INTERNATIONAL

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Standard Test Method for Tensile Properties of Adhesive Bonds[1]

This standard is issued under the fixed designation D 897; 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.

This standard has been approved for use by agencies of the Department of Defense.

~~ε1 NOTE—An editorial correction was made in 8.2 in July 2006.~~

INTRODUCTION

The accuracy of the results of strength tests of adhesive bonds will depend on the conditions under which the bonding process is carried out. Unless otherwise agreed upon by the manufacturer and the purchaser, the bonding conditions shall be prescribed by the manufacturer of the adhesive. In order to ensure that complete information is available to the individual conducting the tests, the manufacturer of the adhesive shall furnish numerical values and other specific information for each of the following variables:

(*1*) Procedure for preparation of surfaces prior to application of the adhesive, including the cleaning and drying of metal surfaces, and special surface treatments which are not specifically limited by the pertinent test method.

(*2*) Complete mixing directions for the adhesive.

(*3*) Conditions for application of the adhesive including the rate of spread or thickness of film, number of coats to be applied, whether to be applied to one or both surfaces, and the conditions of drying where more than one coat is required.

(*4*) Assembly conditions before application of pressure, including the room temperature, length of time, and whether open or closed assembly is to be used.

(*5*) Curing conditions, including the amount of pressure to be applied, the length of time under pressure, and the temperature of the assembly when under pressure. It should be stated whether this temperature is that of the bond line, or of the atmosphere at which the assembly is to be maintained.

(*6*) Conditioning procedure before testing, unless a standard procedure is specified, including the length of time, temperature, and relative humidity.

A range may be prescribed for any variable by the manufacturer of the adhesive if it can be assumed by the test operator that any arbitrarily chosen value within such a range or any combination of such values for several variables will be acceptable to both the manufacturer and the purchaser of the adhesive.

1. Scope

1.1 This test method covers the determination of the comparative tensile properties of the adhesive bonds of metal to metal when tested on standard shape specimens and under defined conditions of pretreatment, temperature, and testing machine speed.

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.*

[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. Referenced Documents

2.1 *ASTM Standards:*[2]

B 16/B 16M Specification for Free-Cutting Brass Rod, Bar and Shapes for Use in Screw Machines

B 107/B 107M Specification for Magnesium-Alloy Extruded Bars, Rods, Profiles, Tubes, and Wire

B 133 Specification for Copper Rod, Bar, and Shapes[3]

B 139/B 139M Specification for Phosphor Bronze Rod, Bar, and Shapes

B 151/B 151M Specification for Copper-Nickel-Zinc Alloy (Nickel Silver) and Copper-Nickel Rod and Bar

B 211 Specification for Aluminum and Aluminum-Alloy Bar, Rod, and Wire

D 907 Terminology of Adhesives

E 4 Practices for Force Verification of Testing Machines

2.2 *Other Documents:*

AISI 1020 Steel Code Tables [4]

3. Terminology

3.1 Many of the terms used in this test method are defined in Terminology D 907.

4. Significance and Use

4.1 This test method is primarily comparative. However, it does have application as a discriminator in determining variations in adherend surface preparation parameters and adhesive environmental durability. The test method has found applications in controlling surface preparations, primer, and adhesive systems for determining strength properties of tested systems.

5. Apparatus

5.1 *Testing Machine*, has a force measurement accuracy of ±1 % when calibrated in compliance with Practices E 4 requirements and capable of maintaining a specified rate of lading and comprising essentially the following:

5.1.1 *Fixed Member*— A fixed or essentially stationary member, carrying one grip.

5.1.2 *Movable Member*, carrying a second grip.

5.1.3 *Grips*, for holding a test specimen between the fixed member and the movable member. Use the self-aligning type. The grips shall be attached to the fixed and movable member, respectively, in such a way that they will move into alignment as soon as any load is applied, so that the long axis of the test specimen will coincide with the direction of the applied pull through the center line of the grip assembly. While the design of grips of this type is optional, one that has been found satisfactory is shown in Fig. 1.

6. Test Specimens

6.1 Use specimens in accordance with Fig. 2. Reuse of the specimens is allowed by resurfacing those surface areas that contained the adhesive. Do this by grinding the adhesive-faced surface flat and parallel. Metals conforming to the following ASTM specifications are recommended:

[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] Withdrawn.

[4] Available from American Iron and Steel Institute (AISI), 1140 Connecticut Ave., Suite 705, Washington, DC 20036.

[4] Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, http://www.ansi.org.