

# Major Changes to NFPA 70E Standard 2015 Edition

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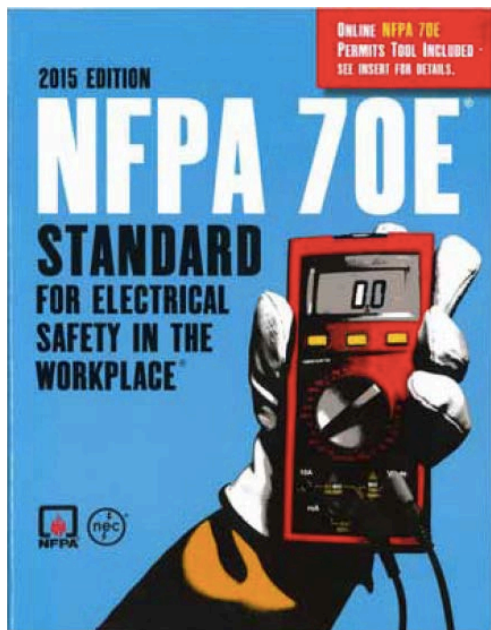
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## I. Introduction

NFPA 70E®, Standard for Electrical Safety in the Workplace, is becoming the most referenced standard for electrical safety. OSHA is using it as a reference tool to determine industry acceptable practices. Additional government agencies are adopting it and mandating compliance within their departments.

The changes in the 2015 are important to integrate into facility safety programs on a timely basis. OSHA recommends using the latest version of NFPA 70E.

This Tech Topic is intended to be used as a reference guide to the actual standard from NFPA, not in place of it. Only selected changes are noted in this paper and other changes may impact your safety program. The material is presented in approximately the same order as in the standard and quoted text is shown in italics. It is recommended to use this document while reviewing the 2015 NFPA 70E Standard since relevant page numbers are listed.



## II. Background

The original standard, first published in 1979, was developed by NFPA with the urging of OSHA. The National Electrical Code® was recognized for facilitating safe equipment installations, but was silent on safe work practices of people doing the installation work. NFPA 70E focused on keeping the workers safe from the hazards of electricity.

The last revision was in 2012. That expanded the Annexes to more fully explain methods. The table method was provided with more pre-calculated information such as required parameters and arc flash boundary. Changes in the Coverage

[90.2(A)] Safety-related maintenance requirements and other administrative controls were added to the scope statement of the standard to clarify that training and auditing are equally important safety related work practices.

[90.2(B)] Mining activities that were formerly excluded from 70E, are now included. The exemption was deleted from this section. Incidentally Veterans Hospitals, and the DoE have adopted 70E and currently the DoD is in the process.

## III. Revisions to Definitions in Article 100

The 2015 edition of NFPA 70E incrementally changed requirements, but moved toward a more systematic way of evaluating electrical hazards. The new designation was “risk assessment.” Terms were changed from “arc flash hazard analysis” to “arc flash risk assessment,” “shock hazard analysis” to “shock risk assessment,” and “hazard identification” to “risk assessment.”

**Risk.** A combination of the likelihood of occurrence of injury or damage to health and the severity of injury or damage to health that results from a hazard.

**Risk Assessment.** An overall process that identifies hazards, estimates the potential severity of injury or damage to health, estimates the likelihood of occurrence of injury or damage to health, and determines if protective measures are required. (Annex F has a detailed description of a Risk Assessment Procedure.)



Informational Note: As used in this standard, arc flash risk assessment and shock risk assessment are types of risk assessments.

Eight pages of text in Annex F describe the “Risk Assessment Procedure” (Pages 73-80). This goes beyond simply selecting the correct PPE. This is almost the longest Annex in the standard demonstrating the importance given to this process. See Figure 1.

**Qualified Person.** This definition was slightly revised to correlate the definition with OSHA 1910.399 Note 2.

**Prohibited Approach Boundary.** This was deleted. The requirement for using shock protective equipment typically begins at the restricted approach boundary. No additional protective equipment was required when crossing the prohibited approach boundary. Previous changes that used the limited approach boundary or arc flash boundary for “triggering” requirements have made the use of this term unnecessary.

**Hazard/Risk Category (HRC)** is changed to “Arc Flash PPE Category.” This is to emphasize that the meaning is only for use with the Table Method of analysis, not with the calculation of Incident Energy Analysis. The 2012 tables used HRC but the new 2015 tables 130.7(A)(a), 130.7(B), and 130.7(C)(16) use Arc Flash PPE Category.

#### IV. Revisions to Requirements in Article 110

New - An electrical safety program must now include elements that consider condition of maintenance. [110.1(B) Page 15]

New - Audits of field work to verify compliance with the procedures of the electrical safety program must be performed at intervals not to exceed 1 year. [110.1(l)(2) Page 16] But, the Electrical Safety Program audit interval remains at 3 years.

Emergency response people who give CPR or apply AEDs shall have documented refresher training annually. [110.2(C) Page 16]

## V. Revisions to Requirements in Article 120

New training documentation is required at least every three years for lockout/tagout procedures. Employee must demonstrate proficiency and the training content must be recorded. [120.2(b)(4) Page 20]

New - The location, sizing, and application of temporary protective grounding equipment is required to be identified as part of the employer's job planning. [120.3(A) Page 23]

## VI. Revisions to Requirements in Article 130

Normal operation of equipment is generally considered safe without PPE. [130.2(A)(4) Page 24 and Table 130.7(15)(a)] New requirements clarifying where "normal operation of electric equipment is permitted" were added.

**Normal Operation.** Normal operation of electric equipment shall be permitted where all of the following conditions are satisfied:

1. The equipment is properly installed.
2. The equipment is properly maintained.
3. The equipment doors are closed and secured.
4. All equipment covers are in place and secured.
5. There is no evidence of impending failure.

Informational Note: The phrase "properly installed" means that the equipment is installed in accordance with applicable industry codes and standards and the manufacturer's recommendations. The phrase "properly maintained" means that the equipment has been maintained in accordance with the manufacturer's recommendations and applicable industry codes and standards. The phrase "evidence of impending failure" means that there is evidence such as arcing, overheating, loose or bound equipment parts, visible damage, or deterioration.

New documentation is required for Arc Flash Risk Assessment [130.5(A) Page 27] Documentation. The results of the arc flash risk assessment shall be documented.

Specific ASTM reference standards were added for cleaning Arc Rated clothing [Table 130.7(C)(14) Page 34]. See Figure 2.

Subject	Document Title	Document Number
Arc Rated Apparel	Standard Performance Specification for FR and AR Textiles Materials	ASTM F1506
	Standard Guide for Industrial Laundering of AR Clothing	ASTM F1449
	Standard Guide for Home Laundering Care of AR Clothing	ASTM F2757

Clarification was added that either the incident energy analysis method or arc flash PPE categories method can be used on the same piece of equipment for the selection of PPE, but not both. The revision also clarifies that the labeled results of an incident energy analysis cannot specify an arc flash PPE

category in Table 130.7(C)(16). **[130.5(C)] Page 28** Incident energy analysis by engineering should use the PPE requirements from Table H.3(b) instead of referring to a PPE category.

**130.5(D) Equipment Labeling Page 28** The labels have all the following information:

1. Nominal system voltage
2. Arc flash boundary
3. At least one of the following:
  - a. A available incident energy and the corresponding working distance, or the arc flash PPE category in Table 130.7(C) (15)(A)(b) or Table 130.7(C)(15)(B)for the equipment, but not both
  - b. Minimum arc rating of clothing
  - c. Site-specific level of PPE

Exception: Labels applied prior to September 30, 2011 are acceptable if they contain the available incident energy or required level of PPE.

Field-marked equipment labeling requirements were revised to require the label to be updated where the arc flash hazard risk assessment identifies a change that renders the label inaccurate. [130.5(D) Page 28]

The documentation, installation, and maintenance of the field-marked label is the responsibility of the owner of the electrical equipment. [130.5(D) Page 28]. See Figure 3.

Additional text now details the requirements in 130.6(D). Conductive articles being worn shall not be worn within the restricted approach boundary or where they present an electrical contact hazard. [130.6(D) Page 28]

A new task-based table combines the separate AC and DC tables previously used to determine when arc flash PPE is required for consistency. The new table lists the task, equipment condition, and whether arc flash PPE required. It utilizes a simple yes or no format. [130.7(C)(15)(A)(a) Pages 35-37]

## **VII. 2015 Revised Table Method for determination of PPE**

The new procedure uses a 3-step process. The first step determines if arc flash PPE is required  
Table 130.7 (C) (15)(A)(a) Pages 35-37 – Arc



The second step selects the Arc Flash PPE Category by identifying the equipment and compliance with listed parameters.

Table 130.7 (C)(15)(A)(b) Pages 38 and 39 -  
Arc Flash Hazard PPE Category by Equipment.  
See Figure 6.

The third step is to select the proper PPE using the identified Arc Flash PPE Category from step two.

Table 130.7 (C)(16) Page 40 - PPE Matrix by  
Arc Flash Hazard PPE Category. See Figure 7.

The use of current-limiting fuses is acknowledged to reduce the need for PPE levels. The fuses or circuit breakers have to be listed equipment with the label stating it is current limiting.

Note: For equipment rated 600 volts and below, and protected by upstream current-limiting fuses or current-limiting circuit breakers sized at 200 amperes or less, the arc flash PPE category can be reduced by one number but not below arc flash PPE category 1. [Table 130.7 (C) (15)(A)(b) Page 38]

Hazard/Risk Category 0 has been removed from Table 130.7(C)(16). Hazard/Risk Category will now be referred to as arc flash PPE category. Hazard/ Risk Category 0 was deleted because the new PPE table only specifies PPE for work within the arc flash boundary. If there is no arc flash hazard, then no arc flash PPE is required and it is therefore not necessary on a table devoted to PPE. [Table 130.7(C)(16) Page 40]

When can you not use the Table Method? [130.7(15) (A) Page 33] An incident energy analysis shall be required in accordance with 130.5 for the following:

1. (1) Tasks not listed in Table 130.7(C)(15)(A)
  - (a)
2. (2) Power systems with greater than the estimated maximum available short circuit current
3. (3) Power systems with longer than the maximum fault clearing times
4. (4) Tasks with less than the minimum working distance

Task Description	Equipment Condition	If PPE is Required

Figure 5: Summary of Table 130.7(C)(15)(A)(a)-Arc Flash Hazard Identification for AC and DC systems

Equipment	Arc Flash PPE Category	Arc Flash Boundary
Specific Equipment and Parameters	1, 2, 3, or 4	Distance

Figure 6: Table 130.7(C)(15)(A)(b) - Arc Flash Hazard PPE Categories for AC Systems

PPE Category	Required PPE Items with their Arc Rating
1	
2	
3	
4	

Figure 7: Summary of Table 130.7(C)(16) - Personal Protective Equipment (PPE)

The criterion for employees to use insulated tools or handling equipment has been changed from the limited approach boundary to restricted approach boundary. [130.7(D)(1) Page 40] (Still required where tools might make accidental contact.)

Barricades cannot be placed closer than the limited approach boundary. Where the arc flash boundary is greater than the limited approach boundary, barricades cannot be placed closer than the arc flash boundary. [130.7(E)(2) Page 41]

A new section was added requiring the employer to perform a risk assessment before cutting or drilling into equipment, floors, walls, or structural elements where a likelihood of contacting energized electrical lines or parts exists. [130.10 Page 43]

### VIII. Revisions to Requirements in the 200 Articles

The equipment owner or the owner's designated representative is responsible for maintenance of the electrical equipment and documentation. [205.3 Page 44]

Fuses should not be modified to fit rejection fuse clips. Non-current limiting fuses shall not be modified to allow their insertion into current-limiting fuse holders. [225.1 Page 46]

New maintenance requirements for test instruments and associated test leads utilized in the verification of the absence or presence of voltages were added. The maintenance program for test instruments must include functional verification as described in 110.4(A)(5). [250.4 Page 47] (Only qualified people are to repair test equipment)

### IX. Revisions to Requirements in Chapter 3

New paragraph 320.3(A)(1) requires a risk assessment to be performed prior to any work on a battery system to identify the chemical, electrical shock, and arc flash hazards and assess the risks associated with the type of tasks to be performed. [320.3(A)(1) Page 51]

### X. Summary

The biggest changes:

- Migration toward more complete Risk Assessment procedures
- Safe equipment can be operated without PPE
- Elimination of HR Cand Category 0
- Revised tables for Arc Flash PPE determination