BOMBARDIER
Toronto Site
PROPRIETARY INFORMATION

PPS 21.22

PRODUCTION PROCESS STANDARD

INSTALLATION OF ATITE SEALS

Issue 8
- This standard supersedes PPS 21.22, Issue 7.
- Vertical lines in the left hand margin indicate changes over the previous issue.
- Direct PPS related questions to christie.chung@aero.bombardier.com or (416) 375-7641.
- This PPS is effective as of the distribution date.

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Signed original on file. Validation of paper prints is the responsibility of the user.

TABLE OF CONTENTS

Sections **Page**

Tables

Figures

1 SCOPE

1.1 This Production Process Standard (PPS) specifies the procedure and requirements for installation of Atite seals for the sealing of wire bundles and single or multi-conductor cables passing through pressurized bulkheads or structures.

1.1.1 This PPS complements the engineering drawings that specify its use as an authorized instruction. The procedure specified in this PPS shall be followed to ensure compliance with all applicable specifications. In general, if this PPS conflicts with the engineering drawing, follow the engineering drawing. The requirements specified in this PPS are necessary to fulfil the engineering design and reliability objectives.

1.1.2 Refer to PPS 13.26 for the subcontractor provisions applicable to this PPS.

1.1.3 Procedure or requirements specified in a Bombardier BAPS, MPS, LES or P. Spec. do not supersede the procedure or requirements specified in this PPS. Similarly, the procedure and requirements specified in this PPS are not applicable when use of a BAPS, MPS, LES or P. Spec. is specified.

2 HAZARDOUS MATERIALS

2.1 Before receipt at Bombardier Toronto, all materials shall be approved and assigned Material Safety Data Sheet (MSDS) numbers by the Bombardier Toronto Environment, Health and Safety Department. Refer to the manufacturer's MSDS for specific safety data on any of the materials specified in this PPS. If the MSDS is not available, contact the Bombardier Toronto Environment, Health and Safety Department.

3 REFERENCES

3.1 PPS 9.04 - Assembly and Installation of Electrical and Electronic Wire Assemblies.

3.2 PPS 13.26 - General Subcontractor Provisions.

3.3 PPS 13.28 - Storage Life of Adhesives, Sealants, Paints and Composite Products.

3.4 PPS 21.20 - Mixing and Handling Two-Part Sealants.

3.5 PPS 21.21 - General Sealing Practices.

3.6 PPS 25.55 - Bonding using DHMS A6.11 Type II Class 1 Adhesive.

3.7 PPS 31.17 - Solvent Usage.

4 MATERIALS AND EQUIPMENT

4.1 Materials

4.1.1 Atite seals, as specified on the engineering drawing (see Table I).

4.1.2 Grommets, plastic, split, NAS557, as specified on the engineering drawing (see Table I).

4.1.3 DHMS S3.01 B2 sealant.

4.1.3.1 With the exception of fuel tank, firewalls and high temperature zones (e.g., nacelles), in place of DHMS S3.01 Type II Class B sealant, it is acceptable to use BAMS 552-008 sealants as specified in PPS 21.20 in place of DHMS S3.01 Type II Class B sealant.

4.1.4 DHMS A6.11 Type II Class 1 adhesive.

TABLE I - ATITE SEALS AND GROMMETS

HOLE DIAMETER (INCHES)	GROMMET (NOTE 1)	ATITE SEAL
0.844	NAS557-12*	AT596-24-8
1.344	NAS557-20*	AT596-40-12
1.625	NAS557-24*	AT596-48-12
2.625	NAS557-40*	AT596-70-20
3.125	NAS557-48*	AT596-96-24

Note 1. Dash number is followed by alpha code denoting sheet thickness:
* = A = 0.025" - 0.060"
* = B = 0.061" - 0.090"
* = C = 0.091" - 0.125"

4.2 Equipment

4.2.1 Sealant gun equipped with 1/16" diameter nozzle orifice and other equipment for the application of sealant according to PPS 21.21.

4.2.2 Suitable hand tool for cutting 3/16" potting and vent holes in Atite seals. Do not use hole punches for this purpose.

4.2.3 Sharp knife for cutting Atite seals.

4.2.4 Hole boring tool (see Figure 1).

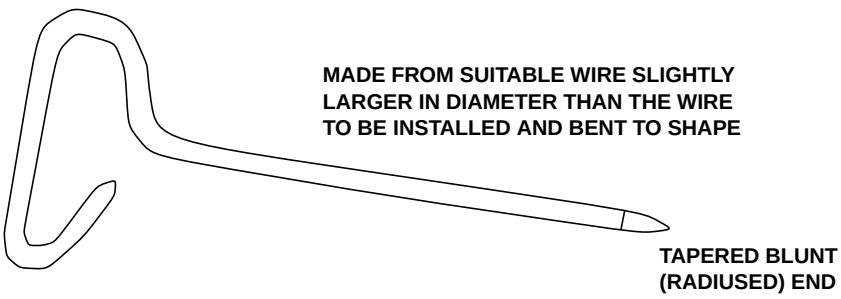


FIGURE 1 - HOLE BORING TOOL

5 PROCEDURE

5.1 General

5.1.1 Store Atite seals in their original corrugated packings until use.

5.1.2 Install Atite seals where specified on the engineering drawing.

5.1.3 The term “harness” refers to both wire bundles and single and multi-conductor cables unless a particular harness type (i.e., wire bundles) is specified.

5.1.4 A complete seal installation consists of a plastic grommet installed in a hole in the structure (to prevent sharp metal edges from cutting the seal), a soft polysulphide Atite seal installed over the grommet and sealant injected into the cavity around the edges of the seal and between the wires (wire bundles only) (see Figure 2).

5.1.5 If possible, install Atite seals on the wire harness before installation in the aircraft.

5.1.6 If the seal has not been placed on the harness before harness installation, cut the seal radially and place it over the harness before installation in the structure.

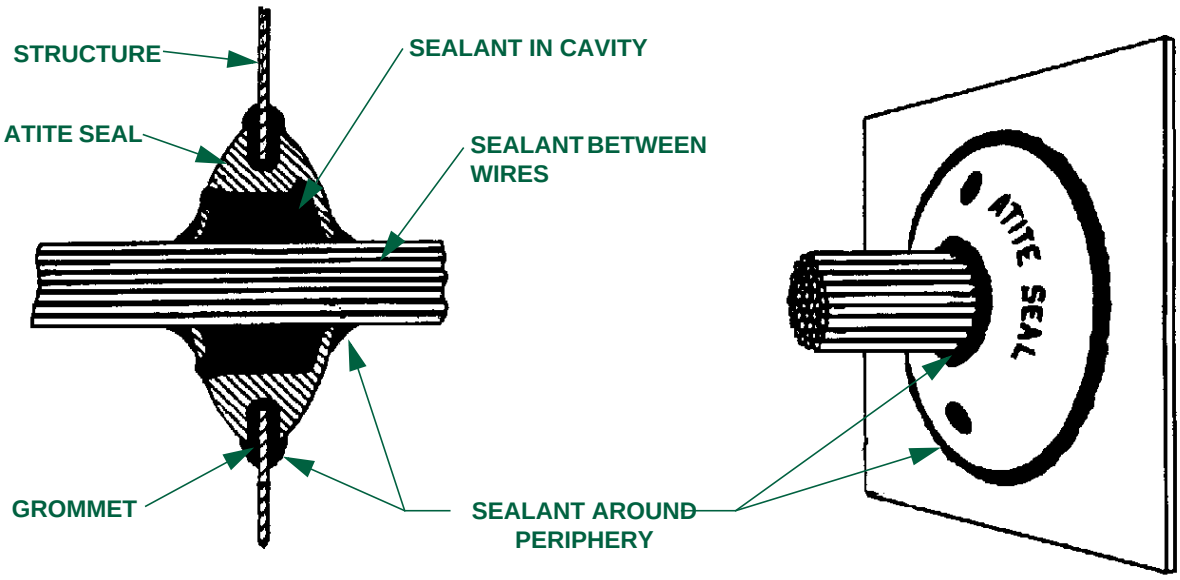


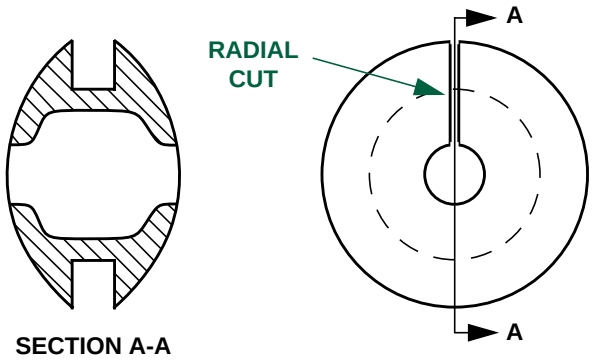
FIGURE 2 - COMPLETED ATITE SEAL INSTALLATION

5.2 Preparation of Parts

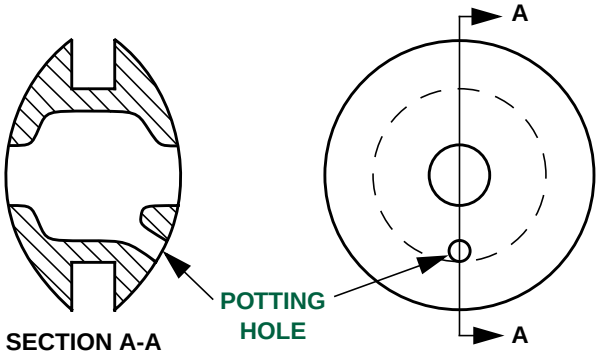
5.2.1 Prepare parts as follows:

Step 1. Solvent clean the structure on both sides within 2" of the seal installation hole according to PPS 31.17.

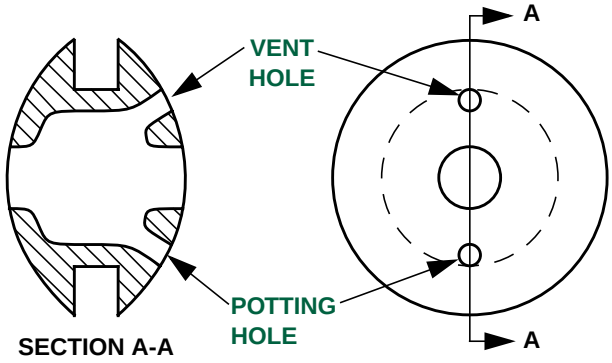
Step 2. If the seal is to be installed on the harness after installation of the harness in the aircraft, cut the seal radially using a sharp knife and place it over the harness before installation in the structure.



Step 3. Using a suitable hand tool, cut a 3/16" potting hole as shown:



Step 4. If the seal has not been cut radially, cut a 3/16" vent hole as shown:



Step 5. Solvent clean any contaminated Atite seals and plastic grommets according to PPS 31.17.

5.3 Preparation of Sealant

5.3.1 Prepare sealants according to PPS 21.20.

5.4 Installation of Grommet

5.4.1 Using DHMS A6.11 Type II Class 1 adhesive, bond the grommet according to PPS 25.55 into the hole in the bulkhead or structure. It is not necessary to meet the cleanliness, temperature and humidity requirements specified in PPS 25.66 when performing bonding to this PPS. Instead, it is acceptable to ensure that the hole in the bulkhead or structure is prepared according to paragraph 5.2.1, Step 1 and that the adhesive does not become contaminated before it is fully cured.

5.5 Installation of Atite Seals

5.5.1 Install Atite seals as follows:

Step 1. If possible, position the Atite seal on the harness before installation in the aircraft. If the diameter of the harness is considerably larger than the hole in the Atite seal, enlarge the hole to a diameter slightly smaller than the harness using a sharp knife.

Step 2. Install the harness in the aircraft and, except as noted below, install clamps and cable ties according to PPS 9.04 and the engineering drawing.

- Do not install clamps or cable ties within 12" of the seal installation hole on the side from which the seal is to be installed, or within 3" of the opposite side. Such clamps and cable ties may be installed after sealing is completed.

Step 3. If not previously installed, place the Atite seal, cut radially as specified in section 5.2, over the harness. If the diameter of the harness is considerably larger than the hole in the Atite seal, enlarge the hole to a diameter slightly smaller than the harness using a sharp knife.

Step 4. If the Atite seal is not to be installed on a wire bundle, slide the seal down the harness to the installation hole. Do not insert the Atite seal into the hole until immediately before sealing will occur.

Step 5. If the Atite seal is to be installed on a wire bundle, slide the seal back, clear of the installation, fan out the wires at the seal installation hole and apply a small amount of sealant. Move the wires around, applying additional sealant as necessary until all the wires are thoroughly coated and all voids between the wires are filled for a length of approximately 1". Install a cable tie on the wire bundle approximately 3/4" from each side of the structure. Do not insert the Atite seal into the hole until immediately before sealing will occur.

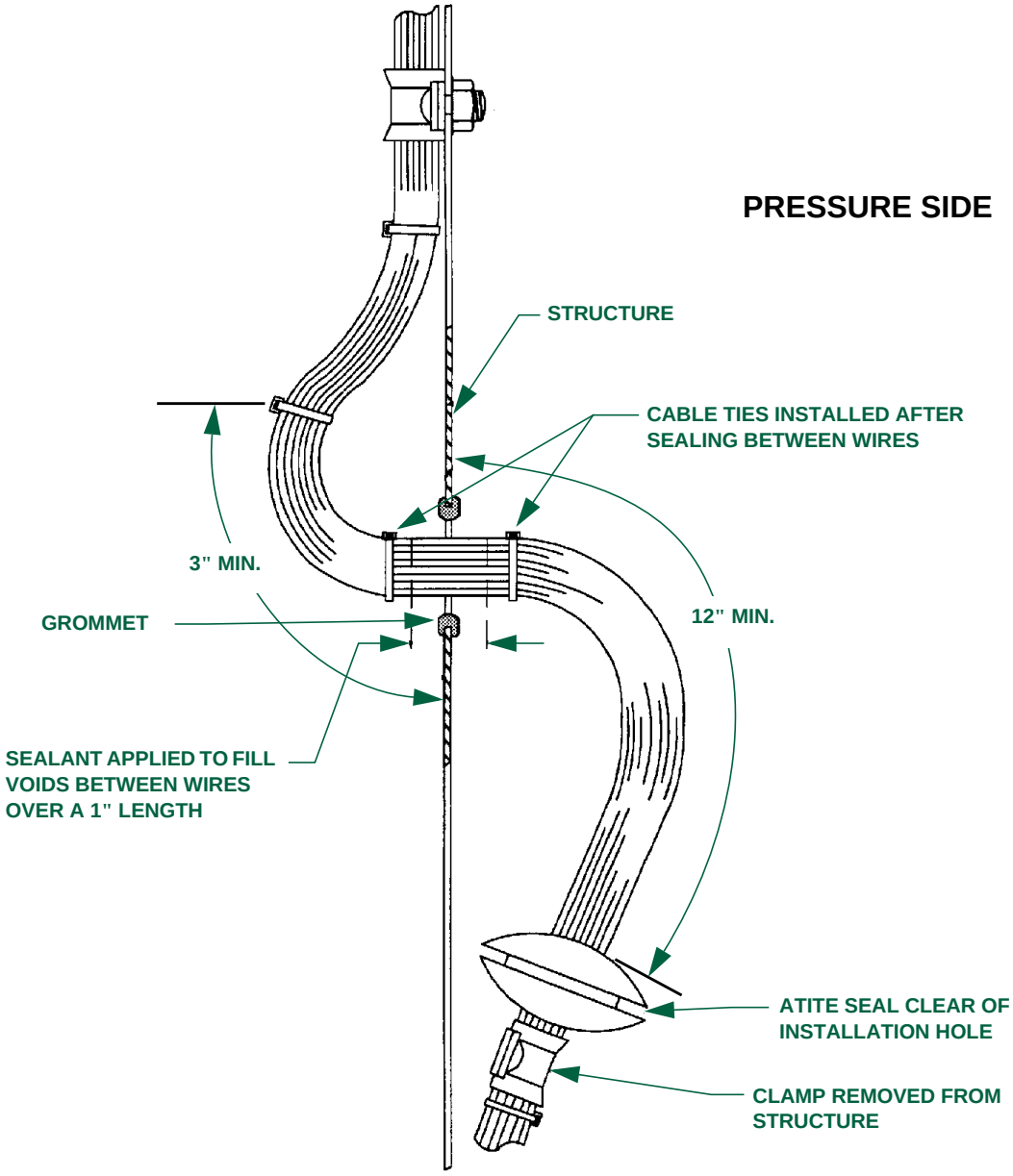
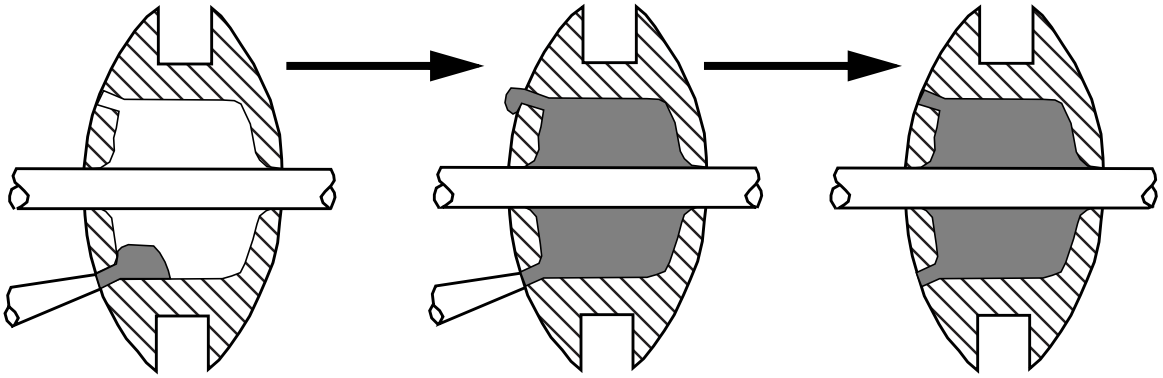


FIGURE 3 - SEALING BETWEEN WIRES

Step 6. Insert the seal into the hole in the structure over the plastic grommet. Work the seal to return it to its normal shape. Ensure that the potting hole is aligned in the 6 o'clock position.

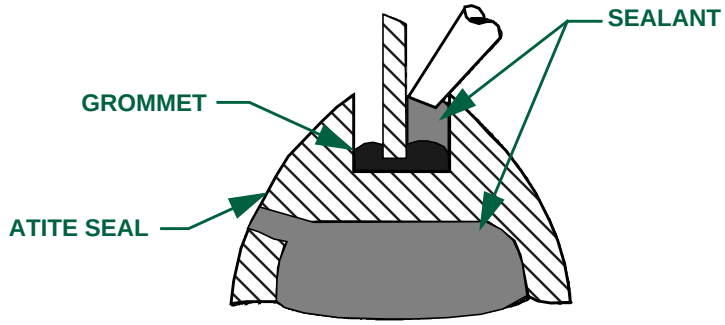
Step 7. Route the harness through the centre of the seal at approximately right angles to the structure to minimize deformation of the seal.

Step 8. Insert the sealant gun nozzle into the potting (6 o'clock position) hole and inject sealant to completely fill the cavity until sealant is extruded out of the vent (12 o'clock position) hole or the radial cut. Take care to ensure that the seal cavity is completely filled as shown:

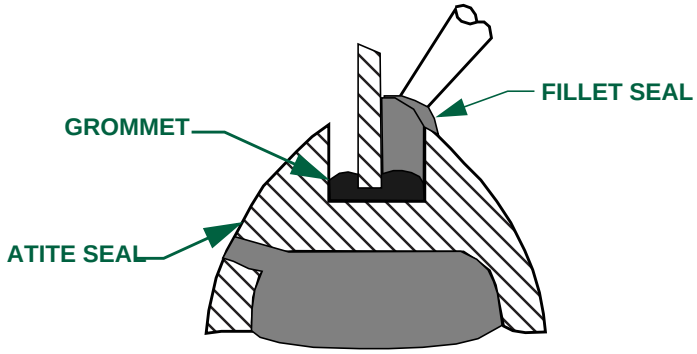


INJECT SEALANT THROUGH POTTING HOLE | INJECT UNTIL SEALANT EXTRUDES FROM VENT HOLE | DRESS POTTING AND VENT HOLES

Step 9. Insert the sealant gun nozzle between the seal rim and the structure and fill the gap around the seal rim on both sides of the structure. If the seal has been cut radially, inject sealant between the cut edges.



Step 10. Apply a fillet seal to the seal periphery at the structure surface and at the harness hole on both sides of the structure as shown:



Step 11. Allow the sealant to cure according to PPS 21.20 before moving or otherwise disturbing the seal or harness.

5.5.2 Secure the harness using clamps and cable ties according to PPS 9.04 and the engineering drawing.

5.5.3 Ensure that sealant has only been applied to the seal cavity, the seal rim and the seal periphery. There shall be no excess sealant on the seal faces.

5.6 Removal of Wires (Wire Bundles Only)

5.6.1 If necessary, remove a wire from an installed seal as follows:

Step 1. Pull the wire straight back out of the seal.

Step 2. If a replacement wire is not to be installed, seal the hole using sealant as specified in paragraph 4.1.3 on the pressure side, if possible.

5.6.2 Alternatively, it is also acceptable to remove a wire from an installed seal as follows:

Step 1. Leave the wire in the seal and cut it off approximately 2" from each side of the seal.

Step 2. Apply a small amount of sealant to both cut ends.

5.7 Replacement of Wires (Wire Bundles Only)

5.7.1 If necessary, replace a wire in a wire bundle as follows:

Step 1. Remove the existing wire according to section 5.6.

Step 2. If the replacement wire is to be installed through the hole left by the original wire, push the new wire through the hole. If the new wire is larger, use a hole boring tool to enlarge the hole, taking care not to damage adjacent wires. If a connector contact has been installed on the new wire, use a contact insertion tool as specified in PPS 9.04 to push the contact and wire through the hole.

Step 3. If the replacement wire cannot be installed through an existing hole, install it according to section 5.8.

Step 4. If possible, apply a fillet seal around the wire on the pressure side.

5.8 Addition of Wires

5.8.1 Add a new wire to an existing seal as follows:

Step 1. Using a hole boring tool, bore a hole in the seal beside the existing sealed harness.

Step 2. Install the new wire by pushing it through the hole or, for wired connector contacts, pushing it through with a contact insertion tool as specified in PPS 9.04.

Step 3. If possible, apply a fillet seal around the wire on the pressure side.

5.9 Replacement of Atite Seals

5.9.1 If necessary, replace an Atite seal as follows:

Step 1. Remove the old seal, carefully cutting it from the harness.

Step 2. Remove the plastic grommet.

Step 3. Remove all sealant from the structure.

Step 4. Install the new Atite seal according to the procedures specified herein.

5.10 Clean-Up

5.10.1 Immediately after use, remove all traces of sealant from equipment by solvent cleaning according to PPS 31.17.

6 REQUIREMENTS

6.1 Post “WET SEALANT” warnings on sealed areas susceptible to damage by nearby assembly operations until the sealant cures tack-free.

6.2 Atite seals, plastic grommets and the structure surfaces to be sealed shall be clean and free from contamination.

6.3 To ensure an effective seal, all spaces between individual wires (wire bundles only) and the sealant cavity shall be completely filled with sealant.

6.4 The periphery of the seal at the structure surface, the harness hole and any cut seal surface shall be completely sealed.

6.5 Installed Atite seals shall be free from excess sealant on the seal faces.

6.6 The potting and vent holes used for filling the seal cavity shall be clearly visible.

6.7 Atite seals which are deformed or sagged (lost its original configurations) shall be rejected.

7 SAFETY PRECAUTIONS

7.1 Observe standard plant safety precautions when performing the procedure specified herein.

7.2 Keep sealants and release agents away from fire and other sources of ignition.

7.3 Do not smoke or eat in areas where sealants is being applied. Avoid ingestion of sealants. If ingestion occurs, obtain medical attention immediately.

7.4 Wash hands thoroughly with soap and water immediately after working with sealants.

7.5 Ensure sufficient ventilation is supplied when using sealants in confined areas.

7.6 Avoid skin and eye contact with sealants and release agents. Wear protective gloves when handling sealants or release agents. If skin contact occurs, wash the affected area thoroughly with soap and water. Do not use protective hand cream as it may cause contamination. If eye contact occurs, immediately flush eyes for 15 minutes minimum with large quantities of water at an eye wash station and report to the Health Centre.

7.7 Refer to PPS 31.17 for the safety precautions for handling and using solvents.

8 PERSONNEL REQUIREMENTS

8.1 Personnel responsible for installation of Atite seals for the sealing of wire bundles and single or multi-conductor cables passing through pressurized bulkheads or structures shall have a good working knowledge of the applicable procedure and requirements as specified herein and shall have exhibited their competency to their supervisor.

9 STORAGE OF SEALANTS

9.1 Always use oldest stock first (i.e., first in/first out (FIFO) basis).

9.2 Store sealants according to PPS 21.20.

9.3 The storage life of the sealant shall be according to PPS 13.28. Keep sealant containers tightly closed when not in use.