BOMBARDIER
Toronto Site
PROPRIETARY INFORMATION

PPS 25.53

PRODUCTION PROCESS STANDARD

BONDING USING 2262 ADHESIVE

Issue 9
- This standard supersedes PPS 25.53, Issue 8.
- 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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Issue 9 - Summary of Changes (over the previous issue)

The following summaries are not detailed and are intended only to assist in alerting PPS users to changes which may affect them; refer to the applicable sections of this PPS for detailed procedure and requirements.

- Revised 3M adhesive name from “EC-2262” to “2262”.

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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 2262 adhesive.

1.1.1 This PPS complements the engineering drawings that specify its use as an authorized instruction. The procedure specified in this PPS must 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.

2 HAZARDOUS MATERIALS

2.1 Before receipt at Bombardier Toronto, all materials must 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 13.26 - General Subcontractor Provisions.

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

3.3 PPS 13.39 - Bombardier Toronto Engineering Process Manual.

3.4 PPS 25.64 - Application of DSC 91 and DSC 464 Adhesive Tapes.

3.5 PPS 31.17 - Solvent Usage.

3.6 PPS 34.08 - Application of Epoxy-Polyamide Primer (F19 & F45).

4 MATERIALS, EQUIPMENT AND FACILITIES

4.1 Materials

4.1.1 2262 adhesive, 3M Company.

4.1.2 Abrasive paper, aluminum oxide, 120 - 180 grit.

4.1.3 DSC 91-8 adhesive transfer tape.

4.2 Equipment

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

4.2.2 Protective gloves, neoprene (e.g., DSC 422-5) or rubber (e.g., DSC 422-2).

4.2.3 Bristle brush.

4.2.4 Mohair roller.

4.2.5 Rubber or stitch roller.

4.2.6 Cotton wiping cloths (e.g., DSC 378-2).

4.3 Facilities

4.3.1 This PPS has been categorized as a Controlled Special Process according to PPS 13.39 and as such only facilities specifically approved according to PPS 13.39 are authorized to perform bonding aircraft parts and assemblies with 2262 adhesive according to this PPS.

4.3.2 Bombardier subcontractors shall direct requests for approval to Bombardier Aerospace Supplier Quality Management. Bombardier Aerospace facilities shall direct requests for approval to the appropriate internal Quality Manager.

4.3.3 Facility approval shall be based on a facility report, a facility survey and completion of a qualification test program, if required. The facility report shall detail the materials and equipment to be used, the process sequence to be followed and the laboratory facilities used to show compliance with the requirements of this PPS. Any deviation from the procedure or requirements of this PPS shall be detailed in the facility report. Based upon the facility report, Bombardier Toronto Engineering may identify additional qualification and/or process control test requirements. During the facility survey, the facility requesting qualification shall be prepared to demonstrate their capability. Once approved, no changes to subcontractor facilities may be made without prior written approval from Bombardier Aerospace Supplier Quality Management.

4.3.3.1 For approval of subcontractor facilities to perform bonding aircraft parts and assemblies with 2262 adhesive according to this PPS, completion of a test program and submission of suitable test samples representative of production parts may be required.

5 PROCEDURE

5.1 Preparation of Parts

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

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

5.1.3 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 (neoprene, nitrile, Buna-N, etc.)	Solvent clean according to PPS 31.17.
Rubber parts (Silicone)	Step 1. Solvent clean according to PPS 31.17. Step 2. Lightly scuff the bonding surfaces with 120 to 180 grit abrasive paper. Step 3. Solvent clean according to PPS 31.17.
Thermoplastic	Solvent clean according to PPS 31.17.
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 bonding surface is contaminated, refer the part to Liaison Engineering.
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.

5.2 Preparation of Adhesive

5.2.1 Before use, thoroughly stir the adhesive in its own container.

5.3 Bonding

5.3.1 Perform bonding in a clean area as specified in section 6.2.

5.3.2 Open Time Method

5.3.2.1 This method is recommended if only a small area is to be bonded or if one or both materials are porous:

Step 1. Using a suitable bristle brush or mohair roller, apply a thin uniform coat of adhesive to both bonding surfaces, making as few strokes as possible. Porous surfaces may require two or more coats to ensure that sufficient adhesive remains on the surface. Allow each preceding coat to air dry before the next coat is applied.

Step 2. Allow the final coat of adhesive to air dry for approximately 3 to 5 minutes until it becomes tacky.

Step 3. Assemble the parts in the correct alignment and roll down with a rubber or stitch roller to ensure intimate contact over the full bonding surface.

5.3.3 Re-Activation Method

5.3.3.1 This method is recommended if large areas of non-porous materials are to be bonded or if a strong immediate bond is desired:

Step 1. Using a suitable bristle brush or mohair roller, apply a thin uniform coat of adhesive to both bonding surfaces, making as few strokes as possible. Porous surfaces may require two or more coats to ensure that sufficient adhesive remains on the surface. Allow each preceding coat to air dry before the next coat is applied.

Step 2. Allow the final coat of adhesive to air dry completely for 1 hour minimum. If parts will not be bonded on the same shift, cover adhesive coated surfaces with Kraft paper after the adhesive has dried to a tack-free condition.

Step 3. Re-activate the dry adhesive coating on the less porous mating surface by wiping with a clean cloth dampened with the solvent specified by PPS 31.17.

Step 4. Immediately join the parts together and roll down with a rubber or stitch roller to ensure intimate contact over the full bonding surface.

5.3.4 Bonding Velcro Tape to Vinyl

5.3.4.1 Bond Velcro tape to vinyl as follows:

Step 1. Using a suitable bristle brush or mohair roller, apply a thin uniform coat of adhesive to both bonding surfaces, making as few strokes as possible.

Step 2. Allow the adhesive coating to air dry completely for 1 hour minimum.

Step 3. Apply a second coat of adhesive to both the vinyl and Velcro tape.

Step 4. Allow the second coat to air dry for approximately 3 to 5 minutes (until it becomes tacky).

Step 5. Assemble the bonding surfaces together and press down firmly with fingers to ensure intimate contact over the full bonding surface.

5.3.5 Bonding Slip Resistant Floor Cover to the Floor Panel

5.3.5.1 For this application, 2262 adhesive acts as a primer for bonding. Therefore, it is critical the adhesive is **fully** cured prior to bonding the slip resistant floor cover to the DSC 91-8 adhesive transfer carpet tape applied to the floor panel.

5.3.5.2 Bond slip resistant floor cover to the floor panel as follows:

Step 1. Using a suitable bristle brush or mohair roller, apply a thin uniform coat of 2262 adhesive to the back face of slip resistant floor cover, making as few strokes as possible. **Do not** apply 2262 adhesive to floor panels.

Step 2. Allow the adhesive coating to air dry completely for 1 hour minimum.

Step 3. Apply a second coat of adhesive to the back face of slip resistant floor cover.

Step 4. Allow the final coat to **fully cure** according to paragraph 5.4.1.

Step 5. Apply DSC 91-8 adhesive transfer carpet tape to the floor panel according to PPS 25.64. **Do not** apply DSC 91-8 carpet tape to the slip resistant floor cover.

Step 6. Bond slip resistant floor cover to the floor panel. Assemble the bonding surfaces together and press down firmly with fingers to ensure intimate contact over the full bonding surface.

5.4 Curing

5.4.1 Allow the bond to cure for a minimum of 24 hours at room temperature (65°F minimum) before being further worked or installed in the aircraft.

5.4.2 The cure time of mixed adhesives varies greatly with changes in temperature and/or relative humidity.

5.5 Clean-Up

5.5.1 Remove adhesive from tools and equipment by solvent cleaning according to PPS 31.17.

6 REQUIREMENTS

6.1 General

6.1.1 Bonded parts and assemblies shall have intimate contact over the full bonding area.

6.1.2 Visual indication of poor adhesion is cause for rejection.

6.1.3 Allow bonds to cure for a minimum of 24 hours at room temperature (65°F minimum) before being further worked or installed in the aircraft.

6.2 Bonding Area Conditions

6.2.1 The cleanliness of the bonding area (e.g., tables, floors, equipment, walls, etc.) shall be checked and cleaned as necessary to ensure that dust accumulation, dirt or other contamination will not be evident. Maintain records of dates of cleaning.

6.2.2 Maintain the temperature and relative humidity of the bonding areas within the range specified in Figure 1. Bonding when the relative humidity is below 30% will increase the chance of static discharge and worker discomfort, but will not affect part quality.

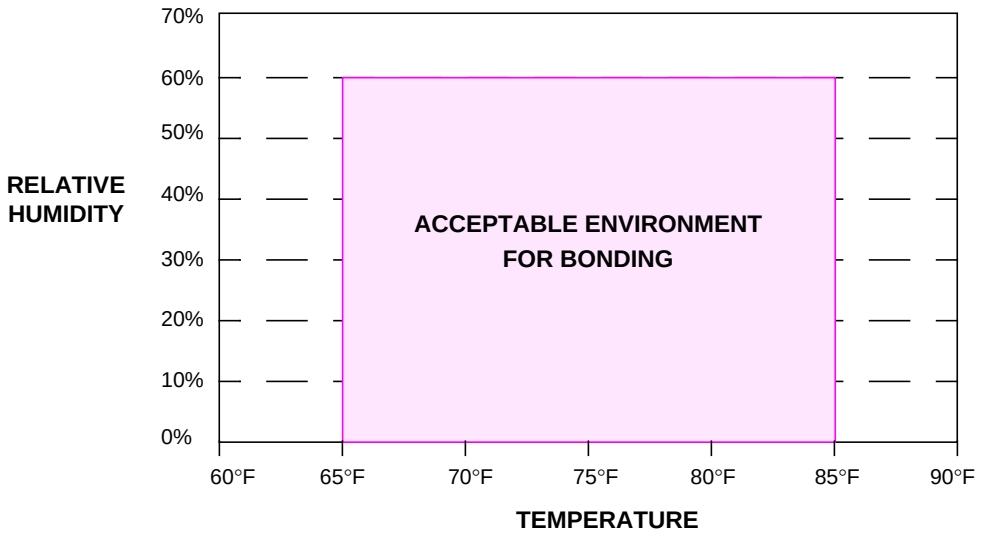

FIGURE 1 - TEMPERATURE AND HUMIDITY LIMITS

7 SAFETY PRECAUTIONS

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

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

7.3 Wear protective gloves when handling adhesive/sealant. Do not use protective hand cream which may cause contamination.

7.4 Avoid skin contact with adhesive. If skin contact occurs, wash thoroughly with soap and water.

7.5 Avoid eye contact with adhesive. 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 complete irrigation of all eye and lid tissue. Contact the Health Centre and a physician.

7.6 Ensure sufficient ventilation is supplied at all times when using adhesive. Avoid inhalation of fumes or vapours from adhesive.

7.7 Wash hands thoroughly with soap and water immediately after using adhesive.

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

8 PERSONNEL REQUIREMENTS

8.1 This PPS has been categorized as a Controlled Special Process according to PPS 13.39. Refer to PPS 13.39 for personnel requirements.

9 STORAGE

9.1 Store 2262 adhesive at a temperature of 60°F to 80°F 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 2262 adhesive containers are clearly marked with the storage life expiry date.

9.4 When not in use, keep containers of adhesive tightly closed.

9.5 Always use oldest stock first.