



Standard Test Methods for Assessing the Durability of Absorptive Electrochromic Coatings on Sealed Insulating Glass Units¹

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1. Scope

1.1 The tests described are methods for the accelerated aging and monitoring of the time-dependent performance of electrochromic windows. Cross sections of typical electrochromic windows are shown² in which devices have four or five-layers of coatings that include the two or three active layers sandwiched between transparent conducting electrodes (TCEs, see Section 3).

1.2 The test methods are applicable only for multilayered (two or more coatings between the TCEs) absorptive electrochromic coatings on sealed insulating glass (IG) units fabricated for vision glass (superstrate and substrate) areas for use in buildings, such as sliding doors, windows, skylights, and exterior wall systems. The multilayers used for electrochromically changing the optical properties may be inorganic or organic materials between the superstrate and substrate.

1.3 The electrochromic coatings used in this test method are exposed to solar radiation and are deployed to control the amount of radiation by absorption and reflection and thus, limit the solar heat gain and amount of solar radiation that is transmitted into the building.

1.4 The test methods are not applicable to other chromogenic devices, e.g., photochromic and thermochromic devices.

1.5 The test methods are not applicable to electrochromic devices consisting of three layers of coatings including the two transparent conducting electrodes (see Section 3).

1.6 The test methods are not applicable to electrochromic windows that are constructed from superstrate or substrate materials other than glass.

1.7 The test methods referenced herein are laboratory tests conducted under specified conditions. These tests are intended to simulate and, in some cases, to also accelerate actual in-service use of the electrochromic windows. Results from these tests cannot be used to predict the performance with time of in-service units unless actual corresponding in-service tests

have been conducted and appropriate analyses have been conducted to show how performance can be predicted from the accelerated aging tests.

1.8 The values stated in metric (SI) units are to be regarded as the standard.

1.9 *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:

C 168 Terminology Relating to Building Materials³

C 1199 Test Method for Measuring the Steady State Thermal Transmittance of Fenestration Systems Using Hot Box Methods³

E 122 Practice for Choice of Sample Size to Estimate a Measure of Quality for a Lot or Process⁴

E 632 Practice to Aid Prediction of Service Life of Building Components and Materials³

E 773 Test Method for Accelerated Weathering of Sealed Insulating Glass Units³

E 774 Specification for the Classification of the Durability of Sealed Insulating Glass Units³

E 891 Tables for Terrestrial Direct Normal Solar Spectral Irradiance for Air Mass 1.5³

E 892 Tables for Terrestrial Solar Spectral Irradiance at Air Mass 1.5 for a 37° Tilted Surface³

E 903 Test Method for Solar Absorptance, Reflectance, and Transmittance of Materials Using Integrating Spheres³

E 1423 Practice for Determining the Steady State Thermal Transmittance of Fenestration Systems³

E 1887 Test Method for Fog Determination³

E 2094 Practice for Evaluating the Service Lifetime of Chromogenic Glazings³

G 113 Terminology Relating to Natural and Artificial Weathering Tests of Non-Metallic Materials³

G 151 Practice for Exposing Nonmetallic Materials in accelerated Test Devices that Use Laboratory Light Source³

¹ This test method is under the jurisdiction of ASTM Committee E06 on Performance of Building Constructions and is the direct responsibility of Subcommittee E06.22 on Durability of Building Constructions.

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² A. W. Czanderna and C. M. Lampert, "Evaluation Criteria and Test Methods for Electrochromic Windows," SERI/PR-255-3537 (July 1990), Golden, CO: Solar Energy Research Institute.

³ Annual Book of ASTM Standards, Vol 04.07.

⁴ Annual Book of ASTM Standards, Vol 14.02.