

## Electrical Safety Gloves: Inspection and Classification

Rubber insulating gloves are among the most important articles of personal protection for electrical workers. To be effective, electrical safety gloves must incorporate high dielectric and physical strength, along with flexibility and durability. To ensure safety and performance, they should meet and/or exceed the requirements of current American Society for Testing and Materials (ASTM) D120 specifications. Gloves should also be electrically tested following ASTM D120/IEC903 specifications.

A glove system consists of:

Rubber insulating gloves - Classified by the level of voltage and protection they provide.

Liner gloves - Reduce the discomfort of wearing rubber insulating gloves in all seasons, for year round use. Liners provide warmth in cold weather, while they absorb perspiration in the warm months. These can have a straight cuff or knit wrist.

**Leather protector gloves** - Worn over rubber insulating gloves to provide the mechanical protection needed against cuts, abrasions and punctures. Look for those that are steam pressed on curved hand forms to ensure proper fit over rubber gloves.

### Electrical Safety Glove Classification

Employees who work in close proximity to live electrical current may require a variety of electrically insulating protective equipment. The Occupational Safety and Health Administration (OSHA) outlines this in their electrical protective equipment standard (29 CFR 1910.137) which provides the design requirements and in-service care and use requirements for electrical-insulating gloves and sleeves as well as insulating blankets, matting, covers and line hoses. Electrical safety gloves are categorized by the level of voltage protection they provide and whether or not they're resistant to ozone.

Voltage protection is broken down into the following classes:

- Class 00 - Maximum use voltage of 500 volts AC/proof tested to 2500 volts AC
- Class 0 - Maximum use voltage of 1,000 volts AC/proof tested to 5,000 volts AC
- Class 1 - Maximum use voltage of 7,500 volts AC/proof tested to 10,000 volts AC

- Class 2 - Maximum use voltage of 17,000 volts AC/proof tested to 20,000 volts AC
- Class 3 - Maximum use voltage of 26,500 volts AC/proof tested to 30,000 volts AC
- Class 4 - Maximum use voltage of 36,000 volts AC/proof tested to 40,000 volts AC

Ozone resistance is covered by the "Type" designation. A Type I glove is not ozone-resistant, while a Type II is ozone-resistant.

Once the electrical safety gloves have been issued, OSHA requires that "protective equipment be maintained in a safe, reliable condition." This requires that gloves be inspected for any damage before each day's use. Gloves must also be inspected immediately following any incident that may have caused damage. OSHA also requires that insulating gloves be given an air test along with the inspection.

The air testing method is described in STM F 496, specification for in-service care of insulating gloves and sleeves. Basically, the glove is filled with air, either manually or with a powered inflator, and then checked for leakage. The leakage is detected by listening for escaping air or holding the glove against the tester's cheek to feel air releasing.

As stated in ASTM specifications for in-service care and use of rubber gloves and sleeves, gloves and sleeves should be expanded no more than 1.5 times their normal size for Type I, and 1.25 times normal for Type II during the air test. The procedure should then be repeated with the glove turned inside out.

In addition to this daily inspection, OSHA requires electrical safety equipment shall be subjected to periodic electrical tests. OSHA references the testing criteria in 1910.137(b)(2)(viii) where the test voltage and intervals are given.

Gloves that have not been placed into service twelve (12) months after an electrical test has been given shall not be placed back into service unless they are electrically tested again. See the reference below for testing agency information.

OSHA recognizes that gloves meeting ASTM D 120-87, specification for rubber insulating gloves, and ASTM F 496, specification for in-service care of insulating gloves and sleeves, meet their requirements.

## Electrical Safety Glove Inspection

In order to maintain the highest level of insulating protection and ensure long life, it is essential that electrical safety gloves (and sleeves) are properly cared for and stored.

Before each use, gloves and sleeves should be inspected for holes, rips or tears, ozone, cutting or UV damage and signs of chemical deterioration. Refer to ASTM F 1236, standard guide for visual inspection of electrical protective rubber products for additional information.

Gloves and sleeves should also be examined to determine if they show any damage as a result of chemical contamination, particularly from petroleum products. The first sign of exposure is swelling in the area of contamination. Should any rubber equipment be exposed to chemical contaminants or be suspect of any other physical damage, it should be turned in for inspection, cleaning and electrical testing.

Since sleeves cannot be inflated, they are inspected along the edge as they are rolled. Rolling will stretch the sleeve along the edge, making cuts, tears and ozone cutting more visible. After the outside of the sleeve is inspected, the procedure should also be repeated with the sleeve turned inside out.

## Commonly Asked Questions

Q. Can I just use the rubber glove only, and not buy the leather part?

A. A leather protective glove should always be worn over rubber insulating gloves to provide the needed mechanical protection against cuts, abrasions, and punctures.

Q. Would retesting be needed if I don't use the electrical safety gloves very often and visually see no damage?

A. Yes, retesting is still needed to verify the integrity of the material and to ensure electrical safety is maintained for the user.

Q. If I find a hole, can I just "patch it"--like a tire inner tube?

A. No. This would not comply with ASTM or OSHA standards for electrical protective gloves, and it would not pass accredited laboratory testing.