

American National Standard Safety Requirements for Stepstools



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American National Standard Safety Requirements for Stepstools

Secretariat

American Ladder Institute

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American National Standards Institute, Inc.



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American National Standard

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Foreword

(This foreword is not part of the American National Standard A14.11-2018)

This standard on Stepstools is one of the many American National Standards prepared under the ANSI Accredited Standards Committee on Safety in Construction, Care, and Use of Ladders. A14 Subcommittees that report to the A14 Standards committee have developed the following A14 Standards: A14.1 Portable Wood Ladders; A14.2 Portable Metal Ladders; A14.3 Fixed Ladders; A14.4 Job-made Ladders; A14.5 Portable Reinforced Plastic Ladders; A14.7 Mobile Ladder Stands, A14.8 Ladder Accessories and A14.9 Disappearing Attic Stairways.

This standard for Stepstools was prepared under the supervision of the American National Standards A14 Accredited Standards on Safety in Construction, Care, and Use of Portable Ladders.

Prior to the release of this standard, wood, aluminum and fiberglass ladder-type stepstools were covered by ANSI A14.1, 14.2 & A14.5 respectively. Recognizing the existence of a wide variety of designs in the marketplace that do not fit the description of ladder-type stepstools, the A14.11 Stepstool sub-committee was first formed in the late 1990's to develop a standard that would cover all types of stepstool designs and all types of materials within one document. This standard was written as a guide to both manufacturers and end users alike to instruct in the proper design, manufacture, care, use and selection of stepstools. This first edition of this American National Standard draws largely from the work that was done in the aforementioned standards, but does include additional tests to enable proper evaluation of non-ladder-type stepstools.

This standard prescribes both general design requirements and performance requirements for stepstools. Additionally, labeling, marking and instruction requirements are covered in this standard.

Suggestions for improvement for the standard are welcome. They may be sent to: American Ladder Institute, 330 N. Wabash Ave., Suite 2000, Chicago, IL 60611.

All comments must be sent on the Official Comment Form that can be found on the last page of this document. Each comment must include a rationale. This standard was proposed and approved for submittal to ANSI by the American National Standards Committee on Safety in the Construction, Care, and Use of Portable Ladders. Committee approval of the standard does not necessarily imply that all the committee members voted for its approval. At the time it approved this standard, the A14 had the following members:

Dave Plotner, Chairman
Ryan Crawford, Vice Chair
Pam O'Brien, Secretariat

At the time it approved this standard, the A14 Committee had the following members:

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American Ladder Institute	Ryan Moss
American Society of Safety Engineers	Michael Lorenzo Tim Fisher (Alt)
Associated General Contractors of America	Charles E. Bird Kevin Cannon (Alt)
Canadian Standards Association	Dave Shanahan
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American National Standard Safety Requirements for Stepstools

1. Scope and Purpose

1.1 Scope

This standard prescribes rules governing the safe construction, design, testing, care and use of wood, metal, plastic and reinforced plastic stepstools of various configurations for duty ratings of 200, 225, 250, 300 and 375 lbs. It applies to stepstools that resemble conventional stepladders in their appearance as well as those that do not. It does not cover stepstools that do not meet the general requirements of this standard, nor does it cover accessories that may be installed on or used in conjunction with stepstools. This standard does not apply to those products currently covered by ANSI A14.7 (Mobile Ladder Stands and Mobile Ladder Stand Platforms).

These requirements are also intended to prescribe rules and criteria for labeling/marketing of the kinds of stepstools cited in this standard. These labeling/marketing requirements do not apply to those situations where training, supervision, or documented safety procedures would be in conflict, or serve in lieu of, these labeling/marketing requirements.

1.2 Purpose

The purpose of this standard is to provide reasonable safety for life, limb, and property. In order to develop an effective safety program, the standard may serve also as a basis for purchase requirements and for instructions in personnel training, and in the preparation of motivational/instructional material such as safety practices, manuals, posters and the like.

This standard is also intended to provide the manufacturer of wood, metal, plastic and/or reinforced plastic stepstools with performance and dimensional requirements against which this product may be compared. It is not the purpose of this standard to specify all the details of construction of wood, metal, plastic and/or reinforced plastic stepstools. The limitations imposed are for the purpose of providing adequate general requirements and testing methods.

2. General

2.1 Rationale

The intent of this American National Standard for Stepstools is to establish a set of minimum design and performance requirements for all stepstools that comply with the general description for stepstools provided herein.

2.2 Application

This standard is intended for voluntary use by establishments that use, manufacture or evaluate stepstools. It is also designed to serve as a guide to federal and state authorities or other regulatory bodies in the formulation of laws or regulations.

The methods employed to ensure compliance with this standard shall be determined by the proper regulatory or administrative authority.

2.3 Interpretation

To secure uniform application of this standard, it is recommended that suggestions involving changes in the requirements or disputes over its interpretation shall be referred to the following organization:

AMERICAN LADDER INSTITUTE (ALI)
c/o SMITHBUCKLIN
330 NORTH WABASH AVENUE
SUITE 2000
CHICAGO, ILLINOIS 60611

In cases of practical difficulty or under special-service conditions, it is expected that the administrative authority may grant exceptions to the literal requirements of this standard or may permit the use of alternate designs or features, but only if equivalent safety is thereby secured.

2.4 Mandatory and Advisory Provisions

The word “shall” is to be understood as denoting a mandatory requirement. The word “should” is to be understood as denoting a recommendation.

2.5 Equivalent

The word “equivalent” in this standard means a construction, connection, or material providing equal performance.

2.6 Effective Date

The requirements of this standard shall become effective one year after the date the standard is approved by ANSI.

3. Reference Standards

This standard is intended for use in conjunction with the following American National Standards (see Section 10).

- American National Standard Safety Requirements for Scaffolding, ANSI/ASSE A10.8-2011
- American National Standard for Ladders - Portable Wood - Safety Requirements, ANSI-ASC A14.1-2007
- American National Standard for Ladders - Portable Metal - Safety Requirements, ANSI A14.2-2017
- American National Standard for Ladders - Portable Reinforced Plastic - Safety Requirements, ANSI A14.5-2017
- American National Standard for - Mobile Ladder Stands and Mobile Ladder Stand Platforms A14.7- 2011

4. Definitions and Nomenclature

4.1 General

Back Leg (rear rail). Upright support members of a ladder-type stepstool back section (opposite the climbing side); usually joined by rungs, bars or other cross bracing to form the back section. The back section is typically not designed for climbing or standing unless specified by the manufacturer.

Dead Load. A stationary load statically applied using solid weights or other unchanging downwardly applied force to simulate the effect of gravity.

Duty Rating. The combination of factors, including, but not limited to, stepstool type and design features, which imply service capability.

Effective Area. The net amount of a platform surface that can be utilized by a person’s foot as addressed in section 5.1.3. Small holes and subtle variations in the surface and/or perimeter shape which do not adversely affect support and/or stability shall not be subtracted out when calculating the effective area.

Foot, Shoe, Or Slip Resistant Bearing Surface.

Component(s) at the bottom of a stepstool in contact with the horizontal plane of the base support, providing support and resistance to sliding.

Front Section. The designated climbing side of the stepstool, if so designed.

Height. Vertical distance as measured from the surface of the platform (highest standing level) to the floor. See 5.1.1 for limitations/tolerances.

Inside Clear Width. The minimum usable side-to-side distance on any step below the platform surface. The numeric value determined by this definition shall be used to determine the step side-to-side dimension.

Marking. Any sign, label, stencil, or plate of a primary hazard or informational character, or both, affixed, molded, painted, burned, or embossed on a stepstool surface. (See Appendices)

Permanent Deformation (set). That deformation remaining in any part of a stepstool five minutes after all loads have been removed. (See section 6.1.7)

Platform. The highest intended climbing/standing level of a stepstool.

Plywood Test Surface. The test surface shall be Russian (Baltic) or Finnish Birch throughout plywood (100% Birch veneers through the full thickness of the plywood sheet) between ½ and ¾ inch total thickness, with a face grade of BB or better (this includes face grades B, S, and BB) and void-free. The maximum thickness of the individual veneers shall be 0.1 inch, regardless of plywood thickness.

Special Purpose Stepstool. A stepstool that is either an experimentally designed stepstool or a modification or assemblage of A14 approved requirements for design or construction features of one of the general-purpose stepstools defined elsewhere in this section, in order to adapt the stepstool for special or specific climbing uses. Any product deemed “special purpose” that does not meet either the general requirements or performance of this standard, shall demonstrate an equivalent level of performance and safety when used in its “special purpose” environment. Such a product must be appropriately labeled to warn users regarding its limitations.

Steps. Crosspieces below the platform intended for use by a person in ascending, descending or standing.

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Step/Platform Surfaces. The usable areas on which a person may place their feet to support their weight while using a stepstool.

Stepstool. A self-supporting portable climbing device, 36 inches or less in height.

Test Failure. Damage or visible weakening of the stepstool structure or a component, except where otherwise defined by the test protocol. Localized discoloration (stress whitening) of plastic parts without the presence of a fracture, as a result of testing is allowable.

Test Load. The applied load used to determine compliance with performance (test) requirements.

Through Crack. Permanent damage in a component of a product, which is clearly visible from both sides of the component (see Visual Damage) during either a period of test loading or post-test loading.

Top Rail. A component extending above the platform level from one side to the other that may be used as a carry handle and/or support rail during use. Top Rails may be of any height unless intended for aiding the user with support and balance for stabilizing themselves, in which case the vertical distance from the platform to the top of the top rail must be a minimum of 16 inches (see 5.1.3 and Table 1 for how this relates to appropriate platform size).

Ultimate Failure. The collapse of the stepstool structure or, where applicable, a component thereof.

Utility Shelf. A component permanently attached to a stepstool forming a horizontal surface designed to support containers, tools or other materials, but not the user.

Visual Damage. Damage evident by visual inspection, without the aid of tools or magnification.

Visual Inspection. Inspection by the eye without recourse to any optical device except the observer's prescription eyeglasses.

Working load. The maximum applied load, including the weight of the user, materials, and tools that the stepstool is to support for the intended use.

4.2 Wood Specific

Wood Characteristics. Distinguishing features, the extent and number of which determine the quality of a piece of wood.

Wood Irregularities. Natural characteristics in or on the wood that may lower its durability or strength.

Bark Pocket. An opening between annual growth rings that contain bark. Bark pockets appear as dark streaks on radial surfaces and as rounded areas on tangential surfaces.

Check. A separation of the wood along the fiber direction that usually extends across the rings of annual growth, commonly resulting from stresses set up in the wood during seasoning.

Compression Failure. A deformation (buckling) of the fibers due to excessive compression along the grain. This deformation may appear as a wrinkle across the surface. In some cases, compression failures may be present but not visible as wrinkles; in such cases they are often indicated by "fiber breakage" on end grain surfaces.

Compression Wood. An aberrant (abnormal) and highly variable type of wood structure occurring in softwood species (See 5.4.5.2 for more details).

Cross Grain (Slope of Grain). The deviation of the general wood fiber direction from the center axis of the cross section of the piece. Slope is measured along the edges or on the surfaces of the piece using straight edges and is done visually on each part.

Decay. The disintegration of wood due to the action of wood-destroying fungi; also known as dote and rot.

Knot. A portion of a branch or limb embedded in the tree and cut through in the process of lumber manufacture. It is classified according to size, quality, occurrence, and location in the cross section of a piece. The size of the knot is determined by its average diameter on the surface of the piece.

Low-density Wood. Wood that is exceptionally light in weight and usually deficient in strength properties for the species. In softwood species, low density is frequently indicated by exceptionally wide, or sometimes by extremely narrow, rings, and generally a low proportion of latewood. On the other hand, low-density hardwood, at least in ring-porous species, is most commonly indicated by excessively narrow annual rings in which the earlywood portion predominates.

Pitch Pocket. An opening extending parallel to the annual growth rings that contains, or that has contained, either solid or liquid pitch.

Shake. A separation along the grain, occurring most often between the rings of annual growth.

Split. A separation of the wood parallel to the fiber direction due to tearing apart of the wood fibers normally caused by external forces.

Tension Wood. A characteristic of hardwoods created by tensile stresses during growth (usually associated with large branches). These regions are noted by fuzzy, torn grain on machined surfaces, which can result in strength losses and high shrinkage rates.

Truss Rod. Threaded metal component (typically on wooden stepstools) located directly beneath a step.

Wane. Bark, or lack of wood, on the corner of a piece.

5. Design Requirements

5.1 General

Specific design and construction requirements are minimized in this standard because of the wide variety of materials and design possibilities. However, the design shall have such characteristics as to produce a stepstool of sufficient strength and stiffness to meet the requirements of this standard and shall produce a stepstool without structural defects or accident hazards such as sharp edges, burrs, and the like.

5.1.1 Stepstool Size Limitation and Tolerance. The size of the stepstool shall be measured as the vertical distance from the surface of the platform to floor. The labeled height shall not exceed 36 inches. The actual height measured on any sample product shall be within a tolerance of +/- 0.5-in. of the labeled size.

5.1.2 Step, and Platform Spacing & Angular Tolerances. The vertical spacing between steps/platforms shall be uniform, nominally 8-12 inches within a tolerance of +/- 1/8 inch. Step/platform surfaces shall be level

side-to-side within 1.0 degree of the stepstool's support surface. Step/platform surfaces shall be level front-to-back within 2.5 degrees of the stepstool's support surface. The support surface-to-bottom step spacing shall be at least 6 inches but not greater than the nominal step-to-step/platform vertical spacing (plus tolerance).

5.1.3 Platform Size. Platform size shall comply with the dimensions listed in Table 1, as measured using the guidelines of Figure 1a. The effective area of any platform shall be determined by its gross perimeter as demonstrated in Figure 1a. Reduced minimum platform size dimensions (as specified in Table 1) are permissible for stepstools having a top rail extending a minimum of 16 inches vertically above the platform level, as measured from the top of the platform to the top of the top rail.

5.1.4 Inside Clear Width. The inside clear width on any standing surface below the platform shall not be less than 10.5 inches per Figure 1b.

5.1.5 Step Size. The minimum front-to-back dimension of all steps below the platform shall be 3 inches at all points over a central width of 10.5-in. as shown in Fig. 1b. Step size outside of the 10.5-in. minimum may be less than 3 inches. For levels below the platform meant only as transitional steps (not for standing and working from), the step depth of 3-in. is not required to be maintained over the full 10.5-in. opening, but shall be

Table 1: Platform Size Requirements

Minimum Platform Size	STEPSTOOL TYPES		
	Platform Only (No Steps)	Platform plus at least one step	
		With a (minimum) 16" top rail	Without a (minimum) 16" top rail
Front-to-Back	5.0 in	6.0 in	7.0 in
Side-to-Side	10.5 in	10.5 in	12.0 in
Area	50 sq in	60 in	80 sq in

Figure 1a: Platform Size

