

SECTION 16010 – GENERAL PROVISIONS - ELECTRICAL

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. This Section includes the following:
 - 1. General electrical requirements.
 - 2. Quality Assurance.
 - 3. Submittals.
 - 4. Coordination.
 - 5. Temporary construction power.
 - 6. Electrical equipment supports.
 - 7. Concrete bases.
 - 8. Excavation and backfill.
 - 9. Tests and adjustments.
 - 10. Operations and Maintenance Manuals.
 - 11. Startup services and training.
 - 12. Firestopping.
 - 13. Touchup painting.
 - 14. Electrical demolition.

1.03 GENERAL ELECTRICAL REQUIREMENTS

- A. Furnish all labor, materials, and equipment necessary to obtain a complete and functional electrical system as indicated on the drawings and as required by the specifications.
- B. Furnish all permits and fees required for completion of the electrical work.
- C. Review the drawings and specifications of other Divisions associated with this project, and provide electrical devices and circuiting for the proper operation of all electrical devices requiring electrical connections.
- D. Provide all required guards, barriers, signs and miscellaneous items at electrical equipment to insure the safety of personnel during the duration of construction.
- E. The electrical drawings are diagrammatic in nature and are intended to indicate the general arrangement and quantity of electrical devices, equipment and circuiting. Field verify dimensional requirements, locations and levels of all electrical equipment with actual site conditions.
- F. The installation of all electrical equipment shall be coordinated with the installation of equipment from all other Divisions of the specifications.
- G. Discrepancies in the drawings or specifications shall be brought to the attention of the Owner's Representative prior to the bid date.

1.04 QUALITY ASSURANCE

- A. All electrical products furnished under Division 16 specifications shall be UL listed and labeled, and shall be used for the application for which they are approved.

- B. Installation of electrical wiring and devices specified in Division 16 shall comply with the applicable edition of all national, state, and local codes and ordinances, and the requirements of the local authority having jurisdiction. The electrical installation shall comply with but not be limited to the following:
 - 1. The National Electric Code (NFPA 70).
 - 2. The National Electric Safety Code.
 - 3. Standard Fire Prevention Code.
 - 4. All applicable building codes.
 - 5. Occupational Safety and Health Act (OSHA).
 - 6. Americans with Disabilities Act (ADA).
 - 7. The requirements of the local power and telephone companies providing services to the project.
- C. Electrical products furnished for installation under Division 16 of the specifications, where applicable, shall adhere to the following industry guidelines and standards:
 - 1. ANSI – American National Standards Institute
 - 2. CBM – Certified Ballast Manufacturers
 - 3. EIA – Electronics Industry Association
 - 4. IEEE – Institute of Electrical and Electronics Engineers
 - 5. IESNA – Illuminating Engineering Society of North America
 - 6. NEMA – National Electrical Manufacturers Association
 - 7. UL – Underwriter's Laboratories

1.05 SUBMITTALS

- A. Submit for approval all electrical items proposed to be furnished under Division 16 specifications. See individual sections for specific requirements.
- B. Furnish submittals for all electrical items at the same time. Partial electrical submittals are not acceptable.
- C. Submit sufficient information to allow verification that the item submitted meets the requirements of the drawings and specifications. Include operating characteristics to include but not be limited to voltage, amperage, phase, KVA, wattage, horsepower, NEMA ratings, dimensions, etc.
- D. Submit (7) copies of electrical submittals. Each submittal shall be furnished in a three-ring binder and shall include an index page, and tabbed sections.

1.06 COORDINATION

- A. Coordinate chases, slots, inserts, sleeves, and openings with general construction work and arrange in building structure during progress of construction to facilitate the electrical installations that follow.
 - 1. Set inserts and sleeves in poured-in-place concrete, masonry work, and other structural components as they are constructed.
- B. Sequence, coordinate, and integrate installation of electrical materials and equipment for efficient flow of the Work. Coordinate installing large equipment requiring positioning before closing in the building.
- C. Coordinate electrical service connections to components furnished by utility companies.
 - 1. Coordinate installation and connection of exterior underground and overhead utilities and services, including provision for electricity-metering components.
 - 2. Comply with requirements of authorities having jurisdiction and of utility company providing electrical power and other services.

- D. Coordinate the telephone service entrance requirements with the local telephone company providing service to the site.
- E. Coordinate the installation of equipment furnish by the Owner for installation under Division 16 of the specifications.
- F. Coordinate the installation of equipment specified in other Divisions of the specifications for installation under Division 16 specifications.
- G. Coordinate location of access panels and doors for electrical items that are concealed by finished surfaces.
- H. Where electrical identification devices are applied to field-finished surfaces, coordinate installation of identification devices with completion of finished surface.
- I. Where electrical identification markings and devices will be concealed by acoustical ceilings and similar finishes, coordinate installation of these items before ceiling installation.

1.07 TEMPORARY CONSTRUCTION POWER

- A. Furnish all temporary lighting, power equipment, and circuiting required for the construction of the facility. Temporary wiring shall meet all applicable codes, ordinances and safety regulations, and shall be furnished with ground fault protection.
- B. Furnish a temporary electrical service to the project. Include all fees and permits required for a temporary electrical service.
- C. Remove all temporary electrical devices, wiring and service upon completion of the project.

1.08 ELECTRICAL EQUIPMENT SUPPORTS

- A. Furnish and install all necessary steel members, frames, connections, etc. to support equipment installed under Division 16. Support members shall be rigidly attached to building structural members using clamps and accessories which do not permanently modify the structural member.
- B. Welding, drilling, or other modifications to structural members or equipment is not allowed.
- C. All supports shall be sized to adequately support the equipment being installed. See specification section 16050 for additional electrical supporting device requirements.
- D. All support hardware shall include lock washers.
- E. Supports for large pieces of electrical equipment and large feeders shall be designed to place a symmetrical load on the structural supporting members.

1.09 CONCRETE BASES

- A. Furnish and install concrete forms and reinforcement materials as indicated on the drawings, as required in the specifications, and as otherwise required for proper support and operation of electrical equipment furnished under Division 16.

- B. Furnish and install concrete housekeeping pads with chamfered edges for all floor-mounted electrical equipment.
- C. Concrete shall be 3000-psi (20.7-MPa), 28-day compressive strength minimum.

1.10 EXCAVATION AND BACKFILL

- A. Furnish all equipment and labor required to perform all excavation required for the installation of equipment and work specified under Division 16. Verify all existing underground utilities and proposed locations for new underground utilities prior to beginning excavation work.
- B. Furnish all required backfill material. Backfill material shall be installed and compacted in 6" layers, with compaction equal to the surrounding undisturbed soil. Conduits located in trenches shall be anchored to prevent displacement during backfill.
- C. Excess excavated material shall be disposed of off-site in accordance with all applicable codes and regulations.

1.11 TESTS AND ADJUSTMENTS

- A. Furnish all equipment, materials and labor required to test all equipment and wiring installed under Division 16 specifications.
- B. All tests and adjustments shall be made prior to acceptance by the local authority having jurisdiction.
- C. All electrical equipment and wiring found to be defective shall be promptly replaced at no additional cost.
- D. All tests shall be made in accordance with manufacturer's recommendations and accepted industry standards and practices.

1.12 OPERATIONS AND MAINTENANCE MANUALS

- A. Furnish three copies of operations and maintenance manuals for all major pieces of electrical equipment installed under Division 16 specifications. Manuals shall be furnished in three-ring binders, and shall include and index and tabs for all sections.
- B. Operations and maintenance manuals shall include the manufacturer's recommendations for installation, operation, maintenance, repair and troubleshooting of electrical equipment. Include parts list, schematic diagrams, and the name, address and telephone number of factory approved equipment suppliers and service organizations.
- C. Furnish one complete approved set of electrical submittals in each operations and maintenance manual.
- D. Furnish documentation for all equipment requiring programming or trip setting adjustments.

1.13 STARTUP SERVICES AND TRAINING

- A. Furnish services of a factory trained and authorized technician for the checkout and startup of all major pieces of electrical equipment and systems. Include all required adjustments, settings, and programming. Furnish a typed report indicating all settings and programming required for the proper operation of electrical equipment.
- B. Furnish the services of a factory trained and authorized service technician for training the Owner's designated personnel in the proper operation and maintenance of electrical equipment furnished under Division 16 specifications. Furnish the Owner with Operations and Maintenance manuals prior to beginning training.
- C. Furnish a short circuit and coordination study with recommended trip settings for all circuit breakers furnished with adjustable electronic trip settings. The short circuit and coordination study shall be completed by the manufacturer of the circuit breakers. Furnish one copy of the study and trip settings in each operations and maintenance manual.

1.14 FIRESTOPPING

- A. Furnish and install firestopping materials at all electrical penetrations of rated walls, floors, and other fire-rated assemblies.
- B. Firestopping material shall be UL listed for the application, and shall be manufactured by 3M or approved equal.
- C. Firestopping materials shall be installed as recommended by the manufacturer, as required by Code, and shall be approved by the Local Authority having Jurisdiction.

1.15 TOUCHUP PAINT

- A. Furnish and install touchup paint for all scratches and minor finish damage to electrical equipment. Touchup paint shall be equipment manufacturer's paint selected to match installed equipment finish.
- B. Galvanized surfaces shall be touched up with zinc-rich paint recommended by the equipment manufacturer.

- C. Electrical equipment with damage greater than minor surface scratches shall be replaced with new equipment. Replace all equipment and cabinets that have visible deformation or damage from shipping, handling or installation.

1.16 ELECTRICAL DEMOLITION

- A. Where indicated on the drawings, furnish all equipment, materials and labor required to remove electrical equipment, devices, wiring, conduit, boxes, etc.
- B. Circuiting shall be removed back to nearest junction box outside of the demolition area and insulated. Close all unused openings in existing junction boxes and enclosures. Reconnect circuiting as required to maintain the operation of electrical devices and circuiting in the areas around the demolition area.
- C. Dispose of demolished electrical materials in a manner approved by the Owner, and in accordance with all applicable Codes, laws and regulations.

PART 2 - PRODUCTS

2.01 GENERAL

- A. See individual specification sections for electrical product requirements.

PART 3 - EXECUTION

3.01 ELECTRICAL EQUIPMENT INSTALLATION

- A. Arrange and install electrical equipment and components to provide the maximum possible headroom.
- B. Install electrical materials and components level, plumb, and parallel and perpendicular to other building systems and components.
- C. Install electrical equipment to facilitate service, maintenance, and repair or replacement of components. Connect for ease of disconnecting, with minimum interference with other installations. All clearances in front of and around electrical equipment required by Code or local authorities having jurisdiction shall be observed.
- D. Piping systems requiring slope shall take precedence over installation of electrical equipment and conduits.

3.02 FIELD QUALITY CONTROL

- A. Check all installed electrical components for damage and faulty work, and replace any items found to be defective or damaged.

3.03 CUTTING AND PATCHING

- A. Cut, channel, chase, and drill floors, walls, partitions, ceilings, and other surfaces required to permit electrical installations. Perform cutting by skilled mechanics of trades involved.
- B. Repair and refinish disturbed finish materials and other surfaces to match adjacent undisturbed surfaces. Install new fireproofing where existing firestopping has been

disturbed. Repair and refinish materials and other surfaces by skilled mechanics of trades involved.

3.04 CLEANING AND PROTECTION

- A. On completion of electrical installation, clean and inspect electrical devices and finishes. Remove burrs, dirt, paint spots, and construction debris from surfaces and from within enclosures and junction boxes.
- B. Protect equipment and installations and maintain conditions to ensure that coatings, finishes, and enclosures are without damage or deterioration at time of Substantial Completion.

3.05 CONCRETE BASES

- A. Concrete bases shall be of dimensions shown (where indicated), but not less than 4 inches (100 mm) larger, in both directions, than supported unit. Follow supported equipment manufacturer's anchorage recommendations and setting templates for anchor-bolt and tie locations. Use 3000-psi (20.7-MPa), 28-day compressive-strength concrete and reinforcement.

3.06 FIRESTOPPING

- A. Apply firestopping to cable, raceway, and other electrical penetrations of fire-rated floor and wall assemblies to achieve fire-resistance rating of the assembly.

3.07 REFINISHING AND TOUCHUP PAINTING

- A. Refinish and touch up paint.
 - 1. Clean damaged and disturbed areas and apply primer, intermediate, and finish coats to suit the degree of damage at each location.
 - 2. Follow paint manufacturer's written instructions for surface preparation and for timing and application of successive coats.
 - 3. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
 - 4. Repair damage to PVC or paint finishes with matching touchup coating recommended by manufacturer.

3.08 DEMOLITION

- A. Protect existing electrical equipment and installations indicated to remain. If existing electrical equipment is damaged or disturbed in the course of the work, remove damaged portions and install new products of equal capacity, quality, ratings, and functionality.
- B. Remove electrical equipment and installations, indicated to be demolished, in their entirety.
- C. Cut and remove buried raceway and wiring, indicated to be abandoned in place, 2 inches (50 mm) below the surface of adjacent construction. Cap raceways and patch surface to match existing finish.
- D. Remove demolished material from the Project site and dispose of in accordance with all applicable Codes, laws, and regulations.
- E. Remove, store, clean, reinstall, reconnect, and make operational electrical components indicated for relocation and electrical components scheduled to remain.

END OF SECTION 16010