

A worker wearing a white hard hat, a blue long-sleeved shirt, dark pants, and a full-face green and black protective shield is working on an electrical panel. The worker is also wearing yellow and white gloves and is using a tool to work on the panel. The background shows a hallway with a white wall and a door.

THE NFPA 70E ARC FLASH PPE CATEGORY 2 DAILY WEAR SOLUTION!

 **CSA Z462
COMPLIANT**

 **WESTEX**[®]
by *Milliken*

“ARC FLASH” DEFINED — NFPA 70E Annex K.3

When an electric current passes through air between ungrounded conductors and grounded conductors, the temperatures can reach 35,000°F. Exposure to these extreme temperatures both burns the skin directly and causes ignition of clothing, which adds to the burn injury. The majority of hospital admissions due to electrical accidents are from the arc flash burns, not from shock. Each year, more than 2,000 people are admitted to burn centers with severe arc flash burns. Arc flashes can and do kill at distances of 10 ft.

NFPA 70E STANDARD FOR ELECTRICAL SAFETY IN THE WORKPLACE

The Need

With possible temperatures of 35,000°F, the quick and intense energy of an electric arc flash can both burn the skin directly and cause ignition of clothing made from regular cotton and poly/cotton fabrics. Government reports note that the majority of severe and fatal burn injuries are due to an individual's clothing igniting and continuing to burn — not by the exposure itself. In an arc flash exposure, flame resistant clothing will provide a level of thermal protection (which is listed as an Arc Rating) and will self-extinguish, limiting the potential for more serious burn injuries.

The Standard

The National Fire Protection Association (NFPA) published the latest edition of the NFPA 70E Standard (Standard for Electrical Safety in the Workplace) in 2014. NFPA 70E states in section 130.7 Personal and Other Protective Equipment (C)(6) Body Protection, “Employees shall wear arc-rated clothing wherever there is possible exposure to an electric arc flash above the threshold incident energy level for a second degree burn [5 J/cm² (1.2 cal/cm²).” Although a voluntary standard, OSHA considers NFPA 70E a “recognized industry practice” and has levied fines to companies that haven't protected their employees when arc flash accidents have occurred.

The Solution

When evaluating fabrics for an FR clothing program to comply with NFPA 70E, Westex UltraSoft® and UltraSoft AC® are excellent options. With our market-proven technology, you can have flame resistance that is guaranteed for the life of the garment without sacrificing the soft, breathable comfort of cotton.

Many industry experts and end users have stated that an overwhelming majority of electrical job tasks fall within NFPA 70E PPE Category 1 or 2. The enclosed samples of UltraSoft® shirt, pant and coverall fabrics meet PPE Category 1 and 2 as a single layer, while providing superior comfort and a better value than other FR fabrics that only meet PPE Category 1. The majority of companies that have implemented FR clothing programs to comply with NFPA 70E have specified UltraSoft® by brand name.

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Westex UltraSoft AC[®]

Made with Long-Staple Cotton

STYLE	DESCRIPTION	ATPV	WEIGHT
901	Shirt/Light Weight Coverall	8.3	7 oz. (237 g/m ²)
951	Pant/Jacket Coverall	11.7	9 oz. (305 g/m ²)

Westex UltraSoft[®]

STYLE	DESCRIPTION	ATPV	WEIGHT
301	Shirt/Light Weight Coverall	8.7	7 oz. (237 g/m ²)
451	Pant/Jacket Coverall	12.4	9 oz. (305 g/m ²)

LIFT SWATCHES FOR MORE INFORMATION

ARC FLASH HAZARD ANALYSIS AND THE SELECTION OF PROPER ARC-RATED FR CLOTHING AND OTHER RELATED PERSONAL PROTECTIVE CLOTHING (PPE)



NFPA 70E requires an arc flash analysis to be performed before work on energized systems greater than 50 volts. This is to be conducted to determine the Arc Flash Protection Boundary and the required PPE for people within the boundary. In determining the required PPE, an arc flash hazard analysis needs to be performed. There are two methods available for performing an arc flash hazard analysis, both of which are highlighted below, including a simplified approach to one of the methods.

Incident Energy Analysis

The incident energy analysis shall determine the incident energy exposure to a worker in calories per square centimeter. Arc-rated flame resistant clothing and other PPE shall be used by the worker based upon the incident energy exposure associated with the specific task.

For information on estimating the incident energy, please see Annex D in NFPA 70E.

PPE Arc Flash Category Determination

In NFPA 70E, an Arc Flash Hazard Identification for Alternating Current (ac) and Direct Current (dc) Systems Table 130.7(C)(15) (A)(a) is available to determine your hazard. The table lists common electrical tasks and equipment condition and lists whether Arc Flash PPE is required or not. Once a requirement is identified, the Arc-Flash Hazard PPE Categories for Alternating Current (ac) Systems Table 130.7(C)(15)(A)(b) or the Arc-Flash Hazard PPE Categories for Direct Current (dc) Systems Table 130.7(C)(15)(B) shall be used to the Arc Flash PPE Category. Once the Arc Flash PPE Category has been determined the Personal Protective Equipment (PPE) Table 130.7(C)(16) shall be used to determine the proper PPE needed to satisfy the category.

It is suggested to see Annex H for a simplified approach to ensure adequate PPE for electrical workers within facilities with large and diverse systems.

Informative Annex H Guidance on Selection of Protective Clothing and Other Personal Protective Equipment

Table H.2 Simplified, Two-Category, Arc-Rated Clothing System

CLOTHING ^a	APPLICABLE TASKS
Everyday Work Clothing Arc-rated long-sleeve shirt with arc-rated FR pants (minimum arc rating of 8) or arc-rated coveralls (minimum arc rating of 8)	All arc flash PPE Category 1 and arc flash PPE Category 2 tasks listed in Table 130.7 (C)(15)(A)(b), and Table 130.7(C)(15)(B) ^b
Arc Flash Suit A total clothing system consisting of arc-rated shirt and pants and/or arc-rated coveralls and/or arc flash coat and pants (clothing system minimum arc rating of 40)	All arc flash PPE Category 3 and arc flash PPE Category 4 tasks listed in Table 130.7(C)(15)(A)(a), Table 130.7(C)(15)(A)(b), and Table 130.7(C)(15)(B) ^b

^a Note that other PPE required for the specific tasks listed in Table 130.7(C)(15)(a), Table 130.7(C)(15)(b), and Table 130.7(C)(16), which include arc-rated face shields or arc flash suit hoods, arc-rated hard hat liners, safety glasses or safety goggles, hard hats, hearing protection, heavy-duty leather gloves, voltage-rated gloves, and voltage-rated tools, could be required. The arc rating for a garment is expressed in cal/cm².

^b The assumed short-circuit current capacities and fault clearing times for various tasks are listed in the text of Table 130.7(C)(15)(a) and Table 130.7(C)(15)(b). For tasks not listed, or for power systems with greater than the assumed short-circuit capacity or with longer than the assumed fault clearing times, an arc flash hazard analysis is required in accordance with 130.5.

Standard for NFPA 70E Safety Requirements for Employee Workplaces — 2015 Edition

130.7 (C)(16) Personal Protective Equipment (PPE)			
PPE Category	PPE	MINIMUM ARC RATING (cal/cm ²)	SINGLE LAYER FABRIC OPTIONS
1	Arc-rated long-sleeve shirt and pants or arc-rated coverall	4	UltraSoft® Style 301 Shirt/Coverall & Style 451 Pant/Coverall PPE Category 1 and 2
2	Arc-rated long-sleeve shirt and pants or arc-rated coverall	8	UltraSoft AC® Style 901 Shirt/Coverall & Style 951 Pant/Coverall PPE Category 1 and 2
3	Arc-rated long-sleeve shirt (AR), arc-rated pants (AR), arc-rated coverall (AR), arc-rated arc flash suit jacket (AR), arc-rated arc flash pants (AR), arc-rated jacket, parka, rainwear, or hard hat liner (AN).	25	
4	Arc-rated long-sleeve shirt (AR), arc-rated pants (AR), arc-rated coverall (AR), arc-rated arc flash suit jacket (AR), arc-rated arc flash pants (AR), arc-rated jacket, parka, rainwear, or hard hat liner (AN).	40	



Visit westex.com to view and download our arc flash and flash fire testing videos.

NOTE: The chart that is shown above has been condensed.

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