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## OSHA Requires Arc Flash Protection

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Determining what your organization should do to protect employees from electrical hazards can be a challenge. I will attempt to simplify it for you.

I am fortunate to be a seminar instructor whose topic is electrical safety, because every month I meet hundreds of people who are trying to do the right thing and protect their employees from electrical hazards. Yet these meetings have made clear there is much confusion about regulatory compliance in regards to electrical hazards. This is caused by the National Fire Protection Association standard 70E - not the document itself, but its place in the overall compliance picture. The most common question I receive concerning 70E is, "Is it the law?" Many others state definitively that since 70E is not an OSHA requirement, they are not implementing it at their facility. My response is three-fold: NFPA 70E is not an OSHA requirement. It is not the law. And neither of these facts matter.

What does matter is this: OSHA currently requires employers to protect their employees from electrical hazards, including shock and arc flash. It bears repeating: OSHA currently requires your facility to protect employees from arc flash. However, OSHA regulations themselves do not provide enough detailed information to accomplish this. NFPA 70E is crucial because it provides a bridge between OSHA's requirement to protect against these dangers and actual compliance with that rule. OSHA itself defers to 70E in a Standard Interpretation Letter dated November 14, 2006: "OSHA recommends that employers consult consensus standards such as NFPA 70E-2004 to identify safety measures that can be used to comply with or supplement the requirements of OSHA's standards for preventing or protecting against arc flash hazards." The question you should be asking about 70E is not whether it is the law, but rather if your company is not using 70E to guard against electrical hazards, what is it

using? If your electrical safety training does not include the procedures explained in 70E, what does it include?

The primary method of protecting employees from arc flash as spelled out in 70E is de-energizing live parts prior to working on or near them using proper lockout-tagout procedures. This limits the employee's exposure to electrical hazards during the shutdown and verification process. Many believe they don't have to worry about arc flash because they have instituted a "no live work" policy at their facility. Because the employee is still exposed during shutdown and verification, this policy does nothing to remove the need to protect against arc flash. Until you have verified that the circuit is de-energized, it must be treated as energized and the appropriate Personal Protective Equipment (PPE) must be used to protect against arc flash.

The first step in protecting employees who will be exposed to an arc flash hazard is to identify the level of the hazard. NFPA 70E lists these as Hazard Risk Category (HRC) 0 through 4 based on the incident energy of the circuit. Each category requires progressively more thermal protection. Circuits with incident energy above HRC 4 are considered so dangerous that exposure to them is not recommended as PPE is not manufactured to guard against an arc flash of that magnitude. These circuits are more common than you might think: 42 percent of the facilities we've studied had such a panel.

There are two methods prescribed by 70E to determine the HRC. One tactic is to use the series of task-based tables provided in 70E that list HRC based on the type of equipment and the task being performed. The downside of this approach is that it is not specific enough. Think of a doctor who tells every patient who complains of chronic headaches that their symptoms are stress-related and they need to take a vacation. While he may be accurate in a handful of cases, this doctor is potentially misdiagnosing a serious life-threatening condition by applying a blanket solution to a specific situation. Similarly, the tables do not account for vital factors such as the facility in which the equipment is located. What applies to a piece of equipment in a library will likely not apply to the same piece of equipment in a steel mill.

A more thorough method is to have a complete arc flash analysis performed on your facility. This type of analysis involves a detailed field verification of your electrical distribution system from your utility to the equipment on the floor. This data is used by engineers utilizing software specifically designed to perform the calculations of the arc flash hazard levels. The engineers then must write a set of detailed instructions showing how these hazard levels can be reduced. In facilities we've studied, 90 percent of the panels did not need any modification. Of those that did, 80 percent could be modified relatively easily at a low cost, such as circuit breaker adjustment and fuse replacement. More expensive and time-consuming modifications include breaker replacement or having entire panels upgraded.

The full arc flash analysis has added benefit in that it will often turn up situations that eliminate the need to wear as much flame resistant clothing. Often we find the tables calculate a Hazard Risk Category much higher than is shown by the full analysis. Electrical staff appreciates this.

The tables alone will not provide your facility with an adequate long-term solution for providing protection from electrical hazards for your employees, but they are better than no solution at all. If your organization is not currently providing PPE to shield against arc flash hazards, then begin using the 70E tables immediately. OSHA requires arc flash protection now. Begin by using the tables until you can get a proper arc flash analysis completed that will give you a more accurate evaluation of the hazard risk levels and provide you with recommendations to reduce those levels.

NFPA 70E is a wonderful tool put together over many years by hundreds of people participating in the standards development process. It's not perfect, but it has and will save lives. That, in the end, is appropriate reason to implement 70E. Do not employ 70E purely for compliance reasons. There will be many decisions in the process of putting 70E into practice: which insulated tools to purchase, what PPE to purchase, who provides the training, drafting an electrical safety policy, performing hazard analysis, and many more. Make injury prevention your overall objective in these deliberations and you'll find your organization will be more than just compliant; it will be a safer place to work.

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