



# Standard Test Method for Softness of Preformed Tape Sealants<sup>1</sup>

This standard is issued under the fixed designation C 782; 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 ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

## 1. Scope

1.1 This test method describes a laboratory procedure for determining the softness of preformed tape sealants.

NOTE 1—Cone penetration methods applicable to greases and to petrolatum are described in Test Methods D 217 and D 937. Test Method D 2451 also uses a penetration technique for determining the degree of set in sash glazing compounds.

1.2 The values stated in SI units are to be regarded as the standard. The values given in parenthesis are for information only.

1.3 The subcommittee with jurisdiction is not aware of any similar ISO standard.

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:

- C 717 Terminology of Building Seals and Sealants<sup>2</sup>
- D 5 Test Method for Penetration of Bituminous Materials<sup>3</sup>
- D 217 Test Method for Cone Penetration of Lubricating Grease<sup>4</sup>
- D 937 Test Method for Cone Penetration of Petrolatum<sup>3</sup>
- D 1321 Test Method for Needle Penetration of Petroleum Waxes<sup>4</sup>
- D 2451 Test Method for Degree of Set for Glazing Compounds on Metal Sash<sup>2</sup>
- E 1 Specification for ASTM Thermometers<sup>5</sup>

## 3. Terminology

3.1 Definitions—The definition of the following term used in this test method is found in Terminology C 717: preformed tape sealant.

<sup>1</sup> This test method is under the jurisdiction of ASTM Committee C24 on Building Seals and Sealants and is the direct responsibility of Subcommittee C24.20 on General Sealant Standards.

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<sup>2</sup> Annual Book of ASTM Standards, Vol 04.07.

<sup>3</sup> Annual Book of ASTM Standards, Vol 04.03.

<sup>4</sup> Annual Book of ASTM Standards, Vol 05.01.

<sup>5</sup> Annual Book of ASTM Standards, Vol 14.03.

## 4. Summary of Test Method

4.1 The preformed tape sealant specimen is allowed to equilibrate at standard conditions. A standard needle under a defined load is placed on the specimen for 5 s. The penetration of the needle into the preformed tape sealant is measured. Multiple readings are recorded and averaged.

## 5. Significance and Use

5.1 Preformed tape sealants are tacky, deformable solids that are used under compression between two substrates in a variety of sealing applications. This procedure measures the softness of a preformed tape sealant and gives an indication of the preformed tape sealant's ease of compression during installation. The resistance to penetration may also give an indication of the toughness of the preformed tape sealant.

## 6. Apparatus

6.1 *Needle Penetrometer*, as described in Test Method D 5, with a certified needle.

NOTE 2—Test Method D 5 describes the needle method for determining the penetration of bituminous material; Test Method D 1321 describes a similar method for use with petroleum waxes, but a different needle is used.

6.2 *Stop Watch or Timing Mechanism*, for the penetrometer.

6.3 *Thermometer*, to measure the temperature of the test specimen in the vicinity of the temperature of the test. For tests at  $23 \pm 0.5^\circ\text{C}$  ( $73 \pm 1^\circ\text{F}$ ) a thermometer conforming to the requirements prescribed in Specification E 1 is recommended, such as ASTM Saybolt Viscosity Thermometer 17C (or 17F) having a range from 19 to  $27^\circ\text{C}$  (66 to  $80^\circ\text{F}$ ).

## 7. Sampling

7.1 Samples to be tested shall be taken from a fresh roll of preformed tape sealant, after first removing and discarding approximately the first 600 mm (2 ft) of the roll.

7.2 Remove release paper as required in order to fashion a suitable test specimen.

## 8. Test Specimen

8.1 Prepare a test specimen by cutting short lengths of preformed tape sealant and plying them together to form a solid block no smaller than 13 mm (0.5 in) wide by 13 mm (0.5 in) by 25 mm (1.0 in) long.

## 9. Conditioning

9.1 Condition the test specimen and the penetrometer, including the needle, for at least 2 h at  $23 \pm 2^\circ\text{C}$  ( $73 \pm 3.6^\circ\text{F}$ ).

NOTE 3—Other test temperatures may be used, provided that the specimen and the penetrometer, including the needle, are conditioned for at least 2 h at such temperature and maintained at that temperature during the test. For low temperature testing, for example, both conditioning and testing must be done in a cold box.

## 10. Procedure

10.1 Place the penetrometer in a level position with the shaft set up so that there is a total moving load of 100 g. This load is comprised of the 2.5-g needle, the 47.5-g shaft, and an extra weight of 50 g placed atop the shaft.

10.2 Raise the penetrometer shaft until the pointer on the dial reads exactly zero. Lightly tap the indicator dial control lever to ensure that this reading is maintained.

10.3 Position the test specimen on the penetrometer so that it is approximately centered under the needle. Then lower that part of the apparatus consisting of the dial gage and shaft with the needle point until the needle point just makes contact with the top surface of the specimen.

NOTE 4—If the specimen is made from preformed tape sealant less than 13 mm (0.5 in.) wide, care should be taken to see that the needle is not placed in the joint between two abutting strips of preformed tape sealant.

10.4 Quickly release the needle for 5 s.

10.5 Adjust the apparatus to measure the distance through which the needle penetrated the specimen. Record the amount of penetration to the nearest 0.1 mm.

10.6 Wipe the penetrometer needle clean. Following the same procedure, take at least two additional penetration readings for the same preformed tape sealant specimen. If readings are taken on the same specimen surface, the penetration should

be made at points at least 7 mm (0.25 in.) from other readings. The amount of penetration for each reading should be recorded separately and the needle should be wiped clean after each reading.

NOTE 5—Unusually low readings, caused by the needle striking an embedded core or other hard material, and unusually high readings caused by penetrating a void or air pocket shall be considered invalid and disregarded.

## 11. Report

11.1 Report the following information:

11.1.1 Identification of the preformed tape sealant, that is, the name, lot number, and any other identifying characteristics.

11.1.2 Actual temperature of the test specimen and apparatus at the time of the test.

11.1.3 At least three valid penetration readings and their average.

## 12. Precision and Bias

12.1 Interlaboratory round-robin testing of the preformed tape sealant softness has determined the  $2\sigma$  or 95 % confidence level of precision for the needle penetrometer test of preformed tape sealant softness at  $23 \pm 0.5^\circ\text{C}$  ( $73 \pm 1^\circ\text{F}$ ).

12.2 The single-operator-penetrometer-day precision is 0.3 mm.

12.3 The interlaboratory or multioperator precision is 1.0 mm.

NOTE 6—The single-operator and interlaboratory precision statements for needle penetrometer testing of preformed tape sealant softness at  $23^\circ\text{C}$  ( $73^\circ\text{F}$ ) have been found to hold for tests run at lower tape temperatures, for example,  $-17.8^\circ\text{C}$  ( $0^\circ\text{F}$ ). At elevated test temperatures, for example,  $70^\circ\text{C}$  ( $158^\circ\text{F}$ ) penetrometer readings and interlaboratory agreement is somewhat less precise.

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