



Standard Test Method for Creep Properties of Adhesives in Shear by Tension Loading (Metal-to-Metal)¹

This standard is issued under the fixed designation D2294; 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 test method covers the determination of the creep properties of adhesives for bonding metals when tested on a standard specimen and subjected to certain conditions of temperature and tensile stress in a spring-loaded testing apparatus.

1.2 This test method is applicable to the temperature range from -55 to $+260^{\circ}\text{C}$ (-67 to $+500^{\circ}\text{F}$).

1.3 The values stated in SI units are to be regarded as standard. The values given in parentheses are for information only.

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:*²

[D638 Test Method for Tensile Properties of Plastics](#)

[D907 Terminology of Adhesives](#)

[D1002 Test Method for Apparent Shear Strength of Single-Lap-Joint Adhesively Bonded Metal Specimens by Tension Loading \(Metal-to-Metal\)](#)

2.2 *ASTM Adjuncts:*

Tension Creep Test Apparatus³

3. Terminology

3.1 *Definitions*—Many terms in this test method are defined in Terminology [D907](#).

¹ This test method is under the jurisdiction of ASTM Committee [D14](#) on Adhesives and is the direct responsibility of Subcommittee [D14.80](#) on Metal Bonding Adhesives.

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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 Detailed working drawings for the construction of the tensile creep test apparatus are available from ASTM International Headquarters. Order Adjunct No. ADJD2294.

4. Significance and Use

4.1 This test method is useful in research and development for comparison of creep properties of adhesives, particularly as those properties are affected by changes in adhesive formulation or expected service conditions, including temperature, moisture level, and duration of loading.

4.2 The relative size and simplicity of design of the spring-loaded apparatus permits easy portability and transfer from one environment to the next without disturbing static loads.

4.3 The relative simplicity of design with inexpensive materials permits replication of creep tests at relatively low costs.

5. Apparatus

5.1 *Tension Creep Test Apparatus*, as shown in [Fig. 1](#).³ It shall consist of a hollow loading chamber, a solid extension rod with provisions for attachment of test specimens, and a high-temperature-resistant spring. A testing machine conforming to the requirements of Test Method [D638](#) is required to apply the static load.

5.2 *Microscope*, calibrated, having 100 \times magnification.

6. Test Specimens

6.1 Test specimens shall conform to the shape and dimensions shown in [Fig. 2](#). These specimens are similar to the tension lap shear specimens described in Test Method [D1002](#), except for the holes as shown in [Fig. 2](#).

6.2 Test at least three specimens for each set of standard conditions of load, time, and temperature.

6.3 A complete description of these specimens and the method of preparation is given in Sections 6, 7, and 8 of Test Method [D1002](#).

6.4 For creep measurements, polish the 12.7-mm ($\frac{1}{2}$ -in.) edges of the bonded area of each test specimen, and scribe with three fine lines across the bondline ([Fig. 1](#)).

7. Procedure

7.1 Attach the test apparatus to a testing machine and condition to a prescribed test temperature. Place a specimen