

Testing Times

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Thoughts on Arc Flash Hazard Studies

The 2002 National Electrical Code (NEC) included a new paragraph, Article 110.16, about flash protection. Since its publication, a whole new industry has developed to provide site specific arc flash hazard studies and incident energy labels for switchboards, panelboards and motor control centers (MCC). The wording in 110.16 is vague in terms of what is meant by "field marked." This vagueness is intentional. The code allows either generic labels (see illustration) or site specific labels which include the required personal protective equipment (PPE) based on an arc flash hazard study.

The problem with a generic label is that it doesn't tell the qualified personnel what PPE is required. This lack of information means the qualified personnel has to use tables in NFPA 70E or other calculation methods to determine what PPE is necessary. These NFPA 70E tables are very conservative and could result in PPE one or two levels higher than site specific calculations. So what is the harm in being overly



A generic arc flash hazard label is acceptable per 2005 NEC Article 110.16.

conservative with PPE? A risk level 3 includes a switching coat and a double-layer switching hood. The more you increase the amount of PPE, the more you limit mobility and peripheral vision, increase the potential for a person to overheat, and increase stress and work time.

If a company wants to be more proactive and have an arc flash hazard study performed, they can apply site specific incident energy labels identifying the risk hazard and PPE requirements at each piece of equipment. In many cases, the risk categories will be lowered over the NFPA 70E

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tables. This would increase and enhance overall safety by decreasing any excessive PPE. However, there are still many unsettled issues surrounding arc flash hazard studies.

One issue is which standard to use as the basis for calculations: IEEE standard 1584 or NFPA 70E. Some software manufacturers have written their software to cover both, but you must choose one as the basis for your study, and the two methods can yield different results. Another issue is the label itself. What information should go on it? There is not standard for the information to be included. Another question is where



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should the label go: on the outside or inside of a panel cover? What if the panel is in a public hallway? Some believe that the sign itself is asking for trouble. Also, do labels only need to be on new equipment or are you obliged to put them on existing equipment? The NEC normally only applies to new construction unless you are renovating or adding to an existing facility. However, what if you have a new arc flash hazard labeled panel next to an existing unlabeled panel? Is there additional liability in this case? What about OSHA requirements for all employers to provide a "safe workplace?" It seems that OSHA considers labeling equipment to be a step towards providing a safe workplace. Labeling would apply not only to new but also to existing electrical equipment.

With all the rush to generate site specific labels, many folks are trying to cash in. Anyone can buy arc flash hazard software and announce they are in the study and labeling business, but experience goes a long way in getting the most out of your study. The study preparer in most cases will determine what standard

is used, what information will go on the labels, and even which iteration of the study (often yielding different PPE results) will be used on the labels. Voltage tolerances are another factor in the study that must be considered. For a 480 volt system the default in the software is set to zero. In most cases in the field, the voltage is not exactly 480V so the tolerance must be changed. An inexperienced study preparer can easily miss this step among others.

Arc flash hazard labels are merely one part of a comprehensive safety program. An employer must determine whether generic or site specific incident energy AFH labels fit best into his safety program. Labels should be applied to both new and existing electrical equipment. The industry and the NEC are still in flux regarding calculation and labeling requirements. There is a reason the NEC committee hasn't made further clarifications. The answers are not simple and the effects are far reaching, possibly expensive, and involve liability. The NEC may or may not ever further address this issue. Until then, be cautious and informed in your arc flash hazard study and labeling choices.

All questions, comments and topics for future discussion are welcomed. If we use your topic in a future *Testing Times* issue we will send you a \$25.00 American Express gift card. Please send to Ms. Lyn Cosby at e-mail Lcosby@hoodpd.com.

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