BOMBARDIER
Toronto (de Havilland)
PROPRIETARY INFORMATION

PPS 25.70

PRODUCTION PROCESS STANDARD

BONDING USING SCOTCH-WELD DP805 ACRYLIC ADHESIVE

Issue 1
- This is a new Production Process Standard.
- Direct PPS related questions to PPS.Group@aero.bombardier.com or (416) 375-7641.
- This PPS is effective as of the distribution date.

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1 SCOPE

1.1 This Production Process Standard (PPS) specifies the procedure and requirements for bonding aircraft parts and assemblies with Scotch-Weld DP805 acrylic adhesive.

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 (de Havilland), all materials shall be approved and assigned Material Safety Data Sheet (MSDS) numbers by the Bombardier Toronto (de Havilland) 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 (de Havilland) Environment, Health and Safety Department.

3 REFERENCES

3.1 PPS 13.13 - Personal Protective Respiratory Equipment.

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 31.17 - Solvent Usage.

3.5 PPS 34.08 - Application of Epoxy-Polyamide Primer (F19 and F45).

4 MATERIALS, EQUIPMENT AND FACILITIES

4.1 Materials

4.1.1 Abrasive paper, aluminum oxide, 50 to 80 grit and 120 to 180 grit.

4.1.2 3M Scotch-Weld DP805 acrylic adhesive, Duo-Pak Cartridge.

4.1.3 DHMS S3.01 Class A Type I sealant.

4.1.4 Protective coating, PR 1005-L, Products Research.

4.2 Equipment

4.2.1 Lint-free cotton gloves (e.g., DSC 422-1).

5 PROCEDURE

5.1 General

5.1.1 Due to the short application life, Scotch-Weld DP805 should be procured in the Duo-Pak Cartridges.

5.1.2 When bonding parts using Scotch-Weld DP805 adhesive, ensure that the minimum temperature is 60°F (15°C) and the maximum relative humidity is 85%.

5.1.3 Take extreme care to avoid skin contact with the adhesive.

5.1.4 Use oldest stock of adhesive first.

5.2 Preparation of Parts

5.2.1 Wear clean cotton gloves when handling bonding surfaces. Do not touch or contaminate prepared surfaces with bare hands or other foreign objects.

5.2.2 Ensure the bonding surfaces of aluminum alloy parts and cadmium plated parts have been primed with F19 according to PPS 34.08.

5.2.3 Immediately before applying adhesive, prepare the bond surfaces as specified in Table I.

TABLE I - PREPARATION OF PARTS FOR ADHESIVE BONDING

MATERIAL	CLEANING PROCEDURE
All F19 primed parts	Solvent clean according to PPS 31.17.
Unprimed metal parts	Solvent clean according to PPS 31.17.
Unprimed fibreglass (including Kevlar laminates and composites)	Step 1. Lightly scuff the bonding surfaces with 120 to 180 grit abrasive paper. Step 2. Solvent clean according to PPS 31.17.
Unprimed phenolic (except Formica, Arborite, etc.)	Step 1. Lightly scuff the bonding surfaces with 120 to 180 grit abrasive paper. Step 2. Solvent clean according to PPS 31.17.
Unprimed Formica, Arborite, etc.	Solvent clean according to PPS 31.17.
Unprimed plastic parts (except Kevlar and fibreglass)	Solvent clean according to PPS 31.17.
Rubber parts except silicone (neoprene, Buna-N (nitrile, NBR))	Solvent clean according to PPS 31.17.
Silicone rubber parts	Step 1. Solvent clean according to PPS 31.17. Step 2. Lightly scuff the bonding surfaces with 120 to 180 grit abrasive paper.
Wood (except balsa)	Step 1. Sand bond surfaces with 50 to 80 grit abrasive paper. Step 2. Remove residual dust with clean compressed air.
Porous materials (Velcro, fabrics, balsa, cork, etc.)	Do not clean porous materials in any way. If the surfaces are contaminated, do not use the materials for bonding.
Rulon A	Solvent clean according to PPS 31.17.
Flexible polyurethane foam	Solvent clean according to PPS 31.17.
Rigid polyurethane foam	Step 1. Lightly scuff the bonding surfaces with 120 to 180 grit abrasive paper. Step 2. Remove residual dust with clean compressed air.

5.3 Preparation of Adhesive Supplied as Duo-Pak Cartridges

5.3.1 Prepare adhesive supplied in a dual syringe plastic duo-pak cartridge as follows:

Step 1. Insert the duo-pak cartridge into the EPX applicator and start the plunger into the cylinders using light pressure on the trigger.

Step 2. Remove the duo-pak cartridge cap and expel a small amount of adhesive onto a test surface (i.e., non-production part) to be sure both sides of the duo-pak cartridge are flowing evenly and freely.

Step 3. Mix Part A and Part B together by attaching the EPX mixing nozzle to the duo-pak cartridge and begin dispensing the adhesive.

5.4 Bonding

5.4.1 If bonding in a confined area, wear protective respiratory equipment as specified in PPS 13.13.

5.4.2 Perform bonding using Scotch-Weld DP805 as follows:

Step 1. Apply the adhesive directly from the tube to both bonding surfaces. Use the adhesive sparingly.

Step 2. Using the tip of the tube, spread the adhesive over both bonding surfaces to form a thin, continuous film. Application to the substrate should be made within two minutes. Once the adhesive has been applied, join the two mating surfaces together according to Step 3 as soon as possible (approximately one minute after adhesive application, a very thin skin may form which will inhibit the proper wetting needed to achieve maximum bond strength).

Step 3. Assemble the parts together in the correct alignment. Do not attempt to re-position the parts after contact has been made.

Step 4. Apply pressure to ensure intimate contact over the full bonding surface and to distribute the adhesive as thinly as possible in the glue line. Maintain pressure on metal-to-metal bonds for approximately 60 seconds and on metal-to-rubber bonds for approximately 30 seconds.

5.5 Curing

5.5.1 Allow the adhesive to cure for a minimum of 12 hours at 60 to 90°F.

5.6 Sealing

5.6.1 Except as specified in paragraph 5.6.1.1, after curing according to section 5.5, seal the exposed glue line on all parts with a thin brush coat of either DHMS S3.01 Class A Type I sealant prepared according to PPS 21.20 or PR 1005-L sealant.

5.6.1.1 Unless otherwise specified by the engineering drawing, where the engineering drawing specifies “tack bonding” according to this PPS, sealing as specified herein is not required.

5.6.2 Allow the sealant to cure according to Table II.

TABLE II - SEALANT CURE TIMES

SEALANT	SUBSEQUENT PROCESSING	MINIMUM CURE TIME AT 75 ± 2°F, 50% R.H. (Note 1)
PR 1005-L	Before further handling	30 minutes
	Before further working or installation	4 hours
DHMS S3.01 Type I	Before further handling	according to PPS 21.20
	Before further working or installation	12 hours for Class A1/2 or 48 hours for Class A2
Note 1. Lower temperature and relative humidity extends cure time. Higher temperature and relative humidity shortens application life.		

5.7 Clean-Up

5.7.1 Solvent clean uncured adhesive from tools and equipment according to PPS 31.17.

5.7.2 Remove excess adhesive from the tube tip before replacing the screw cap.

6 REQUIREMENTS

6.1 Bonded parts and assemblies must have intimate contact over the full bonding area.

6.2 Visual indication of poor adhesion is cause for rejection.

6.3 Allow bonds to cure for a minimum of 12 hours at 60 to 90°F before being further worked or installed in the aircraft.

6.4 Allow sealed parts to cure according to section 5.6 before being further worked or installed in the aircraft.

7 SAFETY PRECAUTIONS

7.1 Observe general shop safety precautions when performing the procedure specified herein.

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

7.3 Always avoid skin contact with the adhesive. If skin contact occurs, immediately wash the affected area with warm water. If fingers become stuck together, immerse bonded area in warm water and pry fingers apart slowly to prevent tearing of skin.

7.4 Keep adhesive away from fire and other sources of ignition.

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

7.6 Operators sanding parts must wear protective respiratory equipment according to PPS 13.13.

8 PERSONNEL REQUIREMENTS

8.1 Personnel responsible for bonding aircraft parts and assemblies with Scotch-Weld DP805 acrylic adhesive shall have a basic understanding of the applicable procedure and requirements as specified herein and shall have exhibited their familiarity to their supervisor.

9 STORAGE

9.1 Store adhesive in a cool, dry area where the temperature will not exceed 60°F (16°C) according to the precautions necessary for flammable materials.

9.2 Refer to PPS 13.28 for the storage life of the adhesive.

9.3 Ensure adhesive Duo-Pak cartridges are clearly marked with the storage life expiry date. Issue adhesive on a first in, first out basis.