



Designation: D7466/D7466M – 23

Standard Test Method for Measuring Asperity Height of Textured Geomembranes¹

This standard is issued under the fixed designation D7466/D7466M; 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.

1. Scope

1.1 This test method covers a procedure to measure the asperity height of textured geomembranes.

1.2 This test method does not provide for measurement of the spacing between the asperities nor of the complete profile of the textured surface.

1.3 The values stated in either SI units or inch-pound units are to be regarded separately as standard. The values stated in each system are not necessarily exact equivalents; therefore, to ensure conformance with the standard, each system shall be used independently of the other, and values from the two systems shall not be combined.

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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.5 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 *ASTM Standards:*²

[D4439 Terminology for Geosynthetics](#)

[D5994/D5994M Test Method for Measuring Core Thickness of Textured Geomembranes](#)

[E177 Practice for Use of the Terms Precision and Bias in ASTM Test Methods](#)

[E691 Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method](#)

¹ This test method is under the jurisdiction of ASTM Committee D35 on Geosynthetics and is the direct responsibility of Subcommittee D35.10 on Geomembranes.

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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.

[E2554 Practice for Estimating and Monitoring the Uncertainty of Test Results of a Test Method Using Control Chart Techniques](#)

3. Terminology

3.1 For definitions of other terms used in this test method, refer to Terminology [D4439](#).

3.2 *Definitions:*

3.2.1 *asperity, n*—the individual projections of polyethylene that extend above the core surface of a textured geomembrane resulting in the textured surface profile.

3.2.2 *core thickness, n*—the average thickness of a textured geomembrane as measured using Test Method [D5994/D5994M](#).

3.2.3 *geomembrane, n*—an essentially impermeable geosynthetic composed of one or more synthetic sheets. [D4439](#)

3.2.4 *setting block, n*—the component part of a depth gauge that rests on top of the asperities.

3.2.5 *thickness, n*—the perpendicular distance between one surface and its opposite.

3.2.6 *thickness gauge contact point, n*—the tip of a thickness gauge which contacts the base sheet of the geomembrane surface.

4. Summary of Test Method

4.1 The asperity height of a textured geomembrane is measured with a depth gauge, the setting block of which rests on the top of the asperities while the contact point extends to the sheet's core surface.

4.2 The asperity height of a textured geomembrane is calculated as the average value of ten (10) individual measurements taken across the roll width of the sample under investigation.

5. Significance and Use

5.1 The asperity height is an index property used to quantify one of the physical attributes related to the surface roughness of textured geomembranes.

5.2 This test method is applicable to all currently available textured geomembranes that are deployed as manufactured geomembrane sheets.

6. Apparatus

6.1 *Depth Gauge*—The depth gauge shall consist of three components that conform the requirements of this section: a digital or dial indicator, a setting block, and a contact point with extension.

6.1.1 *Digital/Dial Indicator*—Capable of measuring to a depth of at least 2.5 mm [0.10 in.] with an accuracy of ± 0.025 mm [0.001 in.].

6.1.2 *Setting Block*—The setting block shall have a base dimension of 50 mm to 63.5 mm long by 20 mm to 12.7 mm wide [2.0 in. to 2.5 in. long by 0.75 in. to 0.50 in. wide] and a height of 15 mm [0.60 in.].

6.1.3 *Contact Point with Extension*—The contact point is 1.3 mm [0.051 in.] in diameter with the tip tapered to a point. An extension of approximately 17 mm [0.66 in.] is required to achieve the necessary travel beyond the base surface of the setting block. The contact point should protrude at least 10 mm below the setting block when not in use in order to ensure that a competent “zero” setting is achieved. See Figs. 1-3.

6.1.4 *Mass of Assembly*—The mass of the depth gauge fully assembled with the dial indicator, setting block, and contact point with extension should not exceed 300 g.

7. Sampling

7.1 *Sample and Specimens*—For the sample, take a full-width sample at least 75 mm [3 in.] wide. Exclude the inner and outer wraps of the roll or any material not representative of the sample. Either the entire strip may be tested or individual test specimens may be taken from this sample, with a minimum diameter of 75 mm [3 in.], spaced such that a total of ten (10) asperity height determinations will be made approximately evenly across the sample.

7.2 *Sample Labeling*—For textured geomembrane samples that are textured on both sides, identify one surface as “Side A” and the other as “Side B.” Side A should correspond to the outside surface of the product when on the parent roll, and Side B the inside surface whenever this relationship is known. Obtain and record sample identification.

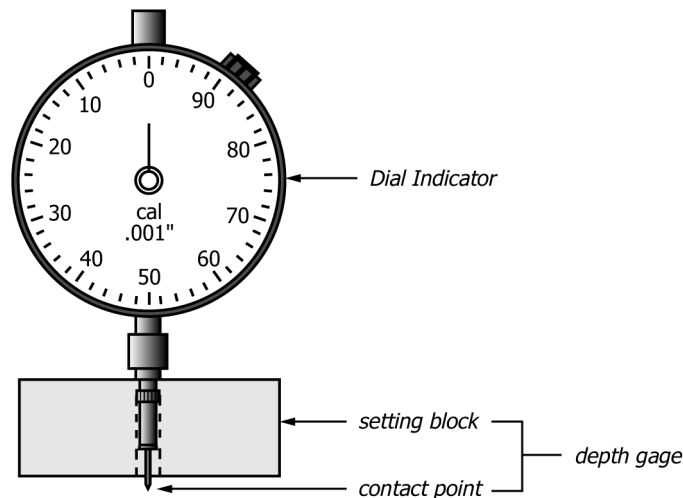


FIG. 1 Dial Indicator Asperity Height Test Gauge

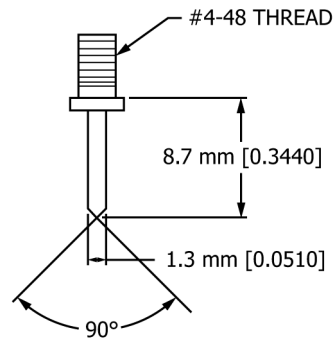


FIG. 2 Contact Point

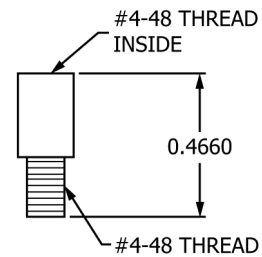


FIG. 3 Contact Extension

8. Conditioning and Test Conditions

- 8.1 Bring the specimens to temperature equilibrium at 21 ± 2 °C [70 ± 4 °F] and at a relative humidity of 60 ± 10 %.
- 8.2 Perform the test at the above conditions.

9. Procedure

- 9.1 Test the conditioned specimens in the standard laboratory atmosphere specified in 8.1.
- 9.2 Place the depth gauge on a flat, smooth, rigid supporting surface to zero the contact point with the bottom of the setting block.
- 9.3 Place the geomembrane specimen being tested on a flat, smooth, rigid supporting surface, being vigilant to keep the specimen flat for the measurements. For two side textured geomembranes, measure the asperity height of Side A first.
- 9.4 Place the depth gauge on the surface of the textured geomembrane specimen, with the long axis of the setting block perpendicular to the machine direction of the roll. Do not apply downward hand pressure on the gauge as this would compress the asperities under the setting block.
- 9.5 Allow the contact point to come into contact with the “low spots” or “valleys” in between the asperities, or into the indentations of the textured surface(s). Move the depth gauge slightly on the test specimen to obtain the local maximum reading. Repeat the above within a search radius of approximately 12 mm [0.5 in.] so that a total of three observations are obtained.
- 9.6 Record the highest value of the three observations to the nearest 0.025 mm or 0.001 in. as the asperity height determination.

NOTE 1—Be vigilant not to drag the extended contact point while