

Does OSHA Require an Arc Flash Study or Electrical Maintenance?

Does OSHA require the employer to follow NFPA 70E? Do they require the employer to perform an “Arc Flash Study?” Is electrical maintenance a requirement? How can we communicate these potentially complex questions to a customer and simplify them?

Let’s start with a few comparisons between OSHA and NFPA and then ask a few questions that may start a more detailed conversation with a prospect.

OSHA provides the laws that must be followed. There are many, but we can pick a few of them in order to talk about electrical safety (see Figure 1).

OSHA 29CFR 1910.132 mandates the use of a hazard assessment and proper selection of PPE (Personal Protective Equipment). PPE used to protect an employee from arc flash hazards is referred to as **Arc Flash PPE**. How would a person know what level of **Arc Flash PPE** is adequate for an arc flash hazard and know when one exists?

OSHA requires the use of PPE, but does not give the method that would find out what type of PPE would be able to protect a person given the severity of the arc flash. In the OSHA general requirement regulation of 29CFR 1910 subsection “S,” NFPA 70E is listed as a reference document.

The US standard NFPA 70E, Electrical Safety in the Workplace, gives us the “HOW” when it comes to hazard assessments (now referred to as risk assessments in 70E) and the PPE selection that might need to be used to protect a person from electrical hazards. Without these specific directions, it would be very difficult to meet the law as required from OSHA.

29 CFR 1910.132 (d)(1): Requires employers perform a personal protective equipment (PPE) hazard assessment to determine necessary PPE.

29 CFR 1910.332 (b) Content of training. (1): Practices addressed in this standard. Employees shall be trained in and familiar with the safety-related work practices required by 1910.331 through 1910.335 that pertain to their respective job assignments.

29 CFR 1910.333 (b)(2)(iv)(B): A qualified person shall use test equipment to test the circuit elements and electrical parts of equipment to which employees will be exposed and shall verify that the circuit elements and equipment parts are deenergized...”

29 CFR 1910.335 (a)(1)(i): Employees working in areas where there are potential electrical hazards shall use electrical protective equipment appropriate for the specific parts of the body for the work being performed.

29 CFR 1910.335 (a)(1)(iv): Requires employees wear nonconductive head protection whenever exposed to electric shock or burns due to contact with exposed energized parts.

29 CFR 1910.335 (a)(1)(v): Employees shall wear protective equipment for the eyes or face wherever there is danger of injury to the eyes or face from electric arcs or flashes or from flying objects resulting from an electrical explosion.

29 CFR 1910.335 (a)(2): Employees shall use insulated tools or handling equipment when working near exposed energized conductors or circuit parts.

29 CFR 1926.28 (a): Employer shall require employees wear appropriate personal protective equipment (PPE) during construction work.

Figure 1: OSHA 29 CFR 1910

To provide further clarity, 29 CFR 1910.335 (a)(1)(i) Employees working in areas where there are potential electrical hazards shall be provided with, and shall use, electrical protective equipment that is appropriate for the specific parts of the body to be protected and for the work to be performed.

Let us look at a few tough comments and questions a prospect could ask and then add a few ideas on how to respond.

1. **I'm not required to follow NFPA 70E.** This is correct. However, what other electrical safety standard will the customer use to give them details on HOW to comply with OSHA's electrical safety regulations as stated in the beginning of this article? Some potential answers that might help:

- a. **Do you follow OSHA's safety regulations?** If so, OSHA requires us to protect against electrical hazards, perform hazard assessments, and provide and wear protective equipment when faced with these hazards. But OSHA doesn't describe exactly how to do this.
- b. **They do refer to NFPA 70E in their regulations and 70E is there for us to find out the specifics in order to address OSHA's regulations.**
- c. **How will you comply? What procedures will you use if you decide to not follow NFPA 70E?**
- d. **OSHA has stated that if you implement NFPA 70E for your safety program, you will meet OSHA's requirements for electrical safety.**



Figure 2: An arc flash hazard is defined as (per NFPA 70E, 2018): A source of possible injury or damage to health associated with the release of energy caused by an electrical arc. Electrical arcs occur whenever there is a short/open, ground fault, or bolted fault across multiple phases.

2. **OSHA doesn't require me to do an "arc flash study."** OSHA does require us to understand the electrical hazards, perform a hazard assessment, and wear appropriate PPE. Some potential answers that might help:
 - a. **It is dangerous to assume that wearing a 40 calorie arc flash suit will protect a person against all arc flash hazards. The incident energy analysis (arc flash analysis) gives the qualified person greater understanding of the level of PPE that may be necessary. Also, it may determine that there is too much danger and even PPE would not be sufficient protection.**
 - b. **NFPA 70E is the most complete electrical safety standard in the world. OSHA refers to it in Subpart S of the General Industry requirements. It exists to give the employer and employees the procedures and processes to meet with OSHA's laws and regulations. An arc flash study is a requirement of 70E. If you are not using NFPA 70E to comply with OSHA's electrical safety regulations, how else will you know how to perform hazard assessments and provide the correct PPE?**
3. **Is electrical maintenance mandatory? I cannot budget for electrical safety or maintenance at this time.** Some potential answers that might help:
 - a. **What parts of OSHA's safety regulations do you choose not to follow? Do you follow OSHA's walking and working surface regulations? Working safely at a height? Storage of hazardous and flammable materials? Why would you believe that you can choose to ignore electrical hazards and safety?**
 - b. **Do you budget for fire safety systems, alarms, and other safety equipment and PPE? Why would you ignore the electrical system hazards. Electrical energy and unsafe electrical systems present a potential fire hazard and safety hazards for employees and contractors on site if it is not maintained, installed correctly, or used improperly.**
 - c. **NFPA 70E requires the electrical system to be maintained as part of a safety program. The condition of maintenance has to be a consideration whenever a person operates electrical equipment or is performing a risk assessment for the electrical hazards.**
 - d. **In other words, if NFPA 70E is followed, electrical maintenance is NOT AN OPTION. Unsafe electrical systems can present a dangerous work environment and they SHALL be addressed per NPFA 70E, 2018.**

About the author: Joe DeMonte spent 6 years as a Nuclear Operator with the United States Navy in submarines. As a PdM engineer for a commercial nuclear power plant, Joe implemented Beaver Valley Power Stations' first infrared and vibration analysis programs. He has over 27 years of industry experience, specializing in predictive maintenance techniques, especially infrared thermography. A former senior infrared thermography instructor for the ITC (Infrared Training Center of FLIR), he designed courses for instructing and certifying industrial and commercial infrared maintenance. He has degrees in Applied Nuclear Science and Liberal Arts and holds an ASNT Thermal Infrared Level III Certification.

References:

OSHA 29CFR 1910: General Industry Regulation, <https://www.osha.gov/laws-regs/regulations/standardnumber/1910>

NFPA 70E, 2018 Edition. <https://www.nfpa.org/>