



# Standard Test Method for Accelerated Aging of Electrochromic Devices in Sealed Insulating Glass Units<sup>1</sup>

This standard is issued under the fixed designation E2141; 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 ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

## 1. Scope

1.1 This test method covers the accelerated aging of electrochromic devices (ECD) integrated in insulating glass units.

1.2 The test method is applicable for any electrochromic device incorporated into sealed insulating glass units (IGUs) fabricated for vision glass (superstrate and substrate) areas for use in buildings, such as sliding doors, windows, skylights, and exterior wall systems. The layers used for constructing the EC device and electrochromically changing the optical properties may be inorganic or organic materials.

1.3 The electrochromic (EC) glazings used in this test method are exposed under use conditions 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 method is not applicable to other chromogenic devices, such as, photochromic and thermochromic devices which do not respond to electrical stimulus.

1.5 The test method is not applicable to electrochromic (EC) glazings that are constructed from superstrate or substrate materials other than glass.

1.6 The test method referenced herein is a laboratory test conducted under specified conditions. The test is 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.

1.7 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

1.7.1 *Exception*—Inch-pound units are used **7.6.2**.

<sup>1</sup> 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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1.8 *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:<sup>2</sup>

**C168** Terminology Relating to Thermal Insulation

**E177** Practice for Use of the Terms Precision and Bias in ASTM Test Methods

**E631** Terminology of Building Constructions

**E691** Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method

**E2953** Specification for Evaluating Accelerated Aging Performance of Electrochromic Devices in Sealed Insulating Glass Units

**G113** Terminology Relating to Natural and Artificial Weathering Tests of Nonmetallic Materials

**G173** Tables for Reference Solar Spectral Irradiances: Direct Normal and Hemispherical on 37° Tilted Surface

### 2.2 ISO Standard:<sup>3</sup>

**ISO 9050** Glass in building - Determination of light transmittance, solar direct transmittance, total solar energy transmittance, ultraviolet transmittance and related glazing factors

## 3. Terminology

3.1 *Definitions*—For definitions of general terms used in this test method related to building construction, thermal insulating materials and natural and artificial weathering tests for nonmetallic materials, refer to Terminologies **E631**, **C168** and **G113**, respectively.

### 3.2 Definitions of Terms Specific to This Standard:

<sup>2</sup> For referenced ASTM standards, visit the ASTM website, [www.astm.org](http://www.astm.org), or contact ASTM Customer Service at [service@astm.org](mailto:service@astm.org). For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

<sup>3</sup> Available from International Organization for Standardization (ISO), 1, ch. de la Voie-Creuse, CP 56, CH-1211 Geneva 20, Switzerland, <http://www.iso.org>.