



Side view of an equipment rack during an arc flash explosion

## Square D Solutions For Electrical Workplace Safety

Our services team can provide on site analysis, assessment, NFPA 70E training and equipment solutions where existing equipment needs upgrading, or even replacement.

We service Square D brand equipment as well as virtually all other brands of electrical equipment and maintain a ready inventory of replacement components.

Contact your Square D sales representative, distributor or contact our Square D services team for assistance at 1-888-778-2733 or visit [www.SquareD.com](http://www.SquareD.com).



# Arc Flash:

*Understanding The Need For Increased Electrical Safety*

## Understanding Arc Flash

According to the National Fire Protection Association (NFPA), an arc flash hazard is “a dangerous condition associated with the release of energy caused by an electric arc.” An arc flash is an explosion causing severe burns, injuries and/or death depending on the severity.

Arc flash incidents typically occur in applications above 120V and can take place when an electrical service is being inspected or serviced. In fact, some incidents occur when a worker is removing a cover or trim from a piece of equipment.

An arc flash is caused by a reduction of the insulation or the isolation distance between energized components. This could be caused by a tool being inserted or dropped into a breaker or service area, or other element that may be accidentally left behind that could compromise the distance between energized components. Often, incidents occur when a worker mistakenly fails to insure that the equipment has been properly de-energized.





## Employee Safety

Five to 10 arc flash explosions occur in electric equipment every day in the United States, according to statistics compiled by CapSchell, Inc., a Chicago-based research and

consulting firm that specializes in preventing workplace injuries and deaths.

Injuries from arc flash events range from minor injuries to third degree burns and potential death due to the energy released.

Other injuries include blindness, hearing loss, nerve damage and cardiac arrest.

## Potential Equipment Damage

The damage caused by an arc flash explosion can be serious enough to render equipment unusable, which can cause a disruption in operation that can last anywhere from hours to days, depending upon the equipment, its age and how quickly service can be restored. The explosion can also bend and distort pieces of the equipment leaving it unsuitable for service.

Because the temperatures of the arcing event can typically range from 5,000 degrees Fahrenheit and up, an arc can erode or destroy components in the service area as well, vaporizing the copper and steel components.

## What Is NFPA 70E?

As part of the National Fire Protection Association guidelines, NFPA 70E is a recommended safety standard that provides awareness of arc flash hazards. NFPA 70E also provides information on flash analysis, which can help in choosing appropriate personal protective equipment (PPE) to enhance worker safety. A fundamental requirement of this standard is to de-energize equipment.

## How OSHA Is Involved

The Occupational Safety and Health Administration (OSHA) is currently the enforcement agency driving arc flash safety in the industry. If they investigate an arc flash incident, OSHA insists that companies follow NFPA 70E as a guideline for workplace safety. OSHA can take “enforcement action” by levying fines if safety standards are not being followed. In addition, OSHA has begun to enforce the NFPA 70E guidelines as a part of their routine inspection procedures.

## Implications To Facility

With increased understanding of the dangers of arc flash incidents, industry as a whole will need to adjust many different aspects of their electrical maintenance procedures.

Before enforcement of these standards becomes commonplace, companies need to be aware of what is occurring throughout the industry on this subject. They also need to be notified that an enforcement agency is beginning to drive this change should it not be adopted voluntarily by industrial, commercial, institutional or municipal entities who operate electrical equipment.

National Electrical Code is a registered trademark of the National Fire Protection Association, Quincy, MA 02169



## What a Facility Can Do To Comply with NFPA 70E

NFPA 70E compliance begins by instituting a comprehensive safety program with defined responsibilities. This can then be followed by defining and calculating arc flash incident energy for each equipment location in a facility.

This is typically done through an arc flash assessment by an outside vendor, such as Square D/Schneider Electric. The assessment will provide a baseline to determine status of the equipment in place and recommend remedial actions if necessary to mitigate arc flash incidents.

The assessment and recommendations may include:

- Calculations for the degree of arc hazard
- Personal protective equipment (PPE) for workers
- Training for workers
- Tools for safe work
- Warning labels on equipment
- Products, solutions or methods to limit arc flash, when possible

Plant or safety managers will need to include arc flash safety training for their employees and electricians. In addition, they will need to update and enhance their safety procedures and manuals to comply with the NFPA 70E guidelines that OSHA is enforcing.

## Understanding The Risks Of Failing To Comply

The best practice is to work on equipment that has been properly de-energized. However, if electricians are required to work on energized or “hot” equipment, an assessment can help them select the appropriate level of protection, without reducing their dexterity.

By completing a full arc flash assessment, a company can determine what equipment labeling and safe boundary distances are required and, ensure the best possible mix of worker safety, efficiency and compliance.

The risks of not doing an assessment can be very expensive. First, without knowing the boundary distance of an arc flash event, it is impossible to know where to begin implementing safety procedures. The assessment activity provides the background necessary to make intelligent safety decisions.

For instance, Level 4 PPE, which is very difficult to work in, may not provide protection from the impact of a blast and may not even be necessary in many cases. Attempting to complete work in a Level 4 suit

(shown in photo at right) is very slow and time consuming. Also, depending upon the complexity of the job and manual dexterity required, some work is more difficult to complete in this type of suit.

