Professional Aviation Safety Specialists

Occupational Safety and Health Bulletin

Electrical Safety

Electrically Insulated Hand Tools

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Insulated Electrical Hand Tool Safety

In most cases, ATO electricians and specialists should only be working on or around electrical equipment that has been placed in an electrically safe working condition. Part of that process is removing all sources of electricity, or deenergizing, the equipment. However, there are narrow exceptions to that rule. Additionally, electrical conductors and equipment must be treated as fully energized until the full procedure for placing the equipment in an electrically safe working condition has been completed.

This discussion is limited to service and maintenance of existing electrical distribution equipment, operating at 1000 Vac or less, occurring downstream in the electrical path from the main service entrance disconnect. The main service entrance disconnect is usually the first disconnect downstream from the power service company's meter.

OSHA regulations require that any hand tools used on or around electrical conductors or equipment that have not been place in an electrically safe working condition must be electrically insulated. The electrically insulated hand tool, when properly used, will not conduct electricity from an energized electrical component to the user.

29 CFR 1910.335(a)(2)(i)
When working near exposed energized conductors or circuit parts, each employee shall use insulated tools or handling equipment if the tools or handling equipment might make contact with such conductors or parts. If the insulating capability of insulated tools or handling equipment is subject to damage, the insulating material shall be protected.

29 CFR **1910.333(c)(2)**
"Work on energized equipment." Only qualified persons may work on electric circuit parts or equipment that have not been deenergized under the procedures of paragraph (b) of this section. Such persons shall be capable of working safely on energized circuits and shall be familiar with the proper use of special precautionary techniques, personal protective equipment, insulating and shielding materials, and insulated tools.

It's vital that insulated hand tools are rated, and properly tested, for the voltages that they may come in contact with. NFPA Standard 70E-2015 *Electrical Safety in the Workplace*, Table 130.7(F) *Standards on Other Protective Equipment,* indicates that insulated hand tools must conform to ASTM F1505, *Standard Specification for Insulated and Insulating Hand Tools.* The same requirement appears in Table 3-4.11 of the 2000 edition of NFPA 70E. Hence, this requirement has existed for at least the past fifteen years.

Moreover, the listing of markings that must appear on all insulated hand tools has remained unchanged in ASTM F1505 since at least 2010:

- Manufacturer's name or trademark
- Type or product reference
- On the insulating material:

- The double triangle symbol
- 1000 V (AC working limit)
- At least the last two digits of the year of manufacture
- The Letter "C" if rated for use at temperatures at a range of -4° F to -40° F
- The number of the relevant standard and edition. (i.e. ASTM F1505-07; IEC 60900) Note: this may be abbreviated to just the standard number when space is limited.

Some of the markings are shown in the pictures below:
Note: pictures may not show all of the markings on the tool as only one side is shown.

Insulated hand tools must be inspected before each use. Remove tools from service that show any damage to the insulation, or any other damage that creates doubt about the safety of the tool.

Ensure that insulated hand tools are used only in the temperature range that they are rated for:

-4° to 158° F for tools not marked with "C";
-40° to 158° F for tools marked with "C".

An informative, albeit marketing, presentation by Klein Tools is available at in the Safety/ATO/Reference Documents/Insulated Hand Tools section of the PASS member-only website.

Filing a grievance with your supervisor is appropriate if you have been issued tools that are not properly marked, are inappropriate for the intended use (e.g., temperature range), or damaged. Return any unsuitable tool to your supervisor. If the tool does not have the appropriate markings, return the tool with the edited/completed grievance provided in the Safety/ATO/Reference Documents/Insulated Hand Tools section of the PASS member-only website. Consult with your workplace PASS representative for additional assistance and guidance.