

OSHA regulations for arc flash safety—What does this mean for you?

OSHA has recently added a new regulation: “Electric Power Generation, Transmission, and Distribution and Electrical Protective Equipment.” This paper will outline the background of the changes and offer best practices for how you can make your business safer by protecting against arc flash hazards.

Background

Historically, OSHA has provided general language to industry requiring employers to provide a workplace free of hazards. This broad definition left it to the employer to determine how to accomplish this feat. With this rule, OSHA is addressing arc flash hazards with required estimations for incident energy. This regulation gives teeth to citations and essentially requires an arc flash study be performed.

Significant changes to the OSHA standards

- General training of workers
- Employer and contractor coordination of rules and procedures
- Fall protection
- Minimum approach distances and insulation
- Protection from flames and electric arc hazards
- Foot protection
- De-energizing transmission and distribution lines and equipment
- Protective grounding
- Underground electrical installations
- Electrical protective equipment



Worker wearing personal protective equipment (PPE)

WARNING	
EATON SHOCK & ARC FLASH HAZARD	
<small>Location: MAIN SWGR</small>	
<small>Report #: TQ512345.1 Rev. 0</small>	
<small>Issued: JAN-2017</small>	
13' 6"	ARC FLASH BOUNDARY
32 cal/cm²	CALCULATED INCIDENT ENERGY AT 36" WORKING DISTANCE
3' 10"	ARC FLASH BOUNDARY
6 cal/cm²	CALCULATED INCIDENT ENERGY AT 36" WORKING DISTANCE
480 V Shock Hazard	
<small>Min. Glove Class: 00</small>	<small>Limited Approach Boundary: 3' - 6"</small>
<small>Restricted Approach Boundary: 1' - 0"</small>	

Arc flash label

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Who does this apply to?

Potentially affected companies found in a variety of manufacturing and other industries that own or operate their own electric power generation, transmission or distribution installations as a secondary part of their business operations:

- Companies that rely on the Table/Category Method defined by NFPA-70E 130.7(C)(15) and 130.7(C)(16). This method is no longer recognized or allowed by OSHA
- Companies that have not performed arc flash analysis to determine incident energy
- Companies with distributed/remote locations that do not have a global arc flash safety policy

Note: For facilities that have already performed arc flash studies, the NFPA-70E still recommends that arc flash studies be updated when a major modification or renovation takes place and at intervals not to exceed 5 years.

When did the changes occur?

On July 10, 2014, the final rule became effective (90 days after publication).

In fact, all employers must estimate the incident heat energy of any electric-arc hazard to which a worker would be exposed no later than January 1, 2015. And by April 1, 2015, employers must provide workers exposed to hazards from electric arcs with protective clothing and other protective equipment with an arc rating greater than the estimated hazard.

Benefits of the changes

OSHA expects the updated standards to prevent at least an additional 118 workplace injuries and 20 fatalities annually, compared to earlier standards. It estimates the net monetized benefits of the final rule to be about \$130 million annually. In addition, the updated standards are easier to understand and apply, thus improving safety by facilitating compliance.

Arc flash basics

NFPA 70E defines arc flash hazard as “a dangerous condition associated with the possible release of (thermal) energy caused by an electric arc.” NFPA, NESC®, CSA® Z462, MSHA, OSHA and IEEE® all deal with arc flash.

Definitions

Incident energy (arc flash energy)

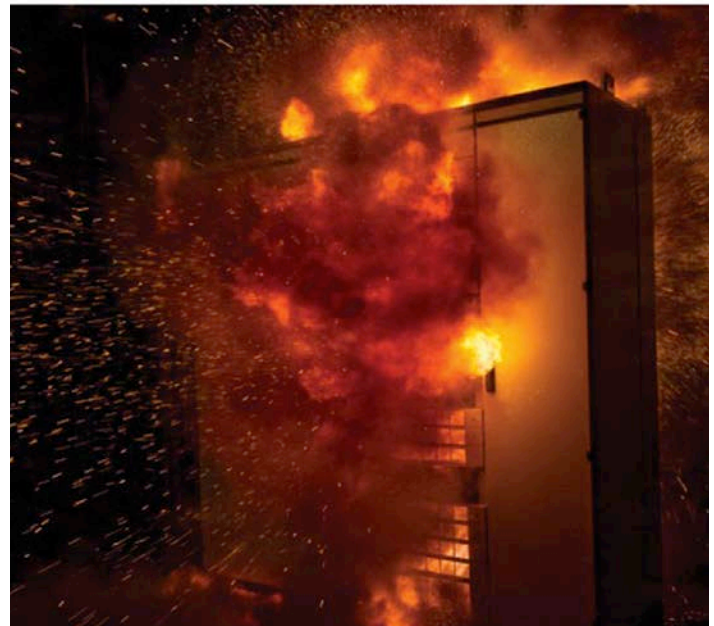
- The amount of thermal energy impressed on a surface, a certain distance from the source, generated during an electrical arc event
- Incident energy is measured in calories/cm²
- 1.2 cal/cm² of heat energy can cause a second degree burn to unprotected skin

The arc flash boundary

- The distance from the source of the arc flash blast where the incident energy equals 1.2 cal/cm²
- In order to protect workers, one would have to stand outside of this boundary or be dressed in personal protective equipment (PPE) that has a withstand rating exceeding the level of exposure at a given distance (usually a working distance of 18–24 inches)



Worker wearing PPE inspecting low-voltage switchgear



Example of arc flash event



Medium-voltage switchgear



Low-voltage switchgear

Eaton's answers to mitigating arc flash hazards

Eaton offers a wide range of expertise to help address the new OSHA regulations.

- Strong track record performing arc flash hazard analysis and studies
- Attention to detail and quality when personal safety is at stake
- Arc flash mitigation solutions to lower incident energy levels
- Arc flash safety training courses approved at state and national levels

Eaton arc flash prevention solutions

Solutions for reducing arc flash generally involve decreasing fault clearing time, increasing the distance from the arc to the worker or reducing fault current. Eaton has solutions for all of these.

- Arc flash studies
- Arc flash training
- Arc flash limiter conversion
- Arc flash relay
- Remote and motorized breaker racking solutions
- Compliant arc flash labels
- Arcflash Reduction Maintenance System™ breaker upgrades
- Arc-resistant low- and medium-voltage switchgear
- FlashGard™ motor control center (MCC)
- Arc-resistant medium-voltage variable frequency drives
- And more!

Eaton has nearly 100 solutions to help you keep your personnel and operations safe from arc flash hazards.

For more information, please visit
www.arcflashsolutions.com

Eaton
1000 Eaton Boulevard
Cleveland, OH 44122
United States
Eaton.com

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