SECTION 26 0501 - COMMON ELECTRICAL REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. General electrical system requirements and procedures.
   2. Make electrical connections to equipment provided under other Sections.

1.2 SUBMITTALS

A. Product Data:
   1. Provide following information for each item of equipment:
      a. Catalog Sheets.
      b. Assembly details or dimension drawings.
      c. Installation instructions.
      d. Manufacturer's name and catalog number.
      e. Name of local supplier.
   2. Furnish such information for following equipment:
      a. Section 26 2726: Wiring devices.
      b. Section 26 2816: Enclosed switches and circuit breakers.
      c. Section 26 2417: Panelboards.
   3. Do not purchase equipment before approval of product data.
   4. Submit in three-ring binder with hard cover (six sets)

B. Quality Assurance / Control:
   1. Report of site tests, before Substantial Completion.

1.3 QUALITY ASSURANCE

A. Requirements of Regulatory Agencies:
   1. NEC and local ordinances and regulations shall govern unless more stringent requirements are specified.
   2. Material and equipment provided shall meet standards of NEMA or UL, or ULC, CSA, or EEMAC and bear their label wherever standards have been established and label service is available.

B. Materials and equipment provided under following Sections shall be by same Manufacturer:
   1. Sections 26 2416, 26 2816, and 26 2913: Panelboards, Enclosed Switches And Circuit Breakers, and Enclosed Controllers.

C. Contractor shall obtain all permits and arrange all inspections required by local codes and ordinances applicable to this Division.

1.4 OWNER'S INSTRUCTIONS

A. Provide competent instructor for time required to adequately train maintenance personnel in operation and maintenance of electrical equipment and systems. Factory representatives shall assist this instruction as necessary. Schedule instruction period at time of final inspection.

1.5 OPERATION AND MAINTENANCE MANUALS

A. Prepare and submit (3) three complete copies of the O & M Manuals—manuals to contain information listed below. Place each manual in a tabbed three-ring binder upon completion of the project.
   1. Operation and Maintenance manual must contain the following items:
      a. Copies of reviewed shop drawings.
      b. Letter of 1-year guarantee of workmanship.
      c. Copy of voltage and ammeter readings.
      d. Copy of letter verifying owner’s receipt of spare parts.

1.6 WARRANTY & CORRECTION OF WORK

A. See specification Section FPCC-22 Article 17.4.

1.7 RECORD DRAWINGS

A. During the course of construction, the Electrical Contractor shall maintain a set of drawings upon which all deviations from the original layout are recorded. These marked-up prints shall be turned over to the Engineer at the conclusion of the work.

PART 2 - PRODUCTS: Not Used

PART 3 - EXECUTION

3.1 EXAMINATION

A. All relocations, reconnections, and removals are not necessarily indicated on Drawings. All such work shall be included without additional cost to Owner.

B. Confirm dimensions, ratings, and specifications of equipment to be installed and coordinate these with site dimensions and with other Sections.

3.2 INSTALLATION

A. General:
   1. Locations of electrical equipment shown on Drawings are approximate only. Field verify actual locations for proper installation.
   2. Coordinate electrical equipment locations and conduit runs with those providing equipment to be served before installation or rough-in.
      a. Notify Engineer of conflicts before beginning work.
      b. Coordinate locations of power and lighting outlets in mechanical rooms and other areas with mechanical equipment, piping, ductwork, cabinets, etc, so they will be readily accessible and functional.
   3. Work related to other trades which is required under this Division, such as cutting and patching, trenching, and backfilling, shall be performed according to standards specified in applicable Sections.

3.3 FIELD QUALITY CONTROL

A. Site Tests: Test systems and demonstrate equipment as working and operating properly. Notify Engineer before test. Rectify defects at no additional cost to Owner.

B. Measure current for each phase of each motor under actual final load operation, i.e. after air balance is completed for fan units, etc. Record this information along with full-load nameplates current rating and size of thermal overload unit installed for each motor.

END OF SECTION

SECTION 26 0502 - ELECTRICAL DEMOLITION REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To
   1. Demolition involving electrical system as described in Contract Documents.

B. Related Sections
   1. Section 26 0501 - Common Electrical Requirements
   2. New and replacement work specified in appropriate specification Section.

PART 2 - NOT USED

PART 3 - PART 3 EXECUTION

3.1 EXAMINATION

A. All relocations, reconnections, and removals are not necessarily indicated on Drawings. All such work shall be included without additional cost to Owner.

3.2 PREPARATION

A. Disconnect equipment that is to be removed or relocated. Carefully remove, disassemble, or dismantle as required, and store in approved location on site, existing items to be reused in completed work.

B. Where affected by demolition or new construction, relocate, extend, or repair raceways, conductors, outlets, and apparatus to allow continued use of electrical system. Use methods and materials as specified for new construction.

3.3 PERFORMANCE

A. Perform drilling, cutting, block-offs, and demolition work required for removal of necessary portions of electrical system. Do not cut joists, beams, girders, trusses, or columns without prior written permission from Engineer.

B. Remove concealed wiring abandoned due to demolition or new construction. Remove circuits, conduits, and conductors that are not to be re-used back to next active fixture, device, or junction box.

C. Patch, repair, and finish surfaces affected by electrical demolition work, unless work is specifically called for under other Sections of the specifications.

3.4 CLEANING

A. Remove obsolete raceways, conductors, apparatus, and lighting fixtures promptly from site and dispose of legally.

END OF SECTION

SECTION 26 0519 - LINE-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Quality of conductors used on Project except as excluded below.

B. Related Sections:
   1. Section 26 0501: Common Electrical Requirements.

1.2 DEFINITIONS

A. Line Voltage: Over 70 Volts.

PART 2 - PRODUCTS

2.1 COMPONENTS

A. Line Voltage Conductors:
   1. Copper with AWG sizes as shown:
      a. Minimum size shall be No. 12 except where specified otherwise.
      b. Conductor size No. 8 and larger.
   2. Insulation:
      a. Standard Conductor Size No. 10 And Smaller: 600V type THWN or XHHW (75 deg C).
      b. Standard Conductor Size No. 8 And Larger: 600V Type THW, THWN, or XHHW (75 deg C).
      c. Higher temperature insulation as required by NEC or local codes.
   3. Colors:
      a. 208Y / 120 V System:
         1) Black: Phase A.
         2) Red: Phase B.
         3) Blue: Phase C.
         4) Green: Ground.
         5) White: Neutral.
      b. 480Y / 277 Volt System:
         1) Brown: Phase A.
         2) Orange: Phase B.
         3) Yellow: Phase C.
         4) Gray: Neutral.
         5) Green: Ground.
      c. Conductors size No. 10 and smaller shall be colored full length. Tagging or other methods for coding of conductors size No. 10 and smaller not allowed.
      d. For feeder conductors larger than No. 10 at pull boxes, gutters, and panels, use painted or taped band or color tag color-coded as specified above.

B. Standard Connectors:
   1. Conductors No. 8 And Smaller: Steel spring wire connectors.
   2. Conductors Larger Than No. 8: Pressure type terminal lugs.
   3. Connections Outside Building: Watertight steel spring wire connections with waterproof, non-hardening sealant.

C. Terminal blocks for tapping conductors:
   1. Terminals shall be suitable for use with 75 deg C copper conductors.
   2. Acceptable Products:
      a. 16323 by Cooper Bussmann, St Louis, MO www.bussmann.com
      b. LBA363106 by Square D Co, Palatine, IL www.squared.com.
      c. Equal as approved by Engineer before bidding.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General:
   1. Conductors and cables shall be continuous from outlet to outlet.
   2. Do not use direct burial cable.

B. Line Voltage Conductors (Over 70 Volts):
   1. Install conductors in raceway except where specifically indicated otherwise. Run conductors of different voltage systems in separate conduits.
   2. Route circuits at own discretion, however, circuiting shall be as shown in Panel Schedules. Group circuit homeruns to panels as shown on Drawings.
   3. Neutrals:
      a. On three-phase, 4-wire systems, do not use common neutral for more than three circuits.
      b. On single-phase, 3-wire systems, do not use common neutral for more than two circuits.
      c. Run separate neutrals for each circuit where specifically noted on Drawings.
      d. Where common neutral is run for two or three home run circuits, connect phase conductors to breakers in panel which are attached to separate phase legs so neutral conductors will carry only unbalanced current. Neutral conductors shall be of same size as phase conductors unless specifically noted otherwise.
   4. Pulling Conductors:
      a. Do not pull conductors into conduit until raceway system is complete and cabinets and outlet boxes are free of foreign matter and moisture.
      b. Do not use heavy mechanical means for pulling conductors.
      c. Use only listed wire pulling lubricants.

END OF SECTION

SECTION 26 0523 - CONTROL VOLTAGE ELECTRICAL CABLES

PART 1 - GENERAL

PART 2 - SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install control-voltage electrical cables as described in Contract Documents.

B. Related Sections:
   1. Section 26 0501: Common Electrical Requirements.

2.2 DEFINITIONS

A. Control Voltage: 70 Volts and under.

PART 3 - PRODUCTS

3.1 COMPONENTS

A. Building Telephone / Data System Cables.
   1. CAT 5E, 24 AWG, solid bare copper, four pair, UTP.
   2. Sheath Colors:
      a. Telephone: Yellow.
      b. Data: Blue.
   3. Meet requirements of EIA / TIA 568 Standard.

B. Building Telephone System Cables:
   1. CAT 5e, 24 AWG, solid copper, four pair, UTP, yellow cable jacket.
   2. Meet requirements of TIA / EIA 568 Standard.

C. Approved Manufacturers.
   1. Belden Wire & Cable Co, Richmond, IN www.belden.com.
   2. West Penn Wire Corp, Washington, PA www.westpenn-cdt.com.

PART 4 - EXECUTION

4.1 INSTALLATION

A. General:
   1. Cables shall be continuous and without splices from terminal board to outlet.
   2. In inaccessible, concealed spaces, run cables in raceway. In accessible, unfinished areas, install all cables in conduit, see Sec. 26 0533
   3. Pulling Conductors:
      a. Do not pull conductors into conduit until raceway system is complete and cabinets and outlet boxes are free of foreign matter and moisture.
      b. Do not use heavy mechanical means for pulling conductors.
      c. Use only listed wire pulling lubricants.

B. Telephone / Data System Cables:
   1. Install cable from terminal board to each telephone and data outlet unless indicated otherwise on Drawings.
   2. Leave adequate slack cable at terminal board and outlets for termination of each cable run.

END OF SECTION

SECTION 26 0526 - GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install grounding for electrical installation as described in Contract Documents except as excluded below.

B. Related Sections:
   1. Section 26 0501: Common Electrical Requirements.

PART 2 - PRODUCTS

2.1 COMPONENTS

A. Size materials as shown on Drawings and in accordance with applicable codes.

B. Grounding And Bonding Jumper Conductors: Bare copper or with green insulation.

C. Make grounding conductor connections to ground rods and water pipes using approved bolted clamps listed for such use.

D. Service Grounding Connections And Cable Splices:
   1. Make by compression type connectors designed specifically for this purpose.
   2. Acceptable Products:
      a. Burndy
      b. Thomas & Betts.
      c. Equal as approved by Engineer before bidding.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Grounding conductors and bonding jumper conductors shall be continuous from terminal to terminal without splice. Provide grounding for following.
   1. Electrical service, its equipment and enclosures.
   2. Conduits and other conductor enclosures.
   3. Neutral or identified conductor of interior wiring system.
   4. Non-current-carrying metal parts of fixed equipment such as motors, starter and controller cabinets, instrument cases, and lighting fixtures.

B. Pull grounding conductors in non-metallic raceways, in flexible steel conduit exceeding 72 inches in length, and in flexible conduit connecting to mechanical equipment.

C. Provide grounding bushings on all feeder conduit entrances into panelboards and equipment enclosures.

D. Bond conduit grounding bushings to enclosures with minimum #10 AWG conductor.

E. Connect equipment grounds to building system ground.
   1. Use same size equipment grounding conductors as phase conductors up through #10 AWG.
   2. Use NEC Table 250-95 for others unless noted otherwise in Drawings.

F. Run separate insulated grounding cable from each equipment cabinet to electrical panel. Do not use intermediate connections or splices. Affix directly to cabinet.

G. On motors, connect ground conductors to conduit with approved grounding bushing and to metal frame with bolted solderless lug.

H. Provide a separate, insulated equipment green grounding conductor in all feeder and branch circuits. Terminate each end on a grounding lug, bus, or bushing and to all metallic enclosures. A conduit ground is not acceptable. Install grounding bushings on both ends of all feeder conduit and bond to ground system.

3.2 FIELD QUALITY CONTROL

A. Inspections: Notify Engineer for inspection two days minimum before placing concrete over grounding conductor.

END OF SECTION

SECTION 26 0533 - RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Quality of material and installation procedures for raceway, boxes, and fittings used on Project but furnished under other Divisions.
   2. Furnish and install raceway, conduit, and boxes used on Project not specified to be installed under other Divisions.

B. Related Sections
   1. Section 26 0501: General Electrical Requirements.

PART 2 - PRODUCTS

2.1 COMPONENTS

A. Raceway And Conduit:
   1. Sizes:
      a. 3/4 inch for exterior underground use.
      b. 1/2 inch minimum elsewhere, unless indicated otherwise.
   2. Types: Usage of each type is restricted as specified below by product.
      a. Galvanized rigid steel or galvanized intermediate metal conduit (IMC) is allowed for use in all areas. Where in contact with earth or concrete, wrap buried galvanized rigid steel and galvanized IMC conduit and fittings completely with vinyl tape.
      b. Galvanized Electrical Metallic Tubing (EMT):
         1) Allowed for use only in indoor dry locations where it is:
            a) Not subject to damage.
            b) Not in contact with earth.
            c) Not in concrete.
         2) Flexible steel conduit or metal-clad cable required for final connections to indoor mechanical equipment.
      c. Schedule 40 Polyvinyl Chloride (PVC) Conduit:
         1) Allowed for use only underground or below concrete with galvanized rigid steel or IMC elbows and risers.
      d. Listed, Liquid-Tight Flexible Metal Conduit:
         1) Use in outdoor final connections to mechanical equipment, length not to exceed 36 inches.
   3. Prohibited Raceway Materials:
      a. Aluminum conduit.
      b. Armored cable type AC (BX) cable.

B. Raceway And Conduit Fittings:
   1. Rigid Steel Conduit And IMC: Threaded and designed for conduit use.
   2. EMT:
      a. Compression type.
      b. Steel set screw housing type.
   3. PVC Conduit:
      a. PVC type. Use PVC adapters at all boxes.
      b. PVC components, (conduit, fittings, cement) shall be from same Manufacturer.
   4. Flexible Steel Conduit: Screw-in type.
   5. Liquid-tight Flexible Metal Conduit: Sealtite type.
   6. Expansion fittings shall be equal to OZ Type AX sized to raceway and including bonding jumper.
   7. Prohibited Fitting Materials:
      a. Crimp-on, tap-on, indenter type fittings.
      b. Cast set-screw fittings for EMT.

c. Spray (aerosol) PVC cement.

C. Outlet Boxes:
1. Galvanized steel of proper size and shape are acceptable for all systems. Where metal boxes are used, provide following:
a. Provide metal supports and other accessories for installation of each box.
b. Equip ceiling and bracket fixture boxes with fixture studs where required.
c. Equip outlets in plastered, paneled, and furred finishes with plaster rings and extensions to bring box flush with finish surface.
2. Telephone / data outlet boxes shall be 4' 11/16" deep box with single gang mud ring.

D. Air / Vapor Barrier Back Boxes: Pre-molded polyethylene fitting between framing members and inhibiting air / vapor infiltration and exfiltration around recessed outlet boxes.

2.2 MANUFACTURERS

A. Contact Information:
1. Cooper B-Line, Highland, IL www.bline.com.
2. Hubbell Incorporated, Milford, CT www.hubbell-wiring.com.
3. Square D, Palatine, IL www.squared.com.
4. Steel City, Div Thomas & Betts, Memphis, TN www.tnb.com.
5. Thomas & Betts, Memphis, TN www.tnb.com.
6. Walker Systems Inc, Williamstown, www.wiremold.com.
7. Wiremold Co, West Hartford, CT www.wiremold.com.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Confirm dimensions, ratings, and specifications of materials to be installed and coordinate these with site dimensions and with other Sections.

3.2 INSTALLATION

A. Interface With Other Work:
1. Coordinate with Divisions 22 for installation of raceway for control of plumbing and HVAC equipment.
2. Before rough-in, verify locations of boxes with work of other trades to insure that they are properly located for purpose intended.
a. Coordinate location of outlet for water cooler with Division 22.
3. Install pull wires in raceways installed under this Section where conductors or cables are to be installed under other Divisions.

B. Conduit And Raceway:
1. Conceal raceways within ceilings, walls, and floors, except at Contractor's option, conduit may be exposed on walls or ceilings of mechanical equipment areas and above acoustical panel suspension ceiling systems. Install exposed raceway runs parallel to or at right angles to building structure lines.
2. Keep raceway runs 6 inches minimum from hot water pipes.
3. Make no more than four quarter bends, 360 degrees total, in any conduit run between outlet and outlet, fitting and fitting, or outlet and fitting.
a. Make bends and offsets so conduit is not injured and internal diameter of conduit is not effectively reduced.
b. Radius of curve shall be at least minimum indicated by NEC.
4. Cut conduit smooth and square with run and ream to remove rough edges. Cap raceway ends during construction. Clean or replace raceway in which water or foreign matter have accumulated.
5. Install insulated bushings on each end of raceway 1-1/4 inches in diameter and larger, and on all raceways where low voltage cables emerge. Install expansion fittings where raceways cross building expansion joints.

6. Run two spare conduits from each new panelboard to ceiling access area or other acceptable accessible area and cap for future use.
7. Where conduit penetrates fire-rated walls and floors, seal opening around conduit with UL-listed foamed silicone elastomer compound. Fill void around perimeter of conduits with nonmetallic nonshrink grout in all concrete or masonry walls.
8. Bend PVC conduit by hot box bender and, for PVC 2 inches in diameter and larger, expanding plugs. Apply PVC adhesive only by brush.
    a. Holes shall be one inch diameter maximum.
9. Conduit And Raceway Support:
    a. Securely support raceway with approved straps, clamps, or hangers, spaced as required.
    b. Do not support from mechanical ducts or duct supports without Engineer's written approval. Securely mount raceway supports, boxes, and cabinets in an approved manner by:
        1) Expansion shields in concrete or solid masonry.
        2) Toggle bolts on hollow masonry units.
        3) Wood screws on wood.
        4) Metal screws on metal.
10. Prohibited Procedures:
    a. Use of wooden plugs inserted in concrete or masonry units for mounting raceway, supports, boxes, cabinets, or other equipment.
    b. Installation of raceway that has been crushed or deformed.
    c. Use of torches for bending PVC.
    d. Spray applied PVC cement.
    e. Boring holes in truss members.
    f. Notching of structural members.
    g. Supporting raceway from ceiling system support wires.
    h. Nail drive straps or tie wire for supporting raceway.

C. Boxes:
1. Boxes shall be accessible and installed with approved cover.
2. Locate boxes so pipes, ducts, or other items do not obstruct outlets.
3. Install outlets level and plumb.
4. Support switch boxes larger than two-gang with side brackets and steel bar hangers in framed walls.
5. At time of substantial completion, install blank plates on uncovered outlet boxes that are for future use.

END OF SECTION

SECTION 26 0613 - ELECTRICAL EQUIPMENT MOUNTING HEIGHT SCHEDULE

A. Unless otherwise indicated, mount center of outlets or boxes at following heights above finish floor: Refer special conditions to Engineer before rough-in and locate outlet under his direction.

B. Electrical:
   1. Distribution Panels: 72 inches to top.
   2. Receptacles: 18 inches

END OF SECTION

SECTION 26 2200 - DRY TYPE TRANSFORMERS

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Dry type two winding transformer. Size as per plan.

1.2 RELATED WORK

A. This Section shall be used in conjunction with the following other specifications and related Contract Documents to establish the total requirements for secondary grounding.
   1. Section 26 0501 - Basic Electrical Requirements.

B. In the event of conflict regarding dry type transformer requirements between this Section and any other section, the provisions of this Section shall govern.

1.3 DELIVERY, STORAGE, AND HANDLING

A. Store in warm, dry location with uniform temperature. Cover ventilating openings to keep out dust.

B. Handle transformers using only lifting eyes and brackets provided for that purpose. Protect units against entrance of rain, sleet, or snow it handled in inclement weather.

1.4 SUBMITTAL

A. Provide a separate set of shop drawings for each transformer supplied.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS - DRY TYPE TWO WINDING TRANSFORMERS

A. General Electric Company

B. Square D Company (Sorgel)

C. ITE

D. Federal Pacific

2.2 DRY TYPE TWO WINDING TRANSFORMERS

A. Dry Type Transformers: NEMA ST 20; factory-assembled, air cooled dry type transformers.

B. Insulation system and average winding temperature rise for rated kVA as follows:

Rating	Class	Rise (degree C)
16-500	220	150

C. Case temperature shall not exceed 35 degrees C rise above ambient at its warmest point.

D. Winding Taps, Transformers 15 kVA and Larger: NEMA ST 20. Two 5 percent taps above and below full rated voltage.

E. Transformers 75 kVA and larger, provide an impedance of 4.5 percent minimum.

F. Sound Levels: NEMA ST 20.

G. Sound Levels: Maximum sound levels are as follows:

kVA Rating	Sound Level

1-5	30 db
6-25	40 db
26-150	42 db
151-225	43 db
226-300	47 db
301-500	51 db

H. Basic Impulse Level: 10 kV

I. Ground core and coil assembly to enclosure by means of a visible flexible copper grounding strap.

J. Mounting: Transformers 75 kVA and less shall be suitable for wall, floor, or trapeze mounting; transformers larger than 75 kVA shall be suitable for floor or trapeze mounting.

K. Coil Conductors: Continuous windings with terminations brazed or welded.

L. Enclosure: NEMA ST 20; Type 1. Provide lifting eyes or brackets.

M. Isolate core and coil from enclosure using vibration-absorbing mounts.

N. Nameplate: Include transformer connection data and overload capacity based on rated allowable temperature rise.

END OF SECTION

SECTION 26 2417 - CIRCUIT-BREAKER PANELBOARDS

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install circuit-breaker panelboards as described in Contract Documents.

B. Related Sections:
   1. Section 26 0501: Common Electrical Requirements.

PART 2 - PRODUCTS

2.1 EQUIPMENT

A. General:
   1. Circuit-breaker type.
   2. Galvanized steel cabinets
   3. Bussing and lugs arranged as required.
   4. Multi-pole circuit-breakers shall be common trip.
   5. Circuit-breakers shall be molded case thermal magnetic type with inverse time characteristics.

B. Lighting And Appliance Panelboards:
   1. Minimum integrated equipment short circuit rating of 10,000 amperes for 120 / 208 Volts.
   2. Minimum integrated equipment short circuit rating of 14,000 amperes for 277 / 480 Volts.
   3. Plug-on or bolt-on breakers. Multi-pole breakers shall be common trip.
   4. Cabinets shall be locking type with no exposed latches or screws when door is closed. Key panels alike and provide minimum of three keys.
   5. Minimum dimensions of 20 inches wide by 5-3/4 inches deep.
   6. Space designation on Drawings indicates bus hardware and panelboard capacity for future acceptance of one 20 Amp, single-pole circuit-breaker.
   7. Breakers specified to be shunt trip and shall include shunt trip accessories to remotely trip breaker using separate 120 V power source. Trip coil shall include coil-clearing contact to break coil current when breaker opens.
   8. Use equipment from same manufacturer as main panelboard.
   9. Approved Products.
      a. Type PRL1a by Cutler-Hammer.
      b. Type AL or AQ by General Electric.
      c. Type P1 by Siemens.
      d. Type NQOD by Square D.

2.2 MANUFACTURERS

A. Contact Information:
   1. Cutler-Hammer Inc, Pittsburgh, PA www.eatonelectric.com.
   2. General Electric Industrial Systems, Charlotte, NC www.geindustrial.com.
   3. Siemens Energy & Automation, Alphrata, GA www.sea.siemens.com.
   4. Square D Co, Palatine, IL www.squared.com.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Label panelboards, load centers, and each breaker in main panelboard with 1/16 inch thick laminated plastic composition material with contrasting color core. Engraved letters shall be 1/4 inch high.

B. Provide typewritten circuit schedules in lighting and distribution panelboards and load centers to identify panelboard and load served by each branch breaker.

C. Arrange conductors neatly within panelboards and load centers.

D. Secure to structure in accordance with applicable seismic zone requirements.

E. Surface mounted panelboards.

3.2 PROTECTION

A. Protect panelboards, load centers, and interior components from paint, gypsum board compound, dirt, dust, and other foreign matter during construction.

END OF SECTION

SECTION 26 2726 - WIRING DEVICES

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install wiring devices complete with plates as described in Contract Documents.

B. Related Sections
   1. Section 26 0501: Common Electrical Requirements.

PART 2 - PRODUCTS

2.1 GENERAL

A. Faces shall be nylon where available.

B. Devices of single type shall be from same Manufacturer.

C. Device color shall be selected after bid. Standard colors shall include brown, gray, ivory and black for all devices. Emergency devices shall be red.

D. GFCI Receptacles: Duplex convenience receptacle with integral ground fault current interrupter. NEMA Type 5-20R. All units shall be feed-through type for downstream decive protection. All receptacles indicated to be installed in a toilet room, bathroom, kitchen (except for refrigerator receptacle), roof top, and outdoors or within 6 feet of a sink, basin, tub or floor sink be GFIC protected.

2.2 MANUFACTURED UNITS

A. Receptacles:
   1. Duplex receptacle:
      a. 20 AMP, specification grade, back and side wired, self grounding.
      b. Approved Products
         1) Cooper: 5352X.
         2) Hubbell: 5352X.
         3) Leviton: 5352X.
         4) Pass & Seymour: 5352X.

B. Plates:
   1. Standard Cover Plates:
      a. All areas with finished walls:
         1) Nylon or high impact resistant thermoplastic.
         2) Color shall match wiring device.
      b. All Other: galvanized steel.
      c. Ganged switches shall have gang plates.
      d. Approved Products.
         1) Cooper.
         2) Hubbell.
         3) Leviton.
         4) Pass & Seymour.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install devices straight, and solid to box.

END OF SECTION

SECTION 26 2816 - ENCLOSED SWITCHES AND CIRCUIT BREAKERS

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install disconnects as described in Contract Documents, except those provided integral with equipment.

B. Related Sections:
   1. Section 26 0501: Common Electrical Requirements.

PART 2 - PRODUCTS

2.1 EQUIPMENT

A. Disconnects:
   1. Heavy-duty quick-make, quick-break type, non-fused unless indicated otherwise.
   2. Provide interlock to prevent opening of door when switch is in ON position.
   3. Provide means to lock switch in OFF position with padlock.
   4. Disconnects for motor circuits shall be horsepower rated
   5. Enclosures:
      a. Interior: NEMA / CEMA Type 1.
      b. Exterior: NEMA / CEMA Type 3R.
   6. Fuses:
      a. Fuse fused disconnects with dual-element time delay fuses.
      b. Fuses on Project shall be from single manufacturer.
      c. Approved Manufacturers.
         1) Cooper Bussmann, Chicago. IL www.bussmann.com.
         2) Edison Fusegear, Des Peres, MO (314) 391-3443.
         3) GEC Alsthom Electrical Equipment, Hawthorne, NJ (800) 678-9322 or (201) 869-7777.
         4) Ferraz Shawmut, Newburyport, MA www.ferrazshawmut.com.
         5) Littelfuse Inc, Des Plaines, IL www.littelfuse.com.
   7. Approved Manufacturer.
      a. Same as Manufacturer of Project's main panelboard.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Label disconnects to indicate equipment served, such as Condensing Unit CU-1. Use 1/16 inch thick laminated plastic composition material with contrasting color core. Engraved letters shall be 1/4 inch high. Attach labels with screws.

END OF SECTION

END OF DIVISION 26