

SECTION 26 05 02
BASIC ELECTRICAL REQUIREMENTS

PART 1 GENERAL

1.01 RELATED SECTIONS

- A. Requirements specified within this section apply to Division 26, Electrical. Work specified herein shall be performed as if specified in the individual sections.

1.02 REFERENCES

- A. The following is a list of standards which may be referenced in this section:
 - 1. National Electrical Contractors Association (NECA): National Electrical Installation Standards.
 - 2. National Electrical Manufacturers Association (NEMA):
 - a. 250, Enclosures for Electrical Equipment (1000 Volts Maximum).
 - b. Z535.4, Product Safety Signs and Labels.
 - 3. National Fire Protection Association (NFPA): 70, National Electrical Code (NEC).

1.03 DESIGN REQUIREMENTS

- A. Provide anchorage and bracing design drawings, calculations, and related information where required under Section 01 88 15, Anchorage and Bracing.
- B. Provide seismic certification per requirements of Section 01 45 33, Special Inspection, Observation, and Testing, where required in that section for electrical equipment listed.

1.04 ELECTRIC AND TELEPHONE SERVICE DIVISION OF RESPONSIBILITY

- A. Under this Contract, provide customer required service provisions and electrical work including, but not limited to, primary trench and backfill, primary duct and cable system, transformer pad site preparation, transformer and transformer pad, pad mounted switch and associated conduit, and secondary facilities. Schedule and coordinate work of serving utility as required to provide electric service to the Work.
- B. Incoming telephone service facilities provided by the serving utilities as part of their normal obligation to customers is work provided outside this Contract. Under this Contract, provide customer required service provisions and electrical work.

1.05 SUBMITTALS

A. Action Submittals:

1. Provide manufacturers' data for the following:
 - a. Electrical service components.
 - b. Telephone service components.
 - c. Nameplates, signs, and labels.
2. Anchorage and bracing drawings and catalog information, as required by Section 01 88 15, Anchorage and Bracing, for loads in Section 01 67 00, Product Requirements.

B. Informational Submittals: Anchorage and bracing calculations, as required by Section 01 88 15, Anchorage and Bracing, for loads in Section 01 67 00, Product Requirements.

1.06 QUALITY ASSURANCE

- A. Provide the Work in accordance with NFPA 70. Material and equipment shall be labeled or listed by a nationally recognized testing laboratory or other organization, in order to provide a basis for approval under the NEC.
- B. Materials and equipment manufactured within the scope of standards published by UL shall conform to those standards and shall have an applied UL listing mark or label.

1.07 ENVIRONMENTAL CONDITIONS

- A. For material and methods required in different areas of the Project, see the material classification table on the Drawings.

PART 2 PRODUCTS

2.01 GENERAL

- A. Where two or more units of the same class of material or equipment are required, provide products of a single manufacturer. Component parts of materials or equipment need not be products of the same manufacturer.
- B. Manufacturer's standard finish color, except where specific color is indicated. If manufacturer has no standard color, finish equipment with light gray color finish.
- C. Material and equipment installed in heated and ventilated areas shall be capable of continuous operation at their specified ratings within an ambient temperature range of 32 degrees F to 104 degrees F.

- D. Materials and equipment installed outdoors shall be capable of continuous operation at their specified rating within the ambient temperature range stated in Section 01 67 00, Product Requirements.
- E. Electrical ratings of materials and equipment that are reduced by increased elevation shall be derated as required for Site elevation specified in Section 01 67 00, Product Requirements.

2.02 NAMEPLATES

A. Physical Characteristics:

- 1. Material: Laminated plastic.
- 2. Means of attachment:
 - a. Screws: Stainless steel.
 - b. Adhesive: Single-part room-temperature vulcanizing adhesive suitable for the environment and materials involved. Use adhesive only on NEMA 4 or NEMA 4X enclosures.
- 3. Color: White, engraved to a black core.
- 4. Letter Height:
 - a. Pushbuttons, selector switches, and other pilot devices: 1/8 inch.
 - b. Other Electrical Equipment: 1/4 inch.

B. Functional Characteristics: None.

C. Performance Characteristics: None.

2.03 TELEPHONE BACKBOARD

A. Physical Characteristics: Plywood, 3/4-inch thick, 48-inches wide, 96-inches high. Painted with white, fire-retardant paint.

B. Functional Characteristics: None.

C. Performance Characteristics: None.

2.04 SIGNS AND LABELS

A. Physical Characteristics: Sign size, lettering, and color shall be in accordance with NEMA Z535.4.

B. Functional Characteristics: None.

C. Performance Characteristics: None.

PART 3 EXECUTION

3.01 GENERAL

- A. Electrical Drawings show general locations of equipment, devices, and raceway, unless specifically dimensioned. Contractor shall be responsible for actual location of equipment and devices and for proper routing and support of raceways, subject to approval of Contracting Officer.
- B. Check approximate locations of light fixtures, switches, electrical outlets, equipment, and other electrical system components shown on the Drawings for conflicts with openings, structural members, and components of other systems and equipment having fixed locations. In the event of conflicts, notify Contracting Officer in writing.
- C. Install work in accordance with NECA Standard of Installation, unless otherwise specified.
- D. Keep openings in boxes and equipment closed during construction.
- E. Lay out work carefully in advance. Do not cut or notch any structural member or building surface without specific approval of Contracting Officer. Carefully perform cutting, channeling, chasing, or drilling of floors, walls, partitions, ceilings, paving, or other surfaces required for the installation, support, or anchorage of conduit, raceways, or other electrical materials and equipment. Following such work, restore surfaces to original condition.

3.02 ANCHORING, BRACING, AND MOUNTING

- A. Equipment anchoring and mounting shall be in accordance with manufacturer's requirements for Project design criteria provided in Section 01 67 00, Product Requirements, to meet the requirements of Section 01 88 15, Anchorage and Bracing.

3.03 COMBINING CIRCUITS INTO COMMON RACEWAY

- A. Homerun circuits shown on the Drawings indicate functional wiring requirements for power and control circuits. Circuits may be combined into common raceways in accordance with the following requirements:
 - 1. Analog control circuits from devices in same general area to same destination.
 - a. No power or ac discrete control circuits shall be combined in same conduit with analog circuits.
 - b. No Class 2 or Class 3 circuits including, but not limited to, HVAC control circuits, fire alarm circuits, paging system circuits shall be combined with power or Class 1 circuits.

- c. Analog circuits shall be continuous from source to destination. Do not add TJB, splice, or combine into a multi-pair cable without authorization of Contracting Officer.
 - d. Raceways shall be sized per Contract Drawings and do not exceed 40 percent fill.
 - e. Changes shall be documented on the Record Drawings.
- 2. Discrete control circuits from devices in the same general area to the same destination.
 - a. No analog control circuits shall be combined in same conduit with discrete circuits.
 - b. No Class 2 or Class 3 circuits including, but not limited to, HVAC control circuits, fire alarm circuits, and paging system circuits shall be combined with power or Class 1 circuits.
 - c. Raceways shall be sized per the Contract Drawings and do not exceed 40 percent fill.
 - d. Changes shall be documented on the Record Drawings.
- 3. Power circuits from loads in same general area to same source location (such as: panelboard, switchboard, low voltage motor control center).
 - a. Lighting Circuits: Combine no more than three circuits to a single raceway. Contractor shall be responsible for increasing conduit and conductor size if derating is required by NEC.
 - b. Receptacle Circuits, 120 Volt Only: Combine no more than three circuits to a single raceway. Provide a separate neutral conductor for each circuit. Contractor shall be responsible for increasing conduit and conductor size if derating is required by NEC.
 - c. All Other Power Circuits: Do not combine power circuits without authorization of Contracting Officer.

3.04 NAMEPLATES, SIGNS, AND LABELS

A. Arc Flash Protection Warning Signs:

- 1. Field mark switchboards, motor control centers, panelboards, motor starters, and other 480V panels to warn qualified persons of potential arc-flash hazards. Locate marking so to be clearly visible to persons before working on energized equipment.
- 2. Use arc flash hazard boundary, energy level, PPE level and description, shock hazard, bolted fault current, and equipment name from study required in Section 26 05 70, Electrical Systems Analysis as basis for warning signs.

B. Available Fault Current Signs:

- 1. Install label on service equipment to indicate the maximum available fault current at the equipment. Labels shall be of sufficient durability for

the environment in which the equipment is installed. Labels shall include the following information:

- a. Equipment name or identification.
 - b. Available fault current at the equipment.
 - c. Date the fault current calculations were performed.
2. Use bolted fault current and equipment name from study required in Section 26 05 70, Electrical Systems Analysis, as basis for the label.
 3. Where existing electrical systems are modified, completely remove existing fault current labels if present, and install new labels in accordance with the above requirements.
- C. Multiple Power Supply Sign: Install permanent plaque or directory at each service disconnect location denoting other services, feeders, and branch circuits supplying the building, and the area served by each.
- D. Equipment Nameplates:
1. Provide a nameplate to label electrical equipment including , switchboards, motor control centers, panelboards, motor starters, transformers, terminal junction boxes, disconnect switches, switches and control stations.
 2. Switchboard, motor control center, transformer, and terminal junction box nameplates shall include equipment designation.
 3. Disconnect switch, starter, and control station nameplates shall include name and number of equipment powered or controlled by that device.
 4. Switchboard and panelboard nameplates shall include equipment designation, service voltage, and phases.

3.05 LOAD BALANCE

- A. Drawings and Specifications indicate circuiting to electrical loads and distribution equipment.
- B. Balance electrical load between phases as nearly as possible on switchboards, panelboards, motor control centers, and other equipment where balancing is required.
- C. When loads must be reconnected to different circuits to balance phase loads, maintain accurate record of changes made, and provide circuit directory that lists final circuit arrangement.

3.06 CLEANING AND TOUCHUP PAINTING

- A. Cleaning: Throughout the Work, clean interior and exterior of devices and equipment by removing debris and vacuuming.

B. Touchup Paint:

1. Touchup scratches, scrapes and chips on exterior and interior surfaces of devices and equipment with finish matching type, color, and consistency and type of surface of original finish.
2. If extensive damage is done to equipment paint surfaces, refinish entire equipment in a manner that provides a finish equal to or better than factory finish, that meets requirements of Specification, and is acceptable to Contracting Officer.

3.07 PROTECTION FOLLOWING INSTALLATION

- A. Protect materials and equipment from corrosion, physical damage, and effects of moisture on insulation and contact surfaces.
- B. When equipment intended for indoor installation is installed at Contractor's convenience in areas where subject to dampness, moisture, dirt or other adverse atmosphere until completion of construction, ensure adequate protection from these atmospheres is provided and acceptable to Contracting Officer.

END OF SECTION

