

# ELECTRICAL SPECIFICATIONS

## Section 16010 - General Provisions

- A. General
- Requirements specified in Division 1, instructions to bidders, supplemental general conditions, special conditions, addenda, alternates, contract and proposal, along with Division 16 and all its sections, comprise the contract documents for the electrical contract, along with these specifications as though they were one, and anything implied by the specifications shall be interpreted as also implied by the drawings and vice versa. Provide necessary items for a complete installation of all electrically operated equipment listed in the specifications or shown on the contract drawings.
  - The architectural, structural, mechanical, plumbing and equipment drawings and specifications are incorporated into, and become a part of this division. This contractor shall examine all such drawings and specifications and become thoroughly familiar with the provisions contained therein. The submission of his bid shall indicate such knowledge.
  - Electrical drawings are diagrammatic. They are intended to show the approximate locations of equipment and conduit. Dimensions given on the plans, in figures, shall take precedence over scaled dimensions and shall be verified in the field. The electrical contractor shall layout all equipment rooms to make sure the equipment, as purchased, fits in the room or space shown. Exact location of all equipment shall be verified in the field and routing of conduits shall suit field conditions.
  - Until the time of installation, the architect reserves the right to make minor changes in the location of conduit and equipment without additional cost to the contractor.
  - The electrical drawings and specifications are intended to supplement each other. Material and labor necessary to the project shall be furnished and installed even though not specifically mentioned in both. Labor and/or materials neither shown nor specified, but obviously necessary for the completion and proper functioning of the system, shall be furnished and installed by the electrical contractor.
  - Arrange all equipment substantially as shown on the drawings. Make deviations only where necessary to avoid interference. Check all equipment sizes against available space prior to shipment to avoid interference.
  - Examine the work of other trades insofar as their work comes in contact with or is covered by this work in no case attach to, or finish against any defective work or install work in a manner which will prevent proper installation of the work of other trades.
  - Electrical contractor shall verify with other trades all electrical characteristics of equipment requiring electrical connections, contractor shall verify voltage, phase and horsepower and shall notify engineer of any discrepancies prior to start of work. Electrical contractor shall provide disconnecting means and overload protection for all equipment, unless furnished integral with equipment package.
  - It is the intent of these drawings that this be a complete electrical job, any errors or omissions shall be brought to the attention of the engineer prior to bidding the job.

- B. Visit to the Site
- This contractor shall visit the site of the work and familiarize himself with all conditions affecting his work. The submission of his proposal shall indicate such knowledge. No additional payment shall be made on claims that arise from a lack of knowledge of the existing conditions.

- C. Code and Permits
- Installation shall be in full accordance with all codes, rules and regulations of municipal, city, county, state and public utilities and all other authorities having jurisdiction over the premises.
  - Comply with any specification requirements that are in excess but not in conflict with code requirements.
  - The contractor shall secure and pay for all permits, plan reviews and certificates of inspection in connection with his work, required by the foregoing authorities. Before final payment of the contract is allowed, all certificates shall be delivered to the architect in duplicate.
  - Electrical material and equipment shall bear the UL label except where UL does not label such types of material and equipment.

- D. Shop Drawings Submittals
- The electrical contractor shall submit five (5) sets of shop drawings, the shop drawings of the following equipment using the indicated numbering system and titles, shall be submitted through the architect to the engineer and then resubmitted for final approval if necessary. Shop drawings shall be submitted for the following items:
    - Wiring devices
      - Panelboards, transformers and safety switches including fault current study based on equipment being supplied.
      - Connectors, time switches and photocell
      - Lighting fixtures
      - Fire alarm system
  - All submitted shop drawings (manufacturers' equipment descriptive sheets or vendors' prepared drawings) shall have the general contractor's or subcontractor's "stamp of approval" indicating that the item submitted is as called for on the plans and specifications, is approved by the general contractor or subcontractor, the date of approval and initialed by the person approving the submittal and the name of the company submitting said equipment for approval.
  - Submit bound brochures complete with a table of contents. Loose or stapled together sheets are not acceptable. Any submittals not in brochure form or not as specified shall be returned at the contractor's expense for resubmittal.
  - All descriptive literature shall be submitted in a three (3) hole brochure with a cover identifying the following:
    - Name of the job
    - Location of the job, address, city and state
    - Name and address of the company submitting the brochures.
    - Date of the submittal
  - Every effort shall be made, in checking the shop drawings, to detect and correct all errors, omissions and inaccuracies. Failure to do this will not relieve the electrical contractor of the responsibility for the proper and complete installation in accordance with the contract documents.

- E. As-built Drawings
- Submit to the architect one set of reproducible (mylar) electrical drawings showing the as-built conditions.

- F. Standards and Substitutions
- Whenever the words "approved by," "approved equal," "as directed" or similar phrases are used in the following specifications, they shall be understood to refer to the owner as the approving authority. The name or make of any equipment or materials named in this specifications (whether or not the words "or approved equal" are used) shall be known as the "standard".
  - These specifications establish quality standard of materials and equipment to be provided. Specific items are identified by manufacturer, trade name or catalog designation. This contractor shall submit his base bid price based upon standard specified equipment described herein and as detailed on drawings and associated contract documents. These specifications are not to be considered proprietary. The contractor may submit information on materials and manufacturers (other than those listed) for review by the architect and engineer no later than ten (10) days before bids are submitted. Manufacturers of products accepted by the architect and engineer shall be listed in an addendum to the specifications as an acceptable substitution equipment. Substitutions listed below and shall be shown as a separate add or deduct prior to be factored into the base bid by the architect and owner if accepted.
  - Should the contractor propose to furnish materials and equipment other than those specifically approved by addendum, submit a written request for substitutions to the architect at the time of opening. The request shall be an alternate to the original bid; be accompanied by a complete descriptive (manufacturer, brand name, catalog number, etc.) and technical data sheets. Failure by the contractor to submit the requisite documentation detailed above shall be understood by the architect and engineer to indicate that substitute equipment will not be presented to the contractor for consideration. Such substitutions will not be considered after the bid opening and delay of project will not be permitted for further information and evaluation after this time.
  - Where such substitutions alter the design or spacing requirements indicated on the drawings, include all items of cost for the design and installation and the cost of all allied trades involved.
  - Acceptance or rejection of proposed substitutions shall be subject to approval of the architect and engineer. If requested, the contractor shall submit (at his expense) inspection samples of both the specified and proposed substitution items.
  - In all cases where substitutions are permitted, the contractor shall bear any extra cost of evaluating the quality of the materials and equipment to be provided.

- G. Testing and Placing in Service
- Any material or equipment failing a test shall be repaired or replace at the contractor's expense. Tests shall include the following:
    - Measure the no-load and full-load voltages (phase to phase, phase to neutral and phase to ground) for each phase of each service, of each separately derived system, and on each panelboard or transformer).
    - Measure the ground resistance of the main service grounding electrode and the ground resistance of each separately derived system's grounding electrode.
    - Make insulation resistance tests on all dry type transformers and motors.

- H. Interferences
- Before the installation of any item begins, the electrical contractor shall carefully ascertain that it does not interfere with clearances for the erection of finish beams, columns, pilasters, walls or other structural or architectural members as shown on the architectural drawings. If any work is installed and the architectural design cannot be followed, this contractor shall, at his own expense, make changes in his work as directed by the architect to permit the completion of the architectural work in accordance with drawings and specifications.
  - It shall be the duty of this contractor to report any interferences between his work and that of any of the other contractors as soon as they are discovered. The architect shall determine which equipment will be relocated, regardless of which was installed first. His decision will be final.
- I. Quality Assurance
- All products shall be new and of the type and quality specified. Where materials, equipment, apparatus or other products are specified by manufacturer, brand name, type of catalog number, such designation shall establish the standards of the desired quality and style. It is the intent of these specifications to establish a standard of quality of materials and equipment installed.

## Section 16050 - Basic Electrical Materials and Methods

- A. Nameplates
- General: furnish and mount on each panelboard, switchboard (including branch switches), large junction box, safety switch, starter, remote control, push button station, and all similar controls, a nameplate descriptive of the equipment or equipment controlled.
  - Provide black and white nameplates constructed from laminated phenolic with a white center core. Letters shall be engraved in the phenolic to form white letters 3/8" high. Fasten the nameplates with an adhesive type fastener.
- B. Mounting Accessories
- This contractor shall furnish and install all angle iron, channel iron, rods, supports, hangers, concrete or plywood required to install, mount and support any electrical equipment or device called for on the plans.
  - Supporting material shall be complete with hangers, connectors, bolts, clamps and necessary accessories to make a complete installation. Supporting material shall be galvanized, painted or otherwise suitably finished. Products by Binkley, Steel City, or Raco will be acceptable.
  - All surface-mounted equipment on block walls shall be mounted on 3/4" plywood backboard. All floor-mounted equipment shall be installed on a 4" high concrete housekeeping pad.

- C. Execution
- The electrical work for construction proposed shall conform to all federal (OSHA), state, all specific safety requirements and the requirements of the current edition of the NEC.
  - Check the HVAC and plumbing specifications for electrical requirements and include the same in the contract cost.
  - Equipment connections, starters, disconnect switches, control transformers and pushbutton stations for the equipment furnished by the owner or under a separate contract shall be installed and connected under this division, as indicated on the contract drawings.
  - All cutting, patching, excavating, backfilling and concrete work related to this contract will be the responsibility of the electrical contractor. This contractor shall assume the responsibility of providing the sleeves, chases and openings necessary for the electrical installation and for their repair in an acceptable manner, as determined by the architect. All holes shall be core-drilled. Provide fire stop in all openings created through fire-rated walls, floors or ceilings. Contractor shall field verify slab on grade floor construction type prior to cutting. Under no circumstances shall the contractor cut a structural floor slab thicker than four (4") inches without prior written approval from Engineer of Record. Notify Engineer of Record of any slab thickness greater than four (4") inches prior to proceeding with any saw cutting.
  - This contractor shall be responsible for providing all required access panels necessary for his work, coordinate with architect prior to installation.

- D. Materials and Workmanship
- All work shall be installed in a practical and workmanlike manner, by mechanics skilled in the several trades necessary.
  - All materials shall be new and free from defects and shall be the best of their several kinds unless specified or indicated on the drawings to the contrary.
  - During each phase and at the completion of the construction, this contractor shall remove all debris and excess materials caused by his work. He shall leave the area of operation broom clean.
  - All electrical equipment shall bear the underwriter's laboratories label or ETL label.
  - This contractor shall guarantee his workmanship and material (lamps excepted) for a period of one year from the date of building opening and leave his work in perfect order at the completion. Should defects develop within the guarantee period, the contractor shall, upon notice of the same, remedy the defects and have all damages to other work or furnishings caused by the repairs corrected at his expense to the condition before such damage.

- E. Scope of Work
- The electrical contractor shall provide all labor, material, storage, unpacking and placement, include but not be limited to, the following items:
    - Emergency lighting and power.
    - Complete power and lighting distribution system including all panels, transformers, feeders.
    - Complete branch circuit wiring system.
    - Complete power wiring for all air conditioning equipment, plumbing system, heating equipment, ventilating and exhaust equipment.
    - Complete lighting fixture installation, including all incandescent, fluorescent and HID lamps.
    - Complete telephone and communication conduit cabling system including boxes, plates, jacks, etc., as specified, shown on the drawings and required by the local telephone company and/or owner.
    - Testing of all cables and circuit wiring after installation.
    - Exit light system.
    - Wiring devices and floor boxes.
    - Lighting control.
    - Grounding of the electrical system.
    - Telephone and data services.

## Section 16060 - Grounding and Bonding

- A. Ground all equipment per NEC.
- B. All conduits shall contain a grounded ground wire size per N.E.C. in addition to the conductors shown on the drawings. Where conduit conductors are increased in size for voltage drop, the ground wire size shall be increased proportionately.
- C. Where an isolated, insulated ground is required a separate isolated green ground shall be run from the panel isolation and connect to the isolated ground connection of the device served. In no case shall the system ground (green wire and associated outlet boxes, conduit and building steel) be allowed to contact the isolated ground (green wire with white stripe).

## Section 16120 - Wiring and Cable

- Color code conductors (except control and instrumentation conductors) as follows:
- |         |                |
|---------|----------------|
|         | 208/120 System |
| Phase A | Black          |
| Phase B | Red            |
| Phase C | Blue           |
| Neutral | White          |
| Ground  | Green          |
- #12 and #10 conductors shall have continuous insulation color, as listed above.
  - Color code conductors larger than above, which do not have continuous insulation color by application of at least two laps of colored tape on each conductor at all points of access including junction boxes. Color tape shall be the equal of 3M products Scotch #35.
  - Conductors shall be soft annealed copper insulated for 600 volts unless specifically indicated otherwise. Aluminum conductors are not allowed on this project.
- B. Insulation type shall be type THWN for wire sizes #8 AWG and larger and THHN or THWN for #10 AWG and smaller. THHN shall not be used in wet or damp locations.
- C. Flexible cord shall be heavy duty type so with an equipment ground conductor in addition to the current carrying conductors.
- D. Provide #12 conductors, unless otherwise indicated.
- Control conductors shall be #14 minimum for NEC class I and #16 for NEC class II.
- E. Conductors #8 AWG and larger shall be stranded.
- F. Conductors #10 AWG and smaller shall be solid.

- G. Install wiring in conduit.
- H. Connect #10 and smaller wires with constant pressure expandable spring type connectors, "Scotchlok" by 3M or B-Cap by Buchanan.
- I. Connect #8 and larger wires with compression connectors or splices as manufactured by Burndy or T&B.
- J. Insulate splicing connectors to at least 200% of the wire insulation. Use pre-stretched tubing connector insulators, 3M PST for #2 and larger conductors.
- K. Pull conductors using recognized methods and equipment leaving at least 6" wire at all junction boxes for connections.
- Clean out each conduit system before pulling wire.
- L. Form and tie all wiring in panelboards.
- M. There shall be no wirenut joints or splices made inside switchboards/panelboards.
- N. Branch circuit wire sizes (and conduits) shall be increased from those indicated on the plans to prevent excessive voltage drop. Branch circuits shall be installed with wires of sufficient size so that voltage drop between the panel and the loads does not exceed limit of 3%.
- O. Regardless of the temperature rating of the conductor insulation, all conductor ampacity rating for this project shall be determined from the 75°C conductor temperature ratings indicated in the NEC tables. Where equipment or devices are provided with terminals/rugs rated for 60°C, the ampacity rating of the 75°C conductor shall be limited to its associated 60°C rating as indicated in the NEC tables. The electrical contractor shall be permitted to increase the conductors and conduit size as required.
- P. Circuits may be multi-plexed in conduit provided wire is properly derated and conduit sized per code. Under no circumstances shall more than six (6) current carrying conductors be run in a single conduit.

## Section 16130 - Raceways and Boxes

- A. Raceways
- All wire shall be run in accordance with code in corrosion resistant, rigid, threaded, metal conduit or electrical metallic tubing (E.M.T.) unless otherwise specifically stated herein.
    - Conduit in exterior walls, below floor slab, or underground shall be rigid, threaded, galvanized, heavy wall type.
    - Carlon PVC type 40 heavy wall conduit with ground wire may be used below floor slab or underground in lieu of rigid, threaded, galvanized conduit. PVC 40 conduit shall not be run in or above floor slab. PVC conduit shall terminate below floor slab with rigid, threaded metal conduit adapter. Conduit above slab shall be metal.
    - Conduit run exposed to the weather shall be heavy wall, metal threaded type.
    - Conduit shall be securely fastened in place.
    - All conduit shall be concealed in walls, floor and ceilings wherever possible. Exposed conduit in finished areas will not be permitted. Exposed conduit will be permitted in the unfinished areas with the specific approval of the architect.
    - Support runs of conduit as detailed in the approved drawings shall be supported at intervals (6' maximum). Use liquid tight metal conduit for all semi-conductors and other equipment subject to vibration and in areas subject to moisture.
    - Use watertight joints with buried and concrete encased conduit. All buried conduits outside of buildings shall have a minimum of 24" of cover. Metal conduits buried in earth shall be painted with heavy asphaltum paint.
    - Support runs of conduit as detailed in the approved drawings shall be supported at intervals (6' maximum). Use liquid tight metal conduit for all semi-conductors and other equipment subject to vibration and in areas subject to moisture.
    - Installed exposed runs of conduit and conduit above ceilings parallel or perpendicular to the walls, structural members of intersecting vertical planes and ceilings. Provide right angle turns using fittings or symmetrical bends. Support conduits with hangers. Changes in direction if a conduit is suspended, it shall be supported by trapeze hangers. Do not use "all-thread" rods from the structural steel. The use of all wiring supports of the same material shall not be accepted.
    - Install empty conduit for future use as indicated on the drawings. Conduit shall be complete with jettie or pull rope in/outlet boxes, tie rings and pull rope in/outlet cover plates.
    - Provide pit covers where conduits penetrate the roof.
    - Thread lubrication shall be required on outdoor and underground threaded metal joints.
    - Install a seal fitting on all conduit penetrate concrete floor slabs or masonry walls required to be installed.
  - Horizontal run of conduit in the roof and feeding equipment shall not be more than 5'-0" unless specifically written approval of the architect or engineer is obtained.

- B. Pull at Junction Boxes
- Install pull and junction boxes where shown on the drawings, and where required for changes in direction, at junction points, and to facilitate wire pulling. Furnish box sizes in accordance with NEC unless larger boxes are indicated.
  - Provide steel boxes and removable covers of code gauge, hot rolled sheet steel, hot dipped galvanized inside and outside, for above ground work. Furnish weatherproof boxes when installed above ground outside.
  - Flush cast iron boxes, hot dipped galvanized inside and outside where shown on the drawings. Furnish removable covers with gaskets and stainless steel, brass or bronze screws.
  - Provide concrete boxes for underground work unless otherwise indicated on the drawings. Furnish steel frames and covers with the cover attached to the frame with hexagon head, brass or bronze cap screws, 3/8" in diameter. Provide a rubber gasket for sealing between the cover and the frame. Paint the cover with two coats of heavy asphaltum.

- C. Outlet Boxes
- Use sheet steel boxes, zinc coated or cadmium plated, for concealed interior work.
  - Use cast boxes, zinc-cadmium finish malleable iron, for exposed interior work, and for exposed or concealed work in wet, damp or exterior locations. Cast boxes shall be series FD by Crouse Hinds or Appliotron.
  - Wall box sizes (minimum) shall be 4" square X 2-1/2" deep where wall construction permits. Where wall construction dictates, the depth may be reduced to 2-1/8" or 1-1/2" under special conditions.
  - Fixture outlets in ceilings (minimum) shall be 4" octagonal X 1-1/2" deep (4-11/16" octagonal X 2-1/2" deep where required to accommodate larger conduit or larger number of wires).
  - Ganged boxes shall be one piece (minimum), 2-1/8" deep.
  - Provide cast iron, concrete-tile floor boxes with adjustable covers set flush and level with the finished floor, with outlets as indicated on the drawings. Provide Hubbell #8-2400, 4200, or 4300 series boxes with leveling screws. Flush type covers and openings to serve outlets used. Furnish flush caps for closing off box when not in use.
  - Flush mount boxes in all finished walls, install the plaster rings in drywalled plastered walls and raised covers as required in walls with other finishes so that the cover plates fit tightly against boxes or rings. 3/16" maximum gaps are allowed for noncombustible walls.
  - Adjust location of outlets in masonry or tile construction to occur in the nearest joint to the height specified. Heights shall meet A.D.A. requirements.
  - Support all boxes to maintain proper alignment and rigidity.
  - Clean boxes of all foreign matter prior to the installation or wiring of devices.
  - Mounting heights on the drawings are to the centerline of the box unless otherwise noted.

## Section 16140 - Wiring Devices

- A. Wiring device color shall be selected by architect, unless otherwise indicated.
- B. Provide totally enclosed, 20 ampere, 120/277 volt, quiet A/C general use snap switches.
- C. Switches shall be specification grade as manufactured by Hubbel, P&S, or Leviton.
- D. Provide NEMA configuration 5-20R Duplex 125 volt grounding type receptacles rated for 20 amperes unless otherwise indicated on the drawings.
- E. Receptacles shall be specification grade as manufactured by Hubbell, P&S or Leviton.
- F. Receptacles requiring amperages, voltages or configurations different from the duplex convenience receptacles above shall be as indicated on the drawings.
- G. Provide other receptacles of a quality, material and workmanship equal to that specified for duplex convenience receptacles.
- H. Provide cover or device plates for outlet boxes as follows unless otherwise noted:
  - Finished areas: thermoplastic - color to match device.
  - Unfinished areas: zinc coated sheet metal, aluminum, or cast metal as appropriate for the type of box.
- I. Exterior areas: copper free aluminum with gray, powder epoxy finish, gasket, weatherproof, Crouse-Hinds "WLRD" for duplex receptacles and WLRD for single receptacles or equal.
- J. Telephone, communication, and signal outlet plates, shall match those used for receptacles and switches. All outlet and/or junction boxes shall be complete with a cover plate by this contractor. Where devices are ganged, they shall be installed under a common coverplate.

- L. Locate the switches approximately 4'-0" above the finished floor elevation or nearest block course (within A.D.A. requirements), unless otherwise indicated. The long dimension of the switches shall be vertical.
- J. Locate receptacles approximately 1'-6" above the finished floor elevation or nearest block course (within A.D.A. requirements), unless noted otherwise. The long dimension of receptacles shall be vertical.

## Section 16410 - Safety Switches

- A. Safety switches shall be the enclosed heavy-duty type (type HD) with quick-make, quick-break mechanism and external pad lockable operating handle.
- B. Safety switches shall be rated for 240 or 600 volts as applicable. They shall be horsepower rated when used in motor circuits.
- C. Safety switches shall be single or non-fusible 2, 3, or 4 pole as indicated on the drawings.
- D. Safety switches shall be fusible throw unless otherwise indicated on the drawings.
- E. Enclosures shall be NEMA 1 indoors and NEMA 3R outdoors unless otherwise indicated on the drawings.
- F. Manufacturer shall be Square D, Siemens, G.E., or Cutler-Hammer. All safety switches shall be by one manufacturer.
- G. Mount the safety switches securely between 3' X 6' levels above the floor unless otherwise indicated on the drawings.
- H. Switches on block walls shall be mounted on a 3/4" plywood backboard, where located indoors.

## Section 16420 - Motor Starters

- A. Provide motor starters (magnetic or fused combination) and control equipment as shown on drawings. Starters shall be provided with 120 volt coils, 3 overloads, control transformer with fused 125 amp secondary circuit, (2) N.O. and (2) N.C. auxiliary contacts, hand-off-auto selector switch and run stop button. Noting otherwise noted. Wire thru control devices furnished by other trades. Provide motor drive equipment furnished by other trades, the control indicated on the drawings shall be coordinated as to timing purposes only. Wire to conform to the actual equipment supplied and installed by the other trades. All starters shall be dual element type. Provide blowout indicator lamps in cover.
- B. Starters shall be Square D, P.E., Cutler-Hammer, or Siemens.
- C. The exact number of starters open and normally close auxiliary contacts for each starter shall be determined by the temporary control drawing.
- D. Coordinate placement indicated on the electrical drawings with mechanical equipment schedules and specifications to provide motor starters for all motors indicated as being interlocked or started from a remote location.
- E. Starters supplied as integral part of equipment shall be furnished under the division providing the equipment. Wiring and connections shall be by this contractor. All other starters and auxiliary control equipment shall be supplied and wired by this contractor unless otherwise noted.

## Section 16491 - Fuses

- A. The contractor shall furnish a complete set of fuses for all switches, plus fusible equipment furnished by other trades. Unless indicated otherwise on plans, the fuses shall be of the following types:
  - Fuses 601 to 6000 amps shall be UL class. Trade type shall be KRP-C as manufactured by Bussmann Company.
  - Fuses 1/10 to 600 amps shall be UL class RK1. Trade type shall be low peak LPS-RK (600V) and LPN-RK (250V) as manufactured by Bussmann Company.
  - All other fuses shall be dual-element current-limiting type with 200,000 amperes symmetrical interrupting capacity.
- B. Fuses shall be manufactured by Bussman, Gould-Shawmutt, or Reliance.
- C. Spare fuses amounting to a duplicate set of each size installed shall be turned over to the owner upon completion of the project. Provide and place in a spare fuse cabinet similar to Bussman #SFC.
- D. This contractor shall replace all fuses blown during construction.

## Section 16511 - Lighting Fixtures

- A. Linear fluorescent lamps for new light fixtures shall be T8, 3500K of the following manufacturers:
  - General Electric "Staroad" SP35 Series
  - Osrarn/Sylvania "Octron" 735 Series
  - Philips TL75 Series
- B. Compact fluorescent lamps for new light fixtures shall be 3500K of the following manufacturers:
  - General Electric "Blax" SPX35 Series (4 pin base)
  - Osrarn/Sylvania "Duxax" S35 Series (4 pin base)
  - Philips "FL" or "PL-T" 3500K Series (4 pin base)
- C. All lighting fixtures shall be furnished and installed by electrical contractor as indicated on the lighting fixture schedule, including lamps. Lamps shall be of the same manufacturer for all types.
- D. All fixtures shall bear the underwriter's laboratories label and shall be installed according to manufacturer's instructions.
- E. Ballasts for linear fluorescent lamps shall be electronic, parallel, instant-start, normal output type, less than 10% THD, CBM and ETL certified, as manufactured by Magnetek, Motorola or Advance.
- F. Ballasts for "T5" compact fluorescent lamps shall be electronic, parallel, instant-start, normal output type, less than 10% THD, CBM and ETL certified, as manufactured by Magnetek, Motorola or Advance.
- G. Ballasts for "T4" compact fluorescent lamps shall be electronic, parallel, rapid-start, normal output type, less than 10% THD, CBM and ETL certified, as manufactured by Magnetek, Advance, Energy Savings, Inc. or Robertson.
- H. Existing fluorescent fixtures noted to be reused shall be cleaned and relamped as indicated on the fixture schedule.
- I. High intensity discharge ballasts shall be constant wattage type.
- J. This contractor shall provide and install all necessary support media for all lighting fixtures including structural steel, angle, rods, etc. in general, fluorescent and high intensity discharge fixtures shall be supported in a manner acceptable to the local inspection authorities. All fixtures shall be firmly supported from beams or joists.
  - Provide all necessary backing, blocking and supports for wall mounted fixtures.
  - Fixtures shall not be supported from roof deck.
- K. All fixtures shall be UL listed and approved for the purpose intended.
- L. If required by code, light fixtures shall be Chicago Plenum rated.
- M. Recessed fixtures in fire rated ceiling or supply air plenums shall be approved for the fire rating of the ceiling. Provide air-tight gaskets to seal around openings.
- N. All adjustable fixtures shall be aimed and adjusted during evening hours to the satisfaction of the architect.

## Section 16750 - Telephone System

- A. Electrical contractor to provide telephone service conduit or duct to telephone board as shown on plans. Service conduit size and quantity shall be as determined by local telephone company.
- B. This contractor shall provide and install all conduits with pull wires, outlet boxes, metal cabinets and pull boxes. Provide a complete conduit system with pull wire as indicated on drawings.
- C. All plates shall be standard telephone type with jack. Provide plates of same material and finish as specified for receptacles. Wall phone plates shall have mounting studs.
- D. Provide plywood terminal board as shown on drawings.
- E. A conduit run shall have not more than three (3) bends in a run between outlet boxes or between outlet box and a metal cabinet or pull box. When a run requires more than three (3) bends, a pull box of suitable size shall be placed in suitable location to meet the above conditions.

# MORPHE

## #029

### THE FLORIDA MAIL

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1	09/04/2018	PERMIT/BID SET
NO.	DATE	DESCRIPTION

DATE:	08/20/2018
DRAWN BY:	STAFF
PROJECT NO.:	18125
FILE NAME:	2018-0918 E4.0_E1.rvt

# ELECTRICAL SPECIFICATIONS

## E4.0

GRAPHIC SCALE

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