

TMS 15

Standard Test Method for Repetitive Loading Capability

1. Scope

- 1.1 This test method covers the procedures for determine the capability of climbing and ladder treestands to withstand repeated loading relative to the manufacturers rated capacity. For changes to this specification since the last issue, refer to the Summary of Changes section at the end of the standard.
- 1.2 The values stated are in inch-pound units and are to be regarded as 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 and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

- 2.1 *ASTM Standards:*
- 2.2 *Federal Standards:*
- 2.3 *Manufacturing Standards:* Treestand Manufacturing Standard TMS 01.

3. Terminology

- 3.1 The terminology and definitions in the referenced documents are applicable to this practice.
- 3.2 *Definitions:*
 - 3.2.1 *Non-climbing, fixed position or hang-on treestand--* a treestand which 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).
 - 3.2.2 *Climbing treestand--* a treestand which provides both the means to ascend the tree, and allow the user to remain at a desired elevation.
 - 3.2.3 *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.
 - 3.2.4 *Backbar or V-bar--* the adjustable component of a climbing treestand or handclimber which engages the tree to provide support.
 - 3.2.5 *Platform--* the horizontal structural area of a treestand on which the user stand places his feet.
 - 3.2.6 *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.
 - 3.2.7 *Ladder Treestand --* a treestand which 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).
 - 3.2.8 *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 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 the load is applied to the rungs of the ladder.

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 and/or cracking has occurred.

- 4.2 Standup-sit down two-piece climbers--both seat and foot sections 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 inches (254 mm) +/-1 in. (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 re-direct 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 on a climbing treestand shall be at a point on the platform area which 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 The load shall be applied to the test subject over a 100 square inch (0.065 sq. m) area for climbing treestands and over a 25 square inch (0.016 sq.m) area for ladder treestands by either (A) controlled application of calibrated weights or (B) as described in 6.2.2, to a flat rectangular steel plate 10 inches (254 mm) wide by 10 inches (254 mm) long for climbing treestands and 5 inches (127 mm) wide by 5 inches (127 mm) long for ladder treestands and a minimum 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 .015/.030 inch (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 ½ foot per second (9.144M/min).
- 6.3.2 A one-quarter ¼ inch (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 square inch (0.065 sq.m) or 25 square inch (0.016 sq. m) respective contact area. A centerline of the load plate must be parallel to the major axis (axis of symmetry) of the test subject.

7. Test 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. A small band on the mounting pole may be 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 in Section 6.1.6 in TMS 05-00, "Standard Practice for Testing Ladder Treestand, Tripod Treestand and Climbing Stick Load Capacity"). Example: a test subject with a rated capacity of 300 pounds (136.1 kg) shall be tested using a load of 300 pounds (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 thirty (30) cycles per minute, i.e., the load is applied and then removed within no less than two (2) seconds (to avoid heating).
- 7.6 The repetitive loading shall be 10,000 cycles for climbing treestands. This testing is based on a person using a stand 2 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 treestands shall be the number of steps multiplied by 500 (based on usage of cycle up and down with each use, 25 days per year for 10 years). Testing on ladder and tripod stands shall be performed on 1 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 2 persons the number of repetitive loading cycles shall be the number of steps multiplied by 1,000 to account for 2 persons climbing.
- 7.7 Periodic checks at the end of one-third of the total 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 pole, whether the test subject continues to support the applied load, and in general whether any changes have occurred during the test.
- 7.8 A thorough inspection shall be made and noted to identify any and all yielding, cracking or other permanent deformation as a result of the repetitive loading.

8. Report

- 8.1 Recording of results shall include the following:
 - 8.1.1 Identification of test subject model, manufacturer and rated capacity.
 - 8.1.2 Photograph of test subject.
 - 8.1.3 Photograph of test set-up (three views: side, top and end).
 - 8.1.4 Verification of calibration.
 - 8.1.5 Date of test.
 - 8.1.6 If movement (shifting) has been detected as given in 7.7 a description shall be recorded.
 - 8.1.7 A description and detailed (close-up) photographs of any and all permanent deformation that has been observed and noted as given in 7.8 shall be recorded.
 - 8.1.8 A note shall be recorded whether the test subject remained free of defects.

- 8.2 *Pass-Fail Criterion*
- 8.2.1 Any cracking or other structural defects noted shall be a cause for failure of the repetitive load test.
- 8.2.2 If a treestand fails this test the stand and a copy of the test data shall be returned to the manufacturer.

SUMMARY OF CHANGES

This section identifies the location of principle changes to this standard that have been incorporated since its last issue. Changes or additions are underlined on the section reference number.

Revision A – Sections 4.1, 6.1, 6.3, 6.3.2, 9.1 and 9.2 revised.

Revision B – Sections 7.4 and 7.6 revised.

Revision C – Sections 1,2, 4.1, 6.3, 7.4, 7.6, and 7.7 revised, Section 3.2.6 and 3.2.8 added, metric equivalents added to Sections 6 and 7, Section 8 title changed, Section 9 numbering changed to Section 8.2.

Revision D – Section 7.6 revised.


Date Approved: **06/15/12**



(Signature and date)

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