



Standard Test Method for Evaluating Resistance of Modified, Bituminous Roofing Membranes to Cyclic Joint Displacement¹

This standard is issued under the fixed designation D 5849; 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} NOTE—Editorially switched from English dominant to SI dominant.

1. Scope

1.1 This test method determines the effect of constant cyclic displacement on polymer-modified bituminous membrane specimens. In this test method, a relatively low travel rate of cycling is used and the material is tested for a specified number of cycles under conditions of increased amplitude or lower temperature.

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

2. Referenced Documents

2.1 ASTM Standards:

D 41 Specification for Asphalt Primer Used in Roofing, Dampproofing, and Waterproofing²

D 1079 Terminology Relating to Roofing, Waterproofing, and Bituminous Materials²

D 5147 Test Methods for Sampling and Testing Modified Bituminous Sheet Material²

2.2 Canadian General Standards Board Method:³

CGSB 37-GP-56M Standard for Membrane, Modified, Bituminous, Prefabricated, and Reinforced for Roofing

3. Terminology

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

4. Summary of Test Method

4.1 This test method measures the ability of an unaged polymer-modified bituminous membrane material to resist

deterioration during 500 cycles (Note 1) at predetermined temperature and cycle-amplitude conditions. If the specimen passes the test under the selected conditions, the severity of the test is raised by either lowering the temperature or increasing the amplitude of the cycle, or both (see Table 1). Similarly, heat-aged specimens are subjected to 200 cycles (Note 1) under the same conditions of temperature and cycle-amplitude. Test the membrane until failure or until Test Condition No. 5 is achieved.

NOTE 1—Other numbers of cycles may be used depending on the reason for conducting the test, for example, to determine the number of cycles necessary to produce failure.

5. Significance and Use

5.1 This test method provides data on classifying polymer-modified bituminous membranes by their performance related to the fatigue conditions to which they are subjected.

5.2 This test method is applicable to testing specimens consisting of a single ply of the polymer-modified bitumen material or a multiple-ply composite that includes the polymer-modified bitumen material.

5.3 This test method is conducted on both unaged and heat-aged specimens to determine the effect of heat exposure on the membrane material's ability to resist deterioration from cyclic strain. This test method may also be conducted on specimens subjected to other laboratory exposure conditions that are not specified herein.

6. Apparatus

6.1 Any fatigue apparatus capable of producing cyclic strain at the selected test temperature is suitable. The apparatus shall be capable of changing cycle amplitude depending on the selected conditions. It has been found that an apparatus using a cam-driven mechanism is suitable for this purpose. The amplitude of the cycle is altered by changing the lift of the cam.

6.2 The apparatus shall be capable of cycling the specimens at 16 mm/h (0.011 in./min).

6.3 Two concrete slabs (Note 2), 150 by 150 by 50-mm (6 by 6 by 2-in.) minimum thickness are attached to the fatigue apparatus such that one moves continuously back and forth in relation to the other. The gap between the slabs forms the joint

¹ This test method is under the jurisdiction of ASTM Committee D08 on Roofing, Waterproofing, and Bituminous Materials and is the direct responsibility of Subcommittee D08.04 on Fabrics for Bituminous Roofing and Waterproofing. Current edition approved Oct. 10, 1995. Published December 1995.

² Annual Book of ASTM Standards, Vol 04.04.

³ Available from the Canadian General Standards Board (CGSB), 37-GP-56M, Ottawa, Canada, K1A 1G6.