



Facility Safety

NFPA 70E Standard for Electrical Safety in the Workplace: Understand the Latest Updates

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Here's what you need to know about electrical safety standards, your options for personal protective equipment, and how to approach the testing of electrical safety equipment using a helpful checklist.

Working near live energy presents many dangers for workers, who are at heightened risk of encountering such hazards as arc flashes or electrical shocks.

It's why safety managers need to be aware of the *National Fire Protection Association's (NFPA) 70E Standard* for Electrical Safety in the Workplace.

What is NFPA 70E?

NFPA 70E is an electrical safety standard that aims to keep workers safe when they are working with or near electrical systems and circuits, and it is best looked at through who is affected—meaning those who are working with equipment in either energized or de-energized states.

Understanding the latest changes to the NFPA 70E can help safety managers select the proper PPE to keep employees safe from highly dangerous, and sometimes fatal, arc flash incidents, while also protecting businesses from property damage and liability.

The standard is revised every three years to reflect industry changes, new technologies or research.

In the *2018 edition of the standard*, the NFPA introduced a series of updates covering such issues as procedures for risk assessments, the hierarchy of risk control methods, PPE selection, training, and a new tool to assist with arc flash hazard assessment. The tool estimates whether an arc flash event is

likely to occur while your workers are performing a variety of electrical tasks.

Electrical Testing Equipment Safety

Before maintenance and repair work begins on equipment such as motors and pumps, the NFPA 70E standard states that qualified personnel are required to make sure their testing meters are in good working order. Testing tools must be visually inspected frequently to help detect damage and ensure proper operation. Workers should always test their meter to make sure it is operating correctly before taking it into the field.

“In the old days, an electrician would take the meter to an outlet and touch it with the test leads to make sure their meter was working correctly,” says Sean Silvey, product specialist for electrical voltage testers at Fluke.

“Through the years, guys were getting hurt, thinking that that outlet was on or wasn’t on,” he says. “Now they can use a known voltage source to take the place of the wall outlet.”

Before beginning work on any piece of electrical equipment over 50 volts, a qualified person wearing the proper level of PPE must ensure that the equipment has been de-energized. This should be done using International Electrotechnical Commission rated test tools that are marked with either CAT III for 600 volt or 1000 volt, CAT IV rating for 600 volt, depending on the equipment.

A traditional voltage meter has red and black test leads with metal points that are used to touch a piece of metal, such as an open cover or wire nut, to make the measurement.

Newer technology allows electricians to test the voltage by sliding the test wire through an open jaw-type meter—which removes the need for metal test leads that are often the source of sparks leading to an arc flash, according to Silvey.

“It’s a game changer because it creates a safer work environment,” he says. “The key thing for anyone working with electrical equipment is safety, safety, safety.”

For guidelines on safety checks for your meter and selecting the testing equipment to comply with OSHA and NFPA 70E, **download** this checklist from Fluke.

The **2021 edition of NFPA 70E** includes just a few changes, such as:

- Updates to some requirements in Article 110 that were reorganized for a more logical progression
- Revisions to Table 130.5(C), which can be used to help estimate the likelihood of occurrence of an arc flash incident.
- Revisions to energy thresholds for electrical equipment and systems in laboratories to accurately reflect the data in the Informational Note’s resource document.

- Addition of Article 360, a new article on the safety-related requirements for capacitors.

You can read more about the 2021 updates [here](#).

Is Compliance with NFPA 70E Mandatory?

NFPA 70E is not encoded into law, but it fleshes out how the performance-based standards in the Occupational Safety and Health Administration (OSHA) requirements should be met by defining minimum standard industry practices necessary for electrical safety.

As often is the case with OSHA, the governing body uses consensus industry standards to help frame their perspective on the law—and what is in violation.

“The NFPA 70E is put together by a team of experts, and if a company is looking for a program or plan to implement, that’s where I would suggest they start,” says Brian McCauley, vice president of Salisbury Assessment Solutions at Honeywell/Salisbury.

Read more: 5 Arc Flash Safety and Injury Prevention Tips for Manufacturing

Hierarchy of Control Methods: What to Do

A big change for NFPA 70E in 2018 was making the hierarchy of risk control methods mandatory—emphasizing that the first priority of an employer must be to eliminate electrical hazards, if possible. Following that, each method for ensuring safety is considered less effective than the one before it, with the use of PPE as the method of last resort.

The update also combined several different parts into Article 120, which covers the program, principles, equipment and procedures needed to establish and verify an electrically safe condition.

“The problem that companies face is getting to the point of de-energization so they can work on equipment without having to wear arc flash PPE,” McCauley says, “but in order to do this, they have to suit up with the proper PPE and then verify that the equipment is de-energized.”

For more information, see the sidebar on electrical testing equipment.

Determining the Appropriate Arc Flash PPE Category

Another important change that came with the 2018 update was the method for determining the proper arc flash PPE for a certain task.

“Selecting arc flash clothing is difficult for some customers,” says Kevin Highland, vice president of Stanco Manufacturing. “The end user has to decide what level of protection is required and then search for clothing that meets that requirement.”

To make this task easier, the 2018 updated standard stated that if the likelihood of an arc flash for a particular activity exists, employers could now use one of two methods to determine the appropriate PPE:

1. Incident energy analysis method: Annex D and Table 130.5(G)
2. Arc flash PPE category method: Table 130.5(C) and a series of tables in 130.7(C)(15)

“Option 1 would be utilizing the ARC flash assessment methodology by hiring an engineering firm to

come out and do the assessment,” McCauley says. “They can determine exactly what the equipment is capable of producing, so the customer knows the risks and the arc flash energy for each one.”

Table 130.5(G), formerly part of the 70E Annex, was revised and moved into the standard’s mandatory text.

Option 2 is using Tables 130.5(C) and 130.7(C)(15) (a and b), which lists Category 1 to Category 4, based on the maximum arc flash energy level, and identifies all of the PPE needed for each category. In order to use this method, a safety manager must know the maximum available fault current, maximum fault-clearing time and minimum working distances for each equipment type.

Read more: OSHA Dart Safety Rate Explained and How to Calculate It

Using the PPE Categories Method for Electrical Safety and Arc Flash Compliance

“Category 1 requires a minimum arc flash rating of 4 cal/cm², so if you’re wearing a 40 cal/cm² arc flash suit while working on a job listed in Category 1 and OSHA walked in, you’d be fine,” Highland says. “But if you were wearing a shirt and pants rated at 8 cal/cm² (Category 2) while working in a 40 cal/cm² situation, you’d be cited for not wearing the proper PPE for the task.”

The PPE table method only provides a broad category that may result in the end user wearing more protection than is required when calculated using the incident energy analysis method.

“Using the tables, you might have somebody that’s wearing a beekeeper hood, which is hotter and doesn’t breathe as well, versus a balaclava and a face shield with much thinner, lighter clothing from head to toe,” McCauley says. “Option 1 could improve morale, productivity and safety because employees are more likely to wear it—and the PPE costs less.”

Would you like some help finding the right PPE arc flash clothing for your facility? Use our interactive protective clothing selector to take out the complexity and narrow down your options.

Digging Into the NFPA 70E Conformity Standard

The 2018 edition of NFPA 70E also introduced using the ANSI/ISEA 125-2014 national consensus standard for conformity assessments of safety and personal protective equipment (PPE).

“The purpose of adding the conformity assessment was to help customers understand the level of quality of the PPE they are purchasing,” says Melissa Gerhardt, product manager for flame-resistant clothing and arc flash PPE at National Safety Apparel.

Manufacturers can assess their level of conformity with the standard using one of the three methods.

“The first option is self-assessment, which means a manufacturer self-certifies that its products meet the standard,” Gerhardt says.

“The second option is for manufacturers to be ISO 9001 certified, which lets customers know there are processes in place to ensure product quality for every aspect of production,” she says.

“Third and most rigorous is the third-party certification, which requires an outside party, such as UL or another certifying partner, to make sure that the company is following all the proper protocols to verify the garments are meeting the standard,” Gerhardt says.

“It’s not defined within 70E how manufacturers need to communicate their level of conformity to potential customers,” Gerhardt says. “It could be as simple as providing conformity certificates to those

that require it, telling them how the standard is being met for specific products.”

Read more: Lockout Safety Procedures: 5 Elements Critical to Success

Electrical Safety Standard for Leather Protectors

A 2018 update to the NFPA 70E means it now follows the ASTM standard, which allows workers to wear insulating rubber gloves without leather protectors for some jobs, notes McCauley.

“However, it’s important people understand that each time an employee wears them without the leather protectors, they must be retested at a third-party test lab, which doesn’t make sense from a cost standpoint,” McCauley adds.

For that reason, McCauley recommends always using leather protectors on top of the insulating rubber gloves and getting them recertified every six months.

Understanding the latest changes to the NFPA 70E can help safety managers select the proper PPE to keep employees safe from highly dangerous, and sometimes fatal, arc flash incidents, while also protecting businesses from property damage and liability.

This article was updated from a previous version to include information about the 2021 changes to the NFPA 70E standard.

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What’s been your experience with NFPA 70E compliance? Were you aware of all the recent changes? Share your insights in the comments below.

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