SECTION 26 0553

IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. This section includes electrical identification materials and devices required to comply with ANSI, NFPA, and OSHA standards.

B. This section addresses identification of electrical equipment, raceways, boxes, conductors, and other related electrical system components.

1.2 SECTION INCLUDES

A. Identification of power conductors and control cables.

B. Identification of equipment and instructions.

C. Miscellaneous identification products.

1.3 RELATED SECTIONS

A. Sections in Division 26.

1.4 REFERENCES

A. ANSI Z535.4: Standard for Product Safety Signs and Labels.

B. ANSI/IEEE C2: National Electrical Safety Code.

C. NFPA 70: National Electrical Code.

D. NFPA 70E: Standard for Electrical Safety in the Workplace.

E. OSHA 29 CFR 1910.144: Safety Color Code for Marking Physical Hazards.

F. OSHA 29 CFR 1910.145: Specifications for Accident Prevention Signs and Tags.

G. UL 969: Standard for Marking and Labeling Systems.

H. Definitions:

1. Circuit designation includes both equipment source and equipment position.

1.5 SUBMITTALS

A. Product data: For each type of electrical identification product.

1.6 QUALITY ASSURANCE

A. Comply with ANSI A13.1 and IEEE C2.

B. Comply with NFPA 70.

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C. Comply with OSHA standards.

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

1.7 COORDINATION

A. Coordinate identification names, abbreviations, colors, and other features with requirements in other sections requiring identification applications, drawings, shop drawings, manufacturer's wiring diagrams, and the operation and maintenance manual; and with those required by codes, standards, and safety regulations. Use consistent designations throughout Project.

B. Coordinate installation of identification materials and devices with completion of covering and painting of surfaces where devices are to be applied.

C. Coordinate installation of identification materials and devices with location of access panels and doors.

D. Install identifying materials and devices before installing acoustical ceilings and similar concealment.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Subject to compliance with requirements, provide products by one of the following manufacturers, or approved equal:

1. Brady USA, Inc.
2. Carlton Industries
3. Graphic Products, Inc.
4. Ideal Industries, Inc.
5. Panduit Corporation
6. Presco
7. Seton Identification Products
8. Thomas & Betts Company
9. Utility Safeguard

2.2 GENERAL PRODUCT REQUIREMENTS

A. Except where otherwise indicated, provide manufacturer's standard identification products of category and type suitable for each application. Where more than one identification method is specified for an application, the Installer shall select and utilize each material in a consistent manner.

2.3 CONDUCTOR AND CABLING IDENTIFICATION

A. Adhesive labels: Preprinted, flexible, self-adhesive vinyl with legend overlaminated with a clear weather- and chemical-resistant coating and matching wraparound adhesive tape for securing ends of legend label.

B. Color-coded, adhesive tape: Self-adhesive, vinyl tape, in appropriate colors for system voltage and phase.

C. Marker tapes: Vinyl or vinyl-cloth, self-adhesive, wraparound type with preprinted numbers and letters.

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2.4 EQUIPMENT IDENTIFICATION

A. Engraved plastic nameplates: Laminated plastic, engraved, white letters on black background, except where other color schemes are noted or specified.

1. Size: Minimum 0.75-inch (19 mm) by 2.5-inches (64 mm).
2. Letter size: Minimum height of 0.375-inch (10 mm).
3. Mechanically fastened, except adhesive mounted where necessary due to substrate.

a. Mechanical fastener: Punched or drilled, with vandalproof stainless steel or brass screws or rivets.

B. Baked-enamel signs: Preprinted, aluminum signs, punched or drilled for fasteners with corner grommets; with colors, legend, and size required for application.

C. Exterior, metal-backed, signs: Weather-resistant, nonfading, preprinted, cellulose-acetate butyrate (CAB) signs with galvanized steel backing; punched or drilled for fasteners with corner grommets; with colors, legend, and size required for application.

D. Adhesive film label: Machine-printed, black letters on white background, through thermal transfer or equivalent process, with clear weatherproof and UV-resistant covering. Minimum letter size height of 0.375-inch (10 mm).

2.5 MISCELLANEOUS IDENTIFICATION PRODUCTS

A. Underground warning tape: Permanent, bright-colored, continuous-printed, vinyl tape for use with underground cables, conduits, and ductbanks. Comply with ANSI Z535.

1. Not less than 6-inches wide by 4 mils thick (152 mm wide by 0.102 mm thick).
2. Tape Material:

a. Made of metal detectable polyester or vinyl.
b. Compounded for permanent direct-burial service. Tape material and ink shall be chemically inert, and not subject to degrading when exposed to destructive substances commonly found in soils.

3. Printed legend with black lettering, indicating type of underground line.

a. Provide inscriptions for power cabling with red-colored tape: Example – “CAUTION – BURIED ELECTRIC LINE BELOW” .

B. Wiring device tape labels:

1. Adhesive film label: Machine-printed, black letters on clear background, through thermal transfer or equivalent process. Minimum letter size height of 0.25-inch (6 mm).

a. Labeling for electrical devices and components such as receptacles, switches, control device stations, manual motor starters, network and phone jacks, junction and pull boxes, etc.

C. Warning labels and signs:

1. Self-adhesive warning labels: Factory-printed, multicolor, pressure-sensitive adhesive labels, configures for display on front cover, door, or other access to equipment unless otherwise noted.

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2. Baked-enamel warning signs: Preprinted, aluminum signs, punched or drilled for fasteners with corner grommets; with colors, legend, and size required for application.
3. Fasteners: Self-tapping, stainless-steel screws or, stainless-steel machine screws with nuts, flat and lock washers.

D. Cable ties: Fungus-inert, self-extinguishing, one-piece, self-locking, color-coded, nylon cable ties suitable for the application (general purpose, UV-stabilized outdoor, or plenum rated).

E. Paint: Formulated for the type of surface, location, and intended use.

F. Stenciling: Nonfading, waterproof, ink or paint. Black or color-coded.

G. Adhesive: Heavy-duty, thermo-resistant, industrial grade adhesive, for adhesion to any surface without identification curling, peeling, or falling off.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Verify identity of each item before installing identification products.

B. Location: Install identification products at locations for most convenient viewing without interference with operation and maintenance of equipment.

1. For finished public spaces, coordinate identification product mounting locations with Owner.

C. Existing equipment: Apply identification products to unmarked existing equipment where work is being performed.

D. Apply identification products to surfaces after equipment finish work has been completed.

E. Clean surfaces before applying identification products, using materials and methods recommended by manufacturer of identification device.

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

G. System identification labeling for raceways and cables: Each label shall be installed on sidewall of conduit and easily placed for proper identification. Locate labels at changes in direction, at penetrations of walls and floors, at 50-foot (15-meter) maximum intervals in straight runs, and at 25-foot (7.6-meter) maximum intervals in congested areas.

H. Cable ties: For attaching tags, use general-purpose type, except as listed below:

1. Outdoors: UV-stabilized nylon.
2. In spaces handling environmental air: Plenum rated.

I. 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.

3.2 APPLICATION

A. Miscellaneous:

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1. Access doors and panels: Apply engraved nameplate labels at access doors identifying concealed electrical item. Do not locate labels in finished, public spaces.
2. Available fault current labels: Refer to Section 26 0573, Overcurrent Protective Device Studies, for fault current labeling requirements.
3. Arc flash warning labels: Refer to Section 26 0573, Overcurrent Protective Device Studies, for arc flash labeling requirements.

B. Junction and pull boxes:

1. Label each junction and pull box, identifying circuit designation or type of system.

   a. Exposed boxes: Place label on coverplate, externally visible.
   b. Concealed boxes: Place label or tag on inside cover of box.
   c. Junction boxes concealed above suspended ceilings or exposed in non-occupied spaces may be marked with permanent ink marker in lieu of printed labels.

2. Boxes with conductors greater than 600V: Apply labels identifying nominal system voltage on cover and minimum of one fixed side. One label shall be visible from the floor where boxes are installed exposed.
3. Fire alarm system boxes shall have red finish. Boxes shall be prefinished prior to installation.

C. Wiring and cabling identification:

1. Power circuit conductor identification, 600 volts or less: Apply color-coded identification for cables, feeders, and power circuit conductors exposed in accessible vaults, junction and pull boxes, utility structures, and equipment enclosures. Apply color-coding scheme as indicated below throughout the building's network of feeders and circuits, unless otherwise required by the authority having jurisdiction.

   a. Colors on conductors No. 10 and smaller, or No. 6 and smaller for grounded and grounding conductors: Solid colored insulation.
   b. Colors on conductors No. 8 and larger, or No. 4 and larger for grounded and grounding conductors: Apply colored tape wrapped a minimum of 6 inches (150 mm) on either end of conductor and in boxes where splices or taps are made.
   c. Conductors used solely for grounding purposes shall be green, if insulated.
   d. Where multi-conductor cables are used, use same color coding system for identification of wiring.

COLOR CODE (600 volts maximum)				
VOLTAGE	NEUTRAL	PHASE		
		A	B	C
120 volts, 2-wire	White	Black, Red, or Blue depending on phase		
277 volts, 2-wire	Gray	Brown, Orange, or Yellow depending on phase		
208 volts, single-phase, 2-wire		Black/Red, Red/Blue, or Blue/Black		
208/120 volts wye, 3-phase, 4-wire	White	Black	Red	Blue
480/277 volts wye, 3-phase, 4-wire	Gray	Brown	Orange	Yellow
480 volts delta, 3-phase, 3-wire		Brown	Orange	Yellow

2. Conductors for future use: Attach tags with circuit designation for conductors to be extended for future use.
3. Control and low-voltage system wiring shall be coded with colors and markings different from those used to designate phase wires.

D. Wiring device labels: For wiring devices such as receptacles, devices installed in surface raceway assemblies, and other wiring devices operating at or greater than 120V.

1. Apply adhesive film labels on outside of wiring device coverplates identifying circuit designation serving device.

E. Equipment identification: Install unique designation label consistent with contract documents and shop drawings.

1. Labeling instructions:

a. Engraved plastic laminate nameplates, unless otherwise indicated.
b. Unless otherwise required, provide a single line of text with 0.5-inch (13 mm) high lettering on 1.5-inch (38 mm) high label. Where two or more lines are required, use single label with increased height.
c. For multi-section or multi-compartment equipment, apply labels identifying each compartment or section.
d. For fusible equipment, identify fuse type and size on the front cover.
e. For enclosed circuit breaker equipment, identify device trip rating where rating is not visible.
f. Where equipment has more than one source of power (i.e., transfer switch, separate control power source), the location and circuit designation of each power source shall be clearly identified at the equipment location.

2. Apply nameplates and labels to equipment according to the below identification schemes:

a. Identify available fault current and calculation date. Apply products to the following equipment:

(1) Panelboards
(2) Switchboards

b. Identify equipment designation; voltage rating; phase and number of wires; and designation and location of load served. Apply products to the following equipment:

(1) Panelboards

c. Identify equipment designation; primary and secondary voltage ratings; phase and number of wires; circuit designation and location of primary source; and designation and location of load served. Apply products to the following equipment:

(1) Enclosed switches (disconnects/safety switches)
(2) Enclosed circuit breakers
(3) Transformers

d. Identify equipment designation; voltage rating; phase and number of wires; and capacity rating. Apply products to the following equipment:

(1) Generator: Capacity rating in kilowatts (kW).
(2) Transfer switches: Capacity rating in amperes; identify the location and circuit designation of each power source at the equipment location.

3. Nameplates shall incorporate white lettering on colored backgrounds based on the following color-coding scheme:

a. Normal power system: Black background.
b. Emergency power system (life-safety branch): Red background.
c. Emergency power system (equipment branch): Blue background.

F. Warning and caution labels and signs:

1. Apply warning and caution labels on equipment in accordance with NFPA 70 and 70E, ANSI, and OSHA requirements including arc flash hazard warning labels and special clearance requirements.
2. Apply warning and caution labels and signs at locations where safe operation and maintenance of electrical system equipment is of concern.
3. Apply warning signs on electrical room doors in accordance with NFPA 70 and 70E, ANSI, and OSHA requirements. Where doors are located in finished, public areas, located sign on the inside of the door. Coordinate mounting requirements with door type.

G. Service-entrance equipment: Update field marking of service entrance equipment maximum available fault current values in accordance with NFPA 70 requirements.

H. Underground warning tape: Apply underground warning tape above underground ductbanks, conduit, or direct-buried cable.

3.3 FIELD QUALITY CONTROL

A. Coordinate names, abbreviations, colors, and other designations with construction documents, submittals, and applicable code and standards requirements. Utilize consistent designations and identification techniques throughout project.

B. Install identification products at locations that are clearly visible at normal viewing angles and without interference with operation and maintenance of the equipment.

C. Install identification products in a neat and clean, workmanship-like manner where products are securely attached and oriented parallel to equipment edges.

END OF SECTION

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