



Standard Specification for Rubber Seals Contacting Liquids in Solar Energy Systems¹

This standard is issued under the fixed designation D 3832; 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 This specification covers the general requirements for materials used in preformed rubber seals that contact the circulating liquid in solar energy systems. Particular applications may necessitate other requirements that would take precedence over these requirements when specified.

1.2 This specification does not include requirements pertaining to the design, fabrication, or installation of the seals.

2. Referenced Documents

2.1 ASTM Standards:

D 412 Test Methods for Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers—Tension²

D 471 Test Method for Rubber Property—Effect of Liquids²

D 1149 Test Method for Rubber Deterioration—Surface Ozone Cracking in a Chamber²

D 1229 Test Method for Rubber Property—Compression Set at Low Temperatures²

D 1349 Practice for Rubber—Standard Temperatures for Testing²

D 1415 Test Method for Rubber Property—International Hardness²

D 1566 Terminology Relating to Rubber²

D 2137 Test Methods for Rubber Property—Brittleness Point of Flexible Polymers and Coated Fabrics²

D 3182 Practice for Rubber—Materials, Equipment, and Procedures for Mixing Standard Compounds and Preparing Standard Vulcanized Sheets²

D 3183 Practice for Rubber—Preparation of Pieces for Test Purposes from Products²

2.2 Other Standards:

RMA Handbook—Rubber Products: Molded, Extruded, Lathe Cut, and Cellular³

3. Terminology

3.1 Refer to the definitions of terms in Terminology D 1566.

¹ This specification is under the jurisdiction of ASTM Committee D11 on Rubber and is the direct responsibility of Subcommittee D11.36 on Seals.

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² Annual Book of ASTM Standards, Vol 09.01.

³ Available from the Rubber Manufacturers Association (RMA), 444 Madison Ave., New York, NY 10022.

4. Classification

4.1 Types:

4.1.1 *Type C*, intended for use in cold climates (below – 10°C in winter).

4.1.2 *Type W*, intended for use in warm climates (above – 10°C in winter).

4.2 Grades:

4.2.1 Grade designations represent differing degrees of hardness in accordance with Test Method D 1415 as follows:

4.2.1.1 *Grade 3*, hardness of 30 ± 5 .

4.2.1.2 *Grade 4*, hardness of 40 ± 5 .

4.2.1.3 *Grade 5*, hardness of 50 ± 5 .

4.2.1.4 *Grade 6*, hardness of 60 ± 5 .

4.2.1.5 *Grade 7*, hardness of 70 ± 5 .

4.2.1.6 *Grade 8*, hardness of 80 ± 5 .

NOTE 1—The grade to be used in a particular application depends on the design of the seal and must be specified by the designer.

4.3 Classes:

4.3.1 Seals shall be classified as follows:

4.3.1.1 *Class A*, seals for use with aqueous liquids at a maximum service temperature of 100°C.

4.3.1.2 *Class AT*, seals for use with aqueous liquids at a maximum service temperature above 100°C.

4.3.1.3 *Class N*, seals for use with nonaqueous liquids.

NOTE 2—Aqueous liquids include water and antifreeze solutions.

5. Ordering Information

5.1 Orders for seals under this specification shall include the following information:

5.1.1 ASTM designation and year of issue,

5.1.2 Type, grade, and class,

TABLE 1 Elongation Requirements for Rubber Seals in Liquid Heat-Transport Systems

Grade	Ultimate Elongation, min, %
3	350
4	300
5	250
6	200
7	150
8	100