

ARC FLASH INFORMATION GUIDE

DATA REQUIRED TO BE ON THE NEW ARC FLASH WARNING LABELS

Here's the facts . . .

The Federal Government (OSHA) requires that all "Non-Dwelling" facilities have an Arc Flash Hazard Analysis done to determine:

- The Arc Flash Boundary
- The Level of PPE Required
- The presence of a Flash Hazard

NFPA 70E 130.3 says:

"A flash analysis shall be done in order to protect personnel from the possibility of being injured by an arc flash. The analysis shall determine the Flash Protection Boundary and the Personal Protective Equipment that people within the Flash Protection Boundary shall use."

NFPA 70E 400.11 says:

"Switch boards, Panel boards, Industrial Control Panels, and motor control centers that are in other than dwelling occupancies and are likely to require examination, adjustment, servicing, or maintenance while energized shall be field marked to warn qualified persons of potential arc flash hazards. **The marking shall be located so as to be clearly visible to qualified persons before examination, adjustment, servicing or maintenance of the equipment.**"

NFPA 130.7 (E) says:

"Safety signs that meet the ANSI Z535 Standard shall be used to warn employees about electrical hazards that might endanger them."

Refer to:

OSHA 29CFR Part 1910.302-308 & 1910.331-335
US Department of Labor, Occupational Safety & Health Administration.
National Fire Protection Association, NFPA 70E

Your OSHA compliance checklist:

- Conduct Arc Flash Analysis
- Place Labels/Signs on Panels
- Obtain PPE
- Train workers on safety/hazards

Call for a free consultation...

WARNING	
Arc Flash and Shock Hazard Appropriate PPE Required	
FLASH PROTECTION Flash Hazard Category: <u>4</u> Min. Arc Rating (cal/cm2): <u>71</u> Flash Protection Boundary: <u>328</u> PPE: <input checked="" type="checkbox"/> Cotton Underwear <input checked="" type="checkbox"/> FR shirt and pants <input checked="" type="checkbox"/> Full Flash Suite & Hood <input checked="" type="checkbox"/> Hard Hat <input checked="" type="checkbox"/> Safety Glasses or Goggles <input checked="" type="checkbox"/> Hearing Protection <input checked="" type="checkbox"/> Leather Gloves and Shoes	SHOCK PROTECTION 480 VAC Shock Hazard When: Cover is Removed Limited Approach Boundary: <u>36</u> Restricted Approach Boundary: <u>12</u> Prohibited Approach Boundary: <u>1</u> PPE: <input checked="" type="checkbox"/> Class 00 <input checked="" type="checkbox"/> V-Rating 500
Equipment ID: MD-1 Main Disconnect Switch	

Boundaries

The limited, restricted and prohibited approach boundaries are determined using NFPA Table 2-1.3.4 (2000 edition).

Flash Protection Boundary

This boundary is the closest that anyone may approach without the use of PPE. The available short circuit current, predicted fault duration and the voltage are all needed to determine the flash protection boundary. This boundary is the distance from the arc source where there is a potential heat energy of 1.2 calories/cm² falling on the surface of the skin of 0.1 seconds. According to NFPA 70E, there are three ways in which this boundary can be calculated:

- Simplified Table 220.2 (B) (2), 220.6 (B) (9)
- Analysis based on NFPA 70E, Annex B
- Analysis based on IEEE 1584

Limited Shock Approach Boundary

This boundary may only be crossed by an "unqualified" person when they are accompanied by a "qualified" person. Documented training in the hazards of the particular equipment being serviced, as well as general training on the hazards of working on energized equipment, are required to become "qualified". Proper application of PPE must be a part of this training.

Restricted Shock Approach Boundary

This boundary may only be crossed by a "qualified" person that uses adequate shock prevention equipment and techniques.

Prohibited Shock approach Boundary

This boundary may only be crossed by a "qualified" person that has the same level of protection as if they are planning on direct contact with live parts.

PPE Required

The Personal Protective Equipment (PPE) required is dependent on the incident energy at every point a person may perform work on energized equipment. An electrical engineer or other qualified person should perform the calculations that determine the incident energy. The appropriate PPE should cover all parts of the body that may be exposed to an arc flash. This could include shoes, gloves, flame resistant clothing, safety glasses, etc.

Available Short-Circuit Current

The magnitudes of the prospective current flowing through the power system a various time intervals after a fault occurs are determined by short-circuit studies. This model is then used to perform a short-circuit analysis. The resulting data is used to determine the bolted three-phase short-circuit analysis. The resulting data is used to determine the bolted three-phase short-circuit, current which allows for the calculation of the arcing fault current.

Incident Energy at 18" (in cal/cm²)

This is the energy per unit area on a surface located 18in from the potential arc source. The incident energy is measured in units of calories per square centimeter. Second degree burns occur at an energy level of approximately 1.2 calories/cm².

Voltage shock hazard

The hazard on the voltage of a system that is used to determine the glove rating when working on that system. NFPA 70E has a table for glove ratings based on the voltage shock hazard.

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