

SECTION 16050 - BASIC ELECTRICAL MATERIALS AND METHODS

PART 1 - GENERAL

SUMMARY

This Section includes the following:

- Raceways.
- Building wire and connectors.
- Supporting devices for electrical components.
- Electrical identification.
- Electrical demolition.
- Cutting and patching for electrical construction.

QUALITY ASSURANCE

Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

Comply with NFPA 70.

COORDINATION

Coordinate chases, slots, inserts, sleeves, and openings for electrical supports, raceways, and cable with general construction work.

Sequence, coordinate, and integrate installing electrical materials and equipment for efficient flow of the Work. Coordinate installing large equipment that requires positioning before closing in the building.

Coordinate electrical service connections to components furnished by utility companies.

Coordinate location of access panels and doors for electrical items that are concealed by finished surfaces. Access doors and panels are specified in Division 8 Section "Access Doors and Frames."

Where electrical identification devices are applied to field-finished surfaces, coordinate installation of identification devices with completion of finished surface.

PART 2 - PRODUCTS

RACEWAYS

EMT: Electrical metallic tubing; ANSI C80.3, zinc-coated steel, with set-screw or compression fittings.

FMC: Flexible metal conduit; zinc-coated steel.

RNC: Rigid nonmetallic conduit; NEMA TC 2, Schedule 40 PVC, with NEMA TC3 fittings.

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Raceway Fittings: Specifically designed for raceway type with which used.

WIRES, CABLES, AND CONNECTIONS

Conductors, No. 10 AWG and Smaller: Solid or stranded copper.

Conductors, Larger Than No. 10 AWG: Stranded copper.

Insulation: Thermoplastic, rated 600 V, 75 deg C minimum, Type THW, THHN-THWN, or USE depending on application..

Cable: Type MC with ground wire.

Wire Connectors and Splices: Units of size, ampacity rating, material, type, and class suitable for service indicated.

ELECTRICAL IDENTIFICATION

Identification Device Colors: Use those prescribed by ANSI A13.1, NFPA 70, and these Specifications.

Color-Coding Cable Ties: Type 6/6 nylon, self-locking type. Colors to suit coding scheme.

Engraved-Plastic Labels, Signs, and Instruction Plates: Engraving stock, melamine plastic laminate punched or drilled for mechanical fasteners **1/16-inch (1.6-mm)** minimum thickness for signs up to **20 sq. in. (129 sq. cm)** and **1/8-inch (3.2-mm)** minimum thickness for larger sizes. Engraved legend in black letters on white background.

Warning and Caution Signs: Preprinted; comply with 29 CFR 1910.145, Chapter XVII. Colors, legend, and size appropriate to each application.

Interior Units: Aluminum, baked-enamel-finish, punched or drilled for mechanical fasteners.

Fasteners for Nameplates and Signs: Self-tapping, stainless-steel screws or No. 10/32 stainless-steel machine screws with nuts and flat and lock washers.

PART 3 - EXECUTION

ELECTRICAL EQUIPMENT INSTALLATION

Headroom Maintenance: If mounting heights or other location criteria are not indicated, arrange and install components and equipment to provide maximum possible headroom.

Materials and Components: Install level, plumb, and parallel and perpendicular to other building systems and components, unless otherwise indicated.

Equipment: Install to facilitate service, maintenance, and repair or replacement of components. Connect for ease of disconnecting, with minimum interference with other installations.

Right of Way: Give to raceways and piping systems installed at a required slope.

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RACEWAY APPLICATION

Indoor Installations:

- Exposed: EMT except in wet or damp locations, use IMC.
- Concealed in Walls or Ceilings: EMT.
- In Concrete Slab: RNC.
- Below Slab on Grade or in Crawlspace: RNC.
- Connection to Vibrating Equipment: FMC.
- Boxes and Enclosures: NEMA 250, Type 1, unless otherwise indicated.

RACEWAY AND CABLE INSTALLATION

Conceal raceways and cables, unless otherwise indicated, within finished walls, ceilings, and floors.

Keep legs of raceway bends in the same plane and keep straight legs of offsets parallel.

Use RMC elbows where RNC turns out of slab.

Install pull wires in empty raceways. Use No. 14 AWG zinc-coated steel or woven polypropylene or monofilament plastic line with not less than 200-lb (90-kg) tensile strength. Leave at least 12 inches (300 mm) of slack at each end of pull wires.

Connect motors and equipment subject to vibration, noise transmission, or movement with a maximum of 72-inches (1830-mm) flexible conduit. Install LFMC in wet or damp locations. Install separate ground conductor across flexible connections.

Set floor boxes level and trim after installation to fit flush to finished floor surface.

WIRING METHODS FOR POWER, LIGHTING, AND CONTROL CIRCUITS

Application: Use wiring methods specified below to the extent permitted by applicable codes as interpreted by authorities having jurisdiction.

Exposed Feeders: Metal-clad cable.

Concealed Feeders in Ceilings and Gypsum Board Partitions: Metal-clad cable.

Concealed Feeders in concrete: Insulated single conductors in raceway.

Exposed Branch Circuits: Metal-clad cable.

Concealed Branch Circuits in Ceilings Walls and Gypsum Board Partitions: Metal-clad cable.

Concealed Branch Circuits in Concrete: Insulated single conductors in raceway.

WIRING INSTALLATION

Make splices and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.

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ELECTRICAL SUPPORTING DEVICE APPLICATION

Damp Locations and Outdoors: Hot-dip galvanized materials or nonmetallic, slotted channel system components.

Dry Locations: Steel materials.

Strength of Supports: Adequate to carry present and future loads, times a safety factor of at least four with, **200-lb (90-kg)** minimum design load for each support element.

SUPPORT INSTALLATION

Install sleeves for cable and raceway penetrations of concrete slabs and walls unless core-drilled holes are used. Install sleeves for cable and raceway penetrations of masonry and fire-rated gypsum walls and of all other fire-rated floor and wall assemblies. Install sleeves during erection of concrete and masonry walls.

Secure electrical items and their supports to building structure, using the following methods unless other fastening methods are indicated:

Wood: Wood screws or screw-type nails.

Gypsum Board: Toggle bolts. Seal around sleeves with joint compound, both sides of wall.

Masonry: Toggle bolts on hollow block and expansion bolts on solid block. Seal around sleeves with mortar, both sides of wall.

New Concrete: Concrete inserts with machine screws and bolts.

Existing Concrete: Expansion bolts or threaded studs driven by powder charge and provided with lock washers.

Fasteners: Select so load applied to each fastener does not exceed 25 percent of its proof-test load.

IDENTIFICATION MATERIALS AND DEVICES

Install at locations for most convenient viewing without interference with operation and maintenance of equipment.

Coordinate names, abbreviations, colors, and other designations used for electrical identification with corresponding designations indicated in the Contract Documents or required by codes and standards. Use consistent designations throughout Project.

Self-Adhesive Identification Products: Clean surfaces before applying.

DEMOLITION

Protect existing electrical equipment and installations indicated to remain. If damaged or disturbed in the course of the Work, remove damaged portions and install new products of equal capacity, quality, and functionality.

Accessible Work: Remove exposed electrical equipment and installations, indicated to be demolished, in their entirety.

Abandoned Work: Cut and remove buried raceway and wiring, indicated to be abandoned in place, **2 inches (50 mm)** below the surface of adjacent construction. Cap raceways and patch surface to match existing finish.

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Remove, store, clean, reinstall, reconnect, and make operational components indicated for relocation.

CUTTING AND PATCHING

Cut, channel, chase, and drill floors, walls, partitions, ceilings, and other surfaces required to permit electrical installations. Perform cutting by skilled mechanics of trades involved.

Repair, refinish and touch up disturbed finish materials and other surfaces to match adjacent undisturbed surfaces.

END OF SECTION 16050