



Standard Specification for Portable and Permanent Emergency Escape Ladders for Residential Use¹

This standard is issued under the fixed designation F2175; 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 specification establishes recognized performance requirements for portable and permanent emergency escape ladders for residential use.

1.2 This specification replaces provisional standard PS 117.

1.3 *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 consult and establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*²

D648 Test Method for Deflection Temperature of Plastics Under Flexural Load in the Edgewise Position

2.2 *Underwriters Laboratories Standard:*³

UL 746b Oven Aging Techniques

3. Requirements

3.1 The ladder shall show evidence of good workmanship and meet the following requirements:

3.1.1 *Vertical Static Load*—The ladder components shall not allow evidence of failure (material or joint separation, cracking, or collapse) when tested in accordance with **4.1**.

3.1.2 *Horizontal Static Load*—The ladder components shall not show evidence of failure (material or joint separation, cracking, or collapse) when tested in accordance with **4.2**.

3.1.3 *Rung/Step Strength*—The rungs/steps shall not show any evidence of failure (material or joint separation, cracking, or collapse) when tested in accordance with **4.3**.

3.1.4 *Rung/Step/Side Support Shear*—The rungs/steps and side support shall not show evidence of failure (material or joint separation, cracking, or collapse) when tested in accordance with **4.4**.

3.1.5 *Deployment Weight*—Maximum weight of the ladder shall be less than or equal to 20 lb (9.0 kg) for a 20-ft (5.1-m) ladder and not more than 0.75 ft (.34 kg) per foot (30 cm) of additional length.

3.1.6 *Deployment Time*—Deployment of the ladder shall be less than 60 s as tested in accordance with **4.5**.

3.1.7 *Hook or Attachment Stability*—The unit shall have hooks or other means of attachment to the window or permanent structural attachment that are stable. With the ladder in place, no hazardous condition shall be created when tested in accordance with **5.1**.

3.1.8 *Rung/Step Size*—Rungs/steps shall be 0.97 in. (25 mm) minimum in depth and greater than 10 in. (254 mm) in width. For rungs made from round tubing, the minimum rung depth can be reduced at each end for attachment to side supports.

3.1.9 *Rung/Step Release Mechanism*—For ladders having rung/step release mechanisms, the pull force to release and deploy the ladder shall be 5 lb (2.3 kg) or less.

3.1.10 *Heat Deflection Temperature*—All materials that soften or melt by heat used in support components of the ladder including the rungs, rung supports, and hooks, shall have a heat deflection temperature, as measured by Test Method **D648**, of not less than 150°C at 66 psi (455 kPa).

3.1.11 *Standoff*—Standoffs for each rung/step shall be supplied with each ladder. Minimum distance between the outer face of the rung/step and standoff contact at building shall be not less than 3.6 in. (9.1 cm). If standoffs are shipped unattached, the label shown in Section **5** shall be used on opposite sides of the final package.

3.1.12 *Designed Length*—Designed for a maximum use of 3 stories (unless specified otherwise).

3.1.13 *Rung/Step Spacing*—Rungs/steps shall be spaced at a uniform distance and spaced at intervals of 13 ± 2 in. (325 ± 5 cm).

3.1.14 *Rungs/Steps*—Rungs/steps are to be corrugated, serrated, knurled, dimpled, embossed, or coated with slip-resistant material.

¹ This specification is under the jurisdiction of ASTM Committee F15 on Consumer Products and is the direct responsibility of Subcommittee F15.47 on Fire Ladders.

Current edition approved April 1, 2015. Published August 2015. Last previous edition approved in 2007 as F2175 – 07. DOI: 10.1520/F2175-07R15.

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 Global Engineering Documents, 15 Inverness Way East, Englewood, CO 80112.

3.1.15 *Rated Load*—The rated load shall be indicated for each ladder and shall be rated at 250 lb or more.

3.1.16 *Stress Relief*—Rungs/steps, rung/step supports, hooks or permanent structural attachment assembly shall stand conditioning at 70°C for 7 h without significant deformation or any cracking that would, in any way, adversely affect the functionality of the ladder.

3.1.17 *Heat Aging*—Polymeric components shall have a calculated use temperature of 75°C or more when heat aged according to UL 746b or shall be heat aged at 100°C for 1000 h without a 25 % or more decrease (unaged to aged) in tensile properties.

4. Test Methods

4.1 *Vertical Static Load Test*—The ladder shall be mounted as intended and subjected to a vertical static load of three times the rated load to evaluate the hook or anchoring, rung/step, and rung/step support components. The loads shall be evenly distributed along length of the ladder, with a maximum of 250 lb (113 kg) per rung, for 1 min. Following the test, the ladder shall be examined for evidence of failure.

4.2 *Horizontal Static Load Test*—The ladder shall be mounted as intended and subjected to a horizontal static load of 200 lb (91 kg) to evaluate the hook (for portable ladders) or permanent structural attachment (for permanent ladders) and standoff components. The load(s) shall be applied at the point where it would cause the greatest stress on the component for 1 min. Following this test, the components shall be visually examined for evidence of failure.

4.3 *Rung/Step Strength Test*—Rungs/steps shall be mounted as intended to the side supports and subjected to a static load of 750 lb (340 kg) applied at the center of the rung/step of a 4-in. (10-cm) width for 1 min. Following the test, the rung/step and side support shall be visually examined for evidence of failure.

4.4 *Rung/Step Support Shear Test*—Rungs/steps shall be mounted as intended to the side supports and subjected to a static load of 750 lb (340 kg) applied to the rung/step of a 4-in. (10-cm) width immediately adjacent to the side support for 1 min. Following the test, the rung/step and side support shall be visually examined for evidence of failure.

4.5 Deployment Test:

4.5.1 A variety of able-bodied individuals who have no prior knowledge of the product shall deploy and use the ladder through a window opening as defined and instructed by the manufacturer. Each test person shall be evaluated for their ability to follow the instructions correctly, install the ladder (for portable ladders), deploy the ladder, and climb through the window and down the ladder. The deployment shall be timed.

4.5.2 All members of the testing group shall accomplish deployment through an opening in 1 min. or less.

NOTE 1—The time period shall start at the time the person grasps the ladder and shall end when the ladder is fully deployed (as intended for use).

4.6 *Abnormal Operation Test*—A representative sample of the ladder shall be mounted as intended and subjected to the following test: A 250-lb (113-kg) load shall be placed 10 ft

(3.0 m) below the hooks or permanent structural attachment. The bottom end of the ladder shall be displaced 10° to the right from vertical. The ladder shall be evaluated for evidence of slipping, disconnection, or any other hazardous conditions with respect to attachment to the window sill or permanent structural attachment.

5. Labels

5.1 If any assembly by the consumer is required, the label in Fig. 1 shall be visible on two opposite sides of the final package. Similar wording shall be included in any advertising copy. The words “some assembly” may be modified to be more specific, for example, standoffs only.

6. Marking

6.1 The company’s name, model designation, and date of manufacture (month and year) or dated serial number shall be permanently marked on the product. The following information shall be on the product:

- 6.1.1 Ladder length,
- 6.1.2 Ladder load rating,
- 6.1.3 Minimum window opening dimensions,
- 6.1.4 Maximum window sill depth for portable escape ladders, and
- 6.1.5 Instructions for deployment.

7. Instructions

7.1 For portable ladders, the shipping box shall contain the following statement: READ INSTRUCTIONS FOR ASSEMBLY AND USE IMMEDIATELY UPON PURCHASE. For permanent ladders, the shipping box or cover of the installation manual shall contain the following statement: BEFORE YOU INSTALL OR USE THIS PRODUCT, READ INSTRUCTIONS COMPLETELY AND CAREFULLY. Instructions for proper installation, assembly, operation, and use shall be provided with each unit and shall include the following:

- 7.1.1 Load ratings (lb) and required window openings.
- 7.1.2 Instructions for proper use with step-by-step pictorial description. Must include instructions for proper securement of hook for portable ladders, installation and deployment of permanent ladders and lowering ladder.

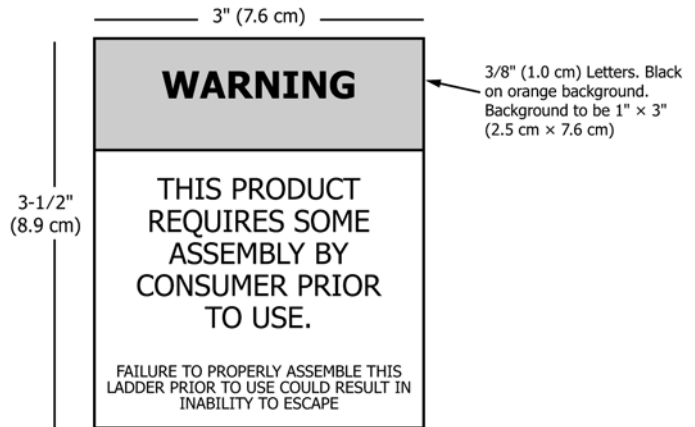


FIG. 1 Warning Label

7.1.3 The statement “Close doors before opening any windows to prevent fire from being drawn into the room.”

7.1.4 The statement “Do not lean away from ladder” or “Keep body close to ladder.”

7.1.5 The statement “Unless absolutely necessary, do not carry a child when using this ladder.”

7.1.6 The statement “Do not carry pets or miscellaneous objects when using this ladder.”

7.1.7 The statement “Instruct family members to use the escape ladder only when the primary escape path (that is, the main exit) is blocked or unsafe to use,” or equivalent.

7.1.8 The statement “This escape ladder is not a toy or recreational device. Instruct children that the ladder is to be used only in an emergency or adult supervised exit drill,” or equivalent.

7.1.9 The statement “For use only in windows that are structurally safe for the intended load,” or equivalent.

7.1.10 The statement “Not recommended for use with storm windows or other windows that do not open to the recommended minimum dimensions (____),” or equivalent.

7.1.11 The statement “Make sure ladder is correct length. Do not use above 2 or 3-story height” (indicated on product label).

7.1.12 Instructions advising the user not to attempt to deploy the ladder from windows that are obstructed by furniture, radiators, air conditioning units, or security devices such as grilles or bars (without inside release mechanisms).

7.1.13 Instructions advising the user to check for outside obstructions such as electric lines, telephone wires, or fences.

7.1.14 For portable escape ladders, instructions advising the user not to attempt to use the ladder if the window sill does not meet the size range specified by the manufacturer. Additionally, a schematic showing the minimum and maximum dimensions of window sills to accommodate ladder hooks.

7.1.15 The statement “After assembly, plan and practice drills to ensure that occupants are familiar enough for proper use. This ladder is intended to supplement (not replace) the more important fire protection principles of fire drills, emergency evacuation plans, smoke detectors, fire extinguishers, etc.,” or equivalent.

7.1.16 The ladder should be periodically inspected for damage, loosening of any assembled items, incorrect assembly, or significant deterioration of the materials of construction.

7.1.17 The ladder is designed for use by one person at a time.

7.1.18 For portable escape ladders, store the ladder in a convenient location near the emergency escape window; for example, under bed, in closet, etc.

7.1.19 Provide instructions, if needed for returning ladder to “ready state” after practice drills.

7.1.20 *Repacking*—Instructions shall be given in clear detail as to any appropriate repacking of the ladder for subsequent use.

8. Keywords

8.1 emergency egress; escape ladder; fire safety; ladder; safety standard

ASTM International takes no position respecting the validity of any patent rights asserted in connection with any item mentioned in this standard. Users of this standard are expressly advised that determination of the validity of any such patent rights, and the risk of infringement of such rights, are entirely their own responsibility.

This standard is subject to revision at any time by the responsible technical committee and must be reviewed every five years and if not revised, either reapproved or withdrawn. Your comments are invited either for revision of this standard or for additional standards and should be addressed to ASTM International Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee, which you may attend. If you feel that your comments have not received a fair hearing you should make your views known to the ASTM Committee on Standards, at the address shown below.

This standard is copyrighted by ASTM International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA 19428-2959, United States. Individual reprints (single or multiple copies) of this standard may be obtained by contacting ASTM at the above address or at 610-832-9585 (phone), 610-832-9555 (fax), or service@astm.org (e-mail); or through the ASTM website (www.astm.org). Permission rights to photocopy the standard may also be secured from the Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923, Tel: (978) 646-2600; <http://www.copyright.com/>