



Designation: E2188 – 19

Standard Test Method for Insulating Glass Unit Performance¹

This standard is issued under the fixed designation E2188; 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 procedures for testing the performance of preassembled permanently sealed insulating glass units or insulating glass units with capillary tubes intentionally left open.

1.2 This test method is applicable only to insulating glass units that are constructed with glass.

1.3 This test method is applicable to both double-glazed and triple-glazed insulating glass units. For triple-glazed insulating glass units where both of the outer lites are glass and the inner lite is either glass or a suspended film.

1.4 The unit construction used in this test method contains dimensions that are an essential component of the test. Different types of glass, different glass thicknesses, and different cavity sizes may affect the test results.

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

1.6 The values stated in SI units are to be regarded as standard. The values given in parentheses after SI units are provided for information only and are not considered standard.

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

1.8 *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.*

¹ This test method 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. Referenced Documents

2.1 ASTM Standards:²

C162 Terminology of Glass and Glass Products

C717 Terminology of Building Seals and Sealants

C1036 Specification for Flat Glass

E631 Terminology of Building Constructions

E546 Test Method for Frost/Dew Point of Sealed Insulating Glass Units

E2190 Specification for Insulating Glass Unit Performance and Evaluation

3. Terminology

3.1 Definition of Terms:

3.1.1 For definitions of terms found in this standard, refer to Terminologies C162, C717, and E631.

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *frost/dew point, n*—the temperature at which water, organic vapor, or other chemicals begin to appear on the interior glass surface of an insulating glass unit.

4. Significance and Use

4.1 This test method is intended to provide a means for testing the performance of the sealing system and construction of insulating glass units.

4.1.1 Insulating glass units tested in accordance with this method may be suitable for structurally glazed applications. However, 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.

4.1.2 Insulating glass units tested in accordance with this method are not intended for continuous exposure to high relative humidity conditions or long-term immersion in water.

5. Test Specimens

5.1 Each test specimen shall measure 355 ± 6 mm by 505 ± 6 mm ($14 \pm \frac{1}{4}$ in. by $20 \pm \frac{1}{4}$ in.) and shall be composed of two or three lites of clear, tinted, coated, annealed, heat-strengthened, tempered, or laminated glass.

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.

5.1.1 The double-glazed test samples shall be fabricated with at least one lite of clear, uncoated glass. The triple-glazed test samples shall be fabricated with at least one outer lite of clear, uncoated glass. The other outer lite shall be fabricated with a glass which allows easy viewing of the frost point.

5.1.2 The thickness of the glass lites shall be between nominal 3.0 mm (1/8 in.) and a maximum of 6.0 mm (1/4 in.) nominal.

5.1.3 The cavity for specimens with either two or three lites of glass shall be a minimum of 6.0 ± 0.8 mm (1/4 ± 1/32 in.).

5.1.4 When testing to Specification E2190 the specimen construction shall be as defined in that document.

5.1.5 Triple-pane units where the intermediate cavity divider is a plastic film are acceptable.

NOTE 1—Overall unit thickness has some limits. Testing laboratories are usually able to accommodate 30 mm overall thickness. If testing thicker units, contact the testing laboratory to ascertain their capabilities for testing thicker units.

5.2 The thickness tolerance of the glass shall conform to Specification C1036.

5.3 Each specimen shall be legibly marked with the designation of the manufacturer, the date of fabrication (month or quarter and year) and orientation intended in the field (for units constructed with coated glass). This marking is recommended to be positioned on the glass surface that will be oriented on the room temperature side during the weather cycle phase (see 8.3).

5.4 At least nine specimens of identical component materials and construction shall be submitted for testing.

5.5 During all stages of exposure and storage, the units shall be held in a vertical position with equal support to all panes and no compression loading.

5.6 Selection of six specimens for testing shall be made at random from the submitted specimens except for specimens damaged in transit. Damaged specimens shall not be tested.

5.7 Test specimens representing insulating glass units that will be gas filled shall be fabricated using the same hole sealing and gas filling techniques as those used for manufacturing. For example, if a gas-filling plug is used in manufacturing then it must be used in the test units.

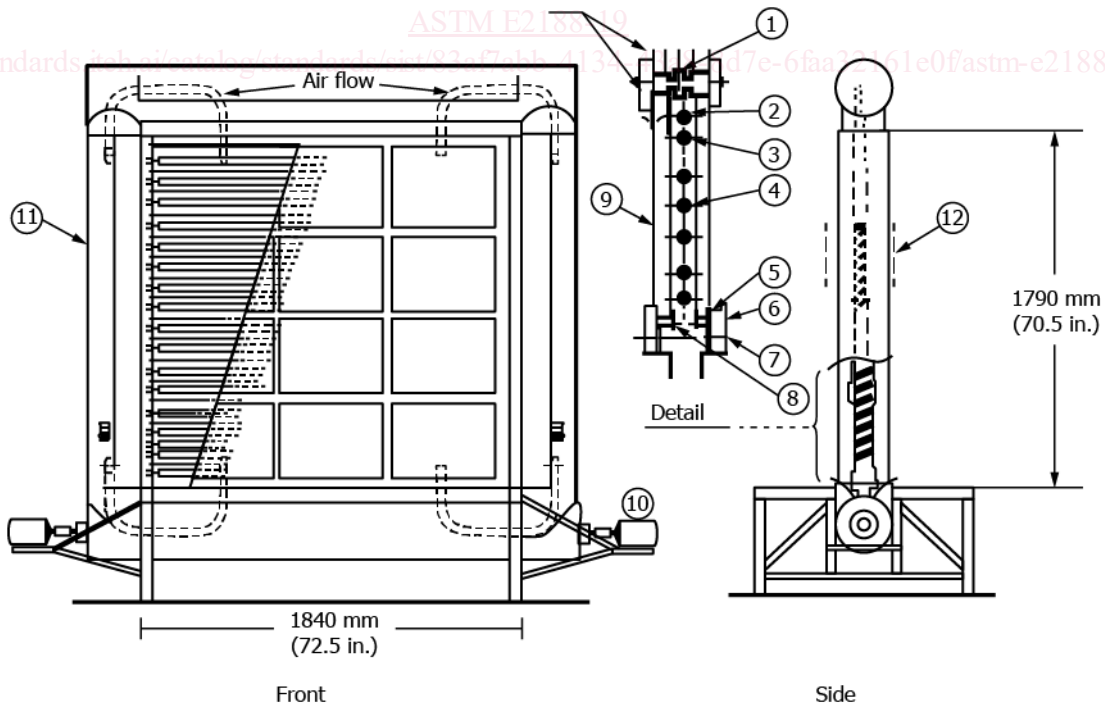
5.8 Test specimens representing insulating glass units that include tubes intended to be left open shall be fabricated with one tube. These tubes shall be left open during testing. Test samples representing units that include tubes intended to be closed off after shipping shall be fabricated with one tube. These tubes shall be closed at the exterior end prior to testing.

6. Apparatus

6.1 For Weather Cycle Phase:

6.1.1 Weather Cycle Test Chamber³—The weather cycle test chamber shall be essentially that shown in Figs. 1 and 2 to provide the required test conditions indicated in Section 8. Modifications to this test chamber are acceptable providing that the required test conditions are met.

³The chamber is a modification of the device developed by the Institute for Research in Construction (IRC) of the National Research Council of Canada. One modification was to expose each test specimen to two ultraviolet lamps.



Description: (1) Fog or mist spray; (2) Cooling coil; (3) Fluorescent ultraviolet lamp, F72T12BL/HO; (4) Heating coil; (5) Rubber pad; (6) Polystyrene insulation; (7) Rubber washer; (8) Clamping device; (9) Test specimen; (10) Fan motor; (11) Air duct; (12) Insulation

FIG. 1 Schematic Drawing of Typical Accelerated Weathering Chamber