BOMBARDIER Toronto (de Havilland) **PROPRIETARY INFORMATION**	**PPS 34.01** **PRODUCTION PROCESS STANDARD**

Application of Cellulose Nitrate Lacquer (F2 & F4)

Issue 19
- This standard supersedes PPS 34.01, Issue 18.
- Vertical lines in the left hand margin indicate technical changes over the previous issue.
- This PPS is effective as of the distribution date.
- Validation of issue status is the responsibility of the user.

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Issue 19 - 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.

- Clarified Table 1 (Superseded Finishes).
- Deleted all reference to use of TT-L-20 and TT-L-32 lacquers, as these products could contain ingredients that are banned under REACH regulations.
- Revised/clarified reference to relative humidity recording and/or indicating equipment.
- Deleted specific reference to the use of “Gardco EZ cup” Zahn #2 cups for measuring lacquer viscosity.
- Revised lacquer preparation procedure to specify reducing the lacquer to be used for spray application to the appropriate spraying viscosity (instead of specifically the viscosity specified by the manufacturer).

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1 Scope

1.1 This Production Process Standard (PPS) specifies the procedure and requirements for the application of cellulose nitrate lacquer (finish codes F2 and F4 according to PPS 23.02) 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.

1.1.3 Procedure or requirements specified in a Bombardier BAPS, MPS, LES or P. Spec. **do not** supersede the procedure or requirements specified in this PPS.

1.2 For application of F5 Baking Enamel, formerly covered by this PPS, refer to PPS 34.39.

1.3 If application of F3, F6, F10 or F11 finish is specified (finishes formerly covered by this PPS) apply one of the superseding finishes specified in Table 1.

Table 1 - Superseded Finishes

Superseded Finish	Superseding Finishes	
	Finish Code	PPS
F3	F2	PPS 34.01
	F22	PPS 34.41
	F24	PPS 34.03
F6	F22	PPS 34.41
	F24	PPS 34.03
F10	F5	PPS 34.39
F11	F22	PPS 34.41
	F24	PPS 34.03

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 General

3.1.1 Unless a specific issue is indicated, the issue of the reference documents specified in this section in effect at the time of manufacture shall form a part of this specification to the extent indicated herein.

3.2 Bombardier Toronto (de Havilland) Specifications

3.2.1 PPS 13.13 - Personal Protective Respiratory Equipment.

3.2.2 PPS 13.26 - General Subcontractor Provisions.

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

3.2.4 PPS 17.02 - Abrasive Blasting.

3.2.5 PPS 31.07 - Cleaning and Stripping of Painted Surfaces.

3.2.6 PPS 31.17 - Solvent Usage.

3.2.7 PPS 34.03 - Application of Polyurethane Enamel.

3.2.8 PPS 34.07 - Application of Urethane Primer (F14) to Plastic Surfaces.

3.2.9 PPS 34.08 - Application of Epoxy-Polyamide Primer (F19 and F45).

3.2.10 PPS 34.16 - Application of Epoxy-Amine, Urethane Compatible, Intermediate Primer (F23).

3.2.11 PPS 34.39 - Application of Alkyd Baking Enamel (F5).

3.2.12 PPS 34.41 - Application of Epoxy-Polyamide Enamel (F22).

3.3 Bombardier Aerospace Specifications

3.3.1 BAERD GEN-023 - Contamination Control for Compressed Air.

4 Materials and Equipment

4.1 Materials

4.1.1 Unless otherwise specified in this section, use only the materials specified; use of superseding or alternative materials is not allowed.

4.1.2 Lacquer, cellulose nitrate, flat, pigmented, finish code F2, to A-A-3164.

4.1.3 Lacquer, cellulose nitrate, gloss, pigmented, finish code F2, to A-A-3165.

4.1.4 Lacquer, cellulose nitrate, clear, finish code F4, to A-A-3165.

4.1.5 Sanding sealer, 2478 Lacquer (Tempo Paint and Varnish Co.).

4.1.6 Thinner, cellulose nitrate, to A-A-857.

4.1.7 Abrasive paper, aluminum oxide, 180 - 220 grit.

4.1.8 Polishing compound, Met-All No. 1187.

4.1.9 Protective wrapping material (e.g., brown Kraft paper, Kimpac K41, AIR-CAP C120 or D120 plastic bubble film, Poly Foam).

4.1.10 Compressed air for use with spray guns. Compressed air used with spray application equipment must meet the requirements of BAERD GEN-023.

4.2 Equipment

4.2.1 Unless otherwise specified in this section, use only the materials specified; use of superseding or alternative materials is not allowed.

4.2.2 Lint free cheesecloth or filtermesh.

4.2.3 Tack rags (e.g., DSC 375-1).

4.2.4 Paint spray rooms equipped with forced or induced ventilation systems such that the air flow will not cause air turbulence or excessive air currents but be adequate to prevent dried overspray from settling on primed surfaces that are still tacky. Adequate lighting must be provided, including in under-surface areas. Spray rooms must be equipped with calibrated temperature and humidity indicators. Wash floors as frequently as required to avoid build-up of dust and loose overspray.

4.2.5 Relative humidity recording and/or indicating equipment: sling psychrometer or hygrometer (e.g., Extrech RHT20). Relative humidity recording and/or indicating equipment must be calibrated and operated according to the manufacturers' instructions.

4.2.6 Film thickness gauge (e.g., Elcometer or micrometer).

4.2.7 Mechanical paint shaker, capable of agitation of lacquer to ensure uniform distribution of solids without adversely affecting the lacquer.

4.2.8 Standard spray gun and associated hardware (e.g., HVLP guns, air assisted or airless spray guns with or without electrostatic spray equipment). Spray guns and associated equipment must be capable of applying coatings as specified herein without unacceptable defects as specified in section 6. Operate spray guns and associated equipment according to the equipment manufacturers instructions.

5 Procedure

5.1 General

5.1.1 Flat (F2) and gloss (F2) pigmented lacquers and clear (F4) lacquer are top coats for detail parts and small assemblies.

5.1.2 Do not paint when the temperature is less than 60°F (16°C) or the relative humidity less than 30% or more than 80%. Use calibrated indicators to monitor and record temperature and humidity conditions.

5.2 Preparation of Lacquer

5.2.1 Submit lacquer which has exceeded its storage life for shelf life extension testing and disposition according to PPS 13.28.

5.2.2 Lacquer which shows signs of skinning, gelling, lumping, pigment separation or any other deterioration is not acceptable.

5.2.3 Prepare lacquer according to the manufacturers instructions, or as follows:

Step 1. Agitate the lacquer on a mechanical paint shaker (ref. para. 4.2.7) for a minimum of 1 minute.

Step 2. Strain the lacquer through a clean, lint free cheesecloth or filter mesh.

Step 3. For spray application, reduce the lacquer to the appropriate spraying viscosity using A-A-857 thinner (ref. para. 4.1.6). Do not reduce lacquer to be used for touch-up. Clean viscosity measurement cups thoroughly after every use; if there is reason to doubt the accuracy of a cup (e.g., clogging of the orifice) submit the cup for calibration or replace with a new certified cup.

5.3 Preparation of Parts (See Flow Chart 1)

5.3.1 For F19 primed surfaces which have been cured for less than 12 hours at room temperature, to obtain proper topcoat adhesion use a tack cloth to remove loose particles (i.e., dust, etc.) immediately before painting.

5.3.2 For F19 primed surfaces which have been cured for 12 to 48 hours at room temperature, to obtain proper topcoat adhesion solvent clean according to PPS 31.17 and then wipe surfaces with a tack cloth immediately before painting.

5.3.3 Prepare F19 primed surfaces which have been heat cured or have room temperature cured for more than 48 hours as follows:

Step 1. Scuff the surface using 180 - 220 grit aluminum oxide abrasive paper.

Step 2. Dust off scuffed areas with a clean cloth.

Step 3. Re-activate the primer according to PPS 31.17.

Step 4. Apply a light coat of F23 primer (0.0003" - 0.0005") according to PPS 34.16.

Step 5. Allow to air dry approximately 2 - 24 hours before application of topcoat.

Step 6. Immediately before painting, tack rag to remove loose particles (i.e., dust, etc.).

5.3.4 For F14 primed polycarbonate parts, immediately before painting, tack rag all F14 primed surfaces to remove loose particles (i.e., dust, etc.). If parts have been handled after F14 priming, solvent clean them according to PPS 31.17.

5.3.5 Prepare unprimed surfaces other than wood as follows:

Step 1. Clean and prime the surface.

- F14 prime polycarbonate surfaces according to PPS 34.07.
- F19 prime non-polycarbonate surfaces according to PPS 34.08.

Step 2. Allow the primer to cure.

Step 3. Prepare F19 primed surfaces which have room temperature cured for less than 12 hours according to para. 5.3.1. Prepare F19 primed surfaces which have room temperature cured for12 - 48 hours according to para. 5.3.2. Prepare F19 primed surfaces which have been heat cured or have cured for more than 48 hours according to para. 5.3.3. Prepare F14 primed parts according to para. 5.3.4

5.3.6 Prepare wooden parts as follows:

Step 1. Lightly sand with 180 - 220 grit aluminum oxide or garnet abrasive paper.

Step 2. After sanding, dust off with a clean cloth.

Step 3. Immediately before applying sealer, tack rag to remove loose particles (e.g., dust).

Step 4. Apply one coat of sanding sealer (ref. para. 4.1.5).

Step 5. Allow the sealer to dry for 5 - 10 minutes.

Step 6. Sand the sealer with 180 - 220 grit aluminum oxide or garnet abrasive paper.

Step 7. Immediately before painting, tack rag to remove loose particles (i.e., dust, etc.).

5.4 Application of Lacquer (See Flow Chart 1)

5.4.1 Apply lacquer immediately after the surface has been prepared.

Step 1. Apply an even coating (cross-coat) to obtain a dry film thickness of 0.0005" - 0.0008".

Step 2. Allow the first coat to air dry a minimum of 30 minutes.

Step 3. Apply the second coat (cross-coat) to a dry film thickness of 0.0005" - 0.0008".

Step 4. To eliminate spray-gun marks, overlaps and overspray, a light mist coating of lacquer thinner containing approximately 10% blush-retarding thinner may be applied to level out the surface of the lacquer coating.

5.5 Drying Time of Lacquer

5.5.1 Allow lacquer to air dry at a temperature of 60°F (16°C) minimum for a minimum of 30 minutes before further working of the parts or wrapping the parts for transport or storage. Accelerated, heat curing is not allowed.

5.6 Rework of Damaged or Defective Coatings

5.6.1 Remove dried overspray by solvent cleaning according to PPS 31.17 or by polishing with Met-All polishing compound (ref. para. 4.1.8) after allowing the coating to cure for a least 24 hours.

5.6.2 Use a brush to touch up small pits and scratches.

5.6.3 Repair minor defects, other than small pits and scratches, as follows:

Step 1. Locally strip (according to PPS 31.07) or abrade coatings with other minor defects as required.

Step 2. Feather edge the old finish adjacent to the stripped area by sanding with abrasive paper. Wipe the surface with a tack rag after abrading.

Step 3. If the base material (metal or plastic) has been exposed, spot-in the applicable pretreatment coatings, lapping slightly over the old finish.

Step 4. Repaint the area according to the procedures specified in this standard.

5.6.4 Repair major defects as follows:

Step 1. Completely strip coatings using chemical stripper according to PPS 31.07. Alternatively, on metal substrates only, it is acceptable to strip coatings by abrasive blasting according to PPS 17.02.

Step 2. Reprocess the parts according to the original processing sequence.

5.7 Protection for Transport or Storage

5.7.1 Use protective wrapping material (ref. para. 4.1.9) to individually wrap painted parts which are to be transported or stored and place them in cardboard boxes to provide protection against damage.

6 Requirements

6.1 Ensure that painted surfaces are free of damage (such as scratches), defects (such as blemishes, runs, sags, pits, streaks, excessive orange peel, dried overspray, blisters, peeling) or other irregularities that impair the appearance or protective qualities. Rework damaged or defective coatings according to section 5.6.

6.2 The total dry film thickness, as measured with an electronic thickness gauge or micrometer, must be 0.0010" - 0.0016". When using an electronic thickness gauge or micrometer on previously primed parts, measure the thickness at locations where the underlying primer has been previously measured and recorded. If thickness cannot be measured with an electronic coating thickness gauge or micrometer, check the film thickness on a test panel prepared using the same procedure as for production parts. Refer coatings which fail to meet the dry film thickness requirements to Material Review Board (MRB) for disposition.

6.2.1 In small repair areas touched up by brush application, it is acceptable to vary from the dry film thickness limitations provided that complete coverage is visually verified. Take care to avoid application of an excessively thick or thin coating beyond the dry film thickness limitations specified.

7 Safety Precautions

7.1 The safety precautions specified herein are specific to Bombardier Toronto to meet Canadian Federal and Provincial government environmental, health and safety regulations. It is 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 general shop safety precautions when performing the procedure specified herein.

7.3 Do not smoke, eat, or drink in paint spraying areas.

7.4 Always wear protective respiratory equipment as specified in PPS 13.13 when painting operations are carried out.

7.5 Keep all containers of lacquer closed when not in use.

7.6 Ensure that spray booths and spray rooms are equipped with a suitable exhaust system. Paint spray rooms must be equipped with forced or induced ventilation systems capable of maintaining sufficient ventilation to meet Occupational Health and Safety Act requirements.

7.7 Do not have open flames or unprotected lights in areas where painting operations are carried out. Do not use infra-red or other heat lamps in the paint booths (i.e., any area where paint is being applied).

7.8 Always wear protective coveralls, rubber gloves and splash goggles when handling F2 or F4. Avoid skin contact with mixed F2 or F4. If contact occurs, wash contact area thoroughly with soap and water. Should accidental eye contact occur, flush eyes immediately with large quantities of water at an eye wash station and report to the Health Centre.

8 Personnel Requirements

8.1 Personnel responsible for the application of cellulose nitrate lacquer to aircraft parts and assemblies must have a good working knowledge of the procedure and requirements as specified herein and shall have exhibited their competency to their supervisor.

9 Additional Information

9.1 Store lacquer in a dry area at a temperature of 40°F - 100°F (4°C - 38°C). For optimum storage life (as specified in PPS 13.28), a temperature of 60°F - 80°F (16°C - 27°C) is recommended. Refer to PPS 13.28 for the storage life of cellulose nitrate lacquer (finish codes F2 and F4).

9.2 After use, it is recommended that equipment be promptly cleaned with the solvent specified in PPS 31.17 to avoid having the paint dry on or in the equipment.

Flow Chart 1 - Surface Preparation and Painting