NFPA 70E 2015
Changes

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Who I Am

- President - Nebraska Safety and Health Professionals (formally NCSP)
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So what is the **NFPA 70 E**?

- The Purpose of the 70E Standard is to provide safe working guidelines and practices to ensure employee safety when working on electrical systems.
- First published in 1979
  - It is a appendix to NFPA 70 or known more commonly as the NEC.
- Consists of several updated versions
  - Working on 2018 updates.
NFPA-70E  90.2

This standard addresses electrical practices for employee workplaces that are necessary for the practical safeguarding of employees relative to the hazards associated with electrical energy. This standard also includes safe work practices for employees performing other activities that expose them to electrical hazards.
What Is an Arc Flash?
Arc Flash

- Arc Flash

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130.7(J) Anticipating Failure

When there is evidence that electrical equipment could fail and injure employees, the equipment **shall** be deenergized. Until the equipment is deenergized or repaired, employees **shall** be protected from hazards associated with impending failure by suitable barricades or other alerting techniques necessary for the safety of employees.
Barricading
WHY SHOULD I HAVE AN ARC FLASH RISK ASSESSMENT?

1. OSHA General Duty Clause which states: Each employer shall furnish to each of his employees employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious physical harm.

2. OSHA 29 CFR 1926.960(g)

1. Hazard assessment. The employer shall assess the workplace to identify employees exposed to hazards from flames or from electric arcs.

2. Estimate of available heat energy. For each employee exposed to hazards from electric arcs, the employer shall make a reasonable estimate of the incident heat energy to which the employee would be exposed.

3. OSHA 29 CFR 1910.335 Employees working in areas where potential electrical hazards exist shall be provided with and shall use personal protective equipment.
Risk assessment cont.

• NFPA 70e 110. A The employer shall implement and document an overall electrical safety program that directs activity appropriate to the risk associated with electric hazards. The electrical safety program shall be implemented as apart of the employer’s overall occupational health and safety management system, when one exists.
REQUIRED

130.5 Arc Flash Risk Assessment

(1) Determine if arc flash hazard exists
   a. Appropriate safety-related work practices
   b. Arc flash boundary
   c. PPE to be used within arc flash boundary
What is the purpose of an risk assessment?
To prevent this
Shock / Flash Protection Boundary
600 Volt Panelboard

Note: Boundaries dependent on system voltage level
Flash Boundary also dependent on cycles and fault current

Restricted Shock Boundary:

Limited Shock Boundary: Qualified persons Only

Flash Protection Boundary:
2015 Change

• (C) (D) Equipment Labeling.
  – Nominal system voltage
  – Arc flash boundary

• At least one of the following:
  – Incident energy and working distance or arc flash PPE category but not both
  – Minimum clothing arc rating
  – Site-specific level of PPE
Sample NEC Minimum Warning
Article 110.16

WARNING

Arc Flash and Shock Hazard
Appropriate PPE Required

Businesses will need to bring their systems up to "code".
Sample NEC Warning
Article 110.16 (2012)

WARNING

Arc Flash and Shock Hazard
Appropriate PPE Required

24 inch Flash Hazard Boundary
3 cal/cm² Flash Hazard at 18 inches

480 VAC Shock Hazard when Cover is removed
42 inch Limited Approach
12 inch Restricted Approach - 500 V Class 00 Gloves
1 inch Prohibited Approach - 500 V Class 00 Gloves

Date: 6/28/2001

Bldg. ECR #1 Equipment Name: Slurry Pump Starter
2015 Change

— • (C) (D) Equipment Labeling.
   ‒ Nominal system voltage
   ‒ Arc flash boundary
• At least one of the following:
  ‒ Incident energy and working distance or arc flash PPE category but not both
  ‒ Minimum clothing arc rating
  ‒ Site-specific level of PPE
2015 Change

• ... Where the review of the arc flash hazard risk assessment identifies a change that renders the label inaccurate, the label shall be updated.

• The owner of the electrical equipment shall be responsible for the documentation, installation, maintenance of the field-marked label.
2015 Change

• Energized Electrical Work Permit
  • Required
    – within the limited restricted approach boundary or the arc flash boundary...
2015 Change

• **The hazard/risk category method is deleted**, the Arc Flash PPE Category Method does not vary PPE levels based on an associated risk.

• Table 130.7(C)(15)(A)(a) identifies when arc flash PPE is required.
Who’s Required To Do What?

- NFPA 70E 3-1 General: employees working in areas where there are electrical hazards shall be provided with, and shall use, protective equipment that is designed and constructed for the specific part of the body to be protected and for the work to be performed.

- OSHA 1910.335 - Safeguards for personal protection: (a)use of protective equipment. (1) Personal protective equipment. (i) Employees working in areas where there are potential electrical hazards shall be provided with, and shall use, electrical protective equipment that is appropriate for the specific parts of the body to be protected and for the work to be performed.
Host Employer
2015 Change

110.3 Host and Contract Employers’ Responsibilities
• (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.
2015 Change

• All justified energized work requires a job briefing before each task including tasks that are repetitive or similar.
• It is no longer “satisfactory” to have only a brief discussion at the start of each day for routine and qualified employees.
• Routine work by qualified persons now requires a job briefing before each task.
20150 Change

Arc Flash PPE Categories recognized are limited to 1 through 4 only.

- Previous protective clothing and PPE requirements of HRC 0 are deleted.
PERSONAL PROTECTIVE EQUIPMENT
PPE – Why It’s Important
And then there were four...
Remember these?
OSHA 1910.335(a)(2)(i) Subpart S

Electrical Safety - Related Work Practices

Personal Protective Equipment (PPE)

• When working near exposed energized conductors or circuit parts, each employee shall use insulated tools or handling equipment if the tools or handling equipment might make contact with such conductors or parts. If the insulating capability of insulated tools or handling equipment is subject to damage, the insulating material shall be protected.
2015 Change

• (1) Insulated Tools and Equipment

  – Employees shall use insulated tools or handling equipment, or both, when working inside the limited restricted approach boundary of exposed energized electrical conductors or circuit parts where tools or handling equipment might make accidental contact.
2015 Change

- Test instruments used to verify absence or presence of voltage must be maintained.

- Test instruments and all associated test leads must be maintained to assure functional integrity.

- Operation verification tests must be performed to ensure functional verification of the test instrument.
120.1 Process of Achieving Verification of an Electrically Safe Work Condition.

(5) Use an adequately rated voltage detector test instrument to test each phase conductor or circuit part to verify they are it is de-energized. Test each phase conductor or circuit part both phase-to-phase and phase to-ground. Before and after each test, determine that the voltage detector test instrument is operating satisfactorily through verification on a known voltage source.
GFCI’s 2015

GFCI protection is required for 125-volts, 15, 20 or 30 amps receptacles supplying cord and plug. Connected tools used for maintenance activities.
The previous code section 305-6 specified that ground-fault protection for personnel was *only* required on construction site receptacles.

The 1996 code expanded ground-fault protection of personnel to *include* receptacles used for remodeling, maintenance, repair or demolition of building, structures, equipment or similar activities.
120.2(D)(1) Simple Lockout/Tagout Procedures

120.2(C)(2) Two forms of hazardous electrical energy control shall be permitted Simple lockout/tagout and complex lockout/tagout.

Simple lockout/tagout – the qualified person shall be in charge.

Complex lockout/tagout – the person in charge shall have overall responsibility.
“Qualified Person”

Who is a Qualified Person?

Hmm..
2015 Change
2015 Change

• Qualified Persons must have “demonstrated skills and knowledge related to the construction and operation of electrical equipment and installations.”

• Qualified Persons must have “received safety training to identify and avoid the hazards involved.”

• A person can be considered qualified with respect to certain equipment and methods but still be unqualified for others.
2015 Change - Training
Training

Training shall apply to employees *exposed* to an electrical hazard when the risk associated with the hazard is not reduced to a safe level by the applicable installation requirements. Such employees shall be trained to understand the specific hazards associated with electrical energy. ............... 

Maintenance, in-house electricians, outside contractors??????

What am I to do?
2015 Change

Training

• (3) Retraining.
  • When the established procedure is revised & at intervals not to exceed 3 years

• (4) Training Documentation
  • Must be documented (including name, date & content) when employee demonstrates proficiency.
Emergency Procedures Response Training

• (2) CPR and AED Refresher training shall occur annually.

  [For responding employees]

• (4) Documentation. The employer shall document that the training required by this section has occurred.
2015 Change

- Employers are not required to certify the training and the employer may use a third party to perform the training......but,

- Employers must now document emergency response training and verify that employees are retrained annually.

Tool box meeting, document team meeting etc.
All justified energized work requires a job briefing before each task including tasks that are repetitive or similar. It is no longer “satisfactory” to have only a brief discussion at the start of each day for routine and qualified employees.
Who’s Responsible?

The “employer” is responsible for:

- Electrical safety program
- Safety policies and procedures
- Safety equipment
- Safety training
Individual’s Responsibility

1. Implement employer's program.
2. Follow procedures published by employer.
3. Go home in one piece.
Questions????