Designation: E 1887 – 97

An American National Standard

Standard Test Method for Fog Determination[1]

This standard is issued under the fixed designation E 1887; 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 against fogging.

1.2 This test method is applicable only to sealed insulating glass units, with one or two airspaces, fabricated for vision glass areas for use in buildings, such as sliding doors, windows, wall systems, and picture windows.

1.3 This test method is not applicable to sealed insulating glass units that are constructed from vision materials other than glass.

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

1.5 *This standard may involve hazardous materials, operations, and equipment. 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.* A specific hazard statement is given in Note 1.

2. Referenced Documents

2.1 *ASTM Standards:*

E 773 Test Method for Accelerated Weathering of Sealed Insulating Glass Units[2]

E 774 Specification for the Classification of the Durability of Sealed Insulating Glass Units[2]

3. Terminology

3.1 *Definition of Term Specific to This Standard:*

3.1.1 *fogging*—visible deposits present after testing in accordance with Section 8.

4. Significance and Use

4.1 This test method is intended to provide a means for evaluating fogging of sealed insulating glass units.

5. Apparatus

5.1 *Cooling Plate*, approximately 127 mm (5 in.) square, to be centered on the back side of each specimen. The temperature of the cooling plate shall be 21 ± 3°C (70 ± 5°F). (See Fig. 1.)

5.2 *Ultraviolet Light Source*[3]—Ultraviolet light output of the source shall be tested every 200 h and shall have an output not less than 20 kW/m^2 when tested at the specimen glass surface. The intensity shall be measured with a long-wave ultraviolet light meter.[4] If the ultraviolet light output falls below the minimum, the lamp shall be replaced.

5.3 The temperature at the glass surface shall be 65± 3°C (150 ± 5°F).

NOTE 1—**Warning:** Ultraviolet light sources used in this test method are harmful, especially to the eyes. Appropriate protective measures must be observed.

NOTE 2—The conditions of a minimum output of 20 kW/m^2 when tested at the distance needed to maintain the temperature at the glass surface of 65 ± 3°C (150 ± 5°F) can be obtained with a single 275 to 300 watt RS1 sun lamp. These conditions can also be obtained using an Osram[5] lamp. Alternatively, a long wave UV bulb (B100A)[6] and an infrared lamp can be used.

6. Test Specimens

6.1 Test specimen design and construction shall be established by Test Method E 773.

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[1] This test method is under the jurisdiction of ASTM Committee E-6 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 04.11.

[3] The previous ultraviolet light source was a 275 W, Type RS sunlamp or equivalent.

[4] The sole source of supply of the apparatus known to the committee at this time is Ultra-Violet Products, Inc., 5100 Walnut Grove Ave., San Gabriel, CA 91778. If you are aware of alternative suppliers, please provide this information to ASTM Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee,[1] which you may attend.

[5] The sole source of supply of the apparatus known to the committee at this time is Bulbtronics, Inc., 45 Banfi Plaza, Farmingdale, NY 11735. If you are aware of alternative suppliers, please provide this information to ASTM Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee,[1] which you may attend.

[6] The sole source of supply of the apparatus known to the committee at this time is Ultra-Violet Products, Inc., 2066 W. 11th Street, Upland, CA 91786. If you are aware of alternative suppliers, please provide this information to ASTM Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee,[1] which you may attend.

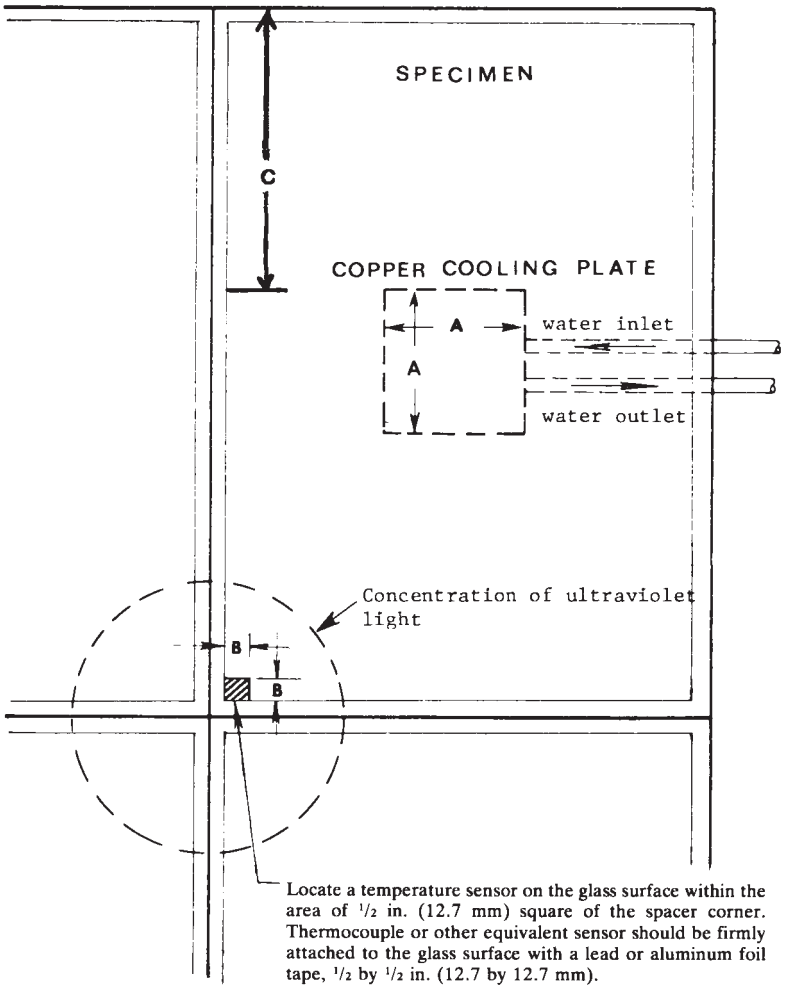

FIG. 1 Arrangement of Fogging Test

7. Preparation of Test Specimens

7.1 Mount the specimens in a frame that is positioned vertically. Place one specimen in the upper position location and one specimen in the lower position location (see Fig. 1). The specimens tested shall not be those tested in an accelerated weathering test apparatus.

7.2 Remove from a corner of the specimen on one side of the glass only, metal edging, banding tape, or other covering so as to expose 76 mm (3 in.) of glass periphery on two adjacent legs (see Fig. 1). The corner thus exposed shall be on the side of the specimen exposed to the ultraviolet light source.

7.3 Arrange the ultraviolet source so that it is perpendicular to the glass surface with the lamp aligned to the corner so as to maintain a glass surface temperature of 65 ± 3°C (150 ± 5°F) as measured by a thermocouple or other equivalent temperature indicator which is taped to the glass surface as shown in Fig. 1. (**Warning**—See Note 1.)

7.4 Conduct the fogging test with the remainder of the test specimen having a glass surface temperature of at least 24°C (75°F).

8. Procedure

8.1 Place a cooling plate on the center of the back side of each specimen, and maintain the temperature of the cooling plate at 21± 3°C (70 ± 5°F).

8.2 Turn on the ultraviolet light source, and maintain the glass surface temperature at 65 ± 3°C (150 ± 5°F) by adjusting the distance of the ultraviolet light source.

8.3 Expose each specimen continuously (except for brief inspection and servicing) for the time period prescribed in Table 1 of Specification E 774.

8.4 Remove the specimen from the test. Condition it for 24 h at room temperature.[7] Examine it carefully for fog by holding it at arms length (approximately 750 to 900 mm (30 to 36 in.) from the eyes) with light behind the specimen. Move the specimen to any angle necessary to thoroughly check the surface of the glass for fogging.

9. Report

9.1 Report the following data:

9.1.1 *Complete Description of Specimen Tested*:

9.1.1.1 Dimensions of the test specimen (width by height) and overall thickness,

9.1.1.2 Type and thicknesses of the glass panes and air space thickness,

9.1.1.3 Describe the spacer composition and configuration,

9.1.1.4 Describe the corner construction including the type and number of corner keys,

9.1.1.5 State the desiccant type and quantity, if known, and sealant type,

9.1.1.6 Record the sealant dimensions, and

9.1.1.7 State the manufacturer and manufactured date (month, if known, and year).

9.1.2 State the duration of test (number of days).

9.1.3 Report the presence of fog (any visible deposit) on the interior glass surface. (If it exists, it will probably appear at the surface that has been in contact with the cooling plate.)

10. Precision and Bias

10.1 *Precision*—The precision of the procedure in Test Method E 1887 for measuring fog is being determined.

10.2 *Bias*—Since there is no accepted reference material suitable for determining the bias for the procedure in Test Method E 1887 for measuring fog, bias has not been determined.

11. Keywords

11.1 chemical fogging; insulating glass units; sealed insulating glass units

[7] Room temperature is from nominal 15°C (60°F) through 30°C (86°F).