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Standard Specification for Rubber Seals—Splice Strength[1]

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1. Scope

1.1 This specification covers the strength and appearance of the splice in vulcanized rubber-seal material of any size, type, or cross-sectional shape.

1.2 Many types and varieties of seals are used in services of all degrees of severity. In some instances, hollow tubing is spliced and used as a seal. It is also possible to have seals of irregular cross sections, or made of polymers which, due to their nature, or not conducive to a high-strength splice, although they will perform satisfactorily in their intended application.

1.3 Seals are exposed in service to a wide variety of media at various temperatures. The effect of such media on the spliced area must be considered. Details of the test procedures to evaluate the effect of the media shall be agreed upon by the purchaser and seller as part of the purchase contract.

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:*

D 412 Test Methods for Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers—Tension[2]

3. Classification

3.1 In order to provide for the various types of seals and requirements, three classes of splices have been established:

3.1.1 *Class 1* covers splices in seals not having a solid cross section but an irregular cross section, of a polymer not conducive to a high-strength splice, or for moderate service requirements.

3.1.2 *Class 2* covers splices in solid seals of a shape and composition conducive to high-strength splices. This class covers applications requiring high-splice strength or service requirements.

3.1.3 *Class 3* covers splices in round solid seals of a composition conducive to extra-high-strength splices. This class covers applications requiring extra-high-splice tensile and bend strength due to difficult service requirements. Class 3 tests of seals in other than round shapes shall be agreed upon by the purchaser and manufacturer using this specification as a guide.

3.2 In the event that an application requires special consideration and values, these values can be indicated on the part print, using this specification as a guide.

4. Workmanship

4.1 Upon visual inspection, the splice shall not show any signs of separation.

5. Physical Requirements

5.1 When tested in accordance with the procedure outlined in Section 7, the splice shall meet the following requirements:

	Class 1	Class 2	Class 3[A]
Ultimate elongation for the seal area, %	20	50	100

[A] In qualitative nondestructive test, Class 3 seals shall also meet the requirements in 7.2.3 and 7.2.4.

6. Significance and Use

6.1 These tests are used quantitatively, for evaluation, approval, and as a referee method. Also these tests are used qualitatively for quality control purposes.

7. Test Methods

7.1 *Quantitative Destructive Test*:

7.1.1 The method described herein is for a quantitative-type destructive test to be used for relative evaluation, approval, and as a referee method in the event of a dispute.

7.1.2 When the dimensions of the seal permit it, prepare elongation specimens in accordance with Test Methods D 412 in such a manner that the splice area shall fall within the test area (Dimension L of Fig. 2, Test Methods D 412). When a bias-cut splice is made, cut the elongation specimen from the seal in such a manner that the "line of splice" shall run straight across the test specimen and perpendicular to the edges of the width of the test specimen (Dimension L of Fig. 2, Test Methods D 412).

7.1.3 In the event that the seal cross section is too small to prepare a suitable standard specimen, employ the same method normally used to establish the ultimate tensile and elongation

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[2] *Annual Book of ASTM Standards*, Vol 09.01.

of the seal to establish the elongation of the splice.

7.2 *Qualitative Nondestructive Test*:

7.2.1 For a nondestructive type test such as used for production quality control, stretch the spliced area of the seal itself. Determine the elongation of the joints by measuring the separation of two marks placed 75 mm (3 in.) apart with the splice in the center of the marked area.

7.2.2 The minimum required elongation for the nondestructive seal test shall be as indicated in Section 5, or on the part print.

7.2.3 Class 3 seals while elongated 100 % shall be rotated in the splice area for a minimum of 180° in each direction.

7.2.4 Class 3 seals in the unstretched splice area shall be subjected to bend test—a maximum of 270° and a minimum of 180°. The rod diameter used to bend the gasket shall be equal to the cross-sectional diameter of the gasket.

8. Precision and Bias

8.1 A precision and bias statement is not necessary for this specification as it is a listing of material quality criteria.

9. Keywords

9.1 rubber seals; splice strength