

~~~~~ **PROJECT NOTE** ~~~~~

ARCHITECT OF RECORD/ENGINEER OF RECORD IS RESPONSIBLE FOR REVIEWING THIS SPECIFICATION SECTION IN DETAIL FOR COORDINATION WITH THE PROJECT SCOPE OF WORK.

ALL "PROJECT NOTE" TEXT IS TO BE REMOVED FOLLOWING REVIEW OF THE CONTENT OF EACH NOTE BY THE ARCHITECT OF RECORD/ENGINEER OF RECORD.

EDIT THE DOCUMENT FOOTER TO INCLUDE THE PROJECT NAME AND NUMBER.

EDIT THE DOCUMENT HEADER TO INDICATE THE ARCHITECT OF RECORD PROJECT ISSUE" DATE. THE "CPS CONTROL" DATE SHOULD NOT BE EDITED.

ANY MODIFICATIONS TO THE TECHNICAL STANDARDS IN THIS SECTION - INCLUDING THE REMOVAL OR ADDITION OF MANUFACTURERS - MUST BE APPROVED BY CPS. REQUESTS FOR MODIFICATION ARE TO BE SUBMITTED TO THE DESIGN MANAGER DURING THE DESIGN PHASE FOR REVIEW AND APPROVAL.

~~~ **END OF PROJECT NOTE** ~~~

SECTION 26 05 33.16
BOXES FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

~~~~~ **PROJECT NOTE** ~~~~~

SELECT PROJECT SPECIFIC "BOXES" TO BE UTILIZED IN SCOPE OF PROJECT. HAZARDOUS LOCATION BOXES AND FLOOR BOXES MAY NOT BE USED WITHIN PROJECT SCOPE. COORDINATE WITH INSTALLATION AREAS AND METHODS.

~~~ **END OF PROJECT NOTE** ~~~

1.01 SECTION INCLUDES

- A. Outlet and device boxes up to 100 cubic inches, including those used as junction and pull boxes.
- B. Cabinets and enclosures, including junction and pull boxes larger than 100 cubic inches.
- C. Boxes for hazardous (classified) locations.
- D. Floor boxes.

1.02 REFERENCE STANDARDS

- A. Chicago Electrical Code - Municipal Code of the City of Chicago, Building/Electrical Code Requirements 2018.
- B. NECA 1 - Standard for Good Workmanship in Electrical Construction 2015.
- C. NECA 130 - Standard for Installing and Maintaining Wiring Devices 2016.
- D. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum) 2020.
- E. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable 2014.

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|----------------------------------|-----------------|------------------------------|
| NAME OF SCHOOL
PROJECT NUMBER | 26 05 33.16 - 1 | BOXES FOR ELECTRICAL SYSTEMS |
|----------------------------------|-----------------|------------------------------|

- F. NEMA OS 1 - Sheet-Steel Outlet Boxes, Device Boxes, Covers, and Box Supports 2013 (Reaffirmed 2020).
- G. NEMA OS 2 - Nonmetallic Outlet Boxes, Device Boxes, Covers and Box Supports 2013 (Reaffirmed 2020).
- H. NFPA 70 - National Electrical Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- I. UL 50 - Enclosures for Electrical Equipment, Non-Environmental Considerations Current Edition, Including All Revisions.
- J. UL 50E - Enclosures for Electrical Equipment, Environmental Considerations Current Edition, Including All Revisions.
- K. UL 508A - Industrial Control Panels Current Edition, Including All Revisions.
- L. UL 514A - Metallic Outlet Boxes Current Edition, Including All Revisions.
- M. UL 514C - Nonmetallic Outlet Boxes, Flush-Device Boxes, and Covers Current Edition, Including All Revisions.
- N. UL 1203 - Explosion-Proof and Dust-Ignition-Proof Electrical Equipment for Use in Hazardous (Classified) Locations Current Edition, Including All Revisions.

1.03 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate the work with other trades to avoid placement of ductwork, piping, equipment, or other potential obstructions within the dedicated equipment spaces and working clearances for electrical equipment required by the ANSI/IEEE 802.7.
 - 2. Coordinate arrangement of electrical equipment with the dimensions and clearance requirements of the actual equipment to be installed.
 - 3. Coordinate minimum sizes of boxes with the actual installed arrangement of conductors, clamps, support fittings, and devices, calculated according to the City of Chicago Electrical Code.
 - 4. Coordinate minimum sizes of pull boxes with the actual installed arrangement of connected conduits, calculated according to the City of Chicago Electrical Code.
 - 5. Coordinate the placement of boxes with millwork, furniture, devices, equipment, etc. installed under other sections or by others.
 - 6. Coordinate the work with other trades to preserve insulation integrity.
 - 7. Coordinate the work with other trades to provide walls suitable for installation of flush-mounted boxes where indicated.
 - 8. Coordinate painting in finished areas and where exposed to view at exterior and interior areas of the building; exposed pipes, conduit, boxes, hangers, brackets and supports, and electrical equipment, unless otherwise indicated. Refer to 09 91 13 - Exterior Painting and 09 91 23 - Interior Painting as required.
 - 9. Notify Architect/Engineer of Record of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

1.04 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's standard catalog pages and data sheets for cabinets and enclosures, boxes for hazardous (classified) locations, floor boxes, and underground boxes/enclosures.

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|----------------------------------|-----------------|------------------------------|
| NAME OF SCHOOL
PROJECT NUMBER | 26 05 33.16 - 2 | BOXES FOR ELECTRICAL SYSTEMS |
|----------------------------------|-----------------|------------------------------|

- C. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.
- D. Project Record Documents: Record actual locations for junction boxes, pull boxes, cabinets and enclosures, and floor boxes.

1.05 QUALITY ASSURANCE

- A. Comply with City of Chicago Electrical Code.
- B. Comply with NECA's "Standard of Installation".
- C. Product Listing Organization Qualifications: An organization recognized by OSHA Regulation 1910.7 as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.01 BOXES

- A. General Requirements:
 - 1. Do not use boxes and associated accessories for applications other than as permitted by the City of Chicago Electrical Code.
 - 2. Provide all boxes, fittings, supports, and accessories required for a complete raceway system and to accommodate devices and equipment to be installed.
 - 3. Provide products listed, classified, and labeled as suitable for the purpose intended.
 - 4. here box size is not indicated, size to comply with the City of Chicago Electrical Code but not less than applicable minimum size requirements specified.
 - 5. Provide grounding terminals within boxes where equipment grounding conductors terminate.
 - 6. Paint in finished areas and where exposed to view at exterior and interior areas of the building; exposed pipes, conduit, boxes, hangers, brackets and supports, and electrical equipment, unless otherwise indicated. Refer to 09 91 13 - Exterior Painting and 09 91 23 - Interior Painting as required.
- B. Outlet and Device Boxes Up to 100 cubic inches, Including Those Used as Junction and Pull Boxes:
 - 1. Use sheet-steel boxes for dry locations unless otherwise indicated or required.
 - 2. Use cast iron boxes or cast aluminum boxes for damp or wet locations unless otherwise indicated or required; furnish with compatible weatherproof gasketed covers.
 - 3. Use cast iron boxes or cast aluminum boxes where exposed galvanized steel rigid metal conduit or exposed intermediate metal conduit (IMC) is used.
 - 4. Use cast aluminum boxes where aluminum rigid metal conduit is used.
 - 5. Use nonmetallic boxes where exposed rigid PVC conduit is used.
 - 6. Use suitable concrete type boxes where flush-mounted in concrete.
 - 7. Use suitable masonry type boxes where flush-mounted in masonry walls.
 - 8. Use raised covers suitable for the type of wall construction and device configuration where required.
 - 9. Use shallow boxes where required by the type of wall construction.
 - 10. Do not use "through-wall" boxes designed for access from both sides of wall.

11. Sheet-Steel Boxes: Comply with NEMA OS 1, and list and label as complying with UL 514A.
12. Cast Metal Boxes: Comply with NEMA FB 1, and list and label as complying with UL 514A; furnish with threaded hubs.
13. Nonmetallic Boxes: Comply with NEMA OS 2, and list and label as complying with UL 514C.
14. Boxes for Supporting Luminaires and Ceiling Fans: Listed as suitable for the type and weight of load to be supported; furnished with fixture stud to accommodate mounting of luminaire where required.
15. Boxes for Ganged Devices: Use multigang boxes of single-piece construction. Do not use field-connected gangable boxes unless specifically indicated or permitted.
16. Wall Plates: Comply with Section 26 27 26 - Wiring Devices.
17. Manufacturers:
 - a. Cooper Crouse-Hinds, a division of Eaton Corporation: www.cooperindustries.com.
 - b. Hubbell Incorporated; : www.hubbell-rtb.com.
 - c. Hubbell Incorporated; RACO Products: www.hubbell-rtb.com.
 - d. O-Z/Gedney, a brand of Emerson Industrial Automation: www.emersonindustrial.com.
 - e. Appleton Electric, a brand of Emerson Corporation; www.emersonindustrial.com
 - f. Walker Systems, a part of Wiremold, a brand of Legrand; www.legrand.us .
 - g. Hoffman, a brand of Pentair Technical Products; www.hoffmanonline.com
- C. Cabinets and Enclosures, Including Junction and Pull Boxes Larger Than 100 cubic inches:
 1. Comply with NEMA 250, and list and label as complying with UL 50 and UL 50E, or UL 508A.
 2. NEMA 250 Environment Type, Unless Otherwise Indicated:
 3. Junction and Pull Boxes Larger Than 100 cubic inches:
 - a. Provide hinged-cover enclosures unless otherwise indicated.
 4. Cabinets and Hinged-Cover Enclosures, Other Than Junction and Pull Boxes:
 - a. Removable interior panel and removable front.
 - b. Hinged door in front cover with flush latch and concealed hinge.
 - c. Keyed latch to match panelboards.
 - d. Metal barriers to separate wiring of different systems and voltages.
 - e. Accessory feet where required for freestanding equipment.
 5. Finish for Painted Steel Enclosures: Finished inside and out with manufacturer's standard enamel. unless otherwise indicated.
 6. Manufacturers:
 - a. Cooper B-Line, a division of Eaton Corporation: www.cooperindustries.com.
 - b. Hoffman, a brand of Pentair Technical Products: www.hoffmanonline.com.
 - c. Hubbell Incorporated; Wiegmann Products: www.hubbell-wiegmann.com.
 - d. Hubbell Incorporated; RACO Products; www.hubbell-rtb.com.
 - e. O-Z/Gedney, a brand of Emerson Industrial Automation; www.emersonindustrial.com
 - f. Appleton Electric, a brand of Emerson Corporation; www.emersonindustrial.com
 - g. Walker Systems, a part of Wiremold, a brand of Legrand; www.legrand.us
- D. Boxes for Hazardous (Classified) Locations: Listed and labeled as complying with UL 1203 for the classification of the installed location.

1. Manufacturers:
 - a. Appleton, a brand of Emerson Industrial Automation: www.emersonindustrial.com.
 - b. Cooper Crouse-Hinds, a division of Eaton Corporation: www.cooperindustries.com.
 - c. Hubbell Incorporated; Killark Products: www.hubbell-killark.com.
- E. Floor Boxes:
 1. Description: Floor boxes compatible with floor box service fittings provided in accordance with Section 26 27 26 - Wiring Devices; with partitions to separate multiple services; furnished with all components, adapters, and trims required for complete installation.
 2. Use cast iron floor boxes within slab on grade.
 3. Use sheet-steel or cast iron floor boxes within slab above grade.
 4. Metallic Floor Boxes: Fully adjustable (with integral means for leveling adjustment prior to and after concrete pour).
 5. Manufacturer: Same as manufacturer of floor box service fittings, comply with Section 26 27 26 - Wiring Devices.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that mounting surfaces are ready to receive boxes.
- B. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Install boxes in accordance with NECA 1 (general workmanship) and, where applicable, NECA 130, including mounting heights specified in those standards where mounting heights are not indicated.
- C. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and the City of Chicago Electrical Code.
- D. Unless otherwise indicated, provide separate boxes for line voltage and low voltage systems.
- E. Flush-mount boxes in finished areas unless specifically indicated to be surface-mounted.
 1. In masonry walls, saw-cut opening for box in center of cell of masonry block, and install box flush with surface of wall.
- F. Unless otherwise indicated, boxes may be surface-mounted where exposed conduits are indicated or permitted.
- G. Box Locations:
 1. Locate boxes to be accessible. Provide access panels in accordance with Section 08 31 00 - Access Doors and Panels as required where approved by the Architect/Engineer of Record.
 2. Unless dimensioned, box locations indicated are approximate.
 3. Locate boxes as required for devices installed under other sections or by others.
 - a. Switches, Receptacles, and Other Wiring Devices: Comply with Section 26 27 26 - Wiring Devices.
 - b. Communications Systems Outlets: Comply with Section 27 10 00 - Structured Cabling.
 4. Locate boxes so that wall plates do not span different building finishes.
 5. Locate boxes so that wall plates do not cross masonry joints.
 6. Unless otherwise indicated, where multiple outlet boxes are installed at the same location at different mounting heights, install along a common vertical center line.

7. Unless otherwise indicated, where multiple outlet boxes are installed at the same location and at the same mounting height, install devices in multi-gang barriered box appropriate for the devices types.
 - a. Multi-ganged devices shall have a common, multi-device faceplate.
8. Do not install flush-mounted boxes on opposite sides of walls back-to-back. Provide minimum 6 inches horizontal separation unless otherwise indicated.
9. Acoustic-Rated Walls: Do not install flush-mounted boxes on opposite sides of walls back-to-back; provide minimum 24 inches horizontal separation.
10. Fire Resistance Rated Walls: Install flush-mounted boxes such that the required fire resistance will not be reduced.
 - a. Do not install flush-mounted boxes on opposite sides of walls back-to-back; provide minimum 24 inches separation where wall is constructed with individual noncommunicating stud cavities or protect both boxes with listed putty pads.
 - b. Do not install flush-mounted boxes with area larger than 16 square inches or such that the total aggregate area of openings exceeds 100 square inches for any 100 square feet of wall area.
11. Locate junction and pull boxes in the following areas, unless otherwise indicated or approved by the Architect/Engineer of Record:
 - a. Concealed above accessible suspended ceilings.
 - b. Within joists in areas with no ceiling.
 - c. Electrical rooms.
 - d. Mechanical equipment rooms.
12. Install hinged-cover enclosures and cabinets plumb. Support at each corner.
13. Installation of Combination Device Wall Enclosures:
 - a. In each instance where two or more device boxes are generally located in the same vicinity and at the same mounting height, mount those devices in a common multi-gang barriered box appropriate for the device types.
 - b. Combination receptacle and communications devices (i.e. television, data and receptacle shall be installed in minimum 2 gang boxes with barriers to segregate the systems.
 - c. Combination devices (i.e. data/voice outlet and normal and IG receptacle) installed in minimum 3 gang box under common wall plate. Provide barriers to segregate systems.
- H. Box Supports:
 1. Secure and support boxes in accordance with NFPA 70 and Section 26 05 29 - Hangers and Supports for Electrical Systems using suitable supports and methods approved by the authority having jurisdiction.
 2. Provide independent support from building structure except for cast metal boxes (other than boxes used for fixture support) supported by threaded conduit connections in accordance with NFPA 70. Do not provide support from piping, ductwork, or other systems.
 3. Installation Above Suspended Ceilings: Do not provide support from ceiling grid or ceiling support system.
 4. Install hinged-cover enclosures and cabinets plumb. Support each corner.
- I. Install boxes plumb and level.
- J. Flush-Mounted Boxes:

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|----------------------------------|-----------------|------------------------------|
| NAME OF SCHOOL
PROJECT NUMBER | 26 05 33.16 - 6 | BOXES FOR ELECTRICAL SYSTEMS |
|----------------------------------|-----------------|------------------------------|

1. Install boxes in noncombustible materials such as concrete, tile, gypsum, plaster, etc. so that front edge of box or associated raised cover is not set back from finished surface more than 1/4 inch or does not project beyond finished surface.
 2. Install boxes in combustible materials such as wood so that front edge of box or associated raised cover is flush with finished surface.
 3. Repair rough openings around boxes in noncombustible materials such as concrete, tile, gypsum, plaster, etc. so that there are no gaps or open spaces greater than 1/8 inch at the edge of the box.
- K. Floor-Mounted Cabinets: Mount on properly sized 4 inch high concrete pad constructed in accordance with Section 03 30 00 - Cast-in-Place Concrete.
- L. Install boxes as required to preserve insulation integrity.
- M. Metallic Floor Boxes: Install box level at the proper elevation to be flush with finished floor.
- N. Install permanent barrier between ganged wiring devices when voltage between adjacent devices exceeds 300 V.
- O. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 07 84 00 - Firestopping.
- P. Close unused box openings.
- Q. Install blank wall plates on junction boxes and on outlet boxes with no devices or equipment installed or designated for future use.
- R. Provide minimum 2-gang box with barriers for combination receptacle and data locations for specialty equipment (i.e. televisions, monitors).
- S. Combination devices (i.e. data/voice outlet and normal and isolated ground receptacle) installed in minimum 3-gang box with barriers.
- T. Provide grounding and bonding in accordance with Section 26 05 26 - Grounding and Bonding for Electrical Systems.
- U. Identify boxes in accordance with Section 26 05 53 - Identification for Electrical Systems.
- 3.03 CLEANING
- A. Clean interior of boxes to remove dirt, debris, plaster and other foreign material.
- B. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer or as required per 09 91 13 - Exterior Painting and 09 91 23 - Interior Painting.
- C. Repair damage to PVC or paint finishes with matching touchup coating recommended by manufacturer or as required per 09 91 13 - Exterior Painting and 09 91 23 - Interior Painting.
- 3.04 PROTECTION
- A. Immediately after installation, protect boxes from entry of moisture and foreign material until ready for installation of conductors.

END OF SECTION