

PART 1 - GENERAL

1.1 SUMMARY

A. Purpose

1. The purpose of this section is to provide electrical identification for electrical equipment, raceway, and conductors.

B. Section Includes:

1. Equipment identification nameplates.
2. Identification for conductors
3. Identification for raceways.
4. Warning labels and signs.
5. Instruction signs.
6. Receptacle Identification Labels
7. Miscellaneous identification products.

1.2 REFERENCES

A. American National Standards Institute (ANSI):

1. ANSI A13.1 "Scheme for Identification of Piping Systems"

B. Occupational Safety and Health Administration (OSHA). 29 CFR - Labor Chapter XVII Part 1910-145 "Occupational and Safety Health Standards" 1992.

C. Washington Administrative Code (WAC) 296-24 Part B-2 "Safety Color Code for Marking Physical Hazards."

1.3 ACTION SUBMITTALS

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

B. General

1. Submittals shall be in accordance with Conditions of the Contract and Division 01 Specification Sections.
2. Prior to making nameplates, submit a complete schedule indicating nameplate size, lettering size, color, and actual nameplate information.

1.4 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.

1.5 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 29 CFR 1910.145. Use consistent designations throughout Project.
- B. Coordinate installation of identifying devices with location of access panels and doors.
- C. Install identifying devices before installing acoustical ceilings and similar concealment.

1.6 MEETINGS

- A. Within one month after "Notice to Proceed", schedule a meeting with UW representatives to review electrical identification requirements.

PART 2 - PRODUCTS

2.1 EQUIPMENT NAMEPLATES

- A. Materials:
 - 1. Engraved plastic laminate - three-layer laminated plastic with punched or drilled holes for screw mounting
- B. Dimension
 - 1. Nameplate minimum of 1-3/4" high by 5" wide.
 - 2. Lettering height for panel or equipment identifier @ 3/8".
 - 3. Lettering height for remaining lines @ 3/16" high with 1/8" spacing between lines.
 - 4. Normal System: White letters on black background.
 - 5. Emergency System: White letters on red background.
 - 6. Comply with ANSI 13.1.
- C. Unit Substation, Switchboard and Switchgear Nameplates:
 - 1. Provide engraved plastic nameplate for each new Switchboard or Switchgear with the following information:
 - Line 1: Unit Substation, Switchboard or Switchgear Name
 - Line 2: Source from which fed and the source location (i.e. "Fed From PCM-SA00-N01 Located in Room SA003:")
 - Line 3: Amps, voltage, phase and wire
 - Line 4: Branch from which served (Normal, Life Safety, Critical, Equipment, Optional Standby)

2. Provide engraved plastic nameplates for each new or revised branch device in each unit sub-station, switchboard or switchgear with the following information:

Line 1: Load Served (i.e. panel names, motor control center, etc.)

Line 2: Area of building served (i.e. penthouse, lab, etc.)

Line 3: Type of load served (i.e. lighting, receptacles, equipment, etc.)

Line 4: Amp and AIC rating, if Amp rating and AIC are not visible on branch device with dead-front cover in closed position.

D. Panelboard Nameplates

1. Provide engraved plastic nameplate for each new panelboard with the following information:

Line 1: Panelboard Name

Line 2: Source from which panel is fed and the source location (e.g. Fed From PCD-SA03-N03 Located in Room SA3003)

Line 3: Transfer switch from which panel is fed (if applicable)

Line 4: Amps, voltage, phase and wire

E. Transfer Switches

1. Provide phenolic nameplate for each new automatic and manual transfer switch with the following information:

Line 1: Transfer switch name (i.e. SWAT...)

Line 2: Branch from which served (Normal, Life Safety, Critical, Equipment, Optional Standby).

Line 3: Normal source feed and location

Line 4: Emergency source feed and location

Line 5: Load served

F. Disconnects, Starters, Combination Starters and Other Devices

1. Provide phenolic nameplate for each device with the following information:

Line 1: Load served

Line 2: Panelboard and circuit number from which device is fed and location

Line 3: Fuse size or breaker size as applicable

2.2 CONDUCTOR, CABLE AND AC AND MC 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 conductor and cable size.
- B. 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.
- 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.

2.3 RACEWAY IDENTIFICATION MATERIALS

- A. Comply with ANSI A13.1, for minimum lettering size and for minimum length of color field for each raceway size.
- B. Legend for Raceway Carrying Circuits at 600 V or Less:
 - 1. Legend: Indicate system identification, panel and circuit numbers
- 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. Color scheme for plastic labels

System	Label Color	Lettering Color	Identification
4.16kV Emergency	Red	White	
13.8kV Normal	Yellow	Black	
Normal Power and Control	White	Black	
Emergency Power and Control:			
Emergency - Life Safety	Red	White	"EM - LS"
Emergency - Critical	Red	White	"EM - CR"
Emergency - Legally Required Standby	Red	White	"EM - LRS"
Emergency - Optional Standby	Red	White	"EM - OS"
Fire Alarm	Red	White	"FA"
Clean Agent System	Dk. Blue	White	"FP"
Security	Green	Black	"SEC"
Intercom, Public Address, Nurse Call	Orange	Black	"IC", "PA", or "NC" (as app.)
Clock	Lt. Blue	Black	(Symbol for Clock)
CATV	Yellow	Black	"CATV"
CCTV	Lt. Green	Black	"CCTV"
Communication Data	Black	White	"C/D"

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.

2.5 RECEPTACLE AND SWITCH IDENTIFICATION LABELS

- A. Materials
 - 1. Adhesive Film Label: Machine printed, in black, by thermal transfer or equivalent process.
- B. Identification
 - 1. Label emergency receptacle and switch device plates with "EMERGENCY" above the receptacle with the panelboard and circuit number supplying them below the receptacle. Label lettering shall be approximately 3/16" high, red filled characters.
 - 2. Label normal receptacle and switch cover plates with the circuit number supplying them below the device using 3/16" high, black filled letters.
 - 3. For all receptacles other than 15 and 20 amp, 120 volts, provide separate nameplate with ampere rating, voltage and phase.
 - 4. Provide labels on faceplates of all owner furnished equipment and equipment furnished under other divisions with circuit number, and "EMERGENCY" (where applies) as specified in this section. This includes but is not limited to: headwalls, gas columns and booms, patient consoles, medical rail systems, custom casework with electrical devices, etc.
 - 5. In addition to receptacle labels, provide labels for fixed equipment at a visible location mounted on or near the equipment. Examples of fixed equipment are refrigerators, water fountains, hoods, ranges, dishwashers, etc. Coordinate location of labels with the Owner.
 - 6. Special equipment outlet labels.

2.6 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 - GENERAL

- A. Verify identity of each item before installing identification products.
- B. Location: Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment.
- C. Apply identification devices to surfaces that require finish after completing finish work.

- D. Self-Adhesive Identification Products: Clean surfaces before application, using materials and methods recommended by manufacturer of identification device.

3.2 EQUIPMENT IDENTIFICATION:

- A. On each unit of equipment, install unique designation nameplate that is consistent with naming used in wiring diagrams, schedules, and the Operation and Maintenance Manual.
- B. In addition to equipment listed in Part 2 provide nameplates for:
1. Access doors for concealed electrical devices
 2. Transformers
 3. Enclosed over-current protective devices
 4. Electrical cabinets, enclosures and terminal cabinets
 5. Contactors
 6. Battery -inverters, battery racks, UPS equipment
 7. Monitoring and control panels and equipment
- C. Confirm all final naming prior to label manufacture.
- D. Labeling Instructions:
1. Indoor Equipment:
 - a. Receptacle and switch cover plates: Adhesive film label.
 - b. Other: Self-adhesive, engraved, laminated acrylic or melamine label.

3.3 CIRCUIT CONDUCTOR IDENTIFICATION

- A. Power-Circuit Conductor Identification, 600 V or Less:
1. For conductors #8 and larger, in vaults, pull and junction boxes, manholes, and handholes, use color-coding conductor tape to identify the phase.
 2. 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 permit.
 - b. Colors for Circuits:

Conductor	120/208V (note 1)	277/480V
Phase A	Black	Brown
Phase B	Red	Orange
Phase C	Blue	Yellow
Neutral	White	Gray
Ground	Green	Green
Isolated Ground	Green/Yellow	Green/Yellow

- 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. Note 1 – This color code also applies to medium voltage phasing at cable terminations. Identify color-coded conductors with appropriately colored plastic vinyl tape (3M #190-A).
 - e. Buses and connections shall be identified left to right, top to bottom, or front to rear; shall read A-B-C; and shall be color-coded per the table above.
 - f. Feeders for all new construction shall have color-coded phase identification at all junction boxes and wherever feasible, and shall have solid color-coded insulation for phase designation. Where the proper color wire insulation cannot be obtained, black insulation shall be used and the conductors shall be coded with plastic vinyl tape, 3M #190-A, 3/4-inch or equal.
 - g. Identify color-coded conductors with appropriately colored plastic vinyl tape (3M #190-A) in the panel when branch circuits are reconnected for balancing panel load.
3. Conductors to Be Extended in the Future: Attach self adhesive label to conductors and list source.

B. Control wiring

- 1. All control-wire terminations are to be identified by tubular sleeve heat shrink-type markers to agree with wire marking identification on manufacturer's equipment drawings.

3.4 RACEWAY IDENTIFICATION

A. Accessible Raceways and Metal-Clad Cables, 600 V or Less, for Service, Feeder, and Branch Circuits.

- 1. Install labels at 30-foot (10-m) maximum intervals.
- 2. Install minimum one label per enclosed room.

B. System Identification Color-Coding Bands for Raceways: Each color-coding band shall completely encircle raceway. 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.

C. Junction Box Color Coding

- 1. Color Code all junction and pull boxes installed in accessible ceiling spaces and exposed in unfinished areas using spray paint on the box and entire cover in the following manner:

<u>System</u>	<u>Color</u>
480 Volt Power	Brown
277 volt lighting	Yellow
120/208 volt	Unpainted
Emergency Power	Orange
Clock & Program	Green
Fire Alarm	Red
Telephone/Network	Black
Nurse Call	Light Blue
Public Address	Silver
Television	Gold
Access Control	Gray

CCTV Light Green

2. Use self-adhesive vinyl labels following painting to indicate the system and the circuit numbers in 1" (25mm) high letters contained within.

D. Feeder and branch circuit conduits

1. No labeling required for raceways with readily identifiable terminations within the same room
2. In accessible ceiling spaces and exposed in unfinished areas, label conduit with panel and circuit numbers of conductors routed through the conduit. Label conduit at all wall penetrations and connections to all panels, junction boxes, and equipment served.
3. Use a black indelible marker and hand print label in a clear workmanlike manner, or use stencil and black paint to provide a clearly legible label.

E. Empty conduits

1. Provide labels with description of purpose, and location of opposite end, on each end of conduits provided for future.
2. Equipment or those abandoned as a result of this contract: Cardboard or plastic handwritten tags are permissible. Note accurately on as-built drawings.

3.5 BRANCH CIRCUIT PANELBOARD DIRECTORIES

A. Provide neatly typed schedule within a plastic jacket, pocket, or protective cover for protection from damage or dirt.

1. Number each single pole space: Odd-numbered circuits on left side or top, even on right side or bottom.
2. Securely mount on inside face of panelboard door.
3. When no cover, provide individual nameplates for each overcurrent and other device.
4. Define briefly, but accurately, nature of connected load (i.e., Lighting Office, Receptacles, Mechanical/Electrical Room, etc.) as approved.
5. Provide room locations for all loads and indicate panel name on schedule.
6. Multi-pole circuits to utilize first pole space number as its circuit number

B. Confirm room numbers with U.W. Construction Coordinator prior to noting on schedules.

C. Spare circuit breakers and space positions shall be noted in pencil.

D. Panel schedules and as-built circuit numbers shall agree.

3.6 WARNING SIGNS

A. Warning Labels for Indoor Cabinets, Boxes, and Enclosures for Power and Lighting: Self-adhesive warning labels.

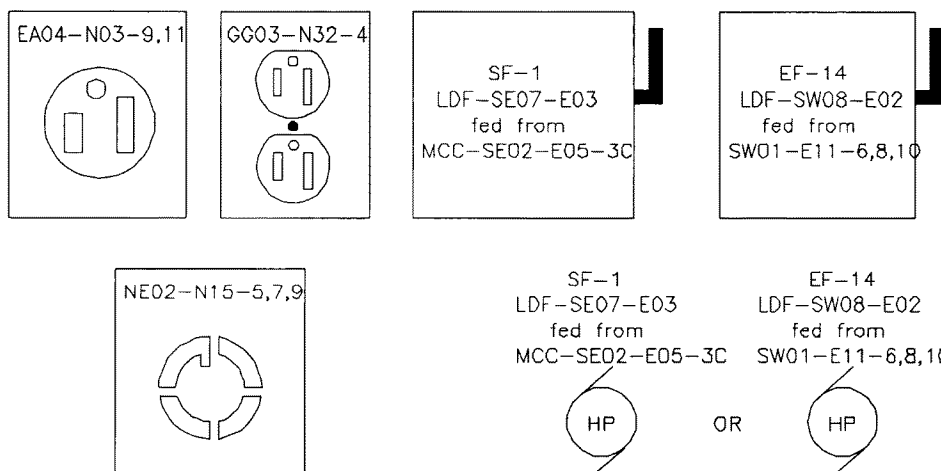
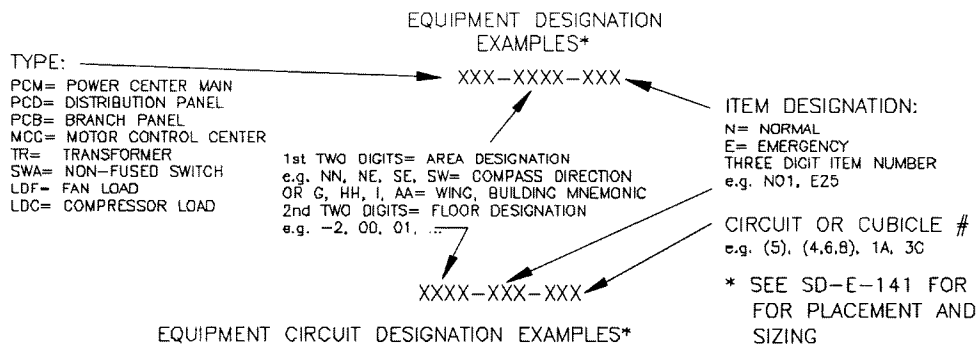
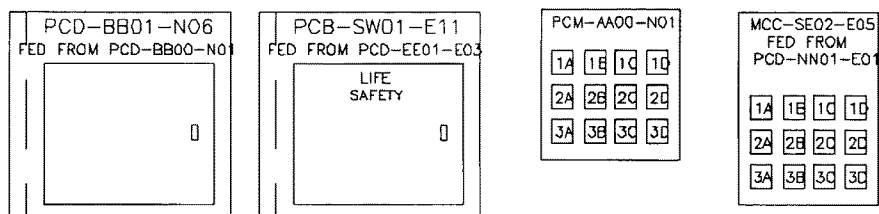
1. Comply with 29 CFR 1910.145.
2. Identify system voltage with black letters on an orange background.
3. Apply to exterior of door, cover, or other access.
4. For equipment with multiple power or control sources, apply to door or cover of equipment including, but not limited to, the following:
 - a. Power transfer switches.
 - b. Controls with external control power connections.

3.7 MISCELLANEOUS NAMEPLATES

- A. In addition to those nameplates required by these documents, provide 50 additional nameplates as directed by the Owner. For bidding purposes, nameplates shall be based on a size of 1-3/4" high x 5" long and shall contain one line of 30 characters at 3/8" high and three lines of 50 characters at 3/16" high with 1/16" spacing between lines.

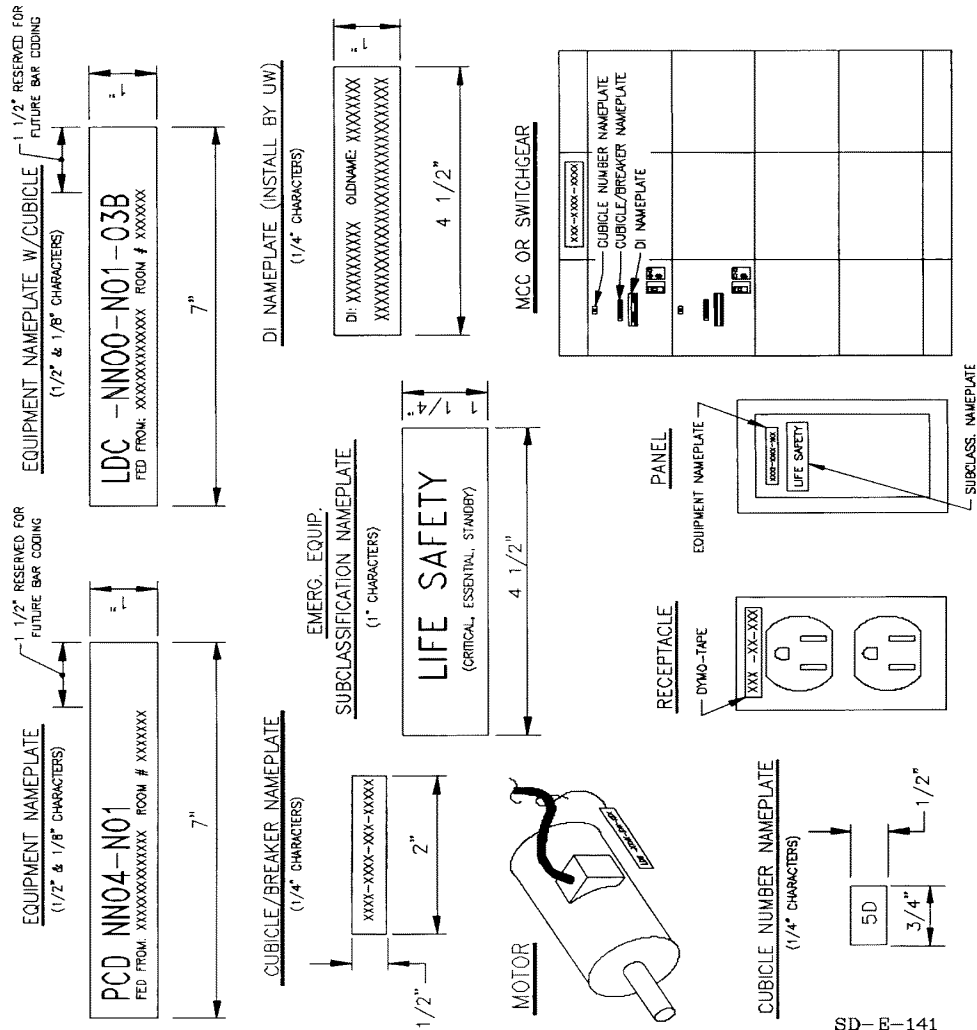
3.8 LABEL EXAMPLES

- A. Refer to following example for equipment nameplate labeling format:



SD-E-154

Equipment "Fed From" Label



SD-E-141

Equipment Label Format and Location



**Arc Flash and Shock Hazard
Appropriate PPE Required**

<i>Dist in Ft & In</i>	Flash Hazard Boundary
<i>XX</i>	cal/cm² Flash Hazard at 1 Ft 6 In
<i>Category</i>	List of PPE Required
<i>XXX VAC</i>	Shock Hazard when cover is removed
<i>XX</i>	Glove Class
<i>Dist in Ft & In</i>	Limited Approach Dist (Fixed Circuit)
<i>Dist in Ft & In</i>	Restricted Approach
<i>Dist in Ft & In</i>	Prohibited Approach
<i>MM/DD/YYYY</i>	Arc Flash Study Date (IEEE 1584-2004a)

Equipment ID (Name): (Place Panel Name Here)
Protective Device: (Name of Upstream Protective Device)

Scenario 1 – Utility (In most cases)

Study Performed By: Firm Name, Telephone #, Date

Sample Arc Flash Warning Label

END OF SECTION