



Standard Practice for Use of Sealants in Acoustical Applications¹

This standard is issued under the fixed designation C 919; 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 practice is a guide for the use of sealants to reduce the sound transmission characteristics of interior walls, ceilings, and floors by proper application of sealants to joints, voids, and penetrations normally found in building construction.

1.2 *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.*

1.3 The committee with jurisdiction over this standard is not aware of any comparable standards published by other organizations.

2. Referenced Documents

2.1 ASTM Standards:

C 570 Specification for Oil- and Resin-Base Caulking Compound for Building Construction²

C 634 Terminology Relating to Environmental Acoustics³

C 834 Specification for Latex Sealants²

C 920 Specification for Elastomeric Joint Sealants²

E 90 Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions³

E 336 Test Method for Measurement of Airborne Sound Insulation in Buildings³

E 413 Classification for Rating Sound Insulation³

E 497 Practice for Installing Sound-Isolating Lightweight Partitions³

2.2 Federal Specifications:

TT-S-1657 (COM-NBS) Interim Federal Specification for Sealing Compound—Single Component, Butyl Rubber Based, Solvent Release Type (for Buildings and Other Type of Construction)⁴

TT-C-598C (COM-NBS) Interim Federal Specification for Caulking Compound, Oil and Resin Base Type (for Building Construction)⁴

2.3 DHUD Standards:

HUD Minimum Property Standards for One and Two Family Housing, Section 4900.1⁵

HUD Minimum Property Standard for Multi Family Housing, Section 4910.1⁵

HUD Minimum Property Standard for Care Type Housing, Section 4920.1⁵

3. Significance and Use

3.1 Construction utilizing lightweight walls and floors can have undesirable sound transmission characteristics if care is not taken to seal joints and voids that are common to this type of construction. By sealing these penetrations the transmission of sound can be diminished.

4. Sound Transmission Class

4.1 The construction industry has adopted Sound Transmission Class (STC) units (defined in Definitions C 634) to rate the sound barrier properties of walls, ceilings, and floors. The STC is determined in accordance with Classification E 413. The test data are obtained in accordance with Test Methods E 90 or E 336.

NOTE 1—For example, The Department of Housing and Urban Development (DHUD) has issued the following three standards dealing with the STC limitation in various housing units:

HUD Minimum Property Standard for One and Two Family Housing, Section 4900.1;

HUD Minimum Property Standard for Multi Family Housing, Section 4910.1; and

HUD Minimum Property Standard for Care Type Housing, Section 4920.1

5. Need to Seal Openings

5.1 The effect of unsealed openings on the STC of partition walls is shown in Fig. 1. This chart also shows the improvement of the STC when openings are sealed. It should be recognized for slit openings that the STC values may be different from the STC value for a hole opening.

¹ This practice is under the jurisdiction of ASTM Committee C24 on Building Seals and Sealants and is the direct responsibility of Subcommittee C24.10 on Specifications, Guides and Practices.

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² Annual Book of ASTM Standards, Vol 04.07.

³ Annual Book of ASTM Standards, Vol 04.06.

⁴ Available from Standardization Documents Order Desk, Bldg. 4 Section D, 700 Robbins Ave., Philadelphia, PA 19111-5094, Attn: NPODS.

⁵ Available from Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

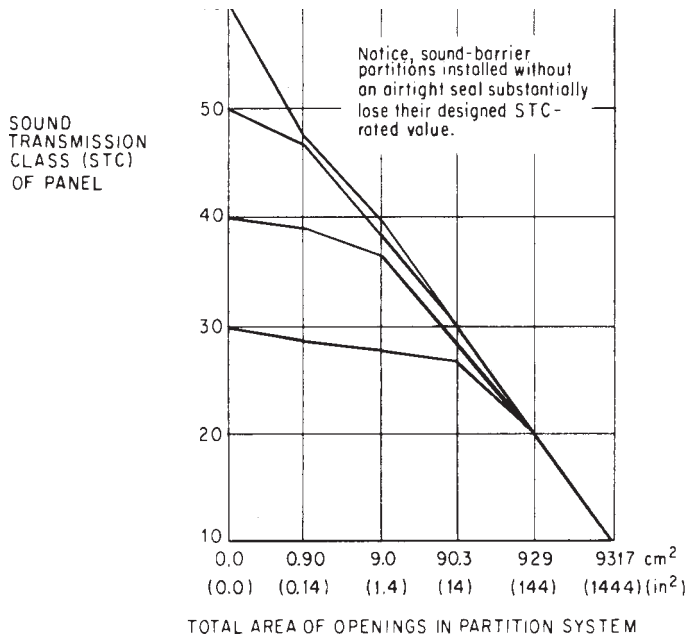


FIG. 1 Effect of Unsealed Hole Openings on STC-Rated Test Wall, 3.8 by 2.4 m (12 ft 6 in. by 8 ft)

5.2 Fig. 2 shows examples of how sound travels through

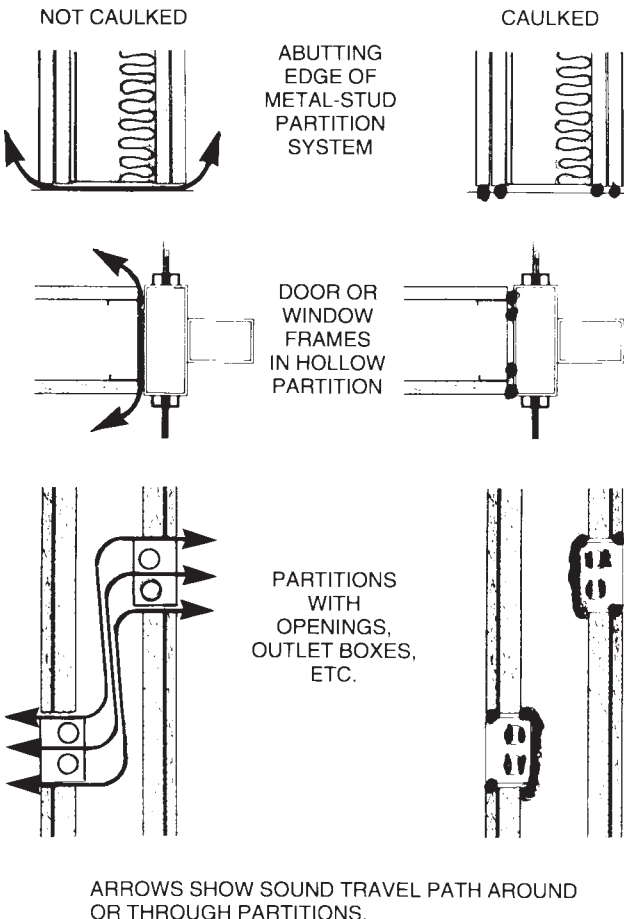


FIG. 2 Examples of Achieving an Effective Sound Barrier and Maintaining the Designed STC Value of Partition Systems

openings in walls and how sealing may serve to minimize sound transmission. Further examples may be found in Practice E 497.

6. Positioning of Sealants

6.1 Fig. 3 illustrates placement of beads of sealant to improve the STC from a value of 29 to a value of 53. Note that two properly placed beads are sufficient and sealing beyond that point is unnecessary.

7. Application Method of Gunnable Sealant

7.1 Fig. 4 shows typical sealant applications.

8. Types of Sealant for Acoustical Improvement

8.1 *Preformed Sealants*—Preformed sealants include gasketing, tapes, and preformed foams. Most of these materials are effective only when the tolerances of the perimeter joints can be accurately predicted and installed to those tolerances. Joint sizes vary widely and preformed sealants may have difficulty in maintaining a proper seal at all points with the constant compression that is necessary to effect a seal. Preformed sealants in the form of pads have proved to be effective for sealing electric, telephone, and television jack boxes.

8.2 *Gunnable Sealants*—These sealants have the capacity of conforming to the wide range of joint sizes encountered in most construction. The following types are available:

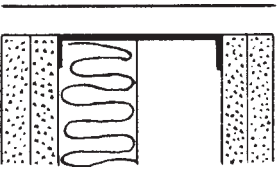
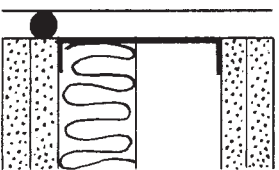
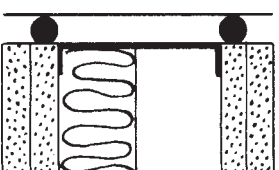
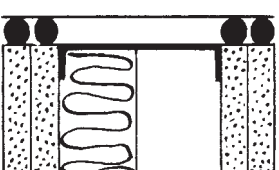
8.2.1 *Skinning and Drying Sealants*—Skinning and drying sealants such as asphalt- and oil-based caulking compounds perform satisfactorily initially but within a short period of time could begin to shrink, harden, crack, and lose adhesion, thereby losing their effectiveness in providing a positive seal. Many of these sealants tend to stain the walls. Specification C 570 and Federal Specification TT-C-598C reference these sealant types.

8.2.2 *Nondrying, Nonhardening, Nonskinning Sealants*—Of all the products evaluated to date, the nondrying, nonhardening, nonskinning types of sealant have proven to be the most effective in reducing sound transmission. By remaining indefinitely flexible as well as permanently adhesive, they can maintain a positive airtight seal. These sealants normally are nonbleeding and will not stain walls. The nonskinning materials should be used only in concealed areas. When used as exposed beads, they may stain through paint or pick up dirt. Federal Specification TT-S-1657 references these sealant types.

8.2.3 *Nonoxidizing, Skinning Sealants*—Sealants that skin, retain flexibility, and maintain adhesion can be effective in reducing sound transmission. These sealants are preferred in exposed bead applications, as they readily accept paint and other finishes. Federal Specification TT-S-1657 references these sealant types.

8.2.4 *Latex-Based Sealants*—Latex-based sealants that retain flexibility and maintain adhesion can be effective in reducing sound transmission. Specification C 834 references these sealant types.

8.2.5 *Chemically Curing Sealants*—Many chemically curing one- and two-part sealants are available. While normally used for exterior seals, they can be effectively used for interior sound reduction. Specification C 920 and Federal Specifications TT-S-227E, TT-S-230C, and TT-S-1543A reference these sealant types.

	Edge Detail	STC Value	Comments
	uncaulked	29	the open-edge track gave the STC value of 29 through direct leakage
	single bead at the perimeter of one base layer	49	this bead closed void but did not seal leakage around the joint between the wallboard and track
	two beads, one under each base layer of gypsum board	53	the beads closed void and sealed leakage around track
	four beads, one under each base and face layer of gypsum board	53	the void is closed; no leaks around track and wallboard

Note—The test partitions consisted of metal studs, 610 mm (24 in.) on center, with double layers of 13-mm (0.5-in.) wallboard screw-attached to each side. Sound attenuation blanket, 38 mm (1.5 in.), was placed in the void. The partition panels were erected, shimmed out 3 mm (0.125 in.) at the periphery: top, bottom, and edges.

Note—Data were obtained from the United States Gypsum Co. Round Lake Acoustical Research Facilities from a study conducted in accordance with Test Method E 336.

FIG. 3 Performance of a Partition System Sealed with Single or Multiple Beads

9. Paintability of Exposed Beads of Sealants

9.1 Sealant beads are usually painted if they are exposed. Because of the wide variety of types and brands of interior paint and the variety of types and brands of sealants, on-site paintability and stain tests are recommended.

9.2 Paint applied before the sealant has cured may crack during the curing process of the sealants. A reasonable sealant cure time should be allowed before painting. The sealant manufacturer should be consulted regarding the recommended cure time prior to painting. (Structural movement may cause paint to crack.)

10. Keywords

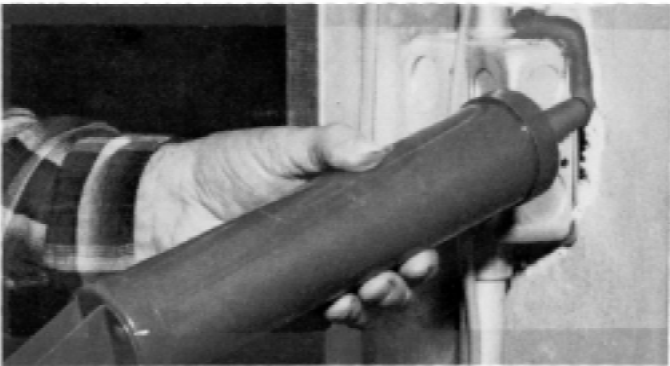
10.1 acoustical; sealants; sound transmission



(a)



(b)



(c)



(d)

FIG. 4 Typical Sealant Application

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