

## OSHA and NFPA 70E

OSHA has adopted Electrical Safety-related work practices in OSHA 1910 Subpart "S" (1910.301 to 1910.399). While NFPA 70E is not enforced by OSHA, it's considered an industry best practice and designed to show employers and employees not just how to meet OSHA requirements, but how to exceed them.

### Who is Qualified to perform electrical work?

OSHA: One who has received training in and has demonstrated skills and knowledge in the construction and operation of electric equipment and installations and the hazards involved.

NFPA 70E®: One who has demonstrated skills and knowledge related to the construction and operation of electrical equipment and installations and has received safety training to identify the hazards and reduce the associated risk.

### Can anyone throw a disconnect?

It depends. Is the equipment in normal operating condition? Do you know how to assess the level of risk present? What signs of danger should you be looking for? What are these labels telling me about this equipment? When would PPE be required? These aren't just hypothetical questions; they can mean the difference between life and death. Everyone, not just Electricians should receive electrical safety training at a level appropriate to their job duties before attempting to interact with equipment. Working around electricity can be hazardous, and there may not be a second chance if you make the wrong call.



# NFPA 70E and Electrical Safety

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. Imagine a lightning bolt traveling faster than a fighter jet that's throwing streams of lava sprinkled with chunks of metal at you while at the same time making a boom louder than a stadium full of football fans learning to use jackhammers, and you might start to get an idea of the destructive potential of an arc flash. Because of the violent nature of an arc flash exposure when an employee is injured, the injury is serious – even resulting in death. It's not uncommon for an injured employee to never regain their past quality of life.

The National Fire Protection Association (NFPA) has developed specific approach boundaries designed to protect employees while working on or near energized equipment and exposed conductors. These boundaries are:

- **Limited Approach Boundary:** This is the boundary that marks the outer edge of the electrical shock hazard presented by an exposed energized conductor. As you pass this boundary moving closer to the exposed energized conductor, you are at risk of being shocked. Unqualified personnel must be warned of the hazards and escorted by a qualified person if they approach or cross this boundary.
- **Restricted Approach:** This is the boundary where you're at an increased risk of shock. Once you've crossed this boundary, you're close enough to the energized conductor that one wrong move could lead to tragedy. Unqualified personnel, personnel who aren't wearing the appropriate PPE and those wearing conductive objects are never allowed to cross this boundary.
- **Arc Flash Boundary:** This is the boundary where you would be exposed to enough heat from an arc flash that it would cause (painful, but hopefully survivable) second degree burns to any unprotected skin. As you move closer to the equipment, the amount of heat and energy you would be exposed to steadily increases. Unlike shock hazards, an arc flash hazard doesn't require the equipment to be open or the conductors to be exposed. Anyone who crosses this boundary must be protected from the arc flash hazard present. This boundary may be inside the Limited Approach Boundary, or it may be further away.

Typical Results from an Arc Flash

- Burns (Non-FR clothing can burn onto skin)
- Fire (could spread rapidly through building)
- Flying objects (often molten metal)
- Blast pressure (200 psi)
- Sound Blast (noise can reach 140 dB)
- Heat (upwards of 35,000 degrees F)

### Understanding the Arc Flash Warning Labels

NFPA 70E® requires owners or their designees to evaluate any equipment that must be serviced for the presence of arc flash and shock hazards. Once these evaluations have been completed, NFPA 70E® requires that the equipment be clearly labeled so that workers are given the necessary information to perform their jobs safely. These labels will tell workers things like operating voltage, shock and arc flash boundary distances, and PPE requirements.

ARC FLASH AND SHOCK HAZARD	
<b>FLASH PROTECTION</b> 32.8	<b>SHOCK PROTECTION</b> 480 VAC
Available Fault Current 168 kA	Shock Hazard at 18 inches
Arc Flash Boundary 28.82 ft	Shock Hazard at 42 inches
<small>(FOR WHEN AN INCREASED LIKELIHOOD OF INJURY FROM AN ARC FLASH HAZARD EXISTS)</small>	
<small>Recommended PPE for Flash and Shock: Clothing with an arc rating greater than the incident energy, i.e. Arc Flash Suit, Hood, Hard Hat, Safety Glasses or Goggles, Hearing Protection, Rubber Insulating Gloves with Leather Protectors, Leather Footwear (EH).</small>	
<small>Site Name: Name of Site January 1, 2021</small>	

### Is an Arc-Flash Hazard Assessment required?

Both OSHA and NFPA 70E® require employers to assess their workplace for hazards and to provide protection from these hazards. A shock and arc flash hazard assessment, along with the labeling requirement are specific and achievable tools NFPA 70E® gives to employers to help them protect their employees and the facilities where they work. These, along with a comprehensive Electrical Safety Program that incorporates training, permitting, procedures, and proper equipment selection for all workers can keep your job running smoothly, safely, and uneventfully.