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Standard Specification for Secondary Edge Sealants for Structurally Glazed Insulating Glass Units¹

This standard is issued under the fixed designation C 1369; 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 This specification is under the jurisdiction of ASTM Committee C-24 on Building Seals and Sealants and is the direct responsibility of Subcommittee C24.35 on Structural Sealants.

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1. Scope

1.1 This specification ~~covers~~ describes the properties of cold, liquid-applied, single or multi-component, chemically curing, elastomeric sealants used as the secondary seal of sealed insulating glass units, hereinafter referred to as the “sealant” (see Fig. 1). These sealants are intended to be a structural component of sealed insulating glass (IG) units used in structural sealant glazing (hereinafter referred to as SSG). ~~Hereinafter, the term “insulating glass” will be referred to as IG.~~ Presently only certain silicone sealants are recognized as having the necessary durability for use as secondary sealant in IG units in ~~structural glazing~~ SSG applications.

1.2 This specification does not describe all of the necessary properties of the sealant. Only those properties for which there are ASTM test methods and industry-agreed-upon minimum acceptable test requirements are described by this specification. Additional properties will be added as ASTM test methods for these properties become available.

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

2. Referenced Documents

2.1 ASTM Standards:

C 603 Test Method for Extrusion Rate and Application Life of Elastomeric Sealants²

C 639 Test Method for Rheological (Flow) Properties of Elastomeric Sealants²

C 661 Test Method for Indentation Hardness of Elastomeric-Type Sealants by Means of a Durometer²

C 679 Test Method for Tack-Free Time of Elastomeric Sealants²

C 717 Terminology of Building Seals and Sealants²

C 792 Test Method for Effects of Heat Aging on Weight Loss, Cracking, and Chalking of Elastomeric Sealants²

C 1135 Test Method for Determining Tensile Adhesion Properties of Structural Sealants²

C 1184 Specification for Structural Silicone Sealants²

C 1265 Test Method for Determining the Tensile Properties of an Insulating Glass Edge Seal for Structural Glazing Applications²

3. Terminology

3.1 *Definitions*—Refer to Terminology C 717 for definitions of the following terms used in this specification: chemically curing sealant, compatibility, cure, cured, elastomeric, hardness, non-sag sealant, sealant, shelf life, silicone sealant, and substrate.

4. Classification of Sealants

4.1 A sealant qualifying under this specification shall be classified as to type and use as follows:

4.1.1 *Type S*—A single-component sealant.

4.1.2 *Type M*—A multi-component sealant.

4.1.3 *Use G*—A sealant that meets the requirements of this specification when tested on clear, uncoated float glass substrates.

² Annual Book of ASTM Standards, Vol 04.07.

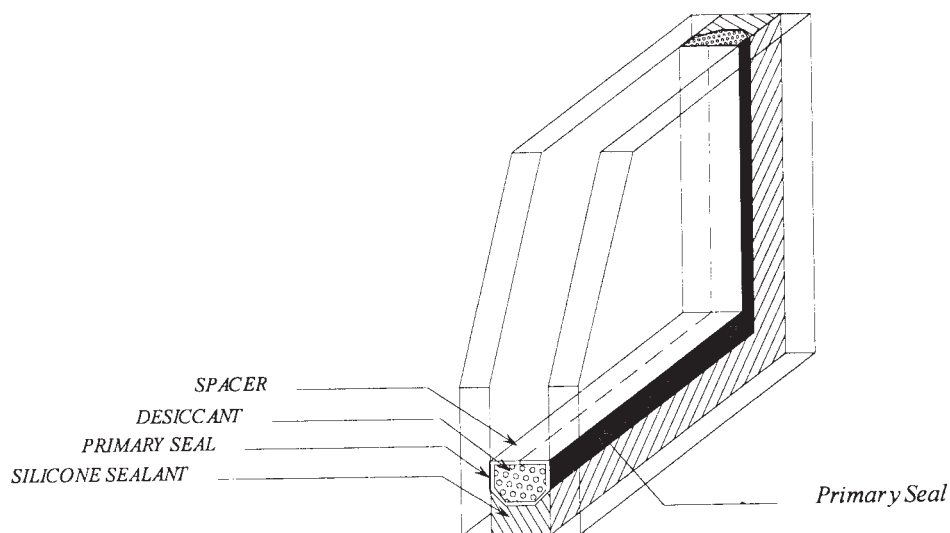


FIG. 1 Cutaway Section of IG Unit Edge Seal

4.1.4 *Use O*—A sealant that meets the requirements of this specification when tested on coatings³ such as reflective and low-emissivity metallic materials applied to glass substrates.

5. Materials and Manufacture

5.1 *Sealant:*

5.1.1 Furnish single-component sealants as a homogeneous mixture of a consistency suitable for application. Apply the sealant in strict accordance with the written recommendations of the sealant manufacturer. The cured sealant shall be an elastomeric solid.

5.1.2 Multi-component sealants shall be mixed in the correct ratio⁴ of components and delivered by appropriate equipment as specified by the sealant manufacturer.

6. Requirements

6.1 The physical, mechanical, and performance properties of the sealant shall conform to the requirements described in Table 1.

6.2 The standard substrate for this specification is clear, uncoated float glass. If metallic coated⁵ glass substrates are to be qualified under by this specification, they shall be tested by Test Method C 1135 as required in 8.1.6.

6.3 The sealant shall be compatible with the components of the edge seal.

³ Reflective and low-emissivity metallic materials are typical coatings applied to the glass substrate. If the coatings are edge deleted for actual production, they should be edge deleted for use in this specification.

⁴ If the mix ratio of multi-component sealant is not within the sealant manufacturers recommendations, the cure rate, tack free time, cohesive strength, and adhesive strength of the sealant can be adversely affected.

⁵ Metallic coatings that require a sealed air space are typically edge deleted in regular production. They must also be edge deleted for this testing.

TABLE 1 Requirements for Physical, Mechanical, and Performance Qualities of the Sealant

| Property | Requirements | Test Method |
|--------------------------|-------------------|-------------|
| <i>Extrudability</i> | 10 s, max | C 603 |
| <i>Rheological, max</i> | | C 639 |
| Vertical | 4.8 mm (3/16 in.) | |
| Horizontal | none | |
| <i>Hardness, Shore A</i> | 20 to 60 | C 661 |
| <i>Heat Aging</i> | | C 792 |
| Weight Loss, max | 10 % | |
| Cracking | none | |
| Chalking | none | |
| <i>Durability</i> | | |
| Tensile Value, min | | 8.1.6 |
| Standard Conditions | 345 kPa (50 psi) | |
| 88°C (190°F) | 345 kPa (50 psi) | |
| -29°C (-20°F) | 345 kPa (50 psi) | |
| Water Immersion | 345 kPa (50 psi) | |
| 5000h Weathering | 345 kPa (50 psi) | |
| Shelf Life, min | 6 months | 8.1.7 |

7. Significance and Use

7.1 Not all sealants meeting this specification should be presumed to be suitable for all applications and all substrates. This specification assists in selecting sealants that meet certain minimum standards of performance.

7.2 This specification does not evaluate the adhesion of the secondary sealant to the IG unit spacer. Adhesion of the secondary sealant to the spacer is generally considered necessary for the successful performance of the IG unit edge seal.

7.3 When specifying a sealant using this specification, it is essential that the applicable type and use also be included in the requirements. This will ensure that the proper sealant is provided for the intended use.

7.4 IG units ~~used under~~ qualified by this specification shall have a low moisture vapor transmission sealant for a primary seal and a structural silicone sealant for a secondary seal.

7.5 This specification does not address appropriate sealant stiffness since the appropriate stiffness is a function of the particular insulating glass system in which the sealant is used (that is, varies with spacer, shape and set back, and sealant configuration). Test Method C 1265 can assist in evaluating these aspects of the sealant in a particular ~~insulating glass~~ IG system.

8. Test Methods

8.1 Sealant:

8.1.1 *Extrudability*—See Test Method C 603.

8.1.2 *Rheological Properties*—See Test Method C 639, using test procedures for Type II and IV sealants.

8.1.3 *Hardness*—See Test Method C 661, using a Type A-2 durometer.

8.1.4 *Heat Aging*—See Test Method C 792, using a temperature of $88 \pm 5^\circ\text{C}$ ($190 \pm 10^\circ\text{F}$).

8.1.5 *Tack Free Time*—See Test Method C 679.

8.1.6 *Durability*—See Test Method C 1135 as modified in 8.6 through 8.6.2.5 of Specification C 1184. (See Table 1.)

8.1.7 *Shelf Life*—Meet the requirements of Table 1 when the sealant has been stored in original, unopened container(s) at temperatures in accordance with recommendations from the manufacturer.

9. Keywords

9.1 edge sealant; IG unit; insulating glass; secondary sealant; structural glazing

APPENDIX

(Nonmandatory Information)

X1. COMMENTARY

X1.1 This specification does not presently address all the performance criteria necessary for an adequate technical description of structural silicone sealants used in insulating glass units. ASTM Committee C-24, Subcommittee C24.35, is in the process of defining other criteria which will be incorporated in this specification. Performance criteria presently under consideration include: durability, fatigue cycling, ultimate elongation, shear value, and long term dead load capacity.

X1.2 Input is requested from users of this specification in helping C24.35 to identify, as well as develop, future performance criteria. Your participation is critical to the timely development of this specification.

X1.3 Subcommittee C24.35 decided that publishing this specification in its present form was necessary for the use by the structural glazing industry even though it is acknowledged to be incomplete and still under development.

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