BOMBARDIER
Toronto Site
PROPRIETARY INFORMATION

PPS 25.16

PRODUCTION PROCESS STANDARD

BONDING WITH HYSOL #4326 ADHESIVE

Issue 9
- This standard supersedes PPS 25.16, Issue 8.
- 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.

Prepared By:	(Christie Chung)	November 10, 2014
	PPS Group	
Approved By:	(*K. Quon*, for L.K. John)	November 11, 2014
	Materials Technology	
	(*A. Assivero*, for D. Dawe)	November 19, 2014
	Quality	

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 bonding aircraft parts using Hysol #4326 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, 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 EHS-OP-005 - Hazardous Materials Management - *Bombardier Toronto internal operating procedure*.

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 & F45).

4 MATERIALS AND EQUIPMENT

4.1 Materials

4.1.1 Adhesive resin, Hysol #4326.

4.1.2 Adhesive catalyst, Hysol #3404.

4.1.3 Bristle brush, spatula or mohair roller.

4.2 Equipment

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

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

5 PROCEDURE

5.1 Preparation of Parts

5.1.1 Ensure bonding surfaces have been primed with F19 according to PPS 34.08.

5.1.2 Immediately before applying adhesive, solvent clean the bonding surface of each part according to PPS 31.17.

5.1.3 Always wear clean cotton gloves when handling prepared bonding surfaces. Protect prepared surfaces from contamination.

5.2 Preparation of Adhesive

5.2.1 Hysol #4326 is a two-part resin/catalyst mixture.

5.2.2 Thoroughly stir the resin and catalyst in their separate containers before mixing the parts together.

5.2.3 Mixing ratios, pot life and cure times of the adhesive are shown in Table I.

5.2.4 Stir the resin/catalyst mixtures thoroughly to obtain a homogeneous air-free mix.

5.2.5 Mix only sufficient material for the job on hand or which will be used up within the pot life of the material. Dispose of excess material upon expiration of the material pot life (e.g., according to EHS-OP-005).

TABLE I - ADHESIVE MIXING/CURING DATA

ADHESIVE SYSTEM	COMPONENT	MIXING RATIO (PARTS BY WEIGHT)	POT LIFE (NOTE 1)	CURE TO HANDLE (NOTE 2)
Hysol #4326	Resin #4326	100	1 Hour	24 hours at room temp. OR 1 hour at room temp. followed by 1 hour at 150 to 170°F
	Catalyst #3404	8		

Note 1. The pot life is the time during which mixed adhesive remains suitable for application at 75 ± 5°F. The time indicated is for a 100 gram mix unless otherwise specified. The pot life is based on a temperature of 75°F and 50% relative humidity. Higher humidity and temperature conditions will shorten the pot life.

Note 2. If the accelerated cure is used, record the date, time and oven temperature on the manufacturing document (e.g., Work Order or Process Sheet) next to the operation.

5.3 Bonding

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

5.3.2 Using a suitable bristle brush, spatula or mohair roller, apply a thin, uniform coat (0.005" - 0.020") of adhesive to both bonding surfaces.

5.3.3 Immediately following the application of the adhesive, assemble the parts to be bonded in the correct alignment and apply pressure with clamps or weights so as to ensure intimate contact over the full bonding area.

5.4 Curing

5.4.1 Allow assemblies to cure to handle according to Table I before further working of the part or installation on the aircraft.

5.5 Clean-Up

5.5.1 Remove uncured adhesive from tools and equipment according to PPS 31.17.

6 REQUIREMENTS

6.1 General

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

6.1.2 Visual indications of poor adhesion shall be cause for rejection.

6.1.3 Allow all bonds to cure to handle according to Table I before working the part further or installing it on the aircraft. If the accelerated cure is used, the date, time and oven temperature must be recorded on the manufacturing document (e.g., Work Order or Process Sheet) next to the curing operation.

6.2 Bonding Area Conditions

6.2.1 On a regular basis, check the cleanliness of the bonding area (e.g., tables, floors, equipment, walls, etc.) and clean 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.

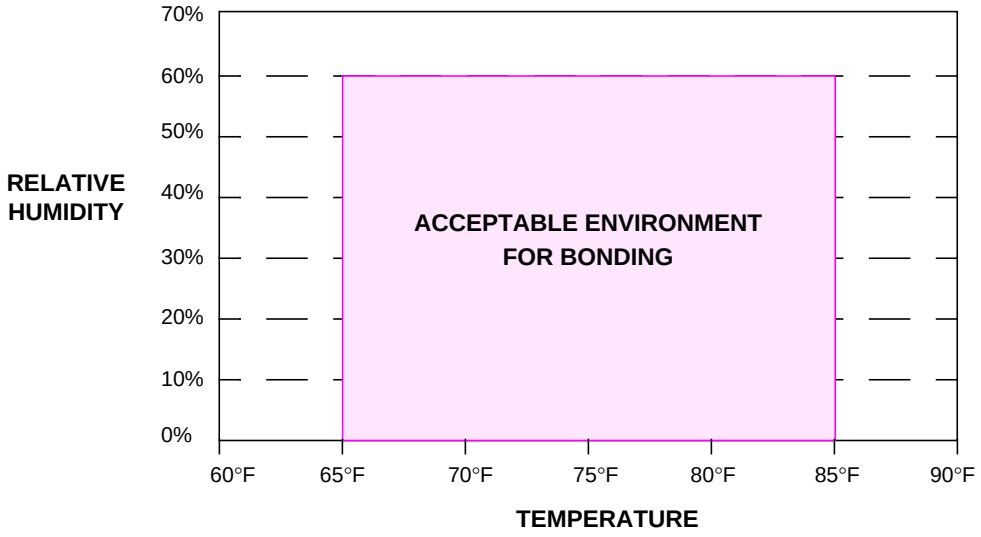

FIGURE 1 - TEMPERATURE AND HUMIDITY LIMITS

7 SAFETY PRECAUTIONS

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

7.2 Keep all adhesive components away from fire or other sources of ignition.

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

7.4 Always wear protective neoprene gloves when handling adhesive. Do not use protective hand cream which may cause contamination.

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

7.6 Avoid skin contact with adhesive components. If contact occurs, wash the affected area thoroughly with soap and water. If skin irritation occurs, contact the Health Centre and a physician.

7.7 Smoking or eating is not permitted in areas in which adhesive is being used. Avoid ingesting adhesive. If ingestion occurs, immediately contact the Health Centre and a physician.

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

8 PERSONNEL REQUIREMENTS

8.1 Personnel responsible for bonding aircraft parts with Hysol #4326 adhesive 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 the adhesive components (i.e., resin and catalyst) according to the precautions necessary for flammable materials and at a temperature of 60 to 80°F (16 to 26°C).

9.2 The storage life of the resin and catalyst are specified in PPS 13.28. Ensure containers of resin and catalyst are clearly marked with the storage life expiry date.

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