

## SECTION 260553 - IDENTIFICATION FOR ELECTRICAL SYSTEMS

### PART 1 - GENERAL

#### 1.1 SUMMARY

##### A. Section Includes:

1. Identification for raceways.
2. Identification of power and control cables.
3. Identification for conductors.
4. Underground-line warning tape.
5. Warning labels and signs.
6. Instruction signs.
7. Equipment identification labels.
8. Miscellaneous identification products.

### PART 2 - PRODUCTS

#### 2.1 POWER RACEWAY IDENTIFICATION MATERIALS

- A. Comply with ANSI A13.1 for minimum size of letters for legend and for minimum length of color field for each raceway size.
- B. Colors for Raceways Carrying Circuits at 600 V or Less:
  - 1. Black letters on an orange field.
  - 2. Legend: Indicate voltage and system or service type.
- C. Self-Adhesive Vinyl Labels for Raceways Carrying Circuits at 600 V or Less: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound adhesive tape for securing ends of legend label.
- D. Snap-Around Labels for Raceways Carrying Circuits at 600 V or Less: Slit, pretensioned, flexible, preprinted, color-coded acrylic sleeve, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.

#### 2.2 CONDUCTOR IDENTIFICATION MATERIALS

- A. Color-Coding Conductors: Color shall be factory applied over the entire length of conductor. This includes all conductor sizes.
- B. Marker Tapes: Vinyl or vinyl-cloth, self-adhesive wraparound type, with circuit identification legend machine printed by thermal transfer or equivalent process.

#### 2.3 FLOOR MARKING TAPE

- A. 2-inch- (50-mm-) wide, 5-mil (0.125-mm) pressure-sensitive vinyl tape, with black and white stripes and clear vinyl overlay.

## 2.4 UNDERGROUND-LINE WARNING TAPE

### A. Tape:

1. Recommended by manufacturer for the method of installation and suitable to identify and locate underground electrical and communications utility lines.
2. Printing on tape shall be permanent and shall not be damaged by burial operations.
3. Tape material and ink shall be chemically inert, and not subject to degrading when exposed to acids, alkalis, and other destructive substances commonly found in soils.

### B. Color and Printing:

1. Comply with ANSI Z535.1 through ANSI Z535.5.
2. Inscriptions for Red-Colored Tapes: ELECTRIC LINE, HIGH VOLTAGE.
3. Inscriptions for Orange-Colored Tapes: TELEPHONE CABLE, CATV CABLE, COMMUNICATIONS CABLE, OPTICAL FIBER CABLE.

## 2.5 WARNING LABELS AND SIGNS

### A. Comply with NFPA 70 and 29 CFR 1910.145.

### B. Self-Adhesive Warning Labels: Factory-printed, multicolor, pressure-sensitive adhesive labels, configured for display on front cover, door, or other access to equipment unless otherwise indicated.

### C. Metal-Backed, Butyrate Warning Signs:

1. Weather-resistant, nonfading, preprinted, cellulose-acetate butyrate signs with 0.0396-inch (1-mm) galvanized-steel backing; and with colors, legend, and size required for application.
2. 1/4-inch (6.4-mm) grommets in corners for mounting.
3. Nominal size, 10 by 14 inches (250 by 360 mm).

### D. Warning label and sign shall include, but are not limited to, the following legends:

1. Multiple Power Source Warning: "DANGER - ELECTRICAL SHOCK HAZARD - EQUIPMENT HAS MULTIPLE POWER SOURCES."

## 2.6 NAMEPLATES AND INSTRUCTION SIGNS

### A. Engraved, laminated acrylic or melamine plastic, minimum 1/16 inch (1.6 mm) thick for signs up to 20 sq. inches (129 sq. cm) and 1/8 inch (3.2 mm) thick for larger sizes. Lettering shall be "machine engraved". Home-made engraved nameplates will not be accepted.

1. Normal Power: Engraved legend with black letters on white face.
2. Emergency Power: Engraved legend with white letters on red face.
3. Punched or drilled for mechanical fasteners.
4. Framed with mitered acrylic molding and arranged for attachment at applicable equipment.

## 2.7 MISCELLANEOUS IDENTIFICATION PRODUCTS

### A. Paint: Comply with requirements in painting Sections for paint materials and application requirements. Select paint system applicable for surface material and location (exterior or interior).

- B. Fasteners for Nameplates and Signs: Rivets or stainless-steel machine screws with nuts and flat lock washers.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Location: Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment.
- B. Apply identification devices to surfaces that require finish after completing finish work.
- C. Self-Adhesive Identification Products: Clean surfaces before application, using materials and methods recommended by manufacturer of identification device. Do not use self-adhesive identification for equipment labeling.
- D. Attach signs and nameplates with mechanical fasteners appropriate to the location and substrate.
- E. System Identification Color-Coding Bands for Raceways and Cables: Each color-coding band shall completely encircle cable or conduit. Place adjacent bands of two-color markings in contact, side by side. Locate bands at changes in direction, at penetrations of walls and floors, at 50-foot (15-m) maximum intervals in straight runs, and at 25-foot (7.6-m) maximum intervals in congested areas. Apply the following colors to the systems listed below:
  - 1. Fire Alarm System: Red
  - 2. Security System: Yellow
  - 3. Telecommunication System: Blue
- F. Underground-Line Warning Tape: During backfilling of trenches install continuous underground-line warning tape directly above line at 6 to 8 inches (150 to 200 mm) below finished grade. Use multiple tapes where width of multiple lines installed in a common trench exceeds 16 inches (400 mm) overall. Install underground-line warning tape for both direct-buried cables and cables in raceway.
- G. Painted Identification: Comply with requirements in painting Sections for surface preparation and paint application. Paint all Fire Alarm junction boxes red.
- H. Lettering, Colors, and Graphics: Coordinate names, abbreviations, colors, and other designations with corresponding designations in the Contract Documents or with those required by codes and standards. Use consistent designations throughout Project.

### 3.2 IDENTIFICATION SCHEDULE

- A. Circuit Identification Labels on Boxes: Install labels externally. Includes all receptacle coverplates/boxes.
  - 1. Exposed Boxes/coverplates: Pressure-sensitive, self-adhesive vinyl label on cover (1/8" black letters on clear tape).
  - 2. Concealed Boxes: Permanent black marker.
  - 3. Labeling Legend: Permanent, waterproof listing of panel and circuit number.
- B. Accessible Raceways, 600 V or Less, for Service, Feeder, and Branch Circuits More Than **30 A**, and **120 V** to ground: Install labels at **30-foot (9-m)** maximum intervals.

1. Label shall include voltage, amperage and panel I.D.
- C. Power-Circuit Conductor Identification, 600 V or Less:
1. Color-code throughout the electrical system. Color-Coding for Phase and Voltage Level Identification, Use colors listed below; Color shall be factory applied over the entire length of conductor.
    - a. Colors for 208/120-V Circuits:
      - Phase A: Black.
      - Phase B: Red.
      - Phase C: Blue.
      - Neutral: White.
      - Ground: Green.
      - Isolated Ground: Green with yellow stripe.
    - b. Colors for 480/277-V Circuits:
      - Phase A: Brown.
      - Phase B: Orange.
      - Phase C: Yellow.
      - Neutral: White with a colored stripe or gray.
      - Ground: Green.
- D. Install instructional sign including the color-code for grounded and ungrounded conductors using engraved plastic-laminated labels.
- E. Conductors to Be Extended in the Future: Attach write-on tags to conductors and list source.
- F. Auxiliary Electrical Systems Conductor Identification: Identify field-installed alarm, control, and signal connections.
1. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, and pull points. Identify by system and circuit designation.
  2. Use system of marker tape designations that is uniform and consistent with system used by manufacturer for factory-installed connections.
  3. Coordinate identification with Project Drawings, manufacturer's wiring diagrams, and the Operation and Maintenance Manual.
- G. Workspace Indication: Install floor marking tape to show working clearances in the direction of access to live parts. Workspace shall be as required by NFPA 70 and 29 CFR 1926.403 unless otherwise indicated. Do not install at flush-mounted panelboards and similar equipment in finished spaces.
- H. Warning Labels for Indoor Cabinets, Boxes, and Enclosures for Power and Lighting: Self-adhesive warning labels.
1. Comply with 29 CFR 1910.145.
  2. Identify system voltage with black letters on an orange background.
  3. Apply to exterior of door, cover, or other access.
- I. Operating Instruction Signs: Install instruction signs to facilitate proper operation and maintenance of electrical systems and items to which they connect. Install instruction signs with approved legend where instructions are needed for system or equipment operation.

- J. Emergency Operating Instruction Signs: Install instruction signs with white legend on a red background with minimum 3/8-inch- (10-mm-) high letters for emergency instructions at equipment used for power transfer or power disconnect.
- K. Equipment Identification Labels (Nameplates): Engraved plastic laminate. Install on each unit of equipment, including central or master unit of each system. This includes power, lighting, communication, signal, and alarm systems, unless units are specified with their own self-explanatory identification. Apply nameplates for each unit of the following categories of equipment using mechanical fasteners (adhesive labels for equipment identification is not acceptable). All nameplates shall adequately describe the function or use of the particular equipment involved.
  - 1. Panelboards, switchgear, switchboards and enclosures; Include panel designation, amperage, voltage, phase, color coding of phases, and A.I.C. rating. See detail on plans.
  - 2. Disconnect switches; Include size & type of fuse used if fusible.
  - 3. Transformers.

END OF SECTION 260553