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Standard Specification for Type 101 Sealing Glass¹

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1. Scope

1.1 This specification covers Type 101 sealing glass for use in electronic applications.

NOTE 1—This specification is primarily intended to consider glass as most generally used, this is, glass in its transparent form as normally encountered in fabricating electronic devices. X1.3 lists sealing metals and alloys that are compatible with this glass. Type 101 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*:²

C336 Test Method for Annealing Point and Strain Point of Glass by Fiber Elongation

C338 Test Method for Softening Point of Glass

C598 Test Method for Annealing Point and Strain Point of Glass by Beam Bending

D150 Test Methods for AC Loss Characteristics and Permittivity (Dielectric Constant) of Solid Electrical Insulation

D257 Test Methods for DC Resistance or Conductance of Insulating Materials

E29 Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications

E228 Test Method for Linear Thermal Expansion of Solid Materials With a Push-Rod Dilatometer

F14 Practice for Making and Testing Reference Glass-Metal Bead-Seal

F140 Practice for Making Reference Glass-Metal Butt Seals and Testing for Expansion Characteristics by Polarimetric Methods

F144 Practice for Making Reference Glass-Metal Sandwich Seal and Testing for Expansion Characteristics by Polarimetric Methods

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

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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.

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):

Major Constituents	Weight %
Silica (SiO ₂)	56.0
Alumina (Al ₂ O ₃)	1.5
Soda (Na ₂ O)	4.0
Potash (K ₂ O)	8.5
Lead oxide (PbO)	29.0
Antimony trioxide (Sb ₂ O ₃)	1.0, max
Arsenic trioxide (As ₂ O ₃)	1.0, max
Halogens	0.2, 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.

5. Physical Properties

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. Workmanship, Finish, and Appearance

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*—See Test Method C338.

7.2 *Annealing Point*—See Test Method C336 or Test Method C598.

7.3 *Thermal Expansion Coefficient*—Pretreat the specimen by heating to 10°C above the annealing point and hold it at that