

OVERVIEW

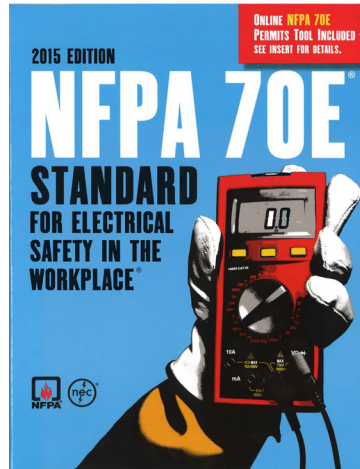
Occupational Health and Safety Administration (OSHA) provides the legal requirement for employers to ensure a safe work environment, and its regulations are enforceable under federal law. It sets general requirements for safe work practices, personal protective equipment (PPE) and risk assessment.

National Fire Protection Association (NFPA) is the world's leading advocate of fire protection and has published more than 300 consensus codes and standards.

National Electrical Code (NEC) protects individuals from fire and shock hazards under normal conditions and provides requirements for arc flash labels.

Together, OSHA, NFPA and NEC are working to ensure safe working conditions. Although OSHA outlines general requirements, in many cases it does not detail how to meet them. This is left to national consensus standards such as NFPA 70E: Standard for Electrical Safety in the Workplace®.

NFPA 70E outlines the specific safety procedures and practices to be followed when working on live equipment. The standard covers safety-related work practices associated with electrical energy during activities such as installation, inspection, operation, maintenance and demolition of electric equipment.



Many companies believe they have adequately protected their employees by labeling their equipment, yet hundreds of deaths and thousands of injuries still occur each year due to shock, electrocution, arc flash and arc blast. Unfortunately, a majority of these incidents are caused by unsafe acts—not faulty equipment.

The Standard for Electrical Safety in the Workplace undergoes updates and revisions every three years, and the 2015 edition builds on the safety, training and maintenance requirements outlined in NFPA 70E 2012. While some of the updates are editorial or informational in nature, others require facility managers to once again take action to revise and update safety policies.

Terminology

- Arc Flash PPE Category: Replaces hazard risk category (HRC)
- Hazard vs. Risk: Hazard identification refers to the potential for harm, while risk refers to the chance or probability that the identified hazard could result in physical harm

- Risk vs. Risk Assessment: Risk is a combination of the likelihood of and severity of injury or damage to health that results from a hazard; risk assessment is the process for identifying risk and determining if protective measures are required

The terms “arc flash hazard analysis,” “shock hazard analysis,” and “electrical hazard analysis” are now referred to, respectively, as “arc flash risk assessment,” “shock risk assessment,” and “electrical risk assessment.”

Arc Flash Analysis 130.5, 130.7

The arc flash analysis shall be updated when a major modification or renovation takes place. It should be reviewed periodically, *not to exceed five years*, to account for changes in the electrical distribution system that could affect the results of the arc flash risk assessment.

- 130.5(A): Requires the arc flash boundary distance to be calculated (versus using the table method) for all locations where voltage is greater than 50 volts
- 130.5(D): Equipment labels must now include the following information

1. Nominal system voltage
2. Arc flash boundary
3. At least one of the following:
 - 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

NFPA 70E 130.5 includes an exception that permits labels applied prior to Sept. 30, 2011, as long as they contain the available incident energy or required level of PPE. This is acceptable only until the labels come due for review or if an arc flash hazard risk assessment shows the labels are inaccurate.

- Table 130.7(C)(16): Provides arc flash category of the recommended clothing and PPE when it has been determined, through the use of the task-based tables for AC and DC systems, that an arc flash hazard exists

Safety-Related Work Practices 110.1, 110.2, 110.3, 110.4

- 110.1(I)(1): Requires that the employer's electrical safety program be audited to verify the principles and procedures of the electrical safety program are in compliance with this standard; and the audit shall not exceed three years
- 110.1(I)(2): Field work shall be audited to verify the requirements contained in the procedures of the electrical safety program are being followed
- 110.1(I)(3): The audits shall be documented and revisions made to any elements not in compliance
- 110.2(D)(1)(f): Employers are to perform annual inspections to ensure each employee complies with all safety-related work practices outlined in 70E
- 110.2(D)(3) and (E): Employees are to be retrained at intervals not to exceed three years and the training dates and content for each employee must be documented
- 110.3(C): Meetings between employers and contractors to communicate known hazards and installation information the contractor needs to make assessments must be documented
- 110.4: Only *qualified* persons according to OSHA 1910 shall perform testing and maintenance within the limited approach boundary

General Maintenance Requirements 205.2, 205.3, 205.4

- 205.2: A single-line diagram, where provided for the electrical system, shall be maintained in a legible condition and shall be kept current
- 205.3: Electrical equipment shall be maintained in accordance with manufacturers' instructions or industry consensus standards to reduce the risk of failure and the subsequent exposure of employees to electrical hazards
- 205.4: Overcurrent protective devices shall be maintained in accordance with the manufacturers' instructions or industry consensus standards. Maintenance, tests, and inspections shall be documented
- Industry consensus standards include the following:
 - ANSI/NETA 2015 Standard for Maintenance Testing Specifications, IEEE 3007.2 Recommended Practice for the Maintenance of Industrial and Commercial Power Systems, and NFPA 70B Recommended Practice for Electrical Equipment Maintenance
 - Preferred method of performance testing is via primary current injection

Battery Risk Assessment Requirements 320.3

- 320.3(A)(1): A risk assessment shall 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