DE HAVILLAND AIRCRAFT OF CANADA LIMITED

BOMBARDIER

Toronto Site

PPS 16.01 - APPLICATION OF HARD AND SOFT FILM (F13) CORROSION PREVENTIVE COMPOUND

Issue 24
- This Production Process Standard (PPS) supersedes PPS 16.01, Issue 23.
- Vertical lines in the left hand margin indicate technical changes over the previous issue.
- Direct PPS related questions to christie.chung@dehavilland.com.
- This PPS is effective as of the distribution date.

THIS PPS IS CO-OWNED BY DE HAVILLAND AIRCRAFT OF CANADA LIMITED AND BOMBARDIER INC.

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

Issue 24 - 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.
- Added Socopac 65H option to DHMS C4.12 Grade 4 Type II.
- Specified to always use the oldest stock first (i.e., first in/first out (FIFO) basis).

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1 SCOPE

1.1 This Production Process Standard (PPS) specifies the procedure and requirements for the application of F13 hard and soft film corrosion preventive compound to aircraft parts and assemblies.

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.

1.2 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., BAPS, BAERD GEN, BAMS, etc.) specified herein apply only to the DASH 8 program.

2 HAZARDOUS MATERIALS

2.1 Before receipt at DHC or BA, all materials must 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 BMS 3-29 - Advanced Organic Corrosion Inhibiting Compounds.

3.2 DHMS C4.12 - Compound, Water Displacing, Corrosion Inhibiting.

3.3 MIL-PRF-16173 - Corrosion Preventive Compound, Solvent Cutback, Cold-Application.

3.4 PPS 2.02 - Installation of Cherry Rivets.

3.5 PPS 13.13 - Personal Protective Respiratory Equipment.

3.6 PPS 13.26 - General Subcontractor Provisions.

3.7 PPS 16.20 - Temporary Corrosion Protection of Carbon and Low Alloy Steel Parts.

3.8 PPS 31.03 - Cleaning of Carbon and Low Alloy Steels.

3.9 PPS 31.04 - Degreasing Processes.

3.10 PPS 31.17 - Solvent Usage.

4 MATERIALS AND EQUIPMENT

4.1 Materials

4.1.1 F13 Grade 1 hard film corrosion preventive compound to MIL-PRF-16173 Grade 1, Class 1 or Class 2. Although Tectyl 890 and Petrotect 1-X are no longer qualified to MIL-PRF-16173 Grade 1 they may be used where use of F13 Grade 1 is specified.

4.1.2 F13 Grade 2 soft film corrosion preventive compound: MIL-PRF-16173 Grade 2, Class 1 or Class 2 (e.g., Tectyl 502C). Although Petrotect 2 and LPS-3 are no longer qualified to MIL-PRF-16173 Grade 2 they may be used where use of F13 Grade 2 is specified.

4.1.3 F13 Grade 3 Type I colourless transparent water displacing, soft film corrosion preventive compound to DHMS C4.12 Grade 3 Type I (i.e., Colourless Boeshield T-9 or LPS-3).

4.1.4 F13 Grade 3 Type II coloured transparent water displacing soft film corrosion preventive compound to DHMS C4.12 Grade 3 Type II (i.e., Coloured Boeshield T-9 or Cor-Ban 23, LPS HardCoat, Protector 100, or Ardrox AV-8).

4.1.5 F13 Grade 4 Type I colourless transparent water displacing corrosion preventive compound to DHMS C4.12 Grade 4 Type I (i.e., Protector 1500).

4.1.6 F13 Grade 4 Type II coloured transparent water displacing corrosion preventive compound to DHMS C4.12 Grade 4 Type II (i.e., ZC 029 (ZC D-5029NS), Cor-Ban 35, Procyon (Formula 13-100-1), Ardrox AV-15, Socopac 65H) or BMS 3-29 (e.g., Dinitrol AV30 or Procyon).

4.2 Equipment

4.2.1 Airless paint spraying equipment for the spray application of F13 Grade 3 and Grade 4 compounds (e.g., Dinol International).

4.2.2 Extension spray equipment for spray application of F13 Grade 3 and Grade 4 Type I and Type II compounds in confined areas (e.g., Adhesive Application Systems Ltd. 4 ft. extension, #105-504, and 8 ft. extension, #105-508).

4.2.3 Standard paint spraying equipment.

4.2.4 Dip tank with close fitting cover.

5 PROCEDURE

5.1 General

5.1.1 The grade and, if applicable, the type of corrosion preventive material to be used for any particular application is specified on the engineering drawing or Production Process Standards.

5.1.2 In confined areas, perform spray application of F13 Grade 3 or Grade 4, Type I or Type II, corrosion preventive compound to major components after final fabrication and assembly of aircraft. After spray application, allow the enclosed area to dry for 1 hour under forced ventilation or 6 to 8 hours under natural ventilation.

5.1.3 If spraying F13 Grade 3 or Grade 4, Type I or Type II, corrosion preventive compound within the interior of finished aircraft, mask or shield the following areas from direct spray or overspray contamination:

- black boxes with cooling holes
- control cables and associated hardware
- systems components
- open ended tubing
- oxygen tubes and fittings
- windows

5.1.4 Avoid spraying directly onto the following parts; however, a light overspray is acceptable:

- bearings
- non-oxygen system tubes
- pulleys
- rubber items

5.1.5 If the engineering drawing does not specify what grade of F13 corrosion preventive compound to apply (e.g., drawing specifies “F13 Type 1”, “F13 Type 2” or “F13 Type 3”), refer to Liaison Engineering for the grade **and type** (may be different) of F13 preventive compound to apply.

5.2 Preparation of Material

5.2.1 Prepare and apply corrosion preventive material according to Table I.

TABLE I - PREPARATION OF CORROSION PREVENTIVE MATERIAL

MATERIAL	PREPARATION	APPLICATION METHOD
F13 Grade 1	Use as received (Note 1)	Brush, Dip or Pour
F13 Grade 2	Thin with the solvent specified in PPS 31.17 to the consistency of thin syrup	Brush, Dip or Pour
F13 Grade 3 Type I and Type II	Use as received (Note 1)	Spray or Brush
F13 Grade 4 Type I and Type II	Use as received (Note 1)	Spray or Brush (Note 2)

Note 1. Do not thin with any solvent.
Note 2. Use brush method if penetration of material is not required.

5.3 Preparation of Parts

5.3.1 Except for open ended tubes, complete all operations such as welding, heat treatment, sand blasting, plating and painting before applying corrosion preventive compound. Corrosion preventive compound may be applied to the inside of the open ended tubes before painting if enough time is allowed for the film to dry and the outside of the tube is adequately cleaned immediately before painting.

5.3.2 Except for large parts or assemblies, degrease parts contaminated with shop soil or grease according to PPS 31.04 before applying corrosion preventive compound. Solvent clean large parts or assemblies according to PPS 31.17.

5.3.3 Acid pickle parts with surface rust or oxide according to PPS 31.03 before applying corrosion preventive compound. The time interval between acid pickling and the application of corrosion preventive compound must not exceed 1/2 hour. If the time interval exceeds 1/2 hour, apply temporary corrosion protection according to PPS 16.20. There must be no signs of rust, even light surface rust, on the part surface that is to receive F13 treatment.

5.4 Application of F13 Grade 1 Hard Film Compound

5.4.1 Open Ended Tubes

5.4.1.1 Apply F13 Grade 1 hard film to the inside of open ended tubes as follows:

Step 1. Mask off any open holes or cut-outs. If the tube is open at both ends, mask off one end.

Step 2. Fill the tube with F13 Grade 1 hard film slowly to prevent any air bubble formation.

Step 3. Completely drain excess film from the inside of the tube.

Step 4. Position the part vertically and allow to dry for at least 4 hours.

Step 5. Ensure that the inside of the tube is completely covered with the film (i.e., the film should be continuous and uniformly black). Re-coat if necessary.

5.4.2 Sealed tubes

5.4.2.1 Apply F13 Grade 1 hard film to sealed tubes as follows:

Step 1. Pour F13 Grade 1 hard film into drilled holes of sealed tubes.

Step 2. Seal the holes temporarily with tape.

Step 3. Slowly, rotate the tube axially and end to end to ensure that the film has completely covered the interior surfaces of the tube (i.e., the film should be continuous and uniformly black).

Step 4. Remove tape.

Step 5. Completely drain excess film from the tube. Turn multi-sectioned parts frequently to ensure drainage from all low points and pockets.

Step 6. Seal the drill holes with self-plugging cherry rivets installed according to PPS 2.02.

Step 7. Solvent clean exterior surfaces according to PPS 31.17.

5.4.3 Blind Bores

5.4.3.1 Apply F13 Grade 1 hard film to blind bores as follows:

Step 1. Mask off any open holes or cut-outs not to be coated with F13 Grade 1 hard film.

Step 2. Fill the blind bore with F13 Grade 1 hard film slowly to prevent any air bubble formation.

Step 3. Completely drain excess film from the inside of the blind bore.

Step 4. Position the part in such a manner that will allow the film to settle to the bottom of the blind bore and allow to dry for at least 4 hours.

Step 5. Ensure that the inside of the blind bore is completely covered with the film (i.e., the film should be continuous and uniformly black). Re-coat if necessary.

5.4.4 Parts and Assemblies

5.4.4.1 Apply a continuous and uniformly black film of F13 Grade 1 to parts and assemblies by dipping or brush coating.

5.5 Application of F13 Grade 2 Soft Film Compound

5.5.1 Apply a thin uniform film of F13 Grade 2 compound to bolt **shanks** (do not apply to the threads) by dipping or brush coating. For magneformed tubes, thin F13 Grade 2 compound with the solvent specified in PPS 31.17 to the consistency of a thin syrup and apply by the fill and drain method.

5.6 Application of F13 Grade 3 Type I or Type II Soft Film Compound

5.6.1 Apply F13 Grade 3, Type I or Type II, as a thin uniform film to small parts and assemblies by brushing or spraying using standard or airless spraying equipment, or an aerosol can.

5.6.2 Apply F13 Grade 3, Type I or Type II, as a thin uniform film to large parts or aircraft components (e.g., fuselage) using airless spraying equipment. Spray inaccessible areas (e.g., horizontal stabilizer) using extension spray equipment.

5.6.3 The final wet film thickness of applied F13 Grade 3, Type I or Type II, should be approximately 0.0003" - 0.0005" thick.

5.7 Application of F13 Grade 4 Type I or Type II Soft Film Compound

5.7.1 Apply F13 Grade 4, Type I or Type II, as a thin uniform film to aircraft parts or; components (e.g., fuselage) by brushing or spraying using airless spraying equipment. Spray inaccessible areas by using extension spraying equipment.

5.7.2 The final wet film thickness of applied F13 Grade 4, Type I or Type II, should be approximately 0.0012" - 0.0016" thick.

5.8 Removal of Film

5.8.1 Remove hard and soft film compound by degreasing according to PPS 31.04 or solvent cleaning according to PPS 31.17.

5.9 Clean-Up

5.9.1 Remove corrosion preventive compound from tools, equipment, etc. by solvent cleaning according to PPS 31.17. Do not allow solvent to enter bores to treated tubes. Use a rag or wiper to remove any puddles of excess compound.

5.9.2 Solvent clean plastic parts according to PPS 31.17.

5.10 Touch-Up and Repair

5.10.1 If corrosion preventive compound has been removed from treated surfaces, touch-up these areas with the same type of compound as originally used on the parts. It is acceptable to use aerosol cans, if available, containing the same compound for touch-up.

5.10.2 If parts have been reworked after application of corrosion preventive compound, ensure that the surfaces are free of swarf or chips before re-application of compound.

6 REQUIREMENTS

6.1 Surfaces treated with F13 must be completely covered with a continuous film of compound.

6.2 For all F13 Grade 1 hard film coated parts, ensure the coating is continuously black when examined under direct lighting. Re-coat as necessary according to section 5.4. The coating inside open ended tubes or bores should be examined using a light source of sufficient intensity as to fully illuminate the full length of the tube or to the bottom of the bore.

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

7.4 Do not smoke, have open flames or naked lights in areas where spray application of corrosion preventive compound is being carried out.

7.5 Electrically ground finished aircraft and aircraft major assemblies during spray operations.

7.6 Wear protective respiratory equipment as specified in PPS 13.13 when applying F13 corrosion preventive compound.

7.7 Dispose of used rags or wipers contaminated with F13 compound in oily waste cans (red containers with a self-closing lid).

8 PERSONNEL REQUIREMENTS

8.1 Personnel responsible for applying F13 hard or soft film corrosion preventive compound must have a good working knowledge of the applicable procedure and requirements as specified herein and must have exhibited their competency to their supervisor.

9 STORAGE AND SHELF LIFE

9.1 Store F13 corrosion preventive compound at a temperature of 40 to 80°F. Protect from direct heat and open flame.

9.2 The storage life of F13 corrosion preventive compounds must be two years from the date of manufacture. If the product manufacturer's technical data sheet specifies otherwise, follow the technical data sheet.

9.3 Ensure the product is clearly marked with the storage life expiry date.

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