



Designation: D 5602 – 98

Standard Test Method for Static Puncture Resistance of Roofing Membrane Specimens¹

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1. Scope

1.1 This test method covers evaluation of the maximum static puncture load that roofing membrane samples can withstand without allowing the passage of water.

1.2 This laboratory test is conducted at any desired temperature using sheet membrane samples manufactured in a factory or prepared in a laboratory.

1.3 Roof membrane specimens to which the test method is applicable include bituminous built up, polymer-modified bitumens, vulcanized rubbers, non-vulcanized polymeric, and thermoplastic materials.

1.4 This test method is not applicable to aggregate-surfaced membrane specimens, but it is applicable to specimens having factory-applied granules.

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

1.6 *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 578 Specification for Preformed Cellular Polystyrene Thermal Insulation²

D 1079 Terminology Relating to Roofing, Waterproofing, and Bituminous Materials³

3. Terminology

3.1 *Definitions*—For definitions of terms used in this test method, refer to Terminology D 1079.

¹ This test method is under the jurisdiction of ASTM Committee D-8 on Roofing, Waterproofing, and Bituminous Materials and is the direct responsibility of Subcommittee D08.20 on Roofing Membrane Systems.

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² *Annual Book of ASTM Standards*, Vol 04.06.

³ *Annual Book of ASTM Standards*, Vol 04.04.

4. Summary of Test Method

4.1 Set on a thermal insulation substrate, the roofing membrane test specimen is subjected for 24 h to a predetermined static puncture force using a ball bearing having a 10-mm (0.39-in.) diameter.

4.2 The loads are increased in 10-N (2.2-lbf) increments until puncture of the membrane specimen occurs or the maximum load of the test apparatus which is at least 250 N (56 lbf) is reached.

4.3 Puncture of the test specimen is assessed by visual examination and verified by conducting a watertightness test.

5. Significance and Use

5.1 An important factor affecting the performance of many membrane roofing systems is their ability to resist static puncture loads. This test method provides a means for assessing static puncture resistance.

5.2 This test method can be used to compare the puncture resistance of a single type of membrane as a function of a variety of insulation substrates or, conversely, to compare the resistance of a number of membrane specimens set on a single type of insulation.

5.3 The effect of temperature on puncture resistance can be studied by conducting the test under controlled conditions using such equipment as an environmental chamber, oven, or freezer.

5.4 This test method can be useful for developing performance criteria for membrane roofing systems.

5.5 This test method can be useful for developing classifications of the static puncture resistance of membrane roofing systems.

5.6 While it is considered that the results obtained by this laboratory test can afford a measure of the static puncture resistance of membrane roofing systems in the field provided that service loads and temperature conditions are known, no direct correlation has yet been established.

6. Apparatus

6.1 *Static Puncture Device*—An apparatus consisting primarily of a movable rod to which a 10-mm (0.39-in.) diameter ball bearing is attached at one end and a means for loading the