

Testing Times

A newsletter for the electrical construction and maintenance industry

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Arc Flash Hazards: What You Need to Know

In our last *Testing Times* issue, we discussed the addition of Arc Flash Protection to the 2002 National Electric Code (NEC) in Article 110.16. Since then, articles have been published in nearly every electrical magazine about the topic. What do you need to know about arc flash protection?

An arc flash occurs when insulation or isolation between conductors is breached or can no longer withstand the applied voltage. In other words, it is a short circuit through open air. According to Square D's *design* magazine, Issue 13, "aging equipment and inconsistent maintenance increase the likelihood of an arc flash incident. While most power circuit breakers will last 20 years or more, older installations require more maintenance to make sure they remain functional." Unfortunately, as the need for maintenance increases, the chance of an accident or equipment failure leading to an arc flash increases too.

What are the steps to minimize the risks associated with arc flash hazards?

1. Safety begins before the facility is built. Design of the electrical

⚠ WARNING	
Arc Flash and Shock Hazard Appropriate PPE Required	
48 inch	Flash Hazard Boundary
2.6	cal/cm² Flash Hazard at 18 inches
Class 1	FR Shirt and Pants
480 VAC	Shock Hazard when cover is removed
42 inch	Limited Approach
12 inch	Restricted Approach
1 inch	Prohibited Approach
Bus Name: MainSwbd, Prot Device: Fire Fuse	

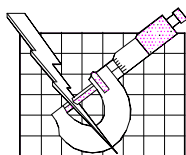
Arc flash hazard labels are required on electrical equipment by the 2002 National Electrical Code

equipment, design of the electrical distribution system, and the installation itself can all contribute to increased safe working conditions. Electrical equipment manufacturers are designing safer equipment. Their designs now limit current at high values and interrupt current more rapidly at lower short circuit values. Safer distribution designs can include designing bypass options, utilizing remote racking systems, and specifying current limiting devices.

2. Perform a comprehensive safety evaluation of the facility. Hold a safety meeting

prior to performing any work. Ask the question "can the electrical equipment be de-energized before it is touched"? De-energization should be the first choice for maintenance at any facility. Of course, de-energization isn't always an option, but the possibility should always be considered.

3. Perform arc flash hazard calculations. It is a simple matter to perform an arc flash hazard study in conjunction with a short circuit and coordination study (SCCS) at a new facility as the same data is required. Existing facilities should consider performing an updated SCCS along with an arc flash hazard study. Proper coordination can reduce the arc flash hazard.
4. Place warning labels on equipment based on the arc flash hazard study. The NEC 110.16 says "switchboards, panelboards, industrial control panels, and motor control centers that are in other than dwelling occupancies and are likely to require examination, adjustment, servicing, or maintenance while energized shall be field marked to warn qualified persons of potential electric arc flash hazards".



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(Arc Flash Hazard, Continued from page 1)

Neither the NEC, NFPA or IEEE specifies the amount of detail currently required on the arc flash warning labels. Industry speculation says that additional and more detailed label requirements will be covered in future revisions of the codes and standards. Safety conscious facilities and engineers can apply this labeling now.

5. Train workers in safe work practices. This is required by NFPA 70E and the NEC. Training in the correct procedures to follow during de-energization will also help ensure electrically safe working conditions. The proper procedures according to NFPA 70E Part 2 Chapter 5 include:
 - 1) Determine all possible sources of power
 - 2) Open the disconnecting device for each source
 - 3) When possible, visually verify that each device is open
 - 4) Apply proper lockout/tag out devices
 - 5) Test voltage on each conductor to verify that it is de-energized
 - 6) Apply grounding devices

6. Use personal protective equipment (PPE) for workers. The arc flash hazard study and resulting labels will give you the corresponding class of PPE required at each piece of equipment.

There are 5 classes of PPE, Class 0 through 4. These categories are based on the amount of energy that could be generated from an arc flash at a particular distance from the source. Higher classes of risk come from higher available energy. The level of required PPE increases as the risk increases. The different levels of required PPE may include head protection, eye and face protection, sleeves, pants, gloves, footwear, glasses and additional layers of protection including coveralls, a switching hood and a flash suit.

The new arc flash requirements in the 2002 NEC give us an excellent opportunity to review, revise or develop a comprehensive electrical safety program. Employers should be the catalysts for encouraging and promoting an atmosphere of safety. Ultimately everyone benefits. *

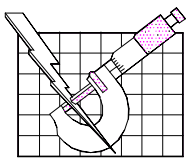
Testing Times by e-mail

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We always appreciate your input. Please send any questions or comments to the editor, Lyn Cosby, at Lcosby@hoodpd.com or fax (404) 299-3534.

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