Worker Safety

Arc Flash Protection Guide for Keeping Workers Safe

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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 the ground. The results can cause serious injury and even death. The temperature of an arc flash can reach upwards of four times hotter than the sun!

Three factors determine the severity of an arc flash injury:

1. Proximity of the worker to the hazard
2. Temperature
3. Time for circuit to break

Arc flash incidents can result in extreme heat exposure, burns, fires, flying objects and sound blasts.

The National Fire Protection Association's NFPA 70E contains requirements for performing a shock and arc flash hazard assessment, which involves a calculation performed by a professional engineer to determine the incident energy found at each location. This risk assessment determines the various arc flash boundaries, as well as the PPE that must be used when approaching each boundary.

Arc flash boundaries

When determining what the arc flash boundaries are, the assessment includes three separate items. First is the **flash protection boundary**, the distance at which the incident energy from the live part is equal to 1.2 cal/cm2 (calories per square centimeter), which is the limit for a second-degree burn on bare skin. People must not cross this boundary unless they are wearing appropriate protective clothing and are under the close supervision of a qualified individual.

The second item is the **limited approach**, which is the distance at which barriers should be placed to protect unqualified personnel from an electrical hazard. Only qualified individuals and escorted unqualified people are allowed to enter a limited space.

The third is the **restricted approach**. This is the distance at which only qualified personnel are allowed, with appropriate protective clothing and other PPE for the associated hazard. No unauthorized conductive material or unqualified people are permitted to cross a restricted boundary. Further, a documented, management-approved plan, known as an energized electrical work permit, is required to enter a restricted space.

The NFPA has developed specific approach boundaries designed to protect employees while working on or near energized equipment. These boundaries move from least to most dangerous as follows:

1. **Flash Protection Boundary** (outer boundary): The flash boundary is the farthest established boundary from the energy source. If an arc flash occurred, this boundary is where an individual would be exposed to a curable second-degree burn (1.2 calories/cm2) from the heat generated from a flash.
2. **Limited Approach:** An approach limit at a distance from an exposed live part where a shock hazard exists.
3. **Restricted Approach:** An approach limit at a distance from an exposed live part which there is an increased risk of shock.
4. **Prohibited Approach** (inner boundary): A distance from an exposed part which is considered the same as making contact with the live part.

Each piece of equipment operating at 50 volts or more and not put into a deenergized state must be evaluated for arc flash and shock protection. This evaluation will determine the actual boundaries (i.e., prohibited, limited, restricted) and will help the worker determine what type of PPE must be worn.

Once the evaluation is complete, an Arc Flash Hazard warning label must be affixed to the equipment and readily accessible to employees who may work on the energized equipment.

Protective garments and equipment

Honeywell's ***arc flash PPE*** offers protection from head-to-toe, including clothing, head protection, foot protection and hand protection. They also make accessories, such as tool kits and maintenance boxes, to help electrical workers perform their roles safely.

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