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## **OSHA And Arc-Flash Protection**

*OSHA says an employer must protect workers from electrical hazards, and employees must wear personal protective equipment. An industry consensus standard show how to comply.*

*By Daryn Lewellyn*

The National Fire Protection Association's 70E Standard for Electrical Safety in the Workplace is causing quite a storm in industry. From the same people who bring you a new version of the National Electrical Code every three years, 70E has a lot of people asking questions: What is it, does it apply to us, does OSHA require it, and can we be fined for not doing it?

The national discourse on 70E is pushed into a gray area by comments made by OSHA leadership. From comments like "OSHA doesn't require NFPA 70E per se" to an OSHA director going as far as saying if he were an employer and wanted to protect his employees from electrical hazards, he would certainly "turn to NFPA 70E." However, if you read between the lines, it appears more black and white.

### **Some History**

Years ago, OSHA realized the national consensus standards-producing organizations like NFPA were quite good at the process of developing standards for specific hazards, and it was unwise for OSHA to reinvent the wheel. Why not rely on these existing organizations to develop the standards, and OSHA will use them where applicable? In the mid-1970s, OSHA asked NFPA to create a standard to protect workers from electrical hazards in the workplace. Thus, the NFPA 70E was born; OSHA used it to create much of its 1910 Subpart S and 1926 Subpart K standards. Through this collaboration, electrical safety in the workplace was improved; many lives were saved and many accidents were averted.

Although it has been a while since OSHA adopted all of the changes in the newer editions, there have been several updates since NFPA 70E was first created. The latest edition, 70E 2004, has in it many requirements that, quite frankly, only a small percentage of facilities in this country have put into practice.

The dilemma centers on the vagueness of OSHA standards involving electrical safety. OSHA says an employer must protect workers from electrical hazards and that employees must wear personal protective equipment (PPE) to protect themselves.

The agency does not tell you how this should be done—but 70E does explain how to accomplish both of these requirements.

The combination of OSHA's intentional vagueness and its reliance on other organizations for detail makes the process effective. Although in situations like today, where the NFPA standard has been updated but not fully written into OSHA code, it can become a confusing environment for the employer to provide a safe and OSHA-compliant workplace.

Some of 70E's requirements causing the most angst in industry among those implementing the standards are: energized work permits, putting panels in an electrically safe condition, written electrical safety programs, training requirements, outside contractors, approach boundaries, arc-flash and PPE requirements.

### **Arc-Flash Basics**

Of all these, none causes more confusion than arc flash. In some organizations it is believed that 70E associates itself with arc flash and nothing more. This assumption is wrong. Arc-flash hazards, a small part of the standard, are hazards created when electrical energy is released in the form of heat and pressure. It can be caused by myriad of problems, some as simple as dropping a wrench into a live panel. Others may include an internal failure in a fuse or circuit breaker. The energy released can cause a small spark or potentially fatal explosion created by massive amounts of electrical current flowing through super-heated air.

An electrical engineering study, called an "arc-flash hazard analysis," is required to protect your employees from arc flash. This study will determine the hazards of each point in your facility where live electrical conductors might become exposed by opening of electrical enclosures. Simply put, the engineers will calculate the temperature of the energy release and how long it will last.

The three factors that determine the extent of an arc-flash injury are temperature, distance workers are to the hazard and the time it takes for a circuit to break.

Using the study results can determine what type of PPE is required at the location and at what distance to the exposed live parts must it be worn. The study will identify those areas of greatest hazard and make recommendations to reduce those hazards through modifications in the over-current protective equipment, current-limiting fuses, adjustable breakers, etc.

If you are unable to put the equipment in an electrically safe condition due to the exceptions allowed, then you must obtain an energized work permit, perform a shock-hazard analysis of the equipment, determine appropriate PPE and insulated tools required for shock protection, determine the shock-protection boundaries, perform an arc-flash hazard analysis, determine appropriate PPE required for arc-flash protection, determine flash-protection boundaries, and notify anyone in the area of your work.

These new requirements will be quite foreign to some, and it is these people that will undergo the greatest change in behavior. The 70E standard should be looked at as just that—a behavior change. It must start at the top of your organization, because everyone needs to realize it is no longer business as usual.

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