



Standard Specification for Reins Used in Thoroughbred and Quarter Horse Racing¹

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.*

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.

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.

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.

Current edition approved Dec. 15, 2011. Published January 2012. Originally approved in 2010. Last previous edition approved in 2010 as F2842 – 10. DOI:10.1520/F2842-11.

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.

4.3 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 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 $21 \pm 3^{\circ}\text{C}$ ($70 \pm 5^{\circ}\text{F}$) and a relative humidity of $50 \pm 15\%$. 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 $19 \pm 4^{\circ}\text{C}$ ($66 \pm 7^{\circ}\text{F}$) 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