Sealants - Weather Sealing – General Data

1. General

WARNING **THIS PROCEDURE USES MATERIALS THAT MAY BE DANGEROUS TO THE PERSONNEL'S HEALTH AND/OR THE ENVIRONMENT. SUFFICIENT PRECAUTIONS MUST BE TAKEN AT ANY STEP OF USE. IF NOT, THIS CAN CAUSE DAMAGE TO THE ENVIRONMENT AND DANGEROUS EFFECTS ON THE PERSONNEL'S HEALTH AND SAFETY.**

For fay surface sealing use sealant to MIL–PRF–81733 Type IV, Class 1, Grade A (P/S 870 C). For fillet or butt joint sealing use sealant PR–1776MB.

A. Location of Sealant

The sealant is used:

1) To fill butt joints around door sills, hatches, and external fittings which penetrate skin panels.

2) Between faying surfaces.

3) Fillet sealing along edges of skin panels.

4) To dome seal fasteners.

B. Safety Precautions

1) Keep solvents and sealant away from fire and other sources of ignition.

2) Provide sufficient ventilation when working in confined spaces; avoid breathing of solvent or sealant fumes.

3) Wear protective respiratory equipment when spraying sealant or working in spray sealing areas.

4) Avoid skin contact with solvents or sealants. Where skin contact has occurred, the affected area should be washed thoroughly with soap and water.

5) In case of sealant or solvent ingestion, immediate medical attention should be obtained.

6) Splash goggles should be worn when mixing and handling sealant components.

7) When eye contact with sealing components has occurred, thoroughly flush eye with water and obtain medical attention.

2. Preparation of Sealant

A. Prepare Sealant as follows:

1) Thoroughly stir base compound and accelerator in their original separate container until a uniform consistency is achieved.

2) When supplied in kit form, add all accelerator supplied to the base compound and mix slowly and thoroughly. Scrape sides and bottom of container and mixing paddle periodically, to ensure thorough mixing. Mix for five or six minutes. If required, transfer mixed sealant to polyethylene cartridge and use with applicator gun.

3) When packaged in bulk, mix according to manufacturer's instructions. Mix thoroughly as in Para 2.A.2).

B. Pot Life of Mixed Adhesive

1) Pot life is the time and condition during which mixed sealant remains suitable for application.

2) Refer to manufacturer's data for sealant pot life. High humidity and temperature conditions will shorten the pot life.

3. Preparation of Parts

A. Prepare parts as follows:

WARNING KEEP SOLVENT AWAY FROM FIRE AND OTHER SOURCES OF IGNITION. PROVIDE SUFFICIENT VENTILATION WHEN WORKING IN CONFIRMED SPACES. AVOID SKIN CONTACT WITH SOLVENT.

1) Apply small amount of solvent to a clean wiping cloth. Refer to 20-10-25/14, Adhesives – General Electric PSA529-SRC18, Table 1 for the solvent appropriate for the surface to be cleaned. For solvents which evaporate quickly, apply more solvent than for solvents which evaporate slowly.

2) Wipe the area with a solvent dampened wiping cloth.

a) When cleaning bonded surfaces with solvent saturated wiping cloth, thoroughly scrub the bonding surfaces. Wipe dry with cloth before solvent evaporates.

b) Keep solvent cloth saturated and turn frequently to avoid reusing a dirty area.

3) Wipe dry with another clean wiping cloth before the solvent evaporates. It is important to wipe the surface immediately after cleaning because if the solvent evaporates before it is wiped up, the oil, and grease residue will remain on the surface. Although the DS 108 solvent has a slow evaporation rate, wipe dry as soon as possible as delay will result in a longer lingering odour.

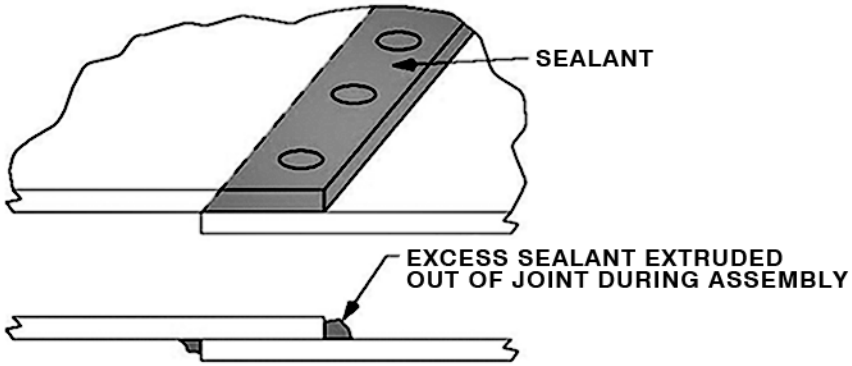
4) If more cleaning is needed, apply fresh solvent to a clean portion of the wiping cloth and repeat Para 3.A.1) through to Para 3.A.3).

5) Areas to be sealed which contain acrylic plastic (plexiglass) parts must be cleaned with NAPHTHA spirits.

B. Application of Sealant

1) Faying Surface Sealing

a) A faying surface seal is a thin, even layer of sealant between two overlapping surfaces preventing leakage of air or liquid from a sealed area to an unsealed area (refer to Figure 1).



Faying Surface Seal
Figure 1

b) Fay seal as follows:

1 If necessary, mask off adjacent areas using masking tape and/or cardboard.

2 If using a 3" mohair roller, pour a small quantity of sealant onto a clean piece of polyethylene plastic sheet and saturate the roller surface with sealant. If using a standard 1/2" bristle brush, pour the sealant into a clean wax free container and saturate the brush with sealant.

3 Apply a uniform coat of sealant to the faying surface of one part. Completely cover the faying surface leaving a smooth layer approximately 0.005" thick if using the brush method or 0.004" thick if using the roller method. Avoid applying the sealant too heavily or over-brushing applied sealant.

4 Draw parts together using Cleco fasteners or slave bolts in at least every fourth fastener hole. Install temporary fasteners with a washer under the head and nut to prevent marking the part surfaces.

5 Re-tighten wing-nut Clecos or slave bolts approximately 5 minutes after initial tightening.

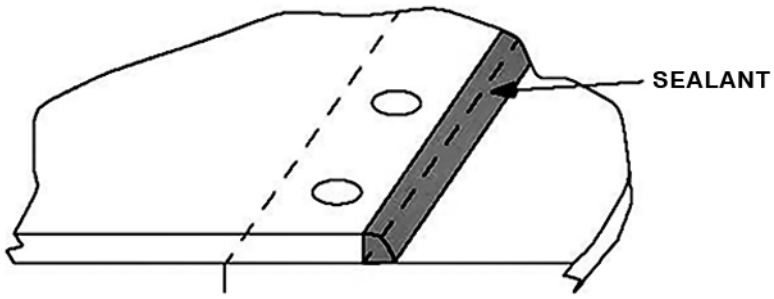
6 Install permanent fastners starting at the centre of the pattern or line and working outwards, removing Clecos or slave bolts as installation progresses. Do not remove temporary fasteners until installing permanent fasteners. Remove sealant extruded into fastener holes before inserting fasteners or wipe sealant from fastener ends, locking grooves or threads after insertion.

7 Torque or drive all fasteners at least twice within the assembly life of the sealant. Allow a minimum of 5 minutes between torquing operations.

8 Wipe sealant from fastener ends. Remove and fair the excess sealant extruded along both sides of the overlap after assembly using a sealant scraper before the sealant cures (refer to Figure 1). Minimum visible sealant shall remain along the entire mating surfaces.

2) Fillet Sealing

a) A fillet seal is a bead of sealant applied as a dam along a seam, on either the pressure or weather side of the structure, preventing the passage of air or liquid through the joint (refer to Figure 2).



General Description of Fillet Seal
Figure 2

b) Apply fillet seals as follows:

1 Load a sealant gun with sealant. For overhead fillet sealing, use sealant that has approximately half of its pots life expired.

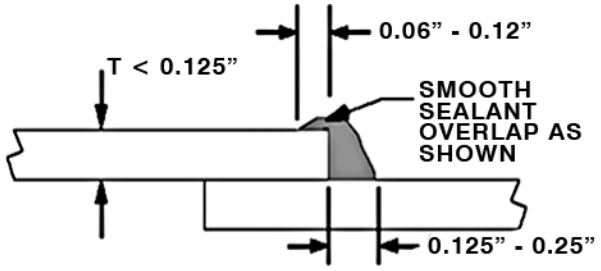
2 Hold the flared or standard nozzle at 90° to the direction of travel and 45° to the surface of the parts.

3 Squeeze the gun trigger and move the nozzle along the seam in approximately 3 foot increments at a rate that maintains a slight build-up of sealant in front of the nozzle. This will force the sealant into the root of the angle and exclude air from the bead. If required, cut nozzles back to obtain larger holes.

4 Ensure that applied sealant beads do not extend across the manufactured heads of installed fasteners (refer to Figure 3).

5 After applying each 3 foot increment, examine the seal for air bubbles. Open any air bubbles and fill them with fresh sealant. When opening the bubbles, make the cavities large enough to permit the fresh sealant to fill them.

6 If a sealant bead overlaps onto the structure in a fuel area, fair the sealant bead into the structure as shown in Figure 3.

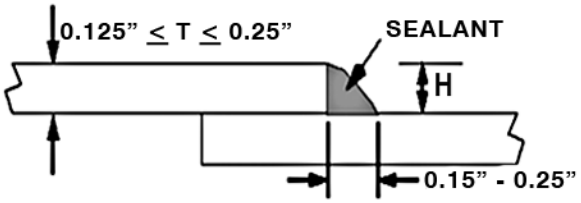


NOTES:

- OVERLAP IN THE FUEL TANK MUST BE FAIRED IN.
- OVERLAP MUST BE AS SHOWN IN FIGURE.

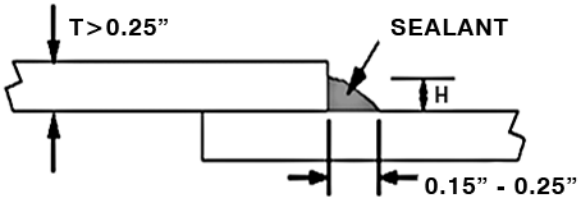
EXCEPTIONS:

- OVERLAP IS NOT ACCEPTABLE ON THE AIRCRAFT WEATHER SIDE (EXTERIOR).



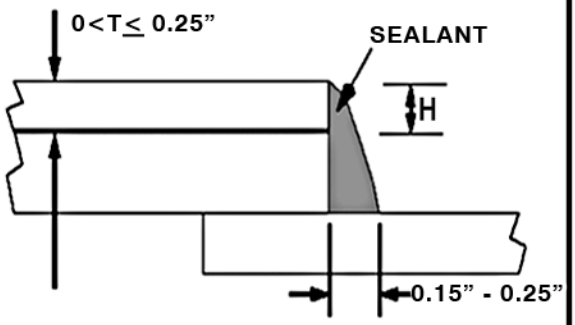
NOTES:

- OVERLAP IS NOT ACCEPTABLE.
- MINIMUM SEALANT HEIGHT (H) IS THE PANEL THICKNESS (T).



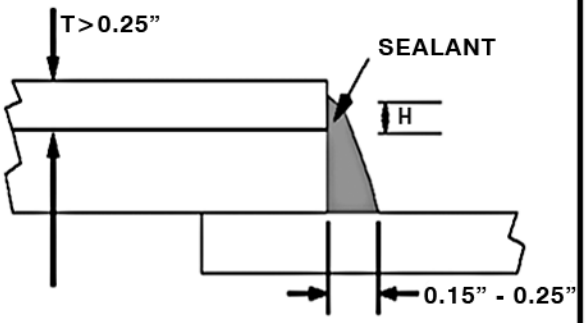
NOTES:

- OVERLAP IS NOT ACCEPTABLE
- MINIMUM SEALANT HEIGHT (H) IS 0.25’’. IT IS NOT NECESSARY OR REQUIRED TO APPLY EXCESSIVE SEALANT BEYOND 0.25’’. APPLY SUFFICIENT SEALANT FOR THE JOB ON HAND.



NOTES:

- OVERLAP IS NOT ACCEPTABLE.
- MINIMUM SEALANT HEIGHT (H) IS THICKNESS, (T).



NOTES:

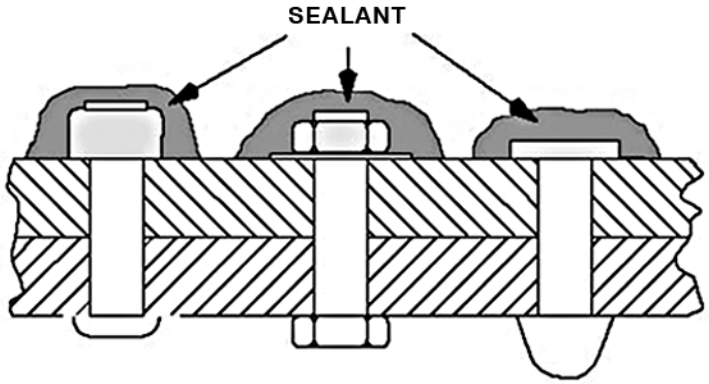
- OVERLAP IS NOT ACCEPTABLE
- MINIMUM SEALANT HEIGHT (H) IS 0.25’’. IT IS NOT NECESSARY OR REQUIRED TO APPLY EXCESSIVE SEALANT BEYOND 0.25’’. APPLY SUFFICIENT SEALANT FOR THE JOB ON HAND.

Acceptable Application of Fillet Seals
Figure 3

3) Dome Sealing Fasteners

a) Unless specified dome sealing fasteners that penetrate pressure or fluid light structures, dome seal on the pressure side.

b) Dome seals must completely cover the fastener head or end (including attachment hardware, nuts, washers, locking collars, etc.) and overlap the adjacent structure by approximately 1/4" (refer to Figure 4).

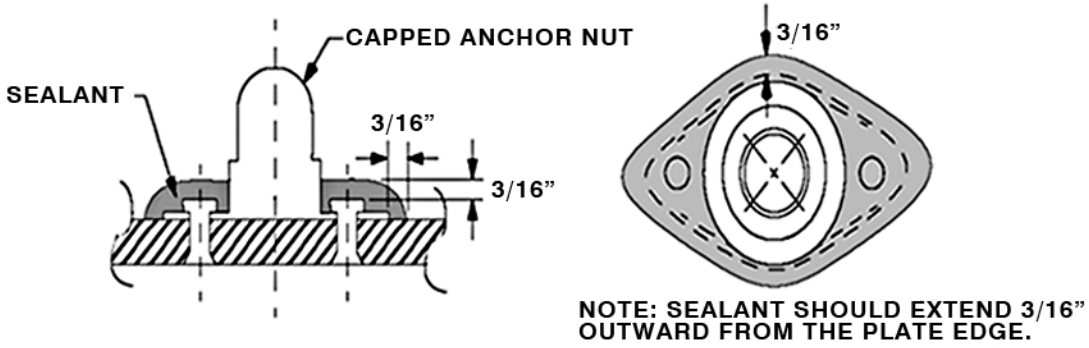


Typical Dome Sealing Of Fasteners
Figure 4

c) If using modified nozzles for dome sealing rivets and lockbolts, ensure the nozzle is full of sealant and free of voids before applying the first dome seal in a series.

d) It is acceptable to use a modified flared nozzle for dome sealing NAS 1473A–3 and NAS 1473A–4 capped anchor nuts. Ensure the nozzle is full of sealant and free of voids before applying the first dome seal in a series.

e) Dome seal anchor nuts approximately as follows (refer to Figure 5).



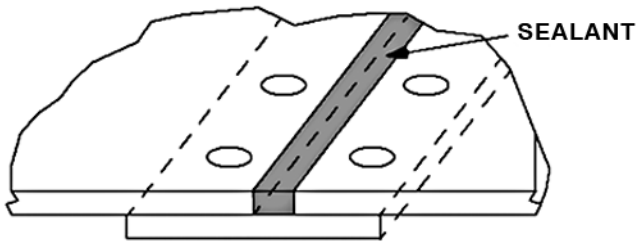
Dome Sealing Anchor Nut
Figure 5

1 Hold the sealant gun perpendicular to the work with the modified flared nozzle completely covering the anchor nut.

2 Apply the dome seal to completely cover the anchor nut plate. Ensure that the sealant dome is at least 0.1875" (3/16") above each rivet shop head and also extends 0.1875" (3/16") beyond the edge of the anchor nut plate as shown in Figure 5.

4) Butt Joint Sealing

a) A butt joint seal is a bead of sealant applied to the gap between the parts that butt together, such as skin panels, providing an aerodynamically smooth surface (refer to Figure 6).



Butt Seal Joint
Figure 6

b) Avoid applying butt joint seals between exterior skin panels within 72 hours before painting the aircraft exterior.

c) Apply butt joint seals as follows:

1 Load a sealant gun within sealant. Use a standard nozzle. If necessary, cut the nozzle back to obtain a larger hole.

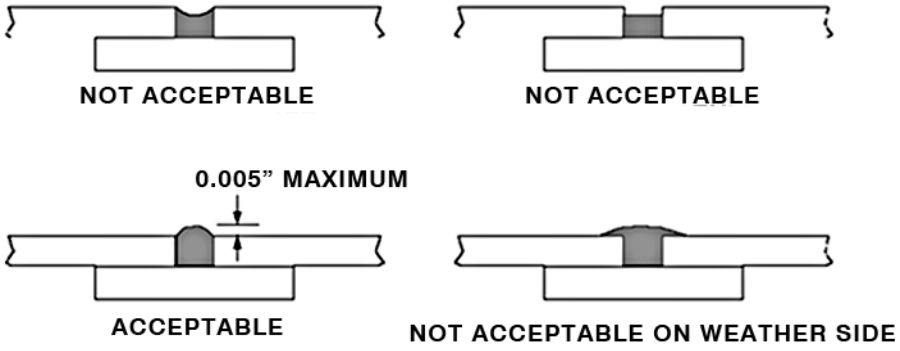
2 Hold the nozzle in line with the joint, at approximately 45° to the part surface, and place the nozzle tip in the bottom of the joint.

3 Squeeze the trigger and move the nozzle back along the joint in approximately 3 foot increments at a rate that allows the sealant to continuously fill the joint flush with the adjacent surfaces. Avoid air entrapment in the sealant bead. The cured sealant must be flush (0" to + 0.005") with the surrounding structure (refer to Figure 7). Ensure sealant does not overlap onto adjacent skin surfaces on the weather side of a structure when aerodynamic smoothness is a requirement.

4 After applying each 3 foot increment of sealant, examine the bead for air bubbles. Open any air bubbles and fill them with fresh sealant. When opening bubbles, make the cavities large enough to permit the fresh sealant to fill them easily.

5 If necessary, smooth out the sealant bead with a sealant spatula.

d) Refer to Figure 7 for acceptable and unacceptable butt joint sealing configurations.



Butt Seal Configurations
Figure 7

C. Resealing

Seams and joints which show signs of leakage can be resealed by laying a fillet of sealant along the weather edge of the defective seam or joint. Use applicator gun to pressure feed the sealant into the leak path. Allow to cure, as in Para 4.

4. Sealant Curing

A. Curing of the mixed sealant is as per manufacturers recommendation.

1) The curing rate of mixed sealants varies greatly with changes in temperature or humidity. Sealant curing is extremely slow when the ambient temperature is less than 60°F.

Note Lower temperature and relative humidity extends cure time. Higher temperature and relative humidity shortens application life.

2) Tack-free cure is the time required for the sealant to cure sufficiently such that shop swarf, chips, etc. will not stick to the sealant. To prevent contamination of the seal, do not perform further work on sealed areas until the sealant is tack-free.

5. Clean-Up

A. Remove excess sealant from structures and parts, before the sealant material has cured, with DS108 or MEK (except as noted in Para 5.B).

B. Acrylic plastic (plexiglass) parts must be cleaned with NAPHTHA.

6. Maintenance of Equipment

Clean all equipment with methyl ethyl ketone before the sealant materials have cured.