BOMBARDIER
Toronto Site
PROPRIETARY INFORMATION

PPS 21.05

PRODUCTION PROCESS STANDARD

SEALING OF FIBRE REINFORCED COMPOSITE PARTS (F32)

Issue 8
- This standard supersedes PPS 21.05, Issue 7.
- Vertical lines in the left hand margin indicate technical 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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1 SCOPE

1.1 This Production Process Standard (PPS) specifies the procedure and requirements for the brush application of F32 clear enamel seal-coat to fibre-reinforced aircraft parts as specified on the engineering drawing.

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 BAERD GEN-018 - Engineering Requirements for Laboratories.

3.2 DHMS C4.11 - Enamel, Epoxy Polyamide.

3.3 EHS-OP-005 - Hazardous Materials Management - *Bombardier Toronto internal operating procedure*.

3.4 PPS 13.13 - Personal Protective Respiratory Equipment.

3.5 PPS 13.26 - General Subcontractor Provisions.

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

3.7 PPS 31.17 - Solvent Usage.

4 MATERIALS AND EQUIPMENT

4.1 Materials

4.1.1 Clear epoxy, two-part, 1900-CG-1 base and 1900-C-1 catalyst, Tempo Paint & Varnish Co. to DHMS C4.11.

4.2 Equipment

4.2.1 Camel hair brush.

4.2.2 Nylon spatula.

4.2.3 Cotton gloves (e.g., DSC 422-1).

4.2.4 Neoprene rubber gloves (e.g., DSC 422-5).

4.2.5 Bombardier approved splash goggles.

5 PROCEDURE

5.1 General

5.1.1 In general, Tempo 1900 to DHMS C4.11, two-part epoxy clear coat is used to seal voids and pinholes in composite air ducts against air leaks.

5.2 Preparation of Parts

5.2.1 Immediately before seal-coat application, solvent clean surfaces according to PPS 31.17.

5.2.2 If necessary, mask off the coating area to avoid contaminating adjacent part surfaces with seal-coat.

5.2.3 Do not touch cleaned surfaces with bare hands or otherwise subject them to contamination. Always wear clean cotton gloves when handling prepared parts.

5.3 Preparation of Coating

5.3.1 Only use base and catalyst within their storage lives labelled on the containers. If necessary, submit storage life expired base or catalyst to the Bombardier Toronto Materials Laboratory or a laboratory accredited according to BAERD GEN-018 for shelf life extension testing according to PPS 13.28.

5.3.2 Discard coating material showing signs of skinning, gelling, lumping or any other forms of deterioration. Discard catalyst showing signs of milkiness, precipitation or other deterioration.

5.3.3 When preparing Tempo 1900, gently stir base and catalyst in their containers using a spatula and mix them together according to Table I.

TABLE I - PREPARATION OF TEMPO 1900 COATING

COATING	COMPONENTS	MIXING RATIO (BY VOLUME)	REACTION TIME (NOTE 1)	POT LIFE (NOTE 2)
Tempo 1900 to DHMS C4.11	1900-CG-1 BASE	1	15 to 30 minutes	8 hours
	1900-C-1 CATALYST	1		

Note 1. Allow mixture to stand for the specified time before use.
Note 2. The pot life is the time during which mixed coating remains suitable for application at 75 ± 5°F. The time indicated is for a 100 gram mix.

5.4 Application of Coating

5.4.1 Apply seal-coat only under the following work area conditions:

- Temperature - 59 to 95°F
- Relative Humidity - 35 to 75%

5.4.2 Apply seal-coat to part surfaces specified on the engineering drawing as follows:

Step 1. Prepare coating according to paragraph 5.3.3.

Step 2. Prepare parts according to section 5.2.

Step 3. Apply a smooth, even, continuous coating of seal-coat to part surfaces using a soft, camel hair brush. Avoid producing sags, runs, bubbles, etc.

Step 4. Cure coating according to section 5.5. Protect parts from dust and other forms of contamination while curing. If necessary, remove masking material before coating becomes tack-free.

5.5 Curing of Coating

5.5.1 Allow parts to cure according to Table II before further handling, working or heat treatment (i.e., subjecting parts to temperatures greater than 150°F).

TABLE II - TEMPO 1900 COATING CURE DATA

COATING	CURE TO TACK-FREE (NOTE 1)	CURE TO HANDLE (NOTES 1 & 2)	CURE BEFORE WORKING (NOTES 1 & 3)	FULL CURE (NOTE 1)
DHMS C4.11 Tempo 1900-CG-1/1900-C-1	4 hours	8 hours	24 hours (Note 4)	168 hours (7 days)

Note 1. Curing time at 75 ± 5°F and 50% relative humidity.
Note 2. For the purposes of this PPS, handling is considered as relocating for storage, transporting or inspection.
Note 3. For the purposes of this PPS, further working of the part includes any operation or process such as machining, bonding, painting, blanket installation, etc.
Note 4. May be forced dried at 140 - 160°F for 20 - 30 minutes.

5.6 Clean-Up and Disposal

5.6.1 Remove uncured coating from tools and equipment by solvent cleaning according to PPS 31.17.

5.7 Repair

5.7.1 For surface repair, touch-up seal-coat by brush application.

6 REQUIREMENTS

6.1 Visually inspect all sealed surfaces for indications of unsealed areas, bubbles or other irregularities that could impair the performance of the coating. If necessary, repair coating according to section 5.7.

6.2 The seal-coat shall be applied to all areas specified on the engineering drawing.

7 SAFETY PRECAUTIONS

7.1 Observe standard plant 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 Do not smoke or eat in coating application areas.

7.4 Wear protective respiratory equipment according to PPS 13.13 during coating application.

7.5 Keep all containers closed when not in use.

7.6 Disposal of empty cans or containers, rags, wipers or paper contaminated with clear enamel seal-coat shall be disposed of according to EHS-OP-005.

7.7 Wear rubber gloves to avoid skin contact when handling coating. If contact occurs, wash contact area thoroughly with soap and water.

7.8 Wear splash goggles when handling coating. Avoid eye contact with coating components. If eye contact occurs, immediately flush eyes in a directed stream of water for at least 15 minutes while forcibly holding eyelids apart to ensure completed irrigation of all eye and lid tissue. Immediately contact the Health Centre and a physician.

8 PERSONNEL REQUIREMENTS

8.1 Personnel responsible for the brush application of F32 clear enamel seal-coat to the exterior surfaces of fibre-reinforced aircraft parts 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

9.1 Store coating with the precautions necessary for flammable materials.

9.2 Store Tempo 1900 in a dry area at a temperature between at 40 and 100°F (5 and 38°C).

9.3 Always use the oldest Tempo 1900 stock first (i.e., first in/first out (FIFO) basis).

9.4 Keep containers of Tempo base and catalyst components tightly closed when not in use. Clearly mark containers with the storage expiry date.

9.5 Refer to PPS 13.28 for the storage life of coating.

9.6 Store base compound and accelerator together as matched batch numbers.

9.7 Store solvents according to PPS 31.17.