

The following standard specification is intended to be edited according to the specifics of the project. Brackets [ ] and areas shaded in gray [e.g. format] indicate requirements that are optional depending upon the type of system being provided or per instructions associated with the [ ] and project requirements. Consult with University's Representative and campus stakeholders.

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## SECTION 26 05 53 ELECTRICAL SYSTEMS IDENTIFICATION

### PART 1 - GENERAL

#### 1.1 SUMMARY

##### A. Section includes:

1. Equipment identification
2. Panelboard directories
3. Identification for power, conductors, communication, and control cable
4. Wire and cable identification
5. Buried electrical line warnings
6. Junction box identification
7. Inscribed device coverplates
8. Warning labels and signs
9. Instruction signs
10. Miscellaneous identification products

#### 1.2 RELATED SECTIONS

- A. Section 09 XX XX, Painting
- B. Section 26 XX XX

#### 1.3 REFERENCE STANDARDS

- A. ANSI/ASME A13.1 – Scheme for the Identification of Electrical Systems.

#### 1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples: Submit samples of each color, lettering style, and other graphic representation required for each identification material or system.
- C. Schedules of nameplates to be furnished indicating wording, symbols, letter size, letter style, and color coding for each system.

#### 1.5 QUALITY ASSURANCE

- A. Coordinate identification names, abbreviations, colors, and other features with requirements in the Contract Documents, Shop Drawings, manufacturer's wiring diagrams, and the Operation and Maintenance Manual, and with those required by codes, standards, and 29 CFR 1910.145.

### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

##### A. Manufacturer:

1. Brady/Seton
2. Stranco
3. Rowmark
4. Or equal

## 2.2 CONDUCTOR AND COMMUNICATION AND CONTROL-CABLE IDENTIFICATION

- A. 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.
  - 1. Marker for Tags: Machine-printed permanent, waterproof, black ink marker recommended by printer manufacturer.
- B. 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.
- C. Snap around, Color Coding Bands: Slit, pretensioned, flexible, solid color-coded acrylic sleeve, 2 inches long, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.

## 2.3 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 A535.5
  - 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.
- C. Tag:
  - 1. Pigmented polyolefin, bright-colored, compounded for direct-burial service.
  - 2. Thickness: 4 mils.
  - 3. Weight: 18.5 lb/1000 sq. ft.
  - 4. 3-inch Tensile According to ASTM D 882: 30 lbf, and 2500 psi.

## 2.4 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. Warning label and sign shall include, but are not limited to, the following legends:
  - 1. Material: rigid plastic laminated impact acrylic, 2 layer, exterior grade, UV stable
  - 2. Thickness: 3/16 inch minimum
  - 3. Maximum label size: Length and width vary for required label content, but no less than 2 inches wide by 1 inch high.
- D. Baked-Enamel Warnings Signs:
  - 1. Preprinted aluminum signs, punched or drilled for fasteners, with colors, legend, and size required for application.
  - 2. 1/4 inch grommets in corners for mounting.
  - 3. Nominal size, 7 inches by 10 inches
- E. Metal-Backed, Butyrate Warning Signs:

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

## 2.5 EQUIPMENT IDENTIFICATION NAMEPLATES

- A. Provide plastic labels for mechanical engraving with predrilled holes for attachment hardware.
  1. Material: rigid plastic laminated impact acrylic, 2 layer, exterior grade, UV stable
  2. Thickness: 3/16 inch minimum
  3. Maximum label size: Length and width vary for required label content, but no less than 2 inches wide by 1 inch high.
  4. Background color:
    - a. Normal power: Black, matte finish
    - b. Emergency power: Red, matte finish
  5. Lettering: White, machine engraved, Futura font, 3/8 inch high, all caps
  6. Maximum temperature: Able to withstand up to 160 deg. F.
  7. Fasteners: Self-tapping stainless steel screws, except contact type permanent adhesive where screws cannot or should not penetrate substrate.
    - a. Mounting screw type to be #8- 18 x 1 /2 drilling or tapping style, 1/4 inch hex washer head, stainless steel, or similar, appropriate for material in which sign is affixed to. A bead of silicone sealer shall be applied on back of sign and at screw locations prior to affixing sign to equipment.
    - b. For signs larger than 3 inches by 3 inches, use a minimum of 4 mounting screws.

## 2.6 LEGEND PLATES

- A. Die-stamped legend plate with mounting hole and positioning key for panel mounted operator devices, i.e. motor control pilot devices, hand-off-auto switches, reset buttons, etc.

## 2.7 BRASS TAGS

- A. 2 inch, 19 gauge, metal tags with die-stamped legend, punched for fastener.

## 2.8 PANELBOARD DIRECTORIES (400 AMP, OR LESS)

- A. Directories: Minimum 6 inch by 8 inch circuit directory frame and card with clear plastic covering shall be provided inside the inner panel door.
- B. Circuit numbering: Starting at the top, odd numbered circuits in sequence down the left hand side and even numbered circuits down the right hand side. Multi-section panelboards shall have continuous consecutive circuit numbers.

## 2.9 WIRE AND TERMINAL MARKERS

- A. Provide self-adhering, pre-printed, machine printable or write-on, self-laminating vinyl wrap around strips. Blank markers shall be inscribed using the printer or pen recommended by Manufacturer for this purpose.

## 2.10 PAINTED IDENTIFICATION MATERIALS

- A. Stencils: Standard fiberboard stencils, prepared for required applications with the letter sizes generally complying with recommendations of ANSI A13.1 for piping and similar applications, but not less than 3/4 inch high letters for access door signs and similar operational instructions.
- B. Stencil Paint: Standard exterior type stenciling enamel; black, except as otherwise indicated; either brushing grade or pressurized spray-can form and grade.

- C. Identification Paint: Standard identification enamel of colors indicated or, if not otherwise indicated for piping systems, comply with ANSI A13.1 for colors.

### PART 3 - EXECUTION

#### 3.1 PREPARATION

- A. Clean piping and equipment surfaces of substances that could impair bond of identification devices, including dirt, oil, grease, release agents, and incompatible primers, paints, and encapsulants.
- B. Coordination: Where identification is to be applied to surfaces which require insulation, painting or other covering or finish, install identification after completion of covering and painting. Install identification prior to installation of acoustical ceilings and similar removable concealment.

#### 3.2 ELECTRICAL EQUIPMENT IDENTIFICATION

- A. General: Install engraved plastic laminate sign or plastic equipment marker on or near each major item of electrical equipment and each operational device, as specified herein if not otherwise specified for each item or device.
- B. Optional sign types: Where lettering larger than 1 inch height is needed for proper identification, because of distance from normal location of required identification, stenciled signs may be provided in lieu of engraved plastic, verify with University's Representative.
- C. Lettering size: Minimum 1/4 inch high lettering for name of unit where viewing distances less than 24 inches, 1/2 inch high for distances up to 6 feet, and proportionately larger lettering for greater distances. Provide secondary lettering of 2/3 to 3/4 of size of the principal lettering.
- D. Plasticized tags: Where equipment to be identified is concealed above acoustical ceilings or similar concealment, use plasticized tags installed within concealed space to eliminate text in exposed sign (outside concealment). In rooms other than security area, mechanical rooms, storage, etc. use thumbtacks for exposed signs with color coded for each type of equipment. Verify with University's Representative.

#### 3.3 LEGEND PLATES

- A. Provide panel-mounted operators devices such as pilot lights, reset buttons, "HAND-OFF-AUTO" switches, etc.

#### 3.4 BRASS TAGS

- A. Provide tags for individual ground conductors to exposed ground bus indicating connection, i.e. "UFER", "Cold Water Bond", etc.
- B. Provide tags for all feeder cables in underground vaults and pull boxes.
- C. Provide tags for empty conduits in underground vault, pull boxes, and stubs.

#### 3.5 PANELBOARD DIRECTORIES (400 AMP, OR LESS)

- A. Provide typewritten directories arranged in numerical order denoting loads served by room number or area for each circuit.
- B. Verify room numbers or area designation with University's Representative.
- C. Mount panelboard directories in a minimum 6 inch by 8 inch metal frame under clear plastic cover inside every panelboard.

#### 3.6 WIRE AND CABLE IDENTIFICATION

- A. Provide wire markers on each conductor in panelboards, pull boxes outlet and junction boxes and at load connection. Identify with branch circuit or feeder number for power and lighting circuits and with control wire number as indicated on Manufacturer's shop drawings for control wiring.

- B. Provide colored phase markers for conductors as noted in Section 26 XX XX. Apply colored, pressure sensitive plastic tape in half-lapped turns for a distance of 3 inches from terminal points and in boxes where splices or taps are made. Apply the last two laps of tape with no tension to prevent possible unwinding. Do not cover cable identification markings by taping.

### 3.7 UNDERGROUND CONDUIT MARKERS

- A. During trench backfilling, for exterior underground power, signal and communications lines, install continuous underground plastic line marker, located directly above line at 6 inches to 8 inches below finished grade. Where multiple lines installed in a common trench or concrete envelope, do not exceed an overall width of 16 inches; install a single line marker.

### 3.8 JUNCTION BOX IDENTIFICATION

- A. The cover of junction, pull, and connection boxes for both power and signal systems, located above suspended ceilings and below ceilings in non-public areas, shall be clearly marked with a permanent ink felt pen. Identify the circuits (panel designation and circuit numbers) contained in each box.

### 3.9 ADJUSTING AND CLEANING

- A. Adjusting: Relocate any electrical identification device which has become visually blocked by Work of this Division or other Divisions.
- B. Cleaning: Clean face of identification devices.

### 3.10 EXTRA STOCK

- A. Furnish minimum of 5% extra stock of each electrical identification material required, including additional numbered valve tags (not less than 3) for each piping system, additional piping system identification markers, and additional plastic laminate engraving blanks of assorted sizes.
  - 1. Where stenciled markers are provided, clean and retain stencils after completion of stenciling and include used stencils in extra stock, along with required stock of stenciling paints and applicators.

END OF SECTION 23 05 53