SECTION 16075 - 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.   Warning labels and signs.
        5.   Instruction signs.
        6.   Equipment identification labels.
        7.   Miscellaneous identification products.

1.2   SUBMITTALS

   A.   Product Data: For each electrical identification product indicated.

1.3   QUALITY ASSURANCE

   A.   Comply with ANSI A13.1.

   B.   Comply with NFPA 70.

   C.   Comply with 29 CFR 1910.144 and 29 CFR 1910.145.

   D.   Comply with ANSI Z535.4 for safety signs and labels.

   E.   Adhesive-attached labeling materials, including label stocks, laminating adhesives, and inks
        used by label printers, shall comply with UL 969.

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.

   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.

E. Snap-Around, Color-Coding Bands for Raceways Carrying Circuits at 600 V or Less: Slit, pretensioned, flexible, solid-colored acrylic sleeve, 2 inches (50 mm) long, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.

F. Write-On Tags: Polyester tag, 0.010 inch (0.25 mm) thick, with corrosion-resistant grommet and cable tie for attachment to conductor or cable.
   1. Marker for Tags: Permanent, waterproof, black ink marker recommended by tag manufacturer.

2.2 ARMORED AND METAL-CLAD CABLE 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 and cable size.

B. Colors for Raceways Carrying Circuits at 600 V and Less:
   1. Black letters on an orange field.
   2. Legend: Indicate voltage.

C. Self-Adhesive Vinyl Labels: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound adhesive tape for securing ends of legend label.

D. Self-Adhesive Vinyl Tape: Colored, heavy duty, waterproof, fade resistant; 2 inches (50 mm) wide; compounded for outdoor use.

2.3 POWER AND CONTROL CABLE 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 and cable size.

B. Self-Adhesive Vinyl Labels: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound adhesive tape for securing ends of legend label.

C. Write-On Tags: Polyester tag, 0.010 inch (0.25 mm) thick, with corrosion-resistant grommet and cable tie for attachment to conductor or cable.
   1. Marker for Tags: Permanent, waterproof, black ink marker recommended by tag manufacturer.

D. Snap-Around Labels: 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.

E. Snap-Around, Color-Coding Bands: Slit, pretensioned, flexible, solid-colored acrylic sleeve, 2 inches (50 mm) long, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.

2.4   CONDUCTOR IDENTIFICATION MATERIALS

A.   Color-Coding Conductor Tape: Colored, self-adhesive vinyl tape not less than 3 mils (0.08 mm) thick by 1 to 2 inches (25 to 50 mm) wide.

B.   Self-Adhesive Vinyl Labels: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound adhesive tape for securing ends of legend label.

C.   Marker Tapes: Vinyl or vinyl-cloth, self-adhesive wraparound type, with circuit identification legend machine printed by thermal transfer or equivalent process.

D.   Write-On Tags: Polyester tag, 0.010 inch (0.25 mm) thick, with corrosion-resistant grommet and cable tie for attachment to conductor or cable.
        1.   Marker for Tags: Permanent, waterproof, black ink marker recommended by tag manufacturer.

2.5   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.

2.6   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.   Baked-Enamel Warning Signs:
        1.   Preprinted aluminum signs, punched or drilled for fasteners, with colors, legend, and size required for application.
        2.   1/4-inch (6.4-mm) grommets in corners for mounting.
        3.   Nominal size, 7 by 10 inches (180 by 250 mm).

D.   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).

E.   Warning label and sign shall include, but are not limited to, the following legends:
        1.   Workspace Clearance Warning: "WARNING - OSHA REGULATION - AREA IN FRONT OF ELECTRICAL EQUIPMENT MUST BE KEPT CLEAR FOR 36 INCHES (915 MM)."

2.7   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.
        1.   Engraved legend with black letters on white face.
        2.   Punched or drilled for mechanical fasteners.
        3.   Framed with mitered acrylic molding and arranged for attachment at applicable equipment.

B.   Adhesive Film Label: Machine printed, in black, by thermal transfer or equivalent process. Minimum letter height shall be 3/8 inch (10 mm).

C.   Adhesive Film Label with Clear Protective Overlay: Machine printed, in black, by thermal transfer or equivalent process. Minimum letter height shall be 3/8 inch (10 mm). Overlay shall provide a weatherproof and UV-resistant seal for label.

2.8   EQUIPMENT IDENTIFICATION LABELS

A.   Adhesive Film Label with Clear Protective Overlay: Machine printed, in black, by thermal transfer or equivalent process. Minimum letter height shall be 3/8 inch (10 mm). Overlay shall provide a weatherproof and UV-resistant seal for label.

B.   Self-Adhesive, Engraved, Laminated Acrylic or Melamine Label: Adhesive backed, with white letters on a dark-gray background. Minimum letter height shall be 3/8 inch (10 mm).

C.   Stenciled Legend: In nonfading, waterproof, black ink or paint. Minimum letter height shall be 1 inch (25 mm).

2.9   MISCELLANEOUS IDENTIFICATION PRODUCTS

A.   Paint: Comply with requirements in Division 09 painting Sections for paint materials and application requirements. Select paint system applicable for surface material and location (exterior or interior).

B.   Fasteners for Labels and Signs: Self-tapping, stainless-steel screws or stainless-steel machine screws with nuts and flat and 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.

D.   Attach signs and plastic labels that are not self-adhesive type with mechanical fasteners appropriate to the location and substrate.

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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.

F.   Painted Identification: Comply with requirements in Division 09 painting Sections for surface preparation and paint application.

3.2   IDENTIFICATION SCHEDULE

A.   Accessible Raceways and Metal-Clad Cables, 600 V or Less, for Service, Feeder, and Branch Circuits More Than 30 amps, and 120 volts to ground: Install labels at 30-foot (10-m) maximum intervals.

B.   Accessible Raceways and Cables within Buildings: Identify the covers of each junction and pull box of the following systems with self-adhesive vinyl labels with the wiring system legend and system voltage. System legends shall be as follows:
1.   Emergency Power.
2.   Power.
3.   UPS.

C.   Power-Circuit Conductor Identification, 600 V or Less: For conductors in vaults, pull and junction boxes, manholes, and handholes, use color-coding conductor tape to identify the phase.
1.   Color-Coding for Phase and Voltage Level Identification, 600 V or Less: Use colors listed below for ungrounded service, feeder and branch-circuit conductors.
a.   Color shall be factory applied or field applied for sizes larger than No. 8 AWG, if authorities having jurisdiction allow.
b.   Colors for 208/120-V Circuits:
1)   Phase A: Black.
2)   Phase B: Red.
3)   Phase C: Blue.
c.   Field-Applied, Color-Coding Conductor Tape: Apply in half-lapped turns for a minimum distance of 6 inches (150 mm) from terminal points and in boxes where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding. Locate bands to avoid obscuring factory cable markings.

D.   Install instructional sign including the color-code for grounded and ungrounded conductors using adhesive-film-type 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 panelboardsand 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.
4.   For equipment with multiple power or control sources, apply to door or cover of equipment including, but not limited to, the following:
a.   Controls with external control power connections.

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.   Equipment Identification Labels: On each unit of equipment, install unique designation label that is consistent with wiring diagrams, schedules, and the Operation and Maintenance Manual. Apply labels to disconnect switches and protection equipment, central or master units, control panels, control stations, terminal cabinets, and racks of each system. Systems include power, lighting, control, communication, signal, monitoring, and alarm systems unless equipment is provided with its own identification.
1.   Labeling Instructions:
a.   Indoor Equipment: Adhesive film label with clear protective overlay. Unless otherwise indicated, provide a single line of text with 1/2-inch- (13-mm-) high letters on 1-1/2-inch- (38-mm-) high label; where two lines of text are required, use labels 2 inches (50 mm) high.
b.   Outdoor Equipment: Engraved, laminated acrylic or melamine label.
c.   Elevated Components: Increase sizes of labels and letters to those appropriate for viewing from the floor.
d.   Unless provided with self-adhesive means of attachment, fasten labels with appropriate mechanical fasteners that do not change the NEMA or NRTL rating of the enclosure.

END OF SECTION 16075