



Arc Flash, ESWP and OSHA

If you've ever witnessed an arc flash explosion, you know that it can be a dangerous and violent event. In the approximate 30,000 arc flash events per year, there are 400 fatalities – 80 percent of which are caused by severe burns – and an additional 7,000 injuries and 2,000 hospitalizations.¹ In addition to worker safety issues, violations of Electrical Safe Work Practices (ESWP) can cost hundreds of thousands of dollars in fines from the Occupational Safety and Health Administration (OSHA). Two recent examples include a U.S. Postal Service location in Boston, Mass., that was levied a fine of \$357,000, while one in Scarborough, Maine, was fined \$430,000.²

Standard Requirements

Determining whether or not your facility is in compliance with OSHA ESWP requirements is of paramount importance. OSHA does not dictate the exact outline for an employer's ESWP program, but they do refer to the National Fire Protection Association (NFPA) 70E as the universally recognized standard. The NFPA-70E committee was first established in 1976 and the first standard was published in 1979. The standard has since gone through significant changes, most recently in 2012 with 19 major revisions. The exact requirements for OSHA ESWP can be found in OSHA chapters 1910.331-335, and in 1910.145 for signage requirements.

Risks and Analysis

One of the most significant risks in the workplace is the electrical arc flash. As defined by OSHA, "an arc flash is a phenomenon where a flashover of electric current leaves its intended path and travels through the air from one conductor to another, or to ground. The results are often violent and when a human is in close proximity to the arc flash, serious injury and even death can occur." Needless to say, when an arc flash occurs, both the human and financial tolls can far exceed the cost of even the heaviest OSHA fine.

Conducting arc flash hazard analysis is critical for every facility. A hazard analysis examines the potential for worker exposure to arc-flash energy, and can help your facility prevent injury and determine safe work practices, arc flash protection boundary, and the appropriate levels of personal protective equipment (PPE).³

A simple quiz to determine if your arc flash protection knowledge is up to date can be found at <http://ep-us.mersen.com> under the resources section.

¹Industrial Safety & Hygiene News, www.ishn.com

²US Department of Labor, Office of Public Affairs

³NFPA-70E

Determining Your ESWP

A large percentage of the requirements for ESWP are based on the available fault current for the electrical gear in question. Calculating this fault current requires extensive analysis of the electrical system, typically using a sophisticated computer modeling software program such as SKM or ETAP. This calculated fault current then determines the available energy in calories per square centimeter (cal/cm²). The available fault energy determines the level of PPE for safe energized work on the equipment (if equipment cannot be deenergized per OSHA standards). OSHA chapter 1910.333 can help you define which equipment should be classified as energized or deenergized.

Compliance

Achieving and maintaining compliance with OSHA standards can be a difficult task. In addition to analyzing your arc flash hazards, there are many other tools and studies that can help assure your facility's readiness.

- Analyze your electrical system to determine arc fault currents and PPE requirements at each point in your electrical system per NFPA-70E requirements or IEEE 1584
- Develop appropriate printed labels for compliance with NFPA-70E and OSHA 1910.145
- Short-circuit analysis (SKM PTW DAPPER Study)
- Protective device coordination study (SKM PTW CAPTOR Study)
- Load flow analysis

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