TMS 11-98

Standard Test Method for Treestand Static Load Capacity

1. Scope

1.1 This test method covers the determination of the static load capacity of treestands in terms of a factor of safety 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 English units.

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. Terminology

2.1 The terminology and definitions in the referenced documents are applicable to this test method.

2.2 *Definitions:*

2.2.1 *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.)

2.2.2 *Climbing treestand*---a treestand which provides both the means to ascend the tree, and allow the user to remain at a desired elevation.

2.2.3 *Hand climber* 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.

2.2.4 *Backbar* or *V-bar*--- the adjustable component of a climbing treestand or Hand climber which engages the tree to provide support.

2.2.5 *Ladder treestand*--- a treestand which is secured to the tree at the elevation where the platform is located. (The ladder treestand may be secured to the tree at other locations and has steps that are used to reach the platform or hunting position).

2.2.6 *Tripod or Tower stand*--- a tripod or tower stand (free standing platform) is constructed to be self-supporting and is not required to be secured to a tree.

2.2.7 *A Climbing Stick*--- a device to assist climbing a tree primarily to a fixed position treestand. A structure that is secured to the tree and allows the user to support his weight and climb to the desired height on the tree.

2.2.8 *Platform*---the horizontal structural area of a treestand on which the user stands and/or places his feet.

2.2.9 *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. Summary of Test Method

3.1 A climbing treestand is mounted so that its platform is perpendicular or slightly above horizontal to a rigid wood or metal pole when the rated load is applied parallel to the mounting pole. A fixed position or ladder treestand shall be mounted with the platform perpendicular to the mounting pole. A tripod stand shall be positioned so that the platform is perpendicular to the application of the load. A climbing stick shall be mounted such that the steps are perpendicular to the pole. The platform is equipped with deflection measurement devices. The load is applied step-wise and recordings are made of the load and deflection at each step until yielding or permanent deflection occurs or until twice the rated

load is applied. The ladder, tripod and climbing sticks do not require deflection measurements be taken.

4. Significance and Use

4.1 This test method is intended for quality assurance and production control purposes.

5. Apparatus

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

5.1.1 The mounting pole diameter shall be ten (10) inches, +/- 1 inch.

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

5.2.1 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 5.4. Caution should be exercised for operator protection with the use of weights in case of slippage or premature failure.

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

5.3 Calibrated deflection measuring devices (such as dial indicators or optical laser) shall be used to measure movement of the test subject under load. The accuracy of the measuring devices shall be at within .010 inches and repeatable within .005 inches. The devices shall measure movement parallel to the direction of the applied load and shall be mounted in such a manner to eliminate deflection of the test apparatus and be placed, as a minimum, as follows:

5.3.1 There shall be at least two measurements taken at the load; one on each side and six (6) inches from the center of load application.

5.3.2 A deflection measurement shall be taken at two points furthest from the mounting pole, one on each side symmetrical with the test subject.

5.3.3 A deflection measurement shall be taken at two points six (6) inches from the mounting pole, one on each side symmetrical with the test subject.

5.4 The application of the load shall be at the centroid of the platform area for standing platforms or the centroid of the users load application area for handclimbers (climbing aids).

5.4.1 For standing platforms the load shall be applied to the test subject over one hundred (100) square inch area by means of a flat rectangular steel plate ten (10) inches wide by ten (10) inches long and a minimum of one-half (½) inch thick. The edges of the load plate adjacent to the test subject shall be de-burred (.015/.030 inch radius) to reduce damage to the test subject by sharp corners. A single layer of thin masking tape may be applied to the surface of the load plate contacting the test subject to reduce scratching and improve friction.

NOTE 1 -- Load attachment structure must be secured to this load plate therefore fabrication by welding must assure that the plate remain flat and free of distortion.

5.4.2 Handclimbers (climbing aids) shall have the load applied along the centroid of the supporting structure furthest from the test pole (which by design must be capable of directly supporting the user's weight during normal use) by means of a four (4) inch wide steel plate or rigid shape of sufficient length to horizontally span the width of the test subject.

5.4.3 For two-piece (stand/sit) climbing treestands with moveable non-rigid seats (such as mesh, slings or similar) which can be slid forward or backward during normal use, two additional separate tests shall be conducted on the seat. The first test shall be conducted with the load applied to the centroid of the non-rigid platform with the non-rigid platform located in its normal position, typically in the center of

the supporting structure. The second test shall be conducted with the load applied along the centroid of the supporting structure furthest from the test pole, which by design must be capable of directly supporting the user's weight during normal use. (For example, the horizontal framing member of a treestand where the user must support his weight during normal stand up/sit down climbing procedures.) For this second case, a rigid steel bar should be used to distribute the load over 16-inch wide area of the supporting structure.

5.5 For climbing treestands in which the seat is not used during the climbing, i.e., a handclimber or climbing aid is used, refer to TMS 17 for seat requirements.

6. Test Procedure

6.1 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).

6.2 By geometric means determine the location of the centroid of the platform area and mark accordingly. Place the load plate centerline coincident with the centroid of the platform.

6.3 Determine if the test subject will deflect sufficiently during the test to allow the load plate to slip or shift. If so, provide auxiliary means such as clamps or stops to eliminate sideways movement of the load plate. The load must be applied as given in 5.4 and must be continuously applied parallel to the mounting pole throughout the entire test.

6.4 Locate and mount deflection measurement devices, or reference points using optical laser, as given in 5.3.

6.5 The initial load for beginning the test shall be one-fourth of the test subjects' rated capacity. Example: a test subject with a rated capacity of 400 pounds shall begin the test at a load of 100 pounds. Loads shall be increased by twenty-five percent (25%) increments up to the test subjects' rated capacity after which the load shall be increased to 150%, 175% and 200% pound increments. After the load meets or exceeds the rated capacity, it shall be returned to zero and checked for yielding.

6.6 At each load value exceeding the rated capacity (test point) the load and all deflection measurements shall be recorded. The load shall then be removed and the deflection measurements re-recorded. A note shall be made of any measurement that does not return to within .200 inch of its initial value. After the load is removed, all deflection measurements shall be checked, and the test subject visually inspected for permanent deformations by yielding.

6.7 The load shall incrementally increase until it determined that (A) a factor of safety of 2.0 has been met, or (B) permanent deformation (yielding) has occurred.

7. Report

7.1 Deflection readings shall be discarded only when a calibration change is discovered after readings have been made or when improper operator techniques can be cited.

7.2 Recording of results shall include the following:

7.2.1 Identification of test subject model, manufacturer and rated capacity.

7.2.2 Photograph of test subject.

7.2.3 Photograph of test set-up (three views; side, top and end).

7.2.4 Load and deflection measurements at all test points.

7.2.5 Verification of calibration.

7.2.6 Date of test.

7.3 *Determination of factor of safety*.

7.3.1 When yielding or permanent deformation has been reached as given in 6.7, the

corresponding load in pounds shall be noted as the yield load.

7.3.2 The factor of safety shall be calculated by dividing the manufacturers rated capacity of the test subject into the resulting yield load. Example: rated capacity-300 pounds, yield load-630 pounds; therefore the factor of safety is 630/300 or 2.10 (usually noted as 2.10 SF)

7.3.3 The factor of safety must meet or exceed 2.0.

7.4 *Pass-Fail Criterion:*

7.4.1 A treestand is considered failed if it cannot support twice its rated load capacity without yielding or permanent deformation. The deflection measurements can be used as an indication of permanent deformation but shall not be used as pass-fail criterion.

7.4.2 If a treestand fails this test, the stand and a copy of the test data shall be returned to the manufacturer.

8. Precision and Bias

8.1 No statement is made about either the precision or bias of this test method for measuring load capacity since the result merely states whether there is conformance to the criteria for success specified in the procedure.

9. Keywords

9.1 backbar; climbing aid; climbing stick; platform; treestand; tripod

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 B – Sections 3.2.5, 3.2.6, 3.2.7 and 6.6 added. Section 4.1 revised.
Revision C – Sections 6.5, 6.6, 7.7 replaced and 8.3.3 revised.
Revision D _ Removed Section 2 References and re-numbered accordingly. Section 2.2.9 added. Section 5.4.2, 5.4.3 and 5.5 revised. Section 6.7 revised. Added Sections 8 and 9.

11-3-04
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