Designation: ~~D2095 – 96 (Reapproved 2008)~~ D2095 – 96 (Reapproved 2015)

Standard Test Method for Tensile Strength of Adhesives by Means of Bar and Rod Specimens[1]

This standard is issued under the fixed designation D2095; 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 relative tensile strength of adhesives by the use of bar- and rod-shaped butt-joined specimens under defined conditions of preparation, conditioning, and testing. This test method is applicable to the testing of adhesives with various adherend materials in either similar or dissimilar combinations.

NOTE 1—An alternative test method for determining the tensile strength of adhesives is Test Method D897.

1.2 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]

D897 Test Method for Tensile Properties of Adhesive Bonds
D907 Terminology of Adhesives
D2094 Practice for Preparation of Bar and Rod Specimens for Adhesion Tests
E4 Practices for Force Verification of Testing Machines
E6 Terminology Relating to Methods of Mechanical Testing
E104 Practice for Maintaining Constant Relative Humidity by Means of Aqueous Solutions

3. Terminology

3.1 Many of the terms in this standard are defined in Terminology D907.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *tensile strength of an adhesive, n*—the maximum tensile stress which it is capable of sustaining. Tensile strength is calculated from the maximum load during a tension test carried to rupture and the original cross-sectional area of the specimen (see Terminology E6).

4. Significance and Use

4.1 Tension tests provide reasonably accurate information with regard to the tensile strength of adhesives. Tensile strength data may be suitable for specification acceptance, service evaluation, manufacturing control, research, and development. Tension tests are not considered significant for applications differing from the test in rate, direction, and type of loading.

5. Apparatus

5.1 *Testing Machine*—A testing machine capable of maintaining a specified rate of loading, with the error for indicated loads that are to be measured not exceeding ±1 % and the load-indicating mechanism essentially free of inertial lag at a specified rate of loading. Verify the accuracy of the testing machine in accordance with Practices E4. Ensure that the testing machine is provided with the following:

[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.
Current edition approved ~~April 1, 2008~~April 1, 2015. Published ~~April 2008~~April 2015. Originally approved in 1962. Last previous edition approved in ~~2002~~2008 as D2095 – 96 ~~(2002).~~(2008). DOI: ~~10.1520/D2095-96R08.~~10.1520/D2095-96R15.

[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~~standard's Document Summary page on the ASTM website.

5.1.1 *Fixed Member*—A fixed or essentially stationary member carrying one attachment fixture.

5.1.2 *Movable Member*—A movable member carrying a second attachment fixture.

5.1.3 *Attachment Fixtures*—Self-aligning type fixtures for holding a specimen between the fixed member and the movable member. Ensure that the fixtures are attached to the fixed and movable members in such a way that they will move into alignment as soon as load is applied, so that the long axis of the test specimen will coincide with the direction of the applied load. A design for fixtures that has proven satisfactory is shown in Fig. 1 and Fig. 2.

5.2 *Conditioning Room or Desiccators*—A conditioning room capable of maintaining a relative humidity of 50 ± 2 % at 23 ± 1°C (73.4 ± 1.8°F) or desiccators containing a saturated salt solution (Note 2) to give the same relative humidity and temperature.

NOTE 2—A saturated salt solution of calcium nitrate will give approximately 51 % relative humidity at 24.5°C (see Practice E104).

6. Test Specimens

6.1 *Description and Preparation*—Bar- or rod-type specimens. Refer to Practice D2094 for the design of the specimens and the procedures used in preparing them.

6.2 *Number of Specimens*—Test a minimum of five specimens for each test condition.

7. Conditioning

7.1 Condition all specimens, except those in which both adherends are metals, prior to testing for at least 40 h at 50 ± 1°C (73.4 ± 1.8°F). Metal-to-metal bonds can be tested as soon as the specimen has reached an equilibrium temperature of 23 ± 1°C (73.4 ± 1.8°F) after curing.

7.2 Special conditioning procedures may be used by agreement between the purchaser and the manufacturer when the tensile strength of the adhesive at other conditions is to be determined.

8. Procedure

8.1 Place the specimen in the testing machine (see Fig. 2), using steel dowel pins and fixtures such as those described in 5.1.3 and start the loading. Conduct tests at other than room temperature with a suitable temperature-controlled test chamber enclosing the fixtures and test specimen while assembled in the testing machine.

8.2 *Speed of Testing*—Apply the load to the specimen at the rate of 17 to 20 MPa/cm^2 (2400 to 2800 psi) of bond area per min, or, if rate of loading is measured as crosshead motion, set the testing machine to obtain the foregoing rate of loading.

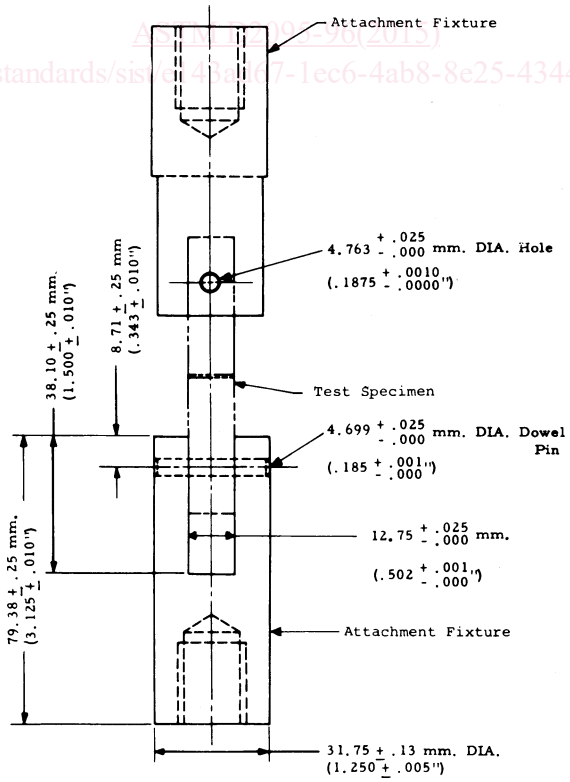

FIG. 1 Test Specimens and Attachment Fixtures