Thermosil T7000

Heat-Resistant Abradable Sealant

Thermosil T7000 is a 2-part (A/B), low-density silicone sealant used to create an abradable air seal for high-speed compressor blades in jet turbines. Thermosil T7000 meets the following OEM specifications:

- PWA 407
- GE A15F18A1/A15F18B1
- Honeywell EMS53163 Type I and Type II

Thermosil T7000 provides a securely cross-linked glass-polymer matrix that will not degrade during aggressive mixing or application, ensuring consistent hardness and durability throughout the product life cycle. Glass agglomerates — that can clog turbine vane cooling holes and contribute to premature erosion and seal failure — are eliminated during the manufacturing process for optimum sealing and compressor performance. T7000 can withstand operating temperatures up to 525˚F (274˚C).

Thermosil T7000 is available in a 2.74 kg two-part (A/B) kit, or in pre-measured void-free A/B injection cartridges. Thermosil T7000 is a nontoxic, nonhazardous material.

Application Information

Curing Inhibition

Thermosil T7000 is a platinum-catalyzed addition reaction silicone rubber. The curing mechanism is sensitive to inhibition by amines, sulfur, or tin-catalyzed rubbers.

High Adhesion Warning

Thermosil T7000 exhibits enhanced adhesion qualities. All molds and tooling coming in contact with T7000 must be pre-treated with a suitable mold release.

Mixing and Handling

Thermosil T7000 is designed to be mixed by automated mixing equipment specific to that purpose. The following containers and tools are approved for handling this material:

- Stainless steel, glass, or high-density polyethylene (HDPE) containers
- Stainless steel or HDPE hand tools
- Stainless steel mixing equipment

Clean all tools and equipment thoroughly after use. Clean with mineral spirits, followed by a solvent rinse.

Applying The Product

A standard application of Thermosil T7000 requires a clean surface and the use of a primer. Clean and prepare surfaces with a solvent wash, degreaser, or abrasion.

Component Matching

Thermosil T7000 is supplied as a 2-part (A/B) kit. Mix the product using the specific Part A and Part B components supplied with the kit. Using a different Part A or Part B component may affect product properties.

Automated Mixing

This data sheet provides general mixing instructions for Thermosil T7000 using industry-standard automated mixing equipment (see page 2). FMi Chemical recommends the use of automated mixing equipment for Thermosil T7000. Mix times can vary using alternative methods. For questions about mixing this product, please contact FMi Chemical.

PLEASE READ THE SAFETY DATA SHEET BEFORE USING THIS PRODUCT.

Mixing Full 2.74 kg Thermosil T7000 Kits

Step 1: Transferring Components

Transfer the contents of Part A to a mixing vessel that is 2 to 3 times larger than the total amount of material to be mixed. Scrape the interior sides and bottom of the container with a high-density polyethylene (HDPE) spatula to ensure all the material is transferred. The use of HDPE utensils is recommended to prevent scratching the container surface.

Add the contents of the Part B container to the mixing vessel. Use (1) full Part B component for every (1) full Part A component being mixed. Only use the A and B components from the same kit.

Step 2: Mixing

There are two methods for mixing Thermosil T7000. The preferred method is to mix the components and vacuum simultaneously (see Step 2a). The other method is to mix the components together first, then vacuum out the excess air to eliminate any voids in the final material (see Step 2b).

Step 2a: Simultaneous Mixing and Vacuuming

Once the A and B components have been transferred to the mixing vessel, activate the vacuum unit before turning on the mixer. Pull a vacuum of <1 Torr (-29.9 in. Hg gauge) minimum. When the proper vacuum is reached, start the mixer and mix at 90 RPM for 15 minutes, maintaining the vacuum as specified. Ensure that the temperature of the product does not exceed 90˚F (32˚C). Properly mixed and vacuumed material will appear glassy, with no evidence of bubbles, pin-holes, or other imperfections.

Step 2b: Sequential Mixing then Vacuuming

Once the A and B components have been transferred to the mixing vessel, activate the mixer and mix at 90 RPM for 15 minutes taking care not to mix air into the material. Ensure that the temperature of the product does not exceed 90˚F (32˚C).

After the mixing period is complete, place the material under vacuum at a minimum <1 Torr (-29.9 in. Hg gauge). During the vacuum process, the material will rise and fall indicating that air is being evacuated.

IMPORTANT: If the material does not rise and fall on its own, you must release the vacuum and restart it, several times if necessary, until the material begins to rise and fall by itself under full vacuum. Continue to vacuum the mixed material at a minimum <1 Torr (-29.9 in. Hg gauge) until the surface appears glassy, with no evidence of bubbles, pin-holes, or other imperfections.

Mixing Partial Thermosil T7000 Kits

The most accurate and optimum results are achieved by mixing a full Thermosil T7000 kit. However, smaller quantities can be prepared with careful measuring and mixing as follows:

Preparing Part A

Before dispensing the desired amount of component A from its container, the entire container of material must be mixed thoroughly. This will homogenize the material, evenly dispersing any glass microspheres that may have risen to the surface during storage. Use a suitable mixing blade, turning at 40 RPM. Once thoroughly mixed, a measured quantity (by weight) of component A can be transferred to a mixing vessel.

Adding Part B

Add the appropriate proportional amount of component B to the vessel (A:B ratio-by-weight = 10:1). Then, follow the mixing instructions for a full kit as described in Steps 1–2 above.

Mixing Note: The exact time required to achieve completely void-free material will vary as a function of the mass of the material being processed, the vacuum pressure, the leak rate of the entire vacuum system, and the temperature of the material.

Mixing Thermosil T7000 Cartridges

The following are general mixing instructions using an industry-standard automated mixer. FMi Chemical recommends the use of automated mixing equipment for Thermosil T7000 A/B injection cartridges. Thread the Part B dasher rod into the spoker at the top of the Part A cartridge. If applicable, use a ramrod to inject Part B into the middle of Part A. Install the joined cartridge and dasher rod unit into the mixer and adjust the mixer's settings for the correct cartridge size. Mix the material for 70 strokes, or 2.5 minutes (00:02:30) at 90 rpm. When mixing is complete, pull the spoker to the top of the cartridge, unthread the dasher rod, and install the cartridge in a pneumatic or mechanical dispensing gun. For more information about automated mixing procedures, mixing various cartridge sizes, or alternative mixing methods, please contact FMi Chemical.

Tooling

Thermosil T7000 can be tooled with acetone, methyl ethyl ketone (MEK), or isopropyl alcohol (IPA).

Storage, Shelf Life and Recertification

Thermosil T7000 has a shelf-life of nine (9) months from the date of manufacture when stored in its original, unopened containers at temperatures not exceeding 90˚F (32˚C). FMi Chemical offers recertification of its products where permitted. Please contact FMi for details.

Thermosil T7000 Uncured Properties	Part A	Part B
Viscosity	2900 Poise	N/A
Color	Black	Clear
Parts A and B mixed at 75˚F (24˚C) at 50% relative humidity		
Mix ratio A:B (Parts by weight)	10:1	
Mixed Viscosity	1850 Poise	
Working Life	> 24 hours	
Thermosil T7000 Cured Properties — Cured 1 hour at 300˚F (149˚C) and post cured 1 hour at 400˚F (204˚C)		
Color	Black	
Specific Gravity	0.74	
Tensile Strength	300 psi	
Elongation	110%	
Lap Shear Strength	200 psi	
Cohesive Failure	100%	
Hardness	56 Duro A	
Hardness (24 hours at 600˚F (316˚C) — Mold A)	60 Duro A	
Weight Loss (24 hours at 600˚F (316˚C))	10%	

Typical manufactured properties should not be used as specifications.

Thermosil T7000 Curing Times per OEM Specifications		
OEM Specification	**Curing Times**	**Special Instructions**
PWA 407	Cure: 1 hour at 300˚F Post Cure: 1 hour at 400˚F	Add a heat soak period, as needed, to achieve the recommended temperatures.
GE A15F18A1	Cure: 2.25 hours at 300˚F Post Cure: 1 hour at 400˚F	Add a heat soak period, as needed, to achieve the recommended temperatures.
GE A15F18B1	Cure: 1 hour at 300˚F Post Cure: 1 hour at 400˚F	Add a heat soak period, as needed, to achieve the recommended temperatures.
Honeywell EMS53163 Type I	Cure: 1 hour (+/- 0.1 hr) at 300˚– 325˚F Post Cure: 1 hour (+/- 0.1 hr) at 400˚– 425˚F	Add a heat soak period, as needed, to achieve the recommended temperatures. The elapsed time between completion of curing and initiation of post curing should not exceed 2 hours.
Honeywell EMS53163 Type II	Cure: 1 hour (minimum) at 175˚–185˚F Post Cure: 4 hours (minimum) at 175˚–185˚F	Add a heat soak period, as needed, to achieve the recommended temperatures. The elapsed time between completion of curing and initiation of post curing should not exceed 2 hours.