



Standard Test Method for Calculating the Concentration of Fill Gas in a Sealed Insulating Glass Unit Using Measurements From an Oxygen Analyzer¹

This standard is issued under the fixed designation E 2323; 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 the use of oxygen analyzers to measure the percentage of oxygen in an insulating glass unit where normal atmospheric air has been replaced with other gases such as argon, krypton, xenon, or sulfur hexafluoride (SF_6). The procedure shows how to convert the measured percentage of oxygen in an insulating glass unit to the percentage of air in the unit, and subtracts the air percentage from 100 % to calculate the percentage of fill gas in the unit.

1.2 This test method does not determine the type of fill gas. It only measures the percentage of oxygen in the gas in the space between the lites of an insulating glass unit.

1.3 This test method is not applicable to insulating glass units containing open capillary/breather tubes.

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 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:²

C 162 Terminology of Glass Products

C 717 Terminology of Building Seals and Sealants

E 631 Terminology of Building Constructions

3. Terminology

3.1 Definition of Terms:

3.1.1 For definitions of terms found in this standard, refer to Terminologies **C 717**, **C 162**, and **E 631**.

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *Fill Gas*—Any gas, or mixture of gases intended to replace atmospheric air in the space between the lites of a sealed insulating glass unit. A fill gas is typically inert. The most commonly used fill gases include argon, krypton and sulfur hexafluoride (SF_6).

3.2.2 *Sealed Insulating Glass Unit*—a pre-assembled unit, comprising lites of glass, which are sealed at the edges and separated by dehydrated space(s), intended for clear 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. Significance and Use

4.1 Air between the lites of an insulating glass unit can be replaced with other gases such as argon, krypton, xenon or SF_6 to modify the thermal or acoustical performance, or both, of the unit.

4.2 The primary use of this test method is as a quality control test for gas filling of insulating glass units.

4.3 This test method can be used to verify and ensure a fill gas percentage during manufacturing.

4.4 This test method is used to calculate the percentage of fill gas.

4.5 This test method does not identify the composition of the fill gas.

NOTE 1—If the atmospheric air is intended to be replaced in total or in part by filling with a gas of known composition, then the user may reasonably infer that the composition of the fill gas in the insulating glass unit is a mixture of the fill gas and atmospheric air.

4.6 Calculation of the thermal performance of an insulating glass unit using fill gas values generated by this test method also requires that the composition of the fill gas in the space between the lites of the sealed insulating glass unit be determined.

4.7 This test method can be used before, during or after accelerated weathering testing.

NOTE 2—Due to differences in diffusion rates of gases into or out of the insulating glass unit, the calculation may only be an approximation if the method is used during or after weathering. Similarly, if a period of time has passed since the original filling of the insulating glass unit then the accuracy of the calculated results may be affected.

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 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.