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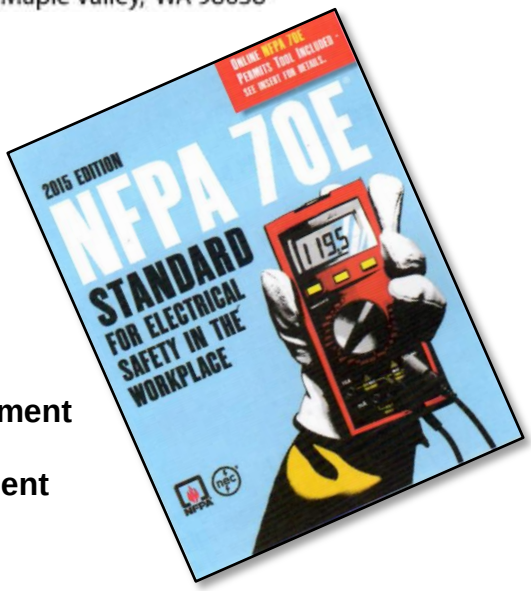
Phone 253-639-8535 ■ Fax 425-413-6797 ■ 22443 SE 240th St., Ste. 207, Maple Valley, WA 98038

NFPA 70E-2015®
Major Revisions



Global Changes

~~Arc flash hazard analysis~~ now **Arc flash risk assessment**
~~Electrical hazard analysis~~ now **Electrical hazard risk assessment**
~~Harm~~ now **injury or damage to health**
~~Hazard identification and risk assessment~~ now **Risk assessment**
~~Hazard Risk Category (HRC)~~ now **Arc Flash PPE Category**
~~Probability~~ now **Likelihood**
~~Shock hazard analysis~~ now **Shock risk assessment**
~~Workshoes~~ now **Footwear**

Article 100 - Definitions

Hazard (New Definition) A source of possible injury or damage to health.
Hazardous (New Definition) Involving exposure to at least one hazard.
Risk (New Definition) 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 (New Definition) 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.

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

Prohibited Approach Shock Boundary has been eliminated. (Only Limited and Restricted boundaries remain)
Incident Energy - The amount of thermal energy impressed on a surface, a certain distance from the source generated during an electrical arc event. Incident energy is typically expressed in calories per square centimeter (Cal/cm2).
Qualified Person - One who has demonstrated skills and knowledge related to the construction and operation of electrical equipment and installations and has received safety training to identify and avoid the hazards involved

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

Article 110 - General Requirements for Electrical Safety-Related Work Practices

110.1(A) General

The employer shall implement and document an overall electrical safety program that directs activity appropriate to the risk associated with electrical hazards, voltage, energy level, and circuit conditions. The electrical safety program shall be implemented as part of the employer's overall occupational health and safety management system, when one exists.

Informational Note No. 1: Safety-related work practices such as verification of proper maintenance and installation, alerting techniques, auditing requirements, and training requirements provided in this standard are administrative controls and part of an overall electrical safety program.

110.1(B) Maintenance.

The electrical safety program shall include elements that consider condition of maintenance of electrical equipment and systems.

110.2 Training Requirements.

(**A) Safety Training**.

The training requirements contained in this section shall apply to employees exposed to an electrical hazard when the risk associated with that hazard is not reduced to a safe level by the applicable electrical installation requirements.

(**C) Emergency Response Training.**

(1) Contact Release. Employees exposed to shock hazards shall be trained in methods of safe release of victims from contact with exposed energized electrical conductors or circuit parts. Refresher training shall occur annually.

(2) First Aid, Emergency Response, and Resuscitation.

(a) Employees responsible for responding to medical emergencies shall be trained in first aid and emergency procedures.

(b) Employees responsible for responding to medical emergencies shall trained in cardiopulmonary resuscitation (CPR). Refresher training shall occur annually.

(c) Employees responsible for responding to medical emergencies shall be trained in the use of an automated external defibrillator (AED) if an employer's emergency response plan includes the use of this device. Refresher training shall occur annually.

(3) Training Verification. Employers shall verify at least annually that employee training required by this section is current

(4) Documentation. The employer shall document that the training required by this section has occurred.

(D) Employee Training.

(1) Qualified Person.

(b) Such persons permitted to work within the limited approach boundary shall, at a minimum, be additionally trained in all of the following: (Added the following)

(4) Decision-making process necessary to be able to do the following:

a. Perform the job safety planning
b. Identify electrical hazards
c. Assess the associated risk
d. Select the appropriate risk control methods from the hierarchy of control identified in 110.1(F), including personal protective equipment.

Informational Note 1 : Content of the training could include one or more of the following: course syllabus, course curriculum, outline, table of contents or training objectives

(3) Retraining.

Retraining in safety-related work practices and applicable changes in this standard shall be performed at intervals not to exceed three years. An employee shall receive additional training (or retraining) if any of the following conditions exists:

(1)...
(2)...
(3)…

110.3 Relationships with Contractors (Outside Service Personnel, and So Forth).

(C) Documentation. Where the host employer has knowledge of hazards covered by this standard that are related to the contract employer's work, there shall be a documented meeting between the host employer and the contract employer.

110.4 Use of Equipment.

(C) Ground-Fault Circuit-Interrupter (GFCI) Protection.

(1) General.

Employees shall be provided with ground-fault circuit-interrupter (GFCI) protection where required by applicable state, federal, or local codes and standards. Listed cord sets or devices incorporating listed GFCI protection for personnel identified for portable use shall be permitted…..

(2) Maintenance and Construction.

GFCI protection shall be provided when an employee is operating or using cord- and plug-connected equipment supplied by 125-volt, 15-, 20-, or 30-ampere circuits. Where employees working outdoors operate or use equipment supplied by greater than 125-volt, 15-, 20-, or 30-ampere circuits, an assured equipment grounding conductor program shall be implemented.

Article 120 - Establishing an Electrically Safe Work Condition

120.1 Verification of an Electrically Safe Work Condition.

(5) Use an adequately rated test instrument to test each phase conductor or circuit part to verify it is deenergized. Test each phase conductor or circuit part both phase-to-phase and phase-to-ground. Before and after each test, determine that the test instrument is operating satisfactorily through verification on a known voltage source.

120.2 De-energized Electrical Equipment That Has Lockout/Tagout Devices Applied.

(3) Retraining. Retraining shall be performed:

(a) When the established procedure is revised
(b) At intervals not to exceed 3 years.

(4) Training Documentation.

(a) The employer shall document that each employee has received the training required by this section.
(b) The documentation shall be made when the employee demonstrates proficiency in the work practices involved.
(c) The documentation shall contain the content of the training, each employee's name and the dates of the training.
Informational Note: Content of the training could include one or more of the following: course syllabus, course curriculum, outline, table of contents, or training objectives.

120.3 Temporary Protective Grounding Equipment.

(A) Placement. Temporary protective grounding equipment shall be placed at such locations and arranged in such a manner as to prevent each employee from being exposed to a shock hazard (hazardous differences in electrical potential). The location, sizing, and application of temporary protective grounding equipment shall be identified as part of the employer's job planning.

Article 130 - Work Involving Electrical Hazards

130.2(A) Energized Work.

(4) Normal Operation. **(New Item)** 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 the 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.

130.2(B) Energized Electrical Work Permit

(1) When Required. When energized work is permitted in accordance with 130.2(A), an energized electrical work permit shall be required under the following conditions:

(1) When work is performed within the restricted approach boundary
(2) When the employee interacts with the equipment when conductors or circuit parts are not exposed but an increased likelihood of injury from an exposure to an arc flash hazard exists

(3) Exemptions to Work Permit. An energized electrical work permit shall not be required if a qualified person is provided with and uses appropriate safe work practices and PPE in accordance with Chapter 1 under any of the following conditions:

(1) Testing, troubleshooting, and voltage measuring
(2) Thermography and visual inspections if the restricted approach boundary is not crossed
(3) Access to and egress from an area with energized electrical equipment if no electrical work is performed and the restricted approach boundary is not crossed
(4) General housekeeping and miscellaneous non-electrical tasks if the restricted approach boundary is not crossed.

130.3 Working While Exposed to Electrical Hazards - (A) General.

Safety-related work practices shall be used to safeguard employees from injury while they are exposed to electrical hazards from electrical conductors or circuit parts that are or can become energized. The specific safety related work practices shall be consistent with the electrical hazards and the associated risk. Appropriate safety-related work practices shall be determined before any person is exposed to the electrical hazards involved by using both shock risk assessment and arc flash risk assessment. Only qualified persons shall be permitted to work on electrical conductors or circuit parts that have not been put into an electrically safe work condition.

130.5 Arc Flash Risk Assessment.

An arc flash risk assessment shall be performed and shall:

(1) Determine if an arc flash hazard exists. If an arc flash hazard exists, the risk assessment shall determine:

(a) Appropriate safety-related work practices

(b) The arc flash boundary

(c) The PPE to be used within the arc flash boundary

130.5 Arc Flash Risk Assessment. Informational Note No. 1:

Improper or inadequate maintenance can result in increased opening time of the overcurrent protective device, thus increasing the incident energy. Where equipment is not properly installed or maintained, PPE selection based on incident energy analysis or the PPE category method may not provide adequate protection from arc flash hazards.

130.5 (A) Documentation. (New Item)

The results of the arc flash risk assessment shall be documented.

130.5(C) Arc Flash PPE.

One of the following methods shall be used for the selection of PPE. Either, but not both, methods shall be permitted to be used on the same piece of equipment. The results of an incident energy analysis to specify an arc flash PPE Category in Table 130.7(C)(16) shall not be permitted.

130.5 (D) Equipment Labeling. (New Item)

The owner of the electrical equipment shall be responsible for the documentation, installation, and maintenance for the field-marked label.

130.6(D) Conductive Articles Being Worn.

Conductive articles of jewelry and clothing (such as watchbands, bracelets, rings, key chains, necklaces, metalized aprons, cloth with conductive thread, metal headgear, or metal frame glasses) shall not be worn within the restricted approach boundary or where they present an electrical contact hazard with exposed energized electrical conductors or circuit parts.

130.6(H) Clear Spaces. (New Item)

Working space in front of electrical equipment required by other codes and standards shall not be used for storage. This space shall be kept clear to permit safe operation and maintenance of electrical equipment.

130.7(C)(9) Factors in Selection of Protective Equipment.

(d) Coverage. Clothing shall cover potentially exposed areas as completely as possible. Shirt and coverall sleeves shall be fastened at the wrists, shirts shall be tucked into pants, and shirts, coveralls, and jackets shall be closed at the neck.

130.7(C)(15) Selection of Personal Protective Equipment When Required for Various Tasks

(A) Alternating Current (ac) Equipment. Where selected in lieu of the incident energy analysis of 130.5(B)(1), Table 130.7(C)(15)(A)(a) . (New Table) shall be used to identify when arc flash PPE is required. Table 130.7(C)(15)(A)(b) shall be used to determine the arc flash PPE category. The estimated maximum available short-circuit current, maximum fault clearing times, and minimum working distances for various ac equipment types or classifications are listed in Table 130.7(C)(15)(A)(b). An incident energy analysis shall be required in accordance with 130.5 for the following:

(1)Tasks not listed in Table 130.7(C)(15)(A)(a)

(2) Power systems with greater than the estimated maximum available short-circuit current

(3) Power systems with longer than the maximum fault clearing times

(4) Tasks with less than the minimum working distance.

Table 130.7(C)(15)(A)(b) & Table 130.7(C)(15)(B) Task Tables -
Arc Flash Hazard Category 0 has been removed.

Table 130.7(C)(16) Protective Equipment (PPE)
PPE Categories 1-4 (No Category 0)

130.7(D) Other Protective Equipment.
(1) Insulated Tools and Equipment. Employees shall use insulated tools or handling equipment, or both, when working inside the restricted approach boundary of exposed energized electrical conductors or circuit parts where tools or handling equipment might make accidental contact. Table 130.7(C)(15)(a) and Table 130.7(C)(15)(b) provide further information for tasks that require insulated and insulating hand tools. Insulated tools shall be protected from damage to the insulating material.
(2) Barricades ...Where the arc flash boundary is greater than the limited approach boundary, barricades shall not be placed closer than the arc flash boundary.

130.10 Cutting or Drilling. (New Item)
Before cutting or drilling into equipment, floors, walls, or structural elements where a likelihood of contacting energized electrical lines or parts exists, the employer shall perform a risk assessment to:
(1) Identify and mark the location of conductors, cables, raceways, or equipment,
(2) Create an electrically safe work condition, and
(3) Identify safe work practices and PPE to be used.

Article 200 - Safety-Related Maintenance Requirements

205.3 General Maintenance Requirements
….The equipment owner or the owner's designated representative shall be responsible for maintenance of the electrical equipment and documentation.

205.7 Guarding of Energized Conductors and Circuit Parts.
Enclosures shall be maintained to guard against accidental contact with energized conductors and circuit parts and other electrical hazards. Covers and doors shall be in place with all associated fasteners and latches secured.

205.14 Flexible Cords and Cables. **(New Item)**
(3) Repair and Replacement. Cords and cord caps for portable electrical equipment shall be repaired and replaced by qualified personnel and checked for proper polarity grounding, and continuity prior to returning to service.

205.15 Overhead Line Clearances. **(New Item)**
For overhead electrical lines under the employer's control, grade elevation shall be maintained to preserve no less than the minimum designed vertical and horizontal clearances necessary to minimize risk of unintentional contact.

210.5 Protective Devices
Informational Note: Improper or inadequate maintenance can result in increased opening time of the overcurrent protective device, thus increasing the incident energy.

225.1 Fuses.
Fuses shall be maintained free of breaks or cracks in fuse cases, ferrules, and insulators. Fuse clips shall be maintained to provide adequate contact with fuses. Fuseholders for current-limiting fuses shall not be modified to allow the

insertion of fuses that are not current-limiting. Non-current limiting fuses shall not be modified to allow their insertion into current-**limiting fuseholders.**

250.4 Test Instruments. **(New Item))**

Test Instruments and associated test leads used to verify the absence or presence of voltage shall be maintained to assure functional integrity. The maintenance program shall include functional verification as described in 110.4(A)(5).

205.15 Overhead Line Clearances. **(New Item)**

For overhead electrical lines under the employer's control, grade elevation shall be maintained to preserve no less than the minimum designed vertical and horizontal clearances necessary to minimize risk of unintentional contact.

250.4 Test Instruments. **(New Item)**

Test Instruments and associated test leads used to verify the absence or presence of voltage shall be maintained to assure functional integrity. The maintenance program shall include functional verification as described in 110.4(A)(5).

Article 300 - Safety Requirements for Special Equipment

320.2 Prospective Short-Circuit Current.

The highest level of fault current that could theoretically occur at a point on a circuit. This is the fault current that can flow in the event of a zero impedance short circuit and if no protection devices operate.

320.3 General Safety Hazards. **(New Item)**

(1) Battery Risk Assessment

Prior to any work on a battery system, a risk assessment shall be performed to identify the chemical, electrical shock, and arc flash hazards and assess the rislks associated with the type of tasks to be performed.

320.3(B)(2) Activities That Do Not Include Handling of Electrolyte. **(New Item)**

Employees performing any activity not involving the handling of electrolyte shall wear safety glasses.

Informational Note: Battery maintenance activities usually do not involve handling electrolyte. Batteries with solid electrolyte (such as most lithium batteries: or immobilized electrolyte (such as valve-regulated lead acid batteries) preset little or no electrolyte hazard. Most modern density meters expose a worker to a quantity of electrolyte too minute to considered hazardous, if at all. Such work would not be considered handling electrolyte. However, if specific gravity readings are taken using a bulb hydrometer, the risk of exposure is higher – this could be considered to be handling electrolyte, and the requirements of 320.3(B)(1) would apply.

Note: This handout is for education purposes only. Its purpose is to educate the user on the changes and revisions made to NFPA 70E®. Users are encouraged to purchase the new version of NPFA 70E® at http://www.nfpa.org.

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