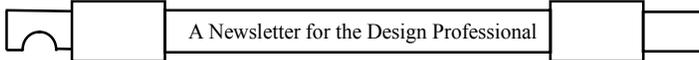


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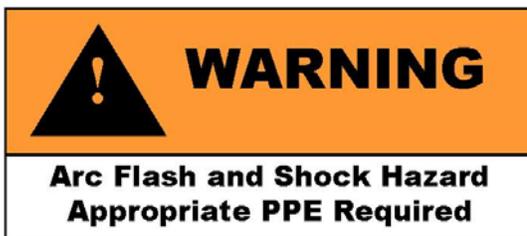
New Flash Protection Marking Requirement

A significant change was made to the 2002 NEC® by the addition of the new requirement, in NEC 110.16, for the arc flash hazard labeling of equipment. NEC 110.16 requires equipment, likely to be worked on while “hot”, to be field marked to warn of potential electric arc flash hazards. The requirement is shown below.

110.16 Flash Protection. Switchboards, panelboards, industrial control panels, and motor control centers in other than dwelling occupancies, that 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. The marking shall be located so as to be clearly visible to qualified persons before examination, adjustment, servicing, or maintenance of the equipment.

As indicated in 110.16, equipment in dwelling units is excluded from this labeling requirement. However, for all other electrical equipment likely to be worked on with the possibility of being “hot”, an arc flash warning label must be affixed to the equipment. Since most equipment in industrial and commercial installations must be considered “hot” during the lockout/tagout procedure when testing for the absence of voltage in order to put the equipment into a “safe working condition”, the equipment must be properly labeled per this requirement.

The warning label, required by 110.16, should remind the worker that a serious electrical hazard exists and that the worker should follow proper work practices which include the required personal protective equipment (PPE) for the potential hazard of the task at hand. An example of a label, courtesy of E.I. du Pont de Nemours & Company, for this purpose is shown below.



The requirements of 110.16 only extend to warn of an arc flash hazard. However, additional information is recommended to be shown. This additional information includes: flash protection boundary, incident energy, required PPE, voltage shock hazard, as well as the limited, restricted, and prohibited approach boundaries.

In addition, two new Fine Print Notes are indicated in 110.16. These Fine Print Notes reference NFPA 70E-2000, *Electrical Safety Requirements for Employee Workplaces* and ANSI Z535.4-1998, *Product Safety Signs and Labels* as sources of information that can be referenced when complying with these requirements.

NFPA 70E is highly recommended for those who are responsible for electrical safety, since there are some requirements from this document that are similar to those in OSHA 29 CFR, part 1910 (electrical safety for general installations). Additionally, the Bussmann® Safety BASICs™ Handbook can be used as a source for information on NFPA 70E and OSHA.

The next obvious question remains, why is this label needed? Every year, workers are injured or die due to electrical incidents from electrical hazards as a result of contact with “live” equipment. These electrical hazards include shock, arc flash, and arc blast. Arc flash and arc blast result in hazards that include high temperatures (up to 35,000 °F), pressure and sound waves, molten metal, copper vapor, intense light and shrapnel. The photo below is an actual picture of an arcing fault caused by a screwdriver with only 22,000A available.



The question that remains is how can these hazards be limited? Several design concepts are available that can limit these electrical hazards. One possible solution is the use of current-limiting devices. Current-limiting devices have the ability to greatly reduce the electrical hazards from high level arcing faults. In addition, “finger-safe” devices can be added to reduce the possibility of contact with live parts.

Conclusions:

The new requirement of NEC 110.16 is intended to help reduce injuries and deaths due to electrical arc flash incidents. It is important to be aware of the regulations and requirements of OSHA and NFPA 70E when considering electrical tasks that involve working on or near energized electrical equipment.

For questions, contact Bussmann® Application Engineering at (636) 527-1270, (636) 527-1607 (fax), or e-mail (fusetech@buss.com). Visit our web pages, "On-Line Training" and "Safety BASICs™" under "Services" at www.bussmann.com. These areas include downloadable Safety BASICs™ information, 2002 Code Changes presentations, including 110.16, 240.85, and 430.102(B), and various overcurrent protection and electrical hazards training presentations.