



Standard Test Method for Determining Argon Concentration in Sealed Insulating Glass Units using Gas Chromatography¹

This standard is issued under the fixed designation E 2269; 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 using gas chromatographs to determine the concentration of argon gas in the space between the panes of sealed insulating glass.

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

1.3 The values stated in metric (SI) units are to be regarded as the standard. The values given in parentheses are for information only.

1.4 *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 162 Terminology of Glass and Glass Products²

C 717 Terminology of Building Seals and Sealants³

E 355 Practice for Gas Chromatography Terms and Relationships⁴

E 631 Terminology of Building Constructions⁵

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

E 2188 Test Method for Insulating Glass Unit Performance³

3. Terminology

3.1 **Definitions**—For definitions of terms found in this standard, refer to Terminologies C 162, C 717, 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 panes of a sealed insulating glass unit. a fill gas is typically inert. the most commonly used fill gases include argon, krypton and sulfur hexafluoride (SF₆).

3.2.2 **sealed insulating glass unit**—a pre-assembled unit, comprising sealed panes of glass 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 windows or doors.

4. Significance and Use

4.1 This test method is intended to provide a means for determining the concentration of argon, oxygen, and nitrogen gases, in individual sealed insulating glass units, which were intended to be filled with a specific concentration of argon at the time of manufacture.

4.2 The argon, oxygen and nitrogen are physically separated by gas chromatography and compared to corresponding components separated under similar conditions from a reference standard mixture or mixtures of known composition.

4.3 The composition of the sample is calculated from the chromatogram by comparing the area under the curve of each component with the area under the curve of the corresponding component on the reference standard chromatogram.

4.4 It is essential that the person or persons performing this test are very knowledgeable about the principles and techniques of gas chromatography, operation and calibration of gas chromatographs. More information can be found in Practice E 355.

4.5 It takes time for the fill gas to equilibrate in any insulating glass unit. This is particularly important in insulating glass units using a tubular spacer and in units containing interior components such as tubular muntin bars. Performing this test before a unit has equilibrated could result in fill gas concentrations that are measurably different than the actual fill gas concentration.

4.6 This method may be used to determine the initial argon gas concentration achieved by the filling method, or the argon gas concentration in units which have been in service or which have been subjected to durability tests such as those described in Test Methods E 773 and E 2188.

4.7 This method is not applicable to units filled with mixtures of argon and gases other than air.

4.8 This is a destructive test method in that the edge seal of the insulating glass unit is breached in order to obtain a gas sample for analysis by gas chromatography.

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.

Current edition approved Sept. 10, 2003. Published October 2003.

² *Annual Book of ASTM Standards*, Vol 15.02.

³ *Annual Book of ASTM Standards*, Vol 04.07.

⁴ *Annual Book of ASTM Standards*, Vol 14.02.

⁵ *Annual Book of ASTM Standards*, Vol 04.11.