

APS RF Group Arc Flash Reference

The Standards Council of the National Fire Protection Association, Inc. (NFPA) formed the Committee on Electrical Safety Requirements for Employee Workplaces, NFPA 70E. This committee was formed to assist OSHA in the preparation of electrical safety requirements for safeguarding of employees in their workplaces.

In an effort to comply with the NFPA 70E requirements, the Argonne National Laboratory's Electrical Safety Committee (ESC) drafted the Electrical Safety Flowchart for Working On or Near Live Parts. (See figure1). This flowchart will be used as the basis for determining the requirements necessary to work "Hot" and refers to NFPA 70E's table 130.2(c) "Approach Boundaries to Live Parts for Shock Protection", table 130.7(c) (9) (a) "Hazard/Risk Category Classification", table 130.7(c) (10) "Protective Clothing and PPE Matrix", and table 130.7(c) (11) "Protective Clothing Characteristics".

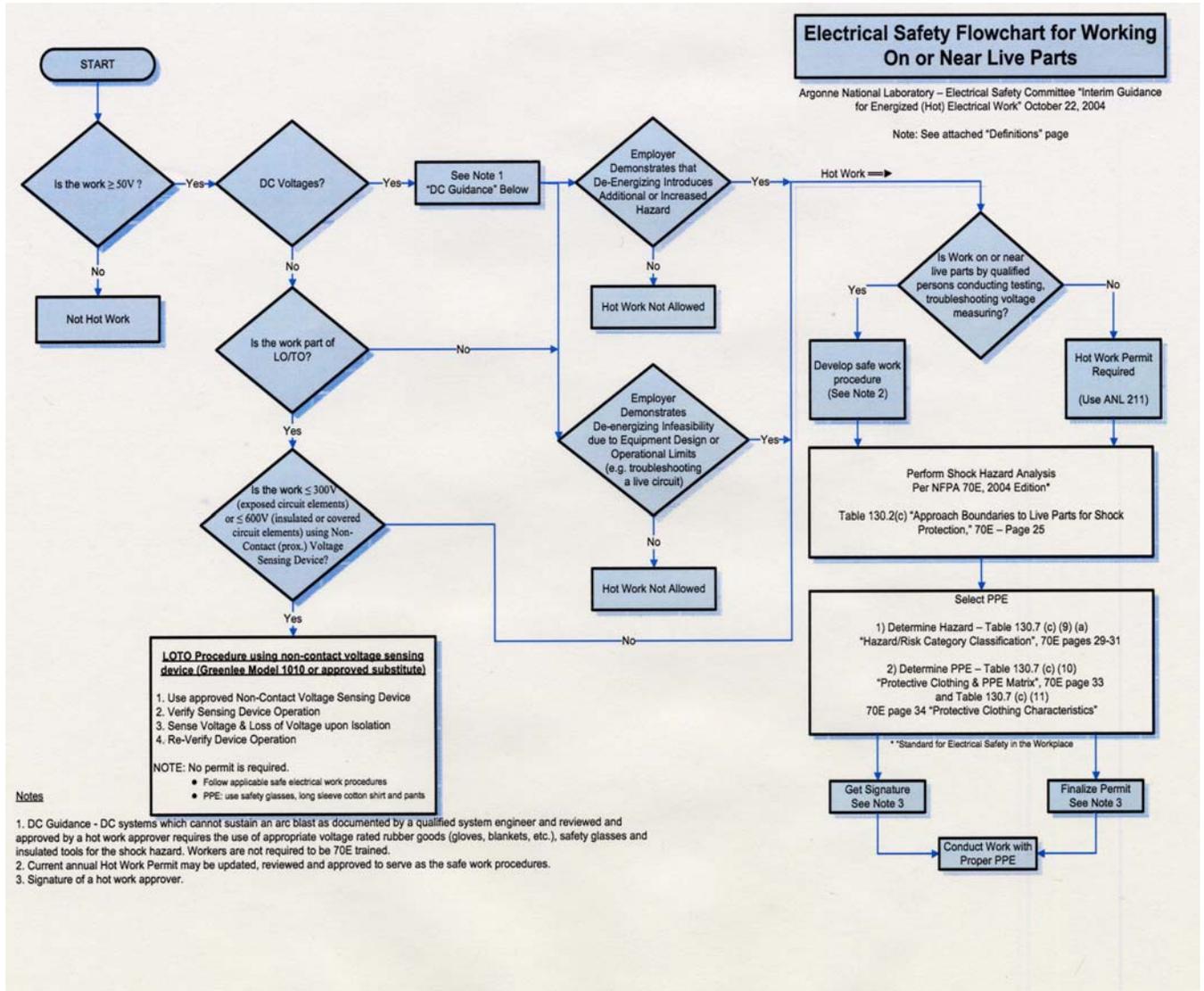


Figure 1. ANL ESC Electrical Safety Flowchart for Working On or Near Live Parts

The following are examples of proper Arc Flash apparel and their usages within the RF Group:

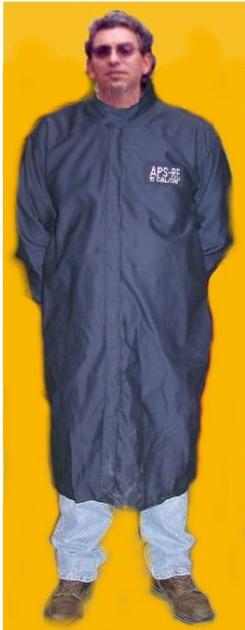
Category -1



NFPA 70E FR clothing, per Table 130.7(C) (11):

Non-melting or untreated natural fiber (untreated cotton, wool, rayon or silk or blends of these materials with a fabric weight of at least 4.5 oz/yd²), short-sleeve T-shirt, long pants and safety glasses. An incidental amount of elastic used on non-melting fabric underwear or socks shall be permitted.

Work examples include low level circuit troubleshooting on circuits < 50 volts.



Category 0



100% cotton “Union Blues”

Cat 0 and below: RF Group recommended FR apparel, cotton jeans with the Cat 2 coverall (if you are wearing a short-sleeved shirt).

NFPA 70E FR clothing, per Table 130.7(C) (11):

Non-melting or untreated natural fiber (untreated cotton, wool, rayon or silk or blends of these materials with a fabric weight of at least 4.5 oz/yd²) long-sleeve shirt, long pants and safety glasses. No synthetic materials such as acetate, nylon, polyester, polypropylene and spandex, either alone or in blends shall be used as under-layers. An incidental amount of elastic used on non-melting fabric underwear or socks shall be permitted.

Work examples include circuit breaker or fused switch operation with covers on/off, opening hinged covers to visually inspect energized parts all rated 240V and below.

Category 1



Cat 1 Shirt and Pants



NFPA 70E clothing label

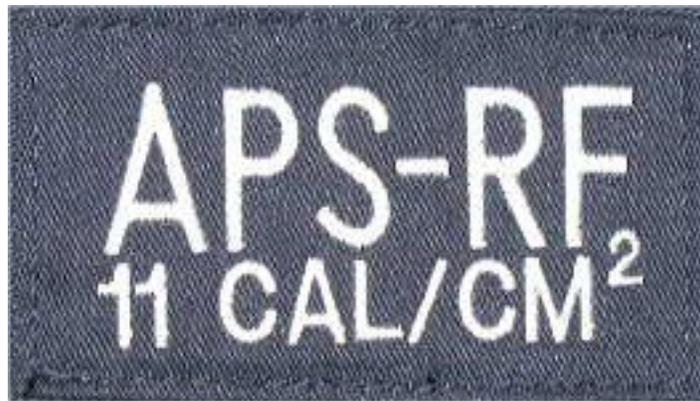
Cat 1 and below: RF group recommended FR apparel, cotton jeans with the Cat2 coverall (if you are wearing a short-sleeved shirt).

NFPA 70E FR clothing, per Table 130.7(C) (11):

FR pants, FR long-sleeve shirt or FR coveralls, all with minimum Arc Rating of 4, **OR** the CAT2 coverall with cotton jeans. Hardhat, safety glasses, Proper Voltage Rated gloves with leather protectors as needed, and proper leather work shoes. No synthetic materials such as acetate, nylon, polyester, polypropylene and spandex, either alone or in blends shall be used as under-layers. An incidental amount of elastic used on non-melting fabric underwear or socks shall be permitted.

Work examples include working on energized parts, including LOTO verification and voltage testing on circuits rated 240V and below.

Category 2



NFPA 70E FR clothing, per Table 130.7(C) (11):

Cotton underwear –conventional short sleeve and brief/shorts,
FR Pants with minimum Arc rating of 8,
FR Long-Sleeve Shirt or FR coveralls with minimum Arc Rating of 8,
Hardhat, safety glasses, proper Voltage Rated gloves with leather protectors,
Arc Rated face shield or flash suit hood, hearing protection, leather-work shoes.
No synthetic materials such as acetate, nylon, polyester, polypropylene and spandex,
either alone or in blends shall be used as under-layers. An incidental amount of elastic
used on non-melting fabric underwear or socks shall be permitted.

Work examples include the troubleshooting of control circuits with energized parts
>120V (exposed) within a metal clad switchgear, 1kV and above; work on energized
parts including voltage testing within a panel-board rated >240V and 65kA short circuit
current is available.

Category 3



NFPA 70E FR clothing, per Table 130.7(C) (11):

Cotton underwear plus FR shirt and FR Pants Arc Rated at 4, Flash Suit and Hood with minimum Arc Rating of 25, Hardhat, safety glasses, proper Voltage Rated gloves with leather protectors, Arc Rated face shield or flash suit hood, hearing protection, and leather work shoes. No synthetic materials such as acetate, nylon, polyester, polypropylene and spandex, either alone or in blends shall be used as under-layers. An incidental amount of elastic used on non-melting fabric underwear or socks shall be permitted.

Work example includes the voltage verification and bus grounding of the 13.2kV Motorized Fused Disconnect or the Matching Transformer.

The System Engineer or Group Leader should answer any question concerning the proper Arc Flash Apparel (PPE) for a specific job.