

## IEEE Guide for In-Service Maintenance and Electrical Testing of Live-Line Tools Sponsor

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### 4.2 Periodic Inspection and Checking

Insulating tools should be visually inspected before use for indications that they may have been mechanically or electrically overstressed (see 5.1.1). Tools that show evidence of overstress (such as damaged, bent, worn, or cracked components) should be removed from service and evaluated for repair. Elongated or deformed rivet ends, for instance, indicate that excessive mechanical loading has occurred and has weakened or sheared the bond between the ferrules and the insulating pole.

The surface of each tool must be inspected before and after each use for contamination such as dirt, creosote, grease, or any other foreign material. If any of the above contaminants exist, the tool surface should be cleaned.

When the insulating member of a tool shows signs of accumulated contamination, surface blisters, excessive abrasion, nicks, or deep scratches the tool should be removed from service and cleaned or refinished as recommended by the manufacturer, and re-tested. Any moisture penetration will reduce the insulating properties of these tools.

When the tools have been exposed to excess moisture, their moisture content can be measured with a moisture meter, which is commercially available (see 4.5), or their general condition determined on the basis of ac dielectric-loss measurements (see 5.9)

### 4.3 Cleaning and waxing

**Before each use, insulating tools should be wiped with a clean, absorbent paper towel or a clean, absorbent cloth and followed by wiping with a silicone-treated cloth.**

**Caution: Do not use cloths that have been washed in harsh solvents, since some residues on the cloth can be deposited on the pole surface**

**If simple wiping does not remove the contaminant then apply denatured alcohol with a paper towel or clean, absorbent cloth and follow by wiping with a silicone-treated cloth.** Other solvents or cleaners may be used as recommended by the manufacturers of the insulating tools.

**Caution: Do not use soap detergents, liquid or powdered form, such as 409, Fantastic, Comet, ND-150, Bon Ami, Ajax, etc, to clean fiberglass tool under field conditions because of the following problems:**

- (1) The above described cleaning agents will leave a conductive residue unless rinsed with generous amounts of water (usually not available in the field).
- (2) Abrasive cleaners will destroy the surface gloss on the stick.

Note: All fiberglass tools that are subjected to such cleaning agents should be electrically tested under wetting conditions to ensure complete removal of residue from soap-type cleaners (see 5.3).

**Waxing is not necessary after every use of the tools but rather as needed to maintain a glossy surface that will cause any moisture or water to bead on the surface (see 5.5). Before the tool is rewaxed, to avoid a wax buildup, the pole should always be cleaned with a solvent or cleanser recommended by the manufacturer of the tools.**

Waxing imparts not only a glossy finish to the surface of the fiberglass but also adds to the electrical integrity of the tool by providing a protective barrier against dirt, creosote, and other contaminants, and moisture.

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## Copy of OSHA Regulation 1910.269 Part J – Live Line Tools

- (j) "Live-line tools." **.1910.269(j)(2)(iii)(B)**
- (j)(1) "Design of tools." Live-line tool rods, tubes, and poles shall be designed and constructed to withstand the following minimum tests:  
**..1910.269(j)(1)(i)**
- (j)(1)(i)**  
100,000 volts per foot (3281 volts per centimeter) of length for 5 minutes if the tool is made of fiberglass-reinforced plastic (FRP), or
- (j)(1)(ii)  
75,000 volts per foot (2461 volts per centimeter) of length for 3 minutes if the tool is made of wood, or
- (j)(1)(iii)  
Other tests that the employer can demonstrate are equivalent. Note: Live-line tools using rod and tube that meet ASTM F711- 89, Standard Specification for Fiberglass-Reinforced Plastic (FRP) Rod and Tube Used in Live-Line Tools, conform to paragraph (j)(1)(i) of this section.
- (j)(2) "Condition of tools."
- (j)(2)(i)  
**Each live-line tool shall be wiped clean and visually inspected for defects before use each day.**
- (j)(2)(ii)**  
**If any defect or contamination that could adversely affect the insulating qualities or mechanical integrity of the live- line tool is present after wiping, the tool shall be removed from service and examined and tested according to paragraph (j)(2)(iii) of this section before being returned to service.**
- (j)(2)(iii)**  
**Live-line tools used for primary employee protection shall be removed from service every 2 years and whenever required under paragraph (j)(2)(ii) of this section for examination, cleaning, repair, and testing as follows:**
- (j)(2)(iii)(A)**  
Each tool shall be thoroughly examined for defects.
- (j)(2)(iii)(B)**  
If a defect or contamination that could adversely affect the insulating qualities or mechanical integrity of the live-line tool is found, the tool shall be repaired and refinished or shall be permanently removed from service. If no such defect or contamination is found, the tool shall be cleaned and waxed.
- (j)(2)(iii)(C)**  
The tool shall be tested in accordance with paragraphs (j)(2)(iii)(D) and (j)(2)(iii)(E) of this section under the following conditions:
- (j)(2)(iii)(C)(1)**  
After the tool has been repaired or refinished; and
- (j)(2)(iii)(C)(2)**  
After the examination if repair or refinishing is not performed, unless the tool is made of FRP rod or foam-filled FRP tube and the employer can demonstrate that the tool has no defects that could cause it to fail in use.
- (j)(2)(iii)(D)**  
The test method used shall be designed to verify the tool's integrity along its entire working length and, if the tool is made of fiberglass-reinforced plastic, its integrity under wet conditions.
- (j)(2)(iii)(E)**  
The voltage applied during the tests shall be as follows:
- (j)(2)(iii)(E)(1)**  
75,000 volts per foot (2461 volts per centimeter) of length for 1 minute if the tool is made of fiberglass, or
- (j)(2)(iii)(E)(2)**  
50,000 volts per foot (1640 volts per centimeter) of length for 1 minute if the tool is made of wood, or
- (j)(3)**  
Other tests that the employer can demonstrate are equivalent. Note: Guidelines for the examination, cleaning, repairing, and in- service testing of live-line tools are contained in the Institute of Electrical and Electronics Engineers Guide for In-Service Maintenance and Electrical Testing of Live-Line Tools, IEEE Std. 978-1984.