

## SECTION 26 00 00 - GENERAL PROVISIONS FOR ELECTRICAL SYSTEMS

### PART 1 - GENERAL

#### 1.1 SUMMARY

A. Section Includes:

1. Supplemental requirements generally applicable to the Work specified in Division 26. This Section is also referenced by related Work specified in other Divisions.

#### 1.2 DEFINITIONS

- A. Action Submittals: Written and graphic information and physical samples that require Architect's responsive action. Action submittals are those submittals indicated in individual Specification Sections as "action submittals."
- B. Informational Submittals: Written and graphic information and physical samples that do not require Architect's responsive action. Submittals may be rejected for not complying with requirements. Informational submittals are those submittals indicated in individual Specification Sections as "informational submittals."
- C. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents.
1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
  2. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required to meet other Project requirements but may offer advantage to Contractor or Owner.

#### 1.3 SUBMITTALS

- A. Comply with Division 01 requirements for submittals.
- B. Submit shop drawings and product data for approval to Architect.
- C. Action Submittals and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.
- D. Contractor's Approval: Indicate Contractor's approval for each submittal with a uniform approval stamp or indication in web-based Project management software. Include name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.
1. Architect will not review submittals received from Contractor that do not have stamp indicating Contractor's review and approval.

- E. Action Submittals: Architect will review each submittal, indicate corrections or revisions required, and return to Contractor.
- F. Informational Submittals: Architect will review each submittal and will not return it, or will return it if it does not comply with requirements. Architect will forward each submittal to appropriate party.
- G. Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval from Architect.
- H. Each submittal shall contain shop drawings or product data for items in only one specification section. Submittals containing information about items from multiple specification sections will be returned without review.
- I. Each submittal shall contain shop drawings or product data for all items in one specification section to be provided for this Project. Incomplete submittals are unacceptable and will be returned for resubmittal without review.
- J. Architect will return without review submittals received from sources other than Contractor.
- K. Submittals not required by the Contract Documents will be returned by Architect without review or action.
- L. Clearly identify on each submittal specified items, accessories, and options, as applicable to this project. Catalog numbers, part numbers, etc. on submittals will not be reviewed for correctness. Submittals not clearly indicating only the items to be provided for this project will not be approved.
- M. Submittal review by Architect is for conformance with design concept of the Project and general compliance with information given in the construction documents. Approval, corrections and/or comments made as part of the submittal review do not relieve the Contractor of the responsibility from conformance with all requirements of the Contract Documents, applicable codes and laws. Contractor is responsible for dimensions, quantities, and performance requirements to be confirmed and correlated at the job site; for information that pertains solely to the fabrication processes or to techniques of construction; and for all coordination with the Work of all trades.
- N. At the time of each submittal, Contractor shall give Architect specific written notice of such variations, if any, that the Shop Drawing or product submitted may have from the requirements of the Contract Documents, such notice to be in a written communication separate from the submittal; and, in addition, shall cause a specific notation to be made on each Shop Drawing and sample submitted to Architect for review and approval of each such variation.
- O. Architect's review and approval of Shop Drawings or products shall not relieve Contractor from responsibility for any variation from the requirements of the Contract Documents unless Contractor has in writing called the Architect's attention to each such variation at the time of each submittal and Architect has given written notation thereof incorporated in or accompanying the Shop Drawing or product approval; nor will any approval by Architect relieve contractor from responsibility for complying with the requirements of this paragraph.
- P. Shop drawing submittals shall be accompanied by a transmittal sheet with the applicable specification section number and the "name" of the item or items being submitted clearly indicated on the transmittal. All "names" on the transmittal shall match exactly the "names" listed in the specifications for the item being submitted.

- Q. The name of the supplier, distributor, subcontractor, etc., who will furnish equipment and items to the Contractor shall appear on the shop drawings when submitted. Shop drawing submittals without supplier's, distributor's, subcontractor's, etc., name will be returned without being reviewed.
- R. If Architect is required to review any shop drawing or product data submittal more than two times, a Change Order will be issued to the Contractor for a credit due on the Contract Price to recoup Architect's expenses associated with the multiple reviews.
- S. Complete sets of approved shop drawings and product data, as required in Division 01, shall be delivered to Owner at completion of Work.

#### 1.4 SUBSTITUTIONS

- A. Comply with Division 01 requirements for substitutions.
- B. Specifications for each piece of equipment and each item of material are written around a product of a specific base manufacturer. This base manufacturer is the basis of design, dimensions, and details. The basis of design manufacturer's name and model information are included with the product description as designated next to the manufacturer's name under the heading "Acceptable Manufacturers".
- C. Substitution • manufacturers are defined as any manufacturer other than the one used as the basis of design. Substitution • manufacturers will be permitted, in accordance with the bidding requirements and where indicated herein.
- D. Manufacturers named in the product description, in addition to the base manufacturer, are substitution manufacturers, have been determined to be manufacturers capable of manufacturing products similar to the base manufacturer and these manufacturers are acceptable substitution manufacturers to the base manufacturer. Where additional manufacturer's names do not appear with the base manufacturer, the Architect reserves the right to disallow any substitution manufacturers. Where the base manufacturer's name is followed by the term "no substitution", no substitution manufacturers will be considered.
- E. Naming of specific manufacturers shall not be construed as eliminating products or services of other substitution manufacturers having comparable items. Where permitted by these Specifications, and where Bidder desires to use other substitution manufacturers, they may submit a request for approval to use the substitution manufacturer in accordance with bidding requirements.
- F. Products described in Specifications are intended to set a quality level and ensure a workable system. Substitution of manufacturers, including those herein named, may be made only after approval of Architect. Bidder shall assume full responsibility for installation and dimensional changes required by the use of all substitution manufacturer's products, including revisions to wiring, controls, piping, structural revisions, etc., and all room or space changes as required due to dimension differences of the substitution manufacturer product. Architect approval of substitution manufacturer's products shall be limited to compliance with information given on the Drawings and Specifications.
- G. Where the Bidding requirements call for submittal for approval of substitutions prior to bids due, all approvals given are for substitution manufacturers only, not approval of any particular product. An approved substitution manufacturer's product must comply with all requirements of the specifications and drawings for the base manufacturer's product.

## 1.5 PRODUCTS

### A. MATERIALS

1. Provide all materials and equipment as new, without imperfections or blemishes.

## PART 2 - EXECUTION

### 2.1 INSTALLATION

- A. Drawings are generally indicative of work to be installed but may not indicate all bends, fittings, boxes, etc. required to meet field conditions.
- B. Coordinate installation of work of this Division with Work of other Divisions. Install in most direct manner possible to avoid interference between conduits, piping, ducts, equipment, and architectural or structural features. Work installed in an arbitrary manner without regard for Work of other Divisions will not be accepted.
- C. Provide scaffolding and hoist or rigging materials as required for installation of Work of this Division.
- D. Where equipment is furnished as Work of other Divisions for installation or wiring under Work of this Division, obtain and coordinate with approved shop drawings and installation instructions from respective contractor prior to rough-in.
- E. Electrical scope shown in each area of work shall be completed during construction phase as indicated on architectural phasing plans and/or phasing construction sequence narrative.
- F. Codes and Standards:
  1. Comply with all applicable local, state, national, and international codes and ordinances.
  2. Reference to codes and standards listed herein shall constitute minimum acceptable requirements. Where Drawings and Specifications requirements exceed those of codes listed, Drawings and Specifications shall take precedence for Work of this Project.
  3. Where applicable, materials and equipment shall bear the label of approval of Underwriters Laboratories, Inc.
  4. Unless more stringent requirements are specified in the Contract Documents or manufacturers' written instructions, comply with NFPA 70 and NECA NEIS 1 for installation of Work specified in Division 26. Consult Architect for resolution of conflicting requirements.
- G. Coordination - New Construction:
  1. Openings and recesses in new construction (including cutting, patching, and finishing) necessary for installation of Work of this Division to be provided by General Contractor. Coordinate required locations, dimensional data, and scheduling of Work with General Contractor.
  2. Where conduit is run concealed in concrete masonry unit (block) walls, Contractor shall be responsible for installing his work in cores of block for mason to wall-in as he carries up wall. Coordinate locations and scheduling of Work with General Contractor.
- H. Coordination - Existing Construction:

1. Cut openings required in existing construction for installation of electrical equipment, materials, and devices. Perform all cutting, patching, and refinishing as required to match surroundings.

I. Concrete:

1. Furnish and install concrete for Work of this Division. Concrete work shall be completed in accordance with requirements of Division 03.

J. Excavation and Backfill:

1. Perform excavation and backfill required for Work of this Division, inside and outside building. Excavation and backfill shall be in accordance with requirements set forth in Division 31.
  - a. Include saw cutting, trenching, backfilling, patching of all areas disturbed by excavation.
  - b. Banks and excavations shall be retained by means of shoring and braces to avoid cave-ins. Shoring shall be in accordance with the requirements of state and local regulatory agencies. Shoring shall be maintained until installation, tests, and inspections are complete.
  - c. Pumping equipment shall be provided and maintained to pump water from excavations.
2. Comply with Pennsylvania Underground Utility Line Protection Law requirements before commencing any excavation work.

K. Painting:

1. Equipment furnished under this Division that is pre-painted or pre-finished by manufacturer shall have all nicks, scratches, blemishes, and rust spots cleaned, primed, and refinished prior to final acceptance by Owner.
2. Painting shall be in accordance with the Division 09.
3. General Contractor will paint exposed unfinished equipment, conduit, supports and miscellaneous steel installed under this Division.

L. Existing Equipment:

1. Removal of Existing Equipment: Electrical equipment and materials indicated on drawings as "to be removed" • • shall be removed as Work of this Division. Items of value as determined by Owner shall be stored on site where directed by Owner. Equipment and material that Owner does not wish to retain shall be legally disposed of offsite. Do not remove any equipment and materials from the site without Owner's approval.

## 2.2 HAZARDOUS MATERIALS

- A. Promptly notify Owner and Architect if hazardous materials are observed in the structure or on the project site during the course of Work. Do not perform any work pertinent to the hazardous material prior to receipt of special instructions from the Owner. "Hazardous materials" • • are defined as asbestos, PCBs, petroleum, radioactive material, or hazardous waste substances.

## 2.3 CLEANING

- A. Upon completion of Work, remove all dirt, foreign materials, stains, fingerprints, etc., from all parts and equipment.
- B. Remove all construction debris and vacuum interior spaces of all compartmental equipment.
- C. Conduct cleaning and disposal operations to comply with codes, ordinances, regulations and anti-pollution laws.

## 2.4 Work shall be subject to inspection by the PROTECTION FROM DUST AND DEBRIS

- A. During patching, painting, ceiling removal and replacement, working on the ceiling or on things above the ceiling, etc., maintain cloths or suitable building paper covers to protect building surfaces. Protective measures (drop cloths, protective covers, etc.) shall be placed and sealed over all furniture and equipment to keep items clean and protected against dirt, dust and debris from entering furniture and equipment that the Owner has not removed.
- B. Upon completion of work each day when building is occupied, remove all temporary covers, drop cloths, and debris and vacuum clean all worked-in areas to mitigate carrying of dirty materials and tracking dirt throughout building during time construction is not occurring.

## 2.5 ACCEPTANCE TESTING

### A. Electrical Acceptance Testing

- 1. Testing shall be performed on electrical equipment and systems to assure that equipment and systems are operational and within applicable standards and manufacturer's tolerances. Testing should verify that equipment and systems are installed in accordance with design specifications. All testing shall occur at the building site.
- 2. Testing shall be performed by an independent organization that is professionally independent of the manufacturers, suppliers, and installers of the equipment or systems being evaluated. The name of the proposed testing organization shall be submitted to Engineering Services Electrical Group for approval.
- 3. Qualified technicians who are trained and regularly employed for testing services shall do all testing. Submit technician qualifications.
- 4. The testing organization shall conform to the general guidelines of section 5 of the latest NETA Acceptance Testing Specifications, in their entirety. This includes the following:
  - a. Safety and Precautions
  - b. Suitability of Test Equipment
  - c. Test Instrument Calibration
  - d. Test Report
- 5. Provide report in the Megger "Power DB• " program. Furnish one (1) original, editable electronic (.mdb format), one (1) electronic PDF copy, and Four (4) paper copies of the completed report to Engineering Services Electrical Group. Have the testing firm contact Engineering Services Electrical Group to procure PSU standard Power DB testing forms.
- 6. Notify Engineering Services Electrical Group at least seven (7) days in advance of any testing. A representative of Engineering Services Electrical Group shall witness testing.

7. Inspection and testing of all applicable electrical equipment listed below shall be done in accordance with the latest version of NETA ATS. This will include all tests marked optional unless waived in writing by Engineering Services Electrical Group.
  - a. Transformers, Air Cooled
  - b. Cables, Low Voltage
  - c. Circuit Breakers, Low Voltage, Insulated Case/Molded Case (100 amp frame and larger)
  - d. Instrument Transformers
  - e. Metering
  - f. Grounding Systems
  - g. Ground Fault Protection Systems
  - h. Motors: AC and DC
  - i. Motor Starters: Low Voltage
  - j. Adjustable Speed Drive Systems
  - k. Direct Current Systems, Batteries
  - l. Direct Current Systems, Battery Chargers
8. Testing organization shall perform adjustments for final protective device setting in accordance with coordination study (Power Study) provided by Contractor or owner; prior to performing any testing.

B. System Function Tests

1. Perform system function tests upon completion of equipment tests as defined in this specification. It is the purpose of the system function tests to prove the correct interaction of all sensing, process, and action devices.
2. Verify the correct operation of all safety devices for fail-safe functions in addition to design function.
3. Verify the correct operation of all sensing devices, alarms, and indicating devices.

C. Electromagnetic Field Testing

1. Determine the vector-valued quantity of magnetic flux density for power frequency magnetic fields over a predetermined space or area, as designated by Engineering Services Electrical Group.
2. Perform testing in accordance with the latest version of NETA ATS.

D. Voltage Drop Testing

1. Perform a voltage test at the last receptacle of each branch circuit of each Panelboard. Total voltage drop shall not exceed 3% of the initial voltage measured at the end of that branch circuit. Perform the test using a 12A load attached to the furthest receptacle. Correct any installation with a voltage drop of greater than 3%. If a branch circuit fails the test, perform the test on all other branch circuits on that panel.
2. Provide documentation of the results shall be provided to Engineering Services Electrical Group.

END OF SECTION 26 00 00