



TECHNICAL SUPPLEMENT

ELECTRICAL SAFETY FCX-HS03 | PERSONAL PROTECTIVE CLOTHING AND EQUIPMENT
RELEASE 07/2018 | VERSION 1

GENERAL INFORMATION

- This defines the minimum requirements that must be followed if work requires circuits of 50 volts or more to be energized. Electrical personnel include for example: electricians, instrument technicians, relay technicians, linemen, electrical engineers, electrical superintendents, and in some cases computer/communications technicians.
- This policy does not cover operators or non-electrical personnel.
- Only electrically qualified individuals will be allowed to perform the work. No work will be performed without the proper safety equipment being worn. The following are the minimum requirements when working around electrical equipment and is intended to meet the standards of the current edition of the NFPA 70E.
- Refer to the Arc Flash Calculation Technical supplement for specific rules for incident energy analysis.

Process for PPE selection; Energized Electrical Work

1. Prior to performing energized work, an electrical risk assessment shall be performed to determine if a hazard exists. The “Arc Flash Risk Assessment” flow chart at the end of this document may be used as an acceptable Arc Flash Risk Assessment.
2. If an electrical risk assessment determines that an arc flash hazard exists, the results from the incident energy analysis (arc flash label) shall be used to determine the following:
 - a. Arc Flash Boundary
 - b. Arc flash PPE required to perform the energized work within the Arc Flash Boundary
3. If an Incident Energy Analysis has not been performed for the equipment, (no arc flash label is present) the “Arc Flash Risk Assessment” flow chart may be used to determine the appropriate level of PPE. Inform a supervisor so that an Incident Energy Analysis can be performed.
4. Prior to performing energized work, the Arc Flash Boundary determined by the Incident Energy Analysis shall be used to provide flagging, barricading or an attendant to prevent unqualified personnel from entering the boundary.

Assessment and Shock Protection Boundaries

- Shock risk assessment is the process that identifies exposure to the potential electrical shock hazards, estimates the potential severity of a shock injury, estimates the likelihood of occurrence of this injury and then determines if protective measures are required and determines the appropriate protective measure to use.
- The shock protection boundaries identified as limited approach boundary and restricted approach boundary shall be applicable where personnel are approaching exposed energized electrical conductors or circuit parts. Refer to the NFPA 70E Table 130.4(D) (a) for A.C. and Table 130.4(D) (b) for D.C.

The chart below shows part of the NFPA 70E Table 130.4(D) (a) for AC and Table 130.4(D) (b) for DC

AC Voltage Range	Limited Approach Boundary	Restricted Approach Boundary
Less than 50V	Not specified	Not specified
50V-150V	3 ft. 6 in. (1.07 m)	Avoid Contact
151-750V	3 ft. 6 in. (1.07 m)	1 ft. (0.3 m)
750V-15KV	5 ft. (1.52 m)	2 ft. 2 in. (0.6 m)

DC Voltage Range	Limited Approach Boundary	Restricted Approach Boundary
Less than 50V	Not specified	Not specified
50V-300V	3 ft. 6 in. (1.07 m)	Avoid Contact
300V-1KV	3 ft. 6 in. (1.07 m)	1 ft. (0.3 m)

Arc Flash PPE

- All personnel inside the flash hazard boundary must follow the same arc flash clothing requirements. If the proper safety equipment is not available, the individual performing the work must clear and guard the area of all affected personnel before any work is performed. The arc flash PPE shall be selected based on the incident energy shown on the arc flash label, or from the “Arc Flash Risk Assessment” flow chart when an arc flash label is not present. The table below shall be used to determine the required PPE once the incident energy is known.
- The Company will provide the required protective clothing for the designated employees working under the mandates of this technical supplement. Cotton underclothing is necessary to maintain maximum burn protection.
- When the incident energy exceeds 40 cal/cm², energized work shall not be performed and the circuit must be de-energized at a location upstream of the work area where the incident energy is less than 40cal/cm².

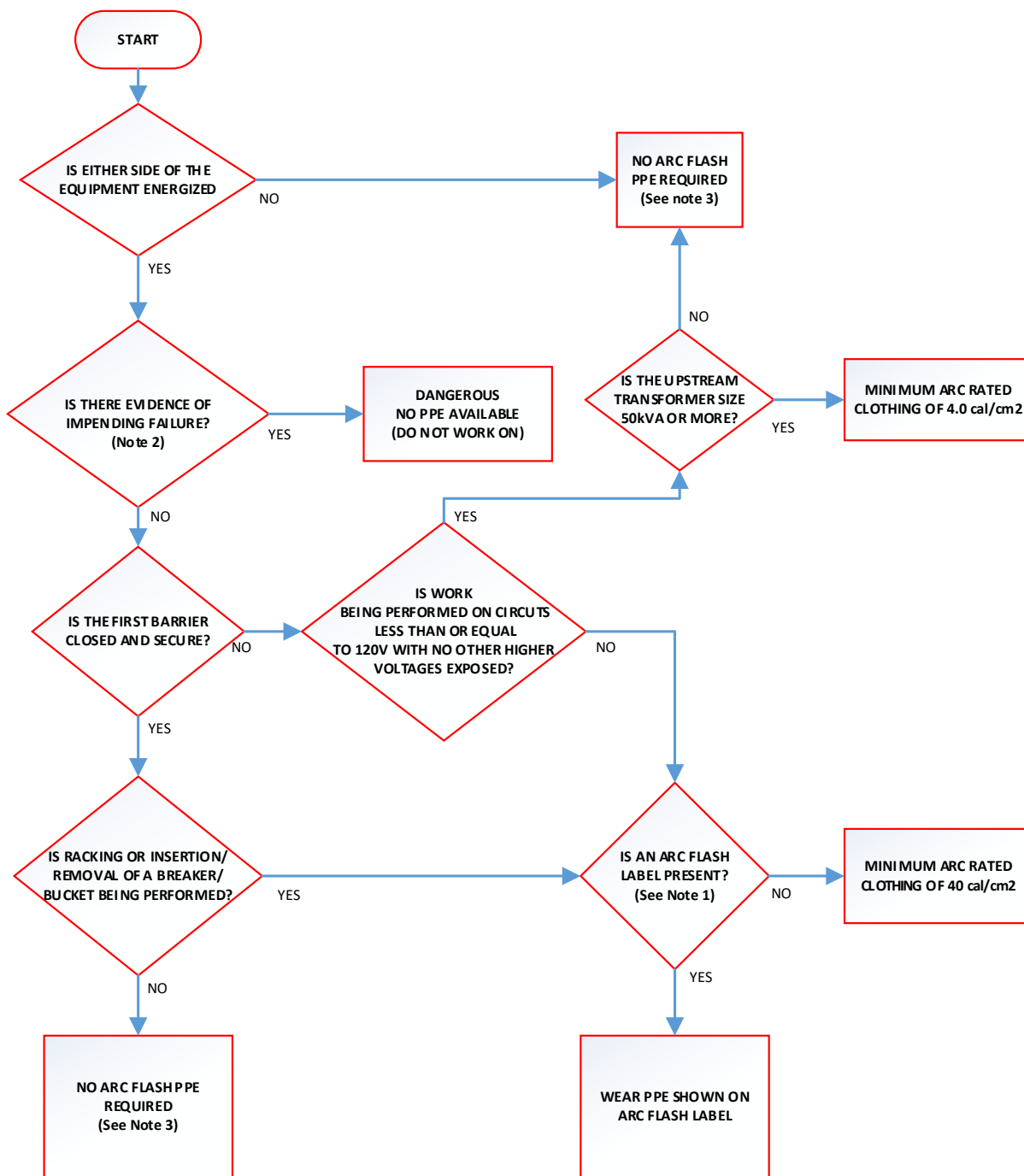
Arc Flash Protective Clothing Table
Less than 1.2 cal/cm²
<ul style="list-style-type: none"> • Hard hat • Safety glasses • Leather work shoes • Appropriate gloves
Greater than 1.2 cal/cm² AND Less than 8 cal/cm²
<ul style="list-style-type: none"> • Arc-rated long-sleeve shirt and pants (or arc-rated coverall) • Arc-rated face shield w/ balaclava (or arc flash suit hood) • Arc-rated outerwear (e.g., jacket, parka, rainwear, hard hat liner) • Appropriate gloves • Safety glasses • Hearing protection • Leather work shoes
Greater than 8 cal/cm² AND Less than 40 cal/cm²
<ul style="list-style-type: none"> • Arc-rated long-sleeve shirt and pants (or arc-rated coverall) • Arc-rated arc flash suit jacket and pants • Arc-rated arc flash suit hood • Arc-rated gloves or rubber insulating gloves with leather protectors • Safety glasses • Hearing protection • Leather work shoes
Greater than 40 cal/cm²
waitNO APPROVED ARC FLASH PPE AVAILABLE. DO NOT WORK ON WHILE ENERGIZED

Incident Energy	Arc Flash/Shock Hazard Glove Requirements	
	Shock Hazard Present	No Shock Hazard
Less than 1.2 cal/cm ²	Rubber insulating gloves with leather protectors (Rubber insulating sleeves may also be required)	Heavy Leather gloves
Greater than 1.2 cal/cm ² AND Less than 8 cal/cm ²	Rubber insulating gloves with leather protectors (Rubber insulating sleeves may also be required)	Heavy Leather gloves OR Arc-rated gloves
Greater than 8 cal/cm ² AND Less than 40 cal/cm ²	Rubber insulating gloves with leather protectors (Rubber insulating sleeves may also be required)	Arc-rated gloves
Greater than 40 cal/cm ²	NO APPROVED ARC FLASH PPE AVAILABLE. DO NOT WORK ON ENERGIZED	

All heavy leather gloves and leather protector gloves must be a minimum thickness 0.03 in. (0.08 cm)

ARC FLASH RISK ASSESSMENT FLOW CHART

NOTE: A Shock Risk Assessment must still be performed to determine electrical shock PPE (rubber gloves, insulated tools, etc.)



Notes:

1. If No Arc Flash Label is present, Inform Supervisor so that an analysis can be performed.
2. Examples may include: arcing, overheating, loose or bound equipment parts, unusual vibration, unusual smell, visible damage or deterioration.
3. This does not preclude the requirements of site specific Arc Flash PPE, Most facilities require an 8cal/cm2 shirt and pants for all electrical personnel while working around electrical equipment.