

DIVISION

16

ELECTRICAL

SECTION 16010 - ELECTRICAL GENERAL REQUIREMENTS

PART 1 - GENERAL

1.1 SCOPE

- A. These specifications are intended to provide for labor, materials, equipment and services and of performing all operations required for the complete electrical system as specified herein and/or shown on the accompanying drawings.

1.2 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of all sections of Division 16.

1.3 DESCRIPTION OF WORK

- A. Summary: Electrical work includes, but is not limited to the following:
- B. General Work: General work associated with electrical systems and equipment including conduit sleeves and supports, anchors, vibration and sound isolation, access panels, identification, record drawings, installation permits, tests, inspections by governing authorities, cutting-and-patching work, utility companies connections coordination, start-up of electrical systems and equipment, training of Owner's operating personnel, operating and maintenance manuals, final cleaning of electrical and similar work.
- C. Wiring and Power Distribution: Panelboards, enclosures, electrical boxes, conduit systems, raceways, wires/cables, wiring devices, overload protective devices, equipment connections, grounding systems, and similar work, all as indicated on electrical drawings and elsewhere in contract documents.
- D. Lighting: General light fixtures for interior lighting, emergency lighting and exit signs.
- E. Special Electric Systems: Included are an empty conduit system for portions (as indicated) of a telephone system and data (computer) system.

1.4 MATERIALS AND EQUIPMENT

- A. Materials and equipment shall conform in all respects to the requirements set forth in these specifications and the accompanying drawings. The Electrical Contractor shall furnish the items as specified or an equal as listed by addendum. Review of substitutions shall be requested in writing as described in the General Specifications and shall contain all data to indicate equality to what was specified.
- B. Except as otherwise specified, materials and equipment shall be new and bear the

approval label of the Underwriters' Laboratories, Incorporated and all other standards specified herein.

1.5 PHASED CONSTRUCTION; SEQUENCING: Refer to Division-1 provisions for determination of how construction phasing and sequencing requirements may affect performance of electrical work.

1.6 ALTERNATES

A. There may be certain alternates involved in the construction. The Contractor is cautioned to be aware of and to provide appropriate adjustments for all alternates described in the specifications or on the drawings.

1.7 PERMITS, INSPECTIONS AND FEES

A. Obtain all necessary permits and work orders required and pay for all fees for such permits. Upon completion, a certificate of approval from the appropriate regulatory agency shall be finished to the architect. All fees for services to be paid for by the Electrical Contractor. Include all such fees in bid.

1.8 WARRANTY

A. The Electrical Contractor shall guarantee the work installed by him for one year from the date of final acceptance of the project and shall furnish free of cost to the Owner materials and labor necessary to repair or replace defective items of workmanship. The Electrical Contractor shall guarantee all equipment to be of the quality and capacity specified.

PART 2 - PRODUCTS

2.01 MATERIALS

A. All electrical products on this project shall conform, unless otherwise specifically noted, to applicable standards of the National Electrical Manufacturer's Association and shall be listed by the Underwriter's Laboratories, Inc.

B. Where materials, equipment, apparatus or other products are specified by manufacturer, brand name or type, or catalog number, such designation is to establish standards of desired quality and style and shall be the basis of the bid. Except where noted, it is implied that "or approved equal" follows all specified items. Approved for substitutions will be granted by the Architect/Engineer to the Electrical Contractor only, through the General Contractor. where two or more designations are listed, choice shall be optional with the Contractor.

C. 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/Engineer. SUBSTITUTION REQUESTS SHALL BE SUBMITTED TO THE ARCHITECT/ENGINEER BY THE GENERAL CONTRACTOR AT LEAST TEN (10) CALENDAR DAYS PRIOR TO BID DATE. AS PERMITTED BY THE "OR APPROVED EQUAL" CLAUSE. IF REQUESTED BY THE ENGINEER/ARCHITECT THE CONTRACTOR SHALL SUBMIT FOR INSPECTION SAMPLES OF BOTH THE SPECIFIED AND THE PROPOSED SUBSTITUTE ITEM, THE TEN DAY DEAD LINE WILL BE INCLUSIVE OF SAMPLES SUBMITTAL.

- D. 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.
- E. 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 SUBSTITUTIONS

- A. All material, equipment, methods, and accessories entering into the work under this section of contract are subject to the approval or disapproval of the A/E. Approval of any manufacturer, material, or product shall not constitute a waiver of A/E right to demand full compliance with contract requirements, including shape, size, quality, and performance.
- B. Equality of materials is that established by the opinion of A/E. Decision of A/E is final.
- C. Whenever a material or article of equipment is specified by use of a proprietary name, or by naming the manufacturer or vendor, an material or article which will perform adequately the duties imposed by the design will be considered for substitution, providing it is of equal substance, and function, meets specifications, and is aesthetically acceptable to the A/E. See division 1 for prior approval requirements.
- D. Literature, technical data, etc., includes complete data and samples if necessary, with submissions for substitutions. Burden of proof that material offered for substitution is equal, or superior, in construction and efficiency to that named, rests on the Contractor, unless proof is satisfactory to A/E, substitution will not be approved.
- E. Approval for substitutions will be granted by the Architect/Engineer to the Electrical Contractor, only through the General Contractor.

2.03 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

3.1 REGULATORY COMPLIANCE

- A. All applicable sections of the NFPA (latest edition) including the NEC, ADA (Americans with Disabilities Act) latest edition, and all state and/or local codes or ordinances shall apply as minimum standards.

3.2 WORKMANSHIP

- A. All workmanship shall be of the highest quality. Any work judged substandard by the architect shall be redone at the contractor's expense.

END OF SECTION 16010

SECTION 16020 - ELECTRICAL COORDINATION

PART 1 - GENERAL

1.1 SUBMITTALS

A. Shop Drawings: As soon as practicable after the contract is let, in order that work under this contract will not be delayed, submit to the Architect, for review, complete descriptive and dimensional data on those items specified in sections that follow.

B. Shop drawings shall be furnished for the following items as a minimum:

1. Panelboards, Transformers
2. Lighting Fixtures & Lamps
3. Wiring Devices & Device Cover Plates
4. Safety and/or Disconnect Switches
5. Fuses
6. Grounding Equipment
7. Raceways and Fittings
8. Boxes
9. Wiring/Cables

C. Corrections or comments made on shop drawings during the review do not relieve this Contractor from compliance with requirements of the contract documents, plans and specifications. Shop drawings will be checked for general conformance with the design concept of the project and general compliance with information given in the contract documents. Review of the shop drawings shall not relieve the Contractor from responsibility for confirming and correlating all quantities and dimensions, coordinating his work with that of all other trades, and performing his work in a safe and satisfactory manner. Review of shop drawings shall not permit any deviation from plans and specifications.

D. Submit 7 copies of shop drawings.

1.2 EQUIPMENT MANUALS

A. Furnish three bound sets of descriptive, dimensional and parts data on:

1. Switchboard, Panelboards, Busways, Transformers
2. Lighting Fixtures with Lamp Data
3. Wiring/Cables
4. Wiring Devices and Device Cover Plates
5. Safety/Disconnect Switches
6. Fuses

1.3 DELIVERY, STORAGE AND HANDLING

- A. Storage Coordination: It is recognized that space at project for storage of materials and products is limited. Coordinate deliveries of electrical materials and products with scheduling and sequencing of work so that storage requirements at project are minimized. In general, do not deliver individual items of electrical equipment to project substantially ahead of time of installation.

1.4 PROTECTION OF APPARATUS

- A. At all times take precautions necessary to properly protect electrical equipment from damage. Failure to comply with the above to the Architect's satisfaction shall be sufficient cause for the rejection of the particular piece of apparatus in question.

PART 2 - PRODUCTS

2.1 ELECTRICAL PRODUCT COORDINATION

- A. Power Characteristics: For all items requiring power provided in sections of Division 2 through 15, the Contractor is to verify all electrical requirements, including voltages, ratings and any other electrical characteristics with actual equipment to be furnished and adjust work as required to provide proper electrical service to the particular item at not extra cost to owner. Notify the Architect before starting work if changes from the work shown on the drawings will be necessary.
- B. Coordination of Options and Substitutions: Where contract documents permit selection from several product options, do not proceed with purchasing until coordination of interface requirements has been checked and satisfactorily established.
- C. Raceways, Wiring, Safety/Disconnect Switches, etc. for Equipment by Others: Electrical service required for all equipment furnished under Division 15 (Mechanical), 16 (Electrical), or other Divisions of this Specification shall be furnished and connected as part of this work. It is part of the work of this Division to obtain correct roughing-in dimensions and requirements for this equipment and provide labor, materials, equipment and services for a complete installation.

PART 3 - EXECUTION

3.1 INSPECTION AND PREPARATION

- A. Substrate Examination: Installer of each element of electrical work shall examine

condition of substrate to receive work, and conditions under which work will be performed, and shall make notification of conditions detrimental to completion of work. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to Installer.

- B. Existing Facilities and Conditions: The Electrical Contractor shall visit the building sites to determine existing conditions and will be held responsible for allowing for these conditions in his bid. There will be no extra consideration for work discovered as being hidden after the bid, and no change orders for extra cost that may be caused by unknown conditions after bid conditions. This area of work may have existing storm drainage, mechanical and electrical utilities, etc. located underground and within and under the buildings. It is part of this work for the Electrical Contractor to determine the scope and location of all existing utilities and the scope and location of all new utilities to be installed concurrent with this project and arrange his work around others. Damages to existing utilities by the contractor shall be corrected by him at no additional compensation. Contractor shall call 1-800-272-3020 per Louisiana statutes.
- C. Layout electrical work in conformity with contract drawings, coordination drawings and other shop drawings, product data and similar requirements, so that entire mechanical/electrical plant will perform as an integrated system, properly interfaced with other work.
- D. Large and Heavy Equipment: Where possible, prearrange for movement and positioning of large equipment into building structure, so that enclosing walls and roofs will neither be delayed nor need to be removed. Otherwise, make notice of opening requirements to be maintained for subsequent entry of large equipment units.

3.2 CUTTING AND PATCHING

- A. Structural Limitations: Do not cut structural framing, walls, floors, decks and other members which are load bearing, except with Architect's written authorization. Authorization will be granted only where there is no other reasonable method for completing electrical work, and where proposed cutting clearly does not materially weaken the structure.
- B. Other Work: Do not endanger or damage other work through procedures and processes of cutting to accommodate electrical work. Review proposed cutting with Installers of the work to be cut, and comply with their recommendations to minimize damage. Where necessary, engage original Installer or other specialists to execute cutting in recommended manner.
- C. Patching: Where patching is required to restore other work, because of cutting or other damage occurring during installation of electrical work, execute patching in manner recommended by original Installer. (Original Installer, where patching of finishes existing prior to beginning of work, refers to those performing similar work in areas of new construction.) Restore other work in every respect,

including elimination of visual defects in exposed finishes, as judged by Architect. Engage original Installer to complete patching of the following categories of work:

1. Lawns, planting and unit-type paving (brick, etc.).
2. Exposed concrete finishes.
3. Exposed masonry and stonework.
4. Exposed structural metal and ornamental metal.
5. Architectural woodwork.
6. Waterproofing and vapor barriers.
7. Roofing, flashing, and accessories.
8. Exterior wall systems.
9. Sprayed-on insulation and fireproofing.
10. Interior exposed finishes and casework, where judged by Architect to be difficult to achieve an acceptable match by other means.

3.3 COORDINATION OF ELECTRICAL INSTALLATION

- A. Sequence, coordinate, and integrate various elements of electrical work so that electrical system will perform as indicated and be in harmony with other work of building. Architect will not supervise coordination, which is exclusive responsibility of Contractor.
- B. Install raceways straight and true, aligned with other work, close to walls and overhead structure, concealed where possible in occupied spaces, and out-of-the-way with maximum passageway and headroom remaining in each space.
- C. Arrange work to facilitate maintenance and repair or replacement of equipment. Locate services requiring maintenance on wiring devices and similar units in front of services requiring less maintenance. Connect equipment for ease of disconnecting, with minimum of interference with other work. Locate operating and control equipment and devices for easy access. Maintain NEC code clearances around all electrical equipment.
- D. Install access panels where electrical work requiring access is concealed by finishes and similar work. Access panels utilized shall be approved by the Architect.
- E. Integrate electrical work in ceiling plenums, including lighting fixtures, with ceiling finish, suspension, ductwork, air diffusers and other work, so that required performances of each will be achieved.
- F. Where work is in close proximity to the work of other contractors, the Electrical Contractor shall review plans of other contractors and coordinate his work with theirs. The Electrical Contractor shall verify the location of lighting fixtures, beams, structural members, conduit, ductwork, pipes or other obstructions before

beginning his work in the area. Notify the Architect where proper clearances do not occur or where the work of others would interfere with the safe and/or proper operation of this work. Give right-of-way in confined-service spaces to piping which must slope for drainage, and to larger HVAC ductwork and similar services which are less conformable than electrical services.

3.4 MOUNTING HEIGHTS

- A. Unless otherwise noted on the drawings or required by the Architect, the following mounting heights shall apply. Heights are to center of device unless noted otherwise:

Toggle Switches	4' - 0"
Receptacles	1' - 6"
Telephone Outlets	1' - 6"
Motor Control Equipment	5' - 0"
Panelboards	6' - 6" to top (Not more than 5' - 6" from top most operating handling to floor.)
Computer Outlets	1' - 6"

- B. Upon approval of the Architect, mounting heights may be adjusted to simplify cutting of concrete blocks in block walls or to facilitate furniture, base or cabinet arrangements. All mounting heights may be field adjusted by the Architect without any additional cost.
- C. Wiring devices above counters and/or benches and/or shelves and/or lavatories shall be mounted as directed by architect.
- D. All mounting heights may be adjusted in the field to reduce visibility at outside and in certain inside areas. Coordinate heights of all equipment with screen walls, fencing, other equipment, etc., and with Architect before rough-in. This will include wall and rack mounted equipment inside or outside. Verify all mounting heights with Architect prior to rough-in.
- E. Where designated by the Architect or otherwise shown, those rooms that are equipped for use by the physically impaired (handicapped) or to be designated adaptive for that use shall have all receptacle, telephone, and computer outlets mounted with the bottom 15 inches above the floor minimum and switches and other rough-ins (such as thermostats, dimmers, etc.) mounted with the bottom no higher than 42 inches above the floor.

3.5 EQUIPMENT LABELS

- A. Panelboards, safety switches, motor starters, and all other equipment shown on the drawings and furnished and/or installed under this section of the specifications shall be labeled with laminated plastic nameplates inscribed to identify equipment with description shown on the drawings for panels, the name of the equipment

