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An American National Standard

Standard Test Method for Treestand Fall Arrest System[1]

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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 and health practices and determine the applicability of regulatory limitations prior to use.*

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

~~2.2~~ [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 to which a FBH is attached to the tree trunk.

3.2.2 *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 *connecting hardware*, *n*—includes snap hooks, D-rings, carabineers, links, anchorage hardware, and buckles. 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 *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.

3.2.5 *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.

3.2.7 *maximum arrest force*, *n*—the maximum force acting on the body at the instant of an arrest of its free fall.

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~~[2] Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036.~~

[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.

3.2.8 *shock absorbers*, *n*—a component used to reduce/absorb the energy gained by the user of the FAS when falling.

3.2.9 *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).

3.2.10 *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.

3.2.11 *treestand*, *n*—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.

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.

7.1.2 The force sensor or load cell shall be placed in series with the full body harness and lanyard or anchorage. The total fall distance required is a distance of 6 ft or twice the maximum lanyard length or whichever is less. Any length added from the force sensor or load cell and any connecting hardware must be subtracted from the total fall distance.

7.1.3 Prior to performing the drop test, the anchorage shall be properly secured with a permanent stop placed directly under the anchorage to the backside of the pole to eliminate movement during test.

7.1.4 Attach the quick release mechanism to the test weight torso. The test weight torso shall be raised to an elevation such that its free fall begins at the point above the anchorage equal to the maximum length of the lanyard (if adjustable) or a distance which allows 6 ft of free fall, whichever is less. The test weight torso shall be located as close to the pole as practical or not greater than