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An American National Standard

# Standard Specification for Reins Used in Thoroughbred and Quarter Horse Racing[1]

This standard is issued under the fixed designation F2842; 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 The specification describes minimum performance criteria and describes test methods for reins for use in thoroughbred and quarter horse racing activities.

1.2 Except where noted, 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.*

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]

D6775 Test Method for Breaking Strength and Elongation of Textile Webbing, Tape and Braided Material

E4 Practices for Force Verification of Testing Machines

E6 Terminology Relating to Methods of Mechanical Testing

2.2 *Other Standards:*[3]

SAE J211 Recommended Practice for Instrumentation for Impact Tests – Requirements for Channel Class 1000

## 3. Terminology

3.1 The terminology relating to tensile testing in Terminology E6 applies to this specification. In addition, the following definitions will apply:

3.2 *Definitions:*

3.2.1 *breaking force*—the maximum load at which a tensile failure occurs.

3.2.2 *connecting hardware*—any hardware that connects the rein system components in series or in parallel along which the rein forces will act.

3.2.2.1 *Discussion*—Connecting hardware may include snap hooks, D-rings, loops, links, anchorage hardware, and buckles.

3.2.3 *grip*—the length of rein assembly normally covered with a non-slip material that is intended to be gripped by the rider.

3.2.4 *maximum breaking force*—a specified value that the breaking force shall not exceed in a prescribed test.

3.2.5 *minimum breaking force*—a specified value that the breaking force must meet or exceed in a prescribed test.

3.2.6 *primary rein system*—any natural or synthetic material or assembly designed for the purpose of controlling a horse while riding or driving.

3.2.7 *rein system section 1*—the portion of the rein system defined as the section between the mid-point of the grip and distal loop end of the rein system.

3.2.7.1 *Discussion*—Rein system section 1 may or may not include some type of secondary rein system designed to permit the rein system to remain functional should the primary rein system fail between the grip and connecting hardware or loop end of the rein.

3.2.8 *rein system section 2*—the portion of the rein system defined as the section between the mid-point of the grip of the right rein leading away from loop end to the mid-point of the grip of the left rein.

3.2.8.1 *Discussion*—Rein system section 2 may include a buckle assembly for connecting two single sections of rein. Rein system section 2 shall not include a secondary rein system but may include connecting hardware.

3.2.9 *secondary rein system*—any natural or synthetic material or assembly designed to activate and function after a failure of the primary rein system.

## 4. Significance and Use

4.1 All test procedures described in this specification are to be performed on new rein systems.

[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 F08.55 on Body Padding.

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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 SAE International (SAE), 400 Commonwealth Dr., Warrendale, PA 15096-0001, http://www.sae.org.

4.2 This specification is intended to measure the breaking force of the primary rein system and secondary rein system (if applicable) as well as the breaking force of rein section 2 when loaded in a tensile testing machine.

4.3 This specification is not meant to be all inclusive since special circumstances may occur that dictate the use of nonconforming procedures for evaluation of a rein system. These special circumstances and the requirements they establish cannot be totally anticipated and therefore must be considered on an individual basis.

## 5. Apparatus

5.1 *Testing Machines*—Machines used for tension testing shall conform to the requirements of Practices E4. The loads used in used in determining the breaking force of the reins shall be within the loading range of the tensile machine as defined in Practices E4.

5.2 *Gripping Devices:*

5.2.1 *General*—Various types of gripping devices may be used to transmit the measured load applied by the testing machine to the test specimens. To ensure axial tensile stress within the gage length, the axis of the test specimen should coincide with the center line of the heads of the machine. Any departure from this requirement may introduce bending stresses that are not included in the usual stress computation. It is essential that any gripping mechanism, whether it be a winch, wedge grip, or slip drum clamp, not cause any damage or stress concentration in the test material that might influence the breaking strength. Failure away from the area of the gripping mechanism is generally sufficient to demonstrate this.

5.2.2 *Shackle and Eye Bolts*—A shackle and eye-bolt loop assembly may be used at one end of the testing machine to attach the loop end of the rein system to the testing machine. Where the loop end of the rein passes over the shackle or eye bolt, the minimum effective diameter of the bearing surface must exceed 5 mm. The maximum load capacity of the shackle and eye bolt must at least be greater than the 10 kN (2250 lb).

5.2.3 *Tie Down Winch*—A tie down winch assembly may be used at one of the testing machine to attach the strap or grip section of the rein system to the testing machine. The tie down winch assembly shall have sufficient diameter that several revolutions of strap section may be wrapped around the winch rod and held in place during tensile loading.

5.2.4 *Wedge Grips*—Testing machines usually are equipped with wedge grips. These wedge grips generally furnish a satisfactory means of gripping long specimens of ductile material. If, however, for any reason, one grip of a pair advances farther than the other as the grips tighten, an undesirable bending stress may be introduced. When liners are used behind the wedges, they must be of the same thickness and their faces must be flat and parallel. For best results, the wedges should be supported over the entire lengths of the heads of the testing machine. This requires that liners of several thicknesses be available to cover the range of specimen thickness. For proper gripping, it is desirable that the entire length of the serrated face of each wedge be in contact with the specimen. It is essential that the rein system is uniformly gripped when the load is applied.

5.2.5 *Split Drum Clamps*—Split drum type clamping systems that conform to Specification D6775 may be used to clamp the rein systems in the testing machine. Ensure that the clamps are positioned such that they are facing opposite of each other in order to ensure that the applied forces are acting through the rein system and no off-axis loading is occurring.

5.3 *Recording Equipment*—The recording equipment shall meet the following criteria:

5.3.1 *Force Transducer*—A load cell or force transducer shall be mounted at the top or bottom of the support assembly in such a manner that it shall be capable of reporting the magnitude of the axial tensile force applied to the rein system throughout the entire duration of the testing sequence. The load cell shall be capable of measuring a force of at least 13.3 kN (3000 lb).

5.3.2 *Force Recording*—The force applied to the rein system shall be recorded using digital data processing that complies with the requirements of SAE J211. The minimum sampling rate shall not be less than 100 Hz and the resolution of the data acquisition system shall not be less than 12 bits (including sign).

5.3.3 *Signal filtering*—Analog or digital filtering of the force data channel shall comply with the requirements of SAE J211.

## 6. Performance Requirements

6.1 When the rein section 1 samples are tested according to the procedures described in Section 9, the maximum breaking force for the primary rein system shall be greater than 2.22 kN (500 lb). If the primary rein section breaks at a maximum force of less than 2.22 kN (500 lb), then the rein shall be considered to fail this performance requirement. Upon breakage of the primary rein system, a secondary rein system shall be actuated and the maximum breaking force for the secondary rein system of rein section 1 shall be greater than 2.22 kN (500 lb) when tested according to the procedures described in Section 9.

6.2 When the rein section 2 samples are tested according to the procedures described in Section 9, the breaking force shall not exceed 3.3 kN (750 lb).

## 7. Sampling and Test Schedule

7.1 A total of six complete rein systems as offered for sale shall be required for testing to this specification. Each rein shall be prepared in accordance with the procedures in 9.1 and tested in accordance with the procedures described in 9.2.

7.2 Testing must begin within ten minutes after the test sample is removed from the conditioning environment.

## 8. Conditioning

8.1 Three-rein systems shall be conditioned for a period of not less than four hours at laboratory conditions which shall be at a temperature of 21 ± 3°C (70 ± 5°F) and a relative humidity of 50 ± 15 %. Record the temperature to the nearest degree and the relative humidity to the nearest percent at the time of testing on the report form for each test series.

8.2 Three-rein systems shall be conditioned by fully immersing in a 2 % chlorhexidine solution at a temperature of 19

± 4°C (66 ± 7°F) and diluted at a ratio of 20:1 (water : disinfectant). Sufficient solution shall be prepared to fully immerse the rein section. Each rein section shall be immersed in the disinfectant cleaner solution for a period 60 ± 15 s. Prior to testing, the rein system shall be removed from the disinfectant cleaner solution and any excess cleaner shall be allowed to drip off the rein system prior to mounting on the test fixture.

8.3 All tests shall be performed under the conditions described in 8.1.

## 9. Test Methods

9.1 *Sample Preparation:*

9.1.1 Prepare the test samples by isolating the bit end of the reins and the mid-point of the rubber grip section of each rein. These samples shall be designated as rein section 1 samples.

9.1.1.1 The length of the rein section 1 sample shall be sufficient to include both the primary rein system and the secondary rein system (if applicable) and shall not compromise the integrity of either the primary or the secondary system.

9.1.2 Prepare an additional set of test samples using the remaining section of rein samples that were not used as rein section 1 test samples as prepared in 9.1.1. These samples shall be designated as rein section 2 samples.

9.1.2.1 The rein section 2 samples shall be prepared by cutting the section 2 samples at the geometric middle of the reins or separating the tail ends of the rein. For most test samples, the location of a buckle assembly represents the geometric middle of the reins. If the rein does not have a buckle assembly, measure the total length of the rein system 2 (that is, the complete left and right rein sections after preparation of the rein section 1 samples). Half of this length represents the geometric middle of the mid-rein section.

9.2 *Sample Testing:*

9.2.1 *Rein Section 1 Sample Testing:*

9.2.1.1 Place the sample in the testing machine, ensuring that the integrity of the primary and secondary systems is not compromised as a result of the gripping of the test sample in the testing machine.

9.2.1.2 If the rein system includes a secondary rein system, connect the secondary rein system according to the manufacturer's instructions.

9.2.1.3 After the sample is placed in the test machine, complete the zeroing procedure before testing begins. Start applying the load to the test sample. The rate of loading shall be 75 ± 25 mm/min (3 ± 0.1 in/min) when the rate is under the operator control. Apply the load until a failure occurs. This failure will normally be indicated by a substantial reduction from a maximum load and a noise or visual indication that the primary rein system has broken. The maximum value obtained during this part of the test represents the maximum breaking force of the primary rein system of rein section 1.

9.2.1.4 If the rein system includes a secondary rein and if the breaking force is less than specified in 6.1 then continue to apply the load at a maximum rate of 75 ± 25 mm/min until a substantial reduction from the maximum reading occurs a second time. This reduction will normally be accompanied by a noise or visual indication that the secondary rein system has broken. The maximum value obtained during this part of the test represents the maximum breaking force of the secondary rein system of rein section 1.

9.2.1.5 Measure the distance from the point of attachment to the rein or grip assembly opposite the loop end to the point of failure. If the rein section 1 failure occurs within a distance equivalent to six times the width of the rein system from the point of attachment the test shall be discarded and repeated using an alternative gripping methodology. Loop end failures that are adjacent to a shackle or eyebolt are permissible.

9.2.2 *Rein Section 2 Sample Testing:*

9.2.2.1 Place the sample in the testing machine, ensuring that the integrity of the rein system is not compromised as a result of the gripping of the test sample in the testing machine.

9.2.2.2 After the sample is placed in the test machine, complete the zeroing procedure before testing begins. Start applying the load to the test sample. The rate of loading shall be 75 ± 25 mm/min (3 ± 0.1 in/min) when the rate is under the operator control. Apply the load until a failure occurs. This failure will normally be indicated by a substantial reduction from a maximum load and a noise or visual indication that the primary rein system has broken. The maximum value obtained during this part of the test represents the maximum breaking force of rein section 2.

9.2.2.3 Measure the distance from the point of attachment of the rein and the grip assembly to the point of failure. If the rein section 2 failure occurs within a distance equivalent to 6 times the width of the rein system from the point of attachment the test shall be discarded and repeated using an alternative gripping methodology.

## 10. Reporting

10.1 *Record of Test*—The manufacturer, retailer, or importer shall maintain complete test records and test summary reports for all certification testing, whether performed by the manufacturer or an independent laboratory. The records and force-time data can be stored on paper, electronically, or on photographs.

10.2 *Laboratory Record of Test*—The test laboratory must keep an original paper copy of each test summary with the signature of the technician who performed the test, for a period of no less than five years.

10.3 *Test Summary*—The test summary shall include the following information:

10.3.1 Name and location of the test laboratory,

10.3.2 Signature and printed/typed name of the technician who performed the test,

10.3.3 Date of testing,

10.3.4 A list of all laboratory equipment used for testing,

10.3.5 Manufacturer's name and location,

10.3.6 Model designation of each rein system,

10.3.7 Identifying code for each sample of rein system tested,

10.3.8 Observed temperature and the relative humidity of the laboratory at the time of testing,

10.3.9 A summary of the results from the maximum breaking force tests and labeling evaluation,

10.3.10 Parameters and measured results of the maximum breaking force tests in sequence stating the identifying code of the sample, maximum force at failure, and location of failure, and

10.3.11 Paper copies, photographs or scanned images of all product marking, labeling and instructional literature.

## 11. Certification

11.1 These test methods permit self-certification. It is recommended that each manufacturer employ an independent test laboratory on an annual basis to test each model of rein system offered for sale by the manufacturer.

## 12. Product Marketing

12.1 Each rein system shall be permanently labeled with the following information:

12.1.1 Identification of the manufacturer including name and address of the manufacturer, or if a private labeler is on the label, the name and address of the private labeler. An internet or website address shall not be considered an acceptable address,

12.1.2 Month and year of manufacture, and

12.1.3 Model designation.

12.2 *Warning Labels*—Each rein system shall be permanently labeled with information for the user stating the limits of protection afforded by the rein system. Such language must convey that serious injury or death can occur despite the use of a rein system, and that no rein system can prevent all injuries.

12.3 Each rein system shall include a label stating "For maximum performance, this rein system must be properly installed, be free from rips or tears, and remain securely in position."

12.4 Care instructions including a warning concerning improper cleaning agents, paint, or other factors affecting rein system integrity or performance, or both.

## 13. Instructional Literature

13.1 Instructions accompanying the rein system must include at least the following information:

13.1.1 A warning concerning improper cleaning agents, paint, or other factors affecting rein system integrity or performance, or both,

13.1.2 Each rein system shall be provided with instructions that describe the proper installation and maintenance of the rein system,

13.1.3 Notification that the rein system meets the minimum requirements of this ASTM standard specification for rein systems for equine racing provided it has not been reconditioned or altered in any way, and

13.1.4 Instructions to replace the rein system if damaged, or if the condition is in doubt.

## 14. Precision and Bias

14.1 *Precision*—The precision of this specification has not been determined.

14.2 *Bias*—The bias of this specification includes quantitative estimates of the uncertainties of the dimensional measuring devices, the calibrations of the test equipment and the skill of the operators. At this time, the statements on bias shall be limited to documented performance of particular laboratories.

## 15. Keywords

15.1 breaking force; rein system