Designation: E 2190 – 02

Standard Specification for Insulating Glass Unit Performance and Evaluation[1]

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1. Scope

1.1 This specification is applicable to preassembled permanently sealed insulating glass units with one or two airspaces and preassembled insulating glass units with capillary tubes intentionally left open.

1.2 This specification is applicable only to sealed insulating glass units that are constructed with glass.

1.3 The qualification of test specimens is based on frost/dew point and on the absence of fog after the specified test durations.

1.4 Qualification under this specification is intended to provide a basis for evaluating the durability of sealed insulating glass units.

1.5 This specification is not applicable to sealed insulating glass units containing a spandrel glass coating due to test method limitations.

1.6 This specification does not cover other physical requirements such as appearance, thermophysical properties, heat and light transmission, and glass displacement.

NOTE 1—Sealed insulating glass units qualified according to this specification are not necessarily suitable for structurally glazed applications. Factors such as sealant longevity when exposed to long term ultraviolet light and the structural properties of the sealant must be reviewed for these applications. For more information on the requirements for structural sealant glazing applications refer to Specification C 1369, Guide C 1249, and Test Method C 1265.

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 requirements prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*

C 162 Terminology of Glass and Glass Products[2]

C 717 Terminology of Building Seals and Sealants[3]

C 1036 Specification for Flat Glass[2]

C 1249 Guide for Secondary Seal for Sealed Insulating Glass Units for Structural Sealant Glazing Applications[3]

C 1265 Test Method for Determining the Tensile Properties of an Insulating Glass Edge Seal for Structural Glazing Applications[3]

C 1369 Specification for Edge Sealants for Structurally Glazed Insulating Glass Units[3]

E 546 Test Methods for Frost Point of Sealed Insulating Glass Units[4]

E 631 Terminology of Building Constructions[4]

E 2188 Test Method for Insulating Glass Units Performance[5]

E 2189 Test Method for Testing Resistance to Fogging in Insulating Glass Units[5]

3. Terminology

3.1 *Definition of Terms*:

3.1.1 For definitions of terms found in this Specification, refer to Terminology C 717 , Terminology C 162 and Terminology E 631.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *sealed insulating glass unit, n*—a preassembled unit, comprising lites of glass, which are sealed at the edges and separated by dehydrated space(s), intended for vision areas of buildings. The unit is normally used for windows, window walls, picture windows, sliding doors, patio doors, or other types of fenestration.

4. Performance Requirements

4.1 The six units that complete the weather cycle and high humidity phases of Test Method E 2188 unbroken shall have the frost/dew point determined and reported.

4.2 Initial, intermediate (after the weather cycle phase) and final frost/dew points (after final high humidity test) shall be determined. For triple pane units, the frost/dew point is determined for all airspaces. The final frost/dew points shall be −40°C or colder when measured in accordance with Test Method E 546 or equivalent.

4.3 Final frost/dew points shall be determined after 24 h but no later than 7 days.

4.4 *Fog*—No fog shall be visible after testing in accordance with Test Method E 2189.

[1] This specification is under the jurisdiction of ASTM Committee E06 on Performance of Buildings and is the direct responsibility of Subcommittee E06.22 on Durability Performance of Building Constructions.

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[2] *Annual Book of ASTM Standards*, Vol 15.02.

[3] *Annual Book of ASTM Standards*, Vol 04.07.

[4] *Annual Book of ASTM Standards*, Vol 04.11.

[5] *Annual Book of ASTM Standards*, Vol 04.12.

5. Test Specimens

5.1 Specimen design and construction techniques shall be established by Test Method E 2188.

5.2 The glass and airspace thickness(es) for qualification under this specification are 4 mm (5⁄32 in.) glass with 12 mm (½ in.) airspace or 5 mm (3⁄16 in.) glass with 6 mm (¼ in.) airspace.

5.3 Glass or airspace thickness(es), or both, may be increased. (For example, using 6 mm glass with 12 mm airspace.) This may result in a more rigorous test.

5.4 For triple pane units, 4 mm (5⁄32 in.) glass with 6 mm (¼ in.) airspaces are used.

5.5 All of the values in 5.2 and 5.4 are nominal.

5.6 Tolerance of glass thickness shall be in accordance with Specification C 1036.

5.7 Airspace tolerance(s) shall be ± 0.8 mm (1⁄32 in.).

5.8 Twelve double-glazed units shall be submitted when testing to this specification.

5.9 Fourteen triple-glazed units shall be submitted when testing to this specification.

6. Test Methods

6.1 *Unit Performance Test*:

6.1.1 Test six randomly selected specimens for 14 days in the high humidity phase, followed by 63 days in the weather cycle phase followed by 28 days in the high humidity phase in accordance with Test Method E 2188.

6.1.2 Breakage of only two specimens is permitted throughout the test.

NOTE 2—Breakage due to laboratory handling is not considered to be test breakage. Units broken due to handling shall be replaced and tested from the beginning.

6.1.3 If there are more than two broken samples during the test, do not qualify this set of test specimens.

6.1.4 If a specimen has any visible deposits in the air space, do not qualify this set of test specimens for that test except as permitted in 6.1.2 (that is, breakage).

6.2 *Fog Test*:

6.2.1 Test the two fog test specimens for 7 days in accordance with Test Method E 2189.

6.3 The test durations are net testing periods. If the test is interrupted for any reason, the remaining portions shall be completed to qualify for the testing.

7. Qualification

7.1 When all test specimens have met the requirements as described in Section 4, this set of test specimens shall be deemed to be qualified according to this specification.

7.2 If a specimen fails to meet the requirements as described in Section 4, this set of specimens shall not be qualified according to this specification.

8. Report

8.1 *Test Methods*:

8.1.1 Report all information as required in the Report Section of Test Method E 2188.

8.1.2 Report all information as required in the Report Section of Test Method E 2189.

8.2 *Test Durations*:

8.2.1 Report the duration of the accelerated weathering test.

8.2.2 Report the duration of the high humidity testing.

8.2.3 Report the duration of the fog testing.

8.3 Report whether or not the set of test specimens meets the qualifications of this specification.

9. Keywords

9.1 insulating glass units; seal durability; sealed insulating glass units; unit performance and evaluation