

PROTECTION UPDATE

SPRING 2017

FROM THE INTERNATIONAL SAFETY
EQUIPMENT ASSOCIATION

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UNDERSTANDING THE ROLE OF RUBBER INSULATING GLOVES IN NFPA 70E COMPLIANCE

Submitted by: Richard Rivkin, Saf-T-Gard

The risks associated with shock and electrocution from inadvertent contact with energized parts have long been recognized as a threat to electrical workers, and they aren't going away anytime soon if ever. According to the Bureau of Labor Statistics (BLS), electrocution is the fifth leading cause of workplace fatalities in the United States with more than 2,000 fatal and more than 24,000 non-fatal electrical injuries reported in the last 10 years.

Since the BLS counts arc flashes as burns rather than in its electrical shock statistics, the true rate of electrical shocks are even higher. The danger of exposure to arc flash and electrical hazards is on the rise and continues to increase as workers' responsibilities expand to include interaction with electrical equipment. Nowadays, maintenance workers, janitorial staff, facilities staff and equipment operators (not just electricians) all risk exposure to electrical shock, making the need for stringent safety standards even more imperative. Not just to protect the workers, but also to protect the employers



against loss time, costly damage to equipment and facilities, legal liability, increased insurance premiums and hefty regulatory fines. To help reduce the risk for all involved parties, the National Fire Protection Association (NFPA) developed and regularly updates its NFPA 70E: Standard for Electrical Safety in the Workplace®.

According to the NFPA, arc flash is an electric current that passes through the air when insulation or isolation between electrified conductors is no longer sufficient to withstand the applied voltage. Each day in the United States, an estimated 5 to 10 arc flash incidents occur with electrical

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ABOUT PROTECTION UPDATE

Protection Update is an e-newsletter with the aim of informing users, specifiers and purchasers of personal protective equipment, and those who regulate it. Protection Update is distributed without charge and also available on both the Safety+Health website at www.safetyandhealthmagazine.com/isea

and on the ISEA website at www.safetysite.org.

For more information, contact: Protection Update Editor, Lydia Baugh at Lbaugh@safetysite.org

ISEA 1901 North Moore Street
Arlington, VA 22209-1762 USA

1901 North Moore Street
Arlington, VA 22209
Email: isea@safetysite.org
Telephone: 703.525.1695

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equipment according to the National Institute of Occupational Safety and Health (NIOSH). An arc flash may be caused by a tool, rodent or other element in a breaker or service area that could compromise the distance between energized components. Incidents often occur when personnel fails to ensure that the equipment has been properly de-energized. While the flash itself is immediate, the result of these incidents can cause severe injuries including burns, blindness, hearing loss, nerve damage, cardiac arrest and even death.

Arc flash can also lead to shocks and electrocutions. In fact, about 80 percent of electrically-related accidents involving qualified workers are a result of arc flashes. Because of the severe consequences of arc flash incidents, the NFPA along with the Occupational Safety and Health Administration (OSHA), mandates and enforces safer electrical work practices under the NFPA 70E standard. Numerous experts and training programs are available to instruct you on how to keep your workers safe and compliant in terms of conducting a proper hazard assessment and selecting the required PPE. However, one topic that is often not discussed in detail is the need for rubber insulating gloves where a shock hazard exists from exposure to energized equipment.

OSHA rules and the NFPA 70E standard make the use of rubber insulating products mandatory when even the smallest probability of contact with 50 volts AC or higher exists. According to the OSHA 29 CFR 1910.137 standard, rubber insulating gloves must be rated for the voltage to which a worker will be exposed (phase to ground or phase to phase) and marked to indicate their rating. For in-service use, the maximum use voltage must be above the actual exposure, but it is important to take note of the proof test voltage as well. Rubber insulating gloves are offered in six different classes, based on ASTM D-120. All rubber insulating gloves are tested by the manufacturer at the specified proof test voltage.

Manufacturers also perform a dielectric breakdown test at an even higher voltage to validate the dielectric strength of the rubber material. The result is a significant margin of safety between the test voltages and the maximum use voltage. Each specific hazard assessment will help you determine which class of gloves is appropriate for your application.

ASTM D120 CLASS SPECIFICATIONS FOR RUBBER INSULATING GLOVES			
CLASS	PROOF TEST VOLTAGE	MAX USE VOLTAGE	LABEL COLOR
CLASS 00	2,500 AC/10,000 DC	500 AC/750 DC	BEIGE
CLASS 0	5,000 AC/20,000 DC	1,000 AC/1,500 DC	RED
CLASS 1	10,000 AC/40,000 DC	7,500 AC/11,250 DC	WHITE
CLASS 2	20,000 AC/50,000 DC	17,000 AC/25,500 DC	YELLOW
CLASS 3	30,000 AC/60,000 DC	26,500 AC/39,750 DC	GREEN
CLASS 4	40,000 AC/70,000 DC	36,000 AC/54,000 DC	ORANGE

With few specific exceptions, rubber insulating gloves must always be worn with leather protector gloves manufactured in compliance with ASTM standard specification F696. Be sure to verify that the leather protectors that you are using meet ASTM F696. Moreover, the OSHA "269" standard (29CFR 1910.269) requires that rubber insulating gloves along with leather protectors must be worn by 269-qualified employees within the Minimum Approach Distance to exposed energized conductors.

Another component to compliance that is frequently overlooked with regards to rubber insulating gloves is retesting. Periodic retesting of rubber insulating gloves should be performed at the proof test voltage to ensure that they are still safe using specialized equipment designed to gradually increase the voltage to the desired test level. The dielectric test is two-fold: pass/fail on the ability to withstand the rated test voltage and, for gloves, quantitative on the ability to prevent electric current from passing through the rubber goods above the maximum contained in the specifications. Products passing the inspection and test procedures can then be returned to service. If you do not have the equipment required to perform these electrical tests, there are independent testing facilities that can perform the acceptance and in-service testing on behalf of end users.

When selecting a test lab for use, make sure that it is a NAIL-accredited test lab. NAIL stands for National Association of Independent Laboratories for Protective Equipment Testing (www.nail4pet.org). It incorporates the only Laboratory Accreditation for the electrical equipment test labs program in North America. NAIL4PET helps develop uniformity in testing and works in close association with the American Society of Testing Materials (ASTM International).

The interval between the date of issue and electrical testing should be based on work practices and test experience. For gloves, the interval shall not exceed six months except for industries such as telecommunications that utilize insulating gloves as precautionary protection, in which case the maximum interval may be increased to nine months. End users (or an end users' designee) may perform acceptance testing within the first two months after receipt. However, do not place rubber insulating products into service unless they have been tested electrically within the previous 12 months.

With several workers required to wear rubber gloves and so many different testing intervals to consider, it is easy to see how compliance can fall through the cracks. Consider partnering with an electrical test lab that can test your rubber goods **AND** manage the rubber goods change-out process for you. Keeping these services bundled together under one roof will minimize out-of-service time and save money by delivering a start-to-finish solution that includes cleaning, visual inspection, electrical testing, markings according to your safety protocols and shipment to your warehouse or jobsite so that you can focus on other work priorities while staying safe, productive and compliant!

Bio

Richard A. Rivkin is President and Chief Executive Officer of Saf-T-Gard International, Inc., a privately-held family-owned and operated global supplier of industrial safety products based in Northbrook, Illinois. Saf T Gard actively operates the Voltgard Test Lab, the largest, independent, NAIL4PET-accredited test lab for rubber insulating products in the United States.