SECTION 260534

BOXES AND CABINETS

PART 1 GENERAL

1.1 STIPULATIONS

A. The specifications sections “General Conditions of the Construction Contract”, “Special Conditions”, and “Division 1 - General Requirements” form a part of this Section by this reference thereto, and shall have the same force and effect as if printed herewith in full.

1.2 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions, Instructions to Bidders and Division 1 Specifications Sections, apply to this Section.

B. Requirements of the following Division 26 Sections apply to this section:

1. Section 260000 - Basic Electrical Requirements
2. Section 260001 - Basic Electrical Materials and Methods
3. Section 260533 - Raceways
4. Section 260526 – Grounding and Bonding

1.3 SUMMARY

A. This section includes cabinets, boxes and fittings for electrical installation and certain types of electrical fittings not covered in other sections. Types of products specified in this Section include:

1. Steel Device Boxes
2. Cast Device Boxes
3. Floor Boxes
4. Pull and Junction Boxes
5. Cabinets

B. Conduit-body type electrical enclosures and raceway fittings are specified in Section 260533 - Raceways.

1.4 SUBMITTALS

A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections:

1. Product data for cabinets and enclosures with classification higher than NEMA 1.
2. Shop drawings for floor boxes and boxes, enclosures and cabinets that are to be shop fabricated, (nonstock items). For shop fabricated junction and pull boxes, show accurately scaled views and spatial relationships to adjacent equipment. Show box types, dimensions and finishes.

1.5 QUALITY CONTROL

A. UL Listing and Labeling: Items provided under this section shall be listed and labeled by UL.

B. National Electrical Code Compliance: Components and installation shall comply with NFPA 70 "National Electrical Code."

C. NEMA Compliance: Comply with NEMA Standard 250, "Enclosures for Electrical Equipment (1000 Volts Maximum)."

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by the following, or equivalent manufacturer as approved by the Professional:

B. Steel Device Boxes

1. Appleton Electric Co.
2. Midland Ross Corp. (Steel City)
3. Raco Inc.

C. Cast Device Boxes

1. Appleton Electric Co.
2. Crouse Hinds Electrical Construction Material
3. Killark Electric Manufacturing Co.
4. O-Z/Gedney

D. Pull and Junction Boxes

1. O-Z/Gedney
2. Crouse Hinds
3. Appleton Electric Co.
4. Hoffman Engineering Co.
5. Lee Products
6. Hammond Manufacturing
7. Electromate Corporation

E. Cabinets

1. Galvanized Sheet Steel

a. Square-D
b. Westinghouse
c. General Electric
d. ITE
e. Hoffman Engineering Co.
f. Lee Products
g. Crenlo, Inc.
h. Hammond Manufacturing
i. Electromate Corporation

2. Sheet Aluminum

a. Hennessy Products, Inc.

2.2 CABINETS AND BOXES - GENERAL

A. Electrical Cabinets and Boxes: Of indicated types, sizes and NEMA enclosure classes. Where not indicated, provide units of types, sizes and classes appropriate for the use and location. Provide all items complete with covers and accessories required for the intended use. Provide gaskets for units in damp or wet locations.

2.3 MATERIALS AND FINISHES

A. Sheet Steel: Flat-rolled, code-gage, galvanized steel.

B. Fasteners for General Use: Corrosion resistant screws and hardware including cadmium and zinc plated items.

C. Fasteners for Damp or Wet Locations: Stainless steel screws and hardware.

D. Cast Metal for Boxes, Enclosures and Covers: Copper-free aluminum except as otherwise specified.

E. Exterior Finish: Gray baked enamel for items exposed in finished locations except as otherwise indicated.

F. Painted Interior Finish: Where indicated, white baked enamel.

G. Fittings for Boxes, Cabinets and Enclosures: Conform to UL 514B. Malleable iron or zinc plated steel for conduit hubs, bushings and box connectors.

2.4 STEEL DEVICE BOXES

A. General

1. Fabricate from galvanized or cadmium plated pressed sheet steel, with covers, extension, etc., as required by the installation.

B. Outlet, Receptacle, Device and Junction Boxes

1. 4 inch square by 1-1/2 inch depth minimum, without clamps for either conduit or tubing.
2. 4-11/16 inch square by 1-1/2 inch depth minimum, without clamps for either conduit or tubing.

2.5 CAST DEVICE BOXES

A. General

1. Copper-free aluminum or malleable iron with matching cast cover.

B. Switch Boxes

1. FS or FD series, single, two, multi-gang as required for wiring device arrangement.

C. Outlet, Receptacle, Device and Junction Boxes

1. FD series, single, two, multi-gang as required for wiring device arrangement.

2.6 PULL AND JUNCTION BOXES

A. General

1. NEMA type and size as required by area or as shown, complete with matching cover. Where necessary, gaskets shall be used to prevent entrance of moisture.

B. Galvanized Sheet Steel

1. Minimum 14-gauge, solder or braze all seams, roll edges at openings and bolt on covers.

C. Cast Iron

1. Corrosion resistant, hot-dip galvanized and bolt on cast cover utilizing stainless steel screws.

D. Cast Aluminum

1. Non-rusting, non-sparking, non-magnetic and bolt on cast cover utilizing stainless steel screws.

E. Cast Bronze

1. Non-rusting, non-sparking, non-magnetic and bolt on cast cover utilizing brass screws.

2.7 CABINETS

A. Comply with UL 50, "Electrical Cabinets and Boxes."

B. General: NEMA type and size as required by area, application, or as shown. Cabinet shall consist of a box and a front consisting of a one piece frame and hinged door. Hinged side shall be dependent upon physical application. Arrange door to close against a rabbet placed around the inside edge of the frame, with a uniformly close fit between door and frame. Provide concealed fasteners, not over 24 inches apart, to hold fronts to cabinet boxes and provide for adjustment. Provide flush or concealed door hinges not over 24 inches apart and not over 6 inches from top and bottom of door. Louvers for cabinet ventilation shall be provided as required by application. For flush cabinets, make the front approximately 3/4 inch larger than the box all around. For surface mounted cabinets make front same height and width as box.

C. Doors: Double doors for cabinets wider than 24 inches. Telephone cabinets wider than 48 inches may have sliding or removable doors.

D. Locks: Combination spring catch and key lock, with all locks for cabinets of the same system keyed alike. Locks may be omitted on signal, power and lighting cabinets located within wire closets and mechanical-electrical rooms. Locks shall be of a type to permit doors to latch closed without locking. Latch shall be padlocking type for exterior applications.

E. Galvanized Sheet Steel: Minimum 14-gauge, solder or braze all seams, roll edges at openings and minimum 12 gauge doors to match panelboard enclosures.

F. Sheet Aluminum: Minimum .125 inch 5052-H32 sheet aluminum thickness, welded seams, gasketed weathertight door, weather-resistance hinge, and weather-resistant padlockable latching mechanism.

PART 3 EXECUTION

3.1 INSTALLATION, GENERAL

A. Install items where indicated and where required to suit code requirements and installation conditions.

B. Cap unused knockout holes where blanks have been removed and plug unused conduit hubs.

C. Support and fasten items securely in accordance with Section 260529 - Supporting Devices.

D. Sizes shall be adequate to meet NEC volume requirements, but in no case smaller than sizes indicated.

E. Remove sharp edges where they may come in contact with wiring or personnel.

3.2 APPLICATIONS

A. Cabinets: Flush mounted, NEMA enclosure type 1 except as otherwise indicated.

B. Outlet Boxes and Fittings: Install outlet and device boxes and associated covers and fittings of materials and NEMA types suitable for each location and in conformance with the following requirements.

1. Interior Dry Locations: Sheet steel, NEMA type 1.
2. Locations Exposed to Weather or Dampness: Cast metal, NEMA type 3R.
3. Wet Locations: NEMA type 4 enclosures.
4. Hazardous (Classified) Locations: NEMA type listed and labeled for the location and class of hazard indicated.

C. Pull and Junction Boxes: Install pull and junction boxes of materials and NEMA types suitable for each location except as otherwise indicated.

3.3 INSTALLATION OF BOXES

A. Size all boxes as required by the National Electrical Code with oversize boxes as shown on Drawings. Obtain special backboxes with associated equipment when available.

B. Provide where required for outlet facility and rough-in requirements. Securely support from building construction with rods or bar hangers independent of raceways. Provide backing extension for all steel device boxes in stud walls or support box on two opposite sides such that cover plate and drywall is not stressed to hold box in position.

C. Give priority in available space to large steam mains, steam lines that pitch, waste lines, drain lines, large air duct, and all structural steel, unless shown otherwise.

1. Minimum Spacing: 3 inches between boxes and cold water or waste piping and 6 inches between boxes and parallel steam pipes, condensate pipes, hot water pipes and air ducts.
2. Do not support from ceiling supporting system, mechanical system supports or mechanical systems.
3. Do not penetrate or anchor into mechanical ductwork.

D. Install recessed except where shown or specified surface mounted.

E. Maintain accessibility to all boxes. Z-spline ceilings are considered not accessible.

F. Size and install so no part is visible and is completely covered by wall plate or fixture.

G. Do not cut insulation in walls to install boxes.

H. Do not use through-the-wall boxes.

I. Recessed boxes shall not be installed back to back (stagger horizontally).

J. Install in center of glazed tile, brick, block or other masonry wall material with square cornered tile or masonry extension rings of proper depth.

K. Install outlet boxes in sheet rock walls with square cornered tile or masonry rings of proper depth. Standard drywall rings are acceptable. Maintain NEC required tolerances.

L. Close off all unused openings with proper fittings.

M. Install outlet boxes for electric water coolers concealed inside cooler cabinet. Locate outlet boxes using rough-in template furnished with cooler.

N. Use multi-gang cast device boxes whenever possible unless specifically noted otherwise for adjacent multi-device installations.

O. Combination devices (ie. switch and receptacle) installed in minimum 2 gang box under common cover. Provide barriers to segregate voltages 300 volts and greater and to segregate normal and emergency distribution system branches.

P. Combination receptacle and communications devices (ie. television and receptacle) shall be installed in minimum 2 gang boxes with barriers to segregate the systems.

3.4 INSTALLATION OF PULL AND JUNCTION BOXES

A. All boxes shall be concealed and accessible after completion of building.

B. Installation in finished spaces requiring access panels is prohibited except where specifically shown or directed.

3.5 BOX MARKING

A. Mark box cover on exterior in unfinished areas (including accessible ceiling spaces) and interior of box in finished areas with the following:

1. Load served.
2. Circuit origin and number.

B. Paint cover of box in unfinished areas and in accessible ceiling spaces:

1. Fire alarm - red.
2. Life safety - yellow.
3. Critical - blue.
4. General emergency - green.
5. Communications - independent color for each system as directed by Department.

3.6 BOX COVERS

A. Provide appropriate screw cover for all boxes dependent upon type and application.

3.7 BOX APPLICATION

A. Galvanized steel boxes may be used in:

1. Concealed interior locations above ceilings and in hollow studded partitions.
2. Exposed interior location above seven feet.
3. Direct contact with concrete except slab on grade.
4. Stud walls of kitchens and laundries.

B. Cast boxes shall be used in:

1. Exterior locations.
2. Hazardous locations.
3. Within seven feet area around boilers, incinerators and other heat producing equipment.
4. Exposed interior locations within seven feet of the floor.
5. Direct contact with earth.
6. Direct contact with concrete in slab on grade.
7. Wet locations.
8. Kitchens and laundries except in stud walls.

C. Sectional Boxes

1. Shall not be used in any application.

3.8 INSTALLATION OF CABINETS

A. Support securely from building construction and align with adjacent equipment. Maximum height of top shall be less than 6 foot - 6 inches.

3.9 GROUNDING

A. Electrically ground metallic cabinets, boxes and enclosures. Where wiring to item includes a grounding conductor, provide a grounding terminal in the interior of the cabinet, box or enclosure.

3.10 CLEANING AND FINISH REPAIR

A. Upon completion of installation, inspect components. Remove burrs, dirt and construction debris and repair damaged finish including chips, scratches, abrasions and weld marks.

B. Galvanized Finish: Repair damage using a zinc-rich paint recommended by the tray manufacturer.

C. Painted Finish: Repair damage using matching corrosion inhibiting touch-up coating.

END OF SECTION 260534