

UNIFIED FACILITIES CRITERIA (UFC)

WATER SUPPLY FOR SPECIAL PROJECTS



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U.S. ARMY CORPS OF ENGINEERS (Preparing Activity)

NAVAL FACILITIES ENGINEERING COMMAND

AIR FORCE CIVIL ENGINEER SUPPORT AGENCY

Record of Changes (changes are indicated by \1\ ... /1/)

Change No.	Date	Location

This UFC supersedes TM 5-813-7, dated 2 September 1986. The format of this UFC does not conform to UFC 1-300-01; however, the format will be adjusted to conform at the next revision. The body of this UFC is the previous TM 5-813-7, dated 2 September 1986.

FOREWORD

\1\

The Unified Facilities Criteria (UFC) system is prescribed by MIL-STD 3007 and provides planning, design, construction, sustainment, restoration, and modernization criteria, and applies to the Military Departments, the Defense Agencies, and the DoD Field Activities in accordance with [USD\(AT&L\) Memorandum](#) dated 29 May 2002. UFC will be used for all DoD projects and work for other customers where appropriate. All construction outside of the United States is also governed by Status of forces Agreements (SOFA), Host Nation Funded Construction Agreements (HNFA), and in some instances, Bilateral Infrastructure Agreements (BIA.) Therefore, the acquisition team must ensure compliance with the more stringent of the UFC, the SOFA, the HNFA, and the BIA, as applicable.


UFC are living documents and will be periodically reviewed, updated, and made available to users as part of the Services' responsibility for providing technical criteria for military construction. Headquarters, U.S. Army Corps of Engineers (HQUSACE), Naval Facilities Engineering Command (NAVFAC), and Air Force Civil Engineer Support Agency (AFCEA) are responsible for administration of the UFC system. Defense agencies should contact the preparing service for document interpretation and improvements. Technical content of UFC is the responsibility of the cognizant DoD working group. Recommended changes with supporting rationale should be sent to the respective service proponent office by the following electronic form: [Criteria Change Request \(CCR\)](#). The form is also accessible from the Internet sites listed below.

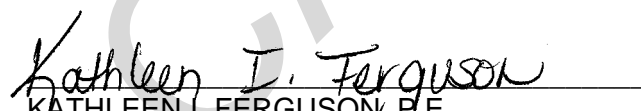
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- Whole Building Design Guide web site <http://dod.wbdg.org/>.


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TECHNICAL MANUAL

WATER SUPPLY FOR SPECIAL PROJECTS

DEPARTMENTS OF THE ARMY AND THE AIR FORCE
2 SEPTEMBER 1986

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AND THE AIR FORCE
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WATER SUPPLY FOR SPECIAL PROJECTS

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This manual supersedes TM 5-813-7/AFM 88-10, Chap. 7, 20 March 1975

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CHAPTER 1 GENERAL WATER REQUIREMENTS

1-1. Purpose This manual establishes the minimum water supply requirements for fire protection and domestic purposes at various small military projects. It is intended to be used by all Army and Air Force personnel responsible for the planning and design of military construction.

1-2. Scope This manual prescribes the duration and rates of flow required for fire hydrant hose streams. It establishes criteria concerning the treatment of water, pumping, pneumatic pressure systems, and the location of fire hydrants. Many special projects and tactical sites have special water requirements that are not covered by referenced Technical Manuals. This manual covers water supply requirements for some of these sites; requirements for those not mentioned will be covered by special instructions from CDR USACE (DAEN-ECE-G), WASH DC 20314-1000, for Army projects; and HQ USAF/LEEE, WASH DC 20332, for Air Force projects.

1-3. Fire protection requirements

a. Air defense tactical sites. Fire protection water will not be provided by installed water supply systems.

b. Family housing at tactical sites.

(1) When the maximum single-floor area of the largest building does not exceed 5,000 square feet, the water supply system will be designed to simultaneously supply a fire flow rate of 500 gallons per minute (gpm) and the domestic demand for a 2-hour duration.

(2) When the single-floor area of a building exceeds 5,000 square feet, refer to MILHDBK 1008 for Army users and AFM 8810, Chap. 6 for Air Force users for fire protection water supply requirements for that building.

c. Air control and warning stations. The water supply will be designed to simultaneously provide a 500 gpm fire flow rate and the domestic water demand for a 2-hour duration.

d. Reserve centers.

(1) When the reserve center is of noncombustible construction with a maximum floor area of 12,000 square feet or of heavy timber, ordinary or

wood frame construction with a maximum floor area of 8,000 square feet, the water supply system will be designed to simultaneously provide a 1,000 gpm fire flow rate and the domestic demand for a 2-hour duration.

(2) When the building floor area exceeds these limits, refer to MILHDBK 1008 for Army users and AFM 88-10, Chap. 6 for Air Force users for fire protection water supply requirements.

1-4. Domestic water requirements

All stations with populations of 500 or more will be designed on the basis of a demand of 150 gallons per capita per day. Where the population is less than 500, the following demands will govern:

a. Air defense tactical sites, including family housing. Average demand will be 150 gallons per capita per day. Peak demand will be determined according to fixture units (National Standard Plumbing Code) plus 50 gpm to any one of the underground structures. Residual pressures will be not less than 30 pounds per square inch at the emergency shower fixtures and not less than 20 pounds per square inch at other fixtures.

b. Air control and warning stations. Average demand will be 150 gallons per capita per day. Minimum pressure in the distribution system will be 30 pounds per square inch. Where sufficient supply at required pressure is not available from an existing dependable source, a pneumatic pressure system will be necessary, supplemented by a ground storage tank and pump equipment (TM 5-810-5/AFM 888, Chap. 4).

c. Reserve centers. Demand will be based on fixture units (National Standard Plumbing Code).

d. Use of existing fixtures. Expansion of existing facilities that have proved adequate will not be undertaken solely to comply with these criteria. Where an increased authorized population can be accommodated by existing facilities, these facilities will not be expanded. If the increased population will require expansion of existing facilities or if existing inadequate and unsuitable facilities are to be replaced, the capacity factor will be applied.

CHAPTER 2 WATER SUPPLY

2-1. Water sources

Available public or private water supply systems will be used as sources of water supply wherever feasible. In the absence of such a source, adequate water source and supply facilities will be constructed in accordance with criteria established in TM 5-813-1/ AFM 88-10, Vol. 1. If no adequate source of water is economically available at the site, domestic use water may be hauled in.

2-2. Water treatment

Usually only chlorination will be required. If other treatment is found necessary, it will be provided in accordance with criteria in TM 5813-3/AFM 88-10, Vol. 3. Water treatment units will not be provided in duplicate. However, more than one unit may be provided where necessary to produce the required daily demands. Such cases will be limited to electro dialysis, zeolite-type softeners, and ion exchange units except when used in the two-step demineralization process. An exception to the above policy of not providing duplicate water treatment facilities will be made where the sole source of water is obtained by the conversion of sea water. In this event sufficient salt water treatment units for producing potable water will be provided so that the required daily domestic water demand can be maintained when one or more units are out of service for maintenance or repair.

2-3. Water storage

Water storage may be required for fire protection purposes. Ground storage will be provided unless it is determined by the using service that elevated storage will not interfere with the operation of technical equipment.

a. Air defense tactical sites. Where peak domestic demand at adequate pressure is not available, a pneumatic pressure system supplemented by a ground storage tank with a minimum gross capacity of 3,500 gallons, pumping equipment, and appurtenances as required by site conditions will be installed. An elevated storage tank, if economically justified, may be installed in lieu of a pressure system. The capacity of the pneumatic pressure tank will be not less than the discharge from the pump in 3 minutes (TM 5810-5/AFM 88-8, Chap. 4). The capacity of the storage tank will be at least equal to the water requirement for 1 day.

b. Family housing at tactical sites, air control and warning stations. Storage capacity as determined by criteria in TM 58134/AFM 88-10, Vol. 4 will be provided for the fire protection.

2-4. Pumping stations for fire protection water supply

All pump installations to be used in fire protection service will meet the requirements of MILHDBK 1008, TM 5-812-1, AFM 8810, Chap. 6, and NFPA 20.

2-5. Residual pressure

The residual pressure for domestic demands will be as required in paragraphs 1-4a, 1-4b and 1-4c. The residual pressure for the fire protection water supply will be 90 psi when hose streams are to be taken directly from fire hydrants without the use of a fire department pumper. When a fire department pumper is to be used, the minimum residual pressure will be 10 psi.

2-6. Water distribution systems

Water distribution systems will be designed in accordance with criteria in TM 5-8135/AFM 88-10, Vol. 5. Pipe sizes will be based on domestic flow at air defense tactical sites, and on combined domestic and fire flow requirements at all other sites.

2-7. Fire hydrants

a. Fire hydrants will be installed in accordance with the criteria in TM 58135/AFM 8810, Vol. 5.

b. Fire hydrants serving family housing at tactical sites will be located so that no family unit entrance is more than 200 feet from a fire hydrant.

c. Where local fire departments are not readily available, each fire hydrant will be provided with a fire hose house in accordance with the requirements of NFPA 24. Each hose house will be equipped with 300 feet of 1-1/2 inch approved fire hose and adjustable nozzle capable of producing either a water spray or a straight-stream pattern in addition to the equipment required by NFPA 24. Where the fire protection water supply is provided by a ground storage reservoir and a fire pump, the fire pump will be arranged to start upon a drop in pressure below the minimum pressure which would exist in maximum domestic water demand.

**APPENDIX A
REFERENCES**

Government Publications.

Departments of the Army, the Navy, and the Air Force
MIL-HDBK-1008

Fire Protection for Facilities,
Engineering, Design, and Construction

Departments of the Army and the Air Force

TM 5-810-5/AFM 888, Chap. 4
TM 5-812-1
TM 5-813-1/AFM 8810, Vol. 1
TM 5-813-3/AFM 88-10, Vol. 3
TM 5813-4/AFM 8810, Vol. 4
TM 5813-5/AFM 8810, Vol. 5
AFM 8810, Chap. 6
AFM 88-15

Plumbing
Fire Prevention Manual
Water Supply, Sources and General Considerations
Water Supply, Water Treatment
Water Supply, Water Storage
Water Supply, Water Distribution
Water Supply for Fire Protection
Criteria and Standards for Air Force Construction

Nongovernment Publications.

National Fire Protection Association (NFPA), Publications
Dept., Batterymarch Park, Quincy, MA 02269
NFPA 20-1983
NFPA 24-1984

Centrifugal Fire Pumps
Installation of Private Fire Service Mains and
Their Appurtenances

*National Association of Plumbing, Heating, Cooling Contractors/American Society of Plumbing
Engineers (NAPHCC/ASPE) Standard, 1016 20th Street, NW, Washington, D.C. 20036*
National Standard Plumbing Code (1983)

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