

1. GENERAL

1.1 WORK INCLUDES:

- A. Base Bid:
  - 1. Electrical Contractor:
    - a. Receptacles, receptacles with integral GFCI, and associated device plates.
    - b. Twist-locking receptacles.
    - c. Receptacles with integral surge-suppression units.
    - d. Weather-resistant receptacles.
    - e. Snap switches and wall-box dimmers.
    - f. Wall-switch and exterior occupancy sensors.
    - g. Communications outlets.
    - h. Floor service outlets
- B. Alternate Bids: None

1.2 RELATED WORK

- A. Specified Elsewhere: Drawings and general provisions of the Contract apply to this Section.
- B. Coordination:
  - 1. Receptacles for Owner-Furnished Equipment: Match plug configurations.
  - 2. Cord and Plug Sets: Match equipment requirements.

1.3 Furnished, but installed by others: N/A

1.4 SYSTEM DESCRIPTION

- A. Section Includes:
  - 1. Receptacles, receptacles with integral GFCI, and associated device plates.
  - 2. Twist-locking receptacles.
  - 3. Receptacles with integral surge-suppression units.
  - 4. Weather-resistant receptacles.
  - 5. Snap switches and wall-box dimmers.
  - 6. Wall-switch and exterior occupancy sensors.
  - 7. Communications outlets.
  - 8. Floor service outlets
- B. Definitions

1. EMI: Electromagnetic interference.
2. GFCI: Ground-fault circuit interrupter.
3. Pigtail: Short lead used to connect a device to a branch-circuit conductor.
4. RFI: Radio-frequency interference.
5. TVSS: Transient voltage surge suppressor.
6. UTP: Unshielded twisted pair.

## 1.5 QUALITY ASSURANCE

### A. Testing Agency Qualifications: Member company of NETA or an NRTL.

1. Testing Agency's Field Supervisor: Certified by NETA to supervise on-site testing.

## 1.6 REGULATORY REQUIREMENTS

### A. National Electric Code (NFPA 70)

## 1.7 ABBREVIATIONS: N/A

## 1.8 SUBMITTALS

- A. Shop Drawings: List of legends and description of materials and process used for premarking wall plates.
- B. Product Data: For each type of product.
- C. Samples: One for each type of device and wall plate specified, in each color specified.
- D. Informational Submittals
  1. Field quality-control reports.
- E. Closeout Submittals
  1. Operation and Maintenance Data: For wiring devices to include in all manufacturers' packing-label warnings and instruction manuals that include labeling conditions.
- F. Maintenance Material Submittals
  1. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
    - a. Floor Service-Outlet Assemblies: **One for every 10**, but no fewer than **one**.

## 2. PRODUCTS

### 2.1 MANUFACTURERS

- A. Source Limitations: Obtain each type of wiring device and associated wall plate from single source from single manufacturer.

## 2.2 GENERAL WIRING-DEVICE REQUIREMENTS

- A. Wiring Devices, Components, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Comply with NFPA 70.
- C. Devices that are manufactured for use with modular plug-in connectors may be substituted under the following conditions:
  - 1. Connectors shall comply with UL 2459 and shall be made with stranding building wire.
  - 2. Devices shall comply with the requirements in this Section.

## 2.3 STRAIGHT-BLADE RECEPTACLES

- A. Convenience Receptacles, 125 V, 20 A: Comply with NEMA WD 1, NEMA WD 6 Configuration 5-20R, UL 498, and FS W-C-596.

## 2.4 GFCI RECEPTACLES

- A. General Description:
  - 1. Straight blade, **feed-through** type.
  - 2. Comply with NEMA WD 1, NEMA WD 6, UL 498, UL 943 Class A, and FS W-C-596.
  - 3. Include indicator light that shows when the GFCI has malfunctioned and no longer provides proper GFCI protection.
- B. Duplex GFCI Convenience Receptacles, 125 V, 20 A:

## 2.5 TVSS RECEPTACLES

- A. General Description: Comply with NEMA WD 1, NEMA WD 6, UL 498, UL 1449, and FS W-C-596, with integral TVSS in line to ground, line to neutral, and neutral to ground.
  - 1. TVSS Components: Multiple metal-oxide varistors; with a nominal clamp-level rating of 400 V and minimum single transient pulse energy dissipation of 240 J, according to IEEE C62.41.2 and IEEE C62.45.
  - 2. Active TVSS Indication: Visual and audible, with light visible in face of device to indicate device is "active" or "no longer in service."
- B. Duplex TVSS Convenience Receptacles:
  - 1. Description: Straight blade, 125 V, 20 A; NEMA WD 6 Configuration 5-20R.
- C. Isolated-Ground, Duplex Convenience Receptacles:
  - 1. Description:

- a. Straight blade, 125 V, 20 A; NEMA WD 6 Configuration 5-20R.
  - b. Equipment grounding contacts shall be connected only to the green grounding screw terminal of the device and with inherent electrical isolation from mounting strap. Isolation shall be integral to receptacle construction and not dependent on removable parts.
- D. Hospital-Grade, Duplex Convenience Receptacles: Comply with UL 498 Supplement sd.
1. Description: Straight blade, 125 V, 20 A; NEMA WD 6 Configuration 5-20R.
  2. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
  3. Comply with NFPA 70.

## 2.6 TOGGLE SWITCHES

- A. Comply with NEMA WD 1, UL 20, and FS W-S-896.
- B. Switches, 120/277 V, 20 A:
1. Products: Subject to compliance with requirements, **provide one of the following**
    - a. Single Pole:
      - 1) Cooper; AH1221.
      - 2) Hubbell; HBL1221.
      - 3) Leviton; 1221-2.
      - 4) Pass & Seymour; CSB20AC1.
    - b. Two Pole:
      - 1) Cooper; AH1222.
      - 2) Hubbell; HBL1222.
      - 3) Leviton; 1222-2.
      - 4) Pass & Seymour; CSB20AC2.
    - c. Three Way:
      - 1) Cooper; AH1223.
      - 2) Hubbell; HBL1223.
      - 3) Leviton; 1223-2.
      - 4) Pass & Seymour; CSB20AC3.
    - d. Four Way:
      - 1) Cooper; AH1224.
      - 2) Hubbell; HBL1224.
      - 3) Leviton; 1224-2.
      - 4) Pass & Seymour; CSB20AC4.

- C. Pilot-Light Switches, 20 A:
  - 1. Description: Single pole, with neon-lighted handle, illuminated when switch is "off."
- D. Key-Operated Switches, 120/277 V, 20 A:
  - 1. Description: Single pole, with factory-supplied key in lieu of switch handle.
- E. Single-Pole, Double-Throw, Momentary-Contact, Center-off Switches: 120/277 V, 20 A; for use with mechanically held lighting contactors.
- F. Key-Operated, Single-Pole, Double-Throw, Momentary-Contact, Center-off Switches: 120/277 V, 20 A; for use with mechanically held lighting contactors, with factory-supplied key in lieu of switch handle.

## 2.7 DECORATOR-STYLE DEVICES

- A. Convenience Receptacles: Square face, 125 V, 15 A; comply with NEMA WD 1, NEMA WD 6 Configuration 5-15R, and UL 498.
- B. GFCI, **Feed-Through Type**, Convenience Receptacles: Square face, 125 V, 15 A; comply with NEMA WD 1, NEMA WD 6 Configuration 5-15R, UL 498, and UL 943 Class A.
- C. Toggle Switches, Square Face, 120/277 V, 15 A: Comply with NEMA WD 1, UL 20, and FS W-S-896.
- D. Lighted Toggle Switches, Square Face, 120 V, 15 A: Comply with NEMA WD 1 and UL 20.
  - 1. Description: With neon-lighted handle, illuminated when switch is "off."

## 2.8 WALL-BOX DIMMERS

- A. Dimmer Switches: Modular, full-wave, solid-state units with integral, quiet on-off switches, with audible frequency and EMI/RFI suppression filters.
- B. Control: Continuously adjustable **slider**; with single-pole or three-way switching. Comply with UL 1472.
- C. Fluorescent Lamp Dimmer Switches: Modular; compatible with dimmer ballasts; trim potentiometer to adjust low-end dimming; dimmer-ballast combination capable of consistent dimming with low end not greater than 20 percent of full brightness.

## 2.9 WALL PLATES

- A. Single and combination types shall match corresponding wiring devices.
  - 1. Plate-Securing Screws: Metal with head color to match plate finish.

2. Material for Finished Spaces: **Smooth, high-impact thermoplastic**[0.035-inch- (1-mm-) **thick**.
  3. Material for Unfinished Spaces: **Smooth, high-impact thermoplastic**.
  4. Material for Damp Locations: **Thermoplastic** with spring-loaded lift cover, and listed and labeled for use in wet and damp locations.
- B. Wet-Location, Weatherproof Cover Plates: NEMA 250, complying with Type 3R, weather-resistant **thermoplastic** with lockable cover.

## 2.10 FLOOR SERVICE FITTINGS

- A. Type: Modular, **flush-type**, dual-service units suitable for wiring method used.
- B. Compartments: Barrier separates power from voice and data communication cabling.
- C. Service Plate: **Rectangular, die-cast aluminum** with satin finish.
- D. Power Receptacle: NEMA WD 6 Configuration 5-20R, gray finish, unless otherwise indicated.
- E. Voice and Data Communication Outlet: **Blank cover with bushed cable opening**.

## 2.11 FINISHES

- A. Device Color:
  1. Wiring Devices Connected to Normal Power System: **White** unless otherwise indicated or required by NFPA 70 or device listing.
- B. Wall Plate Color: For plastic covers, match device color.

## 3. EXECUTION

### 3.1 INSTALLATION

- A. Comply with NECA 1, including mounting heights listed in that standard, unless otherwise indicated.
- B. Coordination with Other Trades:
  1. Protect installed devices and their boxes. Do not place wall finish materials over device boxes and do not cut holes for boxes with routers that are guided by riding against outside of boxes.
  2. Keep outlet boxes free of plaster, drywall joint compound, mortar, cement, concrete, dust, paint, and other material that may contaminate the raceway system, conductors, and cables.
  3. Install device boxes in brick or block walls so that the cover plate does not cross a joint unless the joint is troweled flush with the face of the wall.

4. Install wiring devices after all wall preparation, including painting, is complete.

C. Conductors:

1. Do not strip insulation from conductors until right before they are spliced or terminated on devices.
2. Strip insulation evenly around the conductor using tools designed for the purpose. Avoid scoring or nicking of solid wire or cutting strands from stranded wire.
3. The length of free conductors at outlets for devices shall meet provisions of NFPA 70, Article 300, without pigtails.
4. Existing Conductors:
  - a. Cut back and pigtail, or replace all damaged conductors.
  - b. Straighten conductors that remain and remove corrosion and foreign matter.
  - c. Pigtail existing conductors is permitted, provided the outlet box is large enough.

D. Device Installation:

1. Replace devices that have been in temporary use during construction and that were installed before building finishing operations were complete.
2. Keep each wiring device in its package or otherwise protected until it is time to connect conductors.
3. Do not remove surface protection, such as plastic film and smudge covers, until the last possible moment.
4. Connect devices to branch circuits using pigtails that are not less than 6 inches (152 mm) in length.
5. When there is a choice, use side wiring with binding-head screw terminals. Wrap solid conductor tightly clockwise, two-thirds to three-fourths of the way around terminal screw.
6. Use a torque screwdriver when a torque is recommended or required by manufacturer.
7. When conductors larger than No. 12 AWG are installed on 15- or 20-A circuits, splice No. 12 AWG pigtails for device connections.
8. Tighten unused terminal screws on the device.
9. When mounting into metal boxes, remove the fiber or plastic washers used to hold device-mounting screws in yokes, allowing metal-to-metal contact.

E. Receptacle Orientation:

1. Install ground pin of vertically mounted receptacles **up**, and on horizontally mounted receptacles to the **right**.

F. Device Plates: Do not use oversized or extra-deep plates. Repair wall finishes and remount outlet boxes when standard device plates do not fit flush or do not cover rough wall opening.

G. Dimmers:

1. Install dimmers within terms of their listing.
2. Verify that dimmers used for fan speed control are listed for that application.
3. Install unshared neutral conductors on line and load side of dimmers according to manufacturers' device listing conditions in the written instructions.

- H. Arrangement of Devices: Unless otherwise indicated, mount flush, with long dimension vertical and with grounding terminal of receptacles on top. Group adjacent switches under single, multigang wall plates.
- I. Adjust locations of floor service outlets and service poles to suit arrangement of partitions and furnishings.

### 3.2 GFCI RECEPTACLES

- A. Install non-feed-through-type GFCI receptacles where protection of downstream receptacles is not required.

### 3.3 IDENTIFICATION

- A. Comply with Section 260553 "Identification for Electrical Systems."
- B. Identify each receptacle with panelboard identification and circuit number. Use hot, stamped, or engraved machine printing with **white**-filled lettering on face of plate, and durable wire markers or tags inside outlet boxes.

### 3.4 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections **with the assistance of a factory-authorized service representative**:
  - 1. In healthcare facilities, prepare reports that comply with recommendations in NFPA 99.
  - 2. Test Instruments: Use instruments that comply with UL 1436.
  - 3. Test Instrument for Convenience Receptacles: Digital wiring analyzer with digital readout or illuminated digital-display indicators of measurement.
- B. Tests for Convenience Receptacles:
  - 1. Line Voltage: Acceptable range is 105 to 132 V.
  - 2. Percent Voltage Drop under 15-A Load: A value of 6 percent or higher is unacceptable.
  - 3. Ground Impedance: Values of up to 2 ohms are acceptable.
  - 4. GFCI Trip: Test for tripping values specified in UL 1436 and UL 943.
  - 5. Using the test plug, verify that the device and its outlet box are securely mounted.
  - 6. Tests shall be diagnostic, indicating damaged conductors, high resistance at the circuit breaker, poor connections, inadequate fault current path, defective devices, or similar problems. Correct circuit conditions, remove malfunctioning units and replace with new ones, and retest as specified above.
- C. Wiring device will be considered defective if it does not pass tests and inspections.
- D. Prepare test and inspection reports.



END OF SECTION 262726

