COMPLY WITH NEW REGULATIONS, INCREASE SAFETY AND SAVE COSTS WITH PROPER ARC FLASH LABELING

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Last updated: October, 2009

OSHA is citing and fining employers for failure to protect employees from the dangers of arc flash. For guidelines on how to protect employees, OSHA refers employers to the NFPA 70E standard, "Standard For Electrical Safety In the Workplace."

This document provides information on the most current arc flash labeling requirements, as well as best practices for creating and maintaining such labels. In the 2009 version of the NFPA 70E standard, arc flash labeling requirements are covered under Article 130.3(C) and 130.7(E)(1). Additional labeling requirements are also included in Article 110.16 of the 2008 version of the National Electric Code (NEC). This white paper will provide guidance for complying with both standards.

What Needs to be Labeled?

Arc flash labeling is the responsibility of the employer, not the manufacturer or installer of the equipment. The NEC provides the following examples of electrical equipment that must be field marked with a warning label:

- Switchboards
- Panel boards
- Industrial control panels
- Meter socket enclosures
- Motor control centers

This is not an all-inclusive list. Labeling is required for any piece of electrical equipment that is likely to require examination, adjustment, service or maintenance while energized, creating the potential for an arc flash incident to occur. Thus many employers are also labeling bus ducts and other electrical equipment not specifically called out in the NEC.

Any modifications or renovations to electrical equipment will require an updated arc flash hazard analysis and label according to the 2009 NFPA 70E standard. At minimum, this must be reviewed every five years. Equipment installed prior to the 2002 NEC provision does not require a label. However, should it be modified or upgraded in any way, then a label must be affixed. In fact, an OSHA representative has stated that even changing a fuse or circuit breaker could be considered a modification that would require labeling.

From a safety perspective, the hazard is the same regardless of when the equipment was installed. Consequently, most employers are simply labeling all the appropriate equipment, regardless of when it was installed.

The NEC requirement states that the marking must be in a location that is clearly visible to qualified persons before they begin work. Typically, the label is placed outside the panel or enclosure door. In some cases, companies choose to put the label inside the door to protect it from harsh environments; however, this should only be done if the door must be opened (allowing the label to be seen) in order to remove the panel face or enclosure. The key point is that the label be easily noticeable by workers before they may be exposed to any potentially dangerous live parts.

What Needs to Appear on the Label?

Article 116.10 in the NEC states that relevant electrical equipment shall be "field marked to warn qualified persons of potential electric arc flash hazards." Other than that, the NEC leaves the content of the label up to the employer.

Article 130.3(C) in NFPA 70E, however, dictates that the label also shows the available incident energy or required level of personal protective equipment. A hazard/risk category rating is typically used to indicate the required level of personal protective equipment. (For more information on arc flash hazard/risk categories, see section 130.7(C)(10) in the NFPA 70E standard.) At a minimum, Brady recommends that arc flash labels both warn of an arc flash hazard and show either the relevant incident energy or the corresponding hazard/risk category.

In Article 130.7(E)(1), the NFPA 70E standard further notes that the design and formatting of the labels should conform with ANSI Z535 *Series of Standards For Safety Signs & Tags*. Thus it is recommended that the header, message and pictogram, if used, be formatted according to ANSI standards. Currently there is not a widely-accepted symbol for indicating an arc flash hazard. Brady offers stock arc flash labels both with and without a symbol, employing a pictogram composed of a red explosive graphic inside of a triangular border for this purpose. (See below for examples.)

Neither the NFPA 70E nor the NEC requirements specify whether to use a "Danger" or "Warning" header; however, NFPA 70E does recommend identifying those situations in which there is an extreme hazard to the worker. A commonly used guideline is to use a red "Danger" header when the voltage is over 600 volts or when the incident energy is over 40 cals/ cm^2. If it is less than that threshold, an orange "Warning" header is used. The employer has the final decision on which words appear on the labels, but it is imperative that consistency be maintained on all the labels throughout the facility.

It is also important to note that arc flash labels must be able to withstand their usage environment. This means that the print should not fade, and the adhesive should be aggressive enough to avoid peeling. When necessary, an overlaminate should be applied to protect the printed surface from harsh chemicals and exposure to sunlight.

Brady Write-on Labels

Brady provides several versions of stock arc flash labels, which can be written on using a permanent pen or marker. The labels shown below meet all current NEC and NFPA 70E requirements, and are available with either "Danger" or "Warning" headers.
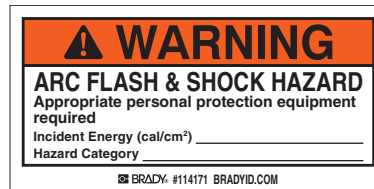

The below goes beyond NEC and NFPA 70E requirements by including write-in fields for indicating the arc flash protection boundary and check boxes for designating the required PPE. This type of extensive label provides employees with the most complete information for protecting themselves from arc flash hazards.

Finally, some safety-conscious employers go one step further by including shock hazard information on the label. After all, as long as you are going through the trouble to warn employees of arc flash hazards, why not provide similar safety guidance for the other electrical hazard – shock? These labels provide complete arc flash hazard information, plus shock hazard information on the applicable voltage, approach boundaries, and insulated glove and tool requirements.

WHEN PERFORMANCE MATTERS MOST™

www.bradyid.com/visualworkplace
1-888-250-3089
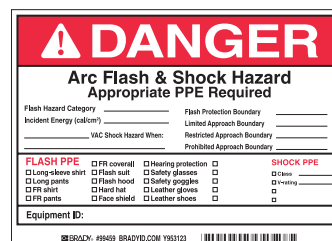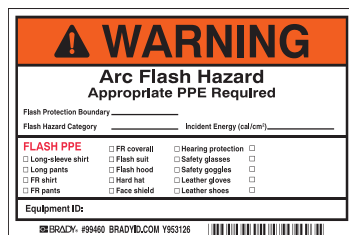
Labels With Pre-Printed Hazard Category & PPE Lists

Brady also offers pre-printed arc flash labels with the hazard category and a list of the required PPE, relieving the employer from having to hand-write this information. As with the check box labels, a version for both arc flash and shock hazards is available.
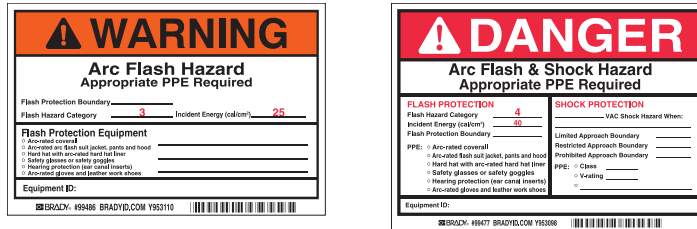
Make-it-Yourself Arc Flash Labels

Large facilities may need to create hundreds - if not thousands - of customized arc flash labels. In this case, Brady's industrial printing systems are the ideal solution. This option avoids the time and trouble associated with handwriting many labels and it allows labels to be printed in batches as the project transitions from one area of the plant to another.
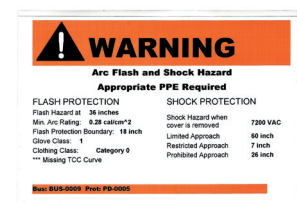
Brady's Make-it-Yourself printing systems are designed as a convenient, flexible and cost-effective way to create, modify and print labels on demand. Printer options for creating arc flash labels include the IP™ Thermal Transfer Printer, the PR Plus Printer, and the GlobalMark® and MiniMark™ printers.

Brady printers and label materials are designed for industrial use, and employ thermal-transfer printing to provide the optimum in UV, chemical and abrasion resistance. For single color printers, label materials with a pre-printed "Danger" or "Warning" header are available; this allows users to print only the black text while still creating a color label that meets the ANSIZ525 standard for safety signs and labels. If you want to print multiple colors or even process color (i.e., photos), Brady has printer models with that capability as well.

In addition, MarkWare™, BradySoft™ and LabelMark™ software applications include preformatted arc flash templates that allow users to quickly fill in the blanks and print. The templates can also be easily customized to include a logo or other company-specific information.

When large quantities of labels need to be created and managed, users often prefer to store the label information in a spreadsheet. Brady software allows this data to be downloaded and automatically merged into the label for output to the Brady printer.

Finally, many companies have begun using commercial power management software from companies such as SKM, EasyPower®, and ETAP® to assist in mapping out their electrical system and creating one-line diagrams. In recent years, many of these third-party applications have added arc flash analysis modules which use the one-line information to calculate incident energy values, flash protection boundaries, and other pertinent arc flash variables.

Brady has partnered with a number of these companies to make it quicker and easier to import this data into labels on a Brady printer. In some cases, users can print directly from the third-party software application to the Brady printer. In other cases, the data is imported as a spreadsheet or database into the Brady labeling software, then automatically formatted and printed from there. Either way, the use of third-party power management software greatly simplifies the process of calculating arc flash values and converting this data into a label.

Brady software and printing systems can also be used throughout the plant for other forms of safety and facility identification, such as pipe marking, equipment identification, chemical labels, barcode labels and inventory labels. This provides an even greater and faster return on your system investment, since it can have ongoing, beneficial use for a variety of purposes long after the primary arc flash labeling project is complete.

Other Awareness Aids

OSHA is enforcing arc flash standards because it is critically important to make workers aware of this dangerous hazard. OSHA is emphasizing that employers need to modify long established work habits and practices to ensure adequate protection. In addition to labeling, Brady also provides a variety of other training and awareness aids to help keep your message in front of workers.

Brady's "Preventing Arc Flash Injuries" poster highlights the common causes of arc flash and emphasizes safe work practices and PPE requirements when working live. Brady also offers rigid signs, adhesive labels and wallet cards that indicate the PPE required for each arc flash hazard class category. These can be given to employees and posted in the work area to reinforce the company's safety training and ensure that employees remember exactly what is required for each situation.

Your Opportunity to Reduce the Risk
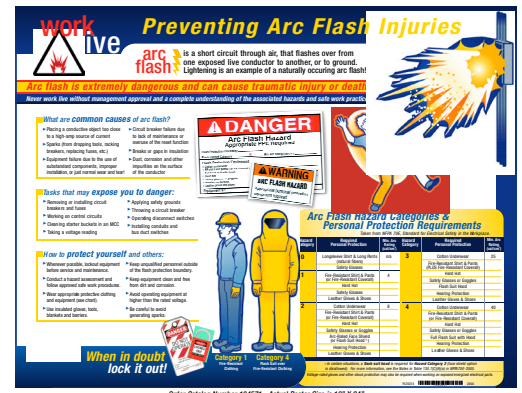
With the rising frequency of reported arc flash accidents, and the potential for serious injury or death, arc flash deserves the concern it is generating within OSHA and the safety industry.

To increase safety and ensure compliance throughout the workplace, it is essential to learn and identify arc flash hazards in your facilities. Train your employees in safe work practices and utilize the labels and awareness aids that are available to you to keep the message in the forefront of your workers' minds, and reinforce the desired behavior in your own facility.

Brady can help you achieve these goals with industry-leading products, training resources, services and more. For more information on arc flash label solutions, go to www.bradyid.com/arcflash. Or call 1-888-272-3946 to arrange for a Brady salesperson to visit your site.

www.bradyid.com/visualworkplace
1-888-250-3089