

## ELECTRICAL SAFETY STANDARDS:

### *DON'T RISK GETTING BEHIND ON TODAY'S KEY FACILITIES PRACTICES*

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AUGUST 2008

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As electrical system professionals, we are regularly reminded of the often tragic and costly consequences to clients that have lax or non-existent safety standards. The latest of these standards, National Fire Protection Association (**NFPA**)-**70E**, is an element critical in insuring personnel and operational risks are managed in a manner consistent with **OSHA** and the National Electric Code (NEC).

**OSHA** sets safety standards for all electrical systems including the standards for electric utilization systems, which include systems that provide power and light to employee workplaces. Ideally, **OSHA** mandates working on de-energized systems; the practical reality is that power systems and equipment need to be regularly worked on while in an energized state. A whole article can be written on the justification for working on energized equipment, but that is not the intent with this article however it is important to at least mention. **OSHA** and the **NFPA** require that you must put this equipment into an electrically safe work condition (locked out, tagged out) prior to working on parts that operate at greater than 50 volts to ground. There are only two exceptions to this requirement. The employer must demonstrate that de-energizing *introduces additional or increased hazards* (loss of electrical power for life support systems or loss of power that could result in an environmental spill) *or is infeasible due to equipment design* (troubleshooting, voltage testing, infrared testing) *or operational limitations* (de-energizing a single instrument circuit would require a complete shutdown of a continuous process). I believe that too many look at “infeasible” as “inconvenient”. There is a big difference between these two terms.

Working under energized conditions creates special safety concerns, such as arc-flash hazards, electric shock and arc blast which are all least life-threatening and potentially fatal. To give a quick perspective, these arcs, consisting of energized ionized plasma, can - within a fraction of a second - reach some of the highest temperatures on Earth - up to 35,000 degrees Fahrenheit; a temperature that vaporizes all known materials.

A key component of **NFPA-70E** is the analysis of arc-flash hazards associated with common electrical distributions systems in place at most of today's commercial, industrial and institutional facilities. The assessment is designed to identify system conditions associated with dangerous releases of energy caused by an electric arc when working on energized equipment.

The corresponding analysis provides the necessary information to establish a custom level of Personal Protective Equipment (PPE) needed for each location in a facility's system based on the incident energy at that specific location. A field labeling requirement provides fair warning to qualified personnel of the hazard potential and the need to utilize appropriate PPE while working in a specific environment.

The **NEC**, first introduced almost a century ago, requires the placement of labels warning workers of serious injury or death that can occur due to arcing faults. These labels must be located where they will be visible to qualified personnel before any adjustment or servicing is undertaken.



Although **OSHA** sets forth the legal requirements for these safety standards, it does not spell out how they are to be implemented. On the other hand, **NFPA-70E** provides safety guidelines such as the use of protective clothing and safe distances when working on energized equipment. Although **NFPA-70E** compliance is not strictly required by law, compliance with its regulations ensures **OSHA** compliance, which is a requirement.

In effect, **OSHA** says *what's required*; **NFPA-70E** explains *what to do*.

All of this is done under the - Institute of Electrical and Electronics Engineers (**IEEE**) Standard 1584, "Guide for Performing Arc Flash Calculations" which provides the definitive steps in calculating the hazards of arc flash in different types of equipment, in support of **NFPA-70E**. With this information, an informed decision can be made about the level of PPE to wear for those who work in an energized environment. There are many variables that go into determining the incident energy at any given point in an electrical system (fault current, clearing time, distance from the arc, etc), but unless the system is regularly inspected and maintained, the protective functions that we would then rely on to protect our employees could, in all likelihood, fail to operate as it was intended, thus, resulting in an increased exposure, injury severity and additional equipment damage.

As professionals in facilities that can be dangerous at times, we are forever diligent when it comes to worker safety and opportunity cost of damaged facilities. **NFPA-70E** provides a good emphasis which helps to spread a level of awareness to a larger audience in an effort to insure none of us ever has to make that call to a hospital or worst yet to the family of a co-worker.

Momentum is building as facility and property managers get up to speed on **NFPA-70E** and the availability of this type of analysis. Strides are being made – it's just one of those key facility practices – **staying diligent on safety related risks** – where falling behind is 'not an option' given the potentially extraordinary cost of life and property.

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