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An American National Standard

Standard Test Method for Treestand Repetitive Loading Capability[1]

This standard is issued under the fixed designation F2128; 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 test method covers the procedures for determining the capability of climbing and ladder ~~treestands and tripods~~ treestands, climbing sticks (Sectional and Continuous), and tripods/towers to withstand repeated loading relative to the manufacturer's rated capacity. For actual specification requirements for each subject unit refer to Specification F3249.

1.2 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.

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

1.4 *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.*

2. Referenced Documents

2.1 *ASTM Standards:*[2]

~~F2124~~F3249 ~~Practice for Testing Treestand Ladder, Tripod Stand and Climbing Stick Load Capacity~~Specification for Treestands, Climbing Sticks, and Tripod or Tower Stands ~~(Withdrawn 2017)~~

3. Terminology

3.1 The terminology and definitions in the referenced documents are applicable to this practice.

3.2 *Definitions:*

3.2.1 *backbar or V-bar*—the adjustable component of a climbing treestand or handclimber that engages the tree to provide support. ~~The backbar may be rigid or flexible.~~

3.2.1.1 *Discussion—*

The backbar may be rigid or flexible.

3.2.2 *climbing ~~treestand—~~treestand – (hand climber) – Type I—*a treestand that provides both the means to ascend and descend the ~~tree,~~tree and allow the user to remain at a desired elevation.

[1] This test method is under the jurisdiction of ASTM Committee F08 on Sports Equipment, Playing Surfaces, and Facilities and is the direct responsibility of Subcommittee F08.18 on Treestands.

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[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.

3.2.2.1 *Discussion—*
It consists of a top section and a foot platform, which are independent of one another. The user's arms are used to support and transfer their weight to the top section when ascending or descending.

3.2.3 *climbing treestand – (sit/stand) – Type II*—a treestand that provides both the means to ascend and descend the tree and allow the user to remain at a desired elevation.

3.2.3.1 *Discussion—*
It consists of a top section and a foot platform, which are independent of one another. The user sits on the extended structure of the top section, opposite the seat, when ascending or descending.

3.2.4 *climbing treestand – (sit/stand) – Type III*—a treestand that provides both the means to ascend and descend the tree and allow the user to remain at a desired elevation.

3.2.4.1 *Discussion—*
It consists of a top section and a foot platform, which are independent of one another. The user sits on the seat of the top section when ascending or descending.

3.2.5 *handclimber, or climbing aid*—a device to assist climbing with a climbing treestand. A structure that allows the user to support his weight when lifting a climbing treestand with his legs.

3.2.6 *ladder treestand*—a treestand that is secured to the tree at the elevation where the platform is located. ~~(The ladder treestand can be secured to the tree at other locations and has steps that are used to reach the platform or hunting position.)~~

3.2.6.1 *Discussion—*
The ladder treestand can be secured to the tree at other locations and has steps that are used to reach the platform or hunting position.

3.2.7 *non-climbing, fixed position or hang-on treestand*—a treestand that is secured to the tree at the elevation where it is used. ~~(The user usually ascends the tree by some means and then lifts the treestand to the desired position and secures it for use.)~~

3.2.7.1 *Discussion—*
The user usually ascends the tree by some means and then lifts the treestand to the desired position and secures it for use.

3.2.8 *platform*—the horizontal structural area of a treestand on which the user stands or places his feet, or both.

3.2.9 *treestand*—a device designed to be affixed to a tree or its branches so as to permit an individual to sit or stand thereon for the purpose of attaining an elevated position from which to observe, photograph or hunt.

3.2.10 *two person treestand*—a ladder or hang-on treestand designed and marketed for use by two persons simultaneously.

4. Summary of Test Method

4.1 A climbing treestand is mounted so that its platform is perpendicular to a rigid wood ~~or metal~~ pole when the rate load capacity is applied parallel to the mounting pole. The load is applied vertically and is guided so that it is applied at the locations applied when ascending or descending a tree on the treestand. In the case of a ladder treestand or ~~tripod,~~tripod/tower, the load is applied to the rungs of the ladder or ~~tripod.~~ tripod/tower. In case of a climbing stick (Sectional and Continuous), the load is applied to the steps. The test subject is noted after a certain number of loading cycles, by means of a thorough visual inspection, to determine if any structural damage such as yielding or cracking, or both, has occurred.

4.2 Stand up-sit down two-piece climbers—both seat and foot ~~sections~~platforms may be tested at the same time.

5. Significance and Use

5.1 This test method is intended for quality assurance and production control purposes with recognition that individual usage will vary considerably. This test method is not intended to be an independent material or product-acceptance test.

6. Apparatus

6.1 A rigid, round wood ~~or metal~~ pole, preferably vertical, is used to mount the subject product such that pole deflection is minimized.

6.1.1 The mounting pole diameter shall be 10 ± 1 in. (254 ± 25.4 mm).

6.2 The load shall be applied using either calibrated weights or a mechanical device in conjunction with a calibrated load cell.

6.2.1 The use of calibrated weights requires that weight placement be accurate to assure that the load application centroid is coincident with the boundaries defined and meets the requirements as given in 6.3. Caution should be exercised for operator protection with the use of weights in case of slippage or premature failure.

6.2.2 The use of a mechanical device such as a tensile testing machine or hydraulic power, in combination with pulleys, fulcrums or bearing to redirect forces, requires the use of a calibrated load cell attached adjacent to the test subject to account for friction losses.

6.3 The application of the load shall be at a point on the platform area that is the geometric centroid of the test subjects load placement area while ascending or descending a tree. The application of the load on a ladder treestand shall be at a point on the rung area which is the geometric center.

6.3.1 *Foot Platforms* shall be tested using a 10 in. by 10 in. by 0.5 in. thick steel plate placed in the center of the platform. The load shall be applied at a velocity as given in 7.5.

6.3.2 *Steps,* which are supported on two sides, shall be tested using 3 in. wide by 5 in. long by 0.5 in. thick steel plate placed in the center of the step with the 3 in. width parallel to the step. The location of the step(s) for ladder treestands, continuous climbing sticks and tripod or tower stands shall be approximately ⅔ or higher of the total height of the ladder or climbing stick section.

6.3.3 *Cantilever Steps,* which are supported only on one side, shall be tested using a 3 in. wide by 5 in. long by 0.5 in. thick steel plate. For steps that are longer than 3 in. the plate shall be flush with the furthest supporting edge. In the case that a step should have a side stop which prevents the plate from achieving full contact with the area of the step then the plate may be shimmed with a rubber pad to ensure full contact with the step. In the case where full contact may not be achieved by shimming, due to the contour of the step, a 3 in. wide strap may be used for loading.

6.3.4 *Climbing Treestand – Upper Section (Type I)* shall be tested using a 2 in. wide strut channel which spans the furthest supporting members. This would be the span between where the user would place their hands/arms when ascending or descending.

6.3.5 *Climbing Treestand – Upper Section (Type II)* shall be tested using a 10 in. by 10 in. by 0.5 in. thick steel plate that is mounted to the center of the extended structure opposite the seat where the user would sit when ascending or descending.

6.3.6 *Climbing Treestand – Upper Section (Type III)* ~~The load shall be applied to the test subject over a 100 in.~~shall be tested using a ~~2 (0.065 m2) area for climbing treestands and over a 25 in.2 (0.016 m2) area for ladder treestands by either: (1) controlled application of calibrated weights, or (2) as described in 6.2.2, to a flat rectangular steel plate 10 in. (254 mm) wide~~ 10 in. by 10 in. ~~(254 mm) long and a minimum of ½ in. (12.7 mm) thick for climbing treestands and 5 in. (127 mm) wide by 5 in. (127 mm) long for ladder treestands and a minimum~~by 0.5 in. thick steel plate that is mounted to the center of ~~½ in. (12.7 mm) thick on top of the test subject. The edges of the load plate adjacent to the test subject shall be deburred with 0.015/0.030 in. (0.381/0.762 mm) radius to reduce damage to the test subject by sharp corners. The load shall be applied at a velocity no more than~~the seat where the user would sit when ascending or descending. The furthest supporting structure of the stand should also be tested. If an open frame configuration, then the extended structure would be tested in the same fashion as Climbing Treestand Type I using a 2 in. wide strut channel. If closed frame configuration, ~~½ ft/s (9.144 m/min).~~then the extended structure would be tested in the same fashion as Climbing Treestand – Type II with 10 in. by 10 in. by 0.5 in. steel plate mounted to the center of the extended structure.

6.3.7 A ¼ ~~in. (6.350 mm)~~ -in. (6.350-mm) thick 90 durometer rubber sheet may be placed between the test subject and the load plate and shall be, at a minimum, at least equal in size and symmetrical to the load plate (to prevent the metal load plate from directly contacting the test subject).

~~NOTE 1—If load guidance is required, fabrication and attachment of any necessary guide bars to this load plate by welding must assure that the plate remain flat and free of distortion.~~

~~6.3.3 The load plate shall be positioned on the test subject with its center as close to the point as given in 6.3 as possible, yet maintaining the 100 in.^{2} (0.065 m^2) or 25 in.^{2} (0.016 m^2) respective contact area. A centerline of the load plate must be parallel to the major axis (axis of symmetry) of the test subject.~~

7. Procedure

7.1 Read instructions accompanying the test subject to ascertain the proper procedure for use and mounting and secure the test subject to the mounting pole such that the platform (plane of the platform) is perpendicular to the mounting pole. If necessary, use minimum auxiliary temporary means to maintain the subject in the correct position during set-up. (Frictional forces, without a load on the subject, may not be sufficient in some cases for the subject to remain in ~~position).~~position.) A small band on the mounting pole may by necessary.

7.2 By geometric means, determine the location of the load application points as given in 6.3 and mark accordingly.

7.3 Determine if the test subject will deflect sufficiently during the test to allow the load plate or weight to slip or shift. If so, provide auxiliary means such as clamps or stops to eliminate sideways movement of the load plate to protect operators.

7.4 The load (calibrated weight) shall be equal to the test subject's rated ~~capacity (except as noted within Section 6.1.6 of Practice~~ capacity. ~~F2124).~~ For example, a test subject with a rated capacity of 300 ~~lbs~~lb (136.1 kg) shall be tested using a load of 300 ~~lbs~~lb (136.1 kg).

7.5 The load shall be applied for a minimum time of one second and then removed completely. The repetitive frequency of load application and removal shall be no more than 30 cycles/min, that is, the load is applied and then removed within no less than 2 s (to avoid heating).

7.6 The repetitive loading shall be ~~10 000 cycles for climbing treestands.~~ 10 000 cycles for all test subjects (climbing treestands, ladders, tripods, towers, and climbing sticks (Sectional and Continuous)). This testing based on a person using a stand two times a day (10 cycles up, 10 cycles down each time) for 25 days each year for 10 years. ~~The number of repetitive loading cycles for ladder and tripod stands shall be the number of steps multiplied by 500 (based on usage of cycles up and down with each use, 25 days per year for 10 years). Testing on ladder and tripod~~ Testing on ladder, tripod/tower stands shall be performed on one step with the test subject assembled and in-place against the test pole (when applicable). The step shall be chosen at a location approximately two-thirds of the total assembled vertical height. ~~For ladder treestands and tripods capable of supporting two persons, the number of repetitive loading cycles shall be the number of steps multiplied by 1000 to account for two persons climbing.~~Subject unit requirements for Repetitive Load Testing are listed in Table 1.

7.7 Periodic checks at the end of each 3000 cycles shall be made and a note shall be made if the test subject, or load application apparatus, moves (shifts) from its initial equilibrium position on the mounting pile, whether the test subject continues to support the applied load, and in general whether any changes have occurred during the test.

TABLE 1 Requirements for Repetitive Load Testing

Stand Type	Load	Point of Loading	Plate Size	# of Cycles
Climbing (Upper Section)	Rated Capacity	Seat or Front Support depending on Design	10 in. by 10 in. by 0.5 in. or 2 in. Wide Strut depending on Type	10 000 Cycles
Climbing (Foot Platform)	Rated Capacity	Center of Platform	10 in. by 10 in. by 0.5 in.	10 000 Cycles
Ladder	Rated Capacity	1 Step at ⅔ Height	3 in. by 5 in. by 0.5 in.	10 000 Cycles
2 Person Ladder	SUR Rated Capacity	1 Step at ⅔ Height	3 in. by 5 in. by 0.5 in.	10 000 Cycles
Tripod/Tower	Rated Capacity	1 Step at ⅔ Height	3 in. by 5 in. by 0.5 in.	10 000 Cycles
2 Person Tripod/Tower	SUR Rated Capacity	1 Step at ⅔ Height	3 in. by 5 in. by 0.5 in.	10 000 Cycles
Climbing Stick (Sectional)	Rated Capacity	Bottom Left or Right	3 in. by 5 in. by 0.5 in.	10 000 Cycles
Climbing Stick (Continuous)	Rated Capacity	1 Step at ⅔ Height	3 in. by 5 in. by 0.5 in.	10 000 Cycles