



Designation: F 105 – 72 (Reapproved 1995)^{ε1}

AMERICAN SOCIETY FOR TESTING AND MATERIALS
100 Barr Harbor Dr., West Conshohocken, PA 19428
Reprinted from the Annual Book of ASTM Standards. Copyright ASTM

Standard Specification for Type 58 Borosilicate Sealing Glass¹

This standard is issued under the fixed designation F 105; 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.

^{ε1} NOTE—Editorial changes were made throughout in November 1995.

1. Scope

1.1 This specification covers Type 58 borosilicate sealing glass for use in electronic applications.

NOTE 1—This specification is primarily intended to consider glass as most generally used, that is, glass in its transparent form as normally encountered in fabricating electronic devices. X1.3 refers to a sealing alloy that is compatible with this glass. Type 58 glass in other forms such as powdered, crushed, sintered, fibrous, etc., are excluded. The requirements of this specification, as applied to these forms, must be established in the raw glass prior to its conversion.

2. Referenced Documents

2.1 ASTM Standards:

C 336 Test Method for Annealing Point and Strain Point of Glass by Fiber Elongation²

C 338 Test Method for Softening Point of Glass²

C 598 Test Method for Annealing Point and Strain Point of Glass by Beam Bending²

D 150 Test Methods for ac Loss Characteristics and Permittivity (Dielectric Constant) of Solid Electrical Insulating Materials³

D 257 Test Methods for dc Resistance or Conductance of Insulating Materials³

E 29 Practice for Using Significant Digits in Test Data to Determine Conformance with Specification⁴

E 228 Test Method for Linear Thermal Expansion of Solid Materials With a Vitreous Silica Dilatometer⁴

F 14 Practice for Making and Testing Reference Glass-Metal Bead-Seal²

F 15 Specification for Iron-Nickel-Cobalt Sealing Alloy⁵

F 140 Practice for Making Reference Glass-Metal Butt Seals and Testing for Expansion Characteristics by Polarimetric Methods²

F 144 Practice for Making Reference Glass-Metal Sandwich Seal and Testing for Expansion Characteristics by

Polarimetric Methods²

3. Ordering Information

3.1 Orders for material under this specification shall include the following information:

3.1.1 Form,

3.1.2 Type of glass,

3.1.3 Dimensions,

3.1.4 Marking and packaging, and

3.1.5 Certification (if required).

4. Chemical Composition

4.1 The typical chemical composition of this glass is as follows (Note 2):

	Weight %
Major Constituents:	
Silica (SiO ₂)	65.0
Alumina (Al ₂ O ₃)	7.5
Boron oxide (B ₂ O ₃)	18.0
Soda (Na ₂ O)	2.0
Potash (K ₂ O)	3.0
Barium oxide (BaO)	3.0
Minor Constituents:	
Lithium oxide (Li ₂ O)	0.6
Fluorine (F)	0.6, max
Reducible oxides (Note 3)	0.05, max

NOTE 2—Major constituents may be adjusted to give the desired electrical and physical properties to the glass. However, no change shall be made that alters any of these properties without due notification of, and approval by, the user.

NOTE 3—Total of arsenic trioxide (As₂O₃), antimony trioxide (Sb₂O₃), and lead oxide (PbO).

5. Physical Requirements

5.1 The material shall conform to the physical properties prescribed in Table 1. For electrical properties see Table 2, and its Footnote A.

6. Finish and Workmanship

6.1 The glass shall have a finish that ensures smooth, even surfaces and freedom from cracks, checks, bubbles, and other flaws of a character detrimental to the strength or life of the component or device for which its use is intended.

7. Test Methods

7.1 *Softening Point*—Test Method C 338.

¹ This specification is under the jurisdiction of ASTM Committee C-14 on Glass and Glass Products and is the direct responsibility of Subcommittee C14.04 on Physical and Mechanical Properties.

Current edition approved Nov. 10, 1995. Published January 1996. Originally published as F 105 – 68 T. Last previous edition F 105 – 72 (1991).

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

³ *Annual Book of ASTM Standards*, Vol 10.01.

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

⁵ *Annual Book of ASTM Standards*, Vol 10.04.