

## SECTION 16050

### BASIC ELECTRICAL MATERIALS AND METHODS

#### PART 1 - GENERAL

##### 1.01 SUMMARY

- A. Provisions of Division 01 apply to this section
- B. Section Includes:
  - 1. Boxes, enclosures, keys and locks.
  - 2. Receptacles and switches.
  - 3. Identifications and signs.
- C. Related Sections:
  - 1. Section 16010: Basic Electrical Requirements.

#### PART 2 - PRODUCTS

##### 2.01 BOXES, ENCLOSURES, KEYS AND LOCKS

- A. Outlet Boxes and Fittings:
  - 1. Outlet boxes installed in concealed Work shall be galvanized steel, pressed, or welded type, with knockouts.
  - 2. In exposed Work, where conduit runs change direction or size, outlet boxes and conduit fittings shall be cast metal with threaded hubs cast integral with box or fitting.
  - 3. Fittings shall be cast metal and non-corrosive. Ferrous metal fittings shall be cadmium-plated or zinc galvanized. Castings shall be true to pattern, smooth, straight, with even edges and corners, of uniform thickness of metal, and shall be free of cracks, gas holes, flaws, excessive shrinkage, and burnt-out sand.
  - 4. Covers for fittings shall be galvanized steel or non-corrosive aluminum and shall be designed for particular fitting installed.
  - 5. Light fixture outlets shall be 4-inch octagon, 4-inch square, 2-1/8 inches deep or larger, depending upon number of conductors or conduits therein. Plaster rings shall be furnished with round opening with 2 ears drilled 2-23/32 inches center to center.
  - 6. For local device outlets provide 4-inch square 2-1/8 inch deep, boxes for single gang, 5-inch square boxes for two-gang, and special solid gang boxes with gang plaster ring for more than 2 switches.
  - 7. Plaster rings shall be provided on flush-mounted outlet boxes except where otherwise indicated or specified. Plaster rings shall be same depth as finished surface. Install approved ring extension to obtain depth to finish surface.

8. In existing plywood wall or drywall construction, and where flexible steel conduit is fished into walls, one-gang and 2-gang outlets for wiring devices may be sectional steel boxes with plaster ears. Boxes shall be fastened to plywood with flat-head screws in each plaster ear screw hole. Boxes fastened to gypsum board shall be Gripsite by Raco, or equal.
9. Factory made knockout seals shall be installed to seal box knockouts, which are not intact.
10. Where flexible conduit is extended from flush outlet boxes, provide and install weatherproof universal box extension adapters.

B. Junction and Pull boxes:

1. Junction and pull boxes, in addition to those indicated, shall only be used in compliance with codes, recognized standards, and Contract Documents.
2. Interior and non-weatherproof boxes shall be constructed of blue or galvanized steel with ample laps; spot welded, and shall be rigid under torsion and deflecting forces. Boxes shall be furnished with auxiliary angle iron framing where necessary to ensure rigidity.
3. Covers shall be fastened to box with a sufficient number of brass machine screws to ensure continuous contact all around. Flush type boxes shall be drilled and tapped for cover screws if boxes are not installed plumb. Surfaces of pull and junction boxes and covers shall be labeled in black marker ink designating system, panelboard and circuit designation contained in box. In exposed Work, designation shall be installed on inside of pullbox or junction box cover.
4. Weatherproof NEMA 3R pull and junction boxes shall conform to foregoing for interior boxes with following modifications:
  - a. Cover of flush mounting boxes shall be furnished with a weather-tight gasket cemented to, and trimmed even with, cover all around.
  - b. Surface or semi-flush mounting pull and junction boxes shall be UL, or another Nationally Recognized Testing Laboratory (NRTL) listed as rain-tight and shall be furnished complete with threaded conduit hubs.
  - c. Exposed portions of boxes shall be galvanized and finished with one prime coat and one coat of baked-on gray enamel, unless already furnished with factory baked-on finish.
5. Junction and pull boxes shall be rigidly fastened to structure and shall not depend on conduits for support.

C. Keys and Locks:

1. Provide 2 keys with furnished door locks, including cabinet door locks and switchboard locks, 2 keys for lock switches on switchboards or control panels, and 2 keys with interlocks or other furnished lock switches. Deliver keys to IOR.
2. Locks shall be keyed to Corbin No. 60 keys for access to operate equipment and Corbin 70 keys for service access. Special keys and locks shall only be provided where specified.

## RECEPTACLES AND SWITCHES

## A. Receptacles:

1. Duplex receptacles shall be heavy-duty specification grade, grounding type. Terminal screws shall be back and side wired with internal screw pressure plates. Mounting strap shall feature heavy-duty brass construction. Receptacle back body shall be PVC. Receptacle face shall be ivory, impact resistant nylon. Receptacles shall have triple wipe brass power contacts.

<u>NEMA #</u>	<u>Pass &amp; Seymour</u>	<u>Hubbell</u>	<u>Leviton</u>
(20 amps) NEMA 5-20	RPS5362-I	HBL5362-I	5362-I
(15 amps) NEMA 5-15	RPS5262-I	HBL5262-I	5262-I

2. Duplex receptacles on circuits supplied by panel boards with integral surge suppression shall be Pass & Seymour model number PS5262LB (blue), 15 amps, 120 volts, or approved equal.
3. 15 and 20 amps single receptacles on circuits supplied by panel boards with integral surge suppression shall be Pass & Seymour NEMA 5-20R model number 5361-BL (blue), and NEMA 5-15R model number 5261-BL (blue) respectively. Equal receptacles by other Owner approved manufactures are acceptable.
4. Provide specification grade ground-fault circuit interrupter (GFCI) type receptacles in accordance with 2003 UL standards. GFCI receptacles shall have a trip indication light. Receptacle terminal screws shall be back and side wire with internal screw pressure plates. Test and reset buttons shall match device body and shall be ivory. GFCI receptacles shall be manufactured in standard configuration for installation with stainless steel smooth plates. Exterior mounted receptacles shall be mounted inside weatherproof enclosure.

<u>NEMA #</u>	<u>Pass &amp; Seymour</u>	<u>Hubbell</u>	<u>Leviton</u>
NEMA 5-20	R2094-I	GFR5352-IA	8898-I
NEMA 5-15	R1594-I	GFR5252-IA	8598-I

## B. Switches:

## 1. Local Switches:

- a. Provide local switches, high strength thermoplastic toggle, specification grade, rated 20 amps at 120-277 volts AC only, with plaster ears, external screw pressure plate back and side wired, and standard size composition cups which fully enclose mechanism. Switches shall be approved for installation at currents up to full rating on resistive, inductive, tungsten filament lamp and fluorescent lamp loads, and for up to 80 percent of rating for motor loads. Switches shall have oversized silver alloy contacts for long life and better heat dissipation. Provide switches as single pole, double pole, 3-way, 4-way, non-lock type. Provide non-lock type switches with ivory handles;

	<u>Pass &amp; Seymour</u>	<u>Hubbell</u>	<u>Leviton</u>
Single pole	PS20AC1I	HBL1221I	1221-2I
Double pole	PS20AC2I	HBL1222I	1222-2I
Three way	PS20AC3I	HBL1223I	1223-2I
Four way	PS20AC4I	HBL1224I	1224-2I

## PART 3 - EXECUTION

### 3.01 INSTALLATION AND SUPPORT OF BOXES

- A. Install outlet boxes flush with finished surface of wall or ceiling. Install plumb and securely fastened to structure, independent of conduit. Except where otherwise indicated, provide factory-fabricated bar hangers to support outlet boxes. When installation is performed in fire rated walls, maintain the wall's rating integrity by means of approved fire stop methods.
- B. Outlet boxes installed in suspended or furred ceilings with steel runner or furring channels shall be supported, except where otherwise indicated, by a Unistrut P-4000 channel spanning main ceiling runner channels. Each box shall be supported from its channel by a 3/8 inch 16 threaded steel rod with a Unistrut P-4008 nut and a Tomic No. 711-B Adapta-Stud. Rod shall be tightened to a jamb fit with channel and its nut. Box shall be locked to rod by means of a 1/2 inch locknut on stud and a 3/8 inch 16 hex nut locking stud to rod.
- C. Heights of outlets and equipment indicated on Drawings shall govern. In absence of such indications, following heights shall be maintained with heights measured to centerline unless otherwise noted:
  - 1. Install wall-mounted telephones, light switches, other switches, and fire alarm pull stations, 48 inches above finished floor. Refer to other Division 16 Sections.
  - 2. Install bell outlets in corridors 12 inches below ceiling.

### 3.02 COVER PLATES

- A. Provide a plate on each switch, plug, pilot light, data, interphone, public telephone, and television outlet, and on existing and reset outlets where so indicated or required. Plates shall be of stainless steel unless otherwise specified.
- B. Flush wiring device and signal system outlets indicated to be blank covered, shall be covered with blank stainless steel plates. Flush lighting outlets to be blanked shall be covered with Wiremold 5736 steel covers, or equal, painted to match surrounding finish. Provide stainless steel covers to blank indicated or required surface-mounted outlets.

### 3.03 PROTECTION

- A. Protect Work of this section until Substantial Completion.

### 3.04 CLEANUP

- A. Remove rubbish, debris, and waste materials and legally dispose of off Project site.

END OF SECTION