DE HAVILLAND AIRCRAFT OF CANADA LIMITED

PPS 10.44

PRODUCTION PROCESS STANDARD

PROPRIETARY INFORMATION

APPLICATION OF LIQUID SHIMS

Issue 6
- This standard supersedes PPS 10.44, Issue 5.
- Vertical lines in the left hand margin indicate technical changes over the previous issue.
- Direct PPS related questions to christie.chung@dehavilland.com or (416) 375-7641.
- This PPS is effective as of the distribution date.

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M&P Engineering

Issue 6 - 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.

- Replaced throughout PPS where “Bombardier” is specified with “De Havilland Aircraft of Canada Limited” or “DHC”.
- Added a safety precaution to wear personal protective respiratory equipment as specified in PPS 13.13 when bonding liquid shim using DHMS A6.09 adhesive.
- Added disposal of chemical wastes section.
- Specified to use the oldest stock first (i.e., first in/first out (FIFO) basis).

TABLE OF CONTENTS

Sections **Page**

Figures

1 SCOPE

1.1 This Production Process Standard (PPS) specifies the procedure and requirements for application of liquid shims to surfaces of fibre reinforced plastic assemblies.

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.

2 HAZARDOUS MATERIALS

2.1 Before receipt at De Havilland Aircraft of Canada Limited (DHC), all materials shall be approved and assigned Material Safety Data Sheet (MSDS) numbers by the DHC 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 DHC Environment, Health and Safety Department.

3 REFERENCES

3.1 PPS 2.64 - Installation of Potting Type Sandwich Panel Fasteners.

3.2 PPS 10.22 - Preparation of Moulds.

3.3 PPS 13.13 - Personal Protective Respiratory Equipment.

3.4 PPS 13.26 - General Subcontractor Provisions.

3.5 PPS 25.30 - Bonding Using DHMS A6.09 Epoxy Adhesive.

3.6 PPS 25.66 - Cleanliness Requirements for Application of Adhesives.

3.7 PPS 31.17 - Solvent Usage.

4 MATERIALS AND EQUIPMENT

4.1 Materials

4.1.1 DHMS A6.09 epoxy adhesive.

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

4.1.3 DSC 234-12 release ply.

4.1.4 DSC 234-13 release agent.

4.1.5 Epoxy resin filler, Cab-O-Sil.

4.1.6 Masking tape, 1" wide.

4.2 Equipment

4.2.1 Shim surface forming tools.

4.2.2 Sandwich panel insert plugs.

4.2.3 Wooden or plastic spatula.

4.2.4 Lint-free wipers (e.g. DSC 378-2 or DSC 378-3).

5 PROCEDURE

5.1 General

5.1.1 Liquid shims are used to provide a flat or dimensionally controlled surface to facilitate the mounting of additional parts to fibre reinforced plastic components.

5.1.2 DHMS A6.09 adhesive is also used to build up joggled or mismatched assemblies of fibre reinforced plastic components.

5.1.3 Apply DHMS A6.09 adhesive in a clean area as specified in PPS 25.66.

5.2 Preparation of Parts

5.2.1 Install through type sandwich panel fasteners according to PPS 2.64 before the application of the liquid shims.

5.2.2 Install blind type sandwich panel fasteners after application and full curing of the liquid shim.

5.2.3 If DHMS A6.09 adhesive is to be used as a bonding pad for additional details, apply a layer of DSC 234-12 release ply to the forming tool so as to cover the shim surface forming area.

5.2.4 Shim surface forming tools (see paragraph 4.2.1) and insert plugs (see paragraph 4.2.2) which have been fabricated from or are permanently faced with Teflon or other similar parting material, need only be solvent cleaned according to PPS 31.17 and inspected for embedded shop swarf.

5.2.4.1 Coat forming tools and plugs which are not permanently faced with a suitable parting material with DSC 234-13 release agent according to PPS 10.22.

5.2.4.2 Immediately before use, wipe forming tools and plugs with a clean, dry wiper (see paragraph 4.2.4).

5.2.5 If peel ply has been incorporated into the lay-up of the sandwich panel, limit preparation to careful removal of the peel ply immediately before the application of DHMS A6.09 adhesive.

5.2.5.1 Take care not to contaminate the exposed surfaces of the assembly.

5.2.6 If peel ply has not been incorporated into the lay-up of the assembly, prepare as follows:

Step 1. Using masking tape, mask off the area to which the DHMS A6.09 adhesive is to be applied.

Step 2. Lightly scuff the bonding area with abrasive paper (see paragraph 4.1.2) taking care not to expose the reinforcing fibres.

Step 3. Solvent clean according to PPS 31.17.

5.3 Preparation of Liquid Shim/Adhesive

5.3.1 Prepare DHMS A6.09 liquid shim/adhesive according to PPS 25.30.

5.3.1.1 Cab-O-Sil epoxy resin filler, up to 2% by weight, may be added to DHMS A6.09 epoxy adhesive when mixing.

5.4 Application of Liquid Shim (See **Figure 1**)

5.4.1 If necessary, use suitable plugs, prepared according to paragraph 5.2.4 to plug the bores of all sandwich panel inserts to prevent the ingress of DHMS A6.09 adhesive.

5.4.2 Using a spatula, apply a sufficient quantity of mixed DHMS A6.09 adhesive to the bond area to ensure complete coverage and sufficient thickness of the shim.

5.4.3 Locate the forming tool at the required location, ensuring that insert plugs, if applicable, enter the corresponding holes in the tool.

5.4.4 Press the pad down firmly and evenly so that the DHMS A6.09 adhesive is forced out around the perimeter of the tool.

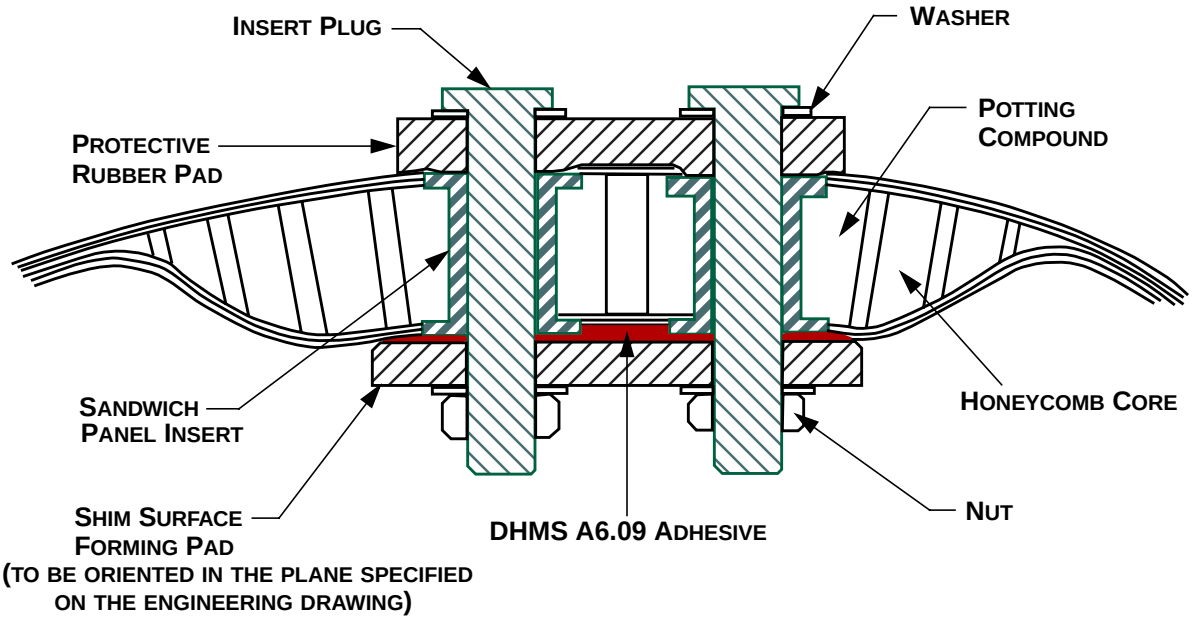

FIGURE 1 - LIQUID SHIM FORMING TOOL ASSEMBLY (TYPICAL)

5.4.5 Secure the tool in position and solvent clean according to PPS 31.17 to remove the extruded DHMS A6.09 adhesive.

5.4.6 If possible, remove the masking tape and allow the DHMS A6.09 adhesive to cure according to PPS 25.30 before further working of the part.

5.4.7 After curing, remove the forming tool and if possible, the insert plugs.

5.4.7.1 Do not remove peel ply applied according to paragraph 5.2.3 until immediately before bonding of additional details.

5.4.8 Check that the surface of the cured DHMS A6.09 adhesive is free of defects (i.e., voids, etc.) and repair according to section 5.5 if required.

5.5 Repair of Cured DHMS A6.09 Adhesive Shim Surfaces

5.5.1 If possible, scuff the DHMS A6.09 adhesive shim surface with abrasive paper (see paragraph 4.1.2) in the area requiring repair.

5.5.2 Solvent clean the scuffed area according to PPS 31.17.

5.5.3 Mix a sufficient quantity of DHMS A6.09 adhesive according to section 5.3.

5.5.4 Apply the mixed DHMS A6.09 adhesive to the areas to be repaired ensuring that all voids are filled flush to the surrounding surface.

5.5.5 Allow the DHMS A6.09 adhesive to cure according to PPS 25.30.

6 REQUIREMENTS

6.1 Sandwich panel fasteners shall meet the requirements specified in PPS 2.64.

6.2 There shall be no evidence of DHMS A6.09 adhesive in the bore of sandwich panel fasteners.

6.3 Cured DHMS A6.09 adhesive shim surface shall be free of defects in the plane specified on the engineering drawing.

6.4 Release ply shall be present on all cured DHMS A6.09 adhesive shim surfaces which require subsequent bonding of additional details.

6.5 If the thickness of the DHMS A6.09 adhesive shim is critical, the engineering drawing will specify a minimum or maximum acceptable thickness. If the DHMS A6.09 adhesive shim does not meet these values, contact Liaison Engineering for disposition of the assembly.

7 DHC SAFETY PRECAUTIONS

7.1 The safety precautions specified herein are specific to DHC to meet Canadian Federal and Provincial government environmental, health and safety regulations. It is strongly recommended that other facilities consider these safety precautions; however, suppliers, subcontractors and partners are responsible for ensuring that their own environmental, health and safety precautions satisfy the appropriate local government regulations.

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

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

7.4 Wear protective respiratory equipment according to PPS 13.13 when bonding liquid shim with DHMS A6.09 adhesive.

8 PERSONNEL REQUIREMENTS

8.1 Personnel responsible for the application of liquid shims to surfaces of fibre reinforced plastic assemblies 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 DISPOSAL OF CHEMICAL WASTES

9.1 Dispose of all chemical wastes according to national legislation and local regulations. At DHC, dispose of chemical wastes according to EHS-OP-005.

9.2 At DHC, dispose of chemical contaminated work clothes, rags, etc., into Red Containers labelled “Waste Rags”.

10 STORAGE

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

10.2 Store DHMS A6.09 adhesive according to PPS 25.30.