BOMBARDIER
Toronto (de Havilland)
PROPRIETARY INFORMATION

PPS 2.33

PRODUCTION PROCESS STANDARD

Installation of ATR Panel Pins in Sandwich Panel Assemblies

Issue 3
- This standard supersedes PPS 2.33, Issue 2.
- Vertical lines in the left hand margin indicate changes over the previous issue.
- Direct PPS related questions to PPS.Group@aero.bombardier.com or (416) 375-4365.
- This PPS is effective as of the distribution date.

Prepared By:	(Michael Wright)	August 14, 2012
	Production Process Standards (PPS)	
Approved By:	(L.K. John)	August 14, 2012
	Materials Technology	
	(B. DeVreede)	August 16, 2012
	Quality	

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

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1 Scope

1.1 This Production Process Standard (PPS) specifies the procedure and requirements for the installation of ATR panels pins in fibre reinforced honeycomb sandwich panel assemblies.

1.1.1 This PPS complements the engineering drawings that specify its use as an authorized instruction and the procedure specified 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. 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 must 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 10.35 - Fabrication of 250° Cure Epoxy Resin Pre-Impregnated, Fibre Reinforced Composite Parts.

3.2 PPS 10.39 - Machining of Fibre Reinforced Composite Parts.

3.3 PPS 13.23 - Preparation and use of DHMS P1.30 Resin.

3.4 PPS 13.26 - General Subcontractor Provisions.

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

3.6 PPS 31.17 - Solvent Usage.

3.7 PPS 34.34 - Surface Finishing Compounds (F33).

4 Materials and Equipment

4.1 Materials

4.1.1 ATR (Advanced Technology and Research Co.) panel pins as specified on the engineering drawing. Refer to Figure 1 for a general description of the pins. Refer to Figure 2 for the panel pin part number breakdown.

4.1.2 Epoxy resin, low density to DHMS P1.30 Grade 2.

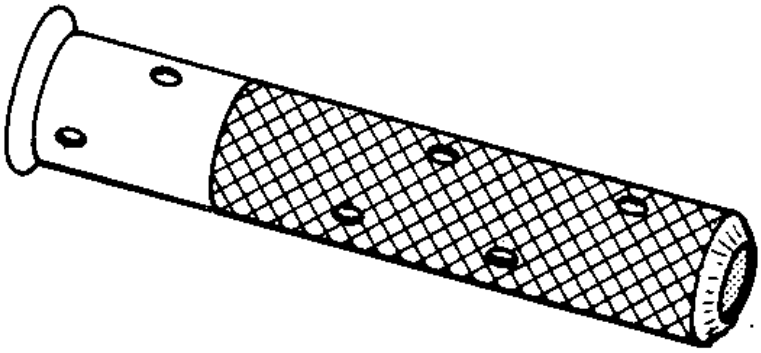


Figure 1 - General Description of Panel Pins

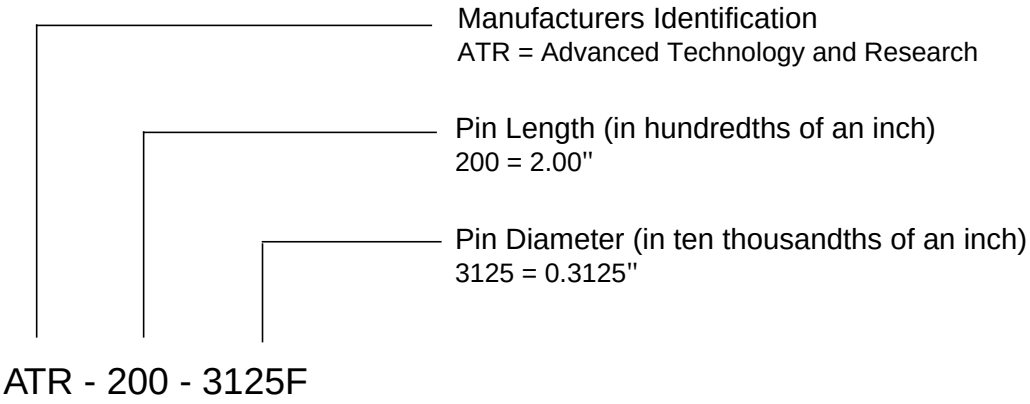


Figure 2 - Part Number Breakdown

4.2 Equipment

4.2.1 Scriber, awl, ice-pick or similar tool.

4.2.2 Weighing scales, (e.g., triple beam balance type) capable of weighing to ± 0.5 grams.

4.2.3 Disposable, wax-free paperboard containers (e.g., MELO take-out food containers).

4.2.4 Air operated sealant guns (e.g., Semco #250-6).

4.2.5 Polyethylene sealant dispensing cartridges and plungers (e.g., 2 1/2 oz Semco #250-CP 2 1/2 or 6 oz Semco #250-CP 6).

4.2.6 Standard polyethylene nozzles, 1/16" diameter orifice (e.g., Semco #420).

4.2.7 Release tape (e.g., Flash breaker #2).

5 Procedure

5.1 General

5.1.1 ATR panel pins are used as a structural fastener for making edge corner and tee joints in sandwich panel assemblies.

5.1.2 Prepare DHMS P1.30 Grade 2 resin according to PPS 13.23.

5.2 Preparation of Parts

5.2.1 Before assembly, ensure all sandwich panels have been machined to final size and, if specified, surface finished according to PPS 34.34.

5.2.2 If specified on the engineering drawing, edge fill the open edge of the facing panel with DHMS P1.30 Grade 1 compound and fully cure according to PPS 10.35 before installation of the panel pins.

5.2.3 Locate the panel pin holes in the facing panels using a drill template, assemble panels into the assembly fixture and transfer holes from the facing panel to the edge panel by 'match' drilling. Drill holes to size specified in Table I according to PPS 10.39.

Table I - Hole Preparation Data

PANEL PIN DESIGNATION	PIN COLOUR	RECOMMENDED DRILL SIZE	FINAL HOLE SIZE	MAXIMUM DRILL DEPTH
ATR-150-1875F	Blue	3/16" (0.1875")	0.187" - 0.194"	1.75"
ATR-200-3125F	Yellow	5/16" (0.3125")	0.312" - 0.322"	2.25"
ATR-250-4375F	Red	7/16" (0.4375")	0.437" - 0.447"	2.75"

5.2.4 After final drilling, break back the honeycomb core cells in the facing panel 1 - 2 cell widths around the hole by inserting a suitable scriber or awl into the hole at an angle of approximately 45° and rotating the tool around the hole 2 or 3 times to break and crush the core cells approximately as shown in Figure 3-A. If the facing panel incorporates a foam core in the area the panel pin is to be installed, break back the foam core approximately 1/4" - 1/2" around the hole in the same manner as for honeycomb core (see Figure 3-B).

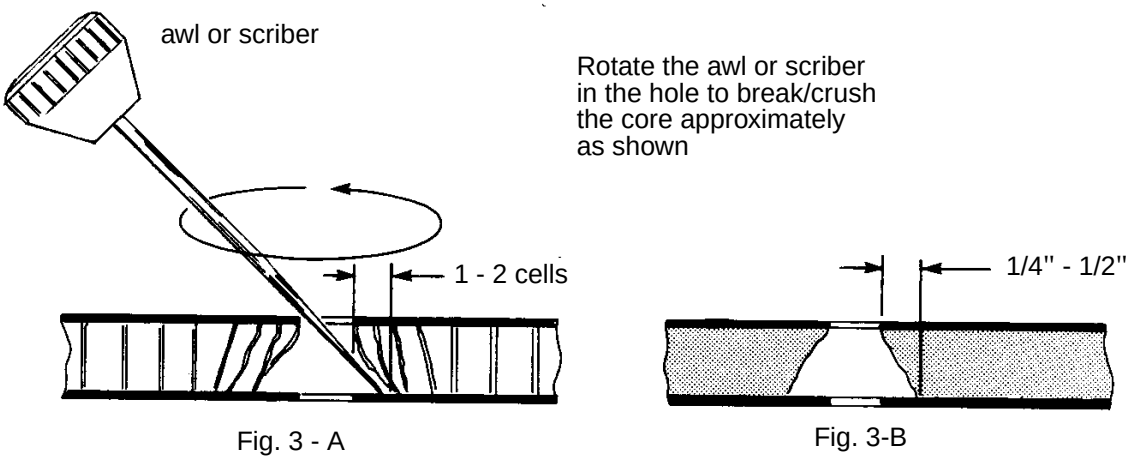
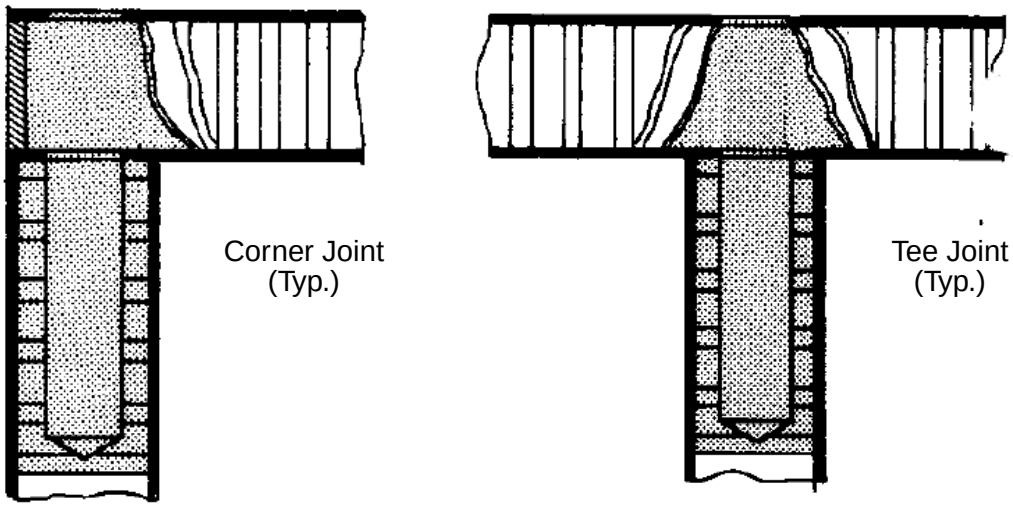


Figure 3 - Detail of Core Crushing in Facing Panel

5.3 Installation of Panel Pins

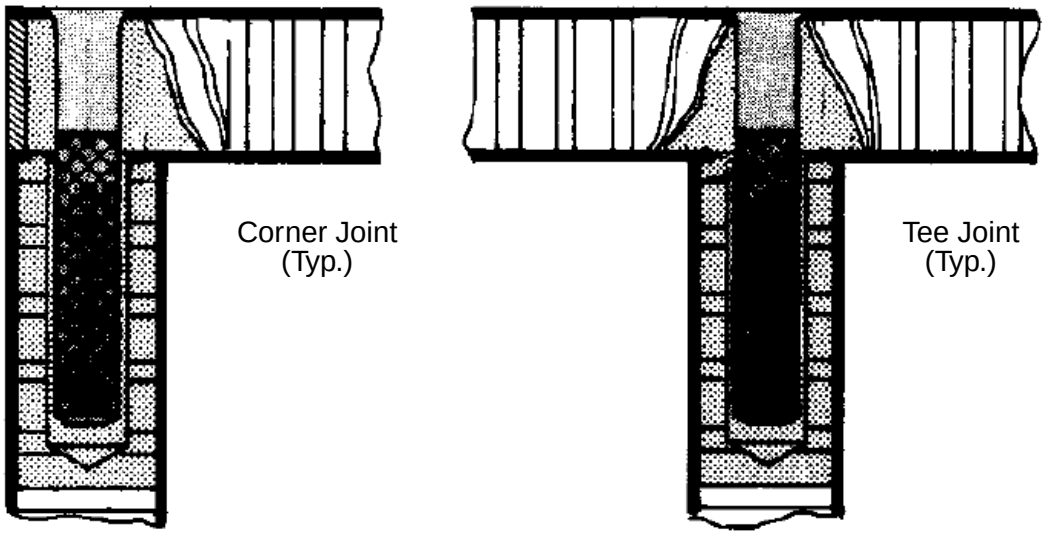
5.3.1 Install panel pins as follows:

Step 1. Using a standard sealant gun and sealant cartridge fitted with a straight nozzle (ref. para. 4.2.6.), inject DHMS P1.30 Grade 2 resin into the facing panel cavity and joining panel hole so as to completely fill the hole as shown below.



Step 2. Allow 1 - 2 minutes for the resin to flow into the cells and, if necessary, top up the cavity.

Step 3. Slowly insert the panel pin fully into the panels as shown below. Lightly tap pin end to ensure that it is firmly seated in the panel. Check that resin fills the pin bore flush to the end. Refill the pin with DHMS P1.30 Grade 2 resin, as required.



Step 4. Remove excess resin from the facing panel surface by solvent wiping according to PPS 31.17.

Step 5. Allow the completed assembly to cure for a minimum of 3 hours before removing from the assembly fixture.

5.4 Curing

5.4.1 If possible, position the assembled panels so the pins are upright to allow the compound to flow into the cavity.

5.4.2 If necessary on horizontal installations, cover the pin end with release tape (ref. para. 4.2.7) to prevent the compound from flowing out.

5.4.3 Allow assemblies to cure according to PPS 13.23 before installing in the aircraft.

5.5 Post Installation Procedure

5.5.1 After curing of the DHMS P1.30 Grade 2 resin, check the pin installation for flushness and complete filling of the pin. Shave pins that are above flush using a micro-stop shaver. Re-fill pins that are not filled to flush with DHMS P1.30 Grade 2 resin after shaving.

5.5.2 Allow filled areas to cure according to section 5.4.

6 Requirements

6.1 Panel pins must be flush to 0.005" below flush with the surrounding surface and be filled flush to the end with DHMS P1.30 Grade 2 resin. Shave pins above flush according to section 5.5.

6.2 Pin installations more than 0.005" below flush are not acceptable.

6.3 Breakout of the pin at the edge of the facing panel due to lack of edge distance is not acceptable.

7 Safety Precautions

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

7.2 Avoid skin contact with the mixed DHMS P1.30 Grade 2 resin and resin components.

7.3 Keep mixed DHMS P1.30 Grade 2 resin and resin components away from fire and other sources of ignition.

8 Personnel Requirements

8.1 Personnel responsible for installation of ATR panel pins in sandwich panel assemblies must have a good working knowledge of the procedure and requirements as specified herein and must have exhibited their competency to their supervisor.

9 Storage of DHMS P1.30 Grade 2 Resin

9.1 Store DHMS P1.30 Grade 2 resin components at a temperature of 16 - 26°C (60 - 80°F) according to the precautions necessary for flammable materials. Refer to PPS 13.28 for the storage life of the resin components. Ensure containers are clearly marked with the storage life expiry date.