

SECTION 26 27 26
WIRING DEVICES

PART 1 - GENERAL

1.1 DESCRIPTION

This section specifies the furnishing, installation and connection of wiring devices.

1.2 RELATED WORK

- A. Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS: General electrical requirements that are common to more than one section of Division 26.
- B. Section 26 05 33, RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS: Conduits and outlets boxes.
- C. Section 26 05 21, LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES (600 VOLTS AND BELOW): Cables and wiring.
- D. Section 26 05 26, GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS: Requirements for personnel safety and to provide a low impedance path to ground for possible ground fault currents.

1.3 QUALITY ASSURANCE

Refer to Paragraph, QUALIFICATIONS, in Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS.

1.4 SUBMITTALS

- A. In accordance with Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS, submit the following:
- B. Shop Drawings:
 - 1. Sufficient information, clearly presented, shall be included to determine compliance with drawings and specifications.
 - 2. Include electrical ratings, dimensions, mounting details, construction materials, grade and termination information.
- C. Manuals: Two weeks prior to final inspection, deliver four copies of the following to the Resident Engineer: Technical data sheets and information for ordering replacement units.
- D. Certifications: Two weeks prior to final inspection, submit four copies of the following to the Resident Engineer: Certification by the Contractor that the devices comply with the drawings and specifications, and have been properly installed, aligned, and tested.

1.5 APPLICABLE PUBLICATIONS

- A. Publications listed below (including amendments, addenda, revisions, supplements and errata) form a part of this specification to the extent

referenced. Publications are referenced in the text by basic designation only.

- B. National Fire Protection Association (NFPA):
 - 70.....National Electrical Code (NEC)
- C. National Electrical Manufacturers Association (NEMA):
 - WD 1.....General Color Requirements for Wiring Devices
 - WD 6Wiring Devices - Dimensional Requirements
- D. Underwriter's Laboratories, Inc. (UL):
 - 5.....Surface Metal Raceways and Fittings
 - 20.....General-Use Snap Switches
 - 231.....Power Outlets
 - 467.....Grounding and Bonding Equipment
 - 498.....Attachment Plugs and Receptacles
 - 943.....Ground-Fault Circuit-Interrupters

PART 2 - PRODUCTS

2.1 RECEPTACLES

- A. General: All receptacles shall be listed by Underwriters Laboratories, Inc., and conform to NEMA WD 6.
 - 1. Mounting straps shall be plated steel, with break-off plaster ears and shall include a self-grounding feature. Terminal screws shall be brass, brass plated or a copper alloy metal.
 - 2. Receptacles shall have provisions for back wiring with separate metal clamp type terminals (four min.) and side wiring from four captively held binding screws.
- B. Duplex Receptacles: Extra heavy duty, hospital-grade, single phase, 20 ampere, 120 volts, 2-pole, 3-wire, and conform to the NEMA 5-20R configuration in NEMA WD 6. The duplex type shall have break-off feature for two-circuit operation. The ungrounded pole of each receptacle shall be provided with a separate terminal.
 - 1. Bodies shall be ivory in color.
 - 2. Duplex Receptacles on Emergency Circuit:
 - a. In rooms without emergency powered general lighting, the emergency receptacles shall be of the self-illuminated type.
 - 3. Ground Fault Interrupter Duplex Receptacles: Shall be an integral unit, extra heavy duty, hospital-grade, suitable for mounting in a standard outlet box.
 - a. Ground fault interrupter shall consist of a differential current transformer, solid state sensing circuitry and a circuit interrupter switch. Device shall have nominal sensitivity to

ground leakage current of five milliamperes and shall function to interrupt the current supply for any value of ground leakage current above five milliamperes (+ or - 1 milliamp) on the load side of the device. Device shall have a minimum nominal tripping time of 1/30th of a second.

- C. Receptacles; 20, 30 and 50 ampere, 250 volts: Shall be complete with appropriate cord grip plug. Devices shall meet UL 231.
- D. Weatherproof Receptacles: Shall consist of a duplex receptacle, mounted in box with a gasketed, weatherproof, cast metal cover plate and cap over each receptacle opening. The cap shall be permanently attached to the cover plate by a spring-hinged flap. The weatherproof integrity shall not be affected when heavy duty specification or hospital grade attachment plug caps are inserted. Cover plates on outlet boxes mounted flush in the wall shall be gasketed to the wall in a watertight manner.

2.2 TOGGLE SWITCHES

- A. Toggle Switches: Shall be totally enclosed tumbler type with bodies of phenolic compound. Toggle handles shall be ivory in color unless otherwise specified. The rocker type switch is not acceptable and will not be approved.
 - 1. Switches installed in hazardous areas shall be explosion proof type in accordance with the NEC and as shown on the drawings.
 - 2. Shall be single unit toggle, butt contact, quiet AC type, heavy-duty general-purpose use with an integral self grounding mounting strap with break-off plaster ears and provisions for back wiring with separate metal wiring clamps and side wiring with captively held binding screws.
- 3. Ratings:
 - a. 120 volt circuits: 20 amperes at 120-277 volts AC.
 - b. 277 volt circuits: 20 amperes at 120-277 volts AC.

2.3 WALL PLATES

- A. Wall plates for switches and receptacles shall be type 302 stainless steel. Oversize plates are not acceptable.
- B. Standard NEMA design, so that products of different manufacturers will be interchangeable. Dimensions for openings in wall plates shall be accordance with NEMA WD 6.
- C. For receptacles or switches mounted adjacent to each other, wall plates shall be common for each group of receptacles or switches.
- D. Wall plates for data, telephone or other communication outlets shall be as specified in the associated specification.

E. Duplex Receptacles on Emergency Circuit:

1. Bodies shall be red in color. Wall plates shall be red with the word "EMERGENCY" engraved in 1/4 inch white letters.

2.4 THREE COMPARTMENT SURFACE MOUNTED MULTIPLE-OUTLET ASSEMBLIES

- A. Assemblies shall conform to the requirements of NFPA 70 and UL 5.
- B. Raceway shall be prewired and have three wiring compartments with field removable cover(s). Raceway shall have a nominal wall thickness of 0.078". Multiple compartment raceway shall have integral dividing barrier(s) isolating wiring compartments and provided with fittings that maintain the separation of compartments.
- C. Raceway covers shall be 12" in length to facilitate future modification. Covers must be removable with a standard straight blade screwdriver without marring. Raceways having multiple covers must allow each cover to be removed separately without allowing access into the compartment(s) enclosed by the other cover.
- D. Raceway shall be manufactured of extruded #6063-T5 aluminum with a heavy etched Architectural Class II clear anodized finish (AA-C22A31). Dimensions of the raceway shall be 7-3/8" in width by 1-3/4" in height and each length of raceway shall be cut to specified job requirements by the manufacturer. Field cutting of raceway will not be permitted.
- E. Wiring devices and other connectors shall be factory installed, electrically wired, and covers labeled, see section INSTALLATION for required labeling. Each receptacle shall be identified noting the panel number and circuit number from which it is fed. Receptacles shall be duplex, hospital grade, see paragraph 'RECEPTACLES' in this section. Device cover plates shall be the manufacturer's standard corrosion resistant finish and shall not exceed the dimensions of the enclosure. Raceway sections shall be provided with 12" pigtails at feed locations for ease of installation. Grounding shall be maintained by means of factory installed NEC sized grounding conductor(s) and utilize insulation displacement connectors as required.
- F. Raceway covers shall have holecut provision for communications outlets, outlets provided by others. The raceway must be capable of containing, but not limited to, snap-in modular jacks (3-pair, 4-pair, 4-pair keyed and MMJ), coaxial and F-connectors and communication grommets. Wiring connections of these devices shall be completed at the jobsite by others.
- G. The multioutlet assembly is to consist of factory assembled product with a full complement of fittings including, but not limited to, elbows

(90°, internal and external), slide couplings for joining raceway sections, blank end caps for closing open ends of the raceway, and flat tees.

- H. Unless otherwise shown on drawings, spacing of the receptacles and holecuts for devices by others along the strip shall be 18 inches on centers.
- I. Wires within the assemblies shall be not less than No. 12 AWG copper, with 600 volt ratings.
- J. Bond the strips to the conduit systems for their branch supply circuits.
- K. Basis of design for multi-outlet assembly is Wiremold AL7320 series. Manufacturers requesting consideration as an alternative to the basis of design shall submit documentation establishing their product equality at least 10 days prior to bid date. Request shall include documentation of UL listings as both a Multioutlet Assembly and a Surface Metal Raceway and include a sample of the prewired components. A list of similar installations in service for two years or longer must be provided. Systems of other manufacturers may be considered equal, if in the opinion, and the written approval of the engineer, they meet all the performance standards specified herein.

2.5 TWO COMPARTMENT SURFACE MOUNTED MULTIPLE-OUTLET ASSEMBLIES

- A. Assemblies shall conform to the requirements of NFPA 70 and UL 5.
- B. Raceway shall be prewired and have two wiring compartments with field removable cover(s). Raceway shall have a nominal wall thickness of 0.078". Multiple compartment raceway shall have integral dividing barrier(s) isolating wiring compartments and provided with fittings that maintain the separation of compartments.
- C. Raceway covers shall be 12" in length to facilitate future modification. Covers must be removable with a standard straight blade screwdriver without marring. Raceways having multiple covers must allow each cover to be removed separately without allowing access into the compartment(s) enclosed by the other cover.
- D. Raceway shall be manufactured of extruded #6063-T5 aluminum with a heavy etched Architectural Class II clear anodized finish (AA-C22A31). Dimensions of the raceway shall be 4-3/4" in length by 1-3/4" in depth and each length of raceway shall be cut to specified job requirements by the manufacturer. Field cutting of raceway will not be permitted.
- E. Wiring devices and other connectors shall be factory installed, electrically wired, and covers labeled, see section INSTALLATION for required labeling. Each receptacle shall be identified noting the panel

number and circuit number from which it is fed. Receptacles shall be duplex, hospital grade, see paragraph 'RECEPTACLES' in this section. Device cover plates shall be the manufacturer's standard corrosion resistant finish and shall not exceed the dimensions of the enclosure. Raceway sections shall be provided with 12" pigtails at feed locations for ease of installation. Grounding shall be maintained by means of factory installed NEC sized grounding conductor(s) and utilize insulation displacement connectors as required.

- F. Raceway covers shall have holecut provision for communications outlets, outlets provided by others. The raceway must be capable of containing, but not limited to, snap-in modular jacks (3-pair, 4-pair, 4-pair keyed and MMJ), coaxial and F-connectors and communication grommets. Wiring connections of these devices shall be completed at the jobsite by others.
- G. The multioutlet assembly is to consist of factory assembled product with a full complement of fittings including, but not limited to, elbows (90°, internal and external), slide couplings for joining raceway sections, blank end caps for closing open ends of the raceway, and flat tees.
- H. Unless otherwise shown on drawings, spacing of the receptacles and holecuts for devices by others along the strip shall be 18 inches on centers.
- I. Wires within the assemblies shall be not less than No. 12 AWG copper, with 600 volt ratings.
- J. Bond the strips to the conduit systems for their branch supply circuits.
- K. Basis of design for multi-outlet assembly is Wiremold AL4000 series. Manufacturers requesting consideration as an alternative to the basis of design shall submit documentation establishing their product equality at least 10 days prior to bid date. Request shall include documentation of UL listings as both a Multioutlet Assembly and a Surface Metal Raceway and include a sample of the prewired components. A list of similar installations in service for two years or longer must be provided. Systems of other manufacturers may be considered equal, if in the opinion, and the written approval of the engineer, they meet all the performance standards specified herein.

2.6 POKE-THRU ASSEMBLIES

- A. This poke-thru device shall have been examined and tested by Underwriters Laboratories Inc. to Standard UL514A and/or UL514C and Canadian Standard C22.2, No. 18-98 and bear the U.S. and Canadian UL

Listing Mark. This poke-thru device shall also have been tested by Underwriters Laboratories Inc. and classified for fire resistance and bear the U.S. UL Classification Mark. Devices shall be classified for use in 1-, 1 1/2-, or 2-hour rated, unprotected reinforced concrete floors and 1-, 1 1/2-, or 2-hour rated floors employing unprotected steel floor units and concrete toppings or concrete floors with suspended ceilings (fire resistive designs with suspended ceilings should have provisions for accessibility in the ceiling below the poke-thru fittings). This device shall also conform to the standards set in the National Electric Code, Section 300-21. These devices meet all UL scrub water requirements, but are not suitable for wet or damp locations, or other areas subject to saturation with water or other liquids such as commercial kitchens. This poke-thru device shall also have been evaluated by UL to meet the applicable U.S. safety standards for scrub water. Suitable for use in air handling spaces in accordance with Sec 300-22 (C) of the National Electrical Code.

B. This assembly consists of an insert and an activation cover. Overall poke-thru assembly length shall be 16 3/4".

C. Insert:

1. The insert body shall recess the devices a minimum of 2 3/4" and have a polyester based backing enamel finished interior (ivory). There shall be the necessary channels to provide complete separation of power and communication services. There shall be five compartments that allow for up to five duplex receptacles that can be wired as a standard receptacle or isolated ground and/or twenty-two communication ports and/or sixteen of Extron® Electronics MAAP™ and/or four AAP™ devices. See details on drawings for layout of poke-thru and devices required. Normal power and emergency power conductors shall not occupy the same conduit feed assembly into the insert.
2. The body will consist of an intumescent fire stop material to maintain the fire rating of the floor slab. The intumescent material will be held securely in place in the insert body and shall not have to be adjusted to maintain fire rating of the unit and the floor slab. The insert shall have retaining feature that will hold the poke-thru device in the floor slab without additional fasteners. The poke-thru insert shall also consist of a 3/4" trade size conduit stub that is connected to the insert body and a 24.5 cu. in. stamped steel junction box for wire splices and connections. The stamped steel

junction box shall also contain the necessary means to electrically ground the poke-thru device to the system ground.

D. Activation Cover:

1. The activation covers shall be manufactured of die-cast aluminum alloy and be available in powder-coated gray, black, or plated in brass, nickel or bronze finish, finish shall be as selected by the architect. Two gaskets (one for carpet and one for tile) are provided to go under of the trim flange to maintain scrub water tightness. The activation cover shall be 9 1/4" in diameter. The cover shall have spring loaded slides to allow cables to egress out of the unit and maintain as small an egress opening as possible.

E. Bottom feed, side mount device plates:

1. Bottom, side mount, housing assembly shall consist of half-gang, 3/4" trade size conduit housing assembly. Shall also include junction box attached to 3/4" trade size conduit. Assembly shall be for use on side compartment only.

F. Bottom feed, center mount device plates:

1. Bottom, center mount, housing assembly shall consist of one-gang, 3/4" trade size conduit housing assembly. Shall also include junction box attached to 3/4" trade size conduit for electrical power connections. For use on any one (1) of the three (3) gangs in the center compartment.

- G. Basis of design for the poke-thru is Wiremold Evolution series model 8AT. Poke-thru devices of other manufacturers may be considered, if equal in functionality and quality, by written approval of the specifying engineer and shall meet all the performance standards specified herein. The same manufacturer shall provide all poke-thru types for the project. In addition, the contractor shall have ten days prior to the date for receipt of bids to submit to the specifying engineer a working sample from any other manufacturer.

2.7 POWER-TELECOMMUNICATIONS POLES

A. Channels:

1. The Tele-Power Pole channel shall be steel, ivory baked enamel finish with cross section of 3" x 2.75" with two separate compartments. One compartment is to be factory wired with two duplex 20A, 125V NEMA 5-20R grounding type hospital grade receptacles, and red colored. The harness is to be single circuit (2 conductor plus ground) with #12 AWG solid type THHN conductors, factory assembled to

the receptacles. 6" conductor leads are to be furnished for termination to the overhead wiring system.

2. The second compartment is to be for field installation of telephone or data network cabling. A 12" removable cover section in this compartment must be provided to assemble and mount communications connectors. This section must be removable without dismantling or removing the Tele-Power Pole after installation. Network cabling and voice-data jacks provided by others. The cover section is to have four knockouts for modular voice-data jacks (RJ-type) and a 1.375" x 2.7" rectangular knockout for a modular furniture outlet. A "mouse hole" knockout with furnished grommet is to be included for straight through communication cable access.
3. The Tele-Power Pole shall be 10'-5" long.

B. Fittings:

1. A full complement of fittings for the Tele-Power Pole shall be available including, but not limited to, entrance end fitting for top of the electrical channel, ceiling trim plate, pole-mounting bracket, Velcro carpet gripper pad, and adhesive pad. (If for air handling spaces, an entrance end fitting must be furnished for the communications channel.)

C. Add-On Device Covers:

1. The Tele-Power Poles must be UL Listed for field modifications, changes and additions of receptacles, devices and circuits. Field installed device plates shall be available to add duplex, single 1.40" and 1.59" dia., and rectangular-type receptacles. These plates must be ivory in color to match the Tele-Power Pole.
2. Add-on communication covers must be available to mount workstation device faceplates, inserts, and specialty mounting bezels. The power pole manufacturer will provide a complete line of connectivity outlets and multi-media modular inserts for UTP, fiber optic, coaxial, and other cabling types.
3. UTP inserts shall feature a unique recessed area for port labeling and shall be able to accommodate designation icon buttons or icon labels. Custom label capabilities shall be available using templates that can be downloaded from the Internet.

D. Modular Communications Inserts Tele-Power Poles:

- A. The manufacturer shall provide a Tele-Power Pole with one compartment, factory wired with two duplex styles 20A, 125V NEMA 5-20R grounding-type hospital grade receptacles, and colored red. The

harness is to be single circuit (2 conductor plus ground) with #12 AWG solid type THHN conductors, factory assembled to the receptacles.

6" conductor leads are to be furnished for termination to the overhead wiring system. The other compartment shall have a modular communications insert bezel installed and three modular communications inserts, as well as labeling.

- E. Basis of design for Tele-power poles is Wiremold Steel tele-power poles model number 30TP-4V. Systems of other manufacturers may be considered equal if, in the opinion, and the written approval of the engineer, they meet all the performance standards specified herein.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Installation shall be in accordance with the NEC and as shown as on the drawings.
- B. Ground terminal of each receptacle shall be bonded to the outlet box with an approved green bonding jumper, and also connected to the green equipment grounding conductor.
- C. Outlet boxes for light and dimmer switches shall be mounted on the strike side of doors.
- D. Provide barriers in multigang outlet boxes to separate systems of different voltages, Normal Power and Emergency Power systems, and in compliance with the NEC.
- E. Coordinate with other work, including painting, electrical boxes and wiring installations, as necessary to interface installation of wiring devices with other work. Coordinate the electrical work with the work of other trades to ensure that wiring device flush outlets are positioned with box openings aligned with the face of the surrounding finish material. Pay special attention to installations in cabinet work, and in connection with laboratory equipment.
- F. Exact field locations of floors, walls, partitions, doors, windows, and equipment may vary from locations shown on the drawings. Prior to locating sleeves, boxes and chases for roughing-in of conduit and equipment, the Contractor shall coordinate exact field location of the above items with other trades. In addition, check for exact direction of door swings so that local switches are properly located on the strike side.
- G. Install wall switches 48 inches above floor, OFF position down.
- H. Install wall dimmers 48 inches above floor; derate ganged dimmers as instructed by manufacturer; do not use common neutral.

- I. Install convenience receptacles 18 inches above floor, and 6 inches [152mm] above counter backsplash or workbenches. Install specific-use receptacles at heights shown on the drawings.
- J. Label device plates with a permanent adhesive label listing panel and circuit feeding the wiring device. Receptacles that are shown with dedicated branch circuit on drawings shall be identified on device plate with the label 'DEDICATED'.
- K. Installation of poke-thru devices:
 - 1. Units shall mount in an 8" cored hole, actual 8 1/16" core hole. Use is defined by the UL Fire Resistance Directory as a minimum spacing of "2 ft. on center and not more than one device per each 65 sq. ft. of floor area in each span."
 - 2. Installation shall be completed by pushing unit down into the cored hole. Prior to and during installation, refer to system layout and/or approval drawings. Installer shall comply with detailed manufacturer's instruction sheet included with each device. The unit shall contain a retainer for securing the device in the slab, as well as the necessary intumescent material to seal the cored hole under fire conditions.
- L. Installation of power poles:
 - 1. All raceway systems shall be mechanically continuous and connected to all electrical outlets, boxes, device mounting brackets, and cabinets, also in accordance with manufacturer's installation sheets.
 - 2. All metal raceway shall be electrically continuous and bonded in accordance with the National Electric Code for proper grounding.
 - 3. Raceway shall be securely supported at intervals not exceeding 5' or in accordance with manufacturer's installation sheets.
 - 4. All Tele-Power Pole Systems shall be installed complete in accordance with the manufacturer's installation sheets. All unused openings shall be closed.
- M. Test wiring devices for damaged conductors, high circuit resistance, poor connections, inadequate fault current path, defective devices, or similar problems using a portable receptacle tester. Correct circuit conditions, remove malfunctioning units and replace with new, and retest as specified above.
- N. Test GFCI devices for tripping values specified in UL 1436 and UL 943.

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