Arc Flash Basics

An arc flash is a sudden electrical explosion that results when a high-voltage gap exists and there is a breakdown between conductors. An arc flash typically gives off great amounts of energy in several forms; light, heat, pressure and noise. The heat released during an arc flash can reach temperatures as high as 35,000° F. This temperature is sufficient to melt most metals.

The rapidly heated air expands with great force creating a pressure burst reaching pressures as high as thousands of pounds per square foot. This burst can hit a worker with great force and when combined with the typical high temperature of an arc flash, cause molten metal droplets of copper and aluminum electrical components to fly great distances at extremely high speeds (up to 700 mph). The noise generated by an arc flash can exceed 160 dB, loud enough to cause permanent hearing damage.

Arc flashes can be spontaneous or caused by accidentally bridging electrical contacts with a conducting object like a tool or even from a buildup of conductive dust. There are 2 main conditions under which an arc flash is likely to occur; while working on an energized circuit or when electrical equipment fails.

NFPA 70E recommends establishing an electrically safe work condition before working on a circuit. This can be done most simply by de-energizing the circuit by locking out and tagging the circuit. This is work to be left to trained professionals. Another recommendation of NFPA 70E to help protect against arc flash hazards is to establish boundary limits to limit who can access potentially electrically dangerous areas. These distances are calculated by using the voltage of the circuit and any special conditions that may affect the area. Access across these boundaries is determined by your qualifications to deal with electricity.

The furthest boundary from the electrical source is the Limited Approach Boundary. This boundary is to be crossed only by qualified persons or someone unqualified that is advised and escorted by a qualified individual. Closer in is the Restricted Approach Boundary that is to be entered only by someone qualified and they are required to use shock protection techniques and the appropriate PPE.
This is the closest a qualified person can approach without wearing rubber insulating gloves. The Prohibited Approach Boundary is also only to be entered by a qualified person but it requires the same level of protection as if the person is to have direct contact with a live part. Being within the Prohibited Approach Boundary is considered the same as contacting energized parts.

If you are not a qualified person, it is crucial that you are aware of and obey this approach distances. They are in place for your safety as well as those that are charged with working on energized parts. Whenever working around these boundaries or within them, be on alert that there may be the potential for an arc flash and pay close attention to all that the qualified person is instructing you to do. These instructions could save your life.

**Discussion Questions**

What can cause an arc flash?

What are the dangers that an arc flash can create?
MEETING / TRAINING
ATTENDANCE ROSTER

COMPANY: ______________________________________  ____ SAFETY MEETING

JOB/DEPT: ______________________________________  ____ SAFETY TRAINING

DATE: ___/___/_______  TIME: _______

TOPICS ADDRESSED: ____________________________________________________________

EMPLOYEE'S SIGNATURES

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EMPLOYEE SUGGESTIONS AND RECOMMENDATIONS:

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ACTION TAKEN:

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Supervisor's Signature         Date

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Safety Coordinator's Signature  Date

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