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Standard Test Method for STRENGTH PROPERTIES OF METAL-TO-METAL ADHESIVES BY COMPRESSION LOADING (DISK SHEAR)¹

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1. Scope

1.1 This method covers the determination of the shear strength of adhesives when tested on a standard specimen under specified conditions of preparation and loading in compression. This method is intended primarily as an evaluation of adhesives for metals.

2. Apparatus

2.1 *Testing Machine* with a capacity of not less than 4500 kg (10,000 lb) in compression. The testing machine shall be capable of maintaining a uniform rate of loading, such that the load can be applied at a constant rate to a maximum load at a rate of 85 to 100 kgf/cm² (1200 to 1400 psi) per min. The testing machine shall conform to the requirements of ASTM Methods E 4, Verification of Testing Machines.²

2.2 *Shearing Tool*—The tests shall be performed using a shearing tool consisting of a semicircular anvil held vertically by rigid supports. The shearing tool shown in Figs. 1 and 2 has been found satisfactory.³ One side of this shearing tool has a built-in, thermostatted, electric heater. However, other heating methods may be used. In order to obtain the proper clearance between the shearing tool and the specimen, the radius of the anvil (Fig. 1) shall be 14.55 ± 0.05 mm (0.573 ± 0.002 in.). The thickness of the anvil (Fig. 1(b)) shall be 6.86 ± 0.13 mm (0.270 ± 0.005 in.), and the depth of the slot in the spacer (Fig. 1(c)) shall be 13.72 ± 0.13 mm (0.540 ± 0.005 in.).

3. Test Specimens

3.1 Each test specimen shall be formed from a strip and disk of the dimensions shown in Fig. 3. The disks shall have an area of 6.45 cm² (1 in.²) with a radius of 14.32 ± 0.05 mm (0.564 ± 0.002 in.). The thickness of the disk shall be 6.35 ± 0.05 mm (0.250 ± 0.002 in.). A thermocouple well shall be drilled in the disk parallel to the bonding surface as shown in Fig. 3. The strip shall be 107.95 ± 0.25 mm (4.25 ± 0.010 in.) long, 28.66 ± 0.050 mm (1.128 ± 0.002 in.) wide, and 6.35 ± 0.050 mm (0.250 ± 0.002 in.) thick. The strip and disk shall be ground flat to 0.025 mm (0.001 in.). The strip and disk may be made of any desired metal, or even of dissimilar metals. One surface of the disk and one surface of the strip shall be prepared according to the procedure to be used in the manufacture of the parts.

3.2 The adhesive shall be prepared and applied according to the recommendations of the manufacturer of the adhesive to both the disk and a portion of the strip. The adhesive-coated strips and disks shall then be assembled and bonded according to the procedure to be used in the manufacture of the parts. The

¹ This method is under the jurisdiction of ASTM Committee D-14 on Adhesives.

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² *Annual Book of ASTM Standards*, Part 10.

³ Blueprints of detailed drawings for the construction of the shearing tool shown in Fig. 1 are available at a nominal cost from the American Society for Testing and Materials, 1916 Race St., Philadelphia, Pa. 19103. Request Adjunct No. 12-421820-00.