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Standard Test Method for Cyclic Movement and Measuring the Minimum and Maximum Joint Widths of Architectural Joint Systems[1]

This standard is issued under the fixed designation E1399; 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 testing procedures for architectural joint systems. This test method is intended for the following uses for architectural joint systems:

1.1.1 To verify movement capability information supplied to the user by the producer,

1.1.2 To standardize comparison of movement capability by relating it to specified nominal joint widths,

1.1.3 To determine the cyclic movement capability between specified minimum and maximum joint widths without visual deleterious effects, and

1.1.4 To provide the user with graphic information, drawings or pictures in the test report, depicting them at minimum, maximum, and nominal joint widths during cycling.

1.2 This test method is intended to be used only as part of a specification or acceptance criterion due to the limited movements tested.

1.3 The values stated in SI units are to be regarded as standard. The values given in parentheses are mathematical conversions to inch-pound units that are provided for information only and are not considered 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:*[2]

C719 Test Method for Adhesion and Cohesion of Elastomeric Joint Sealants Under Cyclic Movement (Hockman Cycle)

C794 Test Method for Adhesion-in-Peel of Elastomeric Joint Sealants

C962 Standards Guide for Use of Elastomeric Joint Sealants (Withdrawn 1992)[3]

D1079 Terminology Relating to Roofing and Waterproofing

E577 Guide for Dimensional Coordination of Rectilinear Building Parts and Systems (Withdrawn 2011)[3]

E631 Terminology of Building Constructions

IEEE/ASTM SI 10 Standard for Use of the International System of Units (SI): The Modern Metric System

3. Terminology

3.1 *Defintions*—Terms defined in Terminology E631 will prevail for terms not defined in this test method.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *architectural joint system*—any filler or cover, except poured or formed in place sealants, used to span, cover, fill, or seal a joint.

3.2.1.1 *Discussion*—Joint is defined in Guide E577.

3.2.2 *compression seal*—an elastomeric extrusion, having an internal baffle system produced continuously and longitudinally throughout the material having side walls without horizontal edge flaps.

3.2.3 *cyclic movement*—the periodic change between the widest and narrowest joint widths in an automatically mechanically controlled system.

3.2.4 *elastomeric membrane systems*—an elastomeric extrusion being either a baffled, single, or multi-layered system incorporating horizontal edge flaps normally used with a nosing material.

3.2.5 *fire barriers*—any material or material combination, when fire tested after cycling, designated to resist the passage of flame and hot gases through a movement joint.

3.2.6 *maximum joint width*—the widest linear gap an architectural joint system tolerates and performs its designed function without damaging its functional capabilities.

[1] This test method is under the jurisdiction of ASTM Committee E06 on Performance of Buildings and is the direct responsibility of Subcommittee E06.21 on Serviceability.

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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.

[3] The last approved version of this historical standard is referenced on www.astm.org.

3.2.7 *metallic systems*—one or more metal components integrated to perform the specific function of sealing or bridging a joint, or both.

3.2.8 *minimum joint width*—the narrowest linear gap an architectural joint system tolerates and performs its designed function without damaging its functional capabilities.

3.2.9 *movement capability*—the value obtained from the difference between the widest and narrowest widths of a joint opening typically expressed in numerical values (mm or in.) or a percentage of the nominal value of the joint width.

3.2.9.1 *Discussion*—Nominal value is defined in IEEE/ASTM SI 10.

3.2.10 *preformed foam and sponges*—a porous elastomeric open or closed cell material capable of being compressed and recovering once the compressive force is removed.

3.2.11 *preformed sealant system*—a device composed of a previously shaped or molded mixture of polymers, fillers, and pigments used to fill and seal joints where moderate movement is expected; unlike caulking, it cures to a resilient solid (see Appendix X1).

3.2.11.1 *Discussion*—Sealant is defined in Definitions D1079.

3.2.12 *strip seal*—a single or multi-layered elastomeric extrusion, not having an internal baffle system produced continuously and longitudinally throughout the material, used in conjunction with a compatible frame(s).

4. Significance and Use

4.1 Types of architectural joint systems included in this test method are the following:

4.1.1 Metallic systems;

4.1.2 Compression seals:

4.1.2.1 With frames, and

4.1.2.2 Without frames,

4.1.3 Strip seals;

4.1.4 Preformed sealant systems (see Appendix X1):

4.1.4.1 With frames, and

4.1.4.2 Without frames,

4.1.5 Preformed foams and sponges:

4.1.5.1 Self-Expanding, and

4.1.5.2 Nonexpanding,

4.1.6 Fire barriers:

4.1.6.1 Used as joint systems, and

4.1.6.2 Used as a part of the joint system, and

4.1.7 Elastomeric membrane systems:

4.1.7.1 With nosing material(s), and

4.1.7.2 Without nosing material(s).

4.2 This test method will assist users, producers, building officials, code authorities, and others in verifying some performance characteristics of representative specimens of architectural joint systems under common test conditions. The following performance characteristics are verifiable:

4.2.1 The maximum joint width,

4.2.2 The minimum joint width, and

4.2.3 The movement capability.

4.3 This test compares similar architectural joint systems by cycling but does not accurately reflect the system's application. Similar refers to the same type of architectural system within the same subsection under 4.1.

4.4 This test method does not provide information on:

4.4.1 Durability of the architectural joint system under actual service conditions, including the effects of cycled temperature on the joint system,

4.4.2 Loading capability of the system and the effects of a load on the functional parameters established by this test method,

4.4.3 Rotational, vertical, and horizontal shear capabilities of the specimen,

4.4.4 Any other attributes of the specimen, such as fire resistance, wear resistance, chemical resistance, air infiltration, watertightness, and so forth, and

4.4.5 Testing or compatibility of substrates.

4.5 This test method is only to be used as one element in the selection of an architectural joint system for a particular application. It is not intended as an independent pass/fail acceptance procedure. In conjunction with this test method, other test methods are to be used to evaluate the importance of other service conditions such as durability, structural loading, and compatibility.

5. Apparatus

5.1 *Testing Machine,* capable of attaining specified maximum and minimum joint widths.

5.2 *Measuring Device,* capable of an accuracy of 0.25 ± 0.013 mm (0.010 ± 0.005 in.).

5.3 *Cyclic Device,* capable of continual repetitious movement between two specified dimensions, equipped with an automatic counter which records movement of the joint during the test.

5.4 *Mounting Plates,* or other apparatus suitable to install the specimen and undergo the test procedures.

6. Safety Hazards

6.1 **Warning—**Take proper precautions to protect the observers in the event of any failure. If extreme pressures develop during this test, considerable energy and hazard are involved. In cases of failure, the hazard to personnel is less if a protective shield is used and protective eye wear worn. Do not permit personnel between the shield and equipment during the test procedure.

7. Sampling

7.1 A lot of material consists of the quantity for each cross section agreed upon by the user and the producer. Sample each lot.

7.2 Obtain samples by one of the following methods:

7.2.1 Samples provided by the producer, or

7.2.2 Samples taken at random from each shipment.

7.3 A sample constitutes a minimum length as required to perform the tests, but not less than 914.4 mm (36.00 in.).

7.4 Producer specifies the following in mm (in.):