



Designation: F3622 – 24

Standard Specification for Insulating Live Line Ladders¹

This standard is issued under the fixed designation F3622; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This standard covers the specification and qualification testing of insulating ladders used for performing live line work by electrical workers.

1.2 These insulating ladders are used to provide access, generally on overhead power line structures and to facilitate live line work with live line tools, bare hand methods, or a combination of both.

1.3 These ladders are used to provide access to energized power lines in either a horizontal, vertical, or inclined position.

1.4 The ladder may be structure-mounted, base-supported, or cable-supported by a crane or similar device.

1.5 Hook ladders are positioned on the structure by two hooks or by a hook swivel attachment.

1.6 The use and maintenance of the ladders are beyond the scope of this specification although it is critical to understand the importance of proper application rigging of a live line ladder.

1.7 The values stated in inch-pound units are to be regarded as standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered standard.

1.8 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.9 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

¹ This specification is under the jurisdiction of ASTM Committee F18 on Electrical Protective Equipment for Workers and is the direct responsibility of Subcommittee F18.35 on Tools & Equipment.

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2. Referenced Documents

2.1 ASTM Standards:²

F711 Specification for Fiberglass-Reinforced Plastic (FRP) Rod and Tube Used in Live Line Tools

F819 Terminology Relating to Electrical Protective Equipment for Workers

2.2 IEC Standard:³

IEC Standard 61478: Live Working – Ladders of Insulating Material

3. Terminology

3.1 Definitions:

3.1.1 Refer to Terminology F819.

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *base section, n*—the first element of an insulating ladder.

3.2.2 *design test, n*—type of test made on a sample treated as representative of an industrial product; these tests will not be repeated in quantity production.

3.2.3 *insulating distance, n*—distance from the structure attachment point to the beginning of the work area of the ladder.

3.2.4 *insulating hook ladder, n*—an insulating ladder equipped at one end with permanent or removable hooks which can either rotate or be rigid.

3.2.4.1 *Discussion*—See Fig. 1.

3.2.5 *insulating splice ladder, n*—an insulating ladder constructed of sections that can attach to each other to create an extended ladder.

3.2.5.1 *Discussion*—See Fig. 2.

3.2.6 *insulating support link, n*—an insulating hot line stick used to support the ladder back to the structure.

3.2.7 *insulating three rail ladder, n*—an insulating ladder designed with two outside rails and one center rail.

² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

³ Available from International Electrotechnical Commission (IEC), 3, rue de Varembe, 1st floor, P.O. Box 131, CH-1211, Geneva 20, Switzerland, <https://www.iec.ch>.

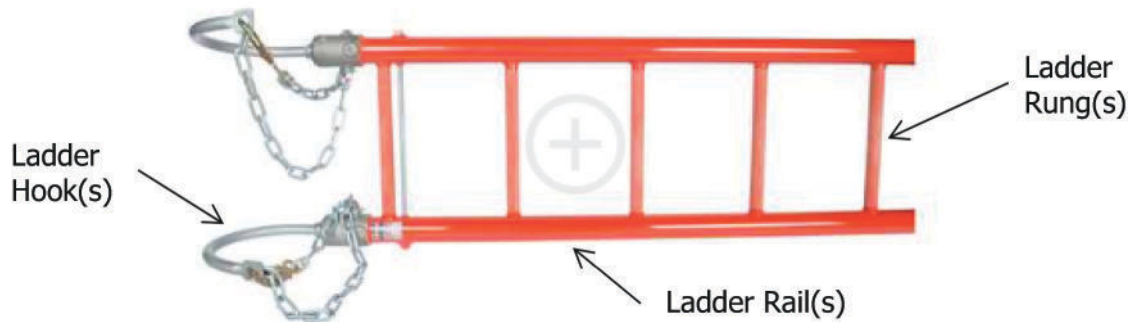


FIG. 1 Hook Ladder Components

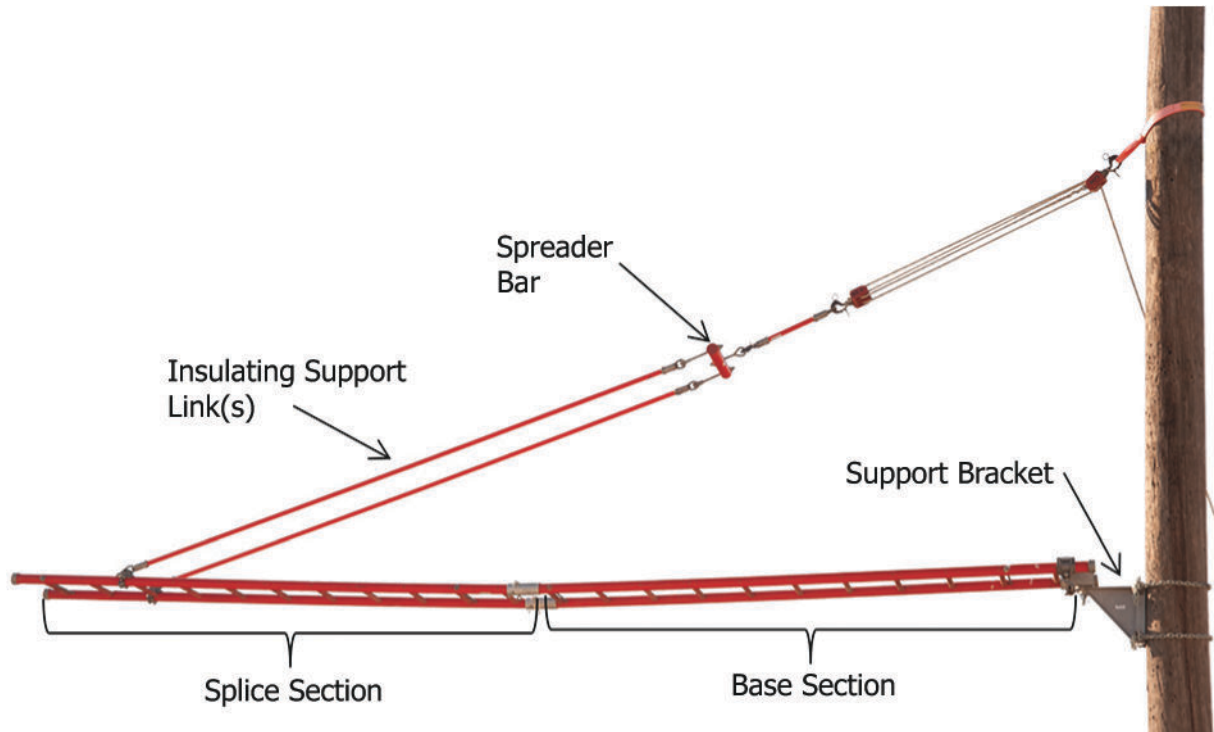


FIG. 2 Representation of a Typical Splice Ladder Arrangement

3.2.8 *ladder hook, n*—a hook with a chain or strap feature with a connection device designed to attach and secure the ladder to the support structure.

3.2.9 *ladder rail(s), n*—the insulating longitudinal members that support the ladder rungs.

3.2.10 *ladder rung(s), n*—the crosspieces that tie together the ladder rails.

3.2.11 *section, n*—a unit of insulating ladder consisting of a minimum of three rungs.

3.2.12 *support bracket, n*—a device designed to be fastened to a structure and the insulating ladder to support the load of the ladder.

3.2.13 *spreader bar, n*—a device the same width as the insulating ladder used to separate the distance between two insulating support links while allowing a support back to the structure.

3.2.14 *ultimate load, n*—amount of load applied to a component beyond which the component will fail and is no longer deemed safe for use.

4. Type or Classification

4.1 Insulating ladders covered by this specification are designed to be used by qualified electrical workers in conjunction with personal protective equipment while working on energized circuits. This may include, but not be limited to:

4.1.1 Rubber insulating gloves with protectors or insulating handheld live line tools, or both;

4.1.2 A properly worn conductive suit with accessories such as boots, gloves, and socks; and

4.1.3 A fall protection device or system that does not compromise the electrical insulating protection of the ladder.

4.2 The ladder is not designed to be a fall arrest anchor point.

4.3 Insulating live line ladders are classified into the following groups:

4.3.1 *Single Ladder*—A one-piece ladder without permanently attached hooks.

4.3.2 *Hook Ladder*—A ladder with permanently attached or removable hooks on one end. See Fig. 3.

4.3.3 *Splice Ladder*—Ladder sections that can be spliced together to extend the overall length of the ladder. See Fig. 2.

4.3.4 *Three-rail Ladder*—A ladder fabricated with three rails which can be a single ladder, hook ladder, or a splice ladder, or combinations thereof. See Fig. 4.

4.4 The test procedures in this specification provide an objective means of determining if an insulating ladder meets minimum electrical and mechanical specifications. The methods permit testing of major components of the insulating ladder under standard laboratory-controlled conditions.

4.5 The test procedures utilize objective criteria for evaluation and may be discontinued any time defects are found.

5. Ordering Information

5.1 Orders for insulating ladders under this specification should include the following information:

5.1.1 *Length of Ladder or Ladder Sections:*

5.1.1.1 Ladder length is a reference dimension from one end of the ladder to the other end of the ladder as specified by the manufacturer.

5.1.1.2 Hook size is a reference dimension which may include hook opening width, hook diameter, hook curvature, and hook length, and is published at the discretion of the manufacturer.

5.1.2 Type or classification of ladder.

6. Materials and Manufacture

6.1 Each insulating ladder covered by this specification shall be marked clearly and permanently with:

6.1.1 Name of the manufacturer,

6.1.2 Catalog number,

6.1.3 ASTM designation, and

6.1.4 Date manufactured.

6.2 This specification provides guidance for the manufacturer to establish a mechanical horizontal or vertical, or both, working load rating for a ladder. (This specification provides guidance for the manufacturer to establish a ladder mechanical horizontal or vertical, or both, working load rating(s) for industry/user reference.)

6.2.1 The mechanical working load rating will take into consideration an established safety factor per the manufacturer with the following requirements: (A horizontal or vertical, or

both, working load rating will be established based upon a safety factor with the following requirements:)

6.2.1.1 Minimum test load shall be 2.5 times the working load without damage, and

6.2.1.2 Minimum ultimate load shall be 4.0 times the working load.

6.3 Construction design shall be such as to meet the mechanical and electrical specifications of this standard.

6.4 Each insulating ladder shall be free of areas that will trap water and debris that may impair the insulating effectiveness between the worker location and the structure attachment.

6.5 The rungs may have a non-slip surface.

6.6 The rungs shall be permanently attached perpendicular to the rails.

6.7 The shape of the rungs shall be designed to provide a firm grip for gloved hands and comfort for the worker wearing shoes or boots.

6.8 Metal parts shall be corrosion resistant.

7. Chemical Composition

7.1 The insulating portion of the ladder shall be made from a fiberglass reinforced plastic as specified in Specification F711.

8. Mechanical and Electrical Properties (Design Test)

8.1 *Strength and Horizontal Bending Deflection Test of a Ladder with or without Splice:*

8.1.1 The test shall be carried out on a complete section or one-piece ladder.

8.1.1.1 In the case of splice ladders, the test shall be carried out on the splice assembly of the ladder with the supports equidistant of the splice center.

8.1.2 The maximum permissible deflection is a function of the ladder design, distance between the supports, and the applied load.

8.1.2.1 Table 1 defines the various ladder designs, support distances, and minimum applied test load.

8.1.3 The ladder shall be positioned horizontally and centered on cylindrical supports which have a diameter that does not impede the deflection of the ladder and at distances defined in Table 1 (see Fig. 5).

8.1.3.1 In the case of a hook ladder, the hook length is not included in the overall length of the ladder and will overhang on one end.

8.1.4 A test load shall be applied slowly and smoothly, equidistant between the supports of the ladder and equally across both rails with a 2 in. (51 mm) wide strap.



FIG. 3 Representation of a Hook Ladder