

SECTION 16010 - BASIC ELECTRICAL REQUIREMENTS

PART 1 - GENERAL

1.01 WORK INCLUDED

This section includes general requirements specifically applicable to Division 16.

1.02 RELATED WORK

The specification and drawings shall be deemed to mutually explain each other and to be descriptive of the work to be done under this contract. Should any discrepancy appear between the specifications and drawings, it shall be referred to the Engineer for interpretation. If Engineer and Contractor disagree in the interpretation of these specifications, the Engineer's interpretation shall be final and binding on the Contractor.

1.03 SITE INVESTIGATION

It is the Contractor's responsibility to satisfy himself as to the nature and location of the work, the general conditions, availability of labor, water, electric power, roads, physical conditions at the site, the existing equipment to remain, existing equipment to be modified or to be removed, and all others matters which can in any way affect the work or the cost thereof under this contract. Any failure by the Contractor to acquaint himself with all available information will not relieve him of responsibility of successfully performing the work.

1.04 COORDINATION

- A. Prepare drawings showing proposed rearrangement of work to meet job conditions. Obtain permission of the Engineer before proceeding.

1.05 ELECTRICAL DRAWINGS

- A. The electrical drawings indicate the general layout of the complete electrical system and show arrangements of feeders, branch circuit, service equipment, and other work based upon information available during the design period. The Contractor shall be responsible to verify all locations, electrical service and power requirements of the actual site in order to deliver a complete electrical system.
- B. Discrepancies shown on plans, or between plans and actual field conditions, shall be brought to the attention of the Engineer for resolution prior to accomplishment of the associated work.
- C. The electrical drawings may be superseded by later revised or detailed drawings or specifications addenda prepared by the Engineer, and the Contractor shall conform to all reasonable changes without extra cost to the Owner. All items not specifically mentioned in the specifications or noted on the drawings, but which obviously are required to make the working installation completely shall be included automatically in the contract at no additional cost to the Owner.

1.06 MATERIALS AND EQUIPMENT

- A. All electrical products used on this project shall be new and shall conform, unless otherwise specifically noted, to applicable standards of the National Electrical Manufacturers' Association and shall be listed by the Underwriters' Laboratories, Inc.
- B. The Contractor shall submit for the Engineer's approval, shop drawings and other product data of all electrical equipment to be furnished. No equipment shall be ordered until submittals have been approved by the Engineer.
- C. All materials and equipment must be installed in accordance with the manufacturer's instructions. Unless authorized by the Engineer, supporting bracket or structural shape recommended by the manufacturer must be installed accordingly.

1.07 REFERENCES

The electrical installation, materials, and equipment shall be constructed, wired, and tested in accordance with:

- A. These specifications.
- B. Applicable drawings.
- C. All codes, acts, laws, rules and regulations within the jurisdiction of the local area, the State of Louisiana, and the current edition of the following standards and codes insofar as they apply.
 - 1. ANSI/IEE C2 - National Electrical Safety Code.
 - 2. ANSI/NFPA 70 - National Electrical Code.
 - 3. NECA - Standard of Installation.
 - 4. NFPA-72 and 101
 - 5. Division-15 specification

1.08 SUBMITTALS

- A. Submit inspection and permit certificates.
- B. Include certificate of final inspection and acceptance from authority having jurisdiction.
- C. As built drawings and equipment shop drawings
- D. Detail circuit diagrams where requested by architect.

1.09 CONTRACTOR SPECIAL NOTES

- A. This specifications and the electrical drawings size equipment, wire, conduit, etc. based on the horse powers of motors and voltage of equipment information available at the time of design and as shown on the plans or specified herein. The electrical contractors, starters, or any other electrical equipment based on equipment actually furnished. The electrical Contractor shall not furnished or installed any electrical raceways, conductors, safety switches, contactors, or motor starters of sizes smaller than those required by codes or shown on drawings, or specified in this specifications. The electrical contractor shall coordinate with various trades, and various sections of specifications to provide the properly sized equipment without additional cost to owner.
- B. Upgrade existing service to building. Provide new junction box outside with main service panel as indicated.

PART 2 PRODUCTS

2.01 MATERIALS

- A. All materials shall be in accordance with associated specifications and drawings. Where equipment is specified by manufacturer, no substitutions shall be made without prior approval by the Architect.
- B. The Contractor shall furnish a list of all materials which he is to furnish for approval of manufacturer type and catalog number.
- C. Any bills of materials, conduit and wire schedules, etc., will be used for identification, type, and reference. It shall be the responsibility of the Contractor to determine exact quantities and components required to effect a complete job in accordance with drawings and associated specifications.
- D. Equipment shall be installed in strict accordance with manufacturer's instructions. Contractor shall obtain these instructions and they shall be considered a part of these specifications. Contractor shall furnish instructions, operation, and maintenance instructions.

2.02 MATERIALS AND EQUIPMENT HANDLING

- A. The Electrical Contractor shall be responsible for receiving, unloading, storing, protecting from weather, theft, breakage, etc., all electrical equipment and material either purchased by the Contractor or furnished by others. The Contractor shall remove such material from storage and transport it to the site of erection when required for construction. The Contractor shall protect his own tools and any tools on loan from the Owner in a like manner. Also, the Contractor shall protect all equipment from accidental damage due to operating and maintenance activities that will be in progress in the same area.

PART 3 - EXECUTION

3.01 CONSTRUCTION FORCE

The Contractor shall provide and maintain at all times, during the fulfillment of the contract, a sufficient force of laborers, mechanics, and foremen to execute the work expediently.

3.02 WORKMANSHIP

All work, performed under this contract, shall be executed in a thorough, substantial and workmanlike manner by competent, experienced mechanics. All materials used in this contract shall be approved by the Underwriters' Laboratories and be listed by them as so approved for the intended use, except as otherwise approved by Engineer.

3.03 CONSTRUCTION POWER

Provide electrical power necessary during construction as required by general section of specifications. The power may be required new temporary service and extension to building as required for the construction.

END OF SECTION 16010

SECTION 16050 - BASIC ELECTRICAL MATERIALS AND METHODS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following electrical materials and methods:

1. Building wire, connectors, and splices for branch circuits and feeders.
2. Supporting devices for electrical components.
3. Concrete equipment bases.
4. Electrical identification.
5. Electrical demolition.
6. Cutting and patching for electrical construction.
7. Touchup painting.
8. Fire Alarm system
9. Intercom system
10. Telephone System
11. Computer data
12. Elevator power, phone, light, recall, communication

1.3 SUBMITTALS

- A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.
- B. Product Data for each type of product specified.
- C. Shop Drawings detailing fabrication and installation of supports and anchorage for electrical items.
- D. Coordination Drawings for electrical installation.
 1. Prepare Coordination Drawings according to Division 1 Section "Submittals" to a 1/4-inch-equals-1-foot (1:50) scale or larger. Detail major elements, components, and systems of electrical equipment and materials in relation to each other and to other systems, installations, and building components. Indicate locations and space requirements for installation, access, and working clearance. Show where sequence and coordination of installations are important to the efficient flow of the Work. Coordinate drawing preparation with effort specified in other Specification Sections. Include the following:

- a. Provisions for scheduling, sequencing, moving, and positioning large equipment in the building during construction.
- b. Floor plans, elevations, and details, including the following:
 - 1) Clearances to meet safety requirements and for servicing and maintaining equipment, including space for equipment disassembly required for periodic maintenance.
 - 2) Equipment support details.
 - 3) Exterior wall, roof, and foundation penetrations of cable and raceway; and their relation to other penetrations and installations.
 - 4) Fire-rated interior wall and floor penetrations by electrical installations.
 - 5) Sizes and locations of required concrete pads and bases.
- c. Reflected ceiling plans to coordinate and integrate installing air outlets and inlets, light fixtures, alarm and communication systems components, sprinklers, and other ceiling-mounted items.

E. Samples of color, lettering style, and other graphic representation required for each identification product for Project.

1.4 QUALITY ASSURANCE

- A. Comply with NFPA 70 for components and installation.
- B. Listing and Labeling: Provide products specified in this Section that are listed and labeled.
 - 1. The Terms "Listed and Labeled": As defined in the National Electrical Code, Article 100.
 - 2. Listing and Labeling Agency Qualifications: A "Nationally Recognized Testing Laboratory" (NRTL) as defined in OSHA Regulation 1910.7.

1.5 SEQUENCING AND SCHEDULING

- A. Coordinate electrical equipment installation with other building components.
- B. Arrange for chases, slots, and openings in building structure during progress of construction to allow for electrical installations.
- C. Coordinate installing required supporting devices and set sleeves in poured-in-place concrete and other structural components as they are constructed.
- D. Sequence, coordinate, and integrate installing electrical materials and equipment for efficient flow of the Work. Coordinate installing large equipment requiring positioning prior to closing in the building.
- E. Coordinate connecting electrical service to components furnished under other Sections.
- F. Coordinate connecting electrical systems with exterior underground and overhead utilities and services. Comply with requirements of governing regulations, franchised service companies, and controlling agencies.

- G. Coordinate requirements for access panels and doors where electrical items requiring access are concealed by finished surfaces. Access panels and doors are specified in Division 8 Section "Access Doors."
- H. Coordinate installing electrical identification after completion of finishing where identification is applied to field-finished surfaces.
- I. Coordinate installing electrical identifying devices and markings prior to installing acoustical ceilings and similar finishes that conceal such items.

PART 2 - PRODUCTS

2.1 BUILDING WIRE

- A. Description: Single conductor, copper. Solid conductor for No. 10 AWG and smaller; stranded conductor for larger than No. 10 AWG.
- B. Thermoplastic Insulated Wire: Conform to NEMA WC 5.
- C. Cross-Linked, Polyethylene Insulated Wire: Conform to NEMA WC 7.
- D. Connectors and Splices: Units of size, ampacity rating, material, type, and class suitable for service indicated. Select to comply with Project's installation requirements.

2.2 SUPPORTING DEVICES

- A. Channel and angle support systems, hangers, anchors, sleeves, brackets, fabricated items, and fasteners are designed to provide secure support from the building structure for electrical components.
 - 1. Material: Steel, except as otherwise indicated, protected from corrosion with zinc coating or with treatment of equivalent corrosion resistance using approved alternative finish or inherent material characteristics.
 - 2. Metal Items for Use Outdoors or in Damp Locations: Hot-dip galvanized steel, except as otherwise indicated.
- B. Steel channel supports have 9/16-inch (14-mm) diameter holes at a maximum of 8 inches (203 mm) o.c., in at least 1 surface.
 - 1. Fittings and accessories mate and match with channels and are from the same manufacturer.
- C. Nonmetallic Channel and Angle Systems: Structural-grade, factory-formed, fiberglass-resin channels and angles with 9/16-inch (14-mm) diameter holes at a maximum of 8 inches (203 mm) o.c., in at least 1 surface.
 - 1. Fittings and accessories mate and match with channels or angles and are from the same manufacturer.

- 2. **Fitting and Accessory Material:** Same as channels and angles, except metal items may be stainless steel.
- D. **Raceway and Cable Supports:** Manufactured clevis hangers, riser clamps, straps, threaded C-clamps with retainers, ceiling trapeze hangers, wall brackets, and spring steel clamps or "click"-type hangers.
- E. **Sheet-Metal Sleeves:** 0.0276-inch (0.7-mm) or heavier galvanized sheet steel, round tube, closed with welded longitudinal joint.
- F. **Pipe Sleeves:** ASTM A 53, Type E, Grade A, Schedule 40, galvanized steel, plain ends.
- G. **Cable Supports for Vertical Conduit:** Factory-fabricated assembly consisting of threaded body and insulating wedging plug for nonarmored electrical cables in riser conduits. Plugs have number and size of conductor gripping holes as required to suit individual risers. Body constructed of malleable iron casting with hot-dip galvanized finish.
- H. **Expansion Anchors:** Carbon-steel wedge or sleeve type.
- I. **Toggle Bolts:** All-steel springhead type.
- J. **Powder-Driven Threaded Studs:** Heat-treated steel.

2.3 CONCRETE EQUIPMENT BASES

- A. **Forms and Reinforcing Materials:** As specified in Division 3 Section "Cast-in-Place Concrete."
- B. **Concrete:** 3000-psi (20.7-MPa), 28-day compressive strength as specified in Division 3 Section "Cast-in-Place Concrete."

2.4 ELECTRICAL IDENTIFICATION

- A. **Manufacturer's Standard Products:** Where more than one type is listed for a specified application, selection is Installer's option, but provide single type for each application category. Use colors prescribed by ANSI A13.1, NFPA 70, and these Specifications.
- B. **Raceway and Cable Labels:** Conform to ANSI A13.1, Table 3, for minimum size of letters for legend and minimum length of color field for each raceway or cable size.
 - 1. **Type:** Preprinted, flexible, self-adhesive, vinyl. Legend is overlaminated with a clear, weather- and chemical-resistant coating.
 - 2. **Color:** Black legend on orange field.
 - 3. **Legend:** Indicates voltage.
- C. **Colored Adhesive Marking Tape for Raceways, Wires, and Cables:** Self-adhesive vinyl tape not less than 3 mils thick by 1 inch wide (0.08 mm thick by 25 mm wide).
- D. **Underground Line Warning Tape:** Permanent, bright-colored, continuous-printed, vinyl tape with the following features:

1. Size: Not less than 4 mils thick by 6 inches wide (0.102 mm thick by 152 mm wide).

a. Compounded for permanent direct-burial service.

2. Embedded continuous metallic strip or core.

a. Printed Legend: Indicates type of underground line.

E. Tape Markers: Vinyl or vinyl-cloth, self-adhesive, wraparound type with preprinted numbers and letters.

F. Color-Coding Cable Ties: Type 6/6 nylon, self-locking type. Colors to suit coding scheme.

G. Engraved, Plastic-Laminated Labels, Signs, and Instruction Plates: Engraving stock, melamine plastic laminate punched for mechanical fasteners 1/16-inch (1.6-mm) minimum thick for signs up to 20 sq. in. (129 sq. cm), 1/8 inch (3.2 mm) thick for larger sizes. Engraved legend in black letters on white face.

H. Interior Warning and Caution Signs: Preprinted, aluminum, baked-enamel finish signs, punched for fasteners, with colors, legend, and size appropriate to the application.

I. Exterior Warning and Caution Signs: Weather-resistant, nonfading, preprinted, cellulose acetate butyrate signs with 0.0396-inch (1-mm), galvanized steel backing, with colors, legend, and size appropriate to the application. 1/4-inch (6.4-mm) grommets in corners for mounting.

J. Fasteners for Plastic-Laminated and Metal Signs: Self-tapping stainless-steel screws or No. 10/32 stainless-steel machine screws with nuts and flat and lock washers.

2.5 METER SOCKETS

A. Meter sockets comply with serving utility company requirements where applicable.

2.6 TOUCHUP PAINT

A. For Equipment: Provided by equipment manufacturer and selected to match equipment finish.

B. For Nonequipment Surfaces: Matching type and color of undamaged, existing adjacent finish.

C. For Galvanized Surfaces: Zinc-rich paint recommended by item manufacturer.

2.7. TELEPHONE, DATA AND ELEVATOR

This contractor shall provide empty conduits in walls for telephone and data wires and cable. Provide J-box with appropriate cover plate.

Provide Power, communication telephone, fire alarm recall shunttrip breaker and any necessary devices to complete elevator requirement and coordination with elevator company.