Designation: E 1773 – 00

An American National Standard

Standard Practice for Sealing Rigid Wall Tactical Shelters with Polysulfide Based Sealants[1]

This standard is issued under the fixed designation E 1773; 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.

This standard has been approved for use by agencies of the Department of Defense.

1. Scope

1.1 This practice establishes the recommended procedures for sealing rigid wall tactical shelters. It outlines the recommended techniques for the storage, mixing, handling, and application of polysulfide based sealants.

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.*

2. Referenced Documents

2.1 *ASTM Standards:*

D 907 Terminology of Adhesives[2]

E 1749 Terminology Relating to Rigid Wall Relocatable Shelters[3]

2.2 *Military Specification:*

MIL-S-8802 Sealing Compound, Temperature-Resistant, Intergal Fuel Tank and Fuel Cell Cavities, High Adhesion[4]

2.3 *Other Document:*

AMS 3819 Cleaning Cloths[5]

3. Terminology

3.1 *Definitions*—See Terminology E 1749 for definitions of general terms used in this practice.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *accelerator*—the term *accelerator* is used by sealant formulators to denote an ingredient included in the formulation to accelerate the rate of cure. It is also used separately in a mixture to accelerate surface curing only of applied polysulfide sealant, that is, tack free time accelerator.

3.2.2 *adhesion*—see Terminology D 907.

3.2.3 *application time (sealants)*—the time available for sealant application after mixing or time available after thawing a premixed and frozen cartridge of sealant.

3.2.3.1 *Discussion*—Acceptability limits for Class B extrudable sealants are expressed in terms of the extrusion rate of a sealant from a 6 fl oz (180 mL) cartridge through a nozzle with a 0.125 in. (3.2 mm) diameter orifice, using air pressure of 90 ± 5 psi (620 ± 34 kPa) in a pneumatic sealant gun. The extrusion rate is expressed in grams per minute or on cc per minute. A minimum extrusion rate after the stated application time is given as the acceptable limit. Sealant applied after the application time is exceeded tends not to wet the surface well and thus not to form a good bond. This term should not be used interchangeably with work life.

3.2.4 *assembly time*—the amount of time available after a two-part sealant is mixed, before the faying surfaces, to which sealant is applied, shall be assembled and the sealant squeezed out.

3.2.4.1 *Discussion*—If the assembly time is exceeded, the cure will have progressed too far to permit most of the sealant to be squeezed out for the desired surface to surface contact. The term assembly time is used in reference to faying-surface sealants. Also called work life and open time.

3.2.5 *base compound*—the major component of a two-part curing sealant that contains the polysulfide polymer.

3.2.6 *bridging*—see Terminology E 1749.

3.2.7 *cartridge*—a plastic container which contains an integral plunger.

3.2.7.1 *Discussion*—The cartridge is used to contain either a frozen quantity of premixed base compound and curing compound or simply the base compound in unmixed injection kits.

3.2.8 *cohesion strength (sealant)*—the internal forces holding a cured sealant together.

3.2.9 *contaminant*—any foreign substance that degrades the performance of the sealant.

3.2.10 *cure rate*—the rate at which a sealant polymerizes or crosslinks (that is, solidifies), a measure of which is the hardness of a sealant at a specified cure time.

[1] This practice is under the jurisdiction of ASTM Committee E-6 on Performance of Buildings and is the direct responsibility of Subcommittee E06.53 on Materials and Processes for Durable Rigidwall Relocatable Structures.

Current edition approved May 10, 2000. Published July 2000. Originally published as E 1773–95. Last previous edition E 1773–95.

[2] *Annual Book of ASTM Standards*, Vol 15.06.

[3] *Annual Book of ASTM Standards*, Vol 04.11.

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

[5] Available from SAE, 400 Commonwealth Dr., Warrendale, PA 15096.

3.2.11 *cure time (sealants)*—the time required for a sealant to polymerize and develop its full physical/mechanical properties.

3.2.11.1 *Discussion*—In practice, however, it is the time required to reach a designated hardness.

3.2.12 *curing compound*—the crosslinking agent for the base compound.

3.2.13 *hardness*—see **Shore A hardness** and **REX Hardness** in Terminology E 1749.

3.2.14 *interference seal*—a seal produced between a given diameter mechanical fastener and a smaller diameter hole in a member into which it is inserted.

3.2.14.1 *Discussion*—An interference seal is also produced when a fastener shank is expanded by the installation process.

3.2.15 *primary seal*—a seal which, in combination with the structure and optional brush coat or secondary seal, forms a continuous, durable seal in the sealing plane and requires no additional seals.

3.2.16 *self-sealing fastener*—a fastener that provides a tight seal without the need for sealant materials or the use of a mechanical seal.

3.2.16.1 *Discussion*—An interference fit fastener is an example.

3.2.17 *tack free time*—the time required for a curing sealant to lose its surface tackiness to polyethylene.

3.2.17.1 *Discussion*—Refer to MIL-S-8802.

3.2.18 *tooled fillet*—a fillet formed by working an applied bead of sealant to a feathered edge using a shaped tool.

3.2.18.1 *Discussion*—The goal is to ensure good surface contact at the feathered edges, to eliminate voids, trapped air and reentrant edges, and to produce a contour of the correct thickness and shape over the area being sealed.

3.2.19 *two-component sealant injection kit*—a kit designed for the mixing and application of a two part sealant. The kit consists of a plastic (usually polyethylene) cartridge filled with base compound, a hollow dasher rod containing curing compound, and a plunger. The dasher rod extends into one end of the cartridge; at the end of the dasher rod inside the cartridge, a multi-armed agitator is attached. The plunger caps the other end of the cartridge.

3.2.19.1 *Discussion*—To use, a ram rod is inserted into the dasher rod and the curing compound is forced into the base compound. The dasher rod is then pulled back and forth at a specified rate with periodic rotation to add to the efficiency of the agitator. When the sealant is mixed thoroughly, the dasher rod is unscrewed from the agitator and removed. A nozzle is screwed onto the cartridge and the unit inserted into a sealant gun. Sealant is dispensed as the plunger is pushed further into the cartridge.

3.2.20 *wet installed fasteners*—fasteners that are coated on the shank and under the head with a curing-type sealant to provide a corrosion barrier and a secondary seal.

4. Significance and Use

4.1 This recommended practice is intended to provide information on the storage, mixing, handling and application of polysulfide based sealants. Tooling and equipment requirements for the satisfactory application of the sealants to joints in tactical shelters are also provided.

5. Hazards

5.1 *Materials*—The precautions outlined in the manufacturers' material safety data sheets (MSDS) for the materials being used shall become a part of this practice.

5.2 *Work Place*:

5.2.1 All lights and other electrical equipment used for the sealant application within an enclosed shelter shall be explosion proof. Extension cords shall be long enough to make electrical connections outside the shelter.

5.2.2 When use of compressed air is required, proper safety equipment shall be provided and used.

6. Storage

6.1 *Premixed and Frozen Sealant*—Sealants that are supplied premixed and frozen shall be stored in a cold box or a room maintained at −40 ± 5°F (−40 ± 2.8°C).

6.2 *Two-Component Sealant Kits*—Two-component sealants supplied as either injection kits or bulk sealant kits shall be stored in areas maintained at a temperature not to exceed 80°F (27°C).

7. Labeling

7.1 Sealant containers shall have attached labels which clearly identify the product, manufacturer, matched base and curing compounds (if applicable), batch and lot numbers, date of manufacture, recommended mix ratio (if applicable), and expiration date under specified storage conditions.

8. Material Handling

8.1 *Premixed and Frozen*—Sealants are supplied premixed and frozen, used prior to the manufacturer's expiration date on the label, and shall be ready for immediate use following thawing of the contents. With the addition of a nozzle, the material is dispensed directly from the cartridge.

8.2 *Two-Component Sealant Injection Kits*—Sealants supplied in this form shall be mixed according to the manufacturer's instructions and used before the expiration date provided on the label and within the application time determined for that sealant.

8.3 *Bulk Sealant*—Two-part sealants are supplied in a wide range of kit sizes from ½ pt to 50 gal drums plus 5 gal pail of curing compound. In every case there is a small percentage of extra curing compound included, ranging from 2 to 10 % to compensate for losses in the transfer of the curing compound. Although kit sizes are generally quoted in terms of volume, the base and curing compound are matched on basis of weight ratio. Both weight and volume ratio are usually included on the label.

8.3.1 *Mixing*:

8.3.1.1 *Hand Mixing*—Kits under 5 gal are packaged such that the base compound container will permit the addition and mixing of the curing compound. Mix the entire kit at one time and use ALL the curing compound. By mixing and using the entire kit at once, the user is assured that the correct amounts have been used and the resultant sealant properties will be those expected. Some of the pitfalls of attempting to use partial kits include: (*1*) the possible use of incorrect ratio; (*2*) incorrect weighing; (*3*) failure to thoroughly stir the curing compound