

**SECTION 26 05 11  
REQUIREMENTS FOR ELECTRICAL INSTALLATIONS**

SPEC WRITER NOTES: Use this section only for NCA projects. Edit this specification section to comply with specific project's scope, latest standards and codes. Delete between //\_\_\_\_// if not applicable to project. Also, delete any other item or paragraph not applicable in the section, and renumber the paragraphs. Include this specification section if any of the specification sections under the Division 26 of the NCA Master Construction Specifications are used for the project.

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. This section applies to all sections of Division 26.
- B. Contractor shall provide electrical equipment, materials, related components and accessories in accordance with the specifications and drawings.
- C. Electrical service entrance equipment (arrangements for temporary and permanent connections to the power company's system) shall conform to the utility power company's requirements. Coordinate fuses, circuit breakers and relays with the power company's system, and obtain power company approval for sizes and settings of these devices.
- D. Conductor shall be copper. Conductor ampacities are based on copper conductors, with the conduit and raceways properly sized. Aluminum conductors are prohibited.

**1.2 MINIMUM REQUIREMENTS**

- A. Reference to the International Building Code (IBC), Underwriters Laboratories, Inc. (UL), and National Fire Protection Association (NFPA) codes are minimum required standards.
- B. Drawings and specification sections shall govern in cases where requirements exceed the ones required in the above standards.

**1.3 TEST STANDARDS**

- A. Materials and equipment shall be listed, labeled or certified by a Nationally Recognized Testing Laboratory (NRTL) to meet Underwriters Laboratories, Inc., standards where test standards have been established. Materials and equipment not listed by UL Standards will be accepted providing that materials and equipment is listed, labeled, and certified to meet safety requirements of a NRTL. Materials and equipment that no NRTL lists, labels, and certifies, will be considered

if inspected or tested in accordance with national industrial standards, such as ANSI, NEMA, or NETA. Evidence of compliance shall include certified test reports and shop drawings.

B. Definitions:

1. Listed: Material or equipment included in a list published by an organization that:
  - a. Is acceptable to the Authority Having Jurisdiction (AHJ) and concerned with evaluation of products or services.
  - b. Is published by a nationally recognized laboratory which makes periodic inspection of production of such equipment.
  - c. States that such equipment meets nationally recognized standards or has been tested and found safe for use in a specified manner.
2. Labeled: Material or equipment is labeled when:
  - a. It embodies a valid label, symbol, or other identifying mark of a nationally recognized testing laboratory such as Underwriters Laboratories, Inc.
  - b. The laboratory makes periodic inspections of the production of such equipment.
  - c. The labeling indicates compliance with nationally recognized standards or tests to determine safe use in a specified manner.
3. Certified: Material or equipment is certified when:
  - a. It has been tested and validated by a NRTL to meet nationally recognized standards or to be safe for use in a specified manner.
  - b. It is periodically inspected by a NRTL.
  - c. It bears a label, tag, or other record of certification.
4. Nationally Recognized Testing Laboratory (NRTL): laboratory which is approved, in accordance with OSHA regulations, by the Secretary of Labor.
5. Provide: The term "provide" denotes "furnish, install and connect".

**1.4 QUALIFICATIONS (MANUFACTURERS, PRODUCTS AND SERVICES)**

- A. Manufacturer's Qualifications: The manufacturer shall regularly and presently produce, as one of the manufacturer's principal products, the equipment and material specified for this project, and shall have manufactured the item for at least three years.
- B. Product Qualification:
  1. Product shall have been in satisfactory operation, on three installations of similar size and type as this project, and for a minimum of three years.

2. The Government reserves the right to require the Contractor to submit a list of installations where the products have been in operation before approval.

SPEC WRITER NOTES: In the following paragraph use 4 hours for metropolitan areas and 8 hours for rural areas.

- C. Service Qualifications: There shall be a permanent service organization maintained or trained by the manufacturer which will render service to this installation within // four (4)// eight (8)// hours of receipt of notification that service is needed. Submit name and address of service organizations.

#### **1.5 APPLICABLE PUBLICATION**

- A. Applicable publications listed in all sections of Division 26 are the latest issues, unless otherwise noted.
- B. Products specified in all sections of Division 26 shall comply with the applicable publications listed in each section.

#### **1.6 MANUFACTURED PRODUCTS**

- A. Materials and equipment furnished shall be of current production by manufacturers regularly engaged in the manufacture of such items, and for which replacement parts shall be available. Materials and equipment furnished shall be new, and shall have superior quality and freshness.
- B. When more than one unit of the same class of equipment is required, such units shall be the product of a single manufacturer.
- C. Equipment Assemblies and Components:
1. Components of an assembled unit need not be products of the same manufacturer.
  2. Manufacturers of equipment assemblies, which include components made by others, shall assume complete responsibility for the final assembled unit.
  3. Components shall be compatible with each other and with the total assembly for the intended service.
  4. Parts which are similar shall be the product of a single manufacturer.
- D. Factory wiring shall be identified on the equipment, and shown on all wiring diagrams.
- E. When Factory Tests are specified, Factory Tests shall be performed in the factory by the equipment manufacturer, and witnessed by the

Contractor. Additionally, the Contractor shall comply with the following requirements:

1. The Government shall have the option of witnessing factory tests. The Contractor shall notify the Government, through the Resident Engineer/COR, a minimum of thirty (30) days prior to the manufacturer's performing of the factory tests.
2. When factory tests are successful, contractor shall furnish four (4) copies of the equipment manufacturer's certified test report to the Resident Engineer/COR fourteen (14) days prior to shipment of the equipment, and not more than ninety (90) days after completion of the factory tests.
3. When factory tests are not successful, factory tests shall be repeated in the factory by the equipment manufacturer, and witnessed by the Contractor. The Contractor shall be liable for additional expenses for the Government to witness factory re-testing.

#### **1.7 VARIATIONS FROM CONTRACT REQUIREMENTS**

- A. Where the Government or the Contractor requests variations from the contract requirements, the Contractor shall provide additional materials, equipment, related components and accessories to satisfy these variations. If the Contractor requests variations from the contract requirements, contractor shall be liable for all additional costs and expenses.

#### **1.8 MATERIALS AND EQUIPMENT PROTECTION**

- A. Materials and Equipment shall be protected during shipment and storage against physical damage, dirt, moisture, cold and rain:
  1. During installation, materials and equipment such as enclosures, switchboards, panelboards, conductors, luminaires etc. shall be protected against entry of foreign matter. Materials and equipment shall be vacuum cleaned both inside and outside before testing and operating and repainting if required.
  2. Damaged equipment shall be, as determined by the Resident Engineer/COR, replaced or repaired.
  3. Painted surfaces shall be protected with removable factory installed heavy kraft paper, sheet vinyl or equal.
  4. Damaged paint on equipment and materials shall be refinished with the same quality of paint and workmanship as used by the manufacturer so repaired areas are not obvious.

**1.9 WORK PERFORMANCE**

- A. All electrical work must comply with the requirements of latest publications of the NFPA 70 (NEC), NFPA 70B, NFPA 70E, NFPA 110, OSHA Part 1910 subpart J, OSHA Part 1910 subpart S and OSHA Part 1910 subpart K in addition to other references required by contract.
- B. Job site safety and worker safety is the responsibility of the Contractor.
- C. Electrical work shall be accomplished with all affected circuits and equipment de-energized. Only non-invasive and non-destructive electrical testing may be performed under energized electrical work. In such case, Contractor shall submit request, and obtain authorization for such work from the Resident Engineer/COR.
- D. For work on existing electrical system, arrange, prioritize and perform work to assure no or minimal interference with normal functioning of the facility. Refer to Article OPERATIONS AND STORAGE AREAS under Sections 01 00 01 (Major NCA Projects) or 01 00 02 (Minor NCA Projects), GENERAL REQUIREMENTS.
- E. New work shall be installed and connected to existing work neatly and professionally. Disturbed or damaged work shall be replaced or repaired to its prior conditions. Refer to Article RESTORATION under Sections 01 00 01 (Major NCA Projects) or 01 00 02 (Minor NCA Projects), GENERAL REQUIREMENTS.
- F. Coordinate location of equipment and conduit with other trades to minimize interferences.

**1.10 EQUIPMENT INSTALLATION AND REQUIREMENTS**

- A. Equipment location shall be as close as practical to locations shown on drawings.
- B. Working spaces shall not be less than specified in the NEC.
- C. Readily Accessible Equipment:
  - 1. Installed equipment shall be readily accessible. When the Government determines that the contractor has installed equipment not readily accessible, contractor shall remove and re-install the equipment as directed by the Government.

**1.11 EQUIPMENT IDENTIFICATION**

- A. In addition to the requirements of the latest NEC, install an identification sign which clearly indicates information required for use and maintenance of items such as panelboards, cabinets, motor controllers (starters), safety switches, separately enclosed circuit

breakers, individual breakers and controllers in switchboards, switchgear, control devices and other significant equipment.

- B. Nameplates shall be laminated black phenolic resin with a white core with engraved lettering, a minimum of 6 mm (1/4 inch) high. Secure nameplates with screws. Nameplates that are furnished by manufacturer as a standard catalog item, or where other method of identification is herein specified, are exceptions.
- C. Install adhesive arc flash warning labels on all equipment as required by the latest NFPA 70E.

#### **1.12 SUBMITTALS**

- A. Submit six copies to Resident Engineer/COR in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. The Government's approval shall be obtained for all equipment and material before delivery to the job site. The Government prohibits delivery, storage or installation of equipment or material which has not been approved through the submittal process.
- C. All submittals shall include descriptive literature, catalog cuts, shop drawings, and other data necessary for the Government to ascertain that the proposed equipment and materials comply with specification requirements. Catalog cuts submitted for approval shall be legible and clearly identify equipment being submitted.
- D. Submittals for individual systems and equipment assemblies which consist of more than one item or component shall be made for the system or assembly as a whole. Partial submittals will not be considered for approval.
  - 1. Mark the submittals, "SUBMITTED UNDER SPECIFICATION SECTION \_\_\_\_\_".
  - 2. Submittals shall be marked to show specification reference including the section and paragraph numbers.
  - 3. Submit each section separately.
- E. The submittals shall include the following:
  - 1. Information that confirms compliance with contract requirements. Include the manufacturer's name, model or catalog numbers, catalog information, technical data sheets, shop drawings, pictures, nameplate data and test reports as required.

SPEC WRITER NOTES: Include the following paragraph for projects in seismic areas of moderate-high, high and very high seismicities as listed in Table 4 of VA Handbook H-18-8, Seismic Design Requirements.

//2. Submittals are required for all equipment anchors and supports. Submittals shall include weights, dimensions, center of gravity, standard connections, manufacturer's recommendations and behavior problems (e.g., vibration, thermal expansion,) associated with equipment or piping so that the proposed installation can be properly reviewed. //

3. Elementary and interconnection wiring diagrams for communication and signal systems, control system and equipment assemblies. All terminal points and wiring shall be identified on wiring diagrams.
4. Parts list to include replacement parts and part numbers recommended by the equipment manufacturer, and quantity of parts.

F. Maintenance and Operation Manuals:

1. Submit as required for systems and equipment specified in the technical sections. Furnish four copies, bound in hardback binders, (manufacturer's standard binders) or an approved equivalent. Furnish one complete manual as specified in the technical section but in no case later than prior to performance of systems or equipment test, and furnish the remaining manuals prior to contract completion.
2. Inscribe the following identification on the cover: the words "MAINTENANCE AND OPERATION MANUAL," the name and location of the system, equipment, building, name of the Contractor, and contract number. Include in the manual the names, addresses, and telephone numbers of each subcontractor installing the system or equipment and the local representatives for the system or equipment.
3. Provide a "Table of Contents" and assemble the manual to conform to the table of contents, with tab sheets placed before instructions covering the subject. The instructions shall be legible and easily read, with large sheets of drawings folded in.
4. The manuals shall include:
  - a. Internal and interconnecting wiring and control diagrams with data to explain detailed operation and control of the equipment.
  - b. A control sequence describing start-up, operation, and shutdown.
  - c. Description of the function of each principal item of equipment.

- d. Installation and maintenance instructions.
- e. Safety precautions.
- f. Diagrams and illustrations.
- g. Testing methods.
- h. Performance data.
- i. Lubrication schedule including type, grade, temperature range, and frequency.
- j. Pictorial "exploded" parts list with part numbers. Emphasis shall be placed on the use of special tools and instruments. The list shall indicate sources of supply, recommended spare parts, and name of servicing organization.
- k. List qualified permanent servicing organizations for support of the equipment, including addresses and certified qualifications.

#### **1.13 SINGULAR NUMBER**

- A. Where any device or part of equipment is referred to in these specifications in the singular number (e.g., "the switch"), this reference shall be deemed to apply to as many such devices as are required to complete the installation as shown on the drawings.

SPEC WRITER NOTES: Include the following paragraph for projects with removal of Polychlorinated Biphenyl (PCB) transformers and capacitors. The drawings shall show location, size and the following reference to the specifications: "Contains PCB, remove and dispose of in accordance with the specifications". Coordinate with the front section of the specifications.

#### **//1.14 PCB EQUIPMENT**

- A. This project requires the removal, transport and disposal of electrical equipment containing Polychlorinated Biphenyl (PCB) in accordance with the Federal Toxic Substances Control Act (TSCA).
- B. The equipment for removal is shown on the drawings.
- C. The selective demolition shall be in accordance with Section 02 41 00, DEMOLITION AND SITE CLEARING. //

#### **1.15 WARRANTY**

- A. Workmanship, labor, equipment, materials, related components and accessories shall be free from defects, and shall remain so for a period of one year from the date of project acceptance by the Government



**1.16 TRAINING**

- A. Training shall be provided to designated Government personnel for particular equipment or system as required in each associated specification section.
- B. Contractor shall furnish the services of factory certified and experienced instructors to provide full instruction in the adjustment, operation, and maintenance of the specified equipment and system. Instruction shall also include safety requirements.
- C. Contractor shall develop a training schedule, and submit training schedule to Resident Engineer/COR for review and approval at least thirty (30) days prior to the scheduled training.

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