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Questions and answers about this set of guidelines for workplace electrical safety.

One of the hot topics in electrical and mechanical training classes is the National Fire Protection Association (NFPA) 70E. Students question what 70E is and how it relates to the National Electrical Code (NEC), if 70E is a new regulation and if not why are they just now hearing about it, and if companies are required to comply with 70E.

This article will take some of the mystery out of 70E.

Troubleshooting live equipment, such as testing a contactor (left), requires hazard/risk level 2 PPE, suitable for protection from an arc flash of 8 cal/cm2, but racking of a circuit breaker (right) demands hazard/risk level 3 PPE, suitable for protection from an arc flash of 25 cal/cm2.

What is 70E?

Parts of 70E have been around since 1979. The Occupational Safety and Health Administration (OSHA) adopted new regulations on safe electrical work practices in 1990 based on 70E. However, 70E is a topic of interest now because the NEC and OSHA are referring to it in their documents, and citations are now being written based on 70E.

With the passing of the Williams-Steiger Occupational Safety and Health Act of 1970 came the need for occupational safety and health regulations. Congress directed OSHA to develop new regulations using existing “national consensus standards” and established federal standards.

For electrical safety regulations it originally adopted the most widely accepted electrical standard in the world—the NEC (National Fire Protection Association’s Standard NFPA 70). However, OSHA encountered several problems in attempting to use the latest editions of the NEC:

• With each new update of the NEC (which occurs every 3 years) OSHA had to go through the extensive legal process of adopting the new NEC edition and risk creating potential conflicts between the adopted version and the published version.
• OSHA needed a regulation that addressed installation, operation, maintenance, and repair in the workplace. The NEC is an electrical installation standard only.
• Because the purpose of the NEC is the practical safeguarding of persons and equipment and because it includes provisions for residential, it contains many provisions that are not relevant to OSHA and only confuse the reader.

To correct these problems and others, NFPA created a committee to develop electrical safety standards that would serve the needs of OSHA. This committee reports through the NEC technical committee and is called the Committee on Electrical Safety Requirements for Employee Workplaces—NFPA 70E. This standard has evolved over time:

• 1979: First edition published with only Part I (Installation Safety Requirements).
• 1981: Second edition added Part II (Safety-Related Work Practices).
• 1983: Third edition added Part III (Safety-Related Maintenance Requirements).
• 1988: Fourth edition had only minor revisions.
• 1995: Fifth edition updated Part I based on the most recent NEC and made some major additions to Part II.
• 2000: Sixth edition updated Part I based on the most recent NEC, made additions to Part II, and added Part IV (Safety Requirements for Special Equipment).
• 2004: The most recent edition made many significant changes including a total reorganization into the NEC format. In the reorganization Part II was moved to become Chapter 1, Part III became Chapter 2, Part IV became Chapter 3, and Part I became Chapter 4.

Is 70E a "national consensus standard"?

By definition NFPA 70E is a national consensus standard. In 29 CFR 1910.2(g), a national consensus standard is defined as a standard that is developed by the same persons it affects and then is adopted by a nationally recognized organization.

Organizations that publish national consensus standards include the NFPA, American Society for Testing and Materials (ASTM), and the American National Standards Institute (ANSI).

What does it cover?

In NFPA's catalog it states: "70E covers the full range of electrical safety issues from safety-related work practices to maintenance, special equipment requirements, and installation. In fact, OSHA bases its electrical safety mandates—OSHA 1910 Subpart S and OSHA 1926 Subpart K—on the comprehensive information in this important Standard."

The 2004 edition of 70E has an introduction, four chapters, and 13 annexes.

Chapter 1, "Safety-Related Work Practices," is the meat of the 70E document. It discusses qualified vs unqualified persons and training. It requires an electrical safety program, electrical hazard analysis for shock and arc flash, energized electrical work permits, and lockout/tagout procedures. It establishes approach boundaries and discusses how to select appropriate personal protective equipment (PPE) and protective clothing. Arc flash protection also is addressed in this chapter.

Chapter 2, "Safety-Related Maintenance Requirements," does not create much discussion. It basically requires that electrical components, wiring, and equipment be maintained in a safe condition.

Chapter 3, "Safety Requirements for Special Equipment," covers batteries, lasers, and power electronic equipment. This chapter affects more installations than one might initially think because power electronic equipment includes electric arc welding equipment, and motor drives, UPS, and lighting controllers that contain rectifiers and inverters. There are no surprises in this chapter but those with the subject equipment should review it.

Chapter 4, “Installation Safety Requirements,” is a truncated version of the NEC. Here authors state that the requirements in Chapter 4 are based on the NEC and in the forward of the 70E document it states that this document is not intended to be used in lieu of the NEC.

Annexes A through M offer useful information including how to calculate flash protection boundaries.

What is the “general duty clause” and how does it relate to compliance?
This clause refers to a portion of the Occupational Safety and Health Act of 1970:

5. Duties
(a) Each employer
(1) 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 to his employees,

Section 5(a)(1) has become known as the “general duty clause.” It is a catch-all for citations if OSHA identifies unsafe conditions to which a regulation does not exist.

WARNING
Arc Flash and Shock Hazard
Appropriate PPE Required
24 inch Flash Hazard Boundary
3 cal/cm² Flash Hazard at 18 inches
1DF PPE Level, 1 Layer 6 oz Nomex®,
Leather Gloves, Faceshield
480 VAC Shock Hazard wh
36 inch Limited Approac
12 inch Restricted Appro
1 inch Prohibited Appro
Equipment Name: Slurry Pump Starter
DANGER
Arc flash and shock hazard.
Follow ALL requirements in NFPA 70E for safe work practices and for Personal Protective Equipment.

[redacted]