



Standard Test Method for Treestand Fall Arrest System¹

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1. Scope

1.1 This test method covers the determination of the load capacities for treestand fall arrest systems (FAS) and components or subsystems.

1.2 This test method addresses equipment used in hunting situations requiring personal protection against falls from heights and applies to the manufacturers, distributors, purchasers, and users of such equipment.

1.3 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.

1.4 *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.*

1.5 *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

[F1749 Specification for Fitness Equipment and Fitness Facility Safety Signage and Labels](#)

2.2 *ANSI Standard:*

[ANSI Z359.1 Safety Requirements for Personal Fall Arrest Systems, Subsystems and Components](#)³

2.3 *Other Document:*

[Individual Manufacturer's FAS Instruction](#)

3. Terminology

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

3.2 *Definitions:*

3.2.1 *anchorage, n*—~~a component/structure~~ component or structure, or both, to which a FBH—full body harness (FBH) is attached to the tree trunk.

3.2.2 *carabiner, n*—a link with a locking gate that is manually closed or automatically closes and is used to connect the tether of a full body harness (FBH) to an anchorage.

3.2.3 *climbing belt, n*—a strap/belt (or system of straps) which is fastened about the person in a manner so as to contain the torso and stabilize the users horizontal load while either working from a vertical position to attach treestands, climbing devices, and so forth, or during ascent/descent of tree or ladder. ~~A FBH may be constructed to additionally serve this function.~~

3.2.3.1 *Discussion—*

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 Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036.

A FBH may be constructed to additionally serve this function.

~~3.2.4 connecting hardware, n—includes snap hooks, D-rings, carabineers, links, anchorage hardware, and buckles. Any any hardware that connects the FAS components in series, thus creating a linear linkage along which the maximum arrest force (MAF) acts.~~

3.2.4.1 Discussion—

Includes snap hooks, carabineers, links, anchorage hardware, and buckles.

~~3.2.5 connector, n—a device that is used to connect components of a full body harness, fall restraint.~~

3.2.5.1 Discussion—

Connectors include but are not limited to tethers, snap hooks, carabiners, deceleration devices, and specialty systems such as self-retracting treestand safety ropes, ladder climbing systems, vertical treestand safety ropes and rope grab.

~~3.2.6 deceleration device, n—any mechanism, such as a rope grab, rip stitch tether, specially woven tether, tearing or deforming tether, automatic self-retracting treestand safety ropes, etc. which serves to dissipate energy during fall arrest or otherwise limit the maximum arrest force (MAF) on a user during a fall arrest.~~

~~3.2.7 deceleration distance, n—the additional vertical distance a falling user travels, excluding treestand safety rope elongation and free-fall distance before stopping, from the point at which the deceleration device begins to operate.~~

~~3.2.8 engineered products, n—strategically designed products by a professional to meet a specific need.~~

~~3.2.9 equivalent, a, n—alternative designs, methods or materials used to protect against a hazard which the manufacturer can demonstrate will provide an equal or greater degree of safety for the user than the methods, materials or designs specified in the standard.~~

~~3.2.10 fall arrest system (FAS), n—a system which is assembled for the purpose of arresting an accidental fall of its user. A FAS consists of a full body harness, lanyard, anchorage means, and connecting hardware. the complete collection of equipment and components that is designed to stop a fall in progress.~~

~~3.2.11 free fall, v—the act of falling before a fall arrest system (FAS) begins to apply force to arrest the fall.~~

~~3.2.12 flexible stretch tether, n—a full body harness tether that expands and contracts following the user’s movement.~~

~~3.2.13 full body harness (FBH), n—a component with a design of straps which is fastened about the person in a manner so as to contain the torso and distribute the fall arrest forces over at least the upper thighs, pelvis, chest, and shoulders with means for attaching it to other components or subsystems.~~

~~3.2.6 lanyards, n—a component consisting of a flexible strap, rope, or wire rope for connecting a component such as a FBH directly or indirectly to an anchorage.~~

~~3.2.14 maximum arrest force, n—the maximum peak dynamic force acting exerted on the body at the instant of an arrest of its free fall during fall arrest.~~

~~3.2.15 product safety sign or label, n—sign, label, hang tag or decal affixed to a product that provides safety information about that product.~~

~~3.2.16 rope grab, n—a device which travels on a connecting treestand safety rope and automatically, by friction, engages the treestand safety rope and locks so as to arrest the fall of a user.~~

3.2.16.1 Discussion—

A rope grab usually employs the principal of inertial locking, cam/level locking, or both (that is, Prusik, Klemheist, or Autoblock knots).

~~3.2.17 shock absorbers; safety symbols, n—a component used to reduce/absorb the energy gained by the user of the FAS when falling; graphic representation intended to convey a safety message without the use of words.~~

~~3.2.18 self-recovery point, n—the maximum distance a user can fall to minimize the risk of the user not having the ability to recover so that they are no longer suspended in a harness after a fall has been arrested.~~

~~3.2.19 suspension relief device, n—a device to allow relief of a person’s weight on the lower extremities if suspended in a harness, or allow the user to descend to the ground. The device is to help maintain circulation in the legs and help prevent suspension trauma (blood pooling).~~

3.2.19.1 Discussion—

The device is to help maintain circulation in the legs and help prevent suspension trauma (blood pooling).

3.2.20 *tether, n*—a component of a treestand full body harness consisting of a flexible strap which is attached to the dorsal area of the harness for the purpose of securing the FBH directly or indirectly to an anchorage to the tree trunk.

3.2.21 *thigh/leg straps, n*—the straps, which are integrated with the buttock strap (optional) and are routed from back to front across the groin area or loop around the upper part of the thigh.

3.2.22 *total fall distance, n*—the maximum vertical distance between a full body harness anchorage and the lowest extremity of the body before and after the fall is arrested including tether extension or drop distance, or both.

3.2.23 *treestand, n*—a 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.

3.2.24 *treestand safety rope, n*—component consisting of a flexible line for connection to a tree trunk at one end to hang vertically and which serves as a means for connecting other components of a fall arrest system.

4. Summary of Test Method

4.1 One system test shall consist of the testing of one individual fall arrest system unit for maximum arrest force (MAF) in accordance with the procedures in 7.1.

4.2 One system test shall consist of the testing of one individual fall arrest system unit for performance in accordance with the procedures in 7.2.

4.3 One system test shall consist of testing one individual fall arrest system unit for dynamic strength in accordance with the procedures in Section 8.

4.4 One climbing belt test shall consist of testing one individual climbing belt (for use only if FAS includes integral climbing belt) in accordance with the procedures in Section 9.

4.5 For each test a test weight torso having the physical properties described in 6.3 or 6.4 shall be dropped from an adequate elevation to simulate a free-fall motion from a treestand platform.

4.6 One static load test shall consist of testing one (1) individual Suspension Relief Device (for use only if FAS includes integral SRD) in accordance with the procedures in Section 10 of this standard.

5. Significance and Use

5.1 This test method is intended to measure the maximum arrest force and dynamic strength on treestand FAS and components or subsystems. This test is intended for program quality assurance and production quality control purposes. It is not intended to be an independent material or product acceptance test.

6. Apparatus

6.1 A vertical, rigid, round wood pole shall be used to mount the test weight torso and fall arrest system (FAS) such that pole deflection is minimized during testing.

6.2 The mounting pole diameter shall be 10 ± 1 in. and shall have a minimum height necessary for free fall to meet the provisions of 7.1.4, 7.2.4, 8.1.3, and 9.1.3.

6.3 The test weight torso used during the performance test shall weigh 220 ± 2 lb. The test weight torso shall be in accordance with ANSI Z359.1, Appendix B, Figs. 18 and 19.

6.4 The test weight torso used during the dynamic strength test shall weigh not less than 300 lb or shall equal the weight of the stated weight capacity of the test subject ± 3 lb, or whichever is greater. The torso shall also be designed such that it closely resembles the human shape and human center of gravity.

6.5 The test weight torso and test operator shall be raised to the required elevation by means of a man lift, forklift/basket, or other device capable of providing means to ascend to the proper elevation and provide a stable and safe working environment.

6.6 The free fall may be induced by manual or automatic means, and shall accomplish an unobstructed, continuous free fall of the test weight torso.

6.7 The instrumentation used to measure the MAF of the FAS should consist of a force sensor or load cell capable of measuring peak loads up to 3375 lb (15 kN). The recording data channel shall have a minimum sampling rate of 1000 samples per second and an active frequency response band up to a corner frequency of 100 Hz + 1.2 dB, -3 dB.

7. Performance Test Procedure

7.1 The following procedures shall apply to one individual unit of a given FAS with the test torso as given in 6.3 dropped “feet first.”

7.1.1 Read instructions accompanying the test subject to ascertain the proper procedure for use and donning. Secure the FAS anchorage to the mounting pole and the test torso in accordance with the device manufacturer’s instructions.