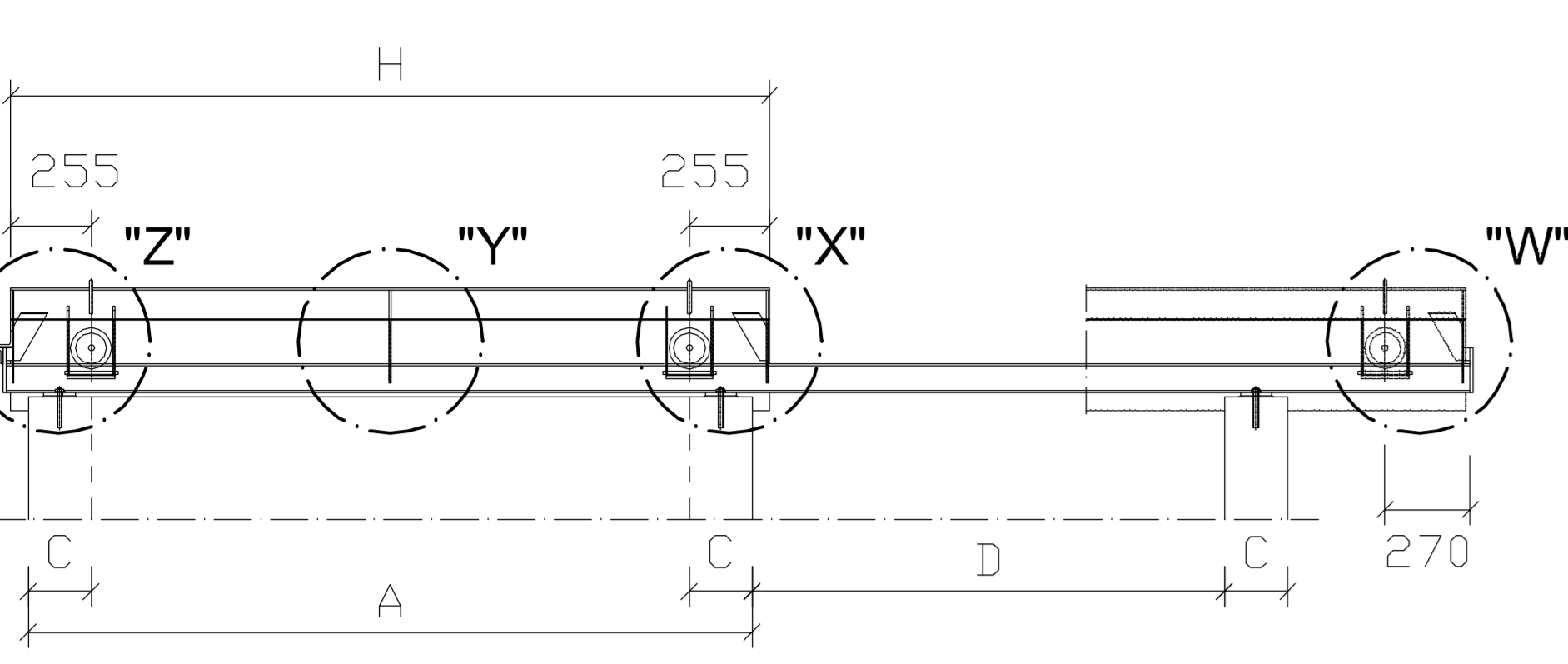
DETAIL 9



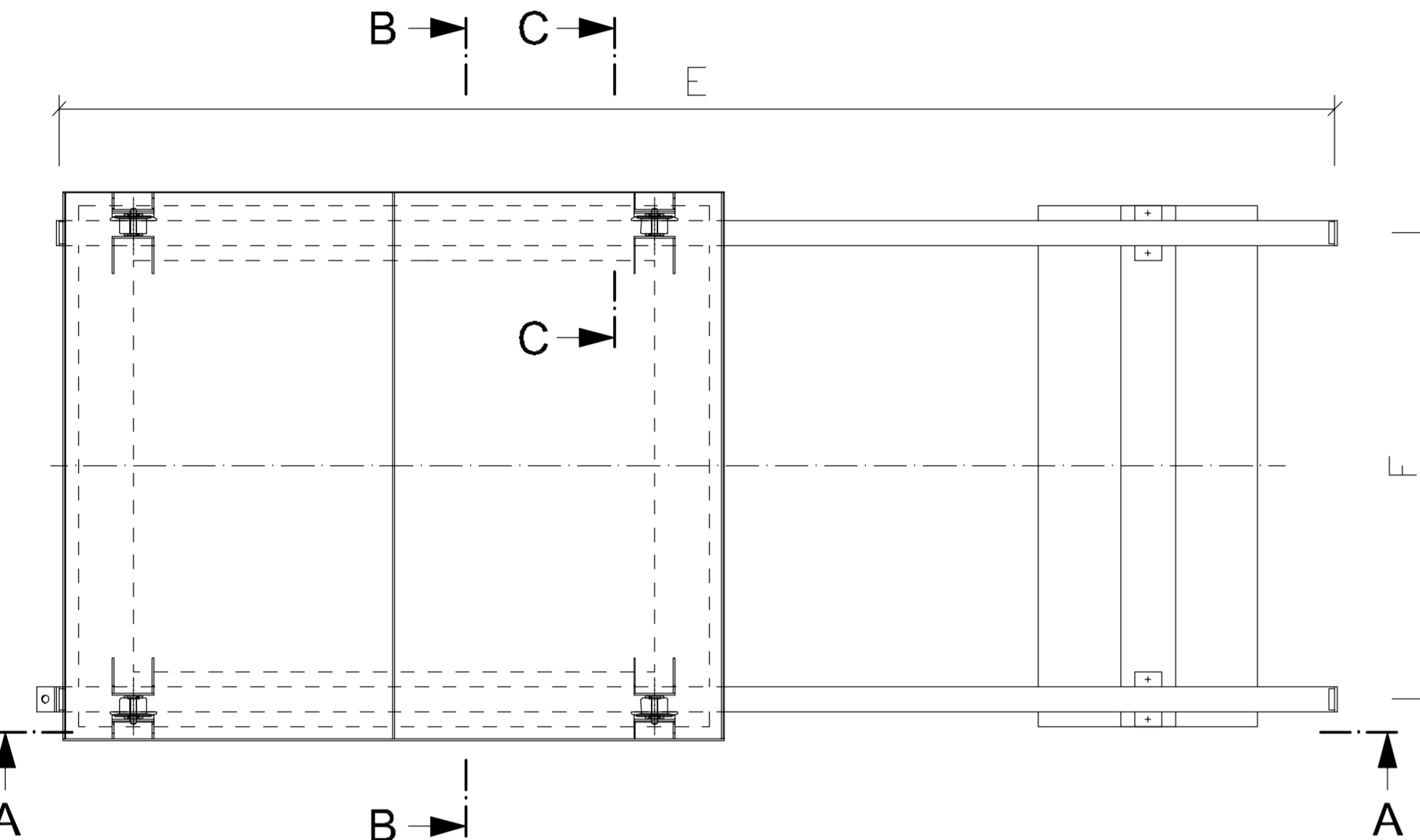
REVISION	DATE	DESCRIPTION	BY	COUNTRY
ÄNDERUNG	DATUM	BESCHREIBUNG	VON	LAND
HEADQUARTERS UNITED STATES AIR FORCES EUROPE				
ENGINEERING & OPERATIONS				
AIRFIELD STANDARD DESIGN US			FLUGPLATZ STANDARDPLANUNG US	
JET FUEL STORAGE AND DISPENSING SYSTEMS			FLUGKRAFTSTOFF - VERSORGENGSANLAGEN	
OPERATING TANK 2500m <sup>3</sup> FLACHBODENTANK 2500m <sup>3</sup>				
FORMWORK PLAN, DETAILS ROOF- AND FLOOR SLAB SCHALPLAN, DETAILS DECKEN- UND BODENPLATTE				
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAU MASSNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED	DATE	SCALE		
GENEHIGT	6. MAI 2015	1:25		
ORIGINAL DESIGNED BY	DATE	STANDARD SHEET		
IN ORIGINAL DES.		STANDARD PLAN		
DESIGNER		CAD-PROJECT NAME	C - 2.9	
CONSTRUCTION PROJECT		CAD-PROJECT PATH	SHEET NO. OF TOTAL	
BAU MASSNAHME		CAD-PROJECT		



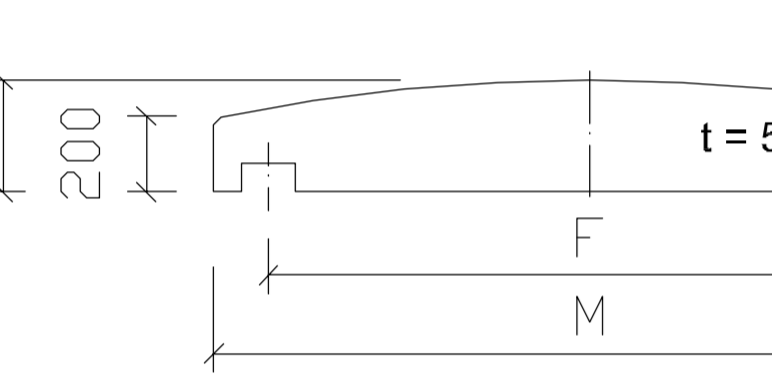
**SECTION A - A**  
**SCHNITT A - A**



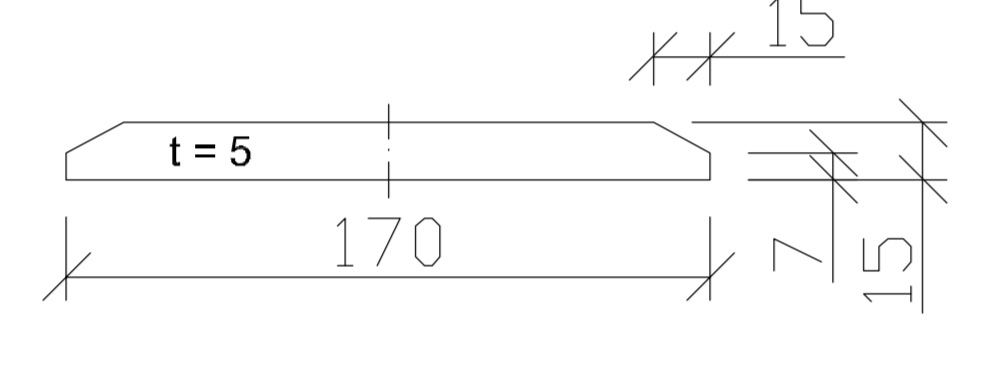
**TOP VIEW DRAUFSICHT**



**DETAIL "U"**  
GABLE PLATE AND CROSS BRACING  
STIRNBLECH UND QUERVERSTEIFUNG

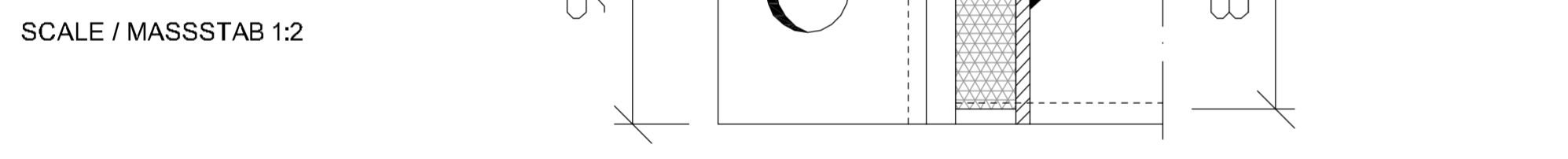


**DETAIL "V"**  
GUIDE RAIL FOR LIFT-OFF PROTECTION  
FÜHRUNGSSCHIENE FÜR ABHEBESICHERUNG

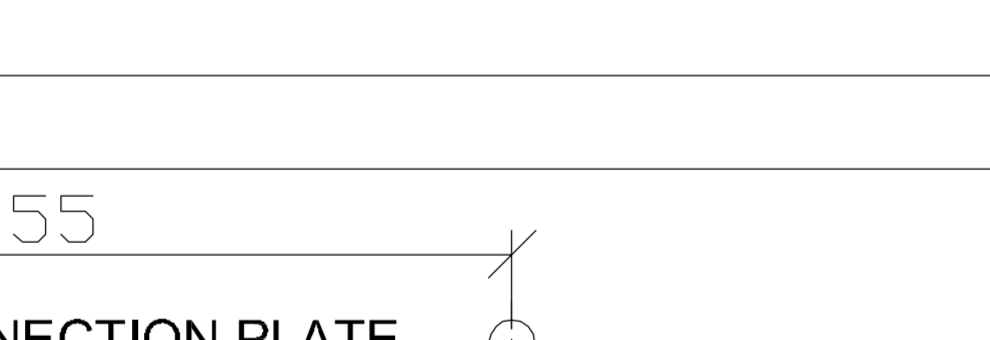


LEAKAGE CONTROL PIT LECKKONTROLLSCHACHT	A	B	C	D	E	F	G	H	J	K (5%v.J)	L	M	N	P
MANHOLE MONTAGEÖFFNUNG	2400	2000	250	1500	4800	1750	125	2510	2100	105	300	2090	192	175

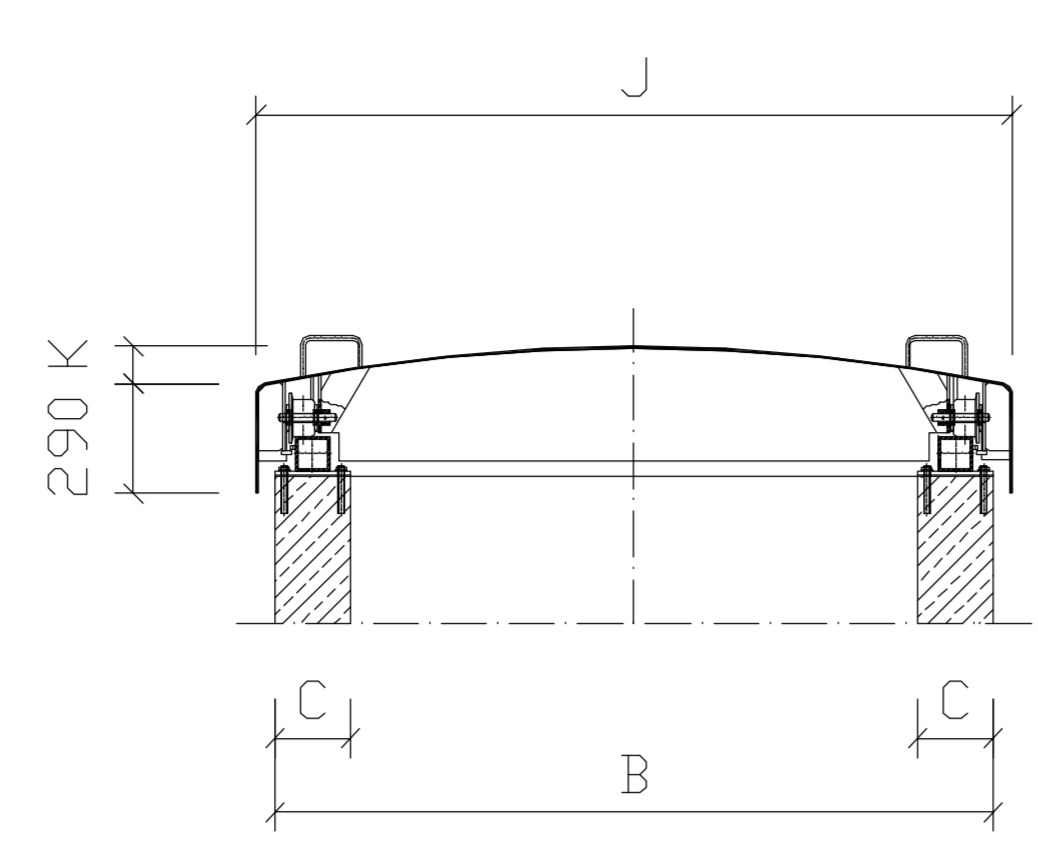
**SECTION D - D**  
**SCHNITT D - D**



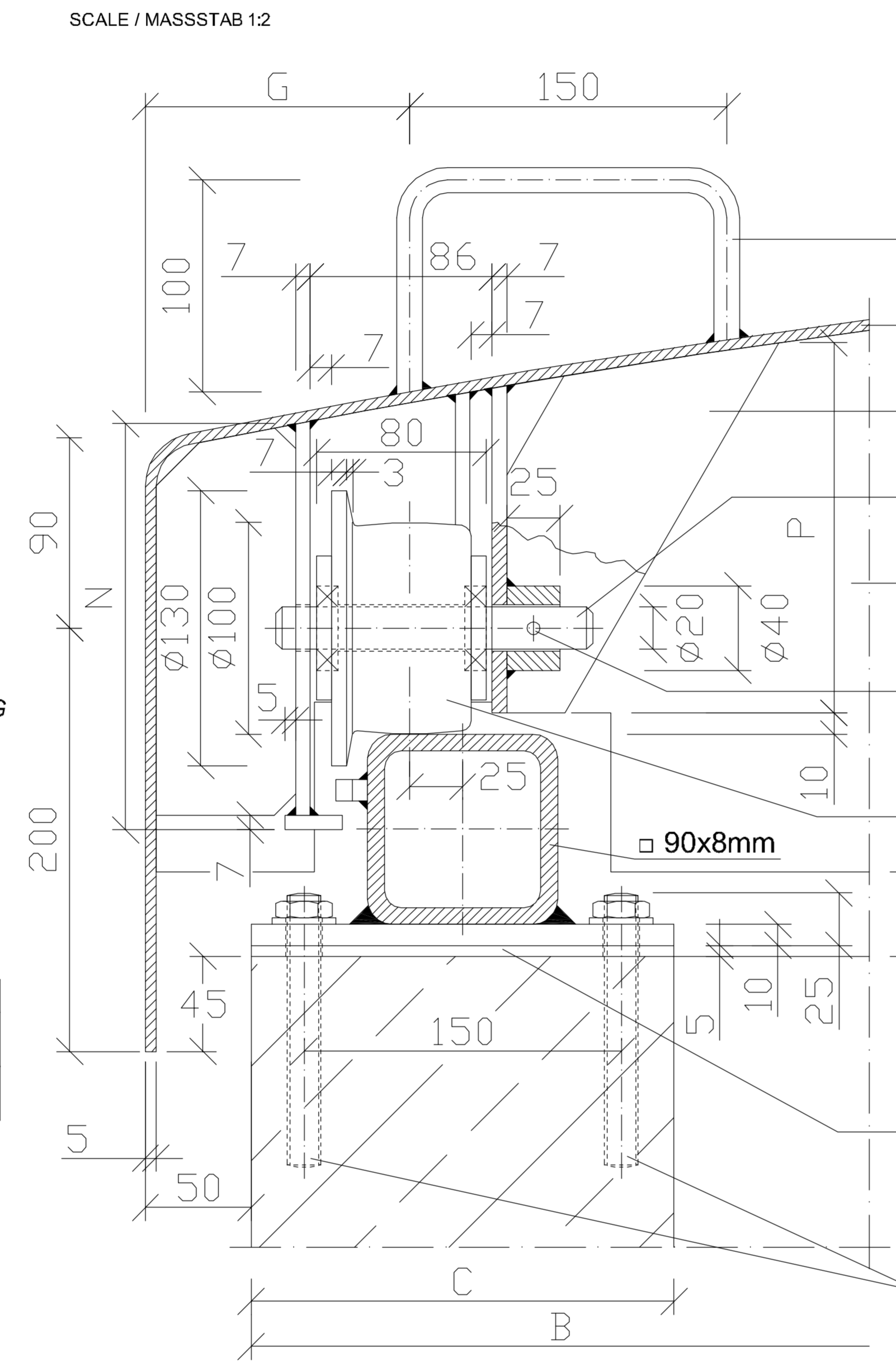
**DETAIL "Z"**  
INTERLOCKING, STOP AND CASTOR  
VERRIEGELUNG, ANSCHLAG UND LAUFROLLE



**SECTION B - B**  
**SCHNITT B - B**

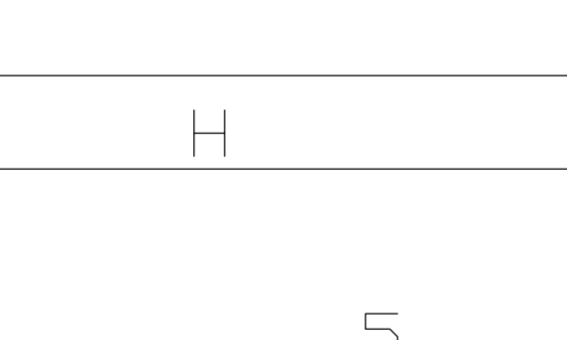


**SECTION C - C**  
**SCHNITT C - C**

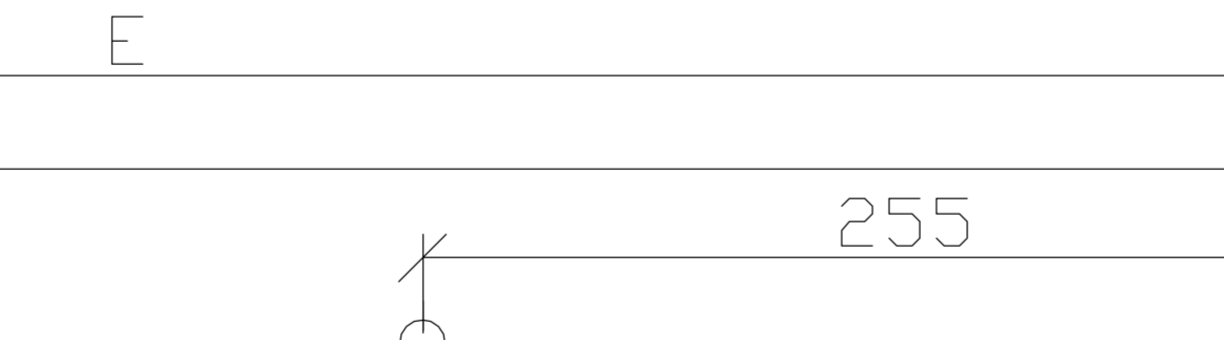


- HANDLE Ø12mm  
HANDGRIFF
- COVER PLATE t = 5mm  
ABDECKBLECH
- CONNECTION PLATE t = 5mm  
KNOTENBLECH
- PIN Ø20x150mm  
BOLZEN
- GABLE PLATE t = 5mm  
STIRNBLECH
- SPRING TYPE STRAIGHT Ø6x40mm  
SPANNHÜLSE
- CASTOR WITH GROOVED BALL BEARING  
LAUFROLLE MIT RILLENKUGELLAGER
- COMPENSATION LAYER OF ARTIFICIAL OR WATER RESISTANT ARTIFICIAL RESIN MORTAR  
AUSGLEICHSSCHICHT AUS KUNSTHARZ ODER WASSERDICHEM KUNSTHARZMÖRTEL
- COMPOSITE DOWEL M10x130mm  
VERBUNDANKER

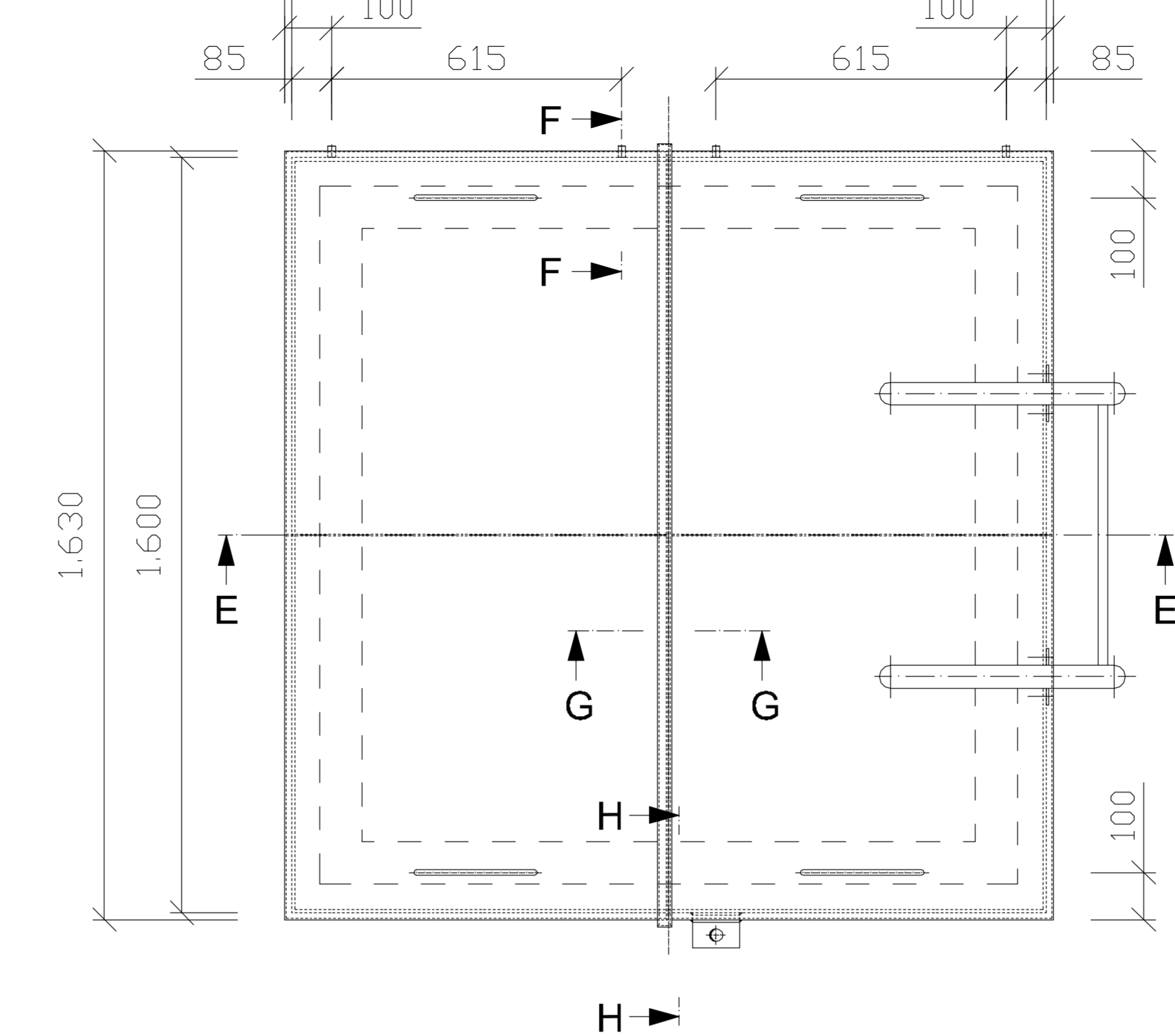
**DETAIL "Y"**  
CROSS BRACING  
QUERVERSTEIFUNG



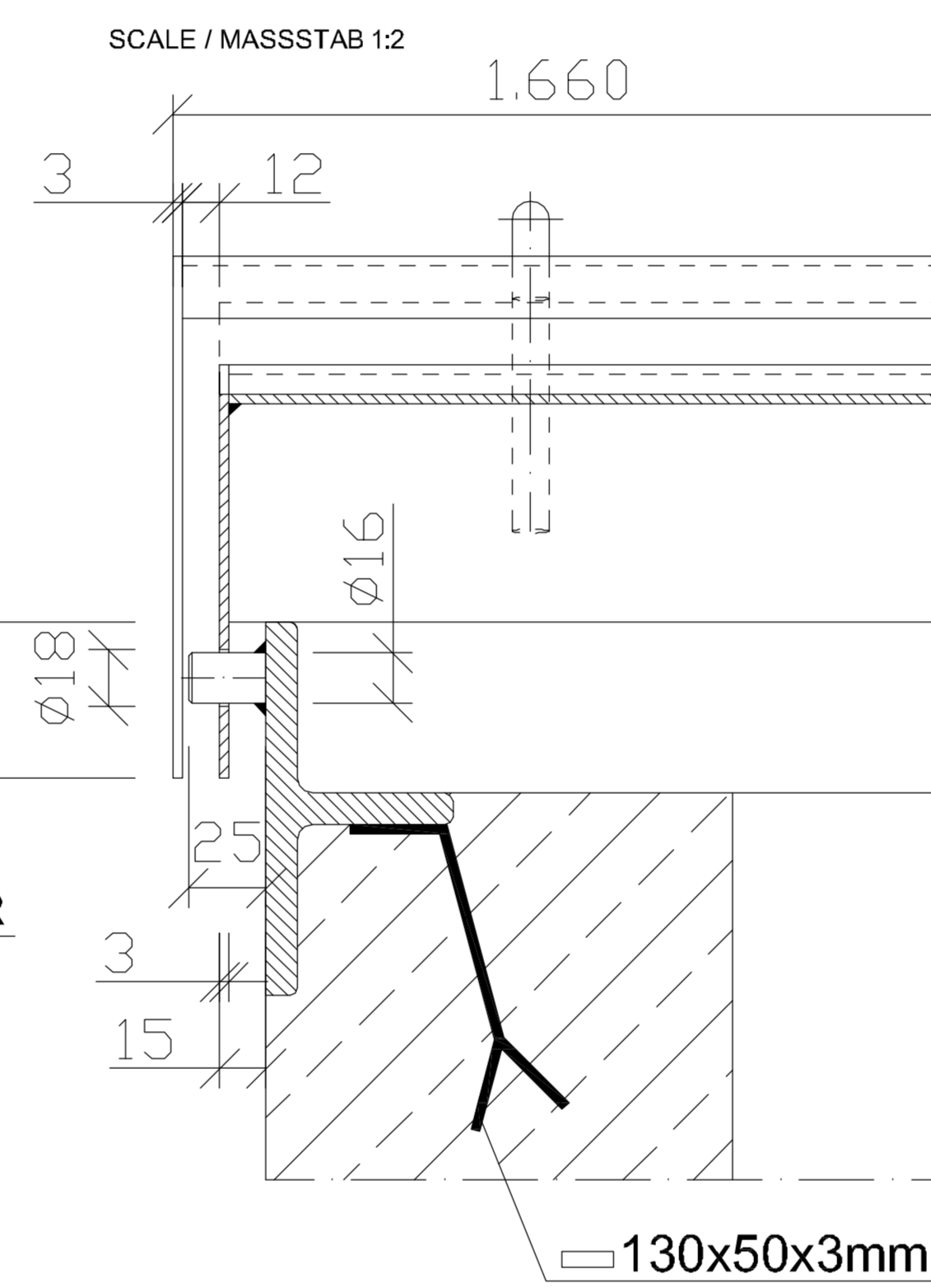
**DETAIL "X"**  
CASTOR AND RAIL HOLDING  
LAUFROLLE UND SCHIENENHALTERUNG



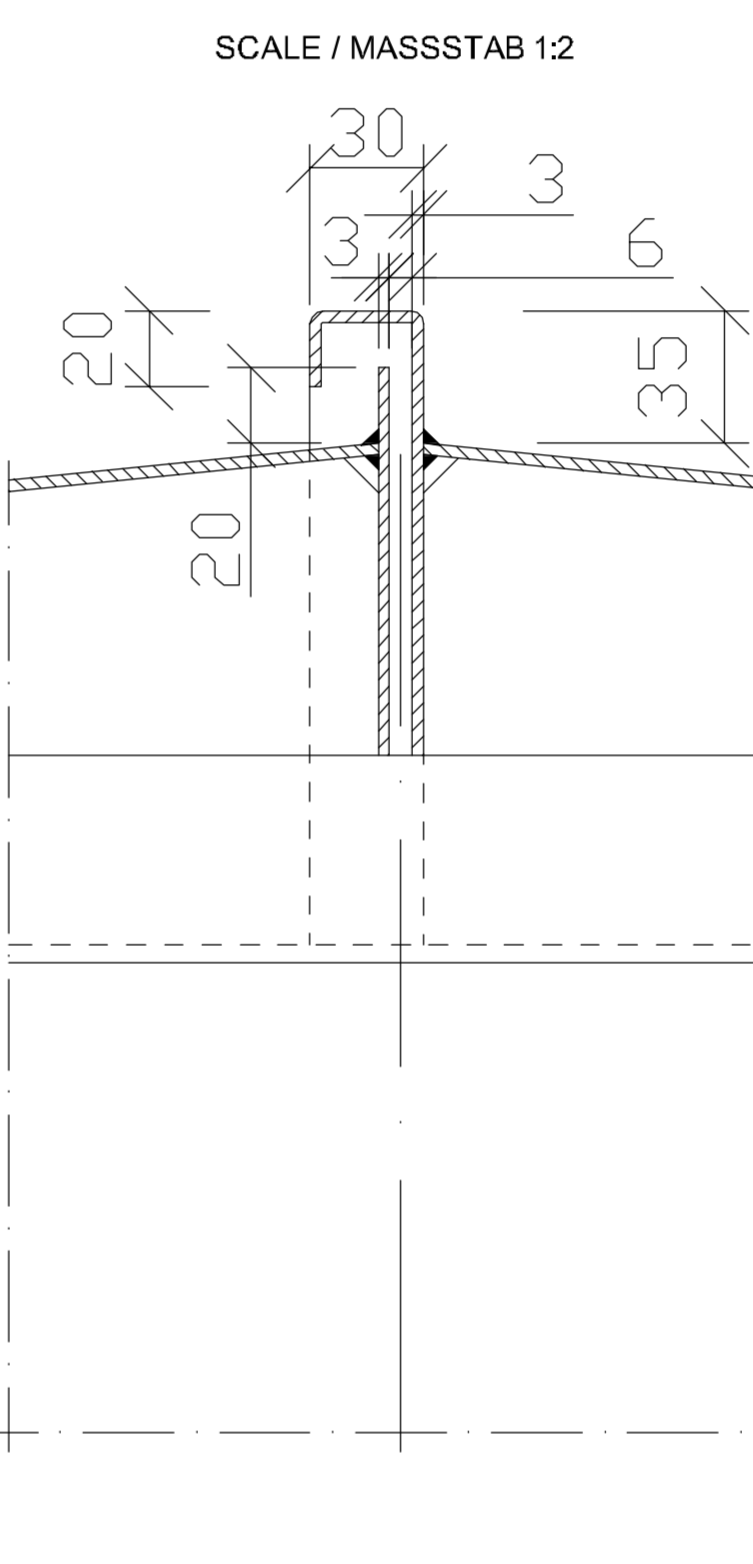
**TOP VIEW DRAUFSICHT**



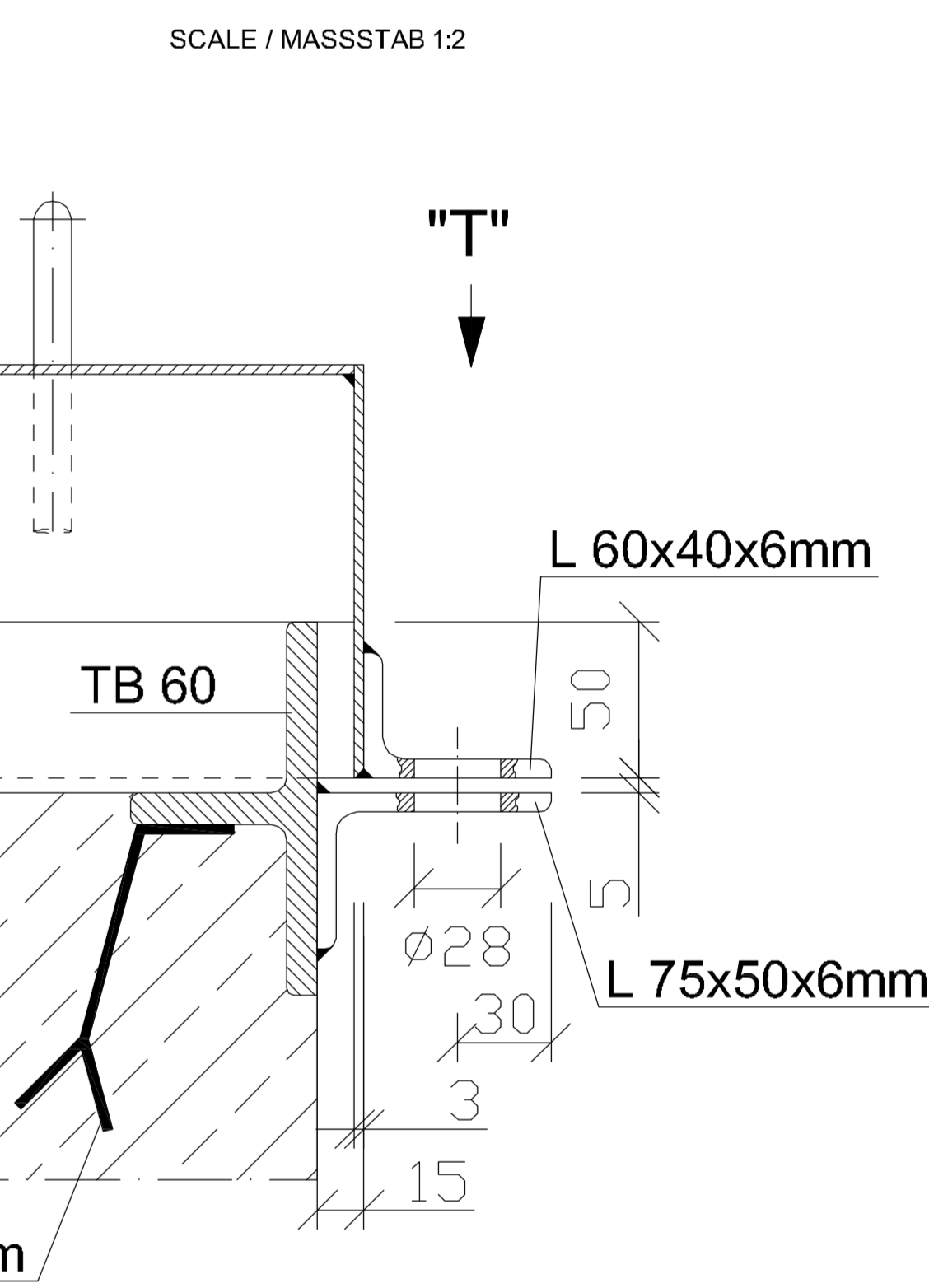
**SECTION F - F**  
**SCHNITT F - F**



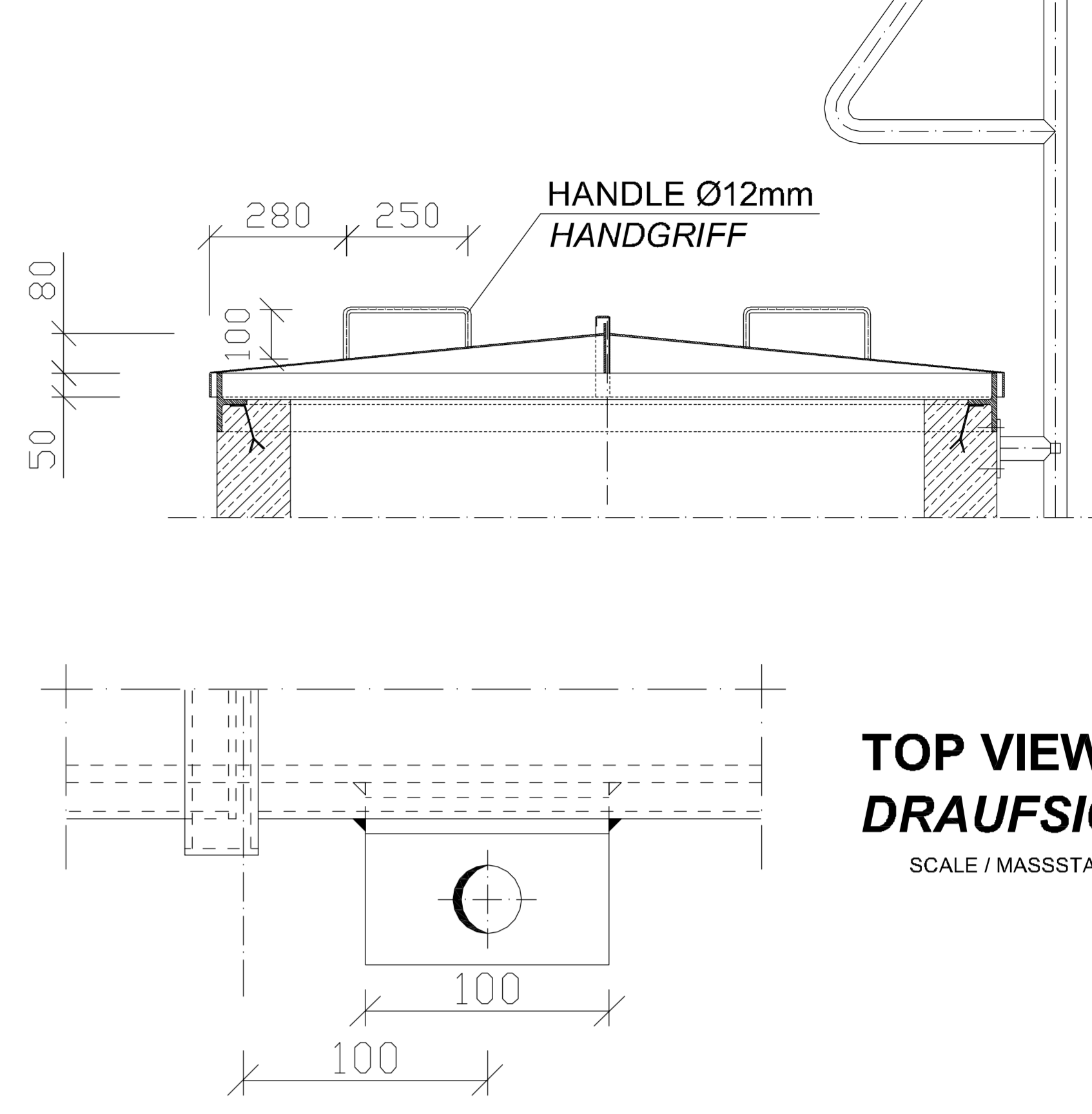
**SECTION G - G**  
**SCHNITT G - G**



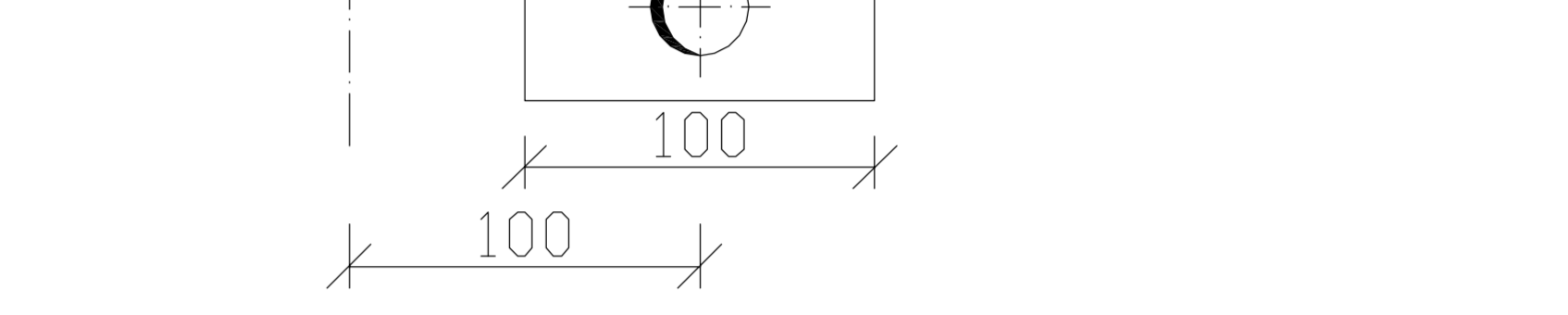
**SECTION H - H**  
**SCHNITT H - H**



**SECTION E - E**  
**SCHNITT E - E**



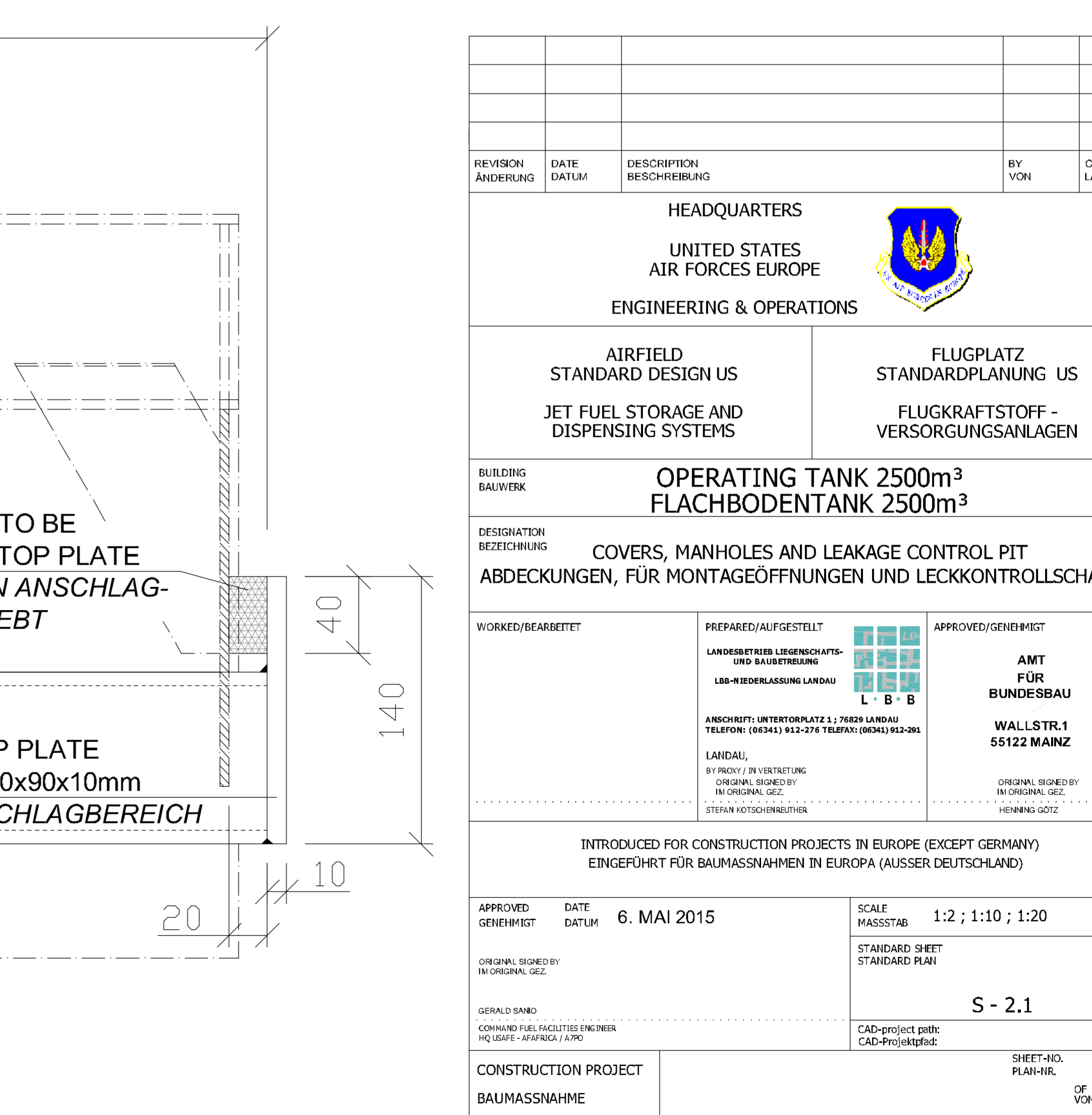
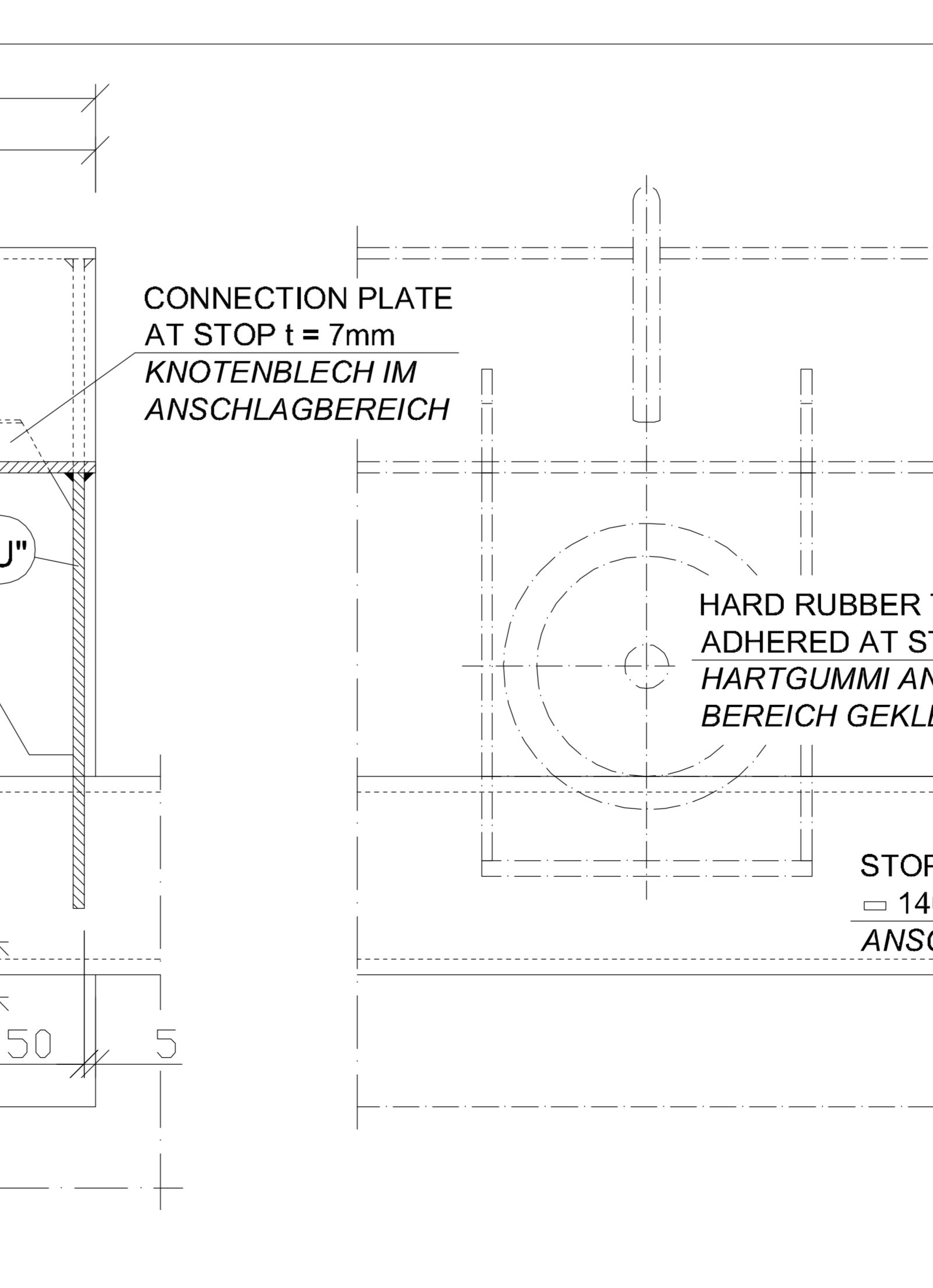
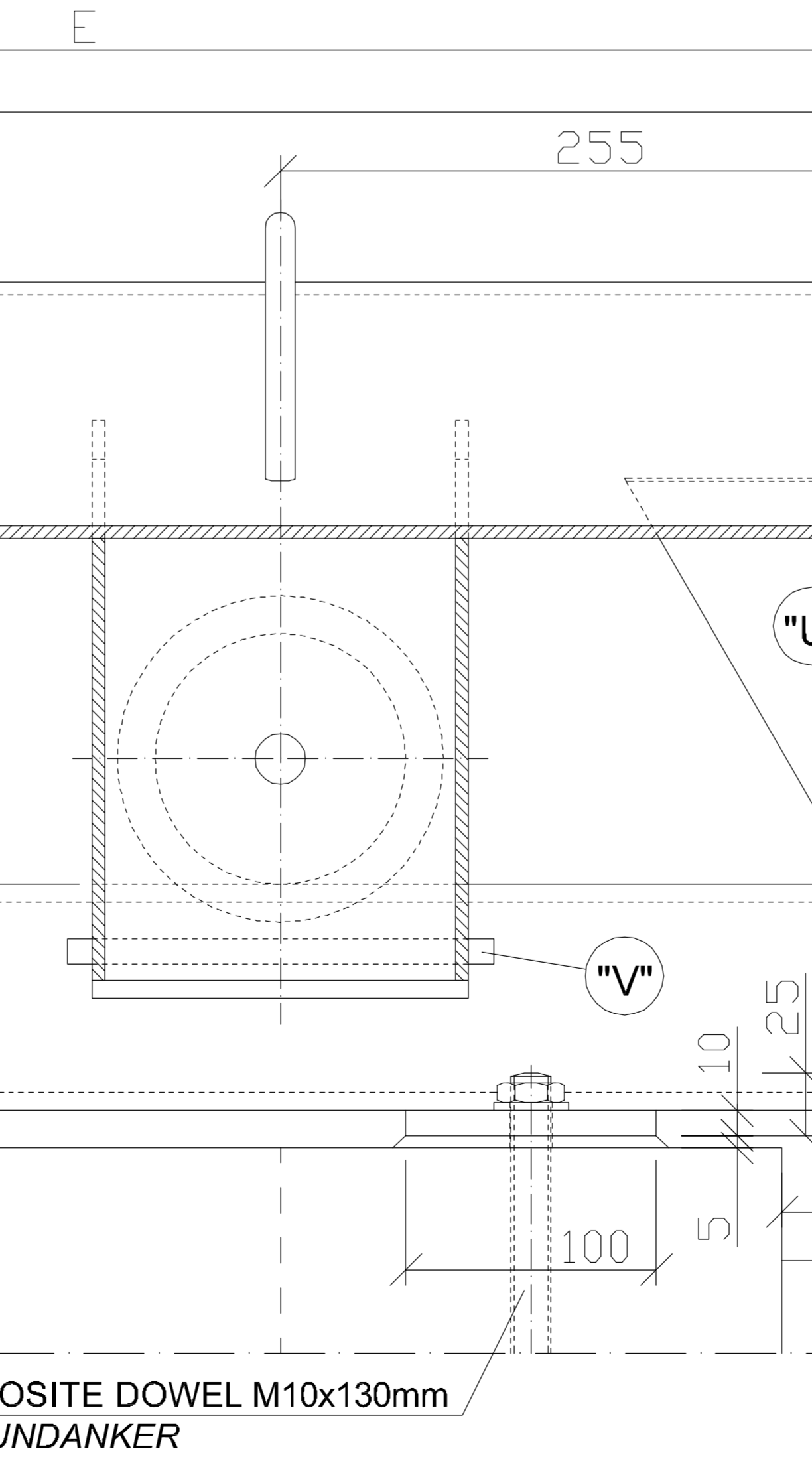
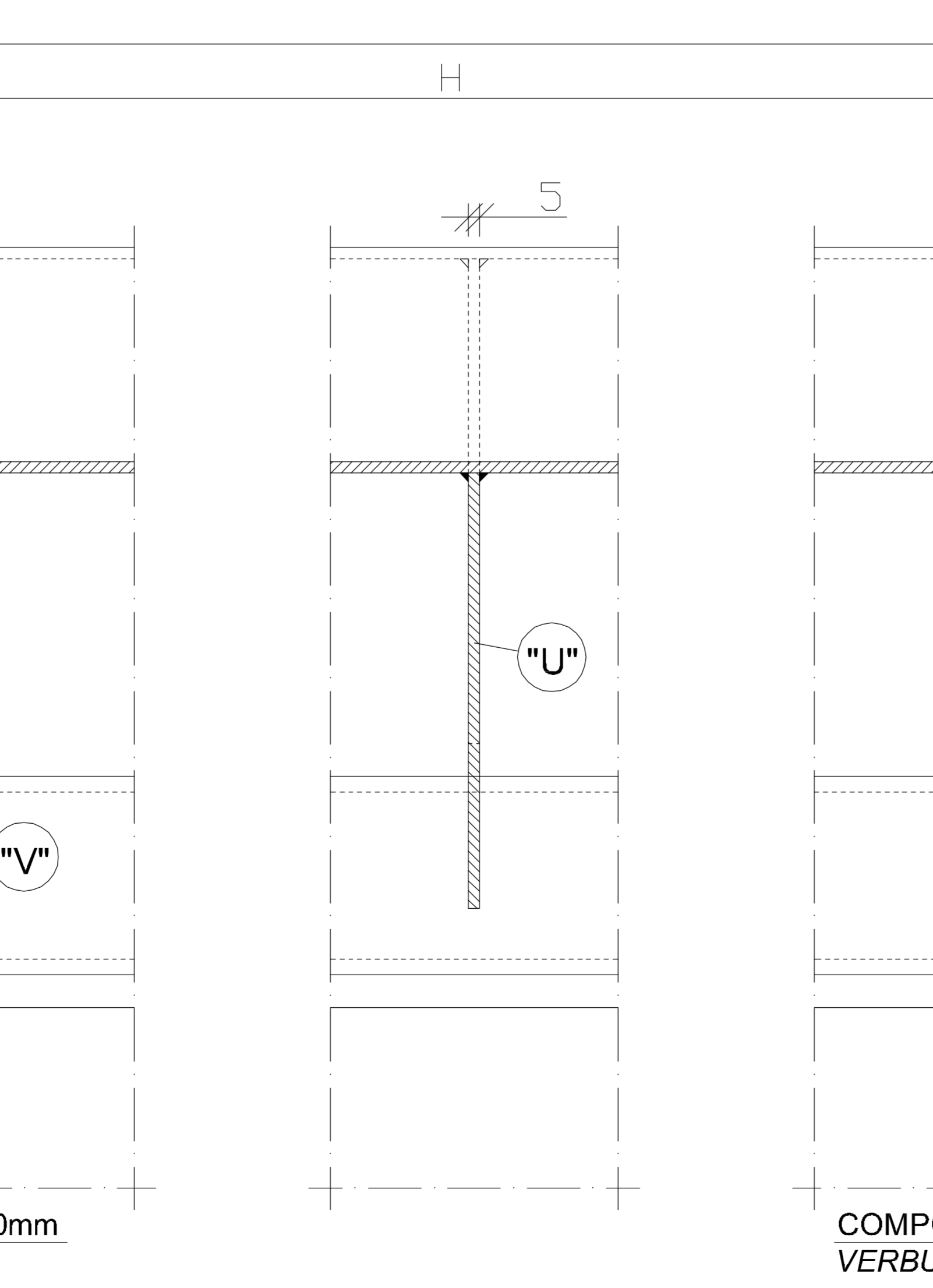
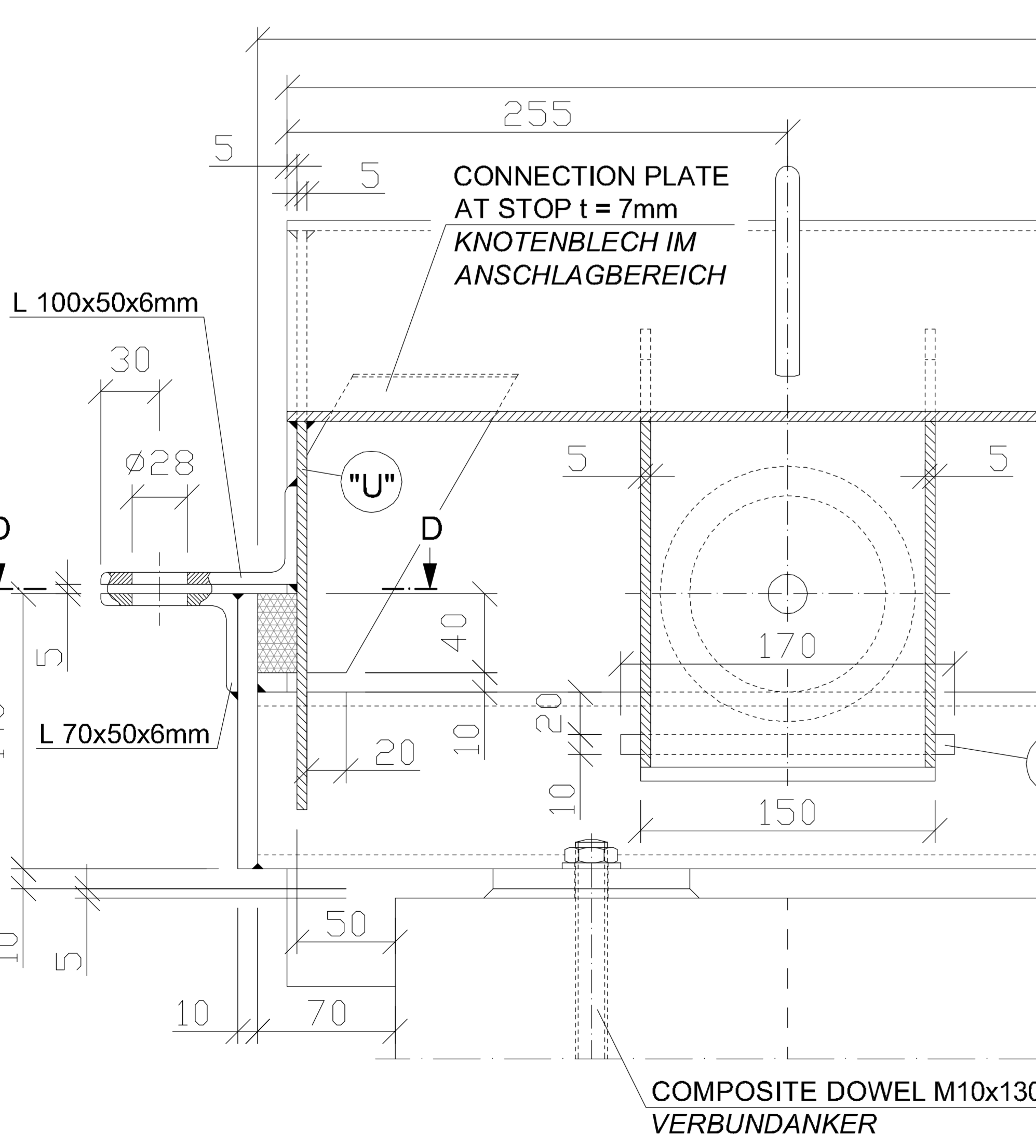
**TOP VIEW DRAUFSICHT "T"**



**PERTINENT DRAWINGS**  
ZUGEHÖRIGE ZEICHNUNGEN

C-24 DETAILS - MANHOLES AND LEAKAGE CONTROL PIT  
DETAILS - MONTAGEÖFFNUNGEN UND LECKKONTROLLSCHACHT

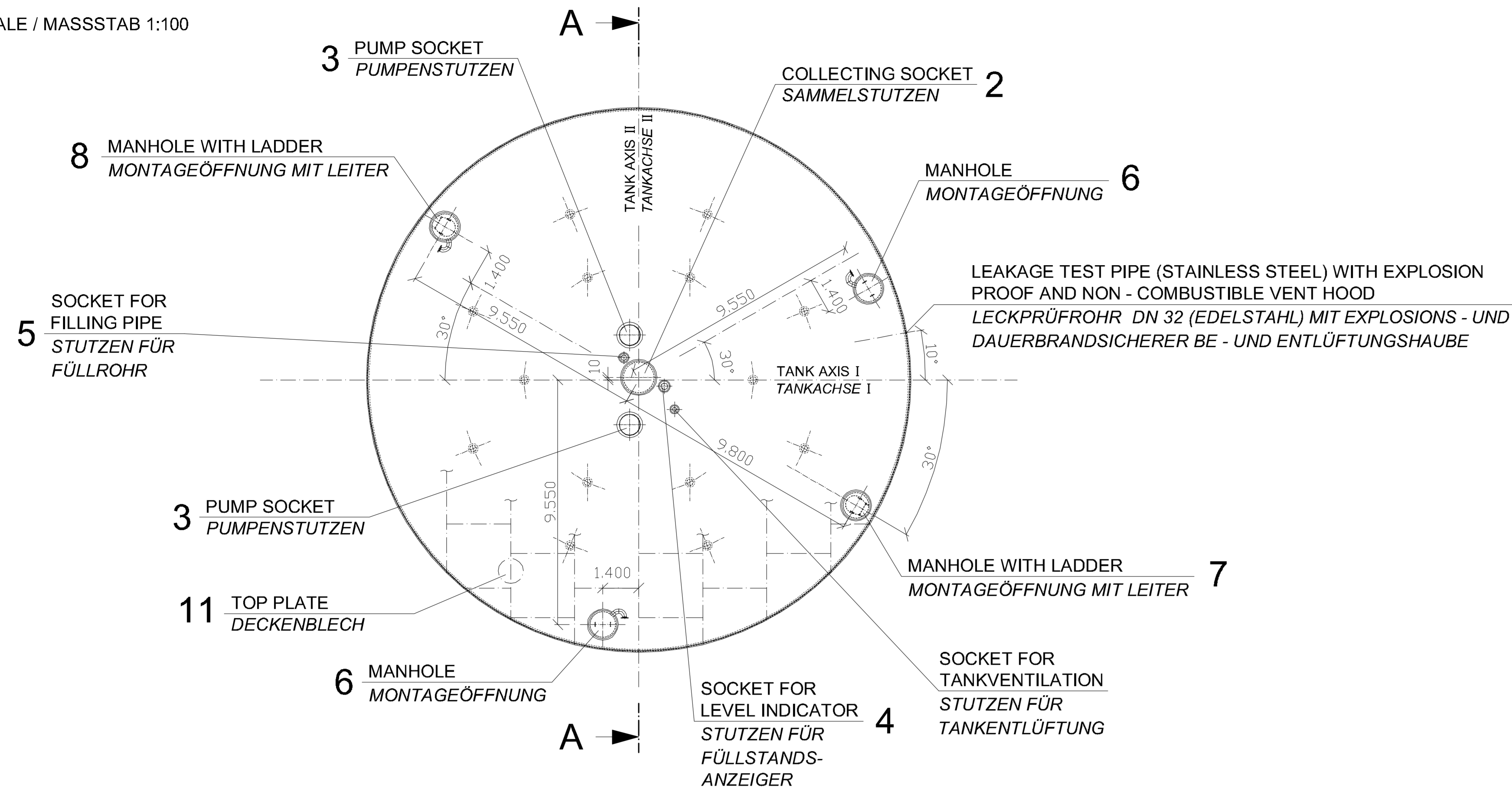
REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
<b>HEADQUARTERS</b> UNITED STATES AIR FORCES EUROPE ENGINEERING & OPERATIONS				
AIRFIELD STANDARD DESIGN US JET FUEL STORAGE AND DISPENSING SYSTEMS		FLUGPLATZ STANDARDPLANUNG US FLUGKRAFTSTOFF - VERSORGENGSANLAGEN		
<b>BUILDING</b> OPERATING TANK 2500m <sup>3</sup> FLACHBODENTANK 2500m <sup>3</sup>				
DESIGNATOR: BEZUGSZEICHEN COVERS, MANHOLES AND LEAKAGE CONTROL PIT ABDECKUNGEN, FÜR MONTAGEÖFFNUNGEN UND LECKKONTROLLSCHACHT				
WORKSHEET/ARBEITSTELLE LANDEBETRIEB LIEGENSCHAFTS- UND BAUEINRICHTUNGEN L B B AMT FÜR BUNDESBAU WALLSTR.1 55122 MAINZ				
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAUMASSNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED GENEHMIGT	DATE DATUM	SCALE MASSSTAB	STANDARD SHEET STANDARD BLATT	
ORIGINAL DRAWN BY IN ORIGINAL DED.	ORIGINAL DRAWN BY IN ORIGINAL DED.	ORIGINAL DRAWN BY IN ORIGINAL DED.	ORIGINAL DRAWN BY IN ORIGINAL DED.	
CONSTRUCTION PROJECT BAUMASSNAHME			SHEET NO. PLATZ NR.	





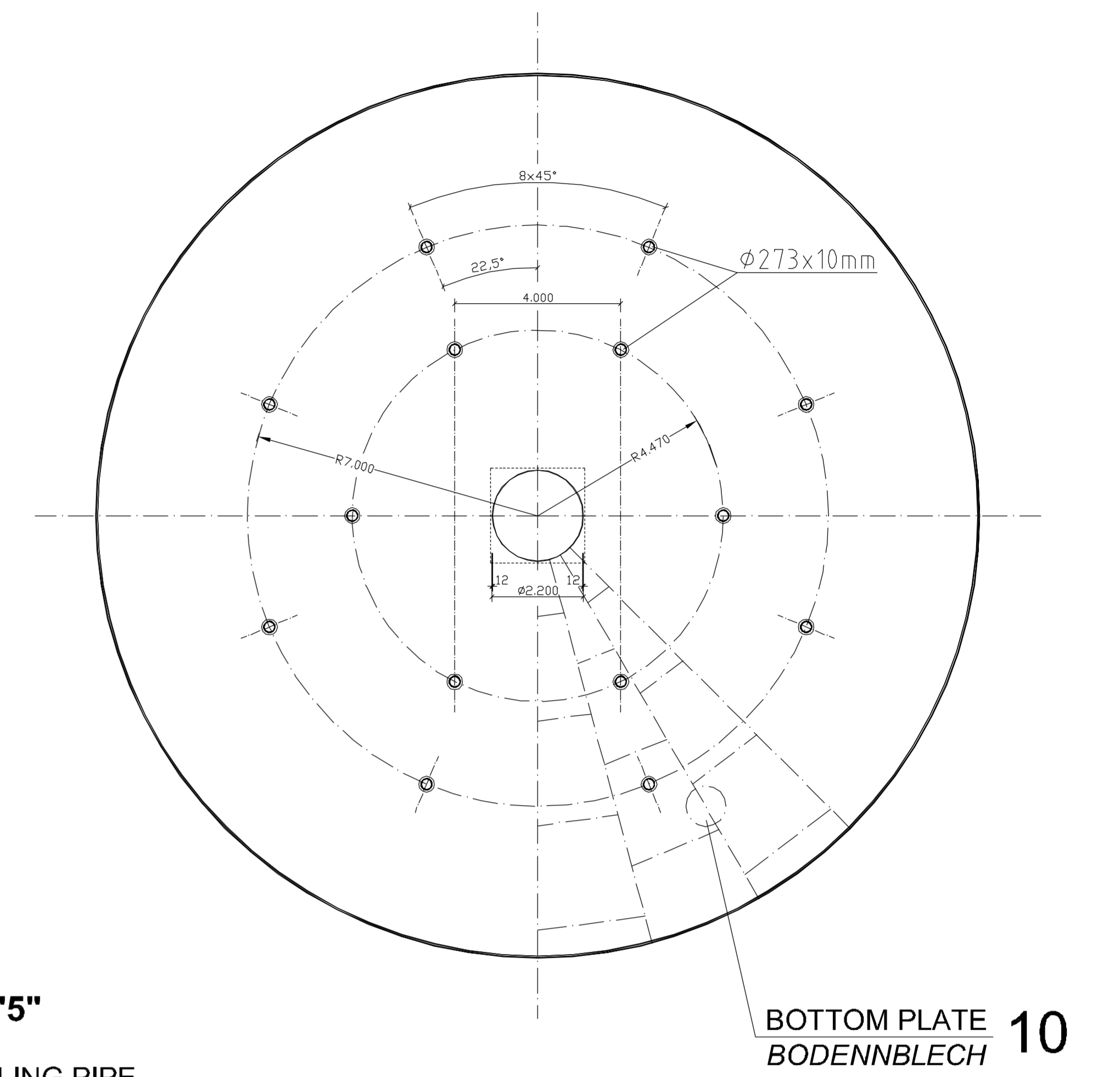
**TOP VIEW  
DRAUFSICHT**

SCALE / MASSSTAB 1:100

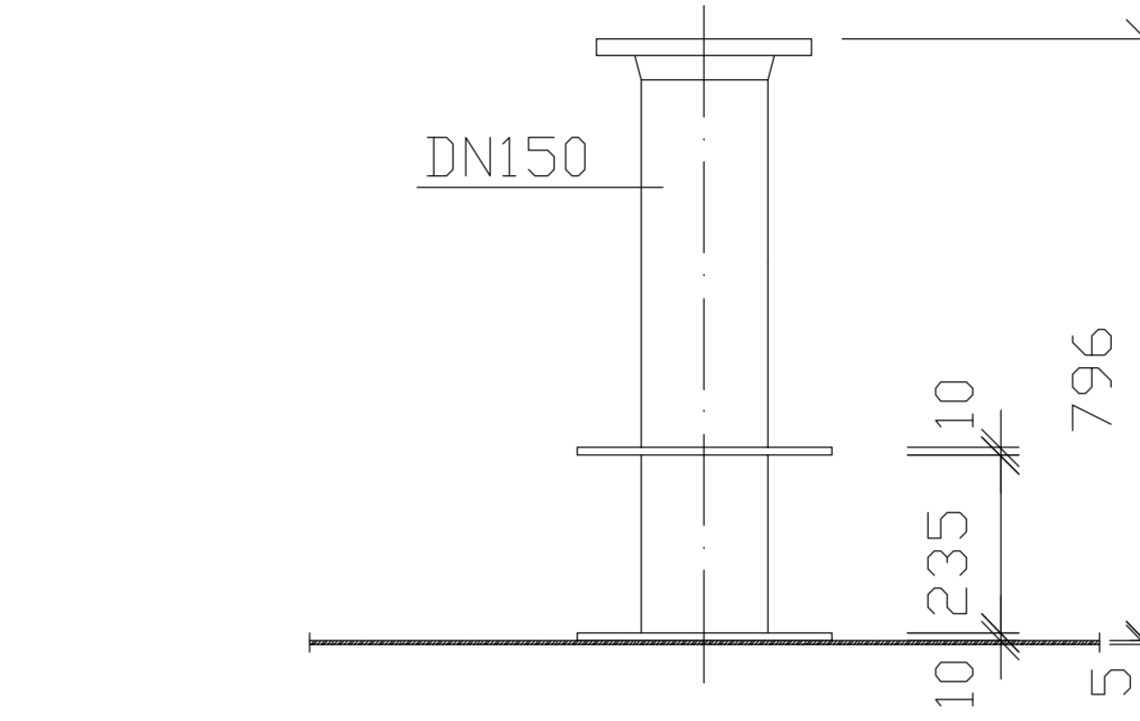


**SECTION  
SCHNITT B - B**

SCALE / MASSSTAB 1:100



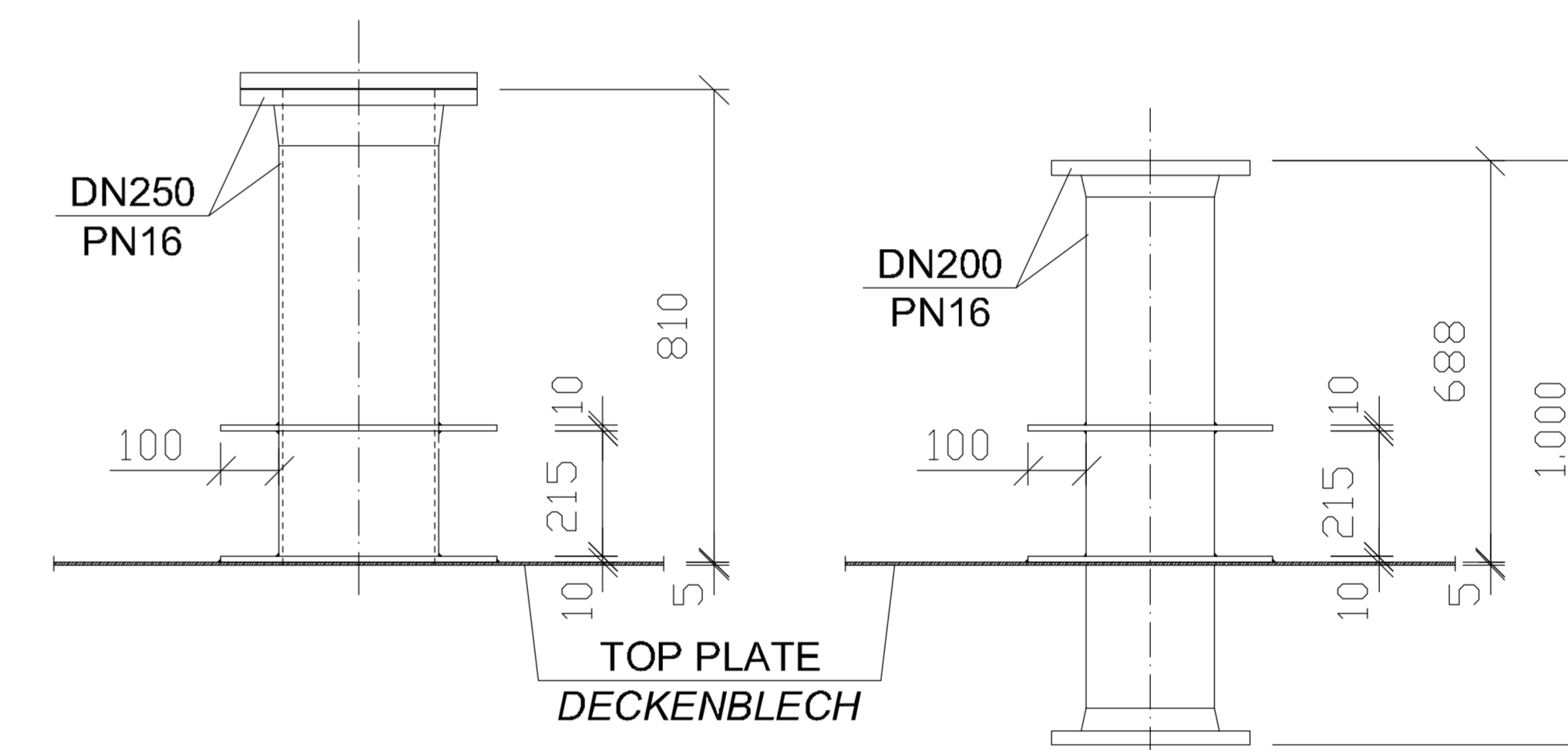
**DETAIL "4"**  
SCALE / MASSSTAB 1:10



**DETAIL "4"**  
SOCKET FOR LEVEL INDICATOR  
STUTZEN FÜR FÜLLSTANDS-ANZEIGE  
SCALE / MASSSTAB 1:10

**DETAIL "5"**  
SCALE / MASSSTAB 1:10

SOCKET FOR FILLING PIPE  
STUTZEN FÜR FÜLLROHR



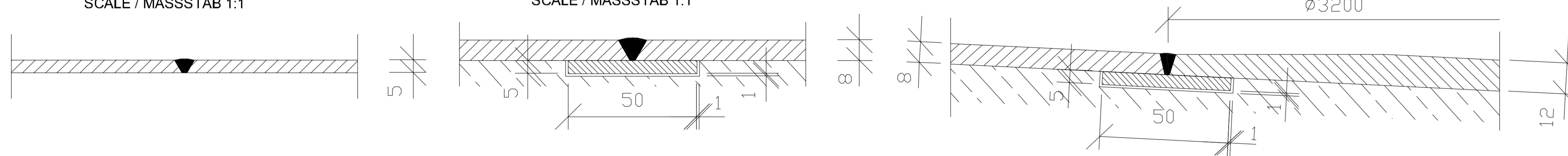
**DETAIL "11"**

TOP PLATE  
DECKENBLECH  
SCALE / MASSSTAB 1:1

**DETAIL "10"**

BOTTOM PLATE  
BODENBLECH  
SCALE / MASSSTAB 1:1

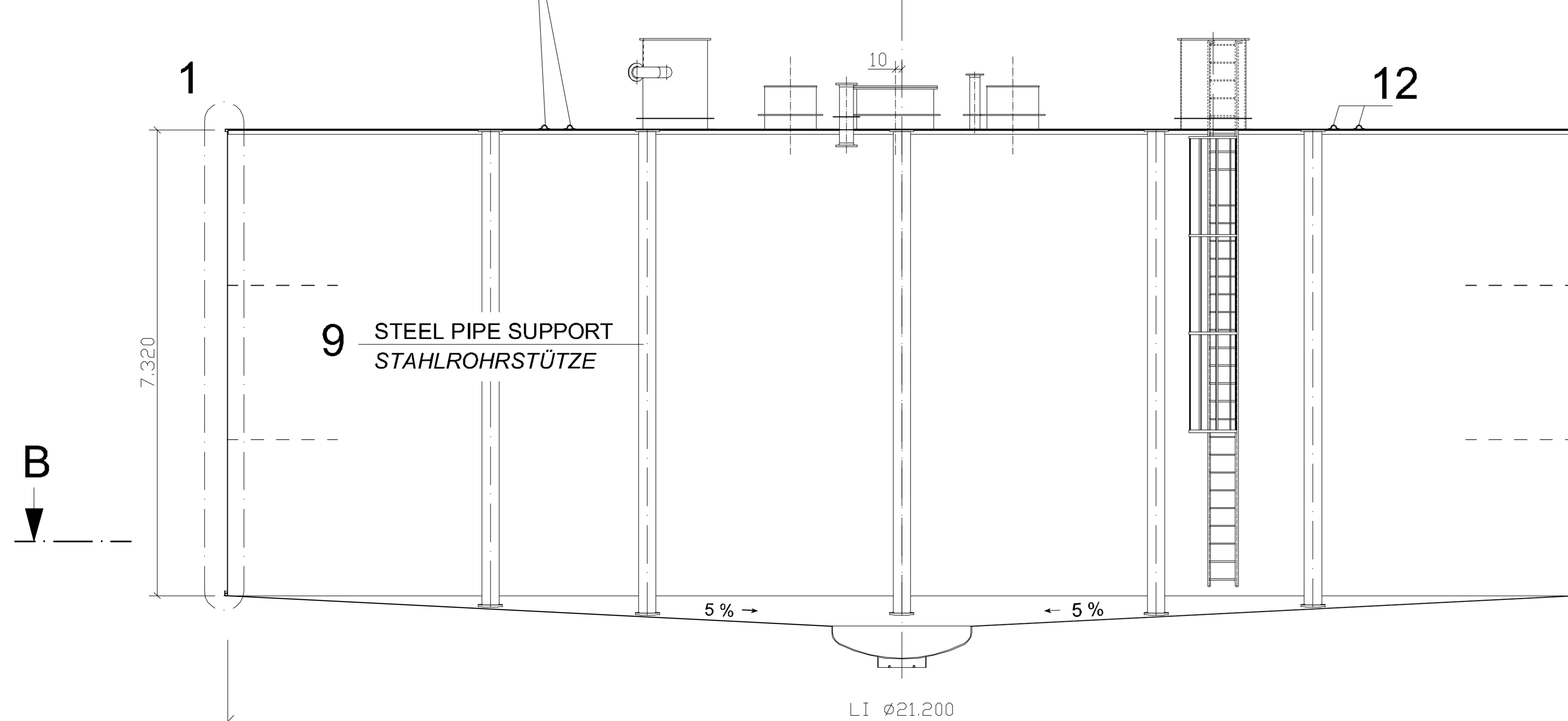
CONNECTION BOTTOM PLATE - SUMP  
ANSCHLUSS BODENBLECH - SUMP  
SCALE / MASSSTAB 1:1



**SECTION  
SCHNITT A - A**

SCALE / MASSSTAB 1:100

**12** BRACKETS WELDED ON TOP PLATE  
WITH A DISTANCE OF 1.0m  
BÜGEL IM RASTERABSTAND VON 1.0m  
AUF DECKENBLECH ANGESCHWEISST



COATING OUTER SURFACE STEEL TANK  
ACC. TO STS-M 72  
BESCHICHTUNG AUSSENFLÄCHE STAHLTANK  
GEMÄSS STS-M 72

**NOTES  
BEMERKUNGEN**

PLACING OF THE BOTTOM PLATES ACCORDING TO THE MOST FAVORABLE WELDING DESIGN AS SELECTED BY THE CONTRACTOR.  
AUFTEILUNG DER BODENBLECHE ENTSPRECHEND DER GÜNSTIGSTEN SCHWEISSTECHNISCHEN AUSFÜHRUNG NACH WAHL DES A.N.

FOR INTERIOR COATING ALL EDGES WITHIN THE TANK MUST BE ROUNDED OFF TO RADIUS OF AT LEAST 3mm AND ALL WELDING SEAMS MUST BE SMOOTHENED.  
FÜR DIE INNENBESCHICHTUNG MÜSSEN ALLE KANTEN INNERHALB DES TANKS AUF EINEN RADIUS VON MIND. 3mm ABGERUNDET UND ALLE SCHWEISSNÄHTE GLATTGESCHLIFFEN SEIN.

IN THE AREA OF PIPE SUPPORTS A DIRECT COMPRESSION CONNECTION IS FORCIBLY REQUIRED, I.E. THE BOTTOM PLATE OF THE TANK MUST BE COMPLETELY SUPPORTED ON CONCRETE FLOOR SLAB.  
IM BEREICH DER STAHLROHRSTÜTZEN IST EINE DIREKTE DRUCK-VERBINDUNG ZUR BODENPLATTE ZWINGEND ERFORDERLICH, D.H. DAS BODENBLECH MUSS VOLLSTÄNDIG AUF DEM BODEN AUFLIEGEN.

**PERTINENT DRAWINGS  
ZUGEHÖRIGE ZEICHNUNGEN**

S-2.11 DETAILS - STEEL TANK  
DETAILS - STAHLTANK

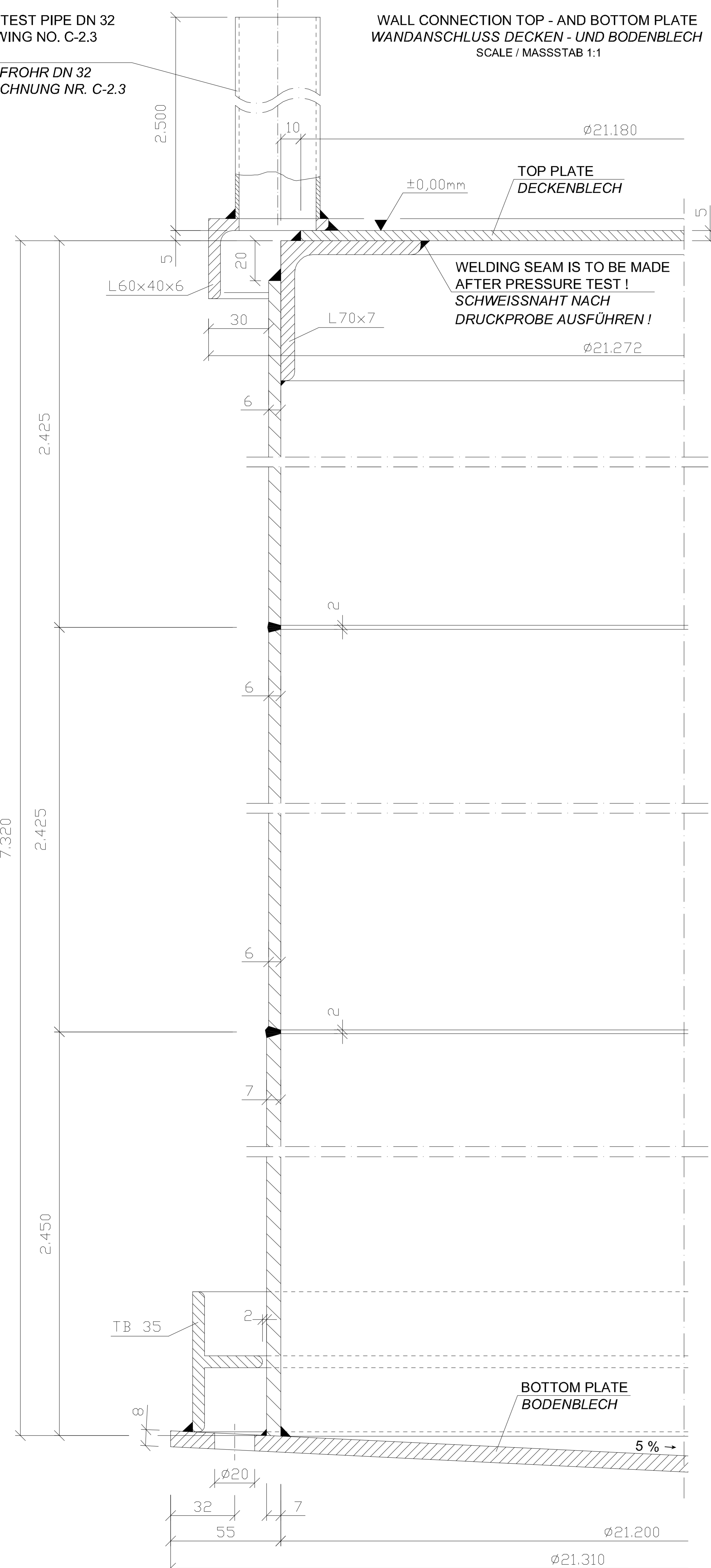
REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
<b>HEADQUARTERS</b>				
UNITED STATES AIR FORCES EUROPE				
<b>ENGINEERING &amp; OPERATIONS</b>				
AIRFIELD STANDARD DESIGN US		FLUGPLATZ STANDARDPLANUNG US		
JET FUEL STORAGE AND DISPENSING SYSTEMS		FLUGKRAFTSTOFF - VERSORGUNGSANLAGEN		
<b>BUILDING BAUWERK</b>				
<b>OPERATING TANK 2500m³ FLACHBODENTANK 2500m³</b>				
<b>DESIGNATOR BEZEICHNUNG</b>				
<b>STEEL TANK STAHLTANK</b>				
WORKED/BEREITET	PREPARED/AUFGESTELLT	APPROVED/GENEHMIGT		
LANDSCHAFTS- UND BAUWESEN LUB	LANDSCHAFTS- UND BAUWESEN LUB	AMT FÜR BUNDESBAU WALLSTR.1 55122 MAINZ		
LANDSCHAFTS- UND BAUWESEN LUB	LANDSCHAFTS- UND BAUWESEN LUB	ORIGINAL, SIGNED BY IN ORIGINAL, GEE.		
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAUMASSNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED/GENEHMIGT	DATE DATUM	SCALE MASSSTAB		
	6. MAI 2015	1:100; 1:50; 1:10; 1:1		
ORIGINAL, SIGNED BY IN ORIGINAL, GEE.	GENERAL DRAWING CONSTRUCTION PROJECT	STANDARD SHEET STANDARD PLAN		
		S - 2.10		
CONSTRUCTION PROJECT BAUMASSNAHME		SHEET NO. PLATZNR.		
		OF VON		



LEAKAGE TEST PIPE DN 32  
SEE DRAWING NO. C-2.3  
DETAIL 4  
LECKPRÜFROHR DN 32  
SIEHE ZEICHNUNG NR. C-2.3  
DETAIL 4

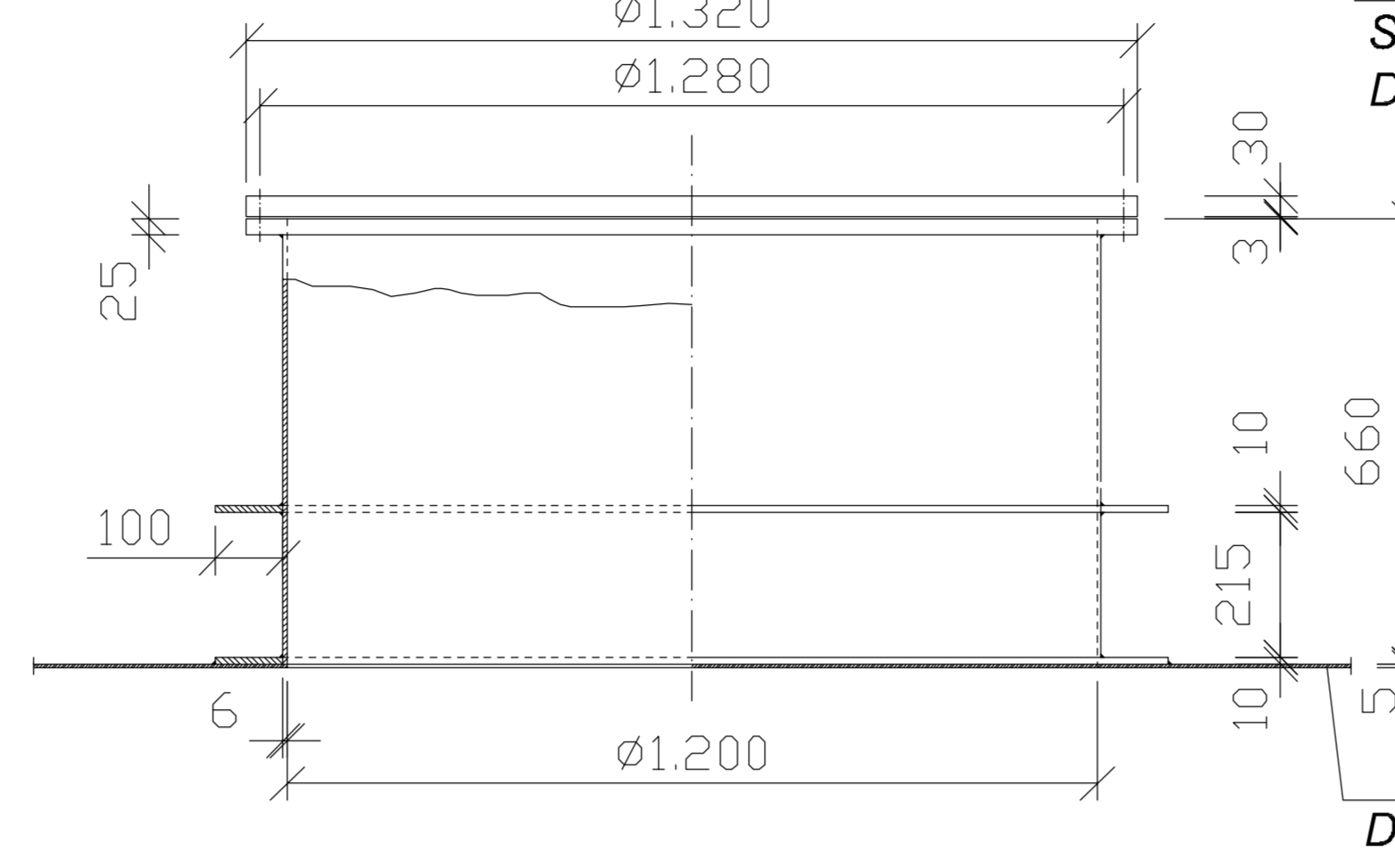
**DETAIL "1"**

WALL CONNECTION TOP - AND BOTTOM PLATE  
WANDANSCHLUSS DECKEN - UND BODENBLECH  
SCALE / MASSSTAB 1:1



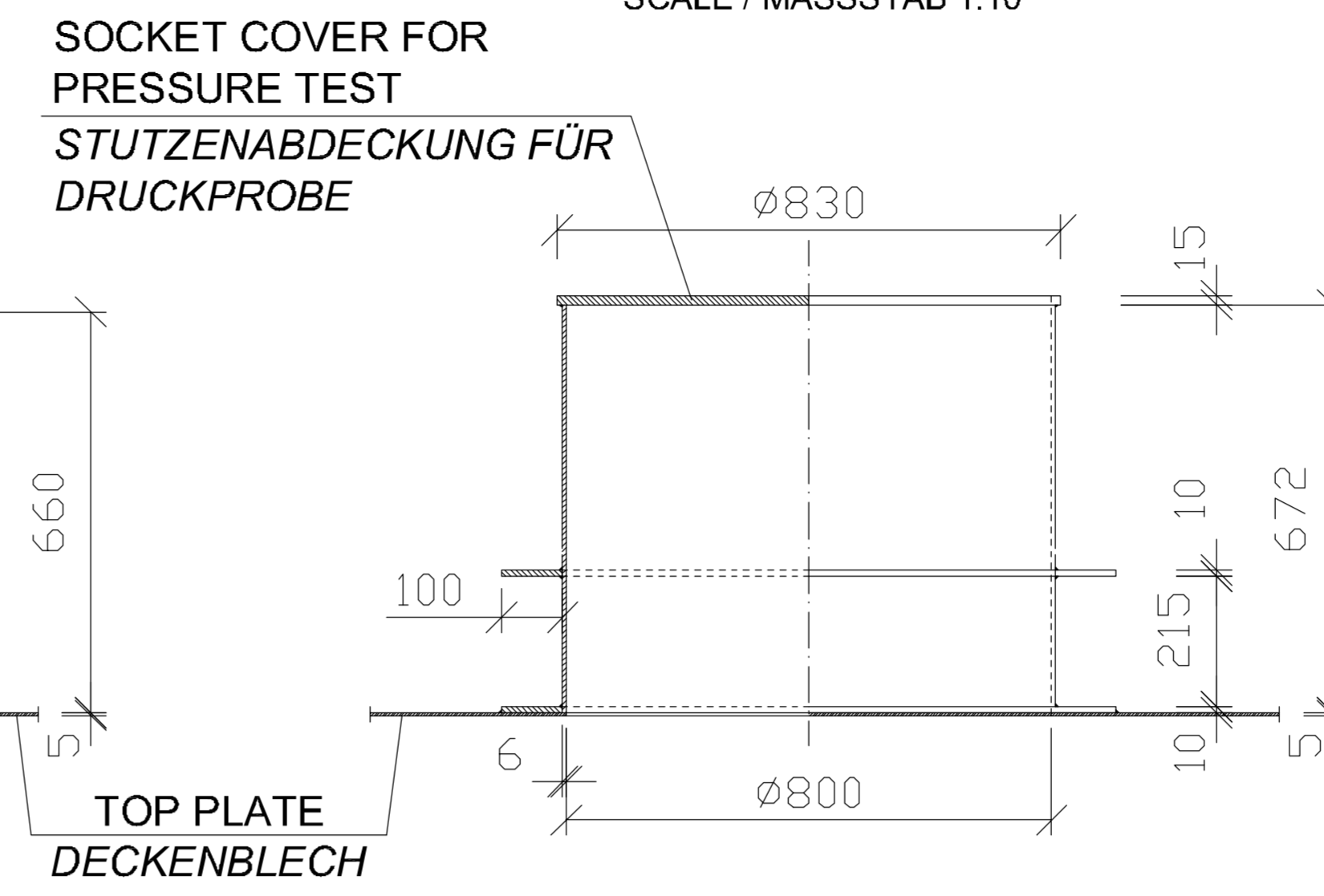
**DETAIL "2"**

COLLECTING SOCKET  
SAMMELSTUTZEN  
SCALE / MASSSTAB 1:10



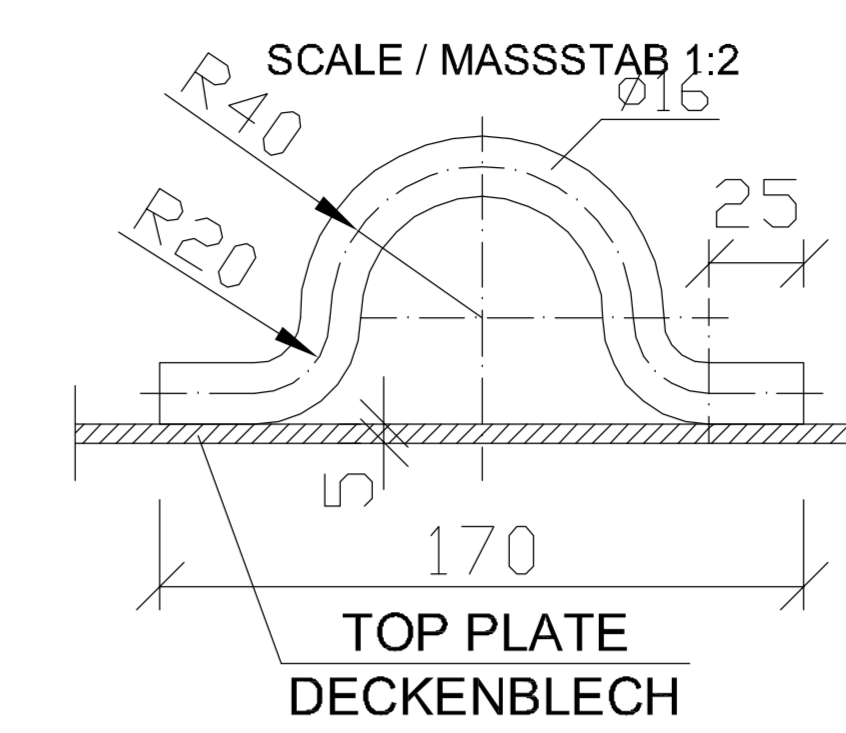
**DETAIL "3"**

PUMP SOCKET  
PUMPENSTUTZEN  
SCALE / MASSSTAB 1:10



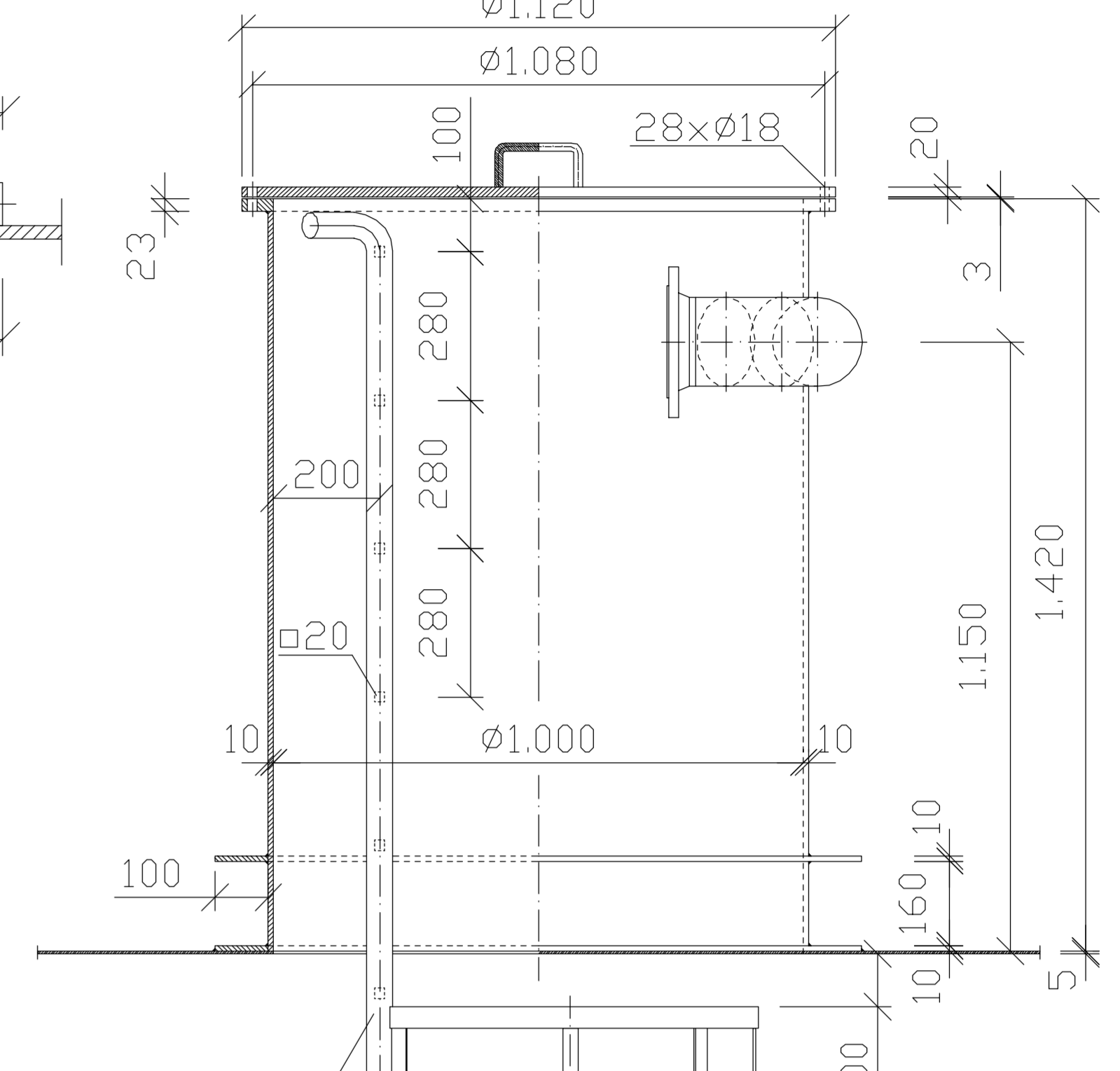
**DETAIL "12"**

BRACKET  
BÜGEL  
SCALE / MASSSTAB 1:2



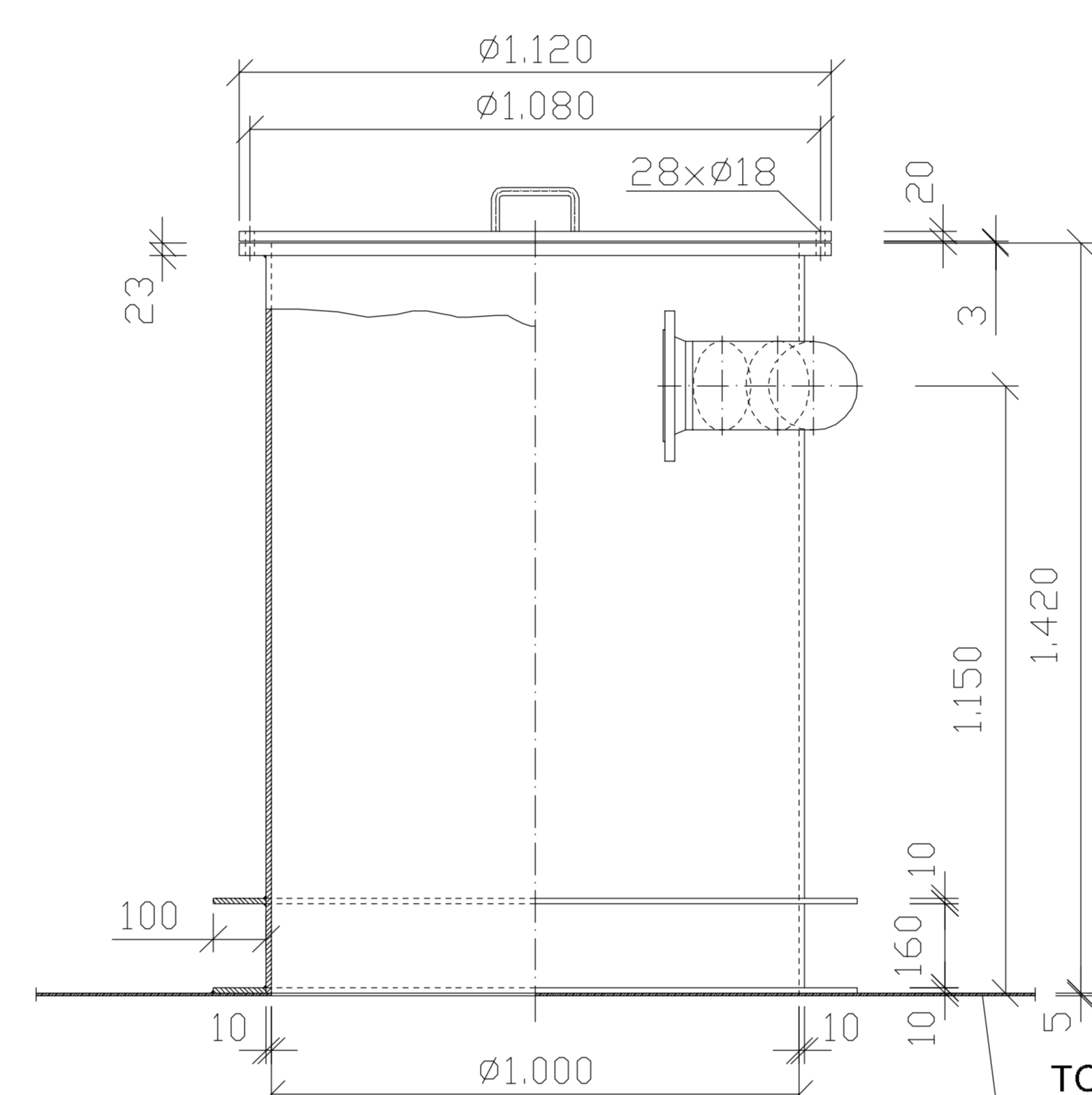
**DETAIL "8"**

MANHOLE WITH LADDER  
MONTAGEÖFFNUNG MIT LEITER  
SCALE / MASSSTAB 1:10



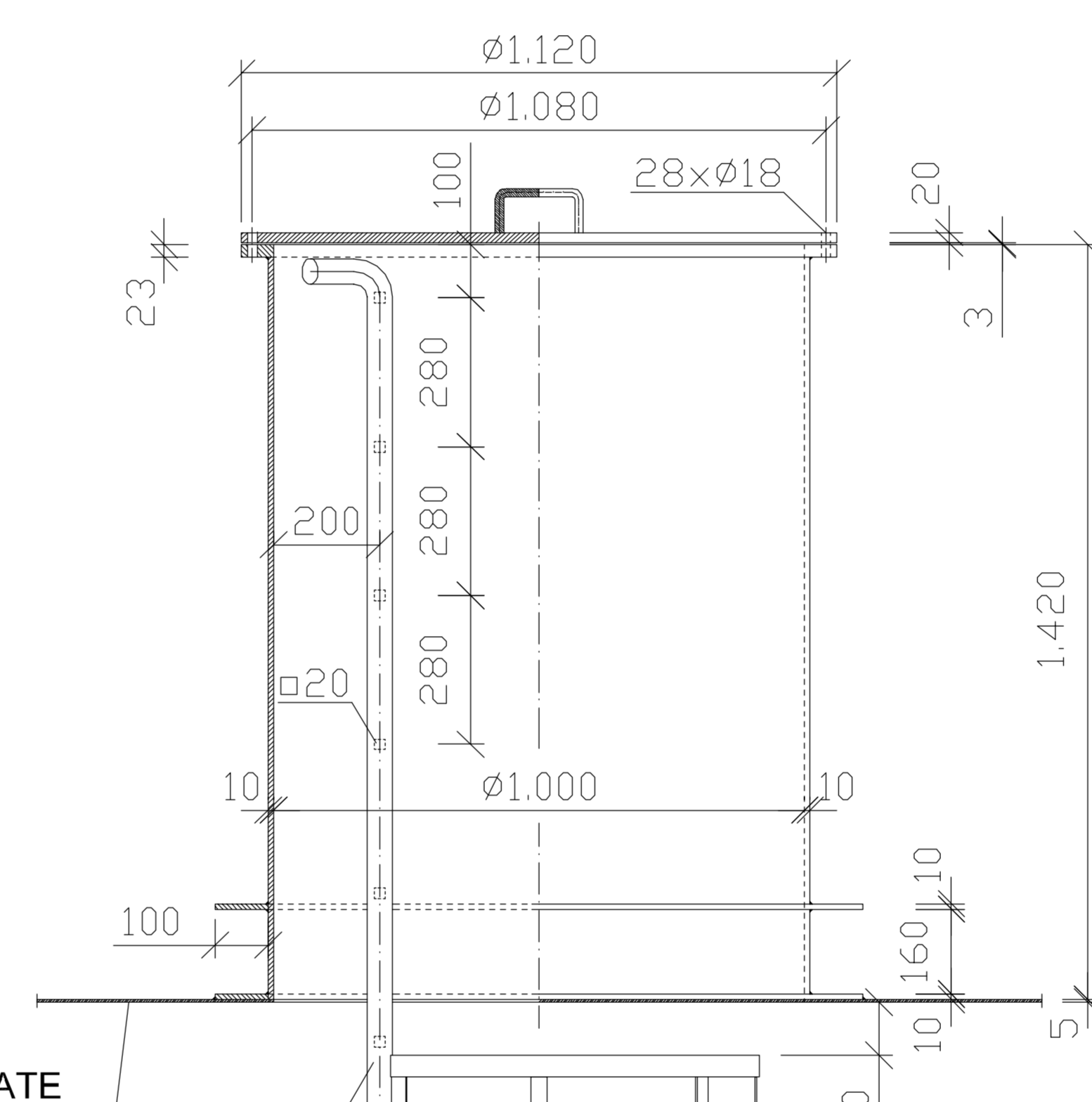
**DETAIL "6"**

MANHOLE  
MONTAGEÖFFNUNG  
SCALE / MASSSTAB 1:10



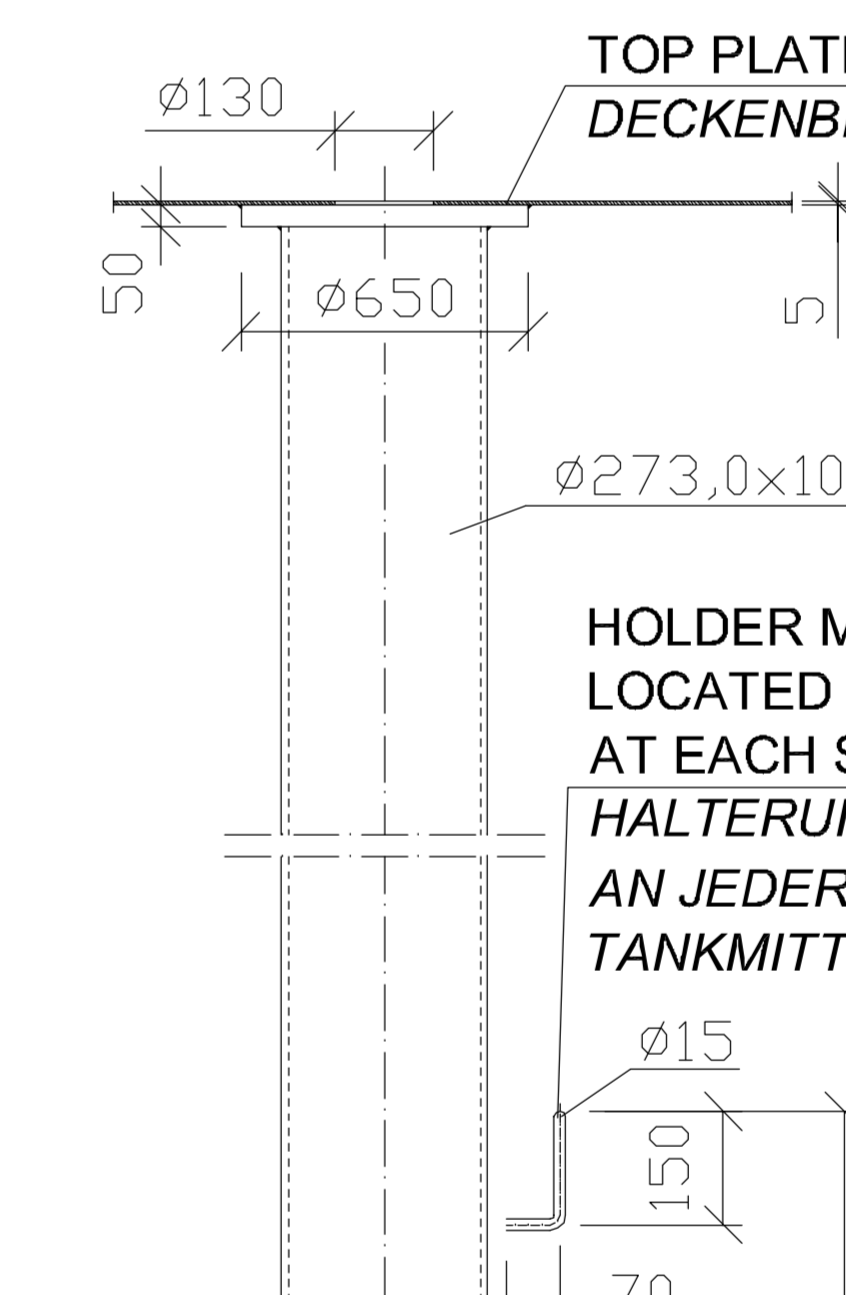
**DETAIL "7"**

MANHOLE WITH LADDER  
MONTAGEÖFFNUNG MIT LEITER  
SCALE / MASSSTAB 1:10



**DETAIL "9"**

STEEL PIPE SUPPORT  
STAHLROHRSTÜTZE  
SCALE / MASSSTAB 1:10



HOLDER MADE OF SS  
LOCATED TO CENTER OF TANK  
AT EACH SUPPORT.  
HALTERUNG AUS CR-NI-STAHL  
AN JEDER ROHRSTÜTZE ZUR  
TANKMITTE ANGEORDET.

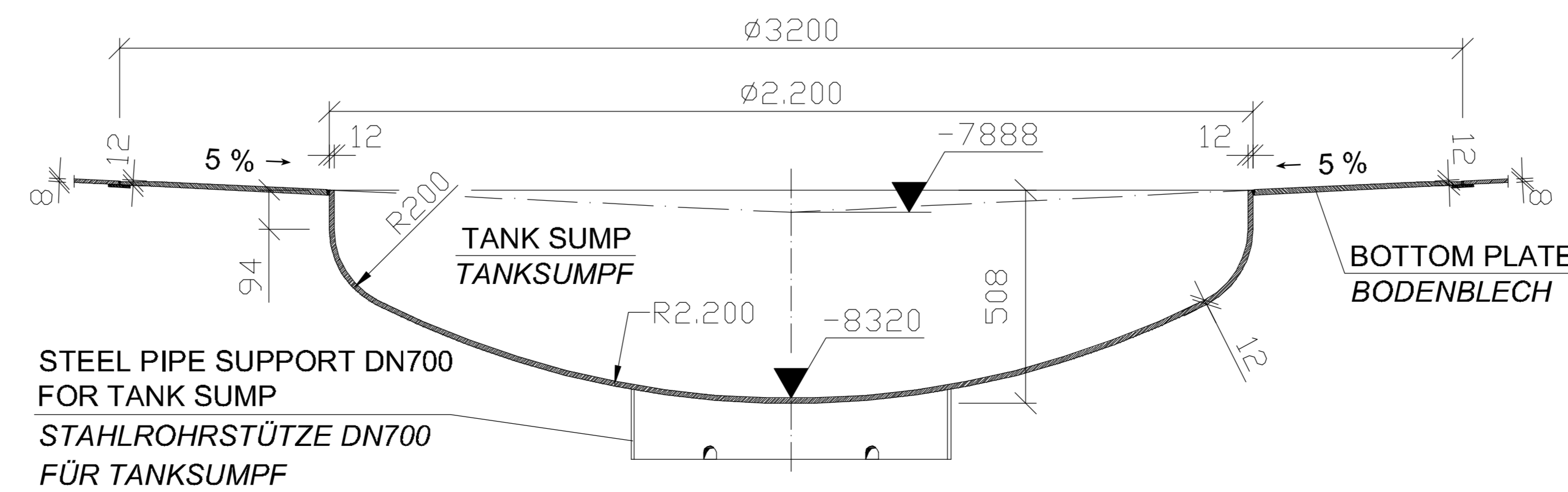
PERTINENT DRAWINGS  
ZUGEHÖRIGE ZEICHNUNGEN

S-2.10 STEEL TANK  
STAHLTANK

**NOTES  
BEMERKUNGEN**

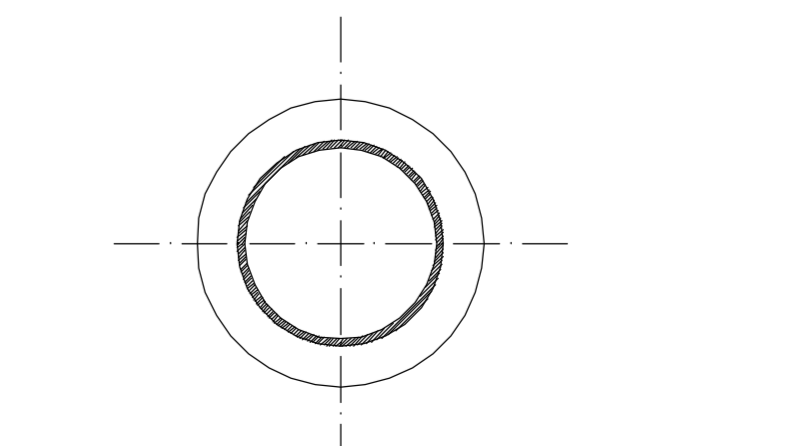
IN THE AREA OF PIPE SUPPORTS A DIRECT COMPRESSION CONNECTION IS FORCIBLY REQUIRED, I.E. THE BOTTOM PLATE OF THE TANK MUST BE COMPLETELY SUPPORTED ON CONCRETE FLOOR SLAB.  
IM BEREICH DER STAHLROHRSTÜTZEN IST EINE DIREKTE DRUCKVERBINDUNG ZUR BODENPLATTE ZWINGEND ERFORDERLICH, D.H. DAS BODENBLECH MUSS VOLLSTÄNDIG AUF DEM BODEN AUFLIEGEN.

**SECTION C - C  
SCHNITT**  
SCALE / MASSSTAB 1:10



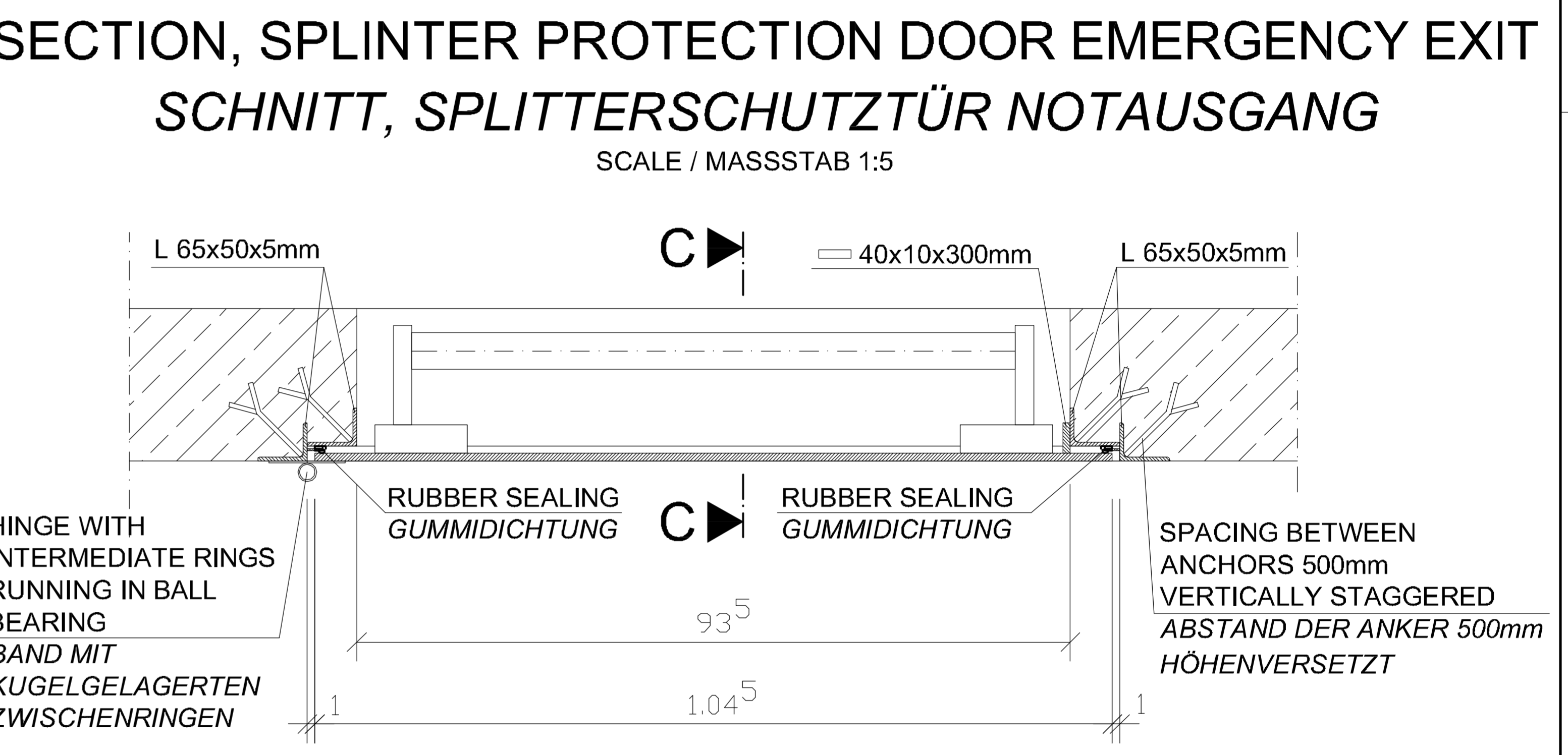
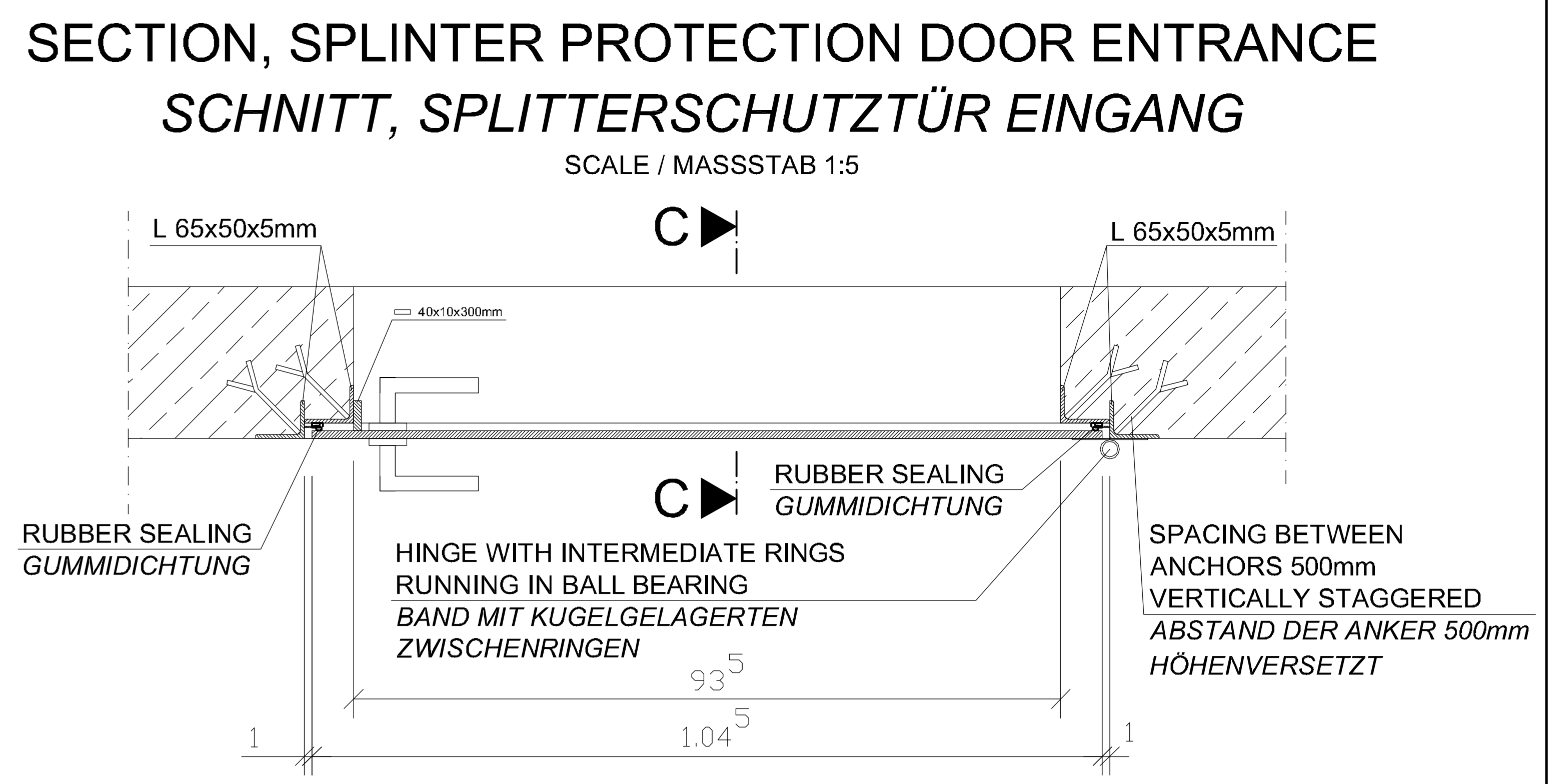
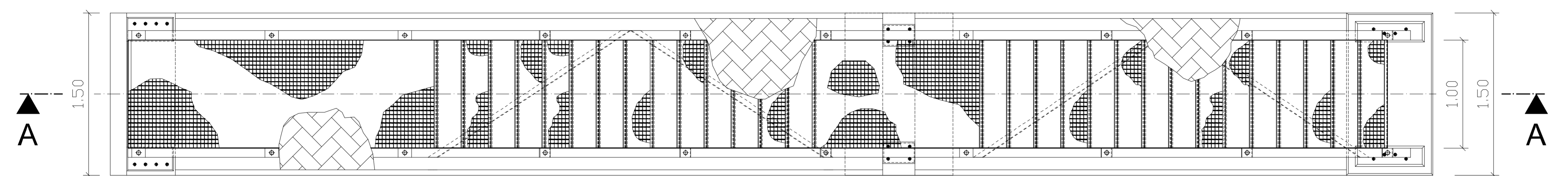
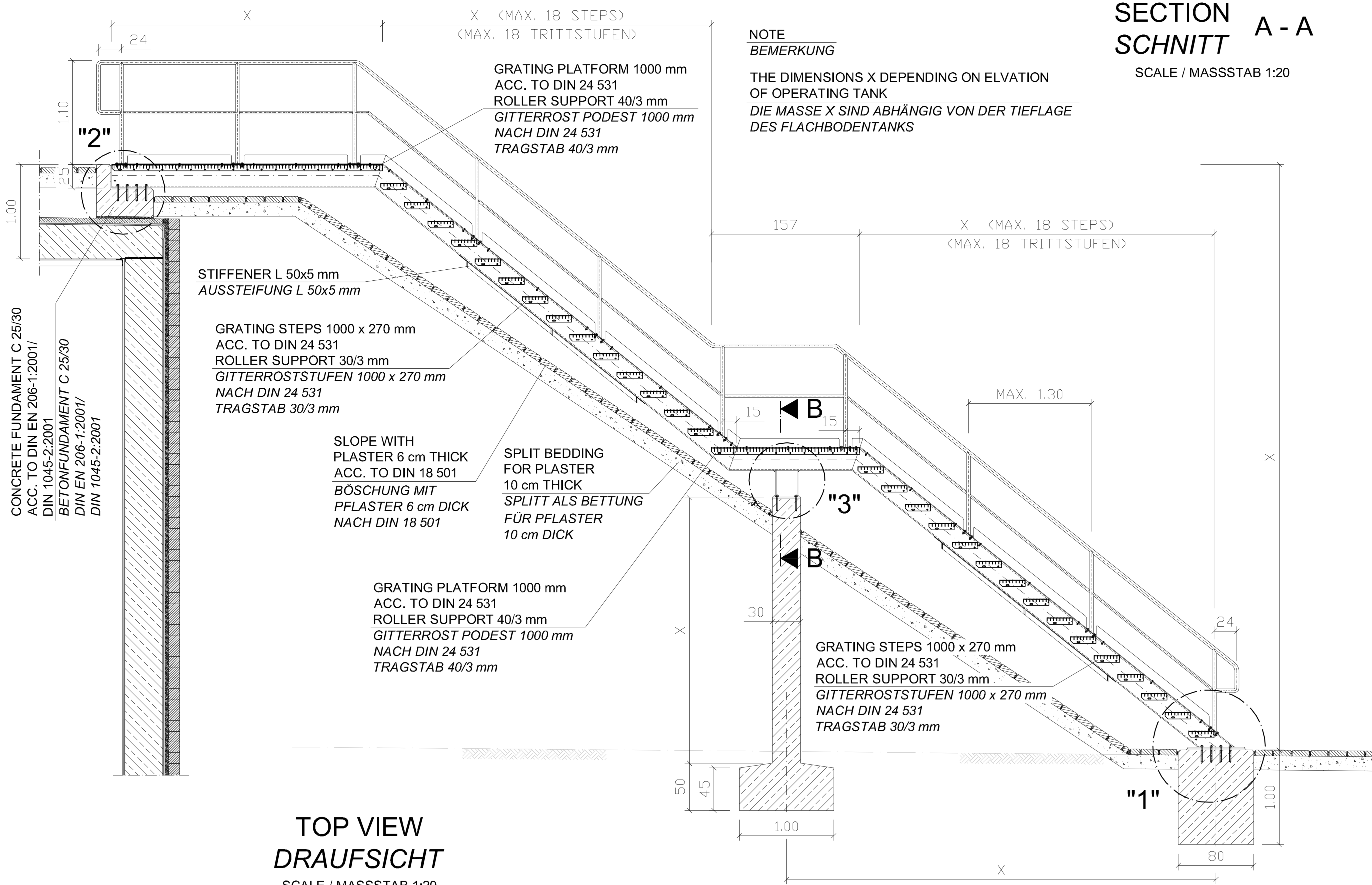
STEEL PIPE SUPPORT DN700  
FOR TANK SUMP  
STAHLROHRSTÜTZE DN700  
FÜR TANKSUMPF

**SECTION E - E  
SCHNITT**  
SCALE / MASSSTAB 1:10

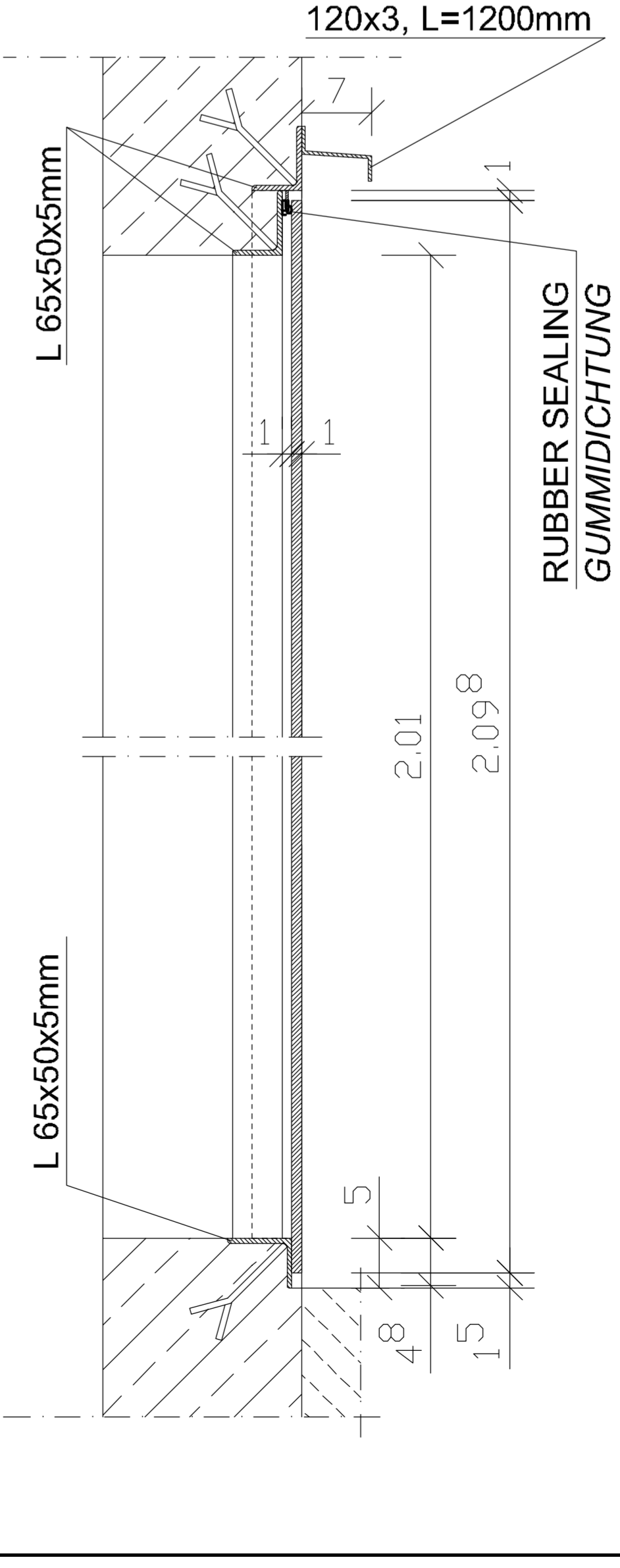
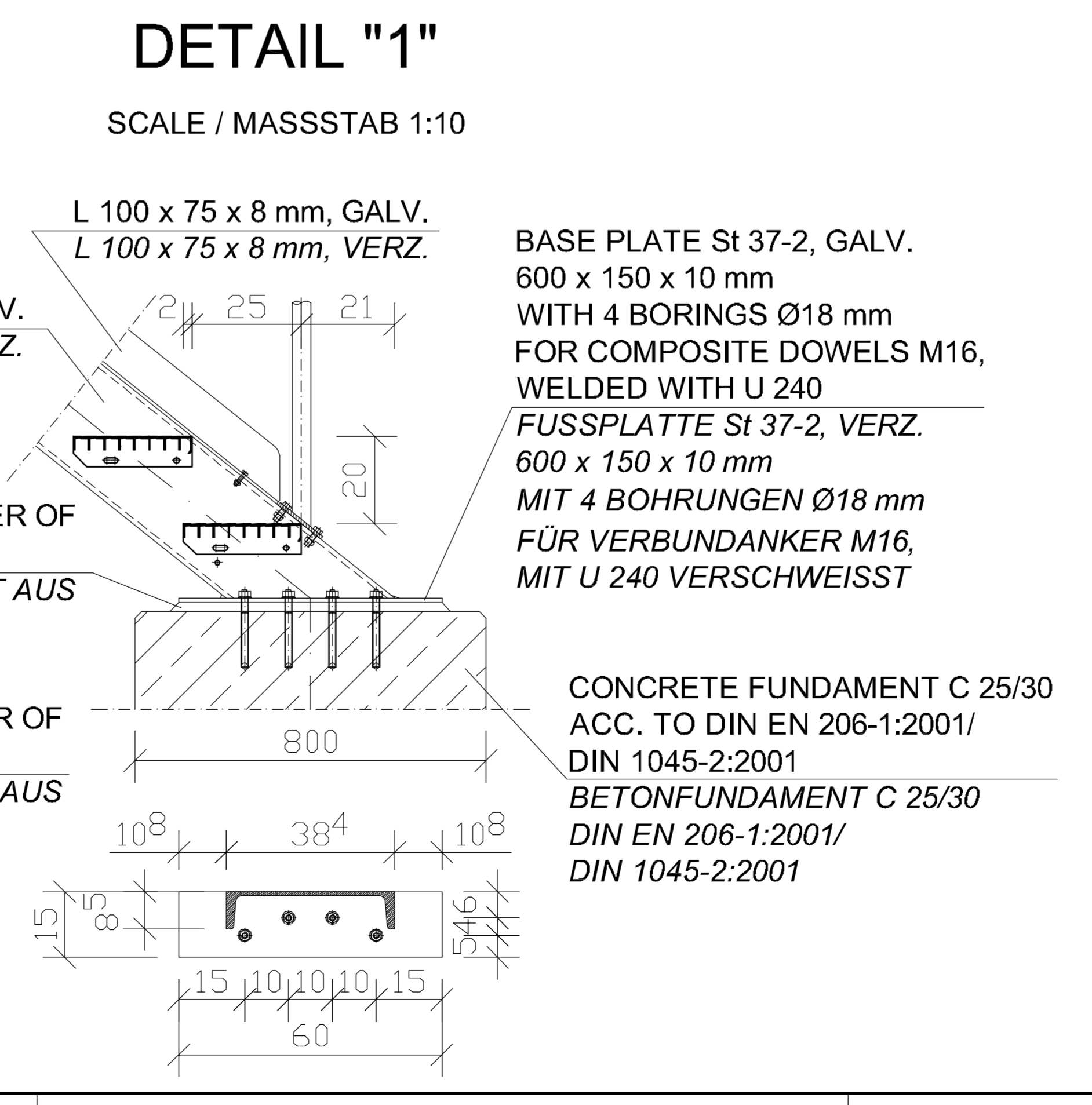
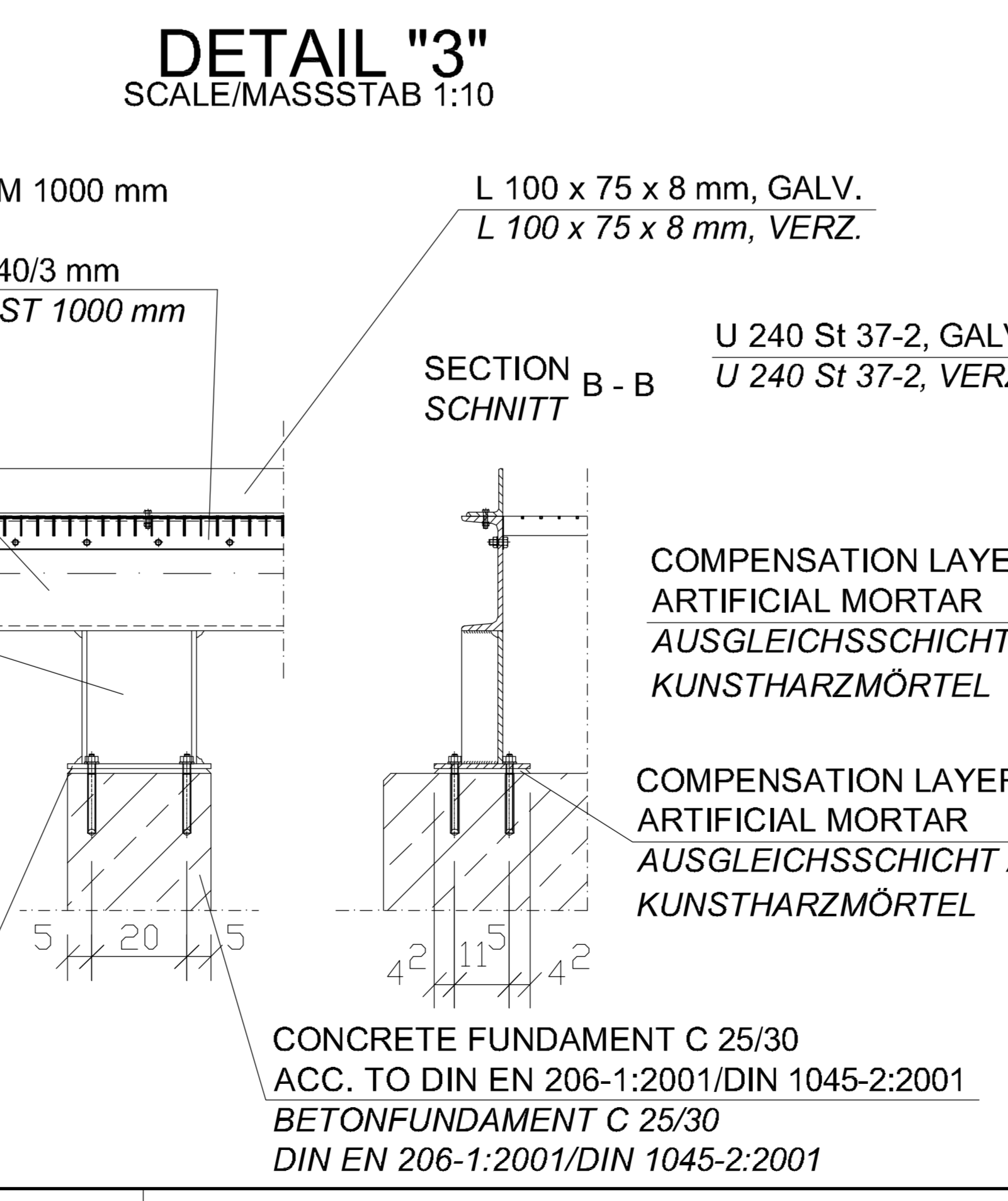
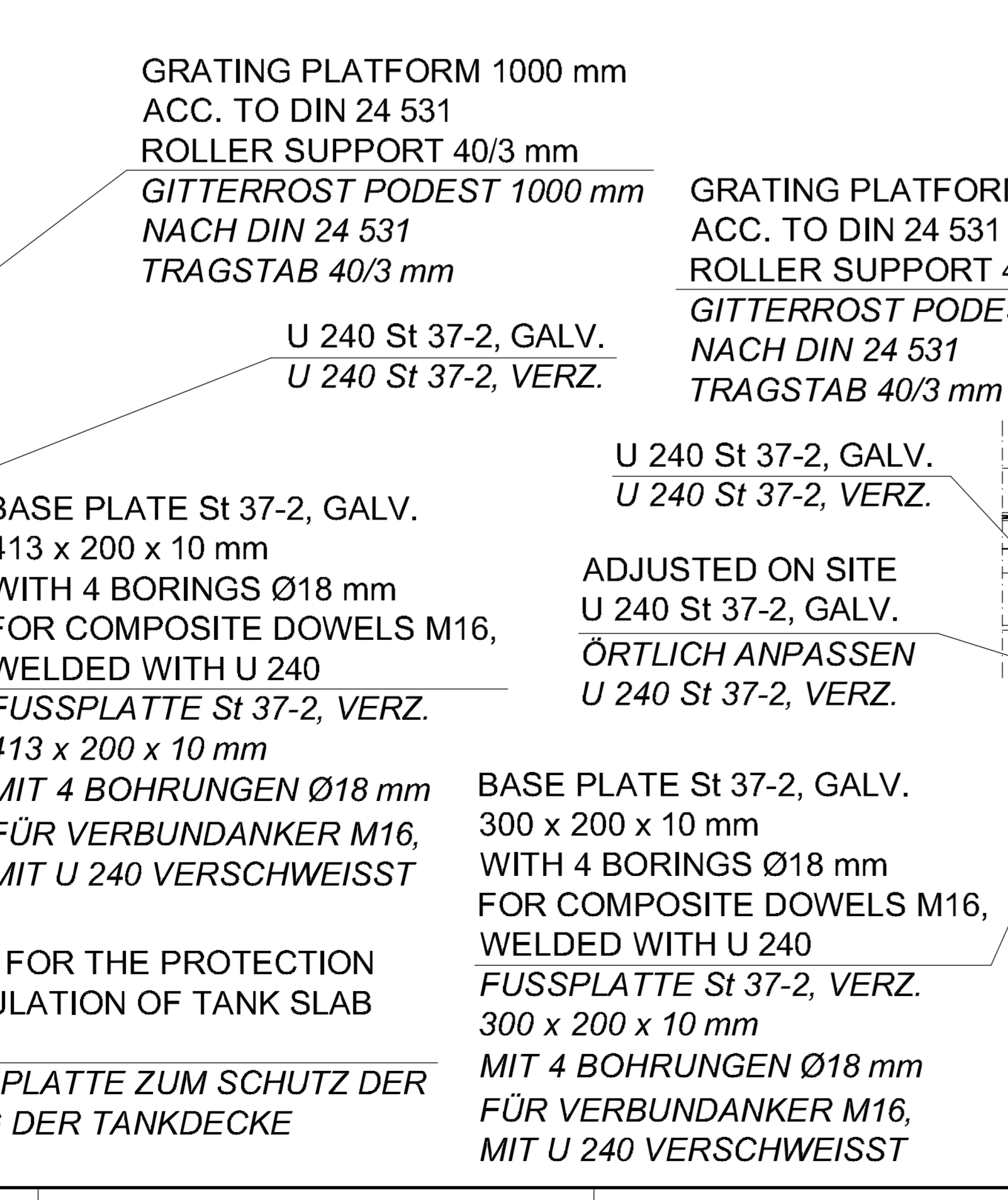
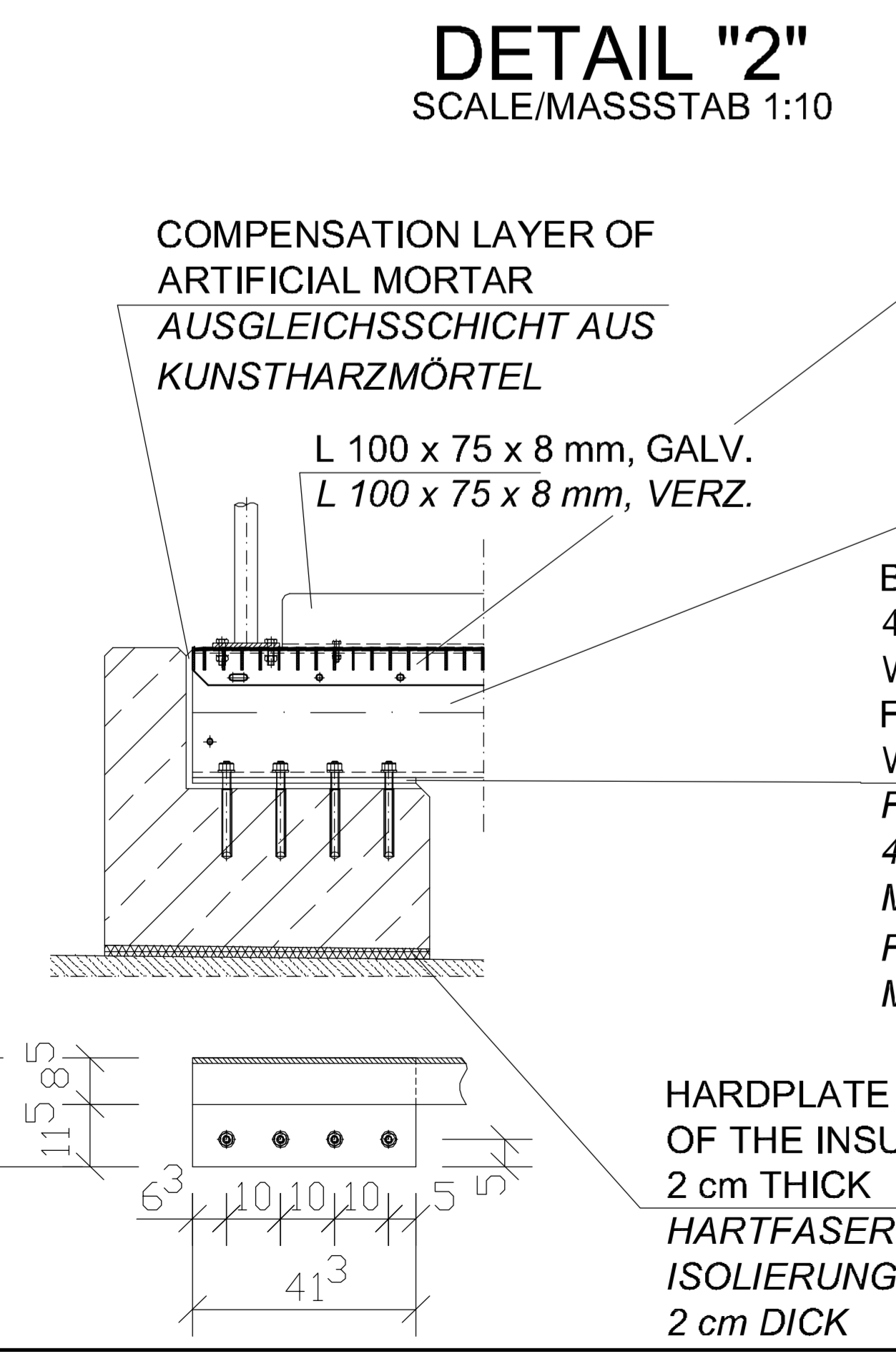
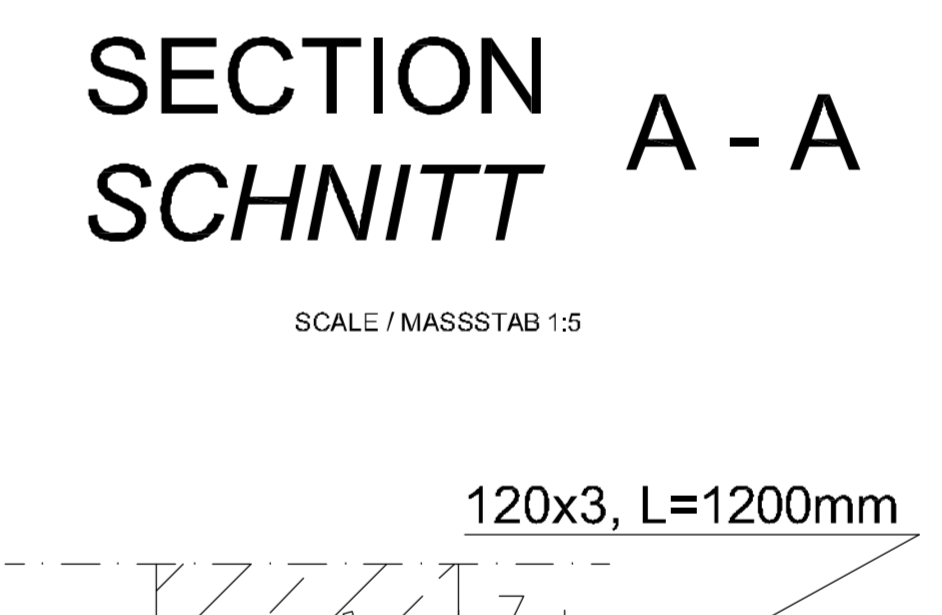
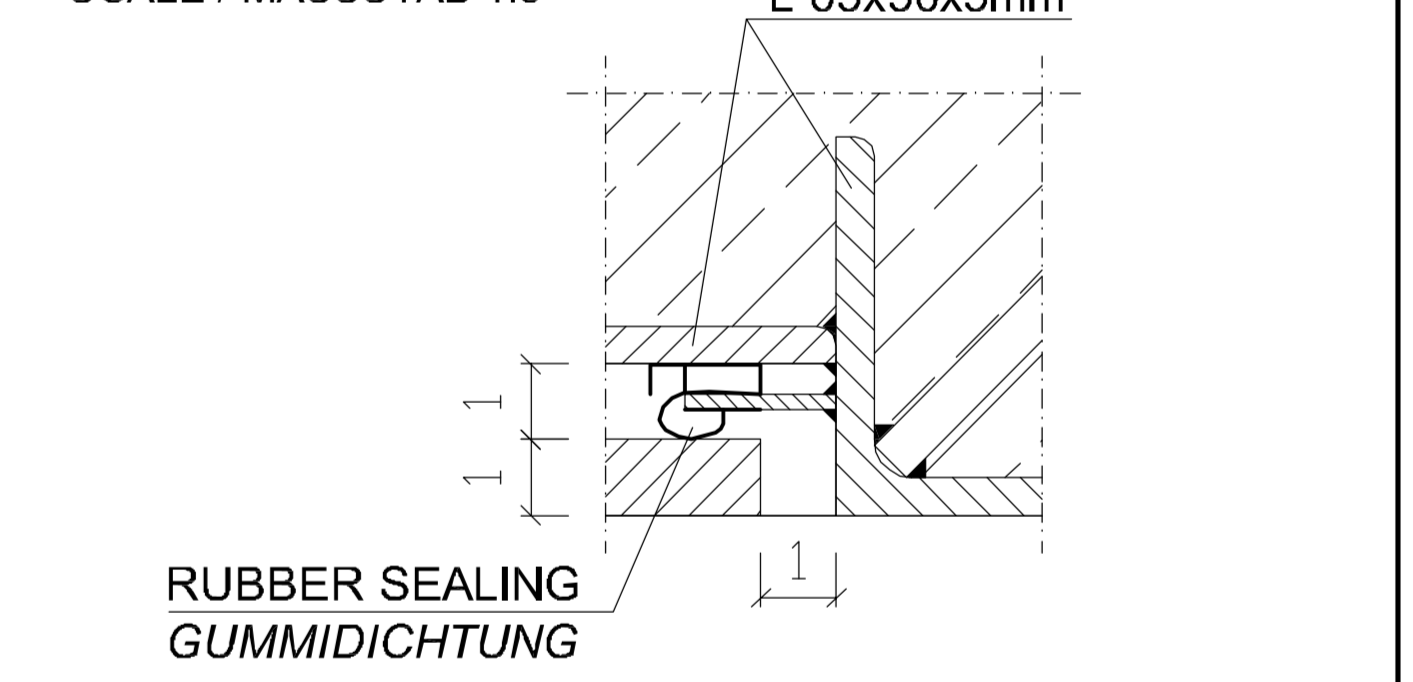


REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
HEADQUARTERS UNITED STATES AIR FORCES EUROPE ENGINEERING & OPERATIONS				
AIRFIELD STANDARD DESIGN US		FLUGPLATZ STANDARDPLANUNG US		
JET FUEL STORAGE AND DISPENSING SYSTEMS		FLUGKRAFTSTOFF - VERSORGUNGSANLAGEN		
BUILDING BAUWERK OPERATING TANK 2500m <sup>3</sup> FLACHBODENTANK 2500m <sup>3</sup>				
DESIGNATOR BEZEICHNUNG DETAILS, STEEL TANK DETAILS, STAHLTANK				
WORKED/REARBEITET	PREPARED/AUFGESTELLT	APPROVED/GENEHMIGT		
LANDSCHAFTS- UND BAUWERKE UND BAUWERKE LANDSCHAFTS- UND BAUWERKE LANDSCHAFTS- UND BAUWERKE		AMT FÜR BUNDESBAU WALLSTR.1 55122 MAINZ		
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAUWAHRNAMEN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED GENEHMIGT	DATE DATUM	SCALE MASSSTAB		
6. MAI 2015	1:1; 1:2; 1:10			
ORIGINAL DRAWN BY IN ORIGINAL DED.	STANDARD SHEET STANDARD PLAN	S - 2.11		
CONSTRUCTION PROJECT BAUWAHRNAME		SHEET NO. PLATZNR.	OF VON	





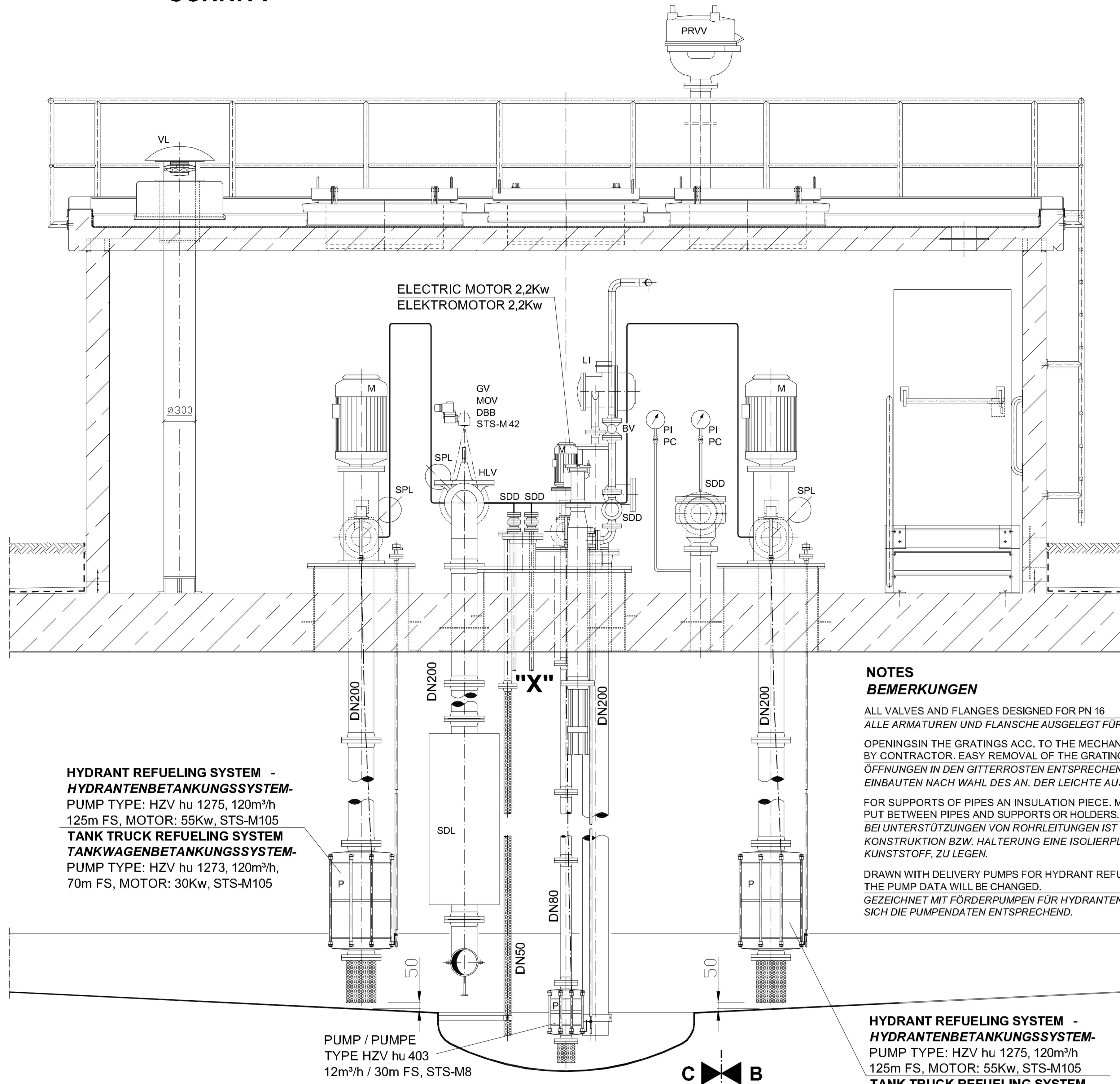
**DETAIL RUBBER SEALING**  
**DETAIL GUMMIDICHTUNG**  
SCALE / MASSSTAB 1:5



REVISION	DATE	DESCRIPTION	BY	COUNTRY
ÄNDERUNG	DATUM	BESCHREIBUNG	VON	LAND
<b>HEADQUARTERS</b>				
UNITED STATES AIR FORCES EUROPE				
ENGINEERING & OPERATIONS				
AIRFIELD STANDARD DESIGN US			FLUGPLATZ STANDARDPLANUNG US	
JET FUEL STORAGE AND DISPENSING SYSTEMS			FLUGKRAFTSTOFF - VERSORGENGSANLAGEN	
<b>OPERATING TANK 2500m³</b> <b>FLACHBODENTANK 2500m³</b>				
TANK STAIRS AND SPLINTER PROTECTION DOORS TANKTREPPE UND SPLITTERSCHUTZTÜREN				
WORKPREPARED BY:	PREPARED/ALFGEFESTELT	APPROVED/GEPRÜFT		
LANDING/ENTWURFSLEISTUNG UND BAUELEMENTE L B B		AMT FÜR BUNDESBAU WALLSTR.1 55122 MAINZ		
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAUMASSNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED/GEPRÜFT	DATE/DATUM	6. MAI 2015	SCALE/MASSSTAB	1:20 ; 1:10 ; 1:5 ; 1:1
DRAWING/ZEICHNUNG IN ORIGINAL/GEZ.			STANDARD SHEET/STANDARDBLATT	S - 2.12
CONSTRUCTION PROJECT/BAUMASSNAHME			SHEET NO./BLATT-NR.	OF/ VON



**SECTION A - A**  
**SCHNITT**



**HYDRANT REFUELING SYSTEM -  
HYDRANTENBETANKUNGSSYSTEM-**  
PUMP TYPE: HZV hu 1275, 120m³/h  
125m FS, MOTOR: 55Kw, STS-M105  
**TANK TRUCK REFUELING SYSTEM-  
TANKWAGENBETANKUNGSSYSTEM-**  
PUMP TYPE: HZV hu 1273, 120m³/h,  
70m FS, MOTOR: 30Kw, STS-M105

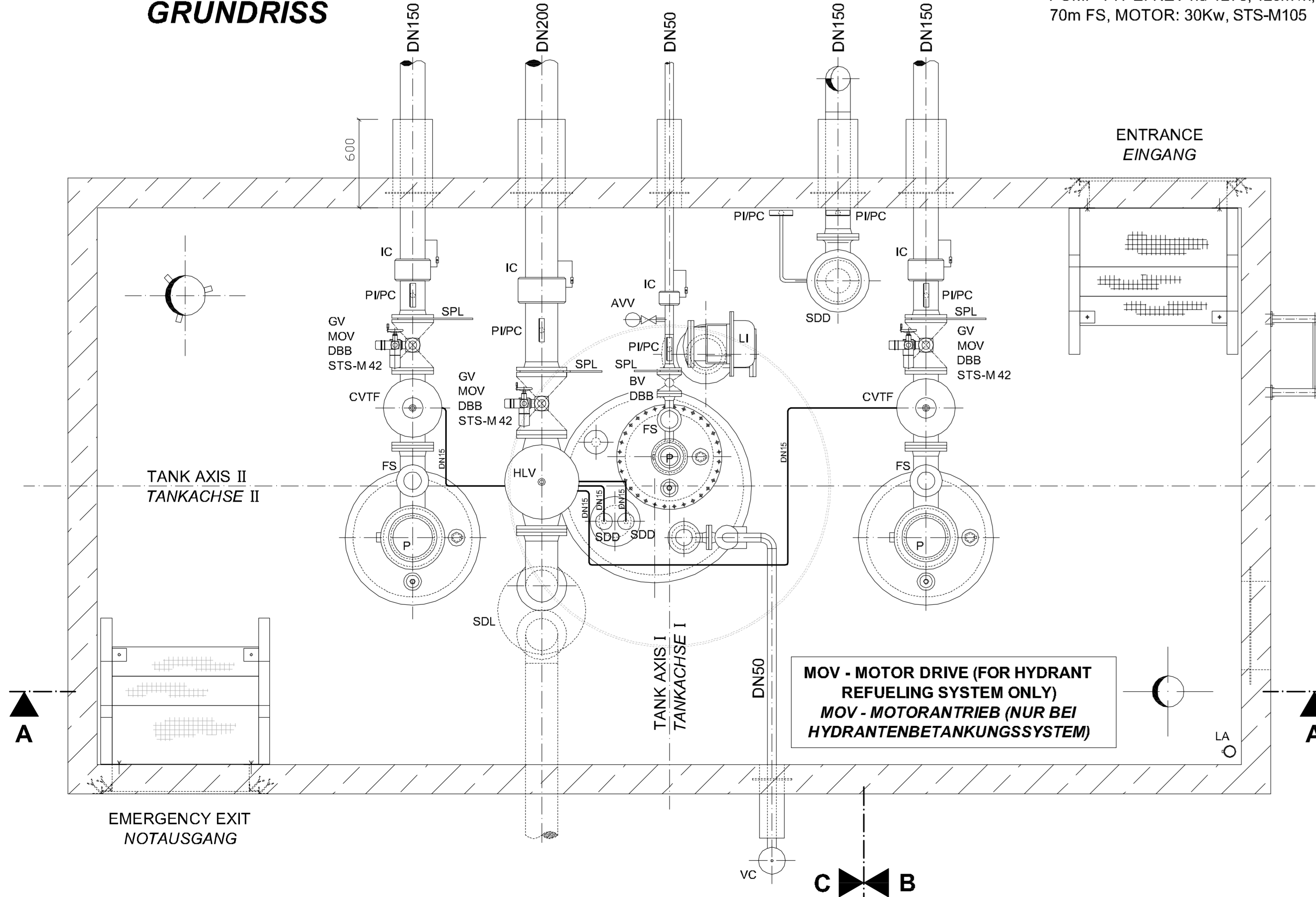
**NOTES  
BEMERKUNGEN**

ALL VALVES AND FLANGES DESIGNED FOR PN 16  
ALLE ARMATUREN UND FLANSCHEN AUSGELEGT FÜR PN 16  
OPENINGS IN THE GRATINGS ACC. TO THE MECHANICAL INSTALLATIONS AS SELECTED  
BY CONTRACTOR. EASY REMOVAL OF THE GRATINGS SHALL BE GUARANTEED.  
ÖFFNUNGEN IN DEN GITTERROSTEN ENTSPRECHEND DEN MASCHINENTECHNISCHEN  
EINBAUTEN NACH WAHL DES AN. DER LEICHTE AUSBAU DER GITTERROSTE IST ZU GEWÄHRLEISTEN.  
FOR SUPPORTS OF PIPES AN INSULATION PIECE, MADE OF 10mm THICK FUELRESISTANT PLASTIC IS TO  
BE PUT BETWEEN PIPES AND SUPPORTS OR HOLDERS.  
BEI UNTERSTÜTZUNGEN VON ROHRLEITUNGEN IST ZWISCHEN ROHRLEITUNG UND UNTERSTÜTZUNGS-  
KONSTRUKTION BZW. HALTERUNG EINE ISOLIERPLATTE 10mm DICK AUS KRAFTSTOFFBESTÄNDIGEN  
KUNSTSTOFF, ZU LEGEN.  
DRAWN WITH DELIVERY PUMPS FOR HYDRANT REFUELING. FOR TANK TRUCK REFUELING  
THE PUMP DATA WILL BE CHANGED.  
GEZEICHNET MIT FÖRDERPUMPEN FÜR HYDRANTENBETANKUNG. BEI TRKW - BEFÜLLUNG ÄNDERN  
SICH DIE PUMPENDATEN ENTSPRECHEND.

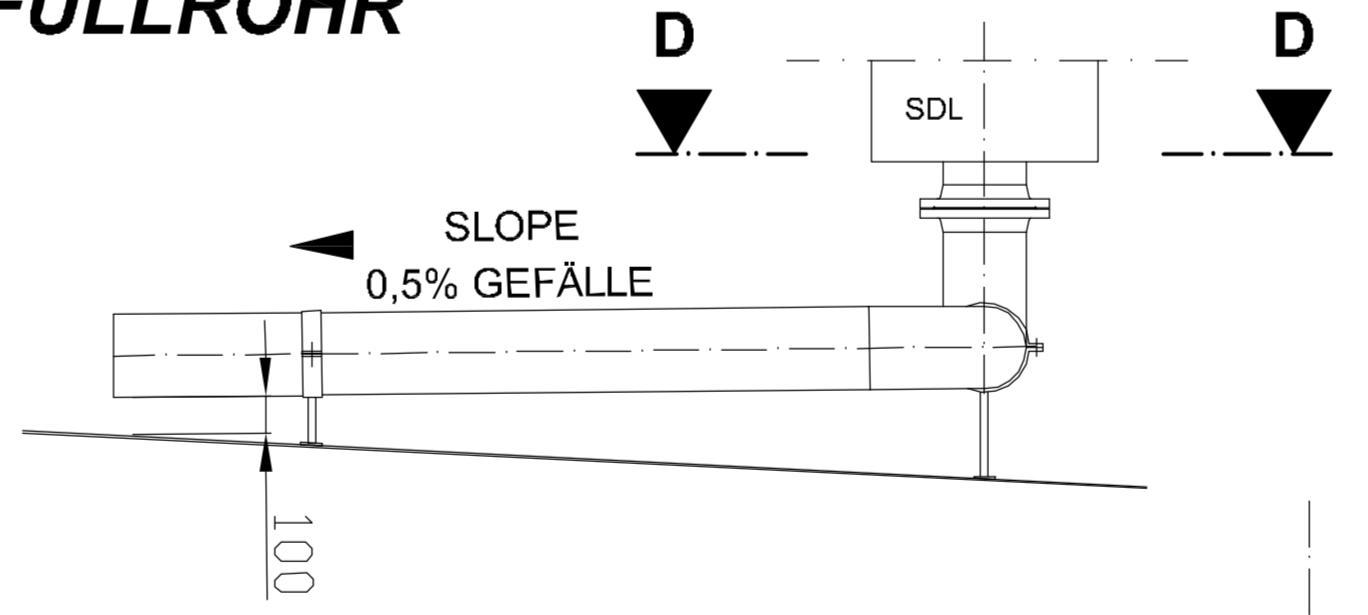
PUMP / PUMPE  
TYPE HZV hu 403  
12m³/h / 30m FS, STS-M8

**HYDRANT REFUELING SYSTEM -  
HYDRANTENBETANKUNGSSYSTEM-**  
PUMP TYPE: HZV hu 1275, 120m³/h  
125m FS, MOTOR: 55Kw, STS-M105  
**TANK TRUCK REFUELING SYSTEM-  
TANKWAGENBETANKUNGSSYSTEM-**  
PUMP TYPE: HZV hu 1273, 120m³/h,  
70m FS, MOTOR: 30Kw, STS-M105

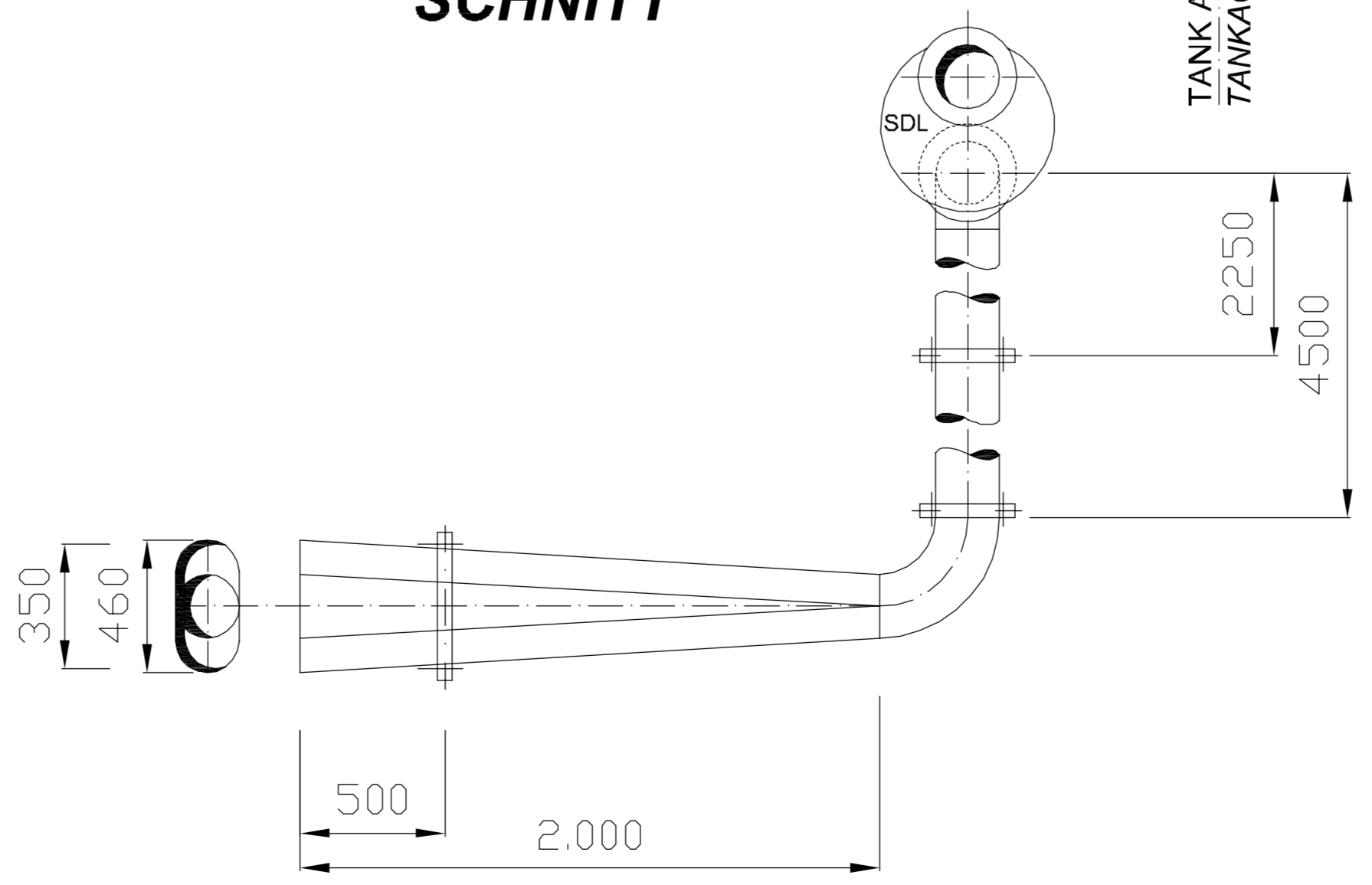
**GROUND PLAN  
GRUNDRISS**



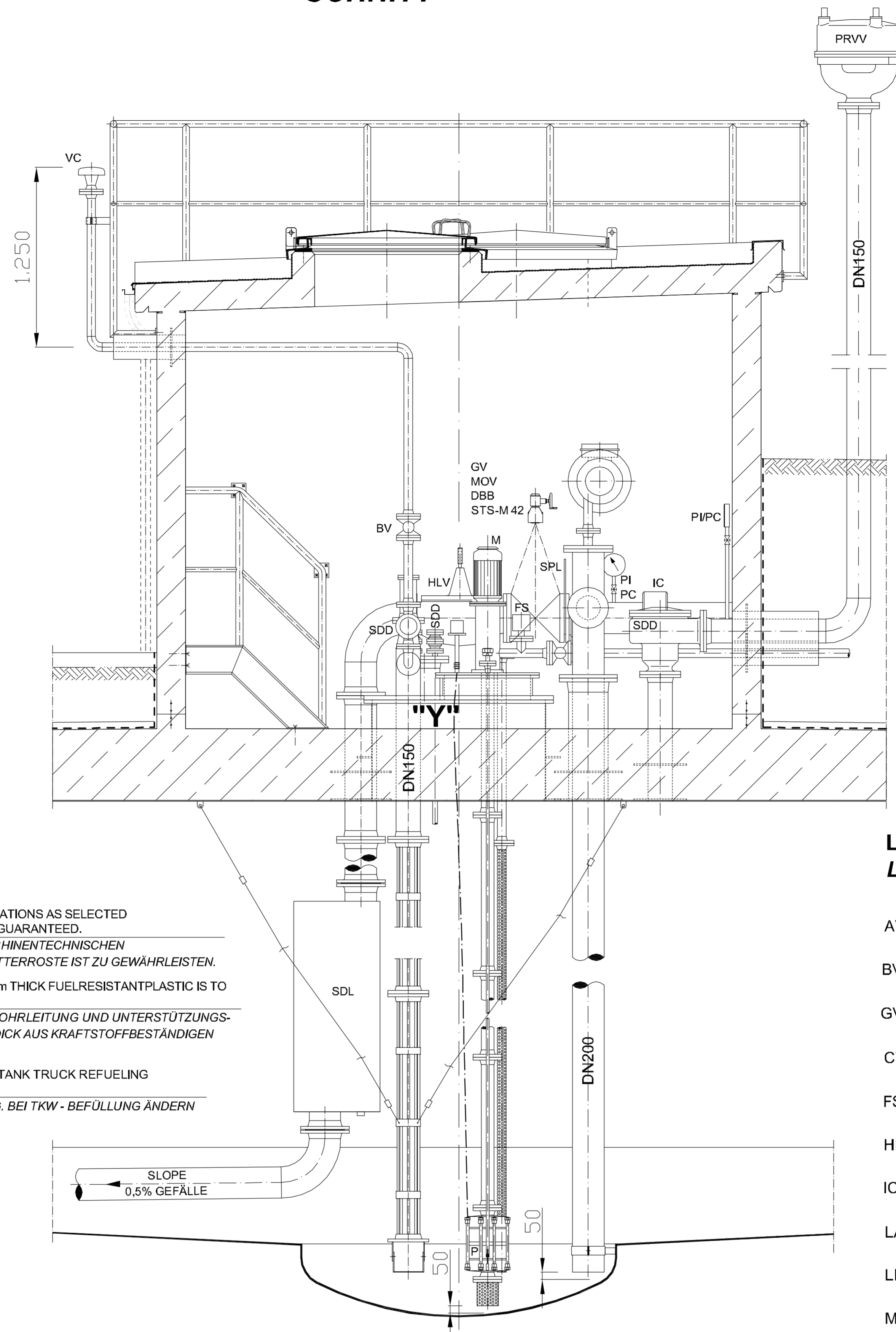
**FILLING PIPE  
FÜLLROHR**



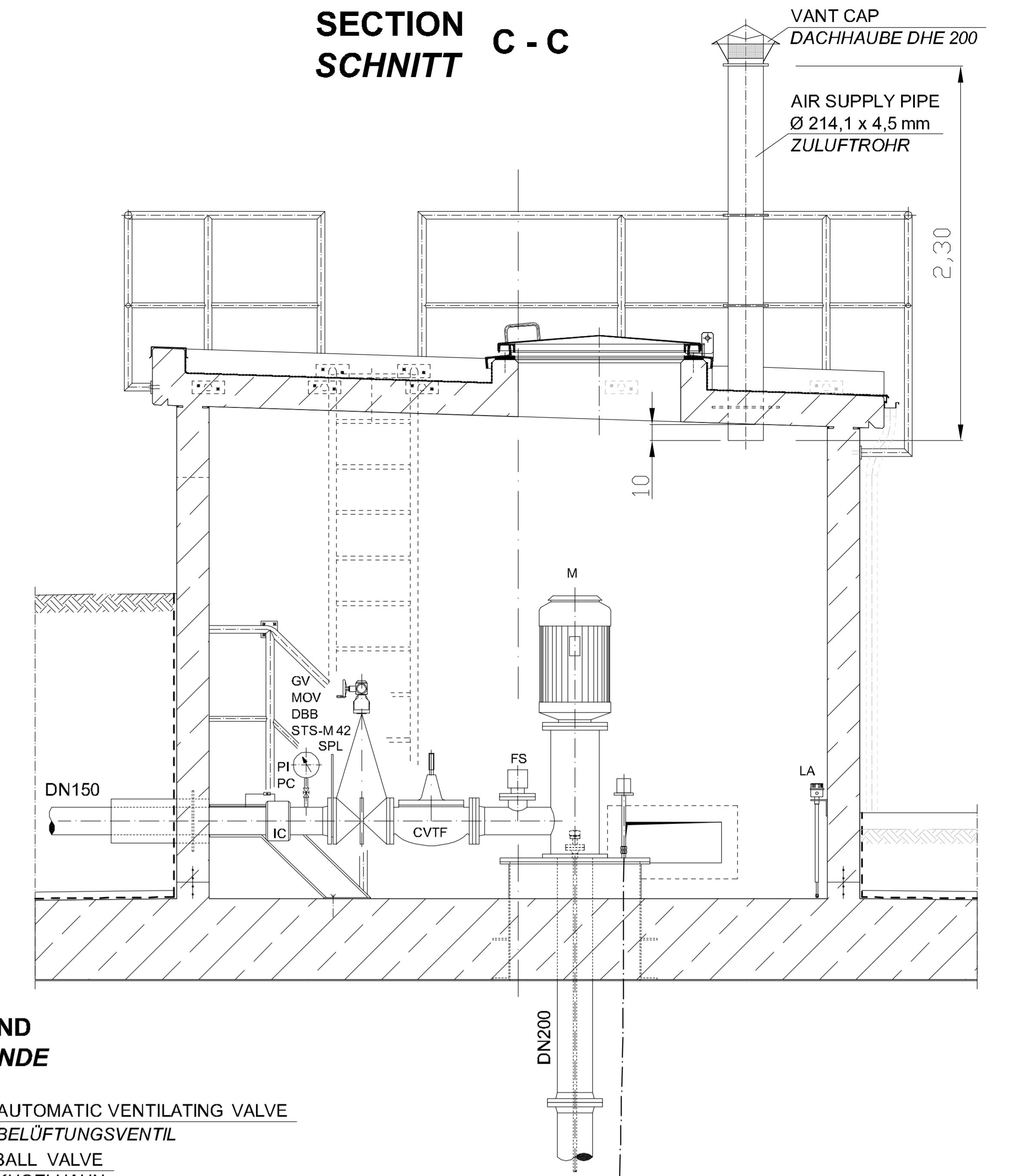
**SECTION D - D  
SCHNITT**



**SECTION B - B  
SCHNITT**



**SECTION C - C  
SCHNITT**

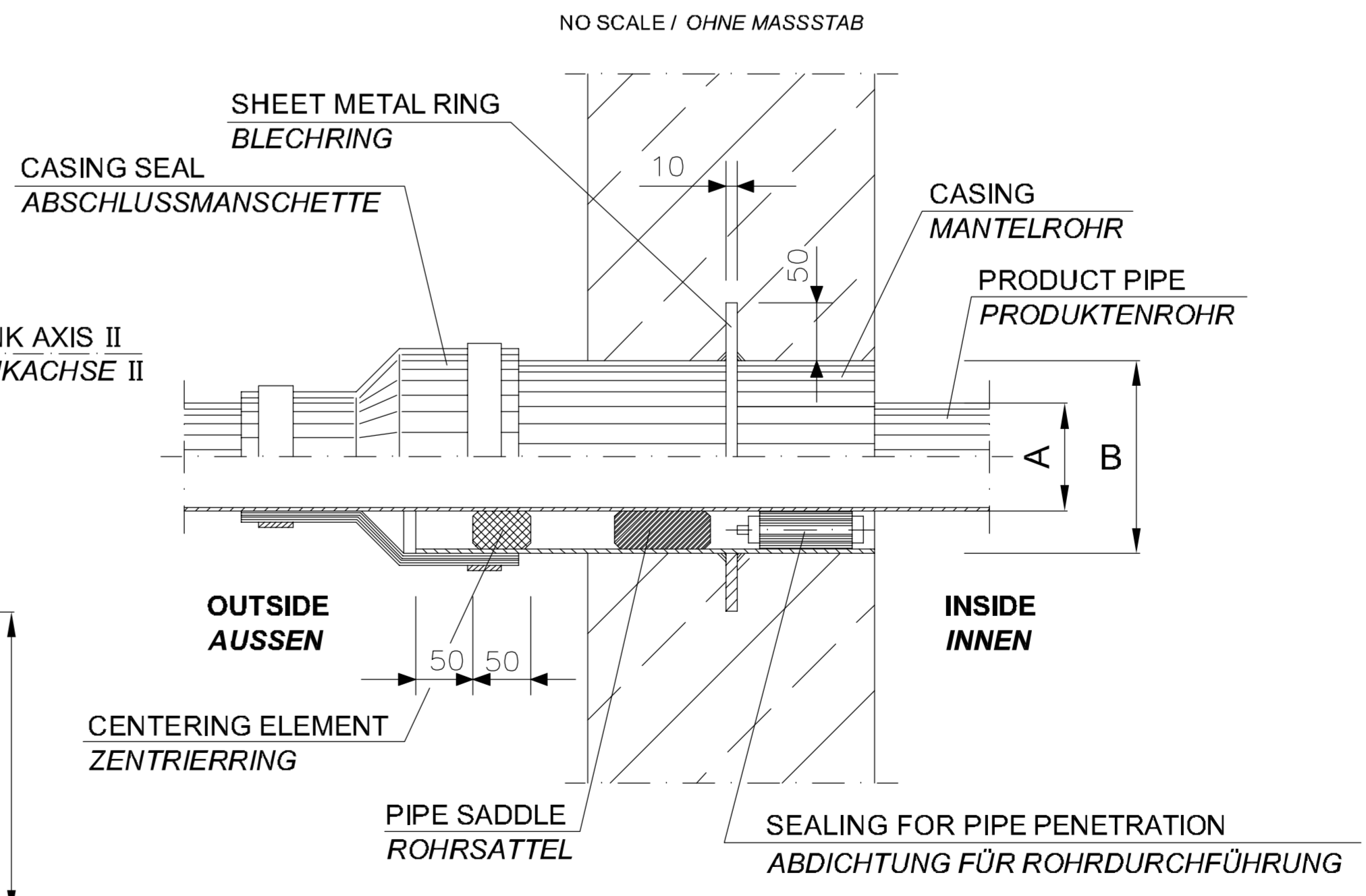


**LEGEND  
LEGENDE**

- AVW AUTOMATIC VENTILATING VALVE  
BELÜFTUNGSVENTIL
- BV BALL VALVE  
KUGELHAHN
- GV GATE VALVE  
ABSPERRSCHIEBER
- CVTF PUMP START VALVE WITH FLOW LIMITATION  
PUMPENANFAHREVENTIL MIT MENGENBEGRENZUNG
- FS FLOW SWITCH  
STRÖMUNGSWÄCHTER
- HLV HIGH LEVEL SHUT - OFF VALVE  
ÜBERFÜLLSICHERUNG
- IC INSULATING COUPLING  
ISOLIERKUPPLUNG
- LA LIQUID PROBE  
FLÜSSIGKEITSSONDE
- LI LEVEL INDICATOR  
FÜLLSTANDSANZEIGER
- M ELECTRIC MOTOR  
ELEKTROMOTOR
- MOV GATE VALVE WITH MOTOR  
ABSPERRARMATUR MIT MOTORANTRIEB
- P PUMP  
PUMPE
- PC PRESSURE GAUGE STOPCOCK  
MANOMETER - ABSPERRVENTIL
- PI PRESSURE GAUGE  
MANOMETER
- PRVV PRESSURE RELIEF - VACUUM VALVE  
ÜBER - UNTERDRUCK MEMBRANVENTIL
- SDD SAFETY DEVICE AGAINST DETONATION, DRY TYPE  
TROCENEN - DETONATIONSSICHERUNG
- SDL SAFETY DEVICE AGAINST DETONATION, LIQUID TYPE  
FLÜSSIGKEITS - DETONATIONSSICHERUNG
- SPL SPADE PLATE  
BRILLENSTECKSCHEIBE
- VC VENTILATING CAP  
ENTLÜFTUNGSHAUBE
- VL VENTILATOR  
VENTILATOR
- DBB DOUBLE BLOCK AND BLEED

**PERTINENT DRAWINGS  
ZUGEHÖRIGE ZEICHNUNGEN**  
C-2.2 GENERAL PLAN - DETAILS  
ÜBERSICHTSPLAN - DETAILS

**DETAIL PIPE PENETRATION  
DETAIL ROHRDURCHFÜHRUNG**

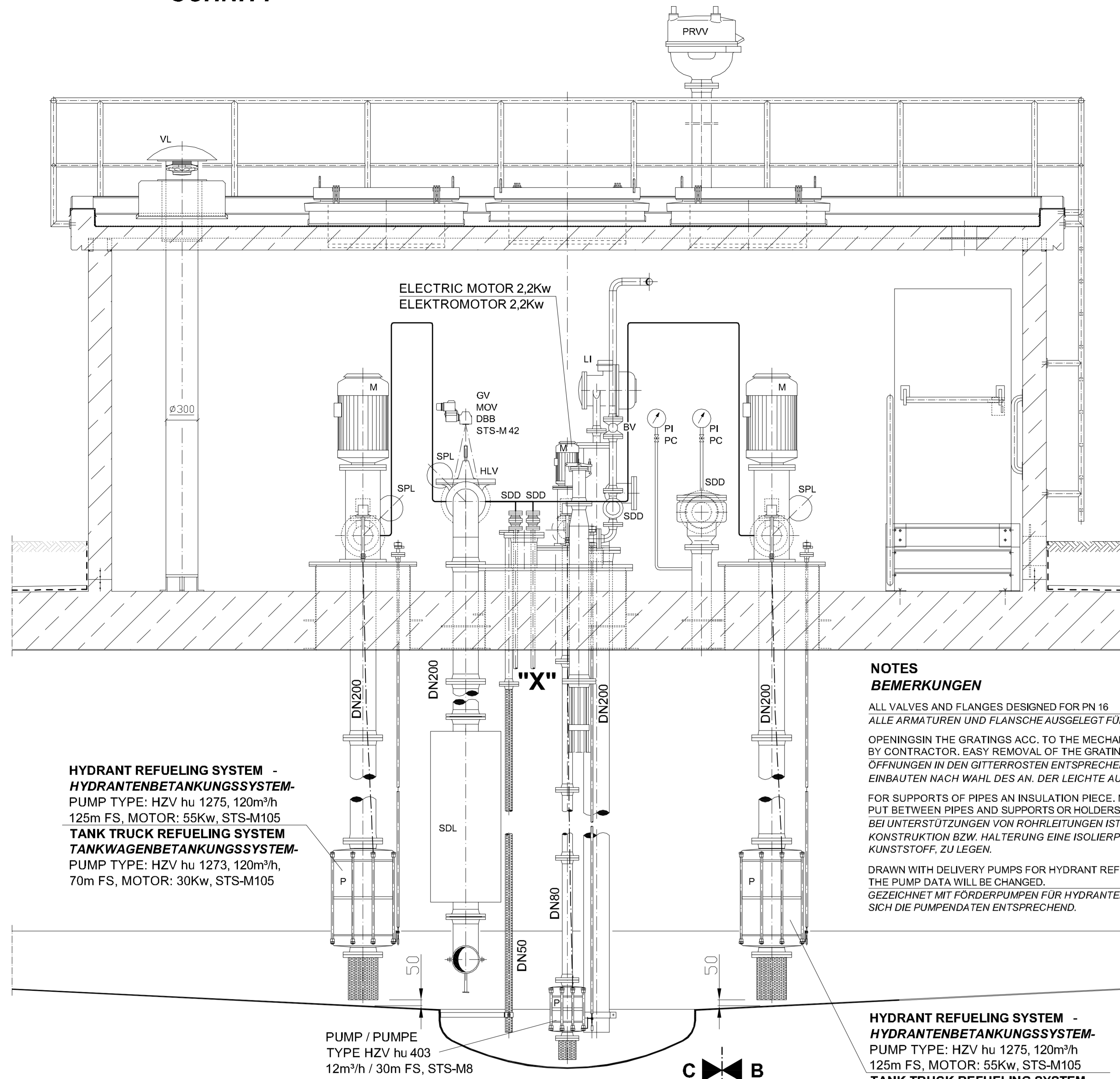


PRODUCT PIPE PRODUKTENROHR	A mm	B mm
DN 25	Ø 33,7	Ø 76,1
DN 50	Ø 60,3	Ø 168,3
DN 150	Ø 168,3	Ø 273
DN 200	Ø 273	Ø 323,9
EXAMPLE	BEISPIEL	

REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
HEADQUARTERS UNITED STATES AIR FORCES EUROPE ENGINEERING & OPERATIONS				
AIRFIELD STANDARD DESIGN US		FLUGPLATZ STANDARDPLANUNG US		
JET FUEL STORAGE AND DISPENSING SYSTEMS		FLUGKRAFTSTOFF - VERSORGUNGSANLAGEN		
BUILDING BAUWERK				
OPERATING TANK 2500m³ FLACHBODENTANK 2500m³				
DESIGNATOR BEZEICHNUNG				
MECHANICAL INSTALLATION WITH INSULATING COUPLING MASCHINENTECHNISCHE INSTALLATION MIT ISOLIERKUPPLUNG				
WORKED/ARBEITET	PREPARED/AUFGESTELLT	APPROVED/GEHEBET		
LANDSBEREITUNGSGESAMTSCHAFT UND BAUBETRIEB LAW-RECHENUNGSANSTALT L B B		AMT FÜR BUNDESBAU WALLSTR.1 55122 MAINZ		
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAUHAUPTNÄHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED GEHEBET	DATE DATUM	6. MAI 2015	SCALE MASSSTAB	1:20
ORIGINAL DRAWN BY IN ORIGINAL DES.			STANDARD SHEET STANDARD BLATT	
GENERAL INFO GEMISCHTE FACILITÄTSEINGANG MISCHTÜR-VERBUNDLICHE EINBAU			CAD-PROJECT NAME CAD-PROJEKTNAME	M - 2.1
CONSTRUCTION PROJECT BAUHAUPTNÄHME				SHEET NO. BLATTNR.
				OF VON



**SECTION A - A**  
SCHNITT



**HYDRANT REFUELING SYSTEM -  
HYDRANTENBETANKUNGSSYSTEM**  
PUMP TYPE: HZV hu 1275, 120m³/h  
125m FS, MOTOR: 55Kw, STS-M105  
**TANK TRUCK REFUELING SYSTEM**  
**TANKWAGENBETANKUNGSSYSTEM**  
PUMP TYPE: HZV hu 1273, 120m³/h,  
70m FS, MOTOR: 30Kw, STS-M105

PUMP / PUMPE  
TYPE HZV hu 403  
12m³/h / 30m FS, STS-M8

**NOTES  
BEMERKUNGEN**

ALL VALVES AND FLANGES DESIGNED FOR PN 16  
ALLE ARMATUREN UND FLANSCHS AUSGELEGT FÜR PN 16

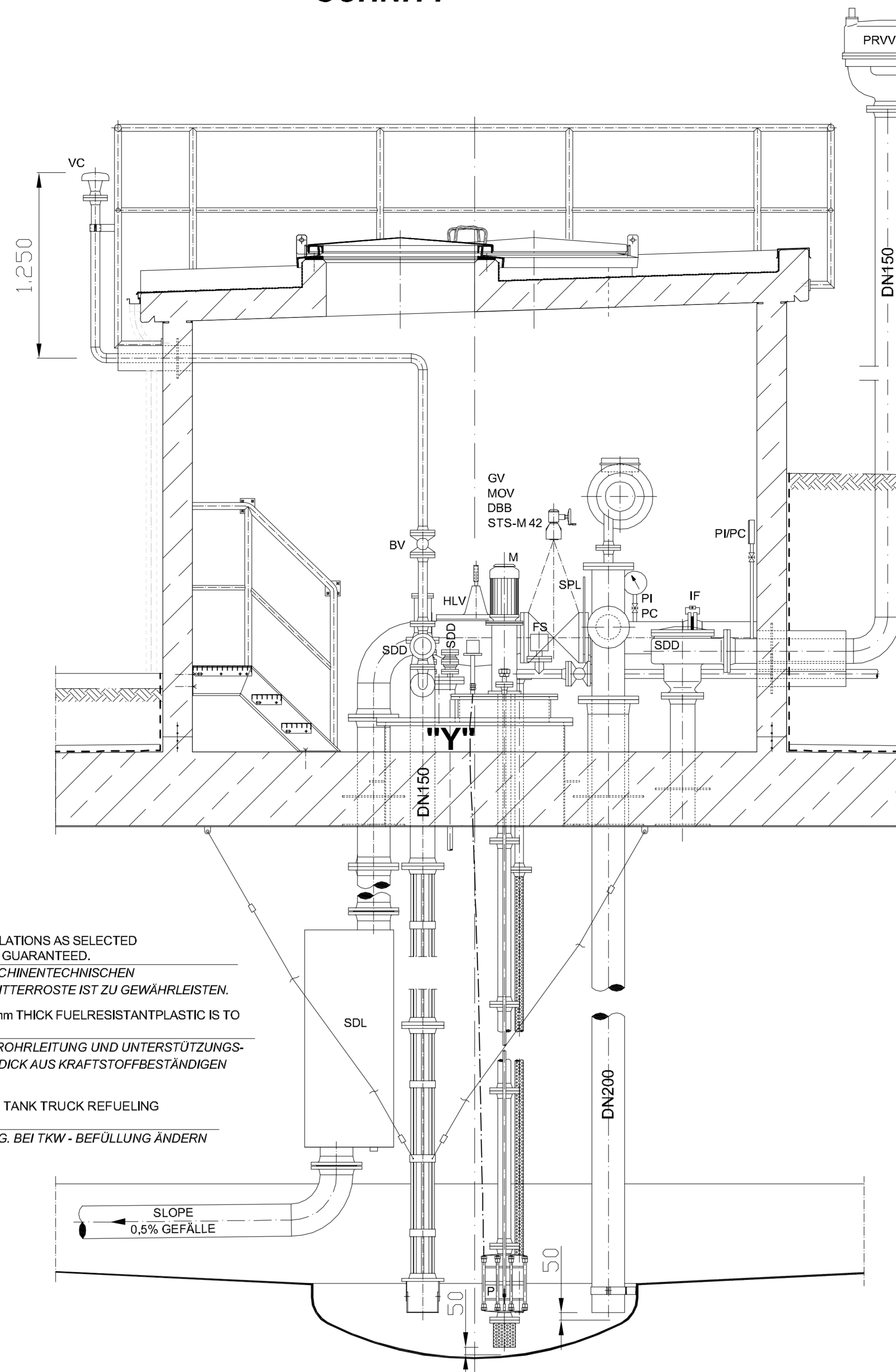
OPENINGS IN THE GRATINGS ACC. TO THE MECHANICAL INSTALLATIONS AS SELECTED BY CONTRACTOR. EASY REMOVAL OF THE GRATINGS SHALL BE GUARANTEED.  
ÖFFNUNGEN IN DEN GITTERROSTEN ENTSPRECHEND DEN MASCHINENTECHNISCHEN EINBAUTEN NACH WAHL DES AN. DER LEICHTE AUSBAU DER GITTERROSTE IST ZU GEWÄHRLEISTEN.

FOR SUPPORTS OF PIPES AN INSULATION PIECE, MADE OF 10mm THICK FUELRESISTANT PLASTIC IS TO PUT BETWEEN PIPES AND SUPPORTS OR HOLDERS.  
BEI UNTERSTÜTZUNGEN VON ROHRLÄITUNGEN IST ZWISCHEN ROHRLÄITUNG UND UNTERSTÜTZUNGS-KONSTRUKTION BZW. HALTERUNG EINE ISOLIERPLATTE 10mm DICK AUS KRAFTSTOFFBESTÄNDIGEN KUNSTSTOFF, ZU LEGEN.

DRAWN WITH DELIVERY PUMPS FOR HYDRANT REFUELING, FOR TANK TRUCK REFUELING THE PUMP DATA WILL BE CHANGED.  
GEZEICHNET MIT FÖRDERPUMPEN FÜR HYDRANTENBETANKUNG, BEI TW - BEFÜLLUNG ÄNDERN SICH DIE PUMPENDATEN ENTSPRECHEND.

**HYDRANT REFUELING SYSTEM -  
HYDRANTENBETANKUNGSSYSTEM**  
PUMP TYPE: HZV hu 1275, 120m³/h  
125m FS, MOTOR: 55Kw, STS-M105  
**TANK TRUCK REFUELING SYSTEM**  
**TANKWAGENBETANKUNGSSYSTEM**  
PUMP TYPE: HZV hu 1273, 120m³/h,  
70m FS, MOTOR: 30Kw, STS-M105

**SECTION B - B**  
SCHNITT



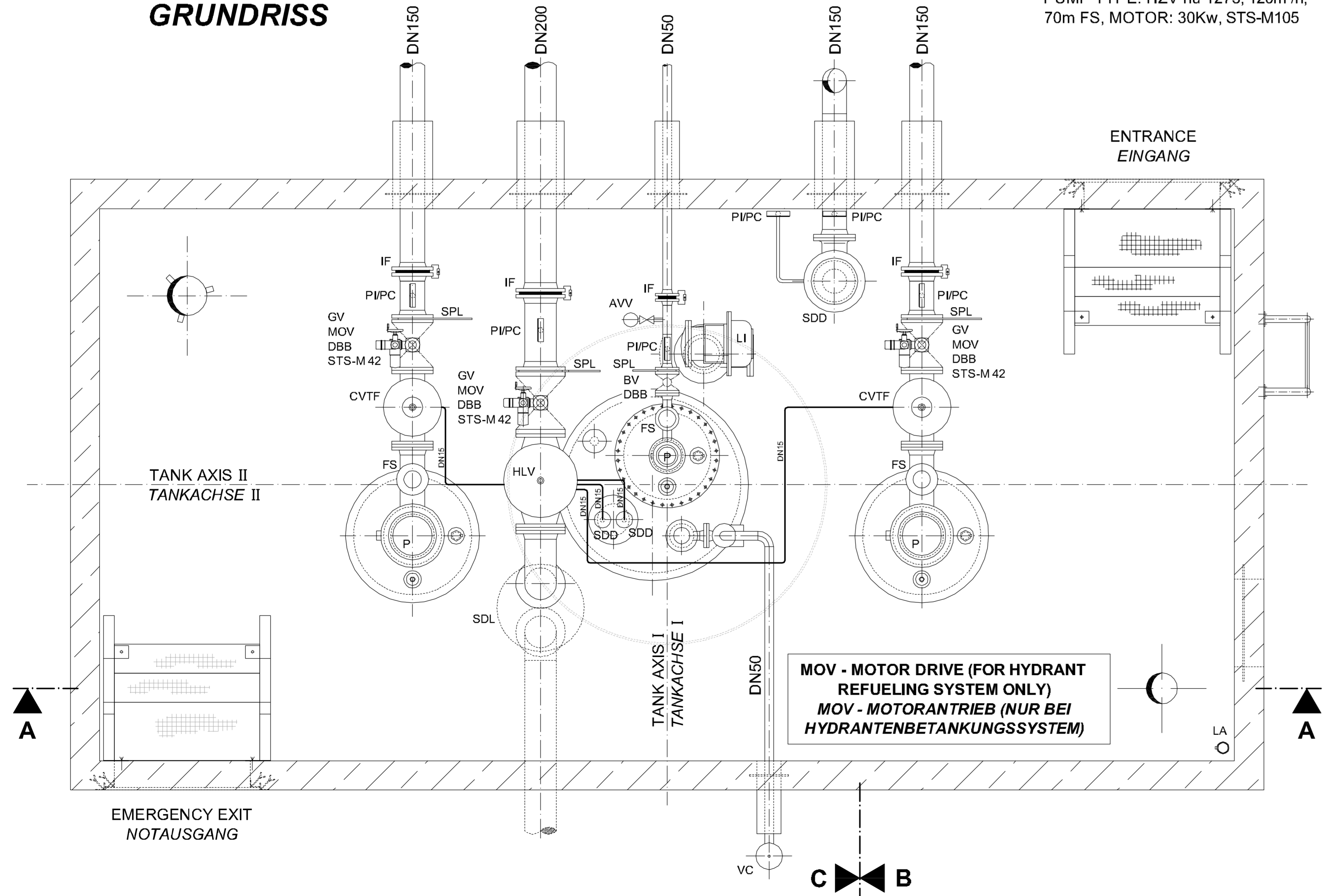
**LEGEND  
LEGENDE**

- AVV AUTOMATIC VENTILATING VALVE  
BELÜFTUNGSVENTIL
- BV BALL VALVE  
KUGELHAHN
- GV GATE VALVE  
ABSPERRSCHIEBER
- CVTF PUMP START VALVE WITH FLOW LIMITATION  
PUMPENANFAHRVENTIL MIT MENGENBEGRENZUNG
- FS FLOW SWITCH  
STRÖMUNGSWÄCHTER
- HLV HIGH LEVEL SHUT - OFF VALVE  
ÜBERFÜLLSICHERUNG
- IF INSULATING FLANGE  
ISOLIERFLANSCH
- LA LIQUID PROBE  
FLÜSSIGKEITSSONDE
- LI LEVEL INDICATOR  
FÜLLSTANDSANZEIGER
- M ELECTRIC MOTOR  
ELEKTROMOTOR
- MOV GATE VALVE WITH MOTOR  
ABSPERRARMATUR MIT MOTORANTRIEB
- P PUMP  
PUMPE
- PC PRESSURE GAUGE STOPCOCK  
MANOMETER - ABSPERRVENTIL
- PI PRESSURE GAUGE  
MANOMETER
- PRVV PRESSURE RELIEF - VACUUM VALVE  
ÜBER - UNTERDRUCK MEMBRANVENTIL
- SDD SAFETY DEVICE AGAINST DETONATION, DRY TYPE  
TROCKEN - DETONATIONSSICHERUNG
- SOL SAFETY DEVICE AGAINST DETONATION, LIQUID TYPE  
FLÜSSIGKEITS - DETONATIONSSICHERUNG
- SPL SPADE PLATE  
BRILLENSTECKSCHEIBE
- VC VENTILATING CAP  
ENTLÜFTUNGSHAUBE
- VL VENTILATOR  
VENTILATOR
- DBB DOUBLE BLOCK AND BLEED

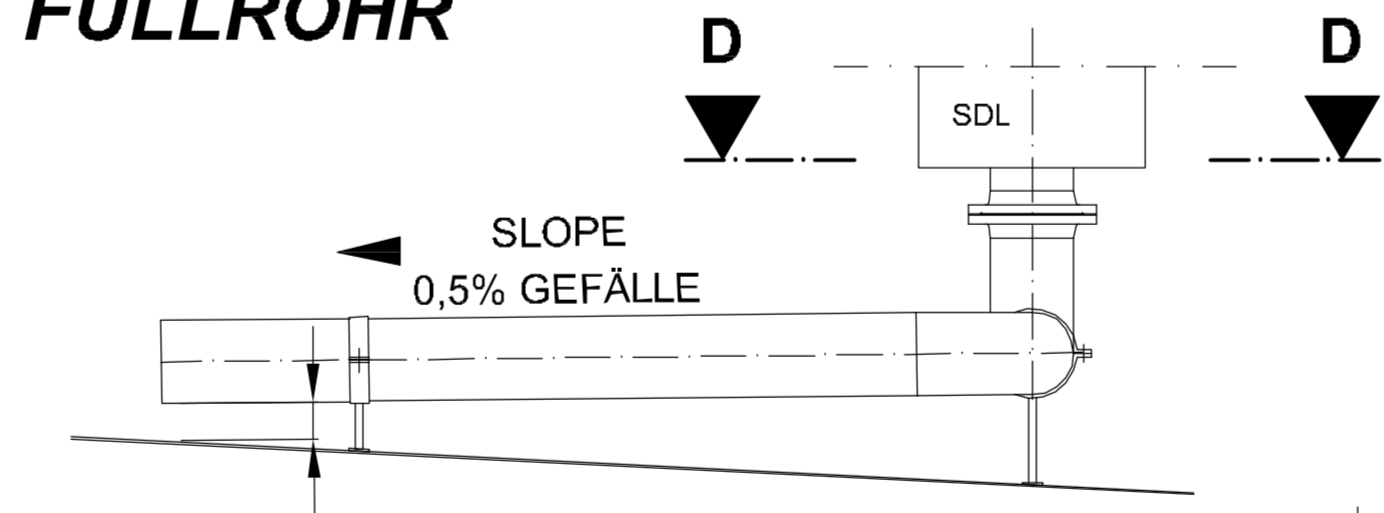
**PERTINENT DRAWINGS  
ZUGEHÖRIGE ZEICHNUNGEN**  
C-2.2 GENERAL PLAN - DETAILS  
ÜBERSICHTSPLAN - DETAILS

REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND								
<b>HEADQUARTERS</b>												
UNITED STATES AIR FORCES EUROPE												
<b>ENGINEERING &amp; OPERATIONS</b>												
AIRFIELD STANDARD DESIGN US		FLUGPLATZ STANDARDPLANUNG US										
JET FUEL STORAGE AND DISPENSING SYSTEMS		FLUGKRAFTSTOFF - VERSORGSANLAGEN										
<b>OPERATING TANK 2500m³ FLACHBÖDENTANK 2500m³</b>												
<b>MECHANICAL INSTALLATION WITH INSULATING FLANGE MASCHINENTECHNISCHE INSTALLATION MIT ISOLIERFLANSCH</b>												
<table border="1" style="width: 100%;"> <tr> <td style="width: 30%;">VORBEREITET</td> <td style="width: 30%;">APPROVED/GEPRÜFT</td> <td style="width: 30%;"></td> <td style="width: 10%;"></td> </tr> <tr> <td>                 LANDBAU- UND BAUWERKE                  UND BAUWERKE                  LANDBAU- UND BAUWERKE                  LANDBAU- UND BAUWERKE             </td> <td>                 AMT                  FÜR                  BUNDESBAU                  WÄLSTR.1                  55122 MAINZ             </td> <td>                 ORIGINAL SIGNED BY                  IN ORIGINAL SIZE             </td> <td>                 ORIGINAL SIGNED BY                  IN ORIGINAL SIZE             </td> </tr> </table>					VORBEREITET	APPROVED/GEPRÜFT			LANDBAU- UND BAUWERKE UND BAUWERKE LANDBAU- UND BAUWERKE LANDBAU- UND BAUWERKE	AMT FÜR BUNDESBAU WÄLSTR.1 55122 MAINZ	ORIGINAL SIGNED BY IN ORIGINAL SIZE	ORIGINAL SIGNED BY IN ORIGINAL SIZE
VORBEREITET	APPROVED/GEPRÜFT											
LANDBAU- UND BAUWERKE UND BAUWERKE LANDBAU- UND BAUWERKE LANDBAU- UND BAUWERKE	AMT FÜR BUNDESBAU WÄLSTR.1 55122 MAINZ	ORIGINAL SIGNED BY IN ORIGINAL SIZE	ORIGINAL SIGNED BY IN ORIGINAL SIZE									
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAUWERKE IN EUROPA (AUSSER DEUTSCHLAND)												
APPROVED GEPRÜFT	DATE DATUM	6. MAI 2015	SCALE MASSSTAB	1:20								
ORIGINAL SIGNED BY IN ORIGINAL SIZE			STANDARD SHEET STANDARD PLAN	M - 2.1								
CONSTRUCTION PROJECT BAUWERKE				SHEET NO. PLATEAU								

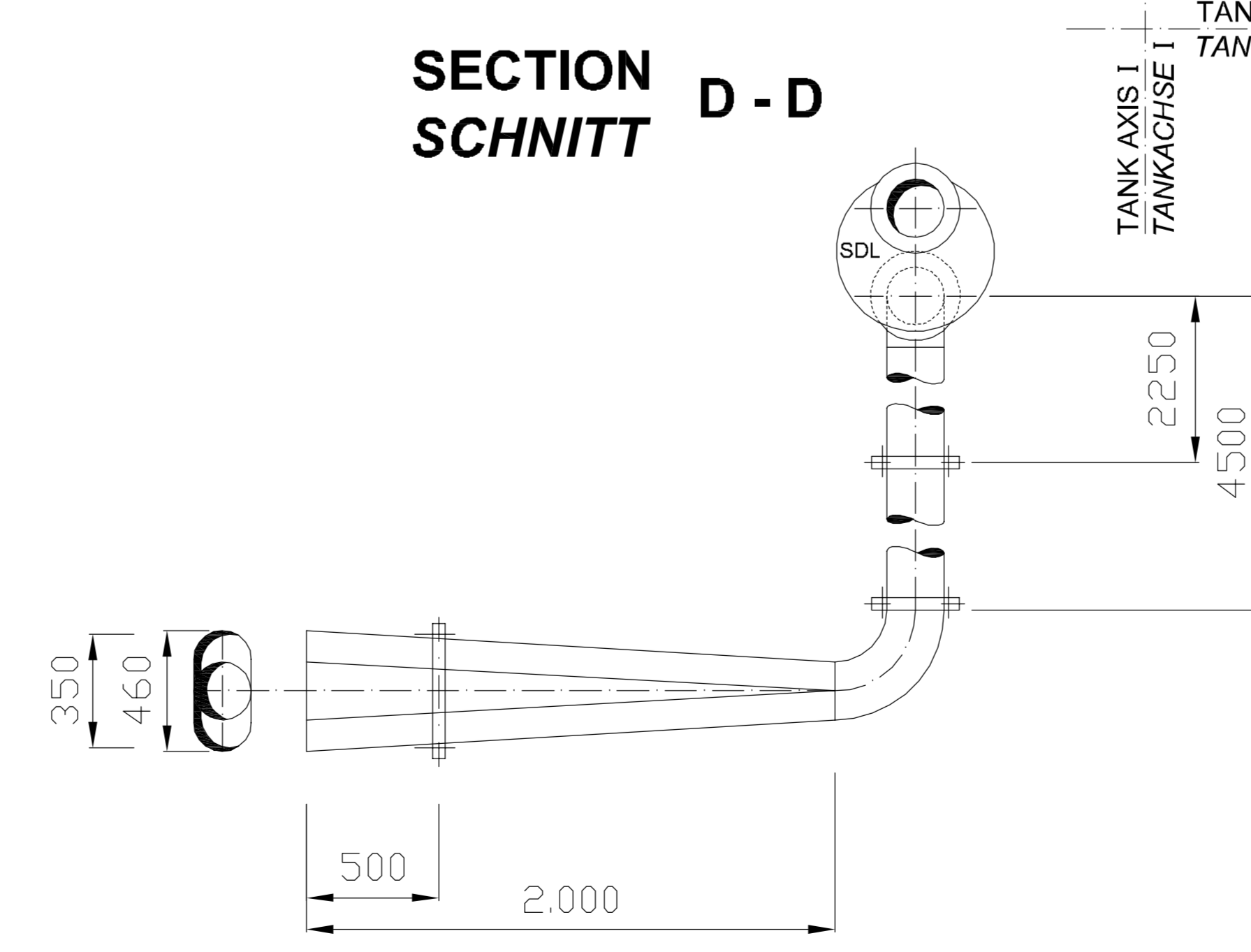
**GROUND PLAN  
GRUNDRISS**



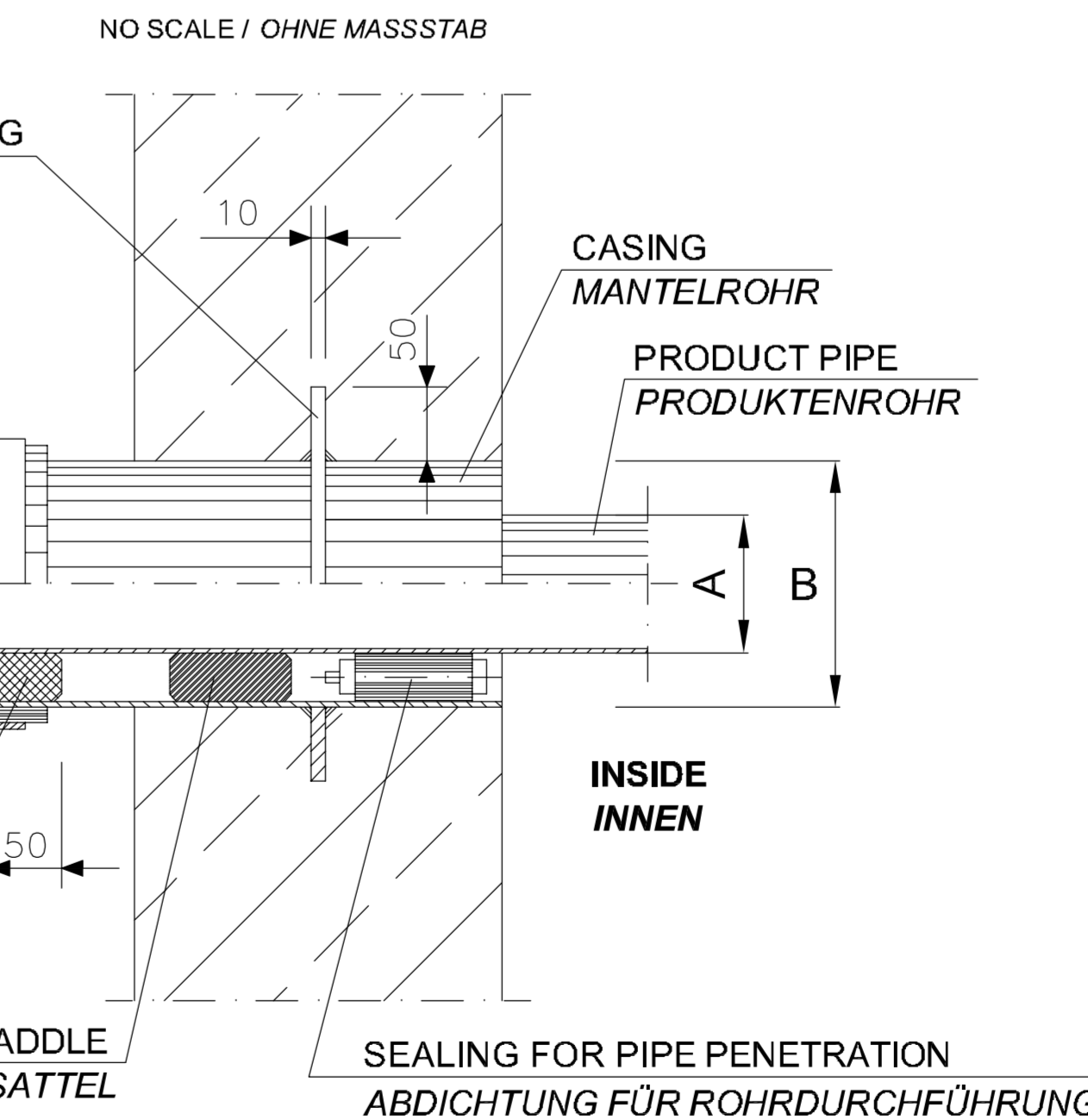
**FILLING PIPE  
FÜLLROHR**



**SECTION D - D  
SCHNITT**



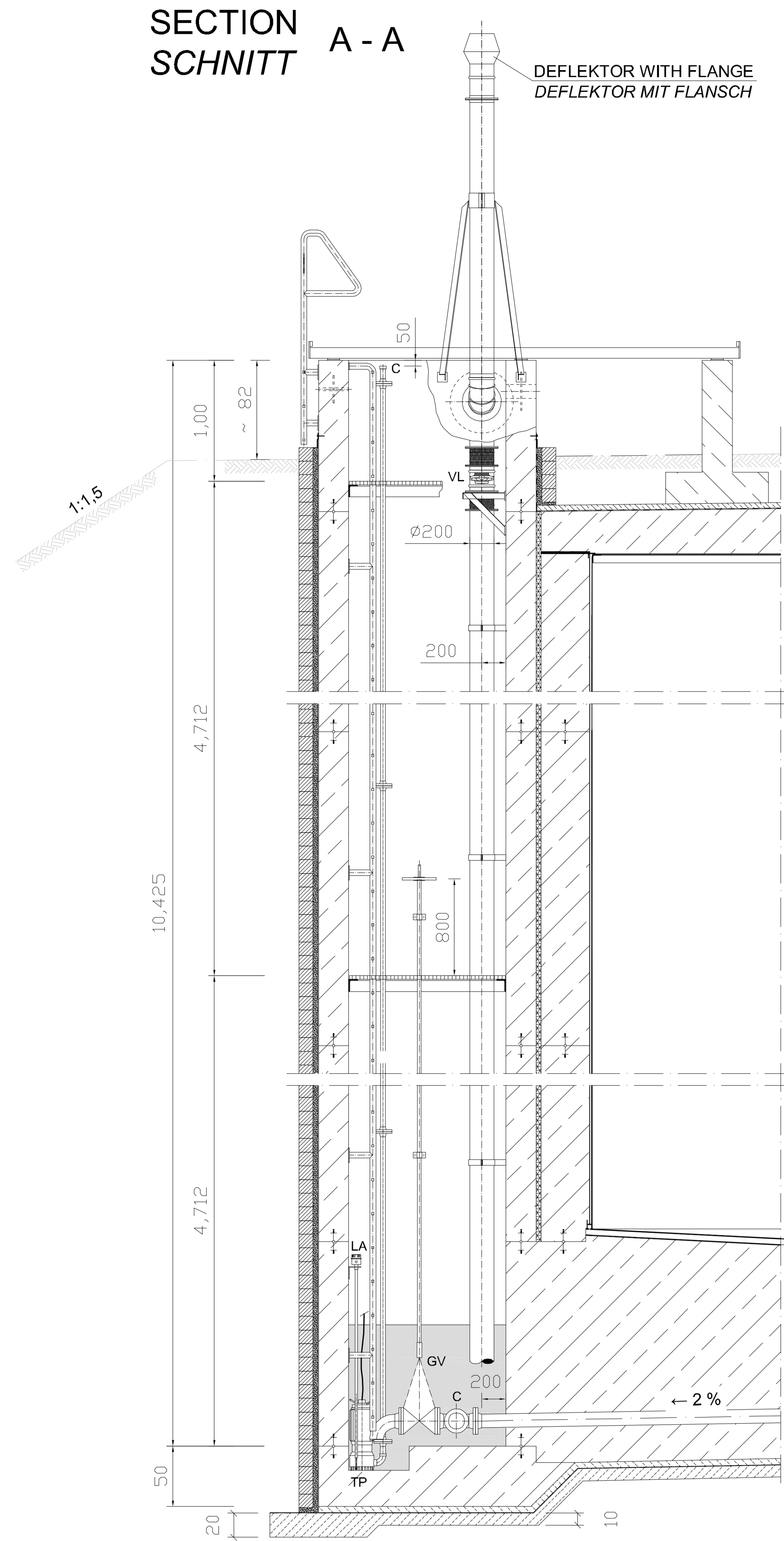
**DETAIL PIPE PENETRATION  
DETAIL ROHRDURCHFÜHRUNG**



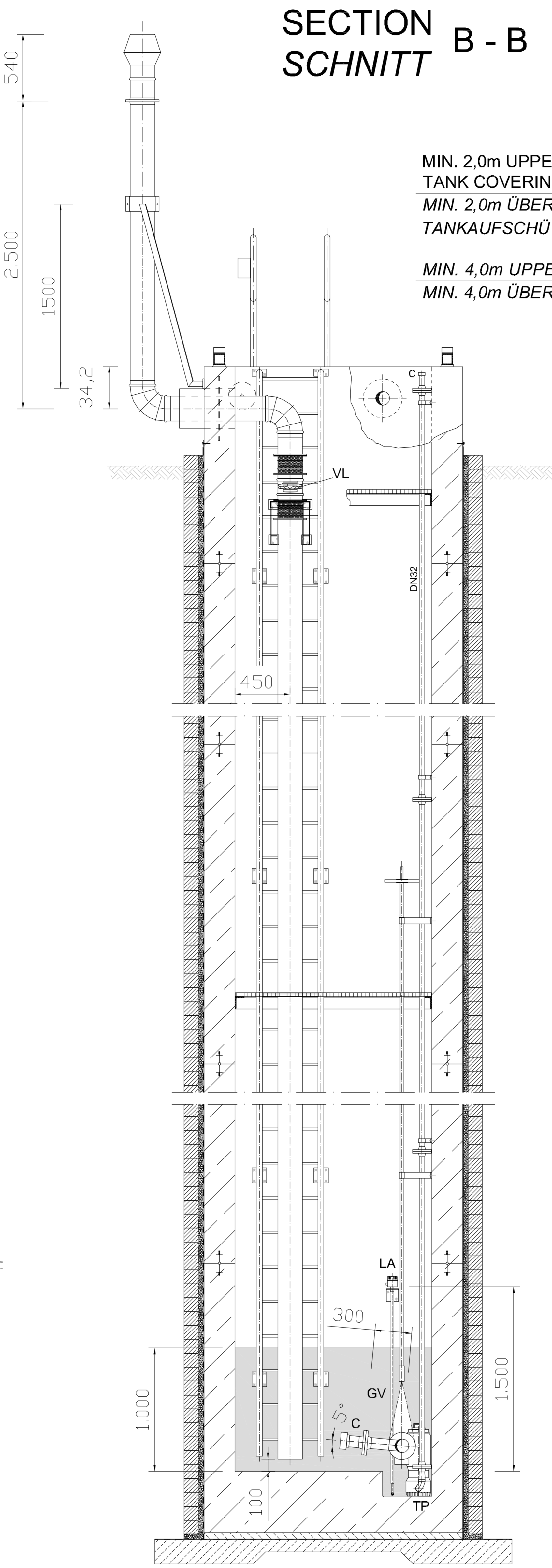
PRODUCT PIPE PRODUKTENROHR	A mm	B mm
DN 25	Ø 33,7	Ø 76,1
DN 50	Ø 60,3	Ø 168,3
DN 150	Ø 168,3	Ø 273
DN 200	Ø 273	Ø 323,9
EXAMPLE	BEISPIEL	



**SECTION A - A**  
**SCHNITT A - A**

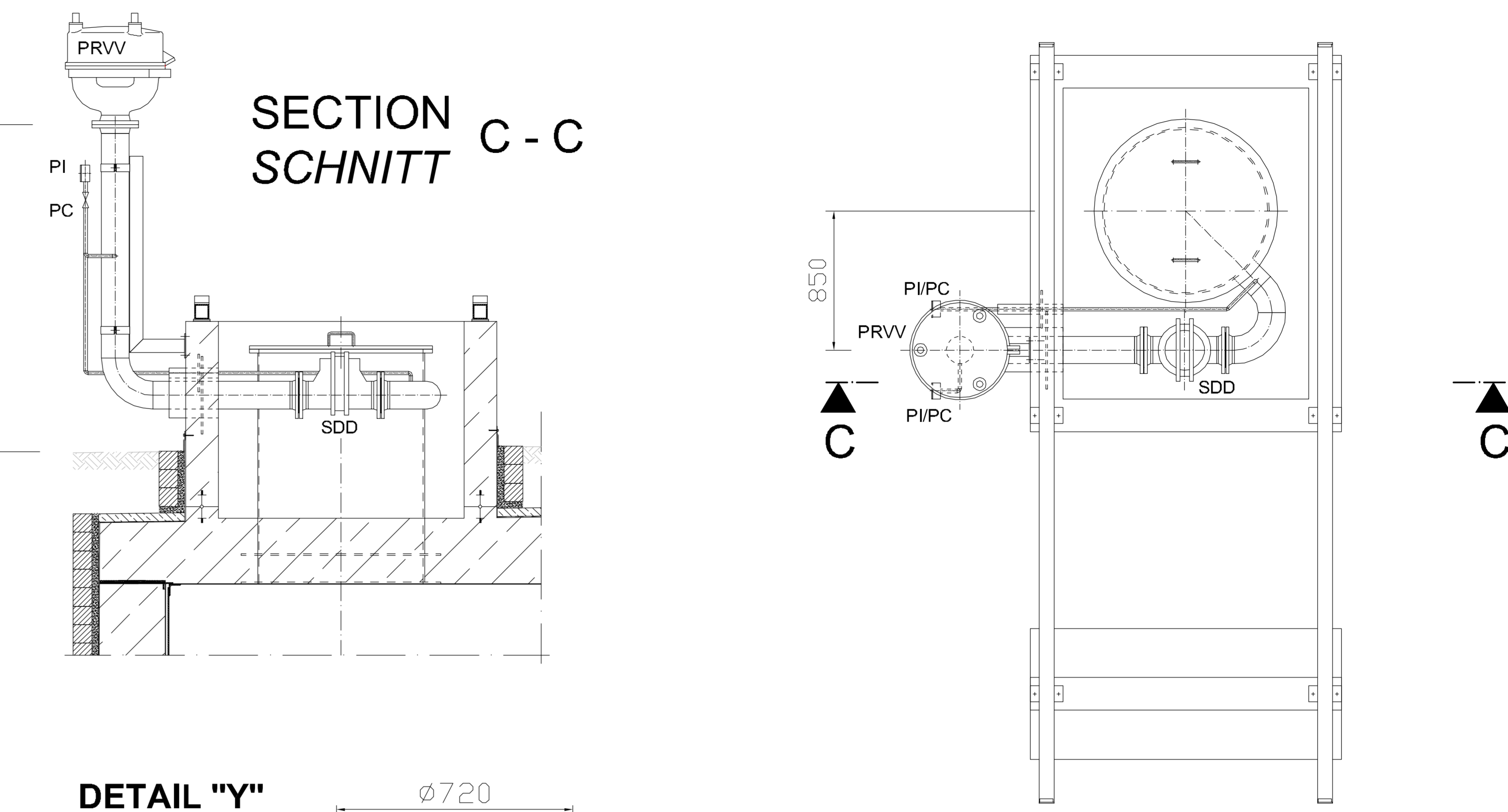


**SECTION B - B**  
**SCHNITT B - B**

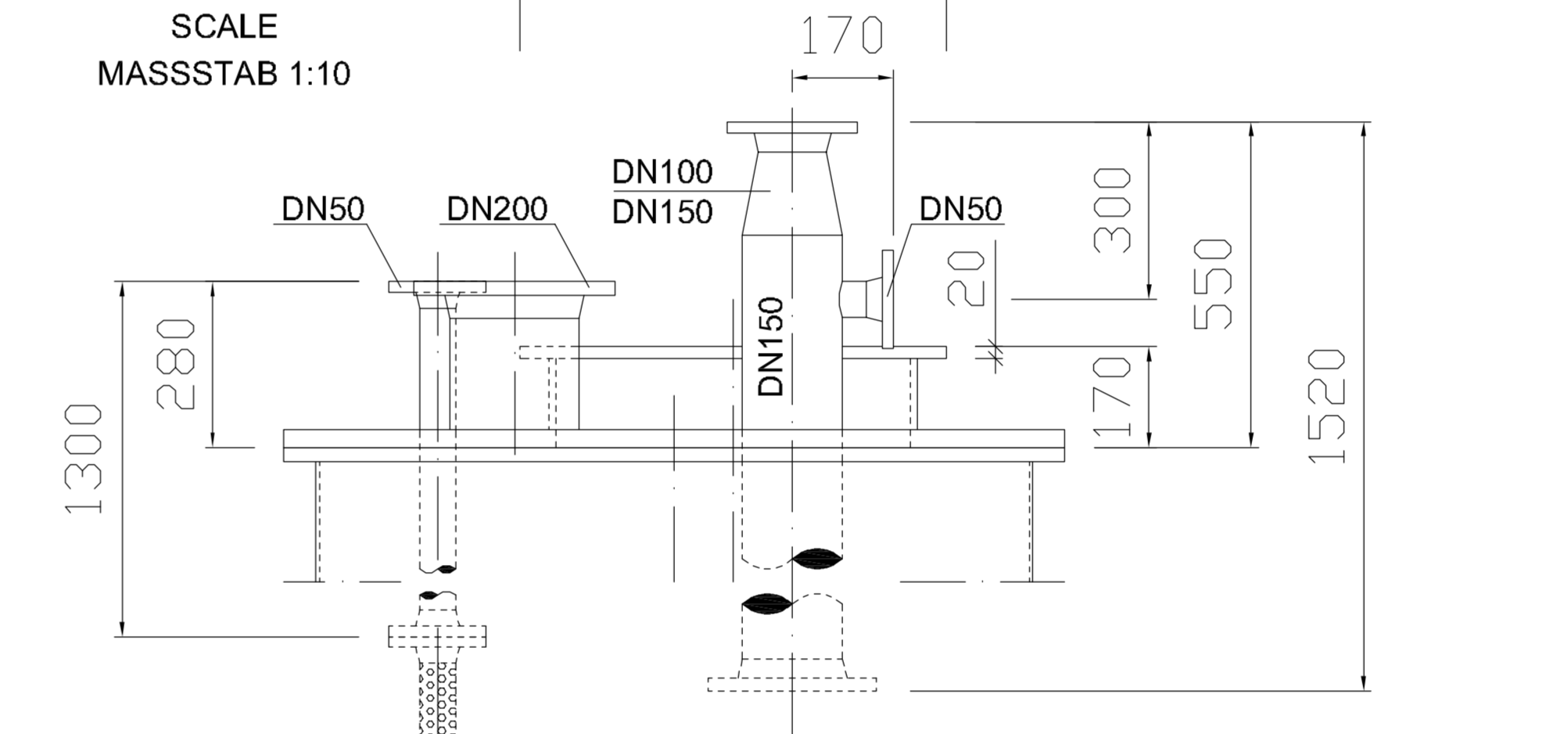


**MANHOLE WITH VENTILATING**  
**MONTAGEÖFFNUNG MIT ENTLÜFTUNG**

**SECTION C - C**  
**SCHNITT C - C**



**DETAIL "Y"**



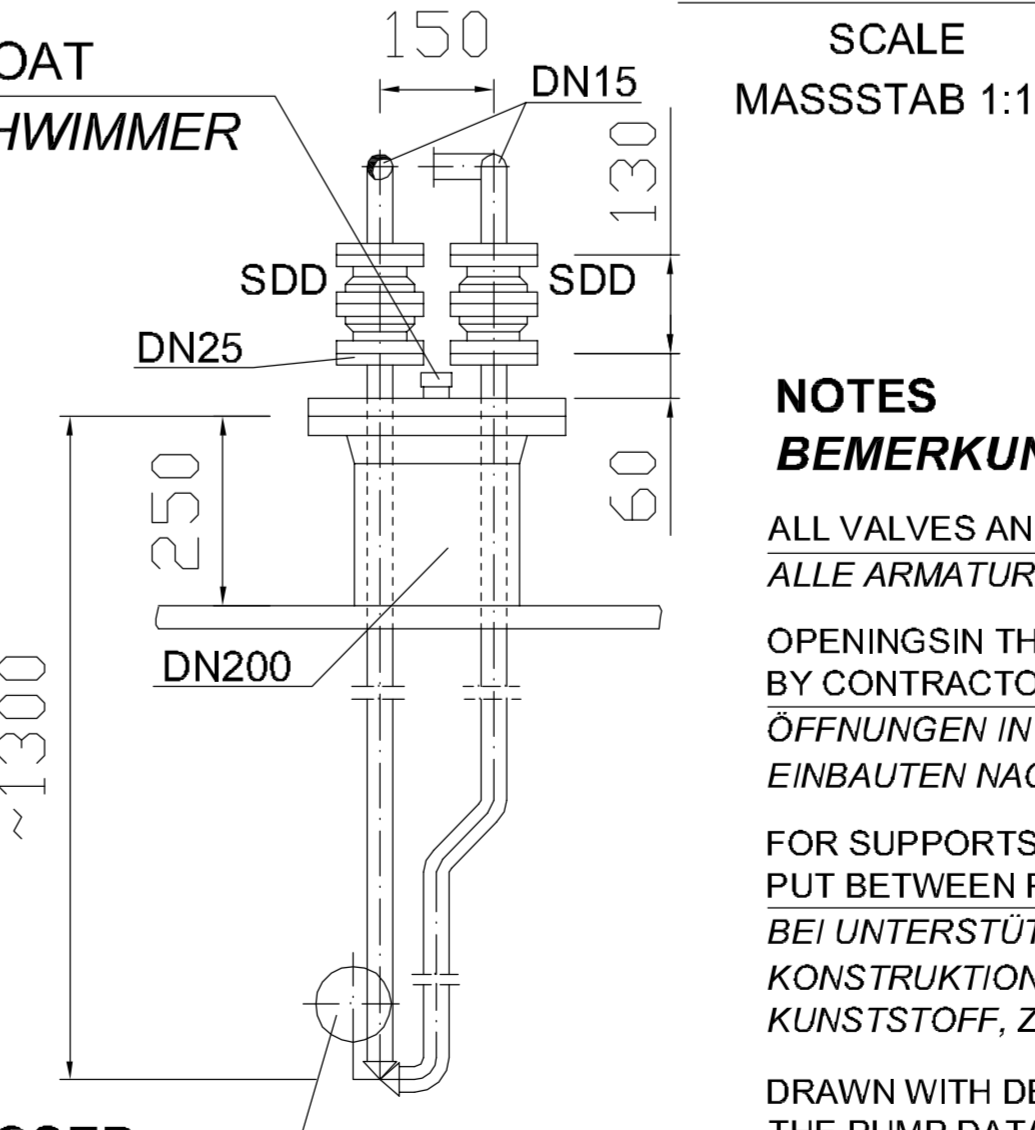
SOCKET DN50 FOR TEMPERATURE MEASURING  
STUTZEN DN50 FÜR TEMPERATURMESSUNG

SOCKET DN200 FOR CONTROLPIPE OF HIGH-LEVEL CONTROL VALVES  
STUTZEN DN200 FÜR STEUERLEITUNGEN DER ÜBERFÜLLSICHERUNG

PUMP SOCKET Ø 600  
PUMPENSTUTZEN Ø 600

SOCKET DN150/100 FOR GAUGING AND SAMPLING DEVICE  
STUTZEN DN150/100 FÜR PEIL- UND PROBEENTNAHMEROHR

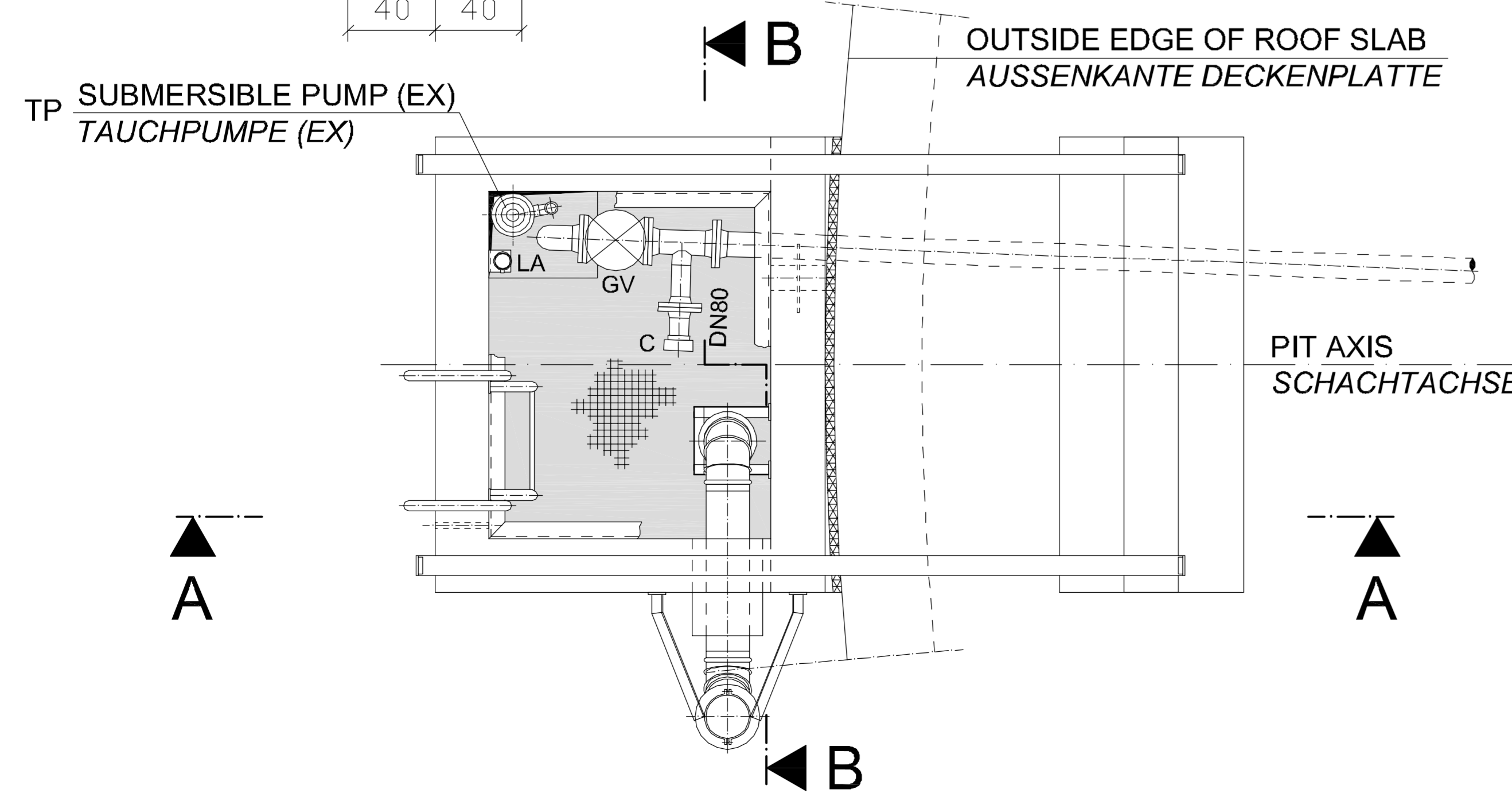
**DETAIL "X"**



HANDTESTING FOR FLOAT  
HANDTESTER FÜR SCHWIMMER

**LEAKAGE CONTROL PIT**  
**LECKKONTROLLSCHACHT**

THE FLOAT OF THE HIGH-LEVEL CONTROL VALVE HAS TO BE INSTALLED IN THAT WAY THAT IN CASE OF A LIQUID LEVEL OF 230mm UNDER TANK ROOF THE HIGH-LEVEL CONTROL VALVE IS CLOSED  
DER SCHWIMMER DER ÜBERFÜLLSICHERUNG MUSS SO EINGEBAUT WERDEN, DASS BEI EINEM FLÜSSIGKEITSSTAND VON 230mm UNTER DER BEHÄLTERDECKE DIE ÜBERFÜLLSICHERUNG GESCHLOSSEN IST.



**LEGEND**  
**LEGENDE**

- GV GATE VALVE  
ABSPERRSCHIEBER
- LA LIQUID PROBE  
FLÜSSIGKEITSSONDE
- PC PRESSURE GAUGE STOPCOCK  
MANOMETER - Absperrventil
- PI PRESSURE GAUGE  
MANOMETER
- PRV PRESSURE RELIEF - VACUUM VALVE  
ÜBER - UNTERDRUCK MEMBRANVENTIL
- SDD SAFETY DEVICE AGAINST DETONATION, DRY TYPE  
TROCKEN - DETONATIONSSICHERUNG
- TP SUBMERSIBLE PUMP  
TAUCHPUMPE
- VL VENTILATOR  
VENTILATOR
- FUEL RESISTANT PLASTIC COATING / DISSIPATIVE (10<sup>-8</sup> S)  
KRAFTSTOFFBESTÄNDIGE KUNSTSTOFFBESCHICHTUNG / ABLEITFÄHIG (10<sup>-8</sup> S)

**PERTINENT DRAWINGS**  
**ZUGEHÖRIGE ZEICHNUNGEN**

M-2.1 MECHANICAL INSTALLATION  
MASCHINENTECHNISCHE INSTALLATION

REVISION	DATE	DESCRIPTION	BY	COUNTRY
ÄNDERUNG	DATUM	BESCHREIBUNG	VON	LAND
HEADQUARTERS UNITED STATES AIR FORCES EUROPE ENGINEERING & OPERATIONS				
AIRFIELD STANDARD DESIGN US		FLUGPLATZ STANDARDPLANUNG US		
JET FUEL STORAGE AND DISPENSING SYSTEMS		FLUGKRAFTSTOFF - VERSORGSANLAGEN		
BUILDING BAUWERK <b>OPERATING TANK 2500m<sup>3</sup></b> <b>FLACHBODENTANK 2500m<sup>3</sup></b>				
DESIGNATOR BEZEICHNUNG MECHANICAL INSTALLATION, LEAKAGE CONTROL PIT AND DETAILS MASCHINENTECHNISCHE INSTALLATION, LECKKONTROLLSCHACHT UND DETAILS				
VORBEREITET		APPROVED/GENEHIGT		
LANDSCHAFTS- UND BAUWERKE L B B		AMT FÜR BUNDESBAU WALLSTR.1 55122 MAINZ		
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAU MASSNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED GENEHIGT	DATE DATUM	6. MAI 2015	SCALE MASSSTAB	1:20 : 1:10
ORIGINAL DRAWN BY IN ORIGINAL SIZE		STANDARD SHEET STANDARD PLAN		M - 2.2
CONSTRUCTION PROJECT BAU MASSNAHME		SHEET NO. PLATZ NR.		OF VON

**NOTES**  
**BEMERKUNGEN**

ALL VALVES AND FLANGES DESIGNED FOR PN 16  
ALLE ARMATUREN UND FLANSCH AUSGELEGT FÜR PN 16

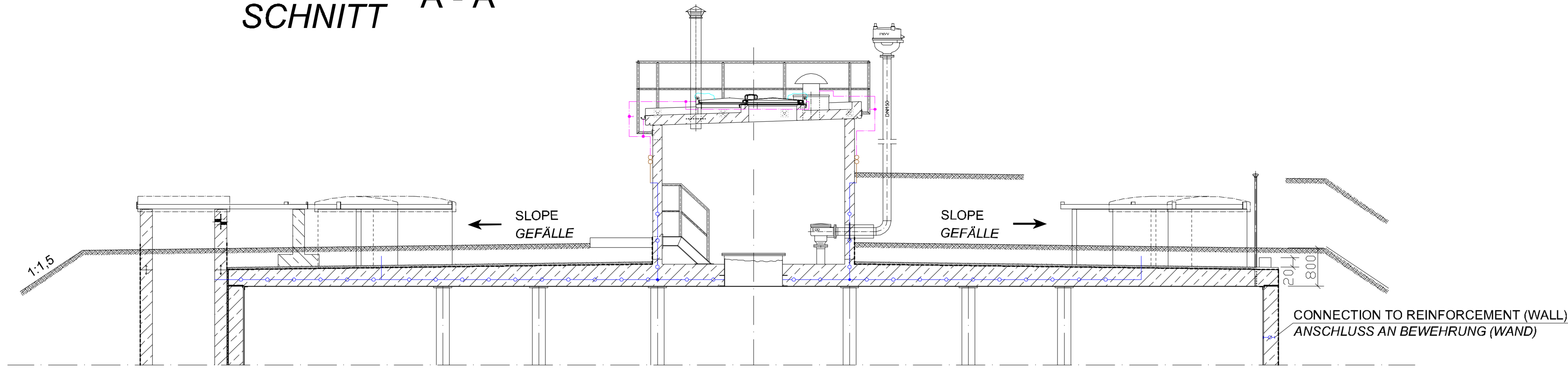
OPENINGS IN THE GRATINGS ACC. TO THE MECHANICAL INSTALLATIONS AS SELECTED BY CONTRACTOR. EASY REMOVAL OF THE GRATINGS SHALL BE GUARANTEED.  
ÖFFNUNGEN IN DEN GITTERROSTEN ENTSPRECHEND DEN MASCHINENTECHNISCHEN EINBAUTEN NACH WAHL DES AN. DER LEICHTE AUSBAU DER GITTERROSTE IST ZU GEWÄHRLEISTEN.

FOR SUPPORTS OF PIPES AN INSULATION PIECE, MADE OF 10mm THICK FUEL RESISTANT PLASTIC IS TO PUT BETWEEN PIPES AND SUPPORTS OR HOLDERS.  
BEI UNTERSTÜTZUNGEN VON ROHRLEITUNGEN IST ZWISCHEN ROHRLEITUNG UND UNTERSTÜTZUNGS-KONSTRUKTION BZW. HALTERUNG EINE ISOLIERPLATTE 10mm DICK AUS KRAFTSTOFFBESTÄNDIGEN KUNSTSTOFF, ZU LEGEN.

DRAWN WITH DELIVERY PUMPS FOR HYDRANT REFUELING. FOR TANK TRUCK REFUELING THE PUMP DATA WILL BE CHANGED.  
GEZEICHNET MIT FÖRDERPUMPEN FÜR HYDRANTENBETANKUNG. BEI TKW - BEFÜLLUNG ÄNDERN SICH DIE PUMPENDATEN ENTSPRECHEND.



SECTION  
SCHNITT A - A



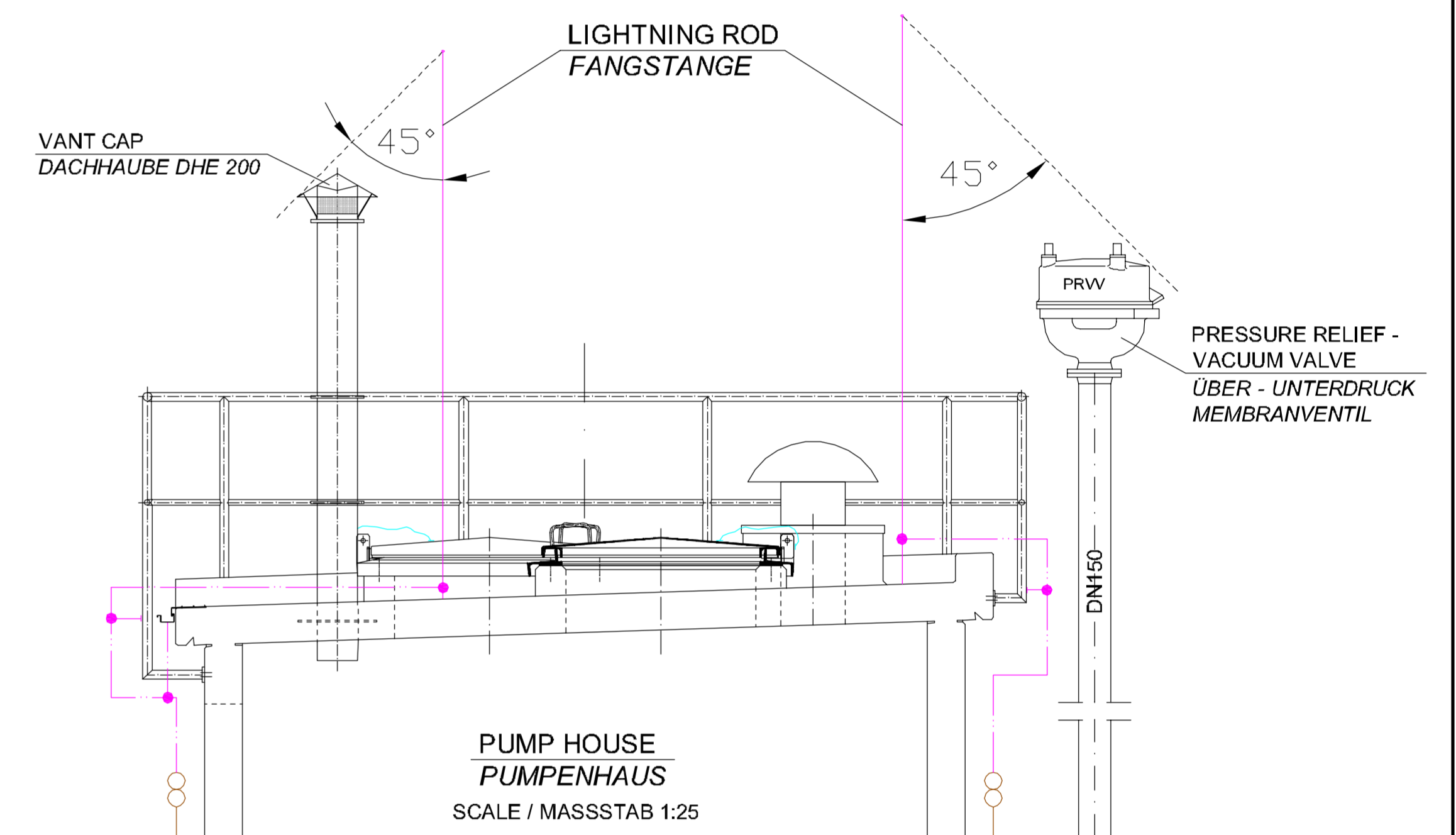
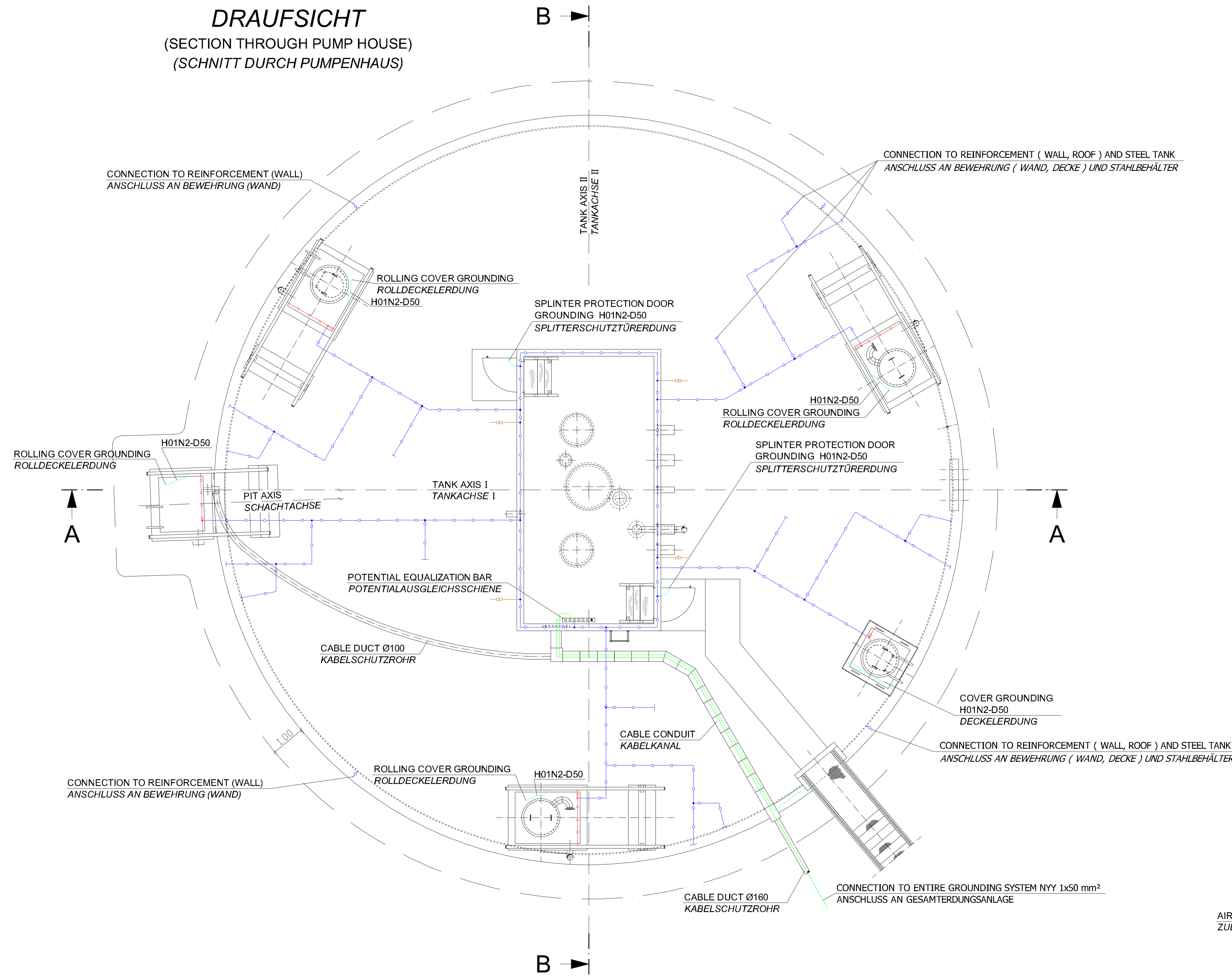
LEGEND  
LEGENDE

- DISCONNECTION POINT  
TRENNSTELLE
- STEEL STRIP 30 x 3.5mm IN CONCRETE  
(STAINLESS STEEL, MATERIAL NO. 1.457)  
BANDSTAHL 30 x 3.5mm IM BETON  
(EDELSTAHL, WERKSTOFF NR. 1.457)
- GALV. STEEL STRIP 30 x 3.5mm SURFACE - MOUNTED  
VERZ. BANDSTAHL 30 x 3.5mm AUF PUTZ
- GALV. ROUND STEEL Ø 8mm  
VERZ. RUNDSTAHL Ø 8mm
- NYY 1 x 50²
- H01N2 - D50

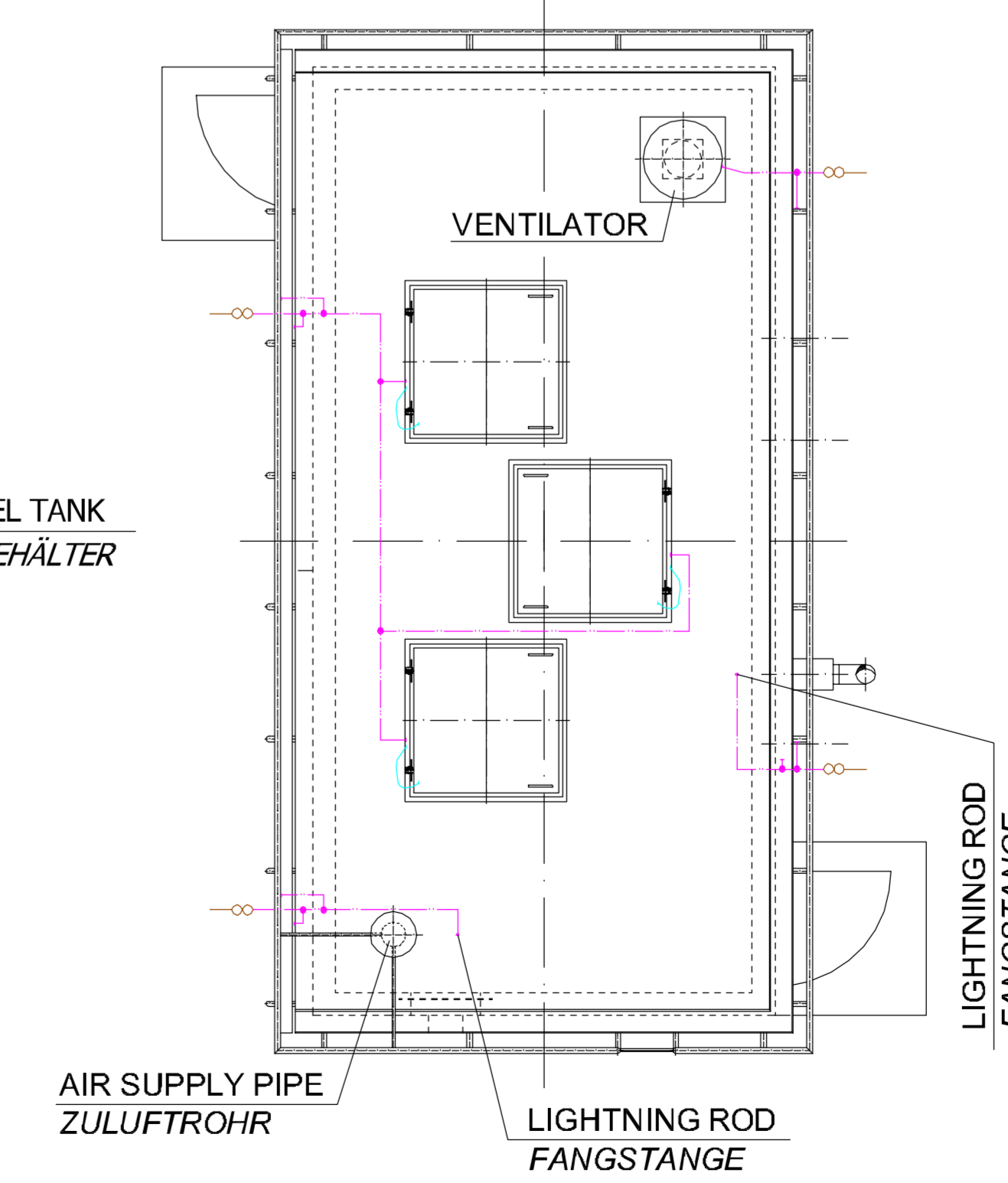
PERTINENT DRAWINGS  
ZUGEHÖRIGE ZEICHNUNGEN

E-2.2 ELECTRICAL INSTALLATION, PUMP HOUSE AND LEAKAGE CONTROL PIT  
ELEKTROTECHNISCHE INSTALLATION, PUMPENHAUS UND  
LECKKONTROLLSCHACHT

TOP VIEW  
DRAUFSICHT  
(SECTION THROUGH PUMP HOUSE)  
(SCHNITT DURCH PUMPENHAUS)



TOP VIEW  
DRAUFSICHT  
PUMP HOUSE  
PUMPENHAUS

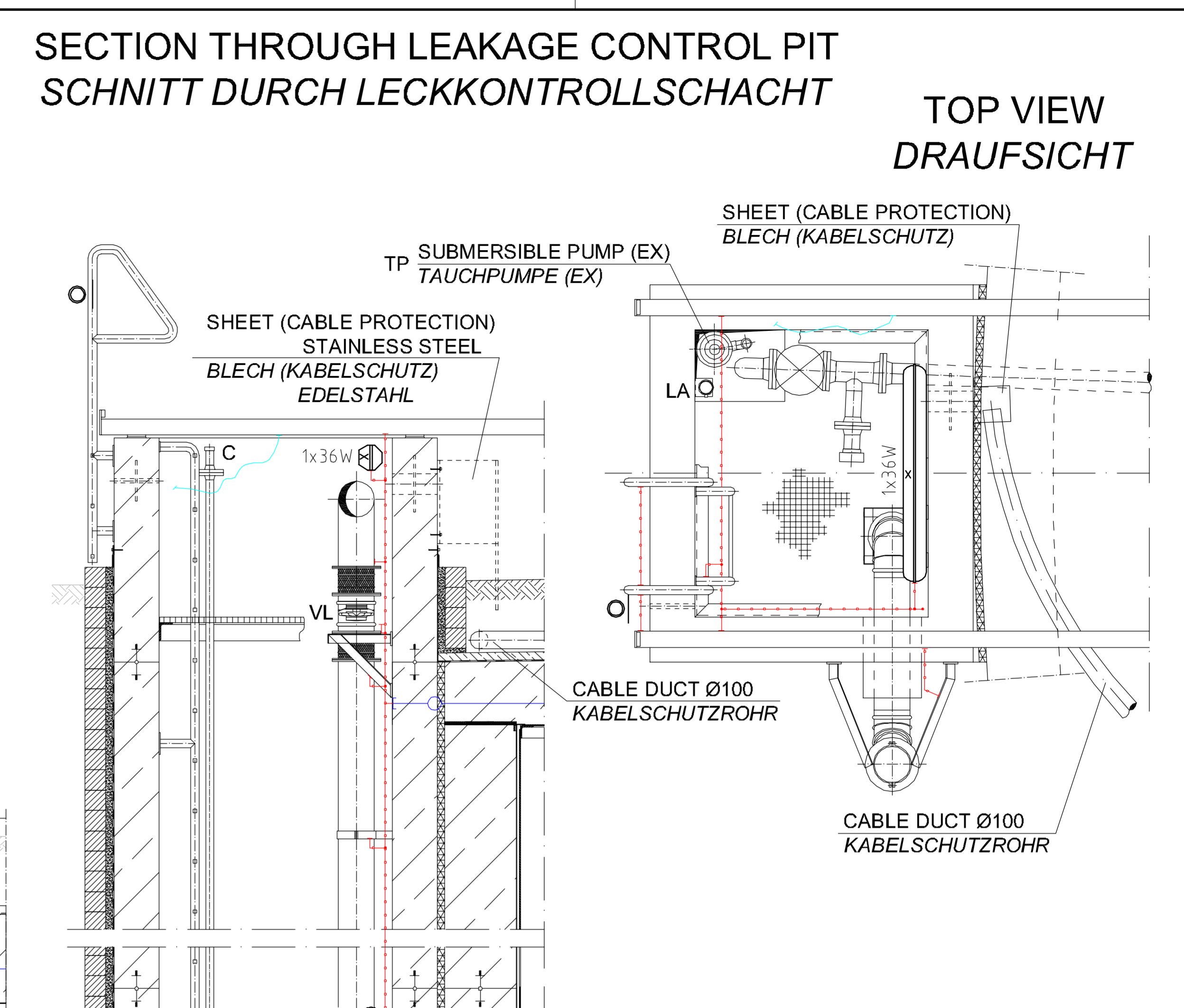
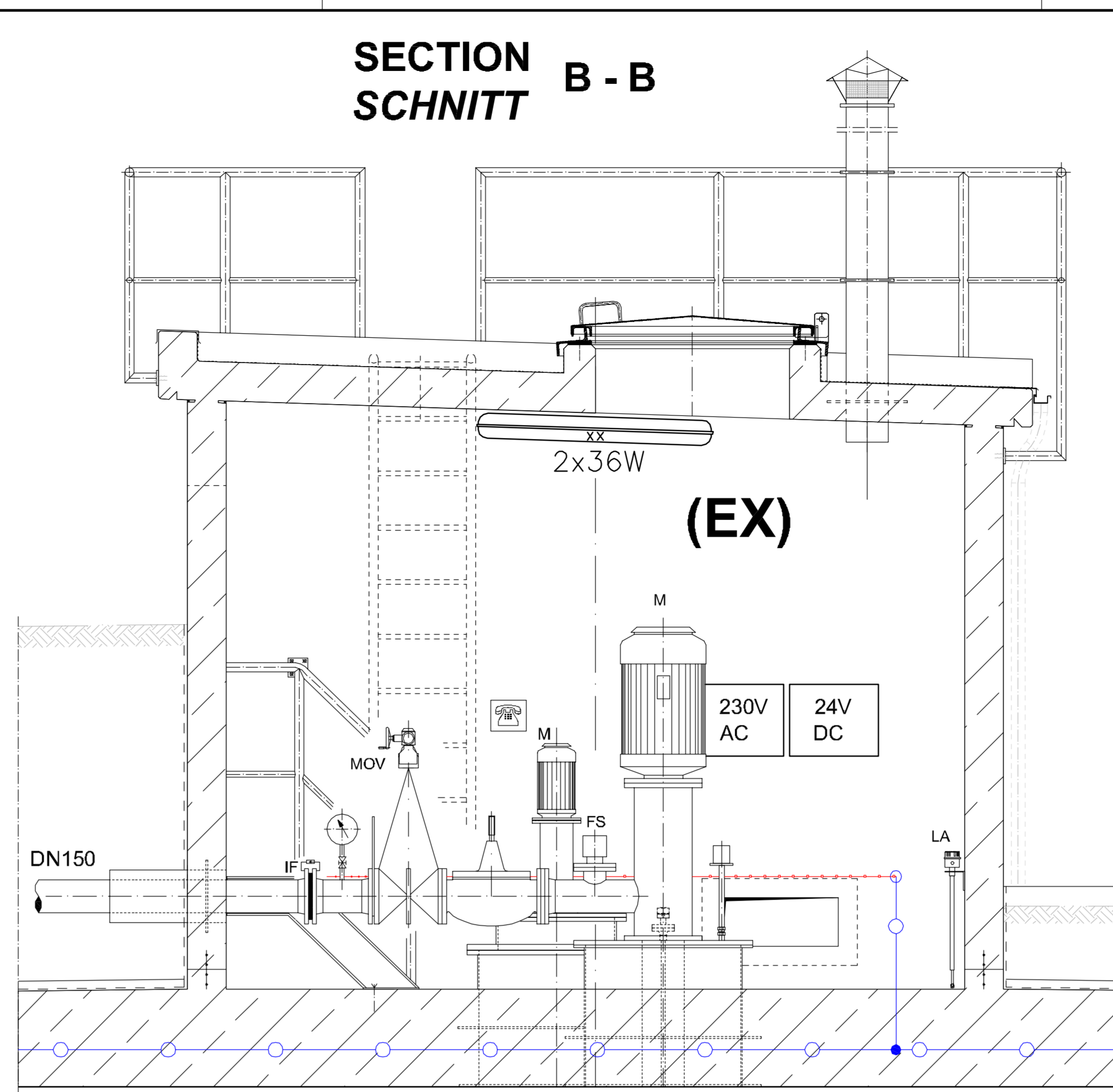
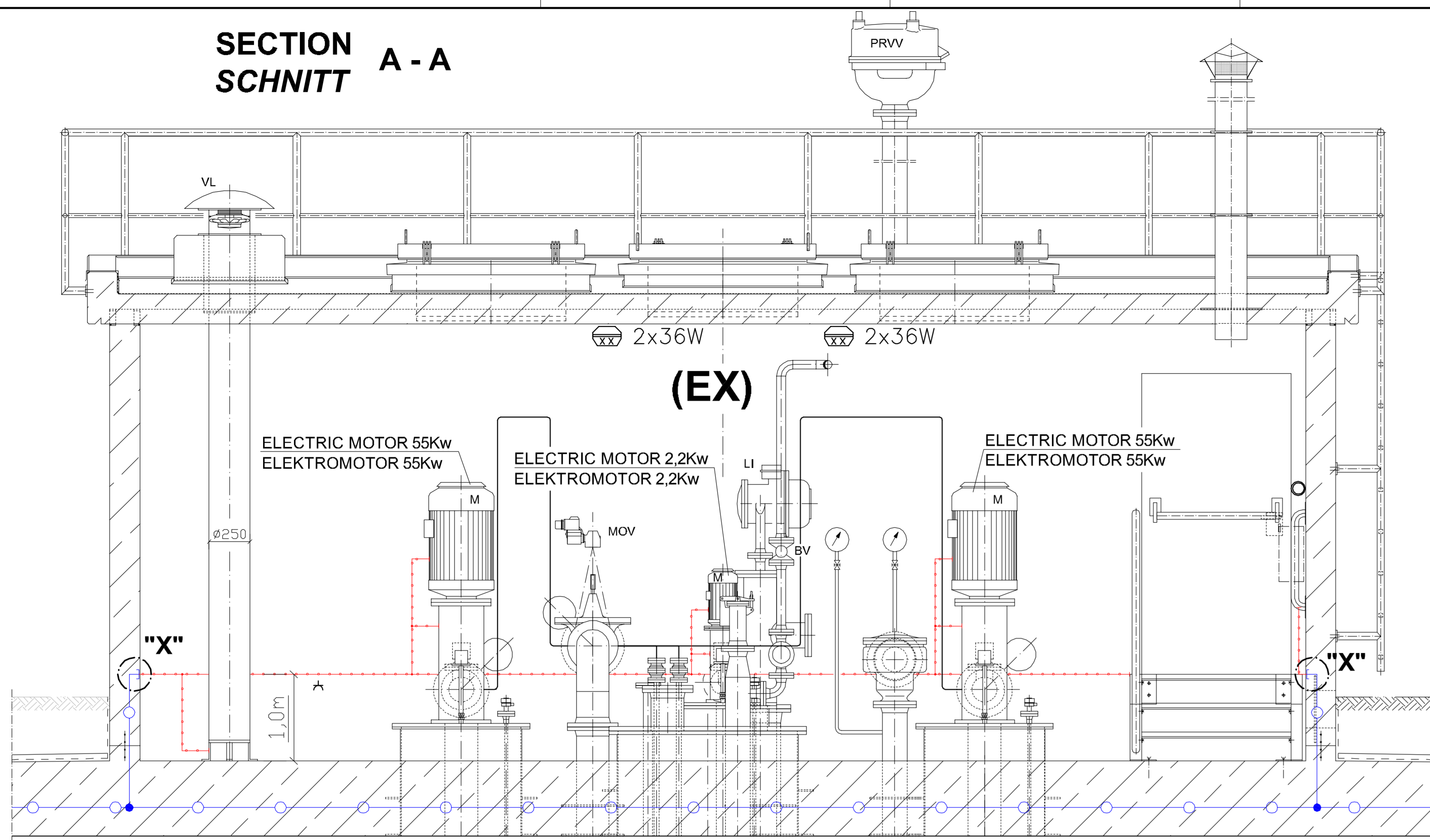


REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
HEADQUARTERS UNITED STATES AIR FORCES EUROPE				
AIRFIELD STANDARD DESIGN US		FLUGPLATZ STANDARDPLANUNG US		
JET FUEL STORAGE AND DISPENSING SYSTEMS		FLUGKRAFTSTOFF - VERSORGSANLAGEN		
BUILDING BAUWERK OPERATING TANK 2500m³ FLACHBODENTANK 2500m³				
DESIGNATOR BEZEICHNUNG GROUNDING - AND LIGHTNING PROTECTION PLAN ERDUNGS - UND BLITZSCHUTZPLAN				
WORKED/BEARBEITET	PREPARED/AUFGESTELLT	APPROVED/GENEHMIGT		
LANDSCHAFTSCHAFTS- UND BAUVERBUND L B B		AMT FÜR BUNDESBAU WALLSTR.1 55122 MAINZ		
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAUMASSNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED GENEHMIGT	DATE DATUM	6. MAI 2015	SCALE MASSSTAB	1:50 / 1:25
ORIGINAL, DRAWN BY IN ORIGINAL, GEZ.			STANDARD SHEET STANDARD PLAN	E - 2.1
CONSTRUCTION PROJECT BAUMASSNAHME			CAD-PROJECT PATH: CAD-PROJekte	SHEET NO. PLATZNR.

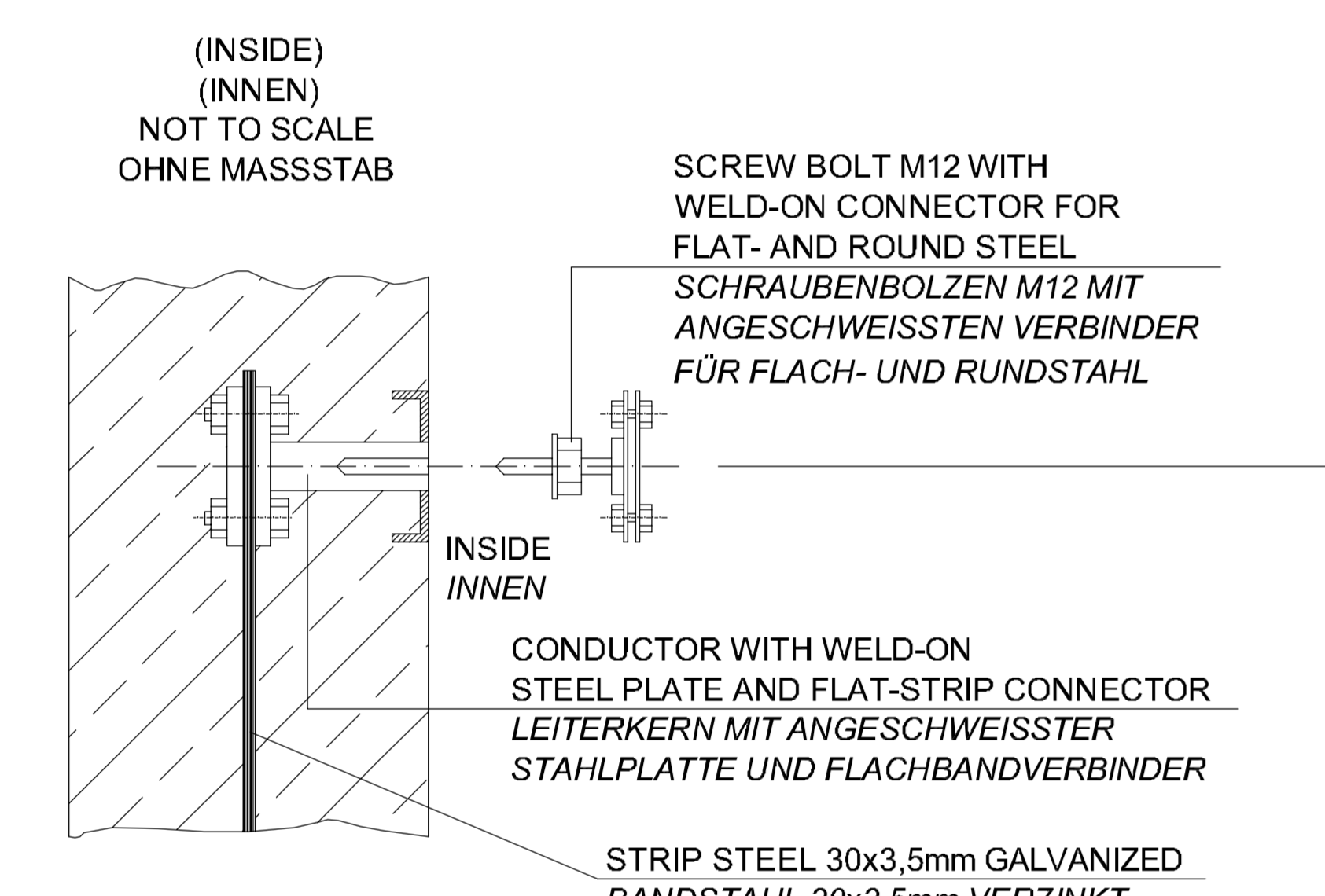




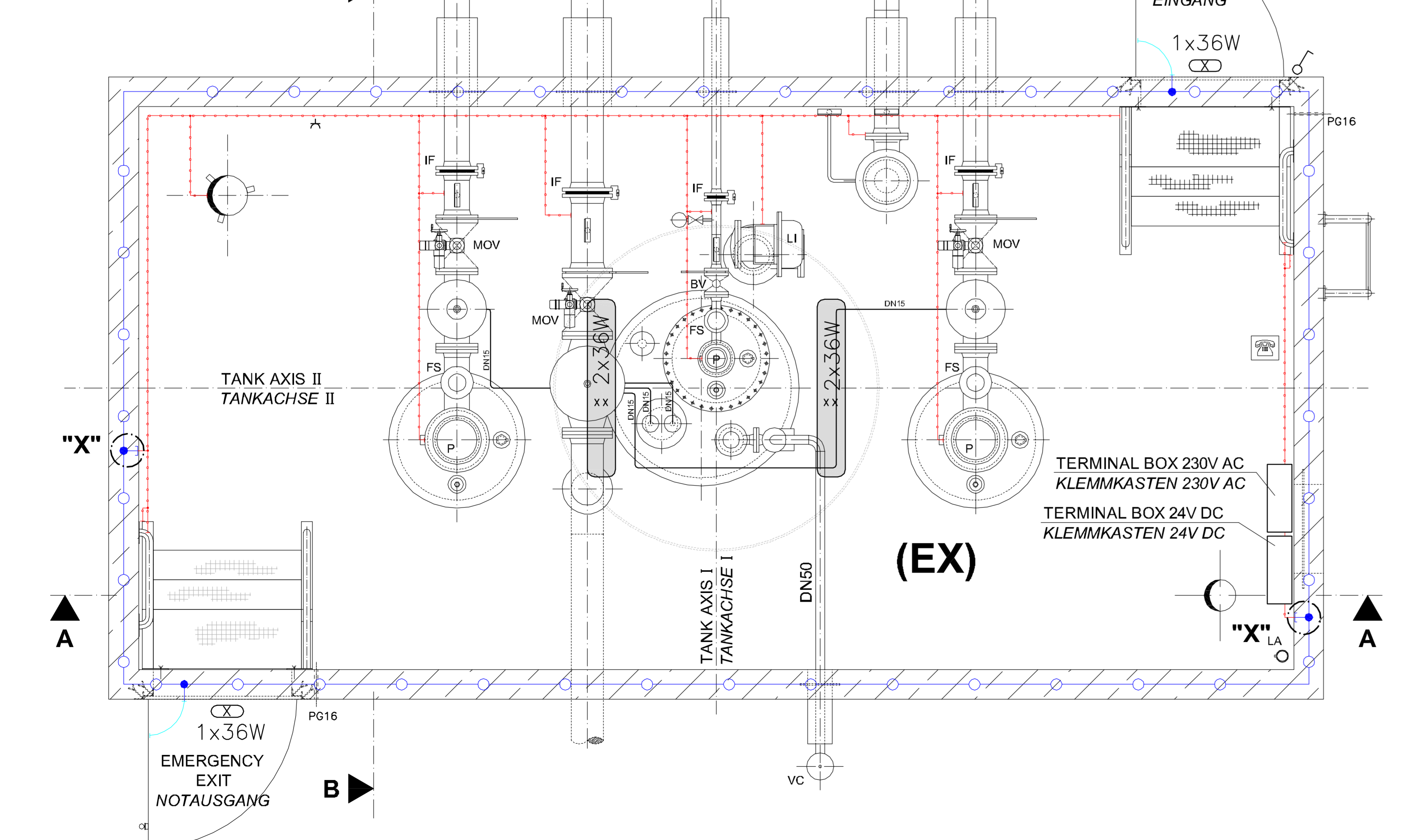




### DETAIL "X" GROUNDING CONNECTION ERDUNGSANSCHLUSS



### GROUND PLAN GRUNDRISS



### LEGEND LEGENDE

- BV BALL VALVE  
KUGELHAHN
- FS FLOW SWITCH  
STRÖMUNGSWÄCHTER
- IF ISULATING FLANGE  
ISOLIERFLANSCH
- LA LIQUID PROBE  
FLÜSSIGKEITSSONDE
- LI LEVEL INDICATOR  
FÜLLSTANDSANZEIGE
- M MOTOR  
MOTOR
- MOV GATE VALVE WITH MOTOR  
ABSPERRARMATUR MIT MOTORANTRIEB
- TP SUBMERSIBLE PUMP  
TAUCHPUMPE
- VL VENTILATOR  
VENTILATOR

STEEL STRIP 30 x 3,5mm IN CONCRETE  
(STAINLESS STEEL, MATERIAL NO. 1.457)  
BANDSTAHL 30 x 3,5mm IM BETON  
(EDELSTAHL, WERKSTOFF NR. 1.457)

GALV. STEEL STRIP 30 x 3,5mm SURFACE - MOUNTED  
VERZ. BANDSTAHL 30 x 3,5mm AUF PUTZ

H01N2 - D50

- FLUORESCENT LAMP  
LEUCHTSTOFFLEUCHTE
- EXPL. PROOF SPARK GAP  
EX- FUNKENSTRECKE
- RECEPTACLE  
STECKDOSE
- SWITCH  
SCHALTER
- PUSH BUTTON  
TASTER

PTC THERMISTOR  
KALTLEITER

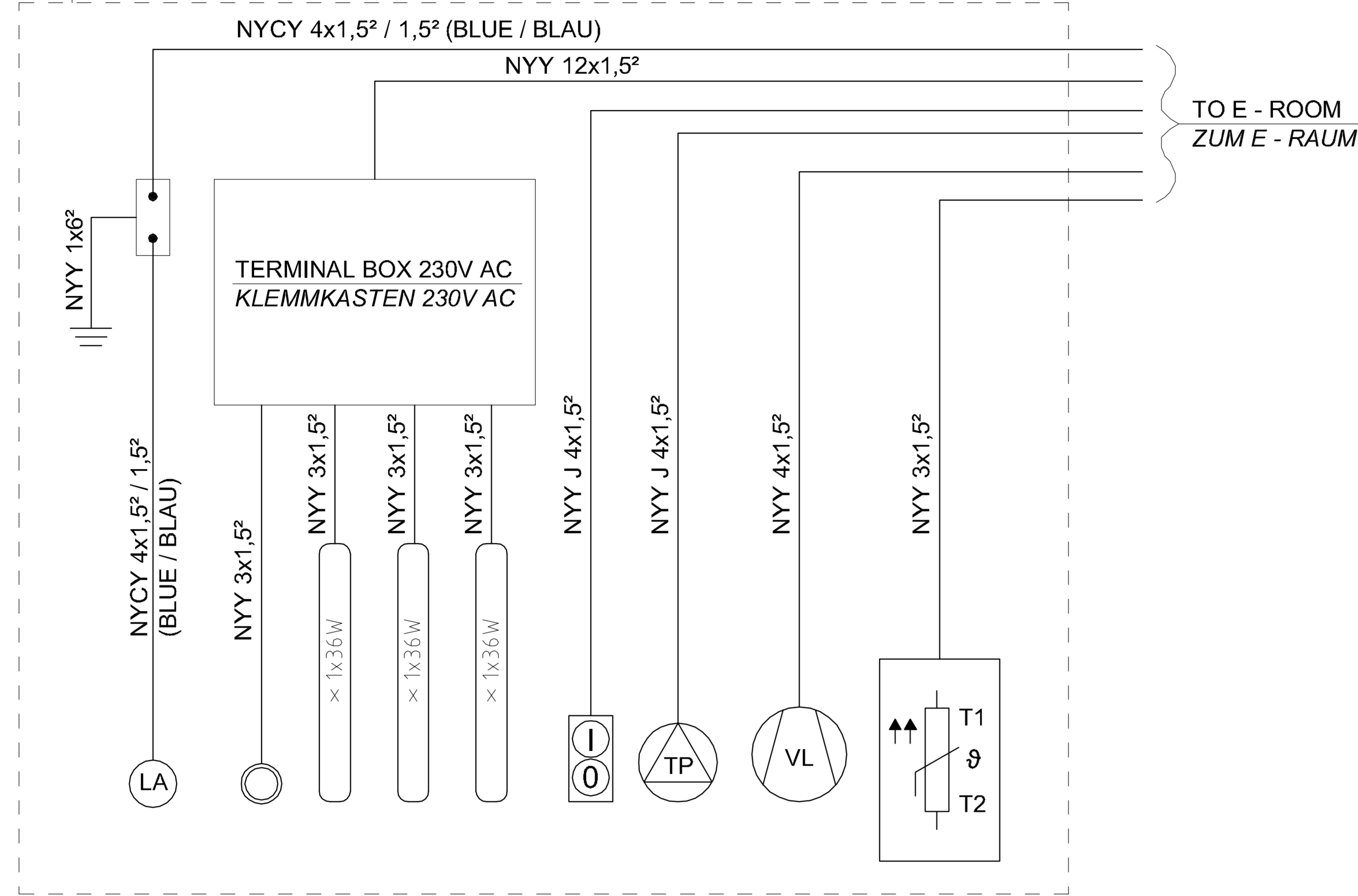
### PERTINENT DRAWINGS ZUGEHÖRIGE ZEICHNUNGEN

- E-2.1 GROUNDING - AND LIGHTNING PROTECTION PLAN  
ERDUNGS - UND BLITZSCHUTZPLAN
- E-2.3 ELECTRICAL DIAGRAMS, PUMP HOUSE  
AND LEAKAGE CONTROL PIT  
SCHALTPLÄNE, PUMPENHAUS  
UND LECKKONTROLLSCHACHT

REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND								
HEADQUARTERS UNITED STATES AIR FORCES EUROPE ENGINEERING & OPERATIONS												
AIRFIELD STANDARD DESIGN US		FLUGPLATZ STANDARDPLANUNG US										
JET FUEL STORAGE AND DISPENSING SYSTEMS		FLUGKRAFTSTOFF - VERSORGSANLAGEN										
OPERATING TANK 2500m <sup>3</sup> FLACHBODENTANK 2500m <sup>3</sup>												
WITH ISULATING FLANGE / MIT ISOLIERFLANSCH ELECTR. INSTALLATION, PUMP HOUSE A. LEAKAGE CONTROL PIT ELEKTR. INSTALLATION, PUMPENHAUS U. LECKKONTROLLSCHACHT												
<table border="1"> <tr> <td>PREPARED/AUFGESTELLT</td> <td>APPROVED/GEPRÜFT</td> </tr> <tr> <td>LANDSCHAFTS- UND BAUVERLEHRE</td> <td>AMT FÜR BUNDESBAU</td> </tr> <tr> <td>LANDSCHAFTS- UND BAUVERLEHRE</td> <td>WALLSTR.1 55122 MAINZ</td> </tr> <tr> <td>LANDSCHAFTS- UND BAUVERLEHRE</td> <td>ORIGINAL, SIGNED BY: [Signature]</td> </tr> </table>					PREPARED/AUFGESTELLT	APPROVED/GEPRÜFT	LANDSCHAFTS- UND BAUVERLEHRE	AMT FÜR BUNDESBAU	LANDSCHAFTS- UND BAUVERLEHRE	WALLSTR.1 55122 MAINZ	LANDSCHAFTS- UND BAUVERLEHRE	ORIGINAL, SIGNED BY: [Signature]
PREPARED/AUFGESTELLT	APPROVED/GEPRÜFT											
LANDSCHAFTS- UND BAUVERLEHRE	AMT FÜR BUNDESBAU											
LANDSCHAFTS- UND BAUVERLEHRE	WALLSTR.1 55122 MAINZ											
LANDSCHAFTS- UND BAUVERLEHRE	ORIGINAL, SIGNED BY: [Signature]											
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAUASSAHMEN IN EUROPA (AUSSER DEUTSCHLAND)												
APPROVED GEPRÜFT	DATE DATUM	6. MAI 2015	SCALE MASSSTAB	1:50								
ORIGINAL, SIGNED BY: IN ORIGINAL, GEZ.	DATE DATUM	6. MAI 2015	SCALE MASSSTAB	1:50								
ORIGINAL, SIGNED BY: IN ORIGINAL, GEZ.	DATE DATUM	6. MAI 2015	SCALE MASSSTAB	1:50								
CONSTRUCTION PROJECT BAUASSAHME	STANDARD SHEET STANDARD PLAN			E - 2.2								
SHEET NO. PLATZNR.				OF VON								



**LEAKAGE CONTROL PIT  
LECKKONTROLLSCHACHT**



**LEGEND  
LEGENDE**

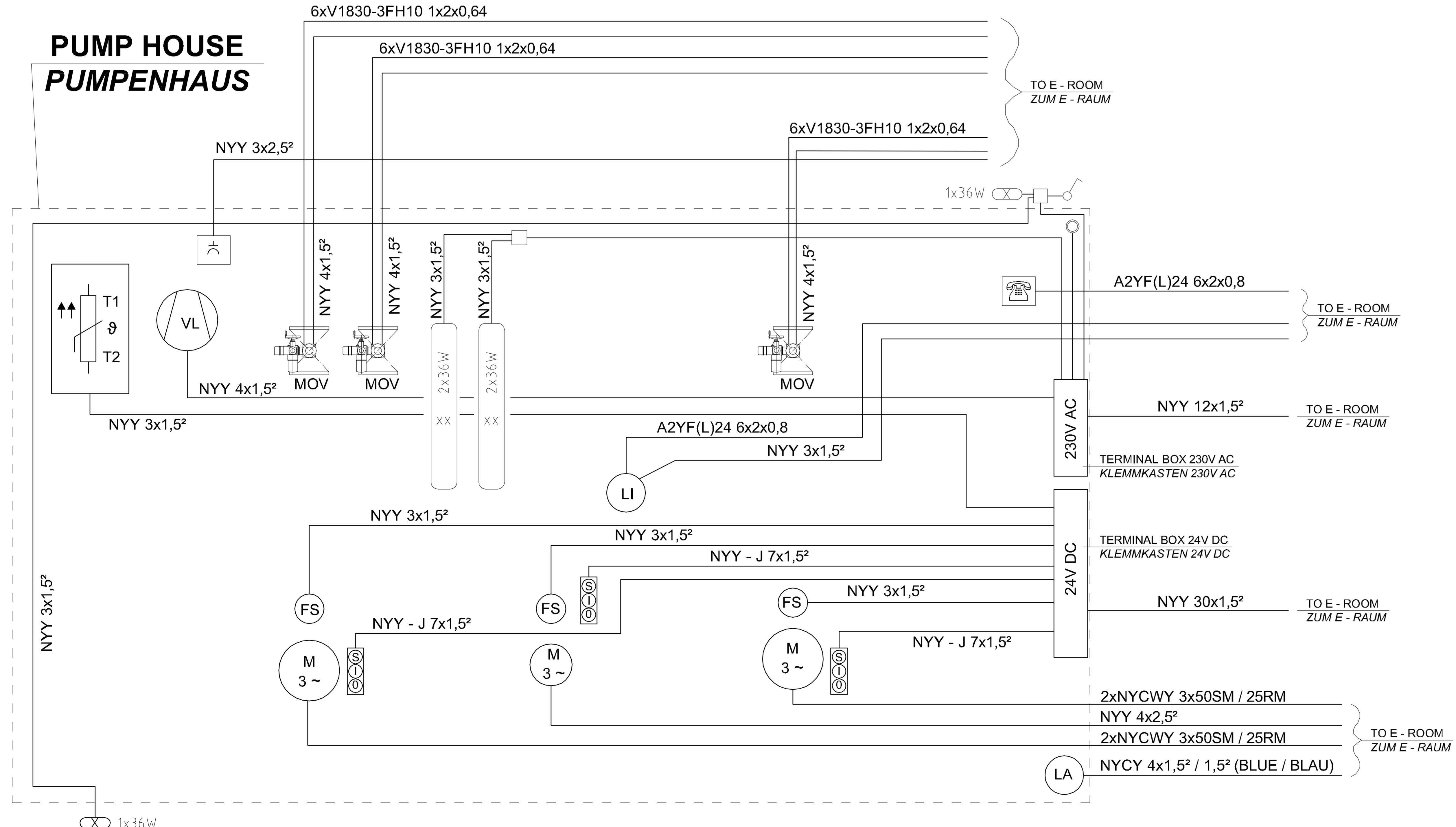
- FS FLOW SWITCH  
STRÖMUNGSWÄCHTER
- IC ISULATING COUPLING  
ISOLIERKUPPLUNG
- LA LIQUID PROBE  
FLÜSSIGKEITSSONDE
- LI LEVEL INDICATOR  
FÜLLSTANDSANZEIGE
- M MOTOR  
MOTOR
- MOV GATE VALVE WITH MOTOR  
ABSPERRARMATUR MIT MOTORANTRIEB
- TP SUBMERSIBLE PUMP  
TAUCHPUMPE
- VL VENTILATOR  
VENTILATOR

- FLUORESCENT LAMP  
LEUCHTSTOFFLEUCHTE
- EXPL. PROOF SPARK GAP  
EX- FUNKENSTRECKE
- RECEPTACLE  
STECKDOSE
- SWITCH  
SCHALTER
- PUSH BUTTON  
TASTER
- PTC THERMISTOR  
KALTLEITER

**PERTINENT DRAWINGS  
ZUGEHÖRIGE ZEICHNUNGEN**

- E-2.1 GROUNDING - AND LIGHTNING PROTECTION PLAN  
ERDUNGS - UND BLITZSCHUTZPLAN
- E-2.2 ELECTR. INSTALLATION, PUMP HOUSE A. LEAKAGE CONTROL  
ELEKTR. INSTALLATION, PUMPENHAUS U. LECKKONTROLLSCHACHT

**PUMP HOUSE  
PUMPENHAUS**



REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
HEADQUARTERS UNITED STATES AIR FORCES EUROPE				
AIRFIELD STANDARD DESIGN US		FLUGPLATZ STANDARDPLANUNG US		
JET FUEL STORAGE AND DISPENSING SYSTEMS		FLUGKRAFTSTOFF - VERSORGENGSANLAGEN		
BUILDING BAUWERK OPERATING TANK 2500m³ FLACHBODENTANK 2500m³				
DESIGNATOR BEZEICHNUNG ELECTRICAL DIAGRAMS, PUMP HOUSE A. LEAKAGE CONTROL PIT SCHALTPLÄNE, PUMPENHAUS U. LECKKONTROLLSCHACHT				
WORKED/REARBEITET	PREPARED/AUFGESTELLT	APPROVED/GENEHMIGT		
<small>LANDSBEREITUNGSGESAMTSCHAFT UND BAUVERTRIEB</small> <small>LEB-WERKSTÄTTEN LANZOU</small> <small>AMSCHEFFEL-STRASSE 11, 70639 LANZOU</small> <small>TELEFON: 07141 934-111 FAX: 07141 934-110</small> <small>LAND: DE</small> <small>BY/BEI: IN DER TUNING</small> <small>ORIGINAL: GEE</small> <small>BY/BEI: IN DER TUNING</small> <small>ORIGINAL: GEE</small>		<small>AMT FÜR BUNDESBAU</small> <small>WALLSTR. 1</small> <small>55122 MAINZ</small> <small>ORIGINAL: BODEN</small> <small>BY/BEI: IN DER TUNING</small> <small>ORIGINAL: GEE</small>		
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAU MASSNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED GENEHMIGT	DATE DATUM 6. MAI 2015	SCALE MASSSTAB 1:50		
ORIGINAL: BODEN BY/BEI: IN DER TUNING		STANDARD SHEET STANDARD PLAN		
DESIGN: BODEN CONRAD FACILITIES ENGINEER IN CHARGE: BODEN		CAD-PROJECT: BODEN CAD-PROJECTOR: BODEN	E - 2.3	
CONSTRUCTION PROJECT BAU MASSNAHME		SHEET NO. PLATZ NR.		



**OPERATING TANK 1250m<sup>3</sup>**  
**FLACHBODENTANK 1250m<sup>3</sup>**

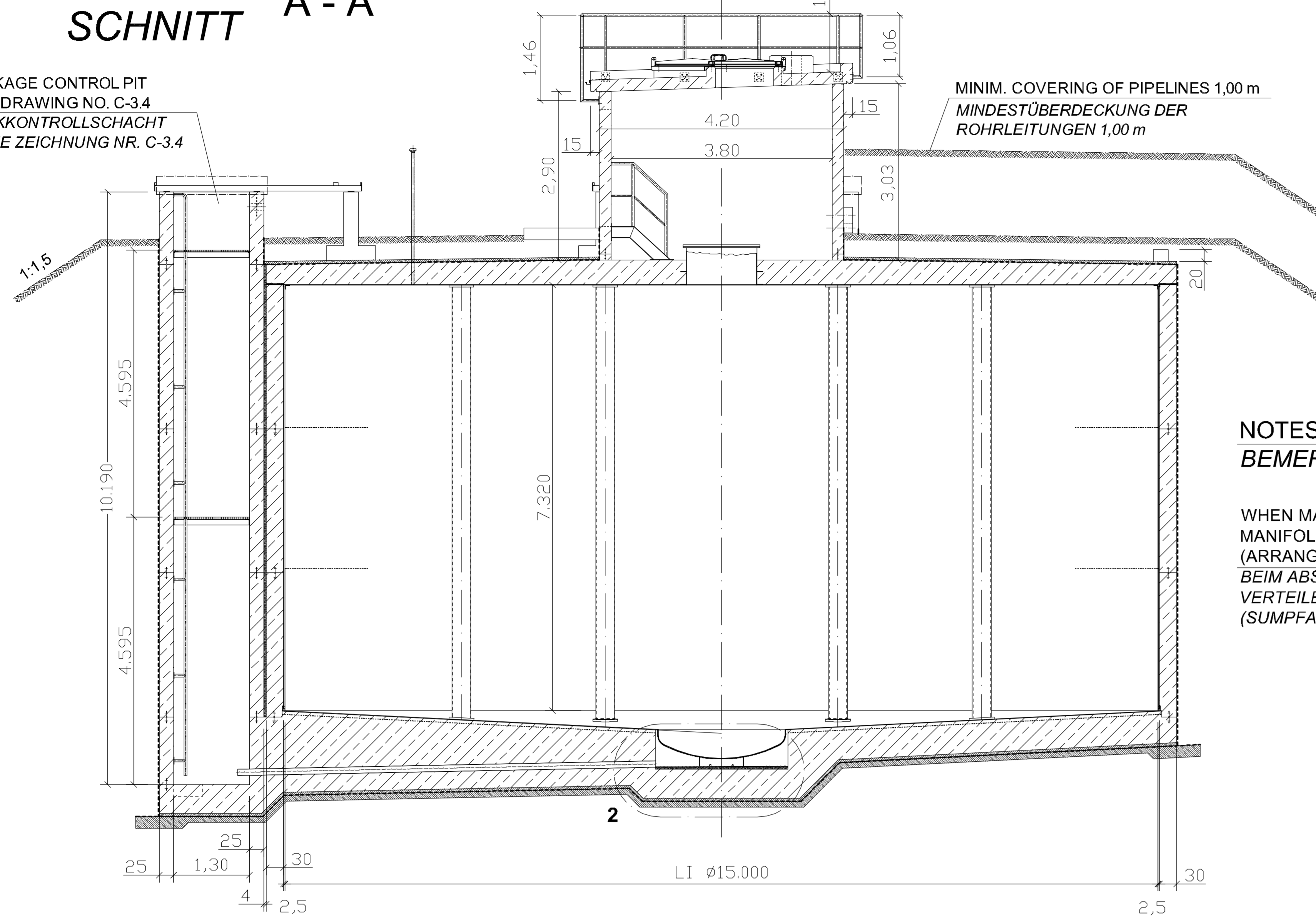
**3**

- C-3.1** GENERAL PLAN  
*ÜBERSICHTSPLAN*
- C-3.2** GENERAL PLAN, DETAILS  
*ÜBERSICHTSPLAN, DETAILS*
- C-3.2.1** GENERAL PLAN, DETAILS  
*ÜBERSICHTSPLAN, DETAILS*
- C-3.2.2** HINGED COVER  
*KLAPPDECKEL*
- C-3.3** DETAILS-MANHOLES AND LEAKAGE CONTROL PIT  
*DETAILS-MONTAGEÖFFNUNGEN UND LECKKONTROLLSCHACHT*
- C-3.4** CONSTRUCTION PLAN, PUMP HOUSE  
*BAUKONSTRUKTIONSPLAN, PUMPENHAUS*
- C-3.5** FORMWORK PLAN, PUMP HOUSE, ROOF AND WALLS  
*SCHALPLAN, PUMPENHAUS, DECKE UND WÄNDE*
- C-3.6** FORMWORK PLAN, PUMP HOUSE, SLAB AND WALL  
*SCHALPLAN, PUMPENHAUS, BODENPLATTE UND WAND*
- C-3.7** FORMWORK PLAN, ROOF SLAB  
*SCHALPLAN, DECKENPLATTE*
- C-3.8** FORMWORK PLAN, DETAILS ROOF- AND FLOOR SLAB  
*SCHALPLAN, DETAILS DECKEN- UND BODENPLATTE*
- S-3.1** COVERS, MANHOLES AND LEAKAGE CONTROL PIT  
*ABDECKUNGEN, FÜR MONTAGEÖFFNUNGEN UND LECKKONTROLLSCHACHT*
- S-3.6** STEEL TANK  
*STAHLTANK*
- S-3.7** DETAILS, STEEL TANK  
*DETAILS, STAHLTANK*
- S-3.8** TANK STAIRS AND SPLINTER PROTECTION DOORS  
*TANKTREPPE UND SPLITTERSCHUTZTÜREN*
- M-3.1** MECHANICAL INSTALLATION  
*MASCHINENTECHNISCH INSTALLATION*
- M-3.2** MECH. INSTALL. LEAKAGE CONTROL PIT AND DETAILS  
*MASCH. INSTALL. LECKKONTROLLSCHACHT U. DETAILS*
- E-3.1** GROUNDING- AND LIGHTNING PROTECTION PLAN  
*ERDUNGS- UND BLITZSCHUTZPLAN*
- E-3.2** ELEC. INSTALL. PUMP HOUSE A. LEAKAGE CONTROL PIT  
*ELEK. INST. PUMPENHAUS U. LECKKONTROLLSCHACHT*
- E-3.3** ELEC. DIAGRAMS PUMP HOUSE A. LEAKAGE CONTROL PIT  
*SCHALTPLÄNE PUMPENHAUS U. LECKKONTROLLSCHACHT*



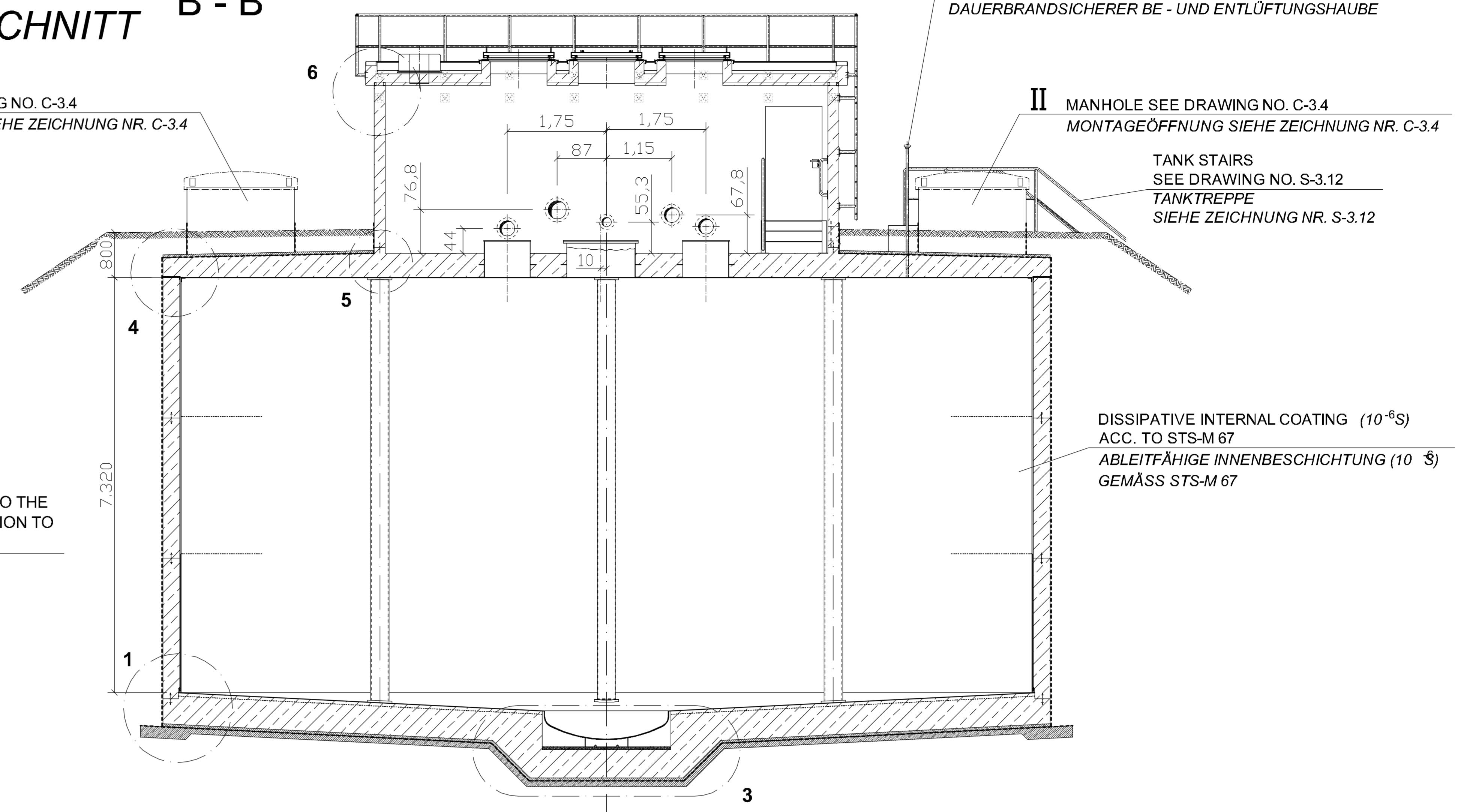
**SECTION A - A**  
SECTION  
SCHNITT

LEAKAGE CONTROL PIT  
SEE DRAWING NO. C-3.4  
LECKKONTROLLSCHACHT  
SIEHE ZEICHNUNG NR. C-3.4



**SECTION B - B**  
SECTION  
SCHNITT

I MANHOLE SEE DRAWING NO. C-3.4  
MONTAGEÖFFNUNG SIEHE ZEICHNUNG NR. C-3.4



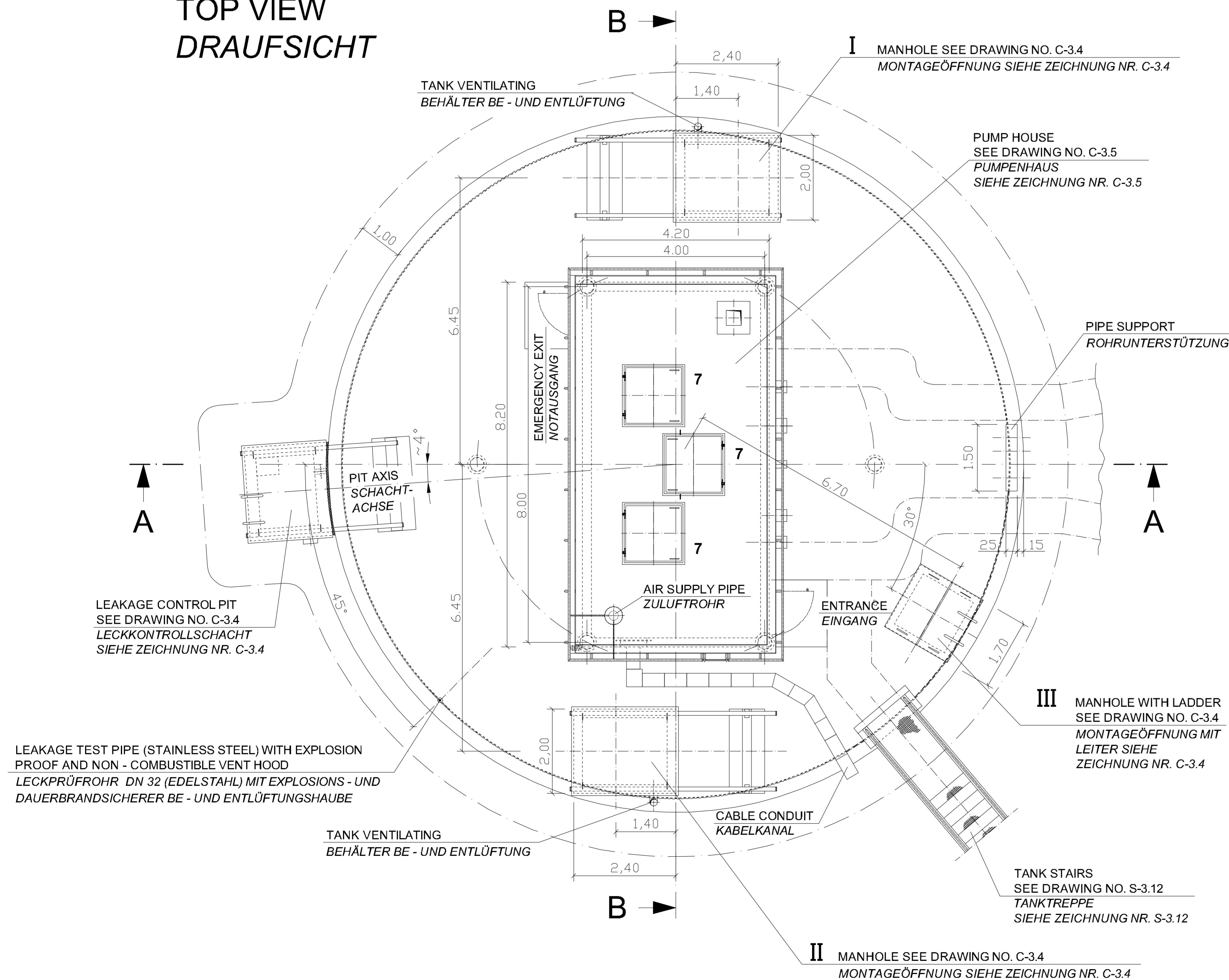
**NOTES**  
BEMERKUNGEN

WHEN MARKING OFF THE STRUCTURE LOCATION TO THE  
MANIFOLD / FILTER STATION IS TO BE PAID ATTENTION TO  
(ARRANGEMENT OF SUMP)  
BEIM ABSTECKEN DES BAUWERKS LAGE ZUR  
VERTEILER / FILTERSTATION BEACHTEN  
(SUMPFANORDNUNG)

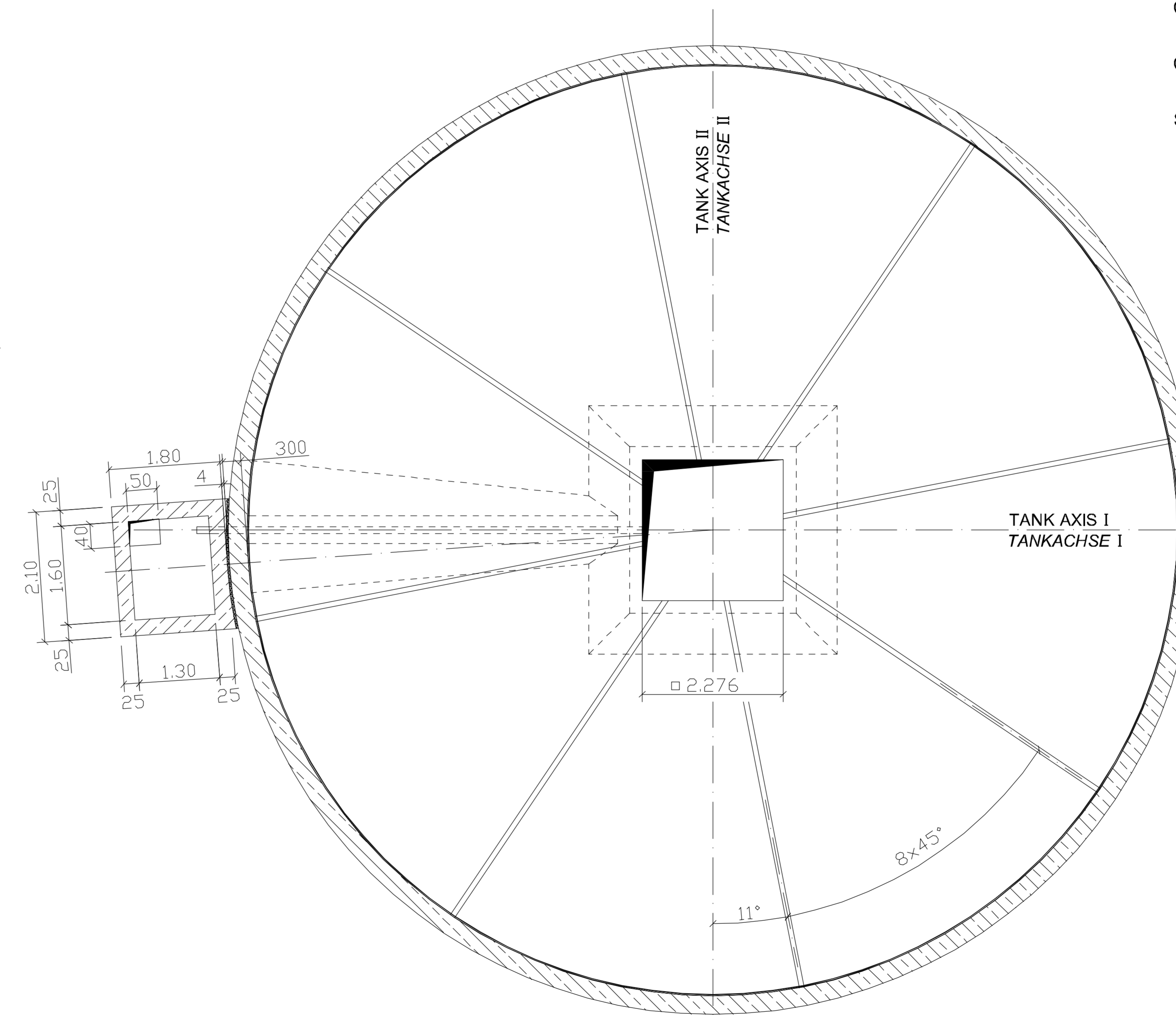
**PERTINENT DRAWINGS**  
ZUGEHÖRIGE ZEICHNUNGEN

- C-3.2 GENERAL PLAN - DETAILS  
ÜBERSICHTSPLAN - DETAILS
- C-3.3 DETAILS - MANHOLES AND LEAKAGE CONTROL PIT  
DETAILS - MONTAGEÖFFNUNGEN UND LECKKONTROLLSCHACHT
- C-3.4 CONSTRUCTION PLAN, PUMP HOUSE  
BAUKONSTRUKTIONSPLAN, PUMPENHAUS
- S-3.7 TANK STAIRS AND SPLINTER PROTECTION DOOR  
TANKTREPPE UND SPLITTERSCHUTZTÜR

**TOP VIEW**  
DRAUFSICHT



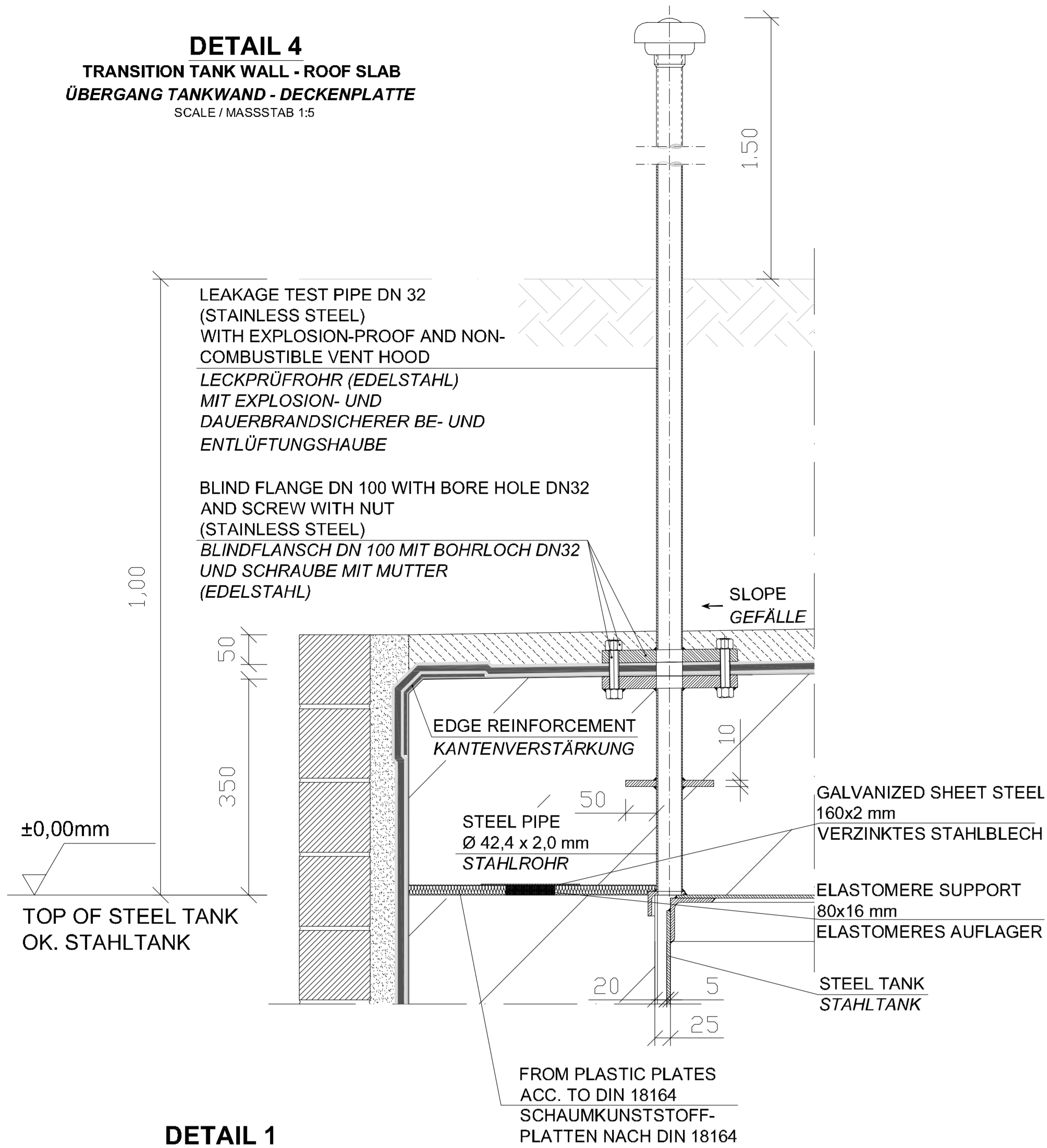
**GROUND PLAN - FLOOR SLAB**  
GRUNDRISS - BODENPLATTE



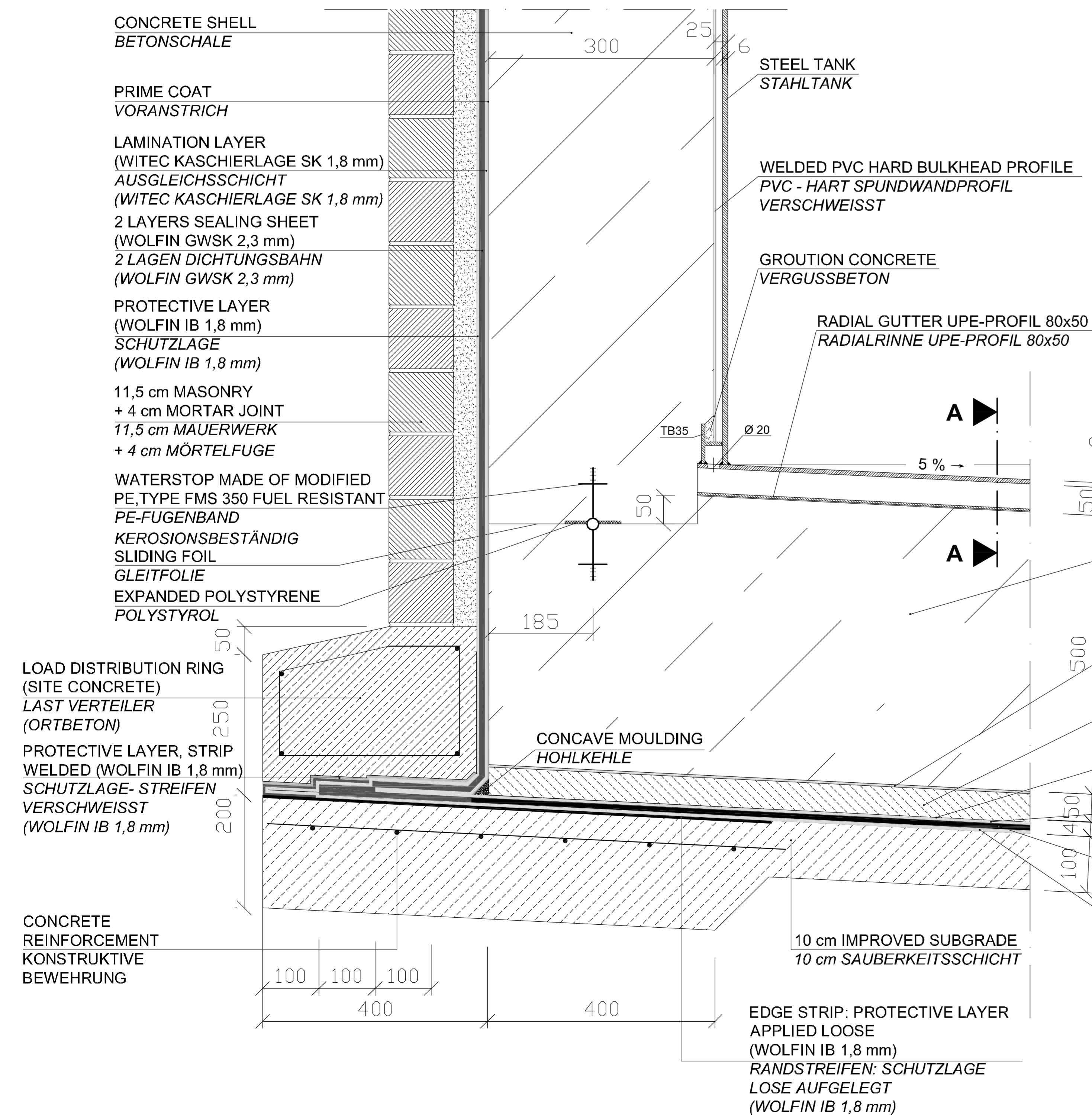
REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
<b>HEADQUARTERS</b>				
UNITED STATES AIR FORCES EUROPE				
ENGINEERING & OPERATIONS				
AIRFIELD STANDARD DESIGN US			FLUGPLATZ STANDARDPLANUNG US	
JET FUEL STORAGE AND DISPENSING SYSTEMS			FLUGKRAFTSTOFF - VERSORGNUNGSANLAGEN	
<b>OPERATING TANK 1250m<sup>3</sup></b> <b>FLACHBODENTANK 1250m<sup>3</sup></b>				
GENERAL PLAN ÜBERSICHTSPLAN				
WORKSHEET ARBEITSBLATT	PREPARED BY LAYOUTING UND BAUEITZGEBUNG LAW-RECHENUNGSLEITUNG L B B	APPROVED BY AMT FÜR BUNDESBAU WALLSTR.1 55122 MAINZ		
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAU MASSNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED GENEHMIGT	DATE DATUM	SCALE MASSSTAB		
ORIGINAL DRAWN BY IN ORIGINAL DED.	6. MAI 2015	1:50		
GENERAL DRAWING CONTRAST FOR FACILITIES ENGINEER IN ORIGINAL DED.		STANDARD SHEET STANDARD PLAN		
CONSTRUCTION PROJECT BAU MASSNAHME		CAD-PROJECT PATH: CAD-PROJEKTE	C - 3.1	
			SHEET NO. PLATZ NR.	
			OF VON	



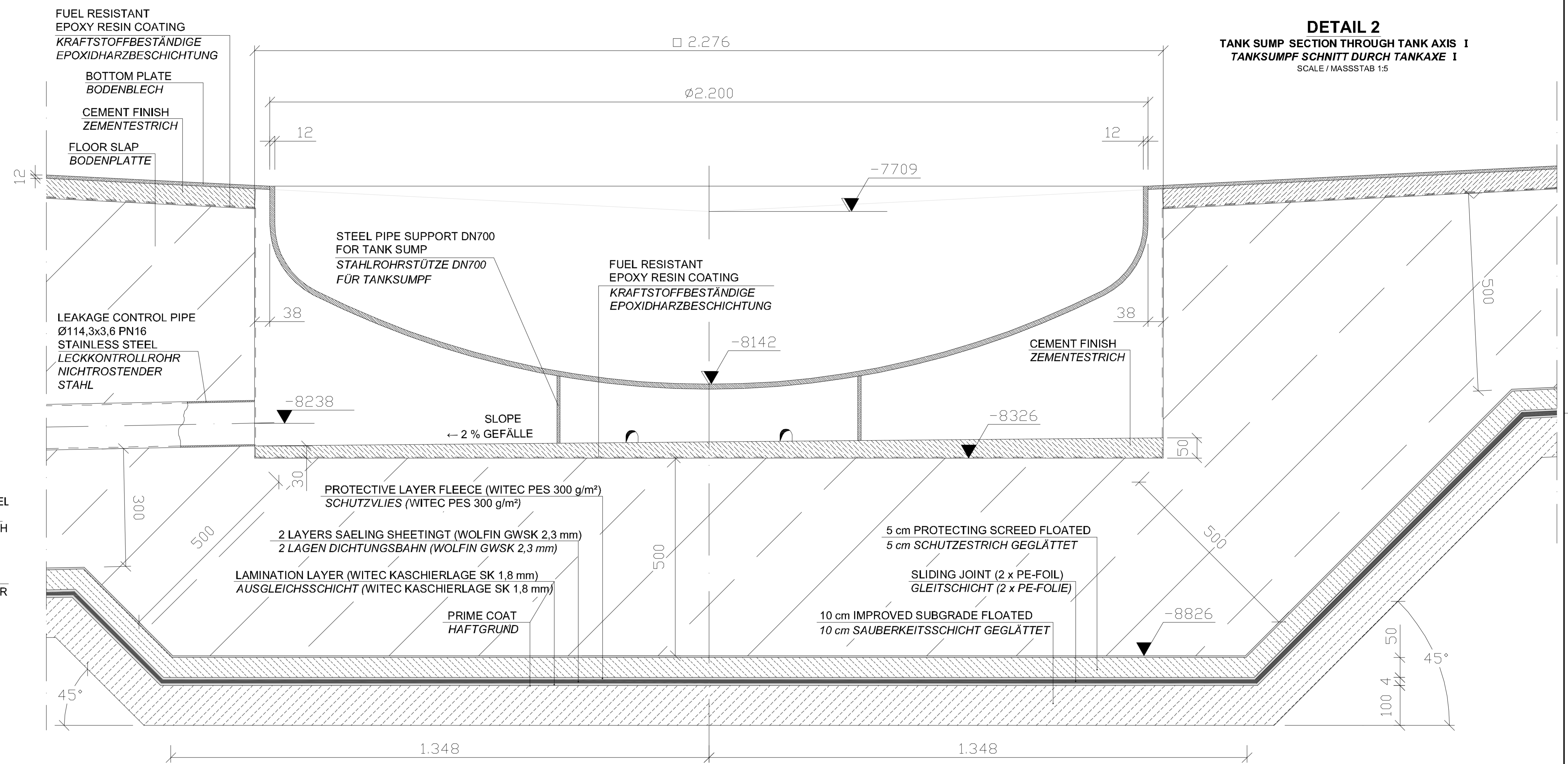
**DETAIL 4**  
TRANSITION TANK WALL - ROOF SLAB  
ÜBERGANG TANKWAND - DECKENPLATTE  
SCALE / MASSSTAB 1:5



**DETAIL 1**  
TRANSITION TANK WALL - FLOOR SLAB  
ÜBERGANG TANKWAND - BODENPLATTE  
SCALE / MASSSTAB 1:5



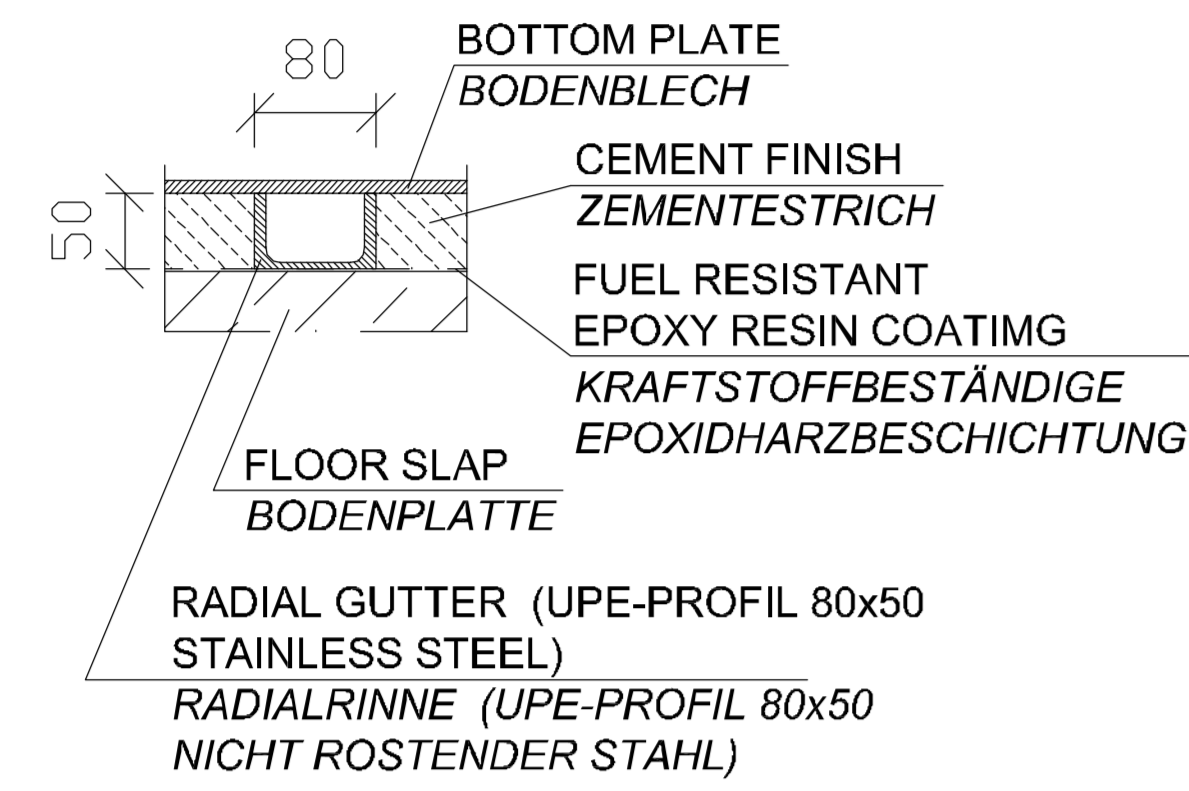
**DETAIL 2**  
TANK SUMP SECTION THROUGH TANK AXIS 1  
TANKSUMPF SCHNITT DURCH TANKAXE 1  
SCALE / MASSSTAB 1:5



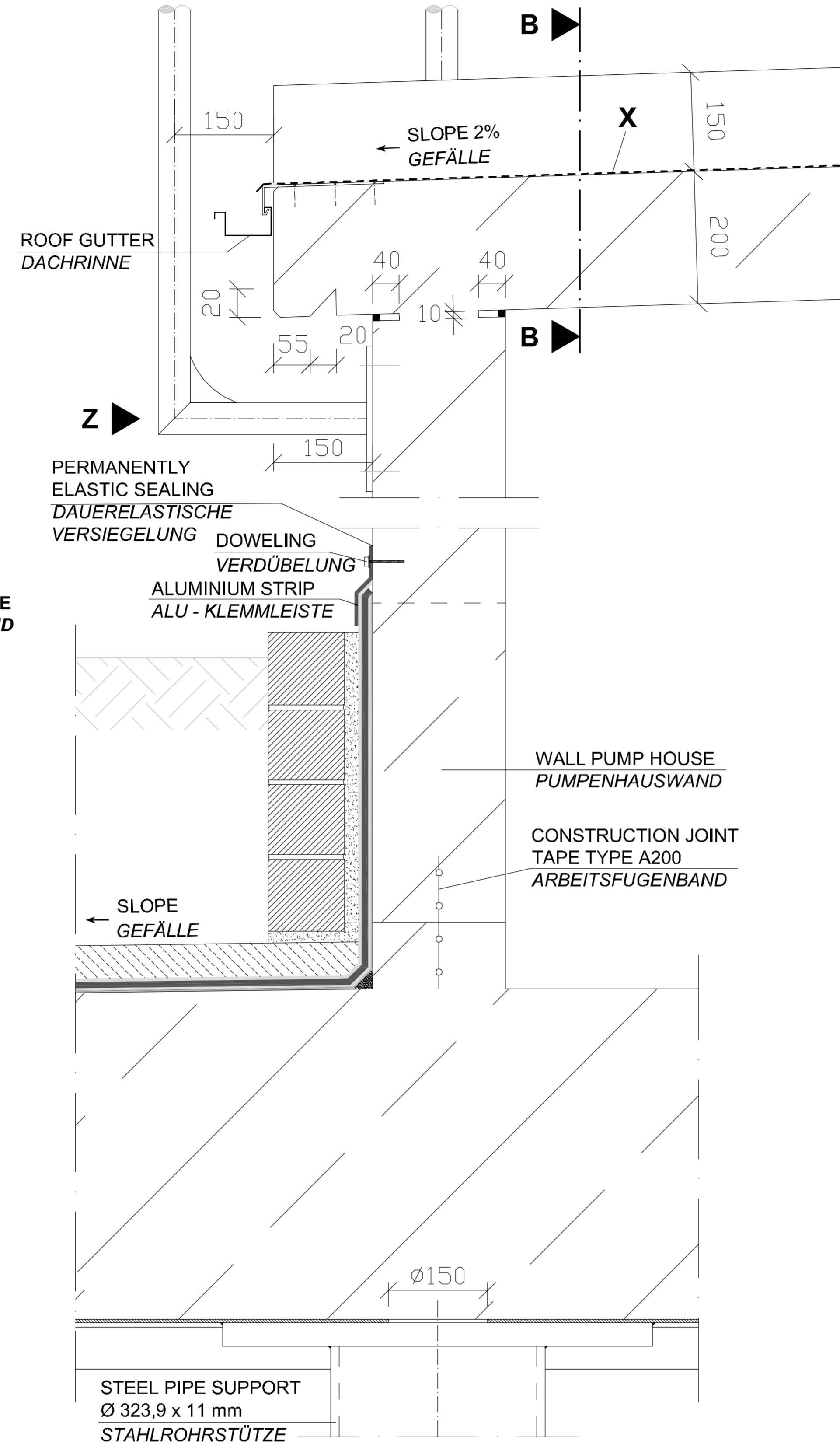
REVISION	DATE	DESCRIPTION	BY	COUNTRY
ÄNDERUNG	DATUM	BESCHREIBUNG	VON	LAND
<b>HEADQUARTERS</b>				
UNITED STATES AIR FORCES EUROPE				
ENGINEERING & OPERATIONS				
AIRFIELD STANDARD DESIGN US		FLUGPLATZ STANDARDPLANUNG US		
JET FUEL STORAGE AND DISPENSING SYSTEMS		FLUGKRAFTSTOFF - VERSORGSANLAGEN		
<b>OPERATING TANK 1250m<sup>3</sup> FLACHBODENTANK 1250m<sup>3</sup></b>				
<b>GENERAL PLAN, DETAILS ÜBERSICHTSPLAN, DETAILS</b>				
WORKED/BEARBEITET	PREPARED/AUFGESTELLT	APPROVED/GENEHMIGT		
	LANDSCHAFTLICHE UMGEBUNG UND BAUBEREICHUNG	AMT FÜR BUNDESBAU		
	LANDSCHAFTLICHE UMGEBUNG UND BAUBEREICHUNG	WALLSTR.1 55122 MAINZ		
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAU MASSNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED/GENEHMIGT	DATE/DATUM	SCALE/MASSSTAB		
	6. MAI 2015	1:5; 1:10		
ORIGINAL DRAWN BY/IN ORIGINAL DZG		STANDARD SHEET/STANDARD PLAN		
		C - 3.2		
GENERAL BOND		CAD-PROJECT PATH		
CONSTRUCTION PROJECT/BAU MASSNAHME		SHEET NO./PLATZ NR.		



**SECTION A - A**  
**SCHNITT**  
**RADIAL GUTTER**  
**RADIALRINNE**  
 SCALE / MASSSTAB 1:5

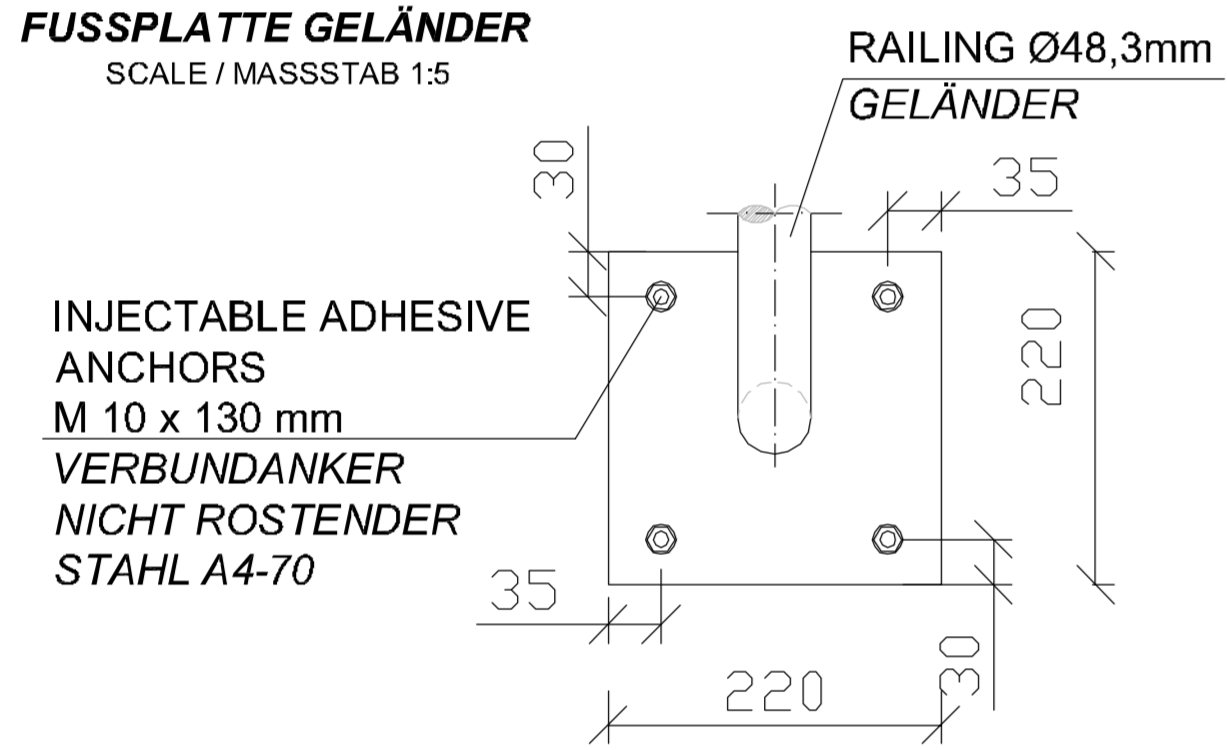


**DETAIL 6**  
**ROOF PUMP HOUSE**  
**PUMPENHAUSDACH**  
 SCALE / MASSSTAB 1:5

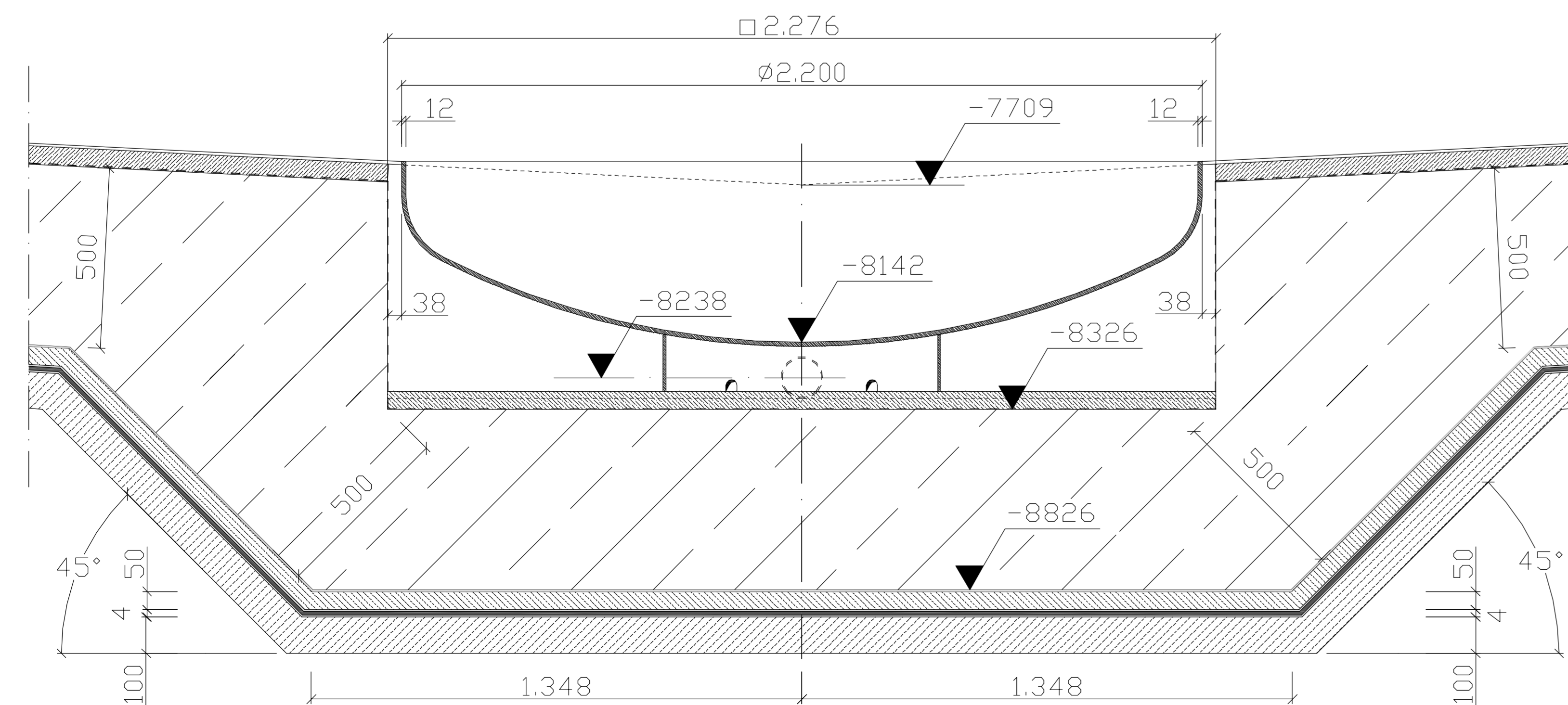


**DETAIL 5**  
**WALL PUMP HOUSE**  
**PUMPENHAUSWAND**  
 SCALE / MASSSTAB 1:5

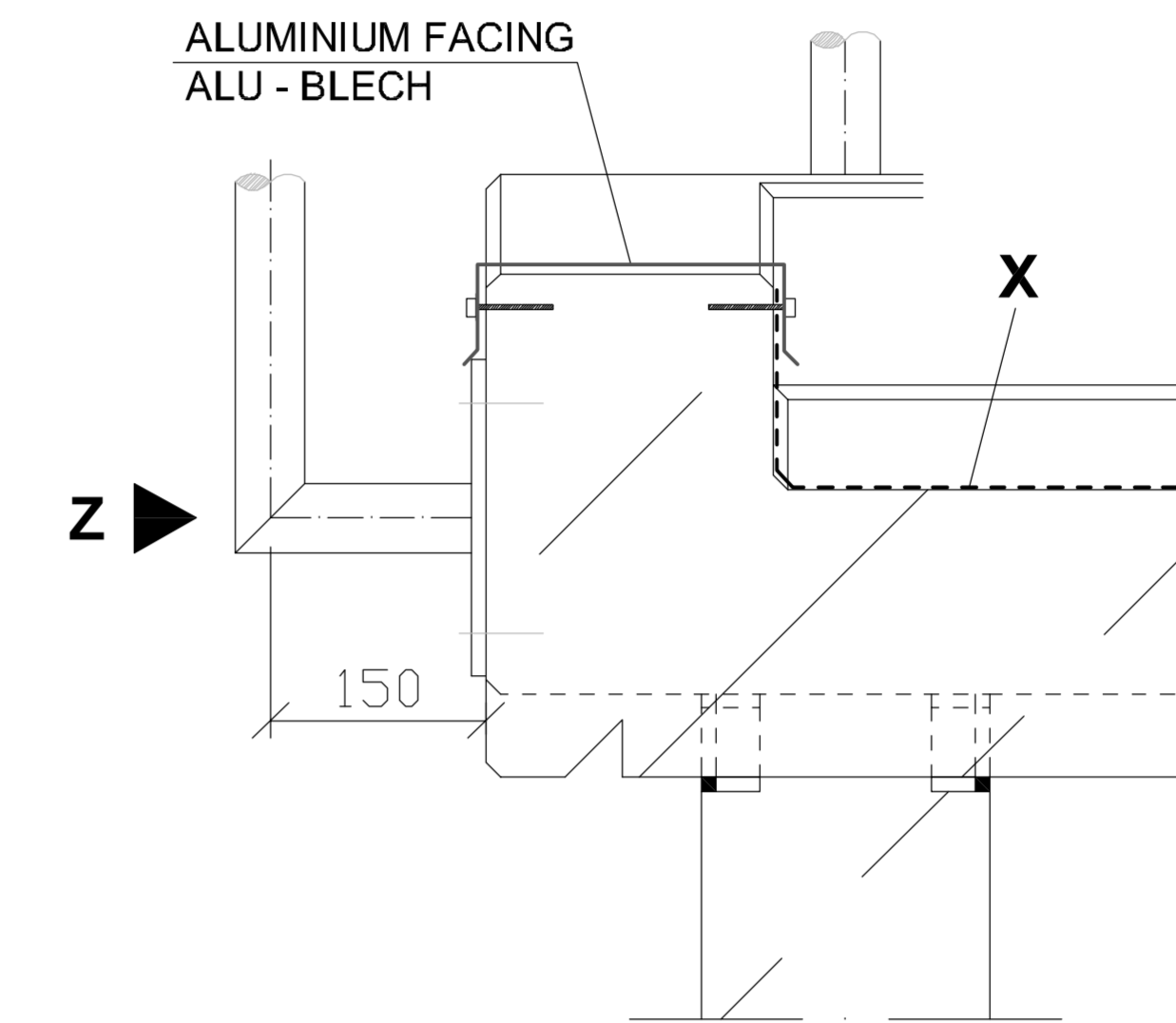
**VIEW Z**  
**ANSICHT**  
**BASE PLATE RAILING**  
**FUSSPLATTE GELÄNDER**  
 SCALE / MASSSTAB 1:5



**DETAIL 3**  
**TANK SUMP SECTION THROUGH TANK AXIS II**  
**TANKSUMPF SCHNITT DURCH TANKAXE II**  
 SCALE / MASSSTAB 1:10



**SECTION B - B**  
**SCHNITT**  
**ROOF PUMP HOUSE**  
**PUMPENHAUSDACH**  
 SCALE / MASSSTAB 1:5

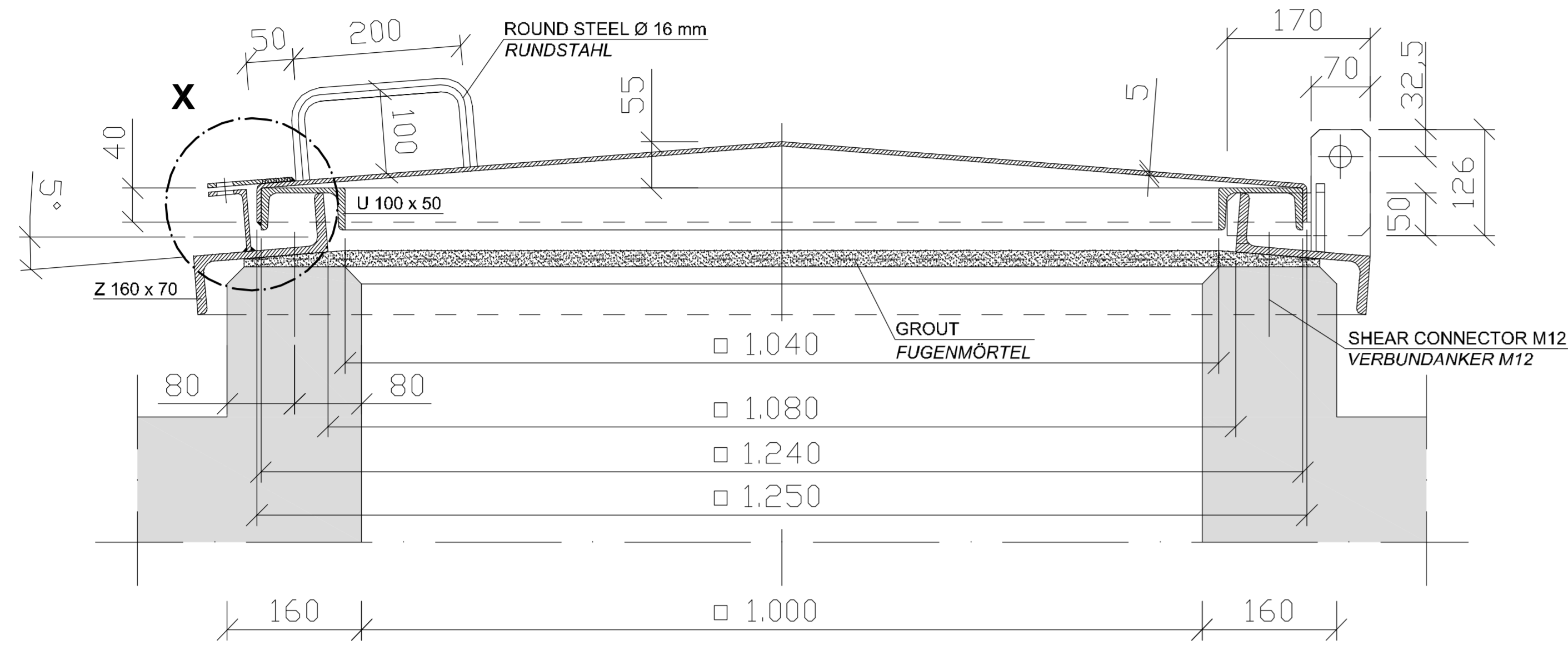


- X**
- TWO-LAYERED ROOF SEALING
  - COMPENSATION AND VAPOUR BARRIER FOR UNVENTILATED ROOF
  - SEPARATING LAYER
  - PRIME COAT BITUMINOUS SOLUTION
  - ZWEILAGIGE DACHABDICHTUNG
  - AUSGLEICHS- UND DAMPFSPERRE FÜR UNBELÜFTETES DACH
  - TRENNSCHICHT
  - VORANSTRICH BITUMENLÖSUNG

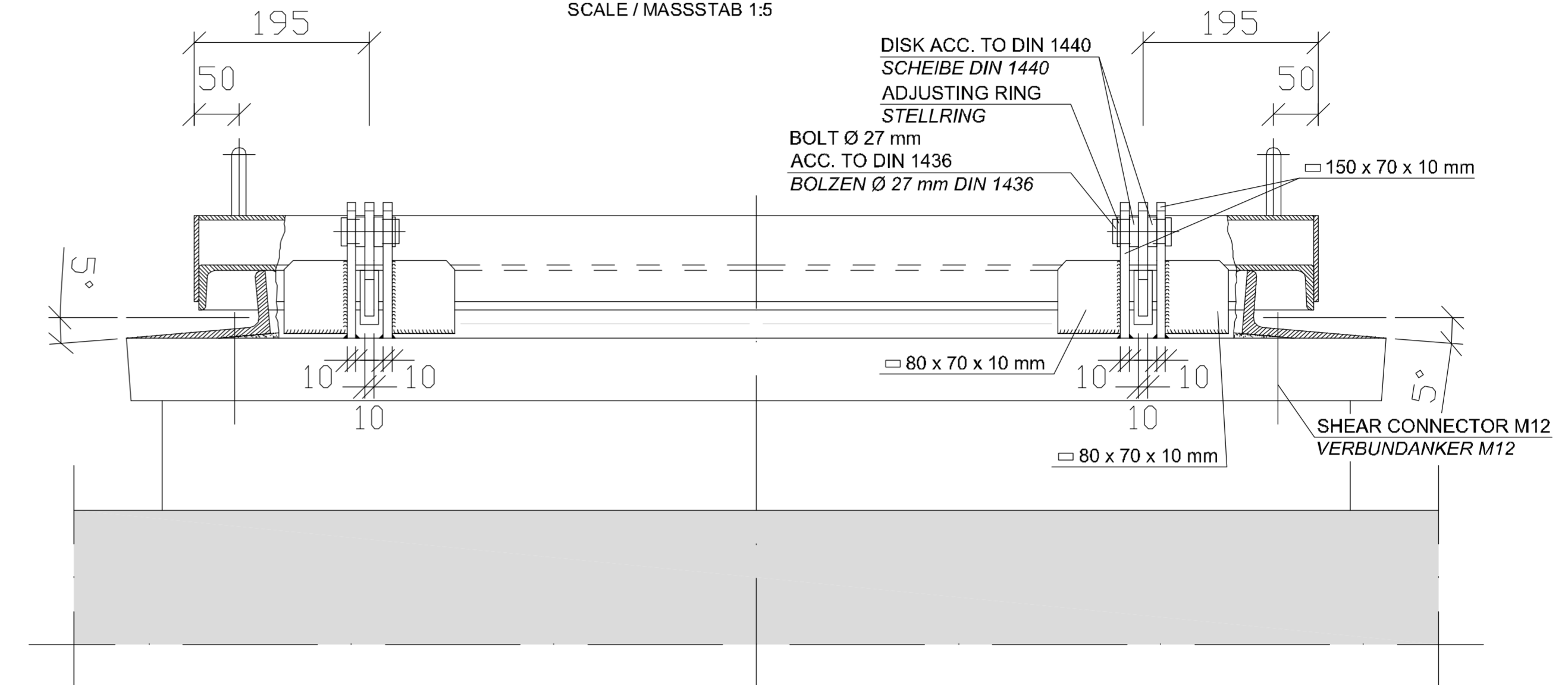
REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
<b>HEADQUARTERS</b> UNITED STATES AIR FORCES EUROPE ENGINEERING & OPERATIONS				
AIRFIELD STANDARD DESIGN US JET FUEL STORAGE AND DISPENSING SYSTEMS		FLUGPLATZ STANDARDPLANUNG US FLUGKRAFTSTOFF - VERSORGENGSANLAGEN		
BUILDING BAUWERK <b>OPERATING TANK 1250m<sup>3</sup></b> <b>FLACHBODENTANK 1250m<sup>3</sup></b>				
DESIGNATOR BEZEICHNUNG <b>GENERAL PLAN , DETAILS</b> <b>ÜBERSICHTSPLAN , DETAILS</b>				
WORKED/BEARBEITET LANDESBETRIEBSLEITUNGSGEWEISE UND BAUVERFAHREN L & B AMT FÜR BUNDESBAU WALLSTR.1 55122 MAINZ		APPROVED/GENEHMIGT AMT FÜR BUNDESBAU WALLSTR.1 55122 MAINZ		
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAU MASSNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED GENEHMIGT IN ORIGINAL DED.	DATE DATUM 6. MAI 2015	SCALE MASSSTAB 1:5 ; 1:10	SHEET NO. PLATZNR. OF VON C - 3.2.1	
CONSTRUCTION PROJECT BAU MASSNAHME				



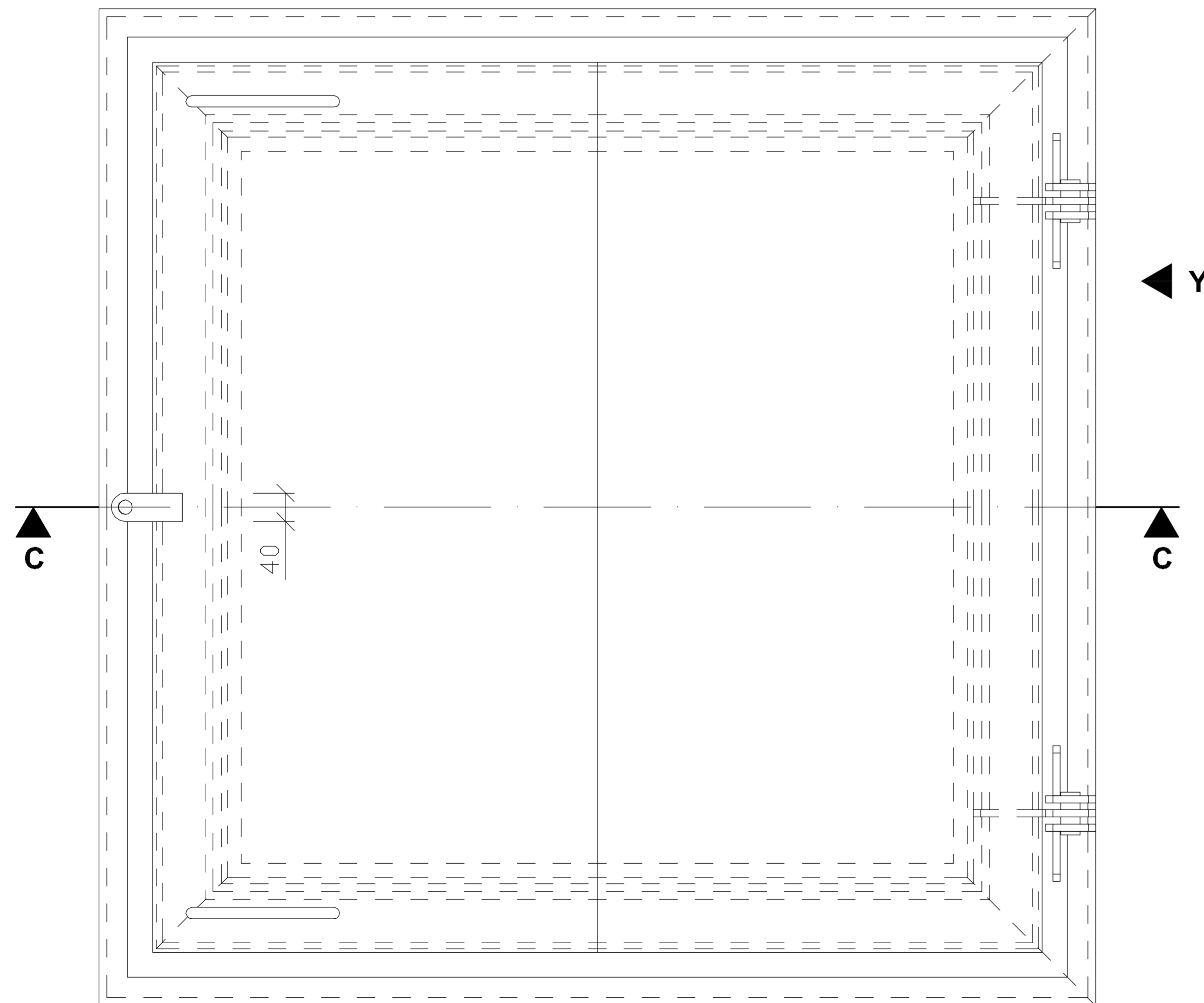
**SECTION C - C**  
**SCHNITT**  
SCALE / MASSSTAB 1:5



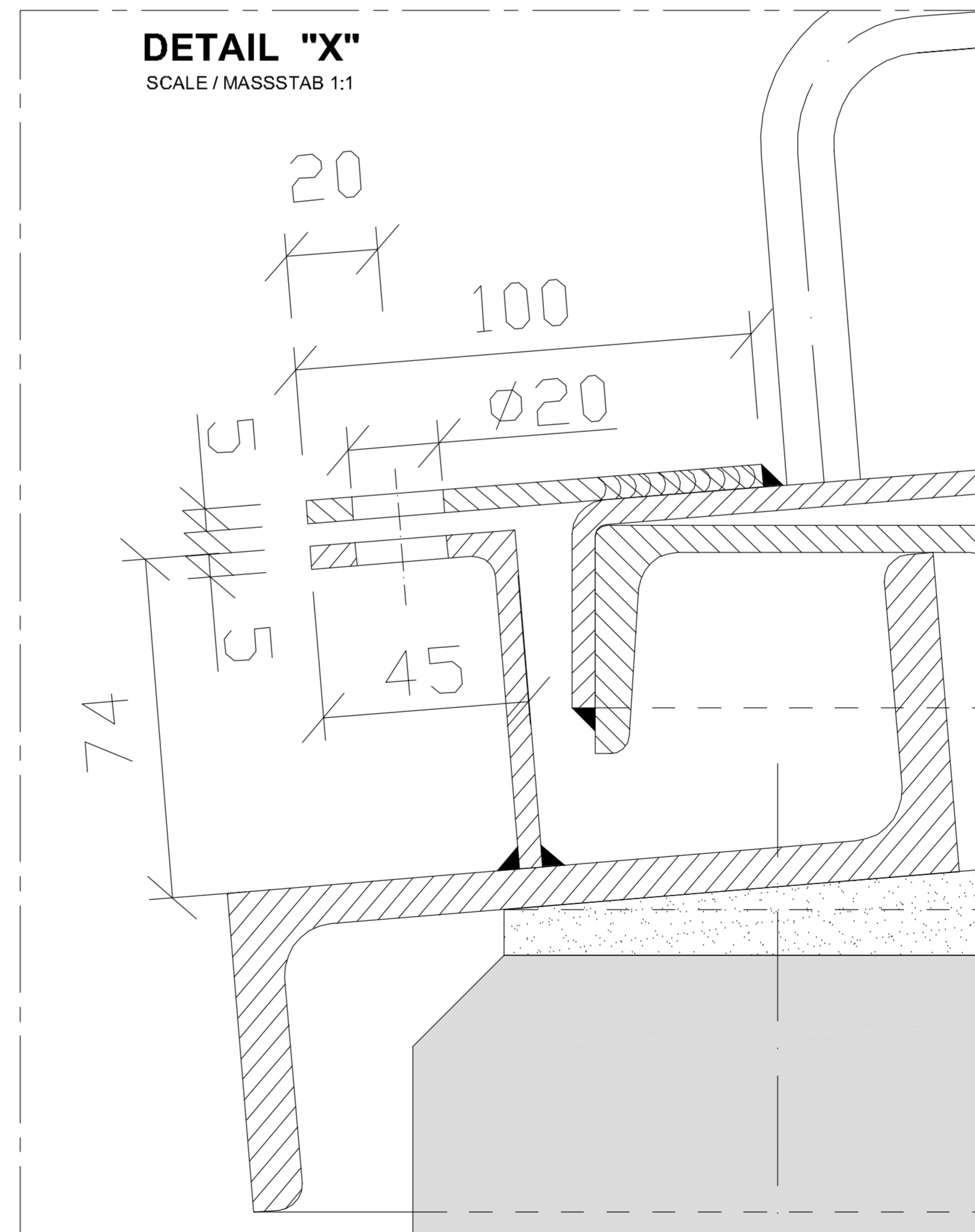
**VIEW ANSICHT Y**  
**HINGED COVER KLAPPDECKEL**  
SCALE / MASSSTAB 1:5



**DETAIL 7**  
**HINGED COVER KLAPPDECKEL**  
SCALE / MASSSTAB 1:5



**DETAIL "X"**  
SCALE / MASSSTAB 1:1

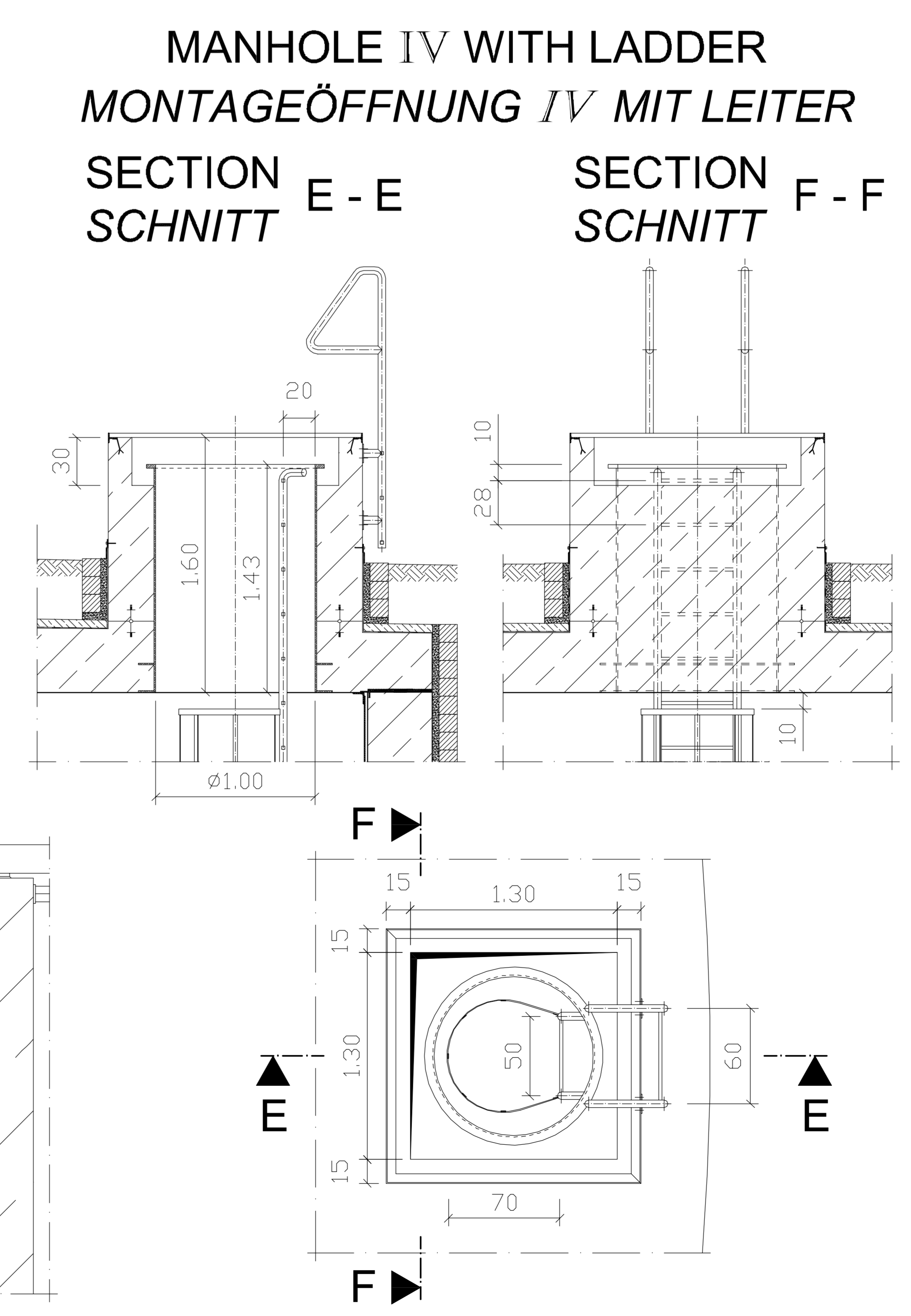
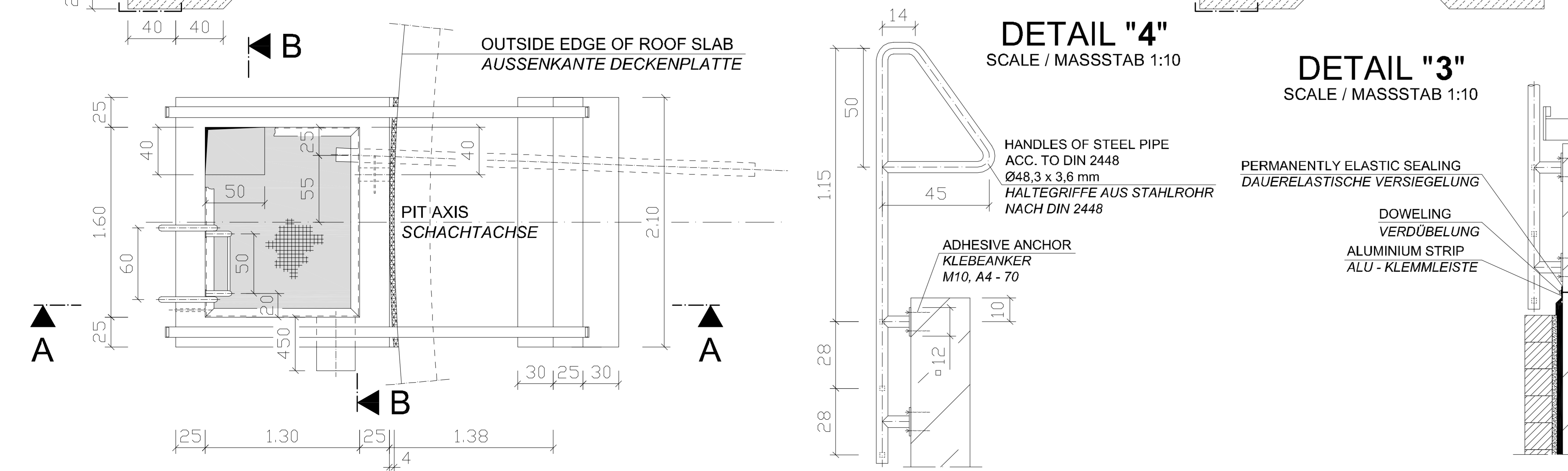
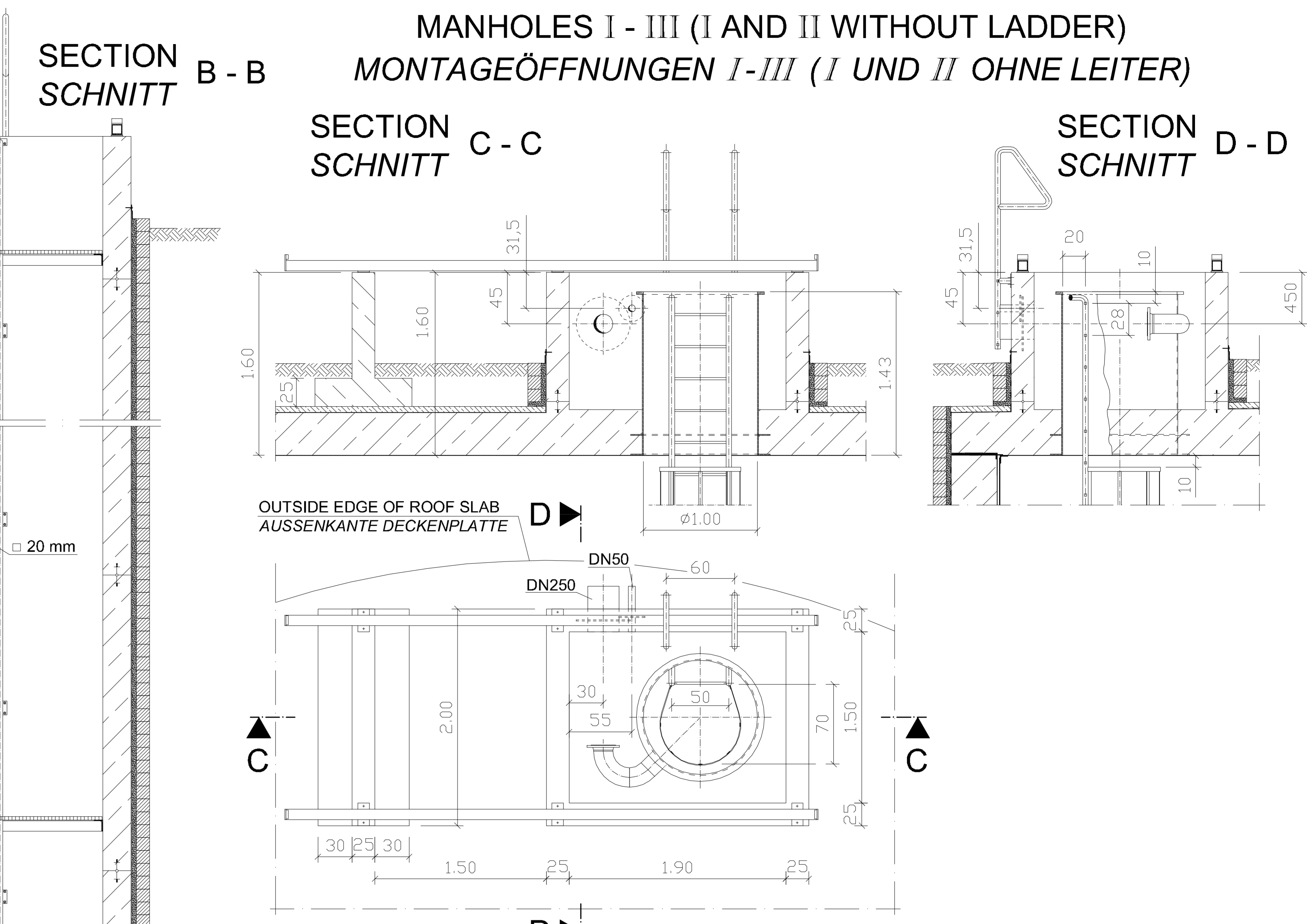
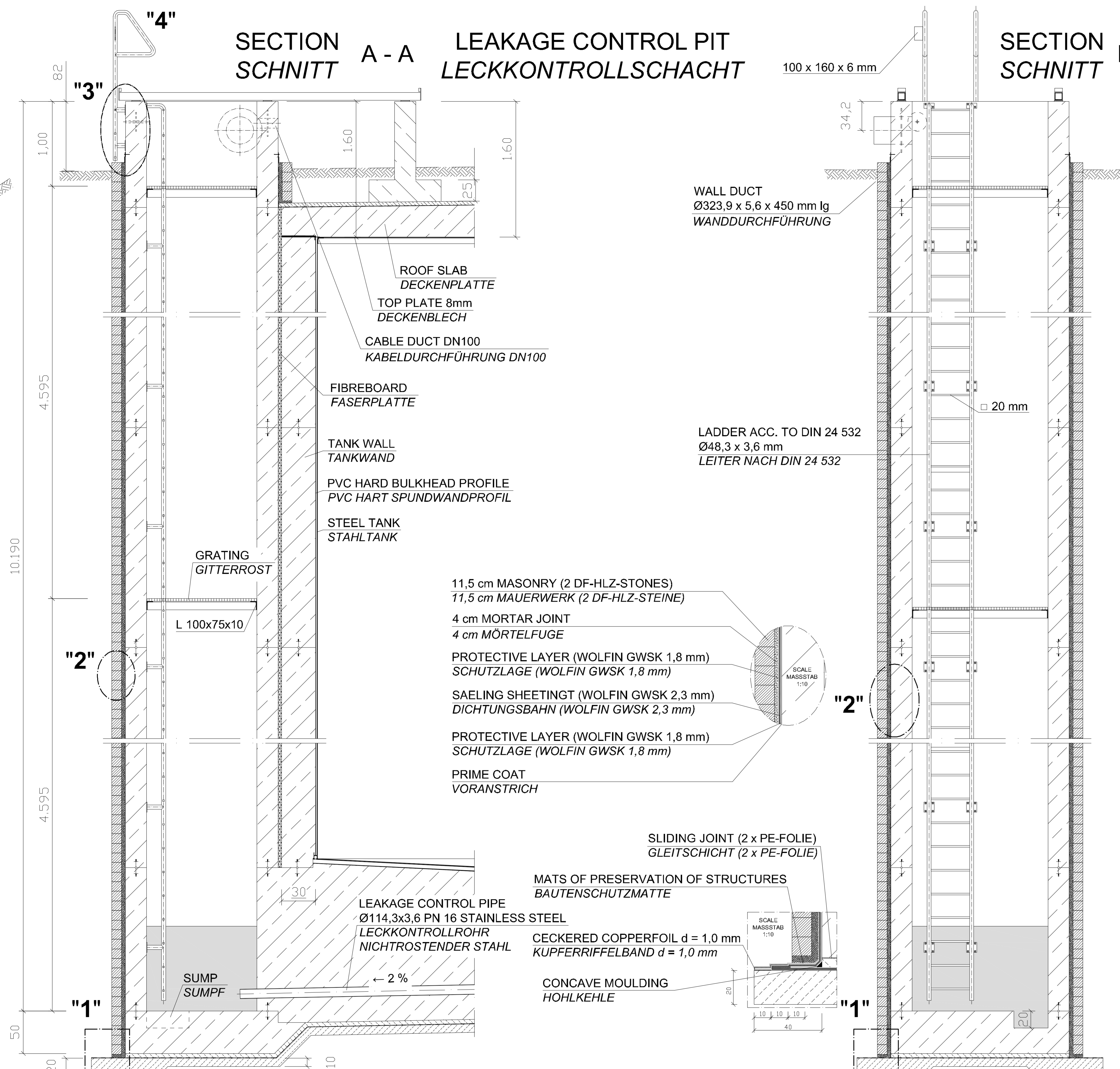


**NOTES**  
**BEMERKUNGEN**

THE HINGED COVER MUST BE SECURED WITH ARMoured PADLOCKS "PANZER" OF STAINLESS STEEL, LOCKING BOLT Ø 12mm  
DIE KLAPPDECKEL SIND MIT GEPANZERTEN VORHÄNGESCHLÖSSER "PANZER" AUS EDELSTAHL, SCHLIESSBOLZEN Ø 12mm ZU SICHERN.

REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
<b>HEADQUARTERS</b> <b>UNITED STATES AIR FORCES EUROPE</b> <b>ENGINEERING &amp; OPERATIONS</b>				
<b>AIRFIELD STANDARD DESIGN US</b> <b>JET FUEL STORAGE AND DISPENSING SYSTEMS</b>		<b>FLUGPLATZ STANDARDPLANUNG US</b> <b>FLUGKRAFTSTOFF - VERSORGENGSANLAGEN</b>		
<b>BUILDING BAUWERK</b> <b>OPERATING TANK 1250m<sup>3</sup></b> <b>FLACHBODENTANK 1250m<sup>3</sup></b>				
<b>DESIGNATION BEZEICHNUNG</b> <b>HINGED COVER KLAPPDECKEL</b>				
<b>WORKED/BEARBEITET</b> LANDBEWEISER LIEGENSCHAFTS- UND BAUVERBUNDUNG LBB-III-BEDERLASSUNG LANDAU ANSCHIEDLICH: UNTERTORPLATZ 1, 76229 LANDAU TELEFON: (06341) 912-276 TELEFAX: (06341) 912-291 LANDAU, BY PROXY / IM VERSTRETTUNG ORIGINAL SIGNED BY: IM ORIGINAL GEZ. STEFAN KOTSCHENREUTHER		<b>APPROVED/GENEHMIGT</b> AMT FÜR BUNDESBAU WALLSTR.1 55122 MAINZ ORIGINAL SIGNED BY: IM ORIGINAL GEZ. WERNING GÖTZE		
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAUMASSNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
<b>APPROVED GENEHMIGT</b> DATE DATUM: <b>6. MAI 2015</b>		SCALE MASSSTAB: <b>1:5 ; 1:10</b>		
ORIGINAL SIGNED BY: IM ORIGINAL GEZ. GERALD SAND COMMAND FUEL FACILITIES ENGINEER HQ USAF - AFAPRMS / AFPO		STANDARD SHEET STANDARD PLAN <b>C - 3.2.2</b> CAD-project path: CAD-Projektfrd:		
<b>CONSTRUCTION PROJECT BAUMASSNAHME</b>				SHEET-NO. PLAN-NR. OF VON





**LEGEND**  
**LEGENDE**

FUEL RESISTANT PLASTIC COATING / DISSIPATIVE (10<sup>-6</sup> S)  
KRAFTSTOFFBESTÄNDIGE KUNSTSTOFFBESCHICHTUNG / ABLEITFÄHIG (10<sup>-6</sup> S)

**PERTINENT DRAWINGS**  
**ZUGEHÖRIGE ZEICHNUNGEN**

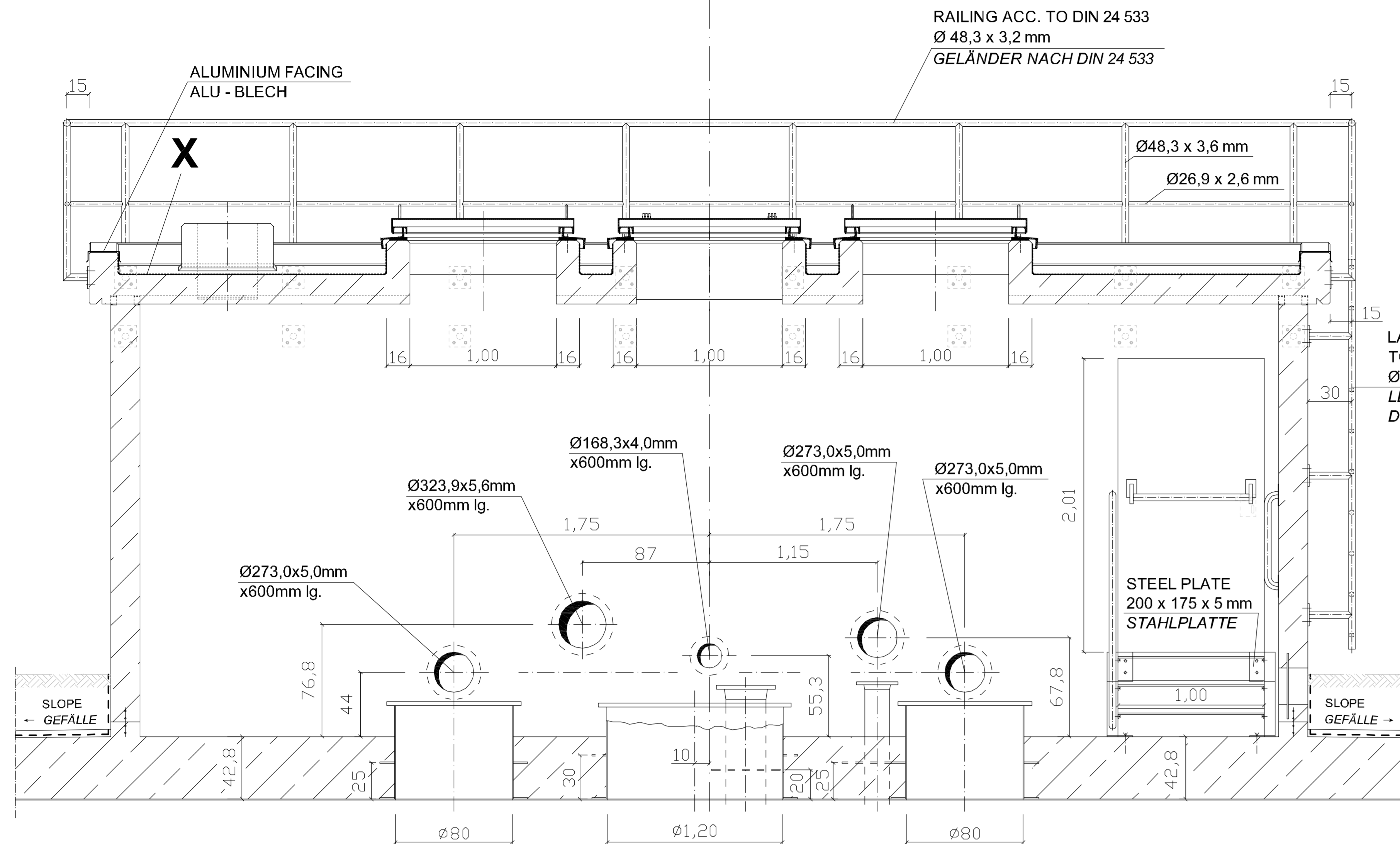
C-3.1 GENERAL PLAN  
ÜBERSICHTSPLAN

C-3.2 GENERAL PLAN - DETAILS  
ÜBERSICHTSPLAN - DETAILS

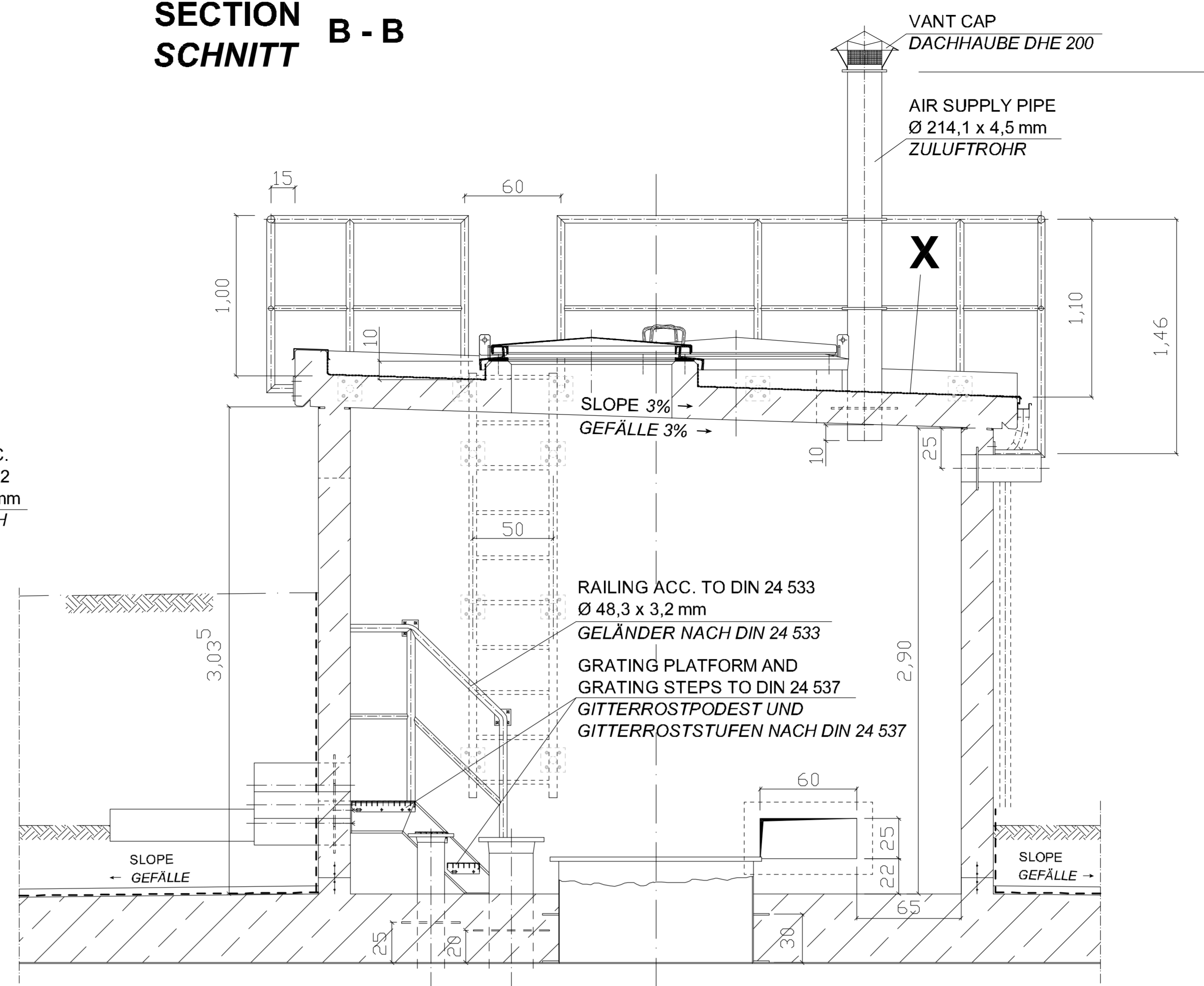
REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
<b>HEADQUARTERS</b>				
UNITED STATES AIR FORCES EUROPE				
ENGINEERING & OPERATIONS				
AIRFIELD STANDARD DESIGN US			FLUGPLATZ STANDARDPLANUNG US	
JET FUEL STORAGE AND DISPENSING SYSTEMS			FLUGKRAFTSTOFF - VERSORGSANLAGEN	
<b>BUILDING</b>				
OPERATING TANK 1250m <sup>3</sup> FLACHBODENTANK 1250m <sup>3</sup>				
<b>DESIGNATOR</b>				
DETAILS - MANHOLES AND LEAKAGE CONTROL PIT DETAILS - MONTAGEÖFFNUNGEN UND LECKKONTROLLSCHACHT				
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAU MASSNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED GENEHMIGT	DATE DATUM	SCALE MASSSTAB	SHEET NO. BLATT-NR.	
	6. MAI 2015	1:20 / 1:10	C - 3.3	
CONSTRUCTION PROJECT BAU MASSNAHME			SHEET NO. BLATT-NR.	



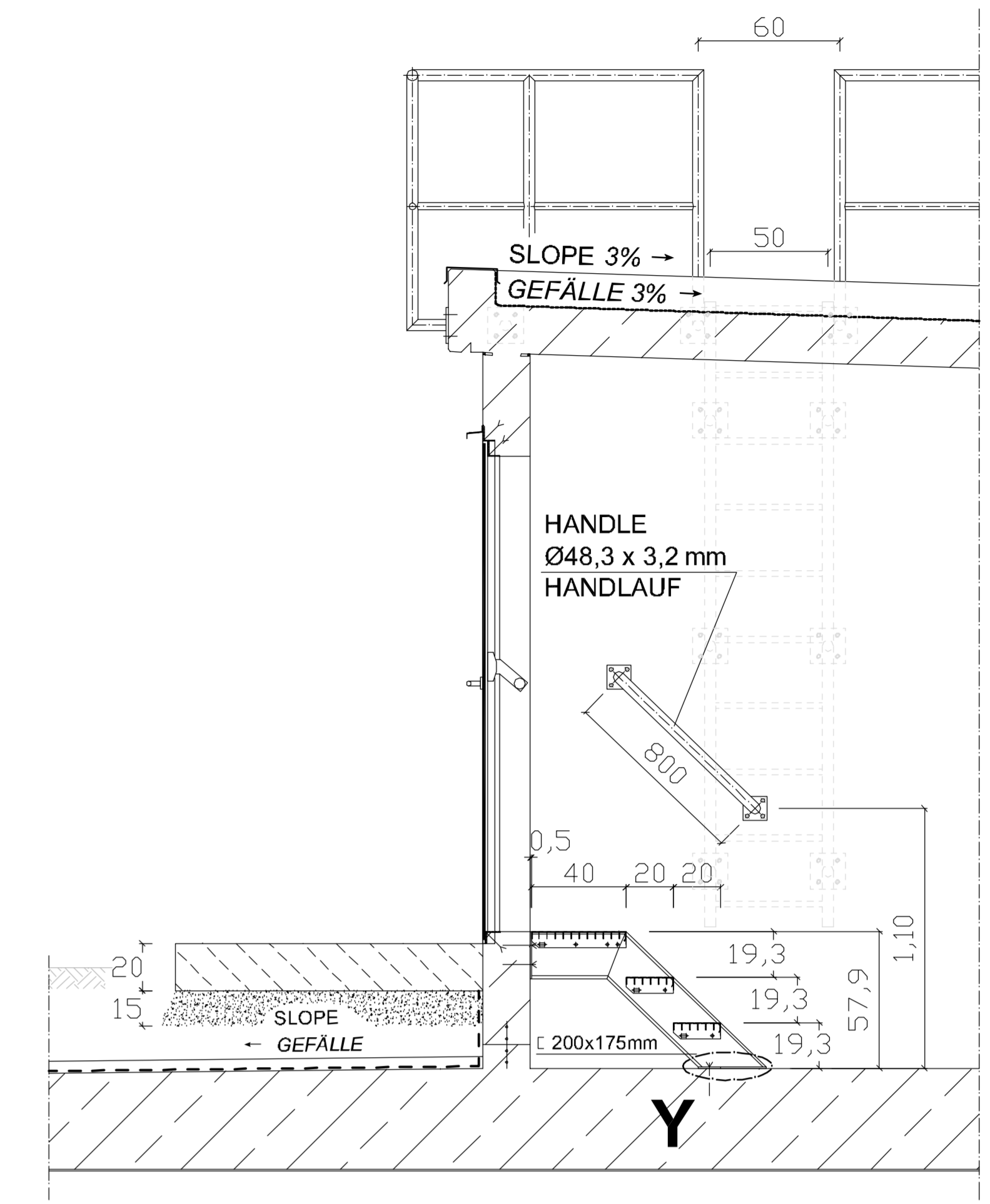
**SECTION A - A**  
**SCHNITT**



**SECTION B - B**  
**SCHNITT**

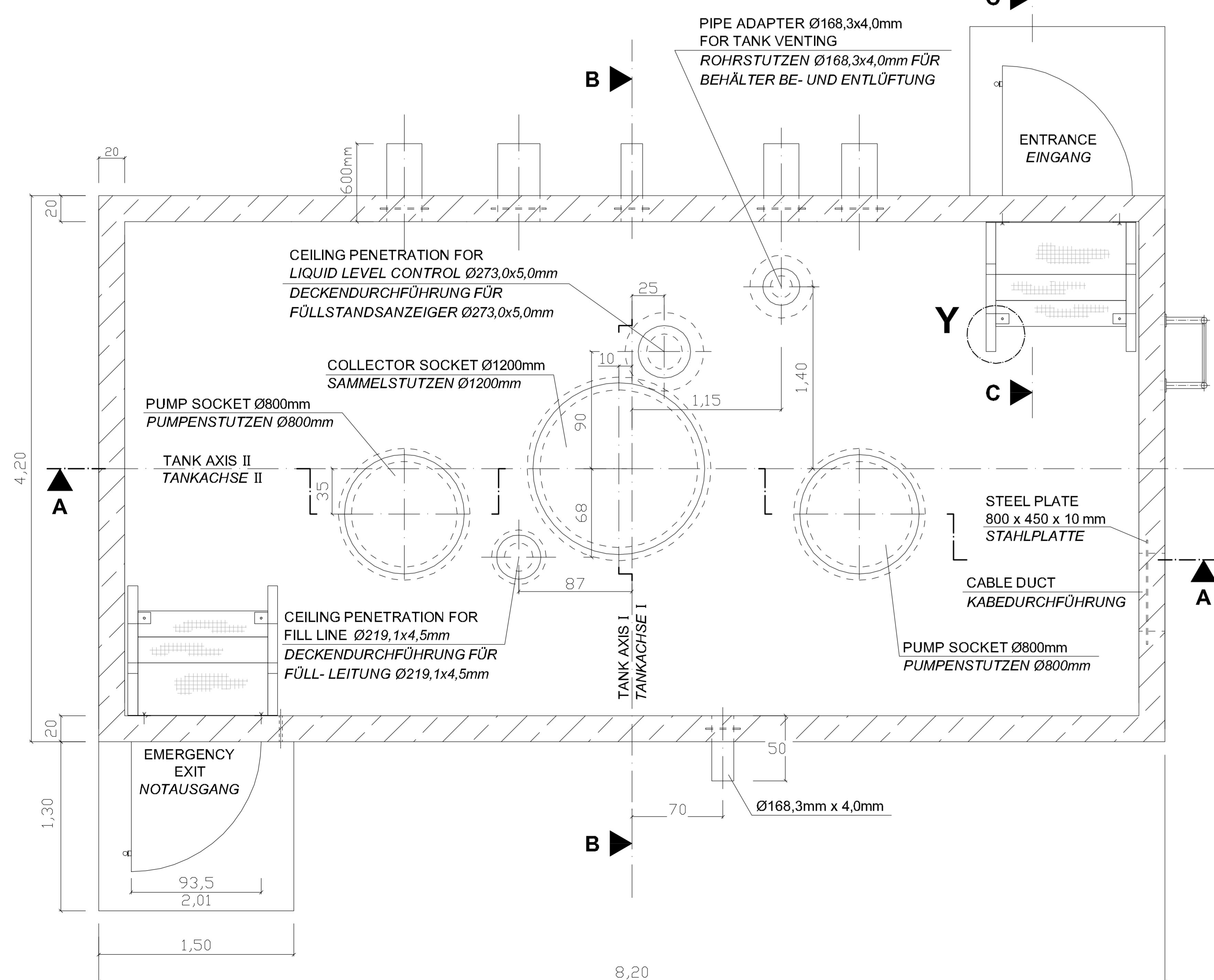


**SECTION C - C**  
**SCHNITT**

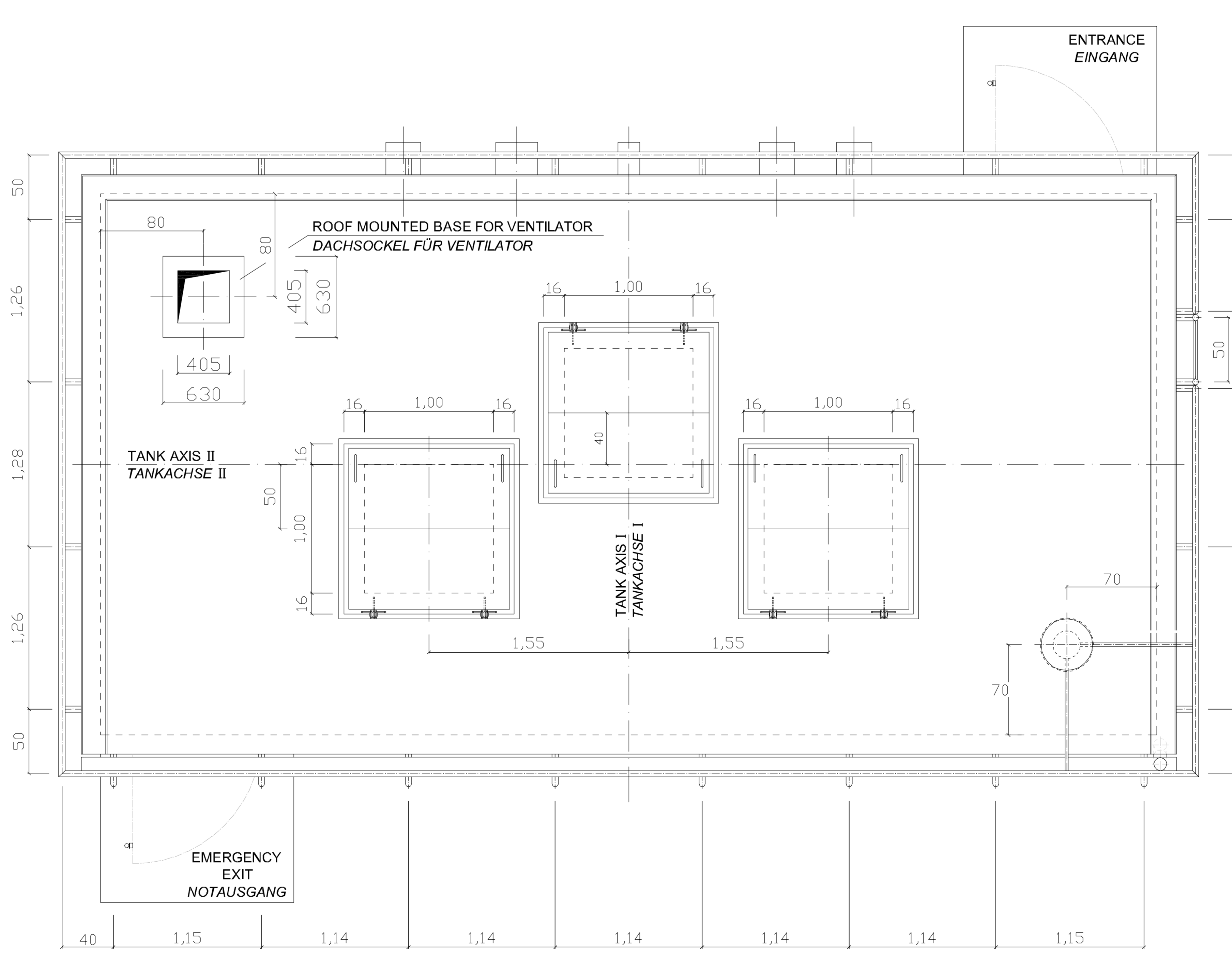


- X**
- TWO-LAYERED ROOF SEALING
  - COMPENSATION AND VAPOUR BARRIER FOR UNVENTILATED ROOF
  - SEPARATING LAYER
  - PRIME COAT BITUMINOUS SOLUTION
  - ZWEILAGIGE DACHABDICHTUNG
  - AUSGLEICHS- UND DAMPFSPERRE FÜR UNBELÜFTETES DACH
  - TRENNSCHICHT
  - VORANSTRICH BITUMENLÖSUNG

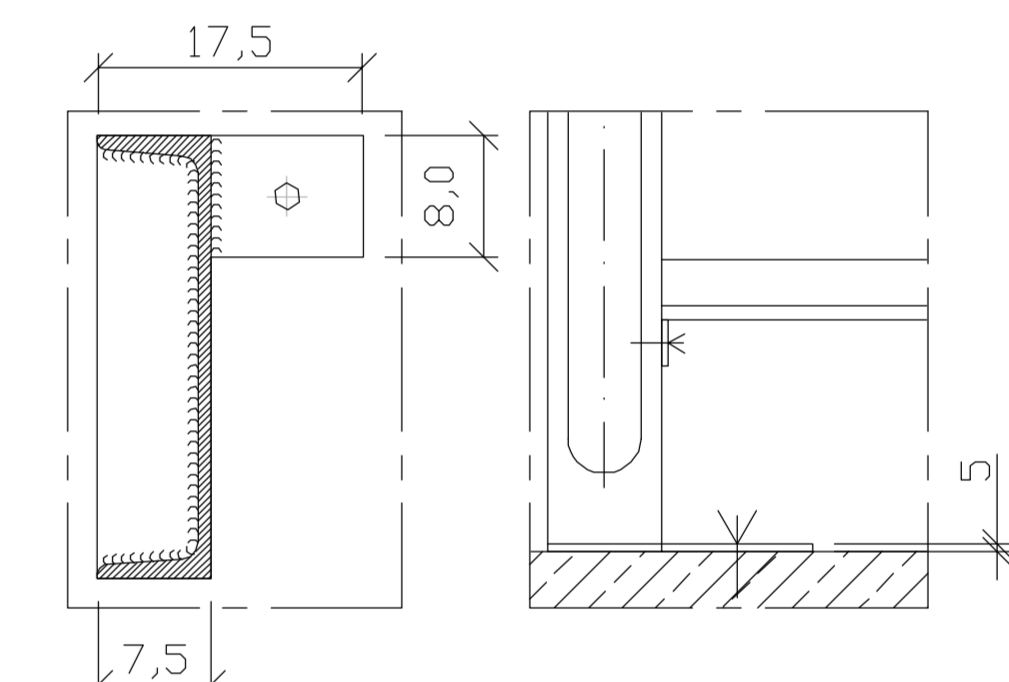
**GROUND PLAN**  
**GRUNDRISS**



**TOP VIEW**  
**DRAUFSICHT**



**DETAIL "Y"**  
SCALE / MASSSTAB 1:5



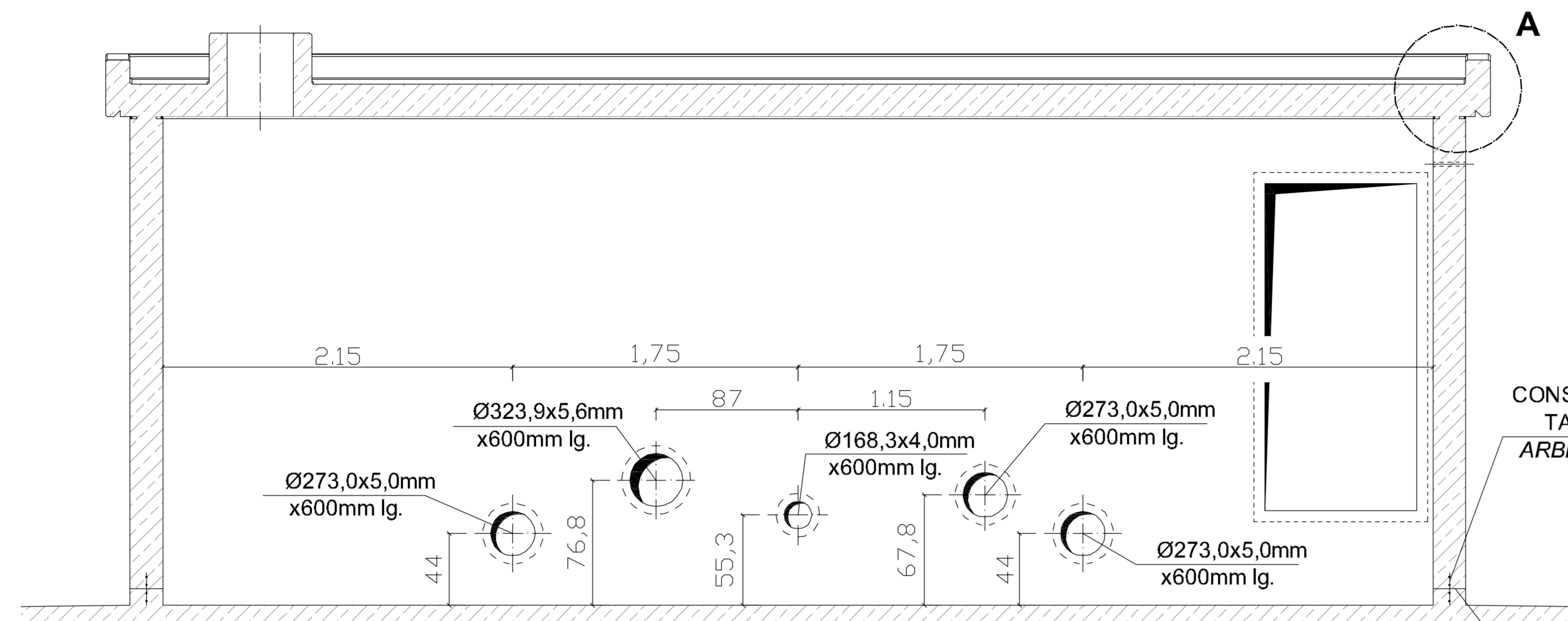
**PERTINENT DRAWINGS**  
**ZUGEHÖRIGE ZEICHNUNGEN**

- C-3.2.1 GENERAL PLAN - DETAILS  
ÜBERSICHTSPLAN - DETAILS
- C-3.5 FORMWORK PLAN, PUMP HOUSE, ROOF AND WALLS  
SCHALPLAN, PUMPENHAUS, DECKE UND WÄNDE
- E-3.1 GROUNDING - AND LIGHTNING PROTECTION PLAN  
ERDUNGS - UND BLITZSCHUTZPLAN
- E-3.2 ELECTRICAL INSTALLATION, PUMP HOUSE AND LEAKAGE CONTROL PIT  
ELEKTROTECHNISCHE INSTALLATION, PUMPENHAUS UND LECKKONTROLLSCHACHT

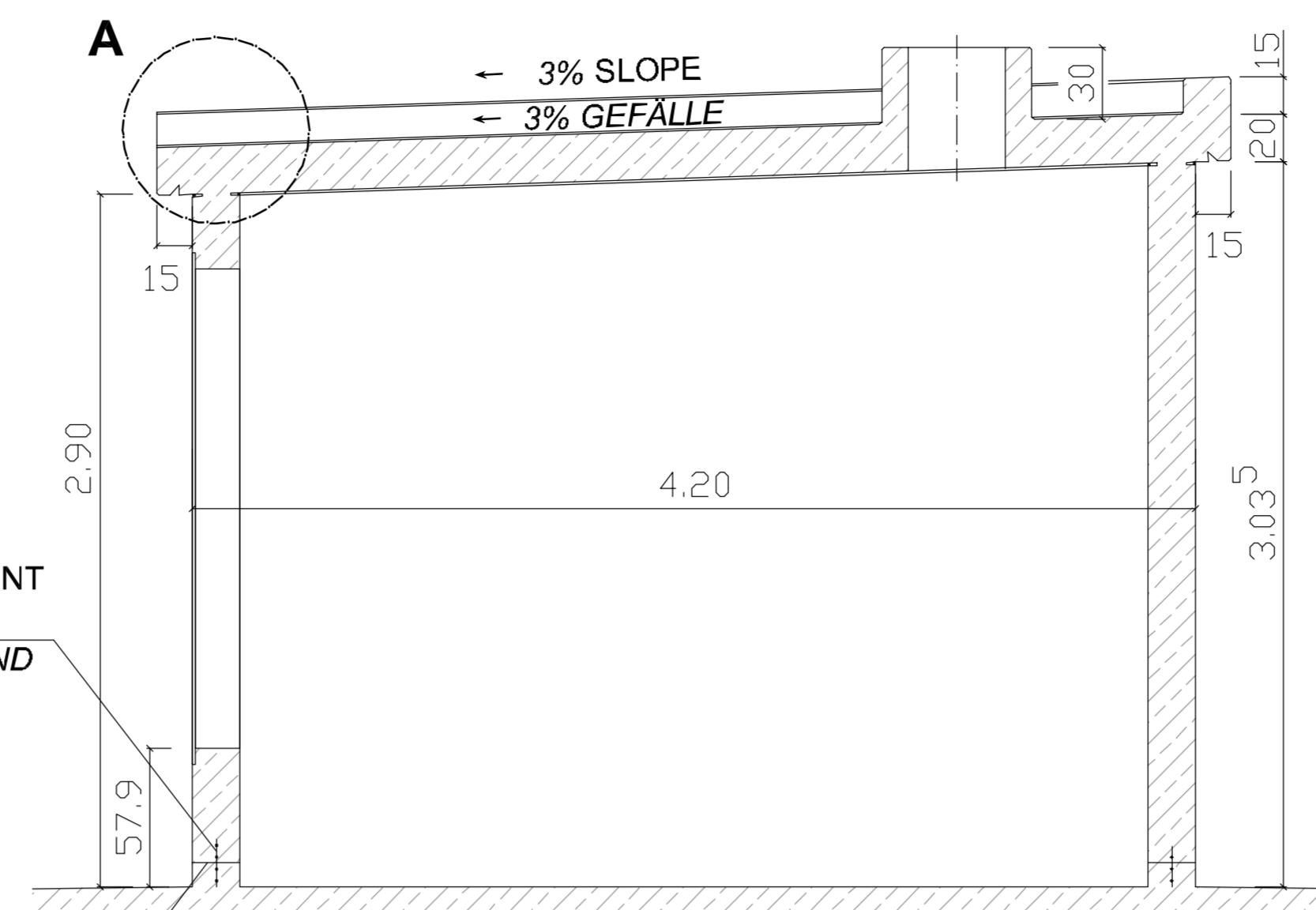
REVISION	DATE	DESCRIPTION	BY	COUNTRY
ÄNDERUNG	DATUM	BESCHREIBUNG	VON	LAND
<b>HEADQUARTERS</b>				
UNITED STATES AIR FORCES EUROPE				
ENGINEERING & OPERATIONS				
AIRFIELD STANDARD DESIGN US			FLUGPLATZ STANDARDPLANUNG US	
JET FUEL STORAGE AND DISPENSING SYSTEMS			FLUGKRAFTSTOFF - VERSORGENGSANLAGEN	
<b>OPERATING TANK 1250m<sup>3</sup></b> <b>FLACHBODENTANK 1250m<sup>3</sup></b>				
<b>CONSTRUCTION PLAN, PUMP HOUSE</b> <b>BAUKONSTRUKTIONSPLAN, PUMPENHAUS</b>				
WORKED/BEARBEITET		PREPARED/ANGEGESTELLT	APPROVED/GENEHIGT	
LANDSCHAFTLICHE VERBUNDENHEIT UND BAUBESTIMMUNG LVA-WERKZEUGLEISTUNG		L B B		AMT FÜR BUNDESBAU WALLSTR.1 55122 MAINZ
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAUASSAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED/GENEHIGT	DATE/DATUM	6. MAI 2015	SCALE/MASSSTAB	1:20 / 1:5
ORIGINAL DRAWN BY/IN ORIGINAL DED.	STANDARD SHEET/STANDARD PLAN			C - 3.4
CONSTRUCTION PROJECT/BAUASSAHME	SHEET NO./BLATT-NR.			OF/ VON



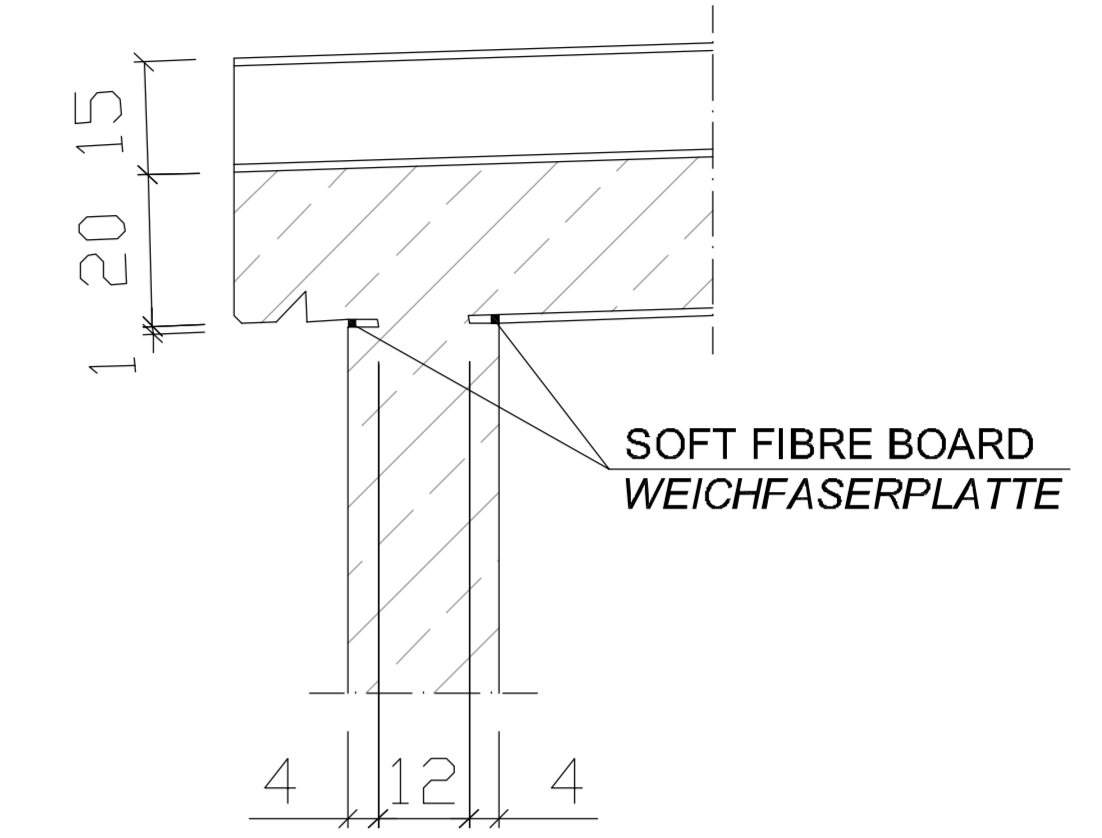
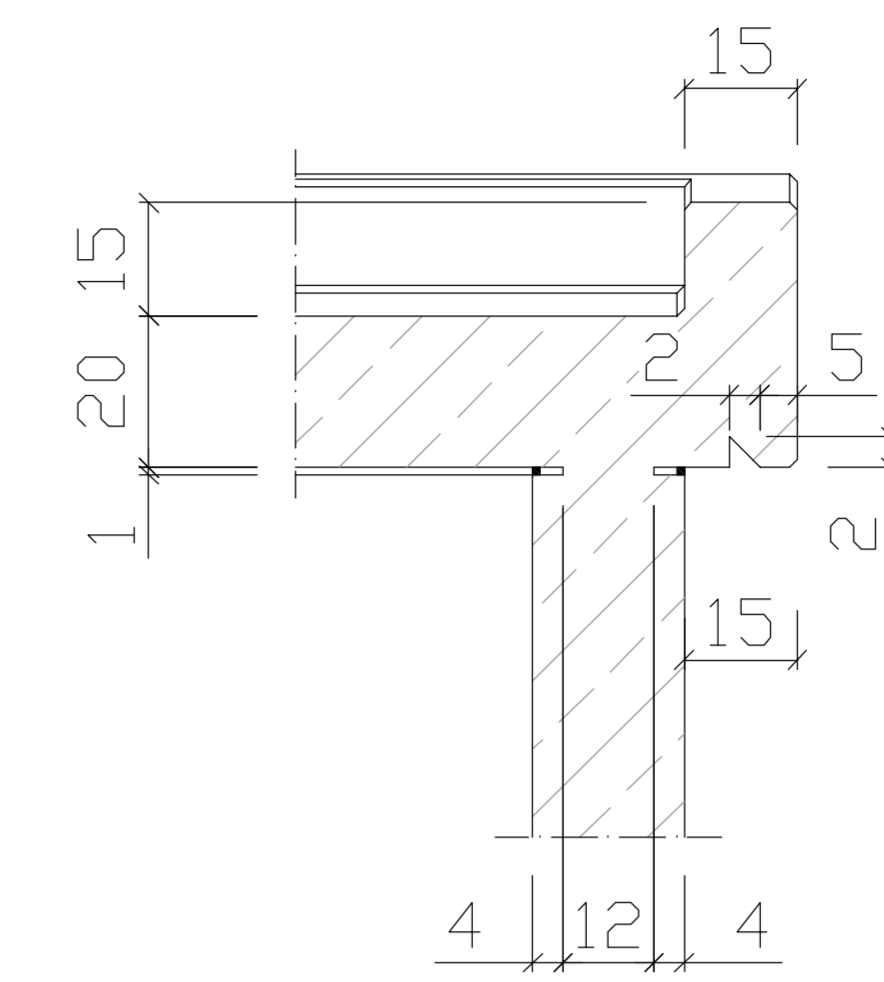
**SECTION A - A**  
**SCHNITT A - A**



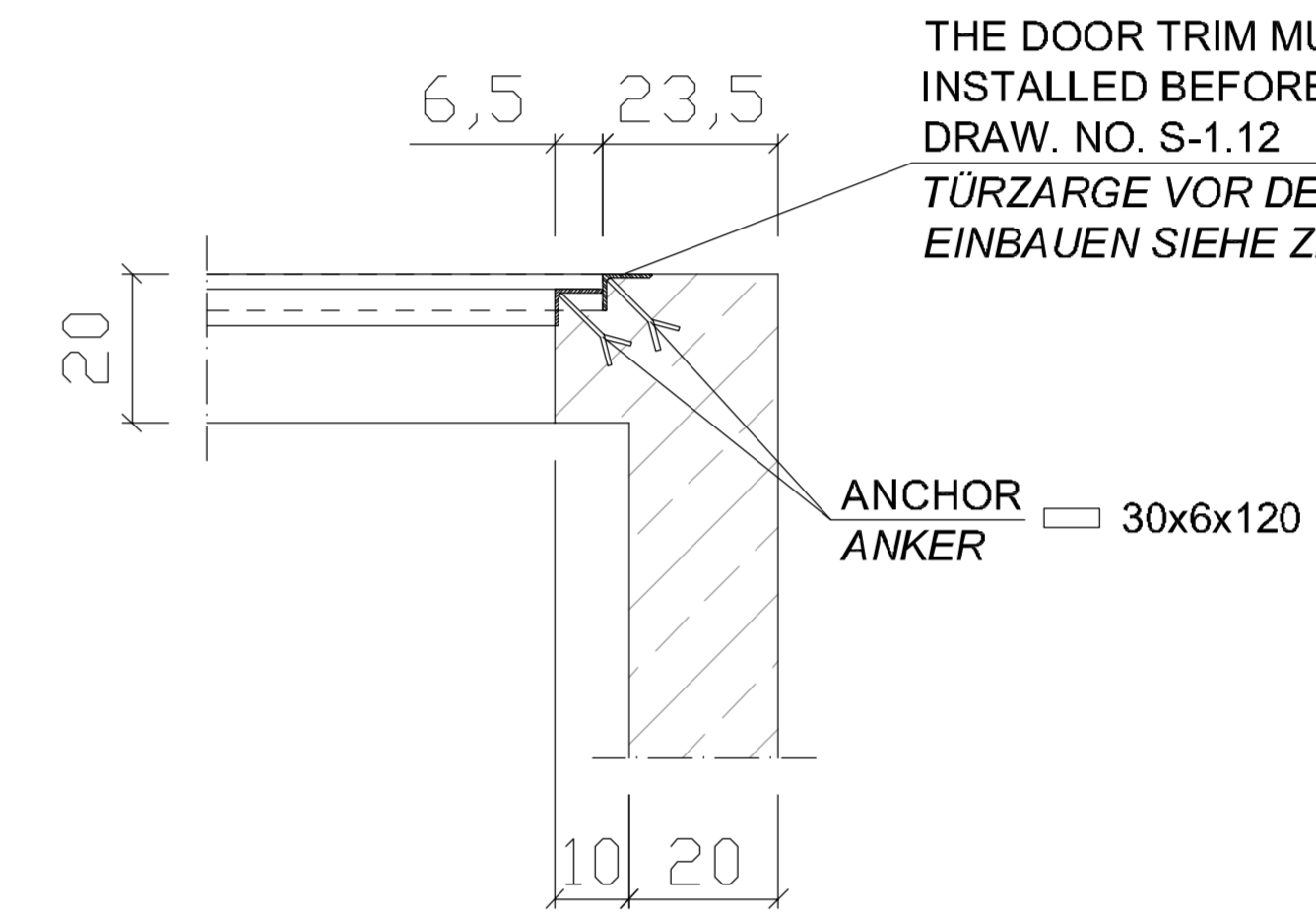
**SECTION C - C**  
**SCHNITT C - C**



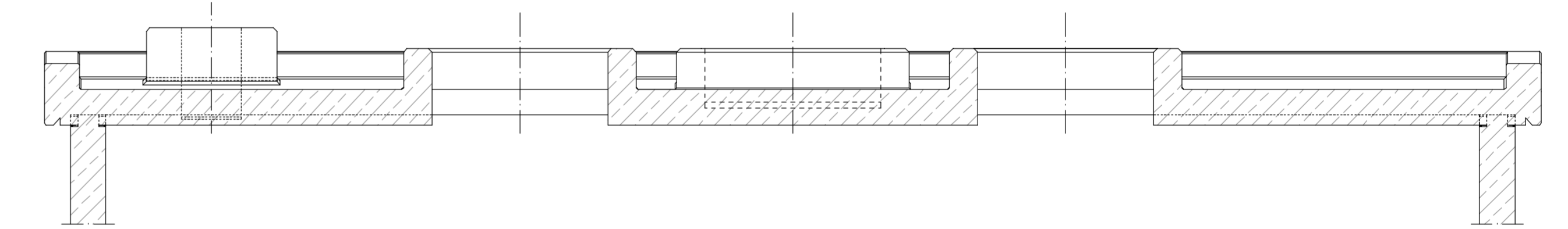
**DETAIL A**  
**SCALE 1:10**  
**MASSTAB 1:10**



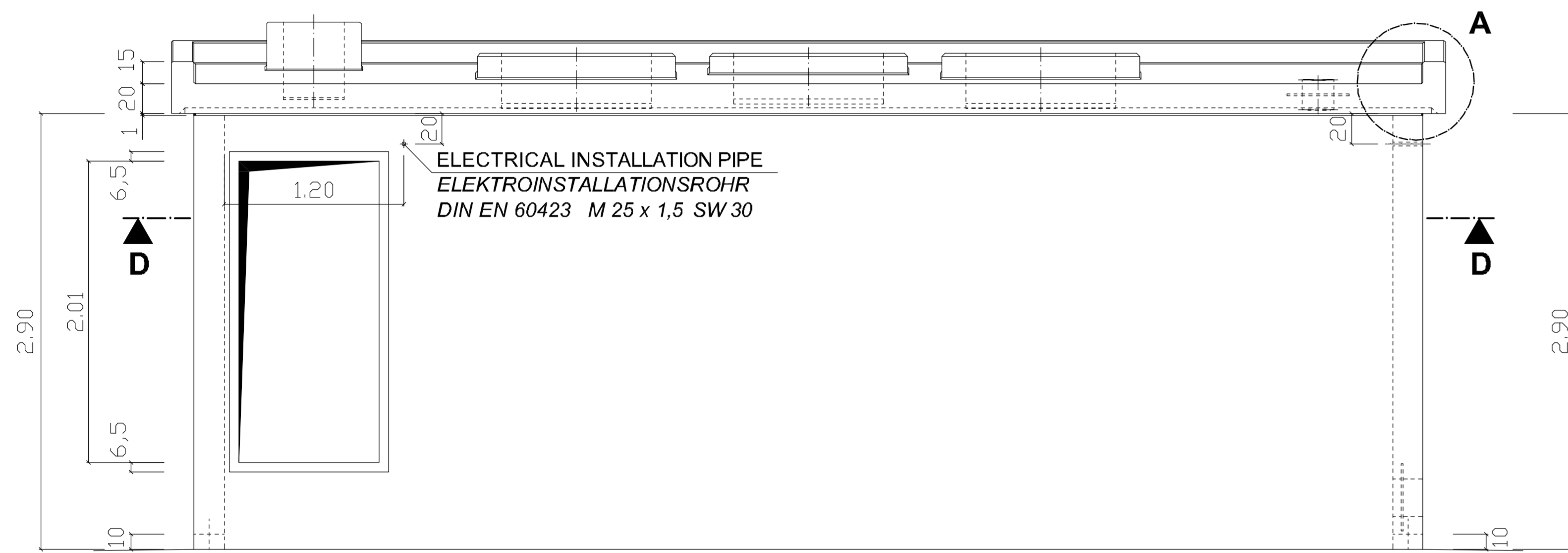
**DETAIL B**  
**SCALE 1:10**  
**MASSTAB 1:10**



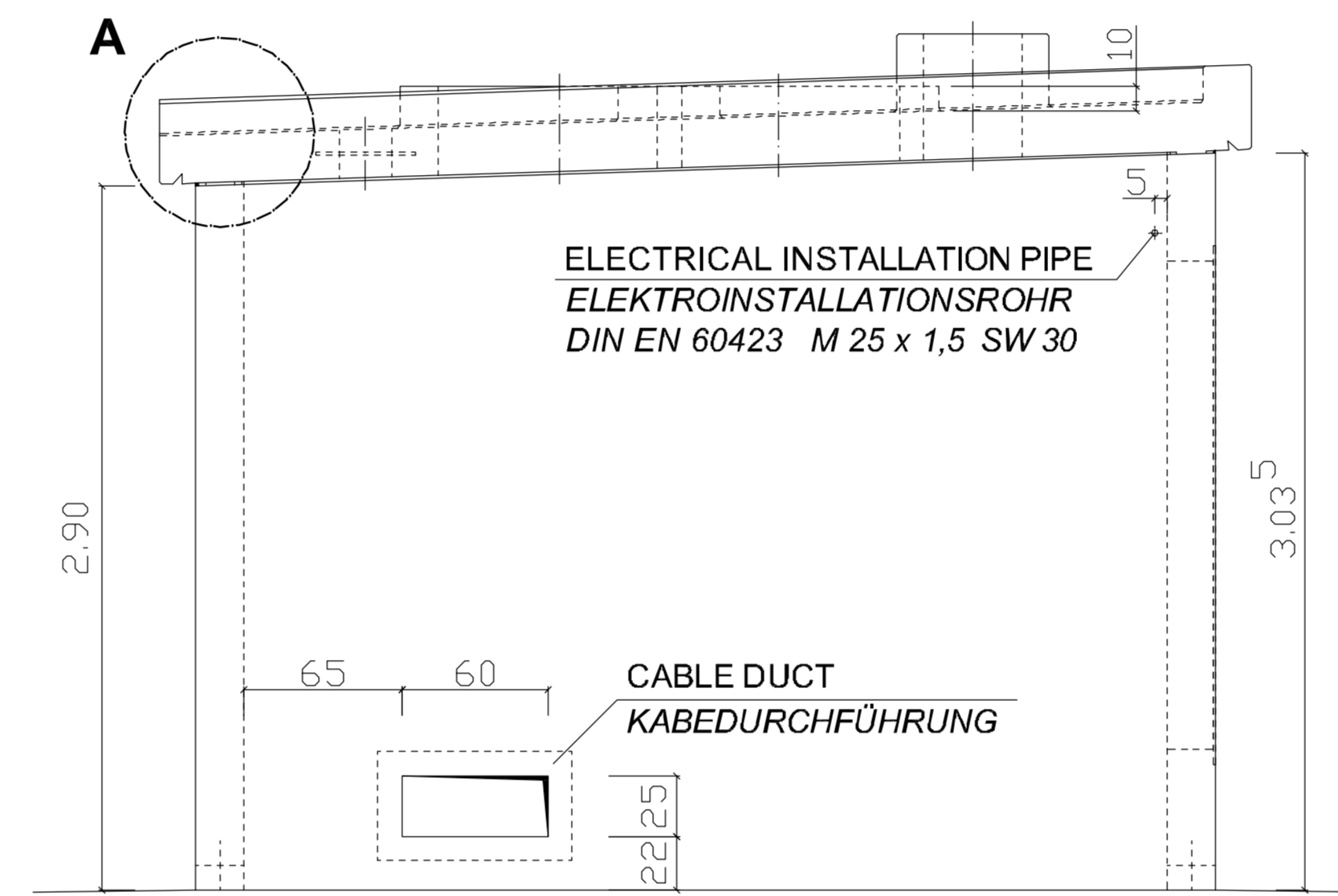
**SECTION B - B**  
**SCHNITT B - B**



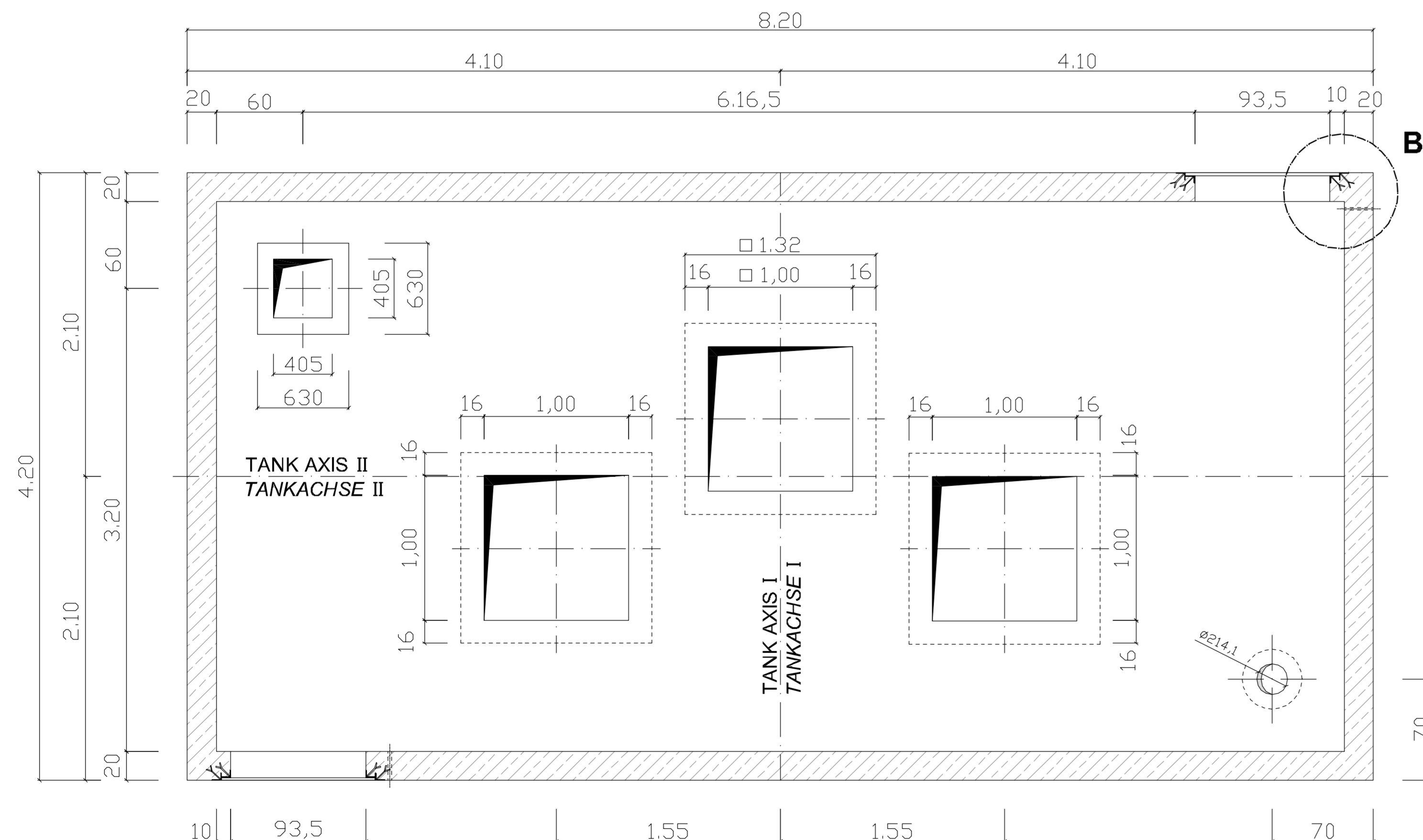
**VIEW Z**  
**ANSICHT Z**



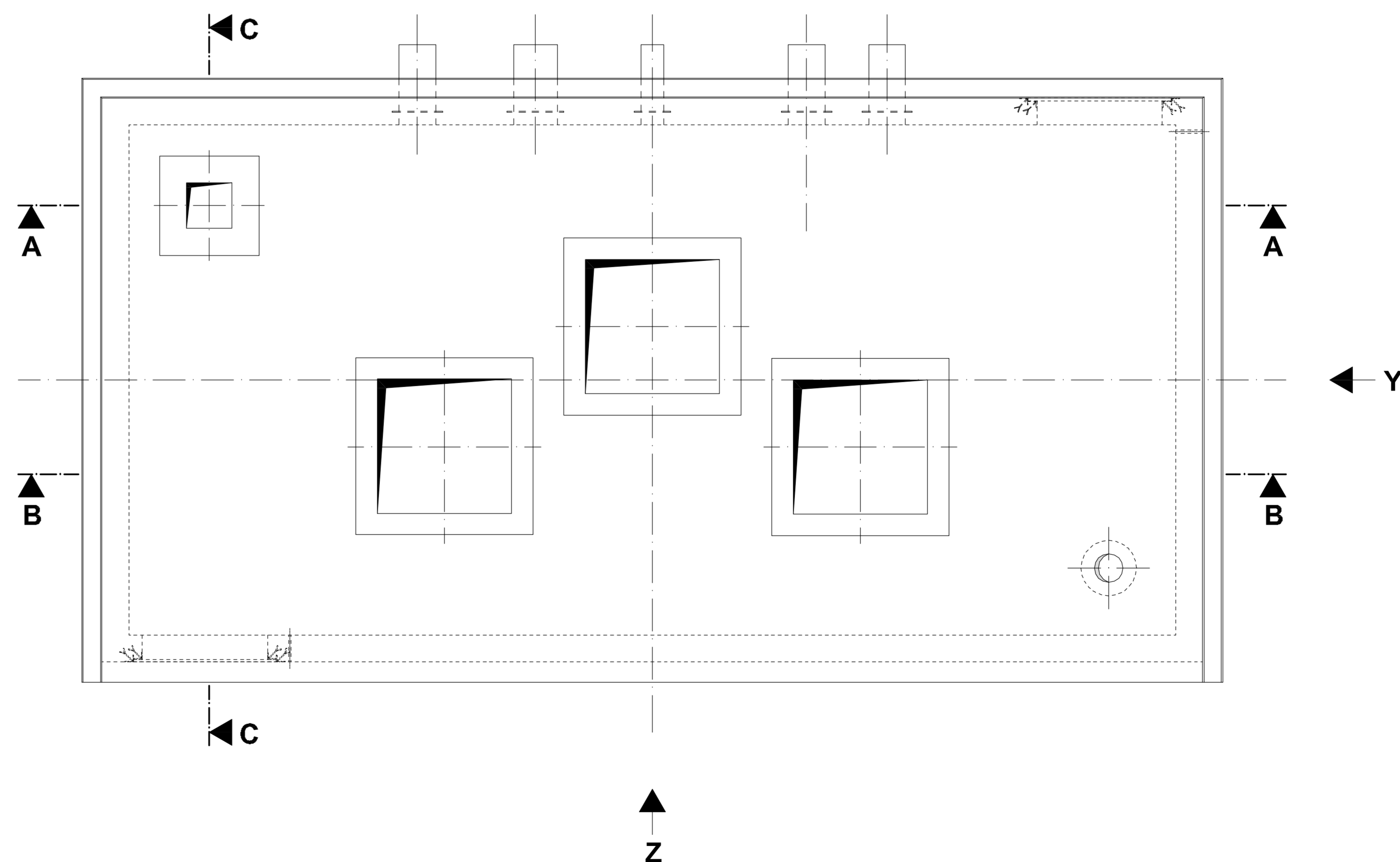
**VIEW Y**  
**ANSICHT Y**



**SECTION D - D**  
**SCHNITT D - D**



**TOP VIEW**  
**DRAUFSICHT**



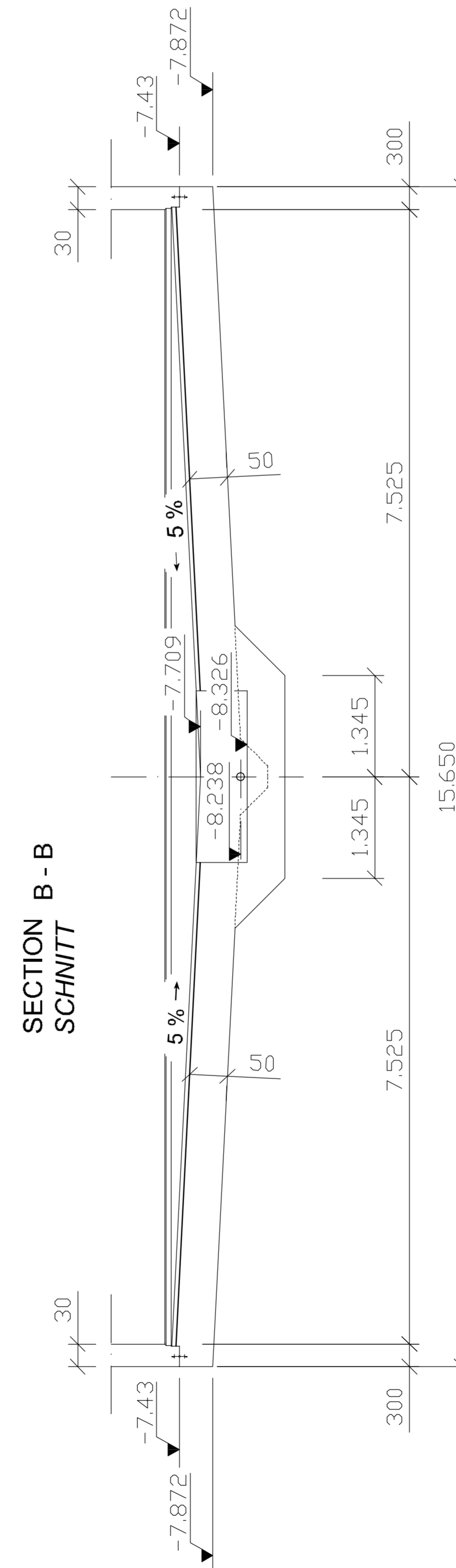
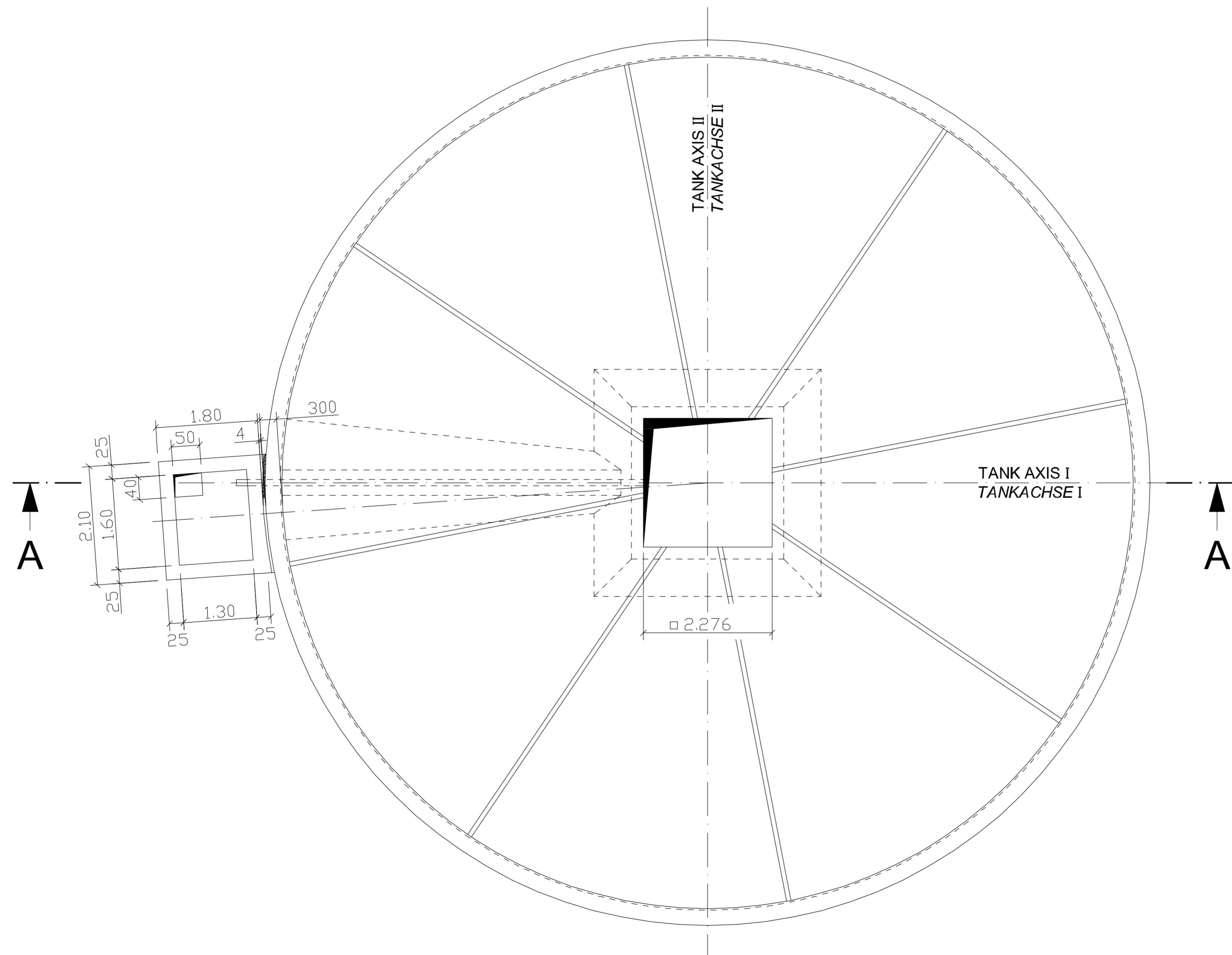
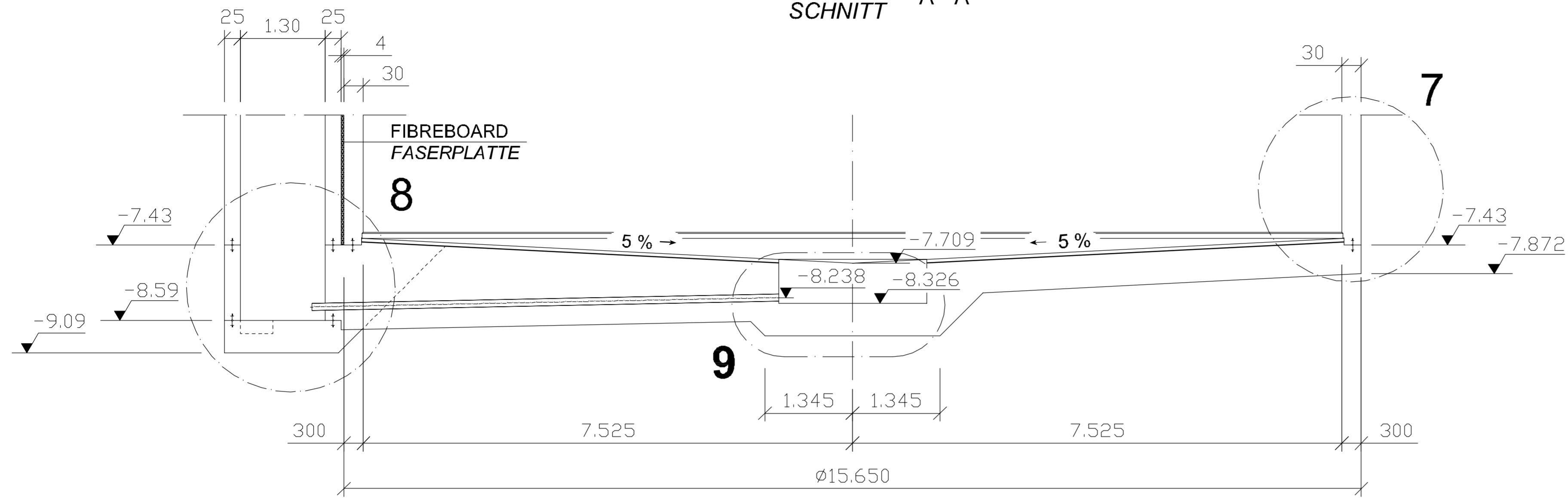
**PERTINENT DRAWINGS**  
**ZUGEHÖRIGE ZEICHNUNGEN**

- C-3.4 CONSTRUCTION PLAN PUMP HOUSE  
BAUKONSTRUKTIONSPLAN, PUMPENHAUS
- C-3.12 TANK STAIRS AND SPLINTER PROTECTION DOOR  
TANKTREPPE UND SPLITTERSCHUTZTÜR

REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
<b>HEADQUARTERS</b> UNITED STATES AIR FORCES EUROPE ENGINEERING & OPERATIONS				
AIRFIELD STANDARD DESIGN US JET FUEL STORAGE AND DISPENSING SYSTEMS		FLUGPLATZ STANDARDPLANUNG US FLUGKRAFTSTOFF - VERSORGSANLAGEN		
<b>BUILDING</b> OPERATING TANK 1250m <sup>3</sup> FLACHBODENTANK 1250m <sup>3</sup>				
<b>DESIGNATOR</b> FORMWORK PLAN, PUMP HOUSE, ROOF AND WALLS SCHALPLAN, PUMPENHAUS, DECKE UND WÄNDE				
<b>WORKED/BEARBEITET</b> LANDBAU- UND BAUWERKE LANDBAU- UND BAUWERKE LANDBAU- UND BAUWERKE LANDBAU- UND BAUWERKE		<b>APPROVED/GENEHMIGT</b> AMT FÜR BUNDESBAU WALLSTR. 1 55122 MAINZ		
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAUWISSEN IN EUROPA (AUSSER DEUTSCHLAND)				
<b>APPROVED</b> GENEHMIGT		<b>DATE</b> DATUM 6. MAI 2015		<b>SCALE</b> MASSTAB 1:10 ; 1:25
<b>ORIGINAL DRAWN BY</b> IN ORIGINAL DED.		<b>ORIGINAL DRAWN BY</b> IN ORIGINAL DED.		<b>STANDARD SHEET</b> STANDARD PLAN
<b>CONSTRUCTION PROJECT</b> BAUWISSEN		<b>CONSTRUCTION PROJECT</b> BAUWISSEN		<b>SHEET NO.</b> PLATZ NR. C - 3.5



SECTION A - A  
SCHNITT A - A

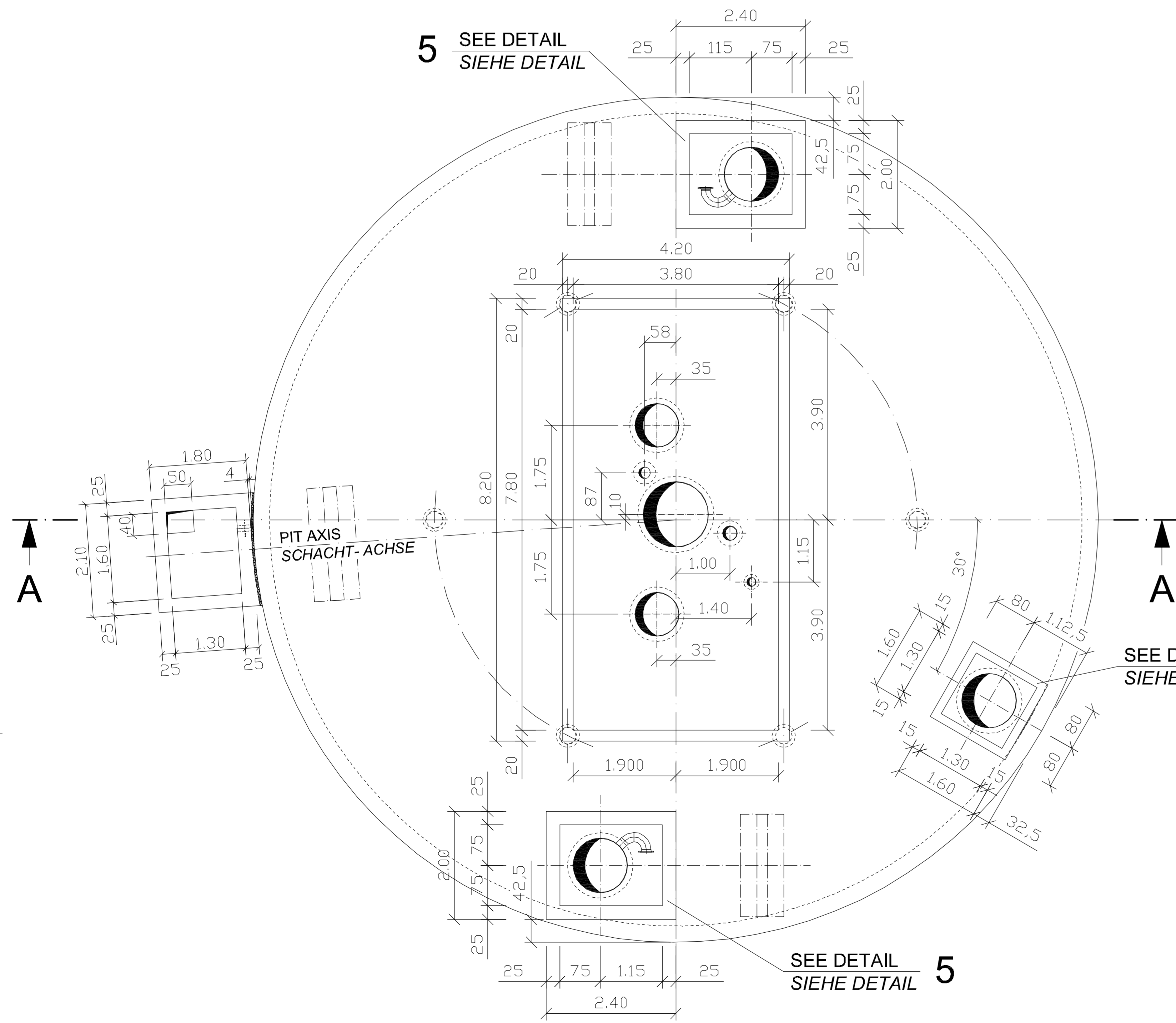
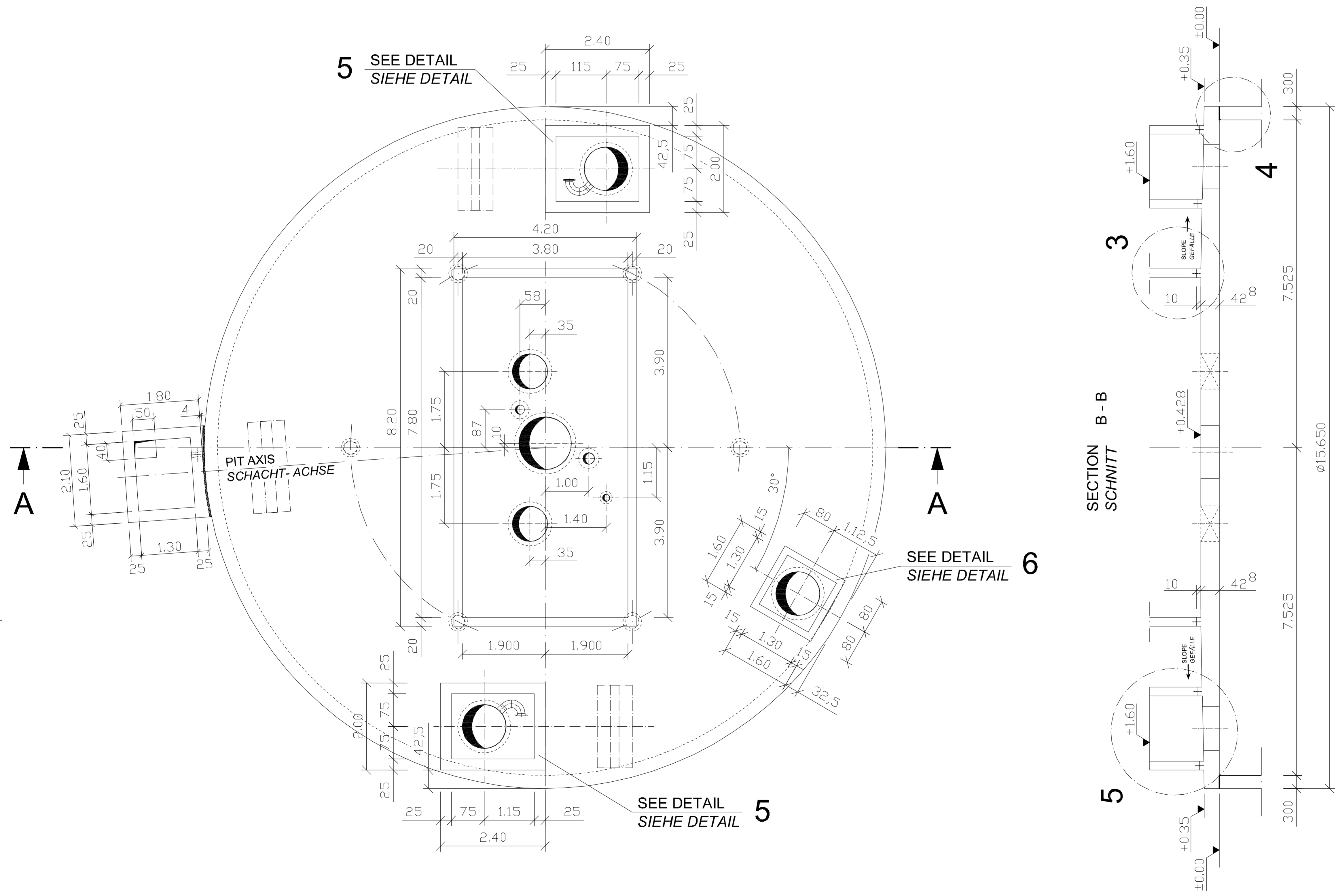
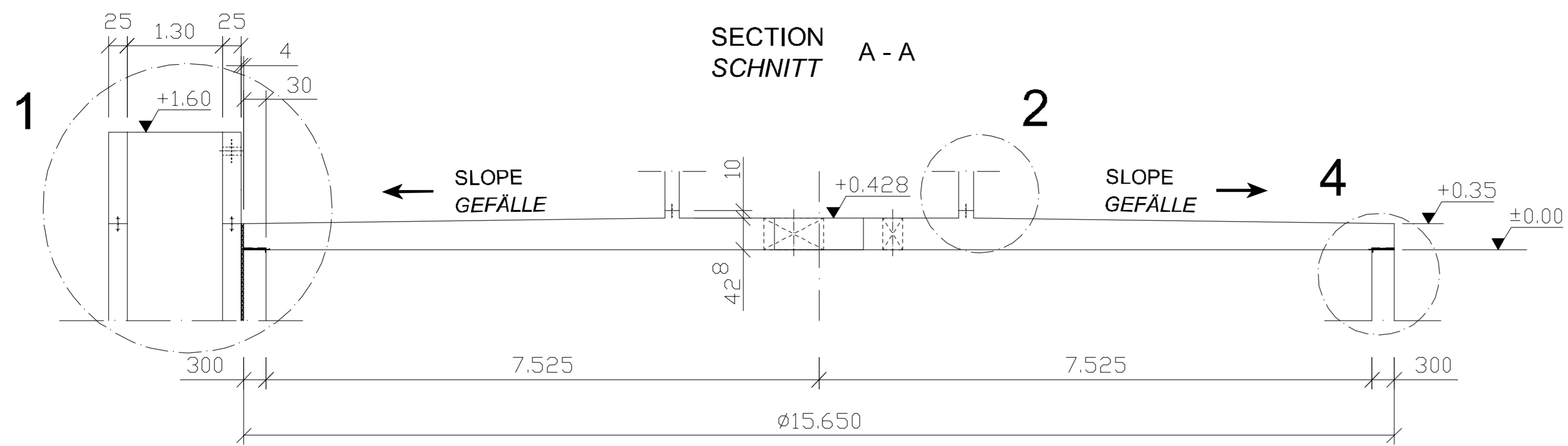


PERTINENT DRAWINGS  
ZUGEHÖRIGE ZEICHNUNGEN

C-3.8 FORMWORK PLAN, DETAILS ROOF - AND FLOOR SLAB  
SCHALPLAN, DETAILS DECKEN - UND BODENPLATTE

REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
<b>HEADQUARTERS</b> <b>UNITED STATES AIR FORCES EUROPE</b> <b>ENGINEERING &amp; OPERATIONS</b>				
<b>AIRFIELD STANDARD DESIGN US</b> <b>JET FUEL STORAGE AND DISPENSING SYSTEMS</b>		<b>FLUGPLATZ STANDARDPLANUNG US</b> <b>FLUGKRAFTSTOFF - VERSORGUNGSANLAGEN</b>		
<b>BUILDING BAUWERK</b> <b>OPERATING TANK 1250m<sup>3</sup></b> <b>FLACHBODENTANK 1250m<sup>3</sup></b>				
<b>DESIGNATION BEZEICHNUNG</b> <b>FORMWORK PLAN. FLOOR SLAB AND WALL</b> <b>SCHALPLAN, BODENPLATTE UND WAND</b>				
<b>WORKED/BEARBEITET</b>		<b>PREPARED/AUFGESTELLT</b> LANDBEWEHRTEB LIEGENSCHAFTS- UND BAUBETRIEBUNG LBB-WIEDERLEASUNG LANDAU L B B ANSCHLUSST: UNTERTORPLATZ 1, 76229 LANDAU TELEFON: (06341) 912-276 TELEFAX: (06341) 912-291 LANDAU, BY PROXY / IM VERSTRETTUNG ORIGINAL SIGNED BY IM ORIGINAL GEZ. STEFAN KOTSCHENREUTHER		<b>APPROVED/GENEHMIGT</b> AMT FÜR BUNDESBAU WALLSTR.1 55122 MAINZ ORIGINAL SIGNED BY IM ORIGINAL GEZ. WERNING GATZ
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAUMASSNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
<b>APPROVED GENEHMIGT</b>		<b>DATE DATUM</b> 6. MAI 2015		<b>SCALE MASSSTAB</b> 1:50
ORIGINAL SIGNED BY IM ORIGINAL GEZ. GERALD SAND COMMAND FUEL FACILITIES ENGINEER HQ USAF - AFAPRGS / AFPO		STANDARD SHEET STANDARD PLAN		<b>C - 3.6</b>
<b>CONSTRUCTION PROJECT BAUMASSNAHME</b>			<b>SHEET-NO. PLAN-NR.</b> OF VON	





**PERTINENT DRAWINGS  
ZUGEHÖRIGE ZEICHNUNGEN**

C-3.8 FORMWORK PLAN, DETAILS ROOF - AND FLOOR SLAB  
SCHALPLAN, DETAILS DECKEN - UND BODENPLATTE

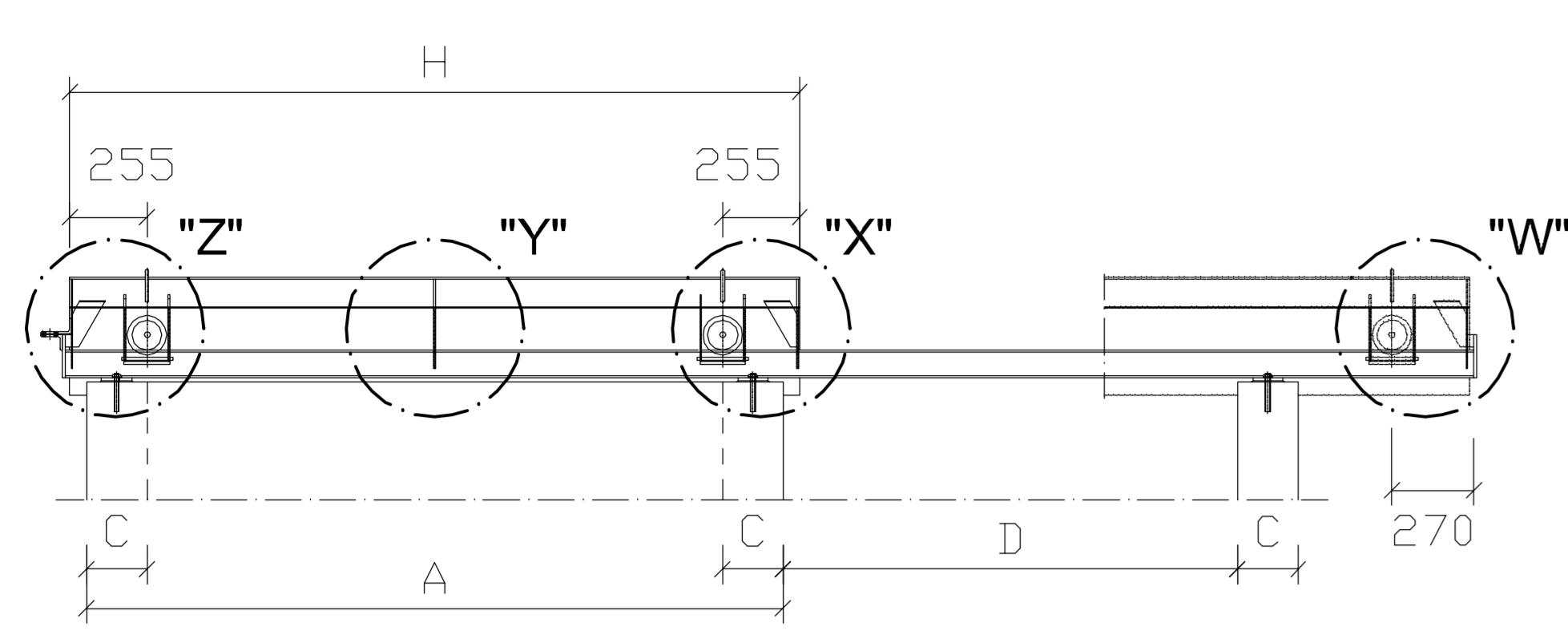
REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
<b>HEADQUARTERS</b> <b>UNITED STATES AIR FORCES EUROPE</b> <b>ENGINEERING &amp; OPERATIONS</b>				
<b>AIRFIELD STANDARD DESIGN US</b> <b>JET FUEL STORAGE AND DISPENSING SYSTEMS</b>		 <b>FLUGPLATZ STANDARDPLANUNG US</b> <b>FLUGKRAFTSTOFF - VERSORGENGSANLAGEN</b>		
<b>BUILDING BAUWERK</b> <b>OPERATING TANK 1250m<sup>3</sup></b> <b>FLACHBODENTANK 1250m<sup>3</sup></b>				
<b>DESIGNATION BEZEICHNUNG</b> <b>FORMWORK PLAN. ROOF SLAB</b> <b>SCHALPLAN, DECKENPLATTE</b>				
<b>WORKED/BEARBEITET</b>		<b>PREPARED/AUFGESTELLT</b> <small>LANDESBEREITER LIEGENSCHAFTS- UND BAUVERBUND          LBB-HEIDERLASSING LANDAU          ANSCHLUSSE: UNTERTORPLATZ 1, 76229 LANDAU          TELEFON: (06341) 912-276 TELEFAX: (06341) 912-291          LANDAU,          BY FRONK / IN VERSTRETLUNG          ORIGINAL SIGNED BY          IM ORIGINAL GEZ.          STEFAN KOTSCHENREUTHER</small>		<b>APPROVED/GENEHMIGT</b>  <b>AMT FÜR BUNDESBAU</b> <b>WALLSTR.1</b> <b>55122 MAINZ</b> <small>ORIGINAL SIGNED BY          IM ORIGINAL GEZ.          WERNING GÖTZ</small>
<small>INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY)          EINGEFÜHRT FÜR BAUMASSNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)</small>				
<b>APPROVED GENEHMIGT</b>		<b>DATE DATUM</b> 6. MAI 2015		<b>SCALE MASSSTAB</b> 1:50
<small>ORIGINAL SIGNED BY          IM ORIGINAL GEZ.</small>		<small>STANDARD SHEET          STANDARD PLAN</small>		<b>C - 3.7</b>
<small>GERALD SAND          COMMAND FUEL FACILITIES ENGINEER          HQ USAFE - AFAPANG / AFPO</small>		<small>CAD-project path:          CAD-Projektfrd:</small>		<small>SHEET-NO.          PLAN-NR.</small>
<b>CONSTRUCTION PROJECT BAUMASSNAHME</b>			<small>OF          VON</small>	



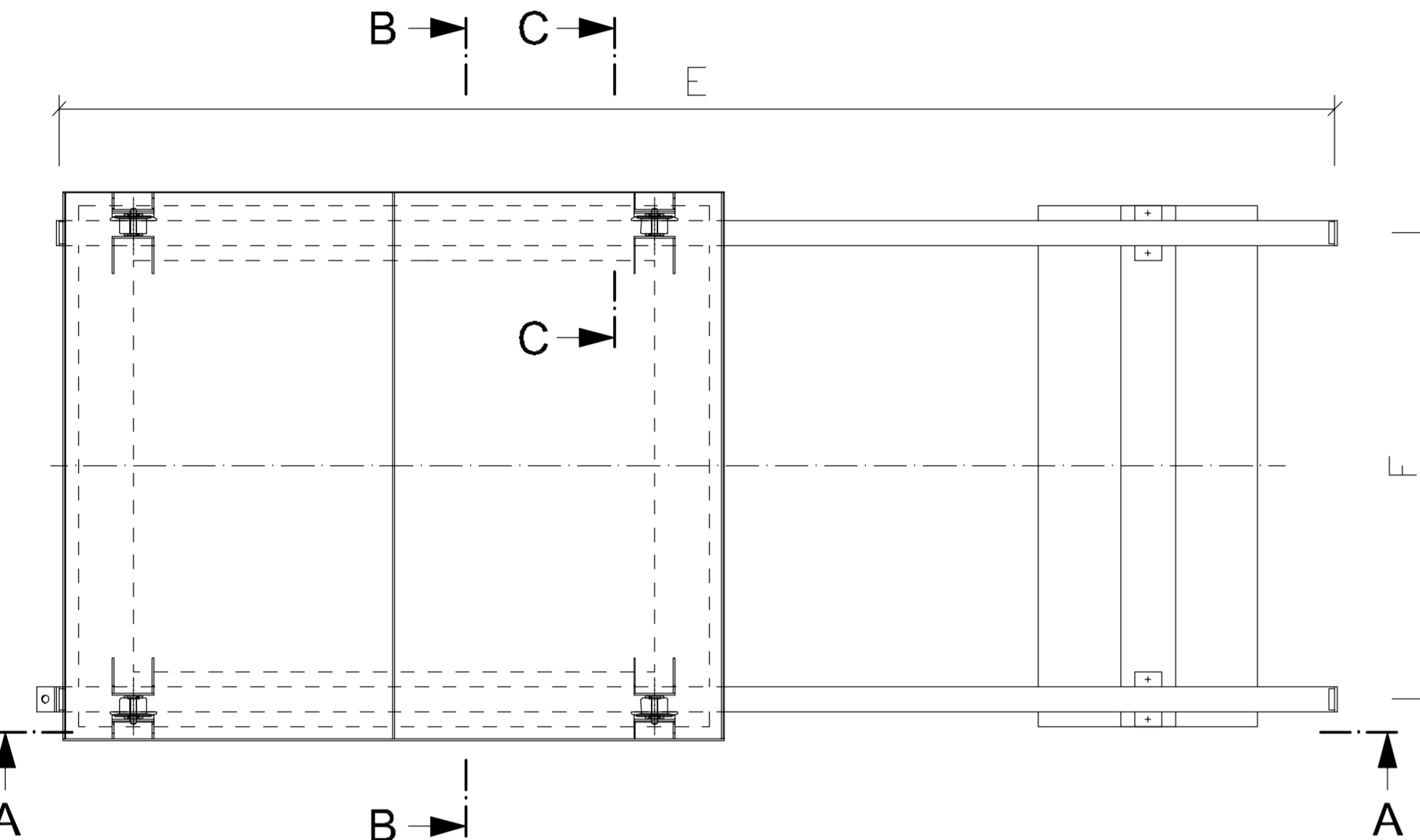




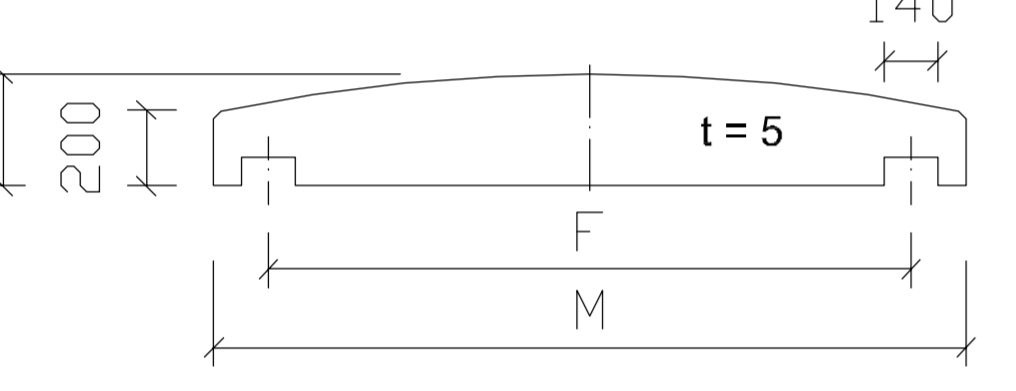
**SECTION A - A**  
**SCHNITT A - A**



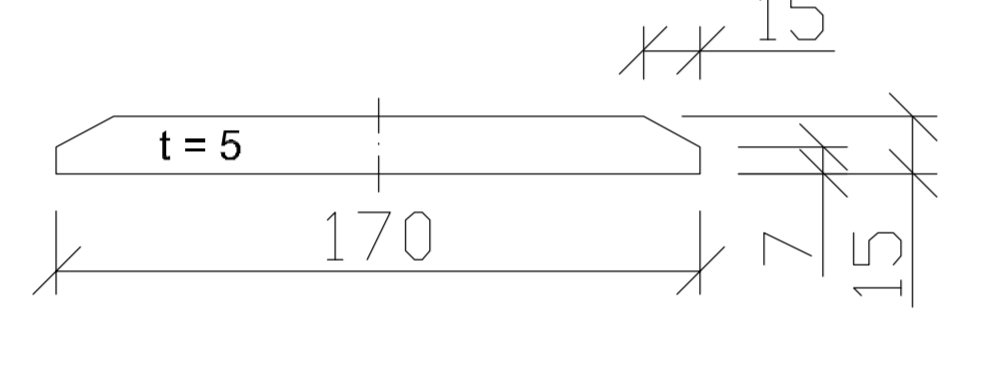
**TOP VIEW DRAUFSICHT**



**DETAIL "U"**  
GABLE PLATE AND CROSS BRACING  
STIRNBLECH UND QUERVERSTEIFUNG

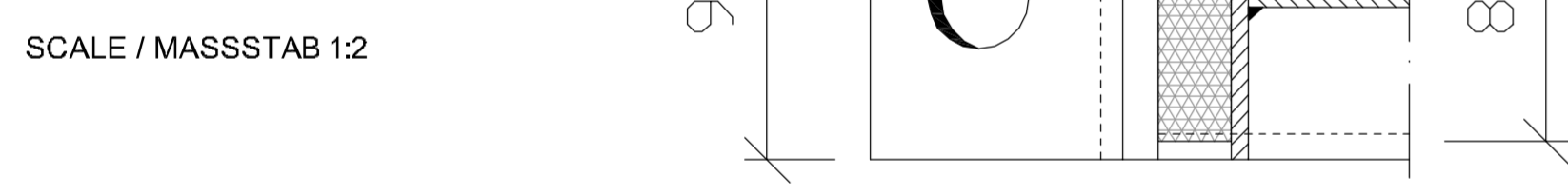


**DETAIL "V"**  
GUIDE RAIL FOR LIFT-OFF PROTECTION  
FÜHRUNGSSCHIEBE FÜR ABHEBESICHERUNG



LEAKAGE CONTROL PIT LECKKONTROLLSCHACHT	A	B	C	D	E	F	G	H	J	K (5%v.J)	L	M	N	P
MANHOLE MONTAGEÖFFNUNG	1800	2100	250	1380	3545	1850	150	1910	2200	110	310	2190	≈ 197	≈ 180
	2400	2000	250	1500	4800	1750	125	2510	2100	105	300	2090	≈ 192	≈ 175

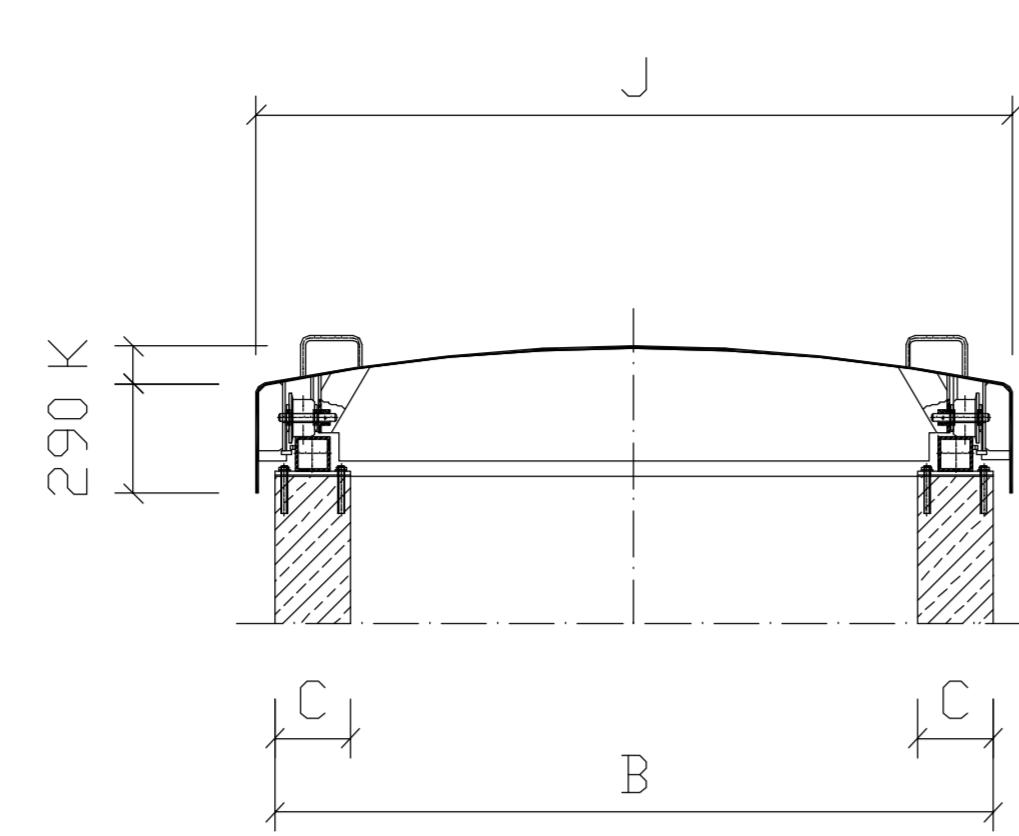
**SECTION D - D**  
**SCHNITT D - D**



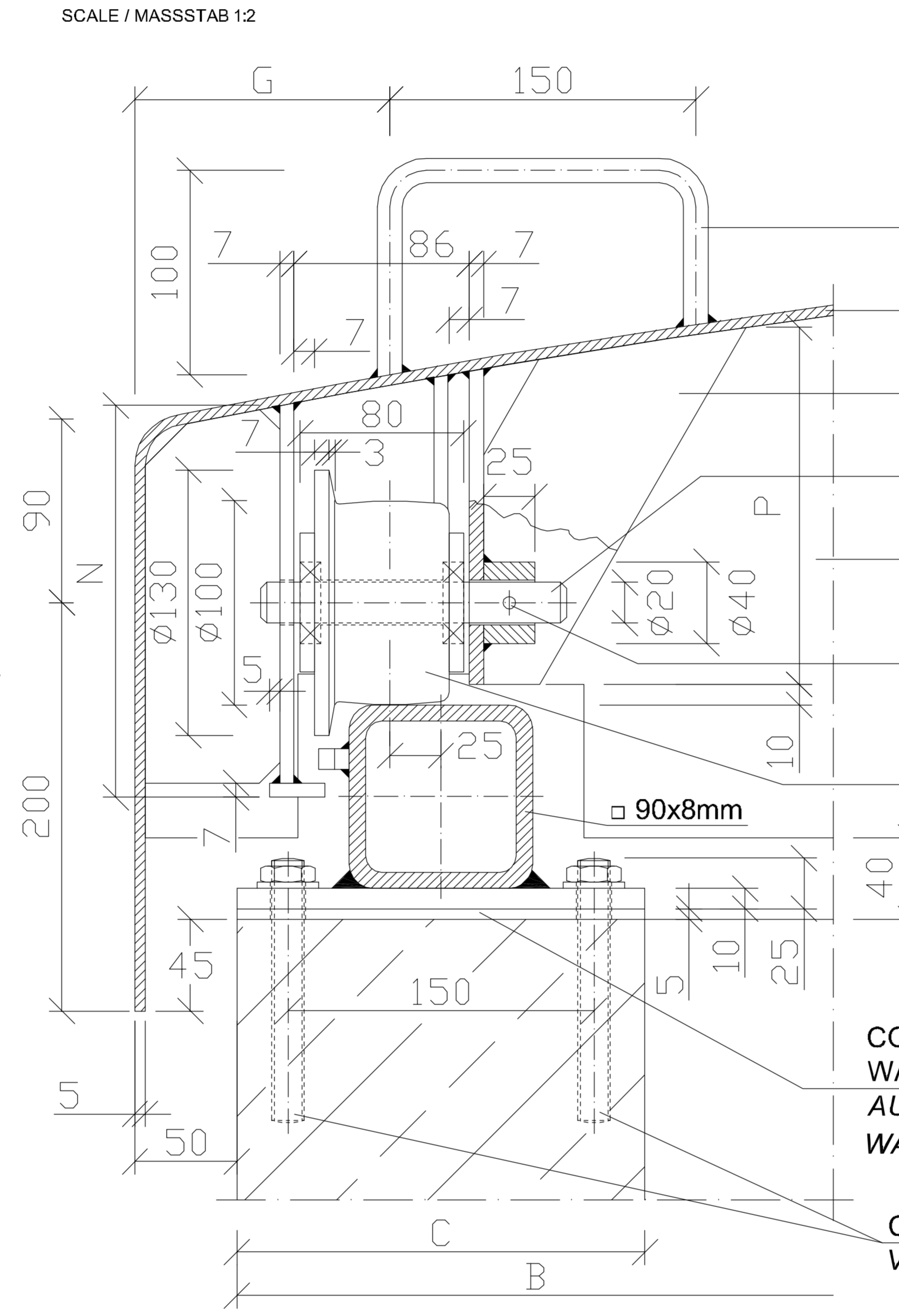
**DETAIL "Z"**  
INTERLOCKING, STOP AND CASTOR  
VERRIEGELUNG, ANSCHLAG UND LAUFROLLE

SCALE / MASSSTAB 1:2

**SECTION B - B**  
**SCHNITT B - B**



**SECTION C - C**  
**SCHNITT C - C**



- HANDLE Ø12mm  
HANDGRIFF
- COVER PLATE t = 5mm  
ABDECKBLECH
- CONNECTION PLATE t = 5mm  
KNOTENBLECH
- PIN Ø20x150mm  
BOLZEN
- GABLE PLATE t = 5mm  
STIRNBLECH
- SPRING TYPE STRAIGHT Ø6x40mm  
SPANNHÜLSE
- CASTOR WITH GROOVED BALL BEARING  
LAUFROLLE MIT RILLENKUGELLAGER
- COMPENSATION LAYER OF ARTIFICIAL OR WATER RESISTANT ARTIFICIAL RESIN MORTAR  
AUSGLEICHSSCHICHT AUS KUNSTHARZ ODER WASSERDICHEM KUNSTHARZMÖRTEL
- COMPOSITE DOWEL M10x130mm  
VERBUNDANKER

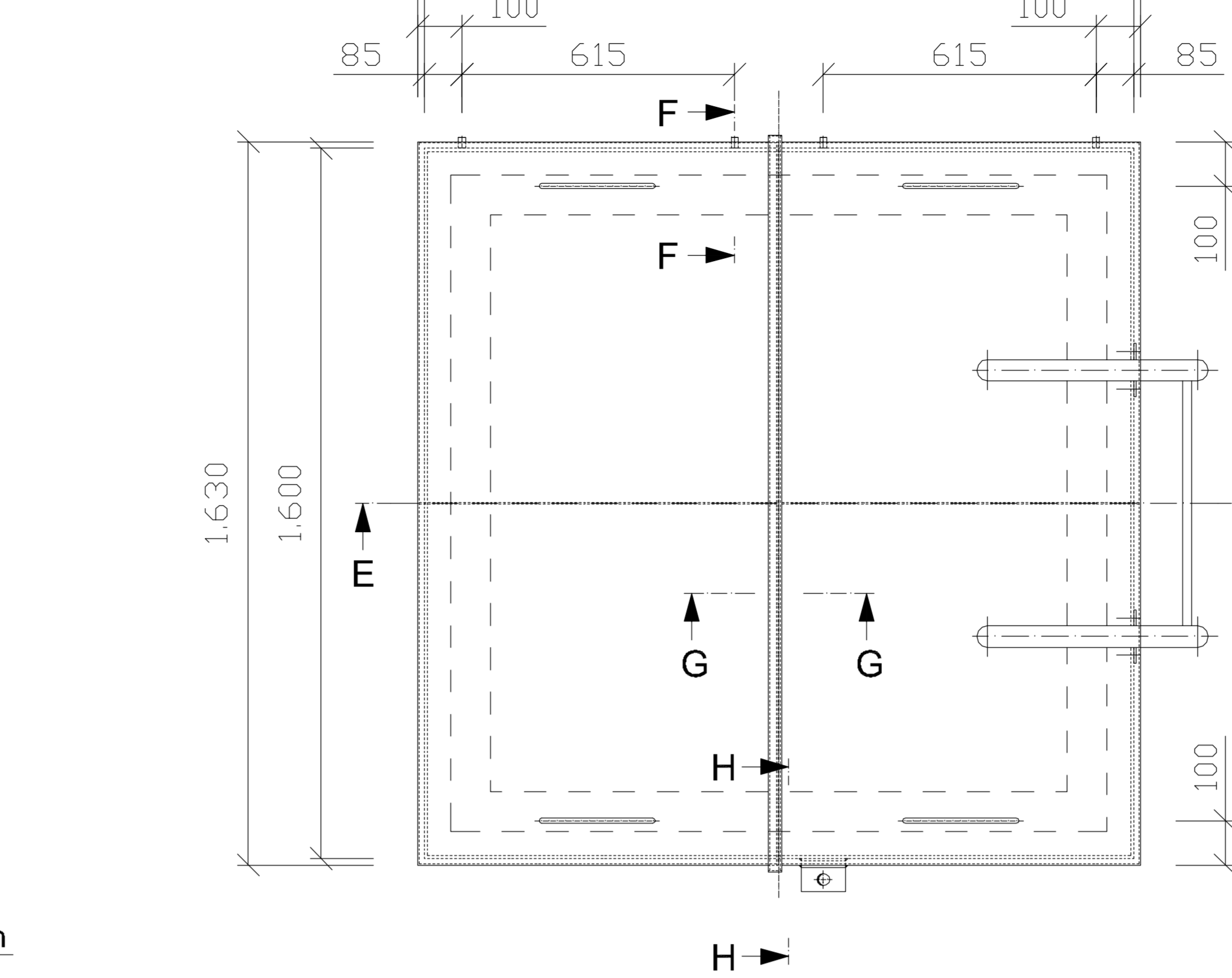
**DETAIL "Y"**  
CROSS BRACING  
QUERVERSTEIFUNG

SCALE / MASSSTAB 1:2

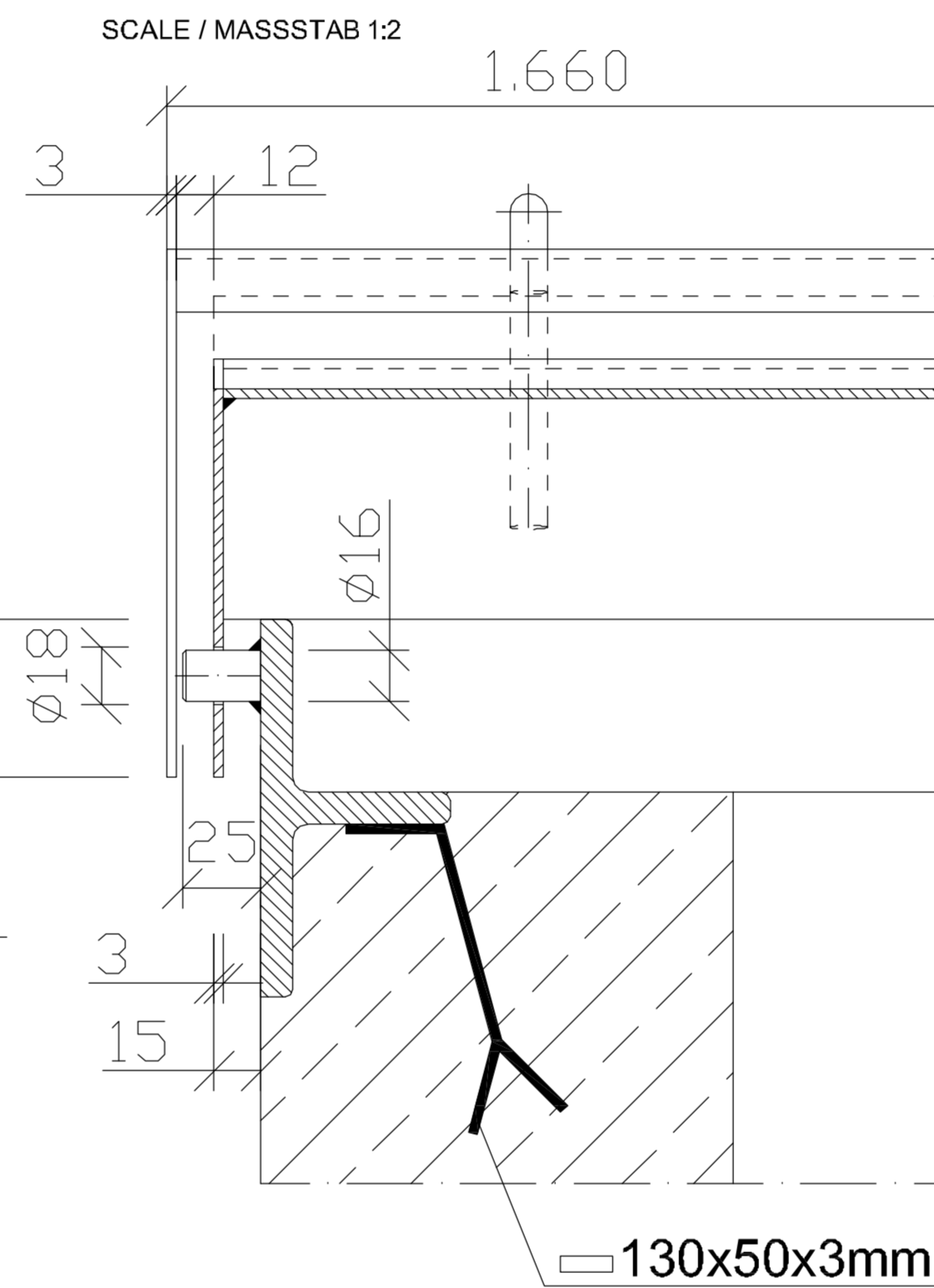
**DETAIL "X"**  
CASTOR AND RAIL HOLDING  
LAUFROLLE UND SCHIENENHALTERUNG

SCALE / MASSSTAB 1:2

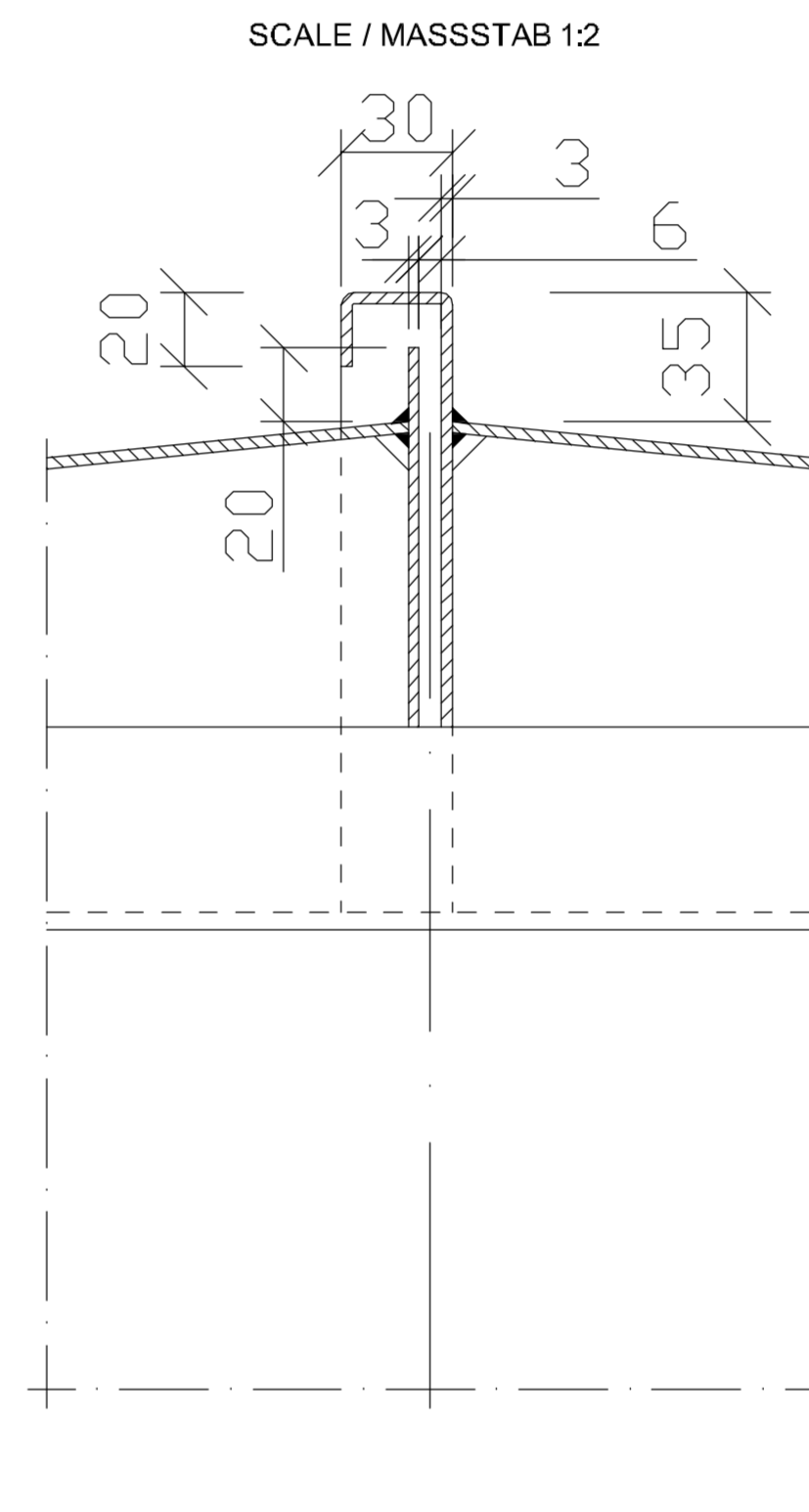
**TOP VIEW DRAUFSICHT**



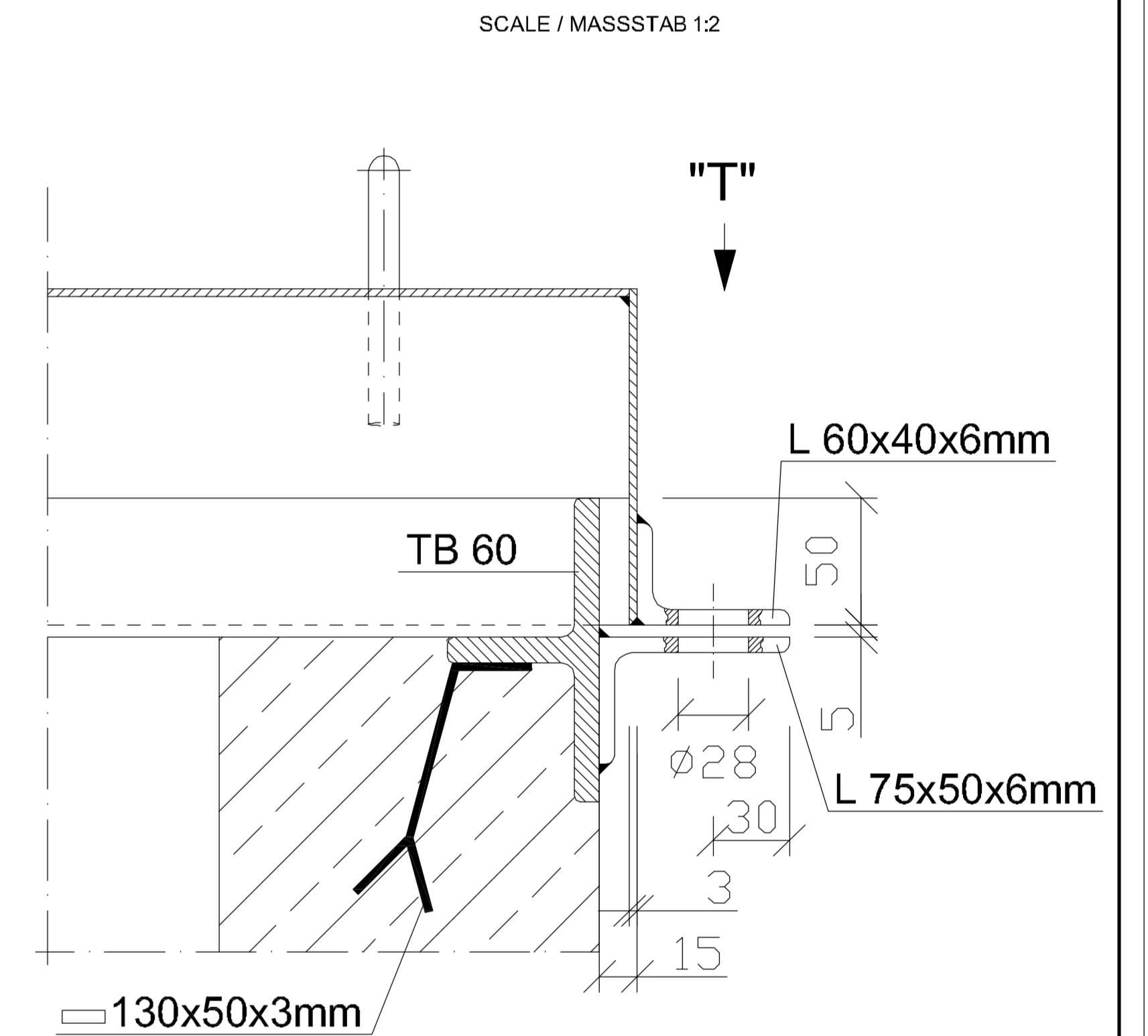
**SECTION F - F**  
**SCHNITT F - F**



**SECTION G - G**  
**SCHNITT G - G**

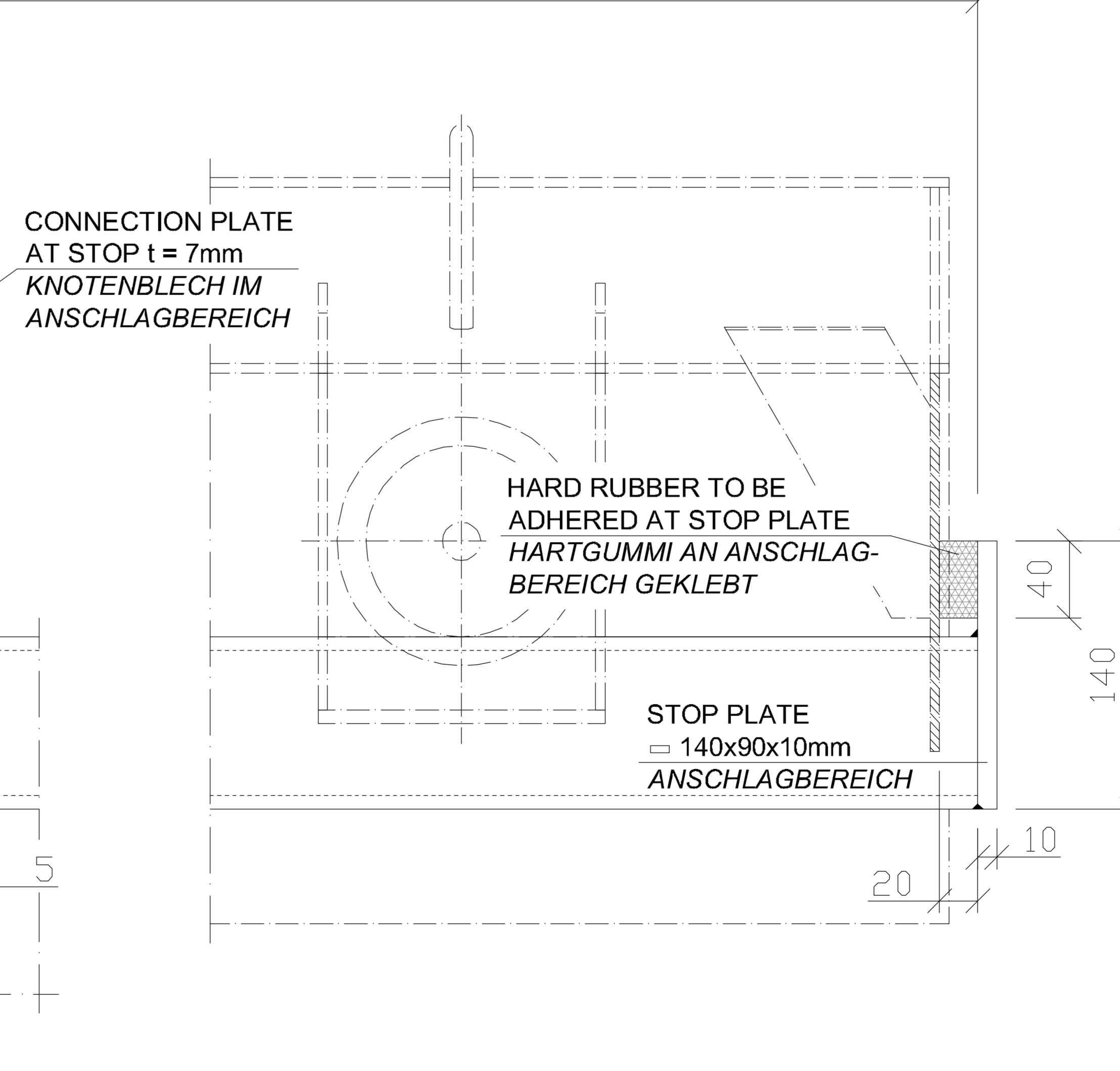
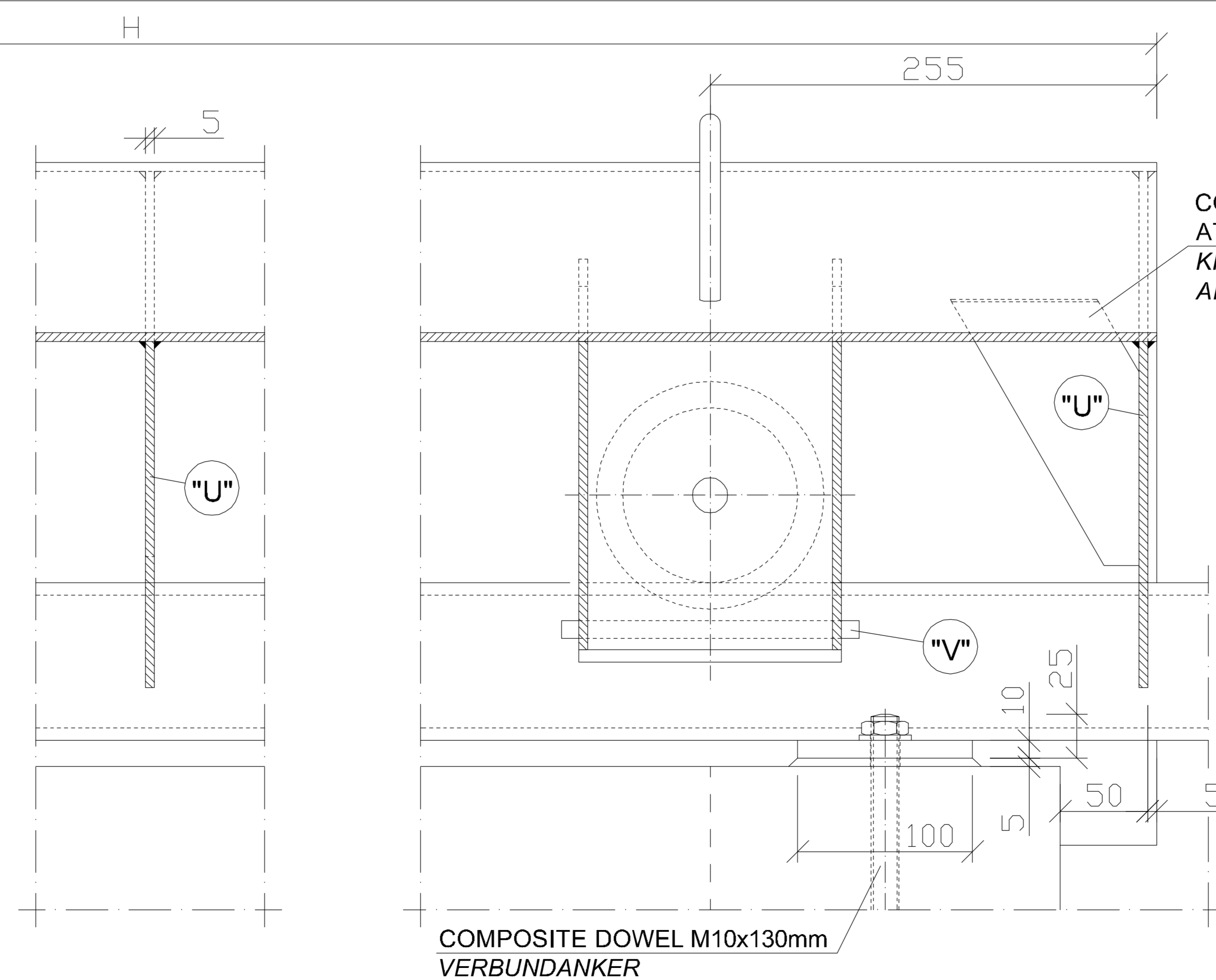
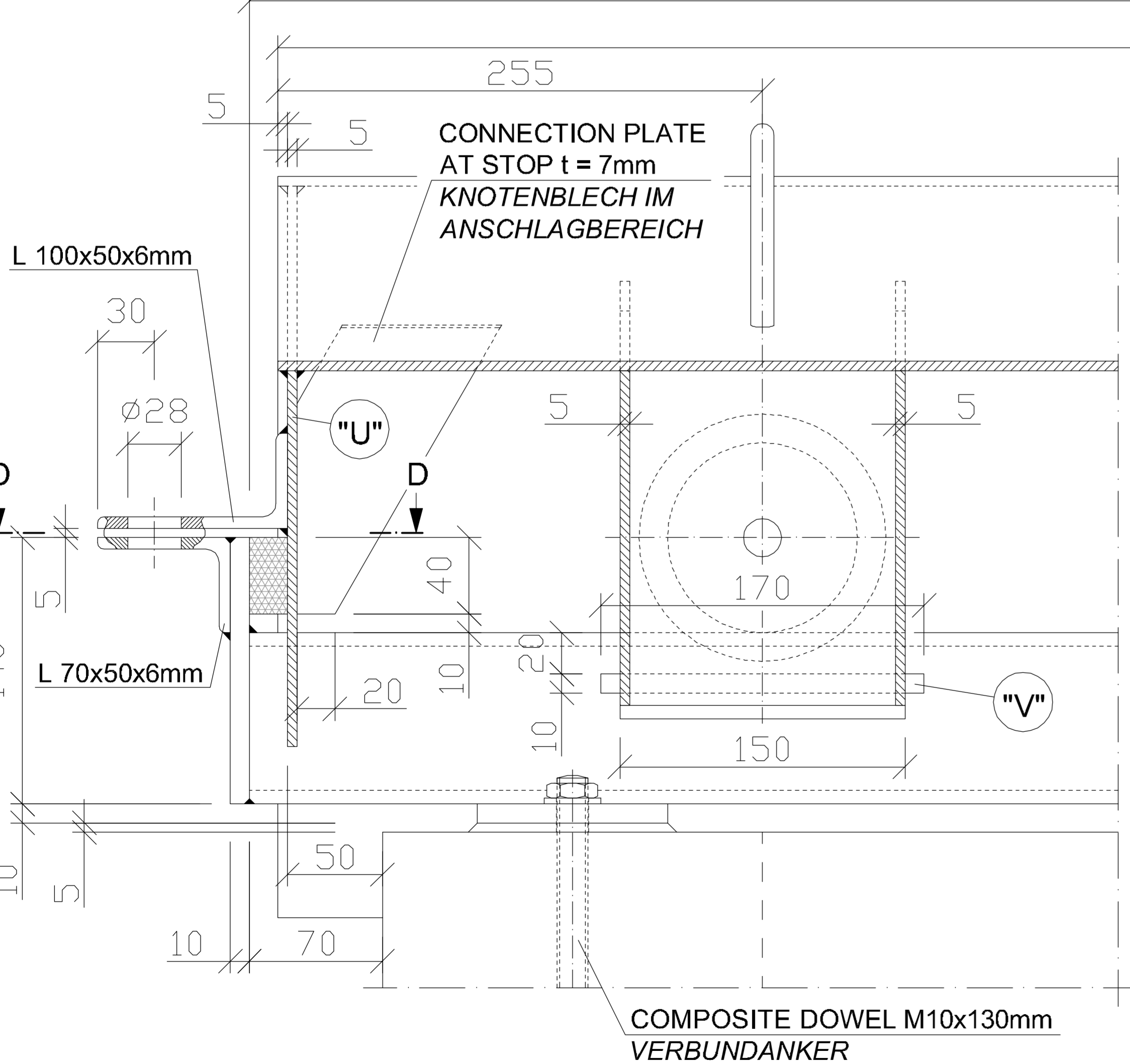


**SECTION H - H**  
**SCHNITT H - H**



**DETAIL "W"**  
STOP  
ANSCHLAG

SCALE / MASSSTAB 1:2



**PERTINENT DRAWINGS**  
ZUGEHÖRIGE ZEICHNUNGEN

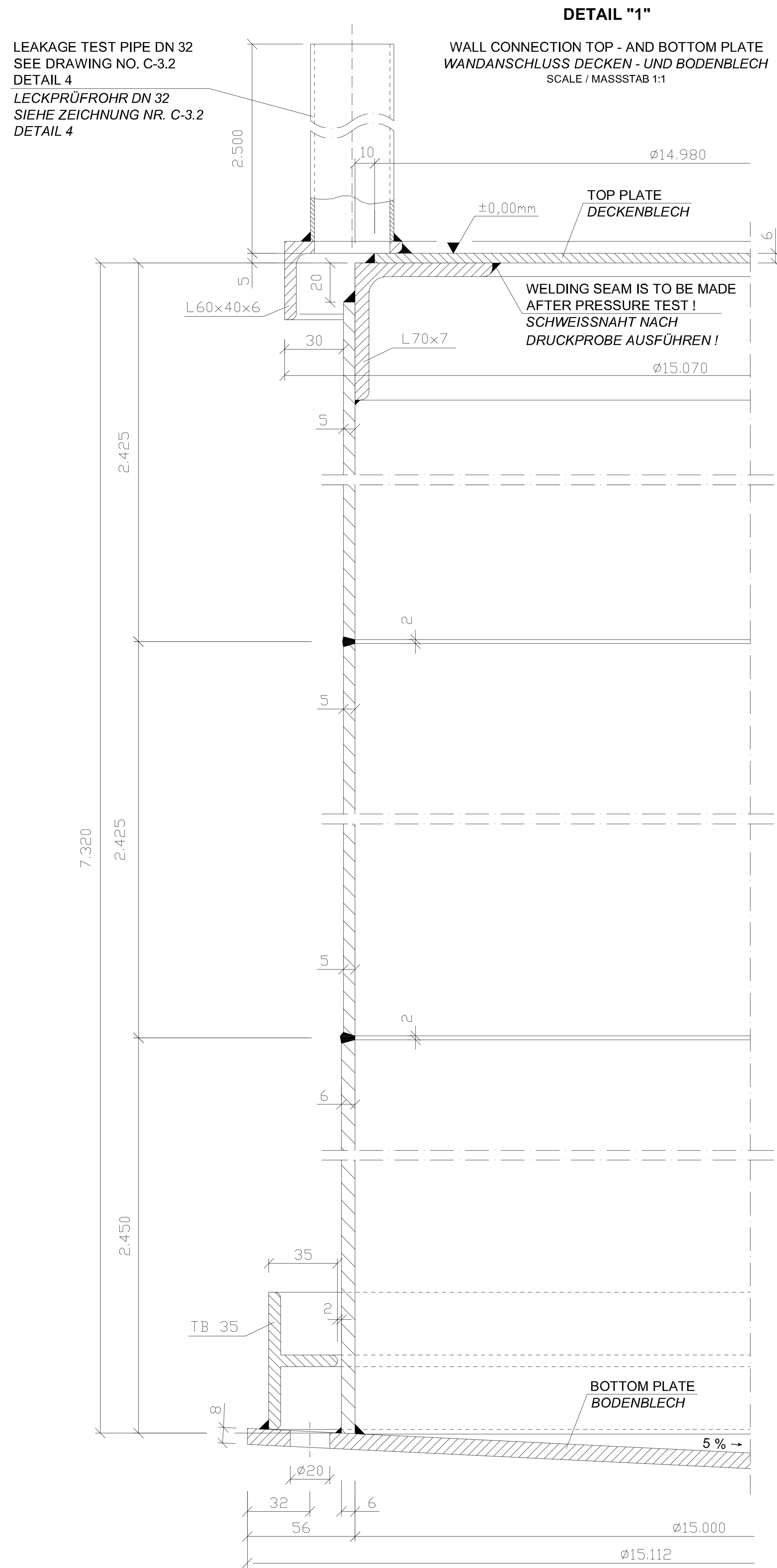
C-3.3 DETAILS - MANHOLES AND LEAKAGE CONTROL PIT  
DETAILS - MONTAGEÖFFNUNGEN UND LECKKONTROLLSCHACHT

REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
<b>HEADQUARTERS</b> UNITED STATES AIR FORCES EUROPE ENGINEERING & OPERATIONS				
AIRFIELD STANDARD DESIGN US JET FUEL STORAGE AND DISPENSING SYSTEMS		FLUGPLATZ STANDARDPLANUNG US FLUGKRAFTSTOFF - VERSORGENGSANLAGEN		
<b>BUILDING</b> OPERATING TANK 1250m <sup>3</sup> FLACHBODENTANK 1250m <sup>3</sup>				
DESIGNATOR BEZEICHNUNG COVERS, MANHOLES AND LEAKAGE CONTROL PIT ABDECKUNGEN, FÜR MONTAGEÖFFNUNGEN UND LECKKONTROLLSCHACHT				
WORKSHEET/ARBEITSTELLE LAGERSTELLE/ARBEITSTELLE L B B		APPROVED/GENEHIGT AMT FÜR BUNDESBAU WALLSTR.1 55122 MAINZ		
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAUMASSNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED GENEHIGT	DATE DATUM 6. MAI 2015	SCALE MASSSTAB 1:2 ; 1:10 ; 1:20	SHEET NO. PLATZNR. S - 3.1	
CONSTRUCTION PROJECT BAUMASSNAHME				

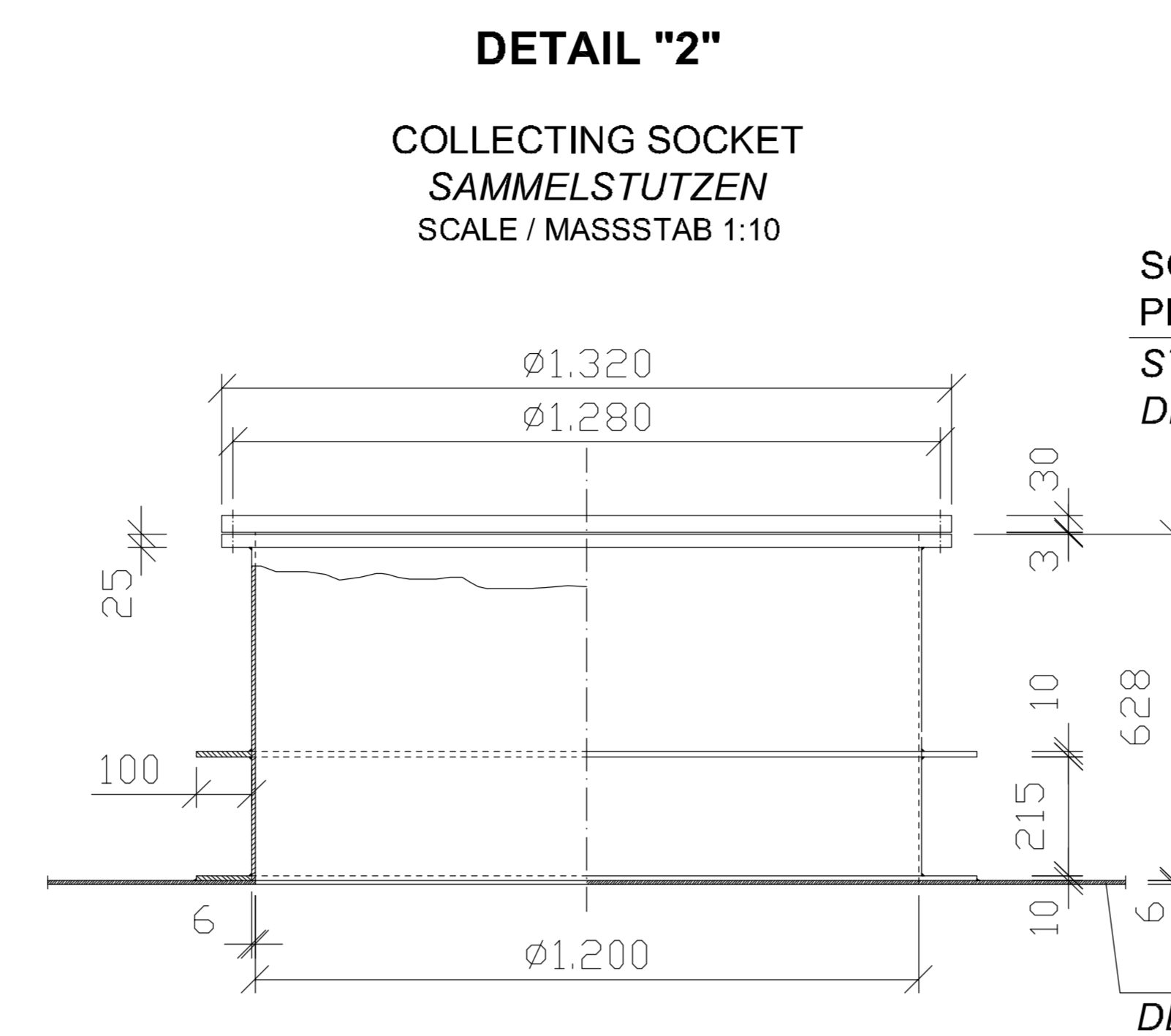




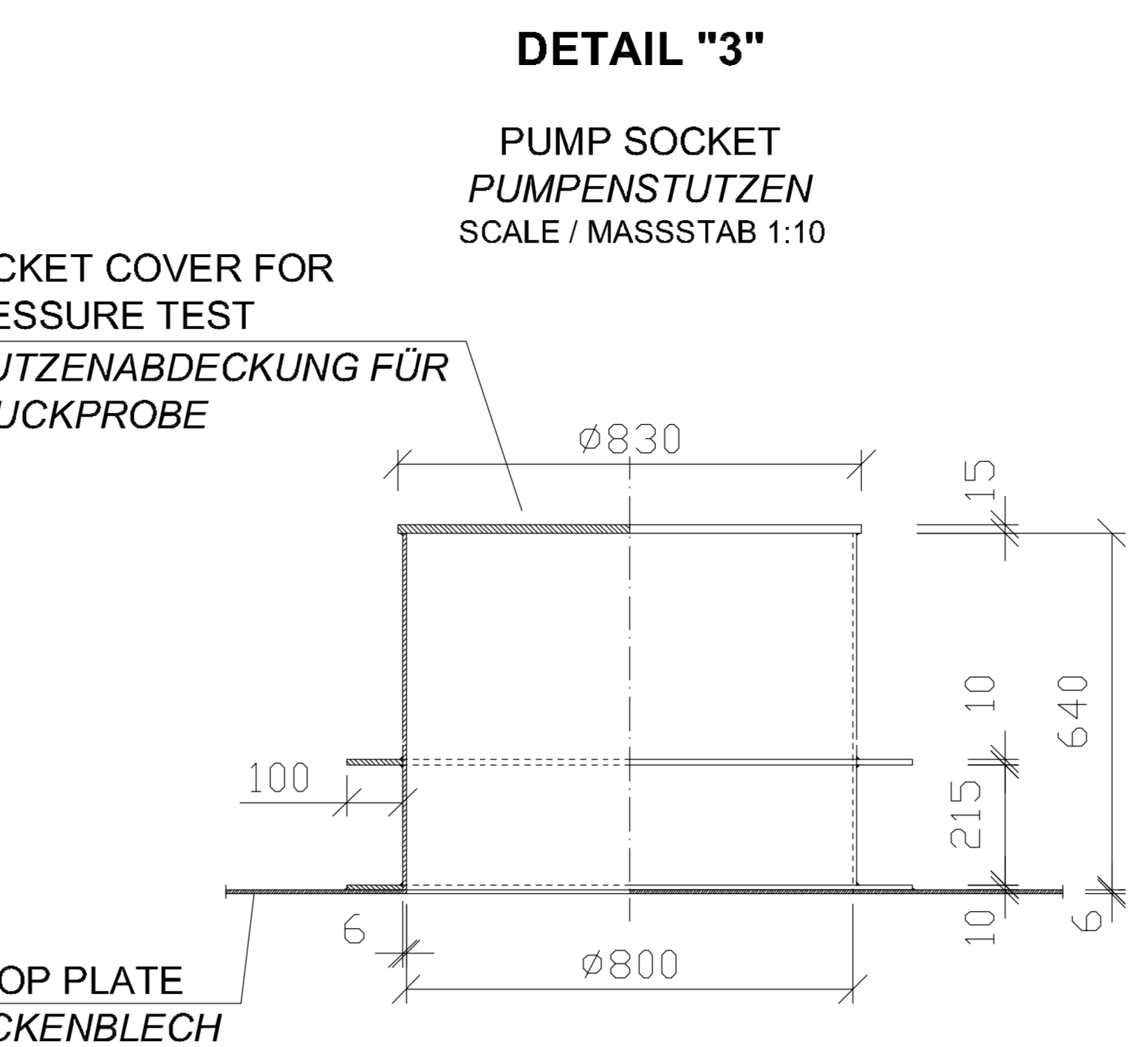




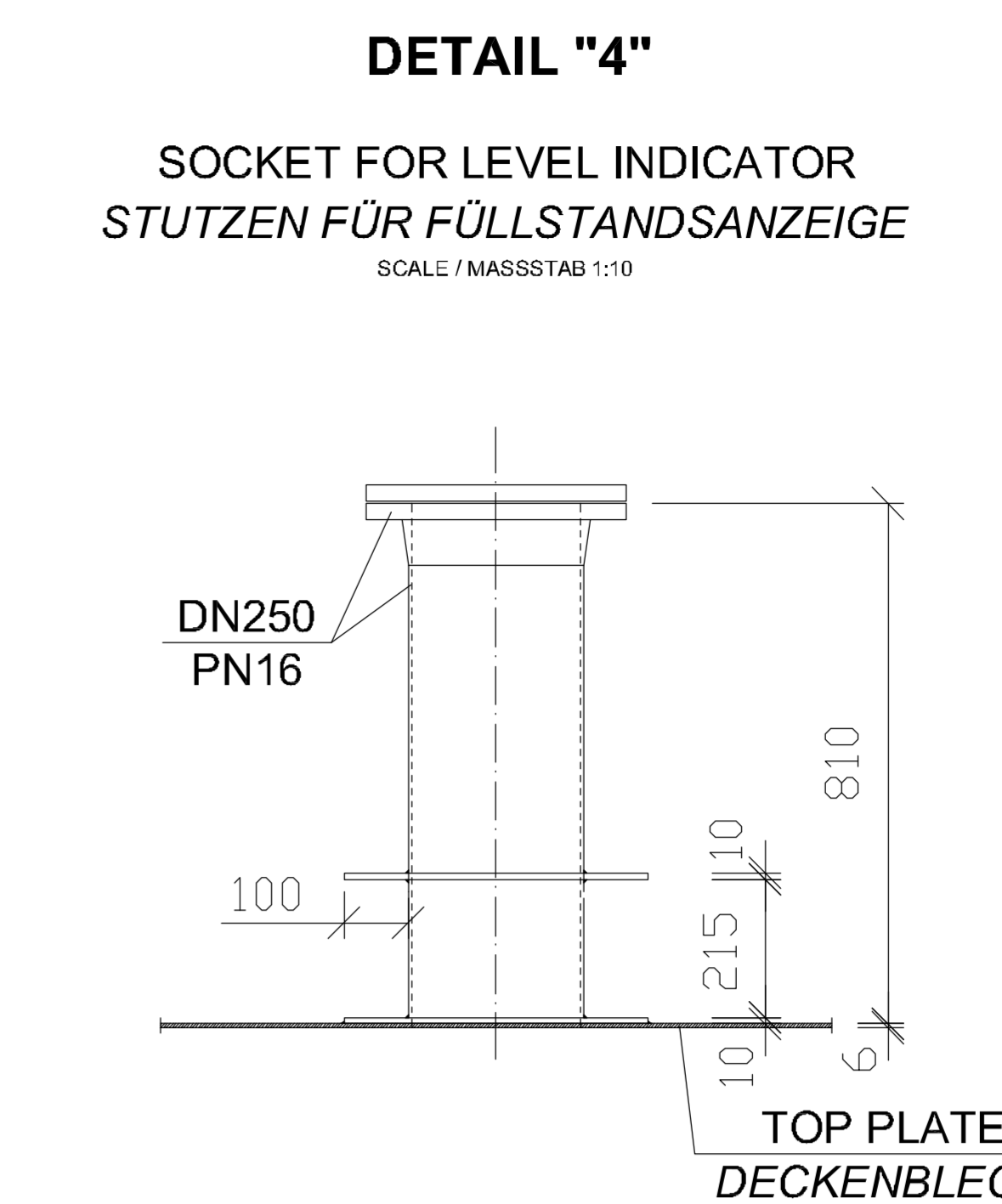
**DETAIL "1"**  
WALL CONNECTION TOP - AND BOTTOM PLATE  
WANDANSCHLUSS DECKEN - UND BODENBLECH  
SCALE / MASSSTAB 1:1



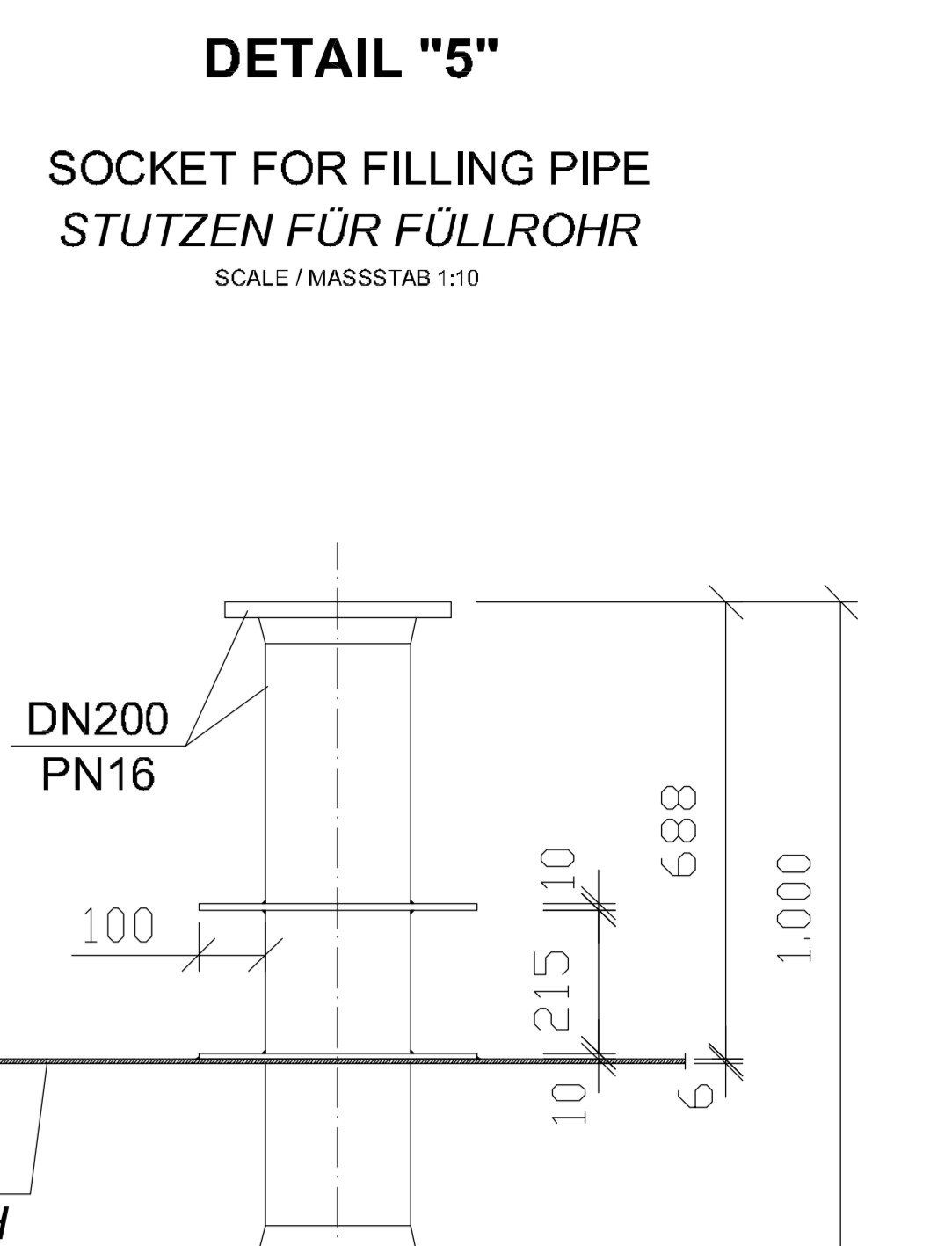
**DETAIL "2"**  
COLLECTING SOCKET  
SAMMELSTUTZEN  
SCALE / MASSSTAB 1:10



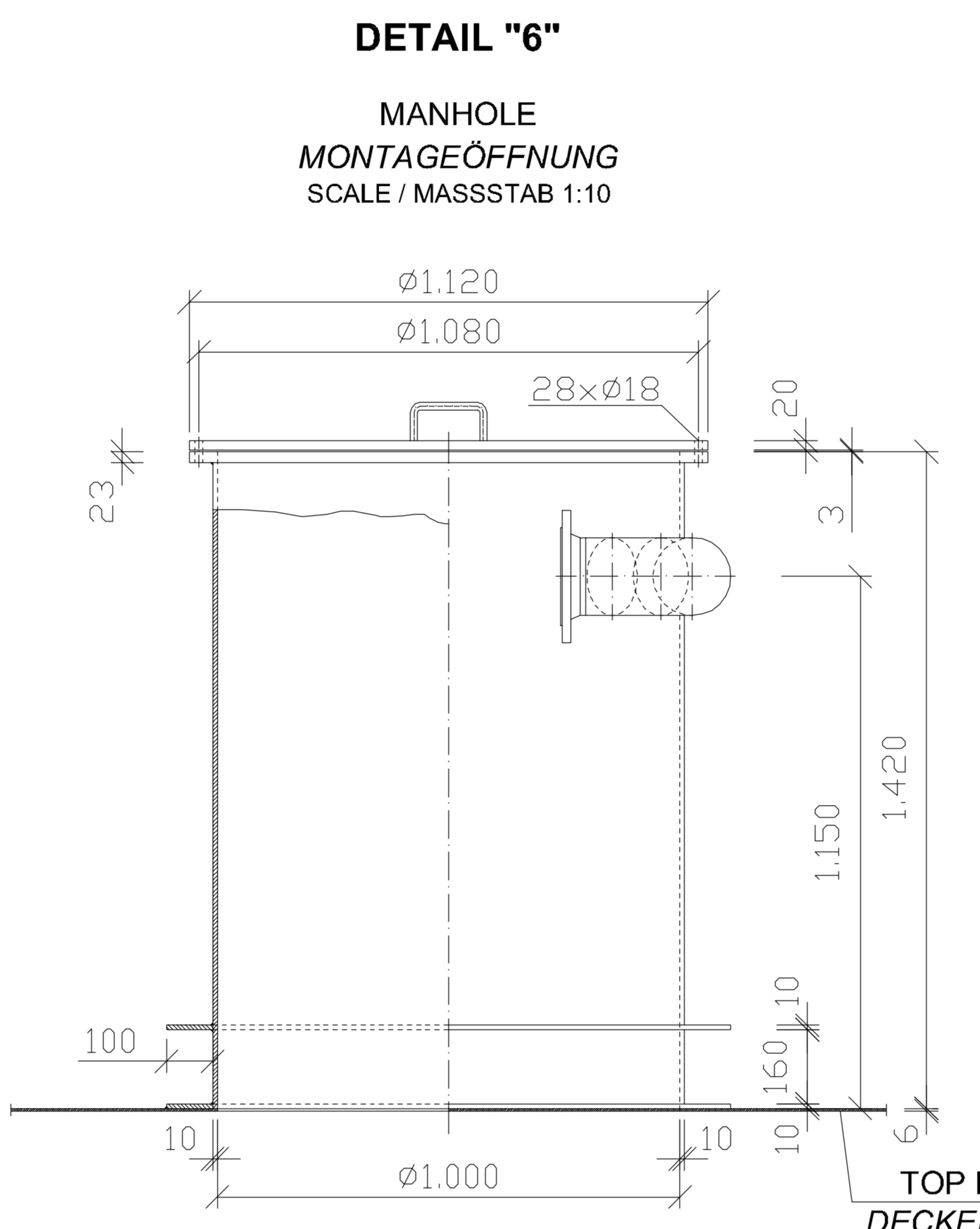
**DETAIL "3"**  
PUMP SOCKET  
PUMPENSTUTZEN  
SCALE / MASSSTAB 1:10



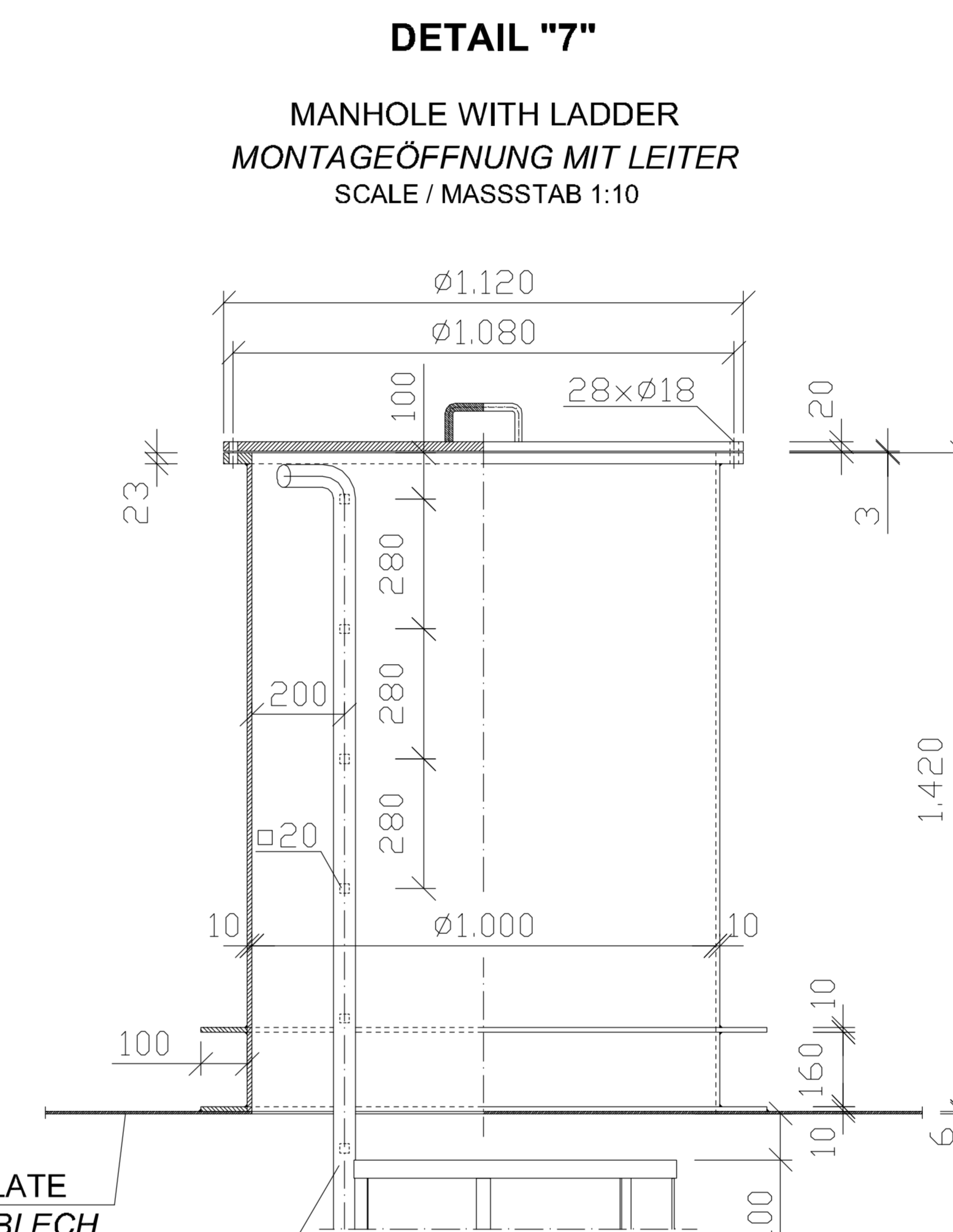
**DETAIL "4"**  
SOCKET FOR LEVEL INDICATOR  
STUTZEN FÜR FÜLLSTANDSANZEIGE  
SCALE / MASSSTAB 1:10



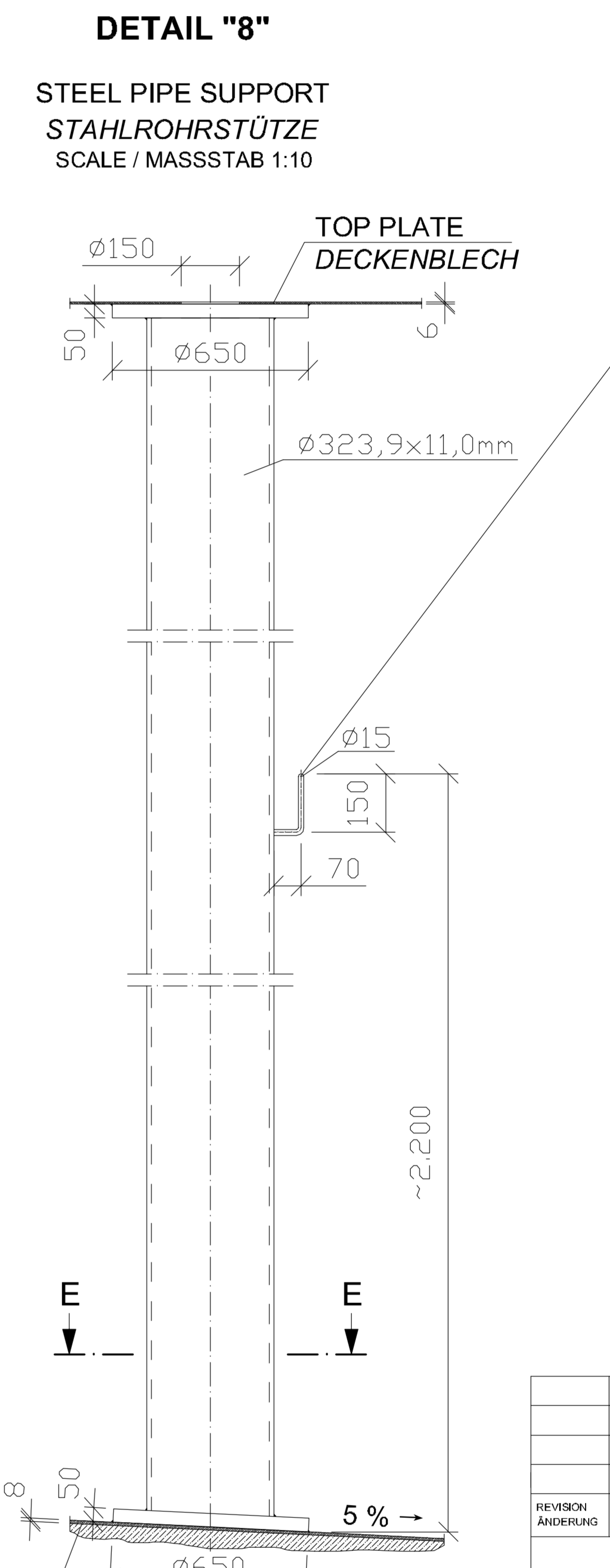
**DETAIL "5"**  
SOCKET FOR FILLING PIPE  
STUTZEN FÜR FÜLLROHR  
SCALE / MASSSTAB 1:10



**DETAIL "6"**  
MANHOLE  
MONTAGEÖFFNUNG  
SCALE / MASSSTAB 1:10

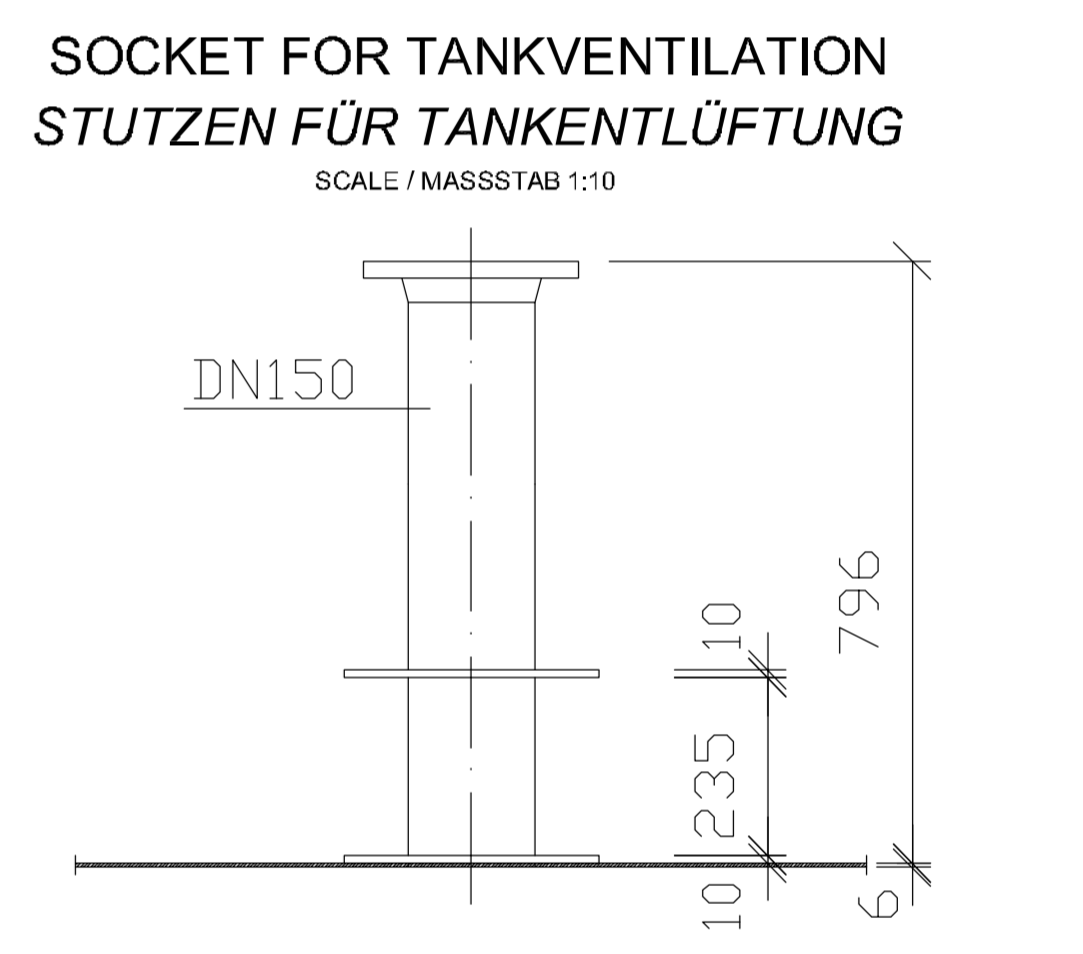


**DETAIL "7"**  
MANHOLE WITH LADDER  
MONTAGEÖFFNUNG MIT LEITER  
SCALE / MASSSTAB 1:10

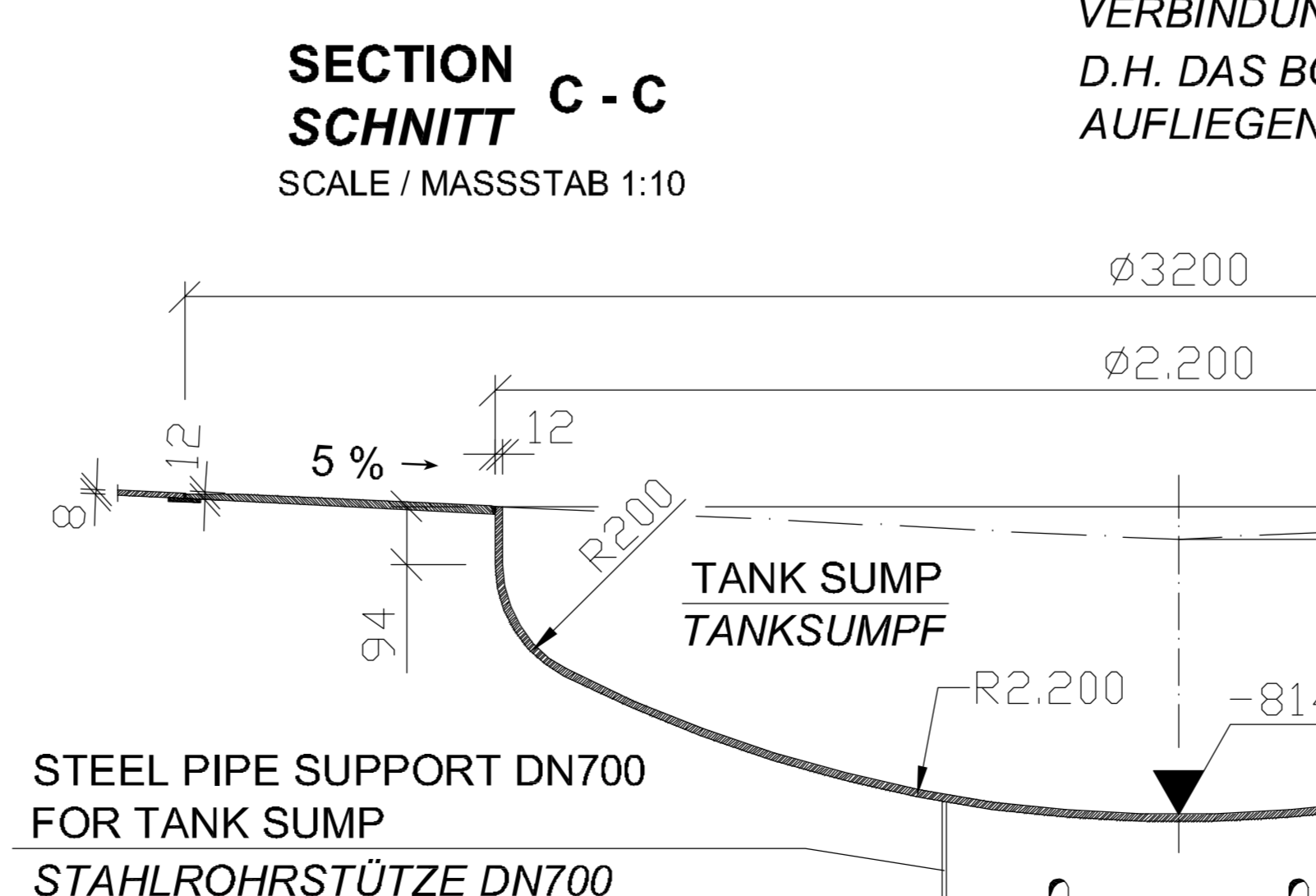
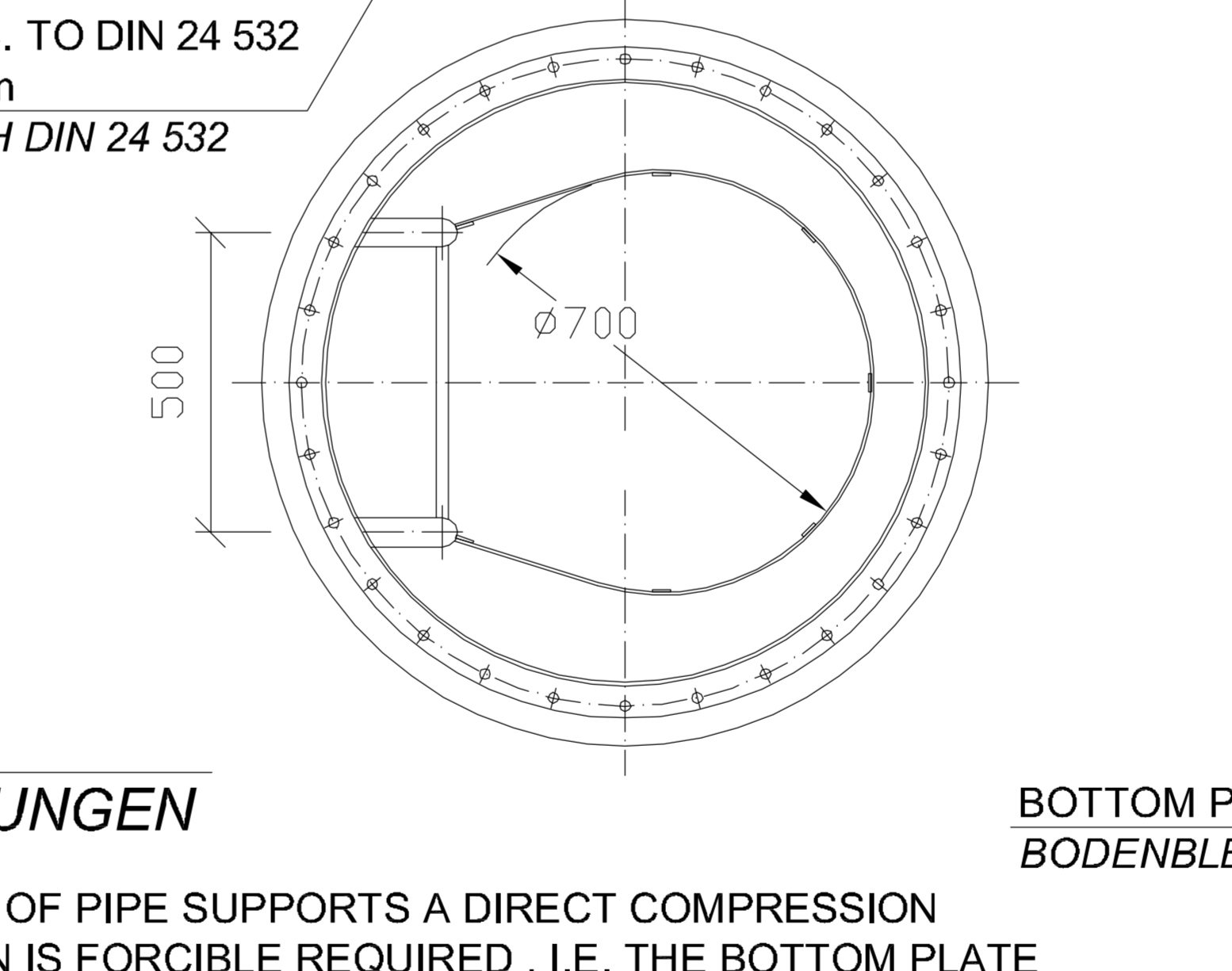
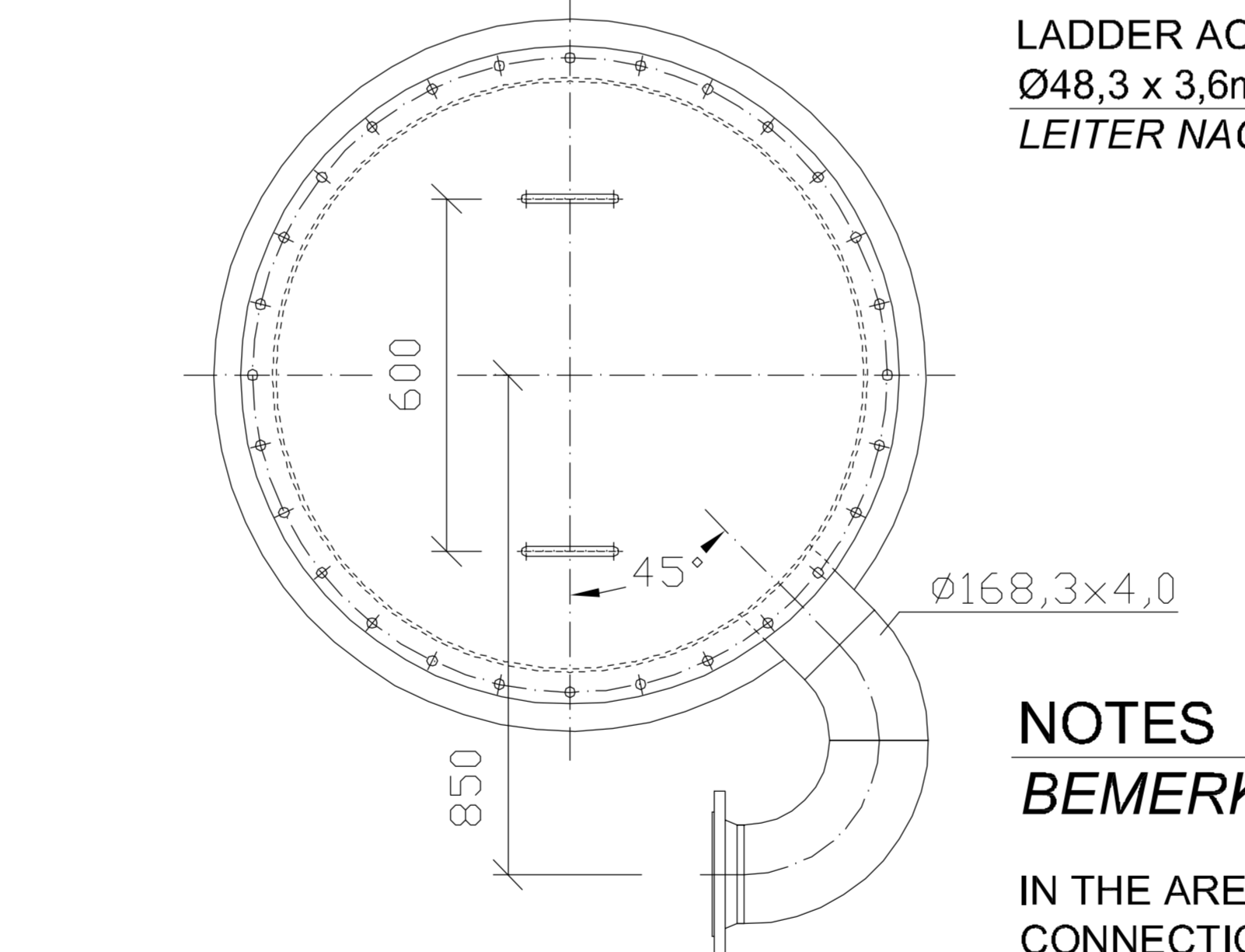


**DETAIL "8"**  
STEEL PIPE SUPPORT  
STAHLROHRSTÜTZE  
SCALE / MASSSTAB 1:10

HOLDER MADE OF SS  
LOCATED TO CENTER OF TANK  
AT EACH SUPPORT.  
HALTERUNG AUS CR-NI-STAHL  
AN JEDER ROHRSTÜTZE ZUR  
TANKMITTE ANGEORDNET.



**SOCKET FOR TANK VENTILATION**  
STUTZEN FÜR TANKENTLÜFTUNG  
SCALE / MASSSTAB 1:10

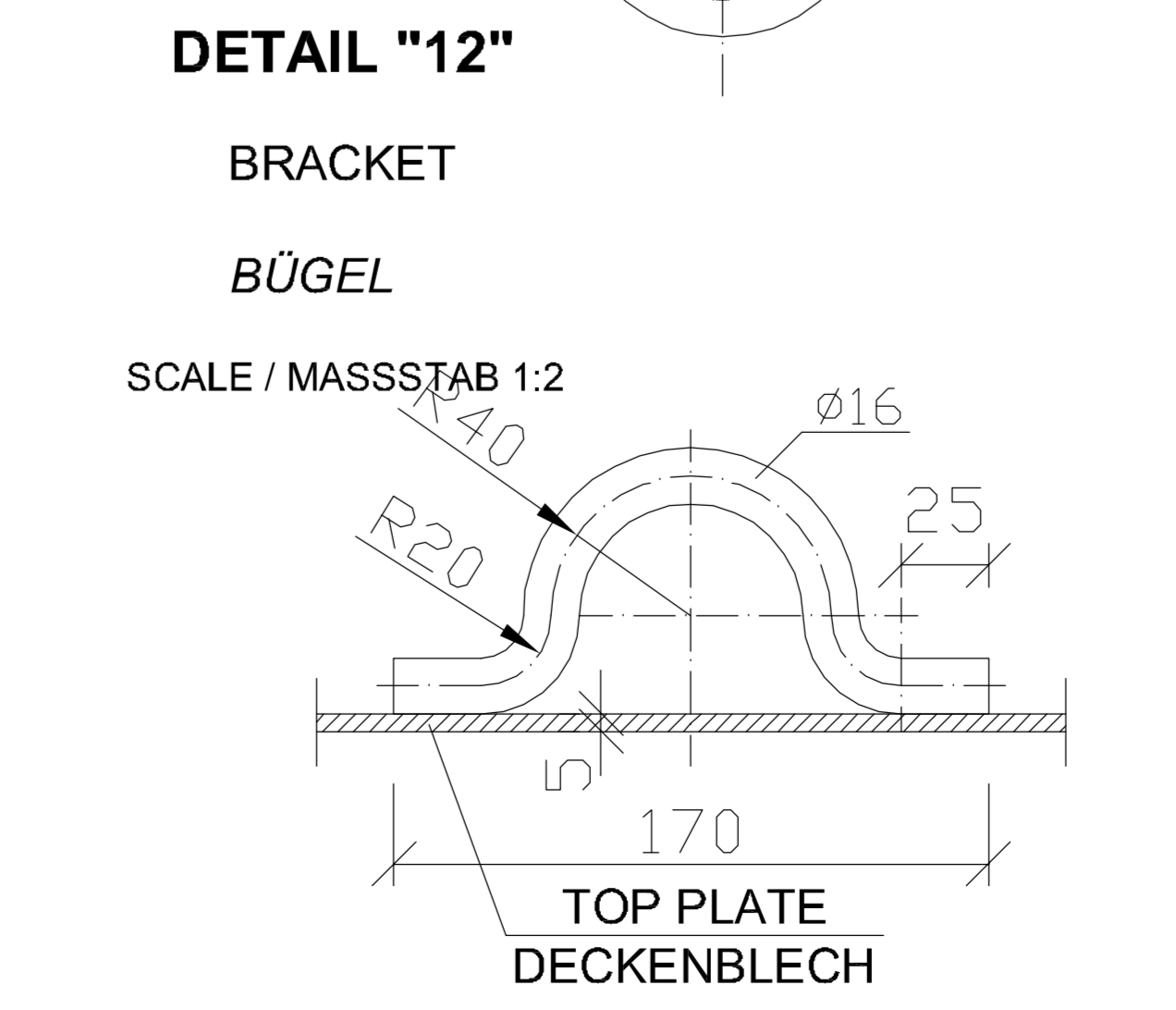


**SECTION C - C**  
SCALE / MASSSTAB 1:10

**STEEL PIPE SUPPORT DN700 FOR TANK SUMP**  
STAHLROHRSTÜTZE DN700 FÜR TANKSUMPF

**NOTES**  
**BEMERKUNGEN**  
IN THE AREA OF PIPE SUPPORTS A DIRECT COMPRESSION CONNECTION IS FORCIBLY REQUIRED, I.E. THE BOTTOM PLATE OF THE TANK MUST BE COMPLETELY SUPPORTED ON CONCRETE FLOOR SLAB.  
IM BEREICH DER STAHLROHRSTÜTZEN IST EINE DIREKTE DRUCKVERBINDUNG ZUR BODENPLATTE ZWINGEND ERFORDERLICH, D.H. DAS BODENBLECH MUSS VOLLSTÄNDIG AUF DEM BODEN AUFLIEGEN.

**SECTION E - E**  
SCALE / MASSSTAB 1:10

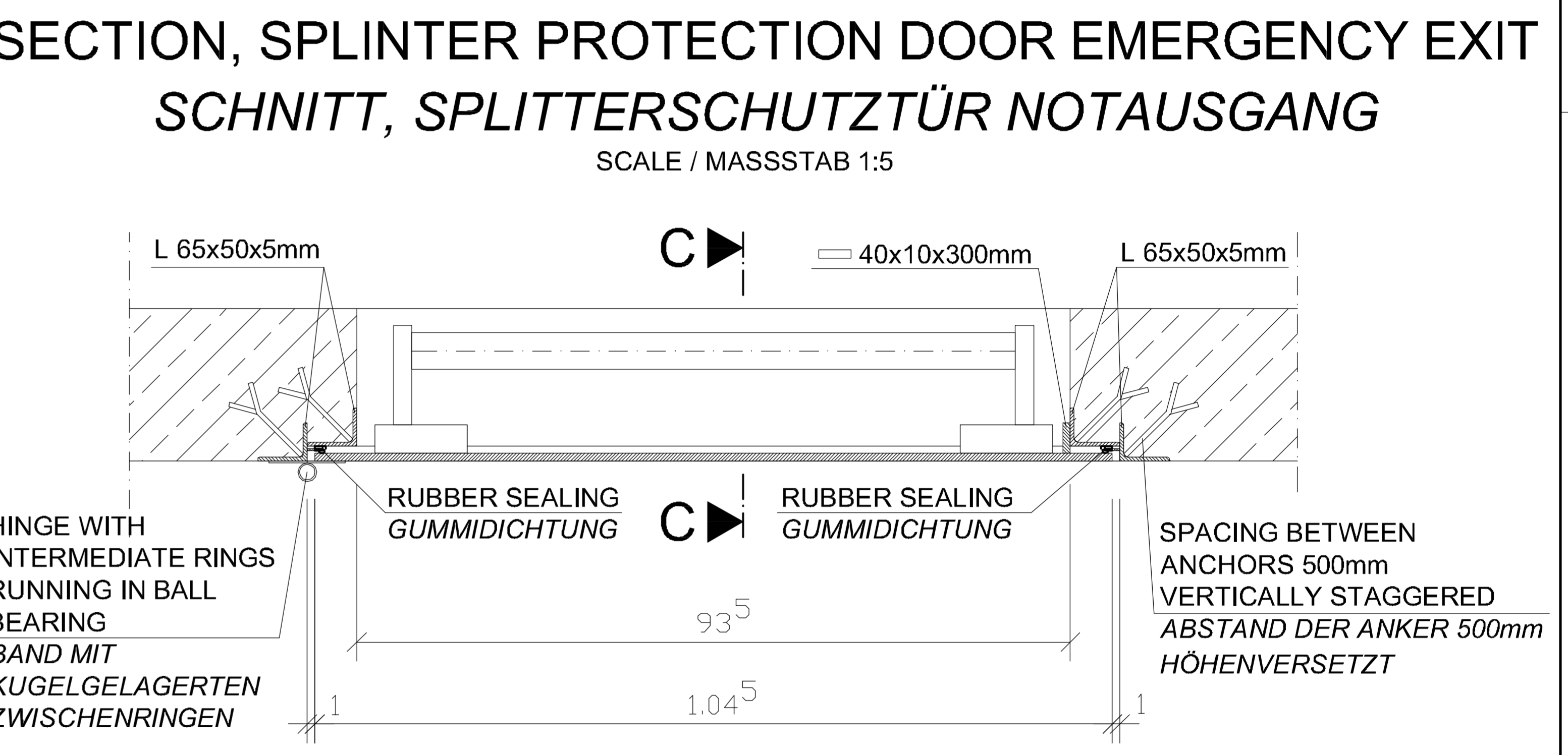
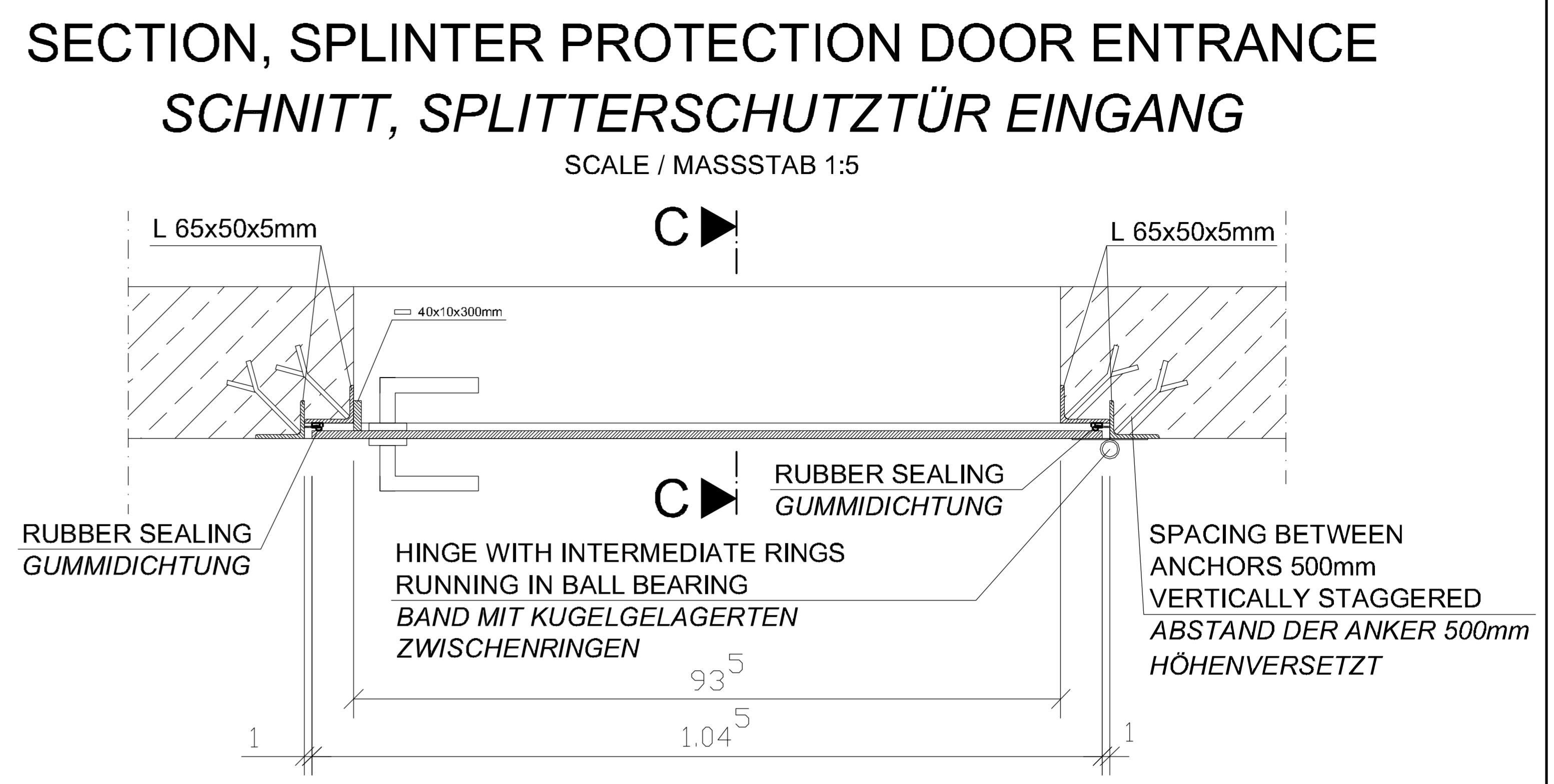
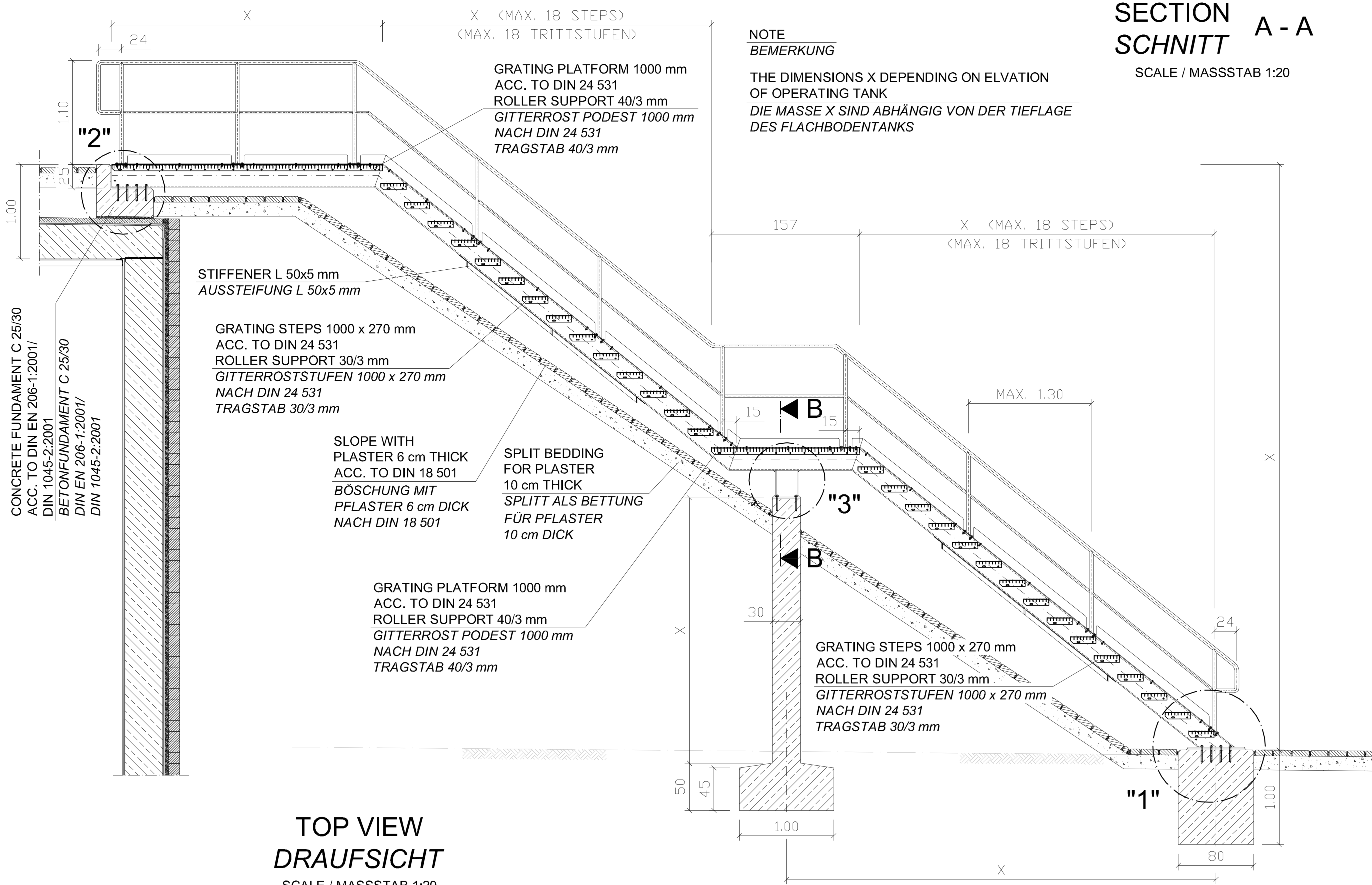


**DETAIL "12"**  
BRACKET  
BÜGEL  
SCALE / MASSSTAB 1:2

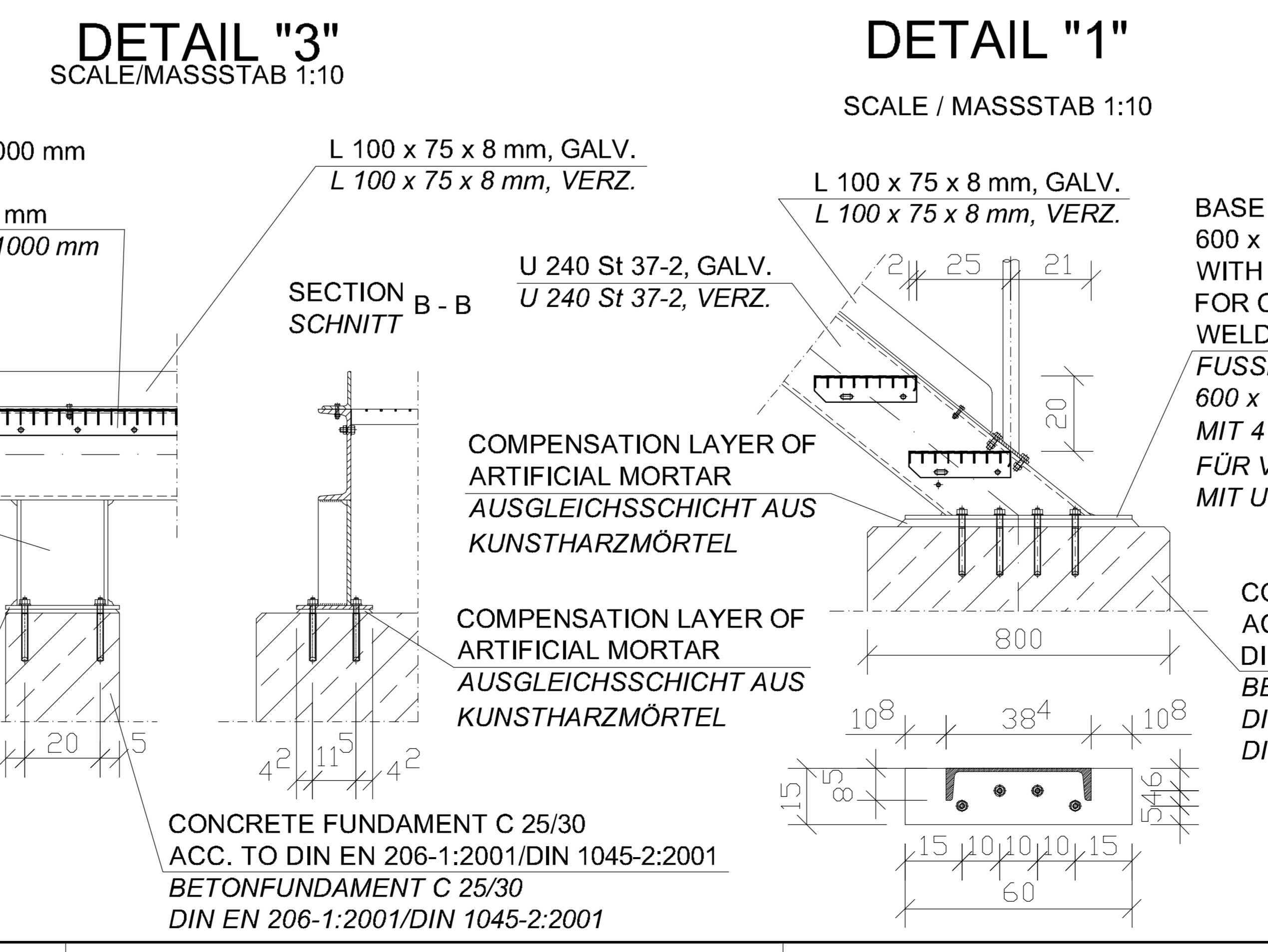
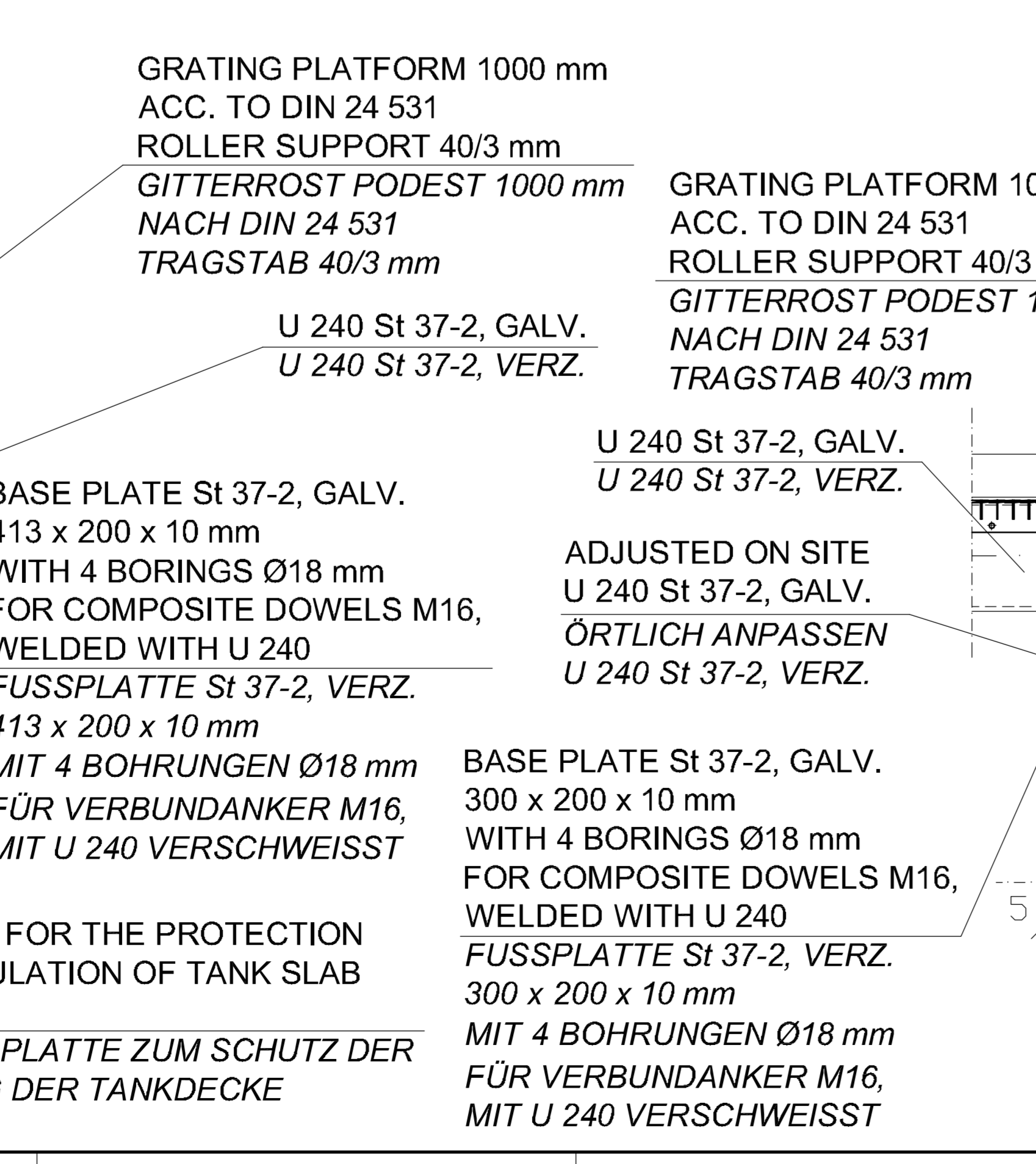
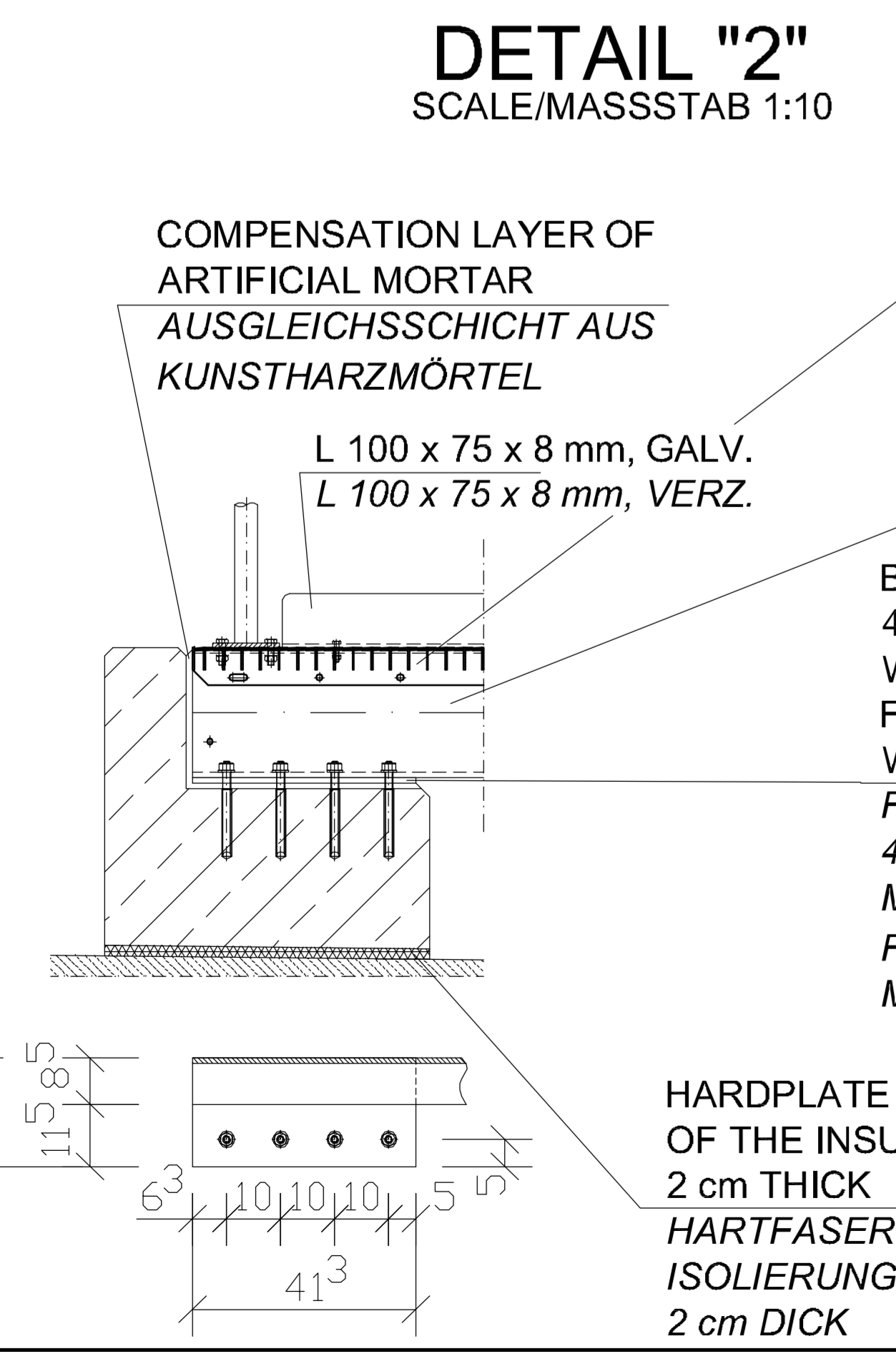
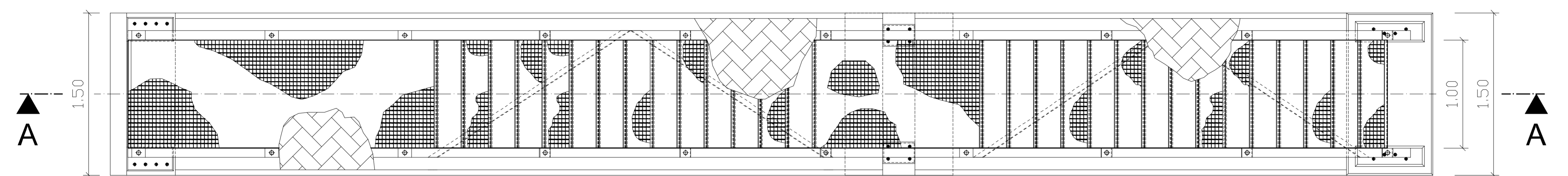
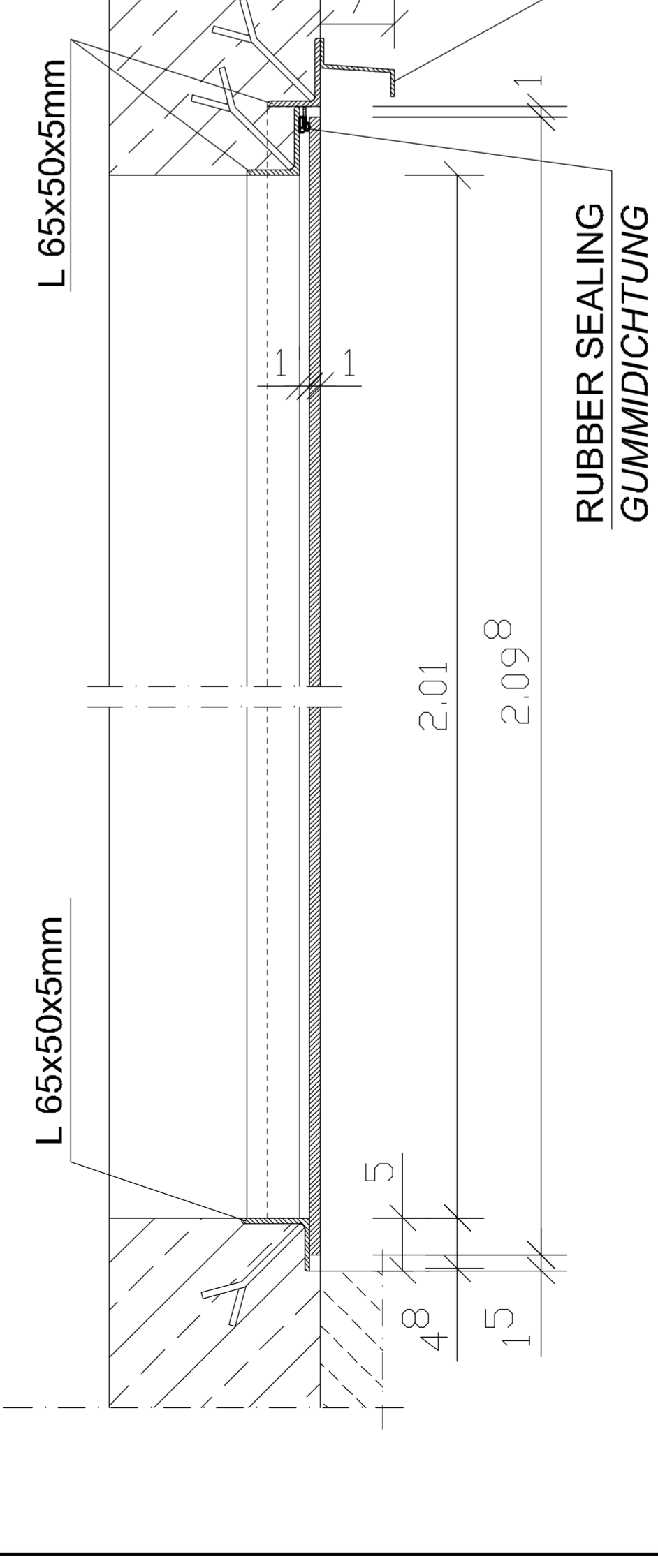
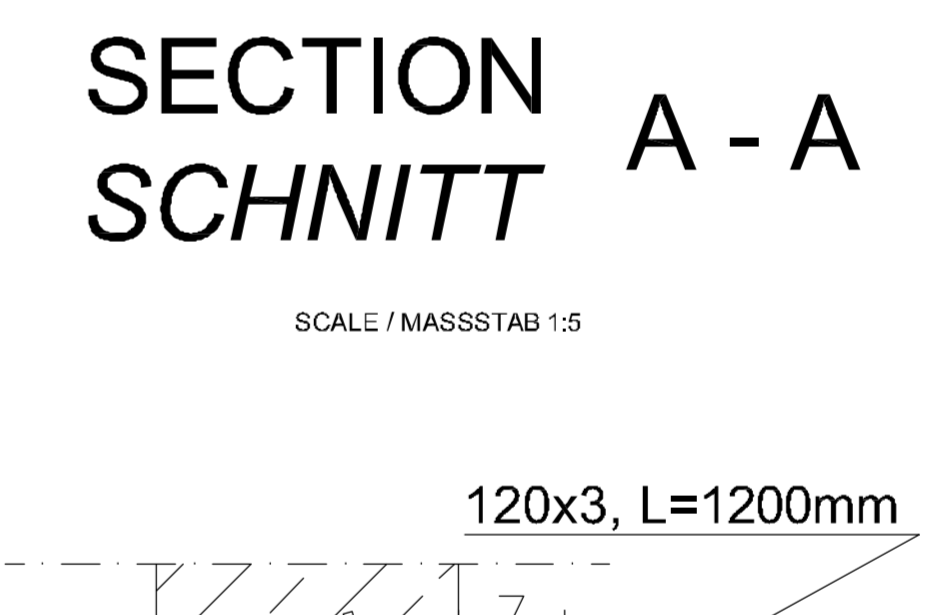
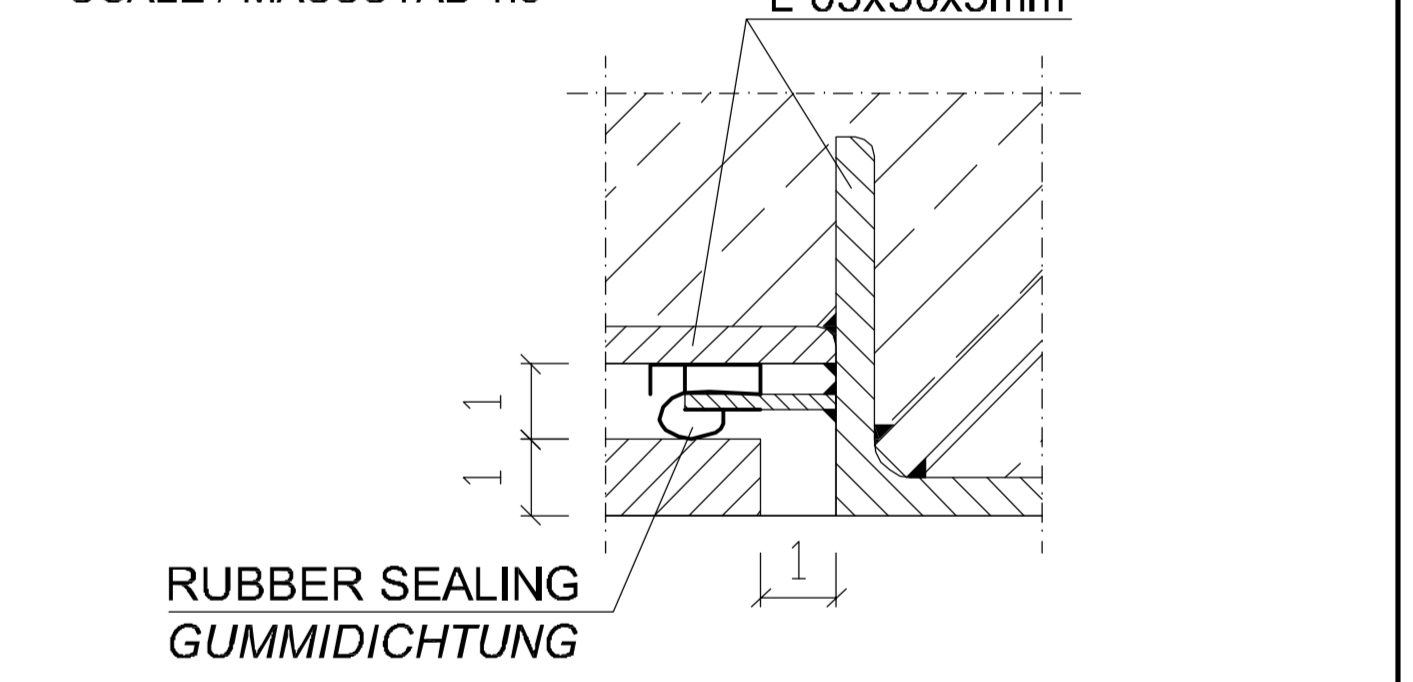
**PERTINENT DRAWINGS**  
**ZUGEHÖRIGE ZEICHNUNGEN**  
S-3.6 STEEL TANK  
STAHLTANK

REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
<b>HEADQUARTERS</b>				
UNITED STATES AIR FORCES EUROPE				
ENGINEERING & OPERATIONS				
AIRFIELD STANDARD DESIGN US		FLUGPLATZ STANDARDPLANUNG US		
JET FUEL STORAGE AND DISPENSING SYSTEMS		FLUGKRAFTSTOFF - VERSORGSANLAGEN		
<b>BUILDING</b> BAUWERK				
<b>OPERATING TANK 1250m<sup>3</sup></b> FLACHBODENTANK 1250m <sup>3</sup>				
<b>DESIGNATION</b> BEZEICHNUNG				
<b>DETAILS - STEEL TANK</b> DETAILS - STAHLTANK				
WORKED/BEARBEITET		PREPARED/AUFGESTELLT		APPROVED/GENEHMIGT
LANDSCHAFTS- UND BAUWERKE UND BAUWERKE UND BAUWERKE		LANDSCHAFTS- UND BAUWERKE UND BAUWERKE UND BAUWERKE		AMT FÜR BAUWERKE
LANDSCHAFTS- UND BAUWERKE UND BAUWERKE UND BAUWERKE		LANDSCHAFTS- UND BAUWERKE UND BAUWERKE UND BAUWERKE		WALLSTR.1 55122 MAINZ
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAUWERKE IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED GENEHMIGT		DATE DATUM		SCALE MASSSTAB
6. MAI 2015		1:1 1:2 1:10		S-3.7
ORIGINAL SIGNED BY IN ORIGINAL DES.		STANDARD SHEET STANDARD PLAN		SHEET NO. PLATZ NR.
CONSTRUCTION PROJECT BAUWERKE		CAD-PROJECT FILE CAD-PROJEKTDATEI		OF VON





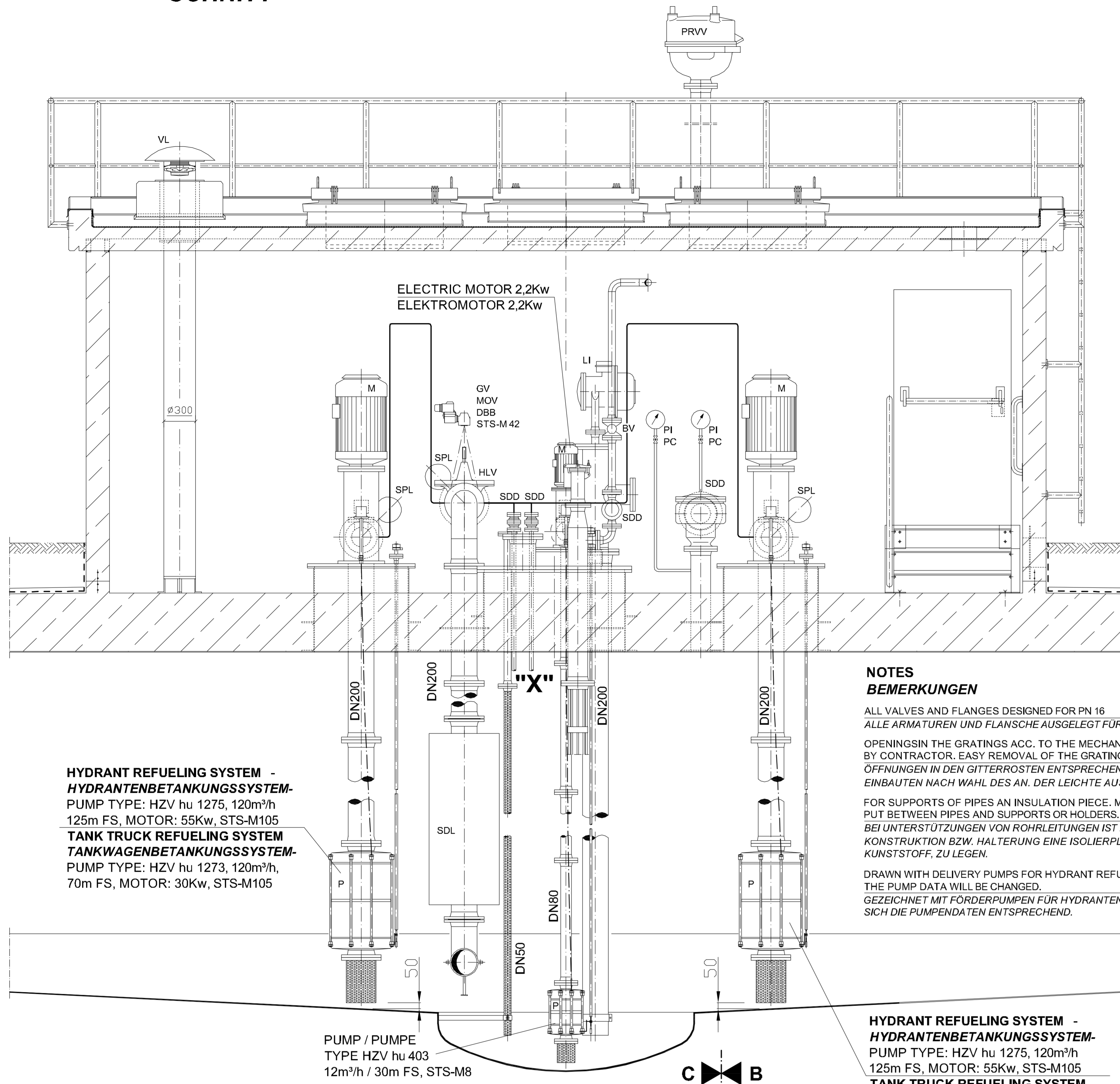
**DETAIL RUBBER SEALING**  
DETAIL GUMMIDICHTUNG  
SCALE / MASSSTAB 1:5



REVISION	DATE	DESCRIPTION	BY	COUNTRY			
ÄNDERUNG	DATUM	BESCHREIBUNG	VON	LAND			
<b>HEADQUARTERS</b>							
UNITED STATES AIR FORCES EUROPE							
ENGINEERING & OPERATIONS							
AIRFIELD STANDARD DESIGN US			FLUGPLATZ STANDARDPLANUNG US				
JET FUEL STORAGE AND DISPENSING SYSTEMS			FLUGKRAFTSTOFF - VERSORGENGSANLAGEN				
<b>OPERATING TANK 1250m<sup>3</sup></b>							
<b>FLACHBODENTANK 1250m<sup>3</sup></b>							
TANK STAIRS AND SPLINTER PROTECTION DOORS							
TANKTREPPE UND SPLITTERSCHUTZTÜREN							
<table border="1" style="width: 100%;"> <tr> <td style="width: 33%;"> <small>WORKPREPARED BY:</small>            LANDESTRASSE LIEGEBEREITUNG UND BAUBEREITUNG            L&amp;B  <small>AMOUNT OF INTERESTS IN THE PROJECT:</small>            ORIGINAL: 000001            IN DESIGN: 000002            IN CONSTRUCTION: 000003            IN OPERATION: 000004         </td> <td style="width: 33%;"> <small>APPROVED/GENERATED BY:</small>            AMT FÜR BUNDESBAU            WALLSTR.1            55122 MAINZ  <small>ORIGINAL STORED BY:</small>            1000000001         </td> <td style="width: 33%;"></td> </tr> </table>					<small>WORKPREPARED BY:</small> LANDESTRASSE LIEGEBEREITUNG UND BAUBEREITUNG L&B <small>AMOUNT OF INTERESTS IN THE PROJECT:</small> ORIGINAL: 000001 IN DESIGN: 000002 IN CONSTRUCTION: 000003 IN OPERATION: 000004	<small>APPROVED/GENERATED BY:</small> AMT FÜR BUNDESBAU WALLSTR.1 55122 MAINZ <small>ORIGINAL STORED BY:</small> 1000000001	
<small>WORKPREPARED BY:</small> LANDESTRASSE LIEGEBEREITUNG UND BAUBEREITUNG L&B <small>AMOUNT OF INTERESTS IN THE PROJECT:</small> ORIGINAL: 000001 IN DESIGN: 000002 IN CONSTRUCTION: 000003 IN OPERATION: 000004	<small>APPROVED/GENERATED BY:</small> AMT FÜR BUNDESBAU WALLSTR.1 55122 MAINZ <small>ORIGINAL STORED BY:</small> 1000000001						
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAUMASSNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)							
<small>APPROVED/GENERATED BY:</small>	<small>DATE:</small> 6. MAI 2015	<small>SCALE:</small> 1:20 ; 1:10 ; 1:5 ; 1:1					
<small>DESIGNED BY:</small>		<small>STANDARD SHEET:</small>					
<small>CONSTRUCTION PROJECT:</small>		<small>CAD-PROJECT FILE:</small>					
<small>BAU MASSNAHME:</small>		<small>SHEET NO.:</small>					
		<small>PLATZ NR.:</small>					
		<small>OF:</small>					
		<small>VON:</small>					



**SECTION A - A**  
**SCHNITT**



**HYDRANT REFUELING SYSTEM -**  
**HYDRANTENBETANKUNGSSYSTEM-**  
PUMP TYPE: HZV hu 1275, 120m³/h  
125m FS, MOTOR: 55Kw, STS-M105  
**TANK TRUCK REFUELING SYSTEM-**  
**TANKWAGENBETANKUNGSSYSTEM-**  
PUMP TYPE: HZV hu 1273, 120m³/h,  
70m FS, MOTOR: 30Kw, STS-M105

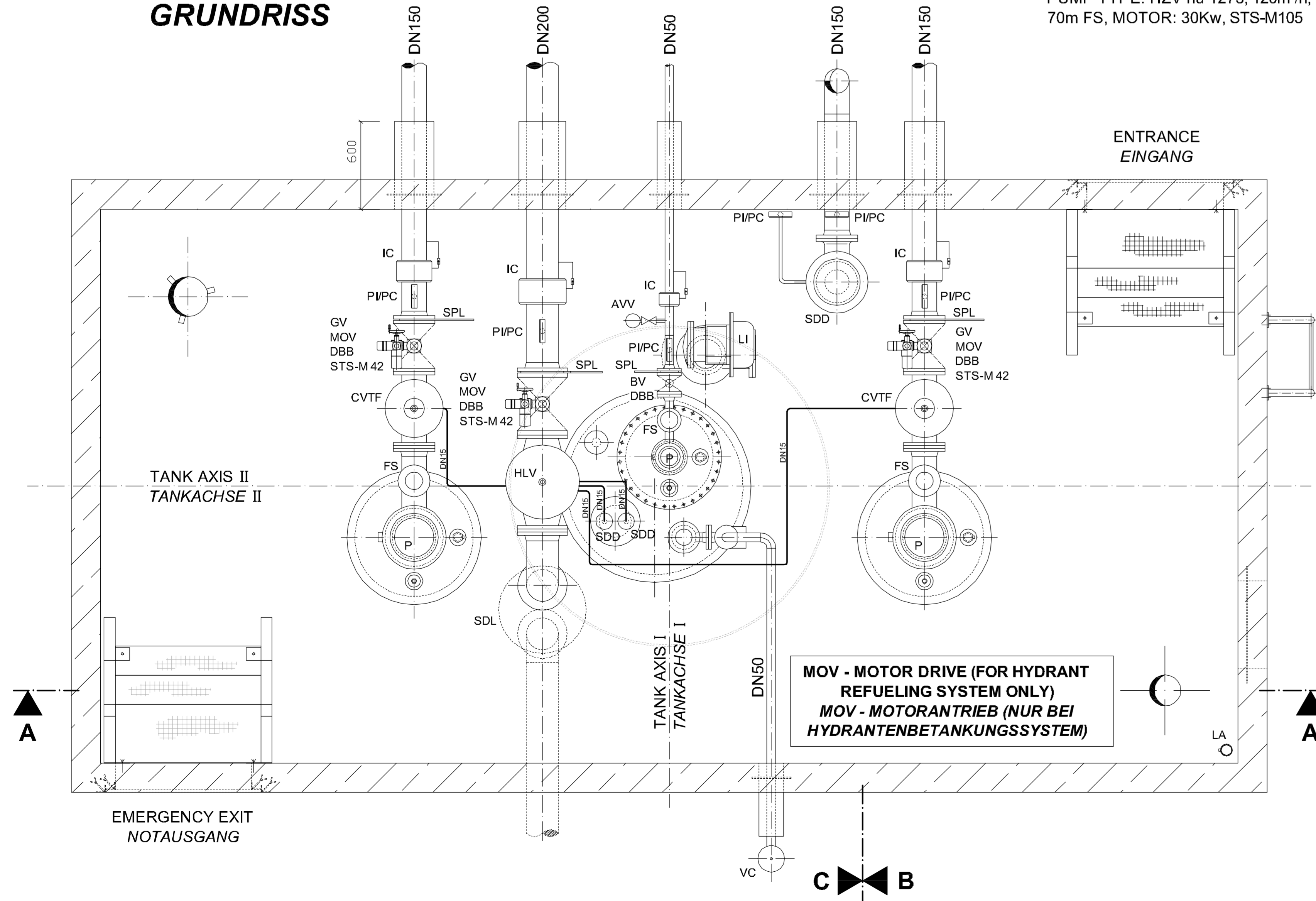
**NOTES**  
**BEMERKUNGEN**

ALL VALVES AND FLANGES DESIGNED FOR PN 16  
ALLE ARMATUREN UND FLANSCHS AUSGELEGT FÜR PN 16  
OPENINGS IN THE GRATINGS ACC. TO THE MECHANICAL INSTALLATIONS AS SELECTED  
BY CONTRACTOR. EASY REMOVAL OF THE GRATINGS SHALL BE GUARANTEED.  
ÖFFNUNGEN IN DEN GITTERROSTEN ENTSPRECHEND DEN MASCHINENTECHNISCHEN  
EINBAUTEN NACH WAHL DES AN. DER LEICHTE AUSBAU DER GITTERROSTE IST ZU GEWÄHRLEISTEN.  
FOR SUPPORTS OF PIPES AN INSULATION PIECE, MADE OF 10mm THICK FUELRESISTANT PLASTIC IS TO  
PUT BETWEEN PIPES AND SUPPORTS OR HOLDERS.  
BEI UNTERSTÜTZUNGEN VON ROHRLEITUNGEN IST ZWISCHEN ROHRLEITUNG UND UNTERSTÜTZUNGS-  
KONSTRUKTION BZW. HALTERUNG EINE ISOLIERPLATTE 10mm DICK AUS KRAFTSTOFFBESTÄNDIGEN  
KUNSTSTOFF, ZU LEGEN.  
DRAWN WITH DELIVERY PUMPS FOR HYDRANT REFUELING. FOR TANK TRUCK REFUELING  
THE PUMP DATA WILL BE CHANGED.  
GEZEICHNET MIT FÖRDERPUMPEN FÜR HYDRANTENBETANKUNG. BEI TRKW - BEFÜLLUNG ÄNDERN  
SICH DIE PUMPENDATEN ENTSPRECHEND.

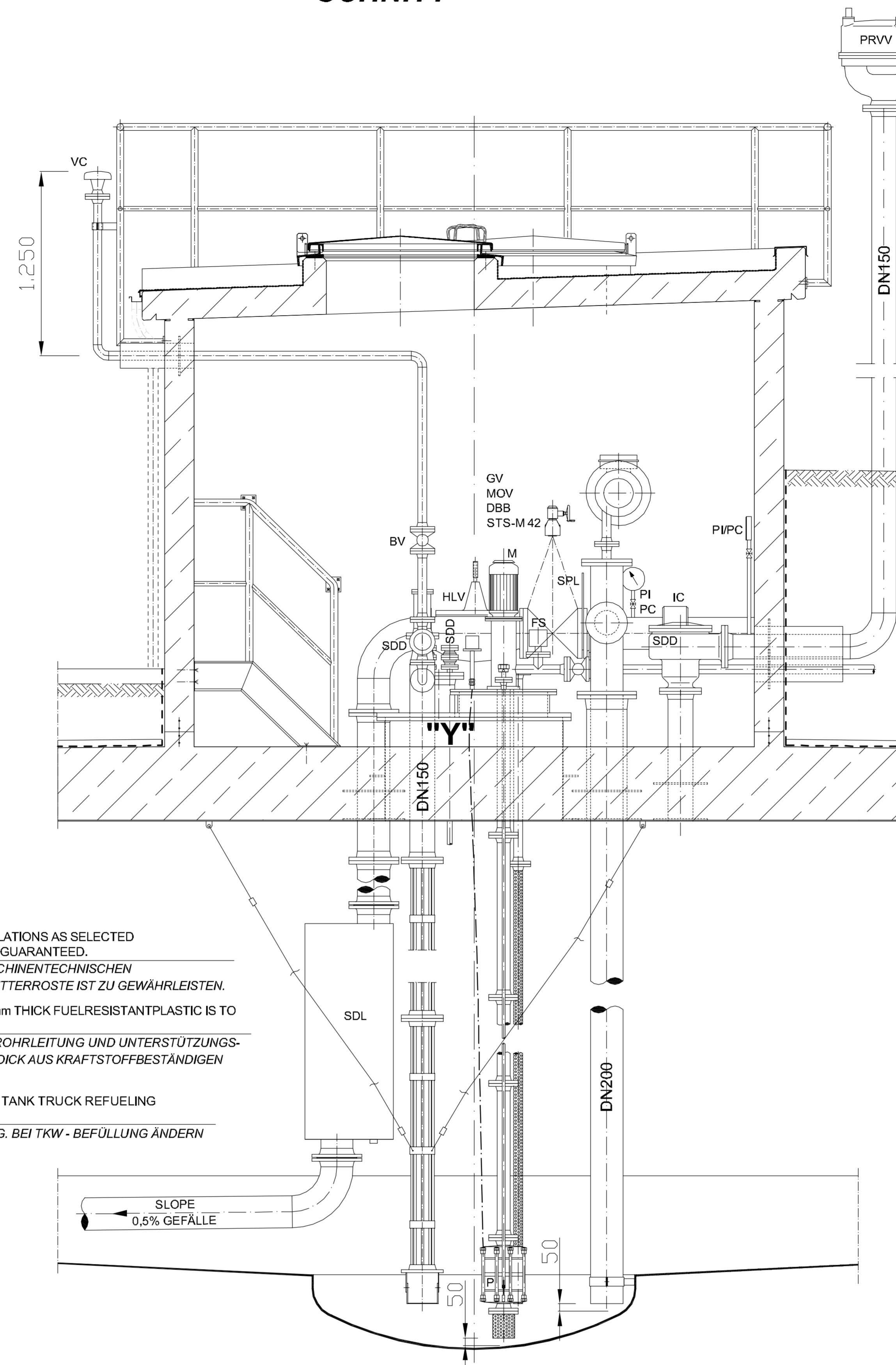
PUMP / PUMPE  
TYPE HZV hu 403  
12m³/h / 30m FS, STS-M8

**HYDRANT REFUELING SYSTEM -**  
**HYDRANTENBETANKUNGSSYSTEM-**  
PUMP TYPE: HZV hu 1275, 120m³/h  
125m FS, MOTOR: 55Kw, STS-M105  
**TANK TRUCK REFUELING SYSTEM-**  
**TANKWAGENBETANKUNGSSYSTEM-**  
PUMP TYPE: HZV hu 1273, 120m³/h,  
70m FS, MOTOR: 30Kw, STS-M105

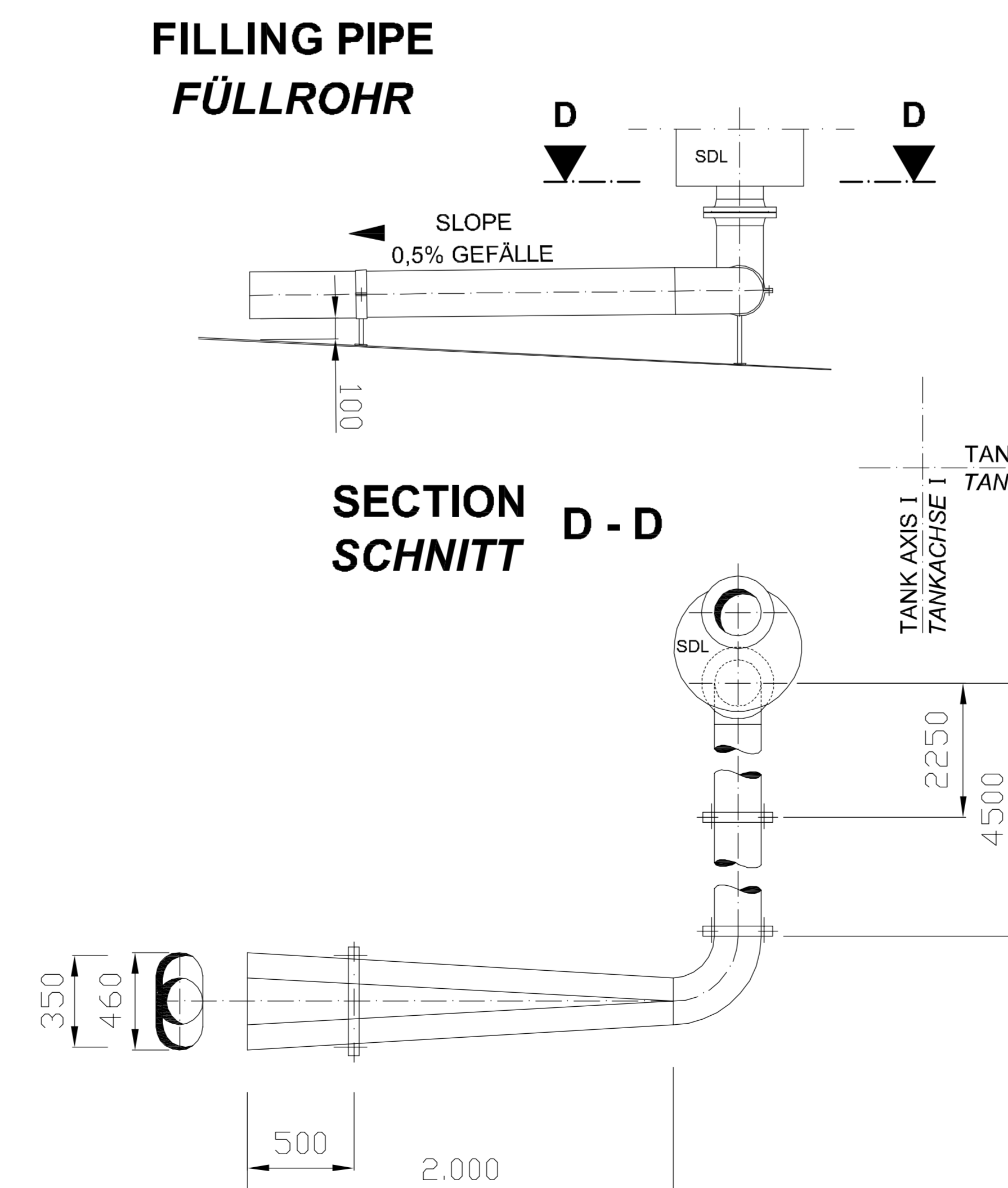
**GROUND PLAN**  
**GRUNDRISS**



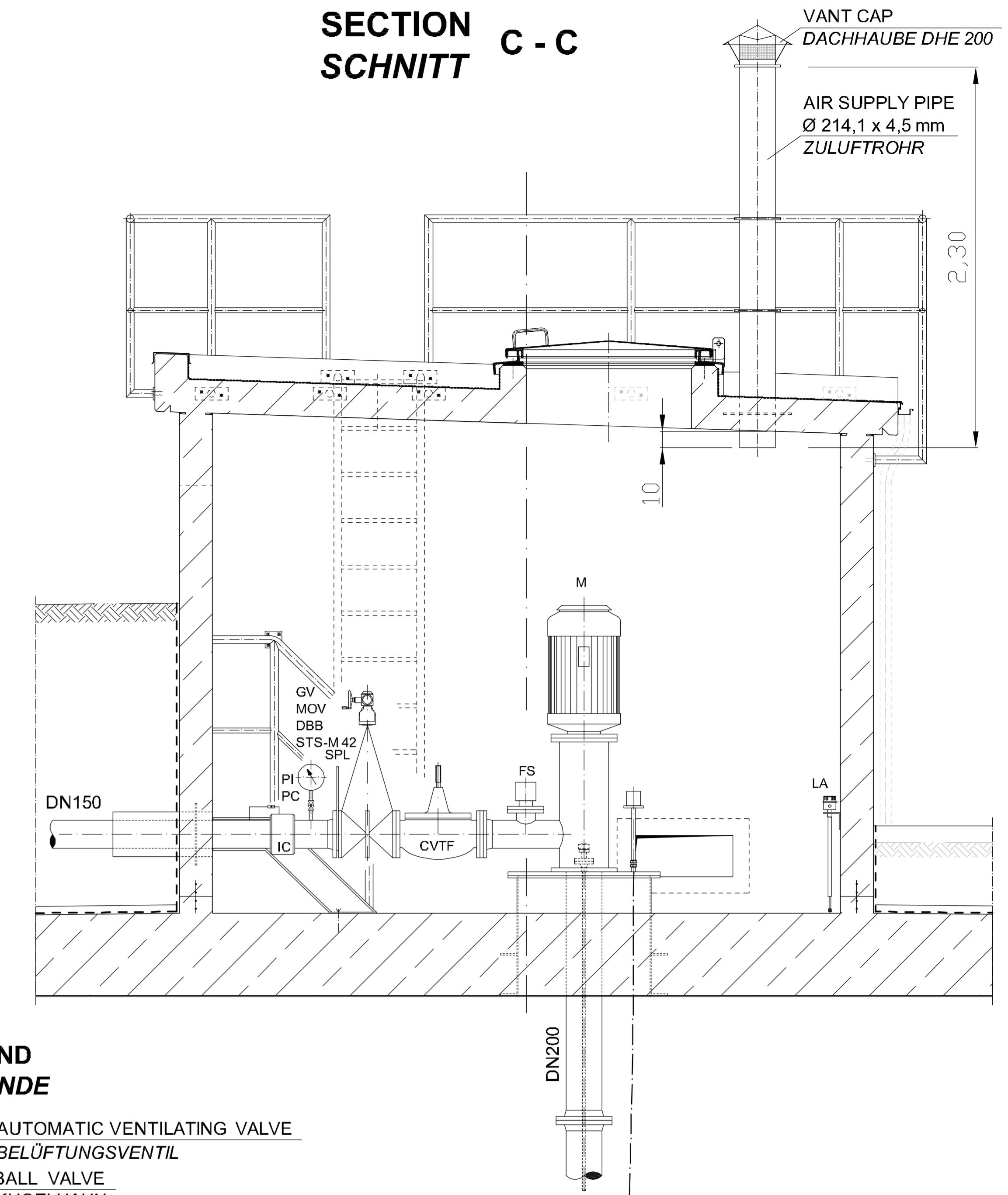
**SECTION B - B**  
**SCHNITT**



**SECTION D - D**  
**SCHNITT**



**SECTION C - C**  
**SCHNITT**



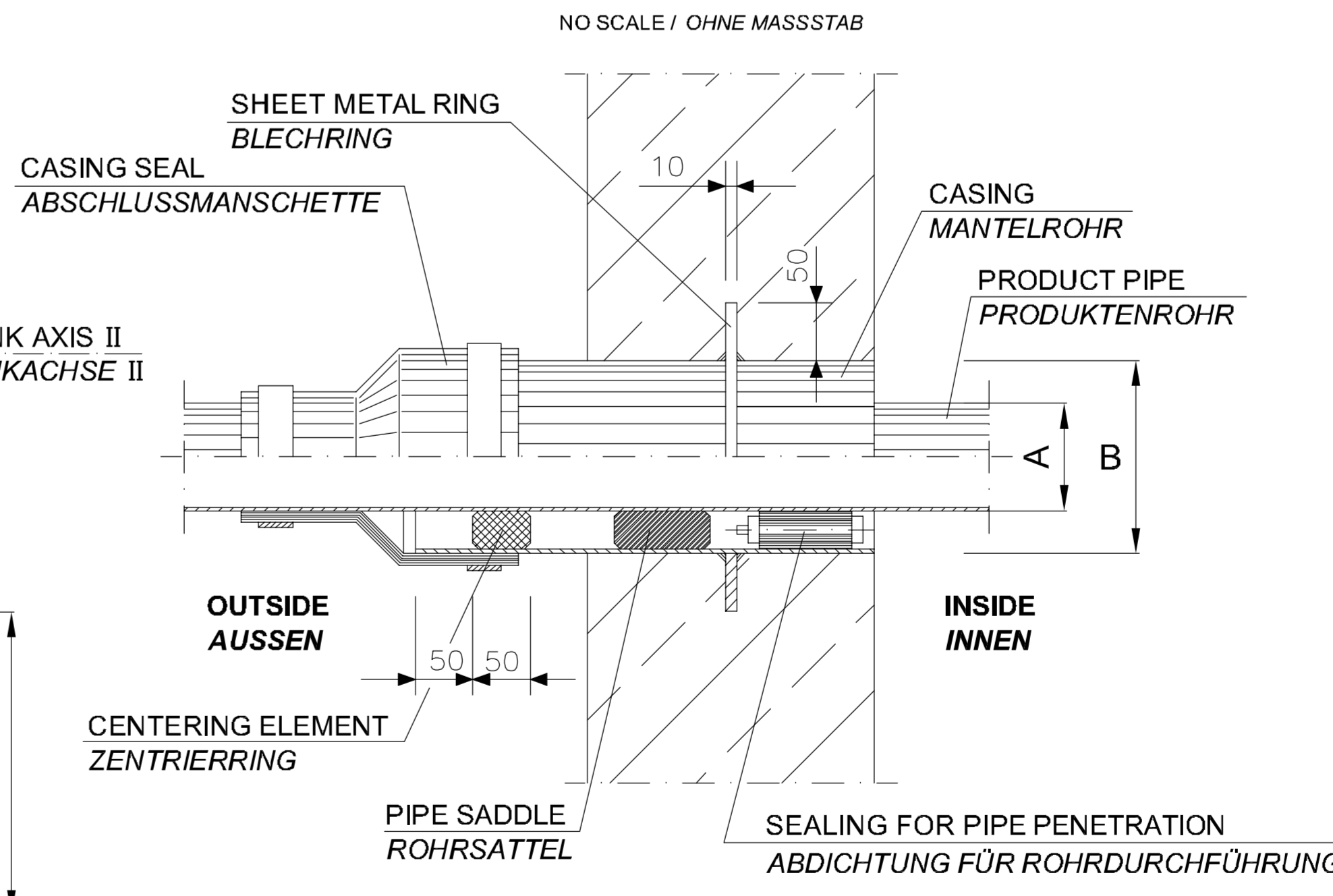
**LEGEND**  
**LEGENDE**

- AW AUTOMATIC VENTILATING VALVE  
BELÜFTUNGSVENTIL
- BV BALL VALVE  
KUGELHAHN
- GV GATE VALVE  
ABSPERRSCHIEBER
- CVTF PUMP START VALVE WITH FLOW LIMITATION  
PUMPENANFAHRENTIL MIT MENGENBEGRENZUNG
- FS FLOW SWITCH  
STRÖMUNGSWÄCHTER
- HLV HIGH LEVEL SHUT - OFF VALVE  
ÜBERFÜLLSICHERUNG
- IC INSULATING COUPLING  
ISOLIERKUPPLUNG
- LA LIQUID PROBE  
FLÜSSIGKEITSSONDE
- LI LEVEL INDICATOR  
FÜLLSTANDSANZEIGER
- M ELECTRIC MOTOR  
ELEKTROMOTOR
- MOV GATE VALVE WITH MOTOR  
ABSPERRARMATUR MIT MOTORANTRIEB
- P PUMP  
PUMPE
- PC PRESSURE GAUGE STOPCOCK  
MANOMETER - ABSPERRVENTIL
- PI PRESSURE GAUGE  
MANOMETER
- PRVV PRESSURE RELIEF - VACUUM VALVE  
ÜBER - UNTERDRUCK MEMBRANVENTIL
- SDD SAFETY DEVICE AGAINST DETONATION, DRY TYPE  
TROCKEN - DETONATIONSSICHERUNG
- SDL SAFETY DEVICE AGAINST DETONATION, LIQUID TYPE  
FLÜSSIGKEITS - DETONATIONSSICHERUNG
- SPL SPADE PLATE  
BRILLENSTECKSCHEIBE
- VC VENTILATING CAP  
ENTLÜFTUNGSHAUBE
- VL VENTILATOR  
VENTILATOR
- DBB DOUBLE BLOCK AND BLEED

**PERTINENT DRAWINGS**  
**ZUGEHÖRIGE ZEICHNUNGEN**

C-2.2 GENERAL PLAN - DETAILS  
ÜBERSICHTSPLAN - DETAILS

**DETAIL PIPE PENETRATION**  
**DETAIL ROHRDURCHFÜHRUNG**



PRODUCT PIPE PRODUKTENROHR	A mm	B mm
DN 25	Ø 33,7	Ø 76,1
DN 50	Ø 60,3	Ø 168,3
DN 150	Ø 168,3	Ø 273
DN 200	Ø 273	Ø 323,9
EXAMPLE	BEISPIEL	

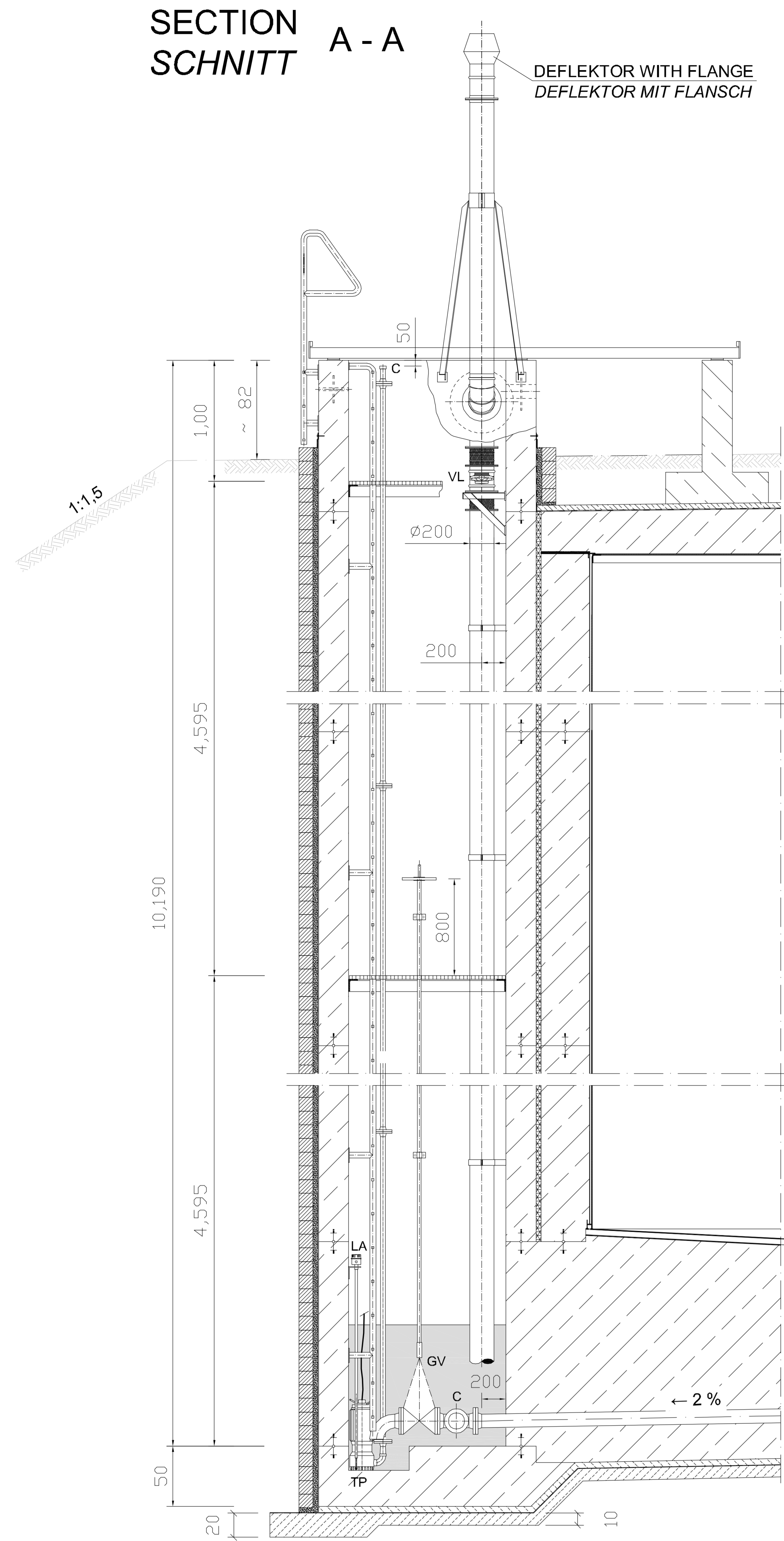
REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
HEADQUARTERS UNITED STATES AIR FORCES EUROPE ENGINEERING & OPERATIONS				
AIRFIELD STANDARD DESIGN US		FLUGPLATZ STANDARDPLANUNG US		
JET FUEL STORAGE AND DISPENSING SYSTEMS		FLUGKRAFTSTOFF - VERSORGSANLAGEN		
BUILDING BAUWERK				
OPERATING TANK 1250m³ FLACHBODENTANK 1250m³				
DESIGNATOR BEZEICHNUNG				
MECHANICAL INSTALLATION WITH INSULATING COUPLING MASCHINENTECHNISCHE INSTALLATION MIT ISOLIERKUPPLUNG				
WORKED/ARBEITET	PREPARED/AUFGESTELLT	APPROVED/GENEHIGT		
LANDSBEREITUNGSGESAMTSCHAFT UND BAUBETRIEB LAW-WEITERLEBUNGSLAND		AMT FÜR BUNDESBAU WALLSTR.1 55122 MAINZ		
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAUPLANEN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED GENEHIGT	DATE DATUM	6. MAI 2015	SCALE MASSSTAB	1:20
ORIGINAL DRAWN BY IN ORIGINAL DES.			STANDARD SHEET STANDARD PLAN	
GENERAL INFO GEMISCHTE FACILITÄTSEINGANG IN GEMISCHTE FACILITÄT		CAD-PROJECT NAME CAD-PROJEKTNAME		M - 3.1
CONSTRUCTION PROJECT BAUPLANNAME				SHEET NO. BLATT NR.



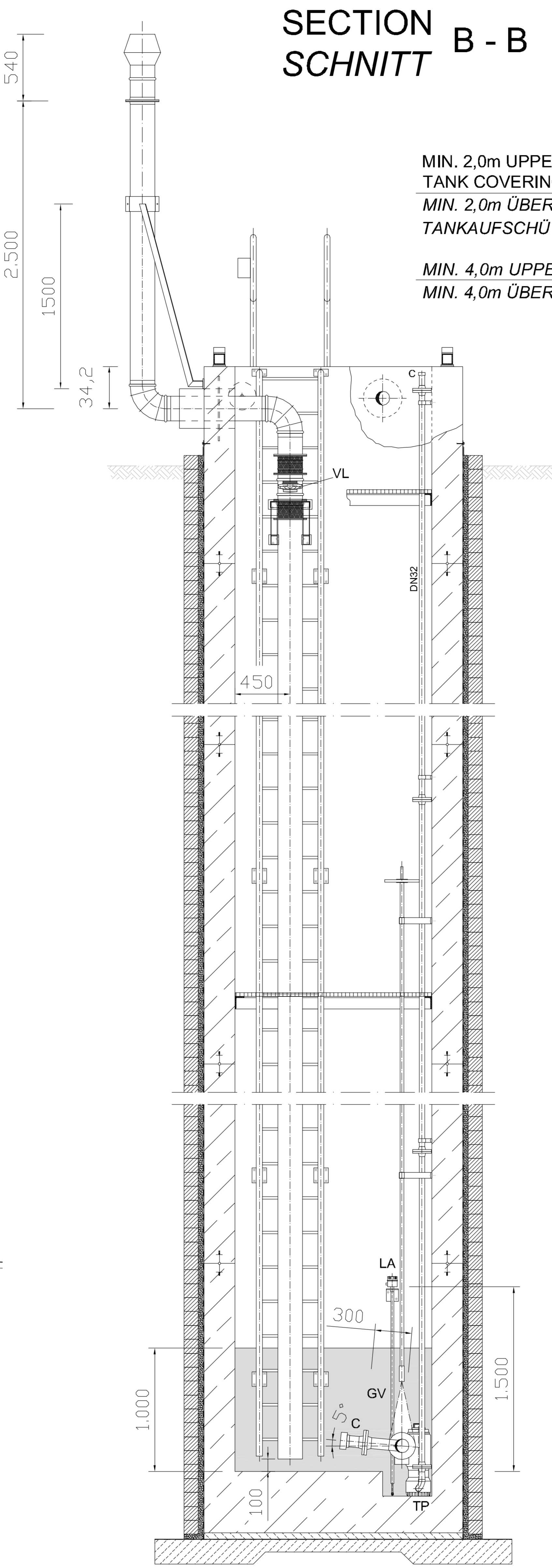




**SECTION A - A**  
**SCHNITT A - A**

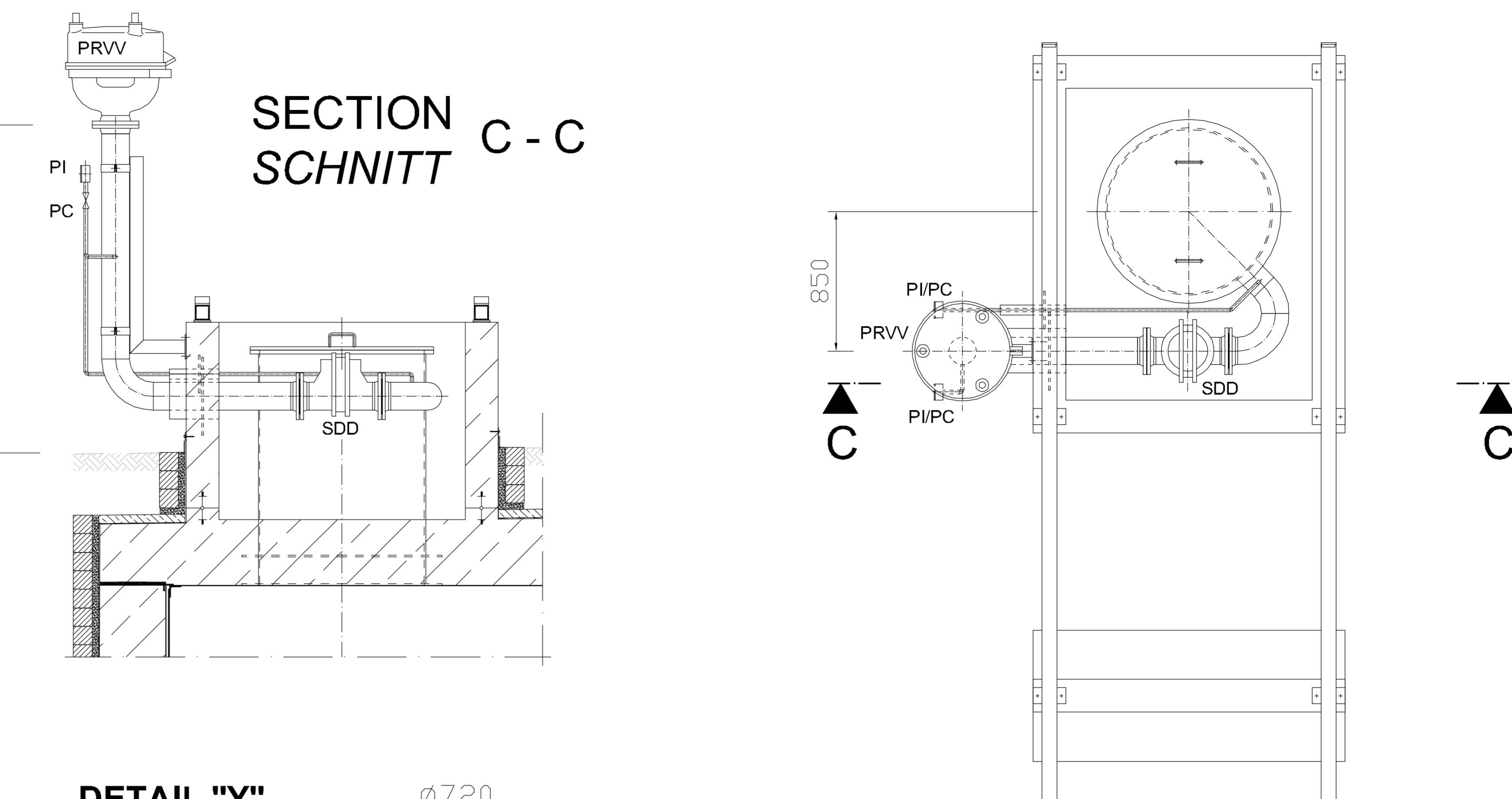


**SECTION B - B**  
**SCHNITT B - B**

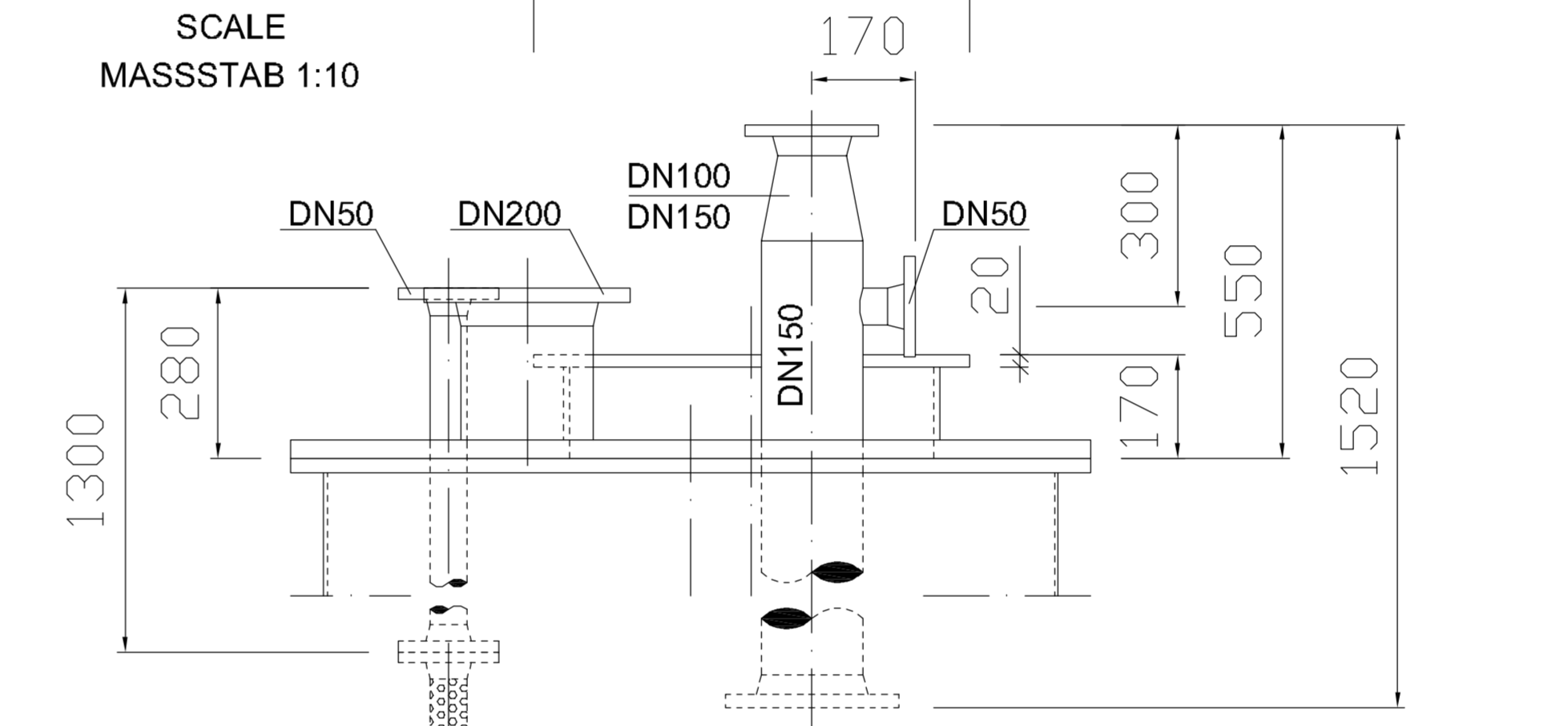


**MANHOLE WITH VENTILATING**  
**MONTAGEÖFFNUNG MIT ENTLÜFTUNG**

**SECTION C - C**  
**SCHNITT C - C**



**DETAIL "Y"**



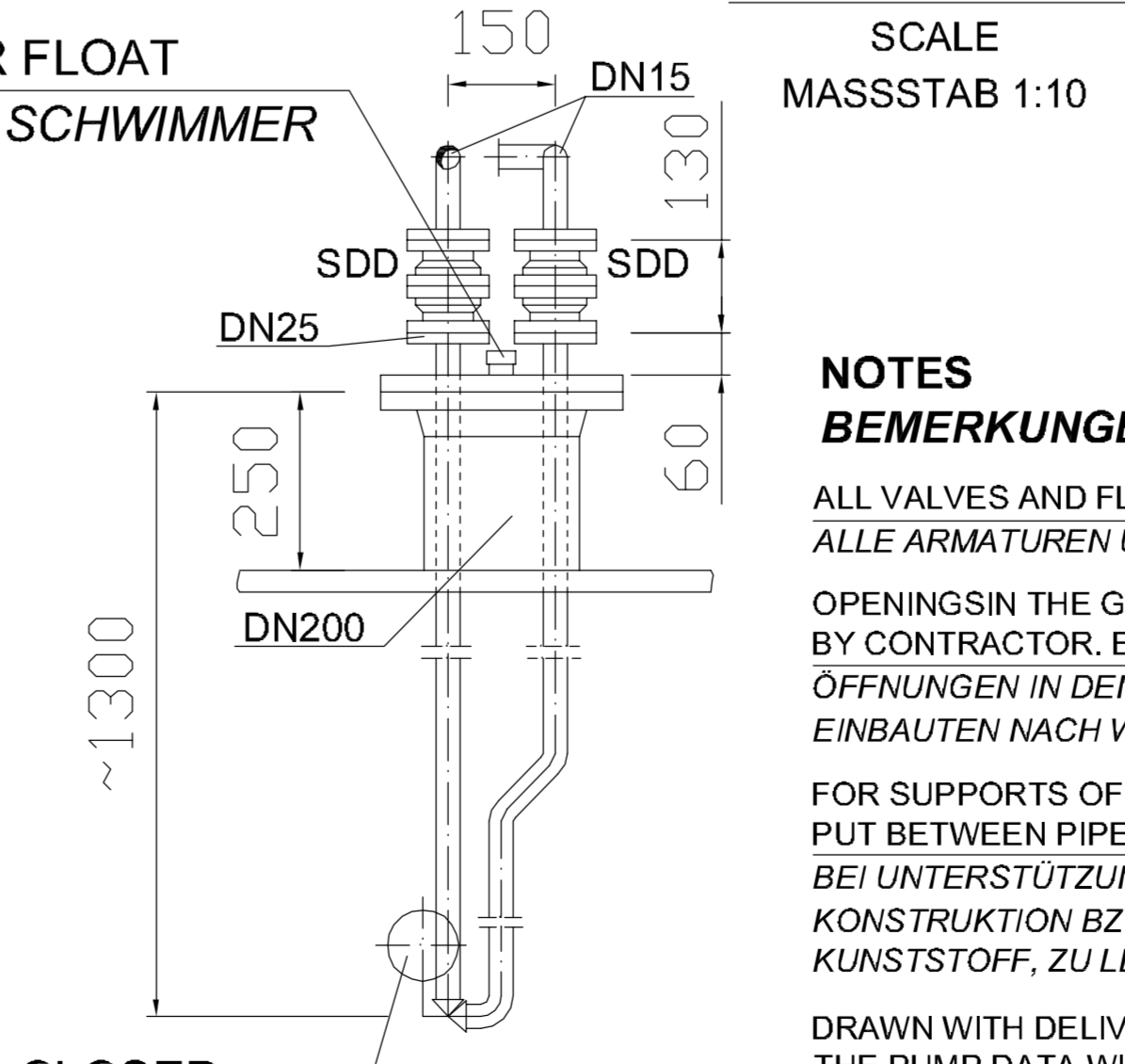
SOCKET DN50 FOR TEMPERATURE MEASURING  
STUTZEN DN50 FÜR TEMPERATURMESSUNG

SOCKET DN200 FOR CONTROLPIPE OF HIGH-LEVEL CONTROL VALVES  
STUTZEN DN200 FÜR STEUERLEITUNGEN DER ÜBERFÜLLSICHERUNG

PUMP SOCKET Ø 600  
PUMPENSTUTZEN Ø 600

SOCKET DN150/100 FOR GAUGING AND SAMPLING DEVICE  
STUTZEN DN150/100 FÜR PEIL- UND PROBEENTNAHMEROHR

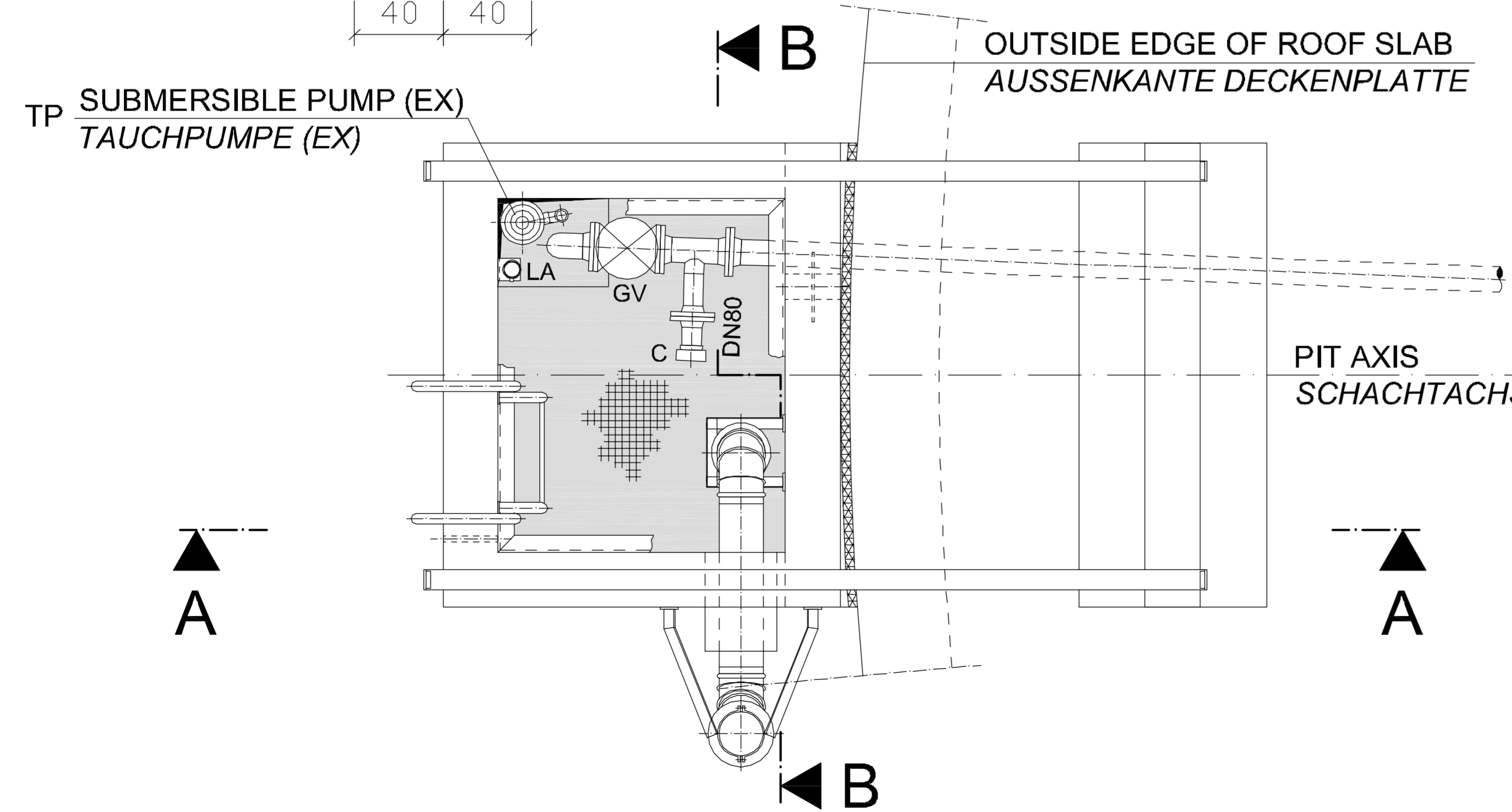
**DETAIL "X"**



HANDTESTING FOR FLOAT  
HANDTESTER FÜR SCHWIMMER

**LEAKAGE CONTROL PIT**  
**LECKKONTROLLSCHACHT**

THE FLOAT OF THE HIGH-LEVEL CONTROL VALVE HAS TO BE INSTALLED IN THAT WAY THAT IN CASE OF A LIQUID LEVEL OF 230mm UNDER TANK ROOF THE HIGH-LEVEL CONTROL VALVE IS CLOSED  
DER SCHWIMMER DER ÜBERFÜLLSICHERUNG MUSS SO EINGEBAUT WERDEN, DASS BEI EINEM FLÜSSIGKEITSSTAND VON 230mm UNTER DER BEHÄLTERDECKE DIE ÜBERFÜLLSICHERUNG GESCHLOSSEN IST.



**LEGEND**  
**LEGENDE**

- GV GATE VALVE  
ABSPERRSCHIEBER
- LA LIQUID PROBE  
FLÜSSIGKEITSSONDE
- PC PRESSURE GAUGE STOPCOCK  
MANOMETER - ABSPERRVENTIL
- PI PRESSURE GAUGE  
MANOMETER
- PRVV PRESSURE RELIEF - VACUUM VALVE  
ÜBER - UNTERDRUCK MEMBRANVENTIL
- SDD SAFETY DEVICE AGAINST DETONATION, DRY TYPE  
TROCKEN - DETONATIONSSICHERUNG
- TP SUBMERSIBLE PUMP  
TAUCHPUMPE
- VL VENTILATOR  
VENTILATOR
- FUEL RESISTANT PLASTIC COATING / DISSIPATIVE (10<sup>-6</sup> S)  
KRAFTSTOFFBESTÄNDIGE KUNSTSTOFFBESCHICHTUNG / ABLEITFÄHIG (10<sup>-6</sup> S)

**PERTINENT DRAWINGS**  
**ZUGEHÖRIGE ZEICHNUNGEN**

M-2.1 MECHANICAL INSTALLATION  
MASCHINENTECHNISCHE INSTALLATION

REVISION	DATE	DESCRIPTION	BY	COUNTRY
ÄNDERUNG	DATUM	BESCHREIBUNG	VON	LAND
HEADQUARTERS UNITED STATES AIR FORCES EUROPE ENGINEERING & OPERATIONS				
AIRFIELD STANDARD DESIGN US		FLUGPLATZ STANDARDPLANUNG US		
JET FUEL STORAGE AND DISPENSING SYSTEMS		FLUGKRAFTSTOFF - VERSORGSANLAGEN		
BUILDING BAUWERK OPERATING TANK 1250m <sup>3</sup> FLACHBODENTANK 1250m <sup>3</sup>				
DESIGNATOR BEZEICHNUNG MECHANICAL INSTALLATION, LEAKAGE CONTROL PIT AND DETAILS MASCHINENTECHNISCHE INSTALLATION, LECKKONTROLLSCHACHT UND DETAILS				
VORBEREITET		APPROVED/GENEHIGT		
LANDSCHAFTS- UND BAUWERKE L B B		AMT FÜR BUNDESBAU WALLSTR.1 55122 MAINZ		
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAU MASSNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED GENEHIGT	DATE DATUM	6. MAI 2015	SCALE MASSSTAB	1:20 : 1:10
ORIGINAL DRAWN BY IN ORIGINAL DED.		STANDARD SHEET STANDARD PLAN		M - 3.2
CONSTRUCTION PROJECT BAU MASSNAHME		SHEET NO. PLATZ NR.		OF VON

**NOTES**  
**BEMERKUNGEN**

ALL VALVES AND FLANGES DESIGNED FOR PN 16  
ALLE ARMATUREN UND FLANSCH AUSGELEGT FÜR PN 16

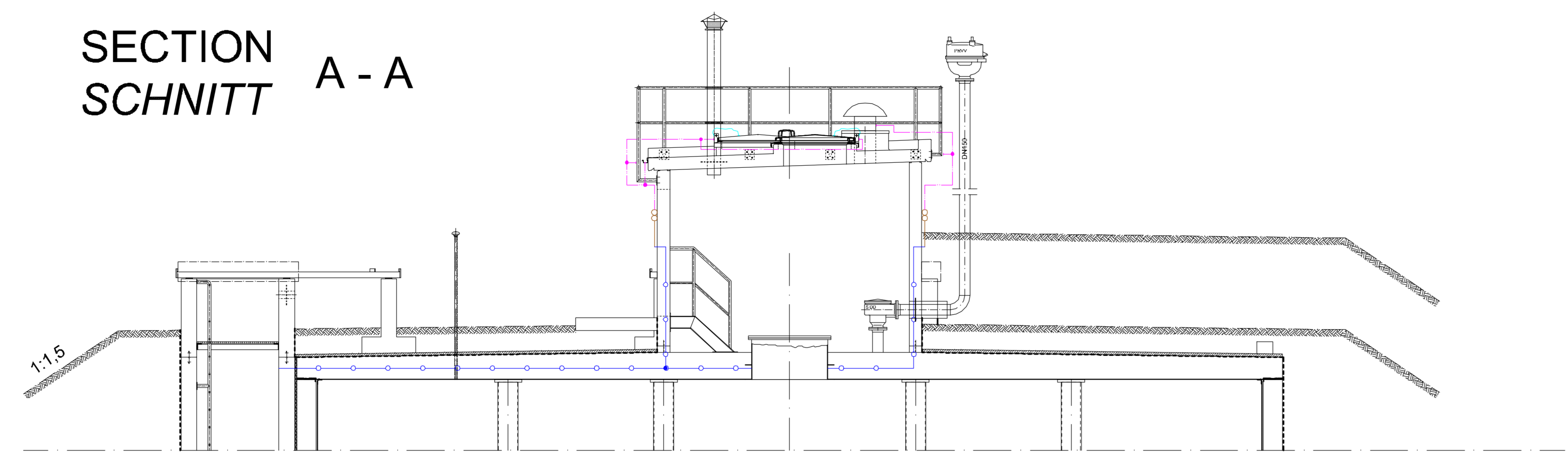
OPENINGS IN THE GRATINGS ACC. TO THE MECHANICAL INSTALLATIONS AS SELECTED BY CONTRACTOR. EASY REMOVAL OF THE GRATINGS SHALL BE GUARANTEED.  
ÖFFNUNGEN IN DEN GITTERROSTEN ENTSPRECHEND DEN MASCHINENTECHNISCHEN EINBAUTEN NACH WAHL DES AN. DER LEICHTE AUSBAU DER GITTERROSTE IST ZU GEWÄHRLEISTEN.

FOR SUPPORTS OF PIPES AN INSULATION PIECE, MADE OF 10mm THICK FUELRESISTANT PLASTIC IS TO PUT BETWEEN PIPES AND SUPPORTS OR HOLDERS.  
BEI UNTERSTÜTZUNGEN VON ROHRLEITUNGEN IST ZWISCHEN ROHRLEITUNG UND UNTERSTÜTZUNGS-KONSTRUKTION BZW. HALTERUNG EINE ISOLIERPLATTE 10mm DICK AUS KRAFTSTOFFBESTÄNDIGEN KUNSTSTOFF, ZU LEGEN.

DRAWN WITH DELIVERY PUMPS FOR HYDRANT REFUELING. FOR TANK TRUCK REFUELING THE PUMP DATA WILL BE CHANGED.  
GEZEICHNET MIT FÖRDERPUMPEN FÜR HYDRANTENBETANKUNG. BEI TKW - BEFÜLLUNG ÄNDERN SICH DIE PUMPENDATEN ENTSPRECHEND.



SECTION  
SCHNITT A - A



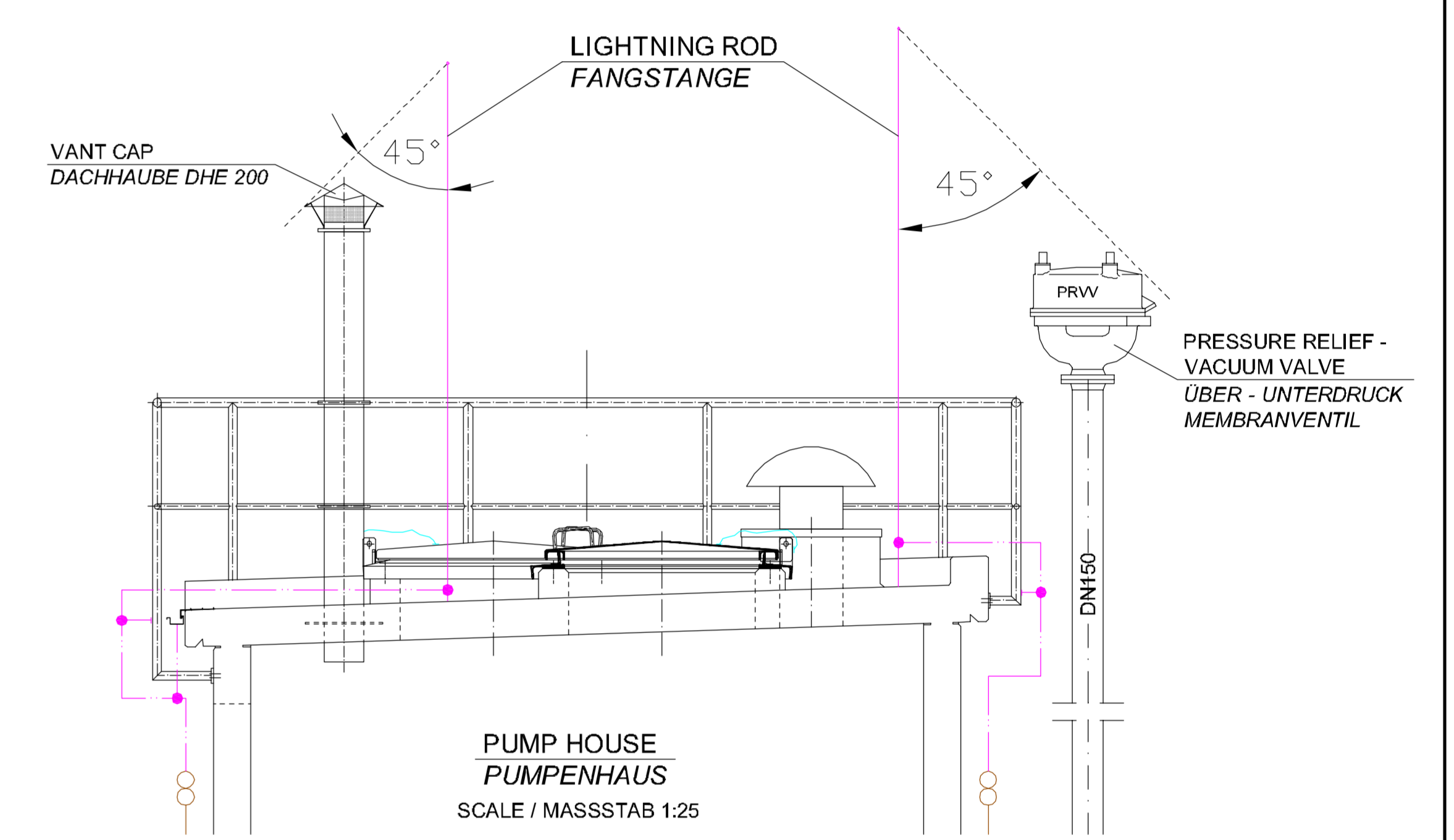
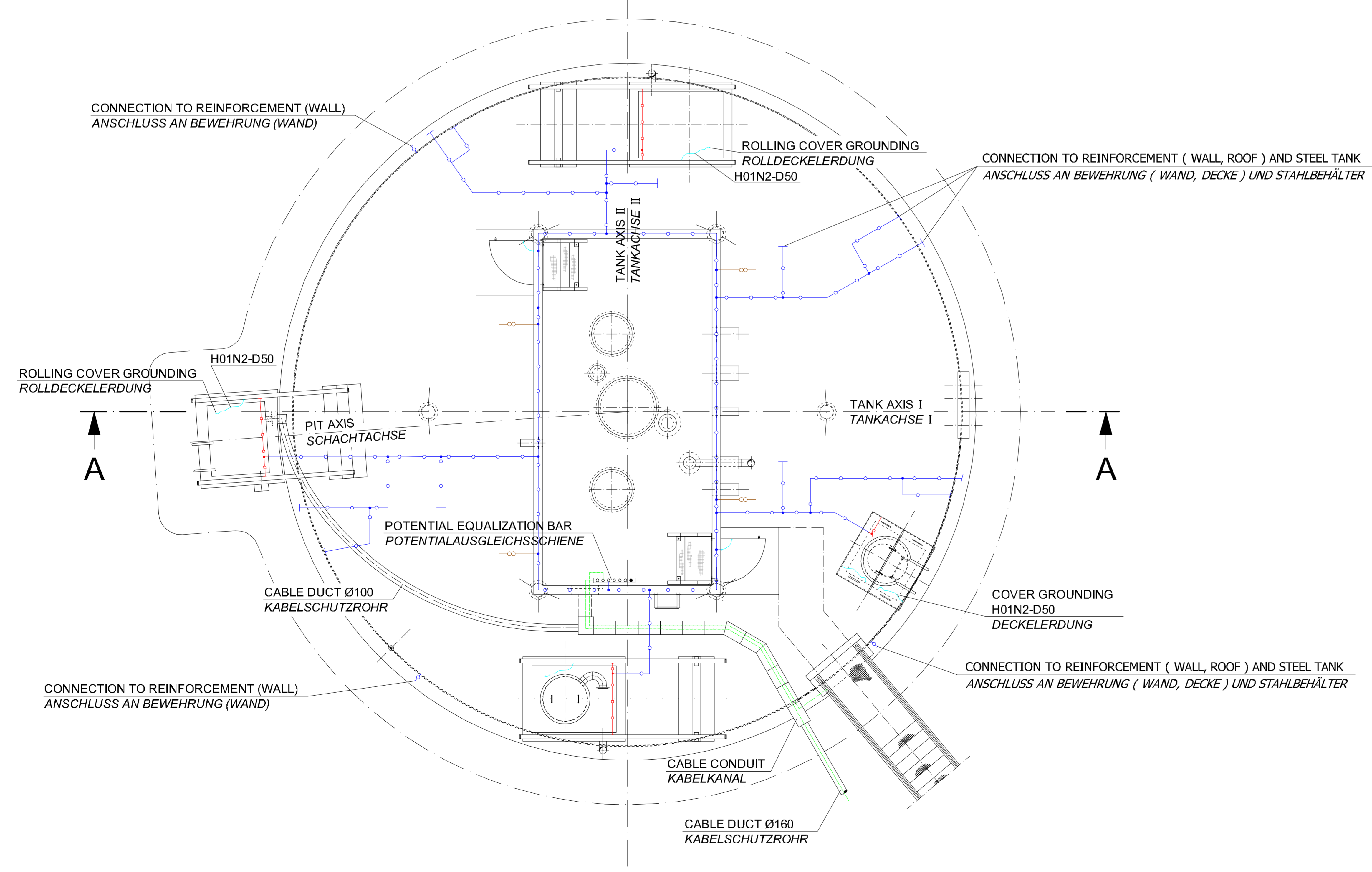
LEGEND  
LEGENDE

- DISCONNECTION POINT  
TRENNSTELLE
- STEEL STRIP 30 x 3.5mm IN CONCRETE  
(STAINLESS STEEL, MATERIAL NO. 1.457)  
BANDSTAHL 30 x 3,5mm IM BETON  
(EDELSTAHL, WERKSTOFF NR. 1.457)
- GALV. STEEL STRIP 30 x 3.5mm SURFACE - MOUNTED  
VERZ. BANDSTAHL 30 x 3,5mm AUF PUTZ
- GALV. ROUND STEEL Ø 8mm  
VERZ. RUNDSTAHL Ø 8mm
- NYY 1 x 50²
- H01N2 - D50

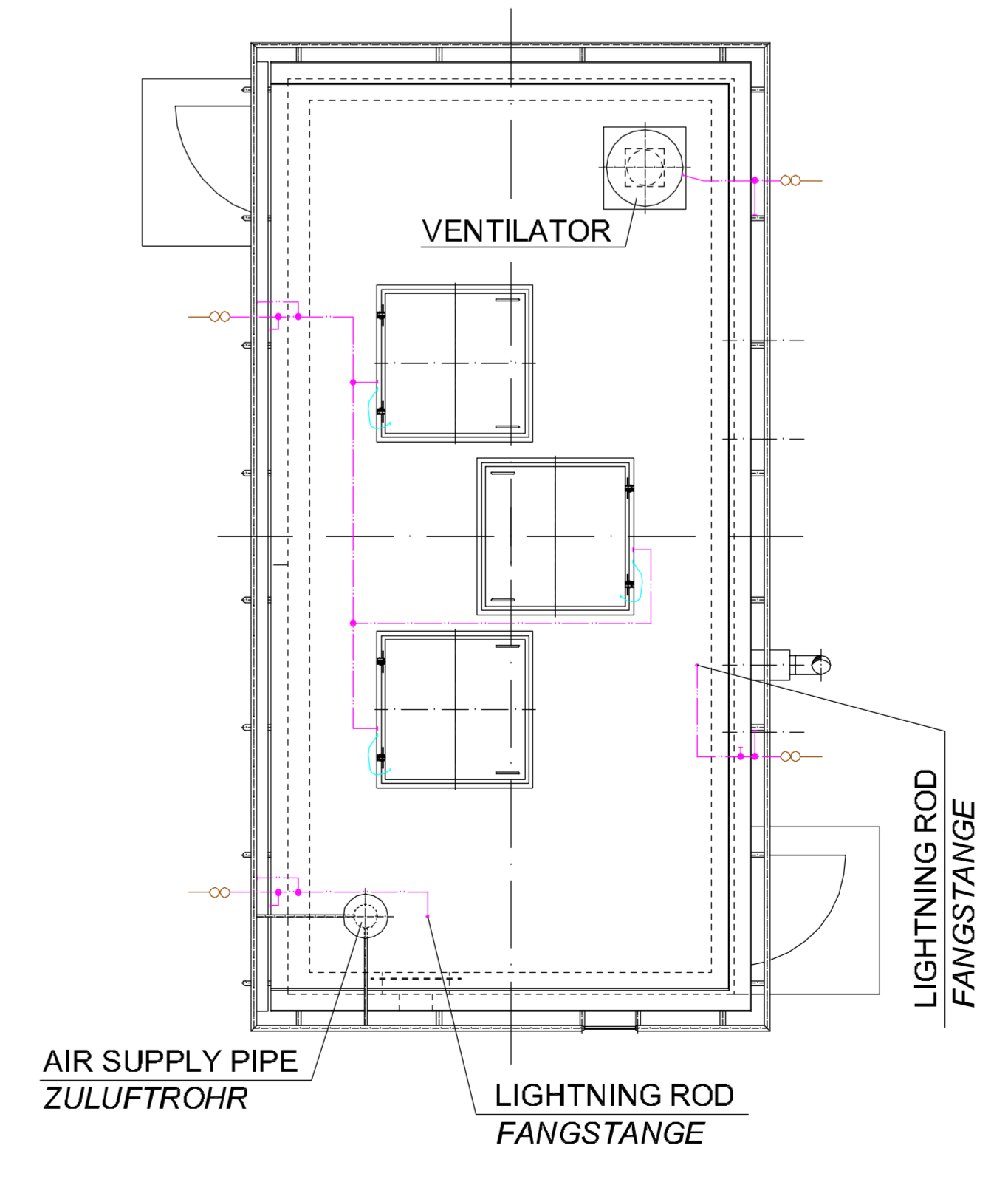
PERTINENT DRAWINGS  
ZUGEHÖRIGE ZEICHNUNGEN

E-3.2 ELECTRICAL INSTALLATION, PUMP HOUSE AND LEAKAGE CONTROL PIT  
ELEKTROTECHNISCHE INSTALLATION, PUMPENHAUS UND  
LECKKONTROLLSCHACHT

TOP VIEW  
DRAUFSICHT  
(SECTION THROUGH PUMP HOUSE)  
(SCHNITT DURCH PUMPENHAUS)



TOP VIEW  
DRAUFSICHT  
PUMP HOUSE  
PUMPENHAUS

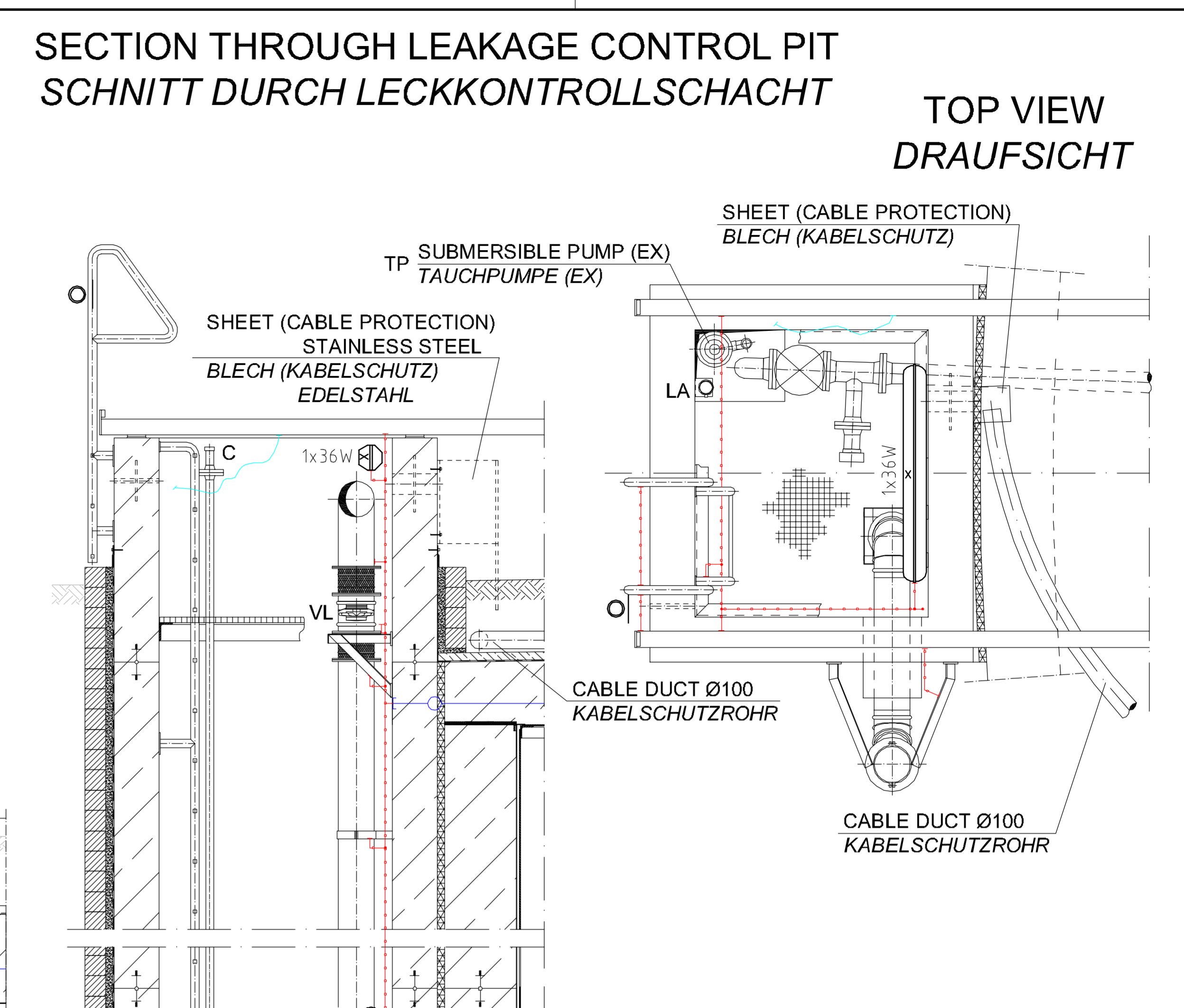
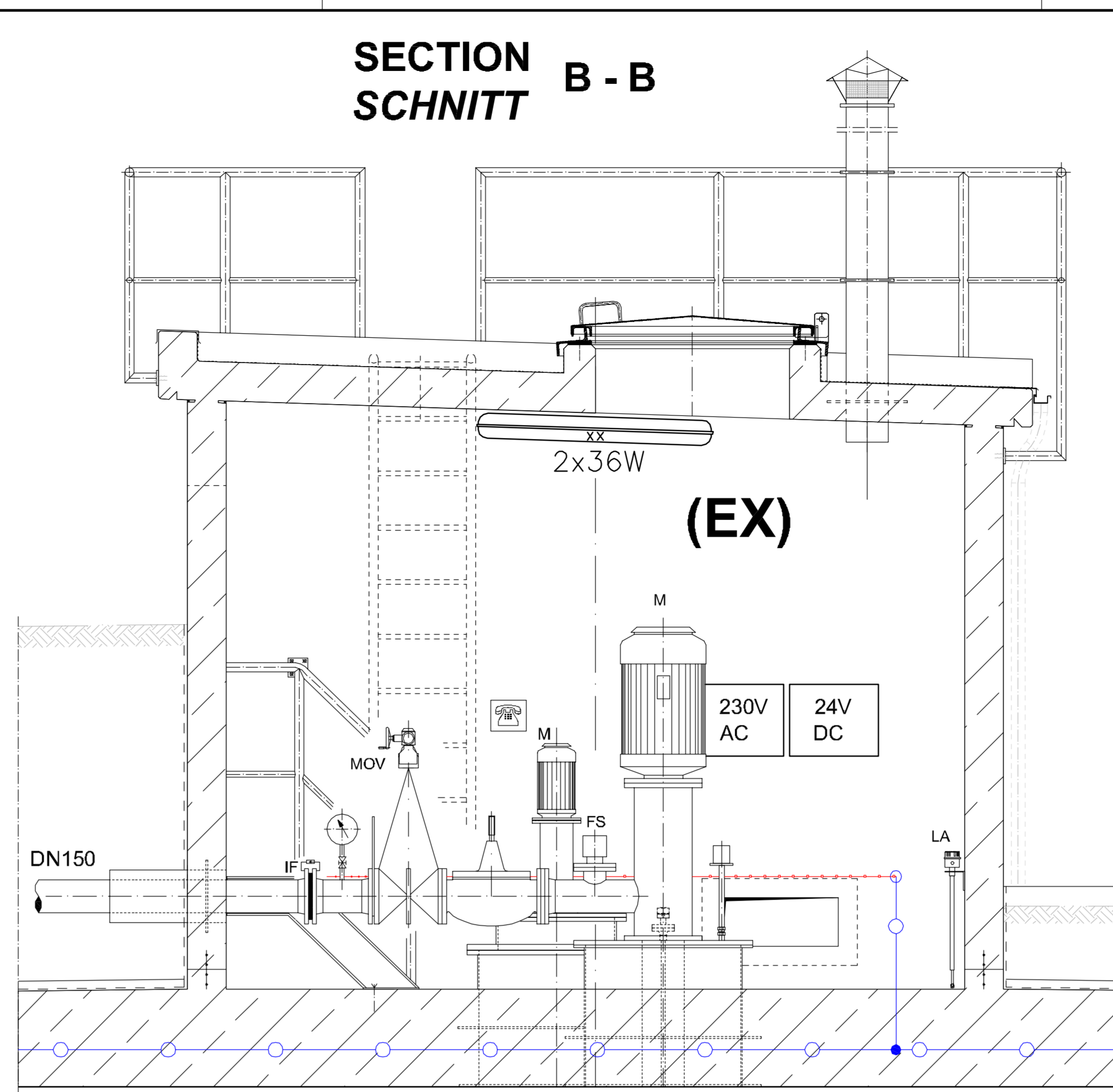
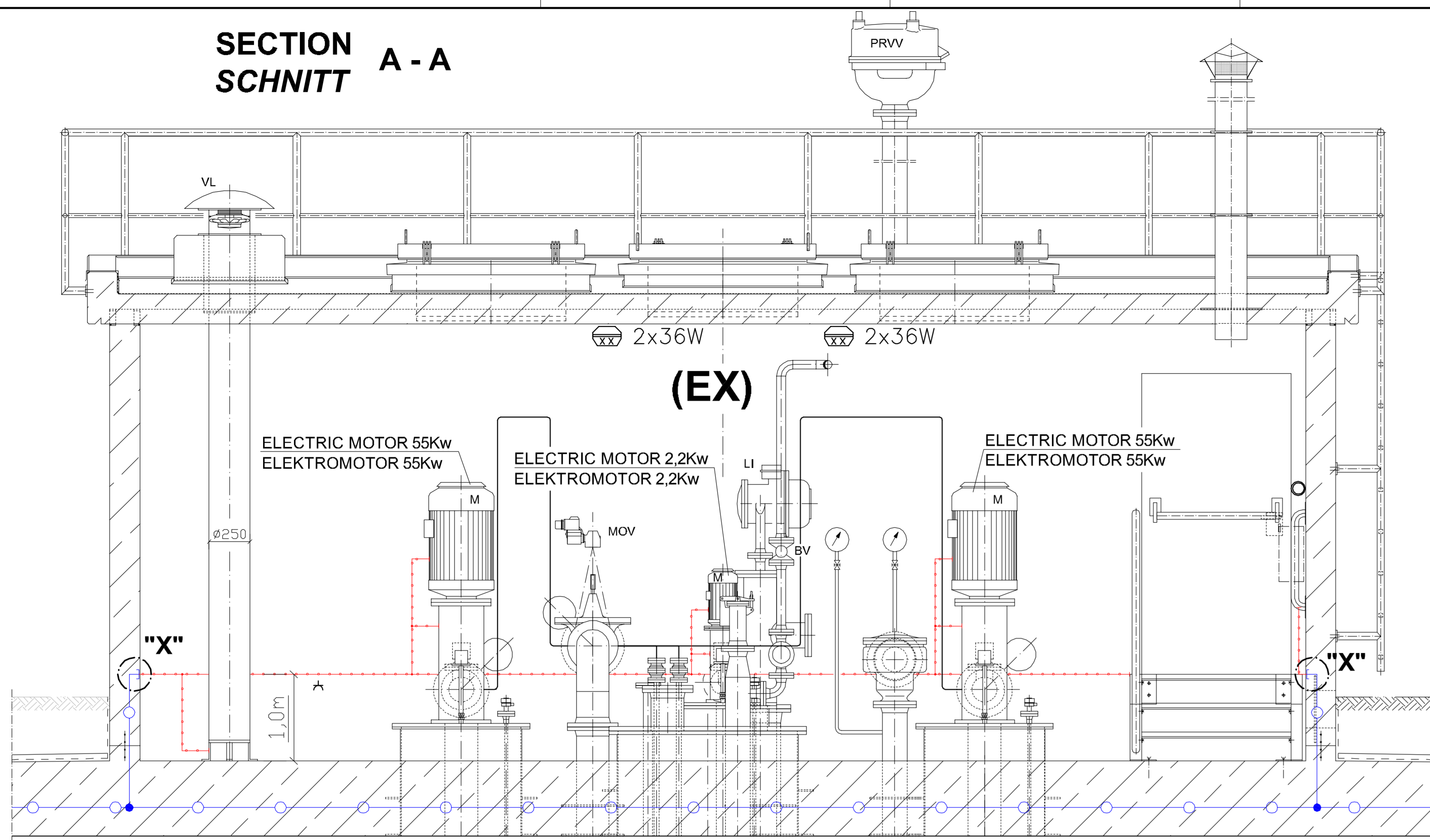


REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
<b>HEADQUARTERS</b>				
UNITED STATES AIR FORCES EUROPE				
ENGINEERING & OPERATIONS				
AIRFIELD STANDARD DESIGN US		FLUGPLATZ STANDARDPLANUNG US		
JET FUEL STORAGE AND DISPENSING SYSTEMS		FLUGKRAFTSTOFF - VERSORGUNGSANLAGEN		
<b>OPERATING TANK 1250m³ FLACHBODENTANK 1250m³</b>				
<b>GROUNDING - AND LIGHTNING PROTECTION PLAN ERDUNGS - UND BLITZSCHUTZPLAN</b>				
WORKED/BEARBEITET		PREPARED/HERGESTELLT	APPROVED/GENEHMIGT	
LANDSCHAFTS- UND BAUVERBUND LUB-WEISSHALLUNG/LANDAU		L B B	AMT FÜR BUNDESBAU WALLSTR.1 55122 MAINZ	
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAU MASSNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED GENEHMIGT	DATE DATUM	6. MAI 2015	SCALE MASSSTAB	1:50 / 1:25
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CONSTRUCTION PROJECT BAU MASSNAHME			CAD-PROJECT PUBL. CAD-PROJEKTDRUCK	SHEET NO. PLATZNR.

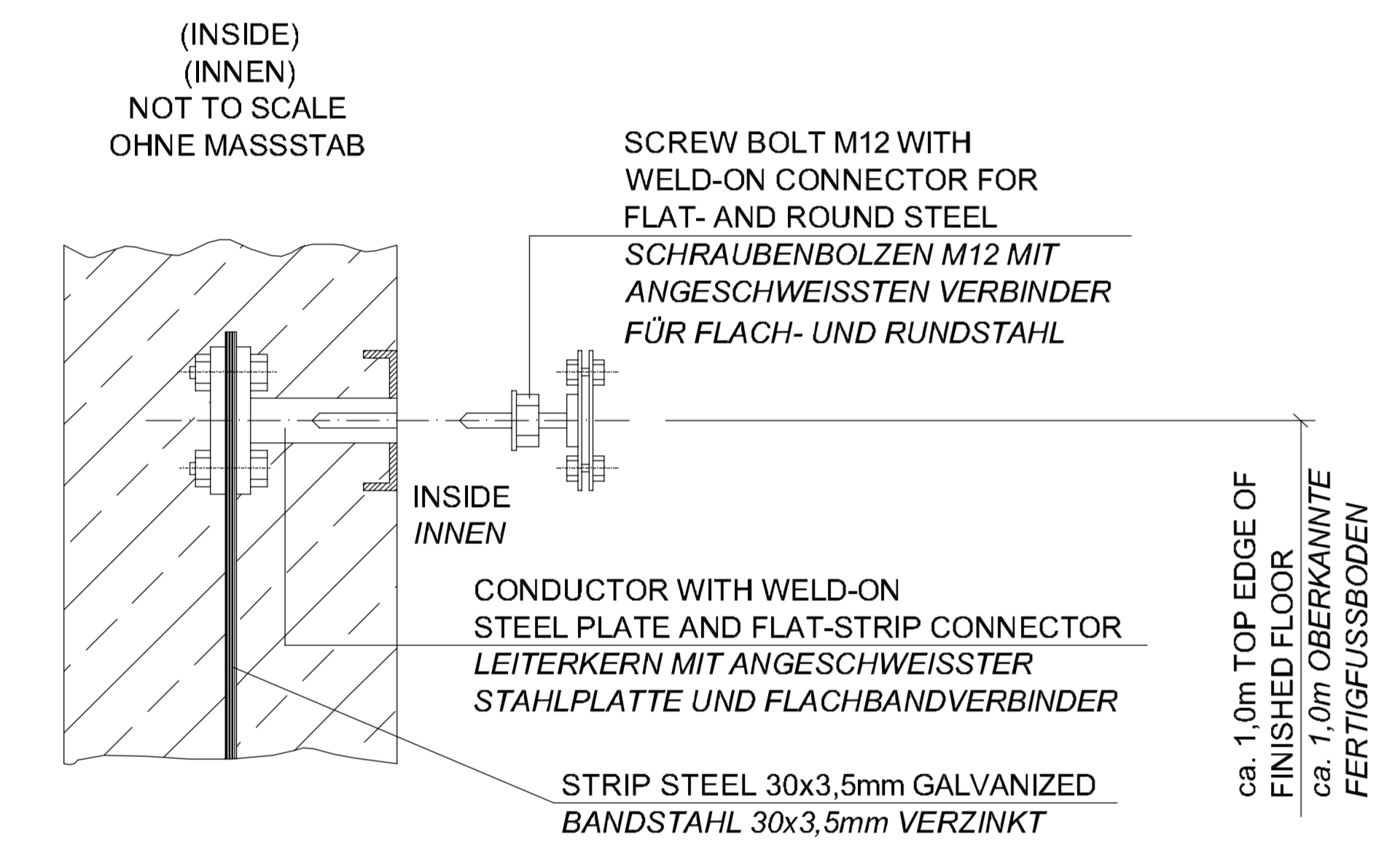




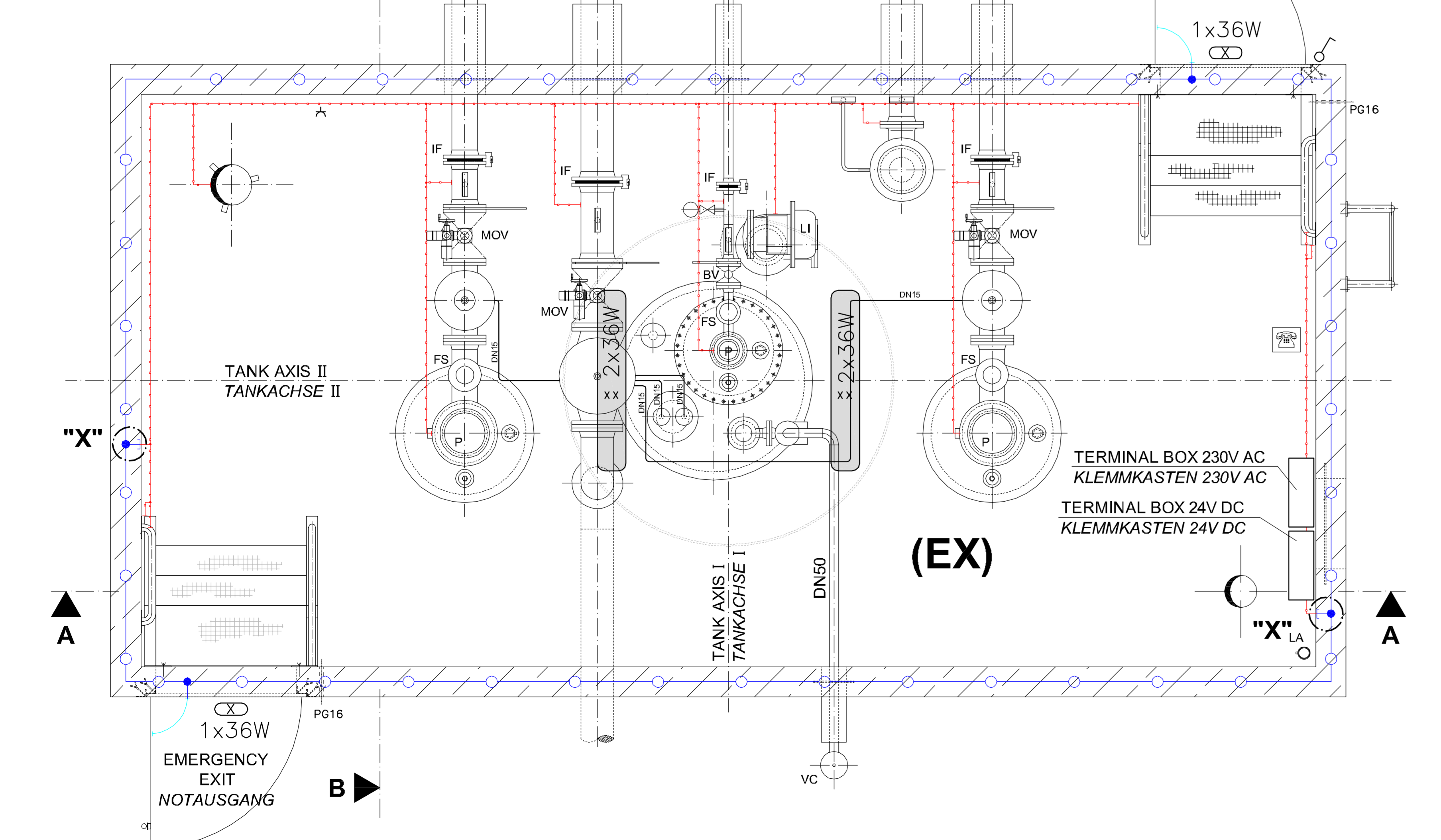




### DETAIL "X" GROUNDING CONNECTION ERDUNGSANSCHLUSS



### GROUND PLAN GRUNDRISS



### LEGEND LEGENDE

- BV BALL VALVE  
KUGELHAHN
- FS FLOW SWITCH  
STRÖMUNGSWÄCHTER
- IF ISULATING FLANGE  
ISOLIERFLANSCH
- LA LIQUID PROBE  
FLÜSSIGKEITSSONDE
- LI LEVEL INDICATOR  
FÜLLSTANDSANZEIGE
- M MOTOR  
MOTOR
- MOV GATE VALVE WITH MOTOR  
ABSPERRARMATUR MIT MOTORANTRIEB
- TP SUBMERSIBLE PUMP  
TAUCHPUMPE
- VL VENTILATOR  
VENTILATOR

- STEEL STRIP 30 x 3,5mm IN CONCRETE  
(STAINLESS STEEL, MATERIAL NO. 1.457)  
BANDSTAHL 30 x 3,5mm IM BETON  
(EDELSTAHL, WERKSTOFF NR. 1.457)
- GALV. STEEL STRIP 30 x 3,5mm SURFACE - MOUNTED  
VERZ. BANDSTAHL 30 x 3,5mm AUF PUTZ
- H01N2 - D50

- FLUORESCENT LAMP  
LEUCHTSTOFFLEUCHE
- EXPL. PROOF SPARK GAP  
EX- FUNKENSTRECKE
- RECEPTACLE  
STECKDOSE
- SWITCH  
SCHALTER
- PUSH BUTTON  
TASTER

- PTC THERMISTOR  
KALTLEITER

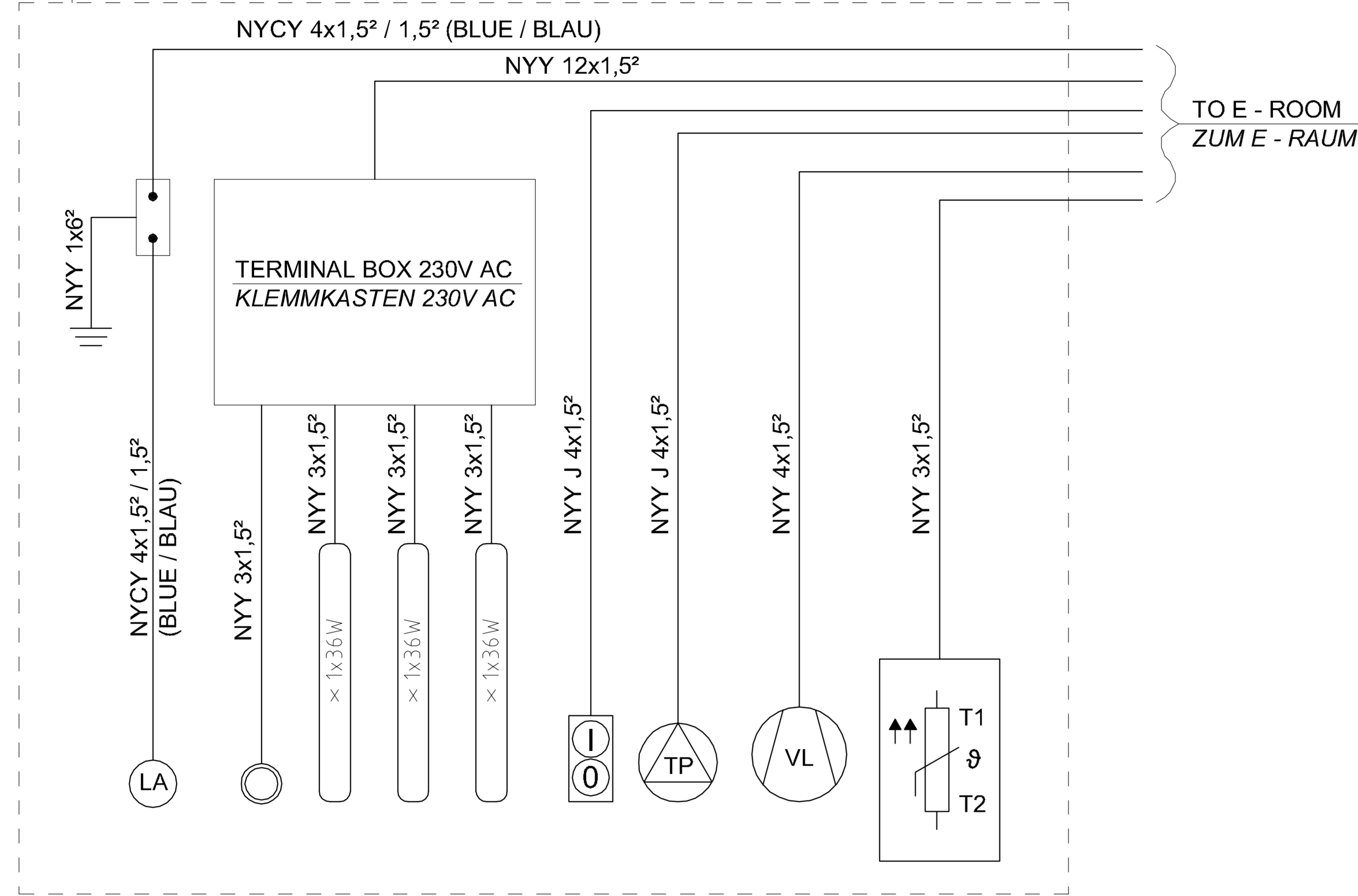
### PERTINENT DRAWINGS ZUGEHÖRIGE ZEICHNUNGEN

- E-3.1 GROUNDING - AND LIGHTNING PROTECTION PLAN  
ERDUNGS - UND BLITZSCHUTZPLAN
- E-3.3 ELECTRICAL DIAGRAMS, PUMP HOUSE  
AND LEAKAGE CONTROL PIT  
SCHALTPLÄNE, PUMPENHAUS  
UND LECKKONTROLLSCHACHT

REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
HEADQUARTERS UNITED STATES AIR FORCES EUROPE				
ENGINEERING & OPERATIONS				
AIRFIELD STANDARD DESIGN US		FLUGPLATZ STANDARDPLANUNG US		
JET FUEL STORAGE AND DISPENSING SYSTEMS		FLUGKRAFTSTOFF - VERSORGSANLAGEN		
BUILDING BAUWERK	OPERATING TANK 1250m <sup>3</sup> FLACHBODENTANK 1250m <sup>3</sup>			
DESIGNATOR BEZEICHNUNG	WITH ISULATING FLANGE / MIT ISOLIERFLANSCH ELECTR. INSTALLATION, PUMP HOUSE A. LEAKAGE CONTROL PIT ELEKTR. INSTALLATION, PUMPENHAUS U. LECKKONTROLLSCHACHT			
WORKSHEET ARBEITSBLATT	PREPARED/ANGESTELLT LANDSBEREITER/BEREITEND LAW/RECHENUNGSLEITER AM/STREITUNGSLÄHRER L B B	APPROVED/GENEHIGT AMT FÜR BUNDESBAU WALLSTR.1 55122 MAINZ		
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAUASSAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED GENEHIGT	DATE DATUM	6. MAI 2015	SCALE MASSSTAB	1:50
ORIGINAL DRAWN BY IN ORIGINAL DESIG.			STANDARD SHEET STANDARD PLAN	E - 3.2
DESIGNER/BAU CONRAD FÜR FACILITIES ENGINEER INGENIEUR FÜR ANLAGEN			CAD-PROGRAMME CAD-PROGRAMME	SHEET NO. PLATZNR.
CONSTRUCTION PROJECT BAUASSAHME				OF VON



**LEAKAGE CONTROL PIT  
LECKKONTROLLSCHACHT**



**LEGEND  
LEGENDE**

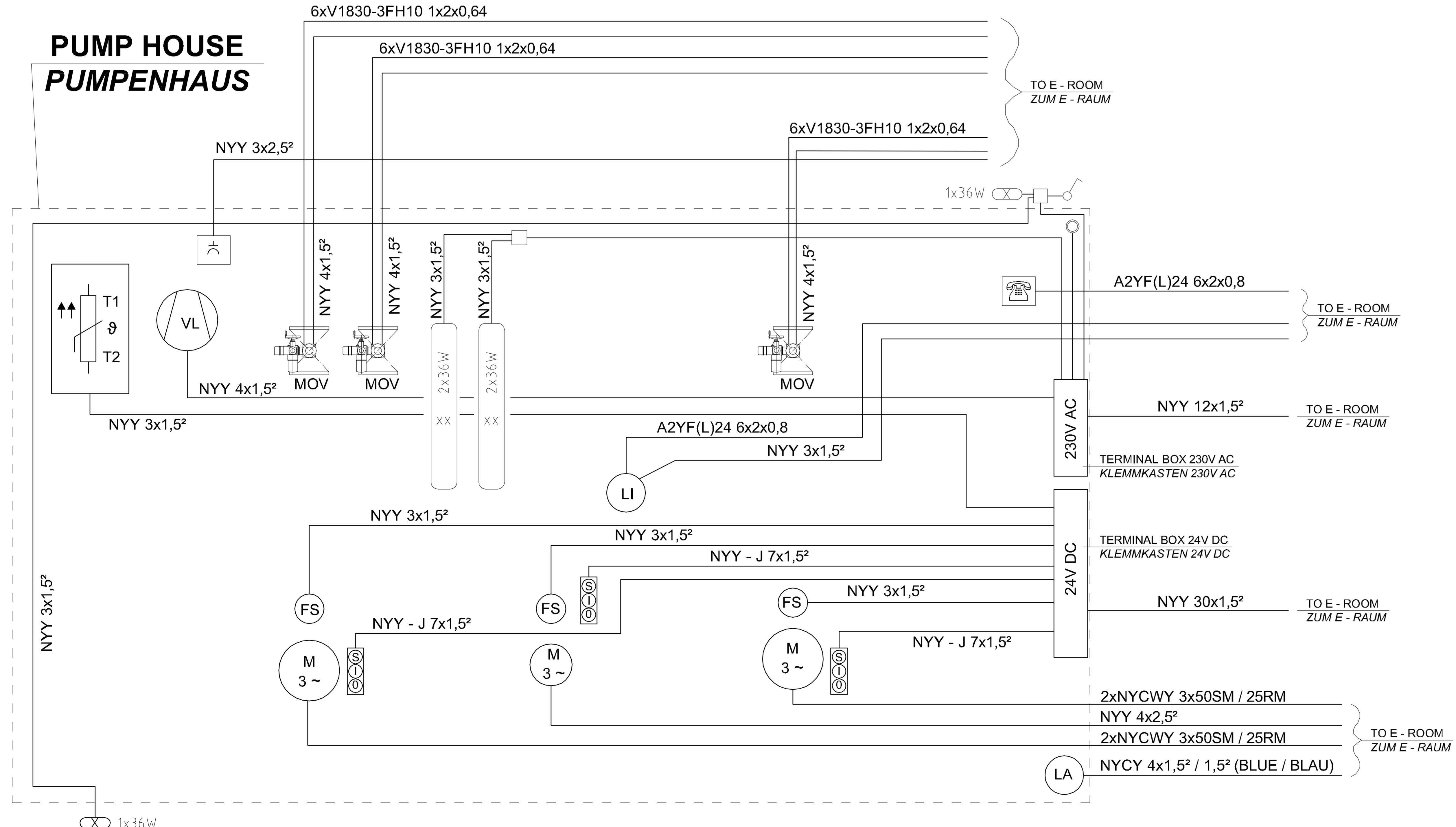
- FS FLOW SWITCH  
STRÖMUNGSWÄCHTER
- IC ISULATING COUPLING  
ISOLIERKUPPLUNG
- LA LIQUID PROBE  
FLÜSSIGKEITSSONDE
- LI LEVEL INDICATOR  
FÜLLSTANDSANZEIGE
- M MOTOR  
MOTOR
- MOV GATE VALVE WITH MOTOR  
ABSPERRARMATUR MIT MOTORANTRIEB
- TP SUBMERSIBLE PUMP  
TAUCHPUMPE
- VL VENTILATOR  
VENTILATOR

- FLUORESCENT LAMP  
LEUCHTSTOFFLEUCHTE
- EXPL. PROOF SPARK GAP  
EX- FUNKENSTRECKE
- RECEPTACLE  
STECKDOSE
- SWITCH  
SCHALTER
- PUSH BUTTON  
TASTER
- PTC THERMISTOR  
KALTLEITER

**PERTINENT DRAWINGS  
ZUGEHÖRIGE ZEICHNUNGEN**

- E-3.1 GROUNDING - AND LIGHTNING PROTECTION PLAN  
ERDUNGS - UND BLITZSCHUTZPLAN
- E-3.2 ELECTR. INSTALLATION, PUMP HOUSE A. LEAKAGE CONTROL  
ELEKTR. INSTALLATION, PUMPENHAUS U. LECKKONTROLLSCHACHT

**PUMP HOUSE  
PUMPENHAUS**



REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
HEADQUARTERS UNITED STATES AIR FORCES EUROPE				
AIRFIELD STANDARD DESIGN US		FLUGPLATZ STANDARDPLANUNG US		
JET FUEL STORAGE AND DISPENSING SYSTEMS		FLUGKRAFTSTOFF - VERSORGENSANLAGEN		
BUILDING BAUWERK OPERATING TANK 1250m³ FLACHBODENTANK 1250m³				
DESIGNATOR BEZEICHNUNG ELECTRICAL DIAGRAMS, PUMP HOUSE A. LEAKAGE CONTROL PIT SCHALTPLÄNE, PUMPENHAUS U. LECKKONTROLLSCHACHT				
WORKED/REARBEITET	PREPARED/AUFGESTELLT	APPROVED/GENEHMIGT		
<small>LANDSBEREITUNGSGEMEINSCHAFT UND BAUVERTRÄGE LAW-VEREINBARUNG LÄNDERN AMSCHEFT, UNTERSTÄTZUNG, IN DER LÄNDER TRAFIK, DIESEL UND DIE TRAFIK (DIESEL) UNTER LANDL. BY PHOTO IN CONNECTION ORIGINAL, GEEIGNET IN DRUCK, GEE. STÄRKE MIT FOLIE</small>		<small>AMT FÜR BUNDESBAU WALLSTR.1 55122 MAINZ</small>		
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAU MASSNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED GENEHMIGT	DATE DATUM	SCALE MASSSTAB		
	6. MAI 2015	1:50		
ORIGINAL, DRAWN BY IN ORIGINAL, GEE.	STANDARD SHEET STANDARD PLAN			
DESIGNER/BAU CONRAD FÜR FACILITIES ENGINEER IN GERMANY, GEEIGNET	CAD-PROGRAMM CAD-PROGRAMM			
CONSTRUCTION PROJECT BAU MASSNAHME	SHEET NO. PLAN NR.			
	E - 3.3			



# MANIFOLD / FILTER STATION, HYDRANT REFUELING SYSTEM

## VERTEILER- / FILTERSTATION, HYDRANTEN- BETANKUNSSYSTEM

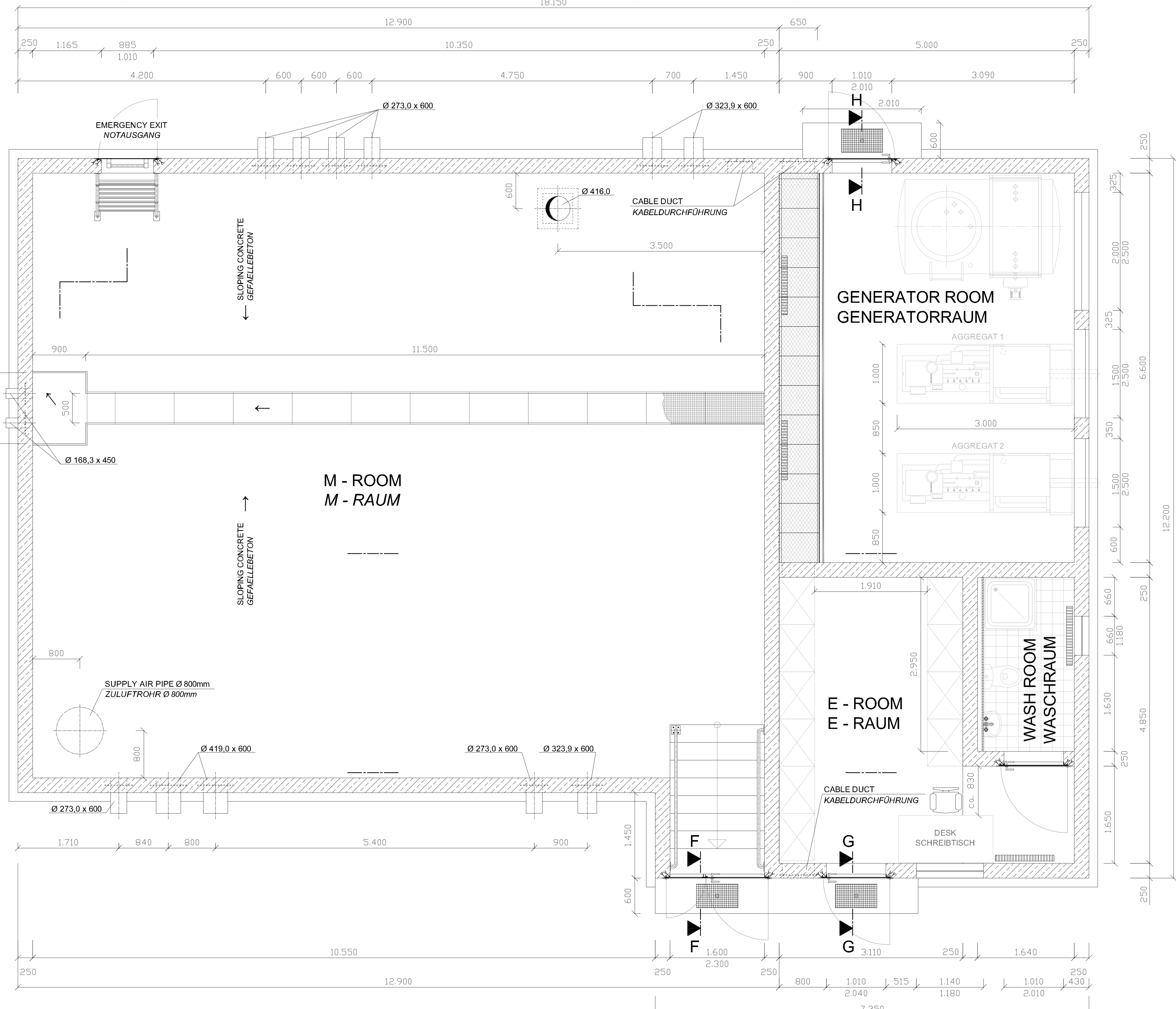
8

A-8.1	GROUND PLAN <i>GRUNDRISS</i>	E-8.3	ELECTRICAL DIAGRAM OPERATING TANK 1 SCHALTPLAN FLACHBODENTANK 1
A-8.2	VIEWS 1 AND 3 <i>ANSICHTEN 1 UND 3</i>	E-8.4	ELECTRICAL DIAGRAM OPERATING TANK 2 SCHALTPLAN FLACHBODENTANK 2
A-8.3	VIEWS 2 AND 4 <i>ANSICHTEN 2 UND 4</i>	E-8.5	ELECTRICAL DIAGRAM OPERATING TANK 2 SCHALTPLAN FLACHBODENTANK 2
A-8.4	TOP VIEW <i>DRAUFSICHT</i>	E-8.6	ELECTRICAL DIAGRAM DRAIN TANK / DETAIL SCHALTPLAN ENTLEERUNGSBEHÄLTER / DETAIL
C-8.1	SECTIONS A-A , B-B <i>SCHNITTE A-A , B-B</i>	E-8.7	ELECTRICAL DIAGRAM GENERAL INSTALLATION SCHALTPLAN ALLGEMEINE INSTALLATION
C-8.2	SECTIONS C-C , E-E <i>SCHNITTE C-C , E-E</i>	E-8.8	ELECTRICAL DIAGRAM GENERAL INSTALLATION SCHALTPLAN ALLGEMEINE INSTALLATION
C-8.3	SECTIONS AND DETAILS <i>SCHNITTE UND DETAILS</i>	E-8.9	ELECTRICAL DIAGRAM GENERAL INSTALLATION SCHALTPLAN ALLGEMEINE INSTALLATION
C-8.4	FORMWORK PLAN, GROUND PLAN SCHALPLAN, <i>GRUNDRISS</i>	E-8.10	ELECTR. INSTALL. GROUNDING A. LIGHTNING PROTECTION PLAN, GROUND PLAN ELEKTR. INSTALL. ERDUNGS- U. BLITZSCHUTZPLAN, GRUNDRISS
C-8.5	FORMWORK PLAN, SECTION "A" AND "B" SCHALPLAN, SCHNITT "A" UND "B"	E-8.11	ELECTR. INSTALL. GROUNDING A. LIGHTNING PROTECTION PLAN, SECTION A,B,C ELEKTR. INSTALL. ERDUNGS- U. BLITZSCHUTZPLAN, SCHNITT A,B,C
C-8.6	FORMWORK PLAN, SECTION "C" , "D" AND "E" SCHALPLAN, SCHNITT "C" , "D" UND "E"	E-8.12	ELECTR. INSTALL. GROUNDING A. LIGHTNING PROTECTION PLAN, DRAUFSICHT ELEKTR. INSTALL. ERDUNGS- U. BLITZSCHUTZPLAN, DRAUFSICHT
M-8.1	MECHANICAL INSTALLATION, GROUND PLAN MASCHINENTECHNISCHE INSTALLATION , GRUNDRISS	E-8.13	MIMIC DIAGRAM CONTROL PANEL SREUER- MESS- UND REGELSCHRANK - BLINDSCHALTBILD
M-8.2	MECHANICAL INSTALLATION, SECTIONS A - D MASCHINENTECHNISCHE INSTALLATION , SCHNITTE A -D	E-8.14	LOW VOLTAGE DISTRIBUTION - MCC NIEDRESPANNUNGSVERTEILUNG IN EINSCHUBTECHNIK
M-8.3	MECHANICAL INSTALLATION, SECTIONS E - G MASCHINENTECHNISCHE INSTALLATION , SCHNITTE E -G	E-8.15	LOW VOLTAGE DISTRIBUTION - MCC NIEDRESPANNUNGSVERTEILUNG IN EINSCHUBTECHNIK
E-8.1	ELECTRICAL DIAGRAM INPUT PANEL SCHALTPLAN EINSPEISEFELD	E-8.16	LOW VOLTAGE DISTRIBUTION - MCC NIEDRESPANNUNGSVERTEILUNG IN EINSCHUBTECHNIK
E-8.2	ELECTRICAL DIAGRAM OPERATING TANK 1 SCHALTPLAN FLACHBODENTANK 1		



GROUND PLAN  
GRUNDRISS

3



2

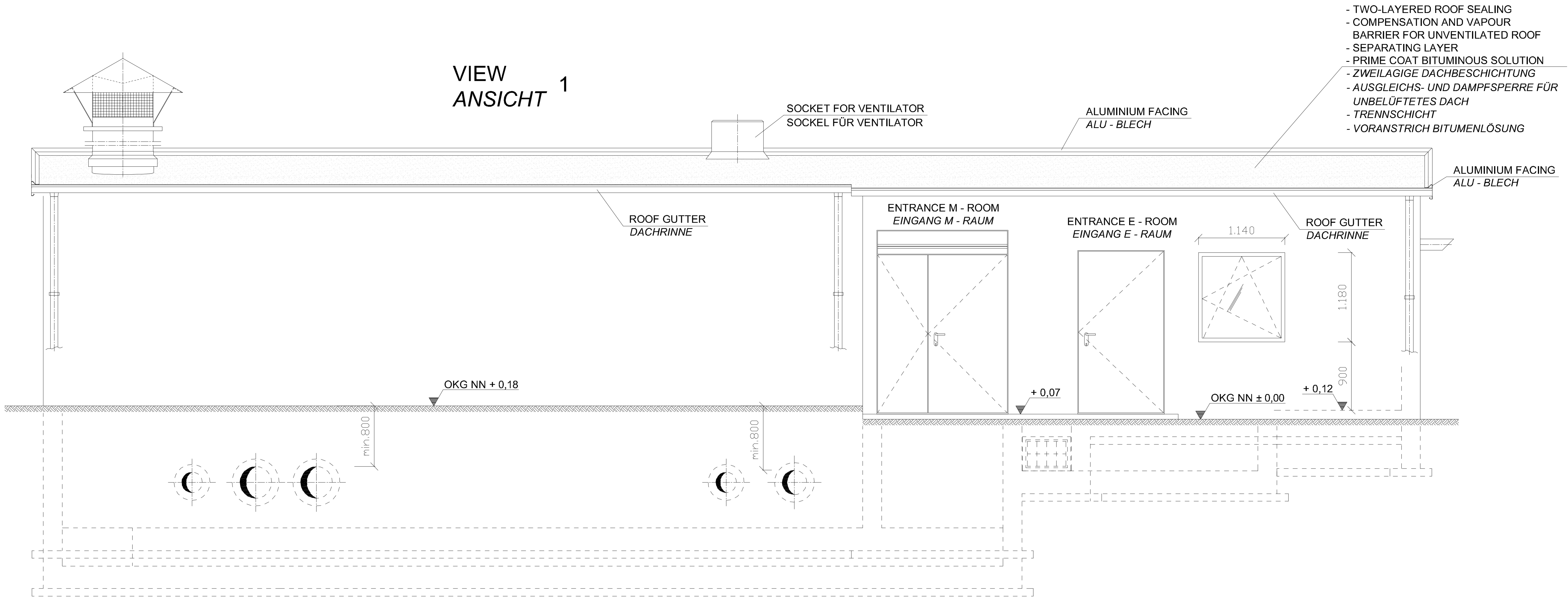
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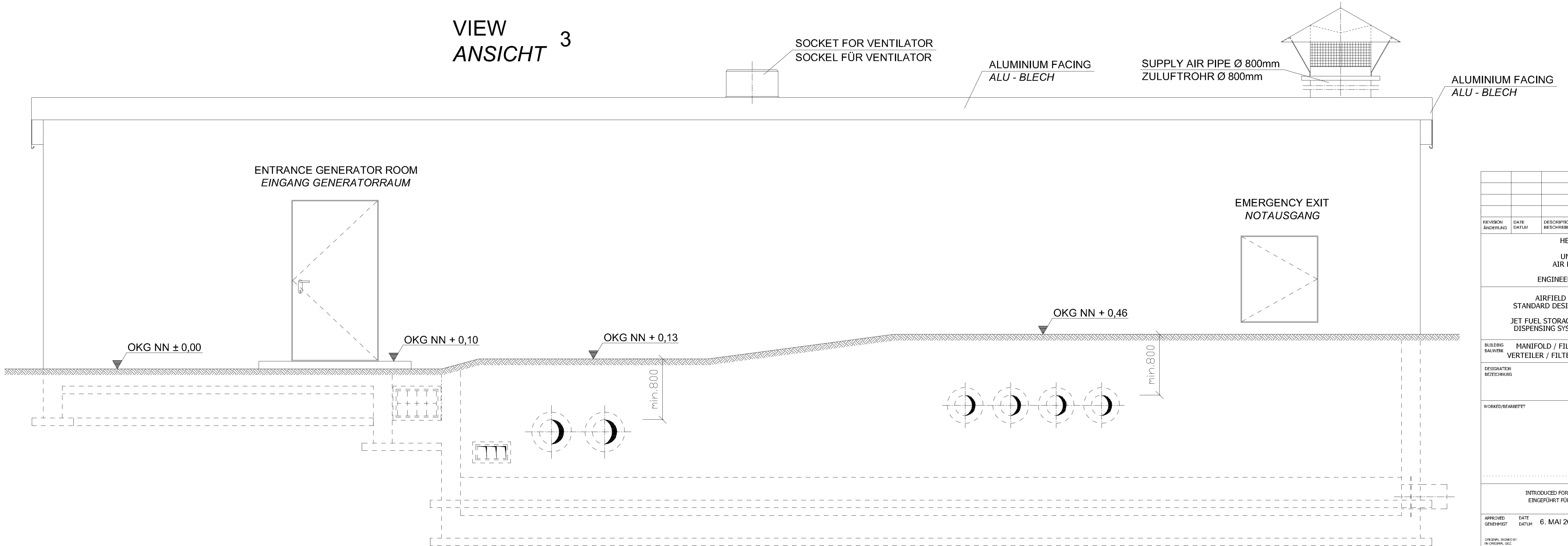
REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
<b>HEADQUARTERS</b>				
UNITED STATES AIR FORCES EUROPE				
ENGINEERING & OPERATIONS				
AIRFIELD STANDARD DESIGN US		FLUGPLATZ STANDARDPLANUNG US		
JET FUEL STORAGE AND DISPENSING SYSTEMS		FLUGKRAFTSTOFF - VERSORGUNGSANLAGEN		
BUILDING BAUWERK	MANIFOLD / FILTER STATION, HYDRANT REFUELING SYSTEM VERTEILER / FILTERSTATION, HYDRANTEN - BETANKUNGSSYSTEM			
DESIGNATOR BEZEICHNUNG	GROUND PLAN GRUNDRISS			
WORKED/BEARBEITET	PREPARED/AUFGESTELLT LANDSBEREITERS LIEGENSCHAFTS- UND BAUBEREITUNG LAW-WESEN/BAUWESEN/LANDW. AMMUNITION UNTERSUCHUNG I. / II. STADIUM TRUPPEN (SIGNAL) UND FÜR TRUPPEN (SIGNAL) UND LANDW.	APPROVED/GENEHMIGT  AMT FÜR BUNDESBAU WALLSTR.1 55122 MAINZ		
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAU MASSNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED GENEHMIGT	DATE DATUM	6. MAI 2015		SCALE MASSSTAB
ORIGINAL DRAWN BY IN ORIGINAL DED.				1:25
DESIGNER/BAU CONTRACTING FACILITIES ENGINEER PLANNING ARCHITECTURE				STANDARD SHEET STANDARD PLAN
CONSTRUCTION PROJECT BAU MASSNAHME				A - 8.1
				SHEET NO. PLATZ NR. OF VON



VIEW ANSICHT 1



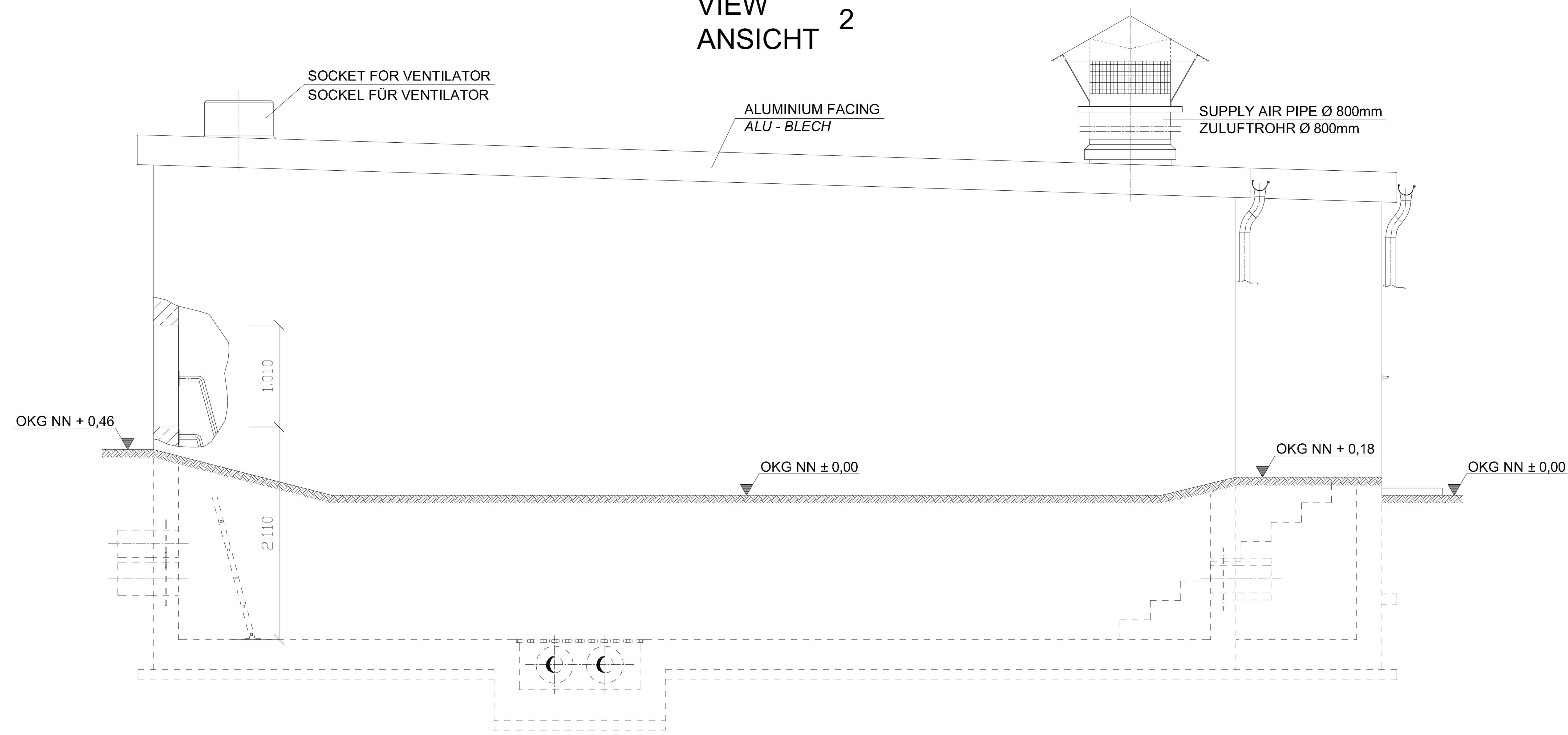
VIEW ANSICHT 3



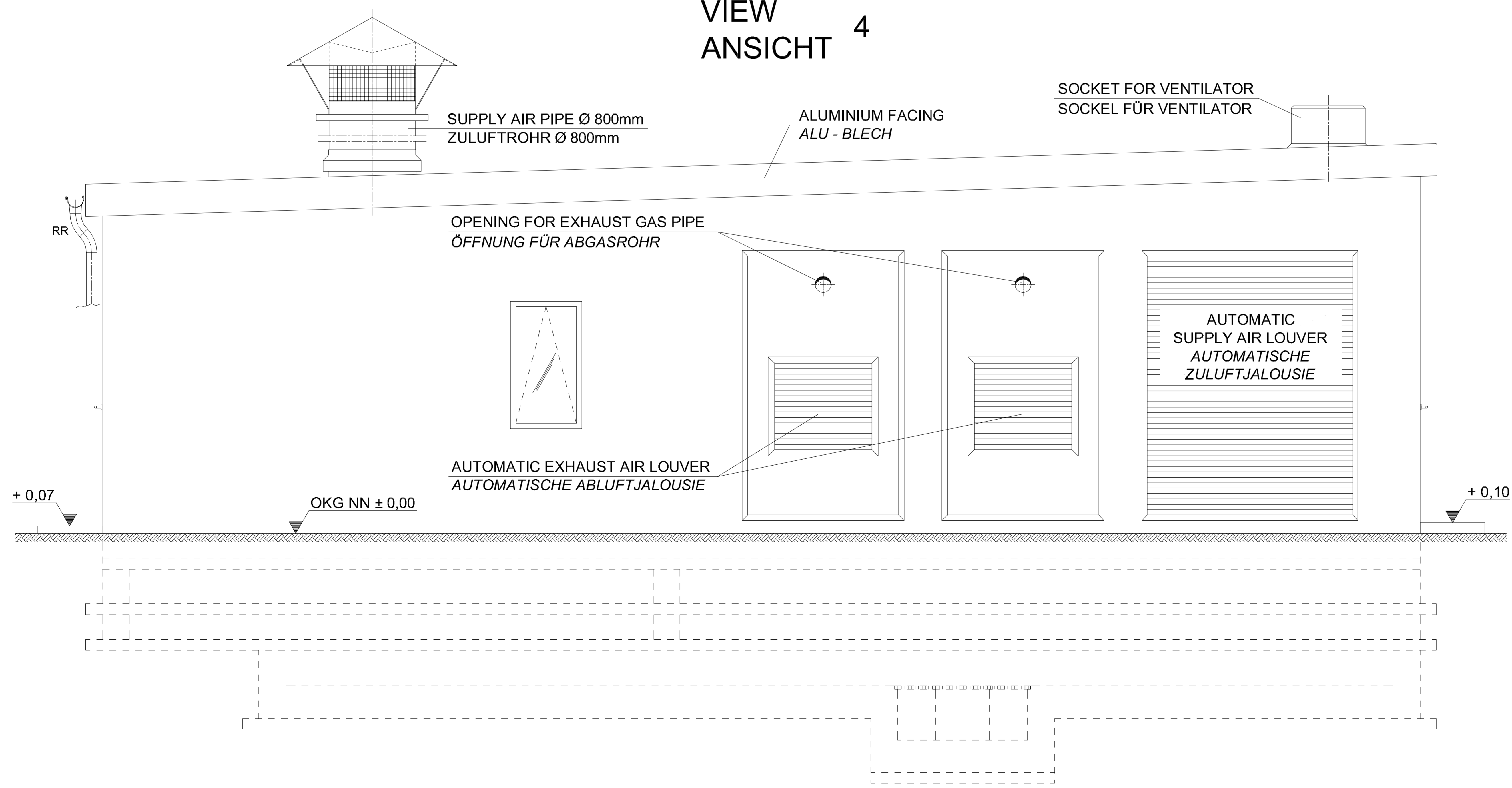
REVISION	DATE	DESCRIPTION	BY	COUNTRY
ÄNDERUNG	DATUM	BESCHREIBUNG	VON	LAND
<b>HEADQUARTERS</b> UNITED STATES AIR FORCES EUROPE ENGINEERING & OPERATIONS				
AIRFIELD STANDARD DESIGN US JET FUEL STORAGE AND DISPENSING SYSTEMS		FLUGPLATZ STANDARDPLANUNG US FLUGKRAFTSTOFF - VERSORGENGSANLAGEN		
BUILDING: MANIFOLD / FILTER STATION, HYDRANT REFUELING SYSTEM BAUWERK: VERTEILER / FILTERSTATION, HYDRANTEN - BETANKUNGSSYSTEM				
DESIGNATOR: VIEWS 1 AND 3 BESCHÜBLING: ANSICHTEN 1 UND 3				
WORKED/BEARBEITET LANDSBEREICHSLEITUNG UND BAULEITUNG L B B ANSCHL. UNTERSTÄTZUNG (NACH LANDESTRASSE)	APPROVED/GEHEBET AMT FÜR BUNDESBAU WALLSTR. 1 55122 MAINZ	INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAUMAßNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)		
APPROVED: 6. MAI 2015 GEHEBET:	SCALE: 1:20 MASSSTAB:	SHEET NO. A - 8.2 OF 101		
CONSTRUCTION PROJECT: BAUMAßNAHME				



VIEW ANSICHT 2



VIEW ANSICHT 4



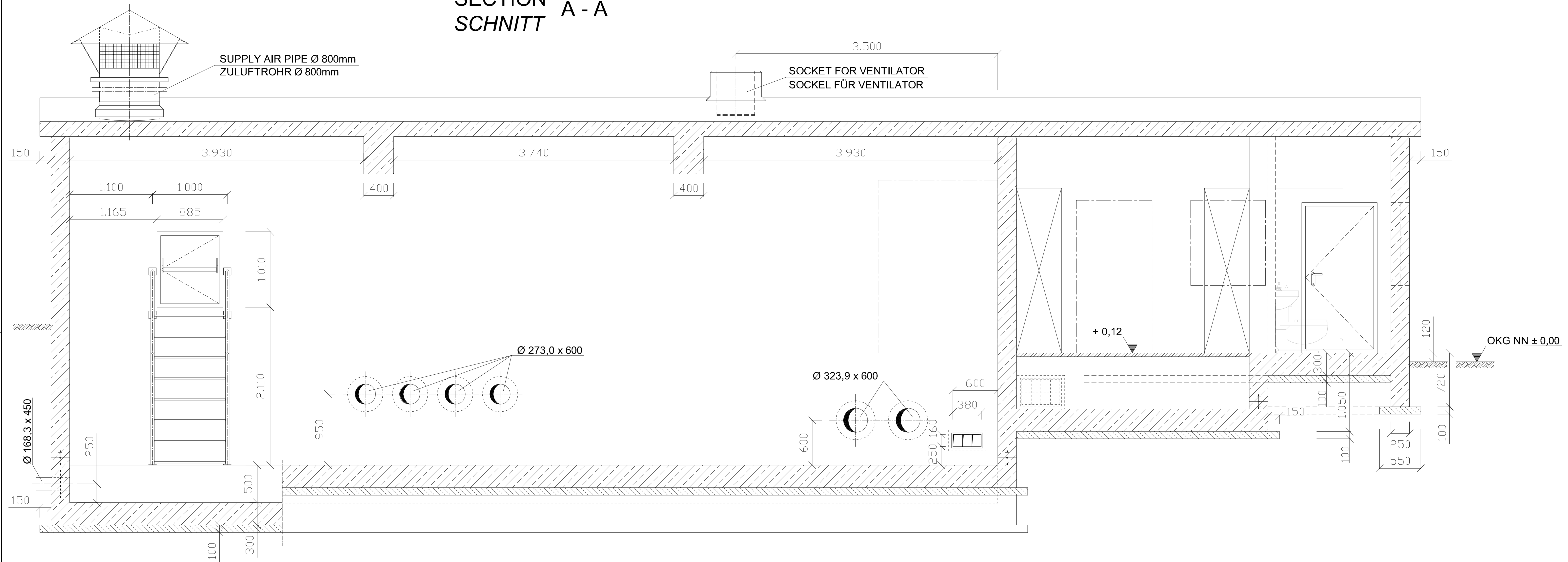
REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
<b>HEADQUARTERS</b> UNITED STATES AIR FORCES EUROPE ENGINEERING & OPERATIONS				
<b>AIRFIELD STANDARD DESIGN US</b> JET FUEL STORAGE AND DISPENSING SYSTEMS		<b>FLUGPLATZ STANDARDPLANUNG US</b> FLUGKRAFTSTOFF - VERSORGSANLAGEN		
<b>BUILDING / BAUWERK:</b> MANIFOLD / FILTER STATION, HYDRANT REFUELING SYSTEM VERTEILER / FILTERSTATION, HYDRANTEN - BETANKUNGSSYSTEM				
<b>DESIGNATION / BEZUEHLUNG:</b> VIEWS 2 AND 4 ANSICHTEN 2 UND 4				
<b>WORKED/BEARBEITET:</b> LANDEBETRIEB LIEGENSCHAFTS- UND BAUBETRIEB LW-WESEN/BAUWERK L B B ANSCHLIEß: UNTERSTADTSTR. 1, MAIN AIRFIELD TRUPPEN (SIGNAL) WEG 478 (RHEIN) (SIGNAL) (SIGNAL) LANDAHL STADT IN DER STADT ORIGINAL: 02.02.1992 IN DER STADT: 02.02.1992 STADT: 02.02.1992		<b>APPROVED/GENEHIGT:</b> AMT FÜR BUNDESBAU WALLSTR. 1 55122 MAINZ ORIGINAL, SIGNED BY: 11.08.2015, 02.02.1992		
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAU MASSNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
<b>APPROVED / GENEHIGT:</b> DATE: 6. MAI 2015 ORIGINAL, SIGNED BY: IN DER STADT, 02.02.1992		<b>SCALE / MASSSTAB:</b> 1:20 <b>STANDARD SHEET / STANDARD PLAN:</b> <b>A - 8.3</b>		
<b>CONSTRUCTION PROJECT / BAU MASSNAHME:</b>				<b>SHEET NO. / PLATZ NR.:</b>



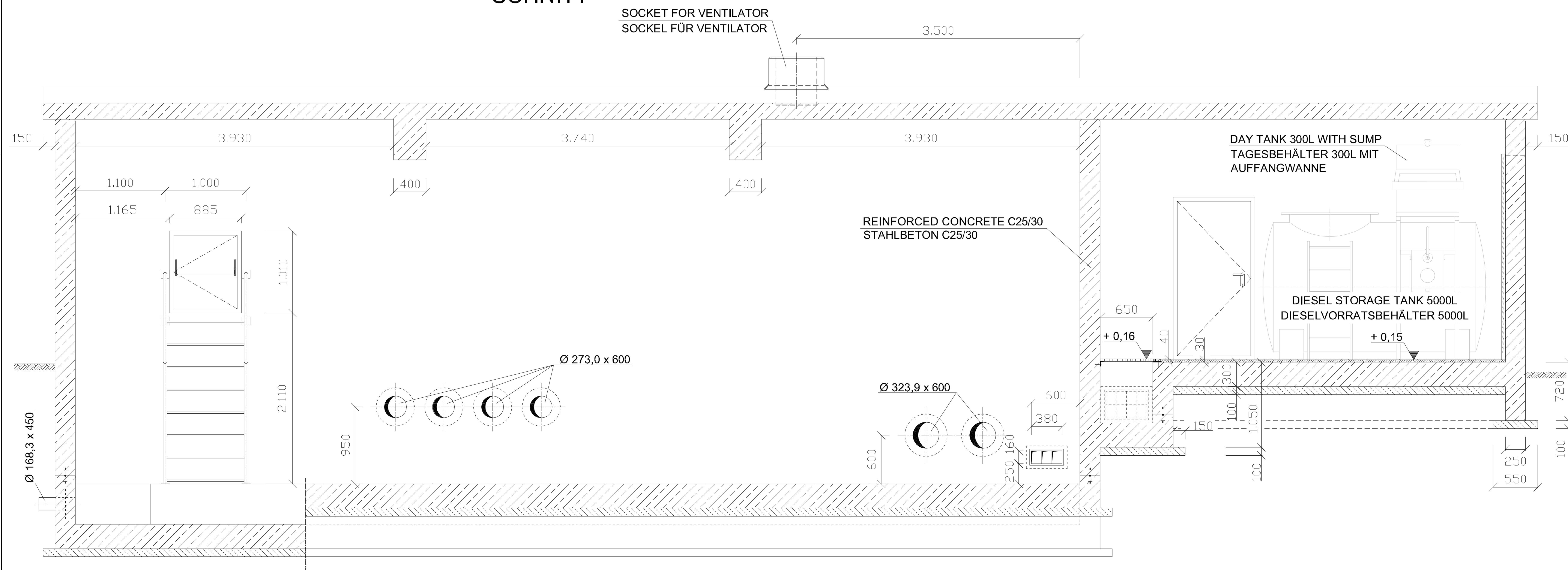




SECTION  
SCHNITT A - A

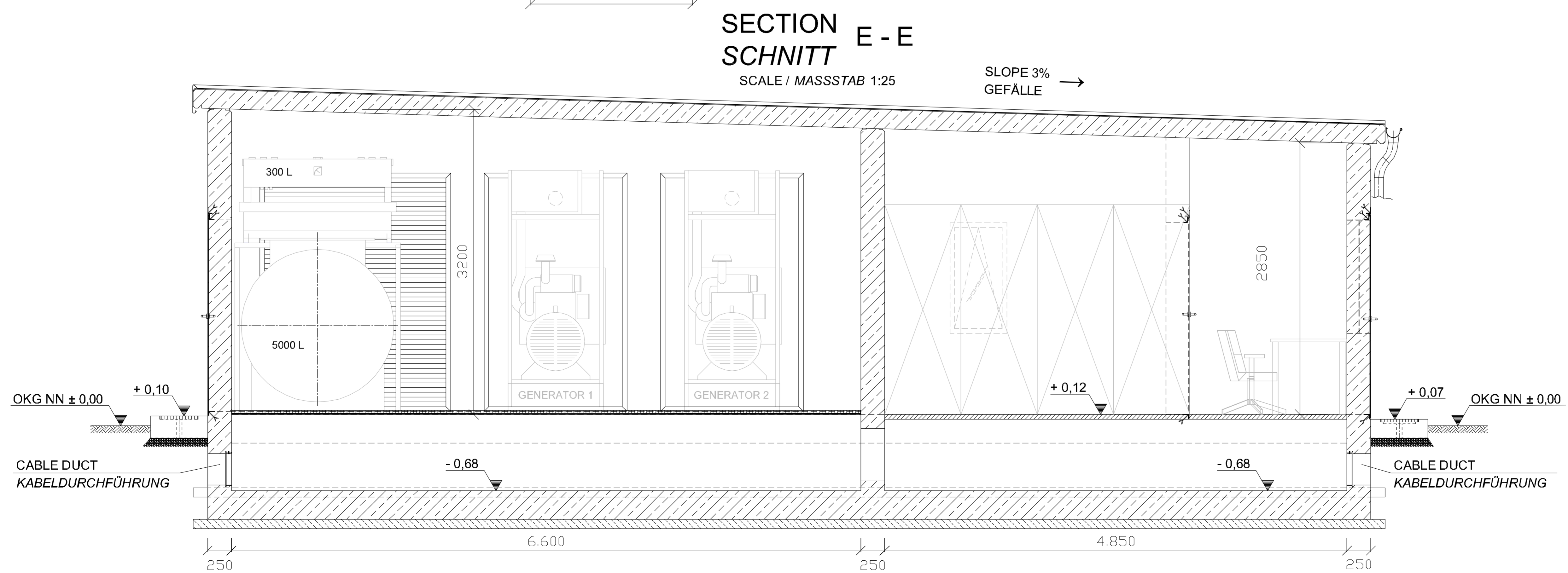
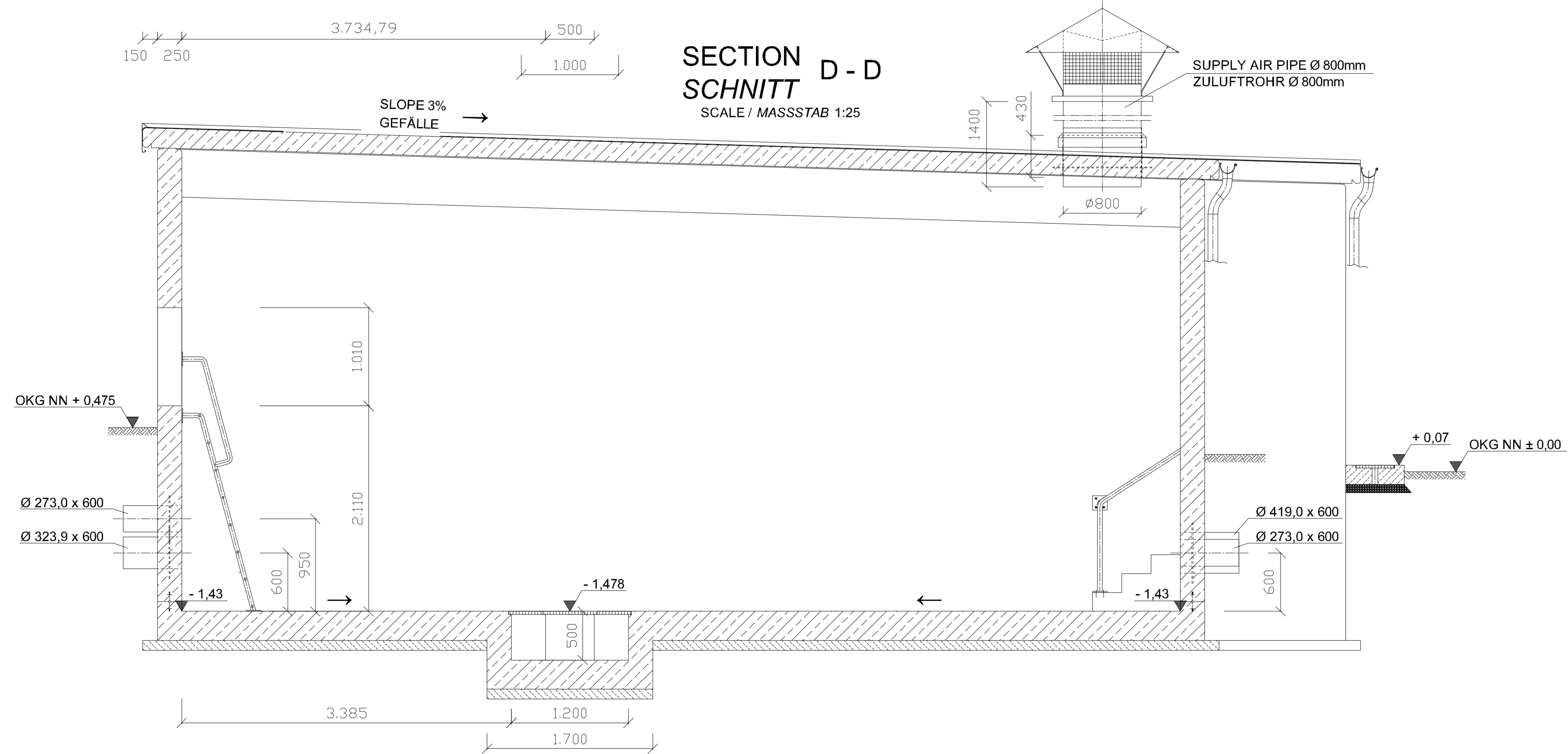
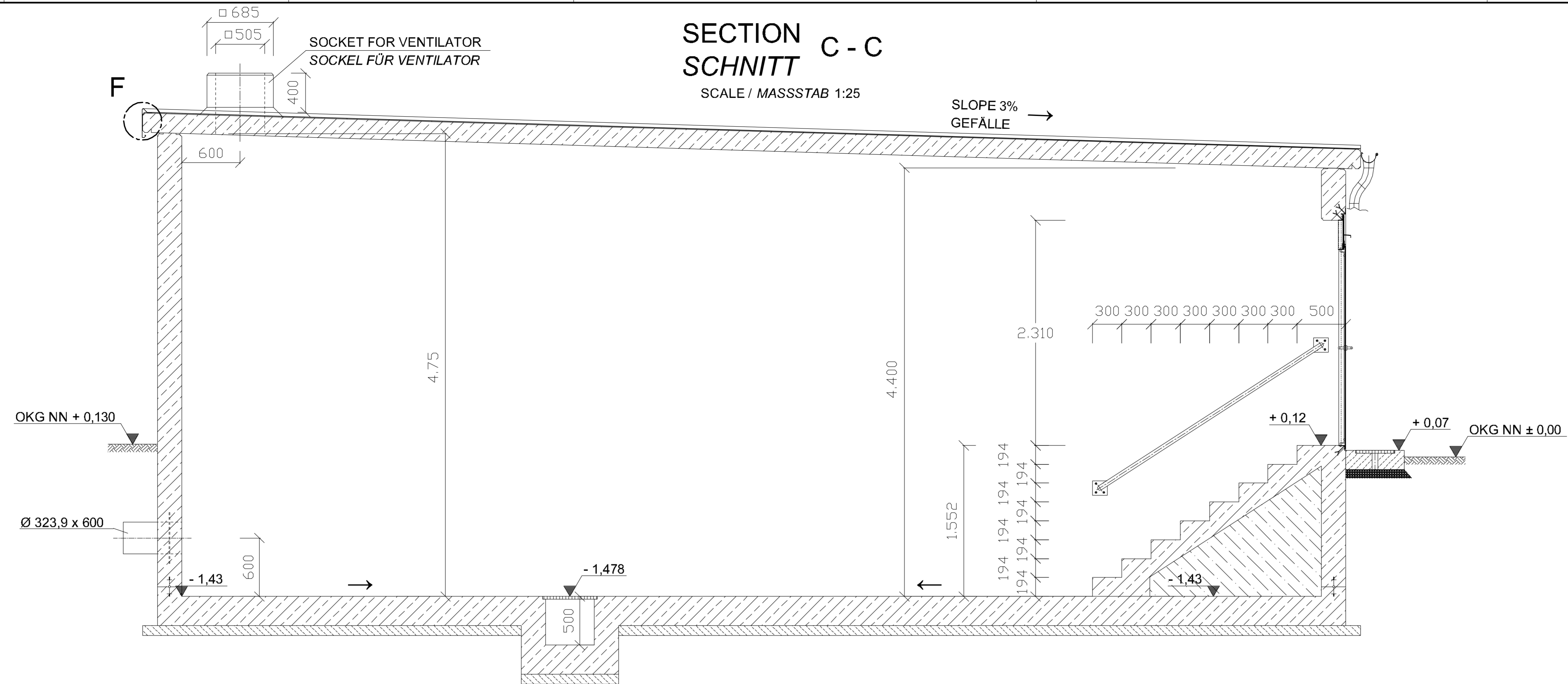


SECTION  
SCHNITT B - B



REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
<b>HEADQUARTERS</b> UNITED STATES AIR FORCES EUROPE ENGINEERING & OPERATIONS				
AIRFIELD STANDARD DESIGN US JET FUEL STORAGE AND DISPENSING SYSTEMS		FLUGPLATZ STANDARDPLANUNG US FLUGKRAFTSTOFF - VERSORGNUNGSANLAGEN		
BUILDING / BAUWERK: MANIFOLD / FILTER STATION, HYDRANT REFUELING SYSTEM VERTEILER / FILTERSTATION, HYDRANTEN - BETANKUNGSSYSTEM				
DESIGNATOR / BEZUGSBEZEICHNUNG: SECTIONS A - A, B - B SCHNITTE A - A, B - B				
WORKED/BEARBEITET:		PREPARED/AUFGESTELLT:		APPROVED/GENEHMIGT:
LANDSBEREITUNGSLICENZSCHAFTS- UND BAUBETREIBUNG LANDBAU- UND VERKEHRSMINISTERIUM AMBASSADEURSTRASSE 1, 70372 WÜRZBURG TELEFON: 09371 91-1111 FAX: 09371 91-1111 LANDTAG:		AMT FÜR BUNDESBAU WALLSTR. 1 55122 MAINZ		ORIGINAL SIGNED BY: IN ORIGINAL: GZJ 10/06/2015
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAU MASSNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED / GENEHMIGT:		DATE / DATUM: 6. MAI 2015		SCALE / MASSSTAB: 1:20
ORIGINAL SIGNED BY: IN ORIGINAL: GZJ		ORIGINAL SIGNED BY: IN ORIGINAL: GZJ		STANDARD SHEET / STANDARD PLAN
DESIGN / BILDUNG:		CHECKED / GEPRÜFT:		C - 8.1
CONSTRUCTION PROJECT / BAU MASSNAHME:		SHEET NO. / PLATZNR.:		OF / VON:





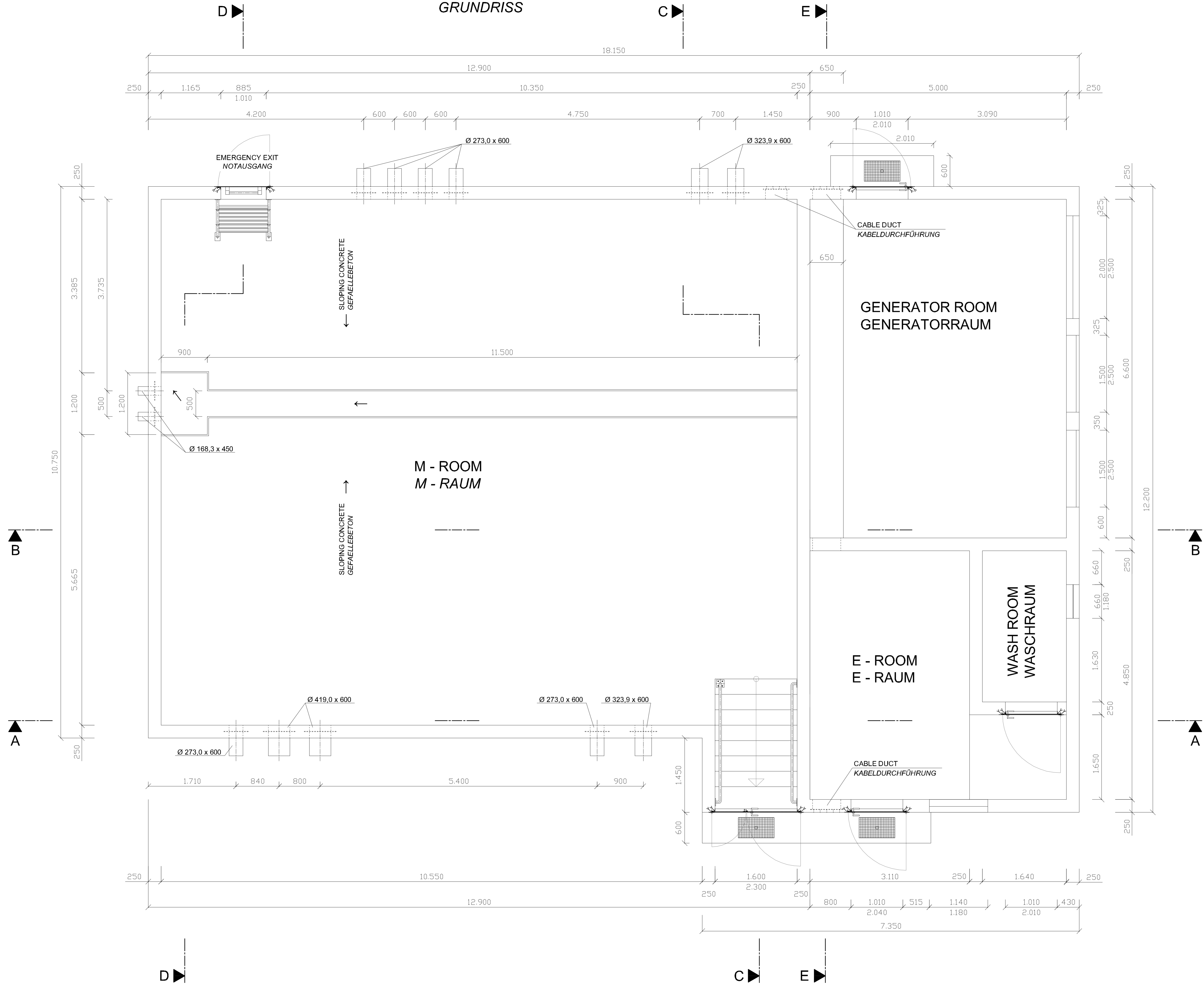
REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
<b>HEADQUARTERS</b> UNITED STATES AIR FORCES EUROPE ENGINEERING & OPERATIONS				
AIRFIELD STANDARD DESIGN US JET FUEL STORAGE AND DISPENSING SYSTEMS		FLUGPLATZ STANDARDPLANUNG US FLUGKRAFTSTOFF - VERSORGENGSANLAGEN		
BUILDING BAUWERK: MANIFOLD / FILTER STATION, HYDRANT REFUELING SYSTEM VERTEILER / FILTERSTATION, HYDRANTEN - BETANKUNGSSYSTEM				
DESIGNATION BEZUEHUNG: SECTIONS C - C - E - E SCHNITTE C - C - E - E				
WORKED/BEARBEITET LANDSBEREITER LINGENSCHEITZ UND BAUVERBUND L B B AMBROSETT, UNIVERSITÄT FÜR INGENIEURWESEN UNIVERSITÄT FÜR INGENIEURWESEN UNIVERSITÄT FÜR INGENIEURWESEN		APPROVED/GENEHMIGT AMT FÜR BUNDESBAU WALLSTR. 1 55122 MAINZ		
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAU MASSNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED GENEHMIGT	DATE DATUM: 6. MAI 2015	SCALE MASSSTAB: 1:25		
ORIGINAL DRAWING URSPRÜNGLICHE ZEICHNUNG		STANDARD SHEET STANDARD PLAN		
DESIGNER CONRAD FÜR FACILITIES ENGINEERING PLANNING ARCHITECTURE		C - 8.2		
CONSTRUCTION PROJECT BAU MASSNAHME		SHEET NO. PLATZ NR.		








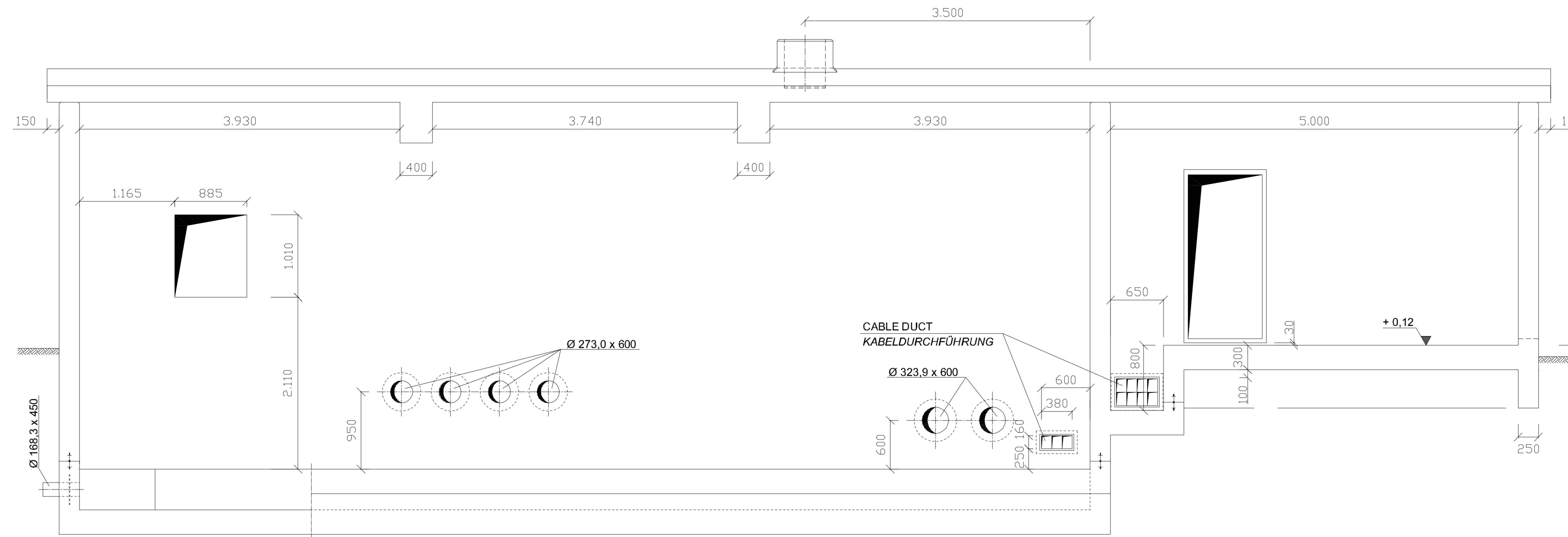
GROUND PLAN  
GRUNDRISS



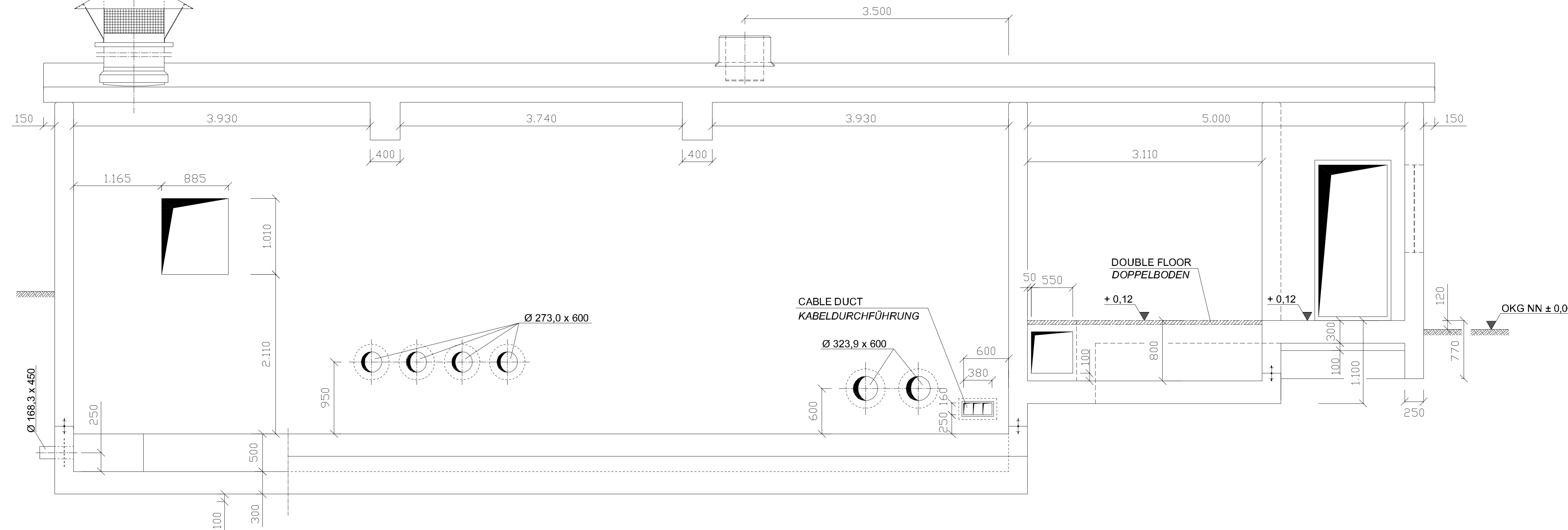
REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
<b>HEADQUARTERS</b>				
UNITED STATES AIR FORCES EUROPE				
ENGINEERING & OPERATIONS				
AIRFIELD STANDARD DESIGN US		FLUGPLATZ STANDARDPLANUNG US		
JET FUEL STORAGE AND DISPENSING SYSTEMS		FLUGKRAFTSTOFF - VERSORGUNGSANLAGEN		
BUILDING BAUWERK	MANIFOLD / FILTER STATION, HYDRANT REFUELING SYSTEM VERTEILER / FILTERSTATION, HYDRANTEN - BETANKUNGSSYSTEM			
DESIGNATOR BEZEICHNUNG	FORMWORK PLAN , GROUND PLAN SCHALPLAN , GRUNDRISS			
WORKED/BEARBEITET	PREPARED/AUFGESTELLT LANDSBEREITUNGSGESAMTSCHAFT UND BAUVERBUND L - B - B AMBROSE/STRASSENBAUPLATZ 1, MAINZ-LANDEL TRUPPENVERBUND DER 1. FLUGKRAFTSTOFF- VERSORGUNGSANLAGE LANDL		APPROVED/GENEHMIGT AMT FÜR BUNDESBAU WALLSTR.1 56122 MAINZ ORIGINAL SIGNED BY IN ORIGINAL SIZE NOVEMBER 2012	
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAU MASSNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED GENEHMIGT	DATE DATUM	6. MAI 2015		SCALE MASSSTAB
ORIGINAL DRAWN BY IN ORIGINAL SIZE				1:25
DESIGN/BAU CONTRACTING/BAUVERBUND PLANNING/BAUVERBUND				STANDARD SHEET STANDARD PLAN
CONSTRUCTION PROJECT BAU MASSNAHME				CAD-PROJECT NUMBER CAD-PROJEKTNUMMER
				C - 8.4
				SHEET NO. PLATZ NR.
				OF VON



SECTION B - B  
SCHNITT B - B



SECTION A - A  
SCHNITT A - A



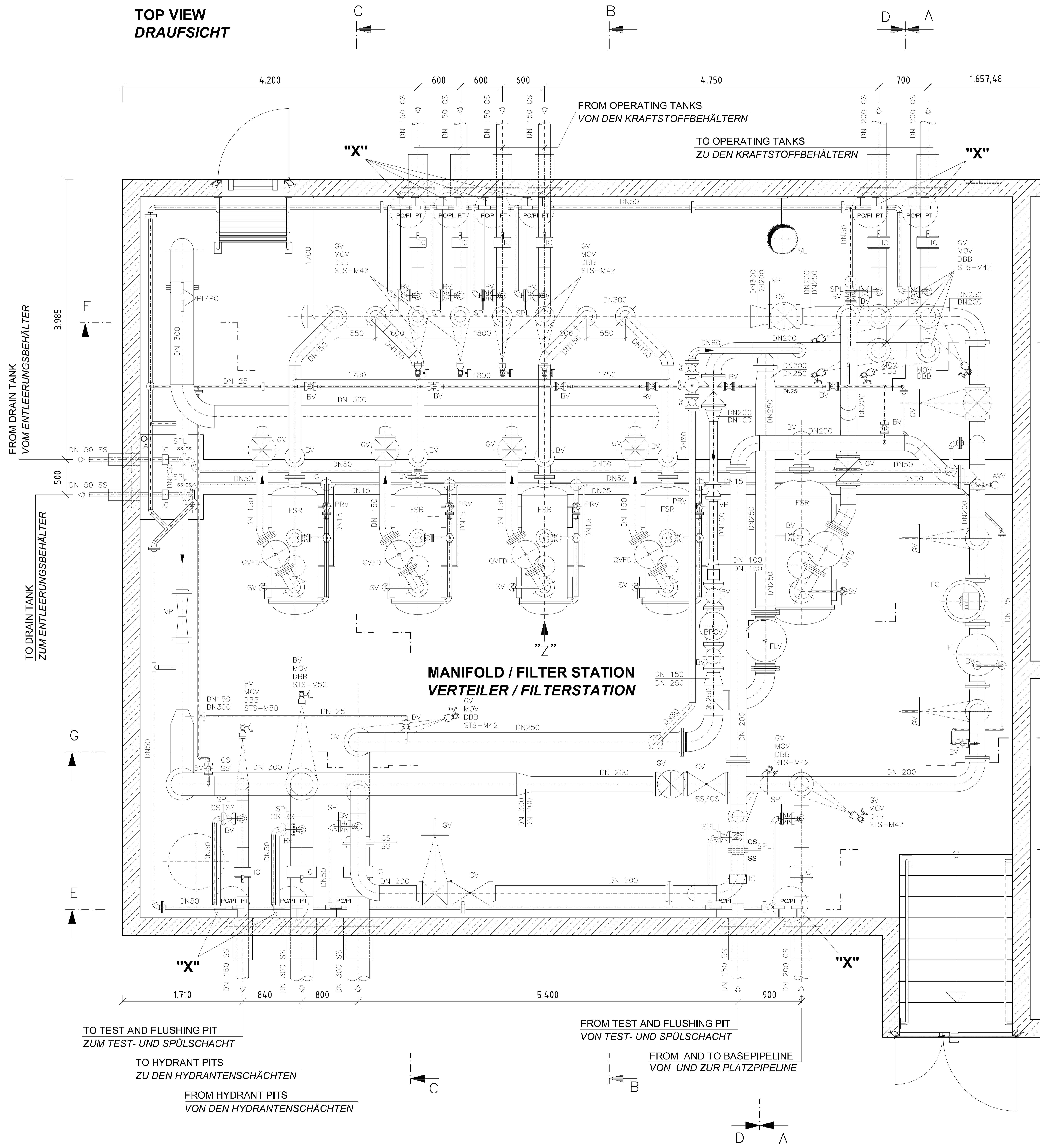
REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
<b>HEADQUARTERS</b> UNITED STATES AIR FORCES EUROPE ENGINEERING & OPERATIONS				
AIRFIELD STANDARD DESIGN US JET FUEL STORAGE AND DISPENSING SYSTEMS		FLUGPLATZ STANDARDPLANUNG US FLUGKRAFTSTOFF - VERSORGENGSANLAGEN		
BUILDING BAUWERK	MANIFOLD / FILTER STATION, HYDRANT REFUELING SYSTEM VERTEILER / FILTERSTATION, HYDRANTEN - BETANKUNGSSYSTEM			
DESIGNATOR BEZEICHNUNG	FORMWORK PLAN , SECTION "A" AND "B" SCHALPLAN , SCHNITT "A" UND "B"			
WORKED/BEARBEITET	PREPARED/AUFGESTELLT LANDESBÜRO FÜR BAUWESEN UND BAUVERMESSUNG L B B AMBASSADE UNTERKUNFT 1, MAIN AIRFIELD THEODOR-HEUSEL-STRASSE 170, 55122 MAINZ LANDAU BY/PROJ. IN CHARGE/LEITUNG IN ORIGINAL/GEZ. 05.05.2015	APPROVED/GENEHMIGT AMT FÜR BUNDEBAU WALLSTR. 1 55122 MAINZ ORIGINAL SIGNED BY IN ORIGINAL/GEZ. 06.05.2015		
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAUMASSNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED GENEHMIGT	DATE DATUM	6. MAI 2015		SCALE MASSSTAB
ORIGINAL SIGNED BY IN ORIGINAL/GEZ.			STANDARD SHEET STANDARD PLAN	1:25
DESIGN/BAU CONTRACTING/BAUVERMESSUNG			CAD-PROGRAM/BAUVERMESSUNG	C - 8.5
CONSTRUCTION PROJECT BAUMASSNAHME			SHEET NO. PLATZNR.	OF VON







**TOP VIEW  
DRAUFSICHT**



**NOTES  
BEMERKUNG**

ALL VALVES AND FLANGES DESIGNED FOR PN 16  
ALLE ARMATUREN UND FLANSCH AUSGELEGT FUER PN 16

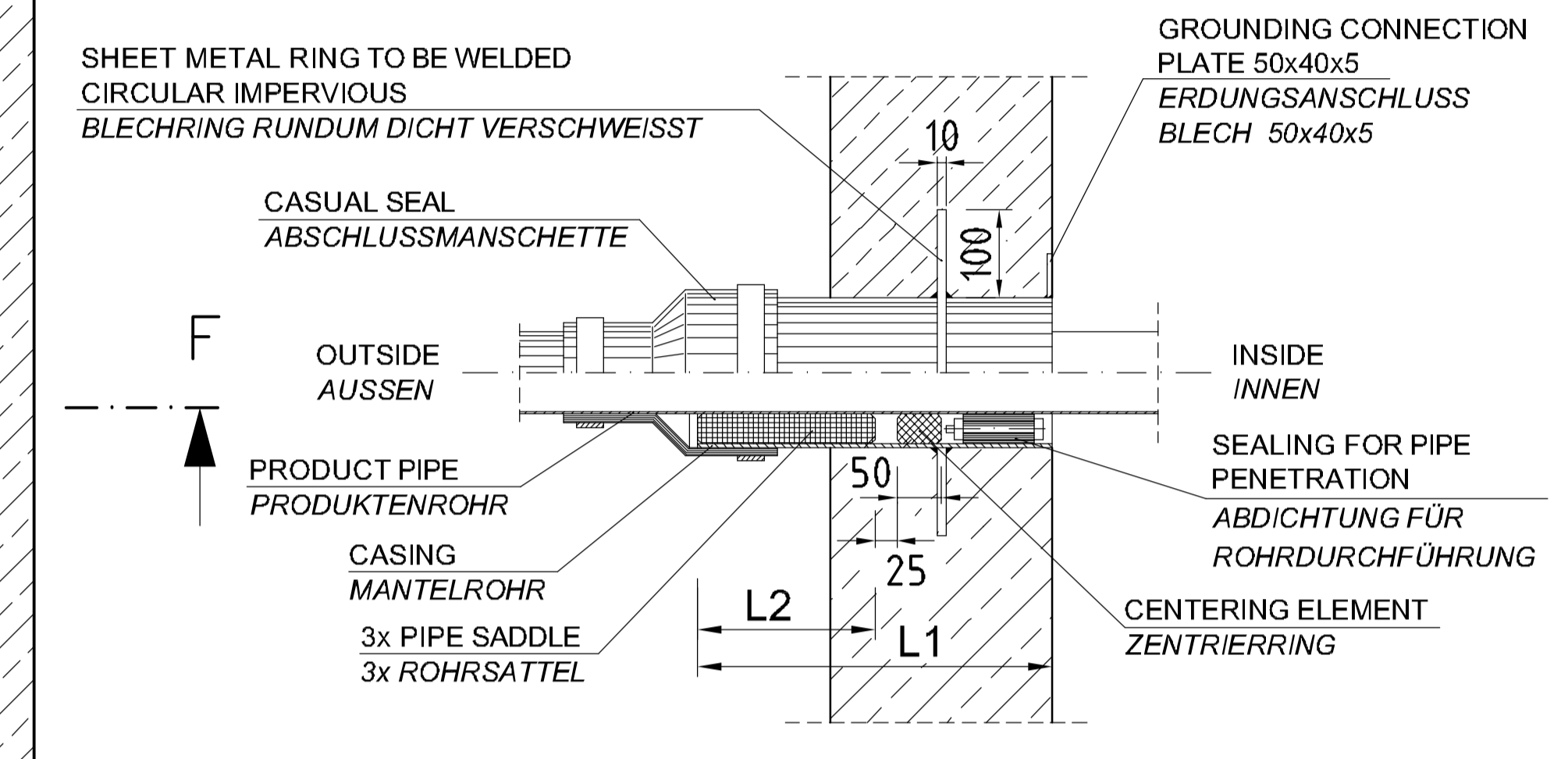
FOR SUPPORTS OF PIPES AN INSULATION PIECE, MADE OF 10mm THICK FUEL RESISTANT PLASTIC, IS TO BE PUT BETWEEN PIPE AND SUPPORTS OR HOLDERS.  
BEI UNTERSTUETZUNGEN VON ROHRLEITUNGEN IST ZWISCHEN ROHRLEITUNG UND UNTERSTUETZUNGSKONSTRUKTION BZW. HALTERUNG EINE ISOLIERPLATTE 10mm DICK AUS KRAFTSTOFFBESTAENDIGEN KUNSTSTOFF ZU LEGEN.

SUPPORTS AND HOLDERS AS SELECTED BY THE CONTRACTOR IN COORDINATION WITH THE LOCAL CONSTRUCTION SUPERVISION  
UNTERSTUETZUNG UND HALTERUNG NACH WAHL DES AN IN ABSTIMMUNG MIT DER OERTLICHEN BAULEITUNG.

**LEGEND  
LEGENDE**

- AVV VENTILATING VALVE  
BELUEFTUNGSVENTIL
- BPCV BACK PRESSURE CONTROL VALVE  
SYSTEMDRUCK-REGELVENTIL
- BV BALL VALVE  
KUGELHAHN
- C QUICK COUPLING  
SCHNELLKUPPLUNG
- CV RUECKSCHLAGVENTIL  
RUECKSCHLAGVENTIL
- CVP PRESSURE CONTROL VALVE  
UEBERDRUCK-REGELVENTIL
- DT DIRT TRAP  
SCHMUTZFAENGER
- DBB DOUBLE BLOCK AND BLEED
- F STRAINER BASKET  
SIEBKORBFILTER
- FLV FLUSHING VALVE  
SPÜLVENTIL
- FQ FLOW METER  
MENGENMESSER
- FSR FILTER/SEPARATOR  
FILTER/WASSERABSCHIEDER
- GV GATE VALVE  
ABSPERRSCHIEBER
- IC INSULATING COUPLING  
ISOLIERKUPPLUNG
- IG INSPECTION GLASS  
SCHAUGLAS
- LA LIQUID PROBE  
FLÜSSIGKEITSSONDE
- LCV LEVEL CONTROL VALVE  
NIVEAUREGELVENTIL
- MOV GATE VALVE WITH MOTOR  
ABSPERRARMATUR MIT MOTORANTRIEB
- PC PRESSURE GAUGE STOPCOCK  
MANOMETER-ABSPERRVENTIL
- PDI DIFFERENTIAL PRESSURE GAUGE  
DIFFERENZDRUCK-MANOMETER
- PI PRESSURE GAUGE  
MANOMETER
- PIS PRESSURE GAUGE WITH CONTACT FOR SWITCH  
MANOMETER MIT SCHALTKONTAKTEN
- PRV PRESSURE RELIEF VALVE  
DRUCKENTLASTUNGSVENTIL
- PT PRESSURE TRANSMITTER  
DRUCKTRANSMITTER
- QVFD FILTER/SEPARATOR VALVE WITH DIFF. PRESSURE SHUT-OFF  
FILTER/WASSERABSCHIEDERVENTIL MIT DIFFERENZDRUCK-ABSCHALTUNG
- SPL SPADE PLATE  
BRILLENSTECKSCHEIBE
- SV SAMPLING VALVE  
PROBEENTNAHMENTIL
- VP VENTURI PIPE  
VENTURIROHR
- VL VENTILATOR  
VENTILATOR
- SS STAINLESS STEEL  
Cr.N. STAHL
- CS STEEL  
STAHL

**PIPE PENETRATION  
ROHRDURCHFÜHRUNG**  
NOT TO SCALE / OHNE MASSTAB

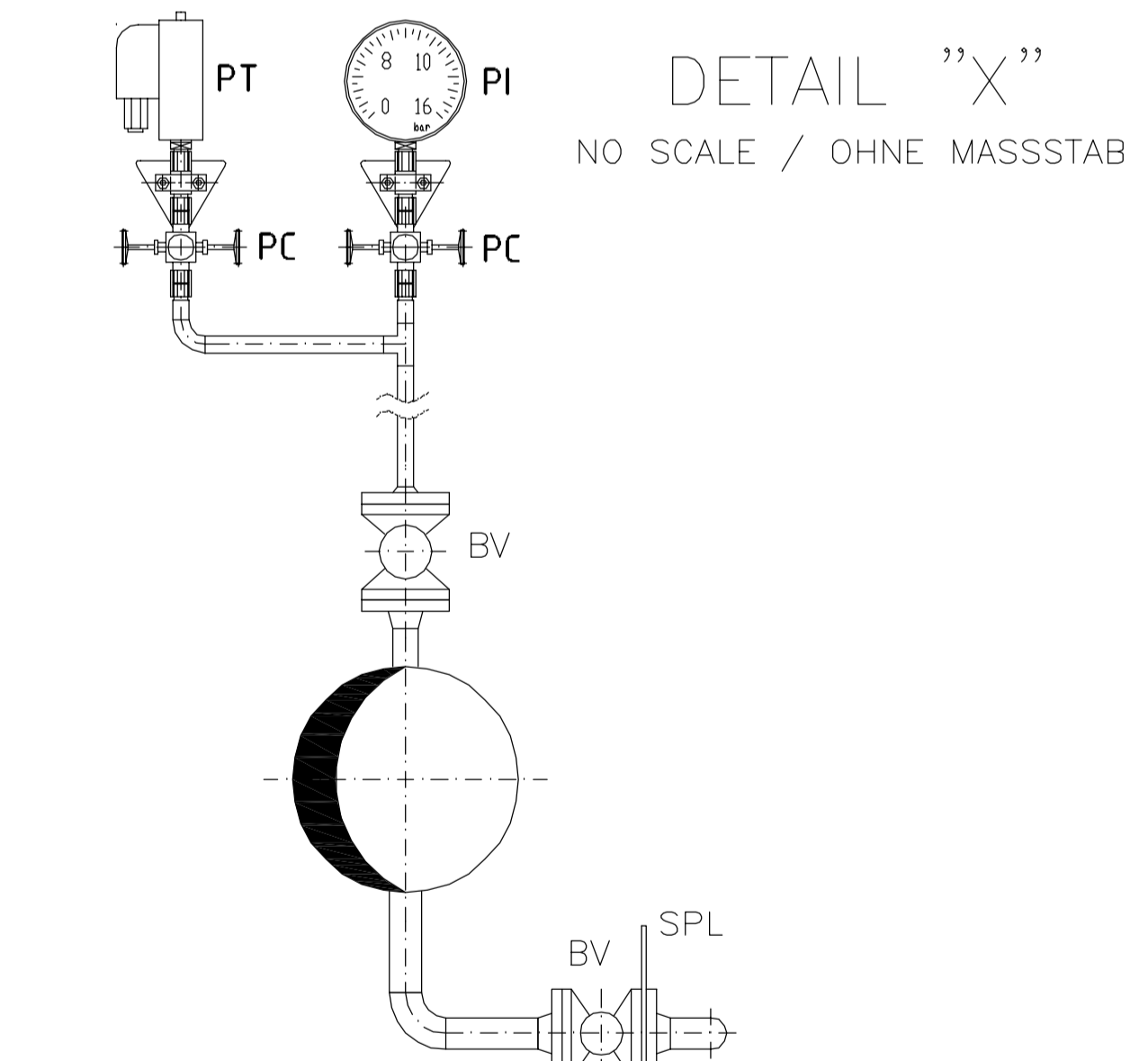


PRODUCT PIPE ROHRLEITUNG	PRODUCT PIPE PRODUKTENROHR mm	CASING MANTELROHR mm	L1 mm	L2 mm
DN 50	ø60,3	ø168,3	450	130
DN 150	ø168,3	ø273,0	600	250
DN 200	ø219,1	ø323,9	600	250
DN 250	ø273,0	ø368,0	600	250
DN 300	ø323,9	ø419,0	600	250

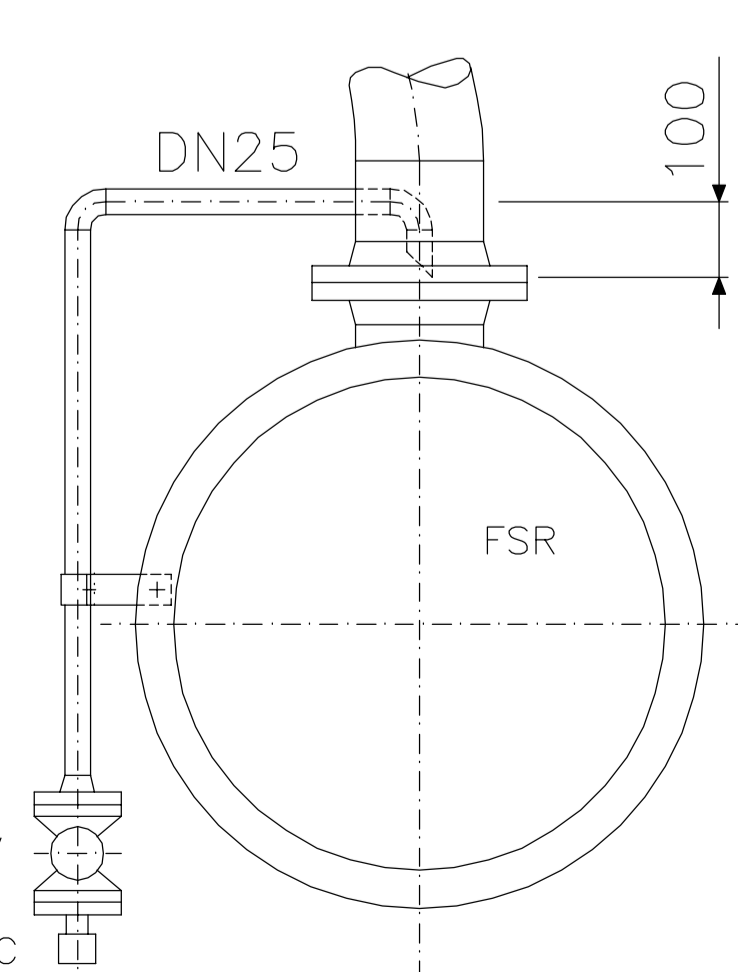
ALL MEASURES HAVE TO BE CHECKED ON SIDE  
SAMTLICHE MASSE SIND VOR ORT ZU ÜBERPRÜFEN!

**PERTINENT DRAWINGS  
ZUGEHÖRIGE ZEICHNUNGEN**

- GM-02.4 GENERAL FLOW DIAGRAM  
GESAMT-FLIESS-SCHEMA
- M-8.2 MECHANICAL INSTALLATION, SECTIONS A-D  
MASCHINENTECHNISCHE INSTALLATION, SCHNITTE A-D
- M-8.3 MECHANICAL INSTALLATION, SECTIONS E-F  
MASCHINENTECHNISCHE INSTALLATION, SCHNITTE E-F



**VIEW  
ANSICHT "Z"**  
SCALE / MASSTAB 1:10



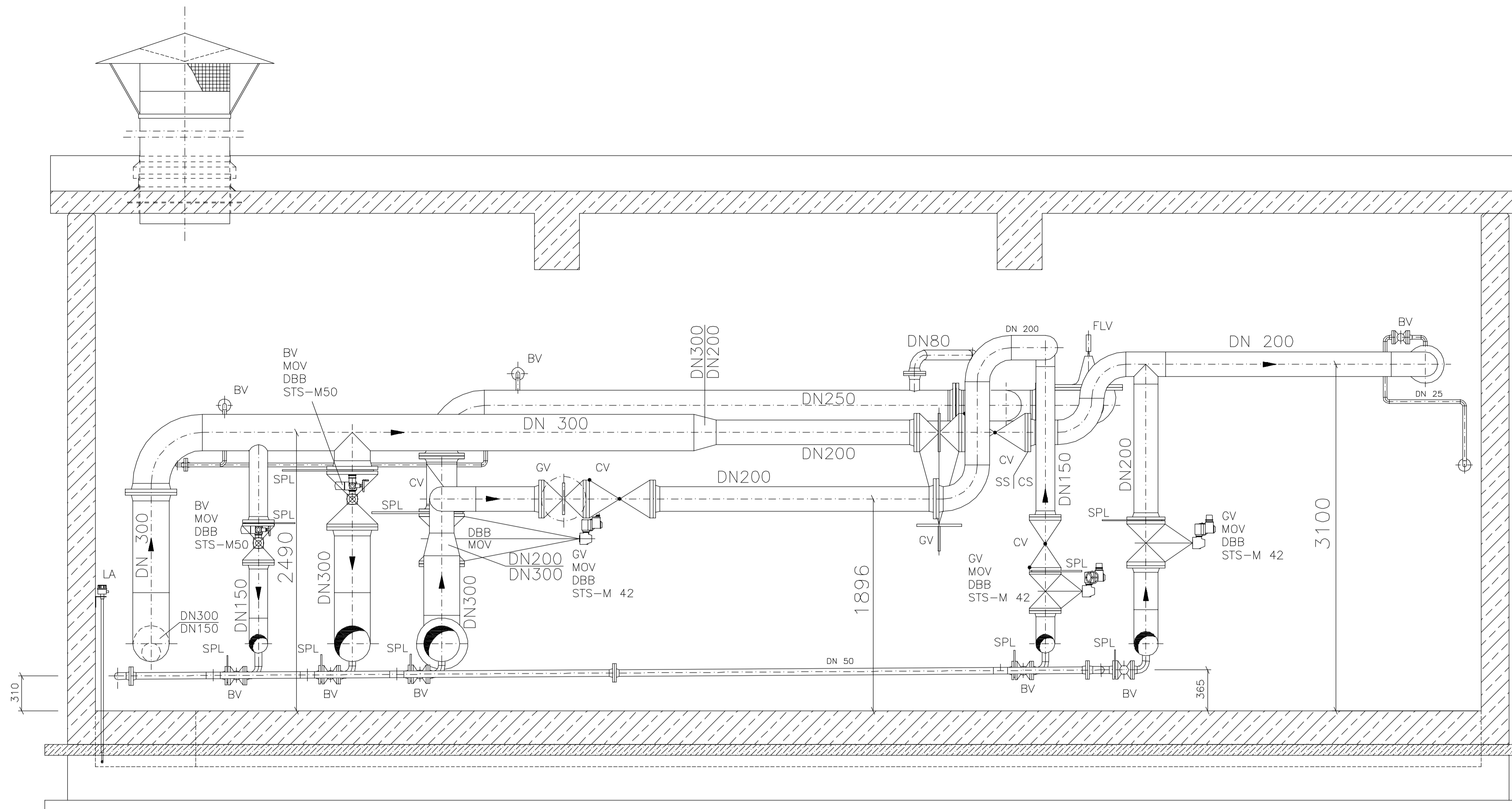
REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
<b>HEADQUARTERS</b> UNITED STATES AIR FORCES EUROPE ENGINEERING & OPERATIONS				
AIRFIELD STANDARD DESIGN US JET FUEL STORAGE AND DISPENSING SYSTEMS		FLUGPLATZ STANDARDPLANUNG US FLUCKRAFTSTOFF-VERSORGUNGSANLAGEN		
BUILDING NAME MANIFOLD / FILTER STATION, HYDRANT REFUELING SYSTEM VERTEILER / FILTERSTATION, HYDRANTEN- BETANKUNGSSYSTEM				
DESIGNATION MECHANICAL INSTALLATION, GROUND PLAN WITH INSULATING COUPLING MASCHINENTECHNISCHE INSTALLATION, GRUNDRISS MIT ISOLIERKUPPLUNG				
PREPARED/AUFGESTELLT LABORATORY APPROVED/UND KONTROLLIERT LAB-MEASUREMENTS/MESSUNGEN APPROVED/GEPRÜFT AMT FÜR BUNDESBAU WALLSTR.1 55122 MANZ				
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAUMAßNAHMEN IN EUROPA (AUßER DEUTSCHLAND)				
APPROVED GEPRÜFT	DATE DATUM	SCALE MASSTAB	STANDARD SHEET STANDARD BLATT	
ORIGINAL DRAWING BY URSPRÜNGLICHE ZEICHNUNG VON	6. MAI 2015	1:20 ; 1:10	M - 8.1	
CONSTRUCTION PROJECT BAUMAßNAHME			CAD-PROJECT FILE CAD-PROJEKTEIGNE	SHEET NO. BLATT NR.



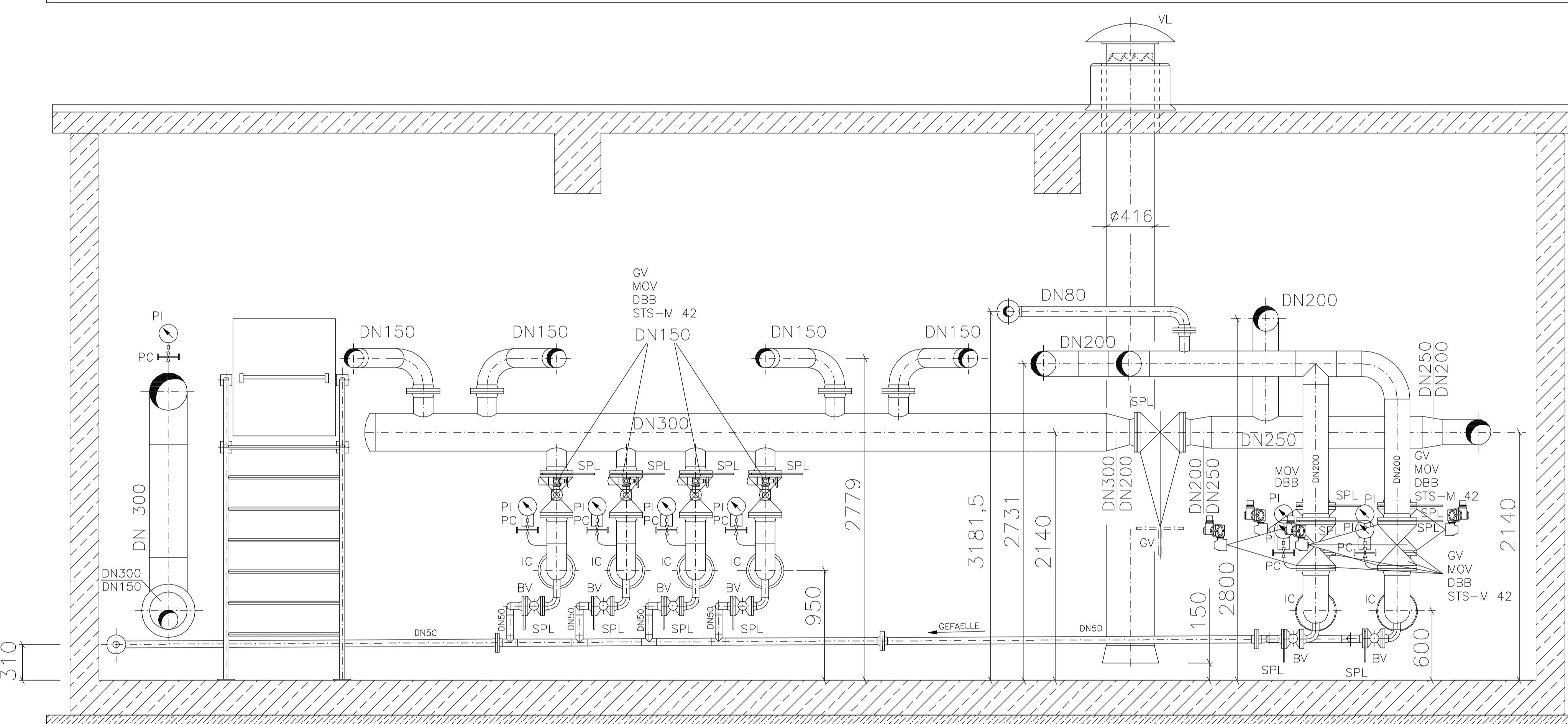




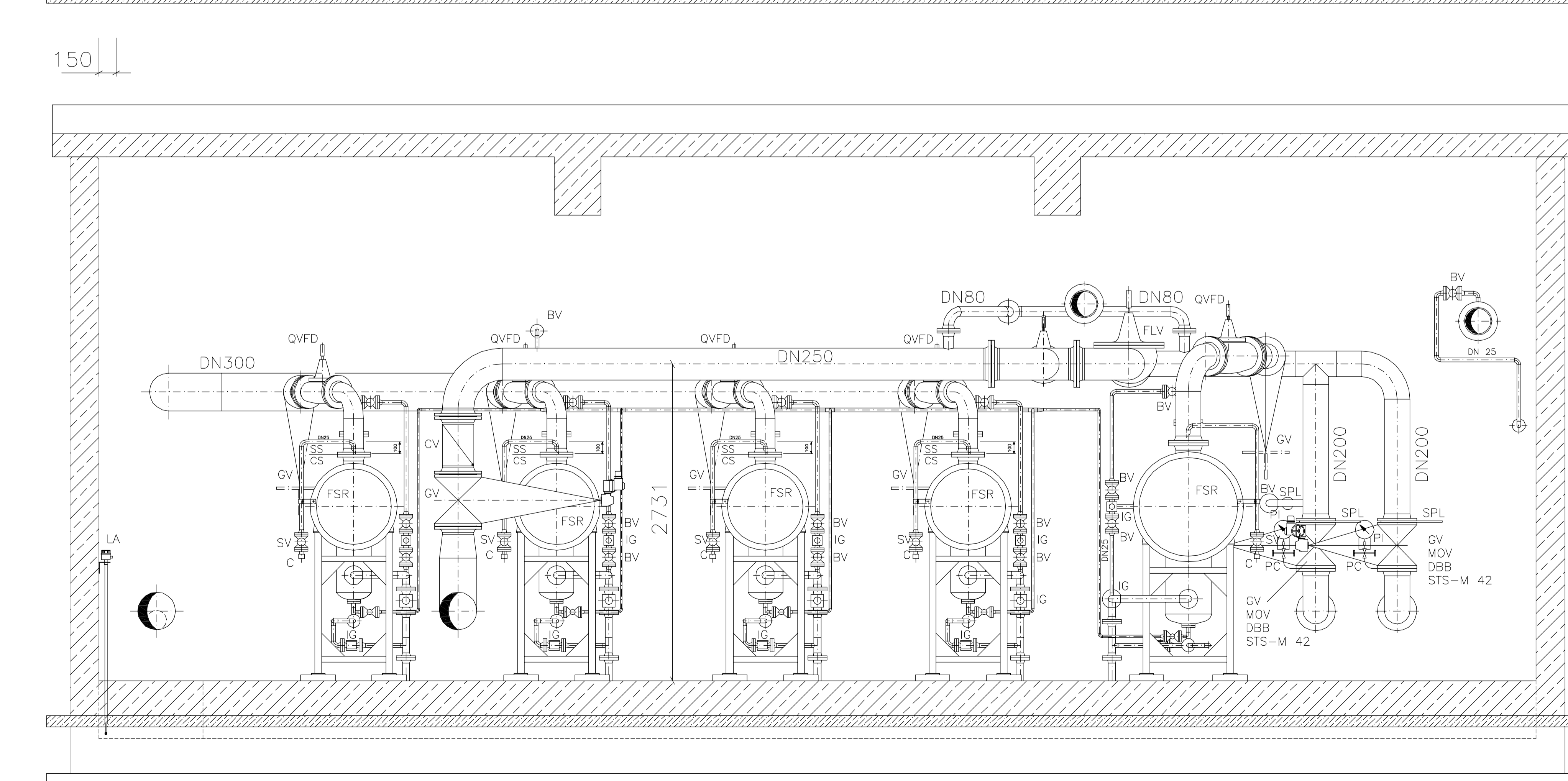
SECTION E-E  
SCHNITT E-E



SECTION F-F  
SCHNITT F-F

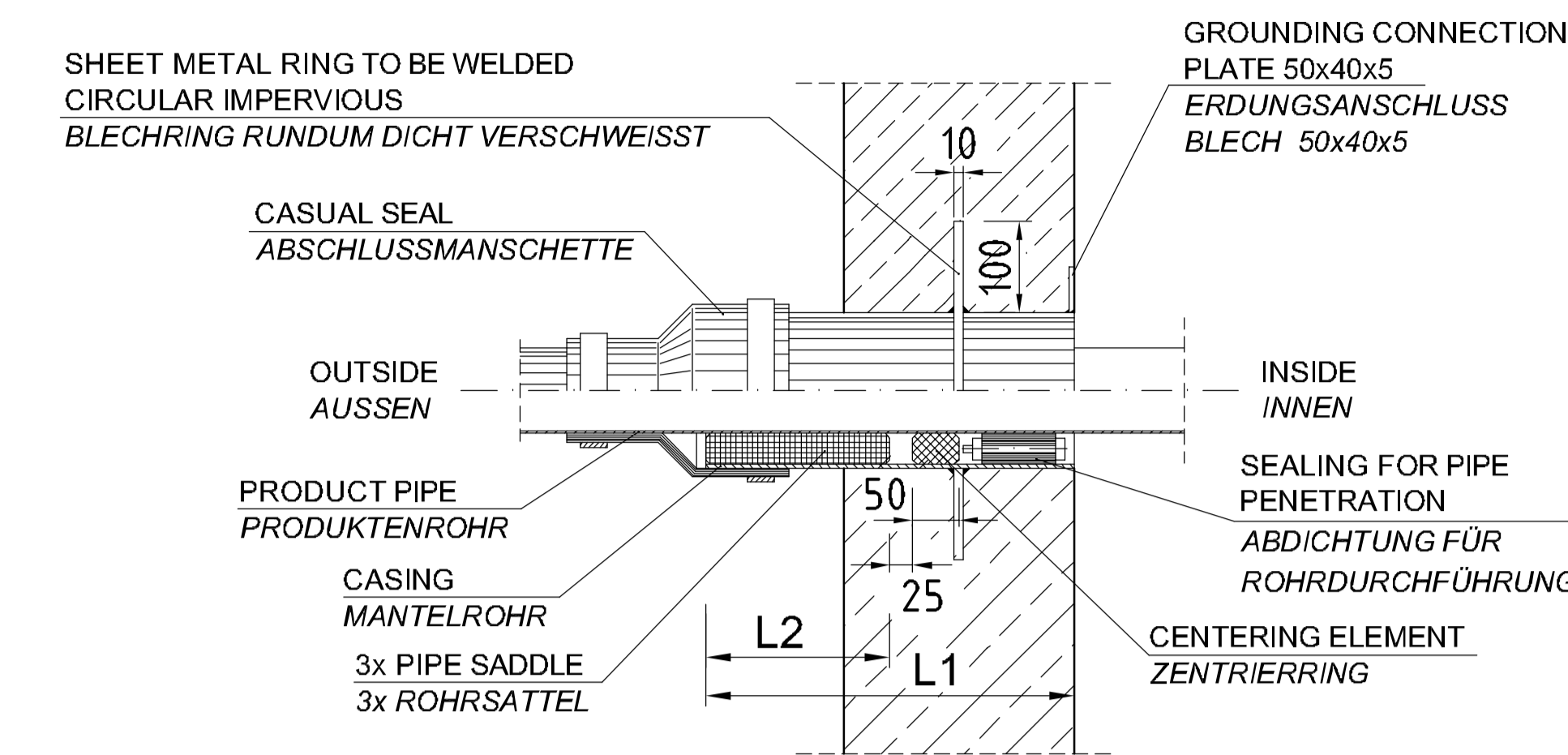


SECTION G-G  
SCHNITT G-G



PIPE PENETRATION  
ROHRDURCHFÜHRUNG

NOT TO SCALE / OHNE MASSTAB



PRODUCT PIPE ROHRLEITUNG	PRODUCT PIPE PRODUKTENROHR mm	CASING MANTELROHR mm	L1 mm	L2 mm
DN 50	ø60,3	ø168,3	450	130
DN 150	ø168,3	ø273,0	600	250
DN 200	ø219,1	ø323,9	600	250
DN 250	ø273,0	ø368,0	600	250
DN 300	ø323,9	ø419,0	600	250

ALL MEASURES HAVE TO BE TO CHECKED ON SIDE  
SAMTLICHE MASSE SIND VOR ORT ZU ÜBERPRÜFEN !

PERTINENT DRAWINGS  
ZUGEHÖRIGE ZEICHNUNGEN

- GM-02.4 GENERAL FLOW DIAGRAM  
GESAMT - FLIESS - SCHEMA
- M-8.1 MECHANICAL INSTALLATION, TOP VIEW  
MASCHINENTECHNISCHE INSTALLATION, DRAUFSICHT
- M-8.2 MECHANICAL INSTALLATION, SECTIONS A - D  
MASCHINENTECHNISCHE INSTALLATION, SCHNITTE A - D

NOTES  
BEMERKUNG

ALL VALVES AND FLANGES DESIGNED FOR PN 16  
ALLE ARMATUREN UND FLANSCHS AUSGELEGT FUER PN 16

FOR SUPPORTS OF PIPES AN INSULATION PIECE, MADE OF 10mm THICK FUEL RESISTANT PLASTIC, IS TO PUT BETWEEN PIPES AND SUPPORTS OR HOLDERS.  
BEI UNTERSTÜTZUNGEN VON ROHRLEITUNGEN IST ZWISCHEN ROHRLEITUNG UND UNTERSTÜTZUNGSKONSTRUKTION BZW. HALTERUNG EINE ISOLIERPLATTE 10mm DICK AUS KRAFTSTOFFBESTEAENDIGEN KUNSTSTOFF, ZU LEGEN.

SUPPORTS AND HOLDERS AS SELECTED BY THE CONTRACTOR IN COORDINATION WITH THE LOCAL CONSTRUCTION SUPERVISION.  
UNTERSTÜTZUNG UND HALTERUNG NACH WAHL DES AN ABSTIMMUNG MIT DER ÖRTLICHEN BAULEITUNG.

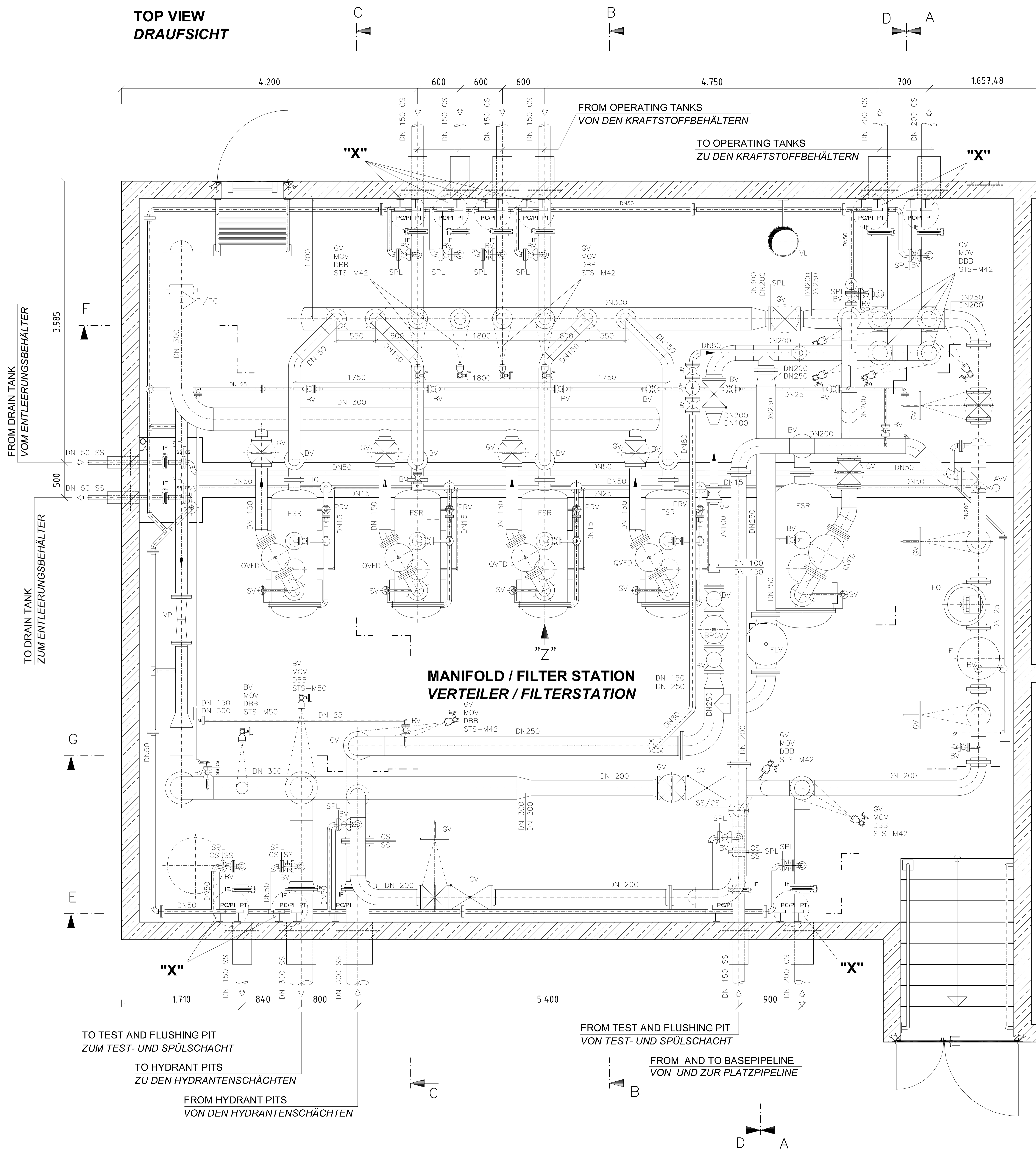
LEGEND  
LEGENDE

- AW VENTILATING VALVE  
BELUEFTUNGSVENTIL
- BPCV BACK PRESSURE CONTROL VALVE  
SYSTEMDRUCK-REGELVENTIL
- BV BALL VALVE  
KUGELHAHN
- C QUICK COUPLING  
SCHNELLKUPPLUNG
- CV RUECKSCHLAGVENTIL  
RUECKSCHLAGVENTIL
- CVP PRESSURE CONTROL VALVE  
UEBERDRUCK-REGELVENTIL
- DT DIRT TRAP  
SCHMUTZFAENGER
- DBB DOUBLE BLOCK AND BLEED
- F STRAINER BASKET  
SIEBKORBFILTER
- FLV FLUSHING VALVE  
SPÜLVENTIL
- FQ FLOW METER  
MENGENMESSER
- FSR FILTER/SEPARATOR  
FILTER/WASSERABSCHIEDER
- GV GATE VALVE  
ABSPERRSCHIEBER
- IC INSULATING COUPLING  
ISOLIERKUPPLUNG
- IG INSPECTION GLASS  
SCHAUGLAS
- LA LIQUID PROBE  
FLÜSSIGKEITSSONDE
- LCV LEVEL CONTROL VALVE  
NIVEAUREGELVENTIL
- MOV GATE VALVE WITH MOTOR  
ABSPERRARMATUR MIT MOTORANTRIEB
- PC PRESSURE GAUGE STOPCOCK  
MANOMETER-ABSPERRVENTIL
- PDI DIFFERENTIAL PRESSURE GAUGE  
DIFFERENZDRUCK-MANOMETER
- PI PRESSURE GAUGE  
MANOMETER
- PIS PRESSURE GAUGE WITH CONTACT FOR SWITCH  
MANOMETER MIT SCHALTKONTAKTEN
- PRV PRESSURE RELIEF VALVE  
DRUCKENTLASTUNGSVENTIL
- QVFD FILTER/SEPARATOR VALVE WITH DIFF.  
PRESSURE SHUT-OFF  
FILTER/WASSERABSCHIEDERVENTIL MIT  
DIFFERENZDRUCK-ABSCHALTUNG
- SPL SPADE PLATE  
BRILLENSTECKSCHEIBE
- SV SAMPLING VALVE  
PROBENTNAHMEVENTIL
- VP VENTURI PIPE  
VENTURIROHR
- VL VENTILATOR  
VENTILATOR
- SS STAINLESS STEEL  
Cr.Ni. STAHL
- CS STEEL  
STAHL

REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
<b>HEADQUARTERS</b> UNITED STATES AIR FORCES EUROPE ENGINEERING & OPERATIONS				
AIRFIELD STANDARD DESIGN US JET FUEL STORAGE AND DISPENSING SYSTEMS		FLUGPLATZ STANDARDPLANUNG US FLUCKRAFTSTOFF-VERSORGUNGSANLAGEN		
BUILDING BAUWERK MANIFOLD / FILTER STATION, HYDRANT REFUELING SYSTEM VERTEILER / FILTERSTATION, HYDRANTEN - BETANKUNGSSYSTEM				
DESIGNATION BEZEICHNUNG MECHANICAL INSTALLATION, SECTIONS E - G WITH INSULATING COUPLING MASCHINENTECHNISCHE INSTALLATION, SCHNITTE E - G MIT ISOLIERKUPPLUNG				
WÄRMERE/BEARBEITET		PREPARED/AUFGESTELLT LAYOUT/VERLEGEN AMT FÜR BUNDESBAU WALLSTR.1 55122 MANZ		
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAUMASSNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED GENEBIGT	DATE DATUM	6. MAI 2015	SCALE MASSTAB	1:25
ORIGINAL DRAWING BY ORIGINAL DED.			STANDARD SHEET STANDARD BLATT	
			<b>M - 8.3</b>	
CONSTRUCTION PROJECT BAUMASSNAHME		CAD PROJECT FILE CAD-PROJEKTDATEI		SHEET NO. BLATT NR.



**TOP VIEW  
DRAUSICHT**



**NOTES  
BEMERKUNG**

ALL VALVES AND FLANGES DESIGNED FOR PN 16  
ALLE ARMATUREN UND FLANSCH AUSGELEGT FUER PN 16

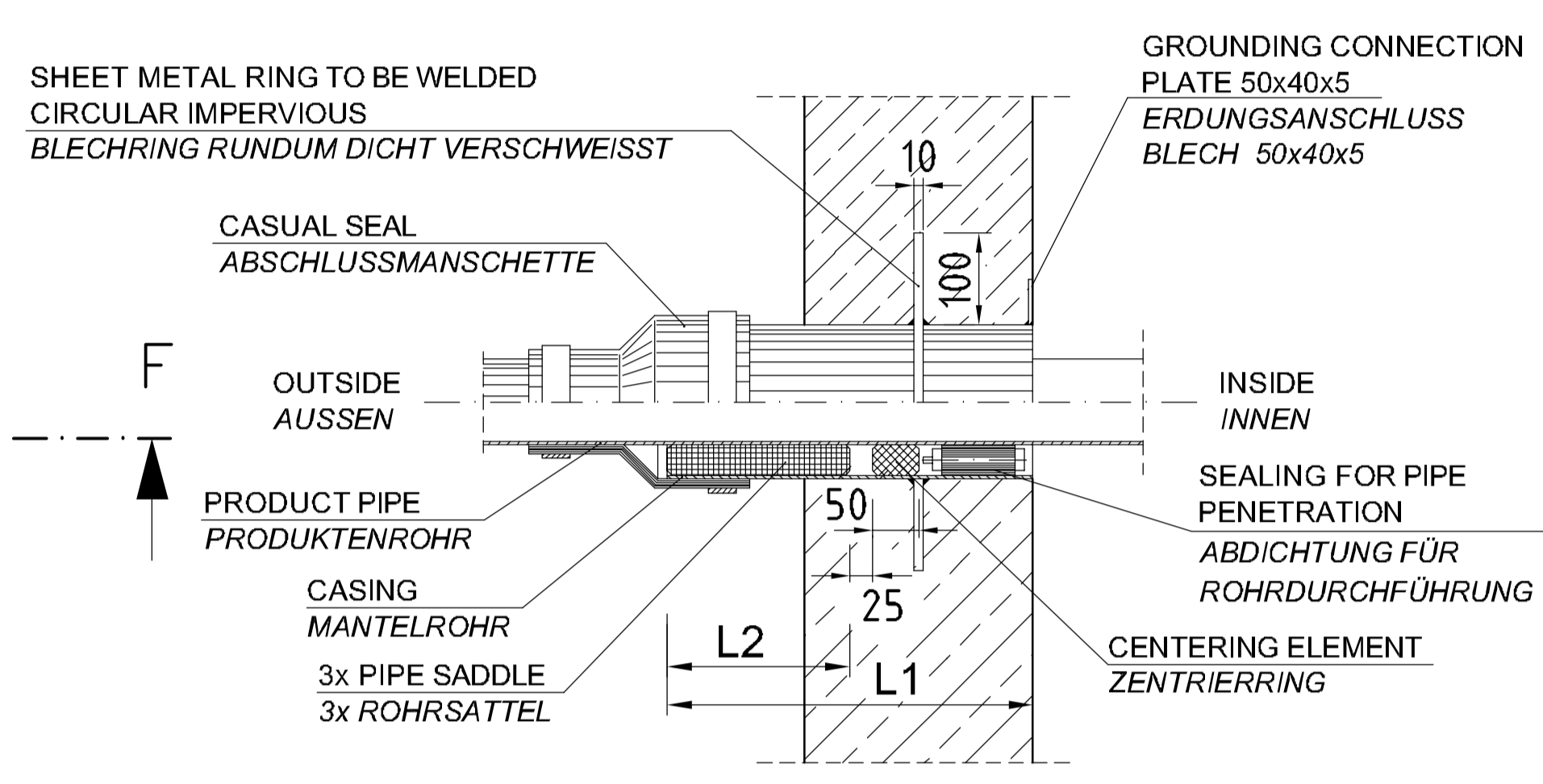
FOR SUPPORTS OF PIPES AN INSULATION PIECE, MADE OF 10mm THICK FUEL RESISTANT PLASTIC, IS TO PUT BETWEEN PIPES AND SUPPORTS OR HOLDERS.  
BEI UNTERSTUETZUNGEN VON ROHRLEITUNGEN IST ZWISCHEN ROHRLEITUNG UND UNTERSTUETZUNGSKONSTRUKTION BZW. HALTERUNG EINE ISOLIERPLATTE 10mm DICK AUS KRAFTSTOFFBESTAENDIGEN KUNSTSTOFF ZU LEGEN.

SUPPORTS AND HOLDERS AS SELECTED BY THE CONTRACTOR IN COORDINATION WITH THE LOCAL CONSTRUCTION SUPERVISION  
UNTERSTUETZUNG UND HALTERUNG NACH WAHL DES AN IN ABSTIMMUNG MIT DER OERTLICHEN BAULEITUNG.

**LEGEND  
LEGENDE**

- AW VENTILATING VALVE  
BELUEFTUNGSVENTIL
- BPCV BACK PRESSURE CONTROL VALVE  
SYSTEMDRUCK-REGELVENTIL
- BV BALL VALVE  
KUGELHAHN
- C QUICK COUPLING  
SCHNELLKUPLUNG
- CV RUECKSCHLAGVENTIL  
RUECKSCHLAGVENTIL
- CVP PRESSURE CONTROL VALVE  
UEBERDRUCK-REGELVENTIL
- DT DIRT TRAP  
SCHMUTZFAENGER
- DBB DOUBLE BLOCK AND BLEED
- F STRAINER BASKET  
SIEBKORBFILTER
- FLV FLUSHING VALVE  
SPÜLVENTIL
- FQ FLOW METER  
MENGMESSE
- FSR FILTER/SEPARATOR  
FILTER/WASSERABSCHIEDER
- GV GATE VALVE  
ABSPERRSCHIEBER
- IF INSULATING FLANGE  
ISOLIERFLANSCH
- IG INSPECTION GLASS  
SCHAUGLAS
- LA LIQUID PROBE  
FLÜSSIGKEITSSONDE
- LCV LEVEL CONTROL VALVE  
NIVEAUREGELVENTIL
- MOV GATE VALVE WITH MOTOR  
ABSPERRARMATUR MIT MOTORANTRIEB
- PC PRESSURE GAUGE STOPCOCK  
MANOMETER-ABSPERRVENTIL
- PDI DIFFERENTIAL PRESSURE GAUGE  
DIFFERENZDRUCK-MANOMETER
- PI PRESSURE GAUGE  
MANOMETER
- PIS PRESSURE GAUGE WITH CONTACT FOR SWITCH  
MANOMETER MIT SCHALTKONTAKTEN
- PRV PRESSURE RELIEF VALVE  
DRUCKENTLASTUNGSVENTIL
- PT PRESSURE TRANSMITTER  
DRUCKTRANSMITTER
- QVFD FILTER/SEPARATOR VALVE WITH DIFF. PRESSURE SHUT-OFF  
FILTER/WASSERABSCHIEDERVENTIL MIT DIFFERENZDRUCK-ABSCHALTUNG
- SPL SPADE PLATE  
BRILLENSTECKSCHEIBE
- SV SAMPLING VALVE  
PROBENTNAHMEVENTIL
- VP VENTURI PIPE  
VENTURIROHR
- VL VENTILATOR  
VENTILATOR
- SS STAINLESS STEEL  
Cr.Ni. STAHL
- CS STEEL  
STAHL

**PIPE PENETRATION  
ROHRDURCHFÜHRUNG**  
NOT TO SCALE / OHNE MASSSTAB

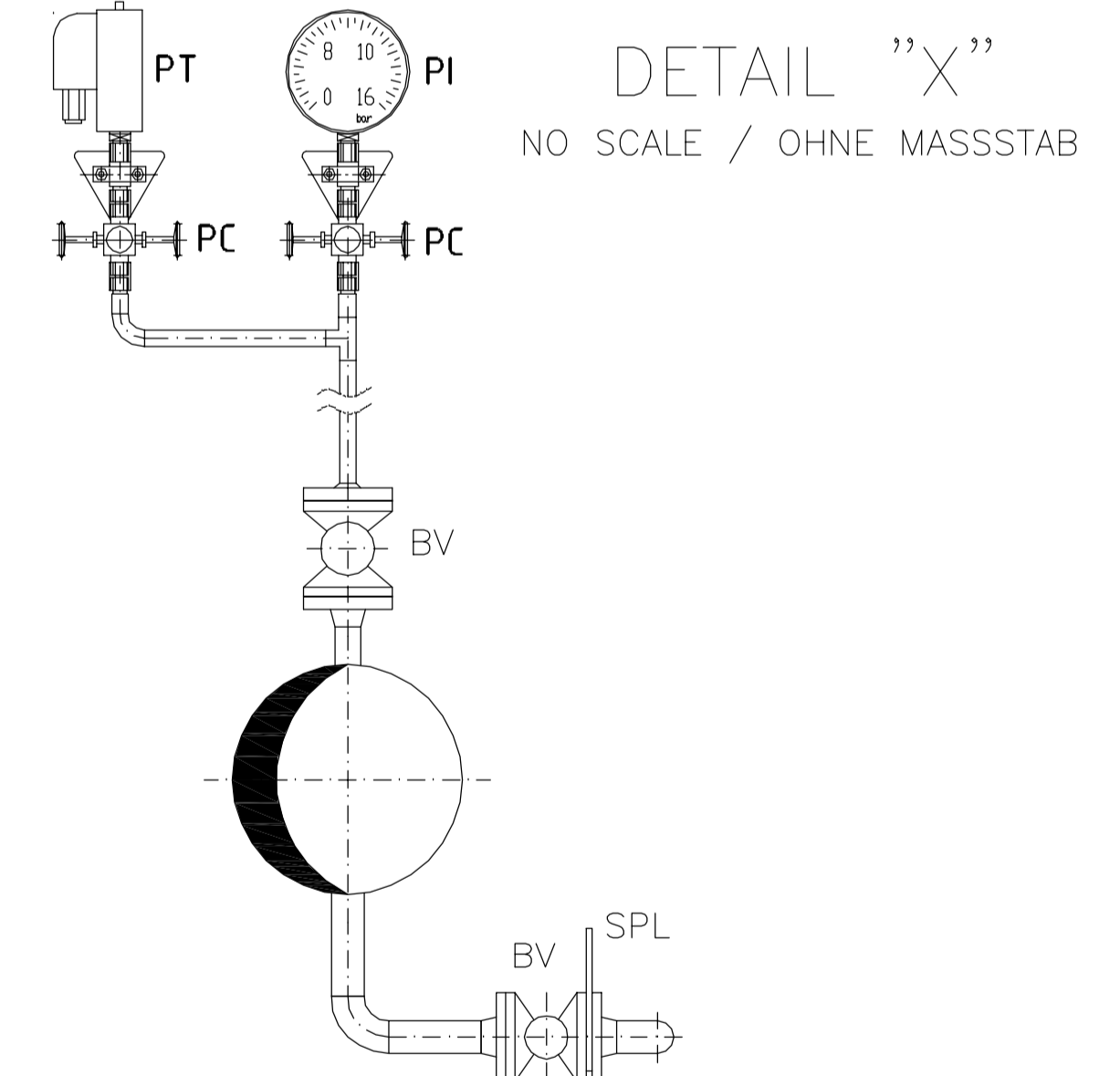


PRODUCT PIPE ROHRLEITUNG	PRODUCT PIPE PRODUKTENROHR mm	CASING MANTELROHR mm	L1 mm	L2 mm
DN 50	ø60,3	ø168,3	450	130
DN 150	ø168,3	ø273,0	600	250
DN 200	ø219,1	ø323,9	600	250
DN 250	ø273,0	ø368,0	600	250
DN 300	ø323,9	ø419,0	600	250

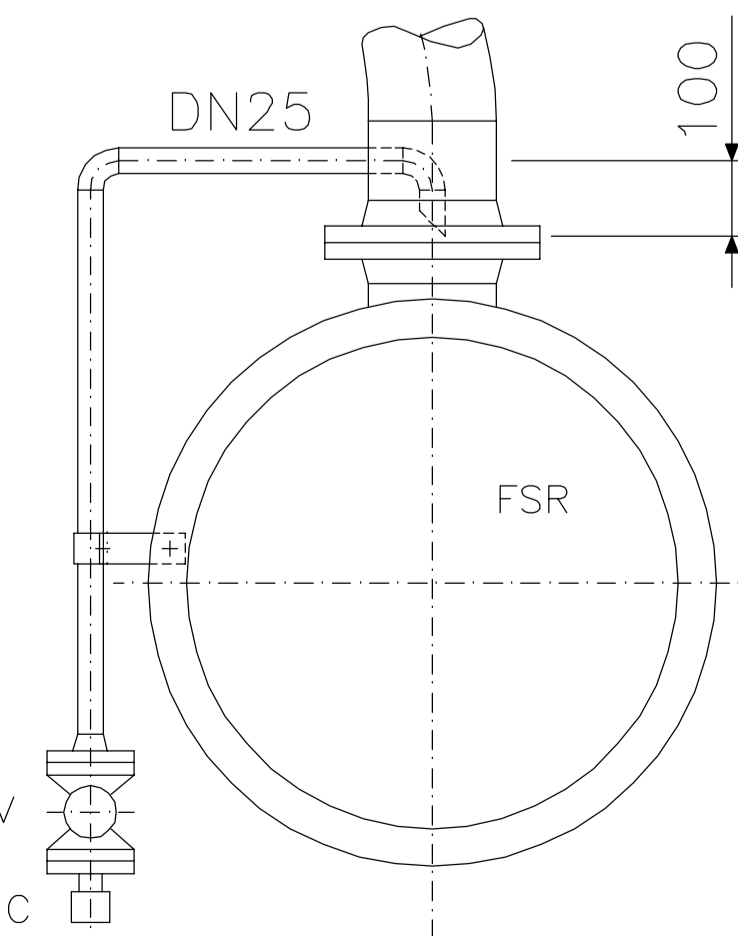
ALL MEASURES HAVE TO BE TO CHECKED ON SIDE  
SAMTLICHE MASSE SIND VOR ORT ZU ÜBERPRÜFEN !

**PERTINENT DRAWINGS  
ZUGEHÖRIGE ZEICHNUNGEN**

- GM-02.4 GENERAL FLOW DIAGRAM  
GESAMT - FLIESS - SCHEMA
- M-8.2 MECHANICAL INSTALLATION, SECTIONS A - D  
MASCHINENTECHNISCHE INSTALLATION, SCHNITTE A - D
- M-8.3 MECHANICAL INSTALLATION, SECTIONS E - F  
MASCHINENTECHNISCHE INSTALLATION, SCHNITTE E - F



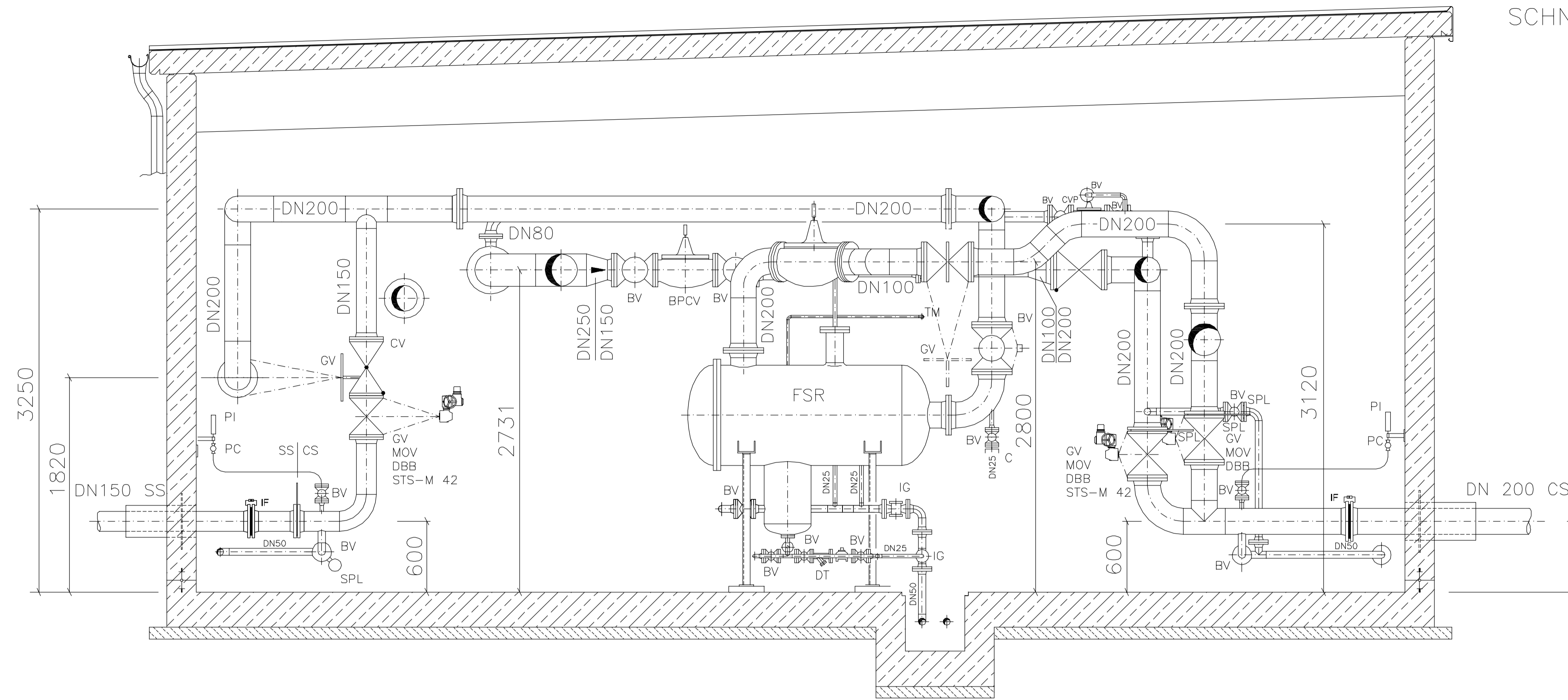
**VIEW  
ANSICHT "Z"**  
SCALE / MASSSTAB 1:10



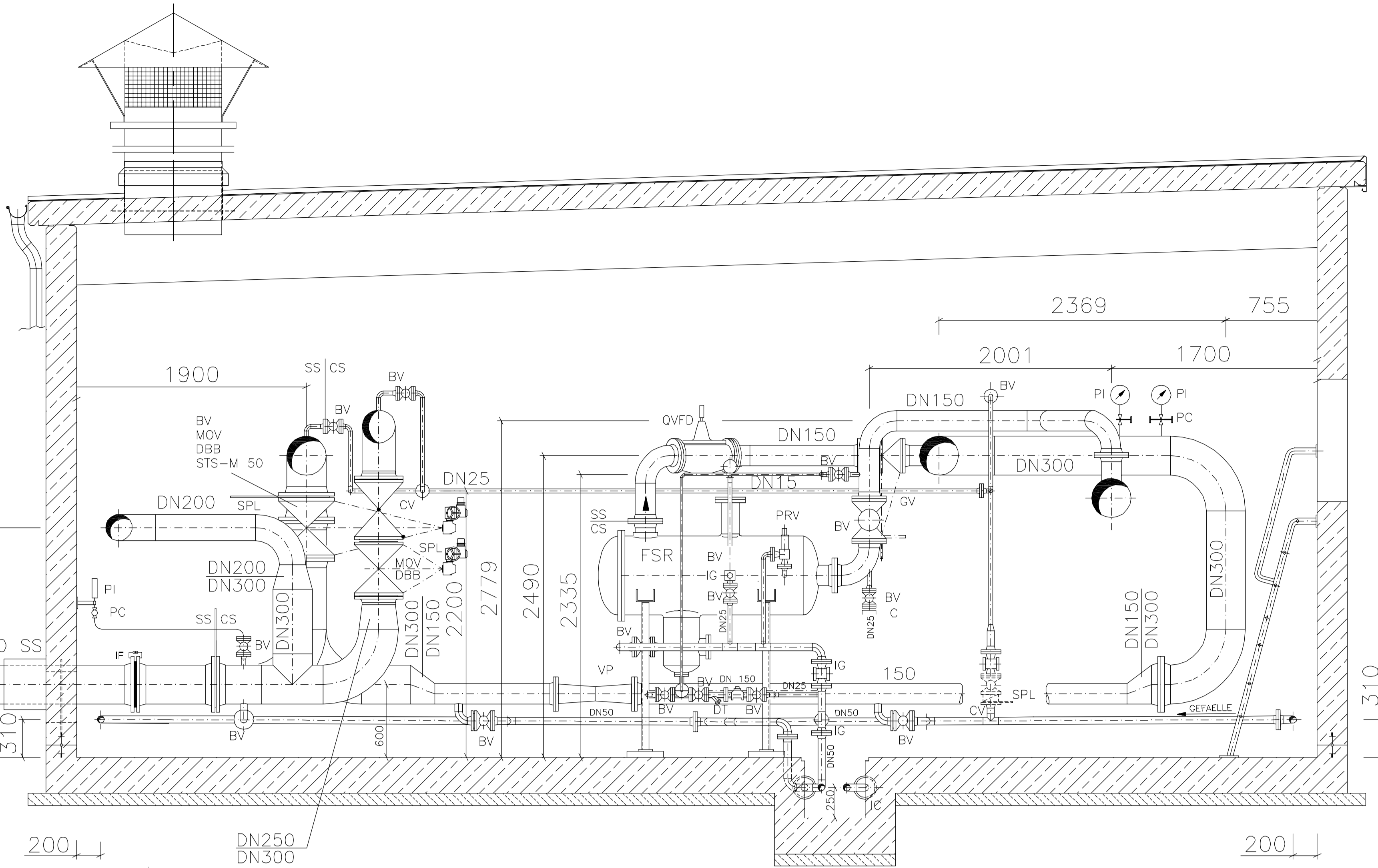
REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
<b>HEADQUARTERS</b> UNITED STATES AIR FORCES EUROPE ENGINEERING & OPERATIONS				
AIRFIELD STANDARD DESIGN US		FLUGPLATZ STANDARDPLANUNG US		
JET FUEL STORAGE AND DISPENSING SYSTEMS		FLUCKRAFTSTOFF- VERSORGUNGSANLAGEN		
BUILDING BAUWERK	MANIFOLD / FILTER STATION, HYDRANT REFUELING SYSTEM VERTEILER / FILTERSTATION, HYDRANTEN - BETANKUNGSSYSTEM			
DESIGNATION BEZEICHNUNG	MECHANICAL INSTALLATION, GROUND PLAN WITH INSULATING FLANGE MASCHINENTECHNISCHE INSTALLATION, GRUNDRISS MIT ISOLIERFLANSCH			
WORKED/BEARBEITET	PREPARED/AUFGESTELLT LAYOUT/GEOMETRIE UND KABELLEITUNG LAGERMASSUNG LAYOUT L B	APPROVED/GENEHMIGT AMT FÜR BUNDESBAU L B	WALLSTR.1 55122 MANZ	
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAUMASSNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED GENEHMIGT	DATE DATUM	SCALE MASSSTAB	STANDARD SHEET STANDARD BLATT	
	6. MAI 2015	1:20 ; 1:10		
DESIGNED ENTWURFEN	CHECKED GEPRÜFT	CAD-PROJECT CAD-PROJEKTE	<b>M - 8.1</b>	
CONSTRUCTION PROJECT BAU MASSNAHME	SHEET NO. BLATT NR.		OF VON	



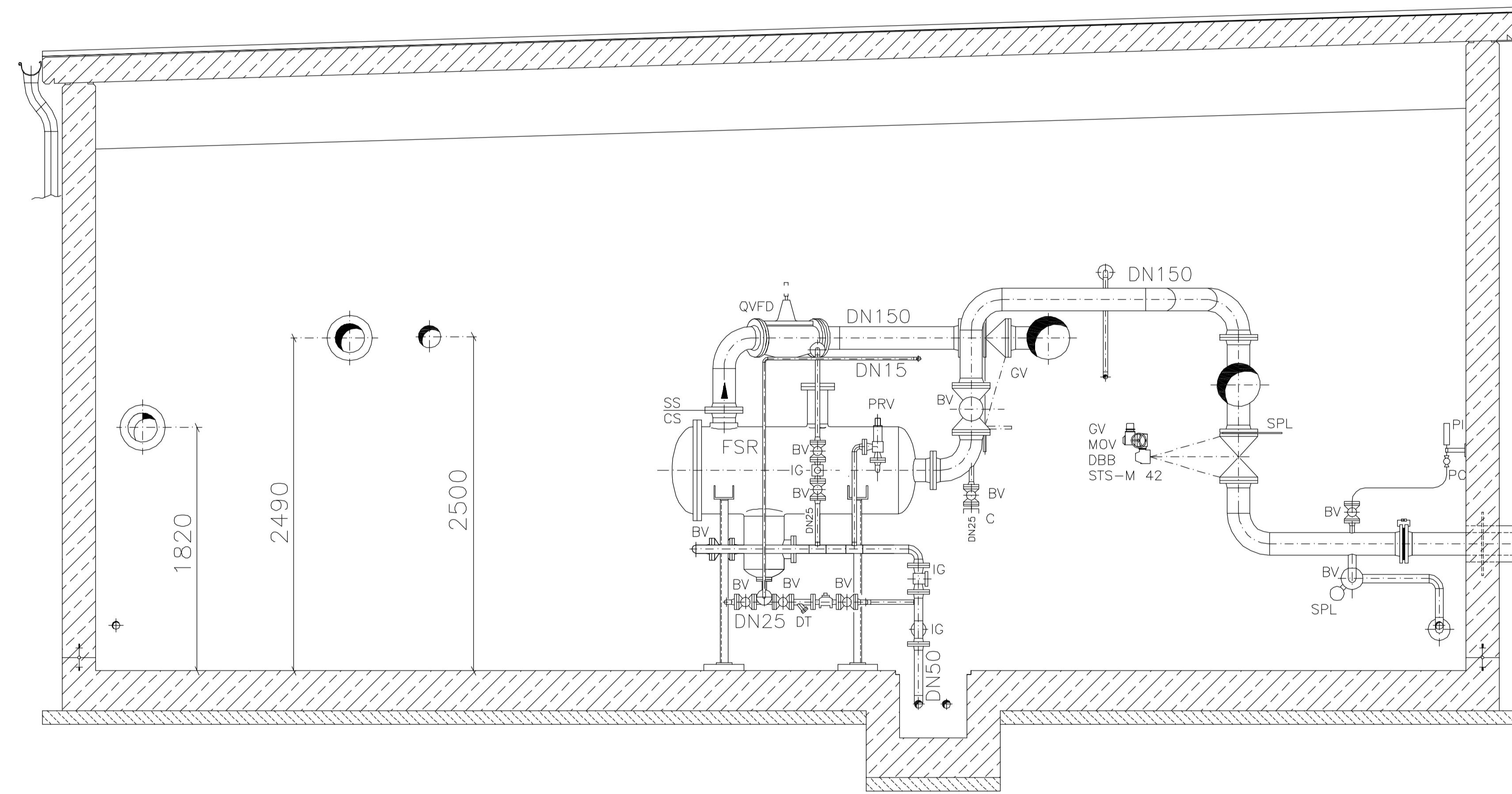
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SCHNITT A-A



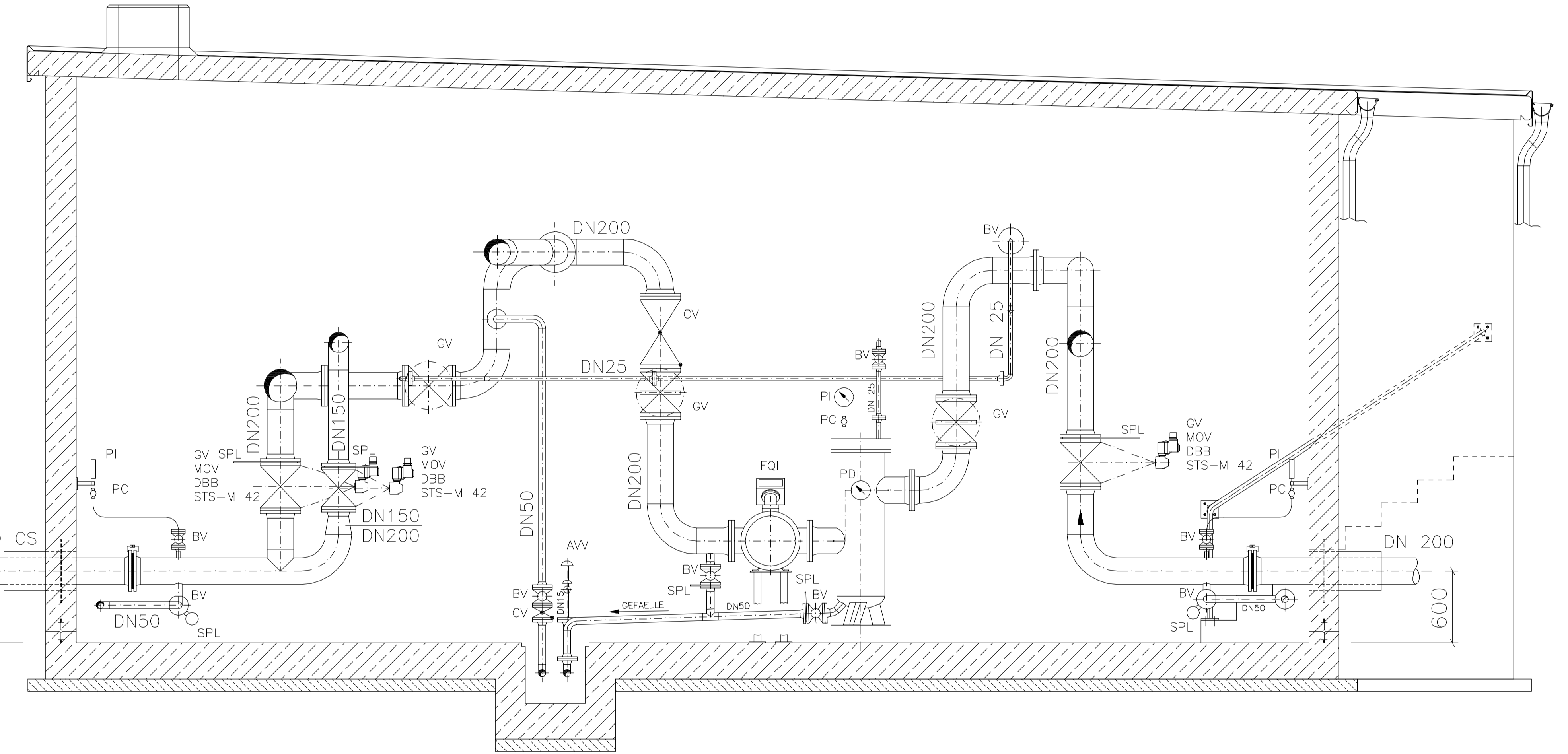
SECTION C-C  
SCHNITT C-C



SECTION B-B  
SCHNITT B-B



SECTION D-D  
SCHNITT D-D

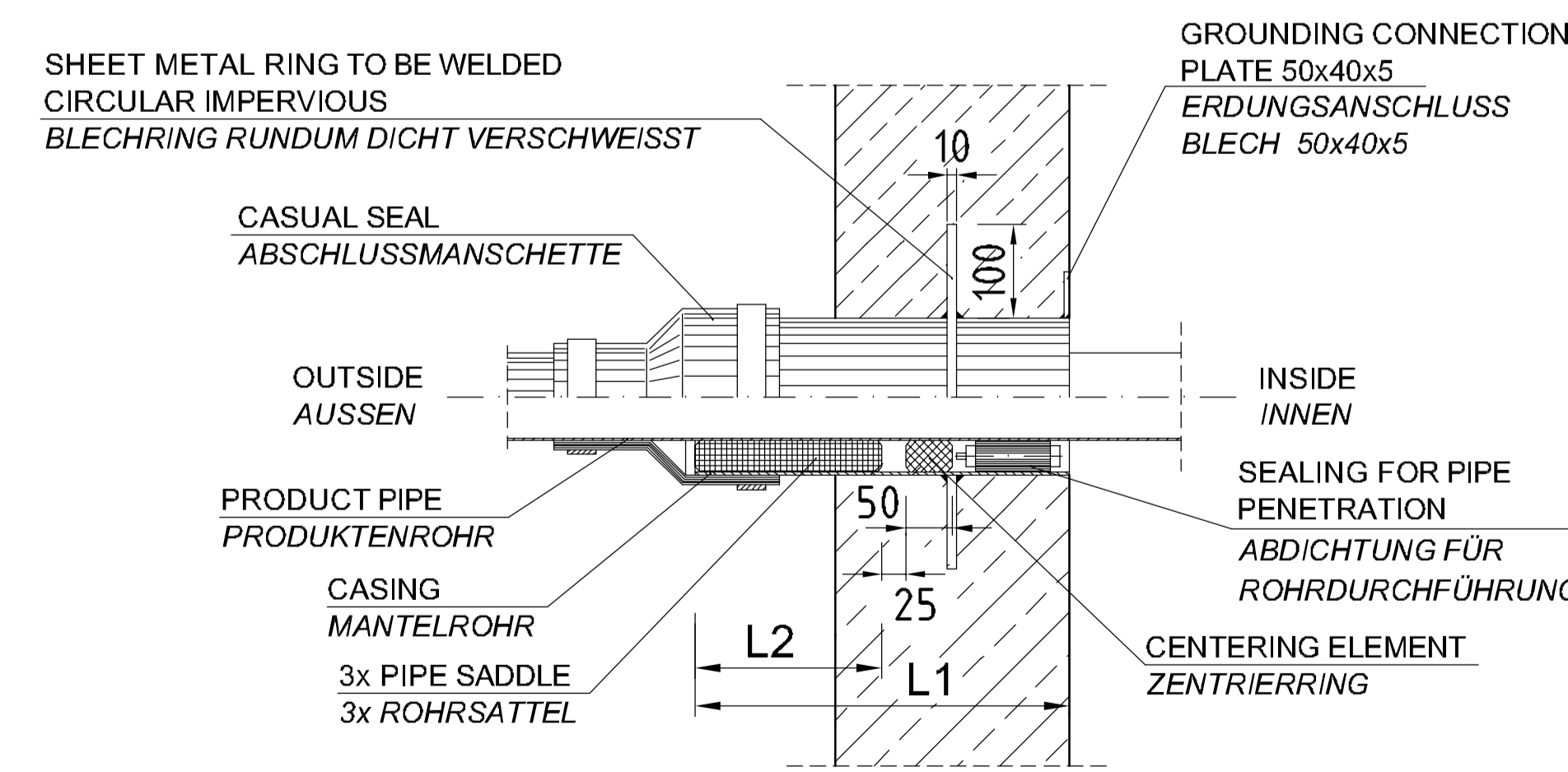


LEGEND  
LEGENDE

AV	VENTILATING VALVE BELÜFTUNGSVENTIL	LCV	LEVEL CONTROL VALVE WEAUREGELVENTIL
BPCV	BACK PRESSURE CONTROL VALVE SYSTEMDRUCK-REGELVENTIL	MOV	GATE VALVE WITH MOTOR ABSPERRARMATUR MIT MOTORANTRIEB
BV	BALL VALVE KUGELHAHN	PC	PRESSURE GAUGE STOPCOCK MANOMETER-ABSPERRVENTIL
C	QUICK COUPLING SCHNELLKUPPLUNG	PDI	DIFFERENTIAL PRESSURE GAUGE DIFFERENZDRUCK-MANOMETER
CV	RUECKSCHLAGVENTIL RUECKSCHLADVENTIL	PI	PRESSURE GAUGE MANOMETER
CVP	PRESSURE CONTROL VALVE UEBERDRUCK-REGELVENTIL	PIS	PRESSURE GAUGE WITH CONTACT FOR SWITCH MANOMETER MIT SCHALKONTAKTEN
DT	DIRT TRAP SCHMUTZFAENGER	PRV	PRESSURE RELIEF VALVE DRUCKENTLASTUNGSVENTIL
F	STRAINER BASKET SIEBKORB/FILTER	QVFD	FILTER/SEPARATOR VALVE WITH DIFF. PRESSURE SHUT-OFF FILTER/WASSERABSCHIEDERVENTIL MIT DIFFERENZDRUCK-ABSCHALTUNG
FLV	FLUSHING VALVE SPULVENTIL	SPL	SPADE PLATE BRILLENSTECKSCHEIBE
FO	FLOW METER MENGENMESSER	SV	SAMPLING VALVE PROBENENTNAHMENTIL
FSR	FILTER/SEPARATOR FILTER/WASSERABSCHIEDER	VP	VENTURI PIPE VENTURIROHR
GV	GATE VALVE ABSPERRSCHEIBER	VL	VENTILATOR VENTILATOR
IF	INSULATING FLANGE ISOLIERFLANSCH	DBB	DOUBLE BLOCK AND BLEED
IG	INSPECTION GLASS SCHAUGLAS		
		SS	STAINLESS STEEL C/N. STAHL
		CS	STEEL STAHL

PIPE PENETRATION  
ROHRDURCHFÜHRUNG

NOT TO SCALE / OHNE MASSTAB



PRODUCT PIPE ROHRLEITUNG	PRODUCT PIPE PRODUKTENROHR mm	CASING MANTELROHR mm	L1 mm	L2 mm
DN 50	ø60,3	ø168,3	450	130
DN 150	ø168,3	ø273,0	600	250
DN 200	ø219,1	ø323,9	600	250
DN 250	ø273,0	ø368,0	600	250
DN 300	ø323,9	ø419,0	600	250

NOTES  
BEMERKUNG

ALL VALVES AND FLANGES DESIGNED FOR PN 16  
ALLE ARMATUREN UND FLANSCHS AUSGELEGT FUER PN 16


FOR SUPPORTS OF PIPES AN INSULATION PIECE, MADE OF 10mm THICK FUEL RESISTANT PLASTIC, IS TO PUT BETWEEN PIPES AND SUPPORTS OR HOLDERS.  
BEI UNTERSTUETZUNGEN VON ROHRLEITUNGEN IST ZWISCHEN ROHRLEITUNG UND UNTERSTUETZUNGSKONSTRUKTION BZW. HALTERUNG EINE ISOLIERPLATTE 10mm DICK AUS KRAFTSTOFFBESTAENDIGEN KUNSTSTOFF ZU LEGEN.

SUPPORTS AND HOLDERS AS SELECTED BY THE CONTRACTOR IN COORDINATION WITH THE LOCAL CONSTRUCTION SUPERVISION  
UNTERSTUETZUNG UND HALTERUNG NACH WAHL DES AN IN ABSTIMMUNG MIT DER OERTLICHEN BAULEITUNG.

ALL MEASURES HAVE TO BE CHECKED ON SIDE  
SAEHTLICHE MASSE SIND VOR ORT ZU UEBERPRUEFEN!

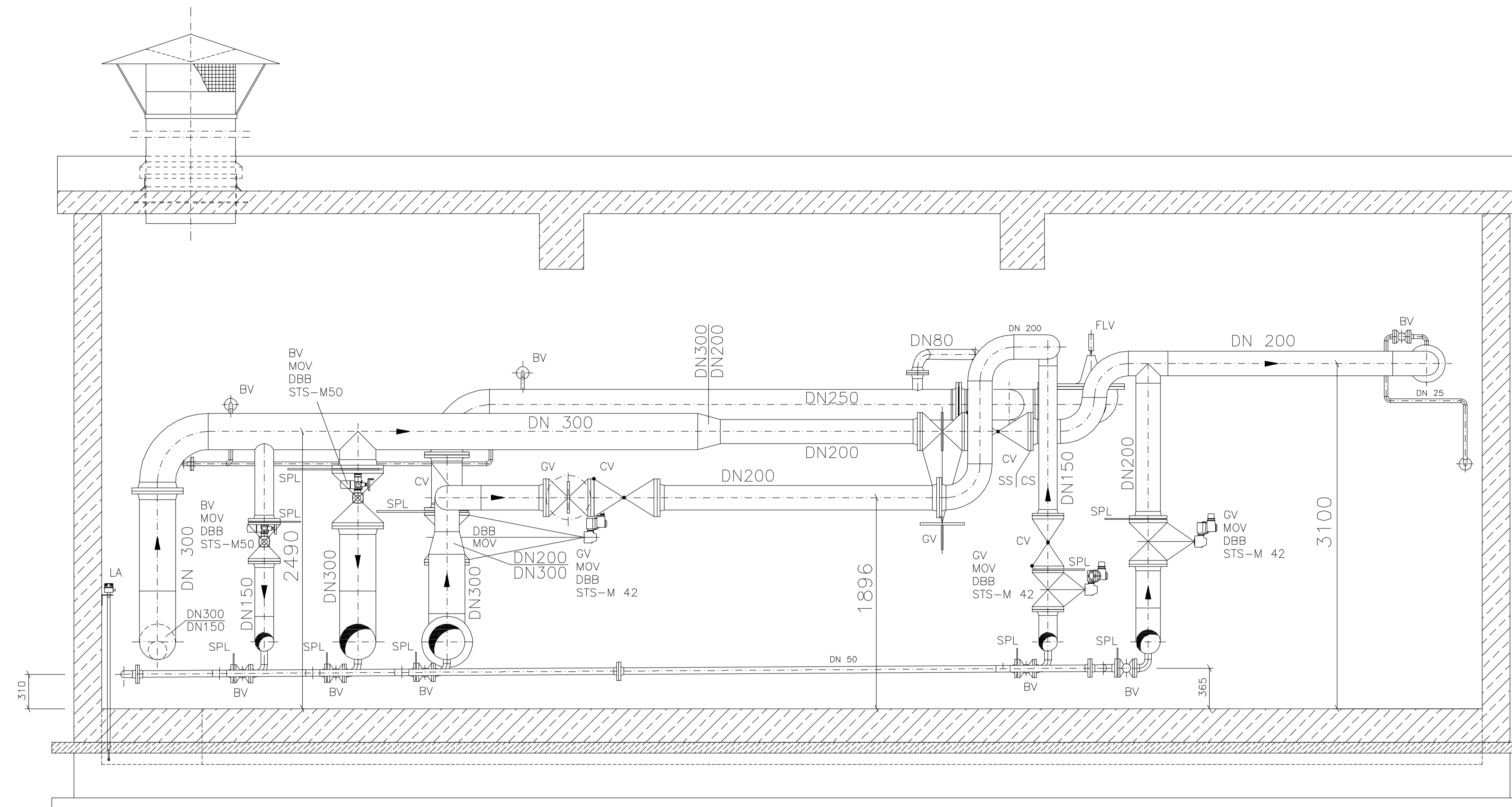
PERTINENT DRAWINGS  
ZUGEHÖRIGE ZEICHNUNGEN

- GM-024 GENERAL FLOW DIAGRAM  
GESAMT-FLEUSS-SCHHEMA
- M-8.1 MECHANICAL INSTALLATION, TOP VIEW  
MASCHINENTECHNISCHE INSTALLATION, DRUCKSICHT
- M-8.3 MECHANICAL INSTALLATION, SECTIONS E-F  
MASCHINENTECHNISCHE INSTALLATION, SCHNITTE E-F

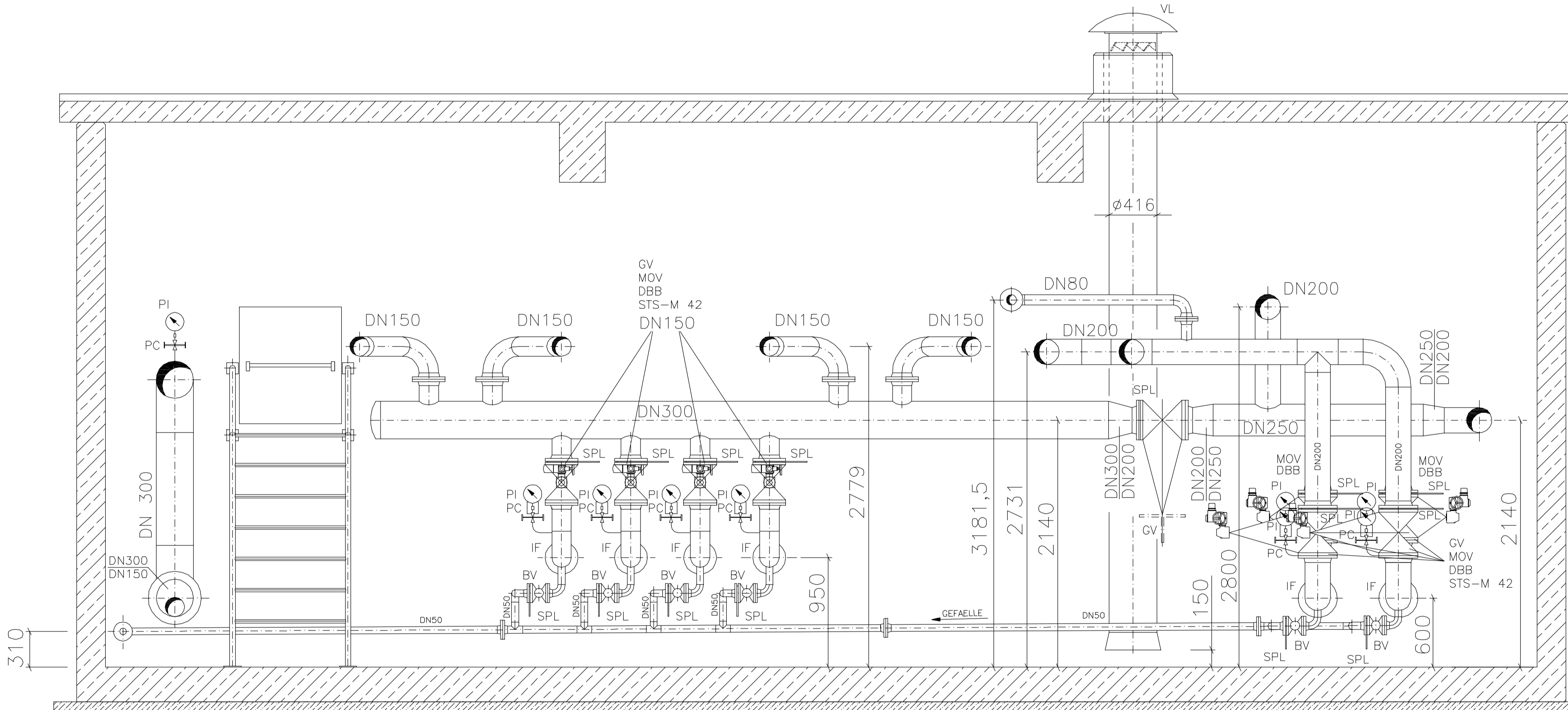
REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
<b>HEADQUARTERS</b> UNITED STATES AIR FORCES EUROPE  ENGINEERING & OPERATIONS				
AIRFIELD STANDARD DESIGN US		FLUGPLATZ STANDARDPLANUNG US		
JET FUEL STORAGE AND DISPENSING SYSTEMS		FLUCKRAFTSTOFF- VERSORGUNGSANLAGEN		
BUILDING BAUWERK	MANIFOLD / FILTER STATION, HYDRANT REFUELING SYSTEM VERTEILER / FILTERSTATION, HYDRANTEN - BETANKUNGSSYSTEM			
DESIGNATION BEZEICHNUNG	MECHANICAL INSTALLATION, SECTIONS A - D WITH INSULATING FLANGE MASCHINENTECHNISCHE INSTALLATION, SCHNITTE A - D MIT ISOLIERFLANSCH			
WORKS/REARBEITET	PREPARED/AUFGESTELLT	APPROVED/GENEHMIGT		
	LAUSANNE/GENÈVE/BRUNNEN UND KÄRNTNERSTRASSE 1000 CH-1000 LAUSANNE	AMT FÜR BUNDESBAU 55122 MAINZ WALLSTR.1		
	LANSALP 1000 CH-1000 LAUSANNE	ORIGINAL CHECKED BY IN ORIGINAL SIZE 100%		
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAUMASSNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED GENEHMIGT	DATE DATUM	SCALE MASSTAB	STANDARD SHEET STANDARD BLATT	
	6. MAI 2015	1:25		
DESIGNED BY IN ORIGINAL SIZE	CHECKED BY IN ORIGINAL SIZE		CAD-PROJECT/PROJEKT CAD-PROJEKTIERE	
CONSTRUCTION PROJECT BAUMASSNAHME			SHEET NO. PLANNR. OF VON	
			<b>M - 8.2</b>	



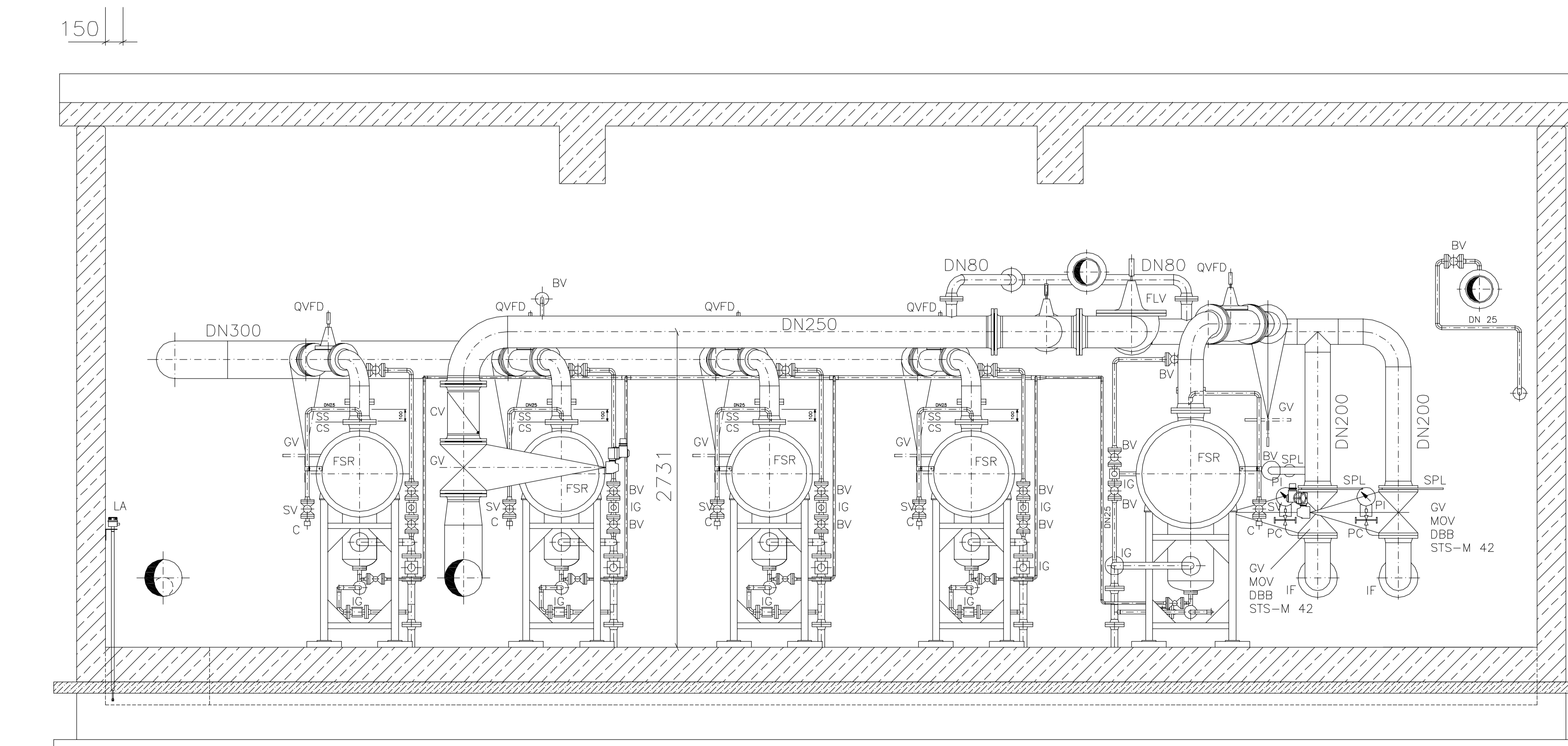
SECTION E-E  
SCHNITT E-E



SECTION F-F  
SCHNITT F-F

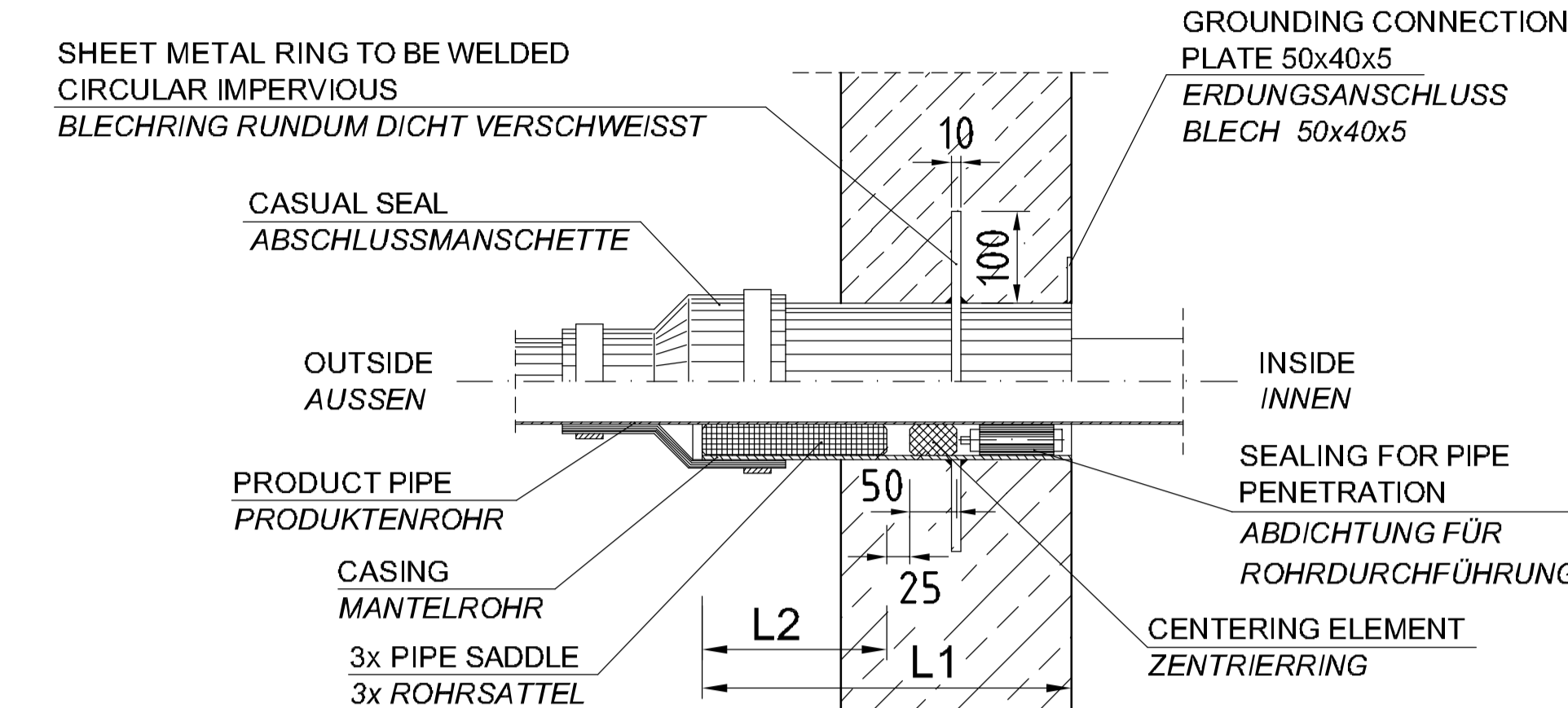


SECTION G-G  
SCHNITT G-G



PIPE PENETRATION  
ROHRDURCHFÜHRUNG

NOT TO SCALE / OHNE MASSTAB



PRODUCT PIPE ROHRL EITUNG	PRODUKT PIPE PRODUKTENROHR mm	CASING MANTELROHR mm	L1 mm	L2 mm
DN 50	ø60,3	ø168,3	450	130
DN 150	ø168,3	ø273,0	600	250
DN 200	ø219,1	ø323,9	600	250
DN 250	ø273,0	ø368,0	600	250
DN 300	ø323,9	ø419,0	600	250

ALL MEASURES HAVE TO BE TO CHECKED ON SIDE  
SÄMTLICHE MASSE SIND VOR ORT ZU ÜBERPRÜFEN !

PERTINENT DRAWINGS  
ZUGEHÖRIGE ZEICHNUNGEN

- GM-02.4 GENERAL FLOW DIAGRAM  
GESAMT - FLIESS - SCHEMA
- M-8.1 MECHANICAL INSTALLATION, TOP VIEW  
MASCHINENTECHNISCHE INSTALLATION, DRAUSICHT
- M-8.2 MECHANICAL INSTALLATION, SECTIONS A - D  
MASCHINENTECHNISCHE INSTALLATION, SCHNITTE A - D

NOTES  
BEMERKUNG

ALL VALVES AND FLANGES DESIGNED FOR PN 16  
ALLE ARMATUREN UND FLANSCHGE AUSGELEGT FUER PN 16

FOR SUPPORTS OF PIPES AN INSULATION PIECE, MADE OF 10mm THICK FUEL RESISTANT PLASTIC, IS TO PUT BETWEEN PIPES AND SUPPORTS OR HOLDERS.  
BEI UNTERSTÜTZUNGEN VON ROHRLEITUNGEN IST ZWISCHEN ROHRLEITUNG UND UNTERSTÜTZUNGSKONSTRUKTION BZW. HALTERUNG EINE ISOLIERPLATTE 10mm DICK AUS KRAFTSTOFFBESTÄNDIGEN KUNSTSTOFF , ZU LEGEN.

SUPPORTS AND HOLDERS AS SELECTED BY THE CONTRACTOR IN COORDINATION WITH THE LOCAL CONSTRUCTION SUPERVISION.  
UNTERSTÜTZUNG UND HALTERUNG NACH WAHL DES AN IN ABSTIMMUNG MIT DER ÖRTLICHEN BAULEITUNG.

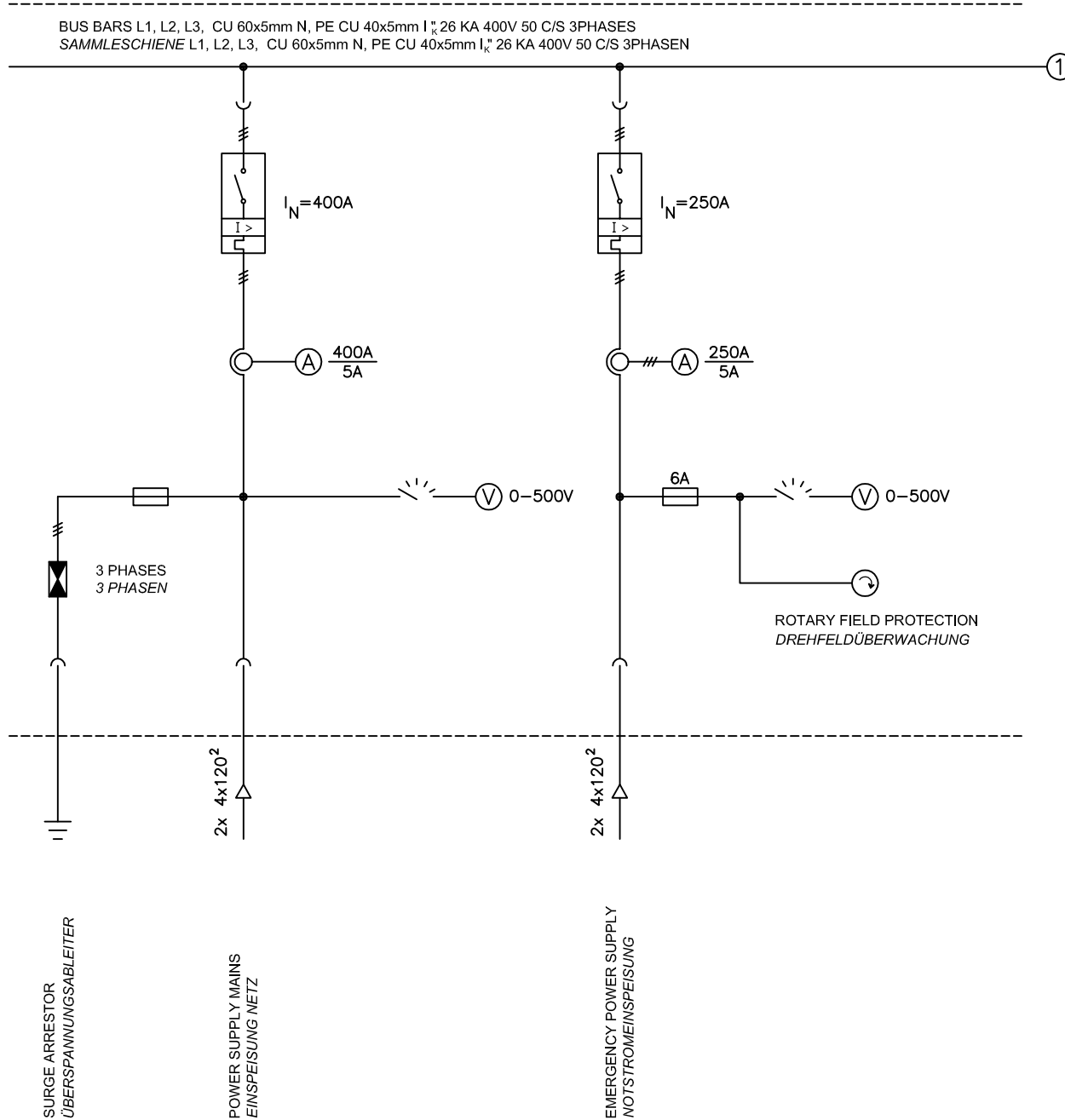
LEGEND  
LEGENDE

- AVV VENTILATING VALVE  
BELÜFTUNGSVENTIL
- BPCV BACK PRESSURE CONTROL VALVE  
SYSTEMDRUCK-REGELVENTIL
- BV BALL VALVE  
KUGELHÄHN
- C QUICK COUPLING  
SCHNELLKUPPLUNG
- CV RUECKSCHLAGVENTIL  
RUECKSCHLAGVENTIL
- QVP PRESSURE CONTROL VALVE  
UEBERDRUCK-REGELVENTIL
- DT DIRT TRAP  
SCHMUTZFAENGER
- DBB DOUBLE BLOCK AND BLEED
- F STRAINER BASKET  
SIEBKORBFILTER
- FLV FLUSHING VALVE  
SPÜLVENTIL
- FQ FLOW METER  
MENGMESSE
- FSR FILTER/SEPARATOR  
FILTER/WASSERABSCHIEDER
- GV GATE VALVE  
ABSPERRSCHIEBER
- IF INSULATING FLANGE  
ISOLIERFLANSCH
- IG INSPECTION GLASS  
SCHAUGLAS
- LA LIQUID PROBE  
FLÜSSIGKEITSSONDE
- LCV LEVEL CONTROL VALVE  
NIVEAUREGELVENTIL
- MOV GATE VALVE WITH MOTOR  
ABSPERRARMATUR MIT MOTORANTRIEB
- PC PRESSURE GAUGE STOPCOCK  
MANOMETER-ABSPERRVENTIL
- PDI DIFFERENTIAL PRESSURE GAUGE  
DIFFERENZDRUCK-MANOMETER
- PI PRESSURE GAUGE  
MANOMETER
- PIS PRESSURE GAUGE WITH CONTACT FOR SWITCH  
MANOMETER MIT SCHALTCONTACTEN
- PRV PRESSURE RELIEF VALVE  
DRUCKENTLASTUNGSVENTIL
- QVFD FILTER/SEPARATOR VALVE WITH DIFF.  
PRESSURE SHUT-OFF  
FILTER/WASSERABSCHIEDERVENTIL MIT  
DIFFERENZDRUCK-ABSCHALTUNG
- SPL SPADE PLATE  
BRILLENSTECKSCHEIBE
- SV SAMPLING VALVE  
PROBENTNAHMEVENTIL
- VP VENTURI PIPE  
VENTURIROHR
- VL VENTILATOR  
VENTILATOR
- SS STAINLESS STEEL  
Cr.Ni; STAHL
- CS STEEL  
STAHL

REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
<b>HEADQUARTERS</b> <b>UNITED STATES AIR FORCES EUROPE</b> <b>ENGINEERING &amp; OPERATIONS</b>				
<b>AIRFIELD STANDARD DESIGN US</b> <b>JET FUEL STORAGE AND DISPENSING SYSTEMS</b>		<b>FLUGPLATZ STANDARDPLANUNG US</b> <b>FLUCKRAFTSTOFF- VERSORGSANLAGEN</b>		
<b>BUILDING BAUWERK</b>				
<b>MANIFOLD / FILTER STATION , HYDRANT REFUELING SYSTEM</b> <b>VERTEILER / FILTERSTATION , HYDRANTEN - BETANKUNGSSYSTEM</b>				
<b>DESIGNATION BEZEICHNUNG</b>				
<b>MECHANICAL INSTALLATION, SECTIONS E - G</b> <b>WITH INSULATING FLANGE</b> <b>MASCHINENTECHNISCHE INSTALLATION, SCHNITTE E - G</b> <b>MIT ISOLIERFLANSCH</b>				
<b>WORKS/BEARBEITET</b>				
<b>PREPARED/AUFGESTELLT</b> <b>LAYOUT/PLANUNG</b> <b>UND KALKULATION</b> <b>LAGERMASSSTAB LAYOUT</b> <b>L - B</b>		<b>APPROVED/GENEHMIGT</b> <b>FOR</b> <b>FÜR</b> <b>BUNDESBAU</b> <b>L - B</b> <b>AMT</b> <b>FÜR</b> <b>BUNDESBAU</b> <b>WALLSTR.1</b> <b>55122 MANZ</b>		
<b>INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY)</b> <b>EINGEFÜHRT FÜR BAUMAßNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)</b>				
<b>APPROVED GENEHMIGT</b>		<b>DATE DATUM</b>		<b>SCALE MASSTAB</b>
		6. MAI 2015		1:25
<b>ORIGINAL DRAWING BY ORIGINAL DZ</b>		<b>STANDARD SHEET STANDARD BLATT</b>		
		M - 8.3		
<b>CONSTRUCTION PROJECT BAUMAßNAHME</b>		<b>CAD PROJECT FILE CAD-PROJEKTDATEI</b>		<b>SHEET NO. BLATT NR.</b>
				OF VON



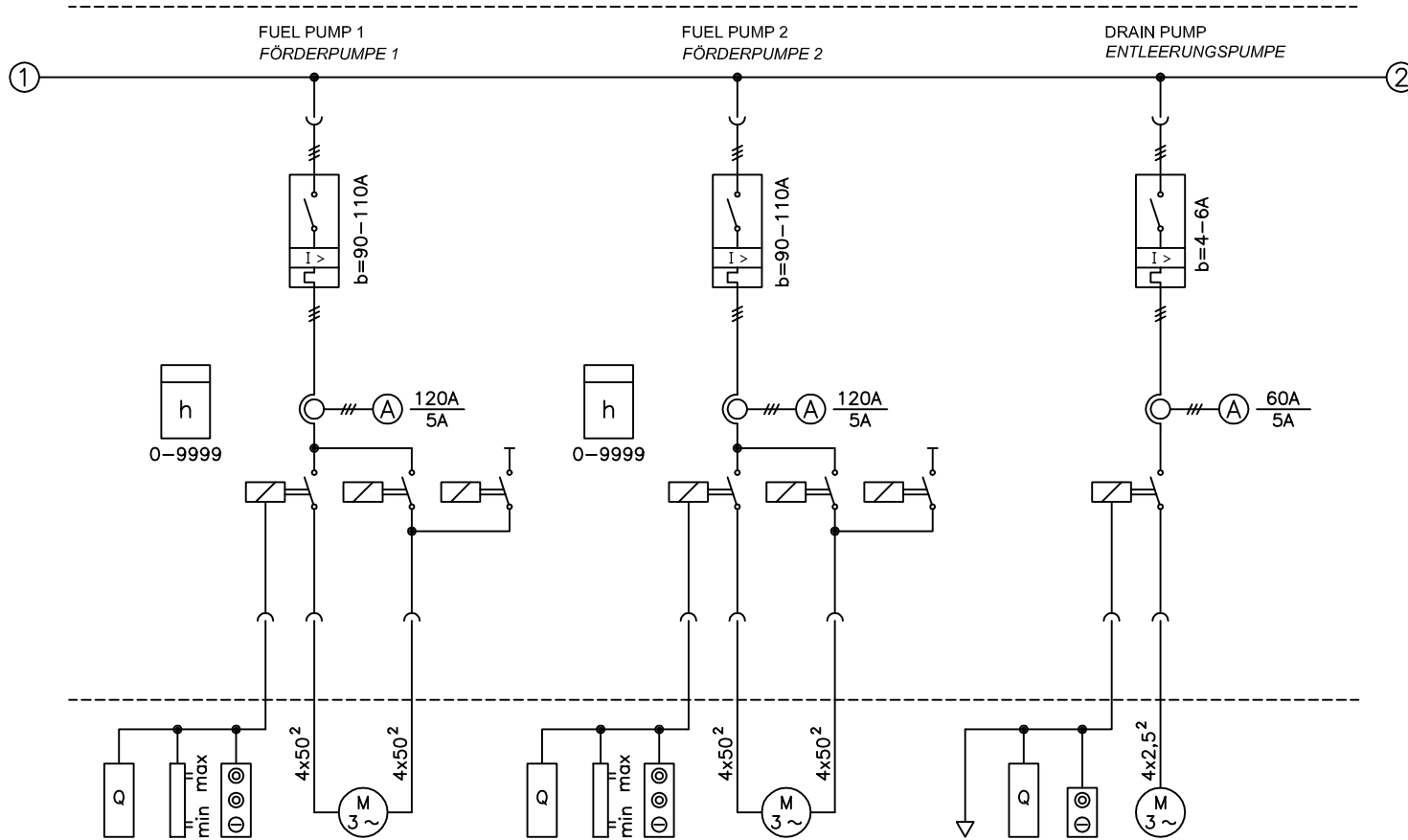
# INPUT PANEL EINSPEISEFELD



REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
HEADQUARTERS UNITED STATES AIR FORCES EUROPE				
ENGINEERING & OPERATIONS				
AIRFIELD STANDARD DESIGN US JET FUEL STORAGE AND DISPENSING SYSTEMS			FLUGPLATZ STANDARDPLANUNG US FLUGKRAFTSTOFF - VERSORGUNGSANLAGEN	
BUILDING BAUWERK: MANIFOLD / FILTER STATION , HYDRANT REFUELING SYSTEM VERTEILER / FILTERSTATION , HYDRANTEN - BETANKUNGSSYSTEM				
DESIGNATION BEZEICHNUNG: ELECTRICAL DIAGRAM INPUT PANEL SCHALTPLAN EINSPEISEFELD				
WORKED/BEARBEITET		PREPARED/AUFGESTELLT <small>LANDESBETRIEBE LIEGENSCHAFTS- UND BAUBETRIEBUNG LBB-WIEDERLASSUNG LANDAU</small>  <small>ANSCHEFT: UNTERBERGSTR. 11, 76829 LANDAU TELEFON: (06341) 912-276 TELEFAX: (06341) 912-291</small> <small>LANDAU</small> <small>BY PROXY / BE VERTRÄGTE:</small> <small>ORIGINAL DRAWN BY:</small> <small>BY PROXY / BE VERTRÄGTE:</small> <small>STEPHAN KOTZSCHNEIDER</small>		APPROVED/GENEHMIGT  <b>AMT FÜR BUNDESBAU</b> <b>WALLSTR. 1 55122 MAINZ</b> <small>ORIGINAL DRAWN BY:</small> <small>BY PROXY / BE VERTRÄGTE:</small> <small>STEPHAN KOTZSCHNEIDER</small>
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAUMASSNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED GENEHMIGT		DATE DATUM: 6. MAI 2015		SCALE MASSSTAB: /
ORIGINAL DRAWN BY BY PROXY / BE VERTRÄGTE:		STANDARD SHEET STANDARD PLAN		E - 8,1
CONSTRUCTION PROJECT BAUMASSNAHME		SHEET NO. PLAN-NR.:		OF VON:



# OPERATING TANK 1 FLACHBODENTANK 1



FLOW SWITCH  
STRÖMUNGSWÄCHTER  
LEVEL INDICATOR  
FÜLLSTANDSANZEIGER  
LOCAL CONTROL UNIT IN PUMP HOUSE  
ORTSSTEUERSTELLE IM PUMPENHAUS

FUEL PUMP 55kW  
FÖRDERPUMPE 55kW


FLOW SWITCH  
STRÖMUNGSWÄCHTER  
LEVEL INDICATOR  
FÜLLSTANDSANZEIGER  
LOCAL CONTROL UNIT IN PUMP HOUSE  
ORTSSTEUERSTELLE IM PUMPENHAUS

FUEL PUMP 55kW  
FÖRDERPUMPE 55kW

INTERLOCKING WITH LEVEL INDICATOR DRAIN PUMP  
VERRIEGELUNG MIT FÜLLSTANDSANZEIGER  
ENTLEERUNGSBEHÄLTNER

FLOW SWITCH  
STRÖMUNGSWÄCHTER  
LOCAL CONTROL UNIT  
ORTSSTEUERSTELLE

DRAIN PUMP 2.2kW  
ENTLEERUNGSPUMPE 2.2kW

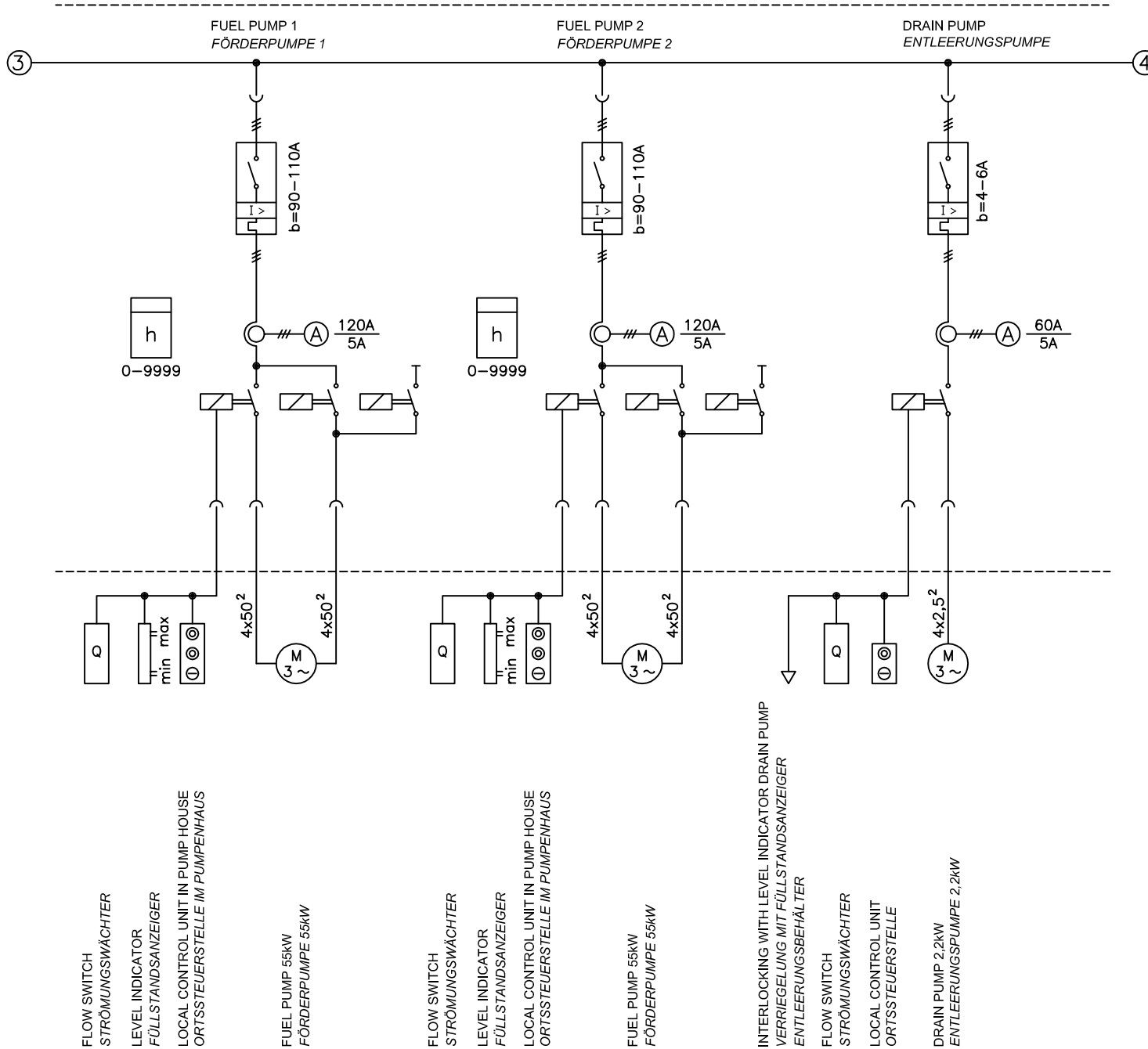
REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
HEADQUARTERS UNITED STATES AIR FORCES EUROPE 				
ENGINEERING & OPERATIONS				
AIRFIELD STANDARD DESIGN US			FLUGPLATZ STANDARDPLANUNG US	
JET FUEL STORAGE AND DISPENSING SYSTEMS			FLUGKRAFTSTOFF - VERSORGSANLAGEN	
BUILDING BAUWERK	MANIFOLD / FILTER STATION , HYDRANT REFUELING SYSTEM VERTEILER / FILTERSTATION , HYDRANTEN - BETANKUNGSSYSTEM			
DESIGNATION BEZEICHNUNG	ELECTRICAL DIAGRAM OPERATING TANK 1 SCHALTPLAN FLACHBODENTANK 1			
WORKED/BEARBEITET	PREPARED/AUFGESTELLT LANDESRECHTLICHE BEZUGSSTELLE UND BAUBESTREUUNG LEB-RIEDELASSUNG LANDAU L B B ANSCHEFTL. UNTERSUCHUNGSPLATZ 11, PABER LAMAU TELEFON (06344) 912-276 TELEFAX (06344) 912-291 LANDAU BY PROSY / H. VORSTREUBER ORIGINAL DRAWN BY H. VORSTREUBER STEPHAN KOTZSCHNEIDER	APPROVED/GENEHMIGT  <b>AMT FÜR BUNDESBAU</b>  WALLSTR. 1 55122 MAINZ  DRAWING CHECKED BY PROSY / H. VORSTREUBER REVISION 002		
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAUMAßNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED GEBENHET	DATE DATUM	6. MAI 2015		SCALE MAßSTAB
ORIGINAL REPROD BY H. VORSTREUBER	STANDARD SHEET STANDARD PLAN			E - 8,2
CONSTRUCTION PROJECT BAUMAßNAHME	SHEET NO. PLAN-NR.			OF VON







# OPERATING TANK 2 FLACHBODENTANK 2



FLOW SWITCH  
STRÖMUNGSWÄCHTER

LEVEL INDICATOR  
FÜLLSTANDSANZEIGER

LOCAL CONTROL UNIT IN PUMP HOUSE  
ORTSSTEUERSTELLE IM PUMPENHAUS

FUEL PUMP 55kW  
FÖRDERPUMPE 55kW

FLOW SWITCH  
STRÖMUNGSWÄCHTER

LEVEL INDICATOR  
FÜLLSTANDSANZEIGER

LOCAL CONTROL UNIT IN PUMP HOUSE  
ORTSSTEUERSTELLE IM PUMPENHAUS


FUEL PUMP 55kW  
FÖRDERPUMPE 55kW

INTERLOCKING WITH LEVEL INDICATOR DRAIN PUMP  
VERRIEGELUNG MIT FÜLLSTANDSANZEIGER  
ENTLEERUNGSMANIPULATOR

FLOW SWITCH  
STRÖMUNGSWÄCHTER

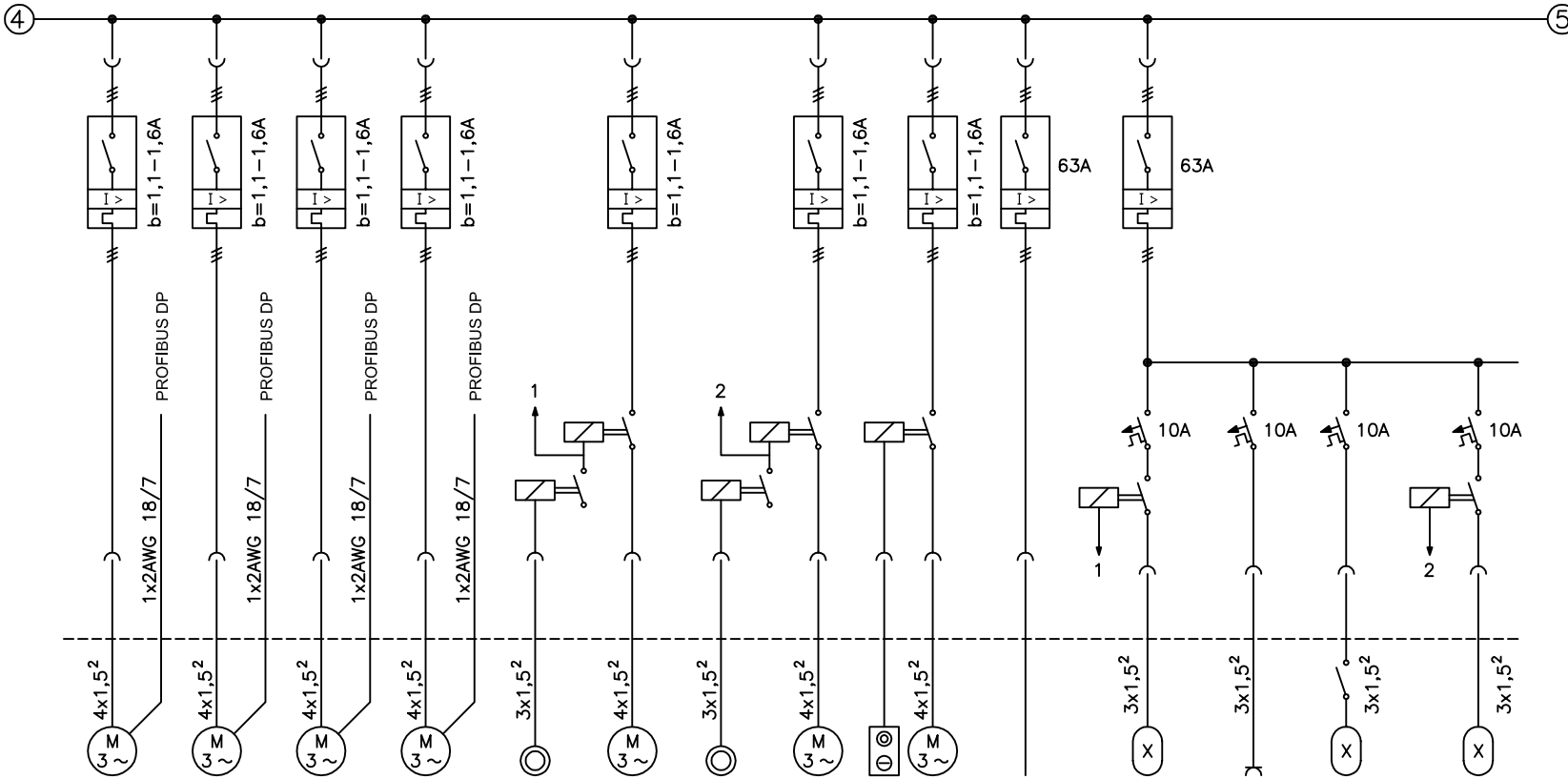
LOCAL CONTROL UNIT  
ORTSSTEUERSTELLE

DRAIN PUMP 2.2kW  
ENTLEERUNGSPUMPE 2,2kW

REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
HEADQUARTERS UNITED STATES AIR FORCES EUROPE				
ENGINEERING & OPERATIONS		AIRFIELD STANDARD DESIGN US		
JET FUEL STORAGE AND DISPENSING SYSTEMS		FLUGPLATZ STANDARDPLANUNG US FLUGKRAFTSTOFF - VERSORGUNGSANLAGEN		
BUILDING BAUWERK	MANIFOLD / FILTER STATION , HYDRANT REFUELING SYSTEM VERTEILER / FILTERSTATION , HYDRANTEN - BETANKUNGSSYSTEM			
DESIGNATION BEZEICHNUNG	ELECTRICAL DIAGRAM OPERATING TANK 2 SCHALTPLAN FLACHBODENTANK 2			
WORKED/BEARBEITET	PREPARED/AUFGESTELLT LANDESBETRIEBE LEIGENSCHAFTS- UND BAUBETRIEBUNG LBB-WIEDERLASSUNG LANDAU L B B LANDAU BY PROXY / IM VERTRAGSNAME: ORIGINAL DRAWN BY: BY ORIGINAL GEZ. STEPHAN KOTZSCHMIDT/HLR	APPROVED/GENEHMIGT AMT FÜR BUNDESBAU WALLSTR. 1 55122 MAINZ ORIGINAL DRAWN BY: BY ORIGINAL GEZ. STEPHAN KOTZSCHMIDT/HLR		
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAUMAßNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED GENEHMIGT	DATE DATUM	6. MAI 2015	SCALE MAßSTAB	/
ORIGINAL REPEATED BY BY ORIGINAL GEZ.			STANDARD SHEET STANDARD PLAN	E - 8,4
CONSTRUCTION PROJECT BAUMAßNAHME				SHEET-NO. PLAN-NR. GE VON



# OPERATING TANK 2 FLACHBODENTANK 2



ACTUATOR FOR LEAKAGE CONTROL SYSTEM  
STELLANTRIEB FÜR LECKKONTROLLSYSTEM

ACTUATOR FOR LEAKAGE CONTROL SYSTEM  
STELLANTRIEB FÜR LECKKONTROLLSYSTEM

ACTUATOR FOR LEAKAGE CONTROL SYSTEM  
STELLANTRIEB FÜR LECKKONTROLLSYSTEM

ACTUATOR FOR LEAKAGE CONTROL SYSTEM  
STELLANTRIEB FÜR LECKKONTROLLSYSTEM

PUSH BUTTON (PUMP HOUSE, FAN AND  
LIGHTING)  
TASTER (PUMPENHAUS, LÜFTER UND  
BELEUCHTUNG)

FAN APP. 0,08kW (PUMP HOUSE)  
LÜFTER CA. 0,08kW (PUMPENHAUS)

PUSH BUTTON (LEAKAGE CONTROL PIT,  
FAN AND LIGHTING)  
TASTER (LECKKONTROLLSCHACHT,  
LÜFTER UND BELEUCHTUNG)

FAN APP. 0,08kW (LEAKAGE CONTROL PIT)  
LÜFTER CA. 0,08kW (LECKKONTROLLSCHACHT)

LOCAL CONTROL UNIT  
ORTSSTEUERSTELLE  
SUBMERSIBLE PUMP  
TAUCHPUMPE

SPARE  
RESERVE

INTERIOR LIGHTING PUMP HOUSE 2x 2x36W  
INNENBELEUCHTUNG PUMPENHAUS 2x 2x36W

RECEPTACLE  
STECKDOSE

ENTRANCE LIGHTING 1x 1x36W  
EINGANGSBELEUCHTUNG 1x 1x36W

INTERIOR LIGHTING  
LEAKAGE CONTROL PIT 3x 1x36W  
INNENBELEUCHTUNG  
LECKKONTROLLSCHACHT 3x 1x36W

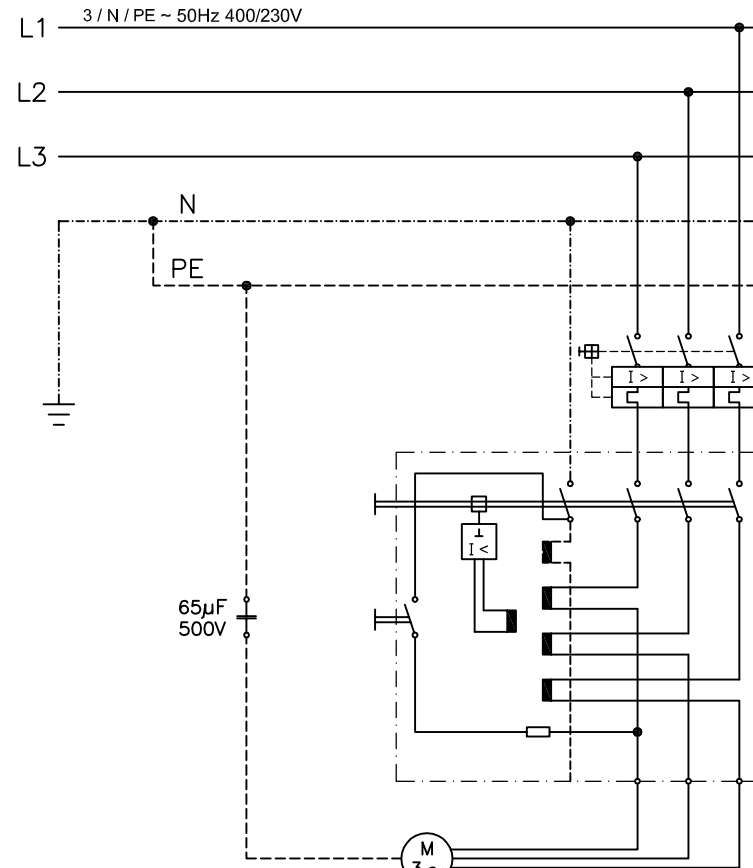
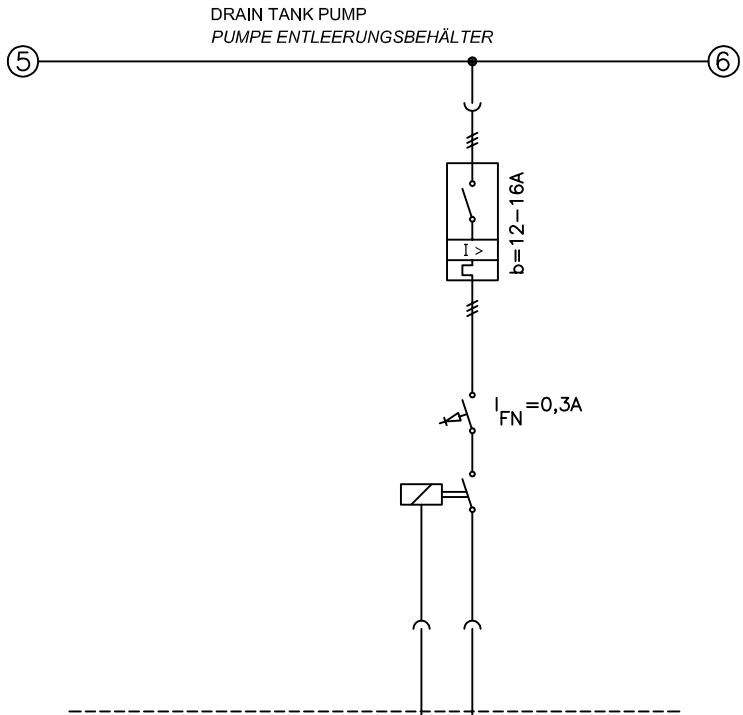
REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
HEADQUARTERS UNITED STATES AIR FORCES EUROPE 				
ENGINEERING & OPERATIONS				
AIRFIELD STANDARD DESIGN US		FLUGPLATZ STANDARDPLANUNG US		
JET FUEL STORAGE AND DISPENSING SYSTEMS		FLUGKRAFTSTOFF - VERSORGUNGSANLAGEN		
BUILDING BAUWERK	MANIFOLD / FILTER STATION , HYDRANT REFUELING SYSTEM VERTEILER / FILTERSTATION , HYDRANTEN - BETANKUNGSSYSTEM			
DESIGNATION BEZEICHNUNG	ELECTRICAL DIAGRAM OPERATING TANK 2 SCHALTPLAN FLACHBODENTANK 2			
WORKED/BEARBEITET	PREPARED/AUFGESTELLT LANDESREIHELEBENSCHAFTS- UND BAUBETRIEBUNG LEB-NIEDERLASSUNG LANAU L B B LANAU BY PROSY / H. VIERSTREUBER ORIGINAL DRAWING BY H. VIERSTREUBER, 1972 STEPHEN KOTZSCHMIDT/LEHNER	APPROVED/GENEHMIGT  AMT FÜR BUNDESBAU  WALLSTR. 1 55122 MAINZ  DRAWING DRAWN BY PROSY/LEHNER REVISION 0072		
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAUMAßNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED GENEHMIGT	DATE DATUM	6. MAI 2015	SCALE MAßSTAB	/
ORIGINAL REPEATED BY H. VIERSTREUBER	STANDARD SHEET STANDARD PLAN		E - 8,5	
CONSTRUCTION PROJECT BAUMAßNAHME	SHEET-NO. PLAN-NR.			OF VON



# DRAIN TANK 10m<sup>3</sup> ENTLEERUNGSBEHÄLTER 10m<sup>3</sup>

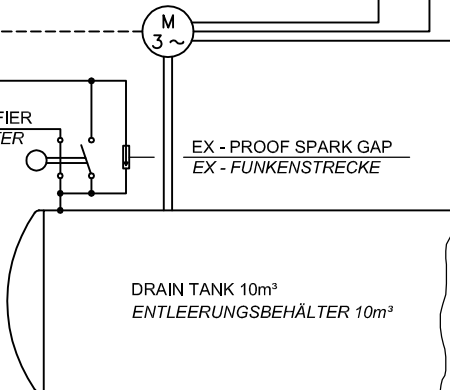
## DETAIL

FUALT CURRENT PROTECTIVE CIRCUIT FOR PUMP MOTOR  
IN DOME SHAFT OF CATHODIC-PROTECTED TANKS  
FEHLERSTROM-SCHUTZSCHALTUNG FÜR PUMPENMOTOR  
IM DOMSCHACHT VON KATHODISCH GESCHÜTZTEN BEHÄLTERN



TO PROTECTIVE CURRENT RECTIFIER  
ZUM SCHUTZSTROMGLEICHRICHTER

EX - PROOF SPARK GAP  
EX - FUNKENSTRECKE




SWITCH CONTROL PANEL  
SCHALTER IM STEUERSCHRANK

FLOW SWITCH  
STRÖMUNGSWÄCHTER

LEVEL INDICATOR  
FÜLLSTANDSANZEIGER

LOCAL CONTROL UNIT  
ORTSSTEUERSTELLE

DRAIN TANK PUMP 7,5kW  
PUMPE ENTLEERUNGSBEHÄLTER 7,5kW

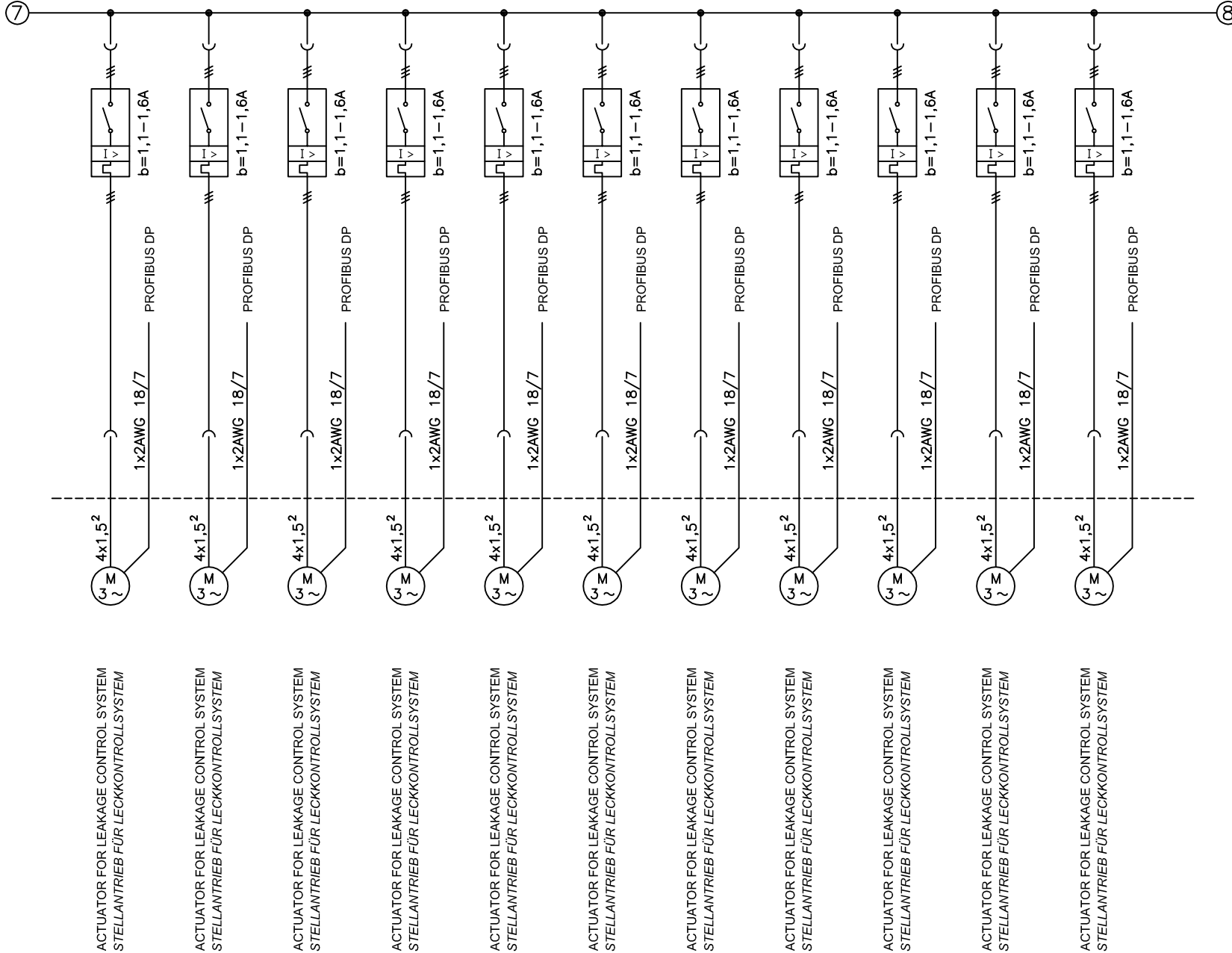
REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
HEADQUARTERS UNITED STATES AIR FORCES EUROPE 				
AIRFIELD STANDARD DESIGN US		FLUGPLATZ STANDARDPLANUNG US		
JET FUEL STORAGE AND DISPENSING SYSTEMS		FLUGKRAFTSTOFF - VERSORGUNGSANLAGEN		
BUILDING BAUWERK	MANIFOLD / FILTER STATION , HYDRANT REFUELING SYSTEM VERTEILER / FILTERSTATION , HYDRANTEN - BETANKUNGSSYSTEM			
DESIGNATION BEZEICHNUNG	ELECTRICAL DIAGRAM DRAIN TANK / DETAIL SCHALTPLAN ENTLEERUNGSBEHÄLTER / DETAIL			
WORKED/BEARBEITET	PREPARED/AUFGESTELLT LANDESBEZIEHUNG UND BAUBETRIEBUNG LBB-VERLEASUNG LANDAU L B B ANSCHRIFFT: UNTERBERGSTRASSE 11, 68303 LANAU TELEFON (06341) 912-276 TELEFAX (06341) 912-291 LANAU BY PROXY / IH VERTRÄGTE: ORIGINAL SIGNED BY: DR. STEPHAN GÖTZ STEPHAN GÖTZ	APPROVED/GENEHMIGT AMT FÜR BUNDESBAU WALLSTR. 1 55122 MAINZ ORIGINAL SIGNED BY: DR. STEPHAN GÖTZ STEPHAN GÖTZ		
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAUMAßNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED GENEHMIGT	DATE DATUM	6. MAI 2015	SCALE MAßSTAB	/
ORIGINAL REFERRED BY BY ORIGINAL GEZ.	STANDARD SHEET STANDARD PLAN		E - 8,6	
CONSTRUCTION PROJECT BAUMAßNAHME	SHEET-NO. PLAN-NR.			GE VON







# GENERAL INSTALLATION ALLGEMEINE INSTALLATION



ACTUATOR FOR LEAKAGE CONTROL SYSTEM  
STELLANTRIEB FÜR LECKKONTROLLSYSTEM

ACTUATOR FOR LEAKAGE CONTROL SYSTEM  
STELLANTRIEB FÜR LECKKONTROLLSYSTEM

ACTUATOR FOR LEAKAGE CONTROL SYSTEM  
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ACTUATOR FOR LEAKAGE CONTROL SYSTEM  
STELLANTRIEB FÜR LECKKONTROLLSYSTEM

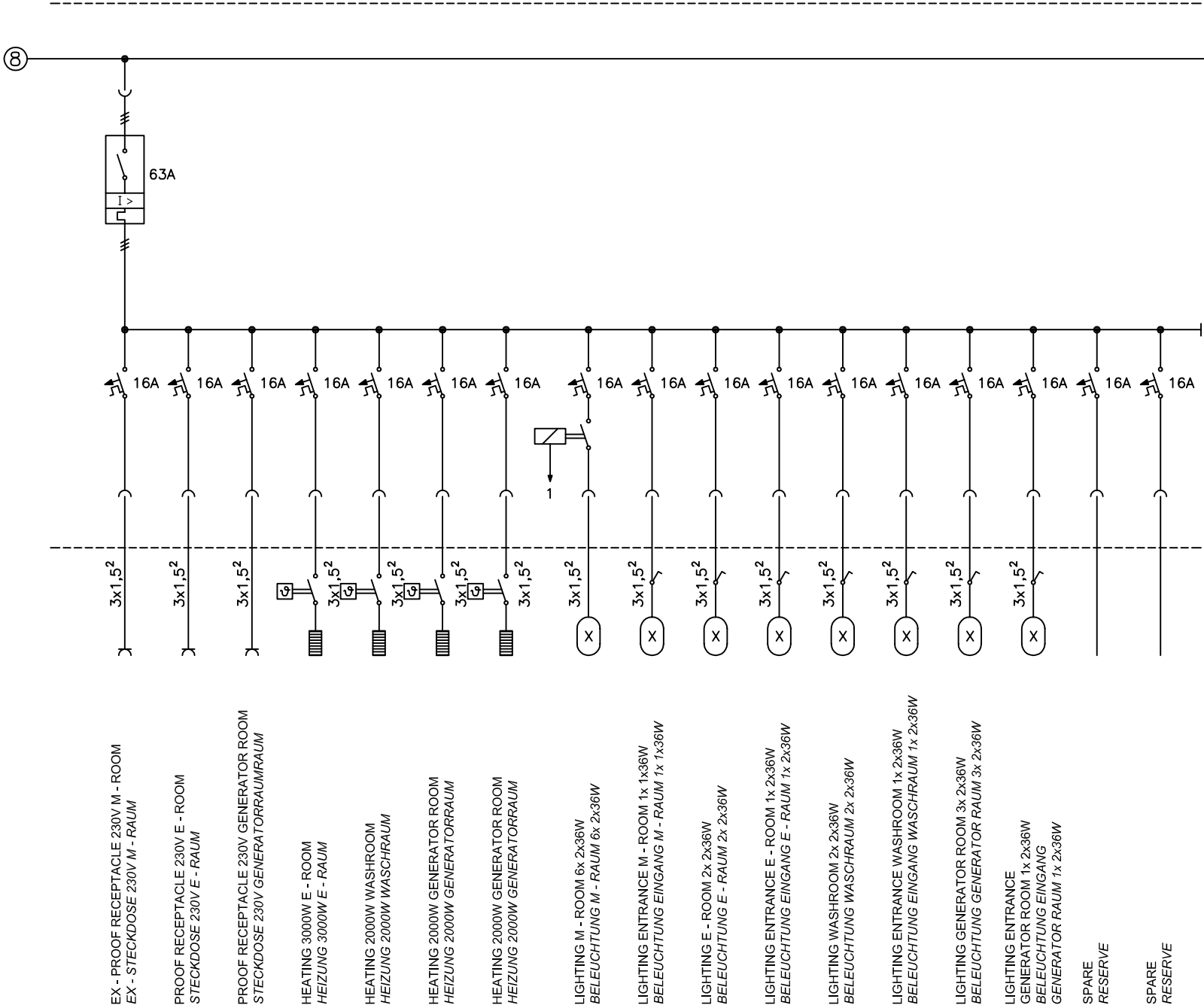
ACTUATOR FOR LEAKAGE CONTROL SYSTEM  
STELLANTRIEB FÜR LECKKONTROLLSYSTEM


ACTUATOR FOR LEAKAGE CONTROL SYSTEM  
STELLANTRIEB FÜR LECKKONTROLLSYSTEM

REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON
HEADQUARTERS UNITED STATES AIR FORCES EUROPE			
ENGINEERING & OPERATIONS		AMT FÜR BUNDESBAU	
AIRFIELD STANDARD DESIGN US	FLUGPLATZ STANDARDPLANUNG US		
JET FUEL STORAGE AND DISPENSING SYSTEMS	FLUGKRAFTSTOFF - VERSORGUNGSANLAGEN		
BUILDING BAUWERK	MANIFOLD / FILTER STATION , HYDRANT REFUELING SYSTEM VERTEILER / FILTERSTATION , HYDRANTEN - BETANKUNGSSYSTEM		
DESIGNATION BEZEICHNUNG	ELECTRICAL DIAGRAM GENERAL INSTALLATION SCHALTPLAN ALLGEMEINE INSTALLATION		
WORKED/BEARBEITET	PREPARED/AUFGESTELLT LANDSBEREITREIBERLEGENSCHAFTS- UND BAUBETRIEBUNG LEB-NIEDERLASSUNG LANDAU L B B ANSCHRIFFT: UNTERBERGSTR. 11, 70809 LANDAU TELEFON (06341) 912-276 TELEFAX (06341) 912-291 LANDAU BY PROXY / IH VERTRÄGLICH: GEMALT, BEARBEITET BY H. GEMALT, GEM. STEFAN KOTZSCHNEIDER	APPROVED/GENEHIGT AMT FÜR BUNDESBAU WALLSTR. 1 55122 MAINZ GEMALT, BEARBEITET BY H. GEMALT, GEM. STEFAN KOTZSCHNEIDER	
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAUMAßNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)			
APPROVED GENEHIGT	DATE DATUM	6. MAI 2015	SCALE MAßSTAB
ORIGINAL REPEATED BY H. GEMALT, GEM.	STANDARD SHEET STANDARD PLAN		E - 8,8
CONSTRUCTION PROJECT BAUMAßNAHME	SHEET NO. PLAN-NR.		OF VON



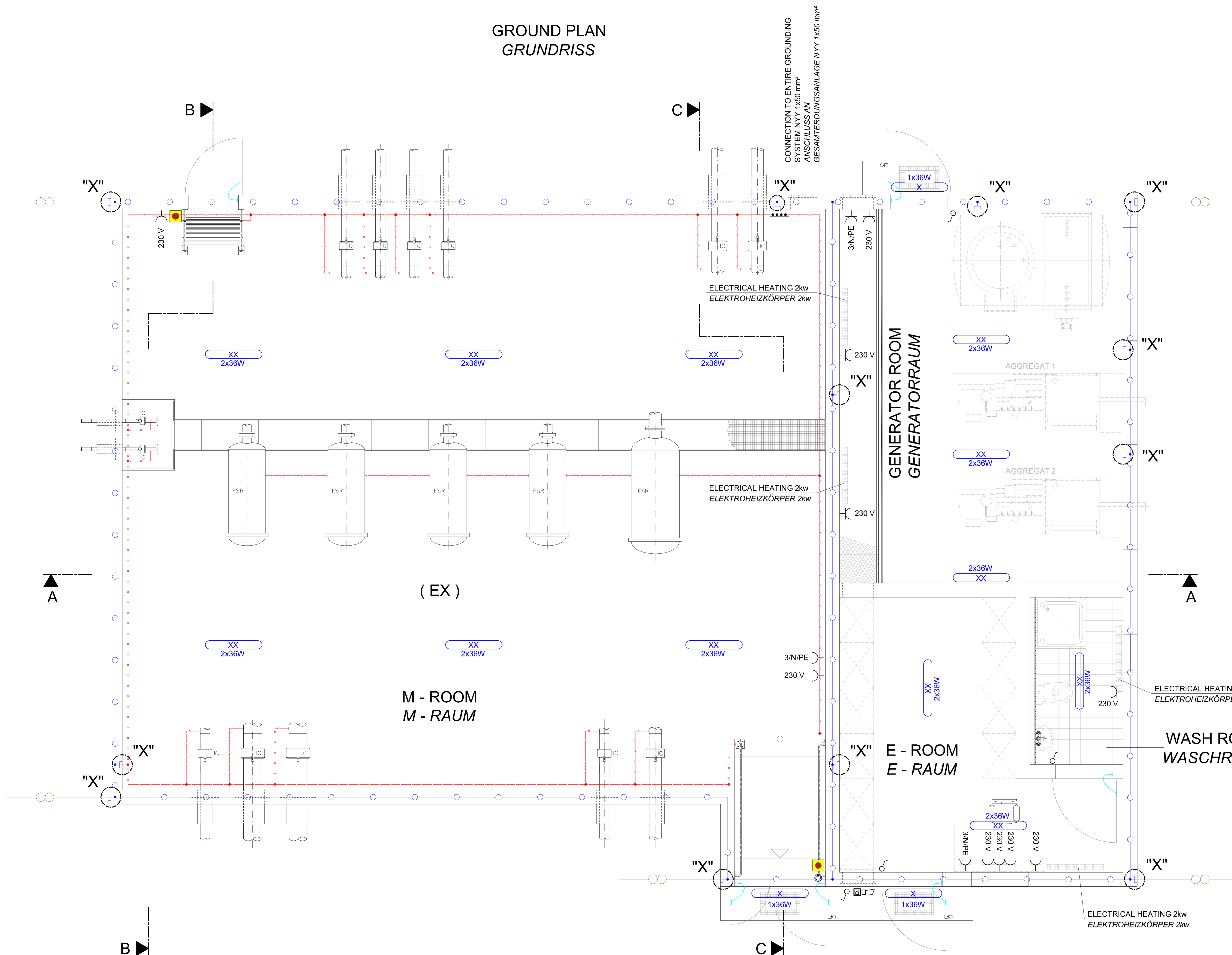
# GENERAL INSTALLATION ALLGEMEINE INSTALLATION



REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND						
HEADQUARTERS UNITED STATES AIR FORCES EUROPE										
ENGINEERING & OPERATIONS										
AIRFIELD STANDARD DESIGN US			FLUGPLATZ STANDARDPLANUNG US							
JET FUEL STORAGE AND DISPENSING SYSTEMS			FLUGKRAFTSTOFF - VERSORGUNGSANLAGEN							
BUILDING BAUWERK	MANIFOLD / FILTER STATION , HYDRANT REFUELING SYSTEM VERTEILER / FILTERSTATION , HYDRANTEN - BETANKUNGSSYSTEM									
DESIGNATION BEZEICHNUNG	ELECTRICAL DIAGRAM GENERAL INSTALLATION SCHALTPLAN ALLGEMEINE INSTALLATION									
WORKED/BEARBEITET	PREPARED/AUFGESTELLT LANDESRETIERELEBENSCHENFT- UND BAUBETRIEUBÜRO LEBN-WIEDERLASSUNG LANAU L B B			APPROVED/GENEHMIGT AMT FÜR BUNDESBAU WALLSTR. 1 55122 MAINZ						
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAUMAßNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)										
APPROVED GENEHMIGT	DATE DATUM	6. MAI 2015							SCALE MAßSTAB	/
ORIGINAL REPEATED BY URSPRÜNGLICH WIEDERHOLTET VON								STANDARD SHEET STANDARD PLAN	E - 8,9	
CONSTRUCTION PROJECT BAUMAßNAHME								SHEET-NO. PLAN-NR.	GE VON	



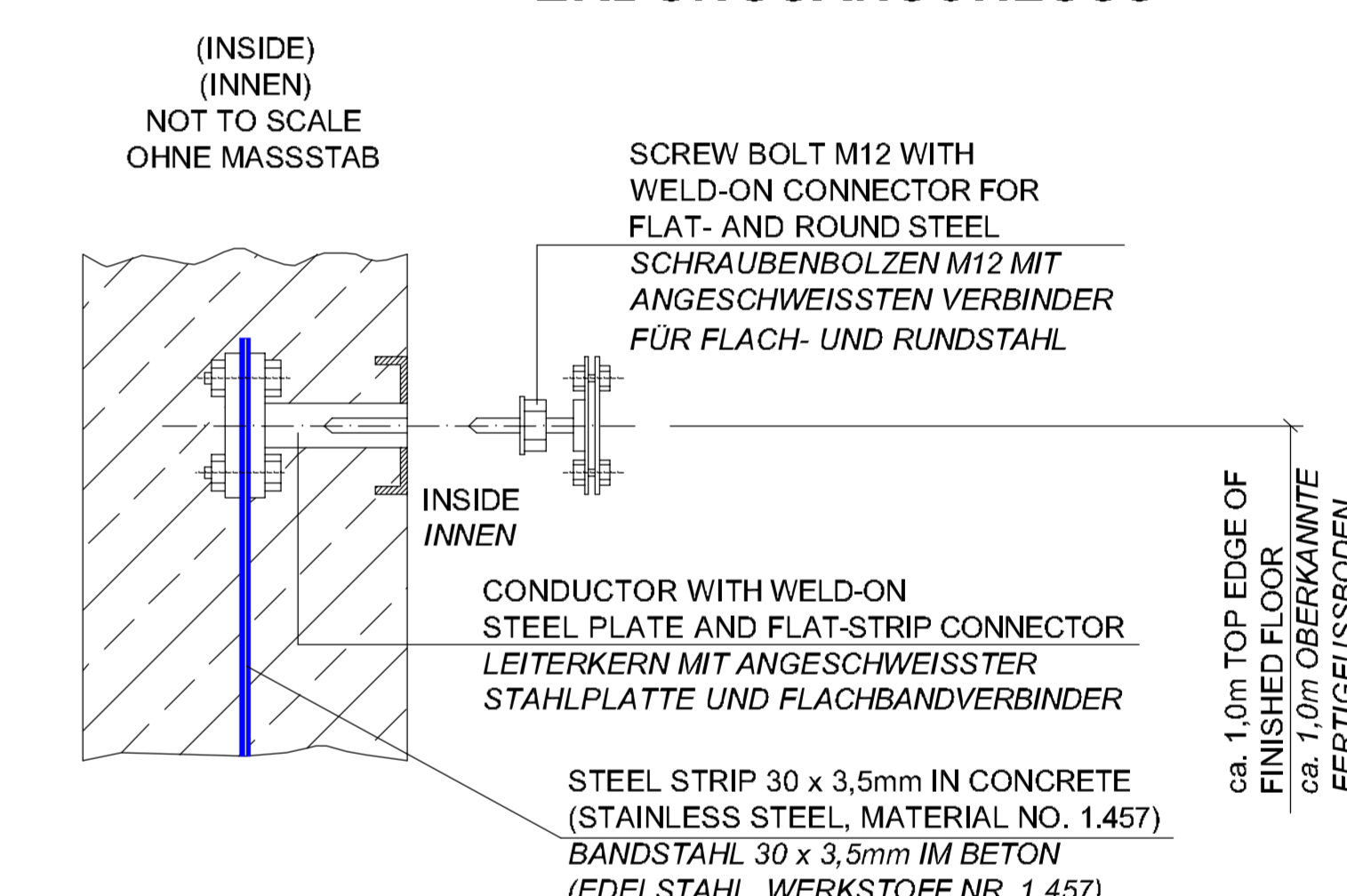
GROUND PLAN  
GRUNDRISS



LEGEND  
LEGENDE

- DISCONNECTION POINT  
TRENNSTELLE
- STEEL STRIP 30 x 3.5mm IN CONCRETE  
(STAINLESS STEEL, MATERIAL NO. 1.457)  
BANDSTAHL 30 x 3.5mm IM BETON  
(EDELSTAHL, WERKSTOFF NR. 1.457)
- GALV. STEEL STRIP 30 x 3.5mm SURFACE - MOUNTED  
VERZ. BANDSTAHL 30 x 3.5mm AUF PUTZ
- GALV. ROUND STEEL Ø 8mm  
VERZ. RUNDSTAHL Ø 8mm
- NYY 1 x 50²mm
- H01N2 - D50
- FLUORESCENT  
LEUCHTSTOFFLEUCHTE
- SWITCH  
SCHALTER
- PUSH BUTTON  
TASTER
- RECEPTACLE  
STECKDOSE
- EMERGENCY STOP  
NOT - AUS
- FLASHING LIGHT  
BLITZLEUCHTE
- HORN  
HUPE
- POTENTIAL EQUALIZATION BAR  
POTENTIALAUSGLEICHSSCHIENE
- ISULATING COUPLING  
ISOLIERKUPPLUNG


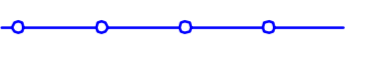
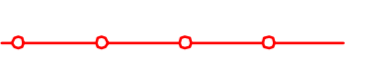

DETAIL "X" GROUNDING CONNECTION  
ERDUNGSANSCHLUSS



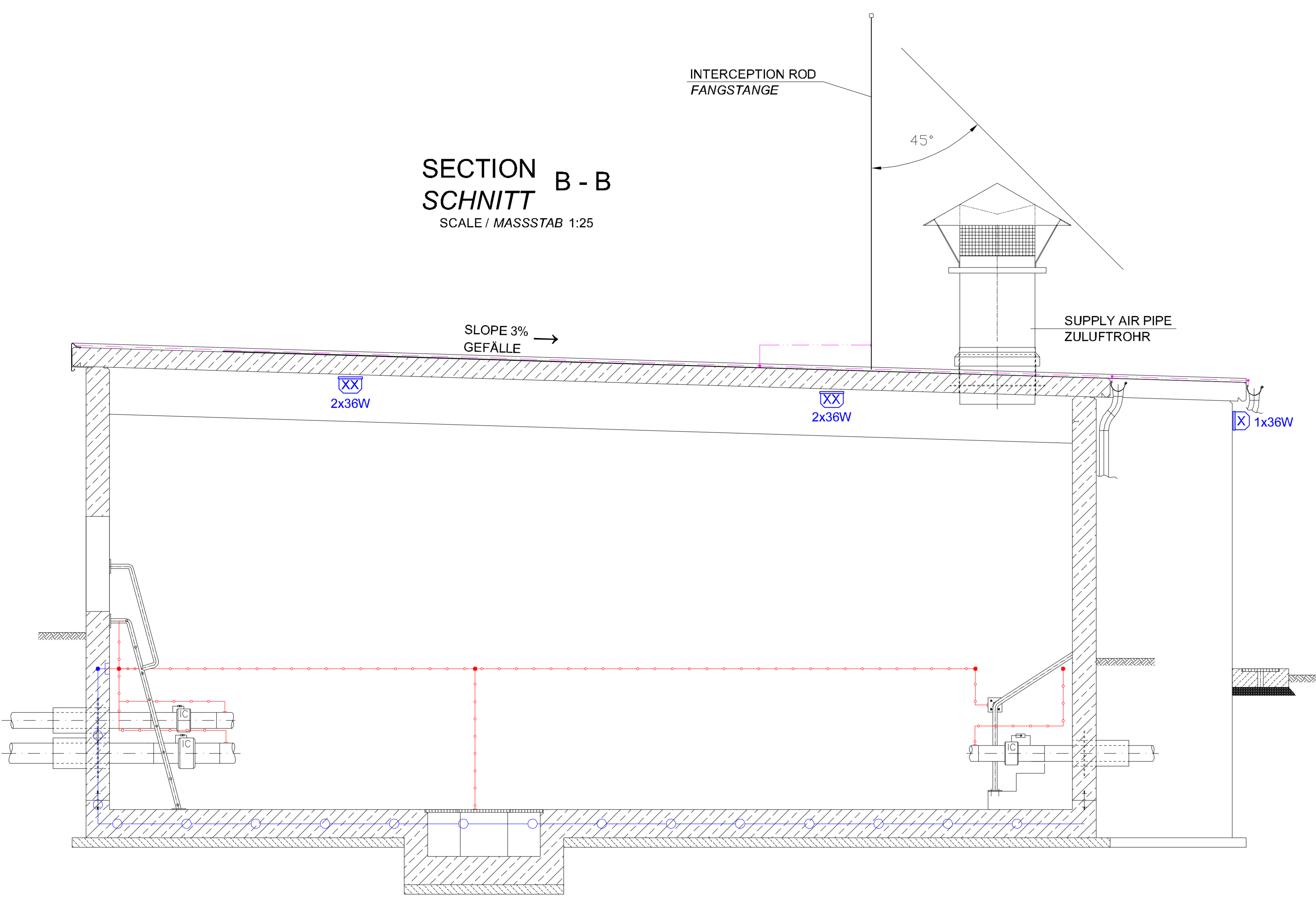
REVISION	DATE	DESCRIPTION	BY	COUNTRY
ÄNDERUNG	DATUM	BESCHREIBUNG	VON	LAND
<b>HEADQUARTERS</b>				
UNITED STATES AIR FORCES EUROPE				
ENGINEERING & OPERATIONS				
AIRFIELD STANDARD DESIGN US			FLUGPLATZ STANDARDPLANUNG US	
JET FUEL STORAGE AND DISPENSING SYSTEMS			FLUGKRAFTSTOFF - VERSORGSANLAGEN	
BUILDING	MANIFOLD / FILTER STATION, HYDRANT REFUELING SYSTEM			
BUILDING	VERTEILER / FILTERSTATION, HYDRANTEN - BETANKUNGSSYSTEM			
DESIGNATION	ELECTR. INSTALL., GROUNDING AND LIGHTNING PROTECTION PLAN			
BEZUGSBUILDUNG	ELECTR. INSTALL., ERDUNGS- UND BLITZSCHUTZPLAN			
WORKSHEET	PREPARED BY	APPROVED BY		
	LANDSCHAFTS- UND BAUVERMESSUNG	AMT FÜR BUNDESBAU		
	LANDMESSUNGSAMT	WALLSTR. 1 55122 MAINZ		
	LANDMANN	ORIGINAL, BOUND BY IN ORIGINAL SIZE		
	BY PROJECT IN EXECUTION	IN ORIGINAL SIZE		
	PROJEKTLEITUNG	IN ORIGINAL SIZE		
	STRUKTURABTEILUNG	IN ORIGINAL SIZE		
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAUMASSNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED	DATE	SCALE		
GENEHMIGT	6. MAI 2015	MASSSTAB	1:25	
ORIGINAL, BOUND BY IN ORIGINAL SIZE	STANDARD SHEET			
	STANDARD PLAN			
CONSTRUCTION PROJECT	E - 8.10			
BAUMASSNAHME	SHEET NO.			
	PLATZNR.			
	OF			
	VON			



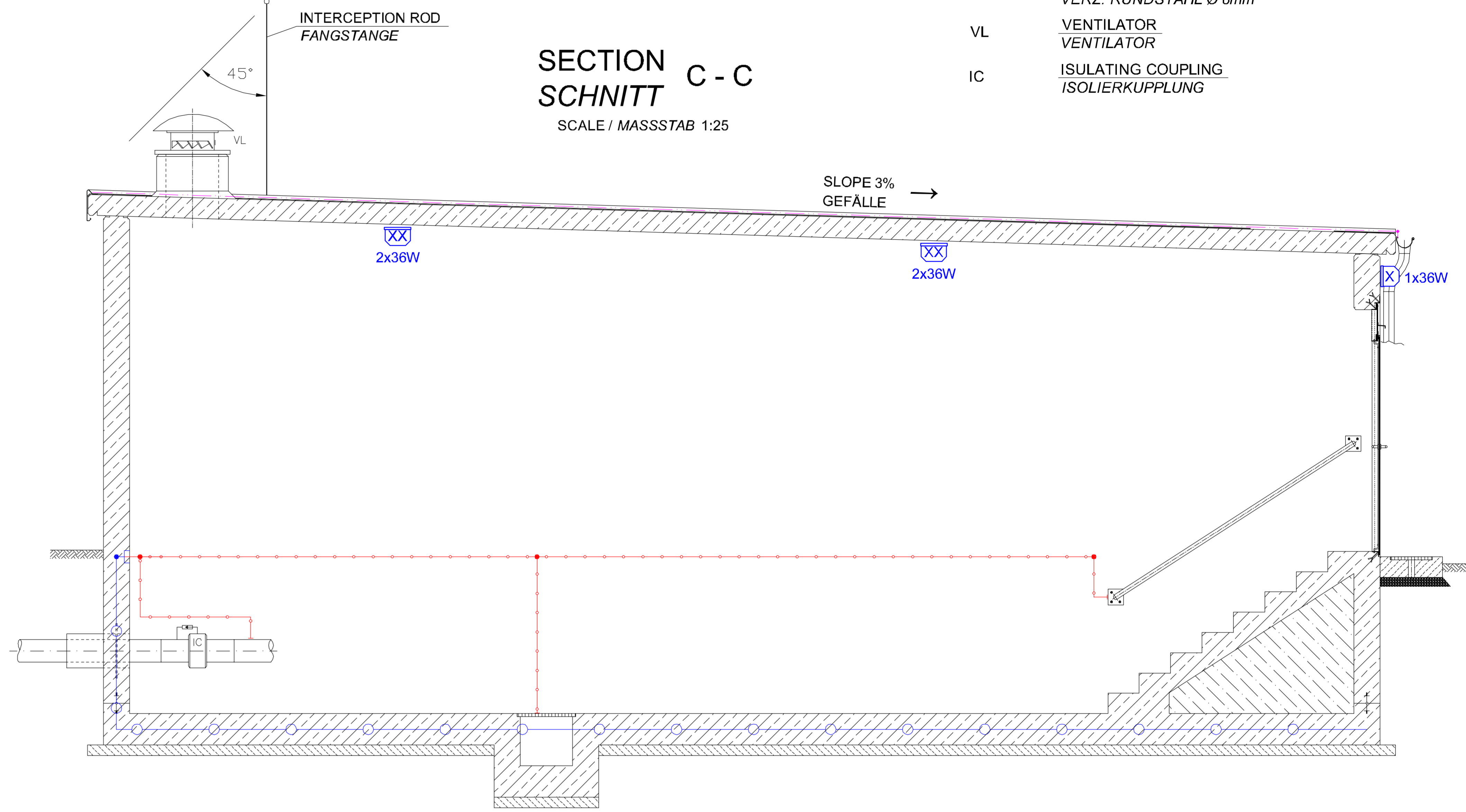
LEGEND  
LEGENDE

-  DISCONNECTION POINT  
TRENNSTELLE
-  STEEL STRIP 30 x 3,5mm IN CONCRETE  
(STAINLESS STEEL, MATERIAL NO. 1.457)  
BANDSTAHL 30 x 3,5mm IM BETON  
(EDELSTAHL, WERKSTOFF NR. 1.457)
-  GALV. STEEL STRIP 30 x 3,5mm SURFACE - MOUNTED  
VERZ. BANDSTAHL 30 x 3,5mm AUF PUTZ
-  GALV. ROUND STEEL Ø 8mm  
VERZ. RUNDSTAHL Ø 8mm
- VL VENTILATOR  
VENTILATOR
- IC ISULATING COUPLING  
ISOLIERKUPPLUNG

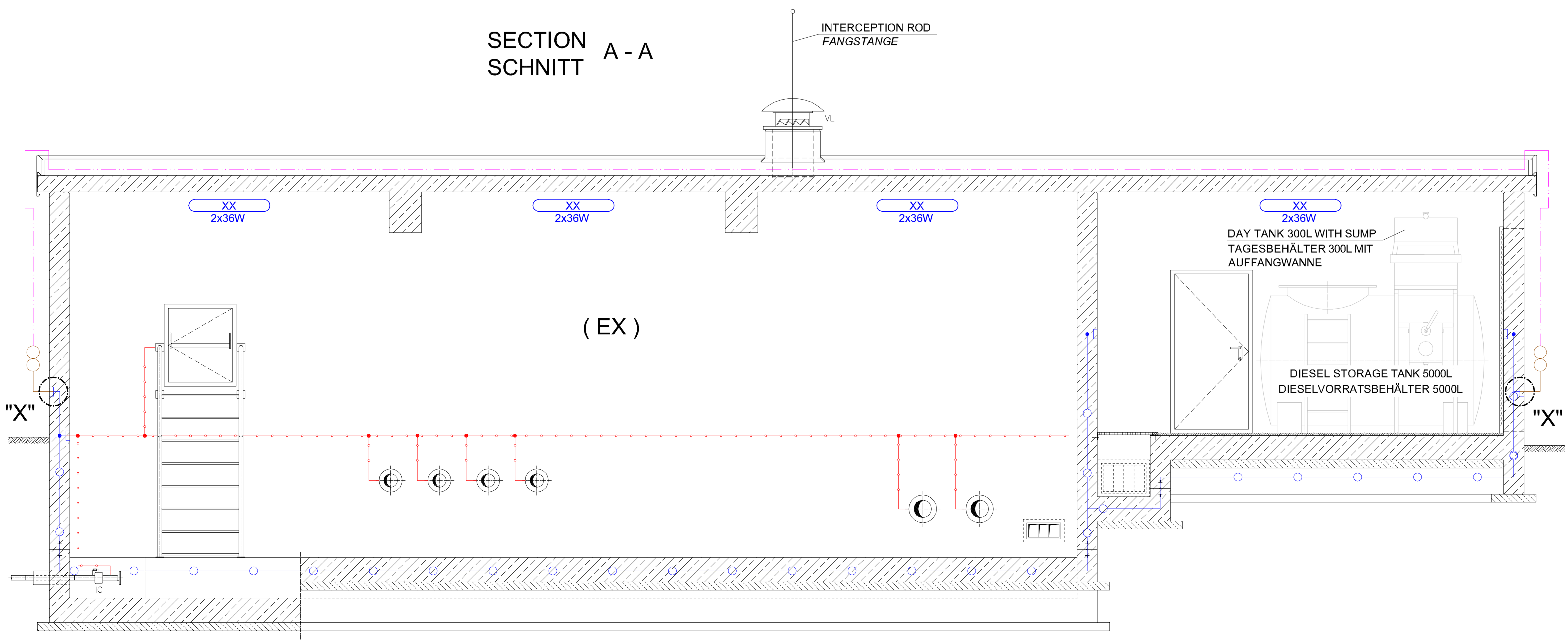
SECTION B - B  
SCHNITT B - B  
SCALE / MASSSTAB 1:25



SECTION C - C  
SCHNITT C - C  
SCALE / MASSSTAB 1:25



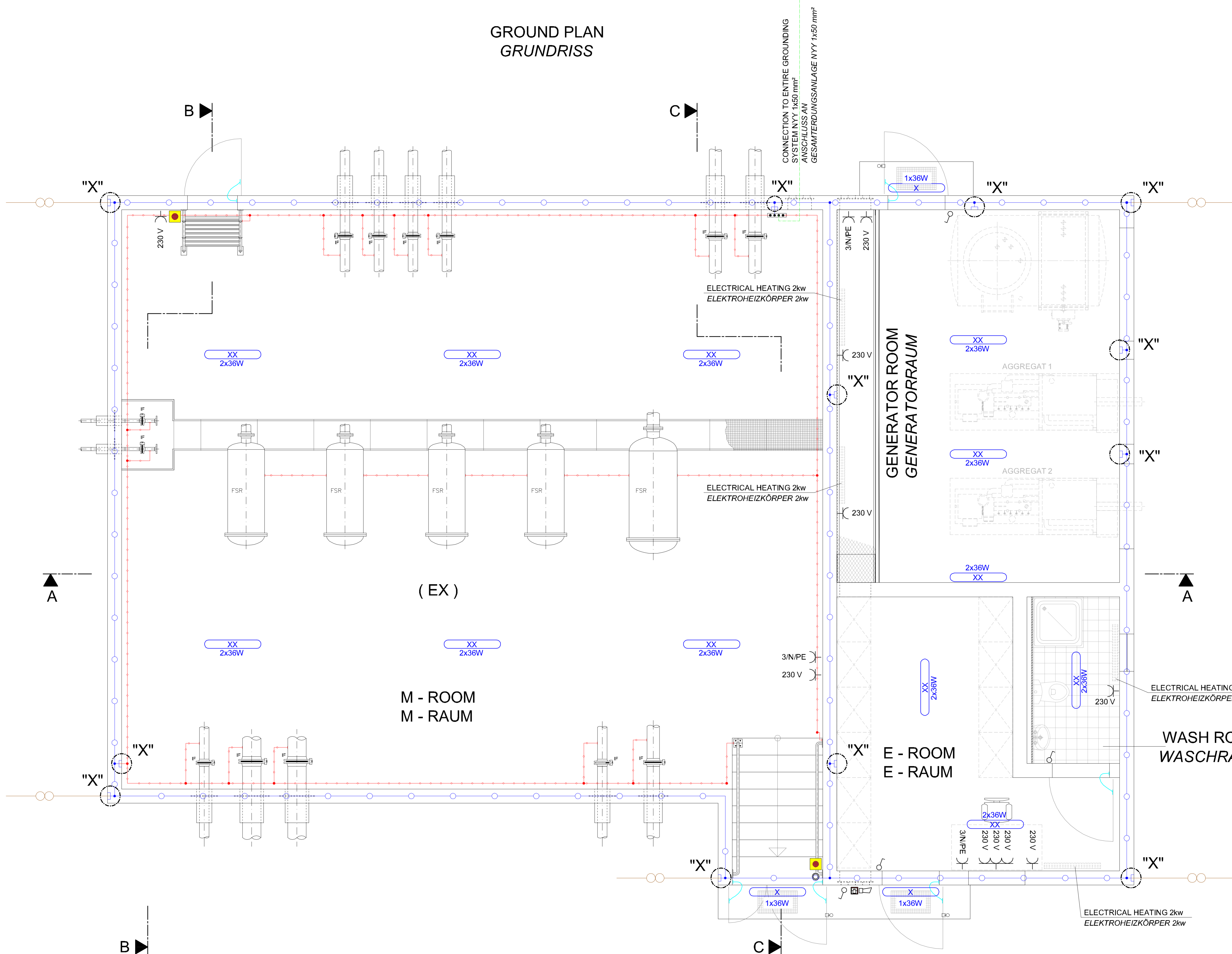
SECTION A - A  
SCHNITT A - A



REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
<b>HEADQUARTERS</b> UNITED STATES AIR FORCES EUROPE ENGINEERING & OPERATIONS				
AIRFIELD STANDARD DESIGN US JET FUEL STORAGE AND DISPENSING SYSTEMS		FLUGPLATZ STANDARDPLANUNG US FLUGKRAFTSTOFF - VERSORGENGSANLAGEN		
BUILDING BAUWERK: MANIFOLD / FILTER STATION, HYDRANT REFUELING SYSTEM VERTEILER / FILTERSTATION, HYDRANTEN - BETANKUNGSSYSTEM				
DESIGNATOR: ELECTR. INSTALL., GROUNDING AND LIGHTNING PROTECTION PLAN BEZEICHNUNG: ELEKTR. INSTALL., ERDUNGS- UND BLITZSCHUTZPLAN SECTION A-A, B-B AND C-C WITH ISULATING COUPLING SCHNITT A-A, B-B UND C-C MIT ISOLIERKUPPLUNG				
WORKED/BEARBEITET:		PREPARED/BEREITET:		APPROVED/GEHEBILIGT:
LANDSBEREINIGUNGS- UND BAUBEREITUNG LANDEBESORGENISSEN		AMT FÜR BUNDESBAU WALLSTR.1 55122 MAINZ		ORIGINAL SIGNED BY: IN ORIGINAL G.D.Z.
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAU MASSNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED GEHEBILIGT	DATE DATUM: 6. MAI 2015	SCALE MASSSTAB: 1:25		
ORIGINAL SIGNED BY: IN ORIGINAL G.D.Z.		STANDARD SHEET STANDARD PLAN		
CONSTRUCTION PROJECT BAU MASSNAHME		E - 8.11 SHEET NO. PLAN NR.		

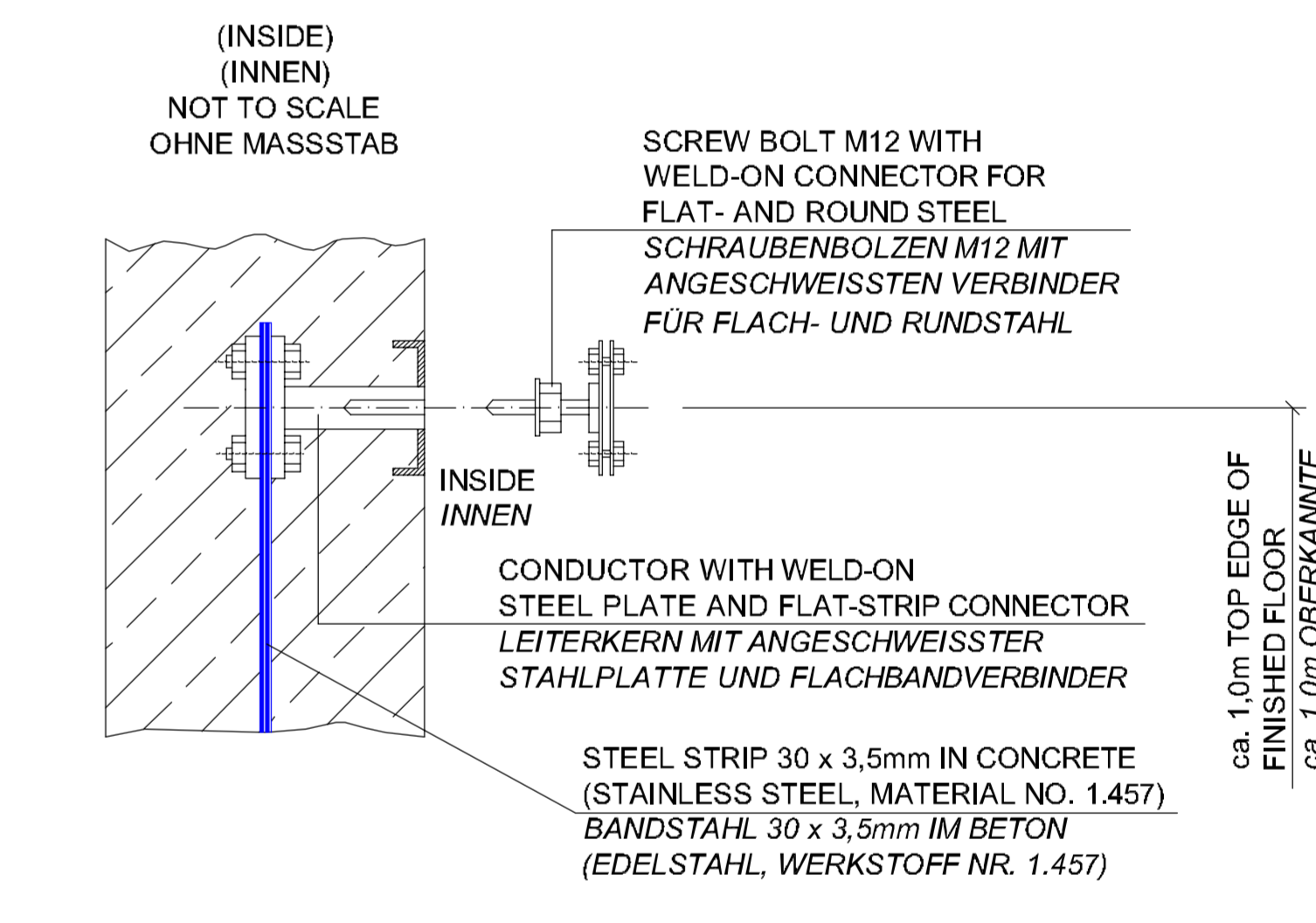


GROUND PLAN  
GRUNDRISS



- LEGEND  
LEGENDE**
- DISCONNECTION POINT  
TRENNSTELLE
  - STEEL STRIP 30 x 3,5mm IN CONCRETE  
(STAINLESS STEEL, MATERIAL NO. 1.457)  
BANDSTAHL 30 x 3,5mm IM BETON  
(EDELSTAHL, WERKSTOFF NR. 1.457)
  - GALV. STEEL STRIP 30 x 3,5mm SURFACE - MOUNTED  
VERZ. BANDSTAHL 30 x 3,5mm AUF PUTZ
  - GALV. ROUND STEEL Ø 8mm  
VERZ. RUNDSTAHL Ø 8mm
  - NYN 1 x 50²mm
  - H01N2 - D50
  - FLUORESCENT  
LEUCHTSTOFFLEUCHTE
  - SWITCH  
SCHALTER
  - PUSH BUTTON  
TASTER
  - RECEPTACLE  
STECKDOSE
  - EMERGENCY STOP  
NOT - AUS
  - FLASHING LIGHT  
BLITZLEUCHTE
  - HORN  
HUPE
  - POTENTIAL EQUALIZATION BAR  
POTENTIALAUSGLEICHSSCHIENE
  - ISULATING FLANGE  
ISOLIERFLANSCH
  - IF

**DETAIL "X" GROUNDING CONNECTION  
ERDUNGSANSCHLUSS**



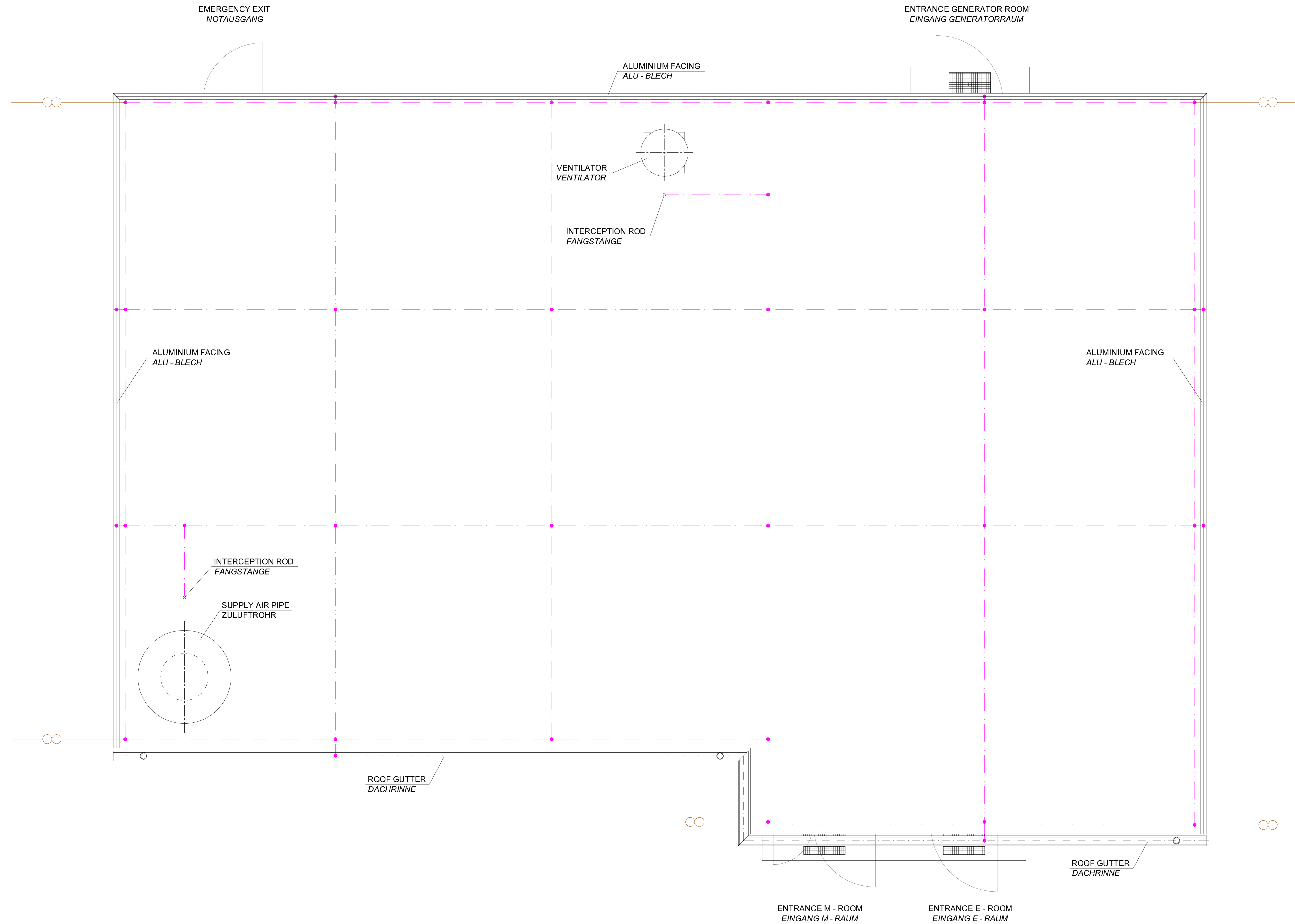
REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
<b>HEADQUARTERS</b>				
UNITED STATES AIR FORCES EUROPE				
ENGINEERING & OPERATIONS				
AIRFIELD STANDARD DESIGN US			FLUGPLATZ STANDARDPLANUNG US	
JET FUEL STORAGE AND DISPENSING SYSTEMS			FLUGKRAFTSTOFF - VERSORGSANLAGEN	
BUILDING BAUWERK	MANIFOLD / FILTER STATION, HYDRANT REFUELING SYSTEM VERTEILER / FILTERSTATION, HYDRANTEN - BETANKUNGSSYSTEM			
DESIGNATION BEZEICHNUNG	ELECTR. INSTALL., GROUNDING AND LIGHTNING PROTECTION PLAN ELECTR. INSTALL., ERDUNGS- UND BLITZSCHUTZPLAN			
WORKED/BEARBEITET	PREPARED/ALFGEFESTELT	APPROVED/GENEHMIGT		
LANDSCHAFTLICHE VERHÄLTNISSE UND BAUBESTIMMUNGEN	LANDSCHAFTLICHE VERHÄLTNISSE UND BAUBESTIMMUNGEN	AMT FÜR BUNDESBAU		
ANMERKUNGEN: UNTERSCHREIBUNG, NAME, DATUM, ANMERKUNGEN: UNTERSCHREIBUNG, NAME, DATUM	ANMERKUNGEN: UNTERSCHREIBUNG, NAME, DATUM, ANMERKUNGEN: UNTERSCHREIBUNG, NAME, DATUM	WALLSTR.1 55122 MAINZ		
LANDTAG	BY/BEI DER VERSTÄNDLICHEN ORIGINAL-UNTERSCHREIBUNG	ORIGINAL, SIGNED BY: IN ORIGINAL, GEE.		
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAUMASSNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED GENEHMIGT	DATE DATUM	6. MAI 2015	SCALE MASSSTAB	1:25
ORIGINAL, SIGNED BY: IN ORIGINAL, GEE.			STANDARD SHEET	
GENERAL NOTE GEMEINSAMER HINWEIS			E - 8.10	
CONSTRUCTION PROJECT BAUMASSNAHME			SHEET NO. PLATZ NR.	









TOP VIEW  
DRAUFSICHT



LEGEND  
LEGENDE

-  DISCONNECTION POINT  
TRENNSTELLE
-  GALV. ROUND STEEL Ø 8mm  
VERZ. RUNDSTAHL Ø 8mm

REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
<b>HEADQUARTERS</b> UNITED STATES AIR FORCES EUROPE ENGINEERING & OPERATIONS 				
AIRFIELD STANDARD DESIGN US JET FUEL STORAGE AND DISPENSING SYSTEMS		FLUGPLATZ STANDARDPLANUNG US FLUGKRAFTSTOFF - VERSORGENGSANLAGEN		
BUILDING BAUWERK	MANIFOLD / FILTER STATION, HYDRANT REFUELING SYSTEM VERTEILER / FILTERSTATION, HYDRANTEN - BETANKUNGSSYSTEM			
DESIGNATOR BEZEICHNUNG	GROUNDING AND LIGHTNING PROTECTION PLAN TOP VIEW ERDUNGS- UND BLITZSCHUTZPLAN DRAUFSICHT			
WORKED/BEARBEITET	PREPARED/AUFGESTELLT LANDESBETRIEBSGEMEINSCHAFTS- UND BAUVERBÄNDE LANDESBETRIEBSGEMEINSCHAFT L B B AMBUNDT, UNIVERSITÄT J. / JAHN LANDEBAU TRUPPEN (SIGNAL) 100 070 (SIGNAL) 100 070 (SIGNAL)		APPROVED/GENEHMIGT AMT FÜR BUNDESBAU WALTSTR.1 55122 MAINZ	ORIGINAL SIGNED BY IN ORIGINAL SIZE 10.06.2015
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAUMASSNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED GENEHMIGT	DATE DATUM	6. MAI 2015	SCALE MASSSTAB	1:25
ORIGINAL SIGNED BY IN ORIGINAL SIZE			STANDARD SHEET STANDARD PLAN	
CONSTRUCTION PROJECT BAUMASSNAHME			E - 8.12	SHEET NO. PLATZNR.
				OF VON



1,60m

2,20m

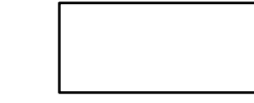
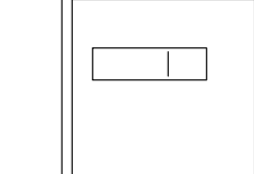
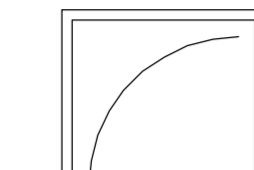
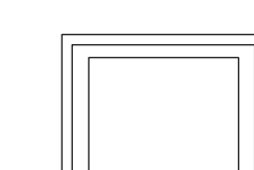
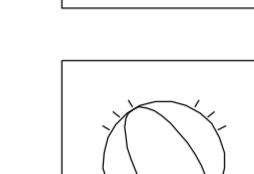
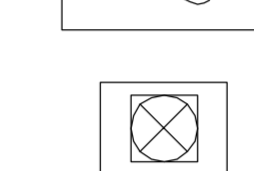
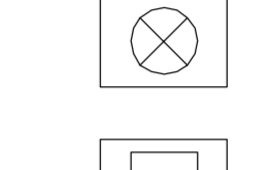
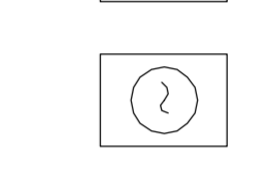

1,90m

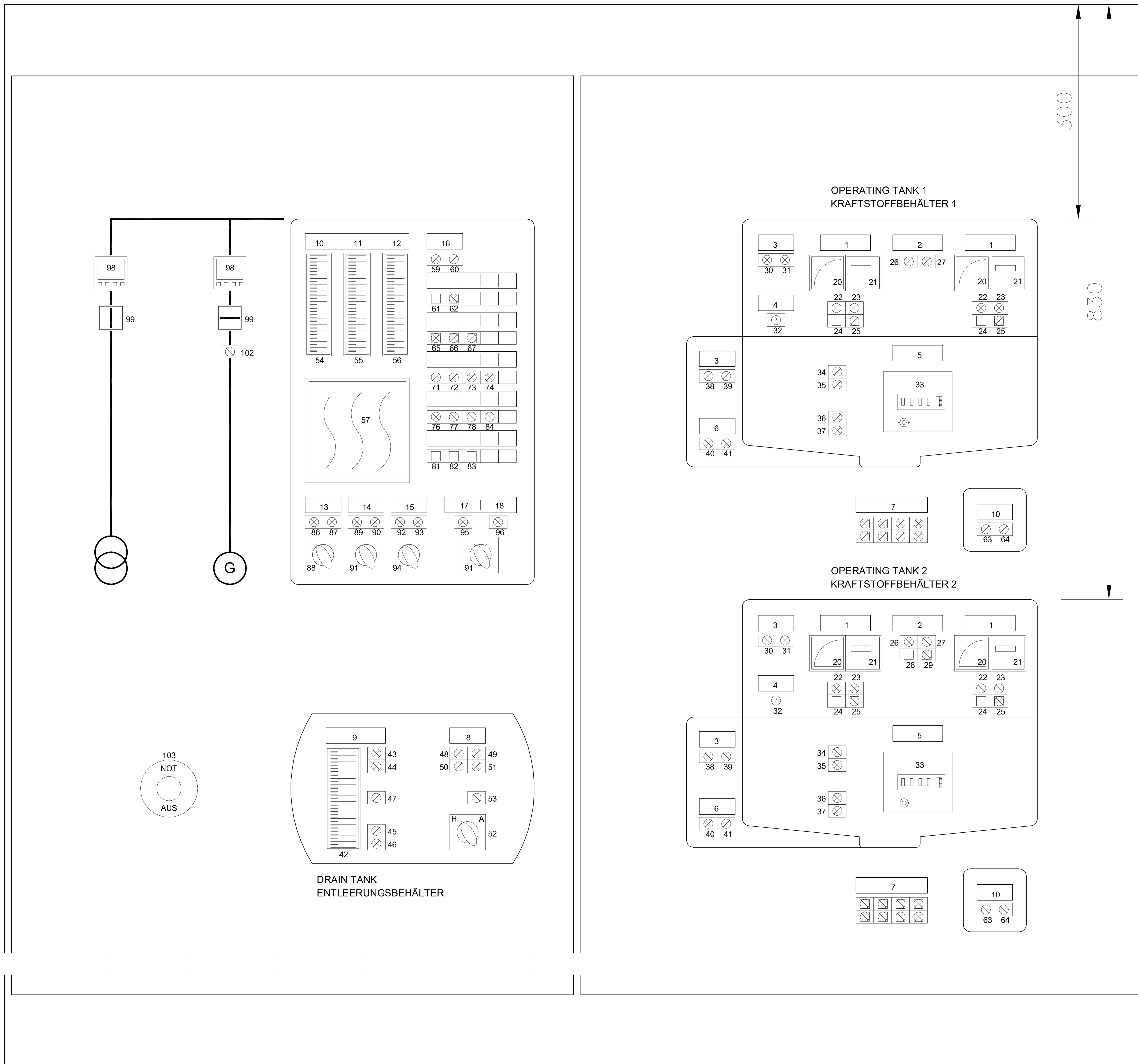
1,00m

300

830

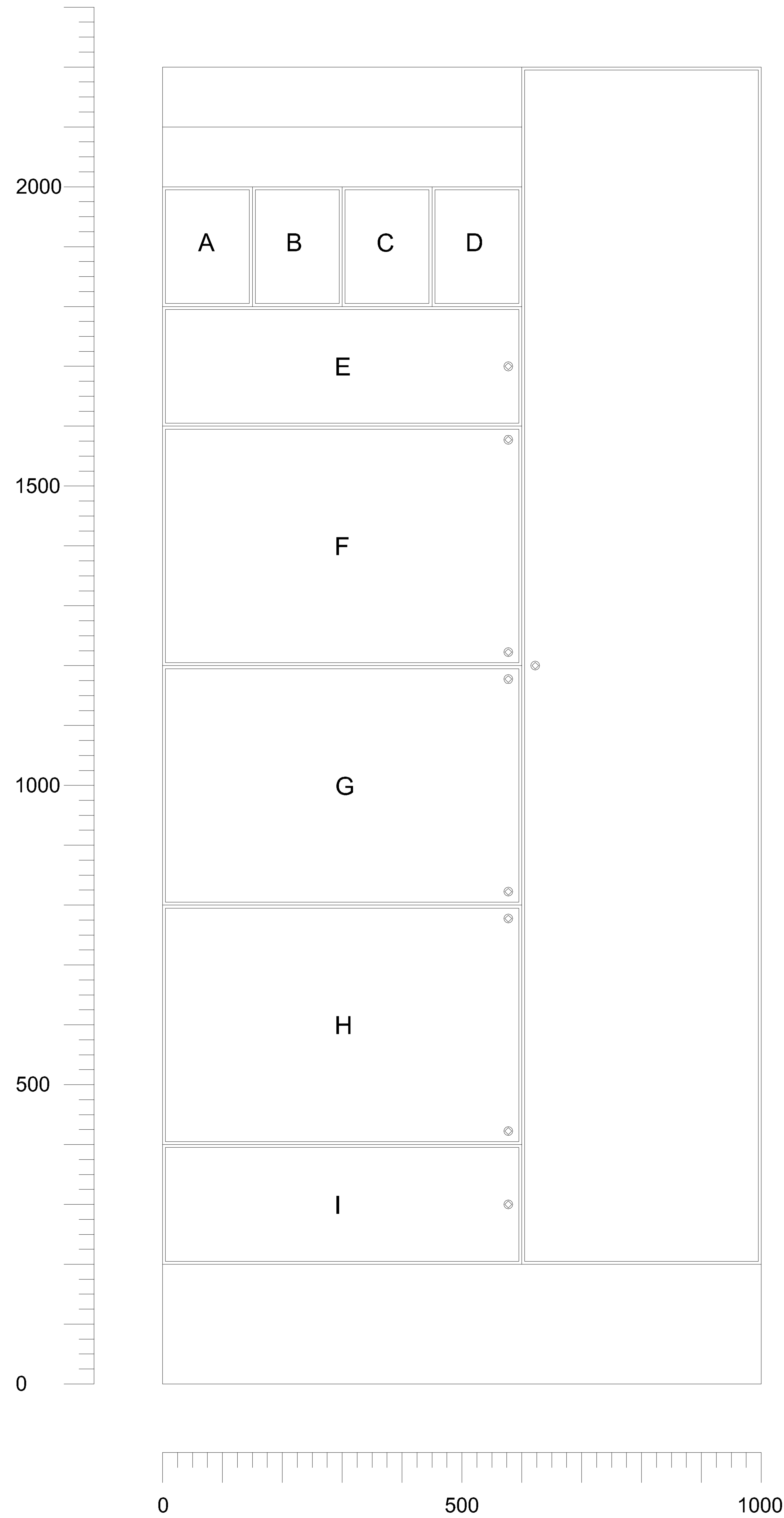
LEGEND  
LEGENDE

-  LABEL  
SCHRIFTFELD
-  48 x 48mm
-  48 x 48mm
-  48 x 48mm
-  48 x 48mm
-  24 x 18mm ILLUMINATED PUSH BUTTON  
LEUCHTD RUCKTASTER
-  24 x 18mm INDICATING LAMP  
MELDELEUCHE
-  24 x 18mm PUSH BUTTON  
DRUCKTASTER
-  24 x 18mm KEY BUTTON  
SCHLUSSELTASTER



REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
<b>HEADQUARTERS</b> UNITED STATES AIR FORCES EUROPE ENGINEERING & OPERATIONS				
AIRFIELD STANDARD DESIGN US JET FUEL STORAGE AND DISPENSING SYSTEMS		FLUGPLATZ STANDARDPLANUNG US FLUGKRAFTSTOFF - VERSORGENGSANLAGEN		
BUILDING BAUWERK	MANIFOLD / FILTER STATION, HYDRANT REFUELING SYSTEM VERTEILER / FILTERSTATION, HYDRANTEN - BETANKUNGSSYSTEM			
DESIGNATION BEZEICHNUNG	MIMIC DIAGRAM CONTROL PANEL HYDRANT REFUELING SYSTEM STEUER- MESS- UND REGELSCHRANK - BLINDSCHALTBI LD HYDRANTEN - BETANKUNGSSYSTEM			
WORKED/BEARBEITET	PREPARED/BEREITET LANGE/STREIBER, LINDENBERG UND BAUER/REINHOLD LANGE/STREIBER, LINDENBERG UND BAUER/REINHOLD	APPROVED/GENEHMIGT AMT FÜR BUNDESBAU WALLSTR.1 55122 MAINZ ORIGINAL STORED BY WOLFRUM, GZ NOVEMBER 2012		
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAU MASSNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED GENEHMIGT	DATE DATUM	6. MAI 2015	SCALE MASSSTAB	1:2
ORIGINAL STORED BY IN ORIGINAL GZ			STANDARD SHEET STANDARD BLATT	
DESIGNER/BAU CONRAD FÜR FACILITIES ENGINEER PLANNING - ARCHITECTURE			CAD-PROJECT PATH: C:\PROJ\1501\1501.dwg	E - 8.13
CONSTRUCTION PROJECT BAU MASSNAHME			SHEET NO. BLATT-NR.	OF VON

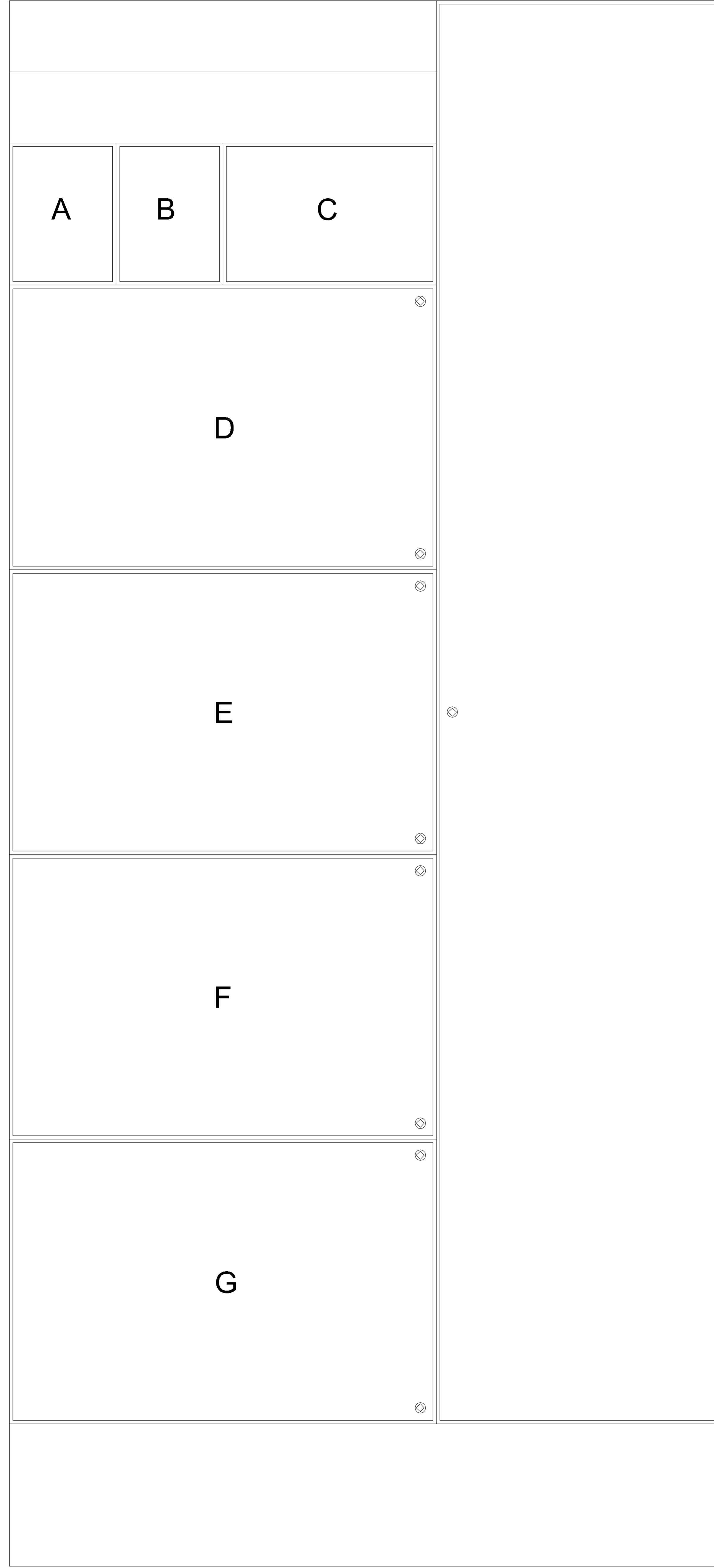
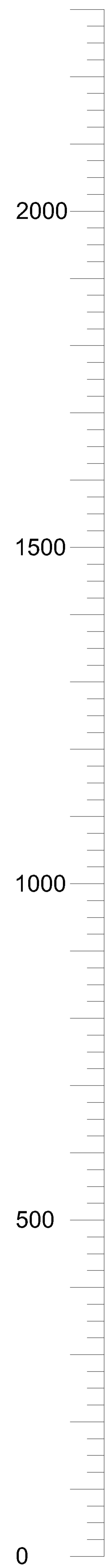




- A - FAN APP. 0,08kW PUMP HOUSE TANK 1  
LÜFTER CA. 0,08kW PUMPENHAUS TANK 1
- B - FAN APP. 0,08kW PUMP HOUSE TANK 2  
LÜFTER CA. 0,08kW PUMPENHAUS TANK 2
- C - FAN APP. 0,08kW LEAKAGE CONTROL PIT TANK 1  
LÜFTER CA. 0,08kW LECKKONTROLLSCHACHT TANK 1
- D - FAN APP. 0,08kW LEAKAGE CONTROL PIT TANK 2  
LÜFTER CA. 0,08kW LECKKONTROLLSCHACHT TANK 2
- E - SPARE  
RESERVE
- F - SPARE  
RESERVE
- G - POWER SUPPLY MAINS  
EINSPEISUNG NETZ
- H - EMERGENCY POWER SUPPLY  
NOTSTROMEINSPEISUNG
- I - SURGR ARRESTOR  
ÜBERSPANNUNGSABLEITER

REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
<b>HEADQUARTERS</b> UNITED STATES AIR FORCES EUROPE ENGINEERING & OPERATIONS				
AIRFIELD STANDARD DESIGN US JET FUEL STORAGE AND DISPENSING SYSTEMS		FLUGPLATZ STANDARDPLANUNG US FLUGKRAFTSTOFF - VERSORGENGSANLAGEN		
BUILDING BAUWERK: MANIFOLD / FILTER STATION, HYDRANT REFUELING SYSTEM VERTEILER / FILTERSTATION, HYDRANTEN - BETANKUNGSSYSTEM				
DESIGNATOR BEZUEHUNG: LOW VOLTAGE DISTRIBUTION PANEL - MCC NIEDERSPANNUNGSVERTEILUNG IN EINSCHUBTECHNIK				
WORKED/BEARBEITET	PREPARED/AUFGESTELLT	APPROVED/GENEHMIGT		
LANGE/STRECKENVERLAUF UND BAUSTRUKTUR LANGE/STRECKENVERLAUF UND BAUSTRUKTUR	AMT FÜR BUNDESBAU WALLSTR.1 55122 MAINZ			
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAUMASSNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED GENEHMIGT	DATE DATUM: 6. MAI 2015	SCALE MASSSTAB		
ORIGINAL, DESIGNED BY IN ORIGINAL, GEG.	GERÄT/BAU CONRAD (BAU) INGENIEUR UND ARCHITECTUR	STANDARD SHEET STANDARD PLAN	E - 8.14	
CONSTRUCTION PROJECT BAU MASSNAHME		CAD-PROJECT PATH: CAD-PROJEKTPfad	SHEET NO. PLATZNR. OF VON	

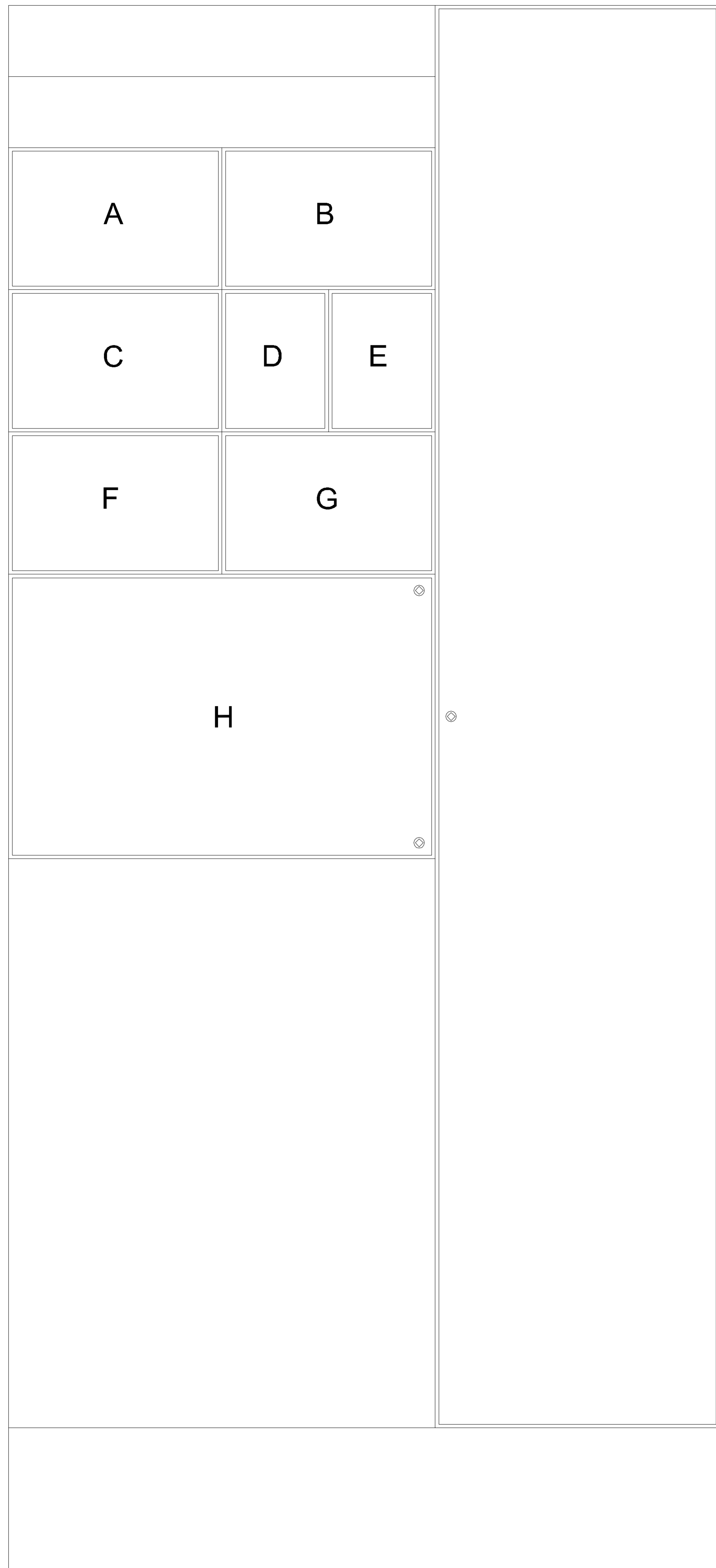




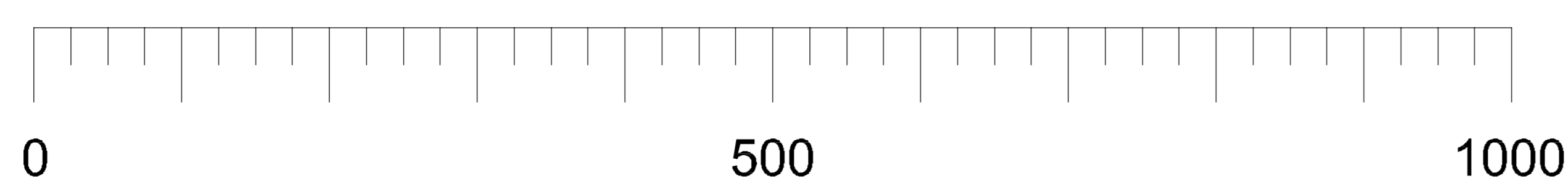
- A - DRAIN PUMP 2,2kw TANK 1  
ENTLEERUNGSPUMPE 2,2kw TANK 1
- B - DRAIN PUMP 2,2kw TANK 2  
ENTLEERUNGSPUMPE 2,2kw TANK 2
- C - DRAIN TANK PUMP 7,5kw  
PUMPE ENTLEERUNGSBEHÄLTER 7,5kw
- D - FUEL PUMP 55kw 1 TANK 1  
FÖRDERPUMPE 55kw 1 TANK 1
- E - FUEL PUMP 55kw 2 TANK 1  
FÖRDERPUMPE 55kw 2 TANK 1
- F - FUEL PUMP 55kw 1 TANK 2  
FÖRDERPUMPE 55kw 1 TANK 2
- G - FUEL PUMP 55kw 2 TANK 2  
FÖRDERPUMPE 55kw 2 TANK 2

REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
<b>HEADQUARTERS</b> UNITED STATES AIR FORCES EUROPE ENGINEERING & OPERATIONS				
AIRFIELD STANDARD DESIGN US JET FUEL STORAGE AND DISPENSING SYSTEMS		FLUGPLATZ STANDARDPLANUNG US FLUGKRAFTSTOFF - VERSORGUNGSANLAGEN		
BUILDING BAUWERK				
MANIFOLD / FILTER STATION, HYDRANT REFUELING SYSTEM VERTEILER / FILTERSTATION, HYDRANTEN - BETANKUNGSSYSTEM				
DESIGNATION BEZÜCHLUNG				
LOW VOLTAGE DISTRIBUTION PANEL - MCC NIEDERSpannungSVERTEILUNG IN EINSCHUBTECHNIK				
WORKED/BEARBEITET		PREPARED/AUFGESTELLT		APPROVED/GENEHMIGT
LANDSCHAFTS- UND BAUVERLEHRE UND BAUVERLEHRE L B B		AMT FÜR BUNDESBAU WALLSTR.1 55122 MAINZ		ORIGINAL SIGNED BY WOLFRAM GÖZ 14.06.2012
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAU MASSNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED GENEHMIGT	DATE DATUM	6. MAI 2015		SCALE MASSSTAB
ORIGINAL SIGNED BY IN ORIGINAL DCC		STANDARD SHEET STANDARD PLAN		
DESIGNER CONRAD EISENBERGER ENGINEERING CONSULTING ENGINEERS		E - 8.15		
CONSTRUCTION PROJECT BAU MASSNAHME		CAD-PROJECT FILE CAD-PROJEKTDATEI		SHEET NO. PLATZ NR. OF VON





- A - POWER SUPPLY CONTROL PANELS  
VERSORGUNG STEUERSCHRÄNKE
- B - SUPPLY DIESEL CONTROL PANEL  
VERSORGUNG DIESELÜBERWACHUNGSSCHRANK
- C - CATHODIC PRETECTION RECTIFIER  
KKS - SCHUTZSTROMGERÄT
- D - VENTILATOR 0,37kw M - ROOM  
VENTILATOR 0,37kw M - RAUM
- E - SPARE  
RESERVE
- F - LEAKAGE CONTROL PANEL  
LECKKONTROLLSCHRANK
- G - POWER RECEPTACLE (400V)  
KRAFTSTECKDOSE (400V)
- H - 230V SUPPLY  
230V VERSORGUNG



REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
<b>HEADQUARTERS</b> <b>UNITED STATES</b> <b>AIR FORCES EUROPE</b>				
<b>ENGINEERING &amp; OPERATIONS</b>				
<b>AIRFIELD</b> <b>STANDARD DESIGN US</b> <b>JET FUEL STORAGE AND</b> <b>DISPENSING SYSTEMS</b>		<b>FLUGPLATZ</b> <b>STANDARDPLANUNG US</b> <b>FLUGKRAFTSTOFF -</b> <b>VERSORGUNGSANLAGEN</b>		
<b>BUILDING</b> <b>BAUWERK</b>				
<b>MANIFOLD / FILTER STATION, HYDRANT REFUELING SYSTEM</b> <b>VERTEILER / FILTERSTATION, HYDRANTEN - BETANKUNGSSYSTEM</b>				
<b>DESIGNATION</b> <b>BESTREICHUNG</b>				
<b>LOW VOLTAGE DISTRIBUTION PANEL - MCC</b> <b>NIEDERSpannungsverteilung in Einschubtechnik</b>				
<b>WORKED/BEARBEITET</b>		<b>PREPARED/AUFGESTELLT</b>		<b>APPROVED/GENEHMIGT</b>
<small>LANDSBETRIEBSLINGENCHAFTS- UND BAUBETRIEBS- UND WERKSTÄTTENLEITUNG</small>		<small>AMT FÜR BUNDESBAU</small>		<small>WALLSTR.1 55122 MAINZ</small>
<small>AMT FÜR BUNDESBAU</small>		<small>LANDTAG</small>		<small>ORIGINAL, BEHOUDEN BY: WÜRZBURG, DEU</small>
<small>INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY)</small> <small>EINGEFÜHRT FÜR BAUMAßNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)</small>				
<b>APPROVED</b> <b>GENEHMIGT</b>	<b>DATE</b> <b>DATUM</b>	<b>6. MAI 2015</b>		<b>SCALE</b> <b>MAßSTAB</b>
<small>ORIGINAL, BEHOUDEN BY: WÜRZBURG, DEU</small>		<small>STANDARD SHEET</small>		<b>E - 8.16</b>
<small>GERÄT FÜR</small>		<small>CAD-PROJEKT</small>		<b>SHEET NO.</b> <b>PLATZNR.</b>
<b>CONSTRUCTION PROJECT</b> <b>BAUUMAßNAHME</b>				<b>OF</b> <b>VON</b>



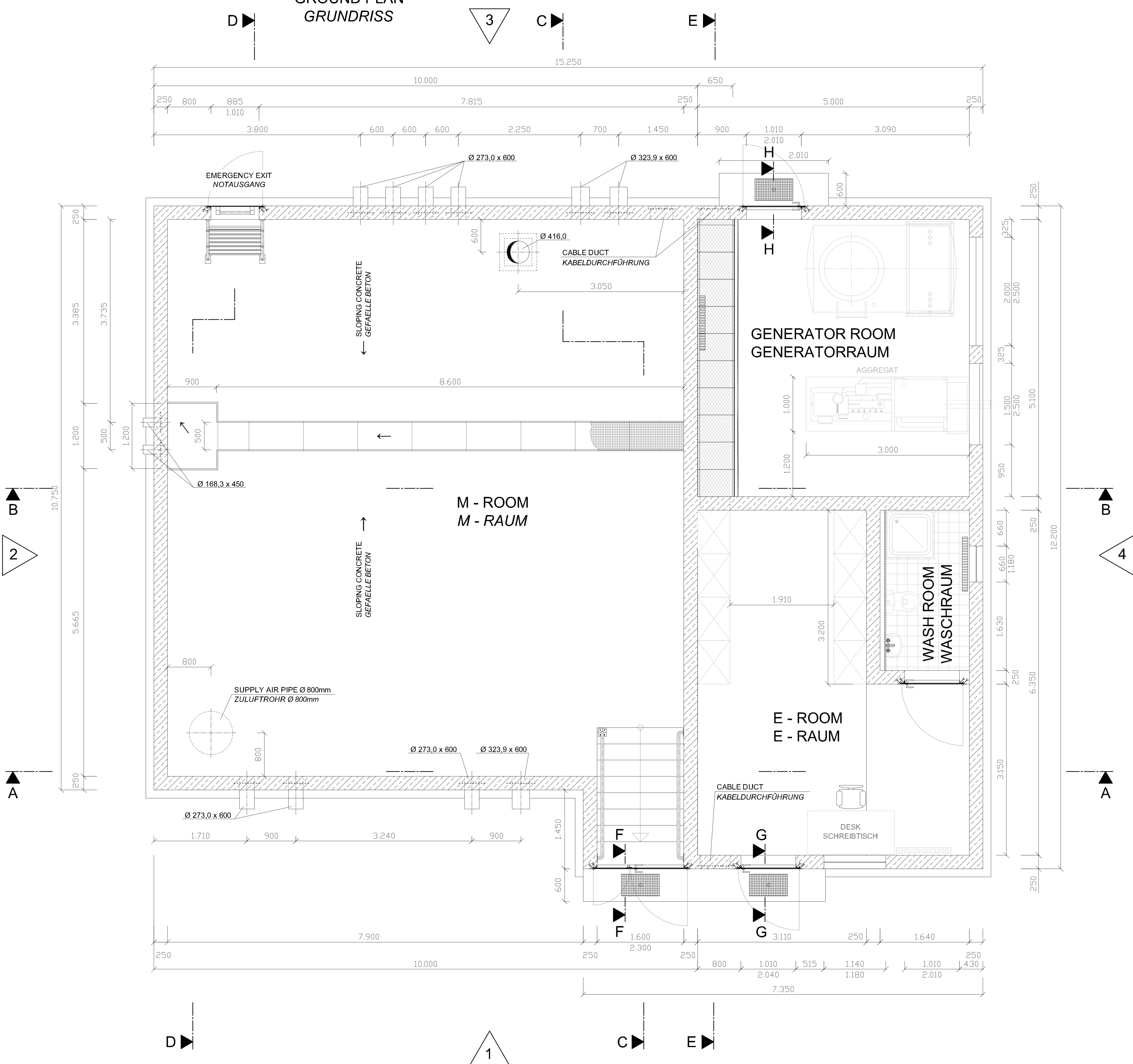
# MANIFOLD / FILTER STATION, TANK TRUCK REFUELING SYSTEM VERTEILER- / FILTERSTATION, TANKWAGEN- BETANKUNSSYSTEM

# 8I

- A-8I.1 GROUND PLAN  
*GRUNDRISS*
- A-8I.2 VIEWS 1 AND 3  
*ANSICHTEN 1 UND 3*
- A-8I.3 VIEWS 2 AND 4  
*ANSICHTEN 2 UND 4*
- A-8I.4 TOP VIEW  
*DRAUFSICHT*
- C-8I.1 SECTIONS A-A , B-B  
*SCHNITTE A-A , B-B*
- C-8I.2 SECTIONS C-C , E-E  
*SCHNITTE C-C , E-E*
- C-8I.3 SECTIONS AND DETAILS  
*SCHNITTE UND DETAILS*
- C-8I.4 FORMWORK PLAN, GROUND PLAN  
*SCHALPLAN, GRUNDRISS*
- C-8I.5 FORMWORK PLAN, SECTION "A" AND "B"  
*SCHALPLAN, SCHNITT "A" UND "B"*
- C-8I.6 FORMWORK PLAN, SECTION "C" , "D" AND "E"  
*SCHALPLAN, SCHNITT "C" , "D" UND "E"*
- M-8I.1 MECHANICAL INSTALLATION, GROUND PLAN  
*MASCHINENTECHNISCHE INSTALLATION , GRUNDRISS*
- M-8I.2 MECHANICAL INSTALLATION, SECTIONS A - D  
*MASCHINENTECHNISCHE INSTALLATION , SCHNITTE A - D*
- M-8I.3 MECHANICAL INSTALLATION, SECTIONS E - G  
*MASCHINENTECHNISCHE INSTALLATION , SCHNITTE E - G*
- E-8I.1 ELECTRICAL DIAGRAM INPUT PANEL  
*SCHALTPLAN EINSPEISEFELD*
- E-8I.2 ELECTRICAL DIAGRAM OPERATING TANK 1  
*SCHALTPLAN FLACHBODENTANK 1*
- E-8I.3 ELECTRICAL DIAGRAM OPERATING TANK 1  
*SCHALTPLAN FLACHBODENTANK 1*
- E-8I.4 ELECTRICAL DIAGRAM OPERATING TANK 2  
*SCHALTPLAN FLACHBODENTANK 2*
- E-8I.5 ELECTRICAL DIAGRAM OPERATING TANK 2  
*SCHALTPLAN FLACHBODENTANK 2*
- E-8I.6 ELECTRICAL DIAGRAM DRAIN TANK / DETAIL  
*SCHALTPLAN ENTLEERUNGSBEHÄLTER / DETAIL*
- E-8I.7 ELECTRICAL DIAGRAM GENERAL INSTALLATION  
*SCHALTPLAN ALLGEMEINE INSTALLATION*
- E-8I.8 ELECTRICAL DIAGRAM GENERAL INSTALLATION  
*SCHALTPLAN ALLGEMEINE INSTALLATION*
- E-8I.9 ELECTR. INSTALL. GROUNDING A. LIGHTNING PROTECTION PLAN, GROUND PLAN  
*ELEKTR. INSTALL. ERDUNGS- U. BLITZSCHUTZPLAN, GRUNDRISS*
- E-8I.10 ELECTR. INSTALL. GROUNDING A. LIGHTNING PROTECTION PLAN, SECTION A,B,C  
*ELEKTR. INSTALL. ERDUNGS- U. BLITZSCHUTZPLAN, SCHNITT A,B,C*
- E-8I.11 ELECTR. INSTALL. GROUNDING A. LIGHTNING PROTECTION PLAN, DRAUFSICHT  
*ELEKTR. INSTALL. ERDUNGS- U. BLITZSCHUTZPLAN, DRAUFSICHT*
- E-8I.12 MIMIC DIAGRAM CONTROL PANEL  
*SREUER- MESS- UND REGELSCHRANK - BLINDSCHALTBILD*
- E-8I.13 LOW VOLTAGE DISTRIBUTION - MCC  
*NIEDRESPANNUNGSVERTEILUNG IN EINSCHUBTECHNIK*
- E-8I.14 LOW VOLTAGE DISTRIBUTION - MCC  
*NIEDRESPANNUNGSVERTEILUNG IN EINSCHUBTECHNIK*
- E-8I.15 LOW VOLTAGE DISTRIBUTION - MCC  
*NIEDRESPANNUNGSVERTEILUNG IN EINSCHUBTECHNIK*



GROUND PLAN  
GRUNDRISS



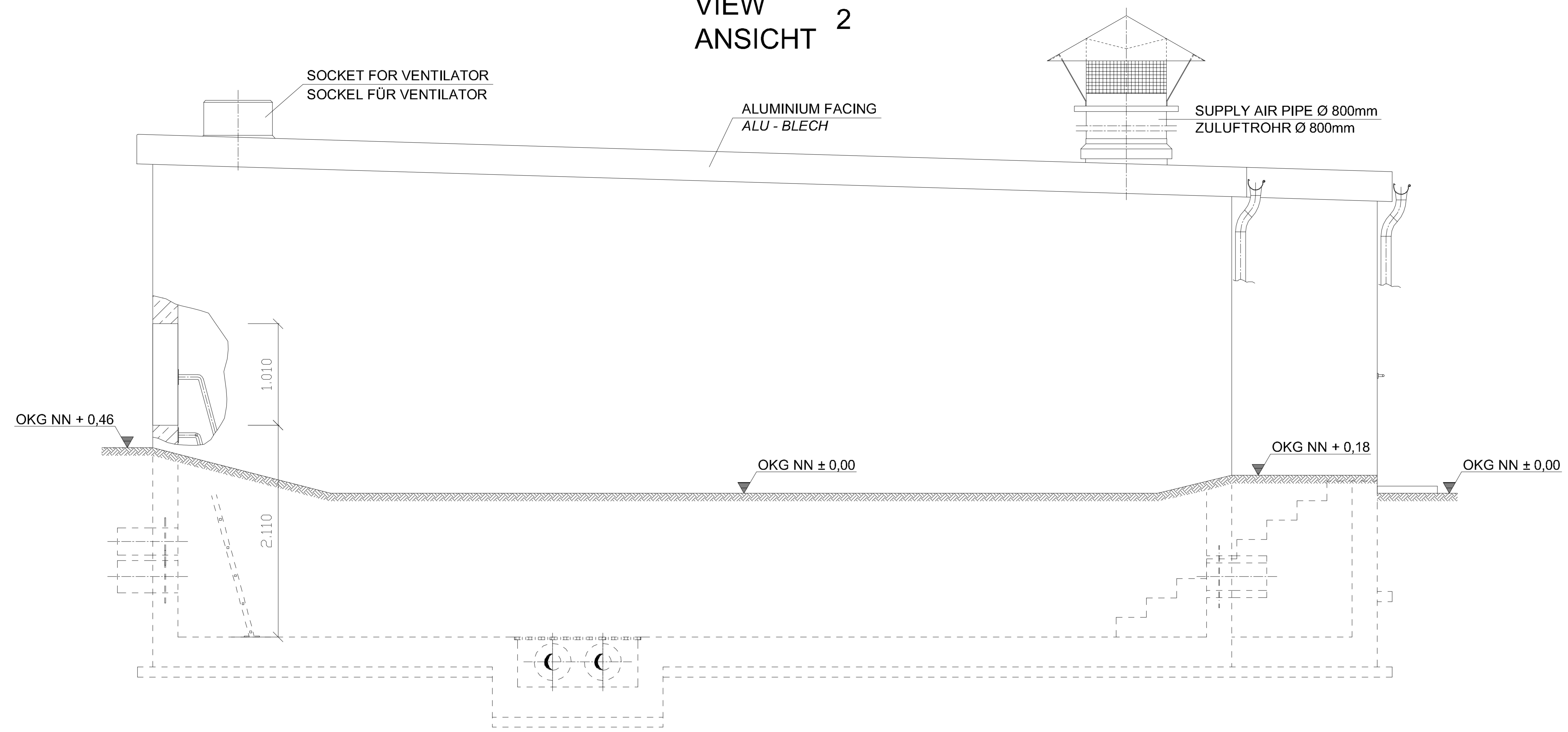
REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
HEADQUARTERS UNITED STATES AIR FORCES EUROPE				
ENGINEERING & OPERATIONS				
AIRFIELD STANDARD DESIGN US		FLUGPLATZ STANDARDPLANUNG US		
JET FUEL STORAGE AND DISPENSING SYSTEMS		FLUGKRAFTSTOFF - VERSORGUNGSANLAGEN		
BUILDING BAUWERK: MANIFOLD / FILTER STATION, TANK TRUCK REFUELING SYSTEM VERTEILER / FILTERSTATION, TANKWAGEN - BETANKUNGSSYSTEM				
DESIGNATION BEZUEHUNG: GROUND PLAN GRUNDRISS				
WORKED/ARBEITET		PREPARED/AUFGESTELLT		APPROVED/GENEHMIGT
LANDSCHAFTS- UND BAUVERBUND LUB-VEREINIGUNG LANDAU				
LANDAU		AMT FÜR BUNDESBAU		WALSTR. 1 55122 MAINZ
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAU MASSNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED GENEHMIGT	DATE DATUM: 6. MAI 2015	SCALE MASSSTAB: 1:25		
ORIGINAL DRAWN BY IN ORIGINAL DED.		STANDARD SHEET STANDARD PLAN		
GENERAL INFO CORPORATE FACILITIES ENGINEER PLANNING ARCHITECT		CAD-PROGRAMM SHEET NO. PLANNING		
CONSTRUCTION PROJECT BAU MASSNAHME		SHEET NO. PLANNING		



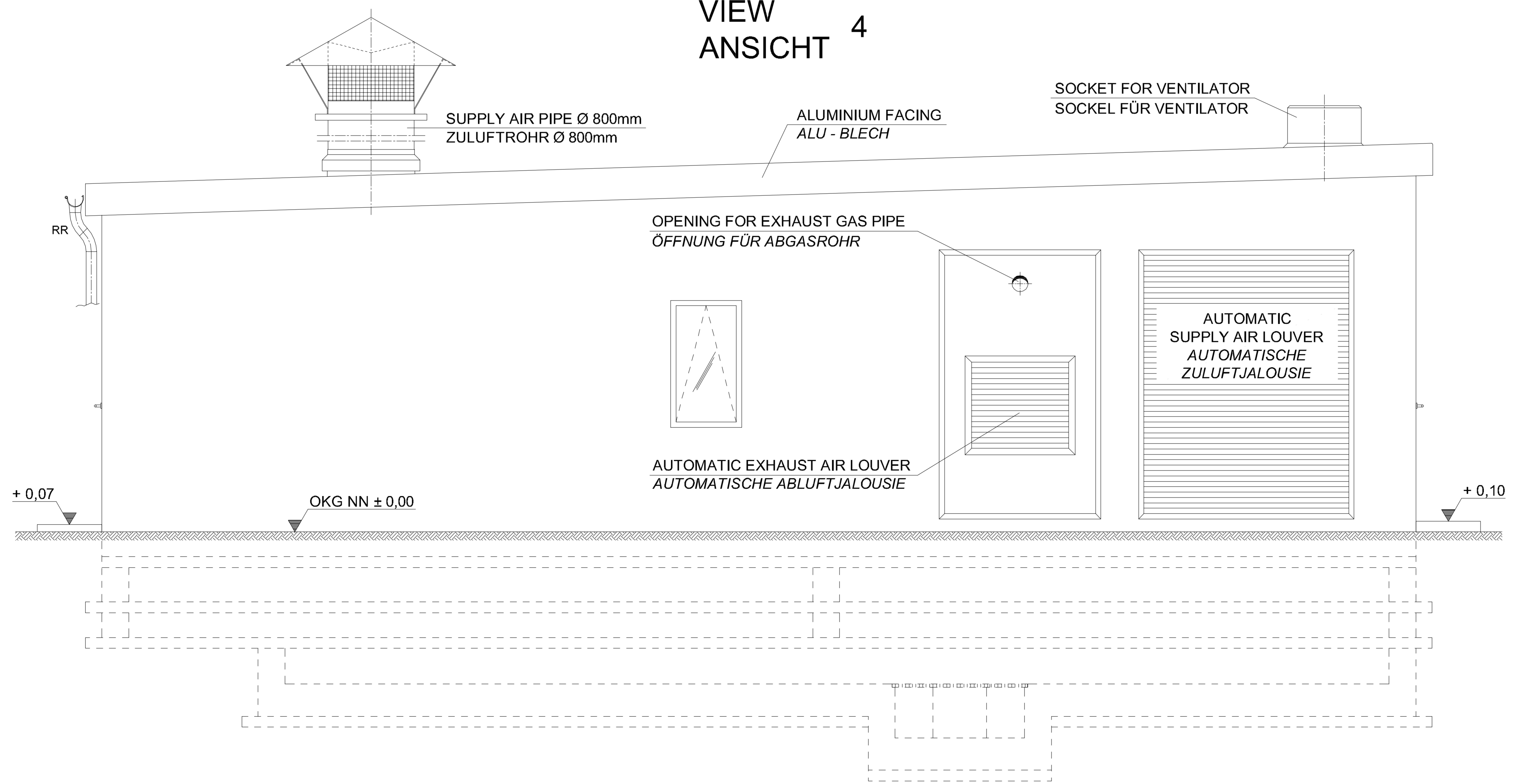




VIEW ANSICHT 2



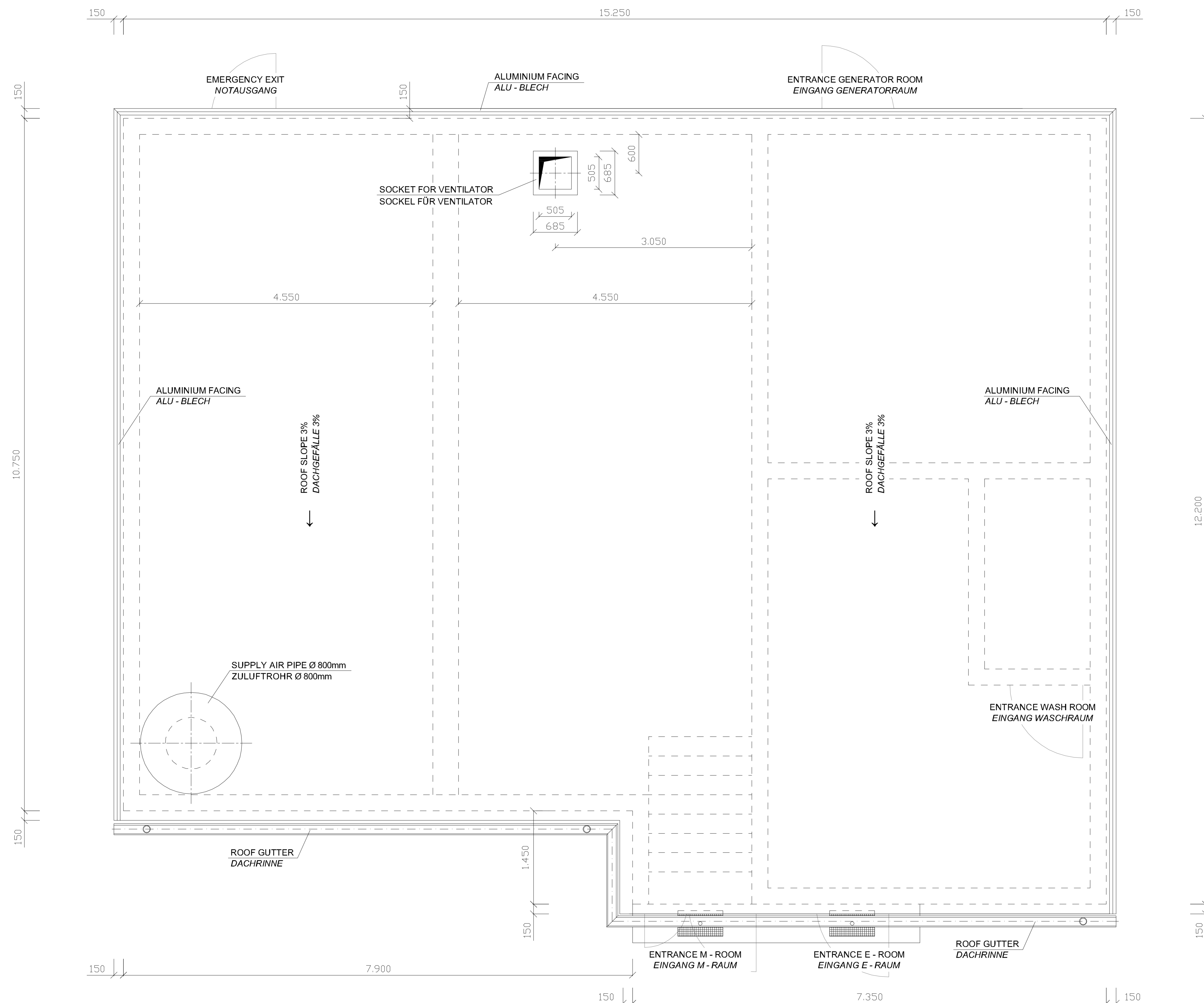
VIEW ANSICHT 4



REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
<b>HEADQUARTERS</b> UNITED STATES AIR FORCES EUROPE ENGINEERING & OPERATIONS				
<b>AIRFIELD STANDARD DESIGN US</b> JET FUEL STORAGE AND DISPENSING SYSTEMS		<b>FLUGPLATZ STANDARDPLANUNG US</b> FLUGKRAFTSTOFF - VERSORGENGSANLAGEN		
<b>BUILDING / BAUWERK</b> MANIFOLD / FILTER STATION , TANK TRUCK REFUELING SYSTEM VERTEILER / FILTERSTATION , TANKWAGEN - BETANKUNGSSYSTEM				
<b>DESIGNATOR / BEZÜCHLUNG</b> VIEWS 2 AND 4 ANSICHTEN 2 UND 4				
<b>WORKED/BEARBEITET</b> LANDEBETRIEBESLEITUNGSGESAMTSCHAFT UND BAUBETRIEB LW-BAUBETRIEBSSYSTEME LANDAU		<b>APPROVED/GENEHIGT</b> AMT FÜR BUNDESBAU WALLSTR.1 55122 MAINZ		
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAU MASSNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
<b>APPROVED / GENEHIGT</b> ORIGINAL SIGNED BY IN ORIGINAL DED.		<b>DATE / DATUM</b> 6. MAI 2015		<b>SCALE / MASSSTAB</b> 1:20 <b>STANDARD SHEET / STANDARD PLAN</b> <b>A - 81.3</b>
<b>CONSTRUCTION PROJECT / BAU MASSNAHME</b>			<b>SHEET NO. / PLATZ NR.</b> OF 101	



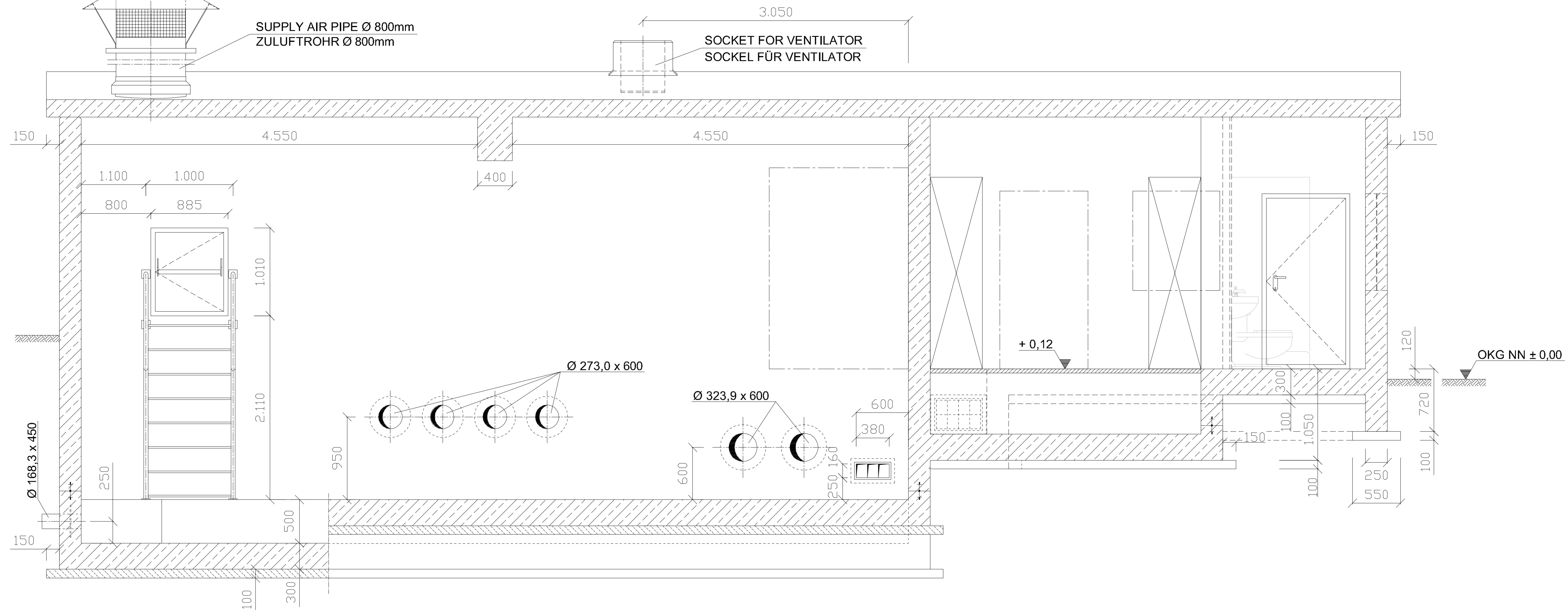
TOP VIEW  
DRAUFSICHT



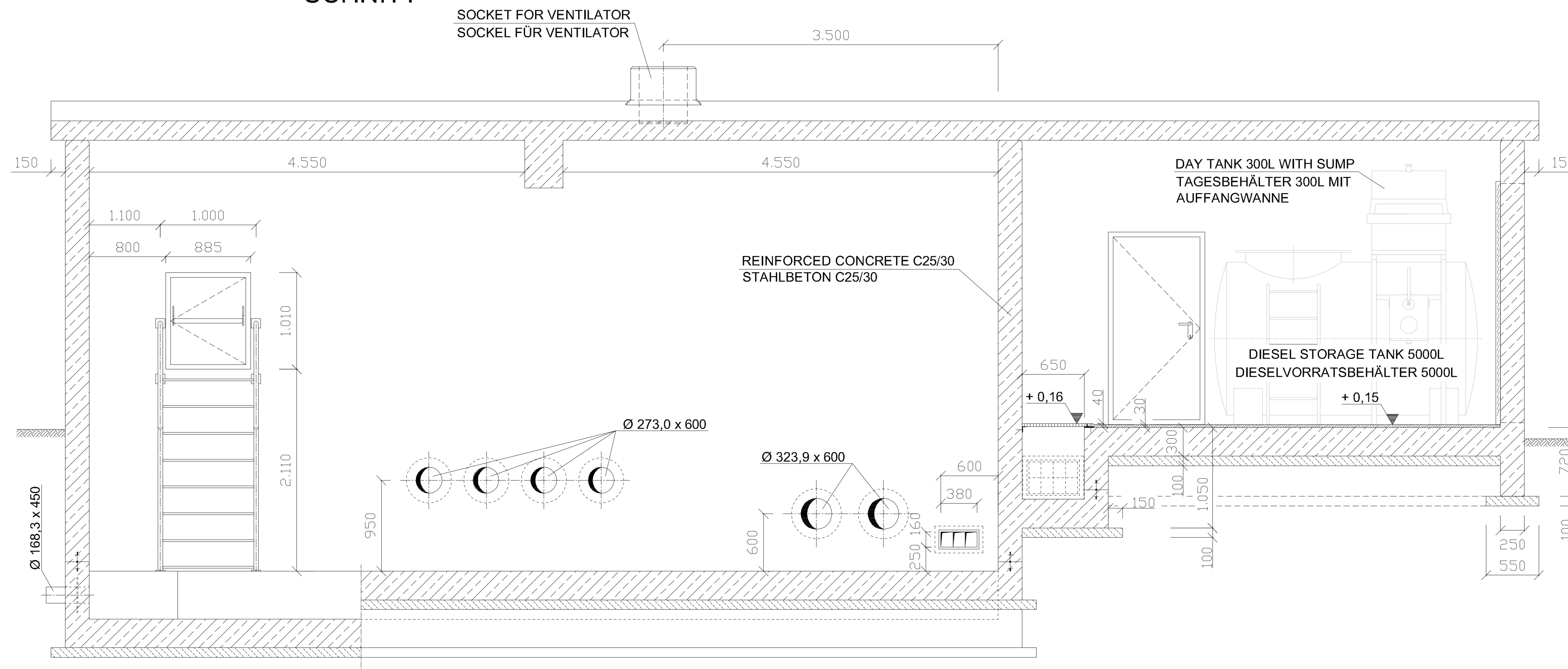
REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
<b>HEADQUARTERS</b> UNITED STATES AIR FORCES EUROPE ENGINEERING & OPERATIONS				
<b>AIRFIELD STANDARD DESIGN US</b> JET FUEL STORAGE AND DISPENSING SYSTEMS		<b>FLUGPLATZ STANDARDPLANUNG US</b> FLUGKRAFTSTOFF - VERSORGENGSANLAGEN		
<b>BUILDING BAUWERK</b> MANIFOLD / FILTER STATION , TANK TRUCK REFUELING SYSTEM VERTEILER / FILTERSTATION , TANKWAGEN - BETANKUNGSSYSTEM				
<b>DESIGNATION BEZUEHUNG</b> TOP VIEW DRAUFSICHT				
<b>WORKED/BEARBEITET</b> LANDESBÜRO FÜR VERKEHRSSACHWENDE UND BAUWESEN LANDESBÜRO FÜR VERKEHRSSACHWENDE UND BAUWESEN LANDESBÜRO FÜR VERKEHRSSACHWENDE UND BAUWESEN LANDTAG STADT FÜR VERKEHRSSACHWENDE UND BAUWESEN VERKEHRSSACHWENDE UND BAUWESEN		<b>APPROVED/GENEHIGT</b> AMT FÜR BUNDESBAU WALLSTR.1 55122 MAINZ ORIGINAL SIGNED BY: IN ORIGINAL SIZE: NOVEMBER 2012		
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAU MASSNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
<b>APPROVED GENEHIGT</b> DATE 6. MAI 2015		<b>SCALE MASSSTAB</b> 1:25		
<b>ORIGINAL SIGNED BY IN ORIGINAL SIZE</b>		<b>STANDARD SHEET STANDARD PLAN</b>		
<b>CONSTRUCTION PROJECT BAU MASSNAHME</b>		<b>A - 81.4</b> SHEET NO. PLATE NO. OF VON		




**SECTION A - A  
SCHNITT A - A**

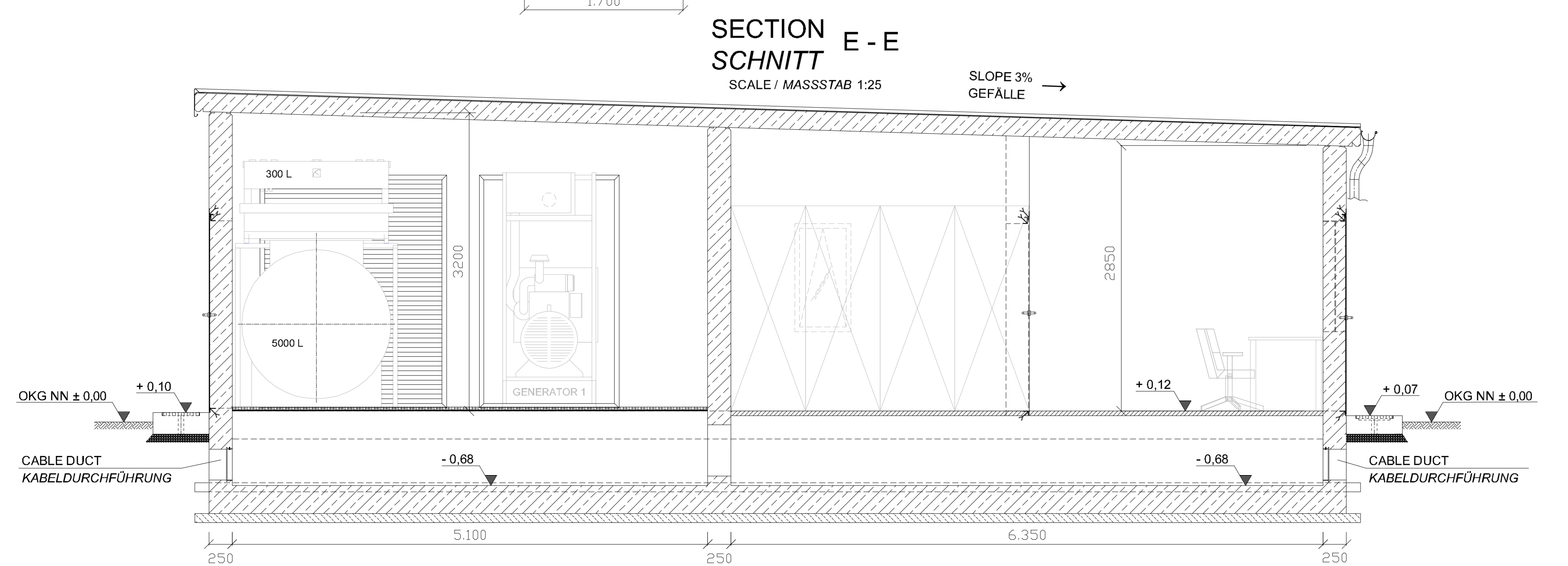
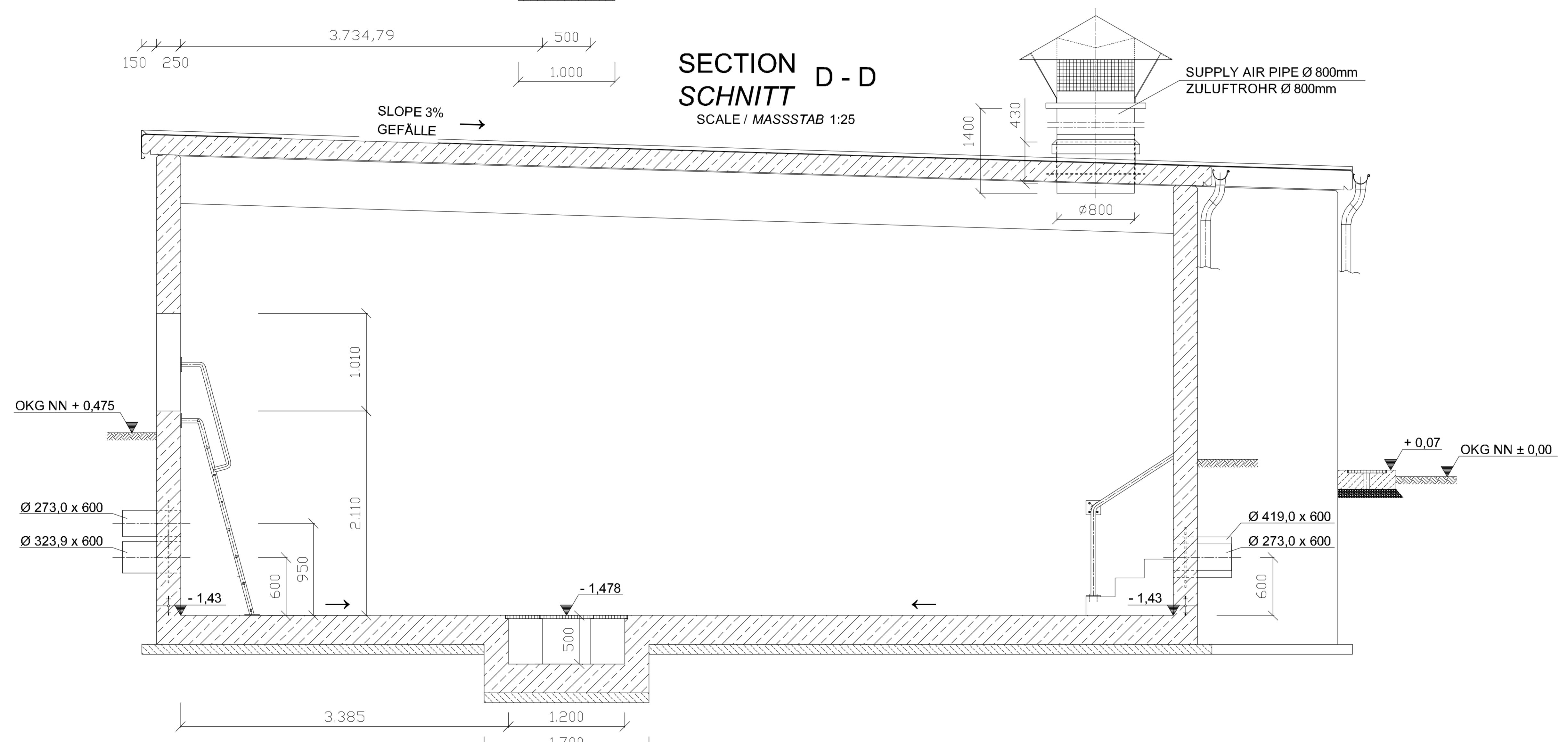
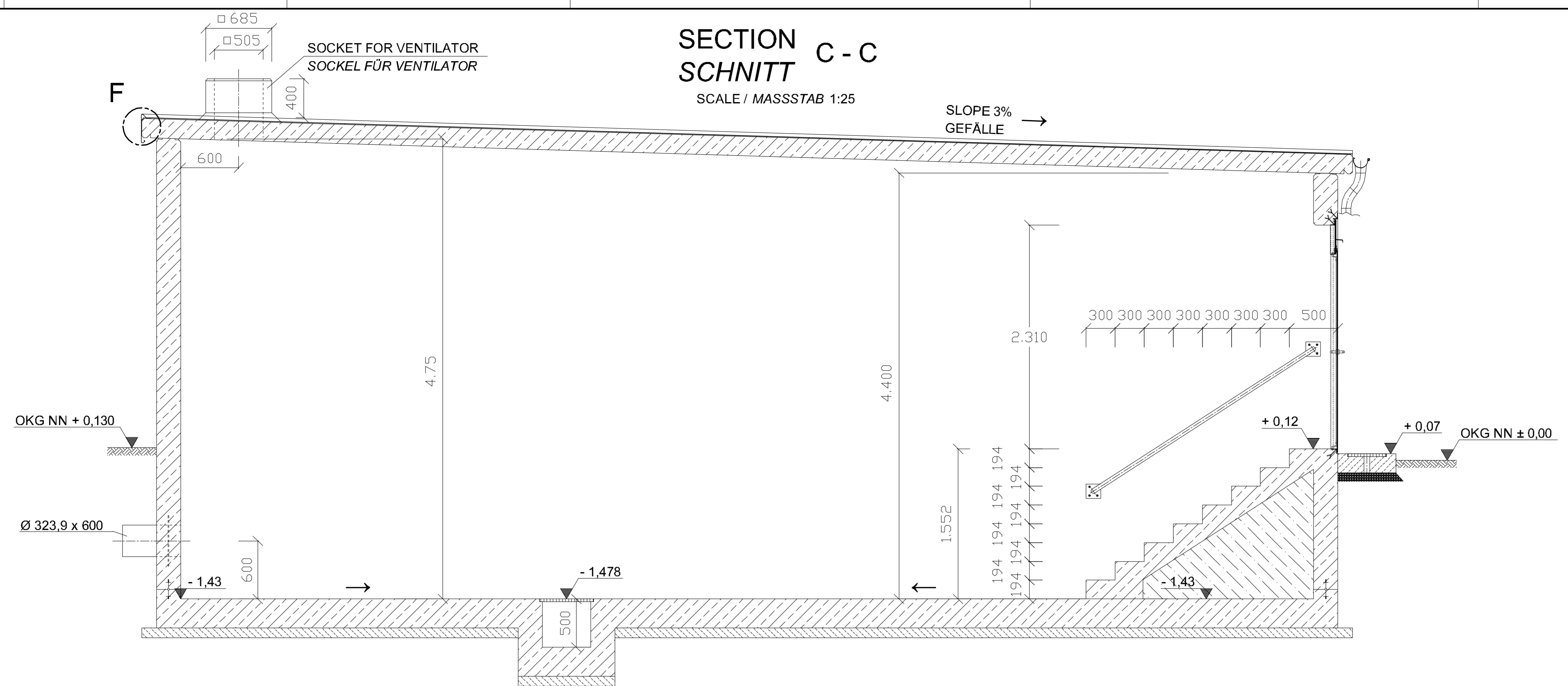


**SECTION B - B  
SCHNITT B - B**



REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
<b>HEADQUARTERS</b> <b>UNITED STATES AIR FORCES EUROPE</b>  <b>ENGINEERING &amp; OPERATIONS</b>				
<b>AIRFIELD STANDARD DESIGN US</b> <b>JET FUEL STORAGE AND DISPENSING SYSTEMS</b>		<b>FLUGPLATZ STANDARDPLANUNG US</b> <b>FLUGKRAFTSTOFF - VERSORNGUNGSANLAGEN</b>		
<b>BUILDING BAUWERK</b> MANIFOLD / FILTER STATION, TANK TRUCK REFUELING SYSTEM <b>BEZUGSBUILDUNG</b> VERTEILER / FILTERSTATION, TANKWAGEN - BETANKUNGSSYSTEM				
<b>SECTIONS A - A, B - B</b> <b>SCHNITTE A - A, B - B</b>				
<b>WORKED/BEARBEITET</b> LANDESBEREITUNGSGEMEINSCHAFT UND BAUBETRIEB LANDESBETRIEBSSYSTEME ANSCHLUSSE UND VERBUNDENHEITEN LANDAU		<b>APPROVED/GENEHMIGT</b>  <b>AMT FÜR BUNDESBAU</b> <b>WALLSTR. 1</b> <b>55122 MAINZ</b> ORIGINAL SIGNED BY: 10/06/2012		
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAU MASSNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
<b>APPROVED GENEHMIGT</b>		<b>DATE DATUM</b> 6. MAI 2015		<b>SCALE MASSSTAB</b> 1:20
<b>ORIGINAL DRAWN BY IN ORIGINAL DED.</b>		<b>STANDARD SHEET STANDARD PLAN</b>		
<b>CONSTRUCTION PROJECT BAU MASSNAHME</b>		<b>CAD-PROJECT PATH: CAD-PROJECT</b>		<b>SHEET NO. PLATZ NR.</b> C - 81.1 <b>OF VON</b>





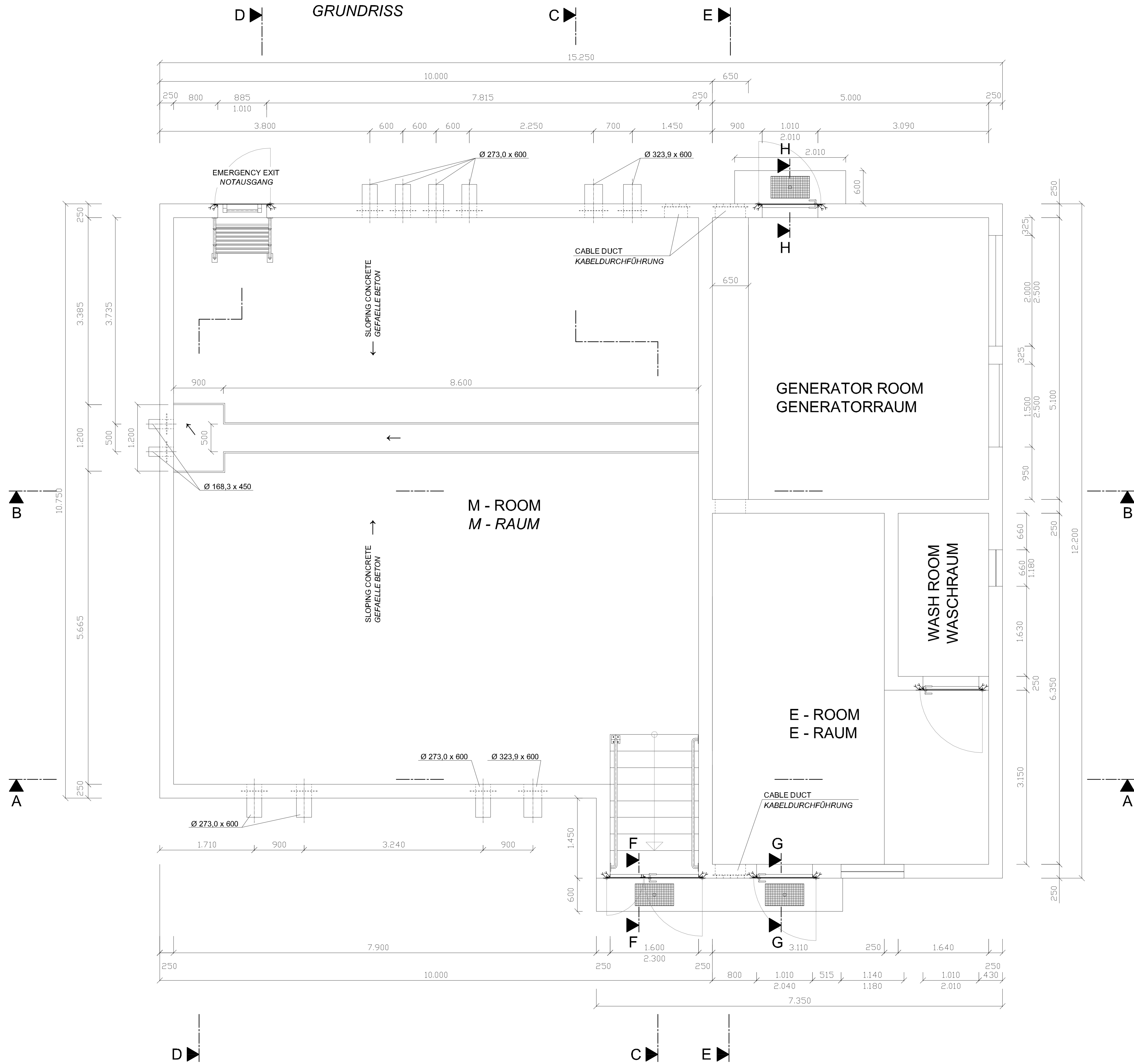
REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
<b>HEADQUARTERS</b> UNITED STATES AIR FORCES EUROPE ENGINEERING & OPERATIONS				
<b>AIRFIELD STANDARD DESIGN US</b> JET FUEL STORAGE AND DISPENSING SYSTEMS		<b>FLUGPLATZ STANDARDPLANUNG US</b> FLUGKRAFTSTOFF - VERSORGENGSANLAGEN		
<b>BUILDING BAUWERK</b> MANIFOLD / FILTER STATION , TANK TRUCK REFUELING SYSTEM VERTEILER / FILTERSTATION , TANKWAGEN - BETANKUNGSSYSTEM				
<b>DESIGNATOR BEZEICHNUNG</b> SECTIONS C - C - E - E SCHNITTE C - C - E - E				
<b>WORKED/REARBEITET</b>		<b>PREPARED/AUFGESTELLT</b>		<b>APPROVED/GENEHIGT</b>
LANDSBEREITERS LINGENSCHEITS- UND BAUVEREIN LAN-WESEN-LEHRANSTALT AMBROSEI-STRASSE 11, 71634 LINDEN TELEFON: 07141 130-111 FAX: 07141 130-112 LANDELL: 07141 130-111 ORIGINAL: BEI DER LEHRSTUHL-LEHRSTELLE IN DER DRUCK-LEZ. 07141 130-111		AMT FÜR BUNDESBAU WALLSTR. 1 55122 MAINZ ORIGINAL: BEI DER IN DER DRUCK-LEZ. 07141 130-111		INTRODUCTION FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAU MASSNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)
<b>APPROVED GENEHIGT</b>	<b>DATE DATUM</b> 6. MAI 2015	<b>SCALE MASSSTAB</b> 1:25		
<b>ORIGINAL, STORED BY IN DRUCK-LEZ.</b>		<b>STANDARD SHEET STANDARD PLAN</b>		
<b>DESIGNER/BAU CONTRAKT-LEISTUNGS-INGENIEUR IN DRUCK-LEZ.</b>		<b>CAD-PROJEKT CAD-PROJEKT</b>		
<b>CONSTRUCTION PROJECT BAU MASSNAHME</b>		<b>C - 81.2</b> SHEET NO. PLATZ NR. OF VON		







GROUND PLAN  
GRUNDRISS



REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
<b>HEADQUARTERS</b> UNITED STATES AIR FORCES EUROPE ENGINEERING & OPERATIONS				
AIRFIELD STANDARD DESIGN US JET FUEL STORAGE AND DISPENSING SYSTEMS		FLUGPLATZ STANDARDPLANUNG US FLUGKRAFTSTOFF - VERSORGENGSANLAGEN		
BUILDING / BAUWERK: MANIFOLD / FILTER STATION, TANK TRUCK REFUELING SYSTEM VERTEILER / FILTERSTATION, TANKWAGEN - BETANKUNGSSYSTEM				
DESIGNATOR / BEZEICHNUNG: FORMWORK PLAN, GROUND PLAN SCHALPLAN, GRUNDRISS				
WORKED/BEARBEITET:		PREPARED/AUFGESTELLT:		APPROVED/GENEHMIGT:
LANDSBEREITERS/BEREITUNGSGRUPPE UND BAUBEREITUNG LW-WEITERLEISTUNGSLANDW		AMT FÜR BUNDESBAU WÄLLSTR.1 55122 MAINZ		ORIGINAL SIGNED BY:
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAUMAßNAHMEN IN EUROPA (AUßER DEUTSCHLAND)				
APPROVED/GENEHMIGT:	DATE/ DATUM: 6. MAI 2015	SCALE/MAßSTAB: 1:25		
ORIGINAL SIGNED BY:		STANDARD SHEET / STANDARD PLAN		
DESIGN/BAU:		C-81.4		
CONSTRUCTION PROJECT / BAUMAßNAHME:		SHEET NO. / PLATZNR.:		



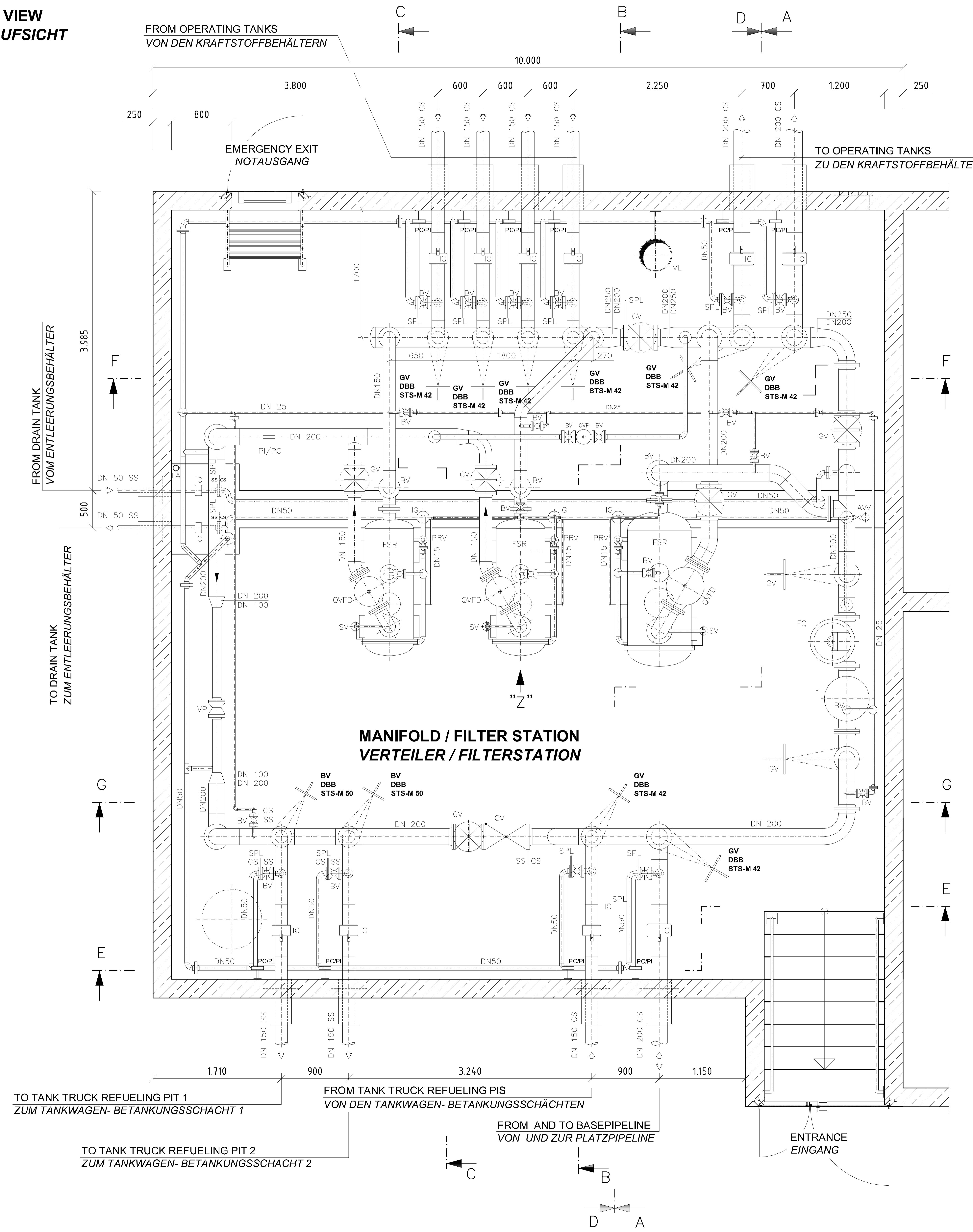








**TOP VIEW  
DRAUFSICHT**



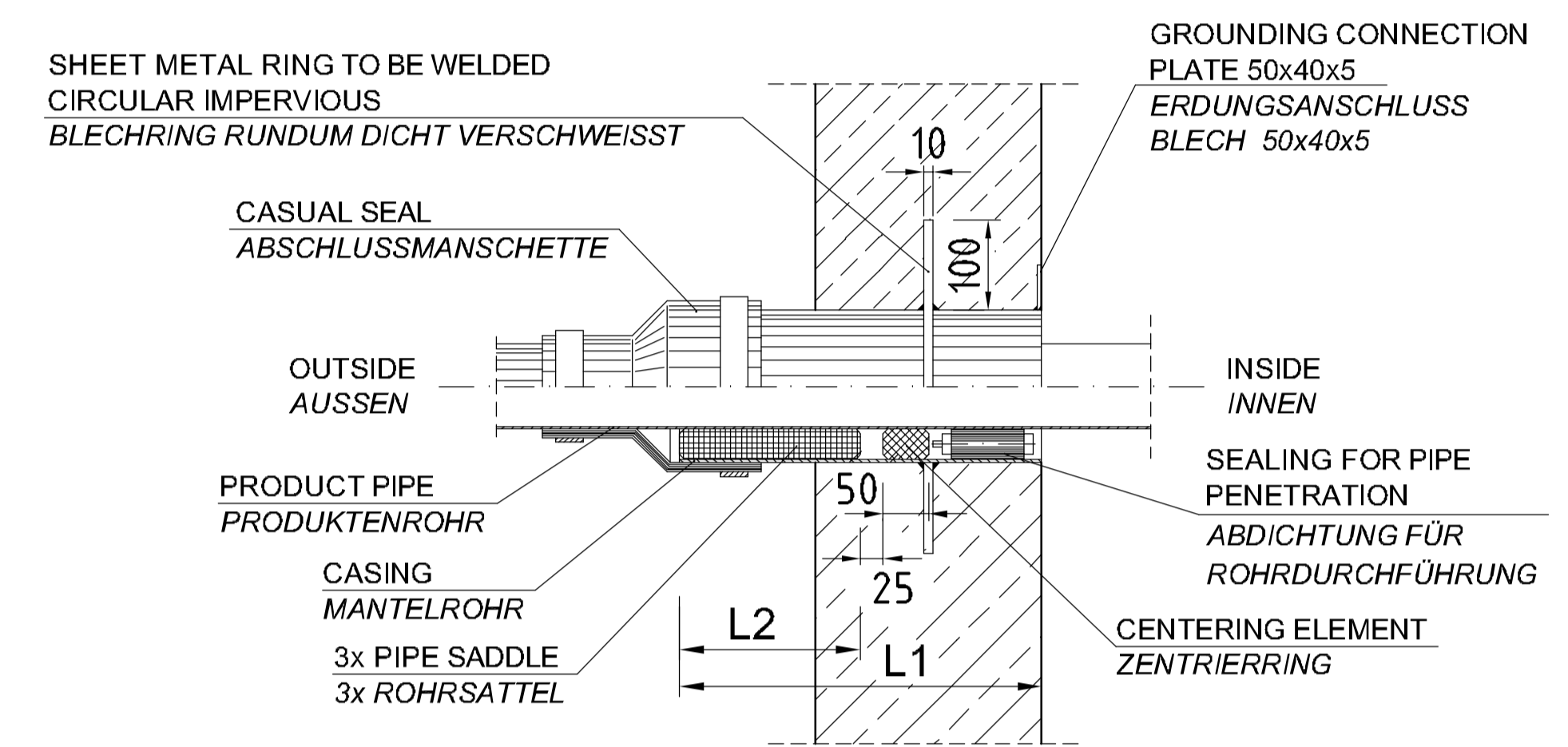
**NOTES  
BEMERKUNG**

ALL VALVES AND FLANGES DESIGNED FOR PN 16  
ALLE ARMATUREN UND FLANSCHS AUSGELEGT FUER PN 16

FOR SUPPORTS OF PIPES AN INSULATION PIECE, MADE OF 10mm THICK FUEL RESISTANT PLASTIC, IS TO PUT BETWEEN PIPES AND SUPPORTS OR HOLDERS.  
BEI UNTERSTUETZUNGEN VON ROHRLEITUNGEN IST ZWISCHEN ROHRLEITUNG UND UNTERSTUETZUNGSKONSTRUKTION BZW. HALTERUNG EINE ISOLIERPLATTE 10mm DICK AUS KRAFTSTOFFBESTAENDIGEN KUNSTSTOFF ZU LEGEN.

SUPPORTS AND HOLDERS AS SELECTED BY THE CONTRACTOR IN COORDINATION WITH THE LOCAL CONSTRUCTION SUPERVISION  
UNTERSTUEZUNG UND HALTERUNG NACH WAHL DES AN IN ABSTIMMUNG MIT DER OERTLICHEN BAULEITUNG.

**PIPE PENETRATION  
ROHRDURCHFUEHRUNG**  
NOT TO SCALE / OHNE MASSTAB



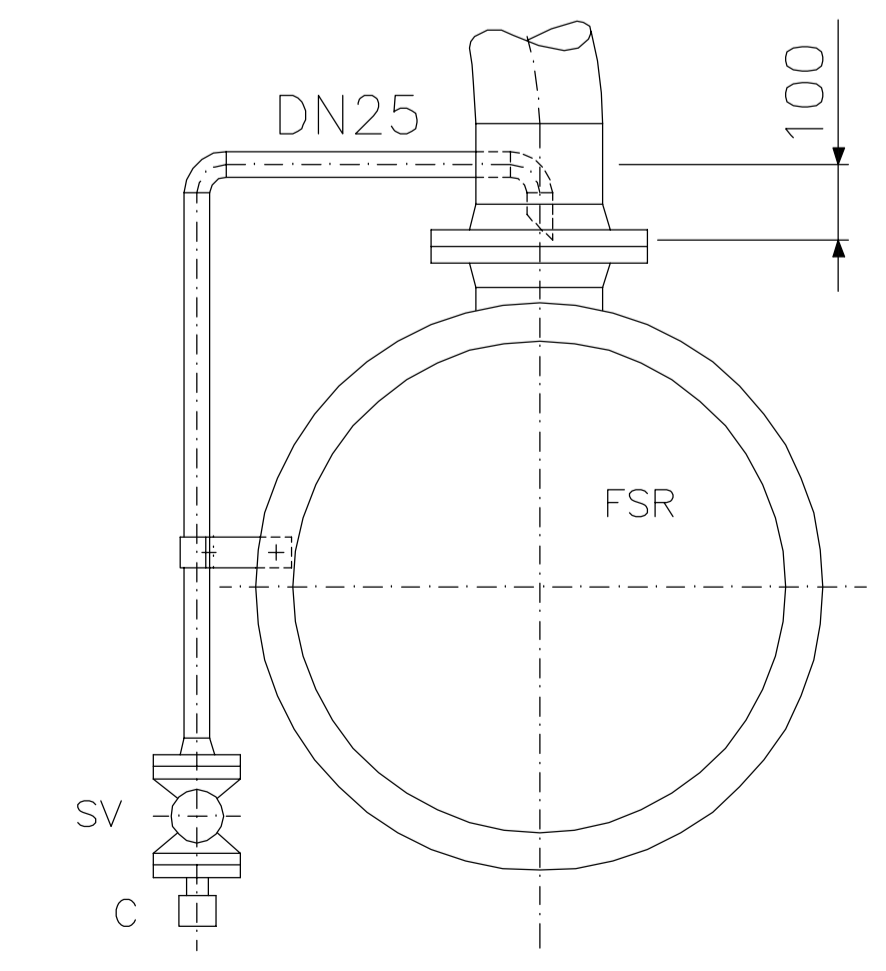
PRODUCT PIPE ROHRLEITUNG	PRODUCT PIPE PRODUKTENROHR mm	CASING MANTELROHR mm	L1 mm	L2 mm
DN 50	ø60,3	ø168,3	450	130
DN 150	ø168,3	ø273,0	600	250
DN 200	ø219,1	ø323,9	600	250

ALL MEASURES HAVE TO BE TO CHECKED ON SIDE  
SAMTLICHE MASSE SIND VOR ORT ZU UEBERPRUEFEN !

SS STAINLESS STEEL  
Cr.Ni. STAHL

CS STEEL  
STAHL

**VIEW  
ANSICHT "Z"**  
SCALE / MASSTAB 1:10



**LEGEND  
LEGENDE**

- AVV VENTILATING VALVE  
BELUEFTUNGSVENTIL
- BV BALL VALVE  
KUGELHAHN
- C QUICK COUPLING  
SCHNELLKUPPLUNG
- CV RUECKSCHLAGVENTIL  
RUECKSCHLAGVENTIL
- CVP PRESSURE CONTROL VALVE  
UEBERDRUCK-REGELVENTIL
- DT DIRT TRAP  
SCHMUTZFAENGER
- DBB DOUBLE BLOCK AND BLEED
- F STRAINER BASKET  
SIEBKORBFILTER
- FLV FLUSHING VALVE  
SPULVENTIL
- FQ FLOW METER  
MENGENMESSER
- FSR FILTER/SEPARATOR  
FILTER/WASSERABSCHIEDER
- GV GATE VALVE  
ABSPERRSCHIEBER
- IC INSULATING COUPLING  
ISOLIERKUPPLUNG
- IG INSPECTION GLASS  
SCHAULAS
- LA LIQUID PROBE  
FLUSSIGKEITSSONDE
- LCV LEVEL CONTROL VALVE  
NIVEAUREGELVENTIL
- MOV GATE VALVE WITH MOTOR  
ABSPERRARMATUR MIT MOTORANTRIEB
- PC PRESSURE GAUGE STOPCOCK  
MANOMETER-ABSPERRVENTIL
- PDI DIFFERENTIAL PRESSURE GAUGE  
DIFFERENZDRUCK-MANOMETER
- PI PRESSURE GAUGE  
MANOMETER
- PIS PRESSURE GAUGE WITH CONTACT FOR SWITCH  
MANOMETER MIT SCHALTKONTAKTEN
- PRV PRESSURE RELIEF VALVE  
DRUCKENTLASTUNGSVENTIL
- QVFD FILTER/SEPARATOR VALVE WITH DIFF.  
PRESSURE SHUT-OFF  
FILTER/WASSERABSCHIEDERVENTIL MIT  
DIFFERENZDRUCK-ABSCHALTUNG
- SPL SPADE PLATE  
BRILLENSTECKSCHEIBE
- SV SAMPLING VALVE  
PROBEENTNAHMEVENTIL
- VP VENTURI ROHR  
VENTURIROHR
- VL VENTILATOR  
VENTILATOR

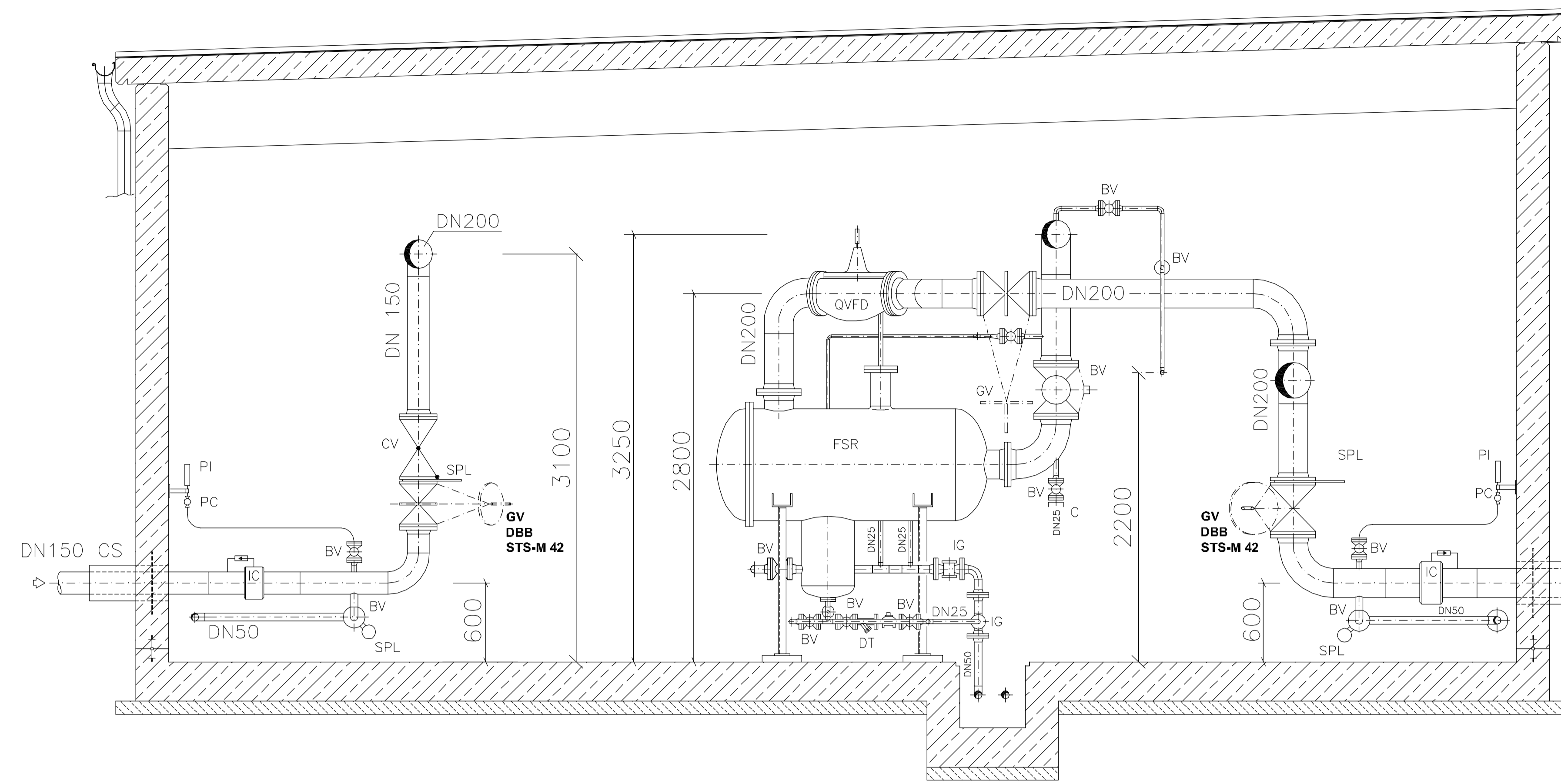
**PERTINENT DRAWINGS  
ZUGEHÖRIGE ZEICHNUNGEN**

- GM-02.2 GENERAL FLOW DIAGRAM  
GESAMT - FLIESS - SCHEMA
- M-8.2 MECHANICAL INSTALLATION, SECTIONS A - D  
MASCHINENTECHNISCHE INSTALLATION, SCHNITTE A - D
- M-8.3 MECHANICAL INSTALLATION, SECTIONS E - F  
MASCHINENTECHNISCHE INSTALLATION, SCHNITTE E - F

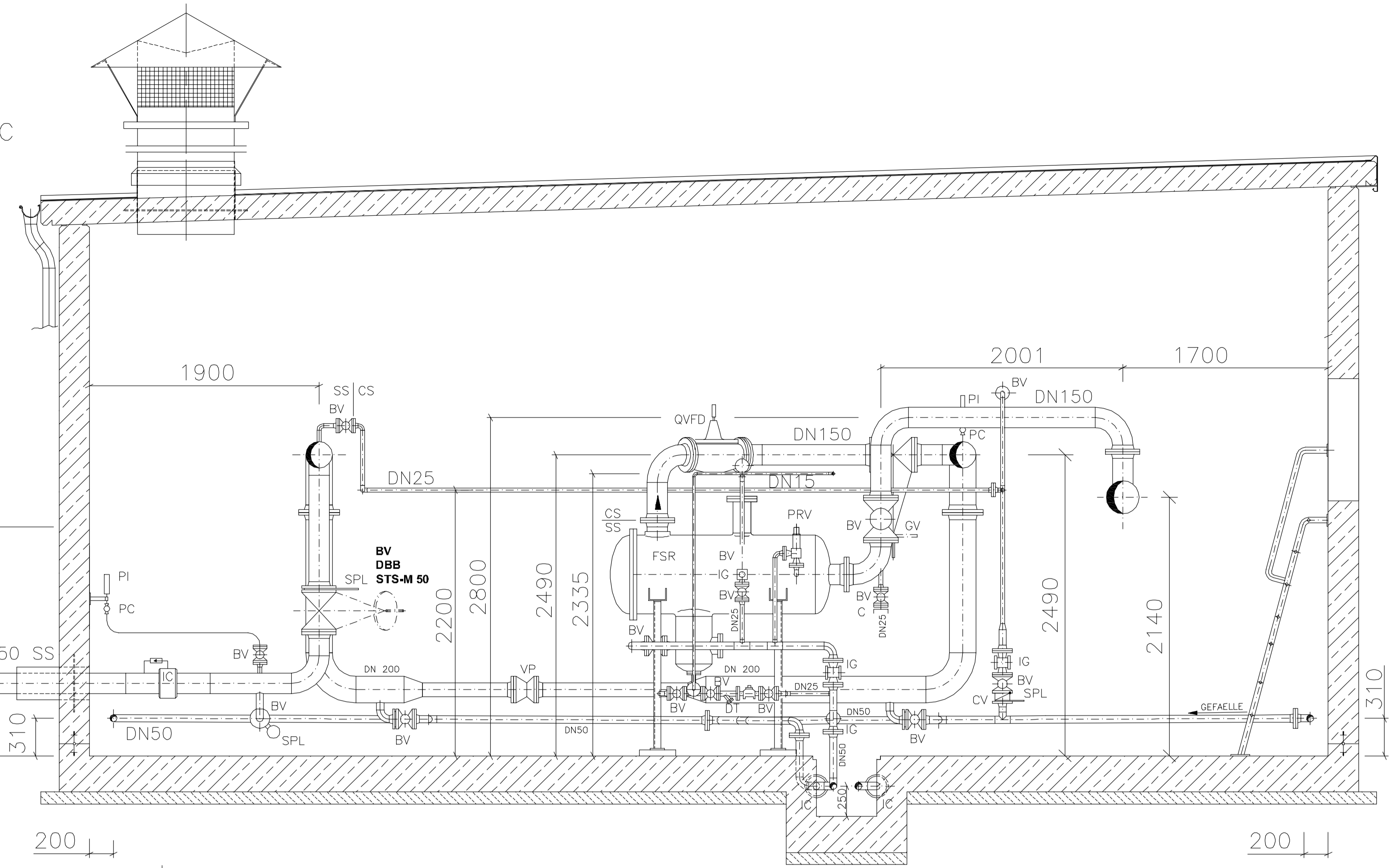
REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
<b>HEADQUARTERS</b> UNITED STATES AIR FORCES EUROPE ENGINEERING & OPERATIONS				
AIRFIELD STANDARD DESIGN US		FLUGPLATZ STANDARDPLANUNG US		
JET FUEL STORAGE AND DISPENSING SYSTEMS		FLUCKRAFTSTOFF- VERSORGUNGSANLAGEN		
BUILDING BAUWERK: MANIFOLD / FILTER STATION, TANK TRUCK REFUELING SYSTEM VERTEILER / FILTERSTATION, TANKWAGEN - BETANKUNGSSYSTEM				
DESIGNATION BEZEICHNUNG: MECHANICAL INSTALLATION, GROUND PLAN WITH INSULATING COUPLING MASCHINENTECHNISCHE INSTALLATION, GRUNDRISS MIT ISOLIERKUPPLUNG				
VORBEREITET		APPROVED/GENEHEBT		
LAYOUT/ANLAGE LAYOUT/ANLAGE LAYOUT/ANLAGE		AMT FÜR BUNDESBAU WALLSTR.1 55122 MAINZ		
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAUMAßNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED GENEHEBT	DATE DATUM: 6. MAI 2015	SCALE MASSTAB: 1:20 ; 1:10		
ORIGINAL DRAWING URSPRÜNGLICHE ZEICHNUNG		STANDARD SHEET STANDARDBLATT		
DESIGNED ENTWURFEN		M - 81.1		
CONSTRUCTION PROJECT BAUMAßNAHME		SHEET NO. BLATT NR.		



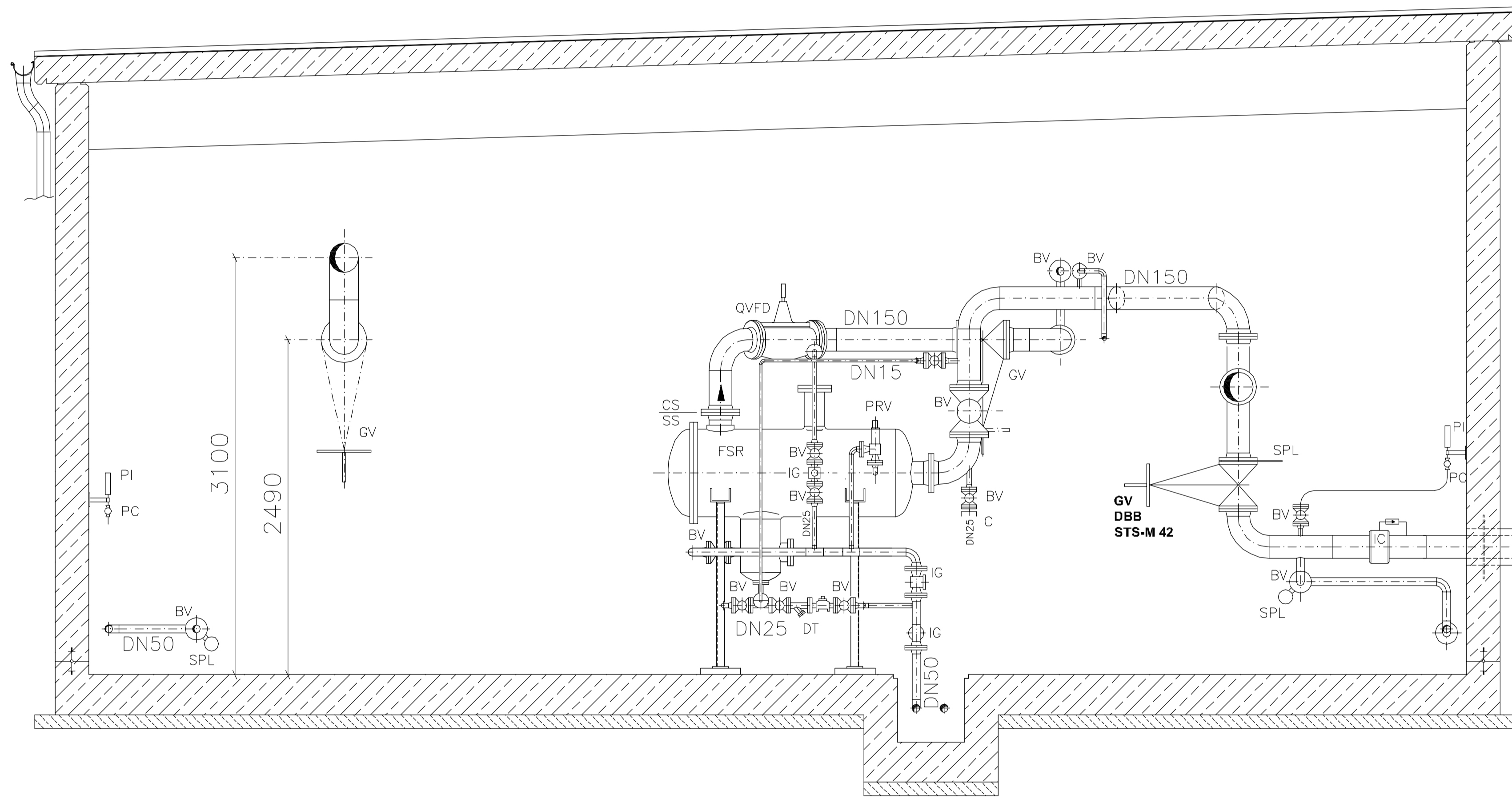
SECTION A-A  
SCHNITT A-A



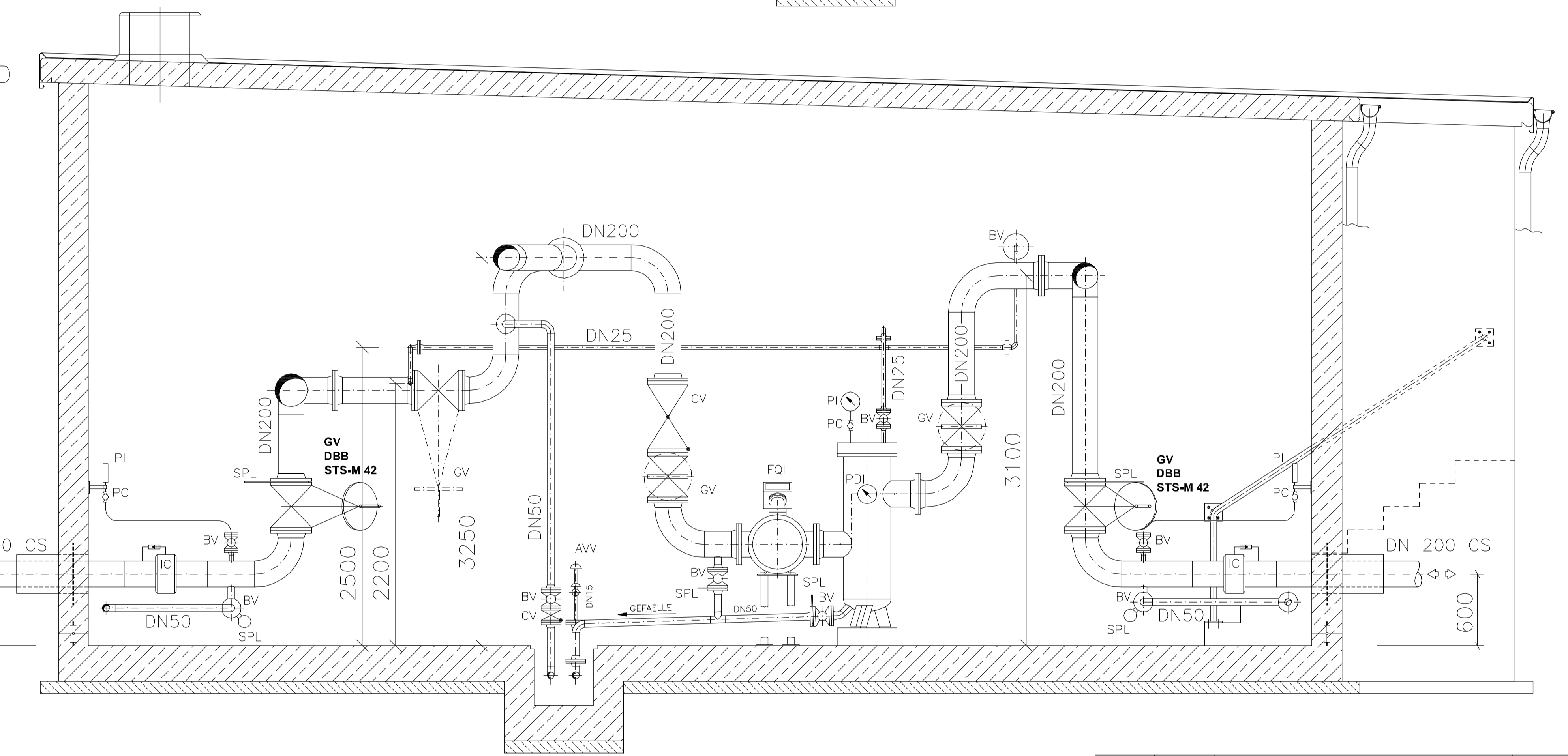
SECTION C-C  
SCHNITT C-C



SECTION B-B  
SCHNITT B-B



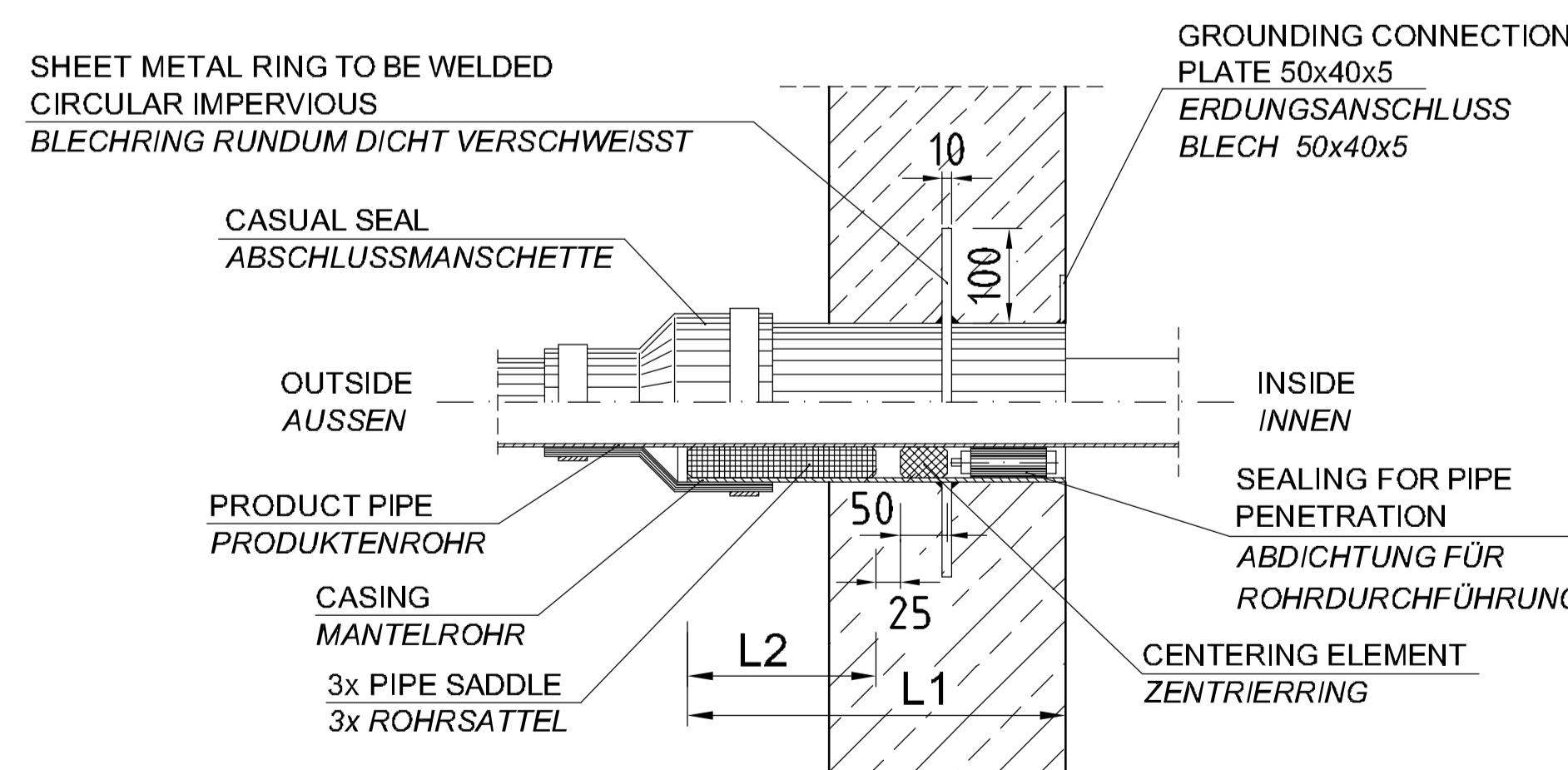
SECTION D-D  
SCHNITT D-D



LEGEND  
LEGENDE

AVV	VENTILATING VALVE BELUEFTUNGSVENTIL	LCV	LEVEL CONTROL VALVE NIVEAUREGELVENTIL
BV	BALL VALVE KUGELHAHN	MOV	GATE VALVE WITH MOTOR ABSPERRARMATUR MIT MOTORANTRIEB
C	QUICK COUPLING SCHNELLKUPPLUNG	PC	PRESSURE GAUGE STOPCOCK MANOMETER-ABSPERRVENTIL
CV	RUECKSCHLAGVENTIL RUECKSCHLAGVENTIL	PDI	DIFFERENTIAL PRESSURE GAUGE DIFFERENZDRUCK-MANOMETER
CVP	PRESSURE CONTROL VALVE UEBERDRUCK-REGELVENTIL	PI	PRESSURE GAUGE MANOMETER
DT	DIRT TRAP SCHMUTZFAENGER	PIS	PRESSURE GAUGE WITH CONTACT FOR SWITCH MANOMETER MIT SCHALTAKONTAKTEN
F	STRAINER BASKET SIEBKORBFILTER	PRV	PRESSURE RELIEF VALVE DRUCKENTLASTUNGSVENTIL
FLV	FLUSHING VALVE SPÜLVENTIL	QVFD	FILTER/SEPARATOR VALVE WITH DIFF. PRESSURE SHUT-OFF
FQ	FLOW METER MENGMESSE	SPL	SPADE PLATE BRILLENSTECKSCHEIBE
FSR	FILTER/SEPARATOR FILTER/WASSERABSCHIEDER	SV	SAMPLING VALVE PROBENTNAHMEVENTIL
GV	GATE VALVE ABSPERRSCHIEBER	VP	VENTURI PIPE VENTURIROHR
IC	INSULATING COUPLING ISOLIERKUPPLUNG	VL	VENTILATOR VENTILATOR
IG	INSPECTION GLASS SCHAUGLASS	DBB	DOUBLE BLOCK AND BLEED
		SS	STAINLESS STEEL C.N.I. STAHL
		CS	STEEL STAHL

PIPE PENETRATION  
ROHRDURCHFÜHRUNG  
NOT TO SCALE / OHNE MASSTAB



PRODUCT PIPE ROHRLEITUNG	PRODUCT PIPE PRODUKTENROHR mm	CASING MANTELROHR mm	L1 mm	L2 mm
DN 50	ø60,3	ø168,3	450	130
DN 150	ø168,3	ø273,0	600	250
DN 200	ø219,1	ø323,9	600	250

NOTES  
BEMERKUNG

ALL VALVES AND FLANGES DESIGNED FOR PN 16  
ALLE ARMATUREN UND FLANSCHEN AUSGELEGT FUER PN 16

FOR SUPPORTS OF PIPES AN INSULATION PIECE, MADE OF 10mm THICK FUEL RESISTANT PLASTIC, IS TO PUT BETWEEN PIPES AND SUPPORTS OR HOLDERS.  
BEI UNTERSTUETZUNGEN VON ROHRLEITUNGEN IST ZWISCHEN ROHRLEITUNG UND UNTERSTUETZUNGSKONSTRUKTION BZW. HALTERUNG EINE ISOLIERPLATTE 10mm DICK AUS KRAFTSTOFFBESTAENDIGEN KUNSTSTOFF ZU LEGEN.

SUPPORTS AND HOLDERS AS SELECTED BY THE CONTRACTOR IN COORDINATION WITH THE LOCAL CONSTRUCTION SUPERVISION  
UNTERSTUETZUNG UND HALTERUNG NACH WAHL DES AN IN ABSTIMMUNG MIT DER OERTLICHEN BAULEITUNG.

ALL MEASURES HAVE TO BE TO CHECKED ON SIDE  
SAMTLICHE MASSE SIND VOR ORT ZU ÜBERPRÜFEN !

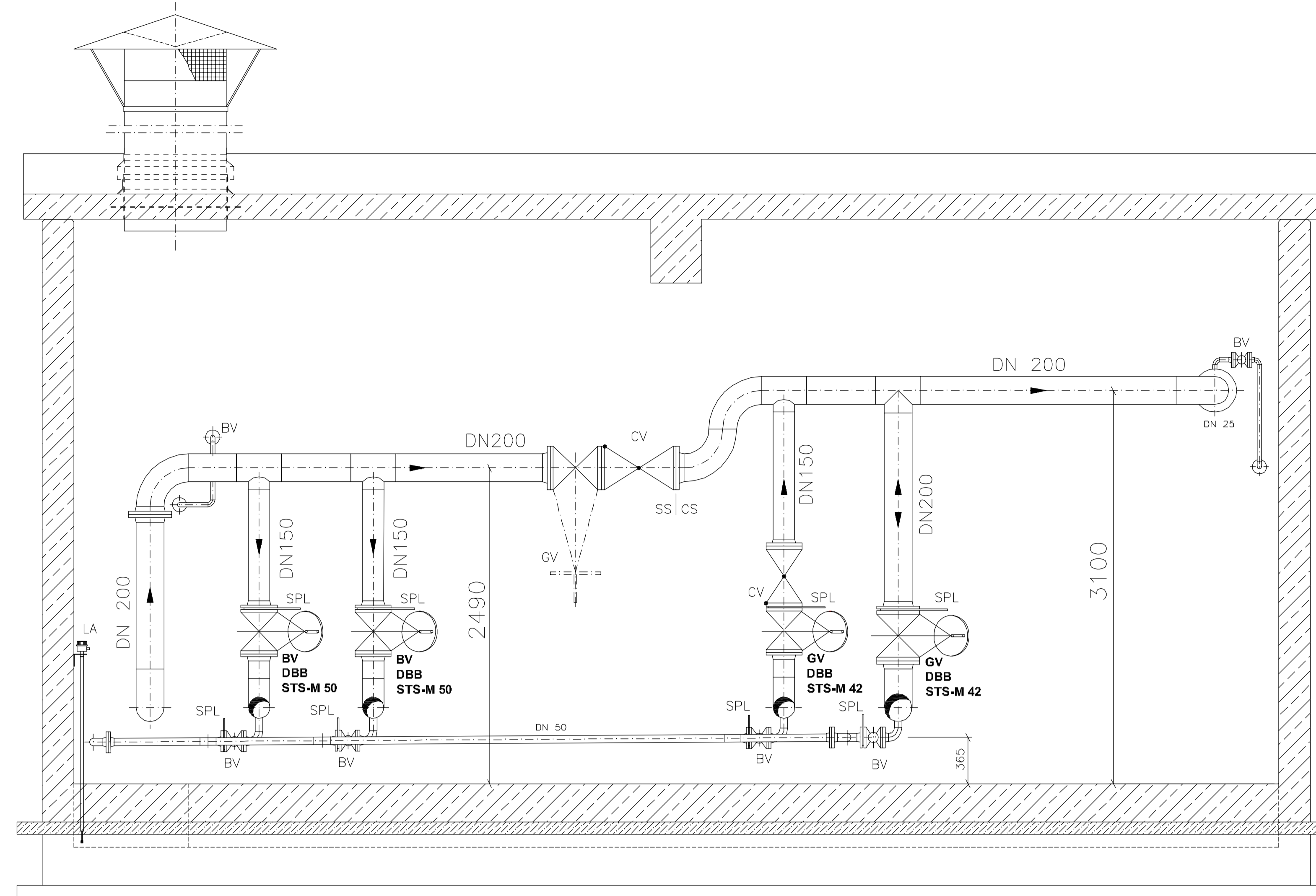
PERTINENT DRAWINGS  
ZUGEHÖRIGE ZEICHNUNGEN

- GM-02.2 GENERAL FLOW DIAGRAM  
GESAMT - FLIESS - SCHEMA
- M-8.1 MECHANICAL INSTALLATION, TOP VIEW  
MASCHINENTECHNISCHE INSTALLATION, DRAUFSICHT
- M-8.3 MECHANICAL INSTALLATION, SECTIONS E-F  
MASCHINENTECHNISCHE INSTALLATION, SCHNITTE E-F

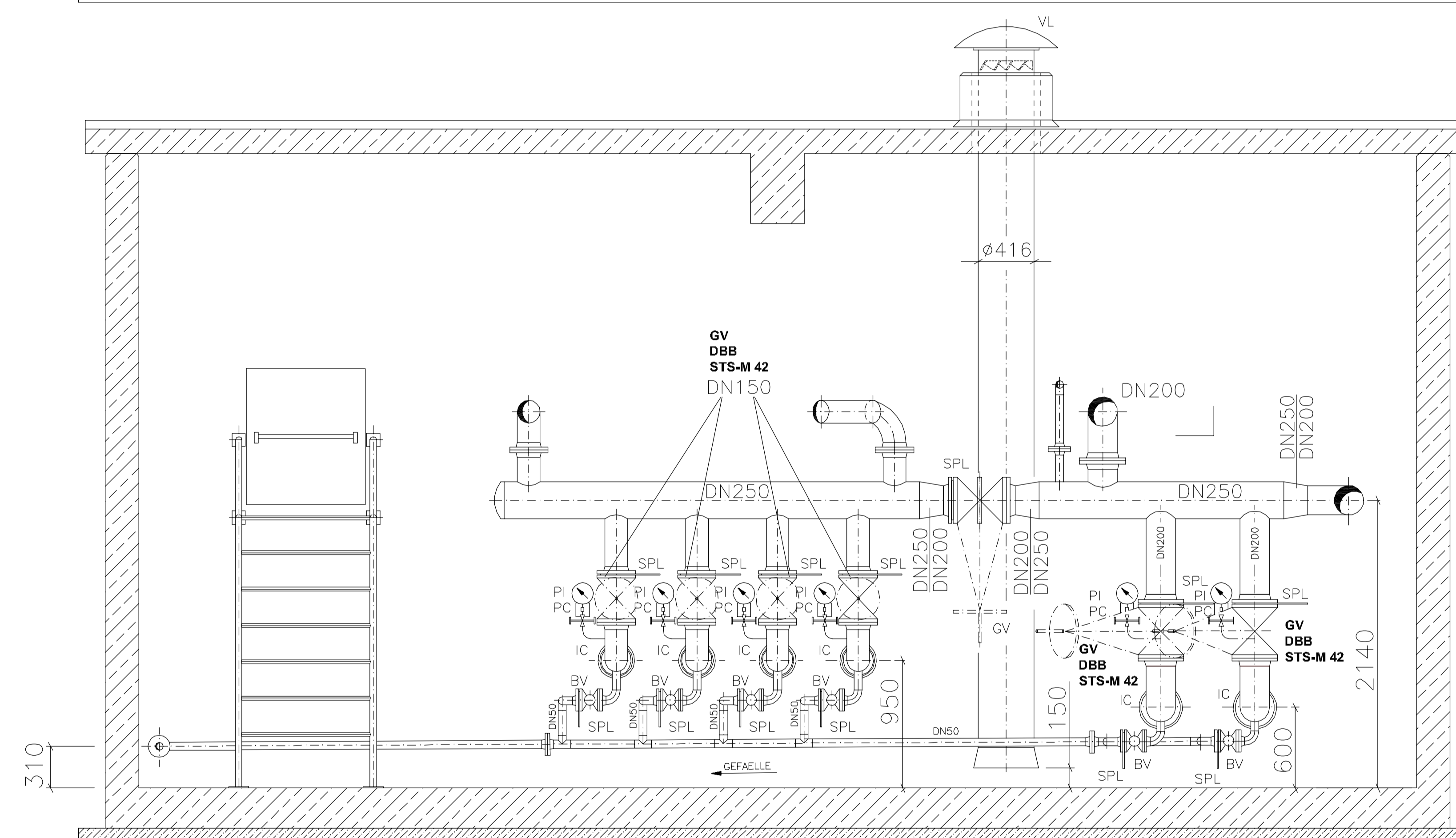
REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
HEADQUARTERS UNITED STATES AIR FORCES EUROPE				
ENGINEERING & OPERATIONS				
AIRFIELD STANDARD DESIGN US		FLUGPLATZ STANDARDPLANUNG US		
JET FUEL STORAGE AND DISPENSING SYSTEMS		FLUCKRAFTSTOFF- VERSORGUNGSANLAGEN		
BUILDING BAUWERK	MANIFOLD / FILTER STATION, TANK TRUCK REFUELING SYSTEM VERTEILER / FILTERSTATION, TANKWAGEN - BETANKUNGSSYSTEM			
DESCRIPTION BESCHREIBUNG	MECHANICAL INSTALLATION, SECTIONS A - D WITH INSULATING COUPLING MASCHINENTECHNISCHE INSTALLATION, SCHNITTE A - D MIT ISOLIERKUPPLUNG			
WORKED/BEARBEITET	PREPARED/AUFGESTELLT	APPROVED/GENEHMIGT		
LAUFGEZEIGT UND KONTROLLIERT	UND KONTROLLIERT	AMT FÜR BUNDESBAU		
ANWEISUNG UND BEWEISUNG	ANWEISUNG UND BEWEISUNG	L 1 B WALLSTR.1 55122 MANZ		
LAEGELT	LAEGELT	DRAUSSICHT IN ORIGIN. ZEICHNUNG		
BY/AN DER IN ORIGIN. ZEICHNUNG	BY/AN DER IN ORIGIN. ZEICHNUNG	DATE/AMT 14.06.2015		
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAUMAßNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED GENEHMIGT	DATE DATUM	SCALE MASSTAB		STANDARD SHEET STANDARDBLATT
	6. MAI 2015	1:25		
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CONSTRUCTION PROJECT BAUUMAßNAHME	CAD PROJECT FILE CAX-PROJEKTDATENE		SHEET NO. BLATTNR.	



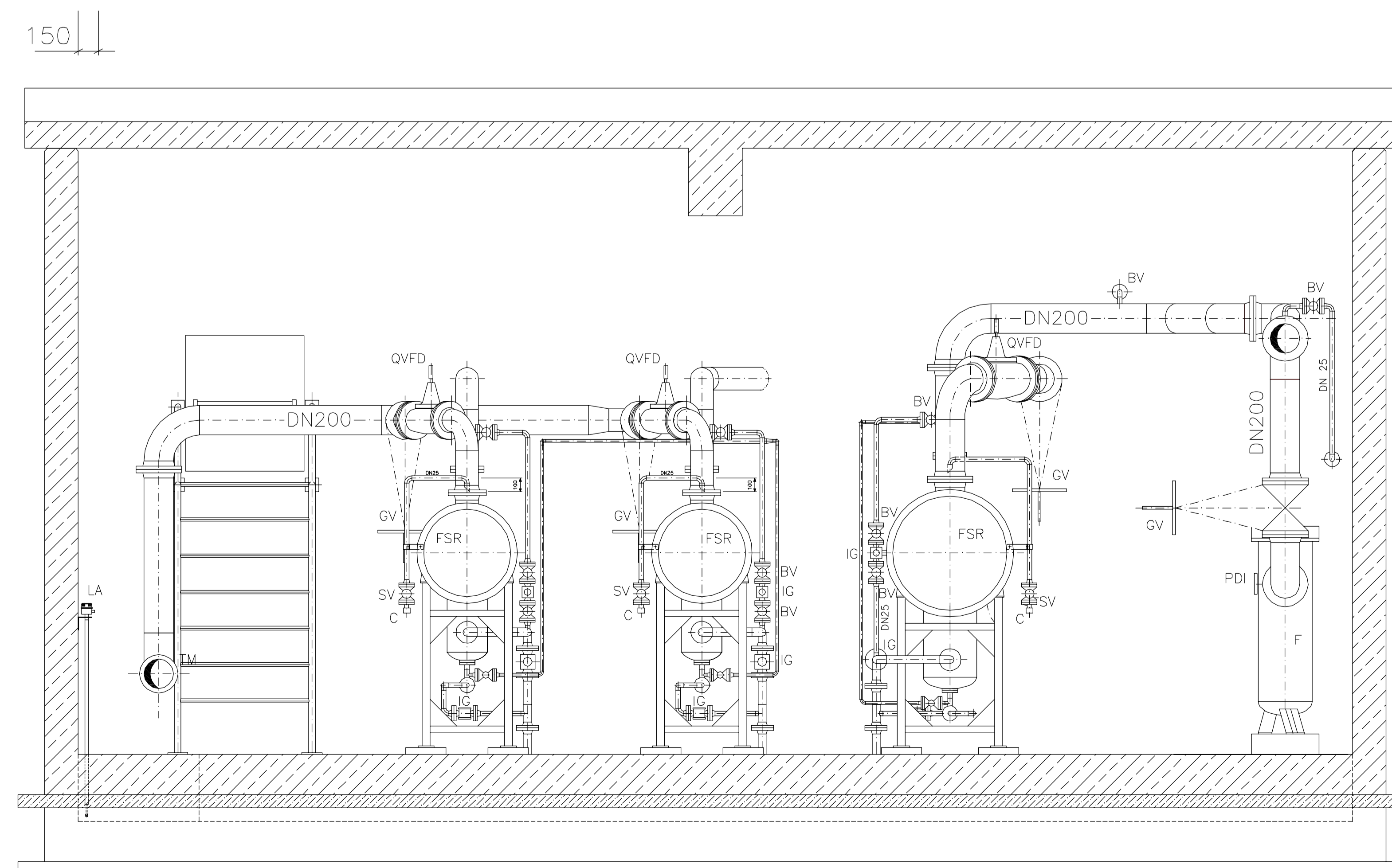
SECTION  
SCHNITT E-E



SECTION  
SCHNITT F-F

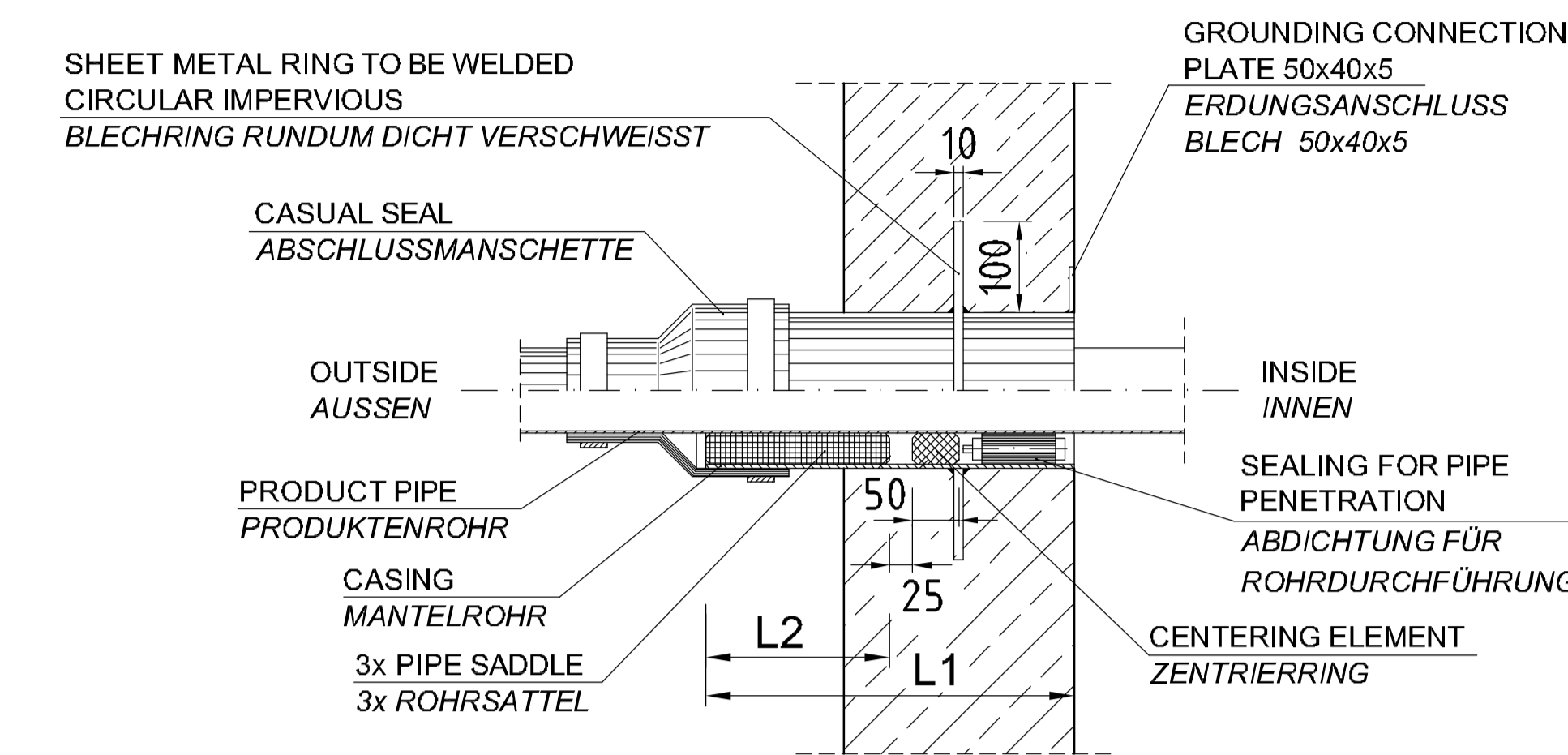


SECTION  
SCHNITT G-G



PIPE PENETRATION  
ROHRDURCHFÜHRUNG

NOT TO SCALE / OHNE MASSTAB



PRODUCT PIPE ROHRLEITUNG	PRODUCT PIPE PRODUKTENROHR mm	CASING MANTELROHR mm	L1 mm	L2 mm
DN 50	ø60,3	ø168,3	450	130
DN 150	ø168,3	ø273,0	600	250
DN 200	ø219,1	ø323,9	600	250

ALL MEASURES HAVE TO BE CHECKED ON SITE  
SÄMTLICHE MASSE SIND VOR ORT ZU ÜBERPRÜFEN !

PERTINENT DRAWINGS  
ZUGEHÖRIGE ZEICHNUNGEN

- GM-02.2 GENERAL FLOW DIAGRAM  
GESAMT - FLIESS - SCHEMA
- M-8.1 MECHANICAL INSTALLATION, TOP VIEW  
MASCHINENTECHNISCHE INSTALLATION, DRAUFSICHT
- M-8.2 MECHANICAL INSTALLATION, SECTIONS A - D  
MASCHINENTECHNISCHE INSTALLATION, SCHNITTE A - D

NOTES  
BEMERKUNG

ALL VALVES AND FLANGES DESIGNED FOR PN 16 ALLE  
ARMATUREN UND FLANSCHEN AUSGELEGT FUER PN 16

FOR SUPPORTS OF PIPES AN INSULATION PIECE, MADE OF 10mm THICK FUEL  
RESISTANT PLASTIC, IS TO BE PUT BETWEEN PIPES AND SUPPORTS OR HOLDERS  
BEI UNTERSTÜTZUNGEN VON ROHRLEITUNGEN IST ZWISCHEN ROHRLEITUNG UND  
UNTERSTÜTZUNGSKONSTRUKTION BZW. HALTERUNG EINE ISOLIERPLATTE 10mm  
DICK AUS KRAFTSTOFFBESTÄNDIGEN KUNSTSTOFF, ZU LEGEN.

SUPPORTS AND HOLDERS AS SELECTED BY THE CONTRACTOR IN  
COORDINATION WITH THE LOCAL CONSTRUCTION SUPERVISION  
UNTERSTÜTZUNG UND HALTERUNG NACH WAHL DES ANBIETERS  
IN ABSTIMMUNG MIT DER OERTLICHEN BAULEITUNG.

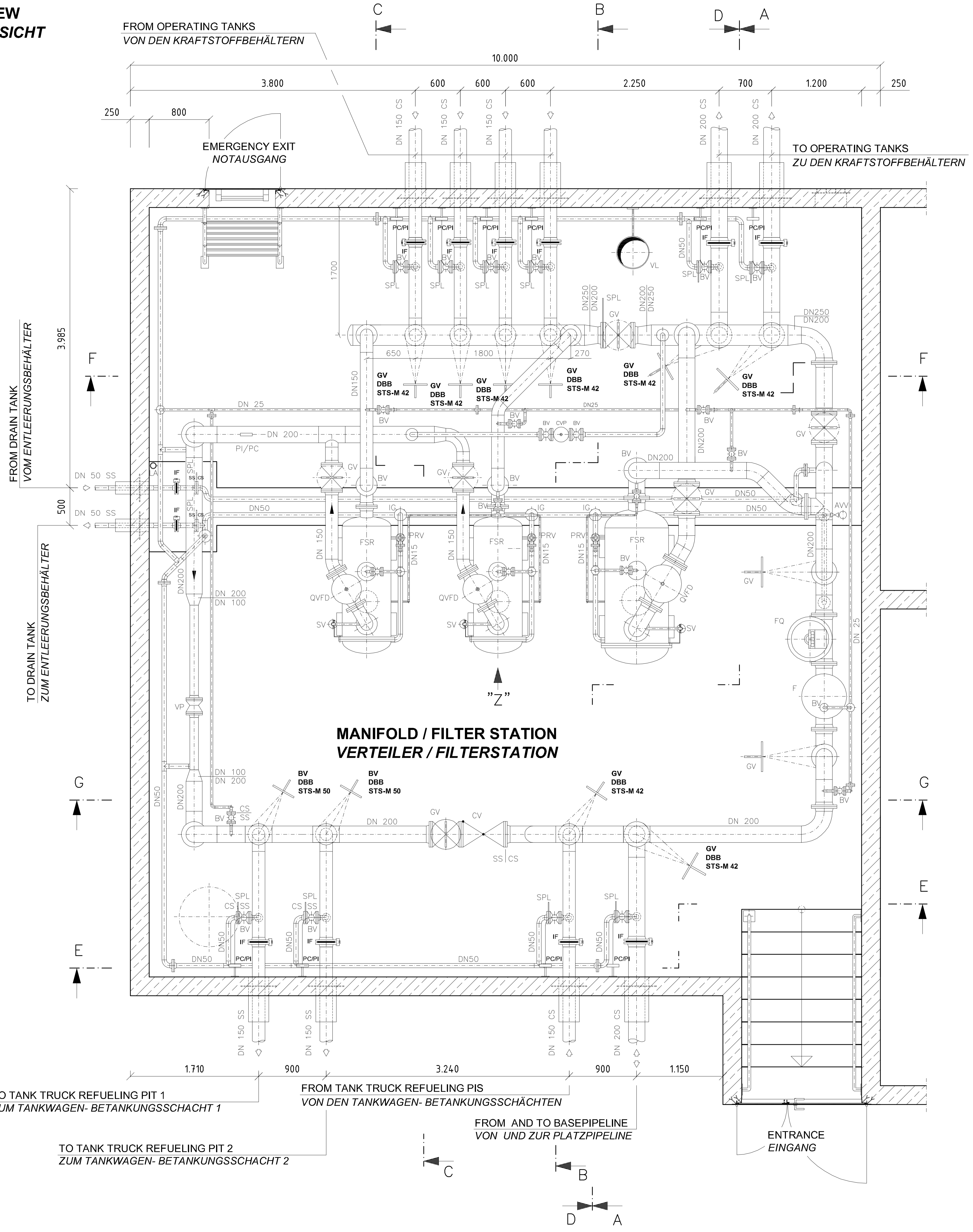
LEGEND  
LEGENDE

- AWV VENTILATING VALVE  
BELUEFTUNGSVENTIL
- BV BALL VALVE  
KUGELHAHN
- C QUICK COUPLING  
SCHNELLKUPPLUNG
- CV RUECKSCHLAGVENTIL  
RUECKSCHLAGVENTIL
- CVP PRESSURE CONTROL VALVE  
UEBERDRUCK-REGELVENTIL
- DT DIRT TRAP  
SCHMUTZFAENGER
- DBB DOUBLE BLOCK AND BLEED
- F STRAINER BASKET  
SIEBKORBFILTER
- FLV FLUSHING VALVE  
SPÜLVENTIL
- FQ FLOW METER  
MENGENMESSER
- FSR FILTER/SEPARATOR  
FILTER/WASSERABSCHIEDER
- GV GATE VALVE  
ABSPERRSCHEIBER
- IC INSULATING COUPLING  
ISOLIERKUPPLUNG
- IG INSPECTION GLASS  
SCHAUGLAS
- LA LIQUID PROBE  
FLÜSSIGKEITSSONDE
- LCV LEVEL CONTROL VALVE  
NIVEAUREGELVENTIL
- MOV GATE VALVE WITH MOTOR  
ABSPERRARMATUR MIT MOTORANTRIEB
- PC PRESSURE GAUGE STOPCOCK  
MANOMETER-ABSPERRVENTIL
- PDI DIFFERENTIAL PRESSURE GAUGE  
DIFFERENZDRUCK-MANOMETER
- PI PRESSURE GAUGE  
MANOMETER
- PIS PRESSURE GAUGE WITH CONTACT FOR SWITCH  
MANOMETER MIT SCHALTKONTAKTEN
- PRV PRESSURE RELIEF VALVE  
DRÜCKENTLASTUNGSVENTIL
- QVFD FILTER/SEPARATOR VALVE WITH DIFF.  
PRESSURE SHUT-OFF  
FILTER/WASSERABSCHIEDERVENTIL MIT  
DIFFERENZDRUCK-ABSCHALTUNG
- SPL SPADE PLATE  
BRILLENSTECKSCHEIBE
- SV SAMPLING VALVE  
PROBENNAHMEVENTIL
- VP VENTURI PIPE  
VENTURIROHR
- VL VENTILATOR  
VENTILATOR
- SS STAINLESS STEEL  
Cr,Ni, STAHL
- CS STEEL  
STAHL

REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
<b>HEADQUARTERS</b> UNITED STATES AIR FORCES EUROPE ENGINEERING & OPERATIONS				
AIRFIELD STANDARD DESIGN US		FLUGPLATZ STANDARDPLANUNG US		
JET FUEL STORAGE AND DISPENSING SYSTEMS		FLUCKRAFTSTOFF- VERSORGUNGSANLAGEN		
BUILDING BAUWERK MANIFOLD / FILTER STATION , TANK TRUCK REFUELING SYSTEM VERTEILER / FILTERSTATION , TANKWAGEN - BETANKUNGSSYSTEM				
DESIGNATION BEZEICHNUNG MECHANICAL INSTALLATION, SECTIONS E - G WITH INSULATING COUPLING MASCHINENTECHNISCHE INSTALLATION, SCHNITTE E - G MIT ISOLIERKUPPLUNG				
WERKZEUGBEARBEITET PREPARED/AUFGESTELLT LABORATORIUM ÜBERWACHUNG UND KONTROLLE LAB-ÜBERWACHUNGSLABOR L 1 B		APPROVED/GENEHMIGT AMT FÜR BUNDESBAU L 1 B WALLSTR.1 55122 MAINZ		
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAUMASSNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED GENEHMIGT	DATE DATUM	SCALE MASSTAB		
	6. MAI 2015	1:25		
ORIGINAL DRAWING BY ORIGINAL GZZ	STANDARD SHEET STANDARDISIERTE BLATT			
USED/ANWENDET CONSTRUCTION FACILITIES ENGINEER INGENIEUR BAUEINRICHTUNGEN	CAD-PROJECT/PROJEKT CAD-PROJEKTIERUNG			
CONSTRUCTION PROJECT BAU MASSNAHME	SHEET NO. BLATT NR.		OF VON	
		<b>M - 81.3</b>		



**TOP VIEW  
DRAUFSICHT**



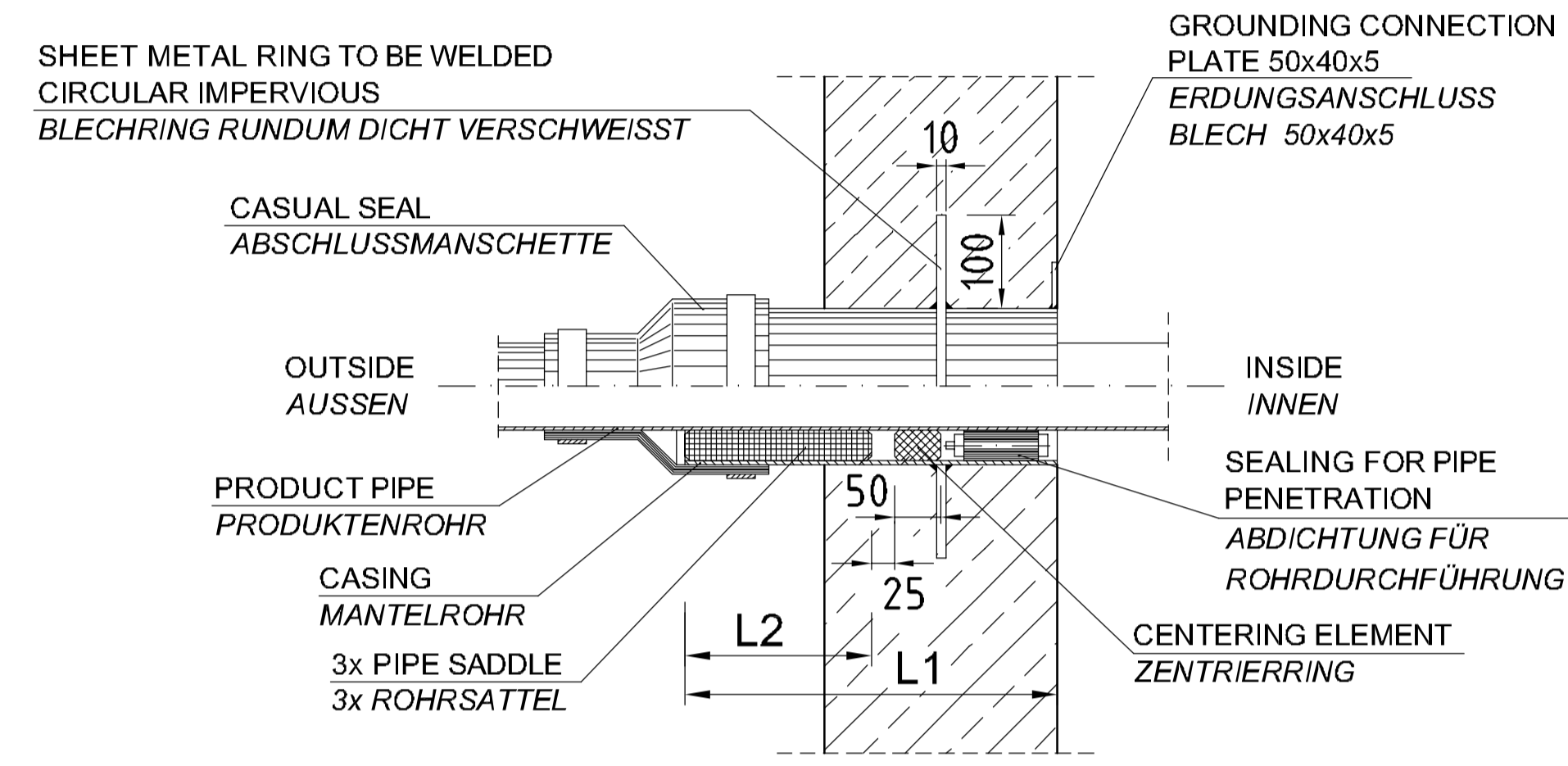
**NOTES  
BEMERKUNG**

ALL VALVES AND FLANGES DESIGNED FOR PN 16  
ALLE ARMATUREN UND FLANSCH AUSGELEGT FUER PN 16

FOR SUPPORTS OF PIPES AN INSULATION PIECE, MADE OF 10mm THICK FUEL RESISTANT PLASTIC, IS TO PUT BETWEEN PIPES AND SUPPORTS OR HOLDERS.  
BEI UNTERSTUETZUNGEN VON ROHRLEITUNGEN IST ZWISCHEN ROHRLEITUNG UND UNTERSTUEZUNGSKONSTRUKTION BZW. HALTERUNG EINE ISOLIERPLATTE 10mm DICK AUS KRAFTSTOFFBESTAENDIGEN KUNSTSTOFF ZU LIEGEN.

SUPPORTS AND HOLDERS AS SELECTED BY THE CONTRACTOR IN COORDINATION WITH THE LOCAL CONSTRUCTION SUPERVISION  
UNTERSTUEZUNG UND HALTERUNG NACH WAHL DES AN IN ABSTIMMUNG MIT DER OERTLICHEN BAULEITUNG.

**PIPE PENETRATION  
ROHRDURCHFUEHRUNG**  
NOT TO SCALE / OHNE MASSTAB



PRODUCT PIPE ROHRLEITUNG	PRODUCT PIPE PRODUKTENROHR mm	CASING MANTELROHR mm	L1 mm	L2 mm
DN 50	ø60,3	ø168,3	450	130
DN 150	ø168,3	ø273,9	600	250
DN 200	ø219,1	ø323,9	600	250

ALL MEASURES HAVE TO BE TO CHECKED ON SIDE  
SÄMTLICHE MASSE SIND VOR ORT ZU ÜBERPRÜFEN !

- SS STAINLESS STEEL  
Cr.Ni: STAHL
- CS STEEL  
STAHL

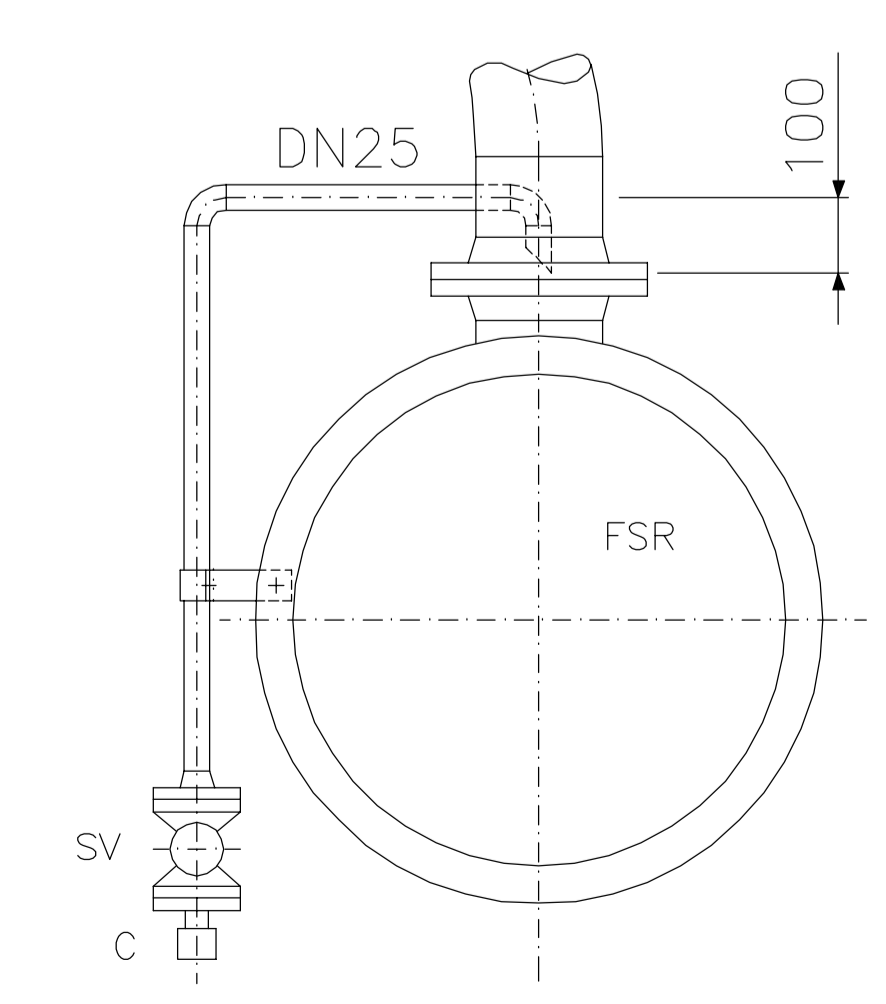
**LEGEND  
LEGENDE**

- AW VENTILATING VALVE  
BELUEFTUNGSVENTIL
- BV BALL VALVE  
KUGELHAHN
- C QUICK COUPLING  
SCHNELLKUPPLUNG
- CV RUECKSCHLAGVENTIL  
RUECKSCHLAGVENTIL
- CVP PRESSURE CONTROL VALVE  
UEBERDRUCK-REGELVENTIL
- DT DIRT TRAP  
SCHMUTZFAENGER
- DBB DOUBLE BLOCK AND BLEED
- F STRAINER BASKET  
SIEBKORBFILTER
- FLV FLUSHING VALVE  
SPULVENTIL
- FQ FLOW METER  
MENGENMESSER
- FSR FILTER /SEPARATOR  
FILTER/WASSERABSCHIEDER
- GV GATE VALVE  
ABSPERRSCHIEBER
- IC INSULATING COUPLING  
ISOLIERKUPPLUNG
- IG INSPECTION GLASS  
SCHAUGLAS
- LA LIQUID PROBE  
FLÜSSIGKEITSSONDE
- LCV LEVEL CONTROL VALVE  
NIVEAUREGELVENTIL
- MOV GATE VALVE WITH MOTOR  
ABSPERRARMATUR MIT MOTORANTRIEB
- PC PRESSURE GAUGE STOPCOCK  
MANOMETER-ABSPERRVENTIL
- PDI DIFFERENTIAL PRESSURE GAUGE  
DIFFERENZDRUCK-MANOMETER
- PI PRESSURE GAUGE  
MANOMETER
- PIS PRESSURE GAUGE WITH CONTACT FOR SWITCH  
MANOMETER MIT SCHALTCONTACTEN
- PRV PRESSURE RELIEF VALVE  
DRÜCKENTLASTUNGSVENTIL
- QVFD FILTER /SEPARATOR VALVE WITH DIFF. PRESSURE SHUT-OFF  
FILTER/WASSERABSCHIEDERVENTIL MIT DIFFERENZDRUCK-ABSCHALTUNG
- SPL SPADE PLATE  
BRILLENSTECKSCHEIBE
- SV SAMPLING VALVE  
PROBENTNAHMEVENTIL
- VP VENTURI PIPE  
VENTURIROHR
- VL VENTILATOR  
VENTILATOR

**PERTINENT DRAWINGS  
ZUGEHÖRIGE ZEICHNUNGEN**

- GM-02.2 GENERAL FLOW DIAGRAM  
GESÄMT - FLIESS - SCHEMA
- M-8.2 MECHANICAL INSTALLATION, SECTIONS A - D  
MASCHINENTECHNISCHE INSTALLATION, SCHNITTE A - D
- M-8.3 MECHANICAL INSTALLATION, SECTIONS E - F  
MASCHINENTECHNISCHE INSTALLATION, SCHNITTE E - F

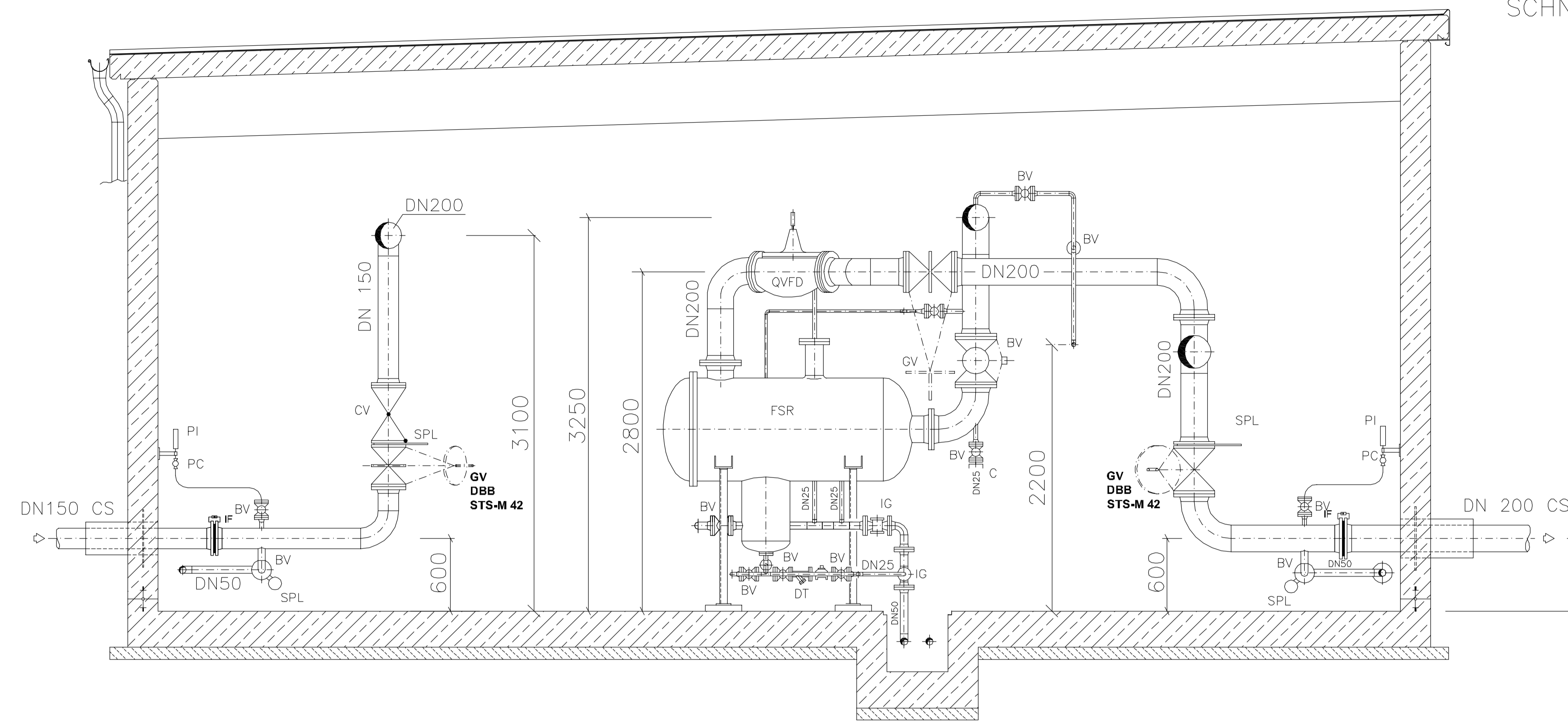
**VIEW  
ANSICHT "Z"**  
SCALE / MASSSTAB 1:10



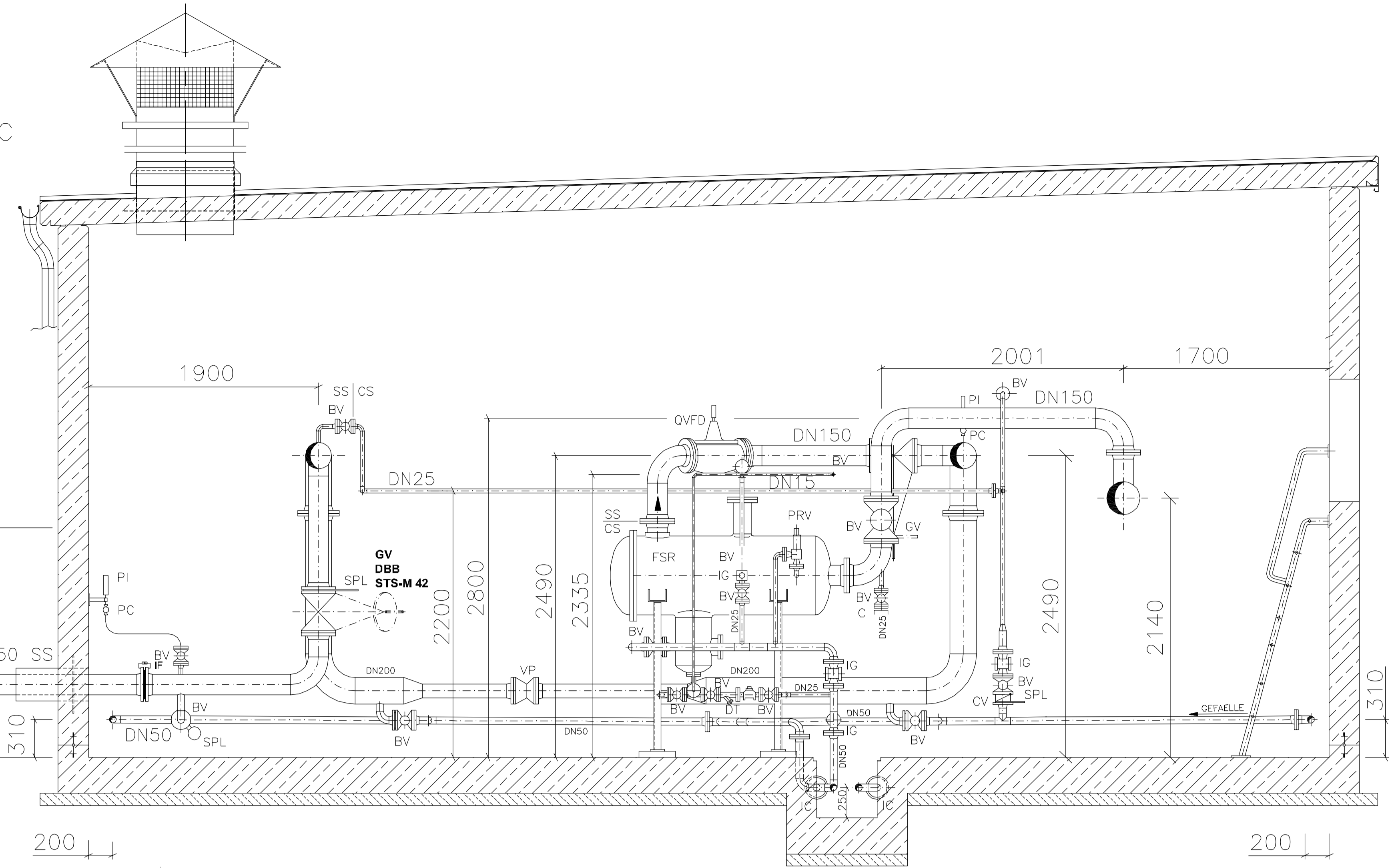
REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
<b>HEADQUARTERS</b> UNITED STATES AIR FORCES EUROPE ENGINEERING & OPERATIONS				
AIRFIELD STANDARD DESIGN US		FLUGPLATZ STANDARDPLANUNG US		
JET FUEL STORAGE AND DISPENSING SYSTEMS		FLUCKRAFTSTOFF- VERSORGUNGSANLAGEN		
BUILDING BAUWERK: MANIFOLD / FILTER STATION , TANK TRUCK REFUELING SYSTEM VERTEILER / FILTERSTATION , TANKWAGEN - BETANKUNGSSYSTEM				
DESIGNATION BEZEICHNUNG: MECHANICAL INSTALLATION, GROUND PLAN MIT INSULATING FLANGE MASCHINENTECHNISCHE INSTALLATION, GRUNDRISS MIT ISOLIERFLANSCH				
WORKED/BEARBEITET	PREPARED/AUFGESTELLT	APPROVED/GENEHMIGT		
LAUSCHENREITER/ÜBERWACHUNG UND KONTROLLE	LAUSCHENREITER/ÜBERWACHUNG UND KONTROLLE	AMT FSR BUNDESBAU L 8		
ANSONSTIG/INTERDISZIPLINÄRE TRÄGER (AUSSEM 900-370 TRÄGER) (DEUTSCH)	ANSONSTIG/INTERDISZIPLINÄRE TRÄGER (AUSSEM 900-370 TRÄGER) (DEUTSCH)	WALLSTR.1 55122 MAINZ		
LABELL	BY HAND / IN ÜBERTRAGUNG PROJEKT/ ÜBERTRAGUNG IN ORIGINAL/ ÜZ. 2016/05/05/08/08/18	DESIGN/ CHECKED BY IN ORIGINAL/ ÜZ. 16/05/2017		
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAUMAßNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED GENEHMIGT	DATE DATUM: 6. MAI 2015	SCALE MASSSTAB: 1:20 ; 1:10		
ORIGINAL DRAWING IN ORIGINAL/ ÜZ.	STANDARD SHEET STANDARD BLATT	<b>M - 81.1</b>		
USED/USED CONSTRUCTION PROJECTS IN ORIGINAL/ ÜZ.	CAD-PROJECT/PROJ. CAD-PROJEKT	SHEET NO. BLATT-NR.		
CONSTRUCTION PROJECT BAUMAßNAHME		SHEET 4/5 BLATT 4/5		



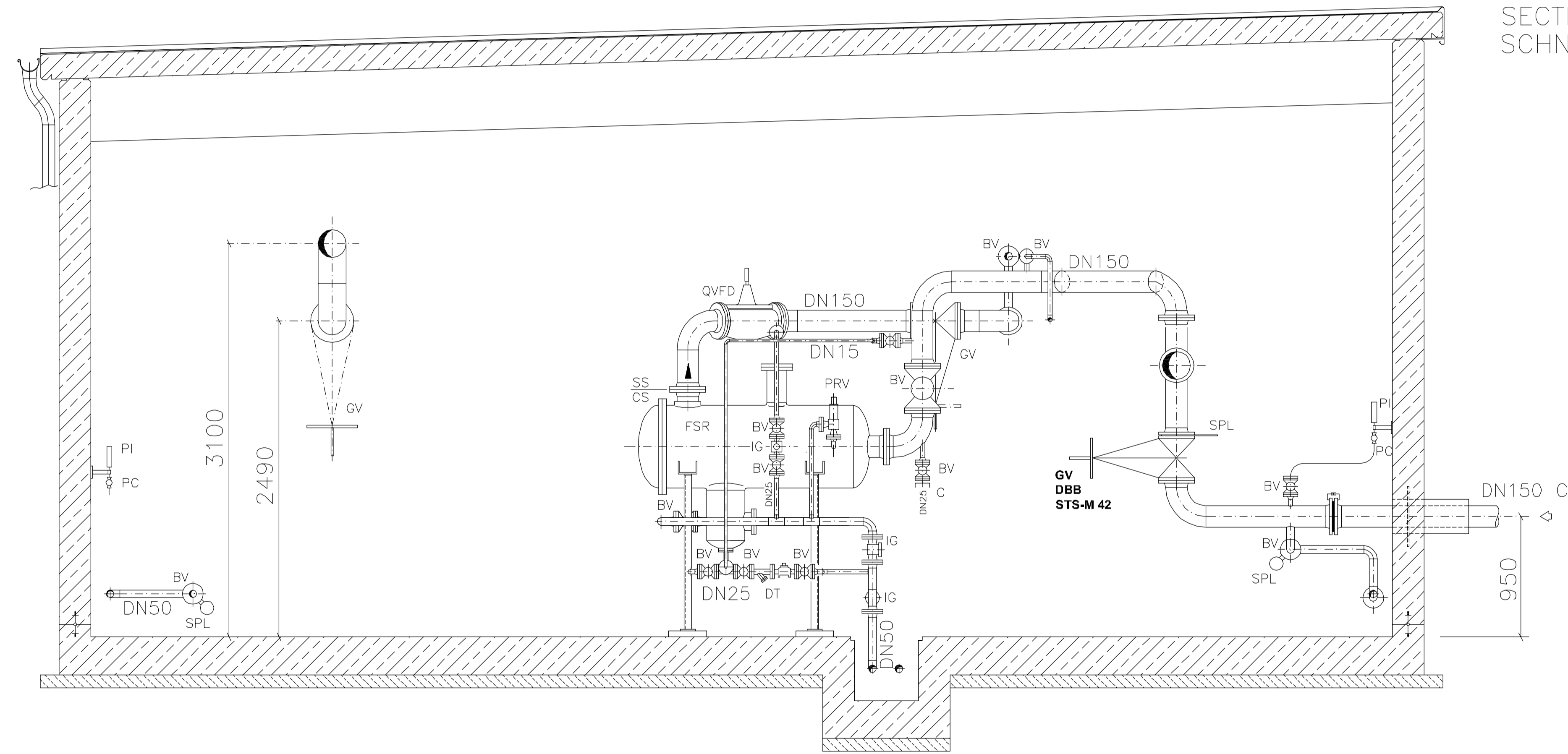
SECTION A-A  
SCHNITT A-A



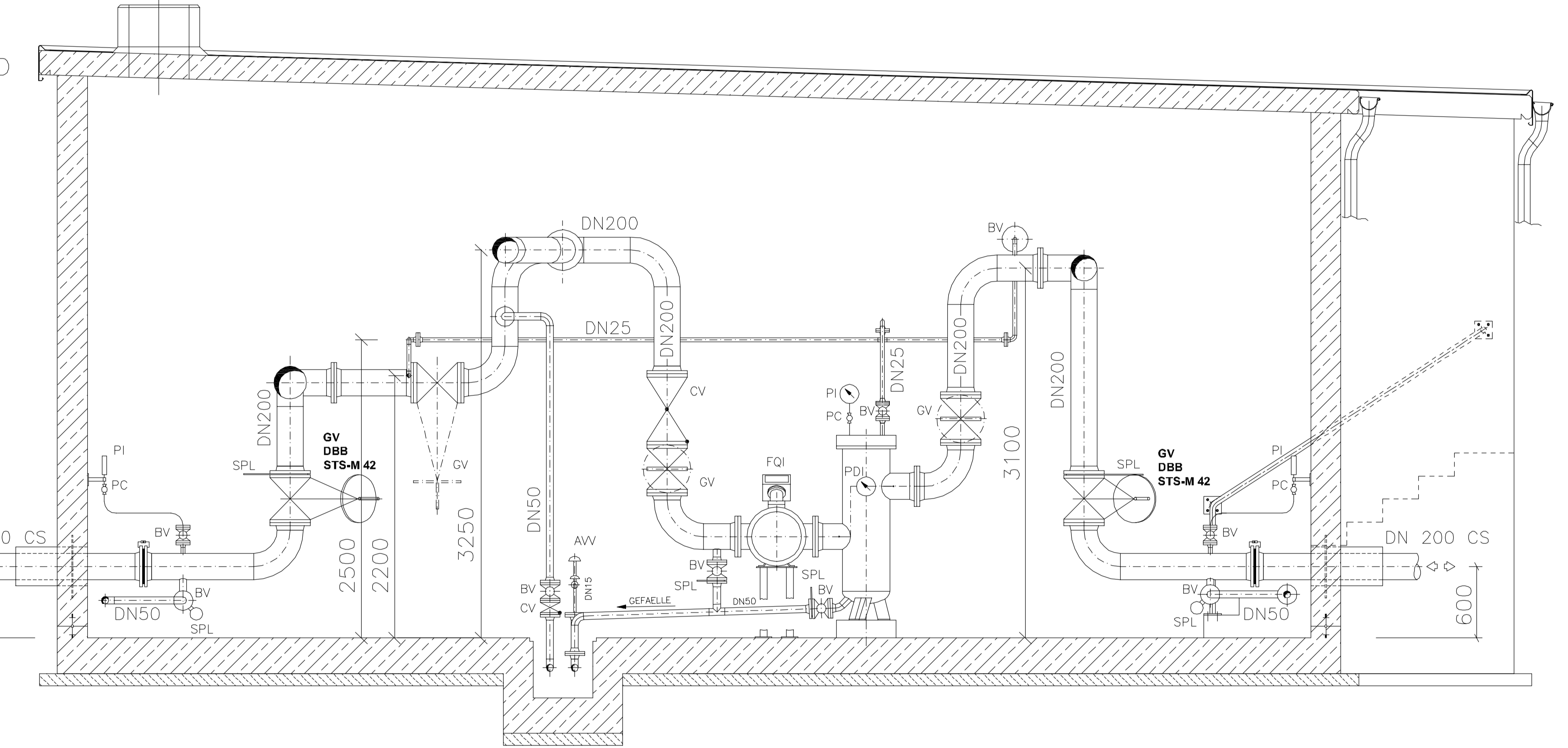
SECTION C-C  
SCHNITT C-C



SECTION B-B  
SCHNITT B-B



SECTION D-D  
SCHNITT D-D

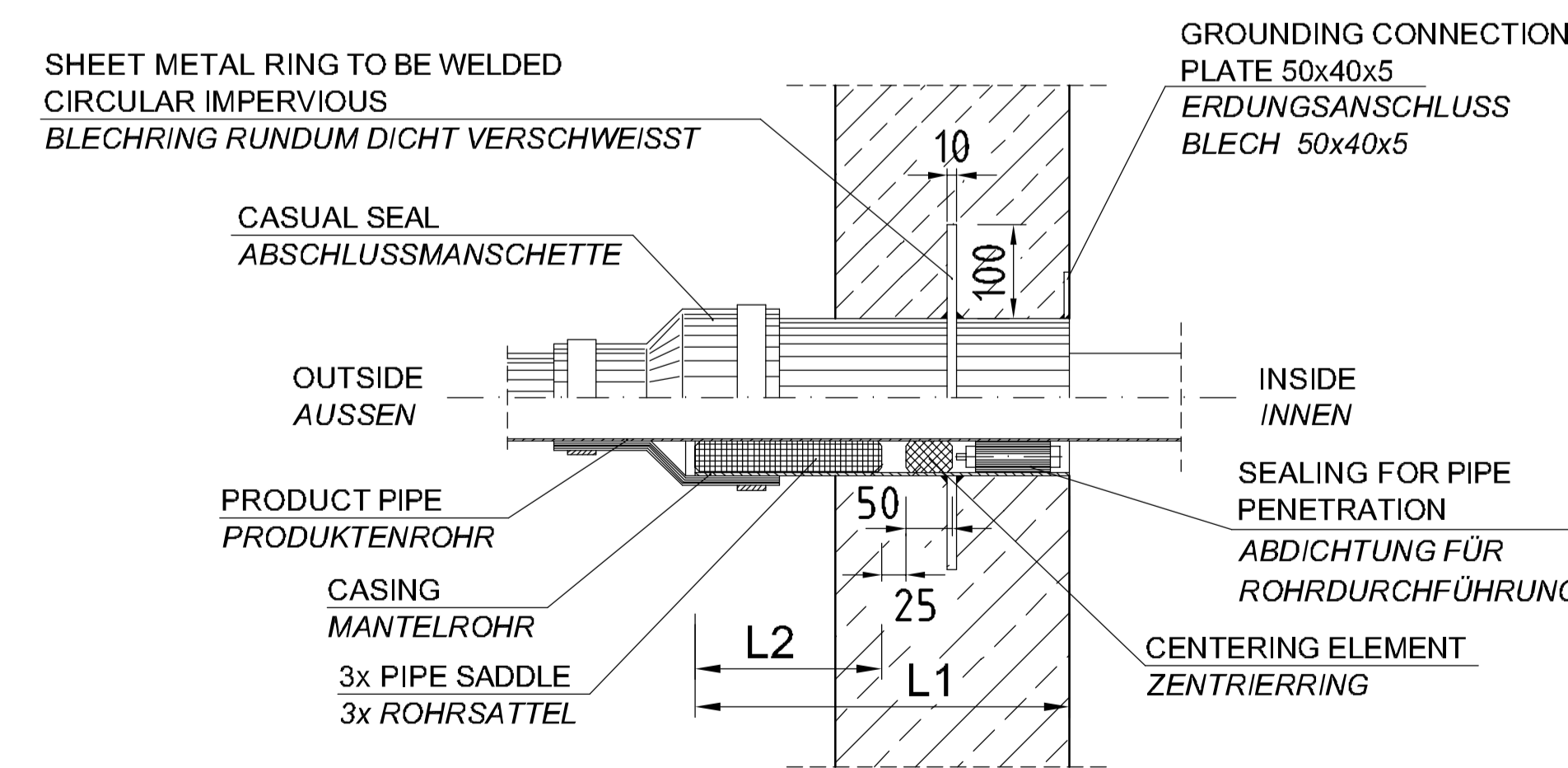


LEGEND  
LEGENDE

AV	VENTILATING VALVE BELÜFTUNGSVENTIL	LCV	LEVEL CONTROL VALVE WEAUREGELVENTIL
BV	BALL VALVE KUGELHAHN	MOV	GATE VALVE WITH MOTOR ABSPERRMOTOR MIT MOTORANTRIEB
C	QUICK COUPLING SCHNELLKUPPLUNG	PC	PRESSURE GAUGE STOPCOCK MANOMETER-ABSPERRVENTIL
CV	RUERCKSCHLAGVENTIL RUECKSCHLAGVENTIL	PDI	DIFFERENTIAL PRESSURE GAUGE DIFFERENZDRUCK-MANOMETER
CVP	PRESSURE CONTROL VALVE UEBERDRUCK-REGELVENTIL	PI	PRESSURE GAUGE MANOMETER
DT	DIRT TRAP SCHMUTZFAENGER	PIS	PRESSURE GAUGE WITH CONTACT FOR SWITCH MANOMETER MIT SCHALKONTAKTEN
F	STRAINER BASKET STREIBKORBFILTER	PRV	PRESSURE RELIEF VALVE DRUCKENTLASTUNGSVENTIL
FLV	FLUSHING VALVE SPÜLVENTIL	QVFD	FILTER/SEPARATOR VALVE WITH DIFF. PRESSURE SHUT-OFF FILTER/WASSERABSCHIEDERVENTIL MIT DIFFERENZDRUCK-ABSCHALTUNG
FQ	FLOW METER MENGMESSE	SPL	SPADE PLATE BRILLENSTECKSCHEIBE
FSR	FILTER/SEPARATOR FILTER/WASSERABSCHIEDER	SV	SAMPLING VALVE PROBENENTNAHMENTIL
GV	GATE VALVE ABSPERRSCHIEBER	VP	VENTURI PIPE VENTURIROHR
IF	INSULATING FLANGE ISOLIERFLANSCH	VL	VENTILATOR VENTILATOR
IG	INSPECTION GLASS SCHAUGLASS	DBB	DOUBLE BLOCK AND BLEED
		SS	STAINLESS STEEL Cf. N. STAHL
		CS	STEEL STAHL

PIPE PENETRATION  
ROHRDURCHFÜHRUNG

NOT TO SCALE / OHNE MASSTAB



PRODUCT PIPE ROHRLEITUNG	PRODUCT PIPE PRODUKTENROHR mm	CASING MANTELROHR mm	L1 mm	L2 mm
DN 50	ø60,3	ø168,3	450	130
DN 150	ø168,3	ø273,0	600	250
DN 200	ø219,1	ø323,9	600	250

NOTES  
BEMERKUNG

ALL VALVES AND FLANGES DESIGNED FOR PN 16  
ALLE ARMATUREN UND FLANSCH AUSGELEGT FUER PN 16

FOR SUPPORTS OF PIPES AN INSULATION PIECE, MADE OF 10mm THICK FUEL RESISTANT PLASTIC, IS TO PUT BETWEEN PIPES AND SUPPORTS OR HOLDERS.  
BEI UNTERSTUETZUNGEN VON ROHRLEITUNGEN IST ZWISCHEN ROHRLEITUNG UND UNTERSTUETZUNGSKONSTRUKTION BZW. HALTERUNG EINE ISOLIERPLATTE 10mm DICK AUS KRAFTSTOFFBESTAENDIGEN KUNSTSTOFF ZU LEGEN.

SUPPORTS AND HOLDERS AS SELECTED BY THE CONTRACTOR IN COORDINATION WITH THE LOCAL CONSTRUCTION SUPERVISION  
UNTERSTUETZUNG UND HALTERUNG NACH WAHL DES AN IN ABSTIMMUNG MIT DER OERTLICHEN BAULEITUNG.

PERTINENT DRAWINGS  
ZUGEHÖRIGE ZEICHNUNGEN

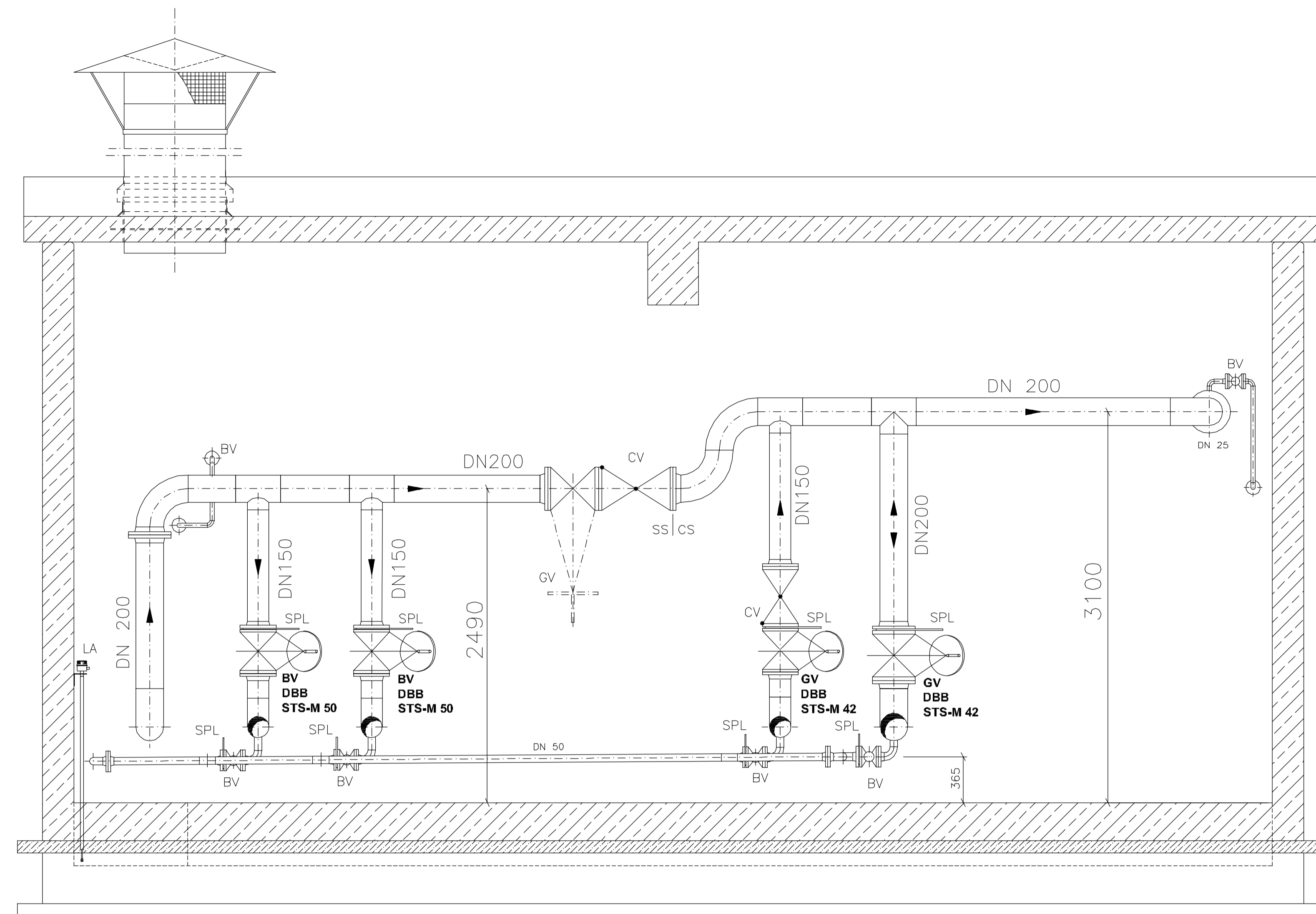
- GA42.2 GENERAL FLOW DIAGRAM  
GESAMT-FLUSS-SCHEMA
- M-8.1 MECHANICAL INSTALLATION, TOP VIEW  
MASCHINENTECHNISCHE INSTALLATION, DRAUSICHT
- M-8.3 MASCHINENTECHNISCHE INSTALLATION, SCHNITTE E-F

ALL MEASURES HAVE TO BE CHECKED ON SIDE  
SÄMTLICHE MASSE SIND VOR ORT ZU ÜBERPRÜFEN!

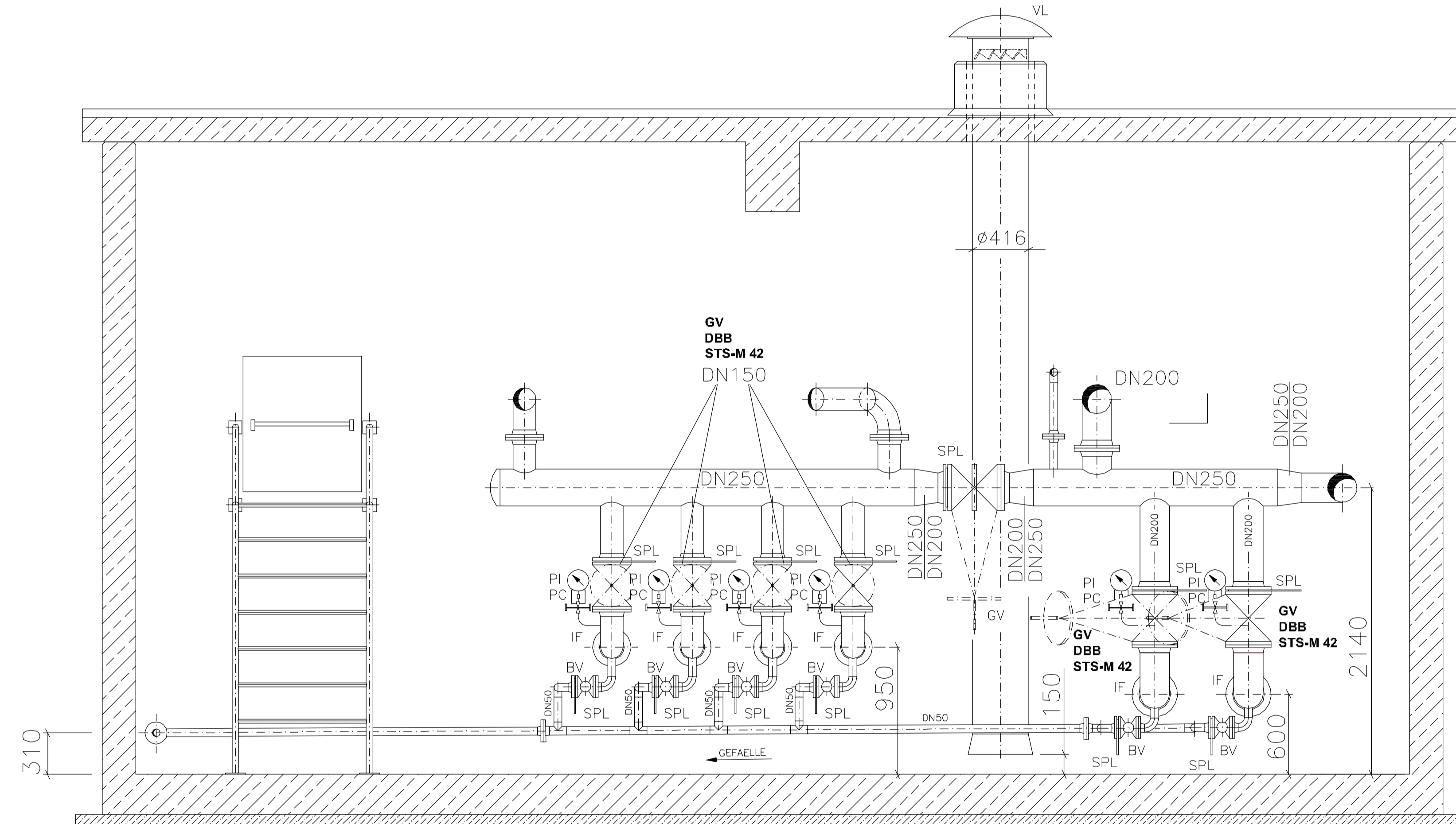
REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
<b>HEADQUARTERS</b> UNITED STATES AIR FORCES EUROPE ENGINEERING & OPERATIONS				
AIRFIELD STANDARD DESIGN US JET FUEL STORAGE AND DISPENSING SYSTEMS		FLUGPLATZ STANDARDPLANUNG US FLUCKRAFTSTOFF-VERSORGUNGSANLAGEN		
BUILDING NAME MANIFOLD / FILTER STATION, TANK TRUCK REFUELING SYSTEM VERTEILER / FILTERSTATION, TANKWAGEN - BETANKUNGSSYSTEM				
DESIGNATION MECHANICAL INSTALLATION, SECTIONS A - D WITH INSULATING FLANGE MASCHINENTECHNISCHE INSTALLATION, SCHNITTE A - D MIT ISOLIERFLANSCH				
WORKED/BEARBEITET	PREPARED/AUFGESTELLT	APPROVED/GENEHMIGT		
LAUFGEHEBEN/ENTWURF UND BAUBEREITUNG LUBRICATIONS/LANGLUB	AMT FÜR BUNDESBAU WALLSTR.1 55122 MAINZ	INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAUMAßNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)		
APPROVED/GENEHMIGT	DATE/DATUM	SCALE/MASSTAB		
	6. MAI 2015	1:25		
DESIGNED/ENTWURFEN	BY/DESIGNER	STANDARD SHEET/STANDARDBLATT		
		M - 81.2		
CONSTRUCTION PROJECT BAUMAßNAHME		SHEET NO./BLATT NR.		



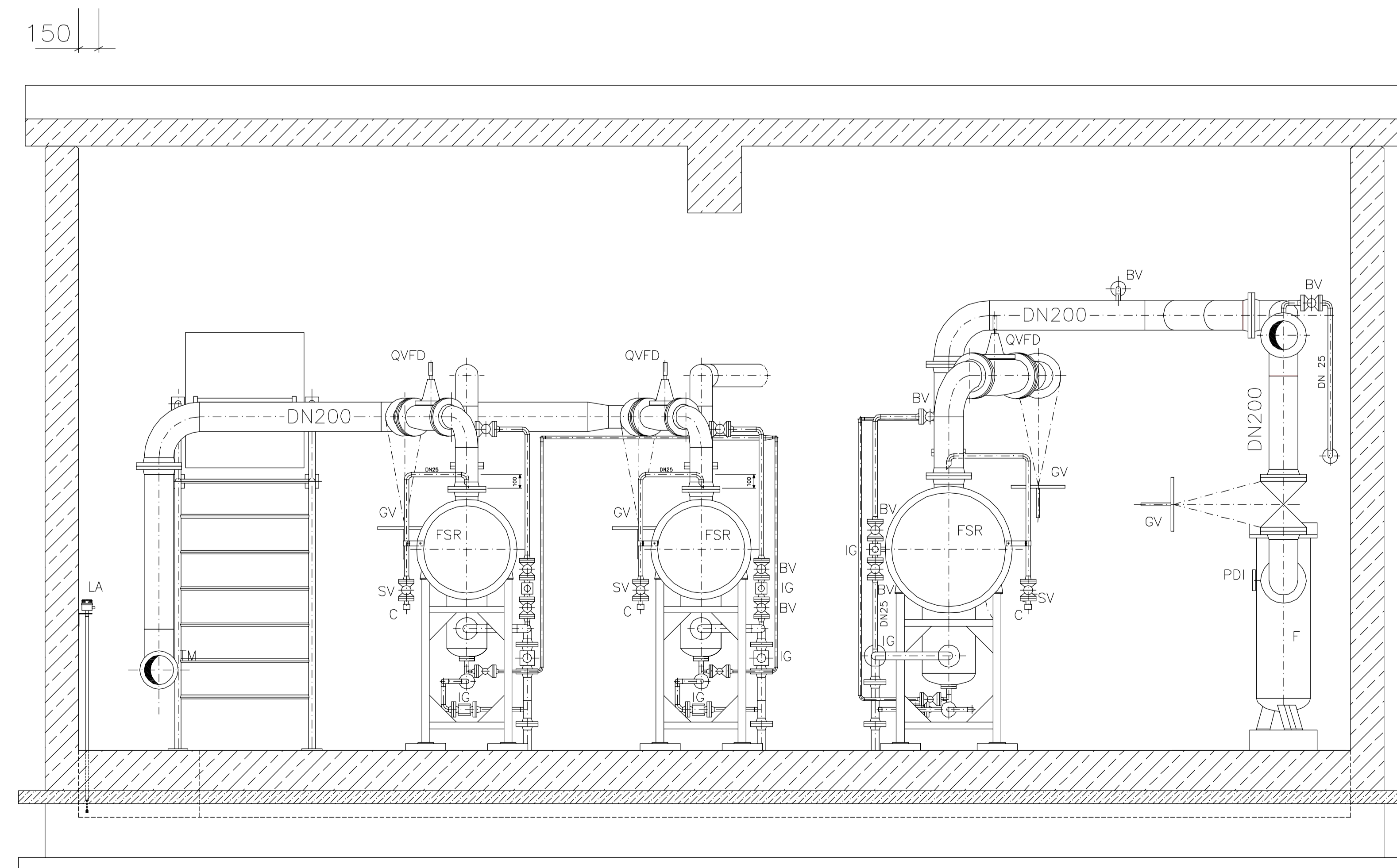
SECTION E-E  
SCHNITT E-E



SECTION F-F  
SCHNITT F-F

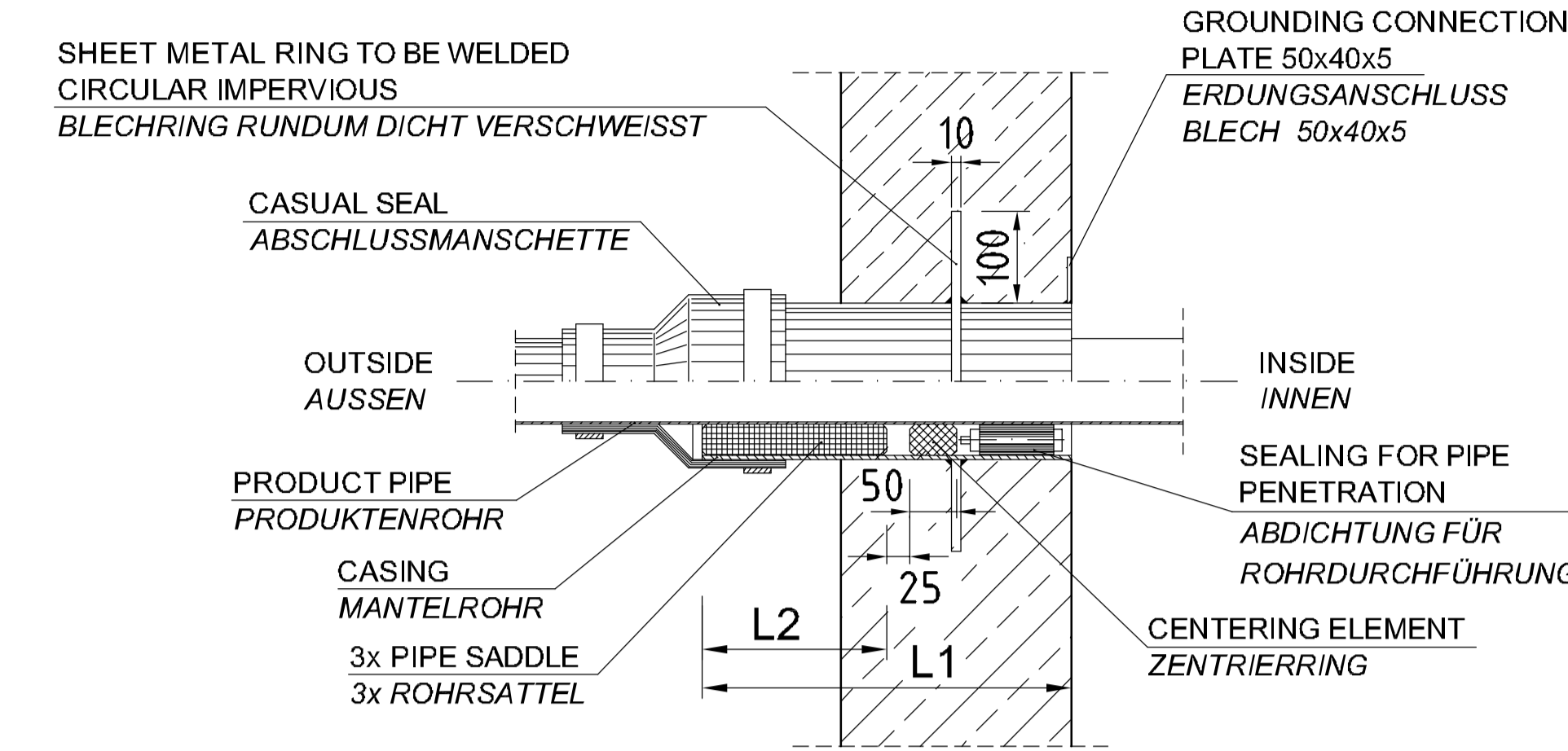


SECTION G-G  
SCHNITT G-G



PIPE PENETRATION  
ROHRDURCHFÜHRUNG

NOT TO SCALE / OHNE MASSTAB



PRODUCT PIPE ROHRLEITUNG	PRODUCT PIPE PRODUKTENROHR mm	CASING MANTELROHR mm	L1 mm	L2 mm
DN 50	ø60,3	ø168,3	450	130
DN 150	ø168,3	ø273,0	600	250
DN 200	ø219,1	ø323,9	600	250

ALL MEASURES HAVE TO BE TO CHECKED ON SIDE  
SÄMTLICHE MASSE SIND VOR ORT ZU ÜBERPRÜFEN !

PERTINENT DRAWINGS  
ZUGEHÖRIGE ZEICHNUNGEN

- GM-02.2 GENERAL FLOW DIAGRAM  
GESAMT - FLIESS - SCHEMA
- M-8.1 MECHANICAL INSTALLATION, TOP VIEW  
MASCHINENTECHNISCHE INSTALLATION, DRAUFSICHT
- M-8.2 MECHANICAL INSTALLATION, SECTIONS A - D  
MASCHINENTECHNISCHE INSTALLATION, SCHNITTE A - D

NOTES  
BEMERKUNG

ALL VALVES AND FLANGES DESIGNED FOR PN 16 ALLE  
ARMATUREN UND FLANSCH AUSGELEGT FUER PN 16

FOR SUPPORTS OF PIPES AN INSULATION PIECE. MADE OF 10mm THICK FUEL  
RESITANT PLASTIC. IS TO PUT BETWEEN PIPES AND SUPPORTS OR HOLDERS  
BEI UNTERSTUETZUNGEN VON ROHRLEITUNGEN IST ZWISCHEN ROHRLEITUNG UND  
UNTERSTUETZUNGSKONSTRUKTION BZW. HALTERUNG EINE ISOLIERPLATTE 10mm  
DICK AUS KRAFTSTOFFBESTAENDIGEN KUNSTSTOFF , ZU LEGEN.

SUPPORTS AND HOLDERS AS SELECTED BY THE CONTRACTOR IN  
COORDINATION WITH THE LOCAL CONSTRUCTION SUPERVISION  
UNTERSTUETZUNG UND HALTERUNG NACH WAHL DES ANBIETERS  
IN ABSTIMMUNG MIT DER OERTLICHEN BAULEITUNG.

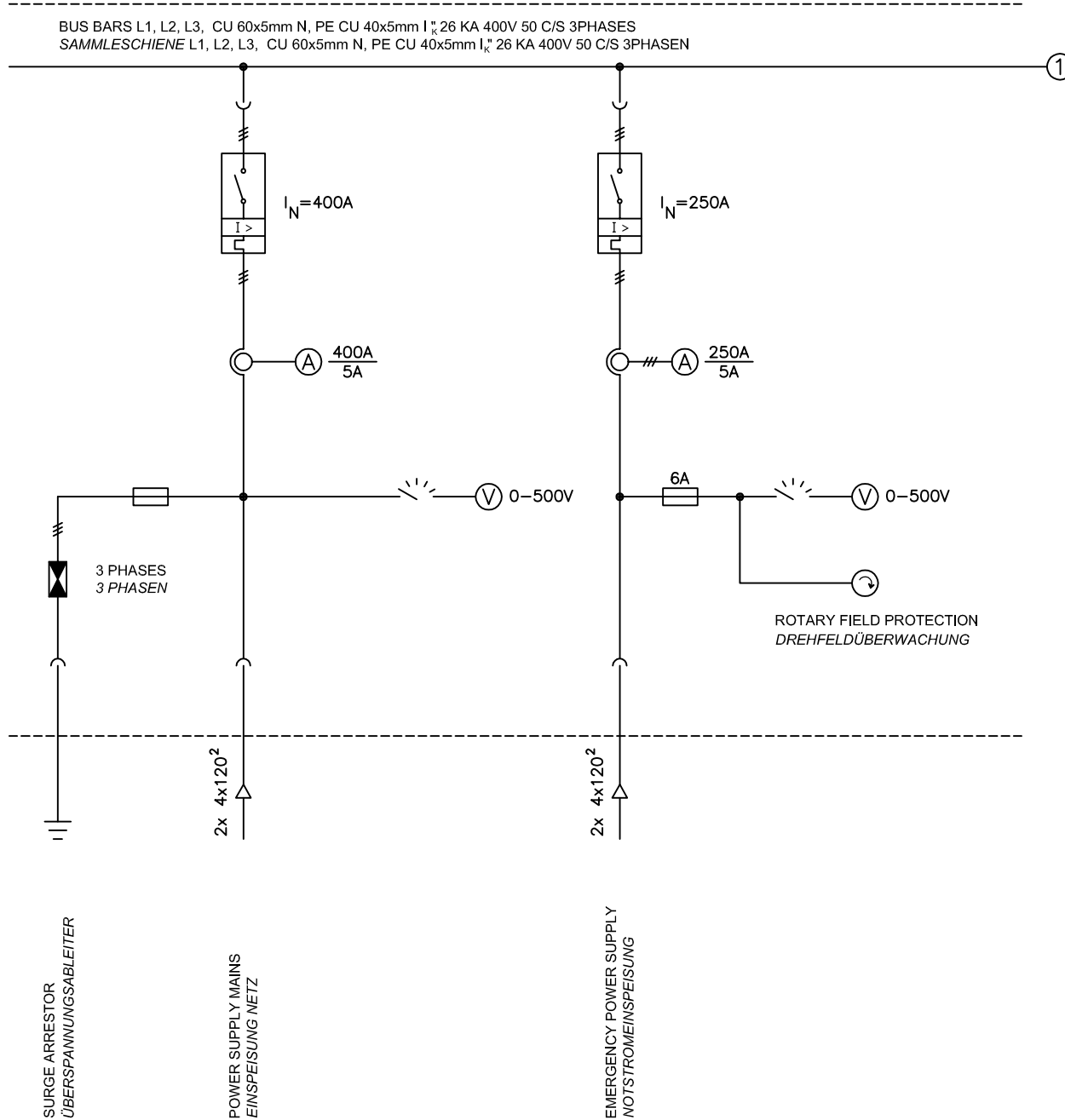
LEGEND  
LEGENDE

- AV VENTILATING VALVE  
BELUEFTUNGSVENTIL
- BV BALL VALVE  
KUGELHAHN
- C QUICK COUPLING  
SCHNELLKUPPLUNG
- CV RUECKSCHLAGVENTIL  
RUECKSCHLAGVENTIL
- CVP PRESSURE CONTROL VALVE  
UEBERDRUCK-REGELVENTIL
- DT DIRT TRAP  
SCHMUTZFAENGER
- DBB DOUBLE BLOCK AND BLEED
- F STRAINER BASKET  
SIEBKORBFILTER
- FLV FLUSHING VALVE  
SPÜLVENTIL
- FQ FLOW METER  
MENGMESSESSER
- FSR FILTER/SEPARATOR  
FILTER/WASSERABSCHIEDER
- GV GATE VALVE  
ABSPERRSCHIEBER
- IF INSULATING FLANGE  
ISOLIERFLANSCH
- IG INSPECTION GLASS  
SCHAUGLASS
- LA LIQUID PROBE  
FLÜSSIGKEITSSONDE
- LCV LEVEL CONTROL VALVE  
NIVEAUREGELVENTIL
- MOV GATE VALVE WITH MOTOR  
ABSPERRARMATUR MIT MOTORANTRIEB
- PC PRESSURE GAUGE STOPCOCK  
MANOMETER-ABSPERRVENTIL
- PDI DIFFERENTIAL PRESSURE GAUGE  
DIFFERENZDRUCK-MANOMETER
- PI PRESSURE GAUGE  
MANOMETER
- PIS PRESSURE GAUGE WITH CONTACT FOR SWITCH  
MANOMETER MIT SCHALTKONTAKTEN
- PRV PRESSURE RELIEF VALVE  
DRÜCKENTLASTUNGSVENTIL
- QVFD FILTER/SEPARATOR VALVE WITH DIFF.  
PRESSURE SHUT-OFF  
FILTER/WASSERABSCHIEDERVENTIL MIT  
DIFFERENZDRUCK-ABSCHALTUNG
- SPL SPADE PLATE  
BRILLENSTECKSCHEIBE
- SV SAMPLING VALVE  
PROBENTNAHMEVENTIL
- VP VENTURI PIPE  
VENTURIROHR
- VL VENTILATOR  
VENTILATOR
- SS STAINLESS STEEL  
Cr.Ni. STAHL
- CS STEEL  
STAHL

REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
<b>HEADQUARTERS</b> UNITED STATES AIR FORCES EUROPE ENGINEERING & OPERATIONS				
AIRFIELD STANDARD DESIGN US		FLUGPLATZ STANDARDPLANUNG US		
JET FUEL STORAGE AND DISPENSING SYSTEMS		FLUCKRAFTSTOFF- VERSORGUNGSANLAGEN		
BUILDING BAUWERK	MANIFOLD / FILTER STATION , TANK TRUCK REFUELING SYSTEM VERTEILER / FILTERSTATION , TANKWAGEN - BETANKUNGSSYSTEM			
DESIGNATION BEZEICHNUNG	MECHANICAL INSTALLATION, SECTIONS E - G WITH INSULATING FLANGE MASCHINENTECHNISCHE INSTALLATION, SCHNITTE E - G MIT ISOLIERFLANSCH			
VORBEREITET	PREPARED/AUFGESTELLT	APPROVED/GENEHMIGT		
LAUFGEHENDEN ÜBERWACHUNG UND BAUFÜHRUNG LIEFERMENSCHEN LAMBO		AMT FÜR BUNDESBAU		
ANSONSTEN: ÜBERWACHUNG L1, TRENNUNG LAMBO TRUCKEN (AUSSEITEN) 900-1200 TRUCKEN (INNEN) 1200-1500		WALLSTR.1 55122 MAINZ		
LABELL:	BY: / IN ÜBERLEITUNG IN ÜBERLEITUNG IN ÜBERLEITUNG	DESIGN: / CHECKED BY IN ÜBERLEITUNG		
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAUMASSNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED GENEHMIGT	DATE DATUM	SCALE MASSTAB		
	6. MAI 2015	1:25		
ORIGINAL BOMBER BY IN ÜBERLEITUNG		STANDARD SHEET STANDARDBLATT		
		M - 81.3		
USED/ANWENDET CONSTRUCTION FACILITIES ENGINEER IN ÜBERLEITUNG		CAD PROJECT FILE: CAD-PROJEKTDATEI		
CONSTRUCTION PROJECT BAUMASSNAHME		SHEET NO. BLATTNR.		



# INPUT PANEL EINSPEISEFELD



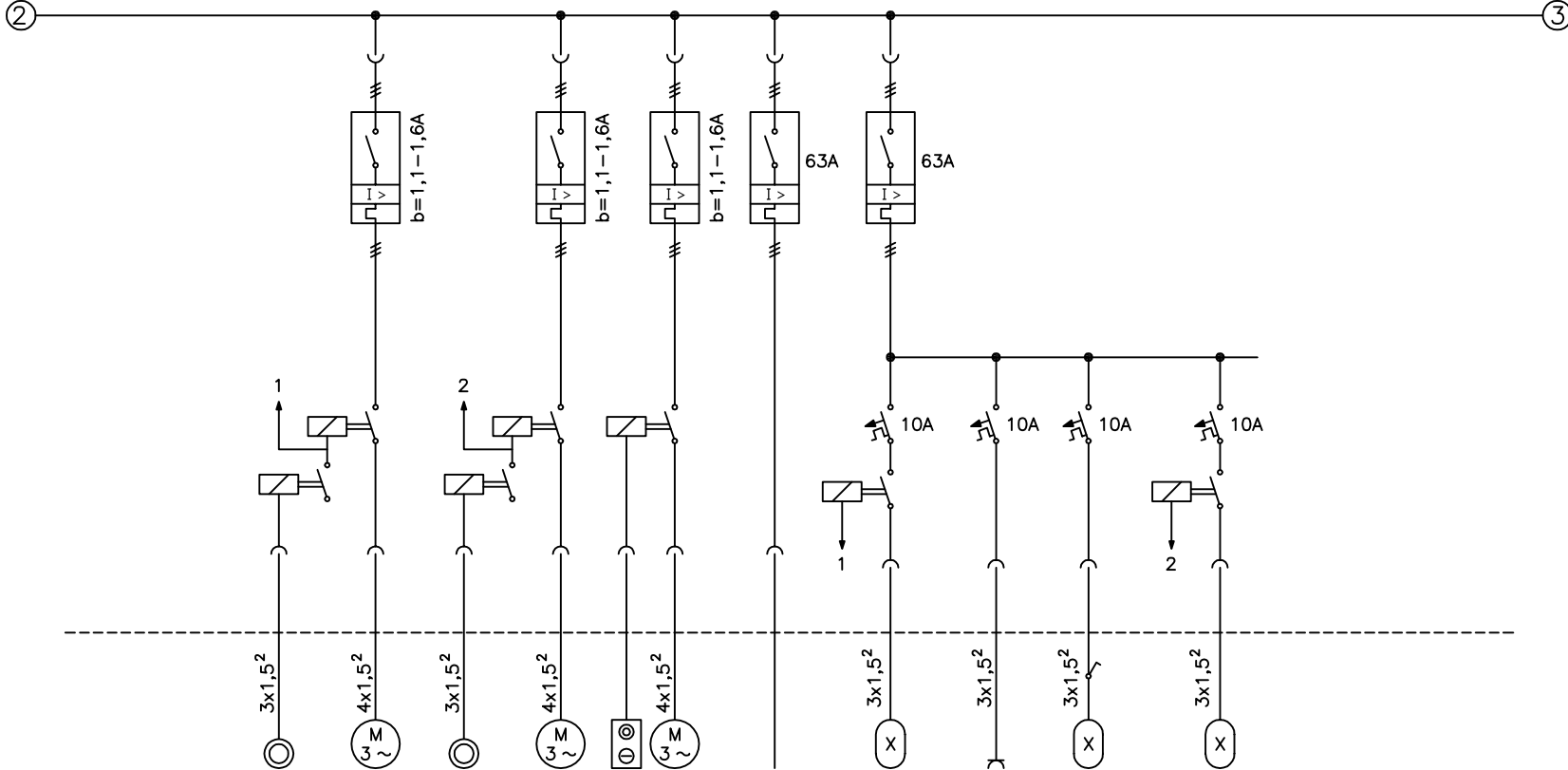
REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
HEADQUARTERS UNITED STATES AIR FORCES EUROPE				
ENGINEERING & OPERATIONS				
AIRFIELD STANDARD DESIGN US JET FUEL STORAGE AND DISPENSING SYSTEMS			FLUGPLATZ STANDARDPLANUNG US FLUGKRAFTSTOFF - VERSORGUNGSANLAGEN	
BUILDING BAUWERK MANIFOLD / FILTER STATION , TANK TRUCK REFUELING SYSTEM VERTEILER / FILTERSTATION , TANKWAGEN - BETANKUNGSSYSTEM				
DESIGNATION BEZEICHNUNG ELECTRICAL DIAGRAM INPUT PANEL SCHALTPLAN EINSPEISEFELD				
WORKED/BEARBEITET		PREPARED/AUFGESTELLT <small>LANDESBETRIEBE LIEGENSCHAFTS- UND BAUBETRIEBUNG LBB-WIEDERLASSUNG LANDAU</small>  <small>ANSCHEFT: ÜBERSTRASSENPLATZ 11, 76831 LANDAU TELEFON (06341) 912-276 TELEFAX (06341) 912-291</small> <small>LANDAU</small> <small>BY PROXY / BE VERTRÄGTE:</small> <small>ORIGINAL DRAWN BY STEPHAN KOTZSCHNEIDER</small>		APPROVED/GENEHMIGT  <b>AMT FÜR BUNDESBAU</b> <b>WALLSTR. 1 55122 MAINZ</b> <small>ORIGINAL DRAWN BY STEPHAN KOTZSCHNEIDER</small>
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAUMAßNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED GENEHMIGT		DATE DATUM 6. MAI 2015		SCALE MAßSTAB /
ORIGINAL DRAWN BY BY ORIGINAL GEZ.		STANDARD SHEET STANDARD PLAN		E - 81.1
CONSTRUCTION PROJECT BAUMAßNAHME		SHEET NO. PLAN-NR.		OF VON







# OPERATING TANK 1 FLACHBODENTANK 1



PUSH BUTTON (PUMP HOUSE, FAN AND LIGHTING)  
TASTER (PUMPENHAUS, LÜFTER UND BELEUCHTUNG)

FAN APP. 0,08kW (PUMP HOUSE)  
LÜFTER CA. 0,08kW (PUMPENHAUS)

PUSH BUTTON (LEAKAGE CONTROL PIT, FAN AND LIGHTING)  
TASTER (LECKKONTROLLSCHACHT, LÜFTER UND BELEUCHTUNG)

FAN APP. 0,08kW (LEAKAGE CONTROL PIT)  
LÜFTER CA. 0,08kW (LECKKONTROLLSCHACHT)

LOCAL CONTROL UNIT  
ORTSSTEUERSTELLE  
SUBMERSIBLE PUMP  
TAUCHPUMPE

SPARE  
RESERVE

INTERIOR LIGHTING PUMP HOUSE 2x 2x36W  
INNENBELEUCHTUNG PUMPENHAUS 2x 2x36W

RECEPTACLE  
STECKDOSE

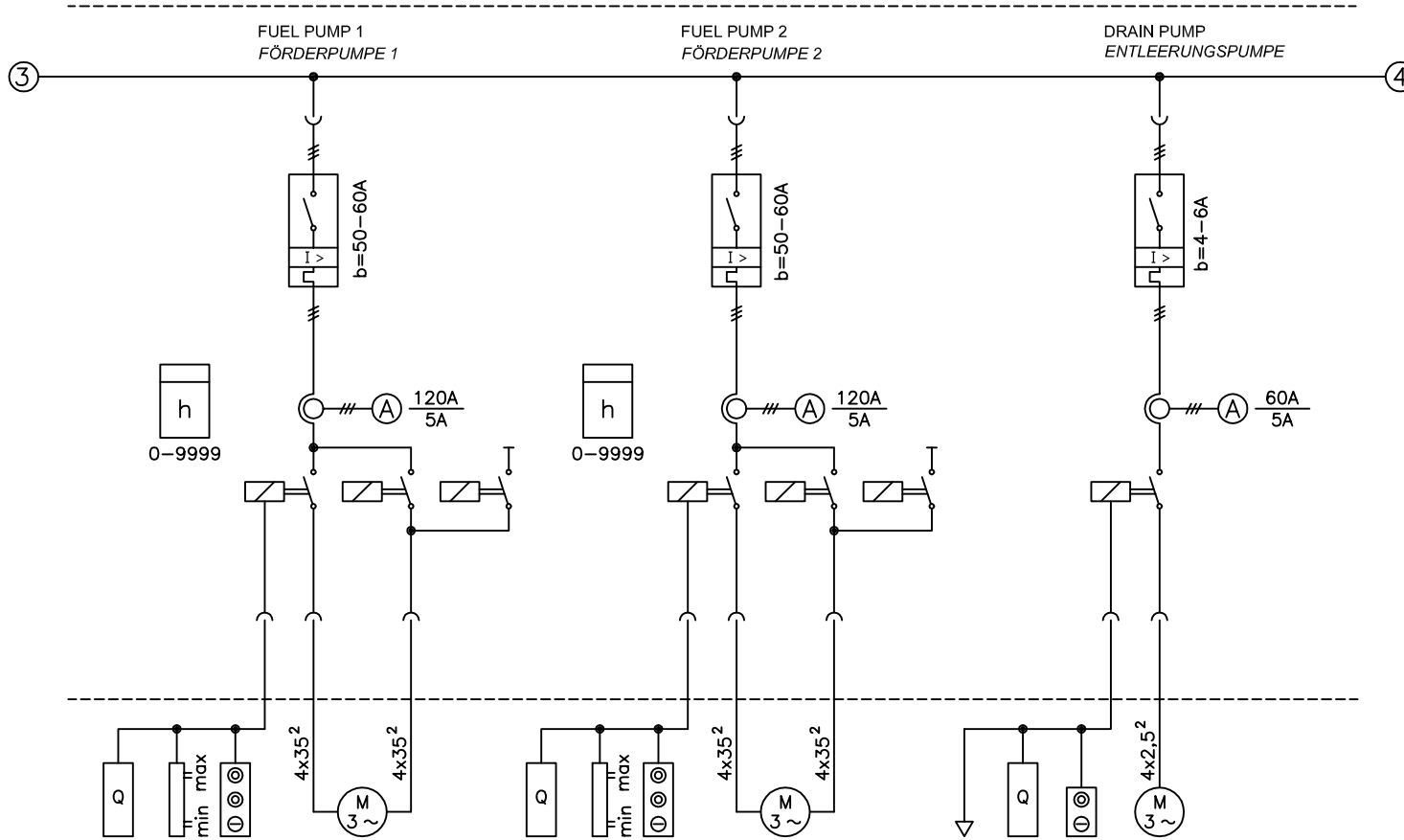
ENTRANCE LIGHTING 1x 1x36W  
EINGANGSBELEUCHTUNG 1x 1x36W

INTERIOR LIGHTING  
LEAKAGE CONTROL PIT 3x 1x36W  
INNENBELEUCHTUNG  
LECKKONTROLLSCHACHT 3x 1x36W

REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON
HEADQUARTERS UNITED STATES AIR FORCES EUROPE			
ENGINEERING & OPERATIONS		AMT FÜR BUNDESBAU	
AIRFIELD STANDARD DESIGN US	FLUGPLATZ STANDARDPLANUNG US		
JET FUEL STORAGE AND DISPENSING SYSTEMS	FLUGKRAFTSTOFF - VERSORGSANLAGEN		
BUILDING BAUWERK	MANIFOLD / FILTER STATION , TANK TRUCK REFUELING SYSTEM VERTEILER / FILTERSTATION , TANKWAGEN - BETANKUNGSSYSTEM		
DESIGNATION BEZEICHNUNG	ELECTRICAL DIAGRAM OPERATING TANK 1 SCHALTPLAN FLACHBODENTANK 1		
WORKED/BEARBEITET	PREPARED/AUFGESTELLT LANDESBETRIEBE LEIGENSCHAFTS- UND BAUBETRIEUBUNG LBR-WIEDERLASSUNG LANDAU L B B LANDAU BY PROSY / H. V. BEITRUEBE DRAWING CHECKED BY BY PROSY / H. V. BEITRUEBE DRAWING CHECKED BY BY PROSY / H. V. BEITRUEBE	APPROVED/GENEHMIGT AMT FÜR BUNDESBAU WALLSTR. 1 55122 MAINZ DRAWING CHECKED BY BY PROSY / H. V. BEITRUEBE	
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAUMAßNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)			
APPROVED GEBENHET	DATE DATUM	SCALE MAßSTAB	SHEET-NO. PLANNR.
CONSTRUCTION PROJECT BAUMAßNAHME	STANDARD SHEET STANDARD PLAN E - 81.3		SHEET-NO. PLANNR. GE VON



# OPERATING TANK 2 FLACHBODENTANK 2



FLOW SWITCH  
STRÖMUNGSWÄCHTER

LEVEL INDICATOR  
FÜLLSTANDSANZEIGER

LOCAL CONTROL UNIT IN PUMP HOUSE  
ORTSSTEUERSTELLE IM PUMPENHAUS

FUEL PUMP 30kW  
FÖRDERPUMPE 30kW

FLOW SWITCH  
STRÖMUNGSWÄCHTER

LEVEL INDICATOR  
FÜLLSTANDSANZEIGER

LOCAL CONTROL UNIT IN PUMP HOUSE  
ORTSSTEUERSTELLE IM PUMPENHAUS

FUEL PUMP 30kW  
FÖRDERPUMPE 30kW

INTERLOCKING WITH LEVEL INDICATOR DRAIN PUMP  
VERRIEGELUNG MIT FÜLLSTANDSANZEIGER  
ENTLEERUNGSBEHÄLTNER

FLOW SWITCH  
STRÖMUNGSWÄCHTER

LOCAL CONTROL UNIT  
ORTSSTEUERSTELLE

DRAIN PUMP 2.2kW  
ENTLEERUNGSPUMPE 2,2kW

REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON
HEADQUARTERS UNITED STATES AIR FORCES EUROPE			
ENGINEERING & OPERATIONS		AIRFIELD STANDARD DESIGN US	FLUGPLATZ STANDARDPLANUNG US
JET FUEL STORAGE AND DISPENSING SYSTEMS		FLUGKRAFTSTOFF - VERSORGUNGSANLAGEN	
BUILDING BAUWERK	MANIFOLD / FILTER STATION , TANK TRUCK REFUELING SYSTEM VERTEILER / FILTERSTATION , TANKWAGEN - BETANKUNGSSYSTEM		
DESIGNATION BEZEICHNUNG			
ELECTRICAL DIAGRAM OPERATING TANK 2 SCHALTPLAN FLACHBODENTANK 2			
WORKED/BEARBEITET	PREPARED/AUFGESTELLT LANDESRECHTLICHE BERATUNGSGESellschaft UND BAUBETREUUNG LEB-RIEDELASSUNG LANDAU L B B ANSCHEFTL. ÜBERBEREITUNG: 1.1.1982 LANDAU BY PROSKY / H. VORBEREITUNG: ORIGINAL: 1982 BY PROSKY / H. VORBEREITUNG: STERN KTS/STERN/STERN	APPROVED/GENEHMIGT  <b>AMT FÜR BUNDESBAU</b>  WALLSTR. 1 55122 MAINZ  DRAWING: 1982 BY PROSKY / H. VORBEREITUNG: STERN KTS/STERN/STERN	
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAUMAßNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)			
APPROVED GENEHMIGT	DATE DATUM	6. MAI 2015	SCALE MAßSTAB
ORIGINAL: 1982 BY PROSKY / H. VORBEREITUNG: STERN KTS/STERN/STERN		STANDARD SHEET STANDARD PLAN	
CONSTRUCTION PROJECT BAUMAßNAHME		SHEET NO. PLAN-NR. E - 81.4 OF VON	



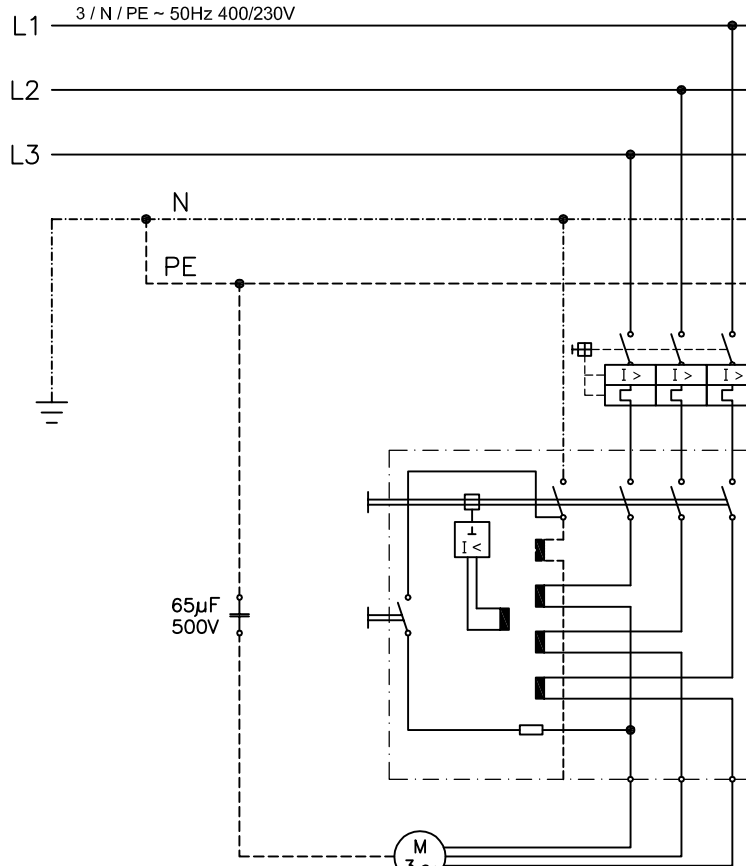
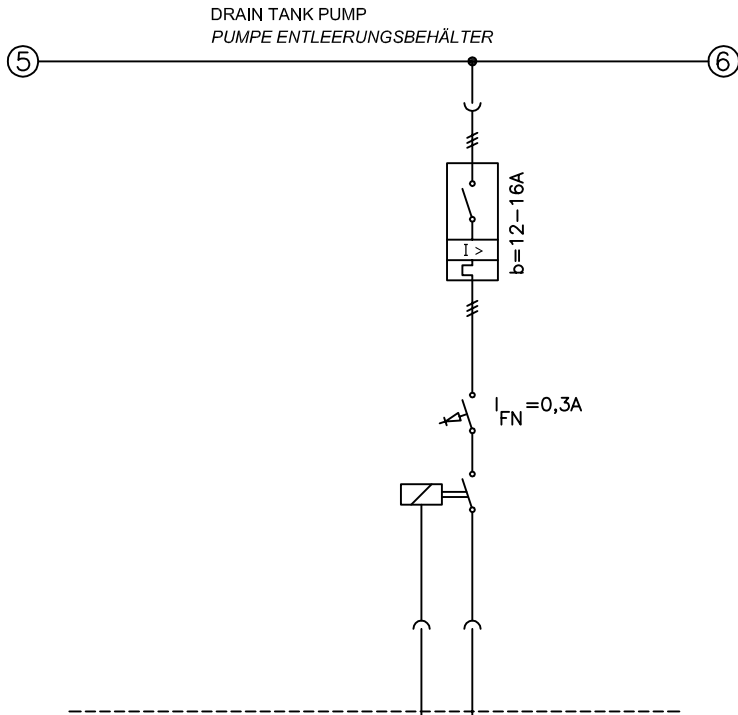




# DRAIN TANK 10m<sup>3</sup> ENTLEERUNGSBEHÄLTER 10m<sup>3</sup>

## DETAIL

FUALT CURRENT PROTECTIVE CIRCUIT FOR PUMP MOTOR  
IN DOME SHAFT OF CATHODIC-PROTECTED TANKS  
FEHLERSTROM-SCHUTZSCHALTUNG FÜR PUMPENMOTOR  
IM DOMSCHACHT VON KATHODISCH GESCHÜTZTEN BEHÄLTERN



TO PROTECTIVE CURRENT RECTIFIER  
ZUM SCHUTZSTROMGLEICHRICHTER

EX - PROOF SPARK GAP  
EX - FUNKENSTRECKE




SWITCH CONTROL PANEL  
SCHALTER IM STEUERSCHRANK

FLOW SWITCH  
STRÖMUNGSWÄCHTER

LEVEL INDICATOR  
FÜLLSTANDSANZEIGER

LOCAL CONTROL UNIT  
ORTSSTEUERSTELLE

DRAIN TANK PUMP 7,5kW  
PUMPE ENTLEERUNGSBEHÄLTER 7,5kW

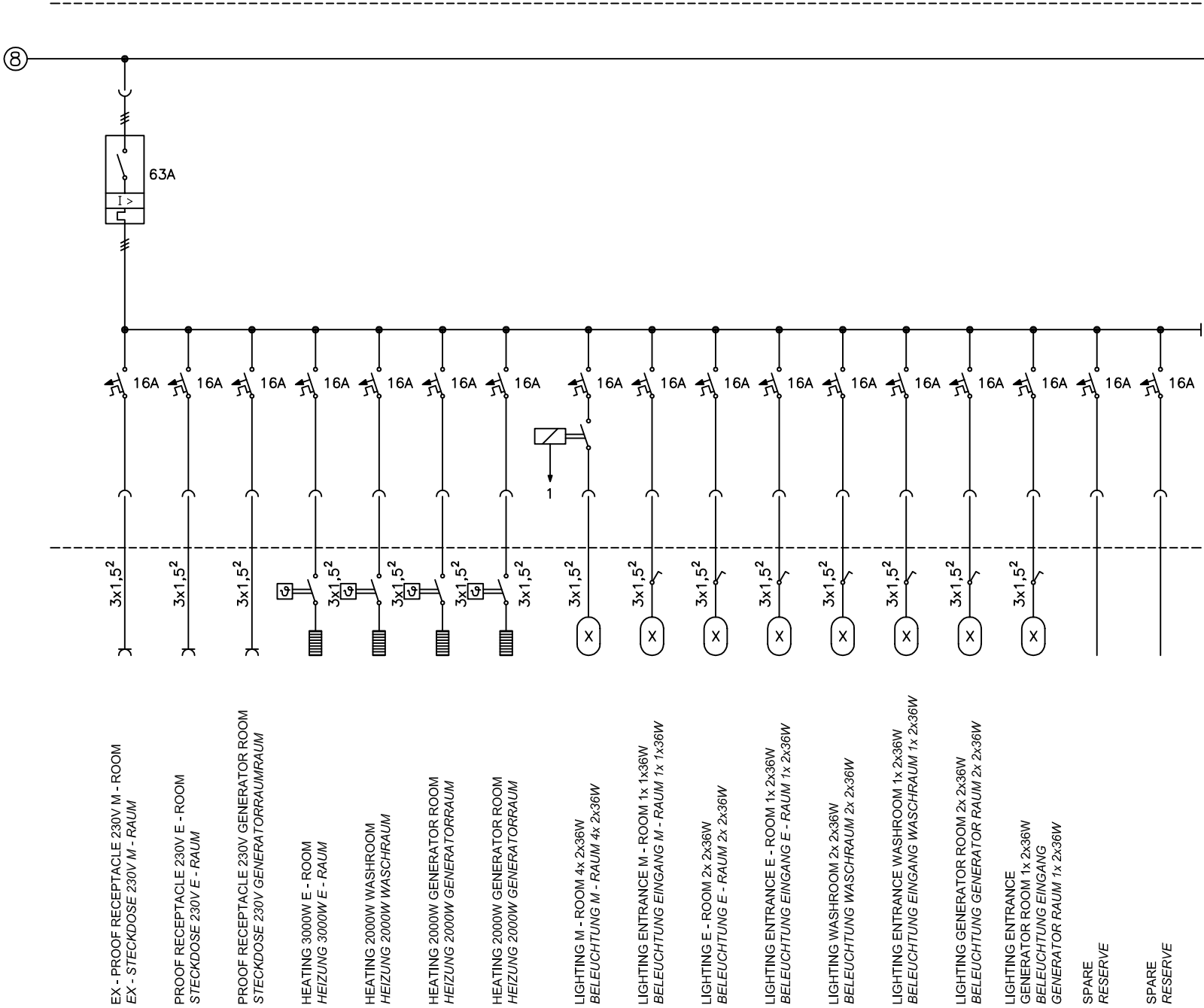
REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
HEADQUARTERS UNITED STATES AIR FORCES EUROPE 				
AIRFIELD STANDARD DESIGN US		FLUGPLATZ STANDARDPLANUNG US		
JET FUEL STORAGE AND DISPENSING SYSTEMS		FLUGKRAFTSTOFF - VERSORGUNGSANLAGEN		
BUILDING BAUWERK	MANIFOLD / FILTER STATION , TANK TRUCK REFUELING SYSTEM VERTEILER / FILTERSTATION , TANKWAGEN - BETANKUNGSSYSTEM			
DESIGNATION BEZEICHNUNG	ELECTRICAL DIAGRAM DRAIN TANK / DETAIL SCHALTPLAN ENTLEERUNGSBEHÄLTER / DETAIL			
WORKED/BEARBEITET	PREPARED/AUFGESTELLT LANDESBETRIEB LIEGENSCHAFTS- UND BAUBETRIEBUNG LBB-WIEDERLASSUNG LANDAU L B B	APPROVED/GENEHMIGT AMT FÜR BUNDESBAU WALLSTR. 1 55122 MAINZ		
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAUMAßNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED GENEHMIGT	DATE DATUM	6. MAI 2015	SCALE MAßSTAB	/
DESIGNED BY BY ENTWURF. GEZ.	DRAWING NUMBER ZEICHEN-NUMMER		STANDARD SHEET STANDARDBLATT	E - 81,6
CONSTRUCTION PROJECT BAUMAßNAHME	SHEET NO. PLAN-NR.			OF VON







# GENERAL INSTALLATION ALLGEMEINE INSTALLATION



REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON
		HEADQUARTERS UNITED STATES AIR FORCES EUROPE ENGINEERING & OPERATIONS	
AIRFIELD STANDARD DESIGN US JET FUEL STORAGE AND DISPENSING SYSTEMS		FLUGPLATZ STANDARDPLANUNG US FLUGKRAFTSTOFF - VERSORGSANLAGEN	
BUILDING BAUWERK	MANIFOLD / FILTER STATION , TANK TRUCK REFUELING SYSTEM VERTEILER / FILTERSTATION , TANKWAGEN - BETANKUNGSSYSTEM		
DESIGNATION BEZEICHNUNG	ELECTRICAL DIAGRAM GENERAL INSTALLATION SCHALTPLAN ALLGEMEINE INSTALLATION		
WORKED/BEARBEITET	PREPARED/AUFGESTELLT LANDESBETRIEBE LEISTUNGSAUF- UND BAUBETRIEBUNG LERN-RIEDELASSUNG LANDAU L B B ANSCHRIFT: UNTERBIBERATZ 11, PABER LANDAU TELEFON (06341) 912-276 TELEFAX (06341) 912-291 LANDAU BY PROXY / IH VERTRETUNG: ORDNUNG BEARBEITET BY PROJEKT LEITUNG STEPHAN KOTZSCHNEIDER	APPROVED/GENEHMIGT AMT FÜR BUNDESBAU WALLSTR. 1 55122 MAINZ ORDNUNG BEARBEITET BY PROJEKT LEITUNG STEPHAN KOTZ	
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAUMAßNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)			
APPROVED GENEHMIGT	DATE DATUM	6. MAI 2015	SCALE MAßSTAB
ORIGINAL REFERRED BY IH ORDNUNG LEITUNG		STANDARD SHEET STANDARD PLAN	
ORIGINAL DRAWN ***** ORIGINAL DRAWN ***** ORIGINAL DRAWN *****		SHEET NO. PLAN-NR. E - 81,8 OF VON	
CONSTRUCTION PROJECT BAUMAßNAHME			



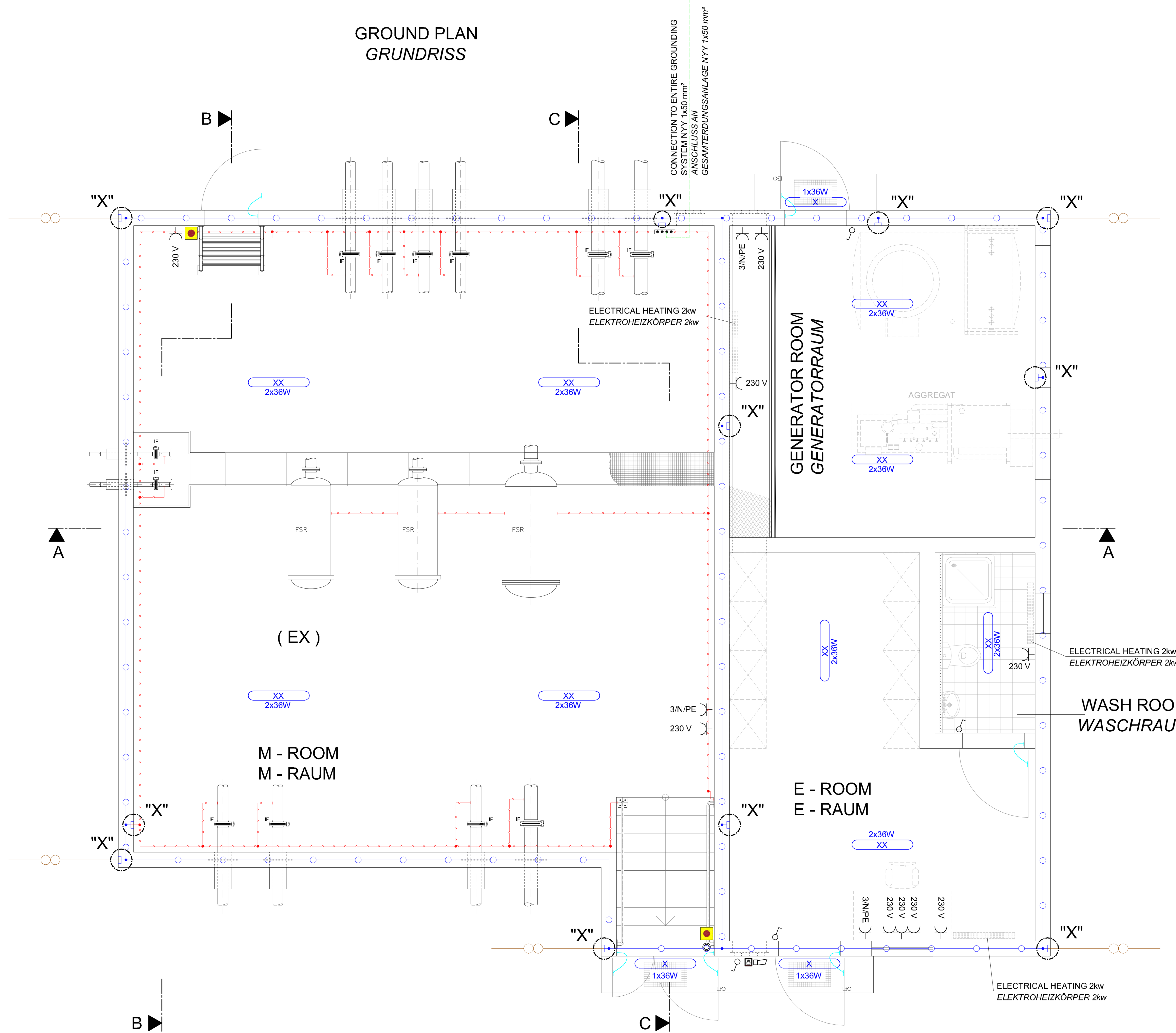








GROUND PLAN  
GRUNDRISS

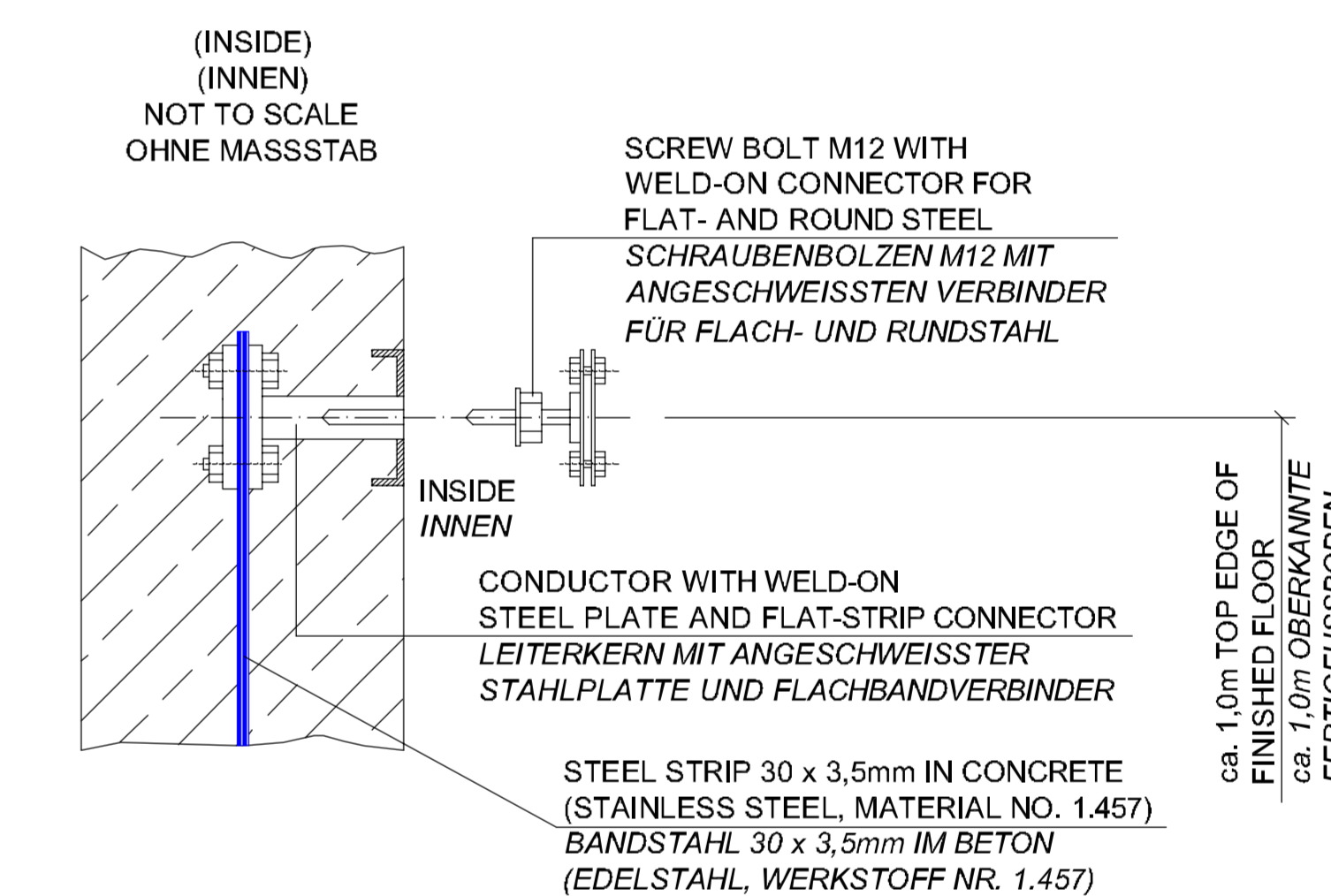


CONNECTION TO ENTIRE GROUNDING SYSTEM NYY 1x50 mm<sup>2</sup>  
ANSCHLUSS AN GESAMTERDUNGUNGSANLAGE NYY 1x50 mm<sup>2</sup>

LEGEND  
LEGENDE

- DISCONNECTION POINT  
TRENNSTELLE
- STEEL STRIP 30 x 3,5mm IN CONCRETE (STAINLESS STEEL, MATERIAL NO. 1.457)  
BANDSTAHL 30 x 3,5mm IM BETON (EDELSTAHL, WERKSTOFF NR. 1.457)
- GALV. STEEL STRIP 30 x 3,5mm SURFACE - MOUNTED  
VERZ. BANDSTAHL 30 x 3,5mm AUF PUTZ
- GALV. ROUND STEEL Ø 8mm  
VERZ. RUNDSTAHL Ø 8mm
- NYY 1 x 50<sup>2</sup>mm
- H01N2 - D50
- FLUORESCENT LEUCHTSTOFFLEUCHTE
- SWITCH SCHALTER
- PUSH BUTTON TASTER
- RECEPTACLE STECKDOSE
- EMERGENCY STOP NOT - AUS
- FLASHING LIGHT BLITZLEUCHTE
- HORN HUPE
- POTENTIAL EQUALIZATION BAR POTENTIALAUSGLEICHSSCHIENE
- ISOLATING FLANGE ISOLIERFLANSCH

DETAIL "X" GROUNDING CONNECTION  
ERDUNGSANSCHLUSS



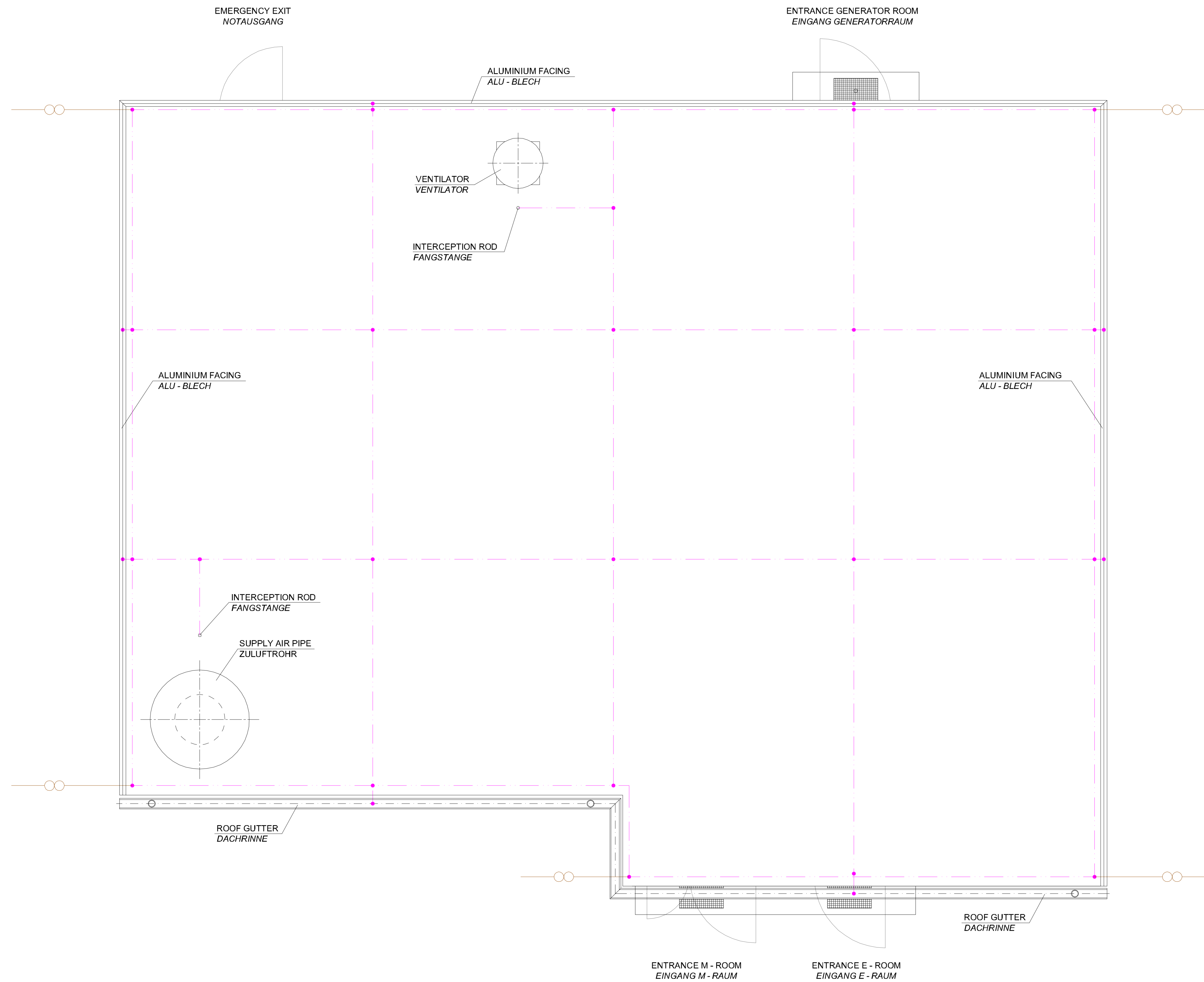
REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
<b>HEADQUARTERS</b>				
UNITED STATES AIR FORCES EUROPE				
ENGINEERING & OPERATIONS				
AIRFIELD STANDARD DESIGN US			FLUGPLATZ STANDARDPLANUNG US	
JET FUEL STORAGE AND DISPENSING SYSTEMS			FLUGKRAFTSTOFF - VERSORGNUNGSANLAGEN	
BUILDING BAUWERK	MANIFOLD / FILTER STATION, TANK TRUCK REFUELING SYSTEM VERTEILER / FILTERSTATION, TANKWAGEN - BETANKUNGSYSTEM			
DESIGNATION BEZUEHUNG	ELECTR. INSTALL., GROUNDING AND LIGHTNING PROTECTION PLAN ELECTR. INSTALL., ERDUNGS- UND BLITZSCHUTZPLAN			
WORKED/REARBEITET	PREPARED/BEREITET	APPROVED/GENEHMIGT		
LANDSCHAFTS- UND BAUVERBUND	AMT FÜR BUNDESBAU	WALLSTR.1 55122 MAINZ		
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAUMASSNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED GENEHMIGT	DATE DATUM	6. MAI 2015	SCALE MASSSTAB	1:25
ORIGINAL DRAWN BY IN ORIGINAL DED.			STANDARD SHEET STANDARD PLAN	
CONSTRUCTION PROJECT BAUMASSNAHME			E - 81.9	SHEET NO. PLATZ NR.









TOP VIEW  
DRAUFSICHT



LEGEND  
LEGENDE

-  DISCONNECTION POINT  
TRENNSTELLE
-  GALV. ROUND STEEL Ø 8mm  
VERZ. RUNDSTAHL Ø 8mm

REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
<b>HEADQUARTERS</b> UNITED STATES AIR FORCES EUROPE ENGINEERING & OPERATIONS 				
AIRFIELD STANDARD DESIGN US JET FUEL STORAGE AND DISPENSING SYSTEMS		FLUGPLATZ STANDARDPLANUNG US FLUGKRAFTSTOFF - VERSORGENGSANLAGEN		
BUILDING MANIFOLD / FILTER STATION, TANK TRUCK REFUELING SYSTEM BAUWERK VERTEILER / FILTERSTATION, TANKWAGEN - BETANKUNGSSYSTEM				
DESIGNATOR: GROUNDING AND LIGHTNING PROTECTION PLAN BEZUGSBILDUNG: TOP VIEW ERDUNGS- UND BLITZSCHUTZPLAN DRAUFSICHT				
WORKED/BEARBEITET LANDSBEREICHESLEITENDSCHAFTS- UND BAULEITENDSCHAFT L B B AMT FÜR BUNDESBAU WÄLLSTR.1 55122 MAINZ	APPROVED/GENEHMIGT ORIGINAL SIGNED BY: 14.05.2015			ORIGINAL SIGNED BY: 14.05.2015
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAU MASSNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED/GENEHMIGT ORIGINAL SIGNED BY: IN ORIGINAL DED.	DATE DATUM: 6. MAI 2015	SCALE MASSSTAB: 1:25 STANDARD SHEET STANDARD PLAN		
CONSTRUCTION PROJECT BAU MASSNAHME		SHEET NO. PLATZ NR.: E - 81.11 OF VON		



1,60m

2,20m

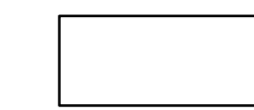
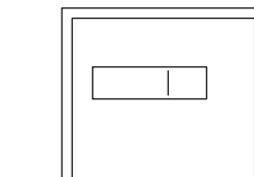
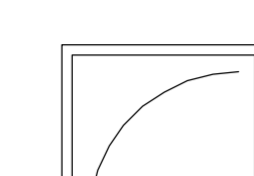
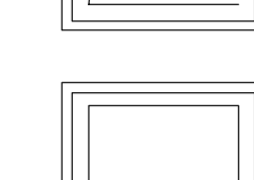
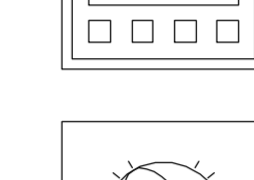
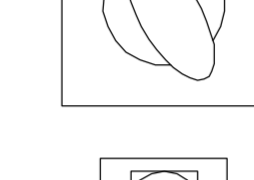
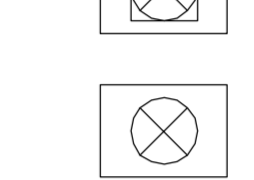
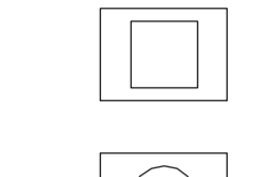
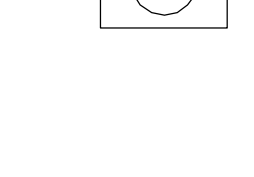
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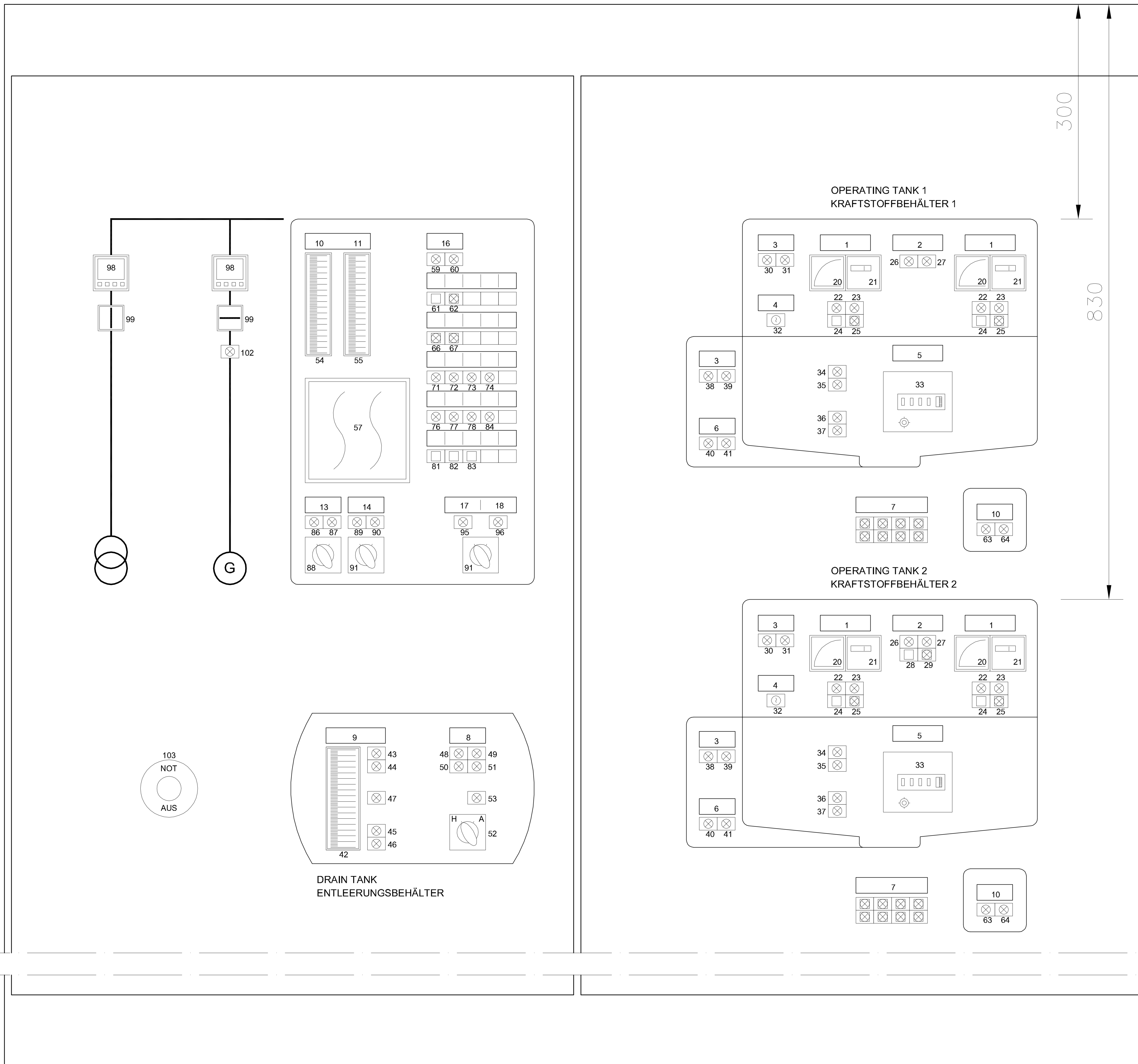
1,00m

300

830

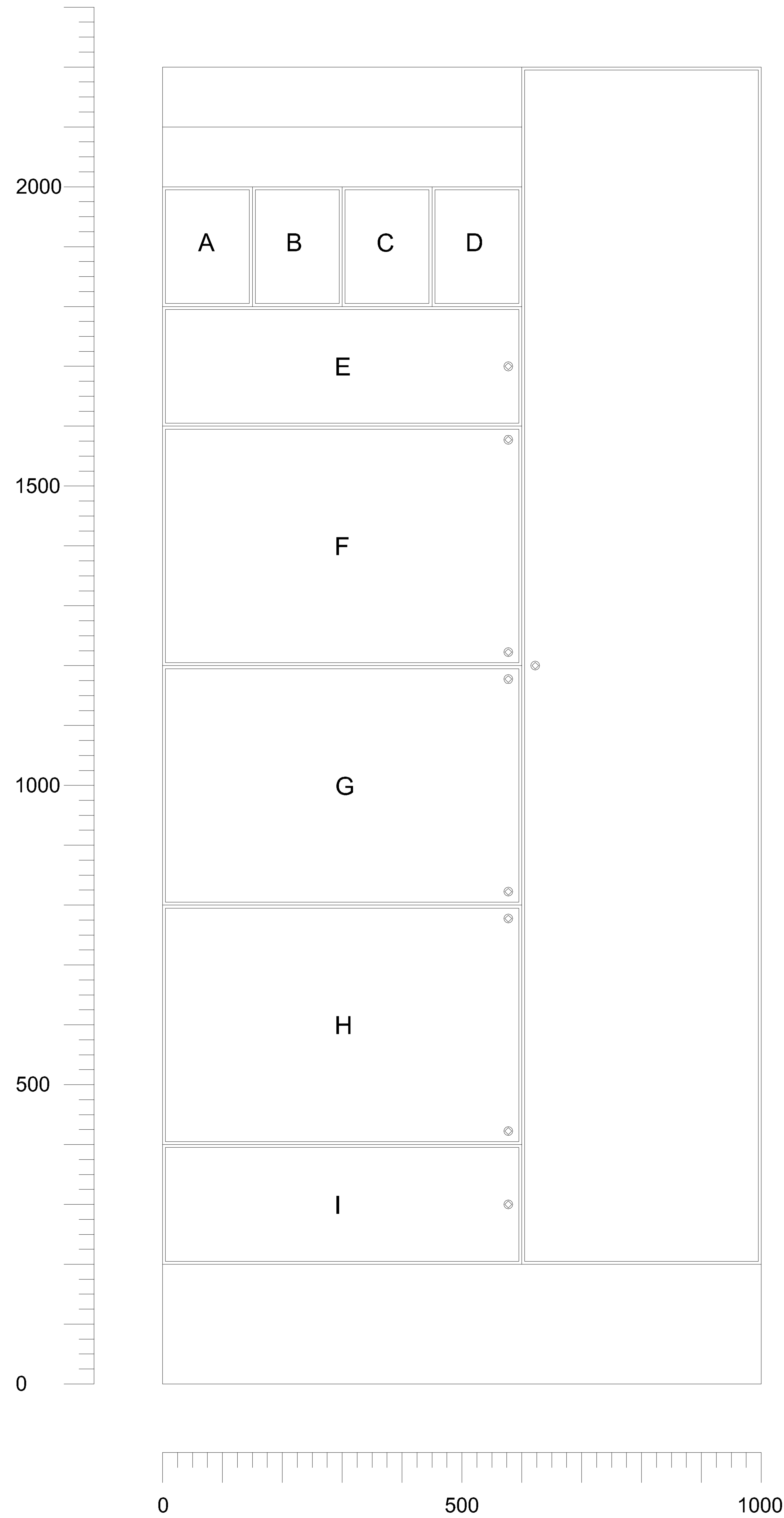
LEGEND  
LEGENDE

-  LABEL  
SCHRIFTFELD
-  48 x 48mm
-  48 x 48mm
-  48 x 48mm
-  48 x 48mm
-  24 x 18mm ILLUMINATED PUSH BUTTON  
LEUCHTDROCKTASTER
-  24 x 18mm INDICATING LAMP  
MELDELEUCHTE
-  24 x 18mm PUSH BUTTON  
DROCKTASTER
-  24 x 18mm KEY BUTTON  
SCHLÜSSELTASTER



REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
<b>HEADQUARTERS</b> UNITED STATES AIR FORCES EUROPE ENGINEERING & OPERATIONS				
AIRFIELD STANDARD DESIGN US JET FUEL STORAGE AND DISPENSING SYSTEMS		FLUGPLATZ STANDARDPLANUNG US FLUGKRAFTSTOFF - VERSORGENGSANLAGEN		
BUILDING / BAUWERK: MANIFOLD / FILTER STATION, TANK TRUCK REFUELING SYSTEM VERTEILER / FILTERSTATION, TANKWAGEN - BETANKUNGSSYSTEM				
DESIGNATOR / BEZUEHUNG: MIMIC DIAGRAM CONTROL PANEL STEUER- MESS- UND REGELSTRANK - BLINDSCHALTBIKD				
WORKED/BEARBEITET:		APPROVED/GENEHIGT:		
<small>LANDSCHAFTS- UND BAUVERBUND            LANDESBÜRO            ANSCHLIESST: UNTERSTÄNDIG, 1. STADTBAU            VERBUND (SIEHE PLAN 55122 MAINZ)</small>		<small>AMT FÜR            BUNDESBAU            WALLSTR. 1            55122 MAINZ</small>		
<small>INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY)            EINGEFÜHRT FÜR BAUMASSNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)</small>				
APPROVED / GENEHIGT	DATE / DATUM: 6. MAI 2015	SCALE / MASSSTAB: 1:2		
<small>ORIGINAL DRAWN BY:            IN ORIGINAL DED.</small>		<small>STANDARD SHEET            STANDARD PLAN</small>		
<small>GERÄTE- UND            CONSTRUCTION PROJECT            BAUMASSNAHME</small>		<small>CAD-PROJEKT            PLANSCH.</small>		SHEET NO. PLANSCH. OF VON
<b>E - 81.12</b>				

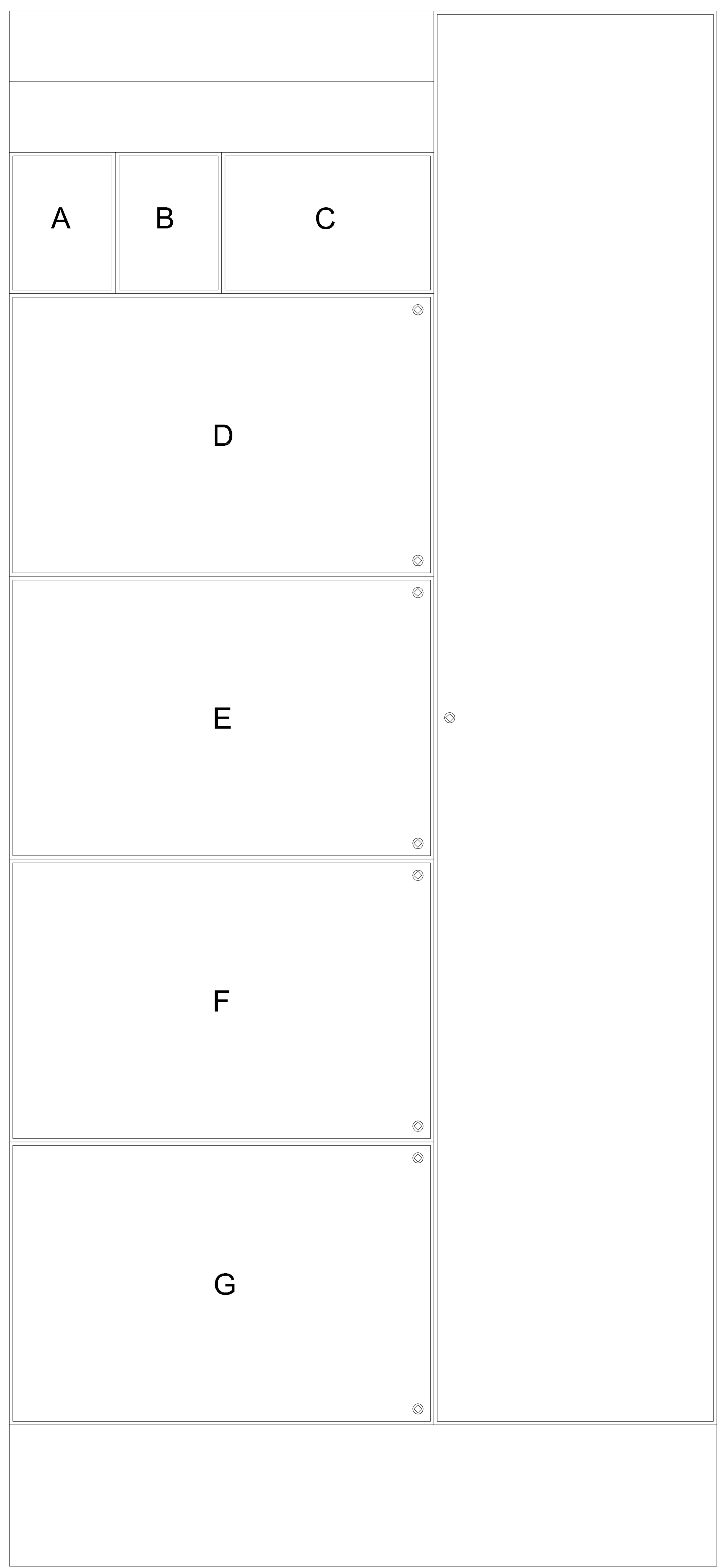
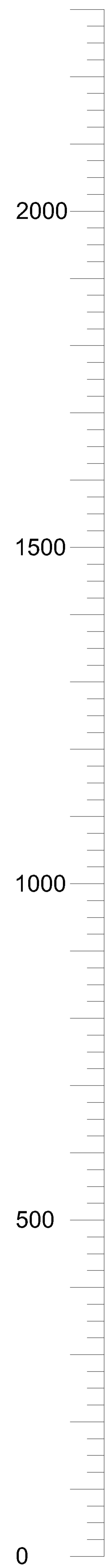




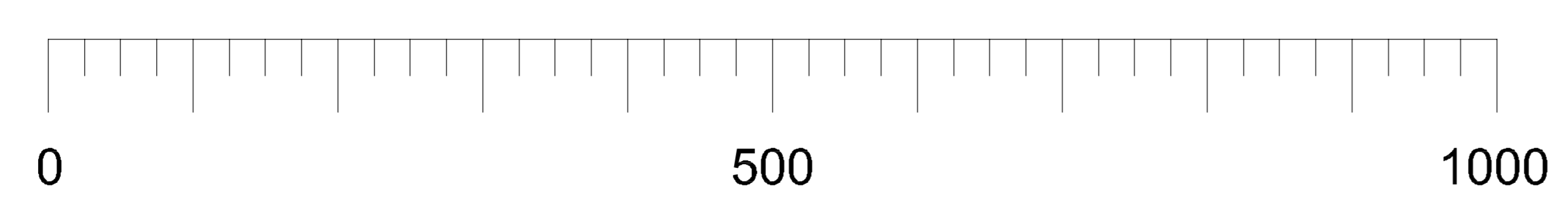
- A - FAN APP. 0,08kW PUMP HOUSE TANK 1  
LÜFTER CA. 0,08kW PUMPENHAUS TANK 1
- B - FAN APP. 0,08kW PUMP HOUSE TANK 2  
LÜFTER CA. 0,08kW PUMPENHAUS TANK 2
- C - FAN APP. 0,08kW LEAKAGE CONTROL PIT TANK 1  
LÜFTER CA. 0,08kW LECKKONTROLLSCHACHT TANK 1
- D - FAN APP. 0,08kW LEAKAGE CONTROL PIT TANK 2  
LÜFTER CA. 0,08kW LECKKONTROLLSCHACHT TANK 2
- E - SPARE  
RESERVE
- F - SPARE  
RESERVE
- G - POWER SUPPLY MAINS  
EINSPEISUNG NETZ
- H - EMERGENCY POWER SUPPLY  
NOTSTROMEINSPEISUNG
- I - SURGR ARRESTOR  
ÜBERSPANNUNGSABLEITER

REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
<b>HEADQUARTERS</b> UNITED STATES AIR FORCES EUROPE ENGINEERING & OPERATIONS				
AIRFIELD STANDARD DESIGN US JET FUEL STORAGE AND DISPENSING SYSTEMS		FLUGPLATZ STANDARDPLANUNG US FLUGKRAFTSTOFF - VERSORGENGSANLAGEN		
BUILDING BAUWERK: MANIFOLD / FILTER STATION, TANK TRUCK REFUELING SYSTEM VERTEILER / FILTERSTATION, TANKWAGEN - BETANKUNGSSYSTEM				
DESIGNATOR BEZUEHUNG: LOW VOLTAGE DISTRIBUTION PANEL - MCC NIEDERSPANNUNGSVERTEILUNG IN EINSCHUBTECHNIK				
WORKED/BEARBEITET	PREPARED/AUFGESTELLT	APPROVED/GENEHIGT		
LANGE/STRECKENVERLAUF UND BAUELEMENTE LANGE/STRECKENVERLAUF UND BAUELEMENTE LANGE/STRECKENVERLAUF UND BAUELEMENTE LANGE/STRECKENVERLAUF UND BAUELEMENTE	AMT FÜR BUNDESBAU WALLSTR.1 55122 MAINZ			
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAUMASSNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED GENEHIGT	DATE DATUM: 6. MAI 2015	SCALE MASSSTAB		
ORIGINAL, DESIGNED BY IN ORIGINAL, GEG.	GERÄT/BAU CONRAD (BAU) INGENIEUR UND ARCHITECTUR LANGE/STRECKENVERLAUF UND BAUELEMENTE	STANDARD SHEET STANDARD PLAN	E - 81.13	
CONSTRUCTION PROJECT BAU MASSNAHME		CAD-PROJECT FILE: CAD-PROJECT	SHEET NO. PLATZNR.	OF VON



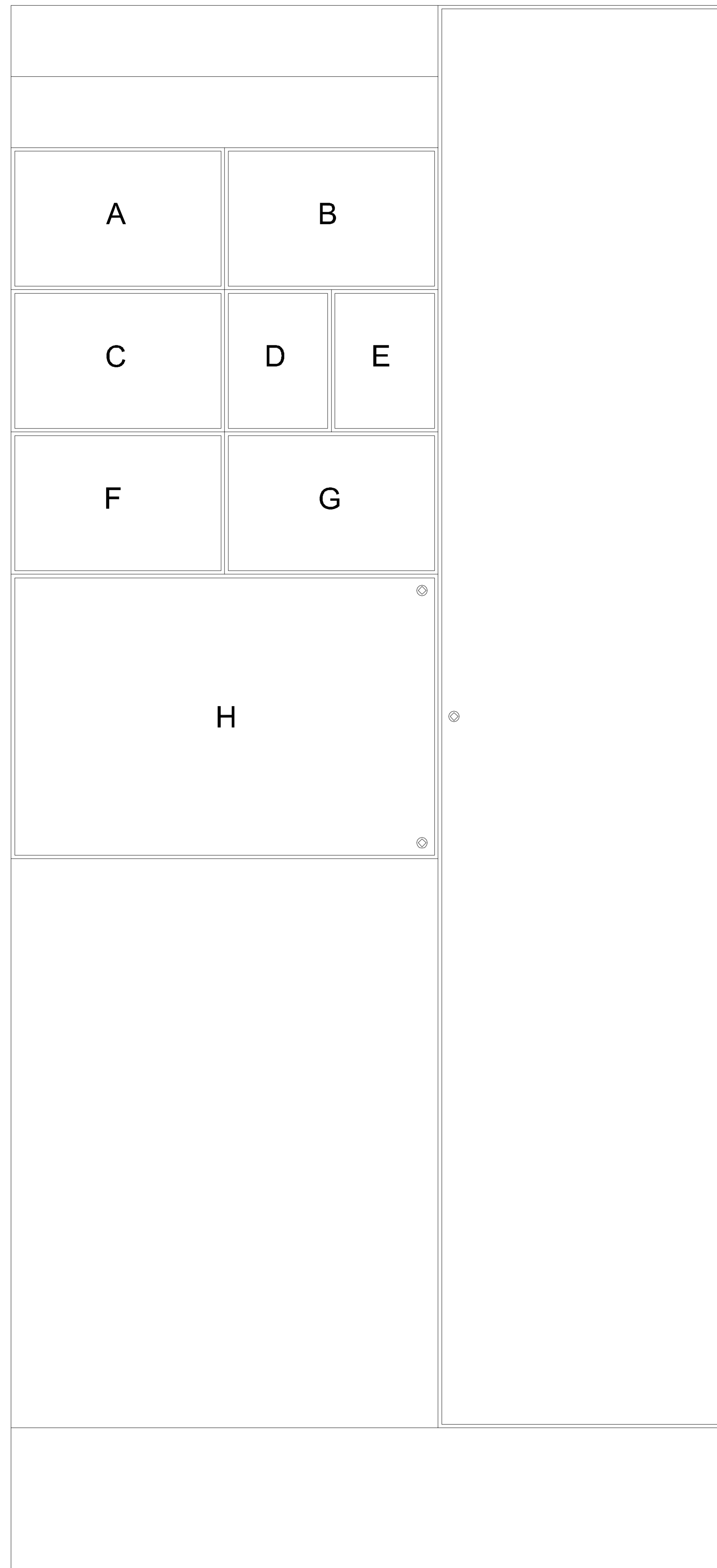


- A - DRAIN PUMP 2,2kw TANK 1  
ENTLEERUNGSPUMPE 2,2kw TANK 1
- B - DRAIN PUMP 2,2kw TANK 2  
ENTLEERUNGSPUMPE 2,2kw TANK 2
- C - DRAIN TANK PUMP 7,5kw  
PUMPE ENTLEERUNGSBEHÄLTER 7,5kw
- D - FUEL PUMP 30kw 1 TANK 1  
FÖRDERPUMPE 30kw 1 TANK 1
- E - FUEL PUMP 30kw 2 TANK 1  
FÖRDERPUMPE 30kw 2 TANK 1
- F - FUEL PUMP 30kw 1 TANK 2  
FÖRDERPUMPE 30kw 1 TANK 2
- G - FUEL PUMP 30kw 2 TANK 2  
FÖRDERPUMPE 30kw 2 TANK 2

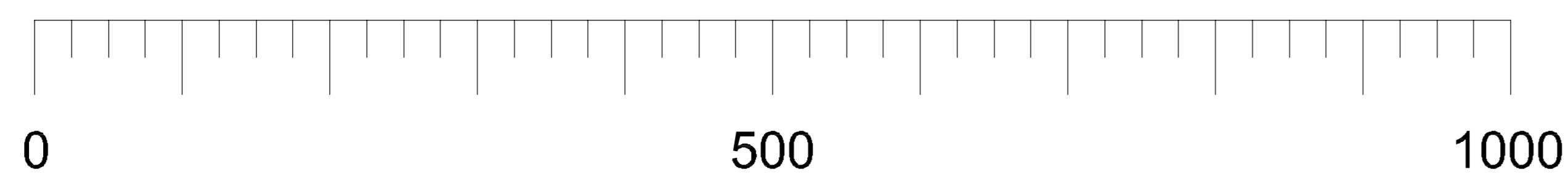


REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
<b>HEADQUARTERS</b> UNITED STATES AIR FORCES EUROPE ENGINEERING & OPERATIONS				
AIRFIELD STANDARD DESIGN US JET FUEL STORAGE AND DISPENSING SYSTEMS		FLUGPLATZ STANDARDPLANUNG US FLUGKRAFTSTOFF - VERSORGENGSANLAGEN		
BUILDING BAUWERK: MANIFOLD / FILTER STATION, TANK TRUCK REFUELING SYSTEM VERTEILER / FILTERSTATION, TANKWAGEN - BETANKUNGSSYSTEM				
DESIGNATOR BEZEICHNUNG: LOW VOLTAGE DISTRIBUTION PANEL - MCC NIEDERSpannungsverteilung in Einschubtechnik				
WORKED/BEARBEITET	PREPARED/AUFGESTELLT	APPROVED/GENEHMIGT		
	LANDESBETRIEBSLEITUNG UND BAUVERWALTUNG LANDESWEITUNG L B B ANSCHLUSSE, UNTERSCHLÜSSEL, INHALT, VERBUNDENE TRÜMMER, VERBUNDENE TRÜMMER (VERBUNDENE)	AMT FÜR BUNDESBAU WALLSTR.1 55122 MAINZ ORIGINAL, SIGNED BY: WOLFGANG GÖTT 14.06.2015		
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAU MASSNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED GENEHMIGT	DATE DATUM: 6. MAI 2015	SCALE MASSSTAB: —		
ORIGINAL, SIGNED BY IN ORIGINAL, GEG.		STANDARD SHEET STANDARD PLAN		
DESIGNER CONRAD EISENBERGER ENGINEER INGENIEUR-ARCHITECTURE		CAD-PROJECT FILE: CAD-PROJECT	E - 81.14	
CONSTRUCTION PROJECT BAU MASSNAHME		SHEET NO. PLATZNR.	OF VON	





- A - POWER SUPPLY CONTROL PANELS  
VERSORGUNG STEUERSCHRÄNKE
- B - SUPPLY DIESEL CONTROL PANEL  
VERSORGUNG DIESELÜBERWACHUNGSSCHRANK
- C - CATHODIC PRETECTION RECTIFIER  
KKS - SCHUTZSTROMGERÄT
- D - VENTILATOR 0,37kw M - ROOM  
VENTILATOR 0,37kw M - RAUM
- E - SPARE  
RESERVE
- F - SPARE  
RESERVE
- G - POWER RECEPTACLE (400V)  
KRAFTSTECKDOSE (400V)
- H - 230V SUPPLY  
230V VERSORGUNG



REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
<b>HEADQUARTERS</b> <b>UNITED STATES</b> <b>AIR FORCES EUROPE</b>				
<b>ENGINEERING &amp; OPERATIONS</b>				
<b>AIRFIELD</b> <b>STANDARD DESIGN US</b> <b>JET FUEL STORAGE AND</b> <b>DISPENSING SYSTEMS</b>		<b>FLUGPLATZ</b> <b>STANDARDPLANUNG US</b> <b>FLUGKRAFTSTOFF -</b> <b>VERSORGUNGSANLAGEN</b>		
<b>BUILDING</b> MANIFOLD / FILTER STATION, TANK TRUCK REFUELING SYSTEM <b>BAUWERK</b> VERTEILER / FILTERSTATION, TANKWAGEN - BETANKUNGSSYSTEM				
<b>DESIGNATION</b> LOW VOLTAGE DISTRIBUTION PANEL - MCC <b>BEZUGSBUILDUNG</b> NIEDERSpannungSVERTEILUNG IN EINSCHUBTECHNIK				
<b>WORKED/BEARBEITET</b> LANDSBEREITUNGSGESAMTSCHAFT UND BAUVERBUND LANDESVERBUNDUNG LANDES L B B AMBASSADE, UNIVERSITÄT J. J. MANN LANDES TRUPPEN, DIESEL UND FUEL TRUCK (DIESEL) - 2015 LANDAU ST. PAVELI IN DER STRASSE CONRAD, INGENIEUR PROGRAMM, GZ. STRASSE 107/108/109/110		<b>APPROVED/GENEHMIGT</b> <b>AMT</b> <b>FÜR</b> <b>BUNDESBAU</b> <b>WALLSTR. 1</b> <b>55122 MAINZ</b> ORIGINAL SIGNED BY: WOLFGANG GZ. 14.06.2015		
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAU MASSNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
<b>APPROVED</b> <b>GENEHMIGT</b>		<b>DATE</b> 6. MAI 2015 <b>DATUM</b>		<b>SCALE</b> <b>MASSSTAB</b>
<b>ORIGINAL, SIGNED BY</b> IN ORIGINAL GZ.		<b>STANDARD SHEET</b> STANDARD PLAN		<b>E - 81.15</b>
<b>GENERAL INFO</b> CONRAD (BAU) INGENIEUR 10.0000 - WERBUNG 1/10		<b>CAD-PROJECT PATH:</b> CAD-PROJEKTE		<b>SHEET NO.</b> PLAN-NR. OF VON
<b>CONSTRUCTION PROJECT</b> <b>BAU MASSNAHME</b>				



# **DRAIN TANK 10m<sup>3</sup>**

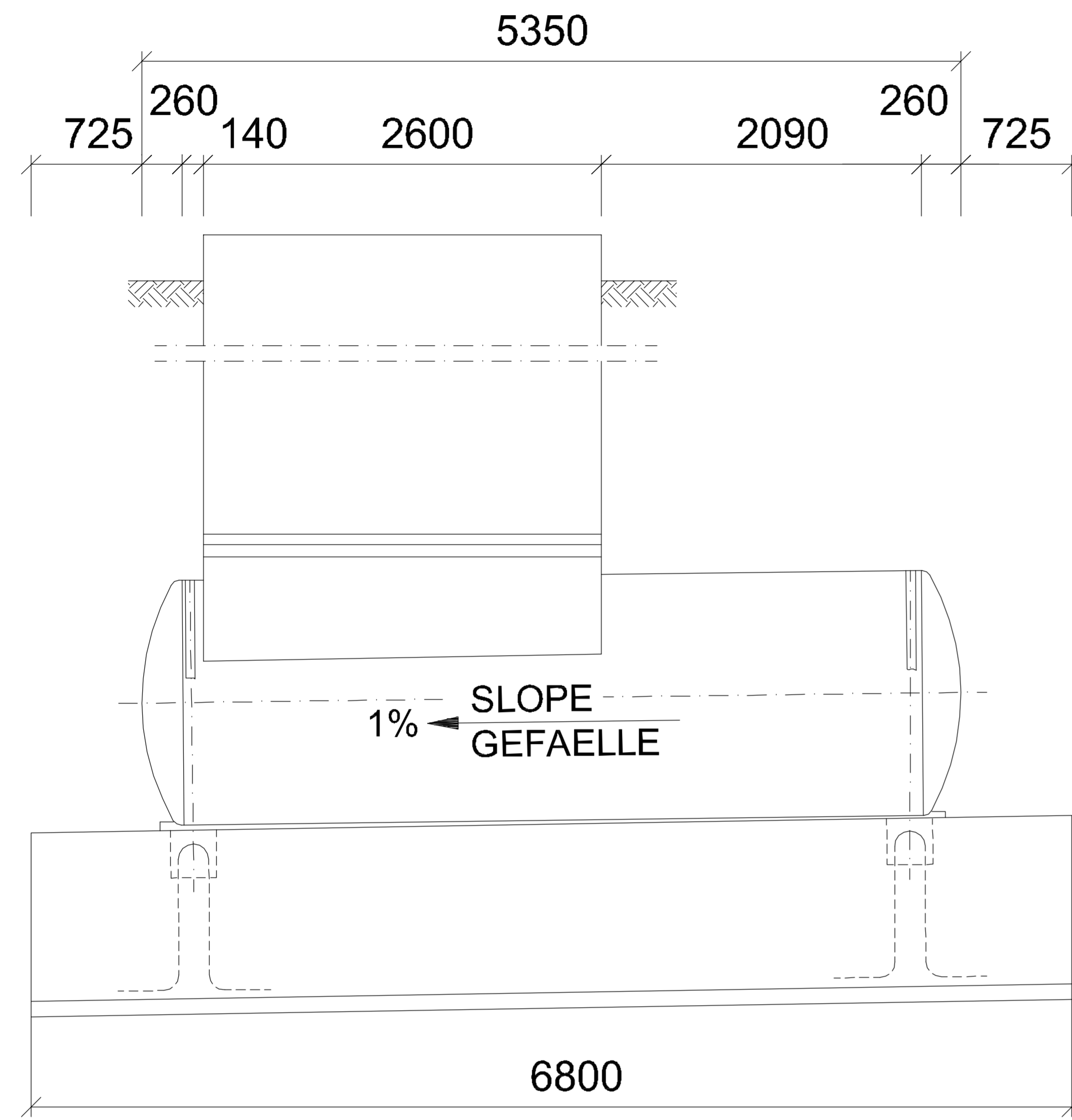
## **ENTLEERUNGSBEHÄLTER 10m<sup>3</sup>**

<b>C-9.1</b>	<b>SAFETY MEASURES AGAINST UPLIFT AUFTRIEBSSICHERUNG</b>	<b>M-9.1</b>	<b>MECHANICAL INSTALLATION MASCHINENTECHNISCHE INSTALLATION</b>
<b>C-9.1.1</b>	<b>REINFORCEMENT, SAFETY MEASURES AGAINST UPLIFT BEWEHRUNG, AUFTRIEBSSICHERUNG</b>	<b>E-9.1</b>	<b>ELECTRICAL INSTALLATION AND GROUNDING ELEKTROTECHNISCHE INSTALLATION UND ERDUNG</b>
<b>S-9.1</b>	<b>STEEL TANK, TOP VIEW, SECTIONS AND DETAIL STAHLBEHÄLTER, DRAUFSICHT, SCHNITTE UND DETAILS</b>	<b>E-9.2</b>	<b>CPS DRAIN TANK KKS ENTLEERUNGSBEHÄLTER</b>
<b>S-9.2</b>	<b>ROLLING COVER, TOP VIEW, VIEW AND SECTIONS ROLLDECKEL, DRAUFSICHT, ANSICHT UND SCHNITTE</b>		
<b>S-9.2.1</b>	<b>ROLLING COVER, DETAILS ROLLDECKEL, DETAILS</b>		



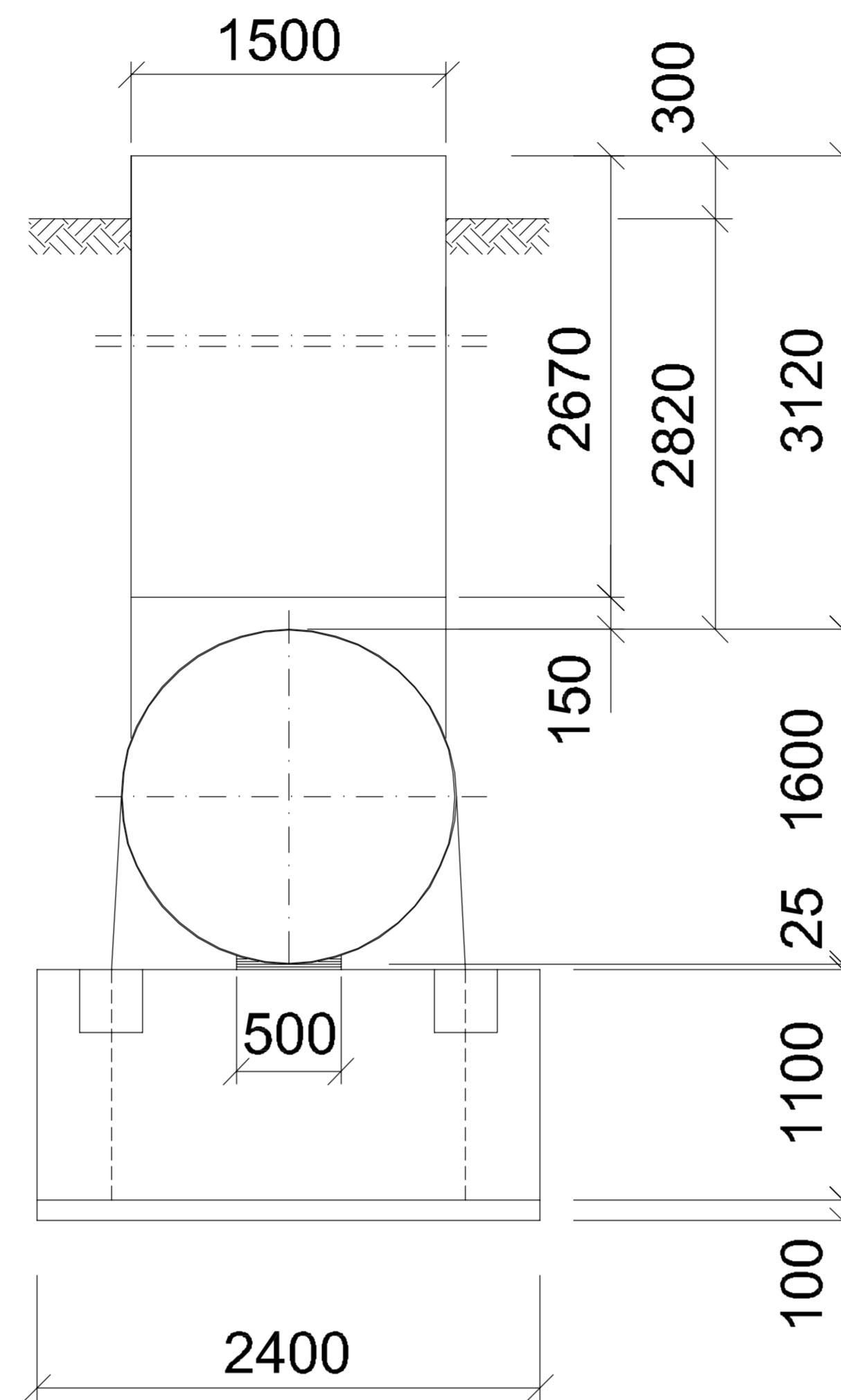
**FRONT VIEW**  
**VORDERANSICHT**

SCALE 1:25

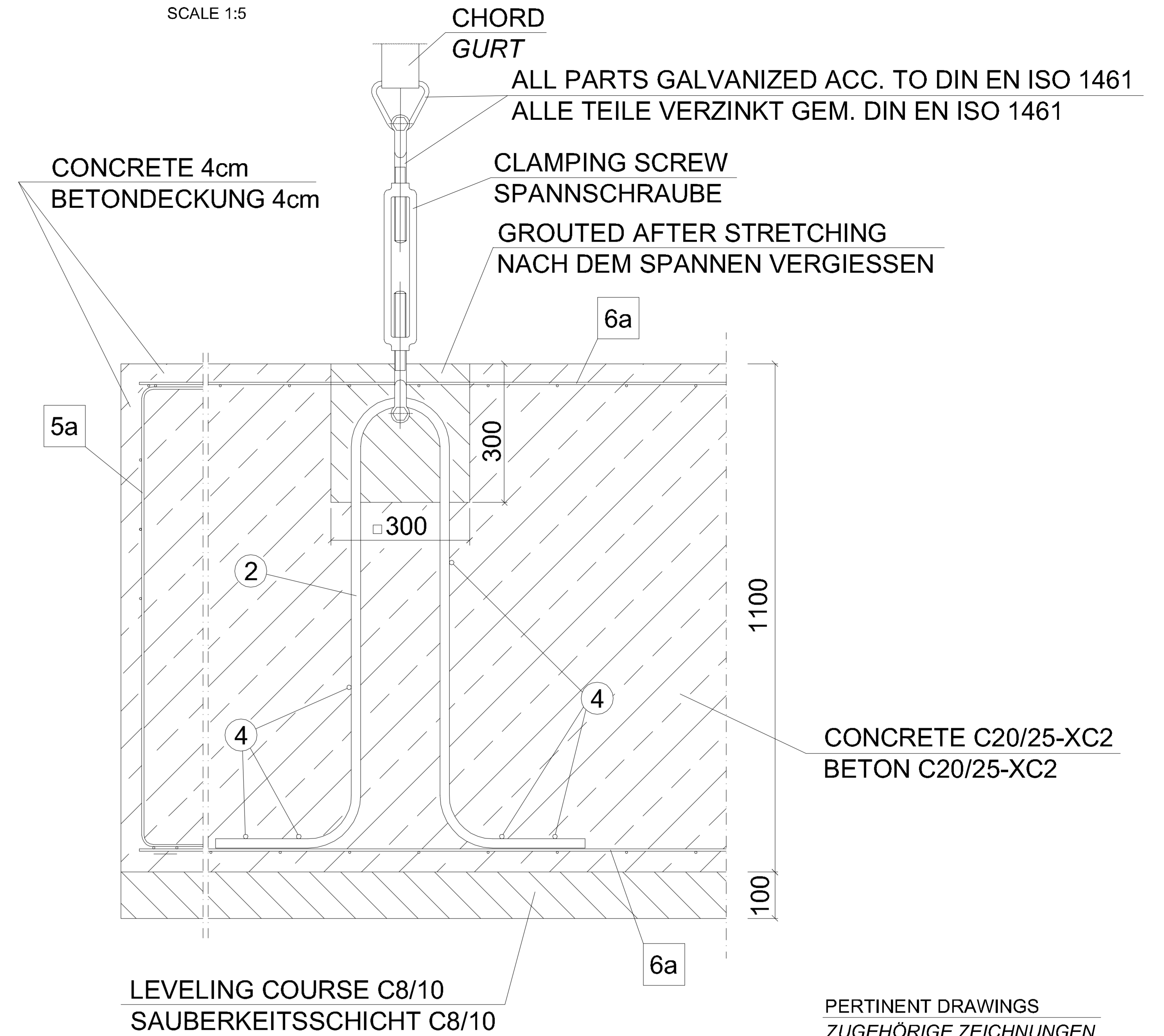


**SIDE VIEW**  
**SEITENANSICHT**

SCALE 1:25

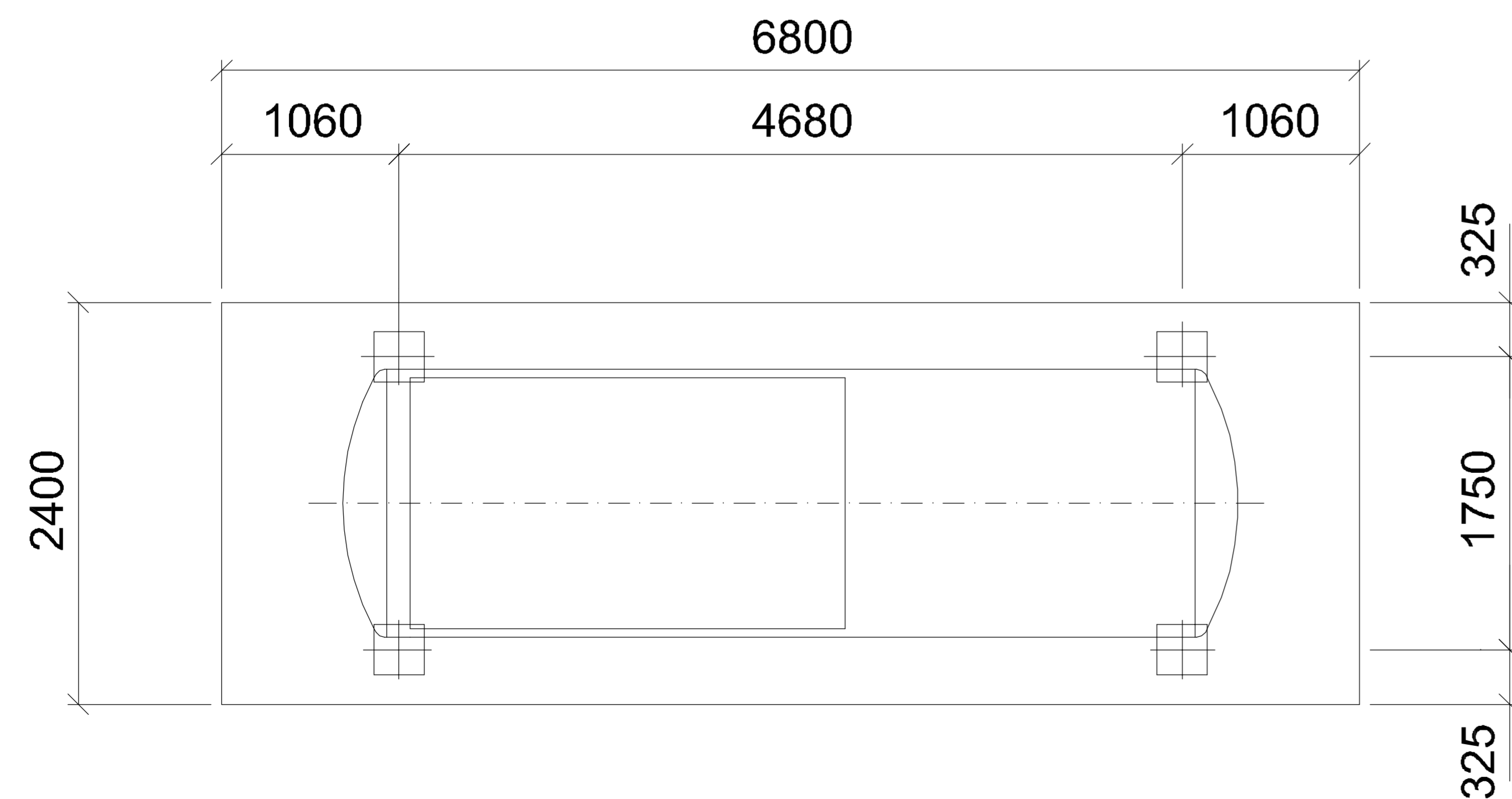


**DETAIL**  
SCALE 1:5



**TOP VIEW**  
**DRAUFSICHT**

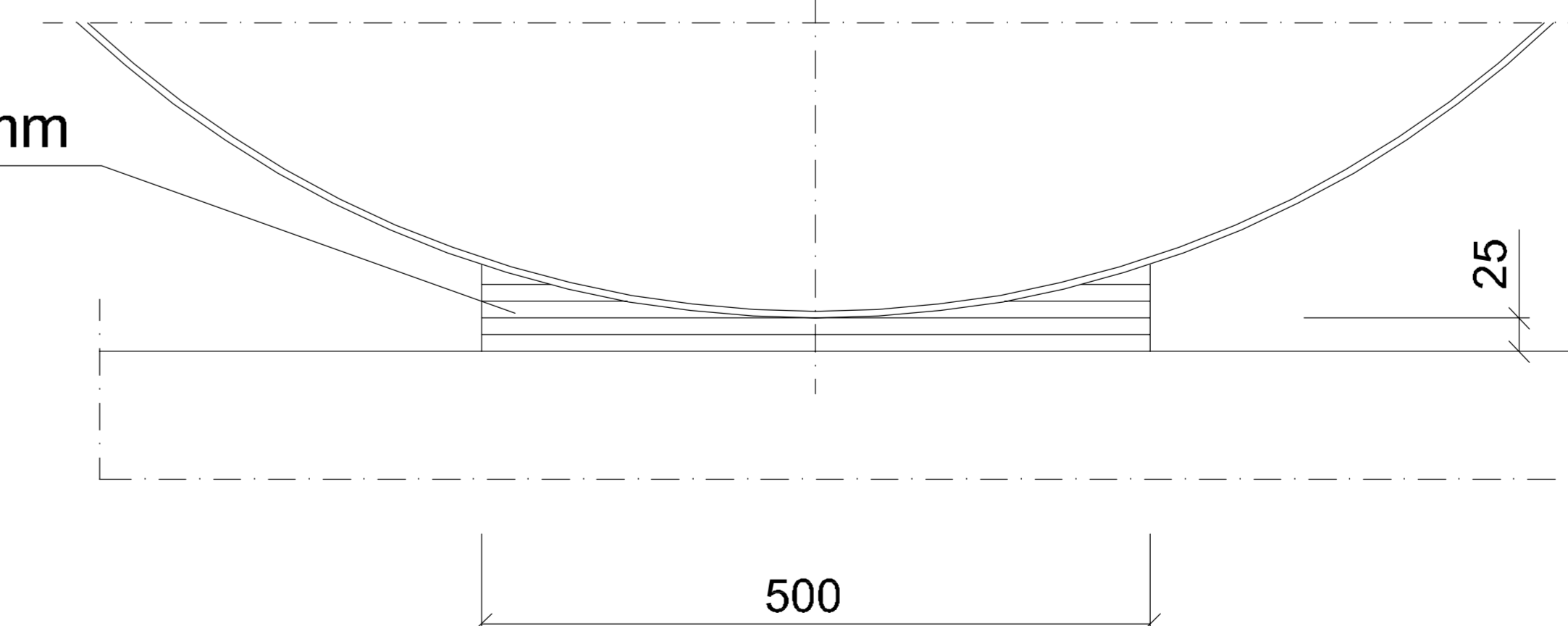
SCALE 1:25



**BEARING AREA OF TANK**  
**BEHAELTERAUFLAGE**

NOT TO SCALE  
OHNE MASSSTAB

ROCK WOOL BLANKET  
THICKNESS (UNDER LOAD) 25mm  
STEINWOLLE-MATTENFILZ  
DICKE (BELASTET) 25mm



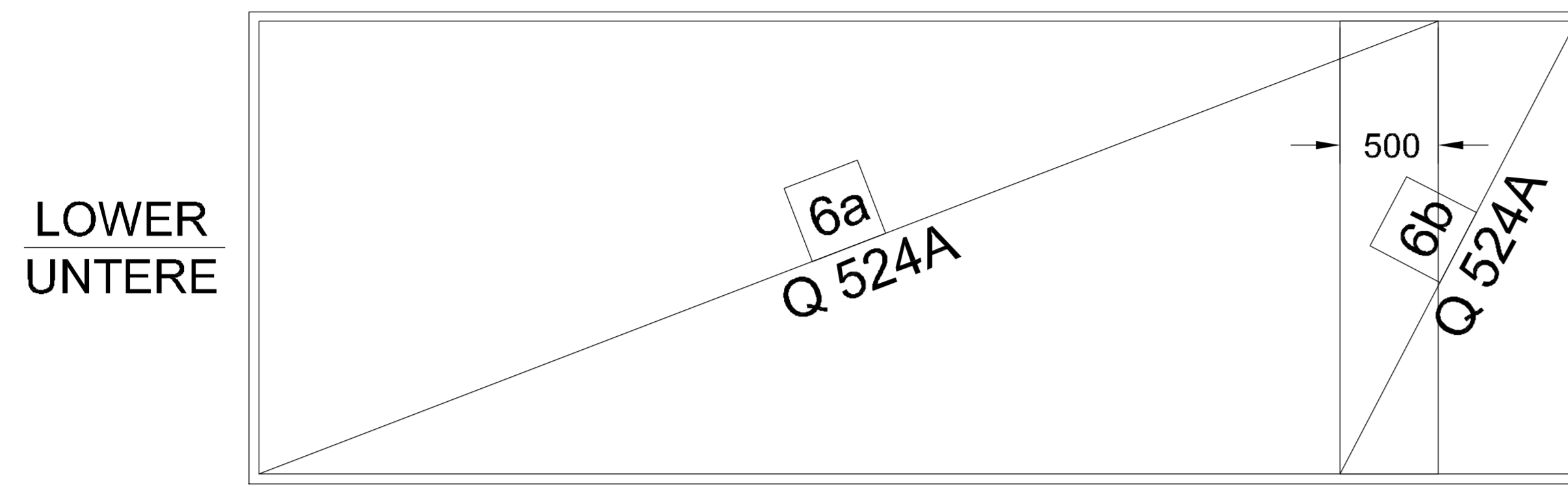
C-9.1.1 REINFORCEMENT SAFETY MEASURES AGAINST UPLIFT  
BEWEHRUNG AUFTRIEBSSICHERUNG

REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
HEADQUARTERS UNITED STATES AIR FORCES EUROPE				
ENGINEERING & OPERATIONS				
AIRFIELD STANDARD DESIGN US		FLUGPLATZ STANDARDPLANUNG US		
JET FUEL STORAGE AND DISPENSING SYSTEMS		FLUGKRAFTSTOFF - VERSORGUNGSANLAGEN		
BUILDING BAUWERK				
DRAIN TANK 10m <sup>3</sup> ENTLEERUNGSBEHÄLTER 10m <sup>3</sup>				
DESIGNATOR BEZEICHNUNG				
SAFETY MEASURES AGAINST UPLIFT AUFTRIEBSSICHERUNG				
WORKED/BEARBEITET		APPROVED/GENEHMIGT		
<small>LANDSBEREITUNGSGESAMTSCHAFT UND BAUVERBUND L B B AMBAUSTR. UNTERSCHLEIFE 1, MAIN AIRFIELD TRUPPEN, VERBUND WELTFLUGTRUPPEN (VERBUND)</small>		<small>AMT FÜR BUNDESBAU WALLSTR. 1 55122 MAINZ</small>		
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAU MASSNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED GENEHMIGT	DATE DATUM	SCALE MASSSTAB	STANDARD SHEET STANDARD PLAN	
	6. MAI 2015	1:10	C - 9.1	
ORIGINAL DRAWING URSPRÜNGLICHE ZEICHNUNG			CAD-DRAWING FILE CAD-ZEICHNUNG	
CONSTRUCTION PROJECT BAU MASSNAHME			SHEET NO. PLATZNR.	

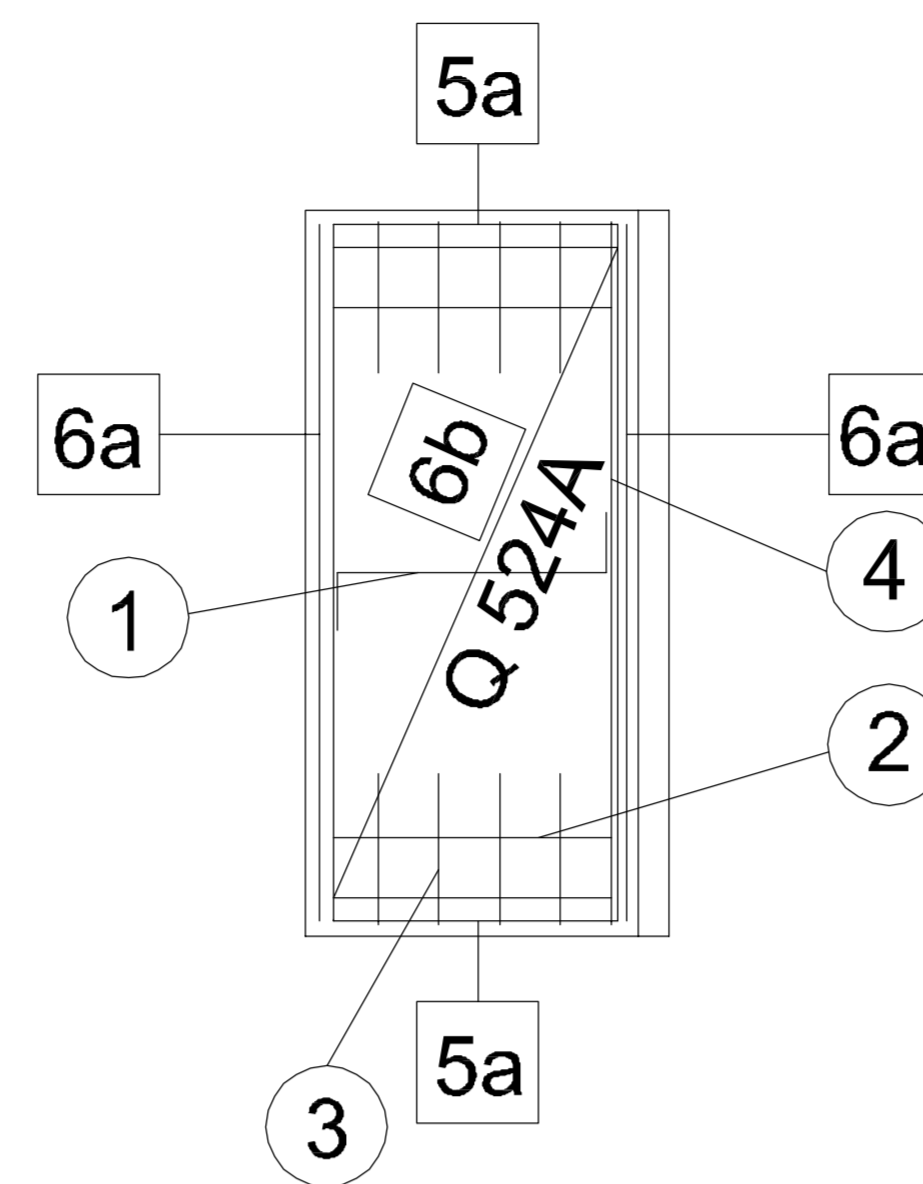
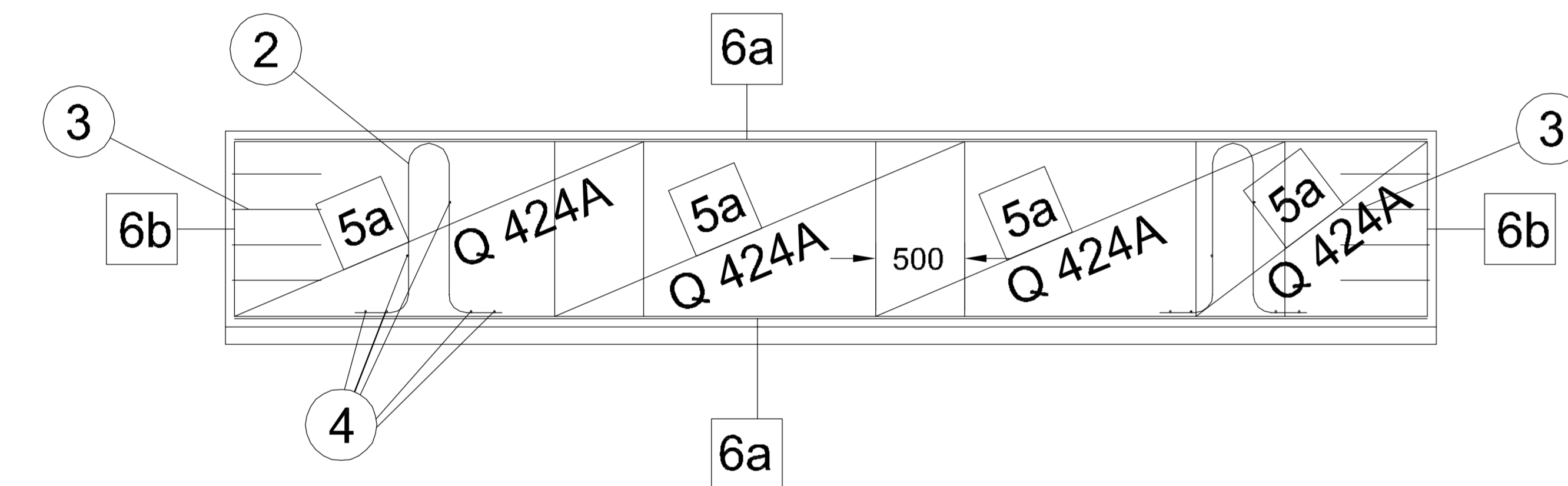
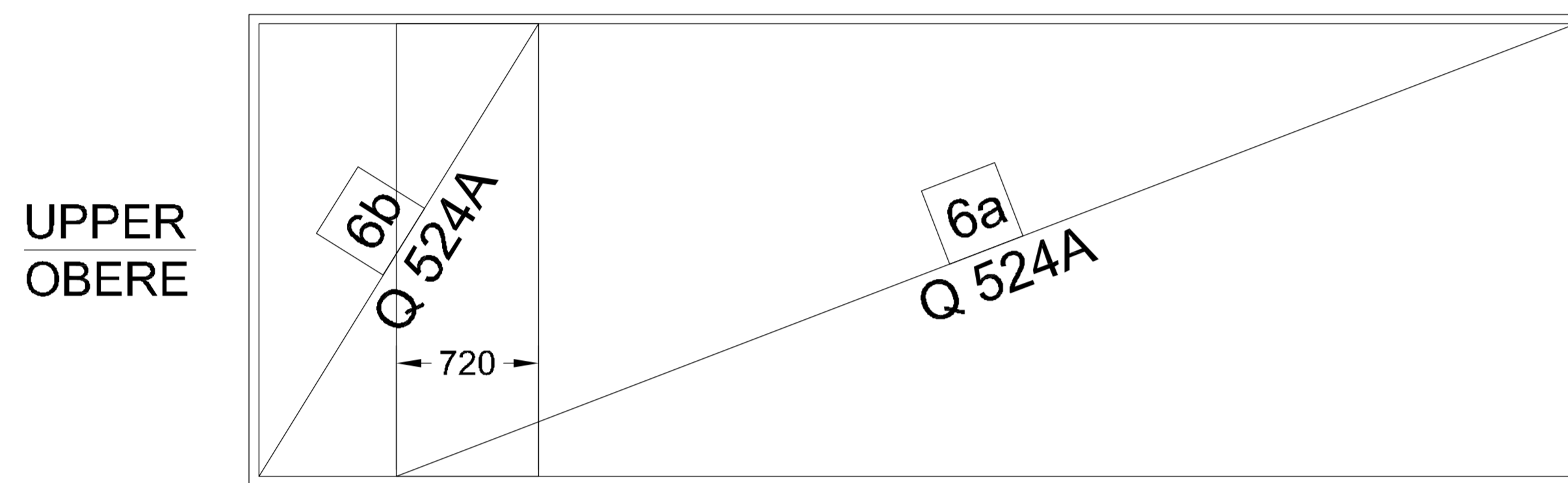


**REINFORCEMENT  
BEWEHRUNG**

SCALE 1:50



**WIRE MESH LAYER  
MATTENLAGE**



**CUTTING SKETCH  
SCHNEIDESKIZZE**

SCALE 1:100

2x Q542A	1x Q542A	4x Q424A
6a 2.30x6.00	6b 2.30x2.80	5a 2.30x2.50
	6b 2.30x2.80	5a 2.30x2.50
	REST 2.30x0.40	REST 2.30x1.00

**MATERIAL  
BAUSTOFFE**

CONCRETE  
BETON C20/25-XC2  
REINFORCEMENT  
BAUSTAHL B500A  
CONCRETE COVER  
BETONDECKUNG 4cm

**BENDING SCHEDULE  
STAHLLISTE**

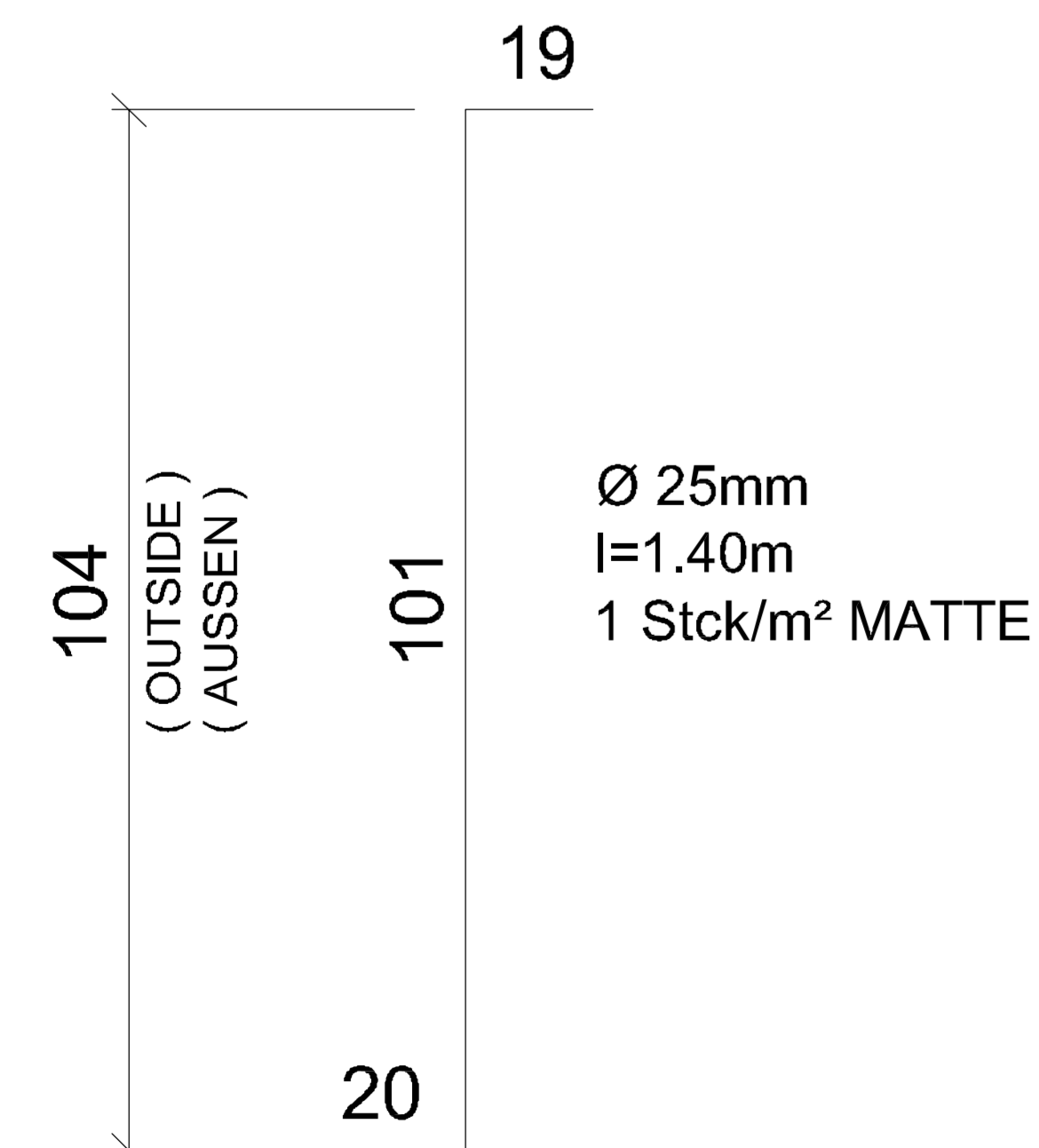
POSITION	PIECES STUECK	Ø	LENGTH LAENGE m	Σ LENGTH LAENGE m	WEIGHT GEWICHT kg
1	15	25	1.40	21.00	80.75
2	4	20	2.50	10.00	24.70
3	16	12	1.00	16.00	14.21
4	12	10	2.32	37.12	19.20
TOTAL SUMME					138.86

**WIRE MESH REQUIRED  
MATTENBEDARF**

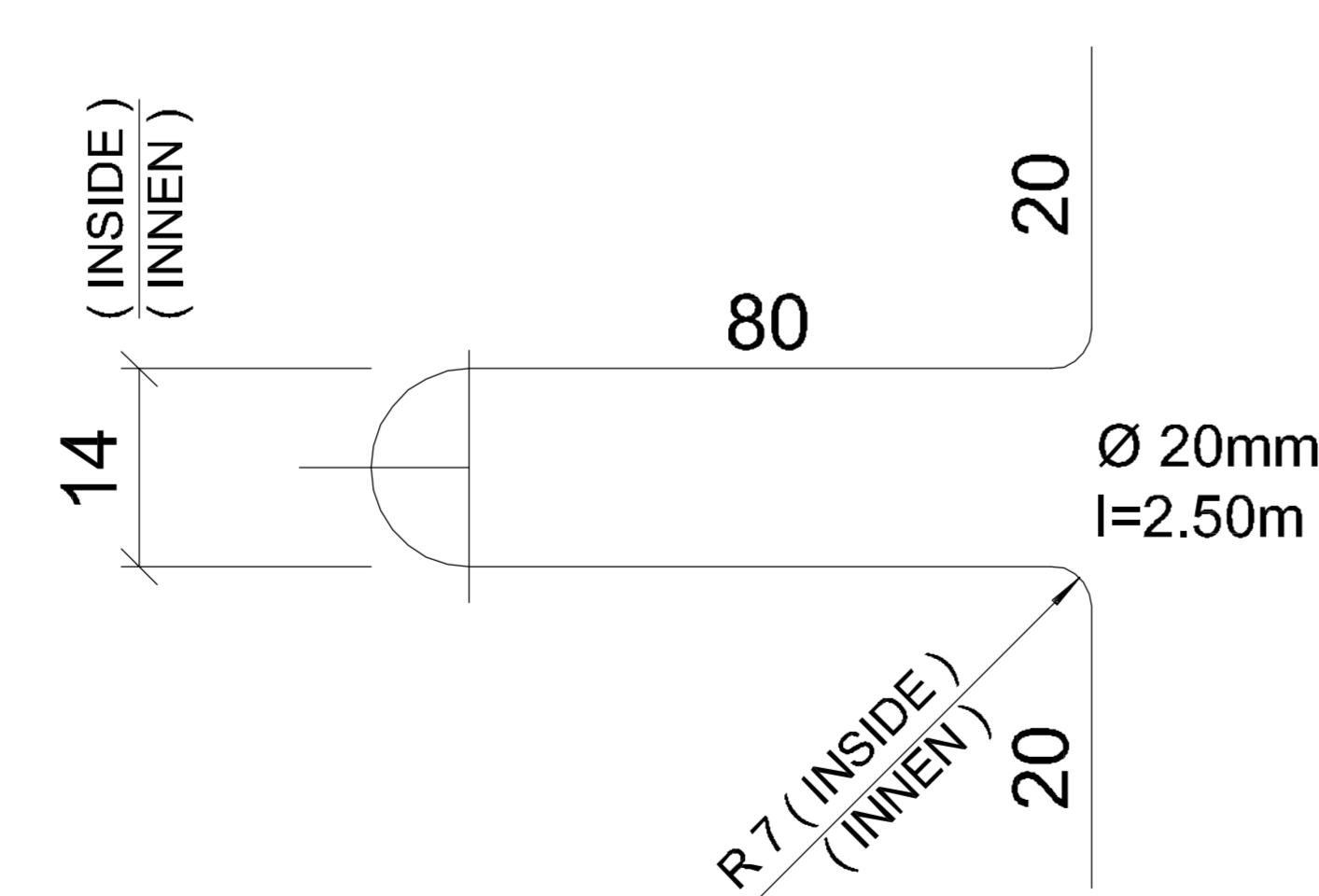
POSITION	PIECES STUECK	DESCRIPTION BEZEICHNUNG	WEIGHT GEWICHT kg
5	4	4 Q 424A REST	84.4 =338 56
6	3	1 Q 542A REST	100.9 =303 7
SUMME REST			-63
SUMME			641

**BENDING FORMS  
BIEGEFORMEN**

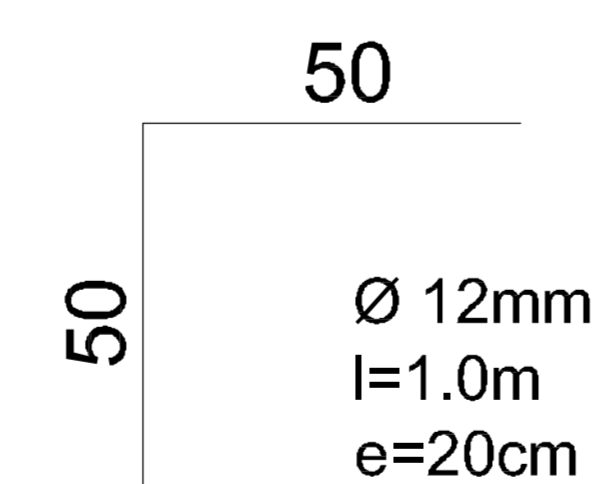
① RANGE SPACER  
ABSTANDHALTER



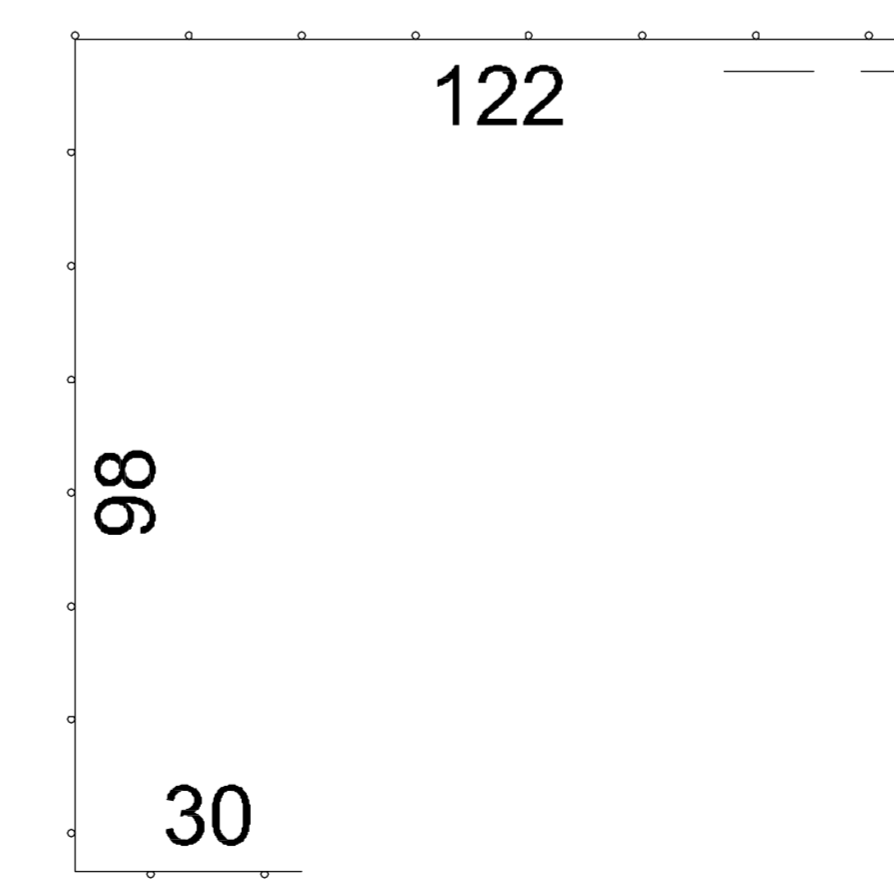
② BEND  
BUEGEL



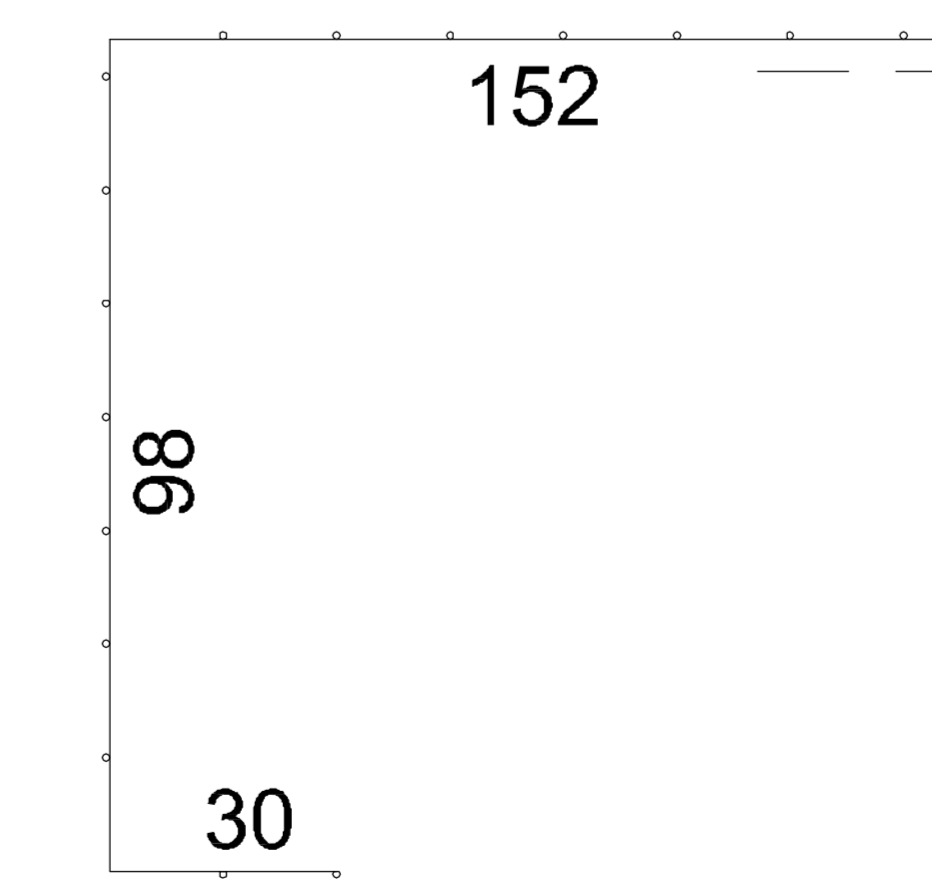
③ ANGLE REINFORCEMENT  
ECKBEWEHRUNG



**BEND OF WIRE MESH  
MATTENBUEGEL**



5a 8x Q 424A  
L.2.50x2.30



6b 2x Q 524A  
L.2.80x2.30

**PERTINENT DRAWINGS  
ZUGEHÖRIGE ZEICHNUNGEN**

C-9.1 SAFETY MEASURES AGAINST UPLIFT  
AUFTRIEBSICHERUNG

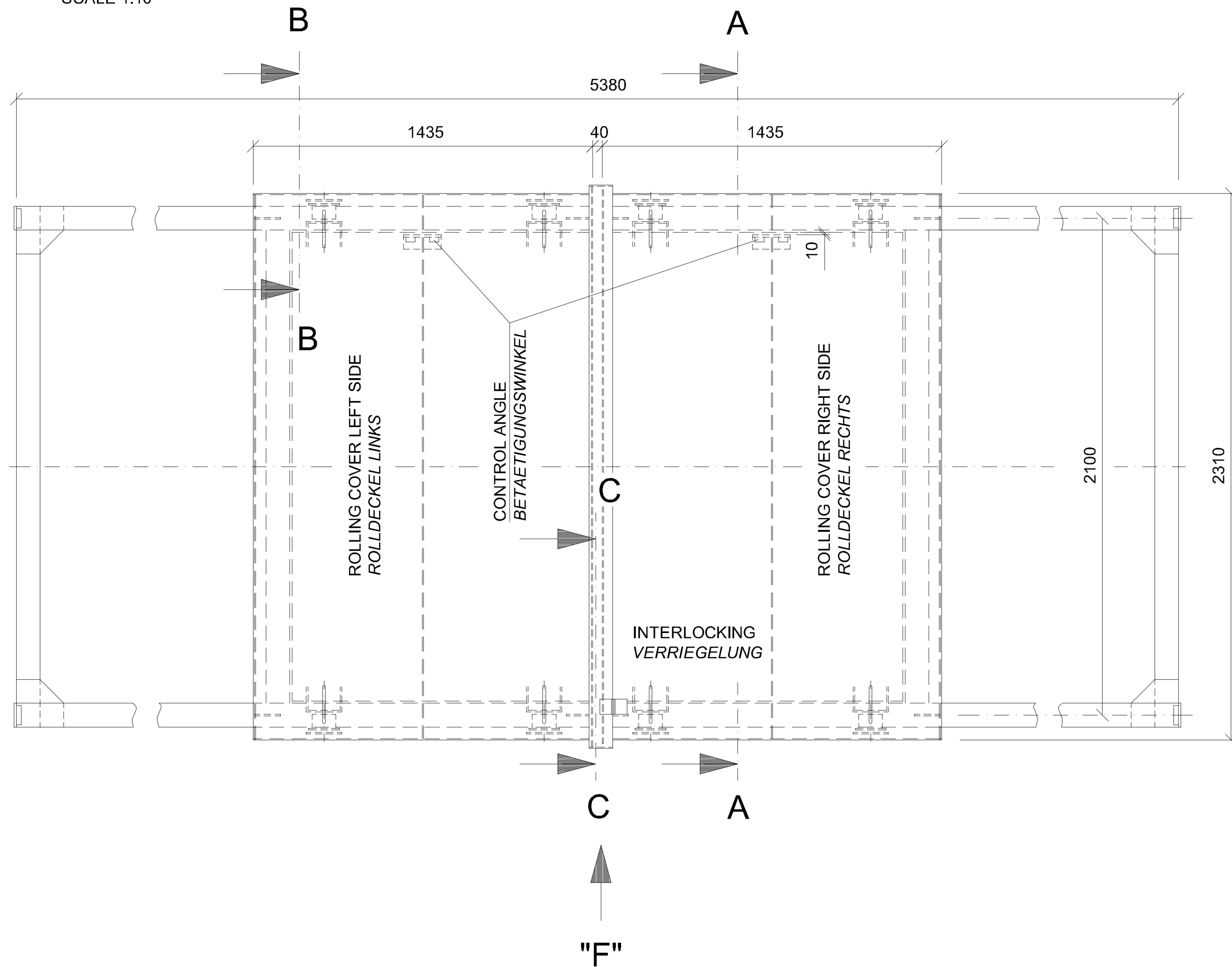
REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
HEADQUARTERS UNITED STATES AIR FORCES EUROPE ENGINEERING & OPERATIONS				
AIRFIELD STANDARD DESIGN US		FLUGPLATZ STANDARDPLANUNG US		
JET FUEL STORAGE AND DISPENSING SYSTEMS		FLUGKRAFTSTOFF - VERSORGUNGSANLAGEN		
BUILDING BAUWERK DRAIN TANK 10m³ ENTLEERUNGSBEHÄLTER 10m³				
DESIGNATOR BEZEICHNUNG REINFORCEMENT, SAFETY MEASURES AGAINST UPLIFT BEWEHRUNG, AUFTRIEBSICHERUNG				
WORKED/BEARBEITET	PREPARED/AUFGESTELLT	APPROVED/GENEHIGT		
LANDSCHAFTS- UND BAUVERBUND L B B	AMT FÜR BUNDESBAU WALLSTR.1 55122 MAINZ	ORIGINAL SIGNED BY IN DRÖHM, GZC 10/06/2012		
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAUMASSNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED GENEHIGT	DATE DATUM	SCALE MASSSTAB	STANDARD SHEET STANDARD PLAN	
ORIGINAL SIGNED BY IN DRÖHM, GZC	6. MAI 2015	1:10	C - 9.1.1	
DESIGN/BAU CONRAD (BAU) FACILITIES ENGINEER IN DRÖHM, GZC			SHEET NO. PLAN NR.	
CONSTRUCTION PROJECT BAU MASSNAHME			OF VON	



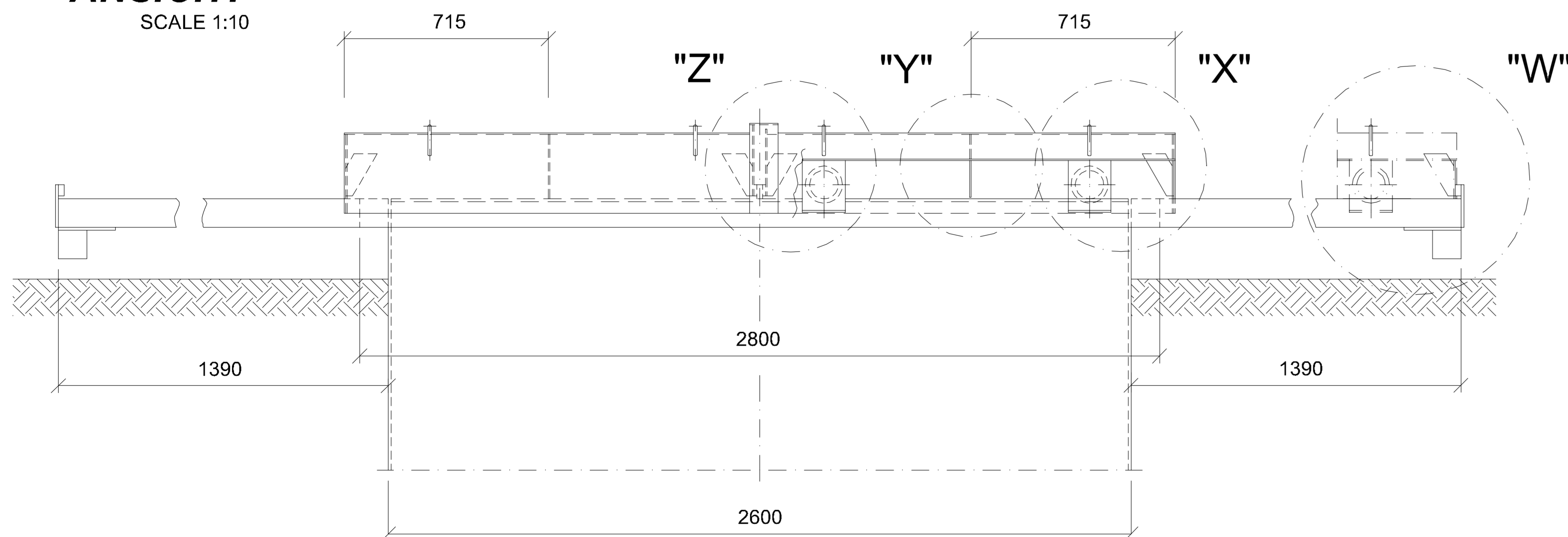




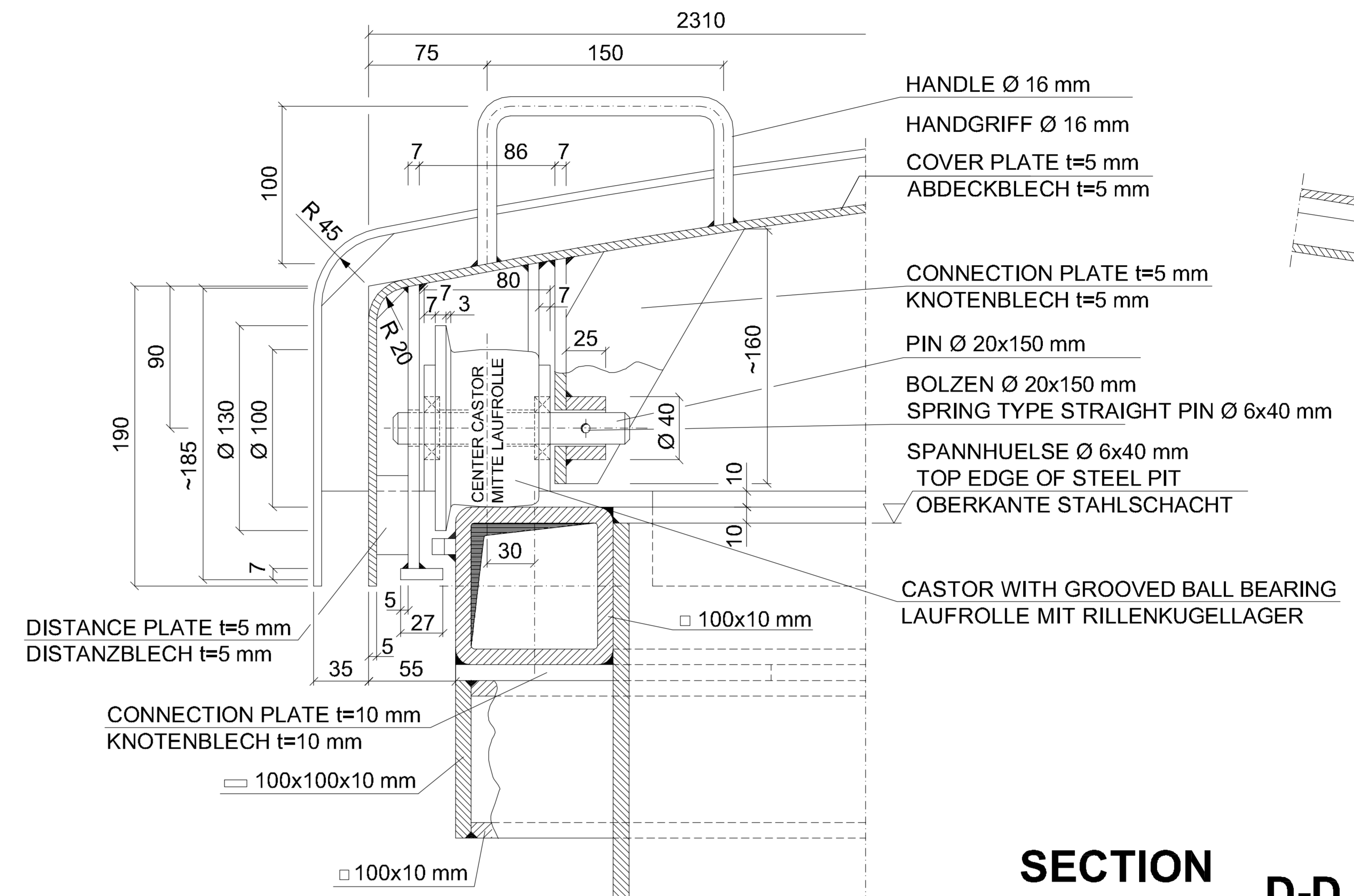
**TOP VIEW  
DRAUFSICHT**  
SCALE 1:10



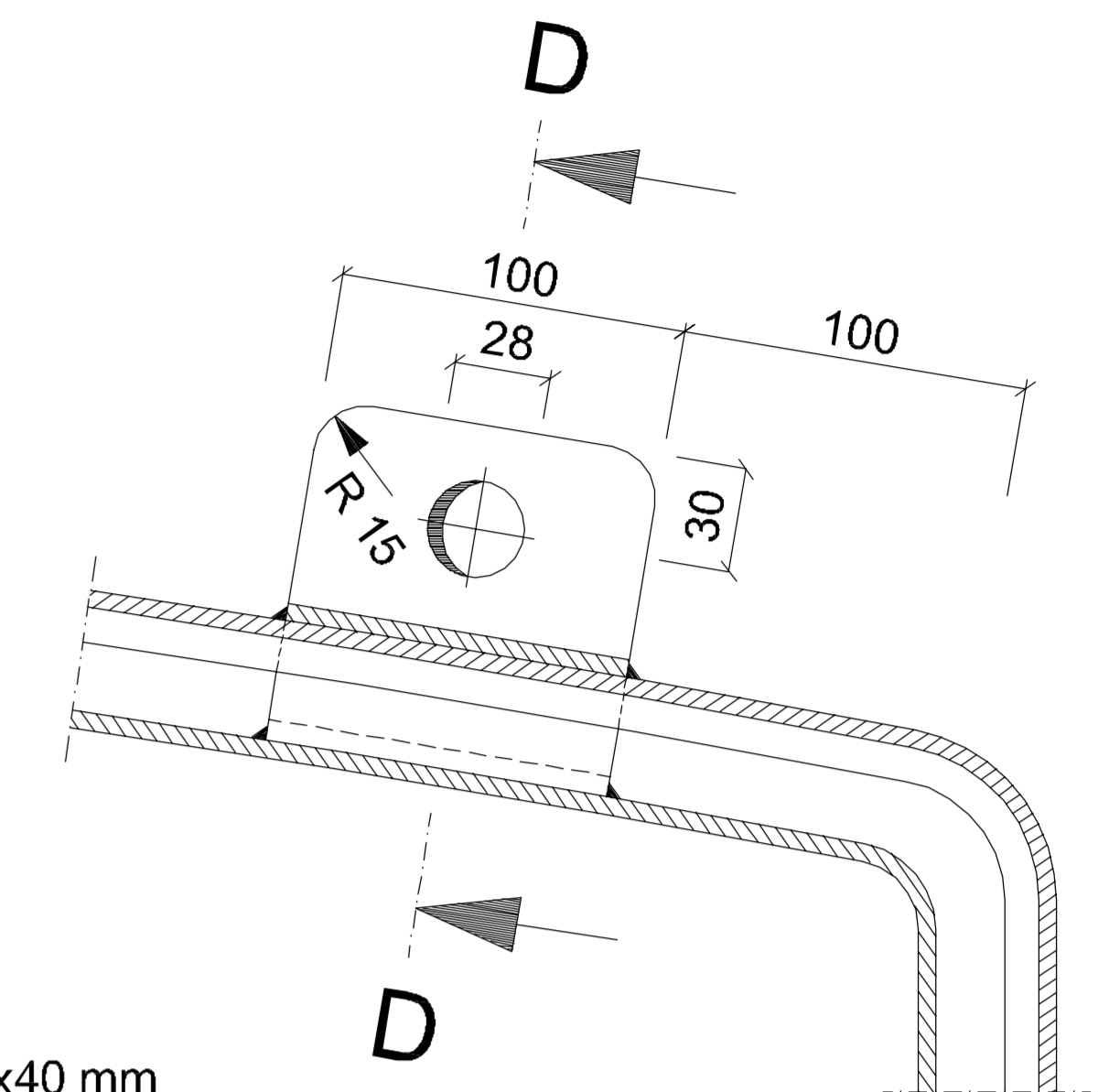
**VIEW  
ANSICHT "F"**  
SCALE 1:10



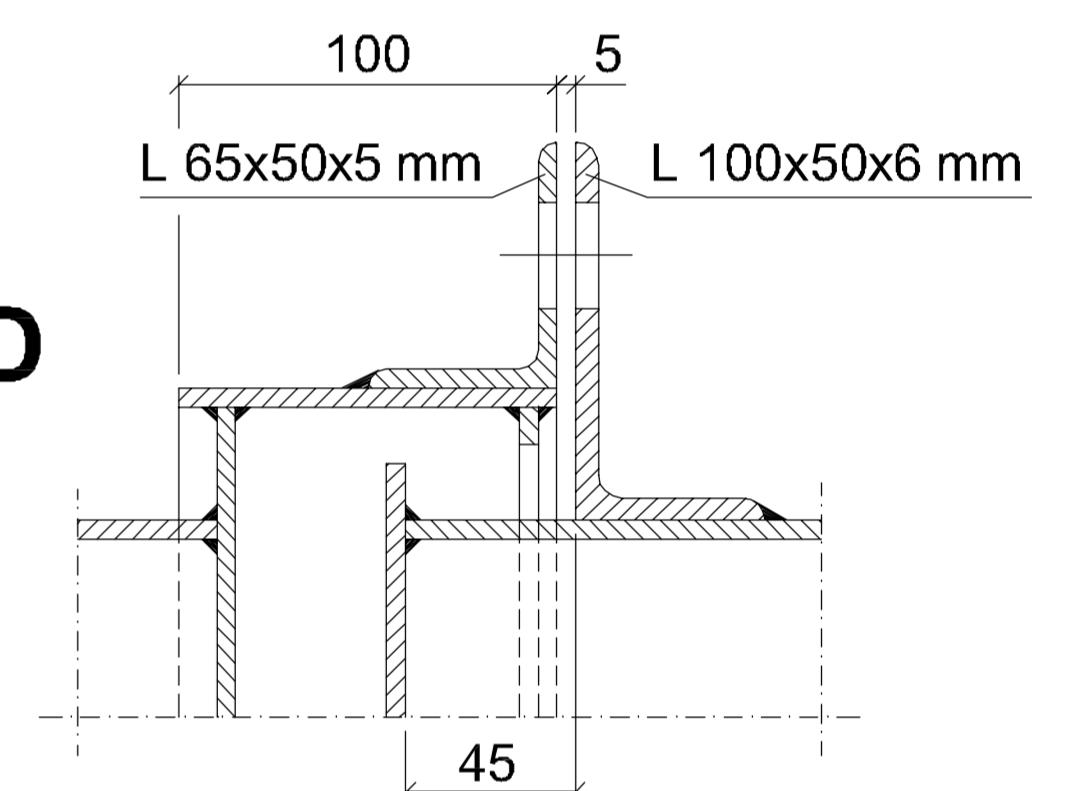
**SECTION  
SCHNITT B-B**  
SCALE 1:2



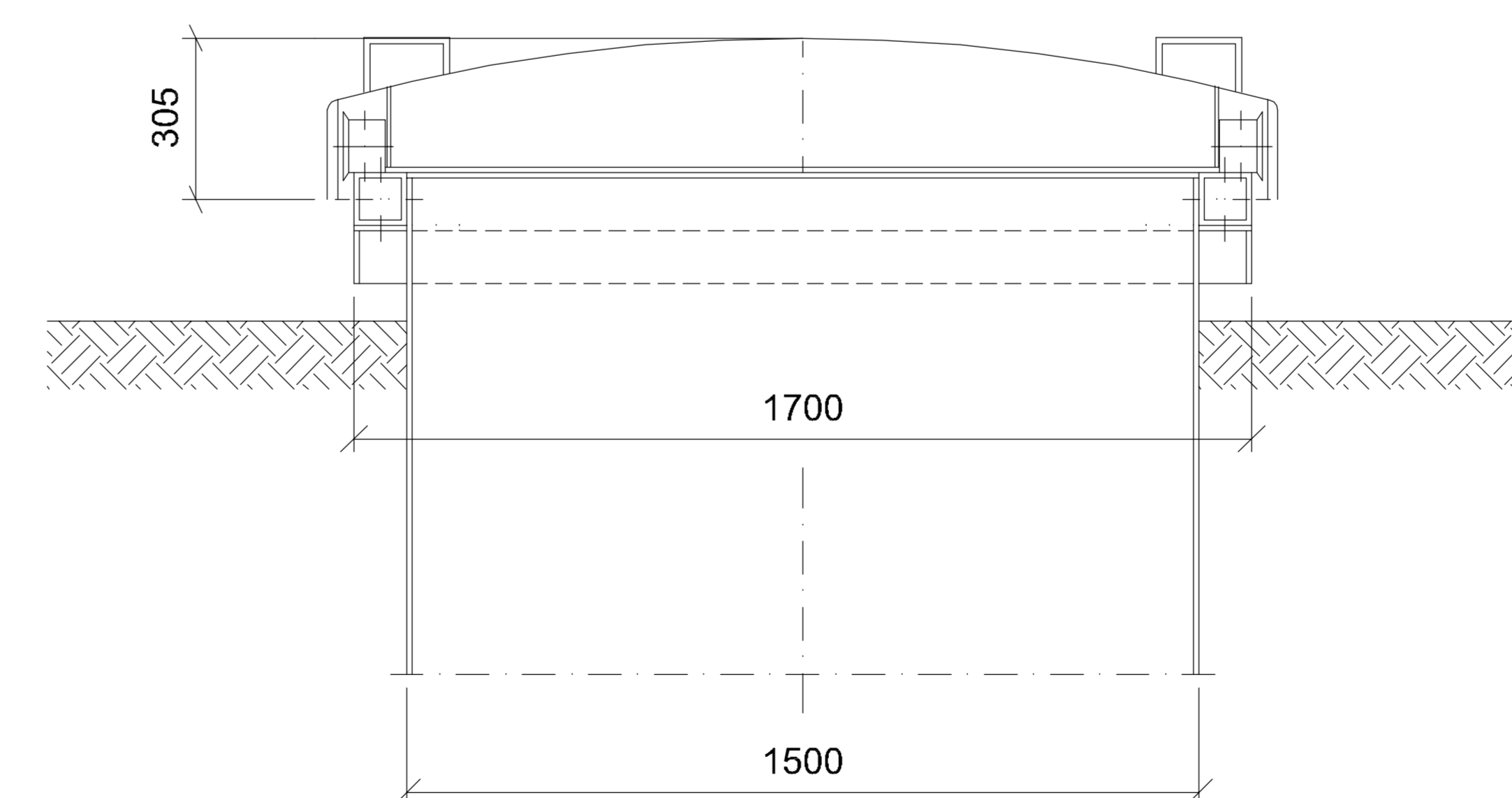
**SECTION  
SCHNITT C-C**  
INTERLOCKING  
VERRIEGELUNG  
SCALE 1:2



**SECTION  
SCHNITT D-D**  
SCALE 1:2



**SECTION  
SCHNITT A-A**  
SCALE 1:10



REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
<b>HEADQUARTERS</b> <b>UNITED STATES</b> <b>AIR FORCES EUROPE</b> 				
<b>ENGINEERING &amp; OPERATIONS</b>				
<b>AIRFIELD</b> <b>STANDARD DESIGN US</b>		<b>FLUGPLATZ</b> <b>STANDARDPLANUNG US</b>		
<b>JET FUEL STORAGE AND</b> <b>DISPENSING SYSTEMS</b>		<b>FLUGKRAFTSTOFF -</b> <b>VERSORGUNGSANLAGEN</b>		
<b>BUILDING</b> <b>BAUWERK</b>				
<b>DRAIN TANK 10m³</b> <b>ENTLEERUNGSBEHÄLTNER 10m³</b>				
<b>DESIGNATOR</b> <b>BESCHREIBUNG</b>				
<b>ROLLING COVER, TOP VIEW, VIEW AND SECTIONS</b> <b>ROLLDECKEL, DRAUFSICHT, ANSICHT UND SCHNITTE</b>				
<b>WORKED/BEARBEITET</b>		<b>APPROVED/GENEHMIGT</b>		
<b>LANDSCHAFTS- UND BAUWERKE</b> <b>UND BAUWERKE</b> <b>UND BAUWERKE</b> <b>UND BAUWERKE</b>		<b>AMT</b> <b>FÜR</b> <b>BUNDESBAU</b> <b>WALLSTR.1</b> <b>55122 MAINZ</b>		
<b>INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY)</b> <b>EINGEFÜHRT FÜR BAU MASSNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)</b>				
<b>APPROVED</b> <b>GENEHMIGT</b>		<b>SCALE</b> <b>MASSSTAB</b>		
<b>DATE</b> <b>DATUM</b>		<b>1:10, 1:2</b>		
<b>6. MAI 2015</b>		<b>STANDARD SHEET</b> <b>STANDARD PLAN</b>		
<b>ORIGINAL SIGNED BY</b> <b>IN ORIGINAL DED.</b>		<b>S - 9,2</b>		
<b>CONSTRUCTION PROJECT</b> <b>BAU MASSNAHME</b>		<b>SHEET NO.</b> <b>PLATZ NR.</b>		
		<b>OF</b> <b>VON</b>		

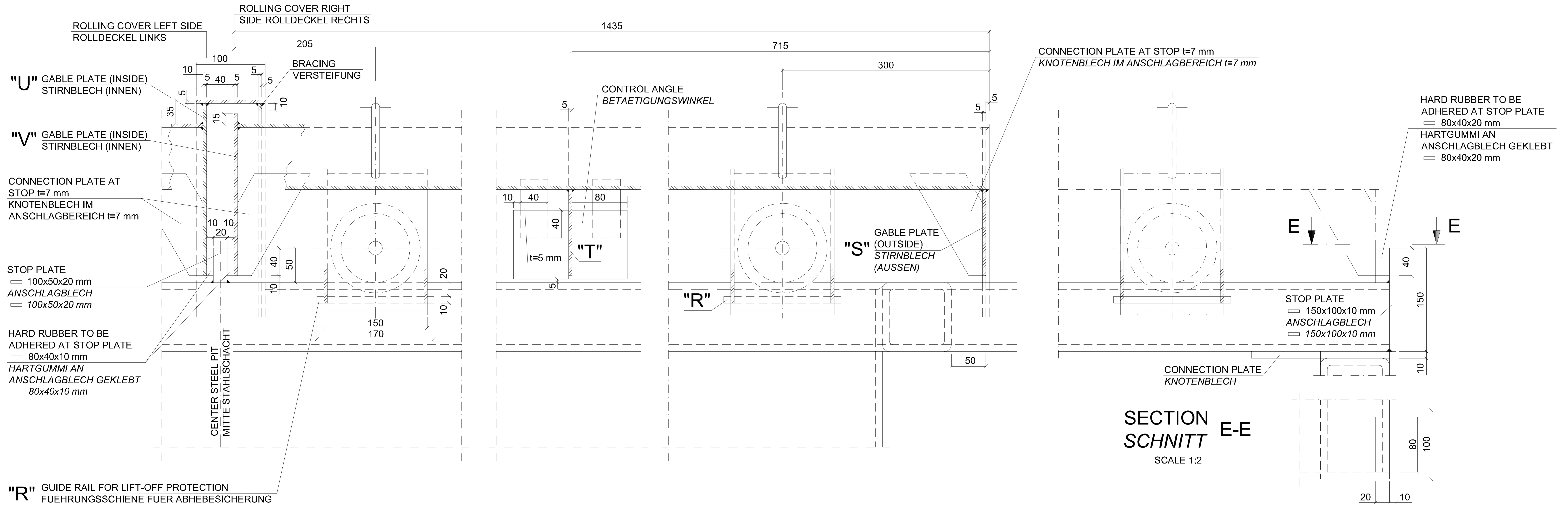


**DETAIL "Z"**  
STOP AND CASTOR  
ANSCHLAG UND LAUFROLLE  
SCALE 1:2

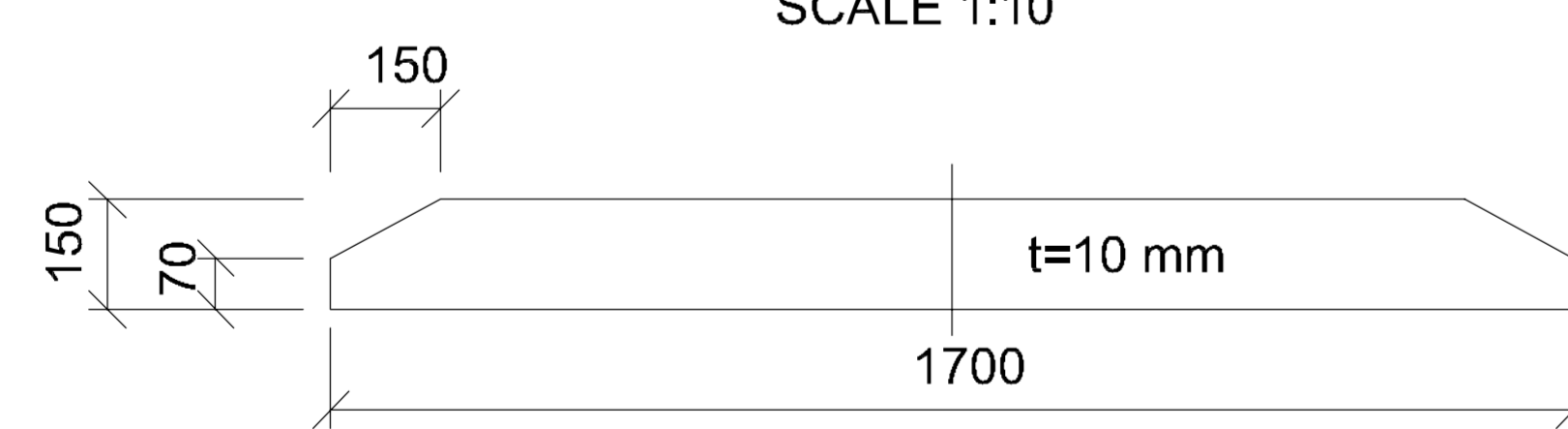
**DETAIL "Y"**  
CROSS BRACING  
QUERVERSTEIFUNG  
SCALE 1:2

**DETAIL "X"**  
CASTOR  
LAUFROLLE  
SCALE 1:2

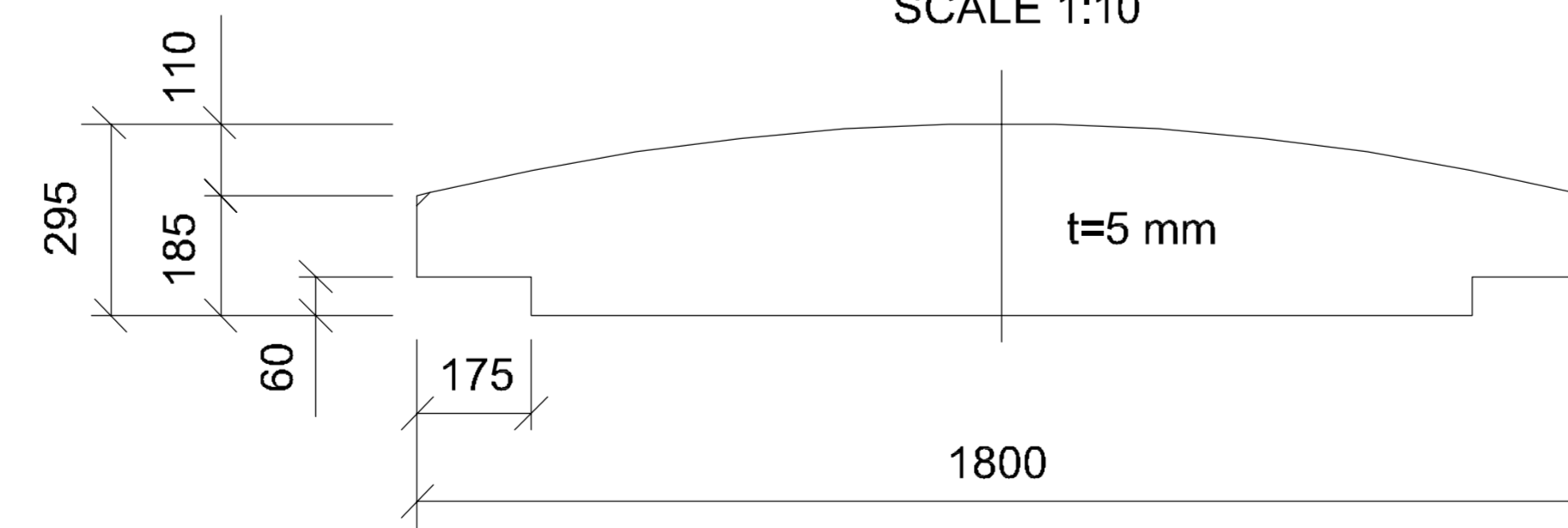
**DETAIL "W"**  
STOP  
ANSCHLAG  
SCALE 1:2



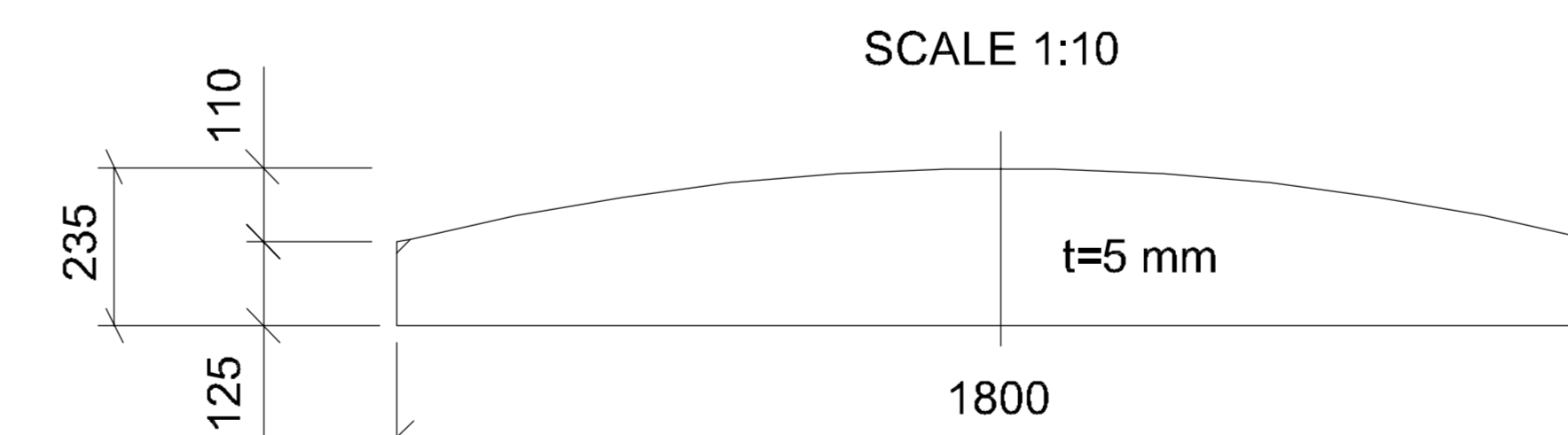
**DETAIL "R"**  
GUIDE RAIL FOR LIFT-OFF PROTECTION  
FUEHRUNGSSCHIENE FUER ABHEBESICHERUNG  
SCALE 1:10



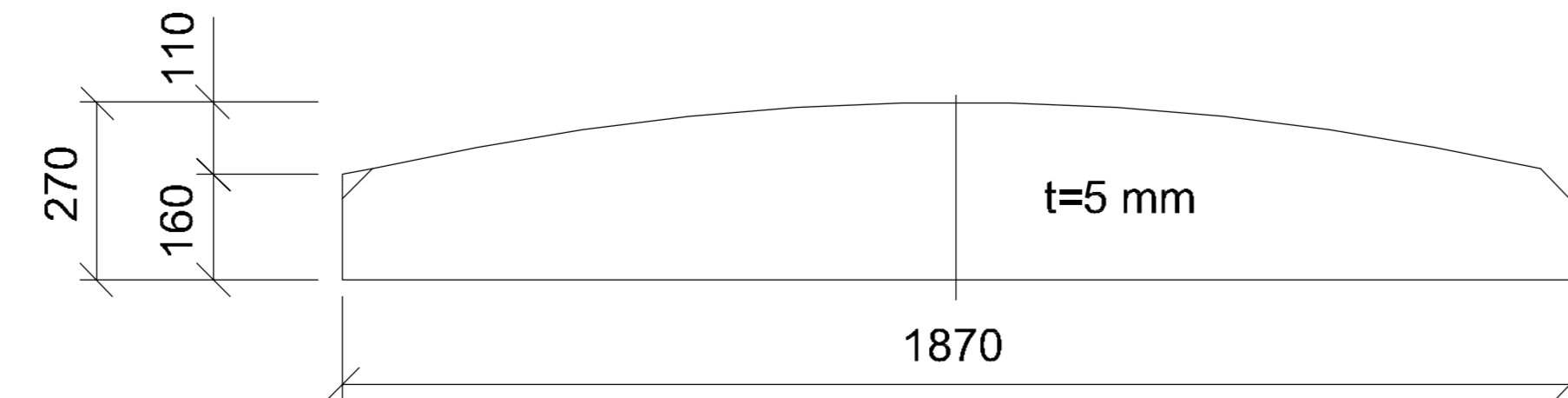
**DETAIL "S"**  
GABLE PLATE (OUTSIDE)  
STIRNBLECH (AUSSEN)  
SCALE 1:10



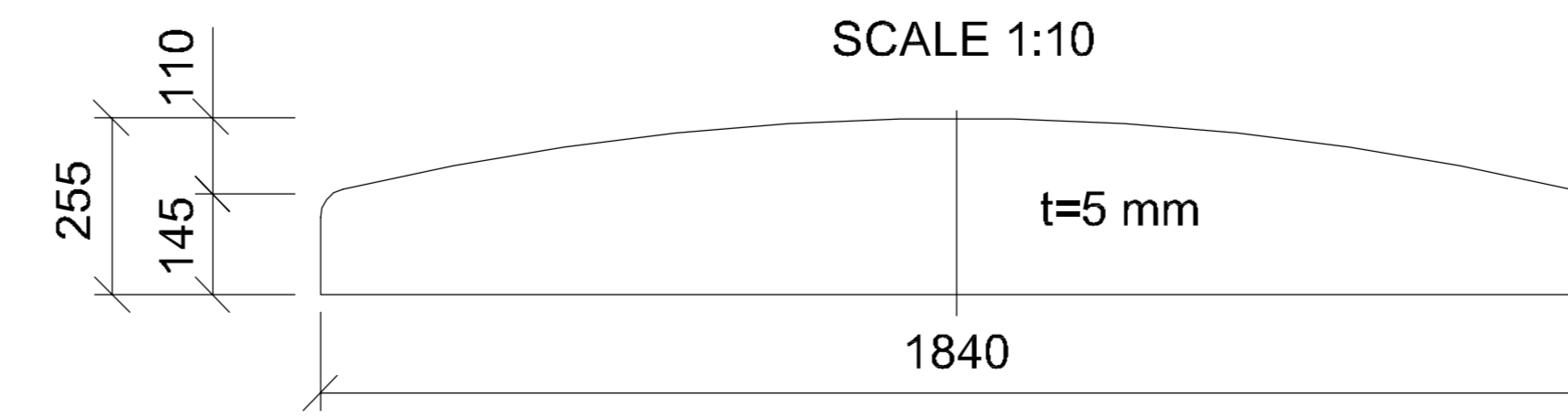
**DETAIL "T"**  
CROSS BRACING  
QUERVERSTEIFUNG  
SCALE 1:10



**DETAIL "U"**  
GABLE PLATE (INSIDE)  
STIRNBLECH (INNEN)  
SCALE 1:10



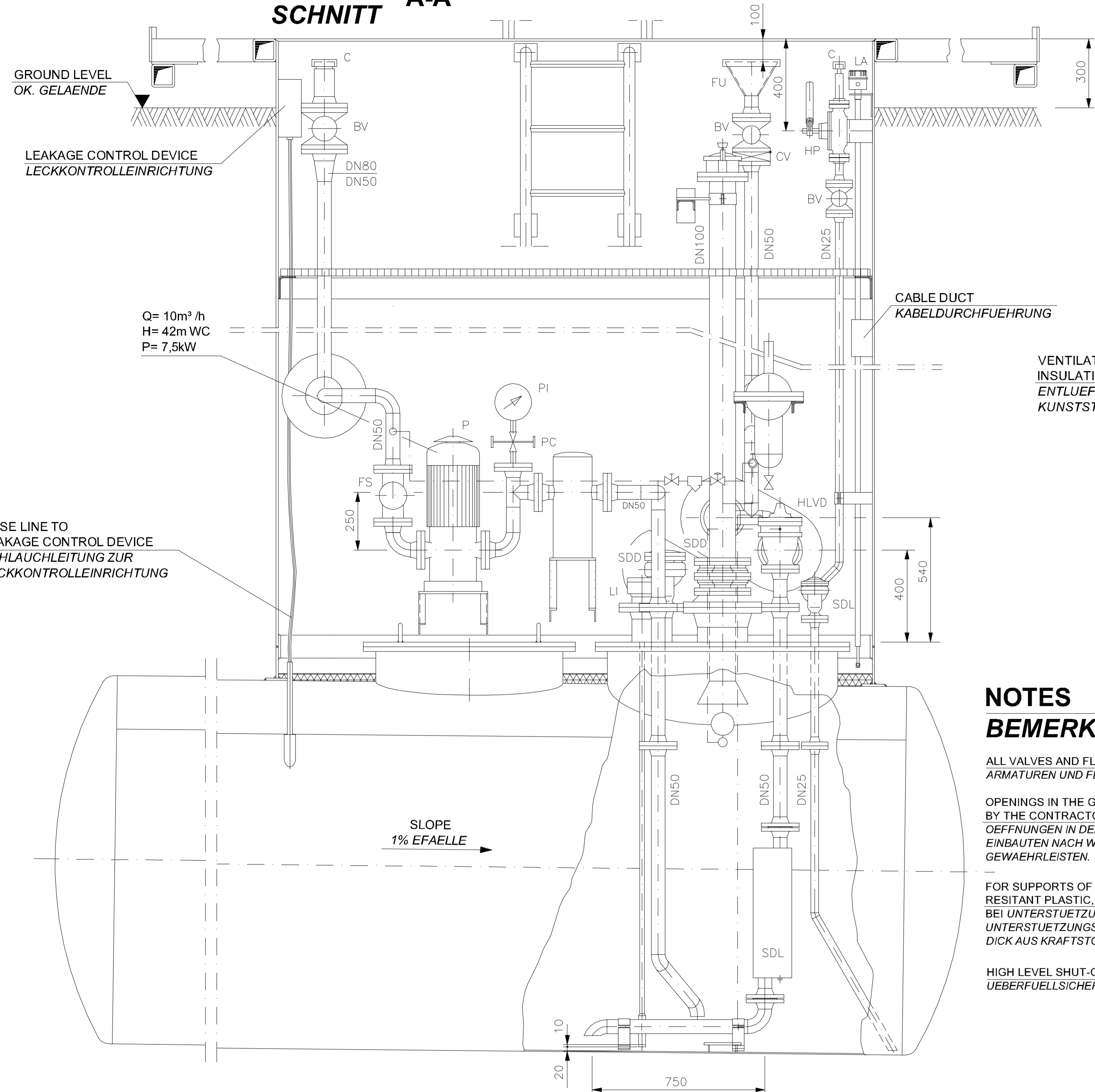
**DETAIL "V"**  
GABLE PLATE (INSIDE)  
STIRNBLECH (INNEN)  
SCALE 1:10



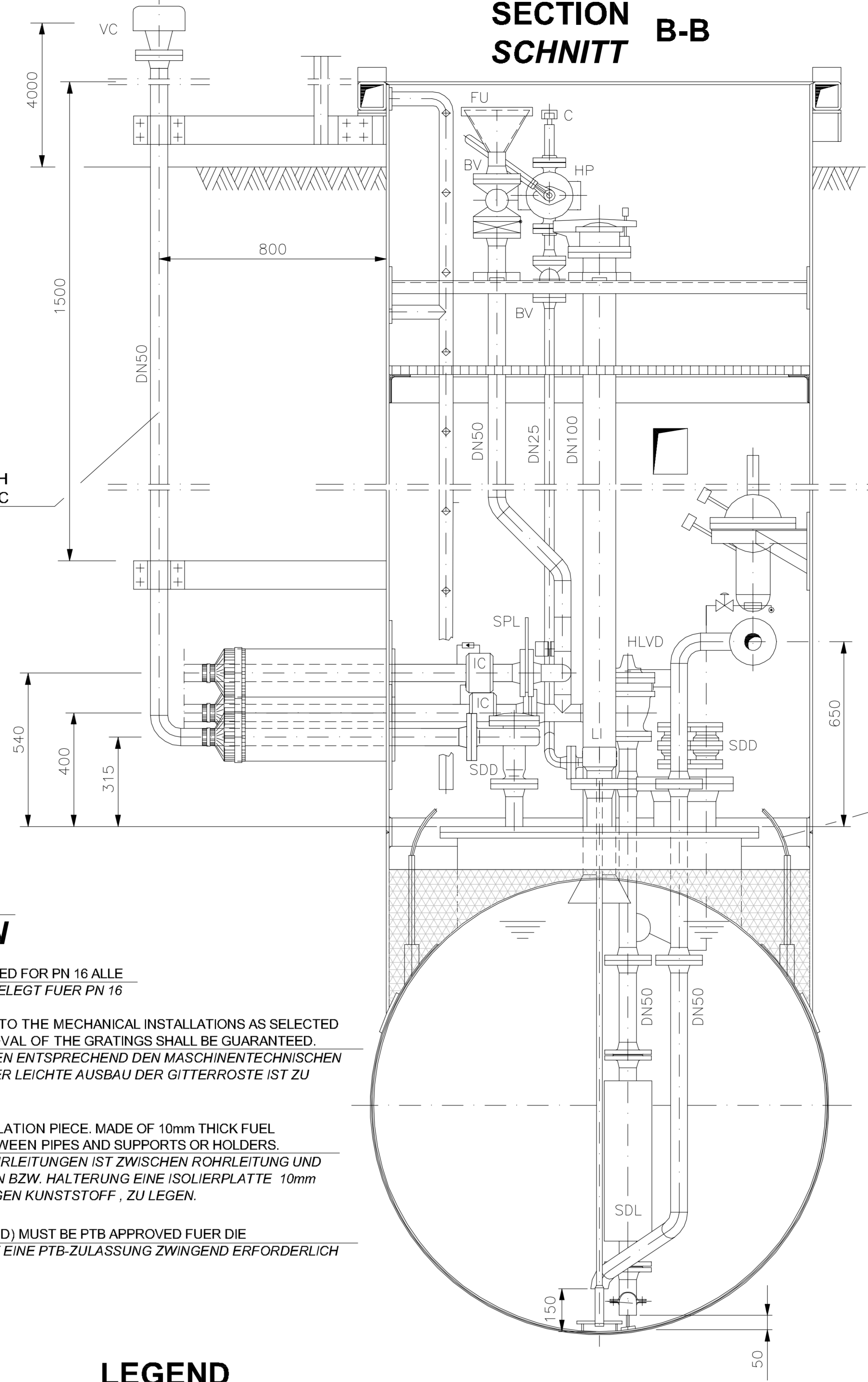
REVISION	DATE	DESCRIPTION	BY	COUNTRY
HEADQUARTERS UNITED STATES AIR FORCES EUROPE				
ENGINEERING & OPERATIONS				
AIRFIELD STANDARD DESIGN US			FLUGPLATZ STANDARDPLANUNG US	
JET FUEL STORAGE AND DISPENSING SYSTEMS			FLUGKRAFTSTOFF - VERSORGUNGSANLAGEN	
BUILDING BAUWERK				
DRAIN TANK 10m <sup>3</sup> ENTLEERUNGSBEHALTER 10m <sup>3</sup>				
DESIGNATOR BEZEICHNUNG				
ROLLING COVER, DETAILS ROLLDECKEL, DETAILS				
WORKED/BEARBEITET		PREPARED/AUFGESTELLT	APPROVED/GENEHIGT	
LANDSCHAFTS- UND BAUVERMESSUNG LUB-WEISSHALLUNG LANGENAU LUB-WEISSHALLUNG LANGENAU		AMT FÜR BUNDESBAU WALLSTR.1 55122 MAINZ	ORIGINAL SIGNED BY: IN ORIGINAL SIZE: 10.06.2015	
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAU MASSNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED GENEHIGT	DATE DATUM	6. MAI 2015	SCALE MASSSTAB	1:10, 1:2
ORIGINAL SIGNED BY: IN ORIGINAL SIZE:	GERARD HANZ CONRAD FÜR FACILITIES ENGINEER IN CHARGE - WEISSHALLUNG		STANDARD SHEET STANDARD PLAN	S - 9.2.1
CONSTRUCTION PROJECT BAU MASSNAHME			CAD-PROJECT NAME: CAD-PROJEKTNAME	SHEET NO. PLATZNR.



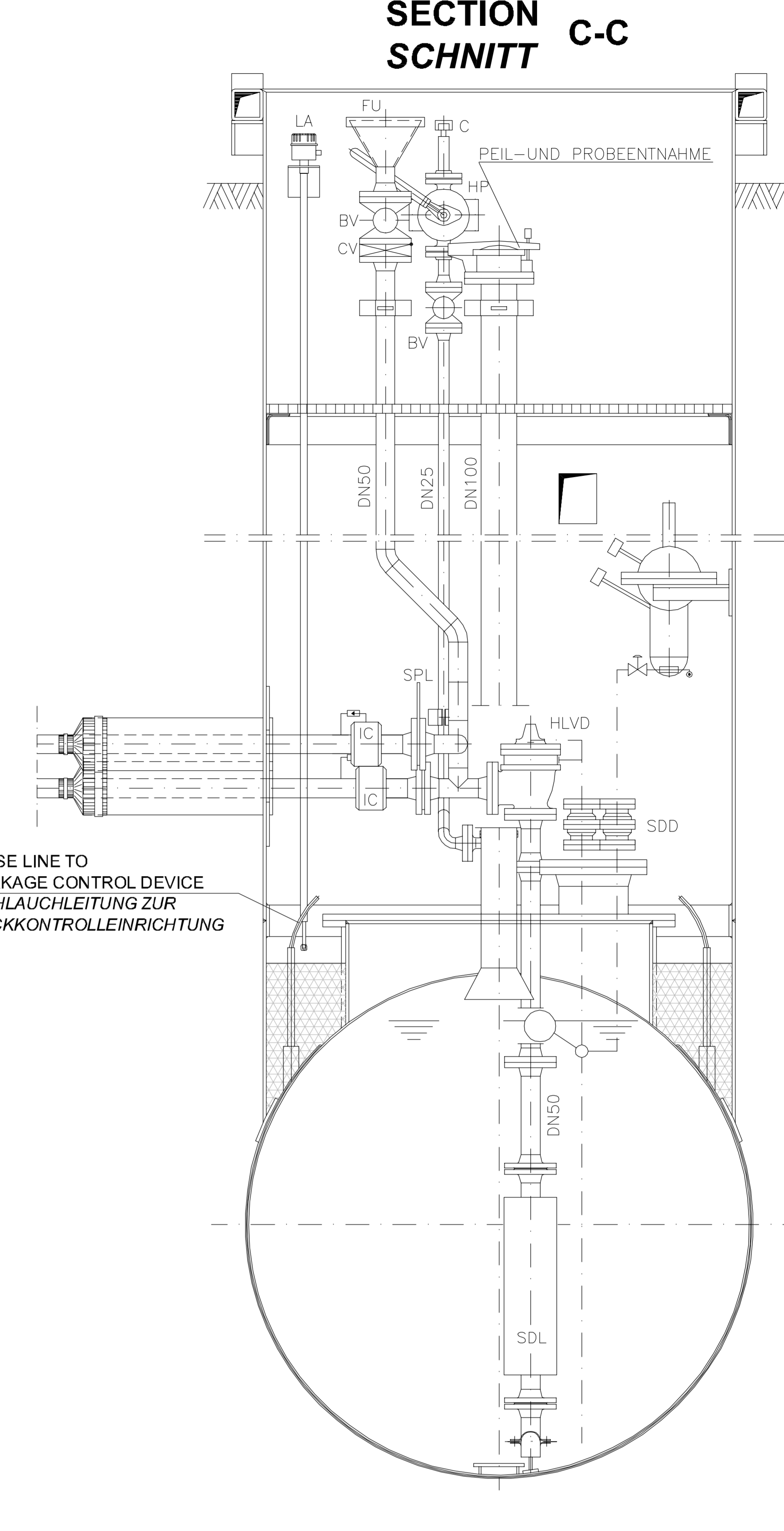
**SECTION A-A  
SCHNITT A-A**



**SECTION B-B  
SCHNITT B-B**



**SECTION C-C  
SCHNITT C-C**



**NOTES  
BEMERKUNGEN**

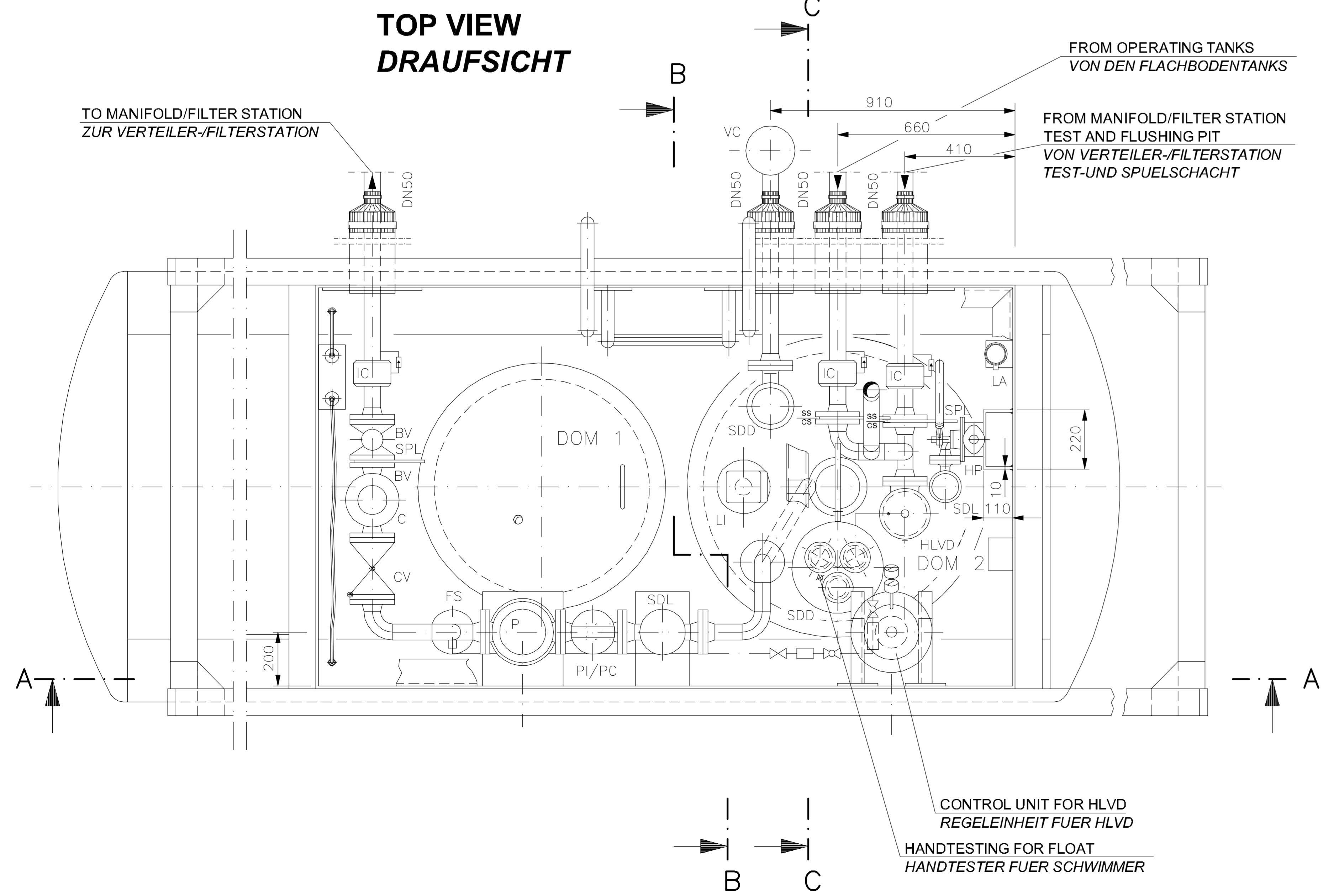
ALL VALVES AND FLANGES DESIGNED FOR PN 16 ALLE ARMATUREN UND FLANSCHS AUSGELEGT FUER PN 16

OPENINGS IN THE GRATINGS ACC. TO THE MECHANICAL INSTALLATIONS AS SELECTED BY THE CONTRACTOR. EASY REMOVAL OF THE GRATINGS SHALL BE GUARANTEED. OEFFNUNGEN IN DEN GITTERROSTEN ENTSPRECHEND DEN MASCHINENTECHNISCHEN EINBAUTEN NACH WAHL DES AN. DER LEICHTE AUSBAU DER GITTERROSTE IST ZU GEWAHRLEISTEN.

FOR SUPPORTS OF PIPES AN INSULATION PIECE, MADE OF 10mm THICK FUEL RESISTANT PLASTIC, IS TO PUT BETWEEN PIPES AND SUPPORTS OR HOLDERS. BEI UNTERSTUETZUNGEN VON ROHRLIETUNGEN IST ZWISCHEN ROHRLIETUNG UND UNTERSTUEZUNGSKONSTRUKTION BZW. HALTERUNG EINE ISOLIERPLATTE 10mm DICK AUS KRAFTSTOFFBESTAENDIGEN KUNSTSTOFF, ZU LEGEN.

HIGH LEVEL SHUT-OFF VALVE (HLVD) MUST BE PTB APPROVED FUER DIE UEBERFUELLSICHERUNG(HLVD) IST EINE PTB-ZULASSUNG ZWINGEND ERFORDERLICH

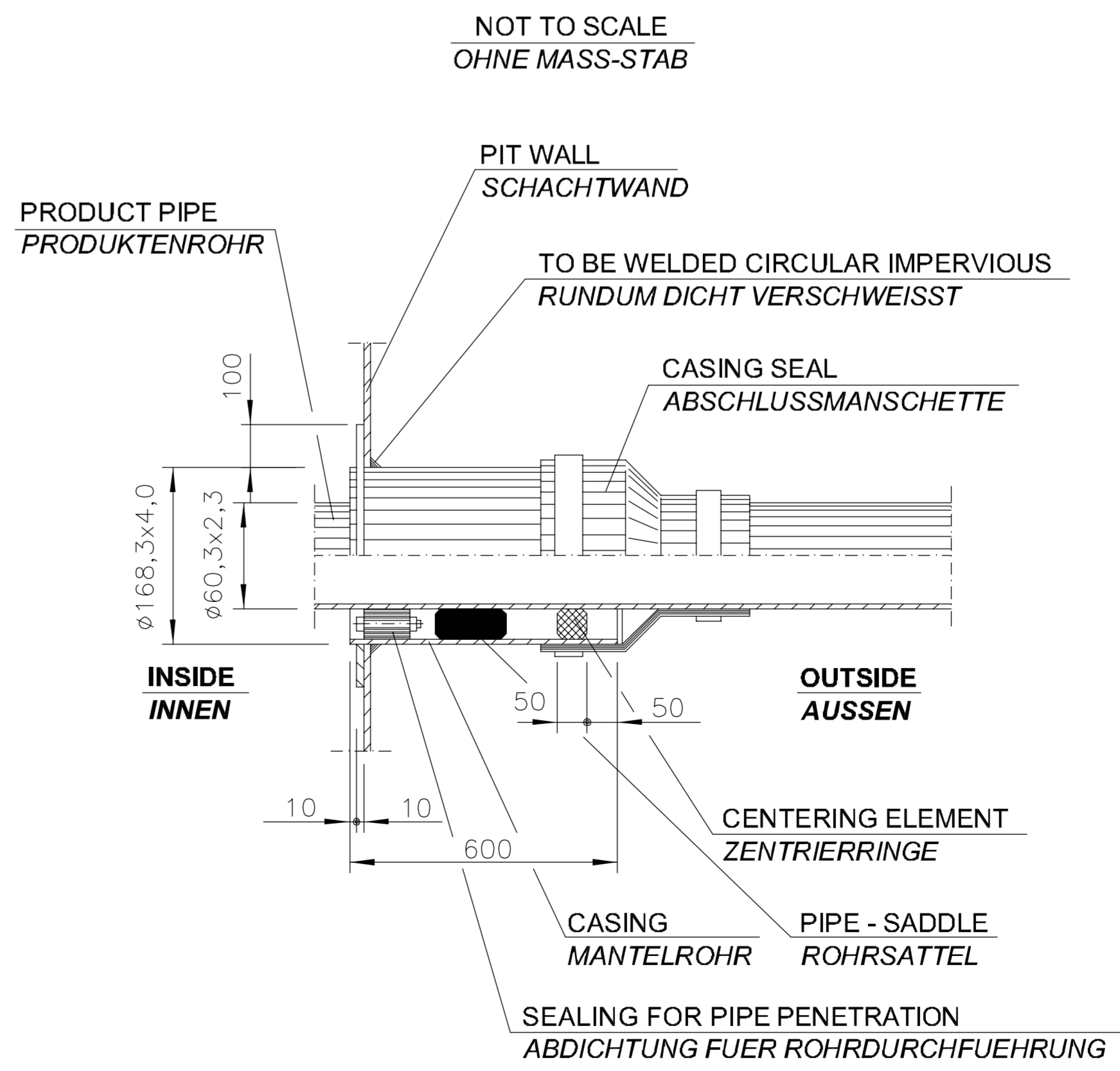
**TOP VIEW  
DRAUFSICHT**



**LEGEND  
LEGENDE**

- BV BALL VALVE KUGELHAHN
- C QUICK COUPLING SCHNELLKUPPLUNG
- CV CHECK VALVE RUECKSCHLAGVENTIL
- FS FLOW SWITCH STROMUNGSWAECHTER
- FU FUNNEL TRICHTER
- HLVD HIGH LEVEL SHUT-OFF VALVE UEBERFUELLSICHERUNG
- HP HAND PUMP HANDFLUEGELPUMPE
- IC INSULATING COUPLING ISOLIERKUPPLUNG
- LI LEVEL INDICATOR FUELLSTANDSANZEIGER
- LA LIQUID PROBE FLUESSIGKEITSSONDE
- P PUMP PUMPE
- PC PRESSURE GAUGE STOPCOCK MANOMETER-ABSPERRHAHN
- PI PRESSURE GAUGE MANOMETER
- PRV PRESSURE RELIEF VALVE DRUCKENTLASTUNGSVENTIL
- SDD SAFETY DEVICE AGAINST DETONATION, DRY TYPE TROCKEN-DETONATIONSSICHERUNG
- SDL SAFETY DEVICE AGAINST DETONATION, LIQUID TYPE FLUESSIGKEITS-DETONATIONSSICHERUNG
- SPL SPADE PLATE BRILLENSTECKSCHEIBE
- VC VENTILATING CAP ENTLUEFTUNGSHAUBE

**DETAIL PIPE PENETRATION  
DETAIL ROHRDURCHFUEHRUNG**



REVISION	DATE	DESCRIPTION	BY	COUNTRY
<b>HEADQUARTERS</b> UNITED STATES AIR FORCES EUROPE ENGINEERING & OPERATIONS				
AIRFIELD STANDARD DESIGN US JET FUEL STORAGE AND DISPENSING SYSTEMS		FLUGPLATZ STANDARDPLANUNG US FLUGKRAFTSTOFF - VERSORGNUNGSANLAGEN		
<b>BUILDING</b> BAUWERK				
<b>DRAIN TANK 10m³</b> ENTLEERUNGSBEHALTER 10m³				
DESIGNATION: MECHANICAL INSTALLATION WITH INSULATING COUPLING MASCHINENTECHNISCHE INSTALLATION MIT ISOLIERKUPPLUNG				
WORKED/GEARBEITET:	PREPARED/BEREITET:	APPROVED/GEHEBET:		
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFUEHRT FÜR BAUMASSNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED/GEHEBET:	DATE/DATUM:	SCALE/MASSSTAB:		
	6. MAI 2015	1:10		
ORIGINAL DRAWN BY/URSPRÜNGLICH GEZ.:		STANDARD SHEET/STANDARD BLATT:		
GERALD SAND:		CAD-PROJECT PART: CAP-Projektphase:		
CONSTRUCTION PROJECT/BAUMASSNAHME:			SHEET NO./BLATT-NR.:	



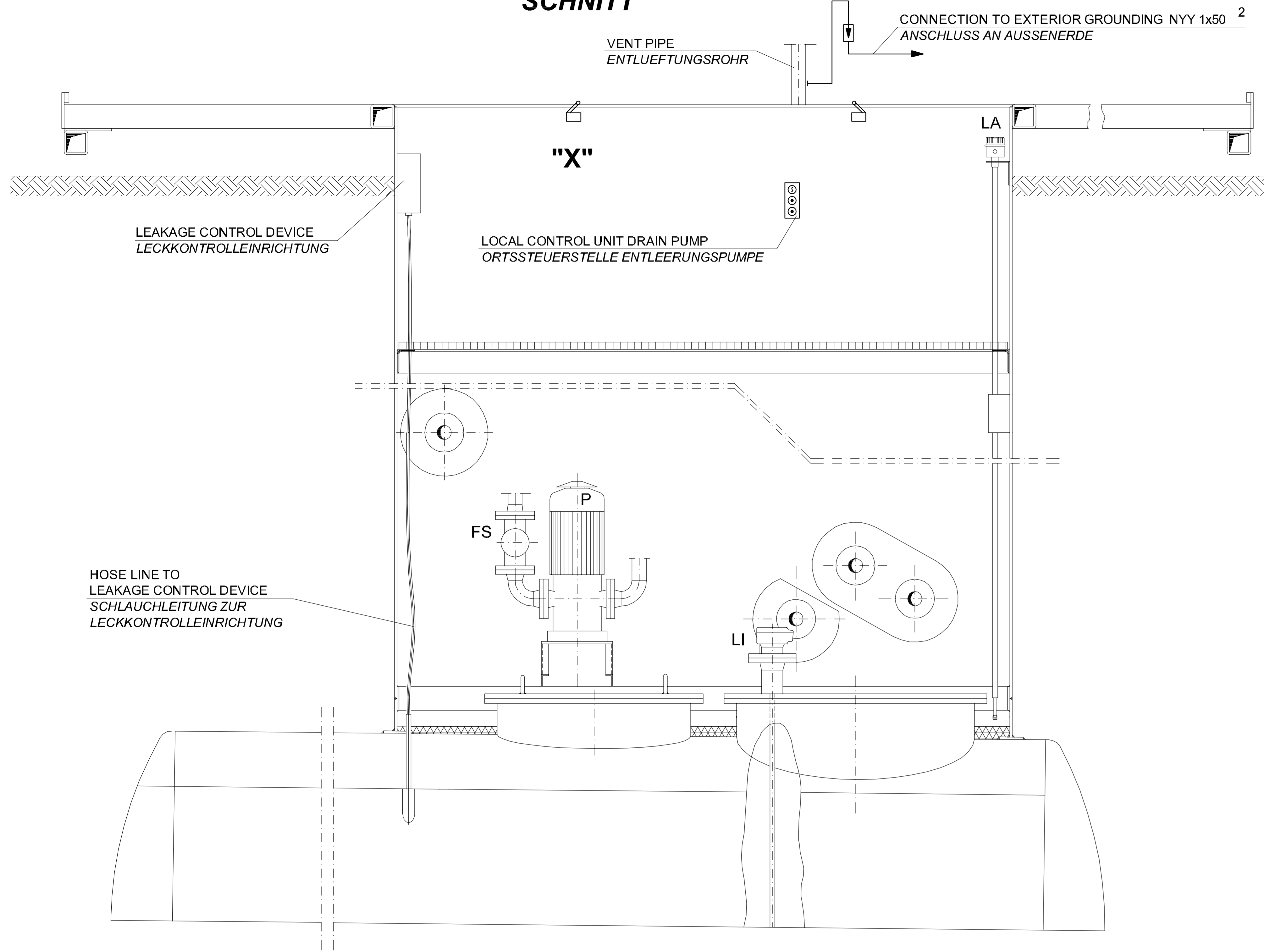




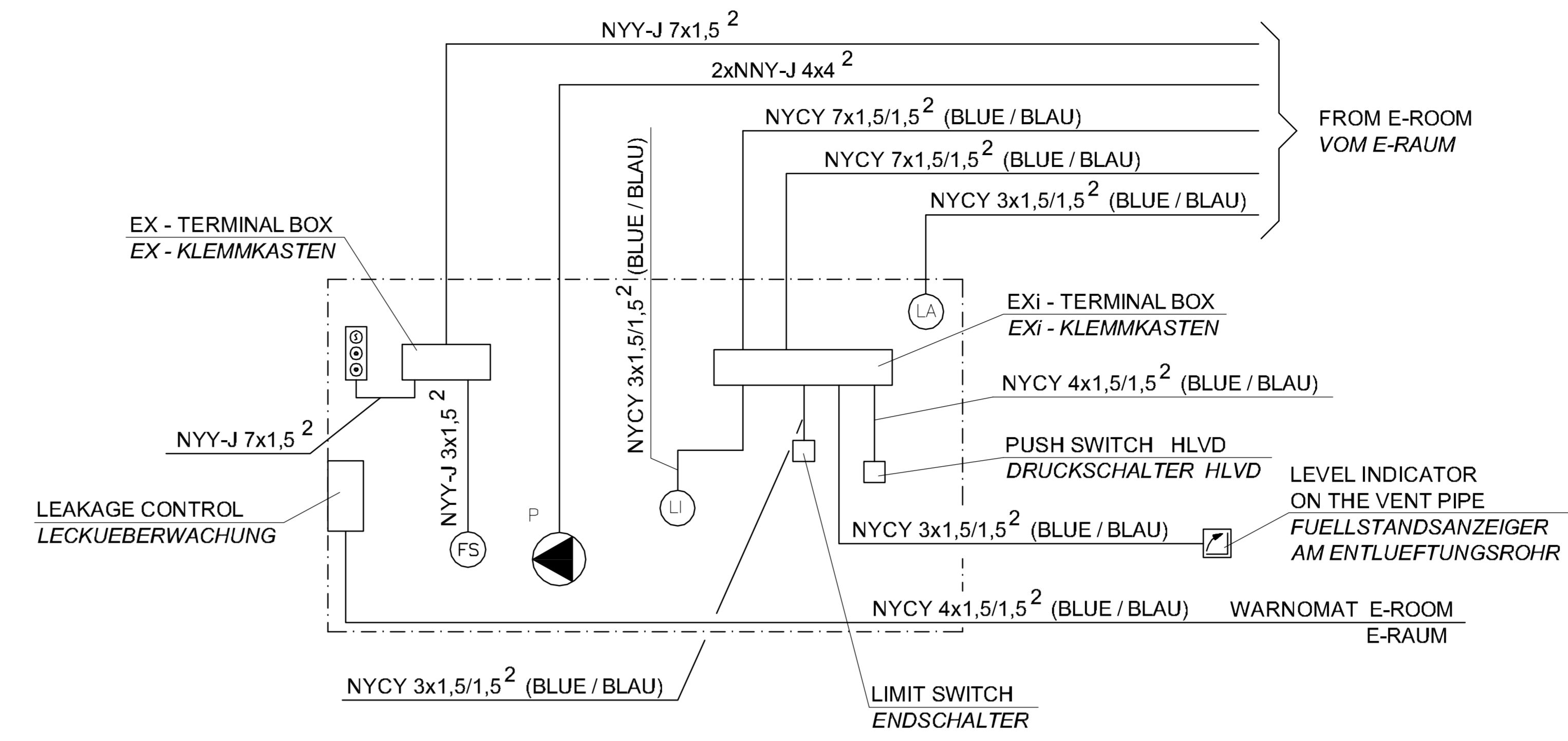
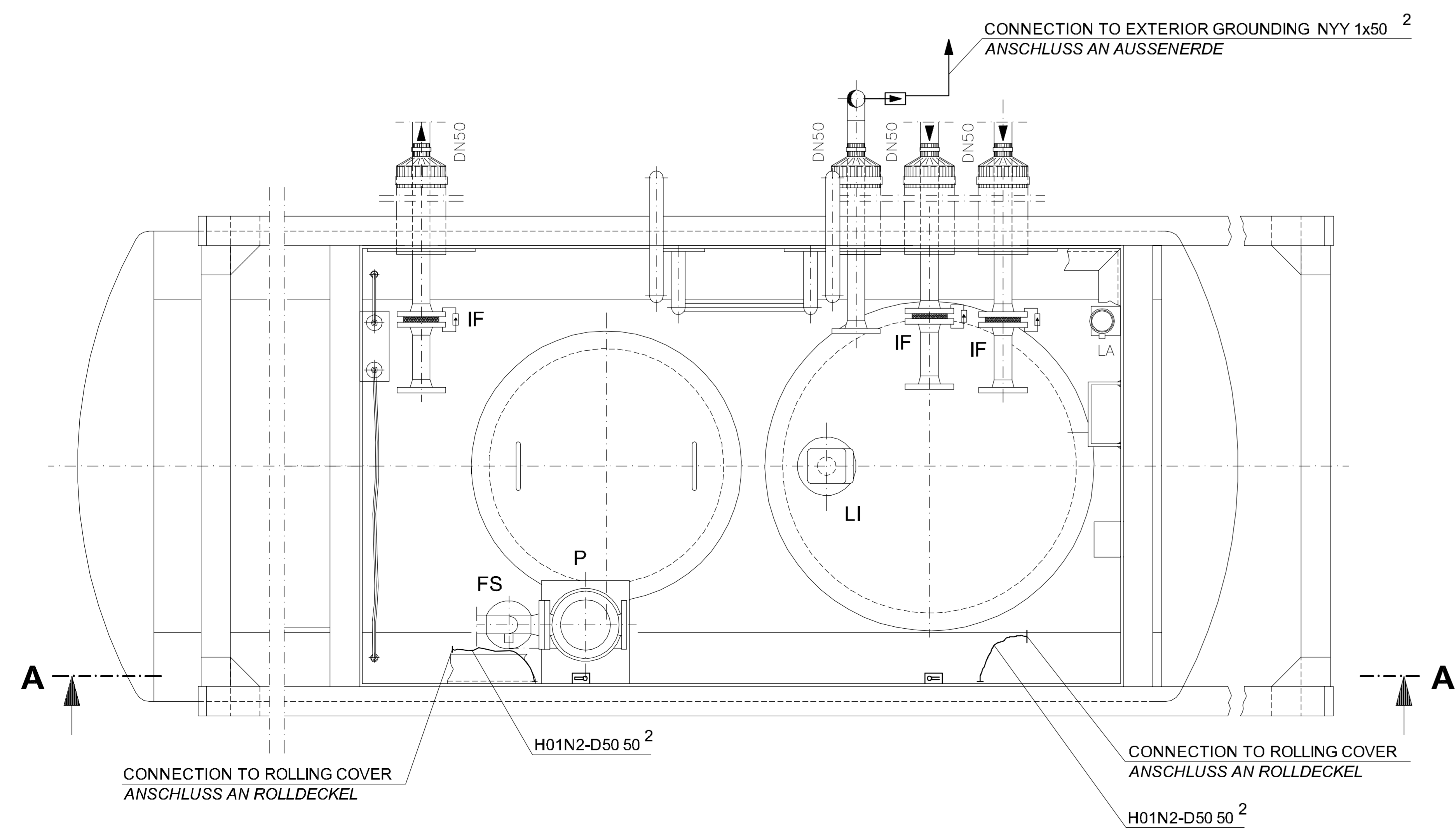




**SECTION  
SCHNITT A-A**



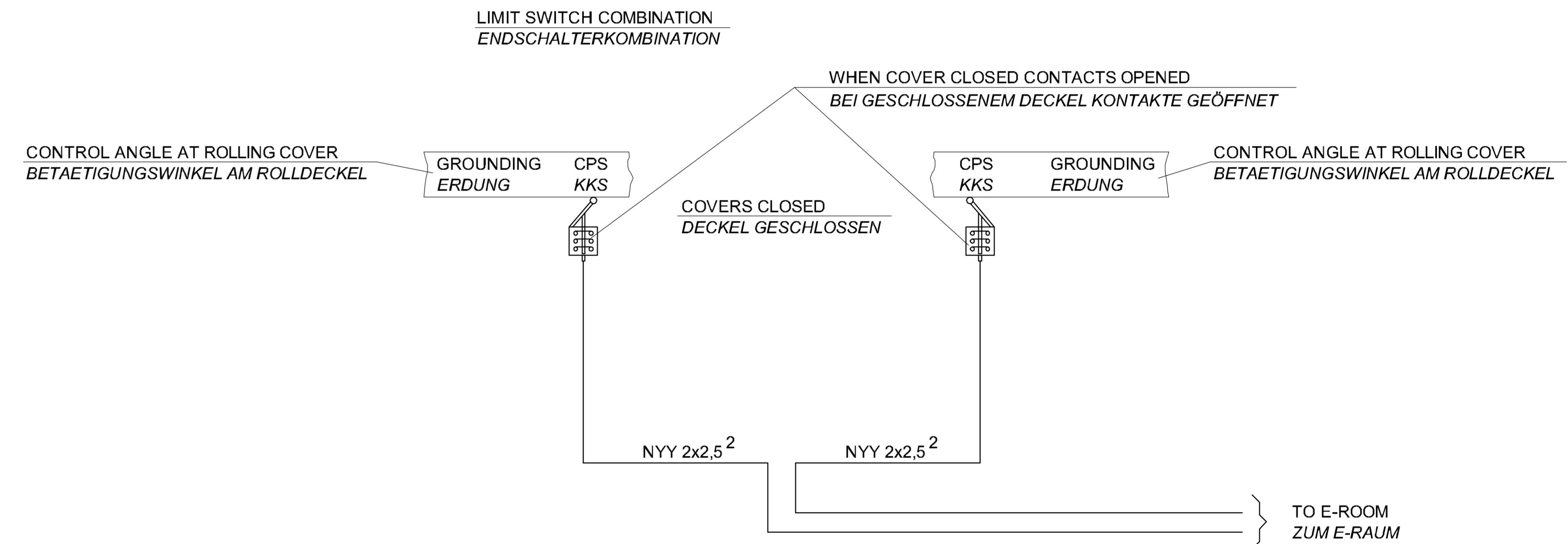
**TOP VIEW  
DRAUFSICHT**



**LEGEND  
LEGENDE**

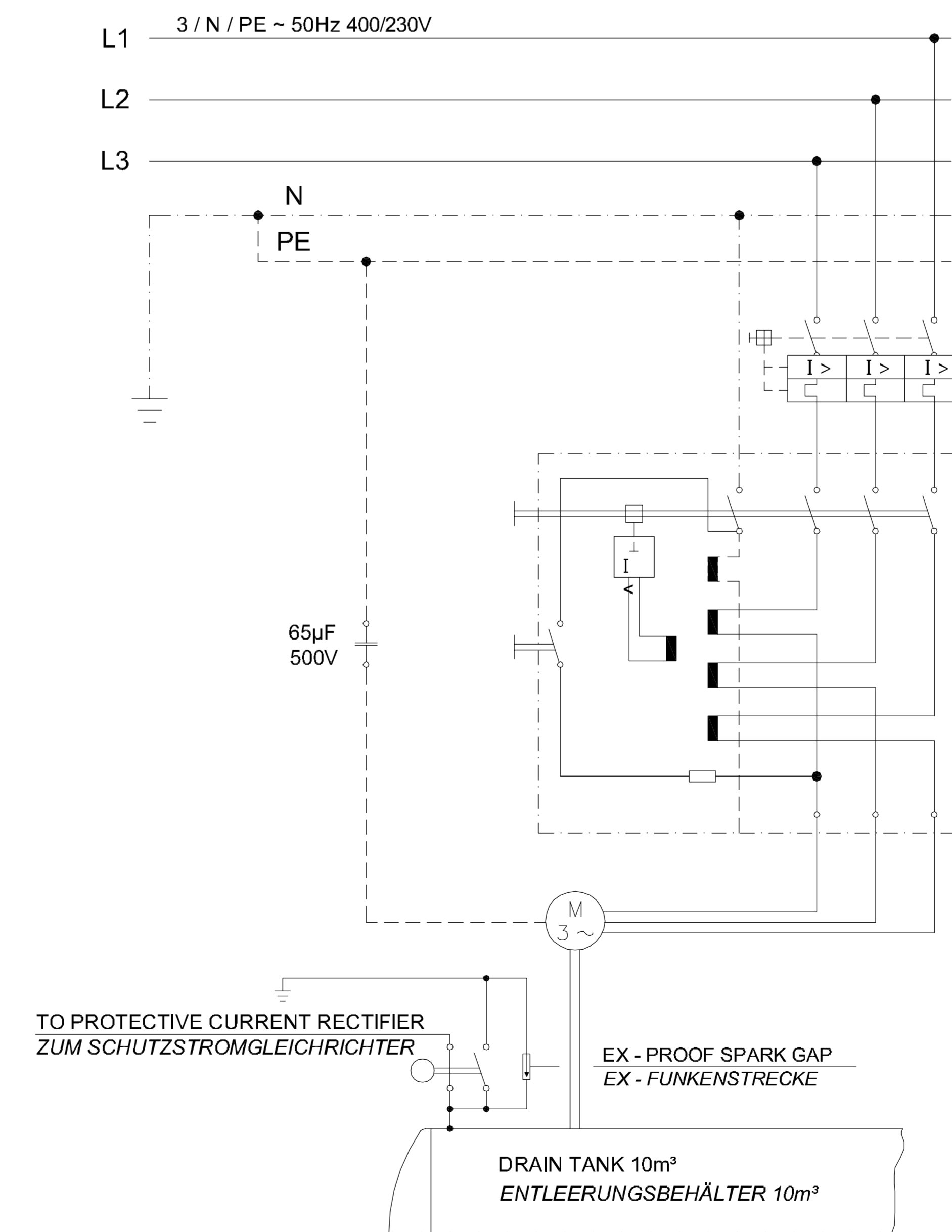
- FS FLOW SWITCH  
STROMUNGSWAECHTER
- IF INSULATING FLANGE  
ISOLIERFLANSCH
- HLVD HIGH LEVEL SHUT-OFF VALVE, DRAIN TANK  
UEBERFÜLLSICHERUNG, ENTLERUNGSBEHALTER
- LA LIQUID PROBE  
FLÜSSIGKEITSSONDE
- LI LEVEL INDICATOR  
FUELLSTANDSANZEIGER
- P PUMP 7,5 KW  
PUMPE 7,5 KW
- EXPL. PROOF SPARK GAP  
EX-FUNKENSTRECKE

**DETAIL "X"**



**DETAIL**

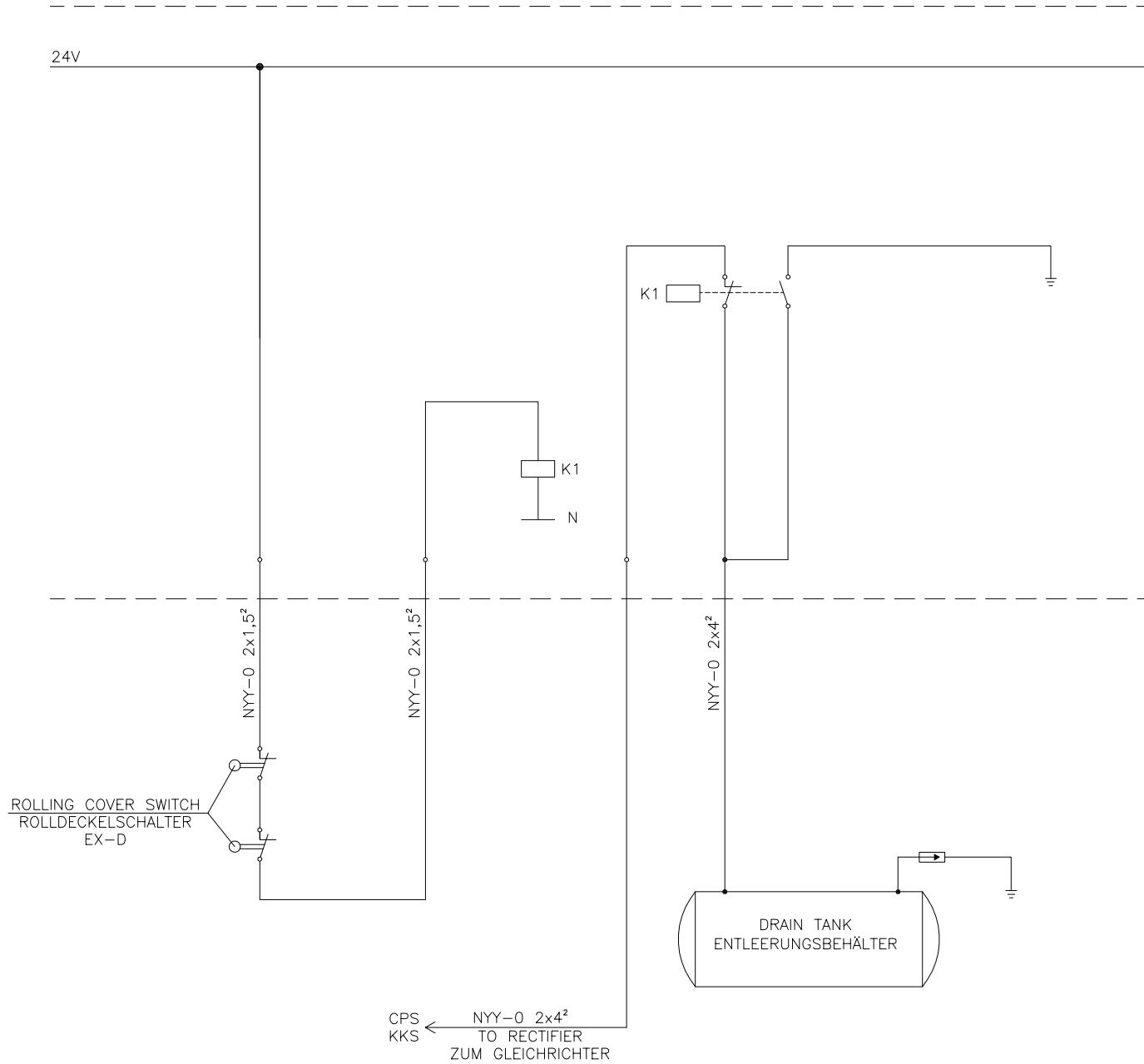
FUALT CURRENT PROTECTIVE CIRCUIT FOR PUMP MOTOR  
IN DOME SHAFT OF CATHODIC-PROTECTED TANKS  
FEHLERSTROM-SCHUTZSCHALTUNG FÜR PUMPENMOTOR  
IM DOMSCHACHT VON KATHODISCH GESCHÜTZTEN BEHÄLTERN



REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
<b>HEADQUARTERS</b>				
UNITED STATES AIR FORCES EUROPE				
ENGINEERING & OPERATIONS				
AIRFIELD STANDARD DESIGN US			FLUGPLATZ STANDARDPLANUNG US	
JET FUEL STORAGE AND DISPENSING SYSTEMS			FLUGKRAFTSTOFF - VERSORGNUNGSANLAGEN	
<b>BUILDING BAUWERK</b>				
<b>DRAIN TANK 10m³ ENTLEERUNGSBEHALTER 10m³</b>				
DESIGNATOR: BEZEICHNUNG: ELECTRICAL INSTALLATION AND GROUNDING WITH ISULATING FLANGE ELEKTROTECHNISCHE INSTALLATION UND ERDUNG MIT ISOLIERFLANSCH				
WORKED/BEARBEITET	PREPARED/AUFGESTELLT	APPROVED/GENEHMIGT		
LANDSBEREITUNGSGESAMTSCHAFT UND BAUEINGENIEUR L B B	AMT FÜR BUNDESBAU WALLSTR.1 55122 MAINZ	ORIGINAL SIGNED BY: H. WERNER 02/12		
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAUHAUSSAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED GENEHMIGT	DATE DATUM: 6. MAI 2015	SCALE MASSSTAB: 1:10		
ORIGINAL SIGNED BY: H. WERNER 02/12	STANDARD SHEET STANDARD PLAN	<b>E - 9.1</b>		
CONSTRUCTION PROJECT BAUHAUSSAHME	SHEET NO. PLATZNR. OF VON			



# CPS DRAIN TANK KKS ENTLEERUNGSBEHÄLTER



REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
<b>HEADQUARTERS</b> UNITED STATES AIR FORCES EUROPE				
<b>AIRFIELD STANDARD DESIGN US</b> <b>JET FUEL STORAGE AND DISPENSING SYSTEMS</b>		<b>FLUGPLATZ STANDARDPLANUNG US</b> <b>FLUGKRAFTSTOFF - VERSORGUNGSANLAGEN</b>		
<b>BUILDING BAUWERK</b> <b>DRAIN TANK 10m³</b> <b>ENTLEERUNGSBEHÄLTER 10m³</b>				
<b>DESIGNATION BEZEICHNUNG</b> <b>CPS DRAIN TANK</b> <b>KKS ENTLEERUNGSBEHÄLTER</b>				
<b>WORKED/BEARBEITET</b>	<b>PREPARED/AUGESTELLT</b> LANDESBETRIEB LEIGERSCHAFTS- UND BAUVERBUND LIE-NIEDERLASSUNG LANSDAU L - B - B ANSCHRIFT, UNTERKORPLATZ 1 : 76829 LANSDAU TELEFON: (00341) 913-276 TELEFAX: (00341) 913-291 LANSDAU, BY PROY. / IN VERBUNDUNG BY ORIGINAL GZC STEFAN KOTSCHENMÜLLER	<b>APPROVED/GENEHIGT</b> AMT FÜR BUNDESBAU WALLSTR. 1 55122 MAINZ ORIGINAL SIGNED BY HILFES GÖTZ		
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAUMASSNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
<b>APPROVED GENEHIGT</b>	<b>DATE DATUM</b> 6. MAI 2015	<b>SCALE MASSSTAB</b> /		
<b>ORIGINAL SIGNED BY BY ORIGINAL GZC</b>		<b>STANDARD SHEET STANDARD PLAN</b> E - 9.2		
<b>GERALD SAND</b> ***** ORIGINAL FILE: EULETSDONNER FIGURATE - AMERICA / A300		<b>CAD-project path:</b> <b>CAD-Projectfile:</b>		
<b>CONSTRUCTION PROJECT BAUMASSNAHME</b>		<b>SHEET NO. PLAN-NR.</b> OF VON		



**DOUBLE WALLED DIESEL STORAGE TANK 5m<sup>3</sup>**  
**DOPPELWANDIGER DIESEL VORRATSBEHÄLTER 5m<sup>3</sup>**

**10**

**M-10.1** MECHANICAL INSTALLATION  
MASCHINENTECHNISCHE INSTALLATION

**M-10.2** DETAIL DOM COVER  
DETAIL DOMDECKEL

**E-10.1** ELECTRICAL INSTALLATION AND ROUNDING  
ELEKTROTECHNISCHE INSTALLATION UND ERDUNG



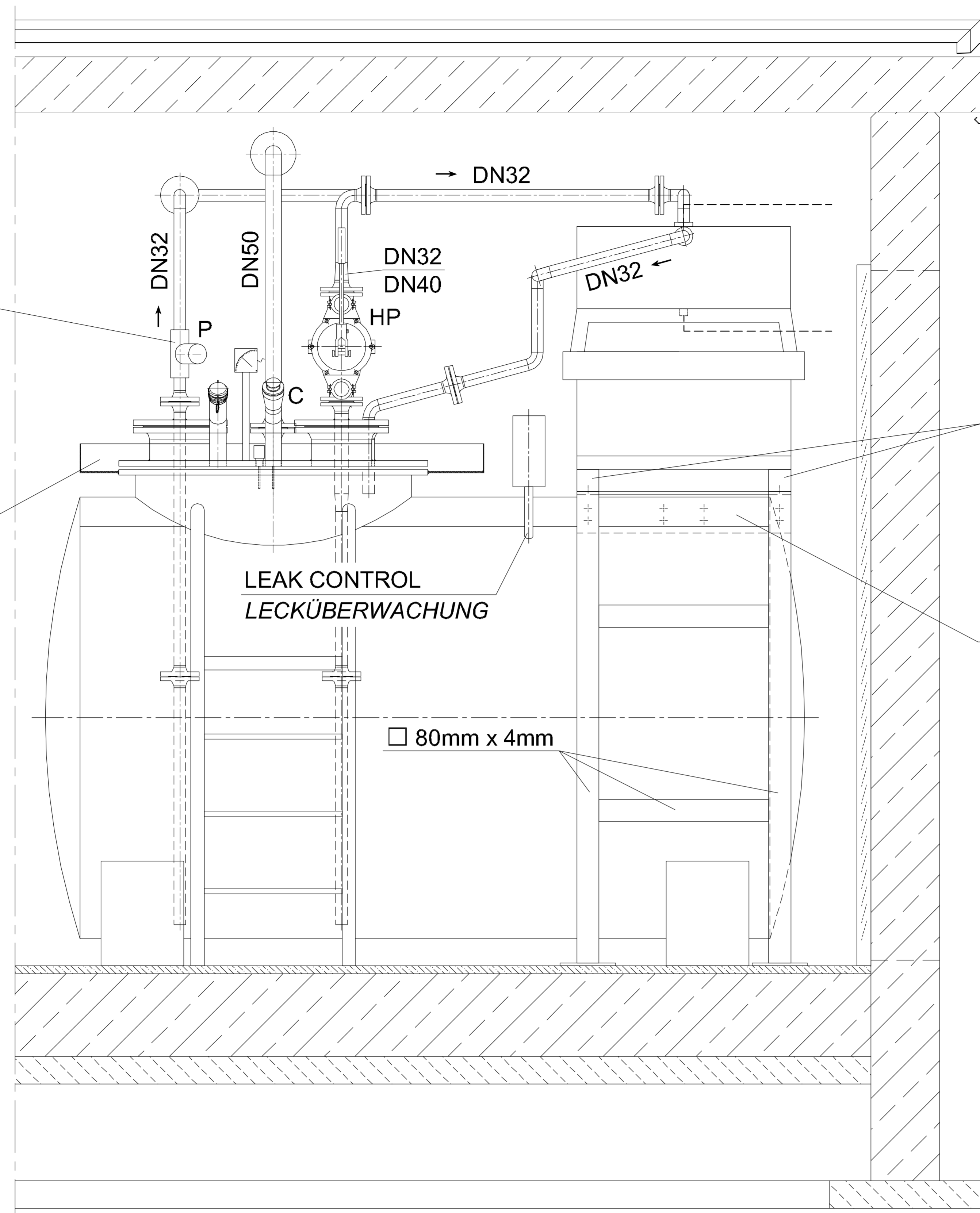
**VIEW  
ANSICHT 1**

ELECTRICAL PUMP  
CAPACITY: APPROX.55 l/min.  
SUCTION: APPROX.4 m  
DRIVE POWER: APPROX.0,55 kw  
ELEKTROPUMPE  
FÖRDERLEISTUNG: CA.55 l/min.  
ANSAUGHÖHE: CA.4 m  
ANTRIEBSLEISTUNG: CA.0,55 kw

COLLECTING PAN  
AUFFANGWANNE

LEAK CONTROL  
LECKÜBERWACHUNG

2



**VIEW  
ANSICHT 2**

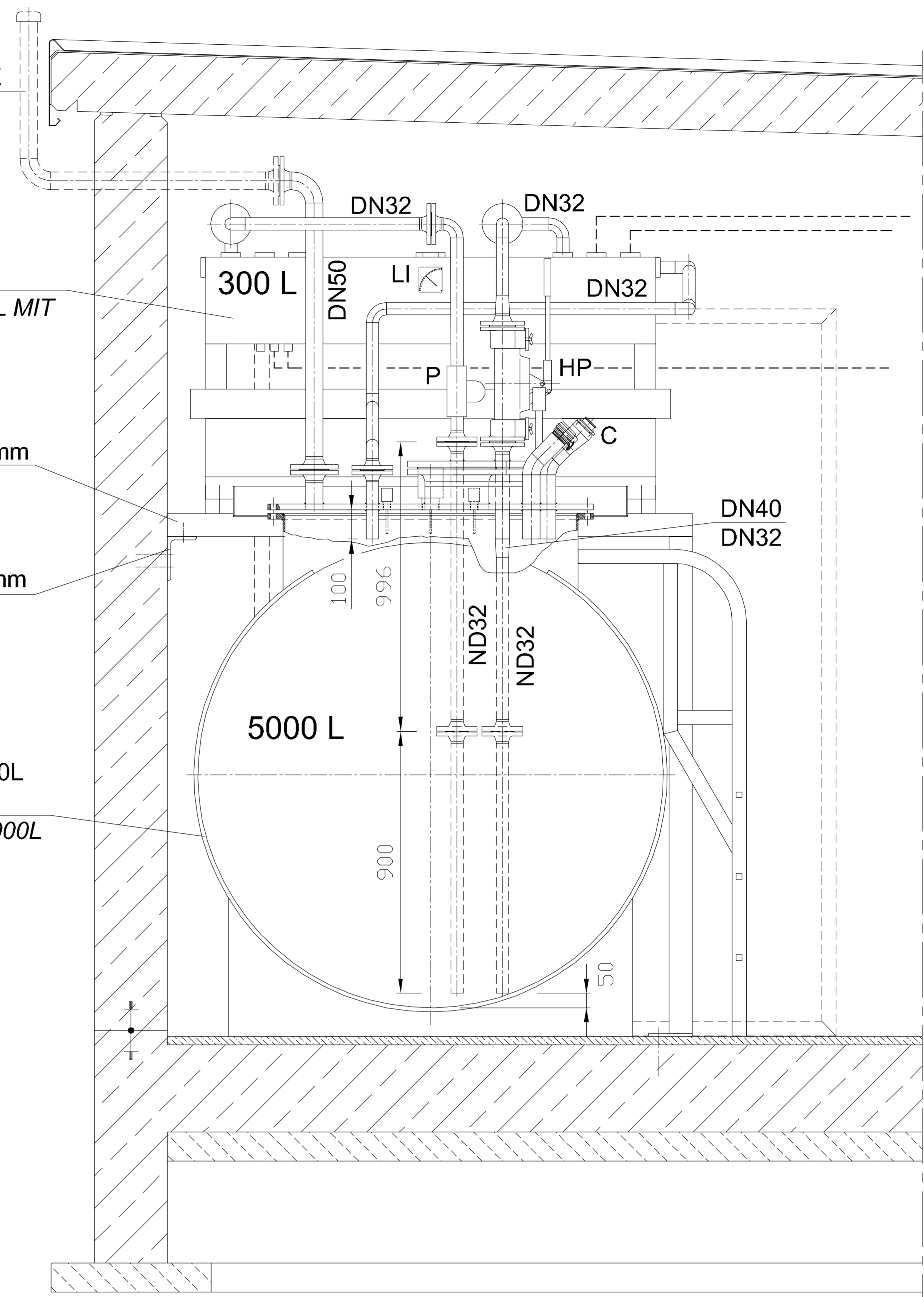
DAY TANK 300L WITH  
COLLECTING PAN  
TAGESBEHÄLTER 300L MIT  
AUFFANGWANNE

80mm x 4mm

L 150mm x 100mm x 12mm

DOUBLE-WALLED DIESEL TANK 5000L  
ACC. TO DIN EN 12285-2  
DOPPELWANDIGER DIESEL TANK 5000L  
NACH DIN EN 12285-2

VENT PIPE  
DN50



**TOP VIEW  
DRAUFSICHT**

COLLECTING PAN  
AUFFANGWANNE

FUEL PIPES TO GENERATORS  
KRAFTSTOFFLEITUNGEN ZU  
DEN GENERATOREN

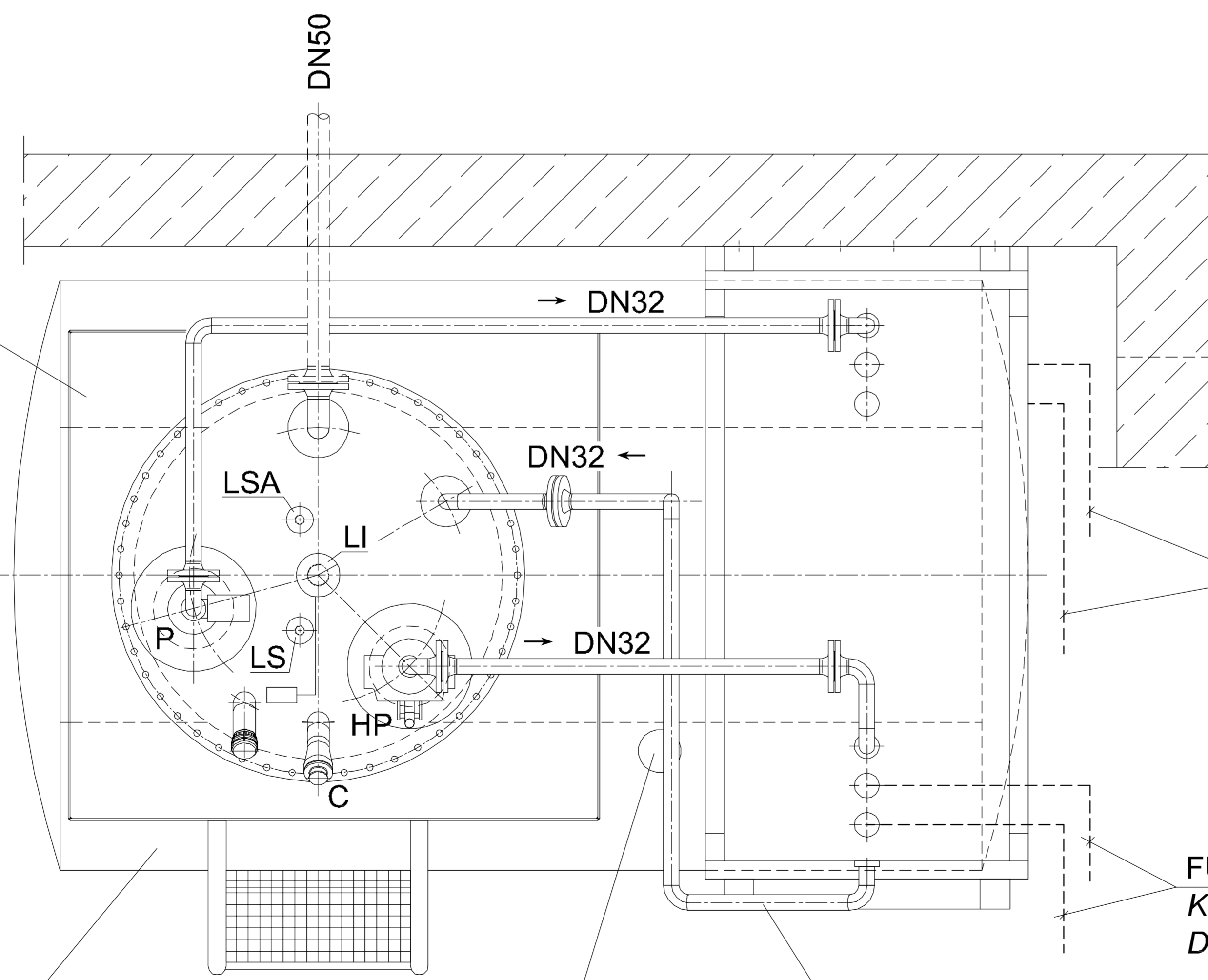
FUEL PIPES FROM GENERATORS  
KRAFTSTOFFLEITUNGEN VON  
DEN GENERATOREN

LEAK CONTROL  
LECKÜBERWACHUNG

OVERFLOW PIPE DAY TANK  
ÜBERLAUFLEITUNG TAGESBEHÄLTER

DOUBLE-WALLED DIESEL TANK 5000L  
ACC. TO DIN EN 12285-2  
DOPPELWANDIGER DIESEL TANK 5000L  
NACH DIN EN 12285-2

1



**LEGEND  
LEGENDE**

- C QUICK COUPLING  
SCHNELLKUPPLUNG
- HP HAND PUMP  
HANDPUMPE
- LI LEVEL INDICATOR  
FÜLLSTANDSANZEIGER
- LS LIMIT SENSOR  
GRENZWERTGEBER
- LSA OVERFILL PROTECTION  
ÜBERFÜLLSICHERUNG
- P PUMP  
PUMPE

REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
HEADQUARTERS UNITED STATES AIR FORCES EUROPE				
AIRFIELD STANDARD DESIGN US		FLUGPLATZ STANDARDPLANUNG US		
JET FUEL STORAGE AND DISPENSING SYSTEMS		FLUGKRAFTSTOFF - VERSORGSANLAGEN		
BUILDING BAUWERK	DOUBLE WALLED DIESEL STORAGE TANK 5m <sup>3</sup> DOPPELWANDIGER DIESEL VORRATSBEHÄLTER 5m <sup>3</sup>			
DESIGNATOR BEZEICHNUNG	MECHANICAL INSTALLATION MASCHINENTECHNISCHE INSTALLATION			
WORKED/REARBEITET	PREPARED/AUFGESTELLT	APPROVED/GENEHMIGT		
LANDSBEREITUNGSGESAMTSCHAFT UND BAUVERBUND LUB-WERKSTÄTTEN LANZOU L B B		AMT FÜR BUNDESBAU WALLSTR.1 55122 MAINZ		
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAU MASSNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED GENEHMIGT	DATE DATUM	6. MAI 2015	SCALE MASSSTAB	1:10
ORIGINAL DRAWN BY IN ORIGINAL SIZE			STANDARD SHEET STANDARD PLAN	
GENERAL INFO CORPORATE FACILITIES ENGINEER PLANNING/DESIGN/CONSTRUCTION			CAD-PROJECT PATH: CAD-PROJECTS	M - 10.1
CONSTRUCTION PROJECT BAU MASSNAHME				SHEET NO. PLATEAU

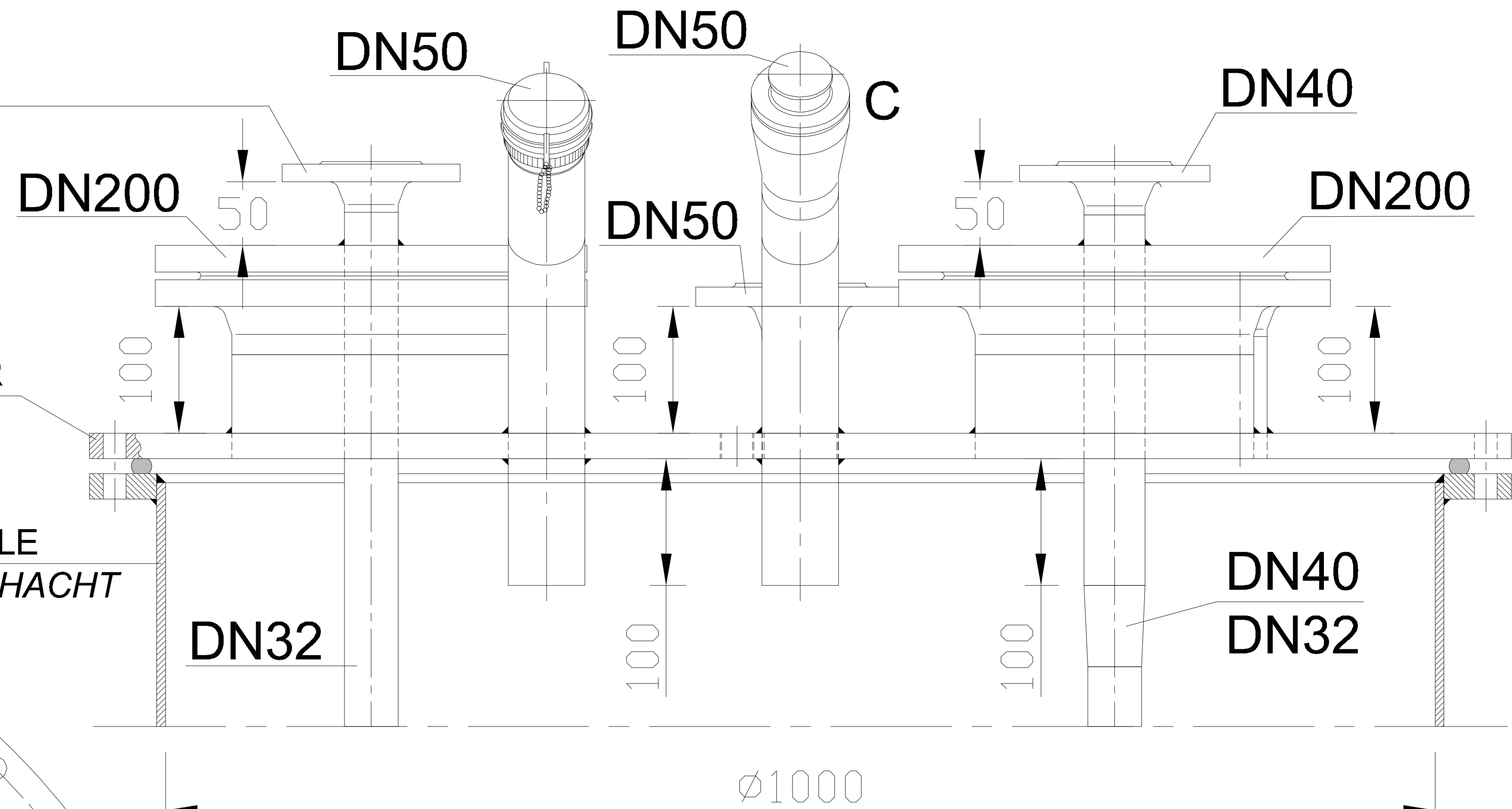
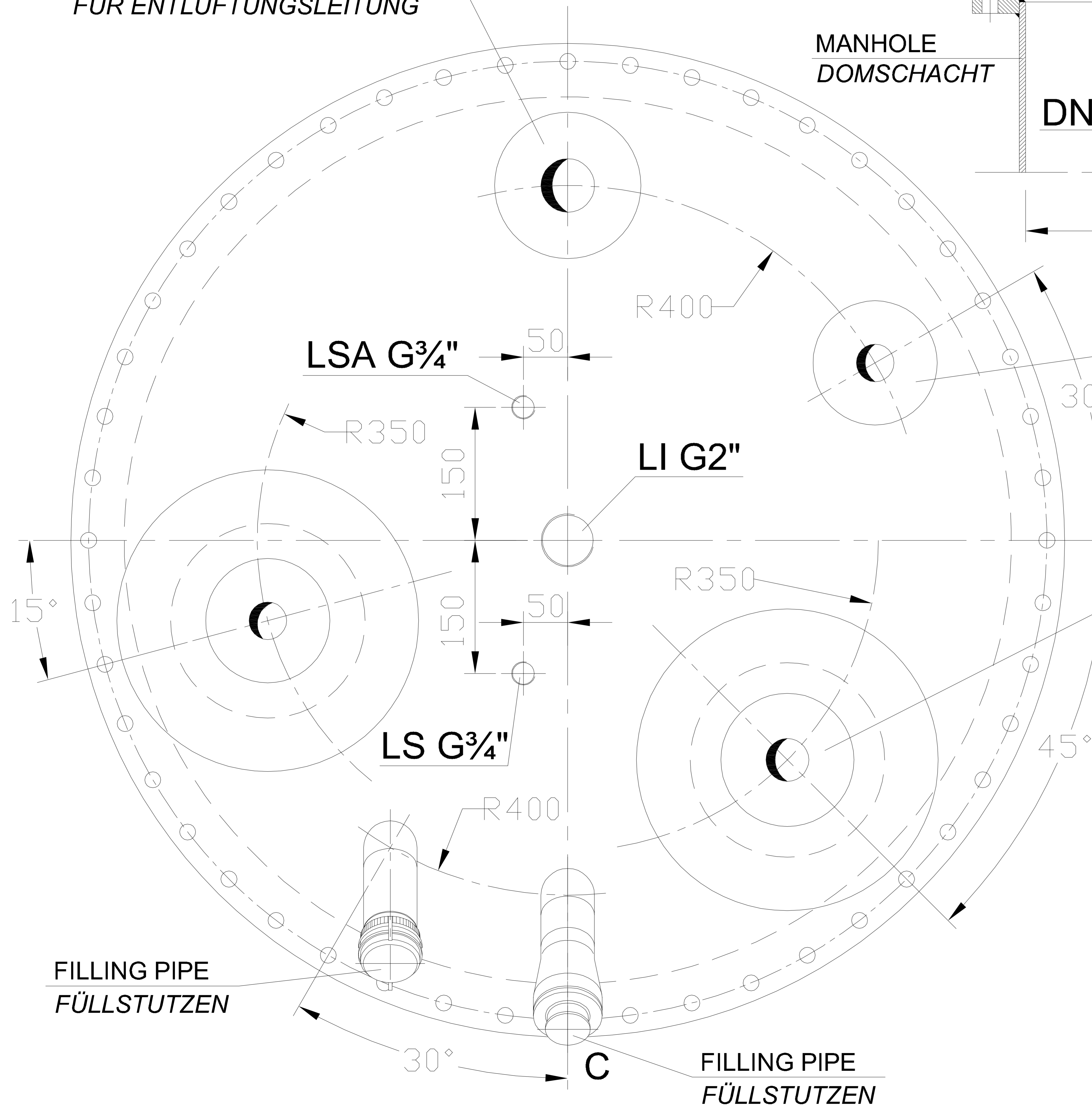


CONNECTION SOCKET DN32 FOR FILLING PIPE DAY TANK  
 ANSCHUSSSTUTZEN DN32 FÜR FÜLLLEITUNG TAGESBEHÄLTER

CONNECTION SOCKET DN50 FOR VENT PIPE  
 ANSCHUSSSTUTZEN DN50 FÜR ENTLÜFTUNGSLEITUNG

DOME COVER  
 DOMDECKEL

MANHOLE  
 DOMSCHACHT



CONNECTION SOCKET DN32 FOR OVERFLOW PIPE DAY TANK  
 ANSCHUSSSTUTZEN DN32 FÜR ÜBERLAUFLEITUNG TAGESBEHÄLTER

CONNECTION SOCKET DN40 FOR FILLING PIPE DAY TANK  
 ANSCHUSSSTUTZEN DN40 FÜR FÜLLLEITUNG TAGESBEHÄLTER

**LEGEND  
 LEGENDE**

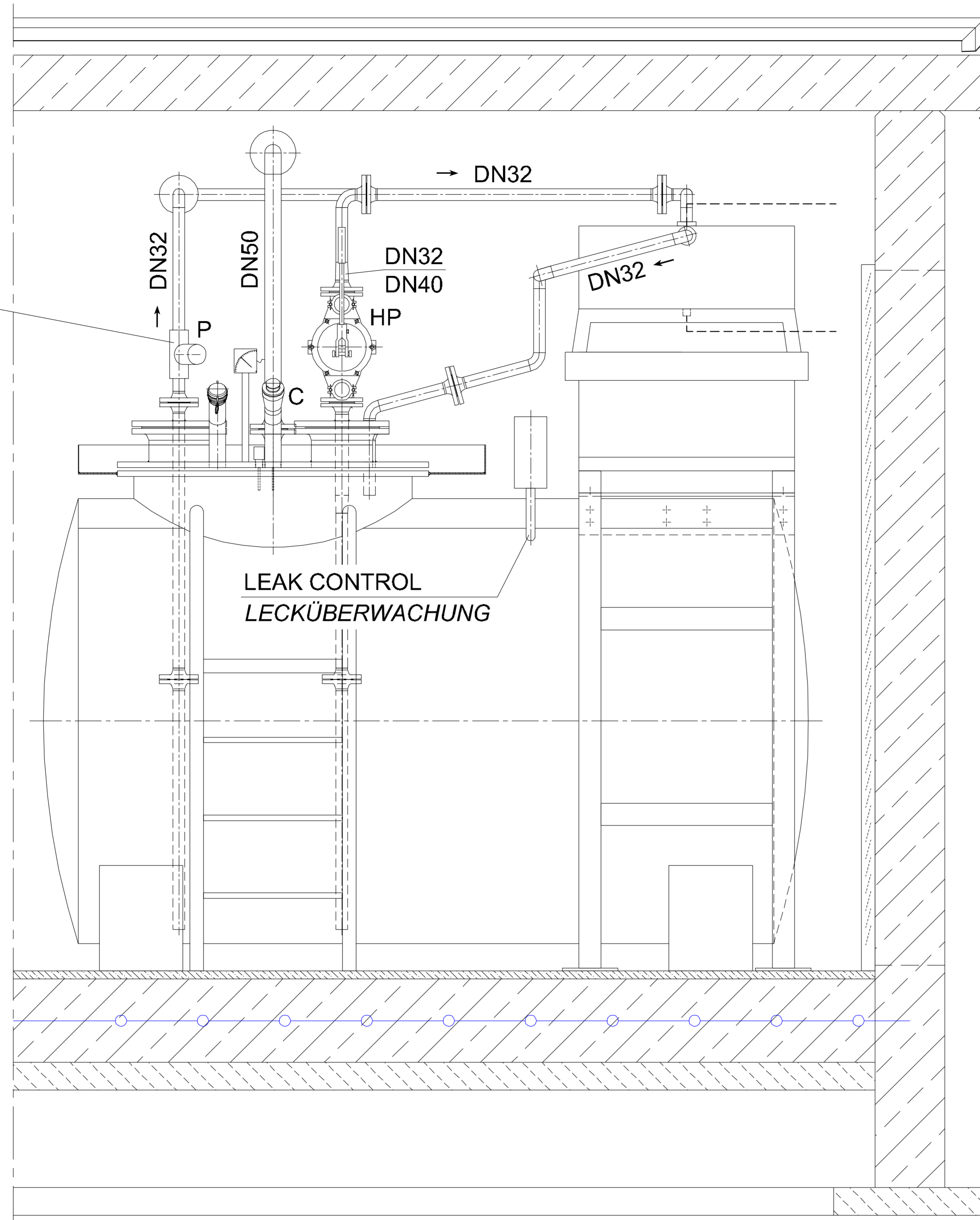
- C QUICK COUPLING  
 SCHNELLKUPPLUNG
- LI LEVEL INDICATOR  
 FÜLLSTANDSANZEIGER
- LS LIMIT SENSOR  
 GRENZWERTGEBER
- LSA OVERFILL PROTECTION  
 ÜBERFÜLLSICHERUNG

REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
<b>HEADQUARTERS</b> UNITED STATES AIR FORCES EUROPE ENGINEERING & OPERATIONS				
AIRFIELD STANDARD DESIGN US JET FUEL STORAGE AND DISPENSING SYSTEMS		 FLUGPLATZ STANDARDPLANUNG US FLUGKRAFTSTOFF - VERSORGSANLAGEN		
<b>BUILDING BAUWERK</b> DIESEL STORAGE TANK 5m <sup>3</sup> DIESEL VORRATSBEHÄLTER 5m <sup>3</sup>				
<b>DESIGNATOR BEZEICHNUNG</b> DETAIL DOME COVER DETAIL DOMDECKEL				
<b>WORKED/REARBEITET</b> LANDEBETRIEB LIEGENSCHAFTS- UND BAUBETRIEBS- UND WERKSTÄTTEN LAMHAW AMBROSSETI, UNIVERSITÄT FÜR INGENIEURWISSENSCHAFTEN LANDAHL BY PRODUZENT IN ÜBERLEBUNG ORIGINAL: 02.02.2015 2D-DRAWING: 02.02.2015		<b>APPROVED/GENEHMIGT</b>  AMT FÜR BUNDESBAU WÄLLSTR.1 55122 MAINZ ORIGINAL: 02.02.2015 2D-DRAWING: 02.02.2015		
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAU MASSNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
<b>APPROVED GENEHMIGT</b>		<b>DATE DATUM</b> 6. MAI 2015		<b>SCALE MASSSTAB</b> 1:2
<b>ORIGINAL: 02.02.2015 IN ORIGINAL: 02.02.2015</b>		<b>STANDARD SHEET STANDARD PLAN</b>		<b>M - 10.2</b>
<b>CONSTRUCTION PROJECT BAU MASSNAHME</b>		<b>CAD-PROJECT PATH: CAD-PROJEKTPfad</b>		<b>SHEET NO. PLATZNR.</b> OF 001



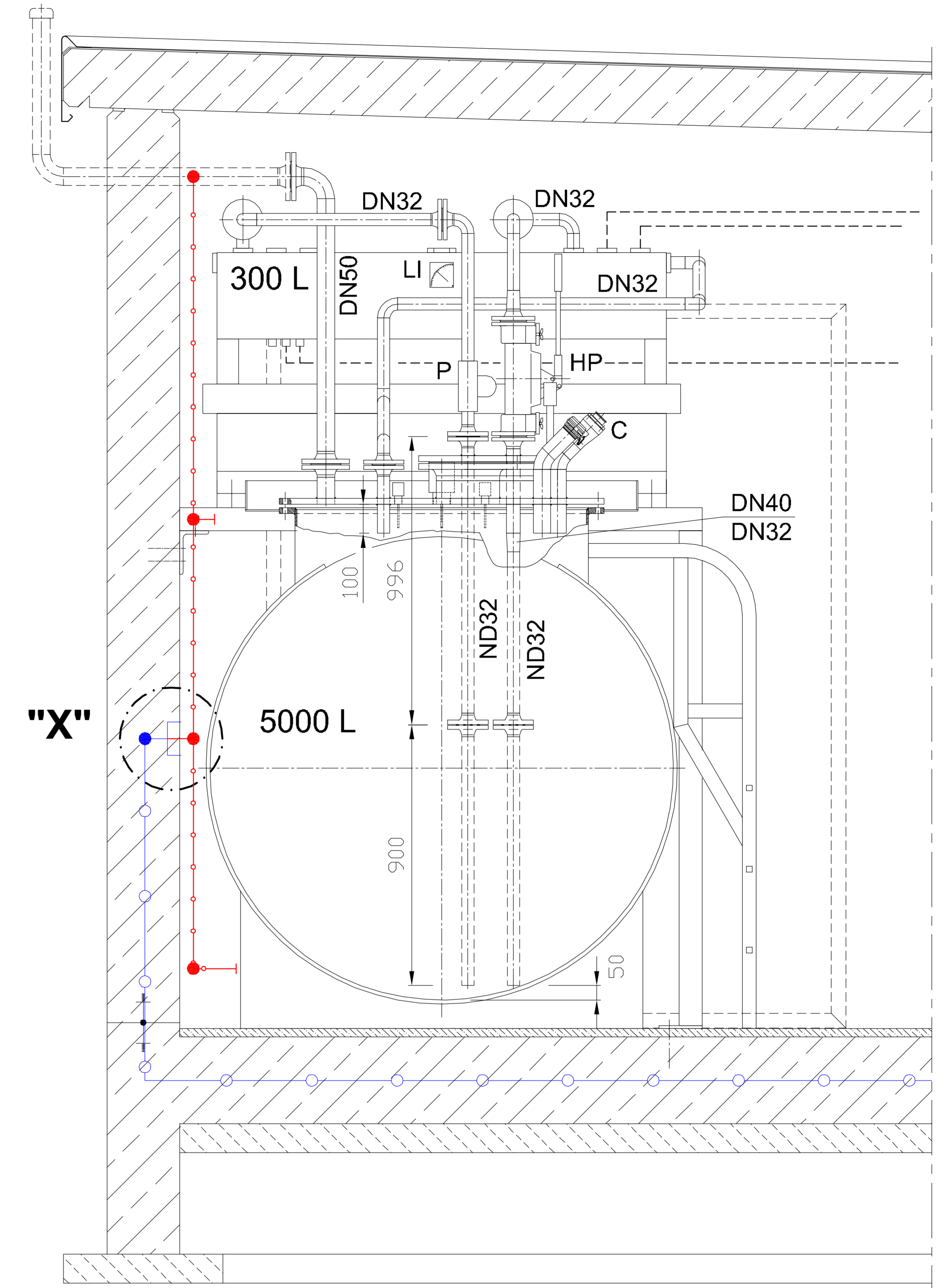
**VIEW  
ANSICHT 1**

ELECTRICAL PUMP  
CAPACITY: APPROX.55 l/min.  
SUCTION: APPROX.4 m  
DRIVE POWER: APPROX.0,55 kw  
ELEKTROPUMPE  
FÖRDERLEISTUNG: CA.55 l/min.  
ANSAUGHÖHE: CA.4 m  
ANTRIEBSLEISTUNG: CA.0,55 kw



2

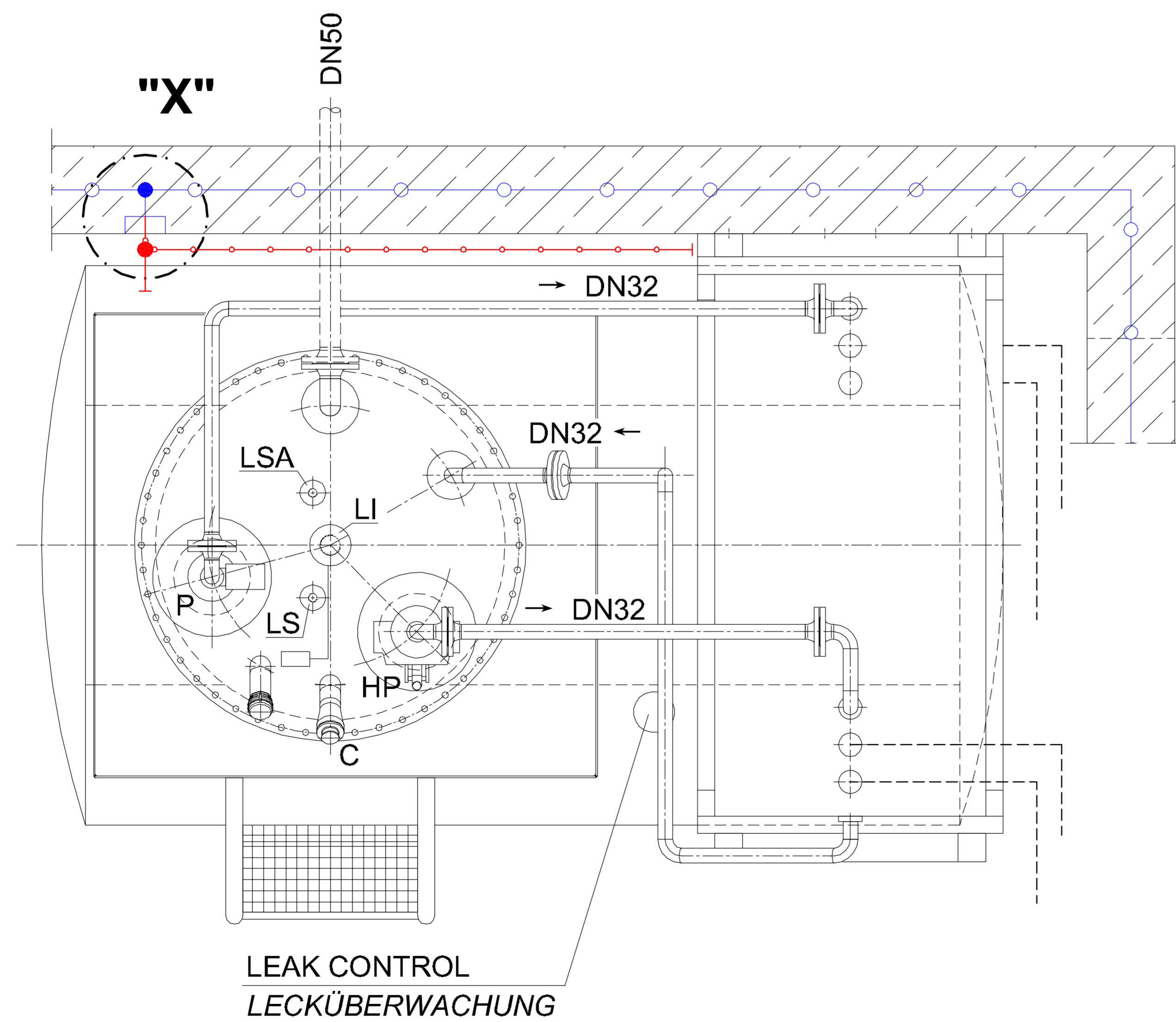
**VIEW  
ANSICHT 2**



**LEGEND  
LEGENDE**

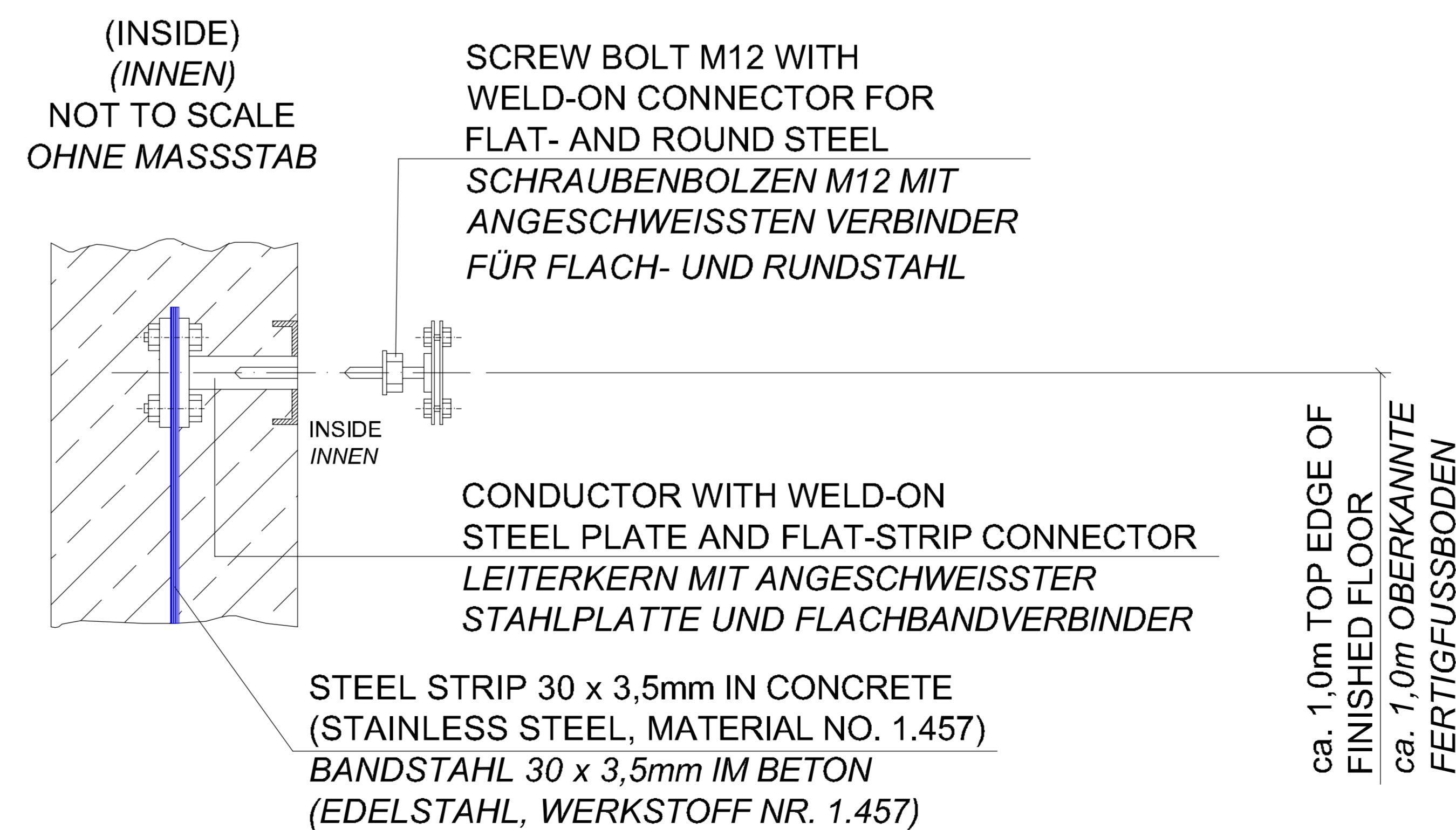
- STEEL STRIP 30 x 3,5mm IN CONCRETE (STAINLESS STEEL, MATERIAL NO. 1.457)  
BANDSTAHL 30 x 3,5mm IM BETON (EDELSTAHL, WERKSTOFF NR. 1.457)
- GALV. STEEL STRIP 30 x 3,5mm SURFACE - MOUNTED  
VERZ. BANDSTAHL 30 x 3,5mm AUF PUTZ
- C** QUICK COUPLING  
SCHNELLKUPPLUNG
- HP** HAND PUMP  
HANDPUMPE
- LI** LEVEL INDICATOR  
FÜLLSTANDSANZEIGER
- LS** LIMIT SENSOR  
GRENZWERTGEBER
- LSA** OVERFILL PROTECTION  
ÜBERFÜLLSICHERUNG
- P** PUMP  
PUMPE

**TOP VIEW  
DRAUFSICHT**



1

**DETAIL "X"  
GROUNDING CONNECTION  
ERDUNGSANSCHLUSS**



ca. 1,0m TOP EDGE OF  
FINISHED FLOOR  
ca. 1,0m OBERKANTE  
FERTIGFUSSBODEN

REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
HEADQUARTERS UNITED STATES AIR FORCES EUROPE				
ENGINEERING & OPERATIONS				
AIRFIELD STANDARD DESIGN US			FLUGPLATZ STANDARDPLANUNG US	
JET FUEL STORAGE AND DISPENSING SYSTEMS			FLUGKRAFTSTOFF - VERSORGENGSANLAGEN	
BUILDING BAUWERK: DOUBLE WALLED DIESEL STORAGE TANK 5m <sup>3</sup> DOPPELWÄNDIGER DIESEL VORRATSBEHÄLTER 5m <sup>3</sup>				
DESIGNATOR: BEZEICHNUNG: ELECTRICAL INSTALLATION AND GROUNDING ELEKTROTECHNISCHE INSTALLATION UND ERDUNG				
WORKPREPARED BY: LANSBERGER LIEFERANTEN- UND BAUBETRIEB L&B	APPROVED/GEHEBET AMT FÜR BUNDESBAU WALLSTR.1 55122 MAINZ	PREPARED/HERGESTELLT APPROVED/GEHEBET LANDTAG BEFUGT IN VERLEHUNG ORIGINAL SIGNED BY IN ORIGINAL GEZ. 10.06.2015		
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAU MASSNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED GEHEBET	DATE DATUM: 6. MAI 2015	SCALE MASSSTAB: 1:10		
ORIGINAL SIGNED BY IN ORIGINAL GEZ.	STANDARD SHEET STANDARD PLAN			
DESIGN NAME CONTRAST FACILITIES ENGINEER IN CHARGE: WERKSTOFF NR.	CAD-PROJECT NAME: CAD-PROJEKTNAME			E - 10.1
CONSTRUCTION PROJECT BAU MASSNAHME	SHEET NO. PLATZNR.			OF VON



# **TANK TRUCK REFUELING PITS**

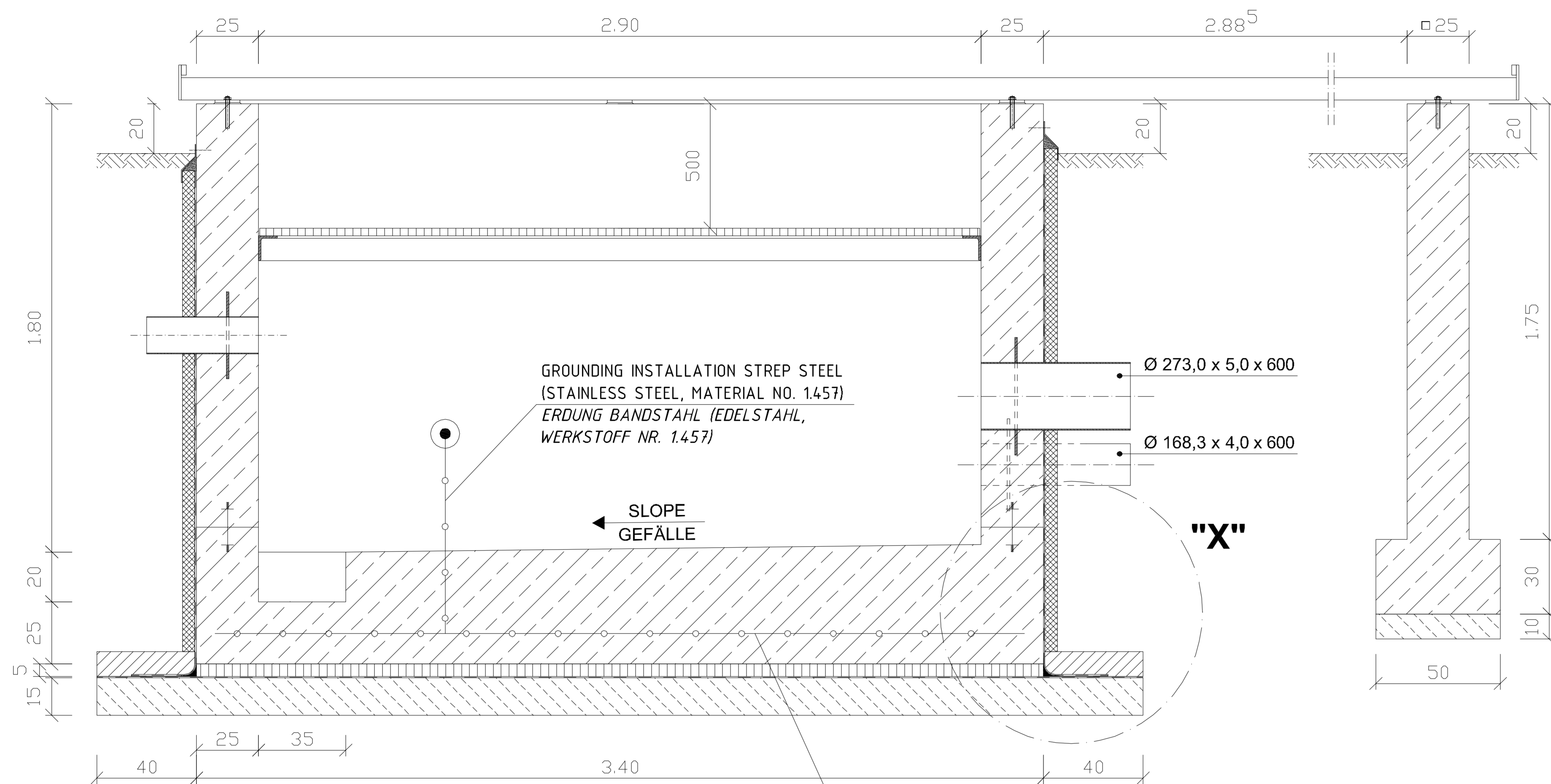
## ***TANKWAGEN- BETANKUNGSSCHÄCHTE***

# 12

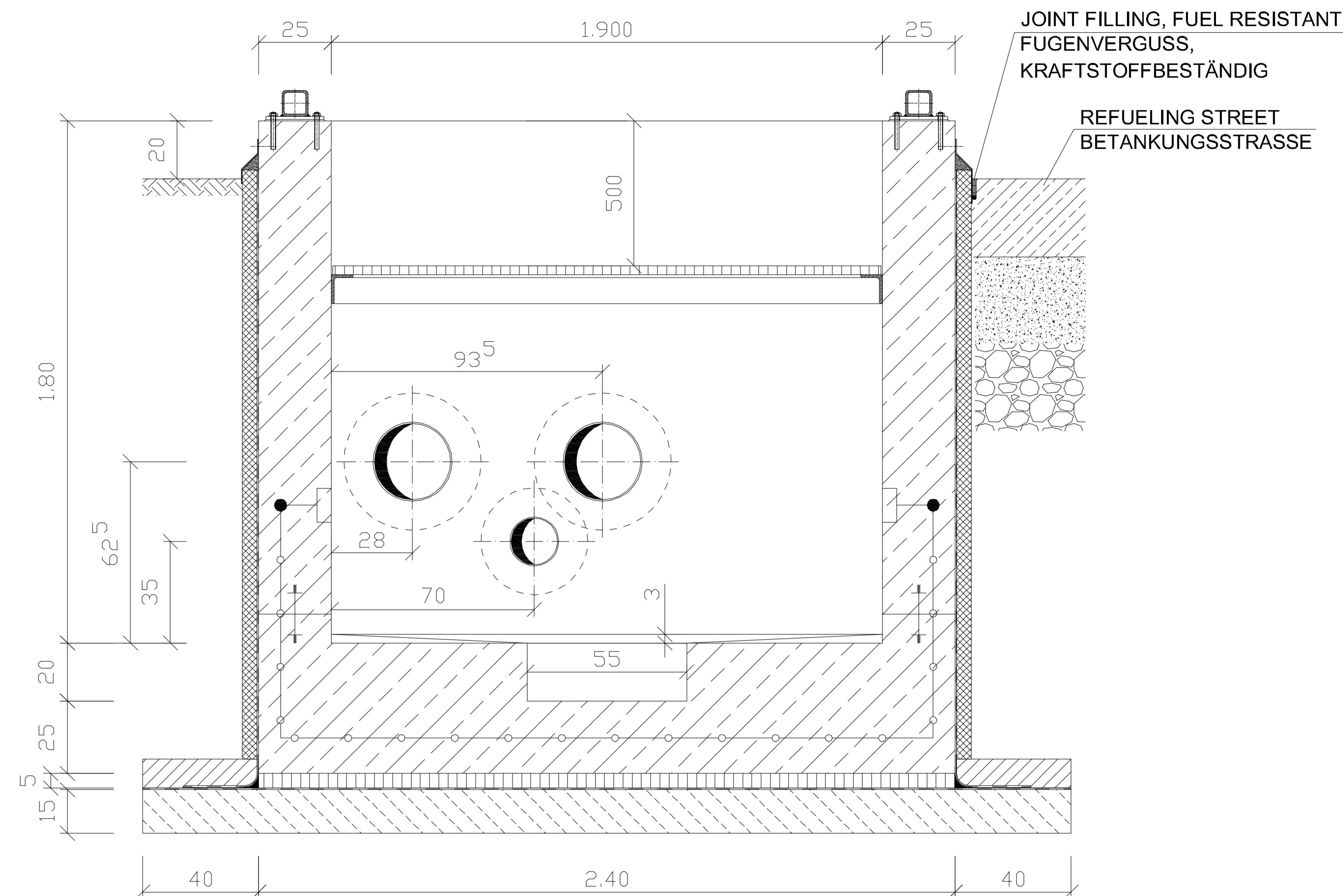
- C-12.1** CONSTRUCTION PLAN (LEFT SIDE)  
*BAUKONSTRUKTIONSPLAN (LINKSAUSFÜHRUNG)*
- C-12.2** CONSTRUCTION PLAN (RIGHT SIDE)  
*BAUKONSTRUKTIONSPLAN (RECHTSAUSFÜHRUNG)*
- C-12.3** DETAILS  
DETAILS
- S-12.2** ROLLING COVER  
ROLLDECKEL
- M-12.1** MECHANICAL INSTALLATION (LEFT SIDE)  
MASCHINENTECHNISCHE INSTALLATION (LINKSAUSFÜHRUNG)
- M-12.2** MECHANICAL INSTALLATION (RIGHT SIDE)  
MASCHINENTECHNISCHE INSTALLATION (RECHTSAUSFÜHRUNG)
- E-12.1** GROUNDING AND LIGHTNING PROTECTION PLAN (LEFT SIDE)  
ERDUNG- UND BLITZSCHUTZPLAN (LINKSAUSFÜHRUNG)
- E-12.2** GROUNDING AND LIGHTNING PROTECTION PLAN (RIGHT SIDE)  
ERDUNG- UND BLITZSCHUTZPLAN (RECHTSAUSFÜHRUNG)
- E-12.3** GROUNDING AND LIGHTNING PROTECTION PLAN, DETAILS  
ERDUNG- UND BLITZSCHUTZPLAN, DETAILS



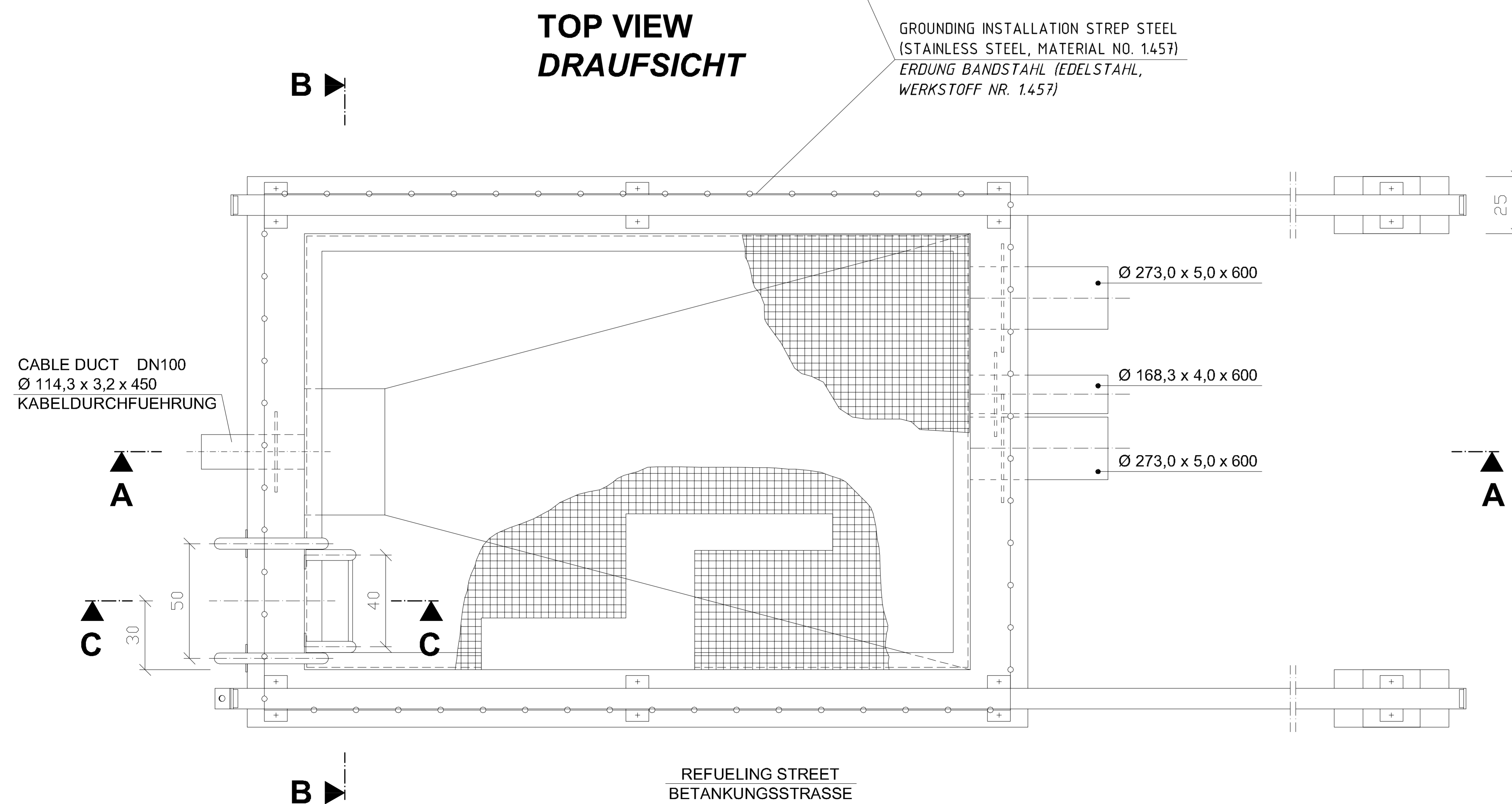
**SECTION A - A**  
**SCHNITT A - A**



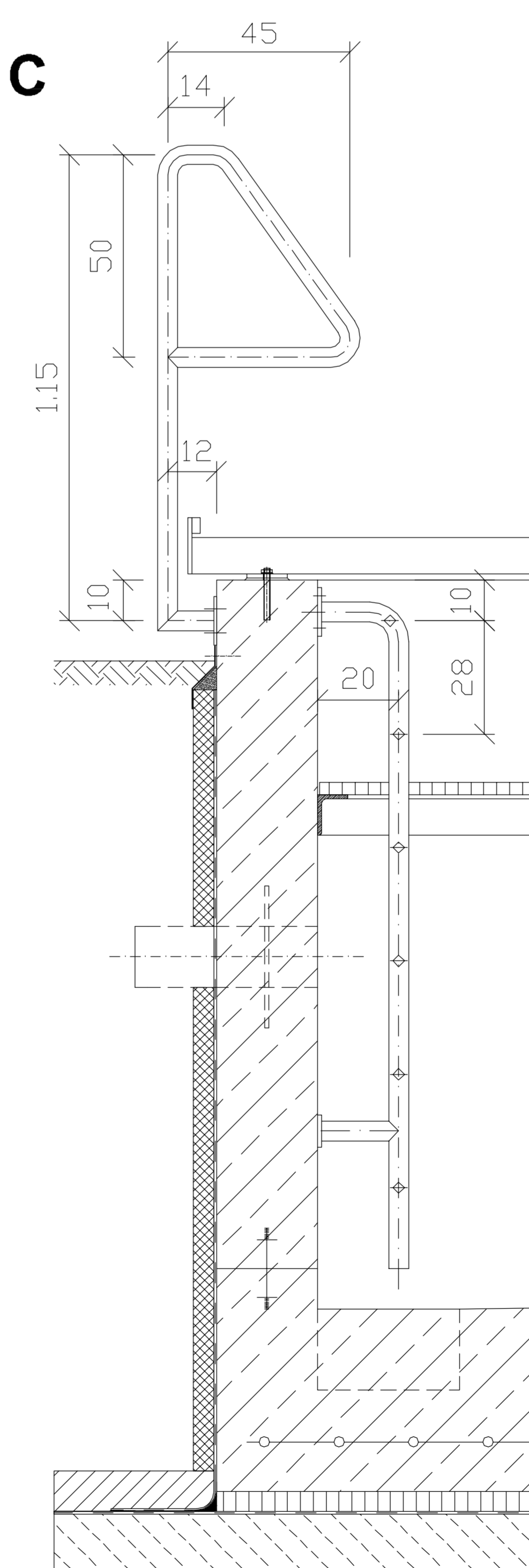
**SECTION B - B**  
**SCHNITT B - B**



**TOP VIEW**  
**DRAUFSICHT**



**SECTION C - C**  
**SCHNITT C - C**



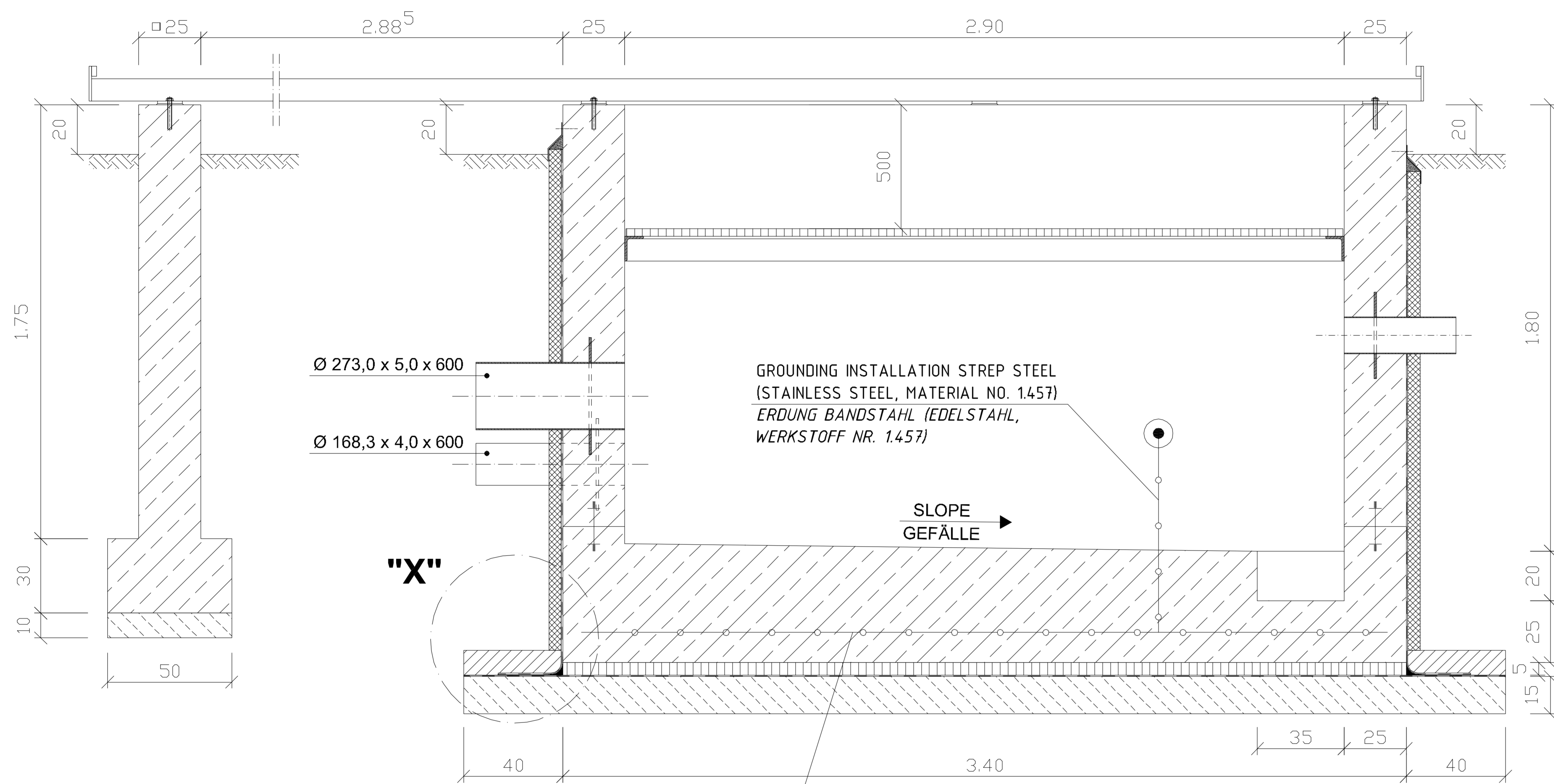
**PERTINENT DRAWINGS**  
**ZUGEHÖRIGE ZEICHNUNGEN**

- C-12.3 DETAILS  
DETAILS
- S-12.2 ROLLING COVER  
ROLLDECKEL
- E-12.1 GROUNDING AND LIGHTNING PROTECTION PLAN  
ERDUNGS- UND BLITZSCHUTZPLAN

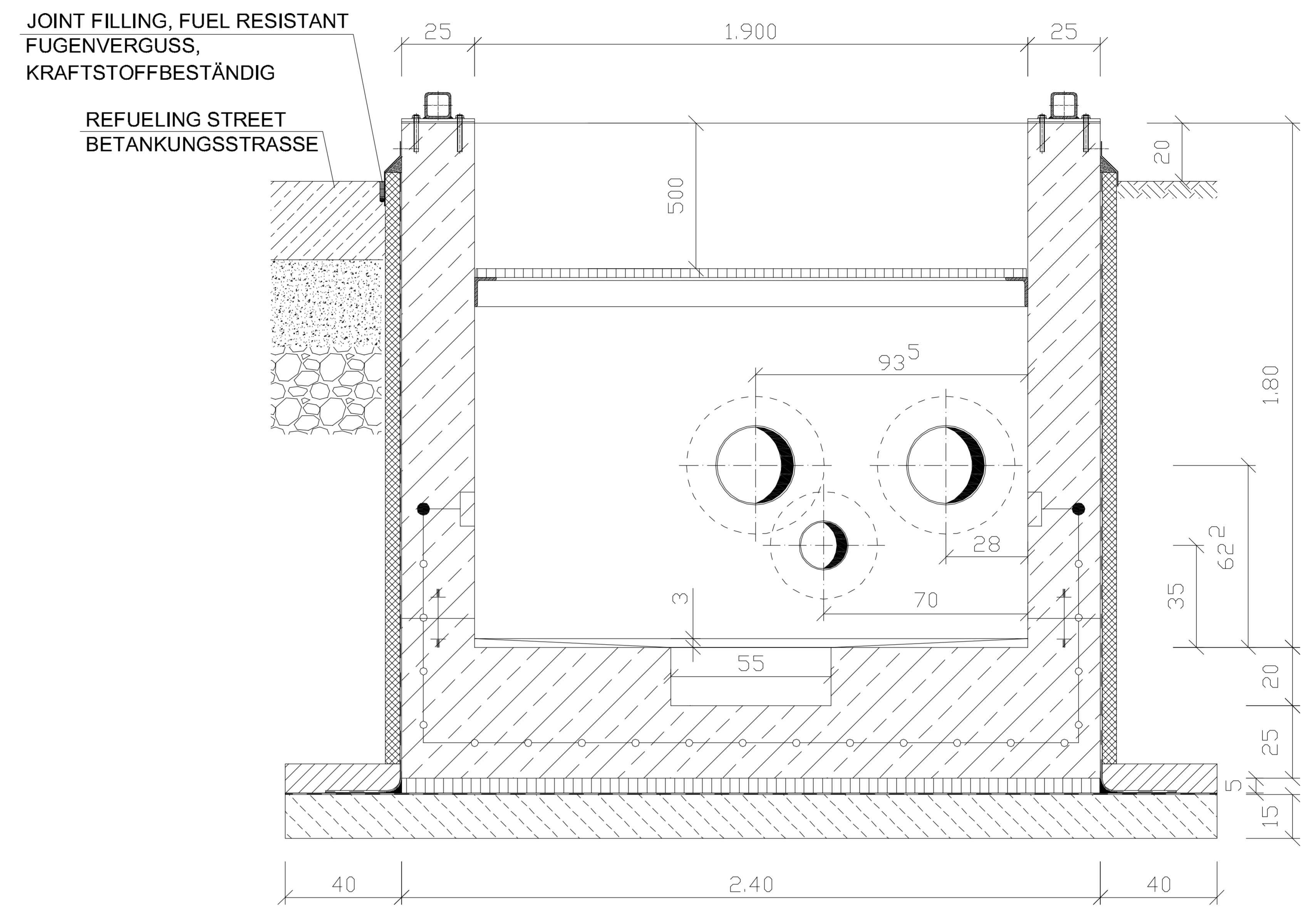
REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
<b>HEADQUARTERS</b>				
UNITED STATES AIR FORCES EUROPE				
<b>ENGINEERING &amp; OPERATIONS</b>				
AIRFIELD STANDARD DESIGN US			FLUGPLATZ STANDARDPLANUNG US	
JET FUEL STORAGE AND DISPENSING SYSTEMS			FLUGKRAFTSTOFF - VERSORGUNGSANLAGEN	
BUILDING BAUWERK				
TANK TRUCK REFUELING PTT (LEFT SIDE) TANKWAGEN - BETANKUNGSSCHACHT (LINKSAUSFÜHRUNG)				
DESIGNATOR BEZEICHNUNG				
CONSTRUCTION PLAN BAUKONSTRUKTIONSPLAN				
WORKED/REARBEITET		PREPARED/AUFGESTELLT	APPROVED/GENEHMIGT	
		LANDSCHAFTS- UND BAULEITUNG LBA LANDSCHAFTS- UND BAULEITUNG LBA	AMT FÜR BUNDESBAU WALLSTR.1 55122 MAINZ	
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAU MASSNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED GENEHMIGT	DATE DATUM	6. MAI 2015	SCALE MASSSTAB	1:10
ORIGINAL SIGNED BY IN ORIGINAL DED.				STANDARD SHEET STANDARD PLAN
CONSTRUCTION PROJECT BAU MASSNAHME			C - 12.1	
			SHEET NO. PLATZ NR.	
			OF VON	



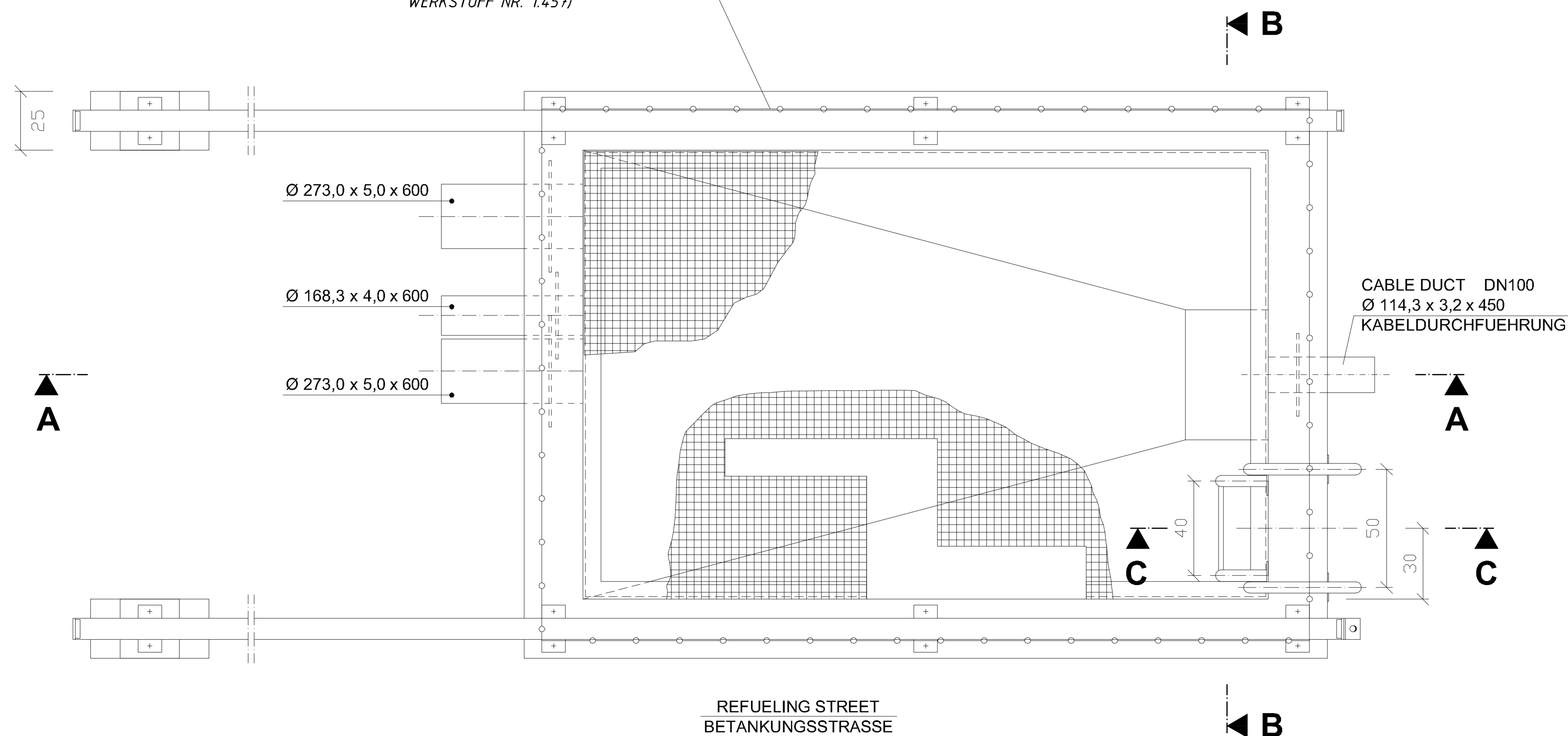
**SECTION  
SCHNITT A - A**



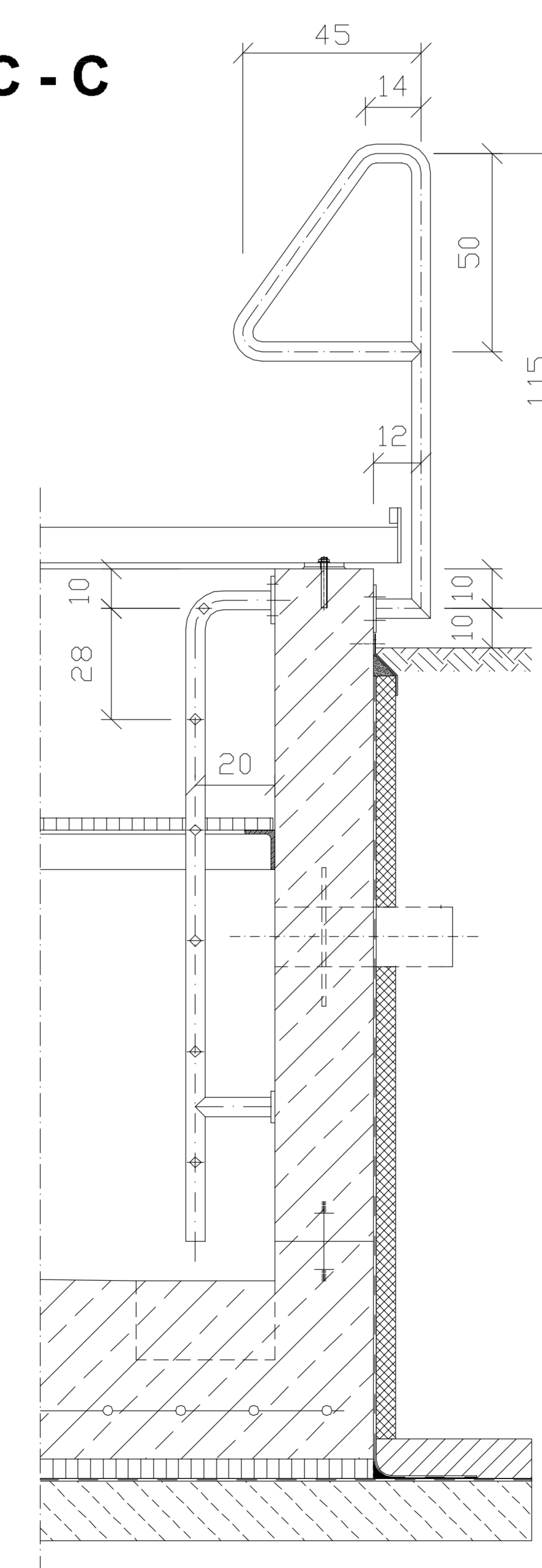
**SECTION  
SCHNITT B - B**



**TOP VIEW  
DRAUFSICHT**



**SECTION  
SCHNITT C - C**



**PERTINENT DRAWINGS  
ZUGEHÖRIGE ZEICHNUNGEN**

- C-12.3 DETAILS  
DETAILS
- S-12.2 ROLLING COVER  
ROLLDECKEL
- E-12.1 GROUNDING AND LIGHTNING PROTECTION PLAN  
ERDUNGS- UND BLITZSCHUTZPLAN

REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
<b>HEADQUARTERS</b> UNITED STATES AIR FORCES EUROPE ENGINEERING & OPERATIONS				
AIRFIELD STANDARD DESIGN US JET FUEL STORAGE AND DISPENSING SYSTEMS		FLUGPLATZ STANDARDPLANUNG US FLUGKRAFTSTOFF - VERSORGENSANLAGEN		
BUILDING BAUWERK TANK TRUCK REFUELING PIT (RIGHT SIDE) TANKWAGEN - BETANKUNGSSCHACHT (RECHTSAUSFÜHRUNG)				
DESIGNATOR BEZEICHNUNG CONSTRUCTION PLAN BAUKONSTRUKTIONSPLAN				
WORKED/REARBEITET LANDEBETRIEB LIEGENSCHAFTS- UND BAUBETRIEB LW-WERKSTÄTTEN LANZOU AMBROSETTI, UNIVERSITÄT J., INGENIEUR TECHN. ZEICHN. UND FOTO. (BRUNNEN)		APPROVED/GENEHMIGT AMT FÜR BUNDESBAU WALLSTR.1 55122 MAINZ		
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAUMASSNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED GENEHMIGT	DATE DATUM	6. MAI 2015		SCALE MASSSTAB
ORIGINAL SIGNED BY IN ORIGINAL DES.				1:10
ORIGINAL SIGNED BY IN ORIGINAL DES. GENERAL SIGNED GENERAL SIGNED CONSTRUCTION PROJECT BAUASSNAHME				STANDARD SHEET STANDARD PLAN C - 12.2 SHEET NO. PLATZ NR. OF VON

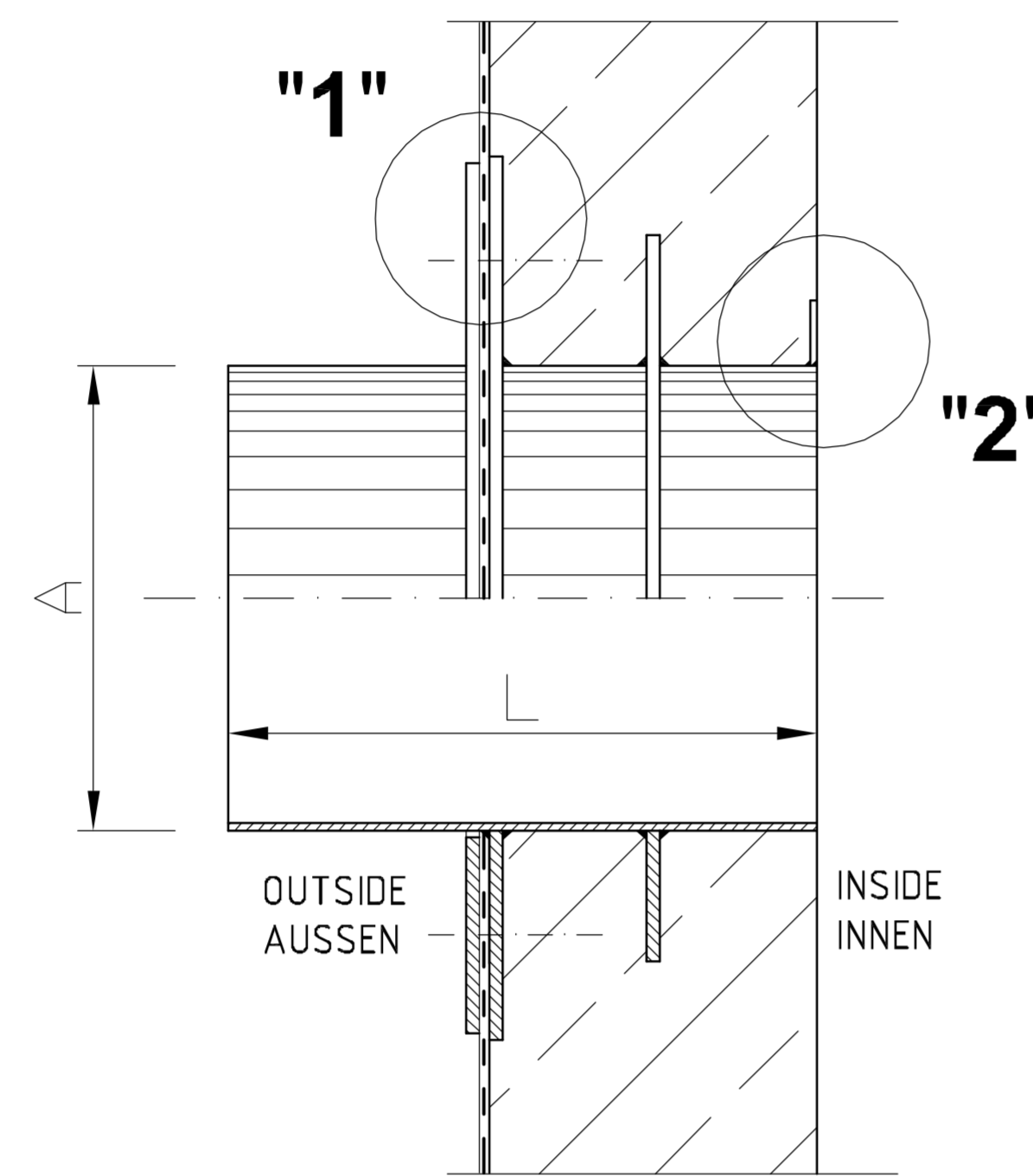


DETAIL PIPE PENETRATION, CASING  
DETAIL ROHRDURCHFÜHRUNG, MANTELROHR

DETAIL CABLE DUCT  
DETAIL KABELDURCHFÜHRUNG

NOT TO SCALE  
OHNE MASSTAB

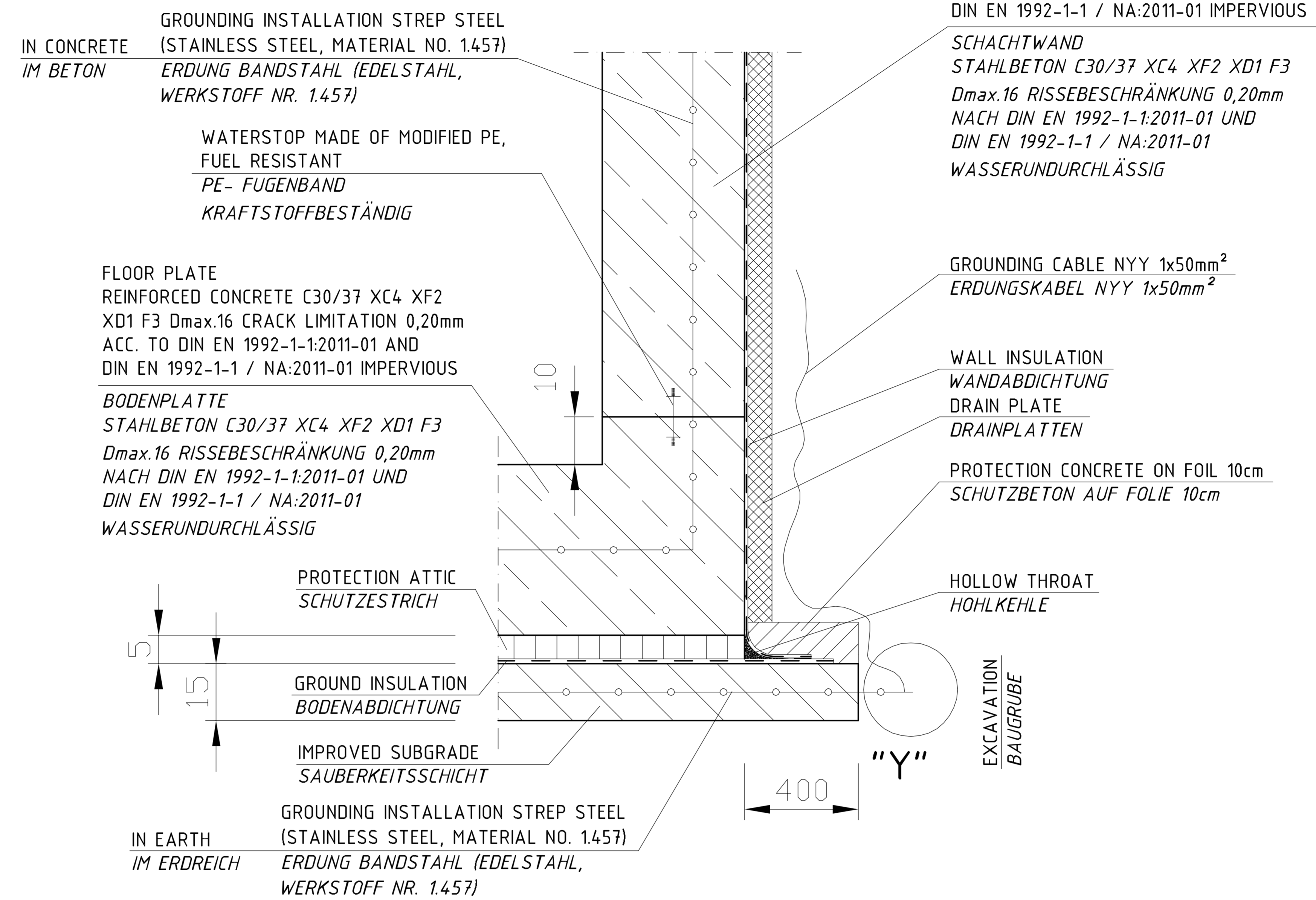
	A	L
	mm	mm
PIPE PENETRATION ROHRDURCHFÜHRUNG	DN 250 Ø273,0	600
	DN 150 Ø168,3	600
CABLE DUCT KABELDURCHFÜHRUNG	DN 100 Ø114,3	450



DETAIL "1"

DETAIL "X"

NOT TO SCALE  
OHNE MASSTAB



PIT WALL  
REINFORCED CONCRETE C30/37 XC4 XF2  
XD1 F3 Dmax.16 CRACK LIMITATION 0,20mm  
ACC. TO DIN EN 1992-1-1:2011-01 AND  
DIN EN 1992-1-1 / NA:2011-01 IMPERVIOUS

SCHACHTWAND  
STAHLBETON C30/37 XC4 XF2 XD1 F3  
Dmax.16 RISSEBESCHRÄNKUNG 0,20mm  
NACH DIN EN 1992-1-1:2011-01 UND  
DIN EN 1992-1-1 / NA:2011-01  
WASSERUNDURCHLÄSSIG

GROUNDING CABLE NY 1x50mm<sup>2</sup>  
ERDUNGSKABEL NY 1x50mm<sup>2</sup>

WALL INSULATION  
WANDABDICHTUNG  
DRAIN PLATE  
DRAINPLATTEN

PROTECTION CONCRETE ON FOIL 10cm  
SCHUTZBETON AUF FOLIE 10cm

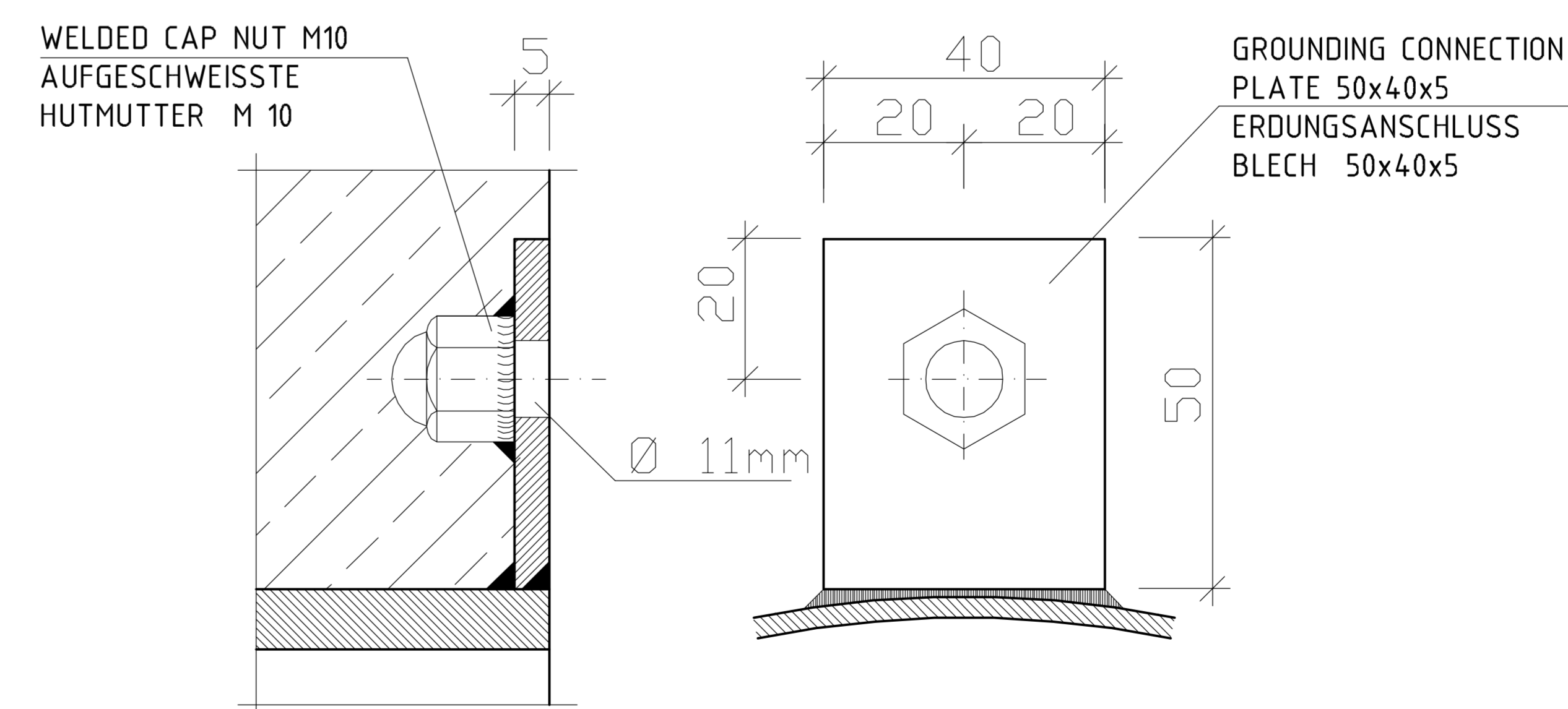
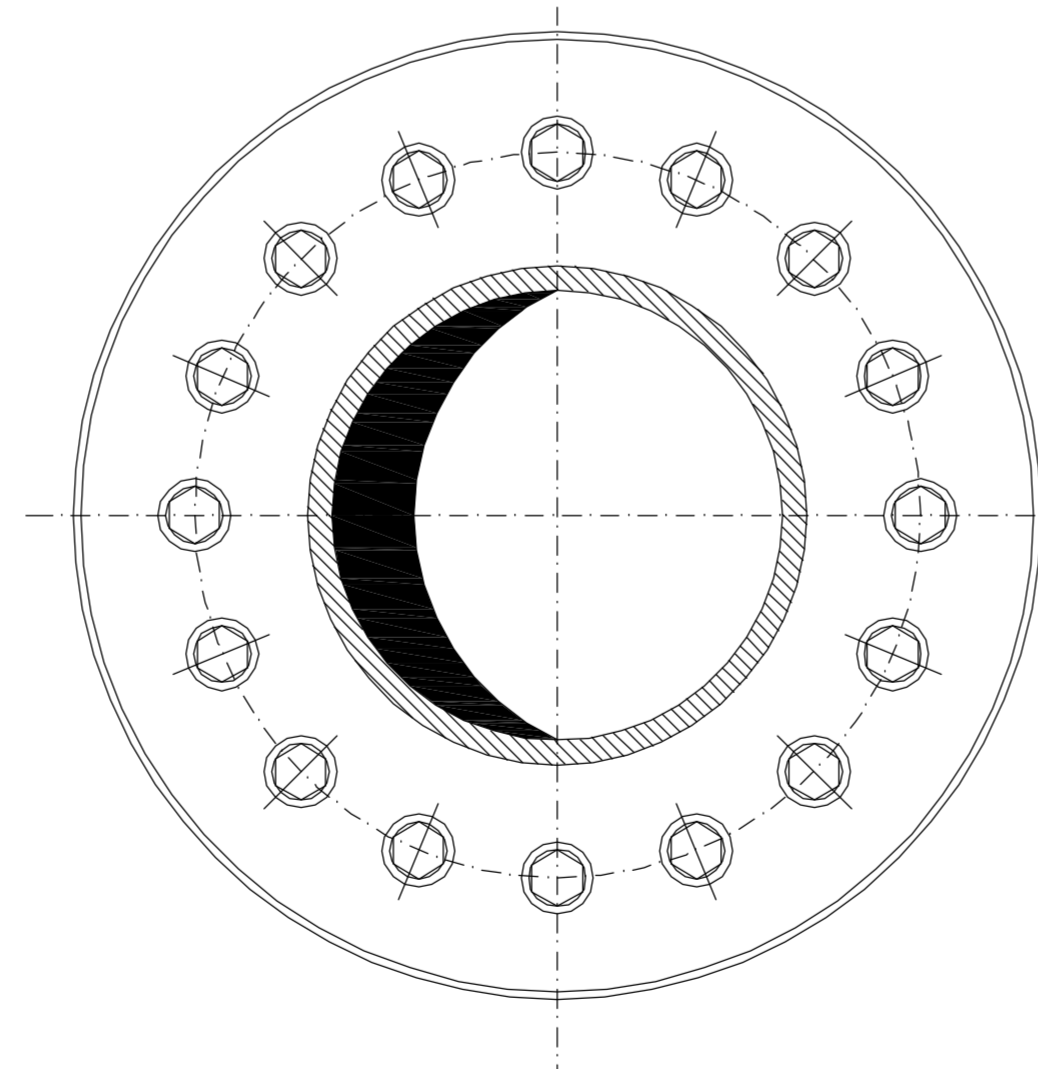
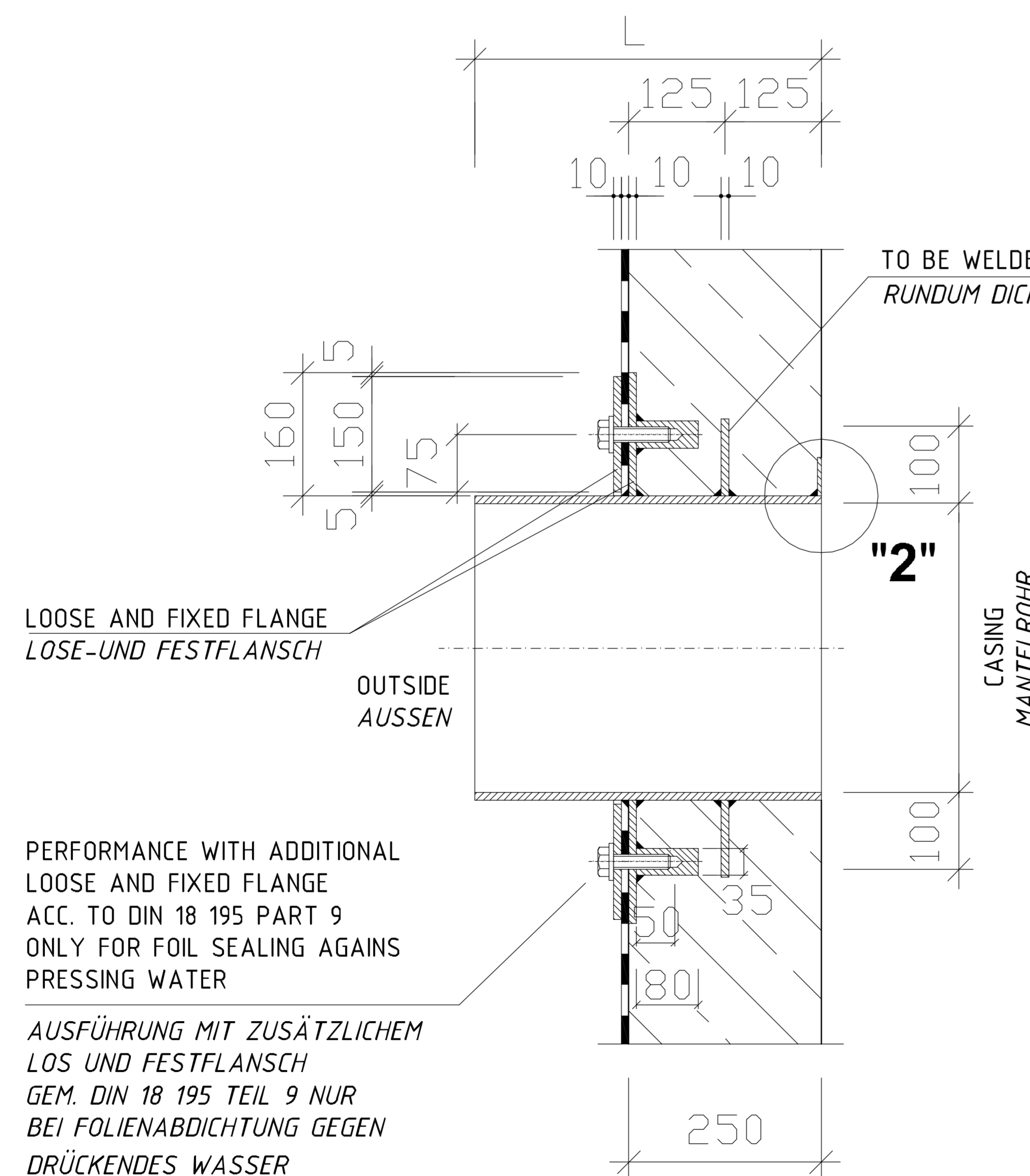
HOLLOW THROAT  
HOHLKEHLE

EXCAVATION  
BAUGRUBE

GROUNDING INSTALLATION STREP STEEL  
(STAINLESS STEEL, MATERIAL NO. 1.457)  
IM ERDREICH  
ERDUNG BANDSTAHL (EDELSTAHL,  
WERKSTOFF NR. 1.457)

DETAIL "2"

GROUNDING CONNECTION CASING ON INTERNAL  
RING GROUNDING INSTALLATION  
ERDUNGSANSCHLUSS MANTELROHR  
AN INNENRINGERDER



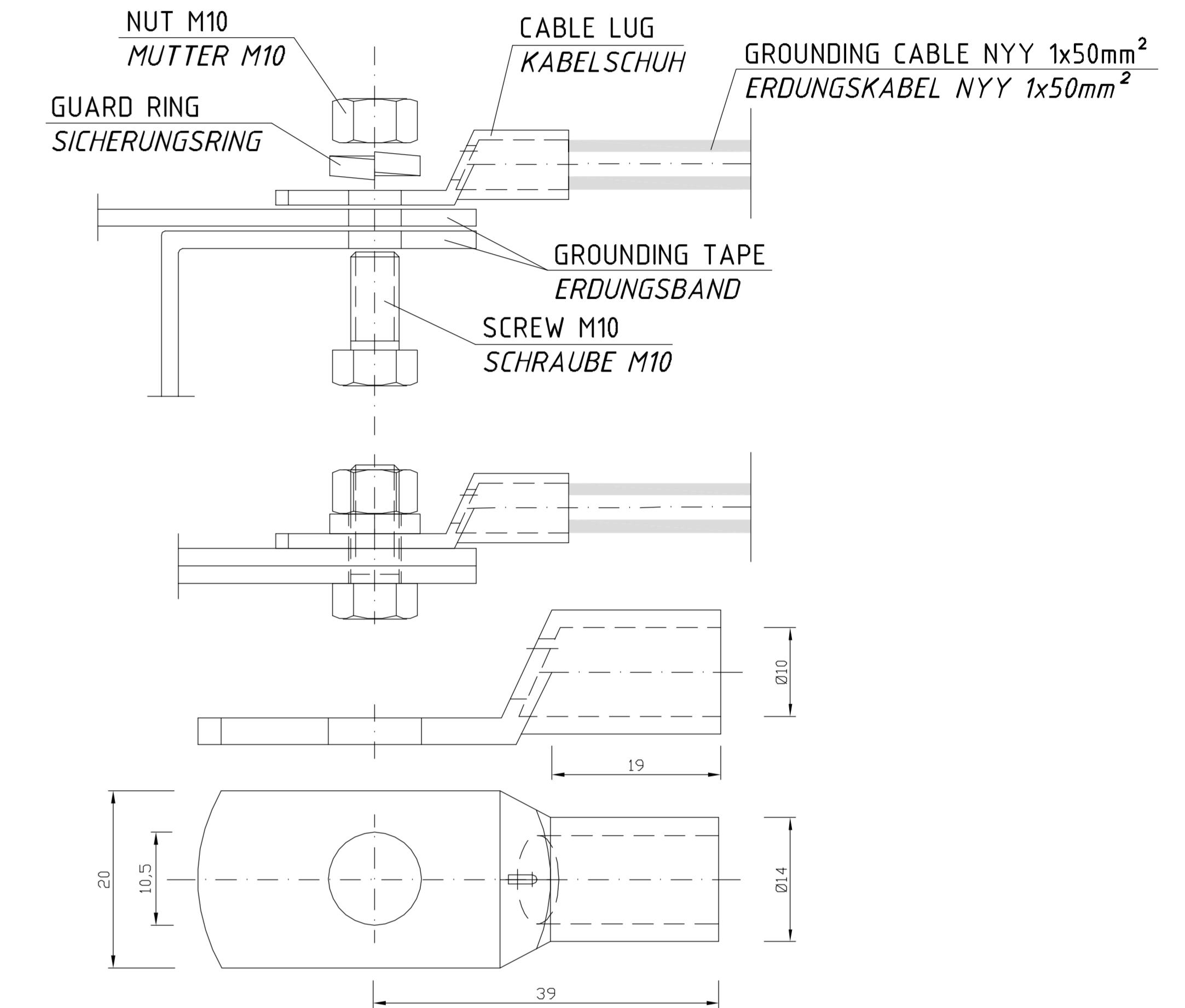
DETAIL "Y"

CONNECTION TO GROUNDING

ANSCHLUSS ERDUNG

NO SCALE / OHNE MASSTAB

GROUNDING CABLE NY 1x50mm<sup>2</sup> WITH CABLE LUG  
AND SCREW CONNECTION M10 WITH GUARD RING  
ERDUNGSKABEL NY 1x50mm<sup>2</sup> MIT KABELSCHUH  
UND SCHRAUBVERBINDUNG M10 MIT SICHERUNGSRING



PERTINENT DRAWINGS

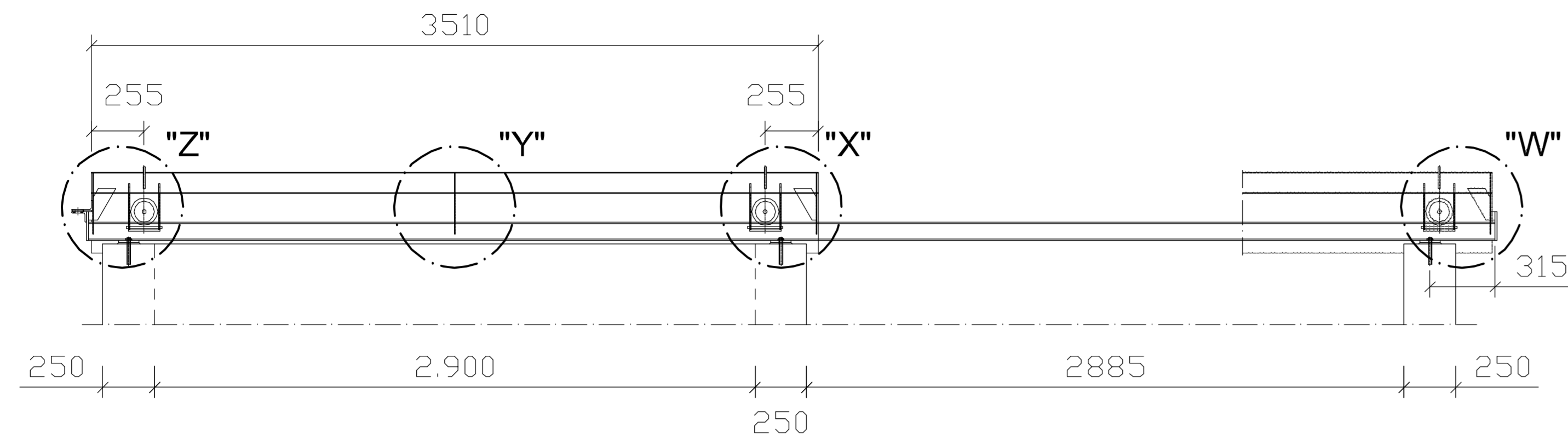
ZUGEHÖRIGE ZEICHNUNGEN

- C-12.1 CONSTRUCTION PLAN (LEFT SIDE)  
BAUKONSTRUKTIONSPLAN (LINKSAUSFÜHRUNG)
- C-12.2 CONSTRUCTION PLAN (RIGHT SIDE)  
BAUKONSTRUKTIONSPLAN (RECHTSAUSFÜHRUNG)
- E-12.1 GROUNDING AND LIGHTNING PROTECTION PLAN  
ERDUNGS- UND BLITZSCHUTZPLAN

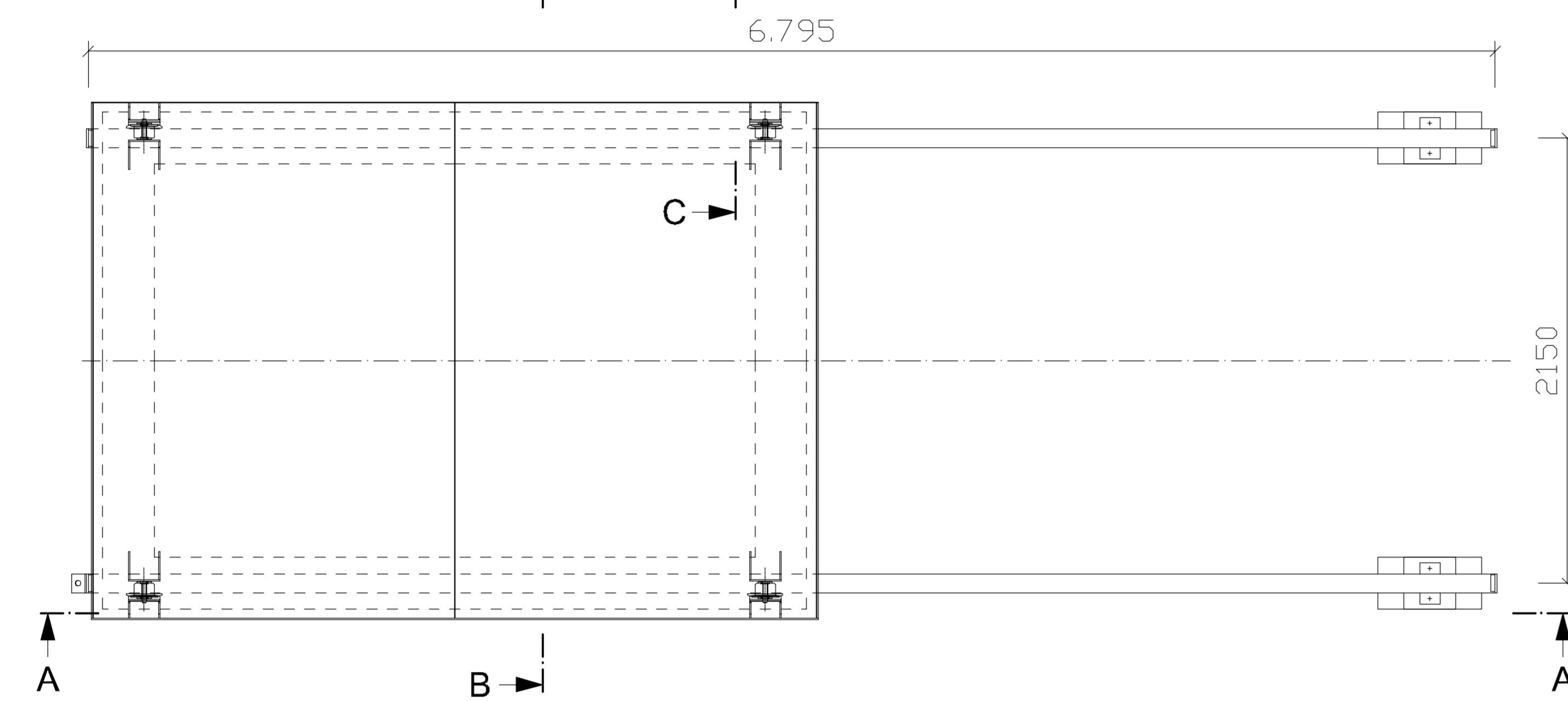
REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
HEADQUARTERS UNITED STATES AIR FORCES EUROPE ENGINEERING & OPERATIONS				
AIRFIELD STANDARD DESIGN US		FLUGPLATZ STANDARDPLANUNG US		
JET FUEL STORAGE AND DISPENSING SYSTEMS		FLUGKRAFTSTOFF - VERSORGUNGSANLAGEN		
BUILDING BAUWERK				
TANK TRUCK REFUELING PIT TANKWAGEN - BETANKUNGSSCHACHT				
DESIGNATION BEZEICHNUNG				
DETAILS DETAILS				
WORKED/BEARBEITET	PREPARED/AUFGESTELLT	APPROVED/GENEHMIGT		
LANDSCHAFTS- UND BAUWERKE LUB	LANDSCHAFTS- UND BAUWERKE LUB	AMT FÜR BUNDESBAU WALLSTR.1 55122 MAINZ		
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAUWERKE IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED GENEHMIGT	DATE DATUM	SCALE MASSTAB	NOT TO SCALE / OHNE MASSTAB	
ORIGINAL SIGNED BY IN ORIGINAL SIZE	6. MAI 2015	STANDARD SHEET STANDARD BLATT		
GENERAL INFO GEM. DIN 18 195 PART 9 NUR BEI FOLIENABDICHTUNG GEGEN DRÜCKENDES WASSER		CAD-PROJECT PATH: C:\PROJ\BIBL\	C - 12.3	
CONSTRUCTION PROJECT BAUWERKNAHME		SHEET NO. BLATTNR.	OF VON	



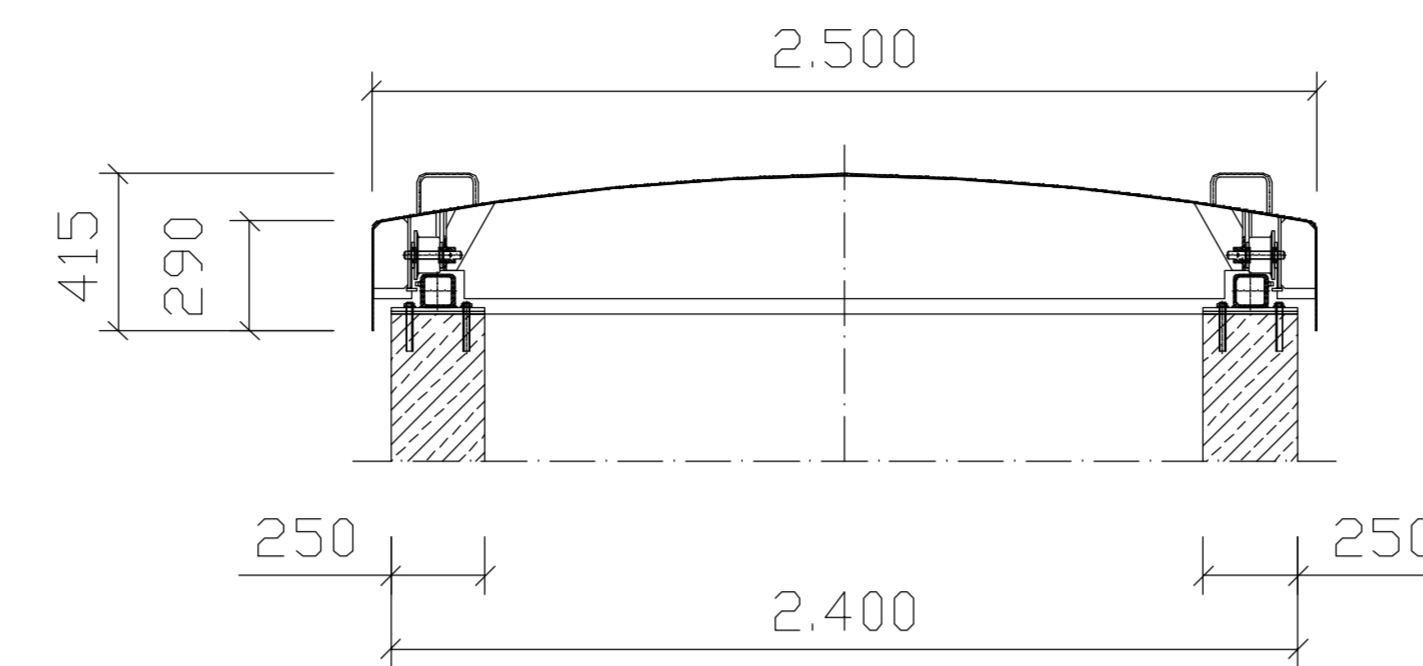
**SECTION A - A**  
**SCHNITT A - A**



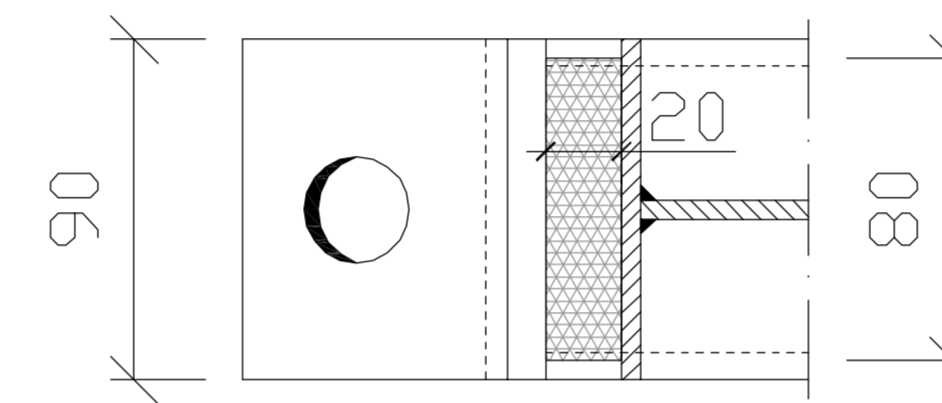
**TOP VIEW**  
**DRAUFSICHT**



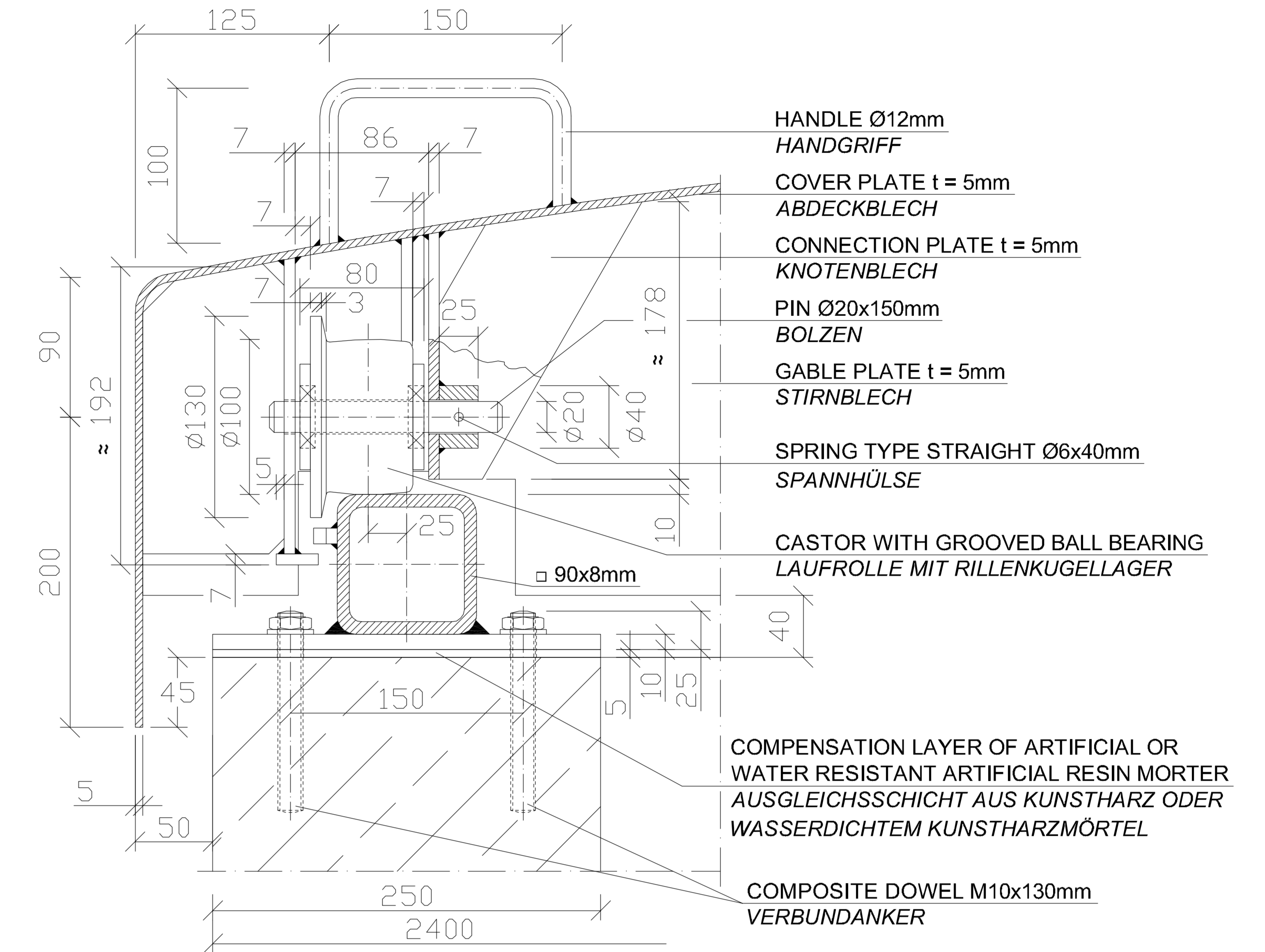
**SECTION B - B**  
**SCHNITT B - B**



**SECTION D - D**  
**SCHNITT D - D**

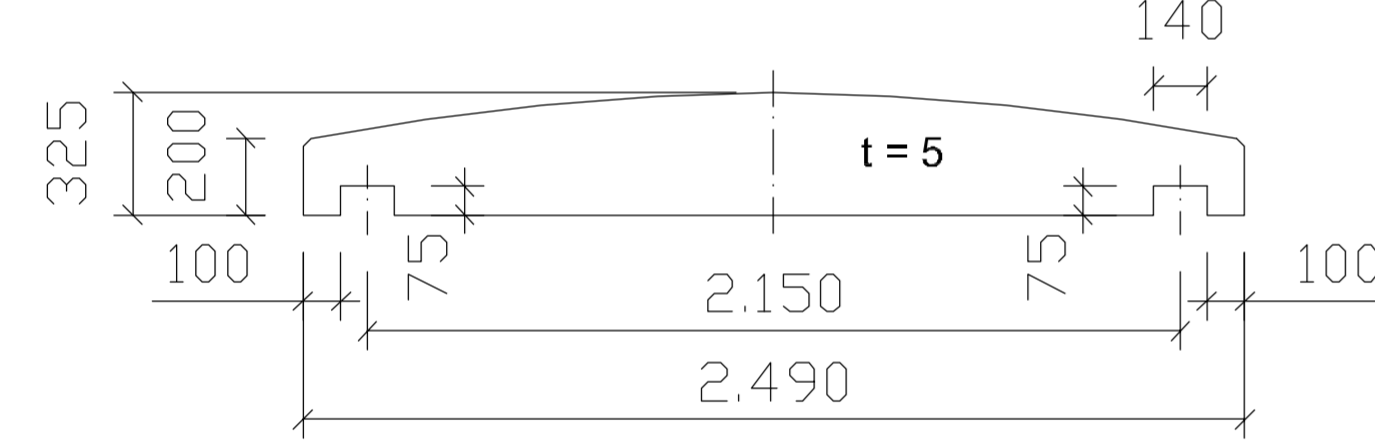


**SECTION C - C**  
**SCHNITT C - C**

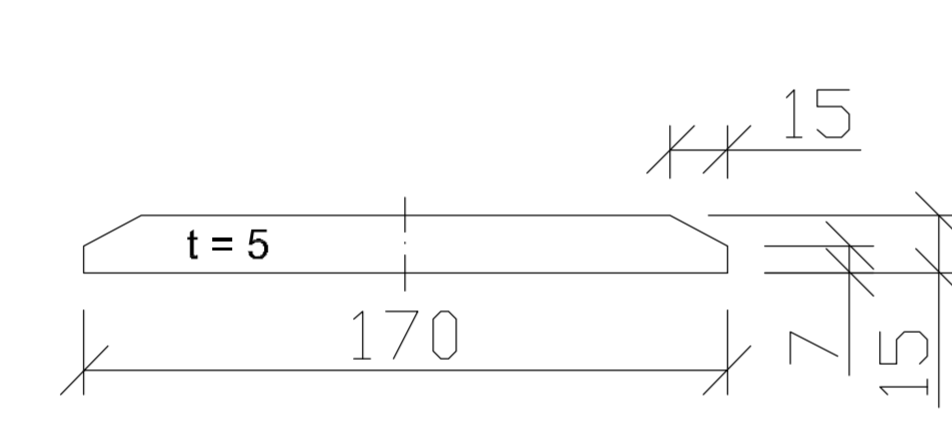


- HANDLE Ø12mm  
HANDGRIFF
- COVER PLATE t = 5mm  
ABDECKBLECH
- CONNECTION PLATE t = 5mm  
KNOTENBLECH
- PIN Ø20x150mm  
BOLZEN
- GABLE PLATE t = 5mm  
STIRNBLECH
- SPRING TYPE STRAIGHT Ø6x40mm  
SPANNHÜLSE
- CASTOR WITH GROOVED BALL BEARING  
LAUFROLLE MIT RILLENKUGELLAGER
- COMPENSATION LAYER OF ARTIFICIAL OR WATER RESISTANT ARTIFICIAL RESIN MORTAR  
AUSGLEICHSSCHICHT AUS KUNSTHARZ ODER WASSERDICHEM KUNSTHARZMÖRTEL
- COMPOSITE DOWEL M10x130mm  
VERBUNDANKER

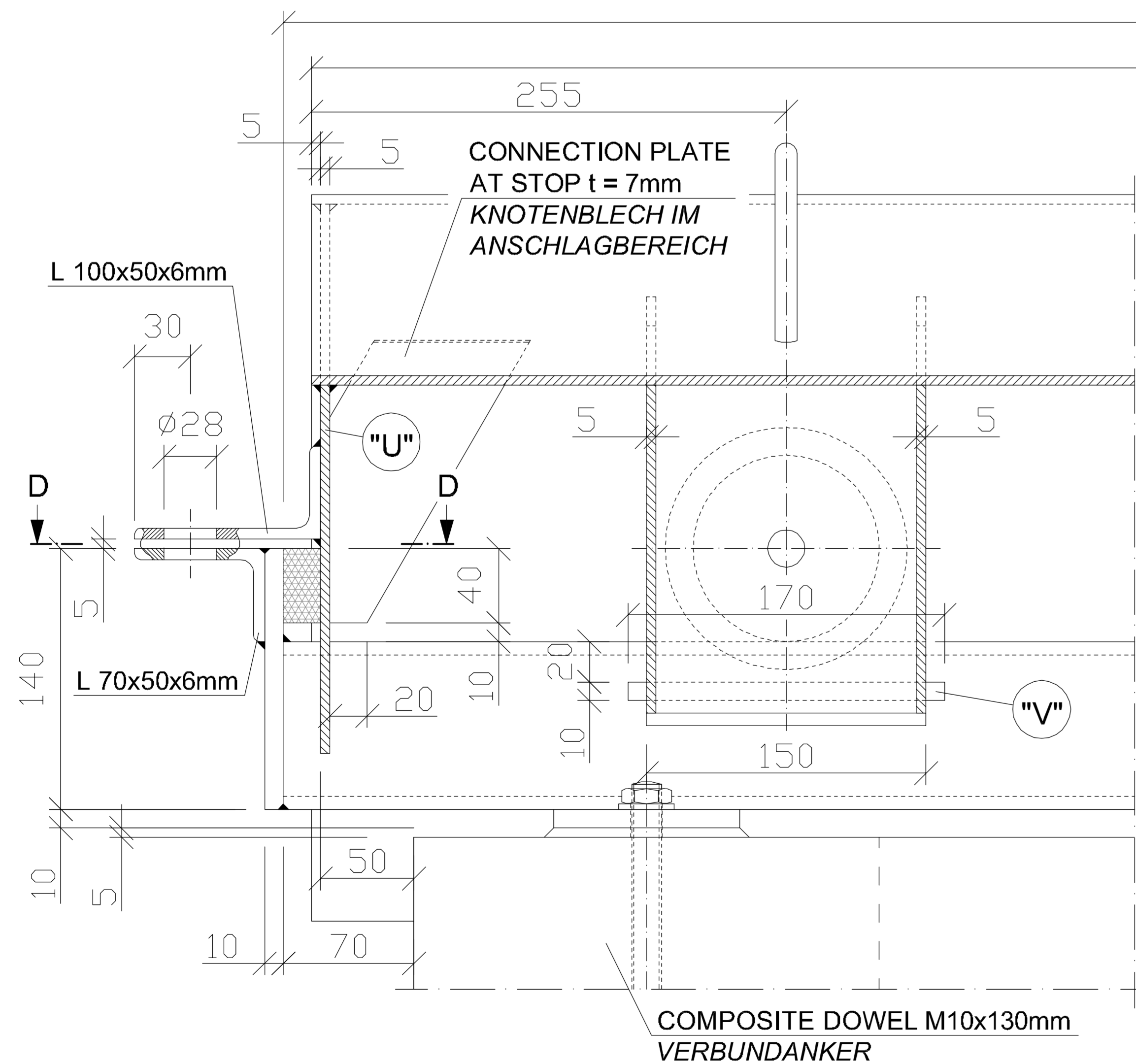
**DETAIL "U"**  
GABLE PLATE AND CROSS BRACING  
STIRNBLECH UND QUERVERSTEIFUNG



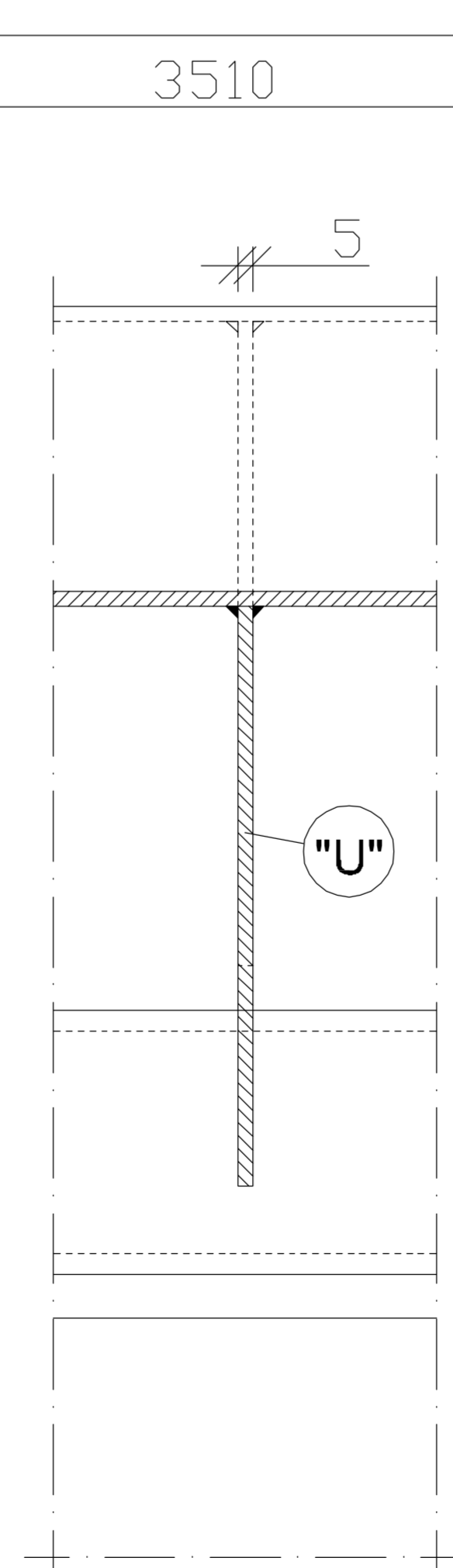
**DETAIL "V"**  
GUIDE RAIL FOR LIFT-OFF PROTECTION  
FÜHRUNGSSCHIENE FÜR ABHEBESICHERUNG



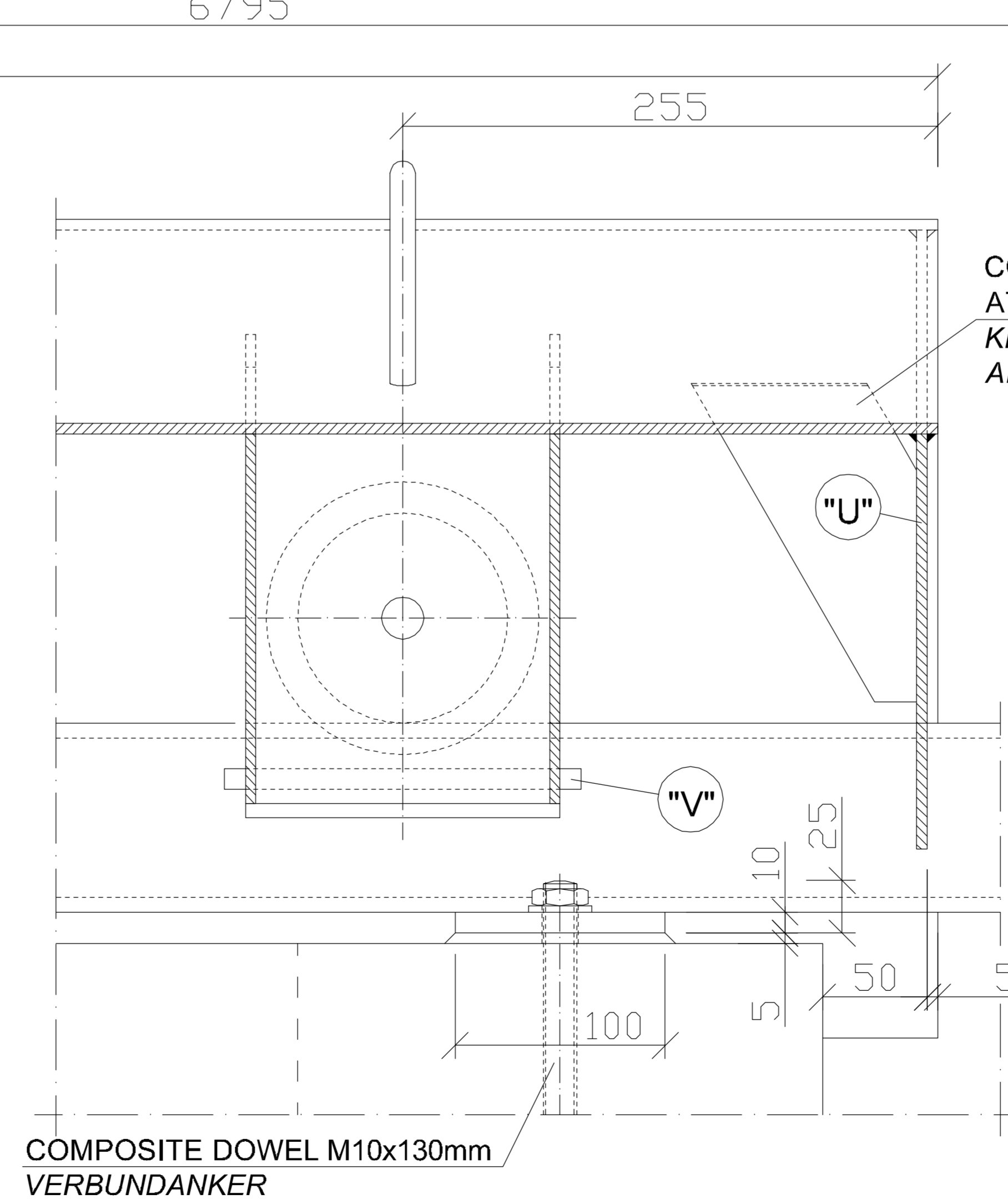
**DETAIL "Z"**  
INTERLOCKING, STOP AND CASTOR  
VERRIEGELUNG, ANSCHLAG UND LAUFROLLE



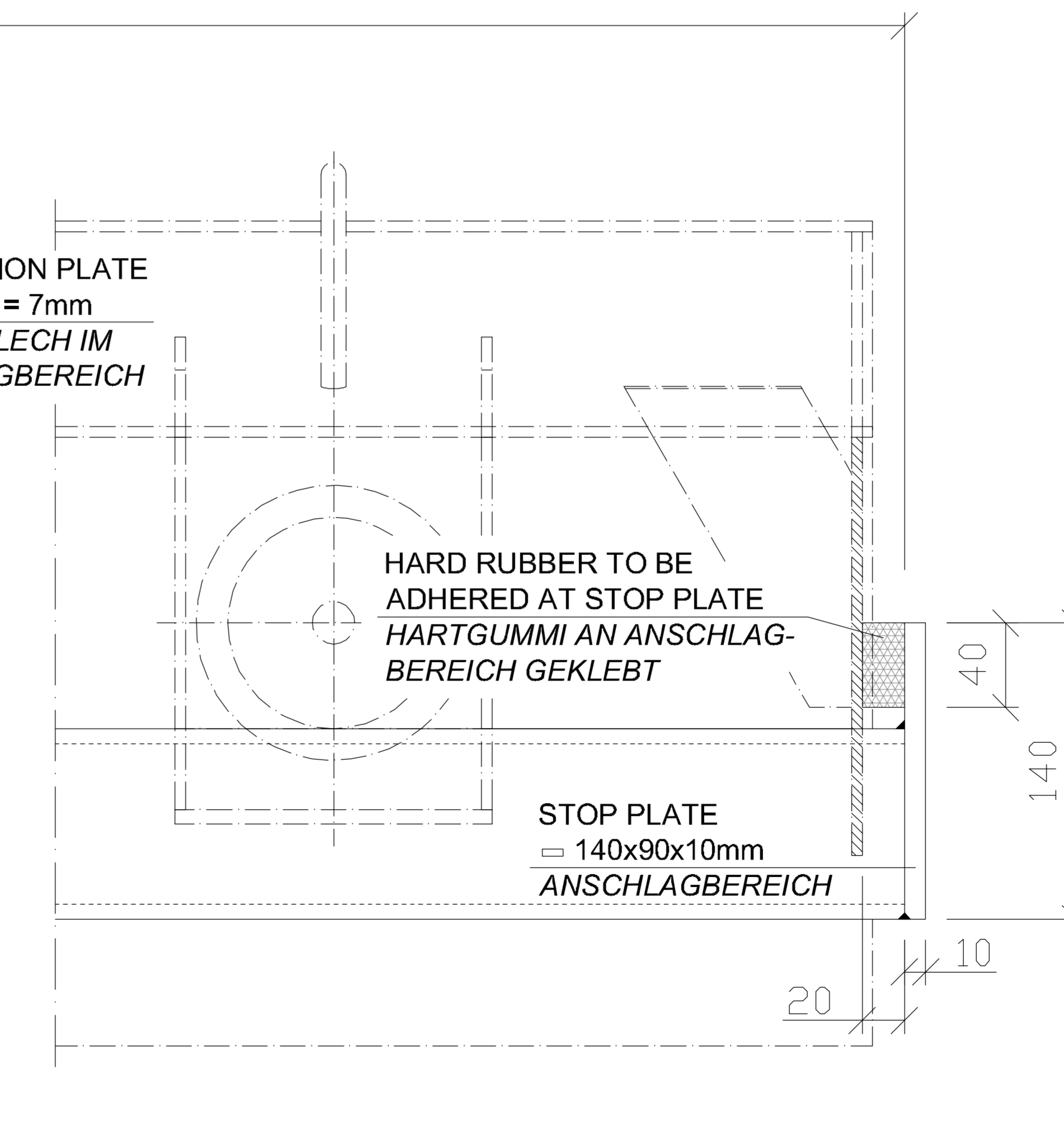
**DETAIL "Y"**  
CROSS BRACING  
QUERVERSTEIFUNG



**DETAIL "X"**  
CASTOR AND RAIL HOLDING  
LAUFROLLE UND SCHIENENHALTERUNG



**DETAIL "W"**  
STOP  
ANSCHLAG



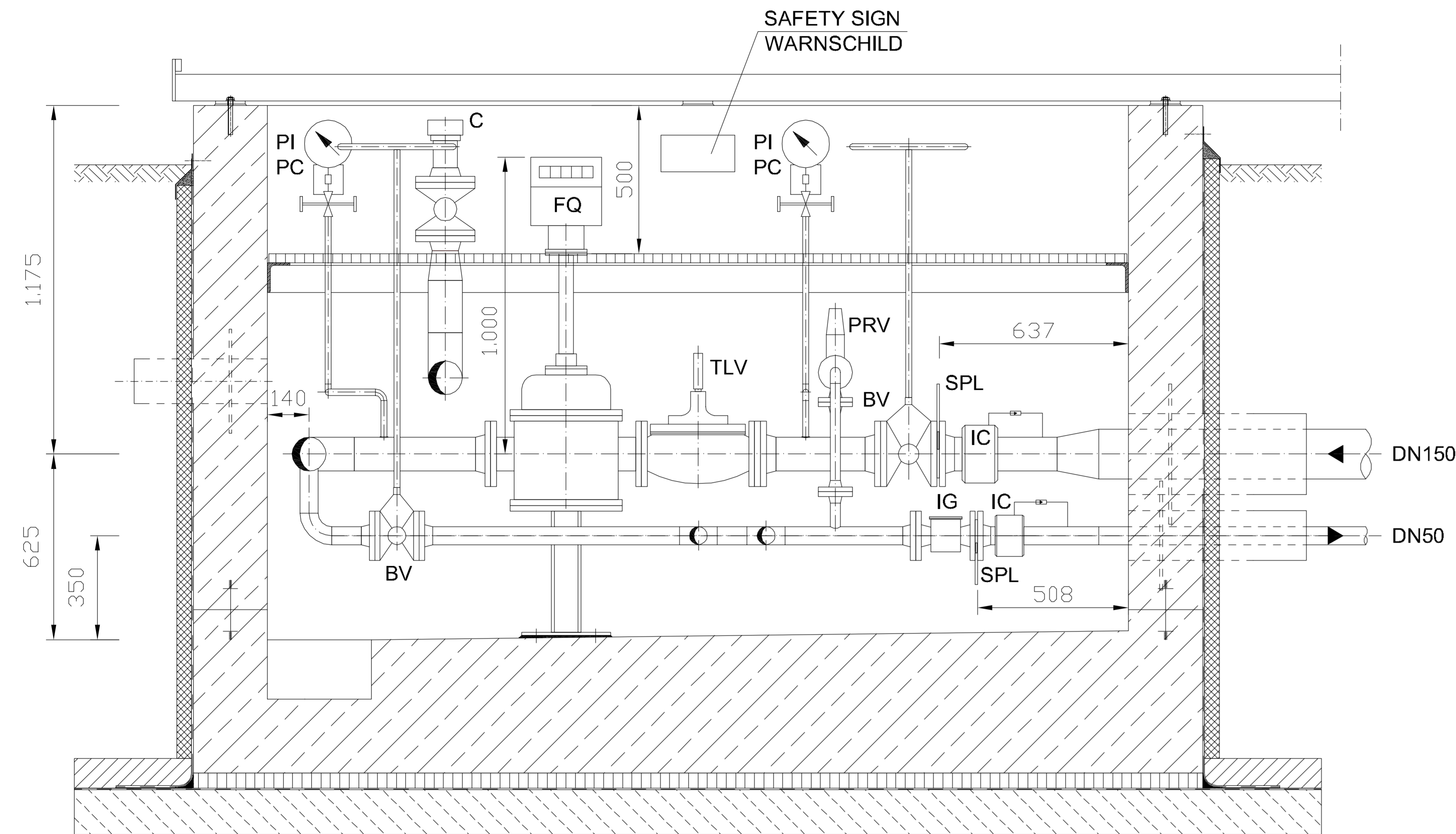
**PERTINENT DRAWINGS**  
**ZUGEHÖRIGE ZEICHNUNGEN**

- C-12.1 CONSTRUCTION PLAN (LEFT SIDE)  
BAUKONSTRUKTIONSPLAN (LINKSAUSFÜHRUNG)
- C-12.2 CONSTRUCTION PLAN (RIGHT SIDE)  
BAUKONSTRUKTIONSPLAN (RECHTSAUSFÜHRUNG)

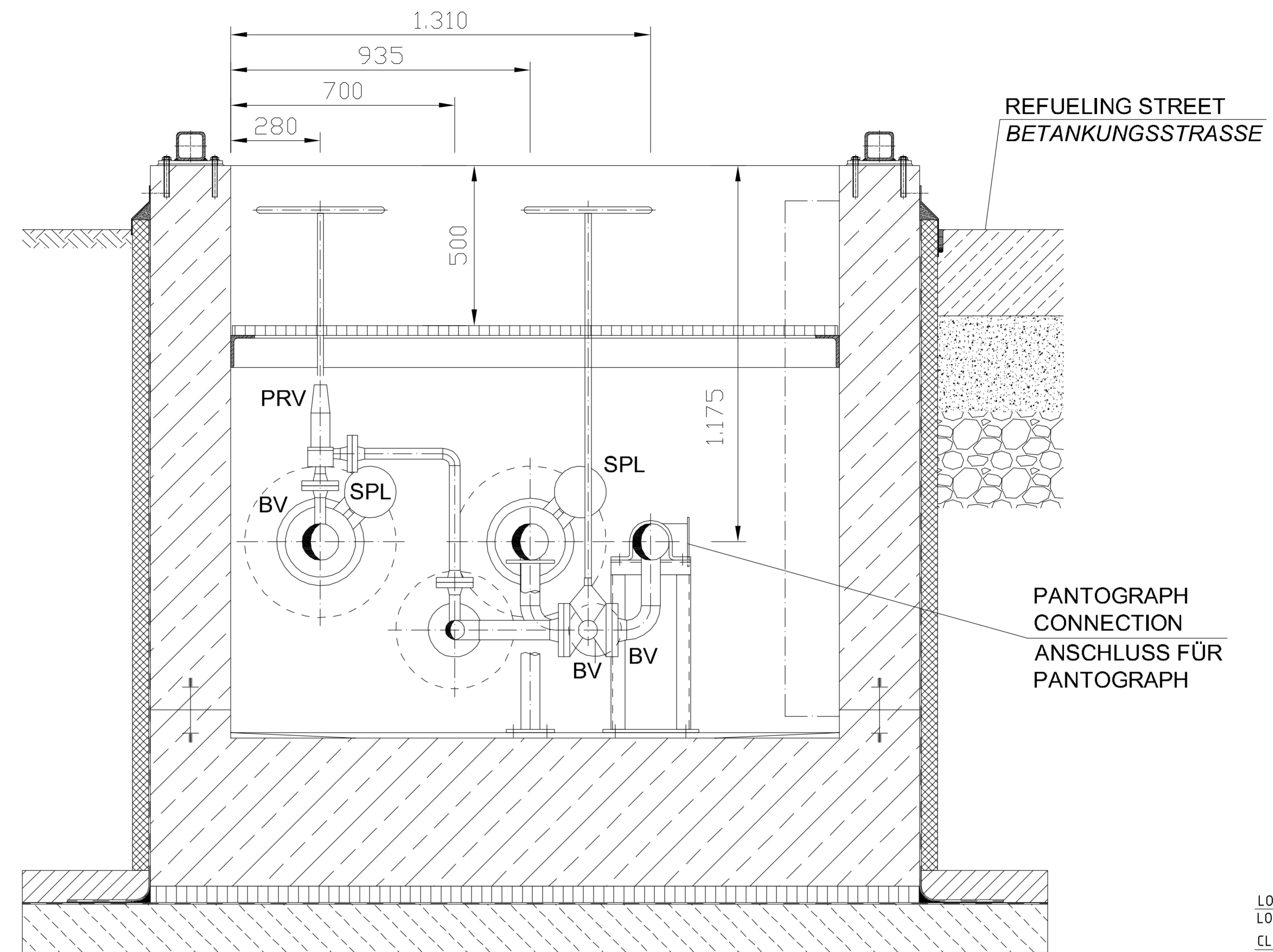
REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
HEADQUARTERS UNITED STATES AIR FORCES EUROPE				
ENGINEERING & OPERATIONS				
AIRFIELD STANDARD DESIGN US JET FUEL STORAGE AND DISPENSING SYSTEMS			FLUGPLATZ STANDARDPLANUNG US FLUGKRAFTSTOFF - VERSORGUNGSANLAGEN	
BUILDING BAUWERK				
DESIGNATOR BEZEICHNUNG				
WORKED/REARBEITET				
PREPARED/AUFGESTELLT LANGENFELDER LIEGENSCHAFTS- UND BAUVERBUND LANGENFELDER LIEGENSCHAFT ANSCHLIEßT: UNTERSTÄTZUNG 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 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799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000		APPROVED/GENEHMIGT AMT FÜR BUNDESBAU WALLSTR.1 55122 MAINZ		
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAUASSCHNITTEN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED GENEHMIGT	DATE DATUM	SCALE MASSSTAB	STANDARD SHEET STANDARDBLATT	
ORIGINAL DESIGNED BY IN ORIGINAL DES.	6. MAI 2015	1:20 / 1:2	S - 12.2	
CONSTRUCTION PROJECT BAUASSCHNITT			SHEET NO. BLATT NR.	



**SECTION  
SCHNITT A - A**

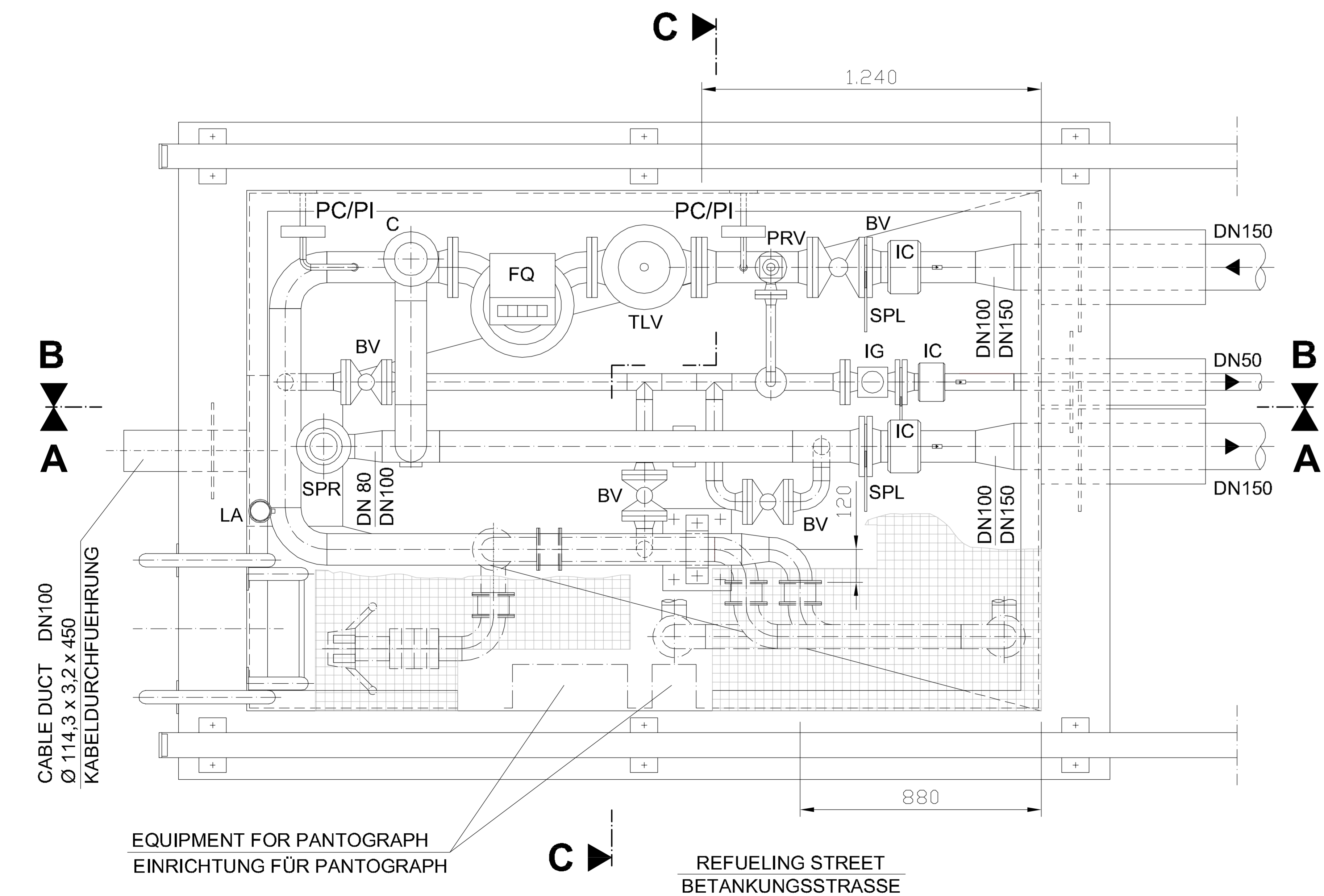


**SECTION  
SCHNITT C - C**

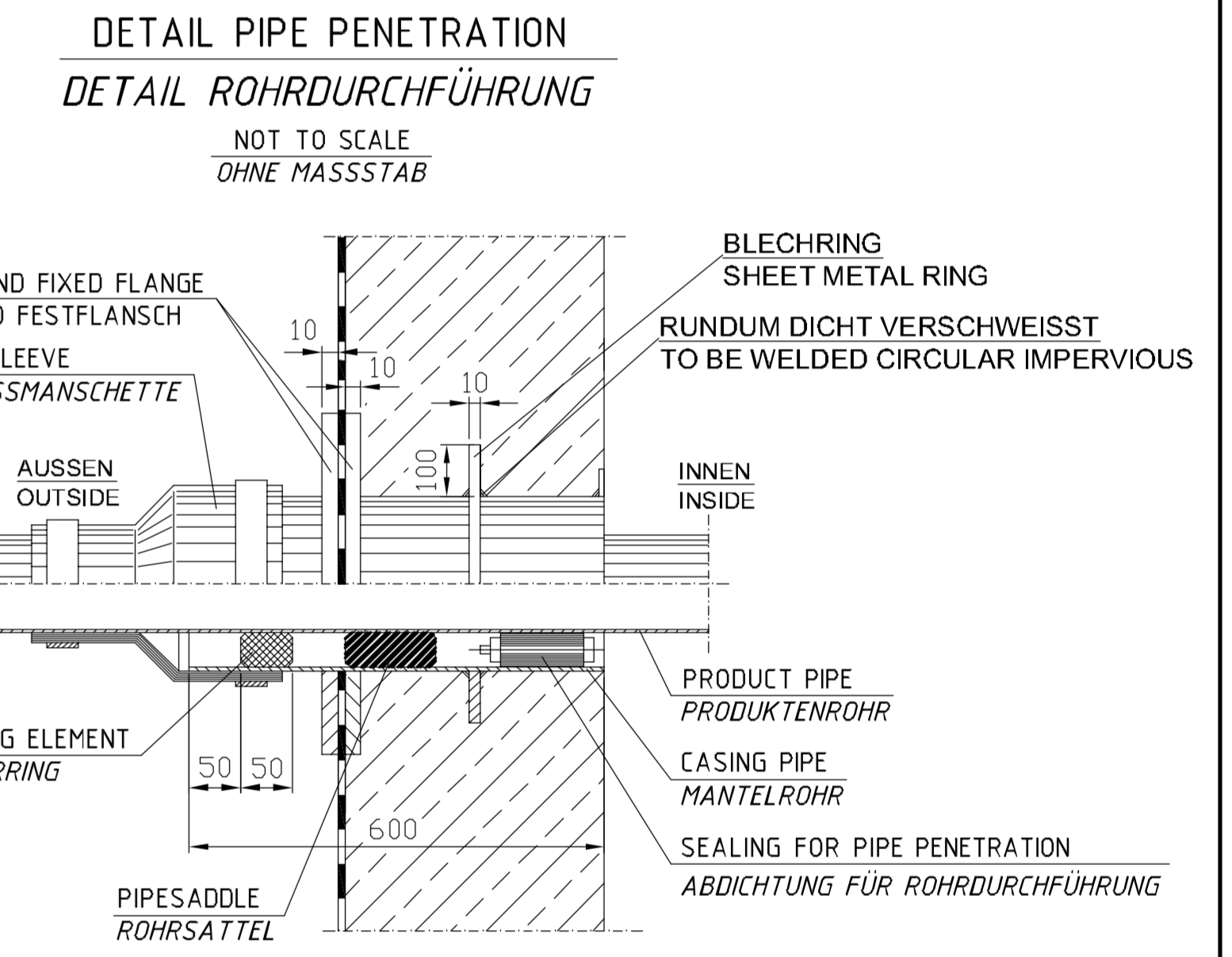
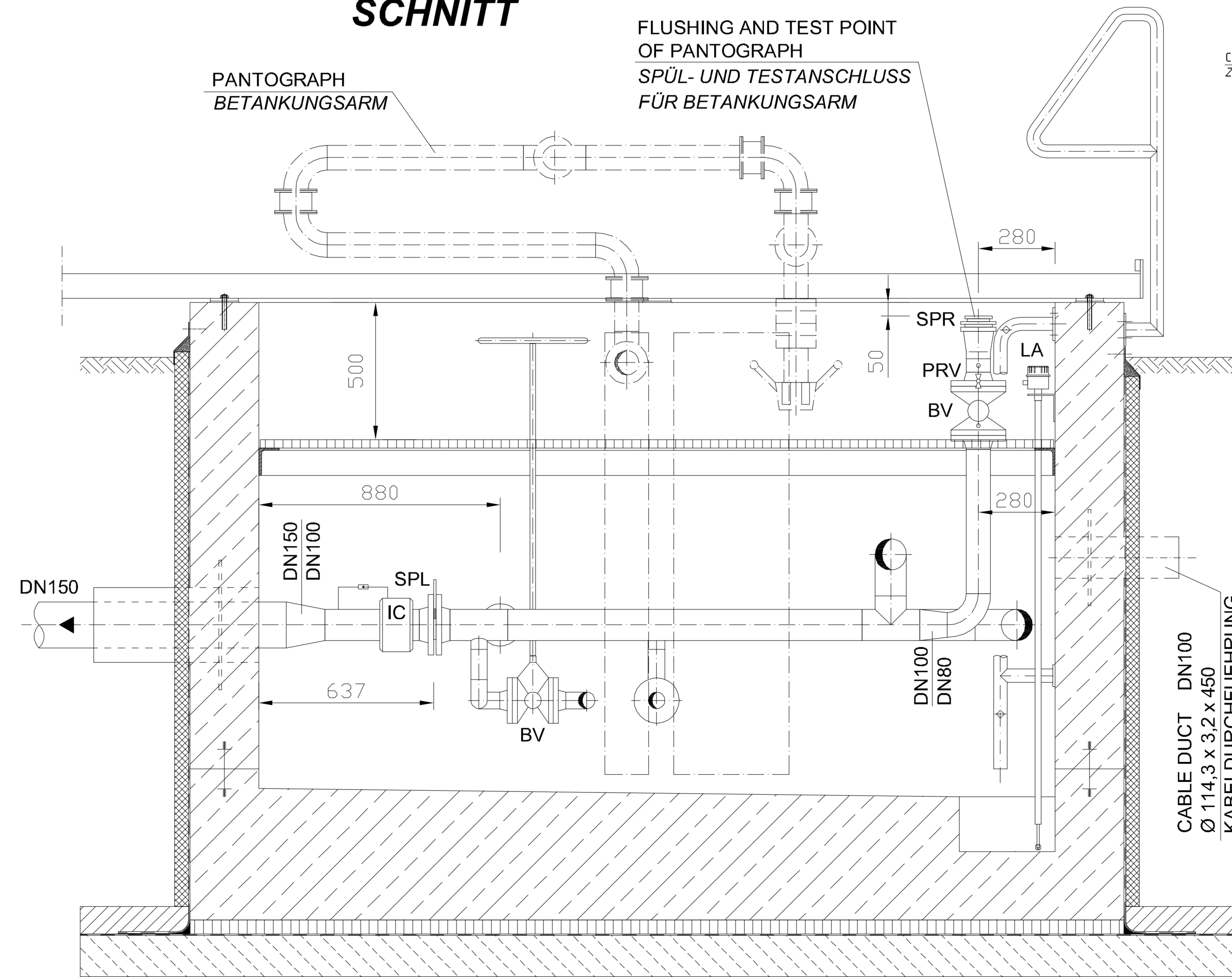


- LEGEND:  
LEGENDE:**
- BV BALL VALVE  
KUGELHAHN
  - C QUICK COUPLING  
SCHNELLKUPPLUNG
  - FQ FLOW METER  
MENGENMESSER
  - IC INSULATING COUPLING  
ISOLIERKUPPLUNG
  - IG INSPECTION GLAS  
SCHAUGLAS
  - LA LIQUID PROBE  
FLÜSSIGKEITSSONDE
  - PC PRESSURE GAUGE STOPCOCK  
MANOMETER- ABSPERRVENTIL
  - PI PRESSURE GAUGE  
MANOMETER
  - PRV PRESSURE RELIEF VALVE  
DRUCKENTLASTUNGSVENTIL
  - SPR SINGLE POINT RECEPTACLE  
FLUGZEUG ADAPTER
  - TLV TANK TRUCK LOADING VALVE  
TANKWAGEN- BEFÜLLVENTIL

**TOP VIEW  
DRAUFSICHT**



**SECTION  
SCHNITT B - B**



THE CASING PIPE HAS TO BE DIMENSIONED ACCORDING TO THE SEALING SYSTEM SELECTED BY THE CONTRACTOR  
DAS MANTELROHR IST ENTSPRECHEND DEM VOM AUFTRAGNEHMER GEWÄHLTEN ABDICHTUNGSSYSTEM ZU DIMENSIONIEREN

PRODUCT PIPE ROHRLEITUNG	PRODUCT PIPE PRODUKTENROHR	EXAMPLE CASING BEISPIEL MANTELROHR
DN 50	Ø 60,3 mm	Ø 168,3 mm
DN 150	Ø 168,3 mm	Ø 273,0 mm

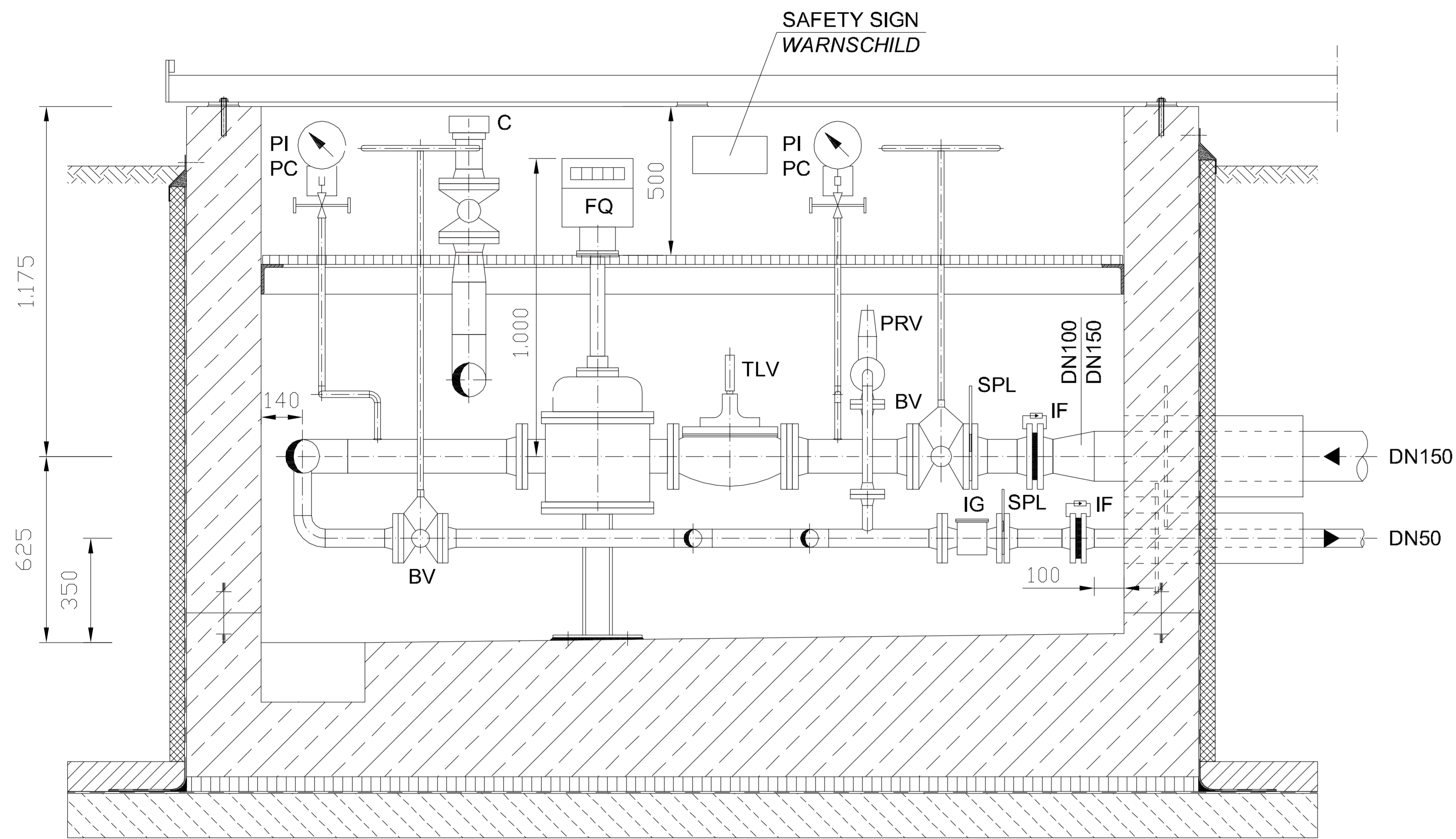
REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
<b>HEADQUARTERS</b>				
UNITED STATES AIR FORCES EUROPE				
ENGINEERING & OPERATIONS				
AIRFIELD STANDARD DESIGN US			FLUGPLATZ STANDARDPLANUNG US	
JET FUEL STORAGE AND DISPENSING SYSTEMS			FLUGKRAFTSTOFF - VERSORGSANLAGEN	
BUILDING BAUWERK				
TANK TRUCK REFUELING PTT (LEFT SIDE) TANKWAGEN - BETANKUNGSSCHACHT (LINKSAUSFÜHRUNG)				
DESIGNATOR BEZEICHNUNG				
MECHANICAL INSTALLATION WITH INSULATING COUPLING MASCHINENTECHNISCHE INSTALLATION MIT ISOLIERKUPPLUNG				
WORKSHEET/ARBEITST LAGEBELEG/ARBEITST LAND: DEUTSCHLAND PROJEKT: 114.3 x 3.2 x 450 ZEICHNUNG: 114.3 x 3.2 x 450 DATE: 05.05.2015				
APPROVED/GENEHIGT AMT FÜR BUNDESBAU WALLSTR.1 55122 MAINZ				
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAUASSAMMELN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED GENEHIGT	DATE DATUM	6. MAI 2015	SCALE MASSSTAB	1:10
ORIGINAL DESIGNED BY IN ORIGINAL DES.			STANDARD SHEET STANDARD PLAN	
GENERAL INFO CORPORATE FACILITIES ENGINEER PLANNING AND DESIGN			M - 12.1	
CONSTRUCTION PROJECT BAUASSAMMELN			SHEET NO. PLATZ NR.	



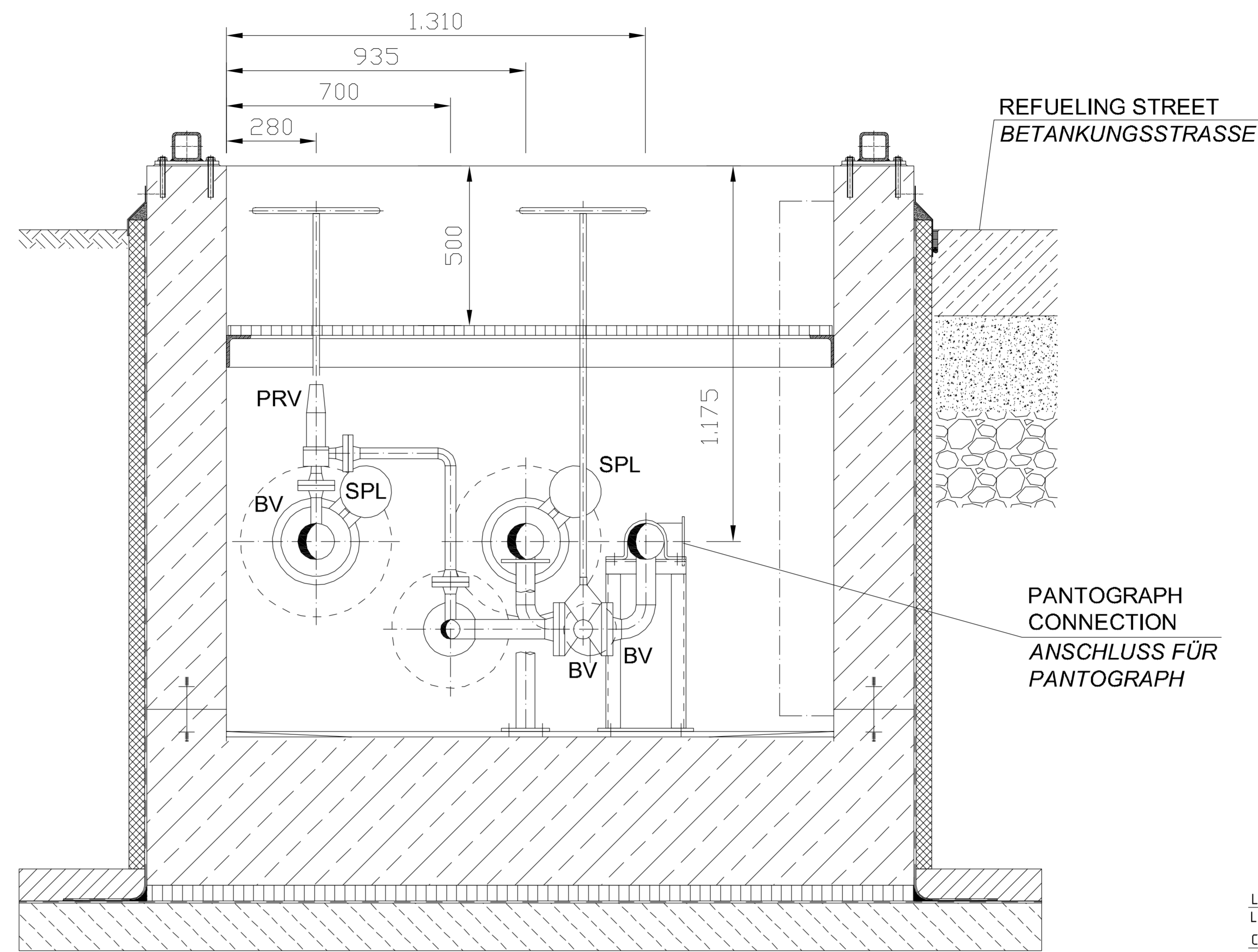




**SECTION  
SCHNITT A - A**



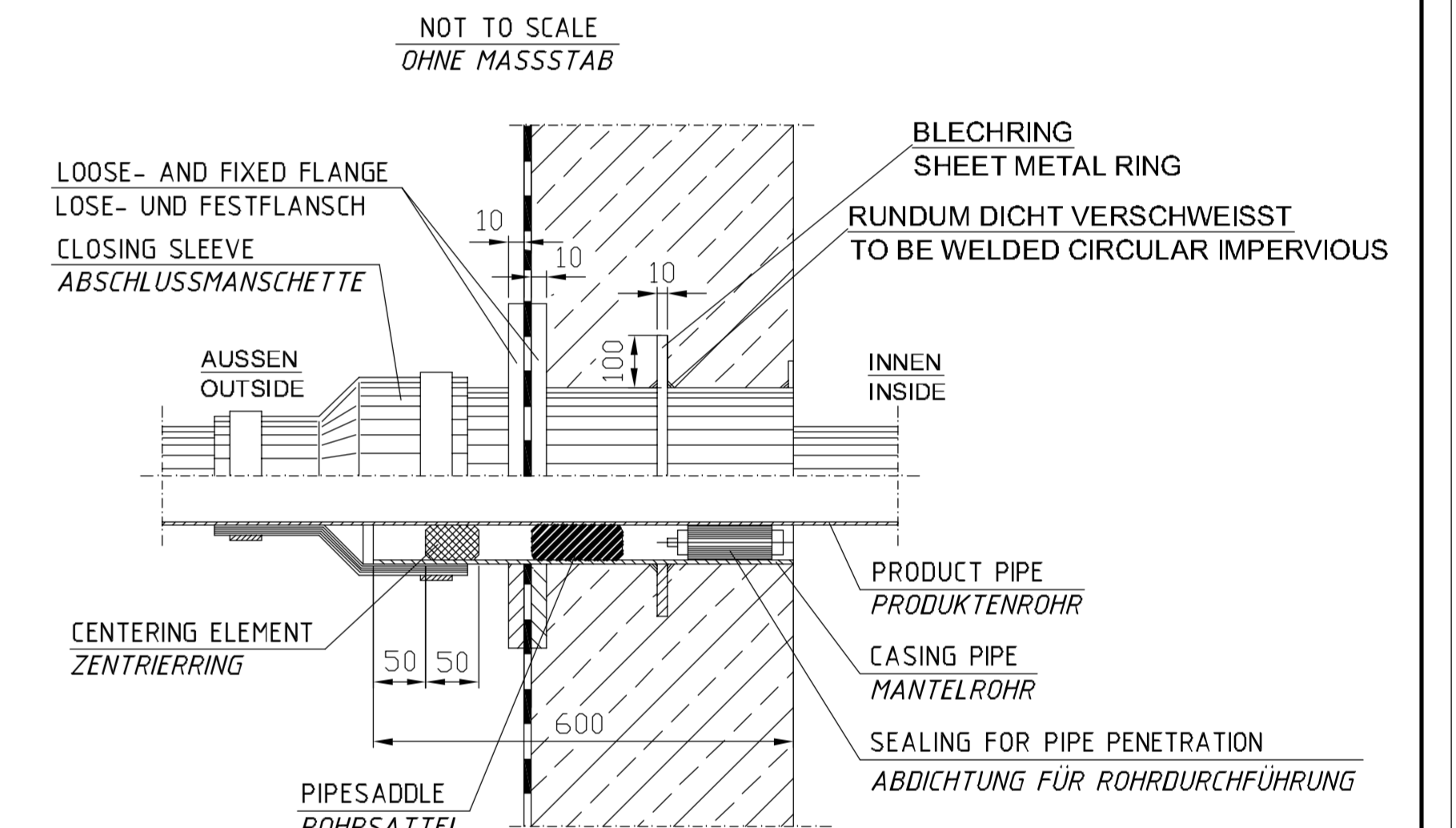
**SECTION  
SCHNITT C - C**



**LEGEND:  
LEGENDE:**

- BV BALL VALVE  
KUGELHAHN
- C QUICK COUPLING  
SCHNELLKUPPLUNG
- FQ FLOW METER  
MENGENMESSER
- IF ISULATING FLANGE  
ISOLIERFLANSCH
- IG INSPECTION GLAS  
SCHAUGLAS
- LA LIQUID PROBE  
FLÜSSIGKEITSSONDE
- PC PRESSURE GAUGE STOPCOCK  
MANOMETER- ABSPERRVENTIL
- PI PRESSURE GAUGE  
MANOMETER
- PRV PRESSURE RELIEF VALVE  
DRUCKENTLASTUNGSVENTIL
- SPR SINGLE POINT RECEPTACLE  
FLUGZEUG ADAPTER
- TLV TANK TRUCK LOADING VALVE  
TANKWAGEN- BEFÜLLVENTIL

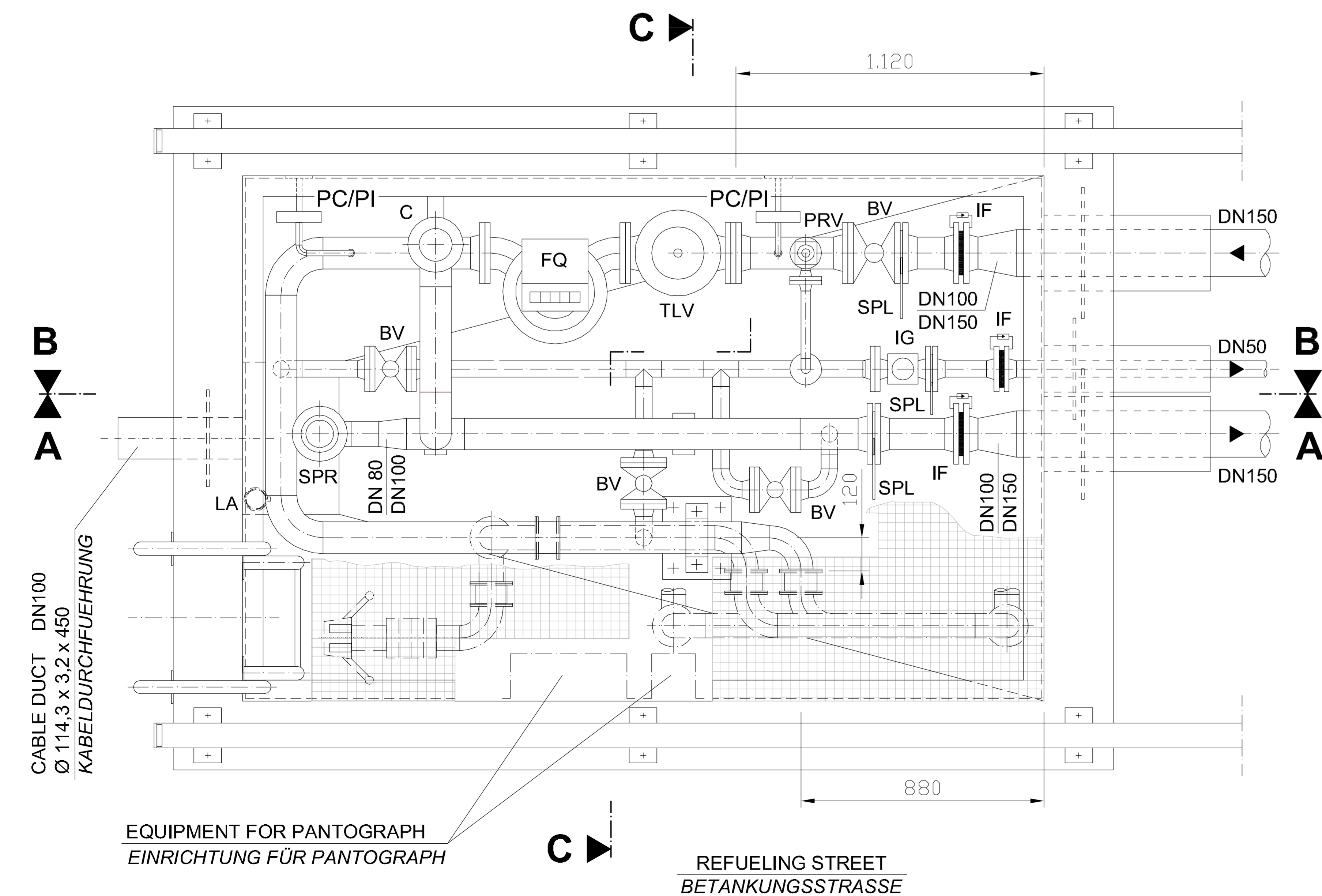
**DETAIL PIPE PENETRATION  
DETAIL ROHRDURCHFÜHRUNG**



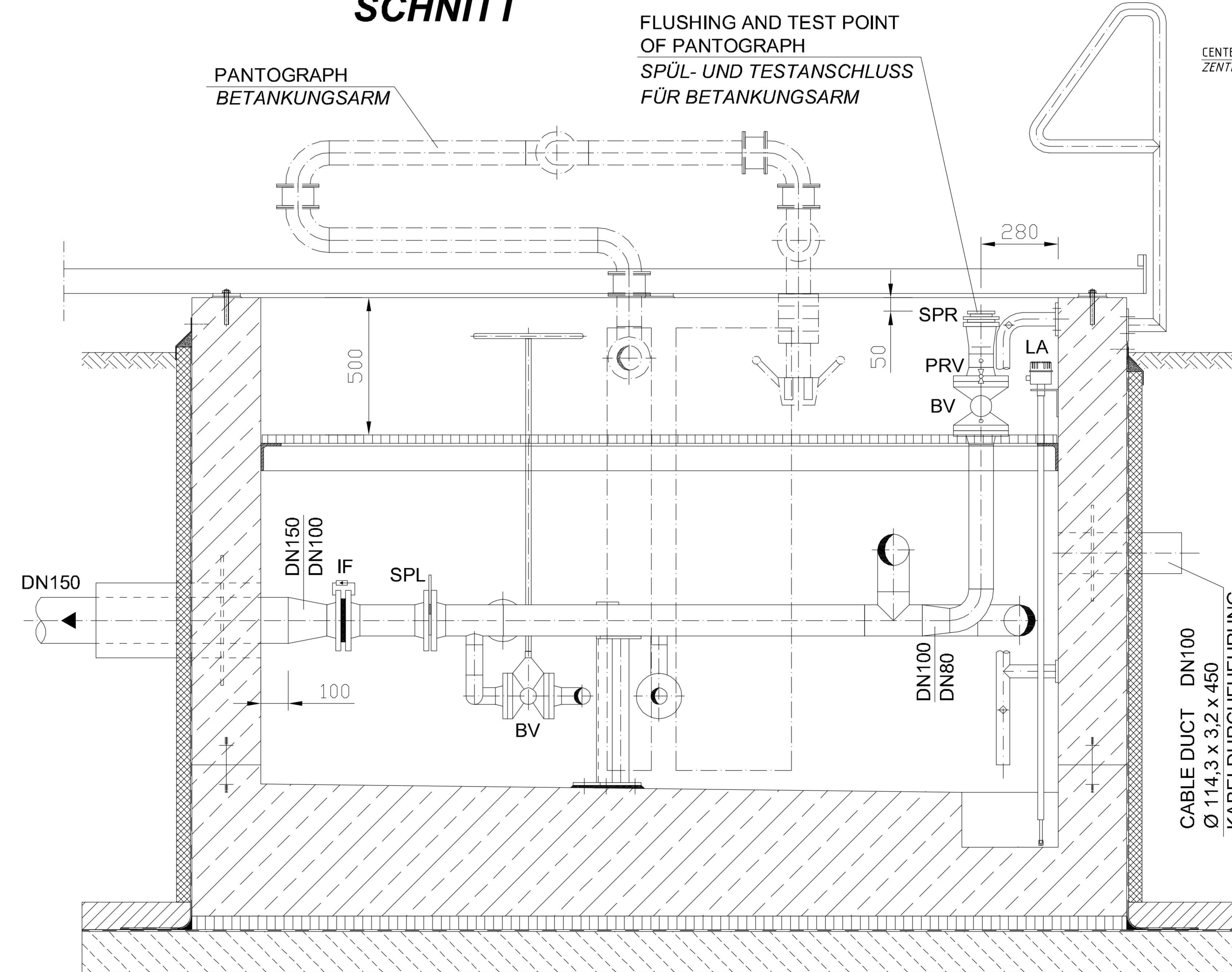
THE CASING PIPE HAS TO BE DIMENSIONED ACCORDING TO THE SEALING SYSTEM SELECTED BY THE CONTRACTOR  
DAS MANTELROHR IST ENTSPRECHEND DEM VOM AUFTRAGNEHMER GEWÄHLTEN ABDICHTUNGSSYSTEM ZU DIMENSIONIEREN

PRODUCT PIPE ROHRLEITUNG	PRODUCT PIPE PRODUKTENROHR	EXAMPLE CASING BEISPIEL MANTELROHR
DN 50	Ø 60,3 mm	Ø 168,3 mm
DN 150	Ø 168,3 mm	Ø 273,0 mm

**TOP VIEW  
DRAUFSICHT**



**SECTION  
SCHNITT B - B**



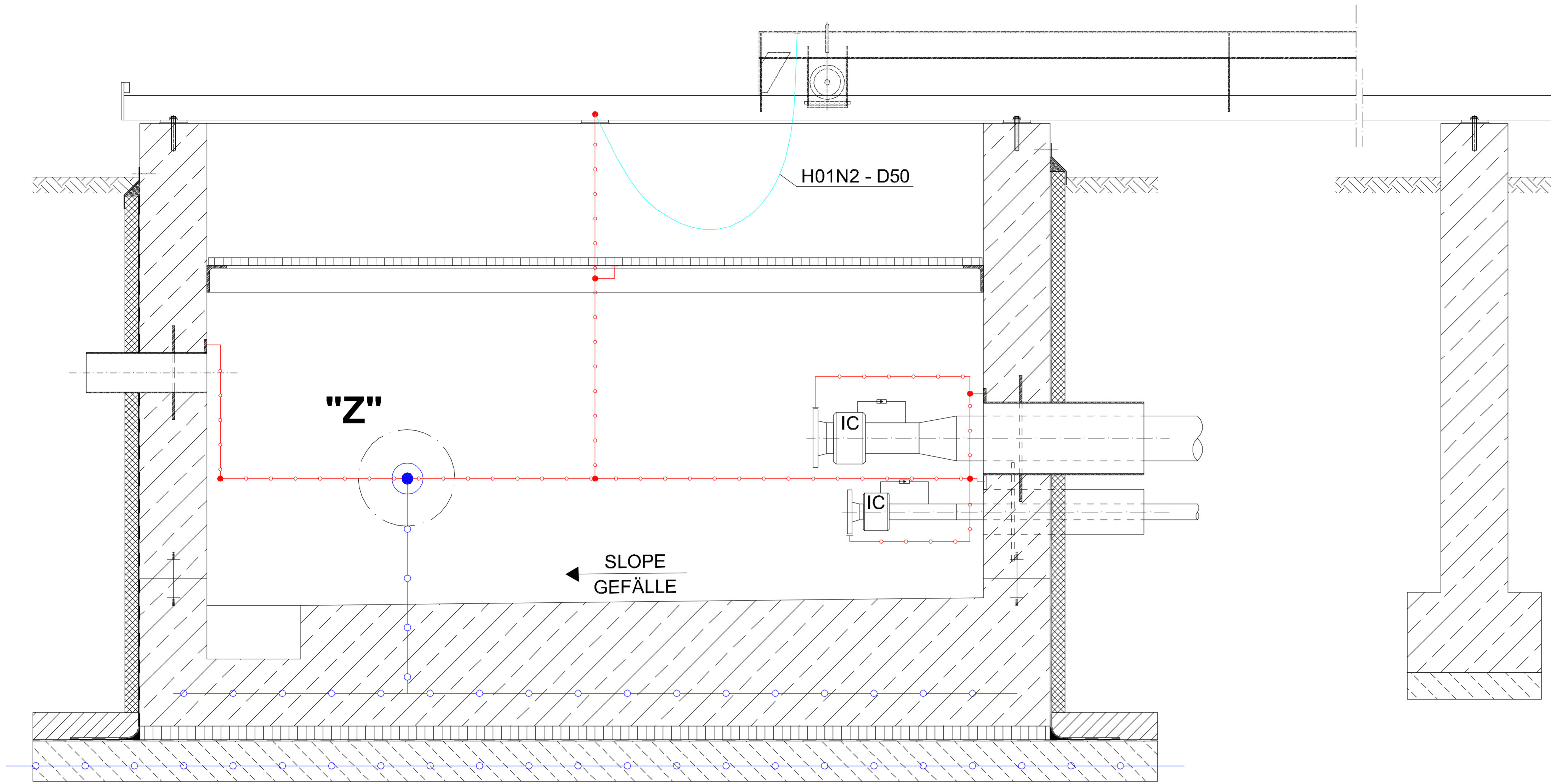
REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
<b>HEADQUARTERS</b> UNITED STATES AIR FORCES EUROPE ENGINEERING & OPERATIONS				
AIRFIELD STANDARD DESIGN US JET FUEL STORAGE AND DISPENSING SYSTEMS		FLUGPLATZ STANDARDPLANUNG US FLUGKRAFTSTOFF - VERSORGSANLAGEN		
BUILDING BAUWERK TANK TRUCK REFUELING PTT (LEFT SIDE) TANKWAGEN - BETANKUNGSSCHACHT (LINKSAUSFÜHRUNG)				
DESIGNATOR BEZEICHNUNG MECHANICAL INSTALLATION WITH INSULATING FLANGE MASCHINENTECHNISCHE INSTALLATION MIT ISOLIERFLANSCH				
WORKSHEET/ARBEITET LAGERSTREIFENLEGENSCHAFTS- UND BAUELEMENTE LAGERSTREIFENLEGENSCHAFTS- UND BAUELEMENTE AMT FÜR BUNDESBAU WALLSTR.1 55122 MAINZ				
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAU MASSNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED GENEHMIGT	DATE DATUM	6. MAI 2015	SCALE MASSSTAB	1:10
ORIGINAL DESIGNED BY IN ORIGINAL DESIG. ORIGINAL GEZEICHNET VON IN URSprüngL. GEZ.		STANDARD SHEET STANDARD BLATT M - 12.1		
CONSTRUCTION PROJECT BAU MASSNAHME		SHEET NO. BLATT NR. OF VON		



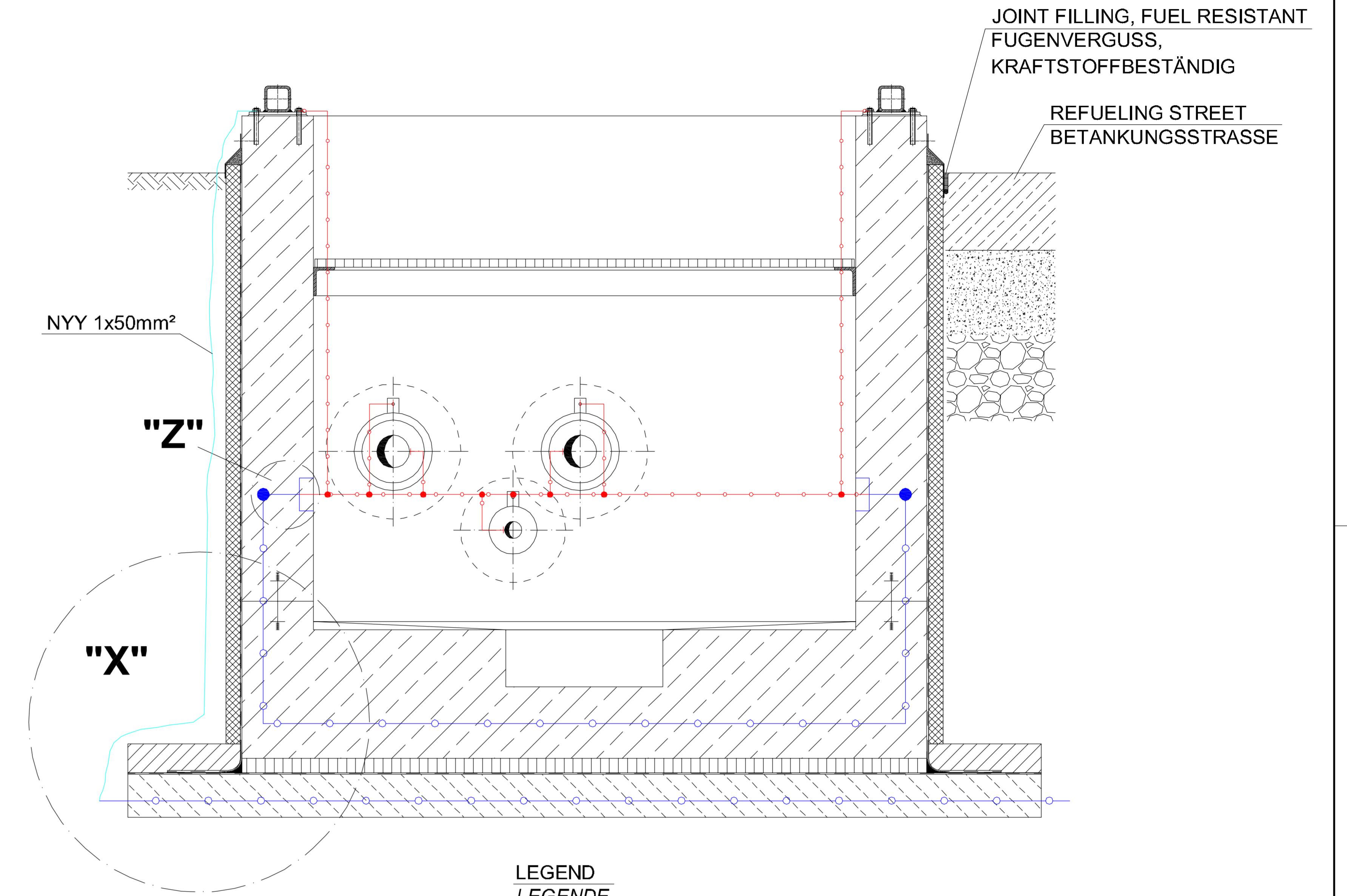




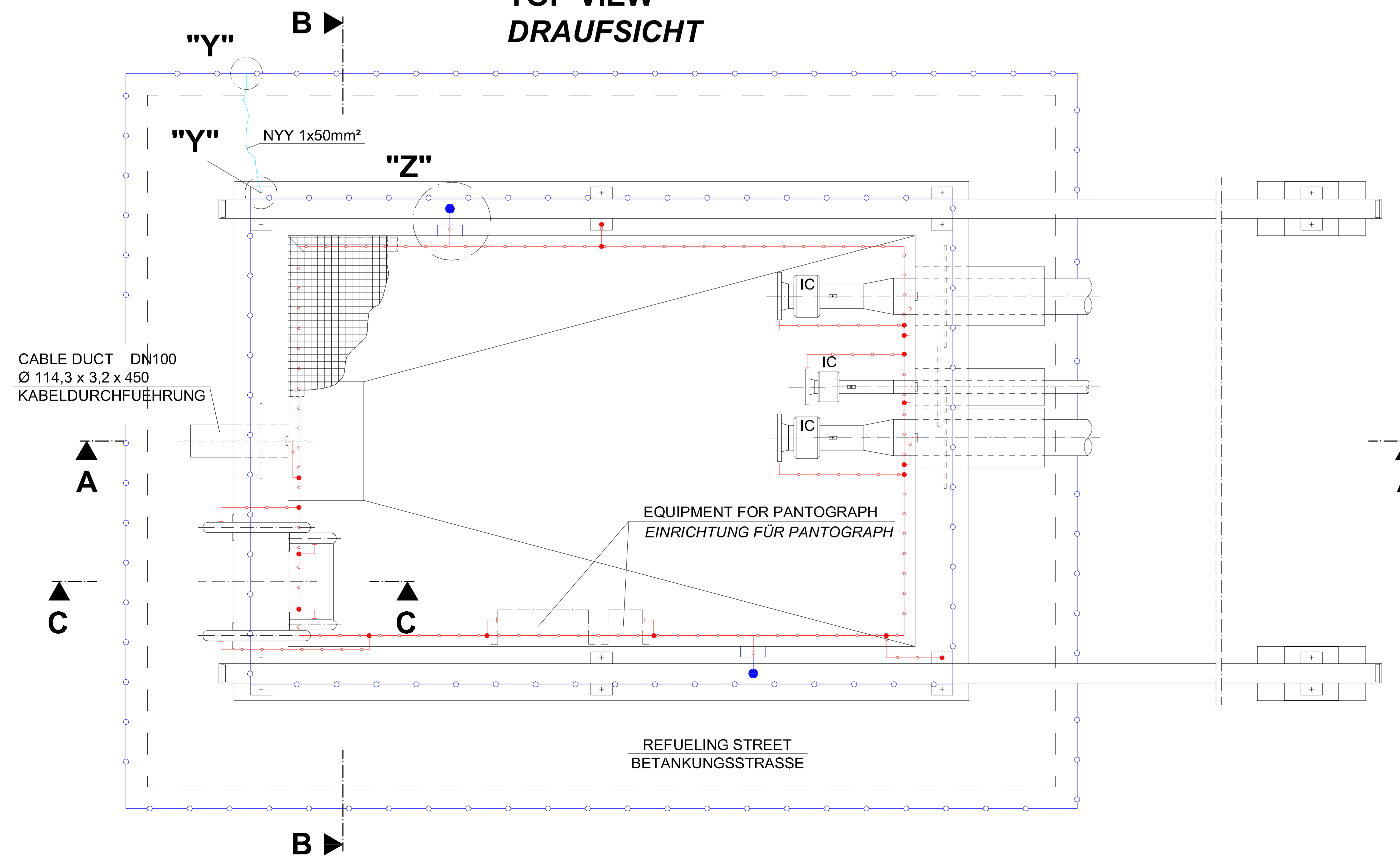
**SECTION A - A**  
**SCHNITT A - A**



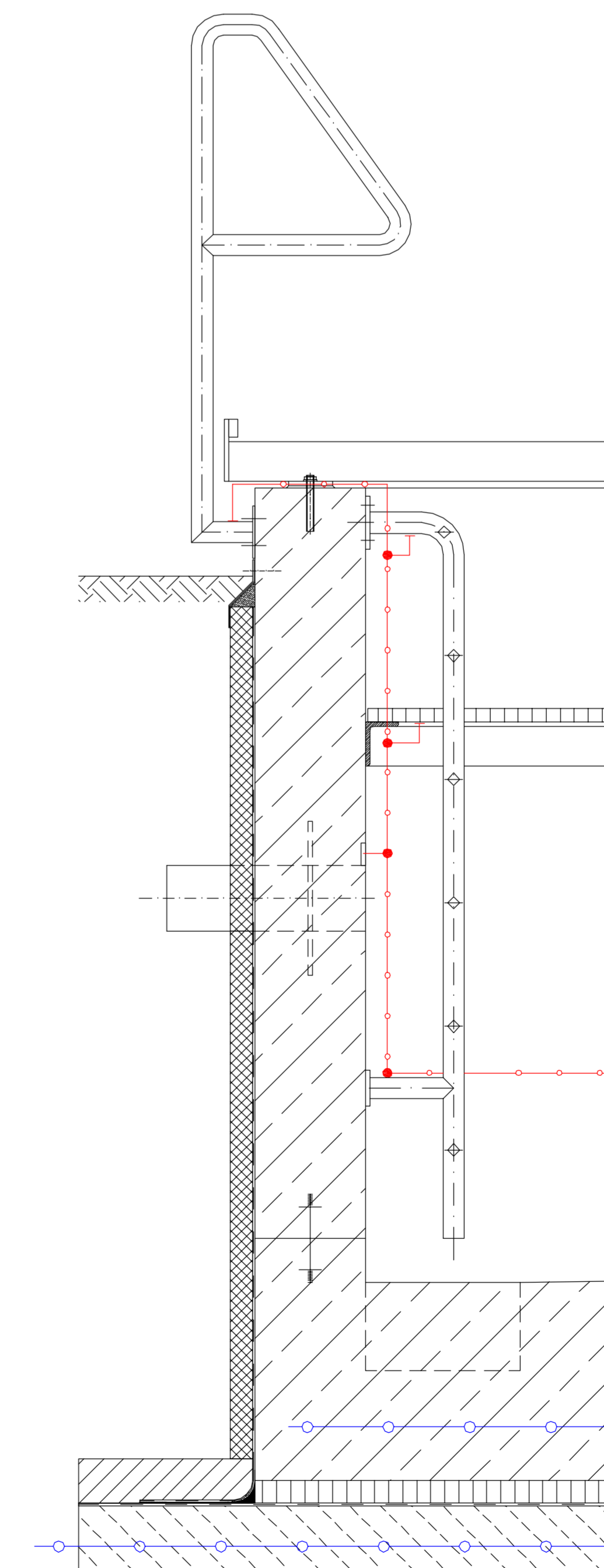
**SECTION B - B**  
**SCHNITT B - B**



**TOP VIEW**  
**DRAUFSICHT**



**SECTION C - C**  
**SCHNITT C - C**



**LEGENDE**  
**LEGENDE**

- STEEL STRIP 30 x 3,5mm IN CONCRETE / IN EARTH (STAINLESS STEEL, MATERIAL NO. 1.457)  
BANDSTAHL 30 x 3,5mm IM BETON / IM ERDREICH (EDELSTAHL, WERKSTOFF NR. 1.457)
- GALV. STEEL STRIP 30 x 3,5mm SURFACE - MOUNTED  
VERZ. BANDSTAHL 30 x 3,5mm AUF PUTZ
- ISULATING COUPLING  
ISOLIERKUPPLUNG

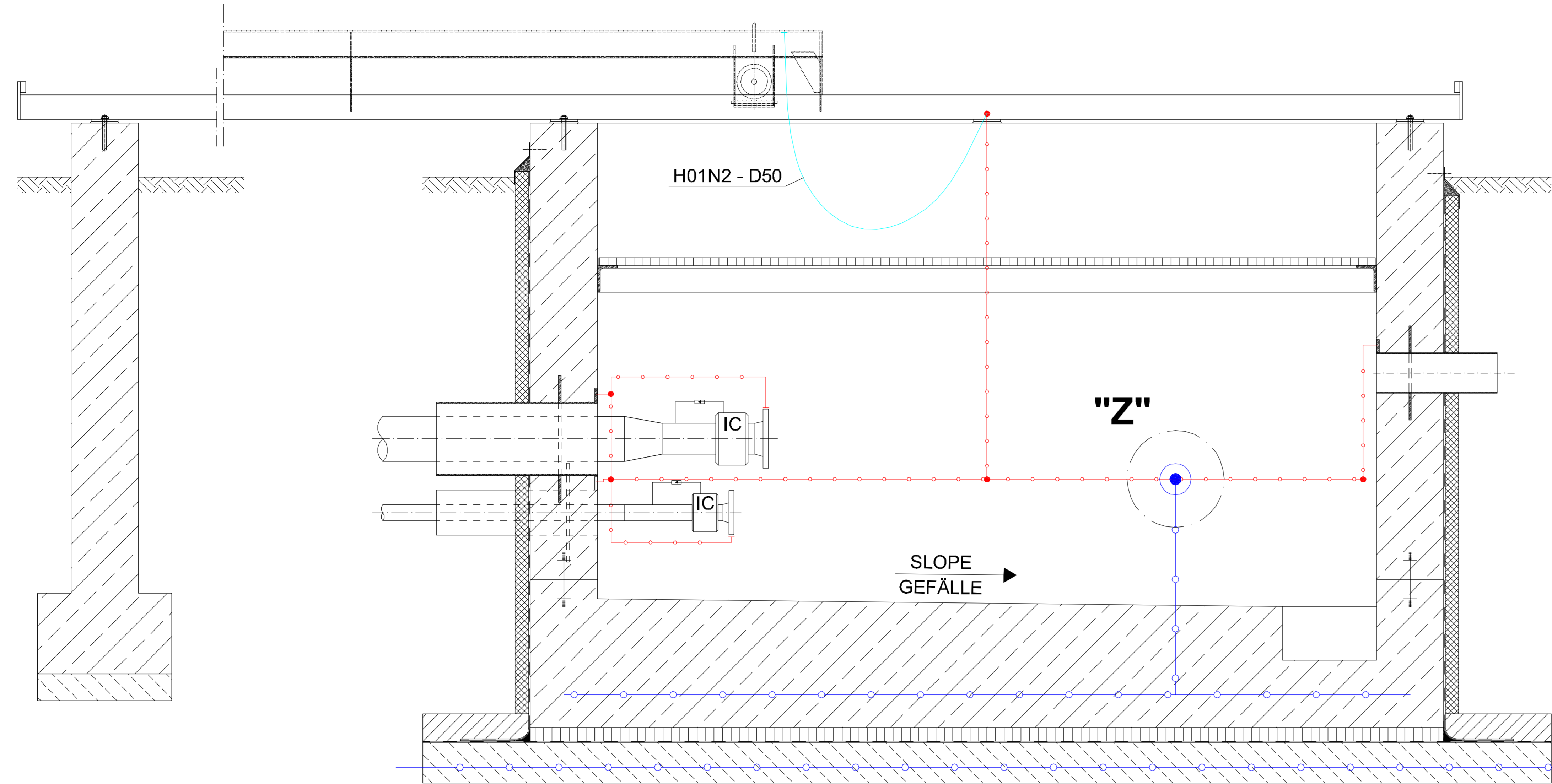
**PERTINENT DRAWINGS**  
**ZUGEHÖRIGE ZEICHNUNGEN**

- C-12.1 CONSTRUCTION PLAN  
KONSTRUKTIONSPLAN
- E-12.3 DETAILS GROUNDING CONNECTION  
DETAILS ERDUNGSANSCHLUSS

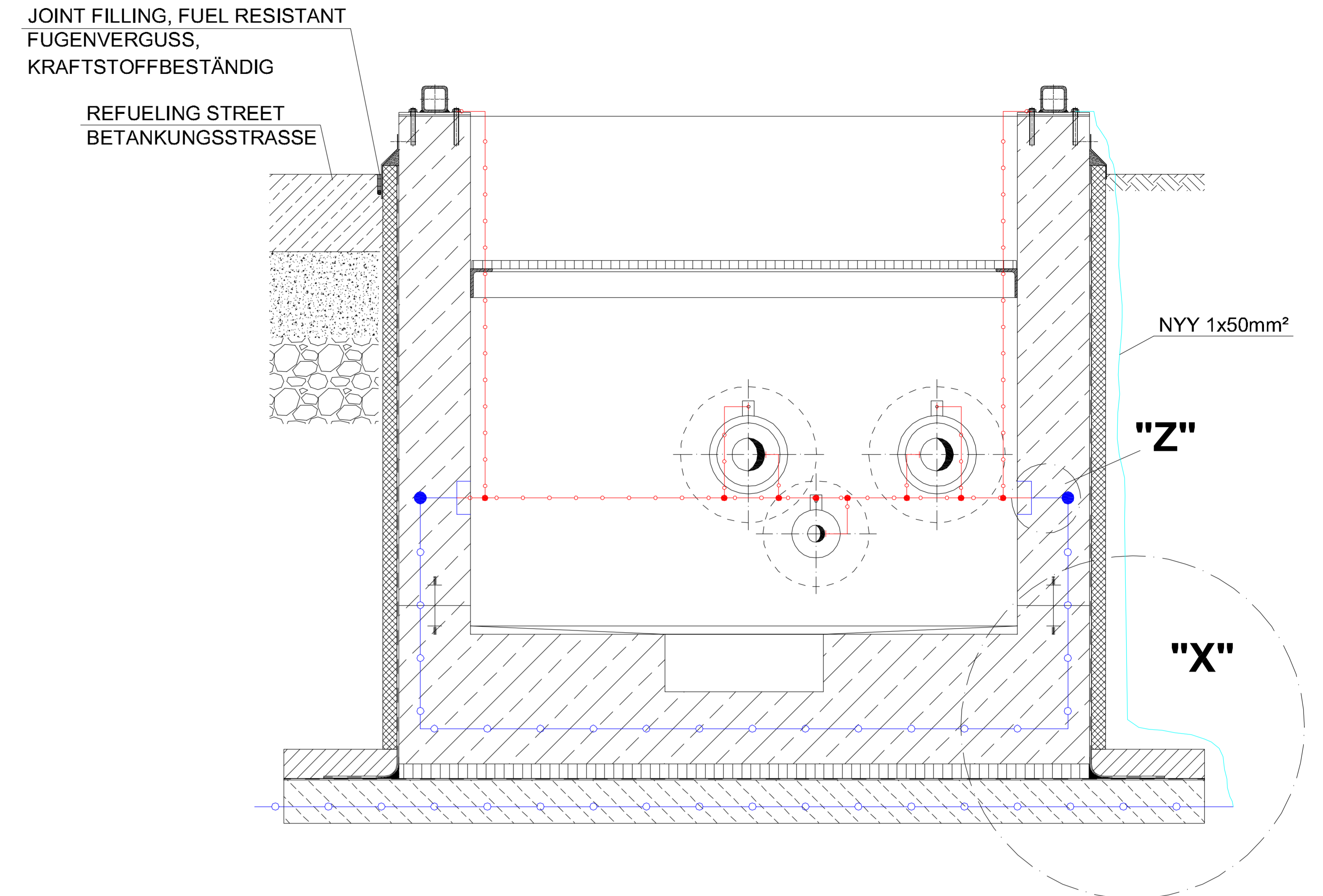
REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
HEADQUARTERS UNITED STATES AIR FORCES EUROPE ENGINEERING & OPERATIONS				
AIRFIELD STANDARD DESIGN US JET FUEL STORAGE AND DISPENSING SYSTEMS		FLUGPLATZ STANDARDPLANUNG US FLUGKRAFTSTOFF - VERSORGUNGSANLAGEN		
BUILDING BAUWERK TANK TRUCK REFUELING P/T (LEFT SIDE) TANKWAGEN - BETANKUNGSSCHACHT (LINKSAUSFÜHRUNG)				
DESIGNATOR BEZEICHNUNG GROUNDING AND LIGHTNING PROTECTION PLAN WITH ISULATING COUPLING ERDUNG- UND BLITZSCHUTZPLAN MIT ISOLIERKUPPLUNG				
WORKED/BEARBEITET	PREPARED/AUFGESTELLT	APPROVED/GENEHMIGT		
LANDSCHAFTS- UND BAUWERKE L 12.1 AMBAU- UND ERWEITERUNGS- TYPEN (SIEHE AUF DER PLAN-UND QUERSICHT)		AMT FÜR BUNDESBAU WALLSTR.1 55122 MAINZ		
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAUMASSNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED GENEHMIGT	DATE DATUM 6. MAI 2015	SCALE MASSSTAB 1:10		
ORIGINAL, SIGNED BY IN ORIGINAL, GEE.		STANDARD SHEET STANDARD PLAN		
GENERAL INFO CONTRACT FACILITIES ENGINEER PLANNING OFFICE		CAD-PROGRAMM CAD-PROJEKT	E - 12.1	
CONSTRUCTION PROJECT BAUMASSNAHME		SHEET NO. PLATZNR.	OF VON	



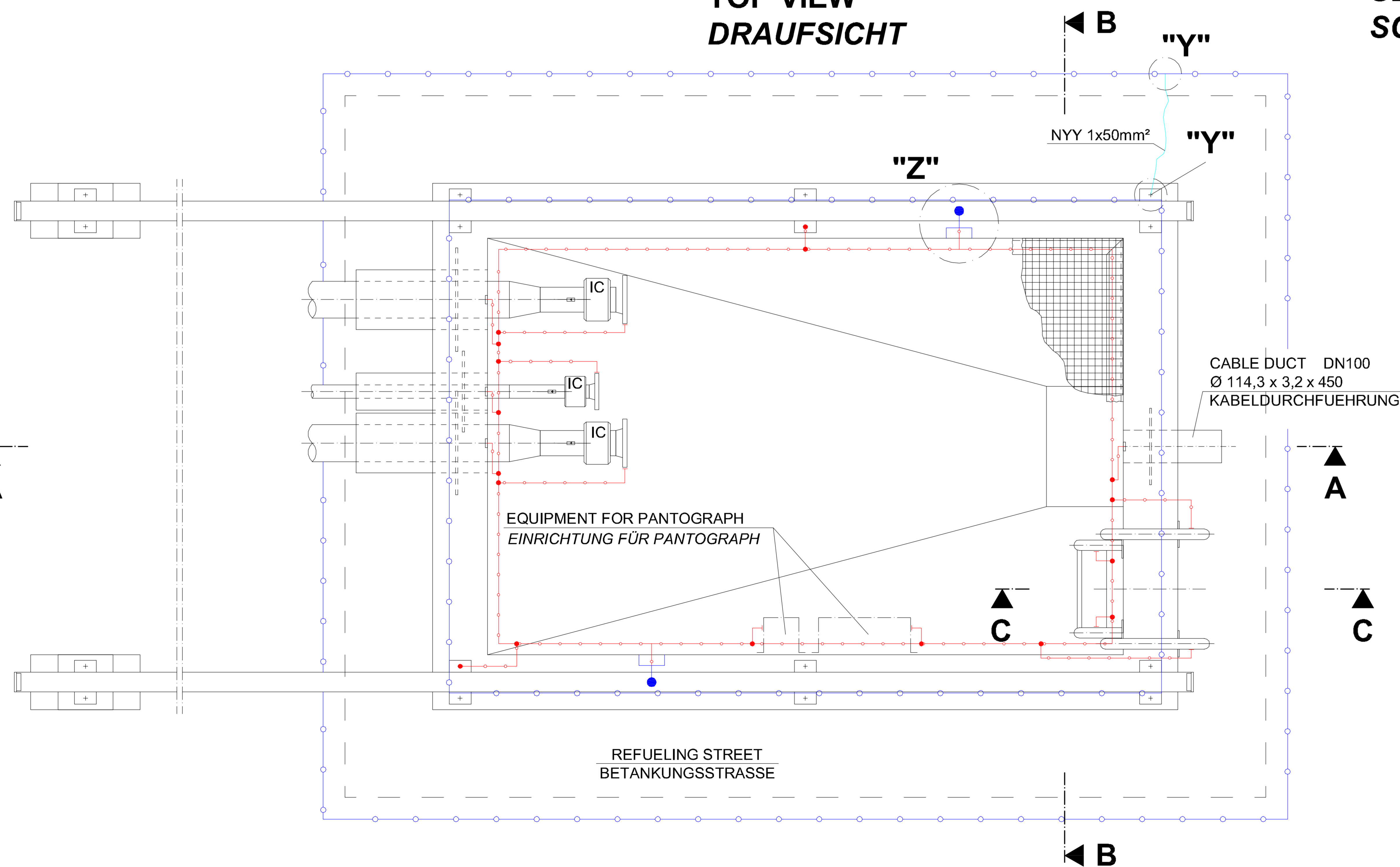
**SECTION  
SCHNITT A - A**



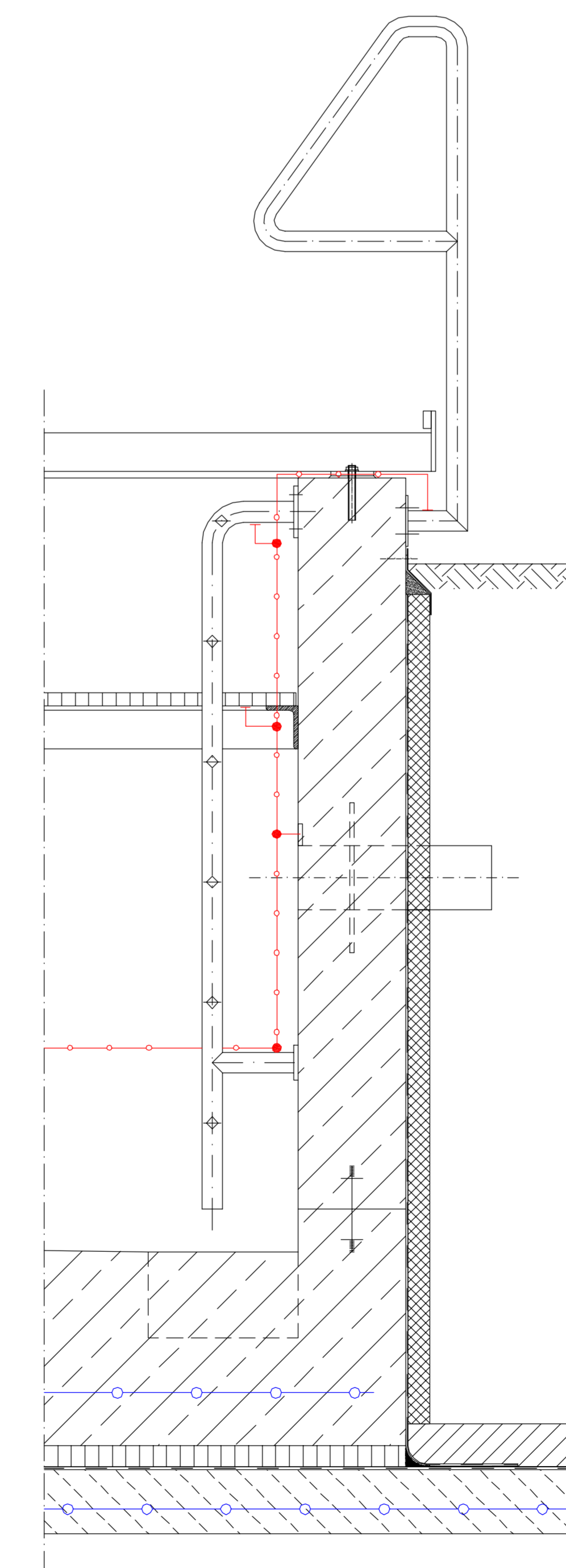
**SECTION  
SCHNITT B - B**



**TOP VIEW  
DRAUFSICHT**



**SECTION  
SCHNITT C - C**



**LEGEND  
LEGENDE**

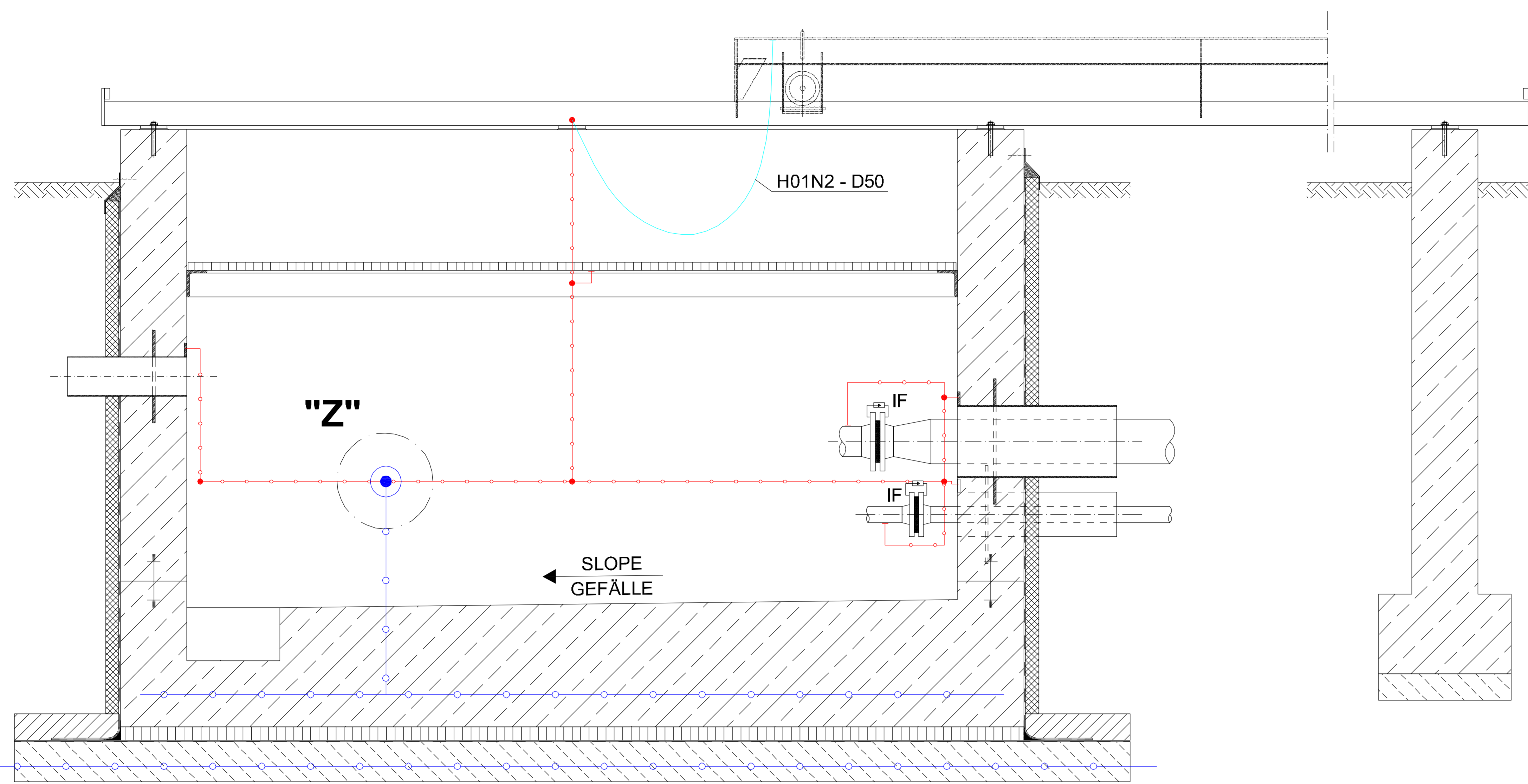
-  STEEL STRIP 30 x 3,5mm IN CONCRETE / IN EARTH (STAINLESS STEEL, MATERIAL NO. 1.457)  
BANDSTAHL 30 x 3,5mm IM BETON / IM ERDREICH (EDELSTAHL, WERKSTOFF NR. 1.457)
-  GALV. STEEL STRIP 30 x 3,5mm SURFACE - MOUNTED  
VERZ. BANDSTAHL 30 x 3,5mm AUF PUTZ
-  ISULATING COUPLING  
ISOLIERKUPPLUNG

- PERTINENT DRAWINGS  
ZUGEHÖRIGE ZEICHNUNGEN**
- C-12.2 CONSTRUCTION PLAN  
KONSTRUKTIONSPLAN
  - E-12.3 DETAILS GROUNDIND CONNECTION  
DETAILS ERDUNGSANSCHLUSS

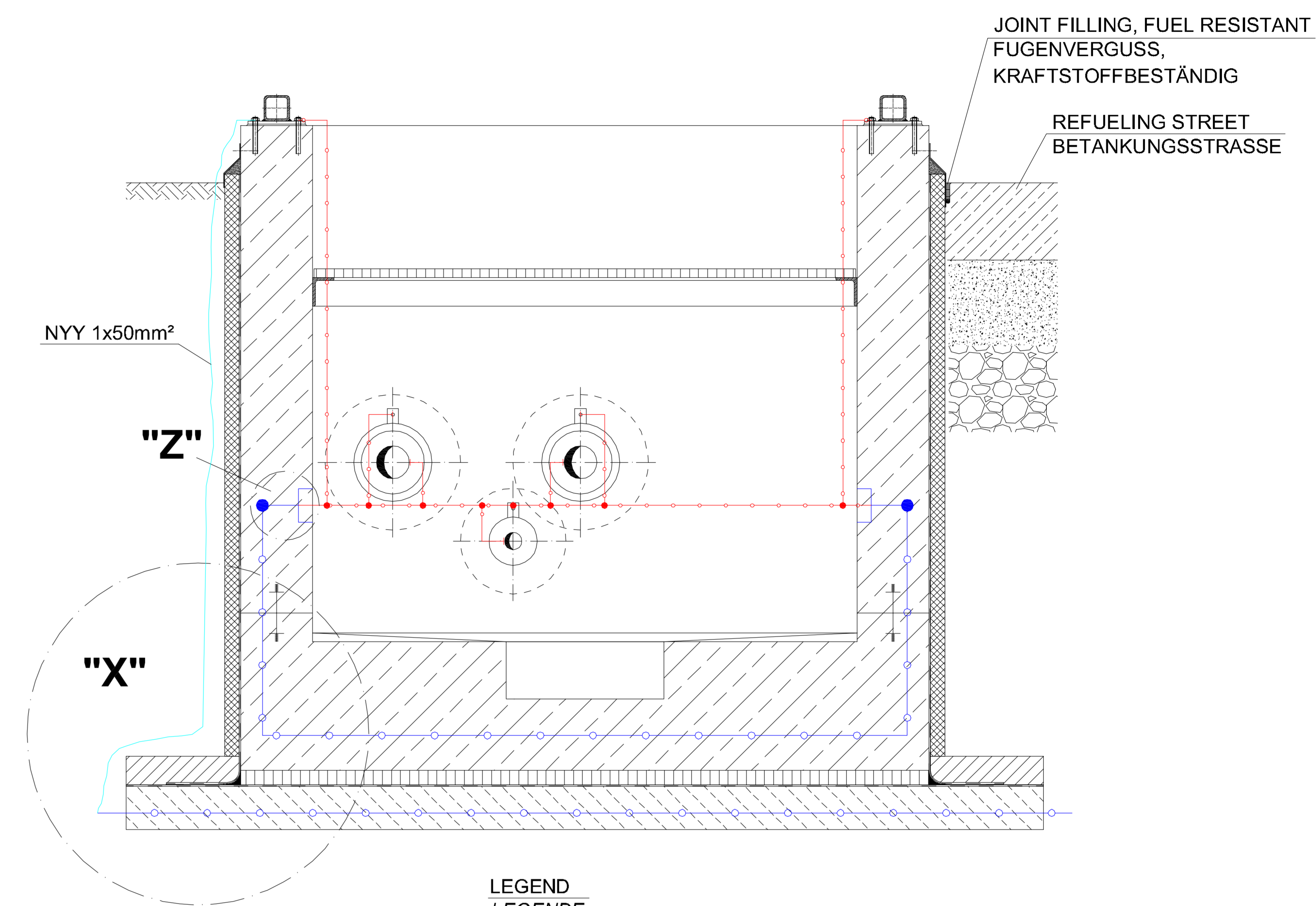
REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
HEADQUARTERS UNITED STATES AIR FORCES EUROPE				
ENGINEERING & OPERATIONS				
AIRFIELD STANDARD DESIGN US			FLUGPLATZ STANDARDPLANUNG US	
JET FUEL STORAGE AND DISPENSING SYSTEMS			FLUGKRAFTSTOFF - VERSORGUNGSANLAGEN	
BUILDING BAUWERK TANK TRUCK REFUELING PIT (RIGHT SIDE) TANKWAGEN - BETANKUNGSSCHACHT (RECHTSAUSFÜHRUNG)				
DESIGNATOR BEZEICHNUNG GROUNDING AND LIGHTNING PROTECTION PLAN WITH ISULATING COUPLING ERDUNG- UND BLITZSCHUTZPLAN MIT ISOLIERKUPPLUNG				
WORKED/REARBEITET		PREPARED/ANGESTELLT	APPROVED/GENEHMIGT	
LANDSCHAFTS- UND BAUVERWALTUNG L 8 - B		AMT FÜR BUNDESBAU WALLSTR.1 55122 MAINZ		
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAU MASSNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED GENEHMIGT	DATE DATUM	6. MAI 2015	SCALE MASSSTAB	1:10
ORIGINAL SIGNED BY IN ORIGINAL DED.			STANDARD SHEET STANDARD PLAN	E - 12.2
CONSTRUCTION PROJECT BAU MASSNAHME			CAD-PROGRAMM SHEET NO. PLATZ NR.	OF VON



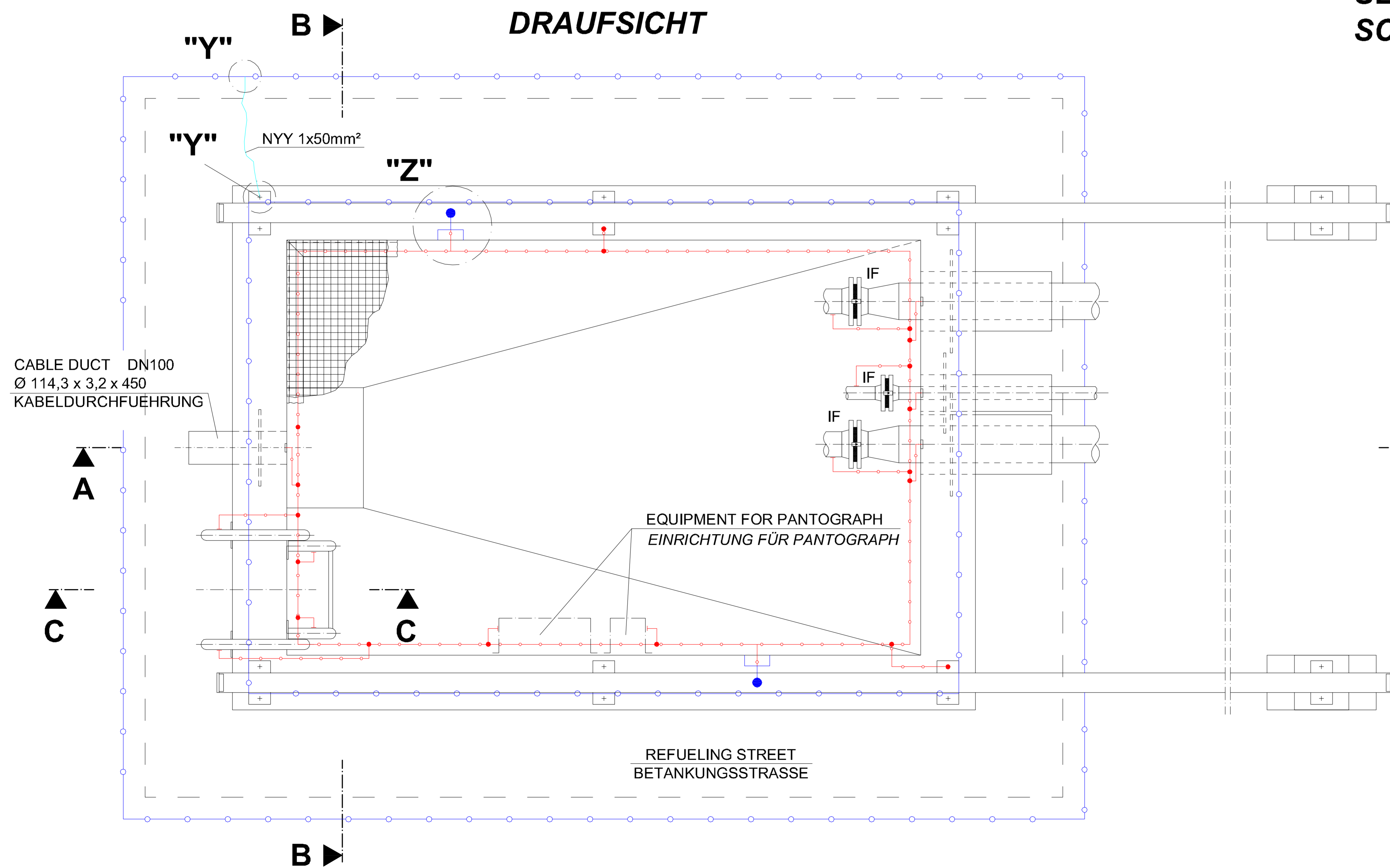
**SECTION  
SCHNITT A - A**



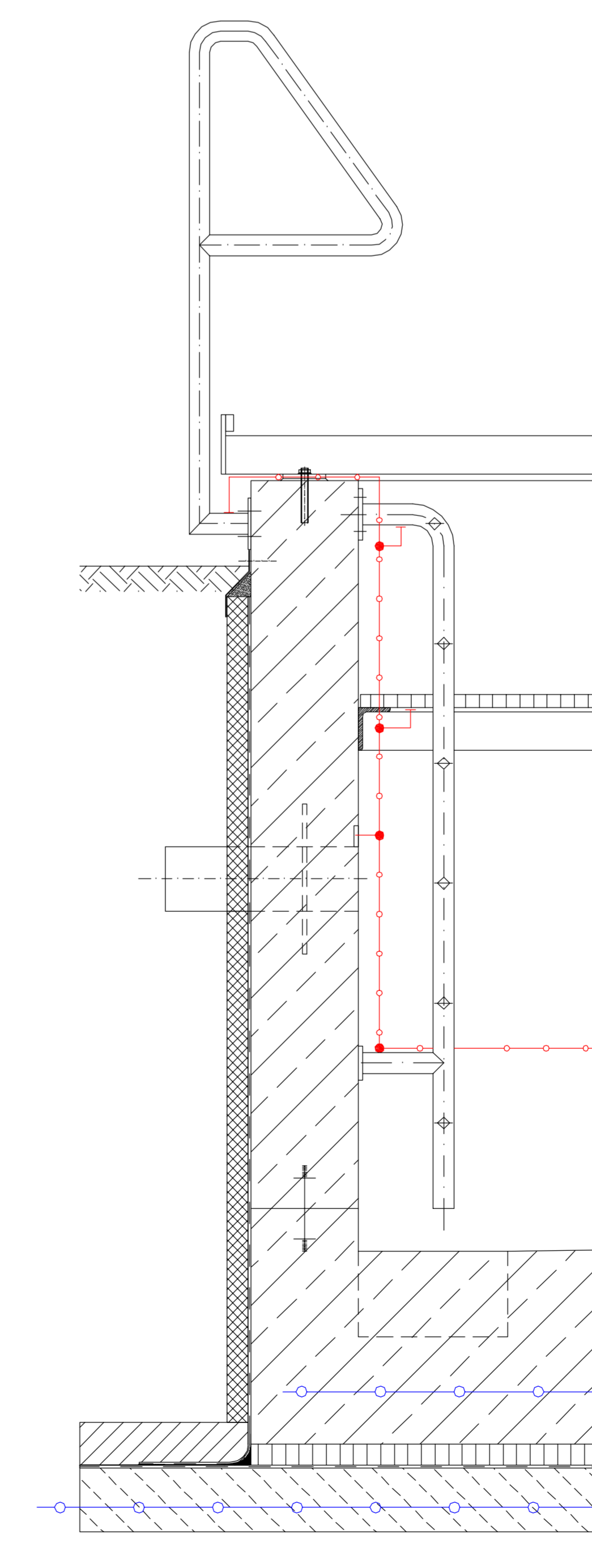
**SECTION  
SCHNITT B - B**



**TOP VIEW  
DRAUFSICHT**



**SECTION  
SCHNITT C - C**



**LEGEND  
LEGENDE**

- STEEL STRIP 30 x 3,5mm IN CONCRETE / IN EARTH (STAINLESS STEEL, MATERIAL NO. 1.457)  
BANDSTAHL 30 x 3,5mm IM BETON / IM ERDREICH (EDELSTAHL, WERKSTOFF NR. 1.457)
- GALV. STEEL STRIP 30 x 3,5mm SURFACE - MOUNTED  
VERZ. BANDSTAHL 30 x 3,5mm AUF PUTZ
- ISULATING FLANGE  
ISOLIERFLANSCH

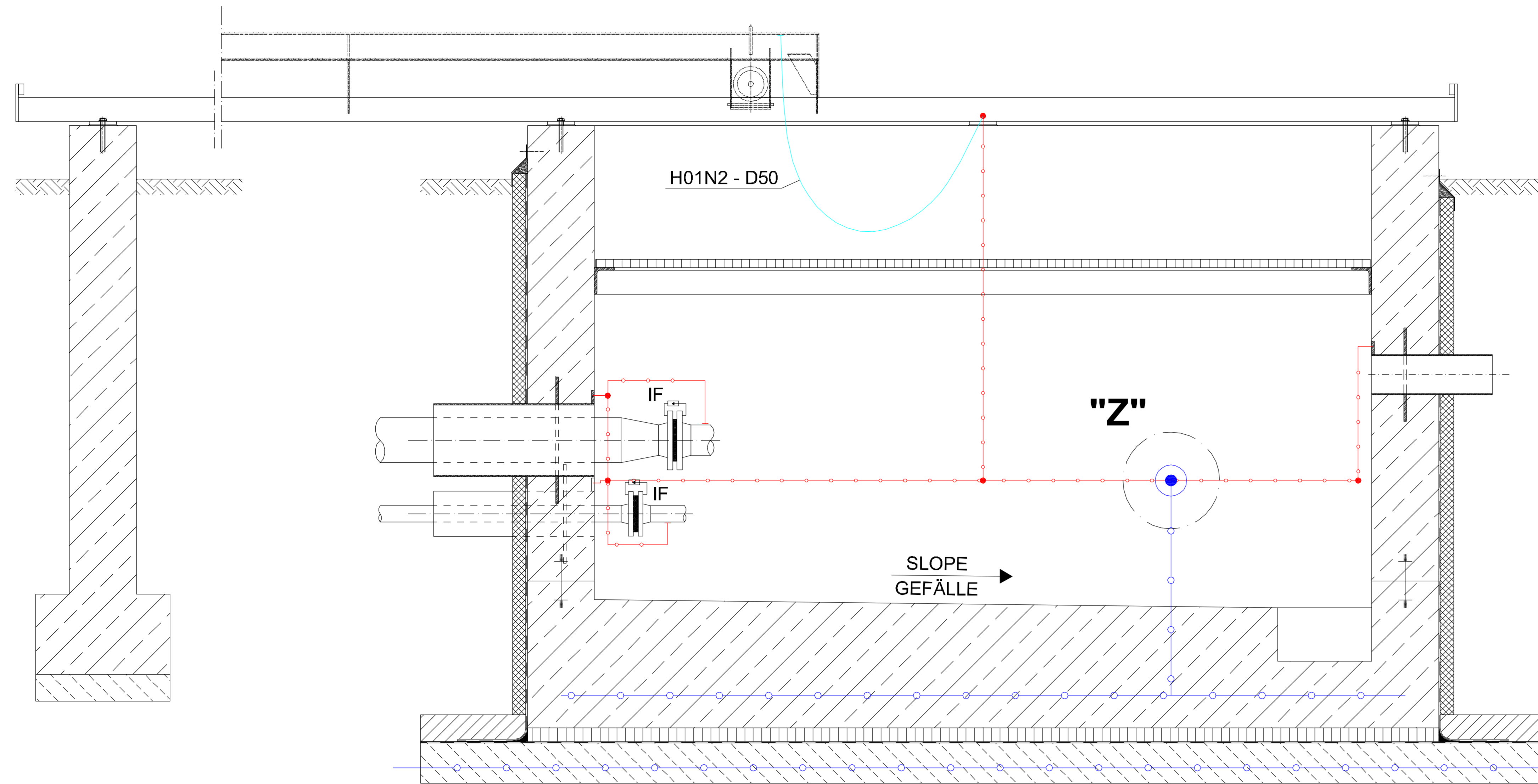
**PERTINENT DRAWINGS  
ZUGEHÖRIGE ZEICHNUNGEN**

- C-12.1 CONSTRUCTION PLAN  
KONSTRUKTIONSPLAN
- E-12.3 DETAILS GROUNDING CONNECTION  
DETAILS ERDUNGSANSCHLUSS

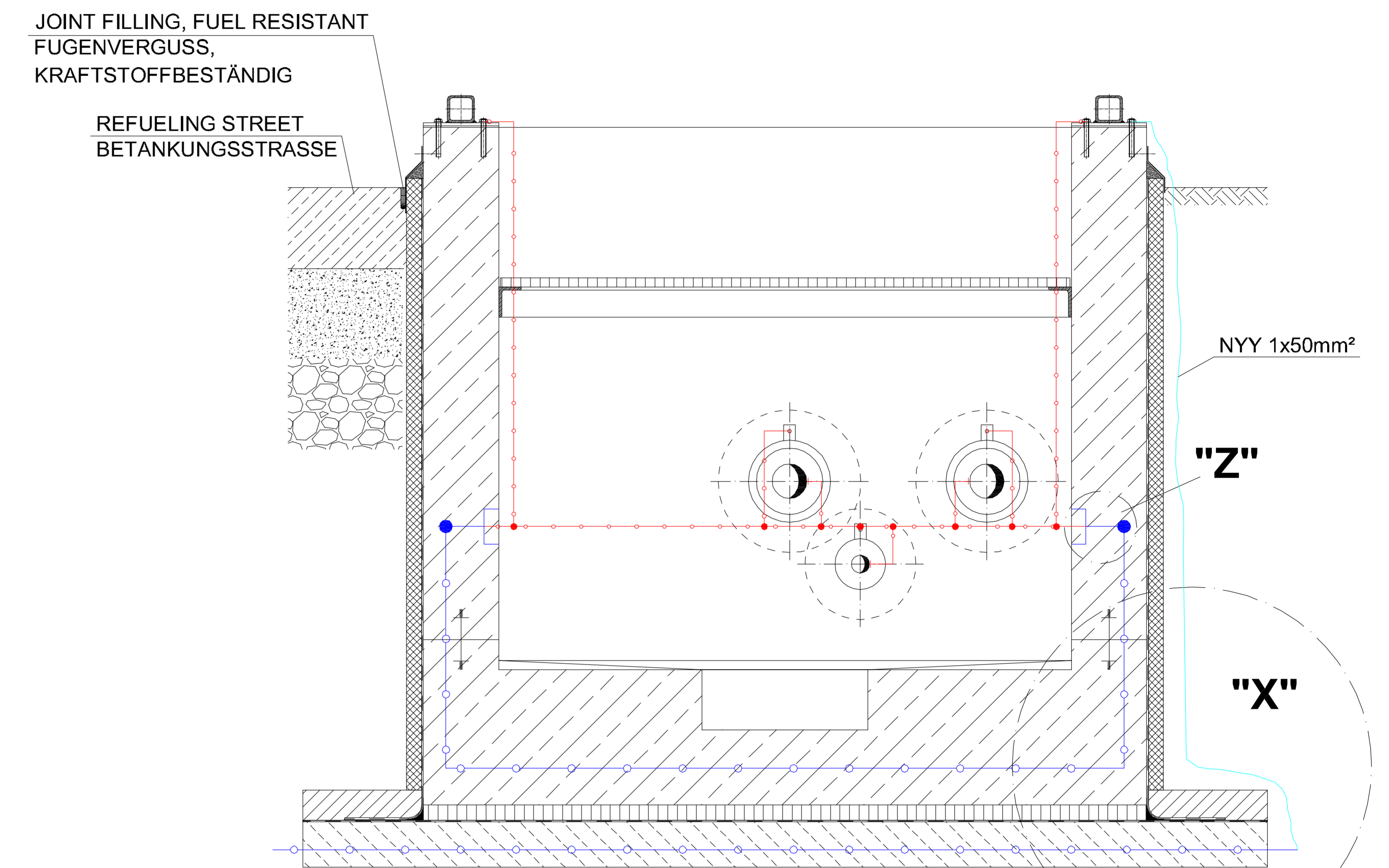
REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
<b>HEADQUARTERS</b> UNITED STATES AIR FORCES EUROPE ENGINEERING & OPERATIONS				
AIRFIELD STANDARD DESIGN US JET FUEL STORAGE AND DISPENSING SYSTEMS		FLUGPLATZ STANDARDPLANUNG US FLUGKRAFTSTOFF - VERSORGENGSANLAGEN		
BUILDING BAUWERK TANK TRUCK REFUELING PTT (LEFT SIDE) TANKWAGEN - BETANKUNGSCHACHT (LINKSAUSFÜHRUNG)				
DESIGNATOR BEZEICHNUNG GROUNDING AND LIGHTNING PROTECTION PLAN WITH ISULATING FLANGE ERDUNG- UND BLITZSCHUTZPLAN MIT ISOLIERFLANSCH				
WORKED/BEARBEITET LANDEBETRIEB LIEGENSCHAFTS- UND BAUVERBUND LW-WESEN/BAUVERBUND AMBISCHT/ UNTERSTABSTÄTTE 1, MAIN LANDEBETRIEB TELEFON: 06941 561476 FAX: 06941 561476		APPROVED/GENEHMIGT AMT FÜR BUNDESBAU WÄLLSTR.1 55122 MAINZ		
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAUMASSNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED GENEHMIGT IN ORIGINAL DED.	DATE DATUM 6. MAI 2015	SCALE MASSSTAB 1:10	STANDARD SHEET STANDARD BLATT E - 12.1	
CONSTRUCTION PROJECT BAUMASSNAHME		SHEET NO. BLATT NR. OF VON		



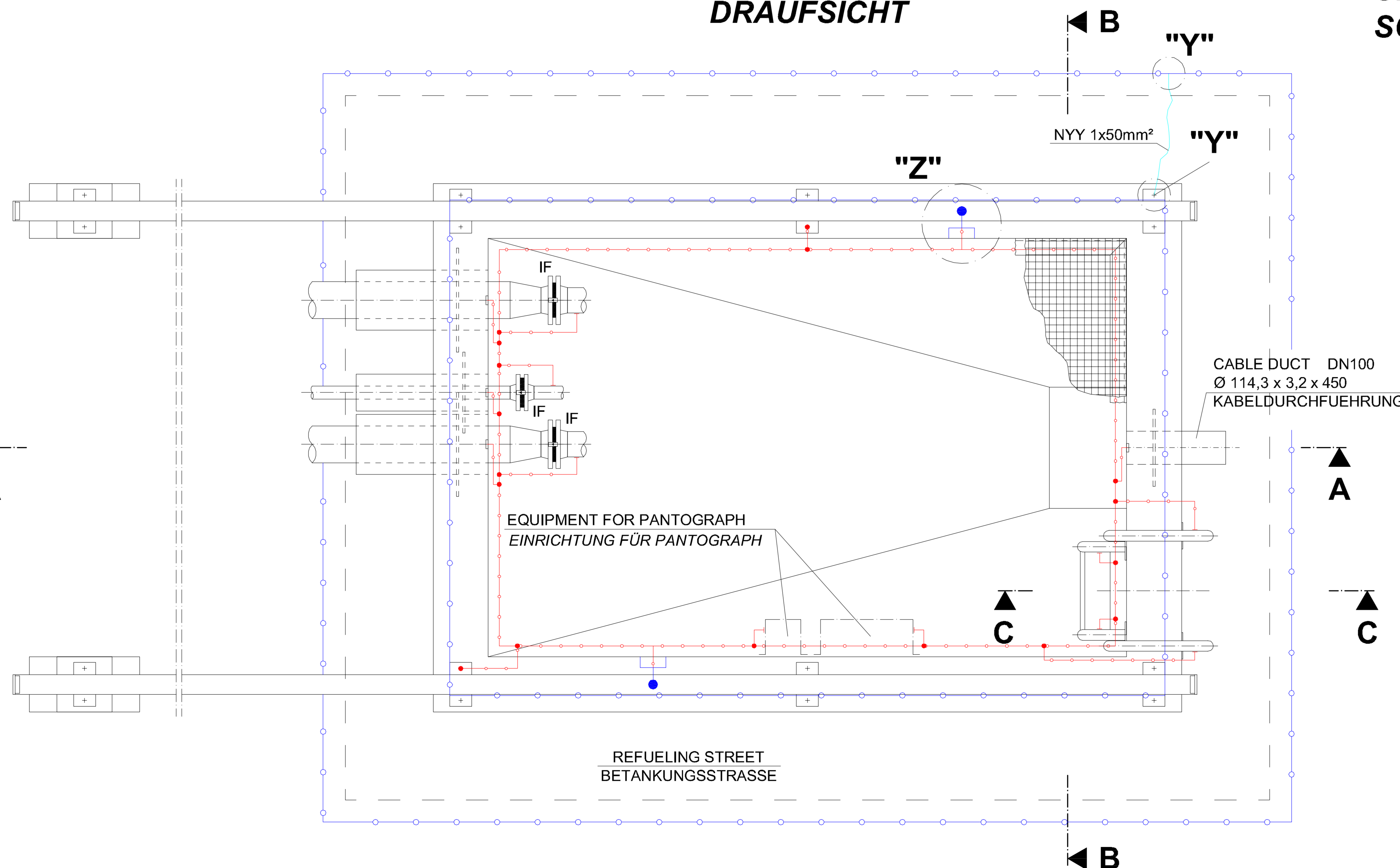
**SECTION  
SCHNITT A - A**



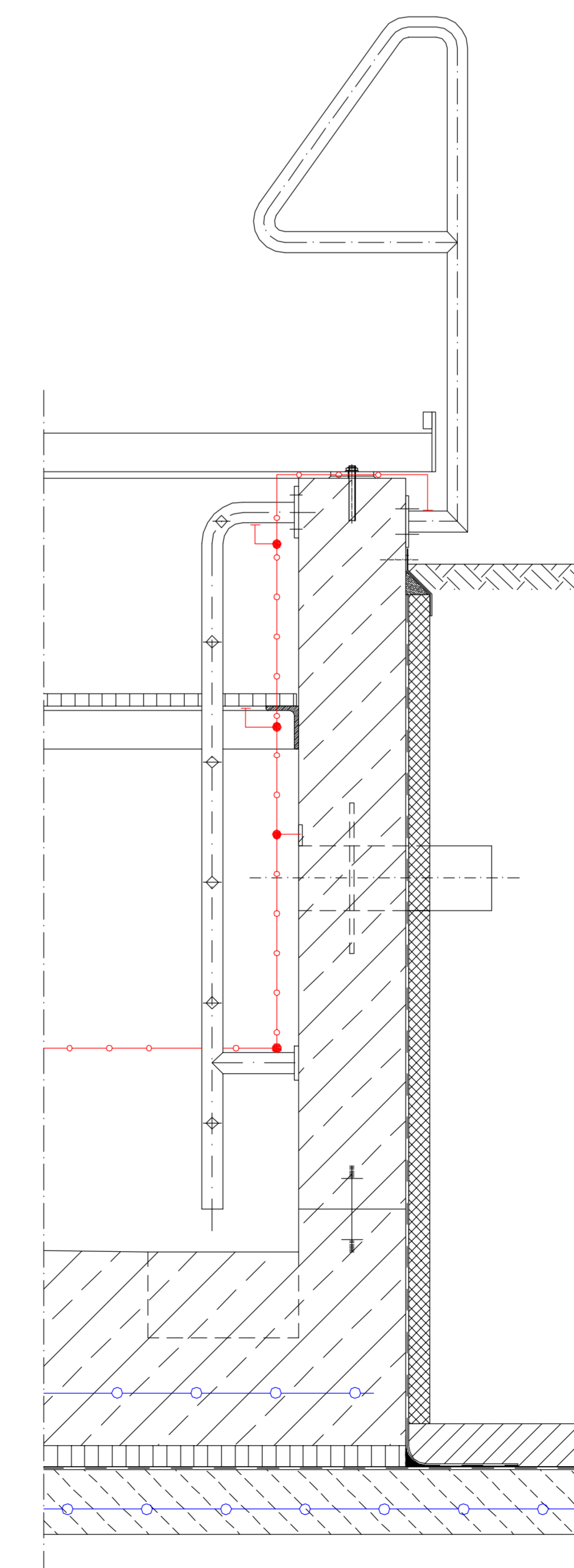
**SECTION  
SCHNITT B - B**



**TOP VIEW  
DRAUFSICHT**



**SECTION  
SCHNITT C - C**



**LEGEND  
LEGENDE**

- STEEL STRIP 30 x 3,5mm IN CONCRETE / IN EARTH (STAINLESS STEEL, MATERIAL NO. 1.457)  
BANDSTAHL 30 x 3,5mm IM BETON / IM ERDREICH (EDELSTAHL, WERKSTOFF NR. 1.457)
- GALV. STEEL STRIP 30 x 3,5mm SURFACE - MOUNTED  
VERZ. BANDSTAHL 30 x 3,5mm AUF PUTZ
- ISULATING FLANGE  
ISOLIERFLANSCH

- PERTINENT DRAWINGS  
ZUGEHÖRIGE ZEICHNUNGEN**
- C-12.2 CONSTRUCTION PLAN  
KONSTRUKTIONSPLAN
  - E-12.3 DETAILS GROUNDIND CONNECTION  
DETAILS ERDUNGSANSCHLUSS

REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
<b>HEADQUARTERS</b>				
UNITED STATES AIR FORCES EUROPE				
ENGINEERING & OPERATIONS				
AIRFIELD STANDARD DESIGN US			FLUGPLATZ STANDARDPLANUNG US	
JET FUEL STORAGE AND DISPENSING SYSTEMS			FLUGKRAFTSTOFF - VERSORGSANLAGEN	
BUILDING BAUWERK				
TANK TRUCK REFUELING PIT (RIGHT SIDE) TANKWAGEN - BETANKUNGSSCHACHT (RECHTSAUSFÜHRUNG)				
DESIGNATOR BEZEICHNUNG				
GROUNDING AND LIGHTNING PROTECTION PLAN WITH ISULATING FLANGE ERDUNG- UND BLITZSCHUTZPLAN MIT ISOLIERFLANSCH				
WORKED/BEARBEITET		PREPARED/ANGEGELISTET		APPROVED/GENEHMIGT
LANDSCHAFTS- UND BAUWERKE L B B		AMT FÜR BUNDESBAU WALLSTR.1 55122 MAINZ		
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAU MASSNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED GENEHMIGT	DATE DATUM	6. MAI 2015	SCALE MASSSTAB	1:10
ORIGINAL DRAWN BY IN ORIGINAL DED.			STANDARD SHEET STANDARD PLAN	
CONSTRUCTION PROJECT BAU MASSNAHME			E - 12.2	SHEET NO. PLATZ NR.

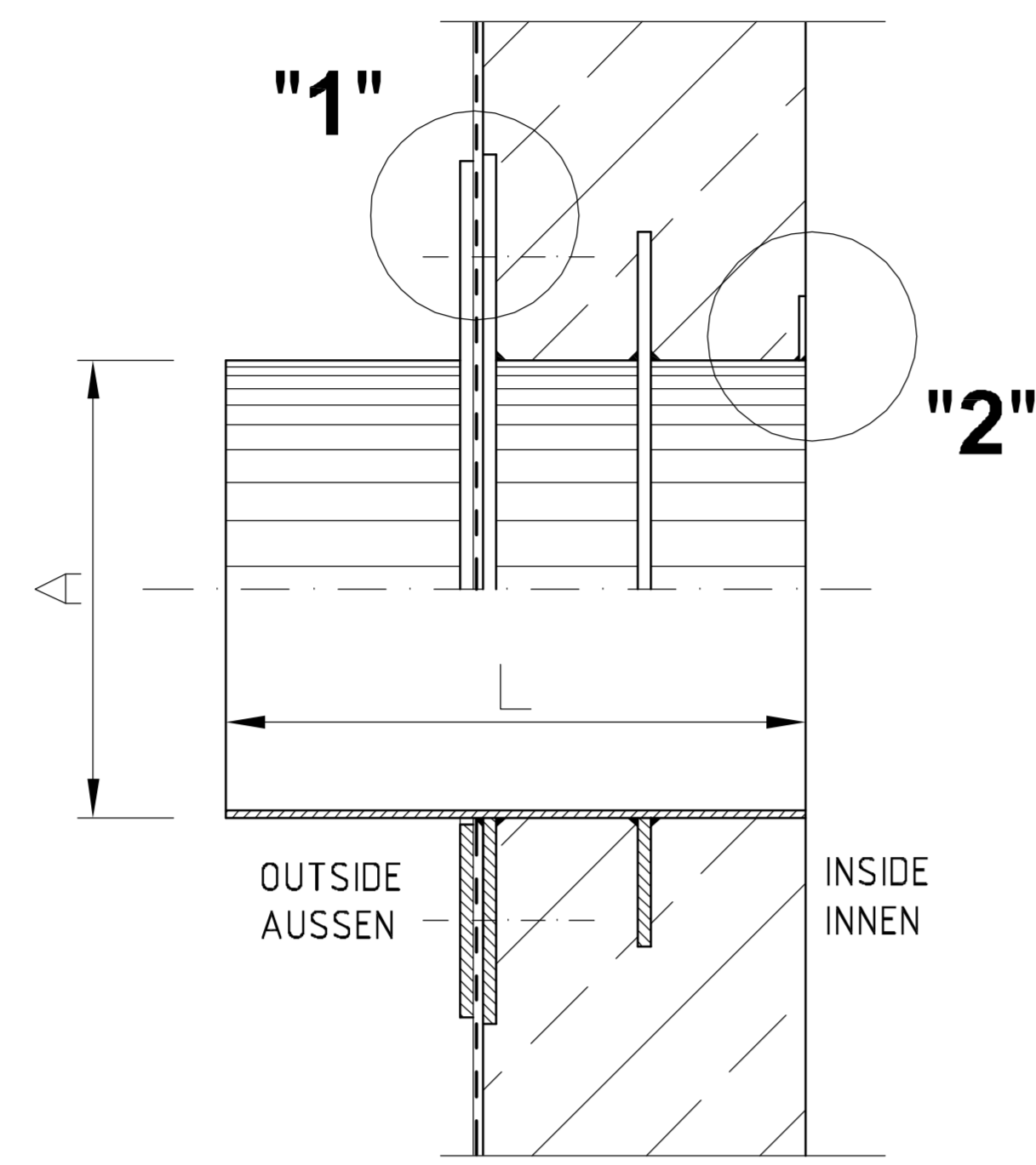


DETAIL PIPE PENETRATION, CASING  
 DETAIL ROHRDURCHFÜHRUNG, MANTELROHR

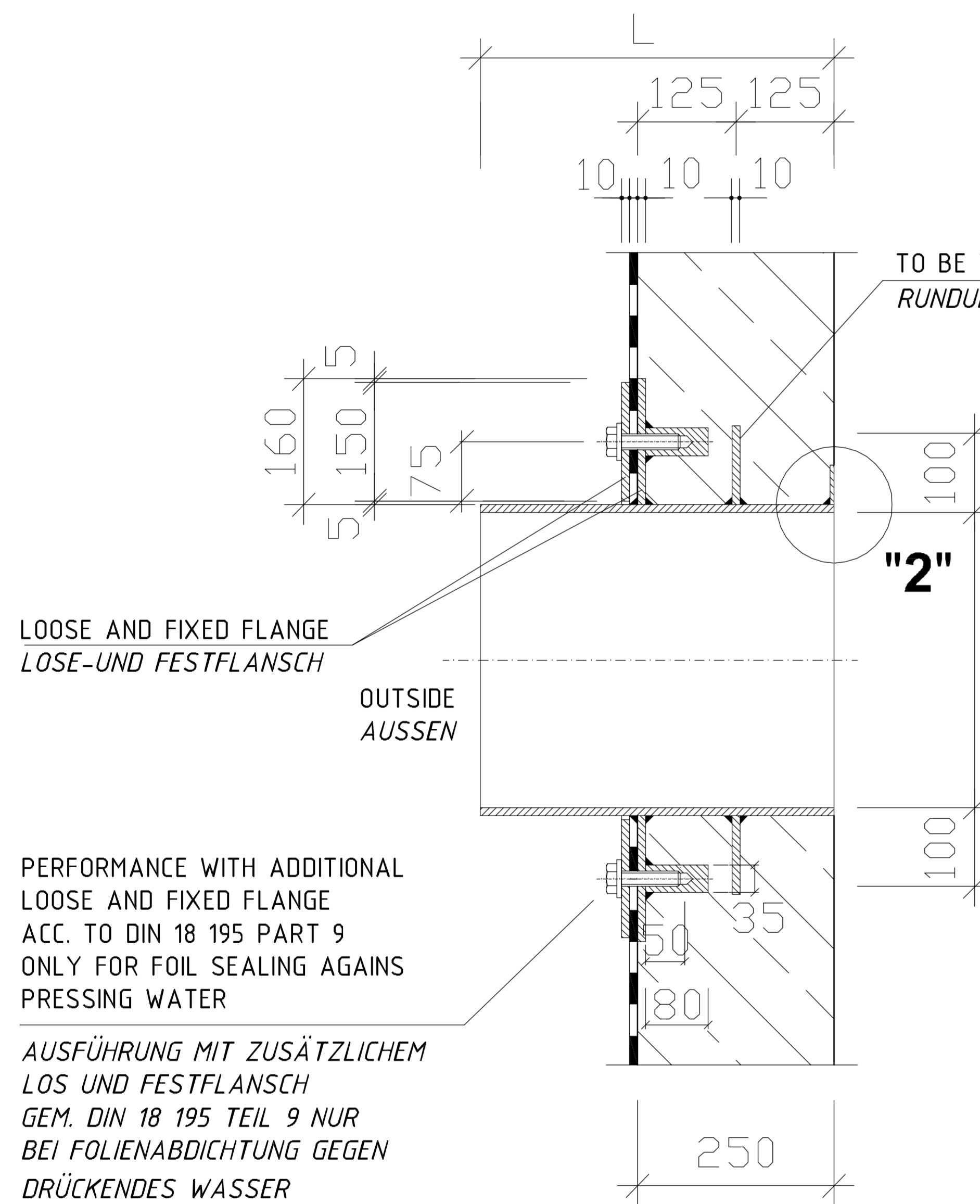
DETAIL CABLE DUCT  
 DETAIL KABELDURCHFÜHRUNG

NOT TO SCALE  
 OHNE MASSTAB

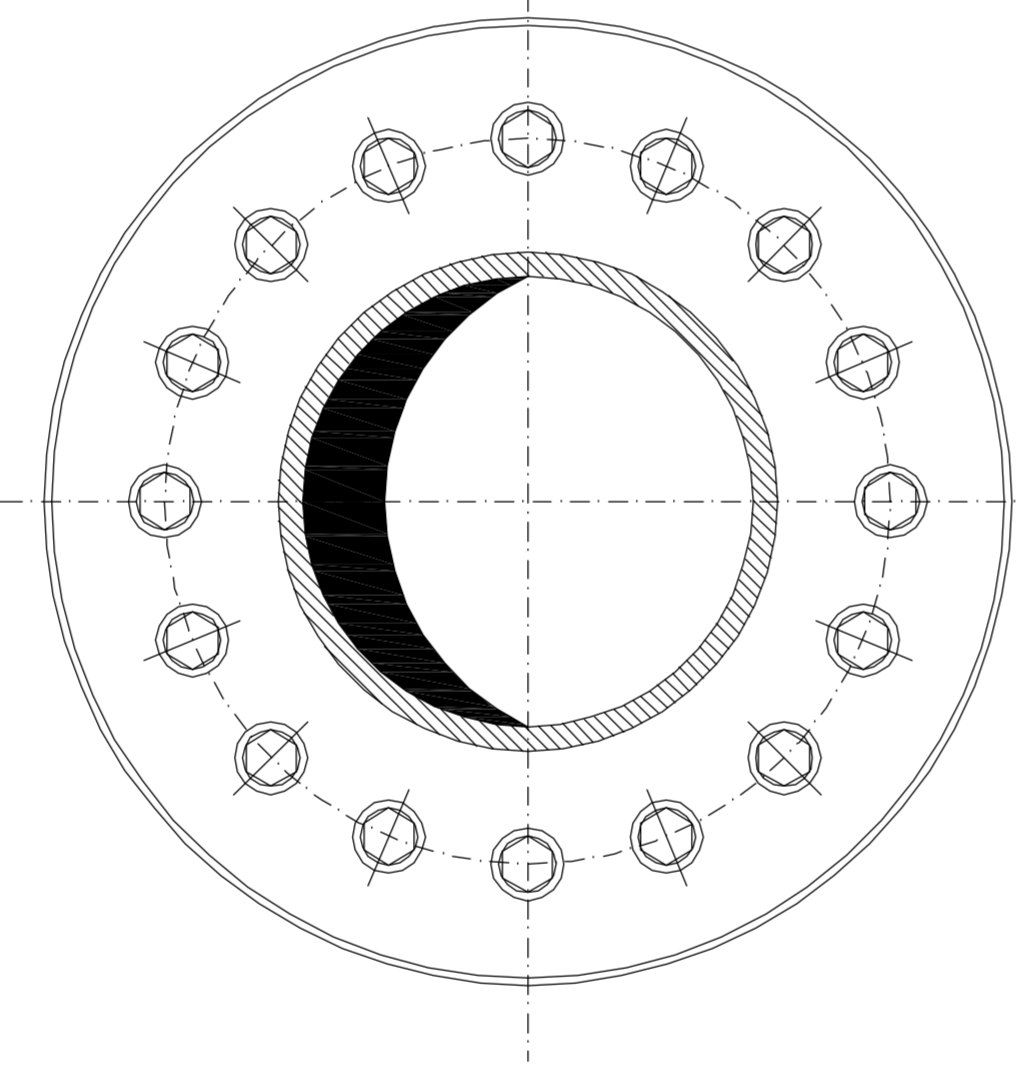
	DN	A mm	L mm
PIPE PENETRATION ROHRDURCHFÜHRUNG	DN 250	ø273,0	600
	DN 150	ø168,3	600
CABLE DUCT KABELDURCHFÜHRUNG	DN 100	ø114,3	450



DETAIL "1"

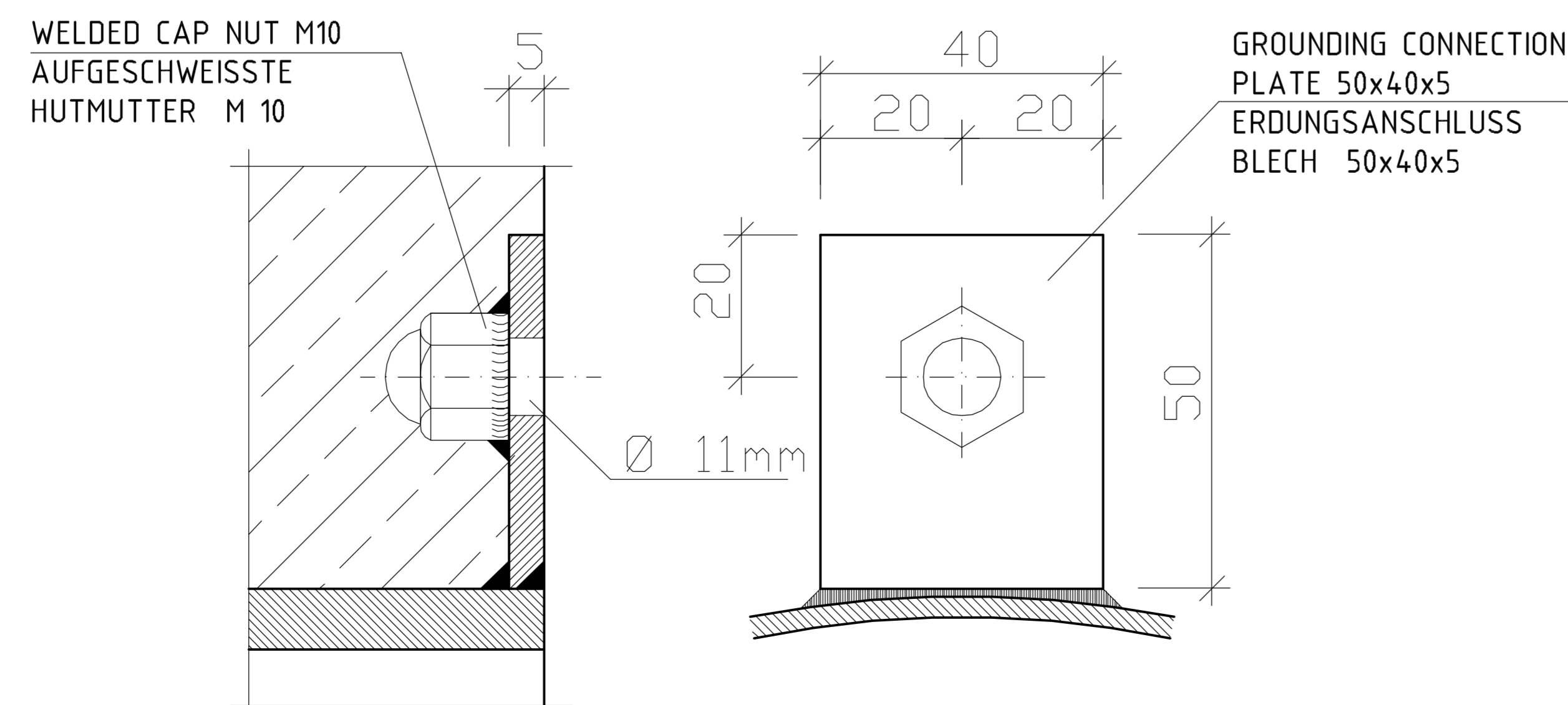


TO BE WELDED CIRCULAR IMPERVIOUS  
RUNDUM DICHT VERSCHWEISST



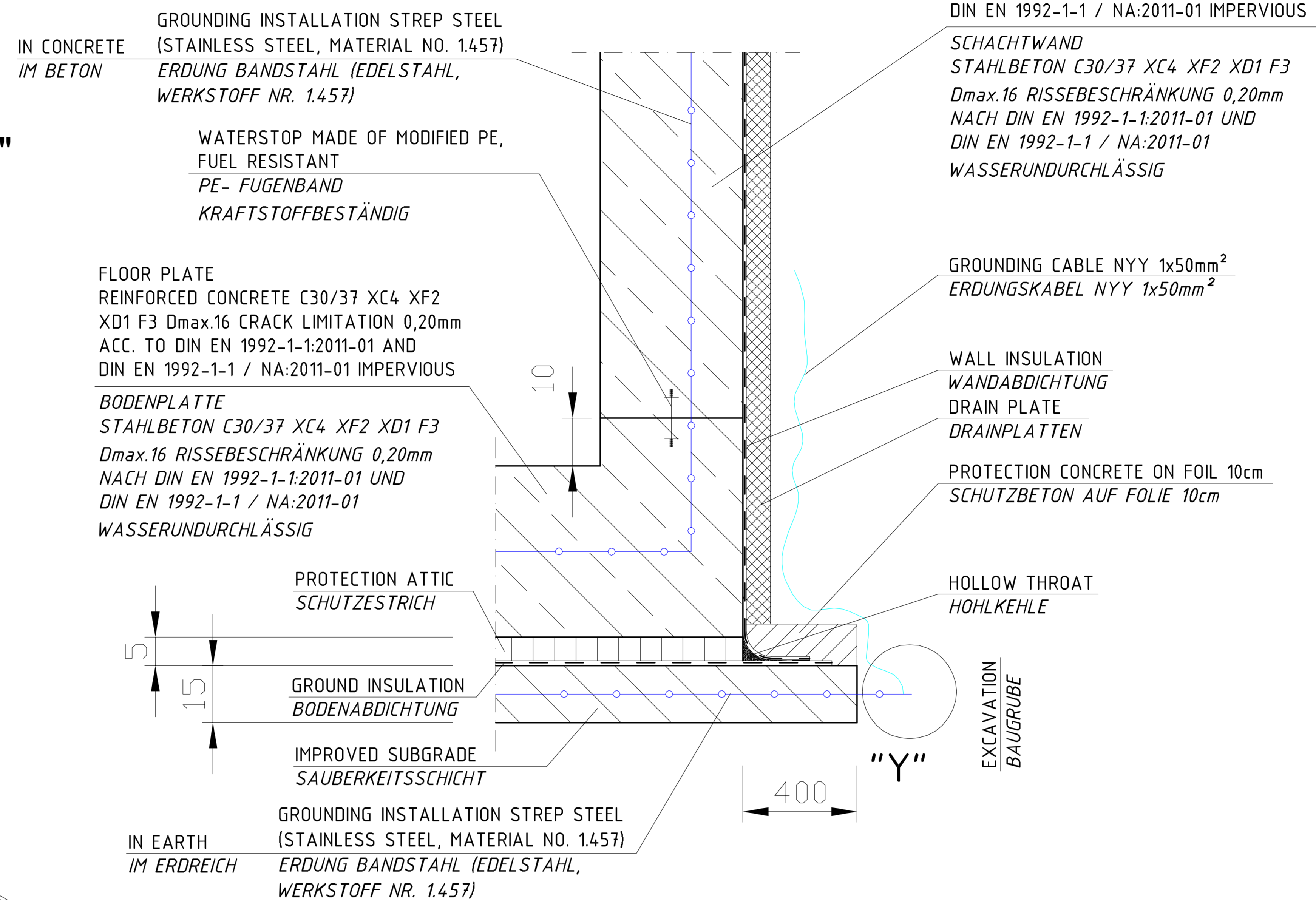
DETAIL "2"

GROUNDING CONNECTION CASING ON INTERNAL  
RING GROUNDING INSTALLATION  
ERDUNGSANSCHLUSS MANTELROHR  
AN INNENRINGERDER



DETAIL "X"

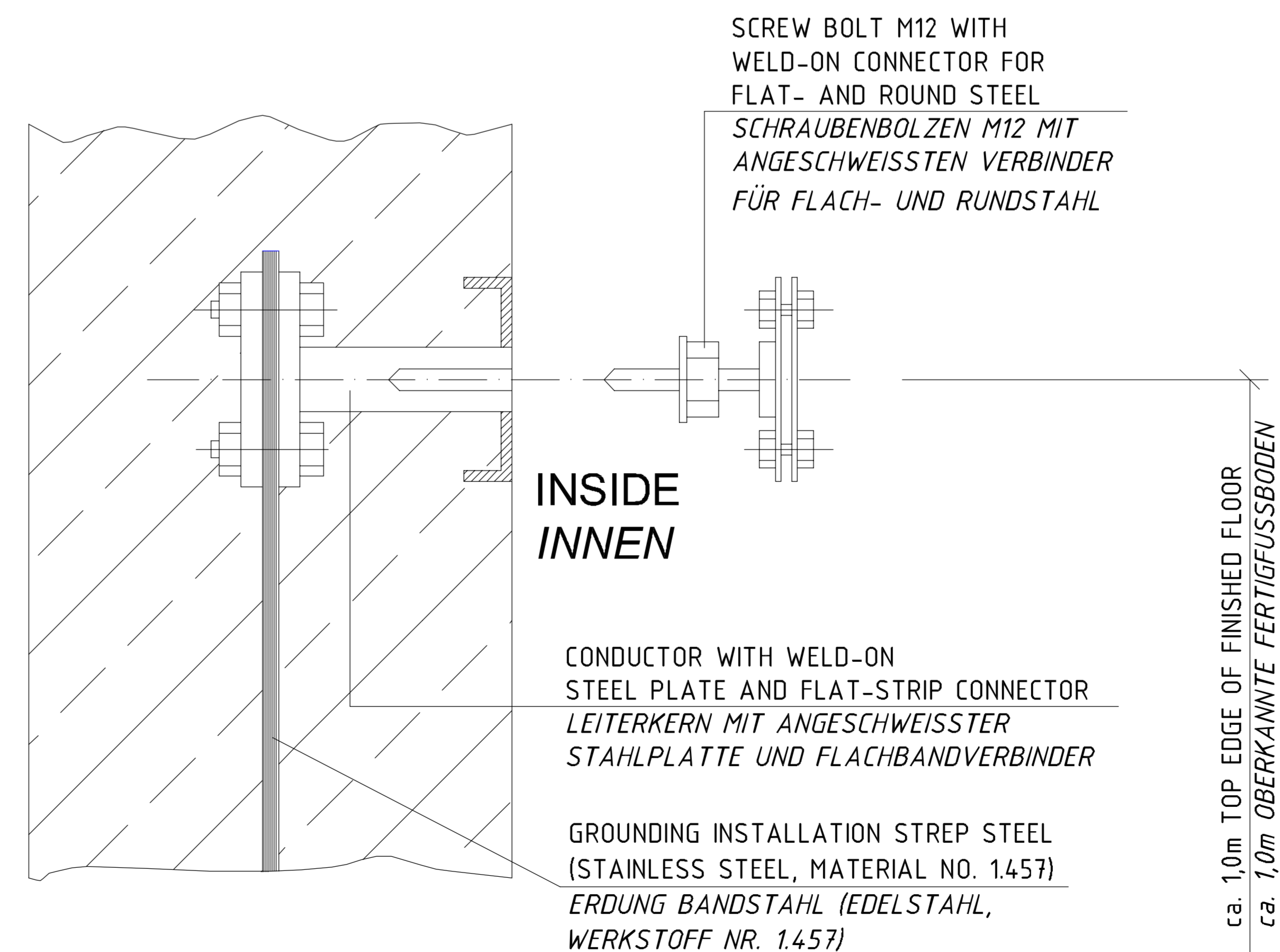
NOT TO SCALE  
 OHNE MASSTAB



DETAIL "Z"

GROUNDING CONNECTION  
ERDUNGSANSCHLUSS

(INSIDE)  
 (INNEN)  
 NOT TO SCALE  
 OHNE MASSTAB

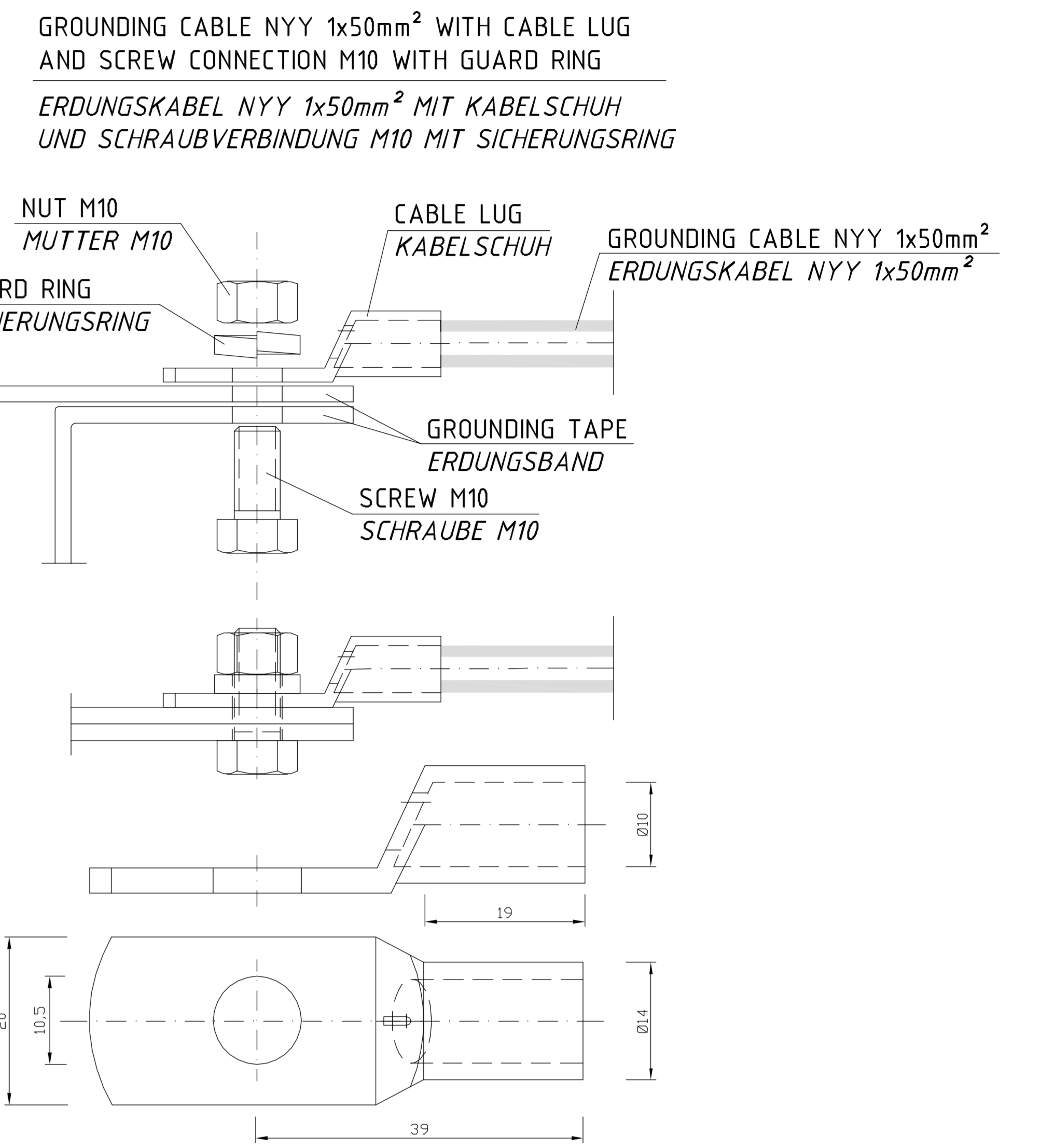


DETAIL "Y"

CONNECTION TO GROUNDING

ANSCHLUSS ERDUNG

NO SCALE / OHNE MASSTAB



PERTINENT DRAWINGS

ZUGEHÖRIGE ZEICHNUNGEN

- C-12.1 CONSTRUCTION PLAN (LEFT SIDE)  
BAUKONSTRUKTIONSPLAN (LINKSAUSFÜHRUNG)
- C-12.2 CONSTRUCTION PLAN (RIGHT SIDE)  
BAUKONSTRUKTIONSPLAN (RECHTSAUSFÜHRUNG)

REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
HEADQUARTERS UNITED STATES AIR FORCES EUROPE ENGINEERING & OPERATIONS				
AIRFIELD STANDARD DESIGN US		FLUGPLATZ STANDARDPLANUNG US		
JET FUEL STORAGE AND DISPENSING SYSTEMS		FLUGKRAFTSTOFF - VERSORGUNGSANLAGEN		
BUILDING BAUWERK				
TANK TRUCK REFUELING PITS TANKWAGEN - BETANKUNGSSCHÄCHTE				
DESIGNATOR BEZEICHNUNG				
GROUNDING AND LIGHTNING PROTECTION PLAN, DETAILS ERDUNG- UND BLITZSCHUTZPLAN, DETAILS				
WORKPREPARED BY VORBEREITET VON	PREPARED/ALFGESETZT LANSBERGER LINGENSCHEITZ- UND BAUVERBUND LAW-WEISS/ALFGESETZT AMBERG (STR. 100/100/100) / MAIN LABOR TRUMPF (STR. 100/100/100) / MAIN LABOR	APPROVED/GENEHMIGT L B B	AMT FÜR BUNDESBAU WALLSTR.1 55122 MAINZ	
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAUHAUPTNÄHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED GENEHMIGT	DATE DATUM	SCALE MASSTAB		
	6. MAI 2015	NOT TO SCALE / OHNE MASSTAB		
ORIGINAL, DRAWN BY IN ORIGINAL, GEZ.		STANDARD SHEET STANDARD PLAN		
GENERAL INFO CORPORATE FACILITIES ENGINEER PLANNING AND DESIGN		E - 12.3		
CONSTRUCTION PROJECT BAUHAUPTNÄHME		SHEET NO. PLATEAU		



**HYDRANT PIT TYPE II (IN THE APRON)**  
***HYDRANTENSCHACHT TYP II (IN DER FLÄCHE)***

**14**

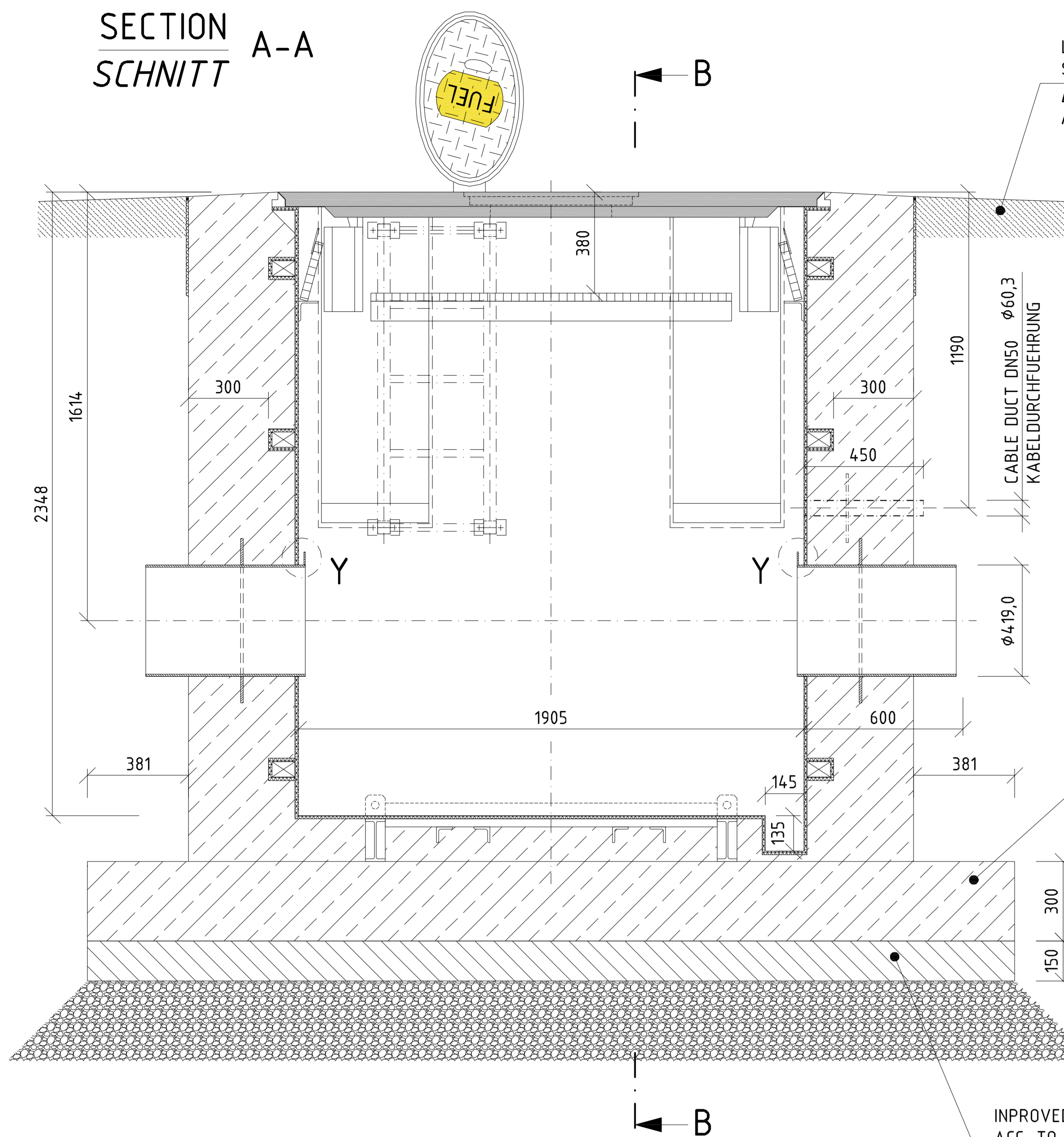
**C-14.1** CONSTRUCTION PLAN  
***BAUKONSTRUKTIONSPLAN***

**M-14.1** MECHANICAL INATALLATION, TOP VIEW AND SECTION "A", "B"  
***MASCHINENTECHNISCHE INSTALLATION, DRAUFSICHT UND SCHNITT "A" , "B"***

**E-14.1** GROUNDING AND LIGHTNING PROTECTION PLAN  
***ERDUNGS- UND BLITZSCHUTZPLAN***

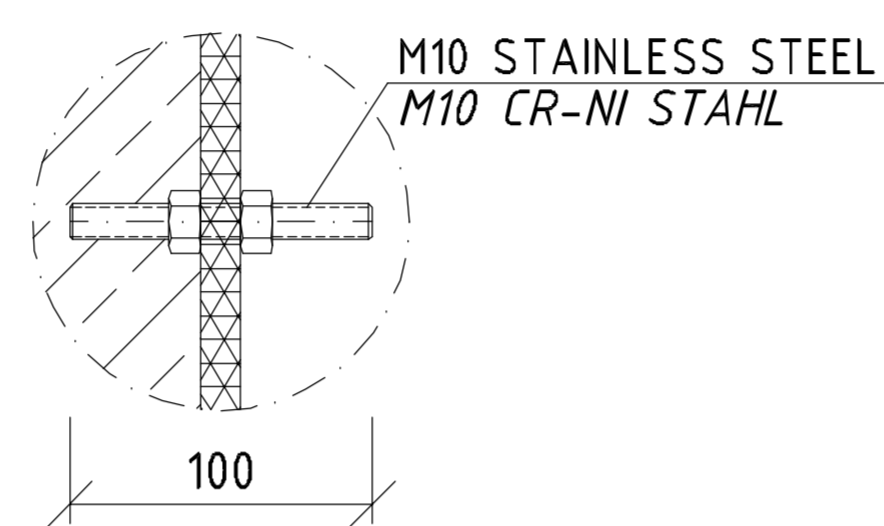


SECTION A-A  
SCHNITT A-A



LIQUID TIGHT CONCRETE AREA ACC. TO STATIC- CONSTRUCTIVE DESIGN  
DICHTFLÄCHE BETON NACH STATISCH-KONSTRUKTIVER BEMESSUNG

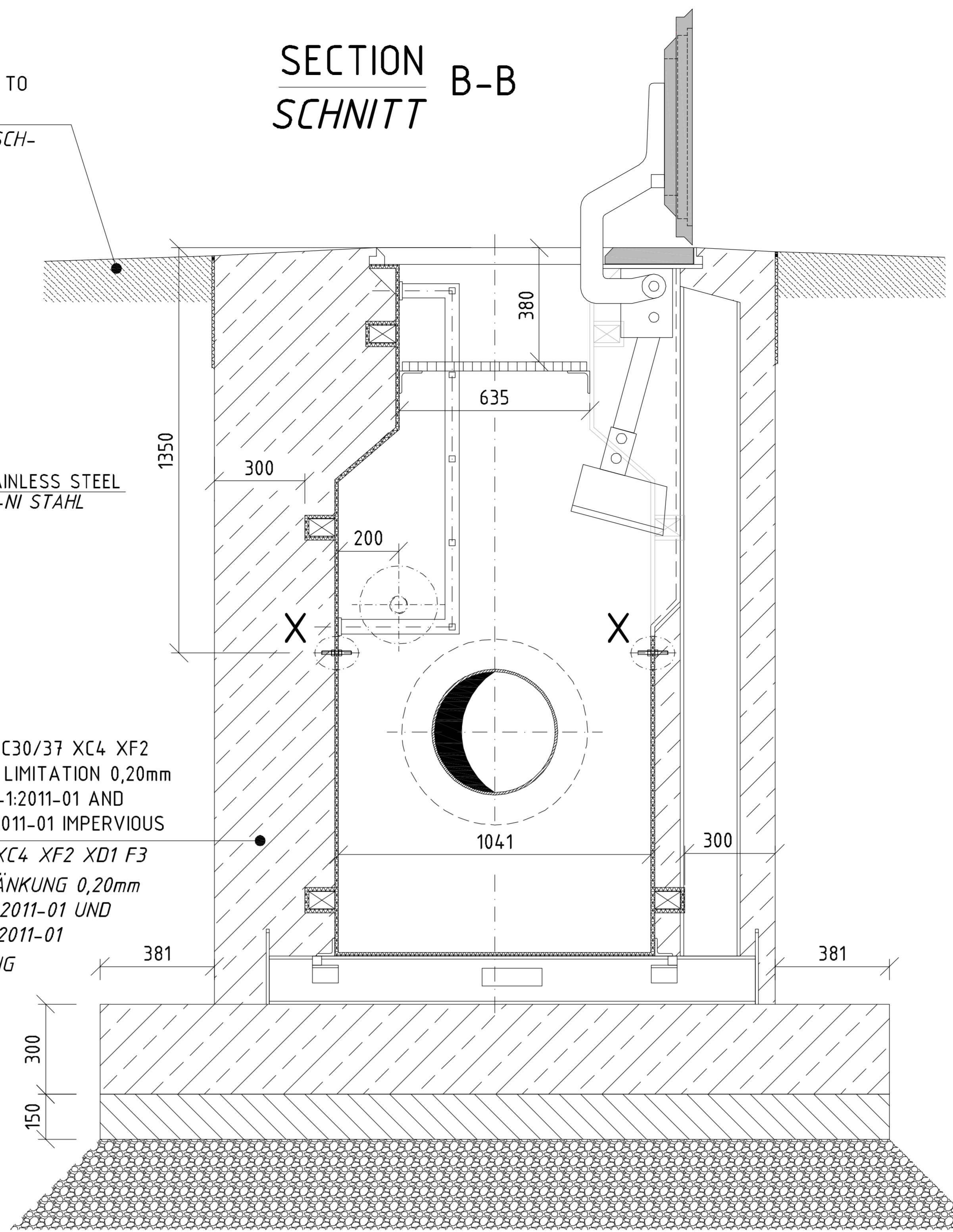
DETAIL "X"  
GROUNDING CONNECTION  
ERDUNGSANSCHLUSS  
NOT TO SCALE  
OHNE MASSTAB



REINFORCED CONCRETE C30/37 XC4 XF2 XD1 F3 Dmax.16 CRACK LIMITATION 0,20mm ACC. TO DIN EN 1992-1-1:2011-01 AND DIN EN 1992-1-1 / NA:2011-01 IMPERVIOUS  
STAHLBETON C30/37 XC4 XF2 XD1 F3 Dmax.16 RISSEBESCHRÄNKUNG 0,20mm NACH DIN EN 1992-1-1:2011-01 UND DIN EN 1992-1-1 / NA:2011-01 WASSERUNDURCHLÄSSIG

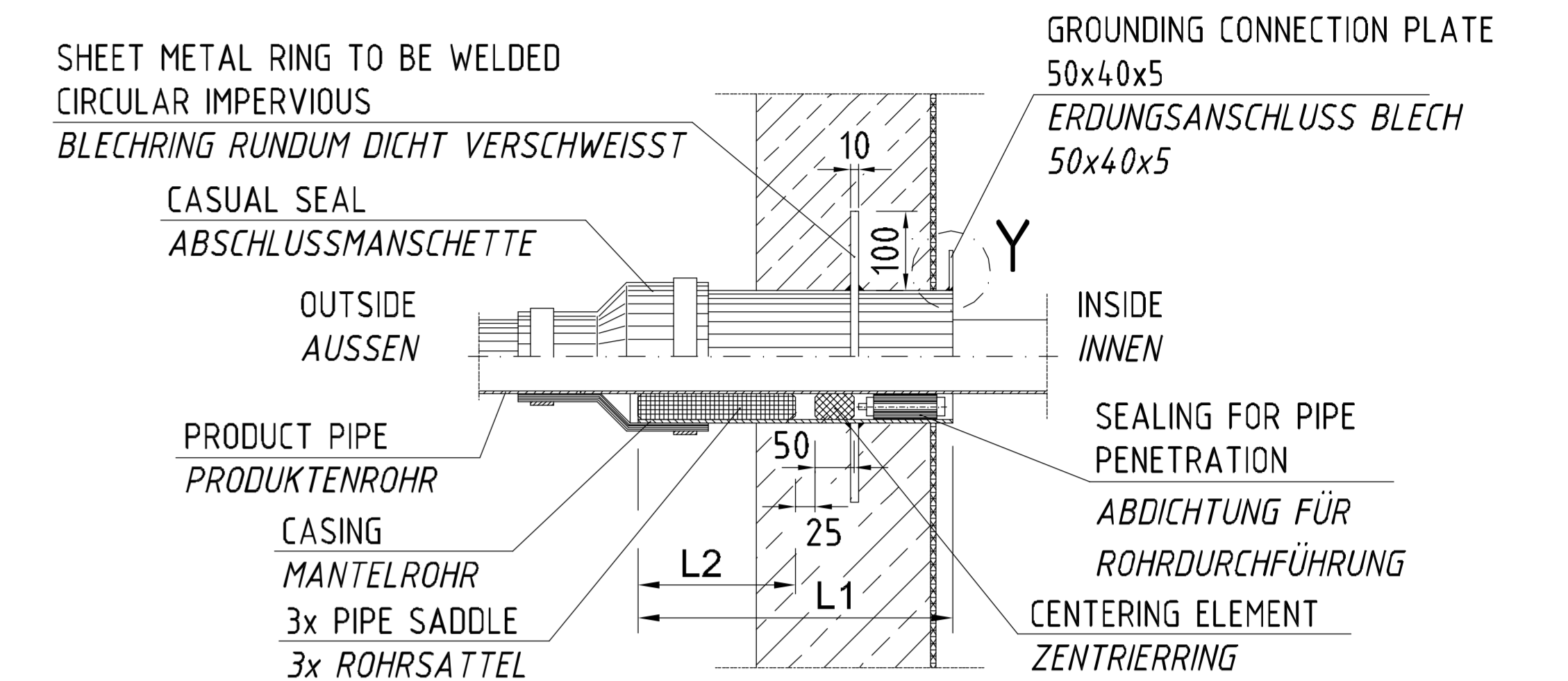
IMPROVED SUBGRATE (CONCRETE C12/15 X0) ACC. TO DIN EN 1992-1-1:2011-01 AND DIN EN 1992-1-1 / NA:2011-01  
SAUBERKEITSSCHICHT (BETON C12/15 X0) ACC. TO DIN EN 1992-1-1:2011-01 UND DIN EN 1992-1-1 / NA:2011-01

SECTION B-B  
SCHNITT B-B



PIPE PENETRATION  
ROHRDURCHFÜHRUNG

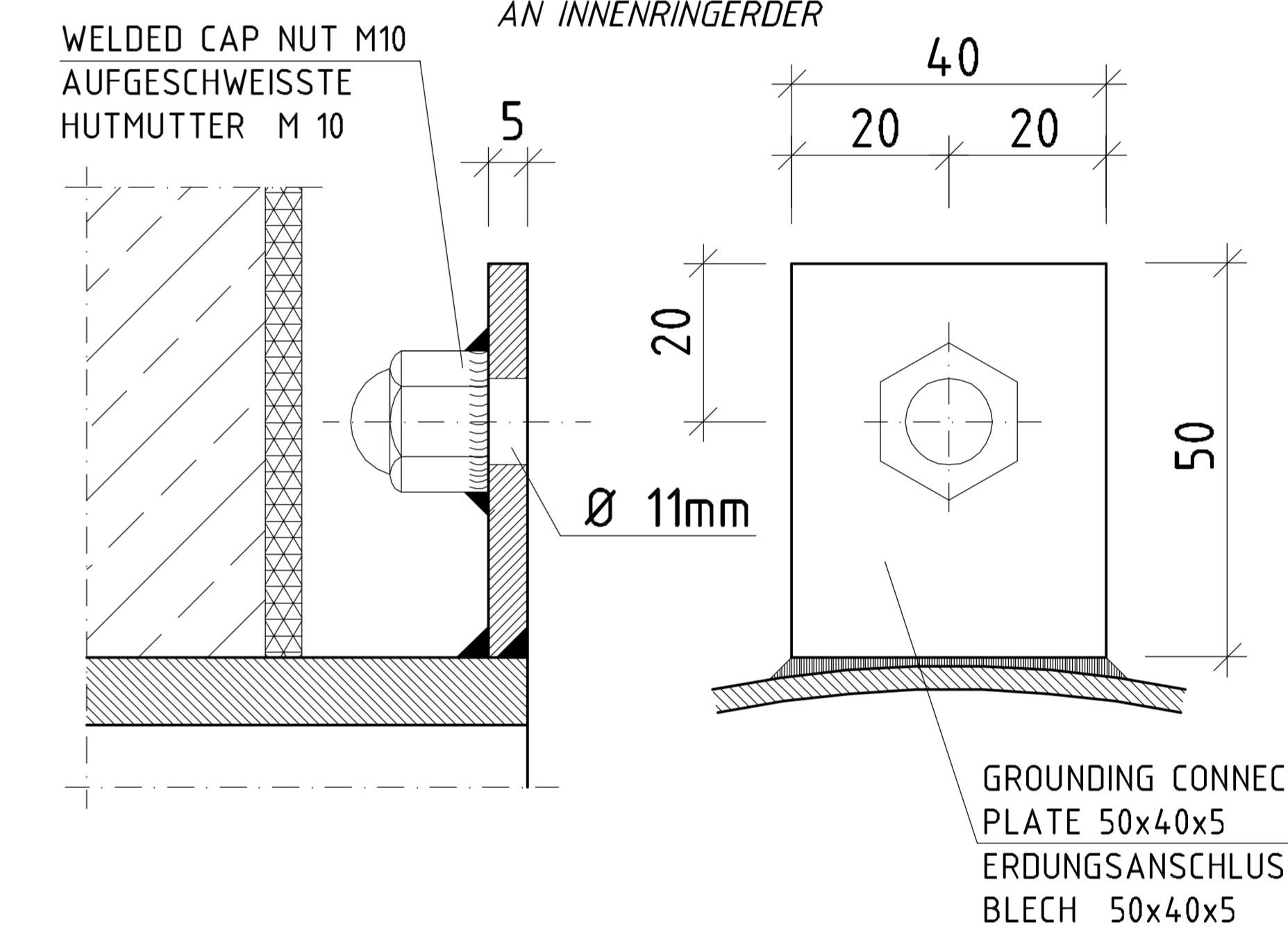
NOT TO SCALE / OHNE MASSTAB



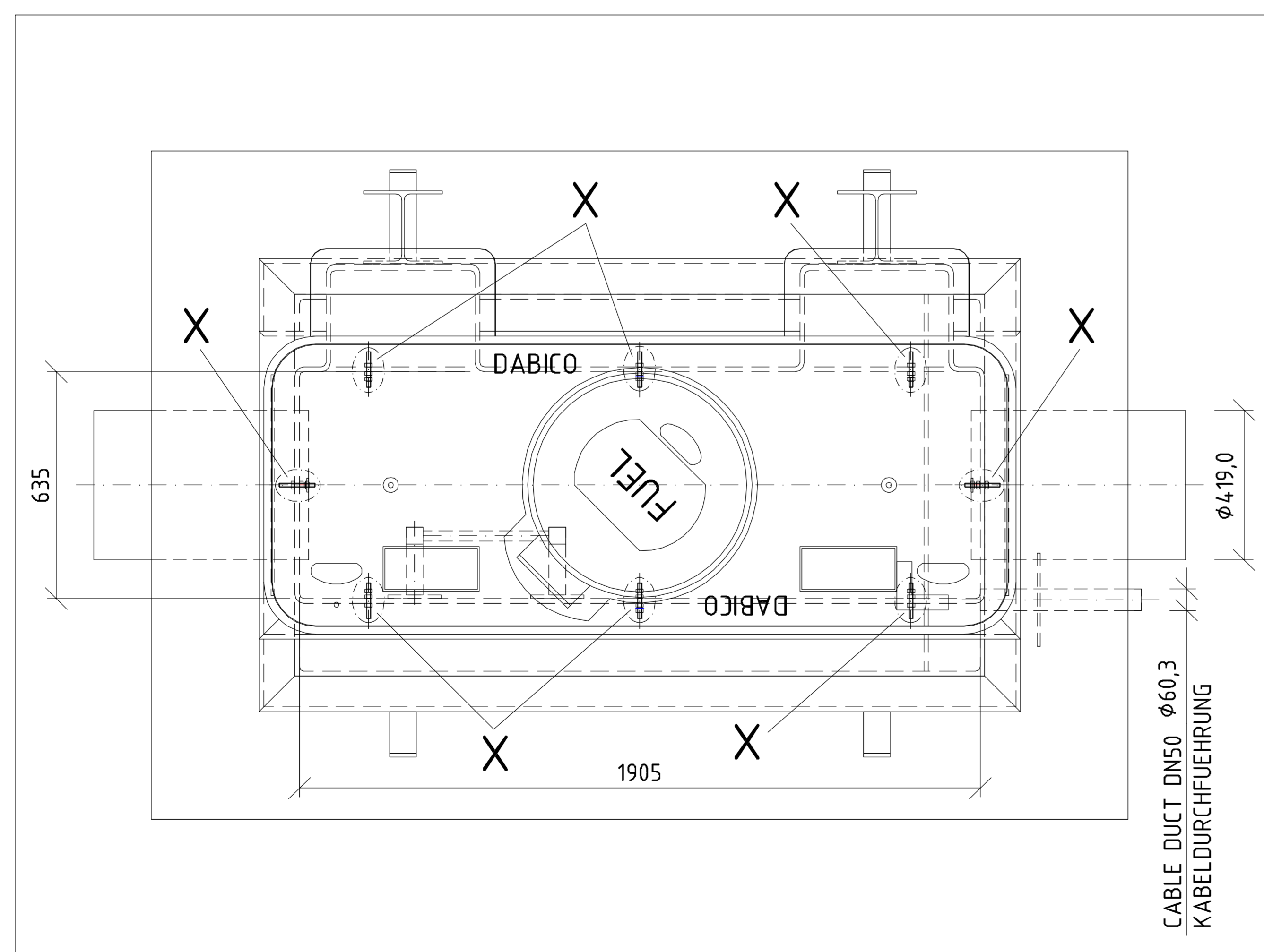
PRODUCT PIPE ROHRLEITUNG	PRODUCT PIPE PRODUKTENROHR mm	CASING MANTELROHR mm	L1 mm	L2 mm
DN300	Ø323,9	Ø419,0	600	250
CABLE DUCT / KABELDURCHFÜHRUNG		Ø60,3	450	

DETAIL "Y"

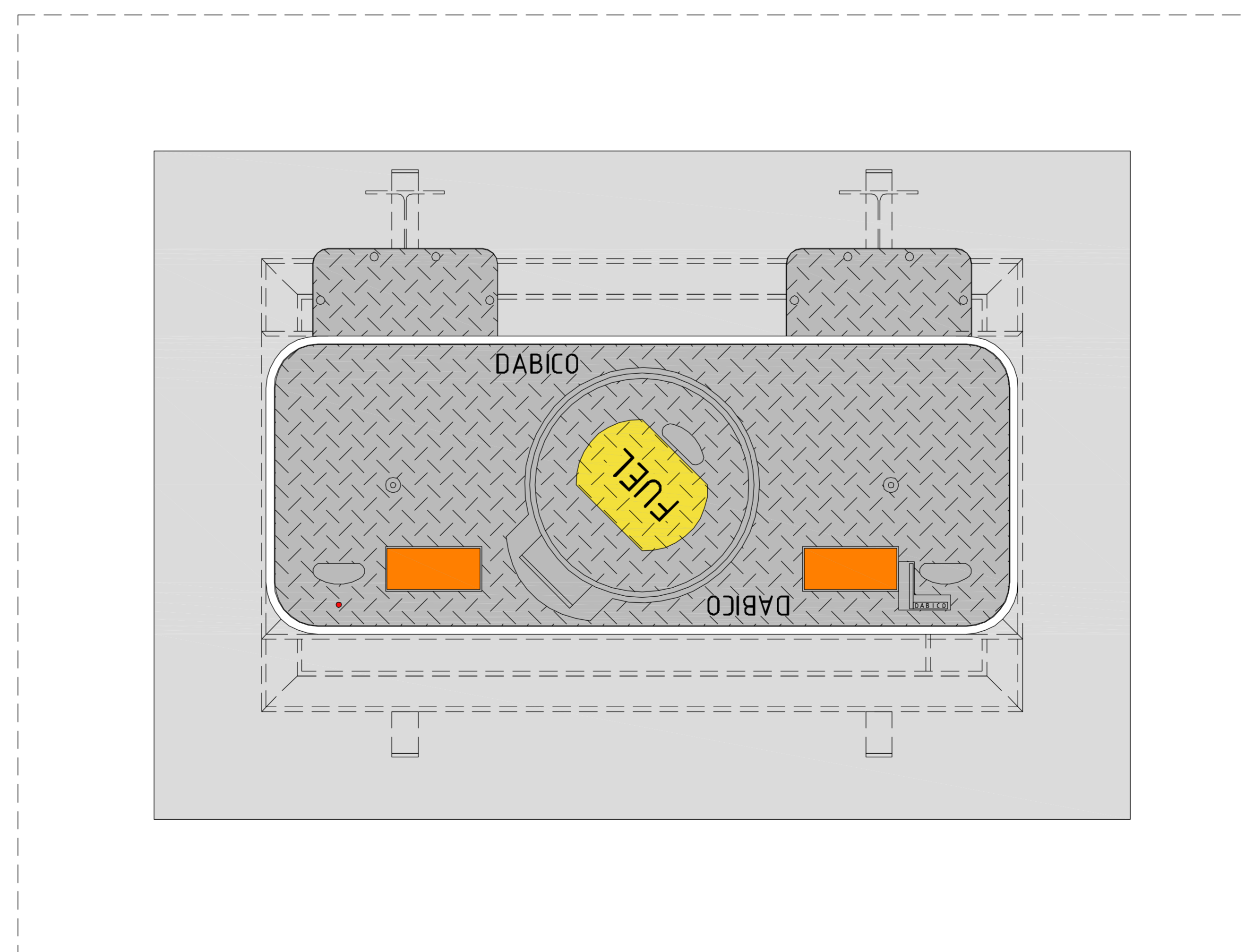
GROUNDING CONNECTION CASING ON INTERNAL RING GROUNDING INSTALLATION  
ERDUNGSANSCHLUSS MANTELROHR AN INNENRINGERDER



TOP VIEW  
DRAUFSICHT



TOP VIEW  
DRAUFSICHT



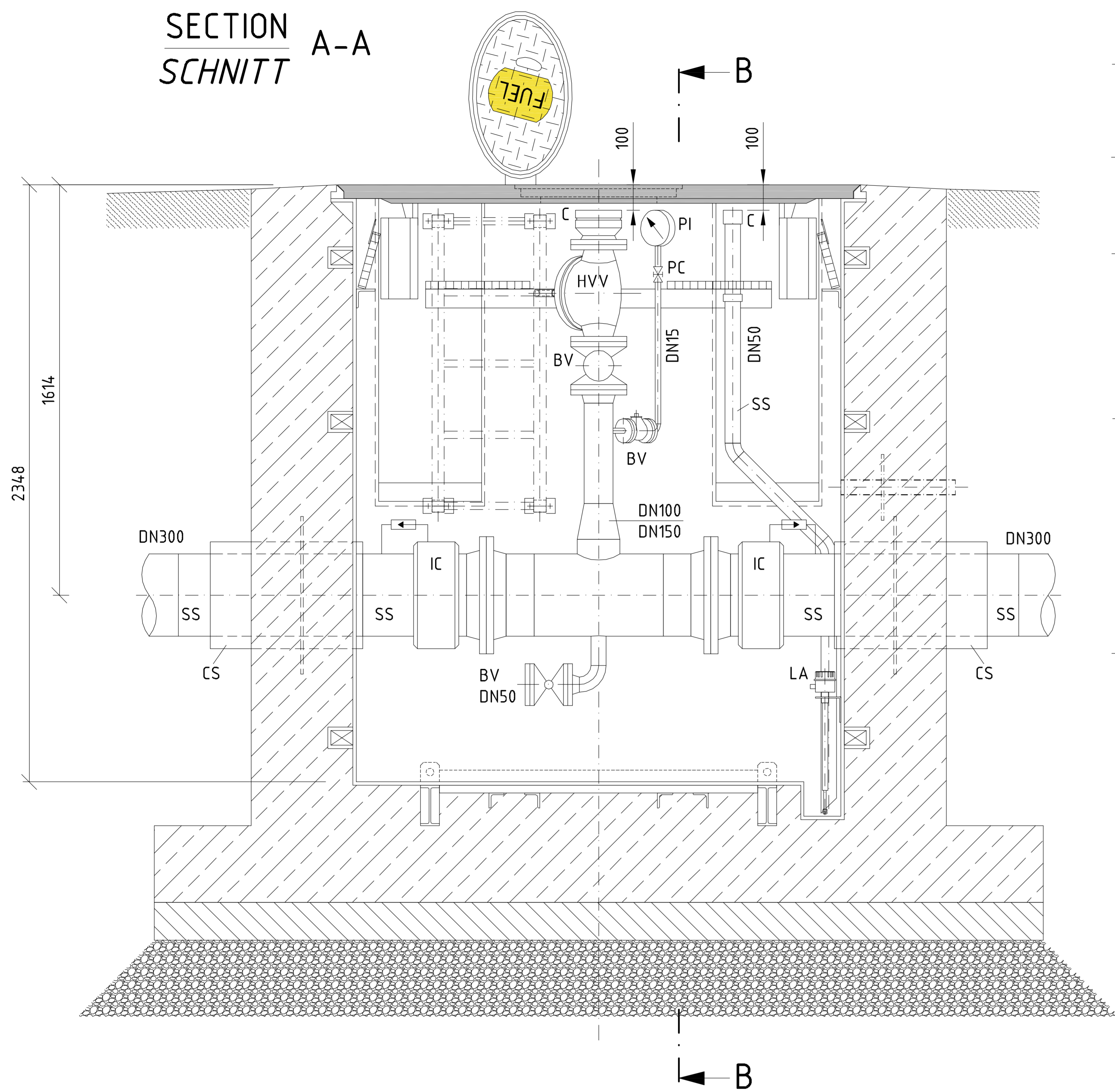
PERTINENT DRAWINGS  
ZUGEHÖRIGE ZEICHNUNGEN

E-14.1 GROUNDING AND LIGHTNING PROTECTION PLAN  
ERDUNGS- UND BLITZSCHUTZPLAN

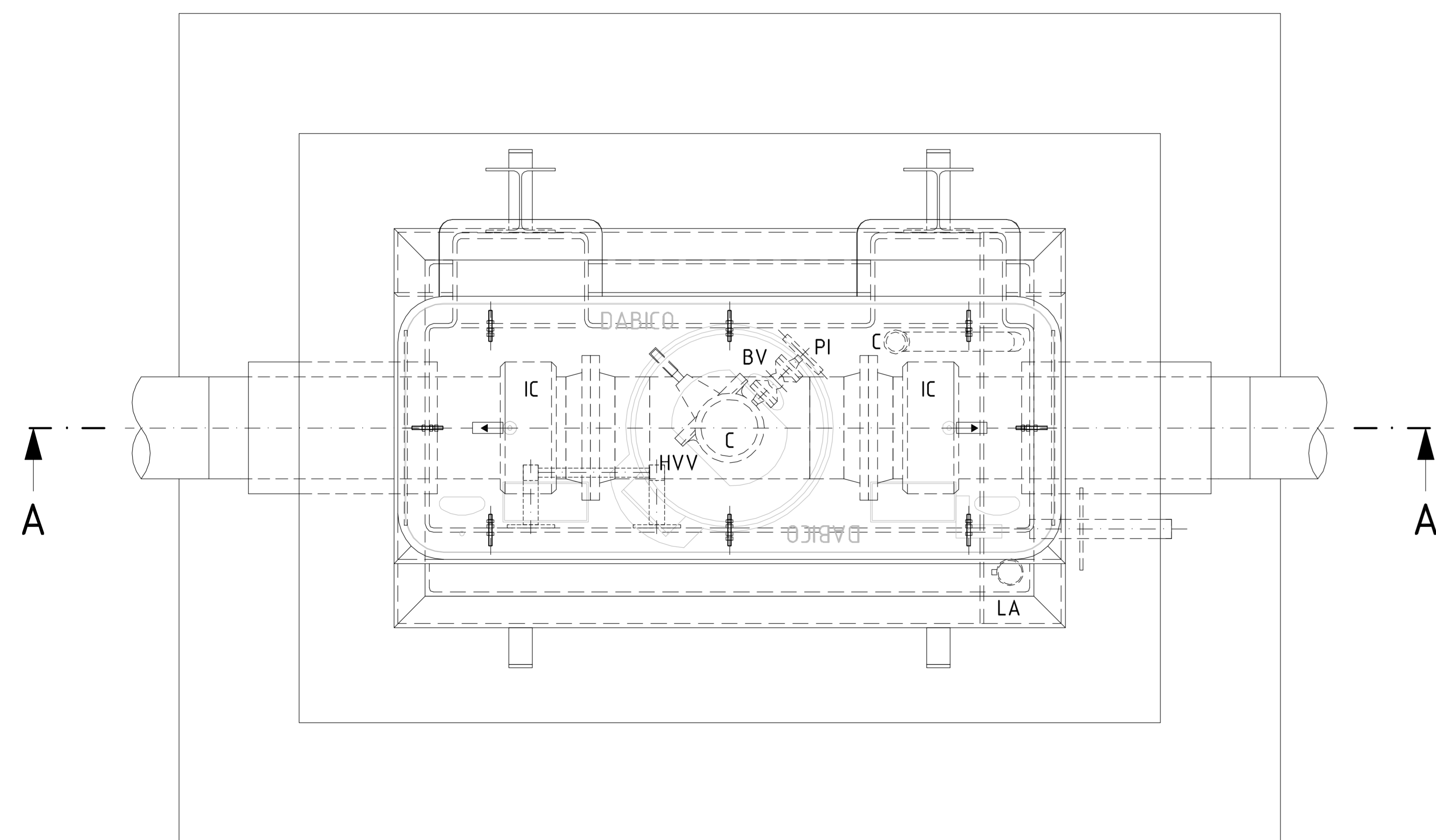
REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
HEADQUARTERS UNITED STATES AIR FORCES EUROPE ENGINEERING & OPERATIONS				
AIRFIELD STANDARD DESIGN US JET FUEL STORAGE AND DISPENSING SYSTEMS		FLUGPLATZ STANDARDPLANUNG US FLUGKRAFTSTOFF - VERSORGSANLAGEN		
BUILDING BAUWERK HYDRANT PIT TYPE II (IN THE APRON) HYDRANTENSCHACHT TYP II (IN DER FLÄCHE)				
DESIGNATION BEZEICHNUNG CONSTRUCTIONS PLAN BAUKONSTRUKTIONSPLAN				
WORKED/BEARBEITET	PREPARED/AUFGESTELLT	APPROVED/GEPRÜFT		
	LANDRECHTES LIEGENSCHAFTS UND BAURECHTIGES LIEGENSCHAFTS LAYOUT L B B	AMT FÜR BUNDESBAU WALLSTR.1 55122 MAINZ		
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAU MASSNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED GEPRÜFT	DATE DATUM	6. MAI 2015	SCALE MASSTAB	1:10
ORIGINAL DRAWN BY ENTWURFEN VON			STANDARD SHEET STANDARD PLAN	
DESIGNER ENTWURF			CAD-PROJECT FILE AUTOCAD-DRAWING	C-14.1
CONSTRUCTION PROJECT BAU MASSNAHME			SHEET NO. BLATT NR.	OF VON



SECTION A-A  
SCHNITT A-A



TOP VIEW  
DRAUFSICHT



NOTES  
BEMERKUNG

THE DIAMETER OF PROTECTION PIPE MAY VARY IN DEPENDENCE OF MANUFACTURER'S SYSTEM.

DIE ANGEGEBENEN SCHUTZROHRENDIAMETER KÖNNEN HERSTELLER-SPEZIFISCH VARIIEREN.

ALL VALVES AND FLANGES DESIGNED FOR PN 16  
ALLE ARMATUREN UND FLANSCHGELEGTE FÜR PN 16

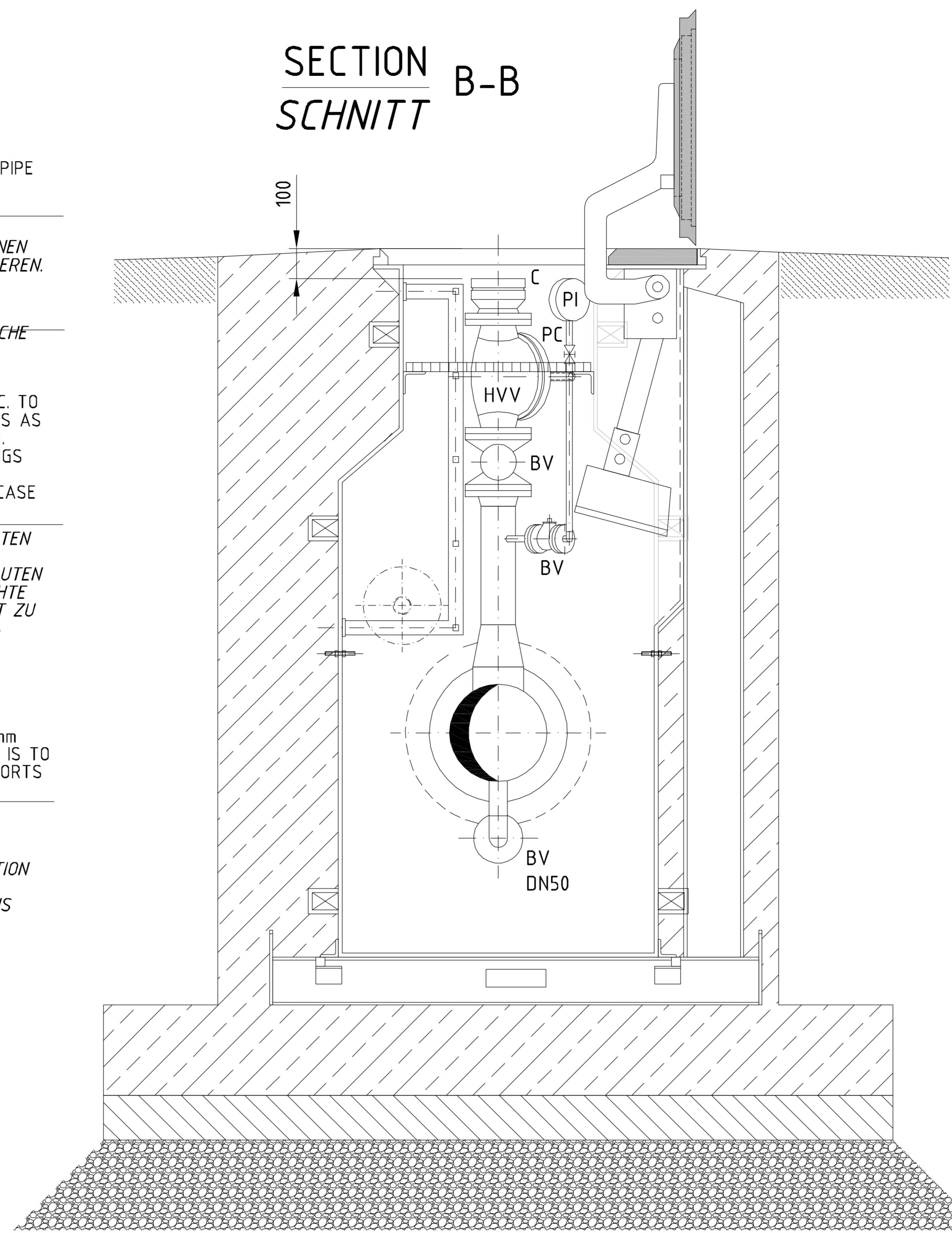
OPENINGS IN THE GRATINGS ACC. TO THE MECHANICAL INSTALLATIONS AS SELECTED BY THE CONTRACTOR. EASY REMOVAL OF THE GRATINGS SHALL BE GUARANTEED, THE GRATINGS NEXT TO THE STAIRCASE HAVE TO BE DROP-TYPE

ÖFFNUNGEN IN DEN GITTERROSTEN ENTSPRECHEND DEN MASCHINENTECHNISCHEN EINBAUTEN NACH WAHL DES AN DER LEICHTE AUSBAU DER GITTERROSTE IST ZU GEWÄHRLEISTEN IM EINSTIEGSBEREICH SIND DIE RÖSTE KLAPPBAR AUSZUFÜHREN

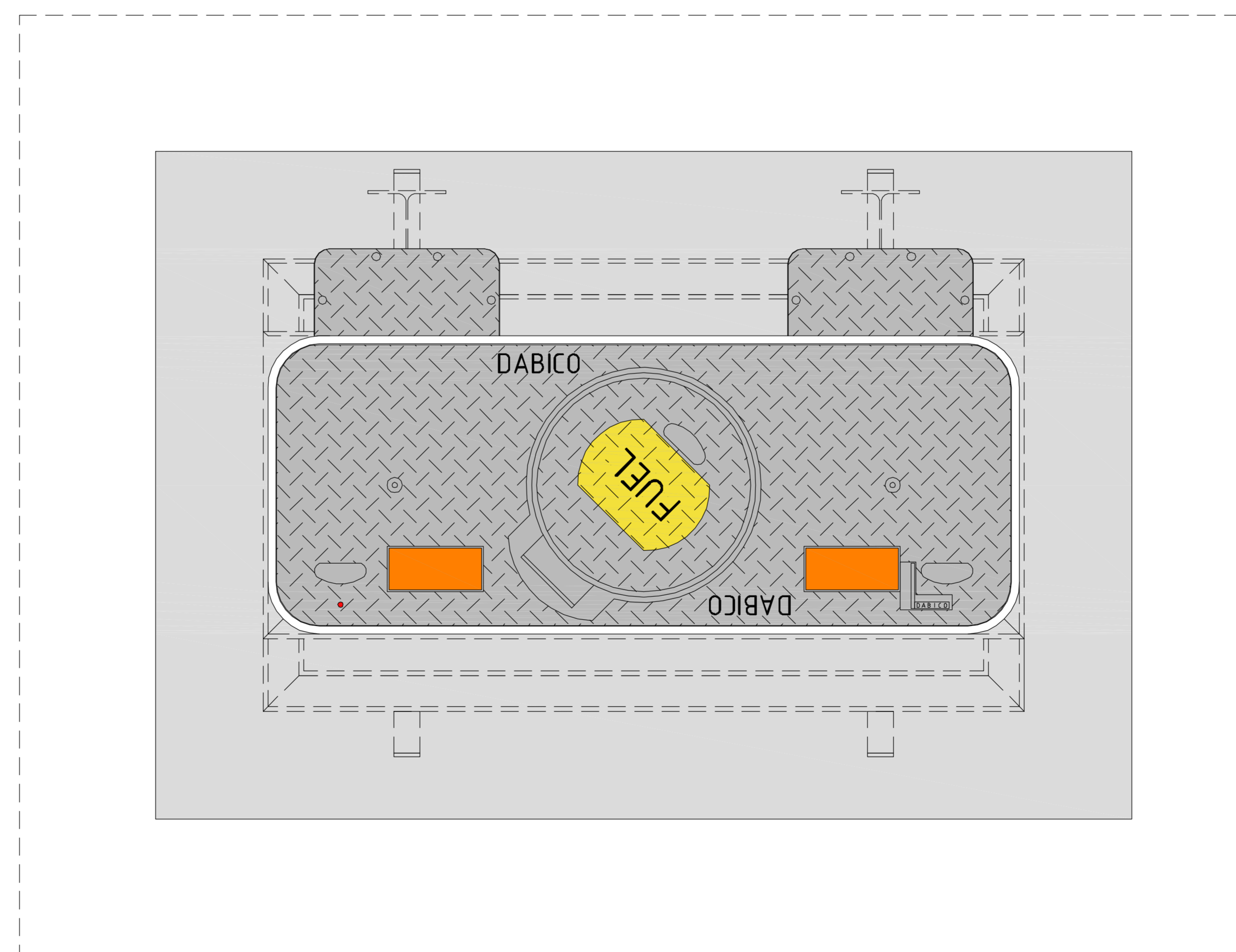
FOR SUPPORTS OF PIPES AN INSULATION PIECE, MADE OF 10mm THICK FUEL RESISTANT PLASTIC, IS TO PUT BETWEEN PIPES AND SUPPORTS OR HOLDERS.

BEI UNTERSTÜTZUNGEN VON ROHRLEITUNGEN IST ZWISCHEN ROHRLEITUNG UND UNTERSTÜTZUNGSKONSTRUKTION BZW. HALTERUNG EINE ISOLIERPLATTE 10mm DICK AUS KRAFTSTOFFBESTÄNDIGEN KUNSTSTOFF, ZU LEGEN.

SECTION B-B  
SCHNITT B-B

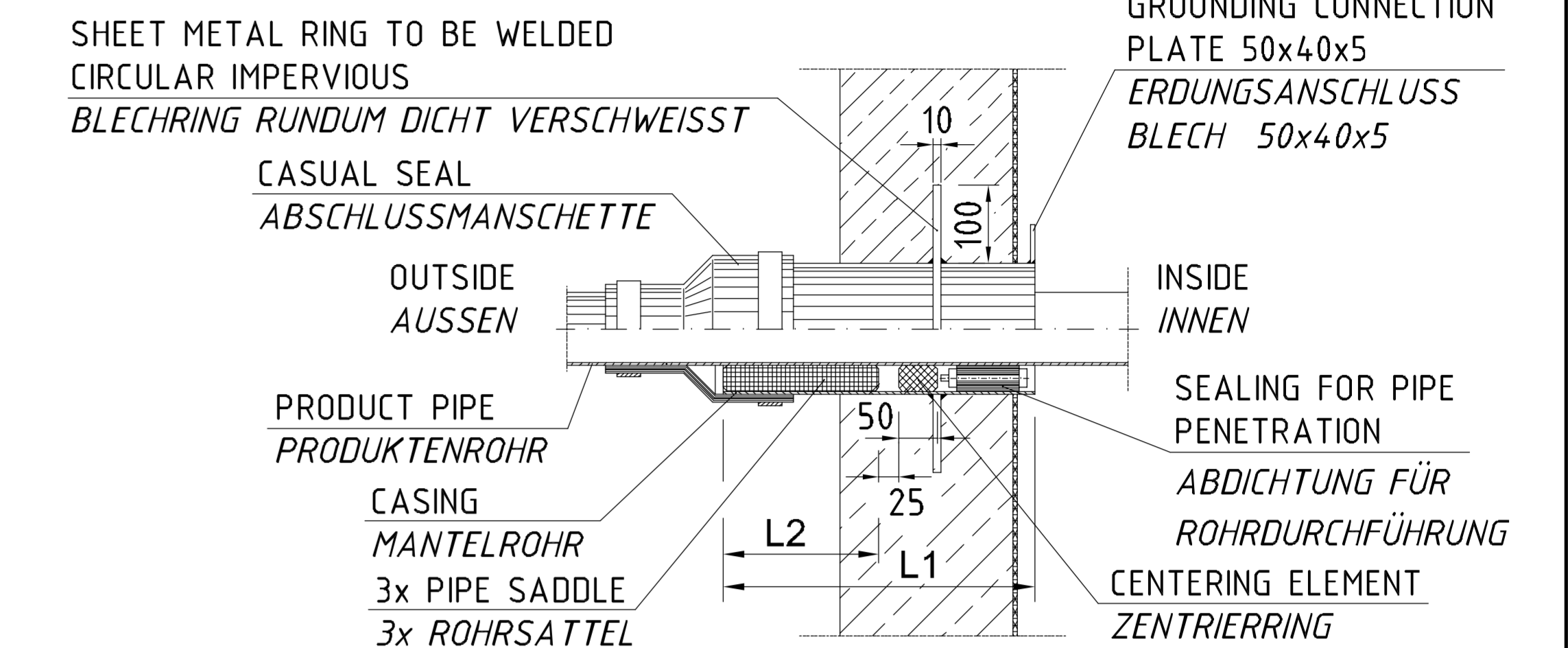


TOP VIEW  
DRAUFSICHT



PIPE PENETRATION  
ROHRDURCHFÜHRUNG

NOT TO SCALE / OHNE MASSSTAB



PRODUCT PIPE ROHRLEITUNG	PRODUCT PIPE PRODUKTENROHR mm	CASING MANTELROHR mm	L1 mm	L2 mm
DN300	ø323,9	ø419,0	600	250

LEGEND  
LEGENDE

- BV BALL VALVE KUGELHAHN
- C QUICK COUPLING STS-M125 SCHNELLKUPPLUNG STS-M125
- HVV HYDRANT VALVE WITH VENTURI CONTROLLER HYDRANTENVENTIL MIT VENTURISTEUERUNG
- IC INSULATING COUPLING WITH EX-PROOF SPARK GAP ISOLIERKUPPLUNG MIT EX-FUNKENSTRECKE
- PC PRESSURE GAUGE STOPCOCK MANOMETERABSERRVENTIL
- PI PRESSURE GAUGE WITH STOPCOCK MANOMETER MIT ABSERRVENTIL
- CS STEEL STAHL
- SS STAINLESS STEEL CR-NI STAHL
- LA LIQUID PROBE FLÜSSIGKEITSSONDE

WARNING !

CATHODIC-PROTECTED FACILITY ! DISCONNECT CATHODIC PROTECTION SYSTEM PRIOR STARTING WORKS ON PIPES ! RE - ACTIVATE PROTECTIVE SYSTEM AS SOON AS WORKS ARE FINISH !

ACHTUNG !

ANLAGE KATHODISCH GESCHÜTZT ! VOR ARBEITEN AM DEN ROHRLEITUNGEN, KATHODISCHE KORROSIONSSCHUTZANLAGE ABSCHALTEN ! NACH BEENDEN DER ARBEITEN SOFORT WIEDER IN BETRIEB NEHMEN !

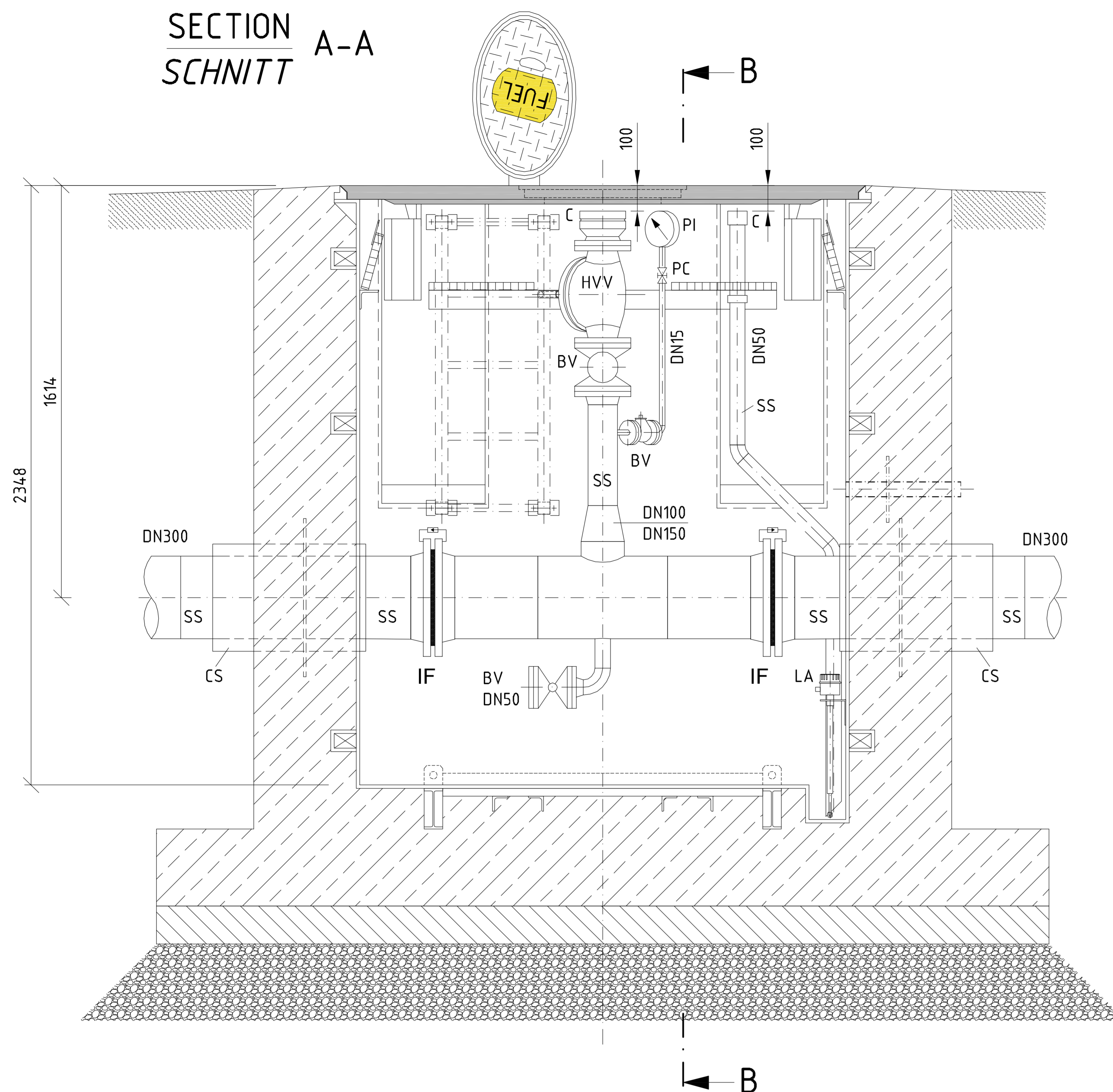
REVISION	DATE	DESCRIPTION	BY	COUNTRY
ÄNDERUNG	DATUM	BESCHREIBUNG	VON	LAND

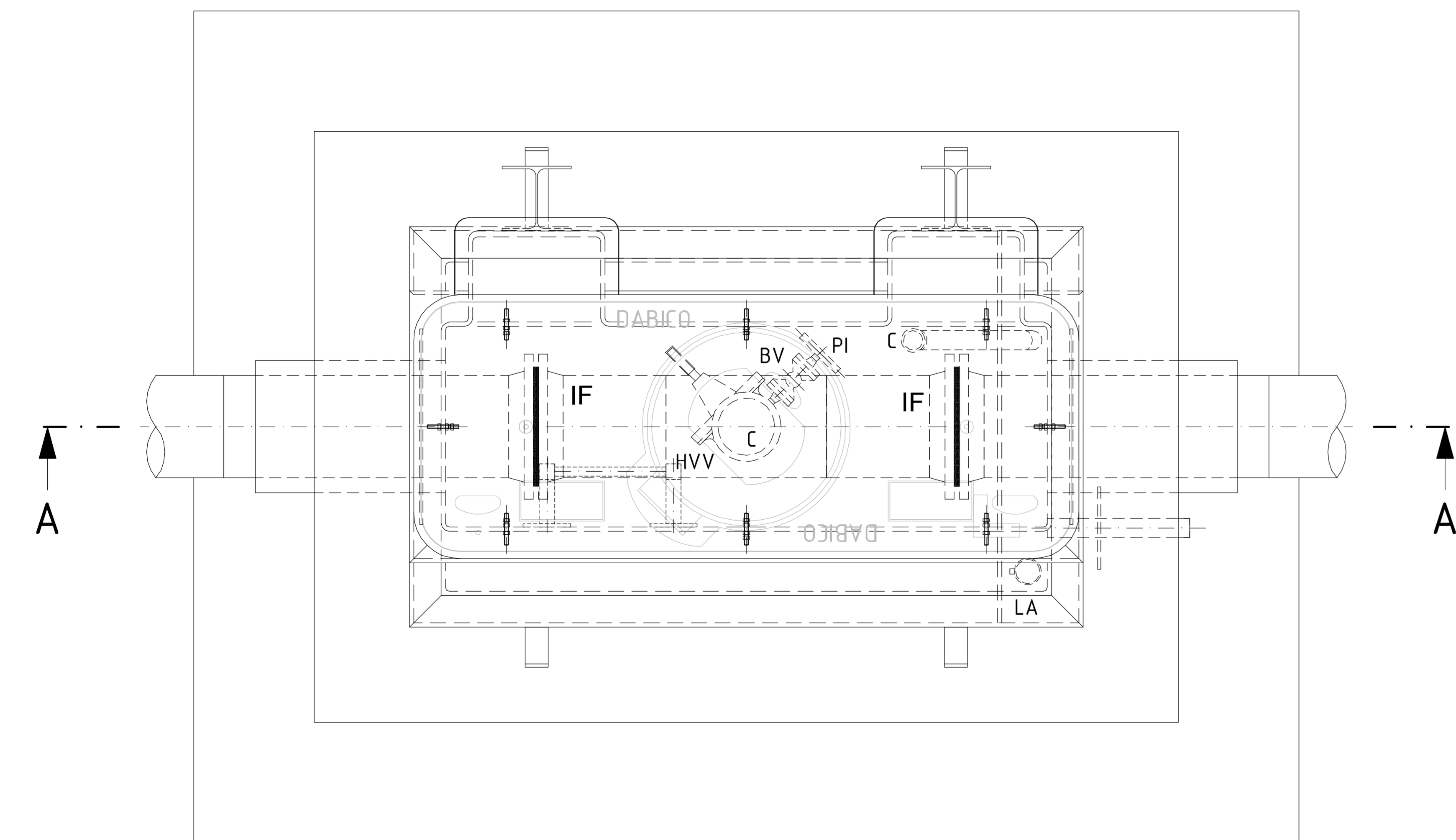
HEADQUARTERS UNITED STATES AIR FORCES EUROPE ENGINEERING & OPERATIONS		
AIRFIELD STANDARD DESIGN US JET FUEL STORAGE AND DISPENSING SYSTEMS	FLUGPLATZ STANDARDPLANUNG US FLUGKRAFTSTOFF- VERSORGENGSANLAGEN	
BUILDING BAUWERK HYDRANT PIT TYPE II (IN THE APRON) HYDRANTENSCHACHT TYP II (IN DER FLÄCHE)		
DESIGNATION: BEZEICHNUNG MECHANICAL INSTALLATION WITH INSULATING COUPLING TOP VIEW AND SECTION A-A, SECTION B-B MASCHINENTECHNISCHE INSTALLATION MIT ISOLIERKUPPLUNG DRAUFSICHT UND SCHNITT A-A, SCHNITT B-B		
WORKED/BEARBEITET	PREPARED/VERFASST	APPROVED/GEPRÜFT
LANSBERGER LERNSCHULE UND BAUBETRIEB LEHRSCHLUSSE LANSBURG L - B - B	AMT FÜR BUNDESBAU WALLSTR.1 55122 MANZ	ORIGINAL ISSUED BY IN ORIGINAL SIZE KOPPIERT
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAU MASSNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)		
APPROVED GEPRÜFT	DATE DATUM 6. MAI 2015	SCALE MASSSTAB 1:10
ORIGINAL ISSUED BY IN ORIGINAL SIZE	STANDARD SHEET STANDARD PLAN	M - 14.1
CONSTRUCTION PROJECT BAU MASSNAHME	SHEET NO. PLATZ NR.	OF VON



SECTION A-A  
SCHNITT A-A



TOP VIEW  
DRAUFSICHT



NOTES  
BEMERKUNG

THE DIAMETER OF PROTECTION PIPE MAY VARY IN DEPENDENCE OF MANUFACTURER'S SYSTEM.

DIE ANGEGEBENEN SCHUTZROHRENWEITEN KÖNNEN HERSTELLER-SPEZIFISCH VARIEREN.

ALL VALVES AND FLANGES DESIGNED FOR PN 16  
ALLE ARMATUREN UND FLANSCHEN AUSGELEGT FÜR PN 16

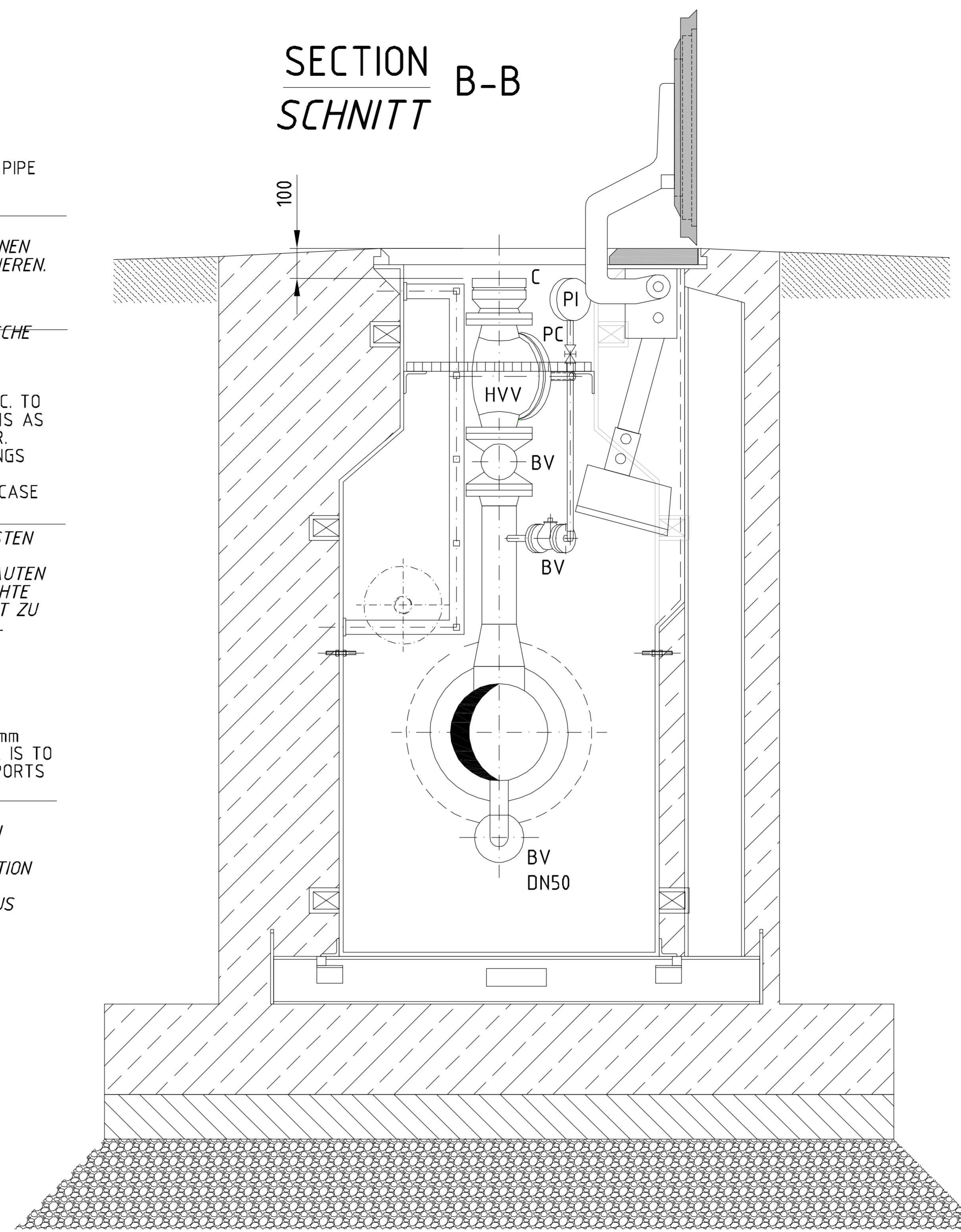
OPENINGS IN THE GRATINGS ACC. TO THE MECHANICAL INSTALLATIONS AS SELECTED BY THE CONTRACTOR. EASY REMOVAL OF THE GRATINGS SHALL BE GUARANTEED. THE GRATINGS NEXT TO THE STAIRCASE HAVE TO BE DROP-TYPE

ÖFFNUNGEN IN DEN GITTERRÖSTEN ENTSPRECHEND DEN MASCHINENTECHNISCHEN EINBAUTEN NACH WAHL DES AN DER LEICHTE AUSBAU DER GITTERRÖSTE IST ZU GEWAHRLEISTEN IM EINSTIEGSBEREICH SIND DIE RÖSTE KLAPPBAR AUSZUFÜHREN

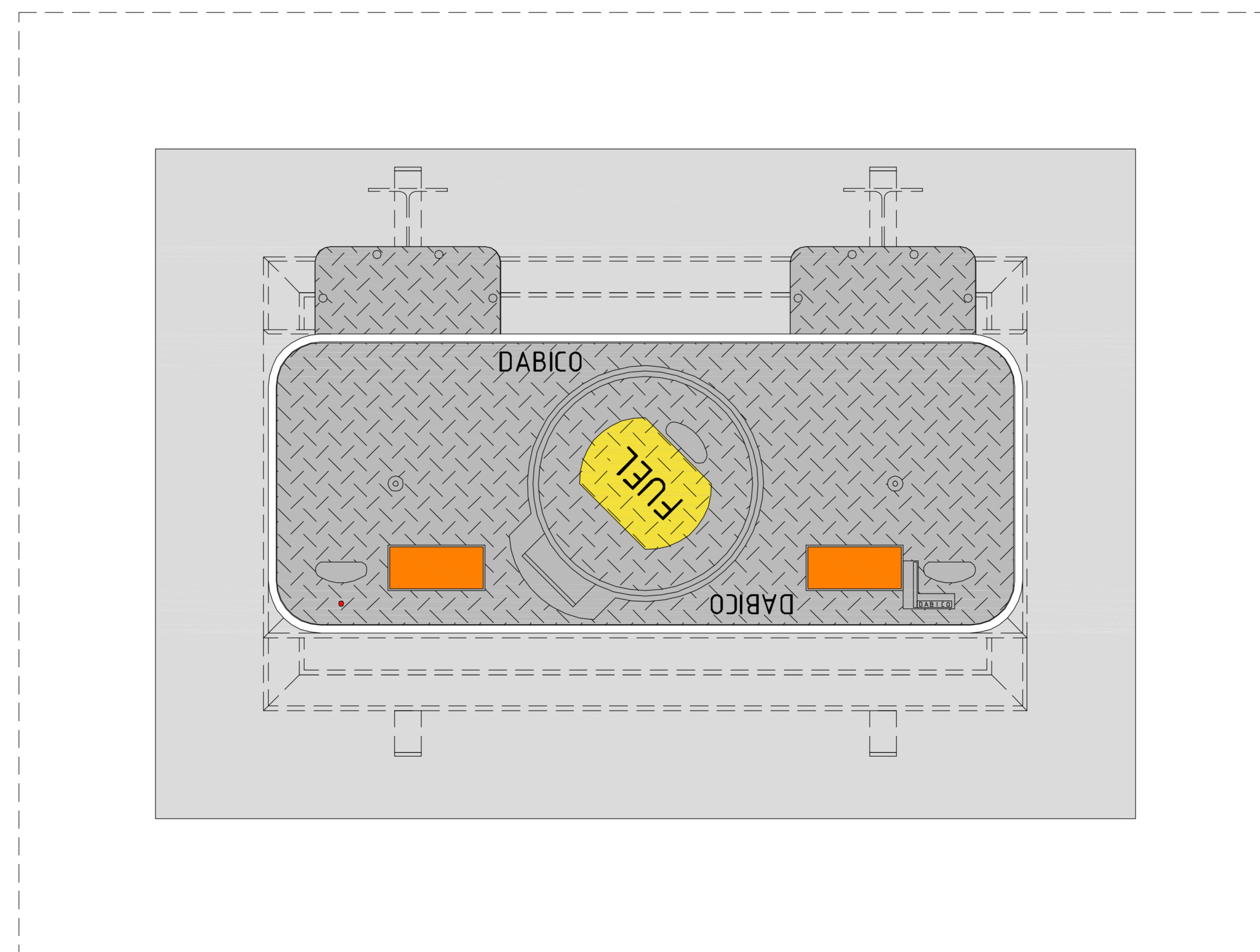
FOR SUPPORTS OF PIPES AN INSULATION PIECE, MADE OF 10mm THICK FUEL RESISTANT PLASTIC, IS TO PUT BETWEEN PIPES AND SUPPORTS OR HOLDERS.

BEI UNTERSTÜTZUNGEN VON ROHRLEITUNGEN IST ZWISCHEN ROHRLEITUNG UND UNTERSTÜTZUNGSKONSTRUKTION BZW. HALTERUNG EINE ISOLIERPLATTE 10mm DICK AUS KRAFTSTOFFBESTÄNDIGEN KUNSTSTOFF ZU LEGEN.

SECTION B-B  
SCHNITT B-B

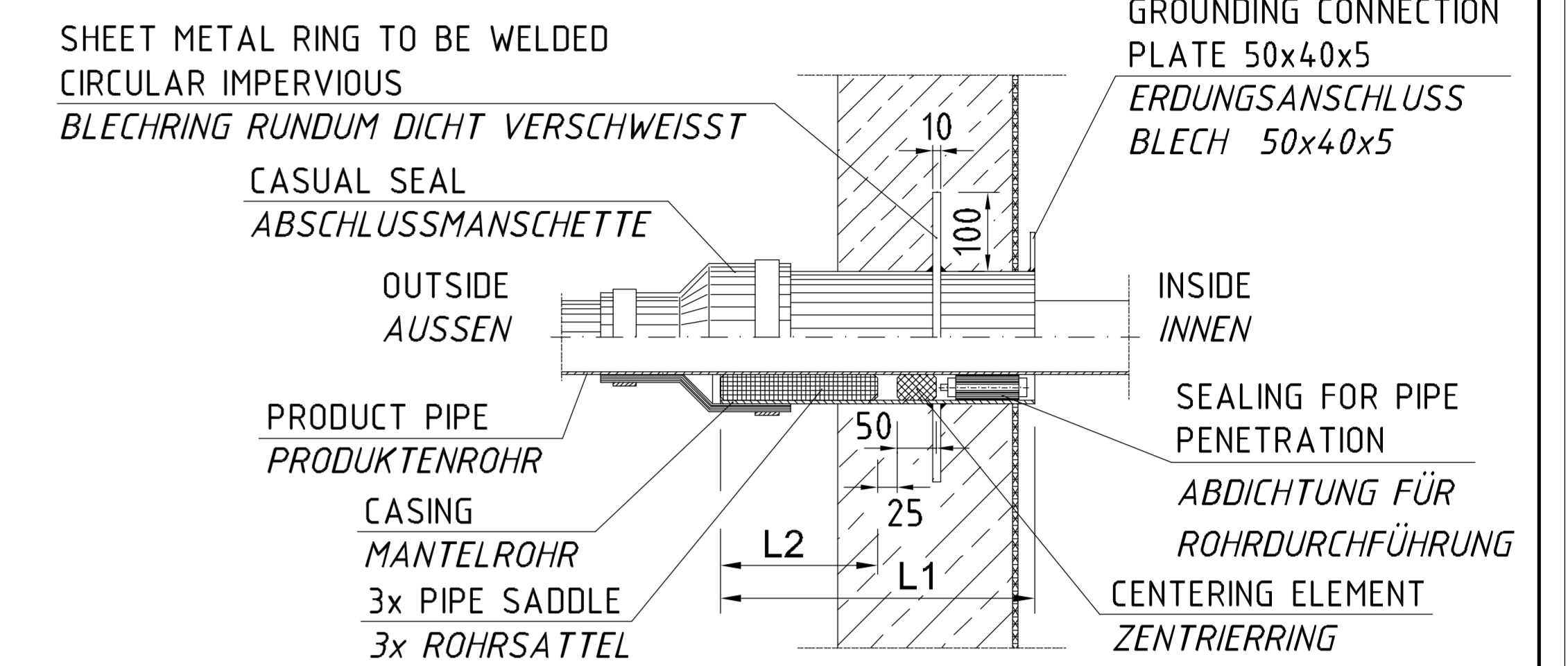


TOP VIEW  
DRAUFSICHT



PIPE PENETRATION  
ROHRDURCHFÜHRUNG

NOT TO SCALE / OHNE MASSTAB



PRODUCT PIPE ROHRLEITUNG	PRODUCT PIPE PRODUKTENROHR	CASING MANTELROHR	L1 mm	L2 mm
DN300	Ø323,9	Ø419,0	600	250

LEGEND  
LEGENDE

- BV BALL VALVE  
KUGELHAHN
- C QUICK COUPLING STS-M125  
SCHNELLKUPPLUNG STS-M125
- HVV HYDRANT VALVE WITH VENTURI CONTROLLER  
HYDRANTENVENTIL MIT VENTURISTEUERUNG
- IF INSULATING FLANGE WITH EX-PROOF SPARK GAP  
ISOLIERFLANSCH MIT EX-FUNKENSTRECKE
- PC PRESSURE GAUGE STOPCOCK  
MANOMETERABSPERRVENTIL
- PI PRESSURE GAUGE WITH STOPCOCK  
MANOMETER MIT ABSPERRVENTIL
- CS STEEL  
STAHL
- SS STAINLESS STEEL  
CR-NI STAHL
- LA LIQUID PROBE  
FLÜSSIGKEITSSONDE

WARNING !

CATHODIC-PROTECTED FACILITY !  
DISCONNECT CATHODIC PROTECTION SYSTEM PRIOR STARTING WORKS ON PIPES !  
RE - ACTIVATE PROTECTIVE SYSTEM AS SOON AS WORKS ARE FINISH !

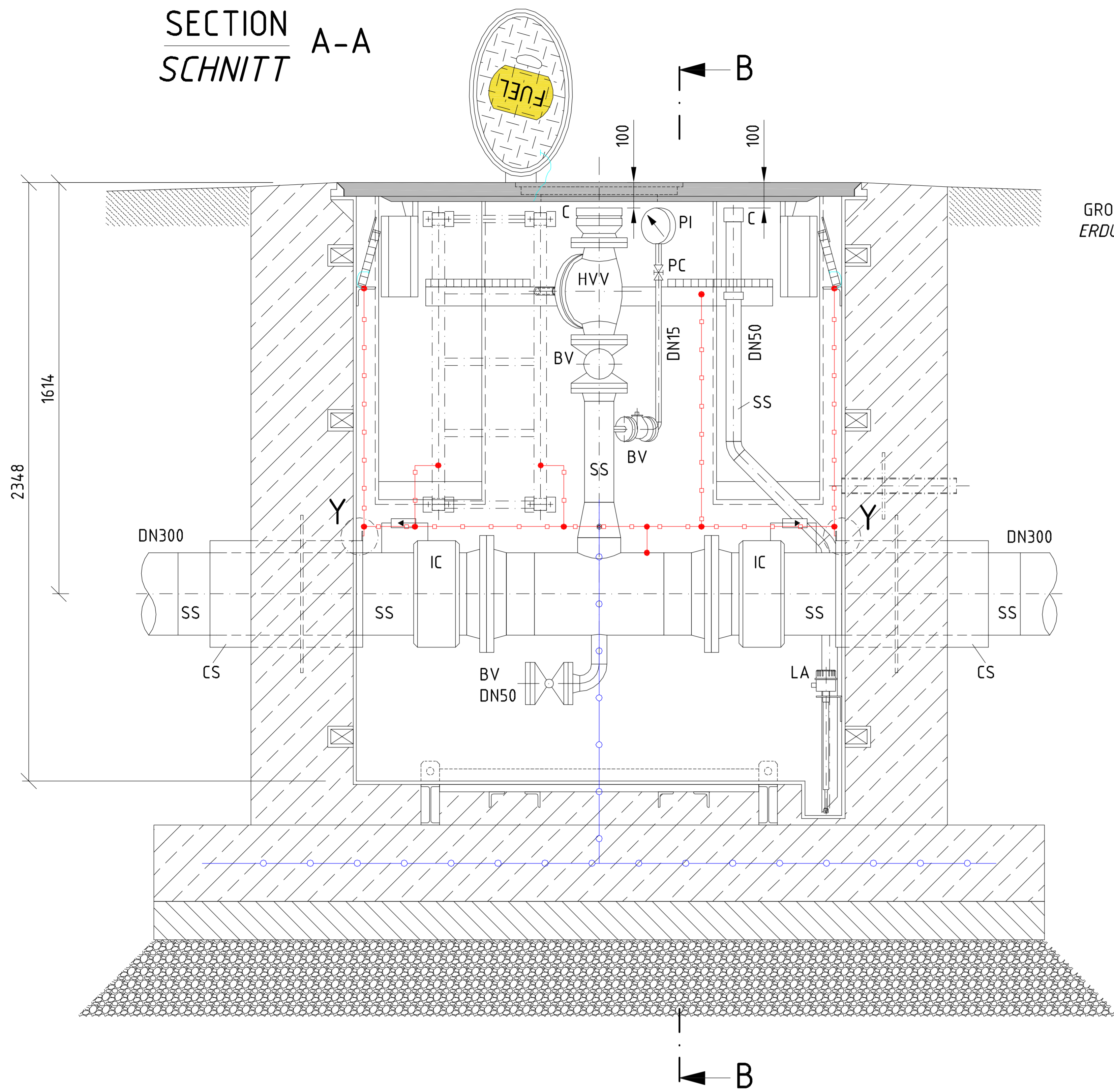
ACHTUNG !

ANLAGE KATHODISCH GESCHÜTZT !  
VOR ARBEITEN AM DEN ROHRLEITUNGEN, KATHODISCHE KORROSIONSSCHUTZANLAGE ABSCHALTEN !  
NACH BEENDEN DER ARBEITEN SOFORT WIEDER IN BETRIEB NEHMEN !

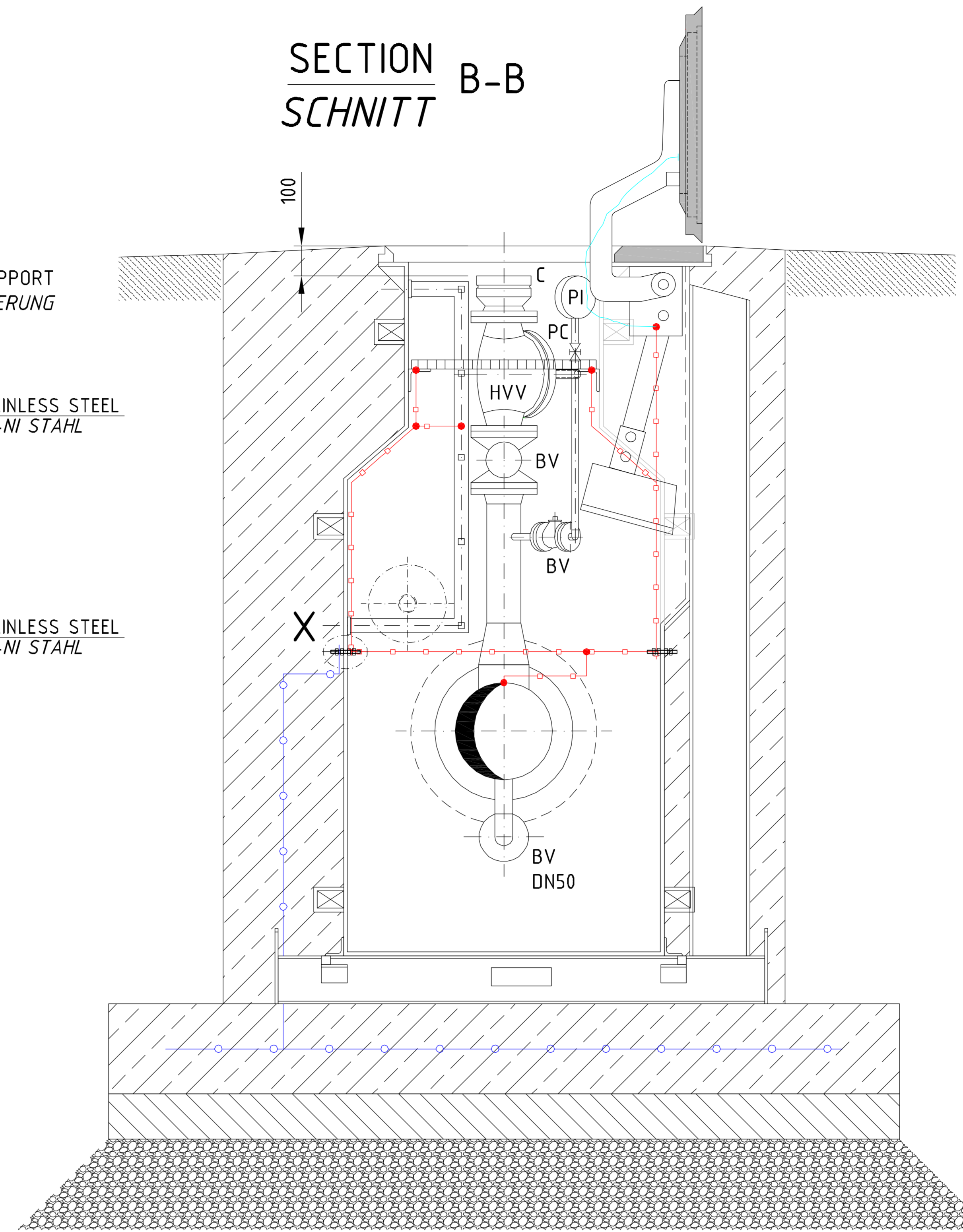
REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
HEADQUARTERS UNITED STATES AIR FORCES EUROPE				
ENGINEERING & OPERATIONS				
AIRFIELD STANDARD DESIGN US			FLUGPLATZ STANDARDPLANUNG US	
JET FUEL STORAGE AND DISPENSING SYSTEMS			FLUGKRAFTSTOFF - VERSORGUNGSANLAGEN	
BUILDING BAUWERK HYDRANT PIT TYPE II (IN THE APRON) HYDRANTENSCHACHT TYP II (IN DER FLÄCHE)				
DESIGNATION: BEZEICHNUNG MECHANICAL INSTALLATION WITH INSULATING FLANGE TOP VIEW AND SECTION A-A, SECTION B-B MASCHINENTECHNISCHE INSTALLATION MIT ISOLIERFLANSCH DRAUFSICHT UND SCHNITT A-A, SCHNITT B-B				
WORKED/BEARBEITET		PREPARED/VERFASST	APPROVED/GEHEBET	
LANSBERGER BERGSCHEITEL- UND BAUREITUNG LWS-WERKSTÄTTE LANS		L B B	AMT FÜR BUNDESBAU WALLSTR.1 55122 MARZ	
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAU MASSNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED GEHEBET	DATE DATUM	6. MAI 2015	SCALE MASSTAB	1:10
ORIGINAL ISSUED BY IN ORIGINAL DED.			STANDARD SHEET STANDARD PLAN	
CONSTRUCTION PROJECT BAU MASSNAHME			M - 14.1 SHEET NO. PLATZ NR.	



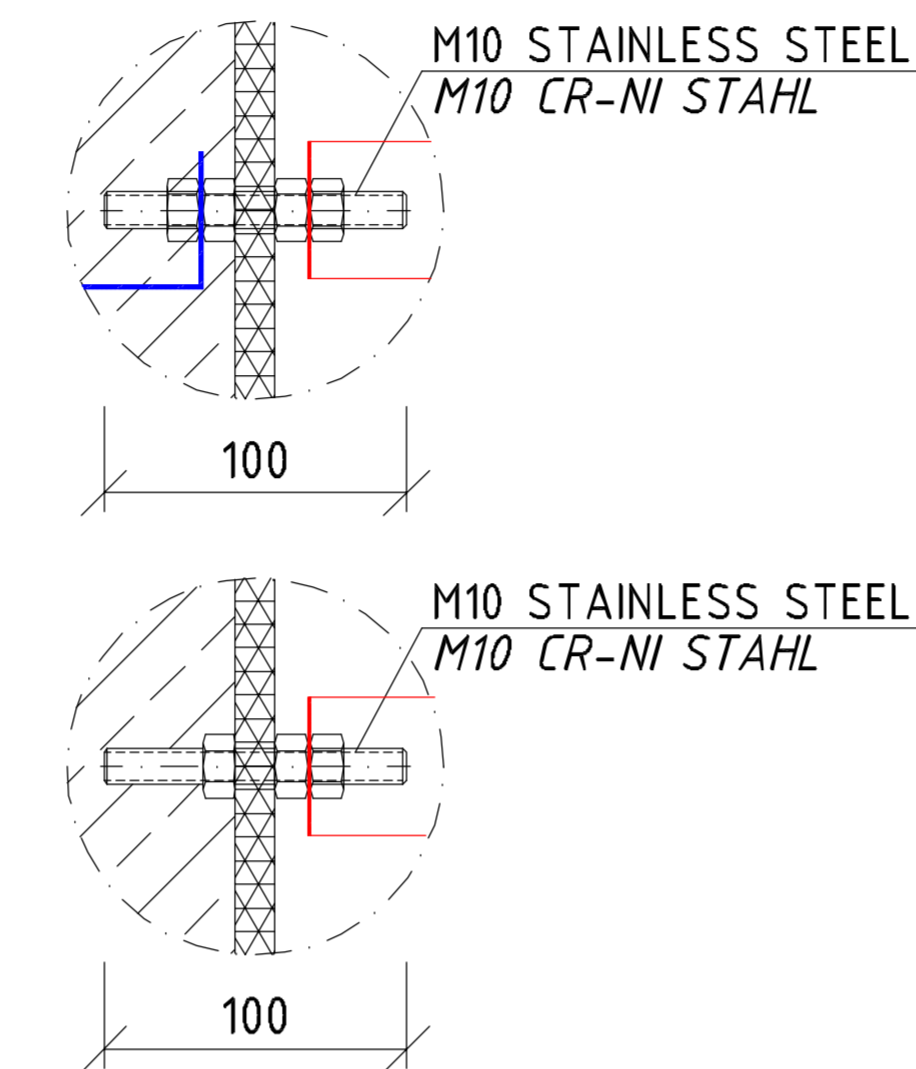
SECTION A-A  
SCHNITT A-A



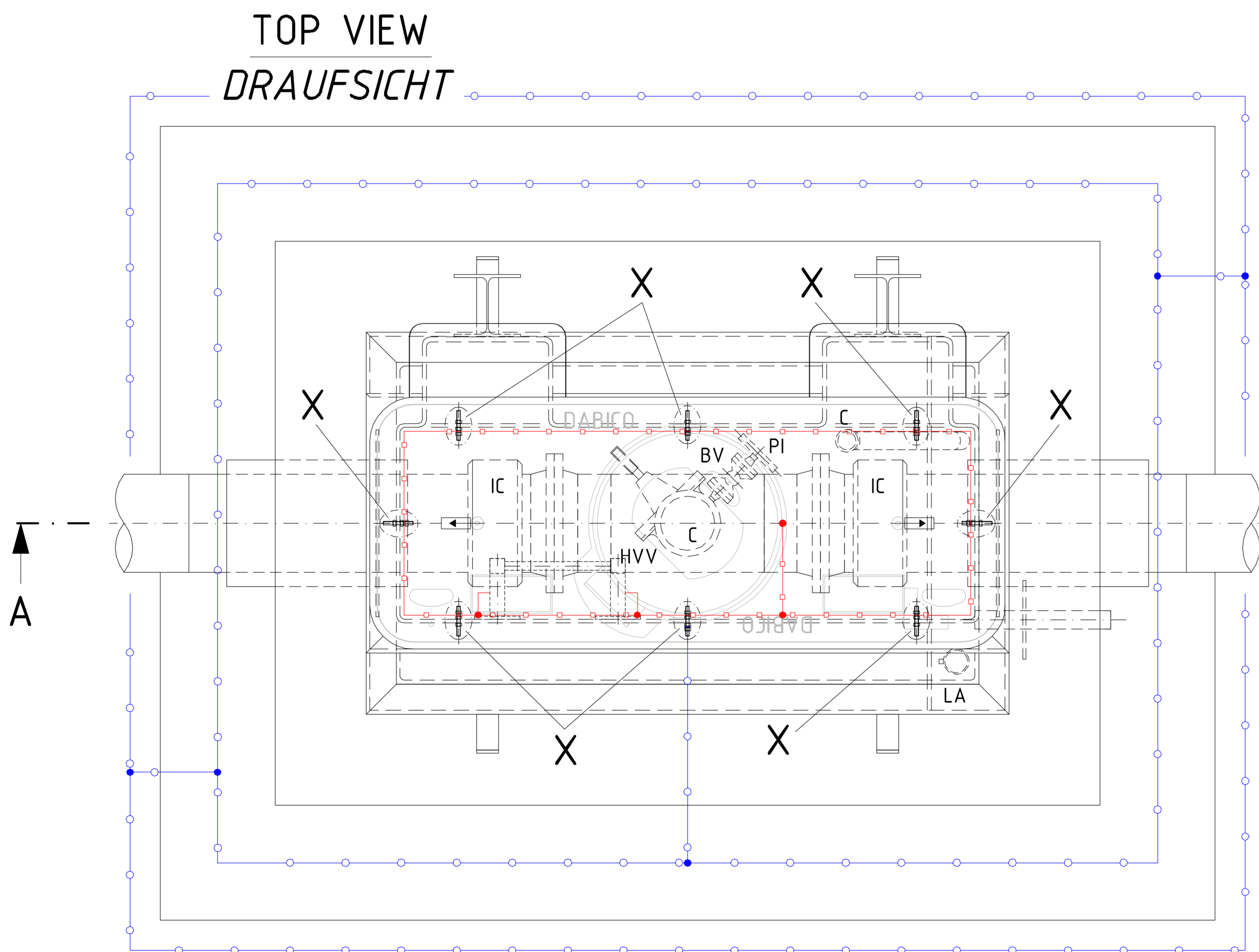
SECTION B-B  
SCHNITT B-B



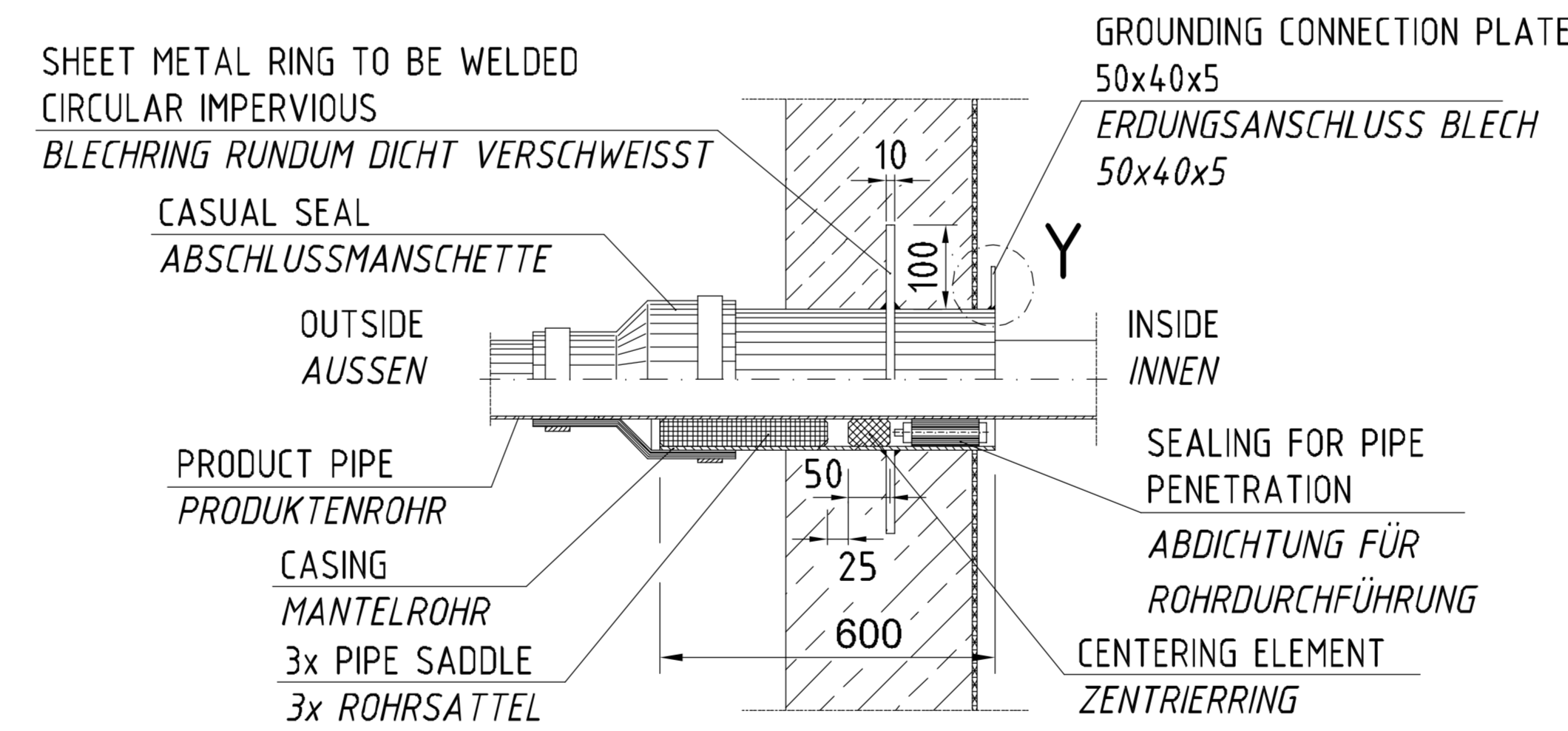
DETAIL "X"  
GROUNDING CONNECTION AND SUPPORT  
ERDUNGSANSCHLUSS UND HALTERUNG  
NOT TO SCALE  
OHNE MASSTAB



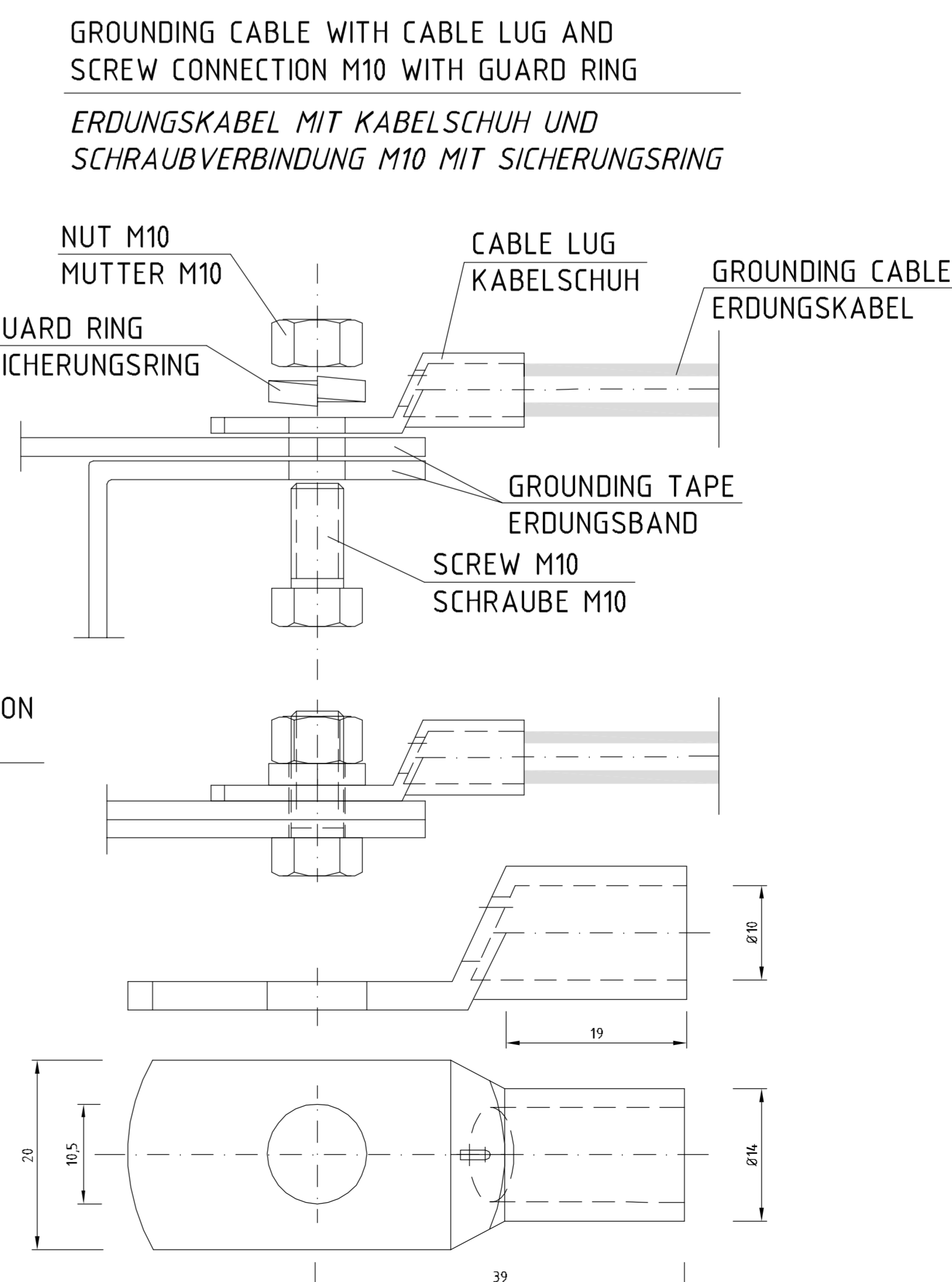
TOP VIEW  
DRAUFSICHT



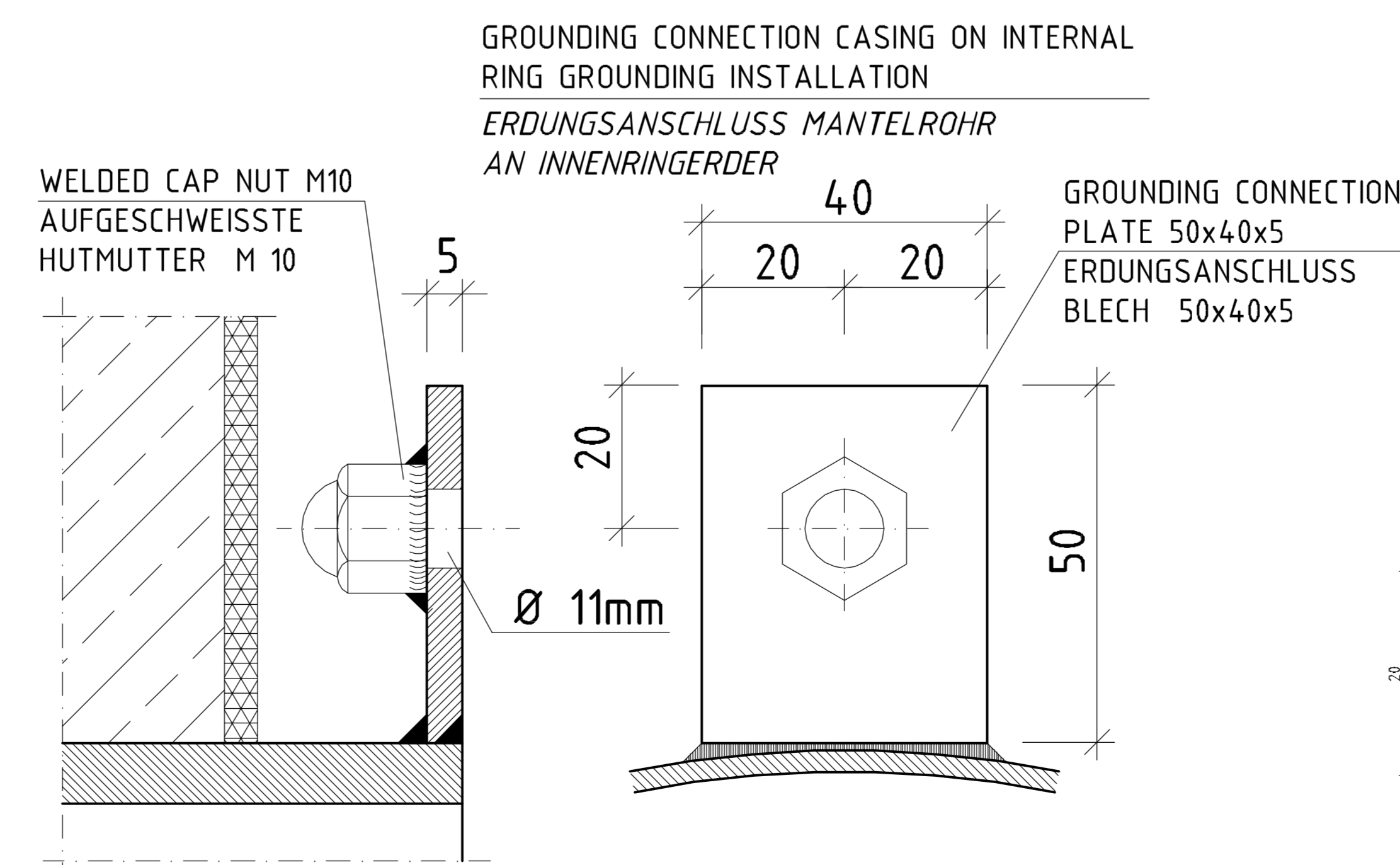
PIPE PENETRATION  
ROHRDURCHFÜHRUNG  
NOT TO SCALE / OHNE MASSTAB



DETAIL CONNECTION TO GROUNDING  
ANSCHLUSS ERDUNG  
NO SCALE / OHNE MASSTAB



DETAIL "Y"



LEGEND

LEGENDE

- BV BALL VALVE  
KUGELHAHN
- C QUICK COUPLING STS-M125  
SCHNELLKUPPLUNG STS-M125
- HVV HYDRANT VALVE WITH VENTURI CONTROLER  
HYDRANTENVENTIL MIT VENTURISTEUERUNG
- IC INSULATING COUPLING WITH EX-PROOF SPARK GAP  
ISOLIERKUPPLUNG MIT EX-FUNKENSTRECKE
- PC PRESSURE GAUGE STOPCOCK  
MANOMETERABSPERRVENTIL
- PI PRESSURE GAUGE WITH STOPCOCK  
MANOMETER MIT Absperrventil
- PR PRESSURE EQUALIZING RESERVOIR  
DRUCKSTOSSDÄMPFER
- SPL SPADE PLATE  
BRILLENSTECKSCHEIBE
- CS STEEL  
STAHL
- SS STAINLESS STEEL  
CR-NI STAHL
- LA LIQUID PROBE  
FLÜSSIGKEITSSONDE
- EXP. PROOF SPARK GAP  
EC- FUNKENSTRECKE
- STEEL STRIP 30 x 3.5mm IN CONCRETE  
(STAINLESS STEEL, MATERIAL NO. 1457)  
BANDSTAHL 30 x 3.5mm IM BETON  
(EDELSTAHL, WERKSTOFF NR. 1457)
- STEEL STRIP 30 x 3.5mm  
(STAINLESS STEEL, MATERIAL NO. 1457)  
BANDSTAHL 30 x 3.5mm  
(EDELSTAHL, WERKSTOFF NR. 1457)
- GROUNDING CABLE H01N2-D50  
ERDUNGSKABEL H01N2-D50

WARNING !

CATHODIC-PROTECTED FACILITY !  
DISCONNECT CATHODIC PROTECTION  
SYSTEM PRIOR STARTING WORKS  
ON PIPES !  
RE - ACTIVATE PROTECTIVE SYSTEM  
AS SOON AS WORKS ARE FINISH !

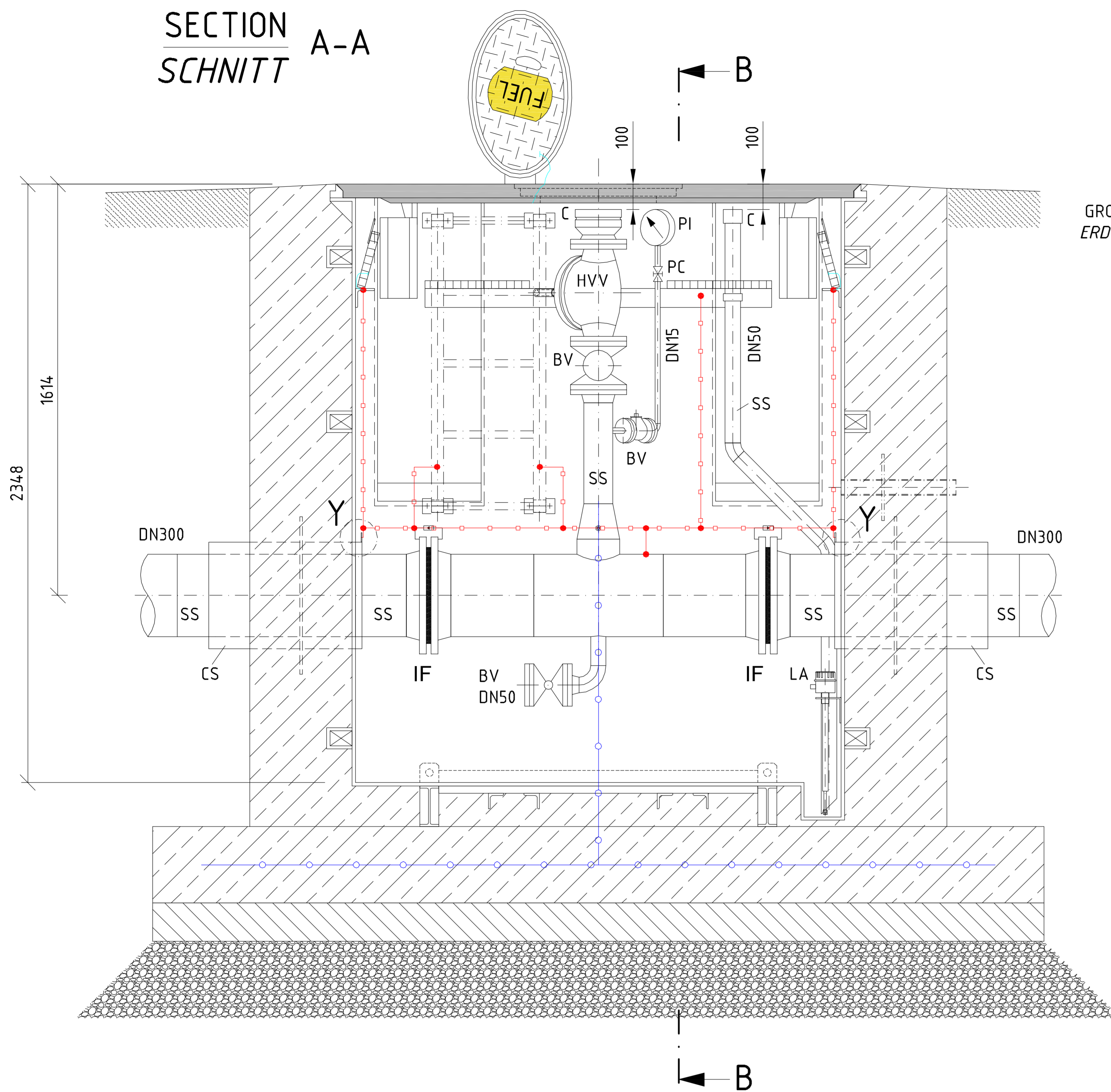
ACHTUNG !

ANLAGE KATHODISCH GESCHÜTZT !  
VOR ARBEITEN AM DEN  
ROHRLEITUNGEN, KATHODISCHE  
KORROSIONSSCHUTZANLAGE  
ABSCHALTEN !  
NACH BEENDEN DER ARBEITEN  
SOFORT WIEDER IN BETRIEB NEHMEN !

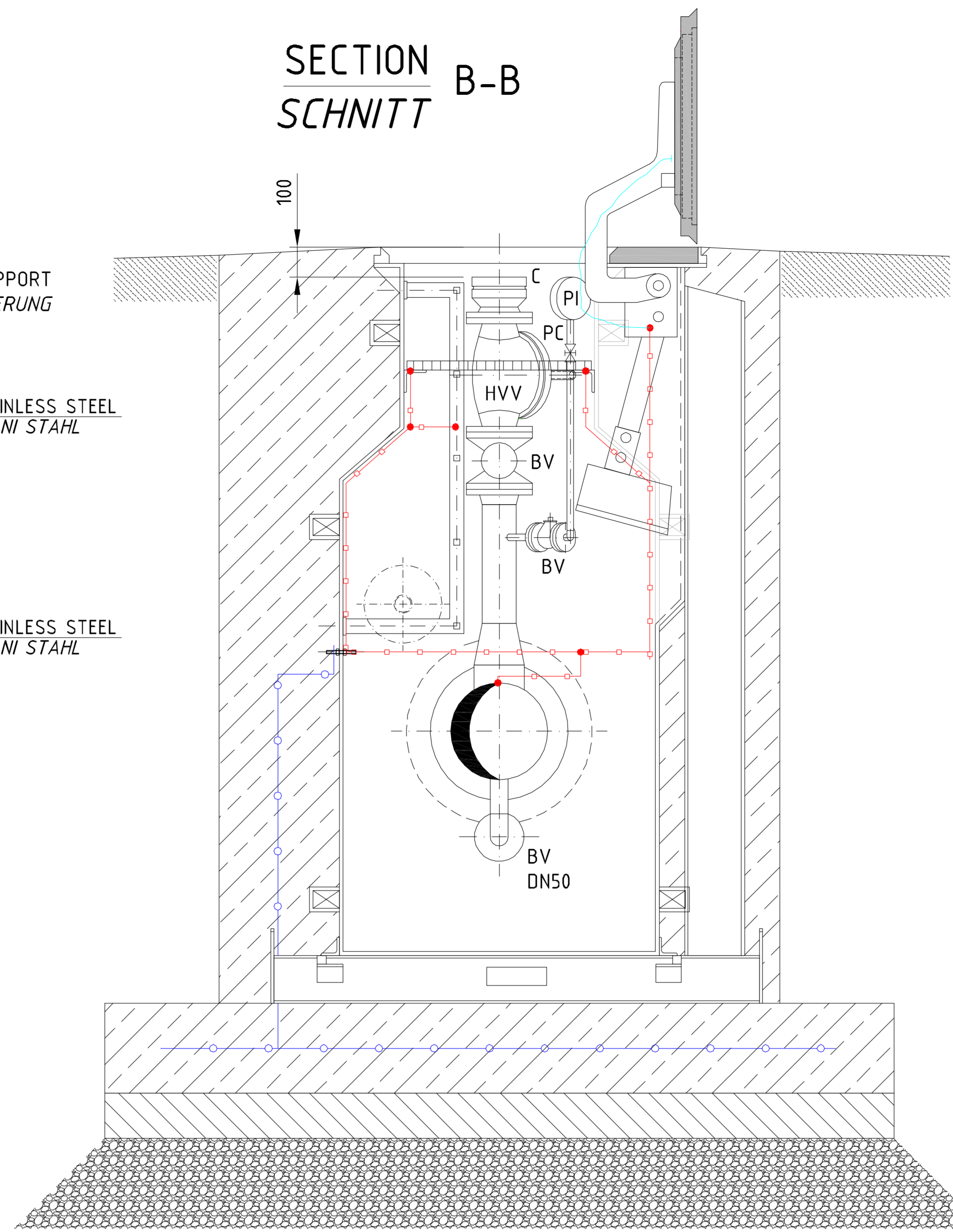
REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
HEADQUARTERS UNITED STATES AIR FORCES EUROPE ENGINEERING & OPERATIONS				
AIRFIELD STANDARD DESIGN US		FLUGPLATZ STANDARPLANUNG US		
JET FUEL STORAGE AND DISPENSING SYSTEMS		FLUGKRAFTSTOFF - VERSORGUNGSANLAGEN		
BUILDING BAUWERK HYDRANT PIT TYPE II (IN THE APRON) HYDRANTENSCHACHT TYP II (IN DER FLÄCHE)				
DESIGNATION BEZEICHNUNG GROUNDING AND LIGHTNING PROTECTION PLAN ERDUNGS- UND BLITZSCHUTZPLAN				
TOP VIEW AND SECTIONS WITH INSULATING COUPLING DRAUFSICHT UND SCHNITTE MIT ISOLIERKUPPLUNG				
WORKED/REARBEITET	PREPARED/ALFGESTELLT	APPROVED/GENEHRIGT		
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAU MASSNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED GENEHRIGT	DATE DATUM 6. MAI 2015	SCALE MASSTAB 1:10		
ORIGINAL DESIGNED BY ENTWURFEN VON		STANDARD SHEET STANDARD BLATT		
DESIGNED BY ENTWURFEN VON		E - 14.1		
CONSTRUCTION PROJECT BAU MASSNAHME		SHEET NO. BLATT NR.		



SECTION A-A  
SCHNITT A-A

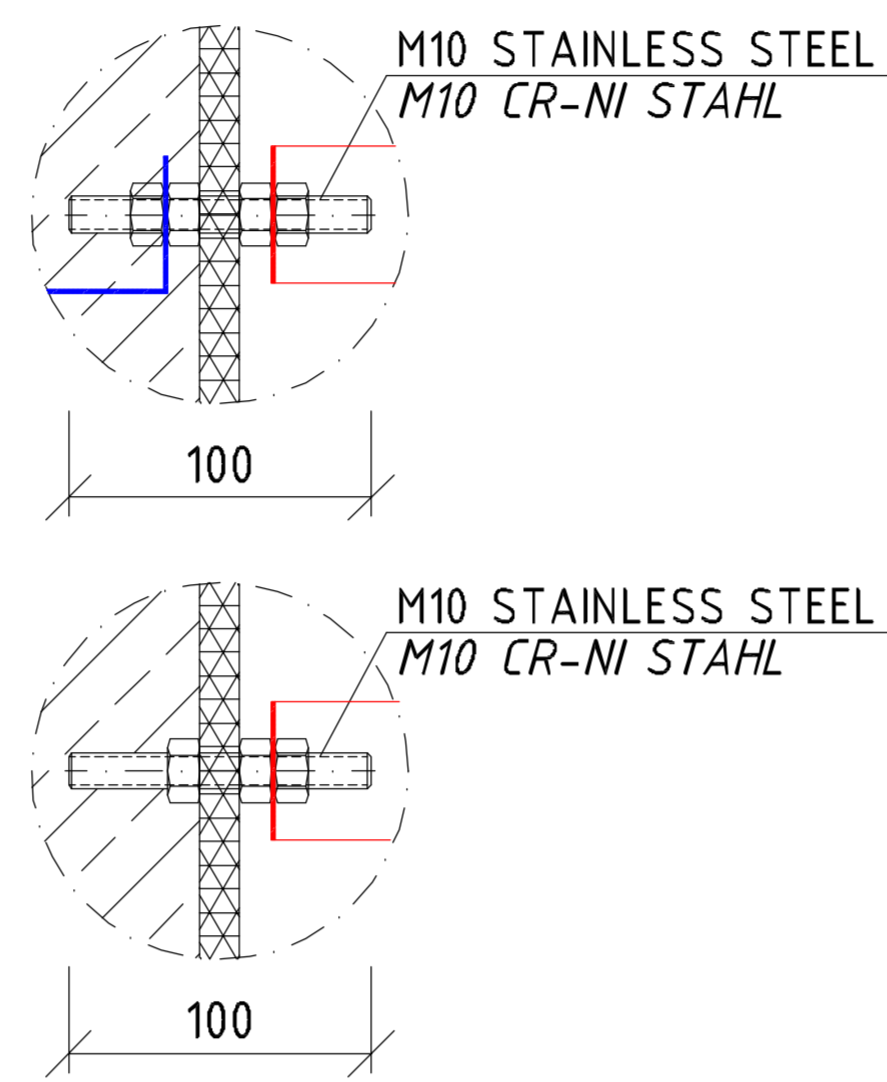


SECTION B-B  
SCHNITT B-B

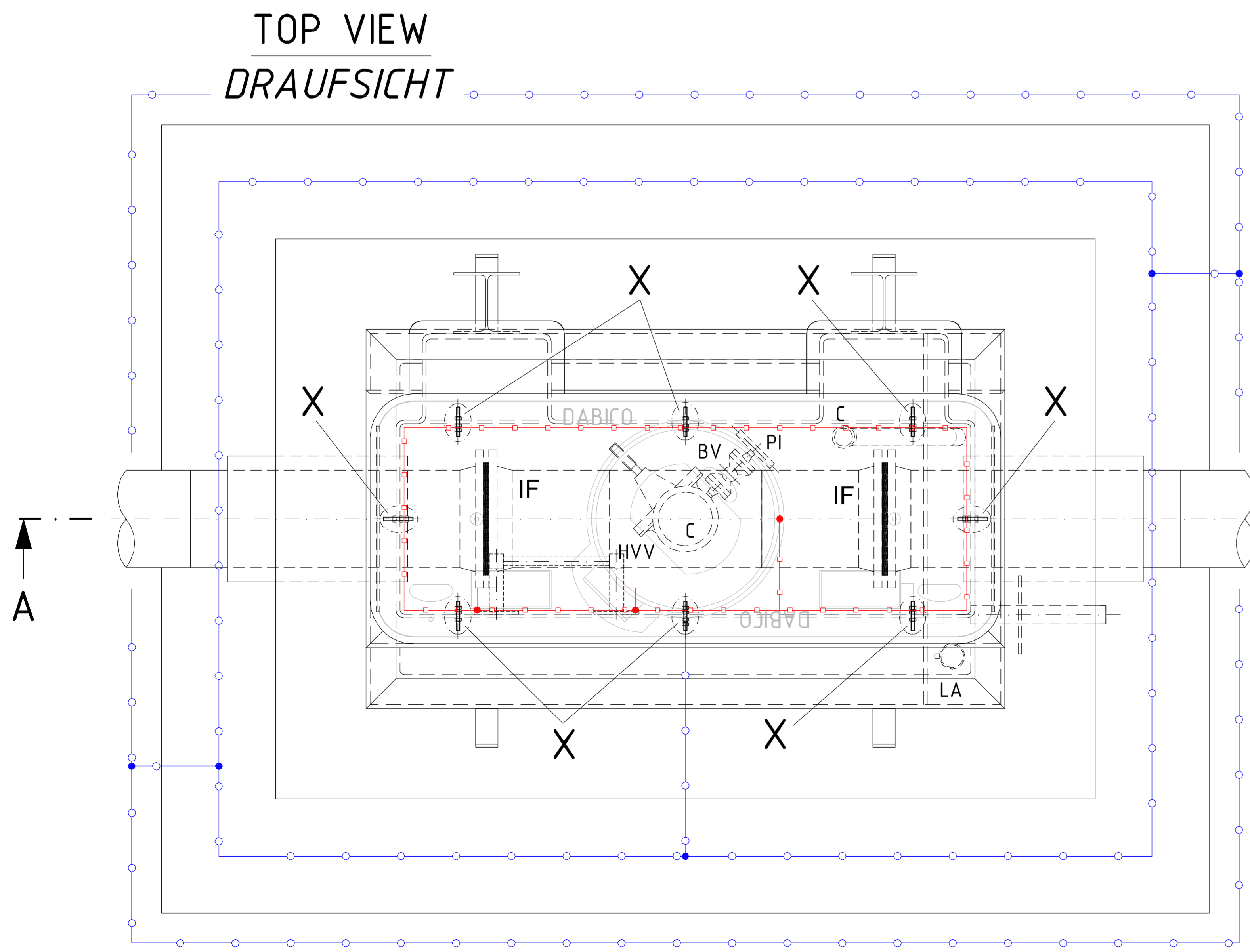


DETAIL "X"

GROUNDING CONNECTION AND SUPPORT  
ERDUNGSANSCHLUSS UND HALTERUNG  
NOT TO SCALE  
OHNE MASSTAB

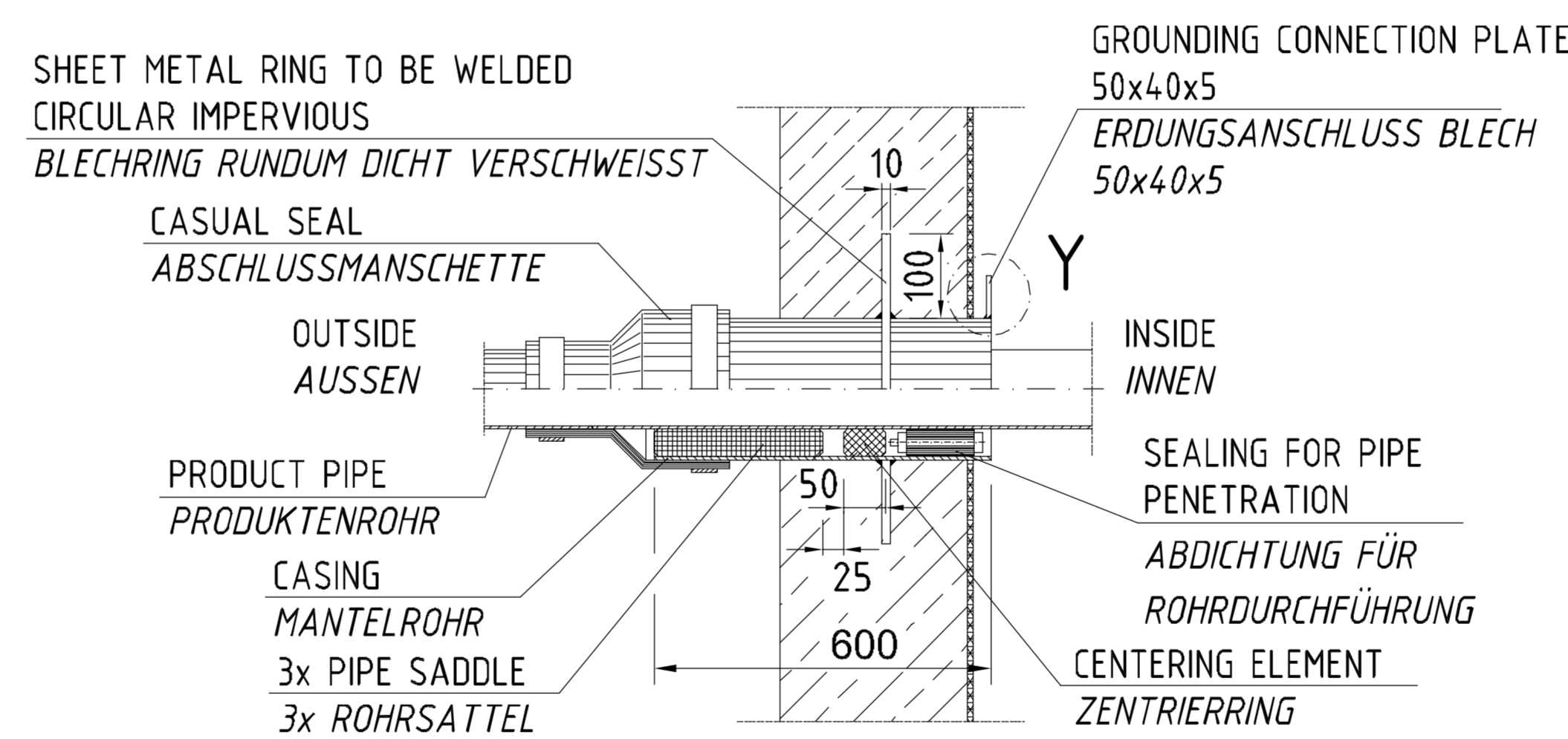


TOP VIEW  
DRAUFSICHT



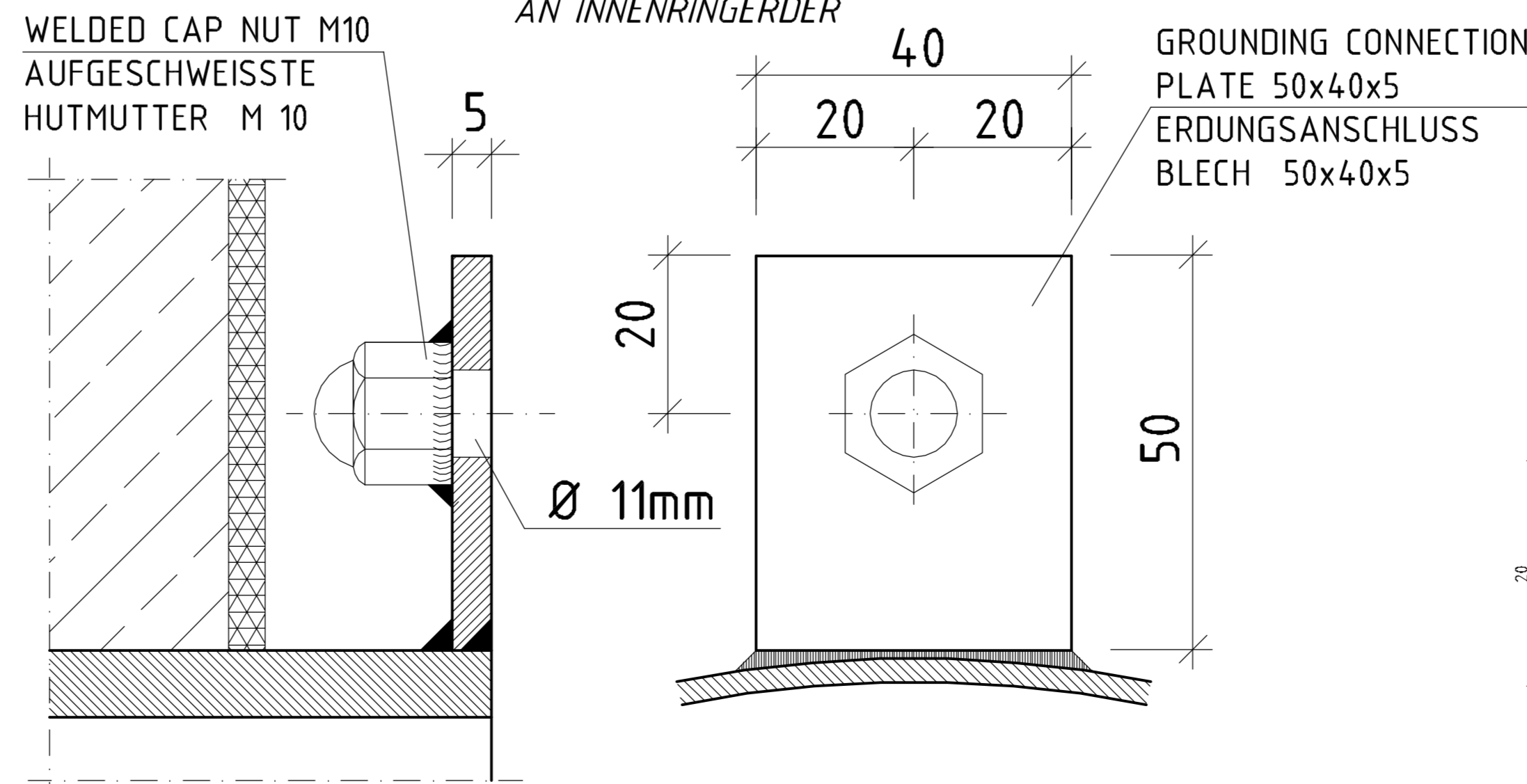
PIPE PENETRATION  
ROHRDURCHFÜHRUNG

NOT TO SCALE / OHNE MASSTAB



DETAIL "Y"

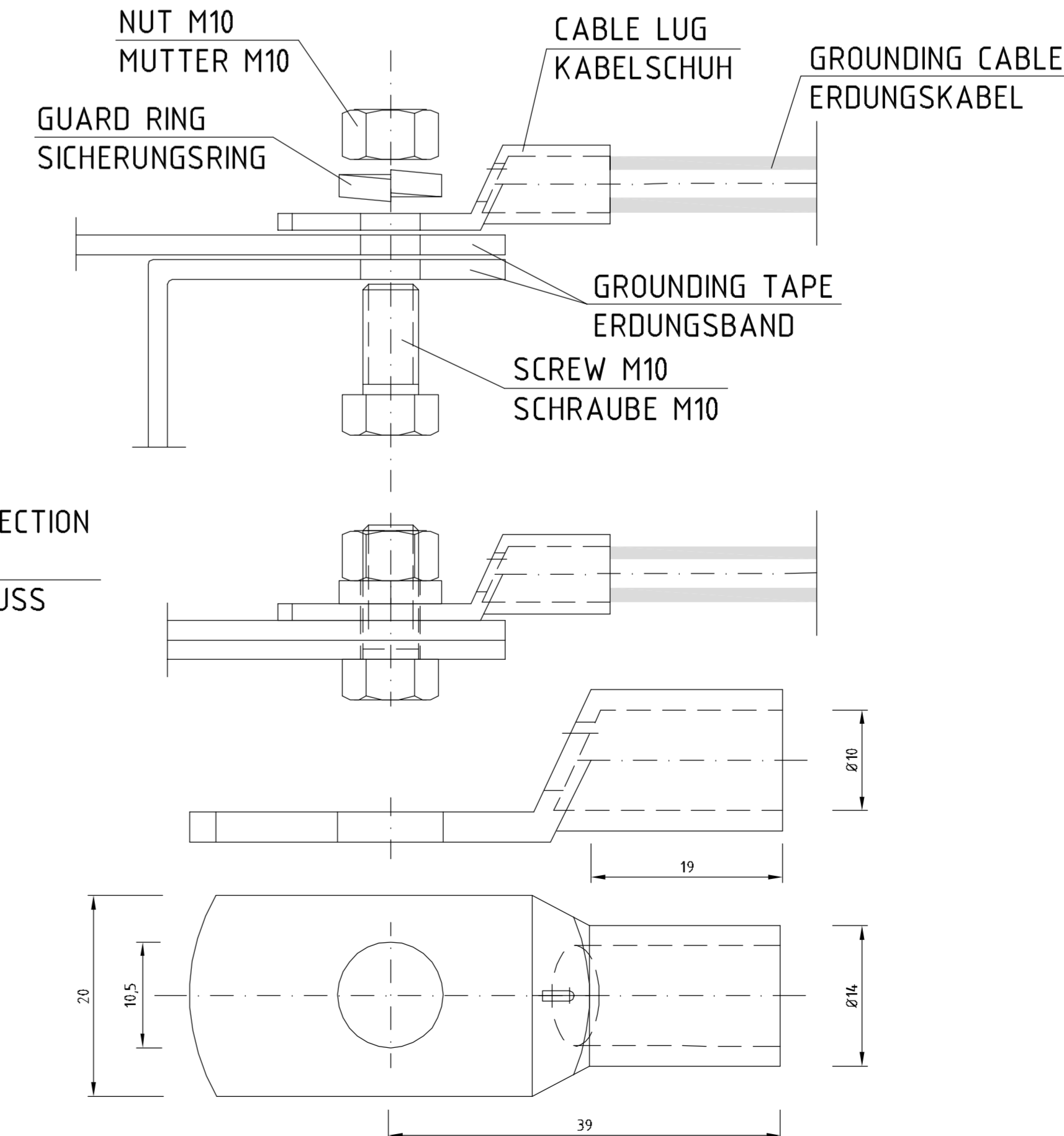
GROUNDING CONNECTION CASING ON INTERNAL RING GROUNDING INSTALLATION  
ERDUNGSANSCHLUSS MANTELROHR AN INNENRINGENDER



DETAIL CONNECTION TO GROUNDING  
ANSCHLUSS ERDUNG

NO SCALE / OHNE MASSTAB

GROUNDING CABLE WITH CABLE LUG AND SCREW CONNECTION M10 WITH GUARD RING  
ERDUNGSKABEL MIT KABELSCHUH UND SCHRAUBVERBINDUNG M10 MIT SICHERUNGSRING



LEGEND

LEGENDE

- BV BALL VALVE  
KUGELHAHN
- C QUICK COUPLING STS-M125  
SCHNELLKUPPLUNG STS-M125
- HVV HYDRANT VALVE WITH VENTURI CONTROLLER  
HYDRANTENVENTIL MIT VENTURISTEUERUNG
- IF INSULATING FLANGE WITH EX-PROOF SPARK GAP  
ISOLIERFLANSCH MIT EX-FUNKENSTRECKE
- PC PRESSURE GAUGE STOPCOCK  
MANOMETERABSPERRVENTIL
- PI PRESSURE GAUGE WITH STOPCOCK  
MANOMETER MIT Absperrventil
- PR PRESSURE EQUALIZING RESERVOIR  
DRUCKSTOSSDÄMPFER
- SPL SPADE PLATE  
BRILLENSTECKSCHEIBE
- CS STEEL  
STAHL
- SS STAINLESS STEEL  
CR-NI STAHL
- LA LIQUID PROBE  
FLÜSSIGKEITSSONDE
- EXP. PROOF SPARK GAP  
EX-FUNKENSTRECKE
- STEEL STRIP 30 x 3,5mm IN CONCRETE  
(STAINLESS STEEL, MATERIAL NO. 1457)  
BANDSTAHL 30 x 3,5mm IM BETON  
(EDELSTAHL, WERKSTOFF NR. 1457)
- STEEL STRIP 30 x 3,5mm  
(STAINLESS STEEL, MATERIAL NO. 1457)  
BANDSTAHL 30 x 3,5mm  
(EDELSTAHL, WERKSTOFF NR. 1457)
- GROUNDING CABLE H01N2-D50  
ERDUNGSKABEL H01N2-D50

WARNING !

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DISCONNECT CATHODIC PROTECTION SYSTEM PRIOR STARTING WORKS ON PIPES !  
RE - ACTIVATE PROTECTIVE SYSTEM AS SOON AS WORKS ARE FINISH !

ACHTUNG !

ANLAGE KATHODISCH GESCHÜTZT !  
VOR ARBEITEN AM DEN ROHRLEITUNGEN, KATHODISCHE KORROSIONSSCHUTZANLAGE ABSCHALTEN !  
NACH BEENDEN DER ARBEITEN SOFORT WIEDER IN BETRIEB NEHMEN !

REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
HEADQUARTERS UNITED STATES AIR FORCES EUROPE ENGINEERING & OPERATIONS				
AIRFIELD STANDARD DESIGN US		FLUGPLATZ STANDARDPLANUNG US		
JET FUEL STORAGE AND DISPENSING SYSTEMS		FLUGKRAFTSTOFF-VERSORGSANLAGEN		
BUILDING BAUWERK	HYDRANT PIT TYPE II (IN THE APRON) HYDRANTENSCHACHT TYP II (IN DER FLÄCHE)			
DESIGNATION BEZUGSBEZEICHNUNG	GROUNDING AND LIGHTNING PROTECTION PLAN TOP VIEW AND SECTIONS WITH INSULATING FLANGE ERDUNGS- UND BLITZSCHUTZPLAN DRAUFSICHT UND SCHNITTE MIT ISOLIERFLANSCH			
WORKED/REARBEITET	PREPARED/AUFGESTELLT	APPROVED/GENEHMIGT	 AMT FÜR BUNDESBAU WALLSTR.1 55122 MAINZ	
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAU MASSNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED GENEHMIGT	DATE DATUM	6. MAI 2015	SCALE MASSTAB	1:10, 1:50
ORIGINAL DESIGNED BY ENTWURFNER			STANDARD SHEET STANDARD PLAN	E - 14.1
CONSTRUCTION PROJECT BAU MASSNAHME				SHEET NO. BLATT NR.



**TEST PIT (IN THE APRON)**  
**TESTSCHACHT (IN DER FLÄCHE)**

**15**

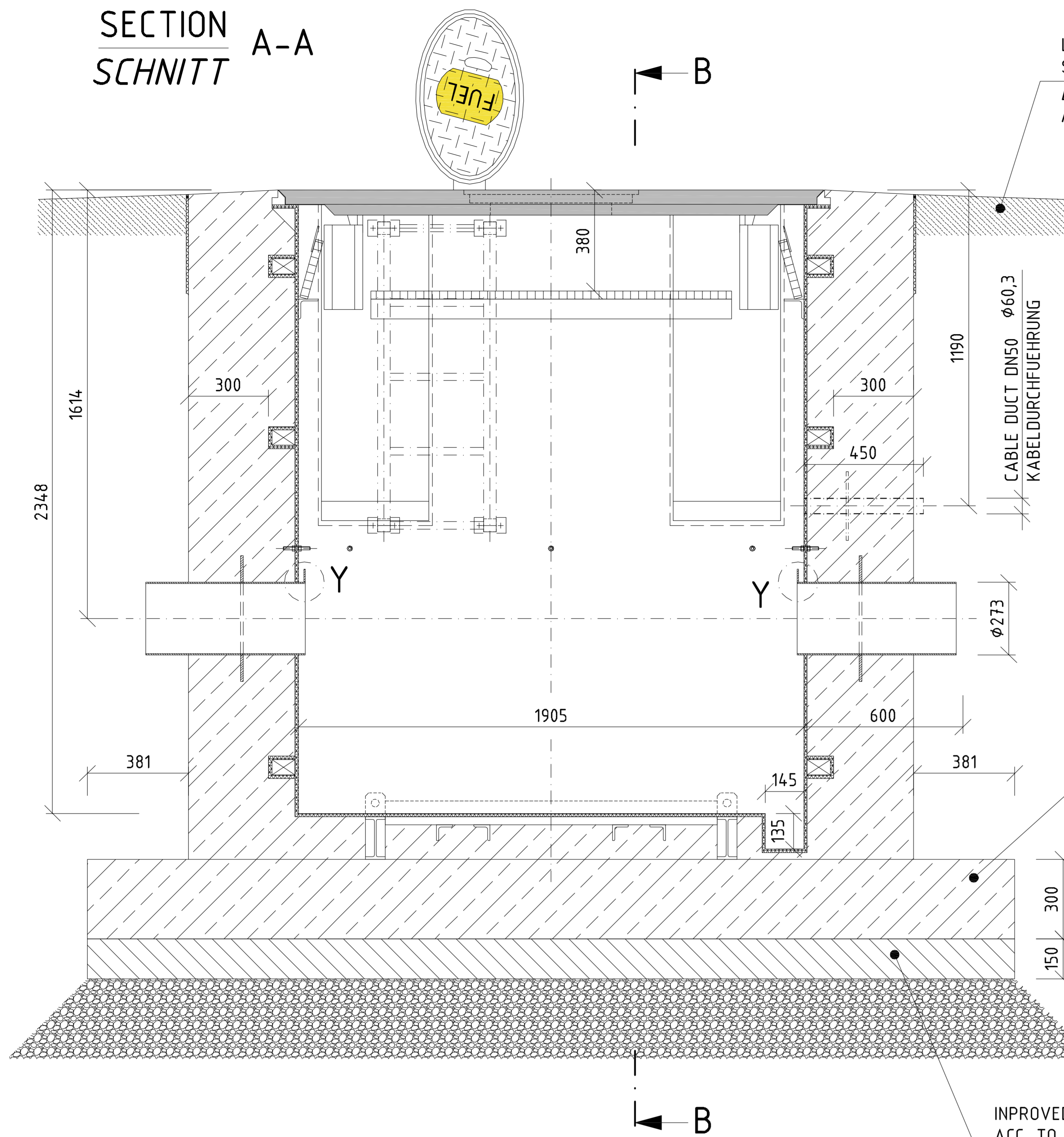
**C-15.1** CONSTRUCTION PLAN  
*BAUKONSTRUKTIONSPLAN*

**M-15.1** MECHANICAL INATALLATION, TOP VIEW AND SECTION "A", "B"  
MASCHINENTECHNISCHE INSTALLATION, DRAUFSICHT UND SCHNITT "A" , "B"

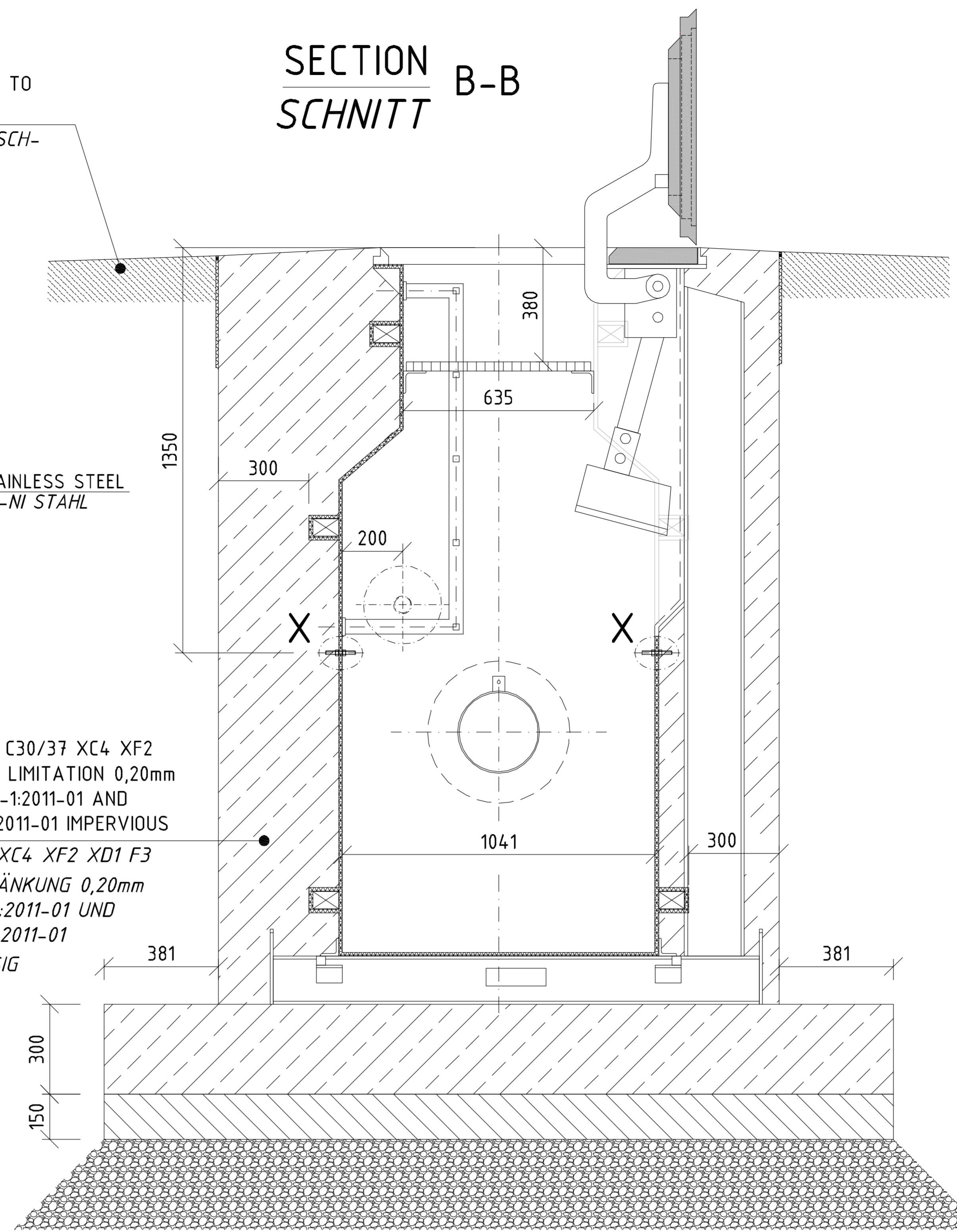
**E-15.1** GROUNDING AND LIGHTNING PROTECTION PLAN  
ERDUNGS- UND BLITZSCHUTZPLAN



SECTION  
SCHNITT A-A

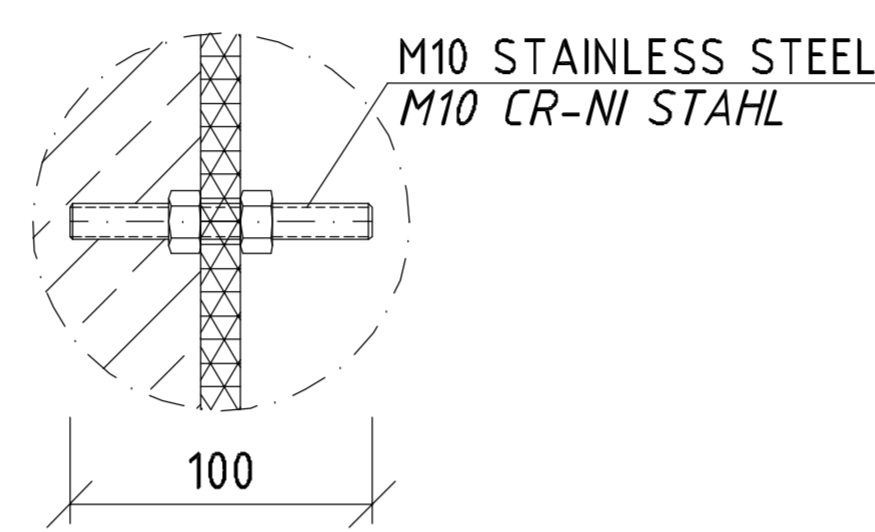


SECTION  
SCHNITT B-B



DETAIL "X"

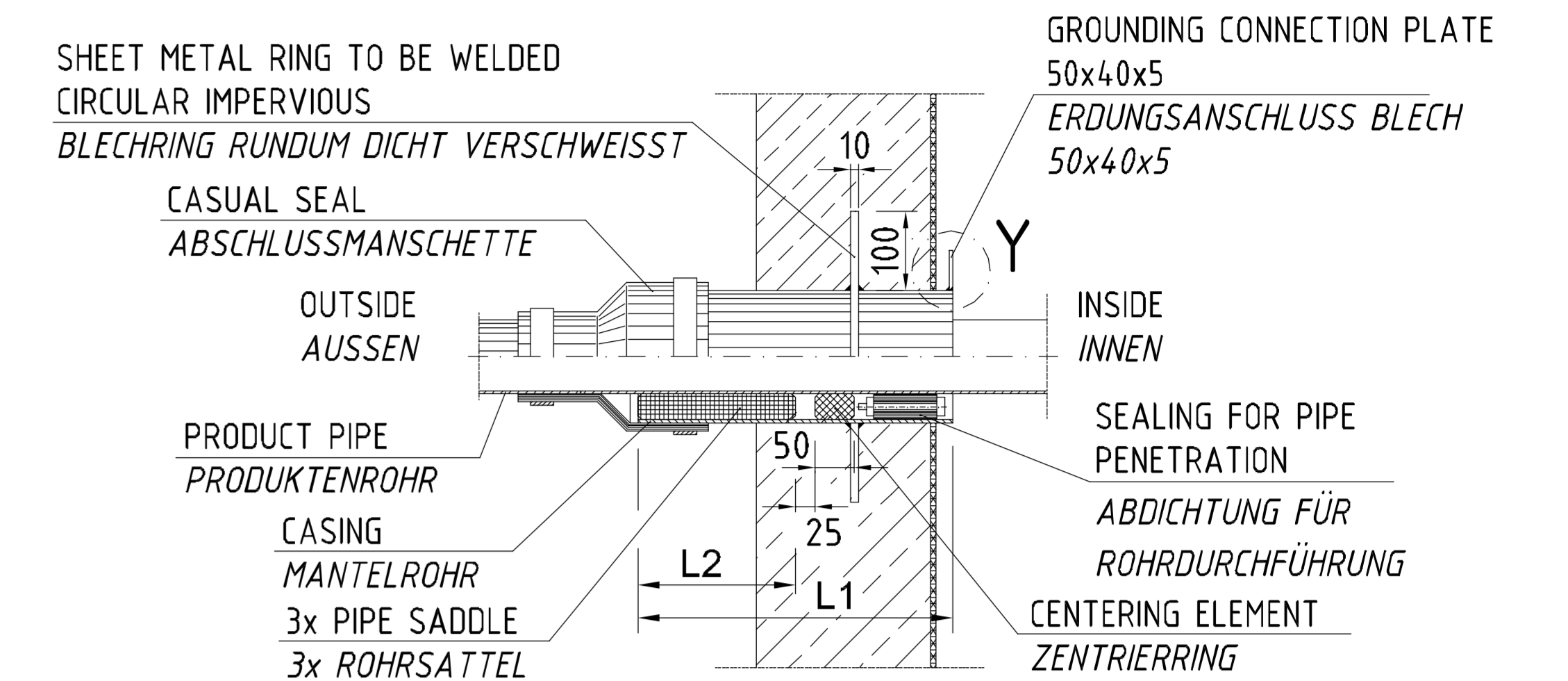
GROUNDING CONNECTION  
ERDUNGSANSCHLUSS  
NOT TO SCALE  
OHNE MASSTAB



REINFORCED CONCRETE C30/37 XC4 XF2 XD1 F3 D<sub>max</sub>16 CRACK LIMITATION 0,20mm ACC. TO DIN EN 1992-1-1:2011-01 AND DIN EN 1992-1-1 / NA:2011-01 IMPERVIOUS  
STAHLBETON C30/37 XC4 XF2 XD1 F3 D<sub>max</sub>16 RISSEBESCHRÄNKUNG 0,20mm NACH DIN EN 1992-1-1:2011-01 UND DIN EN 1992-1-1 / NA:2011-01 WASSERUNDURCHLÄSSIG

PIPE PENETRATION  
ROHRDURCHFÜHRUNG

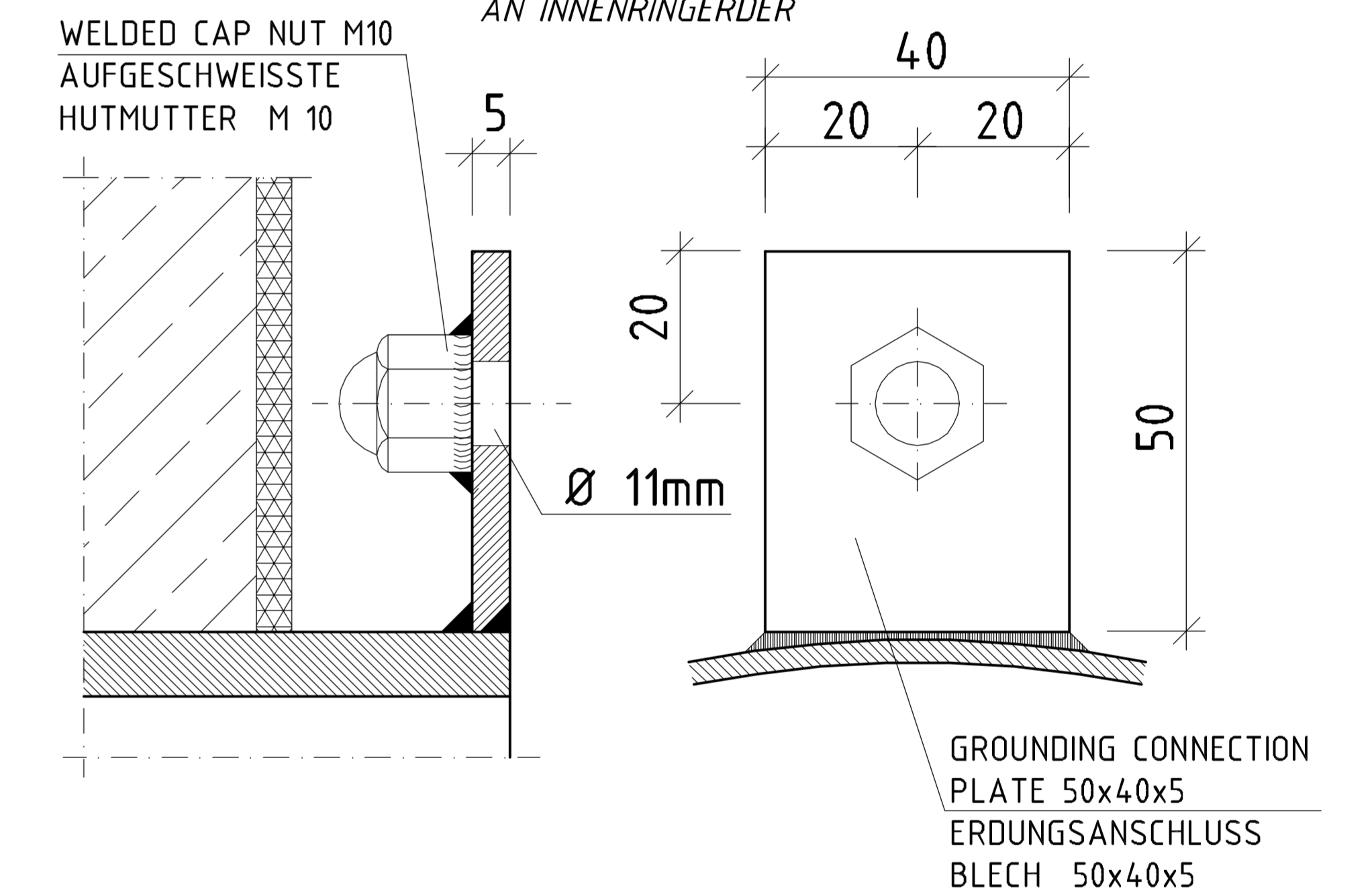
NOT TO SCALE / OHNE MASSTAB



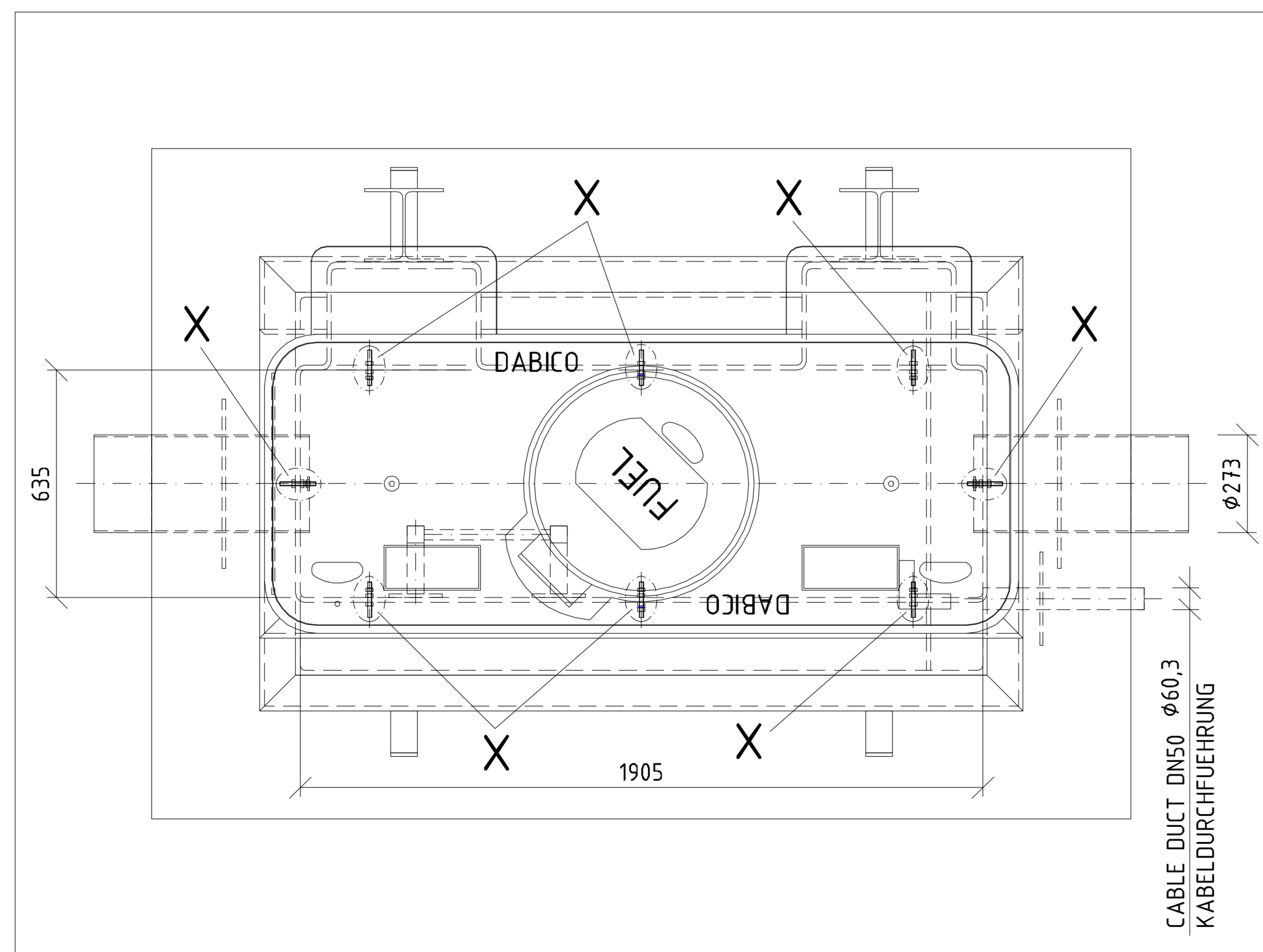
PRODUCT PIPE ROHRLEITUNG	PRODUCT PIPE PRODUKTENROHR mm	CASING MANTELROHR mm	L1 mm	L2 mm
DN150	ø168,3	ø273,0	600	250
CABLE DUCT / KABELDURCHFÜHRUNG		ø60,3	450	

DETAIL "Y"

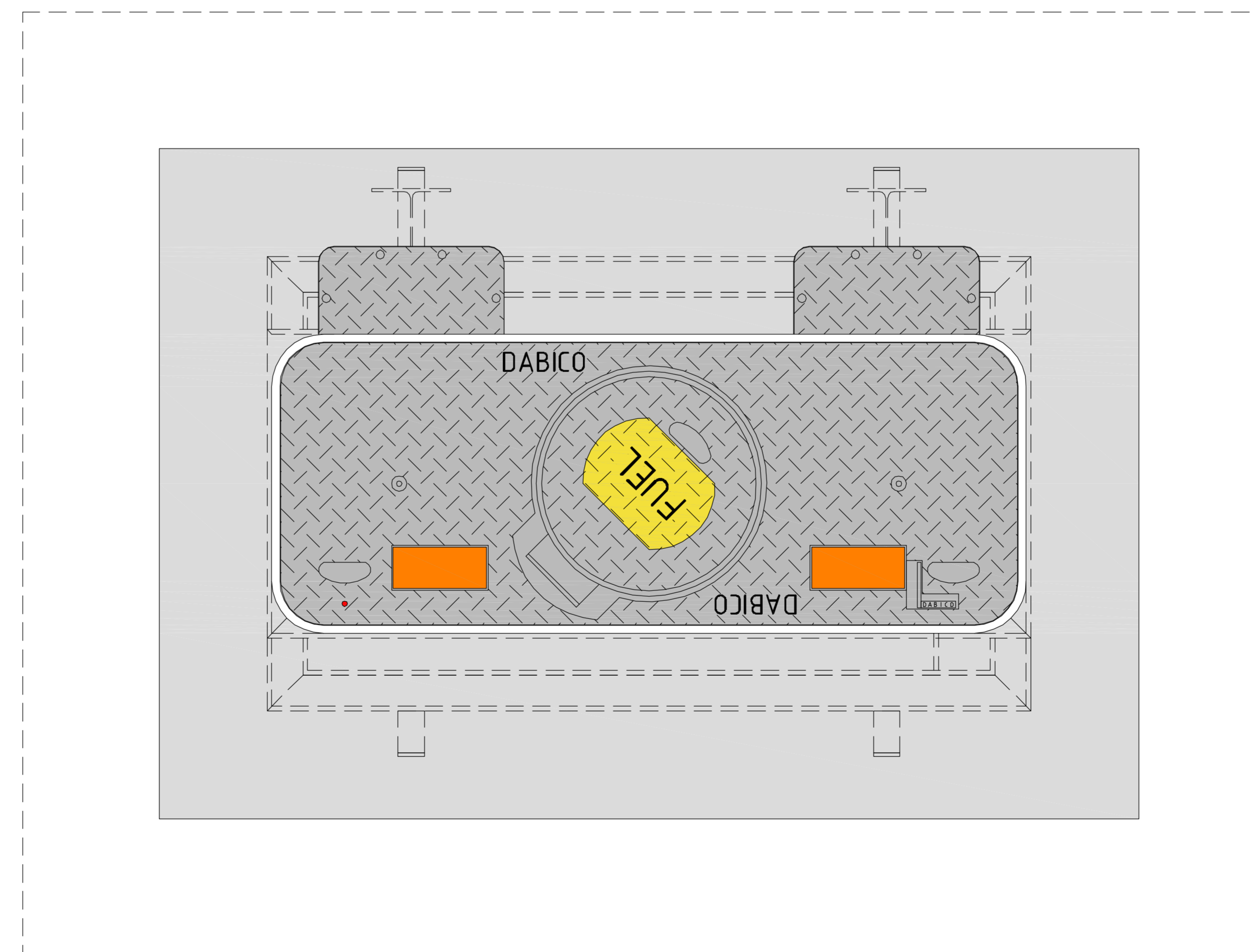
GROUNDING CONNECTION CASING ON INTERNAL RING GROUNDING INSTALLATION  
ERDUNGSANSCHLUSS MANTELROHR AN INNENRINGERDER



TOP VIEW  
DRAUFSICHT



TOP VIEW  
DRAUFSICHT



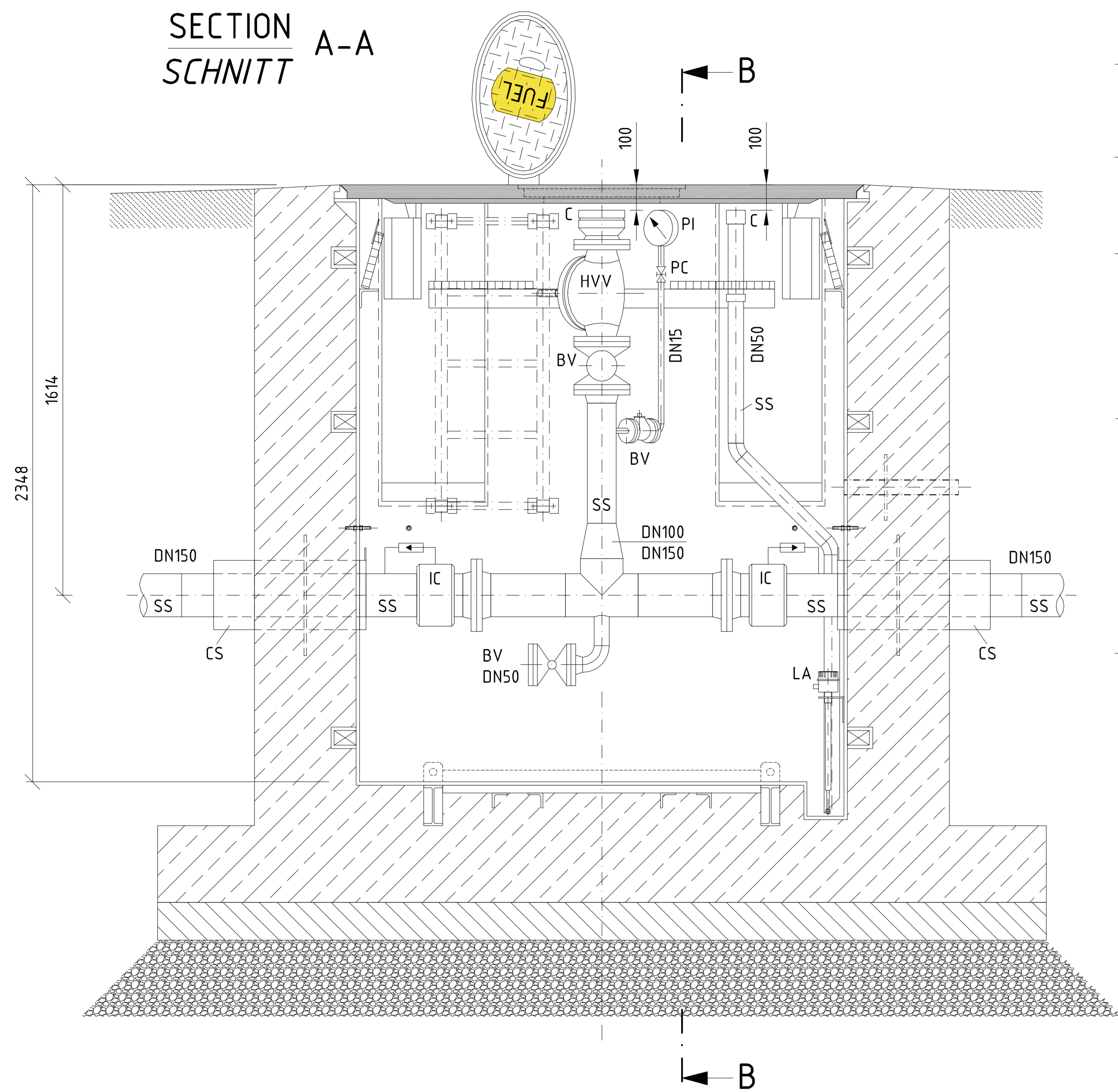
PERTINENT DRAWINGS  
ZUGEHÖRIGE ZEICHNUNGEN

E-15.1 GROUNDING AND LIGHTNING PROTECTION PLAN  
ERDUNGS- UND BLITZSCHUTZPLAN

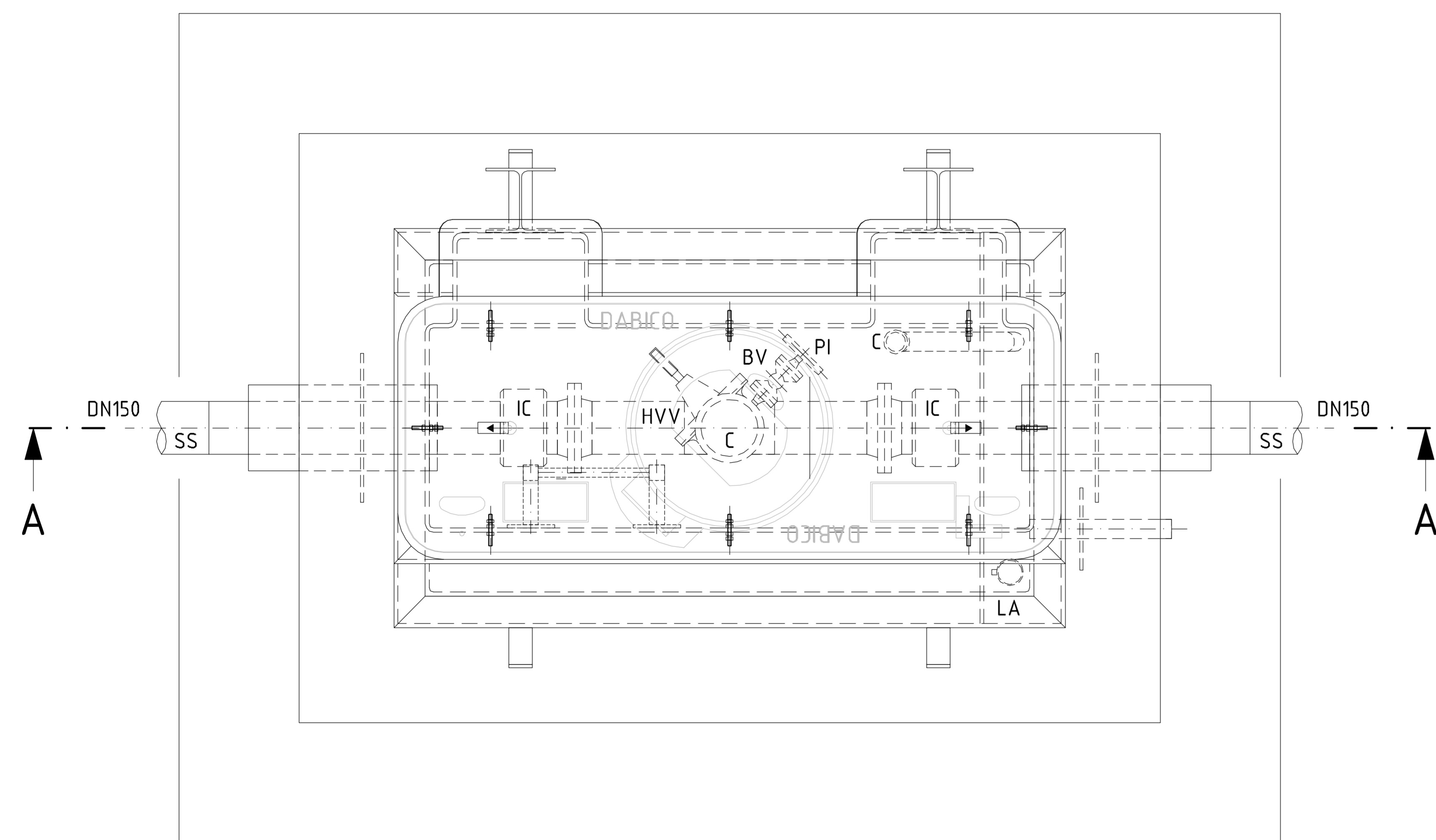
REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
HEADQUARTERS UNITED STATES AIR FORCES EUROPE				
ENGINEERING & OPERATIONS				
AIRFIELD STANDARD DESIGN US JET FUEL STORAGE AND DISPENSING SYSTEMS			FLUGPLATZ STANDARDPLANUNG US FLUGKRAFTSTOFF - VERSORGUNGSANLAGEN	
BUILDING BAUWERK TEST PIT (IN THE APRON) TESTSCHACHT (IN DER FLÄCHE)				
DESIGNATION BEZEICHNUNG CONSTRUCTIONS PLAN BAUKONSTRUKTIONSPLAN				
WORKED/BEARBEITET	PREPARED/AUFGESTELLT	APPROVED/GEPRÜFT		
LINDENBERGER LINDENBERGSTRASSE 55122 MAINZ TEL: +49 67 31 123 456 FAX: +49 67 31 123 456 WWW: WWW.LINDENBERG.COM		AMT FÜR BUNDESBAU WALLSTR.1 55122 MAINZ		
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAUMAßNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED GEPRÜFT	DATE DATUM	6. MAI 2015	SCALE MASSTAB	1:10
ORIGINAL DRAWN BY ENTWURFEN VON			STANDARD SHEET STANDARD PLAN	
DESIGNER ENTWURF			CAD-PROJECT FILE CAD-PROJEKTDATEI	C- 15.1
CONSTRUCTION PROJECT BAUMAßNAHME			SHEET NO. BLATTNR.	OF VON



SECTION A-A  
SCHNITT A-A



TOP VIEW  
DRAUFSICHT



NOTES  
BEMERKUNG

THE DIAMETER OF PROTECTION PIPE MAY VARY IN DEPENDENCE OF MANUFACTURER'S SYSTEM.

DIE ANGEGEBENEN SCHUTZROHRENDIAMETER KÖNNEN HERSTELLER-SPEZIFISCH VARIIEREN.

ALL VALVES AND FLANGES DESIGNED FOR PN 16  
ALLE ARMATUREN UND FLANSCHEN AUSGELEGT FÜR PN 16

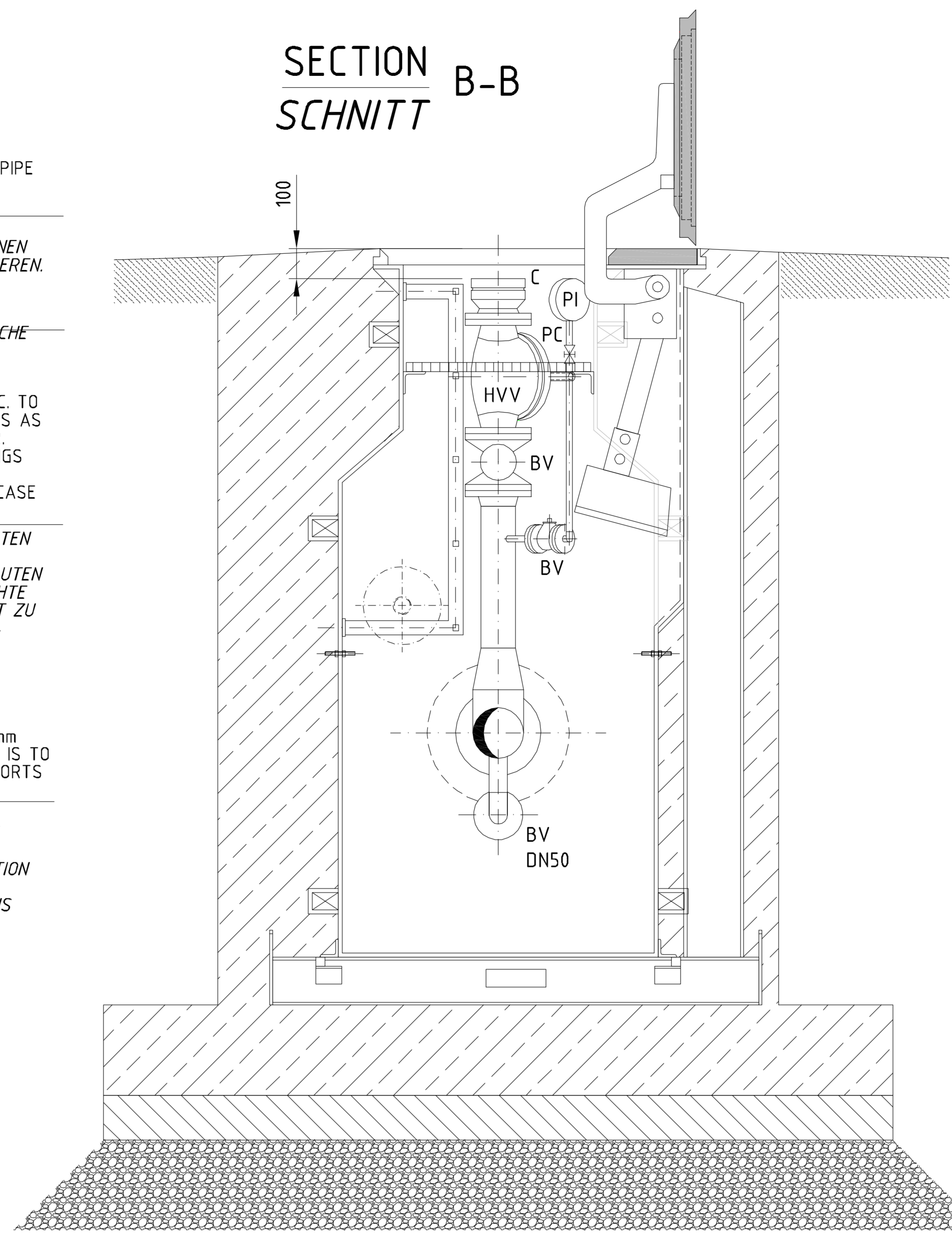
OPENINGS IN THE GRATINGS ACC. TO THE MECHANICAL INSTALLATIONS AS SELECTED BY THE CONTRACTOR. EASY REMOVAL OF THE GRATINGS SHALL BE GUARANTEED, THE GRATINGS NEXT TO THE STAIRCASE HAVE TO BE DROP-TYPE

ÖFFNUNGEN IN DEN GITTERROSTEN ENTSPRECHEND DEN MASCHINENTECHNISCHEN EINBAUTEN NACH WAHL DES AN DER LEICHTE AUSBAU DER GITTERROSTE IST ZU GEWÄHRLEISTEN IM EINSTIEGSBEREICH SIND DIE RÖSTE KLAPPBAR AUSZUFÜHREN

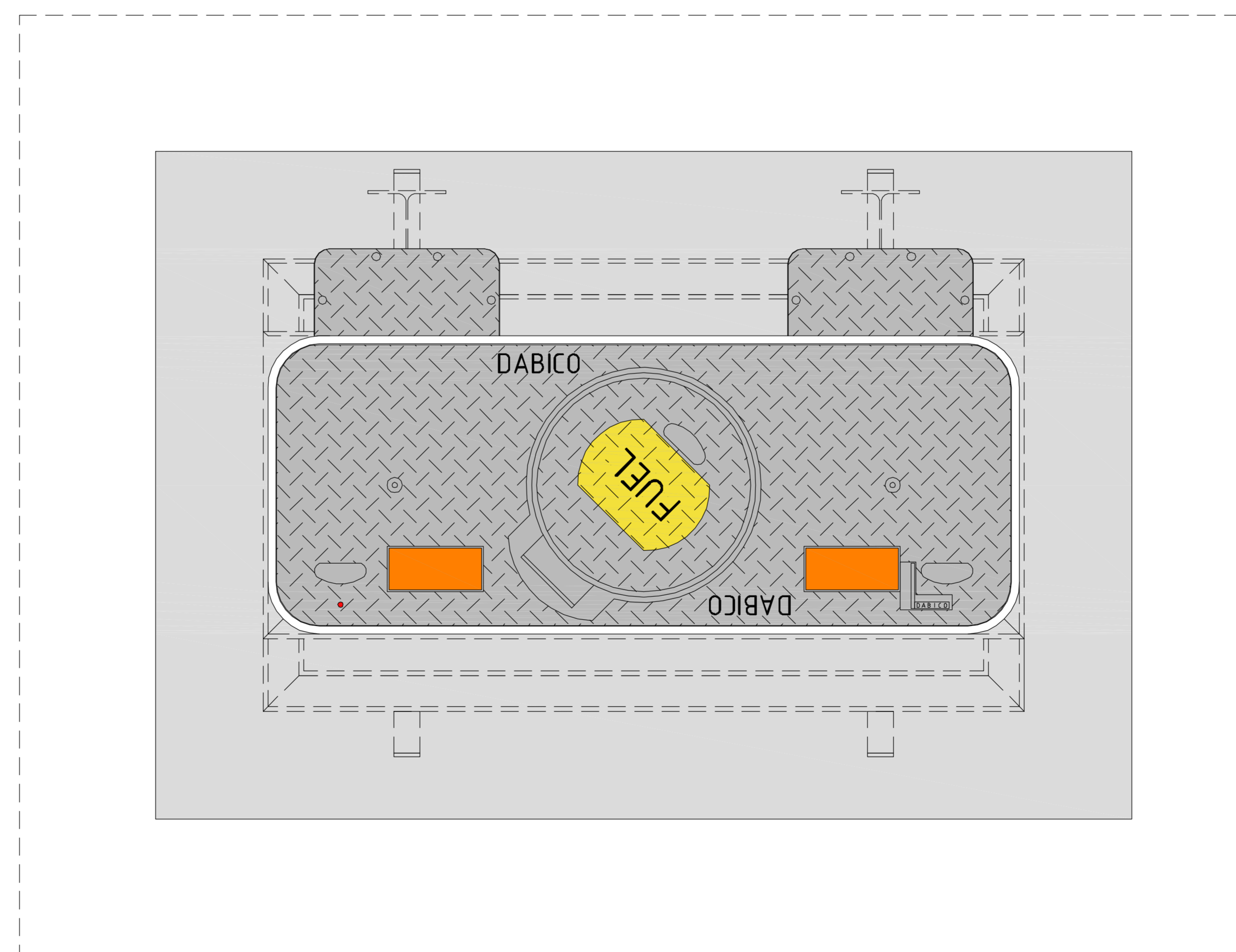
FOR SUPPORTS OF PIPES AN INSULATION PIECE, MADE OF 10mm THICK FUEL RESISTANT PLASTIC, IS TO PUT BETWEEN PIPES AND SUPPORTS OR HOLDERS.

BEI UNTERSTÜTZUNGEN VON ROHRLEITUNGEN IST ZWISCHEN ROHRLEITUNG UND UNTERSTÜTZUNGSKONSTRUKTION BZW. HALTERUNG EINE ISOLIERPLATTE 10mm DICK AUS KRAFTSTOFFBESTÄNDIGEN KUNSTSTOFF, ZU LEGEN.

SECTION B-B  
SCHNITT B-B

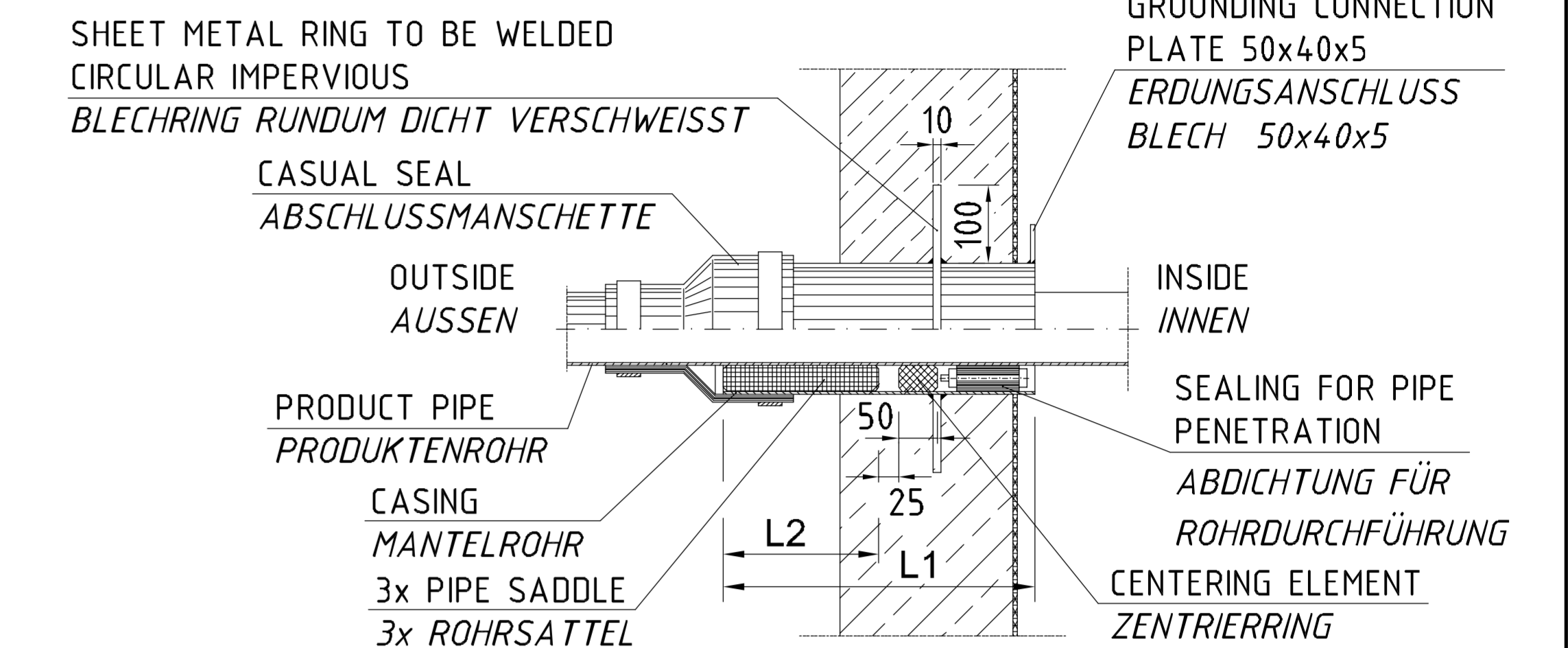


TOP VIEW  
DRAUFSICHT



PIPE PENETRATION  
ROHRDURCHFÜHRUNG

NOT TO SCALE / OHNE MASSSTAB



PRODUCT PIPE ROHRLEITUNG	PRODUCT PIPE PRODUKTENROHR mm	CASING MANTELROHR mm	L1 mm	L2 mm
DN300	Ø323,9	Ø419,0	600	250

LEGEND  
LEGENDE

- BV BALL VALVE  
KUGELHAHN
- C QUICK COUPLING STS-M125  
SCHNELLKUPPLUNG STS-M125
- HVV HYDRANT VALVE WITH VENTURI CONTROLLER  
HYDRANTENVENTIL MIT VENTURISTEUERUNG
- IC INSULATING COUPLING WITH EX-PROOF SPARK GAP  
ISOLIERKUPPLUNG MIT EX-FUNKENSTRECKE
- PC PRESSURE GAUGE STOPCOCK  
MANOMETERABSERRVENTIL
- PI PRESSURE GAUGE WITH STOPCOCK  
MANOMETER MIT ABSERRVENTIL
- CS STEEL  
STAHL
- SS STAINLESS STEEL  
CR-NI STAHL
- LA LIQUID PROBE  
FLÜSSIGKEITSSONDE

WARNING !

CATHODIC-PROTECTED FACILITY !  
DISCONNECT CATHODIC PROTECTION SYSTEM PRIOR STARTING WORKS ON PIPES !  
RE - ACTIVATE PROTECTIVE SYSTEM AS SOON AS WORKS ARE FINISH !

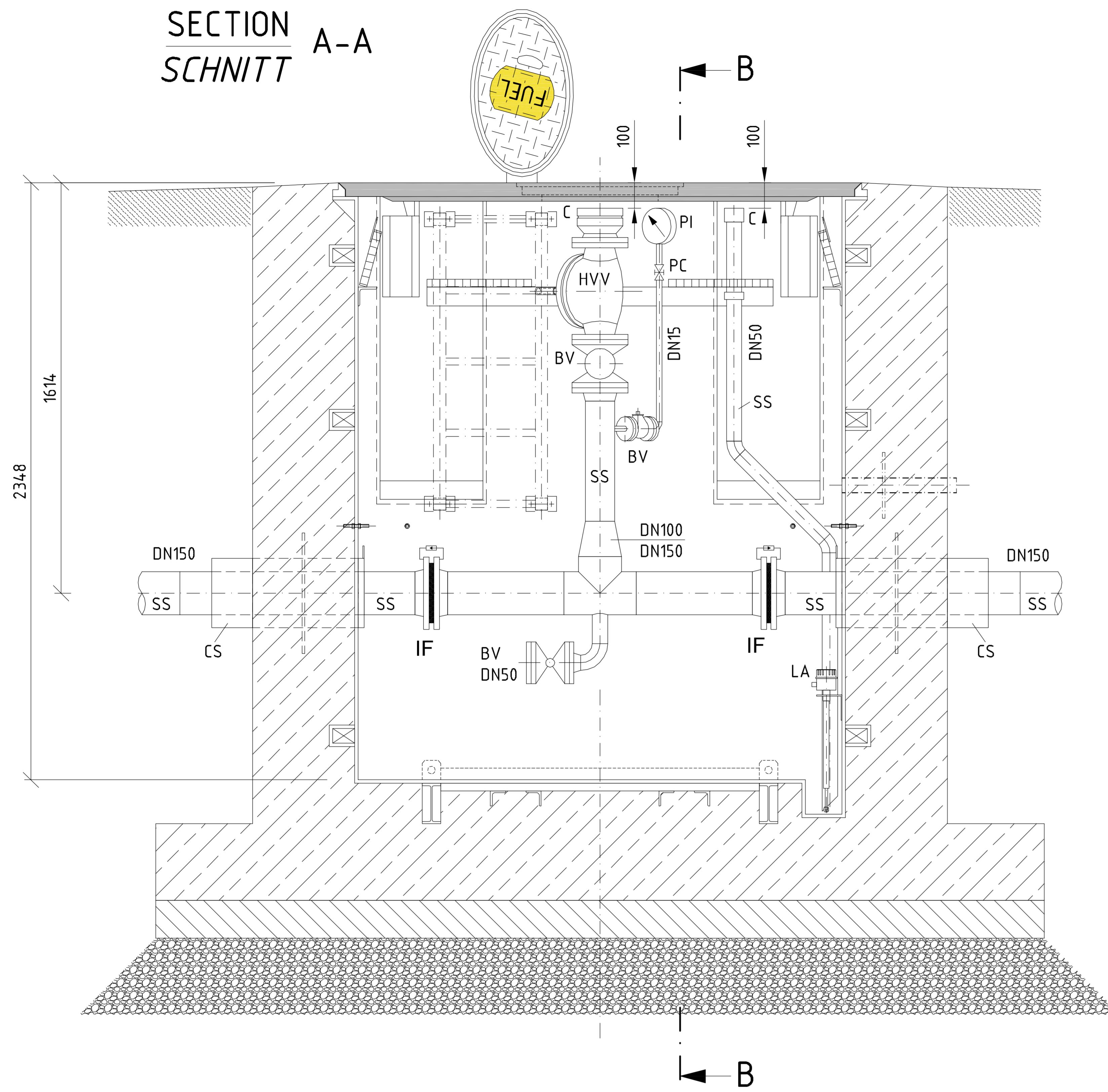
ACHTUNG !

ANLAGE KATHODISCH GESCHÜTZT !  
VOR ARBEITEN AM DEN ROHRLEITUNGEN, KATHODISCHE KORROSIONSSCHUTZANLAGE ABSCHALTEN !  
NACH BEENDEN DER ARBEITEN SOFORT WIEDER IN BETRIEB NEHMEN !

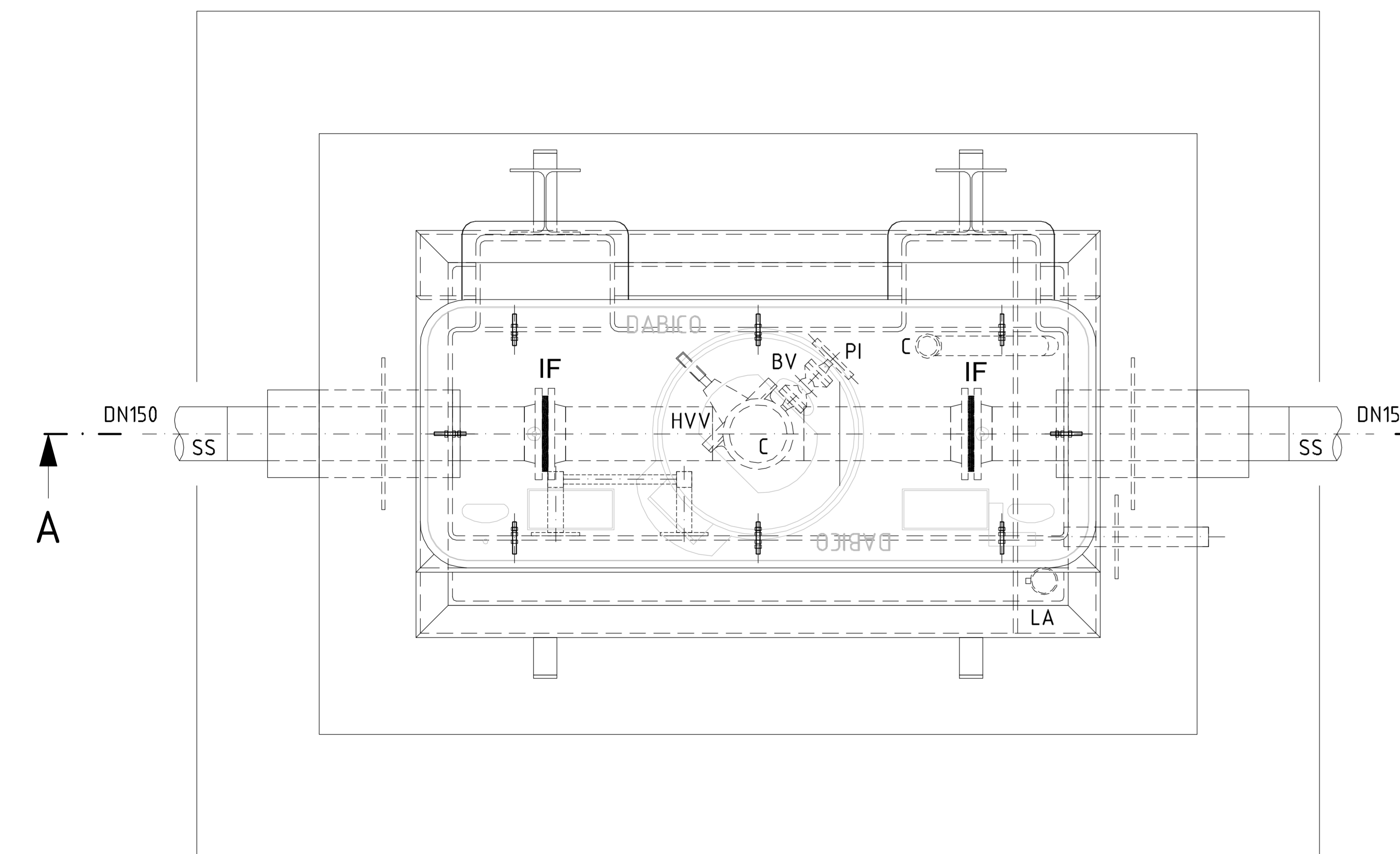
REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
HEADQUARTERS UNITED STATES AIR FORCES EUROPE ENGINEERING & OPERATIONS				
AIRFIELD STANDARD DESIGN US		FLUGPLATZ STANDARDPLANUNG US		
JET FUEL STORAGE AND DISPENSING SYSTEMS		FLUGKRAFTSTOFF - VERSORGENGSANLAGEN		
BUILDING BAUWERK				
TEST PIT (IN THE APRON) TESTSCHACHT (IN DER FLÄCHE)				
DESIGNATION: BESCHREIBUNG				
MECHANICAL INSTALLATION WITH INSULATING COUPLING TOP VIEW AND SECTION A-A, SECTION B-B MASCHINENTECHNISCHE INSTALLATION MIT ISOLIERKUPPLUNG DRAUFSICHT UND SCHNITT A-A, SCHNITT B-B				
WORKED/BEARBEITET	PREPARED/VERFASST	APPROVED/GEPRÜFT		
LAUSERSBETRIEB UNTERSUCHUNGS- UND BAUVERLEHUNG LEB-WERKLEISTUNGSLABOR	AMT FÜR BUNDESSBAU WALLSTR.1 55122 MANZ			
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAU MASSNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED GEPRÜFT	DATE DATUM	6. MAI 2015	SCALE MASSSTAB	1:10
ORIGINAL ISSUED BY IM ORIGINAL GEZ.			STANDARD SHEET STANDARD PLAN	
GENERAL INFO		M - 15.1		
CONSTRUCTION PROJECT BAU MASSNAHME		SHEET NO. BLATT NR.		



SECTION A-A  
SCHNITT A-A



TOP VIEW  
DRAUFSICHT



NOTES  
BEMERKUNG

THE DIAMETER OF PROTECTION PIPE MAY VARY IN DEPENDENCE OF MANUFACTURER'S SYSTEM.

DIE ANGEGEBENEN SCHUTZROHRENWEITEN KÖNNEN HERSTELLER-SPEZIFISCH VARIIEREN.  
ALLE ARMATUREN UND FLANSCHEN AUSGELEGT FÜR PN 16

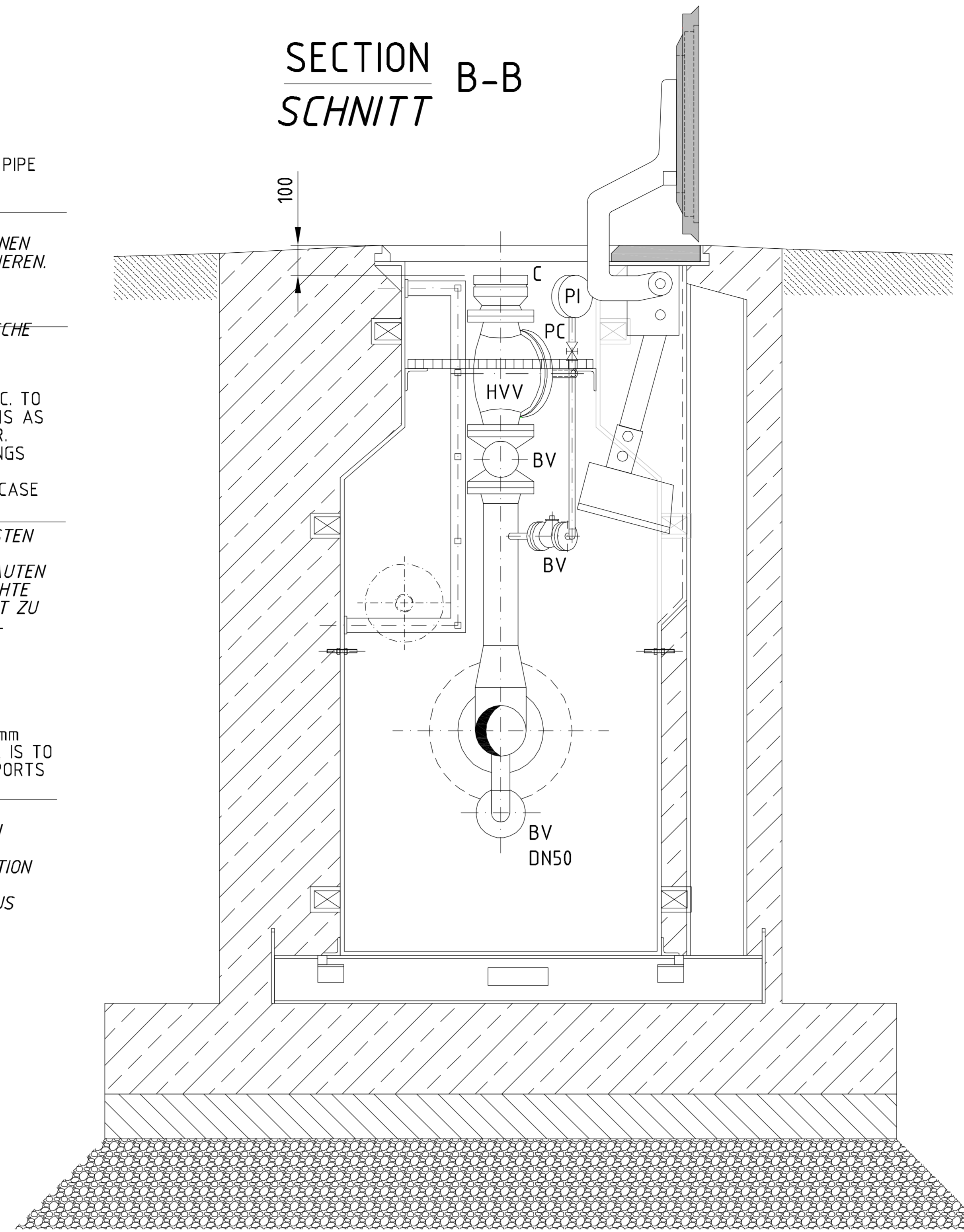
OPENINGS IN THE GRATINGS ACC. TO THE MECHANICAL INSTALLATIONS AS SELECTED BY THE CONTRACTOR. EASY REMOVAL OF THE GRATINGS SHALL BE GUARANTEED. THE GRATINGS NEXT TO THE STAIRCASE HAVE TO BE DROP-TYPE

ÖFFNUNGEN IN DEN GITTERROSTEN ENTSPRECHEND DEN MASCHINENTECHNISCHEN EINBAUTEN NACH WAHL DES AN DER LEICHTE AUSBAU DER GITTERRÖSTE IST ZU GEWAHRLEISTEN IM EINSTIEGSBEREICH SIND DIE RÖSTE KLAPPBAR AUSZUFÜHREN

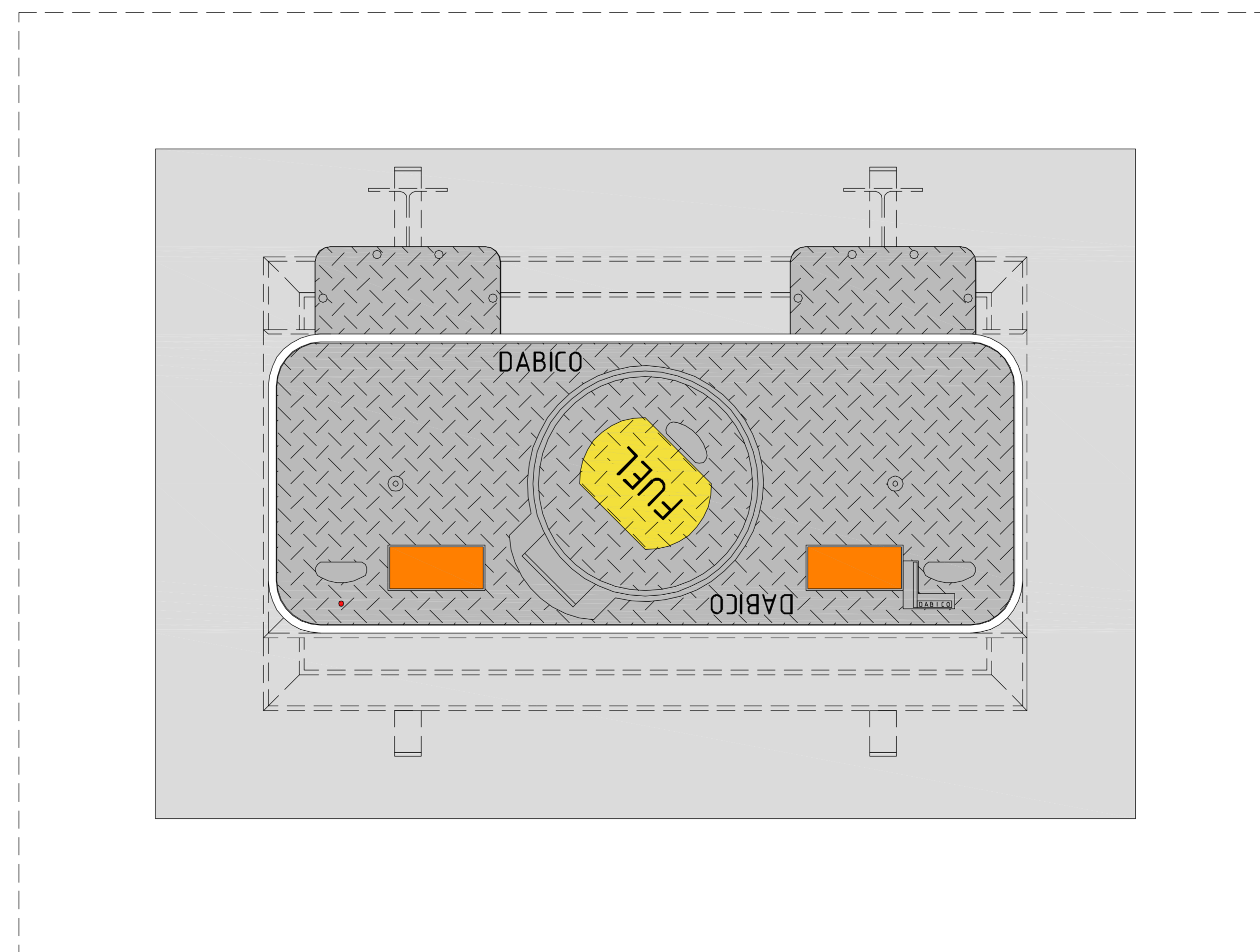
FOR SUPPORTS OF PIPES AN INSULATION PIECE, MADE OF 10mm THICK FUEL RESISTANT PLASTIC, IS TO PUT BETWEEN PIPES AND SUPPORTS OR HOLDERS.

BEI UNTERSTÜTZUNGEN VON ROHRLEITUNGEN IST ZWISCHEN ROHRLEITUNG UND UNTERSTÜTZUNGSKONSTRUKTION BZW. HALTERUNG EINE ISOLIERPLATTE 10mm DICK AUS KRAFTSTOFFBESTÄNDIGEN KUNSTSTOFF ZU LEGEN.

SECTION B-B  
SCHNITT B-B

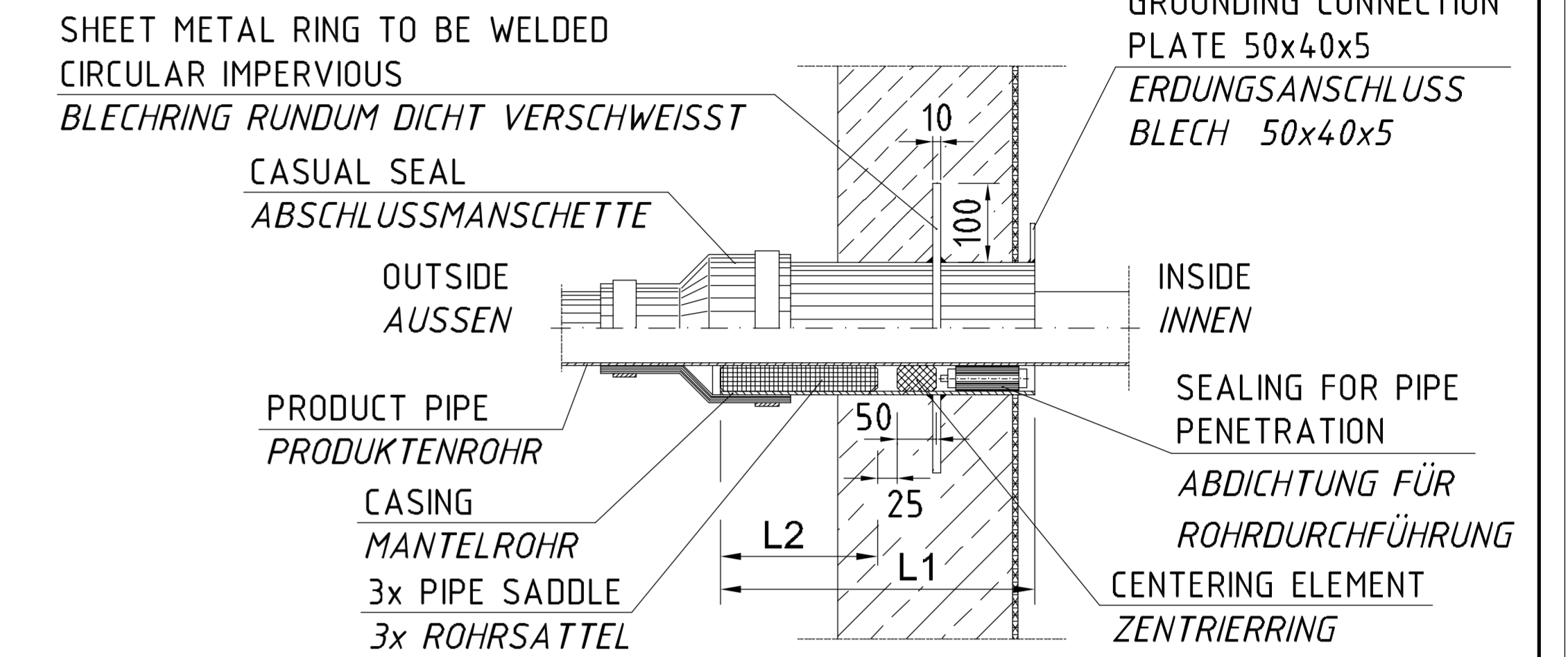


TOP VIEW  
DRAUFSICHT



PIPE PENETRATION  
ROHRDURCHFÜHRUNG

NOT TO SCALE / OHNE MASSTAB



PRODUCT PIPE ROHRLEITUNG	PRODUCT PIPE PRODUKTENROHR	CASING MANTELROHR	L1	L2
	mm	mm	mm	mm
DN300	ø323,9	ø419,0	600	250

LEGEND  
LEGENDE

- BV BALL VALVE  
KUGELHAHN
- C QUICK COUPLING STS-M125  
SCHNELLKUPPLUNG STS-M125
- HVV HYDRANT VALVE WITH VENTURI CONTROLLER  
HYDRANTENVENTIL MIT VENTURISTEUERUNG
- IF INSULATING FLANGE WITH EX-PROOF SPARK GAP  
ISOLIERFLANSCH MIT EX-FUNKENSTRECKE
- PC PRESSURE GAUGE STOPCOCK  
MANOMETERABSPERRVENTIL
- PI PRESSURE GAUGE WITH STOPCOCK  
MANOMETER MIT ABSPERRVENTIL
- CS STEEL  
STAHL
- SS STAINLESS STEEL  
CR-NI STAHL
- LA LIQUID PROBE  
FLÜSSIGKEITSSONDE

WARNING !

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DISCONNECT CATHODIC PROTECTION SYSTEM PRIOR STARTING WORKS ON PIPES !  
RE - ACTIVATE PROTECTIVE SYSTEM AS SOON AS WORKS ARE FINISH !

ACHTUNG !

ANLAGE KATHODISCH GESCHÜTZT !  
VOR ARBEITEN AM DEN ROHRLEITUNGEN, KATHODISCHE KORROSIONSSCHUTZANLAGE ABSCHALTEN !  
NACH BEENDEN DER ARBEITEN SOFORT WIEDER IN BETRIEB NEHMEN !

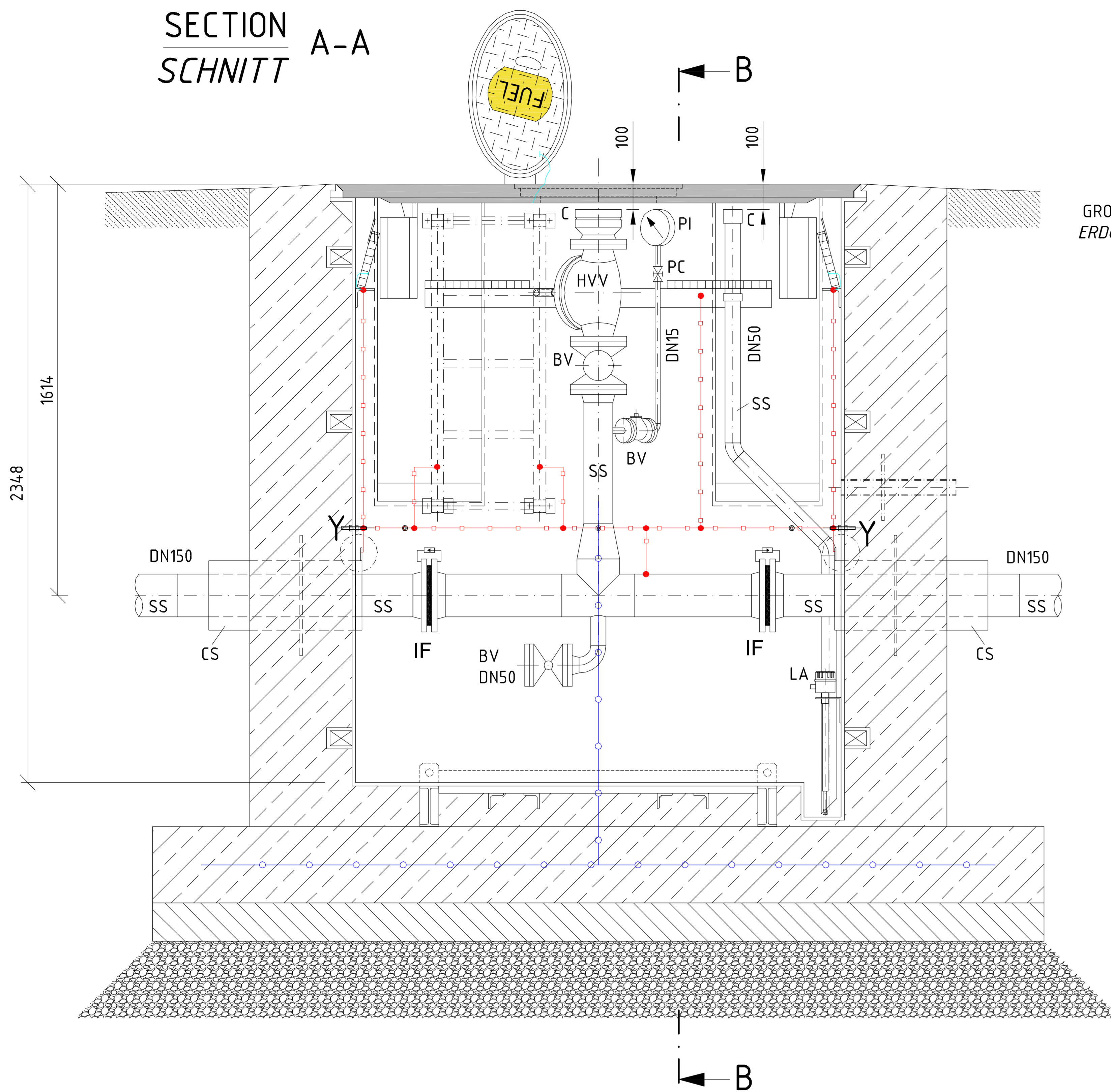
REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
HEADQUARTERS UNITED STATES AIR FORCES EUROPE ENGINEERING & OPERATIONS				
AIRFIELD STANDARD DESIGN US JET FUEL STORAGE AND DISPENSING SYSTEMS		FLUGPLATZ STANDARDFLUGPLAN US FLUGKRAFTSTOFF - VERSORGENGSANLAGEN		
BUILDING BAUWERK				
TEST PIT (IN THE APRON) TESTSCHACHT (IN DER FLÄCHE)				
DESIGNATION: BEZEICHNUNG				
MECHANICAL INSTALLATION WITH INSULATING FLANGE TOP VIEW AND SECTION A-A, SECTION B-B MASCHINENTECHNISCHE INSTALLATION MIT ISOLIERFLANSCH DRAUFSICHT UND SCHNITT A-A, SCHNITT B-B				
WORKED/BEARBEITET		PREPARED/VERFASST	APPROVED/GEPRÜFT	
LAWYER/RECHTSANWALT UND BAURECHNUNG		LEITER/LEITUNG	AMT FÜR BUNDESBAU	
LAWYER/RECHTSANWALT UND BAURECHNUNG		LEITER/LEITUNG	WALLSTR.1 55122 MARZ	
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAUMAßNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED GEPRÜFT	DATE DATUM	6. MAI 2015	SCALE MASSTAB	1:10
ORIGINAL ISSUED BY IN ORIGINAL SIZE	STANDARD SHEET STANDARD PLAN		M - 15.1	
CONSTRUCTION PROJECT BAUMAßNAHME	SHEET NO. BLATT NR.		OF VON	



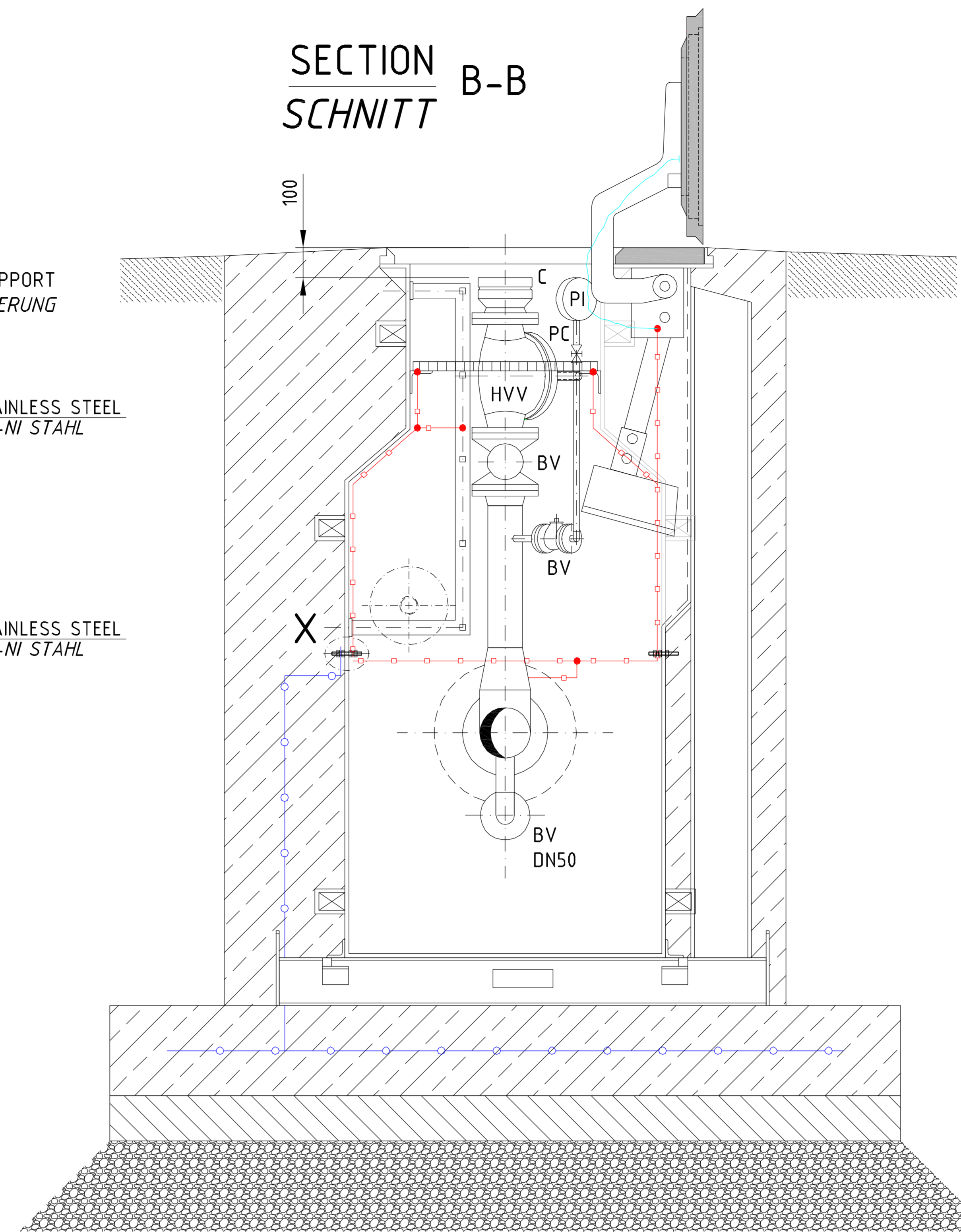




SECTION A-A  
SCHNITT A-A

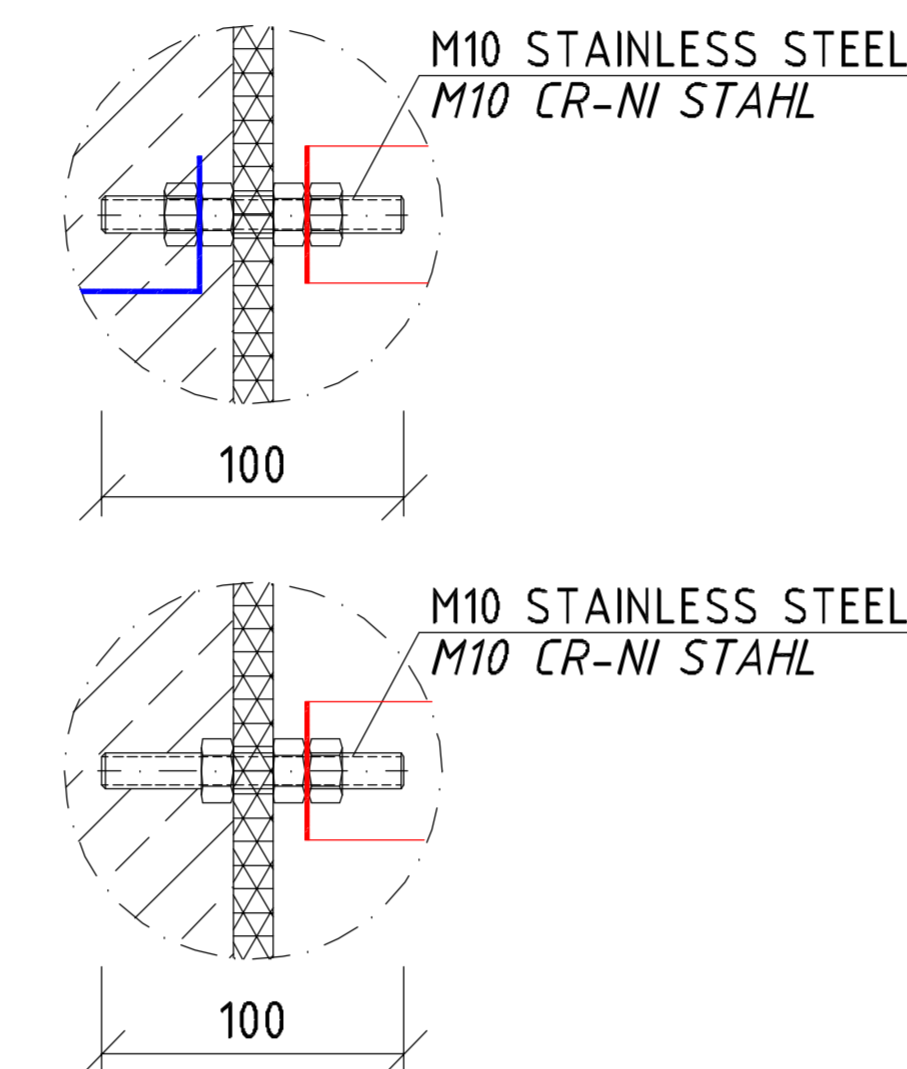


SECTION B-B  
SCHNITT B-B

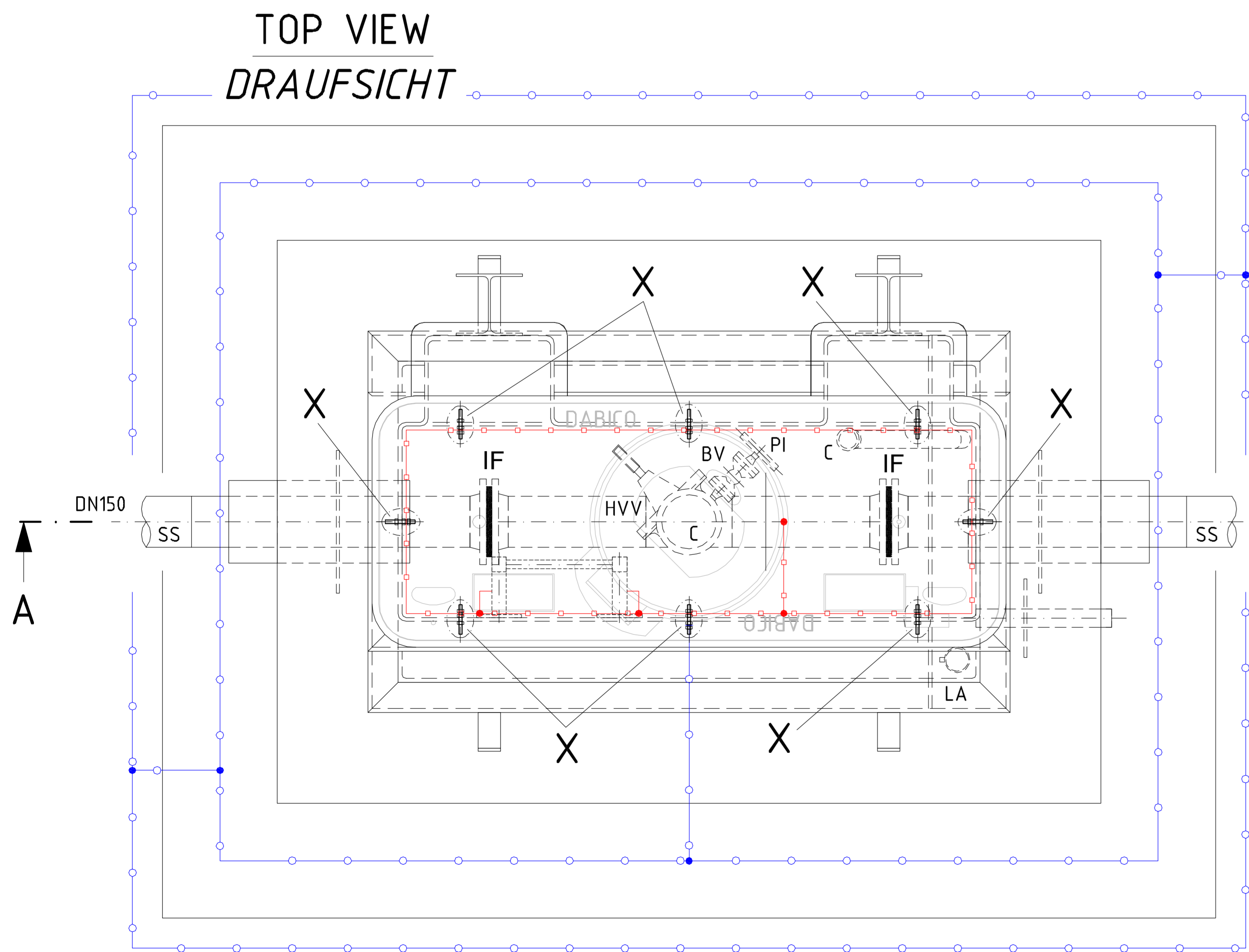


DETAIL "X"

GROUNDING CONNECTION AND SUPPORT  
ERDUNGSANSCHLUSS UND HALTERUNG  
NOT TO SCALE  
OHNE MASSTAB

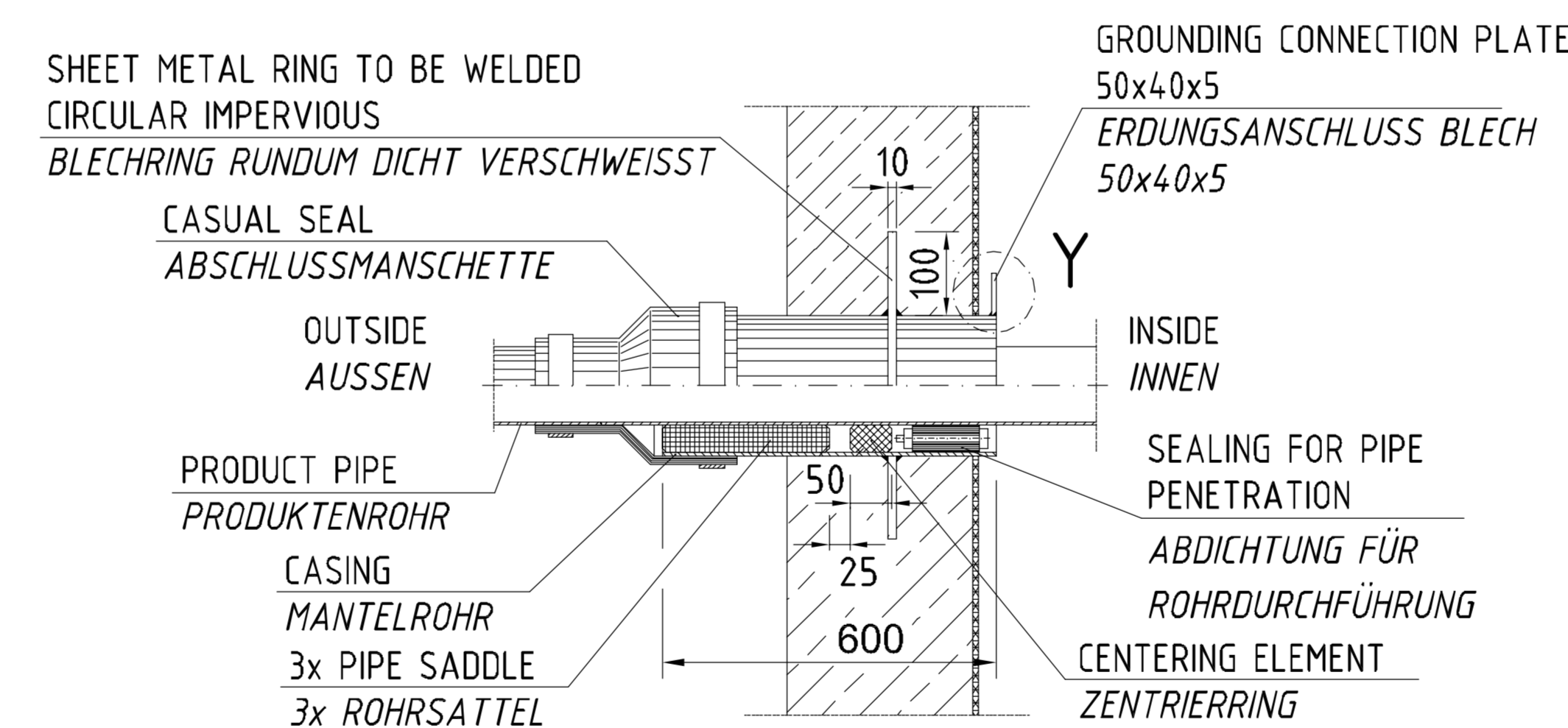


TOP VIEW  
DRAUFSICHT



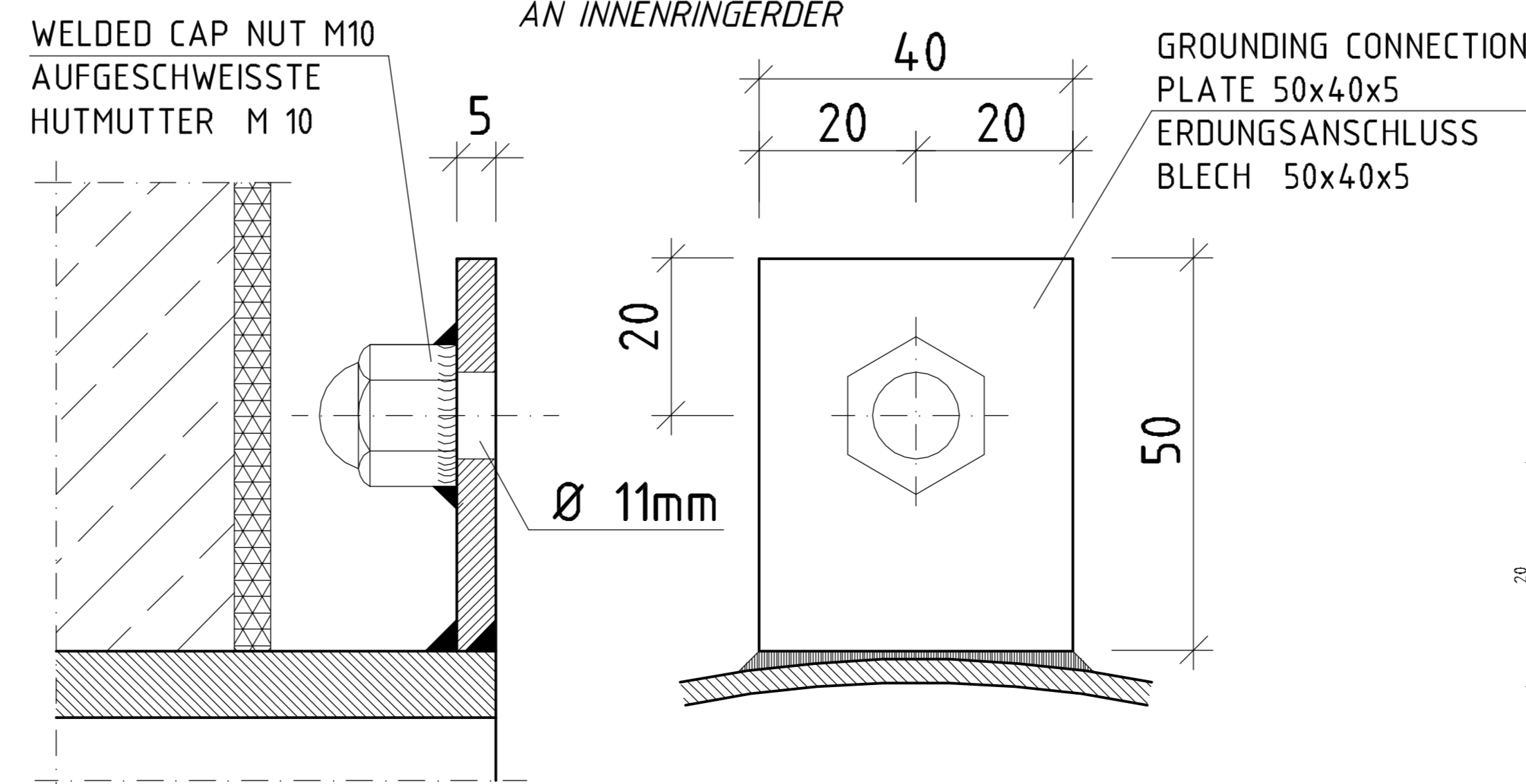
PIPE PENETRATION  
ROHRDURCHFÜHRUNG

NOT TO SCALE / OHNE MASSTAB



DETAIL "Y"

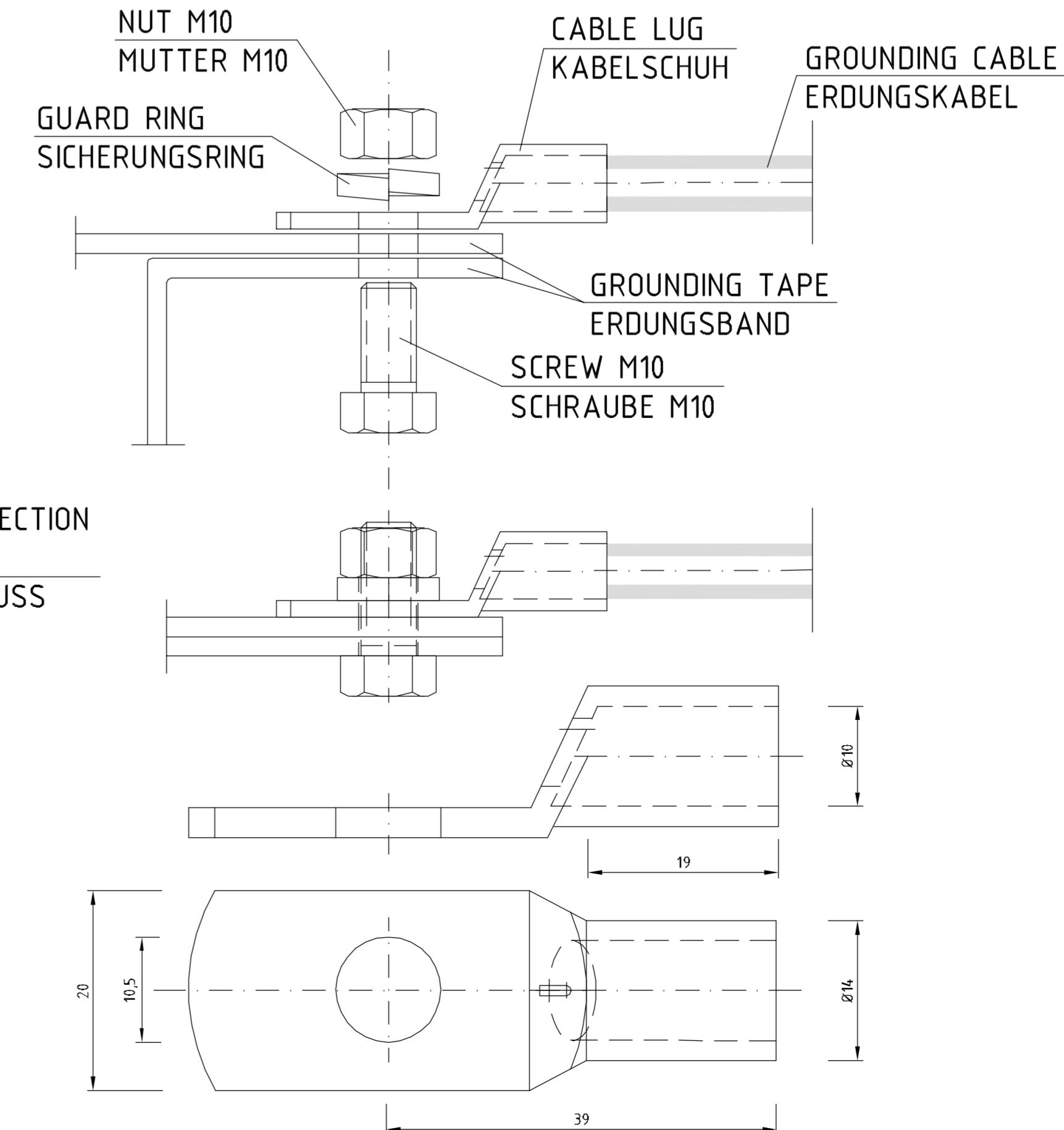
GROUNDING CONNECTION CASING ON INTERNAL RING  
ERDUNGSANSCHLUSS MANTELROHR AN INNENRINGERDER



DETAIL CONNECTION TO GROUNDING  
ANSCHLUSS ERDUNG

NO SCALE / OHNE MASSTAB

GROUNDING CABLE WITH CABLE LUG AND SCREW CONNECTION M10 WITH GUARD RING  
ERDUNGSKABEL MIT KABELSCHUH UND SCHRAUBVERBINDUNG M10 MIT SICHERUNGSRING



LEGEND

LEGENDE

- BV BALL VALVE  
KUGELHAHN
- C QUICK COUPLING STS-M125  
SCHNELLKUPPLUNG STS-M125
- HVV HYDRANT VALVE WITH VENTURI CONTROLLER  
HYDRANTENVENTIL MIT VENTURISTEUERUNG
- IF INSULATING FLANGE WITH EX-PROOF SPARK GAP  
ISOLIERFLANSCH MIT EX-FUNKENSTRECKE
- PC PRESSURE GAUGE STOPCOCK  
MANOMETERABSPERRVENTIL
- PI PRESSURE GAUGE WITH STOPCOCK  
MANOMETER MIT Absperrventil
- PR PRESSURE EQUALIZING RESERVOIR  
DRUCKSTOSSDÄMPFER
- SPL SPADE PLATE  
BRILLENSTECKSCHEIBE
- CS STEEL  
STAHL
- SS STAINLESS STEEL  
CR-NI STAHL
- LA LIQUID PROBE  
FLÜSSIGKEITSSONDE
- EXP. PROOF SPARK GAP  
EX-FUNKENSTRECKE
- STEEL STRIP 30 x 3,5mm IN CONCRETE  
(STAINLESS STEEL, MATERIAL NO. 1457)  
BANDSTAHL 30 x 3,5mm IM BETON  
(EDELSTAHL, WERKSTOFF NR. 1457)
- STEEL STRIP 30 x 3,5mm  
(STAINLESS STEEL, MATERIAL NO. 1457)  
BANDSTAHL 30 x 3,5mm  
(EDELSTAHL, WERKSTOFF NR. 1457)
- GROUNDING CABLE H01N2-D50  
ERDUNGSKABEL H01N2-D50

WARNING !

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ACHTUNG !

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VOR ARBEITEN AM DEN ROHRLEITUNGEN, KATHODISCHE KORROSIONSSCHUTZANLAGE ABSCHALTEN !  
NACH BEENDEN DER ARBEITEN SOFORT WIEDER IN BETRIEB NEHMEN !

REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
HEADQUARTERS UNITED STATES AIR FORCES EUROPE ENGINEERING & OPERATIONS				
AIRFIELD STANDARD DESIGN US		FLUGPLATZ STANDARDBLÄNNE US		
JET FUEL STORAGE AND DISPENSING SYSTEMS		FLUGKRAFTSTOFF-VERSORGSANLAGEN		
BUILDING BAUWERK	TEST PIT (IN THE APRON) TESTSCHAFT (IN DER FLÄCHE)			
DESIGNATION BEZUGSBEZEICHNUNG	GROUNDING AND LIGHTNING PROTECTION PLAN TOP VIEW AND SECTIONS WITH INSULATING FLANGE ERDUNGS- UND BLITZSCHUTZPLAN DRAUFSICHT UND SCHNITTE MIT ISOLIERFLANSCH			
WORKED/REARBEITET	PREPARED/AUFGESTELLT	APPROVED/GENEHRIGT	AMT FÜR BUNDESBAU WALLSTR.1 55122 MAINZ	
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAU MASSNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED GENEHRIGT	DATE DATUM	6. MAI 2015	SCALE MASSTAB	1:10
ORIGINAL DESIGNED BY ENTWURFEN VON			STANDARD SHEET STANDARDBLÄTTER	E - 15.1
CONSTRUCTION PROJECT BAU MASSNAHME				SHEET NO. BLÄTTER NR.



# FLUSHING PIT SPÜLSCHACHT

16

- C-16.1** CONSTRUCTION PLAN  
*BAUKONSTRUKTIONSPLAN*
- C-16.2** DETAILS, CONSTRUCTION PLAN  
DETAILS, *BAUKONSTRUKTIONSPLAN*
- S-16.2** ROLLING COVER  
ROLLDECKEL
- M-16.1** MECHANICAL INATALLATION  
MASCHINENTECHNISCHE INSTALLATION
- E-16.1** GROUNDING AND LIGHTNING PROTECTION PLAN  
ERDUNGS- UND BLITZSCHUTZPLAN
- E-16.2** GROUNDING AND LIGHTNING PROTECTION PLAN, DETAILS  
ERDUNGS- UND BLITZSCHUTZPLAN, DETAILS















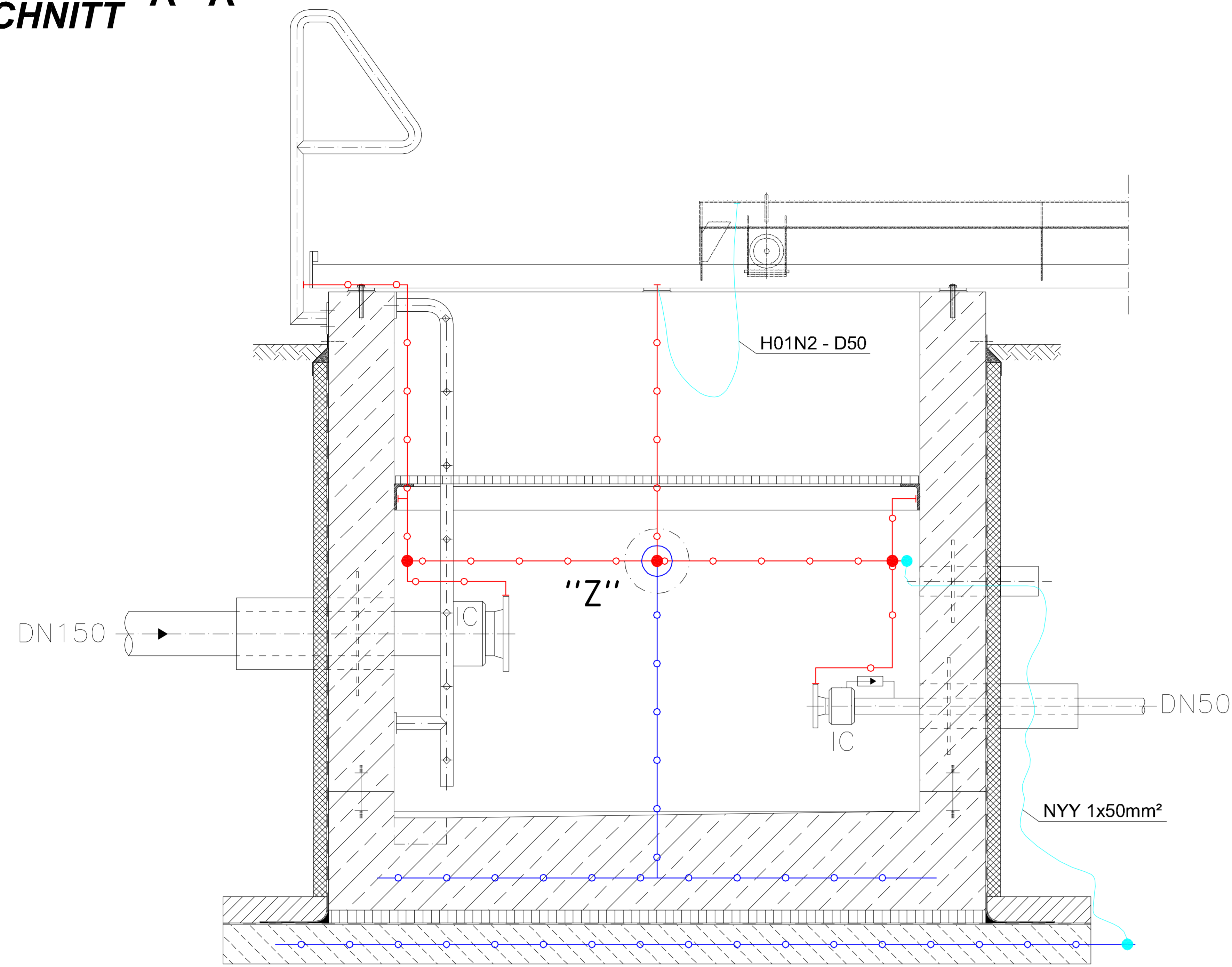




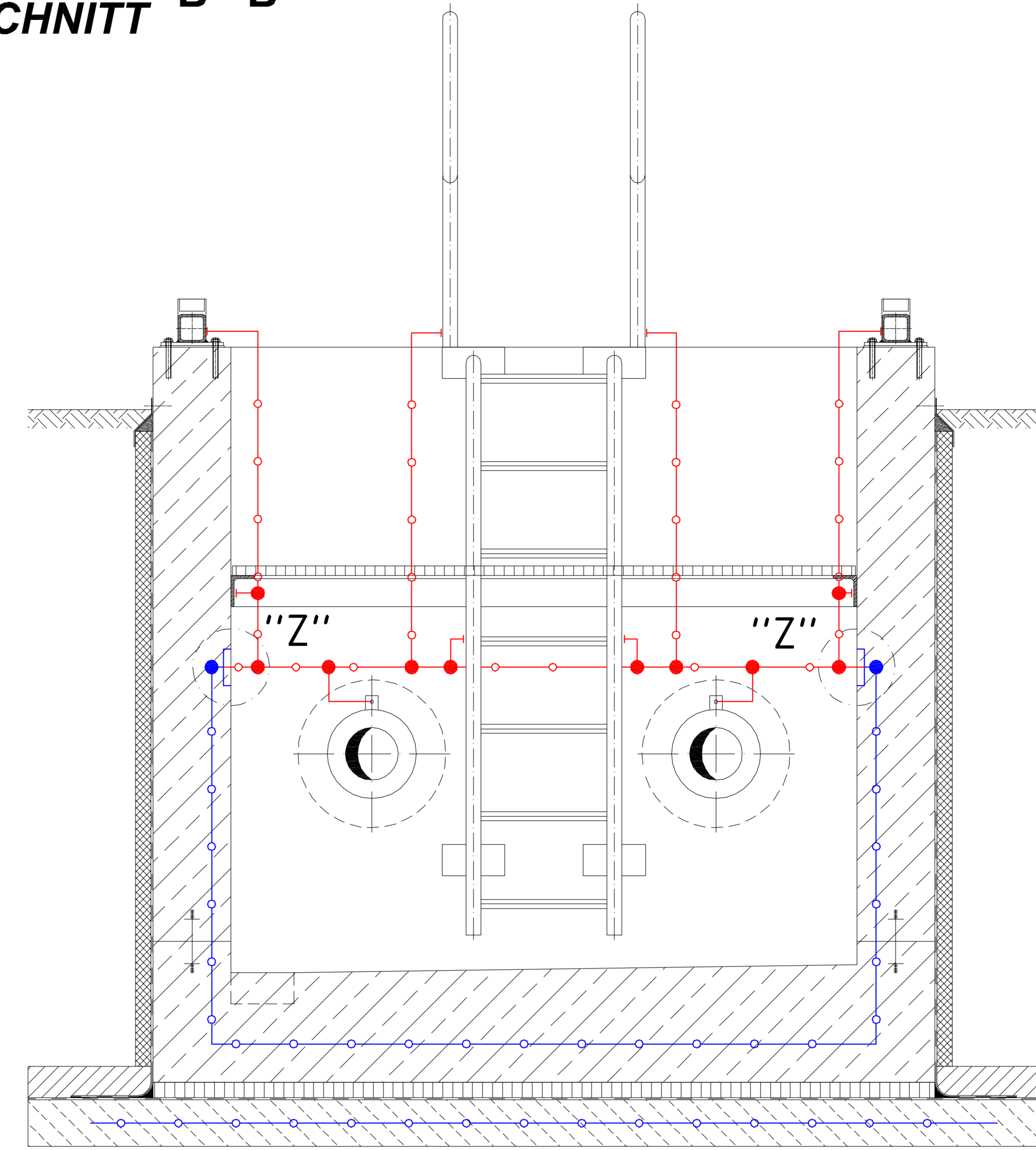




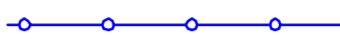



**SECTION  
SCHNITT A - A**



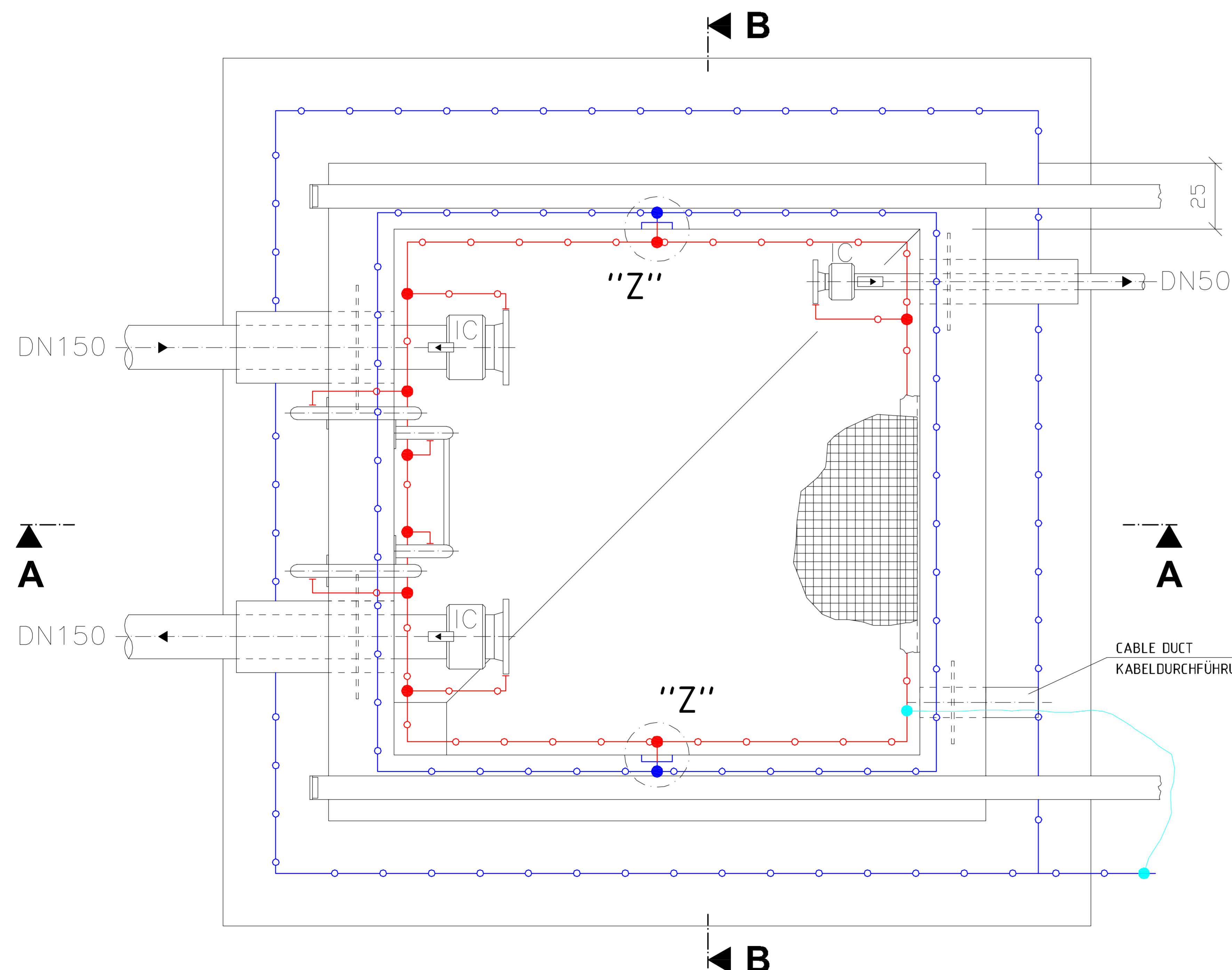
**SECTION  
SCHNITT B - B**



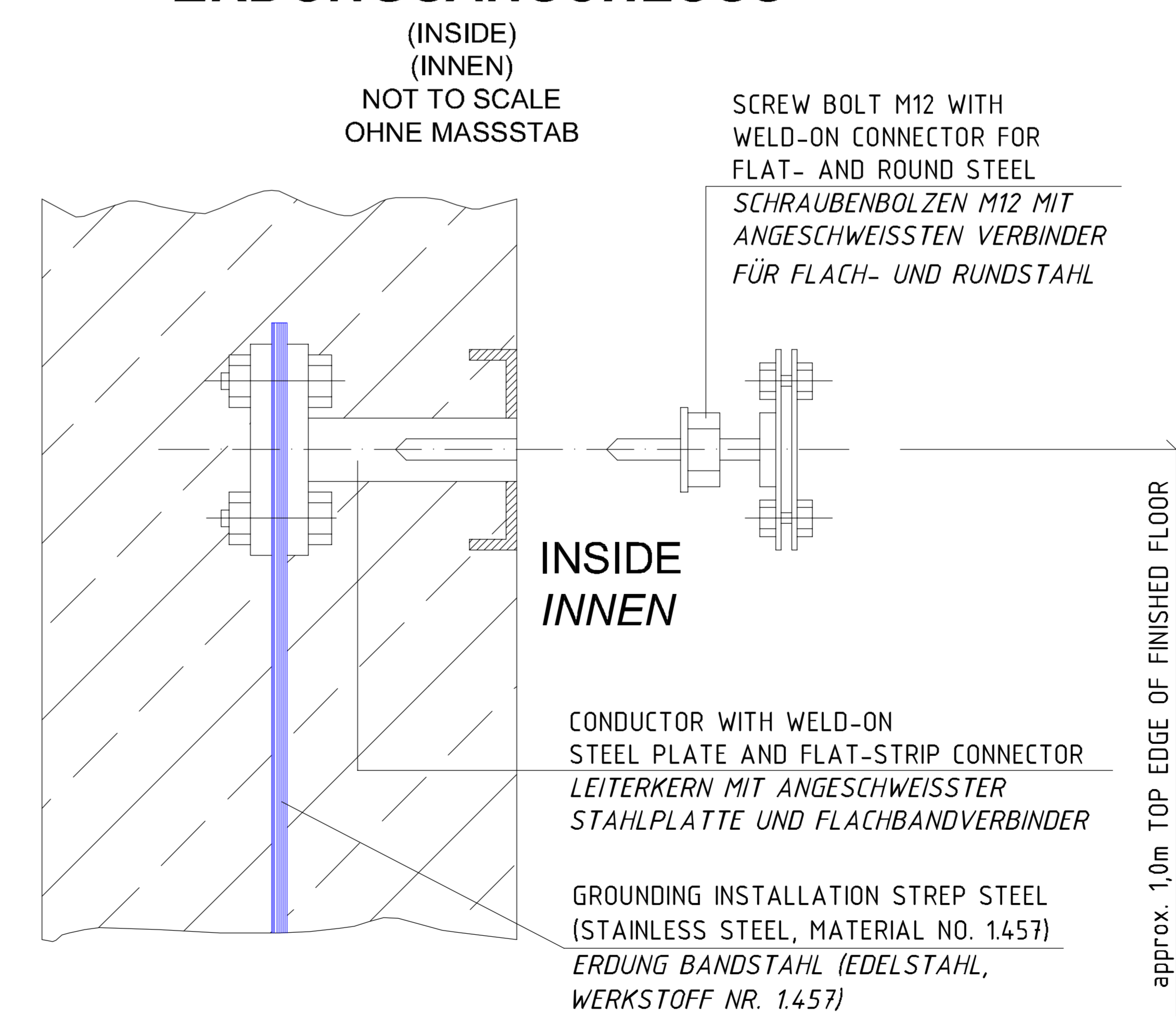
**LEGEND  
LEGENDE**

-  STEEL STRIP 30 x 3,5mm IN CONCRETE / IN EARTH  
(STAINLESS STEEL, MATERIAL NO. 1.457)  
BANDSTAHL 30 x 3,5mm IM BETON / IM ERDREICH  
(EDELSTAHL, WERKSTOFF NR. 1.457)
-  GALV. STEEL STRIP 30 x 3,5mm SURFACE - MOUNTED  
VERZ. BANDSTAHL 30 x 3,5mm AUF PUTZ
-  GROUNDING CABLE  
ERDUNGSKABEL
-  ISULATING COUPLING  
ISOLIERKUPPLUNG

**TOP VIEW  
DRAUFSICHT**



**DETAIL "Z"  
GROUNDING CONNECTION  
ERDUNGSANSCHLUSS**



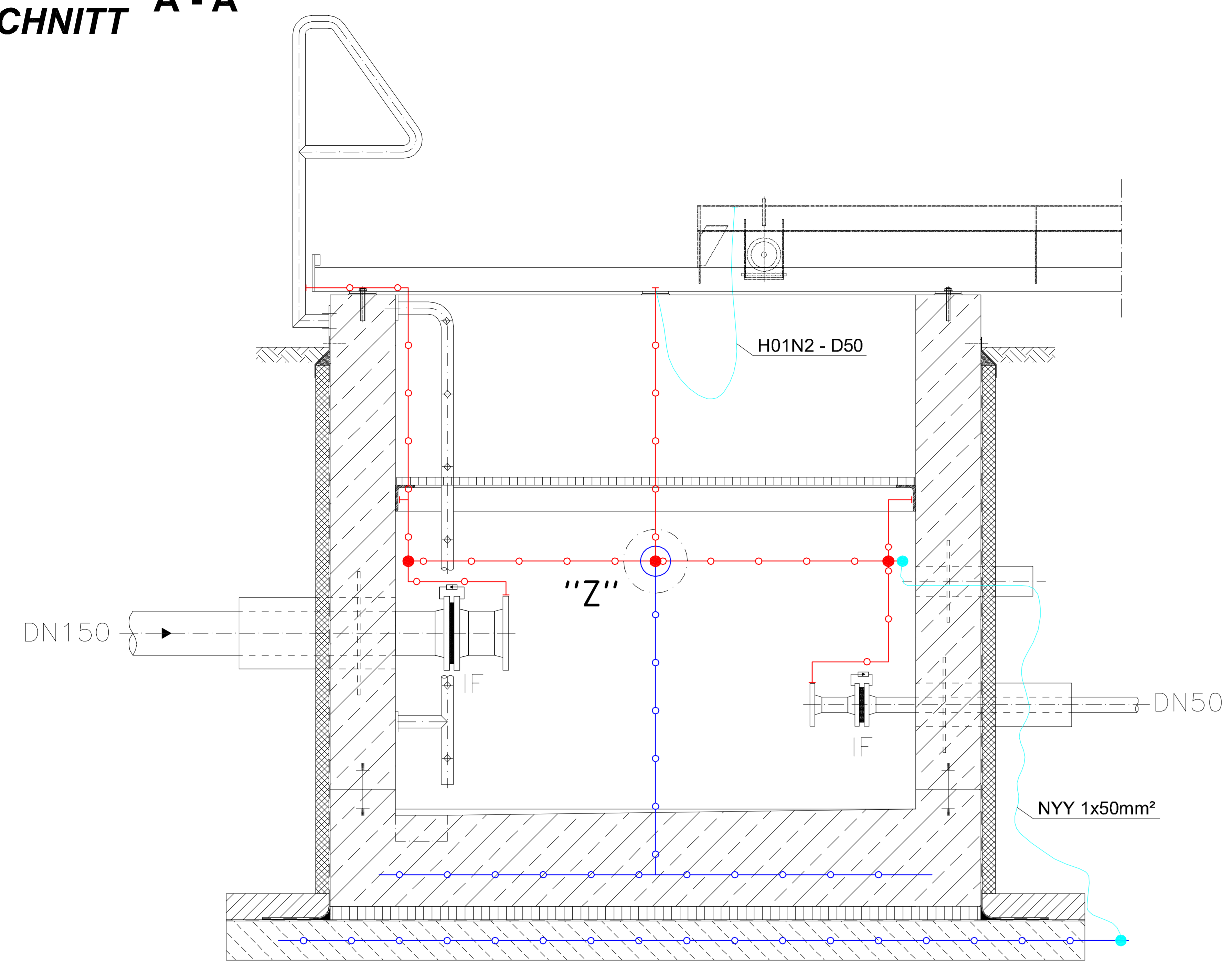
**PERTINENT DRAWINGS  
ZUGEHÖRIGE ZEICHNUNGEN**

E-16.2 GROUNDING AND LIGHTNING PLAN DETAILS  
ERDUNGS- UND BLITZSCHUTZPLAN DETAILS

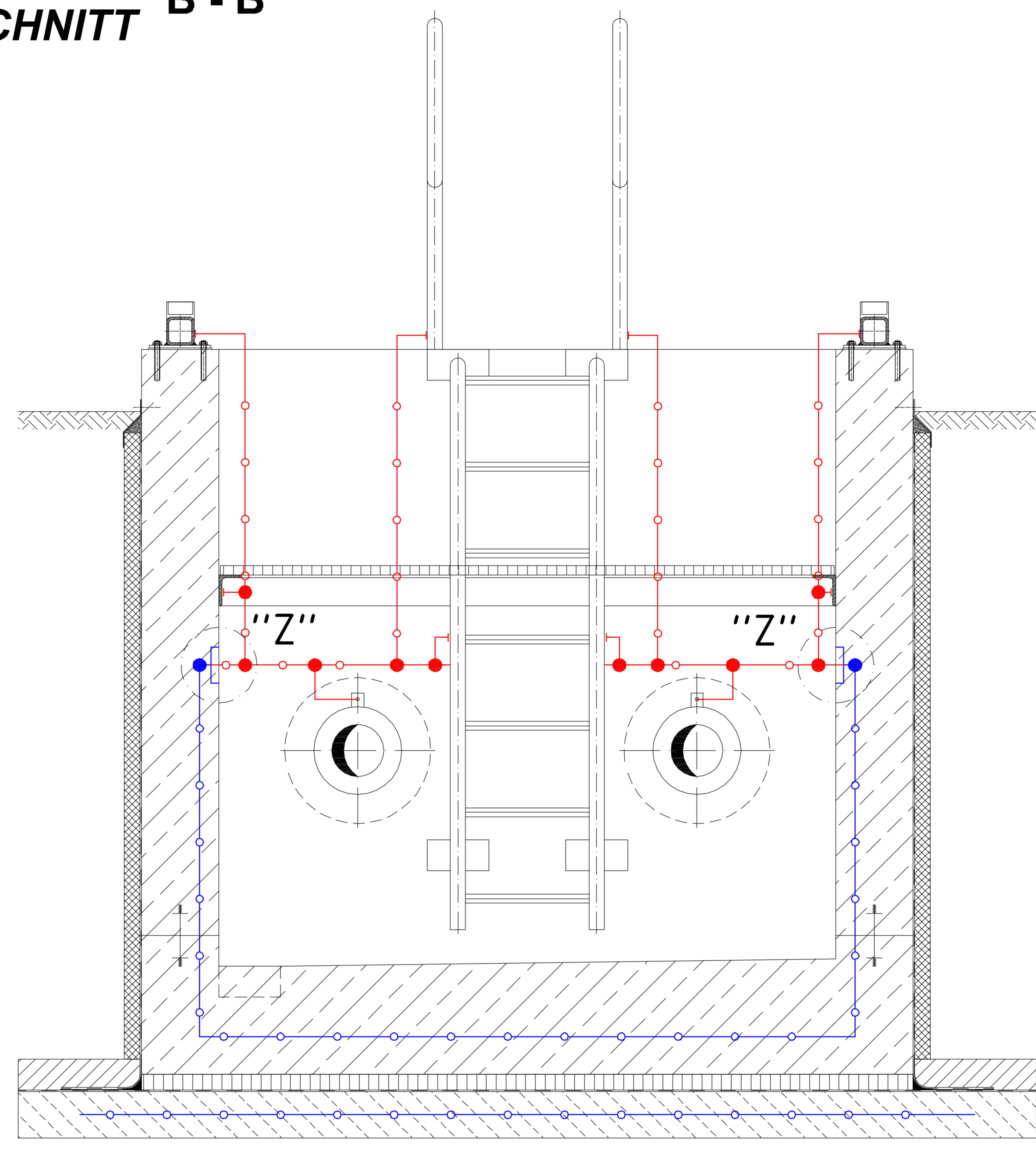
REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
HEADQUARTERS UNITED STATES AIR FORCES EUROPE ENGINEERING & OPERATIONS				
AIRFIELD STANDARD DESIGN US		FLUGPLATZ STANDARDPLANUNG US		
JET FUEL STORAGE AND DISPENSING SYSTEMS		FLUGKRAFTSTOFF - VERSORGUNGSANLAGEN		
BUILDING BAUWERK				
FLUSHING PIT SPÜLSCHACHT				
DESIGNATOR BEZEICHNUNG				
GROUNDING AND LIGHTNING PROTECTION PLAN WITH ISULATING COUPLING ERDUNG- UND BLITZSCHUTZPLAN MIT ISOLIERKUPPLUNG				
WORKED/REARBEITET	PREPARED/HERGESTELLT	APPROVED/GENEHMIGT		
LANDSCHAFTS- UND BAUWERKE UND BAUELEMENTE UND BAUELEMENTE UND BAUELEMENTE	LANDSCHAFTS- UND BAUWERKE UND BAUELEMENTE UND BAUELEMENTE	AMT FÜR BUNDESBAU WALLSTR.1 55122 MAINZ		
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAU MASSNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED GENEHMIGT	DATE DATUM	SCALE MASSSTAB		
	6. MAI 2015	1:10		
ORIGINAL DESIGNED BY IN ORIGINAL DES.			STANDARD SHEET STANDARD PLAN	
DESIGNER'S NAME CONTRACTING ENGINEER IN ORIGINAL DES.			E - 16.1	
CONSTRUCTION PROJECT BAU MASSNAHME			SHEET NO. PLATZ NR.	



**SECTION  
SCHNITT A - A**

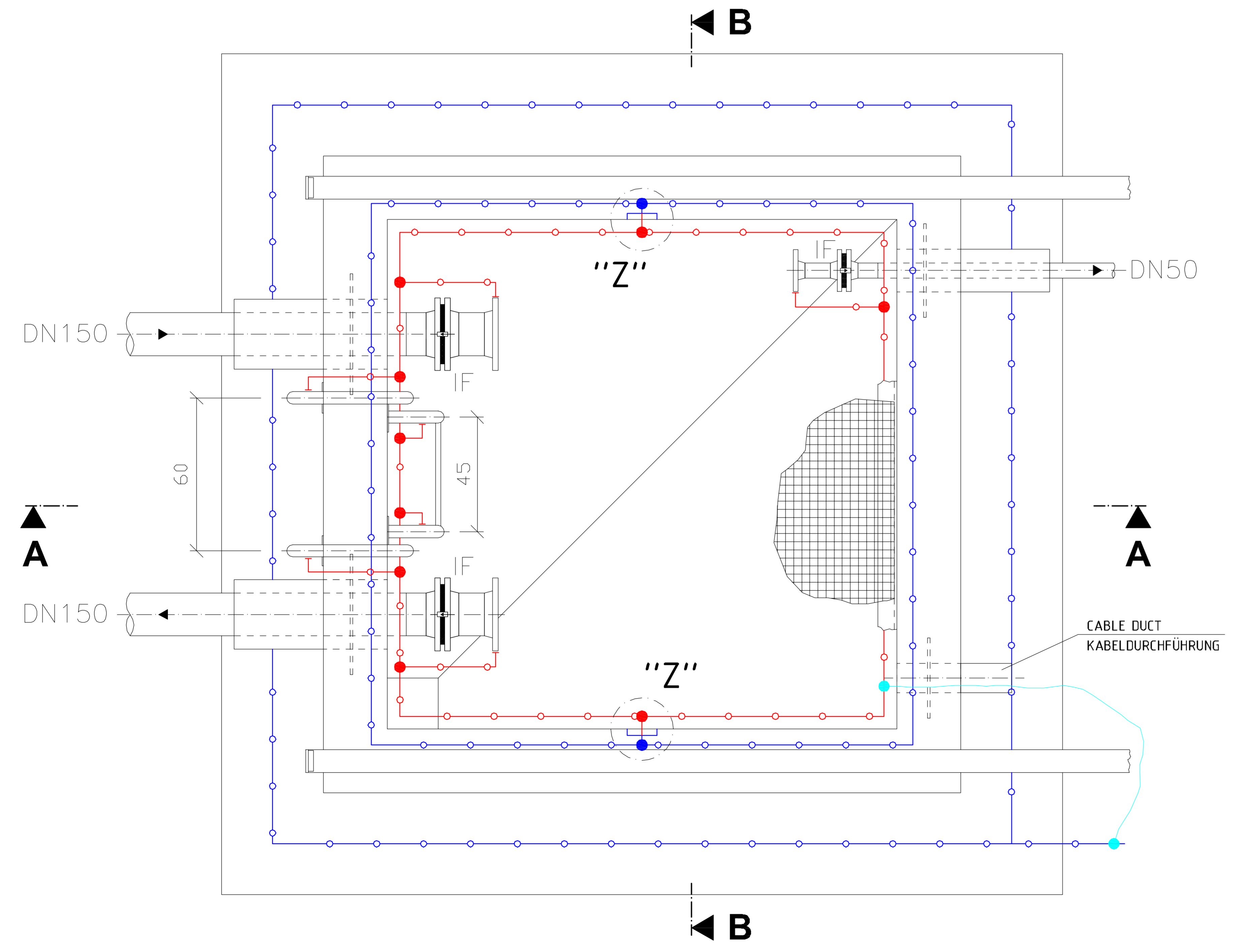


**SECTION  
SCHNITT B - B**

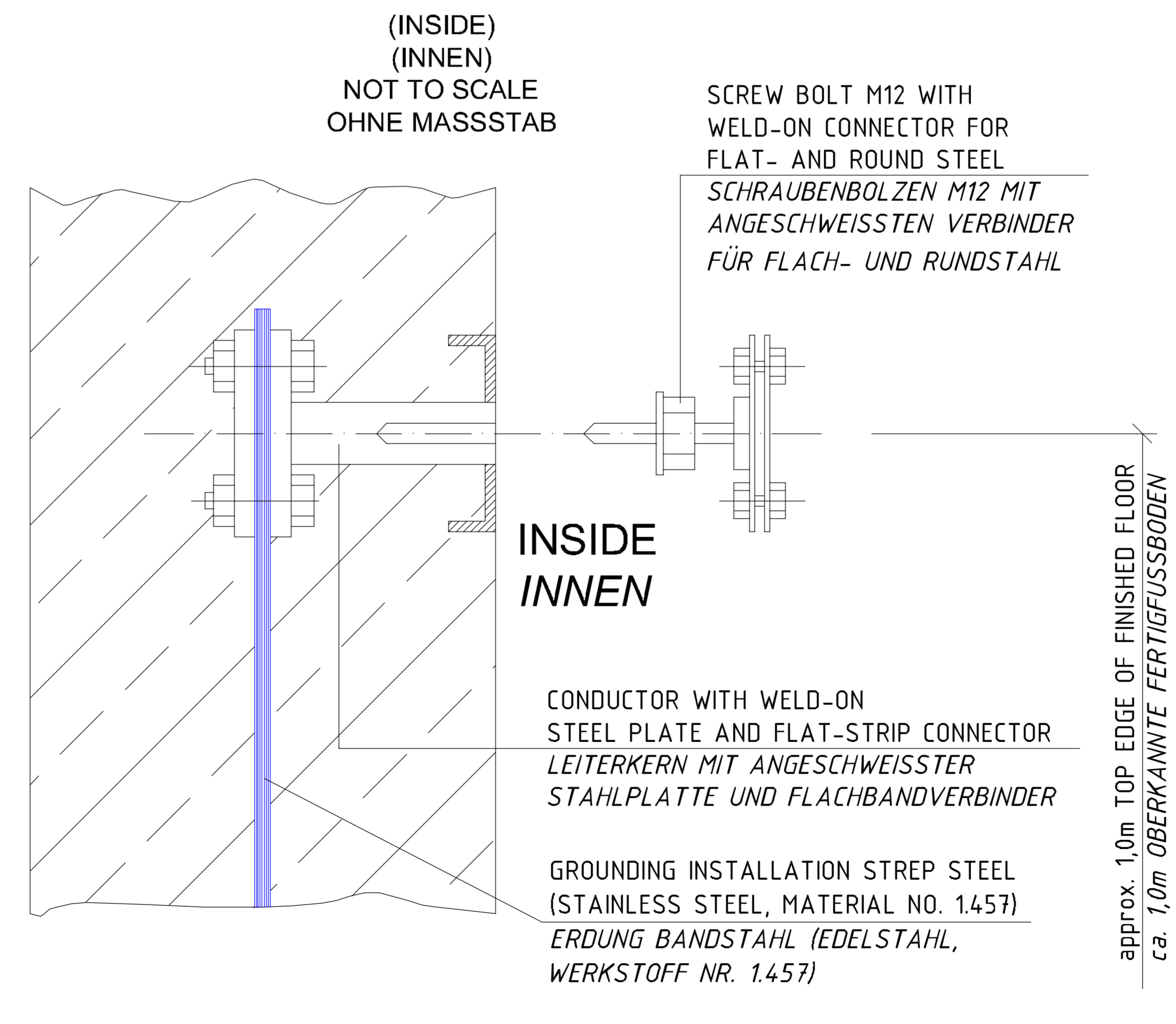


- LEGEND  
LEGENDE**
- STEEL STRIP 30 x 3,5mm IN CONCRETE / IN EARTH  
(STAINLESS STEEL, MATERIAL NO. 1.457)  
BANDSTAHL 30 x 3,5mm IM BETON / IM ERDREICH  
(EDELSTAHL, WERKSTOFF NR. 1.457)
  - GALV. STEEL STRIP 30 x 3,5mm SURFACE - MOUNTED  
VERZ. BANDSTAHL 30 x 3,5mm AUF PUTZ
  - GROUNDING CABLE  
ERDUNGSKABEL
  - ISULATING FLANGE  
ISOLIERFLANSCH

**TOP VIEW  
DRAUFSICHT**



**DETAIL "Z"  
GROUNDING CONNECTION  
ERDUNGSANSCHLUSS**



approx. 1,0m TOP EDGE OF FINISHED FLOOR  
ca. 1,0m OBERKANTE FERTIGFUSSBODEN

**PERTINENT DRAWINGS  
ZUGEHÖRIGE ZEICHNUNGEN**

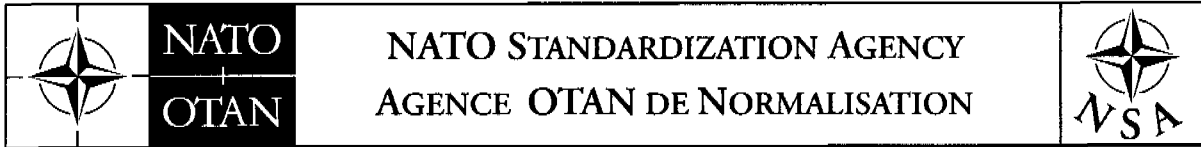
E-16.2 GROUNDING AND LIGHTNING PLAN DETAILS  
ERDUNGS- UND BLITZSCHUTZPLAN DETAILS

REVISION ÄNDERUNG	DATE DATUM	DESCRIPTION BESCHREIBUNG	BY VON	COUNTRY LAND
<b>HEADQUARTERS</b>				
UNITED STATES AIR FORCES EUROPE				
<b>ENGINEERING &amp; OPERATIONS</b>				
AIRFIELD STANDARD DESIGN US			FLUGPLATZ STANDARDPLANUNG US	
JET FUEL STORAGE AND DISPENSING SYSTEMS			FLUGKRAFTSTOFF - VERSORGUNGSANLAGEN	
BUILDING BAUWERK				
FLUSHING PIT SPÜLSCHACHT				
DESIGNATOR BEZEICHNUNG				
GROUNDING AND LIGHTNING PROTECTION PLAN WITH ISULATING FLANGE ERDUNG- UND BLITZSCHUTZPLAN MIT ISOLIERFLANSCH				
WORKED/REARBEITET		PREPARED/ANGEFERTIGT	APPROVED/GENEHMIGT	
LARGE/GRÖßE: LIEFERMENGEN- UND BAUBEREICH L A B		AMT FÜR BUNDESBAU		
ANSCHEFT/ ANSCHLÜSSE: 1. PUNKT ANSCHLÜß TYPISCH (SIEHE AUCH FÜR PLANEN/ANSCHLÜß)		WALLSTR.1 55122 MAINZ		
LAND: DE		ORIGINAL, STORED BY: IN ORIGINAL, GEZ. NOVEMBER 2012		
INTRODUCED FOR CONSTRUCTION PROJECTS IN EUROPE (EXCEPT GERMANY) EINGEFÜHRT FÜR BAU MASSNAHMEN IN EUROPA (AUSSER DEUTSCHLAND)				
APPROVED GENEHMIGT	DATE DATUM	6. MAI 2015		SCALE MASSSTAB
ORIGINAL, STORED BY: IN ORIGINAL, GEZ.				1:10
STANDARD SHEET STANDARD PLAN				E - 16.1
CONSTRUCTION PROJECT BAU MASSNAHME				SHEET NO. PLATZ NR.
				OF VON









19 June 2008

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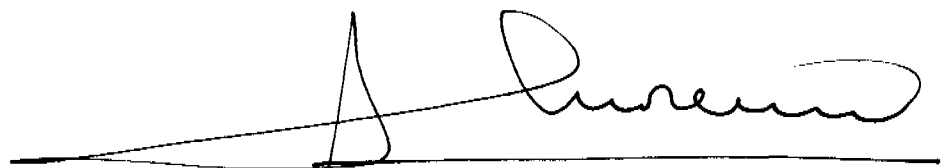
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**STANAG 3609 DPP (EDITION 5) – STANDARDS FOR MAINTENANCE OF FIXED AVIATION FUEL RECEIPT, STORAGE AND DISPENSING SYSTEMS**

Reference:

NSA/0849-DPP/3609 dated 21 September 2005 (Edition 4)

1. The enclosed NATO Standardization Agreement, which has been ratified by nations as reflected in the NATO Standardization and Documentation Database (NSDD), is promulgated herewith.
2. The reference listed above is to be destroyed in accordance with local document destruction procedures.
3. The NATO Pipeline Committee (AC/112) considers this an editorial edition of the STANAG; previous ratifying references and implementation details are deemed to be valid.



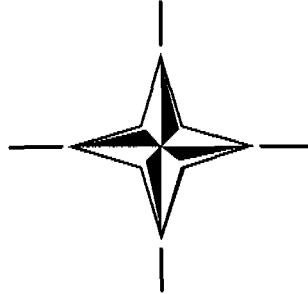
Juan A. MORENO  
Vice Admiral, ESP(N)  
Director, NATO Standardization Agency

Enclosure:

STANAG 3609 (Edition 5)



**NORTH ATLANTIC TREATY ORGANIZATION  
(NATO)**

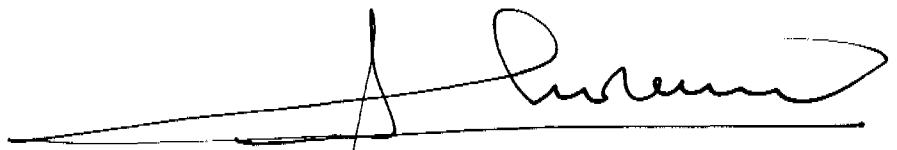


**NATO STANDARDIZATION AGENCY  
(NSA)**

**STANDARDIZATION AGREEMENT  
(STANAG)**

**SUBJECT: STANDARDS FOR MAINTENANCE OF FIXED AVIATION  
FUEL, RECEIPT, STORAGE AND DISPENSING SYSTEMS**

Promulgated on 19 June 2008



Juan A. MORENO  
Vice Admiral, ESP(N)  
Director, NATO Standardization Agency



RECORD OF AMENDMENTS

No.	Reference/date of Amendment	Date Entered	Signature

EXPLANATORY NOTES

AGREEMENT

1. This NATO Standardization Agreement (STANAG) is promulgated by the Director NATO Standardization Agency under the authority vested in him by the NATO Standardization Organisation Charter.
2. No departure may be made from the agreement without informing the tasking authority in the form of a reservation. Nations may propose changes at any time to the tasking authority where they will be processed in the same manner as the original agreement.
3. Ratifying nations have agreed that national orders, manuals and instructions implementing this STANAG will include a reference to the STANAG number for purposes of identification.

RATIFICATION, IMPLEMENTATION AND RESERVATIONS

4. Ratification, implementation and reservation details are available on request or through the NSA websites (internet <http://nsa.nato.int>; NATO Secure WAN <http://nsa.hq.nato.int>).

FEEDBACK

5. Any comments concerning this publication should be directed to NATO/NSA – Bvd Leopold III - 1110 Brussels - BEL.



NATO STANDARDIZATION AGREEMENT  
(STANAG)

STANDARDS FOR MAINTENANCE OF FIXED AVIATION FUEL, RECEIPT  
STORAGE AND DISPENSING SYSTEMS

- Annexes:
- A. Description, Definitions and Terminology for Fixed Jet Fuel Storage Installations
  - B. Required Preventive and Field Maintenance Services and Inspections
  - C. Guidance for Frequency of Periodic Inspections and Maintenance Services
  - D. Guidance for Entry, Inspection, Cleaning and Repair of Jet Fuel Storage Tanks

Related Documents:

- STANAG 1135 DPP - INTERCHANGEABILITY OF FUELS, LUBRICANTS AND ASSOCIATED PRODUCTS USED BY THE ARMED FORCES OF THE NORTH ATLANTIC TREATY NATIONS
- STANAG 3149 DPP - MINIMUM QUALITY SURVEILLANCE OF PETROLEUM PRODUCTS
- STANAG 3583 DPP - STANDARDS OF ACCURACY FOR DIFFERENTIAL PRESSURE GAUGES FOR AVIATION FUEL FILTERS AND FILTER SEPARATOR VESSELS
- STANAG 3681 DPP - CRITERIA FOR PRESSURE FUELLING/DEFUELLING OF AIRCRAFT
- STANAG 3747 DPP - GUIDE SPECIFICATIONS (MINIMUM QUALITY STANDARDS) FOR AVIATION TURBINE FUELS (F-34, F-35, F-40 AND F-44)
- STANAG 3756 DPP - FACILITIES AND EQUIPMENT FOR RECEIPT AND DELIVERY OF LIQUID FUELS
- STANAG 3967 DPP - DESIGN AND PERFORMANCE REQUIREMENTS FOR AVIATION FUEL FILTER SEPARATOR VESSELS AND COALESCER AND SEPARATOR ELEMENTS
- SHAPE 6160/18-6-176/64 - MAINTENANCE OF NATO COMMON INFRASTRUCTURE AIRFIELDS
- STANAG 3784 -DPP TECHNICAL GUIDANCE FOR THE DESIGN AND CONSTRUCTION OF AVIATION AND GROUND FUEL INSTALLATIONS ON NATO AIRFIELDS
- AC 4-M(96)001- NATO APPROVED TECHNICAL CRITERIA AND STANDARDS FOR POL FACILITIES



AIM

1. The aim of this agreement is to establish minimum maintenance standards for fixed Jet Fuel Storage Installations (JFSIs) used by NATO nations.

AGREEMENT

2. Participating nations agree the conditions laid down in paragraphs 3-4 below.

GENERAL

3. Each nation shall establish standards for maintenance of its fixed JFSIs and perform inspections and periodic maintenance based on the guidelines in Annexes A-D.

4. National regulations shall include the following requirements for maintenance of on-base facilities to ensure these facilities are in a reliable condition to meet the assigned military mission:

- a. Perform scheduled maintenance inspections and prompt remedial action on deficiencies.
- b. Maintain written records of inspections.
- c. Provide definitive written procedures for preventive and field maintenance.
- d. Keep system areas free from fire and explosion hazards.
- e. Inspect bulk and operating storage tanks as required to determine the need for cleaning and repair.
- f. Perform periodic pressure checks on piping.
- g. Perform maintenance functions on filter/separator vessels.
- h. Identify systems by the use of NATO markings.
- i. Follow environmental protection requirements when system maintenance is performed.

IMPLEMENTATION OF THE AGREEMENT

5. This STANAG is implemented when a nation has issued the necessary orders/instructions to the forces concerned putting the procedures detailed in this STANAG into effect.



DESCRIPTION, DEFINITIONS AND TERMINOLOGY FOR FIXED  
JET FUEL STORAGE INSTALLATIONS

GENERAL

1. Fuel specifications. Fuel specifications are contained in STANAGs 3747 and 1135. Minimum quality surveillance of petroleum products is specified in STANAG 3149. Proper maintenance of fuel systems assures a product's specification is maintained throughout an on-base distribution system.
2. Pressure and Flow Rate. The required operating pressure and flow rate of a fuelling installation is dependent upon the type of system and aircraft using the fuel.
  - a. Standard truck fill facilities' vertical pumps require a minimum amount of pressure at the pump discharge point in order to assure proper functioning of all installed control valves. Flow rate at the dispensing point should normally be 2000 l/min but not less than 1000 l/min.
  - b. Aircraft hydrant type refuelling systems require higher operating pressures than truck fill stand systems due to the longer pipeline dispensing loops.
  - c. Maintenance personnel must ensure that the established pressure and flow of the facility is maintained.
    - (1) Low pressures may cause malfunctioning of control equipment and insufficient fuel flow.
    - (2) High overpressure may cause damage to equipment and generate increased shock and surges within a system.
3. Spare Parts. A stock of system spare parts, in accordance with SHAPE criteria, shall be retained on base to guard against possible system shutdown for lack of parts. For standard facilities using interchangeable major components, more and different spares could be stored under the NATO critical spare parts requirements, since a lesser number of (costly) major equipment items is needed. A number of standard facilities at several airfields could be combined into a geographical-logistic support area.

PERSONNEL

4. Training. Proper maintenance of fuelling installations requires thorough training of maintenance personnel, to include familiarization with the functioning of the installed equipment and courses on major equipment items. Furthermore, personnel must be made familiar with the hazards of handling jet fuels. It is essential that installed explosion-proof electrical equipment is not tampered with or repaired by unauthorized personnel, making the operation unsafe.



5. Health. Maintenance personnel should receive training to ensure that their health is not jeopardized when working around fuelling systems where spillages could occur and fuel vapours could be inhaled in enclosed areas (pump houses, filter/manifold stations, underground pits and underground storage tanks). Continual contact with fuel product could generate medical implications.

## FACILITIES

6. Description. The JFSIs and components described in this STANAG are in accordance with the technical guidance for design and construction contained in NATO documents AC/4-M(96)001 and STANAG 3784.

7. Receiving. Fuel is received from off-shore tanker unloading; marine docks (piers, wharves, quays); pipeline terminals connected to on-base storage receiving tanks; railcar off-loading manifolds; tank truck off-loading points and additive injection stations.

8. Bulk Storage. Bulk storage tanks receive fuel by the various methods described above and are normally used to transfer fuel into operating tanks.

9. Transfer. Fuel shall be transferred by pumps or pump stations bulk tanks via the on-base pipeline system to storage areas dispersed over the airfield. Many airfields also have the ability to transfer fuel from a pipeline terminal point via a pre-filtration station, directly into operational storage areas, utilizing the off-base pipeline pumping pressure.

10. Operational Storage. Operating storage tanks receive fuel from bulk storage areas or pipelines and, in isolated cases, from trucks. Operating tanks are normally constructed underground and include the "cut and cover" type and are used for dispensing fuel into refuellers or directly into aircraft. The facility has a filter/manifold station where fuel passes at the receiving point through an inlet filter/separator and at the dispensing side through an issue filter/separator. Normally a drain tank for fuel recovery from pump-out of storage tanks and filter/separator is provided with each standard operational storage facility.

11. Dispensing. NATO airfields for tactical aircraft mission support are provided with splinter protected dispensing points for pumping fuel into refueller trucks. Airfields for special tactical aircraft and wide body aircraft are provided with hydrant type refuelling systems. A few bases in NATO are equipped with nationally funded in-shelter refuelling and some with hot pit refuelling from which tactical aircraft can be refuelled directly without refueller trucks.

12. Environmental Protection System. Standardized JFSIs are provided with fuel spill protection around dispensing points to prevent spilled fuel entering the soil and ground water. The inside of underground concrete dispensing pits, interior floors and walls, up to one meter height of pump houses and filter/manifold stations, are coated with a fuel-resistant epoxy paint. To prevent fuel leakages penetrating the concrete into the earth, secondary containment and leak detection systems are provided for storage tanks.



EQUIPMENT

13. Tank Accessories. Standard storage tanks are provided with level indicators, pressure-vacuum valves, gauge pipes, high level shut-off valves, low level control switch and alarms.

14. Pumps. Various types of fuelling pumps are in use. Vertical underground storage tanks are provided with multi-stage, submersible, centrifugal pumps, installed on top of the tank; side-mounted tank installations are provided with multi-stage, horizontal, centrifugal pumps. Some horizontal storage tanks are equipped with floor-mounted rotary gear pumps. Following is a description of the pump's safety components:

- a. Multi-stage, submersible, centrifugal pumps are normally provided with the following safety equipment:
  - (1) A flame-proof foot valve flanged on the suction flange to avoid a flame-break-through into the tank.
  - (2) A surrounding vessel guarantees liquid around the pump, even on an empty tank. Therefore, ignition of explosive gas mixtures in the tank by overheated pump parts is prevented.
  - (3) A small bypass-pipe from the motor bearing lantern, through the dome cover back to the tank bottom, effects a constant minimum discharge of fuel which prevents warming-up of the pump fluid, even when operating against a closed discharge valve.
  - (4) A small leakage reverse pipe between the mechanical seal housing and the tank bottom prevents leakage into the open (in the pump room) in case of seal failure.
  - (5) A flow detector, mounted on the discharge flange of the pump, switches off the pump in case of no flow or if the discharge volume falls short of the required minimum.
- b. Multi-stage, horizontal, self-priming centrifugal pumps and rotary gear pumps are normally provided with an air bleed stage on the pressure-side. For shaft sealing a metal-bellows mechanical seal is commonly used. A flow detector is mounted on the discharge flange (as for the vertical pump).
- c. Single stage, self-priming, side channel pumps with flow detectors are normally provided for a standard horizontal drain tank.



15. Control Valves. Control valves are used in the truck filling facilities and aircraft fuelling systems and consist of the following types:

- a. Automatic control valves for standard truck fuelling systems.
  - (1) Operating tank high level control valve.
  - (2) Drain tank high level control valve.
  - (3) Pump discharge control valve.
  - (4) Filter/separator rate of flow control valve.
  - (5) Overpressure control valve.
  - (6) Filter/separator bypass control valve.
  - (7) Tank truck loading valve.
- b. Types of automatic control valve for aircraft fuelling systems are :
  - (1) As in paragraph 15.a.(1)–(7) plus:
  - (2) Emergency shut-off valve.
  - (3) Back-pressure control valve.
  - (4) Refuelling control valves with venturi control for use in hydrant pits, (hot) refuelling pits and inside aircraft shelters.

16. Filter/Separators. Horizontal and vertical filter/separators are in use with filter elements of varying sizes. STANAG 3967 provides design and performance requirements for these vessels. The following is a description of the types of filter/separator and their components:

- a. The majority of fuelling systems built since 1970 are equipped with horizontal filter/separator units.
- b. A number of vertical filter/separator units are in use in existing systems which require additional maintenance and special safety precautions during element replacement.
- c. Major standard components of filter/separators are:



- (1) Vessel, normally with internally coated carbon steel, stainless steel or aluminum.
- (2) 1st stage coalescer elements.
- (3) 2nd stage separating elements.
- (4) Water sump with sight glass level indicator and float control valve with automatic drain valve.
- (5) Automatic air vent valve (float operated).
- (6) Piston type differential pressure gauge.
- (7) Automatic fuel control valve with shut-down device in case of high water level in sump.
- (8) Pressure relief valve.

17. Pipe and Accessories. Underground carbon steel and stainless steel pipes are normally provided with an external coating system. Following is a listing of pipes and accessories:

- a. Piping. Carbon steel is normally used between the fuel receiving point and operating storage tank and between the operating storage tank and the inlet flange of the issue filter/separators. Stainless steel piping is normally used between the issue filter/separators and the truck fuel dispensing points and aircraft hydrant pits.
- b. Accessories are as follows:
  - (1) Gate valves: normally with a rising stem used as maintenance (isolation) valves.
  - (2) Ball valves: normally for frequent operation and quick opening or closing.
  - (3) Flow meters, pressure gauges, safety devices, sampling devices, pressure/vacuum breather valves, tank level indicators.
  - (4) Strainers: normally in a vertical, cylindrical housing, equipped with a differential pressure gauge, and a cover with a lifting/swinging device; the strainer inserts are either basket or cartridge type.



18. Vehicle and Aircraft Connections. The truck filling and hydrant dispensing points are provided with the following types of dispensing equipment:

- a. A truck filling point is normally provided with either a mechanical swivel type loading arm ('pantograph') of corrosion resistant metal or a flexible rubber hose.
- b. Aircraft dispensing points are normally provided with either swivelling mechanical loading arms ('pantographs'), which may be fixed or detachable, or with conventional hoses and couplings, or portable hose carts.

19. Ventilation Equipment. A roof-top ventilator is normally used to remove hazardous fuel vapours by venting rooms, such as tank pump houses and filter/manifold stations. A pipe ventilator is normally used to remove hazardous fuel vapours from deep pits.

## ELECTRICAL SYSTEMS

20. In a standardized JFSI the power distribution panel, control panel and standby generator are normally located in separate rooms of the filter/manifold station. Alternatively the electric power supply, control equipment and generator may be located in separate buildings.

21. Power Supply. A JFSI's primary power is supplied from the on-base electrical network and the emergency supply from a standby Diesel generator. Both sources are provided with power switches, which are interlocked to prevent simultaneous switch-on.

22. Stand-by Electric Power. Diesel generators of 100 kVA are normally provided; larger capacity generators may be installed where required.

23. Switch Gear. The power distribution panel with all required switch gear should normally be of a module type design for easy maintenance, trouble-shooting and repair.

24. Solid State Systems. In JFSIs constructed since the early 1980s the control panels for the operation of the entire facility are normally solid state systems and contain all necessary pump control equipment, instrumentation, flow and pressure controls, emergency cut-off circuits, tank level indications and controls for automatic and manual fuelling operations. They also contain the programmable logical controller (PLC) system of modular design.

25. Fire Protection. Local fire protection is to be provided for each fuelling installation and normally consists of portable or mobile fire fighting equipment using foam and/or powder.



26. Cathodic Protection. A corrosion survey should normally be carried out to determine the need and the most effective method of protection (either by a sacrificial anode or impressed current cathodic protection system) for the underground pipe network within a standard JFSI, the interconnecting on-base pipeline, the feeder pipeline from the external (off-base) NATO pipeline system and the horizontal steel storage tanks. It must be assured that there is no electrical interference between the off-base and on-base pipeline networks when both are provided with separate cathodic protection systems. A cathodic protection system must be in continuous operation to ensure an effective current and voltage potential is applied to the entire structure.

27. Bonding and Grounding. JFSIs require bonding and grounding which are as follows:

- a. Bonding. All mechanical metal parts, components and equipment in a fuelling system must be bonded to achieve a balanced static potential throughout the system. Normally metal flanges do not require a bonding strip as long as the flange bolts provide sufficient metallic continuity.
- b. Grounding. Two different groundings exist in a fuelling installation. They are:
  - (1) The electrical ground applying to electrical equipment only and requires low resistance to earth, up to 25 Ohms.
  - (2) The static ground is only for the metallic mechanical part of the system to ensure ready dissipation of accumulated static electricity. Values below 10000 Ohms are sufficient.

#### MAINTENANCE PROCEDURES AND RECORDS

28. General. Definitive written procedures for preventive and field maintenance of JFSIs are necessary for efficient, safe operation and assurance that clean-dry fuel is delivered. The preparation of written procedures is the responsibility of the technical maintenance support services. The objectives (of preventive and field maintenance) are to:

- a. Prevent breakdowns.
- b. Ensure proper and timely maintenance.
- c. Provide immediate and adequate minor repair to avoid major repair.
- d. Control maintenance cost.
- e. Keep a system in operational readiness and ensure the dispensing of clean-dry fuel complying with applicable specifications.



29. Responsibility. Maintenance should normally be the responsibility of the technical support services (base engineer). It will be necessary for each country to supplement this Annex with national instructions to cater for variations in design and components of fuelling systems. It is important that the personnel operating fuelling systems maintain a close relationship with the technical support services responsible for maintaining each system.

30. Equipment Classification and Maintenance Record. Equipment should be classified and numbered according to its function in the operation of the system. The classification should correspond to the installation plan of the system and equipment components should be keyed to the plan. It is recommended that this information be incorporated in the existing maintenance record file, with each file bearing the following:

- a. Name of unit and coding to system plan.
- b. Manufacturer of equipment and major components.
- c. Code or initial record of inspections.
- d. Coded records of repairs and system modifications.
- e. Equipment procured by NATO or national funds.

The type of records, forms or files to be used for preventive or field maintenance control should be established by each country concerned.



REQUIRED PREVENTIVE AND FIELD MAINTENANCE SERVICES AND INSPECTIONS

1. General Information. The following paragraphs describe the required preventive maintenance services and inspections.

2. Fuelling System Area. Preventive maintenance and safety inspections are as follows:

- a. Keep system area free from fire and explosion hazards (written procedures should be developed by fire or safety group). Wipe dirt and grease from piping.
- b. Keep all pits clean and dry.
- c. Cut grass and weeds when necessary.
- d. Check fire extinguishers for date of recharge, pressure, or supply of extinguishing agent.
- e. Exercise care to prevent damage to gaskets when removing couplers, strainers, covers, fill caps, gauge covers, valves and the like. Spare gaskets must be available to ensure integrity of systems.
- f. Lubricate coupling threads when necessary and check seals for tightness.
- g. Inspect hydrant outlets for dents, abrasions or other damage. Dust caps must be in place.
- h. Location of signs and markings should be recorded to facilitate ease of inspection. Check for condition, adequacy, possibility of deleting obsolete signs and necessity of additional signs. All signs are to conform to national standards.

3. Storage Tanks. The following steps are required to assure safe functioning of storage tanks:

- a. Check liquid level gauge to verify operational capability and accuracy by comparing stick or dip tape reading with gauge reading.
- b. Check flame arrestor of pressure-vacuum vent valves for free movement and proper functioning. Remove internal mesh plug of flame arrestor and flush out with fuel and compressed clean air. Check antifreeze liquid level within the pressure and vacuum chamber.



- c. Check operation of low level control switch by observing whether pumps stop when fuel level drops to the specified design minimum. Dip tank to be sure fuel level is at the height specified and adjust low level control as necessary.
  - d. Check operation of high level control for a safe fill-alarm.
  - e. Check proper functions of hydraulically operated high level control valve.
  - f. Check functioning of vapour or leak detection equipment.
  - g. Check tanks for accumulation of water and sludge. Excessive deposits of water and sludge are to be reported immediately to expedite remedial action.
  - h. Tank interior inspection to include: condition of internal coating; structural integrity of tank bottom and shell; condition of pump suction intakes; and condition of mechanical float of high level control valve and level indicator.
4. Pumps. All types of pumps in use require the following checks and inspections:
- a. Check for corrosion on pump exterior.
  - b. Check for leaks around seals, vibration, noise, overheating, alignment, clearance and rotation of shaft and coupling.
  - c. Check operating pressure and flow rate, and compare with the initial pressure and flow data when system was new or newly upgraded.
  - d. Inspections are to be carried out on pump motors, motor connections, overheating and anti-condensation heaters installed in motor casings.
  - e. Follow manufacturer's guidelines for trouble shooting.
5. Filter/Manifold Station. The equipment installed in the filter/manifold station requires the following checks:
- a. Check function of all installed equipment, strainers, filter/separators, flow meters, control valves, gate and ball valves, pressure gauges and pressure differential gauges and watch for leaks around connections and flanges during operation.
  - b. Simultaneously observe and record flow rate and pressure reading of filter/separator differential pressure gauge. When filter/separators are manifolded, isolate each filter/separator when determining flow and differential pressure. Differential pressure gauge isolating cocks should remain open during normal operating procedures.



- c. Filter/Separators. Whenever filter elements are replaced, the date of installation shall be recorded; elements shall be replaced when either:
- (1) The differential pressure across the unit reaches the maximum recommended by the filter element manufacturer or by national regulations, normally 15 psi at issue filter/separators and 20 psi at receipt filter/separators or,
  - (2) After 36 months use, unless national regulations specify a shorter service length.

During the installation of replacement elements, they must be handled with the utmost care, since a tear or puncture of any one element will result in inefficient operation of the entire unit. Wear protection on hands to keep oils off elements and separator canisters, as this reduces water removal capability.

Personnel handling used elements must take appropriate precautions and comply with any national directives. Refilling of the filter/separator unit must be carried out at a low flow rate (approximately 5 minutes for a standard 2000 l/min filter/separator) to prevent the risk of internal explosion due to the generation of static electricity. Additional requirements and guidance for filter/separator maintenance should be taken from the manufacturer's instructions.

- d. Strainers. Basket or cartridge type strainers shall be opened and cleaned when differential pressure across the unit reaches the maximum recommended by the manufacturer or national regulations. Strainers are washable and reusable.
- e. Pressure Gauges. Check all pressure and differential pressure gauges for proper functioning. Check the readings (inch and metric scale) and ensure that the needle or pressure mark is in alignment, if not, re-adjust according to manufacturer's instructions. Check gauge glass for cleanliness and breakage or leakage of liquid (glycerin) in liquid filled pressure gauges.
- f. Gate and Ball Valves. Inspect for easy operation, adjust packing and re-pack if necessary using aromatic fuel resistant materials.
- g. Exhaust Fans. Check condition of fan wheel and clean interior of housing; check for excessive vibration and overheating; and check explosion-proof motor connection for condition and tightness. Remove all rust deposits on fan and housing and re-paint if necessary.



6. Dispensing Points for Trucks, Aircraft Hydrants and Hot Refuelling Pits. Installed equipment must be kept free of leaks and checked as follows:

- a. Check functioning of installed equipment and watch for leaks around connections and flanges. Observe and record flow rates and pressures, compare with the design data of the facility.
- b. Check 'dead-man" control hose for nicks, cuts and leaks on handle. Check handle for cracks.
- c. Check grounding wire for continuity, loose connection, fraying and insulation; replace if necessary.
- d. Inspect nozzle for excessive wear and cracks around collar and seal; repair or replace as required.

7. Mechanical Loading Arms (Pantographs) for Truck and Aircraft Refuelling. Mechanical loading arms require minimum maintenance, which is as follows:

- a. Fixed mounted, bottom loading type pantographs, normally made of stainless steel, have a maintenance advantage due to non-lubricated type swivel joints.
- b. Check overall electrical continuity between the connecting flange and refuelling nozzle (not to exceed 1000 Ohms resistance).
- c. On detachable type pantographs the zerk fitting of the casters needs to be lubricated periodically. The surface wheels should be inspected for wear and abrasion.
- d. Follow manufacturer's inspection manual for equipment component repairs.

8. Flexible Rubber Hoses for Truck and Aircraft Refuelling. Ensure that the hoses are free from oil and grease and that protective end caps are fitted and in position. Hoses must be stowed correctly on racks or hangers and protected from sunlight. Perform the following checks:

- a. Test hoses hydrostatically at 1½ times dead head (shut-off head) pressure of system.
- b. Check for nicks, cuts and scuffs on the hose surface and ageing of the material.
- c. Lubricate ball bearing type swivel joints to ensure easy operation.



9. Automatic Control Valves. Perform the following maintenance on control valves specified under paragraph 15 of Annex A:
- a. Check control valves during operation for proper functioning in accordance with commissioning data.
  - b. Check for leaks around the control tubing connections and retighten, if necessary.
  - c. In the event of malfunction, check manufacturer's instructions for corrective action.
10. Pipeline Systems. Perform the following maintenance on the pipeline systems:
- a. Patrol pipeline systems (and off-base connecting lines) with linewalkers and/or vehicles. Right-of-way should be kept free of overgrowth; encroachment of any nature should be reported.
  - b. Perform pressure check at 1½ times the normal working pressure for a minimum of 24 hours or at the maximum working pressure laid down for the system.
11. Off-shore Unloading Facilities. Maintenance of tanker off-loading facilities requires specially trained personnel and divers. The inspections should be performed as follows:
- a. Inspect navigation aids and mooring buoys, in accordance with national standards and regulations, for evidence of damage and possible movement or dragging by vessels, current or winds. Mark wrecks or other navigational hazards and initiate action for their removal.
  - b. Inspect submarine pipelines and their seaward end for tell-tale oil or gasoline slicks indicating leakage from pipes or tanker unloading hose.
  - c. Inspect and, if necessary, repair or replace all mooring hawsers or lines, deck hose, chain, chair stoppers, flange adaptors, gaskets or other deck gear used in mooring the tanker and in connecting tanker unloading hoses to the side of the tanker or to the tanker's manifold.
  - d. Divers should inspect tanker unloading hoses, navigational and mooring buoys and their mooring chains, shackles and anchors for signs of incipient failure or indications of rapid wear of parts subject to wave motion or abrasion on the ocean floor.



- e. Hydrostatically test, in accordance with applicable regulations, the entire unloading system to 1½ times normal working pressure or the maximum working pressure laid down for the system.

12. Marine Dock (Piers, Wharves or Quays Equipped with a Tanker Unloading System). The marine dock should be maintained as follows:

- a. Inspect pipelines, valves and dock hoses for signs of damage or deterioration. Perform maintenance or repair as required.
- b. Inspect all mooring lines, cleats, bollards, bitts, pulley blocks, steel wire ropes, winches, etc. and repair or replace as required.
- c. Inspect dock for signs of any serious damage as soon as tanker leaves. Initiate repairs required as quickly as possible.
- d. Hydrostatically test, in accordance with applicable regulations, the dock piping system to 1½ times normal working pressure or the maximum working pressure laid down for the system.

13. Electrical Systems. Electrical systems, including all safety circuits and emergency switches, should be inspected and maintained in accordance with the manufacturer's guidelines and instructions. In order to ensure safe operation of the facilities a number of items should be checked as follows:

- a. Observe function of the pump flow control by energizing the pump; if there is no flow, pump should stay on line for approximately 45 to 60 seconds and then cut off automatically.
- b. Check all equipment indicator lights on control panel; replace any burned out bulbs.
- c. Test the main panel emergency switch when emergency button is energized, all control systems should be off with the exception of the normal in- and outdoor lighting system.
- d. Check for proper functioning all emergency stop switches in pump houses, filter/separator rooms and outdoor locations.
- e. Check all sensing, alarm and control functions.
- f. Check all exposed wiring, conduits and fuse boxes.
- g. Check the interior of power-switch gear panels and control panels and remove dust, moisture, and corrosion from contacts.



- h. Bonding and grounding: Inspect the ground cable connection points, wires and clips and replace cable immediately if insulation is damaged or broken. Measure the low-ohm resistance of the cable with a "high-ohm resistivity" meter to ensure adequate conductivity between the grounding connection and the cable clip.

14. Cathodic Protection System. Proper function of cathodic protection systems can only be assured when the following inspections and surveys are performed:

- a. Check power source to ensure uninterrupted operation and record power consumption.
- b. Clean rectifier area and check inside of rectifier cabinet for any debris (birdnest debris is very common) which could cause malfunction of rectifier.
- c. Perform cathodic protection potential measurement survey, including the rectifier in- and output readings, and keep records of all readings obtained. Compare with previous recorded measurement survey to determine the effectiveness of the cathodic protection system.

15. Environmental Protection. Perform the following maintenance services to protect the environment in and around JFSIs:

- a. Check fuel/water separators (oil interceptors) for operation and inspect internal float switch mechanism for proper functioning.
- b. If fuel/water separator contains excessive liquid (fuel or water) containing sludge and debris, take action for removal in accordance with national environmental laws and inspect internal float switch mechanism for proper functioning.
- c. Inspect epoxy paint surfaces in pits, pumphouses and filter/manifold station for cracks and peeling. If necessary, repair by patching and recoating the damaged surface areas with fuel resistant material and epoxy paint.
- d. Inspect concrete pads at refueller dispensing points for cracks and repair as necessary.
- e. Water bottoms from drain tanks (fuel recovery tanks) shall be removed in accordance with national environmental laws.

16. Standby Generator. Diesel generators should be maintained as follows:

- a. Ensure that the daytank has sufficient fuel for operation of the generator.



- b. Perform inspection and maintenance services in accordance with manufacturer's instructions.



GUIDANCE FOR FREQUENCY OF PERIODIC INSPECTIONS AND  
MAINTENANCE SERVICES

1. The frequencies listed below are considered minimum requirements. However, national guidelines or special characteristics of installed equipment may require more or less frequent maintenance services. The following abbreviations are used:

- D - Daily
- W - Weekly
- M - Monthly
- Q - Quarterly
- S - Semi-annually
- A - Annually
- AR - As Required

2. Fuelling System Area.

a. Inspect for fire hazards.

- D - Systems in daily operation.
- M - Systems used monthly.
- Q - For dormant systems (standby systems not in use).

b. Keep all pits clean and dry.

- W - Systems in daily operation.
- M - Systems used monthly.
- Q - For dormant systems.

c. Cut grass and weeds regularly in the growing season.

d. Inspect fire extinguishers or other installed firefighting equipment.

- M - or as required by national laws.

3. Storage Tanks.

a. Check function of liquid level gauge.

- S - For tanks in daily use.
- A - For dormant tanks.

b. Check pressure vacuum vent valves and flame arrestors.

- S - For tanks, all uses.



- c. Check function of low level control and high level alarm of automatic level indicator; check operation (open and close) of hydraulically operated high level control valves.
- Q - For tanks in daily operation.  
A - For tanks used quarterly.
- d. Check function of vapour or leak detection equipment.
- Q - For daily used tanks.  
A - For dormant tanks.
- e. Inspect tanks in accordance with the table below. Guidelines for entry and inspection, cleaning and repair of aviation fuel storage tanks are contained in Annex D.

Tank Inspection Frequency  
(maximum interval between cleaning)

Tank Type	Tank Interior Uncoated		Tank Interior Coated	
	Without inlet filter/separator	With inlet filter/separator	Without inlet filter/separator	With inlet filter/separator
Operating Tanks (i.e. tanks which directly serve refuelling vehicles or hydrant systems)	3 years	5 years	5 years	8 years 5 years **
Bulk Storage or buffer tanks	4 years	6 years * 5 years **	6 years 5 years **	8 years 5 years **
Bulk Storage (barge or tanker delivery)	3 years	5 years *	5 years	8 years 5 years **
Drain Tanks (fuel recovery tank)	normally inspected and cleaned concurrently with the inspection/cleaning of operating storage tank			

\* If a filter/separator or micron filter is installed in the receipt system

\*\* Recommend tanks be inspected every 5 years to check the mechanical integrity of the interior and components, although the cleanliness requirement for inspections would have a longer extended time period (as indicated above)

Note: Newly constructed tanks should be inspected after one year of initial filling to check the condition of the interior coating, an item still under warranty.



4. Pumps.

- a. Check for corrosion on pump-motor unit.
  - Q - For units in daily or monthly use.
  - A - For dormant systems.
  
- b. Check for leaks, vibration, noise, overheating, alignment, clearance and rotation of shaft and coupling.
  - W - For pumps in daily use.
  - M - For pumps used monthly.
  - A - For dormant systems.
  
- c. Check operating pressure and flow rate.
  - Q - For pumps in daily or monthly use.
  - A - For dormant systems.
  
- d. Pump motor: check connections, check for overheating, check anti-condensation heaters in motor casings (if installed), check explosion-proof controls.
  - M - For units in daily or monthly use.
  - A - For dormant systems.

5. Filter/Manifold Station.

- a. Check functions of all installed equipment and watch for leaks; record flow rate and differential pressure readings of filter/separators.
  - M - For systems in daily use.
  - Q - For systems used monthly.
  - A - For dormant systems.
  
- b. Filter/separator element replacement: frequency for first and second stage elements; if second stage consists of a single permanent strainer or a number of reusable cartridges, it should be inspected and cleaned concurrently with the replacement of the first stage coalescer elements.
  - AR - By national regulations and/or
    - when differential pressure has reached the maximum limit, normally 15 psi
    - or after 36 months in use.



- c. Check and clean basket strainers.
  - AR - By national regulations or
    - if strainer is provided with a differential pressure gauge, it should be cleaned when differential pressure has reached the recommended maximum.
- d. Check all installed manual valves and exhaust fans.
  - Q - For systems in daily or monthly use.
  - A - For dormant systems.
- e. Check overpressure control valve for proper functioning.
  - M - For systems in daily use.
  - Q - For systems used quarterly.
  - A - For dormant systems.

6. Dispensing Points for Trucks and Aircraft Fuelling. Check functions of all installed equipment, watch for leaks and record operational flow and pressure ratings; check "dead-man" control hose; check grounding wire and inspect nozzle for wear and tear.

- M - For systems in daily use.
- S - For systems used quarterly.
- A - For dormant systems.

7. Mechanical Loading Arms (Pantographs) for Trucks and Aircraft Fuelling.

- a. Check function and easy movement of fixed pantograph; check nozzle and inspect swivel joints for leakproof tightness.
  - Q - For systems in daily or monthly use.
  - A - For dormant systems.
- b. Check detachable pantographs for easy mobility and proper functioning of all components; inspect swivel joints, automatic pressure equalizing chambers, venting and draining valves, sampling device, pressure gauge, locking device (breaks), dry-break shut-off, hydrant coupler and fuelling nozzle.
  - M - For systems in daily use.
  - Q - For systems used monthly.
  - A - For dormant systems.



- c. Perform conductivity test for fixed and detachable type pantographs and inspect grounding wire for continuity.

S - For all pantographs in use.

AR - For pantographs not in use, however prior to each reactivation of a system.

8. Flexible Rubber Hoses for Truck and Aircraft Fuelling.

- a. Check for nicks, cuts and scuffs on hose surface and ageing of material. If nicks, cuts or scuffs are noted, the hose must be pressure tested before use to prevent a fuel spill.

Q - For all uses.

- b. Lubricate ball bearing type swivel joints.

A - For daily or quarterly use.

- c. Hydrostatic pressure test at 1½ times dead head (shut-off head) pressure of system

S - For daily or monthly use.

9. Automatic Control Valves.

- a. Check all installed control valves during operation for proper functioning; check for fuel leaks, tightness of all connections for pilot controls; check opening/closing of valves at indicator stem; this is also an indication of proper diaphragm operation.

Q - For daily or monthly use.

A - For dormant systems.

- b. Check electric solenoid control (if used) for proper functioning.

A - For daily or quarterly use.

10. Pipeline System.

- a. Patrol pipelines (and any off-base connecting lines) and check for leak indications (at waterways, ditches, brown patches of vegetation).

M - For all underground pipelines.



- b. Perform pipeline pressure test.
  - A - For all underground pipelines.
- c. Inspection and testing of exposed piping systems.
  - W - Check operational system for apparent leakage under operating pressure.
  - Q - Check dormant systems for apparent leakage under pressure.
  - Q - Inspect for corrosion control and necessity for rectification action.
  - Q - Inspect marking and identification.
  - A - Inspect bonding/grounding.
  - A - Perform system pressure test.
  - AR - Lubricate couplings and threads; replace gaskets and seals when leaking.

11. Off-Shore Unloading Facilities.

- Q - Inspect navigation aids and mooring buoys, check route of submarine pipeline and seaward end for tell-tale fuel slick.
- A - Perform pipeline pressure test.
- AR - Diver should inspect tanker unloading hoses, mooring chains, shackles and anchors concurrently with tanker unloading operation.

12. Marine Docks (Piers, Wharves or Quays) Equipped with Tanker Unloading Equipment.

- Q - Inspect pipeline, valves and dock hoses, check mooring lines, cleats, bollards, bits, pulley blocks, steel wire ropes and winches.
- A - Perform pipeline pressure test.

13. Electrical Systems.

- a. Observe function of pump flow control, check control panel, test emergency switches on the main panel, check all emergency stop switches in the fuelling system area, check sensing, alarm and controls, check exposed wiring, conduits and fuse boxes.
  - Q - For systems in daily or monthly use.
  - A - For dormant systems.



- b. Inspect bonding and grounding for proper conductivity.

- M - For systems in daily use.
- Q - For systems used monthly.
- A - For dormant systems.

14. Cathodic Protection System.

- M - Check power source for uninterrupted operation.
- Q - Inspect rectifier inside for any debris and compare the rectifier output (volts and amps) with the previously recorded readings.
- A - Perform potential measurement survey.

15. Environmental Protection.

- a. Check fuel/water separators (oil interceptors) for presence of fuel; find out where it comes from and remove by proper means.

- W - For systems in daily use.
- Q - For systems used monthly.
- A - For dormant systems.

Note: After heavy rain storms check fuel/water separator for proper functioning since there could be a problem of clogging from debris.

- b. Inspect epoxy paint surface area in pits, pumphouses and filter/manifold stations, check concrete pads at refueller fillstands.

- Q - For systems in daily use.
- A - For dormant systems.

16. Stand-by Diesel Generator.

- a. Operate generator for approximately one hour under load condition.

- Q - For systems in daily or monthly use.
- A - For dormant systems.

- b. Perform inspection services as specified in the manufacturer's instructions.



GUIDANCE FOR ENTRY, INSPECTION, CLEANING AND  
REPAIR OF JET FUEL STORAGE TANKS

GENERAL

1. The common fuels used for NATO tactical and wide body aircraft are jet fuel types F-34 (JP-8) and F-44 (JP-5) for NAVY aircraft based on aircraft carriers. In rare cases F-40 (JP-4) is used.
2. For those NATO countries storing jet fuel in tanks which have previously been used for storage of leaded aviation gasoline or which are still used for leaded aviation gasoline, see paragraphs 20 to 22 at the end of this Annex for special safety precautions when tank entry or cleaning is required.
3. The majority of on-base jet fuel storage tanks are provided with total internal coating (bottom, wall and roof). Furthermore, normal standard vertical tanks have a 5% sloped tank bottom to the centre sump. The tank entry, inspection and cleaning of such coated tanks is much simpler and safer, and requires much less manpower and equipment, in comparison with the "old-rusty" flat bottom type. Therefore, the technical guidance described in this Annex is based on standard storage tank design used since the early 1980s.

RESPONSIBILITY

4. Tank cleaning responsibilities are vested in national technical maintenance support organizations.
5. Tank cleaning operations must be coordinated between the various base organizations such as system operators and maintenance crews, the fuel quality control section, ground safety, fire protection and environmental health personnel.

PERSONNEL SAFETY EQUIPMENT AND TANK CLEANING EQUIPMENT

6. Because the health and safety laws of each NATO nation vary the equipment required for personnel entry and tank cleaning could also vary. A list of recommended minimum equipment for tank entry and tank cleaning is as follows:
  - a. Personnel Safety Equipment. Personnel safety equipment should consist of:
    - (1) Breathing air trailer, positive pressure type respirator;
    - (2) Overalls made of cotton, soft overshoes with embedded grit soles; fireman boots;
    - (3) Ear protection, cotton hood (surgical type);
    - (4) Fuel resistant gloves, wristlet and safety harness with ropes;
    - (5) First aid kit;



- (6) Tripod assembly.
- b. Tank Cleaning Equipment. Tank cleaning equipment should consist of:
- (1) Eductor type air blower unit, either explosion-proof type or air power driven pump;
  - (2) Compressor;
  - (3) Squeegees, mops, rags, scoop, rubber type dust pan and buckets;
  - (4) Portable electric explosion-proof lighting; approved battery operated lights;
  - (5) Grounding wire, warning signs;
  - (6) Vapour-oxygen meter, multimeter (Ohm-tester).

### PREPARATION FOR TANK ENTRY

7. Top-Mounted Pumps. Fuel shall be pumped out and transferred to another storage tank until the low level device cuts off the installed fuelling pump. Then minimum 1 should be deactivated by the override switch and the fuelling pump manually started to pump the remaining fuel out of the tank until the minimum 2 or the flow switch again stops the pump. The remainder of fuel on the tank bottom shall be removed by the sump pump (in the centre sump) into the drain tank (which must be empty at the beginning of the operation), until the flow switch stops the sump pump.

Caution: Continually monitor drain tank during this operation to ensure tank does not overflow. Depending on tank size several fillings/pump-out cycles of the drain tank may be required until all fuel has been removed.

8. Side-Entry Pumps. Most fuel shall be pumped out and transferred to another storage tank until the low level device or a flow switch cuts off the pump. The remaining fuel shall be pumped out through the centre (or side) low sump piping, using an installed pump or a temporary pump, depending on the tank design.

9. The tank being inspected/cleaned shall be isolated from the remainder of the facility to preclude accidental fuel penetration; closure of valves in the connecting lines to the tank is not sufficient. To ensure positive isolation, the connecting lines are to be disconnected from the tank and blanked off.

10. The tank area should be roped off in order to prevent entry by unauthorized personnel during the cleaning process.

11. All tank dome manway covers must be removed to enable access to the tank. One manhole is to be used to install the tank ventilation equipment and the second for the entrance/exit of personnel (a third one could be used to expedite removal of vapours and give more natural light).

WARNING: If the tank manhole diameter is smaller than 800 mm (32"), personnel shall, under no circumstance, enter the tank with breathing apparatus, because, in case of an



accident inside the tank, it will be impossible to pull the troubled person through such a small manhole. For older tanks with 600 mm (24") diameter manholes, nations should develop procedures for cleaning without tank entry by personnel.

Standardized NATO fuel storage tanks normally have 1000 mm (40') diameter manholes to assure safe entry and exit for cleaning personnel.

12. To free a tank from vapour portable ventilation equipment should be employed; extend the suction hose (duct) through the manhole to within approximately 100 mm (4") of the tank floor and start the ventilation. Initially test the atmosphere in the tank through the manhole with a calibrated vapour indicator.

13. Tank cleaning and repairs should be performed by personnel having proper respiratory equipment. If the tank has a benzene level below 1 ppm and the oxygen level is above 19 percent, then entry without respiratory equipment is acceptable.

#### CLEANING AND INSPECTION OF TANKS

14. Cleaning and inspection of tanks should be performed by a five man team as follows:

- a. Two men inside the tank for cleaning.
- b. One man as supervisor/observer at the manhole, also serving as standby, fully suited for rescue in case someone inside the tank is in trouble.
- c. One man operating compressor, blower and breathing air trailer.
- d. One man (runner) to handle movement (in/out of tank) of cleaning equipment (squeegees, mops, rags buckets, etc).

15. As indicated in paragraph 13 above cleaning may be performed without respirator equipment. However, this would require one man taking continuous vapour/oxygen readings inside the tank while the tank floor is cleaned. Normally an experienced tank cleaning crew, with modern safety equipment, prefers to wear the full safety gear and mask while the tank floor is cleaned. Monitoring of the tank atmosphere should be carried out at appropriate intervals to ensure that the conditions required for entry are maintained.

16. Vapour removal from a standard 1250 m<sup>3</sup> storage tank with an adequate size ventilator should not take more than 24–36 hours. Cleaning personnel should enter the tank while the floor is still wet, since this will simplify the clean-up and removal of slime, a fine sediment which is a combination of fuel additives, water and fuel. If the tank floor is dry, it is difficult to remove the sediment. Utilization of squeegees and mops will expedite clean-up of the floor without damage to the coated surfaces. If the slimy residue is too thick, use either fuel or water for clean-up and mop it to the centre sump. From there it can be pumped out by the centre sump pump either into the drain tank or with a portable pump directly into metal barrels or containers.



17. Tank coating inspection shall be performed upon completion of the cleaning process. In order to perform a thorough inspection of the coated surfaces (tank floor and wall) sufficient portable explosion-proof lighting should be installed to provide adequate lighting. Small cracks, blistering or peeling of the coated surface area should be repaired by the tank cleaning crew using commercially recommended repair kits. If the number of cracks and peelings is too large, the supervisor should decide whether or not the tank should remain out of operation while the damaged areas are repaired by a specialized coating contractor.

18. Lastly inspect all equipment inside the tank for wear or unusual deformation. Then remove all temporary equipment and cleaning tools from the tank. The tank cleaning supervisor shall perform the last inspection (walk-thru) inside the tank to ensure it is ready for refilling with fuel. When there is no further need for entry to the tank, reinstall fill line valves and/or remove blind flanges. The gasket of the tank manhole covers shall be replaced. Upon closure of all manholes, stencil on one cover (manhole with ladder) the date and year of the tank cleaning with name of contractor or in-house crew.

#### CLEAN-UP AND DISPOSAL OF WASTE

19. Dispose of waste material, slime, sediment and any contaminated fuel (from the sump area) and water bottoms, in accordance with the instructions from the environmental coordinator.

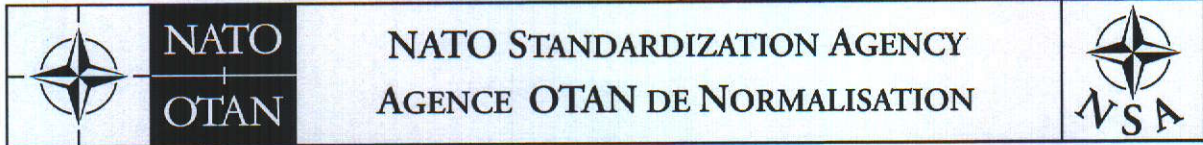
#### SPECIAL SAFETY PRECAUTIONS FOR CLEANING OF LEADED AVIATION GASOLINE TANKS

20. Nations are responsible for laying down clear instructions for handling tanks currently used for storing leaded aviation gasoline or having previously been in use with such a product. This is because the tank bottom residue will contain quantities of toxic lead compound, regardless, if the tank is vapour-free or not.

21. The Associated Octel Co. Ltd publishes a booklet in a number of languages which provides a clear guide to enable nations to produce instructions for maintenance and operating personnel. The cleaning of tanks that have contained leaded gasoline presents special problems and is hazardous throughout the entire cleaning process.

22. The tank cleaning crew must use the full safety gear, clothing and respirator equipment during the entire cleaning process regardless of low vapour readings in the tank, because the volatile lead compounds in the sludge are toxic and a source of danger when inhaled or absorbed through the skin.





21 November 2008

NSA/1106(2008)-DPP/3784


See Distribution List: EAPC (NPC – PHEWG)

**STANAG 3784 DPP (EDITION 5) – TECHNICAL GUIDANCE FOR THE DESIGN AND CONSTRUCTION OF AVIATION AND GROUND FUEL INSTALLATIONS ON NATO AIRFIELDS**

Reference:

MAS/774-SILCEP/3784 dated 18 June 1999 (Edition 4)

1. The enclosed NATO Standardization Agreement, which has been ratified by nations as reflected in the NATO Standardization Documentation Database (NSDD), is promulgated herewith.
2. The reference listed above is to be destroyed in accordance with local document destruction procedures.
3. The NATO Petroleum Committee (AC/112) considers this an editorial edition of the STANAG; previous ratifying references and implementation details are deemed to be valid.



Juan A. MORENO  
Vice Admiral, ESP(N)  
Director, NATO Standardization Agency

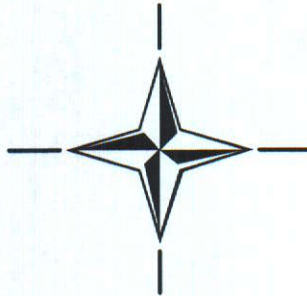
Enclosure:

STANAG 3784 (Edition 5)

NATO Standardization Agency – Agence OTAN de normalisation  
B-1110 Brussels, Belgium Internet site: <http://nsa.nato.int>  
E-mail: [van-exem.philippe@hq.nato.int](mailto:van-exem.philippe@hq.nato.int) – Tel 32.2.707.4564 – Fax 32.2.707.4843



**NORTH ATLANTIC TREATY ORGANIZATION  
(NATO)**



**NATO STANDARDIZATION AGENCY  
(NSA)**

**STANDARDIZATION AGREEMENT  
(STANAG)**

SUBJECT: TECHNICAL GUIDANCE FOR THE DESIGN AND CONSTRUCTION  
OF AVIATION AND GROUND FUEL INSTALLATIONS ON NATO  
AIRFIELDS

Promulgated on 21 November 2008

A handwritten signature in blue ink, which appears to read 'Moreno', is written over a horizontal line. The signature is stylized and cursive.

Juan A. MORENO  
Vice Admiral, ESP(N)  
Director, NATO Standardization Agency



RECORD OF AMENDMENTS

No.	Reference/date of Amendment	Date Entered	Signature

EXPLANATORY NOTES

AGREEMENT

1. This NATO Standardization Agreement (STANAG) is promulgated by the Director NATO Standardization Agency under the authority vested in him by the NATO Standardization Organisation Charter.
2. No departure may be made from the agreement without informing the tasking authority in the form of a reservation. Nations may propose changes at any time to the tasking authority where they will be processed in the same manner as the original agreement.
3. Ratifying nations have agreed that national orders, manuals and instructions implementing this STANAG will include a reference to the STANAG number for purposes of identification.

RATIFICATION, IMPLEMENTATION AND RESERVATIONS

4. Ratification, implementation and reservation details are available on request or through the NSA websites (internet <http://nsa.nato.int>; NATO Secure WAN <http://nsa.hq.nato.int>).

FEEDBACK

5. Any comments concerning this publication should be directed to NATO/NSA – Bvd Leopold III - 1110 Brussels - BEL.



NATO STANDARDIZATION AGREEMENT  
(STANAG)

TECHNICAL GUIDANCE FOR THE DESIGN AND CONSTRUCTION OF  
AVIATION AND GROUND FUEL INSTALLATIONS  
ON NATO AIRFIELDS

Annex A: Technical Requirements

Related Documents:

AC/4-M(96)001	NATO Approved Technical Criteria and Standards for POL Facilities
6160/SHLOFA – 059/82	NATO Approved Criteria and Standards for Tactical and Transport Airfields
C-421/11000/KBH SER 1581	NATO Approved Criteria for Maritime Patrol Airfields
STANAG 3149 DPP	Minimum Quality Surveillance of Petroleum Products
STANAG 3681 SILCEP	Criteria for Pressure Fuelling/Defuelling of Aircraft
STANAG 3682 PHE	Electrostatic Safety Connection Procedures for Aviation Fuel Handling and Liquid Fuel Loading/Unloading Operations During Ground Transfer and Aircraft Fuelling/Defuelling
STANAG 3756 SILCEP	Facilities and Equipment for Receipt and Delivery of Liquid Fuels
STANAG 3967 DPP	Design and Performance Requirements for Aviation Fuel Filter Separator Vessels and Coalescer and Separator Elements
STANAG 7011 SILCEP	Automated Fuel System Monitoring and Control Equipment
BI-SC 85-5	NATO Approved Criteria and Standards for Airfields



AIM

1. The aim of this agreement is to provide technical guidance for the design and construction of aviation and ground fuel installations on NATO airfields.

AGREEMENT

2. Participating nations agree to the technical requirements described in Annex A for the design and construction of aviation and ground fuel installations on NATO airfields.

IMPLEMENTATION OF THE AGREEMENT

3. This STANAG is implemented when a nation has issued the necessary orders/instructions to the forces concerned putting the requirements detailed in this STANAG into effect.



TECHNICAL REQUIREMENTS

GENERAL

1. In the drafting of this STANAG, reference has been made to various STANAGs, and current approved NATO Criteria. This document develops the guidance pertinent to airfield on-base facilities now included in AC/4-M(96)001. Any modification or amendment to the above STANAGs, NATO Criteria or other new STANAGs or criteria that are relevant, is applicable to this technical guidance. Facilities constructed according to the technical requirements as stated below will generally be eligible for common funding. Items which are not currently so eligible, are appropriately annotated. This STANAG describes a fully protected facility. The need for protecting elements of airfield fuel facilities has to be decided on a case by case basis by the Strategic Command and shall be discussed beforehand with the Strategic Command and NATO International Staff.

LOCATION OF FUEL STORAGE

2. All on-base aviation fuel storage is to be splinter protected as defined in current MNC Criteria. All on-base fuel storage tanks are to be constructed either underground, or semi-buried and mounded over with earth, and grouped together in installations. As a minimum, each Jet Fuel Storage Installation (JFSI) shall comprise the following:

- (a) Receiving facilities.
- (b) Storage/operating tank(s).
- (c) Pumps and manifold pipework.
- (d) Filter/water separators.
- (e) Vehicle dispensing and/or aircraft dispensing points.
- (f) Drain tank.
- (g) Standby electric generator.
- (h) Operator/control area.
- (i) Access road and vehicle hardstanding.
- (j) Security fencing and access gate.
- (k) Drench shower. (Ineligible for common funding unless demanded by national law).



3. For survival, each tactical airfield should have at least 2 JFSI as widely dispersed as is practicable, but sited near aircraft dispersal areas to reduce refueller vehicle transit time - JFSI to aircraft. The minimum distance between JFSIs, and the circumstances under which more than 2 are required, are detailed in approved current MNC Criteria.

4. AVGAS storage is normally sited at only one location and should be combined with jet fuel storage in a JFSI. Siting of ground fuel storage and dispensing facilities should take into account the need to provide fuel for aircraft ground equipment and vehicles directly in support of airfield wartime operations, as well as the peacetime need to dispense fuel to administrative vehicles.

5. The siting of pipeline terminal facilities and buffer storage tank(s), if required on an airfield, is largely governed by space availability and the direction from which the off-base supply pipeline comes. Consideration to dispersal and survival must be given.

#### MOVEMENT OF JET FUEL

6. Jet fuel may be received from road or rail tankers, tanker ships, barges or pipelines. Whenever feasible, each airfield is to have the ability to receive fuel by 2 different methods. The design of JFSI, interconnecting pipelines and feeder pipeline is governed by the required wartime delivery rate of jet fuel to the airfield. The feeder pipeline is the connecting line between the off-base pipeline terminating point and one of the JFSIs and is operated at low pressure. Off-base pipeline fuel resupply systems, provided under the POL category, should be completely isolated both cathodically and for pressure (by pressure reduction and relief valves) from the on-base system.

7. The delivery of fuel, from operating/storage tanks in a JFSI, to aircraft, will normally be by a refueller vehicle. Where operationally justified, delivery of fuel may be direct to aircraft, using a hydrant refuelling system. The number of dispensing points and rate of delivery shall be in accordance with the documents in paragraph 3 above.

8. Interconnecting pipelines are required to permit the transfer of jet fuel between JFSIs. The interconnecting pipelines also act as an extension of the feeder pipeline and permit the resupply of jet fuel into any JFSI from the off-base pipeline. Provisions may be made for one emergency take-off point in each interconnecting pipeline between 2 JFSIs.

9. Arrangements to return unused, surplus (recoverable) jet fuel from a refueller vehicle (or directly from an aircraft, where a hydrant system is provided) into a JFSI, are required (see paragraphs 40 and 62).

10. Meters. Flow quantity meters are required at fuel receipt and dispensing points. Flow meters are ineligible for common funding unless demanded by national law.



OPERATING/STORAGE TANKS

11. Types. The type of tank used (horizontal or vertical cylindrical shapes) whilst primarily motivated by economy will also depend upon the volume of fuel to be stored, the geology of the site and the height of the water table. At JFSIs, new operating tanks shall normally have a capacity of at least 200 m<sup>3</sup>. Tanks of 500 m<sup>3</sup> capacity and more will normally be designed as a vertical cylindrical tanks, semi-buried and earth covered. For MOGAS and DIESEL, tanks 150 m<sup>3</sup> or smaller, normally horizontal type, completely buried, gravity filled, steel double-walled or fibreglass (GRP) with hydrostatic tank monitor and overflow spill containment device, shall be provided. Calibration charts in millimetre increments, are to be provided for each type and size of storage tank.

12. Usable Volume. New tanks shall be designed to a net usable capacity. An additional volume, not exceeding 5% of the usable volume, shall be allowed for, in order to accommodate liquid expansion caused by temperature variations.

13. Spacing. The distance between tanks in a JFSI should be not less than:

- (a) Two metres for buried, horizontal cylinder tanks.
- (b) One tank diameter for vertical cylinder tanks.

14. Water Table. To minimize problems of hydrostatic pressure, buoyancy and external corrosion, tanks should be positioned above the subsoil water level. To enhance survivability against remote, large weapon detonation, direct burial in wet, cohesive solid or wet, silty ground should be avoided.

15. Design and Construction Material. The design of tanks and the materials selected for their construction, whilst primarily motivated by economy of storage/operation, should also take into account weapon effects and survivability. One wall of every fuel storage tank must normally be of steel construction. Day tanks for standby power installations and minor service tanks may be of plastic material.

16. Double Walls. All vertical cylinder tanks should have double walls, each wall being structurally independent. The inner wall shall be of mild steel to provide the best safeguard for survival. Normally, the outer wall should be of reinforced concrete. In order to control the interstitial space, a leak detection system shall be provided by installing a liquid sensor and a drain between the concrete and steel wall and bottom, the content of which must be capable of being checked visually. Liquid sensors are ineligible for common funding unless demanded by national law. Inter-wall water must be capable of being drained away by gravity or by a sump pump. In the case of one country this requirement can be satisfied by using a non-structural, sandwich lining constructed of glass reinforced polymer (GRP)/metal foil/GRP; the metal foil having an integral air gap capable of being checked for leaks - this technical solution is eligible for common funding because it is required by national law.



17. Diameter/Height. For vertical cylinder tanks, smaller than 1,250 m<sup>3</sup>, the proportion of height to diameter should range between 1:2 and 1:2.6. For tanks larger than 1,250 m<sup>3</sup>, proportions between 1:2 to 1:6 are acceptable. Dimensions of steel plates, positioning pumps and limiting suction heads all influence tank dimensions. Local conditions may dictate tank diameter and height.

18. Piping. Access pipes to a tank can suffer from corrosion if they are not adequately protected when buried in the ground; connecting pipes placed in valve pits and properly insulated do not corrode. Whilst delivery and draw-off pipes penetrating the tank walls are technical acceptable, the concept, requiring either an approach tunnel or pipe duct, has weaknesses from a survivability view point. Although adequate splinter protection of pipes and valves is provided by open approach tunnels, they allow the ingress of napalm and blast pressure. To prevent damage to the tanks' double walls, there should be no construction continuity between duct wall and the outer tank wall. Arrangements should be made to limit the effects of napalm and reduce the effect of blast weapons.

19. Gradient of Bottoms. The floors of vertical cylinder tanks shall have a 2-5% gradient fall towards a central sump (depending on the diameter of the tank); horizontal tanks should have minimum invert gradient of 1% to the end at which a sump pump is positioned.

20. Welding of Plates. In the construction of both horizontal and vertical tanks, butt welding shall be used. The welding of the bottom on vertical tank must be controlled so as to minimize the undulation which may form during construction and which affects the ability of any undissolved water and sediment to gravitate to the sump.

21. Structural Support. Support columns in vertical cylinder tanks shall be of tubular construction to facilitate coating and drainage of sediment to the bottom. If supporting rings are required in horizontal cylinder tanks, they should be fitted either externally or internally in accordance with national specifications. Tanks shall be designed to permit complete drainage of fuel and avoid trapping pockets of fuel in or around fittings.

22. Tank Drainage. A collecting sump is to be provided on all tanks. Hand operated pumps shall be provided for emptying sumps of tanks up to and including 200 m<sup>3</sup> in size, and motorized pumps shall be provided for horizontal and vertical tanks larger than 200 m<sup>3</sup>.

23. Suction Pipes. The mouth of the draw-off pipe in a vertical tank should be a minimum of 1 m horizontally from the lowest point of the floor of the tank, that is the lip of the sump, and no more than 30 cm above it. In horizontal tanks, the suction pipe should be a minimum of 1 m from the lowest end and must be positioned 5 cm above the bottom of the tank.



24. Vent Openings and Flame Arrestors. Tanks of 200 m<sup>3</sup> capacity and larger shall be safeguarded by a minimum of two pressure vacuum relief valves (PVRV). Each valve may be constructed with a combined flame arrestor or the flame arrestor may be separate, but in both cases the flame arrestor will be positioned below the PVRV. The PVRV shall be mounted for easy maintenance. The design venting rate must be based upon the maximum filling and discharge rate, whichever is the greater, with 100% reserve venting capacity should the primary PVRV system fail. Tanks smaller than 200 m<sup>3</sup> are to be fitted with separate flame arrestor and open vent. All vents are to terminate in the open air, not less than 4 m above the ground level around the JFSI and not in an enclosed space.

25. Internal Coating. All new tanks and tanks undergoing restoration in a JFSI (other than those fabricated of non-corrodible material) shall be internally coated with a minimum 200 micron film (when dry) of nationally approved, resin based, corrosion protective material. The coating shall be applied to all internal tank surfaces. The coating serves the dual purpose of reducing steel surface corrosion and aiding settling of particles in suspension. To assist in the future maintenance and inspection of tanks, the top coating should be of a light colour. In those countries where national legislation requires a conductive coating, the coating shall be of the lightest shade possible.

26. External Protection. The external surfaces of steel tanks directly buried are to be given protection against corrosion.

27. Access Manholes. All new tanks are to be fitted with manholes of a minimum of 0.8 m, but normally 1 m diameter. The number of manholes required for each tank is:

- |     |   |    |
|-----|---|----|
| (a) | Horizontal tanks                              | 2  |
| (b) | Vertical tanks below 2,500 m <sup>3</sup>     | 3  |
| (c) | Vertical tanks 2,500 m <sup>3</sup> and above | 4  |
| (d) | Horizontal ground fuel and drain tanks        | 2. |

28. Internal Fittings. All internal tank fittings, including pumps, should be designed in such a way as to permit maintenance without having to empty the tank. Fittings are to be provided for the following functions:

- (a) Fuel Sampling and Temperature Readings. A stainless steel pipe of normally 150 mm, but at least 100 mm diameter, extending a maximum of 1 m below the tank roof, is to be provided. The upper end of this pipe must be bonded, to eliminate the possibility of sparks from static discharge during sampling operations. A plate welded to the tank floor



directly underneath the sampling pipe shall be provided, in order to prevent damage to the coating of the tank bottom.

- (b) Removal of Unusable Fuel. In every storage tank there shall be means of removing water and slop drainage from the lowest point of the tank bottom (see paragraph 22).
- (c) Filling. In vertical tanks, the fill pipes are to terminate and discharge not more than 10 cm above the sloping tank bottom. In horizontal tanks, the fill pipes are to discharge not more than 5 cm above tank bottom. To reduce the danger of static electricity build-up, an internal relaxation pipe, close to the bottom and along the tank sidewall, must be provided following good engineering practice. Additionally, the product flow velocity, at the point of entry into the tank, must not exceed the velocity given by the following formula until such time as the outfall within the tank is covered by fuel

$$V = \sqrt{0.64/D}, \text{ where}$$

V= is the velocity flow in metres per second

D= is the diameter of pipe in metres.

- (d) Draw Off/Suction. The maximum suction lift at normal ambient temperatures for aviation petroleum products is of the order of 3 m (including friction head losses from all sources). The maximum suction lift for each installation, however, will depend upon the characteristics of the installed pumps. In most cases, all pumps should be positioned so as to have a positive head on the suction side. Where that is not practical, pump priming may be achieved by means of either a priming system or a foot/check valve on the suction pipe to retain priming.

29. External Fittings. All external fittings to tanks shall be weatherproof or be protected against the weather and readily accessible for inspection and maintenance. External fittings are to be provided for the following functions:

- (a) Automatic Shut-Off: A fuel operated, automatic, high level control valve or other means of fail safe control shall be provided to shut-off fuel receipt to a tank. A warning alarm shall be activated prior to closure of the high level control valve. Similarly, a low level control is also required as an automatic safety device to prevent accidents associated with fuel levels below the pump suction level.
- (b) Gauge. Every tank shall have a gauge located on it in a protected position. The gauge should show the tank's fuel content, as directly measured in the internal gauging device. The gauge shall have an



accuracy at 1 mm increments. In addition, other selected tank content information may be provided in accordance with STANAG 7011, i.e., water level, temperature, density and volume. The instrumentation and associated communications for information other than fuel content and high and low level alarms is ineligible for common funding.

- (c) Remote Data Indicators. Devices to relay the tank's data to remote indicators shall be provided; the remote indicators are to be located in the JFSI control room.

30. Protection. All storage/operating tanks are to be constructed underground or mounded over with earth to give protection from natural hazards and enemy action. Siting and protection, as laid down in approved current MNC Criteria, should be implemented. Advantage should be taken of existing topography and ground contours to obtain maximum concealment. Concrete slabs may be used in lieu of earth if site conditions make such a form of protection more practicable. Upon completion of construction the battered sides of earth-covered tanks should be grassed in order to protect and retain the earth against weather erosion. Other suitable forms of low growth vegetation may be used if grass growth cannot be sustained.

#### FILTRATION

31. The following filtration requirements shall be satisfied when designing on-base installations:

- (a) Removal of particles in the incoming fuel.
- (b) Final filtration of fuel prior to delivery into a refuelling vehicle or aircraft.

32. Incoming Filtration/Straining. Any filtration performed on incoming fuel, which is being directly delivered from a pipeline, must be arranged so as not to affect or interrupt that pipeline's operation. All fuel being received into a JFSI shall first pass through a strainer of at least 100 mesh to the linear inch, or 150 micron, and then through a filter/water separator. Where existing JFSI do not have filter/water separators on the receipt side, such filtration shall be introduced when the facility is next due for restoration/modification or at such other time as may be militarily justified. The provision of a filter/water separator on the receipt side of an installation allows simultaneous receipt and issue of fuel. The previously recommended minimum settling time of 2 hour per metre of fuel depth is considered operationally unacceptable for on-base JFSI. Filter separators, or performance equal to the latest issue of STANAG 3967 or equivalent national specification, are to be used in JFSI. A sampling connection at the inlet and outlet of each filter/separator shall be provided.



33. Pre-Filtration Station. Additional filtration of incoming jet fuel may be technically warranted for those airfields connected directly to the off-base pipeline system. Where justified, consideration may be given to the construction of a pre-filtration station, located on-base, near the beginning of the low pressure feeder pipeline delivering fuels to on-base JFSI.

34. Filtration Safeguards. Pre-filtration stations should normally have duplicate filters, permitting alternate, automatic filtration without interruption to the incoming jet fuel flow; the change over between filters being activated by differential pressure limiters. A by-pass should be provided to the receipt filter/water separator in a JFSI, the changeover to which must also be controlled by a differential pressure limiter. For airfields supplied directly from a nearby off-base depot, the automatic differential pressure-actuated by-pass control valve may be eliminated.

35. Final Filtration. All aviation fuel must pass through a filter/water separator prior to delivery to a vehicle dispensing point, or into an aircraft hydrant system. A capability for complete recirculation of fuel that has remained still on the delivery side of the final filter must be provided. Only freshly filtered/separated aviation fuel should be delivered. If existing pipework arrangements at JFSI do not allow fresh final filtration, modifications are to be made when the installation is next restored/modified. The capacity of a filter should be allied to the design delivery pumping rate of a JFSI, which normally are to be 2000 l/min. At least two final filters (one operational and one a spare) are to be installed to guarantee continuous fuel delivery to dispensing points. Filter/water separators, of performance equal to the latest issue of STANAG 3967 or equivalent national specification, are to be used in JFSI. A sampling connection at the inlet and outlet of each filter/water separator shall be provided.

36. Protection. All filters/water separators and associated pipework and valves are to be installed in underground pits or be splinter protected in accordance with current MNC Criteria.

37. Internal Coating. The internal wetted surfaces of a filter/water separator if made of carbon steel shall be coated with a minimum of 125 micron of an approved coating material referred to in paragraph 25.

## DISPENSING

38. Requirement/Location. Each JFSI shall normally have two vehicle dispensing points, each capable of simultaneously dispensing at least 1,000 l/min, but adjustable between 1,000 l/min and 2,000 l/m, of freshly filtered fuel. For JFSIs equipped with standard 2000 l/min pumps, each pump shall provide 2000 l/min at one dispensing point or concurrently 1000 l/m at each of two dispensing points. At those installations with AVGAS storage, one additional dispensing point with a minimum capacity of 500 l/min, is to be provided. It is essential that AVGAS and jet fuel dispensing points, pipework, filters and manifolds, are completely isolated to prevent the accidental mixing of aviation fuel. Aircraft hydrant pumping rates are dependent upon the type of



aircraft, capacity and operational requirements and are to be designed on a case-by-case basis, subject to a minimum of 1,000 l/min per hydrant. Vehicle points shall be sufficiently separated to allow independent movement of refueller vehicles; commonly a 8 m wide hardstand should be provided (4m as loading platform plus 4m as passing lane).

39. Main Hydrant Piping and Interconnecting Pipelines. The velocity of fuel flow should be sufficient to enable removal of free water, from the low points within the pipes, utilizing the "flushing" concept. This capability is important for hydrant systems not frequently used. For hydrant fuelling systems the velocity of fuel should be governed by the system hydraulic surge calculations. For interconnecting pipelines a similar concept could be achieved, providing local conditions such as terrain, size and capacity of available pumps allow for a high speed flushing.

40. Receiving Fuel. Each dispensing point must also be fitted with a suitable connection to receive fuel from road tanker vehicles and to delivery it through a strainer and filter/water separator, to a storage tank (see paragraph 32). Where the primary means of resupply of fuel to an airfield is by road tanker vehicle, a separate off-load point, remote from the dispensing points must be provided (see paragraph 62).

41. Vehicle Connection. Connection of the dispensing point to the vehicle may be made either through an articulated corrosion resistant metal, mechanical loading arm or through a flexible rubber hose. Each dispensing point shall be provided with the capability of bottom loading refuelling vehicles; overhead filling arms are also required in exceptional cases where the users' vehicles do not have a bottom loading capability.

42. Aircraft Connection. Aircraft fuelling hydrants should be connected to aircraft by articulated mechanical loading arms or conventional hoses and couplings.

43. Controlled Delivery. Each dispensing point and aircraft hydrant should be provided with a fuel actuated (dead man) control valve or equivalent safety devices. The maximum flow rate should be governed to prevent generation of static electrical charge and excessive surge pressures. Pressures shall be controlled in accordance with STANAG 3681.

44. MOGAS and DIESEL Dispensing. At the MOGAS and DIESEL station, dispensing equipment is to be of the normal metering column type, as used by civil filling stations.

45. Protection. Dispensing point equipment at JFSIs is to be installed in underground pits or to be splinter protected in accordance with current MNC Criteria. Mobile aircraft connecting devices shall be similarly protected.



## PIPEWORK

46. Size. The diameter of pipework is generally governed by maximum flow rates, friction losses, and limiting surge pressure and static charge generation. Interconnecting pipelines between JFSIs should be at least 150 mm diameter for new construction, compatible with efficient transmission of bulk fuel.

47. Valves and Fitting. Valves are to be of cast or forged steel and are to be the gate, ball, or non-lubricated plug type. On new constructions the surface of valves and fittings in contact with the fuel downstream of filter separators are to be of corrosion-resistant material. Swivel joints must be non-lubricated type.

48. Corrosion Resistance. All pipework and fittings carrying filtered fuel are to be of corrosion-resistant material. The exterior of all pipework should be treated with an approved protective coating. The whole pipework and tankage system is to be electrically grounded except for those parts that have cathodic protection. Internally coated pipes, using a 125 micron lining of the material referred to in paragraph 25, may be considered where operational concerns and lifetime costs are favourable.

49. Surge Pressures. Pipework systems should be designed to avoid unacceptable high surge pressures arising during operations. Shock alleviators may be used, but only in exceptional cases where it is not otherwise practicable to design the pipework systems to safely accommodate the anticipated surge pressures.

50. Protection. All pipework, valves and fitting should be splinter protected as required by current MNC criteria. If dual runway crossings are required for survival for interconnecting pipelines, the crossings should be separated by at least 100 m. There should be valve pits at the dividing/joining points. Only single crossings are currently supported for common funding.

## DRAIN TANK

51. Type. A small drain tank for fuel recovery is required in each JFSI to hold temporarily unused/surplus fuel. For AVGAS a separate drain tank is required. It shall normally be of horizontal cylinder double wall design with a capacity of up to 10 m<sup>3</sup>. The bottom of the tank should slope to one end at a gradient of 1%. An overflow protection device shall be included in this type of installation.

52. Location. The drain tank should be separated from storage/operating tanks and located at a point convenient to drain operating tanks, manifold filter, pumping and dispensing points. Storm water run-off from paved surfaces is not to be collected in drain tanks.

53. Tank Level. The drain tank should be sited low enough to permit free drainage by gravity of all elements of a JFSI into it.



54. Re-Use of Fuel. The pipework arrangement should allow fuel in the drain tank to be refiltered, water separated and after a suitable settling period, returned to an operating/storage tank.

55. Transfer. For the transfer of contaminated fuel from a vehicle to the drain tank or the transfer from the drain tank to a road vehicle, a connection shall be provided at each JFSI, normally at the drain tank itself.

#### PUMPS, MOTORS AND ELECTRICAL EQUIPMENT

56. Pumps. Main pumps must be capable of delivering fuel to dispensing outlets at the minimum rate. Each JFSI shall have at least two main pumps, arranged in parallel so that each may be stand-by for the other, and also arranged for concurrent operation. Normally all pumps should have electric motors. Smaller hand-operated sump pumps are adequate for the removal of unusable fuel from horizontal storage tanks up to 200 m<sup>3</sup> (see paragraph 22). Sump pumps of vertical storage tanks shall be provided with electric motors.

57. Flexibility. The pipework in the manifold filter station should be arranged to permit concurrent dispensing and tank to tank transfer of fuel within one JFSI. Transfer is to be achieved by means of either of the main pumps, when it is not in use for dispensing. Additionally, a main pump in one JFSI must be capable of delivering fuel to a tank in another JFSI, through the interconnecting pipeline, at whatever rate is achievable. Constant pressure type JFSIs have shown operational advantages when resuming fuel dispensing in war damaged JFSI.

58. Hand Pump. A portable hand pump may be used to remove spillages from sumps in dispensing points and manifold filter stations at those JFSIs where complete drainage is not a legal requirement.

59. Switches. All motor driven pumps shall have control (ON-OFF) switches inside each pump room. In addition to the automatic safety devices, emergency switches must be positioned at/in:

- (a) Each pump room.
- (b) Each dispensing point.
- (c) JFSI control room (if provided).

60. Safety. Pumping equipment is to be provided with the necessary overload safety devices, including flow/pressure controls. All host nation legal safety regulations are to be satisfied. Particular attention is to be paid to the positioning of motors and electrical equipment in confined and potentially dangerous, gas laden locations; in those locations explosion-proof types of equipment should be installed.



Where natural ventilation cannot be relied upon to clear vapour, forced air ventilation should be fitted.

61. Duplication. Vertical tanks of 750 m<sup>3</sup> and larger capacity, served by submersible centrifugal pumps, are to have two pumps and two delivery main pipes, each capable of achieving the minimum delivery rate of 2 x 1,000 l/min at the dispensing points. Tanks smaller than 750 m<sup>3</sup> normally need only be fitted with one main pump.

62. Receipt Pump. At those airfields where fuel is delivered to a JFSI by road tankers and trailers not fitted with pumps, a receiving pump with a capacity of 1,000 l/min placed in a splinter protected location is to be provided (see paragraph 40). System shall have the capacity to prevent the introduction of air into the JFSI and to shut the pumps off when receipt is completed.

63. Protection. All pumps, motors and related electric panels, switchboards, and standby electrical generators, etc., are to be splinter protected in accordance with current MNC Criteria.

#### CATHODIC, FIRE AND ENVIRONMENTAL PROTECTION

64. Cathodic Protection. External cathodic protection for the underground metal pipe network, interconnecting pipeline, feeder and horizontal metal storage tanks shall be provided. Prior to design and installation, a corrosion survey should be carried out to determine the most effective method of protection - sacrificial anode or impressed current system.

65. Fire Protection. At fuel installations, local fire protection is to be provided by portable or mobile fire fighting equipment, using foam and/or powder. The provision of a water supply to a JFSI is not supported for NATO common funding as, in the airfield category, all on-base fire fighting is, in principle, a national funding responsibility.

66. Environmental Protection. A hardstand shall be constructed for vehicles, or aircraft receiving (or delivering) fuels. Each hardstand should have adequate water drainage sumps and, where national legal and environmental protection regulations dictate, all dispensing points should have curb containment, water/fuel separator and reservoir to protect the surrounding soil and water sources from hydrocarbon contamination (see paragraph 38).

#### SECURITY

67. JFSIs are to be enclosed within a security fence, as required under current MNC Criteria. As a general guide, fencing should be sited 30 m away from vent openings and dispensing points (distances as small as 20 m have been accepted at some JFSIs).



## UTILITIES

68. Primary Electrical Power. Normally electrical power for fuel installations is to be provided from the primary airfield supply.

69. Standby Electrical Power. To ensure continued operations if primary power is cut off, each JFSI is to have a dedicated, standby generator. The capacity of the generator must be capable of meeting the combined power requirements of one main pump motor, running on load, and the surge start power of a second main pump motor. Generators of up to 100 KVA are normally required; larger capacity generators should be provided where technically justified.

70. Exterior Lighting and Communication. Each JFSI should be provided with a minimum of exterior lighting at each dispensing point and between facilities and walkways. A telephone shall be provided for normal and emergency purposes.

## STANDARD DESIGNS

71. The development of standard design elements allows for the rapid design of new JFSI. Such designs have been developed in the past and continue to be encouraged by the International Staff. To become NATO-approved standard designs, host nations should submit them to the NATO International Staff and MNCs for examination and approval. NATO approval will be formally recorded in a letter of protocol (Memorandum of Understanding) to which future Type B cost estimates may refer. Once a design is NATO approved, only airfield plan, site plans, detail drawings, where different from the standard, and utility plans are required to accompany project fund requests to NATO.

## STANDARDIZATION OF MAIN EQUIPMENT

72. Interchangeability. Following sabotage or war damage to JFSIs, the recovery of refuelling operations is enhanced if the installed main equipment is readily interchangeable. User nations in co-operation with host nations should foster rapid recovery in wartime, both by holding adequate 90-day spare parts and by cannibalization between JFSIs.





**NATO/EAPC UNCLASSIFIED**  
Releasable to Australia

18 December 2015

**NOTICE**  
AC/112(PHEWG)(EAPC)N(2015)0010

**PETROLEUM COMMITTEE (PC)**  
**PETROLEUM HANDING EQUIPMENT WORKING GROUP (PHEWG)**

**USAFE/NATO AIRFIELD STANDARD DESIGN FOR JET FUEL  
STORAGE/DISPENSING SYSTEMS**

**Note by the Staff Officer**

Reference: AC/112(PHEWG)(EAPC)DS(2015)0001, paragraphs 13.4 and 13.5

Further to reference, please find at Enclosure a copy of the USAFE/NATO Airfield Standard Design for Jet Fuel Storage and Dispensing Systems for your information and consideration. The Enclosure does NOT include the plans of installations as the file was far too big (72 MB) to send by electronic means. However, the plans of installations file have been posted on the NATO Logistics website (<https://dpplog.hq.nato.int>)<sup>1</sup>.

(Signed) P. VAN EXEM

1 Enclosure

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<sup>1</sup> The plans are in the PHEWG 2015 Meeting folder and listed as Total plans PART 1, 2 and 3.

**NATO/EAPC UNCLASSIFIED**





**DEPARTMENT OF THE AIR FORCE  
UNITED STATES AIR FORCES IN EUROPE  
UNITED STATES AIR FORCES AFRICA**

MEMORANDUM FOR Distribution

10. May 2015

FROM: HQ USAFE/A7NE

SUBJECT: USAFE/NATO Airfield Standard Design for Jet Fuel Storage/ Dispensing Systems

1. In corporation with the German LBB we developed an update to the USAFE/NATO Airfield Standard Design for Jet Fuel Storage and Dispensing Systems.
2. The USAFE/NATO Airfield Standard Design has evolved over many years and has been successfully implemented in most NATO but also other AOR countries for numerous fuel systems. This design package allows for the rapid design of new fuel systems and is following the requirements of governing NATO criteria and guidance to include AC/4-M(96)001 Technical Criteria and Standards for POL Facilities, Bi-SC Directive 85-5 Approved Criteria and Standards for Airfields and STANAG 3784 Technical Guidance for the Design and Construction of Aviation and Ground Fuel Installations on NATO Airfields.
3. As any standard design package also this one does not claim to be complete and cover all situations. We had to concentrate on the most popular and most often needed facilities and tank sizes. Of course each design for specific projects requires site adaption and possibly adjustment to country specific peculiarities, preferences and legislation.
4. Please don't hesitate to contact me by E-mail [gerald.sanio@ramstein.af.mil](mailto:gerald.sanio@ramstein.af.mil) or tel +49-6371-47-7425.

A handwritten signature in black ink, appearing to read "Gerald Sanio".

GERALD SANIO  
Command Fuel Facilities Engineer  
Civil Engineering Operations



<h1>USAFE</h1>	REVISION 1	DATUM: MAY 15
	BLATT 1 VON 1	
<b>STANDARD SPEZIFIKATION</b>	<b>STS – E</b>	
<b>Title</b> <b>LIST OF STANDARD SPECIFICATIONS ON-BASE</b>		KURZZEICHEN

STS-.....	Titel	General conditions and explications	Kurz- zeichen	Rev.	Stand
E 0				1	MAY 2015
E 100	Low voltage distribution frame			1	MAY 2015
E 102	Measuring and control cabinet			1	MAY 2015
E 103	Stand-by power generator set				
E 104	Electric actuator for ball valve			1	MAY 2015
E 105	Leak detection system			1	MAY 2015
E 107	Temperature gauge of leak detection system				
E 110	Level gauge for flat-bottom tanks			1	MAY 2015
E 111	Level gauge for steel tanks up to 10 m³			1	MAY 2015
E 113	Liquid detection probe			1	MAY 2015
E 115	Flow meter assembly			1	MAY 2015
E 116	System pressure gauge assembly			1	MAY 2015
E 120	Trench for buried cables and strip steel			1	MAY 2015
E 121	Cable bushing			1	MAY 2015
E 122	Cast resin sleeves for low-voltage cables, 0.6 to 1 kV			1	MAY 2015
E 123	Low-voltage cables			1	MAY 2015
E 124	Cables for grounding and lightning protection systems			1	MAY 2015
E 125	Connections for grounding and lightning protection systems			1	MAY 2015
E 126	Spark gap			1	MAY 2015
E 127	Grounding system			1	MAY 2015
E 129	Armored plastic conduit, cable tray, vertical cable run			1	MAY 2015
E 130	Tubular steel pole for side-mounted fixture			1	MAY 2015
E 131	Fluorescent fixture			1	MAY 2015
E 133	Electrical radiator			1	MAY 2015
E 134	Horn			1	MAY 2015
E 135	EX-proof standard units			1	MAY 2015
E 136	In-situ/remote control selection			1	MAY 2015
E 137	Emergency-off switch			1	MAY 2015
E 138	Limit switch			1	MAY 2015
E 140	Measuring cable connection			1	MAY 2015
E 141	Measuring point for cathodic protection			1	MAY 2015
E 142	Anodes			1	MAY 2015
E 143	Protective current generator			1	MAY 2015

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<h1>USAFE</h1>	REVISION 1	DATE: MAY 2015
	SHEET 1 OF 2	
<h2>STANDARD SPECIFICATION</h2>	<h1>STS – E 0</h1>	
DESCRIPTION		ID-CODE
<b>GENERAL CONDITIONS AND EXPLICATIONS</b>		

The present specification contains general conditions and explications on the handling of standard specifications in the electrical sector.

Acronyms used:

VAwS	Landesverordnung über Anlagen zum Umgang mit wassergefährdenden Stoffen (Ordinance on systems handling water-polluting materials and on the relevant specialist companies)
WHG	Wasserhaushaltsgesetz (Water Resources Act)
TRbF	Technische Regeln für brennbare Flüssigkeiten (Technical Rules for the Handling of Combustible Liquids)
PSD	Product Safety Directive (ProdSG ProduktSicherheitsgesetz)
PSR	Regulation associated to the PSD (ProdSV Verordnung zum ProduktSicherheitsgesetz)
BetrSichV	Betriebssicherheitsverordnung (German Ordinance on Industrial Safety and Health)
VDE	Verein deutscher Elektrotechniker (Association for Electrical, Electronic & Information Technologies)
BGV	Berufsgenossenschaftliche Verordnungen (Directives of Professional Associations)
ATEX	ATmosphere EXplosibles
PL	Pipeline
CA	Contracting Agency
CO	Contractor
SS	Site Supervision
DS	Design Specifications
STS-E	Specifications for Electrical Engineering

Important Notes for the Use of the Standard Specifications (STS-Es)

The specifications are integral parts of the bid solicitation. The requirements specified there-in are minimum requirements and compliance must be ensured. If a deviation from the specified requirements is indispensable, the Contractor must obtain the written consent of the Contracting Agency in this case.

As a fundamental principle, always the latest legal regulations, directives, DIN and EN standards and technical rules such as the VDE regulations should be applied, even if older laws and directives are cited in the specifications. The resulting costs shall be included in the unit prices of the relevant components.

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<h1>USAFE</h1>	REVISION 1	DATE: MAY 2015
	SHEET 2 OF 2	
STANDARD SPECIFICATION	<h2>STS – E 0</h2>	
DESCRIPTION	ID-CODE	
<b>GENERAL CONDITIONS AND EXPLICATIONS</b>		

All legally required documents and proofs, in particular inspection and acceptance certificates, operating and maintenance instructions as well as spare parts lists must be supplied in four printed copies and as digital versions (inspection and acceptance certificates: PDF files; operating and maintenance instructions, spare parts lists: MS Word, Excel, DWG files). One copy of each inspection and acceptance certificate of the components must be submitted prior to their installation. If the design specifications give any indications about the legally required documents and proofs, these indications have priority.

The components described in the specifications are intended for the erection and operation of facilities requiring supervision in accordance with the German Ordinance on Industrial Safety and Health (BetrSichV). These facilities convey finished mineral oil products with the hazard characteristics R 10 (flammable), F (easily flammable) and F+ (highly flammable) and an aromatic content of up to 50 %. The components are partly installed in the explosion hazard zones 1 and 0.

In accordance with the German Ordinance on Industrial Safety and Health (BetrSichV), Art. 16, the operational condition of systems requiring monitoring and their pertaining components must be inspected at regular intervals by a qualified person. The components described in the specifications must be conceived and designed so as to allow inspection intervals of three years.

Remark: When the European Directive 2014/34/EU (also referred to as ATEX Directive) came into force, the governments of the member states were recommended introducing and implementing the stipulations of the Directive in their national legislations. The Federal Republic of Germany has anchored the stipulations of the European Directive in national legislation by adopting and bringing into force the Appliance and Product Safety Act (GPSG) and the Ordinance on Industrial Safety and Health (BetrSichV).

#### General requirements applying to electrical equipment

The appliances and components specified in the STSs must be suitable for the following temperature ranges/ambient temperatures in accordance with their place of installation:

- Ambient outdoor temperatures: from –20°C to +40°C
- Ambient temperatures in the manifold/filter station, dome shafts, etc.: from –20°C to +40°C
- Ambient temperatures in electrical room/social room: from +5°C to +30°C
- Temperatures inside switch cabinets: from +5°C to +40°C

All electrical equipment must carry the CE Sign of Conformity.

All electrical equipment must comply with the requirements of the German Professional Association Regulation BGV-A2 (contact protection).

The specifications of the manufacturer on the assembly and commissioning of the electrical equipment shall be complied with.

All equipment shall be labeled permanently with a component identification. The inscription on the label must not be in hand writing.

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	SHEET 1 OF 7	
<h2>STANDARD SPECIFICATION</h2>	<h1>STS – E 100</h1>	
DESCRIPTION <b>LOW VOLTAGE DISTRIBUTION FRAME</b>		ID-CODE

Low-voltage distribution frame in draw-out design, in accordance with the regulations for type-tested switchgear combinations (TSK) VDE 0660 Part 500 or IEC publication 439 as well as with the stipulations of VDE 0100/0110 in accordance with Group C.

The proposed draw-out distribution frame must have a type approval.

The unit shall be installed in the electrical room of the manifold/filter station.

The following regulations are imperative and must be complied with:

1. Directive 2009/104/EC of the European Parliament and of the Council of 16 September 2009 stating minimum requirements of safety and health protection for the operation of electrical equipment at work.
2. Directive 2006/95/EC of the European Parliament and of the Council on the approximation of the laws of the Member States concerning electrical equipment suitable for use within defined voltage limits.
3. Directive 94/9EC of the European Parliament and of the Council on the approximation of the laws of the Member States concerning the appropriate use of equipment in explosion hazard areas (ATEX)
4. Directive 2006/42/EC of the European Parliament and of the Council on the approximation of the laws of the Member States of 17 May 2006 concerning machinery.
5. General Product Safety Directive (GPSD) and associated regulations (GPSR), especially:  
First GPSR: Low-Voltage Directive in combination with Directive 2006/95/EC and others  
Eleventh GPSR: Explosion Protection Directive (ATEX) in combination with Directive 2014/34/EU and others
6. German Ordinance on Industrial Safety and Health (BetrSichV)
7. Stipulations and regulations of the Association for Electrical, Electronic & Information Technologies VDE and DIN/EN codes, especially VDE 0100 Installation of Low-Voltage Switchgear Systems.
8. Technical Rules on the Operational Safety, especially TRBS 1201 / TRGS 2152

Structure:

Section frame with steel sheet lining, horizontal draw-in racks, front doors and metal sheet covers for the modules.

Mechanical and electrical locking mechanisms shall ensure a safe manipulation of the draw-out units. The different operational states of the equipment (operation, inspection and idle) shall be visible when the front doors are closed.

Cable lead-ins shall be on the bottom.

Technical details

Nominal voltage : 400/230 V, 50/60 Hz, L1, L2, L3, N, PE  
Control voltage : 230 V, 50/60 Hz

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<h2>STANDARD SPECIFICATION</h2>	<h1>STS – E 100</h1>	
DESCRIPTION		ID-CODE
<b>LOW VOLTAGE DISTRIBUTION FRAME</b>		

Nominal current main busbar (horizontal) : 1000 A  
Nominal surge current (peak values) : 105 kA  
Nominal short-time current (Is) : 39 kA

Nominal current field busbar (vertical) : 600 A  
Nominal surge current (peak value) : 105 kA  
Nominal short-time current (Is) : 26 kA

Protection type: IP 40, as per DIN 40 050 529/IEC publication 529

Dimensions per compartment: height 2,200 mm (cabinet 2,000 mm, base 200 mm)  
width 1000 mm  
depth 600 mm

Color: frame RAL U 706 (charcoal gray)  
cover and doors RAL 7032 (gravel gray)

Design A (motor output of feed pumps 30 kW)  
as per drawing no. E-8I.1 – E8I.9

The distribution frame shall be fitted with the following built-in units:

Item a) - 1 ea draw-out unit for supply, consisting of:

- 1 ea. circuit breaker for AC as per DIN EN 60947-2 in compact design for system and cable protection, three-pole type, current limiter with thermal excess-current release, rated operating voltage: 400 V AC; rated operating current: 250 A; short-circuit breaking capacity: 30 kA
- 3 ea. current transformers, 250/5 A, for the current indication in the I&C cabinet
- 1 ea. output for low-voltage HRC fuse, 6 A, 3-pole, complete with fuse base parts, 125 A, for the voltage measurement in the I&C cabinet
- 3 ea. low-voltage HRC fuses, 125 A, complete with three-pole fuse base parts 125 A or surge arrester
- 1 ea. surge arrester, three-phase, 400 V, 50 Hz, short-circuit proof, incl. zero-potential alarm contact for the tripping of this protective device

Item b) - 1 ea draw-out unit for emergency supply, consisting of:

- 1 ea. circuit breaker for AC as per DIN EN 60947-2 in compact design, for system and cable protection, three-pole type, current limiter with thermal excess-current release, rated operating voltage: 400 V AC; rated operating current: 250 A; short-circuit breaking capacity: 30 kA

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<h2>STANDARD SPECIFICATION</h2>	<h1>STS – E 100</h1>	
DESCRIPTION		ID-CODE
<b>LOW VOLTAGE DISTRIBUTION FRAME</b>		

- 3 ea. current transformers, 250/5 A, for the current indication in the I&C control cabinet
- 1 ea. output for low-voltage HRC fuse, 6 A, 3-pole, complete with fuse base parts, 125 A, for the voltage measurement and phase-sequence indication in the I&C cabinet

Item c) - 4 ea. draw-out units for feed pumps, consisting of:

- 1 ea. current transformer, 75/5 A, for the current indication in the I&C cabinet
- Circuit breaker for AC as per DIN EN 60947-2 (VDE 0660-101), compact design (MCCB), for motor protection, three-pole, current limiter, as a load disconnect switch, fixed-mounted version, with insulator enclosure, encapsulated, protection IP 41 as per DIN EN 60529 (VDE 0470-1), with toggle actuator, with mechanical on/off push button, rated operating voltage: 400 V AC, rated operating current: 63 A, rated short-circuit limit breaking capacity: 30 kA, with auxiliary switch
- 1 ea. star-delta contactor combination, complete with time relay for three-phase current 30 kW
- Contactor relays for coupling of signals and alarms to the I&C cabinet

Item d) - 2 ea. draw-out units for discharge pumps, consisting of:

- 1 ea. circuit breaker for AC as per DIN EN 60947-2 (VDE 0660-101) in compact design (MCCB), for motor protection, three-pole, current limiter, as a load disconnect switch, fixed-mounted version, with insulator enclosure, encapsulated, protection IP 41 DIN EN 60529 (VDE 0470-1), with toggle actuator and mechanical on/off push button, rated operating voltage 400 V AC, rated operating current 10 A, rated short-circuit breaking capacity 30 kA, with auxiliary switch
- 1 ea. contactor for three-phase motor 2.2 kW
- Contactor relays for coupling of signals and alarms to the I&C cabinet

Item e) - 1 ea. draw-out unit for pump in drain tank, consisting of:

- 1 ea. circuit breaker for AC as per DIN EN 60947-2 (VDE 0660-101), in compact design (MCCB), for motor protection, three-pole, current limiter, as a load disconnect switch, fixed-mounted version, with insulator enclosure, encapsulated, protection IP 41 DIN EN 60529 (VDE 0470-1), with toggle actuator, with mechanical on/off push button, rated operating voltage 400 V AC, rated operating current 25 A, rated limit short-circuit breaking capacity 30 kA, with auxiliary switch
- 1 ea. fault-current circuit breaker 25A, 4-pole,  $I_{FN} = 0.30$  A, DC-proof with test key, which must be accessible without having to draw out the unit
- 1 ea. star-delta contactor combination, complete with time relay for three-phase current 7.5 kW
- Contactor relays for coupling of signals and alarms to the I&C cabinet.

Item f) - 5 ea. draw-out units for fans and lighting in the mechanical room, in the pump stations and leak detection shafts, consisting of:

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<h2>STANDARD SPECIFICATION</h2>	<h1>STS – E 100</h1>	
DESCRIPTION	ID-CODE	
<b>LOW VOLTAGE DISTRIBUTION FRAME</b>		

- 1 ea. circuit breaker for AC as per DIN EN 60947-2 (VDE 0660-101) in compact design (MCCB), for motor protection, three-pole, current limiter, as load disconnect switch, fixed-mounted version, with insulator enclosure, encapsulated, protection IP 41 DIN EN 60529 (VDE 0470-1), with toggle actuator and mechanical on/off push button, rated operating voltage 400 V AC, rated operating current 4 A, rated short-circuit breaking capacity 30 kA, with auxiliary switch
- 1 ea. contactor for three-phase motor 0.37 kW
- 1 ea. time pulse relay

- Item g) - 2 ea. draw-out units for the supply of the control cabinet and the diesel-fuel monitoring cubicle, each consisting of:
- 1 ea. circuit breaker for AC as per DIN EN 60947-2 (VDE 0660-101), in compact design (MCCB), for cable and system protection, three-pole, current limiter, as a load disconnect switch, fixed-mounted version, with insulator enclosure, encapsulated, protection IP 41 DIN EN 60529 (VDE 0470-1), with toggle actuator, with mechanical on/off push button, rated operating voltage 400 V AC, rated operating current 25 A, rated limit short-circuit breaking capacity 30 kA, with auxiliary switch.

- Item h) - 1 ea. draw-out unit for cathodic protection system, consisting of:
- 1 ea. circuit breaker for AC as per DIN EN 60947-2 (VDE 0660-101), in compact design (MCCB), for cable and system protection, three-pole, current limiter, as a load disconnect switch, fixed-mounted version, with insulator enclosure, encapsulated, protection IP 41 DIN EN 60529 (VDE 0470-1), with toggle actuator, with mechanical on/off push button, rated operating voltage 400 V AC, rated operating current 16 A, rated limit short-circuit breaking capacity 30 kA, with auxiliary switch.

- Item i) - 3 ea. draw-out units for power sockets in the mechanical room, electrical room and generator room, each consisting of:
- 1 ea. circuit breaker for AC as per DIN EN 60947-2 (VDE 0660-101), in compact design (MCCB), for cable and system protection, three-pole, current limiter, as a load disconnect switch, fixed-mounted version, with insulator enclosure, encapsulated, protection IP 41 DIN EN 60529 (VDE 0470-1), with toggle actuator, with mechanical on/off push button, rated operating voltage 400 V AC, rated operating current 32 A, rated limit short-circuit breaking capacity 30 kA, with auxiliary switch.

- Item k) - 1 ea. draw-out unit for spare outlet 32 A, consisting of:
- 1 ea. circuit breaker for AC as per DIN EN 60947-2 (VDE 0660-101), in compact design (MCCB), for cable and system protection, three-pole, current limiter, as a load disconnect switch, fixed-mounted version, with insulator enclosure, encapsulated, protection IP 41 DIN EN 60529 (VDE 0470-1), with toggle actuator, with mechanical on/off push button, rated operating voltage 400 V AC, rated operating current 32 A, rated limit short-circuit breaking capacity 30 kA, with auxiliary switch.

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DESCRIPTION		ID-CODE
<b>LOW VOLTAGE DISTRIBUTION FRAME</b>		

- Item l) - 1 ea. draw-out unit for spare outlet 16 A, consisting of:
- 1 ea. circuit breaker for AC as per DIN EN 60947-2 (VDE 0660-101), in compact design (MCCB), for cable and system protection, three-pole, current limiter, as a load disconnect switch, fixed-mounted version, with insulator enclosure, encapsulated, protection IP 41 DIN EN 60529 (VDE 0470-1), with toggle actuator, with mechanical on/off push button, rated operating voltage 400 V AC, rated operating current 16 A, rated limit short-circuit breaking capacity 30 kA, with auxiliary switch.
- Item m) - 1 ea. draw-out unit for 220 V consumer, consisting of:
- 1 ea. circuit breaker for AC as per DIN EN 60947-2 (VDE 0660-101), in compact design (MCCB), for cable and system protection, three-pole, current limiter, as a load disconnect switch, fixed-mounted version, with insulator enclosure, encapsulated, protection IP 41 DIN EN 60529 (VDE 0470-1), with toggle actuator, with mechanical on/off push button, rated operating voltage 400 V AC, rated operating current 63 A, rated limit short-circuit breaking capacity 30 kA, with auxiliary switch.
  - 18 ea. miniature automatic circuit breakers 16 A
  - 1 ea. contactor relay for lighting in the mechanical room

The distribution frame shall be delivered completely, installed and connected ready for operation in the electrical room of the manifold/filter station.

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DESCRIPTION		ID-CODE
<b>LOW VOLTAGE DISTRIBUTION FRAME</b>		

Design B (motor output feed pumps 55 kW)  
as per drawing no. E-8.1 to E8.9

The distribution frame shall be fitted with the following built-in units:

Item a) - 1 ea draw-out unit for supply, consisting of:

- 1 ea. circuit breaker for AC as per DIN EN 60947-2 in compact design for system and cable protection, three-pole type, current limiter with thermal excess-current release, rated operating voltage: 400 V AC; rated operating current: 400 A; short-circuit breaking capacity: 25 kA
- 3 ea. current transformers, 400/5 A, for the current indication in the I&C cabinet
- 1 ea. outputs for low-voltage HRC fuses, 6 A, 3-pole, complete with fuse base parts, 125 A, for the voltage measurement in the I&C cabinet
- 1 ea. surge arrester, three-phase, 380 V, 50 Hz, short-circuit proof, incl. zero-potential alarm contact for the tripping of this protective device

Item b) - 1 ea. draw-out unit for emergency supply, consisting of:

- 1 ea. circuit breaker 400 A, 3-pole, with thermal undercurrent trip, adjusting range 250 A to 400 A and magnetic short-circuit trip, adjusting range 2.6 to 5.0 kA
- 3 ea. current transformer, 400/5 A, for the current indication in the I&C cabinet
- 1 ea. output for low-voltage HRC fuse, 6 A, 3-pole, complete with fuse base parts, 125 A, for the voltage measurement and phase-sequence indication in the I&C cabinet

Item c) - 4 ea draw-out units for feed pumps, consisting of:

- 1 ea. load disconnect switch 125 A, 3-pole
- 1 ea. current transformer, 120/5 A, for the current indication in the I&C cabinet,
- Circuit breaker for AC as per DIN EN 60947-2 (VDE 0660-101), compact design (MCCB), for motor protection, three-pole, current limiter, as a load disconnect switch, fixed-mounted version, with insulator enclosure, encapsulated, protection IP 41 as per DIN EN 60529 (VDE 0470-1), with toggle actuator, with mechanical on/off push button, rated operating voltage 400 V AC, rated operating current 125 A, rated limit short-circuit breaking capacity 30 kA, with auxiliary switch.
- 1 ea. star-delta contactor combination, complete with bimetal trip and time relay, dimensioned for three-phase motor 55 kW
- contactor relays for coupling of signals and alarms to the I&C cabinet.

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DESCRIPTION		ID-CODE
<b>LOW VOLTAGE DISTRIBUTION FRAME</b>		

Item d) - 1 ea. draw-out unit for leak detection 25 A, consisting of:

- 1 ea. circuit breaker for AC as per DIN EN 60947-2 (VDE 0660-101), in compact design (MCCB), for cable and system protection, three-pole, current limiter, as a load disconnect switch, fixed-mounted version, with insulator enclosure, encapsulated, protection IP 41 DIN EN 60529 (VDE 0470-1), with toggle actuator, with mechanical on/off push button, rated operating voltage 400 V AC, rated operating current 32 A, rated limit short-circuit breaking capacity 30 kA, with auxiliary switch.

Additional built-in units and work as with design A, without item a), b) and c).

Inspection intervals:

In accordance with the German Ordinance on Industrial Safety and Health (BetrSichV), Art. 16, the operational condition of systems requiring monitoring and their pertaining components must be inspected at regular intervals by a qualified person. The components described in the specifications must be conceived and designed so as to allow inspection intervals **of three years**.

STS-E 0 must be adhered to.

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<h2>STANDARD SPECIFICATION</h2>	<h1>STS – E 102</h1>	
DESCRIPTION	ID-CODE	
<b>MEASURING AND CONTROL CABINET</b>		

Suitable for the monitoring and control of pressure refuelling systems.

The cabinet is installed in the electrical room of the manifold/filter station.

1. Basic documents:

Regulations for industrial health, facility safety and environmental protection.

Especially:

1. Directive 2009/104/EC of the European Parliament and of the Council of 16 September 2009 stating minimum requirements of safety and health protection for the operation of electrical equipment at work.
2. Directive 2006/95/EC of the European Parliament and of the Council on the approximation of the laws of the Member States concerning electrical equipment suitable for use within defined voltage limits.
3. Directive 2014/34/EU of the European Parliament and of the Council on the approximation of the laws of the Member States concerning the appropriate use of equipment in explosion hazard areas (ATEX)
4. Directive 2006/42/EC of the European Parliament and of the Council on the approximation of the laws of the Member States of 17 May 2006 concerning machinery.
5. General Product Safety Directive (GPSD) and associated regulations (GPSR), especially:  
First GPSR: Low-Voltage Directive in combination with Directive 73/23/EEC and others  
Eleventh GPSR: Explosion Protection Directive (ATEX) in combination with Directive 2014/34/EU and others
6. German Ordinance on Industrial Safety and Health (BetrSichV)
7. Stipulations and regulations of the Association for Electrical, Electronic & Information Technologies VDE and DIN/EN codes, especially VDE 0100 Installation of Low-Voltage Switchgear Systems.
8. Technical Rules on the Operational Safety, especially TRBS 1201, TRGS 2152

2. Design:

Cabinet made of steel, consisting of two compartments, side by side, fixed to each other, dimensions of each compartment: height of 2,200 mm, width of 800 mm and depth of 600 mm.

With overview diagrams fitted to both hinged front doors and integrated indication, command and alarm units.

Execution of the overview diagrams:

- Overlay, material PETP, mat surface with removable protective film

Colors for	fuel tank	RAL 1024
	drain tank	RAL 1001
	manifold/filter station	RAL 5014

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DESCRIPTION <b>MEASURING AND CONTROL CABINET</b>		ID-CODE

The base or floor slab must be fitted with all required bores and cut-outs.

Overlays and base plates shall be glued with high-performance glue.

The overview diagrams shall be fitted with transparent windows into which a labeling strip can be inserted. The text shall be visible in the legend of the corresponding I&C cabinets and shall be in English and the language of the host country.

The cabinet shall provide enough space for the installation of pressure, flow and tank level measuring units as well as leakage detection systems at a later time.

For built-in components that are not part of the standard equipment, a space reserve of at least 400 x 400 mm and sufficient space for a 19-inch component carrier shall be available on the assembly plate.

Operational state, trouble and limit signals put out by the motor and solenoid valves shall be indicated on indicator lamps by flash light or permanent illumination. A siren shall be installed that can be activated and reset for each alarm. Each lamp shall be fitted with a functional testing facility.

The cables shall be led in from the bottom.

Two independent **PLCs** (programmable logical controllers) shall be available for the entire control of the filling system, the trouble indicator log, the measuring value processing and the two-position control. These two PLCs shall monitor and replace each other if required.

PLC design:

Surge protection by means of power line filters for the supply voltage as well as all inputs and outputs of the PLCs.

Safety circuits for the shut down of the pumps by flow switches and for the functional monitoring in accordance with TRBS shall be installed downstream of the PLC.

The PLC shall be designed as a modular, freely programmable multi-processor system, which is able to perform the above mentioned functions.

The PLC must be able to process:

- measuring values from 0 to 10 V or 0(4) to 20 mA, measured by analog equipment
- analog set values from 0 to 10 V or 0(4) to 20 mA
- digital input and output signals

All binary signals from field equipment installed outside of the electrical room shall be connected inside the I&C cabinet via switching relays to prevent overvoltage on the PLC. Every switching relay shall be fitted with two zero-potential single-pole double throw contacts (SPDT) and wired with connectors.

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DESCRIPTION <b>MEASURING AND CONTROL CABINET</b>		ID-CODE

The software shall handle all functions.

The contractor shall submit a specification of the scope of work to the Contracting Agency for approval prior to programming the PLC.

The logic diagram and the statements list shall be handed over to the Contracting Agency together with a detailed description of the software as an integral part of the facility documentation.

The software shall include:

- complete trouble indication and alarm system incl. signal transmission
- a complete control system

The software shall be handed over to the Contracting Agency in the following manner:

- as an EPROM in the PLC
- as a separate EPROM, not integrated
- as a backup copy on a USB stick

### 3. Technical details

Nominal voltage	:	400/230 V, 50/60 Hz, L1, L2, L3, N, PE
Control voltage	:	230 V, 50/60 Hz, 24 V DC
Signal voltage	:	24 V DC
Protection	:	IP 40, as per DIN 40 050/IEC publ. 529

Temperature and humidity as per DIN 40 050:

Ambient temperature	:	0 to +40°C
Storage temperature	:	40°C to +40°C
Humidity	:	class F ( $\leq 75^\circ\text{C}$ )

Dimensions per compartment	:	height: 2,200 mm width: 800 mm depth: 600 mm
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Color	:	RAL 7032 (gravel gray)
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Conductor colors	:	400 V conductor L1, L2, L3 – black – 230 V control voltage – red – 24 V voltage – gray – measuring circuit – purple –
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DESCRIPTION <b>MEASURING AND CONTROL CABINET</b>		ID-CODE

intrinsically safe circuits – light blue –  
neutral conductor – blue –  
PE conductors – green/yellow

Design in accordance with valid VDE regulations, especially VDE 0100/0110/0160/0660 Part 500 and/or IEC publ. 439.

The switch cabinet shall be delivered completely, installed and connected ready for operation in the electrical room of the manifold/filter station and adjusted accordingly.

#### Prerequisites

The facility shall consist of two storage tanks; each of these tanks shall be fitted with two feed pumps.

The entire facility shall be located approximately at the same geodetic level.

The feed pumps shall have a nominal power of 55 kW (tank truck refuelling 30 kW). Two of them shall be authorized to receive emergency power supply.

The supply line is assumed to have a length of 150 m.

The supply line of the feed pumps shall be determined by the current carrying capacity of the cable (see VDE 0298 Part 4, Table 4). A grounding cable of 4\*50 mm<sup>2</sup> (tank truck refuelling 35 mm<sup>2</sup>) is required. It shall not exceed a length 170 m.

Two of the four feed pumps shall be authorized to receive emergency power supply.

The following data shall be assumed for the supply transformer. Sn = 630 kVA; uk = 4 %

Instead of a combination of fuse switches and low-voltage HRC fuses, which has been customary in the past, circuit breakers shall be used. In motor supply circuits, the circuit breakers shall also assume the motor protection function.

There will be no EX distribution frames in the pump stations any more.

When calculating the materials and components that are required for the functions, also those materials and components shall be included that are not described explicitly in this specification.

#### 4. Design A (tank truck loading in accordance with drawing E-8I.12)

The following facility components shall be controlled:

- 4 ea. fuel pumps 30 kW
- 2 ea. discharge pumps 2.2 kW
- 1 ea. pump of drain tank 7.5 kW
- 1 ea. fan for mechanical room 0.37 kW
- 1 ea. solenoid valve, pressure control valve
- 1 ea pressure holding device for the maximum level control valve in the drain tank

The following signals and measuring values shall be processed by the PLC:

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STANDARD SPECIFICATION	<h2>STS – E 102</h2>	
DESCRIPTION <b>MEASURING AND CONTROL CABINET</b>		ID-CODE

- Liquid levels in the fuel tanks
- Liquid level in the drain tank
- Accumulation of liquid in the leak detection shaft
- System pressure in the pipeline system
- Flow rate in the filling line
- Phase sequence in the emergency power supply system
- Ground fault monitoring

#### 4.1 Functional features

The system control shall be designed for the following operating modes:

- Manual operation of the entire system
- Automatic operation for tank truck loading (pressure filling)
- Automatic drainage of the drain tank
- Automatic control of the pressure holding device in the pressure tank for the maximum level control valve in the drain tank (HLVD)

The filling system shall be fitted with a pressure control valve (CVP) with solenoid valve that monitors the no-flow pressure in the pipeline system when the filling system is out of operation and prevents overpressure due to warming up (de-energized solenoid valve).

#### MANUAL mode

In this mode, it shall be possible to switch all fuel and discharge pumps on the fuel tanks manually off and on. The automatic pressure and flow control shall be out of operation. If the pumps cannot be switched off manually, they shall be stopped by the flow switches after a time of approx. 1 minute.

#### AUTOMATIC mode

Maximally two fuel pumps shall be selectable. First, the start-up order of the pumps shall be selected. The pressure control valve (CVP) shall be open (de-energized solenoid valve).

#### System pressure holding device

The system shall have a no-flow pressure of 4.0 bar approx. At a no-flow pressure below 3.0 bar, the first fuel pump in the program shall be started by the SPM (system pressure gage) after an adjustable delay (of approx. 10 seconds).

The start conditions for the fuel pump shall also apply to the solenoid valve of the pressure control valve (CVP), i.e. the valve shall remain closed.

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STANDARD SPECIFICATION	<h2>STS – E 102</h2>	
DESCRIPTION	ID-CODE	
<b>MEASURING AND CONTROL CABINET</b>		

If a pressure of 5.5 bar is attained, the pump shall be switched off by the system pressure gage after a delay.

The solenoid valve of the pressure control valve shall be de-energized when the pump is switched off. As a consequence, the main valve shall open again and the pressure in the pipe system shall drop to the no-flow pressure level.

When the fuel pump has been switched on several times within a given period by the system pressure gage (approx. 6 times within 15 minutes) without fuel having been drawn off, visual and audible alarms shall be triggered. In this case, the pipeline system must be affected by leakage (leaking valve, pipe etc.) The internal measuring device shall not be reset before at least 50 m<sup>3</sup>/h fuel have been drawn off or the system has been commuted to manual mode.

#### Loading of tank trucks

At a no-flow pressure below 3.0 bar, the first fuel pump in the program shall be started by the SPM (system pressure gage) after an adjustable delay (of approx. 3 seconds).

The start-up conditions for the fuel pump shall also apply to the solenoid valve. The main valve shall remain closed.

When the flow rate exceeds 50 m<sup>3</sup>/h, the system shall switch from pressure control to flow control.

For dispensing flow rates of up to 120 m<sup>3</sup>/h, a single fuel pump shall be in operation.

When the flow rate falls below 50 m<sup>3</sup>/h, the automatic control system shall switch from flow control (by flow meter) to pressure control (by the system pressure gage).

If a pressure of 5.5 bar is attained, the system pressure gage shall switch off the pump after a delay. The solenoid valve of the CVP shall be de-energized, when the pump is switched off. As a consequence, the pressure in the pipe system drops to the no-flow pressure level.

The start-up of the second fuel pump shall be controlled as follows:

When the flow rate has attained 130 m<sup>3</sup>/h, the second fuel pump in the program shall be switched on after a delay of 5 seconds.

The shut-down of the second fuel pump shall be controlled as follows:

When the fuel withdrawal rate falls below 120 m<sup>3</sup>/h, the pump shall be switched off after a delay of two seconds. After the second pump has been switched off, it shall not be possible to restart it until a period of approx. 7 seconds has elapsed. In this connection, it is important to adjust the backpressure on the tank truck loading valve (TLV) to a flow rate of 120 m<sup>3</sup>/h maximum during commissioning.

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<h2>STANDARD SPECIFICATION</h2>	<h1>STS – E 102</h1>	
DESCRIPTION <b>MEASURING AND CONTROL CABINET</b>		ID-CODE

Pressure holding device for the maximum level control valve in the drain tank (HLVD).

Automatic control by a pressure switch, fitted on the pressure tank with MIN and MAX contacts.

#### 4.2 Overview diagram with legend

All actuator and display elements as well as indicator lamps shown in the drawings E-8I.12 and in the legend shall be included in the overview diagram.

Legend for the drawings E – 8I.12

Item	Color	Designation
1		Fuel pump
2		Drain pump P
3		Fan
4		Tank gap
5		Filling level
6		Leak detection liquid
7		Pump selection panel
8		Pump drain tank P...
9		Filling level
10		System pressure
11		Flow rate
13		System pressure gage
14		Flow rate meter
16		Fan in mechanical room
17		Control unit 1
18		Control unit 2
20		Ammeter

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<b>STANDARD SPECIFICATION</b>	<b>STS – E 102</b>	
DESCRIPTION		ID-CODE
<b>MEASURING AND CONTROL CABINET</b>		

21		Operating hours counter
22	(yellow)	Indicator lamp - fuel pump "ERROR"
23	(green)	Indicator lamp - fuel pump "IN OPERATION"
24	(red)	Push button – fuel pump "OFF"
25	(green)	Illuminated push button – fuel pump "ON"
26	(yellow)	Indicator lamp - drain pump "ERROR"
27	(green)	Indicator lamp - drain pump "IN OPERATION"
28	(red)	Push button – drain pump "OFF"
29	(green)	Illuminated push button – drain pump "ON"
30	(yellow)	Indicator lamp - fan in pump station "ERROR"
31	(green)	Indicator lamp - fan in pump station "IN OPERATION"
32		Key switch – filling level of storage tank
33		Indicator lamp – filling level of storage tank
34	(yellow)	Indicator lamp - filling level "MAX 2"
35	(white)	Indicator lamp - filling level "MAX 1"
36	(yellow)	Indicator lamp - filling level "MIN 1"
37	(yellow)	Indicator lamp - filling level "MIN 2"
38	(yellow)	Indicator lamp - fan in leakage indication shaft "ERROR"
39	(green)	Indicator lamp - fan in leakage indication shaft "IN OPERATION"
40	(yellow)	Indicator lamp - fan in leakage detection "ERROR"
41	(yellow)	Indicator lamp - "LIQUID DETECTED"
42		Indication – filling level of drain tank
43	(yellow)	Indicator lamp - filling level of drain tank "MAX 2"
44	(white)	Indicator lamp - filling level of drain tank "MAX 1"
45	(white)	Indicator lamp - filling level of drain tank "MIN 1"
46	(yellow)	Indicator lamp - filling level of drain tank "MIN 2"

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<b>STANDARD SPECIFICATION</b>	<b>STS – E 102</b>	
DESCRIPTION		ID-CODE
<b>MEASURING AND CONTROL CABINET</b>		

47	(yellow)	Indicator lamp - filling level gage "ERROR"
48	(yellow)	Indicator lamp - drain tank pump "ERROR"
49	(green)	Indicator lamp - drain tank pump "IN OPERATION"
50	(red)	Push button – drain tank pump "OFF"
51	(green)	Illuminated push button Pump drain tank "ON"
52		Selector switch Pump drain tank „MANUAL/AUTOMATIC“
53	(yellow)	Indicator lamp - automatic control "ERROR"
54		Indication - system pressure
55		Indication - flow rate
57		Two-channel paperless recorder System pressure / flow rate
59	(yellow)	Indicator lamp - fan in mechanical room "ERROR"
60	(green)	Indicator lamp - fan in mechanical room "IN OPERATION"
61	(red)	Push button – control voltage "OFF"
62	(green)	Illuminated push button – control voltage "ON"
66	(white)	Indicator lamp - "MANUAL" mode
67	(white)	Indicator lamp - "AUTOMATIC" mode
71	(yellow)	Indicator lamp - voltage control "GROUND FAULT"
72	(yellow)	Indicator lamp - protective current rectifier "POWER SUPPLY ERROR"
73	(yellow)	Indicator lamp - protective current System pressure "BELOW MINIMUM"
74	(yellow)	Indicator lamp EMERGENCY-OFF push button "TRIPPED"
77	(green)	Indicator lamp Maximum level control valve Drain tank (HLVD) "CLOSED"

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<b>STANDARD SPECIFICATION</b>	<b>STS – E 102</b>	
DESCRIPTION		ID-CODE
<b>MEASURING AND CONTROL CABINET</b>		

78	(green)	Indicator lamp - pressure Control valve drain tank (CVP) "IN OPERATION"
81	(white)	Push button - lamp test
82	(white)	Push button - lamp reset
83	(white)	Push button - reset siren
86	(yellow)	Indicator lamp - pressure gage 1 "ERROR"
87	(yellow)	Indicator lamp - pressure gage 2 "ERROR"
88		Selector switch – pressure gage 1/2
89	(yellow)	Indicator lamp - flow meter 1 "ERROR"
90	(yellow)	Indicator lamp - flow meter 2 "ERROR"
91		Selector switch – flow meter 1/2
95	(yellow)	Indicator lamp - control unit 1 "ERROR"
96	(yellow)	Indicator lamp - control unit 2 "ERROR"
97		Selector switch – control unit 1/2
98		Electronic multiple meter
99		Operating indication - power supply
102		Phase change switch - emergency supply
103		EMERGENCY-OFF push button

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STANDARD SPECIFICATION	<h2>STS – E 102</h2>	
DESCRIPTION	ID-CODE	
<b>MEASURING AND CONTROL CABINET</b>		

5. Design B (hydrant filling as per drawings E-8.1 and E-8.16)

The following facility components shall be controlled:

- 4 ea. fuel pumps 55 kW
- 2 ea. discharge pumps 2.2 kW
- 1 ea. pump of drain tank 7.5 kW
- 1 ea. fan for mechanical room 0.37 kW
- 1 ea. solenoid valve, pressure control valve (CVP)
- 1 ea. solenoid valve, system pressure control valve (BCVP)
- 1 ea. solenoid valve, flushing valve (FLV), interlocked with BPCV
- 1 ea. pressure holding device for the maximum level control valve in the drain tank

The following signals and measuring values shall be processed by the PLC:

Liquid levels in the fuel tanks  
Liquid level in the drain tank  
Accumulation of liquid in the leak detection shaft  
System pressure in the pipeline system  
Flow rate in the filling line  
Flow rate in the return line  
Phase sequence in the emergency power supply system  
Grounding monitoring system

5.1 Functional features

The system control shall be designed for the following operating modes:

1. Manual operation of the entire system
2. Automatic operation for aircraft refuelling with pressure holding device
3. Flushing of the filling loop (pipeline)
4. Aircraft defuelling via the filling loop
5. Flushing of the filling facilities and defuelling of tank trucks
6. Automatic drainage of the drain tank
4. Automatic control of the pressure holding device in the pressure tank for the maximum level control valve in the drain tank (HLVD)

The system is equipped with the following control valves and solenoid valves:

Pressure control valve (CVP) with solenoid valve that monitors the no-flow pressure in the pipeline system when the filling system is out of operation and prevents overpressure by warming up (de-energized solenoid valve).

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DESCRIPTION <b>MEASURING AND CONTROL CABINET</b>	ID-CODE	

System pressure control valve (BPCV) with one solenoid valve controlling the pressure in the filling loops during filling operations (de-energized solenoid valve).

Flushing valve with one solenoid valve that is energized during the flushing process. The solenoid valves of the FLV and the BPCV shall be interlocked to block each other.

#### Mode 1 - MANUAL –

In this mode, it shall be possible to switch all fuel and discharge pumps on the fuel tanks manually off and on.

If the pumps cannot be switched off manually, they shall be stopped by the flow switches after a time of approx. 1 minute.

#### Mode 2 - AUTOMATIC –

Maximally two fuel pumps shall be selectable. First, the start-up order of the pumps shall be selected.

Initial position of the solenoid valve of the control valves:

CVP : solenoid valve de-energized;  
main valve can open.

BPCV: solenoid valve de-energized;  
main valve remains closed.

FLV: solenoid valve de-energized;  
main valve remains closed.

#### System pressure holding device

The system shall have a no-flow pressure of 6.5 bar approx.

At a no-flow pressure below 4.0 bar, the SPM (system pressure gage) shall start the first fuel pump in the program after an adjustable delay (of approx. 10 seconds).

The start conditions for the fuel pump shall also apply to the solenoid valve of the pressure control valve (CVP), i.e. the valve shall remain closed.

If a pressure of 8.5 bar is attained, the pump shall be switched off by the system pressure gage after a delay.

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DESCRIPTION	ID-CODE	
<b>MEASURING AND CONTROL CABINET</b>		

The solenoid valve of the pressure control valve shall be de-energized when the pump is switched off. As a consequence, the main valve shall open again and the pressure in the pipe system shall drop to the no-flow pressure level.

When the system pressure gage has switched on the fuel pump several times within a given period (approx. 6 times within 15 minutes) without fuel having been drawn off, visual and audible alarms shall be triggered. In this case, there must be a leak in the pipeline system (leaking valve, pipe etc.) The internal measuring device shall not be reset before at least 50 m<sup>3</sup>/h fuel have been drawn off or the system has been commuted to manual mode.

#### Aircraft refuelling

The system shall have a no-flow pressure of 6.5 bar approx.

The system pressure shall drop when the refuelling arm is connected to the aircraft and the dead man switch has been activated.

At a no-flow pressure below 4.0 bar, the first fuel pump in the program shall be started by the SPM (system pressure gage) after an adjustable delay (of approx. 3 seconds).

The start-up conditions for the fuel pump shall simultaneously apply to the solenoid valve of the CVP. The main valve remains closed.

After the fuel pump motor has been switched from star to delta connection, the solenoid valve of the BPCV shall be switched on and the main valve can open.

The flow meter 1 (FM1) shall switch the system from pressure control (by SP) over to flow control when more than 50 m<sup>3</sup>/h fuel are drawn off the pipeline system.

For dispensing flow rates of up to 120 m<sup>3</sup>/h, a single fuel pump shall be in operation.

When the flow volume passing through the flow meter 2 (FM 2) in the return line is equal to the fuel pump capacity (120 m<sup>3</sup>/h), i.e. when no fuel is drawn off the system, a time t=60 seconds shall be set.

When the fuel volume flowing through FM 2 in the return line is lower than the full capacity of the fuel pump during these 60 seconds, i.e. fuel is drawn off the system, the time relay shall be reset to 0. The time t = 60 seconds shall start to elapse once more when the flow rate is equal to the full capacity limit of the fuel pump again.

The solenoid valve 1 of the BPVC shall be de-energized after expiry of the time t = 60 seconds.

When the fuel dispensing rate falls below 40 m<sup>3</sup>/h, the system shall return to pressure control mode.

When attaining a pressure of 8.5 bar, the pump shall be switched off by the SPM after a delay.

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DESCRIPTION	ID-CODE	
<b>MEASURING AND CONTROL CABINET</b>		

The contact of the solenoid valve of the BPVC shall de-energize the solenoid valve of the CVP at the same time. As a consequence, the main valve shall open again and the pressure in the pipe system shall drop to the no-flow pressure level.

The start-up of the second fuel pump shall be controlled as follows:

When the flow rate through FM 1 approaches 130 m<sup>3</sup>/h, the second pre-set fuel pump shall start immediately.

Valve 1 of the BPVC shall remain open during the duty cycle, i. e. the main valve can open at any time.

Depending on the dispensed fuel quantity, a fuel volume between 0 and 100 % of the pump capacity limit flows through the BPCV during the above-mentioned switching operation.

The shut-down of the fuel pumps shall be controlled as follows:

If the fuel volume drawn off the system falls to or below the full capacity level of one fuel pump (< 120 m<sup>3</sup>/h), the flow rate through FM 2 in the return line exceeds 120 m<sup>3</sup>/h. A time relay (t = 15 seconds) shall be started up as soon as this flow rate is attained or exceeded.

If the flow rate in the return line falls below the full capacity of the fuel pump during this delay (t = 15 seconds), the delay time shall automatically be reset to 0 and shall restart expiring as soon as the capacity limit is attained or exceeded.

The second fuel pump shall be switched off after the time t = 15 seconds has elapsed.

After switching off the fuel pump, it is locked against reactivation for approximately 30 seconds.

The first pump shall be switched off as described above.

### Mode 3 – FLUSHING OF THE FILLING LOOP LINE

The selection of this mode shall trigger the following changes in the control:

1. Manual control of the fuel pump
2. Pressure gage and flow meter out of operation

### Mode 4 – DEFUELLING OF AIRCRAFT

This mode shall only be selected when the system is ready for filling (AUTOMATIC mode) and no fuel is drawn off the hydrant system.

It is selected in addition of the AUTOMATIC mode. The selection of this mode shall activated the solenoid valve of the BPVC, this allowing the main valve to open.

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STANDARD SPECIFICATION	<h2>STS – E 102</h2>	
DESCRIPTION <b>MEASURING AND CONTROL CABINET</b>		ID-CODE

The defuelling of aircrafts shall be possible simultaneously to filling operations.

Mode 5 – FLUSHING OF THE FILLING ARM/UNLOADING OF TANK TRUCKS -

It is selected in addition to AUTOMATIC mode.

The selection of this mode shall de-energize the solenoid valve of the BPVC and the main valve shall remain closed.

Emergency operation

Same as for design A.

Emptying of the drain tank;

Same as for design A.

Pressure holding device for the maximum level control valve in the drain tank (HLVD).

Same as for design A.

## 5.2 Overview diagram with legend

All actuator and display elements as well as indicator lamps in the drawing E-8.13 US and in the legend shall be included in the overview diagram.

Legend for the drawings E – 8.13 US

Item	Color	Designation
3		Fan
4		Tank gap
5		Filling level
6		Leak detection liquid
7		Pump selection panel

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DESCRIPTION	ID-CODE	
<b>MEASURING AND CONTROL CABINET</b>		

8		Pumps drain tank P...
9		Filling level
10		System pressure
11		Flow rate filling line
12		Flow rate return line
13		System pressure gage
14		Flow meter (filling line)
15		Flow meter (return line)
16		Fan in mechanical room
17		Control unit 1
18		Control unit 2
20		Ammeter
21		Operating hours counter
22	(yellow)	Indicator lamp - fuel pump "ERROR"
23	(green)	Indicator lamp - fuel pump "IN OPERATION"
24	(red)	Push button – fuel pump "OFF"
25	(green)	Illuminated push button – fuel pump "ON"
26	(yellow)	Indicator lamp - drain pump "ERROR"
27	(green)	Indicator lamp - drain pump "IN OPERATION"
28	(red)	Push button – drain pump "OFF"
29	(green)	Illuminated push button – drain pump "ON"
30	(yellow)	Indicator lamp - fan pump station "ERROR"
31	(green)	Indicator lamp - fan pump station "IN OPERATION"
32		Key switch – filling level of storage tank
33		Indicator lamp – filling level of storage tank
34	(yellow)	Indicator lamp - filling level "MAX 2"

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DESCRIPTION		ID-CODE
<b>MEASURING AND CONTROL CABINET</b>		

35	(white)	Indicator lamp - filling level "MAX 1"
36	(yellow)	Indicator lamp - filling level "MIN 1"
37	(yellow)	Indicator lamp - filling level "MIN 2"
38	(yellow)	Indicator lamp - fan in leakage indication shaft "ERROR"
39	(green)	Indicator lamp – fan in leakage indication shaft "IN OPERATION"
40	(yellow)	Indicator lamp – fan in leakage detection "ERROR"
41	(yellow)	Indicator lamp - "LIQUID DETECTED"
42		Indication – filling level of drain tank
43	(yellow)	Indicator lamp - filling level of drain tank "MAX 2"
44	(white)	Indicator lamp - filling level of drain tank "MAX 1"
45	(white)	Indicator lamp - filling level of drain tank "MIN 1"
46	(yellow)	Indicator lamp - filling level of drain tank "MIN 2"
47	(yellow)	Indicator lamp - filling level gage "ERROR"
48	(yellow)	Indicator lamp - drain tank pump "ERROR"
49	(green)	Indicator lamp - drain tank pump "IN OPERATION"
50	(red)	Push button – drain tank pump "OFF"
51	(green)	Illuminated push button Drain tank pump "ON"
52		Selector switch Drain tank pump "MANUAL/AUTOMATIC"
53	(yellow)	Indicator lamp - automatic control "ERROR"
54		Indication - system pressure
55		Indication - flow rate (filling line)
56		Indication - flow rate (return line)
57		3-channel paperless recorder System pressure / flow rate (supply line) Flow rate (return line)

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<b>STANDARD SPECIFICATION</b>	<b>STS – E 102</b>	
DESCRIPTION		ID-CODE
<b>MEASURING AND CONTROL CABINET</b>		

59	(yellow)	Indicator lamp - fan in mechanical room "ERROR"
60	(green)	Indicator lamp - fan in mechanical room "IN OPERATION"
61	(red)	Push button – control voltage "OFF"
62	(green)	Illuminated push button - control voltage "ON"
65	(white)	Indicator lamp - "LEAK DETECTION" mode
66	(white)	Indicator lamp - "MANUAL" mode
67	(white)	Indicator lamp - "AUTOMATIC" mode
68	(green)	Illuminated push button - "FLUSHING OF FILLING LOOP" mode
69	(green)	Illuminated push button - "DEFUELLING OF AIRCRAFT" mode
70	(green)	Illuminated push button - "FLUSHING OF REFUELLING ARMS/ REFUELLING OF TANK TRUCK" mode
71	(yellow)	Indicator lamp - voltage control "GROUND FAULT"
72	(yellow)	Indicator lamp - protective current Rectifier "POWER SUPPLY ERROR"
73	(yellow)	Indicator lamp - protective current System pressure "BELOW MINIMUM"
74	(yellow)	Indicator lamp EMERGENCY-OFF push button "TRIPPED"
77	(green)	Indicator lamp Maximum level control valve Drain tank (HLVD) "CLOSED"
78	(green)	Indicator lamp - pressure Control valve (CVP) "IN OPERATION"
79	(green)	Indicator lamp - counter pressure Control valve (BPCV) "IN OPERATION"
80	(green)	Indicator lamp - EMERGENCY-OFF valve (EV) "IN OPERATION"
81	(white)	Push button - lamp test

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<b>STANDARD SPECIFICATION</b>	<b>STS – E 102</b>	
DESCRIPTION		ID-CODE
<b>MEASURING AND CONTROL CABINET</b>		

82	(white)	Push button - reset lamps
83	(white)	Push button - reset siren
86	(yellow)	Indicator lamp - pressure gage 1 "ERROR"
87	(yellow)	Indicator lamp - pressure gage 2 "ERROR"
88		Selector switch – pressure gage 1/2
89	(yellow)	Indicator lamp - flow meter 1 (supply line) "ERROR"
90	(yellow)	Indicator lamp - flow meter 2 (supply line) "ERROR"
91		Selector switch – flow meter (supply line) 1/2
92	(yellow)	Indicator lamp - flow meter 1 (return line) "ERROR"
93	(yellow)	Indicator lamp - flow meter 2 (return line) "ERROR"
94		Selector switch - flow meter (return line) 1/2
95	(yellow)	Indicator lamp - control unit 1 "ERROR"
96	(yellow)	Indicator lamp - control unit 2 "ERROR"
97		Selector switch – control unit 1/2
98		Operating indication - power supply
99		Operating indication - power supply
100		Volt meter – power supply
101		Selector switch - volt meter – power supply
102		Phase change switch - emergency power supply
103		EMERGENCY-OFF push button

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STANDARD SPECIFICATION	<h2>STS – E 102</h2>	
DESCRIPTION <b>MEASURING AND CONTROL CABINET</b>	ID-CODE	

Legally and additionally required evidences included in the scope of delivery:

Evidences required by the General Product Safety Directive (GPSD) and associated regulations (GPSR);

especially:

- EC type-test certificate as per Directive 2014/34/EU
- Identification as per Annex II, Item 1.05 of the Directive 2014/34/EU
- CE Conformity Sign as per Art. 5 Para. 1 and 2 of the Directive 2014/34/EU
- Assembly instructions
- Operating instructions
- Maintenance instructions

Inspection intervals:

In accordance with the German Ordinance on Industrial Safety and Health (BetrSichV), Art. 16, the operational condition of systems requiring monitoring and their pertaining components must be inspected at regular intervals by a qualified person. The components described in the specifications must be conceived and designed so as to allow inspection intervals **of three years**.

STS-E-0 shall be observed.

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	SHEET 1 OF 8	
STANDARD SPECIFICATION	<h2>STS – E 103</h2>	
DESCRIPTION	ID-CODE	
<b>STAND-BY POWER GENERATOR SET</b>		

Suitable for emergency power supply of a refuelling system in the event of a power mains failure.

In the event of a power outage, it shall be possible to start the stand-by power generator set manually. After the diesel engine has run up, the operator shall be able to switch the refuelling system manually over to emergency operation. Switching over shall be done in the low-voltage distribution frame in the electrical room of the manifold/filter station. For systems with two generator sets, a selector switch allowing the operation of both aggregates simultaneously shall be provided for. After restoration of the mains power supply, the refuelling system shall be switched over manually from emergency operation to mains supply.

Basic documents:

Regulations for industrial health, facility safety and environmental protection.

Especially:

1. Directive 2009/104/EC of the European Parliament and of the Council of 16 September 2009 stating minimum requirements of safety and health protection for the operation of electrical equipment at work.
2. Directive 2006/95/EC of the European Parliament and of the Council on the approximation of the laws of the Member States concerning electrical equipment suitable for use within defined voltage limits.
3. Directive 2014/34/EU of the European Parliament and of the Council on the approximation of the laws of the Member States concerning the appropriate use of equipment in explosion hazard areas (ATEX)
4. Directive 2006/42/EC of the European Parliament and of the Council on the approximation of the laws of the Member States of 17 May 2006 concerning machinery.
5. General Product Safety Directive (GPSD) and associated regulations (GPSR), especially:  
First GPSR: Low-Voltage Directive in combination with Directive 73/23/EEC and others  
Eleventh GPSR: Explosion Protection Directive (ATEX) in combination with Directive 2014/34/EU and others
6. German Ordinance on Industrial Safety and Health (BetrSichV)
7. Stipulations and regulations of the Association for Electrical, Electronic & Information Technologies VDE and DIN/EN codes, especially VDE 0100 Installation of Low-Voltage Switchgear Systems.
8. Technical Rules for Operational Safety, especially TRBS 1201, TRGS 2152

Erecting and operating conditions

The unit shall be put up in the electrical room of the manifold/filter station.

The ambient temperature, exterior temperatures, the relative humidity and the erection height above sea level may vary according to the place of installation and shall be taken into account.

The following conditions shall be satisfied:

- Changeover time as per VDMA 6280 for full load: 15 s
- Voltage drop at load transfer: max. 15 %
- Uninterrupted operating time: 7 days

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	SHEET 2 OF 8	
STANDARD SPECIFICATION	<h2>STS – E 103</h2>	
DESCRIPTION	ID-CODE	
<b>STAND-BY POWER GENERATOR SET</b>		

Design:

Stand-by power generator set as per VDMA 6280, stationary, for indoor installation.

Manual operation with fully automatic monitoring and shutting down of the diesel engine.

With the following design features:

- Water-cooled with honeycomb radiator
- Flywheel fitted to the engine
- Torsionally elastic clutch between the engine and the generator
- Torsion-proof base frame for generator set without intermediate globe between engine and generator
- Elastic mounting between generator set and perimeter base frame with rubber silent block

Diesel engine as per DIN 627.

Generator as per VDE 0530.

Engine

Four-stroke diesel engine, continuous performance A as per DIN 6271-3, speed 1500 l/min, fuel as per DIN EN 590.

With the following features:

- Electric starter
- Lead battery (vehicle starter battery) 24 V and self-regulating charger unit, capacity and charger unit in accordance with VDE 0108
- Electric speed control
- Water cooling with honeycomb cooler, blower driven by diesel engine
- Electric cooling water pre-heating device with recirculating pump, if necessary acc. to the manufacturer's instructions, rated voltage 230 V AC

Fuel supply from intermediate tank

The capacity of the collecting trough shall be greater than that of the daily service tank. The automatic supply of the intermediate tank with fuel from the storage tank shall be ensured by the existing electric pump on top of the storage tank via a level control system. A manual pump for the external filling of the intermediate tank shall be installed in addition. The intermediate tank shall have a capacity that ensures at least 8 hours of full load operation. The tank shall be fitted on wall brackets. An immersion probe for 3 indication signals (lack of fuel, pump ON/OFF), as well as visual and audio monitoring, shall be provided for.

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	SHEET 3 OF 8	
STANDARD SPECIFICATION	<h2>STS – E 103</h2>	
DESCRIPTION	ID-CODE	
<b>STAND-BY POWER GENERATOR SET</b>		

- Collecting tank for lubricating oil, with sufficient capacity for 7 days of full load operation, with connecting line to the engine and the collecting pan.
- Exhaust gas system incl. integrated exhaust muffler, with insulation and jacket, noise level 40 dB (A) maximum, measured at a distance of 7 m from the exhaust outlet.
- Room ventilation by air supply louver in the wall, with bird screen, rainwater flashing, and electric drive.
- Exhaust air louver in the wall or the exhaust duct, with bird screen, rainwater flashing, and electric drive.

It shall be possible to operate the ventilation louvers also manually.

### Generator

Internal-pole synchronous three-phase generator acc. to VDE 0530, with external star point.

Brushless exciter with integrated control device.

Sustained short circuit current for 3-pole short circuit 2 times rated current for a period of at least 4 s, or 3 times rated current single-pole against ground for > 5 s.

Load criteria for the generator set under stable voltage and frequency conditions in accordance with VDMA 6280, symmetrical load, load sequence 100 %.

Voltage characteristic curve as per VDE 0530.

Voltage setting range  $\pm 5\%$

Voltage accuracy  $\pm 2.5\%$ , related to the rated voltage at idle run up to full load, at  $\cos \phi 0.8$  (cold-warm)

Static change of speed  $\pm 3\%$  (total of all static disturbance variables)

Dynamic change of voltage:  $\pm 10\%$  maximum at  $\cos \phi 1$ , and dynamic change of speed:  $\pm 7\%$  maximum at maximum change of load

Voltage stabilization time: 3 s maximum

Insulation class F

Degree of radio interference K as per VDE 0875

Type of construction B 5/B 20

### Switch cabinet for tank truck facility

Switch cabinet with complete control and monitoring system for the stand-by power generator set.

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STANDARD SPECIFICATION	<h2>STS – E 103</h2>	
DESCRIPTION <b>STAND-BY POWER GENERATOR SET</b>		ID-CODE

Cabinet made of steel sheet, torsion-proof, suitable for wall fastening.

With hand-operated power switch with instantaneous overcurrent and short-circuit tripping, 3-pole disconnection device.

Degree of radio interference K as per VDE 0875

Monitoring devices for the Diesel engine for safety circuit, oil pressure, cooling water temperature, lack of cooling water, lack of fuel, and over-speed (pick-up units shall be fitted completely to the engine)

Control, indicating, and measuring devices shall be mounted in the front panel, and identified with name plates.

The following equipment shall be installed:

- 1 digital multiple meter for voltage, current, wattage,  $\cos \phi$ , frequency
- 3 transformers
- 1 operating hours counter
- 1 number-of-start-ups counter
- 1 voltmeter for battery voltage
- 1 current meter for charging current

Fault indication system with collective signal (visual and audio), and reset, as well as zero-potential contacts, 1 NC contact and 1 NO contact, contact current capacity 230 V, 10 A, for transmitting the collective signal to an external facility

Indicator lamps for generator ON and power mains ON

Lamp test push-button for indicator lamps

Gages class 1.5, dimensions 96 x 96 mm

In addition to the generator set control, a controller for

- the cooling water pre-heating
- the cooling water pump (if required acc. to the manufacturer)
- the feed pump (2-position level control) for the diesel storage tank

shall be installed.

The cabinet shall be delivered, installed and adjusted completely and ready for operation in the generator room.

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STANDARD SPECIFICATION	<h2>STS – E 103</h2>	
DESCRIPTION		ID-CODE
<b>STAND-BY POWER GENERATOR SET</b>		

Switch cabinet for hydrant system

Switch cabinet with complete control and monitoring system for the stand-by power generator set.

Cabinet made of steel, consisting of one compartment, dimensions of the compartment: height of 2,200 mm, width of 800 mm and depth of 600 mm.

With hand-operated power switch, with instantaneous overcurrent and short-circuit tripping, 3-pole disconnection device for each generator unit.

Degree of radio interference K as per VDE 0875

Monitoring devices for the diesel engines for safety circuit, oil pressure, cooling water temperature, lack of cooling water, lack of fuel, and over-speed (pick-up units shall be fitted completely to the engine)

Control, indicating, and measuring devices shall be mounted in the front panel, and identified with name plates.

A switch and control system for the parallel operation of two generator sets shall be provided for in the cabinet. The following selection options shall be available:

The control system shall ensure that the second generator set is only connected to the mains when the prerequisites (same voltage, frequency and phase angle) are satisfied.

The following selection options shall be available:

- Generator set 1
- Generator set 2
- Generator sets 1 and 2 in parallel operation.

For each generator set, the following equipment shall be installed:

- 1 digital multiple meter for voltage, current, wattage,  $\cos \phi$ , frequency
- 3 transformers
- 1 operating hours counter
- 1 start-ups counter
- 1 voltmeter for battery voltage
- 1 ammeter for charging current

Fault indication system with collective signal (visual and audio), and reset, as well as zero-potential contacts, 1 NC contact and 1 NO contact, contact current capacity 230 V, 10 A, for transmitting the collective signal to an external facility.

Indicator lamps for generator ON and power mains ON  
Lamp test push-button for indicator lamps

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<b>STANDARD SPECIFICATION</b>	<b>STS – E 103</b>	
DESCRIPTION	ID-CODE	
<b>STAND-BY POWER GENERATOR SET</b>		

Gages class 1.5, dimensions 96 x 96 mm

In addition to the control system of the generator set, a controller for

the cooling water pre-heating

the cooling water pump (if required acc. to the manufacturer)

the feed pumps (2-position level control) for the diesel storage tank

shall be installed.

### Assembly

The Contractor shall install the stand-by power supply system in the generator room.

The generator set can be transported to the place of installation in completely assembled condition and shall be mounted on the existing concrete foundation in accordance with the drawing.

The exact dimensions of the foundation and the fasteners as well as the cut-outs for the supply and exhaust air louver and the exhaust gas pipe shall be specified by the manufacturer of the generator set prior to the commencement of works.

The following maximum dimensions are possible:

Supply air louver                      H x W              150 x 92.5 cm

Exhaust air louver                      H x W              110 x 80.0 cm

The stand-by power generator set shall be delivered completely with all required assembly accessories such as pipes, air ducts, elbows, fasteners, elastic joining pieces, fittings, etc. incl. electric wiring and shall be assembled ready for operation.

### Trial run and acceptance

Prior to the delivery of the generator set, a factory test shall be performed in the manufacturer's factory in the presence of the Contracting Agency.

At the place of installation, a trial run of the complete stand-by power generator set as well as a power test over a period of 3 hrs. at maximum output of the refuelling facilities shall be carried out.

The functional test shall also include the shut-down of the diesel engine in the event of an emergency, such as "insufficient oil pressure", "insufficient cooling water flow", "cooling water temperature too high", etc.

The acceptance will be in compliance with the guidelines for the procurement and the maintenance of autonomous power supply plants (guidelines for stand-by power supply plants).

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STANDARD SPECIFICATION	<h2>STS – E 103</h2>	
DESCRIPTION	ID-CODE	
<b>STAND-BY POWER GENERATOR SET</b>		

The acceptance records of the tests performed, incl. the factory acceptance test, will be handed over to the Contracting Agency.

After the trial run, the operating personnel shall be instructed on the operation of the facility.

Operating media for the trial run shall be provided by the Contractor.

One set of tools incl. tool cabinet and standard spare parts shall be included in the scope of delivery.

The operating instructions and the spare parts list shall be handed over in three copies, each in English and in the host nation language.

#### Design A Tank Truck Refuelling

Rated power	100 kVA at cos phi 0.8
Rated voltage	400/230 V
Frequency	50 Hz
Efficiency 4/4 load cos phi 0.8	> 90 %
Specific fuel consumption 4/4 load	< 230 g/kWh

The generator set shall be designed for the following load situation:

One feed pump 30 kW in operation.

Additional activation (star-delta) of a second feed pump 30 kW.

Additional activation (star-delta) of the pump in the drain tank 7.5 kW, when two feed pumps are simultaneously in operation.

Approx. 15 kW basic load for secondary consumers at cos phi 0.8.

#### Design B Hydrant Refuelling

Rated power	2 x 100 kVA at cos phi 0.8
Rated voltage	400/230 V
Frequency	50 Hz
Efficiency 4/4 load cos phi 0.8	> 90 %

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STANDARD SPECIFICATION	<h2>STS – E 103</h2>	
DESCRIPTION		ID-CODE
<b>STAND-BY POWER GENERATOR SET</b>		

Specific fuel consumption 4/4 load < 230 g/kWh

The generator set shall be designed for the following load situation:

One feed pump 55 kW in operation.

Additional activation (star-delta) of a second feed pump 55 kW.

Additional activation (star-delta) of the pump in the drain tank 7.5 kW, when two feed pumps are simultaneously in operation.

Approx. 15 kW basic load for secondary consumers at cos phi 0.8.

A control system for the following operating states shall be provided for:

Generator set 1

Generator set 2

Generator sets 1 and 2 in parallel operation.

The control system shall ensure that the second generator set is only activated in addition after the synchronization of the mains.

#### Design C

Same as design A, but with a frequency of 60 Hz.

#### Design D

Same as design B, but with a frequency of 60 Hz.

#### Inspection intervals:

In accordance with the German Ordinance on Industrial Safety and Health (BetrSichV), Art. 16, the operational condition of systems requiring monitoring and their pertaining components must be inspected at regular intervals by a qualified person. The components described in the specifications must be conceived and designed so as to allow inspection intervals **of three years**.

STS-E 0 must be adhered to.

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<h2>STANDARD SPECIFICATION</h2>	<h1>STS – E 104</h1>	
DESCRIPTION <b>ELECTRIC ACTUATOR FOR BALL VALVE</b>	ID-CODE	

This specification states the technical requirements on rotary and part-turn electric valve actuators.

Basic documents:

Regulations for industrial health, facility safety and environmental protection.

Especially:

1. Directive 2009/104/EC of the European Parliament and of the Council of 16 September 2009 stating minimum requirements of safety and health protection for the operation of electrical equipment at work
2. Directive 2006/95/EC of the European Parliament and of the Council on the approximation of the laws of the Member States concerning electrical equipment suitable for use within defined voltage limits
3. Directive 2014/34/EU of the European Parliament and of the Council on the approximation of the laws of the Member States concerning the appropriate use of equipment in explosion hazard areas (ATEX)
4. Directive 2006/42/EC of the European Parliament and of the Council on the approximation of the laws of the Member States of 17 May 2006 concerning machinery
5. General Product Safety Directive (GPSD) and associated regulations (GPSR), especially:  
First GPSR: Low-Voltage Directive in combination with Directive 73/23/EEC and others  
Eleventh GPSR: Explosion Protection Directive (ATEX) in combination with Directive 2014/34/EU and others
6. German Ordinance on Industrial Safety and Health (BetrSichV)
7. Stipulations and regulations of the Association for Electrical, Electronic & Information Technologies VDE and DIN/EN codes, especially VDE 0100 Installation of Low-Voltage Switchgear Systems
8. Technical Rules for Operational Safety, especially TRBS 1201, TRGS 2152

Use:

The exterior temperature variations typical in Europe must be considered.

Stored medium:	finished mineral oil product with solids up to 800 µm
Density:	736 to 860 kg/m <sup>3</sup>
Kinematic viscosity of conveyed medium:	0.9 x 10 <sup>-6</sup> to 8.0 x 10 <sup>-6</sup> m <sup>2</sup> /s
System pressure:	up to +16 bar

The components described in this specification are intended for the erection and operation of facilities requiring supervision in accordance with the German Ordinance on Industrial Safety and Health (BetrSichV). These facilities convey finished mineral oil products with the hazard characteristics R 10 (flammable), F (easily flammable) and F+ (highly flammable) and an aromatic content of up to 50 %.

Electric actuator suitable for mounting on valves in pipelines for finished mineral oil products.

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STANDARD SPECIFICATION	<h2>STS – E 104</h2>	
DESCRIPTION <b>ELECTRIC ACTUATOR FOR BALL VALVE</b>	ID-CODE	

### General

The manufacturer of the actuator shall inquire about suitable actuators for the valves in question at the manufacturer of the fitting. The actuator shall be dimensioned in such a manner that the valve will fully open and close under the different operating conditions and at the highest differential pressure.

The electro-magnetic actuator shall be designed as a rotary or part-turn actuator for a ball cock or a flat slide valve.

### Requirements on the rotary or part-turn valve actuator

The actuator shall be conceived as an integrated unit and shall be suitable for direct fitting on top of the valve.

- Equipment category as per Directive 2014/34/EU: II 2 G
- Explosion protection: EEx ed II C T3
- Rated voltage: 400 V / 50 Hz
- Protection: IP 65
- Maximum actuating time: 40 seconds
- 4 ea. cable lead-in bushings with approved EX screw connections
- Three-phase motor in insulator class F, with full motor protection by three thermal switches or thermocouplers fitted in the stator winding, suitable for direct start-up
- Continuous electric recording of displacement and torque
- Profibus parameter setting, limit position and torque setting shall be possible without having to open the drive
- Anti-condensation heater in the actuator
- For motorized actuators, a hand wheel for manual operation shall be available that is inoperative in other modes
- Reversing contactors or electronic load relays (thyristor controllers), electrically locked
- Local control station with operating mode selector, operator button for OPEN, CLOSE, STOP, display with plain text for parameter setting, status, position and trouble indicators.
- Incl. a unit for activation and feedback via field bus Profibus DP V1, interface as per RS 485
- In the event of a failure or malfunction of the bus system, the actuator shall move to the OPEN position
- Actuator fitting position shall be changeable by 90°
- Manual operation with hand wheel

The electric actuator shall be delivered with all required accessories and assembly parts and installed ready for operation.

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STANDARD SPECIFICATION	<h2>STS – E 104</h2>	
DESCRIPTION <b>ELECTRIC ACTUATOR FOR BALL VALVE</b>	ID-CODE	

Legally and additionally required evidences included in the scope of delivery:

Evidences required by the General Product Safety Directive (GPSD) and associated regulations (GPSR);

especially:

- EC type test certificate as per Directive 2014/34/EU
- Identification as per Annex II, Item 1.05 of the Directive 2014/34/EU
- CE Conformity Sign as per Art. 5 Para. 1 and 2 of the Directive 2014/34/EU
- Specification of the temperature range on the component as per DIN EN 60079 (VDE 0170)
- Assembly instructions
- Operating instructions
- Maintenance instructions

Inspection intervals:

In accordance with the German Ordinance on Industrial Safety and Health (BetrSichV), Art. 16, the operational condition of systems requiring monitoring and their pertaining components must be inspected at regular intervals by a qualified person. The components described in the specifications must be conceived and designed so as to allow inspection intervals **of three years**.

STS E-0 shall be observed.

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<h2>STANDARD SPECIFICATION</h2>	<h1>STS – E 105</h1>	
DESCRIPTION <b>LEAK DETECTION SYSTEM</b>		ID-CODE

This specification lays down the technical requirements on leakage detection systems.

Basic documents:

Regulations for industrial health, facility safety and environmental protection;

especially:

1. Directive 2009/104/EC of the European Parliament and of the Council of 16 September 2009 stating minimum requirements of safety and health protection for the operation of electrical equipment at work
2. Directive 2006/95/EC of the European Parliament and of the Council on the approximation of the laws of the Member States concerning electrical equipment suitable for use within defined voltage limits
3. Directive 2014/34/EU of the European Parliament and of the Council on the approximation of the laws of the Member States concerning the appropriate use of equipment in explosion hazard areas (ATEX)
4. Directive 2006/42/EC of the European Parliament and of the Council on the approximation of the laws of the Member States of 17 May 2006 concerning machinery
5. General Product Safety Directive (GPSD) and associated regulations (GPSR), especially:  
First GPSR: Low-Voltage Directive in combination with Directive 2006/95/EC and others  
Eleventh GPSR: Explosion Protection Directive (ATEX) in combination with Directive 2014/34/EU and others
6. German Ordinance on Industrial Safety and Health (BetrSichV)
7. Stipulations and regulations of the Association for Electrical, Electronic & Information Technologies VDE and DIN/EN codes, especially VDE 0100 Installation of Low-Voltage Switchgear Systems.
8. Technical Rules for Operational Safety, especially TRBS 1201, TRGS 2152

Features of the system:

The leakage detection system includes a control unit, various sensors for environmental and pipeline-related data as well as the leakage detection software database. The system consists of a data recording unit, the processing units for the leakage detection and a logger unit for the long-term storage of data and the generation of reports.

All process data and the data generated in the processing unit are transferred to the control unit and the logger.

The detection of leaks is ensured by accelerated, temperature-compensated pressure measurement with correlation to the environmental temperature (PT+ method). The method and its application shall be tested by independent experts. To prevent disturbances in the airport operation, the minimally required testing time shall not be less than 60 minutes (without settling times). For reasons of safety, it is not permitted to pump and draw off fuel (static method) during the tests and the facility shall be unattended if possible.

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<h2>STANDARD SPECIFICATION</h2>	<h1>STS – E 105</h1>	
DESCRIPTION		ID-CODE
<b>LEAK DETECTION SYSTEM</b>		

- The system measures pressures and temperatures at both ends of the line as well as in the ground.
- The testing period can range from hour to several days.

### Notes:

An accuracy of up to 20 ml/m<sup>3</sup>/h are possible, when the pipeline and product data (e.g. expansion coefficients, wall thicknesses, diameters and lengths) are know exactly. The alarm level shall be set to a reasonable value during commissioning. Typical values are 20 to 40 ml/m<sup>3</sup>/h.

For pipeline volumes of 150 m<sup>3</sup> and more, a second separable segment with gate valves and its own instrumentation shall be provided for, because the absolute volume of the calculated leakage rate will be too great otherwise.

When using the detection system on transfer pipelines, additional communication equipment between the front and rear end of the pipeline will be required.

A separate PLC shall be provided for the leakage detection tasks. The system shall remain operable even in the event of a total failure of this PLC. In the event of serious malfunction that might cause the leak detection system to fail completely, the associated valves shall be open.

In addition to the "MANUAL" and "AUTOMATIC" modes, a third operating level shall be implemented in the I&C cabinet: "LEAK DETECTION". Leakage detection shall only be enabled in this operating mode. The additional PLC in the leak detection cabinet shall only be able to access the fittings in this mode. In the positions "MANUAL" and "AUTOMATIC" all user actions shall be disregarded.

Description of the individual components:

### 2 x valve block

- For manometer with exhaust and drainage/sampling.

### 2 x pressure transmitter

Pressure transmitter with ceramic sensor, communication via PROFIBUS PA with sensor made of electronics-grade ceramics; fitted to the valve block.

- Accuracy up to: ±0.05 %
- Approval: ATEX II 1/2 G Ex ia IIC T6
- Output: PROFIBUS PA
- Detection range: up to 10 bar
- Overload range: up to 40 bar
- Process connection: thread ISO 228 G 1/2 A EN 837
- Additional manometer valve with test connection and air-vent screw

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<h2>STANDARD SPECIFICATION</h2>	<h1>STS – E 105</h1>	
DESCRIPTION		ID-CODE
<b>LEAK DETECTION SYSTEM</b>		

### Temperature sensor

Resistance thermometer in surface-mounted design suitable for fitting to the exterior wall of single-wall pipelines. Installation at a distance of at least 5 m to a shaft or a building. Fitted with thermo-insulation against the soil, in waterproof cast enclosure. Cable laid in protective hose/conduit. Fitting of a spare sensor in each measuring point.

- PT 100 class A 4-wire
- Complying with ATEX 2014/34/EU
- The sensors are fitted directly to the line (with tightening straps), sealed and buried. The distance to the next building or shaft shall not be less than 10 m.

### Temperature transmitter

Temperature transmitter with PROFIBUS® PA protocol  
Standardized communication via PROFIBUS® PA Profile 3.02. Shall comply with EMC requirements as per NAMUR NE21 and with the recommendations of NE89 concerning temperature transducers with digital signal processing.

Installation in outdoor cabinet, because the sensors are buried in the ground.

- Approval: ATEX II 1/2 G Ex ia IIC T6
- Input: PT100 4-wire
- Output: PROFIBUS PA
- Resolution: 18 bit
- Permitted variation:  $\pm 0.1$  °C

### Valves to isolate the segment

In order to ensure tightness, double block & bleed valves are required at each end of the segment. Alternatively, plug valves or double gate valves are permitted.

- Motor driven
- Control via Profibus DP
- Fitted with limit switches.

### Control cabinet or compartment in the control cabinet of the refuelling system

- Made of steel sheet, suitable for wall mounting
- Size: WxHxT 60cm x 100cm x 35 cm minimum
- A PLC handling all control tasks in connection with leak detection shall be provided in the control cabinet.

### Software

- Leak detection in accordance with the PT+ method (temperature-compensated pressure measurement with correlation to the ambient temperature)
- Shall be interruptible at any time.
- Cyclic updating of results, reading shall be possible at any time.
- Leak rate detection with an accuracy of up to 20 ml/m<sup>3</sup>/h (corresponds to 2 liters per hours in a 100 m<sup>3</sup> line)

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<h2>STANDARD SPECIFICATION</h2>	<h1>STS – E 105</h1>	
DESCRIPTION		ID-CODE
<b>LEAK DETECTION SYSTEM</b>		

- Availability of at least 10 test logs in the local memory
- Control of motor gate valves via touch panel
- Communication to refuelling system via digital I/O (safety and automation signals)
- Charts of the behavior of pressures, temperatures and leak rates
- Up to five different sections in one segment
- Optional: remote access via VPN router for maintenance and diagnosis tasks
- When the leak detection fails, the valves shall be open

Installation of the following components:

#### Segment coupler:

Segment coupler, suitable to connect a PROFIBUS PA segment to the PROFIBUS DP, in compact design, with enclosure. Installation on mounting rail or directly on the wall. Function transparent for the process control system and the field equipment, zero configuration and without dedicated field bus address.

- Approval: ATEX II 3 G EEx n A II T4
- Protocol conversion: Profibus DP/PA
- Speed DP: 93.75 kBit/s
- Speed DP: 31.25 kBit/s
- Integrated terminator
- Up to 10 devices shall be connectable to the PA segment.

#### Surge protection

- Surge protection to protect electronic components against destructive voltage surges. Voltage surges generated in signal cables (e.g....20 mA), communication cables (field busses) and supply cables are safely discharged into the ground. The functionality of the transmitter and/or the electronic equipment to be protected remains unaffected.

#### Leak computer control:

- Programmable as per IEC 61131
- Integrated Profibus master
- Ethernet interface for communication via OPC / Modbus TCP
- 1 GB minimum of non-volatile memory
- 32 MB RAM minimum
- Digital inputs/outputs for the communication with refuelling systems

#### Visualization (MMI):

- Touchscreen panel
- Resolution: 1280\*1024 pixel
- Display diagonal: 15"
- VGA connection (monitor signal)
- USB connection (touch signal)

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STANDARD SPECIFICATION	<h2>STS – E 105</h2>	
DESCRIPTION <b>LEAK DETECTION SYSTEM</b>	ID-CODE	

Legally required evidences included in the scope of delivery:

Evidences required by the General Product Safety Directive (GPSD) and associated regulations (GPSR);

especially:

- EC type test certificate as per Directive 2014/34/EU
- Homologation as per Art. 62 of the German Water Resources Act (WHG) or approval by the construction authorities
- Identification as per Annex II, Item 1.05 of the Directive 2014/34/EU
- CE Conformity Sign as per Art. 5 Para. 1 and 2 of the Directive 2014/34/EU
- Specification of the temperature range on the component as per DIN EN 60079 (VDE 0170)

Inspection intervals:

In accordance with the German Ordinance on Industrial Safety and Health (BetrSichV), Art. 16, the operational condition of systems requiring monitoring and their pertaining components must be inspected at regular intervals by a qualified person. The components described in the specifications must be conceived and designed so as to allow inspection intervals **of three years**.

STS E 0 shall be observed.

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STANDARD SPECIFICATION	<h2>STS – E 107</h2>	
DESCRIPTION		ID-CODE
<b>TEMPERATURE GAUGE OF LEAK DETECTION SYSTEM</b>		

The temperature gage shall measure the fuel temperature that is required by the leak detection system.

Basic documents:

Regulations for industrial health, facility safety and environmental protection;

especially:

1. General Product Safety Directive (GPSD) and associated regulations (GPSR)  
especially:  
First GPSR: Low-Voltage Directive in combination with Directive 2006/95/EC and others  
Eleventh GPSR: Explosion Protection Directive (ATEX) in combination with Directive 2014/34/EU and others
2. German Ordinance on Industrial Safety and Health (BetrSichV)
3. Directives and regulations of the VDE and DIN / EN
4. Technical Rules for Operational Safety, especially TRBS 1201, TRGS 2152
5. Water Resources Act (WHG)

Use:

Medium:	finished mineral oil product with solids up to 800 µm
Density:	736 to 860 kg/m <sup>3</sup>
Kinematic viscosity of the conveyed medium:	0.9 x 10 <sup>-6</sup> to 8.0 x 10 <sup>-6</sup> m <sup>2</sup> /s
Ambient temperature:	-20°C to 40°C

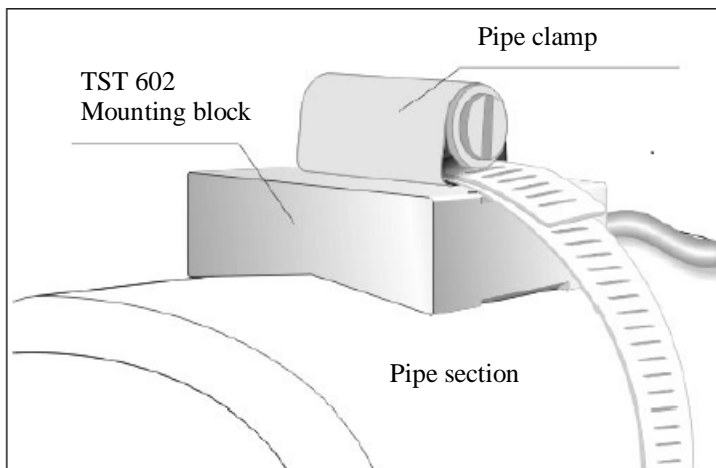
The components described in this specification are intended for the erection and operation of facilities requiring supervision in accordance with the German Ordinance on Industrial Safety and Health (BetrSichV). These facilities convey finished mineral oil products with the hazard characteristics R 10 (flammable), F (easily flammable) and F+ (highly flammable) and an aromatic content of up to 50 %.

Requirements on the components of the temperature gage:

The temperature shall be measured with a resistance thermometer, Pt100 class A in four-wire technique, which shall be fixed to the outer surface of the pipeline. The pertaining transmitter shall be installed in an exterior cabinet at a distance of at least 5 m to buildings, water pipes and similar utilities. The resistance thermometer shall be fastened to the pipeline with a hose clamp. The pipeline shall be insulated subsequently.

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<h2>STANDARD SPECIFICATION</h2>	<h1>STS – E 107</h1>	
DESCRIPTION		ID-CODE
<b>TEMPERATURE GAUGE OF LEAK DETECTION SYSTEM</b>		



The temperature transmitter shall satisfy the following requirements.  
 Temperature transmitter with PROFIBUS® PA protocol  
 Standardized communication via PROFIBUS® PA Profile 3.02. Shall comply with EMC requirements as per NAMUR NE21 and with the recommendations of NE89 concerning temperature transducers with digital signal processing.

- Approval: ATEX II 1G Ex ia IIC T6
- Input : PT100 4-wire
- Output : PROFIBUS PA
- Resolution: 18 bit
- Permitted variation:  $\pm 0.1$  °C

The below manufacturer(s) is (are) known to manufacture products of the type specified in this specification section. Any other manufacturer(s) from a NATO member Nation Country may provide this product, provided they can prove to meet this specification.

Recommended make:  
 RTD Thermometer OMNIGRAD TST602  
 Endress+Hauser  
[www.endress.com](http://www.endress.com)  
 Tel.: +49 7627 975 02

Temperature transmitter  
 iTEMP TMT84  
 Same manufacturer as above

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STANDARD SPECIFICATION	<h2>STS – E 107</h2>	
DESCRIPTION		ID-CODE
<b>TEMPERATURE GAUGE OF LEAK DETECTION SYSTEM</b>		

Legally required evidences included in the scope of delivery:

Evidences required by the General Product Safety Directive (GPSD) and associated regulations (GPSR);

especially:

- EC type test certificate as per Directive 2014/34/EU
- Homologation as per Art. 62 of the German Water Resources Act (WHG) or approval by the construction authorities
- Identification as per Annex II, Item 1.0.5 of the Directive 2014/34/EU
- CE Conformity Sign as per Art. 5 Para. 1 and 2 of the Directive 2014/34/EU
- Specification of the temperature range on the component as per DIN EN 60079 (VDE 0170)

Inspection intervals:

In accordance with the German Ordinance on Industrial Safety and Health (BetrSichV), Art. 16, the operational condition of systems requiring monitoring and their pertaining components must be inspected at regular intervals by a qualified person. The components described in the specifications must be conceived and designed so as to allow inspection intervals **of three years**.

STS-E 0 shall be observed.

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<b>STANDARD SPECIFICATION</b>	<b>STS – E 110</b>	
DESCRIPTION	ID-CODE	
<b>LEVEL GAUGE FOR FLAT-BOTTOM TANKS</b>		

Filling level monitoring assembly, suitable for the detection of the filling level, the temperature, the parting layer and the density, pre-tested by the local bureau of standards for calibrated measurements of the filling level in fuel tanks for flammable and water-polluting liquids with the hazard characteristics R10 (flammable), F (easily flammable) and F+ (highly flammable) with an aromatic content up to 50 %.

Basic documents:

Regulations for industrial health, facility safety and environmental protection;

especially:

1. Directive 2009/104/EC of the European Parliament and of the Council of 16 September 2009 stating minimum requirements of safety and health protection for the operation of electrical equipment at work.
2. Directive 2006/95/EC of the European Parliament and of the Council on the approximation of the laws of the Member States concerning electrical equipment suitable for use within defined voltage limits.
3. Directive 2014/34/EU of the European Parliament and of the Council on the approximation of the laws of the Member States concerning the appropriate use of equipment in explosion hazard areas (ATEX).
4. Directive 2006/42/EC of the European Parliament and of the Council on the approximation of the laws of the Member States of 17 May 2006 concerning machinery.
5. General Product Safety Directive (GPSD) and associated regulations (GPSR), especially:  
First GPSR: Low-Voltage Directive in combination with Directive 2006/95/EC and others  
Eleventh GPSR: Explosion Protection Directive (ATEX) in combination with Directive 2014/34/EU and others
6. German Ordinance on Industrial Safety and Health (BetrSichV)
7. Stipulations and regulations of the Association for Electrical, Electronic & Information Technologies VDE and DIN/EN codes, especially VDE 0100 Installation of Low-Voltage Switchgear Systems
8. Technical Rules for Operational Safety, especially TRBS 1201, TRGS 2152

The level gage assembly comprises the following components:

1. Filling level gage, make HONEYWELL ENRAF, XEAO 854 C 12 Y 20 SW
2. VITO MTT Combi probe, make HONEYWELL ENRAF
3. Interface, make: HONEYWELL ENRAF NONIUS U 858 C I U

1. Filling level gage

Place of installation: explosion hazard zone 0/zone 1  
Place of measurement: explosion hazard zone 0

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STANDARD SPECIFICATION	<h2>STS – E 110</h2>	
DESCRIPTION	ID-CODE	
<b>LEVEL GAUGE FOR FLAT-BOTTOM TANKS</b>		

Technical details:

Measuring range:	0 to 27 m
Mounting flange:	DN 50, PN 6
Explosion protection :	EEx DE (IA) IIC T6, suitable for explosion hazard zone 0
Protection:	IP 65
Ambient temperature:	-40 up to +85 °C
Measuring accuracy:	0.014 %
Operating voltage:	65/240 V, 50/60 Hz

Fitted in control housing:

- Local LCD-display
- Testing and motor control device
- 2 motor limit switches
- 2 programmable alarm points
- 2 limit contacts for overflow protection
- 1 MPU board for the connection of a measuring point selector switch
- 2-wire field bus

Materials:

- Graduated drum housing made of Cr-Ni steel,  
mat. no. 1.3953 93.
- Control housing made of cast aluminum
- Graduated drum and filament made of Cr-Ni steel,  
mat. no. 1.4401

Accessories:

- Displacer, diameter of 90 mm, suitable for the measurement of level, density and parting layer.

2. VITO-MTT Combi probe

With reference resistor and water sensor for the detection of the medium temperature and the water level.

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STANDARD SPECIFICATION	<h2>STS – E 110</h2>	
DESCRIPTION	ID-CODE	
<b>LEVEL GAUGE FOR FLAT-BOTTOM TANKS</b>		

Length of the water sensor: 0.5 m with reference resistor PT 100, with 15 thermal sensors and protective hose.

Temperature range: -20°C to +90 °C, distribution of the sensors all over the area in a symmetrical layout.

Installation in zone 0.

Length incl. weight and threaded rod, matched to the tank depth.

Connection flange DN 50, PN 16,

incl. VITO MTT interface; identification code 762,

measuring circuit EEx ia,

Material: stainless steel (material no.: 1.4404)

### 3. Interface

Interface for the recording of the filling level and parting layer data and their transmission to a communication module, installed in a 19" rack.

Connection of two level gauges. Galvanic separation of the data output from the field cabling via isolation transformers. Modulation and demodulation of the signals between the field equipment and the CIU interface, serial ASCII RS 232-C. Self-monitoring via LRC test.

The interface shall be delivered completely and installed in the I&C cabinet.

The below manufacturer(s) is (are) known to manufacture products of the type specified in this specification section. Any other manufacturer(s) from a NATO member Nation Country may provide this product, provided they can prove to meet this specification.

Recommended make:

Delftechpark 39

2628 XJ Delft

Niederlande

Tel.: +31 152701 100

E-Mail: [enraf-nl@honeywell.com](mailto:enraf-nl@honeywell.com)

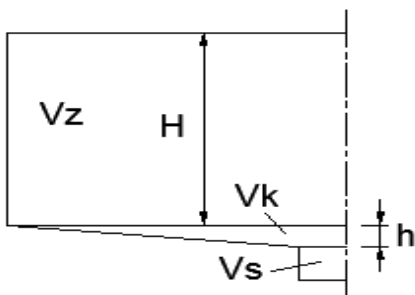
[www.honeywellenraf.com](http://www.honeywellenraf.com)

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STANDARD SPECIFICATION	<h2>STS – E 110</h2>	
DESCRIPTION		ID-CODE
<b>LEVEL GAUGE FOR FLAT-BOTTOM TANKS</b>		

#### 4. Supervision of tank filling



Sketch flat bottom tank (not to scale)

#### General consideration

As can be seen from the above sketch, the complete volume of the flat bottom tanks utilized here is composed of three parts:

- Volume of cylinder  $V_z = D^2 \cdot \pi/4 \cdot H$  (D=diameter, H=height of cylinder)
- Volume of lower, conical part of tank  $V_k = D^2 \cdot \pi/4 \cdot h/3$  (D=diameter, h=height of cone). This volume amounts to max. 3% of the total volume.
- Volume of pump sump, this volume the same for all used tanks and amounts to approx. 0,8m<sup>3</sup>.

The filling of storage tanks is supervised as follows:

- In case of a filling level of 95%, that is 0.38 m under the top edge of the tank, a pre-alarm is triggered. Thereupon the operating personnel will stop the filling.
- In case of a filling level of 96%, that is 0.30 m under the top edge of the tank, the filling pipe will be closed by the high filling level control valve.
- If this failed, a new alarm is triggered in case of a filling level of 97%, that is 0.23 m under the top edge of the tank. When this alarm is triggered, the operating personnel at the smallest tank (1250m<sup>3</sup>) and a fill rate of 240m<sup>3</sup>/h has 9 minutes time to prevent an overfilling of the tank.

#### Legally and additionally required evidences included in the scope of delivery:

Evidences required by the General Product Safety Directive (GPSD) and associated regulations (GPSR);

especially:

- EC type test certificate as per Directive 2014/34/EU
- EC Declaration of Conformity as per Directive 2014/34/EU
- Identification as per Annex II, Item 1.0.5 of the Directive 2014/34/EU

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STANDARD SPECIFICATION	<h2>STS – E 110</h2>	
DESCRIPTION		ID-CODE
<b>LEVEL GAUGE FOR FLAT-BOTTOM TANKS</b>		

- CE Conformity Sign as per Art. 5, Para. 1 and 2 of the Directive 2014/34/EU
- Homologation in accordance with the German Water Resources Act (WHG) or approval as overflow protection by the construction authorities
- Installation and operating instructions for the filling level gage
- Inspection report

Inspection intervals:

In accordance with the German Ordinance on Industrial Safety and Health (BetrSichV), Art. 16, the operational condition of systems requiring monitoring and their pertaining components must be inspected at regular intervals by a qualified person. The components described in the specifications must be conceived and designed so as to allow inspection intervals **of three years**.

STS-E 0 shall be observed.

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<h2>STANDARD SPECIFICATION</h2>	<h1>STS – E 111</h1>	
DESCRIPTION	ID-CODE	
<b>LEVEL GAUGE FOR STEEL TANKS UP TO 10 M3</b>		

Filling level monitoring assembly, suitable for the detection of the filling level, the temperature, the parting layer and the density in fuel tanks with a capacity of up to 10 m<sup>3</sup>, storing flammable and water-polluting liquids with the hazard characteristics R10 (flammable), F (easily flammable) and F+ (highly flammable) and an aromatic content up to 50 %.

Basic documents:

Regulations for industrial health, facility safety and environmental protection;

especially:

1. General Product Safety Directive (GPSD) and associated regulations (GPSR), especially:  
First GPSR: Low-Voltage Directive in combination with Directive 2006/95/EC and others  
Eleventh GPSR: Explosion Protection Directive (ATEX) in combination with Directive 2014/34/EU and others
2. German Ordinance on Industrial Safety and Health (BetrSichV)
3. Directives and regulations of the VDE and DIN / EN
4. Technical Rules for Operational Safety, especially TRBS 1201, TRGS 2152
5. Water Resources Act (WHG)

Two filling level gages shall be fitted inside the drain tank:

1 Vega sensor providing overflow protection in addition

1 filling level sensor by Veeder-Root, integrated in the ATG system for the detection of the filling level, the density and the temperature.

The below manufacturer(s) is (are) known to manufacture products of the type specified in this specification section. Any other manufacturer(s) from a NATO member Nation Country may provide this product provided they can prove to meet this specification.

Design A Drain Tank

1 ea. filling level sensor in explosion hazard zone 0

Measuring range	: 0 .... 0.4 bar, linear
Explosion protection	: EEx ia IIB T4
Protection type	: IP 54
Sensor material	: stainless steel, mat. no. 1.4571 as per DIN 17 440
Mounting	: flange DN 50, PN 16, material no. 1.4571 as per DIN 17 440

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<b>STANDARD SPECIFICATION</b>	<b>STS – E 111</b>	
DESCRIPTION	ID-CODE	
<b>LEVEL GAUGE FOR STEEL TANKS UP TO 10 M3</b>		

The length of the suspension cable shall be matched to the tank diameter.

Design : make VEGA, type Vegabar 67  
or equivalent.

- 1 ea. surge protection unit in metal enclosure, for the protection of the pressure transducer, protection IP 54, suitable for installation in explosion hazard zone 1 in the area of the pressure transducer

Design : make VEGA, type B 63-48  
or equivalent

- 1 ea. remote filling level indicator with function monitoring unit, trouble signal lamp and trouble signal relay.

Input : appropriate for the pressure transducer mentioned above,  
explosion protection EEx ia II a

Output : 4 to 20 mA, isolated,

explosion protection : EEx ib IIC

Protection : IP 40

Operating voltage : 230 V/50 to 60 Hz

Installation in I&C cabinet

Design : make VEGA, type VEGAMET 391  
or equivalent.

- 1 ea. surge protection device for the input of remote filling level indicator, installation in I&C cabinet

Execution : make VEGA, type B 62-36 G  
or equivalent.

- 1 ea. moving-coil indicator (48 x 144 mm), 4 to 20 mA, scale 0 to 100 %, class 1.5, installation in door of I&C cabinet

- 1 ea. moving coil indicator (144 x 144 mm) for continuous level indication on the drain tank, 4 - 20 mA, scale 0 - 100 %, class 1.5, protection IP 55, installed in plastic enclosure with transparent cover, fitted in explosion hazard zone 1 on the vent pipe of the drain tank, identification sign with inscription "Filling level of drain tank".

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<h2>STANDARD SPECIFICATION</h2>	<h1>STS – E 111</h1>	
DESCRIPTION	ID-CODE	
<b>LEVEL GAUGE FOR STEEL TANKS UP TO 10 M3</b>		

The level gage assembly shall be delivered and installed completely and connected ready for operation.

To ensure integration into the ATG system, a filling level gage by Veeder-Root shall be installed with all required accessories.

The associated work shall be carried out by:

Actemium Cegelec GmbH  
Colmarer Str. 11  
60528 Frankfurt  
[www.actemium.de](http://www.actemium.de)

Design B:

For the measurement and monitoring of the filling level in the diesel fuel storage tank.

The filling level gage in the diesel fuel storage tank shall also be integrated into the ATG system. To ensure this, a filling level gage by Veeder-Root shall be installed with all required accessories.

The associated work shall be carried out by:

Actemium Cegelec GmbH  
Colmarer Str. 11  
60528 Frankfurt  
[www.actemium.de](http://www.actemium.de)

- 1 ea. remote filling level indicator with function monitoring unit, trouble signal lamp and trouble signal relay.

An indicator allowing the reading of all measuring values shall be installed in the door of the switch cabinet for the stand-by power generator set.

The filling level gage shall be delivered and installed completely and connected ready for operation.

Legally required evidences included in the scope of delivery:

Evidences required by the General Product Safety Directive (GPSD) and associated regulations (GPSR);

especially:

- EC type test certificate as per Directive 2014/34/EU

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STANDARD SPECIFICATION	<h2>STS – E 111</h2>	
DESCRIPTION	ID-CODE	
<b>LEVEL GAUGE FOR STEEL TANKS UP TO 10 M3</b>		

- Homologation as per Art. 62 of the German Water Resources Act (WHG) or approval by the construction authorities
- Identification as per Annex II, Item 1.0.5 of the Directive 2014/34/EU
- CE Conformity Sign as per Art. 5, Para. 1 and 2 of the Directive 2014/34/EU
- Specification of the temperature range on the component as per DIN EN 60079 (VDE 0170)

Inspection intervals:

In accordance with the German Ordinance on Industrial Safety and Health (BetrSichV), Art. 16, the operational condition of systems requiring monitoring and their pertaining components must be inspected at regular intervals by a qualified person. The components described in the specifications must be conceived and designed so as to allow inspection intervals **of three years**.

STS-E 0 shall be observed.

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<h2>STANDARD SPECIFICATION</h2>	<h1>STS – E 113</h1>	
DESCRIPTION	ID-CODE	
<b>LIQUID DETECTION PROBE</b>		

This specification lays down the technical requirements on electric liquid probes.

Basic documents:

Regulations for industrial health, facility safety and environmental protection;

especially:

1. General Product Safety Directive (GPSD) and associated regulations (GPSR);  
especially:  
First GPSR: Low-Voltage Directive in combination with Directive 2006/95/EC and others  
Eleventh GPSR: Explosion Protection Directive (ATEX) in combination with Directive 2014/34/EU and others
2. German Ordinance on Industrial Safety and Health (BetrSichV)
3. Directives and regulations of the VDE and DIN / EN
4. Technical Rules for Operational Safety, especially TRBS 1201, TRGS 2152
5. Water Resources Act (WHG)

Use:

Medium:	finished mineral oil products (with solids up to 800 µm)
Density:	736 to 860 kg/m <sup>3</sup>
kinematic viscosity of the conveyed medium:	0.9 x 10 <sup>-6</sup> to 8.0 x 10 <sup>-6</sup> m <sup>2</sup> /s
Ambient temperature :	-20°C to +40°C

The components described in this specification are intended for the erection and operation of facilities requiring supervision in accordance with the German Ordinance on Industrial Safety and Health (BetrSichV). These facilities convey finished mineral oil products with the hazard characteristics R 10 (flammable), F (easily flammable) and F+ (highly flammable) and an aromatic content of up to 50 %.

The liquid detection probe shall monitor collection spaces in order to detect leakage.

Requirements on the components of the electric liquid detection probe:

Liquid detection probe with sliding coupler, function based on the vibration principle, with evaluation unit and function monitoring, suitable for liquid detection. Fitted with a working contact and a trouble signal contact

- Designed as bar probe with electronics module (in plastic enclosure), continuous adjustment of the switching point during commissioning
- Probe length as indicated in the specifications
- Equipment category as per Directive 2014/34/EU: II 1/2 G
- Explosion protection: EEx ia II C T3

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<h2>STANDARD SPECIFICATION</h2>	<h1>STS – E 113</h1>	
DESCRIPTION	ID-CODE	
<b>LIQUID DETECTION PROBE</b>		

- Protection: IP 65
- Materials: 1.4571
- Sliding coupler
- Inputs and outputs per evaluation unit:
  - Input : 1 sensor (test probe)
  - Output : 2 relays with a single-pole double-throw contact each (NO contact and NC contact)

Liquid detection probe and evaluation unit (in I&C cabinet) incl. system-relevant accessories and assembly parts, deliver and fit ready for operation, adjust switching point. The wiring inside the cabinet shall be included in the prices.

Legally required evidences included in the scope of delivery:

Evidences required by the General Product Safety Directive (GPSD) and associated regulations (GPSR);

especially:

- EC type test certificate as per Directive 2014/34/EU
- Homologation as per Art. 62 of the German Water Resources Act (WHG) or approval by the construction authorities
- Identification as per Annex II, Item 1.0.5 of the Directive 2014/34/EU
- CE Conformity Sign as per Art. 5, Para. 1 and 2 of the Directive 2014/34/EU
- Specification of the temperature range on the component as per DIN EN 60079 (VDE 0170)

Inspection intervals:

In accordance with the German Ordinance on Industrial Safety and Health (BetrSichV), Art. 16, the operational condition of systems requiring monitoring and their pertaining components must be inspected at regular intervals by a qualified person. The components described in the specifications must be conceived and designed so as to allow inspection intervals **of three years**.

STS-E 0 shall be observed.

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<h2>STANDARD SPECIFICATION</h2>	<h1>STS – E 115</h1>	
DESCRIPTION <b>FLOW METER ASSEMBLY</b>	ID-CODE	

Suitable for the measurement and control of the flow rate in pressure refuelling systems.

Basic documents:

Regulations for industrial health, facility safety and environmental protection;

especially:

1. Directive 2009/104/EC of the European Parliament and of the Council of 16 September 2009 stating minimum requirements of safety and health protection for the operation of electrical equipment at work.
2. Directive 2006/95/EC of the European Parliament and of the Council on the approximation of the laws of the Member States concerning electrical equipment suitable for use within defined voltage limits.
3. Directive 2014/34/EU of the European Parliament and of the Council on the approximation of the laws of the Member States concerning the appropriate use of equipment in explosion hazard areas (ATEX)
4. Directive 2006/42/EC of the European Parliament and of the Council on the approximation of the laws of the Member States of 17 May 2006 concerning machinery.
5. General Product Safety Directive (GPSD) and associated regulations (GPSR), especially:  
First GPSR: Low-Voltage Directive in combination with Directive 2006/95/EC and others  
Eleventh GPSR: Explosion Protection Directive (ATEX) in combination with Directive 2014/34/EU and others
6. German Ordinance on Industrial Safety and Health (BetrSichV)
7. Stipulations and regulations of the Association for Electrical, Electronic & Information Technologies VDE and DIN/EN codes, especially VDE 0100 Installation of Low-Voltage Switchgear Systems
8. Technical Rules for Operational Safety, especially TRBS 1201, TRGS 2152

Design A:

Flow meter assemblies 1 and 2, in parallel standby circuit, for feed piping of hydrant system

1 ea. Venturi pipe

Differential pressure	:	min. limit value of measuring range: 250 mbar max. limit value of measuring range: 1,500 mbar
Flow rate	:	max. 480 m <sup>3</sup> /h
Medium	:	jet fuel, mogas and diesel fuel
Medium temperature	:	5 to 25 °C
Materials	:	stainless steel, mat. no. 1.4571, as per DIN 17 440
Design	:	a) flanges DN 150, PN 16, as per DIN 2633 b) two connection each on the plus and minus sides with a set off of 120 degrees, pressure pipe 12 x 1.5 mm

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STANDARD SPECIFICATION	<h2>STS – E 115</h2>	
DESCRIPTION	ID-CODE	
<b>FLOW METER ASSEMBLY</b>		

8 ea. shut-off valve DN 6, pressure pipe joint: 12 mm

Materials: stainless steel, mat. no. 1.4571, as per DIN 17 440

Pressure pipe 12 mm x 1.5 mm, fitted in different lengths, between the Venturi pipe and the differential pressure transducer incl. all screw connections, thread NPT ½" (mat. no. 1.4571)

2 ea. three-way valves (operation zero test), suitable for connection to a differential pressure transducer (mat. no. 1.4571) including threaded joints NPT ½", fitted to a galvanized frame in the mechanical room.

2 ea. differential pressure transducer (type VEGADIF 65; www.vega.com)

Explosion protection	: ATEX II, EEx ia IIC T6
Output	: 4 to 20 mA HART
Display	: 0 to 480 m³/h linear
Protection	: IP 66/67
Housing	: stainless steel
Assembly	: below the measuring point, in such a manner that the pipeline is always filled with liquid

Supply devices to be installed in the I&C cabinet shall be included in the price.

1 ea. analog moving coil indicator (144 x 36 mm)

Input	: 4 to 20 mA
Scale	: 0 to 480 m³/h
Class	: 1.5

Installation in I&C cabinet

1 ea. paperless recorder (144 x 144 mm) with two measurement inputs for flow rate and pressure logging

Double scale	: a) 0 to 480 m³/h and 0 to 2,200 gpm b) 0 to 25 bar and 0 to 360 psi
Input	: 4 to 20 mA
Auxiliary power	: 230 V AC
Accessories	: memory card, suitable for the proposed recorder

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STANDARD SPECIFICATION	<h2>STS – E 115</h2>	
DESCRIPTION	ID-CODE	
<b>FLOW METER ASSEMBLY</b>		

Installation in door of I&C cabinet, pump control compartment

ATEX certificate and/or certificate of conformity shall be included in the scope of delivery in three copies.

The performance described above includes the delivery, installation and connection ready for operation. The installation of the Venturi pipe is described in the mechanical part of the specifications.

Design B:

Flow meter assemblies 1 and 2, in parallel stand-by circuit, for hydrant system, in the return piping

This Venturi pipe is also used in the tank truck refuelling system.

Additional flow meters 1 and 2 in parallel stand-by circuit for the return piping with additional Venturi pipe, three-way valves with piping, differential pressure transducer with analog display.

1 ea. Venturi pipe

Differential pressure : min. limit value of measuring range: 250 mbar  
max. limit value of measuring range: 1,500 mbar  
Flow rate : 240 m<sup>3</sup>/h max.  
Medium : jet fuel, mogas and diesel fuel  
Medium temperature : 5 to 25 °C

Materials : stainless steel, mat. no. 1.4571, as per DIN 17 440  
Design : a) flanges DIN 100, PN 16, as per DIN 2633  
b) two connection each on the plus and minus sides  
with a set off of 120 degrees, pressure pipe 12 x 1.5 mm

1 ea. analog moving coil indicator (144 x 36 mm)

Input : 4 to 20 mA  
Scale : 0 to 160 m<sup>3</sup>/h  
Class : 1.5

Installation in door of I&C cabinet, pump control compartment

Paperless recorder for hydrant system

1 ea. paperless recorder (144 x 144 mm) with three measurement inputs for flow rate and pressure logging

Triple scale : a) 0 to 480 m<sup>3</sup>/h and 0 to 2,200 gpm  
: b) 0 to 480 m<sup>3</sup>/h and 0 to 2,200 gpm  
: c) 0 to 25 bar and 0 to 360 psi

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STANDARD SPECIFICATION	<h2>STS – E 115</h2>	
DESCRIPTION <b>FLOW METER ASSEMBLY</b>	ID-CODE	

Input : 4 to 20 mA  
 Auxiliary power : 230 V AC  
 Accessories : memory card, suitable for the proposed recorder

Installation in door of I&C cabinet, pump control compartment

Paperless recorder for tank truck refuelling system

1 ea. paperless recorder (144 x 144 mm) with two measurement inputs for flow rate and pressure logging

Double scale : a) 0 to 240 m<sup>3</sup>/h and 0 to 1100 gpm  
 b) 0 to 25 bar and 0 to 360 psi

Input : 4 to 20 mA  
 Auxiliary power : 230 V AC  
 Accessories : memory card, suitable for the proposed recorder

Installation in door of I&C cabinet, pump control compartment

Legally and additionally required evidences included in the scope of delivery:

Evidences required by the General Product Safety Directive (GPSD) and associated regulations (GPSR);

especially:

- EC type test certificate as per Directive 2014/34/EU
- Identification as per Annex II, Item 1.05 of the Directive 2014/34/EU
- CE Conformity Sign as per Art. 5 Para. 1 and 2 of the Directive 2014/34/EU
- Specification of the temperature range on the component as per DIN EN 60079 (VDE 0170)
- Assembly instructions
- Operating instructions
- Maintenance instructions

Inspection intervals:

In accordance with the German Ordinance on Industrial Safety and Health (BetrSichV), Art. 16, the operational condition of systems requiring monitoring and their pertaining components must be inspected at regular intervals by a qualified person. The components described in the specifications must be conceived and designed so as to allow inspection intervals **of three years**.

STS-E 0 shall be observed.

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STANDARD SPECIFICATION	<h2>STS – E 116</h2>	
DESCRIPTION		ID-CODE
<b>SYSTEM PRESSURE GAUGE ASSEMBLY</b>		

Suitable for the measurement and control of the flow rate in pressure refuelling systems.

Basic documents:

Regulations for industrial health, facility safety and environmental protection;

especially:

1. General Product Safety Directive (GPSD) and associated regulations (GPSR)  
especially:  
First GPSR: Low-Voltage Directive in combination with Directive 2006/95/EC and others  
Eleventh GPSR: Explosion Protection Directive (ATEX) in combination with Directive 2014/34/EU and others
2. German Ordinance on Industrial Safety and Health (BetrSichV)
3. Directives and regulations of the VDE and DIN / EN
4. Technical Rules for Operational Safety, especially TRBS 1201, TRGS 2152
5. Water Resources Act (WHG)
6. Directive 2009/104/EC of the European Parliament and of the Council of 16 September 2009 stating minimum requirements of safety and health protection for the operation of electrical equipment at work.
7. Directive 2006/95/EC of the European Parliament and of the Council on the approximation of the laws of the Member States concerning electrical equipment suitable for use within defined voltage limits.
8. Directive 2014/34/EU of the European Parliament and of the Council on the approximation of the laws of the Member States concerning the appropriate use of equipment in explosion hazard areas (ATEX).

System pressure gage assembly consisting of:

2 ea. double shut-off valves as per STS-M 86

1 ea. manometer as per STS-M 87

1 ea. process pressure transducer (e.g. make VEGA, VEGABAR 17; [www.vega.com](http://www.vega.com))

Measuring range : 0 to 25 bar

Explosion protection of input : [EEx ia] IIC

Output : 4 to 20 mA

The corresponding power supply unit in the I&C cabinet shall be included in the price.

1 ea. moving-coil indicator (144 x 36 mm), 4 to 20 mA, scale 0 to 100 %, class 1.5,  
Installation in door of I&C cabinet

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STANDARD SPECIFICATION	<h2>STS – E 116</h2>	
DESCRIPTION		ID-CODE
<b>SYSTEM PRESSURE GAUGE ASSEMBLY</b>		

Legally required evidences included in the scope of delivery:

Evidences required by the General Product Safety Directive (GPSD) and associated regulations (GPSR);

especially:

- EC type test certificate as per Directive 2014/34/EU
- Homologation as per Art. 62 of the German Water Resources Act (WHG) or approval by the construction authorities
- Identification as per Annex II, Item 1.0.5 of the Directive 2014/34/EU
- CE Conformity Sign as per Art. 5 Para. 1 and 2 of the Directive 2014/34/EU
- Specification of the temperature range on the component as per DIN EN 60079 (VDE 0170)

Inspection intervals:

In accordance with the German Ordinance on Industrial Safety and Health (BetrSichV), Art. 16, the operational condition of systems requiring monitoring and their pertaining components must be inspected at regular intervals by a qualified person. The components described in the specifications must be conceived and designed so as to allow inspection intervals **of three years**.

STS-E 0 shall be observed.

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<h2>STANDARD SPECIFICATION</h2>	<h1>STS – E 120</h1>	
DESCRIPTION		ID-CODE
<b>TRENCH FOR BURIED CABLES AND STRIP STEEL</b>		

Basic documents:

Regulations for industrial health, facility safety and environmental protection;

especially:

1. General Product Safety Directive (GPSD) and associated regulations (GPSR)  
especially:  
First GPSR: Low-Voltage Directive in combination with Directive 2006/95/EC and others  
Eleventh GPSR: Explosion Protection Directive (ATEX) in combination with Directive 2014/34/EU and others
2. German Ordinance on Industrial Safety and Health (BetrSichV)
3. Directives and regulations of the VDE and DIN / EN
4. Technical Rules for Operational Safety, especially TRBS 1201, TRGS 2152
5. Water Resources Act (WHG)

Design A

Cable trench, 80 cm deep and 40 cm wide, to be excavated by hand. The top soil shall be removed and stored separately. A sand bed of 10 cm thickness shall be installed. After laying the cables, they shall be covered with a sand layer of 10 cm thickness. As a mechanical protection, cover plates shall be laid without gaps on top of the sand layer. The delivery and filling of the sand and the laying of the plates shall be included in the unit prices.

The cable trench shall be filled back up to half of its depth and compacted. Cable marker strip of yellow plastic, 40 x 0.15 mm with the inscription "Attention cables" shall be delivered and laid on top to the backfill. After this, the trench shall be filled back completely, the backfill shall be compacted and the original ground surface shall be restored.

Design B

Same as design A, with manual excavation, however.

Design C

Exploring trench shall be excavated manually in accordance with the instructions of the site supervision, soil classes 3 to 5, excavation width: 40 cm. Billing of excavation and backfilling in m<sup>3</sup> as specified in the survey.

Design D

Same as design A, with a depth of 80 cm and a width of 80 cm, however.

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STANDARD SPECIFICATION	<h2>STS – E 120</h2>	
DESCRIPTION <b>TRENCH FOR BURIED CABLES AND STRIP STEEL</b>		ID-CODE

Design E

Same as design A, with a depth of 50 cm and a width of 30 cm, without sand bed and covering, without cable marker strip, suitable for laying strip steel and/or buried cable NYY 1 x 50 mm<sup>2</sup>, however.

In accordance with the German Ordinance on Industrial Safety and Health (BetrSichV), Art. 16, the operational condition of systems requiring monitoring and their pertaining components must be inspected at regular intervals by a qualified person. The components described in the specifications must be conceived and designed so as to allow inspection intervals **of three years**.

STS-E 0 shall be observed.

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STANDARD SPECIFICATION	<h2>STS – E 121</h2>	
DESCRIPTION <b>CABLE BUSHING</b>	ID-CODE	

Basic documents:

Regulations for industrial health, facility safety and environmental protection;

especially:

1. General Product Safety Directive (GPSD) and associated regulations (GPSR)  
especially:  
First GPSR: Low-Voltage Directive in combination with Directive 2006/95/EC and others  
Eleventh GPSR: Explosion Protection Directive (ATEX) in combination with Directive 2014/34/EU and others
2. German Ordinance on Industrial Safety and Health (BetrSichV)
3. Directives and regulations of the VDE and DIN / EN
4. Technical Rules for Operational Safety, especially TRBS 1201, TRGS 2152
5. Water Resources Act (WHG)

The cables leading to the individual buildings shall be laid in cable bushings.

The cable bushings shall be pressure-water tight and gas tight. The metal parts shall be protected against corrosion.

The structure and the available inner space shall be sufficiently dimensioned to allow the subsequent drawing in of additional cables.

The mounting frames and the tubes shall be cast in concrete or fixed with welding in accordance with the drawings.

Design A

Cable bushing consisting of double mounting frames

Interior dimensions          w x h          205 x 160 mm

with 2 chambers, each with an effective inner space of 120 x 120 mm, complete with all accessories such as press screws, packing and filling material, adapting plates, fixing plates, press plate, special end seals, and sealing material, shall be delivered and installed ready for operation.

Design B:

Same as design A, with triple mounting frame, however.

Interior dimensions          w x h          380 x 220 mm

with three chambers and an effective inner space of 120 x 180 mm in each chamber.

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STANDARD SPECIFICATION	<h2>STS – E 121</h2>	
DESCRIPTION	ID-CODE	
<b>CABLE BUSHING</b>		

Design C

Cable bushing, consisting of steel tube DN 65 and round-hole packing, shall be delivered completely and installed ready for operation with all accessories such as packing pieces, filling pieces, and sealing material.

Design D

Same as design C, with steel tube DN 150, however.

Inspection intervals:

In accordance with the German Ordinance on Industrial Safety and Health (BetrSichV), Art. 16, the operational condition of systems requiring monitoring and their pertaining components must be inspected at regular intervals by a qualified person. The components described in the specifications must be conceived and designed so as to allow inspection intervals **of three years**.

STS-E 0 shall be observed.

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<h1>USAFE</h1>	REVISION 1	DATE: MAY 2015
	SHEET 1 OF 1	
STANDARD SPECIFICATION	<h2>STS – E 122</h2>	
DESCRIPTION <b>CAST RESIN SLEEVES FOR LOW-VOLTAGE CABLES, 0.6 TO 1 KV</b>		ID-CODE

Basic documents:

Regulations for industrial health, facility safety and environmental protection;

especially:

1. General Product Safety Directive (GPSD) and associated regulations (GPSR)  
especially:  
First GPSR: Low-Voltage Directive in combination with Directive 2006/95/EC and others  
Eleventh GPSR: Explosion Protection Directive (ATEX) in combination with Directive 2014/34/EU and others
2. German Ordinance on Industrial Safety and Health (BetrSichV)
3. Directives and regulations of the VDE and DIN / EN
4. Technical Rules for Operational Safety, especially TRBS 1201, TRGS 2152
5. Water Resources Act (WHG)

Design A:

Deliver jointing sleeve for low-voltage cables 0.6 to 1 kV, four to five core, nominal cross section 1.5 to 6 mm<sup>2</sup>, shall be delivered completely with all accessory parts such as plastic enclosure with tongue and groove, jointing sleeves, cast resin, assemble and install ready for operation.

Design B:

Same as design A, as a branching sleeve, however.

Inspection intervals:

In accordance with the German Ordinance on Industrial Safety and Health (BetrSichV), Art. 16, the operational condition of systems requiring monitoring and their pertaining components must be inspected at regular intervals by a qualified person. The components described in the specifications must be conceived and designed so as to allow inspection intervals **of three years**.

STS-E 0 shall be observed.

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<h1>USAFE</h1>	REVISION 1	DATE: MAY 2015
	SHEET 1 OF 2	
<h2>STANDARD SPECIFICATION</h2>	<h1>STS – E 123</h1>	
DESCRIPTION		ID-CODE
<b>LOW-VOLTAGE CABLE 0.6/1 KV LOW-VOLTAGE CABLES UP TO 500 V</b>		

Basic documents:

Regulations for industrial health, facility safety and environmental protection;

especially:

1. General Product Safety Directive (GPSD) and associated regulations (GPSR)  
especially:  
First GPSR: Low-Voltage Directive in combination with Directive 2006/95/EC and others  
Eleventh GPSR: Explosion Protection Directive (ATEX) in combination with Directive 2014/34/EU and others
2. German Ordinance on Industrial Safety and Health (BetrSichV)
3. Directives and regulations of the VDE and DIN / EN
4. Technical Rules for Operational Safety, especially TRBS 1201, TRGS 2152
5. Water Resources Act (WHG)

Design A:

Buried installation

Deliver cables and install them in the existing cable trench. The cables shall carry identification signs with engraved inscription of the cable number, the number of conductors and the cross section. The sign shall be fitted at a distance of 20 cm from the connection. The specifications on the sign must comply with the cable inventory (cable number, type, number of conductors, cross section and specification of the destination), which shall be prepared by the Contractor.

Design B:

Drawing in of cables in cable-duct blocks or cable conduits:

Deliver and draw in cables in existing cable-duct blocks and/or cable conduits.

Design C

Laying of cables on spacing clamps or profiled rails:

Deliver and install cables including insulator spacing clamps or profiled rails and series terminals. The clamps and terminals shall not be fixed by gluing.

Design D

Drawing in of cables in armored plastic conduit:

Deliver and draw in cables in existing armored plastic conduit (open cable laying).

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<h1>USAFE</h1>	REVISION 1	DATE: MAY 2015
	SHEET 2 OF 2	
STANDARD SPECIFICATION	<h2>STS – E 123</h2>	
DESCRIPTION		ID-CODE
<b>LOW-VOLTAGE CABLE 0.6/1 KV</b> <b>LOW-VOLTAGE CABLES UP TO 500 V</b>		

Design E:

Laying of cables in cable duct:

Deliver cables and install them in the existing cable duct.

Design F:

Laying of cables on cable tray:

Deliver cables and lay them on existing cable tray.

Design G:

Laying of cables in vertical cable routes:

Deliver and install cables including galvanized cable clamps.

Inspection intervals:

In accordance with the German Ordinance on Industrial Safety and Health (BetrSichV), Art. 16, the operational condition of systems requiring monitoring and their pertaining components must be inspected at regular intervals by a qualified person. The components described in the specifications must be conceived and designed so as to allow inspection intervals **of three years**.

STS-E 0 shall be observed.

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<h1>USAFE</h1>	REVISION 1	DATE: MAY 2015
	SHEET 1 OF 2	
<b>STANDARD SPECIFICATION</b>	<b>STS – E 124</b>	
DESCRIPTION		ID-CODE
<b>CABLES FOR GROUNDING AND LIGHTNING PROTECTION SYSTEMS</b>		

Basic documents:

Regulations for industrial health, facility safety and environmental protection;

especially:

1. General Product Safety Directive (GPSD) and associated regulations (GPSR)  
especially:  
First GPSR: Low-Voltage Directive in combination with Directive 2006/95/EC and others  
Eleventh GPSR: Explosion Protection Directive (ATEX) in combination with Directive 2014/34/EU and others
2. German Ordinance on Industrial Safety and Health (BetrSichV)
3. Directives and regulations of the VDE and DIN / EN
4. Technical Rules for Operational Safety, especially TRBS 1201, TRGS 2152
5. Water Resources Act (WHG)

Design A:

Lay galvanized strip steel, zinc coat > 70 µm, dimensions 30 x 3.5 mm, as well as round steel, zinc coat > 70 µm, dimensions: 8 mm diameter as per DIN 57 185 and VDE 0185, in accordance with working drawing.

The fasteners shall be included in the unit prices.

When installing strip steel and round steel, it shall be made sure that the steel is insulated with bitumen band 30 cm below and 30 cm above the point where the cables enter the ground. Underground clamping joints shall also be wrapped in bitumen band.

All above-ground joints shall be fitted with a galvanic zinc coat.

The performance described above includes the delivery, installation and assembly ready for operation.

I Laying of strip steel		II Laying of round steel
A	On spacers	On roof cables holders
B	As foundation grounding	On cable holders
C	In trenches	

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<h1>USAFE</h1>	REVISION 1	DATE: MAY 2015
	SHEET 2 OF 2	
STANDARD SPECIFICATION	<h2>STS – E 124</h2>	
DESCRIPTION		ID-CODE
<b>CABLES FOR GROUNDING AND LIGHTNING PROTECTION SYSTEMS</b>		

Design B:

Same as design A, stainless strip steel for buried installation as per DIN EN 62561-2 (VDE 0185-202) and DIN EN 62305-3 (VDE 0185-305-3) NIRO(V4A), Molybdenum portion > 2 %, however.

Inspection intervals:

In accordance with the German Ordinance on Industrial Safety and Health (BetrSichV), Art. 16, the operational condition of systems requiring monitoring and their pertaining components must be inspected at regular intervals by a qualified person. The components described in the specifications must be conceived and designed so as to allow inspection intervals **of three years**.

.

STS-E 0 shall be observed.

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<h1>USAFE</h1>	REVISION 1	DATE: MAY 2015
	SHEET 1 OF 4	
STANDARD SPECIFICATION	<h2>STS – E 125</h2>	
DESCRIPTION		ID-CODE
<b>CONNECTIONS FOR GROUNDING AND LIGHTNING PROTECTION SYSTEMS</b>		

Basic documents:

Regulations for industrial health, facility safety and environmental protection;

especially:

1. General Product Safety Directive (GPSD) and associated regulations (GPSR)  
especially:  
First GPSR: Low-Voltage Directive in combination with Directive 2006/95/EC and others  
Eleventh GPSR: Explosion Protection Directive (ATEX) in combination with Directive 2014/34/EU and others
2. German Ordinance on Industrial Safety and Health (BetrSichV)
3. Directives and regulations of the VDE and DIN / EN
4. Technical Rules for Operational Safety, especially TRBS 1201, TRGS 2152
5. Water Resources Act (WHG)

In all connections of grounding and lighting protection systems, only bolts, nuts and spring washers made of stainless steel shall be used.

Design A

For a flexible connection between the cover frame and the cover and the metal door and the frame.  
Deliver insulating cable H01N2-D50 50 mm<sup>2</sup>, incl. 2 cable lugs, 2 tongues, each with bore 1 x 11 mm and welded on one side, length of approx. 50 cm, completely with bolts, nuts and spring washers M 10 and install ready for operation.

Design B

For a flexible connection between the sliding cover and the frame of a shaft; insulating cable H01N2-D50 50 mm<sup>2</sup>, length of approx. 1.50 m, deliver in accordance with design A and install.

Design C1

For the connection of galvanized steel strips 30 x 3.5 mm; deliver galvanized webs 60 x 60 mm with spacer, bolts, nuts and spring washers M 8, incl. insulation, and install ready for operation.

Design C2

Same as C1, in stainless steel, however.

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STANDARD SPECIFICATION	<h2>STS – E 125</h2>	
DESCRIPTION		ID-CODE
<b>CONNECTIONS FOR GROUNDING AND LIGHTNING PROTECTION SYSTEMS</b>		

Design D1

For the connection of galvanized steel strips 30 x 3.5 mm; deliver galvanized webs 60 x 60 mm with spacer, bolts, nuts and spring washers M 8, without insulation, and install ready for operation.

Design D2

Same as D1, in stainless steel, however.

Design E1

For the connection of partial round steel sections, diameter 8 to 10 mm; deliver galvanized webs 50 x 50 mm with spacer, bolts, nuts and spring washers M6 and install ready for operation.

Design E2

Same as E1, in stainless steel, however.

Design F

Install separable connection of steel strips 30 x 3.5 mm to metal components such as pipelines, ladders, guide rails etc. ready for operation, including the delivery of the required material (2 bolts with nuts and spring washers M 8 or 1 bolt with nut and spring washer M 10, hot-galvanized weld-on part with the required bore). The ends shall be welded to the corresponding metal device.

Design G

Deliver and install ready for operation disconnect terminals of hot-galvanized malleable cast iron incl. stainless steel screws as per DIN 57 185 for the connection of steel strips 30 x 3.5 mm to round steel ladders, diameter 8 mm.

Design H

Deliver disconnect terminals as for design G, for the connection of steel strips 30 x 3.5 mm to steel strips 30 x 3.5 mm and install.

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<h1>USAFE</h1>	REVISION 1	DATE: MAY 2015
	SHEET 3 OF 4	
STANDARD SPECIFICATION	<h2>STS – E 125</h2>	
DESCRIPTION <b>CONNECTIONS FOR GROUNDING AND LIGHTNING PROTECTION SYSTEMS</b>		ID-CODE

Design I1

Deliver groove or gutter clamps, suitable for diameter of 8 to 10 mm, made of hot-galvanized mild steel and install.

Design I2

Same as I1, in stainless steel, however.

Design K1

Deliver galvanized diagonal connector clamp, suitable for round conductors with a max. diameter of 10 mm and strip steel with a max. width of 30 mm and install ready for operation.

Design K2

Same as K1, in stainless steel, however.

Design L

Weld galvanized steel strip 30 x 3.05 mm to steel structure and apply cold-galvanized zinc coat on weld seam.

Design M

Deliver connecting rail of steel, approx. 200 mm long, with 3 bores of 10.5 mm diameter and 3 screws M 10 with washers, spring washers and nuts made of rustproof steel and weld it to the dome shaft wall prior to the insulation of the shaft wall.

Design N

Same as design M, with two bores.

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STANDARD SPECIFICATION	<h2>STS – E 125</h2>	
DESCRIPTION		ID-CODE
<b>CONNECTIONS FOR GROUNDING AND LIGHTNING PROTECTION SYSTEMS</b>		

### Design O

Bonding busbar with base plate and cover, with terminal rail made of mild steel TZN O 40 x 5 mm and stainless steel screws for the following connecting options:

- 2 conductors FL 30
- 2 cables 50 mm<sup>2</sup>
- 5 cables 16 mm<sup>2</sup>
- 1 cable 10 mm<sup>2</sup>

Deliver and install ready for operation.

### Design P

Same as design O, for the following connecting options, however:

- 3 conductors FL 30
- 1 cable 50 mm<sup>2</sup>
- 6 cables 16 mm<sup>2</sup>

### Inspection intervals:

In accordance with the German Ordinance on Industrial Safety and Health (BetrSichV), Art. 16, the operational condition of systems requiring monitoring and their pertaining components must be inspected at regular intervals by a qualified person. The components described in the specifications must be conceived and designed so as to allow inspection intervals **of three years**.

STS-E 0 shall be observed.

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<h1>USAFE</h1>	REVISION 1	DATE: MAY 2015
	SHEET 1 OF 2	
<h2>STANDARD SPECIFICATION</h2>	<h1>STS – E 126</h1>	
DESCRIPTION <b>SPARK GAP</b>	ID-CODE	

Basic documents:

Regulations for industrial health, facility safety and environmental protection;

especially:

1. General Product Safety Directive (GPSD) and associated regulations (GPSR)  
especially:  
First GPSR: Low-Voltage Directive in combination with Directive 2006/95/EC and others  
Eleventh GPSR: Explosion Protection Directive (ATEX) in combination with Directive 2014/34/EU and others
2. German Ordinance on Industrial Safety and Health (BetrSichV)
3. Directives and regulations of the VDE and DIN / EN
4. Technical Rules for Operational Safety, especially TRBS 1201, TRGS 2152
5. Water Resources Act (WHG)

Design A

Explosion-protected spark gap with the following technical properties:

Alternating spark-over voltage (50 Hz)	:	max. 1.0 KV
Impulse spark-over voltage	:	max. 2.2 KV
Rated discharge current	:	100 KA
Protection	:	EEx II C T4

Deliver the spark gap including the connecting cable and 2 connecting brackets and assemble ready for operation. The installation shall be carried out in compliance with the VDE regulation 0185/DIN EN 62 305-1 in their latest version. All connecting joints shall be secured against loosening by means of spring washers. The connecting bracket shall be wrapped in insulating plastic tape.

Design B

Spark gap for galvanic separation of the grounding system of the outdoor facilities from the grounding system of the indoor facilities incl. foundation grounding. The spark gap shall have the following technical properties:

Alternating spark-over voltage (50 Hz): approx. 2 kV

Rated discharge current: 100 kA

Housing made of weathering resistant plastic

Deliver the spark gap including the connecting material and connect it ready for operation.

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	SHEET 2 OF 2	
STANDARD SPECIFICATION	<h2>STS – E 126</h2>	
DESCRIPTION <b>SPARK GAP</b>	ID-CODE	

Legally required evidences included in the scope of delivery:

Evidences required by the General Product Safety Directive (GPSD) and associated regulations (GPSR);

especially:

- EC type test certificate as per Directive 2014/34/EU
- Homologation as per Art. 62 of the German Water Resources Act (WHG) or approval by the construction authorities
- Identification as per Annex II, Item 1.0.5 of the Directive 2014/34/EU
- CE Conformity Sign as per Art. 5 Para. 1 and 2 of the Directive 2014/34/EU
- Specification of the temperature range on the component as per DIN EN 60079 (VDE 0170)

Inspection intervals:

In accordance with the German Ordinance on Industrial Safety and Health (BetrSichV), Art. 16, the operational condition of systems requiring monitoring and their pertaining components must be inspected at regular intervals by a qualified person. The components described in the specifications must be conceived and designed so as to allow inspection intervals **of three years**.

STS-E 0 shall be observed.

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<h1>USAFE</h1>	REVISION 1	DATE: MAY 2015
	SHEET 1 OF 2	
STANDARD SPECIFICATION	<h2>STS – E 127</h2>	
DESCRIPTION <b>GROUNDING SYSTEM</b>	ID-CODE	

Suitable for bonding between refuelling facilities and vehicles, etc.

Basic documents:

Regulations for industrial health, facility safety and environmental protection;

especially:

1. General Product Safety Directive (GPSD) and associated regulations (GPSR)  
especially:  
First GPSR: Low-Voltage Directive in combination with Directive 2006/95/EC and others  
Eleventh GPSR: Explosion Protection Directive (ATEX) in combination with Directive 2014/34/EU and others
2. German Ordinance on Industrial Safety and Health (BetrSichV)
3. Directives and regulations of the VDE and DIN / EN
4. Technical Rules for Operational Safety, especially TRBS 1201, TRGS 2152
5. Water Resources Act (WHG)

Design A

Grounding facility for tank trucks, in hot-galvanized design, steel hanger 3 mm, outer radius 250 mm, inner radius 200 mm, supporting area of approx. 100 mm, with welded-on fixing clamp (suitable for fastening to the tubular steel pole for the side-mounted fixture).

Incl. 10 m cable H01N2-D25 25 mm<sup>2</sup>, with cable lug on one end and a grounding clamp made of brass on the other end, tension spring of stainless steel, throat opening of 20 mm approx.

Incl. uninsulated, corrosion-resistant panel jack at the front, suitable for the connection of 6.3 mm jack plug to accommodate the grounding wire of the tank truck.

All drilling and welding work shall be carried out before galvanization.

Deliver grounding facility inclusive small parts for the connection to the grounding facility of the steel tube pole and install ready for operation.

Fixing height: 150 cm approx.

Design B

Same as design A, with stand pipe instead of pole assembly, however. 3 inch stand pipe, length of 200 cm, with concrete foundation B 25 (30 x 30 x 60 cm), upper 10 cm as exposed concrete incl. earthworks.

Excess material from excavation shall be graded in or hauled off at no extra costs.

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<h1>USAFE</h1>	REVISION 1	DATE: MAY 2015
	SHEET 2 OF 2	
STANDARD SPECIFICATION	<h2>STS – E 127</h2>	
DESCRIPTION <b>GROUNDING SYSTEM</b>	ID-CODE	

Deliver grounding facility inclusive small parts for the connection to the grounding cable NYY-0 1 x 50 mm<sup>2</sup> and install ready for operation.

#### Design C

Same as design A, without fixing clamp, however.

The facility shall be fitted to an existing hot-galvanized bearing structure.

#### Design D

Grounding cable drum with spring-driven traction mechanism and corrosion-resistant housing, 25 mm galvanized steel rope, 3 mm Ø with at least 0.5 mm PVC insulation as well as corrosion-resistant alligator clip 50 A or grounding clamp made of brass with tension spring of stainless steel.

Deliver grounding facility inclusive hot-galvanized assembly scaffold suitable for fastening to a concrete wall and small parts for the connection to the grounding cable or steel strip. and install ready for operation.

All drilling and welding work shall be carried out before galvanization.

#### Design E

Same as design D, with assembly scaffold with concrete foundation B 25, however; the upper 10 cm shall be cast as exposed concrete incl. earthworks.

Excess material from excavation shall be graded in or hauled off at no extra costs.

#### Inspection intervals:

In accordance with the German Ordinance on Industrial Safety and Health (BetrSichV), Art. 16, the operational condition of systems requiring monitoring and their pertaining components must be inspected at regular intervals by a qualified person. The components described in the specifications must be conceived and designed so as to allow inspection intervals **of three years**.

STS-E 0 must be adhered to.

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<h1>USAFE</h1>	REVISION 1	DATE: MAY 2015
	SHEET 1 OF 2	
STANDARD SPECIFICATION	<h2>STS – E 129</h2>	
DESCRIPTION <b>ARMORED PLASTIC CONDUIT, CABLE TRAY, VERTICAL CABLE RUN</b>		ID-CODE

Basic documents:

Regulations for industrial health, facility safety and environmental protection;

especially:

1. General Product Safety Directive (GPSD) and associated regulations (GPSR)  
especially:  
First GPSR: Low-Voltage Directive in combination with Directive 2006/95/EC and others  
Eleventh GPSR: Explosion Protection Directive (ATEX) in combination with Directive 2014/34/EU and others
2. German Ordinance on Industrial Safety and Health (BetrSichV)
3. Directives and regulations of the VDE and DIN / EN
4. Technical Rules for Operational Safety, especially TRBS 1201, TRGS 2152
5. Water Resources Act (WHG)

Armored plastic conduit

Design A

Plastic armored conduit as per DIN VDE 0605, made of hard PVC, medium weight, rigid, ACF label as per VDE, open installation.  
Nominal width: 25.

Design B

Same as design A, with a nominal width of 32 mm, however.

Design C

Same as design A, with a nominal width of 40 mm, however.

Design D

Same as design A, with a nominal width of 50 mm, however.

The plastic armored conduits shall be delivered in partial lengths incl. the required fastening material and installed on the surface of a steel or concrete wall.

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<h1>USAFE</h1>	REVISION 1	DATE: MAY 2015
	SHEET 2 OF 2	
STANDARD SPECIFICATION	<h2>STS – E 129</h2>	
DESCRIPTION		ID-CODE
ARMORED PLASTIC CONDUIT, CABLE TRAY, VERTICAL CABLE RUN		

### Cable tray

#### Design E

Cable tray, made of steel, hot galvanized, as per DIN EN 10 346 Part 1, zinc-coating group 275 or as per DIN EN ISO 1461:2009-10, nominal width 150 mm, lateral height of 45 mm min.

#### Design F

Same as design E, with a nominal width of 200 mm.

Deliver cable trays completely with the required fastening material incl. brackets for wall mounting and/or cable carrier for floor assembly and install ready for operation.

### Vertical cable ladder

#### Design G

Vertical cable ladder, made of steel, hot galvanized, as per DIN EN 10 346 Part 1, zinc-coating group 275 or as per DIN EN ISO 1461:2009-10, load-carrying capacity per web: up to 0.75 kN/m nominal width: 200 mm

#### Design H

Same as design G, with a nominal width of 300 mm.

Deliver vertical cable ladders completely with the required assembly material incl. connectors and fix to the wall.

### Inspection intervals:

In accordance with the German Ordinance on Industrial Safety and Health (BetrSichV), Art. 16, the operational condition of systems requiring monitoring and their pertaining components must be inspected at regular intervals by a qualified person. The components described in the specifications must be conceived and designed so as to allow inspection intervals **of three years**.

STS-E 0 must be adhered to.

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<h1>USAFE</h1>	REVISION 1	DATE: MAY 2015
	SHEET 1 OF 2	
STANDARD SPECIFICATION	<h2>STS – E 130</h2>	
DESCRIPTION		ID-CODE
<b>TUBULAR STEEL POLE FOR SIDE-MOUNTED FIXTURE</b>		

Basic documents:

Regulations for industrial health, facility safety and environmental protection;

especially:

1. General Product Safety Directive (GPSD) and associated regulations (GPSR)  
especially:  
First GPSR: Low-Voltage Directive in combination with Directive 2006/95/EC and others  
Eleventh GPSR: Explosion Protection Directive (ATEX) in combination with Directive 2014/34/EU and others
2. German Ordinance on Industrial Safety and Health (BetrSichV)
3. Directives and regulations of the VDE and DIN / EN
4. Technical Rules for Operational Safety, especially TRBS 1201, TRGS 2152
5. Water Resources Act (WHG)

Design A

Tubular steel pole for side-mounted fixture as per DIN 49 778. Cantilever, circularly curved, continuously conical pole, with grounding screw M 10, approx. 300 mm above ground, hot-galvanized on the inside and outside, light source height of 6.5 m, base plate 350 x 350 x 5 mm, cable entry point 50 x 100 mm, 50 cm above ground, door opening 100 x 300 mm, door with triangular lock, bearing socket, cable branch box, explosion-protected EEx e IIC T5 including NYM-I 3 x 1.5 cable to side-mounted fixture.

Excavate soil for pole hole, soil classes 3 to 5. Deliver and install concrete foundation made of B 25, size: 50 x 50 x 90 cm. The foundations shall jut out of the ground by 10 cm. The surfaces shall be slightly slanted outwards and troweled off, the edges shall be slightly beveled.  
The surplus soil from excavation shall be graded in or hauled off on request of the site supervision at no extra costs.

Deliver tubular steel pole with all accessories, install and connect it ready for operation.

PTB<sup>1</sup> certificate and/or certificate of conformity shall be included in the scope of delivery in three copies.

Design B

Same as design A, with two cantilevers, however.

Design C

Same as design A, with cable branch box without explosion protection, however.

<sup>1</sup> PTB = Physikalisch-Technische Bundesanstalt (national metrology institute providing scientific and technical services).

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<h1>USAFE</h1>	REVISION 1	DATE: MAY 2015
	SHEET 2 OF 2	
STANDARD SPECIFICATION	<h2>STS – E 130</h2>	
DESCRIPTION <b>TUBULAR STEEL POLE FOR SIDE-MOUNTED FIXTURE</b>		ID-CODE

Design D

Deliver supporting arm for side-mounted fixture, total length of approx. 3 m, with mounting plate, suitable for mounting to a concrete wall, grounding screw M 10, inside and outside galvanized, complete with all accessory parts and install ready for operation.

Legally required evidences included in the scope of delivery:

Evidences required by the General Product Safety Directive (GPSD) and associated regulations (GPSR);

especially:

- EC type test certificate as per Directive 2014/34/EU
- Homologation as per Art. 62 of the German Water Resources Act (WHG) or approval by the construction authorities
- Identification as per Annex II, Item 1.0.5 of the Directive 2014/34/EU
- CE Conformity Sign as per Art. 5 Para. 1 and 2 of the Directive 2014/34/EU
- Specification of the temperature range on the component as per DIN EN 60079 (VDE 0170)

Inspection intervals:

In accordance with the German Ordinance on Industrial Safety and Health (BetrSichV), Art. 16, the operational condition of systems requiring monitoring and their pertaining components must be inspected at regular intervals by a qualified person. The components described in the specifications must be conceived and designed so as to allow inspection intervals **of three years**.

STS-E 0 shall be observed.

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	SHEET 1 OF 2 SHEETS	
STANDARD SPECIFICATION	<h2>STS – E 131</h2>	
DESCRIPTION <b>FLUORESCENT FIXTURE</b>	ID-CODE	

Regulations for industrial health, facility safety and environmental law;

especially:

1. General Product Safety Directive (GPSD) and associated regulations (GPSR)  
especially:  
First GPSR: Low-Voltage Directive in combination with Directive 2006/95/EC and others  
Eleventh GPSR: Explosion Protection Directive (ATEX) in combination with Directive 2014/34/EU and others
2. German Ordinance on Industrial Safety and Health (BetrSichV)
3. Directives and regulations of the VDE and DIN / EN
4. Technical Rules for Operational Safety, especially TRBS 1201, TRGS 2152
5. Water Resources Act (WHG)

#### Design A

Ex-protected fluorescent fixture for ceiling and wall mounting for 2 fluorescent lamps 36 Watt, with Plexiglas trough, wide ranging narrow angle distribution, incl. 2 fluorescent lamps 36 Watt, light color 25 (universal white), lead-lag circuit, incl. electronic ballast, protection IP 65, ex-protection EEx e IIC T3.

#### Design B

Same as design A, however, for 1 fluorescent fixture 36 Watt.

#### Design C

Same as design A, however, as side-mounted light fixture.

#### Design D

Fluorescent fixture for ceiling and wall mounting for 2 fluorescent lamps 58 Watt, with Plexiglas trough, wide ranging narrow angle distribution, incl. 2 fluorescent lamps 58 Watt, incl. electronic ballast, light color 25 (universal white), protection IP 55.

#### Design E

Same as design D, however, for 1 fluorescent fixture 58 Watt.

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<h1>USAFE</h1>	REVISION 1	DATE: MAY 2015
	SHEET 2 OF 2 SHEETS	
STANDARD SPECIFICATION	<h2>STS – E 131</h2>	
DESCRIPTION <b>FLUORESCENT FIXTURE</b>	ID-CODE	

Design I

Same as design D, however, as side-mounted light fixture.

The above-mentioned designs include delivery, installation and connection ready for operation.

Legally required evidences included in the scope of delivery:

Evidences required by the General Product Safety Directive (GPSD) and associated regulations (GPSR);

especially:

- EC type test certificate as per Directive 2014/34/EU
- Homologation as per Art. 62 of the German Water Resources Act (WHG) or approval by the construction authorities
- Identification as per Annex II, Item 1.0.5 of the Directive 2014/34/EU
- CE Conformity Sign as per Art. 5 Para. 1 and 2 of the Directive 2014/34/EU
- Specification of the temperature range on the component as per DIN EN 60079 (VDE 0170)

Inspection intervals:

In accordance with the German Ordinance on Industrial Safety and Health (BetrSichV), Art. 16, the operational condition of systems requiring monitoring and their pertaining components must be inspected at regular intervals by a qualified person. The components described in the specifications must be conceived and designed so as to allow inspection intervals **of three years**.

STS-E 0 shall be observed.

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<h1>USAFE</h1>	REVISION 1	DATE: MAY 2015
	SHEET 1 OF 2	
STANDARD SPECIFICATION	<h2>STS – E 133</h2>	
DESCRIPTION <b>ELECTRICAL RADIATOR</b>		ID-CODE

Basic documents:

Regulations for industrial health, facility safety and environmental protection;

especially:

1. General Product Safety Directive (GPSD) and associated regulations (GPSR)  
especially:  
First GPSR: Low-Voltage Directive in combination with Directive 2006/95/EC and others  
Eleventh GPSR: Explosion Protection Directive (ATEX) in combination with Directive 2014/34/EU and others
2. German Ordinance on Industrial Safety and Health (BetrSichV)
3. Directives and regulations of the VDE and DIN / EN
4. Technical Rules for Operational Safety, especially TRBS 1201, TRGS 2152
5. Water Resources Act (WHG)

Design A

Flat converter with facing and room thermostat 230 V/50 Hz, to be delivered and mounted on wall ready for operation incl. connection box and silicone line SiHF. In case of mounting on inflammable material the radiator has to be mounted on a sufficiently large mineral fiber board.

Design	1	2	3	4	5	
-----						
Capacity (W)		600	1000	1500	2000	3000

Design B

Electrical furnace, rectangular shape, for wall mounting, 230 V, 2000 W, incl. protective housing made of solid and perforated steel sheet, varnished with heat-resistant paint, incl. room thermostat, temperature range 5 to 30° C, protection IP 30, to be delivered, mounted and connected ready for operation incl. connection box and silicone line SiHF.

Design C

Small frost protection heater with incorporated overheating protection and thermostat, 230 V, 500 W incl. connection line and plug to be delivered and mounted ready for operation.

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	SHEET 2 OF 2	
STANDARD SPECIFICATION	<h2>STS – E 133</h2>	
DESCRIPTION <b>ELECTRICAL RADIATOR</b>	ID-CODE	

Design D

Water heater with open storage system, 2 kW, 230 V, capacity 5 liter, undersink device, incl. thermostat with freezing protection, continuously adjustable from 35°C to 85°C approx., temperature fuse, replaceable flange for heating element, thermal insulation, signal lamp, connection line and plug to be delivered and mounted ready for operation.

Legally required evidences included in the scope of delivery:

Evidences required by the General Product Safety Directive (GPSD) and associated regulations (GPSR); especially:

- EC type test certificate as per Directive 2014/34/EU
- Homologation as per Art. 62 of the German Water Resources Act (WHG) or approval by the construction authorities
- Identification as per Annex II, Item 1.0.5 of the Directive 2014/34/EU
- CE Conformity Sign as per Art. 5 Para. 1 and 2 of the Directive 2014/34/EU
- Specification of the temperature range on the component as per DIN EN 60079 (VDE 0170)

Inspection intervals:

In accordance with the German Ordinance on Industrial Safety and Health (BetrSichV), Art. 16, the operational condition of systems requiring monitoring and their pertaining components must be inspected at regular intervals by a qualified person. The components described in the specifications must be conceived and designed so as to allow inspection intervals **of three years**.

STS-E 0 shall be observed.

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	SHEET 1 OF 2	
STANDARD SPECIFICATION	<h2>STS – E 134</h2>	
DESCRIPTION		ID-CODE
<b>HORN</b>		

Basic documents:

Regulations for industrial health, facility safety and environmental protection;

especially:

1. General Product Safety Directive (GPSD) and associated regulations (GPSR)  
especially:  
First GPSR: Low-Voltage Directive in combination with Directive 2006/95/EC and others  
Eleventh GPSR: Explosion Protection Directive (ATEX) in combination with Directive 2014/34/EU and others
2. German Ordinance on Industrial Safety and Health (BetrSichV)
3. Directives and regulations of the VDE and DIN / EN
4. Technical Rules for Operational Safety, especially TRBS 1201, TRGS 2152
5. Water Resources Act (WHG)

Design A

Alarm horn, acoustic pressure level approx. 105 dB at a distance of 1 m, Ed = 100 %, 230 V/50 Hz, protection IP 54, to be delivered and installed above the entrance of the electrical room of the filter/manifold station and to be connected ready for operation.

Design B

Alarm horn, acoustic pressure level approx. 105 dB at a distance of 1 m, Ed = 100 %, 230 V/50 Hz, protection IP 54, explosion protection EEx de IIA T3 to be delivered, installed ready for operation and to be connected.

Design C

Magnetic switch for alarm horn control with 1 make contact incl. magnet to be delivered and mounted at the inside of the entrance door to the electrical room and to be connected ready for operation.

Legally required evidences included in the scope of delivery:

Evidences required by the General Product Safety Directive (GPSD) and associated regulations (GPSR);

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STANDARD SPECIFICATION	<h2>STS – E 134</h2>	
DESCRIPTION <b>HORN</b>	ID-CODE	

especially:

- EC type test certificate as per Directive 2014/34/EU
- Homologation as per Art. 62 of the German Water Resources Act (WHG) or approval by the construction authorities
- Identification as per Annex II, Item 1.0.5 of the Directive 2014/34/EU
- CE Conformity Sign as per Art. 5 Para. 1 and 2 of the Directive 2014/34/EU
- Specification of the temperature range on the component as per DIN EN 60079 (VDE 0170)

Inspection intervals:

In accordance with the German Ordinance on Industrial Safety and Health (BetrSichV), Art. 16, the operational condition of systems requiring monitoring and their pertaining components must be inspected at regular intervals by a qualified person. The components described in the specifications must be conceived and designed so as to allow inspection intervals **of three years**.

STS-E 0 shall be observed.

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	SHEET 1 OF 5	
STANDARD SPECIFICATION	<h2>STS – E 135</h2>	
DESCRIPTION <b>EX-PROOF STANDARD UNITS</b>	ID-CODE	

Basic documents:

Regulations for industrial health, facility safety and environmental protection;

especially:

1. General Product Safety Directive (GPSD) and associated regulations (GPSR)  
especially:  
First GPSR: Low-Voltage Directive in combination with Directive 2006/95/EC and others  
Eleventh GPSR: Explosion Protection Directive (ATEX) in combination with Directive 2014/34/EU and others
2. German Ordinance on Industrial Safety and Health (BetrSichV)
3. Directives and regulations of the VDE and DIN / EN
4. Technical Rules for Operational Safety, especially TRBS 1201, TRGS 2152
5. Water Resources Act (WHG)

Design A

Installation switch, surface-mounted device, 1-pole switch-off device

Rated voltage	500 V AC
Rated current	16 A
Explosion protection	EEx de II C T61
Protection type	IP 54 DIN 50 040/IEC-Publ. 529
Casing material	Plastic
Gland screw connection	NW 21

Design B

Same as design A, however, as toggle switch.

Design C

Installation push button, surface-mounted device, 1 make-contact and 1 break-contact

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	SHEET 2 OF 5	
STANDARD SPECIFICATION	<h2>STS – E 135</h2>	
DESCRIPTION <b>EX-PROOF STANDARD UNITS</b>		ID-CODE

Rated voltage	500 V AC
Rated current	4 A
Explosion protection	EEx de II C T6
Protection type	IP 54 DIN 50 040/IEC-Publ. 529
Casing material	Plastic
Gland screw connection	NW 21

#### Design D

Wall socket, 2-pole plug-device + protective wire, i.a.w. EN-CEE-norm and IEC-Publ. 309-1/2.

Operating voltage	230 V AC
Rated current	16 A
Explosion protection	EEx de II C T6
Protection type	IP 54 DIN 50 040/IEC-Publ. 529
Casing material	Insulator

#### Design E

Plug, corresponding to wall socket type D.

Technical data same as design D.

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STANDARD SPECIFICATION	<h2>STS – E 135</h2>	
DESCRIPTION <b>EX-PROOF STANDARD UNITS</b>	ID-CODE	

### Design F

Wall socket, 3-pole plug device + N + protective wire, i.a.w. EN-CEE-norm and IEC-Publ. 309-1/2. 1

Rated voltage	500 V AC
Rated current	32 A
Explosion protection	EEX de II C T6
Protection type	IP 54 DIN 50 0 40/IEC-Publ. 529
Casing material	Insulator

### Design G

Plug, corresponding to wall socket design F.

Technical data same as type F.

### Design H

Branch box with 4 terminals and 1 protection wire terminal, 4 mm<sup>2</sup>, 4 gland screw connections Pg 16.

Rated voltage	500 V AC
Explosion protection	EEx e II T6
Protection type	IP 55 DIN 50 040/IEC-Publ. 529
Casing material	Insulator

### Design I

Terminal box with mounting rail made of steel and 10 line-up terminals, 4 mm<sup>2</sup> (blue), complete with lettering. Protection wire terminal and screwings have to be adapted to the specific requirements.

Explosion protection	EEx eib II C T5
Protection type	IP 54 DIN 50 040/IEC-Publ. 529
Casing material	Plastic

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	SHEET 4 OF 5	
STANDARD SPECIFICATION	<h2>STS – E 135</h2>	
DESCRIPTION <b>EX-PROOF STANDARD UNITS</b>		ID-CODE

### Design K

Same as design I, however, with 20 line-up terminals.

### Design L

Terminal box with mounting rail made of steel and 20 line-up terminals 4 mm<sup>2</sup>, complete with lettering. Protection wire terminals and screwing have to be adapted to the specific requirements.

Rated voltage	500 V AC
Explosion protection	EEx e II T6
Protection type	IP 54 DIN 50 040/IEC-Publ. 529
Casing material	Plastic

### Design M

Same as design L, however, with 30 line-up terminals.

### Design N

Same as design L, however, with 40 line-up terminals.

### Design O

Same as design L, however, with 60 line-up terminals.

Devices have to be delivered, mounted and connected ready-to-operate.

#### Legally required evidences included in the scope of delivery:

Evidences required by the General Product Safety Directive (GPSD) and associated regulations (GPSR); especially:

- EC type test certificate as per Directive 2014/34/EU

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STANDARD SPECIFICATION	<h2>STS – E 135</h2>	
DESCRIPTION <b>EX-PROOF STANDARD UNITS</b>		ID-CODE

- Homologation as per Art. 62 of the German Water Resources Act (WHG) or approval by the construction authorities
- Identification as per Annex II, Item 1.0.5 of the Directive 2014/34/EU
- CE Conformity Sign as per Art. 5 Para. 1 and 2 of the Directive 2014/34/EU
- Specification of the temperature range on the component as per DIN EN 60079 (VDE 0170)

Inspection intervals:

In accordance with the German Ordinance on Industrial Safety and Health (BetrSichV), Art. 16, the operational condition of systems requiring monitoring and their pertaining components must be inspected at regular intervals by a qualified person. The components described in the specifications must be conceived and designed so as to allow inspection intervals **of three years**.

STS-E 0 shall be observed.

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STANDARD SPECIFICATION	<h2>STS – E 136</h2>	
DESCRIPTION		ID-CODE
<b>IN-SITU/REMOTE CONTROL SELECTION</b>		

For in-situ pump control

Basic documents:

Regulations for industrial health, facility safety and environmental protection;

especially:

1. General Product Safety Directive (GPSD) and associated regulations (GPSR)  
especially:  
First GPSR: Low-Voltage Directive in combination with Directive 2006/95/EC and others  
Eleventh GPSR: Explosion Protection Directive (ATEX) in combination with Directive 2014/34/EU and others
2. German Ordinance on Industrial Safety and Health (BetrSichV)
3. Directives and regulations of the VDE and DIN / EN
4. Technical Rules for Operational Safety, especially TRBS 1201, TRGS 2152
5. Water Resources Act (WHG)

Design A

Ex protection : EEX de IIC T6

Protection : IP 54

Housing material : Plastic (RAL 7032)

Installed right up from below:

- 1 ea. key-operated push button, 1 make contact and 1 break contact, lockable lock, unlockable with one key only.  
For each key-operated push button 2 keys are to be delivered  
All key-operated push buttons have the same locking. Lettering of the push button: "In-situ-Remote".
- 1 ea push button, 1 make contact and 1 break contact, lettering of signboard: "O"
- 1 ea push button, 1 make contact and 1 break contact, lettering of signboard: "I"
- 1 ea screw gland NW 21 on housing bottom.

In-situ/remote control selection to be delivered, installed and connected ready for operation.

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STANDARD SPECIFICATION	<h2>STS – E 136</h2>	
DESCRIPTION <b>IN-SITU/REMOTE CONTROL SELECTION</b>		ID-CODE

Design B

Same as design A, however, without key-operated push button

Legally required evidences included in the scope of delivery:

Evidences required by the General Product Safety Directive (GPSD) and associated regulations (GPSR); especially:

- EC type test certificate as per Directive 2014/34/EU
- Homologation as per Art. 62 of the German Water Resources Act (WHG) or approval by the construction authorities
- Identification as per Annex II, Item 1.0.5 of the Directive 2014/34/EU
- CE Conformity Sign as per Art. 5 Para. 1 and 2 of the Directive 2014/34/EU
- Specification of the temperature range on the component as per DIN EN 60079 (VDE 0170)

Inspection intervals:

In accordance with the German Ordinance on Industrial Safety and Health (BetrSichV), Art. 16, the operational condition of systems requiring monitoring and their pertaining components must be inspected at regular intervals by a qualified person. The components described in the specifications must be conceived and designed so as to allow inspection intervals **of three years**.

STS-E 0 shall be observed.

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<h2>STANDARD SPECIFICATION</h2>	<h1>STS – E 137</h1>	
DESCRIPTION <b>EMERGENCY-OFF SWITCH</b>		ID-CODE

Basic documents:

Regulations for industrial health, facility safety and environmental protection;

especially:

1. General Product Safety Directive (GPSD) and associated regulations (GPSR)  
especially:  
First GPSR: Low-Voltage Directive in combination with Directive 2006/95/EC and others  
Eleventh GPSR: Explosion Protection Directive (ATEX) in combination with Directive 2014/34/EU and others
2. German Ordinance on Industrial Safety and Health (BetrSichV)
3. Directives and regulations of the VDE and DIN / EN
4. Technical Rules for Operational Safety, especially TRBS 1201, TRGS 2152
5. Water Resources Act (WHG)

Design A

- 1) EMERGENCY-OFF switch, composed of plastic casing with lock-up door and replaceable glass pane, mushroom push-button with stop, auxiliary contact and display.

Service voltage	:	max 250 V
Contact rating of the auxiliary contact	:	500 W
Current on auxiliary contact	:	2 A
Protection type i.a.w DIN 40 050	:	IP 54
Color mushroom push button	:	red
Color casing	:	yellow
Authorized ambient temperature	:	- 30° to + 70°C
Lettering on casing	:	EMERGENCY-OFF

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<h2>STANDARD SPECIFICATION</h2>	<h1>STS – E 137</h1>	
DESCRIPTION <b>EMERGENCY-OFF SWITCH</b>		ID-CODE

2) Signal transmitter as wall or ceiling light made of light metal casting

Technical data:

Illuminant : 230 V, approx. 10 W; LED  
 Socket : E 27  
 Protection type i.a.w. DIN 40 050 : IP 54  
 Protective glass : made of temperature-resistant red glass

Both devices (EMERGENCY-OFF bush-button and light) have to be mounted as a unit on a galvanized sheet steel or aluminium sheet with rain-proof roof.

To be delivered completely with all accessories, to be wired and mounted ready-to-operate.

#### Design B

Same as design A, however, ex-type, explosion protection EEx de II A T 3.

#### Design C

Same as design A, however, with rectangular tube 70 x 40 mm, length 2,000 mm, closed head end, with mounting plate, made of galvanized sheet steel or aluminum sheet.

All borings and welding works are to be performed before galvanizing.

The mounting height of the emergency-off display is 1400 mm above earth.

The costs for the earth works and a concrete foundation B 25 (400 x 400 x 600 mm) have to be included into calculation of the unit price.

The excess soil is to be levelled laterally or removed gratuitously on request of the construction supervision.

#### Design D

Same as design B, however, with support same as type C.

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<h1>USAFE</h1>	REVISION 1	DATE: MAY 2015
	SHEET 3 OF 3	
STANDARD SPECIFICATION	<h2>STS – E 137</h2>	
DESCRIPTION <b>EMERGENCY-OFF SWITCH</b>	ID-CODE	

Legally required evidences included in the scope of delivery:

Evidences required by the General Product Safety Directive (GPSD) and associated regulations (GPSR);

especially:

- EC type test certificate as per Directive 2014/34/EU
- Homologation as per Art. 62 of the German Water Resources Act (WHG) or approval by the construction authorities
- Identification as per Annex II, Item 1.0.5 of the Directive 2014/34/EU
- CE Conformity Sign as per Art. 5 Para. 1 and 2 of the Directive 2014/34/EU
- Specification of the temperature range on the component as per DIN EN 60079 (VDE 0170)

Inspection intervals:

In accordance with the German Ordinance on Industrial Safety and Health (BetrSichV), Art. 16, the operational condition of systems requiring monitoring and their pertaining components must be inspected at regular intervals by a qualified person. The components described in the specifications must be conceived and designed so as to allow inspection intervals **of three years**.

STS-E 0 shall be observed.

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<h1>USAFE</h1>	REVISION 1	DATE: MAY 2015
	SHEET 1 OF 2	
STANDARD SPECIFICATION	<h2>STS – E 138</h2>	
DESCRIPTION <b>LIMIT SWITCH</b>	ID-CODE	

For the shut-down of the CCP and the grounding of the tank with open sliding cover

Basic documents:

Regulations for industrial health, facility safety and environmental protection;

especially:

1. General Product Safety Directive (GPSD) and associated regulations (GPSR)  
especially:  
First GPSR: Low-Voltage Directive in combination with Directive 2006/95/EC and others  
Eleventh GPSR: Explosion Protection Directive (ATEX) in combination with Directive 2014/34/EU and others
2. German Ordinance on Industrial Safety and Health (BetrSichV)
3. Directives and regulations of the VDE and DIN / EN
4. Technical Rules for Operational Safety, especially TRBS 1201, TRGS 2152
5. Water Resources Act (WHG)

The roller tappet switch installed in a housing with a snap action has a make contact and a break contact.

Type of current:	AC current	DC current
Nominal voltage:	500 V	24 V
Nominal current:	16 A	10 A
Protection acc. to DIN 40 050:	IP 54	
Explosion protection:	EEx de IIC T5 W	

Electrical connection by stirrup clamps up to 2.5 mm<sup>2</sup> with screw glands.

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<h1>USAFE</h1>	REVISION 1	DATE: MAY 2015
	SHEET 2 OF 2	
STANDARD SPECIFICATION	<h2>STS – E 138</h2>	
DESCRIPTION <b>LIMIT SWITCH</b>	ID-CODE	

The delivery includes:

One roller tappet switch, one switching T-bar acc. to standard drawings of the sliding covers incl. mounting and connection works.

Furthermore the scope of delivery includes a contactor with 2 make contacts and 2 break contacts for min. 4mm<sup>2</sup> for the installation in the M+C cabinet.

Source of supply of the switch:

K.A. Schmersal GmbH & Co. KG, Möddinghofe 30, D-42279 Wuppertal  
Positionsschalter mit Sicherheitsfunktion EX-Z1K 335-11Z-3G/D

Legally required evidences included in the scope of delivery:

Evidences required by the General Product Safety Directive (GPSD) and associated regulations (GPSR);

especially:

- EC type test certificate as per Directive 2014/34/EU
- Homologation as per Art. 62 of the German Water Resources Act (WHG) or approval by the construction authorities
- Identification as per Annex II, Item 1.0.5 of the Directive 2014/34/EU
- CE Conformity Sign as per Art. 5 Para. 1 and 2 of the Directive 2014/34/EU
- Specification of the temperature range on the component as per DIN EN 60079 (VDE 0170)

Inspection intervals:

In accordance with the German Ordinance on Industrial Safety and Health (BetrSichV), Art. 16, the operational condition of systems requiring monitoring and their pertaining components must be inspected at regular intervals by a qualified person. The components described in the specifications must be conceived and designed so as to allow inspection intervals **of three years**.

STS-E 0 shall be observed.

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<h1>USAFE</h1>	REVISION 1	DATE: MAY 2015
	SHEET 1 OF 4	
STANDARD SPECIFICATION	<h2>STS – E 140</h2>	
DESCRIPTION <b>MEASURING CABLE CONNECTION</b>		ID-CODE

### General

The connections have to be performed mainly on pipe lines or pipe line sections made of steel and conveying finished mineral oil products with the hazard characteristics R10 (flammable) F (easily flammable) and F\* (highly flammable) and an aromatic content of up to 50%.

The connection points are indicated in the as-to-be-built plans or will be determined at site by a representative of the contracting agency.

Welding works are subject to welding supervision. Welding works may be executed by skilled workers only.

The welding joint must be faultless. It must be verified by ultrasonic testing with regard to defects in the outer shell or double draws. If a wall thickness of less than 4 mm is detected a double draw can be assumed. In this case an appropriate welding point has to be determined and the site supervision must be informed.

In the area of the connection point the stripped pipe surface has to be cleaned to white metal with appropriate tools.

The bolt connection point must be dry before welding and the distance to the next round seam must be at least 100 mm.

### Design A

#### Stud welding

The corresponding welding stud of stainless steel with external thread M 6 to be welded on steel pipeline.

Cable connection to be performed acc. to sketch sheet 5.

The following instructions are to be observed:

1. The corresponding sections of DIN EN 14555 have to be met.
2. Cable at the connection point to be installed in form of a loop, to be fixed with insulating band. At the connection point double-layered bitumen or plastic band (0.2 mm thickness) has to be wrapped around the whole pipe with 50 % overlap. The cavities between the fuel pipeline, the cable and the connection point have to be filled with plastic material to obtain a smooth subsurface of the insulating band. Generally the measuring cable type NYY-0 2 x 2.5 mm<sup>2</sup> is used. The welding-on of both welding studs including the connection of the measuring cable is considered as one measuring cable connection.

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<h1>USAFE</h1>	REVISION 1	DATE: MAY 2015
	SHEET 2 OF 4	
STANDARD SPECIFICATION	<h2>STS – E 140</h2>	
DESCRIPTION <b>MEASURING CABLE CONNECTION</b>		ID-CODE

### Design B

#### Measuring contact bolts on steel pipeline

##### I. Mechanical works

Measuring contact bolts made of steel St 37 to be delivered and welded on to the steel pipeline acc. to sketch sheet 4. The 10 mm bore holes have to be tinned before welding.

After welding the pipe insulation has to be insulated until the measuring contacts with an appropriate insulation material incl. delivery of required material.

##### II. Electrical portion

The electrical connection has to be performed acc. to sketch.

The welding-on of both measuring bolts incl. connection of the measuring cable is considered as one measuring connection.

### Design C

#### Screwed connection to steel strip

Remove measuring cable and screw on steel strip or connecting angle and secure against loosening. Insulate connection point by means of plastic band of 0.2 mm thickness with 50 % overlap.

#### Inspection intervals:

In accordance with the German Ordinance on Industrial Safety and Health (BetrSichV), Art. 16, the operational condition of systems requiring monitoring and their pertaining components must be inspected at regular intervals by a qualified person. The components described in the specifications must be conceived and designed so as to allow inspection intervals **of three years**.

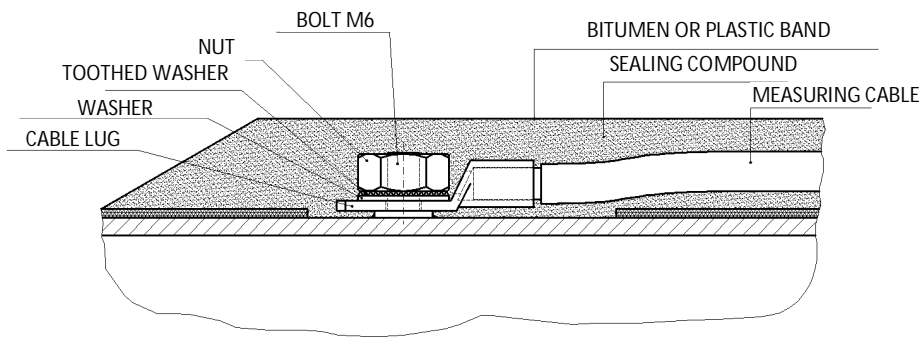
STS-E 0 must be adhered to.

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<h1>USAFE</h1>	REVISION 1	DATE: MAY 2015
	SHEET 3 OF 4	
STANDARD SPECIFICATION	<h2>STS – E 140</h2>	
DESCRIPTION	ID-CODE	
<b>MEASURING CABLE CONNECTION</b>		

DESIGN A:

MEASURING CABLE CONNECTION ON STEEL PIPELINE ( STUD WELDING PROCEDURE )



MATERIALS:

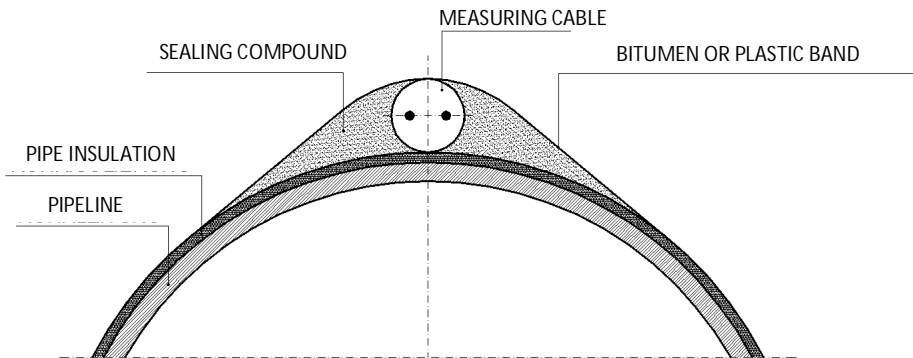
BOLTS:

Cr-Ni-STEEL

NUT, TOOTH LOCK WASHER, WASHER: Cr-Ni-STEEL AND/OR CHROMED OR NICKEL-PLATED

CABLE SHOE:

E-Cu, GALVANIZED

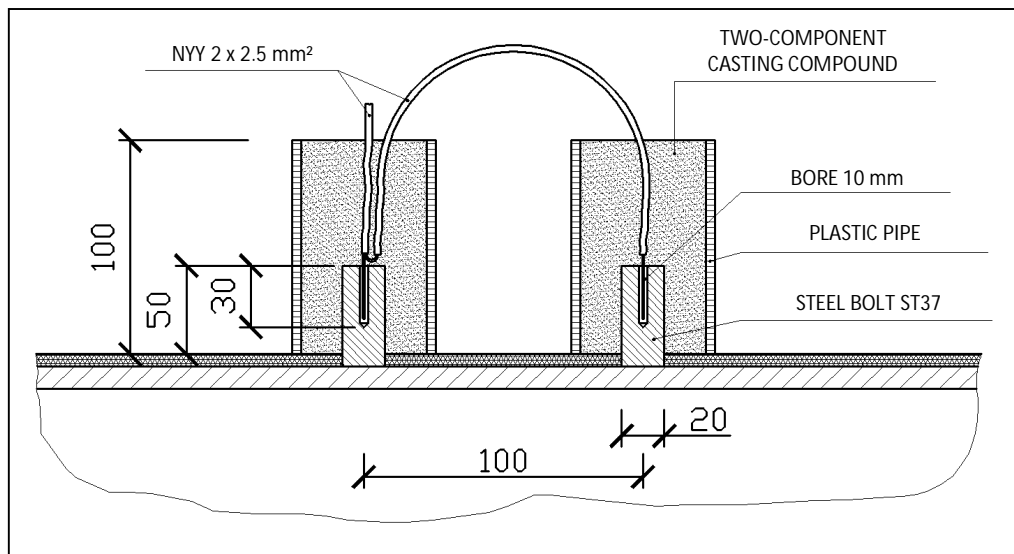
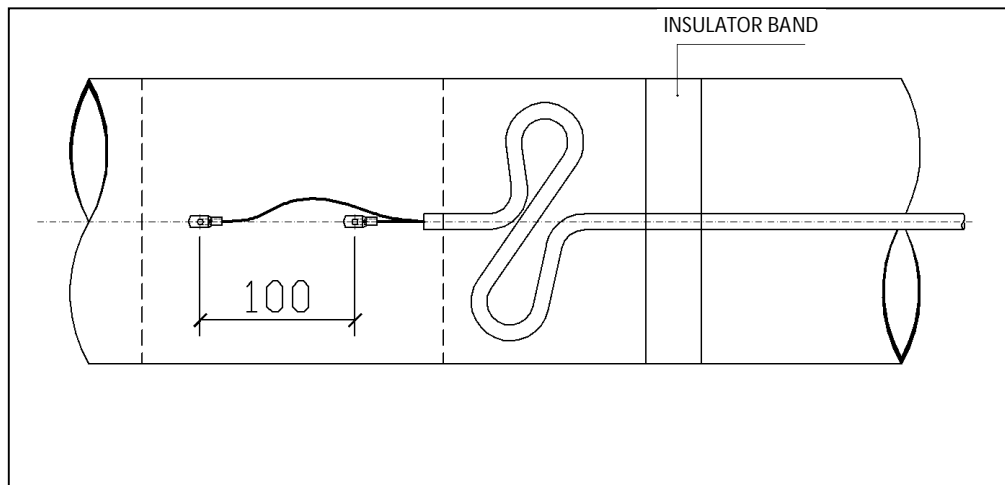


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STANDARD SPECIFICATION	<h2>STS – E 140</h2>	
DESCRIPTION	ID-CODE	
<b>MEASURING CABLE CONNECTION</b>		

Design B



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<h1>USAFE</h1>	REVISION 1	DATE: MAY 2015
	SHEET 1 OF 4	
<h2>STANDARD SPECIFICATION</h2>	<h1>STS – E 141</h1>	
DESCRIPTION <b>MEASURING POINT FOR CATHODIC PROTECTION</b>		ID-CODE

Basic documents:

Regulations for industrial health, facility safety and environmental protection;

especially:

1. General Product Safety Directive (GPSD) and associated regulations (GPSR)  
especially:  
First GPSR: Low-Voltage Directive in combination with Directive 2006/95/EC and others  
Eleventh GPSR: Explosion Protection Directive (ATEX) in combination with Directive 2014/34/EU and others
2. German Ordinance on Industrial Safety and Health (BetrSichV)
3. Directives and regulations of the VDE and DIN / EN
4. Technical Rules for Operational Safety, especially TRBS 1201, TRGS 2152
5. Water Resources Act (WHG)

Design A

Above-ground measuring point of stainless steel, protection IP 54, introduction of cables from below, line-up terminals, each with 1 short circuit-proof isolator and 2 test sockets with an inside diameter of 4 mm, mounting rail, lettering of the connections and terminals, identification of measuring point with a multi-layer astralon signboard with engraved text (see sheet 3).

The size and number of housings depend on the number of line-up terminals and screwed cable connections indicated in the standard specification, considering a space reserve of 10 %.

The measuring point will be mounted on the concrete wall outside ex-area.

The works include delivery, installation, wiring as well as connection works ready for operation.

Design B

Above-ground measuring point same as design A, however, with a supporting structure of approx. 5.50 m hot-galvanized rectangular tubes with rounded edges 60 x 60 x 4 mm and 1.50 m profile 60 x 30 x 6 mm as crosshead for the mounting of cables and protective tubes.

All drilling and welding work shall be completed before galvanization.

Install 2 foundation bases 40 x 40 x 80 of concrete B 25. The upper 20 cm of the base are to be executed as exposed concrete.

The required excavation work refers to the soil classes 3 to 5 acc. to DIN 18 300, the backfilling, the levelling and/or hauling off of surplus soil are to be included in the unit price.

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<h1>USAFE</h1>	REVISION 1	DATE: MAY 2015
	SHEET 2 OF 4	
STANDARD SPECIFICATION	<h2>STS – E 141</h2>	
DESCRIPTION		ID-CODE
<b>MEASURING POINT FOR CATHODIC PROTECTION</b>		

### Design C

Above-ground measuring point of glass fiber-reinforced polyester resin with line-up terminals with sockets for test plugs, 4 mm Ø, incl. mounting rail with lettering, lock-up shutter, signboards of multi-layer astralon with designation (see sheet 4), incl. concrete base of B 25, dimensions 40 x 40 x 60 cm, to be delivered, installed and connect ready for operation. The upper 10 cm of the concrete base are to be executed as exposed concrete.

The required excavation work refers to the soil classes 3 to 5 acc. to DIN 18 300, the backfilling, the leveling and/or the hauling off of surplus soil are to be included in the unit price.

### Design D

Above-ground measuring point as precast concrete part, dimensions: height 1350 mm, width 210 mm, depth 130 mm incl. concrete slab, opening for entering cables, terminal box with terminal board of plastic and 6 ea. pole terminals, protection IP 54. The concrete inside the soil has to be coated with Inertol, to be completely delivered, to be mounted ready-to-operate and to be connected.

The required excavation work refers to the soil classes 3 to 5 acc. to DIN 18 300, the backfilling, the levelling and/or the hauling-off of surplus soil are to be included in the unit price.

The height of the measuring point has to be agreed on site with the user. It may vary from 40 to 80 cm.

### Design E

Above-ground measuring point of glass fiber-reinforced polyester resin light grey. Length 2500 mm, diameter 110 mm.

Every 15 cm a weatherproof plastic tape of 15 cm width, color: red-orange RAL 3026, has to be wrapped around the pipe (all in all three stripes). Complete with 6 line-up terminals with sockets for test plugs, 4 mm Ø, incl. mounting rail, lettering, lock-up shutter, 1 signboard (outside) mounted, made of multi-layer plastics with designation acc. to sheet 4 and 1 signboard made of multi-layer plastics (white with black inscription)

eg. Potential Measuring Point

terminal 1/2 pipeline  
terminal 3/4 casing pipe  
terminal 5/6 grounding

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<h2>STANDARD SPECIFICATION</h2>	<h1>STS – E 141</h1>	
DESCRIPTION	ID-CODE	
<b>MEASURING POINT FOR CATHODIC PROTECTION</b>		

eg. Pipe Current Measuring Point

terminal 1/2 pipeline direction . . . . .  
terminal 3/4 pipeline direction . . . . .  
terminal 5/6 casing pipe  
terminal 7/8 grounding

inside the measuring point, incl. base of concrete B 25, dimensions 40 x 40 x 40, to be delivered, mounted ready-to-operate and connected.

The required excavation work refers to the soil classes 3 to 5 acc. to DIN 18 300, the backfilling, the levelling and/or the hauling-off of surplus soil are to be included in the unit price. The measuring points must be installed immediately above the pipeline.

Design F

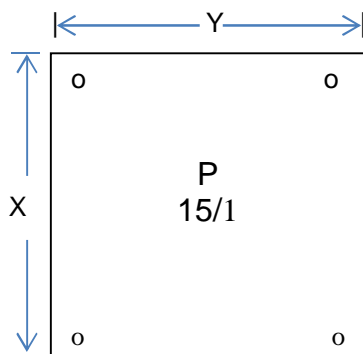
Transportable measuring point for hydrant pit, consisting of:

- ex-terminal box made of impact-resistant plastics, with 4 line-up terminals 4 mm<sup>2</sup> with bridges, trumpet-type screwed couplings PG 21
- 8 m cable NSSHÖU-J 5 x 2.5 mm<sup>2</sup> Cu
- suspension and transportation handle

Rated voltage 500 V AC/DC  
Explosion protection EEK e IIC T6  
Protection type IP 65 DIN 50 040/IEC Publ. 529

Measuring point to be delivered, installed, and connected ready-to-operate.

Signboard for above-ground measuring point:



The measures X and Y can be taken from the measuring pole.

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<h1>USAFE</h1>	REVISION 1	DATE: MAY 2015
	SHEET 4 OF 4	
STANDARD SPECIFICATION	<h2>STS – E 141</h2>	
DESCRIPTION <b>MEASURING POINT FOR CATHODIC PROTECTION</b>		ID-CODE

The signboard should be made of multi-layer plastic material (white with black lettering) and be fixed with rivets made of stainless steel.

Minimum letter height: 15 mm

Legend:

P	=	Potential measuring point
PC	=	Potential and pipe current measuring point
PP	=	Potential and protective pipe measuring point
PPC	=	Potential, protective pipe and pipe current measuring point
PEL	=	Potential and external line measuring point
PR	=	Potential measuring point in rectifier cabinet
PCR	=	Potential and pipe current measuring point in rectifier cabinet
PPR	=	Potential and protective pipe measuring point in rectifier cabinet
PPEL	=	Potential-, protective pipe and external line measuring point

The numbering should be coordinated with the contracting agency.

Legally required evidences included in the scope of delivery:

Evidences required by the General Product Safety Directive (GPSD) and associated regulations (GPSR);

especially:

- EC type test certificate as per Directive 2014/34/EU
- Homologation as per Art. 62 of the German Water Resources Act (WHG) or approval by the construction authorities
- Identification as per Annex II, Item 1.0.5 of the Directive 2014/34/EU
- CE Conformity Sign as per Art. 5 Para. 1 and 2 of the Directive 2014/34/EU
- Specification of the temperature range on the component as per DIN EN 60079 (VDE 0170)

Inspection intervals:

In accordance with the German Ordinance on Industrial Safety and Health (BetrSichV), Art. 16, the operational condition of systems requiring monitoring and their pertaining components must be inspected at regular intervals by a qualified person. The components described in the specifications must be conceived and designed so as to allow inspection intervals **of three years**.

STS-E 0 must be adhered to.

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<h1>USAFE</h1>	REVISION 1	DATE: MAY 2015
	SHEET 1 OF 4	
STANDARD SPECIFICATION	<h2>STS – E 142</h2>	
DESCRIPTION <b>ANODES</b>	ID-CODE	

Basic documents:

Regulations for industrial health, facility safety and environmental protection;

especially:

1. General Product Safety Directive (GPSD) and associated regulations (GPSR)  
especially:  
First GPSR: Low-Voltage Directive in combination with Directive 2006/95/EC and others  
Eleventh GPSR: Explosion Protection Directive (ATEX) in combination with Directive 2014/34/EU and others
2. German Ordinance on Industrial Safety and Health (BetrSichV)
3. Directives and regulations of the VDE and DIN / EN
4. Technical Rules for Operational Safety, especially TRBS 1201, TRGS 2152
5. Water Resources Act (WHG)

Design A

Iron silicon anode, weighing 3.0 kg, length approx. 0.50 m, cone-shaped

Connection cable of 5 m length, type adapted to the anode collecting cable, resin sealed anode head.

The anodes are installed in vertical position. Their locations are indicated in the layout and the terminal assignment plan. Installation to be performed acc. to enclosed sketch. The bore hole diameter must be approx. 30 cm. The hole must be deep enough to allow an anode covering of 1 m. The bedding has to be performed with of coke (grain size: 4).

For earth works the soil classes 3 to 5 shall be assumed.

All works required for the installation (such as hauling-off of surplus soil, restoration of the former surface, etc.) have to be included in the price.

Design B

As design A, however, installed horizontally.

Design C

Iron silicon anode, weighing 3.0 kg, length approx. 0.50 m, cone-shaped, embedded in sheet metal pipe Ø 195 x 1,200 mm with vibrated crushed coke (grain size: 4), installation position horizontal.

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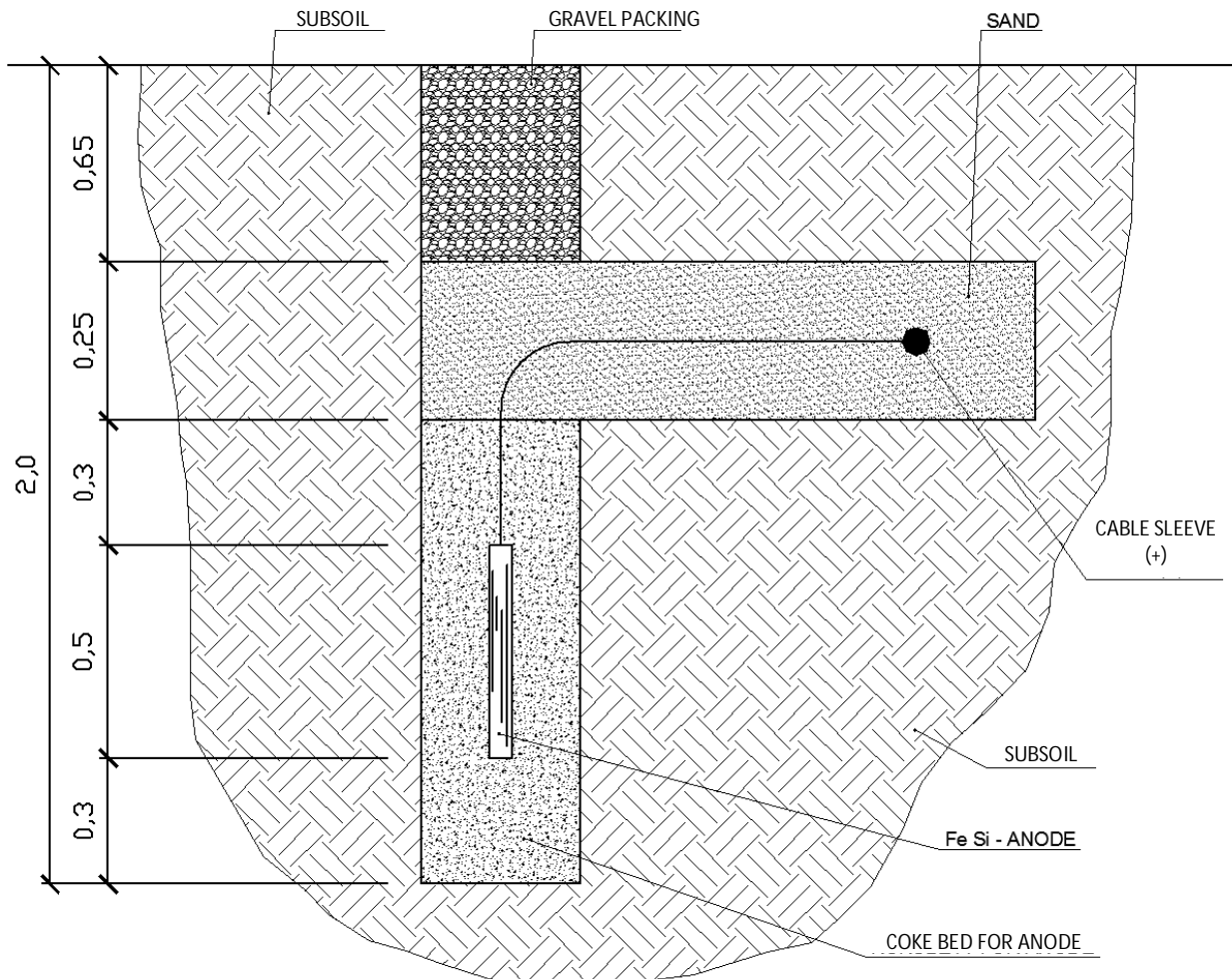


<h1>USAFE</h1>	REVISION 1	DATE: MAY 2015
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STANDARD SPECIFICATION	<h2>STS – E 142</h2>	
DESCRIPTION <b>ANODES</b>	ID-CODE	

Design D

Magnesium underground anode for the discharge of the fault current if a fault current protective circuit is tripped for tanks with cathodic protection.

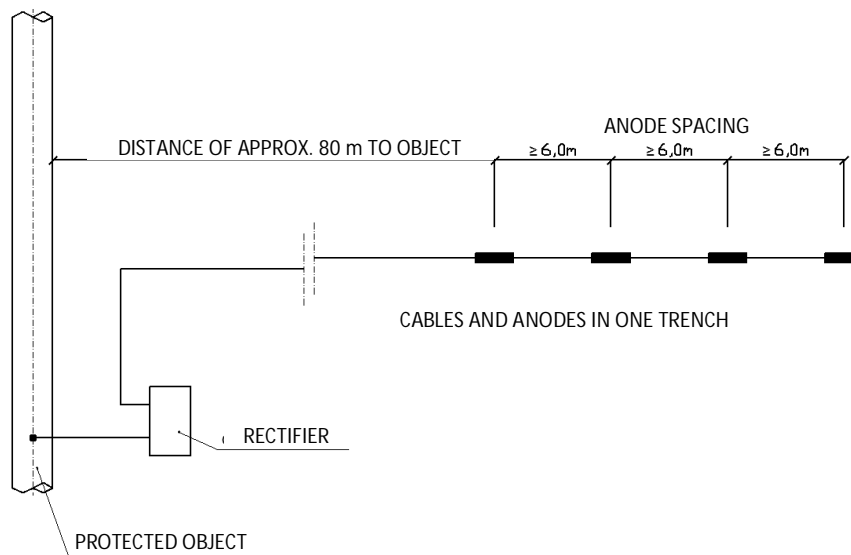
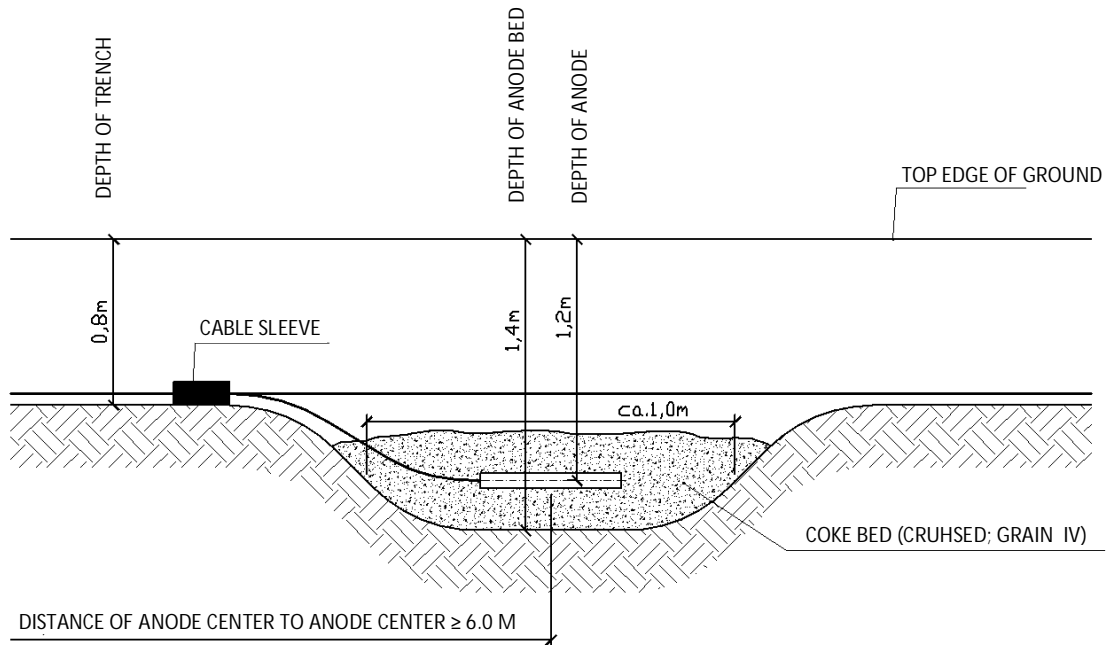
Magnesium underground anode weighing 5 kg, installed in bedding material (backfill) in textile bag, with factory-mounted cable NYY-0 2 x 2.5 mm<sup>2</sup>, to be delivered and installed in outside area of filter/manifold station, in a depth of 2 m, incl. soil excavation, backfilling, and laying of the connecting cable into the filter/manifold station. The anode bedding shall be wetted thoroughly.



THE BORE HOLES IN THE SOIL FOR THE INSTALLATION OF ANODES MUST HAVE A DIAMETER OF AT LEAST 300 mm.

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<h1>USAFE</h1>	REVISION 1	DATE: MAY 2015
	SHEET 3 OF 4	
STANDARD SPECIFICATION	<h2>STS – E 142</h2>	
DESCRIPTION <b>ANODES</b>	ID-CODE	



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	SHEET 4 OF 4	
STANDARD SPECIFICATION	<h2>STS – E 142</h2>	
DESCRIPTION <b>ANODES</b>	ID-CODE	

Inspection intervals:

In accordance with the German Ordinance on Industrial Safety and Health (BetrSichV), Art. 16, the operational condition of systems requiring monitoring and their pertaining components must be inspected at regular intervals by a qualified person. The components described in the specifications must be conceived and designed so as to allow inspection intervals **of three years**.

STS-E 0 shall be observed.

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<h1>USAFE</h1>	REVISION	DATE:
	SHEET 1 OF 2	
<h2>STANDARD SPECIFICATION</h2>	<h1>STS – E 143</h1>	
DESCRIPTION <b>RECTIFIER</b>	ID-CODE	

Basic documents:

Regulations for industrial health, facility safety and environmental protection; especially:

1. General Product Safety Directive (GPSD) and associated regulations (GPSR) especially:  
First GPSR: Low-Voltage Directive in combination with Directive 73/23/EEC and others  
Eleventh GPSR: Explosion Protection Directive (ATEX) in combination with Directive 94/9/EC and others
2. German Ordinance on Industrial Safety and Health (BetrSichV)
3. Directives and regulations of the VDE and DIN / EN
4. Technical Rules for Operational Safety, especially TRBS 1201, TRGS 2152
5. Water Resources Act (WHG)

Design A

Rectifier with housing JP 20 incl. door, electric mains 230 V, 50 Hz, with a capacity of 200 W, consisting of:

Steel sheet housing for wall mounting with door. Equipped with ammeter and voltmeter, test sockets for protective current.

Equipment protection above transformer circuit breaker at the entrance and fuse at the exit.

- 1 ea automatic circuit breaker 10 A for receptacle
- 1 ea automatic circuit breaker 6 A for rectifier
- 1 ea receptacle 16 A, 250 V
- 1 ea safety transformer acc. to VDE 0551,-  
0,3,  
continuously adjustable
- 1 ea rectifier set
- 2 ea overvoltage arresters 230 V between + and - outlet and between - protected object and + rectifier housing for overvoltage protection of the equipment
- 1 ea voltmeter with moving coil system, full scale deflection 20 V, class 1.5
- 1 ea current meter with moving coil system, full scale deflection, e.g. 1 A (the meter has to be adapted to the required input current), class 1.5 incl. shunt
- 1 ea voltmeter with moving coil system (for pipe/soil potential measuring), full scale deflection 2.5 V, class 1.5, internal resistance 100 K, connection through one-channel push button.

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STANDARD SPECIFICATION	<h2>STS – E 143</h2>	
DESCRIPTION <b>RECTIFIER</b>	ID-CODE	

4 ea test jacks to measure the protective current and protective voltage

1 ea AC current meter 1 A, 230 V, incl. mounting plate.

to be delivered completely, mounted in the building and connected ready-to-operate.

### Design B

Same as design A, however with a weather-proof equipment cabinet made of stainless steel, protection JP 54, incl. foundation and earth works.

### Legally required evidences included in the scope of delivery:

Evidences required by the General Product Safety Directive (GPSD) and associated regulations (GPSR);

especially:

- EC type test certificate as per Directive 94/9/EC
- Homologation as per Art. 62 of the German Water Resources Act (WHG) or approval by the construction authorities
- Identification as per Annex II, Item 1.0.5 of the Directive 94/9/EC
- CE Conformity Sign as per Art. 5 Para. 1 and 2 of the Directive 94/9/EC
- Specification of the temperature range on the component as per DIN EN 60079 (VDE 0170)

### Inspection intervals:

In accordance with the German Ordinance on Industrial Safety and Health (BetrSichV), Art. 15, the operational condition of systems requiring monitoring and their pertaining components must be inspected at regular intervals by an authorized inspection body. The components described in the specifications must be conceived and designed so as to allow inspection intervals **of five years**.

STS-E 0 shall be observed.

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<h2>STANDARD SPECIFICATION</h2>	<h1>STS – E 143</h1>	
DESCRIPTION <b>RECTIFIER</b>	ID-CODE	

Basic documents:

Regulations for industrial health, facility safety and environmental protection; especially:

1. General Product Safety Directive (GPSD) and associated regulations (GPSR) especially:  
First GPSR: Low-Voltage Directive in combination with Directive 2006/95/EC and others  
Eleventh GPSR: Explosion Protection Directive (ATEX) in combination with Directive 2014/34/EU and others
2. German Ordinance on Industrial Safety and Health (BetrSichV)
3. Directives and regulations of the VDE and DIN / EN
4. Technical Rules for Operational Safety, especially TRBS 1201, TRGS 2152
5. Water Resources Act (WHG)

Design A

Rectifier with housing JP 20 incl. door, electric mains 230 V, 50 Hz, with a capacity of 200 W, consisting of:

Steel sheet housing for wall mounting with door. Equipped with ammeter and voltmeter, test sockets for protective current.

Equipment protection above transformer circuit breaker at the entrance and fuse at the exit.

- 1 ea automatic circuit breaker 10 A for receptacle
- 1 ea automatic circuit breaker 6 A for rectifier
- 1 ea receptacle 16 A, 250 V
- 1 ea safety transformer acc. to VDE 0551, continuously adjustable
- 1 ea rectifier set
- 2 ea overvoltage arresters 230 V between + and - outlet and between - protected object and + rectifier housing for overvoltage protection of the equipment
- 1 ea voltmeter with moving coil system, full scale deflection 20 V, class 1.5
- 1 ea current meter with moving coil system, full scale deflection, e.g. 1 A (the meter has to be adapted to the required input current), class 1.5 incl. shunt
- 1 ea voltmeter with moving coil system (for pipe/soil potential measuring), full scale deflection 2.5 V, class 1.5, internal resistance 100 K, connection through one-channel push button.

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STANDARD SPECIFICATION	<h2>STS – E 143</h2>	
DESCRIPTION <b>RECTIFIER</b>	ID-CODE	

4 ea test jacks to measure the protective current and protective voltage

1 ea AC current meter 1 A, 230 V, incl. mounting plate.

to be delivered completely, mounted in the building and connected ready-to-operate.

### Design B

Same as design A, however with a weather-proof equipment cabinet made of stainless steel, protection JP 54, incl. foundation and earth works.

### Legally required evidences included in the scope of delivery:

Evidences required by the General Product Safety Directive (GPSD) and associated regulations (GPSR);

especially:

- EC type test certificate as per Directive 2014/34/EU
- Homologation as per Art. 62 of the German Water Resources Act (WHG) or approval by the construction authorities
- Identification as per Annex II, Item 1.0.5 of the Directive 2014/34/EU
- CE Conformity Sign as per Art. 5 Para. 1 and 2 of the Directive 2014/34/EU
- Specification of the temperature range on the component as per DIN EN 60079 (VDE 0170)

### Inspection intervals:

In accordance with the German Ordinance on Industrial Safety and Health (BetrSichV), Art. 16, the operational condition of systems requiring monitoring and their pertaining components must be inspected at regular intervals by a qualified person. The components described in the specifications must be conceived and designed so as to allow inspection intervals **of three years**.

STS-E 0 shall be observed.

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	SHEET 1 OF 3	
<h2>STANDARD SPECIFICATIONS</h2>	<h1>STS – M</h1>	
Title		CODE
<b>LIST OF STANDARD SPECIFICATIONS ON-BASE</b>		

STS-.....	Titel	Kurz- zeichen	Rev.	Stand
I 1*	Commissioning of a refuelling system		1	MAY 2015
H 0	Turnover Documents		1	MAY 2015
M 0	General conditions and explications		1	MAY 2015
M 1	Hydraulic control valves		1	MAY 2015
M 8	Sump pump 12 m <sup>3</sup> /h	P	1	MAY 2015
M 11	Roof Ventilator	VL	1	MAY 2015
M 12	Pipe Ventilator	VL	1	MAY 2015
M 14	Steel Pipes		1	MAY 2015
M 15	Steel Elbows		1	MAY 2015
M 16	Steel Pipe Fittings		1	MAY 2015
M 17	Welding Neck Flanges Made of Steel		1	MAY 2015
M 18	Blind Flanges Made of Steel		1	MAY 2015
M 19	Stainless Steel Pipes		1	MAY 2015
M 20	Stainless Steel Elbows		1	MAY 2015
M 21	Stainless Steel Fittings		1	MAY 2015
M 23	Welding Neck Flanges (Stainless Steel)		1	MAY 2015
M 24	Blind Flanges (Stainless Steel)		1	MAY 2015
M 33	Pump Start Valve with Flow Limitation	CVTF	1	MAY 2015
M 37	Pressure Control Valve	CVP	1	MAY 2015
M 41	High Level Check Valve	HLV	1	MAY 2015
M 42	Single plait gate valve	GV	1	MAY 2015
M 43	Coating of System Components		1	MAY 2015
M 44	Gate Valve (Steel)	GV	1	MAY 2015
M 45	Gate Valve (Stainless Steel)	GV	1	MAY 2015
M 46	Ball Valve (Steel)	BV	1	MAY 2015
M 47	Ball Valve (Stainless Steel)	BV	1	MAY 2015
M 48	Check Valve (Steel)	CV	1	MAY 2015
M 49	Check Valve Funnel Line	CV	1	MAY 2015
M 50	Ball Valve, double block and bleed (Stainless steel)	BV	1	MAY 2015
M 51	Pressure-Relief Valve (Stainless steel)	PRV	1	MAY 2015
M 52	Pressure relief valve (Steel)	PRV	1	MAY 2015
M 53	Dirt Trap	DT	1	MAY 2015
M 54	Pressure Relief Vacuum Valve	PRVV	1	MAY 2015
M 55	Gauging and Sampling Hatch		1	MAY 2015
M 56	Guidance for Gauging Tape and Sampling Vessel		1	MAY 2015
M 57	Safety Device against Detonation Liquid Type	SDL	1	MAY 2015

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Title		CODE
<b>LIST OF STANDARD SPECIFICATIONS ON-BASE</b>		

STS-.....	Titel	Kurz- zeichen	Rev.	Stand
M 58	Safety Device against Detonation Liquid Type (for fill line only)	SDL	1	MAY 2015
M 59	Safety device against detonation dry type	SDD	1	MAY 2015
M 60	Ventilation cap	VC	1	MAY 2015
M 61	Inspection glas	IG	1	MAY 2015
M 62	Dry explosion and detonation arrestor	SDD	1	MAY 2015
M 63	Insulation flange set with ex-proof spark gap	IF	1	MAY 2015
M 64	Machine screws, nuts		1	MAY 2015
M 65	Flat gasket		1	MAY 2015
M 66	Surface protection of exposed system parts by coating		1	MAY 2015
M 67	Interior coating of tanks		1	MAY 2015
M 68	Exterior insulation of steel tanks		1	MAY 2015
M 69	Factory insulation with synthetic material		1	MAY 2015
M 70	Site insulation - plastic		1	MAY 2015
M 71	Welding connections (Steel and stainless steel)		1	MAY 2015
M 72	Surface protection steel tank		1	MAY 2015
M 73	Non-destructive testing of welding connections		1	MAY 2015
M 74	Pressure test of welded pipeline		1	MAY 2015
M 75	Insulation testing		1	MAY 2015
M 76	Information Signs and Name Plates		1	MAY 2015
M 77	Foot valve	FV	1	MAY 2015
M 79	Gauging and sampling well for level indicator with gauging table		1	MAY 2015
M 79A	Guide tube for filling level indicator without gauging table		1	MAY 2015
M 80	Insulation coupling (insulation piece) with Ex-spark gap	IC	1	MAY 2015
M 84	Blank	SPL	1	MAY 2015
M 86	Pressure gauge stopcock	PC	1	MAY 2015
M 87	Pressure gauge	PI	1	MAY 2015
M 88	Differential pressure gauge	PDI	1	MAY 2015
M 89	Flow switch (Pendulum type)	FS	1	MAY 2015
M 90	Flow switch (Valve type)	FS	1	MAY 2015
M 103	Steel tank 5000 m <sup>3</sup> , 2500 m <sup>3</sup> , 1250 m <sup>3</sup>		1	MAY 2015
M 105	Fuel pump – vertical (discharge)	P	1	MAY 2015
M 112	Safety device against detonation, liquid type	SDL	1	MAY 2015
M 113	Precision pressure gauge	PI	1	MAY 2015
M 115	Sealing for pipe penetration		1	MAY 2015
M 116	Sealing collar		1	MAY 2015
M 119	Flow meter (stainless steel)	FQ	1	MAY 2015

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Title		CODE
<b>LIST OF STANDARD SPECIFICATIONS ON-BASE</b>		

STS-.....	Titel	Kurz- zeichen	Rev.	Stand
M 122	Tank truck loading valve	TLV	1	MAY 2015
M 124	Pipe Fasteners and Pipe Supports Inside of Structures		1	MAY 2015
M 125	Coupling connection	C	1	MAY 2015
M 126	Filter water separator (horizontal)	FSR	1	MAY 2015
M 129	Volumeter (aluminum)	FQ	1	MAY 2015
M 130	Volumeter (steel)	FQ	1	MAY 2015
M 131	Strainer basket	CF	1	MAY 2015
M 132	Ventilation systems		1	MAY 2015
M 135	Cleaning and degassing of storage and service tanks		1	MAY 2015
M 137	Drain Pump 10 m³/h	P	1	MAY 2015
M 138	Aircraft refuelling valve	RCV	1	MAY 2015
M 143	Refuelling arm (stationary) (in-shelter refuelling)		1	MAY 2015
M 144	Refuelling arm (mobile) (underwing refuelling)		1	MAY 2015
M 145	Refuelling arm (mobile) (refuelling of wide-bodied aircrafts)		1	MAY 2015
M 146	Refuelling arm (stationary) (refuelling of wide-bodied aircrafts)		1	MAY 2015
M 147	Refuelling arm (retractable)		1	MAY 2015
M 148	Refuelling arm (stationary) (hot refuelling of tactical aircrafts)		1	MAY 2015
M 150	Refuelling arm (stationary) (hot refuelling of helicopters)		1	MAY 2015
M 158	Bypass control valve with flow limitation	BCVF	1	MAY 2015
M 159	High-level shut-off valve for drain tank	HLVD	1	MAY 2015
M 160	Backpressure control valve	BPCV	1	MAY 2015
M 162	Flushing valve	FLV	1	MAY 2015
M 164	Hydrant valve with venturi control	HVV	1	MAY 2015
M 165	Refuelling valve with venturi control	RCVV	1	MAY 2015
M 166	Filter water separator valve with differential pressure shut-off	QVFD	1	MAY 2015
M 167	Volumeter for refuelling arm		1	MAY 2015
M 168	Single point receptacle	SPR	1	MAY 2015
M 200	Steel tank (double-shelled)		1	MAY 2015
M 201	Steel tank (double-shell type), diesel storage tank		1	MAY 2015
M 202	Above-ground steel tank (double-walled), diesel fuel storage tank		1	MAY 2015

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<h2>STANDARD SPECIFICATION</h2>	<h1>STS – HO</h1>	
DESCRIPTION		ID-CODE
<b>TURNOVER DOCUMENTS (Structure and Content)</b>		

This specification includes the description of structure and content of the turnover documents which have to be prepared and recorded by the contractor in the course of the retaining. The requirements mentioned herein are minimum requirements so that they must be guaranteed by the contractor.

All costs, especially for preparation, registration, structuring, compilation, reproduction and filing of the turnover documents in the required form have to be included in the price.

The structure of the transfer documents will be given to the contractor as **project-specific directory structure on CD /DVD**. The requested legal and specialized documents have to be filed in this given project-specific directory structure. Deviations from this directory structure are permitted after written approval of the contracting agency only.

To avoid registration errors, the construction-related registration must be regularly coordinated with the overall site supervision/the site supervision of the contracting agency. The construction-related registration of the transfer documents has to be enclosed to the partial invoices acc. to the given directory structure on CD or DVD. **If transfer documents belonging to a component are not registered, no approval will be given in the course of the partial payment processing.**

The complete turnover documents are:

1. to be handed over **digitally** to the contracting agency in the given directory structure acc. to the registration rules of this specification on CD or DVD.
2. to be handed over to the contracting agency in **paper form 3-fold** in accordingly labelled folders DIN A4. The plastic holders must have insertable spine labels, edge protection, 4-ring precision mechanics, hold-down and finger-hole. The list of content for the paper copies has to be prepared analogously to the directory structure (see chapter 2). Acc. to this list of content the documents have to be filed with labelled separator sheets DIN A4. The color of the plastic folders has to be coordinated with the contracting agency. The separator sheets have to be delivered in good quality (grammage 200 g/qm).
3. The overview isometry is also part of the transfer documents. It has to be installed in the filter/manifold station acc. to instructions of the contracting agency. The scope for work for the overview isometry is described in the following:

Prepare of an overview isometry of the complete facility with descriptions of operating processes (bilingual, native language and English). The different operating paths have to be colored in the isometry.

The operating processes (instruction manual) for the mechanical part have to be listed on a separate sheet.

Size of isometrie: DIN A 0

Size operating processes: DIN A I (upright)

Scope of delivery:

5 colored copies each (lightfast), welded in foil. One copy each has to be put under glass, with alu-frame and fixed in the filter/manifold station. The digital original file (dwg) as well as the Pdf file have also to be filed in the directory structure and handed over on CD or DVD.

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DESCRIPTION		ID-CODE
<b>TURNOVER DOCUMENTS (Structure and Content)</b>		

**At least 14 days prior to the acceptance**, the complete turnover documents **have to be submitted to the site supervision**, because POL-facilities may not be operated without the corresponding turnover documents and documentation (for ex. functional and operating instructions).

The acceptance can be performed only after submission of complete and correct turnover documents.

### 1.0 Project-specific directory structure:

The turnover documents must be recorded acc. to a project-specific directory structure. The top level of this directory structure is always a **real estate** (for ex. Ramstein Air Base), followed by the subdirectories

- Constructions
- Groups of constructions
- Documents

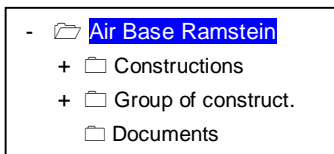


Figure 1: Example of the real estate Ramstein Air Base

For a specific project, individual subdirectories of the provided directory structure can be dispensed with.

### 1.1 Subdirectory „Constructions“:

Under an individual separate construction like a pre-filter station the subdirectories

- Structural engineering
- Machine technology
- Electrical engineering

can be found.

All documents concerning the given individual construction (for ex. pre-filter station) have to be filed in these subdirectories acc. to the above mentioned trades. If a document cannot be filed acc. to trades it must be filed directly in the directory of the corresponding construction.

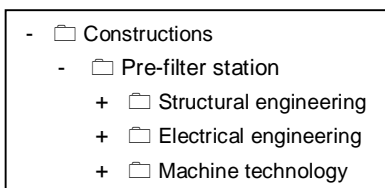


Figure 2: Example for a construction „Pre-filter station“

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DESCRIPTION		ID-CODE
<b>TURNOVER DOCUMENTS (Structure and Content)</b>		

In these individual subdirectories all documents like:

- component documents (all documents for each component have to be summarized in one document),
- drawings,
- photos,
- other documents (for ex. statics, soil expertises – documents belonging together have to be summarized in one document),

concerning the related individual construction, have to be recorded.

The above mentioned documents are not to be recorded only for structural elements and components of the construction like steel structure, concrete structure, doors, windows, receptacles, lighting, flooring and so on, but also for the complete technical and other installation and equipment components like printer, CMR panels with internals, mosaic tableau, fittings, pipelines, shaped pieces and so on.

If applicable, the content listed in the following must be recorded as **minimum requirement** in the subdirectories of the individual constructions, especially all documents requested acc. to the specifications:

- Document (content as described in the following) for each component or for each serial component (\*.pdf)
- Fire protection drawings (\*.dwg and \*.pdf)
- Escape route drawings (\*.dwg and \*.pdf)
- Circuit diagrams (inventory) (\*.dwg and \*.pdf)
- Terminal schemes (inventory) (\*.dwg and \*.pdf)
- Inventory plans of mechanical installation (\*.dwg and \*.pdf)
- Inventory plans of electrical installations (\*.dwg and \*.pdf)- Longitudinal sections (inventory) (\*.dwg and \*.pdf)
- Inventory plans of buildings and constructions (\*.dwg, \*.db and \*.pdf)
- Statics (\*.pdf)

For the **designation** of the data files to be recorded in the subdirectories (text documents, drawings, photos and so on) the following rules have to be observed:

- Data file names shall be meaningful, abbreviations shall be avoided.
- The data file name should be chosen in that way, if possible, that the designation indicates the content of the document
- If a document has to be recorded in different file formats, the data file names must be identical with exception of the extension.
- For the same components, a counting number, for ex. from the R&I scheme, has to be added to the file name.
- The length of a file name has to be limited to **50 characters**.

Examples:

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DESCRIPTION	ID-CODE	
<b>TURNOVER DOCUMENTS (Structure and Content)</b>		

- Shut-off valve DN 50 PN 16.doc
- Flow meter 003.doc
- Flow meter 003.pdf
- Receptacle.pdf
- Floor covering.doc
- CMR panel1\_SPS.pdf
- View CMR cabinet.JPG

Drawings have to be recorded in the dwg- **and** pdf- format.

Further information to above mentioned text documents (summarized documents for each component):

When text documents are recorded it must be observed that for each component like „strainer“ or for each serial component like the „shut-off valves DN 50 PN 16“ only one summarized document has to be prepared. This means that all individual documents required for components/serial components like works certificate, operation instructions, certificates of conformity, maintenance instructions, delivery notes (for ex. for concrete) and so on will be summarized in one file with a list of content.

The text documents have to be filed in pdf **and** in the source format.

The **list of contents of the text documents** has to be arranged, for example, like the following:

Cover sheet	– P. 1
List of contents	– P. 2 to
1.0 Legally required evidences	– P. ? to ?
1.1 for ex. certificate of conformity	- P. ? to ?
2.0 Proofs required acc. to STS or specifications	– P. ? to ?
2.1 for ex. acceptance test certificates	– P. ? to ?
2.2 for ex. material certificates, delivery notes	– P. ? to ?
3.0 Operation instructions	– P. ? to ?
(only for the really installed type of component)	
4.0 Maintenance instructions	– P. ? to ?
(only for the really installed type of component)	
5.0 Spare parts lists	– P. ? to ?
6.0 Installation instructions	– P. ? to ?
(only for the really installed type of component)	
7.0 .....	– P. ? to ?
8.0 .....	– P. ? to ?

If in an individual construction serial components of the same dimensioning and the same type are used several times, they have to be summarized in a text document.

Example: Individual construction „Machinery room“  
 – Component „Ball valves DN 50 PN 16“

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DESCRIPTION		ID-CODE
<b>TURNOVER DOCUMENTS (Structure and Content)</b>		

(All ball valves DN 50 PN 16) have to be summarized in a text document).

Individual construction „Machinery room“

– Component „Ball valves DN 100 PN 16“

(All ball valves DN 100 PN 16) have to be summarized again in a text document).

<p>Construction project: NATO Air Base Ramstein Adaptation and renovation concept Jet fuel supply systems</p> <p>Contract No.: C 13-4003 Project-No.: TYFR 13-0094</p> <p>Tank group TG A Filter/Manifold station</p> <p><b>Ball valve DN 150 PN 16 (CS-steel) acc. to STS-M 46 of firm .....</b></p> <p>This document includes evidences and documents for the following ball valves:</p> <ul style="list-style-type: none"> <li>- BV 01</li> <li>- BV 02</li> <li>- BV 04</li> <li>- BV 06</li> <li>- BV 07</li> <li>- BV 22</li> <li>- BV 23</li> <li>- BV 24</li> <li>- BV 25</li> <li>- BV 28</li> <li>- BV 29</li> <li>- BV 30</li> <li>- BV 31</li> </ul>
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Figure 3: Example of a cover sheet

**1.2 Subdirectory „Group of constructions“:**

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<h2>STANDARD SPECIFICATION</h2>	<h1>STS – HO</h1>	
DESCRIPTION		ID-CODE
<b>TURNOVER DOCUMENTS (Structure and Content)</b>		

In the subdirectory „Group of constructions“ of a real estate, all documents concerning the given group of constructions have to be filed.

Generally, a **Group of constructions** (for ex. „Tank group TG A“) has the following subdirectories:

- Constructions
- Documents
- Plant lines

<ul style="list-style-type: none"> <li>- <input type="checkbox"/> Air Base Ramstein</li> <li>+ <input type="checkbox"/> Constructions</li> <li>- <input type="checkbox"/> Groups of constructions</li> <li>+ <input type="checkbox"/> Base pipeline</li> <li>- <input checked="" type="checkbox"/> Tank group TG A <ul style="list-style-type: none"> <li>+ <input type="checkbox"/> Constructions</li> <li>+ <input type="checkbox"/> Documents</li> <li>+ <input type="checkbox"/> Plant lines</li> </ul> </li> <li>+ <input type="checkbox"/> Tank group TG B</li> <li>+ <input type="checkbox"/> Tankgroup TG C</li> </ul>
--

Fig. 4: Example Ramstein AB “Groups of constructions”

<ul style="list-style-type: none"> <li>- <input type="checkbox"/> Tank group TG A <ul style="list-style-type: none"> <li>- <input type="checkbox"/> Constructions <ul style="list-style-type: none"> <li>+ <input type="checkbox"/> Tank truck refuelling pit 1</li> <li><input type="checkbox"/> Tank truck refuelling pit 2</li> </ul> </li> <li>+ <input type="checkbox"/> Diesel storage tank</li> <li>+ <input type="checkbox"/> Filter/manifold station electrical room</li> <li>+ <input type="checkbox"/> Drain tank</li> <li>+ <input type="checkbox"/> CCP system with anodic ground bed</li> <li>+ <input type="checkbox"/> Storage tank 1</li> <li>+ <input type="checkbox"/> Storage tank 2</li> <li>+ <input type="checkbox"/> Storage tank 3</li> <li>+ <input type="checkbox"/> Storage tank 4</li> <li>+ <input type="checkbox"/> Storage tank 5</li> <li>+ <input type="checkbox"/> Filter/manifold station machinery room</li> <li>+ <input type="checkbox"/> Emergency power supply</li> <li>+ <input type="checkbox"/> Other facilities (fence, ways, cabling and so on)</li> <li>+ <input type="checkbox"/> Recreation building</li> <li>+ <input type="checkbox"/> WHG surfaces with related drainage incl. light material sep</li> </ul> </li> <li>+ <input type="checkbox"/> Documents</li> <li>+ <input type="checkbox"/> Connection lines between building</li> </ul>
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Figure 5: Example of the Group of Constructions “Tank group TG A“

### **1.2.1 “Constructions“ subdirectory associated to a group of constructions**

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In the **Constructions** subdirectory, the individual constructions assigned to the group of constructions, for ex. filter/manifold station, CCP system with anodic ground bed, storage tank or outside facilities are filed as individual structures in the given project-specific directory structure.

For the registration of documents in these „Construction“ subdirectories of a “Group of constructions“ the instructions concerning constructions in **chapter 1.1.** are applicable.

### 1.2.2 "Documents“ subdirectory associated to a group of constructions

In the **Documents** subdirectory, all documents have to be filed which generally concern the complete group of constructions and cannot be assigned to an individual construction.

If applicable, the following content must be recorded as a **minimum requirement** in the directory and the subdirectories prepared therein– if required. This concerns also, in particular, the documents requested in the specifications.

***The contents shown in italics and with a colored background will be recorded by the contracting agency!***

1. *Acceptances – Construction administration*
  - o *Acceptance and operation certificates ZÜS (\*.pdf)*
  - o *Acceptance certificate (\*.pdf)*
2. *Requests*
  - o *All requests for approval (\*.pdf)*
3. *Approvals, permits and so on*
  - o *All approval and permit notifications (\*.pdf)*
4. *Technical operation*
  - o *Functional and operating instructions of the facility (\*.doc a. \*.pdf)*
  - o *General description of facility electrical part (\*.doc a. \*.pdf)*
  - o *General description of facility mechanical part (\*.doc a. \*.pdf)*
  - o *Builder certificate (\*.pdf)*
  - o *Summary of known requirements, rights and obligations on real estate, construction or facilities (\*.doc or \*.xls a. \*.pdf)*
  - o *Periods for periodic inspections (\*.doc a. \*.pdf)*
  - o *Maintenance list electrical part (\*.doc a. \*.pdf)*
  - o *Maintenance list mechanical part (\*.doc a. \*.pdf)*
  - o *Maintenance list structural part (\*.doc a. \*.pdf)*
  - o *Maintenance instruction electrical part of group of constructions (\*.doc a. \*.pdf) (z. B. TG A),*
  - o *Maintenance instructions mechanical part of group of constructions (\*.doc a. \*.pdf)*
  - o *Maintenance instructions structural part of group of constructions (\*.doc a. \*.pdf)*
  - o *Equipment, inventory, equipment list of group of constructions, split acc. to constructions (\*.doc, \*.xls a. \*.pdf)*
  - o *Proof instruction operation personnel (\*.pdf)*
  - o *Specifications manual (\*.doc) a. (\*.pdf)*
  - o *Commissioning protocol (\*.doc) a. (\*.pdf)*
  - o *Warranty list (\*.doc) a. (\*.pdf)*
  - o *Construction diary (\*.doc a. \*.pdf)*

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- *Explosion protection document (\*.doc a. \*.pdf)*
- 5. CAD-files
  - Block diagram complete facility (\*.dwg)
  - Flow chart complete facility (\*.dwg)
  - Logic diagrams complete facility (\*.dwg)
  - Summary isometry (\*.dwg)
- 6. Photos
- 7. Drawings
  - Block diagram complete facility (\*.pdf)
  - Flow chart complete facility (\*.pdf)
  - Summary isometry (\*.pdf)
  - Logic diagram complete facility (\*.pdf)
  - Layout plans (\*.pdf)
  - Longitudinal sections (\*.pdf)

Information concerning maintenance lists:

Maintenance lists have to be prepared with periodic partition (daily, weekly, monthly, yearly and so on)!

For the registration of documents in the subdirectory „Documents“ of a „Group of components“ the explanations concerning constructions in **chapter 1.1.** are applicable.

### **1.2.3 "Connection pipes" subdirectory associated to a group of constructions**

In the subdirectory **Connection pipes between buildings** the connection pipes like

- Draw-off pipe storage tank– filter/manifold station
- Drain pipe
- and so on

assigned to the group of constructions in the given project-specific directory structure are filed as individual directories. For the "Plant lines" directory, the regulations specified under „Construction“ must also be observed (**see chapter 1.1**).

### **1.3 "Documents" subdirectory „**

In this directory the documents concerning the complete real estate (for ex. an air base) are filed.

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For the documents directory of a real estate, for ex. Ramstein air base, the regulations under "Group of constructions" – "Documents" shall also be observed (**see chapter 1.2.2**).

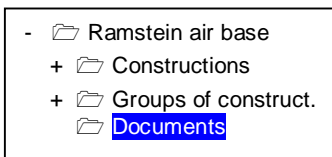


Figure 6: Example of documents on real estate of Ramstein Air Base

If works on CCP facilities will be performed, the CCP facility part included in the contract has to be added to the existing inventory documents (\*.dwg and \*.pdf).

In the "Documents" subdirectory, the following **further directories** are available – if applicable – see also explanations under chapter 1.2.2:

<b>Drawing</b>	Scanned analog document or modified edition of CAD programs as pdf-file; Example: complete layout plan Remark: if the pdf file has been created from a CAD application the original file has to be handled as sub-type "CAD file"
<b>Photo</b>	Photograph, digital or scanned analog photos. Format: *.jpg
<b>CAD file</b>	File created with assistance of the DP application of a drawing/ construction program. Format *.dwg, *. dxf,
<b>Pipe log</b>	File created with the assistance of a DP application for the keeping of the digital pipe log for long distance pipelines. Format: *.rob-Format)
<b>Longitudinal section</b>	File of the longitudinal sections performed specially for this project at the time of turnover. The longitudinal section can be submitted as CAD-file or scanned. Format: *.dxf. *.pdf
<b>Technical operation</b>	All documents relevant for operation (see above 1.2.2 par. 4); format * pdf, <b>and</b> *.doc or *.xls
<b>Other document</b>	all documents in digital form which cannot be assigned to the a.m. sub-types, (for ex. soil expertise). Format: *pdf, <b>and</b> *.doc or *.xls

## 2. Registration guidelines for digital documents

### 2.1 Digital documents

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If documents are already available in digital form, they can be filed – depending on the format – directly or after a format transformation in the given directory. For text-based or table-based documents, a conversion into the PDF (Portable Document Format) is required in addition to the original document (perhaps transformed).

A format transformation has to be performed acc. to the following instructions:

1. Format

Generally, a compressed format is preferable to a non-compressed one. The following formats have to be used:

- For text-based or table-based documents, the Microsoft Office Formats \*.doc and \*.xls as well as the PDF format
- For photos the JPG format
- For drawings the Autodesc formats \*.dwg or \*.dxf as well as the pdf-Format. Furthermore, formats created by CADISON (CADISON data base \*.db).

2. Resolution

For pictures (photos) available with a very high resolution the resolution has to be reduced. The reduction should allow a file as small as possible without the loss of essential information. Depending on the respective content, a picture for ex., taken with digital camera in a resolution of 3888 x 2592, has to be transformed or reduced to a resolution of 10 x 16cm at 150 dpi (corresponding to 590 x 980 Pixel). This is also applicable for pictures which are embedded in digital documents like text-based or table-based documents.

If a document is already available as a scan in a digital form, the guidelines of chapter 3.2. apply.

## 2.2 Analog documents

If documents are not available in digital form they must be digitalized (scanned). Generally the scanning procedure has to be chosen in that way that the result is a file with lowest possible file size containing all essential information, however. Therefore, the following regulations for the digitalizing of documents have to be considered.

1. Format

All scan results shall be saved as files in a compressed format. Compression involving losses is only allowed for pictures. For all other document types, a compression method without losses must be chosen generally. Consequently the following formats will be used:

- For text or table based documents PDF (Portable Document Format).
- For pictures JPEG (see ISO 10918)
- For drawings PNG (see ISO 15948)

On one hand, the scan results of text-based or table-based documents must be compressed and embedded in the PDF file and, on the other hand, documents of several pages must be summarized in one PDF file.

2. Resolution

As a standard, scanning should be performed with a resolution of 150 dpi. If, in case of 150 dpi, information

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is lost in the scanning procedure (for ex. in documents with a very small font size or in plans with many details) an accordingly higher resolution until 300 dpi must be chosen.

3. Color depth

As a standard, the text-based or table-based documents with a color depth of 8 Bit should be scanned in greyscales and pictures with a color depth of 24 Bit in color. If in a text-based or table-based document important information is marked by colors, a corresponding color depth (8 to 24 Bit) has to be selected. The color depth for plans has to be chosen each time acc. to the submitted plan. If a plan is submitted for ex. in black and white, it should be scanned with a color depth of 8 Bit in **grayscales**. In case of a colored plan, however, a color depth of 8 to 24 Bit has to be chosen, depending on the number of colors used.

4. Size

The size of the scan should be determined in that way that it corresponds to the size of the originals. Up to a size of DIN A0 the documents should be scanned accordingly in one process (one file). In case of bigger formats the scan of the documents has to be divided accordingly in a useful way.

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<b>COMMISSIONING OF A REFUELLING SYSTEM UNDER THE DIRECTION OF A SYSTEM INTEGRATOR</b>		ID-CODE

### 1.0 GENERAL

This paragraph includes general requirements for the commissioning of a pressure refuelling system for mineral oil products with the hazard characteristics R10 (flammable), F (easily flammable) and F\* (highly flammable) with aromatic content of up to 50%.

Commissioning includes the following works:

- Flushing and cleaning of pipeline systems and facility parts
- Adjusting and testing of facility parts
- Functional test
- Final acceptance and turnover of the facility

### 1.1 System integrator

The commissioning of the facility must be performed under the direction of a system integrator. The system integrator must have enough experience. That means that he must already have performed the commissioning of several facilities of the same type. The system integrator is responsible for the harmonization of all components and for the turnover of a functional facility. Therefore the system integrator must already be involved during the ordering of the facility components. All components required for the control (control valves, SPS and so on) may only be ordered after approval by the system integrator. Alternatively all components required for the control can be ordered directly by the system integrator. Not later than at the introduction meeting the system integrator has to be named in writing to the contracting agency.

### 1.2 Commissioning procedure

Prior to the start of commissioning the contractor has to submit a time schedule to the contracting agency for approval. This schedule shall describe the entire workflow and include information about approach and equipment used for flushing, cleaning and testing of the different facility parts.

If not authorized otherwise, the commissioning work will be performed in the following order:

- a. Flushing of the filling pipe
- b. Flushing of connection pipes between structures, refuelling or hydrant loop, pipelines in filter/manifold station and in refuelling pits as well as refuelling arms
- c. Cleaning of filter/water separator and exchange of filter elements
- d. Setting and testing of control valves and pressure measuring and flow meter device.
- e. Function test and certification of performance of complete refuelling facility.

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### 1.3 Test reports

The contractor has to submit a report about all tests described under par. 3.2 and 3.3. This report must include all data about set values.

### 1.4 Assistance at commissioning

For the commissioning, especially for the calibration of facility parts and test runs, the contractor has to provide additional personnel. The personnel shall mainly consist of representatives of the of the manufacturers of the most important mechanical and electrical facility parts like control valves, re-fuelling arms, electrical controls and so on.

The contractor will be assisted in the commissioning by the user's personnel and equipment.

### 1.5 Instruction of operating personnel

The user's operating personnel must be instructed by the representatives of the manufacturers on the operation of the facility. During this instruction, knowledge about calibration and maintenance of facility parts (valves, refuelling arms, control and alarm systems and so on) has to be provided. During the instruction which should be performed prior to the turnover of the facility, the relevant safety regulations for handling and operation of fuelling systems must be explained under all circumstances. If not specified otherwise by the contracting agency, the instruction for mechanical and electrical facility parts shall take min. 8 hours each.

## 2.0 PROVISION OF MATERIALS AND EQUIPMENT

### 2.1 Provisions by the contractor

The contractor has to provide the required material, equipment and personnel for the commissioning. This includes in particular:

- Flushing filter in pipelines
- Filter and elements in the filter/water separators for the flushing procedure
- Installations for bypasses of facility parts during the flushing procedure incl. flow meter and manometer.

### 2.2 Provisions by the user

#### 2.2.1 Jet fuel

Depending on the type of refuelling system and the length of the pipeline system a jet fuel quantity, to be determined by the contractor, will be made available for the coarse flushing of the different pipeline systems and facility parts.

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After completion of the coarse flushing procedure, additional jet fuel will be provided for the main flushing. After the satisfactory completion of the flushing, additional jet fuel will be made available for the continuation of the commissioning (adjusting facility parts, functional test and so on). The provided fuel remains property of the contracting agency or the user. Deficits that cannot be attributed to normal operation will be at the expense of the contractor (billing at handover of facility).

### 2.2.2 Quality control

The contractor or the user initiates the taking of fuel samples to determine the results of the flushing and cleaning works. Only after release of the fuel by the quality control service, commissioning may be continued (setting of facility parts, function test and so on).

### 2.2.3 Tank truck

The airfield tank trucks or aircrafts required for the commissioning incl. the service personnel will be made available free of charge for the contractor.

### 2.2.4 Power

The electrical power required for the commissioning will be provided free of charge to the contractor.

## 3.0 COMMISSIONING

### 3.1 Flushing and cleaning of pipeline systems and facility parts

After completion of assembly and installation of the complete facility and after release by the expert or the contracting agency the flushing can be started.

#### 3.1.1 Preparation of flushing

Prior to flushing, all facility parts whose function could be affected by contamination have to be dismantled and replaced by fitting pieces.

Parts to be dismantled, for ex.:

- Pump discharge control valve in pump buildings
- High-level control valves in pump buildings and in drain tank
- Filter/water separator valves behind the filter/water separators

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- Water outlet control valve on filter/water separators
- Emergency shut-off valve, back pressure control valve, bypass control valve, flushing valve and overpressure control valve in in filter/manifold station
- Orifice meters and Venturi pipes in filter/manifold station and in refuelling pits
- Flow meters in filter/manifold station, in test and flushing pits and refuelling pits
- Tank truck filling valves and refuelling valves in refuelling pits

After flushing and release by the contracting agency the a.m. facility parts have to be re-installed.

Furthermore, the filter elements in the filter/water separators have to be dismantled and replaced by flushing elements (filter elements second choice).  
 For the first flushing procedure, temporary conic strainers have to be installed in the pipelines downstream of longer pipeline sections, (between two flanges) and to be cleaned frequently during the flushing procedure so that a maximum flow is guaranteed. After completion of the first flushing procedure the conic strainers have to be dismantled and cleaned.

### 3.1.2 Flushing procedure

All pipeline systems inside the facility, except for drain pipes, have to be flushed one by one with fuel until they are free of dirt and the contracting agency has ascertained their perfect condition. For the flushing of the individual pipelines, the manually operated shut-off valves shall be opened or closed as required. The fuel is pumped via a filter/manifold station and via the refuelling pits back to the circulation pipe into the fuel tank. This procedure is always performed with a pump via one of both filter/water separators into the dispensing pipe. The pumps and filter/water separators have to be used alternately.

During the flushing procedure, the pressure loss on the filter/water separators shall be monitored. The flushing procedure has to be interrupted periodically to take samples from the fuel tank. At the end of the flushing procedure, high-speed flushing with a considerably increased flow speed must be performed; for tank truck facilities with both pumps; for hydrant loops with all installed pumps. The pipelines have to be flushed until the fuel in the tank shows the purity required by the contracting agency. That is the case when the contained solids do not exceed 1.0 mg/l and the portion of free water is not greater than 10 mg/l.

### 3.1.3 Works after the flushing and cleaning of the facility parts

After flushing and release by the contracting agency, the complete pipeline system has to be drained and all dismantled facility parts have to be re-installed.

The filter/water separators have to be cleaned and the flushing elements have to be replaced by filter elements.

After completion of all works, the entire pipeline system will be re-filled slowly with fuel. Ventilation systems and/or fittings on the high points of the pipeline system have to be opened, to be supervised and to be closed in case of accruing fuel.

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### 3.2 Setting and inspection of control valves and electrical installations

#### 3.2.1 Control valves

All hydraulically working control valves have to be set acc. to the requirements of the contracting agency and the functioning has to be tested. The set values for inlet pressure, outlet pressure, opening time, closing time, flow and filling level in the tanks with high level check valves have to be reported in writing and documented in the operation and maintenance manuals to assure that replaced fittings can be reset with the same values. The setting works have to be performed on site by an expert of the valve manufacturer.

#### 3.2.2 Electrical installations

All electrical installations ensuring the functioning and the security of the facility have to be adjusted acc. to the requirements of the contracting agency and to the corresponding instructions or regulations (TRBS, TRGS, TRbF, VDE, etc.). The function has to be tested. The adjusted switching and alarm points of the filling level supervisions, the overflow protections, the pressure and flow measuring installations, motor protection relay, star-delta switches and leakage monitoring have to be recorded in writing and documented in the operating and maintenance manuals to assure that replaced installations can be adjusted to the same values. The setting and adjusting work shall be performed on site by an expert.

### 3.3 Functional test

After the adjustment of control valves and electrical installations a test run will be performed; during this test run, the set parameters are checked and re-adjusted, if required. The automatic control (SPS) can be checked for its functionality.

All tests have to be performed in the presence of the contracting agency or a representative and to be recorded in a result protocol.

#### 3.3.1 Refuelling quantities

The fuel quantities for hydrant refuelling systems (requirement: 2000 l/min per outlet) and for systems for the filling of truck refuellers (requirement: 2000 l/min per dispensing pit) have to be set with the aid of installed volumeters and time measurement.

#### 3.3.2 Function of feed pumps

The function of each feed pump in combination with the filling level monitoring in the fuel tanks as well as the pressure and flow meter devices have to be checked.

At a set minimum filling level, each feed pump must shut down.

Via the pressure and flow meter devices the pumps must switch on or shut down at given pressures or flow rates. The complete refuelling procedure shall be tested with all possible pump pre-selection settings.

Each procedure has to be performed min. 5 times.

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3.3.3 Function of drain pump in drain tank

During automatic operation the drain pump must switch on at filling level MAX 1 until filling level MIN 1 is reached.

3.3.4 Function of drain pump in fuel tank

At filling level MAX 1 in drain tank or filling level MIN 2 in fuel tank, the pump must shut down.

3.3.5 Emergency shutdown of facility

During the test runs each EMERGENCY-OFF button has to be tested to see if the pumps shut down. This test has to be repeated for each pump individually. In hydrant-refuelling systems the emergency-shut-down valve (if existing) must close with the pump shut-down.

4.0 FINAL ACCPETANCE AND TURNOVER OF THE FACILITY

4.1 Final acceptance

During the final acceptance in the presence of the contracting agency, all possible functions shall be tested as a proof and the evidences of performance shall be presented. Where hydrant refuelling system are concerned, evidences shall be provided at direct refuelling and defuelling of aircrafts. For tank truck-refuelling systems the evidences shall be provided at filling of truck refuellers.

The final acceptance has to be announced in time to the contracting agency so that they can request the required aircrafts or truck refuellers.

All other equipment and instruments as well as the commissioning personnel required for the performance of the final acceptance have to be provided by the contractor.

The contractor has to prepare an acceptance report specifying each verified function and the individual dispensing capacities.

The report must include at least the following information:

- a. Time for refuelling procedures
- b. Filling levels in fuel tanks
- c. Quantity proof refuelling pit (tank truck) with volumeter reading of total delivery
- d. Operational pressures during operation, pump outlet, FWA input and output, refuelling pit input and output

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COMMISSIONING OF A REFUELLING SYSTEM UNDER THE DIRECTION OF A SYSTEM INTEGRATOR		ID-CODE

- e. Identification of the pumps that were in operation
- f. Pumps: speed, power consumption
- g. Results of fuel samples
- h. Fuelling capacity with dispensing quantity and operational pressure

#### 4.2 Turnover of the facility

After completion of the final acceptance the facility shall be turned over to the contracting agency with keys and documents required for the operation of the facility.  
Any required subsequent work shall be coordinated with the contracting agency.

STS-M 0 has to be observed.

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<h2>STANDARD SPECIFICATION</h2>	<h1>STS – M 0</h1>	
DESCRIPTION	ID-CODE	
<b>GENERAL CONDITIONS AND EXPLICATIONS</b>		

The present specification is an integral part of the bid solicitation. The requirements specified there-in are minimum requirements and compliance must be ensured.

If the specified requirements cannot be met in exceptional cases, the Contractor must obtain the written consent of the Contracting Agency in each case.

All legally required documents and proofs, in particular inspection and acceptance certificates, operating and maintenance instructions as well as spare parts lists must be supplied in four printed copies and as digital versions (inspection and acceptance certificates: PDF files; operating and maintenance instructions, spare parts lists: MS Word, Excel, DWG files). One copy of each inspection and acceptance certificate of the components must be submitted prior to their installation. If the design specifications give any indications about the legally required documents and proofs, these indications have priority.

The inspection bodies competent for testing and acceptance are:

For delivered components - the inspection body competent for the supplier's factory in accordance with the German Products Safety Directive (ProdSG) Art. 37 if a certificate as per DIN EN 10204/3.2 is required.

For assembly works - the inspection body charged with the inspection of the jobsite in accordance with the German Products Safety Directive (ProdSG).

The manufacturers of materials, equipment, devices and fittings etc. must have an ISO 9000 quality management system implemented in their organization and handle all activities in line with this system.

A corresponding certificate must be enclosed in the factory documentation.

The manufacturer's certificates must be delivered in four printed copies and as digital versions (pdf). A single copy of each document must be submitted prior to the installation. If the design specifications give any indications about the legally required documents and proofs, these indications have priority.

Acronyms used:

VAwS	Verordnung über Anlagen zum Umgang mit wassergefährdenden Stoffen und über Fachbetriebe (Ordinance on systems handling water-polluting materials and on the relevant specialist companies)
WHG	Wasserhaushaltsgesetz (Water Resources Act)
TRBS	Technische Regeln für Betriebssicherheit (Technical Rules for Operational Safety)
TRGS	Technische Regeln für Gefahrstoffe (Technical Rules for the Handling of Hazardous Materials)
VdTÜV	Merkblatt des Verbandes der TÜV e.V. (Code of Practice of the TÜV Technical Supervision Association)

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DESCRIPTION	ID-CODE	
<b>GENERAL CONDITIONS AND EXPLICATIONS</b>		

TRbF	Technische Regeln für brennbare Flüssigkeiten (Technical Rules for the Handling of Combustible Liquids)
AD	Arbeitsgemeinschaft Druckbehälter (Working Group on Pressure Vessels)
PN	Nenndruck (Nominal Pressure)
DN	Nennweite (Nominal Width)
PL	Pipeline
AG	Auftraggeber (Contracting Agency)
AN	Auftragnehmer (Contractor)
BL	Bauleitung (Site Supervision)
US	Ultraschall (Ultrasound)
LV	Leistungsverzeichnis (Design Specifications)
STS-M ...	Specification (Mechanical Engineering)
ProdSG	Produktsicherheitsgesetz (General Product Safety Directive GPSD)
ProdSV	Produktsicherheitsverordnungen (General Product Safety Regulations GPSR)
BetrSichV	Betriebssicherheitsverordnung (German Ordinance on Industrial Safety and Health)
BGV	Berufsgenossenschaftliche Verordnungen (Directives of Professional Associations)
LAU systems	systems for the storage, filling and handling of water-polluting materials

### Important Notes for the Use of the Standard Specifications (STS-Ms)

The ON-BASE (STS-M) standard specifications are always adjusted to the current state of legislation, technical rules, DIN and EN codes. As this cannot always be ensured, the following text shall apply as a minimum requirement to all standard specifications. The resulting costs shall be included in the unit prices of the relevant fittings and components.

As a fundamental principle, always the latest legal regulations and directives should be applied, even if older laws and directives are cited in the specifications. The same should apply to DIN and EN codes as well as to technical rules such as the TRBS directives or the VdTÜV and AD 2000 Codes of Practice.

All fittings and components described in the specifications will be installed in pipelines conveying flammable and water-polluting liquids (containing solid particles up to 800 µm) of the hazard characteristics R10, F and F+ with an aromatic content up to 50 %. The component will be installed in explosion hazard zone I, the inner fitting is to be classified as explosion hazard zone 0. If the fittings are installed in vessels, explosion hazard zone 0 applies.

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DESCRIPTION		ID-CODE
<b>GENERAL CONDITIONS AND EXPLICATIONS</b>		

The stations and pits where the fittings and components will be installed, are exposed to climatic variations typical for Europe. Their design and dimensioning should provide for this and all liquid-filled spaces of fittings should be safeguarded against overpressure exceeding the prescribed limits (see also DIN 3230, Part 6).

In accordance with the German Ordinance on Industrial Safety and Health (BetrSichV), the operational condition of facilities and facility parts requiring monitoring must be inspected at regular intervals by an authorized inspection body. The operator of the entire facility and its components must prepare the inspection lists on the basis of a technical safety assessment. A prerequisite to this task is that the manufacturer determines and specifies the inspection intervals for each individual component of the facility requiring monitoring. As the operator wants the control office to authorize review periods as long as possible, the fittings and components described in this specifications must be designed and dimensioned in a way that they allow a review period of 3 years for electrical and 5 years for mechanical components.

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<h2>STANDARD SPECIFICATION</h2>	<h1>STS – M 1</h1>	
DESCRIPTION	ID-CODE	
<b>HYDRAULIC CONTROL VALVES</b>		

This specification covers the conditions for manufacture, tests, acceptance and evidence of quality features of control valves installed into pipelines for finished mineral oil products with the hazard characteristics R10 (flammable), F (easily flammable) and F+ (highly flammable) and an aromatic content of up to 50 % (VbF § 3). Contractors are not allowed to deviate from the present specifications.

Suitable for installation in stations and pits (in zone 1, the inside of fittings is to be assigned to zone 0).

1. The following regulations are imperative and must be complied with:

- 1.1 Directive 2014/68/EU of the European Parliament and of the Council on the approximation of the laws of the Member States concerning pressure equipment
- 1.2 Directive 2014/34/EU of the European Parliament and of the Council on the approximation of the laws of the Member States concerning the appropriate use of equipment in explosion hazard areas (ATEX).
- 1.3 Regulation (EU) No. 305/2011 of the European Parliament and of the Council on laying down harmonized conditions for the marketing of construction products
- 1.4 Directive 2006/42/EC of the European Parliament and of the Council on the approximation of the laws of the Member States of 17 May 2006 concerning machinery.
- 1.5 General Product Safety Directive (GPSD) and associated regulations (GPSR)
- 1.5 German Ordinance on Industrial Safety and Health (BetrSichV)
- 1.6 Construction Products Act
- 1.7 Technical Rules on the Operational Safety/Hazardous Materials, especially TRBS 3151 / TRGS 751
- 1.8 VdTÜV Codes of Practice, especially VdTÜV-MB 967, VdTÜV-MB 966-1 and VdTÜV-MB 966-2
- 1.9 DIN, DIN EN and DIN ISO standards
- 1.10 AD 2000 Codes of Practice, especially AD 2000 W and AD 2000 A4
- 1.11 ASME and ASTM standards
- 1.12 Technical Rules for the Handling of Flammable Liquids, especially TRbF 50 (other sources of information)

2. Use

Medium: jet fuel, mogas, diesel fuel and petroleum products  
as per MIL-G-5572F, MIL-T-5624L

Pressure level: PN 16 / ASME CLASS 150

Temperature range: - 57°C (- 70°F) to + 71°C (+ 160°F)

3. Valve description

3.1 General

The valve shall be a hydraulically operated, diaphragm-controlled, single-seated straight-way or angle valve and consist of the valve body, the valve cover and the diaphragm assembly. The valve should have a closed outer surface and must not be fitted with gland packing's. The valve shall be equipped with a frictionless valve position indicator, which operates in a liquid-tight enclosure made of safety glass. The valve position indicator shall be threaded into the valve stem. Welded valve position indicators or valve stems shall not be permitted. Piston valves are not allowed as base valves or control valves.

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<b>HYDRAULIC CONTROL VALVES</b>		

Line fluid shall flow over the main valve seat (reverse flow) in order to close the valve or keep it closed when the main valve diaphragm fails.

### 3.2 Valve gasket

The valve shall contain a resilient, synthetic rubber seat gasket having a rectangular cross section, contained on three and one-half sides by a retainer, thus forming a drip-tight seal against the seat. The gasket shall be removable and usable on either side. O-ring type gaskets shall not be permitted.

The gasket retaining disc shall be of the contoured type to permit a smooth transition of flow and shall hold the gasket firmly in place during high differential pressure conditions that may develop across the seating surface. The gasket retainer shall be of a sturdy single-piece design capable of withstanding pressure shocks. Therefore, the gasket retainer shall have a cylindrical shape. Double-cone retainers shall not be permitted.

### 3.3 Diaphragm assembly

The diaphragm assembly shall be the only moving part. It shall form a sealed chamber in the upper portion of the valve, separating the operating pressure from the system pressure.

The diaphragm assembly with the valve stem shall be guided by a bearing bush in the valve cover, and an integrated bearing bush in the valve seat or the valve body. The lower valve body and the cover shall be sealed by the rim of the diaphragm.

The diaphragm shall be made of a minimum of 2 layers of tear-resistant plastic fabric bonded with fuel-resistant synthetic rubber, and the edge area of the center hole for the valve stem shall be sealed by vulcanization (one layer of tear-resistant plastic for valves up to DN 50 / 2").

The diaphragm must have a MULLEN-burst rating as per ASTM D 751-68 of a minimum of 42 bar (600 psi) per layer of tear-resistant plastic fabric. Moreover, each and every diaphragm size must be cycle tested 100,000 times in the valve of the appropriate nominal width, by alternately applying pressure of 20 bar (300 psi) under the diaphragm (main valve pressure) and above the diaphragm (cover chamber pressure). This test shall be certified by the manufacturer. The diaphragm shall not be used as a seat gasket. The diaphragm must be supported by the body and the cover to the greatest possible extent in either the open or closed position. Evidence of the conduction of the MULLEN burst test as well as the associated documentation shall be submitted to the Contracting Agency on request.

### 3.4 Valve seat

The valve seat and the stem bearings shall be removable and screwed in the body or the cover. The lower stem bearing must be concentrically contained in the valve seat and shall be exposed to flow on all sides to avoid deposits in the bearing. Proper alignment of the valve stem shall be ensured by the concentric, self-centering recess of the lower valve body with the cover.

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<b>HYDRAULIC CONTROL VALVES</b>		

With DN 150 / 6" and smaller sizes, the valve seat shall be threaded into the body. With valves larger than DN 150 / 6", the valve seat must be fastened to the body with screws. The seal between body and valve seat shall consist of an O-ring.

The valve shall have a screwed bottom drain device, and a top venting device for horizontal and vertical installation.

The diameter of the valve seat shall be the same as the inlet and/or outlet flanges of the main valve.

### 3.5 Renewable internal parts

The valve seat, stem bearings, control system, strainers, and all movable internal parts must be replaceable without removing the main valve from the pipeline.

### 3.6 Control tubing

For the screwed connections on all control valves it is recommended to use conic cutting-ring screw joints (NPT-threads). However, any cutting-ring screw joints shall be permitted that are easy to loosen and to replace. Diameters shall match the control valve connections. The control tubing connections on control valves shall be replaceable.

#### 3.6.1 Material:

For the entire valve including the control valves and the control tubing, it shall not be permitted to use any non-ferrous metal in contact with the conveyed medium.

### 3.7 Flow Rate and pressure drop

The  $C_v$ -factor is defined in accordance with VDI/VDE directive 2173, 3.1 as the number of gallons of water at 5 °C (41 °F) to 30° C (86 °F) which will flow at a pressure drop of one bar through a valve in a fully open position in reverse flow.

The indicated  $C_v$ -factors are minimum factors; smaller factors shall not be permitted.

The pressure drop is based on fuel of a density of  $\delta = 0.78 \text{ kg/dm}^3$ . The corresponding values apply to the fully open valve without orifice plate in the flow direction from top (reverse flow). The indicated pressure drop is a maximum and must not be exceeded.

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Nominal width/size		K <sub>v</sub> / C <sub>v</sub>		Pressure drop				
DN	Inch	m³/h	gpm	Flow rate			Pressure drop	
				m³/h	l/min	gpm	bar	psi
50	2	42.0	49.0	12	200	53	0.06	0.9
50	2	42.0	49.0	30	500	132	0.39	5.7
65	2 ½	69.0	80.0	45	750	198	0.33	4.8
80	3	93.0	107.0	60	1000	262	0.32	4.7
100	4	173.0	200.0	120	2000	528	0.38	5.4
150	6	380.0	440.0	120	2000	528	0.08	1.1
200	8	667.0	771.0	240	4000	1057	0.10	1.5
250	10	994.0	1150.0	360	6000	1585	0.10	1.5
300	12	1380.0	1600.0	480	8000	2113	0.09	1.4

On request of the Contracting Agency, evidence of the actual pressure drop shall be provided on a test stand at the Contractor's choice. The costs shall be included in the unit price.

### 3.8 Valve characteristic

In accordance with VDI/VDE directive 2173, the valve characteristic shall basically have a linear shape, however, differing from that, asymptotic "soft" transitions into the lower (valves closed) and upper (valves open) final positions ("soft" opening and closing). The final positions shall be reached gradually, i.e. at constant changes in stroke; the change in rate of flow shall decrease. The valve characteristic curve must be continuously ascending with only one point of inflection. It has to be a sinusoidal curve complying with the following functional description:

$$C_v/C_{vs} = 50 - 50 \cos \left( \frac{\pi}{100} \times H/H_{100} \right); 0 \leq H/H_{100} \leq 100$$

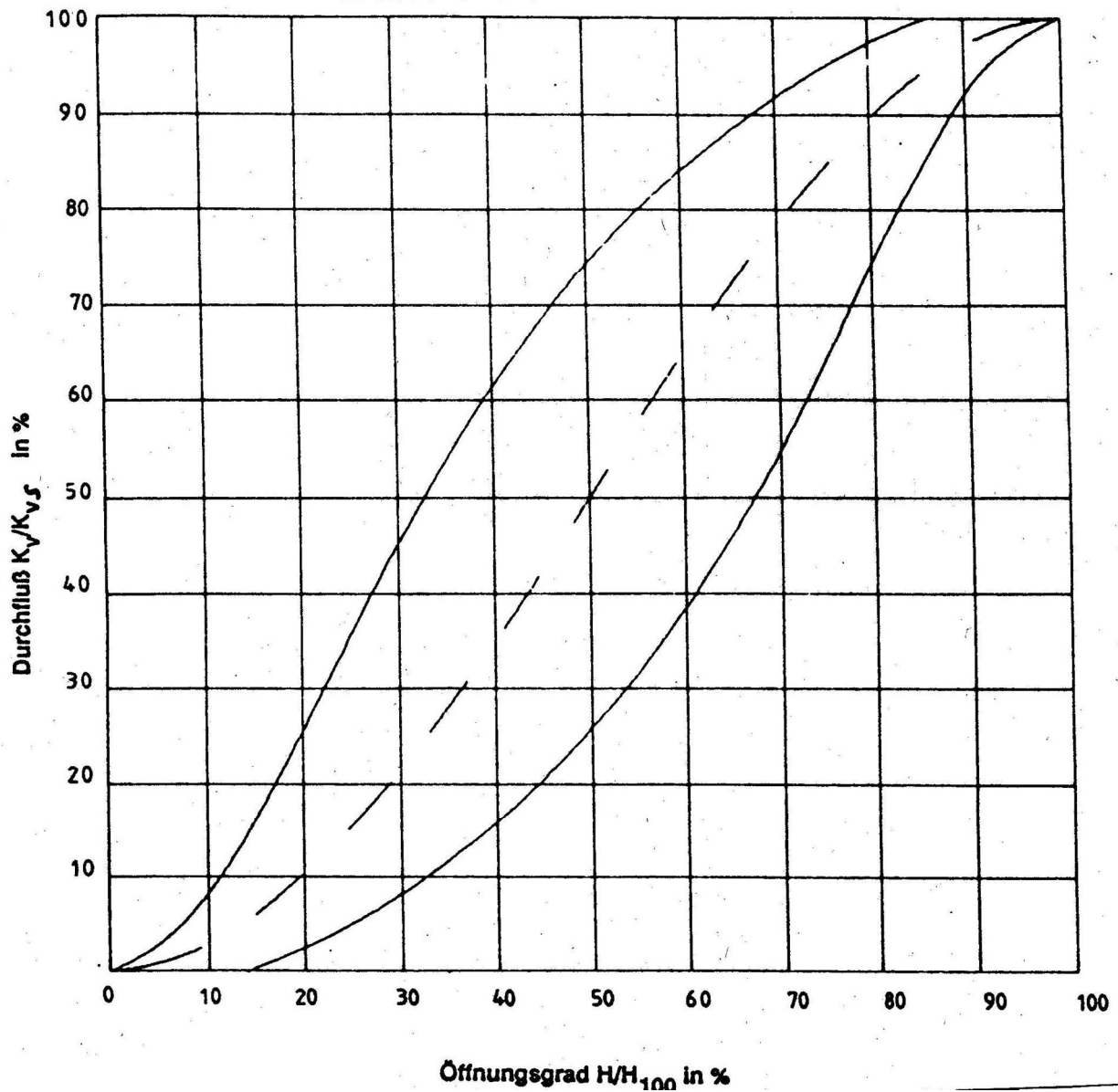
The principal curve is shown in the following graph:

- C<sub>v</sub> : flow rate at 1 bar pressure drop
- C<sub>vs</sub> : flow rate at 1 bar pressure drop with valve fully open
- H : opening height
- H<sub>100</sub> : opening height with valve fully open

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### Bandwidth for characteristic curve



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The maximum deviations from the center line shown in the graph shall meet the following criteria:

- The highest deviations may occur at the highest ascent of the center line, i.e. at 50 % stroke and flow rate. In the directions of 0 % stroke and 100 % stroke, the deviations shall decrease towards 0.
- The values must not be lower than 0 % flow rate or higher than 100 % flow rate.
- The marginal lines shall also join in horizontally at 0 and 100 % valve opening.
- Moreover, the marginal lines, which may represent a characteristic curve in extreme situations, shall have only one inflection point, a constant gradient (i.e. no kinks), and an operating range which is at least almost linear.

The appropriate deviations („A" perpendicular to the center line) are defined by:

$$A = 10 \sin \left( \pi \frac{x}{L} \right), 0 \leq x \leq L, L = \text{length of the center line}$$

On request of the Contracting Agency, evidence of the actual characteristic curve shall be provided on a test stand at the Contractor's choice. The costs shall be included in the unit price.

### 3.9 Total length

The total valve length does not include the orifice plate. The dimension of the orifice plate flange must be added in accordance with item 5. 5 for valves fitted with orifice plates upstream. The total lengths of the valves shall be equal for the materials cast stainless steel, cast steel, and cast aluminum.

Nominal width	Valve length [mm]	
	PN 16	ASME CLASS 150
DN 50	254.0 mm	254.0 mm
DN 65	280.0 mm	280.0 mm
DN 80	305.0 mm	305.0 mm
DN 100	381.0 mm	381.0 mm
DN 150	508.0 mm	508.0 mm
DN 200	645.0 mm	645.0 mm
DN 250	756.0 mm	756.0 mm
DN 300	864.0 mm	864.0 mm

To ensure interchangeability of the valves, the above dimensions must be strictly adhered to, i.e. they are absolute values. Should smaller dimensions occur as a result of the manufacturing process, an appropriate spacer ring (same material as the valve body) must be furnished by the valve supplier.

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### 3.10 Flange design

Material	PN 16	Sealing surface	ASME CLASS 150	Sealing surface
Cast steel	DIN EN 1092-1	Shape B1	ASME B16.5	RF
Ductile cast iron	DIN EN 1092-1	Shape B1	ASME B16.5	RF
Cast stainless steel	DIN EN 1092-1	Shape B1	ASME B16.5	RF

### 3.11 Requirements for the manufacturer of the valve bodies

In accordance with TRbF 50.

#### 3.11.1 Dimensioning and manufacture

In accordance with TRbF 50.

Previous examination by an independent expert is mandatory for all sizes and pressure levels.

#### 3.11.2 Materials

Valve body and cover:

3.11.2.1 Cast steel as per U.S. Standard ASTM A 216 WCB or equal quality similar to GP240GH (1.0619) in accordance with DIN 17 245, formerly GS-C25

3.11.2.2 Ductile cast iron with a nickel coating as per U.S. Standard ASTM A 536 / A 536 M (Material only allowed for USAFE and Canadian facilities)

3.11.2.3 Highly corrosion-resistant cast steel as per U.S. Standard ASTM A296 CF-16 or equivalent highly corrosion-resistant forging steel

#### 3.11.2.4 Internal valve parts:

Valve seat : cast stainless steel or stainless steel

Valve stem and bearing : stainless steel

Valve spring : stainless steel

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Diaphragm	:	synthetic rubber with tear-resistant plastic fabric layers, resistant to aromatics up to 50 %, resistant to fungi and bacteria as per MIL-STD-810 D Item 508.3, as per U.S. Standard ASTM-D -2000 or equal type
Valve seat gasket	:	synthetic rubber, resistant to aromatics up to 50 %, resistant to fungi and bacteria as per MIL-STD-810 D Item 508.3, as per U.S. Standard ASTM-D -2000 or equal type
Gasket retaining disc	:	stainless steel, U.S. Standard ANSI 303 or equivalent steel, material no. 1.4305 as per DIN EN 10088-2
Gasket retainer	:	as valve body, item 3.11.2.1 to 3.11.2.3
Diaphragm retaining disc	:	as valve body, with cast steel according to item 3.11.2.1 to 3.11.2.3, epoxy-resin coated or chrome-nickel steel
Screws, bolts and nuts	:	<p>For the valve body as specified in item 3.11.2.3:</p> <p>Stainless steel, U.S. Standard ASTM A 320 B8M CL 1 or equivalent steel, similar to material no. 1.4305/1.4310 as per DIN EN 10088-3</p> <p>For the valve body as specified in item 3.11.2.1 to 3.11.2.2:</p> <p>Bolts and cap screws:</p> <p>Chromate conversion-coated steel as per DIN 50961-FeZn8 - D or of quality class 8 as per DIN 267.</p>

### 3.12 Control tubing and screwed connections

Stainless steel, U.S. Standard AISI 316 or steel, material no. 1.4571 as per DIN EN 10088-3.

### 3.13 Rubber and plastic parts

All rubber and plastic parts shall be easily removable and must not be fixed irremovably to other valve parts. All non-metal materials shall be resistant to all fuels mentioned at para. 3. All rubber parts shall be resistant to fungi and bacteria according to MIL-S T D 810 D Item 508.3

#### 3.13.1 Diaphragms for main and control valves:

Synthetic rubber as per ASTM D-2000 or equivalent type.

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3.13.2 Seat gaskets for main and control valves:

Synthetic rubber as per ASTM D-2000 or equivalent type.

3.14 Requirements on the base valve and testing

Base valves have to be tested in accordance with DIN 3230 (edition 9/87) Part 6, Para.4, Tables 3 and 4, Group II. For the test methods, DIN EN 12266-1 and 2 will be applicable.

Requirements in addition to Table 4:

- Re. Item 6 : additional functional test of F20 at 16 bar
- Re. Item 8 : strength test of pressure-bearing valve body P10
- Re. Item 9 : instead of this, tightness of the pressure-bearing body P11 at 6 bar
- Re Item 10 : tightness of valve seat P12

All tests must be proven by a certificate as specified in Para. 3.14.1.

Material tests must be performed in accordance with applicable material standards and the AD 2000 W Codes of Practice.

Screws and nuts must be tested in accordance with the AD 2000 W7 and/or W2 Codes of Practice.

3.14.1 Evidence of quality features:

In accordance with DIN 3230, Part 6, Para.6, Group II.

Moreover, proof of the acceptance testing up to a nominal width of DN 200 is to be established by a certificate as per DIN EN 10204 3.1, and for nominal widths of DN 250 and larger as per DIN EN 10204 3.2.

3.14.2 Identification:

The base valve body shall be permanently marked with the following data as per EN 19 and AD 2000 A4:

- Identification of cast iron manufacturer and fittings manufacturer
- Nominal pressure (PN) or permissible maximum pressure (PS) as well as max./min. inlet temperature (TS)
- Nominal width (DN)
- Material designation
- Year of manufacture
- Presentation of the valve seat bridge
- CE mark
- Identification code of the independent inspection body

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The base valve cover shall be permanently marked with the following data as per EN 19 AD 2000 A4:

- Nominal width (DN)
- Material designation
- Identification of cast iron manufacturer

The fabrication number must be cast in both, the body and the cover of the base valve.

A name plate of brass should be fitted to the valve. The name plate on the valve body shall list the following:

- Nominal width (DN)
- Type number
- Part number
- Manufacturer/supplier
- Identification code of the independent inspection body

A name plate with the following details must be fitted to the inlet of the base valve:

- Nominal width (DN)
- "Inlet" marking
- Valve type number
- Part number

A plate marked "Outlet" shall be fitted to the valve outlet.

#### 4. Control and pilot valves

The Technical Specification STS-M refers to the number of the following sections where the respective control valve is described.

All control valves must be properly identified

The following materials shall be used for the control and pilot valves (diaphragm valves) indicated under item 4.1 to 4.24, unless specified otherwise in the respective paragraphs

- Valve body : highly corrosion-resistant cast steel as per U.S. Standard ASTM A296 CF-16 or equivalent highly corrosion-resistant forging steel
- Internal parts : stainless steel as per U.S. Standard AISI 303 or material no. 1.4305 as per DIN EN 10088-3 and AISI 302 or equivalent stainless steel similar to material no. 1.4310 as per DIN EN 10088-3
- Diaphragm and seat gasket : in accordance with Item 3.13

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4.1 Opening and closing speed pilot valve

- 4.1.1 Design A opening-speed pilot valve
- 4.1.2 Design B closing-speed pilot valve

One-way pilot valve permitting fixed setting of flow control, with unrestricted flow in the reverse direction, however, and secured against operating errors when in operation. It shall not be possible to fully close the valve by the adjusting stem.

4.2 Check pilot valve (closer)

Diaphragm-actuated pilot valve with drip-tight closure. The diaphragm shall be fully supported by the cover chamber or the valve body in both open and closed positions.

Opening Pressure: 0.1 bar maximum

On request of the Contracting Agency, evidence of the actual opening pressure shall be provided on a test stand at the Contractor's choice. The costs shall be included in the unit price.

4.3 Shut-off pilot valve (closer)

See item 4.2 except: "Opening speed".

4.4 Water drain valve (closer)

Diaphragm-actuated pilot valve

The valve will be installed in the water drain line of the filter/water separator sump. In the normal state, it shall be held closed by the pressure in the filter/water separator, directed into the cover chamber by the float control valve. When pressure is relieved from the cover chamber, the valve shall open, and the water accumulated in the filter sump shall be drained off. The diaphragm shall be fully supported by the cover chamber or the valve body in both the open and closed positions. The valve seat seal shall be securely fastened (against being sucked out).

Connection flange: as per DIN EN 1092-1 shape B1 or ASME B16.5 shape RF  
 Connection size: DN 25 / PN 16 or NPS 1" / ASME CLASS 150; seat 3/4"

4.5 Pressure pilot valve

Diaphragm-actuated pilot valve with separate control pressure chamber. The valve seat shall be replaceable. The diaphragm shall be fully supported by the cover chamber or the valve body in both open and closed positions.

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#### 4.6 Pressure pilot valve

Diaphragm-actuated pilot valve with separate control pressure chamber. The diaphragm shall be fully supported by the cover chamber or the valve body in both open and closed positions.

#### 4.7 Pressure-reducing control valve (closer)

Direct-acting, diaphragm-actuated, spring-loaded control valve. The control range shall be adjustable by a set screw with jam nut. The set screw shall be secured by a cap. It shall be possible to secure the adjusted setting with a lead seal.

#### 4.8 Pressure-reducing control valve (closer)

Direct-acting, diaphragm-actuated, spring-loaded control valve with separate control pressure chamber.

The control range shall be adjustable by a set screw with jam nut. The set screw shall be secured by a cap. It shall be possible to secure the adjusted setting with a lead seal.

#### 4.9 Pressure-relief control valve (opener)

Direct-acting, diaphragm-actuated, spring-loaded control valve with separate control pressure chamber.

The valve seat seal shall be secured against coming-off (against being sucked out). The control range shall be adjustable by a set screw with jam nut. It shall be possible to secure the adjusted setting with a lead seal.

#### 4.10 Pressure-sustaining control valve (opener)

Direct-acting, diaphragm-actuated, spring-loaded control valve with one separate control pressure chamber.

The valve seat shall be replaceable. The control range shall be adjustable by a set screw with jam nut. It shall be possible to secure the adjusted setting with a lead seal.

#### 4.11 Pressure-sustaining control valve (opener)

Direct-acting, diaphragm-actuated, spring-loaded control valve with one separate control pressure chamber.

The valve seat seal shall be secured against coming-off (against being sucked out). The control range shall be adjustable by a set screw with jam nut. The set screw shall be secured by a cap. It shall be possible to secure the adjusted setting with a lead seal.

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4.12 Differential pressure control valve (closer)

Direct-acting, diaphragm-actuated, spring-loaded control valve with one control pressure chamber.

Adjusting stem secured against operating errors when in operation. The control range shall be adjustable by a set screw with jam nut. The set screw shall be secured by a cap. It shall be possible to secure the adjusted setting with a lead seal.

4.13 Differential pressure control valve (closer)

Direct-acting, diaphragm-actuated, spring-loaded control valve with two control pressure chambers.

Adjusting stem secured against operating errors when in operation. The control range shall be adjustable by a set screw with jam nut. The set screw shall be secured by a cap. It shall be possible to secure the adjusted setting with a lead seal.

4.14 Differential pressure pilot valve (opener)

Direct-acting, diaphragm-actuated, spring-loaded control valve with two control pressure chambers.

Adjusting stem secured against operating errors when in operation. The control range shall be adjustable by a set screw with jam nut. The set screw shall be secured by a cap. It shall be possible to secure the adjusted setting with a lead seal.

4.15 Differential pressure pilot valve

Diaphragm-actuated, rotary disc-type, spring-loaded pilot valve with snap lock and two control pressure chambers. When the differential pressure exceeds the previously adjusted monitoring pressure, the rotary disc shall move into the shut-off position and redirect the flow to a different port. Reset after actuation shall only be possible in manual mode.

Adjusting stem secured against operating errors when in operation. The control range shall be adjustable by a set screw with jam nut. The set screw shall be secured by a cap. It shall be possible to secure the adjusted setting with a lead seal.

4.16 Three-way pilot valve

Spring-loaded, diaphragm-actuated three-way valve with integrated orifice in the valve bridge.

The diaphragm shall be fully supported by the cover chamber or the valve body in both open and closed positions. The upper and lower seats must be replaceable.

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4.17 Three-way pilot valve

Spring-loaded, diaphragm-actuated three-way valve with separate intermediate pressure chamber.

The diaphragm shall be fully supported by the cover chamber or the intermediate pressure chamber in both open and closed positions. The upper and lower seats must be replaceable.

4.18 Three-way pilot valve

Direct-acting, drip-tight closing, three-way valve with one moving part and replaceable seal.

Materials:

- Body : see preliminary remarks, Item 5.0
- Internal parts : Delrin or equivalent Nylon synthetics

4.19 Solenoid valve

Direct-acting, three-way, solenoid valve with adjusting screw for manual emergency operation.

Materials:

- Body : stainless steel, U.S. Standard AISI 303 or mat. no. 1.4305 as per DIN EN 10088-2/3
- Internal parts : stainless steel, U.S. Standard AISI 316 or mat. no. 1.4305 as per DIN EN 10088-3
- Solenoid : 230 V / 50 Hz, ex-proof incl. EC homologation in accordance with Directive 2014/34/EU (ATEX) and conformity mark

4.20 Float control valve

Float-actuated, rotary disk-type two-way valve for level control.

4.21 Float control valve

Float-actuated, rotary disk-type four-way valve for level control.

4.22 Float control valve with manual testing feature

Float-actuated, rotary-type, four-way level control valve with manual actuation and testing features. The valve consists of a mounting flange with integral control valve and the float assembly. It will be flanged to the water sump of the filter/water separator and shall activate the water drain valve automatically in line with the level of the interface between water and fuel. In the event of excessive water accumulation, it shall close the filter/separator control valve, until all water has been discharged via the water drain valve.

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The manual testing facility shall provide for the manual actuation of the main valve and the water drain valve on the one hand, and allow checking the float unit for leakage on the other hand.

#### 4.23 Dead man pilot valve

Manually operated, hydraulic two-way valve with quick-closing, dry-break couplers and high-pressure hoses, admitted for an operating pressure of 210 bar.

##### Materials:

- Manual valve : cast aluminum as per U.S. Standard ASTM B 26 Type 356-T6 or equivalent quality similar to EN AC-AISI10 Mg (EN AC-43000) as per DIN 1725, formerly G AISI 10 Mg.
- Internal parts : stainless steel, U.S. Standard AISI 302 or mat. no. 1.4305 as per DIN EN 10088-3 and AISI 302 or equivalent steel similar to mat. no. 1.4310 as per DIN EN 10088-3 and Delrin or equivalent Nylon synthetics
- Adapters : stainless steel, U.S. Standard AISI 303 or mat. no. 1.4305 as per DIN EN 10088-3 or chromate conversion-coated steel
- Dry-break coupler : stainless steel, U.S. Standard AISI 303 or mat. no. 1.4305 as per DIN EN 10088-3
- Hydraulic hoses : stainless steel mesh hose with inside and outside coating of synthetic rubber
- Hose length : up to 20.0 m

#### 4.24 Intermediate pressure chamber (Powerrol)

See also valve description in Item 3.0.

The main valve shall be controlled by external pressure and shall be independent of the system pressure. The specified valve shall be fitted additionally with an intermediate pressure chamber.

The relevant pressure chambers shall be separated by a diaphragm.

The valve shall close when pressure is applied to the upper chamber and open when pressure is applied to the lower chamber.

The intermediate pressure chamber shall be located between valve body and cover. There shall be an additional gasket between valve body and intermediate pressure chamber. The lower bearing of the valve stem shall not be in the valve seat of the body but in the intermediate chamber.

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The bearing shall be replaceable. Proper alignment of the valve stem shall be ensured by the concentric, self-centering recess of the intermediate pressure chamber with the valve body and the cover.

Material: as valve bode and cover, see Item 3.11.2

### 5. Accessories

#### 5.1 Strainers for control systems

Self-cleaning strainer, composed of a coarse-meshed support screen and a fine-meshed outer screen, size: 40 mesh (420 micron).

Material : stainless steel, U.S. Standard AISI 303 or mat. no. 1. 4305 as per DIN EN 10088-2 covered with stainless wire mesh, size: 40 mesh (420 micron)

Connection : according to nominal width of base valve

#### 5.2 Strainer/orifice assembly

Y-pattern strainer with replaceable sleeve, size 40 mesh (420 micron) and replaceable orifice plugs.

The strainer shall prevent foreign particles from entering the control system and shall simultaneously act as an ejector.

Materials:

Valve body : highly corrosion-resistant cast steel as per U.S. Standard ASTM A296 CF-16 or equivalent highly corrosion-resistant forging steel

Internal parts : stainless steel as per U.S. Standard AISI 303 or material no. 1.4305 as per DIN EN 10088-3 and AISI 302 or equivalent stainless steel similar to material no. 1.4310 as per DIN EN 10088-3

Strainer screen : Monel, size: 40 mesh (420 micron)

Orifice plug : stainless steel, U.S. Standard AISI 303 or mat. no. 1.4305 as per DIN EN 10088-3 and AISI 302 or equivalent steel similar to mat. no. 1.4310 as per DIN EN 10088-3, Delrin or equivalent Nylon synthetics

#### 5.3 Valve position indicator

Frictionless, encased bar indicator, firmly screwed to valve stem for the indication of the valve opening width. The accessory shall have an integral ventilation for purging air trapped in the base valve cover. Valve position indicators welded to valve stem shall not be permitted.

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DESCRIPTION <b>HYDRAULIC CONTROL VALVES</b>	ID-CODE	

Materials:

- Body : stainless steel, U.S. Standard AISI 303 or mat. no. 1.4305 as per DIN EN 10088-2/3
- Sight-glass tube : heat-resistant safety glass, resistant up to 600 psi (42. 2 bar); plastic materials are not admitted
- Connection : acc. to connection of the base valve cover chamber

5.4 Actuating rod assembly with solenoid switch

Actuating rod (valve position indicator) as contactless transmitter shall be enclosed in a drip-tight stainless steel sleeve, which shall serve as holder for the height-adjustable transmitter assembly.

Frictionless, encased solenoid switch for electrical indication of valve position. The accessory shall have an integral ventilation for purging air trapped in the base valve cover. Direct control via the valve position indicator shall not be permitted

Materials:

- Body : stainless steel as per U.S. Standard AISI 303 or material no. 1.4305 as per DIN EN 100883-2/3 and AISI 302 or equivalent stainless steel similar to material no. 1.4310 as per DIN EN 10088-2/3
- Internal parts : stainless steel as per U.S. Standard AISI 303 or material no. 1.4305 as per DIN EN 10088-3 and AISI 302 or equivalent stainless steel similar to material no. 1.4310 as per DIN EN 10088-3
- Solenoid switch : 230 V / 50 Hz, ex-proof incl. EC homologation in accordance with Directive 2014/34 EC (ATEX) and conformity mark
- Connection cable : NYMHY 3 x 0.75 mm<sup>2</sup>, 1.0 m long
- Connection : acc. to connection of the main valve cover chamber

5.5 Orifice flange with orifice plate

The orifice flange may be installed separately form the valve body.

Total length: 38 mm without gasket; incl. control tubing and screw connections

- Flange shape : as base valve body

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Materials : orifice flange : as base valve body  
orifice plate: stainless steel, U.S. Standard AISI 303 or  
mat. no. 1.4305 as per DIN EN 10088-3

Testing and acceptance : acceptance certificate as per DIN EN 10204, 3.1

Connection : acc. to main valve

### 5.6 Ejector

Component with internal primary and secondary nozzles

Materials:

Body : stainless steel or cast stainless steel in accordance with Item 4.11.2

Internal parts : stainless steel, U.S. Standard AISI 303 or mat. no. 1.4305 as per DIN EN 10088-3  
and AISI 302 or equivalent steel similar to mat. no. 1.4310 as per DIN EN 10088-3

### 5.7 Throttle assembly

Screwed pipe joint with replaceable throttling plug.

Materials:

Screwed pipe joint : see Item 3.12

Throttling plug : stainless steel, U.S. Standard AISI 303 or mat. no. 1.4305 as per DIN EN 10088-3 and AISI 302 or equivalent steel similar to mat. no. 4310 as per DIN EN 10088-3 and with orifice made of or equivalent Nylon synthetics.

### 5.8 Ball cock

Only permitted for approved tank filling safety valve with certificate of conformity, however, not to shut-off the control system or the individual control valves.

Materials:

Body : stainless steel, U.S. Standard AISI 316 or mat. no. 1.4436 as per DIN EN 10088-3/2 or DIN EN 10222-5

Internal parts : stainless steel, U.S. Standard AISI 316 or mat. no. 1.4436 as per DIN EN 10088-3

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### 5.9 Hydrant adapter

Adapter at hydrant refueling valve, matching hydrant coupler as per MIL-C-83260. The adapter shall be delivered flanged to the refueling valve.

Materials:

- Valve body : highly corrosion-resistant cast steel as per U.S. Standard ASTM A296 CF-16 or equivalent highly corrosion-resistant forging steel
- Internal parts : stainless steel as per U.S. Standard AISI 303 or material no. 1.4305 as per DIN EN 10088-3 and AISI 302 or equivalent stainless steel similar to material no. 1.4310 as per DIN EN 10088-3
- Dust cap : fuel-resistant rubber
- Connection flange : acc. to main valve
- Connection size : DN 100, drilled acc. to DIN EN 1092-1, PN 16 or NPS 4" drilled acc. to ASME B16.5 CLASS 150

### 5.10 Venturi pipe

Cast Venturi pipe as control unit for hydrant and refueling valves with process connections.

Materials:

- Body : cast stainless steel as per DIN EN 10213-4, mat. no. 1.4581
- Control tube connection : 1/8"
- Connecting flange : as per DIN EN 1092-1, shape B1
- Testing and acceptance : acceptance certificate as per DIN EN 10204, 3.1
- Connection size : DN 100 / PN 16 or NPS 4" / ASME CLASS 150

### 5.11 Capacity reservoir

Capacity reservoir for the control medium of the overflow protection of the drain tank. The capacity reservoir must comply with the homologation and/or declaration of conformity.

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<b>HYDRAULIC CONTROL VALVES</b>		

Material:

Body	:	stainless steel
Manometer	:	stainless steel
Ball/shut-off cock	:	stainless steel
Manometric switch	:	stainless steel
Connection size	:	½" NPT

5.12 Manual tester

Manually actuated rod to test the orderly operation of the float control valves in the fuel and drain tanks.

The manual tester shall be threaded into the dome cover of the fuel tank above the float control valve.

The gasket between the rod and the tank shall be gastight.

The manual tester shall be covered with a protective cap.

Materials:

Body	:	stainless steel, mat. no. 1.4301 as per DIN EN 10222-5
Internal parts	:	stainless steel, mat. no. 1.4301 as per DIN EN 10222-5 and fuel resistant synthetics
Pull rope	:	stainless steel Ø 2.5 mm

6. Manuals

In addition to all necessary certificates, manuals shall be furnished in German and English language for any valve model and valve size delivered. The manual shall include the following:

- Flow diagram of the control valve
- Functional description of the fitting and the control valves
- Description of the structure
- Sectional drawings of main valve and all control valves, for each valve size
- Spare parts lists for main valve and all control valves, for each valve size
- Technical instructions for trouble shooting
- Repair and maintenance instructions for the main valve and the control valves

The manual shall enable the operator to independently perform repair work.

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7. Pre-setting of the control valves

All valves have to be delivered pre-adjusted with test stand log, in which all requested functions will be recorded.

8. Functional test and matching (responsibility of the Contracting Agency)

Start-up operations shall be performed at the Contracting Agency's charge, to adjust the control valves to the hydraulic conditions of the system to be installed. The control valves shall not be installed until after flushing of the overall facility; they shall be adjusted by skilled personnel of the valve manufacturer/supplier during the test run.

The valve manufacturer/supplier shall be able to provide technical assistance in the design work and the start-up of the fittings.

The below manufacturer(s) is (are) known to manufacture products of the type specified in this specification section. Any other manufacturer(s) from a NATO member Nation Country may provide this product, provided they can prove to meet this specification.

Brand: Fa. CLA-VAL-CO

or equivalent

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<b>STANDARD SPECIFICATION</b>	<b>STS – M 11</b>	
DESCRIPTION <b>ROOF VENTILATOR</b>		ID-CODE <b>VL</b>

For venting of rooms where explosive gas-vapor-air mixtures (finished mineral oil products) may occur (zone 1).

The following rules have to be kept reliably:

1. Directive 2014/34/EU of the European parliament and of the council on the approximation of the laws of the Member States concerning equipment and protective systems intended for use in potentially explosive atmospheres (ATEX)
2. Directive 2006/42/EU of the European parliament and of the council on the approximation of the laws of the Member States of 17 May 2006 on machinery
3. Regulation (EU) No 305/2011 of the European Parliament and of the laying down harmonised conditions for the marketing of construction products
4. General Product Safety Directive (GPSD) and associated rules (GPSR)
5. Ordinance on Industrial Safety and Health
6. General Product Safety Directive (GPSD)
7. Technical rules for operation safety/hazardous substances, especially TRBS 3151 / TRGS 751
8. VdTÜV instruction sheets, especially VdTÜV-MB 967, VdTÜV-MB 966-1 and VdTÜV-MB 966-2
9. DIN, DIN EN, DIN EN ISO, VDE directives, especially DIN EN 60079/VDE 0170-1, DIN EN 60079-7/VDE 0170-6, VDMA 24169-1
10. Technical rules for flammable liquids, especially TRbF 50, TRbF 20 (other sources of information)

#### Materials

Ventilator housing : galvanized sheet steel, painted inside with fuel-resistant varnish

Impeller : plastic (glass fiber-reinforced polyamide) or equivalent

#### Design

Design as ex-protected axial-roof ventilator with vibration-damped motor suspension.

#### Accessories

- Connection cable, length approx. 1.5 m, loose terminal box, protection type IP 65, with 2 cable glands Pg 11
- elastische pipe connection (collar)
- Flat roof base with insulation (height approx. 300 mm)

#### Drive

Ex-protected three-phase motor EEx e II T3 acc. to DIN EN 60079 /VDE 0170-1, DIN EN 60079-7 / VDE 0170-6, VDMA 24169-1

Voltage : 400 Volt  
Protection type : min. IP 65

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<h2>STANDARD SPECIFICATION</h2>	<h1>STS – M 11</h1>	
DESCRIPTION <b>ROOF VENTILATOR</b>		ID-CODE <b>VL</b>

Frequency : 50 Hz  
 Motor speed : max. 1000 U/min

Design A (Filter/manifold station)

Air flow : approx. 2000 m<sup>3</sup>/h (20° C)  
 Pipeline : approx. 400 mm diameter

Design B (Pump building 5000m<sup>3</sup>, 2500 m<sup>3</sup> and 1250 m<sup>3</sup>tank)

Air flow : approx. 950 m<sup>3</sup>/h (20° C)  
 Pipeline : approx. 300 mm diameter

Evidence of quality features

Type test certificate acc. to directive 2014/34/EU and therein requested documents.

Identification

Acc. to annex IV No. 5 of directive 2014/34/EU  
 CE conformity marking acc. to Art. 16 of directive 2014/34/EU

Legally required evidences

Acc. to General Product Safety Directive (GPSD) and associated rules (GPSR), Construction Products Law especially  
 EG declaration of conformity acc. to directive 2014/34/EU

Periodic inspections by an authorized control office

Acc. to Product Safety Directive, facilities and facility parts in need of monitoring must be reviewed repeatedly in certain periods for their orderly conditions concerning the operation by an authorized control office. The operator has to find out the review periods of the complete facility and the facility parts on the base of a safety related evaluation. Therefore the manufacturer of the components must specify and determine the review periods for the individual components of the facilities in need of monitoring. As the operator wants the control office to authorize review periods as long as possible, the fittings and components described in this specifications must be designed and dimensioned in a way that they allow a review period of 3 years for electrical and 5 years for mechanical components.

STS-M 0 shall be observed.

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<b>STANDARD SPECIFICATION</b>	<b>STS – M 12</b>	
DESCRIPTION <b>PIPE VENTILATOR</b>		ID-CODE <b>VL</b>

For venting of pits where explosive gas-air mixtures may occur (zone 1).

The following rules have to be kept reliably:

1. Directive 2014/34/EU of the European parliament and of the council on the approximation of the laws of the Member States concerning equipment and protective systems intended for use in potentially explosive atmospheres (ATEX)
2. Directive 2006/42/EU of the European parliament and of the council on the approximation of the laws of the Member States of 17 May 2006 on machinery
3. Regulation (EU) No 305/2011 of the European Parliament and of the laying down harmonised conditions for the marketing of construction products
4. General Product Safety Directive (GPSD) and associated rules (GPSR)
5. Ordinance on Industrial Safety and Health
6. General Product Safety Directive (GPSD)
7. Technical rules for operation safety/hazardous substances, especially TRBS 3151 / TRGS 751
8. VdTÜV instruction sheets, especially VdTÜV-MB 967, VdTÜV-MB 966-1 and VdTÜV-MB 966-2
9. DIN, DIN EN, DIN EN ISO, VDE directives, especially DIN EN 60079/VDE 0170-1, DIN EN 60079-7/VDE 0170-6, VDMA 24169
10. Technical rules for flammable liquids, especially TRbF 50, TRbF 20 (other sources of information)

#### Materials

Ventilator housing : galvanized sheet steel, painted inside with fuel-resistant varnish

Impeller : plastic (glass fiber-reinforced polyamide) or equivalent

#### Design

Axial pipe ventilator, motor intake on one side, sheet steel housing with round flanges on both sides, vibration-damped motor suspension, terminal box mounted outside, and control opening with gate valve.

The ventilator will be installed in a vertical piping; the necessary brackets, including wall fixtures, shall be furnished and installed.

#### Drive

Ex-protected three-phase motor EEx e II T3 acc. to DIN EN 60079 /VDE 0170-1, DIN EN 60079-7 / VDE 0170-6, VDMA 24169-1

Voltage : 400 Volt  
Protection type : min. IP 54  
Frequency : 50 Hz  
Motor speed : as selected by the manufacturer

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<b>STANDARD SPECIFICATION</b>	<b>STS – M 12</b>	
DESCRIPTION <b>PIPE VENTILATOR</b>		ID-CODE <b>VL</b>

Lekage control pits

Capacity (air) : approx. 220 m<sup>3</sup>/h  
 Pipeline : 200 mm diameter  
 Speed : approx. 2800 rpm is admissible.  
 The sound level LA, however, must not exceed 64 dB.

Pump pits 300 m<sup>3</sup> and 500 m<sup>3</sup> flat bottom tank FSTS

Capacity (air) : approx. 150 m<sup>3</sup>/h  
 Pipeline : 200 mm diameter  
 Speed : approx. 2800 U/min. is admissible.  
 The sound level LA, however, must not exceed 64 dB.

Evidence of quality features

Type test certificate acc. to directive 2014/34/EU and therein requested documents.

Identification

Acc. to annex II No. 1.0.5. of directive 2014/34/EU  
 CE conformity marking acc. to § 5 Abs. 1 and 2 of directive 2014/34/EU

Legally required evidences

Acc. to General Product Safety Directive (GPSD) and associated rules (GPSR), Construction Products Law especially  
 EU declaration of conformity acc. to directive 2014/34/EU

Periodic inspections by an authorized control office

Acc. to Product Safety Directive, facilities and facility parts in need of monitoring must be reviewed repeatedly in certain periods for their orderly conditions concerning the operation by an authorized control office. The operator has to find out the review periods of the complete facility and the facility parts on the base of a safety related evaluation. Therefore the manufacturer of the components must specify and determine the review periods for the individual components of the facilities in need of monitoring. As the operator wants the control office to authorize review periods as long as possible, the fittings and components described in this specifications must be designed and dimensioned in a way that they allow a review period of 3 years for electrical and 5 years for mechanical components.

STS-M 0 shall be observed.

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<b>STANDARD SPECIFICATION</b>	<b>STS – M 14</b>	
DESCRIPTION <b>STEEL PIPES</b>	ID-CODE	

Steel pipes conveying finished mineral oil products of the hazard characteristics R 10 (flammable), F (easily flammable) and F+ (highly flammable) with an aromatic content of up to 50 %.  
Suitable for underground and above-ground installation as well as installation in stations and pits.

The following regulations are imperative and have to be complied with:

1. Directive 2014/68EC of the European Parliament and of the Council on the approximation of the laws of the Member States concerning pressure equipment
2. Regulation (EU) No. 305/2011 of the European Parliament and of the Council laying down harmonized conditions for the marketing of construction products
3. General Product Safety Directive (GPSD) and associated regulations (GPSR)
4. German Ordinance on Industrial Safety and Health (BetrSichV)
5. Technical Rules on the Operational Safety/Hazardous Materials, especially TRBS 3151 / TRGS 751
6. VdTÜV Codes of Practice, especially VdTÜV-MB 967, VdTÜV-MB 966-1 and VdTÜV-MB 966-2
7. AD 2000 Codes of Practice, especially AD 2000 W2
8. DIN, DIN EN and DIN EN ISO standards, especially DIN 2413, DIN EN 10220, DIN EN ISO 3183, DIN EN 10216, DIN EN 10217, DIN EN 13480-3, DIN EN ISO 9692-1
9. Technical Rules for the Handling of Flammable Liquids, especially TRbF 50 (other sources of information)

### Use

The exterior temperature variations typical in Europe must be considered.

Medium:	finished mineral oil products
Pressure level:	PN 16
Density of the conveyed medium:	736 to 860 kg/m <sup>3</sup>
Kinematic viscosity of conveyed medium:	0.9 x 10 <sup>-6</sup> to 8.0 x 10 <sup>-6</sup> m <sup>2</sup> /s

### Materials

In accordance with TRbF 50, Annex A: Item 3.21

### Manufacture

In accordance with DIN EN ISO 3183, the relevant parts of DIN EN 10216 / DIN EN 10217 and the requirements specified here-in:

- Minimum pipe length       $L_{min}$       =      6.0 m
- Weld seam quality           $V_N$           =      1.0

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<h2>STANDARD SPECIFICATION</h2>	<h1>STS – M 14</h1>	
DESCRIPTION <b>STEEL PIPES</b>	ID-CODE	

- Pipe ends with welding bevels as per DIN EN ISO 9692-1 (inside calibration for DN 150 and more),  
Code number 1.2.1 at a wall thickness  $\leq 4.0$  mm  
Code number 1.3 at a wall thickness  $> 4.0$  mm

### Design

Calculation of the wall thickness as per DIN 2413/DIN EN 13480-3 for an operating pressure of 16.0 bar, at least in accordance with the values in the table below, however.

Outside diameter	Wall thickness for safety coefficient S = 2.0 - as per DIN EN 10220	
	Seamless	Welded
DN 300 – 323.1 mm	7.1 mm	5.6 mm
DN 250 – 273.0 mm	6.3 mm	5.0 mm
DN 200 – 219.1 mm	6.3 mm	4.5 mm
DN 150 – 168.3 mm	4.5 mm	4.0 mm
DN 125 – 138.7 mm	4.0 mm	3.6 mm
DN 100 – 114.3 mm	3.6 mm	3.2 mm
DN 80 – 88.9 mm	3.2 mm	2.9 mm
DN 65 – 76.1 mm	2.9 mm	2.6 mm
DN 50 – 60.3 mm	2.9 mm	2.3 mm
DN 40 – 48.3 mm	2.6 mm	2.3 mm
DN 32 – 42.4 mm	2.6 mm	2.3 mm
DN 25 – 33.7 mm	2.6 mm	2.0 mm
DN 20 – 26.9 mm	2.3 mm	2.0 mm
DN 15 – 21.3 mm	2.0 mm	2.0 mm

### Insulation

Factory insulation as per STS-M 69, if required in the design specifications.

### Transport and storage

Intermediate layers should be part of the scope of delivery.  
All pipes should be fitted with plastic caps for delivery.  
Delivery and storage should be done in such a way that any damage is avoided.

### Requirements and testing

All testing and inspections shall be conducted in accordance with scope specified in the relevant codes.

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STANDARD SPECIFICATION	<h2>STS – M 14</h2>	
DESCRIPTION <b>STEEL PIPES</b>	ID-CODE	

Evidence of quality features

In accordance with TRbF 50, Annex A: Item 3.25

Product of PN x DN ≤ 2000 [bar mm] acceptance inspection certificate as per DIN EN 10204, Para. 2.2

Product of PN x DN > 2000 [bar mm] acceptance inspection certificate as per DIN EN 10204 based on AD 2000 W4

Identification/labeling

In accordance with the relevant parts of DIN EN 10216/DIN EN 10217 and DIN EN ISO 3183

Any identification labeling must be applied in such a way that it can still be seen after the pipe was insulated.

Legally required evidence

In accordance with the General Product Safety Directive (GPSD) and associated regulations (GPSR), Construction Products Law

Especially:

Serviceability and Compatibility Certificates by the supervisory authority.

STS-M 0 must be adhered to.

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<h2>STANDARD SPECIFICATION</h2>	<h1>STS – M 15</h1>	
DESCRIPTION  <b>STEEL ELBOWS</b>	ID-CODE	

Steel elbow, to be welded into piping for the transfer of finished mineral oil products with hazard characteristics R10 (flammable) F (easily flammable) and F\* (highly flammable) with aromatic content of up to 50%.  
For underground and above ground installation as well as for installation in stations and shafts.

The following regulations are imperative and have to be complied with:

1. Directive 2014/68/EU of the European Parliament and of the Council on the approximation of the laws of the Member States concerning pressure equipment
2. Regulation (EU) No 305/2011 of the European Parliament and of the Council laying down harmonized conditions for the marketing of construction products
3. General Product Safety Directive (GPSD) and associated rules (GPSR)
4. Ordinance on Industrial Safety and Health
5. Technical rules for operation safety/hazardous substances, especially TRBS 3151 / TRGS 751
6. VdTÜV Codes of Practice, especially VdTÜV-MB 967, VdTÜV-MB 966-1 and VdTÜV-MB 966-2
7. AD 2000 Codes of Practice, especially AD 2000 series HP and W
8. DIN, DIN EN and DIN EN ISO standards, especially DIN EN 10253, DIN EN 10220, DIN EN ISO 3183, DIN EN 100216, DIN EN 10217, DIN EN 13480-3, DIN EN ISO 9692-1
9. Technical rules for flammable liquids, especially TRbF 20 and 50 (other sources of information)
10. Technical rules for steam boilers, especially TRD 301 annex 2 (other sources of information)

### Use

The exterior temperature changes usual in Europe must be considered.

Medium:	finished mineral oil products
Pressure step:	PN 16
Density of transport medium:	736 to 860 kg/m <sup>3</sup>
Kinematic viscosity of transport medium:	0.9 x 10 <sup>-6</sup> to 8.0 x 10 <sup>-6</sup> m <sup>2</sup> /s

### Material

Acc. to TRbF 50, annex A: par. 3.3 and DIN EN 10253

### Manufacture

Acc. to DIN EN 10253 of seamless and welded steel pipes acc. to DIN EN 10220. The AD 2000 codes of practice of the HP series must be observed.

Additional requirements:

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<h2>STANDARD SPECIFICATION</h2>	<h1>STS – M 15</h1>	
DESCRIPTION <b>STEEL ELBOWS</b>	ID-CODE	

Inside calibrated welded ends, free of burrs with chamfer acc. to DIN EN ISO 9692-1

Code no. 1.2.1 for wall thickness  $\leq 4,0$  mm

Code no. 1.3 for wall thickness  $> 4,0$  mm

### Dimensions

Wall thickness of elbow inside to be calculated acc. to TRD 301 annex 2 and/or DIN EN 13480-3. Elbow outside to be dimensioned analogously to pipe to be connected.

However, the minimum wall thickness of the pipe to be connected has to be used.

### Requirements and tests

On basic material acc. to DIN EN ISO 3183 and parts of DIN EN 10216/ DIN EN 10217.

On finished elbow acc. to DIN EN 10253 and TRbF 50, annex A: par. 3.3 and 3.34.

For the test of welded elbows the AD 2000 instruction sheets of the series HP are applicable analogously.

### Evidence of quality features

- Acc. to TRbF 50, annex A: par. 3.35

Product of PN x DN  $\leq 2000$  [bar mm] Acceptance test certificate acc. to DIN EN 10204 par. 2.2

Product of PN x DN  $> 2000$  [bar mm] Acceptance test certificate acc. to DIN EN 10204 on the base of AD 2000 W4

### Identification

The elbows have to be marked durably and clearly, for ex. by imprinting acc. to DIN 2609 par.6.

### Legally required evidences

Acc. to General Product Safety Directive (GPSD) and associated rules (GPSR), construction products law

Especially:

Certificate of usability and conformity by construction supervision

STS-M 0 shall be observed.

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<b>STANDARD SPECIFICATION</b>	<b>STS – M 16</b>	
DESCRIPTION	ID-CODE	
<b>STEEL PIPE FITTINGS</b>		

T-pieces, reducers and caps, suitable for the installation in pipelines conveying flammable and water-polluting liquids of the hazard characteristics R10 (flammable), F (easily flammable) and F+ (highly flammable) with an aromatic content up to 50 %.

Suitable for underground and above-ground installation as well as installation in stations and pits.

The following regulations are imperative and must be complied with:

1. Directive 2014/68EU of the European Parliament and of the Council on the approximation of the laws of the Member States concerning pressure equipment
2. Regulation (EU) No. 305/2011 of the European Parliament and of the Council on laying down harmonized conditions for the marketing of construction products
3. General Product Safety Directive (GPSD) and associated regulations (GPSR)
4. German Ordinance on Industrial Safety and Health (BetrSichV)
5. Technical Rules on the Operational Safety/Hazardous Materials, especially TRBS 3151 / TRGS 751
6. VdTÜV Codes of Practice, especially VdTÜV-MB 967, VdTÜV-MB 966-1 and VdTÜV-MB 966-2
7. AD 2000 Codes of Practice, especially AD 2000 series B, HP and W
8. DIN, DIN EN and DIN EN ISO standards, especially DIN EN 10253-2, DIN EN 13480-3 DIN EN ISO 9692-1
9. Technical Rules for the Handling of Flammable Liquids, especially TRbF 50 (other sources of information)

### Use

Exterior temperature variations typical in Europe must be considered.

Conveyed media: finished mineral oil products  
 Pressure level: PN 16  
 Density of the conveyed medium: 736 to 860 kg/m<sup>3</sup>  
 Kinematic viscosity of conveyed medium: 0.9 x 10<sup>-6</sup> to 8.0 x 10<sup>-6</sup> m<sup>2</sup>/s

### Materials

In accordance with TRbF 50, Annex A: Item 3.3 and DIN 10253-2

### Design

The dimensioning of the wall thicknesses of the fittings shall be based on the following codes:

Reducer ⇒ AD2000 B2 or DIN EN 13480-3  
 T-piece ⇒ AD2000 B9, TRD 301 or DIN EN 13480-3  
 Cap ⇒ AD2000 B3 or DIN EN 13480-3

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<b>STANDARD SPECIFICATION</b>	<b>STS – M 16</b>	
DESCRIPTION		ID-CODE
<b>STEEL PIPE FITTINGS</b>		

Safety coefficient	S	=	2.0
Corrosion addition	C <sub>2</sub>	=	0 mm
Calculated pressure	p	=	16.0 bar

When using fittings as per DIN EN 10253-2, no calculation is required.

- For the dimensioning of the fittings, the wall thickness of the connected pipe should be taken as the minimum wall thickness of the fitting.

#### Manufacture

In accordance with DIN EN 10253 and of the principles set out in the AD2000 Codes of Practice, HP series; special structures in accordance with the drawings and calculation proofs verified by the specified body including:

- Dimensions and tolerances of the fittings based on the following standards:
  - Reducer    ⇒    DIN EN 10253-2
  - T-piece     ⇒    DIN EN 10253-2
  - Cap         ⇒    DIN EN 10253-2
 Semi-ellipsoidal heads as per DIN 28013 can be used as an alternative to caps.
- Internally sized ends with weld bevels as per DIN EN ISO 9692-1
  - Classification number 1.2.1 at a wall thickness ≤ 4.0 mm
  - Classification number 1.3 at a wall thickness > 4.0 mm

#### Execution:

Forged, welded or hot-shaped from seamless pipes sections.

#### Requirements and inspection/testing

As per DIN EN 10253-2 and TRbF 50 annex A: item 3.3 and 3.34.

Scope of inspection and testing in accordance with the stipulations of the corresponding source material standards and the AD 2000 Codes of Practice, W series.

Welded fittings shall be tested according to the principles set out in the AD 2000 Codes of Practice, HP series.

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STANDARD SPECIFICATION	<h2>STS – M 16</h2>	
DESCRIPTION	ID-CODE	
<b>STEEL PIPE FITTINGS</b>		

Evidence of quality features

As per DIN EN 10252-2 and TRbF 50 annex A: item 3.35

Product of PN and DN  $\leq$  2000 [bar mm] acceptance inspection certificate as per DIN EN 10204, Para. 2.2  
Product of PN and DN  $>$  2000 [bar mm] acceptance inspection certificate as per DIN EN 10204 based on AD 2000 W4.

Identification/labeling

The fittings shall be identified clearly and permanently by embossing for instance, in accordance with DIN EN 10253.

Legally required evidence

General Product Safety Directive (GPSD) and associated regulations (GPSR)  
Especially:  
Serviceability and Compatibility Certificates by the supervisory authority.

STS-M 0 must be adhered to.

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<b>STANDARD SPECIFICATION</b>	<b>STS – M 17</b>	
DESCRIPTION <b>WELDING NECK FLANGES MADE OF STEEL</b>		ID-CODE

Welding neck flanges suitable for the connection of pipes conveying finished mineral oil products of the hazard characteristics R 10 (flammable), F (easily flammable) and F+ (highly flammable) with an aromatic content of up to 50 %.

Suitable for underground and above-ground installation as well as installation in stations and pits.

The following regulations are imperative and must be complied with:

1. Directive 2014/68EC of the European Parliament and of the Council on the approximation of the laws of the Member States concerning pressure equipment
2. Regulation (EU) No. 305/2011 of the European Parliament and of the Council on laying down harmonized conditions for the marketing of construction products
3. General Product Safety Directive (GPSD) and associated regulations (GPSR)
4. German Ordinance on Industrial Safety and Health (BetrSichV)
5. Technical Rules on the Operational Safety/Hazardous Materials, especially TRBS 3151 / TRGS 751
6. VdTÜV Codes of Practice, especially VdTÜV-MB 967, VdTÜV-MB 966-1 and VdTÜV-MB 966-2
7. AD 2000 Codes of Practice, especially AD 2000 series HP and W9
8. DIN, DIN EN and DIN EN ISO standards, especially DIN EN 1092-1, DIN EN 1591, DIN EN ISO 9692-1
9. Technical Rules for the Handling of Flammable Liquids, especially TRbF 50 (other sources of information)

### Use

Exterior temperature variations typical in Europe must be considered.

Conveyed media:	finished mineral oil products
Pressure level:	PN 16
Density of the conveyed medium:	736 to 860 kg/m <sup>3</sup>
Kinematic viscosity of conveyed medium:	0.9 x 10 <sup>-6</sup> to 8.0 x 10 <sup>-6</sup> m <sup>2</sup> /s

### Materials

The selected flange material shall be in line with the pipe material in accordance with DIN EN 1092-1.

### Design

Calculation as per DIN EN 1591.

Dimension as per DIN EN 1092-1, welding neck flange, type 11

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STANDARD SPECIFICATION	<h2>STS – M 17</h2>	
DESCRIPTION	ID-CODE	
<b>WELDING NECK FLANGES MADE OF STEEL</b>		

Manufacture

As per DIN 1092-1 and AD 2000 Code of Practice W9, forged, pressed and turned.

Execution (PN 16)

As per DIN EN 1092-1, sealing surface shape B1.

- Welding end with weld bevels as per DIN EN ISO 9692-1  
Classification number 1.2.1 at a wall thickness  $\leq 4.0$  mm  
Classification number 1.3 at a wall thickness  $> 4.0$  mm

The machined surfaces shall be protected with a colorless, washable corrosion-protection paint.

Requirements and inspection/testing

In accordance with AD 2000 Codes of Practice, W series, especially AD 2000 W9 and the relevant material quality standards and DIN EN 1092-1.

Evidence of quality features

In accordance with the AD 2000 Codes of Practice, W series. The acceptance certificate as per DIN EN 10204 shall be made out in accordance with the AD 2000 Codes of Practice, W series depending on the individual types of material.

Identification/labeling

As per DIN EN 1092-1.

Legally required evidence

General Product Safety Directive (GPSD) and associated regulations (GPSR)  
Especially:  
Serviceability and Compatibility Certificates by the supervisory authority.

STS-M 0 must be adhered to.

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STANDARD SPECIFICATION	<h2>STS – M 18</h2>	
DESCRIPTION	ID-CODE	
<b>BLIND FLANGES MADE OF STEEL</b>		

Blind flanges suitable for the installation in pipelines conveying finished mineral oil products of the hazard characteristics R 10 (flammable), F (easily flammable) and F+ (highly flammable) with an aromatic content of up to 50 %.

Suitable for underground and above-ground installation as well as installation in stations and pits.

The following regulations are imperative and must be complied with:

1. Directive 2014/68/EU of the European Parliament and of the Council on the approximation of the laws of the Member States concerning pressure equipment
2. Regulation (EU) No. 305/2011 of the European Parliament and of the Council on laying down harmonized conditions for the marketing of construction products
3. General Product Safety Directive (GPSD) and associated regulations (GPSR)
4. German Ordinance on Industrial Safety and Health (BetrSichV)
5. Technical Rules on the Operational Safety/Hazardous Materials, especially TRBS 3151 / TRGS 751
6. VdTÜV Codes of Practice, especially VdTÜV-MB 967, VdTÜV-MB 966-1 and VdTÜV-MB 966-2
7. AD 2000 Codes of Practice, especially AD 2000 series HP and W9
8. DIN, DIN EN and DIN EN ISO standards, especially DIN EN 1092-1, DIN EN 1591
9. Technical Rules for the Handling of Flammable Liquids, especially TRbF 50 (other sources of information)

### Use

Exterior temperature variations typical in Europe must be considered.

Conveyed media:	finished mineral oil products
Pressure level:	PN 16
Density of the conveyed medium:	736 to 860 kg/m <sup>3</sup>
Kinematic viscosity of conveyed medium:	0.9 x 10 <sup>-6</sup> to 8.0 x 10 <sup>-6</sup> m <sup>2</sup> /s

### Materials

The selected flange material shall be in line with the pipe material in accordance with DIN EN 1092-1.

### Design

Calculation as per DIN EN 1591.

Dimension as per DIN EN 1092-1, blind flange, type 05

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STANDARD SPECIFICATION	<h2>STS – M 18</h2>	
DESCRIPTION <b>BLIND FLANGES MADE OF STEEL</b>		ID-CODE

Manufacture

As per DIN 1092-1 and AD 2000 Code of Practice W 9.

Execution (PN 16)

As per DIN EN 1092-1, sealing surface shape B1.  
The machined surfaces shall be protected with a colorless, washable corrosion-protection paint.

Requirements and inspection

In accordance with AD 2000 Codes of Practice, W series, especially AD 2000 W9 and the relevant material quality standards and DIN EN 1092-1.

Evidence of quality features

As per AD 2000 Codes of Practice, W series. The acceptance certificate as per DIN EN 10204 shall be made out in accordance with the AD 2000 Codes of Practice, W series depending on the individual materials.

Identification/labeling

As per DIN EN 1092-1.

Legally required evidence

General Product Safety Directive (GPSD) and associated regulations (GPSR)  
Especially:  
Serviceability and Compatibility Certificates by the supervisory authority.

STS-M 0 must be adhered to.

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<h1>USAFE</h1>	REVISION 1	DATE: MAY 2015
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STANDARD SPECIFICATION	<h2>STS – M 19</h2>	
DESCRIPTION	ID-CODE	
<b>STAINLESS STEEL PIPES</b>		

Steel pipes conveying finished mineral oil products of the hazard characteristics R 10 (flammable), F (easily flammable) and F+ (highly flammable) with an aromatic content of up to 50 %.  
Suitable for underground and above-ground installation as well as installation in stations and pits.

The following regulations are imperative and must be complied with:

1. Directive 2014/68EU of the European Parliament and of the Council on the approximation of the laws of the Member States concerning pressure equipment
2. Regulation (EU) No. 305/2011 of the European Parliament and of the Council on laying down harmonized conditions for the marketing of construction products
3. General Product Safety Directive (GPSD) and associated regulations (GPSR)
4. German Ordinance on Industrial Safety and Health (BetrSichV)
5. Construction Products Act (BauPG)
6. Technical Rules on the Operational Safety/Hazardous Materials, especially TRBS 3151 / TRGS 751
7. VdTÜV Codes of Practice, especially VdTÜV-MB 967, VdTÜV-MB 966-1 and VdTÜV-MB 966-2
8. AD 2000 Codes of Practice, W and HP series
9. DIN, DIN EN and DIN EN ISO standards, especially DIN 2413, DIN EN 10217-7, DIN EN 13480-3, DIN EN ISO 1127, DIN EN ISO 9692-1
10. Technical Rules for the Handling of Flammable Liquids, especially TRbF 50 (other sources of information)
11. Technical Rules for Steam Boilers, especially TRD 100 and 201 (other sources of information)

### Use

The exterior temperature variations typical in Europe must be considered.

- Medium: finished mineral oil products
- Pressure level: PN 16
- Density of the conveyed medium: 736 to 860 kg/m<sup>3</sup>
- Kinematic viscosity of conveyed medium: 0.9 x 10<sup>-6</sup> to 8.0 x 10<sup>-6</sup> m<sup>2</sup>/s

### Materials

For pipelines for gaseous and liquid products

- X6CrNiTi18-10 (1.4541) as per DIN EN 10217-7, type W1A or W2A  
X6CrNiMoTi17-12-2 (1.4571) as per DIN EN 10217-7, type W1A or W2A

For discharge/slop pipelines:

- X2CrNiMoN22-5-3 (1.4462) as per DIN EN 10217-7, type W1A or W2A

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STANDARD SPECIFICATION	<h2>STS – M 19</h2>	
DESCRIPTION <b>STAINLESS STEEL PIPES</b>	ID-CODE	

### Manufacture

As per DIN EN 10217-7 and the requirements set out in this specification:

- Supply length  $L_{min} = 6.0 - 12.0$  m
- Weld seam quality  $V_N = 1.0$

Internally sized pipe ends with weld bevels as per DIN EN ISO 9692-1

Classification number 1.2.1 at a wall thickness  $\leq 4.0$  mm

Classification number 1.3 at a wall thickness  $> 4.0$  mm

- Tolerances as per DIN EN 1127: D2; T3

### Design

Calculation of the wall thickness as per DIN 2413/DIN EN 13480-3 for an operating pressure of 16 bar, at least in accordance with the wall thicknesses mentioned in this specification, however.

-----  
Outside diameter

Wall thickness for safety coefficient  
 $S = 2.0$   
-----

DN 350 – 355.6 mm	6.0 mm
DN 300 – 323.9 mm	6.0 mm
DN 250 – 273.0 mm	5.0 mm
DN 200 – 219.1 mm	5.0 mm
DN 150 – 168.3 mm	4.0 mm
DN 100 – 114.3 mm	3.2 mm
DN 80 – 88.9 mm	3.0 mm
DN 65 – 76.1 mm	2.5 mm
DN 50 – 60.3 mm	2.5 mm
DN 40 – 48.3 mm	2.5 mm
DN 32 – 42.4 mm	2.0 mm
DN 25 – 33.7 mm	2.0 mm
DN 20 – 26.9 mm	2.0 mm
DN 15 – 21.3 mm	2.0 mm

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STANDARD SPECIFICATION	<h2>STS – M 19</h2>	
DESCRIPTION <b>STAINLESS STEEL PIPES</b>	ID-CODE	

### Insulation

Factory insulation as per STS-M 69, if required in the design specifications.

### Transport and storage

All pipes should be fitted with plastic caps for delivery. Intermediate layers should be part of the scope of delivery. Delivery and storage should be done in such a way that any damage is avoided.

### Requirements and testing

Inspection and testing in accordance with DIN EN 10217-7, test category 2 and AD 2000 Code of Practice W2.

### Evidence of quality features

In accordance with TRbF 50, Annex A: item 3.25

Product of PN and DN  $\leq$  2000 [bar mm] acceptance inspection certificate as per DIN EN 10204, Para. 2.2  
Product of PN and DN  $>$  2000 [bar mm] acceptance inspection certificate as per DIN EN 10204 based on AD 2000 W2

### Identification/labeling

As per DIN EN 10217-7, item 12

Any identification labeling must be applied in such a way that it can still be seen after the pipe was insulated.

### Legally required evidence

General Product Safety Directive (GPSD) and associated regulations (GPSR)  
Especially:  
Serviceability and Compatibility Certificates by the supervisory authority.

STS-M 0 must be adhered to.

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<b>STANDARD SPECIFICATION</b>	<b>STS – M 20</b>	
DESCRIPTION	ID-CODE	
<b>STAINLESS STEEL ELBOWS</b>		

Stainless steel elbows suitable for welding into pipelines conveying finished mineral oil products with the hazard characteristics R 10 (flammable), F (easily flammable) and F+ (highly flammable) and an aromatic content of up to 50 %.

Suitable for underground and above-ground installation as well as installation in stations and pits.

The following regulations are imperative and must be complied with:

1. Directive 2014/68EG of the European Parliament and of the Council on the approximation of the laws of the Member States concerning pressure equipment
2. Regulation (EU) No. 305/2011 of the European Parliament and of the Council on laying down harmonized conditions for the marketing of construction products
3. General Product Safety Directive (GPSD) and associated regulations (GPSR)
4. German Ordinance on Industrial Safety and Health (BetrSichV)
5. Construction Products Act (BauPG)
6. Technical Rules on the Operational Safety/Hazardous Materials, especially TRBS 3151 / TRGS 751
7. VdTÜV Codes of Practice, especially VdTÜV-MB 967, VdTÜV-MB 966-1 and VdTÜV-MB 966-2
8. AD 2000 Codes of Practice, W and HP series
9. DIN, DIN EN and DIN EN ISO, especially DIN EN 10253-4, DIN EN 10216-5, DIN EN 10217-7, DIN EN 13480-3, DIN EN ISO 1127, DIN EN ISO 9692-1
10. Technical Rules for the Handling of Flammable Liquids, especially TRbF 50 (other sources of information)
11. Technical Rules for Steam Boilers, especially TRD 301, Annex 2 TRD 100 and 201 (other sources of information)

### Use

Exterior temperature variations typical in Europe must be considered.

- Conveyed media: finished mineral oil products
- Pressure level: PN 16
- Density of the conveyed medium: 736 to 860 kg/m<sup>3</sup>
- Kinematic viscosity of conveyed medium: 0.9 x 10<sup>-6</sup> to 8.0 x 10<sup>-6</sup> m<sup>2</sup>/s

### Materials

For pipelines for finished and semi-finished mineral oil products

X6CrNiTi18-10 (1.4541) as per DIN EN 10216-5 or 10217-7, type W1A or W2A  
X6CrNiMoTi17-12-2 (1.4571) as per DIN EN 10216-5 or DIN EN 10217-7, type W1A or W2A

For discharge/slop pipelines:

X2CrNiMoN22-5-3 (1.4462) as per DIN EN 10216-5 or DIN EN 10217-7, type W1A or W2A

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STANDARD SPECIFICATION	<h2>STS – M 20</h2>	
DESCRIPTION	ID-CODE	
<b>STAINLESS STEEL ELBOWS</b>		

### Manufacture

As per DIN EN 10253-4,

- bent from seamless or welded steel pipes as per DIN EN ISO 1127
- two pressed half shells welded longitudinally together

The AD 2000 Codes of Practice of the HP and W series shall be complied with.

Internally sized pipe ends, burr-free, with weld bevels as per DIN EN ISO 9692-1

- Classification number 1.2.1 at a wall thickness  $\leq 4.0$  mm
- Classification number 1.3 at a wall thickness  $> 4.0$  mm

### Design

The calculation of the wall thickness at the inner side of the bend should be based on TRD 301 Annex 2 or DIN EN 13480-3. The outer side of the bend shall be dimensioned in line with the pipe to be connected.

The wall thickness shall be at least equal to that of the pipe to connected, however.

### Requirements and inspection/testing

Source material as per DIN EN 10216-5 or DIN EN 10217-7.

Finished elbow as per DIN EN 10253-4 and TRbF 50 annex A: item 3.3 and 3.34.

The testing/inspections of the welded elbows shall comply with the principles set out in the AD 2000 Codes of Practice, HP series.

### Evidence of quality features

- In accordance with TRbF 50, Annex A: item: 3.35
- Product of PN and DN  $\leq 2000$  [bar mm] acceptance inspection certificate as per DIN EN 10204, Para. 2.2
- Product of PN and DN  $> 2000$  [bar mm] acceptance inspection certificate as per DIN EN 10204 based on AD 2000 W2

### Identification/labeling

The fittings shall be identified clearly and permanently by embossing, for instance, in accordance with DIN EN 10253-4.

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STANDARD SPECIFICATION	<h2>STS – M 20</h2>	
DESCRIPTION	ID-CODE	
<b>STAINLESS STEEL ELBOWS</b>		

Legally required evidence

General Product Safety Directive (GPSD) and associated regulations (GPSR), Construction Products Act, Especially:  
Serviceability and Compatibility Certificates by the supervisory authority.

STS-M 0 must be adhered to.

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STANDARD SPECIFICATION	<h2>STS – M 21</h2>	
DESCRIPTION	ID-CODE	
<b>STAINLESS STEEL FITTINGS</b>		

T-pieces, reducers and caps made of stainless steel, suitable for the installation in pipelines conveying flammable and water-polluting liquids with the hazard characteristics R10 (flammable), F (easily flammable) and F+ (highly flammable) and an aromatic content up to 50 %.

Suitable for underground and above-ground installation as well as installation in stations and pits.

The following regulations are imperative and must be complied with:

1. Directive 2014/68EU of the European Parliament and of the Council on the approximation of the laws of the Member States concerning pressure equipment
2. Regulation (EU) No. 305/2011 of the European Parliament and of the Council on laying down harmonized conditions for the marketing of construction products
3. General Product Safety Directive (GPSD) and associated regulations (GPSR)
4. German Ordinance on Industrial Safety and Health (BetrSichV)
5. Construction Products Act (BauPG)
6. Technical Rules on the Operational Safety/Hazardous Materials, especially TRBS 3151 / TRGS 751
7. VdTÜV Codes of Practice, especially VdTÜV-MB 967, VdTÜV-MB 966-1 and VdTÜV-MB 966-2
8. AD 2000 Codes of Practice, B, W and HP series
9. DIN, DIN EN and DIN EN ISO, especially EN 10028-7, DIN EN 10088-3, DIN EN 10253-4, DIN EN 10216-5, DIN EN 10217-7, DIN EN 13480-3, DIN EN ISO 1127, DIN EN ISO 9692-1
10. Technical Rules for the Handling of Flammable Liquids, especially TRbF 50 (other sources of information)
11. Technical Rules for Steam Boilers, especially TRD 301, Annex 2 TRD 100 and 201 (other sources of information)

### Use

Exterior temperature variations typical in Europe must be considered.

Conveyed media: finished mineral oil products  
 Pressure level: PN 16  
 Density of the conveyed medium: 736 to 860 kg/m<sup>3</sup>  
 Kinematic viscosity of conveyed medium: 0.9 x 10<sup>-6</sup> to 8.0 x 10<sup>-6</sup> m<sup>2</sup>/s

### Materials

For pipelines for finished and semi-finished mineral oil products:

X6CrNiTi18-10 (1.4541) type W1A or W2A  
 X6CrNiMoTi17-12-2 (1.4571) type W1A or W2A

For discharge/slop pipelines:

X2CrNiMoN22-5-3 (1.4462) type W1A or W2A

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STANDARD SPECIFICATION	<h2>STS – M 21</h2>	
DESCRIPTION <b>STAINLESS STEEL FITTINGS</b>		ID-CODE

Material	Material No.	Source material					DIN EN
		TS	TW	FL	FO	B	
X6CrNiTi18-10 X6CrNiMoTi17-12-2 X2CrNiMoN22-5-3	1.4541 1.4571 1.4462	X					10216-5
			X				10217-7
				X			10028-7
					X		10222-5
						X	10088-3

TS = seamless tube, TW = welded tube, FL = flat product, FO = forging, B = bar or section steel

### Design

The dimensioning of the wall thicknesses of the fittings shall be based on the following codes:

Reducer       ⇒     AD2000 B2 or DIN EN 13480-3  
T-piece        ⇒     AD2000 B9, TRD 301 or DIN EN 13480-3  
Cap             ⇒     AD2000 B3 or DIN EN 13480-3

Safety coefficient    s       =     2.0  
Calculated pressure   p       =     16.0 bar  
Weld seam quality    V<sub>n</sub>   =     1.0

For the dimensioning of the fittings, the wall thickness of the connected pipe should be taken as the minimum wall thickness of the fitting.

### Manufacture

In accordance with DIN EN 10253-4 and the principles set out in the AD2000 codes of practice, HP series; special structures in accordance with the drawings and calculation proofs verified by the specified body including:

- Dimensions and tolerances of the fittings based on the following standards:
  - Reducer       ⇒     DIN EN 10253-4
  - T-piece       ⇒     DIN EN 10253-4
  - Cap           ⇒     DIN EN 10253-4
Semi-ellipsoidal heads as per DIN 28013 can be used as an alternative to caps.
- Internally sized pipe ends, burr-free, with weld bevels as per DIN EN ISO 9692-1
  - Classification number 1.2.1 at a wall thickness ≤ 4.0 mm
  - Classification number 1.3 at a wall thickness > 4.0 mm

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STANDARD SPECIFICATION	<h2>STS – M 21</h2>	
DESCRIPTION	ID-CODE	
<b>STAINLESS STEEL FITTINGS</b>		

- If the wall thickness of the fitting differs from the one of the connected pipe by more than 0.5 mm, the fitting ends shall be adjusted by inner turning.

Execution:

Forged, welded or hot-shaped.

Requirements and inspection/testing

As per DIN EN 10253-4 and TRbF 50 annex A: item 3.3 and 3.34.

Scope of inspection and testing in accordance with the stipulations of the corresponding source material standards and the AD 2000 Codes of Practice, W series.

Welded fittings shall be tested according to the principles set out in the AD 2000 Codes of Practice, HP series.

Evidence of quality features

- In accordance with TRbF 50, Annex A: item 3.35
- Product of PN and DN  $\leq 2000$  [bar mm] acceptance inspection certificate as per DIN EN 10204, Para. 2.2
- Product of PN and DN  $> 2000$  [bar mm] acceptance inspection certificate as per DIN EN 10204 based on AD 2000 W2

Identification/labeling

The fittings shall be identified clearly and permanently by embossing for instance, in accordance with DIN EN 10253-4.

Legally required evidence

General Product Safety Directive (GPSD) and associated regulations (GPSR), Construction Product Act, Especially:  
Serviceability and Compatibility Certificates by the supervisory authority.

STS-M 0 must be adhered to.

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STANDARD SPECIFICATION	<b>STS – M 23</b>	
DESCRIPTION	ID-CODE	
<b>WELDING NECK FLANGE MADE OF STAINLESS STEEL</b>		

Welding neck flanges made of stainless steel, suitable for the connection of pipes conveying finished mineral oil products with the hazard characteristics R 10 (flammable), F (easily flammable) and F+ (highly flammable) and an aromatic content of up to 50 %.

Suitable for underground and above-ground installation as well as installation in stations and pits.

The following regulations are imperative and must be complied with:

1. Directive 2014/68EU of the European Parliament and of the Council on the approximation of the laws of the Member States concerning pressure equipment
2. Regulation (EU) No. 305/2011 of the European Parliament and of the Council on laying down harmonized conditions for the marketing of construction products
3. General Product Safety Directive (GPSD) and associated regulations (GPSR)
4. German Ordinance on Industrial Safety and Health (BetrSichV)
5. Construction Products Act (BauPG)
6. Technical Rules on the Operational Safety/Hazardous Materials, especially TRBS 3151 / TRGS 751
7. VdTÜV Codes of Practice, especially VdTÜV-MB 967, VdTÜV-MB 966-1 and VdTÜV-MB 966-2
8. AD 2000 Codes of Practice, W2 and W9 series
9. DIN, DIN EN and DIN EN ISO standards, especially DIN EN 1092-1, DIN EN 1591, DIN EN 10222-5 DIN EN ISO 9692-1
10. Technical Rules for the Handling of Flammable Liquids, especially TRbF 50 (other sources of information)

### Use

Exterior temperature variations typical in Europe must be considered.

Conveyed media:	finished mineral oil products
Pressure level:	PN 16
Density of the conveyed medium:	736 to 860 kg/m <sup>3</sup>
Kinematic viscosity of conveyed medium:	0.9 x 10 <sup>-6</sup> to 8.0 x 10 <sup>-6</sup> m <sup>2</sup> /s

### Materials

For pipelines for finished and semi-finished mineral oil products:

X6CrNiTi18-10 (1.4541)	DIN EN 10222-5
X6CrNiMoTi17-12-2 (1.4571)	DIN EN 10222-5

For discharge/slop pipelines:

X2CrNiMoN22-5-3 (1.4462)	DIN EN 10222-5
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STANDARD SPECIFICATION	<h2>STS – M 23</h2>	
DESCRIPTION <b>WELDING NECK FLANGE MADE OF STAINLESS STEEL</b>		ID-CODE

### Design

Calculation as per DIN EN 1591, safety coefficient S = 2.0  
Dimension as per DIN EN 1092-1, welding neck flange, type 11

### Manufacture

As per DIN 1092-1 and AD 2000 Code of Practice W9.

### Execution (PN 16)

As per DIN EN 1092-1, sealing surface shape B1.

- Welding end with weld bevels as per DIN EN ISO 9692-1  
Classification number 1.2.1 at a wall thickness  $\leq 4.0$  mm  
Classification number 1.3 at a wall thickness  $> 4.0$  mm

The machined surfaces shall be protected with a colorless, washable corrosion-protection paint.

### Requirements and testing/inspection

As per AD 2000 Codes of Practice W2 and W9, DIN EN 10222-5 and DIN EN 1092-1.

### Evidence of quality features

As per AD 2000 Codes of Practice W2 and W9.  
Acceptance certificate: for material 1.4541 and 1.4571 as per DIN EN 10204 – 3.1;  
for material 1.4462 as per DIN EN 10204 - 3.2

### Identification/labeling

As per DIN EN 1092-1.

### Legally required evidence

General Product Safety Directive (GPSD) and associated regulations (GPSR), Construction Product Act,  
Especially:  
Serviceability and Compatibility Certificates by the supervisory authority.

STS-M 0 must be adhered to.

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STANDARD SPECIFICATION	<h2>STS – M 24</h2>	
DESCRIPTION	ID-CODE	
<b>BLIND FLANGES MADE OF STAINLESS STEEL</b>		

Blind flange suitable for the installation in pipelines conveying finished mineral oil products with the hazard characteristics R 10 (flammable), F (easily flammable) and F+ (highly flammable) and an aromatic content of up to 50 %.

Suitable for underground and above-ground installation as well as installation in stations and pits.

The following regulations are imperative and must be complied with:

1. Directive 2014/68EU of the European Parliament and of the Council on the approximation of the laws of the Member States concerning pressure equipment
2. Regulation (EU) No. 305/2011 of the European Parliament and of the Council on laying down harmonized conditions for the marketing of construction products
3. General Product Safety Directive (GPSD) and associated regulations (GPSR)
4. German Ordinance on Industrial Safety and Health (BetrSichV)
5. Construction Products Act (BauPG)
6. Technical Rules on the Operational Safety/Hazardous Materials, especially TRBS 3151 / TRGS 751
7. VdTÜV Codes of Practice, especially VdTÜV-MB 967, VdTÜV-MB 966-1 and VdTÜV-MB 966-2
8. AD 2000 Codes of Practice, W2 and W9 series
9. DIN, DIN EN und DIN EN ISO, especially DIN EN 1092-1, DIN EN 10028-7, DIN EN 1591, DIN EN 10222-5, DIN EN ISO 9692-1
10. Technical Rules for the Handling of Flammable Liquids, especially TRbF 50 (other sources of information)

### Use

The exterior temperature variations typical in Europe must be considered.

Conveyed media:	finished mineral oil products
Pressure level:	PN 16
Density of the conveyed medium:	736 to 860 kg/m <sup>3</sup>
Kinematic viscosity of conveyed medium:	0.9 x 10 <sup>-6</sup> to 8.0 x 10 <sup>-6</sup> m <sup>2</sup> /s

### Materials

For pipelines conveying semi-finished and finished mineral oil products:

X6CrNiTi18-10 (1.4541)	as per DIN EN 10028-7 or DIN EN 10222-5
X6CrNiMoTi17-12-2 (1.4571)	as per DIN EN 10028-7 or DIN EN 10222-5

For discharge/slop pipelines:

X2CrNiMoN22-5-3 (1.4462)	as per DIN EN 10028-7 or DIN EN 10222-5
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STANDARD SPECIFICATION	<b>STS – M 24</b>	
DESCRIPTION <b>BLIND FLANGES MADE OF STAINLESS STEEL</b>		ID-CODE

Design

Calculation as per DIN EN 1591.

Dimension as per DIN EN 1092-1, blind flange, type 05

Manufacture

As per DIN 1092-1 and AD 2000 Code of Practice W9.

Type (PN 16)

As per DIN EN 1092-1, sealing surface shape B1.

The machined surfaces shall be protected with a colorless, washable corrosion-protection paint.

Requirements and testing/inspection

As per AD 2000 Codes of Practice W2 and W9, DIN EN 10028-7, DIN EN 10222-5 and DIN EN 1092-1.

Evidence of quality features

As per AD 2000 Codes of Practice W2 and W9.  
acceptance certificate as per DIN EN 10204 - 3.1

Identification/labeling

As per DIN EN 1092-1.

Legally required evidence

General Product Safety Directive (GPSD) and associated regulations (GPSR), Construction Product Act, especially:

Serviceability and Compatibility Certificates by the supervisory authority.

STS-M 0 must be adhered to.

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STANDARD SPECIFICATION	<h2>STS – M 33</h2>	
DESCRIPTION	ID-CODE	
<b>PUMP START VALVE WITH FLOW LIMITATION</b>	<b>CVTF</b>	

Control valve installed in the pump discharge line to protect pump and motor from overloading due to excessive flow.

Specifications STS-M 0 and STS-M 1 are part of this specification.

### Features

- a) Flow limitation:  
Automatic flow limitation, manually adjustable.
- b) Check-valve feature  
  
Valve shall close immediately if outlet pressure of main valve is higher than valve inlet pressure.
- c) Opening speed control  
  
Valve shall open slowly; opening speed adjustable between 2 and 30 seconds without affecting closing of the valve.
- d) Opening speed control for high-level control valve  
  
Valve must open the high-level control valve widely at start of the pump without affecting the maximum level shut-down of the high-level control valve; this requires a control line between pump start valve and the high-level control valve (STS-M 41).

### Design

Material of main valve body : see drawing and STS-M 1  
Nominal size of valve : see drawing  
Total length and connection flanges : see STS-M 1

Tests and evidence of quality features and all other requirements : see STS-M 1

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STANDARD SPECIFICATION	<h2>STS – M 33</h2>	
DESCRIPTION	ID-CODE	
<b>PUMP START VALVE WITH FLOW LIMITATION</b>	<b>CVTF</b>	

Control and pilot valves:

NAME	CONNECTION SIZE *f. DN 150	SEE STS-M 1
Opening speed pilot valve	3/8" NPT	Nr. 4.1.1
Check valve	3/8" NPT	Nr. 4.2
Check valve	3/8" NPT	Nr. 4.2
Check valve	3/4" NPT	Nr. 4.2
Differential pressure control valve	3/8" NPT	Nr. 4.13
Strainer/orifice plate assembly	3/8" NPT	Nr. 5.2
Valve position indicator	3/4" NPT	Nr. 5.3
Orifice plate flange	DN 150	Nr. 5.5
Ejector	3/8" NPT	Nr. 5.6

\* Above data on connection size and type of thread are recommendations only; all cutting ring unions will be permitted which are easy to loosen and to replace.

#### Pressure drop

Pressure drop caused by the pump start valve (DN 150) when valve fully open (with all internals and attached parts such as orifice plate and pilot valves) and at a flow rate of 2000 l/min must not exceed 0.4 bar maximum. The evidence of the max. pressure drop has to be submitted on request of the contracting agency, on a test stand acc. to choice of the contractor (AN), the costs have to be included in the unit price.

The below manufacturer(s) is (are) known to manufacture products of the type specified in this specification section. Any other manufacturer(s) from a NATO member Nation Country may provide this product, provided they can prove to meet this specification.

Brand: Fa. CLA-VAL-CO  
Type: 40-32ACGS  
or equivalent

STS-M 0 has to be adhered.

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<h2>STANDARD SPECIFICATION</h2>	<h1>STS – M 37</h1>	
DESCRIPTION <b>PRESSURE CONTROL VALVE</b>	ID-CODE <b>CVP</b>	

Use

Control valve installed on a tee downstream of the filter/water separators to lower pressure to the static system pressure and to relief overpressure at stand-by mode.

Specifications STS-M 0 and STS-M 1 are part of this specification.

Features

- a) Check-valve feature  
Valve shall close at once when pressure on the valve outlet exceeds inlet pressure.
- b) Pressure relief:  
Pressure control on main valve inlet adjustable between 1.4 and 14.0 bar (20 psi – 200 psi)
- c) Solenoid control:  
Main valve activation via solenoid control. Valve must open when solenoid control is de-energized and the preset pressure is exceeded. Valve shall close when the solenoid valve is energized and the preset line pressure drops below the set point of relief pilot.
- d) Emergency actuation:  
Activation for opening and closing of the main valve by mechanical emergency actuation.
- e) Opening speed control  
Valve shall open slowly; opening speed adjustable between 2 and 30 seconds, without affecting the closing speed.
- f) Closing speed control  
Valve shall close slowly; closing speed adjustable between 2 and 30 seconds without affecting the opening speed.

Design

- Materials of main valve body : see drawing and STS-M 1
- Size of valve : see drawing
- Total length and connecting flanges : acc. to STS-M 1
- Tests and evidence of quality feature and all other requirements : See to STS-M 1

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<b>STANDARD SPECIFICATION</b>	<b>STS – M 37</b>	
DESCRIPTION <b>PRESSURE CONTROL VALVE</b>	ID-CODE <b>CVP</b>	

Pilot and control valves:

NAME	CONNECTION FOR DN 150	REF STS – M 1
Opening speed control valve	3/8" NPT	Nr. 5.2
Closing speed control valve	3/8" NPT	Nr. 5.2
Check valve	3/8" NPT	Nr. 5.2
Shut-off control valve	3/8" NPT	Nr. 5.3
Pressure relief control valve	1/2" NPT	Nr. 5.9
Solenoid valve	1/4" NPT	Nr. 5.13
Strainer	3/8" NPT	Nr. 6.1
Valve position indicator	1/2" NPT	Nr. 6.7

Above data on connection size and type of thread are recommendations only; any cutting ring unions will be permitted which are easy to loosen and to replace.

Technical note: Solenoid valve shall be fused with a slow-acting fuse acc. to choice of contractor.

The below manufacturer(s) is (are) known to manufacture products of the type specified in this specification section. Any other manufacturer(s) from a NATO member Nation Country may provide this product, provided they can prove to meet this specification.

Brand: Fa. CLA-VAL-CO  
Type: 58-47ACGS

or equivalent

STS-M 0 has to be adhered

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<h2>STANDARD SPECIFICATION</h2>	<h1>STS – M 41</h1>	
DESCRIPTION <b>HIGH LEVEL CHECK VALVE</b>	ID-CODE <b>HLV</b>	

Safety valve in supply lines before entry into fuel tanks as check valve to prevent overfilling.

The specifications STS-M 0 and STS-M 1 are part of this specification.

### Functions

- a) High-level shut-off:  
Valve shall close automatically if the maximum liquid level in the fuel tank is reached.
- b) Automatic opening:  
Valve shall open automatically if the liquid level in the fuel tank lowers.
- c) Securing of control line break:  
Valve shall close immediately in case of rupture of the control line between main valve control system and supply lines.
- d) Manual test function:  
Manual testing of „high-level shut-off“ and „automatic opening“ must be possible.
- e) Opening control:  
Valve must open widely at start of the pump; this requires a control line between pump discharge control valve (STS-M33) and the high level check valve (the impulse for the opening comes from the pump discharge control valve).

### Design

Material of main valve body : See drawing and STS-M 1

Nominal size of valve : See drawing

Construction length and connection flanges : See STS-M 1

Tests and evidence of quality features and all other requirements : See STS-M 1

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<b>STANDARD SPECIFICATION</b>	<b>STS – M 41</b>	
DESCRIPTION <b>HIGH LEVEL CHECK VALVE</b>	ID-CODE <b>HLV</b>	

Control and check valves:

NAME	CONNECTION SIZE *f. DN 150	SEE STS-M 1
Non-return check valve	3/8" NPT	No. 4.2
Pressure check valve	1/2" NPT	No. 4.5
Pressure reduction control valve	3/8" NPT	No. 4.8
Float control calve	1/2" NPT	No. 4.20
Strainer	3/4" NPT	No. 5.1
Valve position indicator	3/4" NPT	No. 5.3
Ejector	3/8" NPT	No. 5.6
Throttle unit	1/8" NPT	No. 5.7
Shut-off ball valve	1/2" NPT	No. 5.8
Manual tester	3/4" NPT	No. 5.12

\* Above data on connection size and type of thread are recommendations only; all cutting ring unions will be permitted which are easy to loosen and to replace.

Technical note: The connecting lines between main valve and float control, as well as between pressure sustaining valve and explosion-safety devices are not part of this specification.

The below manufacturer(s) is (are) known to manufacture products of the type specified in this specification section. Any other manufacturer(s) from a NATO member Nation Country may provide this product, provided they can prove to meet this specification.

Brand: Fa. CLA-VAL-CO

Type: 129-AF3-F

or equivalent

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<b>STANDARD SPECIFICATION</b>	<b>STS – M 42</b>	
DESCRIPTION <b>SINGLE-PLATE GATE VALVE (Flat-Plate Gate Valve)</b>	ID-CODE <b>GV</b>	

Shut-off valve in above-ground pipelines conveying finished mineral oil products with the hazard characteristics R 10 (flammable), F (easily flammable) and F+ (highly flammable) and an aromatic content of up to 50 %. Suitable for installation in stations and pits (in zone 1, the inside of fittings is to be assigned to zone 0).

The following regulations are imperative and must be complied with:

1. Directive 2014/68/EU of the European Parliament and of the Council on the approximation of the laws of the Member States concerning pressure equipment
2. Directive 2014/34/EU of the European Parliament and of the Council on the approximation of the laws of the Member States concerning the appropriate use of equipment in explosion hazard areas (ATEX).
3. Directive 2006/42/EU of the European Parliament and of the Council on the approximation of the laws of the Member States of 17 May 2006 concerning machinery.
4. Regulation (EU) No. 305/2011 of the European Parliament and of the Council on laying down harmonized conditions for the marketing of construction products
5. General Product Safety Directive (GPSD) and associated regulations (GPSR)
6. German Ordinance on Industrial Safety and Health (BetrSichV)
7. Technical Rules on the Operational Safety/Hazardous Materials, especially TRBS 3151/TRGS 751
8. VdTÜV Codes of Practice, especially VdTÜV-MB 967, VdTÜV-MB 966-1 and VdTÜV-MB 966-2
9. AD 2000 Codes of Practice, W series and AD 2000 A4
10. DIN, DIN EN and DIN EN ISO, especially EN 3230-6, DIN EN 558-1, DIN EN 1092-1, DIN EN 1561, EN 10213-2, EN 10216-2 and DIN EN 10028-2
11. Air Pollution Control Standard (TA Luft)
12. Technical Rules for the Handling of Flammable Liquids, especially TRbF 50 (other sources of information)

### Use

Exterior temperature variations typical in Europe must be considered.

Conveyed media:	finished mineral oil products with solids up to 800 µm
Pressure level:	PN 16
Density of the conveyed medium:	736 to 860 kg/m <sup>3</sup>
Kinematic viscosity of conveyed medium:	0.9 x 10 <sup>-6</sup> to 8.0 x 10 <sup>-6</sup> m <sup>2</sup> /s

### Materials

Pressure-bearing enclosure parts	:	as per DIN 3230, Part 6, Para. 6, Group II.
Cover, block top	:	(steel cast or forging steel)
Shut-off plate	:	P265GH (1.0425) as per DIN EN 10028-2 (formerly H II)
Seat ring unit	:	S253JR as per DIN EN 10025-2 (formerly St 37)
Stem	:	stainless steel

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<h2>STANDARD SPECIFICATION</h2>	<h1>STS – M 42</h1>	
DESCRIPTION <b>SINGLE-PLATE GATE VALVE (Flat-Plate Gate Valve)</b>	ID-CODE <b>GV</b>	

- Handwheel : EN-GJL-250 (EN-JL-1040) as per DIN EN 1561(formerly GG 25)
- Bolts and nuts : as per AD 2000 W7
- Packings and gaskets : resistant to aromatics and kerosene;  
in compliance with Air Pollution Control Standard TA Luft, if specified.

### Design and manufacture

In accordance with DIN 3230, Part 6, Para. 3, Group II  
In addition to table 2. item 3.1: applies to all nominal widths

Only parts from foundries that can provide evidence of a qualification as per AD 200 W0 shall be used for components under pressure.

### Execution:

- Single-plate gate valve with parallel shut-off plate, floating metallic seat rings arranged on both sides of the plate.
- Valve body with connecting flanges as per DIN EN 1092-1 (PN 16), contact faces form B1, overall length as per DIN EN 558-1, GR 15.
- Gate valve with plain, piggable passage, also suitable for instrumented pigs.
- Metallic seal in the passage with additional fine sealing by installed O-rings made of aromatic- and kerosene-resistant material (elastomer) and a pressure-spring system.
- Sealing system providing tightness on two sides (upstream and downstream; double block and bleed), suitable for low differential pressures (0 to 0.1 bar), DD method.
- All interior parts shall be exchangeable also in the assembled state.
- Exterior rising stem, non-rising handwheel, protected, gate stem, fine machined and fitted with protective plastic cap.
- Sealing of the stem bushing resistant to aromatics and kerosene and maintenance-free. The stem bushing must comply with the requirements of the Air Pollution Control Standard TA-Luft, item 5.2.6.4, if specified accordingly.
- Suitable for direct fitting of an electrical drive; for DN 200 and more with bevel gear
- Gate valves > DN 200 with bottom drain DN 25 (welding neck flange as per STS-M 17 and blind flange as per STS-M 18)  
Gate valves ≤ DN 200 with threaded 1/2 " plug for drainage of the valve body.

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<b>STANDARD SPECIFICATION</b>	<b>STS – M 42</b>	
DESCRIPTION <b>SINGLE-PLATE GATE VALVE (Flat-Plate Gate Valve)</b>	ID-CODE <b>GV</b>	

- Protection of the valve body against internal overpressure.
- Surfaces primed and finish coated RAL 6018,
- The stations and pits where the fittings and components will be installed, are exposed to climatic variations typical in Europe. Their design and dimensioning should provide for this and all liquid-filled spaces of fittings should be safeguarded against overpressure exceeding the prescribed limits (see also DIN 3230-6).

Requirements and testing

In accordance with DIN 3230, Part 6, Para. 4, Group II.

In addition to table 4:

- Supplement to item 8 : strength test in accordance with the BA method
- Supplement to item 9 : tightness test in accordance with the BK method
- Supplement to item 10 : tightness test of the closure in accordance with the BN method, leak rate 1 (0 droplets per minute); evidence of tightness upstream and downstream shall be provided.

Special tests as per DIN 3230, Part 6, Table 6

- Differential pressure test (DD method)
- Bloc and bleed testing

Material testing as per AD 2000 Codes of Practice, W series  
Bolts and nuts as per AD 2000 W 7.

Evidence of quality features

As per DIN EN 3230-6, Item 6.

Acceptance certificate as per DIN EN 10204 - 3.1.

The certificates of origin of the valve components shall be enclosed in the acceptance documents.

Certificate issued by an accredited supervisory body confirming that the fitting complies with the Air Pollution Control Standard TA-Luft, Item 5.2.6.4. (Only required if a dimensioning in accordance with the Air Pollution Control Standard is specified).

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STANDARD SPECIFICATION	<b>STS – M 42</b>	
DESCRIPTION <b>SINGLE-PLATE GATE VALVE (Flat-Plate Gate Valve)</b>	ID-CODE <b>GV</b>	

Identification/labeling

As per Annex 3 No. 4 of the directive 2014/68/EC  
 Additional identification as per DIN 3230-6, Item 4 and AD 2000 A4  
 CE conformity sign as per Art. 19 of the directive 2014/68/EC

Legally required evidences

In accordance with the General Product Safety Directive (GPSD) and associated regulations (GPSR); especially:  
 EC Declaration of Conformity as per Annex VII of the directive 2014/68/EC

Periodic Inspection by an accredited supervisory body

In accordance with the German Ordinance on Industrial Safety and Health (BetrSichV), the operational condition of systems requiring monitoring and their components must be inspected at regular intervals by an approved inspection body. The operator of the entire system and its components must prepare the inspection lists on the basis of a technical safety assessment. A prerequisite to this task is that the manufacturer determines and specifies the inspection intervals for each individual component of the system requiring monitoring. As the operator wants the control office to authorize review periods as long as possible, the fittings and components described in this specifications must be designed and dimensioned in a way that they allow a review period of 3 years for electrical and 5 years for mechanical components.

STS-M 0 must be adhered to.

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STANDARD SPECIFICATION	<h2>STS – M 43</h2>	
DESCRIPTION  <b>COATING OF SYSTEM COMPONENTS</b>	ID-CODE	

For the coating of tubes, valves, fittings and other metallic system components, that are used as built-in parts in storage tanks for finished mineral oil products with the hazard characteristics R 10 (flammable), F (easily flammable) and F+ (highly flammable) and an aromatic content of up to 50 %.

The following regulations are imperative and must be complied with:

1. Regulation (EU) No. 305/2011 of the European Parliament and of the Council on laying down harmonized conditions for the marketing of construction products
2. General Product Safety Directive (GPSD) and associated regulations (GPSR)
3. German Ordinance on Industrial Safety and Health (BetrSichV)
4. Construction Products Act (BauPG)
5. Technical Rules on the Operational Safety/Hazardous Materials, especially TRBS 3151 / TRGS 751
6. VdTÜV Codes of Practice, especially VdTÜV-MB 967, VdTÜV-MB 966-1 and VdTÜV-MB 966-2
7. Technical Rules for the Handling of Flammable Liquids, especially TRbF 20 and 50 (other sources of information)
8. Water Resources Act (WHG)

### Use

Inside storage tanks, only metallic system components that are in contact with the stored or conveyed media and not resistant to corrosion caused by these media shall be coated.

System components made of Cr-Ni steel in storage tanks shall not be coated. Slide surfaces and centering devices of submersible pumps and internal parts of the above mentioned system components shall not be coated.

### Conveyed or stored media

Finished mineral oil products with the hazard characteristics R 10 (flammable), F (easily flammable) and F+ (highly flammable) and an aromatic content up to 50 %.

### Coating

The relevant system components shall be coated prior to their installation in the storage tank. A general approval by the supervisory construction authorities stating the suitability of the used coating materials and system as interior coating for fuel tanks shall be made available.

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Execution

The conditions specified by TRbF 20 (Annex O, Item 1.1) shall be adhered to.

The coating company requires an approval as a specialist company in the sense of Art. 3 VAUwS in combination with Art. 63 WHG and shall have a corresponding qualification.

The surfaces to be coated shall be prepared in a suitable manner as per TRbF 20 (Annex O, Item 1.1) prior to the application of the coating on the system components. Evidence that the preparation of the surfaces was done in accordance with applicable regulations shall be provided by means of an inspection report.

The surface coating shall not be applied later than five hours after the preparation to the surfaces in question.

Inspection/testing

The coating shall be inspected by an expert in accordance with Art. 22 VAWS. An inspection certificate in accordance with TRbF 20 (Annex O, Item 1.1) shall be made out.

Legally required evidences

General Product Safety Directive (GPSD) and associated regulations (GPSR), Construction Product Act, especially:  
 general approval of the supervisory construction authorities for the coating materials;  
 evidence of the fuel-resistance of the coating

STS-M 0 must be adhered to.

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<b>STANDARD SPECIFICATION</b>	<b>STS – M 44</b>	
DESCRIPTION <b>GATE VALVE (Steel)</b>	ID-CODE <b>GV</b>	

Shutoff valve in above ground pipelines for mineral oil products of liquids with hazard characteristics R10 (flammable) F (easily flammable) and F\* (highly flammable) with aromatic content of up to 50%.  
For the installation in stations and manholes (in zone 1, the inside has to be assigned to zone 0).

The following rules have to be kept reliably:

1. Directive 2014/68/EU of the European parliament and of the council on the approximation of the laws of the Member States concerning pressure equipment
2. Directive 2014/34/EU of the European parliament and of the council on the approximation of the laws of the Member States concerning equipment and protective systems intended for use in potentially explosive atmospheres (ATEX)
3. Directive 2006/42/EU of the European parliament and of the council on the approximation of the laws of the Member States of 17 May 2006 on machinery
4. Regulation (EU) No 305/2011 of the European Parliament and of the laying down harmonised conditions for the marketing of construction products
5. General Product Safety Directive (GPSD) and associated rules (GPSR)
6. Ordinance on Industrial Safety and Health
7. General Product Safety Directive (GPSD)
8. Technical rules for operation safety/hazardous substances, especially TRBS 3151 / TRGS 751
9. VdTÜV instruction sheets, especially VdTÜV-MB 967, VdTÜV-MB 966-1 and VdTÜV-MB 966-2
10. AD 2000 instruction sheets, especially AD 2000 series W and AD 2000 A4
11. DIN, DIN EN and DIN EN ISO, especially DIN 103, DIN 3230-6, DIN EN 558, DIN EN 1092-1, DIN EN 1561, DIN EN 10222-5, DIN EN 10213
12. Technical Instructions to keep the air clean (TA Air)
13. Technical rules for flammable liquids, especially TRbF 50 (other sources of information)

### Use

The exterior temperature changes usual in Europe must be considered.

Medium:	Mineral oil finished products with solid particles up to 800 µm
Pressure step:	PN 16
Density of transport medium:	736 – 860 kg/m <sup>3</sup>
Kinetic viscosity of transport medium:	0.9 x 10 <sup>-6</sup> – 8.0 x 10 <sup>-6</sup> m <sup>2</sup> /s

### Material

Pressurized body parts	:	acc. to DIN EN 3230-6
Wedge, bonnet and yoke		Group II (cast steel or forged steel)

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STANDARD SPECIFICATION	<h2>STS – M 44</h2>	
DESCRIPTION <b>GATE VALVE (Steel)</b>	ID-CODE <b>GV</b>	

Armored plating	:	body and wedge made of stainless steel, high abrasive, with different brinell hardness
Stem	:	Stainless steel
Handwheel	:	EN-GJL-250 (EN-JL-1040) acc. to DIN EN 1561(old GG 25)
Screws and nuts	:	acc. to AD 2000 W 7
Packings and gaskets	:	resistant to aromatic and kerosene In compliance with to TA-air, if requested

#### Dimensioning and manufacture

Acc. to DIN 3230-6, par. 3, group II

In addition to table 2, par. 3.1: Applicable for all nominal sizes

For pressurized components only parts from foundries homologated acc. to AD 2000 W0 may be used.

#### Design

- Wedge gate valve
- Single and flexible wedge
- Metal sealing in the passage with additional precision sealing in the body with PTFE sealing rings
- Replacable internal parts
- Body with connection flanges acc. to DIN EN 1092-1 (PN 16), sealing strip shape B1, overall length acc. to DIN EN 558
- Valve > DN 200 with bottom drainage DN 25 (welding neck flange acc. to STS-M 23 and blind flange acc. to STS-M 24)  
Valve ≤ DN 200 with threaded plug ½ inch for drainage of body
- External stem, rising type, with single-flight trapezoidal thread, acc. to DIN 103.  
Stationary handwheel, closes by turning clockwise  
Stem shank with fine surface treatment
- Adjustable stuffing box; finished stem passage, sealing of stem passage resistant to aromatics and kerosene. The stem passage must meet the requirements of TA air par. 3.1.8.4 if required.
- Thread bushing tenifer treated. Sizes > DN 200 shall run on axial ball bearings, each to be accessible from outside for lubrication.
- Valve stem with plastic covering cap.

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DESCRIPTION <b>GATE VALVE (Steel)</b>	ID-CODE <b>GV</b>	

- Stations and shafts, in which shut-off devices and fittings are installed are exposed to temperature changes usual in Europe. Therefore all liquid-filled spaces of the fittings must be secured against excessive overpressure (see also DIN 3230-6).

### Requirements and tests

Acc. to DIN 3230-6, par. 4, group II

In addition to table 4:

- to par. 8 : strength test acc. to BA
- to par. 9 : tightness acc. to BK
- to par. 10 : tightness of sealing acc. to BN, leakage rate 1 (0 drops per minute). The tightness of both sides shall be proved.

Testing of materials acc. to AD 2000 instruction sheets series W

Screws and nuts acc. to AD 2000 W 7

### Evidence of quality features

Acc. to DIN 3230-6, par. 6

Acceptance test certificate acc. to DIN EN 10204 – 3.1 is required.

Certificates of origin have to be enclosed to the acceptance documents of the fitting parts.

Certificate of approved supervision authority that fittings meet TA-air par. 5.2.6.4t.

(Only required if design of fitting acc. to TA-air is requested).

### Identification

Acc. to annex III No. 4 of directive 2014/68/EG

additional identification acc. to DIN 3230-6, par. 4 and AD 2000 A4

CE conformity marking acc. to Art. 19 of directive 2014/68/EG

### Legally required evidences

Acc. to General Product Safety Directive (GPSD) and associated rules (GPSR),  
General Product Safety Directive (GPSD)

Especially:

EG declaration of conformity acc. to annex IV of directive 2014/68/EG

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STANDARD SPECIFICATION	<h2>STS – M 44</h2>	
DESCRIPTION <b>GATE VALVE (Steel)</b>	ID-CODE <b>GV</b>	

Periodic inspections by an authorized control office

Acc. to Product Safety Directive, facilities and facility parts in need of monitoring must be reviewed repeatedly in certain periods for their orderly conditions concerning the operation by an authorized control office. The operator has to find out the review periods of the complete facility and the facility parts on the base of a safety related evaluation. Therefore the manufacturer of the components must specify and determine the review periods for the individual components of the facilities in need of monitoring. As the operator wants the control office to authorize review periods as long as possible, the fittings and components described in this specifications must be designed and dimensioned in a way that they allow a review period of 3 years for electrical and 5 years for mechanical components.

STS-M 0 shall be observed.

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<b>STANDARD SPECIFICATION</b>	<b>STS – M 45</b>	
DESCRIPTION <b>GATE VALVE (Stainless steel)</b>	ID-CODE <b>GV</b>	

Shutoff valve in above ground pipelines for mineral oil products of liquids with hazard characteristics R10 (flammable) F (easily flammable) and F\* (highly flammable) with aromatic content of up to 50%.  
For the installation in stations and manholes (in zone 1, the inside has to be assigned to zone 0).

The following rules have to be kept reliably:

1. Directive 2014/68/EU of the European parliament and of the council on the approximation of the laws of the Member States concerning pressure equipment
2. Directive 2014/34/EU of the European parliament and of the council on the approximation of the laws of the Member States concerning equipment and protective systems intended for use in potentially explosive atmospheres (ATEX)
3. Directive 2006/42/EU of the European parliament and of the council on the approximation of the laws of the Member States of 17 May 2006 on machinery
4. Regulation (EU) No 305/2011 of the European Parliament and of the laying down harmonised conditions for the marketing of construction products
5. General Product Safety Directive (GPSD) and associated rules (GPSR)
6. Ordinance on Industrial Safety and Health
7. General Product Safety Directive (GPSD)
8. Technical rules for operation safety/hazardous substances, especially TRBS 3151 / TRGS 751
9. VdTÜV instruction sheets, especially VdTÜV-MB 967, VdTÜV-MB 966-1 and VdTÜV-MB 966-2
10. AD 2000 instruction sheets, especially AD 2000 series W and AD 2000 A4
11. DIN, DIN EN and DIN EN ISO, especially DIN 103, DIN 3230-6, DIN EN 558, DIN EN 1092-1, DIN EN 1561, DIN EN 10222-5, DIN EN 10213
12. Technical Instructions to keep the air clean (TA Air)
13. Technical rules for flammable liquids, especially TRbF 50 (other sources of information)

### Use

The exterior temperature changes usual in Europe must be considered.

Medium: Mineral oil finished products with solid particles up to 800 µm  
Pressure step: PN 16  
Density of transport medium: 736 – 860 kg/m<sup>3</sup>  
Kinetic viscosity of transport medium: 0.9 x 10<sup>-6</sup> – 8.0 x 10<sup>-6</sup> m<sup>2</sup>/s

### Material

Pressurized body parts : Stainless steel, material no. 1.4552  
Wedge, bonnet and yoke acc. to DIN EN 10213 or equal

Sealing surfaces : untreated, hardened at the plates

Stem : Stainless steel, material no. 1.4571 acc. to DIN EN 10222-5

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STANDARD SPECIFICATION	<h2>STS – M 45</h2>	
DESCRIPTION <b>GATE VALVE (Stainless steel)</b>	ID-CODE <b>GV</b>	

Handwheel : EN-GJL-250 (EN-JL-1040) acc. to DIN EN 1561(old GG 25)  
Screws and nuts : acc. to AD 2000 W2  
Packings and gaskets : PTFE (Teflon oder gleichwertig)

### Dimensioning and manufacture

Acc. to DIN 3230-6, par. 3, group II

In addition to table 2, par. 3.1: Applicable for all nominal sizes

For pressurized components only parts from foundries homologated acc. to AD 2000 W0 may be used.

### Design

- Wedge gate valve
- Single and flexible wedge
- Metal sealing in the passage with additional precision sealing in the body with PTFE sealing rings
- Replacable internal parts
- Body with connection flanges acc. to DIN EN 1092-1 (PN 16), sealing strip shape B1, overall length acc. to DIN EN 558
- Valve > DN 200 with bottom drainage DN 25 (welding neck flange acc. to STS-M 23 and blind flange acc. to STS-M 24)  
Valve ≤ DN 200 with threaded plug ½ inch for drainage of body
- External stem, rising type, with single-flight trapezoidal thread, acc. to DIN 103.  
Stationary handwheel, closes by turning clockwise  
Stem shank with fine surface treatment
- Adjustable stuffing box; finished stem passage, sealing of stem passage resistant to aromatics and kerosene. The stem passage must meet the requirements of TA air par. 3.1.8.4 if required.
- Thread bushing tenifer treated. Sizes > DN 200 shall run on axial ball bearings, each to be accessible from outside for lubrication.
- Valve stem with plastic covering cap.
- Stations and shafts, in which shut-off devices and fittings are installed are exposed to temperature changes usual in Europe. Therefore all liquid-filled spaces of the fittings must be secured against excessive overpressure (see also DIN 3230-6).

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STANDARD SPECIFICATION	<h2>STS – M 45</h2>	
DESCRIPTION <b>GATE VALVE (Stainless steel)</b>	ID-CODE <b>GV</b>	

### Requirements and tests

Acc. to DIN 3230-6, par. 4, group II

In addition to table 4:

- to par. 8 : strength test acc. to BA
- to par. 9 : tightness acc. to BK
- to par. 10 : tightness of sealing acc. to BN, leakage rate 1  
(0 drops per minute). The tightness of both sides shall be proved.

Testing of materials acc. to AD 2000 instruction sheets series W

Screws and nuts acc. to AD 2000 W 2

### Evidence of quality features

Acc. to DIN 3230-6, par. 6

Acceptance test certificate acc. to DIN EN 10204 – 3.1 at cast compound  $\leq$  200 kg.

Acceptance test certificate acc. to DIN EN 10204 – 3.2 at cast compound  $>$  200 kg

Certificates of origin have to be enclosed to the acceptance documents of the fitting parts.

Certificate of approved supervision authority that fittings meet TA-air par. 5.2.6.4t.  
(Only required if design of fitting acc. to TA-air is requested).

### Identification

Acc. to annex III No. 4 of directive 2014/68/EU

additional identification acc. to DIN 3230-6, par. 4 and AD 2000 A4

CE conformity marking acc. to Art. 19 of directive 2014/68/EU

### Legally required evidences

Acc. to General Product Safety Directive (GPSD) and associated rules (GPSR), Construction Products Law especially:

EG declaration of conformity acc. to annex IV of directive 2014/68/EU

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STANDARD SPECIFICATION	<h2>STS – M 45</h2>	
DESCRIPTION <b>GATE VALVE (Stainless steel)</b>		ID-CODE <b>GV</b>

Periodic inspections by an authorized control office

Acc. to Product Safety Directive, facilities and facility parts in need of monitoring must be reviewed repeatedly in certain periods for their orderly conditions concerning the operation by an authorized control office. The operator has to find out the review periods of the complete facility and the facility parts on the base of a safety related evaluation. Therefore the manufacturer of the components must specify and determine the review periods for the individual components of the facilities in need of monitoring. As the operator wants the control office to authorize review periods as long as possible, the fittings and components described in this specifications must be designed and dimensioned in a way that they allow a review period of 3 years for electrical and 5 years for mechanical components.

STS-M 0 shall be observed.

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<h1>USAFE</h1>	REVISION 1	DATE: MAY 2015
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<b>STANDARD SPECIFICATION</b>	<b>STS – M 46</b>	
DESCRIPTION <b>BALL VALVE (Steel)</b>	ID-CODE <b>BV</b>	

Shutoff device in above ground pipelines for mineral oil products of liquids with hazard characteristics R10 (flammable) F (easily flammable) and F\* (highly flammable) with aromatic content of up to 50%.  
For the installation in stations and manholes (in zone 1, the inside has to be assigned to zone 0).

The following rules have to be kept reliably:

1. Directive 2014/68/EU of the European parliament and of the council on the approximation of the laws of the Member States concerning pressure equipment
2. Directive 2014/34/EU of the European parliament and of the council on the approximation of the laws of the Member States concerning equipment and protective systems intended for use in potentially explosive atmospheres (ATEX)
3. Directive 2006/42/EU of the European parliament and of the council on the approximation of the laws of the Member States of 17 May 2006 on machinery
4. Regulation (EU) No 305/2011 of the European Parliament and of the laying down harmonised conditions for the marketing of construction products
5. General Product Safety Directive (GPSD) and associated rules (GPSR)
6. Ordinance on Industrial Safety and Health
7. General Product Safety Directive (GPSD)
8. Technical rules for operation safety/hazardous substances, especially TRBS 3151 / TRGS 751
9. VdTÜV instruction sheets, especially VdTÜV-MB 967, VdTÜV-MB 966-1 and VdTÜV-MB 966-2
10. AD 2000 instruction sheets, especially AD 2000 series W and AD 2000 A4
11. DIN, DIN EN and DIN EN ISO, especially DIN 3230-6, DIN EN 558, DIN EN 1092-1, DIN EN 10222-5
12. Technical Instructions to keep the air clean (TA Air)
13. Technical rules for flammable liquids, especially TRbF 50 (other sources of information)

### Use

The exterior temperature changes usual in Europe must be considered.

Medium: Mineral oil finished products with solid particles up to 800 µm  
 Pressure step: PN 16  
 Density of transport medium: 736 – 860 kg/m<sup>3</sup>  
 Kinetic viscosity of transport medium: 0.9 x 10<sup>-6</sup> – 8.0 x 10<sup>-6</sup> m<sup>2</sup>/s

### Materials

Body : acc. to DIN 3230-6, group II  
 Ball : stainless steel, mat.no. 1.4571 acc. to DIN EN 10222-5  
 Stem : stainless steel, mat.no. 1.4571 acc. to DIN EN 10222-5  
 Wrench : Wrought steel

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<b>STANDARD SPECIFICATION</b>	<b>STS – M 46</b>	
DESCRIPTION <b>BALL VALVE (Steel)</b>	ID-CODE <b>BV</b>	

Screws and nuts : acc. to AD 2000 W7  
Set rings : PTFE (Teflon or equivalent), self-lubricating  
O-rings : Viton

### Dimensioning and manufacture

Acc. to DIN 3230-6, par. 3, group II

In addition to table 2, par. 3.1: Applicable for all nominal sizes

### Design

- Ball valve with full passage and replaceable gasket
- Body with flanges acc. to DIN EN 1092-1 (PN 16), sealing strip shape B1
- Ball valve sealed on both sides, fire-safe type
- Ball valve > DN 200 with bottom drainage DN 25 (welding neck flange acc. to STS-M 17 and blind flange acc. to STS-M 18)
- Ball valve ≤ DN 200 with screw cap ½ inch for casing drainage
- Construction length acc. to DIN EN 558
- Elastic sealings made of fuel-resistant material
- Stations and shafts, in which shut-off devices and fittings are installed are exposed to temperature changes usual in Europe. Therefore all liquid-filled spaces of the fittings must be secured against excessive overpressure (see also DIN 3230-6).

### Requirements and tests

Acc. to DIN 3230-6, par. 4, group II

In addition to table 4:

- to par. 8 : strength test acc. to BA
- to par. 9 : tightness acc. to BK
- to par. 10 : tightness of sealing acc. to BN, leakage rate 1  
(0 drops per minute). The tightness of both sides shall be proved.

Testing of materials acc. to AD 2000 instruction sheets series W

Screws and nuts acc. to AD 2000 W 7

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STANDARD SPECIFICATION	<h2>STS – M 46</h2>	
DESCRIPTION <b>BALL VALVE (Steel)</b>	ID-CODE <b>BV</b>	

Evidence of quality features

Acc. to DIN 3230-6, par. 6  
Acceptance test certificate acc. to DIN EN 10204 – 3.1 is required.  
Certificates of origin have to be enclosed to the acceptance documents of the fitting parts.  
Certificate of approved supervision authority that fittings meet TA-air par. 5.2.6.4.  
(Only required if design of fitting acc. to TA-air is requested).

Identification

Acc. to annex III No. 4 of directive 2014/68/EU  
additional identification acc. to DIN 3230-6, par. 4 and AD 2000 A4  
CE conformity marking acc. to Art. 19 of directive 2014/68/EU

Legally required evidences

Acc. to General Product Safety Directive (GPSD) and associated rules (GPSR),  
General Product Safety Directive (GPSD)  
especially:  
EG declaration of conformity acc. to annex VII of directive 2014/68/EU

Periodic inspections by an authorized control office

Acc. to Product Safety Directive, facilities and facility parts in need of monitoring must be reviewed repeatedly in certain periods for their orderly conditions concerning the operation by an authorized control office. The operator has to find out the review periods of the complete facility and the facility parts on the base of a safety related evaluation. Therefore the manufacturer of the components must specify and determine the review periods for the individual components of the facilities in need of monitoring. As the operator wants the control office to authorize review periods as long as possible, the fittings and components described in this specifications must be designed and dimensioned in a way that they allow a review period of 3 years for electrical and 5 years for mechanical components.

STS-M 0 shall be observed.

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<h1>USAFE</h1>	REVISION 1	DATE: MAY 2015
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STANDARD SPECIFICATION	<h2>STS – M 47</h2>	
DESCRIPTION <b>BALL VALVE (Stainless steel)</b>	ID-CODE <b>BV</b>	

Shutoff device in above ground pipelines for mineral oil products of liquids with hazard characteristics R10 (flammable) F (easily flammable) and F\* (highly flammable) with aromatic content of up to 50%.  
For the installation in stations and manholes (in zone 1, the inside has to be assigned to zone 0).

The following rules have to be kept reliably:

1. Directive 2014/68/EU of the European parliament and of the council on the approximation of the laws of the Member States concerning pressure equipment
2. Directive 2014/34/EU of the European parliament and of the council on the approximation of the laws of the Member States concerning equipment and protective systems intended for use in potentially explosive atmospheres (ATEX)
3. Directive 2006/42/EU of the European parliament and of the council on the approximation of the laws of the Member States of 17 May 2006 on machinery
4. Regulation (EU) No 305/2011 of the European Parliament and of the laying down harmonised conditions for the marketing of construction products
5. General Product Safety Directive (GPSD) and associated rules (GPSR)
6. Ordinance on Industrial Safety and Health
7. General Product Safety Directive (GPSD)
8. Technical rules for operation safety/hazardous substances, especially TRBS 3151 / TRGS 751
9. VdTÜV instruction sheets, especially VdTÜV-MB 967, VdTÜV-MB 966-1 and VdTÜV-MB 966-2
10. AD 2000 instruction sheets, especially AD 2000 series W and AD 2000 A4
11. DIN, DIN EN and DIN EN ISO, especially DIN 3230-6, DIN EN 558, DIN EN 1092-1, DIN EN 10222-5, DIN EN 10213
12. Technical Instructions to keep the air clean (TA Air)
13. Technical rules for flammable liquids, especially TRbF 50 (other sources of information)

### Use

The exterior temperature changes usual in Europe must be considered.

Medium: Mineral oil finished products with solid particles up to 800 µm  
Pressure step: PN 16  
Density of transport medium: 736 – 860 kg/m<sup>3</sup>  
Kinetic viscosity of transport medium: 0.9 x 10<sup>-6</sup> – 8.0 x 10<sup>-6</sup> m<sup>2</sup>/s

### Materials

Body : cast stainless steel, mat.no. 1.4552 acc. to DIN EN 10213  
Ball : stainless steel, mat.no. 1.4571 acc. to DIN EN 10222-5  
Stem : stainless steel, mat.no. 1.4571 acc. to DIN EN 10222-5

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STANDARD SPECIFICATION	<h2>STS – M 47</h2>	
DESCRIPTION <b>BALL VALVE (Stainless steel)</b>	ID-CODE <b>BV</b>	

Wrench	:	Wrought steel
Screws and nuts	:	acc. to AD 2000 W7
Set rings	:	PTFE (Teflon or equivalent), self-lubricating
O-rings	:	Viton

### Dimensioning and manufacture

Acc. to DIN 3230-6, par. 3, group II

In addition to table 2, par. 3.1: Applicable for all nominal sizes

### Design

- Ball valve with full passage and replaceable gasket
- Body with connecting flanges acc. to DIN EN 1092-1 (PN 16), sealing strip shape B1
- Ball valve sealed on both sides, fire-safe type
- Ball valve > DN 200 with bottom drainage DN 25 (welding neck flange acc. to STS-M 23 and blind flange acc. to STS-M 24)
- Ball valve ≤ DN 200 with screw cap ½ inch for casing drainage
- Construction length acc. to DIN EN 558
- Elastic sealings made of fuel-resistant material

### Requirements and tests

Acc. to DIN 3230-6, par. 4, group II

In addition to table 4:

- to par. 8 : strength test acc. to BA
- to par. 9 : tightness acc. to BK
- to par. 10 : tightness of sealing acc. to BN, leakage rate 1 (0 drops per minute). The tightness of both sides shall be proved.

Testing of materials acc. to AD 2000 instruction sheets series W

Screws and nuts acc. to AD 2000 W 2

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<h1>USAFE</h1>	REVISION 1	DATE: MAY 2015
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STANDARD SPECIFICATION	<h2>STS – M 47</h2>	
DESCRIPTION <b>BALL VALVE (Stainless steel)</b>	ID-CODE <b>BV</b>	

Evidence of quality features

Acc. to DIN 3230-6, par. 6

Acceptance test certificate acc. to DIN EN 10204 – 3.1 at cast compound  $\leq$  200 kg.

Acceptance test certificate acc. to DIN EN 10204 – 3.2 at cast compound  $>$  200 kg.

Certificates of origin have to be enclosed to the acceptance documents of the fitting parts.

Certificate of approved supervision authority that fittings meet TA-air par. 5.2.6.4.  
(Only required if design of fitting acc. to TA-air is requested).

Identification

Acc. to annex III No. 4 of directive 2014/68/EU  
additional identification acc. to DIN 3230-6, par. 4 and AD 2000 A4  
CE conformity marking acc. to Art. 19 of directive 2014/68/EU

Legally required evidences

Acc. to General Product Safety Directive (GPSD) and associated rules (GPSR),  
General Product Safety Directive (GPSD)  
especially:  
EG declaration of conformity acc. to annex IV of directive 2014/68/EU

Periodic inspections by an authorized control office

Acc. to Product Safety Directive, facilities and facility parts in need of monitoring must be reviewed repeatedly in certain periods for their orderly conditions concerning the operation by an authorized control office. The operator has to find out the review periods of the complete facility and the facility parts on the base of a safety related evaluation. Therefore the manufacturer of the components must specify and determine the review periods for the individual components of the facilities in need of monitoring. As the operator wants the control office to authorize review periods as long as possible, the fittings and components described in this specifications must be designed and dimensioned in a way that they allow a review period of 3 years for electrical and 5 years for mechanical components.

STS-M 0 shall be observed.

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<h1>USAFE</h1>	REVISION 1	DATE: MAY 2015
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<b>STANDARD SPECIFICATION</b>	<b>STS – M 48</b>	
DESCRIPTION <b>CHECK VALVE (Steel)</b>	ID-CODE <b>CV</b>	

Check valve in above ground pipelines for mineral oil products of liquids with hazard characteristics R10 (flammable) F (easily flammable) and F\* (highly flammable) with aromatic content of up to 50%.  
For the installation in stations and manholes (in zone 1, the inside has to be assigned to zone 0).

The following rules have to be kept reliably:

1. Directive 2014/68/EU of the European parliament and of the council on the approximation of the laws of the Member States concerning pressure equipment
2. Directive 2014/34/EU of the European parliament and of the council on the approximation of the laws of the Member States concerning equipment and protective systems intended for use in potentially explosive atmospheres (ATEX)
3. Directive 2006/42/EU of the European parliament and of the council on the approximation of the laws of the Member States of 17 May 2006 on machinery
4. Regulation (EU) No 305/2011 of the European Parliament and of the laying down harmonised conditions for the marketing of construction products
5. General Product Safety Directive (GPSD) and associated rules (GPSR)
6. Ordinance on Industrial Safety and Health
7. General Product Safety Directive (GPSD)
8. Technical rules for operation safety/hazardous substances, especially TRBS 3151 / TRGS 751
9. VdTÜV instruction sheets, especially VdTÜV-MB 967, VdTÜV-MB 966-1 and VdTÜV-MB 966-2
10. AD 2000 instruction sheets, especially AD 2000 series W and AD 2000 A4
11. DIN, DIN EN and DIN EN ISO, especially DIN 3230-6, DIN EN 558, DIN EN 1092-1, DIN EN 10302
12. Technical Instructions to keep the air clean (TA Air)
13. Technical rules for flammable liquids, especially TRbF 50 (other sources of information)

### Use

The exterior temperature changes usual in Europe must be considered.

Medium: Mineral oil finished products with solid particles up to 800 µm  
 Pressure step: PN 16  
 Density of transport medium: 736 – 860 kg/m<sup>3</sup>  
 Kinetic viscosity of transport medium: 0.9 x 10<sup>-6</sup> – 8.0 x 10<sup>-6</sup> m<sup>2</sup>/s

Horizontal or vertical installation is possible.

### Material

Pressurized body parts : acc. to DIN 3230-6, group II  
and cap  
 Valve set and cone : Cr-Ni-steel

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<h1>USAFE</h1>	REVISION 1	DATE: MAY 2015
	SHEET 2 OF 3	
STANDARD SPECIFICATION	<h2>STS – M 48</h2>	
DESCRIPTION <b>CHECK VALVE (Steel)</b>	ID-CODE <b>CV</b>	

Reinforcement	:	Plate and seat Cr-Ni-steel, highly non-abrasive with varying degrees of hardness
Spring	:	spring steel, mat. no. 2.4632 acc. to DIN EN 10302
Screws and nuts	:	acc. to AD 2000 W 7
Sealing	:	resistant to aromatics and kerosene

#### Dimensioning and manufacture

Acc. to DIN 3230-6, par. 3, group II

In addition to table 2, par. 3.1: Applicable for all nominal sizes

#### Design

- Body with connection flanges acc. to DIN EN 1092-1 (PN 16), sealing strip shape B1, overall length acc. To DIN EN 558
- Streamlined housing in consideration of a low frictional resistance.
- Seat and lower part of valve to be removable and replaceable.

#### Requirements and tests

Acc. to DIN 3230-6, par. 4, group II

In addition to table 4:

- to par. 8 : strength test acc. to BA
- to par. 9 : tightness acc. to BK
- to par. 10 : tightness of sealing acc. to BN, leakage rate 1, tight at 5 m WS.

Testing of materials acc. to AD 2000 instruction sheets series W

Screws and nuts acc. to AD 2000 W 2

#### Evidence of quality features

Acc. to DIN 3230-6, par. 6

Acceptance test certificate acc. to DIN EN 10204 – 3.1

Certificates of origin have to be enclosed to the acceptance documents of the fitting parts.

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<h1>USAFE</h1>	REVISION 1	DATE: MAY 2015
	SHEET 3 OF 3	
STANDARD SPECIFICATION	<h2>STS – M 48</h2>	
DESCRIPTION <b>CHECK VALVE (Steel)</b>	ID-CODE <b>CV</b>	

Identification

Acc. to annex III No. 4 of directive 2014/68/EU  
 additional identification acc. to DIN 3230-6, par. 4 and AD 2000 A4  
 CE conformity marking acc. to Art. 19 of directive 2014/68/EU

Legally required evidences

Acc. to General Product Safety Directive (GPSD) and associated rules (GPSR),  
 General Product Safety Directive (GPSD)  
 especially:  
 EG declaration of conformity acc. to annex IV of directive 2014/68/EU

Periodic inspections by an authorized control office

Acc. to Product Safety Directive, facilities and facility parts in need of monitoring must be reviewed repeatedly in certain periods for their orderly conditions concerning the operation by an authorized control office. The operator has to find out the review periods of the complete facility and the facility parts on the base of a safety related evaluation. Therefore the manufacturer of the components must specify and determine the review periods for the individual components of the facilities in need of monitoring As the operator wants the control office to authorize review periods as long as possible, the fittings and components described in this specifications must be designed and dimensioned in a way that they allow a review period of 3 years for electrical and 5 years for mechanical components.

STS-M 0 shall be observed.

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<h1>USAFE</h1>	REVISION 1	DATE: MAY 2015
	SHEET 1 OF 3	
STANDARD SPECIFICATION	<h2>STS – M 49</h2>	
DESCRIPTION <b>CHECK VALVE FUNNEL LINE</b>	ID-CODE <b>CV</b>	

Check valve in above ground pipelines for mineral oil products of liquids with hazard characteristics R10 (flammable) F (easily flammable) and F\* (highly flammable) with aromatic content of up to 50%.  
For the installation in stations and manholes (in zone 1, the inside has to be assigned to zone 0).

The following rules have to be kept reliably:

1. Directive 2014/68/EU of the European parliament and of the council on the approximation of the laws of the Member States concerning pressure equipment
2. Directive 2014/34/EU of the European parliament and of the council on the approximation of the laws of the Member States concerning equipment and protective systems intended for use in potentially explosive atmospheres (ATEX)
3. Directive 2006/42/EU of the European parliament and of the council on the approximation of the laws of the Member States of 17 May 2006 on machinery
4. Regulation (EU) No 305/2011 of the European Parliament and of the laying down harmonised conditions for the marketing of construction products
5. General Product Safety Directive (GPSD) and associated rules (GPSR)
6. Ordinance on Industrial Safety and Health
7. General Product Safety Directive (GPSD)
8. Technical rules for operation safety/hazardous substances, especially TRBS 3151 / TRGS 751
9. VdTÜV instruction sheets, especially VdTÜV-MB 967, VdTÜV-MB 966-1 and VdTÜV-MB 966-2
10. AD 2000 instruction sheets, especially AD 2000 series W and AD 2000 A4
11. DIN, DIN EN and DIN EN ISO, especially DIN 3230-6, DIN EN 558, DIN EN 1092-1, DIN EN 10302, DIN EN 10028-7, DIN EN 10222-5
12. Technical Instructions to keep the air clean (TA Air)
13. Technical rules for flammable liquids, especially TRbF 50 (other sources of information)

### Use

The exterior temperature changes usual in Europe must be considered.

Medium:	Mineral oil finished products with solid particles up to 800 µm
Pressure step:	PN 16
Density of transport medium:	736 – 860 kg/m <sup>3</sup>
Kinetic viscosity of transport medium:	0.9 x 10 <sup>-6</sup> – 8.0 x 10 <sup>-6</sup> m <sup>2</sup> /s

For vertical installation in funnel line.

### Materials

Pressure bearing parts of the housing incl. Guiding ribs for the valve disc and the valve seat: acc. to DN 3230-6, group II

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<h1>USAFE</h1>	REVISION 1	DATE: MAY 2015
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STANDARD SPECIFICATION	<h2>STS – M 49</h2>	
DESCRIPTION <b>CHECK VALVE FUNNEL LINE</b>		ID-CODE <b>CV</b>

Valve disc : mat. no. 1.4571 acc. to DIN EN 10028-7 or DIN EN 10222-5  
Spring : mat. no. 2.4632 acc. to DIN EN 10302  
Spring cap : mat. no. 1.4571 acc. to DIN EN 10028-7 or DIN EN 10222-5

#### Dimensioning and manufacture

Acc. to DIN 3230-6, par. 3, group II

#### Design

- Housing designed for installation in between pipe flanges acc. to DIN EN 1092-1 (PN 16), incl. spiral eccentric ring, sealing strip shape B1, overall length acc. to DIN EN 558
- In order to make sure that the valve can be opened if required the opening pressure of the closing spring should be set at 50 mm WS maximum.

#### Requirements and tests

Acc. to DIN 3230-6, par. 4, group II

In addition to table 4:

- to par. 8 : strength test acc. to BA
- to par. 10 : tightness of sealing acc. to BN, leakage rate 1

Testing of materials acc. to AD 2000 instruction sheets series W

#### Evidence of quality features

Acc. to DIN 3230-6, par. 6

Acceptance test certificate acc. to DIN EN 10204 – 3.1

Certificates of origin have to be enclosed to the acceptance documents of the fitting parts.

#### Identification

Acc. to annex III No. 4 of directive 2014/68/EU  
additional identification acc. to DIN 3230-6, par. 4 and AD 2000 A4  
CE conformity marking acc. to Art. 19 of directive 2014/68/EU

<b>AUTHOR:</b> <b>LBB NIEDERLASSUNG LANDAU</b> <b>UNTERTORPLATZ 1</b> <b>D-76829 LANDAU</b> <b>TEL.: +49 (6341) 912-0</b> <b>postfach.landau@LBBnet.de</b>	<b>ISSUED BY:</b>
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<h1>USAFE</h1>	REVISION 1	DATE: MAY 2015
	SHEET 3 OF 3	
STANDARD SPECIFICATION	<h2>STS – M 49</h2>	
DESCRIPTION <b>CHECK VALVE FUNNEL LINE</b>	ID-CODE <b>CV</b>	

Legally required evidences

Acc. to General Product Safety Directive (GPSD) and associated rules (GPSR),  
General Product Safety Directive (GPSD)  
especially:  
EG declaration of conformity acc. to annex IV of directive 2014/68/EU

Periodic inspections by an authorized control office

Acc. to Product Safety Directive, facilities and facility parts in need of monitoring must be reviewed repeatedly in certain periods for their orderly conditions concerning the operation by an authorized control office. The operator has to find out the review periods of the complete facility and the facility parts on the base of a safety related evaluation. Therefore the manufacturer of the components must specify and determine the review periods for the individual components of the facilities in need of monitoring. As the operator wants the control office to authorize review periods as long as possible, the fittings and components described in this specifications must be designed and dimensioned in a way that they allow a review period of 3 years for electrical and 5 years for mechanical components.

STS-M 0 shall be observed.

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<h1>USAFE</h1>	REVISION 1	DATE: MAY 2015
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STANDARD SPECIFICATION	<h2>STS – M 50</h2>	
DESCRIPTION	ID-CODE	
<b>BALL VALVE, DOUBLE BLOCK AND BLEED (Stainless steel)</b>	<b>BV</b>	

Shutoff device in above ground pipelines for mineral oil products of liquids with hazard characteristics R10 (flammable) F (easily flammable) and F\* (highly flammable) with aromatic content of up to 50%. For the installation in stations and manholes (in zone 1, the inside has to be assigned to zone 0).

The following rules have to be kept reliably:

1. Directive 2014/68/EU of the European parliament and of the council on the approximation of the laws of the Member States concerning pressure equipment
2. Directive 2014/34/EU of the European parliament and of the council on the approximation of the laws of the Member States concerning equipment and protective systems intended for use in potentially explosive atmospheres (ATEX)
3. Directive 2006/42/EU of the European parliament and of the council on the approximation of the laws of the Member States of 17 May 2006 on machinery
4. Regulation (EU) No 305/2011 of the European Parliament and of the laying down harmonised conditions for the marketing of construction products
5. General Product Safety Directive (GPSD) and associated rules (GPSR)
6. Ordinance on Industrial Safety and Health
7. General Product Safety Directive (GPSD)
8. Technical rules for operation safety/hazardous substances, especially TRBS 3151 / TRGS 751
9. VdTÜV instruction sheets, especially VdTÜV-MB 967, VdTÜV-MB 966-1 and VdTÜV-MB 966-2
10. AD 2000 instruction sheets, especially AD 2000 series W and AD 2000 A4
11. DIN, DIN EN and DIN EN ISO, especially DIN 3230-6, DIN EN 558, DIN EN 1092-1, DIN EN 10222-5, DIN EN 10213
12. Technical Instructions to keep the air clean (TA Air)
13. Technical rules for flammable liquids, especially TRbF 50 (other sources of information)

### Use

The exterior temperature changes usual in Europe must be considered.

Medium: Mineral oil finished products with solid particles up to 800 µm  
 Pressure step: PN 16  
 Density of transport medium: 736 – 860 kg/m<sup>3</sup>  
 Kinetic viscosity of transport medium: 0.9 x 10<sup>-6</sup> – 8.0 x 10<sup>-6</sup> m<sup>2</sup>/s

### Materials

Body : Cr-Ni-cast steel, mat.no. 1.4552 or 1.4408 acc. to DIN EN 10213  
 Ball : stainless steel, mat.no. 1.4571 acc. to DIN EN 10222-5  
 Stem : stainless steel, mat.no. 1.4571 acc. to DIN EN 10222-5

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STANDARD SPECIFICATION	<h2>STS – M 50</h2>	
DESCRIPTION	ID-CODE	
<b>BALL VALVE, DOUBLE BLOCK AND BLEED (Stainless steel)</b>	<b>BV</b>	

Hand lever	:	Wrought steel
Screws and nuts	:	acc. to AD 2000 W7
Set rings	:	PTFE (Teflon or equivalent), self-lubricating
O-rings	:	Viton

### Dimensioning and manufacture

Acc. to DIN 3230-6, par. 3, group II

In addition to table 2, par. 3.1: Applicable for all nominal sizes

### Design

- Ball valve with full passage and replaceable gaskets
- Body with connecting flanges acc. to DIN EN 1092-1 (PN 16), sealing strip shape B1
- Sealing system, ball supported on both sides, metallic and elastic (at input and output); secured against differential pressure from zero to max. operating pressure
- Ball valve > DN 200 with bottom drainage DN 25 (welding neck flange acc. to STS-M 23 and blind flange acc. to STS-M 24)
- Ball valve  $\leq$  DN 200 with screw cap ½ inch for casing drainage
- Construction length acc. to DIN EN 558
- Ball valve suitable for installation on electric drive acc. to STS-E 104
- Elastic sealing made of fuel-resistant material
- If not required otherwise by the contracting agency the ball valve must correspond to the requirements of TA-Luft par. 5.2.6.4 and the standards derived from these.
- If the ball valve is used without electric drive it must be equipped with gearbox and hand wheel from the size DN 150.

### Requirements and tests

Acc. to DIN 3230-6, par. 4, group II

In addition to table 4:

- to par. 8 : strength test acc. to BA
- to par. 9 : tightness acc. to BK
- to par. 10 : tightness of sealing acc. to BN, leakage rate 1 (0 drops per minute). The tightness of both sides shall be proved.

Testing of materials acc. to AD 2000 instruction sheets series W  
Screws and nuts acc. to AD 2000 W 2

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<h1>USAFE</h1>	REVISION 1	DATE: MAY 2015
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STANDARD SPECIFICATION	<h2>STS – M 50</h2>	
DESCRIPTION <b>BALL VALVE, DOUBLE BLOCK AND BLEED (Stainless steel)</b>		ID-CODE <b>BV</b>

Special testing acc. to DIN 3230 part 6, table 6  
- Block and bleed testing

Evidence of quality features

Acc. to DIN 3230-6, par. 6

Acceptance test certificate acc. to DIN EN 10204 – 3.1 at cast compound  $\leq$  200 kg.

Acceptance test certificate acc. to DIN EN 10204 – 3.2 at cast compound  $>$  200 kg.

Certificates of origin have to be enclosed to the acceptance documents of the fitting parts.

Certificate of approved supervision authority that fittings meet TA-air par. 5.2.6.4.  
(Only required if design of fitting acc. to TA-air is requested).

Identification

Acc. to annex III No. 4 of directive 2014/68/EU  
additional identification acc. to DIN 3230-6, par. 4 and AD 2000 A4  
CE conformity marking acc. to Art. 19 of directive 2014/68/EU

Legally required evidences

Acc. to General Product Safety Directive (GPSD) and associated rules (GPSR),  
General Product Safety Directive (GPSD)  
especially:  
EG declaration of conformity acc. to annex IV of directive 2014/68/EU

Periodic inspections by an authorized control office

Acc. to Product Safety Directive, facilities and facility parts in need of monitoring must be reviewed repeatedly in certain periods for their orderly conditions concerning the operation by an authorized control office. The operator has to find out the review periods of the complete facility and the facility parts on the base of a safety related evaluation. Therefore the manufacturer of the components must specify and determine the review periods for the individual components of the facilities in need of monitoring. As the operator wants the control office to authorize review periods as long as possible, the fittings and components described in this specifications must be designed and dimensioned in a way that they allow a review period of 3 years for electrical and 5 years for mechanical components.

STS-M 0 shall be observed.

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<h1>USAFE</h1>	REVISION 1	DATE: MAY 2015
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<b>STANDARD SPECIFICATION</b>	<b>STS – M 51</b>	
DESCRIPTION <b>PRESSURE-RELIEF VALVE (Stainless steel)</b>	ID-CODE <b>PRV</b>	

Safety device to prevent that maximum pressure limits are exceeded in a pipeline section conveying finished mineral oil products with the hazard characteristics R 10 (flammable), F (easily flammable) and F+ (highly flammable) and an aromatic content of up to 50 %.  
Suitable for installation in stations and pits (in zone 1, the inside of fittings is to be assigned to zone 0).

The following regulations are imperative and must be complied with:

1. Directive 2014/68EU of the European Parliament and of the Council on the approximation of the laws of the Member States concerning pressure equipment
2. Directive 2014/34EU of the European Parliament and of the Council on the approximation of the laws of the Member States concerning the appropriate use of equipment in explosion hazard areas (ATEX)
3. Directive 2006/42/EU of the European Parliament and of the Council on the approximation of the laws of the Member States of 17 May 2006 concerning machinery
4. Regulation (EU) No. 305/2011 of the European Parliament and of the Council on laying down harmonized conditions for the marketing of construction products
5. General Product Safety Directive (GPSD) and associated regulations (GPSR)
6. German Ordinance on Industrial Safety and Health (BetrSichV)
7. Construction Products Regulation (CPR)
8. Technical Rules on the Operational Safety/Hazardous Materials, especially TRBS 3151 / TRGS 751
9. VdTÜV Codes of Practice, especially VdTÜV-MB 967, VdTÜV-MB 966-1, VdTÜV-MB 966-2
10. MB safety valve 100-RL
11. AD 2000 Codes of Practice, especially AD 2000 W and AD 2000 A4
12. DIN, DIN EN and DIN EN ISO, especially DIN 3230-6, DIN EN 1092-1, DIN EN 10213
13. Technical Rules for the Handling of Flammable Liquids, especially TRbF 50 (other sources of information)

### Use

The exterior temperature variations typical in Europe must be considered.

Conveyed media:	finished mineral oil products with 800 µm
Pressure level:	PN 16
Response pressure:	as specified in the design specifications

### Materials

Pressure-bearing housing parts and cover	:	Cr-Ni cast steel, mat. no. 1.4552 as per DIN EN 10213 or similar
Valve cone and seat	:	Cr-Ni steel of different hardness

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<h1>USAFE</h1>	REVISION 1	DATE: MAY 2015
	SHEET 2 OF 3	
STANDARD SPECIFICATION	<h2>STS – M 51</h2>	
DESCRIPTION <b>PRESSURE-RELIEF VALVE (Stainless steel)</b>	ID-CODE <b>PRV</b>	

Pressure spring : high-grade Cr-Ni spring steel as per DIN EN 15800, DIN 2096 and 2097

Gland packing and gasket : resistant to aromatics and kerosene

### Dimensioning and manufacture

In accordance with DIN 3230 Part 6, Group II, AD 2000 A2 and A4

### Design:

Proportional spring safety valve in angled design, with closed spring cap, gas tight, liftable cone, with component test certificate. Lead cap to safeguard spring position.  
The valve must close reliably even after multiple switching processes per day.

Safety valve and connecting flanges as per DIN EN 1092-1 (PN 16), raised flange face, design B1.

Only parts from foundries that can provide evidence of an authorization as per AD 2000 W0 shall be used for components under pressure.

### Requirements and testing

In accordance with DIN 3230 Part 6, AD 2000 A2 and VdTÜV MB safety valve 100-RL

In addition to table 4:

- Supplement to item 8 : Strength test in accordance with the BA method
- Supplement to item 9 : Tightness in accordance with the BK method
- Supplement to item 10 : Tightness of the closure in accordance with the BN method, leak rate 1 (0 droplets per minute)

### Test pressure

Body : 1.5 x nominal pressure = 24 bar  
in closed position, single-sided

Leak rate 1 (0 droplets per minute)

Material tests as per AD 2000 Codes of Practice, W series and associated DIN EN standards

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STANDARD SPECIFICATION	<h2>STS – M 51</h2>	
DESCRIPTION <b>PRESSURE-RELIEF VALVE (Stainless steel)</b>	ID-CODE <b>PRV</b>	

Evidence of quality features

As per DIN EN 3230-6, Item 6  
 Acceptance certificate as per DIN EN 10204 - 3.1  
 The certificates of origin of the valve components shall be enclosed in the acceptance documents.

Identification/labeling

As per Annex III No. 4 of the directive 2014/68/EU  
 Additional identification as per AD 2000 A2 (set pressure in bar)  
 CE Conformity Sign as per Art. 19 of the directive 2014/68/EU

Legally required evidence

In accordance with the General Product Safety Directive (GPSD) and associated regulations (GPSR), Construction Products Regulation (CPR)  
 Especially:  
 EC Declaration of Conformity as per Annex IV of the directive 2014/68/EU

Periodic inspection by an authorized inspection body

In accordance with the German Ordinance on Industrial Safety and Health (BetrSichV), the operational condition of systems requiring monitoring and their pertaining components must be inspected at regular intervals by an authorized inspection body. The operator of the entire system and its components must prepare the inspection lists on the basis of a technical safety assessment. A prerequisite to this task is that the manufacturer determines and specifies the inspection intervals for each individual component of the system requiring monitoring. As the operator wants the control office to authorize review periods as long as possible, the fittings and components described in this specifications must be designed and dimensioned in a way that they allow a review period of 3 years for electrical and 5 years for mechanical components.

STS-M 0 must be adhered to.

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<h1>USAFE</h1>	REVISION 1	DATE: MAY 2015
	SHEET 1 OF 3	
<b>STANDARD SPECIFICATION</b>	<b>STS – M 52</b>	
DESCRIPTION <b>PRESSURE RELIEF VALVE (Steel)</b>	ID-CODE <b>PRV</b>	

Safety device to prevent high pressure in a pipeline section of mineral oil products with hazard characteristics R10 (flammable) F (easily flammable) and F\* (highly flammable).  
For the installation in stations and manholes, zone 1, the inside has to be assigned to zone 0).

The following rules have to be kept reliably:

1. Directive 2014/68/EU of the European parliament and of the council on the approximation of the laws of the Member States concerning pressure equipment
2. Directive 2014/34/EU of the European parliament and of the council on the approximation of the laws of the Member States concerning equipment and protective systems intended for use in potentially explosive atmospheres (ATEX)
3. Directive 2006/42/EU of the European parliament and of the council on the approximation of the laws of the Member States of 17 May 2006 on machinery
4. Regulation (EU) No 305/2011 of the European Parliament and of the laying down harmonised conditions for the marketing of construction products
5. General Product Safety Directive (GPSD) and associated rules (GPSR)
6. Ordinance on Industrial Safety and Health
7. General Product Safety Directive (GPSD)
8. Technical rules for operation safety/hazardous substances, especially TRBS 3151 / TRGS 751
9. VdTÜV instruction sheets, especially VdTÜV-MB 967, VdTÜV-MB 966-1 and VdTÜV-MB 966-2 and MB safety valve 100-RL
10. AD 2000 instruction sheets, especially AD 2000 series W and AD 2000 A2 and A4
11. DIN, DIN EN and DIN EN ISO, especially DIN 3230-6, DIN EN 1092-1
12. Technical rules for flammable liquids, especially TRbF 50 (other sources of information)

### Use

The exterior temperature changes usual in Europe must be considered.

Medium: Mineral oil finished products with solid particles up to 800 µm  
Pressure step: PN 16  
Actuating pressure: as indicated in the specifications

### Material

Pressurized body parts : acc. to DIN 3230-6, group II (cast steel or steel)  
and cap  
Valve set and cone : Cr-Ni-steel with different degrees of hardness

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STANDARD SPECIFICATION	<h2>STS – M 52</h2>	
DESCRIPTION <b>PRESSURE RELIEF VALVE (Steel)</b>	ID-CODE <b>PRV</b>	

Spring : High-grade Cr-Ni-spring steel acc. to DIN EN 15800, DIN 2096 and 2097

Packing gland and sealing : resistant to aromatics and kerosene

### Dimensioning and manufacture

Acc. to DIN 3230 part 6, par. 3, group II, AD 2000 A2 und A4

### Design

Proportional, spring-type safety valve, angle pattern, with closed spring cap, gas-tight, liftable cone, part-approved. Spring setting lead sealable.

Safety valve and connection flanges must close tight even after several daily switching procedures.

Safety valve and connection flanges acc. to DIN EN 1092-1 (PN 16), sealing strip shape B1.

For pressurized components only parts from foundries with homologation acc. to AD 2000 W0 may be used.

### Requirements and tests

Acc. to DIN 3230, part 6, AD 2000 A2 and VdTÜV MB safety valve 100-RL

In addition to DIN 3230-6, table 4:

- to par. 8 : strength test acc. to BA
- to par. 9 : tightness acc. to BK
- to par. 10 : tightness of sealing acc. to BN, leakage rate 1, tight at 5 m WS.

### Test pressure

Body: 1,5 x nominal pressure = 24 bar  
in closed position, on one side

### Leakage rate 1 (tight)

Testing of materials acc. to AD 2000 instruction sheets series W and appropriate DIN EN standards

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	SHEET 3 OF 3	
STANDARD SPECIFICATION	<h2>STS – M 52</h2>	
DESCRIPTION <b>PRESSURE RELIEF VALVE (Steel)</b>	ID-CODE <b>PRV</b>	

Evidence of quality features

Acc. to DIN 3230-6, par. 6  
 Acceptance test certificate acc. to DIN EN 10204 – 3.1  
 Certificates of origin have to be enclosed to the acceptance documents of the fitting parts.

Identification

Acc. to annex III No. 4 of directive 2014/68/EU  
 additional identification acc. to AD 2000 A2 (actuating pressure in bar)  
 CE conformity marking acc. to Art. 19 of directive 2014/68/EU

Legally required evidences

Acc. to General Product Safety Directive (GPSD) and associated rules (GPSR),  
 General Product Safety Directive (GPSD)  
 especially:  
 EG declaration of conformity acc. to annex IV of directive 2014/68/EU

Periodic inspections by an authorized control office

Acc. to Product Safety Directive, facilities and facility parts in need of monitoring must be reviewed repeatedly in certain periods for their orderly conditions concerning the operation by an authorized control office. The operator has to find out the review periods of the complete facility and the facility parts on the base of a safety related evaluation. Therefore the manufacturer of the components must specify and determine the review periods for the individual components of the facilities in need of monitoring As the operator wants the control office to authorize review periods as long as possible, the fittings and components described in this specifications must be designed and dimensioned in a way that they allow a review period of 3 years for electrical and 5 years for mechanical components.

STS-M 0 shall be observed.

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<b>STANDARD SPECIFICATION</b>	<b>STS – M 53</b>	
DESCRIPTION <b>DIRT TRAP</b>	ID-CODE <b>DT</b>	

Inclined-seat dirt trap, suitable for installation in pipelines for finished mineral oil products with the hazard characteristics R10 (flammable), F (easily flammable) and F+ highly flammable, aromatic content up to 50 %, straight passage, for the collection of coarse contamination.  
Suitable for installation in stations and pits (in zone 1, the inside of fittings is to be assigned to zone 0).

The following regulations are imperative and must be complied with:

1. Directive 2014/68EU of the European Parliament and of the Council on the approximation of the laws of the Member States concerning pressure equipment
2. Directive 2014/34EU of the European Parliament and of the Council on the approximation of the laws of the Member States concerning the appropriate use of equipment in explosion hazard areas (ATEX).
3. Directive 2006/42/EU of the European Parliament and of the Council on the approximation of the laws of the Member States of 17 May 2006 concerning machinery
4. Regulation (EU) No. 305/2011 of the European Parliament and of the Council on laying down harmonized conditions for the marketing of construction products
5. General Product Safety Directive (GPSD) and associated regulations (GPSR)
6. German Ordinance on Industrial Safety and Health (BetrSichV)
7. Construction Products Regulation (CPR)
8. Technical Rules on the Operational Safety/Hazardous Materials, especially TRBS 3151 / TRGS 751
9. VdTÜV Codes of Practice, especially VdTÜV-MB 967, VdTÜV-MB 966-1, VdTÜV-MB 966-2 and MB Sicherheitsventil (Safety Valve) 100-RL
10. AD 2000 Codes of Practice, especially AD 2000 W and AD 2000 A4
11. DIN, DIN EN and DIN EN ISO, especially DIN 3230-6, DIN EN 1092-1
12. Technical Rules for the Handling of Flammable Liquids, especially TRbF 50 (other sources of information)

### Use

The exterior temperature variations typical in Europe must be considered.

Conveyed media: finished mineral oil products with 800 µm  
 Pressure level: PN 16  
 Density of the conveyed medium: 736 to 860 kg/m<sup>3</sup>  
 Kinematic viscosity of the conveyed medium: 0.9 x 10<sup>-6</sup> to 8.0 x 10<sup>-6</sup> m<sup>2</sup>/s

### Materials

Housing and cover : as per DIN 3230, Part 6, Group II (cast steel or steel)  
 Basket strainer : galvanized steel sheet  
 Strainer screen : Cr-Ni steel, mat. no. 1.4571  
 Gaskets : resistant to aromatics and kerosene

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STANDARD SPECIFICATION	<b>STS – M 53</b>	
DESCRIPTION <b>DIRT TRAP</b>	ID-CODE <b>DT</b>	

Design and manufacture

In accordance with DIN 3230, Part 6, Para. 3, Group II.

Design:

- Housing: designed for a straight , turbulence-free flow passage with the lowest possible pressure drop. Connecting flanges as per DIN EN 1092-1 (PN 16), raised flange shape B1
- Dirt trap: DN 100 and greater with drain plug R 1".
- Strainer: removable, mesh size 300 µm.

Only parts from foundries that can provide evidence of an authorization as per AD 200 W0 shall be used for components under pressure.

Requirements and testing

In accordance with DIN 3230, Part 6, Para. 4, Group II.

In addition to table 4:

- Supplement to item 8 : Strength test in accordance with the BA method
- Supplement to item 9 : Tightness in accordance with the BK method

Material testing as per AD 2000 Codes of Practice, W series

Bolts and nuts as per AD 2000 Code of practice W 7.

Evidence of quality features

As per DIN EN 3230-6, Item 6

Acceptance certificate as per DIN EN 10204 - 3.1

The certificates of origin of the valve components shall be enclosed in the acceptance documents.

Identification/labeling

As per Annex III No. 4 of the directive 2014/68/EU

Additional identification as per DIN 3230-6, item 4 and AD 2000 A4

CE Conformity Sign as per Art. 19 of the directive 2014/68/EU

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STANDARD SPECIFICATION	<h2>STS – M 53</h2>	
DESCRIPTION <b>DIRT TRAP</b>	ID-CODE <b>DT</b>	

Legally required evidence

In accordance with the General Product Safety Directive (GPSD) and associated regulations (GPSR), Construction Products Regulation (CPR)

Especially:

EC Declaration of Conformity as per Annex IV of the directive 2014/68/EU

Periodic inspection by an authorized inspection body

In accordance with the German Ordinance on Industrial Safety and Health (BetrSichV), the operational condition of systems requiring monitoring and their pertaining components must be inspected at regular intervals by an authorized inspection body. The operator of the entire system and its components must prepare the inspection lists on the basis of a technical safety assessment. A prerequisite to this task is that the manufacturer determines and specifies the inspection intervals for each individual component of the system requiring monitoring. As the operator wants the control office to authorize review periods as long as possible, the fittings and components described in this specifications must be designed and dimensioned in a way that they allow a review period of 3 years for electrical and 5 years for mechanical components.

STS-M 0 must be adhered to.

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	SHEET 1 OF 3	
<h2>STANDARD SPECIFICATION</h2>	<h1>STS – M 54</h1>	
DESCRIPTION <b>PRESSURE RELIEF VACUUM VALVE</b>	ID-CODE <b>PRVV</b>	

Diaphragm valve for the ventilation of buried tanks for the storage of finished mineral oil products with hazard characteristics R10 (flammable) F (easily flammable) and F\* (highly flammable) with aromatic content of up to 50%.

For the installation in zone 1 (the inside of the fitting has to be assigned to zone 0).

The following rules are imperative and have to be complied with:

1. Directive 2006/42/EC of the European Parliament and of the Council on the approximation of the laws of the Member States of 17 May 2006 concerning machinery
2. Regulation (EU) No 305/2011 of the European Parliament and of the Council on laying down harmonized conditions for the marketing of construction products
3. General Product Safety Directive (GPSD) and associated rules (GPSR)
4. Ordinance on Industrial Safety and Health
5. Technical rules for operational safety/hazardous substances, especially TRBS 3151 / TRGS 751
6. VdTÜV Codes of Practice, especially VdTÜV-MB 967, VdTÜV-MB 966-1 and VdTÜV-MB 966-2
7. AD 2000 Codes of Practice, especially AD 2000 series W and AD 2000 A4
8. DIN, DIN EN and DIN EN ISO, especially DIN EN 3230-6, DIN EN 1092-1, DIN EN 10213-2
9. Technical rules for flammable liquids, especially TRbF 50 (other sources of information)

### Use

The exterior temperature changes usual in Europe must be considered.

Medium: finished mineral oil products  
 Pressure step: PN 16  
 Density of transport medium: 736 to 860 kg/m<sup>3</sup>  
 Kinematic viscosity of transport medium: 0.9 x 10<sup>-6</sup> to 8.0 x 10<sup>-6</sup> m<sup>2</sup>/s

### Material

Body : GP240GH (1.0619) acc. to DIN EN 10213-2, formerly GS-C25  
 Top of valve : GP240GH (1.0619) acc. to DIN EN 10213-2, formerly GS-C25  
 resp. P250GH acc. to DIN EN 10222-2  
 (base plate for diaphragm) Mat. No. 1.4571 acc. to  
 DIN EN 10222-5  
 Inner parts : mat. No. 1.4571 acc. to DIN EN 10222-5 and/or PTFE  
 Diaphragm : Viton  
 Diaphragm holders : mat. No. 1.4571 acc. to DIN EN 10222-5  
 Screws and nuts : stainless steel acc. to AD 2000 W 2

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<b>STANDARD SPECIFICATION</b>	<b>STS – M 54</b>	
DESCRIPTION <b>PRESSURE RELIEF VACUUM VALVE</b>	ID-CODE <b>PRVV</b>	

Design

Hydraulic-pressure-loaded diaphragm valve of frost and corrosion proof design.  
 Safety design: permanent fire-proof by dynamic flame arrestor.  
 Hinged valve top with inserted high and low pressure diaphragm.  
 Diaphragm is adjusted to the specified opening pressure by the force of a frost-proof liquid (water-glysantine-mix) – 40°C to + 40°C

Pressure setting:       + 7.5 mbar high pressure  
                               - 3.5 mbar low pressure

Dimensions

Connection flange acc. to DIN EN 1092-1 (PN 16), packing strip shape B1

Requirements and tests

- Acc. to 2006/42/EC
- Acc. to Product Safety Directive (GPSD) and associated rules (GPSR)

Factory tests acc. to DIN/EN 10204/ 3.1

- Material control
- Set pressures
- Tightness test
- Structural and connection dimensions
- Function

Evidence of quality features

- Acceptance test certificate acc. to DIN EN 10 204 – 3.1 for above mentioned tests

Identification

- CE conformity marking acc. to directive 2006/42/EC
- Acc. to Product Safety Directive (GPSD) and associated rules (GPSR)
- Additional marking DIN 3230 part 6, par. 4 and AD 2000 A4

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<b>STANDARD SPECIFICATION</b>	<b>STS – M 54</b>	
DESCRIPTION <b>PRESSURE RELIEF VACUUM VALVE</b>	ID-CODE <b>PRVV</b>	

Legally required evidences

- Acc. to Product Safety Directive (GPSD) and associated rules (GPSR)
- Especially EC declaration of conformity acc. to directive 2006/42/EC

Periodic inspections by an authorized inspection body

In accordance with the German Ordinance on Industrial Safety and Health (BetrSichV), the operational condition of facilities and facility parts requiring monitoring must be inspected at regular intervals by an authorized inspection body. The operator of the entire facility and its components must prepare the inspection lists on the basis of a technical safety assessment. A prerequisite to this task is that the manufacturer determines and specifies the inspection intervals for each individual component of the facility requiring monitoring. As the operator wants the control office to authorize review periods as long as possible, the fittings and components described in this specifications must be designed and dimensioned in a way that they allow a review period of 3 years for electrical and 5 years for mechanical components.

The below manufacturer(s) is (are) known to manufacture products of the type specified in this specification section. Any other manufacturer(s) from a NATO member Nation Country may provide this product, provided they can prove to meet this specification.

Brand:  
Braunschweiger Flammenfilter GmbH  
Industriestr. 11  
D-38110 Braunschweig  
Tel.:+49 (0) 5307 / 809-0

Type: PROTEGO UB/SF-0

or equivalent

STS-M 0 shall be observed.

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<b>STANDARD SPECIFICATION</b>	<b>STS – M 55</b>	
DESCRIPTION	ID-CODE	
<b>GAUGING AND SAMPLING HATCH</b>		

For sampling and filling level gauging in tanks storing flammable liquids with hazard characteristics R10 (flammable) F (easily flammable) and F\* (highly flammable) with aromatic content of up to 50% and protected additionally by safety devices against detonation (acc. to STS – M 59).  
 For the installation in Zone 1 (the inside has to be assigned to 0).

The following rules are imperative and must be complied with:

1. Directive 2006/42/EC of the European Parliament and of the Council on the approximation of the laws of the Member States of 17 May 2006 concerning machinery
2. Regulation (EU) No 305/2011 of the European Parliament and of the Council on laying down harmonized conditions for the marketing of construction products
3. General Product Safety Directive (GPSD) and associated rules (GPSR)
4. German Ordinance on Industrial Safety and Health (BetrSichV)
5. Technical rules for operation safety/hazardous substances, especially TRBS 3151 / TRGS 751
6. VdTÜV Codes of Practice, especially VdTÜV-MB 967, VdTÜV-MB 966-1 and VdTÜV-MB 966-2
7. AD 2000 Codes of Practice, especially AD 2000 series W
8. DIN, DIN EN and DIN EN ISO, especially DIN EN 1092-1, DIN EN 10213-4, DIN EN 10222-5
9. Technical rules for flammable liquids, especially TRbF 20 and 50 (other sources of information)

Use

The exterior temperature changes usual in Europe must be considered.

- Medium: finished mineral oil products
- Density of transport medium: 736 to 860 kg/m<sup>3</sup>
- Kinematic viscosity of transport medium: 0,9 x 10<sup>-6</sup> – 8,0 x 10<sup>-6</sup> m<sup>2</sup>/s

Material

- Casing and cover : stainless steel casting, material no. 1.4408/1.4571 acc. to DIN 10213-4
- Hinged bolt, nut  
hinge, pin and mark : mat. no. 1.4541 acc. to DIN 17 440
- Cover sealing : aromatic and kerosene resistant

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<h2>STANDARD SPECIFICATION</h2>	<h1>STS – M 55</h1>	
DESCRIPTION  <b>GAUGING AND SAMPLING HATCH</b>	ID-CODE	

Design

Gas-tight hatch, pressure resistant and no-spark producing design with U-lock and stop for the opening position as well as detection mark and fixing device for the use of gauging and sampling units acc. to STS-M 111. The fixing device may not project above the hatch.

Flange connection: PN 16, sealing strip shape B1 acc. to DIN 1092-1

Requirements and tests

Material acc. to AD 2000 series W

- operational test
- leak test
- structural and connection dimensions

Evidence of quality features

- Acceptance test certificate acc. to DIN EN 10204 – 2.2

Legally required evidences

Acc. to directive (EU) No. 305/2011

Acc. to Product Safety Directive (GPSD) and associated rules (GPSR)

Periodic inspections by an authorized inspection body

In accordance with the German Ordinance on Industrial Safety and Health (BetrSichV), the operational condition of facilities and facility parts requiring monitoring must be inspected at regular intervals by an authorized inspection body. The operator of the entire facility and its components must prepare the inspection lists on the basis of a technical safety assessment. A prerequisite to this task is that the manufacturer determines and specifies the inspection intervals for each individual component of the facility requiring monitoring. As the operator wants the control office to authorize review periods as long as possible, the fittings and components described in this specifications must be designed and dimensioned in a way that they allow a review period of 3 years for electrical and 5 years for mechanical components.

<b>AUTHOR:</b> <b>LBB NIEDERLASSUNG LANDAU</b> <b>UNTERTORPLATZ 1</b> <b>D-76829 LANDAU</b> <b>TEL.: +49 (6341) 912-0</b> <b>postfach.landau@LBBnet.de</b>	<b>ISSUED BY:</b>
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<b>USAFE</b>	REVISION 1	DATE: MAY 2015
	SHEET 3 OF 3	
<b>STANDARD SPECIFICATION</b>	<b>STS – M 55</b>	
DESCRIPTION <b>GAUGING AND SAMPLING HATCH</b>		ID-CODE

The below manufacturer(s) is (are) known to manufacture products of the type specified in this specification section. Any other manufacturer(s) from a NATO member Nation Country may provide this product, provided they can prove to meet this specification.

Brand:  
Braunschweiger Flammenfilter GmbH  
Industriestr. 11  
D-38110 Braunschweig  
Tel.:+49 (0) 5307 / 809-0

Type: PROTEGO PS/E

or equivalent

STS-M 0 shall be observed.

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<h1>USAFE</h1>	REVISION 1	DATE: MAY 2015
	SHEET 1 OF 3	
<h2>STANDARD SPECIFICATION</h2>	<h1>STS – M 55</h1>	
DESCRIPTION	ID-CODE	
<b>GAUGING AND SAMPLING HATCH</b>		

For sampling and filling level gauging in tanks storing flammable liquids with hazard characteristics R10 (flammable) F (easily flammable) and F\* (highly flammable) with aromatic content of up to 50% and protected additionally by safety devices against detonation (acc. to STS – M 59).  
For the installation in Zone 1 (the inside has to be assigned to 0).

The following rules are imperative and must be complied with:

1. Directive 2006/42/EC of the European Parliament and of the Council on the approximation of the laws of the Member States of 17 May 2006 concerning machinery
2. Regulation (EU) No 305/2011 of the European Parliament and of the Council on laying down harmonized conditions for the marketing of construction products
3. General Product Safety Directive (GPSD) and associated rules (GPSR)
4. German Ordinance on Industrial Safety and Health (BetrSichV)
5. Technical rules for operation safety/hazardous substances, especially TRBS 3151 / TRGS 751
6. VdTÜV Codes of Practice, especially VdTÜV-MB 967, VdTÜV-MB 966-1 and VdTÜV-MB 966-2
7. AD 2000 Codes of Practice, especially AD 2000 series W
8. DIN, DIN EN and DIN EN ISO, especially DIN EN 1092-1, DIN EN 10213-4, DIN EN 10222-5
9. Technical rules for flammable liquids, especially TRbF 20 and 50 (other sources of information)

### Use

The exterior temperature changes usual in Europe must be considered.

- Medium: finished mineral oil products
- Density of transport medium: 736 to 860 kg/m<sup>3</sup>
- Kinematic viscosity of transport medium: 0,9 x 10<sup>-6</sup> – 8,0 x 10<sup>-6</sup> m<sup>2</sup>/s

### Material

- Casing and cover : stainless steel casting, material no. 1.4408/1.4571 acc. to DIN 10213-4
- Hinged bolt, nut  
hinge, pin and mark : mat. no. 1.4541 acc. to DIN 17 440
- Cover sealing : aromatic and kerosene resistant

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<h1>USAFE</h1>	REVISION 1	DATE: MAY 2015
	SHEET 2 OF 3	
<b>STANDARD SPECIFICATION</b>	<b>STS – M 55</b>	
DESCRIPTION  <b>GAUGING AND SAMPLING HATCH</b>	ID-CODE	

Design

Gas-tight hatch, pressure resistant and no-spark producing design with U-lock and stop for the opening position as well as detection mark and fixing device for the use of gauging and sampling units acc. to STS-M 111. The fixing device may not project above the hatch.

Flange connection: PN 16, sealing strip shape B1 acc. to DIN 1092-1

Requirements and tests

Material acc. to AD 2000 series W

- operational test
- leak test
- structural and connection dimensions

Evidence of quality features

- Acceptance test certificate acc. to DIN EN 10204 – 2.2

Legally required evidences

Acc. to directive (EU) No. 305/2011

Acc. to Product Safety Directive (GPSD) and associated rules (GPSR)

Periodic inspections by an authorized inspection body

In accordance with the German Ordinance on Industrial Safety and Health (BetrSichV), the operational condition of facilities and facility parts requiring monitoring must be inspected at regular intervals by an authorized inspection body. The operator of the entire facility and its components must prepare the inspection lists on the basis of a technical safety assessment. A prerequisite to this task is that the manufacturer determines and specifies the inspection intervals for each individual component of the facility requiring monitoring. As the operator wants the control office to authorize review periods as long as possible, the fittings and components described in this specifications must be designed and dimensioned in a way that they allow a review period of 3 years for electrical and 5 years for mechanical components.

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<h1>USAFE</h1>	REVISION 1	DATE: MAY 2015
	SHEET 3 OF 3	
STANDARD SPECIFICATION	<h2>STS – M 55</h2>	
DESCRIPTION	ID-CODE	
<b>GAUGING AND SAMPLING HATCH</b>		

The below manufacturer(s) is (are) known to manufacture products of the type specified in this specification section. Any other manufacturer(s) from a NATO member Nation Country may provide this product, provided they can prove to meet this specification.

Brand:  
Braunschweiger Flammenfilter GmbH  
Industriestr. 11  
D-38110 Braunschweig  
Tel.:+49 (0) 5307 / 809-0

Type: PROTEGO PS/E

or equivalent

STS-M 0 shall be observed.

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<h1>USAFE</h1>	REVISION 1	DATE: MAY 2015
	SHEET 1 OF 3	
<b>STANDARD SPECIFICATION</b>	<b>STS – M 56</b>	
DESCRIPTION <b>GUIDANCE FOR GAUGING TAPE AND SAMPLING VESSEL</b>		ID-CODE

For the sampling and level gauging on tanks for the storage of flammable liquids with hazard characteristics R10 (flammable) F (easily flammable) and F\* (highly flammable) with aromatic content of up to 50%.  
For the installation in zone 0.

The following regulations are imperative and have to be complied with:

1. Directive 2006/42/EC of the European Parliament and of the Council on the approximation of the laws of the Member States of 17 May 2006 concerning machinery
2. Regulation (EU) No 305/2011 of the European Parliament and of the Council laying down harmonized conditions for the marketing of construction products
3. General Product Safety Directive (GPSD) and associated rules (GPSR)
4. Ordinance on Industrial Safety and Health
5. Technical rules for operation safety/hazardous substances, especially TRBS 3151 / TRGS 751
6. VdTÜV Codes of Practice, especially VdTÜV-MB 967, VdTÜV-MB 966-1 and VdTÜV-MB 966-2
7. AD 2000 Codes of Practice, especially AD 2000 W series
8. DIN, DIN EN and DIN EN ISO standards, especially DIN EN 10088-3, DIN EN 10222-5
9. Technical rules for flammable liquids, especially TRbF 20 and 50 (other sources of information)

### Use

The exterior temperature changes usual in Europe must be considered.

Medium: finished mineral oil finished products  
Pressure step: PN 16  
Density of transport medium: 736 to 860 kg/m<sup>3</sup>  
Kinematic viscosity of transport medium: 0.9 x 10<sup>-6</sup> to 8.0 x 10<sup>-6</sup> m<sup>2</sup>/s

### Material

Guidance, gauging table top and suspension structure of chrome nickel steel material no. 1.4541 acc. to DIN EN 10088-3 bzw. DIN EN 10222-5

### Design

Two-part guidance with gauging table and suspension structure. The two sections of the guidance consist of 12 round rods each, which are welded in 2 welding neck flanges acc. to DN 150 acc. to STS-M 23. In order to stabilize the structure, reinforcement rings made of flat steel (50 x 5 mm) shall be spaced at intervals of 1 m maximum. When welding the chrome nickel steel rods (∅ 16 mm) in the welding neck flanges, it shall be seen to that both sections can be mounted afterwards, since 5 cm in the welding neck flange of the other section. The upper

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<h1>USAFE</h1>	REVISION 1	DATE: MAY 2015
	SHEET 2 OF 3	
<b>STANDARD SPECIFICATION</b>	<b>STS – M 56</b>	
DESCRIPTION		ID-CODE
<b>GUIDANCE FOR GAUGING TAPE AND SAMPLING VESSEL</b>		

steel edges of the upper part and the lower steel edges of the lower part shall be slanted towards the inside in order to prevent the jamming of the sampling vessel. The two sections of the guidance (lower part without gauging table top) shall have approximately the same length.

Total length of the guidance (without gauging table top) acc. to the capacities of the fuel tanks:

5000 m <sup>3</sup>	8030 mm
2500 m <sup>3</sup>	7820 mm
1250 m <sup>3</sup>	7660 mm
750 m <sup>3</sup>	4840 mm
500 m <sup>3</sup>	5260 mm
300 m <sup>3</sup>	4220 mm

The adjustable gauging table top consists of a chrome nickel steel plate  $\varnothing$  200 mm, 6 mm thick, to which three flat steel pieces (25 x 6 x 140 mm dotted with oblong holes 100 x 13) are fixed by welding. In order to connect the gauging table top to the guidance, three flat steel pieces (25 x 6 x 130 mm, with drilling  $\varnothing$  13 mm) are welded on the V-flange. The gauging table top will be fixed on the flat steel pieces with three screws M 12 x 30.

The suspension structure consists of 3 shear connectors M 12 x 160 (incl. ring nuts), 6 shackles, 3 steel ropes  $\varnothing$  10 mm, with eyes at both ends, and 3 straining screws with shackles at both ends. The straining screws shall be fixed with the shackles and ring nuts to the lower reinforcement ring. The unit price shall include the borings in the tank roof and the placing of the shear connectors.

#### Tests

Of materials acc. to EN 10088-3 and/or DIN EN 10222-5  
 Of the completed construction acc. to the manufacturer's standard.

#### Evidence of quality features

Acceptance test certificate acc. to DIN EN 10204 – 2.2

#### Legally required evidences

Acc. to directive (EU) No. 305/2011  
 Acc. to General Product Safety Directive (GPSD) and associated rules (GPSR)

STS-M 0 shall be observed.

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REVISION 1

DATE: MAY 2015

SHEET 3 OF 3

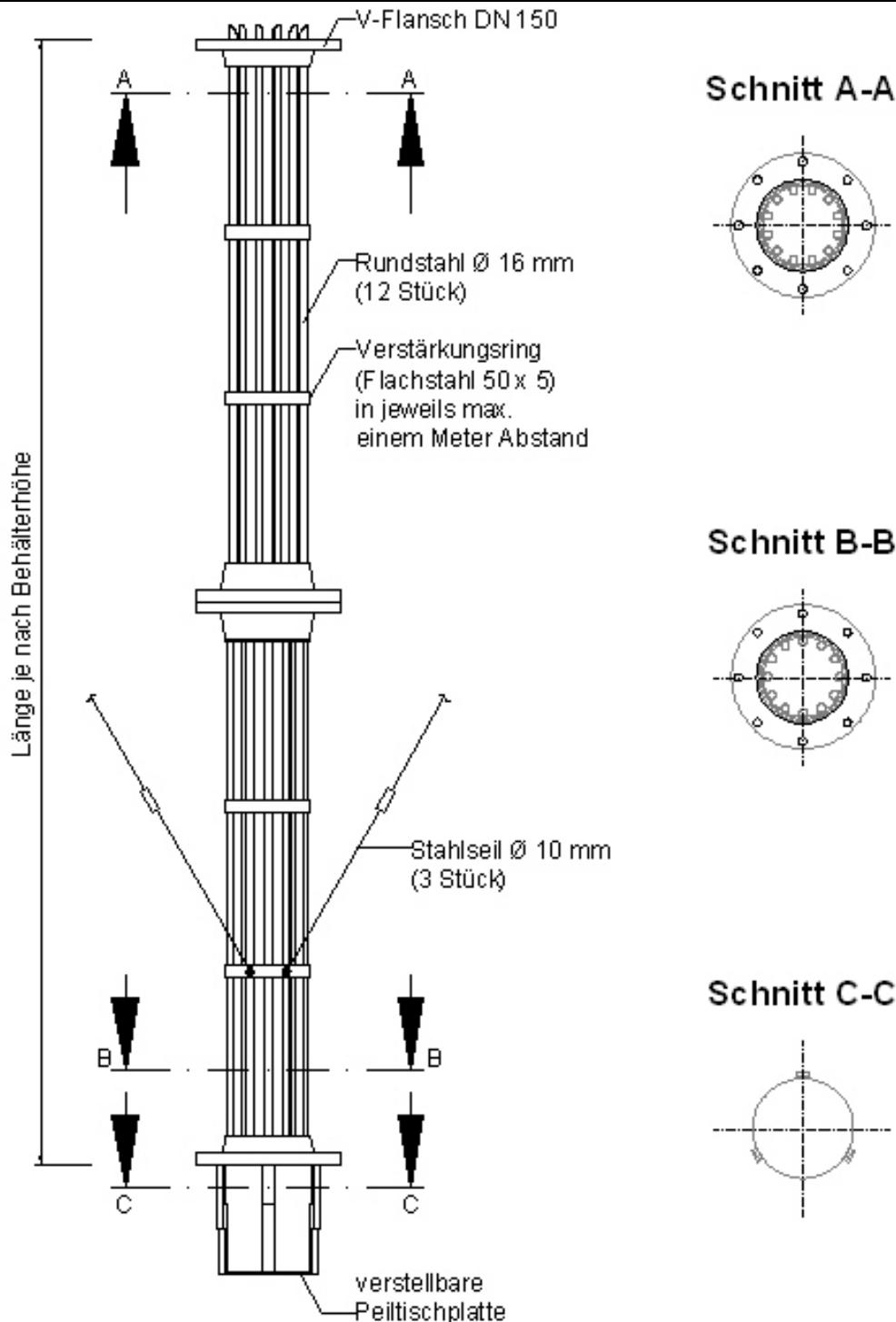
## STANDARD SPECIFICATION

## STS – M 56

DESCRIPTION

**GUIDANCE FOR GAUGING TAPE AND SAMPLING VESSEL**

ID-CODE



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<h1>USAFE</h1>	REVISION 1	DATE: MAY 2015
	SHEET 1 OF 3	
<b>STANDARD SPECIFICATION</b>	<b>STS – M 57</b>	
DESCRIPTION	ID-CODE	
<b>SAFETY DEVICE AGAINST DETONATION, LIQUID TYPE</b>	<b>SDL</b>	

For installation into fill and suction lines of tanks for the storage of flammable liquids with hazard characteristics R10 (flammable) F (easily flammable) and F\* (highly flammable) with aromatic content of up to 50%.  
For the installation in Zone 0.

The following rules are imperative and have to be complied with:

1. Directive 2014/68/EU of the European Parliament and of the Council on the approximation of the laws of the Member States concerning pressure equipment
2. Directive 2014/34/EU of the European Parliament and of the Council on the approximation of the laws of the Member States concerning equipment and protective systems intended for use in potentially explosive atmospheres (ATEX)
3. Directive 2006/42/EU of the European Parliament and of the Council on the approximation of the laws of the Member States of 17 May 2006 concerning machinery
4. Regulation (EU) No 305/2011 of the European Parliament and of the Council on laying down harmonised conditions for the marketing of construction products
5. General Product Safety Directive (GPSD) and associated rules (GPSR)
6. Ordinance on Industrial Safety and Health
7. Technical rules for operation safety/hazardous substances, especially TRBS 3151 / TRGS 751
8. VdTÜV Codes of Practice, especially VdTÜV-MB 967, VdTÜV-MB 966-1 and VdTÜV-MB 966-2
9. AD 2000 Codes of Practice, especially AD 2000 A4
10. DIN, DIN EN and DIN EN ISO standards, especially DIN EN 1092-1, DIN EN 10028-2, DIN EN 10216-2, DIN EN 12874 or ISO 16852
11. Technical rules for flammable liquids, especially TRbF 20 and 50 (other sources of information)

### Use

The exterior temperature changes usual in Europe must be considered.

Medium finished mineral oil products  
 Pressure step PN 16  
 Density of transport medium: 736 to 860 kg/m<sup>3</sup>  
 Kinematic viscosity of transport medium: 0.9 x 10<sup>-6</sup> to 8.0 x 10<sup>-6</sup> m<sup>2</sup>/s

### Material

Casing, dipping fluid tank and expansion space: P265GH (1.0619) or P235 GH (1.0305) acc. to DIN EN 10028-2 (old H II)

Detonation shock absorber: GP240GH (1.0619) or P235 GH (1.0305/1.0460) acc. to DIN EN 10213-2 (old GS-C 25)

Immersion pipes: P235GH-TC1 (1.0345) acc. to DIN EN 10216-2 (old St 35.8 I)

<b>AUTHOR:</b> <b>LBB NIEDERLASSUNG LANDAU</b> <b>UNTERTORPLATZ 1</b> <b>D-76829 LANDAU</b> <b>TEL.: +49 (6341) 912-0</b> <b>postfach.landau@LBBnet.de</b>	<b>ISSUED BY:</b>
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<h1>USAFE</h1>	REVISION 1	DATE: MAY 2015
	SHEET 2 OF 3	
<h2>STANDARD SPECIFICATION</h2>	<h1>STS – M 57</h1>	
DESCRIPTION	ID-CODE	
<b>SAFETY DEVICE AGAINST DETONATION, LIQUID TYPE</b>	<b>SDL</b>	

Flanges: acc. to STS-M 17

Dry levelling security: Cr-Ni-steel, material no. 1.4410 / 1.4541 / 1.4571  
acc. to DIN EN 10028-7 or DIN EN 10222-5

### Design

Acc. to DIN EN 12874 or ISO 16852

Liquid-type safety device against detonation, with wet static flame arrestor, maintenance-free design, for indoor installation, to secure fill and suction lines.

The integral immersion pipes with upstream detonation arrestor, expansion space as well as dipping fluid tank and dry levelling security.

In flame trap design.

Design of casing acc. to EG-type test 2014/34/EG - resistant to explosion, detonation and pressure shocks; safety design for inflammable liquids of explosion class II A.

Flange connection: PN 16, acc. to DIN 1092-1 (inlet and outlet)

### Requirements and tests

- Acc. to DIN EN 12874.
- EC type test acc. Annex III of directive 2014/34/EC
- On starting material acc. to AD 2000 A4 and therein mentioned instruction sheets of the series W
- Type and connection dimensions

### Evidence of quality features

- Acceptance test certificate acc. to DIN EN 10204/3.1 for the above-mentioned tests
- Certificate of type approval acc. to directive 2014/34/EC and the documents required therein.

### Identification

- Acc. to annex IV no. 5 of directive 2014/34/EG
- CE conformity marking acc. to § 16 of directive 2014/34/EC
- Additional identification acc. to DIN EN 12874 and/or ISO 16852

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<h1>USAFE</h1>	REVISION 1	DATE: MAY 2015
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<h2>STANDARD SPECIFICATION</h2>	<h1>STS – M 57</h1>	
DESCRIPTION	ID-CODE	
<b>SAFETY DEVICE AGAINST DETONATION, LIQUID TYPE</b>	<b>SDL</b>	

Legally required evidences

Acc. to General Product Safety Directive (GPSD) and associated rules (GPSR)  
Especially:  
EC declaration of conformity acc. to directive 2014/34/EC

Periodic inspections by an authorized inspection body:

In accordance with the German Ordinance on Industrial Safety and Health (BetrSichV), the operational condition of facilities and facility parts requiring monitoring must be inspected at regular intervals by an authorized inspection body. The operator of the entire facility and its components must prepare the inspection lists on the basis of a technical safety assessment. A prerequisite to this task is that the manufacturer determines and specifies the inspection intervals for each individual component of the facility requiring monitoring. As the operator wants the control office to authorize review periods as long as possible, the fittings and components described in this specifications must be designed and dimensioned in a way that they allow a review period of 3 years for electrical and 5 years for mechanical components.

The below manufacturer(s) is (are) known to manufacture products of the type specified in this specification section. Any other manufacturer(s) from a NATO member Nation Country may provide this product, provided they can prove to meet this specification.

Brand:  
Braunschweiger Flammenfilter GmbH  
Industriestr. 11  
D-38110 Braunschweig  
Tel.:+49 (0) 5307 / 809-0

Type: PROTEGO LDA-F

or equivalent

STS-M 0 shall be observed.

<b>AUTHOR:</b> <b>LBB NIEDERLASSUNG LANDAU</b> <b>UNTERTORPLATZ 1</b> <b>D-76829 LANDAU</b> <b>TEL.: +49 (6341) 912-0</b> <b>postfach.landau@LBBnet.de</b>	<b>ISSUED BY:</b>
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<h1>USAFE</h1>	REVISION 1	DATE: MAY 2015
	SHEET 1 OF 3	
<h2>STANDARD SPECIFICATION</h2>	<h1>STS – M 58</h1>	
DESCRIPTION	ID-CODE	
<b>SAFETY DEVICE AGAINST DETONATION, LIQUID TYPE (for fill line only)</b>	<b>SDL</b>	

For installation into fill lines of tanks for the storage of flammable liquids with hazard characteristics R10 (flammable) F (easily flammable) and F\* (highly flammable) with aromatic content of up to 50%.  
For the installation in Zone 0.

The following rules are imperative and must be complied with:

1. Directive 2014/68/EU of the European Parliament and of the Council on the approximation of the laws of the Member States concerning pressure equipment
2. Directive 2014/34/EU of the European Parliament and of the Council on the approximation of the laws of the Member States concerning equipment and protective systems intended for use in potentially explosive atmospheres (ATEX)
3. Directive 2006/42/EU of the European parliament and of the Council on the approximation of the laws of the Member States of 17 May 2006 concerning machinery
4. Regulation (EU) No 305/2011 of the European Parliament and of the Council on laying down harmonized conditions for the marketing of construction products
5. General Product Safety Directive (GPSD) and associated rules (GPSR)
6. Ordinance on Industrial Safety and Health
7. Technical rules for operational safety/hazardous substances, especially TRBS 3151 / TRGS 751
8. VdTÜV Codes of Practice, especially VdTÜV-MB 967, VdTÜV-MB 966-1 and VdTÜV-MB 966-2
9. AD 2000 Codes of Practice, especially AD 2000 A4
10. DIN, DIN EN and DIN EN ISO, especially DIN EN 1092-1, DIN EN 10028-2, DIN EN 10216-2, DIN EN, DIN EN 12874 or ISO 16852
11. Technical rules for flammable liquids, especially TRbF 20 and 50 (other sources of information)

### Specifications

The exterior temperature changes usual in Europe must be considered.

Medium: finished mineral oil products  
 Pressure step: PN 16  
 Density of transport medium: 736 to 860 kg/m<sup>3</sup>  
 Kinematic viscosity of transport medium: 0.9 x 10<sup>-6</sup> to 8.0 x 10<sup>-6</sup> m<sup>2</sup>/s

### Material

Casing, detonation shock absorber, expansion space and dipping fluid tank : P265GH (1.0619) or P235 GH (1.0305) acc. to DIN EN 10028-2 (old H II)

Immersion pipes : P235GH-TC1 (1.0345) acc. to DIN EN 10216-2 (old St 35.8 I)

Flanges : acc. to STS-M 17

<b>AUTHOR:</b> <b>LBB NIEDERLASSUNG LANDAU</b> <b>UNTERTORPLATZ 1</b> <b>D-76829 LANDAU</b> <b>TEL.: +49 (6341) 912-0</b> <b>postfach.landau@LBBnet.de</b>	<b>ISSUED BY:</b>
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<h1>USAFE</h1>	REVISION 1	DATE: MAY 2015
	SHEET 2 OF 3	
<h2>STANDARD SPECIFICATION</h2>	<h1>STS – M 58</h1>	
DESCRIPTION <b>SAFETY DEVICE AGAINST DETONATION, LIQUID TYPE (for fill line only)</b>		ID-CODE <b>SDL</b>

Design

Acc. to DIN EN 12874 or ISO 16852

Liquid-type safety device against detonation, static flame arrestor, maintenance-free design, for indoor installation, to secure fill lines.

The integral immersion pipes with upstream detonation arrestor, expansion space as well as dipping fluid tank.

Design of casing acc. to EC-type test 2014/34/EU - resistant to explosion, detonation and pressure shocks; safety design for inflammable liquids of explosion class II A.

Flange connection: PN 16, acc. to DIN 1092-1 (inlet and outlet)

Requirements and tests

- Acc. to DIN EN 12874 or ISO 16852
- EC type test acc. Annex III of directive 2014/34/EU
- On starting material acc. to AD 2000 A4 and therein mentioned Codes of Practice of the series W
- Type and connection dimensions

Evidence of quality

- Acceptance test certificate acc. to DIN EN 10204/3.1 for the above-mentioned tests
- Certificate of type approval acc. to directive 2014/34/EC and the documents required therein.

Identification

- Acc. to annex IV no. 5. of directive 2014/34/EU
- CE conformity marking acc. to § 16 of directive 2014/34/EU
- Additional identification acc. to DIN EN 12874 or ISO 16852

Legally required evidences

Acc. to General Product Safety Directive (GPSD) and associated rules (GPSR)

Especially:

EC declaration of conformity acc. to directive 2014/34/EU

<b>AUTHOR:</b> <b>LBB NIEDERLASSUNG LANDAU</b> <b>UNTERTORPLATZ 1</b> <b>D-76829 LANDAU</b> <b>TEL.: +49 (6341) 912-0</b> <b>postfach.landau@LBBnet.de</b>	<b>ISSUED BY:</b>
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<h1>USAFE</h1>	REVISION 1	DATE: MAY 2015
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<h2>STANDARD SPECIFICATION</h2>	<h1>STS – M 58</h1>	
DESCRIPTION		ID-CODE
<b>SAFETY DEVICE AGAINST DETONATION, LIQUID TYPE (for fill line only)</b>		<b>SDL</b>

Periodic inspections by an authorized inspection body

In accordance with the German Ordinance on Industrial Safety and Health (BetrSichV), the operational condition of facilities and facility parts requiring monitoring must be inspected at regular intervals by an authorized inspection body. The operator of the entire facility and its components must prepare the inspection lists on the basis of a technical safety assessment. A prerequisite to this task is that the manufacturer determines and specifies the inspection intervals for each individual component of the facility requiring monitoring. As the operator wants the control office to authorize review periods as long as possible, the fittings and components described in this specifications must be designed and dimensioned in a way that they allow a review period of 3 years for electrical and 5 years for mechanical components.

The below manufacturer(s) is (are) known to manufacture products of the type specified in this specification section. Any other manufacturer(s) from a NATO member Nation Country may provide this product, provided they can prove to meet this specification.

Brand:  
Braunschweiger Flammenfilter GmbH  
Industriestr. 11  
D-38110 Braunschweig  
Tel.:+49 (0) 5307 / 809-0

Type: PROTEGO LDA

or equivalent

STS-M 0 shall be observed.

<b>AUTHOR:</b> <b>LBB NIEDERLASSUNG LANDAU</b> <b>UNTERTORPLATZ 1</b> <b>D-76829 LANDAU</b> <b>TEL.: +49 (6341) 912-0</b> <b>postfach.landau@LBBnet.de</b>	<b>ISSUED BY:</b>
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<h1>USAFE</h1>	REVISION 1	DATE: MAY 2015
	SHEET 1 OF 3	
<b>STANDARD SPECIFICATION</b>	<b>STS – M 59</b>	
DESCRIPTION	ID-CODE	
<b>SAFETY DEVICE AGAINST DETONATION, DRY TYPE</b>	<b>SDD</b>	

For installation into vent lines and for protection of tanks for the storage of flammable liquids with hazard characteristics R10 (flammable) F (easily flammable) and F\* (highly flammable) with aromatic content of up to 50%.

For the installation in Zone 0.

The following rules are imperative and have to be complied with:

1. Directive 2014/68/EU of the European Parliament and of the Council on the approximation of the laws of the Member States concerning pressure equipment
2. Directive 2014/34/EU of the European Parliament and of the Council on the approximation of the laws of the Member States concerning equipment and protective systems intended for use in potentially explosive atmospheres (ATEX)
3. Directive 2006/42/EU of the European Parliament and of the Council on the approximation of the laws of the Member States of 17 May 2006 concerning machinery
4. Regulation (EU) No 305/2011 of the European Parliament and of the Council on laying down harmonized conditions for the marketing of construction products
5. General Product Safety Directive (GPSD) and associated rules (GPSR)
6. Ordinance on Industrial Safety and Health (BetrSichV)
7. Technical rules for operational safety/hazardous substances, especially TRBS 3151 / TRGS 751
8. VdTÜV Codes of Practice, especially VdTÜV-MB 967, VdTÜV-MB 966-1 and VdTÜV-MB 966-2
9. AD 2000 Codes of Practice, especially AD 2000 A4
10. DIN, DIN EN and DIN EN ISO, especially DIN EN 1092-1, DIN EN 10028-7, DIN EN 10213-2 and 4, DIN EN 10222-5, DIN EN 10269, DIN EN 12874 or ISO 16852
11. Technical rules for flammable liquids, especially TRbF 20 and 50 (other sources of information)

### Specifications

The exterior temperature changes usual in Europe must be considered.

Medium: finished mineral oil products  
 Pressure step: PN 16  
 Density of transport medium: 736 to 860 kg/m<sup>3</sup>  
 Kinematic viscosity of transport medium: 0,9 x 10<sup>-6</sup> – 8,0 x 10<sup>-6</sup> m<sup>2</sup>/s

### Material

Casing, cover and detonation  
 Shock absorber : GP240GH (1.0619) acc. to DIN 10213-2 (old GS-C 25)

Flame filter : stainless steel acc. to DIN EN 10028-7 or DIN EN 10222-5  
 (Mat. no. 1.4571 or similar)

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	SHEET 2 OF 3	
<b>STANDARD SPECIFICATION</b>	<b>STS – M 59</b>	
DESCRIPTION	ID-CODE	
<b>SAFETY DEVICE AGAINST DETONATION, DRY TYPE</b>	<b>SDD</b>	

- Cage : stainless steel acc. to DIN EN 10213-4  
(Mat. no. 1.4408 or similar)
- Cover sealing : aromatics and kerosene resistant
- Screws and nuts : inside : Cr-Ni-Steel A 4 (1.4401 or similar) acc. to DIN EN 10269  
: outside: Cr-Ni-Steel A 2 (1.4301 or similar) acc. to DIN EN 10269

### Design

Acc. to DIN EN 12874 or ISO 16852  
 Safety device against explosion and detonation with dry static flame arrestor.  
 Casing with locked cover - resistant to explosion and detonation pressures.  
 Easily replaceable flame trap, including flame filter - multiple -  
 Angled design with 2-part cage and upstream detonation shock absorber.

Design of casing acc. to EC type test 2014/34/EU

Flange connection: PN 16 acc. To DIN EN 1092-1

Design A: corner connection  
 Design B: passage connection

### Requirements and tests

- Acc. to DIN EN 12874 or ISO 16852
- EC type test acc. Annex III of directive 2014/34/EU
- On starting material acc. to AD 2000 A4 and therein mentioned Codes of Practice of the series W
- Type and connection dimensions

### Certification of quality

- Acceptance test certificate acc. to DIN EN 10204/3.1 for the above-mentioned tests
- Certificate of type approval acc. to directive 2014/34/EU and the documents required therein.

### Identification

- Acc. to annex IV no. 5. of directive 2014/34/EU
- CE conformity marking acc. to § 16 of directive 2014/34/EU
- Additional identification acc. to DIN EN 12874 or ISO 16852

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<h2>STANDARD SPECIFICATION</h2>	<h1>STS – M 59</h1>	
DESCRIPTION	ID-CODE	
<b>SAFETY DEVICE AGAINST DETONATION, DRY TYPE</b>	<b>SDD</b>	

Legally required evidences

Acc. to General Product Safety Directive (GPSD) and associated rules (GPSR)  
Especially:  
EU declaration of conformity acc. to directive 2014/34/EU

Periodic inspections by an authorized inspection body

In accordance with the German Ordinance on Industrial Safety and Health (BetrSichV), the operational condition of facilities and facility parts requiring monitoring must be inspected at regular intervals by an authorized inspection body. The operator of the entire facility and its components must prepare the inspection lists on the basis of a technical safety assessment. A prerequisite to this task is that the manufacturer determines and specifies the inspection intervals for each individual component of the facility requiring monitoring. As the operator wants the control office to authorize review periods as long as possible, the fittings and components described in this specifications must be designed and dimensioned in a way that they allow a review period of 3 years for electrical and 5 years for mechanical components.

The below manufacturer(s) is (are) known to manufacture products of the type specified in this specification section. Any other manufacturer(s) from a NATO member Nation Country may provide this product, provided they can prove to meet this specification.

Brand:  
Braunschweiger Flammenfilter GmbH  
Industriestr. 11  
D-38110 Braunschweig  
Tel.: +49 (0) 5307 / 809-0

Type: PROTEGO DR/ES (corner connection)  
Type: PROTEGO DA-E (passage connection)

or equivalent

STS-M 0 shall be observed.

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<h2>STANDARD SPECIFICATION</h2>	<h1>STS – M 60</h1>	
DESCRIPTION <b>VENTILATION CAP</b>	ID-CODE <b>VC</b>	

For the protection of inlets and outlets of ventilating pipes of tanks used for the storage of flammable liquids with hazard characteristics R10 (flammable) F (easily flammable) and F\* (highly flammable) with aromatic content of up to 50% and protected additionally by safety devices against detonation (acc. to STS – M 59).  
For the installation in Zone 1 (the inside has to be assigned to 0).

The following rules are imperative and must be complied with

1. Directive 2006/42/EG of the European parliament and of the council on the approximation of the laws of the Member States of 17 May 2006 on machinery
2. Regulation (EU) No 305/2011 of the European Parliament and of the laying down harmonised conditions for the marketing of construction products
3. General Product Safety Directive (GPSD) and associated rules (GPSR)
4. Ordinance on Industrial Safety and Health
5. Technical rules for operation safety/hazardous substances, especially TRBS 3151 / TRGS 751
6. VdTÜV instruction sheets, especially VdTÜV-MB 967, VdTÜV-MB 966-1 and VdTÜV-MB 966-2
7. AD 2000 instruction sheets, especially AD 2000 A4
8. DIN, DIN EN and DIN EN ISO, especially DIN 3230-6, DIN EN 1092-1, DIN EN 10213-2, DIN EN 10025-2, DIN EN 10028-7
9. Technical rules for flammable liquids, especially TRbF 20 and 50 (other sources of information)

Specifications

The exterior temperature changes usual in Europe must be considered.

- Medium: Mineral oil finished products
- Density of transport medium: 736 – 860 kg/m<sup>3</sup>
- Kinetic viscosity of transport medium: 0,9 x 10<sup>-6</sup> – 8,0 x 10<sup>-6</sup> m<sup>2</sup>/s

Material

- Casing : GP240GH (1.0619) acc. to DIN 10213-2 (old GS-C 25)
- Protecting screen : Cr-Ni-steel, material no. 1.4571 acc. to DIN EN 10028-7
- Cap : S235JR (1.0038) acc. to DIN EN 10025-2 (old RSt37-2)

Design

Ventilation cap in not flame arresting design  
Casing with unscrewable cover and with a replaceable protection screen

Flange connection: PN 16 acc. to DIN EN 1092-1

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<b>STANDARD SPECIFICATION</b>	<b>STS – M 60</b>	
DESCRIPTION <b>VENTILATION CAP</b>	ID-CODE <b>VC</b>	

Requirements and tests

- Material control
- Structural and connection dimensions

Evidence of quality

Acceptance certificate acc. to DIN 10204/2.2

Identification

Manufacturer's directives

Legally required evidences

Acc. to Product Safety Directive (GPSD) and associated rules (GPSR)

The below manufacturer(s) is (are) known to manufacture products of the type specified in this specification section. Any other manufacturer(s) from a NATO member Nation Country may provide this product, provided they can prove to meet this specification.

Brand:  
Braunschweiger Flammenfilter GmbH  
Industriestr. 11  
D-38110 Braunschweig  
Tel.: +49 (0) 5307 / 809-0

Type: PROTEGO EH/O

or equivalent

STS-M 0 shall be observed.

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<h2>STANDARD SPECIFICATION</h2>	<h1>STS – M 61</h1>	
DESCRIPTION <b>INSPECTION GLAS</b>	ID-CODE <b>IG</b>	

Inspection glas for visual control in above ground installed pipelines for mineral oil products of liquids with hazard characteristics R10 (flammable) F (easily flammable) and F\* (highly flammable) with aromatic content of up to 50%.

For the installation in stations and manholes (in zone 1, the inside has to be assigned to zone 0).

The following rules have to be kept reliably:

1. Directive 2014/68/EU of the European parliament and of the council on the approximation of the laws of the Member States concerning pressure equipment
2. Directive 2014/34/EU of the European parliament and of the council on the approximation of the laws of the Member States concerning equipment and protective systems intended for use in potentially explosive atmospheres (ATEX)
3. Directive 2006/42/EU of the European parliament and of the council on the approximation of the laws of the Member States of 17 May 2006 on machinery
4. Regulation (EU) No 305/2011 of the European Parliament and of the laying down harmonised conditions for the marketing of construction products
5. General Product Safety Directive (GPSD) and associated rules (GPSR)
6. Ordinance on Industrial Safety and Health
7. General Product Safety Directive (GPSD)
8. Technical rules for operation safety/hazardous substances, especially TRBS 3151 / TRGS 751
9. VdTÜV instruction sheets, especially VdTÜV-MB 967, VdTÜV-MB 966-1 and VdTÜV-MB 966-2
10. AD 2000 instruction sheets, especially AD 2000 series W and AD 2000 A4 and N4
11. DIN, DIN EN and DIN EN ISO, especially DIN 3230-6, DIN EN 558, DIN EN 1092-1, DIN EN 10302
12. Technical rules for flammable liquids, especially TRbF 50 (other sources of information)

### Use

The exterior temperature changes usual in Europe must be considered.

Medium:	Mineral oil finished products with solid particles up to 800 µm
Pressure step:	PN 16
Density of transport medium:	736 – 860 kg/m <sup>3</sup>
Kinetic viscosity of transport medium:	0.9 x 10 <sup>-6</sup> – 8.0 x 10 <sup>-6</sup> m <sup>2</sup> /s

### Material

Pressurized body parts	:	acc. to DIN 3230-6, group II
Inspection glasses	:	acc. to AD 2000 N 4
Sealings	:	resistant to aromatics and kerosene

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STANDARD SPECIFICATION	<h2>STS – M 61</h2>	
DESCRIPTION <b>INSPECTION GLAS</b>	ID-CODE <b>IG</b>	

Dimensioning and manufacture

Acc. to DIN 3230-6, par. 3, group II

In addition to table 2, par. 3.1: Applicable for all nominal sizes

Design

Inspection glas with opposite replaceable glasses with connecting flanges acc. to DIN EN 1092-1 (PN 16), sealing strip shape B1.

Requirements and tests

Acc. to DIN 3230-6, group II and AD2000 A4

Acc. to DIN 3230-6, par. 4, group II

In addition to table 4:

- to par. 8 : strength test acc. to BA
- to par. 9 : tightness acc. to BK
- to par. 10 : n/a

Testing of materials acc. to AD 2000 instruction sheets series W

Screws and nuts acc. to AD 2000 W 7

Evidence of quality features

Acc. to DIN 3230-6, par. 6

Acceptance test certificate acc. to DIN EN 10204 – 3.1

Certificates of origin have to be enclosed to the acceptance documents of the fitting parts.

Identification

Acc. to annex III No. 4 of directive 2014/68/EU

additional identification acc. to DIN 3230-6, par. 4 and AD 2000 A4

CE conformity marking acc. to Art. 19 of directive 2014/68/EU

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STANDARD SPECIFICATION	<h2>STS – M 61</h2>	
DESCRIPTION <b>INSPECTION GLAS</b>	ID-CODE <b>IG</b>	

Legally required evidences

Acc. to General Product Safety Directive (GPSD) and associated rules (GPSR),  
 General Product Safety Directive (GPSD)  
 especially:  
 EG declaration of conformity acc. to annex IV of directive 2014/68/EU

Periodic inspections by an authorized control office

Acc. to Product Safety Directive, facilities and facility parts in need of monitoring must be reviewed repeatedly in certain periods for their orderly conditions concerning the operation by an authorized control office. The operator has to find out the review periods of the complete facility and the facility parts on the base of a safety related evaluation. Therefore the manufacturer of the components must specify and determine the review periods for the individual components of the facilities in need of monitoring. As the operator wants the control office to authorize review periods as long as possible, the fittings and components described in this specifications must be designed and dimensioned in a way that they allow a review period of 3 years for electrical and 5 years for mechanical components.

STS-M 0 shall be observed.

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<b>STANDARD SPECIFICATION</b>	<b>STS – M 62</b>	
DESCRIPTION <b>DRY EXPLOSION AND DETONATION ARRESTOR</b>	ID-CODE <b>SDD</b>	

Small fitting suitable for the installation in control lines, pipelines of tanks and systems for flammable liquids or product vapor/air mixes with the hazard characteristics R10 (flammable), F (easily flammable) and F+ (highly flammable) and an aromatic content of up to 50 %.  
Suitable for installation in stations and pits (in zone 1, the inside of fittings is to be assigned to zone 0).

The following regulations are imperative and must be complied with:

1. Directive 2014/68EU of the European Parliament and of the Council on the approximation of the laws of the Member States concerning pressure equipment
2. Directive 2014/34EU of the European Parliament and of the Council on the approximation of the laws of the Member States concerning the appropriate use of equipment in explosion hazard areas (ATEX).
3. Directive 2006/42/EU of the European Parliament and of the Council on the approximation of the laws of the Member States of 17 May 2006 concerning machinery.
4. Regulation (EU) No. 305/2011 of the European Parliament and of the Council on laying down harmonized conditions for the marketing of construction products
5. General Product Safety Directive (GPSD) and associated regulations (GPSR)
6. German Ordinance on Industrial Safety and Health (BetrSichV)
7. Technical Rules on the Operational Safety/Hazardous Materials, especially TRBS 3151 / TRGS 751
8. VdTÜV Codes of Practice, especially VdTÜV-MB 967, VdTÜV-MB 966-1 and VdTÜV-MB 966-2
9. AD 2000 Codes of Practice, especially AD 2000 A4
10. DIN, DIN EN and DIN EN ISO, especially DIN EN 1092-1, DIN EN 10028-7, DIN EN 10213, DIN EN 10222-5, DIN EN 10269, DIN EN 12874 or ISO 16852
11. Technical Rules for the Handling of Flammable Liquids, especially TRbF 20 and 50 (other sources of information)

### Use

Exterior temperature variations typical in Europe must be considered.

Conveyed media:	finished mineral oil products
Pressure level:	PN 16
Density of the conveyed medium:	736 to 860 kg/m <sup>3</sup>
Kinematic viscosity of conveyed medium:	0.9 x 10 <sup>-6</sup> to 8.0 x 10 <sup>-6</sup> m <sup>2</sup> /s

### Materials

Enclosure	:	GP240GH (1.0619) as per DIN EN 10213 (formerly GS-C 25)
Flame filter	:	stainless steel as per DIN EN 10028-7 or DIN EN 10222-5 (material no. 1.4571 or equivalent)
Gaskets	:	resistant to aromatics and kerosene (PTFE)
Bolts and nuts	:	Cr-Ni steel A2 (1.4301 or equivalent) as per DIN EN 10269

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STANDARD SPECIFICATION	<h2>STS – M 62</h2>	
DESCRIPTION <b>DRY EXPLOSION AND DETONATION ARRESTOR</b>	ID-CODE <b>SDD</b>	

Execution:

As per DIN EN 12874 or ISO 16852.

Explosion and detonation arrester with dry, static flame arresting device

Enclosure with connecting flange DN 25 PN 16 as per DIN EN 1092-1

Flame arrester with bidirectional flame filter - limit gap width of 0.7 mm - in accordance with the standard gap width for flammable liquids of explosion class II A.

Enclosure dimensioning in accordance with EC homologation 2014/34/EU

Requirements and testing

- As per DIN EN 12874 or ISO 16852.
- EC homologation in accordance with Annex III of Directive 2014/34/EU
- Of the source material as per AD 2000 A4 and the Codes of Practice of the W series mentioned there-in.
- Construction and connection dimensions

Evidence of quality features

- Acceptance certificate as per DIN EN 10204/3.1 for the above-mentioned tests.
- Type approval certificate as per Directive 2014/34/EU and the documents required there-in

Identification/labeling

- In accordance with Annex IV no. 5. of Directive 2014/34/EU
- CE Conformity Sign as per Art. 16 of the directive 2014/34/EC
- Additional identification as per DIN EN 12874 or ISO 16852.

Legally required evidence

In accordance with the General Product Safety Directive (GPSD) and associated regulations (GPSR); especially:

EC declaration of conformity as per Directive 2014/34/EU

Periodic inspections by an accredited supervisory body

In accordance with the German Ordinance on Industrial Safety and Health (BetrSichV), the operational condition of systems requiring monitoring and their components must be inspected at regular intervals by an approved inspection body. The operator of the entire system and its components must prepare the inspection lists on the

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STANDARD SPECIFICATION	<h2>STS – M 62</h2>	
DESCRIPTION <b>DRY EXPLOSION AND DETONATION ARRESTOR</b>	ID-CODE <b>SDD</b>	

basis of a technical safety assessment. A prerequisite to this task is that the manufacturer determines and specifies the inspection intervals for each individual component of the system requiring monitoring. As the operator wants the control office to authorize review periods as long as possible, the fittings and components described in this specifications must be designed and dimensioned in a way that they allow a review period of 3 years for electrical and 5 years for mechanical components.

The below manufacturer(s) is (are) known to manufacture products of the type specified in this specification section. Any other manufacturer(s) from a NATO member Nation Country may provide this product, provided they can prove to meet this specification.

Brand:  
Braunschweiger Flammenfilter GmbH  
Industriestr. 11  
D-38110 Braunschweig  
Tel.:+49 (0) 5307 / 809-0

Type: PROTEGO DA-G

or equivalent

STS-M 0 must be adhered to.

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<h2>STANDARD SPECIFICATION</h2>	<h1>STS – M 63</h1>	
DESCRIPTION	ID-CODE	
<b>INSULATION FLANGE SET WITH EX-PROOF SPARK GAP</b>	<b>IF</b>	

Insulation flange connection as electrical point of separation for the installation in pipelines conveying inflammable and water pollutant liquids with hazard characteristics R10 (flammable) F (easily flammable) and F\* (highly flammable) with aromatic content of up to 50%.  
 For the installation in stations and manholes (in zone 1, the inside has to be assigned to zone 0).

The following rules have to be kept reliably:

1. Directive 2014/68/EU of the European parliament and of the council on the approximation of the laws of the Member States concerning pressure equipment
2. Directive 2014/34/EU of the European parliament and of the council on the approximation of the laws of the Member States concerning equipment and protective systems intended for use in potentially explosive atmospheres (ATEX)
3. Directive 2006/42/EU of the European parliament and of the council on the approximation of the laws of the Member States of 17 May 2006 on machinery
4. Regulation (EU) No 305/2011 of the European Parliament and of the laying down harmonised conditions for the marketing of construction products
5. General Product Safety Directive (GPSD) and associated rules (GPSR)
6. Ordinance on Industrial Safety and Health
7. General Product Safety Directive (GPSD)
8. Technical rules for operation safety/hazardous substances, especially TRBS 3151 / TRGS 751
9. VdTÜV instruction sheets, especially VdTÜV MB insulation pieces 100
10. AD 2000 instruction sheets, especially AD 2000 series HP
11. DIN, DIN EN, DIN EN ISO, VDE regulations, especially DIN EN10028, DIN EN 10213, DIN EN 10222, DIN EN 62305; VDE 0185-305, DIN 60893; VDE 0318 part 1 and 2
12. Technical rules for flammable liquids, especially TRbF 50 (other sources of information)

Use

The exterior temperature changes usual in Europe must be considered.

Medium: Mineral oil finished products with solid particles up to 800 µm  
 Pressure step: PN 16  
 Density of transport medium: 736 – 860 kg/m<sup>3</sup>  
 Kinetic viscosity of transport medium: 0.9 x 10<sup>-6</sup> – 8.0 x 10<sup>-6</sup> m<sup>2</sup>/s

Materials

Hex. screws : acc. to STS-M 64, galvanized  
 Hex. nuts : acc. to STS-M 64, galvanized  
 Washer : steel galvanized - 140 HV acc. to DIN EN ISO 7089  
 Flat gaskets : acc. to STS-M 65

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<b>STANDARD SPECIFICATION</b>	<b>STS – M 63</b>	
DESCRIPTION	ID-CODE	
<b>INSULATION FLANGE SET WITH EX-PROOF SPARK GAP</b>	<b>IF</b>	

Insulation parts

- Insulation ring : Material acc. to DIN EN 60893; VDE0318 part 1 and 2, min. 15 mm thick
- Insulation washer : Material acc. to DIN EN 60893; VDE0318 part 1 and 2, min. 12 mm thick
- Insulation cap for hex. screw : Material acc. to DIN EN 60893 / VDE0318 part 1 and 2, wall thickness 2 mm

Design

Acc. to TRbF 302 par. 5.6 ff.

As insulating flange connection ready for installation with:

- A. welding neck flanges of steel acc. to STS-M 17
- B. welding neck flanges of stainless steel acc. to STS-M 23

Flange insulation

Acc. to drawing 4 (plastic coat with brackets of stainless steel).

Design of Ex spark gap

- Response AC voltage (50 Hz) : approx. 1,0 kV
- Response surge voltage (1,2/50) : approx. 2,2 kV
- Nominal discharge surge current (8/20) : 100 kA
- Explosion protection : EEx s T4
- Electrodes : perspiration-proof

Spark gap has to be delivered incl. connecting cable and to be installed ready for operation.

Installation to be performed acc. to DIN EN 62305; VDE 0185-305, latest version.

All connections have to be secured against loosening by spring washers.

Connecting shackles have to be wrapped in insulating tape.

Requirements and tests

On the manufacturing material:

Acc. to the specified standard specifications STS-M and the regulations and standards mentioned therein.

On the finished connection:

Acc. to TRbF 302, par. 5.6.5.

- EG-type test acc. to annex III of directive 2014/34/EG
- Additional type test acc. to VdTÜV MB insulation pieces 100

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	SHEET 3 OF 4	
<b>STANDARD SPECIFICATION</b>	<b>STS – M 63</b>	
DESCRIPTION <b>INSULATION FLANGE SET WITH EX-PROOF SPARK GAP</b>	ID-CODE <b>IF</b>	

**Installed:**

Test of the electric strength acc. to TRbF 20, annex O, par. 6.1 by approved body in the presence of the site supervision acc. to sheet 4 of this specification

Evidence of quality features

For the manufacturing material acc. to corresponding STS-M and regulations and standards mentioned therein.

For the finished connection acc. to TRbF 302, par. 5.6.7 with acceptance test certificate DIN EN 10204/3.2.  
For type tested insulation flange, ready for installation  $\leq$  DN 200/ < 40 an acceptance test certificate DIN EN 10204/3.1 will be sufficient.

Type test certificate acc. to directive 2014/34/EG and the documents requested therein.

Identification

Acc. VdTÜV MB Insulation pieces 100  
Acc. to annex IV No.5. of directive 2014/34/EGU  
CE conformity marking acc. to Art. 16 of directive 2014/34/EGU

Legally required evidences

Acc. to General Product Safety Directive (GPSD) and associated rules (GPSR),  
General Product Safety Directive (GPSD)  
especially:  
EU declaration of conformity acc. to directive 2014/34/EU

Periodic inspections by an authorized control office

Acc. to Product Safety Directive, facilities and facility parts in need of monitoring must be reviewed repeatedly in certain periods for their orderly conditions concerning the operation by an authorized control office. The operator has to find out the review periods of the complete facility and the facility parts on the base of a safety related evaluation. Therefore the manufacturer of the components must specify and determine the review periods for the individual components of the facilities in need of monitoring. As the operator wants the control office to authorize review periods as long as possible, the fittings and components described in this specifications must be designed and dimensioned in a way that they allow a review period of 3 years for electrical and 5 years for mechanical components.

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REVISION 1

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SHEET 4 OF 4

## STANDARD SPECIFICATION

## STS – M 63

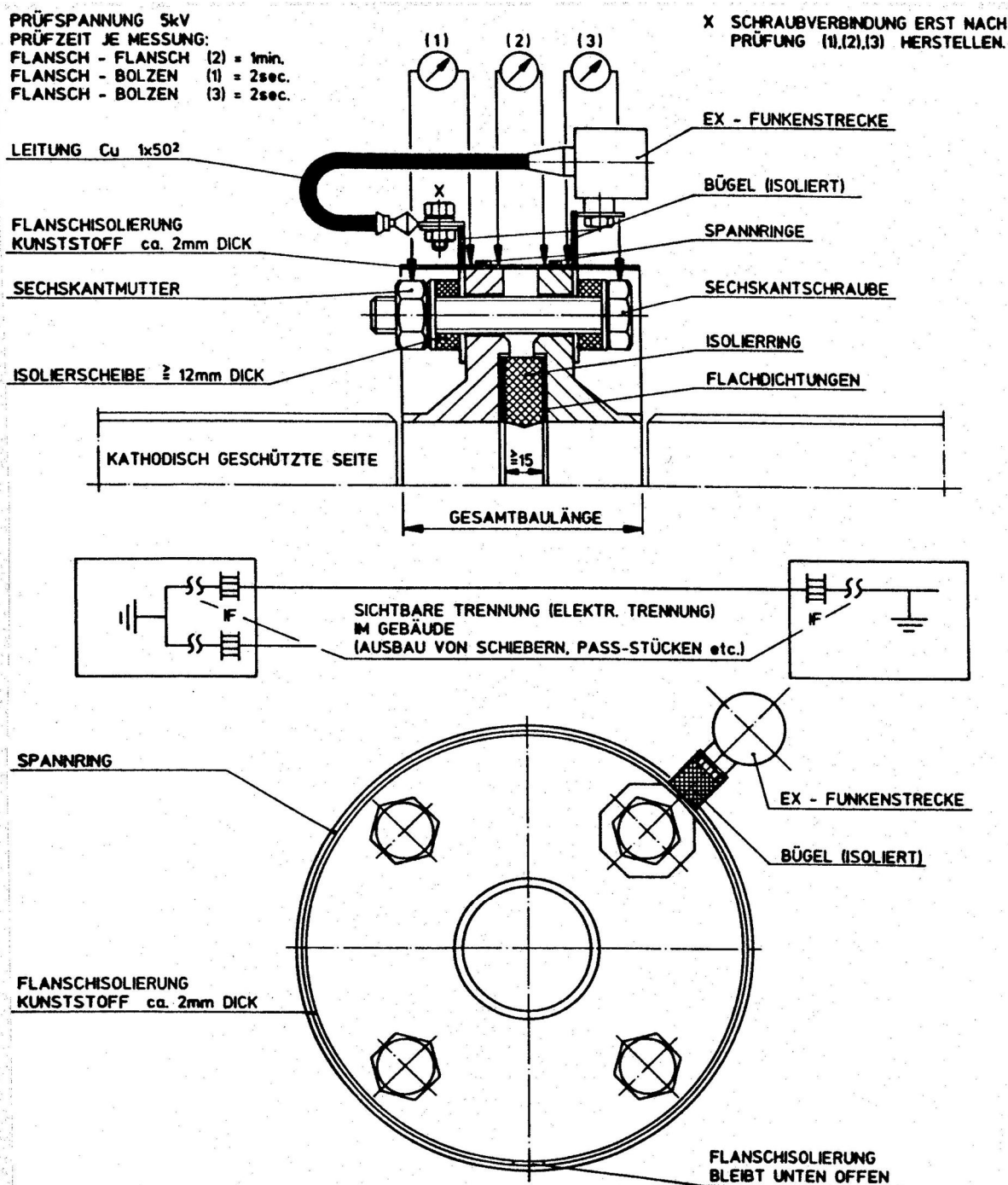
DESCRIPTION

**INSULATION FLANGE SET WITH EX-PROOF SPARK GAP**

ID-CODE

**IF**

STS-M 0 shall be observed.



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<h2>STANDARD SPECIFICATION</h2>	<h1>STS – M 64</h1>	
DESCRIPTION  <b>MACHINE SCREWS, NUTS</b>	ID-CODE	

For flanged connections in aboveground installed pipelines.

The following rules have to be kept reliably:

1. Directive 2014/68/EU of the European parliament and of the council on the approximation of the laws of the Member States concerning pressure equipment
2. Directive 2006/42/EU of the European parliament and of the council on the approximation of the laws of the Member States of 17 May 2006 on machinery
3. Regulation (EU) No 305/2011 of the European Parliament and of the laying down harmonised conditions or the marketing of construction products
4. General Product Safety Directive (GPSD) and associated rules (GPSR)
5. Ordinance on Industrial Safety and Health
6. General Product Safety Directive (GPSD)
7. Technical rules for operation safety/hazardous substances, especially TRBS 3151 / TRGS 751
8. VdTÜV instruction sheets, especially VdTÜV MB insulations pieces 100
9. AD 2000 instruction sheets, especially HPO, WO, W2, W7
10. DIN, DIN EN and DIN EN ISO, especially DIN EN ISO 3506-1 and 2, DIN EN 1515-1 and 2, DIN EN 10269, DIN EN ISO 4016, DIN EN ISO 4034
11. Technical rules for flammable liquids, especially TRbF 50 (other sources of information)

### Use

The exterior temperature changes usual in Europe must be considered.

Medium: Mineral oil finished products with solid particles up to 800 µm  
 Pressure step: PN 16  
 Density of transport medium: 736 – 860 kg/m<sup>3</sup>  
 Kinetic viscosity of transport medium: 0.9 x 10<sup>-6</sup> – 8.0 x 10<sup>-6</sup> m<sup>2</sup>/s

### Materials

Threaded joints acc. to DIN EN 1515-1 and 2

Type A:

For connections C-steel and ferritic materials

Hexagon screw and hexagon nut acc. to DIN EN 10269: 25CrMo4+QT

Type B:

For connection St/VA, Alu/VA, VA/VA

Hexagon screw and hexagon nut acc. to DIN EN ISO 3506-1 and 2: Steel group A 2, strength class 70.

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STANDARD SPECIFICATION	<h2>STS – M 64</h2>	
DESCRIPTION <b>MACHINE SCREWS, NUTS</b>	ID-CODE	

Dimensioning

Hexagon screw acc. to DIN EN ISO 4016  
Hexagon nut acc. to DIN EN ISO 4034

Manufacture

Screws and nuts have to be manufactured acc. to AD2000 Instruction sheet W2 or W7  
Approval of manufacturer acc. to AD2000 Instruction sheet W0 and HP0.

Requirements and tests

Acc. to AD2000 Instruction sheet W2 or W7

Evidence of quality features

Acc. to AD2000 Instruction sheet W2 or W7  
For screws and nuts of A2-70 an acceptance test certificate acc. to DIN EN 10204/ 3.1 is required.  
For screws of 25CrMo4-QT an acceptance test certificate acc. to DIN EN 10204/ 3.2 is required. For nuts of 25CrMo4 an acceptance test certificate acc. to DIN EN 10204/3.1 has to be submitted.

Identification

Acc. to AD2000 Instruction sheet W2 or W7

Legally required evidences

Acc. to General Product Safety Directive (GPSD) and associated rules (GPSR), Construction Products Law

STS-M 0 shall be observed.

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STANDARD SPECIFICATION	<h2>STS – M 65</h2>	
DESCRIPTION <b>FLAT GASKET</b>	ID-CODE	

As sealing elements between flanges and pipelines for mineral oil products of liquids with hazard characteristics R10 (flammable) F (easily flammable) and F\* (highly flammable) with aromatic content of up to 50%.

The following rules have to be kept reliably:

1. Directive 2014/68/EG of the European parliament and of the council on the approximation of the laws of the Member States concerning pressure equipment
2. Regulation (EU) No. 305/2011 of the European Parliament and of the laying down harmonised conditions for the marketing of construction products
3. General Product Safety Directive (GPSD) and associated rules (GPSR)
4. Ordinance on Industrial Safety and Health
5. General Product Safety Directive (GPSD)
6. Technical rules for operation safety/hazardous substances, especially TRBS 3151 / TRGS 751
7. VdTÜV instruction sheets, especially VdTÜV-MB Insulations pieces 100
8. DIN EN, DIN EN ISO, especially DIN EN 1514-1
9. Technical rules for flammable liquids, especially TRbF 50 (other sources of information)

### Use

The exterior temperature changes usual in Europe must be considered.

Medium:	Mineral oil finished products with solid particles up to 800 µm
Pressure step:	PN 16
Density of transport medium:	736 – 860 kg/m <sup>3</sup>
Kinetic viscosity of transport medium:	0.9 x 10 <sup>-6</sup> – 8.0 x 10 <sup>-6</sup> m <sup>2</sup> /s

### Materials

- Acc. to DIN EN 1514-1
- Resistant to fuel and aromatics with evidence of resistance by manufacturer
- Asbestos-free

### Design

Flat gasket acc. to DIN EN 1514-1 (min. thickness 2 mm)

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STANDARD SPECIFICATION	<h2>STS – M 65</h2>	
DESCRIPTION <b>FLAT GASKET</b>	ID-CODE	

Manufacture

Acc. to choice of manufacturer

Identification

Acc. to DIN EN 1514-1

Evidence of quality features

If requested, the keeping of the specific leakage rate of  $10^{-4}$  mbar l / s m has to be proved by a type test acc. to VDI guideline 2440 - 2000/04.

Legally required evidences

Acc. to General Product Safety Directive (GPSD) and associated rules (GPSR),  
 General Product Safety Directive (GPSD)  
 TA air, if required  
 Especially:  
 Building supervision proofs of usability and conformity

STS-M 0 has to be observed.

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<h1>USAFE</h1>	REVISION 1	DATE: MAY 2015
	SHEET 1 OF 3	
STANDARD SPECIFICATION	<h2>STS – M 66</h2>	
DESCRIPTION <b>SURFACE PROTECTION OF EXPOSED SYSTEM PARTS BY COATING</b>	ID-CODE	

Corrosion protection of all exposed pipelines, fittings, valves, pumps, apparatuses, steel plates, dome shafts with cover etc. shall be provided by a coating as per DIN 18364.

The following regulations are imperative and must be complied with:

1. Regulation (EU) No. 305/2011 of the European Parliament and of the Council on laying down harmonized conditions for the marketing of construction products
2. DIN, DIN EN ISO, especially DIN 18364, DIN EN ISO 12944-4
3. General Product Safety Directive (GPSD) and associated regulations (GPSR)
4. German Ordinance on Industrial Safety and Health (BetrSichV)

### Use

Exterior temperature variations typical in Europe must be considered.

Conveyed media:	finished mineral oil products
Density of the conveyed medium:	736 to 860 kg/m <sup>3</sup>
Kinematic viscosity of conveyed medium:	0.9 x 10 <sup>-6</sup> to 8.0 x 10 <sup>-6</sup> m <sup>2</sup> /s

### Execution

Any rust shall be removed from the parts to be protected (standard degree of surface preparation SA 21/2 as per DIN EN ISO 12944-4, Part 4). The surfaces shall be dry and free from mill scale, oil and grease.

Three individual coats of paint shall be applied (each coat on top of the dried previous one)  
On fittings and valves of aluminum and Cr-Ni steel, adhesive primer shall be applied prior to the paint coats.

- |                      |   |
|----------------------|---|
| 1. Adhesive primer   | (only with Cr-Ni steel)                       |
| 2. Base coat         | thickness 30 µm                               |
| 3. Intermediate coat | thickness 50 µm                               |
| 4. Finish coat       | thickness 100 µm<br>(synthetic resin varnish) |

Each of the coats shall have a different color and must have the same basis as the finish coat.

The coating shall be resistant to jet fuel and weathering. The proof of the resistance shall be submitted to the site supervision prior to the commencement of the coating work.

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STANDARD SPECIFICATION	<h2>STS – M 66</h2>	
DESCRIPTION <b>SURFACE PROTECTION OF EXPOSED SYSTEM PARTS BY COATING</b>	ID-CODE	

Color key

The specified color keys are recommendations. The definitive colors shall be determined in coordination with the operator and the site supervision and laid down in writing in due time before the commencement of the coating work.

	<u>Color</u>	<u>RAL no.</u>
Steel pipelines for jet fuel, except discharge lines	green	6018
Pipelines made of Cr-Ni steel for jet fuel, except discharge lines	light green	6019
Other pipelines	gray	7001
Handwheels and keys of valves	black	9005
Filters/water separators and pumps	gray	7001
Sampling facilities and safety valves and fittings	red	3000
Sliding covers, steel dome shafts (inside) and other steel structures US types	brown	8014
All bare parts of the tanks, such as manholes and pump domes with cover	black	3,669005

The colors of parts not mentioned according to the site supervisor's specifications.

Legally required evidence

General Product Safety Directive (GPSD) and associated regulations (GPSR)

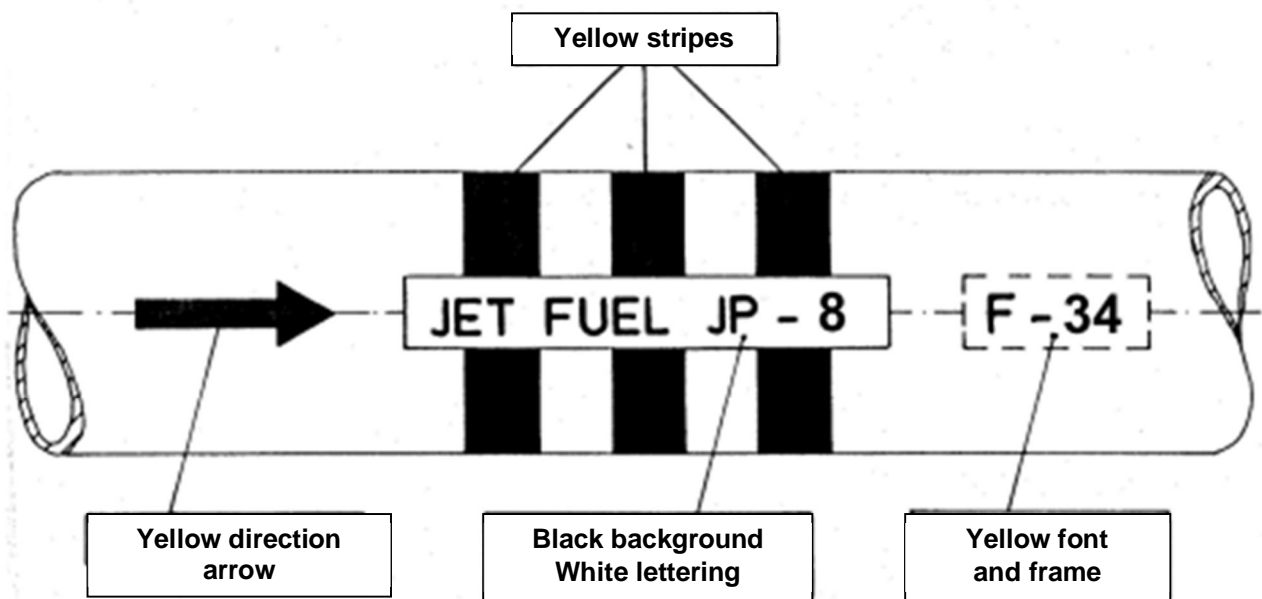
STS-M 0 must be adhered to.

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STANDARD SPECIFICATION	<h2>STS – M 66</h2>	
DESCRIPTION <b>SURFACE PROTECTION OF EXPOSED SYSTEM PARTS BY COATING</b>	ID-CODE	

**COLOR MARKING ON INSTALLED COMPONENTS IN MANIOLD/FILTER STATIONS, PUMP STATIONS AND SHAFTS**



Pipe diameter	Width of stripes	Space between the stripes	Font height
Up to DN 65	75 mm	75 mm	15 mm
DN 80 to DN 125	75 mm	75 mm	25 mm
DN 150 to DN 250	75 mm	75 mm	50 mm

**Apply stripes with synthetic resin varnish as fifth finish coat with a stencil.**

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	SHEET 1 OF 5	
<b>STANDARD SPECIFICATION</b>	<b>STS – M 67</b>	
DESCRIPTION  <b>INTERIOR COATING OF TANKS</b>	ID-CODE	

Interior coating of tanks for the storage of flammable liquids, suitable for finished mineral oil products with the hazard characteristics R 10 (flammable), F (easily flammable) and F+ (highly flammable) and an aromatic content of up to 50 %.

The following regulations are imperative and must be complied with:

1. Regulation (EU) No. 305/2011 of the European Parliament and of the Council on laying down harmonized conditions for the marketing of construction products
2. General Product Safety Directive (GPSD) and associated regulations (GPSR)
3. German Ordinance on Industrial Safety and Health (BetrSichV)
4. Construction Products Act (BauPG)
5. Technical Rules on the Operational Safety/Hazardous Materials, especially TRBS 3151 / TRGS 751
6. VdTÜV Codes of Practice, especially VdTÜV-MB 967, VdTÜV-MB 966-1 and VdTÜV-MB 966-2
7. Technical Rules for the Handling of Flammable Liquids, especially TRbF 20 (other sources of information)
8. Water Resources Act (WHG)
9. Contracting Regulations for Building Works and Supplies

Use

Exterior temperature variations typical in Europe must be considered.

Conveyed media:	finished mineral oil products
Density of the conveyed medium:	736 to 860 kg/m <sup>3</sup>
Kinematic viscosity of conveyed medium:	0.9 x 10 <sup>-6</sup> to 8.0 x 10 <sup>-6</sup> m <sup>2</sup> /s

1. GENERAL

The interior coating shall be applied in accordance with the latest version of TRbF 20, Annex O, Item 1.1. In addition to this, the stipulations of STS-M 67 shall apply.

2. COATING MATERIALS

The coating materials require a general approval by the supervisory construction authorities as per Construction Products Act (BauPG). These requirements are met for ex. by the following products (status 11 sept 2014):

- |                            |  |
|----------------------------|--|
| - Sika Permacor 2807/ HS-A | Sika Deutschland GmbH, Kornwestheimerstraße 103-107, 70439 Stuttgart |
| - Steopox 248 HCB          | Bergollin GmbH & Co KG, Sachsenring 1, 27711 Osterholz-Scharmbeck    |
| - Sika Permacor 138 A      | Sika Deutschland GmbH, Kornwestheimerstraße 103-107, 70439 Stuttgart |

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<h2>STANDARD SPECIFICATION</h2>	<h1>STS – M 67</h1>	
DESCRIPTION  <b>INTERIOR COATING OF TANKS</b>	ID-CODE	

See also "Deutsches Institut für Bautechnik"  
 Website: [www.dibt.de/de/zv/NAT\\_n/zv\\_referat\\_I17/SVA\\_59.htm](http://www.dibt.de/de/zv/NAT_n/zv_referat_I17/SVA_59.htm)

### 3. APPLICATION OF THE COATING

#### 3.1 Requirements on the coating companies

In addition to the conditions and requirements set out in TRbF 20 Annex O, Item 1.1, the following prerequisites shall be fulfilled:

- The Contractor shall provide evidence that he/she has applied flawless interior coating to a steel storage tank as per TRbF 20 for the storage of flammable liquids with the hazard characteristics R10 (flammable), F (easily flammable) and F+ (highly flammable) under comparable site conditions in a previous project.
- The Contractor shall provide evidence that his/her company is approved as a specialist company in the sense of Art. 3 VAUwS in combination with Art 63 WHG for interior coating of tanks for finished mineral oil products with the hazard characteristics R10 (flammable), F (easily flammable) and F+ (highly flammable).

#### 3.2 Coating of built-in components

Pipes, fitting and other built-in parts must be dismantled to ensure perfect blasting and coating. The costs of shall be included in the offered prices.

#### 3.3 Preparation of the steel surfaces to be coated

All weld seams, edges and built-in parts to be coated shall be prepared in accordance with DIN EN ISO 12944-3.

The surface of the weld seams shall be plain and free from strong cambers. Spot welding shall not be permitted. The steel shall be examined for weld flaws and pores.

Possibly required post treatment of welds seams and the elimination of rolling flaws shall be carried out by the company that erected the tank, if these flaws are deficiencies as per DIN EN ISO 12944-3. In order to avoid any downtimes, the site supervision of the ordering party shall coordinate the correction of deficiencies with the tank erecting company in due time

Where old and used tanks are concerned, the repair work shall be carried out by the coating company.

#### 3.4 Execution of the blasting work

Only rough-edged blast granulate (chilled iron grit, rough-edged, grain size: 0.6 to 1.0 mm) shall be used for blasting. The average surface roughness achieved in the blasting process shall be 50 µm. The surface

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STANDARD SPECIFICATION	<h2>STS – M 67</h2>	
DESCRIPTION	ID-CODE	
<b>INTERIOR COATING OF TANKS</b>		

shall be blasted until the degree of surface preparation Sa3 is achieved as required by DIN EN ISO 12944-4. The stipulations of TRbF 20, Annex O, Item 1.1 shall be adhered to in addition.

### 3.5 Inspection of blasted surfaces and approval for coating

The treated surfaces are exposed to corrosion immediately after the blasting, which considerably affects the adhesion of any coating. Therefore, the humidity content inside the tank shall be kept at a level of 45 % maximum with the help of air dehumidifiers. If the relative humidity exceeds this value, the blasting work shall be interrupted. The blasted surfaces shall be freed from dust and coated within the next five hours. If this period expires without the coating being applied, the surfaces shall be blasted again at the Contractors charge. The prepared surfaces shall always be inspected by an expert in accordance with Art. 22 VAWS and approved for coating.

The Contractor shall coordinate the corresponding dates with the expert in such a way that a period of five hours between the completion of the blasting and the beginning of the coating work is not exceeded.

It must be made sure that the conductivity will not fall below 1µS.

### 3.6 Protective measures

All protective measures for the execution of the interior coating shall be undertaken. This applies to the preparation as well as the execution of the interior coating.

The following shall be observed among other measures:

- Verification of the potential between the steel tank and the grounding system; the potential should be matched, if required.
- An additional grounding shall be installed for the duration of the coating work with the help of a grounding rod at a distance of 10 m from the existing grounding and connected to the steel tank and the existing grounding.
- The cathodic corrosion protection system, if any, shall be deactivated for the duration of the coating work.
- The freeness of the air inside the tank from explosive gases shall be monitored with the help of an explosimeter; if any hazardous concentrations are detected, the work shall be immediately interrupted and all machinery and electrical equipment shall be switched off, the tank interior shall be cleared and secured against unauthorized access until the freeness from gas is re-established.
- In order to prevent a lack of oxygen, forced ventilation shall be ensured including the heating of the supplied air, if required to prevent moisture generation. Breathing equipment shall be kept ready.
- Heating and ventilation equipment shall be put up outside of the hazard area (15 m zone), any devices that must be put up inside the hazard area shall be protected against explosion!

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STANDARD SPECIFICATION	<h2>STS – M 67</h2>	
DESCRIPTION  <b>INTERIOR COATING OF TANKS</b>	ID-CODE	

- The tank shall be free from gas at the commencement of the coating work. It shall be kept free from gas during the coating work and corresponding measures shall be undertaken if coating material contains volatile solvents.

Moreover, the relevant accident prevention regulations shall be adhered to.

#### 4. ACCEPTANCE OF THE COATING

- 4.1 The Contractor shall charge an expert in accordance with Art. 22 VAWs with the required acceptance inspections.

The Contractor shall coordinate the acceptance schedule in due time with the expert.

#### 5. TESTING/INSPECTION COSTS

- 5.1 All costs for testing/inspections as per TRbF 20 and STS-M 67 including the costs for the expert's interventions until commissioning and for the testing personnel and equipment required for testing shall be included in the offered prices.

#### 6. WARRANTY

The warranty period shall be five years.

The performed work shall be accepted in accordance with Art. 12 of the General Conditions of Contract for the Execution of Building Works (VOB/B) as soon as evidence of conformity with the contract has been provided. The warranty period starts on the date of the acceptance.

#### 7. INSURANCE

The Contractor shall conclude a liability insurance that covers bodily injury, property damage and financial loss in the amount of at least Euro 500,000 or provide evidence of such insurance cover. The proof of insurance must be furnished prior to the award of the contract.

#### 8. COATING MATERIALS

The coating materials and systems used in the project require a general approval by the supervisory construction authorities as interior coating for fuel tanks.

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DESCRIPTION <b>INTERIOR COATING OF TANKS</b>	ID-CODE	

9. EXPERTS

The coating shall be inspected by an expert in accordance with Art. 22 VAwS.

10. LEGALLY REQUIRED EVIDENCES

General Product Safety Directive (GPSD) and associated regulations (GPSR), Construction Product Act, especially:  
 general approval of the supervisory construction authorities for the coating materials;  
 evidence of the fuel-resistance of the coating.

STS-M 0 must be adhered to.

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STANDARD SPECIFICATION	<h2>STS – M 68</h2>	
DESCRIPTION <b>EXTERIOR INSULATION OF STEEL TANKS</b>	ID-CODE	

For exterior envelope of steel tanks (DIN EN 12285-1) to protect against exterior corrosion.

The following rules have to be kept reliably:

1. Regulation (EU) No 305/2011 of the European Parliament and of the laying down harmonised conditions for the marketing of construction products
2. General Product Safety Directive (GPSD) and associated rules (GPSR)
3. Ordinance on Industrial Safety and Health
4. General Product Safety Directive (GPSD)
5. DIN, DIN EN and DIN EN ISO, especially DIN 6607 and DIN 18364
6. Technical rules for flammable liquids, especially TRbF 50 (other sources of information)
7. Water conservation law (WHG)

### Use

The exterior temperature changes usual in Europe must be considered.

Medium:	Mineral oil finished products
Density of transport medium:	736 – 860 kg/m <sup>3</sup>
Kinetic viscosity of transport medium:	0.9 x 10 <sup>-6</sup> – 8.0 x 10 <sup>-6</sup> m <sup>2</sup> /s

### Design

Steel tanks acc. to DIN EN 12285-1 for the storage of mineral oil products of liquids with hazard characteristics 10, F and F+ with aromatic content of up to 50% will be insulated by the manufacturer with a corrosion protection coating acc. to DIN 6607 for the protection against exterior corrosion.

Type of design will be decided by the contractor.

### Pre-treatment

The steel surfaces to be insulated have to be blasted (steel shot) until the sub-ground will be metallic bright, as requested in VOB part C, DIN 18364, par. 3.2. The surfaces to be blasted must be dry and free of grease.

All welding seams on the tank and on structures and reinforcements have to be cleared from annealing skin and layers of scale. Sharp devices, notches and splatters have to be removed by grinding.

Hardness and grain size of blast material must allow that an average surface roughness of 50 µm will be maintained.

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	SHEET 2 OF 2	
STANDARD SPECIFICATION	<h2>STS – M 68</h2>	
DESCRIPTION <b>EXTERIOR INSULATION OF STEEL TANKS</b>	ID-CODE	

Properties of coating

- Resistant against mineral oil products of liquids with hazard characteristics 10, F and F+ with aromatic content of up to 50%
- Root resistant and microbiologically non-degradable.
- Resistant against fermentation and natural gasses.
- Very good bonding on steel surfaces
- Suitable for tanks with cathodic corrosion protection

Materials

Glassfibre-reinforced plastics (GFK), 2- K- coating systems on epoxy resin base or equivalent.

Requirements for coating firms

Evidence of approval as specialized companies acc. to § 3 VAUwS together with § 63 WHG for interior coatings of tanks for mineral oil products of liquids with hazard characteristics 10, F and F+ with aromatic content of up to 50%).

Requirements and tests

The insulation must stand a test at 25.000 Volt. A certificate about the successfully performed review has to be included to the acceptance documents.

Furthermore, the exterior insulation will be examined prior to the backfilling of the construction pit by approved bodies acc. to General Product Safety Directive (GPSD)

Warranty

The contractor's warranty for the exterior insulation is 4 years after VOB acceptance.

Legally required evidences

General Product Safety Directive (GPSD) and associated rules (GPSR), General Product Safety Directive (GPSD), especially:

Proof of fuel-resistance of coating

Proof of performed insulation test with 25.000 Volt

STS-M 0 shall be observed.

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<b>STANDARD SPECIFICATION</b>	<b>STS – M 69</b>	
DESCRIPTION  <b>FACTORY INSULATION WITH SYNTHETIC MATERIAL</b>	ID-CODE	

Suitable for the insulation of underground pipes made of steel or stainless steel to provide corrosion protection.

The following regulations are imperative and must be complied with:

1. Regulation (EU) No. 305/2011 of the European Parliament and of the Council on laying down harmonized conditions for the marketing of construction products
2. General Product Safety Directive (GPSD) and associated regulations (GPSR)
3. German Ordinance on Industrial Safety and Health (BetrSichV)
4. DIN, DIN EN and DIN EN ISO standards, especially DIN 30670
5. Technical Rules for the Handling of Flammable Liquids, especially TRbF 50 (other sources of information)

#### Use

The exterior temperature variations typical in Europe must be considered.

Conveyed media:	finished mineral oil products
Density of the conveyed medium:	736 to 860 kg/m <sup>3</sup>
Kinematic viscosity of conveyed medium:	0.9 x 10 <sup>-6</sup> to 8.0 x 10 <sup>-6</sup> m <sup>2</sup> /s

#### Materials

Primary polyethylene products, polyvinyl chloride or equivalent materials, with or without pigment additives (UV resistant/black). Insulation suitable for a temperature range of -30 °C up to +50 °C, shore hardness of 70 ° approx.

#### Execution:

As per DIN 30670.

Application of a seamless sleeve in the factory; free from blisters and pores, perfect adhesion also at bends and fittings. Pipe ends shall be kept free from any insulation at a length of 150 mm.

Minimum layer thickness as specified by the manufacturer and in accordance with DIN 30670-PE-v.

#### Manufacture

At the manufacturer's choice.

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STANDARD SPECIFICATION	<h2>STS – M 69</h2>	
DESCRIPTION <b>FACTORY INSULATION WITH SYNTHETIC MATERIAL</b>	ID-CODE	

Inspection/testing

As per DIN 30670.

Evidence of quality features

Evidence of the tests and inspections as per DIN 30670 shall be provided by means of a factory certificate as per DIN 10204/2.2.

Identification/labeling

As per DIN 30670.

Legally required evidences

In accordance with the General Product Safety Directive (GPSD) and associated regulations (GPSR).

STS-M 0 must be adhered to.

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<h2>STANDARD SPECIFICATION</h2>	<h1>STS – M 70</h1>	
IDENTIFICATION  <b>SITE INSULATION - PLASTIC</b>	ID-CODE	

For the repair of damages on shop-insulated pipes and insulation of welding seams, pipe elbows and fittings made of steel or stainless steel to protect against exterior corrosion.

The following rules have to be kept reliably:

1. Regulation (EU) No. 305/2011 of the European Parliament and of the laying down harmonised conditions for the marketing of construction products
2. General Product Safety Directive (GPSD) and associated rules (GPSR)
3. Ordinance on Industrial Safety and Health
4. General Product Safety Directive (GPSD)
5. Technical rules for operation safety/hazardous substances
6. VdTÜV instruction sheets
7. DIN, DIN EN, especially DIN EN 12068
8. Technical rules for flammable liquids, especially TRbF 50 (other sources of information)

### Use

The exterior temperature changes usual in Europe must be considered.

Medium: Mineral oil finished products with solid particles up to 800 µm  
Density of transport medium: 736 – 860 kg/m<sup>3</sup>  
Kinetic viscosity of transport medium: 0.9 x 10<sup>-6</sup> – 8.0 x 10<sup>-6</sup> m<sup>2</sup>/s

### Material

Acc. to DIN EN 12068, suitable for pipelines with cathodic corrosion protection

Prime coat : on plastic base  
Wrapping material : two-layer plastic band with foil

### Performance

Acc. to DIN EN 12068, suitable for pipelines with cathodic corrosion protection

The spot to be insulated shall be thoroughly cleaned from rust, humidity and dirt. To increase the adhesive strength a plastic-base prime coat (primary) will be applied acc. to manufacturer's instructions.

On the shop insulation the band will be wrapped twice around the sections to be insulated with a 50 % overlap. The band must be stretched tight. No bubbles must occur. The shop insulation must be overlapped by 50 mm minimum.

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STANDARD SPECIFICATION	<h2>STS – M 70</h2>	
IDENTIFICATION <b>SITE INSULATION - PLASTIC</b>	ID-CODE	

The processing advices of the manufacturer have to be observed.

The applications should be performed only by persons having the expert knowledge certificate for this.

Tests

Acc. to DIN EN 12068

Identification

Acc. to DIN EN 12068-1

Legally required evidences

Acc. to General Product Safety Directive (GPSD) and associated rules (GPSR).

STS-M 0 shall be observed.

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STANDARD SPECIFICATION	<h2>STS – M 71</h2>	
DESCRIPTION	ID-CODE	
<b>WELDING CONNECTIONS (Steel and stainless steel)</b>		

For the connection of above ground and underground installed pipelines and pipeline parts.

The following rules have to be kept reliably:

1. Directive 2014/68/EG of the European parliament and of the council on the approximation of the laws of the Member States concerning pressure equipment
2. General Product Safety Directive (GPSD) and associated rules (GPSR)
3. Ordinance on Industrial Safety and Health
4. AD 2000 instruction sheets, especially AD 2000 HP3
5. Technical rules for operation safety/hazardous substances
6. VdTÜV instruction sheets
7. DIN, DIN EN and DIN EN ISO standards
8. Technical rules for flammable liquids, especially TRbF 50 (other sources of information)

### Use

The exterior temperature changes usual in Europe must be considered.

Medium:	Mineral oil finished products
Pressure step:	PN 16
Density of transport medium:	736 – 860 kg/m <sup>3</sup>
Kinetic viscosity of transport medium:	0.9 x 10 <sup>-6</sup> – 8.0 x 10 <sup>-6</sup> m <sup>2</sup> /s

### Material

Welding consumables, welding wires and electrodes, adapted to materials of pipelines and pipeline parts to be welded.

Additional materials acc. to DIN EN ISO 2560, DIN EN 12536, DIN EN ISO 3581, DIN EN ISO 15792-1 and DIN EN ISO 14341.

Welding consumables must be appropriate for welding in difficult positions.

### Manufacturing

Acc. to choice of contractor and approval acc. to TRbF 50 par. 5.2

Prior to the start of works all valid welding certificates and procedure qualifications for all planned welding works incl. nozzle welding have to be submitted to the site supervision and approved body. Costs for tests, if required, will not be paid separately.

- The pipe ends have to be prepared with a welding chamfer acc. to DIN EN ISO 9692-1 and 2.  
The joint flanks must be clean, smooth and dry.

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<b>STANDARD SPECIFICATION</b>	<b>STS – M 71</b>	
DESCRIPTION	ID-CODE	
<b>WELDING CONNECTIONS (Steel and stainless steel)</b>		

- On both sides of the welding seam the pipe end must be free of covers and paints on a width of 150 mm.
- At an ambient temperature under +5°C a preheating up to 20° C to 50° C has to be performed.
- At an ambient temperature under –5°C welding must be stopped.
- Direct impacts by wind, rain and snow must be kept away from welding seam until cooling of welding seam.

Performance of welding works

- During the performance of welding works TRbF 50 par. 5.2 has to be observed.
- Manual welding may be performed only by welders who have proved acc. to AD 2000 Instruction sheet HP3 their qualification acc. to DIN EN 287-1 in the group corresponding to material and wall thickness.
- Welding consumables have to be coordinated concerning the basis material and among each other, so that the required features of the welding connections are assured.
- The root passage must always be performed by WIG welding.
- The second layer must be performed immediately after grinding of root passage
- All further filling and covering layers shall be completely finished before the following layer is applied. After completion of top layer the welding seam and its surrounding have to be cleaned carefully from slag and splashes.
- If construction parts must be welded on, approval by the expert is required. Generally, special measures (welding procedures, welding consumables, preheating) are required.
- Welding connections on stainless steel acc. to DIN EN 10088-1 to 3, DIN EN 10028-7 and DIN EN 10222-5 be performed completely by WIG welding. DIN EN ISO 14175 has to be observed.

Designs

Design A:

For welding of pipes acc. to DIN EN 10217, DIN EN 10216 and DIN EN ISO 3183 applies:

Preheating: not required (see also preparation)

Welding:

- Pipes  $\leq$  DN 50 and  
max. 2,9 mm wall thickness : 2-layer, root pass with WIG welding,  
2nd layer can also be performed with gas fusion welding

Pipes  $\geq$  DN 50 und  
Wall thickness > 2.9 mm : Arc welding min. 2-layer,  
root pass with WIG welding

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DESCRIPTION	ID-CODE	
<b>WELDING CONNECTIONS (Steel and stainless steel)</b>		

Design B:

For welding of stainless steel acc. to DIN EN 10088-1 to 3, DIN EN 10028-7 and DIN EN 10222-5 applies:

Preheating : 50° C condensation-dry

Welding : complete WIG welding, forming in the interior  
of pipe with forming gas and protective gas acc. to DIN EN ISO 14175

Test

The number of welding seams to be tested has to be determined together with the expert.

On pipelines  $\geq$  DN 100, at least 2 % of circumferential seams must be tested failure-free acc. to STS-M 73.

Welding connections can be cut out for technological examination on request of the site supervision.

Identification

Identification of welding seams acc. to requirements of approved inspection agency and TRbF 50.

All circumferential welding seams must be provided with a number and recorded.

For each pipe / construction element the material, diameter and wall thickness must be entered herein.

For welding on jobsite, date of welding, welder's name, welding type and all special conditions and measures have to be listed.

Legally required evidences

General Product Safety Directive (GPSD) and associated rules (GPSR).

STS-M 0 shall be observed.

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<h2>STANDARD SPECIFICATION</h2>	<h1>STS – M 72</h1>	
DESCRIPTION <b>SURFACE PROTECTION STEEL TANK</b>	ID-CODE	

The corrosion protection of the outside of the steel tank will be performed by a painting acc. to DIN 18364 and DIN EN ISO 12944-4.

The following rules have to be kept reliably:

1. Regulation (EU) No. 305/2011 of the European Parliament and of the laying down harmonised conditions for the marketing of construction products
2. DIN, DIN EN ISO, especially DIN 18364, DIN EN ISO 12944-4
3. General Product Safety Directive (GPSD) and associated rules (GPSR)
4. Ordinance on Industrial Safety and Health
5. General Product Safety Directive (GPSD)

### Use

The exterior temperature changes usual in Europe must be considered. The steel tank is used for the storage of aircraft fuel with the following physical properties:

Medium:	Mineral oil finished products
Density of transport medium:	736 – 860 kg/m <sup>3</sup>
Kinetic viscosity of transport medium:	0.9 x 10 <sup>-6</sup> – 8.0 x 10 <sup>-6</sup> m <sup>2</sup> /s

### Manufacturing

The parts to be protected must be derusted (standard degree of purity SA 2 ½ acc. to DIN EN ISO 12944-4, part 4). They must be scale-free, oil and grease-free and dry.

The primer coat must be performed within 5 hours after the basic cleaning.

The painting has to be applied in 3 layers (always on the previous dried layer).

- |                      |                        |
|----------------------|------------------------|
| 1. Prime coat        | Layer thickness 30 µm  |
| 2. Intermediate coat | Layer thickness 50 µm  |
| 3. Finishing coat    | Layer thickness 100 µm |

Each layer has to be performed in another color and must be set up on the same basis acc. to the finishing coat.

The painting must be resistant against aircraft fuel and influence of weather. The resistance proof has to be submitted to the site supervision prior to the performance of the painting.

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STANDARD SPECIFICATION	<h2>STS – M 72</h2>	
DESCRIPTION <b>SURFACE PROTECTION STEEL TANK</b>	ID-CODE	

Color coding

The indicated color codings are recommendations. The binding color definition has to be coordinated in time prior to the performance with the operator and the site supervision and to be recorded in writing.

	<u>Color</u>	<u>RAL-No.</u>
All bright tank parts like manholes and pump domes with cover	black	9005

Not mentioned parts acc. to instructions of site supervision.

Legally required evidences

Acc. to General Product Safety Directive (GPSD) and associated rules (GPSR), as well as General Product Safety Directive (GPSD)

STS-M 0 shall be observed.

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STANDARD SPECIFICATION	<h2>STS – M 72</h2>	
DESCRIPTION <b>SURFACE PROTECTION STEEL TANK</b>	ID-CODE	

The corrosion protection of the outside of the steel tank will be performed by a painting acc. to DIN 18364 and DIN EN ISO 12944-4.

The following rules have to be kept reliably:

1. Regulation (EU) No. 305/2011 of the European Parliament and of the laying down harmonised conditions for the marketing of construction products
2. DIN, DIN EN ISO, especially DIN 18364, DIN EN ISO 12944-4
3. General Product Safety Directive (GPSD) and associated rules (GPSR)
4. Ordinance on Industrial Safety and Health
5. General Product Safety Directive (GPSD)

### Use

The exterior temperature changes usual in Europe must be considered. The steel tank is used for the storage of aircraft fuel with the following physical properties:

Medium:	Mineral oil finished products
Density of transport medium:	736 – 860 kg/m <sup>3</sup>
Kinetic viscosity of transport medium:	0.9 x 10 <sup>-6</sup> – 8.0 x 10 <sup>-6</sup> m <sup>2</sup> /s

### Manufacturing

The parts to be protected must be derusted (standard degree of purity SA 2 ½ acc. to DIN EN ISO 12944-4, part 4). They must be scale-free, oil and grease-free and dry.

The primer coat must be performed within 5 hours after the basic cleaning.

The painting has to be applied in 3 layers (always on the previous dried layer).

- |                      |                        |
|----------------------|------------------------|
| 1. Prime coat        | Layer thickness 30 µm  |
| 2. Intermediate coat | Layer thickness 50 µm  |
| 3. Finishing coat    | Layer thickness 100 µm |

Each layer has to be performed in another color and must be set up on the same basis acc. to the finishing coat.

The painting must be resistant against aircraft fuel and influence of weather. The resistance proof has to be submitted to the site supervision prior to the performance of the painting.

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STANDARD SPECIFICATION	<h2>STS – M 72</h2>	
DESCRIPTION <b>SURFACE PROTECTION STEEL TANK</b>	ID-CODE	

Color coding

The indicated color codings are recommendations. The binding color definition has to be coordinated in time prior to the performance with the operator and the site supervision and to be recorded in writing.

	<u>Color</u>	<u>RAL-No.</u>
All bright tank parts like manholes and pump domes with cover	black	9005

Not mentioned parts acc. to instructions of site supervision.

Legally required evidences

Acc. to General Product Safety Directive (GPSD) and associated rules (GPSR), as well as General Product Safety Directive (GPSD)

STS-M 0 shall be observed.

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STANDARD SPECIFICATION	<h2>STS – M 73</h2>	
DESCRIPTION <b>NON-DESTRUCTIVE TESTING OF WELDING CONNECTIONS</b>	ID-CODE	

The following rules have to be kept reliably:

1. Directive 2014/68/EG of the European parliament and of the council on the approximation of the laws of the Member States concerning pressure equipment
2. General Product Safety Directive (GPSD) and associated rules (GPSR)
3. Ordinance on Industrial Safety and Health
4. AD 2000 instruction sheets, especially AD 2000 HP5/3
5. Technical rules for operation safety/hazardous substances
6. VdTÜV instruction sheets
7. DIN, DIN EN and DIN EN ISO – standards
8. Technical rules for flammable liquids, especially TRbF 50 (other sources of information)

#### Requirements and tests

##### **General**

- The non-destructive testing may be performed only by firms who have proved their qualification prior to the start of tests by the approved body. Prior to the start of construction the approved body verifies the orderly working method of the different testing teams, if required with comparative testing on samples, especially for the US testing.
- The documents of the results of non-destructive testing have to be maintained available by the executing firm. The approved body is authorized assist to the testing.
- The testing includes the performance of testing incl. provision of personnel, equipment and all required materials.
- The welding seams  $\geq$  DN 100 have to be tested by X-rays on a random basis acc. to instructions of the approved body, however, at least 2 % of the welding seams.
- The welding seams  $\geq$  DN 100 have to be tested by X-rays acc. to instructions of the approved body.

#### Materials and preparation

For the X-ray test the requirements acc. to DIN EN 444 for class B (improved testing techniques) are applicable.

The quality of pictures must be proven by an image specimen (BPK) for sufficient detail recognition acc. to DIN EN 462.

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STANDARD SPECIFICATION	<h2>STS – M 73</h2>	
DESCRIPTION	ID-CODE	
<b>NON-DESTRUCTIVE TESTING OF WELDING CONNECTIONS</b>		

**Performance**

A. X-ray test

- 100 % radiography of welding seams
- Each circumferential weld for pipes < DN 150 requires 2 pictures, as from DN 200, 3 pictures are required.
- Each film has to be identified clearly with welding seam number and location of film on welding seam. The films shall be submitted not later than after 12 hours to the approved body.

B. Ultra sonic test

The ultra-sonic test shall be performed acc. to AD 2000 HP5/3.

Test instructions based on test pieces (choice of probe, angle, probe position and evaluable areas) have to be prepared and authorized by the approved body. The scope of tests will be coordinated with the approved body.

Prior to the start of their work the ultra-sonic operators must prove their qualification by the approved body.

**Evaluations of testings**

- The quality of welding seams has to be evaluated acc. to requirements of AD 2000 HP5/3 and DIN EN ISO 5817, evaluation group B.  
The evaluation is made in any case by the approved body.
- The sufficient quality of pictures will be evaluated by the approved body during the preliminary tests. DIN EN 462-1 and 2 must be observed. The testing conditions determined in the preliminary tests must be recorded for the ongoing testing on the jobsite. Prior to modification of testing conditions the approved body must be consulted in any case.
- The contractor designates a responsible welding supervisor who evaluates the welding seam quality in advance acc. to this requirement.
- Costs for repeat tests on defective or replaced welding seams and for subsequent increase of the test scope due to faulty welding have to be paid by the contractor without special compensation.
- The costs for the viewing of the x-ray films by the approved supervisory board are paid by the contracting agency.

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STANDARD SPECIFICATION	<h2>STS – M 73</h2>	
DESCRIPTION <b>NON-DESTRUCTIVE TESTING OF WELDING CONNECTIONS</b>	ID-CODE	

Identification

- The identification has to be made acc. to DIN EN 444.
- Each welding seam with not acceptable deficiencies has to be considered as damaged and to be identified with a colored pencil.
- For the identification of seam deficiencies the letter symbols acc. to DIN EN ISO 6520-1 can be used.

**Test record**

Acc. to AD 2000 HP5/3 test records must be prepared for all tests. Acc. to DIN EN ISO 17636-1 and 2 they must include at least the following informations:

- Assignment x-ray image – work piece section
- Radiation source intensity, exposure time
- Arrangement of radiation source, work piece, film
- Distance radiation source – work piece surface and/or work piece surface-film
- Work piece (welding piece)
- Film type, carrier sheet (type and thickness)
- Test class, image quality indicator and image quality class
- Test date

Legally required evidences

Acc. to General Product Safety Directive (GPSD) and associated rules (GPSR),

STS-M 0 shall be observed.

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<h1>USAFE</h1>	REVISION 1	DATE: MAY 2015
	SHEET 1 OF 2	
STANDARD SPECIFICATION	<h2>STS – M 74</h2>	
DESCRIPTION	ID-CODE	
<b>PRESSURE TEST OF WELDED PIPELINE</b>		

Pressure tests on pipelines conveying inflammable and water pollutant liquids with hazard characteristics R10 (flammable) F (easily flammable) and F+ (highly flammable) with aromatic content of up to 50%.

This specification applies for pipelines located inside a plat area acc. to VdTÜV instruction sheet 967 (underground pipelines, pipelines in tanks, stations and manholes).

This specification applies only for first pressure test before commissioning.

The following rules have to be kept reliably:

1. Directive 2014/68/EU of the European parliament and of the council on the approximation of the laws of the Member States concerning pressure equipment
2. General Product Safety Directive (GPSD) and associated rules (GPSR)
3. Ordinance on Industrial Safety and Health
4. Accident prevention regulations (UVV)
5. Technical rules for operation safety/hazardous substances
6. VdTÜV instruction sheets
7. DVGW (German Association for gas and water applications) - worksheet G 469
8. Technical rules for flammable liquids, especially TRbF 50 (other sources of information)

Performance

The pressure test has to be performed after flushing of mechanical installation. Fittings included in the pipeline system have to maintained in position "open".

All tests on welding seams and factory coatings of pipes have to be performed prior to the pressure test. The cover of connection points, for ex. welding seams, has to be performed after the pressure test.

The pipe trench of underground installed pipes may be backfilled only after completion of pressure test.

Type and scope of pressure test have to be determined by the contractor together with the approved supervisory board and the contracting agency.

A water pressure test is not allowed

The contractor has to provide and mount all accessories and connections required for the pressure test, like pressure generator, pressure and temperature measuring devices. He provides the mechanics required for the pressure test.

The test sections have to be locked against other facility parts by appropriate means (blanks, blind flanges).

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STANDARD SPECIFICATION	<h2>STS – M 74</h2>	
DESCRIPTION	ID-CODE	
<b>PRESSURE TEST OF WELDED PIPELINE</b>		

The pressure test of buried connection pipes or their sections and the aboveground installed pipelines has to be performed acc. to DVGW G469.

Exposed connections (flange connections, welding seams) have to be tested for tightness by visual inspection. Therefore all welding seams and connections have to be brushed with Nekal dissolution.

Test pressure, test medium and test period have to be agreed by contractor, approved supervisory board and contracting agency.

The complete lifetime under test pressure must be at least 4 hours. If no clear tightness statement is possible, the lifetime must be increased accordingly.

All costs for the pressure test have to be paid by the contractor. The fees for the approved supervisory board will be paid by the contracting agency.

Costs due to repeat tests are at the expense of the contractor.

After completion of works and when system is filled with fuel a tightness test (visual test) with fuel will be performed. Pressure test acc. to pressure head of installed pumps in tank.

Test pressures

In coordination with the approved supervisory board the following test pressures can be determined under consideration of maximum authorized test pressures of fittings and form pieces acc. to TRbF 620:

- PN 16: 1.3 x maximum authorized operation pressure = 20.8 bar
- For drain pipes and other pipes operated with low overpressure, lower test pressures (min. 5 bar) may be determined in coordination with the expert of the approved supervisory board.

Legally required evidences

General Product Safety Directive (GPSD) and associated rules (GPSR).

STS-M 0 shall be observed.

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STANDARD SPECIFICATION	<h2>STS – M 75</h2>	
DESCRIPTION  <b>INSULATION TESTING</b>	ID-CODE	

For testing the insulation of underground installed pipelines and tanks with a high voltage insulation tester with suitable tactile brushes or spring-loaded rolls.

The following rules have to be kept reliably:

1. General Product Safety Directive (GPSD) and associated rules (GPSR)
2. Ordinance on Industrial Safety and Health
3. Technical rules for operation safety/hazardous substances
4. VdTÜV instruction sheets
5. DIN, DIN EN, especially DIN 30670
6. Technical rules for flammable liquids, especially TRbF 50 (other sources of information)

#### Performance

Testing acc. to DIN 30670.

The testing has to be performed prior to the lowering or installation of the pipes.  
 Test voltage minimum 5 kV plus 5 kV per mm insulation layer thickness, however, maximum 20 kV.  
 Deficiencies have to be repaired orderly and have to be tested again.

#### Acceptance

By the AG or the approved authority.

#### Legally required evidences

Acc. to General Product Safety Directive (GPSD) and associated rules (GPSR).

STS-M 0 shall be observed.

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<b>STANDARD SPECIFICATION</b>	<b>STS – M 76</b>	
SIGNIFICATION  <b>INFORMATION SIGNS AND NAME PLATES</b>	ID-CODE	

Indication signs for safety and health protection identification.  
 Identification plates for the identification of fittings, equipment and flow direction of fuel.

The following rules have to be kept reliably:

1. General Product Safety Directive (GPSD) and associated rules (GPSR)
2. Ordinance on Industrial Safety and Health
3. Technical rules for operation safety/hazardous substances
4. VdTÜV instruction sheets
5. DIN, DIN EN, especially DIN EN ISO 8673
6. BGV, VAWs, especially BGV A8, VAWs § 9
7. Technical rules for flammable liquids, especially TRbF 20 (other sources of information)

Materials

- Signs : Resopal two-layer, surface white, subsurface black
- Screws : Brass (Cylinder head bolts or wood screws acc. to DIN)
- Nuts : Brass (hexagon nuts acc. to DIN EN ISO 8673)

Design

Indication signs

The safety and health protection identification have to be performed acc. to BGV A8 (size, shape and design).  
 On indication signs with text the text must be on the sign in German and in English.

Identification plates

Signs for identification of fittings, equipment and flow direction have to be in German and in English.

The size of signs shall be approx. 50 mm x 130 mm. A modification of the sign dimensions has to be coordinated with the local site supervision and the facility operator.

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SIGNIFICATION  <b>INFORMATION SIGNS AND NAME PLATES</b>	ID-CODE	

### Fastening

- On walls: 4 fastening points with dowels and wood screws  
5 mm of brass
- On equipment and fittings: With galvanized strip steel 30 x 2 mm, length approx. 300 – 400 mm.  
2 fastening points, average distance 100 mm.  
Fastening with brass cylinder head bolts M6, washers and nuts.
- On pipes: Strip steel 30 x 2 mm, approx. 300 mm long to be fastened on pipe with pipe  
2 fastening points, average distance 100 m.  
Fastening with brass cylinder head bolts M6, washers and nuts.

### Writing

- Indication signs: Acc. to BGV A8
- Identification plates: Letters and numbers black, 20 mm high, engraved by negative pressure procedure.

### Labelling of objects

#### 1. General

In principle the labelling of objects has to be coordinated with the local site supervision and the facility operator, the result has to be recorded in writing.  
The following information and name plates have to be considered as minimum requirement for the labelling.

#### 2. Labelling of objects

##### 2.1 Fuel tanks from 5.000 m<sup>3</sup> to 500 m<sup>3</sup>

##### - Information plates

- 1) 2 plates: Exit E 05 acc. to BGV A8
- 2) 1 plate: Instruction sheet  
„Operation and behaviour regulations  
for handling with water-polluting liquid substances“  
acc. to AwS § 9
- 3) 1 plate: Vor dem Betreten des Raumes ist die Belüftungsanlage  
(Text einzuschalten.  
German/ Start ventilation system before entering the room  
English)

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STANDARD SPECIFICATION	<h2>STS – M 76</h2>	
SIGNIFICATION <b>INFORMATION SIGNS AND NAME PLATES</b>	ID-CODE	

- Name plates

- 1) Numbering and lettering of fittings have to be determined together with the local site supervision and the facility operator, the result has to be recorded in writing.
- 2) Plates for identification of fuel flow direction (Text German/English) as mentioned in the following:

Auslagerung Pumpe 1 über Verteilerstation  
Delivery pump 1 via manifold station

Auslagerung Pumpe 2 über Verteilerstation  
Delivery pump 2 via manifold station

\*1

Einlagerung über Verteilerstation  
Input via manifold station

zum Entleerungsbehälter  
to drain tank

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STANDARD SPECIFICATION	<h2>STS – M 76</h2>	
SIGNIFICATION  <b>INFORMATION SIGNS AND NAME PLATES</b>	ID-CODE	

2.2 Manifold station

- Information plates

- 1) 2 plates: Exit E 05 acc. to BGV A8  
4 plates: Indication of exit E 01, E 04 acc. to BGV A8
  
- 2) 1 plate: Instruction sheet  
(near door) „Operation and behaviour regulations  
for handling with water-polluting liquid substances“  
acc. to AwS § 9
  
- 3) 1 plate: Vor dem Betreten des Raumes ist die Belüftungsanlage  
(Text einzuschalten  
German/ Start ventilation system before entering the room  
English)

- Name plates

- 1) Numbering and lettering of fittings have to be determined together with the local site supervision and the facility operator, the result has to be recorded in writing
  
- 2) Plates for identification of fuel flow direction (Text German/English) as mentioned in the following

von und zur Pipeline  
from and to Pipeline

vom Kraftstoffbehälter Nr. ....  
from tank no. ....

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STANDARD SPECIFICATION	<h2>STS – M 76</h2>	
SIGNIFICATION <b>INFORMATION SIGNS AND NAME PLATES</b>		ID-CODE

zum Kraftstoffbehälter Nr. ....  
to tank no. ....

vom Entleerungsbehälter  
from drain tank

zum Entleerungsbehälter  
to drain tank

von den Betankungsschächten  
from refuelling pit

zu den Betankungsschächten  
to refuelling pit

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STANDARD SPECIFICATION	<h2>STS – M 76</h2>	
SIGNIFICATION  <b>INFORMATION SIGNS AND NAME PLATES</b>	ID-CODE	

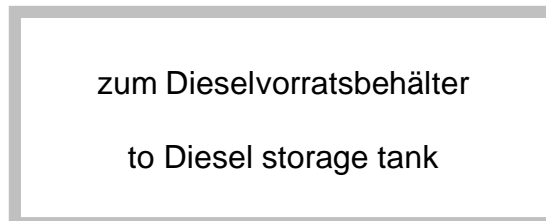
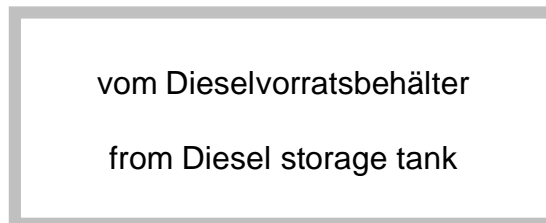
### 2.3 Emergency power supply system

- Information plates

1 plate: Exit E 05 acc. to BGV A8

- Name plates

Plates for identification of fuel flow direction (Text German/English)



### 2.4 Fuel tank 300 m³

- Information plates

1) 2 plates:

Exit E 05 acc. to BGV A8

2) 1 plate:

Instruction sheet

„Operation and behaviour regulations  
for handling with water-polluting liquid substances“  
acc. to AwS § 9

3) 1 plate:

Vor dem Betreten des Raumes ist die Belüftungsanlage

(Text

einzuhalten

German/

Start ventilation system before entering the room

English)

- Information signs

1) Numbering and lettering of fittings have to be determined together with the local site supervision and the facility operator, the result has to be recorded in writing.

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SIGNIFICATION <b>INFORMATION SIGNS AND NAME PLATES</b>	ID-CODE	

2) Plates for identification of fuel flow direction (Text German/English) as mentioned in the following:

von Verteilerstation  
from manifold station

zur Verteilerstation  
to manifold station

zum Entleerungsbehälter  
to drain tank

### 2.5 Fuel tanks 100 m<sup>3</sup> - 40 m<sup>3</sup>

- Information signs

1) 1 plate per dome pit:  
(Text German/English)

1) Achtung!  
Vorsicht gefährliche Gase  
Betreten des Schachtes unterhalb des Gitterrostes nur mit Atemschutzmaske  
  
Attention!  
Caution, dangerous gases. Entering into shaft below grating only with breathing mask

2) Achtung!  
Anlage ist kathodisch geschützt!  
Vor Arbeiten am Tank oder an den Rohrleitungen kathodische Korrosionsschutzanlage abschalten!

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STANDARD SPECIFICATION	<h2>STS – M 76</h2>	
SIGNIFICATION  <b>INFORMATION SIGNS AND NAME PLATES</b>	ID-CODE	

Attention!  
 Facility is equipped with cathodic protection!  
 Disconnect cathodic protection system prior to  
 works on tank or pipelines!

- 2) 1 plate:                      Instruction sheet  
 „Operation and behaviour regulations  
 for handling with water-polluting liquid substances“  
 acc. to AwS § 9

- Name plates

- 1) Numbering and lettering of fittings have to be determined together with the local site supervision and the facility operator, the result has to be recorded in writing
- 2) Plates for identification of fuel flow direction (Text German/English) as mentioned in the following

von Verteilerstation  
 from manifold station

zur Verteilerstation  
 to manifold station

\*1

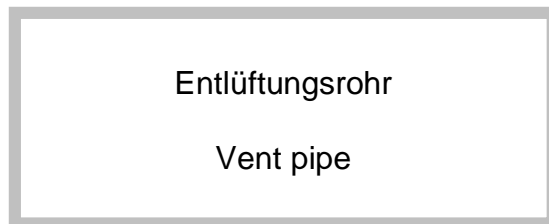
zum Entleerungsbehälter  
 to drain tank

\*1

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SIGNIFICATION  <b>INFORMATION SIGNS AND NAME PLATES</b>	ID-CODE	



### 2.6 Drain tanks 20 m<sup>3</sup> - 5 m<sup>3</sup>

- Information signs

- 1) Plate per dome pit:  
(Text German/English)

1) Achtung!  
Vorsicht gefährliche Gase  
Betreten des Schachtes unterhalb des Gitterrostes nur mit Atemschutzmaske

Attention!  
Caution, dangerous gases. Entering into shaft below grating only with breathing mask

Achtung!  
Anlage ist kathodisch geschützt!  
Vor Arbeiten am Tank oder an den Rohrleitungen kathodische Korrosionsschutzanlage abschalten!

Attention!  
Facility is equipped with cathodic protection!  
Disconnect cathodic protection system prior to works on tank or pipelines!

- 2) 1 plate:

Instruction sheet  
„Operation and behaviour regulations for handling with water-polluting liquid substances“  
acc. to AwS § 9

- Name plates

- 1) Numbering and lettering of fittings have to be determined together with the local site supervision and the facility operator, the result has to be recorded in writing.
- 2) Plates for identification of fuel flow direction (Text German/English) as mentioned in the following:

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STANDARD SPECIFICATION	<h2>STS – M 76</h2>	
SIGNIFICATION <b>INFORMATION SIGNS AND NAME PLATES</b>	ID-CODE	

Entleerungsleitung vom  
Betankungsschacht  
  
Drain pipeline from refuelling pit

Entleerungsleitung von den  
Behälter .....

Drain pipeline from tanks .....

Entleerungsleitung von der  
Verteilerstation  
  
Drain pipeline from manifold station

Entleerungsleitung zur  
Verteilerstation  
  
Drain pipeline to manifold station

Entlüftungsrohr  
  
Vent pipe

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STANDARD SPECIFICATION	<h2>STS – M 76</h2>	
SIGNIFICATION  <b>INFORMATION SIGNS AND NAME PLATES</b>	ID-CODE	

2.7 Diesel storage tank 20 m<sup>3</sup> - 3 m<sup>3</sup>

- Information signs

- 1) 1 plate per dome pit:  
(Text German/English)

1) Achtung!  
Vorsicht gefährliche Gase  
Betreten des Schachtes unterhalb des Gitterrostes nur mit Atemschutzmaske  
  
Attention!  
Caution, dangerous gases. Entering into shaft below grating only with breathing mask

2) Achtung!  
Anlage ist kathodisch geschützt!  
Vor Arbeiten am Tank oder an den Rohrleitungen kathodische Korrosionsschutzanlage abschalten!  
  
Attention!  
Facility is equipped with cathodic protection!  
Disconnect cathodic protection system prior to works on tank or pipelines!

- 2) 1 plate:

Instruction sheet  
„Operation and behaviour regulations for handling with water-polluting liquid substances“  
acc. to AwS § 9

- Name plates

- 1) Numbering and lettering of fittings have to be determined together with the local site supervision and the facility operator, the result has to be recorded in writing
- 2) Plates for identification of fuel flow direction (Text German/English) as mentioned in the following:

zum Tagesbehälter  
  
to service tank

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STANDARD SPECIFICATION	<h2>STS – M 76</h2>	
SIGNIFICATION <b>INFORMATION SIGNS AND NAME PLATES</b>	ID-CODE	

vom Tagesbehälter  
from service tank

Entlüftungsrohr  
Vent pipe

2.8 Fueling pits

- Information signs

1 plate:  
(Text  
German/  
English)

Achtung!  
Vorsicht gefährliche Gase  
Betreten des Schachtes unterhalb des  
Gitterrostes nur mit Atemschutzmaske  
  
Attention!  
Caution, dangerous gases. Entering into  
shaft below grating only with breathing mask

- Name plates

- 1) Numbering and lettering of fittings have to be determined together with the local site supervision and the facility operator, the result has to be recorded in writing
- 2) Plates for identification of fuel flow direction (Text German/English) as mentioned in the following:

Betankungsleitung von  
Verteilerstation  
  
Refuelling pipeline from manifold  
station

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SIGNIFICATION  <b>INFORMATION SIGNS AND NAME PLATES</b>	ID-CODE	

Betankungsleitung zur  
Verteilerstation  
  
Refuelling pipeline to manifold  
station

Entleerungsleitung zum  
Entleerungsbehälter  
  
Drain pipeline to drain tank

### 2.9 Branch pits

- Information signs

1 plate:  
(Text  
German/  
English)

1) Achtung!  
Vorsicht gefährliche Gase  
Betreten des Schachtes unterhalb des  
Gitterrostes nur mit Atemschutzmaske  
  
Attention!  
Caution, dangerous gases. Entering into  
shaft below grating only with breathing mask

2) Achtung!  
Anlage ist kathodisch geschützt!  
Beim Öffnen des Deckels wird die Pipeline  
über Deckelschalter geerdet! Nach Beendigung  
der Arbeiten ist der Deckel zu schließen!  
  
Attention!  
Facility is equipped with cathodic protection!  
During opening of cover pipeline is grounded  
via cover switch!  
After completion of works cover must be closed!

- Name plates

1) Numbering and lettering of fittings have to be determined together with the local site supervision and the facility operator, the result has to be recorded in writing.

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STANDARD SPECIFICATION	<h2>STS – M 76</h2>	
SIGNIFICATION  <b>INFORMATION SIGNS AND NAME PLATES</b>	ID-CODE	

- 2) Plates for identification of fuel flow direction (Text German/English) as mentioned in the following:

<p>Kraftstoffleitung von .....</p> <p>Fuel pipeline from .....</p>
--

<p>Kraftstoffleitung zu .....</p> <p>Fuel pipeline to .....</p>
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\*1 indicate as appropriate only

STS-M 0 shall be observed

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<h2>STANDARD SPECIFICATION</h2>	<h1>STS – M 77</h1>	
DESCRIPTION <b>FOOT VALVE</b>	ID-CODE	

For installation in tanks, for protection of tanks for the storage of flammable liquids with hazard characteristics R10 (flammable) F (easily flammable) and F\* (highly flammable) with aromatic content of up to 50%.  
For the installation in Zone 0.

The following rules are imperative and must be complied with:

1. Directive 2014/68/EU of the European parliament and of the council on the approximation of the laws of the Member States concerning pressure equipment
2. Directive 2014/34/EU of the European parliament and of the council on the approximation of the laws of the Member States concerning equipment and protective systems intended for use in potentially explosive atmospheres (ATEX)
3. Directive 2006/42/EU of the European parliament and of the council on the approximation of the laws of the Member States of 17 May 2006 on machinery
4. Regulation (EU) No 305/2011 of the European Parliament and of the laying down harmonised conditions for the marketing of construction products
5. General Product Safety Directive (GPSD) and associated rules (GPSR)
6. Ordinance on Industrial Safety and Health
7. Technical rules for operation safety/hazardous substances, especially TRBS 3151 / TRGS 751
8. VdTÜV instruction sheets, especially VdTÜV-MB 967, VdTÜV-MB 966-1 and VdTÜV-MB 966-2
9. AD 2000 instruction sheets
10. DIN, DIN EN and DIN EN ISO, especially DIN 3230-6, DIN EN 1092-1, DIN EN 10028-7, DIN EN 10213-2, DIN EN 1022-5, DIN EN 12874 or ISO 16852
11. Technical rules for flammable liquids, especially TRbF 50 (other sources of information)

### Specifications

The exterior temperature changes usual in Europe must be considered.

Medium:	Mineral oil finished products
Pressure step:	PN 16
Density of transport medium:	736 – 860 kg/m <sup>3</sup>
Kinetic viscosity of transport medium:	0.9 x 10 <sup>-6</sup> – 8.0 x 10 <sup>-6</sup> m <sup>2</sup> /s

### Material

Casing and insert	:	GP240GH (1.0619) ac. to DIN EN 10213-2 (old GS-C 25)
Valve cone	:	Cr-Ni-steel, mat.no. 1.4571, DIN 10222-5
O-ring-valve cone sealing	:	Aromatics and kerosene resistant (PTFE)
Casing-O-ring sealing	:	Aromatics and kerosene resistant (Viton)
Screen	:	Cr-Ni-steel, mat.no. 1.4571, DIN EN 10028-7 and/or DIN EN 10222-5

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	SHEET 2 OF 3	
STANDARD SPECIFICATION	<h2>STS – M 77</h2>	
DESCRIPTION <b>FOOT VALVE</b>	ID-CODE	

Screen protection acc. to dimensions of EG-type test certificate

Design

Detonation protected foot valve, maintenance-free, with explosion and detonation-pressure protected casing, sealing by conical metallic valve position with additional O-ring smooth sealing and suction screen. Combined dry and wet flame trap.

Flange connection: drilled acc. to PN 16, DIN EN 1092-1 – with threaded drillings

Requirements and tests

- EG type test acc. Annex III of directive 2014/34/EU
- DIN 3230, part 6

Evidence of quality

- Acceptance test certificate acc. to DIN EN 10204/3.1
- Certificate of type approval acc. to directive 2014/34/EU and the documents required therein.

Identification

- acc. to annex IV no. 5. of directive 2014/34/EU
- additional identification DIN 3230 part 6, par. 4
- CE conformity marking acc. to Art. 16 of directive 2014/34/EU
- additional identification acc. to DIN EN 12874 and/or ISO 16852
- additional identification acc. to DIN EN 12874 and/or ISO 16852

Legally required evidences

Acc. to General Product Safety Directive (GPSD) and associated rules (GPSR)  
Especially:  
EG declaration of conformity acc. to directive 2014/34/EU

Periodic inspections by an authorized control office

As the operator wants the control office to authorize review periods as long as possible, the fittings and components described in this specifications must be designed and dimensioned in a way that they allow a review period of 3 years for electrical and 5 years for mechanical components.

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STANDARD SPECIFICATION	<h2>STS – M 77</h2>	
DESCRIPTION  <b>FOOT VALVE</b>	ID-CODE	

The below manufacturer(s) is (are) known to manufacture products of the type specified in this specification section. Any other manufacturer(s) from a NATO member Nation Country may provide this product, provided they can prove to meet this specification.

Brand:  
Braunschweiger Flammenfilter GmbH  
Industriestr. 11  
D-38110 Braunschweig  
Tel.:+49 (0) 5307 / 809-0

Type: PROTEGO EF/V

or equivalent

STS-M 0 shall be observed.

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<h2>STANDARD SPECIFICATION</h2>	<h1>STS – M 79</h1>	
DESCRIPTION		ID-CODE
<b>GAUGING AND SAMPLING WELL FOR LEVEL INDICATOR WITH GAUGING TABLE</b>		

For the determination of the fill level in tanks storing flammable liquids with hazard characteristics R10 (flammable) F (easily flammable) and F\* (highly flammable) with aromatic content of up to 50%.  
For the installation in Zone 0.

The following rules are imperative and must be complied with:

1. Directive 2006/42/EG of the European parliament and of the council on the approximation of the laws of the Member States of 17 May 2006 on machinery
2. Regulation (EU) No 305/2011 of the European Parliament and of the laying down harmonised conditions for the marketing of construction products
3. General Product Safety Directive (GPSD) and associated rules (GPSR)
4. Ordinance on Industrial Safety and Health
5. Technical rules for operation safety/hazardous substances, especially TRBS 3151 / TRGS 751
6. VdTÜV instruction sheets, especially VdTÜV-MB 967, VdTÜV-MB 966-1 and VdTÜV-MB 966-2
7. AD 2000 instruction sheets, especially AD 2000 series W
8. DIN, DIN EN and DIN EN ISO
9. Technical rules for flammable liquids, especially TRbF 50 (other sources of information)

### Use

The exterior temperature changes usual in Europe must be considered.

- Medium: Mineral oil finished products
- Pressure step: PN 16
- Density of transport medium: 736 – 860 kg/m<sup>3</sup>
- Kinetic viscosity of transport medium: 0,9 x 10<sup>-6</sup> – 8,0 x 10<sup>-6</sup> m<sup>2</sup>/s

### Material

Guiding pipe and gauging table of Cr-Ni-steel, material No. 1.4571.

### Design

Gauging and sampling well DN 200 to be installed on tank socket DN 250, PN 16, dotted with borings of 30 mm Ø, distance between holes 150 mm, always 3 holes on the circumference should be staggered by approx. 80 mm starting from approx. 1100 mm from the upper flange. The borings must be free of burrs on the inside surface.

Gauging and sampling well bottom open, top with reducer to DN 150 and welding neck flange DN 150, PN 16.

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STANDARD SPECIFICATION	<h2>STS – M 79</h2>	
DESCRIPTION		ID-CODE
<b>GAUGING AND SAMPLING WELL FOR LEVEL INDICATOR WITH GAUGING TABLE</b>		

A mounting flange DN 250, PN 16 incl. flange connection parts is provided for the installation on the tank socket.

Overall length of guiding pipe acc. to drawing.

The scope of delivery comprises an adjustable gauging table of perforated sheet steel with a guiding device acc. to drawing. The complete equipment shall be delivered in advance and shall be mounted before pressure testing of the tank.

**CAUTION:** The Gauging and sampling well's position must be absolutely vertical. The gauging table is to be mounted accordingly.

Tests

On starting material acc. to AD 2000 series W.  
On finished component acc. to manufacturers standard.

Evidence of quality

Shop test certificate acc. to DIN EN 10204/2.2

Legally required evidences

Acc. to General Product Safety Directive (GPSD) and associated rules (GPSR), construction products law  
Especially:  
Certificate of usability and conformity by construction supervision

STS-M 0 shall be observed.

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STANDARD SPECIFICATION	<h2>STS – M 79A</h2>	
DESCRIPTION	ID-CODE	
<b>GUIDE TUBE FOR FILLING LEVEL INDICATOR WITHOUT GAUGING TABLE</b>		

Suitable for the detection of the filling level in tanks that are used for the storage of flammable liquids with the hazard characteristics R 10 (flammable), F (easily flammable) and F+ (highly flammable) and an aromatic content of up to 50 %.

Suitable for installation in zone 0.

The following regulations are imperative and must be complied with:

1. Directive 2006/42/EC of the European Parliament and of the Council on the approximation of the laws of the Member States of 17 May 2006 concerning machinery.
2. Regulation (EU) No. 305/2011 of the European Parliament and of the Council on laying down harmonized conditions for the marketing of construction products
3. General Product Safety Directive (GPSD) and associated regulations (GPSR)
4. German Ordinance on Industrial Safety and Health (BetrSichV)
5. Technical Rules on the Operational Safety/Hazardous Materials, especially TRBS 3151 / TRGS 751
6. VdTÜV Codes of Practice, especially VdTÜV-MB 967, VdTÜV-MB 966-1 and VdTÜV-MB 966-2
7. AD 2000 Codes of Practice, especially AD 2000 W series
8. DIN, DIN EN and DIN EN ISO
9. Technical Rules for the Handling of Flammable Liquids, especially TRbF 50 (other sources of information)

### Use

Exterior temperature variations typical in Europe must be considered.

Conveyed media:	finished mineral oil products
Pressure level:	PN 16
Density of the conveyed medium:	736 to 860 kg/m <sup>3</sup>
Kinematic viscosity of conveyed medium:	0.9 x 10 <sup>-6</sup> to 8.0 x 10 <sup>-6</sup> m <sup>2</sup> /s

### Material

Completely made of Cr-Ni steel, material no. 1.4571.

### Execution:

Guide tube DN 200, suitable for fitting in into a tank filler neck DN 250, PN 16, fitted with bores of 30 mm Ø, bore spacing 150 mm, 3 bores distributed over the perimeter in each row with a spacing of 80 mm approximately, starting at a distance of approximately 1,100 mm from the upper flange. The bores must be free from burrs on the inside.

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<h1>USAFE</h1>	REVISION 1	DATE: MAY 2015
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STANDARD SPECIFICATION	<h2>STS – M 79A</h2>	
DESCRIPTION	ID-CODE	
<b>GUIDE TUBE FOR FILLING LEVEL INDICATOR WITHOUT GAUGING TABLE</b>		

The guide tube is fitted with a perforated plate at the bottom, hole  $\varnothing = 20$  mm, top end with reducer to DN 150 and welding neck flange DN 150, PN 16.

The tank filler neck is fitted with a mounting flange DN 250, PN 16 incl. flange connectors.  
The total length of the guide tube as shown in the drawing.

**ATTENTION:** The guide tube must be fitted in in a perfect vertical position.

Testing/inspection

On the source material as per AD 2000, W series.  
On the finished component in accordance with the manufacturer's standards.

Evidence of quality features

Factory certificate as per DIN EN 10204/2.2

Legally required evidence

In accordance with the General Product Safety Directive (GPSD) and associated regulations (GPSR), Construction Products Law;  
especially:  
Serviceability and Compatibility Certificates by the supervisory authority.

STS-M 0 must be adhered to.

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<h1>USAFE</h1>	REVISION 1	DATE: MAY 2015
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<h2>STANDARD SPECIFICATION</h2>	<h1>STS – M 8</h1>	
DESCRIPTION	ID-CODE	
<b>SUMP PUMP 12 m<sup>3</sup>/h</b>	<b>P</b>	

Pump suitable for conveying finished mineral oil products with the hazard characteristics R 10 (flammable), F (easily flammable) and F+ (highly flammable) and an aromatic content of up to 50 %.  
The pump will be installed in a potentially explosive atmosphere (zone 0).

The following regulations are imperative and must be complied with:

1. Directive 97/23EC of the European Parliament and of the Council on the approximation of the laws of the Member States concerning pressure equipment
2. Directive 94/9EC of the European Parliament and of the Council on the approximation of the laws of the Member States concerning the appropriate use of equipment in explosion hazard areas (ATEX).
3. Directive 2006/42/EC of the European Parliament and of the Council on the approximation of the laws of the Member States of 17 May 2006 concerning machinery.
4. Regulation (EU) No. 305/2011 of the European Parliament and of the Council on laying down harmonized conditions for the marketing of construction products
5. General Product Safety Directive (GPSD) and associated regulations (GPSR)
6. German Ordinance on Industrial Safety and Health (BetrSichV)
7. Technical Rules on the Operational Safety/Hazardous Materials, especially TRBS 3151 / TRGS 751
8. VdTÜV Codes of Practice, especially VdTÜV-MB 967, VdTÜV-MB 966-1 and VdTÜV-MB 966-2
9. DIN, DIN EN and DIN EN ISO standards, especially DIN 28090, DIN EN 28091, DIN EN 1561, DIN EN 10035-2, DIN EN 10213-2, DIN EN 10216-2, DIN EN ISO 9906
10. Technical Rules for the Handling of Flammable Liquids, especially TRbF 20 and 50 (other sources of information)

### Use

Exterior temperature variations typical in Europe must be considered.

Media:	JP 4	density $\delta$ = 0.751 – 0.802 kg/dm <sup>3</sup>
	JP 8	density $\delta$ = 0.800 – 0.830 kg/dm <sup>3</sup>
	Mogas	density $\delta$ = 0.735 – 0.759 kg/dm <sup>3</sup>
	Diesel	density $\delta$ = 0.820 – 0.860 kg/dm <sup>3</sup>
	Water	density $\delta$ = 1.000 kg/dm <sup>3</sup>

Pressure level: PN 16

### Materials

1. Pump:

Suction piece	:	}	GP240GH (1.0619) as per DIN EN 10213-2, (formerly GS-C25) with coating as per STS-M 43
Pressure piece	:		
Intermediate piece	:		
Shim	:		
Distributor	:		EN-GJL-250 (EN-JL-1040) as per DIN EN 1561 (formerly GG 25)

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<h2>STANDARD SPECIFICATION</h2>	<h1>STS – M 8</h1>	
DESCRIPTION	ID-CODE	
<b>SUMP PUMP 12 m³/h</b>	<b>P</b>	

Shaft : mat. no. 1.4057  
 Impeller : mat. no. 1.4027  
 Wearing ring : mat. no. 1.4408  
 Housing screws : mat. no. 1.4104  
 Hexagon nuts : mat. no. 1.4571  
 Washers : mat. no. 1.4571  
 Slide bearings,  
 resistant to galling : PTFE (Teflon or equivalent) with graphite

2. Motor bearing lantern:

Welding structure : S235JR (1.0038) as per DIN EN 10025-2 (formerly RSt 37-2) Bearing arm : EN-GJL-250 (EN-JL-1040) as per DIN EN 1561 (formerly GG 25) Sealing flange : EN-GJL-250 (EN-JL-1040) as per DIN EN 1561 (formerly GG 25) Bearing cover : EN-GJL-200 (EN-JL-1030) as per DIN EN 1561 (formerly GG 20) Double-row angular contact ball bearing : steel Bolts : mat. no. 1.4571 Nuts : mat. no. 1.4571 Washers : mat. no. 1.4571 Slide ring packing : all-metal expansion bellow slide ring bearing without elastomers of mat. no. 1.4571, independent of the direction of rotation	} Exterior coating as per STS-M 66
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3. Riser pipes:

Riser pipe : P235GH-TC1 (1.0345) as per DIN EN 10216-2 (formerly St 35.8l) Welding neck flange : S235JR (1.0038) as per DIN EN 10025-2 (formerly RSt 37-2) Guide bearing : EN-GJL-200 (EN-JL-1030) as per DIN EN 1561 (formerly GG 25) Shaft : mat. no. 1.4057 Sleeve coupling : mat. no. 1.4571 Slide bearings, resistant to galling : PTFE (Teflon or equivalent) with graphite Bolts : mat. no. 1.4571 Nuts : mat. no. 1.4571 Washers : mat. no. 1.4571	} Exterior coating as per STS-M 43
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4. Filling level monitoring:

Flange : mat. no. 1.4404/1.4571  
 Sensor : mat. no. 1.4404/1.4571  
 Enclosure : aluminum or chromium-plated brass

5. Temperature monitoring pump housing:

Corrugated hose : mat. no. 1.4571  
 Pipe : mat. no. 1.4571  
 Screw connection : mat. no. 1.4571  
 Clamped joint : mat. no. 1.4571  
 Enclosure : polyamide

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<b>STANDARD SPECIFICATION</b>	<b>STS – M 8</b>	
DESCRIPTION	ID-CODE	
<b>SUMP PUMP 12 m³/h</b>	<b>P</b>	

6. Flow switch:

Flange : mat. no. 1.4404  
 Sensor : mat. no. 1.4404  
 Enclosure : aluminum

7. Dome cover : S235JR (1.0038) as per DIN EN 10025-2 (formerly RSt 37-2), bottom with coating as per STS-M 43, top with coating as per STS-M 66  
 Outer diameter : 720 mm (DN 600)

8. Dome cover screws : mat. no. 1.4571  
 Nuts : mat. no. 1.4571  
 Dome cover seal : as per DIN 28090/28091, suitable for the afore-mentioned media as perforated packing (outside Ø 720 mm)

9. Other gaskets : as per DIN 28090/28091, suitable for the afore-mentioned media

Execution:

Pumping unit consisting of a submersible centrifugal pump, driven by an electric motor via a shaft running centrally in a riser pipe. Distance of the sliding bearings in the riser pipes: 1.100 mm maximum. The electric motor is fitted outside of the tank on a lantern. Sealing in the lantern by the slide ring packing. Motor bearing lantern with connecting flange for the pressure pipe.

Pump capacity	Q :	12 m³/h
Pump head	H :	30 m
Power consumption	P :	1.7 kW ( $\delta = 1.0 \text{ kg/dm}^3$ )
Connection flange	:	DN 50, PN 16
Typ	:	HZV hu 403

Submergence (top edge of tank dome to bottom edge of strainer)

The accurate installation dimension should be taken after completion of the steel tank.

5,000 m³ tank	:	9,350 mm approx.
2,500 m³ tank	:	9,100 mm approx.
1,250 m³ tank	:	8,900 mm approx.
750 m³ tank	:	6,490 mm approx.
500 m³ tank	:	6,430 mm approx.
300 m³ tank	:	4,800 mm approx.

Scope of delivery

- Three-stage ring-section pump with dome cover, 20 mm thick (matching the counter flange of the tank), free of nonferrous metal

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<h2>STANDARD SPECIFICATION</h2>	<h1>STS – M 8</h1>	
DESCRIPTION	ID-CODE	
<b>SUMP PUMP 12 m³/h</b>	<b>P</b>	

- Cooling tank for the pump
- A bypass line and a leakage return line
- Three-phase current motor, IP 55, EEx de IIC T4

Accessories.

- Strainer (appropriate for the pump)
- Filling level limit switch DN 25 PN 25/40 with interpreting device
- Flow switch 1" class 300
- Mineral-insulated RTD temperature probe with terminal head, base, neck tube and transmitter

Coating

All outer parts in contact with the conveyed liquid that are not made from Cr-Ni steel shall be coated in accordance with STS-M 43 with the exception of the sliding surfaces and the centerings. Interior parts shall not be coated.

Drive

Explosion-protected, electrical motor with air-tight encapsulation, with coating in accordance with STS-M 66

Performance data

Type	:	100 L 1-4
Rating	:	2.2 kW
Rated speed	:	1,420 l/min
Rated current at 400 V	:	5 A
Voltage	:	400 V
Protection type	:	IP 55, EEx de IIC T4
Frequency	:	50 Hz
Structural shape	:	V 1
Drive clutch	:	designed for 30 start-ups/hour minimum

Requirements and testing

- EC homologation in accordance with Annex III of Directive 94/9/EC
- Certificate of performance
- Trial run in the factory with recording of the characteristic line as per DIN EN ISO 9906
- Pressure test of pump housing with 50 bar

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<h2>STANDARD SPECIFICATION</h2>	<h1>STS – M 8</h1>	
DESCRIPTION <b>SUMP PUMP 12 m³/h</b>		ID-CODE <b>P</b>

Evidence of quality features

- Type approval certificate as per Directive 94/9/EC and the required documents.
- Acceptance certificate as per DIN EN 10204 - 3.1 for the above-mentioned tests.

Identification/labeling

Name plate and direction of rotation label shall be fixed in an unremovable manner (no adhesive labels) in accordance with Annex II no. 1.0.5. of Directive 94/9/EC.  
CE conformity sign as per Art. 5 Para. 1 and 2 of the directive 94/9/EC.

Legally required evidences

In accordance with GPSG and associated directives (GPSR)  
Especially:  
EC declaration of conformity as per Directive 94/9/EC

Inspection by an accredited supervisory body

In accordance with the German Ordinance on Industrial Safety and Health (BetrSichV), the operational condition of systems requiring monitoring and their components must be inspected at regular intervals by an approved inspection body. The operator of the entire system and its components must prepare the inspection lists based on a technical safety assessment. A prerequisite to this task is that the manufacturer determines and specifies the inspection intervals for each individual component of the system requiring monitoring. As the operator always strives for longest possible inspection intervals to be permitted by the approving authority, the fittings and components described in the specifications should be designed and dimensioned in such a manner that electrical and mechanical equipments are suitable for inspection intervals of five years.

The below manufacturer(s) is (are) known to manufacture products of the type specified in this specification section. Any other manufacturer(s) from a NATO member Nation Country may provide this product, provided they can prove to meet this specification.

Make: DICKOW Pumpen KG, 84465 Waldkraiburg, Germany  
Type: HZV hu 403

or equivalent

STS-M 0 must be adhered to.

<b>AUTHOR:</b> <b>LBB NIEDERLASSUNG LANDAU</b> <b>UNTERTORPLATZ 1</b> <b>D-76829 LANDAU</b> <b>TEL.: +49 (6341) 912-0</b> <b>postfach.landau@LBBnet.de</b>	<b>ISSUED BY:</b>
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<h2>STANDARD SPECIFICATION</h2>	<h1>STS – M 80</h1>	
DESCRIPTION	ID-CODE	
<b>INSULATION COUPLING (INSULAZION PIECE) WITH EX-SPARK GAP</b>	<b>IC</b>	

Insulation coupling as electrical point of separation for the installation in pipelines conveying inflammable and water pollutant liquids with hazard characteristics R10 (flammable) F (easily flammable) and F\* (highly flammable) with aromatic content of up to 50%.

For the installation in stations and manholes (in zone 1, the inside has to be assigned to zone 0).

The following rules have to be kept reliably:

1. Directive 2014/68/EU of the European parliament and of the council on the approximation of the laws of the Member States concerning pressure equipment
2. Directive 2014/34/EU of the European parliament and of the council on the approximation of the laws of the Member States concerning equipment and protective systems intended for use in potentially explosive atmospheres (ATEX)
3. Directive 2006/42/EU of the European parliament and of the council on the approximation of the laws of the Member States of 17 May 2006 on machinery
4. Regulation (EU) No 305/2011 of the European Parliament and of the laying down harmonised conditions for the marketing of construction products
5. General Product Safety Directive (GPSD) and associated rules (GPSR)
6. Ordinance on Industrial Safety and Health
7. General Product Safety Directive (GPSD)
8. Technical rules for operation safety/hazardous substances, especially TRBS 3151 / TRGS 751
9. VdTÜV instruction sheets, especially VdTÜV MB insulation pieces 100
10. AD 2000 instruction sheets, especially AD 2000 series HP
11. DIN, DIN EN, DIN EN ISO, VDE regulations, especially DIN EN10028, DIN EN 10213, DIN EN 10222, DIN EN 62305; VDE 0185-305, DIN 60893; VDE 0318 part 1 and 2
12. Technical rules for flammable liquids, especially TRbF 50 (other sources of information)

### Use

The exterior temperature changes usual in Europe must be considered.

Medium: Mineral oil finished products  
 Pressure step: PN 16  
 Density of transport medium: 736 – 860 kg/m<sup>3</sup>  
 Kinetic viscosity of transport medium: 0.9 x 10<sup>-6</sup> – 8.0 x 10<sup>-6</sup> m<sup>2</sup>/s

### Design and materials

As electrical point of separation ready for installation, with one welding neck flange and one welding socket piece each.

Design A in steel

- welding neck flange of steel acc. to STS-M 17
- welding socket piece (pipe line) of steel acc. to STS-M 14 with insulation acc. to STS-M 69
- materials for other metal parts acc. to DIN EN 10028-2, DIN EN 10222-2, DIN EN 10213-2
- materials for insulation parts acc. to DIN EN 60893; VDE 0318 part 1 and 2.

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	SHEET 2 OF 3	
<b>STANDARD SPECIFICATION</b>	<b>STS – M 80</b>	
DESCRIPTION	ID-CODE	
<b>INSULATION COUPLING (INSULATZION PIECE) WITH EX-SPARK GAP</b>	<b>IC</b>	

Design B in stainless steel

- welding neck flange of stainless steel acc. to STS-M 23
- welding socket piece (pipe line) of stainless steel acc. to STS-M 19 with insulation acc. to STS-M 69
- materials for other metal parts acc. to DIN EN 10028-7, DIN EN 10222-5, DIN EN 10213-4
- materials for insulation parts acc. to DIN EN 60893; VDE 0318 part 1 and 2.

The insulation coupling will be installed in that way that the connection welding socket piece/pipeline is located outside the building and/or dome manhole. The distance from the connection welding socket piece/pipeline to the outside of the building and/or dome manhole is 0.4 m for all nominal widths. The overall length of the insulation couplings will be determined by the local conditions and the lengths delivered by the manufacturer.

No parts from the insulation part located inside the building and/or dome manhole, as e.g. shackles for the mounting of the ex-spark gap, may project into the wall of the building and/or dome manhole, in order to ensure the perfect execution of the pipe penetration. The ex-spark gap will be mounted completely including mounting shackles (galvanized shackles for C-steel design) at the manufacturer's works. It must be made sure, however, that the ex-spark gap can be mounted or dismantled even after the complete insulation coupling was installed.

#### Design of Ex spark gap

Response AC voltage (50 Hz)	:	approx. 1,0 kV
Response surge voltage (1,2/50)	:	approx. 2,2 kV
Nominal discharge surge current (8/20)	:	100 KA
Explosion protection	:	EEx s T4
Electrodes	:	perspiration-proof

Spark gap has to be delivered incl. connecting cable and to be installed ready for operation.

Installation to be performed acc. to DIN EN 62305; VDE 0185-305.

All connections have to be secured against loosening by spring washers.

Connecting shackles have to be wrapped in insulating tape.

#### Requirements and tests

On the manufacturing material:

Acc. to the specified standard specifications STS-M and the regulations and standards mentioned therein.

On the finished connection:

Acc. to TRbF 302, par. 5.6.4.

- EG-type test acc. to annex III of directive 2014/34/EG
- Additional type test acc. to VdTÜV MB insulation pieces 100

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<h1>USAFE</h1>	REVISION 1	DATE: MAY 2015
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STANDARD SPECIFICATION	<h2>STS – M 80</h2>	
DESCRIPTION  <b>INSULATION COUPLING (INSULATZION PIECE) WITH EX-SPARK GAP</b>	ID-CODE  <b>IC</b>	

Evidence of quality features

For the manufacturing material acc. to corresponding STS-M and regulations and standards mentioned therein.  
 For the finished connection acc. to TRbF 302, par. 5.6.7 with acceptance test certificate DIN EN 10204/3.2.  
 For type tested insulation couplings, ready for installation  $\leq$  DN 200 acceptance test certificate DIN EN 10204/3.1.

Type test certificate acc. to directive 2014/34/EU and the documents requested therein.

Identification

Acc. VdTÜV MB Insulation pieces 100  
 Acc. to annex IV No. 5 of directive 2014/34/EU  
 CE conformity marking acc. to Art. 16 of directive 2014/34/EU

Legally required evidences

Acc. to General Product Safety Directive (GPSD) and associated rules (GPSR),  
 General Product Safety Directive (GPSD)  
 especially:  
 EG declaration of conformity acc. Art. 16 of directive 2014/34/EU

Periodic inspections by an authorized control office

Acc. to Product Safety Directive, facilities and facility parts in need of monitoring must be reviewed repeatedly in certain periods for their orderly conditions concerning the operation by an authorized control office. The operator has to find out the review periods of the complete facility and the facility parts on the base of a safety related evaluation. Therefore the manufacturer of the components must specify and determine the review periods for the individual components of the facilities in need of monitoring. As the operator wants the control office to authorize review periods as long as possible, the fittings and components described in this specifications must be designed and dimensioned in a way that they allow a review period of 3 years for electrical and 5 years for mechanical components.

STS-M 0 shall be observed.

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	SHEET 1 OF 3 SHEETS	
<h2>STANDARD SPECIFICATION</h2>	<h1>STS – M 80</h1>	
DESCRIPTION	ID-CODE	
<b>INSULATION COUPLING (INSULATZION PIECE) WITH EX-SPARK GAP</b>	<b>IC</b>	

Insulation coupling as electrical point of separation for the installation in pipelines conveying inflammable and water pollutant liquids with hazard characteristics R10 (flammable) F (easily flammable) and F\* (highly flammable) with aromatic content of up to 50%.

For the installation in stations and manholes (in zone 1, the inside has to be assigned to zone 0).

The following rules have to be kept reliably:

1. Directive 2014/68/EU of the European parliament and of the council on the approximation of the laws of the Member States concerning pressure equipment
2. Directive 2014/34/EU of the European parliament and of the council on the approximation of the laws of the Member States concerning equipment and protective systems intended for use in potentially explosive atmospheres (ATEX)
3. Directive 2006/42/EU of the European parliament and of the council on the approximation of the laws of the Member States of 17 May 2006 on machinery
4. Regulation (EU) No 305/2011 of the European Parliament and of the laying down harmonised conditions for the marketing of construction products
5. General Product Safety Directive (GPSD) and associated rules (GPSR)
6. Ordinance on Industrial Safety and Health
7. General Product Safety Directive (GPSD)
8. Technical rules for operation safety/hazardous substances, especially TRBS 3151 / TRGS 751
9. VdTÜV instruction sheets, especially VdTÜV MB insulation pieces 100
10. AD 2000 instruction sheets, especially AD 2000 series HP
11. DIN, DIN EN, DIN EN ISO, VDE regulations, especially DIN EN10028, DIN EN 10213, DIN EN 10222, DIN EN 62305; VDE 0185-305, DIN 60893; VDE 0318 part 1 and 2
12. Technical rules for flammable liquids, especially TRbF 50 (other sources of information)

### Use

The exterior temperature changes usual in Europe must be considered.

Medium: Mineral oil finished products  
 Pressure step: PN 16  
 Density of transport medium: 736 – 860 kg/m<sup>3</sup>  
 Kinetic viscosity of transport medium:  $0.9 \times 10^{-6} - 8.0 \times 10^{-6} \text{ m}^2/\text{s}$

### Design and materials

As electrical point of separation ready for installation, with one welding neck flange and one welding socket piece each.

Design A in steel

- welding neck flange of steel acc. to STS-M 17
- welding socket piece (pipe line) of steel acc. to STS-M 14 with insulation acc. to STS-M 69
- materials for other metal parts acc. to DIN EN 10028-2, DIN EN 10222-2, DIN EN 10213-2
- materials for insulation parts acc. to DIN EN 60893; VDE 0318 part 1 and 2.

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<b>STANDARD SPECIFICATION</b>	<b>STS – M 80</b>	
DESCRIPTION	ID-CODE	
<b>INSULATION COUPLING (INSULATZION PIECE) WITH EX-SPARK GAP</b>	<b>IC</b>	

Design B in stainless steel

- welding neck flange of stainless steel acc. to STS-M 23
- welding socket piece (pipe line) of stainless steel acc. to STS-M 19 with insulation acc. to STS-M 69
- materials for other metal parts acc. to DIN EN 10028-7, DIN EN 10222-5, DIN EN 10213-4
- materials for insulation parts acc. to DIN EN 60893; VDE 0318 part 1 and 2.

The insulation coupling will be installed in that way that the connection welding socket piece/pipeline is located outside the building and/or dome manhole. The distance from the connection welding socket piece/pipeline to the outside of the building and/or dome manhole is 0.4 m for all nominal widths. The overall length of the insulation couplings will be determined by the local conditions and the lengths delivered by the manufacturer.

No parts from the insulation part located inside the building and/or dome manhole, as e.g. shackles for the mounting of the ex-spark gap, may project into the wall of the building and/or dome manhole, in order to ensure the perfect execution of the pipe penetration. The ex-spark gap will be mounted completely including mounting shackles (galvanized shackles for C-steel design) at the manufacturer's works. It must be made sure, however, that the ex-spark gap can be mounted or dismantled even after the complete insulation coupling was installed.

#### Design of Ex spark gap

Response AC voltage (50 Hz)	:	approx. 1,0 kV
Response surge voltage (1,2/50)	:	approx. 2,2 kV
Nominal discharge surge current (8/20)	:	100 KA
Explosion protection	:	EEx s T4
Electrodes	:	perspiration-proof

Spark gap has to be delivered incl. connecting cable and to be installed ready for operation.

Installation to be performed acc. to DIN EN 62305; VDE 0185-305.

All connections have to be secured against loosening by spring washers.

Connecting shackles have to be wrapped in insulating tape.

#### Requirements and tests

On the manufacturing material:

Acc. to the specified standard specifications STS-M and the regulations and standards mentioned therein.

On the finished connection:

Acc. to TRbF 302, par. 5.6.4.

- EG-type test acc. to annex III of directive 2014/34/EG
- Additional type test acc. to VdTÜV MB insulation pieces 100

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<b>STANDARD SPECIFICATION</b>	<b>STS – M 80</b>	
DESCRIPTION	ID-CODE	
<b>INSULATION COUPLING (INSULATZION PIECE) WITH EX-SPARK GAP</b>	<b>IC</b>	

Evidence of quality features

For the manufacturing material acc. to corresponding STS-M and regulations and standards mentioned therein.  
 For the finished connection acc. to TRbF 302, par. 5.6.7 with acceptance test certificate DIN EN 10204/3.2.  
 For type tested insulation couplings, ready for installation  $\leq$  DN 200 acceptance test certificate DIN EN 10204/3.1.

Type test certificate acc. to directive 2014/34/EU and the documents requested therein.

Identification

Acc. VdTÜV MB Insulation pieces 100  
 Acc. to annex IV No. 5 of directive 2014/34/EU  
 CE conformity marking acc. to Art. 16 of directive 2014/34/EU

Legally required evidences

Acc. to General Product Safety Directive (GPSD) and associated rules (GPSR),  
 General Product Safety Directive (GPSD)  
 especially:  
 EG declaration of conformity acc. Art. 16 of directive 2014/34/EU

Periodic inspections by an authorized control office

Acc. to Product Safety Directive, facilities and facility parts in need of monitoring must be reviewed repeatedly in certain periods for their orderly conditions concerning the operation by an authorized control office. The operator has to find out the review periods of the complete facility and the facility parts on the base of a safety related evaluation. Therefore the manufacturer of the components must specify and determine the review periods for the individual components of the facilities in need of monitoring. As the operator wants the control office to authorize review periods as long as possible, the fittings and components described in this specifications must be designed and dimensioned in a way that they allow a review period of 3 years for electrical and 5 years for mechanical components.

STS-M 0 shall be observed.

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<h1>USAFE</h1>	REVISION 1	DATE: MAY 2015
	SHEET 1 OF 2	
STANDARD SPECIFICATION	<h2>STS – M 84</h2>	
DESCRIPTION <b>BLANK</b>	ID-CODE <b>SPL</b>	

Blank for hydraulic separation of pipe runs inside of flange connections PN 16 in pipelines in pipelines conveying inflammable and water pollutant liquids with hazard characteristics R10 (flammable) F (easily flammable) and F\* (highly flammable) with aromatic content of up to 50%.

The following rules have to be kept reliably:

1. Directive 2014/68/EG of the European parliament and of the council on the approximation of the laws of the Member States concerning pressure equipment
2. Regulation (EU) No 305/2011 of the European Parliament and of the laying down harmonised conditions for the marketing of construction products
3. General Product Safety Directive (GPSD) and associated rules (GPSR)
4. Ordinance on Industrial Safety and Health
5. General Product Safety Directive (GPSD)
6. Technical rules for operation safety/hazardous substances, especially TRBS 3151 / TRGS 751
7. VdTÜV instruction sheets
8. AD 2000 instruction sheets, especially AD 2000 B0 and B5, AD 2000 W2
9. DIN, DIN EN, DIN EN ISO, especially DIN 1092-1, DIN EN 10028-7, DIN EN 10222-5
10. Technical rules for flammable liquids, especially TRbF 50 (other sources of information)

### Use

The exterior temperature changes usual in Europe must be considered.

Medium: Mineral oil finished products with solid particles up to 800 µm  
 Pressure step: PN 16  
 Density of transport medium: 736 – 860 kg/m<sup>3</sup>  
 Kinetic viscosity of transport medium:  $0.9 \times 10^{-6} - 8.0 \times 10^{-6} \text{ m}^2/\text{s}$

### Material

Cr-Ni-steel, mat.no. 1.4541 acc. to DIN EN 10028-7 or DIN EN 10222-5.

### Dimensioning

The exterior and interior diameter of blanks have to be dimensioned acc. to geometrics of appropriate flanges acc. to DIN EN 1092-1, acc. to pressure step PN 16. Sealing strip shape B1.

Thickness acc. to calculation, to be submitted, acc. to AD 2000 B5.

Safety coefficient S = 2,0.

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<h1>USAFE</h1>	REVISION 1	DATE: MAY 2015
	SHEET 2 OF 2	
STANDARD SPECIFICATION	<h2>STS – M 84</h2>	
DESCRIPTION <b>BLANK</b>	ID-CODE <b>SPL</b>	

The thicknesses of spectacle-type blanks must be designed acc. to nominal pressure step PN 16 mentioned in the drawing and they must correspond to the maximum permissible test pressure of the pipeline sections.

#### Design

Spectacle-type blank with turned sealing surfaces, one blank closed, the other one full passage for flange connections acc. to EN 1092-1, PN 16 with smooth sealing strip shape B1. Both blanks connected with bar.

#### Accessories

The additionally required flat gasket acc. to STS-M 65 and the longer screw bolts have to be included in the corresponding items.

#### Test and evidence of quality features

Acc. to AD 2000 W2

#### Identification

With marking stamp durably easily visible

Acc. to DIN EN 1092-1

#### Legally required evidences

Acc. to General Product Safety Directive (GPSD) and associated rules (GPSR),  
General Product Safety Directive (GPSD)

STS-M 0 shall be observed.

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<h2>STANDARD SPEZIFIKATION</h2>	<h1>STS – M 86</h1>	
DESCRIPTION  <b>PRESSURE GAUGE STOPCOCK</b>	ID-CODE  <b>PC</b>	

Shut-off device for manometer for installation in above ground installed pipelines for mineral oil products of liquids with hazard characteristics R10 (flammable) F (easily flammable) and F\* (highly flammable) with aromatic content of up to 50%.

For the installation in stations and manholes (in zone 1, the inside has to be assigned to zone 0).

The following rules have to be kept reliably:

1. Directive 2014/68/EG of the European parliament and of the council on the approximation of the laws of the Member States concerning pressure equipment
2. Directive 2006/42/EG of the European parliament and of the council on the approximation of the laws of the Member States of 17 May 2006 on machinery
3. Regulation (EU) No 305/2011 of the European Parliament and of the laying down harmonised conditions for the marketing of construction products
4. General Product Safety Directive (GPSD) and associated rules (GPSR)
5. Ordinance on Industrial Safety and Health
6. General Product Safety Directive (GPSD)
7. Technical rules for operation safety/hazardous substances, especially TRBS 3151 / TRGS 751
8. VdTÜV instruction sheets
9. AD 2000 instruction sheets, especially AD 2000 W and AD 2000 A4
10. DIN, DIN EN and DIN EN ISO, especially DIN 338-1, DIN 16272, DIN EN 10222-5
11. Technical rules for flammable liquids, especially TRbF 50 (other sources of information)

### Use

The exterior temperature changes usual in Europe must be considered.

Medium: Mineral oil finished products with solid particles up to 800 µm  
 Pressure step: PN 250  
 Density of transport medium: 736 – 860 kg/m<sup>3</sup>  
 Kinetic viscosity of transport medium: 0.9 x 10<sup>-6</sup> – 8.0 x 10<sup>-6</sup> m<sup>2</sup>/s

### Material

Valve complete : Cr-Ni-steel, mat.no. 1.4571 acc. to DIN EN 10222-5  
 Hand wheel : acc. to DIN 388-1  
 Sealings : resistant to aromatics and kerosene

Manufacturing Acc. to DIN 16272

### Design

Acc. to AD 2000 A4.

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<h2>STANDARD SPEZIFIKATION</h2>	<h1>STS – M 86</h1>	
DESCRIPTION <b>PRESSURE GAUGE STOPCOCK</b>	ID-CODE <b>PC</b>	

Pressure gauge stopcock with ventilation screw and test connecting ports with protective cap.  
Pin R 1/2" incl. 2 ea clamping sleeves R 1/2" as well as manometer connection pieces and sealings.  
Hand wheels identified.

Requirements and tests

Acc. to AD2000 A4

Testing of materials acc. to AD 2000 instruction sheets series W

Evidence of quality features

Acceptance test certificate acc. to DIN EN 10204 – 3.1  
Certificates of origin have to be enclosed to the acceptance documents of the fitting parts.

Identification

Acc. to annex I No. 3.3 of directive 2014/68/EG  
additional identification acc. to AD 2000 A4  
CE conformity marking acc. to Art. 16 of directive 2014/68/EG

Legally required evidences

General Product Safety Directive (GPSD) and associated rules (GPSR), General Product Safety Directive (GPSD), especially:  
EG declaration of conformity acc. to annex IV of directive 2014/68/EG

Periodic inspections by an authorized control office

Acc. to Product Safety Directive, facilities and facility parts in need of monitoring must be reviewed repeatedly in certain periods for their orderly conditions concerning the operation by an authorized control office. The operator has to find out the review periods of the complete facility and the facility parts on the base of a safety related evaluation. Therefore the manufacturer of the components must specify and determine the review periods for the individual components of the facilities in need of monitoring. As the operator wants the control office to authorize review periods as long as possible, the fittings and components described in this specifications must be designed and dimensioned in a way that they allow a review period of 3 years for electrical and 5 years for mechanical components.

STS-M 0 shall be observed.

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<h2>STANDARD SPECIFICATION</h2>	<h1>STS – M 87</h1>	
DESCRIPTION <b>PRESSURE GAUGE</b>	ID-CODE <b>PI</b>	

Optionally for measuring of liquid and gas pressure in pipelines, tanks, fittings and on machines in closed facility parts or outside under different operational conditions.

High pressure variations, facility vibration and overpressures outside the measuring range must be expected.

Mineral oil products of liquids with hazard characteristics R10 (flammable) F (easily flammable) and F\* (highly flammable) with aromatic content of up to 50%.

For the installation in stations and manholes (in zone 1, the inside has to be assigned to zone 0).

The following rules have to be kept reliably:

1. Directive 2014/68/EG of the European parliament and of the council on the approximation of the laws of the Member States concerning pressure equipment
2. Directive 2006/42/EG of the European parliament and of the council on the approximation of the laws of the Member States of 17 May 2006 on machinery
3. Regulation (EU) No 305/2011 of the European Parliament and of the laying down harmonised conditions for the marketing of construction products
4. General Product Safety Directive (GPSD) and associated rules (GPSR)
5. Ordinance on Industrial Safety and Health
6. General Product Safety Directive (GPSD)
7. Technical rules for operation safety/hazardous substances, especially TRBS 3151 / TRGS 751
8. VdTÜV instruction sheets
9. AD 2000 instruction sheets
10. DIN, DIN EN and DIN EN ISO, especially DIN 837-1, DIN 10302, DIN EN 10222-5
11. Technical rules for flammable liquids, especially TRbF 50 (other sources of information)

### Use

The exterior temperature changes usual in Europe must be considered.

Medium: Mineral oil finished products with solid particles up to 800 µm  
 Pressure step: PN 25  
 Density of transport medium: 736 – 860 kg/m<sup>3</sup>  
 Kinetic viscosity of transport medium: 0.9 x 10<sup>-6</sup> – 8.0 x 10<sup>-6</sup> m<sup>2</sup>/s

### Materials

Body : Cr-Ni-steel, mat.no. 1.4301 (or equivalent) acc.to DIN EN 10222-5  
 Burdon tube or Rotary spring : Spring steel, mat.no. 2.4632 (or equivalent) acc.to DIN EN 10302  
 Dial train : wear and corrosion resistant  
 Material acc. to choice of manufacturer

All pressurized parts of steel.

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STANDARD SPECIFICATION	<h2>STS – M 87</h2>	
DESCRIPTION <b>PRESSURE GAUGE</b>	ID-CODE <b>PI</b>	

Design

- Acc. to DIN EN 837-1
- Accuracy 1,0
- Permanent load until full scale value at steady impact
- Connection radial downwards with thread for connecting port R ½"
- Casing diameter 160 mm
- Waster-proof and antifreeze design; reinforced dial train (turbine), utilization of wear and corrosion resistant materials
- Pressure gauge with liquid filling (glycerin)
- Overload protection up to 1,3 x full scale value
- Measuring unit in bar and PSI-graduation
- Scale of dial optionally with control marking acc. to specifications

Manufacturing

For pressure range up to 25 bar with burdon tube or rotary spring.

Evidence of quality features

Acceptance certificate acc. to DIN EN 10204/2.2.

Identification

Acc. to annex I No. 3.3 of directive 2014/68/EG  
CE conformity marking acc. to Art. 19 of directive 2014/68/EG

Legally required evidences

General Product Safety Directive (GPSD) and associated rules (GPSR), General Product Safety Directive (GPSD), especially:  
EG declaration of conformity acc. to annex IV of directive 2014/68/EG

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STANDARD SPECIFICATION	<h2>STS – M 87</h2>	
DESCRIPTION <b>PRESSURE GAUGE</b>	ID-CODE <b>PI</b>	

Periodic inspections by an authorized control office

Acc. to Product Safety Directive, facilities and facility parts in need of monitoring must be reviewed repeatedly in certain periods for their orderly conditions concerning the operation by an authorized control office. The operator has to find out the review periods of the complete facility and the facility parts on the base of a safety related evaluation. Therefore the manufacturer of the components must specify and determine the review periods for the individual components of the facilities in need of monitoring. As the operator wants the control office to authorize review periods as long as possible, the fittings and components described in this specifications must be designed and dimensioned in a way that they allow a review period of 3 years for electrical and 5 years for mechanical components.

STS-M 0 shall be observed.

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<h1>USAFE</h1>	REVISION 1	DATE: MAY 2015
	SHEET 1 OF 3	
STANDARD SPEZIFIKATION	<h2>STS – M 88</h2>	
DESCRIPTION <b>DIFFERENTIAL PRESSURE GAUGE</b>	ID-CODE <b>PDI</b>	

For determination of pressure difference (differential pressure) of two measuring points and control of differential pressures at coarse and fine filters.

Mineral oil products of hazard characteristics R10 (flammable) F (easily flammable) and F\* (highly flammable) with aromatic content of up to 50%.

For the installation in stations and manholes (in zone 1), the inside has to be assigned to zone 0).

The following rules have to be kept reliably:

1. Directive 2014/68/EU of the European parliament and of the council on the approximation of the laws of the Member States concerning pressure equipment
2. Directive 2006/42/EU of the European parliament and of the council on the approximation of the laws of the Member States of 17 May 2006 on machinery
3. Regulation (EU) No 305/2011 of the European Parliament and of the laying down harmonised conditions for the marketing of construction products
4. General Product Safety Directive (GPSD) and associated rules (GPSR)
5. Ordinance on Industrial Safety and Health
6. General Product Safety Directive (GPSD)
7. Technical rules for operation safety/hazardous substances, especially TRBS 3151 / TRGS 751
8. VdTÜV instruction sheets
9. AD 2000 instruction sheets
10. DIN, DIN EN and DIN EN ISO, especially DIN 837-1, DIN 10302, DIN EN 10222-5
11. Technical rules for flammable liquids, especially TRbF 50 (other sources of information).

### Use

The exterior temperature changes usual in Europe must be considered.

Medium: Mineral oil finished products with solid particles up to 800 µm  
 Pressure step: PN 25  
 Density of transport medium: 736 – 860 kg/m<sup>3</sup>  
 Kinetic viscosity of transport medium: 0.9 x 10<sup>-6</sup> – 8.0 x 10<sup>-6</sup> m<sup>2</sup>/s

### Materials

Body : Cr-Ni-steel, mat.no. 1.4301 (or equivalent) acc.to DIN EN 10222-5

Burdon tube or Rotary spring : Spring steel, mat.no. 2.4632 (or equivalent) acc.to DIN EN 10302

Dial train : wear and corrosion resistant;  
acc. to choice of manufacturer

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STANDARD SPEZIFIKATION	<h2>STS – M 88</h2>	
DESCRIPTION <b>DIFFERENTIAL PRESSURE GAUGE</b>	ID-CODE <b>PDI</b>	

Design

- Pressure gauge similar to DIN EN 837-1 with overload protection
- Accuracy 1,6
- Casing diameter: 160 mm
- Connection downwards with thread for connecting port R ½"
- Waster-proof design
- At static load 100 % of full scale value. Robust design.
- Dial of aluminium, white, scale and labeling black, without control marking. Pointer indicates differential pressure directly.
- Pressure step PN 16

Indication range

0 – 1 bar differential pressure. Pointer movement with increasing pressure in clockwise direction.

Evidence of quality features

Acceptance certificate acc. to DIN EN 10204/2.2.

Identification

Acc. to annex I No. 3.3 of directive 2014/68/EU  
CE conformity marking acc. to Art. 19 of directive 2014/68/EU

Legally required evidences

General Product Safety Directive (GPSD) and associated rules (GPSR), General Product Safety Directive (GPSD), especially:  
EG declaration of conformity acc. to annex IV of directive 2014/68/EU

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STANDARD SPEZIFIKATION	<h2>STS – M 88</h2>	
DESCRIPTION <b>DIFFERENTIAL PRESSURE GAUGE</b>	ID-CODE <b>PDI</b>	

Periodic inspections by an authorized control office

Acc. to Product Safety Directive, facilities and facility parts in need of monitoring must be reviewed repeatedly in certain periods for their orderly conditions concerning the operation by an authorized control office. The operator has to find out the review periods of the complete facility and the facility parts on the base of a safety related evaluation. Therefore the manufacturer of the components must specify and determine the review periods for the individual components of the facilities in need of monitoring. As the operator wants the control office to authorize review periods as long as possible, the fittings and components described in this specifications must be designed and dimensioned in a way that they allow a review period of 3 years for electrical and 5 years for mechanical components.

STS-M 0 shall be observed.

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<h1>USAFE</h1>	REVISION 1	DATE: MAY 2015
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<h2>STANDARD SPECIFICATION</h2>	<h1>STS – M 89</h1>	
DESCRIPTION <b>FLOW SWITCH (Pendulum type)</b>	ID-CODE <b>FS</b>	

Flow switch for the monitoring of pumping (protection against dry running) in pipelines for flammable liquids with hazard characteristics R10 (flammable) F (easily flammable) and F\* (highly flammable) with aromatic content of up to 50%.  
For the installation in zone 1, the inside has to be assigned to zone 0).

The following rules have to be kept reliably:

1. Directive 2014/68/EU of the European parliament and of the council on the approximation of the laws of the Member States concerning pressure equipment
2. Directive 2014/34/EU of the European parliament and of the council on the approximation of the laws of the Member States concerning equipment and protective systems intended for use in potentially explosive atmospheres (ATEX)
3. Directive 2006/42/EU of the European parliament and of the council on the approximation of the laws of the Member States of 17 May 2006 on machinery
4. Regulation (EU) No 305/2011 of the European Parliament and of the laying down harmonised conditions for the marketing of construction products
5. General Product Safety Directive (GPSD) and associated rules (GPSR)
6. Ordinance on Industrial Safety and Health
7. General Product Safety Directive (GPSD)
8. Technical rules for operation safety/hazardous substances, especially TRBS 3151 / TRGS 751
9. VdTÜV instruction sheets, especially VdTÜV-MB Flow 100, VdTÜV-MB 967, VdTÜV-MB 966-1 and VdTÜV-MB 966-2
10. AD 2000 instruction sheets
11. DIN, DIN EN and DIN EN ISO, VDE-regulations, especially DIN 3230-6, DIN EN 1092-1, DIN EN 10222-5, DIN EN 10213
12. Technical rules for flammable liquids, especially TRbF 50 (other sources of information)

### Use

The exterior temperature changes usual in Europe must be considered.

Medium: Mineral oil finished products with solid particles up to 800 µm  
 Pressure step: PN 16  
 Density of transport medium: 736 – 860 kg/m<sup>3</sup>  
 Kinetic viscosity of transport medium: 0.9 x 10<sup>-6</sup> – 8.0 x 10<sup>-6</sup> m<sup>2</sup>/s

### Materials

Flange : similar to pipe material acc. to DIN EN 1092-1  
 Wetted parts : Cr-Ni-steel, mat.no. 1.4571 acc. to DIN EN 10222-5

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<h1>USAFE</h1>	REVISION 1	DATE: MAY 2015
	SHEET 2 OF 3	
STANDARD SPECIFICATION	<h2>STS – M 89</h2>	
DESCRIPTION <b>FLOW SWITCH (Pendulum type)</b>	ID-CODE <b>FS</b>	

### Design

Flow switch with pendulum and fixed baffle plate, with actuation of a protective gas magnetic switch by permanent magnet, for installation at horizontal or vertical pipelines DN 80 to DN 300.

Connection flange : DN 50, PN 16,  
acc.to DIN EN 1092-1, sealing strip shape B1

Switching point at 10 % of nominal delivery rate of each pump, calibrated with decreasing flow.  
Switching speed starting at 0.04 m/s.

### Electrical equipment

Protection : IP 55, EEx d IIC T5  
 Protective gas magnetic switch : 110 VA, alternating current  
 max. 250 V, max. 0,75 A  
 or  
 75 W, continuous current  
 max. 250 V, max. 0,75 A as changeover contact  
 Switchboard : Metal  
 Cable entry : Pg 16

### Requirements and tests

Acc. to  
 - TRbF 50  
 - EU-Type test certificate acc. to annex III of directive 2014/34/EU  
 - DIN 3230, part 6 and VdTÜV MB Flow 100

### Evidence of quality features

- Acceptance test certificate acc. to DIN EN 10204 – 3.1  
 - Type test certificate acc. to directive 2014/34/EG and therein requested documents.

### Identification

- Acc. to annex II No. 1.0.5. of directive 2014/34/EG  
 - Additional identification acc. to DIN 3230 part 6, par. 4  
 - CE conformity marking acc. to Art. 16 of directive 2014/34/EG

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	SHEET 3 OF 3	
STANDARD SPECIFICATION	<h2>STS – M 89</h2>	
DESCRIPTION <b>FLOW SWITCH (Pendulum type)</b>	ID-CODE <b>FS</b>	

Legally required evidences

Acc. to General Product Safety Directive (GPSD) and associated rules (GPSR), Construction Products Law especially  
EU declaration of conformity acc. to directive 2014/34/EU

Periodic inspections by an authorized control office

Acc. to Product Safety Directive, facilities and facility parts in need of monitoring must be reviewed repeatedly in certain periods for their orderly conditions concerning the operation by an authorized control office. The operator has to find out the review periods of the complete facility and the facility parts on the base of a safety related evaluation. Therefore the manufacturer of the components must specify and determine the review periods for the individual components of the facilities in need of monitoring. As the operator wants the control office to authorize review periods as long as possible, the fittings and components described in this specifications must be designed and dimensioned in a way that they allow a review period of 3 years for electrical and 5 years for mechanical components.

STS-M 0 shall be observed.

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<h1>USAFE</h1>	REVISION 1	DATE: MAY 2015
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<h2>STANDARD SPECIFICATION</h2>	<h1>STS – M 90</h1>	
IDENTIFICATION  <b>FLOW SWITCH (Valve type)</b>	ID-CODE  <b>FS</b>	

Flow switch for the monitoring of pumping (protection against dry running) in pipelines for flammable liquids with hazard characteristics R10 (flammable) F (easily flammable) and F\* (highly flammable) with aromatic content of up to 50%.  
For the installation in zone 1, the inside has to be assigned to zone 0).

The following rules have to be kept reliably:

1. Directive 2014/68/EU of the European parliament and of the council on the approximation of the laws of the Member States concerning pressure equipment
2. Directive 2014/34/EU of the European parliament and of the council on the approximation of the laws of the Member States concerning equipment and protective systems intended for use in potentially explosive atmospheres (ATEX)
3. Directive 2006/42/EU of the European parliament and of the council on the approximation of the laws of the Member States of 17 May 2006 on machinery
4. Regulation (EU) No 305/2011 of the European Parliament and of the laying down harmonised conditions for the marketing of construction products
5. General Product Safety Directive (GPSD) and associated rules (GPSR)
6. Ordinance on Industrial Safety and Health
7. General Product Safety Directive (GPSD)
8. Technical rules for operation safety/hazardous substances, especially TRBS 3151 / TRGS 751
9. VdTÜV instruction sheets, especially VdTÜV-MB Flow 100, VdTÜV-MB 967, VdTÜV-MB 966-1 and VdTÜV-MB 966-2
10. AD 2000 instruction sheets
11. DIN, DIN EN and DIN EN ISO, VDE-regulations, especially DIN 3230-6, DIN EN 1092-1, DIN EN 10222-5, DIN EN 10213
12. Technical rules for flammable liquids, especially TRbF 50 (other sources of information)

### Use

The exterior temperature changes usual in Europe must be considered.

Medium: Mineral oil finished products with solid particles up to 800 µm  
Pressure step: PN 16  
Density of transport medium: 736 – 860 kg/m<sup>3</sup>  
Kinetic viscosity of transport medium: 0.9 x 10<sup>-6</sup> – 8.0 x 10<sup>-6</sup> m<sup>2</sup>/s

### Material

Body : GP240GH W.Nr. 1.0619 acc. to DIN EN 10213-2, old GS-C25)  
Wetted parts : Cr-Ni-steel, mat.no. 1.4571 acc. to DIN EN 10222-5

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	SHEET 2 OF 3	
STANDARD SPECIFICATION	<h2>STS – M 90</h2>	
IDENTIFICATION <b>FLOW SWITCH (Valve type)</b>	ID-CODE <b>FS</b>	

Design

Flow switch with floated element or spring-loaded piston with actuation of a protective gas magnetic switch by permanent magnet, for installation in horizontal or vertical pipelines DN 25 to DN 65.

Operating temperature : -15°C to +50°C  
 Operating pressure : 16,0 bar  
 Flange connection : Acc. to specifications  
 acc.to DIN EN 1092-1, sealing strip shape B1

Switching point at 10 % of nominal delivery rate of each pump, calibrated with decreasing flow.  
 Switching speed starting at 0.04 m/s.

Electrical equipment

Protection : IP 55, EEx d IIC T5  
 Protective gas magnetic switch : 110 VA, alternating current  
 max. 250 V, max. 0,75 A  
 or  
 75 W, continuous current  
 max. 250 V, max. 0,75 A as changeover contact  
 Switchboard : Metal  
 Cable entry : Pg 16

Requirements and tests

Acc. to  
 - TRbF 50  
 - Directive 2014/34/EG - EG-Type test certificate  
 - DIN 3230, part 6  
 - VdTÜV MB Flow 100

Evidence of quality features

- Acceptance test certificate acc. to DIN EN 10204 – 3.1  
 - Type test certificate acc. to directive 2014/34/EG and therein requested documents.

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STANDARD SPECIFICATION	<h2>STS – M 90</h2>	
IDENTIFICATION  <b>FLOW SWITCH (Valve type)</b>	ID-CODE  <b>FS</b>	

Identification

- Acc. to annex II No. 1.0.5. of directive 2014/34/EU
- Additional identification acc. to DIN 3230 part 6, par. 4
- CE conformity marking acc. to Art. 16 of directive 2014/34/EU

Legally required evidences

Acc. to General Product Safety Directive (GPSD) and associated rules (GPSR), Construction Products Law especially

EG declaration of conformity acc. to directive 2014/34/EU

Periodic inspections by an authorized control office

Acc. to Product Safety Directive, facilities and facility parts in need of monitoring must be reviewed repeatedly in certain periods for their orderly conditions concerning the operation by an authorized control office. The operator has to find out the review periods of the complete facility and the facility parts on the base of a safety related evaluation. Therefore the manufacturer of the components must specify and determine the review periods for the individual components of the facilities in need of monitoring. As the operator wants the control office to authorize review periods as long as possible, the fittings and components described in this specifications must be designed and dimensioned in a way that they allow a review period of 3 years for electrical and 5 years for mechanical components.

STS-M 0 shall be observed.

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<h1>USAFE</h1>	REVISION 1	DATE: MAY 2015
	SHEET 1 OF 14 SHEETS	
STANDARD SPECIFICATION	<h2>STS – M 103</h2>	
DESCRIPTION	ID-CODE	
<b>STEEL TANK 5,000 m<sup>3</sup>, 2,500 m<sup>3</sup>, 1,250m<sup>3</sup></b>		

The steel tank is a flat-bottom tank with internal coating.

### BASES OF THE BID SOLICITATION

The enclosed drawings for the construction of the steel tank are only general drawings.

Prior to the commencement of work, the company constructing the tank shall prepare assembly drawings and submit them in three copies to the Contracting Agency for approval.

After approval, the Contractor shall submit the three copies to the TÜV for a preliminary examination. The involved TÜV fees are at the Contractor's charge. Two of the three examined copies shall be returned to the Contracting Agency.

The Technical Rules for the Handling of Combustible Liquids TRbF 20 as well as Annex P, Item 1 and 3 shall be observed during execution of the construction works, the testing and the acceptance.

### DESCRIPTION OF THE TANK

#### General

The steel vessel of the 5,000 m<sup>3</sup> tank is calculated as specified by DIN EN 14015 and/or DIN EN 1993-4-2. The steel vessels of the 2,500 m<sup>3</sup> tank and the 1,250 m<sup>3</sup> tank shall be calculated in accordance with DIN EN 14015 and/or DIN EN 1993-4-2. Changes resulting from the calculation shall be taken into account. A weld seam quality of v = 0.8 is assumed or shall be assumed.

The jacket plates shall be braced to resist the fresh concrete compression prior to the placement of the concrete.

The tank is designed for a positive pressure of 20 mbar and a negative pressure of 5.0 mbar. The positive and negative pressure diaphragm valves are adjusted to a negative pressure of 3.5 mbar and a positive pressure of 7.5 mbar. The afore-mentioned conditions shall also be taken into account for the calculation of the 2,500 m<sup>3</sup> tank and the 1,250 m<sup>3</sup> tank.

The inside of the tank shall be prepared for subsequent coating. Welding seams and edges shall be treated accordingly.

#### Bottom plate:

Material S235JR+AR as per EN 10025 with factory certificate as per DIN EN 10 204–2.2. Plate thickness in accordance with the table below, install bottom plate in a radial layout, with flat iron backing at the butt joints on top of the finished concrete base and weld it to the previously installed steel sheet tray S235JR+AR with V-

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<h1>USAFE</h1>	REVISION 1	DATE: MAY 2015
	SHEET 2 OF 14 SHEETS	
STANDARD SPECIFICATION	<h2>STS – M 103</h2>	
DESCRIPTION	ID-CODE	
<b>STEEL TANK 5,000 m<sup>3</sup>, 2,500 m<sup>3</sup>, 1,250m<sup>3</sup></b>		

welds in accordance with the structural requirements. Make sure that the concrete surface is absolutely clean and free from all iron and weld electrode residues.

**ATTENTION:** After weld joining of the total base plate it shall be straightened and aligned in order to ensure a stress-free position to the greatest possible extent before placing the jacket plate on top of it.

The base plate shall be fitted with bores of a diameter of 20 mm in a circumferential layout with a spacing of 2 m in the area of the leakage gutters to provide for the drainage of leaking liquids. The supports required to fix the fasteners of built-in components shall be welded on before performing the water level test.

The lower side facing the concrete base remains untreated apart from coarse cleaning (standard degree of cleanliness Sa 1 as per DIN EN ISO 12944-4).

When preparing the workshop drawings, make sure that no weld seams will be located underneath the columns that support the tank cover slab.

Underground installed tray (hemiellipsoidal bottom as per drawing)

Material S235 JR+AR as per EN 10025 with factory certificate as per DIN EN 10 204 – 2.2, dimensions and plate thickness in accordance with the table below; insert in the corresponding recess of the base slab as shown in the drawing and prepare for welded connection to the base plate.

Apart from rough cleaning, the outer surfaces of the tray remain untreated (standard degree of cleanliness Sa 1 as per DIN ISO 12944-4).

Jacket plate

Material S235JR+AR as per EN 10025 with factory certificate as per DIN EN 10 204 – 2.2, plate thickness in accordance with the table below, assemble jacket plate and join by welding in accordance with the structural requirements. Weld seams as V-seams with root welding.

The jacket comprises three assembly sections (the lower section is 2,450 mm in height; the two other sections have a height of 2,425 mm each). The sections shall be fitted flush to each other on the inner surface. At the top edge, a circumferential angled steel ring shall be welded on as specified in the table below.

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<b>STANDARD SPECIFICATION</b>	<b>STS – M 103</b>	
DESCRIPTION	ID-CODE	
<b>STEEL TANK 5,000 m<sup>3</sup>, 2,500 m<sup>3</sup>, 1,250m<sup>3</sup></b>		

8 spacers made of flat iron 60 x 10 x 400 mm with oblong holes shall be welded to the jacket plate for the fastening of the steel ladder in accordance with the drawing.

The bracing of the inner steel tank to transfer lateral pressure, especially during the casting of the tank walls and the tank cover plate, shall be included in this item. A structural calculation shall be prepared and submitted to the Ordering Party for approval.

The treatment of the outer surfaces of the steel tank walls shall also be included in this item.

#### Cover plate

Material S235JR+AR as per EN 10025 with factory certificate as per DIN EN 10 204 – 2.2, plate thickness in accordance with the table below, lay in parallel sheets in accordance with the laying drawing and joint with butt joints and single-sided V seams in accordance with the structural requirements.

The scaffold required for the assembly of the cover plate and for the casting of the concrete cover slab shall be included in this item. A structural calculation shall be prepared and submitted to the Ordering Party for approval.

Stirrups with a diameter of 16 mm are to be welded on the cover plates distributed over the entire surface at a spacing of 1 m in the longitudinal and the transverse direction for the connection to the load-bearing reinforced concrete top slab.

Apart from rough cleaning, the outer surface facing the concrete slab remains untreated (standard degree of cleanliness Sa 1 as per DIN ISO 9284).

#### Tank cover slab supports

Material suitable for tube columns P235TR2 as per EN 10217-1 with factory certificate as per DIN EN 10 204 – 2.2 and for base and top plates S235JR+AR as per EN 10025 with factory certificate as per DIN EN 10 204 – 2.2, number and dimensions in accordance with the table below. The column base and top plates shall be welded to the tank base and top plates. The slope of the tank bottom shall be considered when assembling the supports of the tank cover slab.

#### Access ladder

Access ladder for fuel tank as per DIN EN ISO 14122-4. Runners made of steel tube, Ø of 48.3 x 3.6 mm, as per DIN EN 10220, steps made of square steel 20 x 20 mm, welded in diagonally (skid proof), height of approx. 8.20 m. The ladder shall be fitted with a safety cage made of flat steel 50 x 5 mm of a length of 4.20 m starting 3.0 m above the tank bottom and extending up to the bottom edge of the cover plate. Fastening of the ladder to the existing spacers with 8 flat iron strips 60 x 8 x 100 mm approx.

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STANDARD SPECIFICATION	<h2>STS – M 103</h2>	
DESCRIPTION	ID-CODE	
<b>STEEL TANK 5,000 m<sup>3</sup>, 2,500 m<sup>3</sup>, 1,250m<sup>3</sup></b>		

Built-in sockets

Material S235JR+AR as per EN 10025 with factory certificate as per DIN EN 10 204 – 2.2 for assembly openings, pump and collector sockets, consisting of thick-walled plate sections as well as sockets for filling-level indicators, sockets for tank venting and sockets for the filling pipe, all made of steel tube as per STS- M 14 with factory certificate as per DIN EN 10 204 – 2.2, all sockets with top rings and reinforcing rings in the area of the tank cover slab as well as pre-welded flange rings made of S235JR+AR. The sockets shall be welded into the cover plate as shown in the drawing.

Dimensions in accordance with the table below.

For the pressure tests with positive and negative pressure, all openings shall be sealed. The covers of the built-in sockets should be delivered in their final design and installed in accordance with the drawing.

The pump sockets shall be welded to a connecting plate. A sleeve with plug shall be welded on for venting.

The flange rings for the pump sockets shall be manufactured to fit to the pump dome cover and shall have the required bores. The weld-on position of the flange rings shall be aligned to the subsequent fitting of the pumps and piping (free of axes).

The venting connections shall be sealed with blind flanges for the pressure tests.

ACCEPTANCE AND TESTING OF THE STEEL TANK

The required testing of the tank specified by the Technical Rules for the Handling of Combustible Liquids TRbF 20, Annex P, Item 3 shall be performed during its construction and after its completion.

The stability and tightness tests to be performed by an expert of the German TÜV shall be based on TRbF 20, Annex P, Item 3.

The bottom welds shall be subjected to a 100 % vacuum test.

The negative pressure test with a pressure of 7.5 mbar shall be carried out before filling the tank with water.

All costs involved in the testing, also for water supply, with the exception of the TÜV fee, shall be included in the unit prices.

SURFACE PROTECTION

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<h1>USAFE</h1>	REVISION 1	DATE: MAY 2015
	SHEET 5 OF 14 SHEETS	
<b>STANDARD SPECIFICATION</b>	<b>STS – M 103</b>	
DESCRIPTION	ID-CODE	
<b>STEEL TANK 5,000 m<sup>3</sup>, 2,500 m<sup>3</sup>, 1,250m<sup>3</sup></b>		

A conductive coating as per STS-M 67 shall be applied to the inside of the tank. The components to be coated include the pipe columns and built-in components of steel inside the tank as well as the dome sockets and covers. Prior to applying the internal coating, fasteners and fixing devices shall be welded on.

The outer wall surfaces of the tank shall be coated as follows:

- Pre-treatment:           blasting in accordance with DIN EN 12944-4
- Prime coat:               epoxy zinc dust primer, gray,  
thickness of dry layer: 60 µm approx.  
(Resikote EL zinc duct primer or equivalent)
- Finishing coat:           Epoxy finishing coat, shades of gray,  
two layers with a dry layer thickness 150 µm for each layer  
(Resikote EL/HF or equivalent)

DETERMINATION OF THE TANK CAPACITY

In order to assess the tank capacity, each tank shall be scanned with radar measurement equipment. The dead stock capacity up to the suction nozzle of the submersible centrifugal pump shall be determined separately and registered in the calibration chart.

A dimensioned drawing for the tank shall be enclosed.

The layout of the calibration chart shall be coordinated with the operator of the facility.

Example for USAFE facilities:   height scale in 1/16 inches and in mm  
  volume scale in gallons

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	SHEET 6 OF 14 SHEETS	
<b>STANDARD SPECIFICATION</b>		<b>STS – M 103</b>
DESCRIPTION		ID-CODE
<b>STEEL TANK 5,000 m<sup>3</sup>, 2,500 m<sup>3</sup>, 1,250m<sup>3</sup></b>		

DESIGN OF STANDARD 5,000 m<sup>3</sup> TANKS

Rated capacity		m <sup>3</sup>	5,000
Clear cyl. height		mm	7,320
Clear diameter		mm	29,800
Base plate	thk	mm	8
Cover plate	thk	mm	5
Jacket plate (3 assembly sections)	thk	mm	6/7/9
Tank sump			
- Diameter		mm	3,200
- Sheet thickness	thk	mm	12
- Inner diameter of tank sump	dia	mm	2,160
- Height of tank sump	approx.	mm	496
- Steel tube column DN 700	approx.	mm	200
Assembly opening		ea.	4
Clear diameter		mm	1,000
Socket length		mm	1420
Wall thickness	thk	mm	10
Top ring	∅	mm	1,220/1,020
- Sheet thickness	thk	mm	10
Reinforcement ring	∅	mm	1,220/1,020
- Sheet thickness	thk	mm	10
Flange ring	∅	mm	1,220/1,020
- Sheet thickness	thk	mm	23
Cover with handles	∅	mm	1,120
- Sheet thickness	thk	mm	20
Pump socket		ea.	2
Clear diameter		mm	800
Socket length		mm	712
Wall thickness	thk	mm	6
Top ring	∅	mm	1,012/812
- Sheet thickness	thk	mm	10
Reinforcement ring	∅	mm	1,012/812
- Sheet thickness	thk	mm	10

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	SHEET 7 OF 14 SHEETS	
<b>STANDARD SPECIFICATION</b>		<b>STS – M 103</b>
DESCRIPTION		ID-CODE
<b>STEEL TANK 5,000 m<sup>3</sup>, 2,500 m<sup>3</sup>, 1,250m<sup>3</sup></b>		

Sealing plate	∅	mm	830
- Sheet thickness	thk	mm	15
Collector socket		ea.	1
Clear diameter		mm	1,200
Socket length		mm	700
Wall thickness	thk	mm	6
Top ring	∅	mm	1,412/1,212
- Sheet thickness	thk	mm	10
Reinforcement ring	∅	mm	1,412/1,212
- Sheet thickness	thk	mm	10
Flange ring	∅	mm	1,320/1,212
- Sheet thickness	thk	mm	25
Cover	∅	mm	1,320
- Sheet thickness	thk	mm	30

Socket for filling level indicator		ea.	1
In accordance with TRbF 50, Annex A: Item 3.21		mm	∅ 273 x 5.0
Socket length		mm	850
Top ring	∅	mm	473/273
- Sheet thickness	thk	mm	10
Reinforcement ring	∅	mm	473/273
- Sheet thickness	thk	mm	10
Welding neck flange as per STS-M 17			DN 250
Blind flange as per STS-M 18			DN 250
Flange connector			DN 250

Socket for filling pipe		ea.	1
Pipe in accordance with TRbF 50, Annex A: Item 3.21		mm	∅ 219.1 x 4.5
Socket length		mm	1,000
Top ring	∅	mm	420/219.1
- Sheet thickness	thk	mm	10
Reinforcement ring	∅	mm	420/219.1
- Sheet thickness	thk	mm	10
Welding neck flange as per STS-M 17		2 ea.	DN 200
Blind flange as per STS-M 18			DN 200
Flange connector			DN 200

Socket for tank venting		ea.	1
Pipe in accordance with TRbF 50, Annex A: Item 3.21		mm	∅ 168.3 x 4.0

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<h1>USAFE</h1>	REVISION 1	DATE: MAY 2015
	SHEET 8 OF 14 SHEETS	
<b>STANDARD SPECIFICATION</b>	<b>STS – M 103</b>	
DESCRIPTION	ID-CODE	
<b>STEEL TANK 5,000 m<sup>3</sup>, 2,500 m<sup>3</sup>, 1,250m<sup>3</sup></b>		

Socket length		mm	876
Top ring	∅	mm	370/168.3
- Sheet thickness	thk	mm	10
Reinforcement ring	∅	mm	370/168.3
- Sheet thickness	thk	mm	10
Welding neck flange as per STS-M 17			DN 150
Blind flange as per STS-M 18			DN 150
Flange connector			DN 150

Tube column (inner circle)		ea.	6
Tube dimensions		mm	∅ 323.9 x 12.5
Tube column length	approx.	mm	7,830
Top and base plate (12 ea.)		mm	∅ 650 x 50

Tube column (outer circle)		ea.	12
Tube dimensions		mm	∅ 323.9 x 11.0
Tube column length	approx.	mm	7,580
Top and base plate (12 ea.)		mm	∅ 650 x 50

Vent socket (welded in assembly opening)		ea.	3
Steel pipe as per STS-M 14		mm	∅ 168.3 x 4.0
Elbow 90°, St 37.0, DIN 1629		mm	∅ 168.3 x 4.5
Elbow 45°, St 37.0, DIN 1629		mm	∅ 168.3 x 4.5
Welding neck flange, DIN 2633			DN 150

Stiffening ring		ea.	1
Base plate/jacket plate		mm	TB 35
Jacket plate/cover plate		mm	L 70 x 7
Upper termination of jacket plate		mm	L 60 x 40 x 6

Access ladder		ea.	2
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Leakage control pipe DN 32 as shown in drawing C-1.3		ea.	1
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STS-M 0 must be adhered to.

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	SHEET 9 OF 14 SHEETS	
<b>STANDARD SPECIFICATION</b>	<b>STS – M 103</b>	
DESCRIPTION	ID-CODE	
<b>STEEL TANK 5,000 m<sup>3</sup>, 2,500 m<sup>3</sup>, 1,250m<sup>3</sup></b>		

DESIGN OF STANDARD 2,500 m<sup>3</sup> TANKS

(The result of the structural calculation shall be taken into consideration)

Rated capacity		m <sup>3</sup>	2,500
Clear cyl. height		mm	7,320
Clear diameter		mm	21,200
Base plate	thk	mm	8
Cover plate	thk	mm	5
Jacket plate (3 assembly sections)	thk	mm	7/6/6
Tank sump			
- Diameter		mm	3,200
- Sheet thickness	thk	mm	12
- Inner diameter of tank sump	dia	mm	2,160
- Height of tank sump	approx.	mm	496
- Steel tube column DN 700	approx.	mm	200
Assembly opening			
Clear diameter		mm	1,000
Socket length		mm	1,420
Wall thickness	thk	mm	10
Top ring	∅	mm	1,220/1,020
- Sheet thickness	thk	mm	10
Reinforcement ring	∅	mm	1,220/1,020
- Sheet thickness	thk	mm	10
Flange ring	∅	mm	1,220/1,020
- Sheet thickness	thk	mm	23
Cover with handles	∅	mm	1,120
- Sheet thickness	thk	mm	20
Pump socket			
Clear diameter		mm	800
Socket length		mm	672
Wall thickness	thk	mm	6
Top ring	∅	mm	1,012/812
- Sheet thickness	thk	mm	10
Reinforcement ring	∅	mm	1,012/812

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	SHEET 10 OF 14 SHEETS	
<b>STANDARD SPECIFICATION</b>	<b>STS – M 103</b>	
DESCRIPTION	ID-CODE	
<b>STEEL TANK 5,000 m<sup>3</sup>, 2,500 m<sup>3</sup>, 1,250m<sup>3</sup></b>		

- Sheet thickness	thk	mm	10
Sealing plate	∅	mm	830
- Sheet thickness	thk	mm	15
Collector socket		ea.	1
Clear diameter		mm	1,200
Socket length		mm	660
Wall thickness	thk	mm	6
Top ring	∅	mm	1,412/1,212
- Sheet thickness	thk	mm	10
Reinforcement ring	∅	mm	1,412/1,212
- Sheet thickness	thk	mm	10
Flange ring	∅	mm	1,320/1,212
- Sheet thickness	thk	mm	25
Cover	∅	mm	1,320
- Sheet thickness	thk	mm	30

Socket for filling level indicator		ea.	1
Pipe in accordance with TRbF 50, Annex A: Item 3.21		mm	∅ 273 x 5.0
Socket length		mm	810
Top ring	∅	mm	473/273
- Sheet thickness	thk	mm	10
Reinforcement ring	∅	mm	473/273
- Sheet thickness	thk	mm	10
Welding neck flange as per STS-M 17			DN 250
Blind flange as per STS-M 18			DN 250
Flange connector			DN 250

Socket for filling pipe		ea.	1
Pipe in accordance with TRbF 50, Annex A: Item 3.21		mm	∅ 219.1 x 4.5
Socket length		mm	1,000
Top ring	∅	mm	420/219.1
- Sheet thickness	thk	mm	10
Reinforcement ring	∅	mm	420/219.1
- Sheet thickness	thk	mm	10
Welding neck flange as per STS-M 17		2 ea.	DN 200
Blind flange as per STS-M 18			DN 200
Flange connector			DN 200

Socket for tank venting		ea.	1
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	SHEET 11 OF 14 SHEETS	
<b>STANDARD SPECIFICATION</b>	<b>STS – M 103</b>	
DESCRIPTION	ID-CODE	
<b>STEEL TANK 5,000 m<sup>3</sup>, 2,500 m<sup>3</sup>, 1,250m<sup>3</sup></b>		

Pipe in accordance with TRbF 50, Annex A: Item 3.21	mm	∅ 168.3 x 4.0
Socket length	mm	796
Top ring	∅ mm	370/168.3
- Sheet thickness	thk mm	10
Reinforcement ring	∅ mm	370/168.3
- Sheet thickness	thk mm	10
Welding neck flange as per STS-M 17		DN 150
Blind flange as per STS-M 18		DN 150
Flange connector		DN 150
Tube column (inner circle)	ea.	6
Tube dimensions	mm	∅ 273 x 10.0
Tube column length	approx. mm	7,610
Top and base plate (12 ea.)	mm	∅ 650 x 50
Tube column (outer circle)	ea.	12
Tube dimensions	mm	∅ 273 x 10.0
Tube column length	approx. mm	7,490
Top and base plate (12 ea.)	mm	∅ 650 x 50
Vent socket (welded in assembly opening)	ea.	3
Steel pipe as per STS-M 14	mm	∅ 168.3 x 4.0
Elbow 90°, St 37.0, DIN 1629	mm	∅ 168.3 x 4.5
Elbow 45°, St 37.0, DIN 1629	mm	∅ 168.3 x 4.5
Welding neck flange, DIN 2633		DN 150
Stiffening ring	ea.	1
Base plate/jacket plate	mm	TB 35
Jacket plate/cover plate	mm	L 70 x 7
Upper termination of jacket plate	mm	L 60 x 40 x 6
Access ladder	ea.	2
Leakage control pipe DN 32 as shown in drawing C-2.3	ea.	1

STS-M 0 must be adhered to.

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	SHEET 12 OF 14 SHEETS	
<b>STANDARD SPECIFICATION</b>	<b>STS – M 103</b>	
DESCRIPTION	ID-CODE	
<b>STEEL TANK 5,000 m<sup>3</sup>, 2,500 m<sup>3</sup>, 1,250m<sup>3</sup></b>		

DESIGN OF STANDARD 1,250 m<sup>3</sup> TANKS

(The result of the structural calculation shall be taken into consideration)

Rated capacity		m <sup>3</sup>	1,250
Clear cyl. height		mm	7,320
Clear diameter		mm	15,000
Base plate	thk	mm	8
Cover plate	thk	mm	6
Jacket plate (3 assembly sections)	thk	mm	6/5/5

Tank sump

- Diameter		mm	3,200
- Sheet thickness	thk	mm	12
- Inner diameter of tank sump	dia	mm	2,160
- Height of tank sump	approx.	mm	496
- Steel tube column DN 700	approx.	mm	200

Assembly opening		ea.	3
Clear diameter		mm	1,000
Socket length		mm	1,420
Wall thickness	thk	mm	10
Top ring	∅	mm	1,220/1,020
- Sheet thickness	thk	mm	10
Reinforcement ring	∅	mm	1,220/1,020
- Sheet thickness	thk	mm	10
Flange ring	∅	mm	1,120/1,020
- Sheet thickness	thk	mm	23
Cover with handles	∅	mm	1,120
- Sheet thickness	thk	mm	20

Pump sockets		ea.	2
Clear diameter		mm	800
Socket length		mm	640
Wall thickness	thk	mm	6
Top ring	∅	mm	1,012/812
- Sheet thickness	thk	mm	10

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<h1>USAFE</h1>	REVISION 1	DATE: MAY 2015
	SHEET 13 OF 14 SHEETS	
<b>STANDARD SPECIFICATION</b>		<b>STS – M 103</b>
DESCRIPTION		ID-CODE
<b>STEEL TANK 5,000 m<sup>3</sup>, 2,500 m<sup>3</sup>, 1,250m<sup>3</sup></b>		

Reinforcement ring	∅	mm	1,012/812
- Sheet thickness	thk	mm	10
Sealing plate	∅	mm	830
- Sheet thickness	thk	mm	15
Collector socket		ea.	1
Clear diameter		mm	1,200
Socket length		mm	660
Wall thickness	thk	mm	6
Top ring	∅	mm	1,412/1,212
- Sheet thickness	thk	mm	10
Reinforcement ring	∅	mm	1,412/1,212
- Sheet thickness	thk	mm	10
Flange ring	∅	mm	1,320/1,212
- Sheet thickness	thk	mm	25
Cover	∅	mm	1,320
- Sheet thickness	thk	mm	30

Socket for filling level indicator		ea.	1
Pipe in accordance with TRbF 50, Annex A: Item 3.21		mm	∅ 273 x 5.0
Socket length		mm	810
Top ring	∅	mm	473/273
- Sheet thickness	thk	mm	10
Reinforcement ring	∅	mm	473/273
- Sheet thickness	thk	mm	10
Welding neck flange as per STS-M 17			DN 250
Blind flange as per STS-M 18			DN 250
Flange connector			DN 250

Socket for filling pipe		ea.	1
Pipe in accordance with TRbF 50, Annex A: Item 3.21		mm	∅ 219.1 x 4.5
Socket length		mm	1,000
Top ring	∅	mm	420/219.1
- Sheet thickness	thk	mm	10
Reinforcement ring	∅	mm	420/219.1
- Sheet thickness	thk	mm	10
Welding neck flange as per STS-M 17		2 ea.	DN 200
Blind flange as per STS-M 18			DN 200
Flange connector			DN 200

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<h1>USAFE</h1>	REVISION 1	DATE: MAY 2015
	SHEET 14 OF 14 SHEETS	
<b>STANDARD SPECIFICATION</b>	<b>STS – M 103</b>	
DESCRIPTION	ID-CODE	
<b>STEEL TANK 5,000 m<sup>3</sup>, 2,500 m<sup>3</sup>, 1,250m<sup>3</sup></b>		

Socket for tank venting	ea.	1
Pipe in accordance with TRbF 50, Annex A: Item 3.21	mm	∅ 168.3 x 4.0
Socket length	mm	796
Top ring	∅	mm 370/168.3
- Sheet thickness	thk	mm 10
Reinforcement ring	∅	mm 370/168.3
- Sheet thickness	thk	mm 10
Welding neck flange as per STS-M 17		DN 150
Blind flange as per STS-M 18		DN 150
Flange connector		DN 150

Collector socket	ea.	6
Tube dimensions	mm	∅ 323.9 x 11.0
Tube column length	approx. mm	7,470
Top and base plate (12 ea.)	mm	∅ 650 x 50

Vent socket (welded in assembly opening)	ea.	2
Steel pipe as per STS-M 14	mm	∅ 168.3 x 4.0
Elbow 90°, St 37.0, DIN 1629	mm	∅ 168.3 x 4.5
Elbow 45°, St 37.0, DIN 1629	mm	∅ 168.3 x 4.5
Welding neck flange, DIN 2633		DN 150

Stiffening ring	ea.	1
Base plate/jacket plate	mm	TB 35
Jacket plate/cover plate	mm	L 70 x 7
Upper termination of jacket plate	mm	L 60 x 40 x 6

Access ladder	ea.	1
Leakage control pipe DN 32 as shown in drawing C-3.2	ea.	1

STS-M 0 must be adhered to.

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	SHEET 1 OF 6	
<h2>STANDARD SPEZIFIKATION</h2>	<h1>STS – M 105</h1>	
DESCRIPTION	ID-CODE	
<b>FUEL PUMP – vertical (discharge)</b>	<b>P</b>	

Pump for feeding of flammable liquids with the hazard characteristics R10 (flammable), F (easily flammable) and F\* (highly flammable) and an aromatic content of up to 50%.  
 Installation of pump in explosion hazard area (zone 0), motor is installed in zone 1.

The following regulations are imperative and must be complied with:

1. Directive 2014/68/EU of the European parliament and of the council on the approximation of the laws of the Member States concerning pressure equipment
2. Directive 2014/34/EU of the European parliament and of the council on the approximation of the laws of the Member States concerning equipment and protective systems intended for use in potentially explosive atmospheres (ATEX)
3. Directive 2006/42/EU of the European parliament and of the council on the approximation of the laws of the Member States of 17 May 2006 on machinery
4. Regulation (EU) No 305/2011 of the European Parliament and of the laying down harmonised conditions for the marketing of construction products
5. General Product Safety Directive (GPSD) and associated rules (GPSR)
6. Ordinance on Industrial Safety and Health
7. Technical rules for operation safety/hazardous substances, especially TRBS 3151 / TRGS 751
8. VdTÜV instruction sheets, especially VdTÜV-MB 967, VdTÜV-MB 966-1 and VdTÜV-MB 966-2
9. DIN, DIN EN and DIN EN ISO, especially DIN 28090/28091, DIN EN 1561, DIN EN 10025-2, DIN EN 10213-2, DIN EN 10216-2, DIN EN ISO 9906
10. Technical rules for flammable liquids, especially TRbF 20 and 50 (other sources of information)

Use

The exterior temperature changes usual in Europe must be considered.

Medium:	JP 4	Density $\delta = 0.751 - 0.802 \text{ kg/dm}^3$
	Mogas	Density $\delta = 0.735 - 0.759 \text{ kg/dm}^3$
	Diesel	Density $\delta = 0.820 - 0.860 \text{ kg/dm}^3$
	JP 8	Density $\delta = 0.800 - 0.830 \text{ kg/dm}^3$

Pressure step: PN 16

Material

- |          |                     |   |  |
|----------|---------------------|---|--|
| 1. Pump: | Suction piece       | : | } GP240GH (1.0619) acc. to DIN EN 10213-2, old GS-C25)<br>acc. to STS-M 43 |
|          | Pressure piece      | : |  |
|          | Intermediate piece  | : |  |
|          | Intermediate washer | : |  |
|          | Distributor         | : | EN-GJL-250 (EN-JL-1040) acc. to DIN EN 1561, (old GG 25)                   |
|          | Shaft               | : | mat.no. 1.4057   |
|          | Impeller            | : | mat.no. 1.4027   |
|          | Wearing ring        | : | mat.no. 1.4408   |
|          | Housing bolts       | : | mat.no. 1.4104   |

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<h1>USAFE</h1>	REVISION 1	DATE: MAY 2015
	SHEET 2 OF 6	
<h2>STANDARD SPEZIFIKATION</h2>	<h1>STS – M 105</h1>	
DESCRIPTION	ID-CODE	
<b>FUEL PUMP – vertical (discharge)</b>	<b>P</b>	

Hexagon nuts : mat.no. 1.4571  
Washers : mat.no. 1.4571  
Plain bearing with emergency operation characteristics : PTFE (Teflon or equivalent) with graphite

2. Motor bearing lantern:

Welded structure of	S235JR (1.0038) acc. to DIN EN 10025-2 (old RSt 37-2)	}	Outside with painting acc. to STS-M 66
Bearing bracket	: EN-GJL-250 (EN-JL-1040)acc. to DIN EN 1561(old GG 25)		
Sealing flange	: EN-GJL-250 (EN-JL-1040)acc. to DIN EN 1561(old GG 25)		
Bearing cover	: EN-GJL-200 (EN-JL-1030)acc. to DIN EN 1561(old GG 20)		
Double-row inclined ball bearing	: St		
Screws	: Mat.no. 1.4571		
Nuts	: Mat.no. 1.4571		
Washers	: Mat.no. 1.4571		
Mechanical seal	: Acc. to DIN EN 12756, single-acting, balanced, independent of sense of rotation, H7N		

3. Rising pipes:

Rising pipe	: P235GH-TC1(1.0345)acc. to DIN EN 10216-2(old St 35.8l)	}	Outside with coating acc. to STS-M 66
Welding neck flange	: S235JR (1.0038) acc. to DIN EN 10025-2 (old RSt 37-2)		
Guide bearing	: EN-GJL-200(EN-JL-1030)acc. to DIN EN 1561(old GG 25)		
Shaft	: Mat.no. 1.4057		
Sleeve coupling	: Mat.no. 1.4571		
Plain bearing with emergency operation	: PTFE (Teflon or equivalent) with graphite		
Screws	: Mat.no. 1.4571		
Nuts	: Mat.no. 1.4571		
Washers	: Mat.no. 1.4571		

4. Level monitoring:

Flange : Mat.no. 1.4404 / 1.4571  
Probe : Mat.no. 1.4404 / 1.4571  
Casing : Aluminium or brass chromed

5. Temperature monitoring pump casing:

Corrugated tube : Mat.no. 1.4571  
Pipe : Mat.no. 1.4571  
Screwing : Mat.no. 1.4571  
Clamp screw connection: Mat.no. 1.4571  
Casing : Polyamide

6. Flow switch:

Flange : Mat.no. 1.4404  
Probe : Mat.no. 1.4404  
Casing : Aluminium

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	SHEET 3 OF 6	
<b>STANDARD SPEZIFIKATION</b>	<b>STS – M 105</b>	
DESCRIPTION <b>FUEL PUMP – vertical (discharge)</b>	ID-CODE <b>P</b>	

7. Dome cover : S235JR (1.0038) acc. to DIN EN 10025-2 (old RSt 37-2)  
Bottom coated acc. to STS-M 43  
Top coated acc. to STS-M 66  
External diameter : 920 mm (DN 800)
8. Dome cover screws : Mat.no. 1.4571  
Nuts : Mat.no. 1.4571  
Dome cover seal : Acc. to DIN 28090/28091 suitable for above mentioned mediums, as  
Hole seal (exterior Ø 920 mm)
9. Other seals : Acc. to DIN 28090/28091 suitable for above mentioned mediums

Design

Pumping set of a submersible centrifugal pump driven by an electric motor via shaft running centrally on bearings in a rising pipe. The plain bearings shall be spaced in the rising pipes at intervals of 1450 mm max. The E-motor is mounted onto a lantern outside the tank. The seal inside the lantern consists of a mechanical seal. Bearing lantern with connecting flange for the pressure line.

A (Tank truck filling):

Pump capacity Q : 120 m³/h  
Pump head H : 70 m FS  
Power requirement P : 26.7 kW ( $\delta = 0.86 \text{ kg/dm}^3$ )  
Connecting flange : DN 150, PN 16  
Typ : HZV hu 1273

B (Hydrant fuelling):

Pump capacity Q : 120 m³/h  
Pump head H : 125 m FS  
Power requirement P : 48.2 kW ( $\delta = 0.86 \text{ kg/dm}^3$ )  
Connecting flange : DN 150, PN 16  
Typ : HZV hu 1275

Submergence (top edge tank dome – bottom edge foot valve)

The exact assembly dimension shall be measured at the finished tank.

5,000 m³-Tank : approx. 8,630 mm  
2,500 m³-Tank : approx. 8,370 mm

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<h1>USAFE</h1>	REVISION 1	DATE: MAY 2015
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<h2>STANDARD SPEZIFIKATION</h2>	<h1>STS – M 105</h1>	
DESCRIPTION	ID-CODE	
<b>FUEL PUMP – vertical (discharge)</b>	<b>P</b>	

1,250 m <sup>3</sup> -Tank :	approx. 8,190 mm
750 m <sup>3</sup> -Tank :	approx. 5,370 mm
500 m <sup>3</sup> -Tank :	approx. 5,740 mm
300 m <sup>3</sup> -Tank :	approx. 4,700 mm

#### Scope of delivery

- 3-stage segment (design. A) or 5-stage segment pump (design B), dome cover thickness = 25 mm in each case (appropriate for mounting to the tank counter flange), free of non-ferrous metal.
- Cooling tank for the pump
- One bypass and leakage return line each
- Rotary current motor: IP 55, EEx de IIC T4

#### Accessories

- Strainer (suitable to pump)
- Level limit switch DN 25 PN25/40 with evaluation device
- Flow switch 1" Class 300
- Sheath resistance thermometer incl. connection head, base, neck tube and instrument transformer

#### Coating

All external parts which are not made of Cr-Ni-steel but get in contact with the pumping medium shall be coated acc. to STS-M 43, except the sliding surfaces and the centre rings. Internal parts shall not be coated.

#### Driving unit

Ex-protected E-motor with pressure-resistant encasing, with painting acc. to STS-M 66.

#### Technical Data (Design A):

(valid for densities up to  $\delta = 0,860 \text{ kg/dm}^3$ )

Type	:	200 L
Nominal capacity	:	30 kW
Nominal speed	:	1460 l/min
Nominal current at 400 V	:	53.8 A
Voltage	:	400/690 V
		(for Y - $\Delta$ starting)

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<h2>STANDARD SPEZIFIKATION</h2>	<h1>STS – M 105</h1>	
DESCRIPTION	ID-CODE	
<b>FUEL PUMP – vertical (discharge)</b>	<b>P</b>	

Protection : IP 55, ExdeIICT4  
Frequency : 50 Hz  
Structural shape : V 1  
Driving coupling : Radex-N, NN60, appropriate for min. 30 startings/hr

Technical Data (Design B):  
(valid for densities  $\delta = 0,860 \text{ kg/dm}^3$ )

Type : 250M  
Nominal capacity : 55 kW  
Nominal speed : 1470 l/min  
Nominal current at 400 V : 95 A  
Voltage : 400/690 V  
(for Y -  $\Delta$  starting)  
Protection : IP 55, ExdeIICT4  
Frequency : 50 Hz  
Structural shape : V 1  
Driving coupling : Radex-N, NN70, appropriate for min. 30 startings/hr

Requirements and tests

- EC type test acc. to annex III of directive 2014/34/EC
- Proof of performance
- Test run at the manufacturer's works, recording of the characteristic line acc. to DIN EN ISO 9906

Evidence of quality features

- Certificate of type approval acc. to directive 2014/34/EU and the documents required there-in.
- Acceptance test certificate acc. to DIN EN 10204/3.1 for above mentioned tests

Identification

Name plate and running direction plate must be put on unsolvably (no adhesive labels).

Acc. to annex II No. 1.0.5. of guideline 2014/34/EU

- CE conformity marking acc. to Art. 16 of directive 2014/34/EU

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STANDARD SPEZIFIKATION	<h2>STS – M 105</h2>	
DESCRIPTION <b>FUEL PUMP – vertical (discharge)</b>	ID-CODE <b>P</b>	

Legally required evidences

Acc. to General Product Safety Directive (GPSD) and associated rules (GPSR)

Especially:

EC declaration of conformity acc. to directive 2014/34/EU

Periodic inspections by an authorized control office

Acc. to Product Safety Directive, facilities and facility parts in need of monitoring must be reviewed repeatedly in certain periods for their orderly conditions concerning the operation by an authorized control office. The operator has to find out the review periods of the complete facility and the facility parts on the base of a safety related evaluation. Therefore the manufacturer of the components must specify and determine the review periods for the individual components of the facilities in need of monitoring. As the operator wants the control office to authorize review periods as long as possible, the fittings and components described in this specifications must be designed and dimensioned in a way that they allow a review period of 3 years for electrical and 5 years for mechanical components.

The below manufacturer(s) is (are) known to manufacture products of the type specified in this specification section. Any other manufacturer(s) from a NATO member Nation Country may provide this product, provided they can prove to meet this specification.

Brand: DICKOW Pumpen KG, 84465 Waldkraiburg, Germany

Type: HZV hu 1273 (Design A)

Type: HZV hu 1275 (Design B)

or equivalent

STS-M 0 shall be observed.

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<h1>USAFE</h1>	REVISION 1	DATE: MAY 2015
	SHEET 1 OF 3	
<b>STANDARD SPECIFICATION</b>	<b>STS – M 112</b>	
DESCRIPTION <b>SAFETY DEVICE AGAINST DETONATION, LIQUID TYPE</b>	ID-CODE <b>SDL</b>	

For installation in above-ground pipelines for flammable liquids with the hazard characteristics R10 (flammable) F (easily flammable) and F\* (highly flammable) and with an aromatic content of up to 50%.  
For installation in stations and shafts (in zone 1, the interior of the fitting has to be assigned to zone 0).

The following regulations are imperative and must be complied with:

1. Directive 2014/68/EC of the European parliament and of the council on the approximation of the laws of the Member States concerning pressure equipment
2. Directive 2014/34/EC of the European parliament and of the council on the approximation of the laws of the Member States concerning equipment and protective systems intended for use in potentially explosive atmospheres (ATEX)
3. Directive 2006/42/EC of the European parliament and of the council on the approximation of the laws of the Member States of 17 May 2006 on machinery
4. Regulation (EU) No 305/2011 of the European Parliament and of the laying down harmonised conditions for the marketing of construction products
5. General Product Safety Directive (GPSD) and associated rules (GPSR)
6. Ordinance on Industrial Safety and Health
7. Technical rules for operation safety/hazardous substances, especially TRBS 3151 / TRGS 751
8. VdTÜV instruction sheets, especially VdTÜV-MB 967, VdTÜV-MB 966-1 and VdTÜV-MB 966-2
9. AD 2000 instruction sheets, especially AD 2000 series W and AD 2000 A4
10. DIN, DIN EN and DIN EN ISO, especially DIN 3230-6, DIN EN 1092-1, DIN EN 10028-7, DIN EN 10213-2, DIN EN 1022-5, DIN EN 12874 or ISO 16852
11. Technical rules for flammable liquids, especially TRbF 20 and 50 (other sources of information)

### Use

The exterior temperature changes usual in Europe must be considered.

Conveyed media:	finished mineral oil products
Pressure step:	PN 16
Density of conveyed medium:	736 – 860 kg/m <sup>3</sup>
Kinematic viscosity of conveyed medium:	0.9 x 10 <sup>-6</sup> – 8.0 x 10 <sup>-6</sup> m <sup>2</sup> /s

### Material

Casing, dipping fluid tank and expansion space	:	P265GH (1.0619) or P235 GH (1.0305) acc. to DIN EN 10028-2	(old H II)
Detonation stop	:	GP240GH (1.0619) or P235 GH (1.0305) acc. to DIN EN 10213	(old GS-C 25)

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<h1>USAFE</h1>	REVISION 1	DATE: MAY 2015
	SHEET 2 OF 3	
<b>STANDARD SPECIFICATION</b>	<b>STS – M 112</b>	
DESCRIPTION	ID-CODE	
<b>SAFETY DEVICE AGAINST DETONATION, LIQUID TYPE</b>	<b>SDL</b>	

Immersion pipes : P235GH-TC1 (1.0345) acc. to DIN EN 10216-2 (old St 35.8 l)  
 Flanges : acc. to STS-M 17  
 Dry levelling security : Cr-Ni-steel, mat.no. 1.4410/1.4541/1.4571  
 acc. to DIN EN 10028-7 or DIN EN 10222-5

Design

Acc. to DIN EN 12874 or ISO 16852  
 Safety device against detonation, liquid type with wet, static flame trap in maintenance-free design, for outside installation, for the securing of filling and suction pipes. The installed immersion pipes upstream detonation stop, expansion space as well as dipping fluid tank and dry levelling security in flame arresting design.  
 Casing acc. to EC-type approval 2014/34/EC – explosion and detonation-pressure protected; safety-related design for flammable liquids of explosion class II A.

Flange connection: for PN 16 acc. to DIN EN 1092-1

Requirements and tests

- Acc. to DIN EN 12874 or ISO 16852.
- EC type test acc. annex III of directive 2014/34/EC
- on starting material acc. to AD 2000 A4 and therein mentioned instruction sheets of the series W
- type and connection dimensions

Evidence of quality features

- Acceptance test certificate acc. to DIN EN 10204/3.1 for above mentioned tests
- Certificate of type approval acc. to directive 2014/34/EC and the documents required therein.

Identification

- acc. to annex II no. 1.0.5. of directive 2014/34/EC
- CE conformity marking acc. to Art. 16 of directive 2014/34/EC
- additional identification acc. to DIN EN 12874 and/or ISO 16852

Legally required evidences

Acc. to General Product Safety Directive (GPSD) and associated rules (GPSR)  
 Especially:  
 EC declaration of conformity acc. to directive 2014/34/EC

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	SHEET 3 OF 3	
STANDARD SPECIFICATION	<h2>STS – M 112</h2>	
DESCRIPTION <b>SAFETY DEVICE AGAINST DETONATION, LIQUID TYPE</b>	ID-CODE <b>SDL</b>	

Periodic inspections by an authorized control office

Acc. to Product Safety Directive, facilities and facility parts in need of monitoring must be reviewed repeatedly in certain periods for their orderly conditions concerning the operation by an authorized control office. The operator has to find out the review periods of the complete facility and the facility parts on the base of a safety related evaluation. Therefore the manufacturer of the components must specify and determine the review periods for the individual components of the facilities in need of monitoring. As the operator wants the control office to authorize review periods as long as possible, the fittings and components described in this specifications must be designed and dimensioned in a way that they allow a review period of 3 years for electrical and 5 years for mechanical components.

The below manufacturer(s) is (are) known to manufacture products of the type specified in this specification section. Any other manufacturer(s) from a NATO member Nation Country may provide this product, provided they can prove to meet this specification.

Brand:

**Braunschweiger Flammenfilter GmbH**

Industriestr. 11  
D-38110 Braunschweig  
Tel.:+49 (0) 5307 / 809-0

Type: PROTEGO LDA-W

or equivalent

STS-M 0 shall be observed.

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<h1>USAFE</h1>	REVISION 1	DATE: MAY 2015
	SHEET 1 OF 2	
STANDARD SPECIFICATION	<h2>STS – M 113</h2>	
DESCRIPTION  <b>PRECISION PRESSURE GAUGE</b>	ID-CODE	

For measuring the gas and liquid pressures in pipelines and instruments. Fluctuation of pressure and vibrations must be expected.

Mineral oil products of liquids with hazard characteristics R10 (flammable) F (easily flammable) and F\* (highly flammable) with aromatic content of up to 50%.

For the installation in stations and manholes (in zone 1), the inside has to be assigned to zone 0).

The following rules have to be kept reliably:

1. Directive 2014/68/EU of the European parliament and of the council on the approximation of the laws of the Member States concerning pressure equipment
2. Directive 2006/42/EU of the European parliament and of the council on the approximation of the laws of the Member States of 17 May 2006 on machinery
3. Regulation (EU) No 305/2011 of the European Parliament and of the laying down harmonised conditions for the marketing of construction products
4. General Product Safety Directive (GPSD) and associated rules (GPSR)
5. Ordinance on Industrial Safety and Health
6. General Product Safety Directive (GPSD)
7. Technical rules for operation safety/hazardous substances, especially TRBS 3151 / TRGS 751
8. VdTÜV instruction sheets
9. AD 2000 instruction sheets
11. DIN, DIN EN and DIN EN ISO, especially DIN EN 837-3
12. Technical rules for flammable liquids, especially TRbF 50 (other sources of information)

### Use

The exterior temperature changes usual in Europe must be considered.

Medium: Mineral oil finished products  
Pressure step: PN 16  
Density of transport medium: 736 – 860 kg/m<sup>3</sup>  
Kinetic viscosity of transport medium: 0.9 x 10<sup>-6</sup> – 8.0 x 10<sup>-6</sup> m<sup>2</sup>/s

### Materials

Body: Cr-Ni-steel, material no. 1.4301, bare  
Measuring work: Cr-Ni-steel  
Measuring element: Cr-Ni-steel

### Design

- Pressure gauge with plate spring acc. to DIN EN 837-3, diameter of measuring flange 100 mm, with over.
- Load protection.
- Accuracy of indication acc. to quality class 1.6.
- Permanent load to full scale at smooth admission. Heavy-duty version.

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STANDARD SPECIFICATION	<h2>STS – M 113</h2>	
DESCRIPTION  <b>PRECISION PRESSURE GAUGE</b>	ID-CODE	

- Downward connection with thread for connection shank R ½“.
- Diameter of casing 160 mm.
- Watertight design.
- Aluminium face, white, scale and lettering black, without control marking.
- Pressure gauge with liquid filling (glycerol).

Range of indication

-10 mbar to + 30 mbar

Evidence of quality features

Acceptance certificate acc. to DIN EN 10204/2.2.

Identification

Acc. to annex I No. 3.3 of directive 2014/68/EU  
CE conformity marking acc. to Art. 19 of directive 2014/68/EU

Legally required evidences

Acc. to General Product Safety Directive (GPSD) and associated rules (GPSR),  
General Product Safety Directive (GPSD)  
especially:  
EG declaration of conformity acc. to annex IV of directive 2014/68/EU

Periodic inspections by an authorized control office

Acc. to Product Safety Directive, facilities and facility parts in need of monitoring must be reviewed repeatedly in certain periods for their orderly conditions concerning the operation by an authorized control office. The operator has to find out the review periods of the complete facility and the facility parts on the base of a safety related evaluation. Therefore the manufacturer of the components must specify and determine the review periods for the individual components of the facilities in need of monitoring As the operator wants the control office to authorize review periods as long as possible, the fittings and components described in this specifications must be designed and dimensioned in a way that they allow a review period of 3 years for electrical and 5 years for mechanical components.

STS-M 0 shall be observed.

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<h1>USAFE</h1>	REVISION 1	DATE: MAY 2015
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STANDARD SPECIFICATION	<h2>STS – M 115</h2>	
DESCRIPTION <b>SEALING OF PIPE PENETRATION</b>	ID-CODE	

Utilization as hydrostatic sealing of annular space between product pipe or protective pipe of double-walled pipelines and casing pipe for pipe penetrations through casing pipes.

The following rules have to be kept reliably:

1. Regulation (EU) No 305/2011 of the European Parliament and of the laying down harmonised conditions for the marketing of construction products
2. General Product Safety Directive (GPSD) and associated rules (GPSR)
3. Ordinance on Industrial Safety and Health
4. General Product Safety Directive (GPSD)

### Use

The exterior temperature changes usual in Europe must be considered.

Medium: Mineral oil finished products  
Density of transport medium: 736 – 860 kg/m<sup>3</sup>  
Kinetic viscosity of transport medium: 0.9 x 10<sup>-6</sup> – 8.0 x 10<sup>-6</sup> m<sup>2</sup>/s

Utilization as hydrostatic sealing of annular space between product pipe or protective pipe of double-walled pipelines and casing pipe for pipe penetrations through casing pipes.

### Materials and manufacturing

The seal consists of individual, linked rubber elements that are designed to fill the annular space between product pipe or protective pipe and casing pipe. The elements are connected by screws, thus forming a rubber chain around the product pipe or protective pipe with a pressure plate under each bolt head and each nut. By tightening the screws the rubber elements expand and form a water-, air- and gas-tight seal. Absolute tightness up to 1 bar must be guaranteed.

The sealing must be mounted in that way that it can be tightened at any time (inside of pipe).

The material of elements and pressure plates must be resistant to aromatics and fuel. The respective evidence has to be submitted prior to the installation. Screws, nuts and washers of stainless steel.

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<b>STANDARD SPECIFICATION</b>		<b>STS – M 115</b>
DESCRIPTION <b>SEALING OF PIPE PENETRATION</b>		ID-CODE

Dimensioning

Design	Product pipe or protective pipe (insulated)		Casing pipe	
	DN	Dimensions	DN	Dimensions
	300	323,9 x 5,6	400	406,4 x 6,3
	250	273,0 x 5,0	400	406,4 x 6,3
A	200	219,1 x 4,5	300	323,9 x 5,6
B	150	168,3 x 4,0	250	273,0 x 5,0
C	125	139,7 x 3,6	200	219,1 x 4,5
D	100	114,3 x 3,2	150	168,3 x 4,0
E	80	88,9 x 2,9	150	168,3 x 4,0
F	65	76,1 x 2,6	150	168,3 x 4,0
G	50	60,3 x 2,3	150	168,3 x 4,0
H	40	48,3 x 2,3	80	88,9 x 2,9
I	32	42,4 x 2,3	80	88,9 x 2,9
K	25	33,7 x 2,0	80	88,9 x 2,9

Evidence of quality features

Fuel resistance and tightness of annular space sealing has to be proved by a test certificate acc. to DIN EN 10204/2.2.

Legally required evidences

General Product Safety Directive (GPSD) and associated rules (GPSR), General Product Safety Directive (GPSD)

STS-M 0 shall be observed.

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<h1>USAFE</h1>	REVISION 1	DATE: MAY 2015
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STANDARD SPECIFICATION	<h2>STS – M 116</h2>	
DESCRIPTION <b>SEALING COLLAR</b>	ID-CODE	

Used as sealing of pipe penetrations through casing pipes.

The following rules have to be kept reliably:

1. Regulation (EU) No 305/2011 of the European Parliament and of the laying down harmonised conditions for the marketing of construction products
2. General Product Safety Directive (GPSD) and associated rules (GPSR)
3. Ordinance on Industrial Safety and Health
4. General Product Safety Directive (GPSD)

Use

The exterior temperature changes usual in Europe must be considered.

Medium: Mineral oil finished products  
Density of transport medium: 736 – 860 kg/m<sup>3</sup>  
Kinetic viscosity of transport medium: 0.9 x 10<sup>-6</sup> – 8.0 x 10<sup>-6</sup> m<sup>2</sup>/s

Used as sealing of pipe penetrations through casing pipes.

Materials and manufacturing

Sealing collar of special rubber, heavy-duty version, for concentric installations of pipelines in casing pipes. The collar must be dimensioned for the outside diameter of product pipes or protective pipes incl. the plastic insulation. The collar will be mounted water-tight on both pipes with band clamps and patent locks of stainless steel.

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<h1>USAFE</h1>	REVISION 1	DATE: MAY 2015
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STANDARD SPECIFICATION		<h2>STS – M 116</h2>
DESCRIPTION <b>SEALING COLLAR</b>		ID-CODE

Dimensions

Design	Product pipe or protective pipe (insulated)		Casing pipe	
	DN	Dimensions	DN	Dimensions
	300	323,9 x 5,6	400	406,4 x 6,3
	250	273,0 x 5,0	400	406,4 x 6,3
A	200	219,1 x 4,5	300	323,9 x 5,6
B	150	168,3 x 4,0	250	273,0 x 5,0
C	125	139,7 x 3,6	200	219,1 x 4,5
D	100	114,3 x 3,2	150	168,3 x 4,0
E	80	88,9 x 2,9	150	168,3 x 4,0
F	65	76,1 x 2,6	150	168,3 x 4,0
G	50	60,3 x 2,3	150	168,3 x 4,0
H	40	48,3 x 2,3	80	88,9 x 2,9
I	32	42,4 x 2,3	80	88,9 x 2,9
K	25	33,7 x 2,0	80	88,9 x 2,9

Legally required evidences

Acc. to General Product Safety Directive (GPSD) and associated rules (GPSR), General Product Safety Directive (GPSD)

STS-M 0 shall be observed.

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	SHEET 1 OF 3	
<h2>STANDARD SPECIFICATION</h2>	<h1>STS – M 119</h1>	
DESCRIPTION <b>FLOW METER (stainless steel)</b>	ID-CODE <b>FQ</b>	

For installation into hydrant and refueling pits for flow metering of mineral oil products with hazard characteristics R10 (flammable) F (easily flammable) and F\* (highly flammable) with aromatic content of up to 50%. For the installation in zone 1, the inside has to be assigned to zone 0).

The following rules have to be kept reliably:

1. Directive 2014/68/EU of the European parliament and of the council on the approximation of the laws of the Member States concerning pressure equipment
2. Directive 2014/34/EU of the European parliament and of the council on the approximation of the laws of the Member States concerning equipment and protective systems intended for use in potentially explosive atmospheres (ATEX)
3. Directive 2006/42/EU of the European parliament and of the council on the approximation of the laws of the Member States of 17 May 2006 on machinery
4. Regulation (EU) No 305/2011 of the European Parliament and of the laying down harmonised conditions for the marketing of construction products
5. General Product Safety Directive (GPSD) and associated rules (GPSR)
6. Ordinance on Industrial Safety and Health
7. General Product Safety Directive (GPSD)
8. Technical rules for operation safety/hazardous substances, especially TRBS 3151 / TRGS 751
9. VdTÜV instruction sheets, especially VdTÜV-MB 967, VdTÜV-MB 966-1 and VdTÜV-MB 966-2
10. AD 2000 instruction sheets, especially AD 2000 series W2
11. DIN, DIN EN and DIN EN ISO, especially DIN 3230-6, DIN EN 1092-1, DIN EN 10222-5, DIN EN 10028-7
12. Technical rules for flammable liquids, especially TRbF 50 (other sources of information)

### Use

The exterior temperature changes usual in Europe must be considered.

Medium:	Mineral oil finished products with solid particles up to 800 µm
Pressure step:	PN 16
Density of transport medium:	736 – 860 kg/m <sup>3</sup>
Kinetic viscosity of transport medium:	0.9 x 10 <sup>-6</sup> – 8.0 x 10 <sup>-6</sup> m <sup>2</sup> /s

### Material

Body, cover and flanges	:	Cr-Ni-steel, mat. no. 1.4571 acc. to DIN EN 10222-5 or DIN EN 10028-7
Interior parts	:	Stainless steel or cast aluminium (no nonferrous metal, no cast iron)
Screws and nuts	:	acc. to AD 2000 W2

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STANDARD SPECIFICATION	<h2>STS – M 119</h2>	
DESCRIPTION <b>FLOW METER (stainless steel)</b>	ID-CODE <b>FQ</b>	

Design

Globe pattern flow meter for installation into horizontal piping with flanged connection.  
Short-term increase of maximum permanent capacity by 20% must be taken for granted.  
Extension of register, length (distance between pipe axle to top edge of register) acc. to drawing.  
Adapter to allow for reading of roller register from 45° upward.

Roller register for forward operation only, with reverse operation the register must not run back.

- Indication with 8-digit, non-reset totalizer (for continuous metering) as 5-digit manually resettable roller register, smallest reading = 10 ltr. (for partial metering)

Flanges : acc. to DIN EN 1092-1 with sealing surface shape B1 or acc. to specifications  
Flow rate : acc. information of the contracting agency  
Metering accuracy : better than 0,2 % of instantaneous value in metering 1 : 10

Requirements and tests

- Calibration of meter on an approved test stand
- Material tests acc. to AD 2000 W2 and associated DIN EN material standards
- Function test
- EG-type test acc. to annex III of directive 2014/34/EU

Evidence of quality features

- Type test certificate acc. to directive 2014/34/EU and therein requested documents.
- Acceptance test certificate acc. to DIN EN 10204 – 3.1 for above mentioned tests
- Calibration diagram, confirmed by approved authority

Identification

Acc. to annex II No. 1.0.5. of directive 2014/34/EU and par. 17 of directive 2004/22/EU  
additional identification acc. to DIN 3230-6, par. 4  
CE conformity marking acc. to Art. 16 of directive 2014/34/EU and par. 7 of directive 2004/22/EU

Legally required evidences

Acc. to General Product Safety Directive (GPSD) and associated rules (GPSR), Construction Products Law especially  
EG declaration of conformity acc. to directive 2014/34/EU and annexes directive 2004/22/EU

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STANDARD SPECIFICATION	<h2>STS – M 119</h2>	
DESCRIPTION <b>FLOW METER (stainless steel)</b>	ID-CODE <b>FQ</b>	

Periodic inspections by an authorized control office

Acc. to Product Safety Directive, facilities and facility parts in need of monitoring must be reviewed repeatedly in certain periods for their orderly conditions concerning the operation by an authorized control office. The operator has to find out the review periods of the complete facility and the facility parts on the base of a safety related evaluation. Therefore the manufacturer of the components must specify and determine the review periods for the individual components of the facilities in need of monitoring. As the operator wants the control office to authorize review periods as long as possible, the fittings and components described in this specifications must be designed and dimensioned in a way that they allow a review period of 3 years for electrical and 5 years for mechanical components.

The below manufacturer(s) is (are) known to manufacture products of the type specified in this specification section. Any other manufacturer(s) from a NATO member Nation Country may provide this product, provided they can prove to meet this specification.

Brand : Fa. Smith Meter  
Type : SF-4-NF/SS

or equivalent

STS-M 0 shall be observed.

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	SHEET 1 OF 3	
STANDARD SPECIFICATION	<h2>STS – M 122</h2>	
DESCRIPTION <b>TANK TRUCK LOADING VALVE</b>	ID-CODE <b>TLV</b>	

Control valve installed in the discharge line in the tank truck loading pit to control outlet pressure during the truck loading (bottom loading type).

The specifications STS-M 0 and STS-M 1 are part of this specification.

### Features

a) Outlet pressure control:

Constant pressure control at the single point coupling at any flow rate from 190 l/min (50 gpm) up to the valve's nominal rate, with a control accuracy of  $\pm 0,21$  bar (3,0 psi), independent of the valve's inlet pressure.

Setting range: from 1.1 bar to 5.3 bar (15 psi – 75 psi).

b) Quick closing feature:

Valve shall close immediately when outlet pressure exceeds the adjusted value. The outlet pressure at the max. flow rate and at a closing time of the tank truck's tank valve of 0.5 sec shall remain below 8.4 bar (120 psi). The valve must not reopen before the pressure has dropped below the adjusted outlet pressure valve.

The evidence of this feature (outlet pressure below 8.4 bar) must be provided on request of the contracting agency (AG) on a test stand selected by the contractor (AN), the costs have to be included in the unit price.

c) Hydraulic dead man switch:

Actuation of valve by dead man switch via the system pressure. The main valve shall open when the dead man switch is actuated and shall close within 3 sec, when the dead man switch is released. When the hose coupling or the hose between the dead man switch and the valve control system breaks, no fuel may leak out. If one connection of the dead man switch is detached, the valve must close within 3 sec.

d) Open speed controll:

Valve must open with a time delay. The opening time shall be adjustable between 2 and 30 sec, without impairing the quickclosing feature.

e) Thermal pressure release:

When the outlet pressure exceeds the inlet pressure, the valve must open for pressure compensation and backflow.

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STANDARD SPECIFICATION	<h2>STS – M 122</h2>	
DESCRIPTION <b>TANK TRUCK LOADING VALVE</b>	ID-CODE <b>TLV</b>	

Design

Material of basic body : Stainless steel cast of ductile cast with nickel coating acc. to STS-M 1, par. 3.11.2.2 or 3.11.2.3

Nominal width of valve : See drawing

Construction length and connection flanges : See STS-M 1

Tests and evidences of quality features and further requirements : See STS-M 1

Control and pilot valves:

DESCRIPTION	CONNECTION SIZE *f. DN 100	SEE STS-M 1
Non-return check valve	3/8" NPT	Nr. 4.2
Shut-off check valve	3/8" NPT	Nr. 4.3
Pressure reducing control valve	3/8" NPT	Nr. 4.7
Pressure relief control valve	3/4" NPT	Nr. 4.9
Differential pressure control valve	3/8" NPT	Nr. 4.13
Three-way check valve	3/8" NPT	Nr. 4.18
Dead man switch check valve		Nr. 4.23
Strainer	3/4" NPT	Nr. 5.1
Valve position indicator	3/4" NPT	Nr. 5.3
Orifice flange with plate	DN 100	Nr. 5.5
Ejector	3/8" NPT	Nr. 5.6
Throttle unit	3/8" NPT	Nr. 5.7

\* The above mentioned connection sizes and threads are recommendations. Any quickly releasable and replaceable cutting ring union is admitted.

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<b>USAFE</b>	REVISION 1	DATE: MAY 2015
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STANDARD SPECIFICATION	<b>STS – M 122</b>	
DESCRIPTION <b>TANK TRUCK LOADING VALVE</b>	ID-CODE <b>TLV</b>	

The pressure drop caused by the tank truck loading valve (DN 100), when valve fully open (with all internals and attached parts such as orifice plate and pilot valve) and at a flow rate of 2000 l/min must not exceed 1.2 bar maximum.

The evidence of the max. pressure drop has to be submitted on request of the contracting agency, on a test stand acc. to choice of the contractor (AN), the costs have to be included in the unit price.

The below manufacturer(s) is (are) known to manufacture products of the type specified in this specification section. Any other manufacturer(s) from a NATO member Nation Country may provide this product, provided they can prove to meet this specification.

Brand: Fa. CLA-VAL-CO

Type: 49-67AS

or equivalent

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<b>STANDARD SPECIFICATION</b>	<b>STS – M 124</b>	
DESCRIPTION <b>PIPE FASTENERS AND PIPE SUPPORTS INSIDE OF STRUCTURES</b>	ID-CODE	

Suitable for installation in stations, pump stations and shafts for pipelines conveying flammable liquids with the hazard characteristics R 10 (flammable), F (easily flammable) and F+ (highly flammable) and an aromatic content of up to 50 %.

The following regulations are imperative and must be complied with:

1. Regulation (EU) No. 305/2011 of the European Parliament and of the Council on laying down harmonized conditions for the marketing of construction products
2. General Product Safety Directive (GPSD) and associated regulations (GPSR)
3. German Ordinance on Industrial Safety and Health (BetrSichV)
4. Construction Products Act (BauPG)
5. DIN standards, especially DIN 3567, DIN 3570
6. Technical Rules for Operational Safety / Hazardous Goods
7. VdTÜV Codes of Practice
8. Technical Rules for the Handling of Flammable Liquids, especially TRbF 50 (other source of information)

### Use

The exterior temperature variations typical in Europe must be considered.

Conveyed media:	finished mineral oil products
Density of the conveyed medium:	736 to 860 kg/m <sup>3</sup>
Kinematic viscosity of the conveyed medium:	0.9 x 10 <sup>-6</sup> to 8.0 x 10 <sup>-6</sup> m <sup>2</sup> /s

### Design

Supports for pipelines and fittings consisting of a base plate, a steel tube and a bearing plate for fittings or a half pipe for pipelines or pipe fasteners as per DIN 3567, DIN 3570. The supports shall be erected in such a manner that no abrasion or corrosion will affect the pipelines.

The base plate, the steel tube and the supporting elements shall be welded together. The height of the supports shall be taken from the working drawings.

The supports of pipes and fittings shall be protected with fuel-resistant insulating base layers of a thickness  $\geq$  10 mm. The insulating base layers shall project over the supporting surfaces by 10 mm and more.

Pipe fasteners and supports as well as small iron parts, anchor bolts, threaded or cotter pins etc. shall be of robust design. Standard DIN sections shall be used. Dynamic action shall be taken into account.

The pipe supports, pipe fasteners and pipe sleeves as well as supporting structures projecting from concrete surfaces and walls shall be protected against corrosion.

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STANDARD SPECIFICATION	<h2>STS – M 124</h2>	
DESCRIPTION <b>PIPE FASTENERS AND PIPE SUPPORTS INSIDE OF STRUCTURES</b>	ID-CODE	

The number and types of pipe fasteners and pipe supports shall be coordinated with the site supervision and shall ensure that instruments and fittings can be replaced without and impediments.

### Installation principles

If not specified otherwise in the drawings or the design specifications, the Contractor shall determine the number of supports and pipe fasteners to be installed in line with the masses of overground installed system components and in accordance with the following requirements:

Pipelines must be laid in such a manner that they remain invariably in their position. The typical expansion behavior of the pipes shall be taken into account.

This condition is considered to be satisfied when

1. thermal expansion is considered for the laying of the pipelines and the pipe routes provide sufficiently for the expansion to be expected.
2. overground pipelines are supported by a sufficient number of supports, so that sagging is avoided and their fastening prevents any dangerous changes in position.

The Contractor shall submit structural verifications of the supports with consideration of economic efficiency.

Supporting structures on foundation slabs shall be designed and executed in such a manner that the load applied by each individual support on the foundation slab does not exceed the assumed live loads.

The fastening of the supporting structure to the concrete foundation slabs after the application of a fuel-resistant coating shall be imperatively coordinated with an expert authorized by the highest water resources authority.

### Evidences

- Evidence of the load-bearing capacity of the supports to be submitted by the Contractor
- Evidence of the fuel resistance of the insulating material
- Evidence of the quality features of the material provided by a shop test certificate as per DIN EN 10204 - 2.2.

### Legally required evidence

General Product Safety Directive (GPSD) and associated regulations (GPSR), Construction Product Act,

STS-M-0 ist zu beachten.

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STANDARD SPECIFICATION	<h2>STS – M 125</h2>	
DESCRIPTION <b>COUPLING CONNECTION</b>	ID-CODE <b>C</b>	

Suitable for fitting to pipe ends of horizontal and vertical pipelines conveying finished mineral oil products of the hazard characteristics R 10 (flammable), F (easily flammable) and F+ (highly flammable) with an aromatic content of up to 50 %.

Suitable for installation in stations and pits (in zone 1, the inside of the connection is to be assigned to zone 0).

The following regulations are imperative and must be complied with:

1. Regulation (EU) No. 305/2011 of the European Parliament and of the Council on laying down harmonized conditions for the marketing of construction products
2. General Product Safety Directive (GPSD) and associated regulations (GPSR)
3. German Ordinance on Industrial Safety and Health (BetrSichV)
4. Construction Products Regulation (CPR)
5. Technical Rules on the Operational Safety/Hazardous Materials, especially TRBS 3151 / TRGS 751
6. VdTÜV Codes of Practice, especially VdTÜV-MB 967, VdTÜV-MB 966-1 and VdTÜV-MB 966-2
7. AD 2000 Codes of Practice, especially AD 2000 series W2 and W9
8. DIN, DIN EN and DIN EN ISO standards, especially DIN EN 10226-1, DIN EN 14420-6
9. Technical Rules for the Handling of Flammable Liquids, especially TRbF 50 (other source of information)

### Use

The exterior temperature variations typical in Europe must be considered.

Conveyed media:	Finished mineral oil products with 800 µm
Pressure level:	PN 16
Density of the conveyed medium:	736 to 860 kg/m <sup>3</sup>
Kinematic viscosity of the conveyed medium:	0.9 x 10 <sup>-6</sup> to 8.0 x 10 <sup>-6</sup> m <sup>2</sup> /s

Installation: horizontal and vertical, fitted to pipe ends

### Materials and design

The coupling connection shall comprise the following components:  
V-flange, connecting pipe and tank truck coupling.

1. Welding neck flange of stainless steel DN 80, PN 16, as per STS-M 23
2. Pipe made of stainless steel, material no. 1.4571 (w/o insulation) as per STS-M 19, DN 80, approx. 150 mm long, with thread on one end, thread as per DIN EN 10226-1, R 3", approx. 50 mm long
3. Tank truck coupling DN 80, type VK, as per DIN EN 14420-6, made of stainless steel, material no. 1.4410, incl. blind cap, type MB, made of stainless steel mat. no. 1.4410 with chain.

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STANDARD SPECIFICATION	<b>STS – M 125</b>	
DESCRIPTION <b>COUPLING CONNECTION</b>	ID-CODE <b>C</b>	

The coupling connection shall be delivered in completely assembled condition.

Evidence of quality features

Factory certificate as per DIN EN 10204 - 2.1

Legally required evidence

General Product Safety Directive (GPSD) and associated regulations (GPSR), Construction Product Act, especially:  
Serviceability and Compatibility Certificates by the supervisory authority.

STS-M 0 must be adhered to.

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<b>STANDARD SPECIFICATION</b>	<b>STS – M 126</b>	
DESCRIPTION <b>FILTER/WATER SEPARATOR (horizontal)</b>	ID-CODE <b>FSR</b>	

The filter/water separator is used for the separation of solid components and water of mineral oil finished products with hazard characteristics R10 (flammable) F (easily flammable) and F\* (highly flammable) with aromatic content of up to 50%.

For the installation in stations and shafts (in zone 1, the interior of FSR is included in zone 0).

The following rules have to be kept reliably:

1. Directive 2014/68/EU of the European parliament and of the council on the approximation of the laws of the Member States concerning pressure equipment
2. Directive 2006/42/EU of the European parliament and of the council on the approximation of the laws of the Member States of 17 May 2006 on machinery
3. Regulation (EU) No 305/2011 of the European Parliament and of the laying down harmonised conditions for the marketing of construction products
4. General Product Safety Directive (GPSD) and associated rules (GPSR)
6. Technical delivery conditions of the Bundesamt für Ausrüstung, Informationstechnik und Nutzung der Bundeswehr (BAAINBw), especially TL 4330-0001 Part 2
7. Technical rules for operation safety/hazardous substances, especially TRBS 3151 / TRGS 751
8. VdTÜV instruction sheets, especially VdTÜV-MB 967, VdTÜV-MB 966-1 and VdTÜV-MB 966-2
9. VdTÜV instruction sheets, especially VdTÜV-MB 967, VdTÜV-MB 966-1 and VdTÜV-MB 966-2
10. DIN, DIN EN and DIN EN ISO
11. Technical rules for flammable liquids, especially TRbF 20 and 50 (other sources of information)

### Use

The exterior temperature changes usual in Europe must be considered.

Medium:	Mineral oil finished products with solid particles up to 800 µm
Pressure step:	PN 16
Density of transport medium:	736 – 860 kg/m <sup>3</sup>
Kinetic viscosity	0.9 x 10 <sup>-6</sup> to 8.0 x 10 <sup>-6</sup> m <sup>2</sup> /s

### Materials and accessories

Casing:

Jacket, bottoms and flanged ring	: P265GH (1.0425) acc. to DIN EN 10028-2 (old H II)
Intermediate plates	: P265GH (1.0425) acc. to DIN EN 10028-2 (old H II)
Inlet and outlet connections	: P235GH-TC1 (1.0345) acc. to DIN EN 10216-2 (old St 35.8 I)
Threaded sleeves	: Cr-Ni-steel, mat.no 4541
Flanges	: P250GH (1.0460) acc. to DIN EN 10222-2 (old C 22.8)

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<b>STANDARD SPECIFICATION</b>	<b>STS – M 126</b>	
DESCRIPTION <b>FILTER/WATER SEPARATOR (horizontal)</b>	ID-CODE <b>FSR</b>	

Automatic vent:

Jacket	: P235GH-TC1 (1.0345) acc. to DIN EN 10216-2 (alt St 35.8 I)
Flanged ring	: P265GH (1.0425) acc. to DIN EN 10028-2 (alt H II)
Cover	: P265GH (1.0425) acc. to DIN EN 10028-2 (alt H II)
Connecting elements	: Cr-Ni-steel, mat.no. 1.4541
Automatic valve unit	: Cr-Ni-steel, mat.no. 1.4541

Water collecting reservoir:

Jacket	: P235GH-TC1 (1.0345) acc. to DIN EN 10216-2 (alt St 35.8 I)
Bottom	: P265GH (1.0425) acc. to DIN EN 10028-2 (alt H II)
Connections	: P235GH-TC1 (1.0345) acc. to DIN EN 10216-2 (alt St 35.8 I)
Flanges	: P250GH (1.0460) acc. to DIN EN 10222-2 (alt C 22.8)
Threaded sleeves	: Cr-Ni-steel, mat.no. 1.4541

Mounting for 1<sup>st</sup> stage element:

Center spindle with automatic centering For separating elements, nuts and washers	: Cr-Ni-steel, mat.no. 1.4301 acc. to DIN EN 10222-5
Sealing plate and pressure plate	: Cast aluminium EN AC-Al Si12(a) (EN AC-4200) acc. to DIN EN 1706 (old G-AISi12)

Mounting for 2<sup>st</sup> stage element:

Tension unit	: Cr-Ni-steel, mat.no. 1.4301 acc. to DIN EN 10222-5
Guide rails	: Cr-Ni-steel, mat.no. 1.4301 acc. to DIN EN 10222-5

Material of elements:

Separating elements:	: With metal parts of steel acc. to regulations of the quality test service of BW and TL 4330-001, lacqered, and gaskets of Perbunan.
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Permanent separating element

: acc. to regulations of the quality test service of BW of aluminium EN AW-ALMg4,5Mn0,7 (EN AW-5083) (old AIMg 4,5 Mn) and EN AC-Al Si10Mg(a) (EN AC-43000) (old G-AISi10Mg), teflon coated fabric and spindle of Cr-Ni-steel, mat.no.1.4541 acc. to DIN EN 10222-5

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<h2>STANDARD SPECIFICATION</h2>	<h1>STS – M 126</h1>	
DESCRIPTION <b>FILTER/WATER SEPARATOR (horizontal)</b>	ID-CODE <b>FSR</b>	

Size of separating element : 152 mm ä. Ø x 50 mm i. Ø x 842 mm log

Gaskets:

All gaskets : Viton  
(except those of 1st stage elements)

Surface protection (epoxy coated):

Inside : Acc. to US-MIL-C 4556 D; inside radii, edges, welding seams etc. shall be rounded off to r = 3 mm

Outside : Acc. to STS-M 66

Accessories:

1. Rack

Design of rack acc. to attached drawing.

The rack is made of sectional steel braced with gusset plates.

Material : St acc. to DIN EN 10056-1

2. Pressure relief valve (DN 25, PN 16) acc. to STS-M 52

Response pressure : 14 bar

Connection elements : steel

3. Water level indicator (R ½", PN 16)

Installed on the water collecting reservoir to check the level of interface by float ball, incl. shutoff fittings.

Housing with shut-off fittings : Cr-Ni-steel, mat.no. 1.4171

Sight glass : safety glass

4. Differential pressure gauge (PN 16)

Gauging: - 1st stage  
- 2nd stage  
- 1st + 2nd stage

The piston-type differential pressure gauge is attached to the FSR.

Tubing made of Cr-Ni-steel, mat.no. 1.4541 and shutoff valves of Cr-Ni-steel, mat.no. 1.4571 (R ¼").

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DESCRIPTION <b>FILTER/WATER SEPARATOR (horizontal)</b>	ID-CODE <b>FSR</b>	

Connection for differential pressure gauge of 1st stage including T-fitting and additional shut-off valve, for control of filter/separator valve.

5. Shut-off valves (DN 25, PN 16)

4 ea ball valves acc. to STS-M 46, for manual and automatic water discharge and refilling after draining of FSR.  
Connection elements : steel

6. Dirt trap (DN 25, PN 16)

Design acc. to STS-M 53, mesh width 0.1 mm  
Connection elements : steel

7. Automatic vent valve:

Heavy-duty vent valve, minimum valve port 18 mm diameter, in double stage design for initial venting, with support and float ball of Cr-Ni-steel, mat.no. 1.4541, sealing by Viton gaskets.

8. Automatic water discharge:

The furnished parts of STS-M 166, e.g.  
- Float controlled valve with hand tester and  
- Water drain valve 3/4"

shall be installed incl. corresponding control piping of Cr-Ni-steel, mat.no.1.4541.

Connection elements  
For control valve : Cr-Ni-steel, mat.no.1.4541

Design

The device is composed of tank, rack, mechanical accessories and filter elements.

Tank design:

Horizontal, cylindrical casing to house the filtering elements, including water collecting reservoir with water level indicator welded on the bottom side of the casing. Brackets are welded horizontally to both sides of casing to fasten the casing on a rack. One side of the casing is welded on a dished end. On the opposite there is a hinged cover swivelling and screwable on the flanged ring of casing to clean and remove the filtering elements.

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DESCRIPTION <b>FILTER/WATER SEPARATOR (horizontal)</b>	ID-CODE <b>FSR</b>	

Pipe connections are welded to the casing for:

Inlet	:	DN (acc. to specs.)
Outlet	:	DN (acc. to specs.)
Ventilation	:	DN 25, PN 16
Differential pressure gauge	:	G ¼" (4 ea)
Residual draining/Casing – dirt side	:	G ¾"
Rapid draining	:	DN 50, PN 16
Discharge water collecting reservoir (manual + automatic)	:	DN 25, PN 16
Filling (slow filling)	:	DN 25, PN 16
Float control	:	Ø 140 mm
Water level indicator	:	G ½"
Pressure relief valve	:	DN 25, PN 16

### Functioning

The work of the filter/water separator is based on a 2-step separation.

Separating element = 1st stage used for micro-filtration (approx. 1 micron) and for coagulation of free water drops.

Permanent separating element = 2nd stage used for residual separation of free water drops.

Operating pressure	:	16,0 bar
Test pressure	:	22,8 bar
Flow rate	:	acc. to specs.

### Requirements and tests

The filter/water separator must meet the requirements for the separation of solid matters and water acc. to test requirements of MIL-F-8901 A in conjunction with the technical terms of delivery TL 4330-0001 Part 2 of the Bundesamtes für Ausrüstung, Informationstechnik und Nutzung der Bundeswehr (BAAINBw), if anti-icing-, anti-static- and rust-inhibiting agents have to be added to the fuel.

The average residual content of solid impurities must not exceed 0,5 mg/l, the residual content of water shall be zero (not considering dissolved water), the separating elements must resist to the specific bursting pressure of 75 psi (5.2 bar).

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DESCRIPTION <b>FILTER/WATER SEPARATOR (horizontal)</b>	ID-CODE <b>FSR</b>	

Tank test:

Material test acc. to AD 2000 series W and appropriate material standard

Construction test and first pressure test by the approved authority.

Pressure test in accordance with AD 2000 HP30

Test of 1st and 2nd stage separating elements

Acc. to TL 4330-0001 Part

Test of valves : acc. to specs STS-M

Evidence of quality

Test certificate about construction and first pressure test with acceptance certificate DIN EN 10204 – 3.1.

Pressure tank test book

Identification

Pressure tank:

Acc. to annex I No. 3.3 of guideline 2014/68/EU

CE-identification of conformity acc. to Art. 19 of guideline 2014/68/EU

Additional identification:

- Number of 1st and 2nd stage elements with model designation
- Capacity ... l/min.

Legally required evidences

Acc. to General Product Safety Directive (GPSD) and associated rules (GPSR)

Especially:

EG declaration of conformity acc. annex IV of directive 2014/68/EU

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DESCRIPTION <b>FILTER/WATER SEPARATOR (horizontal)</b>	ID-CODE <b>FSR</b>	

Repeated tests by approved supervision authority

Acc. to Product Safety Directive, facilities and facility parts in need of monitoring must be reviewed repeatedly in certain periods for their orderly conditions concerning the operation by an approved supervision authority. The operator has to find out the review periods of the complete facility and the facility parts on the base of a safety related evaluation. Therefore the manufacturer of the components must determine the review periods for individual components of the facilities in need of monitoring. As the operator wants the control office to authorize review periods as long as possible, the fittings and components described in this specifications must be designed and dimensioned in a way that they allow a review period of 3 years for electrical and 5 years for mechanical components.

The below manufacturer(s) is (are) known to manufacture products of the type specified in this specification section. Any other manufacturer(s) from a NATO member Nation Country may provide this product, provided they can prove to meet this specification.

Brand:  
Faudi Aviation GmbH, Scharnhorststrasse 7 b, 35260 Stadtallendorf, Germany  
Type: FWE

or equivalent

STS-M 0 shall be observed.

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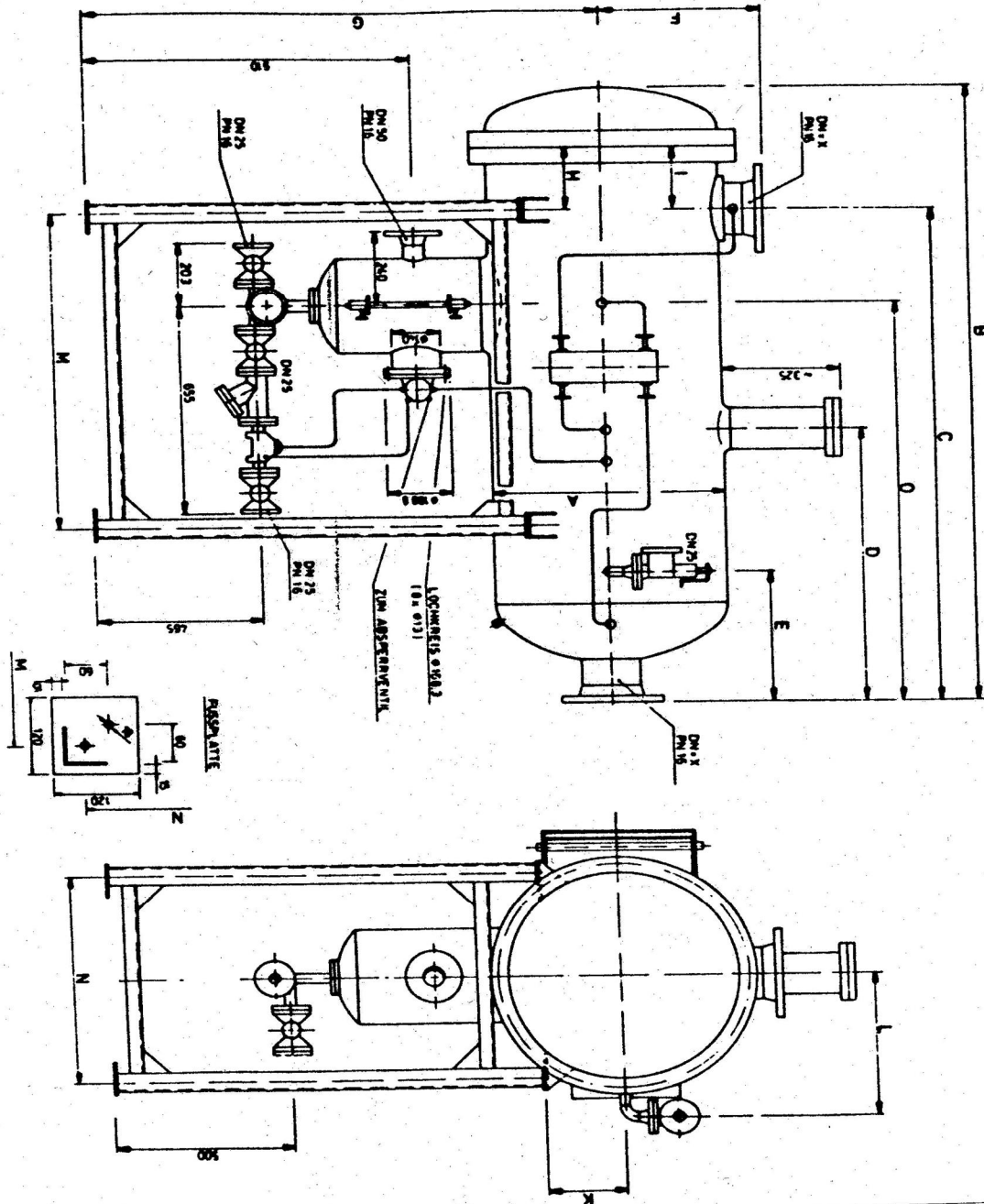
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DESCRIPTION <b>FILTER/WATER SEPARATOR (horizontal)</b>	ID-CODE <b>FSR</b>	

Leistung l/min

	4000	2000	1000	500
X	DN 200	DN 150	DN 100	DN 80
A Ø	850	650	450	450
B	2370	1955	1815	1760
C	1735	1565	1525	1485
D	965	865	860	820
E	500	415	360	350
F	600	450	340	330
G	1560	1450	1350	1325
H	300	200	175	160
I	280	200	160	160
K	300	225	145	120
L	550	450	350	325
M	1070	1000	1000	1000
N	860	650	400	400
O	1365	1265	1235	1195

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STANDARD SPECIFICATION	<h2>STS – M 126</h2>	
DESCRIPTION <b>FILTER/WATER SEPARATOR (horizontal)</b>	ID-CODE <b>FSR</b>	



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<h2>STANDARD SPECIFICATION</h2>	<h1>STS – M 129</h1>	
DESCRIPTION <b>VOLUMETER (Aluminum)</b>	ID-CODE <b>FQ</b>	

For installation into hydrant and refueling pits for flow metering of mineral oil products with hazard characteristics R10 (flammable) F (easily flammable) and F\* (highly flammable) with aromatic content of up to 50%. For the installation in zone 1, the inside has to be assigned to zone 0).

The following regulations are imperative and must be complied with:

1. Directive 2004/23/EC of the European Parliament and of the Council on the approximation of the laws of the Member States concerning pressure equipment
2. Directive 2014/68/EC of the European Parliament and of the Council on the approximation of the laws of the Member States concerning pressure equipment
3. Directive 2014/34/EC of the European Parliament and of the Council on the approximation of the laws of the Member States concerning the appropriate use of equipment in explosion hazard areas (ATEX)
4. Directive 2006/42/EC of the European Parliament and of the Council on the approximation of the laws of the Member States of 17 May 2006 concerning machinery
5. Regulation (EU) No. 305/2011 of the European Parliament and of the Council on laying down harmonized conditions for the marketing of construction products
6. General Product Safety Directive (GPSD) and associated regulations (GPSR)
7. German Ordinance on Industrial Safety and Health (BetrSichV)
8. Construction Products Regulation (CPR)
9. Technical Rules on the Operational Safety/Hazardous Materials, especially TRBS 3151 / TRGS 751
10. VdTÜV Codes of Practice, especially VdTÜV-MB 967, VdTÜV-MB 966-1 and VdTÜV-MB 966-2
11. AD 2000 Codes of Practice, especially AD 2000 W
12. DIN, DIN EN and DIN EN ISO, especially DIN 3230-6, DIN EN 1092-1, DIN EN 1706
13. Technical Rules for the Handling of Flammable Liquids, especially TRbF 50 (other source of information)

Use

The exterior temperature variations typical in Europe must be considered.

Conveyed media: finished mineral oil products  
 Pressure level: PN 16  
 Density of the conveyed medium: 736 to 860 kg/m<sup>3</sup>  
 Kinematic viscosity of the conveyed medium: 0.9 x 10<sup>-6</sup> to 8.0 x 10<sup>-6</sup> m<sup>2</sup>/s

Material

Housing : Cast aluminum as per DIN EN 1706.  
 Internal parts : stainless steel or aluminum cast (free of nonferrous metal and gray cast)  
 Bolts and nuts : as per AD 2000 W2

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STANDARD SPECIFICATION	<h2>STS – M 129</h2>	
DESCRIPTION <b>VOLUMETER (Aluminum)</b>	ID-CODE <b>FQ</b>	

Design

Volumeter in straight-flow design, suitable for installation in horizontal pipelines, with flange connection.

A short-term increase of the flow by 15 % of the maximum flow shall be provided for.

Counter extension, length (distance of pipe center line to top edge of counter), in accordance with the drawing.

Adapter to allow reading of the roller counter at an angle of 45° upwards.

The roller counter shall only count up, even in reverse-flow mode, it shall not count down.

- Display with 8-digit totalizing counter, not resettable (for continuous up-count) as well as 5-digit, manually resettable roller counter, lowest reading = 10 liters (for partial count).

Flanges : as per DIN EN 1092-1 with sealing surface, shape A or information of the contracting agency

Flow rate : acc. Information of the contracting agency

Operating pressure : 16 bar (PN 16)

Measuring accuracy : higher than 0.2 % of the momentary value

Requirements and testing

- Calibration of the counter on a test stand authorized by the specified inspection body.
- Material testing as per AD 2000 series W and the associated DIN EN material standards.
- Functional testing
- EC homologation in accordance with Annex III of the Directive 2014/34/EC

Evidence of quality features

- Acceptance certificate as per DIN EN 10204 - 3.1 for the above-mentioned tests.
- Calibration curve confirmed by the authorized inspection body.

Identification/labeling

In accordance with Annex II no. 1.0.5. of the Directive 2014/34/EC and Article 17 of the Directive 2004/22/EC  
 Additional identification as per DIN 3230-6, item 4  
 CE Conformity Sign as per Art. 5 Para. 1 and 2 of the Directive 2014/34/EC and Art. 7 of the Directive 2004/22/EC

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STANDARD SPECIFICATION	<h2>STS – M 129</h2>	
DESCRIPTION <b>VOLUMETER (Aluminum)</b>	ID-CODE <b>FQ</b>	

Legally required evidence

General Product Safety Directive (GPSD) and associated regulations (GPSR), Construction Product Act, especially:  
CE Declaration of Conformity as per Directive 2014/34/EC and the annexes to the Directive 2004/22/EC.

Periodic inspection by an authorized inspection body

In accordance with the German Ordinance on Industrial Safety and Health (BetrSichV), the operational condition of systems requiring monitoring and their pertaining components must be inspected at regular intervals by an authorized inspection body. The operator of the entire system and its components must prepare the inspection lists on the basis of a technical safety assessment. A prerequisite to this task is that the manufacturer determines and specifies the inspection intervals for each individual component of the system requiring monitoring. As the operator wants the control office to authorize review periods as long as possible, the fittings and components described in this specifications must be designed and dimensioned in a way that they allow a review period of 3 years for electrical and 5 years for mechanical components.

The below manufacturer(s) is (are) known to manufacture products of the type specified in this specification section. Any other manufacturer(s) from a NATO member Nation Country may provide this product, provided they can prove to meet this specification.

Brand : Fa. Smith Meter  
Type : SF-4-NF/AL

or equivalent

STS-M 0 must be adhered to.

<b>AUTHOR:</b> <b>LBB NIEDERLASSUNG LANDAU</b> <b>UNTERTORPLATZ 1</b> <b>D-76829 LANDAU</b> <b>TEL.: +49 6341 912-0</b> <b>postfach.landau@LBBnet.de</b>	<b>ISSUED BY:</b>
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<h2>STANDARD SPECIFICATION</h2>	<h1>STS – M 130</h1>	
DESCRIPTION  <b>VOLUMETER (Steel)</b>	ID-CODE  <b>FQ</b>	

Suitable for volume measurement of finished mineral oil products of the hazard characteristics R 10 (flammable), F (easily flammable) and F+ (highly flammable) with an aromatic content of up to 50 %.  
 Suitable for installation in zone 1, the inside of the instrument is to be assigned to zone 0.

The following regulations are imperative and must be complied with:

1. Directive 2004/23/EC of the European Parliament and of the Council on the approximation of the laws of the Member States concerning pressure equipment
2. Directive 2014/68/EC of the European Parliament and of the Council on the approximation of the laws of the Member States concerning pressure equipment
3. Directive 2014/34/EC of the European Parliament and of the Council on the approximation of the laws of the Member States concerning the appropriate use of equipment in explosion hazard areas (ATEX)
4. Directive 2006/42/EC of the European Parliament and of the Council on the approximation of the laws of the Member States of 17 May 2006 concerning machinery.
5. Regulation (EU) No. 305/2011 of the European Parliament and of the Council on laying down harmonized conditions for the marketing of construction products
6. General Product Safety Directive (GPSD) and associated regulations (GPSR)
7. German Ordinance on Industrial Safety and Health (BetrSichV)
8. Construction Products Regulation (CPR)
9. Technical Rules on the Operational Safety/Hazardous Materials, especially TRBS 3151 / TRGS 751
10. VdTÜV Codes of Practice, especially VdTÜV-MB 967, VdTÜV-MB 966-1 and VdTÜV-MB 966-2
11. AD 2000 Codes of Practice, especially AD 2000 W
12. DIN, DIN EN and DIN EN ISO, especially DIN 3230-6, DIN EN 1092-1, DIN EN 10213
13. Technical Rules for the Handling of Flammable Liquids, especially TRbF 50 (other source of information)

Use

The exterior temperature variations typical in Europe must be considered.

Conveyed media:	finished mineral oil product with solids up to 800 µm
Pressure level:	PN 16
Density of the conveyed medium:	736 to 860 kg/m <sup>3</sup>
Kinematic viscosity of conveyed medium:	0.9 x 10 <sup>-6</sup> to 8.0 x 10 <sup>-6</sup> m <sup>2</sup> /s

Materials

Housing	:	cast steel as per DIN EN 10213
Internal parts	:	steel or stainless steel (free of nonferrous metal and not gray cast)
Bolts and nuts	:	as per AD 2000 W 7

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STANDARD SPECIFICATION	<h2>STS – M 130</h2>	
DESCRIPTION <b>VOLUMETER (Steel)</b>	ID-CODE <b>FQ</b>	

Design:

Volumeter in straight-flow design, suitable for installation in horizontal pipelines, with flange connection.

The generation of air pockets during operation is to be expected. A corresponding functional guaranty of the manufacturer shall be submitted for this operational incident.

A short-term increase of the flow by 15 % of the maximum flow shall be provided for.

The roller counter shall only run in up-count mode.

- Flanges : as per DIN EN 1092-1 with sealing surface, shape B1 or information of the contracting agency
- Flow rate : acc. Information of the contracting agency
- Operating pressure : 16 bar (PN 16)
- Measuring accuracy : higher than 0.2 % of the momentary value in the flow measuring range 1 : 10

Design A (without temperature compensation):

Counter for the volume at operating temperature level, indicated in m<sup>3</sup>.

- Display with 8-digit totalizing counter, not resettable (for continuous up-count) as well as 5-digit, manually resettable roller counter, lowest reading = 10 liters (for partial count).

Design B (with automatic temperature compensation):

Counter for the volume at reference temperature level, indicated in m<sup>3</sup>.

Automatic temperature compensation, capillary system and temperature sensor, installed in the counter housing.

Reference temperature: 15°C

- Compensated display with 8-digit totalizing counter, not resettable (for continuous up-count) as well as 5-digit, manually resettable roller counter, lowest reading = 10 liters (for partial count).
- Normal display with 8-digit totalizing counter, not resettable (for continuous up-count) as well as 5-digit, manually resettable roller counter, lowest reading = 10 liters (for partial count).

Requirements and testing

- Calibration of the counter on a test stand authorized by the specified inspection body.
- Material testing as per AD 2000 series W and the associated DIN EN material standards.
- Functional testing

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DESCRIPTION <b>VOLUMETER (Steel)</b>	ID-CODE <b>FQ</b>	

- EC homologation in accordance with Annex III of the Directive 2014/34/EC

Evidence of quality features

- Acceptance certificate as per DIN EN 10204 - 3.1 for the above-mentioned tests.
- Calibration curve confirmed by the authorized inspection body.

Identification/labeling

In accordance with Annex II no. 1.0.5. of the Directive 2014/34/EC and Article 17 of the Directive 2004/22/EC  
 Additional identification as per DIN 3230-6, item 4  
 CE Sign of Conformity as per Art. 16 of the Directive 2014/34/EC and Article 7 of the Directive 2004/22/EC

Legally required evidence

General Product Safety Directive (GPSD) and associated regulations (GPSR), Construction Product Act, especially:  
 CE Declaration of conformity as per Directive 2014/34/EC and the annexes to the Directive 2004/22/EC

Periodic inspection by an authorized inspection body

In accordance with the German Ordinance on Industrial Safety and Health (BetrSichV), the operational condition of systems requiring monitoring and their pertaining components must be inspected at regular intervals by an authorized inspection body. The operator of the entire system and its components must prepare the inspection lists on the basis of a technical safety assessment. A prerequisite to this task is that the manufacturer determines and specifies the inspection intervals for each individual component of the system requiring monitoring. As the operator wants the control office to authorize review periods as long as possible, the fittings and components described in this specifications must be designed and dimensioned in a way that they allow a review period of 3 years for electrical and 5 years for mechanical components.

The below manufacturer(s) is (are) known to manufacture products of the type specified in this specification section. Any other manufacturer(s) from a NATO member Nation Country may provide this product, provided they can prove to meet this specification.

Brand: Fa. Smith Meter  
 Type SF-??-NF/CS

or equivalent

STS-M 0 must be adhered to.

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<b>STANDARD SPECIFICATION</b>	<b>STS – M 131</b>	
DESCRIPTION <b>STRAINER BASKET</b>	ID-CODE <b>CF</b>	

Strainer basket for installation in pipelines, suitable for filtering finished mineral oil products with the hazard characteristics R 10 (flammable), F (easily flammable) and F+ (highly flammable) and an aromatic content of up to 50 %.

Suitable for installation in stations and pits (in zone 1, the inside of the filter is to be assigned to zone 0).

The following regulations are imperative and must be complied with:

1. Directive 2014/68/EC of the European Parliament and of the Council on the approximation of the laws of the Member States concerning pressure equipment
2. Directive 2006/42/EC of the European Parliament and of the Council on the approximation of the laws of the Member States of 17 May 2006 concerning machinery
3. Regulation (EU) No. 305/2011 of the European Parliament and of the Council on laying down harmonized conditions for the marketing of construction products
4. General Product Safety Directive (GPSD) and associated regulations (GPSR)
5. German Ordinance on Industrial Safety and Health (BetrSichV)
6. Technical Rules on the Operational Safety/Hazardous Materials, especially TRBS 3151 / TRGS 751
7. VdTÜV Codes of Practice, especially VdTÜV-MB 967, VdTÜV-MB 966-1 and VdTÜV-MB 966-2
8. AD 2000 Codes of Practice, especially the W and HP series
9. DIN, DIN EN and DIN EN ISO, especially DIN EN 10025-2, DIN EN 10028-2, DIN EN 10216-2,
10. Technical Rules for the Handling of Flammable Liquids, especially TRbF 50 (other source of information)

Use

The exterior temperature variations typical in Europe must be considered.

Conveyed media: finished mineral oil products  
 Pressure level: PN 16  
 Density of the conveyed medium: 736 to 860 kg/m<sup>3</sup>  
 Kinematic viscosity of the conveyed medium: 0.9 x 10<sup>-6</sup> to 8.0 x 10<sup>-6</sup> m<sup>2</sup>/s

Material

Sleeve and bottom : P265GH (1.0425) as per DIN EN 10028-2 (formerly H II)  
 Inlet and outlet sockets : P235GH-TC1 (1.0345) as per DIN EN 10216-2 (formerly St 35.8.I)  
 Welding neck flanges : S235JR (1.0038) as per DIN EN 10025-2 (formerly RSt 37-2)  
 Bolts and nuts : as per AD 2000 W 7  
 Basket : Cr-Ni steel, mat. no. 1.4571  
 Strainer screen : Cr-Ni steel, mat. no. 1.4401  
 Gaskets : Viton

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<h2>STANDARD SPECIFICATION</h2>	<h1>STS – M 131</h1>	
DESCRIPTION <b>STRAINER BASKET</b>	ID-CODE <b>CF</b>	

### Accessories

- Ball cock for venting as per STS-M 46
- Operating pressure gage as per STS-M 87
- Differential pressure gage as per STS-M 88
- Shut-off valve for pressure gage as per STS-M 86
- Safety valve R ½“, spring loaded, closed design, with name plate, set to 14.0 bar

### Design

Upright cylindrical body with welded on bumped end (including feet), cover with quick-release fasteners and lifting and pivoting mechanism.

Operating pressure	:	16.0 bar
Pressure drop with clean basket	:	0.2 bar
Max. perm. differential pressure	:	1.0 bar

The following connecting sockets are welded to the body or cover:

Inlet and outlet	:	DN 150
Drainage	:	DN 50, PN 16
Venting	:	DN 25, P N16
Pressure gaging	:	R ½“
Differential pressure gaging	:	R ½“
Safety valve	:	R ½“

Outlet socket opposite to inlet socket, but 400 mm lower.

Body and cover with interior coating as per STS-M 67, item 2 with approved coating material.

Removable basket strainer with strainer fabric fitted inside the body.

Filtering surface	:	0.32 m <sup>2</sup> min.
Filter mesh	:	240 µm (micron)

**The basket strainer shall be delivered in completely assembled condition with fitted accessories.**

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DESCRIPTION <b>STRAINER BASKET</b>	ID-CODE <b>CF</b>	

Requirements and testing

Testing of the body:

- Pressure test as per AD 2000 HP30
- Material testing as per AD 2000 series W and the associated DIN EN material standards.
- Preliminary testing and field inspection in accordance with the Directive on Pressure Equipment by an inspection body that is authorized in accordance with the Equipment and Product Safety Directive, Art. 11.

Testing of the accessory parts:

- In accordance with the requirements set forth in the mentioned specifications.

Evidence of quality features

- Acceptance certificate as per DIN EN 10204 - 3.2

Identification/labeling

As per Annex I No. 3.3 of the Directive 2014/68/EC  
CE Conformity Sign as per Art. 19 of the Directive 2014/68/EC

Additional labeling/identification:

- Characteristic flow rate: ..... m<sup>3</sup>/h
- Δ p at 120 m<sup>3</sup>/h: ..... (bar)
- Δ p in clean condition: ..... (bar)
- Filter mesh: ..... [mm]

The details on the name plate shall be in German and English.

Legally required evidence

In accordance with the General Product Safety Directive (GPSD) and associated regulations (GPSR), Construction Products Law (CPL), especially:  
EC Declaration of Conformity as per Annex VII of the Directive 2014/68/EC

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Periodic inspection by an authorized inspection body

In accordance with the German Ordinance on Industrial Safety and Health (BetrSichV), the operational condition of systems requiring monitoring and their pertaining components must be inspected at regular intervals by an authorized inspection body. The operator of the entire system and its components must prepare the inspection lists on the basis of a technical safety assessment. A prerequisite to this task is that the manufacturer determines and specifies the inspection intervals for each individual component of the system requiring monitoring. As the operator wants the control office to authorize review periods as long as possible, the fittings and components described in this specifications must be designed and dimensioned in a way that they allow a review period of 3 years for electrical and 5 years for mechanical components.

The below manufacturer(s) is (are) known to manufacture products of the type specified in this specification section. Any other manufacturer(s) from a NATO member Nation Country may provide this product, provided they can prove to meet this specification.

Brand:  
Faudi Aviation GmbH, Scharnhorststrasse 7 b, 35260 Stadtallendorf, Germany  
Type: SKF-21

or equivalent

STS-M 0 must be adhered to.

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<b>STANDARD SPECIFICATION</b>	<b>STS – M 132</b>	
DESCRIPTION  <b>VENTILATION SYSTEMS</b>	ID-CODE	

Ventilation systems suitable for installation in facilities for conveying and storage of finished mineral oil products of the hazard characteristics R 10 (flammable), F (easily flammable) and F+ (highly flammable) with an aromatic content of up to 50 %.  
Suitable for installation in zone 1.

The following regulations are imperative and must be complied with:

1. Directive 94/9EC of the European Parliament and of the Council on the approximation of the laws of the Member States concerning the appropriate use of equipment in explosion hazard areas (ATEX)
2. Directive 2006/42/EC of the European Parliament and of the Council on the approximation of the laws of the Member States of 17 May 2006 concerning machinery
3. Regulation (EU) No. 305/2011 of the European Parliament and of the Council on laying down harmonized conditions for the marketing of construction products
4. General Product Safety Directive (GPSD) and associated regulations (GPSR)
5. German Ordinance on Industrial Safety and Health (BetrSichV)
6. Construction Products Regulation (CPR)
7. Technical Rules on the Operational Safety/Hazardous Materials, especially TRBS 3151 / TRGS 751
8. VdTÜV Codes of Practice, especially VdTÜV-MB 967, VdTÜV-MB 966-1 and VdTÜV-MB 966-2
9. DIN, DIN EN, DIN EN ISO, VDE guidelines, especially DIN EN 12237.
10. Technical Rules for the Handling of Flammable Liquids, especially TRbF 50 and 20 (other source of information)

### Use

The exterior temperature variations typical in Europe must be considered.

Conveyed media:	finished mineral oil products
Density of the conveyed medium:	736 to 860 kg/m <sup>3</sup>
Kinematic viscosity of the conveyed medium:	0.9 x 10 <sup>-6</sup> to 8.0 x 10 <sup>-6</sup> m <sup>2</sup> /s

### Materials and designs

#### Design A:

Ventilation system for automatic ventilation of the leak detection shafts of the tanks in accordance with the drawing.

Ventilation system, consisting of:

- Pipe fan as per STS-M 12
- Bellow expansion joint made of electro-statically conductive material on both sides of the fan.

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STANDARD SPECIFICATION	<h2>STS – M 132</h2>	
DESCRIPTION <b>VENTILATION SYSTEMS</b>	ID-CODE	

- Pipe made of steel sheet as per DIN EN 12237 airtightness class C, diameter: 200 mm, with 1 x 90° segmental arch, all parts highly galvanized.
- Pressure pipeline made of steel, DN 200, Ø 219.1 x 4.5 mm, with elbow 90°, all parts PE-insulated, with flanged deflector.
- Sealing of wall penetration as per STS-M 115, version A and sealing collar as per STS-M 116, design A.
- Fasteners and a mounting bracket for the vibration-proof fastening of the ventilation system to the reinforced concrete wall.

Deliver complete ventilation system, assembly and install it in accordance with the drawing.

Design B:

Ventilation system for automatic ventilation of the leak detection shafts of the tanks in accordance with the drawing.

Ventilation system, consisting of:

- Roof fan as per STS-M 11, design A.
- Inflow nozzle of steel sheet, galvanized, with protective grille, extraction at a level of 100 mm above the floor.
- Pipe made of steel sheet as per DIN EN 12237 airtightness class C, diameter: 400 mm, all parts highly galvanized.
  - Fasteners for the vibration free fastening of the ventilation system to the reinforced concrete wall.

Deliver complete ventilation system, assembly and install it in accordance with the drawing.

Design C

Ventilation system for automatic ventilation of the pump stations on top of tanks with capacities of 5,000 m<sup>3</sup>, 2,500 m<sup>3</sup> and 1,250 m<sup>3</sup> in accordance with the drawing.

- Roof fan as per STS-M 11, design B.

All other features as with design B, however as per DIN EN 12237, airtightness class C, diameter: 300 mm.

STS-M 0 must be adhered to.

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STANDARD SPECIFICATION	<h2>STS – M 135</h2>	
DESCRIPTION	ID-CODE	
<b>CLEANING AND DEGASSING OF STORAGE AND SERVICE TANKS</b>		

Cleaning and degassing of tanks for the storage of finished mineral oil products of the hazard characteristics R 10 (flammable), F (easily flammable) and F+ (highly flammable) with an aromatic content of up to 50 %.

The following regulations are imperative and must be complied with:

1. Directive 2014/34/EC of the European Parliament and of the Council on the approximation of the laws of the Member States concerning the appropriate use of equipment in explosion hazard areas (ATEX).
2. European Agreement concerning the International Carriage of Dangerous Goods by Road (ADR)
3. General Product Safety Directive (GPSD) and associated regulations (GPSR)
4. German Ordinance on Industrial Safety and Health (BetrSichV)
5. Water Resources Act (WHG)
6. Ordinance on systems handling water-polluting materials and on the relevant specialist companies (VAUwS)
7. German Waste Management and Product Recycling Act (KrW)
8. German Ordinance on Road, Rail and Ship Transport of Dangerous Goods - GGVSEB
9. Technical Rules on the Operational Safety/Hazardous Materials, especially TRBS 3151 / TRGS 751
10. VdTÜV Codes of Practice, especially VdTÜV-MB 967, VdTÜV-MB 966-1 and VdTÜV-MB 966-2
11. DIN, DIN EN, DIN EN ISO, VDE guidelines
12. Technical Rules for the Handling of Flammable Liquids, especially TRbF 50 and 20 (other source of information)

1. General

1.1 Scope of work

Degassing and cleaning of fuel tanks

The above-mentioned work includes the supply of all necessary devices, material, equipment and labor by the Contractor.

The execution of this work shall comply with relevant German safety regulations and directives, especially the VdTÜV Code of Practice MB Tank 967 and TRbF 20 (other source of information).

2. Authorization

The bidder shall submit the following valid authorizations:

Authorization a specialized company in the sense of Art 3 of the Ordinance on Facilities Handling Water-polluting Substances (VAUwS) in combination with Art. 63 of the Water Resources Act (WHG) for the cleaning of fuel tanks (for the required hazard features).

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DESCRIPTION	ID-CODE	
<b>CLEANING AND DEGASSING OF STORAGE AND SERVICE TANKS</b>		

Certification as a Safety Certificate Contractor (SCC/SCP)

Authorization as a specialized waste disposal company as per Art. 56 and 57 of the Waste Management and Product Recycling Act (KrW).

3. Preparation of the tank cleaning and degassing

3.1 Drainage of the tanks

The tank will be emptied by the operator of the POL-facilities and a rest of fuel will be left in the tank.

After the Contracting Agency or the operator has authorized the cleaning of the tank, the remaining fuel shall be hauled off by the Contractor with suitable vehicles (with ADR approval).

Under no circumstances, the remaining fuel and/or the residues from cleaning shall be drained into the ground.

The following shall be observed in this connection:

- Fuel and tank cleaning residues are considered as waste requiring a proof of disposal. Evidence on the type, quantity and disposal of wastes shall be provided by means of consignment notes. The filling out and handling of the consignment notes as well as the keeping of the waste disposal records shall be carried out in compliance with the Ordinance on Waste Recovery and Disposal Records.

The wastes shall only be transferred to carriers that hold a valid transport authorization. The disposal of wastes shall be proven by a certificate issued by the operator of a waste disposal facility stating that the operator is willing to accept the wastes and to provide evidence of their proper disposal.

- The tank trucks hauling off the above-mentioned waste shall be authorized for the transport of this waste in accordance with the Ordinance on Road, Rail and Ship Transport of Dangerous Goods (GGVSEB). The wastes and tank cleaning residues may only be transferred to the carrier if the prerequisites specified by Art. 3 GGVSEB are satisfied and the transport of goods with the hazard features of "flammable finished mineral oil products" is authorized.

Tank trucks must be earthed before the loading in order to discharge all electro-static loads generated during filling or driving.

3.2 Separation of the tank from the piping and the electrical system

The electrical equipment (as well as the cathodic protection system) shall only be connected or disconnected under the supervision of an electrician of the operator. This applies also to the measurement of the resistance of the tank's grounding system if the last resistance measurement took place earlier than half a year before.

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DESCRIPTION	ID-CODE	
<b>CLEANING AND DEGASSING OF STORAGE AND SERVICE TANKS</b>		

The Contractor shall separate visibly all pipelines connected to the tank and seal them with blind flanges. The blind flanges shall be fitted to the pipe ends not to the openings in the tank.

For underground tanks with underground connecting pipes, the pipelines shall be fitted with blind flanges in the closest valve pit. The pipelines to the tank shall be degassed.

Current type-approval certificates as per Directive 2014/34/EC and/or CE Declarations of Conformity as per Directive 2014/34/EC shall be submitted for the equipment and devices to be used.

4. Execution of the tank cleaning and degassing

4.1 General

In general, tank cleaning shall only be done at exterior temperatures above + 5 °C in order to avoid difficult working conditions for the personnel and the equipment.

When thunderstorms are coming up, the cleaning work shall be interrupted immediately, the fan shall be shut off and the tank openings be covered in order to avoid ignitions. People shall not congregate in the immediate surroundings of the tank.

The personnel shall not wear synthetic clothes because of the risk of extreme static charging and the dangerous concomitants in the event of burns. The tank cleaning personnel shall wear conductive shoes when carrying out cleaning work in zone 0. Cigarettes, lighters, matches and cell phones shall be handed over before the commencement of works. The supervisor charged by the Contractor (competent person in the sense of Art 2, Para 7 of the German Ordinance on Industrial Safety and Health (BetrSichV) for explosion protection) is responsible for the collection of the above mentioned devices and for the grounding of all equipment used.

The method of cleaning and the personnel involved shall be laid down in a work program. Cleaning shall be made by blow drying. Rough contamination shall be removed and washed off with water. The use of CEHAPON-Ter or similar agents is not allowed.

4.2 Cleaning workflow for large tanks (after complete emptying)

4.2.1 Fans may only be used in suction mode if they have a general approval by the construction authorities for use in zone 0. All other fans shall only be operated in pressure mode. When putting up the fans, explosion-hazard areas shall be observed.

4.2.2 Residues (sludge) on the tank bottom and in the sump basin shall be pushed together with rubber squeegees and removed.

After removal of the sludge, the tank bottom and interior walls shall be cleaned with spark-free scrapers to remove all loose rusty bits and pieces up to a height of 1.0 m by means of spark-free scrapers. The cleaning personnel shall wear respiratory equipment when performing this work. As soon as the tank is free from gas, the entire interior tank surfaces including braces and supports must be scraped and

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<b>CLEANING AND DEGASSING OF STORAGE AND SERVICE TANKS</b>		

brushed. Subsequently, the bottom shall be flushed with clear water. The water shall be sucked off after completion of the cleaning.

4.2.3 After completion of the work specified in 4.1 and 4.2, the tank shall be blown dry without staff intervention. It shall be made sure that

- the hose complies with the requirements concerning electrostatic charges,
- the nominal width of the hose is matched to the fan power,
- all conductive parts that can get in contact with the outflowing vapors will be grounded electrostatically (derivation resistance against the earth not higher than  $10^6$  Ohm).

4.2.4 After the complete drying of the tank, the supervising engineer or his/her representative shall measure the gas concentration. He/she shall wear a self-contained breathing apparatus and the fan shall run.

4.2.5 If the air is found to be in perfect condition, the tank will be released for sweeping of the residues. The staff shall wear protective masks with appropriate filters.

4.2.6 After removal of the remaining residues and blowing out of the dust swirled up during sweeping, staff members are allowed to enter the tank without protective mask. When the fan has stopped running for more than 10 minutes the breathing air shall be checked again to make sure that its quality is still perfect and there is no risk of explosion.

4.2.7 After completion of the cleaning and inspection, all separated installations (see item 3.1.) shall be re-connected and made ready for operation.

#### 4.3 Workflow of the cleaning of service tanks

Under normal conditions, these tanks shall be emptied, separated from the system and flushed with water. The water shall be pumped off and the tank shall be blown dry. All other measures shall be executed in accordance with the specifications for the cleaning of large storage tanks.

If staff members must enter the tank with a bucket or a similar vessel to remove residues because of internal parts, they shall wear tank cleaning suits. The suits shall be fitted with an integrated belt and the entering person shall be roped up. In addition, two self-contained breathing apparatuses shall be kept ready for emergencies.

The Contractor shall inform the Contracting Agency on any damages on the tanks that were detected during the cleaning work.

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5. Degassing and cleaning of tanks with interior coating

The work and precautions specified in item 1 to 4 also apply to the cleaning of tanks with interior coating,

with the exception of item 4.2.2 – second paragraph.

The walls and bottom shall not be scraped off but washed in order to avoid any damage to the interior coating.

Required repairs on the interior coating shall be carried out in accordance with STS-M 67 (Interior Coating of Tanks). A separate order was or will be passed for this work (e.g. in a separate item).

6. Testing and acceptance

After acceptance of the tank by the authorized inspection body and its release for being refilled, the Contracting Agency, the operator and the Contractor shall inspect the tank commonly.

Only after this inspection, the tank domes shall be closed and all valves and pipelines etc. that have been removed for cleaning shall be reconnected and reinstalled with new fuel-resistant gaskets. The re-establishment of the orderly condition shall be certified by the competent employee of the Contractor. When filling the tank, the connections shall be tested for leakage. For vertical cylindrical tanks with bottom loading, the leakage test of the pipelines shall be repeated shortly before filling is complete. Also the tightness shall be certified by the competent person.

The entire terrain around the tank shall be restored to its original condition.

Legally required evidence

In accordance with the General Product Safety Directive (GPSD) and associated regulations (GPSR)

STS-M 0 must be adhered to.

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<h2>STANDARD SPECIFICATION</h2>	<h1>STS – M 137</h1>	
IDENTIFICATION  <b>DRAIN PUMP 10 m³/h</b>	ID-CODE  <b>P</b>	

Pump for feeding water and finished mineral oil products with the hazard characteristics R10 (flammable) F (easily flammable) and F\* (highly flammable) and an aromatic content of up to 50%.  
The pump will be installed in a explosion hazard area (Zone 0), the motor will be installed in zone 1.

The following rules are imperative and must be adhered to:

1. Directive 2014/68/EC of the European parliament and of the council on the approximation of the laws of the Member States concerning pressure equipment
2. Directive 2014/34/EC of the European parliament and of the council on the approximation of the laws of the Member States concerning equipment and protective systems intended for use in potentially explosive atmospheres (ATEX)
3. Directive 2006/42/EC of the European parliament and of the council on the approximation of the laws of the Member States of 17 May 2006 on machinery
4. Regulation (EU) No 305/2011 of the European Parliament and of the laying down harmonised conditions for the marketing of construction products
5. General Product Safety Directive (GPSD) and associated rules (GPSR)
6. Ordinance on Industrial Safety and Health
7. Technical rules for operation safety/hazardous substances, especially TRBS 3151 / TRGS 751
8. VdTÜV instruction sheets, especially VdTÜV-MB 967, VdTÜV-MB 966-1 and VdTÜV-MB 966-2
9. DIN, DIN EN and DIN EN ISO, especially DIN 28090/28091, DIN EN 1092-1, DIN EN ISO 9906, DIN EN ISO 5199
10. Technical rules for flammable liquids, especially TRbF 20 and 50 (other sources of information)

### Use

Exterior temperature changes typical in Europe must be considered.

Conveyed media:

Finished mineral oil products	density: 736 – 860 kg/m³
Water	density: 1.0 kg/dm³
Kinematic viscosity	0.9 x 10 <sup>-6</sup> to 8.0 x 10 <sup>-6</sup> m²/s

### Materials

Base	:	mat. no. 1.4408
Bearing shield	:	mat. no. 1.4408
Suction and pressure disc	:	mat. no. 1.4408
Impeller	:	mat. no. 1.4457
Mechanical seal	:	full metal bellow-mechanical seal without elastomer of mat. no. 1.4571

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<h2>STANDARD SPECIFICATION</h2>	<h1>STS – M 137</h1>	
IDENTIFICATION  <b>DRAIN PUMP 10 m³/h</b>	ID-CODE  <b>P</b>	

Shaft : mat. no. 1.4571  
Counter ring : silicone carbide (SiC)  
Overflow valve : mat. no. 1.4571  
Seals : acc. to DIN 28090/28091 suitable for above mentioned media

Design

Pumping set, composed of pump and E-Motor, directly assembled in modular construction, sealing with full metal bellow-mechanical seal without elastomer, direction-dependent.

Pump capacity Q : 10 m³/h  
Pump head : 42 m FS  
NPSH pump : 2.6 m  
Power requirement P : 5.0 kW (  $\delta = 1,0 \text{ kg/dm}^3$  )  
Connection flange : DN 50, PN 16 acc. to DIN EN 1092-1 Sealing strip acc. to shape B1

Scope of delivery

- One-stage vertical self-priming side channel pump with overflow valve
- Three-phase motor: IP 55 EExde IIC T4

Drive

Ex-protected e-motor with flame-proof enclosure, with painting acc. to STS-M 66.

Technical data

Type : 132 M  
Nominal capacity : 7.5 kW  
Nominal speed : 1,450 l/min  
Nominal current at 400 V : 14.7 A  
Voltage : 400/690 V (for Y -  $\Delta$  - starting)  
Protection : IP 55, EEx de IIC T4  
Frequency : 50 Hz  
Structural shape : V 1

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STANDARD SPECIFICATION	<h2>STS – M 137</h2>	
IDENTIFICATION  <b>DRAIN PUMP 10 m³/h</b>	ID-CODE  <b>P</b>	

Requirements and tests

- EC type test acc. to annex III of directive 2014/34/EC
- Proof of performance
- Test run at the manufacturer's works, recording of the characteristic line acc. to DIN EN ISO 9906
- Pressure test pump building with 13 bar

Evidence of quality features

- Certificate of type approval acc. to directive 2014/34/EC and the documents required therein.
- Acceptance test certificate acc. to DIN EN 10204/3.1 for the above-mentioned tests.

Identification

- acc. to DIN EN ISO 5199
- acc. to annex II no. 1.0.5. of directive 2014/34/EC
- CE conformity marking acc. to Art.16 of directive 2014/34/EC

Legally required evidences

Acc. to General Product Safety Directive (GPSD) and associated rules (GPSR); especially:  
EC declaration of conformity acc. to directive 2014/34/EC

Repeated tests by approved supervision authority

Acc. to Product Safety Directive, facilities and facility parts in need of monitoring must be reviewed repeatedly in certain periods for their orderly conditions concerning the operation by an approved supervision authority. The operator has to find out the review periods of the complete facility and the facility parts on the base of a safety related evaluation. Therefore the manufacturer of the components must determine the review periods for individual components of the facilities in need of monitoring. As the operator wants the control office to authorize review periods as long as possible, the fittings and components described in this specifications must be designed and dimensioned in a way that they allow a review period of 3 years for electrical and 5 years for mechanical components.

The below manufacturer(s) is (are) known to manufacture products of the type specified in this specification section. Any other manufacturer(s) from a NATO member Nation Country may provide this product, provided they can prove to meet this specification.

Product: DICKOW Pumpen KG, 84465 Waldkraiburg, Germany  
Type: WPV 50

or equivalent.

STS-M 0 shall be observed.

<b>AUTHOR:</b> <b>LBB NIEDERLASSUNG LANDAU</b> <b>UNTERTORPLATZ 1</b> <b>D-76829 LANDAU</b> <b>TEL.: +49 (6341) 912-0</b> <b>postfach.landau@LBBnet.de</b>	<b>ISSUED BY:</b>
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	SHEET 1 OF 3	
<h2>STANDARD SPECIFICATION</h2>	<h1>STS – M 138</h1>	
DESCRIPTION <b>AIRCRAFT REFUELING VALVE</b>	ID-CODE <b>RCV</b>	

Control valve in hot refueling pit or shelter, to control refueling of tactical aircraft.

The specifications STS-M 0 and STS-M 1 are part of this specification.

### Features

a) Outlet pressure control:

Constant pressure control to the aircraft single point nozzle at any flow rate from 190 l/min (50 gpm) up to the valve's nominal rate, with a control accuracy of  $\pm 0,21$  bar (3,0 psi), independent of the valve's inlet pressure.

Setting range: from 1.1 bar to 5.3 bar (15 psi – 75 psi).

The refuelling pressure at the skin of the aircraft may not exceed 3.5 bar (50 psi).

b) Quick closing feature:

Valve shall close immediately when outlet pressure exceeds the adjusted value. The outlet pressure at the max. flow rate and at a closing time of the tank truck's tank valve of 0.5 sec shall remain below 8.4 bar (120 psi). The valve must not reopen before the pressure has dropped below the adjusted outlet pressure valve.

The evidence of this feature (outlet pressure below 8.4 bar) must be provided on request of the contracting agency (AG) on a test stand selected by the contractor (AN), the costs have to be included in the unit price.

c) Hydraulic dead man switch:

Actuation of valve by dead man switch via the system pressure. The main valve shall open when the dead man switch is actuated and shall close within 3 sec, when the dead man switch is released.

When the hose coupling or the hose between the dead man switch and the valve control system breaks, no fuel may leak out. If one connection of the dead man switch is detached, the valve must close within 3 sec.

d) Open speed controll:

Valve must open with a time delay. The opening time shall be adjustable between 2 and 30 sec, without impairing the quickclosing feature.

e) Thermal pressure release:

When the outlet pressure exceeds the inlet pressure, the valve must open for pressure compensation and backflow.

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<b>STANDARD SPECIFICATION</b>	<b>STS – M 138</b>	
DESCRIPTION <b>AIRCRAFT REFUELING VALVE</b>	ID-CODE <b>RCV</b>	

Design

- Material of basic body : Stainless steel cast or ductile cast with nickel coating acc. to STS-M 1, par. 3.11.2.3 or 3.11.2.2
- Nominal width of valve : See drawing
- Construction length and connection flanges : See STS-M 1
- Tests and evidences of quality features and further requirements : See STS-M 1

Control and pilot valves:

NAME	CONNECTION SIZE *f. DN 100	SEE STS-M 1
Non-return check valve	3/8" NPT	Nr. 4.1.1
Non-return check valve	3/8" NPT	Nr. 4.2
Shut-off check valve	3/8" NPT	Nr. 4.3
Pressure reducing control valve	3/8" NPT	Nr. 4.7
Pressure relief control valve	3/4" NPT	Nr. 4.9
Three-way check valve	3/8" NPT	Nr. 4.18
Dead man switch valve		Nr. 4.23
Strainer	3/4" NPT	Nr. 5.1
Valve position indicator	3/4" NPT	Nr. 5.3
Throttle unit	3/8" NPT	Nr. 5.7

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STANDARD SPECIFICATION	<h2>STS – M 138</h2>	
DESCRIPTION <b>AIRCRAFT REFUELING VALVE</b>	ID-CODE <b>RCV</b>	

The above mentioned connection sizes and threads are recommendations. Any quickly releasable and replaceable cutting ring union is admitted.

The below manufacturer(s) is (are) known to manufacture products of the type specified in this specification section. Any other manufacturer(s) from a NATO member Nation Country may provide this product, provided they can prove to meet this specification.

Brand: Fa. CLA-VAL-CO

Type: 362 AF-7A

or equivalent

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	SHEET 1 OF 7	
STANDARD SPECIFICATION	<h2>STS – M 143</h2>	
DESCRIPTION	ID-CODE	
<b>REFUELLING ARM (stationary)</b>		

The refuelling arm shall be used for **in-shelter refuelling** of **tactical aircrafts**. It shall be flanged to the refuelling system in the shelter.

### 1.0 Basic documents

1. Directive 2014/68/EC of the European Parliament and of the Council on the approximation of the laws of the Member States concerning pressure equipment
2. Directive 2006/42/EC of the European Parliament and of the Council on the approximation of the laws of the Member States of 17 May 2006 concerning machinery.
3. Directive 2014/34/EC of the European Parliament and of the Council on the approximation of the laws of the Member States concerning the appropriate use of equipment in explosion hazard areas (ATEX).
4. Regulation (EU) No. 305/2011 of the European Parliament and of the Council on laying down harmonized conditions for the marketing of construction products
5. General Product Safety Directive (GPSD) and associated regulations (GPSR)
6. German Ordinance on Industrial Safety and Health (BetrSichV)
7. Technical Rules on the Operational Safety/Hazardous Materials, especially TRBS 3151 / TRGS 751
8. VdTÜV Codes of Practice, especially VdTÜV-MB 967, VdTÜV-MB 966-1 and VdTÜV-MB 966-2
9. DIN, DIN EN and DIN EN ISO standards, especially DIN 10222-5
10. STANAG 3682 (Procedures to establish electrical safety connections during the use of aircraft POL equipment)
11. AD-2000 regulation, especially AD Code of Practice HP 2/1
12. Technical Rules for the Handling of Flammable Liquids, especially TRbF 50 (other source of information)

### 2.0 Use

Conveyed media : jet fuel, mogas, diesel fuel and petroleum products  
as per MIL-G-5572 F, MIL-T-5624 L

Rated pressure : PN 10

Temperature range : -40°C to +80°C (-40 °F to 176 °F)

### 3.0 Requirements

- 3.1 The refuelling arm shall be designed and executed in such a manner that all wheels of the four wheel carriers touch the ground on the different gradients of the hardstand.
- 3.2 The refuelling arm shall be composed of three sections and the refuelling part (refuelling nozzle) in addition. The total length of the three sections will be specified by the Contracting Agency.  
(Possible length per section: 3.0 m to 7.0 m).

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<b>REFUELLING ARM (stationary)</b>		

- 3.2.1 Alternative design: for small shelters, two sections as specified by the Contracting Agency.
- 3.3 The refuelling arm in combination with a specially designed refuelling nozzle shall allow coupling to the aircraft at a height of 0.30 m and of 2.20 m above the top level of the hardstand. Emergency filling of tank trucks shall be considered as well.
- 3.4 The front part of the refuelling arm with the refuelling nozzle shall be supported by an adjustable spring structure. This structure shall counterbalance the weight of the coupling, the swivel joints and the connecting pipe sections in order to ensure that only a minimum of forces act on the refuelling connection of the aircraft.
  - 3.4.1 The front part of the refuelling arm (refuelling part) shall not exceed a maximum height of 0.45 m above the floor level when lying on the floor.
- 3.5 The maximum height of the refuelling arm shall be below 0.45 m.
- 3.6 Hoses are not permitted as a connection between the refuelling arm and the aircraft.
- 3.7 The refuelling arm shall be equipped with three supporting structures. Two spring-loaded casters shall be fitted underneath each of the supporting structures.
  - 3.7.1 Only 2 supporting structures for the alternative design specified in 3.2.1.
- 3.8 At the bottom side of the pipe sections between the supporting structures, braces of U-channel sections shall be welded on as tiebacks to ensure sufficient stability.
- 3.9 A lockable support shall be fitted to the refuelling arm in order to ensure that the refuelling part can be locked in position. The support shall keep the refuelling nozzle in a safe position when the refuelling arm is out of operation or moved around.
  - 3.9.1 In order to lock the refuelling arm in its parking position, two locking devices shall be provided for.
- 3.10 The entire electrical resistance between the connecting flange and the pressure refueling coupling must not exceed 1 K Ohm. Exterior bridging of the swivel joints is not permitted.
- 3.11 The refuelling arm shall be fitted with a grounding cable reel. The ground wire must have a length of 20.0 m minimum. The cable reel, the ground wire and the connectors must comply with the US military specifications MIL-R-83232 B (2) and MIL-R-83325 A (1).
- 3.12 The refuelling arm shall be fitted with facilities for sampling, draining, pressure gaging and venting.

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<b>REFUELLING ARM (stationary)</b>		

3.13 The entire pressure drop on the refuelling arm (without strainer and pressure refuelling coupling) must not exceed 0.6 bar at a flow rate of 2,000 l/min. The pressure drop is measured during the recirculation of the fuel via the flush line.

4.0 Design:

The following dimensions must be adhered to:

Connecting flange	:	DN 80, PN 10 as per STS-M 23
Pipeline sections	:	DN 80, PN 10 (125 lbs)
Fanged connection	:	as per STS-M 64
Flanged swivel joints	:	DN 80, PN 10 (125 lbs)
Shut-off unit upstream of refuelling coupling incl. strainer	:	DN 65, PN 10 (125 lbs)
Compact swivel joint	:	DN 65, PN 10 (125 lbs)
Pressure refuelling coupling	:	2 ½", PN 10 (125 lbs)

5.0 Equipment

5.1 Flanged swivel joints:

In order to ensure a maximum of flexibility, the refuelling arm shall be equipped with eleven (11) swivel joints (9 for the alternative design as per 3.2.1) at least.

The swivel joints shall be designed as flanged versions and must allow rotations of 360°. They shall not require any lubrication or maintenance.

Each swivel joint shall be equipped with two ball bearings, one roller bearing and two gaskets. The outer gasket shall provide dust shielding in addition.

Construction and design are required to provide for the bearing of all moment forces generated by weight in connection with the rotary motion. At the same time, absolute tightness at positive and negative pressures shall be ensured.

When selecting the gaskets, particular care shall be taken as to ensure the required flexibility of the material at the specified low temperatures.

Swivel joints welded to pipe sections or elbows are not permitted.

The manufacturer shall guarantee the absolute tightness of the swivel joints for a period of four years.

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<h2>STANDARD SPECIFICATION</h2>	<h1>STS – M 143</h1>	
DESCRIPTION	ID-CODE	
<b>REFUELLING ARM (stationary)</b>		

5.1.1 Requirement:

The manufacturer of the swivel joints shall submit a certificate of the factory tests conducted on the swivel joint in the course of the sampling procedure. The certificate shall provide evidence of the kind and scope of the conducted tests. Details on the endurance tests that have been conducted are of particular importance. The following conditions shall be satisfied as a minimum in these tests:

Endurance tests with 100,000 rotary motions (double strokes) per joint on three different flanged swivel joints of the same type. A rotary motion (double stroke) shall consist of a movement by 90° and back to the 0° position. At the same time, a moment of 600 Nm minimum and an axial force of 4000 N minimum (corresponding to a pressure of 8 bar) shall apply to the swivel joints. The number of rotary motions (double strokes, 90°) per minute shall amount to approx. 20. The motion intervals shall ensure that the swivel joints do not overheat. The tests shall be conducted with a test liquid that corresponds to the operating medium F 34 at a pressure of 8 bar. The conditions and results shall be documented as a proof.

5.2 Spring-loaded casters:

The refuelling arm shall be equipped with six (6) casters made of galvanized or hot-galvanized steel or cast. The rotating assembly shall be fitted with ball bearings and grease nipples. The casters shall have a total diameter of at least 100 mm and be fitted with two long-term lubricated grooved ball bearings with grease nipples. The tread material of the casters shall be polyurethane with a shore hardness of 90°. The required casters shall be designed for a static load of 275 kg and a dynamic load of 150 kg at 20 km/h.

5.2.1 Only four (4) casters for the alternative design specified in 3.2.1.

5.3 Sampling assembly:

It shall consist of a shut-off valve and a special dry-break coupling for the connection of a sampling vessel typically used by NATO/USAFE.

The material shall correspond to the pipe material used.

5.4 Drainage assembly:

It shall consist of a shut-off valve DN 15, PN 16, a dry-break coupling with counterpart and a hose fitting with a fuel-resistant hose of 1.0 m length.

The material shall correspond to the pipe material used.

5.5 Venting assembly:

It shall consist of a vent cock, 3/8", with an elbow of 180°.

The material shall correspond to the pipe material used.

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DESCRIPTION <b>REFUELLING ARM (stationary)</b>	ID-CODE	

5.6 Safety disconnect coupling:

Safety disconnect coupling with integrated strainer holder and stainless steel strainer (40 mesh), drip-tight ball cock with lockable opening lever. The safety disconnect coupling shall allow the quick and drip-tight removal of the refuelling coupling from the refuelling arm in the event of a defect or for strainer inspections.

The ball cock must be lockable in the open and closed states.

Opening and disconnection of the coupling as well as strainer replacement shall not require any tools.

A twofold safety mechanism (mechanical and automatic) shall prevent unintentional disconnection during operation.

The disconnect coupling shall be fitted with a double gasket made of aromatics- and fuel-resistant material.

The connection to the refuelling arm shall be designed as a flange connection suitable for DN 80/PN 10 flanges.

The disconnect coupling shall be designed for a permissible operating pressure of 16 bar.

The factory acceptance certificate as per DIN 55 350 Part 18 – 4.2.2 and the material test certificate as per DIN 10 204 – 3.1 B shall be submitted!

5.7 Compact swivel joint for pressure refuelling coupling:

In order to facilitate the coupling process, a swivel joint shall be fitted between the shut-off device with strainer and the aircraft refuelling coupling. The swivel joint shall not require any lubrication or maintenance.

5.8 Pressure refuelling coupling:

This coupling provides the connection between the aircraft and the refuelling arm and shall be designed for dry disconnection.

For USAFE facilities : make Cal-Val Co. No. 341GF  
 For other facilities : as specified by the user

6.0 Materials

Pipes : stainless steel, mat. no. 1.4571, as per STS-M 19  
 Elbows : stainless steel, mat. no. 1.4571, as per STS-M 20

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DESCRIPTION	ID-CODE	
<b>REFUELLING ARM (stationary)</b>		

- Flanges : stainless steel, mat. no. 1.4571 or 1.4404
- Flanged swivel joints : completely made of stainless steel, material no. 1.4404
- Bolts and nuts : stainless steel
- Supporting structure and fasteners : hot-galvanized steel
- Spring damper for refuelling part : springs made of spring steel, guiding facility made of steel and stainless steel
- Bracing, clamps and handles : stainless steel, mat. no. 1.4301 or higher grade
- Gaskets : resistant to kerosene and aromatics
- Shut-off device : aluminum or cast aluminum and internal parts made of rustproof material
- Strainer : stainless steel, mat. no. 1.4571
- Compact swivel joint : stainless steel, mat. no. 1.4404 or 1.4571
- Pressure refuelling coupling : aluminum or cast aluminum and internal parts made of stainless steel

7.0 Testing and acceptance

- Material testing in accordance with the specifications and standards mentioned above
- Leak test
- Evidence of electrical conductivity

7.1 Evidence of quality features

- Source material in accordance with the specifications and standards mentioned above
- Factory test certificate as per DIN 55 350 Part 18
- Material test certificate as per DIN EN 10 204 - 3.1 B
- Declaration of conformity as per Directive 2014/68/EC

7.2 The refuelling arm shall be delivered in completely assembled condition.

7.3 Identification/labeling

- Manufacturer's specification as per DIN standards
- CE Conformity Sign as per Art. 19 of the Directive 2014/68/EC

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DESCRIPTION  <b>REFUELLING ARM (stationary)</b>	ID-CODE	

7.4 Legally required evidence:

General Product Safety Directive (GPSD) and associated regulations (GPSR), Construction Product Act, especially:  
- EC Declaration of Conformity as per Annex IV of the Directive 2014/68/EC

Periodic inspection by an authorized inspection body

In accordance with the German Ordinance on Industrial Safety and Health (BetrSichV), the operational condition of systems requiring monitoring and their pertaining components must be inspected at regular intervals by an authorized inspection body. The operator of the entire system and its components must prepare the inspection lists on the basis of a technical safety assessment. A prerequisite to this task is that the manufacturer determines and specifies the inspection intervals for each individual component of the system requiring monitoring. As the operator wants the control office to authorize review periods as long as possible, the fittings and components described in this specifications must be designed and dimensioned in a way that they allow a review period of 3 years for electrical and 5 years for mechanical components.

Warranty

The warranty period for the entire refuelling arm shall cover four years.

The below manufacturer(s) is (are) known to manufacture products of the type specified in this specification section. Any other manufacturer(s) from a NATO member Nation Country may provide this product, provided they can prove to meet this specification.

Make: Cavotec Meyerinck, 65760 Eschborn, Germany  
Type: Meyerinck Pantograph CM. XX. 08.2-F.R (XX= total length as specified by the CA)

or Fa. CLA-VAL-CO

or equivalent.

STS-M 0 must be adhered to.

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<h2>STANDARD SPECIFICATION</h2>	<h1>STS – M 144</h1>	
DESCRIPTION	ID-CODE	
<b>REFUELLING ARM (mobile)</b>		

The refuelling arm shall be used for **underwing refuelling of wide-bodied aircrafts (C 8, C 10, etc.)** with fuel from hydrant systems. The refuelling arm shall be suitable for traveling with a towing vehicle.

### 1.0 Basic documents

1. Directive 2014/68/EC of the European Parliament and of the Council on the approximation of the laws of the Member States concerning pressure equipment
2. Directive 2006/42/EC of the European Parliament and of the Council on the approximation of the laws of the Member States of 17 May 2006 concerning machinery
3. Directive 2014/34/EC of the European Parliament and of the Council on the approximation of the laws of the Member States concerning the appropriate use of equipment in explosion hazard areas (ATEX)
4. Regulation (EU) No. 305/2011 of the European Parliament and of the Council on laying down harmonized conditions for the marketing of construction products
5. General Product Safety Directive (GPSD) and associated regulations (GPSR)
6. German Ordinance on Industrial Safety and Health (BetrSichV)
7. Technical Rules on the Operational Safety/Hazardous Materials, especially TRBS 3151 / TRGS 751
8. VdTÜV Codes of Practice, especially VdTÜV-MB 967, VdTÜV-MB 966-1 and VdTÜV-MB 966-2
9. DIN, DIN EN and DIN EN ISO standards, especially DIN 10222-5
10. STANAG 3682 (Procedures to establish electrical safety connections during the use of aircraft POL equipment)
11. AD-2000 regulation, especially AD Code of Practice HP 2/1
12. Technical Rules for the Handling of Flammable Liquids, especially TRbF 50 (other source of information)

### 2.0 Use

Conveyed media : jet fuel, mogas, diesel fuel and petroleum products  
as per MIL-G-5572 F, MIL-T-5624 L

Rated pressure : PN 10

Temperature range : -40 °C to +80 °C (-40 °F to 176 °F)

### 3.0 Requirements

- 3.1 The refuelling arm shall be designed and executed in such a manner that all wheels of the four wheel carriers touch the ground on the different gradients of the hardstand.
- 3.2 The refuelling arm shall be composed of three sections and the refuelling part (refuelling nozzle) in addition. The entire length of the three sections shall be specified by the Contracting Agency.  
(Possible length per section: 4.0 m to 10.0 m).

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DESCRIPTION	ID-CODE	
<b>REFUELLING ARM (mobile)</b>		

- 3.3 A special structure of the connecting part, consisting of the hydrant coupling and three swivel joints shall provide for coupling to hydrants at a height between -0.20 and + 0.20 m from the surface level of the hardstand.
- 3.3.1 The connecting part shall be supported by an adjustable spring structure. It shall counterbalance the weight of the hydrant coupling, the swivel joints and the connecting pipe section.
- 3.4 The refuelling arm with a special design of the refuelling part shall provide for the refuelling of aircrafts up to a height of 4.80 m (refuelling of DC 8, DC 10, B 747, A 300). The refuelling part shall be manually extendable; drives with external energy supply (hydraulic or electrical) are not permitted.
- 3.4.1 The refuelling part shall not exceed a height of 2.40 m in the retracted state.
- 3.4.2 Refuelling of aircrafts with a refuelling connection at a height of 1.40 m shall be possible.
- 3.5 The front part of the refuelling arm with the refuelling nozzle shall be supported by an adjustable spring structure. This structure shall counterbalance the weight of the coupling, the swivel joints and the connecting pipe sections in order to ensure that only a minimum of forces act on the refuelling connection to the aircraft.
- 3.6 Hoses are not permitted as a connection between the refuelling arm and the aircraft.
- 3.7 The refuelling arm shall be fitted with an automatic pressure compensation system to balance overpressure and negative pressure caused by thermal action.
- 3.7.1 The vent of the compensation tank shall be fitted with a flame-arresting fitting.
- 3.7.2 The capacity of the compensation tank shall be designed for a temperature difference of 80 °C max. in the refuelling arm.
- 3.8 The refuelling arm shall be equipped with four supporting structures. Two spring-loaded casters shall be fitted underneath each of the supporting structures. The volumeter shall be supported separately.
- 3.9 At the bottom side of the pipe sections between the supporting structures, braces of U-channel sections shall be welded on as tiebacks to ensure sufficient stability.
- 3.10 A drawbar shall be fitted to the supporting structure on the front side allowing the towing of the refuelling arm with a vehicle at a max. speed of 5 km/h.

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DESCRIPTION	ID-CODE	
<b>REFUELLING ARM (mobile)</b>		

- 3.11 Lockable supports shall be fitted to the refuelling arm in order to ensure that the refuelling part can be locked in position. The supports shall keep the hydrant coupling and the refuelling nozzle in a safe position when the refuelling arm is out of operation or moved around.
- 3.12 The refuelling arm shall be fitted with two locking mechanisms for towing operations.
- 3.13 The entire electrical resistance between the connecting flange and the pressure refuelling coupling must not exceed 1 K Ohm. Exterior bridging of the swivel joints is not permitted.
- 3.14 The refuelling arm shall be fitted with a grounding cable reel. The ground wire must have a length of 20.0 m minimum. The cable reel, the ground wire and the connecting terminal must comply with the US military specifications MIL-R-83232 B (2) and MIL-R-83325 A (1).
- 3.15 The refuelling arm shall be fitted with facilities for sampling, draining, pressure gaging and venting.
- 3.16 The entire pressure drop on the refuelling arm (without strainer and pressure refuelling coupling) must not exceed 1.2 bar at a flow rate of 2,000 l/min. The pressure drop is measured during the recirculation of the fuel via the flush line.

4.0 Design:

The following dimensions must be adhered to:

Hydrant coupling	:	DN 100 (4"), PN 16, matching the hydrant valve (HVV) with adapter
Pipeline sections	:	DN 100
Fanged connection	:	as per STS-M 64
Venturi pipe	:	DN 100, PN 16, matching the hydrant valve (HVV)
Coarse strainer	:	DN 100, PN 16 flange
Volumeter	:	DN 100, as per STS-M 167
Flanged swivel joints	:	DN 100, PN 10 (125 lbs) (3 ea. DN 80 for refuelling nozzle)
Shut-off unit upstream of refuelling coupling incl. strainer	:	DN 65, PN 10
Compact swivel joint	:	DN 65, PN 10 (125 lbs)
Pressure refuelling coupling	:	2 ½", PN 10 (125 lbs)

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DESCRIPTION <b>REFUELLING ARM (mobile)</b>	ID-CODE	

5.0 Equipment

5.1 Flanged swivel joints:

In order to ensure a maximum of flexibility, the refuelling arm shall be equipped with fifteen (15) swivel joints (12 x DN 100, 3 x DN 80) at least.

The swivel joints shall be designed as flanged versions and must allow rotations of 360°. They shall not require any lubrication or maintenance.

Each swivel joint shall be equipped with two ball bearings, one roller bearing and two gaskets. The outer gasket shall provide dust shielding in addition.

Construction and design are required to provide for the bearing of all moment forces generated by weight in connection with the rotary motion. At the same time, absolute tightness at positive and negative pressures shall be ensured.

When selecting the gaskets, particular care shall be taken as to ensure the required flexibility of the material at the specified low temperatures.

Each swivel joint shall have two connecting flanges. The latters shall be prepared to accommodate O-ring gaskets.

Swivel joints welded to pipe sections or elbows are not permitted.

The manufacturer shall guarantee the absolute tightness of the swivel joints for a period of four years.

5.1.1 Requirement:

The manufacturer of the swivel joints shall submit a certificate of the factory tests conducted on the swivel joint in the course of the sampling procedure. The certificate shall provide evidence of the kind and scope of the conducted tests. Details on the endurance tests that have been conducted are of particular importance. The following conditions shall be satisfied as a minimum in these tests:

Endurance tests with 100,000 rotary motions (double strokes) per joint on three different flanged swivel joints of the same type. A rotary motion (double stroke) shall consist of a movement by 90° and back to the 0° position. At the same time, a moment of 600 Nm minimum and an axial force of 4000 N minimum (corresponding to a pressure of 8 bar) shall apply to the swivel joints. The number of rotary motions (double strokes, 90°) per minute shall amount to approx. 20. The motion intervals shall ensure that the swivel joints do not overheat. The tests shall be conducted with a test liquid that corresponds to the operating medium F 34 at a pressure of 8 bar. The conditions and results shall be documented as a proof.

5.2 Volumeter :

The volumeter is fitted into a section of the refuelling arm. Design and execution as per STS-M 167.

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5.2.1 A coarse strainer shall be installed upstream of the volumeter to protect it.

5.3 Venturi pipe:

To control the refuelling process, a Venturi pipe is fitted into a section of the refuelling arm upstream of the volumeter. The Venturi pipe is adjustable and controls directly the hydrant valve (HVV) in the hydrant refuelling pit. The scope of delivery shall include the control tubes, partly as flexible versions, the dry-break couplings required for the connection to the hydrant valve.

5.4 Spring-loaded casters:

The refuelling arm shall be equipped with ten (10) casters made of galvanized or hot-galvanized steel or cast. The rotating assembly shall be fitted with ball bearings and grease nipples. The casters shall have a total diameter of at least 300 mm and be fitted with two long-term lubricated grooved ball bearings with grease nipples. The tread material of the casters shall be polyurethane with a shore hardness of 90°. The spring-loaded casters shall be designed for a static load of 800 kg and a dynamic load of 465 kg at 20 km/h.

5.4.1 Two of the ten casters shall be fitted with a brake.

5.4.2 Two casters shall be equipped with an additional mechanism to ensure directional stability after previous activation.

5.5 Sampling assembly:

It shall consist of a shut-off valve and a special dry-break coupling for the connection of a sampling vessel typically used by NATO/USAFE.

The material shall correspond to the pipe material used.

5.6 Drainage assembly:

It shall consist of a shut-off valve DN 15, PN 16, a dry-break coupling with counterpart and a hose fitting with a fuel-resistant hose of 1 m length.

The material shall correspond to the pipe material used.

5.7 Pressure gaging assembly:

It shall consist of:

- Manometer shut-off valve
- Pressure gage, Ø 100 mm, liquid damped, indicating range 0 to 16 bar.

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The material shall correspond to the pipe material used.

5.8 Venting assembly:

It shall consist of a vent cock, 3/8", with an elbow of 180°.

The material shall correspond to the pipe material used.

5.9 Hydrant coupling:

The hydrant coupling provides the connection between the hydrant system (hydrant valve HVV) and the refuelling arm. It shall comply with the US specification MIL-C-83260.

5.10 Pressure compensation system:

The system shall compensate pressures caused by thermal influence and shall consist of:

- Vessel as per item 3.7.2
- Venting facility with detonation trap
- Drainage facility
- Pressure relief valves, set to -0.005 bar and adjustable between 5 to 10 bar

The materials shall correspond to the pipe material used.

5.11 Safety disconnect coupling:

Safety disconnect coupling with integrated strainer holder and stainless steel strainer (40 mesh), drip-tight ball cock with lockable opening lever. The safety disconnect coupling shall allow the quick and drip-tight removal of the refuelling coupling from the refuelling arm in the event of a defect or for strainer inspections.

The ball cock must be lockable in the open and closed states.

Opening and disconnection of the coupling as well as strainer replacement shall not require any tools.

A twofold safety mechanism (mechanical and automatic) shall prevent unintentional disconnection during operation.

The disconnect coupling shall be fitted with a double gasket made of aromatics- and fuel-resistant material.

The connection to the refuelling arm shall be designed as a flange connection suitable for tank truck flanges DIN 28162 DN 80/PN 10.

The disconnect coupling shall be designed for a permissible operating pressure of 16 bar.

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The factory acceptance certificate as per DIN 55 350 Part 18 – 4.2.2 and the material test certificate as per DIN 10 204 – 3.1 B shall be submitted!

5.12 Compact swivel joint for pressure refuelling coupling:

In order to facilitate the coupling process, a swivel joint shall be fitted between the shut-off device with strainer and the aircraft refuelling coupling. The swivel joint shall not require any lubrication or maintenance.

5.13 Pressure refuelling coupling

This coupling provides the connection between the aircraft and the refuelling arm and shall be designed for dry disconnection.

For USAFE facilities : make Cal-Val Co. No. 341GF  
 For other facilities : as specified by the user

6.0 Materials

- Pipes : stainless steel, mat. no. 1.4571, as per STS-M 19
- Elbows : stainless steel, mat. no. 1.4571, as per STS-M 20
- Flanges : stainless steel, mat. no. 1.4571 or 1.4404
- Flanged swivel joints : completely made of stainless steel, material no. 1.4404
- Bolts and nuts : stainless steel
- Supporting structure and fasteners : hot galvanized steel
- Springs for hydrant connection part : stainless steel, mat. no. 1.4310
- Spring damper for refuelling part : springs made of spring steel, guiding facility made of steel and stainless steel
- Bracing, clamps and handles : stainless steel, mat. no. 1.4301 or higher grade
- Gaskets : resistant to kerosene and aromatics
- Venturi pipe : stainless steel cast, mat. no. 1.4581
- Outer insulation : as per STS-M 167
- Coarse strainer : stainless steel, mat. no. 1.4571
- Hydrant coupling : aluminum or cast aluminum and stainless steel

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- Shut-off device : aluminum or cast aluminum and internal parts made of rust-proof material
- Strainer : stainless steel, mat. no. 1.4571
- Compact swivel joint : stainless steel, mat. no. 1.4404 or 1.4571
- Pressure refuelling coupling : aluminum or cast aluminum and internal parts made of stainless steel

7.0 Testing and acceptance

- Material testing in accordance with the specifications and standards mentioned above
- Leak test
- Evidence of electrical conductivity

7.1 Evidence of quality features

- Source material in accordance with the specifications and standards mentioned above
- Factory test certificate as per DIN 55 350 Part 18
- Material test certificate as per DIN EN 10 204 - 3.1 B
- Declaration of conformity as per Directive 2014/68/EC

7.2 The refuelling arm shall be delivered in completely assembled condition.

7.3 Identification/labeling

- Manufacturer's specification as per DIN standards
- CE Conformity Sign as per Directive 2014/68/EC

7.4 Legally required evidence:

General Product Safety Directive (GPSD) and associated regulations (GPSR), Construction Product Act, especially:

- EC Declaration of Conformity as per Annex VII of the directive 2014/68/EC

Periodic inspection by an authorized inspection body

In accordance with the German Ordinance on Industrial Safety and Health (BetrSichV), the operational condition of systems requiring monitoring and their pertaining components must be inspected at regular intervals by an authorized inspection body. The operator of the entire system and its components must prepare the inspection lists on the basis of a technical safety assessment. A prerequisite to this task is that the manufacturer deter-

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mines and specifies the inspection intervals for each individual component of the system requiring monitoring. As the operator always strives for longest possible inspection intervals to be permitted by the approving authority, the fittings and components described in the specifications shall be designed and dimensioned in such a manner that electrical and mechanical equipment is suitable for inspection intervals of five years.

Warranty

The warranty period for the entire refuelling arm shall cover four years.

The below manufacturer(s) is (are) known to manufacture products of the type specified in this specification section. Any other manufacturer(s) from a NATO member Nation Country may provide this product, provided they can prove to meet this specification.

Make: Cavotec Meyerinck, 65760 Eschborn, Germany  
Type: Meyerinck Pantograph CM. XX. 1.3-H.K.M.D-V (XX= total length as specified by the CA)

or Fa. CLA-VAL-CO

or equivalent.

STS-M 0 must be adhered to.

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<b>REFUELLING ARM (mobile)</b>		

The refuelling arm shall be used for refuelling of **wide-bodied aircrafts (C 5, C 141, etc.)** with fuel from hydrant systems. The refuelling arm shall be suitable for traveling with a towing vehicle.

### 1.0 Basic documents

1. Directive 2014/68/EC of the European Parliament and of the Council on the approximation of the laws of the Member States concerning pressure equipment
2. Directive 2006/42/EC of the European Parliament and of the Council on the approximation of the laws of the Member States of 17 May 2006 concerning machinery
3. Directive 94/9/EC of the European Parliament and of the Council on the approximation of the laws of the Member States concerning the appropriate use of equipment in explosion hazard areas (ATEX)
4. Regulation (EU) No. 305/2011 of the European Parliament and of the Council on laying down harmonized conditions for the marketing of construction products
5. General Product Safety Directive (GPSD) and associated regulations (GPSR)
6. German Ordinance on Industrial Safety and Health (BetrSichV)
7. Technical Rules on the Operational Safety/Hazardous Materials, especially TRBS 3151 / TRGS 751
8. VdTÜV Codes of Practice, especially VdTÜV-MB 967, VdTÜV-MB 966-1 and VdTÜV-MB 966-2
9. DIN, DIN EN and DIN EN ISO standards, especially DIN 10222-5
10. STANAG 3682 (Procedures to establish electrical safety connections during the use of aircraft POL equipment)
11. AD-2000 regulation, especially AD Code of Practice HP 2/1
12. Technical Rules for the Handling of Flammable Liquids, especially TRbF 50 (other source of information)

### 2.0 Use

Conveyed media : jet fuel, mogas, diesel fuel and petroleum products  
as per MIL-G-5572 F, MIL-T-5624 L

Rated pressure : PN 10

Temperature range : -40°C to +80°C (-40 °F to 176 °F)

### 3.0 Requirements

- 3.1 The refuelling arm shall be designed and executed in such a manner that all wheels of the four wheel carriers touch the ground on the different gradients of the hardstand.
- 3.2 The refuelling arm shall be composed of three sections and the refuelling part (refuelling nozzle) in addition. The total length of the three sections shall be specified by the Contracting Agency.  
(Possible length per section: 4.0 m to 10.0 m).

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- 3.3 A special structure of the connecting part, consisting of the hydrant coupling and three swivel joints shall provide for coupling to hydrants at a height between -0.20 and + 0.20 m from the top level of the hardstand.
  - 3.3.1 The connecting part shall be supported by an adjustable spring structure. It shall counterbalance the weight of the hydrant coupling, the swivel joint and the connecting pipe section.
- 3.4 The refuelling arm in combination with a specially designed refuelling nozzle shall allow coupling to the aircraft at a height of 0.30 m and of 2.40 m above the top level of the hardstand. Emergency filling of tank trucks shall be considered as well.
- 3.5 The front part of the refuelling arm with the refuelling nozzle shall be supported by an adjustable spring structure. This structure shall counterbalance the weight of the coupling, the swivel joints and the connecting pipe sections in order to ensure that only a minimum of forces act on the refuelling connection of the aircraft. Only one person shall be required to handle the refuelling part.
- 3.6 Hoses are not permitted as a connection between the refuelling arm and the aircraft.
- 3.7 The refuelling arm shall be fitted with an automatic pressure compensation system to balance overpressure and negative pressure caused by thermal action.
  - 3.7.1 The vent of the compensation tank shall be fitted with a flame-arresting fitting.
  - 3.7.2 The capacity of the compensation tank shall be designed for a temperature difference of 80 °C max. in the refuelling arm.
- 3.8 The refuelling arm shall be equipped with four supporting structures. Two spring-loaded casters shall be fitted underneath each of the supporting structures. The volumeter shall be supported separately.
- 3.9 At the bottom side of the pipe sections between the supporting structures, braces of U-channel sections shall be welded on as tiebacks to ensure sufficient stability.
- 3.10 A drawbar shall be fitted to the supporting structure on the front side allowing the towing of the refuelling arm with a vehicle at a max. speed of 5 km/h.
- 3.11 Lockable supports shall be fitted to the refuelling arm in order to ensure that the refuelling part can be locked in position. The supports shall keep the hydrant coupling and the refuelling nozzle in a safe position when the refuelling arm is out of operation or moved around.
- 3.12 The refuelling arm shall be fitted with two locking mechanisms for towing operations.

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- 3.13 The entire electrical resistance between the connecting flange and the pressure refueling coupling must not exceed 1 K Ohm. Exterior bridging of the swivel joints is not permitted.
- 3.14 The refuelling arm shall be fitted with a grounding cable reel. The ground wire must have a length of 20.0 m minimum. The cable reel, the ground wire and the connectors must comply with the US military specifications MIL-R-83232 B (2) and MIL-R-83325 A (1).
- 3.15 The refuelling arm shall be fitted with facilities for sampling, draining, pressure gaging and venting.
- 3.16 The entire pressure drop on the refuelling arm (without strainer and pressure refuelling coupling) must not exceed 0.7 bar at a flow rate of 2,000 l/min. The pressure drop is measured during the recirculation of the fuel via the flush line.

4.0 Design:

The following dimensions must be adhered to:

Hydrant coupling	:	DN 100 (4"), PN 16, matching the hydrant valve (HVV) with adapter
Pipeline sections	:	DN 100
Flanged connection	:	as per STS-M 64
Venturi pipe	:	DN 100, PN 16, matching the hydrant valve (HVV)
Coarse strainer	:	DN 100, PN 16 flange
Volumeter	:	DN 100, as per STS-M 167
Flanged swivel joints	:	DN 100 and DN 80, PN 10 (125 lbs)
Shut-off unit upstream of refuelling coupling incl. strainer	:	DN 65, PN 10
Compact swivel joint	:	DN 65, PN 10 (125 lbs)
Pressure refuelling coupling	:	2 ½", PN 10 (125 lbs)

5.0 Equipment

5.1 Flanged swivel joints:

In order to ensure a maximum of flexibility, the refuelling arm shall be equipped with twelve (12) swivel joints (10 x DN 100, 2 x DN 80) at least.

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The swivel joints shall be designed as flanged versions and must allow rotations of 360°. They shall not require any lubrication or maintenance.

Each swivel joint shall be equipped with two ball bearings, one roller bearing and two gaskets. The outer gasket shall provide dust shielding in addition.

Construction and design are required to provide for the bearing of all moment forces generated by weight in connection with the rotary motion. At the same time, absolute tightness at positive and negative pressures shall be ensured.

When selecting the gaskets, particular care shall be taken as to ensure the required flexibility of the material at the specified low temperatures.

Each swivel joint shall have two connecting flanges. The latter shall be prepared to accommodate O-ring gaskets.

Swivel joints welded to pipe sections or elbows are not permitted.

The manufacturer shall guarantee the absolute tightness of the swivel joints for a period of two years.

#### 5.1.1 Requirement:

The manufacturer of the swivel joints shall submit a certificate of the factory tests conducted on the swivel joint in the course of the sampling procedure. The certificate shall provide evidence of the kind and scope of the conducted tests. Details on the endurance tests that have been conducted are of particular importance. The following conditions shall be satisfied as a minimum in these tests:

Endurance tests with 100,000 rotary motions (double strokes) per joint on three different flanged swivel joints of the same type. A rotary motion (double stroke) shall consist of a movement by 90° and back to the 0° position. At the same time, a moment of 600 Nm minimum and an axial force of 4,000 N minimum (corresponding to a pressure of 8 bar) shall apply to the swivel joints. The number of rotary motions (double strokes, 90°) per minute shall amount to approx. 20. The motion intervals shall ensure that the swivel joints do not overheat. The tests shall be conducted with a test liquid that corresponds to the operating medium F 34 at a pressure of 8 bar. The conditions and results shall be documented as a proof.

#### 5.2 Volumeter :

The volumeter is fitted into a section of the refuelling arm. Design and execution as per STS-M 167

#### 5.2.1 A coarse strainer shall be installed upstream of the volumeter to protect it.

#### 5.3 Venturi pipe:

To control the refuelling process, a Venturi pipe is fitted into a section of the refuelling arm upstream of the volumeter. The Venturi pipe is adjustable and controls directly the hydrant valve (HVV) in the hydrant refuelling pit. The scope of delivery shall include the control tubes, partly as flexible versions, the dry-break couplings required for the connection to the hydrant valve.

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5.4 Spring-loaded casters:

The refuelling arm shall be equipped with eight (8) casters made of galvanized or hot-galvanized steel or cast. The rotating assembly shall be fitted with ball bearings and grease nipples. The casters shall have a total diameter of at least 300 mm and be fitted with two long-term lubricated grooved ball bearings with grease nipples. The tread material of the casters shall be polyurethane with a shore hardness of 90°. The spring-loaded casters shall be designed for a static load of 800 kg and a dynamic load of 465 kg at 20 km/h.

5.4.1 Two of the eight casters shall be fitted with a brake.

5.4.2 Two casters shall be equipped with an additional mechanism to ensure directional stability after previous activation.

5.5 Sampling assembly:

It shall consist of a shut-off valve and a special dry-break coupling for the connection of a sampling vessel typically used by NATO/USAFE.

The material shall correspond to the pipe material used.

5.6 Drainage assembly:

It shall consist of a shut-off valve DN 15, PN 16, a dry-break coupling with counterpart and a hose fitting with a fuel-resistant hose of 1.0 m length.

The material shall correspond to the pipe material used.

5.7 Pressure gaging assembly:

It shall consist of:

- Manometer shut-off valve
- Pressure gage, Ø 100 mm, liquid damped, indicating range 0 to 16 bar

The material shall correspond to the pipe material used.

5.8 Venting assembly:

It shall consist of a vent cock, 3/8", with an elbow of 180°. The material shall correspond to the pipe material used.

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5.9 Hydrant coupling:

The hydrant coupling provides the connection between the hydrant system (hydrant valve HVV) and the refuelling arm. It shall comply with the US specification MIL-C-83260.

5.10 Pressure compensation system:

The system shall compensate pressures caused by thermal influence and shall consist of:

- Vessel as per item 3.7.2
- Venting facility with detonation trap
- Drainage facility
- Pressure relief valves, set to -0.005 bar and adjustable from 5 to 10 bar

The materials shall correspond to the pipe material used.

5.11 Safety disconnect coupling:

Safety disconnect coupling with integrated strainer holder and stainless steel strainer (40 mesh), drip-tight ball cock with lockable opening lever. The safety disconnect coupling shall allow the quick and drip-tight removal of the refuelling coupling from the refuelling arm in the event of a defect or for strainer inspections.

The ball cock must be lockable in the open and closed states.

Opening and disconnection of the coupling as well as strainer replacement shall not require any tools.

A twofold safety mechanism (mechanical and automatic) shall prevent unintentional disconnection during operation.

The disconnect coupling shall be fitted with a double gasket made of aromatics- and fuel-resistant material.

The connection to the refuelling arm shall be designed as a flange connection suitable for DN 80/PN 10 flanges.

The disconnect coupling shall be designed for a permissible operating pressure of 16 bar.

The factory acceptance certificate as per DIN 55 350 Part 18 – 4.2.2 and the material test certificate as per DIN 10 204 – 3.1 B shall be submitted!

5.12 Compact swivel joint for pressure refuelling coupling:

In order to facilitate the coupling process, a swivel joint shall be fitted between the shut-off device with strainer and the aircraft refuelling coupling. The swivel joint shall not require any lubrication or maintenance.

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STANDARD SPECIFICATION	<h2>STS – M 145</h2>	
DESCRIPTION <b>REFUELLING ARM (mobile)</b>	ID-CODE	

### 5.13 Pressure refuelling coupling

This coupling provides the connection between the aircraft and the refuelling arm and shall be designed for dry disconnection.

For USAFE facilities : make Cal-Val Co. No. 341GF  
 For other facilities : as specified by the user

### 6.0 Materials

- Pipes : stainless steel, mat. no. 1.4571, as per STS-M 19
- Elbows : stainless steel, mat. no. 1.4571, as per STS-M 20
- Flanges : stainless steel, mat. no. 1.4571 or 1.4404
- Flanged swivel joints : completely made of stainless steel, material no. 1.4404
- Bolts and nuts : stainless steel
- Supporting structure and fasteners : hot galvanized steel
- Springs for hydrant connection part : stainless steel, mat. no. 1.4310
- Spring damper for refuelling part : steel, galvanized supporting structure, spring steel as per DIN EN 10089, coated with epoxy resin
- Bracing, clamps and handles : stainless steel, mat. no. 1.4301 or higher grade
- Gaskets : resistant to kerosene and aromatics
- Venturi pipe : stainless steel cast, mat. no. 1.4581
- Outer insulation : as per STS-M 167
- Coarse strainer : stainless steel, mat. no. 1.4571
- Hydrant coupling : aluminum or cast aluminum and stainless steel
- Shut-off device : aluminum or cast aluminum and internal parts made of rustproof material
- Strainer : stainless steel, mat. no. 1.4571
- Compact swivel joint : stainless steel, mat. no. 1.4404 or 1.4571
- Pressure refuelling coupling : aluminum or cast aluminum and internal parts made of stainless steel

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DESCRIPTION <b>REFUELLING ARM (mobile)</b>	ID-CODE	

7.0 Testing and acceptance

- Material testing in accordance with the specifications and standards mentioned above
- Leak test
- Evidence of electrical conductivity

7.1 Evidence of quality features as per TRbF 50

- Source material in accordance with the specifications and standards mentioned above
- Factory test certificate as per DIN 55 350 Part 18
- Material test certificate as per DIN EN 10 204 - 3.1 B
- Declaration of conformity as per Directive 2014/68/EC

7.2 The refuelling arm shall be delivered in completely assembled condition.

7.3 Identification/labeling

- Manufacturer's specification as per DIN standards
- CE Conformity Sign as per Directive 2014/68/EC

7.4 Legally required evidence:

General Product Safety Directive (GPSD) and associated regulations (GPSR), Construction Product Act, especially:

- EC Declaration of Conformity as per Annex IV of the directive 2014/68/EC

Periodic inspection by an authorized inspection body

In accordance with the German Ordinance on Industrial Safety and Health (BetrSichV), the operational condition of systems requiring monitoring and their pertaining components must be inspected at regular intervals by an authorized inspection body. The operator of the entire system and its components must prepare the inspection lists on the basis of a technical safety assessment. A prerequisite to this task is that the manufacturer determines and specifies the inspection intervals for each individual component of the system requiring monitoring. As the operator wants the control office to authorize review periods as long as possible, the fittings and components described in this specifications must be designed and dimensioned in a way that they allow a review period of 3 years for electrical and 5 years for mechanical components.

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STANDARD SPECIFICATION	<h2>STS – M 145</h2>	
DESCRIPTION <b>REFUELLING ARM (mobile)</b>	ID-CODE	

Warranty

The warranty period for the entire refuelling arm shall cover four years.

The below manufacturer(s) is (are) known to manufacture products of the type specified in this specification section. Any other manufacturer(s) from a NATO member Nation Country may provide this product, provided they can prove to meet this specification.

Make: Cavotec Meyerinck, 65760 Eschborn, Germany

Type: Meyerinck Pantograph CM. XX. 1.3-H.S.M.D-V (XX= total length as specified by the CA)

or Fa. CLA-VAL-CO

or equivalent.

STS-M 0 must be adhered to.

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STANDARD SPECIFICATION	<h2>STS – M 146</h2>	
DESCRIPTION	ID-CODE	
<b>REFUELLING ARM (stationary)</b>		

The refuelling arm shall be used for refuelling of **wide-bodied aircrafts (C 5, C 141 etc.)** with fuel from hydrant systems. It shall be flanged to the refuelling pit at the edge of the airfield.

### 1.0 Basic documents

1. Directive 2014/68/EC of the European Parliament and of the Council on the approximation of the laws of the Member States concerning pressure equipment
2. Directive 2006/42/EC of the European Parliament and of the Council on the approximation of the laws of the Member States of 17 May 2006 concerning machinery
3. Directive 2014/34/EC of the European Parliament and of the Council on the approximation of the laws of the Member States concerning the appropriate use of equipment in explosion hazard areas (ATEX)
4. Regulation (EU) No. 305/2011 of the European Parliament and of the Council on laying down harmonized conditions for the marketing of construction products
5. General Product Safety Directive (GPSD) and associated regulations (GPSR)
6. German Ordinance on Industrial Safety and Health (BetrSichV)
7. Technical Rules on the Operational Safety/Hazardous Materials, especially TRBS 3151 / TRGS 751
8. VdTÜV Codes of Practice, especially VdTÜV-MB 967, VdTÜV-MB 966-1 and VdTÜV-MB 966-2
9. DIN, DIN EN and DIN EN ISO standards, especially DIN 10222-5
10. STANAG 3682 (Procedures to establish electrical safety connections during the use of aircraft POL equipment).
11. AD-2000 regulation, especially AD Code of Practice HP 2/1
12. Technical Rules for the Handling of Flammable Liquids, especially TRbF 50 (other source of information)

### 2.0 Use

Conveyed media : jet fuel, mogas, diesel fuel and petroleum products  
as per MIL-G-5572 F, MIL-T-5624 L

Rated pressure : PN 10

Temperature range : -40°C to +80°C (-40 °F to 176 °F)

### 3.0 Requirements

- 3.1 The refuelling arm shall be designed and executed in such a manner that all wheels of the four wheel carriers touch the ground on the different gradients of the hardstand.
- 3.2 The refuelling arm shall be composed of three sections and the refuelling part (refuelling nozzle) in addition. The total length of the three sections shall be specified by the Contracting Agency.  
(Possible length per section: 4.0 m to 10.0 m).

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DESCRIPTION	ID-CODE	
<b>REFUELLING ARM (stationary)</b>		

- 3.3 The refuelling arm in combination with a specially designed refuelling nozzle shall allow coupling to an aircraft at a height of 0.30 m and of 2.40 m above the top level of the hardstand. Emergency filling of tank trucks shall be considered in this connection.
- 3.4 The front part of the refuelling arm with the refuelling nozzle shall be supported by an adjustable spring structure. This structure shall counterbalance the weight of the coupling, the swivel joints and the connecting pipe sections in order to ensure that only a minimum of forces act on the refuelling connection of the aircraft. Only one person shall be required to handle the refuelling part.
- 3.5 Hoses are not permitted as a connection between the refuelling arm and the aircraft.
- 3.6 The refuelling arm shall be equipped with three supporting structures. Two spring-loaded casters shall be fitted underneath each of the supporting structures.
- 3.7 At the bottom side of the pipe sections between the supporting structures, braces of U-channel sections shall be welded on as tiebacks to ensure sufficient stability.
- 3.8 A lockable support shall be fitted to the refuelling arm in order to ensure that the refuelling part can be locked in position. The support shall keep the refuelling nozzle in a safe position when the refuelling arm is out of operation or moved around.
  - 3.8.1 In order to lock the refuelling arm in its parking position, two locking devices shall be provided for.
- 3.9 The entire electrical resistance between the connecting flange and the pressure refueling coupling must not exceed 1 K Ohm. Exterior bridging of the swivel joints is not permitted.
- 3.10 The refuelling arm shall be fitted with a grounding cable reel. The ground wire must have a length of 20.0 m minimum. The cable reel, the ground wire and the connecting terminal must comply with the US military specifications MIL-R-83232 B (2) and MIL-R-83325 A (1).
- 3.11 The refuelling arm shall be fitted with facilities for sampling, draining, pressure gaging and venting.
- 3.12 The entire pressure drop on the refuelling arm (without strainer and pressure refuelling coupling) must not exceed 0.7 bar at a flow rate of 2,000 l/min. The pressure drop is measured during the recirculation of the fuel via the flush line.

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DESCRIPTION <b>REFUELLING ARM (stationary)</b>	ID-CODE	

#### 4.0 Design:

The following dimensions must be adhered to:

Connecting flange	:	DN 100, PN 16
Flange connection	:	as per STS-M 64
Pipeline sections	:	DN 100
Flanged swivel joints	:	DN 80, PN 10 (125 lbs)
Shut-off unit upstream of re-fuelling coupling incl. strainer	:	DN 65, PN 10
Compact swivel joint	:	DN 65, PN 10 (125 lbs)
Pressure refuelling coupling	:	2 ½", PN 10 (125 lbs)

#### 5.0 Equipment

##### 5.1 Flanged swivel joints:

In order to ensure a maximum of flexibility, the refuelling arm shall be equipped with eleven (11) swivel joints (9 x DN 100, 2 x DN 80) at least.

The swivel joints shall be designed as flanged versions and must allow rotations of 360°. They shall not require any lubrication or maintenance.

Each swivel joint shall be equipped with two ball bearings, one roller bearing and two gaskets. The outer gasket shall provide dust shielding in addition.

Construction and design are required to provide for the bearing of all moment forces generated by weight in connection with the rotary motion. At the same time, absolute tightness at positive and negative pressures shall be ensured.

When selecting the gaskets, particular care shall be taken as to ensure the required flexibility of the material at the specified low temperatures.

Each swivel joint shall have two connecting flanges. The latter shall be prepared to accommodate O-ring gaskets.

Swivel joints welded to pipe sections or elbows are not permitted.

The manufacturer shall guarantee the absolute tightness of the swivel joints for a period of four years.

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DESCRIPTION <b>REFUELLING ARM (stationary)</b>	ID-CODE	

5.1.1 Requirement:

The manufacturer of the swivel joints shall submit a certificate of the factory tests conducted on the swivel joint in the course of the sampling procedure. The certificate shall provide evidence of the kind and scope of the conducted tests. Details on the endurance tests that have been conducted are of particular importance. The following conditions shall be satisfied as a minimum in these tests:

Endurance tests with 100,000 rotary motions (double strokes) per joint on three different flanged swivel joints of the same type. A rotary motion (double stroke) shall consist of a movement by 90° and back to the 0° position. At the same time, a moment of 600 Nm minimum and an axial force of 4000 N minimum (corresponding to a pressure of 8 bar) shall apply to the swivel joints. The number of rotary motions (double strokes, 90°) per minute shall amount to approx. 20. The motion intervals shall ensure that the swivel joints do not overheat. The tests shall be conducted with a test liquid that corresponds to the operating medium F 34 at a pressure of 8 bar. The conditions and results shall be documented as a proof.

5.2 Casters:

The refuelling arm shall be equipped with six (6) casters made of galvanized steel or cast. The rotating assembly shall be fitted with ball bearings and grease nipples. The casters shall have a total diameter of at least 300 mm and be fitted with two long-term lubricated grooved ball bearings with grease nipples. The tread material of the casters shall be polyurethane with a shore hardness of 90°. The loaded casters shall be designed for a static load of 800 kg and a dynamic load of 465 kg at 20 km/h.

5.2.1 Two of the six casters shall be fitted with a brake.

5.3 Sampling assembly:

It shall consist of a shut-off valve and a special dry-break coupling for the connection of a sampling vessel typically used by NATO/USAFE.

The material shall correspond to the pipe material used.

5.4 Drainage assembly:

It shall consist of a shut-off valve DN 15, PN 16, a dry-break coupling with counterpart and a hose fitting with a fuel-resistant hose of 1.0 m length.

The material shall correspond to the pipe material used.

5.5 Pressure gaging assembly:

It shall consist of:

- Manometer shut-off valve
- Pressure gage, Ø 100 mm, liquid damped, indicating range 0 to 16 bar

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The material shall correspond to the pipe material used.

5.6 Venting assembly:

It shall consist of a vent cock, 3/8", with an elbow of 180°.

The material shall correspond to the pipe material used.

5.7 Safety disconnect coupling:

Safety disconnect coupling with integrated strainer holder and stainless steel strainer (40 mesh), drip-tight ball cock with lockable opening lever. The safety disconnect coupling shall allow the quick and drip-tight removal of the refuelling coupling from the refuelling arm in the event of a defect or for strainer inspections.

The ball cock must be lockable in the open and closed states.

Opening and disconnection of the coupling as well as strainer replacement shall not require any tools.

A twofold safety mechanism (mechanical and automatic) shall prevent unintentional disconnection during operation.

Disconnect coupling with a double gasket made of aromatics- and fuel-resistant material.

The connection to the refuelling arm shall be designed as a flange connection suitable for DN 80/PN 10 flanges.

The disconnect coupling shall be designed for a permissible operating pressure of 16 bar.

The factory acceptance certificate as per DIN 55 350 Part 18 – 4.2.2 and the material test certificate as per DIN 10 204 – 3.1 B shall be submitted!

5.8 Compact swivel joint for pressure refuelling coupling:

In order to facilitate the coupling process, a swivel joint shall be fitted between the shut-off device with strainer and the aircraft refuelling coupling. The swivel joint shall not require any lubrication or maintenance.

5.9 Pressure refuelling coupling

This coupling provides the connection between the aircraft and the refuelling arm and shall be designed for dry disconnection.

For USAFE facilities : make Cal-Val Co. No. 341GF  
 For other facilities : as specified by the user

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DESCRIPTION <b>REFUELLING ARM (stationary)</b>	ID-CODE	

### 6.0 Materials

Pipes	:	stainless steel, mat. no. 1.4571 as per STS-M 19
Elbows	:	stainless steel, mat. no. 1.4571 as per STS-M 20
Flanges	:	stainless steel, mat. no. 1.4571
Flanged swivel joints	:	completely made of stainless steel, material no. 1.4404
Bolts and nuts	:	stainless steel
Supporting structure and fasteners	:	hot galvanized steel
Spring damper for refuelling part	:	supporting structure made of galvanized steel; spring steel as per DIN EN 10089, coated with epoxy resin
Bracing, clamps and handles	:	stainless steel, mat. no. 1.4301 or higher grade
Gaskets	:	resistant to kerosene and aromatics
Shut-off device	:	aluminum or cast aluminum and internal parts made of rustproof, non-ferrous material
Strainer	:	stainless steel, mat. no. 1.4571
Compact swivel joint	:	stainless steel, mat. no. 1.4404 or 1.4571
Pressure refuelling coupling	:	aluminum or cast aluminum and internal parts made of stainless steel

### 7.0 Testing and acceptance

- Material testing in accordance with the specifications and standards mentioned above
- Leak test
- Evidence of electrical conductivity

### 7.1 Evidence of quality features

- Source material in accordance with the specifications and standards mentioned above
- Factory test certificate as per DIN 55 350 Part 18
- Material test certificate as per DIN EN 10 204 - 3.1 B
- Declaration of Conformity as per Directive 2014/68/EC

7.2 The refuelling arm shall be delivered in completely assembled condition.

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DESCRIPTION <b>REFUELLING ARM (stationary)</b>	ID-CODE	

7.3 Identification/labeling

- Manufacturer's specification as per DIN standards
- CE Conformity Sign as per Directive 2014/68/EC

7.4 Legally required evidence:

- General Product Safety Directive (GPSD) and associated regulations (GPSR), Construction Product Act, especially:
- EC Declaration of Conformity as per Annex VII of the Directive 2014/68/EC

Periodic inspection by an authorized inspection body

In accordance with the German Ordinance on Industrial Safety and Health (BetrSichV), the operational condition of systems requiring monitoring and their pertaining components must be inspected at regular intervals by an authorized inspection body. The operator of the entire system and its components must prepare the inspection lists on the basis of a technical safety assessment. A prerequisite to this task is that the manufacturer determines and specifies the inspection intervals for each individual component of the system requiring monitoring. As the operator wants the control office to authorize review periods as long as possible, the fittings and components described in this specifications must be designed and dimensioned in a way that they allow a review period of 3 years for electrical and 5 years for mechanical components.

Warranty

The warranty period for the entire refuelling arm shall cover four years.

The below manufacturer(s) is (are) known to manufacture products of the type specified in this specification section. Any other manufacturer(s) from a NATO member Nation Country may provide this product, provided they can prove to meet this specification.

Make: Cavotec Meyerinck, 65760 Eschborn, Germany  
 Type: Meyerinck Pantograph CM. XX. 1.3-F.S (XX= total length as specified by the CA)

or Fa. CLA-VAL-CO

or equivalent.

STS-M 0 must be adhered to.

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STANDARD SPECIFICATION	<h2>STS – M 147</h2>	
DESCRIPTION <b>REFUELLING ARM (retractable)</b>	ID-CODE	

The refuelling arm shall be installed in the NATO/USAFE standard tank truck refuelling pit and dispense fuel to **truck refuellers**.

### 1.0 Basic documents

1. Directive 2014/68/EC of the European Parliament and of the Council on the approximation of the laws of the Member States concerning pressure equipment
2. Directive 2006/42/EC of the European Parliament and of the Council on the approximation of the laws of the Member States of 17 May 2006 concerning machinery
3. Directive 2014/34/EC of the European Parliament and of the Council on the approximation of the laws of the Member States concerning the appropriate use of equipment in explosion hazard areas (ATEX)
4. Regulation (EU) No. 305/2011 of the European Parliament and of the Council on laying down harmonized conditions for the marketing of construction products
5. General Product Safety Directive (GPSD) and associated regulations (GPSR)
6. German Ordinance on Industrial Safety and Health (BetrSichV)
7. Technical Rules on the Operational Safety/Hazardous Materials, especially TRBS 3151 / TRGS 751
8. VdTÜV Codes of Practice, especially VdTÜV-MB 967, VdTÜV-MB 966-1 and VdTÜV-MB 966-2
9. DIN, DIN EN and DIN EN ISO standards, especially DIN 10222-5
10. STANAG 3682 (Procedures to establish electrical safety connections during the use of aircraft POL equipment).
11. AD-2000 regulation, especially AD Code of Practice HP 2/1
12. Technical Rules for the Handling of Flammable Liquids, especially TRbF 50 (other source of information)

### 2.0 Use

Conveyed media : jet fuel, mogas, diesel fuel and petroleum products  
as per MIL-G-5572 F, MIL-T-5624 L

Rated pressure : PN 10

Temperature range : -40°C to +80°C (-40 °F to 176 °F)

### 3.0 Requirements

- 3.1 It must be possible to retract the refuelling arm completely into the pit in order to protect it from fragment action.
- 3.2 Extending and retracting the refuelling arm as well as coupling to the tank truck and decoupling shall require a minimum of effort and be manageable by a single operator. Spring elements and external energy supply shall not be necessary to operate the refuelling arm.

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DESCRIPTION	ID-CODE	
<b>REFUELLING ARM (retractable)</b>		

- 3.3 A combination of joints shall provide for the required adjustability in height. The refueling arm shall be fitted with an automatic locking mechanism to secure its position in the extended and retracted states. The locking mechanism shall be manually releasable.
- 3.4 The guiding structure for the height adjustment shall require no maintenance at all.
- 3.5 The refuelling arm shall be composed of four sections and the refuelling part (refuelling nozzle) in addition. It shall have a total length of 3.0 m in the extended state.
- 3.6 The refuelling arm in combination with a specially designed refuelling nozzle shall allow coupling to a tank truck at a height of 0.30 m and of 1.20 m above the top level of the access road. The inclination of the connecting socket of particular tank trucks shall be taken into account in this connection.
- 3.7 The front part of the refuelling arm with the refuelling nozzle shall be supported by an adjustable spring structure. This structure shall counterbalance the weight of the coupling, the swivel joints and the connecting pipe sections in order to ensure that only a minimum of forces act on the connection socket of the tank truck.
- 3.8 Hoses are not permitted as a connection between the refuelling arm and the tank truck.
- 3.9 The sealing of the refuelling arm must ensure permanent technical tightness.
- 3.10 The entire electrical resistance between the connecting flange and the tank truck coupling must not exceed 1 K Ohm. Exterior bridging of the swivel joints is not permitted.

4.0 Design:

The following dimensions must be adhered to:

- Connecting flange : DN 80, PN 10, as per STS-M 23
- Pipeline parts : DN 80, PN 10 (125 lbs)
- Flanged swivel joints : DN 80, PN 10 (125 lbs)
- Shut-off unit upstream of re-fuelling coupling incl. strainer : DN 65 or in accordance with the tank truck connection
- Compact swivel joint : DN 65 or in accordance with the tank truck connection
- Tank truck coupling : matching the connecting socket of the tank truck

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STANDARD SPECIFICATION	<h2>STS – M 147</h2>	
DESCRIPTION <b>REFUELLING ARM (retractable)</b>	ID-CODE	

5.0 Equipment

5.1 Flanged swivel joints:

In order to ensure a maximum of flexibility, the refuelling arm shall be equipped with nine (9) swivel joints at least.

The swivel joints shall be designed as flanged versions and must allow rotations of 360°. They shall not require any lubrication or maintenance.

Each swivel joint shall be equipped with two ball bearings, one roller bearing and two gaskets. The outer gasket shall provide dust shielding in addition.

Construction and design are required to provide for the bearing of all moment forces generated by weight in connection with the rotary motion. At the same time, absolute tightness at positive and negative pressures shall be ensured.

When selecting the gaskets, particular care shall be taken as to ensure the required flexibility of the material at the specified low temperatures.

The swivel joint at the front end of the extendable part shall be equipped an additional roller bearing, i.e. two ball bearings and two roller bearings.

The manufacturer shall guarantee the absolute tightness of the swivel joints for a period of four years.

5.1.1 Requirement:

The manufacturer of the swivel joints shall submit a certificate of the factory tests conducted on the swivel joint in the course of the sampling procedure. The certificate shall provide evidence of the kind and scope of the conducted tests. Details on the endurance tests that have been conducted are of particular importance. The following conditions shall be satisfied as a minimum in these tests:

Endurance tests with 100,000 rotary motions (double strokes) per joint on three different flanged swivel joints of the same type. A rotary motion (double stroke) shall consist of a movement by 90° and back to the 0° position. At the same time, a moment of 600 Nm minimum and an axial force of 4,000 N minimum (corresponding to a pressure of 8 bar) shall apply to the swivel joints. The number of rotary motions (double strokes, 90°) per minute shall amount to approx. 20. The motion intervals shall ensure that the swivel joints do not overheat. The tests shall be conducted with a test liquid that corresponds to the operating medium F 34 at a pressure of 8 bar. The conditions and results shall be documented as a proof.

5.2 Safety disconnect coupling:

Safety disconnect coupling with integrated strainer holder and stainless steel strainer (40 mesh), drip-tight ball cock with lockable opening lever. The safety disconnect coupling shall allow the quick and drip-tight removal of the refuelling coupling from the refuelling arm in the event of a defect or for strainer inspections.

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The ball cock must be lockable in the open and closed states.

Opening and disconnection of the coupling as well as strainer replacement shall not require any tools.

A twofold safety mechanism (mechanical and automatic) shall prevent unintentional disconnection during operation.

Disconnect coupling with a double gasket made of aromatics- and fuel-resistant material.

The connection to the refuelling arm shall be designed as a flange connection suitable for DN 80/PN 10 flanges.

The disconnect coupling shall be designed for a permissible operating pressure of 16 bar.

The factory acceptance certificate as per DIN 55 350 Part 18 – 4.2.2 and the material test certificate as per DIN 10 204 – 3.1 B shall be submitted!

5.3 Compact swivel joint for pressure refuelling coupling for jet fuels:

In order to facilitate the coupling process, a swivel joint shall be fitted between the shut-off device with strainer and the aircraft refuelling coupling. The swivel joint shall not require any lubrication or maintenance.

5.4 Tank truck coupling:

The coupling provides the connection of the refuelling arm to the tank truck. It shall be designed as a dry-break coupling.

5.4.1 For replenishment with jet fuel:

Pressure refuelling coupling

For USAFE facilities : make Cal-Val Co. No. 341GF  
 For other facilities : as specified by the user

5.4.2 For replenishment with mogas and Diesel fuel:

Dry-break coupling aligned to the type of tank truck, which may differ from air base to air base.

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<b>REFUELLING ARM (retractable)</b>		

### 6.0 Materials

Pipes	:	stainless steel, mat. no. 1.4571 as per STS-M 19
Elbows	:	stainless steel, mat. no. 1.4571 as per STS-M 20
Flanges	:	stainless steel, mat. no. 1.4571
Flanged swivel joints	:	completely made of stainless steel, material no. 1.4404
Guiding structure	:	stainless steel, mat. no. 1.4301 or higher grade
Bolts and nuts	:	stainless steel
Spring structure	:	steel, corrosion protected
Fasteners	:	stainless steel, mat. no. 1.4301 or higher grade
Bracing, clamps and handles	:	stainless steel, mat. no. 1.4301 or higher grade
Gaskets	:	resistant to kerosene and aromatics
Shut-off device	:	aluminum or cast aluminum and internal parts made of rustproof material
Strainer	:	stainless steel, mat. no. 1.4571
Compact swivel joint	:	stainless steel, mat. no. 1.4404
Pressure refuelling coupling	:	aluminum or cast aluminum and internal parts made of stainless steel

### 7.0 Testing and acceptance

- Material testing in accordance with the specifications and standards mentioned above
- Leak test
- Evidence of electrical conductivity
- Functional testing after installation in the pit

#### 7.1 Evidence of quality features

- Source material in accordance with the specifications and standards mentioned above
- Factory test certificate as per DIN 55 350 Part 18
- Material test certificate as per DIN EN 10 204 - 3.1 B
- Declaration of conformity as per Directive 2014/68/EC

7.2 The supplier shall deliver the refuelling arm in completely assembled condition and install it in the pit.

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DESCRIPTION <b>REFUELLING ARM (retractable)</b>	ID-CODE	

7.3 Identification/labeling

- Manufacturer's specification as per DIN standards
- CE Conformity Sign as per Art. 19 of the Directive 2014/68/EC

7.4 Legally required evidence:

General Product Safety Directive (GPSD) and associated regulations (GPSR), Construction Product Act, especially:

- EC Declaration of Conformity as per Annex IV of the Directive 2014/68/EC

Periodic inspection by an authorized inspection body

In accordance with the German Ordinance on Industrial Safety and Health (BetrSichV), the operational condition of systems requiring monitoring and their pertaining components must be inspected at regular intervals by an authorized inspection body. The operator of the entire system and its components must prepare the inspection lists on the basis of a technical safety assessment. A prerequisite to this task is that the manufacturer determines and specifies the inspection intervals for each individual component of the system requiring monitoring. As the operator wants the control office to authorize review periods as long as possible, the fittings and components described in this specifications must be designed and dimensioned in a way that they allow a review period of 3 years for electrical and 5 years for mechanical components.

Warranty

The warranty period for the entire refuelling arm shall cover four years.

The below manufacturer(s) is (are) known to manufacture products of the type specified in this specification section. Any other manufacturer(s) from a NATO member Nation Country may provide this product, provided they can prove to meet this specification.

Make: Cavotec, 65760 Eschborn, Germany

Type : Meyerinck Pantograph CM. 3.08.5 – BL. T

or Fa. CLA-VAL-CO

or equivalent.

STS-M 0 must be adhered to.

<p><b>AUTHOR:</b></p> <p><b>LBB NIEDERLASSUNG LANDAU</b>  <b>UNTERTORPLATZ 1</b>  <b>D-76829 LANDAU</b>  <b>TEL.: +49 6341 912 -0</b>  <b>postfach.landau@LBBnet.de</b></p>	<p><b>ISSUED BY:</b></p>
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STANDARD SPECIFICATION	<h2>STS – M 148</h2>	
DESCRIPTION	ID-CODE	
<b>REFUELLING ARM (stationary)</b>		

The refuelling arm shall be used for **hot refuelling** of **tactical aircrafts**. It shall be flanged to the refuelling pit at the edge of the traffic area.

### 1.0 Basic documents

1. Directive 2014/68/EC of the European Parliament and of the Council on the approximation of the laws of the Member States concerning pressure equipment
2. Directive 2006/42/EC of the European Parliament and of the Council on the approximation of the laws of the Member States of 17 May 2006 concerning machinery
3. Directive 2014/34/EC of the European Parliament and of the Council on the approximation of the laws of the Member States concerning the appropriate use of equipment in explosion hazard areas (ATEX)
4. Regulation (EU) No. 305/2011 of the European Parliament and of the Council on laying down harmonized conditions for the marketing of construction products
5. General Product Safety Directive (GPSD) and associated regulations (GPSR)
6. German Ordinance on Industrial Safety and Health (BetrSichV)
7. Technical Rules on the Operational Safety/Hazardous Materials, especially TRBS 3151 / TRGS 751
8. VdTÜV Codes of Practice, especially VdTÜV-MB 967, VdTÜV-MB 966-1 and VdTÜV-MB 966-2
9. DIN, DIN EN and DIN EN ISO standards, especially DIN 10222-5
10. STANAG 3682 (Procedures to establish electrical safety connections during the use of aircraft POL equipment)
11. AD-2000 regulation, especially AD Code of Practice HP 2/1
12. Technical Rules for the Handling of Flammable Liquids, especially TRbF 50 (other source of information)

### 2.0 Use

Conveyed media : jet fuel, mogas, diesel fuel and petroleum products  
as per MIL-G-5572 F, MIL-T-5624 L

Rated pressure : PN 10

Temperature range : -40°C to +80°C (-40 °F to 176 °F)

### 3.0 Requirements

- 3.1 The refuelling arm shall be designed and executed in such a manner that all wheels of the four wheel carriers touch the ground on the different gradients of the hardstand.
- 3.2 The refuelling arm shall be composed of three sections and the refuelling part (refuelling nozzle) in addition. The total length of the three sections will be specified in the design specifications.  
(Possible length per section: 3.0 m to 7.0 m).

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DESCRIPTION	ID-CODE	
<b>REFUELLING ARM (stationary)</b>		

- 3.3 The refuelling arm in combination with a specially designed refuelling nozzle shall allow coupling to an aircraft at a height of 0.30 m and of 2.20 m above the top level of the hardstand. Emergency filling of tank trucks shall be considered as well.
- 3.4 The front part of the refuelling arm with the refuelling nozzle shall be supported by an adjustable spring structure. This structure shall counterbalance the weight of the coupling, the swivel joints and the connecting pipe sections in order to ensure that only a minimum of forces act on the refuelling connection to the aircraft. Only one person shall be required to handle the refuelling part.
- 3.4.1 The front part of the refuelling arm with the refuelling nozzle shall not exceed a maximum height of 0.45 m above the hardstand surface when lying on the hardstand.
- 3.5 The maximum height of the refuelling arm shall be below 0.90 m.
- 3.6 Hoses are not permitted as a connection between the refuelling arm and the aircraft.
- 3.7 The refuelling arm shall be equipped with three supporting structures. Two spring-loaded casters shall be fitted underneath each supporting structure.
- 3.8 At the bottom side of the pipe sections between the supporting structures, braces of U-channel sections shall be welded on as tiebacks to ensure sufficient stability.
- 3.9 A lockable support shall be fitted to the refuelling arm in order to ensure that the refuelling part can be locked in position. The support shall keep the refuelling nozzle in a safe position when the refuelling arm is out of operation or moved around.
- 3.9.1 In order to lock the refuelling arm in its parking position, two locking devices shall be provided for.
- 3.10 The entire electrical resistance between the connecting flange and the pressure refueling coupling must not exceed 1 K Ohm. Exterior bridging of the swivel joints is not permitted.
- 3.11 The refuelling arm shall be fitted with a grounding cable reel. The ground wire must have a length of 20.0 m minimum. The cable reel, the ground wire and the connectors must comply with the US military specifications MIL-R-83232 B (2) and MIL-R-83325 A (1).
- 3.12 The refuelling arm shall be fitted with facilities for sampling, draining, pressure gaging and venting.
- 3.13 The entire pressure drop on the refuelling arm (without strainer and pressure refuelling coupling) must not exceed 0.6 bar at a flow rate of 2,000 l/min. The pressure drop is measured during recirculation of the fuel via the flush line.

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DESCRIPTION	ID-CODE	
<b>REFUELLING ARM (stationary)</b>		

#### 4.0 Design:

The following dimensions must be adhered to:

Connecting flange	:	DN 80, PN 16
Pipeline parts	:	DN 80
flange connection	:	as per STS-M 64
Flanged swivel joints	:	DN 80, PN 10 (125 lbs)
Shut-off unit upstream of the re-fuelling coupling incl. strainer	:	DN 65, PN 10
Compact swivel joint	:	DN 65, PN 10 (125 lbs)
Pressure refuelling coupling	:	2 ½", PN 10 (125 lbs)

#### 5.0 Equipment

##### 5.1 Flanged swivel joints:

In order to ensure a maximum of flexibility, the refuelling arm shall be equipped with eleven (11) swivel joints at least.

The swivel joints shall be designed as flanged versions and must allow rotations of 360°. They shall not require any lubrication or maintenance.

Each swivel joint shall be equipped with two ball bearings, one roller bearing and two gaskets. The outer gasket shall provide dust shielding in addition.

Construction and design are required to provide for the bearing of all moment forces generated by weight in connection with the rotary motion. At the same time, absolute tightness at positive and negative pressures shall be ensured.

When selecting the gaskets, particular care shall be taken as to ensure the required flexibility of the material at the specified low temperatures.

Each swivel joint shall have two connecting flanges. The latter shall be prepared to accommodate O-ring gaskets. Swivel joints welded to pipe sections or elbows are not permitted.

The manufacturer shall guarantee the absolute tightness of the swivel joints for a period of two years.

##### 5.1.1 Requirement:

The manufacturer of the swivel joints shall submit a certificate of the factory tests conducted on the swivel joint in the course of the sampling procedure. The certificate shall provide evidence of the kind and scope

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of the conducted tests. Details on the endurance tests that have been conducted are of particular importance. The following conditions shall be satisfied as a minimum in these tests:

Endurance tests with 100,000 rotary motions (double strokes) per joint on three different flanged swivel joints of the same type. A rotary motion (double stroke) shall consist of a movement by 90° and back to the 0° position. At the same time, a moment of 600 Nm minimum and an axial force of 4,000 N minimum (corresponding to a pressure of 8 bar) shall apply to the swivel joints. The number of rotary motions (double strokes, 90°) per minute shall amount to approx. 20. The motion intervals shall ensure that the swivel joints do not overheat. The tests shall be conducted with a test liquid that corresponds to the operating medium F 34 at a pressure of 8 bar. The conditions and results shall be documented as a proof.

#### 5.2 Spring-loaded casters:

The refuelling arm shall be equipped with six (6) casters made of galvanized or hot-galvanized steel or cast. The rotating assembly shall be fitted with ball bearings and grease nipples. The casters shall have a total diameter of at least 100 mm and be fitted with two long-term lubricated grooved ball bearings with grease nipples. The tread material of the casters shall be polyurethane with a shore hardness of 90°. The spring-loaded casters shall be designed for a static load of 275 kg and a dynamic load of 150 kg at 20 km/h.

#### 5.3 Sampling assembly:

It shall consist of a shut-off valve and a special dry-break coupling for the connection of a sampling vessel typically used by NATO/USAFE.

The material shall correspond to the pipe material used.

#### 5.4 Drainage assembly:

It shall consist of a shut-off valve DN 15, PN 16, a dry-break coupling with counterpart and a hose fitting with a fuel-resistant hose of 1.0 m length.

The material shall correspond to the pipe material used.

#### 5.5 Pressure gage assembly:

It shall consist of:

- Manometer shut-off valve
- Pressure gage, Ø 100 mm, liquid damped, Indicating range: 0 to 16 bar

The material shall correspond to the pipe material used.

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DESCRIPTION	ID-CODE	
<b>REFUELLING ARM (stationary)</b>		

5.6 Venting assembly:

It shall consist of a vent cock, 3/8", with an elbow of 180°.

The material shall correspond to the pipe material used.

5.7 Safety disconnect coupling:

Safety disconnect coupling with integrated strainer holder and stainless steel strainer (40 mesh), drip-tight ball cock with lockable opening lever. The safety disconnect coupling shall allow the quick and drip-tight removal of the refuelling coupling from the refuelling arm in the event of a defect or for strainer inspections.

The ball cock must be lockable in the open and closed states.

Opening and disconnection of the coupling as well as strainer replacement shall not require any tools.

A twofold safety mechanism (mechanical and automatic) shall prevent unintentional disconnection during operation.

Disconnect coupling with a double gasket made of aromatics- and fuel-resistant material.

The connection to the refuelling arm shall be designed as a flange connection suitable for tank truck flanges DIN 28 162 DN 80/PN 10.

The disconnect coupling shall be designed for an operating pressure of 16 bar.

The factory acceptance certificate as per DIN 55 350 Part 18 – 4.2.2 and the material test certificate as per DIN 10 204 – 3.1 B shall be submitted!

5.8 Compact swivel joint for pressure refuelling coupling:

In order to facilitate the coupling process, a swivel joint shall be fitted between the shut-off device with strainer and the aircraft refuelling coupling. The swivel joint shall not require any lubrication or maintenance.

5.9 Pressure refuelling coupling

This coupling provides the connection between the aircraft and the refuelling arm and shall be designed for dry disconnection.

For USAFE facilities : make Cal-Val Co. No. 341GF  
 For other facilities : as specified by the user

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DESCRIPTION	ID-CODE	
<b>REFUELLING ARM (stationary)</b>		

### 6.0 Materials

Pipes	:	stainless steel, mat. no. 1.4571 as per STS-M 19
Elbows	:	stainless steel, mat. no. 1.4571 as per STS-M 20
Flanges	:	stainless steel, mat. no. 1.4571 or 1.4404
Flanged swivel joints	:	completely made of stainless steel, material no. 1.4404
Bolts and nuts	:	stainless steel
Supporting structure and fasteners	:	hot galvanized steel
Spring damper for refuelling part	:	supporting structure made of galvanizes steel; spring steel as per DIN EN 10089, coated with epoxy resin
Bracing, clamps and handles	:	stainless steel, mat. no. 1.4301 or higher grade
Gaskets	:	resistant to kerosene and aromatics
Shut-off device	:	aluminum or cast aluminum and internal parts made of rustproof material
Strainer	:	stainless steel, mat. no. 1.4571
Compact swivel joint	:	stainless steel, mat. no. 1.4404
Pressure refuelling coupling	:	aluminum or cast aluminum and internal parts made of stainless steel

### 7.0 Testing and acceptance

- Material testing in accordance with the specifications and standards mentioned above
- Leak test
- Evidence of electrical conductivity

### 7.1 Evidence of quality features

- Source material in accordance with the specifications and standards mentioned above
- Factory test certificate as per DIN 55 350 Part 18
- Material test certificate as per DIN EN 10 204 - 3.1 B

<b>AUTHOR:</b> <b>LBB NIEDERLASSUNG LANDAU</b> <b>UNTERTORPLATZ 1</b> <b>D-76829 LANDAU</b> <b>TEL.: +49 6341 912-0</b> <b>postfach.landau@LBBnet.de</b>	<b>ISSUED BY:</b>
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<b>STANDARD SPECIFICATION</b>	<b>STS – M 148</b>	
DESCRIPTION	ID-CODE	
<b>REFUELLING ARM (stationary)</b>		

- Declaration of conformity as per Directive 2014/68/EC

7.2 The refuelling arm shall be delivered in completely assembled condition.

7.3 Identification/labeling

- Manufacturer's specification as per DIN standards
- CE Conformity Sign as per Directive 2014/68/EC

7.4 Legally required evidence:

General Product Safety Directive (GPSD) and associated regulations (GPSR), Construction Product Act, especially:

- EC Declaration of Conformity as per Annex IV of the Directive 2014/68/EC

Periodic inspection by an authorized inspection body

In accordance with the German Ordinance on Industrial Safety and Health (BetrSichV), the operational condition of systems requiring monitoring and their pertaining components must be inspected at regular intervals by an authorized inspection body. The operator of the entire system and its components must prepare the inspection lists on the basis of a technical safety assessment. A prerequisite to this task is that the manufacturer determines and specifies the inspection intervals for each individual component of the system requiring monitoring. As the operator wants the control office to authorize review periods as long as possible, the fittings and components described in this specifications must be designed and dimensioned in a way that they allow a review period of 3 years for electrical and 5 years for mechanical components.

Warranty

The warranty period for the entire refuelling arm shall cover four years.

The below manufacturer(s) is (are) known to manufacture products of the type specified in this specification section. Any other manufacturer(s) from a NATO member Nation Country may provide this product, provided they can prove to meet this specification.

Make: Cavotec, 65760 Eschborn, Germany

Type : Meyerinck Pantograph CM. XX. 0.3-F.R (XX= total length as specified by the CA)

or Fa. CLA-VAL-CO

or equivalent.

STS-M 0 must be adhered to.

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STANDARD SPECIFICATION	<h2>STS – M 150</h2>	
DESCRIPTION	ID-CODE	
<b>REFUELLING ARM (stationary)</b>		

The refuelling arm shall be used for hot refuelling of **helicopters**. It shall be flanged to the refuelling pit at the edge of the traffic area.

### 1.0 Basic documents

1. Directive 2014/68/EC of the European Parliament and of the Council on the approximation of the laws of the Member States concerning pressure equipment
2. Directive 2006/42/EC of the European Parliament and of the Council on the approximation of the laws of the Member States of 17 May 2006 concerning machinery
3. Directive 2014/34/EC of the European Parliament and of the Council on the approximation of the laws of the Member States concerning the appropriate use of equipment in explosion hazard areas (ATEX)
4. Regulation (EU) No. 305/2011 of the European Parliament and of the Council on laying down harmonized conditions for the marketing of construction products
5. General Product Safety Directive (GPSD) and associated regulations (GPSR)
6. German Ordinance on Industrial Safety and Health (BetrSichV)
7. Technical Rules on the Operational Safety/Hazardous Materials, especially TRBS 3151 / TRGS 751
8. VdTÜV Codes of Practice, especially VdTÜV-MB 967, VdTÜV-MB 966-1 and VdTÜV-MB 966-2
9. DIN, DIN EN and DIN EN ISO standards, especially DIN 10222-5
10. STANAG 3682 (Procedures to establish electrical safety connections during the use of aircraft POL equipment).
11. AD-2000 regulation, especially AD Code of Practice HP 2/1
12. Technical Rules for the Handling of Flammable Liquids, especially TRbF 50 (other sources of information)

### 2.0 Use

Conveyed media : jet fuel, mogas, diesel fuel and petroleum products  
as per MIL-G-5572 F, MIL-T-5624 L

Rated pressure : PN 10

Temperature range : -40°C to +80 °C (-40 °F to 176 °F)

### 3.0 Requirements

- 3.1 The refuelling arm shall be designed and executed in such a manner that all wheels of the four wheel carriers touch the ground on the different gradients of the hardstand.
- 3.2 The refuelling arm shall be composed of three sections and the refuelling part (refuelling nozzle) in addition. The total length of the three sections will be specified in the design specifications.  
(Possible length per section: 4.0 m to 10.0 m).

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DESCRIPTION	ID-CODE	
<b>REFUELLING ARM (stationary)</b>		

- 3.3 The refuelling arm in combination with a specially designed refuelling nozzle shall allow coupling to a helicopter at a height of 0.30 m and of 2.00 m above the top level of the hardstand. Emergency filling of tank trucks shall be considered as well.
- 3.4 The front part of the refuelling arm with the refuelling nozzle shall be supported by an adjustable string structure. This structure shall counterbalance the weight of the coupling, the swivel joints and the connecting pipe sections in order to ensure that only a minimum of forces act on the refuelling connection to the aircraft.
  - 3.4.1 The front part of the refuelling arm with the refuelling nozzle shall not exceed a maximum height of 0.75 m above the hardstand surface when lying on the hardstand.
- 3.5 The maximum height of the refuelling arm shall not exceed 0.90 m.
- 3.6 For pressure refuelling, hoses are not permitted as a connection between the refuelling arm and the helicopter.
- 3.7 For free-fall refuelling, an automatic fuel dispenser gun with front fitted hose and dry-break coupling shall provide the connection between the refuelling arm and the helicopter.
- 3.8 The refuelling arm shall be equipped with three supporting structures. Two spring-loaded casters shall be fitted underneath each supporting structure.
  - 3.8.1 The volumeter shall have a separate dedicated supporting structure.
- 3.9 At the bottom side of the pipe sections between the supporting structures, braces of U-channel sections shall be welded on as tiebacks to ensure sufficient stability.
- 3.10 A lockable support shall be fitted to the refuelling arm in order to ensure that the refuelling part can be locked in position. The support shall keep the refuelling nozzle in a safe position when the refuelling arm is out of operation or moved around.
  - 3.10.1 Two locking mechanisms shall be provided to lock the retracted refuelling arm in its parking position.
- 3.11 A flow meter shall be installed in the foremost section (1) of the refuelling arm.
- 3.12 The entire electrical resistance between the connecting flange and the pressure refuelling coupling must not exceed 1 K Ohm. Exterior bridging of the swivel joints is not permitted. (This value does not refer to refuelling hoses).

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<h2>STANDARD SPECIFICATION</h2>	<h1>STS – M 150</h1>	
DESCRIPTION	ID-CODE	
<b>REFUELLING ARM (stationary)</b>		

- 3.13 The refuelling arm shall be fitted with a grounding cable reel. The ground wire shall have a length of 20.0 m minimum. The cable reel, the ground wire and connecting terminal shall comply with the US military specifications MIL-R-83232 B (2) and MIL-R-83325 A (1).
- 3.14 The refuelling arm shall be fitted with facilities for sampling, draining, pressure gaging and venting.
- 3.15 The refuelling arm shall be fitted with a hydraulic deadman control in the first section.
- 3.16 The entire pressure drop on the refuelling arm (without strainer and pressure refuelling coupling) must not exceed 0.2 bar at a flow rate of 500 l/min.

4.0 Design:

The following dimensions must be adhered to:

Connecting flange	:	DN 80, PN 16
Flange connection	:	as per STS-M 64
Pipeline parts	:	DN 80
Flanged swivel joints	:	DN 80, PN 10 (125 lbs)
Coarse strainer	:	DN 80, PN 16
Volumeter	:	DN 80, PN 16 as per STS-M 167
Shut-off unit upstream of refuelling coupling incl. strainer	:	DN 65, PN 10
Compact swivel joint	:	DN 65, PN 10 (125 lbs)
Pressure refuelling coupling	:	2 ½", PN 10 (125 lbs)
Hose	:	DN 32
Automatic fuel dispenser gun	:	1 bar (PN 16)

5.0 Equipment

5.1 Flanged swivel joints:

In order to ensure a maximum of flexibility, the refuelling arm shall be equipped with eleven (11) swivel joints at least.

The swivel joints shall be designed as flanged versions and must allow rotations of 360°.

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<b>REFUELLING ARM (stationary)</b>		

Each swivel joint shall be equipped with two ball bearings, one roller bearing and two gaskets. The outer gasket shall provide dust shielding in addition.

Construction and design are required to provide for the bearing of all moment forces generated by weight in connection with the rotary motion. At the same time, absolute tightness at positive and negative pressures shall be ensured.

When selecting the gaskets, particular care shall be taken as to ensure the required flexibility of the material at the specified low temperatures.

Each swivel joint shall have two connecting flanges. The latter shall be prepared to accommodate O-ring gaskets.

Swivel joints welded to pipe sections or elbows are not permitted.

The manufacturer shall guarantee the absolute tightness of the swivel joints for a period of two years.

#### 5.1.1 Requirement:

The manufacturer of the swivel joints shall submit a certificate of the factory tests conducted on the swivel joint in the course of the sampling procedure. The certificate shall provide evidence of the kind and scope of the conducted tests. Details on the endurance tests that have been conducted are of particular importance. The following conditions shall be satisfied as a minimum in these tests:

Endurance tests with 100,000 rotary motions (double strokes) per joint on three different flanged swivel joints of the same type. A rotary motion (double stroke) shall consist of a movement by 90° and back to the 0° position. At the same time, a moment of 600 Nm minimum and an axial force of 4,000 N minimum (corresponding to a pressure of 8 bar) shall apply to the swivel joints. The number of rotary motions (double strokes, 90°) per minute shall amount to approx. 20. The motion intervals shall ensure that the swivel joints do not overheat. The tests shall be conducted with a test liquid that corresponds to the operating medium F 34 at a pressure of 8 bar. The conditions and results shall be documented as a proof.

#### 5.2 Loaded casters:

The refuelling arm shall be equipped with six (6) casters made of galvanized or hot-galvanized steel or cast. The rotating assembly shall be fitted with ball bearings and grease nipples. The casters shall have a total diameter of at least 200 mm and be fitted with two long-term lubricated grooved ball bearings with grease nipples. The tread material of the casters shall be polyurethane with a shore hardness of 90°. The loaded casters shall be designed for a static load of 675 kg and a dynamic load of 395 kg at 20 km/h.

##### 5.2.1 Two of the six casters shall be fitted with a brake.

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DESCRIPTION <b>REFUELLING ARM (stationary)</b>	ID-CODE	

5.3 Sampling assembly:

It shall consist of a shut-off valve and a special dry-break coupling for the connection of a sampling vessel typically used by NATO/USAFE.

The material shall correspond to the pipe material used.

5.4 Drainage assembly:

It shall consist of a shut-off valve DN 15, PN 16, a dry-break coupling with counterpart and a hose fitting with a fuel-resistant hose of 1 m length.

The material shall correspond to the pipe material used.

5.5 Pressure gage assembly:

It shall consist of:

- Manometer shut-off valve
- Pressure gage, Ø 100 mm, liquid damped, indicating range: 0 to 16 bar

The material shall correspond to the pipe material used.

5.6 Venting assembly:

It shall consist of a vent cock, 3/8", with an elbow of 180°. The material shall correspond to the pipe material used.

5.7 Safety disconnect coupling:

Safety disconnect coupling with integrated strainer holder and stainless steel strainer (40 mesh), drip-tight ball cock with lockable opening lever. The safety disconnect coupling shall allow the quick and drip-tight removal of the refuelling coupling from the refuelling arm in the event of a defect or for strainer inspections.

The ball cock must be lockable in the open and closed states.

Opening and disconnection of the coupling as well as strainer replacement shall not require any tools.

A twofold safety mechanism (mechanical and automatic) shall prevent unintentional disconnection during operation.

Disconnect coupling with a double gasket made of aromatics- and fuel-resistant material.

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The connection to the refuelling arm shall be designed as a flange connection suitable for tank truck flanges DIN 28 162 DN 80/PN 10.

The disconnect coupling shall be designed for an operating pressure of 16 bar.

The factory acceptance certificate as per DIN 55 350 Part 18 – 4.2.2 and the material test certificate as per DIN 10 204 – 3.1 B shall be submitted!

5.7.1 The specifications of the helicopter adapter might require different designs (see design specifications).

5.8 Compact swivel joint for pressure refuelling coupling:

In order to facilitate the coupling process, a swivel joint shall be fitted between the shut-off device with strainer and the aircraft refuelling coupling. The swivel joint shall not require any lubrication or maintenance.

5.8.1 The specifications of the helicopter adapter might require different designs (see design specifications).

5.9 Pressure refuelling coupling

This coupling provides the connection between the aircraft and the refuelling arm and shall be designed for dry disconnection.

For USAFE facilities : make Cal-Val Co. No. 341GF  
 For other facilities : as specified by the user

5.9.1 The specifications of the helicopter adapter might require different designs (see design specifications).

5.10 Free-fall refuelling:

The unit must consist of:

- Adapter piece
- Refuelling hose as per S 3158, DN 32, length: 2.50 m approx. bursting pressure: 220 bar, electrically conductive  $2 \times 10^4$  Ohm/m
- Automatic fuel dispenser gun: 200 ltr/min, 1 ¼", with PTB approval

The helicopter connection might require different designs (see design specifications).

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DESCRIPTION <b>REFUELLING ARM (stationary)</b>	ID-CODE	

5.11 Volumeter :

Volume displacement meter DN 80, accuracy higher than  $\pm 0.3\%$ ; pivoting counter with 8-digit totalizing counter and 5-digit resettable roller counter.

5.12 Deadman control:

The deadman control shall be fitted in the first section of the refuelling arm. The connecting tube shall be made of stainless steel. High-pressure hoses shall be used above the joints. The deadman control hose (high-pressure hose) has a length of 6 m.

6.0 Materials

Pipes	:	stainless steel, mat. no. 1.4571, as per STS-M 19
Elbows	:	stainless steel, mat. no. 1.4571, as per STS-M 20
Flanges	:	stainless steel, mat. no. 1.4571, as per DIN 17 440
Flanged swivel joints	:	completely made of stainless steel, material no. 1.4404
Coarse filter	:	stainless steel, mat. no. 1.4571
Volumeter	:	housing: stainless steel
Bolts and nuts	:	stainless steel
Supporting structure and fasteners	:	hot galvanized steel,
Spring damper for refuelling part	:	supporting structure made of galvanized steel; spring steel as per DIN EN 10089, coated with epoxy resin
Bracing, clamps and handles	:	stainless steel, mat. no. 1.4301 or higher grade
Gaskets	:	resistant to kerosine and aromatics
Shut-off device	:	aluminum or cast aluminum and internal parts made of rustproof Material, non-ferrous material
Strainer	:	stainless steel, mat. no. 1.4571
Compact swivel joint	:	stainless steel, mat. no. 1.4404

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DESCRIPTION	ID-CODE	
<b>REFUELLING ARM (stationary)</b>		

- Pressure refuelling coupling : aluminum or cast aluminum and internal parts made of stainless steel
- Free-fall refuelling adapter : aluminum or cast aluminum, surface treated and internal parts made of stainless steel
- Hose : as per BS 3158
- Deadman control : cast aluminum, surface treated, internal parts made of stainless steel

#### 7.0 Testing and acceptance

- Material testing in accordance with the specifications and standards mentioned above
- Leak test
- Evidence of electrical conductivity

#### 7.1 Evidence of quality features

- Source material in accordance with the specifications and standards mentioned above
- Factory test certificate as per DIN 55 350 Part 18
- Material test certificate as per DIN EN 10 204 - 3.1 B
- Declaration of conformity as per Directive 2014/68/EC

7.2 The refuelling arm shall be delivered in completely assembled condition.

#### 7.3 Identification/labeling

- Manufacturer's specification as per DIN standards
- CE Conformity Sign as per Directive 2014/68/EC

#### 7.4 Legally required evidence:

General Product Safety Directive (GPSD) and associated regulations (GPSR), Construction Product Act, especially:

- EC Declaration of Conformity as per Annex IV of the directive 2014/68/EC

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DESCRIPTION <b>REFUELLING ARM (stationary)</b>	ID-CODE	

Periodic inspection by an authorized inspection body

In accordance with the German Ordinance on Industrial Safety and Health (BetrSichV), the operational condition of systems requiring monitoring and their pertaining components must be inspected at regular intervals by an authorized inspection body. The operator of the entire system and its components must prepare the inspection lists on the basis of a technical safety assessment. A prerequisite to this task is that the manufacturer determines and specifies the inspection intervals for each individual component of the system requiring monitoring. As the operator wants the control office to authorize review periods as long as possible, the fittings and components described in this specifications must be designed and dimensioned in a way that they allow a review period of 3 years for electrical and 5 years for mechanical components.

Warranty

The warranty period for the entire refuelling arm shall cover four years.

The below manufacturer(s) is (are) known to manufacture products of the type specified in this specification section. Any other manufacturer(s) from a NATO member Nation Country may provide this product, provided they can prove to meet this specification.

Make: Cavotec, 65760 Eschborn, Germany

Type : Meyerinck Pantograph CM. XX. 08.3-F.M.R.L (XX= total length as specified by the CA)

or Fa. CLA-VAL-CO

or equivalent.

STS-M 0 must be adhered to.

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<h2>STANDARD SPECIFICATION</h2>	<h1>STS – M 158</h1>	
DESCRIPTION	ID-CODE	
<b>BYPASS CONTROL VALVE WITH FLOW LIMITATION</b>	<b>BCVF</b>	

Control valve in bypass line of storage filter/water separator, for hydraulic changeover and flow limitation, at closed filter/water separator control valve.

Specifications STS-M 0 and STS-M 1 are part of this specification.

Features

a) Flow limitation:

Automatic flow limitation, manually adjustable.

b) Check feature:

Valve shall close immediately if outlet pressure of main valve is higher than valve inlet pressure.

c) Alarm signal:

Contact-free contactor must close alarm contact, when valve is open, and open alarm contact when valve is closed.

d) Opening function water hammer:

When the maximum water level in the sump of the filter/water separator vessel is exceeded and therefore the inlet filter/water separator valve is closing, the BCVF must open so quickly that the operation pressure in the storage pipe of the filter/manifold station will not be exceeded more than 1.0 bar as result of a pressure surge.

e) Opening function differential pressure:

When the maximum set differential pressure in the filter /water separator is exceeded and therefore the inlet filter/water separator valve is closing, the BCVF must open so quickly that the operation pressure in the storage pipe of the filter/manifold station will not be exceeded more than 1.0 bar as result of a pressure surge.

f) Automatic closing:

When the filter/water separator valve of the inlet filter/water separator is re-opening, the BCVF must close. The duration of the change-over phase, from the start of the opening procedure at the filter/water separator until the complete closing of the BCVF must not exceed 20 sec.

Design

Material of main valve body : See drawing and STS-M 1

Nominal size of valve : See drawing

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STANDARD SPECIFICATION	<h2>STS – M 158</h2>	
DESCRIPTION <b>BYPASS CONTROL VALVE WITH FLOW LIMITATION</b>	ID-CODE <b>BCVF</b>	

Construction length and connection flanges : See STS-M 1

Tests and evidence of quality features and all other requirements : See STS-M 1

Pilot and control valves:

NAME	CONNECTION SIZE *f. DN 150	SEE STS-M 1
Check pilot valve	1/2" NPT	Nr. 4.2
Differential pressure control valve	3/8" NPT	Nr. 4.13
Three-way pilot valve	1/2" NPT	Nr. 4.16
Three-way pilot valve	1/2" NPT	Nr. 4.17
Shift rod unit	3/4" NPT	Nr. 5.4
Orifice plate flange with plate	DN 150	Nr. 5.5

\* The above mentioned connection sizes and threads are recommendations. Any quickly releasable and replaceable cutting ring union is admitted.

Technical note: Connecting control lines between main valve and three-way pilot valve (5.17) as well as between three-way pilot valve (5.17) and filter/water separator valve are not part of this specification.

Pressure drop

Pressure drop caused by the BCVF (DN 150) when valve fully open (with all internals and attached parts such as orifice plate and pilot valves) and at a flow rate of 2000 l/min must not exceed 0.6 bar maximum.

The evidence of the max. pressure drop has to be submitted on request of the contracting agency, on a test stand acc. to choice of the contractor (AN), the costs have to be included in the unit price.

The below manufacturer(s) is (are) known to manufacture products of the type specified in this specification section. Any other manufacturer(s) from a NATO member Nation Country may provide this product, provided they can prove to meet this specification.

Brand: Fa. CLA-VAL-CO

Type: 40-36ACGS

or equivalent

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<h2>STANDARD SPECIFICATION</h2>	<h1>STS – M 159</h1>	
DESCRIPTION <b>HIGH-LEVEL SHUT-OFF VALVE FOR DRAIN TANK</b>	ID-CODE <b>HLVD</b>	

Install high-level shut-off valve in drain pipes before entering into the drain tank as control valve to prevent or avoid overfilling. The working pressure for this valve must be independent of the system operation pressure.

The high-level shut-off valve protects the drain tank against overfilling by pressurized pipes, installed with static slope.

Specifications STS-M 0 and STS-M 1 are part of this specification.

### Features

a) High-level shut-off:

Valve shall close automatically if the maximum liquid level in the drain tank is reached. Provide manual test-function.

b) Automatic opening:

Valve shall open automatically if the liquid level in the fuel tank lowers.

c) Securing of control line break:

Valve shall close in case of no existing control pressure (volume memory pressureless; rupture of the control line).

d) Thermal pressure relief:

In case of closed tank filling safety valve and pressure increase over the system's relief pressure by thermal expansion, the pressure maintaining control valve must open, and close after relieving the thermal pressure.

e) Manual test-function:

Manual testing of „high-level shut-off“ and „automatic opening“ features must be possible.

f) Alarm signal:

Contact-free contactor must close alarm contact, when valve is open, and open alarm contact when valve is closed

g) Pressure switching:

The drain pump of the drain tank must be started by a pressure switch in case of insufficient system pressure in the volume memory.

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STANDARD SPECIFICATION	<h2>STS – M 159</h2>	
DESCRIPTION <b>HIGH-LEVEL SHUT-OFF VALVE FOR DRAIN TANK</b>	ID-CODE <b>HLVD</b>	

Design

- Material of main valve body : Stainless steel cast or ductile cast iron with nickel coating acc. to STS-M 1 3.11.2.3 or 3.11.2.2
- Nominal size of valve : See drawing
- Construction length and connection flanges : See STS-M 1
- Tests and evidence of quality features and all other requirements : See STS-M 1
- Pilot and control valves:

Base valve with additional pressure intermediate chamber (Powertrol) acc. to STS-M 1, par. 4.24  
Pilot and control valves:

NAME	CONNECTION SIZE *f. DN 150	SEE STS-M 1
Check pilot valve	1/2" NPT	Nr. 4.2
Pressure maintaining pilot valve	1/2" NPT	Nr. 4.11
Float pilot valve	1/8" NPT	Nr. 4.21
Strainer/orifice unit	3/8" NPT	Nr. 5.2
Valve status indicator	1/2" NPT	Nr. 5.3
Shift rod unit	1/2" NPT	Nr. 5.4
Ball shut-off valve	1/2" NPT	Nr. 5.8
Volume memory	1/2" NPT	Nr. 5.11
Manual test	3/4" R	Nr. 5.12
Pressure switch for starting of the drain pump		

\* The above mentioned connection sizes and threads are recommendations. Any quickly releasable and replaceable cutting ring union is admitted.

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DESCRIPTION <b>HIGH-LEVEL SHUT-OFF VALVE FOR DRAIN TANK</b>	ID-CODE <b>HLVD</b>	

Technical note: Connection pipes between main valve and float control valve as well as the control unit for the supply of the main valve and required detonation safety are not part of this specification.

The below manufacturer(s) is (are) known to manufacture products of the type specified in this specification section. Any other manufacturer(s) from a NATO member Nation Country may provide this product, provided they can prove to meet this specification.

Brand: Fa. CLA-VAL-CO

Type: 129PAF/2129PAF

or equivalent.

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<h2>STANDARD SPECIFICATION</h2>	<h1>STS – M 160</h1>	
DESCRIPTION <b>BACK PRESSURE CONTROL VALVE</b>	ID-CODE <b>BPCV</b>	

Back Pressure Control Valve installed in the return loop line to control system pressure.

Specifications STS-M 0 and STS-M 1 are part of this specification.

Features

- a) Check-valve feature  
Valve shall close at once when pressure on the valve outlet exceeds inlet pressure.
- b) Pressure sustaining:  
Pressure control on valve inlet. Adjustable between 2.1 and 21.0 bar (30 psi – 300 psi)
- c) Solenoid control:  
Main valve activation via solenoid control. Valve must open when solenoid control is energized and the preset pressure is exceeded. Valve shall close when the solenoid valve is de-energized and the preset line pressure drops below the set point of control.
- d) Emergency actuation:  
Activation for opening and closing of the main valve by mechanical emergency actuation.
- e) Closing speed control  
Valve shall close slowly; closing speed adjustable between 2 and 30 seconds, without affecting the opening speed.

Design

- Materials of main valve body : stainless steel cast or ductile cast with nickel coating acc. to STS-M 1 3.11.2.3 or 3.11.2.2
- Size of valve : see drawing
- Total length and connecting flanges : acc. to STS--M 1
- Tests and evidence of quality feature and all other requirements : See to STS-M 1

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STANDARD SPECIFICATION	<h2>STS – M 160</h2>	
DESCRIPTION <b>BACK PRESSURE CONTROL VALVE</b>	ID-CODE <b>BPCV</b>	

Pilot and control valves:

NAME	CONNECTION SIZE *f. DN 150	SEE STS-M 1
Closing speed control valve	3/8" NPT	Nr. 4.1.2
Check valve	3/8" NPT	Nr. 4.2
Check valve	3/4" NPT	Nr. 4.2
Shut-off control valve	3/8" NPT	Nr. 4.3
Pressure reducing control valve	1/2" NPT	Nr. 4.9
Soleonid valve	1/4" NPT	Nr. 4.19
Strainer	3/4" NPT	Nr. 5.1
Valve position indicator	3/4" NPT	Nr. 5.3
Restriction assembly	3/8" NPT	Nr. 5.7

\* Above data on connection size and type of thread are recommendations only; any cutting ring unions will be permitted which are easy to loosen and to replace.

Technical note: Solenoid valve shall be fused with a slow-acting fuse acc. to choice of contractor.

The below manufacturer(s) is (are) known to manufacture products of the type specified in this specification section. Any other manufacturer(s) from a NATO member Nation Country may provide this product, provided they can prove to meet this specification.

Brand: Fa. CLA-VAL-CO

Type: 58-47ACGS

or equivalent

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<h2>STANDARD SPECIFICATION</h2>	<h1>STS – M 162</h1>	
DESCRIPTION <b>FLUSHING VALVE</b>	ID-CODE <b>FLV</b>	

Shut-off valve installed in the loop return line in the filter/manifold station to the fill line of the fuel tank for the flushing of the hydrant pipe.  
The specifications STS-M 0 and STS-M 1 are part of this specification.

### Features

#### Features

- a) Check-valve feature  
Valve shall close at once when pressure on the valve outlet exceeds inlet pressure.
- b) Pressure sustaining:  
Pressure control on main valve inlet adjustable between 1.4 and 14.0 bar (20 psi – 200 psi)
- c) Solenoid control:  
Main valve activation via solenoid control. Valve must open when solenoid control is energized and the preset pressure is exceeded. Valve shall close when the solenoid valve is de-energized and the preset line pressure drops below the set point of relief pilot.
- d) Emergency actuation:  
Activation for opening and closing of the main valve by mechanical emergency actuation.

### Design

Materials of main valve body : Stainless steel cast or ductile cast with nickel coating acc. to STS-M 1 3.11.2.3 or 3.11.2.2

Size of valve : see drawing

Total length and connection flanges : acc. to STS-M 1

Tests and evidences of quality feature and all other requirements : See STS-M 1

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STANDARD SPECIFICATION	<h2>STS – M 162</h2>	
DESCRIPTION <b>FLUSHING VALVE</b>	ID-CODE <b>FLV</b>	

Pilot and control valves:

NAME	CONNECTION SIZE *f. DN 150	SEE STS-M 1
Check valve	3/8" NPT	No. 4.2
Check valve	3/4" NPT	No. 4.2
Schut-off control valve	3/8" NPT	No. 4.3
Pressure relief control valve	1/2" NPT	No. 4.9
Solenoid valve	1/4" NPT	No. 4.19
Strainer/orifice assembly	3/8" NPT	No. 5.2
Valve position indicator	3/4" NPT	No. 5.3

\* Above data on connection size and type of thread are recommendations only; any cutting ring unions will per permitted which are easy to loosen and to replace.

The below manufacturer(s) is (are) known to manufacture products of the type specified in this specification section. Any other manufacturer(s) from a NATO member Nation Country may provide this product, provided they can prove to meet this specification.

Technical note: Solenoid valve shall be fused with a slow acting fuse acc. to choice of contractor.

Brand: Fa. CLA-VAL-CO

Type: 58-46ACGS

or equivalent

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<h2>STANDARD SPECIFICATION</h2>	<h1>STS – M 164</h1>	
DESCRIPTION <b>HYDRANT VALVE WITH VENTURI CONTROL</b>	ID-CODE <b>HVV</b>	

The control valve which is mounted in the hydrant refuelling shaft, Type II, shall control the direct aircraft refuelling process. Pressure control by the Venturi pipe in the refuelling arm.

The specifications STS-M 0 and STS-M 1 are part of this specification.

### Features

a) Outlet pressure control:

Constant pressure control at the aircraft coupling at any flow rate from 190 l/min (50 gpm) up to the valve's nominal rate, with a control accuracy of  $\pm 0,21$  bar (3,0 psi), independent of the valve's inlet pressure.

Setting range: from 1.1 bar to 5.3 bar (15 psi – 75 psi).

The refuelling pressure at the aircraft may not exceed 3.5 bar (50 psi).

b) Quick closing feature:

Valve shall close immediately when outlet pressure exceeds the adjusted value. The outlet pressure at the max. flow rate and at a closing time of the aircraft's tank valve of 0.5 sec shall remain below 8.4 bar (120 psi). The valve must not reopen before the pressure has dropped below the adjusted outlet pressure valve. The evidence of the actual pressure drop must be provided on request of the contracting agency (AG) on a test stand selected by the contractor (AN), the costs have to be included in the unit price

c) Hydraulic dead man switch:

Actuation of valve by hydraulic dead man switch via the system pressure. The main valve shall open when the dead man switch is actuated and shall close within 3 sec, when the dead man switch is released. When the hose coupling or the hose between the dead man switch and the valve control system breaks, no fuel may leak out. If one connection of the dead man switch is detached, the valve must close within 3 sec.

d) Open speed control:

Valve must open with a time delay. The opening time shall be adjustable between 2 and 30 sec, without impairing the quick-closing feature.

e) Thermal pressure release:

When the outlet pressure exceeds the inlet pressure, the valve must open for pressure compensation and backflow.

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<b>STANDARD SPECIFICATION</b>	<b>STS – M 164</b>	
DESCRIPTION <b>HYDRANT VALVE WITH VENTURI CONTROL</b>	ID-CODE <b>HVV</b>	

Design

Material of basic body : stainless steel cast of ductile cast with nickel coating acc. to STS-M 1, par. 3.11.2.2 or 3.11.2.3

Nominal width of valve : see drawing

Total length and connection flanges : see STS-M 1

Tests and evidences of quality features and further requirements : see STS-M 1

Control and pilot valves:

DESCRIPTION	CONNECTION SIZE *f. DN 150	SEE STS-M 1
Opening time pilot valve	3/8" NPT	Nr. 4.1
Check pilot valve	3/8" NPT	Nr. 4.2
Shut-off pilot valve	3/8" NPT	Nr. 4.3
Pressure reducing control valve	3/8" NPT	Nr. 4.8
Pressure relief control valve	3/4" NPT	Nr. 4.9
Three-way pilot valve	3/8" NPT	Nr. 4.18
Dead man switch pilot valve		Nr. 4.23
Strainer	3/4" NPT	Nr. 5.1
Valve position indicator	3/4" NPT	Nr. 5.3
Throttle unit	3/8" NPT	Nr. 5.7
Hydrant adapter	DN 100	Nr. 5.9

\* The above mentioned connection sizes and threads are recommendations. Any quickly releasable and replaceable cutting ring union is admitted.

The below manufacturer(s) is (are) known to manufacture products of the type specified in this specification section. Any other manufacturer(s) from a NATO member Nation Country may provide this product, provided they can prove to meet this specification.

Brand: Fa. CLA-VAL-CO

Type: 362AF-7

or equivalent

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<h2>STANDARD SPECIFICATION</h2>	<h1>STS – M 165</h1>	
DESCRIPTION <b>REFUELLING VALVE WITH VENTURI CONTROL</b>	ID-CODE <b>RCVV</b>	

The control valve which is mounted in the refuelling shaft, Type I (or at the refuelling arm, if the hydrant shaft is not equipped with a control valve) shall control the direct aircraft refuelling process.  
The Venturi pipe to be delivered shall be installed in the facility acc. to instructions of the manufacturer.

The specifications STS-M 0 and STS-M 1 are part of this specification.

### Features

a) Outlet pressure control:

Constant pressure control at the aircraft coupling at any flow rate from 190 l/min (50 gpm) up to the valve's nominal rate, with a control accuracy of  $\pm 0,21$  bar (3,0 psi), independent of the valve's inlet pressure.

Setting range: from 1.1 bar to 5.3 bar (15 psi – 75 psi).

The refuelling pressure at the aircraft may not exceed 3,5 bar (50 psi (+/- 5 psi)).

b) Quick closing feature:

Valve shall close immediately when outlet pressure exceeds the adjusted value. The outlet pressure at the max. flow rate and at a closing time of the aircraft's tank valve of 0.5 sec shall remain below 8.4 bar (120 psi). The valve must not reopen before the pressure has dropped below the adjusted outlet pressure valve. The evidence of this feature (outlet pressure under 8.4 bar) must be provided on request of the contracting agency (AG) on a test stand selected by the contractor (AN), the costs have to be included in the unit price

c) Hydraulic dead man switch:

Actuation of valve by hydraulic dead man switch via the system pressure. The main valve shall open when the dead man switch is actuated and shall close within 3 sec, when the dead man switch is released.

When the hose coupling or the hose between the dead man switch and the valve control system breaks, no fuel may leak out. If one connection of the dead man switch is detached, the valve must close within 3 sec.

d) Open speed control:

Valve must open with a time delay. The opening time shall be adjustable between 2 and 30 sec, without impairing the quick-closing feature.

e) Thermal pressure release:

When the outlet pressure exceeds the inlet pressure, the valve must open for pressure compensation and backflow.

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<b>STANDARD SPECIFICATION</b>	<b>STS – M 165</b>	
DESCRIPTION <b>REFUELLING VALVE WITH VENTURI CONTROL</b>	ID-CODE <b>RCVV</b>	

Design

- Material of basic body : Stainless steel cast of ductile cast with nickel coating acc. to STS-M 1, par. 3.11.2.2 or 3.11.2.3
- Nominal width of valve : See drawing
- Total length and connection flanges : See STS-M 1
- Test and evidence of quality features and further requirements : See STS-M 1

Control and pilot valves:

DESCRIPTION	CONNECTION SIZE *f. DN 150	SEE STS-M 1
Opening time pilot valve	3/8" NPT	Nr. 4.1.1
Check pilot valve	3/8" NPT	Nr. 4.2
Shut-off pilot valve	3/8" NPT	Nr. 4.3
Pressure reducing control valve	3/8" NPT	Nr. 4.8
Pressure relief control valve	3/4" NPT	Nr. 4.9
Three-way pilot valve	3/8" NPT	Nr. 4.18
Dead man switch pilot valve		Nr. 4.23
Strainer	3/4" NPT	Nr. 5.1
Valve position indicator	3/4" NPT	Nr. 5.3
Throttle unit	3/8" NPT	Nr. 5.7
Venturi pipe	DN 100	Nr. 5.10

\* The above mentioned connection sizes and threads are recommendations. Any quickly releasable and replaceable cutting ring union is admitted.

The below manufacturer(s) is (are) known to manufacture products of the type specified in this specification section. Any other manufacturer(s) from a NATO member Nation Country may provide this product, provided they can prove to meet this specification.

Brand: Fa. CLA-VAL-CO

Type: 362AF-7B

or equivalent

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<b>STANDARD SPECIFICATION</b>	<b>STS – M 166</b>	
DESCRIPTION <b>FILTER/WATER SEPARATOR VALVE WITH DIFFERENTIAL PRESSURE SHUT-OFF</b>		ID-CODE <b>QVFD</b>

The control valve which is mounted at the outlets of the filter/water separators shall control the flow rate to avoid excessive flow by means of flow limitation, high differential pressure shut-off and water outlet control.

Specifications STS-M 0 and STS-M 1 are part of this specification.

Features

a) Flow limitation:

Automatic flow limitation, manually adjustable.

b) Check feature:

Valve shall close immediately if outlet pressure of main valve is higher than valve inlet pressure.

c) Water outlet control:

Automatic water outlet from the tank sump of the filter/water separator. A manual float testing device shall be provided.

d) Water shut-off:

When the maximum water level in the water sump of the filter/water separator is exceeded, the valve must close within 5 sec. A manual testing device shall be provided.

e) Differential pressure shut-off:

When the adjusted maximum differential pressure at the filter /water separator is exceeded, the valve must close within 3 sec. and lock mechanically and hydraulically.

f) Unlock:

The locking at the differential pressure shut-off shall be unlockable by hand.

g) Float test:

A manual testing device for the tightness of the floating ball (buoyancy) shall be provided for.

h) Opening speed control

Valve shall open slowly; opening speed adjustable between 2 and 30 seconds without affecting closing of the valve.

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<h2>STANDARD SPECIFICATION</h2>	<h1>STS – M 166</h1>	
DESCRIPTION <b>FILTER/WATER SEPARATOR VALVE WITH DIFFERENTIAL PRESSURE SHUT-OFF</b>		ID-CODE <b>QVFD</b>

i) Opening speed control

Valve shall close slowly; closing opening speed adjustable between 2 and 30 seconds without affecting closing of the valve.

Design

- Material of main valve body : see drawing and STS-M 1
- Nominal size of valve : see drawing
- Total length and connection flanges : see STS-M 1
- Tests and evidence of quality features and all other requirements : see STS-M 1

Pilot and control valves:

NAME	CONNECTION SIZE *f. DN 150	SEE STS-M 1
Check pilot valve	1/2" NPT	No. 4.2
Opening speed pilot valve	3/8" NPT	No. 4.1.1
Closing speed pilot valve	3/8" NPT	No. 4.1.2
Water outlet valve	DN 25	No. 4.4
Differential pressure control valve	3/8" NPT	No. 4.12
Differential pressure pilot valve	1/8" NPT	No. 4.15
Three-way pilot valve	1/2" NPT	No. 4.16
Float control valve	1/8" NPT	No. 4.22
Valve position indicator	3/4" NPT	No. 5.3
Orifice plate flange	DN 150	No. 5.5

\* Above data on connection size and type of thread are recommendations only; all cutting ring unions will be permitted which are easy to loosen and to replace.

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<h2>STANDARD SPECIFICATION</h2>	<h1>STS – M 166</h1>	
DESCRIPTION <b>FILTER/WATER SEPARATOR VALVE WITH DIFFERENTIAL PRESSURE SHUT-OFF</b>		ID-CODE <b>QVFD</b>

Technical note: Connecting control lines between the main valve and the float control valve and between the water outlet valve and the control lines of the filter/water separator as well as the inlet and outlet to the differential pressure pilot valve are not included in this specification. The float control valve and the water outlet valve shall be placed at the disposal of the manufacturer of the filter/water separator for installation.

Pressure drop

Pressure drop caused by the pump start valve (DN 150) when valve fully open (with all internals and attached parts such as orifice plate and pilot valves) and at a flow rate of 2000 l/min must not exceed 0.4 bar maximum. The evidence of the max. pressure drop has to be submitted on request of the contracting agency, on a test stand acc. to choice of the contractor (AN), the costs have to be included in the unit price.

The below manufacturer(s) is (are) known to manufacture products of the type specified in this specification section. Any other manufacturer(s) from a NATO member Nation Country may provide this product, provided they can prove to meet this specification.

Brand: Fa. CLA-VAL-CO

Type: 40-27ACGS

or equivalent

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<h2>STANDARD SPECIFICATION</h2>	<h1>STS – M 167</h1>	
DESCRIPTION	ID-CODE	
<b>VOLUMETER FOR REFUELLING ARM</b>		

Suitable for volume measurement of finished mineral oil products of the hazard characteristics R 10 (flammable), F (easily flammable) and F+ (highly flammable) with an aromatic content of up to 50 %.

(Installation in explosion hazard zone I, the inner instrument is to be classified as explosion hazard zone 0).

The following regulations are imperative and must be complied with:

1. Directive 2014/68/EC of the European Parliament and of the Council on the approximation of the laws of the Member States concerning pressure equipment
2. Directive 2014/34/EC of the European Parliament and of the Council on the approximation of the laws of the Member States concerning the appropriate use of equipment in explosion hazard areas (ATEX)
3. Directive 2006/42/EC of the European Parliament and of the Council on the approximation of the laws of the Member States of 17 May 2006 concerning machinery
4. Regulation (EU) No. 305/2011 of the European Parliament and of the Council on laying down harmonized conditions for the marketing of construction products
5. General Product Safety Directive (GPSD) and associated regulations (GPSR)
6. German Ordinance on Industrial Safety and Health (BetrSichV)
7. Construction Products Regulation (CPL)
8. Technical Rules on the Operational Safety/Hazardous Materials, especially TRBS 3151 / TRGS 751
9. VdTÜV Codes of Practice, especially VdTÜV-MB 967, VdTÜV-MB 966-1 and VdTÜV-MB 966-2
10. AD 2000 Codes of Practice, especially AD 2000 W series
11. DIN, DIN EN and DIN EN ISO, especially DIN 3230-6, DIN EN 1092-1, DIN EN 1706
12. Technical Rules for the Handling of Flammable Liquids, especially TRbF 50 (other sources of information)

### Use

The exterior temperature variations typical in Europe must be considered.

Conveyed media:	finished mineral oil products
Pressure level:	PN 16
Density of the conveyed medium:	736 to 860 kg/m <sup>3</sup>
Kinematic viscosity of conveyed medium:	0.9 x 10 <sup>-6</sup> to 8.0 x 10 <sup>-6</sup> m <sup>2</sup> /s

### Materials

Housing	:	Cast aluminum as per DIN EN 1706
Internal parts	:	stainless steel or cast aluminum (free of non ferrous metal and gray cast)
Bolts and nuts	:	as per AD 2000 W 2

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STANDARD SPECIFICATION	<h2>STS – M 167</h2>	
DESCRIPTION	ID-CODE	
<b>VOLUMETER FOR REFUELLING ARM</b>		

Design:

Volumeter, straight flow design, suitable for installation in refuelling arms.

A short-term increase of the flow by 15 % of the maximum flow must be provided for.

The roller counter shall only count up, even in reverse-flow mode, it shall never count down.

The counter must be rotatable by 360°.

- Display with 8-digit totalizing counter, not resettable (for continuous up-count) as well as 5-digit, manually resettable roller counter, lowest reading = 10 liters (for partial count).

Flanges	:	DN 100, PN 16, as per DIN EN 1092-1 with sealing face, shape A or information of the contracting agency
Flow rate	:	2,270 l/min.
Operating pressure	:	16 bar (PN 16)
Measuring accuracy	:	higher than 0.2 % of the momentary value in the flow measuring range 1 : 10

Requirements and testing

- Calibration of the counter on a test stand authorized by the specified testing office
- Material testing as per AD 2000 series W and the associated DIN EN material standards.
- Functional testing
- EC homologation in accordance with Annex III of Directive 2014/34/EC

Evidence of quality features

- Acceptance certificate as per DIN EN 10204 - 3.1 for the above-mentioned tests
- Calibration curve confirmed by the authorized office

Identification/labeling

In accordance with Annex II no. 1.0.5. of the Directive 2014/34/EC and Article 17 of the Directive 2004/22/EC. Additional identification as per DIN 3230-6, item 4.

CE Conformity Sign as per Art. 16 of the Directive 2014/34/EC and Art. 7 of the Directive 2004/22/EC.

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STANDARD SPECIFICATION	<h2>STS – M 167</h2>	
DESCRIPTION  <b>VOLUMETER FOR REFUELLING ARM</b>	ID-CODE	

Legally required evidence

In accordance with the General Product Safety Directive (GPSD) and associated regulations (GPSR), Construction Products Law (CPL); especially:  
CE Declaration of conformity as per Directive 2014/34/EC and the annexes to the Directive 2004/22/EC.

Periodic inspection by an authorized inspection body

In accordance with the German Ordinance on Industrial Safety and Health (BetrSichV), the operational condition of systems requiring monitoring and their pertaining components must be inspected at regular intervals by an authorized inspection body. The operator of the entire system and its components must prepare the inspection lists on the basis of a technical safety assessment. A prerequisite to this task is that the manufacturer determines and specifies the inspection intervals for each individual component of the system requiring monitoring. As the operator wants the control office to authorize review periods as long as possible, the fittings and components described in this specifications must be designed and dimensioned in a way that they allow a review period of 3 years for electrical and 5 years for mechanical components.

The below manufacturer(s) is (are) known to manufacture products of the type specified in this specification section. Any other manufacturer(s) from a NATO member Nation Country may provide this product, provided they can prove to meet this specification.

Brand: Fa. Brodie Meter  
Typ: BA80AL

or equivalent

STS-M 0 must be adhered to.

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<h2>STANDARD SPECIFICATION</h2>	<h1>STS – M 168</h1>	
DESCRIPTION  <b>SINGLE POINT RECEPTACLE</b>	ID-CODE  <b>SPR</b>	

Suitable for the connection and flushing of a refueling arm with a pressure refueling coupling 2 ½".  
 Finished mineral oil products with the hazard characteristics R 10 (flammable), F (easily flammable) and F+ (highly flammable) and an aromatic content up to 50 %.  
 Suitable for installation in zone 1, the inside of the adapter is to be assigned to zone 0.

The following regulations are imperative and must be complied with:

1. Directive 2014/68EC of the European Parliament and of the Council on the approximation of the laws of the Member States concerning pressure equipment
2. Directive 2014/34EC of the European Parliament and of the Council on the approximation of the laws of the Member States concerning the appropriate use of equipment in explosion hazard areas (ATEX).
3. Directive 2006/42/EC of the European Parliament and of the Council on the approximation of the laws of the Member States of 17 May 2006 concerning machinery .
4. Regulation (EU) No. 305/2011 of the European Parliament and of the Council on laying down harmonized conditions for the marketing of construction products
5. General Product Safety Directive (GPSD) and associated regulations (GPSR)
6. German Ordinance on Industrial Safety and Health (BetrSichV)
7. Construction Products Regulation (CPR)
8. Technical Rules on the Operational Safety/Hazardous Materials, especially TRBS 3151 / TRGS 751
9. VdTÜV Codes of Practice, especially VdTÜV-MB 967, VdTÜV-MB 966-1 and VdTÜV-MB 966-2
10. AD 2000 Codes of Practice, especially AD 2000 W series
11. DIN, DIN EN and DIN EN ISO standards, especially DIN EN 10217-7, DIN EN 10222-5
12. Air Pollution Control Standard (TA Luft)
13. Technical Rules for the Handling of Flammable Liquids, especially TRbF 50 (other sources of information)
14. American National Standards Institute ANSI (other sources of information)

Use

The exterior temperature variations typical in Europe must be considered.

Conveyed media:	finished mineral oil products
Pressure level:	PN 16
Density of the conveyed medium:	736 to 860 kg/m <sup>3</sup>
Kinematic viscosity of the transport medium:	0.9 x 10 <sup>-6</sup> to 8.0 x 10 <sup>-6</sup> m <sup>2</sup> /s

Materials

Adapter housing	:	stainless steel cast AISI 17-4 PH as per AMS 5344, surface-treated
Adapter internals	:	stainless steel and cast aluminum as per US standard
Adapter protection cap	:	Buna-N, no. 61 358 I
Reducer	:	stainless steel, mat. no. 1.4571 as per DIN EN 10222-5

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STANDARD SPECIFICATION	<h2>STS – M 168</h2>	
DESCRIPTION <b>SINGLE POINT RECEPTACLE</b>	ID-CODE <b>SPR</b>	

Ball cock	:	as per STS-M 47
Pressure relief line and screw joints	:	stainless steel, mat. no. 1.4571 as per DIN EN 10217-7 and/or DIN EN 10222-5
Pressure relief valve	:	stainless steel as per US standard
Bolts and nuts	:	as per STS-M 64, design B
Gaskets	:	as per STS-M 65

Design:

The single point receptacle comprises the following components:

- Adapter 2 ½" as dry-break coupling with bayonet joint as per US specifications MIL-A-25896 E, dimensions as per MS 24484-5 including protection cap.
- Reducer 2 ½" to DN 80, PN 16 with socket ¼" NPTi.
- Ball cock DN 80, PN 16, with connection socket ¼" NPTi on the inlet side.
- Pressure relief line ¼" with integrate pressure relief valve 3/8", incl. screw connections between the reducer and the ball cock at the inlet side.

The single point receptacle shall be delivered in completely assembled condition.

Requirements and testing

Adapter	:	as per MIL-C-6021, class 3, Gr. C
Reducer, pressure relief line	:	as per AD 2000 W2 and the associated DIN EN material standards
Ball cock	:	as per STS-M 47

Evidence of quality features

- Acceptance certificate as per DIN EN 10204 - 3.1 for the reducer and the pressure-relief line
- Acceptance certificate as per DIN EN 10204 - 2.2 for the entire unit.

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STANDARD SPECIFICATION	<h2>STS – M 168</h2>	
DESCRIPTION <b>SINGLE POINT RECEPTACLE</b>	ID-CODE <b>SPR</b>	

Identification/labeling

Manufacturer's specifications

Legally required evidence

In accordance with the General Product Safety Directive (GPSD) and associated regulations (GPSR), Construction Products Regulation (CPR)

Especially:

EC Declaration of Conformity as per Annex IV of the directive 2014/68/EC

Periodic inspection by an authorized inspection body

In accordance with the German Ordinance on Industrial Safety and Health (BetrSichV), the operational condition of systems requiring monitoring and their pertaining components must be inspected at regular intervals by an authorized inspection body. The operator of the entire system and its components must prepare the inspection lists on the basis of a technical safety assessment. A prerequisite to this task is that the manufacturer determines and specifies the inspection intervals for each individual component of the system requiring monitoring. As the operator wants the control office to authorize review periods as long as possible, the fittings and components described in this specifications must be designed and dimensioned in a way that they allow a review period of 3 years for electrical and 5 years for mechanical components.

STS-M 0 must be adhered to.

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STANDARD SPECIFICATION	<h2>STS – M 200</h2>	
IDENTIFICATION  <b>STEEL TANK (DOUBLE-SHELL TYPE)</b>	ID-CODE	

Vertical, cylindrical tank with interior coating and outer insulation for buried installation with two mounted steel pits for the storage of mineral oil products of liquids with hazard characteristics R10 (flammable) F (easily flammable) and F\* (highly flammable) with aromatic content of up to 50%.  
The inside of the tank has to be assigned to zone 0.

The following rules have to be kept reliably:

1. Directive 2014/68/EG of the European parliament and of the council on the approximation of the laws of the Member States concerning pressure equipment
2. Directive 2014/34/EG of the European parliament and of the council on the approximation of the laws of the Member States concerning equipment and protective systems intended for use in potentially explosive atmospheres (ATEX)
3. Regulation (EU) No 305/2011 of the European Parliament and of the laying down harmonised conditions for the marketing of construction products
4. General Product Safety Directive (GPSD) and associated rules (GPSR)
5. Ordinance on Industrial Safety and Health
6. General Product Safety Directive (GPSD)
7. Technical rules for operation safety/hazardous substances, especially TRBS 3151 / TRGS 751
8. VdTÜV instruction sheets, especially VdTÜV-MB 967, VdTÜV-MB 966-1 and VdTÜV-MB 966-2
9. AD 2000 instruction sheets, especially AD 2000 series W
10. DIN, DIN EN and DIN EN ISO, especially DIN 6600, DIN 18364, DIN EN 10025-2, DIN EN 12285-1
11. Technical rules for flammable liquids, especially TRbF 50 (other sources of information)

### Use

The exterior temperature changes usual in Europe must be considered.

Medium: Mineral oil finished products  
Density of transport medium: 736 – 860 kg/m<sup>3</sup>  
Kinetic viscosity of transport medium: 0.9 x 10<sup>-6</sup> – 8.0 x 10<sup>-6</sup> m<sup>2</sup>/s

### Materials

Tank : S235JR (1.0038) acc. to DIN EN 10025-2 (old RSt 37-2)  
Steel pit : S235JR (1.0038) acc. to DIN EN 10025-2 (old RSt 37-2)  
Access ladder, handles and  
Sliding cover guide rails : S235JR (1.0038) acc. to DIN EN 10025-2 (old RSt 37-2)  
Sliding cover : S235JR (1.0038) acc. to DIN EN 10025-2 (old RSt 37-2)

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STANDARD SPECIFICATION	<h2>STS – M 200</h2>	
IDENTIFICATION  <b>STEEL TANK (DOUBLE-SHELL TYPE)</b>	ID-CODE	

Design

Due to the depth of the tank pit a sign shall be attached in the upper area next to the access ladder, indicating that access to the space below the grids is permitted only with respirators and / or artificial ventilation (portable unit made available by the user).

Tank, steel pit with casing pipes (number, dimensions, drawings) and cable penetrations (DN 150, number acc. to drawing), access ladder, handles, supporting structures and mounting brackets as well as connections for over-pressure or under-pressure leak-detectors without leakage control fluid acc. to drawing and sliding cover acc. to drawing.

Delivery includes over-pressure/under-pressure leak-detector, probe and monitoring unit, ex-proof with additional potential-free alarm contact (monitor shall be installed in the electrical room).

Storage temperature : 0 – 40° C

Test pressure (overpressure) : 2 bar

The built-in parts are specified under separate items.

Welding works on the steel pit for supports and brackets may be performed only prior to application of the outer insulation.

Dimensioning

Sizes of tank acc. to DIN EN 12285-1, all other sizes acc. to drawings mentioned.

For tank and steel pit the dimensioning of wall thickness (DIN EN 12285-1) acc. to local adaptation an earth cover up to 2.8 m has to be considered and determined with the authorized supervisory board.

Prior to the construction of tank a drawing has to be submitted to the authorized body for preliminary examination. The approved drawing including the static evidence for the steel pit has to be submitted to the contracting agency.

Surface protection

The tank has to be coated inside acc. to STS-M 67 and insulated outside acc. to STS-M 68. Prior to inside coating the brackets for the built-in parts shall be welded on.

The steel pit has to be insulated outside acc. to STS-M 68.

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STANDARD SPECIFICATION	<h2>STS – M 200</h2>	
IDENTIFICATION  <b>STEEL TANK (DOUBLE-SHELL TYPE)</b>	ID-CODE	

Tightness test

By approved supervision authority.

Test before application of interior coating by water with all filled tank.

Evidence of quality features

- Material - Shop certificate acc. to DIN EN 10204 – 3.1
- Tank, incl. Pressure test - Shop certificate acc. to DIN 6600
- Interior coating - Acc. to STS-M 67
- Exterior insulation - Acc. to STS-M 68

Identification

Acc. to General Product Safety Directive (GPSD)

Plate for test stamps, if needed.

Legally required evidences

General Product Safety Directive (GPSD) and associated rules (GPSR), General Product Safety Directive (GPSD), especially:

Evidence of usability and conformity by the manufacturer

Periodic inspections by an authorized control office

Acc. to Product Safety Directive, facilities and facility parts in need of monitoring must be reviewed repeatedly in certain periods for their orderly conditions concerning the operation by an authorized control office. The operator has to find out the review periods of the complete facility and the facility parts on the base of a safety related evaluation. Therefore the manufacturer of the components must specify and determine the review periods for the individual components of the facilities in need of monitoring As the operator wants the control office to authorize review periods as long as possible, the fittings and components described in this specifications must be designed and dimensioned in a way that they allow a review period of 3 years for electrical and 5 years for mechanical components.

STS-M 0 shall be observed.

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<b>STANDARD SPECIFICATION</b>	<b>STS – M 201</b>	
DESCRIPTION	ID-CODE	
<b>STEEL TANK (DOUBLE-SHELL TYPE), DIESEL STORAGE TANK</b>		

Horizontal, cylindrical tank with interior coating and outer insulation for buried installation, for the storage of Diesel fuel

The following rules have to be kept reliably:

1. General Product Safety Directive (GPSD) and associated rules (GPSR)
2. Ordinance on Industrial Safety and Health
3. General Product Safety Directive (GPSD)
4. Technical rules for operation safety/hazardous substances, especially TRBS 3151 / TRGS 751
5. VdTÜV instruction sheets, especially VdTÜV-MB 967, VdTÜV-MB 966-1 and VdTÜV-MB 966-2
6. AD 2000 instruction sheets, especially AD 2000 series W
7. DIN, DIN EN and DIN EN ISO, especially DIN 6600, DIN EN 18364, DIN EN 10025-2, DIN EN DIN EN 12285-1
8. Technical rules for flammable liquids, especially TRbF 20 (other sources of information)

Use

The exterior temperature changes usual in Europe must be considered.

Medium: Diesel fuel  
Density of transport medium: 820 – 860 kg/m<sup>3</sup>  
Kinetic viscosity of transport medium: 0,9 x 10<sup>-6</sup> – 8,0 x 10<sup>-6</sup> m<sup>2</sup>/s

Material

S235JR (1.0038) acc. to DIN EN 10025-2 (old RSt 37-2)

Design

The steel dome pit with fixed ladder, safety handle and sliding rails for sliding covers as well as the sliding cover itself are part of this item.

Tank with connections for overpressure and negative pressure leak detectors without leakage control liquid acc. to drawing.

The delivery includes overpressure and negative pressure leak detector, probe and monitoring device with additional potential-free alarm contactor (mounting of monitoring device in E-room).

Storage temperature : 0 – 40° C  
Test pressure (positive pressure) : 2 bar

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STANDARD SPECIFICATION	<h2>STS – M 201</h2>	
DESCRIPTION	ID-CODE	
<b>STEEL TANK (DOUBLE-SHELL TYPE), DIESEL STORAGE TANK</b>		

Requirements and tests

By the approved authority for compliance with TRbF 20, AD 2000 sheets W, DIN - or DIN EN - standards, regulations and drawings of this specification.

Tightness test

By authorized control office.

Test prior to performance of interior coating with water when completely filled.

Evidence of quality features

- Material - Shop test certificate acc. to DIN EN 10204 – 3.1
- Tank, incl. pressure test - Shop test certificate acc. to DIN 6600
- Inside coating - Acc. to STS-M 67
- Outside insulation - Acc. to STS-M 68

Identification

According to ProdSG

Label permitting the application of test stamps.

Legally required evidences

Acc. to Product safety Directive (GPSD) and associated rules (GPSR), construction products law

Especially:

Certificate of usability and conformity by construction supervision

Periodic inspections by an authorized control office

Acc. to Product Safety Directive, facilities and facility parts in need of monitoring must be reviewed repeatedly in certain periods for their orderly conditions concerning the operation by an authorized control office. The operator has to find out the review periods of the complete facility and the facility parts on the base of a safety related evaluation. Therefore the manufacturer of the components must specify and determine the review periods for the individual components of the facilities in need of monitoring As the operator wants the control office to authorize review periods as long as possible, the fittings and components described in this specifications must be designed and dimensioned in a way that they allow a review period of 3 years for electrical and 5 years for mechanical components.

STS-M 0 must be observed.

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STANDARD SPECIFICATION	<h2>STS – M 202</h2>	
DESCRIPTION	ID-CODE	
<b>ABOVE-GROUND STEEL TANK (DOUBLE-WALLED), DIESEL FUEL STORAGE TANK</b>		

Cylindrical horizontal tank with interior coating and exterior paint coat suitable for above-ground installation, for the storage of Diesel fuel

The following regulations are imperative and must be complied with:

1. Directive 2014/68EC of the European Parliament and of the Council on the approximation of the laws of the Member States concerning pressure equipment
2. Directive 2014/34EC of the European Parliament and of the Council on the approximation of the laws of the Member States concerning the appropriate use of equipment in explosion hazard areas (ATEX)
3. Regulation (EU) No. 305/2011 of the European Parliament and of the Council on laying down harmonized conditions for the marketing of construction products
4. General Product Safety Directive (GPSD) and associated regulations (GPSR)
5. German Ordinance on Industrial Safety and Health (BetrSichV)
6. Construction Products Regulation (CPR)
7. Technical Rules on the Operational Safety/Hazardous Materials, especially TRBS 3151 / TRGS 751
8. VdTÜV Codes of Practice, especially VdTÜV-MB 967, VdTÜV-MB 966-1 and VdTÜV-MB 966-2
9. AD 2000 Codes of Practice, especially AD 2000 W series
10. DIN, DIN EN and DIN EN ISO, especially DIN 6600, DIN 18364, DIN EN 10025-2, DIN EN 12285-2
11. Technical Rules for the Handling of Flammable Liquids, especially TRbF 20 (other sources of information)

### Use

The exterior temperature variations typical in Europe must be considered.

Stored medium:	Diesel fuel
Density of the stored medium:	820 to 860 kg/m <sup>3</sup>
Kinematic viscosity of the stored medium:	0.9 x 10 <sup>-6</sup> to 8.0 x 10 <sup>-6</sup> m <sup>2</sup> /s

### Material

S235JR (1.0038) as per DIN EN 10025-2 (formerly RSt 37-2)

### Design:

Tank as per DIN 12285-2, horizontal, cylindrical, double-walled, with leakage detection facility.  
Dome neck with cover DN 1000, as per DIN EN 12285-2, neck in accordance with drawing.

A liquid proof welded collecting trough should be installed around the dome neck, design and execution as shown in the drawing. All connected fuel-conveying components, flange connections and screwed joints must be arranged above the collecting trough (see drawing).

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STANDARD SPECIFICATION	<h2>STS – M 202</h2>	
DESCRIPTION	ID-CODE	
<b>ABOVE-GROUND STEEL TANK (DOUBLE-WALLED), DIESEL FUEL STORAGE TANK</b>		

The scope of delivery shall include all components of the leak detection system, such as the leakage indicator and the detector. The monitoring facility must be fitted with a zero-potential alarm contact in addition. (Installation of the monitoring device in the electrical room).

Storage temperature : 0 to 40° C

Test pressure (overpressure) : 2 bar

The internal parts should be provided in accordance with the drawing.

#### Dimensioning

Dimensions of the tank as per DIN EN 12285-2, all other dimensions in accordance with the drawing.

#### Surface protection

The tank shall be fitted with an interior coating as per STS-M 67 and an exterior paint coat as per STS-M 66. Before applying the interior coating, the fasteners for the internal parts shall be fixed by welding.

Interior coating as per STS-M 67

Outer insulation as per STS-M 66

#### Transport and erection

It should be noted that the total facility will accepted in accordance with the Ordinance on Industrial Safety and Health (BetrSichV) ant the Product Safety Regulation (CPR). The required acceptance documents shall be included in the scope of delivery.

The costs for the factory acceptance and the preliminary inspection of the drawings shall be included in the unit price.

#### Tank capacity

A gaging chart allowing the determination of the tank capacity shall be included. The graduation of the gaging table shall be coordinated with the operator of the facility.

Example for USAFE facilities : height scale in 1/8 inches and in mm  
volume scale in gallons

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DESCRIPTION	ID-CODE	
<b>ABOVE-GROUND STEEL TANK (DOUBLE-WALLED), DIESEL FUEL STORAGE TANK</b>		

### Requirements and testing

By an authorized inspection body on compliance with the TRbF 20, AD 2000 Codes of Practice W series, DIN and DIN EN standards, regulations and drawings specified in the present document.

### Evidence of quality features

Material	-	factory certificate as per DIN EN 10204-3.1
Tank, incl. pressure test	-	factory certificate as per DIN 6600
Interior coating	-	as per STS-M 67
Outer insulation	-	as per STS-M 66

### Identification/labeling

In accordance with General Product Safety Directive (GPSD)

Sign-plate for the application of test stamps.

### Legally required evidence

In accordance with the General Product Safety Directive (GPSD) and associated regulations (GPSR), Construction Products Regulation (CPR)

especially:

Serviceability and Compatibility Certificates by the supervisory authority.

### Periodic inspection by an authorized inspection body

In accordance with the German Ordinance on Industrial Safety and Health (BetrSichV), the operational condition of systems requiring monitoring and their pertaining components must be inspected at regular intervals by an authorized inspection body. The operator of the entire system and its components must prepare the inspection lists on the basis of a technical safety assessment. A prerequisite to this task is that the manufacturer determines and specifies the inspection intervals for each individual component of the system requiring monitoring. As the operator wants the control office to authorize review periods as long as possible, the fittings and components described in this specifications must be designed and dimensioned in a way that they allow a review period of 3 years for electrical and 5 years for mechanical components.

STS-M 0 must be adhered to.

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STANDARD SPECIFICATION	<b>STS – B 001</b>	
DESCRIPTION <b>CONTENTS</b>	ID-CODE	

STS-B	Description	Revision	Date
001	Contents	1	May 2015
011	<b>General</b> Specifications concerning structural design	1	May 2015
021	<b>Exemplary structural calculation</b> Exemplary structural calculation of a tank (capacity of 5,000 m3) – <i>(title page only) is made available on request</i>	1	May 2015
031	<b>Buried pipelines and drainage</b> Drainage of accumulating seepage water	1	May 2015
044	<b>Concrete construction</b> Wall penetrations	1	May 2015

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STANDARD SPECIFICATION	<b>STS – B 011</b>	
DESCRIPTION <b>SPECIFICATIONS CONCERNING STRUCTURAL DESIGN</b>	ID-CODE	

## I. Required preliminary examinations

### **Investigation of existing structures**

The surrounding structures, existing cable routes, routes of drainage and water supply lines, telecommunication facilities and data cables have to be detected and recorded. Unknown cables and lines shall be identified if possible. If available, as-built plans and aerial photos from archives shall be consulted and included in the dossier.

### **Dismantling**

If demolishing work is required, it should be included in the design and the possible health hazards due to harmful substance shall be assessed in advance.

### **Combat agents**

Areas where combat agents have to be expected shall be investigated beforehand and the area shall be cleared from existing combat agents. The clearance of combat agents shall be completed prior to the commencement of the local construction works.

### **Subsoil investigation and specifications on groundwater**

The subsoil conditions and the presence of groundwater and seepage water are of fundamental importance for POL facilities. In the area of tanks, the load cases "filled tank" and "empty tank" shall be taken into account when considering settlement.

Homogeneous soil conditions shall be ensured underneath the tanks to prevent varying setting behavior. The assumptions in the structural calculation of the 5,000 m<sup>3</sup> tank shall be adjusted to the local conditions and the design of the load-bearing structures shall be matched accordingly.

Prior to the commencement of the design, a design water level is to be determined.

It is the level up to which existing groundwater, high water and flood water could maximally rise. Depending on the type of facility, in-depth investigations may be required to assess the exact ground water levels.

The present design of a flat-bottom tank does not consider buoyancy on the design level. Also in the construction phase it shall be ensured that the tank structures are not affected by buoyancy.

The earth cover above the tank must consist of suitable material that complies with the specifications in the structural calculation. When filling this material on top of the tank it must be made sure that local piling of soil on top of the tank cover is avoided.

### **As-built survey and draft survey**

The area to be developed shall be surveyed and the altitude and geographical situation shall be determined.

It is recommended recording all constraint points such as adjacent structures, cables and lines, accesses, infrastructural facilities as well as the existing vegetation. Buried cables and lines shall be recorded if possible and shall be represented in an overview layout plan of lines and cables.

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DESCRIPTION <b>SPECIFICATIONS CONCERNING STRUCTURAL DESIGN</b>	ID-CODE	

### Structural calculation

A dedicated structural calculation and dedicated reinforcement and steel drawings shall be drawn up for the facilities in accordance with their local situation and with locally applicable regulations.

### Initial parameters for the design

The initial parameters shall be re-determined in accordance with the local situation.  
The present standard design is based on the following assumptions.

## II 5,000 m<sup>3</sup> flat-bottom tank

### 1. Description of the structure

The tank structure is an underground liquid vessel made of steel with a reinforced concrete envelope. The reinforced concrete envelope consists of a base slab, a jacket and a cover slab with top mounted pump station. The loads applying to the tank cover are transferred via the reinforced concrete jacket and steel columns inside the tank.

Cement floor with leakage gutters is installed between the bottom of the steel tank and the base slab; profiled boards made of hard PVC are installed vertically between the wall of the steel tank and the reinforced concrete jacket. The PVC boards are welded together to provide a tight connection and prevent the penetration of cement sludge. The continuity of these hollow spaces shall be ensured throughout the entire construction period. The hollow spaces created this way ensure the drainage of leaking liquids to the exterior leak detection shaft after completion of the construction works.

The tank shall be sealed on its outside against non-pressing water and a frost-resistant masonry shall be erected as a protection.

### 2. Construction

#### 2.1 Pump station

Dimensions:	8.20 x 4.00 m,
Roof slab on the pump station Load transfer to the perimeter walls	ht = 20 cm,
Perimeter walls of the pump station Execution as load-bearing wall panels, Load transfer to 4 internal columns inside the tank.	thk = 20 cm,

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2.2 Tank cover slab

Diameter: 30.65 m,  
ht = 35 cm at the edge  
increasing to 50 cm towards the pump station  
Load transfer to 18 steel columns inside the tank  
as well as to the tank wall.

2.3 Tank wall

Cylindrical shell  
diameter: 30.65 m, height: 7.40 m, thk = 40 cm

Pinned support on the base slab.

2.4 Base slab

Diameter: 30.65 m,  
ht = 50 cm, slope of 5% from outer edge to central pump sump

2.5 Leak detection shaft

Dimensions: 2.10 x 1.80 m, height: 10.7 m

Shaft wall, thk = 25 cm, base slab, ht = 50 cm,  
free standing next to the tank wall

**3. Requirements on the concrete**

The manufacturing and testing of the concrete shall comply with the standards

DIN EN 1992-1-1  
DIN EN 13670

as well as with any other standards referred to there-in.

The structure is assigned to the consequence class CC3 as per DIN EN 1990. For quality assurance, supervision class 3 as per DIN EN 13670 becomes decisive.

The manufacture of the concrete shall provide for the properties listed in the following overview.

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STANDARD SPECIFICATION	<b>STS – B 011</b>	
DESCRIPTION <b>SPECIFICATIONS CONCERNING STRUCTURAL DESIGN</b>		ID-CODE

- Compliance with EN 206-1
- Compression resistance class C25/30
- Exposure class, see component items
- Max. grain size: 32 mm in general,  
for the lower wall areas up to 1.0 m height, the  
max. grain size shall be limited to 16 mm.  
The same applies to the casting sections of the tank wall
- Consistency class F3
- Use as reinforced concrete
- Concrete with a high water penetration resistance  
Water-cement ratio  $w/c \leq 0.60$   
The water penetration depth must not exceed 5 cm and  
shall be determined in accordance with DIN EN 12390  
Concrete aggregates as per DIN EN 12620, sand and  
gravel in the grain-distribution ranges A and B, close  
to B shall be preferred
- Cement with low hydration heat release shall be used.  
The hydration heat emitted during the hardening of  
the concrete shall be limited to temperatures in the  
range of 40° C. The temperature of the freshly  
poured concrete shall range between 15 and 20 °C  
and shall be proven by measurements.

Additional requirements concerning execution:

- The individual structural components base slab and tank  
cover slab shall be manufactured as monolithic struc-  
tures
- The tank wall shall be cast in three sections, the con-  
struction joints shall be fitted with appropriate sealing  
strips.
- The casting speed for the tank wall shall range between  
0.5 and 1.0 m/h.
- When placing the concrete it shall be made sure that the  
dropping height out of the funnel is lower than 10 to  
20 cm to prevent disintegration processes.

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STANDARD SPECIFICATION	<b>STS – B 011</b>	
DESCRIPTION <b>SPECIFICATIONS CONCERNING STRUCTURAL DESIGN</b>		ID-CODE

- The use of a climbing or sliding shuttering is not permitted for the wall.
- The inner tank shell shall be braced before placing the concrete. The compression of the fresh concrete shall be considered in the design of the bracing.
- The surface of the tank wall must be suitable for painting and coating and ensure good adhesion.
- If subsequent touching up of the concrete surface becomes necessary, only suitable materials shall be used, which are compatible to the sealing materials and the concrete. The compatibility of these materials shall be proven. They must adhere in a force-fit manner to the subgrade.
- The subsequent treatment of the concrete shall be in accordance with the recommendations of DIN EN 13670, Annex F. The minimum duration of the subsequent treatment shall be determined in accordance with the solidification progress and the surface temperature of the concrete as specified in the tables F.1 to F.3.

The following measures shall be undertaken:

Vertical surfaces shall first remain in the shuttering. Immediately after removal of the shuttering, vapor-tight film shall be suspended to cover the surface.

On horizontal surfaces, a suitable post-treatment agent shall be applied to the surface, the suitability of the agent shall be proven. The surfaces shall be covered before the first night.

#### 4. Requirements on the reinforcement steel

In order to limit crack formation, only corrugated reinforcement bars BSt 500 S and woven steel fabric BSt 500 M as per DIN 488-1 shall be used.

#### 5. Requirements on the structural steel

The steel work shall comply with the standards

DIN EN 1993-1  
DIN EN 1393-4

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as well as with any other standards referred to there-in.

The structure is assigned to consequence class CC3 as per DIN EN 1990. The corresponding partial safety factors are taken into account in the design.

## 6. Load assumptions

### 6.1 Permanent loads

are determined in accordance with DIN EN 1991-1-1.

### 6.2 Construction states

#### Shell walls

The concrete of the shell wall shall be placed in several sections against the PVC profiles fitted to the tank. The casting pressure acts on the tank jacket wall. The tank shall be braced against the casting pressure with horizontal columns. The filling of the tank with water alone is insufficient.

#### Cover plates of the steel tank

The cover plates are not sufficiently strong to bear and transfer the concrete casting load. A shuttering and a scaffold shall be erected before casting.

#### Cast tank cover slab in the construction state

In the construction state, before the soil is filled in, the permanent loads of  $\geq 12.5 \text{ kN/m}^2$  can be dispensed with. The tank cover slab can be accessed during the construction state with vehicles not exceeding the specified area load.

The maximum wheel load to be verified is 40 kN.

### 6.3 Live loads

Roof slab above the pump station	$q = 5.0 \text{ kN/m}^2$
Tank cover slab in the pump station	$q = 5.0 \text{ kN/m}^2$
Tank cover slab	$q = 7.5 \text{ kN/m}^2$
Tank cover slab in the piping area on top of soil filling 1.5 m	$q = 5.0 \text{ kN/m}^2$

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7.2 Reinforcing steel

BSt 500 S, BSt 500 M

7.3 Structural steel

S235

more detailed specifications can be taken from STS-M 103

**8. Subsoil**

A subsoil expertise is not available. Because the tank shall be designed as a standard tank, the following soil properties are assumed as the most unfavorable ones:

Density: 20 kN/m<sup>3</sup>  
Friction angle: 25°  
Cohesion: 0 kN/m<sup>2</sup>

These assumptions provide for largest range of subsoil conditions that could be expected.  
The calculation of the base slab is based on subgrade moduli between 2,000 kN/m<sup>3</sup> and 25,000 kN/m<sup>3</sup>  
The maximum soil pressure ranges between 190 and 230 kN/m<sup>2</sup> depending on the bedding.

The submitted structural calculations and construction documents are only considered valid if the subsoil at the planned location is appropriate for the specified compression and if no other considerable differences in setting must be expected.

Therefore, it must be proven in each case that the subsoil complies with the specified requirements.

In cases of doubt, advice of a soil expert shall be sought.

**9. Bases of calculation**

Standards and regulations

EN 1990, EN 1991, EN 1992, EN1993 and EN 1997

as well as any other standards referred to there-in and the associated technical specifications for construction products.

The relevant national annexes shall be considered.

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### III. 2,500 m<sup>3</sup> flat-bottom tank

The above mentioned assumptions apply in principle as far as appropriate for the local conditions. The structural conditions applying to the 5,000 m<sup>3</sup> flat-bottom tank change due to the different geometry. There are no reinforcement drawings available for the 2,500 m<sup>3</sup> flat-bottom tank.

### IV 1,250m<sup>3</sup> flat-bottom tank

The above mentioned assumptions apply in principle as far as appropriate for the local conditions. The structural conditions applying to the 5,000 m<sup>3</sup> flat-bottom tank change due to the different geometry. There are no reinforcement drawings available for the 1,250 m<sup>3</sup> flat-bottom tank.

### V. Manifold-filter station - hydrant refueling system

The above mentioned assumptions apply in principle as far as appropriate for the local conditions. The component properties of the pump station can be transferred analogously to the manifold-filter station. The structural conditions applying to the pump station on top of the 5,000 m<sup>3</sup> flat-bottom tank change due to the different geometry. There are no reinforcement drawings available for the manifold-filter station.

### VI. Manifold-filter station - tank truck refueling system

The above mentioned assumptions apply in principle as far as appropriate for the local conditions. The component properties of the pump station can be transferred analogously to the manifold-filter station. The structural conditions applying to the pump station on top of the 5,000 m<sup>3</sup> flat-bottom tank change due to the different geometry. There are no reinforcement drawings available for the manifold-filter station.

#### STS to be observed in addition

The following documents are to be observed in addition:

STS-M 0

STS-B 021 Exemplary structural calculation of a 5,000 m<sup>3</sup> flat-bottom tank

STS-M 103 Steel tank 5,000 m<sup>3</sup>, 2,500 m<sup>3</sup>, 1,250m<sup>3</sup>

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STANDARD SPECIFICATION	<b>STS – B 021</b>	
DESCRIPTION <b>EXEMPLARY STRUCTURAL CALCULATION OF A 5,000 M<sup>3</sup> FLAT-BOTTOM TANK</b>		ID-CODE

## Structural calculation of a 5,000 m<sup>3</sup> flat-bottom tank

The structural calculation was newly prepared in autumn 2013. The assumptions are taken from STS-B 011.

The calculation comprises 300 pages and is valid if the (notional) assumptions specified in the document STS-B 011 apply. These assumptions must be re-assessed for each project.

If USAFE personnel wants to consult the structural calculation as a reference for new projects it will be made available on request as a PDF file in German. Please refer to:

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### Disclosure to third parties

A transmission of the structural calculation to third parties requires a written release confirmation by USAFE beforehand.

### STS to be observed in addition

The following documents are to be observed in addition:

STS-M 0  
 STS-B 011 Specifications concerning structural design  
 STS-M 103 Steel tanks 5,000 m<sup>3</sup>, 2,500 m<sup>3</sup>, 1,250m<sup>3</sup>

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<b>STANDARD SPECIFICATION</b>	<b>STS – B 031</b>	
DESCRIPTION  <b>DRAINAGE OF IMPOUNDING SEEPAGE WATER</b>	ID-CODE	

General

The groundwater conditions shall be investigated and assessed with the help of a soil expertise prior to the commencement of the design work. The expert shall specify a design water level.

Because tank structures are highly prone to buoyancy, especially in the empty state, any accumulation of water must be prevented by constructive measures. Therefore, the tightness of the construction is of particular importance.

Even if no groundwater can be detected at the place of intervention, impounding seepage water must be expected outside of the concrete cylinder merely because of the height of the structures.

If it is impossible to drain seepage water without pressure to the receiving ditch because of an insufficient difference in height, we recommend increasing the height level of the tank to such extent that drainage becomes possible (by piling up a soil cone). If this is not possible, measures against buoyancy shall be examined because of the risk of impounding seepage water even in combination with favorable groundwater conditions.

If groundwater is detected, the present standard design shall be revised in such a manner that the structures are secured against buoyancy.

**The following specifications apply to the situation with impounding seepage water in accordance with DIN 18195-6.**

Installation of a seepage layer in front of the wall

The wall structure from the inside to the outside shall be as follows:

- Concrete wall
- Prime coat
- Compensation layer (WITEC Lamination Layer SK, 1.8 mm or equivalent)
- Two-layer sealing membrane (Wolfin GWSK, 2.3 mm or equivalent)
- Protective layer (Wolfin IB, 1.8 mm or equivalent)
- Frost-resistant masonry with a leveling mortar layer of 4 cm.

In order to drain impounding seepage water without pressure, a filtering and seepage layer should be built up in front of the frost-resistant masonry. The filter/the protective non-woven fabric should be matched to the soil masses intended for backfilling. Between the backfill material and the frost-resistant masonry, a drainage layer as per DIN 4095 with a thickness of 50 cm shall be provided. Suitable protective non-woven fabric in accordance with the technical guideline TL GEOK E-StB shall be used.

Drainage pipelines

Layout:

Drainage pipelines shall be laid with a slope of approximately 0.5 % in a perimeter layout around the base slab. The installation height shall be below the construction joint between the base slab and the cylinder wall. In order to facilitate flushing narrow-angled bends should be avoided.

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DESCRIPTION <b>DRAINAGE OF IMPOUNDING SEEPAGE WATER</b>		ID-CODE

Pipe materials:

Clay pipes, concrete pipes or plastic pipes made of PE-HD shall be used in line with the constructive requirements. The pipelines shall have a minimum diameter of DN 200. The drainage pipes must have a minimum ring stiffness of SN 8 as per ISO 9969 (without slits) or a diameter/wall thickness ratio  $SDR \leq 26$ . The pipelines must have slits of 5 mm or 6 mm in width and a water inlet area of at least  $100 \text{ cm}^2/\text{m}$ , distributed over  $220^\circ$  of the pipe perimeter. The material and the installation method of the filter layer as well as its stability shall be matched to the size of the inlet openings.

The pipes shall be joined with double-bell couplers or, alternatively, with electro-weld couplers. The required insertion depth as well as the pipe top of the drainage pipes shall be marked permanently.

The seepage pipes shall be bedded in gravel 8/16 mm as per DIN 4226 Part 1. The drainage element shall be wrapped in filter-stable geo-textile.

Drainage to the receiving ditch

The connection to the receiving ditch shall be made with clay pipes, concrete pipes or plastic pipes made of PE-HD in line with structural and constructive requirements. The pipelines shall have a minimum diameter of DN 200.

Runoff structure

A runoff structure shall be erected at the outlet of the drainage pipes. It shall be realized with a bedded pitch foundation with individual stones, installation depth of approx. 15 cm on 20 cm concrete foundation C20/25.

Camera inspection and flushing

The seepage pipeline and the drainage pipeline to the receiving ditch shall be inspected with a camera before and after backfilling. The pipeline must be flushed in connection with the backfilling work.

Surveying

The location of the pipeline is to be surveyed and recorded before filling back the soil.

STS to be observed in addition

The following documents are to be observed in addition:

- STS-M 0
- STS-B 011      Specifications concerning structural design

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STANDARD SPECIFICATION	<b>STS – B 044</b>	
DESCRIPTION	ID-CODE	
<b>CASING PIPES FOR THE PENETRATION OF WALLS</b>		

Tight design

Pipe penetrations in walls shall be tight structures designed in accordance with good engineering practices.

The casing pipes shall be installed on the shuttering in their exact position prior to placing the concrete. Steel pipes in the required diameters shall be used.

The selected casing pipe diameter shall provide for a sufficiently great annular gap between the casing pipe and the product pipe or protective pipe to accommodate a link seal.

The casing pipes shall be sufficiently long to ensure that they jut out from the wall plane on the soil side and allow the fixing of the connecting collar with clamp bands as specified by STS M 116. The casing pipe shall jut out at least 100 mm from the wall.

The dimensions are specified in the STS-Ms mentioned below.

The casing pipes are fitted with a metal sheet ring of 10 mm thickness, collar ring height of at least 50 mm, in order to lengthen the flow path inside the concrete.

Corrosion protection,

The casing pipes shall be protected against corrosion in accordance with the Additional Technical Conditions of Contract ZTV-Ing, Part 4, Paragraph 3, Annex C, component 5.4.1, Sheet 87:

System structure as per Sheet 87:

Corrosiveness category: C5I and C5-M

Surface preparation: Sa 2.5

Basic coating: hot galvanization as per DIN EN ISO 1461, sweep blasting prior to the coating

Intermediate coating: 2K-EP-EG, material no. 687.12 to 687.14  
desired coat thickness wet/dry 80 mym / 150 mym

Finish coating: 2K-PUR, material no. 687.75 to 687.99  
desired coat thickness wet/dry 80 mym / 150 mym

STS to be observed in addition

The following documents are to be observed in addition:

- STS-M 0
- STS-M 115 Sealing for pipe penetrations
- STS-M 116 Terminating collar

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