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An American National Standard

Standard Specification for Pole Vault Box Collars[1]

This standard is issued under the fixed designation F2949; 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.

ε[1] NOTE—Editorially added footnotes regarding patent rights in August 2013.
ε[2] NOTE—Editorially corrected 9.1.3 in April 2014.

1. Scope

1.1 This specification covers minimum requirements of size, physical characteristics of materials, standard testing procedures, labeling and identification of pole vault box collars.[2]

1.2 *Units*—The values stated in SI units are to be regarded as the standard. The values given in parentheses are for information only.

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. Referenced Documents

2.1 *ASTM Standards:*[3]

F1292 Specification for Impact Attenuation of Surfacing Materials Within the Use Zone of Playground Equipment

3. Terminology

3.1 *Definitions:*

3.1.1 *box collar arms, n*—the two parts of the pole vault box collar to the left and right of the pole vault box. If the box collar has box collar wings, the wings are part of the box collar arms.

3.1.2 *box collar body, n*—the part of the pole vault box collar that pads the horizontal surfaces around the rim of the pole vault box and under the front buns.

3.1.3 *box collar cutout, n*—the opening in the pole vault box collar above the pole vault box.

3.1.4 *box collar wing, n*—the part of the box collar arm that extends down the inner sidewall of the pole vault box. The box collar wings provide protection and help to hold the box collar in place.

3.1.5 *front buns, n*—the parts of the pole vault landing system that pad the areas between the standard bases and around the pole vault box.

3.1.6 *front opening, n*—the opening at the front of the pole vault box nearest the approach runway.

3.1.7 *pole bend cavity, n*—the rearmost portion of the pole vault box and box collar cutout in front of the strike plate where the pole bends and rotates. The cavity is formed by the sidewalls and strike plate of the pole vault box, the rearmost part of the pole slide, and inside edges of the box collar cutout over the deepest part of the box where the pole slide meets the strike plate.

3.1.8 *pole slide, n*—the floor of the pole vault box that slants downward from its front boundary with the runway to its rear boundary with the back of the box. The tip of the vaulting pole slides on the pole slide to the strike plate.

3.1.9 *pole slide opening, n*—the space between the ends of the box collar arms at the front of the pole vault box collar and above the intersection of the runway with the pole slide.

3.1.10 *pole vault box, n*—the trough at the end of the pole vault runway. It has four sides: a downward sloping floor or pole slide, two sidewalls, and a strike plate. A vaulter directs the lower end of the vaulting pole into the pole vault box. The back wall of pole vault box stops the forward motion of the end of the pole while allowing the pole to rotate about its end as the vaulter leaves the ground and completes a vault.

3.1.11 *pole vault box collar, n*—a device used to offer impact protection to pole vaulters in and around a pole vault box.

[1] This specification is under the jurisdiction of ASTM Committee F08 on Sports Equipment, Playing Surfaces, and Facilities and is the direct responsibility of Subcommittee F08.67 on Pole Vault.

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[2] The user's attention is called to the possibility that compliance with this standard may require use of an invention covered by patent rights.

By publication of this standard, no position is taken with respect to the validity of any such claim(s) or of any patent rights in connection therewith. If a patent holder has filed a statement of willingness to grant a license under these rights on reasonable and nondiscriminatory terms and conditions to applicants desiring to obtain such a license, then details may be obtained from the standards developer.

[3] 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.

3.1.12 *sidewalls, n*—the left and right walls of the pole vault box.

3.1.13 *strike plate, n*—the back wall of the pole vault box; the stopboard.

4. Performance Requirements

4.1 The average peak acceleration calculated from the last two of a series of three impact tests for each impact test location on the pole vault box collar shall not exceed 200 g when impact tested in accordance with Section 9.

4.2 The average HIC score calculated from the last two of a series of three impact tests for each impact test location on the pole vault box collar shall not exceed 1150 when impact tested in accordance with Section 9.

5. Dimensions

5.1 *Minimum Dimensions*—A pole vault box collar shall be at least 122 cm (48 in.) wide and 146 cm (57½ in.) long. The distance from the rear edge of the box collar at its base to the rear edge of the box collar cutout shall be at least 38 cm (15 in.). At its uppermost surface, the box collar shall cover the upper edges of each sidewall of the box from the front of the box where the pole slide meets the runway to a point on the top edge of the sidewall no less than 20 cm (8 in.) forward of the top of the strike plate. The box collar arms shall extend forward at least 108 cm (42½ in.) from the base of the rear edge of the box collar cutout. (See Figs. 1 and 2.)[4,5]

5.2 *Maximum Thickness*—A pole vault box collar shall be no more than 10 cm (4 in.) thick.

5.3 *Maximum Dimensions of Box Collar Cutout*—At the box collar's uppermost surface in the vertical plane passing through the front edge of the pole slide, the horizontal distance from left to right across the box collar cutout shall be no more than 58 cm (23 in.). At the horizontal plane of the runway, the horizontal distance from left to right across the rear of the box collar cutout at the front of the bend cavity shall be no more than 29 cm (11½ in.). The width across the base of the rear opening of the box collar cutout shall be no more than 42 cm (16½ in.). The width across the base of the front opening of the box collar cutout shall be no more than 60 cm (24 in.). The box collar arms shall extend over the box beyond the upward extended plane of the adjacent sidewall of the pole vault box from a point no more than 20 cm (8 in.) forward from the top edge of the strike plate to the front of the box where the pole slide meets the runway. (See Figs. 1 and 2.)

5.4 *Minimum Dimensions of Box Collar Cutout*—At the box collar's upper most surface in the vertical plane passing through the front edge of the pole slide, the horizontal distance from left to right across the box collar cutout shall be no less than 56 cm (22 in.). At and above the horizontal plane of the runway, the horizontal distance from left to right across the rear of the box collar cutout at the front of the bend cavity shall be no less than 23 cm (9 in.). The width across the base of the rear opening of the box collar cutout shall be no less than 41 cm (16 in). The width across the base of the front opening of the box collar cutout shall be no less than 58 cm (23 in.). The front edge of the box collar that borders the strike plate shall not extend forward past the upward extended plane of the strike plate. The box collar arms shall not extend over the box beyond the upward extended plane of the adjacent sidewall of the pole vault box for a distance of at least 15 cm (6 in.) forward from the top edge of the strike plate. (See Figs. 1 and 2.)

5.5 To allow the pole to bend undisturbed, the front face of the box collar edge that borders the strike plate shall be tapered away from the box at an angle between 105 and 120 degrees from horizontal to match the angle of the strike plate.

5.6 To allow the pole to bend undisturbed, the inner faces of the box collar arms that border the sidewalls shall be tapered away from the box at an angle between 105 and 120 degrees from horizontal to match the angle of the sidewalls. This taper shall extend forward along the side of the pole bend cavity the full length of the pole bend cavity. (See Figs. 1 and 2.)

5.7 The body of the box collar shall extend rearward at least 30 cm (12 in.) under the front buns of the pole vault landing system.

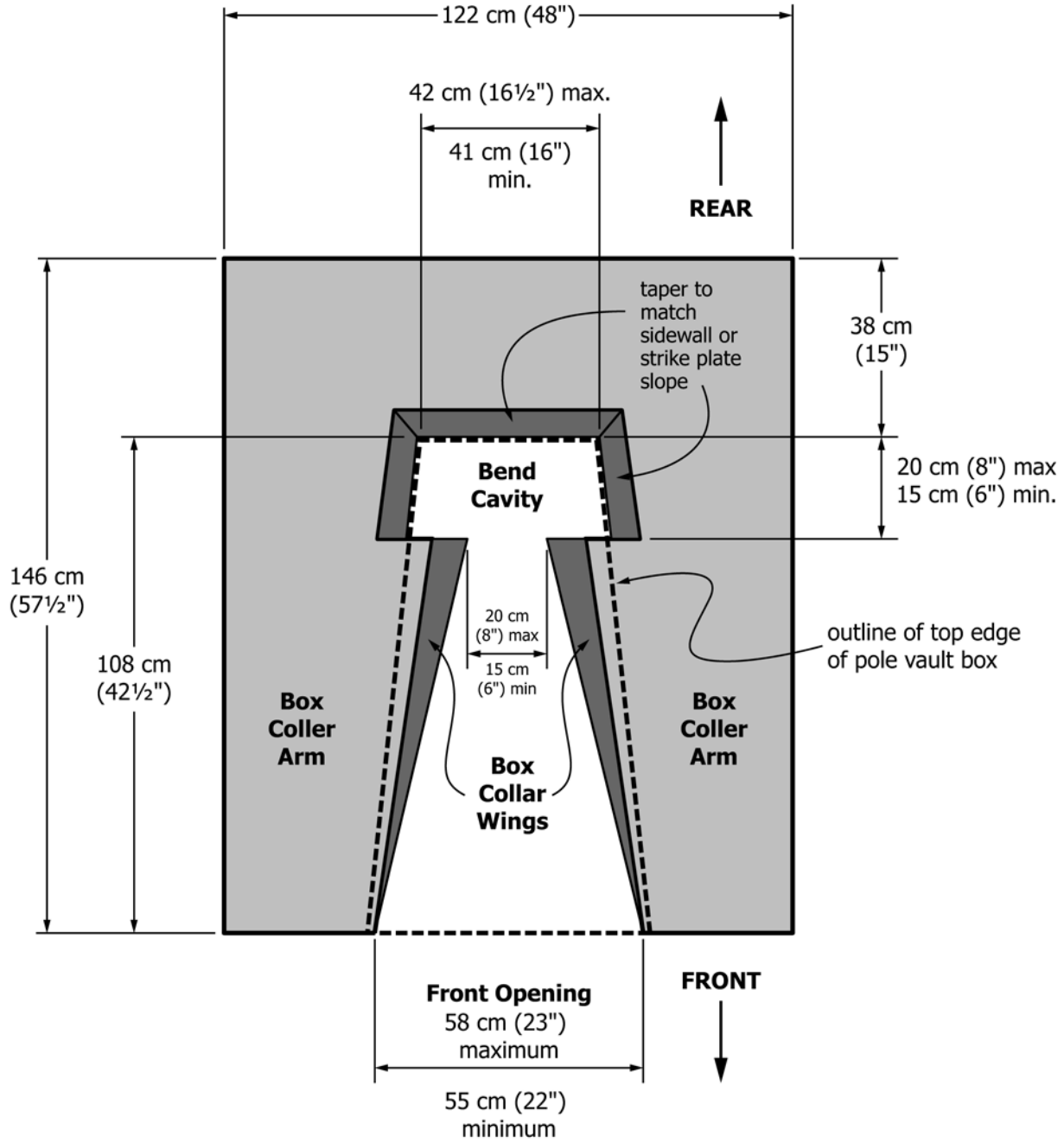
5.8 The body of the box collar shall extend laterally at least 15 cm (6 in.) under the front buns of the pole vault landing system.

5.9 The box collar wings shall be no more than 10 cm (4 in.) thick on the upper sidewalls of the box. The box collar wings shall extend no closer towards rear of the box than 15 cm (6 in.) from the strike plate. The horizontal distance between the wings of the box collar arms shall be no less than 15 cm (6 in.) when measured at the front edge of the bend cavity. The minimum horizontal distance between the wings of the box collar arms shall increase linearly from this point forward to the front opening of the box, where the pole slide meets the runway and where the opening between at the base of the box collar arms shall be no less than 58 cm (23 in.). The box collar wings shall allow room for a pole to slide freely down the interior edges of the pole vault box where the sidewalls meet the pole slide. The box collar wings shall extend down the sidewalls of the box to a point no lower than 10 cm (4 in.) from the pole slide at the front edge of bend cavity. The minimum distance between the lowermost edges of the wings of the box collar arms and the pole slide shall decrease linearly from this point forward to the front opening of the box, where the pole slide meets the runway and where the distance between the lower surface of the inner most edges of the box collar arms and the pole slide shall be no less than 3 cm (1 in.). (See Figs. 1 and 2.)

5.10 The box collar wings shall allow improperly planted poles to slide forward and downward into the bottom of the

[4] ASTM has been informed that a pole vault box collar manufactured to the specifications listed in Fig. 1 may be covered by a patent. ASTM is unable to verify this determination. Information regarding the alleged patent or the identification of an alternative(s) to the alleged patented item should be sent to ASTM International Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee, which you may attend.

[5] ASTM International takes no position respecting the validity of any patent rights asserted in connection with any item mentioned in this standard. Users of this standard are expressly advised that determination of the validity of any such patent rights, and the risk of infringement of such rights, are entirely their own responsibility.



NOTE 1—Minimum dimensions shown unless otherwise noted.

FIG. 1 Plan View of Pole Vault Box Collar

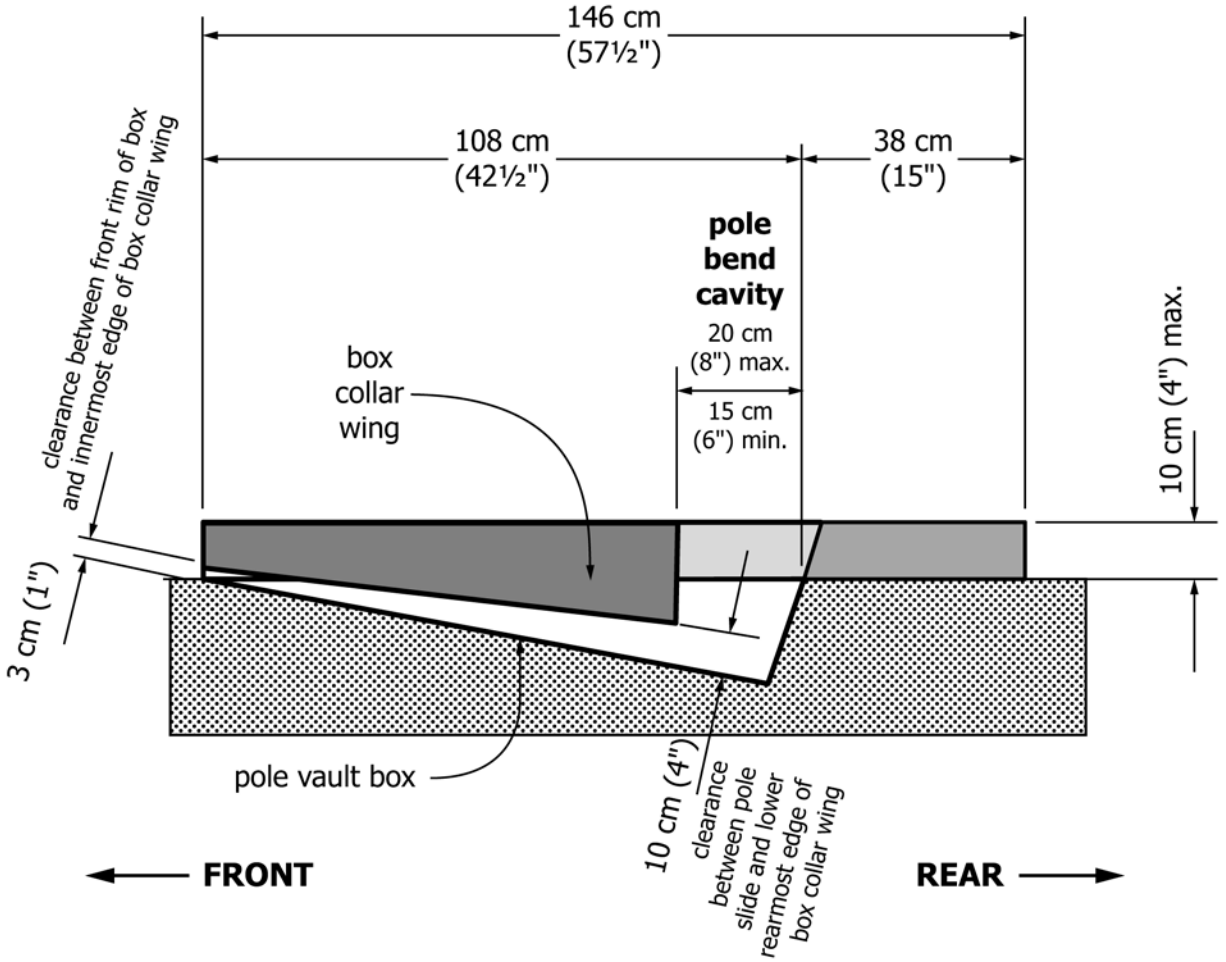
plant box. The wings shall conform to the inner walls of the plant box so as to provide protection and yet guide a poorly planted pole to the base of the strike plate at the bottom-rear of the box.

5.11 The bend cavity must allow the pole to bend into the corners formed by the sidewalls and the strike plate, and beyond. Some poles bend in a circular rotation back toward the runway.

5.12 The pole vault box collar shall be fixed to the ground or the inner walls during use.

6. Significance and Use

6.1 The dynamic data obtained with the procedures given in this specification measure the cushioning properties of the pole vault landing systems tested.



NOTE 1—Minimum dimensions shown unless otherwise noted.

FIG. 2 Cross-section View of Pole Vault Box Collar Along Centerline of Runway

6.2 The dimensions of the pole vault box collar are specified with respect to the dimensions of the pole vault box and the kinematics of typical pole movement in the pole vault box.

7. Test Apparatus

7.1 *Impact Test System*—The test apparatus described in Section 8 of Specification F1292 is used. A free-fall impact test system shall be used.

7.2 *Missile*—The missile used is described in section 8.2.1 of Specification F1292.

8. Conditioning

8.1 Pole vault box collars shall be tested under ambient conditions that match those of intended use.

9. Impact Testing Procedures

9.1 The pole vault box collar shall be tested using the impact testing procedures for Installed Surface Performance Test (Field Test) of Specification F1292 with the following conditions:

9.1.1 If the pole vault box collar is tested at its use site, it shall be tested in situ but with the front buns and any other encroaching components of the pole vault landing system removed so that the pole vault box collar only touches the pole vault box and the surfaces on which the box collar rests.

9.1.2 If the pole vault box collar is tested at other than its use site, it shall be tested while resting on a flat rigid surface.

9.1.3 The impacting missile shall be dropped from a height of 3.80 m (12 ft. 5½ in.) above the impact test location. The 3.80 m (12 ft. 5½ in.) drop height is measured from the upper surface of the pole vault box collar at the impact test location to the lowest point on the impacting missile.

9.1.4 Three consecutive impact tests shall be performed at each impact test location. The interval between impact tests shall be 1.5 ± 0.5 min. Calculate the average *g*-max and HIC score for each impact test location by averaging results from the second and third impacts.

9.1.5 Impact tests shall be completed on the pole vault box collar at the following four locations in any order:

9.1.5.1 On the centerline of the box collar 13 cm (5 in.) behind the rear edge of the box collar cutout;

9.1.5.2 On either box collar arm, 69 cm (27 in.) behind the front edge of the box collar arm and midway between the lateral edge of the box collar arm and its interior edge;

9.1.5.3 On either box collar wing, 10 cm (4 in.) forward of the rearmost edge of the box collar wing and midway between

the upper and lower borders of the wing. To conduct this impact test, the box collar must be removed from the pole vault box and placed on a flat rigid surface;

9.1.5.4 And, on a location selected by the equipment operator. If the location selected by the equipment operator is on either of the box collar wings, the box collar must be removed from the pole vault box and placed on a flat rigid surface.

10. Report

10.1 Report the following information:

10.1.1 *Requesting Agency Information:*

10.1.1.1 The name, address, and telephone number of the person or entity requesting the test.

10.1.2 *Testing Agency Information:*

10.1.2.1 The name, address, and telephone number of the testing agency.

10.1.2.2 The name and signature of the test operator.

10.1.2.3 Date(s) tests were performed.

10.1.2.4 Date of the report.

10.1.3 *Description of the Test Apparatus:*

10.1.3.1 Test equipment type and manufacturer.

10.1.3.2 Date of most recent accelerometer calibration certificate.

10.1.4 *Test Results*—The following shall be reported for each series of impact tests:

10.1.4.1 Whether the sample was dry, wet, or frozen.

10.1.4.2 The ambient air temperature measured after the final drop in each series.

10.1.4.3 The drop height and impact velocity or fall time.

10.1.4.4 The *g*-max and HIC value for each drop and the average *g*-max and HIC value for the last two drops of each series.

10.1.4.5 The location of each impact test on the pole vault box collar.

10.1.5 *Description of the Pole Vault Box Collar:*

10.1.5.1 The address of the test site.

10.1.5.2 The manufacturer and the model name or number of the pole vault box collar.

10.1.5.3 The dimensions of the pole vault box collar.

10.1.5.4 Names, addresses, and phone numbers of the manufacturer, supplier, and installer of the pole vault box collar, to the extent they are available

10.1.5.5 The condition of the pole vault box collar, including observations of excessive wear, rips, tears, moisture content, and so forth.

10.1.6 *Test Outcome*—A statement as to whether or not the test sites conformed to the performance requirements of this specification.

10.1.7 *Statement of Specificity*—The following statement: "The results reported herein reflect the performance of the tested pole vault box collar at the time of testing and at the temperature(s) and ambient conditions reported. Performance will vary with temperature, moisture content, and other factors."

11. Instructions and Labeling

11.1 Each pole vault box collar shall be provided with instructions for proper assembly and installation.

11.2 Each pole vault box collar shall be permanently labeled with the following items:

11.2.1 Identification of manufacturer,

11.2.2 Model designation,

11.2.3 Specific warning on installation, and

11.2.4 A warning label limiting the intended use.

12. Keywords

12.1 box collar; impact testing; pole vault; pole vaulting