

PRC[®] and Pro-Seal[®]
aerospace sealants application guide

Introduction

PRC-DeSoto International PRC®, Pro-Sea®, Permapol® P-3 and P-3.1 brand products are designed for interior/exterior aircraft sealing and coating applications. Polysulfide and Polythioether compounds are used for fuel tank sealing, corrosion inhibition, aero-smoothing, electrical insulation, windshield/canopy sealing, priming and topcoating.

Note: It is important to read and understand the MSDS, process specification, and technical data sheet before working with these products.

Surface preparation

Immediately before applying sealant to substrates, the surfaces should be cleaned with a solvent i.e., Desoclean® or any other approved solvent. Any existing sealant should be removed mechanically or with an appropriate chemical stripper taking care not to damage the substrate. Contaminants such as dirt, grease, and/or processing lubricants must be removed to insure good adhesion prior to sealant application.

A progressive cleaning procedure should be employed using the appropriate solvents and new lint free cloth conforming to AMS 3819. (reclaimed solvents or tissue paper cannot be used).

A progressive cleaning procedure consists of wiping in one direction to remove the dirt from the substrate, not just move it around the substrate.

Always pour solvent on the cloth to avoid contaminating the solvent supply. Wash one small area at a time.

It is important that the surface is dried with a second clean cloth prior to the solvent evaporating to prevent the redeposition of contaminants on the substrate.

Substrate composition can vary greatly. This can affect sealant adhesion. It is recommended that adhesion characteristics to a specific substrate be determined prior to application of sealant on production parts or assemblies.

Adhesion Promoters

Adhesion promoters can greatly enhance sealant adhesion to a substrate. The use of an adhesion promoters is strongly recommended under the following circumstances:

1. Repair applications where fresh sealant will be applied over aged fuel soaked sealant.
 - Polysulfide over Polysulfide - (PR-148, PR-182 or PR-188)
 - Polythioether over Polysulfide - (PR-187 or PR-188)
2. When bonding to Titanium, Stainless Steel or oxidizing and difficult to bond to substrates.

For a more thorough discussion of proper surface preparation, please consult the SAE Aerospace Information Report AIR 4069. This document is available through SAE, 400 Commonwealth Avenue, Warrendale, PA 15096-0001.

Packaging

PRC-DeSoto International Sealants are generally available in different package configurations:

1. Two-part can kits (Polysulfide only): Packaged with part A (Accelerator) and part B (Base) pre-measured into separate containers.
2. Semkit® package: A complete pre-measured package assembly that mixes, and applies sealant. Semkit® packages minimize the labor intensive task of measuring and handling materials, and prevent contamination when opening and closing cans kits. A complete selection of application nozzles are available.
3. Premixed and Frozen (PMF): Pre-measured and mixed material that is frozen and must be stored at extreme low temperature. PMF material is shipped in dry ice and supplied in Semco Cartridges. It is the most convenient package configuration for high usage applications - simply thaw and use.
4. Form-In-Place (FIP): Pre-mixed and frozen strips of sealant designed for the fabrication of form-in-place gaskets.
5. Seal Caps: Molded and cured sealant caps filled with Pre-mixed and frozen sealant.

Preparation of Material for Use

Two-part can kits

Proper mixing and correct component proportions are extremely important to assure optimal results.

1. Kits consist of the pre-measured proportions of base compound (part B - large can) and accelerator (part A - small can). The entire contents of both containers are intended for mix at one time.
2. Before using material, read and understand the process specification and the Material Safety Data Sheet (MSDS), which provides information on health, physical and environmental hazards, handling precautions and first aid recommendations.
3. The accelerator component may settle. Thoroughly stir part A in the original container with a flat metal spatula until an even consistency is obtained.
4. Create a welled depression in the center of the part B material for receiving the part A component. This will aid in mixing.
5. Slowly stir the entire contents of part A into the well formed in the part B material and thoroughly mix to uniformity for approximately 7 to 10 minutes.
6. Scrape the sides and bottom of the container to include all compound in the mixture and assure uniform blending. The mixing spatula should also be scraped clean periodically.

7. When mixing is complete remove some material and spread it out on a light colored cardboard or other material. Examine the material for striations and marbling between light and dark material. If striations and marbling exist the material is not fully mixed. Continue mixing until striations and marbling are no longer present.

Slow mixing by hand is recommended. A high speed mechanical mixer should never be used as internal heat will be generated reducing application life and introducing air in mixture.

Injection style Semkit® package

Caution: Semkits are premeasured and should never be opened to remove material for smaller use applications.

1. Hold cartridge, grasp dasher rod, and pull back approximately one inch.
 2. Insert ram rod into hollow of dasher rod, break piston loose, and inject about one-third of the contents into the back third of the cartridge.
- Note:** Use even pressure; do not use force, tap, pound, or jolt ramrod if piston does not break loose readily.
3. Pull back dasher rod and inject one-third of the rod's contents at the top of the cartridge, then push dasher rod in and inject one-third at the mid point of the cartridge and then push in the dasher rod and inject the last third one inch from the bottom end of the cartridge. Remove ramrod.
 4. To mix, hold cartridge and push dasher rod to the plunger end. Begin stroking the dasher rod in a spiral clockwise motion from the end of the cartridge to the plunger. Rotate the dasher rod approximately 90 degrees each stroke. A stroke is one complete in and out cycle. Mix material for the required number of strokes for hand mix, or for the required time for machine mix, as indicated on the instructions provided with the Semkit®.
 5. After mixing, remove bottom cap.
 6. Pull dasher rod back to the neck of the cartridge. Grasp cartridge firmly at the neck, unscrew dasher rod and remove.
 7. Hold dasher rod up to the light to insure that no accelerator remains in the dasher rod. It is important that all the accelerator material is injected into the cartridge.
 8. Screw nozzle into cartridge, insert into Semco® extrusion gun, and use as required. For hand extrusion, press used dasher rod against plunger to force material from cartridge. **Note:** PR-2001 is supplied with an adapter piece which must be screwed into semkit to allow nozzle to be fitted to Semkit.
 9. Before use, extrude a small bead of material and examine for striations. Examine the material for striations and marbling between light and dark material. If striations and marbling exist the material is not fully mixed. Continue mixing until striations and marbling are no longer present.

Note: It may be desired to use a Semco® mixer model 388 or 285 for mixing sealants packaged in cartridges. Mixer does not reduce the number of strokes required for complete mixing however it does allow the material to be consistently mixed with less user labor.

Storage instructions

Two-part kit and Semkit® package storage

Sealants should be stored according to the instructions on the label.

Premixed and frozen (PMF)

Polysulfide sealants in a PMF form should be stored in a freezer at -40°F (-40°C) or below for optimal retention of application properties and shelf life. Typical shelf life is 30 days.

Polythioether sealants in a PMF form require extreme low temperature refrigeration at -80°F (-62°C), or below for optimal retention of application properties and shelf life. Typical shelf life is 30 days.

Thawing of PMF Material

Thawing of PMF can be accomplished in two ways:

Typical Ambient Thaw: Place the PMF cartridge to be used on a bench in a vertical position. Let stand at 70-80°F (21-27°C) for approximately 30 minutes. Dry any condensation from the exterior of the cartridge prior to use. Actual thawing times may vary.

Typical Polysulfide Water Bath Thaw: Place the PMF cartridge upright in a 120°F (49°C) water bath for approximately 4-6 minutes. Upon removal from the bath, carefully dry the exterior of the cartridge before using. Actual thawing times may vary.

Typical Polythioether Water Bath Thaw: Place the PMF cartridge upright in a 120°F (49°C) water bath for approximately 5-7 minutes. Upon removal from the bath, carefully dry the exterior of the cartridge before using. Actual thawing times may vary.

Cure

Application life and cure times are dependent upon ambient environmental conditions. Humidity and temperature affect material cure as indicated below.

Humidity

-Manganese dioxide cured polysulfides

Relative humidity affects the cure rate. Humidity below 10% increases tack free and cure times. Humidity above 80% accelerates or shortens the cure time.

-Dichromate cured polysulfides

Relative humidity negligibly affects tack free time and cure time.

-Epoxy Cured Polythioethers

Relative humidity does not affect tack free time and cure time.

Temperature

Ambient temperature affects the cure of all sealants. Increasing the temperature reduces cure time. Decreasing the temperature increases cure time.

It is possible to reduce cure times of polysulfide sealants by applying heat. To do this, it is recommended that the polysulfide sealant be allowed to first dwell at ambient conditions for at least the application time of the material. For example, a Class B-1/2 material should dwell for at least 30 minutes.

Once the application time has passed the ambient temperature can be increased. Polysulfide sealants with a two hour, or less, application time can obtain a serviceable cure hardness of 30 Durometer A after eight hours at 125±5°F (52±3°C).

Note: Accelerating the cure of polysulfide sealants above 140°F (60°C) can affect performance properties and is not typically recommended without testing.

Most polysulfide sealants develop a high state of cure in 14 days at 75°F (25°C), longer cure times further improve ultimate resistance to fluids, heat, and pressure. Maximum cure is usually obtained in 30 to 50 days.

Polythioether sealant cure time can also be reduced by increasing the ambient temperature at which the material cures. Please contact your local representative for more information.

Cleaning of application equipment

Uncured Sealant

Wash off/remove uncured sealant with a non-chlorinated solvent before sealant cures.

Cured Sealant

Use care when applying sealant. Cured sealant is very difficult to remove. Mechanical removal of cured sealant is recommended.

Mechanical removal involves using spatulas, scrapers, rotary grinders, etc. It is strongly recommended that non-metallic or other appropriate materials be used to prevent damage to the substrate.

Note: PPG Aerospace/PRC-DeSoto does not endorse the use of any specific industrial stripper. Some industrial strippers are environmentally hazardous and may harm the substrate or existing sealant. Use caution when working with industrial strippers.

For industrial use only. Keep away from children.

**For emergency medical information call
1-800-228-5635.**

**For sales and ordering information in the U.S.A. call 1-800-
AEROMIX (237-6649).**

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