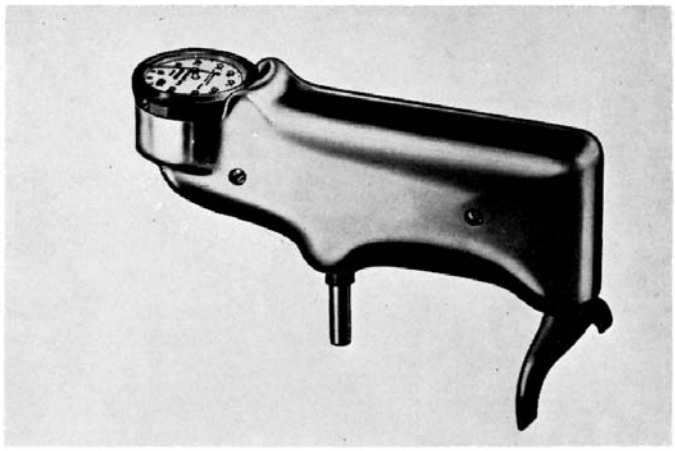

FIG. 1 Barcol Impressor

Designation: D 2583 – 06

Standard Test Method for Indentation Hardness of Rigid Plastics by Means of a Barcol Impressor[1]

This standard is issued under the fixed designation D 2583; 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.

1. Scope*

1.1 This test method covers the determination of indentation hardness of both reinforced and nonreinforced rigid plastics using a Barcol Impressor, Model No. 934-1 and Model No. 935.

1.2 The values stated in SI units are to be regarded as standard. The values given in brackets 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.*

NOTE 1—There is no known ISO equivalent to this test method.

2. Referenced Documents

2.1 *ASTM Standards:* [2]

D 618 Practice for Conditioning Plastics for Testing

D 883 Terminology Relating to Plastics

D 4000 Classification System for Specifying Plastic Materials

E 691 Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method

3. Terminology

3.1 *Definitions*—For definitions of technical terms pertaining to plastics used in this test method, see Terminology D 883.

4. Summary of Test Method

4.1 A material's surface hardness is determined through the use of a Barcol Impressor. The relative depth of penetration of the Impressor's indentor provides a comparative measure of the material's hardness. The Model No. 934-1 and Model No. 935 Barcol Impressors are designated for use with plastics. Within the range of hardness measured by these Impressors the Model No. 934-1 is used for measuring harder materials and the Model No. 935 is used for measuring softer materials.

5. Significance and Use

5.1 The Barcol Impressor is portable and therefore suitable for testing the hardness of fabricated parts and individual test specimens for production control purposes.

5.2 Before proceeding with this test method, reference shall be made to the specification of the material being tested. Table 1 of Classification System D 4000 lists the ASTM materials standards that currently exist. Any test specimen preparation,

[1] This test method is under the jurisdiction of ASTM Committee D20 on Plastics and is the direct responsibility of Subcommittee D20.10 on Mechanical Properties.

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***A Summary of Changes section appears at the end of this standard.**

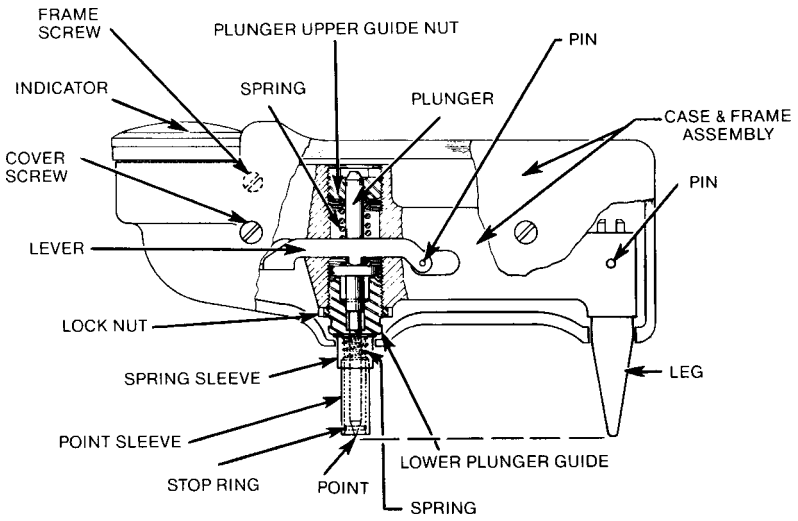

FIG. 2 Diagram of Barcol Impressor

6. Apparatus (Fig. 1 and Fig. 2)

6.1 *Indentor*[3]—The indentor shall consist of a hardened steel truncated cone having an angle of 26° with a flat tip of 0.157 mm [0.0062 in.] in diameter. It shall fit into a hollow spindle and be held down by a spring-loaded plunger. See Fig. 2.

6.2 *Indicating Device*—The indicating dial shall have 100 divisions, each representing a depth of 0.0076-mm [0.0003-in.] penetration. The higher the reading is, the harder the material is.

6.3 *Calibration Standards*—"Hard" and "soft" aluminum alloy disks supplied by the manufacturer of the instrument. Other disks should not be used, even if they are of the same alloy and temper as the manufacturer's disks, as the hardness of aluminum varies within any given alloy-temper parameter.

6.4 A smooth glass plate is also needed.

7. Test Specimens

7.1 The testing area shall be smooth and free from mechanical defects.

7.2 *Dimensions*—Test specimens shall be at least 1.5 mm [1⁄16 in.] thick and large enough to ensure a minimum distance of 3 mm [⅛ in.] in any direction from the indentor point to the edge of the specimen, as well as from test point to test point.

8. Preparation and Operation of Apparatus

8.1 The preparation and operation of Models 934-1 and 935 are identical. Place the Impressor and the material to be tested (or the calibration disk) on a solidly supported, flat, hard, firm surface such as stone, metal, or ceramic. If softer supporting surfaces are used, a false low instrument reading may occur.

8.2 Set the point sleeve on the surface to be tested. Set the legs on the same surface or on solid material of the same thickness, so that the indentor is perpendicular to the surface being tested. Grasp the instrument firmly between the legs and point sleeve. Apply a uniform downward force quickly, by hand, increasing the force on the case until the dial indication reaches a maximum (Note 3). Take care to avoid sliding or scraping while the indentor is in contact with the surface being tested. Record the maximum reading.

NOTE 2—It is recommended that measurements be made with the Model 934-1 Impressor when values above 90 are obtained with the Model 935 Impressor and that measurements be made with the Model 935 Impressor when values less than 20 are obtained with the Model No. 934-1 Impressor. Values below 10 using the Model 935 Impressor are inexact and should not be reported.

NOTE 3—Drift in readings from the maximum occurs in some materials and can be nonlinear with time.

9. Calibration

9.1 With the plunger upper guide backed out until it just engages the spring, place the Impressor on a glass surface and press down until the point is forced all the way back into the lower plunger guide. The indicator should now read 100. If it does not, loosen the lock-nut and turn the lower plunger guide in or out to obtain a 100 reading. Next, read the "hard" aluminum alloy disk supplied by the manufacturer of the Impressor and, if necessary, adjust so that the reading is within the range marked on the disk. Then do the same with the "soft" disk. If these readings cannot be obtained, subsequent measurements are not valid.

10. Conditioning

10.1 *Conditioning*—Condition the test specimens at 23 ± 2°C [73.4 ± 3.6°F] and 50 ± 5 % relative humidity for least 40 h prior to test in accordance with Procedure A of Practice D 618, unless otherwise specified by the contract or relevant ASTM material specification. In cases of disagreement, the tolerances shall be ±1°C [±1.8°F] and ±2 % relative humidity.

10.2 *Test Conditions*—Conduct tests in the standard laboratory atmosphere of 23 ± 2°C [73.4 ± 3.6°F] and 50 ± 5 % relative humidity, unless otherwise specified by the contract or

[3] The sole source of supply of the apparatus known to the committee at this time is Eurotherm/Barber-Colman, 741–F Miller Drive, Leesburg, VA 20175–8993. If you are aware of alternative suppliers, please provide this information to ASTM International Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee,[1] which you may attend.