Personal Protective Equipment

Arc Flash Protective Clothing

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With temperatures reaching 35,000°F, exposure to the extreme heat of an arc flash can result in life-threatening burns. Most fatalities occur because the clothing continues to burn after the arc exposure.

Flame-resistant clothing will self-extinguish, thus limiting the injury. ARC-rated performance values are assigned to clothing under NFPA 70E, ensuring you know what you're purchasing. When you're up against arc flashes and blast hazards, you don't want to take any chances with unproven PPE. Before we go any further, there are several definitions that need to be explained.

- **Arc Flash –** an electric discharge that travels through the air between conductors or from a conductor to a ground. The resulting explosion can cause fires and serious harm to equipment and people.
- **ATPV –** arc thermal performance value tells a wearer the point at which 1.2 Cal/cm2 of incident energy is transferred through the fabric. A garment's fabric is tested for arc, not the actual garment.
- **ARC Rating –** ARC ratings are described by ASTM 1506 as follows: An ARC rating is a value that indicates the ARC performance of a material or system of materials. It is either the ARC thermal performance value (APTV) or breakopen threshold energy (EBT) when the ATPV cannot be determined by Test Method F 1959. A garment's ARC rating can be found on the interior tag below the collar.
- **Calorie –** a measure of the energy released from an electrical explosion. 1 Cal/cm2 of incident energy will raise 1 gram of water 1 degree Celsius.

NFPA 70E stresses an Arc-Rated Category (ARC) level of arc flash protective clothing that must be worn to guard against a minimum level of energy (calories) released from an electrical explosion. Below is a table identifying the four ARC Flash PPE Levels:

Hazard Risk Category	Clothing Description	Minimum Arc Rating (cal/cm^2)
0	Non-melting flammable materials	N/A
1	Arc rated FR Shirt and FR Pants or FR Coverall	4
2	Arc rated FR Shirt and FR Pants or FR Coverall	8
3	Arc rated FR Shirt and FR Pants or FR Coverall, and arc flash suit selected so that the system arc rating meets the required minimum	25
4	Arc rated FR Shirt and FR Pants or FR Coverall, and arc flash suit selected so that the system arc rating meets the required minimum	40

The ARC ratings include five risk levels, which range from 0 to 4. Level 0 means there is no risk of melting materials (N/A), whereas Level 4 is an extreme risk. A Hazard Risk Category Level (HRC) level, now referenced as PPE Level, is determined by the minimum amount of calories per square centimeter (ATPV or Cal/cm2).

It is imperative that an arc flash hazard analysis be performed by safety personnel before selecting PPE styles. This can be accomplished in one of two ways:

1. Determine the energy exposure to a worker in calories.
2. Use the ***Job Task Table 130.7 (C) (9).*** The link provided shows a simplified method for using NFPA 70E tables.

For additional information on 70E, explore more ***here***.

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