

Electrotechnical Commission (IEC) standards are an attempt within international communities to reach a consensus on standard requirements. Significant progress is being achieved with this objective. Many of the European governments have mandated standards systems. The European Union (EU) encourages further consensus among affected nations.

In many instances, protection schemes embraced in the IEC differ from those in the U.S. For example, in the U.S., nationally recognized testing laboratories are used to perform standardized "third party" product testing. Products meeting the testing standard are marked, identifying the testing laboratory. Many products meeting international safety requirements for installation in Europe require certification to testing standards and must bear a CE mark. The CE mark applies to certain "directives" within European Union countries. The intent is to provide a "safe" product that is acceptable to all of the EU countries.

With regard to personnel safety, the IEC standards address protection from electrical shock more directly than U.S. standards. For instance, IEC standards generally recognize that degrees of exposure vary. This idea will be discussed further in the section on IP finger-safe ratings.

III. Establishing an Electrical Safety Program

Reducing and even eliminating exposure to electrical hazards requires continuous attention. An overall electrical safety program must be implemented that emphasizes specific areas of concern. The program must be well thought out. People who are well versed in safety standards and procedures must write the program. Program authors should include safety professionals, technical professionals, and practitioners. And the program must be published and readily available to all employees. The following are three good reasons for practicing electrical safety:

- Personal reasons, which affect us as caring individuals and employers
- Business reasons, because safety makes good business sense
- Regulatory and legal reasons, because violations can result in fines and/or imprisonment

An essential element in an effective electrical safety program is training. From both a legal and effective point of view, training records are important. Training should be based on the program and procedures in place within an organization. The training should focus first on increasing knowledge and understanding of electrical hazards and second on how to avoid exposure to these hazards. As a person completes a specific segment of training, a record should be

established and maintained.

An electrical safety program should accomplish the following objectives:

- Make personnel aware of the rules, responsibilities, and procedures for working safely in an electrical environment.
- Demonstrate the employer's intention to comply fully with federal law.
- Document general requirements and guidelines to provide workplace facilities free from unauthorized exposure to electrical hazards.
- Document general requirements and guidelines to direct the activities of personnel, who could be either deliberately or accidentally exposed to electrical hazards.
- Encourage and make it easier for each employee to be responsible for his or her own electrical safety self-discipline.

IV. Electrical Safety Program

An electrical safety program is vital in establishing an electrically safe work place and is required:

NFPA 70E 110.7 Electrical Safety Program.

(A) General. The employer shall implement an overall electrical safety program that directs activity appropriate for the voltage, energy level, and circuit conditions.

FPN: Safety-related work practices are just one component of an overall electrical safety program.

To reduce electrical hazards, each hazard must be addressed, as the work is being assigned and planned. An overview of electrical safety requirements can be found in OSHA 29 CFR 1910.331—1910.335, "Safety-Related Work Practices." These requirements contain information on qualified vs. unqualified persons, training requirements, work practice selection, use of electrical equipment, and safeguards for personnel protection. In addition, *NFPA 70E* addresses all the key aspects of electrical safety and electrical safe work practices. If these requirements are followed completely, injuries and deaths can be prevented.

A. Electrical safety program principles

The following principles, when implemented, can help ensure safer work places:

1. **Identify and minimize the hazards in electrical systems.** For new systems, designers should address minimizing hazards in the electrical system design stage. For existing systems, implement upgrades or retrofits that reduce the hazards.
2. **Plan every job.** Most incidents occur when something unexpected happens. Take time to prepare a