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Standard Test Method for Static Loading of Treestands, Climbing Sticks, and Tripod or Tower Stands[1]

This standard is issued under the fixed designation F3545; 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 procedures for static loading of various components of treestands, climbing sticks, and tripod/tower stands that are used for hunting, photographing, or general observation. This test method does not specify actual rated load capacities and corresponding factors of safety that each component should be evaluated to. For actual physical test requirements (rated load capacities) pertaining to each stand type please refer to Specification F3249.

1.2 The values stated are in inch-pound units and are to be regarded as the 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]

E4 Practices for Force Calibration and Verification of Testing Machines

F3249 Specification for Treestands, Climbing Sticks, and Tripod or Tower Stands

3. Terminology

3.1 *backbar, n*—adjustable component of a climbing treestand that engages the tree to provide support. The backbar may be rigid or flexible.

3.2 *corner stability, n*—the ability of a treestand to resist eccentricity, twisting, or sudden movement when load is applied separately to each of the four corners of a foot platform.

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

3.4 *integral seat, n*—a seat which is attached to the foot platform and is necessary to the completeness of the product.

3.5 *multiple user rated capacity (MUR), n*—the maximum load capacity, not to be exceeded, of a treestand, tripod or tower stand as determined by the manufacturer for simultaneous multiple users.

3.6 *non-integral seat, n*—a seat which is independent of the foot platform and can be slid forward or backwards during normal use. An example would be a mesh, sling, or similar material.

3.7 *permanent deformation, n*—a condition when metal is deformed to an extent that it cannot fully recover its original dimensions or to its original shape.

3.8 *side stability, n*—the ability of a climbing treestand (top section) to resist eccentricity, twisting, or sudden movement when load is applied to the left and right side of the section. In terms of tripod and tower stands the ability to resist toppling when the center edge spanning each of the supports is loaded.

3.9 *single user rated capacity (SUR), n*—the maximum load capacity, not to be exceeded, of a treestand, climbing stick, tripod, or tower stand as determined by the manufacturer for a single user.

3.10 *treestand, n*—device designed to be affixed to a tree 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.

3.11 *two person treestand, n*—a ladder or hang-on treestand that is designed and marketed for use by two persons simultaneously.

3.12 *two person tower or tripod, n*—a tower or tripod that is designed and marketed for use by two persons simultaneously.

3.13 *user, n*—the consumer or end user of the manufactured product.

[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.

4. Classification

4.1 *Ladder treestand*—A treestand that is secured to the tree at the elevation where the platform is located. The ladder treestand has steps that are used to reach the platform or hunting position. The ladder or steps are an integral part of the product.

4.2 *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.)

4.3 *Climbing stick – continuous*—A device or aide to assist climbing a tree primarily to a fixed position treestand. A continuous interconnected ladder that is secured to the tree and allows the user to support his weight and climb to the desired height on the tree.

4.4 *Climbing stick – sectional*—A device or aide to assist climbing a tree primarily to a fixed position treestand. Consists of multiple independent ladder sections that are secured to the tree and allow the user to support his weight and climb to the desired height on the tree.

4.5 *Tripod or tower stand*—Tripod or tower stand is designed to be self-supporting and is not required to be secured to a tree.

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

4.7 *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. 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.

4.8 *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. 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.

5. Test Equipment

5.1 *Wooden Pole*—The diameter of the pole shall be 10 ± 1 in. The length of the pole should be sufficient to accommodate proper mounting of the product being evaluated. The pole shall be mounted vertically and in a fashion to minimize the deflection and movement of the pole during testing.

5.2 *Steel Plates*—5 in. by 5 in. by 0.5 in. | 10 in. by 10 in. by 0.5 in. | 5 in. by 10 in. by 0.5 in. | 3 in. by 5 in. by 0.5 in. – The steel plates may have holes drilled in various locations to enable attachment to load application devices and mounting to the various components being tested. Variation on width or length should be ± 0.25 in. and ± 0.125 in. for thickness.

5.3 *Steel Strut or Channel,* of sufficient length and rigidity to span the distance over which load is being applied without yielding. Common 1-⅝ in. by 1-⅝ in. 12 gauge strut channel is acceptable.

5.4 *Load Application Devices*—Load may be applied by means of actuators, hydraulics, pulleys, cantilever arms, winches, dead load weight stacks or other mechanical means. Load cells or other force indicating transducers shall be used to verify the applied load when using mechanical devices for load application. The load cell or transducer shall be readable to the nearest 1 lb and an accuracy of 1 % of the applied load. Load cells and transducers shall be verified at least yearly in accordance with Practices E4.

5.5 *Various Connecting Hardware*—Eyebolts, chain, quick links, cable, clamps, carabiners, etc.

5.6 *Digital Level,* with a minimum 12 in. span, readable to 0.1°, and accurate to ±1.0°.

6. Product Installation and Mounting

6.1 Assemble the product in accordance with the manufacturer's written instructions using the provided hardware. Install the stand on the wooden test pole in accordance with the manufacturer's written instructions as well as using any necessary auxiliary safety devices that would be needed for installation under field conditions. Ensure that the foot platform for each product, if applicable, is perpendicular to the mounting pole and level relative to the ground. Foot platforms for fixed position and climbing treestands may be mounted with a slight upward initial angle to allow proper seating of the product on the wooden pole once the load has been applied. For sectional climbing sticks only a single section should be mounted to the pole. Tripods and towers should be placed on a level rigid surface.

6.2 Any aesthetic parts such as rail pad covers, hunting blinds or covers, shooting rails, interconnecting devices for the climbing treestands, or any other non-structural components are not required to be present during testing.

7. Load Application

7.1 Load application for test of components shall be applied perpendicular to the component being tested and parallel relative to the test pole. For static loading of steps, foot platforms, upper climber sections, or seats, the load shall be applied at 100 % of either the single or multiple user rated capacity. This load should be maintained for a period of 2 min. The stand shall then be unloaded. This initial loading sequence is deemed as a seating or shake down load. Following the initial seating process the load should then be increased in increments of 25 % and this process repeated until reaching the prescribed load rating for the test being evaluated or until the product can no longer support the applied load. All loading points should be maintained for a period of 2 min. When testing steps, it may be necessary to affix the loading plate to the step by means of clamping or other method to avoid shifting or movement of the plate.

7.2 When evaluating for corner or side stability the load shall be applied in increments of 80 and 100 % of the single user rated capacity or multiple user rated capacity for ladder stands and tripod/tower stands that are intended for multiple occupants.

7.3 During testing if the treestand, climbing stick, tower/tripod is unable to sustain the applied load for a period of 2 min then the test will be deemed as a failure. Signs of permanent deformation or other structural defects such as cracking will also constitute failure.

8. Static Load Testing

8.1 *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.

8.2 *Steps,* which are supported on two sides, shall be tested using a 3 in. by 5 in. 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 section.

8.3 *Cantilever Steps,* which are supported only on one side, shall be tested using a 3 in. by 5 in. 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 and even 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 also be used for loading.

NOTE 1—In the majority of cases for testing continuous and sectional climbing sticks the use of indirect means of loading such as mounted lever arms or pulleys may be necessary in order to apply the load in parallel with vertical pole and perpendicular to the step.

8.4 *Seats (1 Person Stands)* shall be tested using a 10 in. by 10 in. by 0.5 in. thick steel plate placed in the center of the seat. When testing seats, it is acceptable to drill a small hole in the center of the seat in order to attach the load application device to the steel plate if necessary.

8.5 *Seats – Separate Individual and Bench (2 Person Stands)* shall be tested using a 10 in. by 10 in. by 0.5 in. thick steel plate placed in the center of each seat. The two plates should be attached to an equalizer bar or other means to load the two seats simultaneously. If the seats are separate both seats shall also be tested individually at 1.5 × SUR.

8.6 *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 climbing or descending. The seat should also be tested in accordance with 8.4.

8.7 *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. The seat should also be tested in accordance with 8.4.

8.8 *Climbing Treestand – Upper Section (Type III)* 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 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 a Climbing Treestand – Type I using a 2 in. wide strut channel. If a closed frame configuration, then the extended structure would be tested in the same fashion as a Climbing Treestand – Type II with a 10 in. by 10 in. by 0.5 in. steel plate mounted to the center of the extended structure.

9. Installation Static Load Test (Ladder Treestands Only)

9.1 The ladder treestand shall be installed per the manufacturer's written instructions until reaching the installation step in the instructions in which the user will first climb the ladder. This would include the installation of (crisscross) straps and any other auxiliary safety devices provided by the manufacturer in order to stabilize the ladder from pivoting about the ladder axis and secure it to the tree at ground level before climbing (examples would include but not be limited to: jaw, truss, stabilizer bar(s) ratchet strap, rope, cables, cam buckle strap, etc.). Any securing hardware or straps that cannot be attached and secured while the user is standing on the ground is not to be installed. If the manufacturer requires alternative means which do not involve directly ascending the ladder treestand to secure it to the tree then this test may be omitted.

9.2 The initial position of the foot platform should be level at approximately 0° relative to the pole. A digital level with a 12 in. span shall be placed in the center of the foot platform on top of the loading plate with the length running from the front to back of the stand. The load shall be applied to the test subject at 100 % of the single user rated capacity in the same manner as described in Section 7 and 8.1. The stand shall then be unloaded and observed for any signs of permanent deformation or other structural defects. A reading would also be taken from the digital level at this time. This initial loading sequence is deemed as a seating or shake down load. Following the initial seating process the load shall be increased to 200 % of the single user rated capacity. Incremental loading at 25 % increments shall be omitted. Observations and measurements shall again be repeated after the stand is unloaded. In addition to the requirements per 7.3 if the platform results in a downward shift of greater than 10° then this will constitute failure.

10. Corner Stability – Ladder, Fixed Position, and Climbing Treestands

10.1 *Foot Platforms* shall be tested using a 5 in. by 10 in. by 0.5 in. thick steel plate placed in each of the four corners of the platform. Each corner shall be tested independently. For platforms that may not be rectangular or square adjust the plate to ensure full contact with the platform. In addition, foot platforms for climbing treestands should also be tested using a 10 in. by 10 in. by 0.5 in. placed at the center of the platform with the platform at both angles of +15° and –15°. During testing the stand should be observed for any sudden shifts or movements.