DE HAVILLAND AIRCRAFT OF CANADA LIMITED

BOMBARDIER

Toronto Site

PPS 31.07 - CLEANING AND STRIPPING OF PAINTED SURFACES

Issue 16
- This standard supersedes PPS 31.07, Issue 15.
- 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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Issue 16 - 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.

- Specified this is a jointly owned PPS by both De Havilland Aircraft of Canada Limited and Bombardier Inc.
- Specified use of BAERD GEN-018 at frozen Revision E.
- Specified a limit of two times a part can be immersion stripped without MRB approval.

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Flow Charts

1 SCOPE

1.1 This Production Process Standard (PPS) specifies the procedure and requirements for cleaning, manual stripping, and immersion stripping of painted surfaces.

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.

1.2 This PPS is co-owned by De Havilland Aircraft of Canada Limited (DHC) and Bombardier Inc. (BA) due to its applicability for both the DHC DASH 8 and BA Lear 45 programs. Frozen revisions of Bombardier documents (e.g., BAERD GEN, BAMS, etc.) specified herein applies only to the DASH 8 program.

2 HAZARDOUS MATERIALS

2.1 Before receipt at DHC or BA, all materials shall be approved and assigned Material Safety Data Sheet (MSDS) numbers by the DHC/BA 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/BA Environment, Health and Safety Department.

3 REFERENCES

3.1 BAERD GEN-018, Rev. E - Engineering Requirements for Laboratories.

3.2 EHS-OP-005 - Hazardous Materials Management, *DHC/BA internal operating procedure*.

3.3 PPS 13.13 - Personal Protective Respiratory Equipment.

3.4 PPS 13.26 - General Subcontractor Provisions.

3.5 PPS 13.39 - Bombardier Toronto Engineering Process Manual.

3.6 PPS 17.02 - Abrasive Blasting.

3.7 PPS 31.02 - Cleaning Processes for Aluminum and Aluminum Alloys.

3.8 PPS 31.04 - Degreasing Processes.

3.9 PPS 31.17 - Solvent Usage.

4 MATERIALS, EQUIPMENT AND FACILITIES

4.1 Materials

4.1.1 Liquid Soap (e.g., Swish #4799).

4.1.2 Abrasive paper, aluminum oxide, 180 or 220 grit (e.g., 3M TRI-M-ITE).

4.1.3 Aluminum wool or Scotch-Brite Pads.

4.1.4 DHMS S5.03 Grade 2 manual paint strippers.

4.1.5 Immersion paint stripper:

- Ardrox 266, Ardrox Limited. Ardrox 266 Alkali Additive and Ardrox 266 Solvent Additive.

4.1.6 Aluminum foil.

4.1.7 Aluminum foil tape, adhesive backed, 3M #425.

4.1.8 Protective wrapping material (e.g., Neutral Kraft paper).

4.1.9 Masking tape.

4.1.10 Soft cloths or mops.

4.2 Equipment

4.2.1 Suitable ladders and staging.

4.2.2 Rubber scrapers, wooden or hard.

4.2.3 Suitable containers and brushes.

4.2.4 Suitable spray equipment for manual paint stripping.

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

4.2.6 Chemical resistant boots and aprons, DHC/BA approved.

4.2.7 Chemical splash goggles resistant to high impact and faceshields, DHC/BA approved.

4.2.8 Immersion tank, mild steel construction, equipped with removable sludge tray.

4.2.9 Rinse tank, equipped with spray lance.

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 cleaning and manual and immersion stripping of painted surfaces according to this PPS.

4.3.2 Subcontractors shall direct requests for approval to DHC or BA Quality.

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, DHC or BA 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 DHC or BA Quality.

4.3.3.1 All testing and evaluation specified herein shall only be performed by DHC/BA Toronto Materials Laboratory or by laboratories accredited according to BAERD GEN-018 Rev. E.

5 PROCEDURE

5.1 General

5.1.1 For the purposes of this PPS, the term “MRB” (Material Review Board) is considered to include DHC/BA MRB and DHC/BA delegated MRB.

5.1.2 As an alternative procedure to that specified herein for paint stripping metal parts, it is acceptable to strip the paint from the surface by abrasive blasting according to PPS 17.02. Limitations on paint stripping using abrasive blasting shall be as specified in PPS 17.02.

5.1.3 Generally, strip painted metal detail parts by immersion according to section 5.2.3. However, if necessary, painted metal details may be manually stripped according to section 5.3.3.

5.1.4 Strip painted metal assemblies, details too large to be immersion stripped, major components and complete aircraft according to section 5.3.3.

5.1.5 CEE-BEE E-1004J manual paint stripper to DHMS S5.03 Grade 2 can only be used to strip paint from aluminum or titanium substrates.

5.1.6 Painted composite surfaces are not normally stripped, particularly when re-painting major components or complete aircraft. Such surfaces are masked while stripping adjacent metal surfaces and are then prepared for painting according to the applicable painting PPS.

5.1.6.1 Where it is necessary to remove paint from composite surfaces, remove the paint by sanding with 180 or 220 grit aluminum oxide abrasive paper. Under no circumstances shall chemical strippers be used on composite surfaces.

5.1.7 Do not strip painted plastic surfaces (i.e., Kydex, polycarbonate, etc.). Such surfaces shall be masked off while stripping adjacent metal surfaces and prepared for painting according to the applicable painting PPS.

5.1.8 Do not strip aircraft and sub-assemblies while standing on asphalt floors or runways.

5.1.9 Take care to prevent damage when stripping painted sealant and “O” ring seals.

5.1.10 Chemical strippers shall not be allowed to contact the bondline of metal bonded assemblies.

5.2 Immersion Stripping

5.2.1 Preparation of Solutions

5.2.1.1 Use Ardrox 266 as supplied. The solution separates into 2 layers on standing, the upper layer being an aqueous seal which prevents the evaporation of the lower solvent cleaning layer.

5.2.1.2 Fill a mild steel tank to operating level with Ardrox 266. Since both products consists of two distinct layers, it is necessary to use the whole of the contents of a container, in order to maintain the correct ratio between the lower solvent layer and upper aqueous seal.

5.2.1.3 Allow the bath to stand for approximately 24 hours before use to allow the 2 layers to separate sufficiently.

5.2.1.4 Operate solutions at 61 to 90°F.

5.2.2 Cleaning of Painted Metal Surfaces for Stripping

5.2.2.1 Wash painted surfaces requiring cleaning with a solution consisting of 2 to 3 ounces of soap (ref. paragraph 4.1.1) in one gallon of warm water, using soft cloths or mops.

5.2.2.1.1 Solvent wipe stubborn areas according to PPS 31.17 and then wash according to paragraph 5.2.2.1.

5.2.2.1.2 Degrease excessively oily or greasy detail parts according to PPS 31.04.

5.2.2.2 After cleaning, rinse surfaces thoroughly with clean water and allow to dry.

5.2.3 Immersion Stripping Painted Metal Surfaces (See Flow Chart 1)

5.2.3.1 Place or hang detail parts on suitable racks or in suitable baskets in such a way as to allow the stripping solution to come into contact with all areas of the parts to be stripped.

5.2.3.2 Immerse the parts in the stripping solution for a period of 10 to 20 minutes, ensuring that all parts are below the bottom of the aqueous seal.

5.2.3.3 Racks or baskets may be occasionally agitated to ensure the stripper contacts all part surfaces.

5.2.3.4 Remove parts from the bath and, if paint has not been completely loosened or removed from all parts, re-immerse for another period of a maximum of 20 minutes.

5.2.3.4.1 If paint is not completely loosened or removed after the second immersion, analyze the solution to ensure that it is within the limits specified in section 10.

5.2.3.4.2 After the second attempt and the paint is still not completely loosened or removed, MRB approval is required for further processing.

5.2.3.5 After stripping, move parts to the rinse tank and spray rinse with water to remove any loose paint. Do not spray rinse above the stripping tank as excess water will dilute the seal.

5.3 Manual Stripping

5.3.1 General

5.3.1.1 If large areas are to be manually cleaned or stripped, arrange ladders and staging to permit easy access to the surfaces.

5.3.2 Masking for Cleaning or Stripping

5.3.2.1 Before cleaning or stripping, protect the following surfaces by masking with aluminum foil and adhesive backed aluminum foil tape (ref. paragraph 4.1.6 and paragraph 4.1.7):

- Transparent plastic surfaces such as windshields, side windows, etc.
- Composite parts
- Sealants

5.3.2.2 Mask static vent holes and openings in the airframe, engines or landing gear, which would trap or allow the ingression of strippers to inner surfaces, according to paragraph 5.3.2.1.

5.3.2.3 Mask de-icer boots (if not to be removed), radomes, tires and any other exposed rubber or non-metallic parts according to paragraph 5.3.2.1.

5.3.2.4 Mask metallic areas which are not to be cleaned or stripped using Kraft paper and masking tape.

5.3.2.5 Masking materials shall be considered effective protection from small amounts of stripper only. Remove masking as soon as possible after stripping operations.

5.3.3 Manual Stripping Painted Metal Surfaces (See Flow Chart 2)

5.3.3.1 Manually remove primers, lacquers and enamels from metal assemblies, large detail parts, major components and complete aircraft using DHMS S5.03 Grade 2 paint stripper as follows:

Step 1. Thoroughly stir the stripper and pour the required amount into a suitable container.

Step 2. Spray apply an even coating of stripper to the surface (see paragraph 5.3.3.2). On large surface areas, apply the stripper in sections, removing paint from one section before commencing another.

Step 3. Allow the stripper to remain on the surface until the paint is soft (1 to 2 hours).

Step 4. Remove the soft paint from the surface using a wooden or hard rubber scraper. If necessary, spot re-apply stripper to any remaining painted areas and repeat removal procedure.

Step 5. Remove paint particles remaining around rivet heads and along seams and weld beads using a stiff, short bristle, nylon brush. Take care when stripping around rivet heads, seams or other protrusions to ensure that the surface is completely stripped. If using SV-35 PMA stripper, do not use a bristle brush (as long as the stripper is visibly wet, it is working).

Step 6. Remove masking and, using a small brush, carefully apply stripper up to the edge of the previously protected area. When the paint has softened, remove it by scraping with a wooden or hard rubber scraper.

Step 7. Thoroughly rinse the stripped metal surfaces with a water spray to remove remaining stripper and loosened paint.

Step 8. If necessary, remove any remaining traces of stripper or loosened paint film by solvent wiping according to PPS 31.17. Take extreme care to prevent solvent from coming into contact with previously masked areas.

5.3.3.2 Use of a brush to apply DHMS S5.03 Grade 2 paint strippers is acceptable but should be limited to work where spray application is not practical (e.g., prior to fluorescent penetrant inspection, prior to electrical resistance testing of the bond contact area as specified in PPS 9.06, etc.).

5.4 Final Cleaning

5.4.1 After stripping, deoxidize aluminum and aluminum alloy surfaces according to PPS 31.02.

5.5 Clean-Up

5.5.1 Dispose of stripper waste, stripped paint, used masking materials, etc. according to section 11.

6 REQUIREMENTS

6.1 Painted surfaces which have been cleaned shall show no smudges, fingerprints, oily sections or other forms of contamination.

6.2 Stripped surfaces shall be free from all paint, primer and other contaminants. Pay particular attention when inspecting around rivet heads, seams or other protrusions.

6.3 After final cleaning, check areas from which paint has been removed for evidence of corrosion.

6.4 There shall not be any evidence of damage to transparent plastic surfaces (i.e., windshields, side windows, etc.), composite parts, or sealants.

7 DHC/BA SAFETY PRECAUTIONS

7.1 The safety precautions specified herein are specific to DHC/BA 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 Operators shall wear protective respiratory equipment according to PPS 13.13 while carrying out paint stripping operations.

7.4 Under no circumstances shall paint strippers be kept in sealed containers. The Paint Shop or stores shall issue paint strippers in self-venting containers only.

7.5 Containers of paint strippers should be opened with caution to avoid spurting.

7.6 Paint strippers are toxic and contain components which are corrosive to the eyes and skin. Wear personal protective equipment that is appropriate to the application (as specified below).

7.7 When brush applying paint strippers, operators shall wear the following:

- *DHC/BA approved chemical splash goggles resistant to high impact*
- chemical resistant gloves as specified in paragraph 4.2.5
- *protective respiratory equipment according to PPS 13.13*

7.8 When dispensing paint strippers from bulk containers, operators shall wear the following:

- *DHC/BA approved chemical splash goggles resistant to high impact and faceshields*
- *chemical resistant gloves as specified in paragraph 4.2.5*
- *DHC/BA approved chemical resistant boots and aprons*
- *protective respiratory equipment according to PPS 13.13*

7.9 When spray applying paint strippers, operators shall wear the following:

- *chemical splash goggles resistant to high impact*
- *chemical resistant gloves as specified in paragraph 4.2.5)*
- *DHC/BA approved chemical resistant boots and suit*
- *protective respiratory equipment according to PPS 13.13*

7.10 If skin contact with paint stripper occurs, flush the affected area immediately with clean, cool water. Wash with soap and water, rinse thoroughly and immediately contact the Health Centre.

7.11 If eye contact with paint stripper 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.

7.12 Wherever possible, carry out manual paint removal according to section 5.3.3 in the open air, away from direct sunlight. Provide adequate ventilation where paint removal is being carried out indoors. Consult the Health and Safety Department for the threshold limit values.

7.13 Restrict personnel from the interior of the aircraft during manual paint stripping and cleaning operations.

7.14 Smoking is prohibited in areas where paint stripping is being carried out.

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

7.16 Refer to PPS 17.02 for the safety precautions for abrasive blasting.

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 MAINTENANCE OF EQUIPMENT

9.1 Empty the sludge tray in the immersion tank as required and dispose of the waste material according to section 11.

10 MAINTENANCE OF IMMERSION SOLUTIONS

10.1 The seal layer gradually depletes through evaporation and dragout. Once weekly, take a cross-sectional sample of the immersion solution to ensure that the aqueous seal comprises 10 to 15% of the total volume of solution in the tank. If the level of the aqueous seal falls below 10% of the total volume, add clean cold water to bring the seal up to operating level.

10.2 Once per month, obtain a sample of the lower solvent layer of the solution for analysis and testing according to the manufacturer's instructions.

10.2.1 For Ardrox 266, maintain the solvent density between 20° and 27° Bé. Add Ardrox 266 Solvent Additive to the solution, as required, to maintain the solvent density within the limits specified.

10.2.2 For Ardrox 266, maintain the pH between 9.2 and 10.0. Add Ardrox 266 Alkali Additive to the solution, as required, to maintain the pH within the limits specified.

10.3 Once every 24 months, or as recommended by the DHC/BA approved laboratory, dispose of the immersion solution according to section 11 and make up a new bath according to section 5.2.1.

11 DISPOSAL OF CHEMICAL WASTES

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

11.2 At DHC/BA, dispose of chemical contaminated work clothes, rags, etc., into Red Containers labelled "Waste Rags".

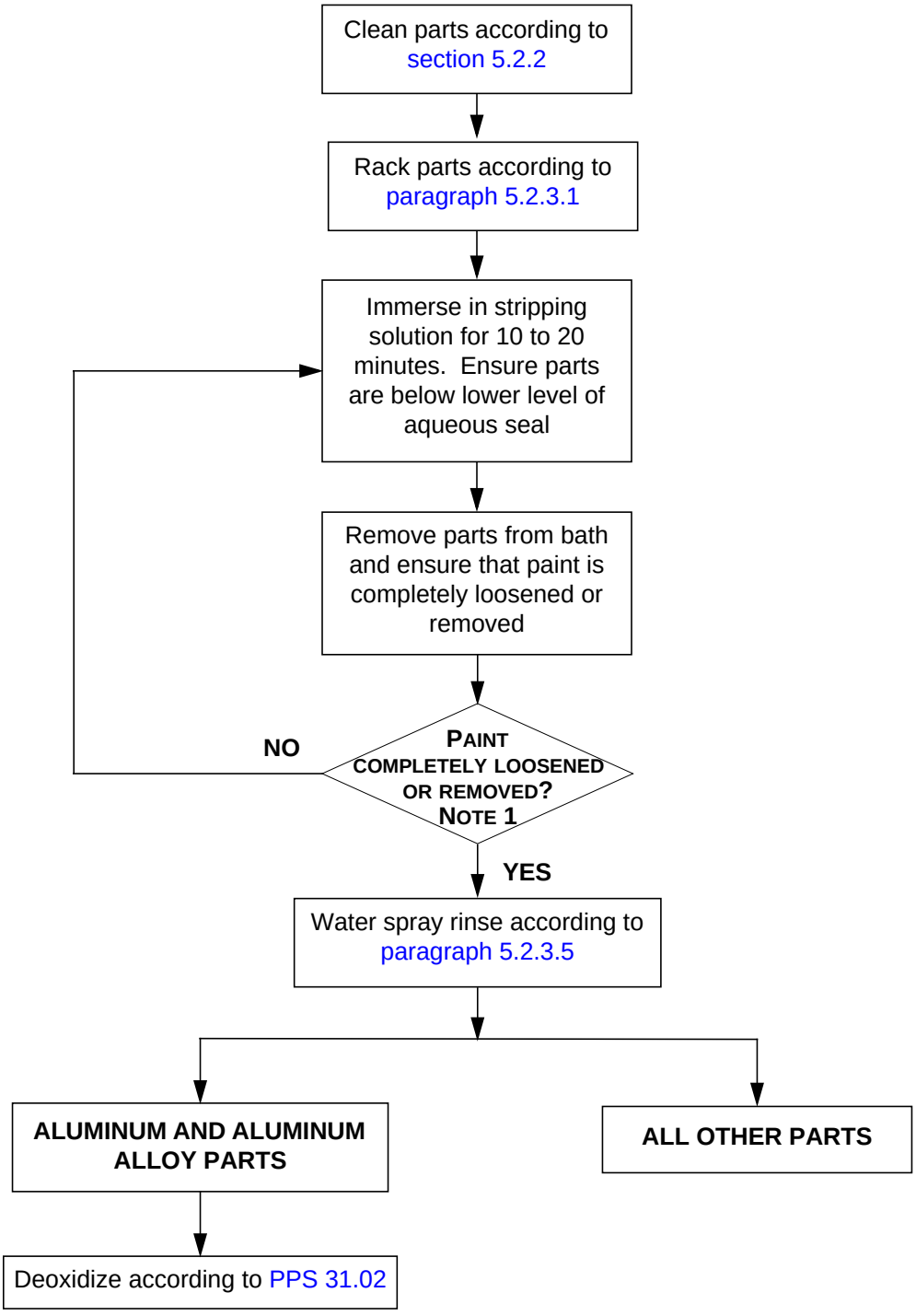
12 STORAGE

12.1 Store paint strippers at a temperature of 61 to 90°F according to the precautions necessary for flammable materials. Do not store in direct sunlight.

12.2 Seal partially used manual paint stripper drums when not in use.

12.3 Issue shelf-life items on a first in/first out (FIFO) basis.

FLOW CHART 1 - IMMERSION STRIPPING OF PAINTED METAL SURFACES



Note 1. See paragraph 5.2.3.4.1 and paragraph 5.2.3.4.2.

FLOW CHART 2 - MANUAL STRIPPING OF PAINTED METAL SURFACES