

# Electrical - Standard Specifications

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## ELECTRICAL IDENTIFICATION

### STANDARD SPECIFICATIONS

The following specification is intended as a guide only. The Consultant shall write the specifications to meet the project needs in consultation with the Owner.

#### **PART 1 – GENERAL**

##### 1.01 DESCRIPTION

###### A. Purpose

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

###### B. General

1. Provide labels, nameplates, panel directories and color-coding as specified herein and according to attached electrical identification drawings.

##### 1.02 RELATED SECTIONS

- A. The work under this section is subject to requirements of the Contract Documents, including the GENERAL CONDITIONS, SUPPLEMENTAL CONDITIONS, and sections under Division 1 GENERAL REQUIREMENTS.

##### 1.03 REFERENCES

###### A. American National Standards Institute (ANSI)

1. ANSI A13.1 Operational and Warning signs

##### 1.04 SUBMITTALS

###### A. 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.

## 1.05 MEETINGS

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

## **PART 2 - PRODUCTS**

### 2.01 EQUIPMENT NAMEPLATES AND DEVICE LABELS

- A. Materials
  - 1. Provide nameplates constructed of 1/16-inch thick plastic laminated material. Engrave through colored surface material to contrasting colored sub-layer.
  - 2. Use receptacle labels by electronic labeler Brother P-Touch, model PT-20/25, Dymo-Tape or approved equal.
- B. Provide nameplates for the following:
  - 1. Equipment identification labels for all electrical equipment including, but not limited to, switchgear, switchboards, panels, transfer switches, disconnect switches, transformers, capacitors, fixed equipment, motor starters, MCC's, motors, etc.
  - 2. Subclassification labels for all emergency power system equipment as listed for equipment identification labels, and all junction and pull boxes.
  - 3. Fire Alarm equipment per the Fire Alarm specification
  - 4. Cubicle/space labels for all MCCs, substations, and distribution switchboards
  - 5. Identify fuse type and size on the cover of fusible equipment.
  - 6. Special equipment outlet labels ( ¼-inch letters)
  - 7. GFCI receptacles: "Series GFCI Protected"
  - 8. Time delays: Provide 1/8-inch lettering at the control location to identify a motor having a time delay relay - "Time Delay Start to Limit System Inrush."
  - 9. Cover plate receptacle labels shall indicate panel and circuit identification for all receptacles.
  - 10. 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 University.
  - 11. Pathway Lighting. Indicate power source. (Bldg name, panel and circuit number).

### 2.02 RACEWAY LABELS

- A. Identify medium/high voltage conduits within buildings and electrical rooms by painting on its full length the following:
  - 1. Stenciling in 2-inch black letters: Stencil to be placed once in each room and at a minimum of every 50 feet. Place where convenient for tracing. Exception: Stencil not required if conduit does not exit room.

2. Stencil to include source equipment name, voltage, load equipment name (i.e. PCU-BB01-E01/4160V/TR-SW01-E01)
3. Paint medium voltage conduits: Emergency system conduit, (4.16 kV and 2.4 kV) - red; normal system conduit, (13.8 kV) - yellow. For other medium or high voltage systems, contact UW Campus Engineering for color scheme.

**B. 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.

**C. 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.

## **2.03 BRANCH CIRCUIT PANELBOARD DIRECTORIES**

- A.** Provide neatly typed schedule under plastic jacket 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. Multipole 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.

## **2.04 WIRE AND CABLE LABELING**

**A. 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.

**B. Power conductor wire, cable and buses**

1. Buses, feeders, branch circuit conductors and medium voltage cables shall be properly phased and identified throughout. Individual conductors shall be color coded as noted below:

| 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 |

*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).*

- a. 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.
  - b. 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.
  - c. 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.
- C. "Low voltage" cable and special systems
1. See individual functional specification sections.

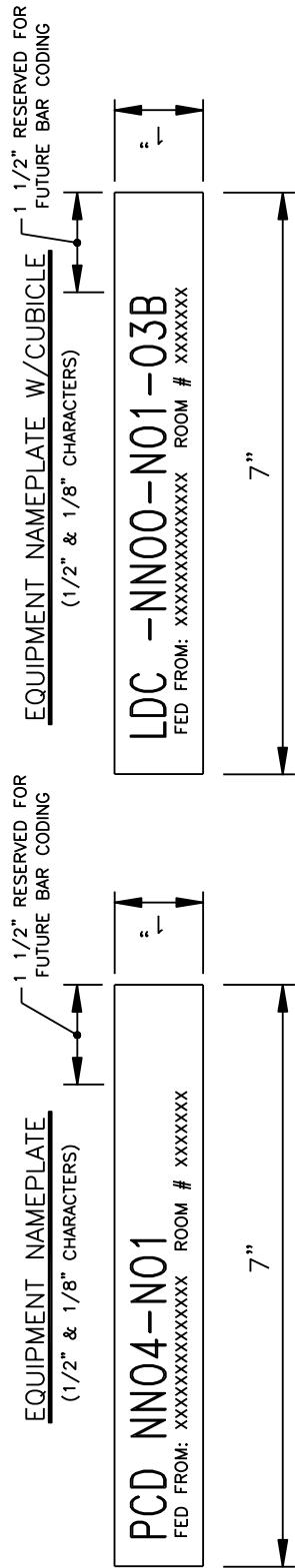
## 2.05 COLOR SCHEME FOR LABELS (See attached standard drawings for examples):

| System                               | Label Color | Lettering Color | Identification                |
|--------------------------------------|-------------|-----------------|-------------------------------|
| 2.4kV & 4.16kV Emergency             | Red         | White           |                               |
| 13.8kV Normal                        | Yellow      | Black           |                               |
| 2.4kV Normal                         | Orange      | White           |                               |
| Normal Power and Control             | White       | Black           |                               |
| <b>Emergency Power and Control:</b>  |             |                 |                               |
| 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"                          |
| Halon                                | 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)            |
| TV                                   | Yellow      | Black           | "TV"                          |
| Communication Data                   | Black       | White           | "C/D"                         |

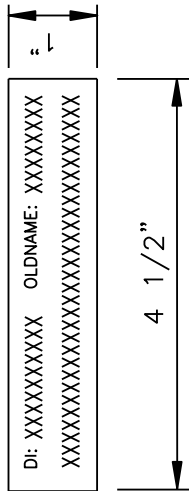
### **PART 3 - EXECUTION**

#### **3.01 REQUIREMENTS**

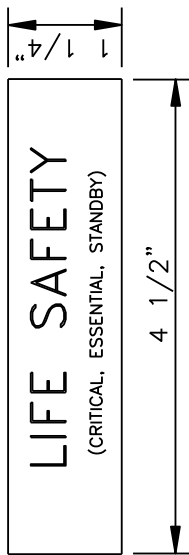
- A. Attachment
  - 1. Securely attach engraved labels and nameplates with rivets or screws.
  - 2. Clean surfaces thoroughly before attaching all labels. Use solvent on device plates before attaching electronic or Dymo-tape labels. (Without proper cleaning, electronic or Dymo-tape labels will soon curl off.)
  - 3. Drill hole in nameplate and attach to motor flexible conduit with plastic tie-wrap.
- B. No temporary markings permitted to remain on equipment. Remove all temporary markings where possible. Where markings cannot be removed, repaint trims, housing, etc. to cover markings. Refinish defaced finishes.
- C. Labeling abbreviations permitted only as approved.



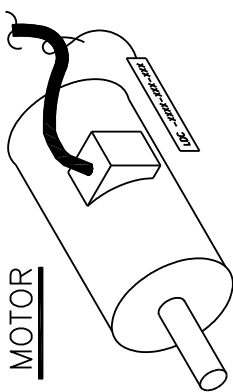
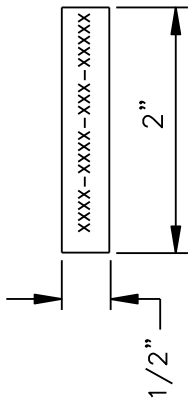
DI NAMEPLATE (INSTALL BY UW)  
(1/4" CHARACTERS)



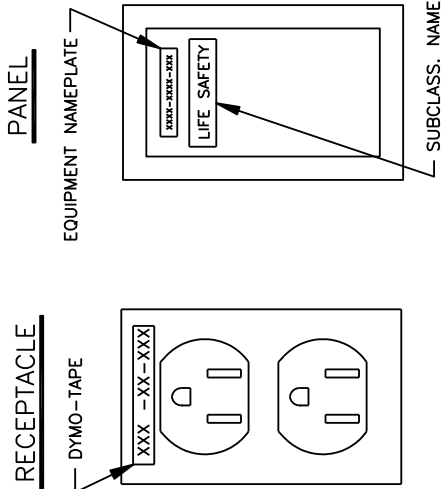
EMERG. EQUIP. SUBCLASSIFICATION NAMEPLATE  
(1" CHARACTERS)



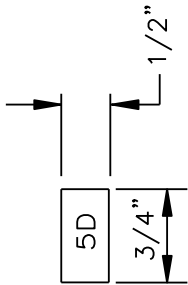
CUBICLE/BREAKER NAMEPLATE  
(1/4" CHARACTERS)



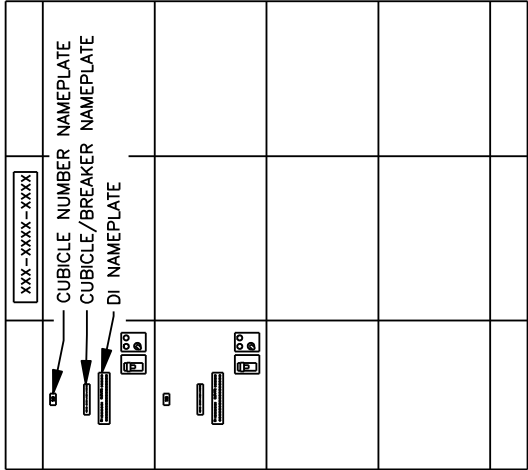
MOTOR



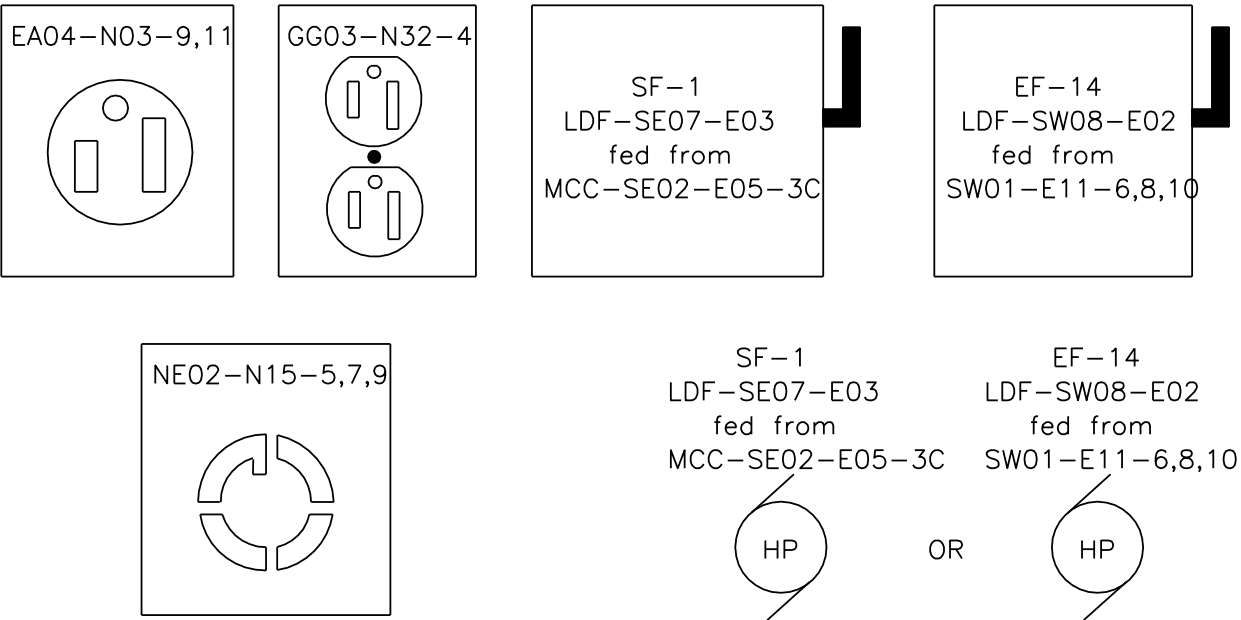
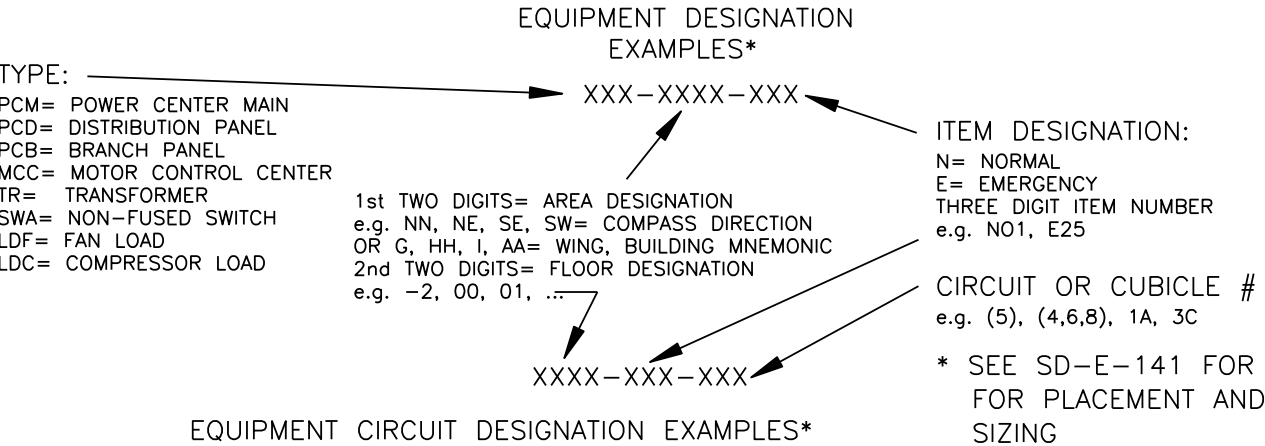
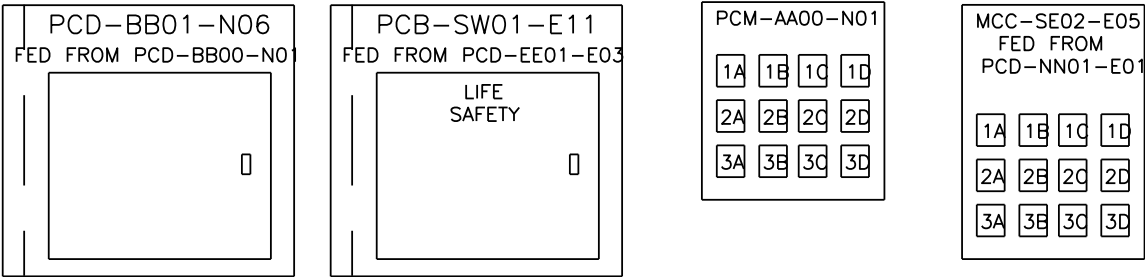
CUBICLE NUMBER NAMEPLATE  
(1/4" CHARACTERS)



MCC OR SWITCHGEAR

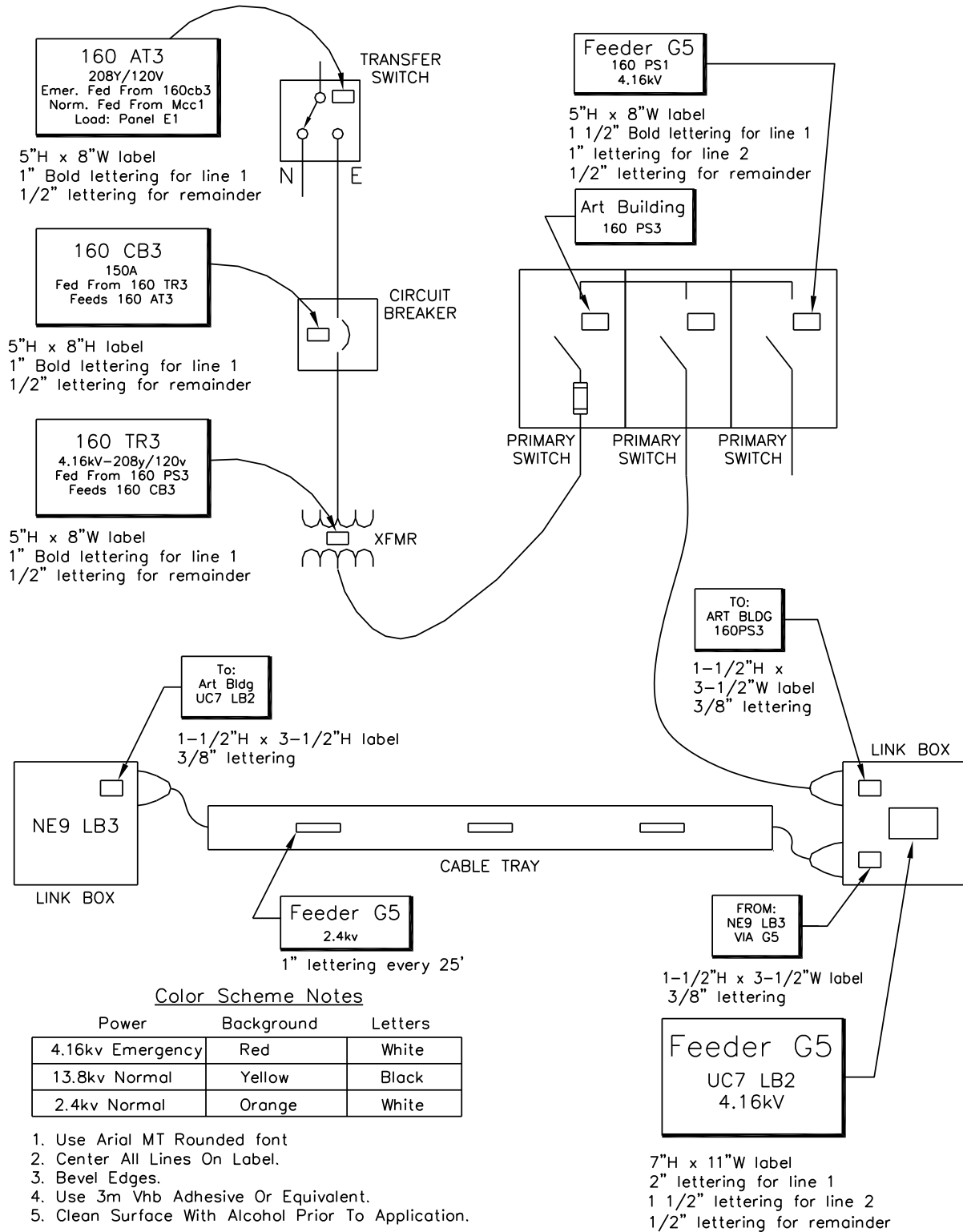


Equipment Label Format and Location



SD-E-154

Equipment “Fed From” Label



### Medium Voltage Equipment Labels

Arc  
and  
Hazard



**WARNING**

Flash  
Shock

**Appropriate PPE Required**

|                            |                                                     |
|----------------------------|-----------------------------------------------------|
| <i>Dist in Ft &amp; In</i> | <b>Flash Hazard Boundary</b>                        |
| <i>XX</i>                  | <b>cal/cm<sup>2</sup> Flash Hazard at 1 Ft 6 In</b> |
| <i>Category</i>            | <b>List of PPE Required</b>                         |
| <i>XXX VAC</i>             | <b>Shock Hazard when cover is removed</b>           |
| <i>XX</i>                  | <b>Glove Class</b>                                  |
| <i>Dist in Ft &amp; In</i> | <b>Limited Approach Dist (Fixed Circuit)</b>        |
| <i>Dist in Ft &amp; In</i> | <b>Restricted Approach</b>                          |
| <i>Dist in Ft &amp; In</i> | <b>Prohibited Approach</b>                          |
| <i>MM/DD/YYYY</i>          | <b>Arc Flash Study Date (IEEE 1584-2004a)</b>       |

**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**