



Designation: F2684/F2684M – 07 (Reapproved 2022)

Standard Test Method for Portable High Anchor Devices¹

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1. Scope

1.1 This test method applies to portable high anchor devices that may be used by rescue personnel during both training exercises and actual rescue operations.

1.2 This test method covers two mechanical tests, the Static Load Test and the Load Test for Failure.

1.3 Tests contained herein are destructive in nature. Portable high anchor devices subjected to any of these tests shall not be used in any way after testing except in evaluating the results of such testing.

1.4 The values stated in either SI units or inch-pound units are to be regarded separately as standard. The values stated in each system may not be exact equivalents; therefore, each system shall be used independently of the other. Combining values from the two systems may result in nonconformance with the standard.

1.5 This specification does not imply approval of any method of use of portable high anchor devices. In addition, the tests described are laboratory tests and do not duplicate field conditions. Furthermore, the test load values contained herein are not to be interpreted as the forces which a portable high anchor device may be subjected to, or may be expected to sustain, in actual field use.

1.6 *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.* See Section 6 on Hazards for safety warning.

1.7 *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.*

¹ This test method is under the jurisdiction of ASTM Committee F32 on Search and Rescue and is the direct responsibility of Subcommittee F32.01 on Equipment, Testing, and Maintenance.

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2. Referenced Documents

2.1 *ANSI Standard:*²

Z359.1-2007 American National Standard Safety Requirements for Personal Fall Arrest Systems, Subsystems and Components

3. Terminology

3.1 *Definitions:*

3.1.1 *portable high anchor, n*—a manufactured device designed to support human loads. Examples include, but are not limited to: davits, A-frames, tripods, quadpods, and cantilevered devices.

4. Significance and Use

4.1 *Static Load Test*—This test verifies that the portable high anchor device can support the design load without permanent deformation and continue to function in a safe manner.

4.2 *Load Test for Failure*—This test determines the force at which the portable high anchor device fails.

5. Apparatus

5.1 For both tests, the portable high anchor device shall be positioned on a flat concrete surface in the manner described by the manufacturer's instructions for use.

5.1.1 Where portable high anchor devices are designed to be affixed to a base or structural member that is not part of the device, the manufacturer shall provide a test base that most closely resembles the structural element to which the device is designed to be affixed. This test base shall be completely stable and shall be permitted to be bolted down to prevent movement during the test.

5.1.2 Portable high anchors designed to be attached to flanged rims of vessel openings would require a test base to simulate the flanged portal to which the device is designed to be affixed.

5.1.3 Portable high anchors such as beam clamps that are designed to be attached to a structural element would require a compatible section of the beam to which the device is designed to be affixed.

² Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, <http://www.ansi.org>.

6. Hazards

6.1 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.

7. Sampling, Test Specimens, and Test Units

7.1 Two samples of each model of portable high anchor device shall be required.

7.1.1 Samples of each model of each portable high anchor device shall be selected randomly for testing.

7.1.2 Test samples shall be new and in an unused condition and shall conform in all respects to the manufacturer's specifications for the model to be tested.

8. Procedure

8.1 *Testing Setup:*

8.1.1 The device shall be positioned according to manufacturer's instructions with all surface contact points securely seated before testing.

8.1.2 The device shall not be bolted, tied off, or affixed to the test base in any way unless required by the manufacturer for normal use.

8.1.3 The device shall be positioned as required in the lowest strength configuration of the device as specified by the manufacturer.

8.1.3.1 In most cases, the portable high anchor device will be weakest at its greatest (or highest) extension. However, many devices have multiple ways they can be used. Different rigging configurations may be stronger or weaker than others. It is intended that the testing be done in the configuration specified in the manufacturer's instructions that would yield the lowest strength results.

8.1.4 For all tests, the device shall be attached to the test machine at the load-bearing connecting point, in accordance with the manufacturer's instructions for use, with a suitable locking carabiner or other connector.

8.1.5 For all tests, all adjuncts designed by the manufacturer to be used in conjunction with the device, including but not limited to ropes, chains, webbing, rope grabs, and bolts, shall be in place.

8.1.6 Each point of contact with the test surface shall be marked in some manner to allow the ability to measure movement of the base during the test.

8.1.7 When testing davits or other cantilevered devices, the load-bearing connection point may move as the device deflects. Make provisions to keep the application of force vertical throughout the test.

8.1.7.1 For example, applying force with a hydraulic cylinder attached to a traveler on an "I" beam secured to the test base in line with the deflection.

8.2 *Static Load Test:*

8.2.1 The Static Load Test shall be set up as specified in 8.1.

8.2.2 A force shall be applied to the portable high anchor device at a rate of 25 ± 5 mm/min [1 ± 0.2 in./min], increasing to a minimum load of at least 22.3 kN [5013 lbf].

8.2.3 The force shall be held for 30 ± 1.0 s, and then the tension shall be completely released over a maximum of 1 min.

8.2.4 The force shall be reapplied immediately and shall be increased to the same maximum force as previously exerted and held for $5 \text{ min} \pm 10.0$ s before release.

8.2.5 At the conclusion of the Static Load Test described in 8.2, the sample portable high anchor device shall be inspected to determine pass/fail. A portable high anchor device shall be considered to fail if any of the following is observed:

8.2.5.1 If any of the load-bearing members remains deflected by more than 1 % of the length of the member from its original position.

8.2.5.2 If there is any cracking or breaking visible to the unaided eye.

8.2.5.3 If an adjustment or moving part becomes nonfunctional.

8.2.5.4 If any base contact point deviates by more than 150 mm [6 in.] from its original position.

8.2.5.5 Where there are multiple load-bearing connection points, the Static Load Test shall be repeated for each load-bearing connection point, or combination of load-bearing connection points, specified in the manufacturer's instructions.

8.3 *Load Test for Failure:*

8.3.1 The Load Test for Failure shall be set up as specified in 8.1.

8.3.2 The load-bearing connecting point used shall provide the lowest strength configuration of the device, as specified by the manufacturer.

8.3.3 Force shall be applied to the portable high anchor device at a rate of 25 ± 5 mm/min [1 ± 0.2 in./min], increasing until the failure point of the device.

8.3.4 A portable high anchor device shall be considered to fail when any of the load-bearing members fractures, collapses, or if any condition exists that causes a failure to support the load.

9. Report

9.1 *Static Load Test:*

9.1.1 The configuration of the attachment of the device to the testing machine shall be reported.

9.1.2 The deflection of load-bearing members shall be reported.

9.1.3 The functionality of adjustment and moving parts shall be reported.

9.1.4 Where applicable, the movement of base contact points from their original position shall be reported.

9.1.5 Any fracture or deformation of the load-bearing members shall be reported.

9.2 *Load Test for Failure:*

9.2.1 The configuration of the attachment of the device to the testing machine shall be recorded and reported.

9.2.2 The maximum force applied before any fracture, collapse, or any other condition that causes a failure to support the load, for each test, shall be reported.