



Designation: D 6382 – 99

# Standard Practice for Dynamic Mechanical Analysis and Thermogravimetry of Roofing and Waterproofing Membrane Material<sup>1</sup>

This standard is issued under the fixed designation D 6382; 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 practice covers test procedures and conditions that are applicable when Test Methods D 5023, D 5024, D 5026, D 5279, and D 5418 are used for conducting dynamic mechanical analysis of roofing and waterproofing membrane material in three-point bending, compression, tension, torsion, and dual cantilever modes, respectively. The specific method is selected by the analyst and depends on the membrane material and the operating principles of the individual instrument used for the analysis.

1.2 This practice covers test procedures and conditions that are applicable when Test Method E 1131 is used for conducting thermogravimetry of roofing and waterproofing membrane material.

1.3 Membrane materials include bituminous built-up roofing, polymer-modified bitumen sheets, vulcanized rubbers, non-vulcanized polymeric sheets, and thermoplastics. The membrane materials can be either nonreinforced or reinforced.

1.4 This practice is applicable to new membrane materials received from the supplier, those exposed artificially in the laboratory or outdoors on an exposure rack, and those sampled from field installations.

1.5 This practice contains notes which are explanatory and are not part of the mandatory requirements of this practice.

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

1.7 *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:

D 1079 Terminology Relating to Roofing, Waterproofing, and Bituminous Materials<sup>2</sup>

<sup>1</sup> This practice 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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<sup>2</sup> *Annual Book of ASTM Standards*, Vol 04.04.

D 4092 Terminology Relating to Dynamic Mechanical Measurements on Plastics<sup>3</sup>

D 5023 Test Method for Measuring the Dynamic Mechanical Properties of Plastics Using Three Point Bending<sup>4</sup>

D 5024 Test Method for Measuring the Dynamic Mechanical Properties of Plastics in Compression<sup>4</sup>

D 5026 Test Method for Measuring the Dynamic Mechanical Properties of Plastics in Tension<sup>4</sup>

D 5279 Test Method for Measuring the Dynamic Mechanical Properties of Plastics in Torsion<sup>4</sup>

D 5418 Test Method for Measuring the Dynamic Mechanical Properties of Plastics Using a Dual Cantilever Beam<sup>4</sup>

E 473 Terminology Relating to Thermal Analysis<sup>5</sup>

E 1131 Test Method for Compositional Analysis by Thermogravimetry<sup>5</sup>

E 1142 Terminology Relating to Thermophysical Properties<sup>5</sup>

## 3. Terminology

3.1 *Definitions*—For definitions of terms used in this practice, refer to Terminologies E 473, D 1079, D 4092, and E 1142.

## 4. Summary of Practice

4.1 In conducting a dynamic mechanical analysis, the roofing or waterproofing membrane specimen is placed in a test chamber and subjected to a controlled, increasing temperature program. The temperature range can be from well-below (for example,  $-80^{\circ}\text{C}$ ) to somewhat (for example,  $50^{\circ}\text{C}$ ) above room temperature. The glass transition temperature, storage modulus, loss modulus, and damping factor of the specimen are measured.

4.2 In conducting a thermogravimetry analysis, the roofing or waterproofing membrane specimen is placed in a test chamber and subjected to a controlled, increasing temperature program. The temperature range can be from about room temperature (for example,  $20$  to  $40^{\circ}\text{C}$ ) to well-above room temperature (for example,  $900^{\circ}\text{C}$ ), and the atmosphere of the

<sup>3</sup> *Annual Book of ASTM Standards*, Vol 08.02.

<sup>4</sup> *Annual Book of ASTM Standards*, Vol 08.03.

<sup>5</sup> *Annual Book of ASTM Standards*, Vol 14.02.