BOMBARDIER
Toronto Site
PROPRIETARY INFORMATION

PPS 34.35

PRODUCTION PROCESS STANDARD

APPLICATION OF POWDER COATINGS (F28)

Issue 8
- This standard supersedes PPS 34.35, Issue 7.
- Vertical lines in the left hand margin indicate technical changes over the previous issue.
- Direct PPS 34.35 related questions to michael.wright@aero.bombardier.com.
- This PPS is effective as of the distribution date.

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1 Scope

1.1 This Production Process Standard (PPS) specifies the procedure and requirements for application of powder coatings (finish code F28, according to PPS 23.02) to aircraft parts and assemblies.

1.2 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.

1.2.1 Refer to PPS 13.26 for the subcontractor provisions applicable to this PPS.

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

2 Hazardous Materials

2.1 Before receipt at Bombardier (Toronto Site), all materials must be approved and assigned Material Safety Data Sheet (MSDS) numbers by the Bombardier (Toronto Site) 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 Site) 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 Site) Specifications

3.2.1 DS 82 - Materials, Interiors, with Colour/Texture Coordination.

3.2.2 PPS 13.26 - General Subcontractor Provisions.

3.2.3 PPS 13.39 - Bombardier Toronto Engineering Process Manual.

3.2.4 PPS 27.06 - Decorative Surface Finishes.

3.2.5 PPS 31.04 - Degreasing Process.

3.2.6 PPS 31.17 - Solvent Usage.

3.2.7 PPS 32.01 - Chemical Conversion Coating of Aluminum and Titanium Alloys by Immersion (C1).

3.2.8 PPS 32.03 - Chromic Acid Anodizing (A1).

3.2.9 PPS 34.03 - Application of Polyurethane Enamel.

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

3.3 Bombardier Aerospace Specifications

3.3.1 BAERD GEN-007 - Quality Control of Heat Treating Equipment and Hot Forming Equipment.

3.3.2 BAPS 138-055 - Accelerated Curing of Organic Compounds.

4 Materials, Equipment and Facilities

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 Pigmented or clear coating powder, Finish Code F28, to DHMS C4.10 or as specified by the engineering drawing. Powder base, colour and manufacturer shall be in accordance with the DS 82 number specified on the engineering drawing.

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

4.2 Equipment

4.2.1 Suitable equipment for electrostatic spray or fluidized bed application of powder.

4.2.2 Baking oven (conventional or infrared (IR)) qualified according to BAPS 138-055 (including temperature uniformity survey according to BAERD GEN-007).

4.2.3 Film thickness gauge (e.g., Isoscope) or micrometer.

4.2.4 Wiping cloth (e.g., DSC 378-1).

4.3 Facilities

4.3.1 This PPS has been categorized as a “Controlled Critical Process” according to PPS 13.39 and as such only facilities specifically approved according to PPS 13.39 are authorized to perform application of powder coatings (F28) according to this PPS.

4.3.2 Bombardier subcontractors must direct requests for approval to Bombardier Aerospace Supplier Quality Management. Bombardier Aerospace facilities must direct requests for approval to the appropriate internal Quality Manager.

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 must 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 must be detailed in the facility report. Based upon the facility report, Bombardier (Toronto Site) Materials Technology may identify additional qualification and/or process control test requirements. During the facility survey, the facility requesting qualification must be prepared to demonstrate their capability. Once approved, no changes to subcontractor facilities may be made without prior written approval from Bombardier Aerospace Supplier Quality Management.

4.3.3.1 Unless otherwise specified by Bombardier Aerospace Supplier Quality Management, for approval of subcontractor facilities to perform application of powder coatings (F28) according to this PPS, completion of a test program and submission of suitable test samples representative of production parts is required. Test samples must meet the requirements specified in section 6.

5 **Procedure** (see Flow Chart 1)

5.1 **General**

5.1.1 F28 is a pigmented or clear powder coating applied by electrostatic spray (Type 1) or fluidized bed (Type 2).

5.2 **Preparation of Parts**

5.2.1 Immediately before the application of powder coating, prepare parts as follows:

Step 1. Except as noted, abrasive blast clean according to PPS 17.02 (use washed silica sand for abrasive blasting aluminum alloy). If the engineering drawing specifies a pre-treatment protective finish (i.e., chemical conversion coating or anodize) or a decorative surface finish code (SF) for aluminum alloy parts, **do not** abrasive blast clean.

Step 2. Degrease according to PPS 31.04 or solvent clean according to PPS 31.17.

5.3 **Application and Curing of Coating**

5.3.1 Immediately after the surface has been prepared, apply powder of the Type and Class specified on the engineering drawing using the electrostatic or fluidized bed method. Apply the powder so as to obtain the cured coating thickness listed below:

Type 1: 0.002" - 0.005" Type 2: 0.008" - 0.012"

5.3.2 Cure the coating at the temperature and for the length of time specified by the powder manufacturer. Baking ovens (conventional or infrared (IR)) used for heat curing must be qualified according to BAPS 138-055 (including temperature uniformity survey according to BAERD GEN-007):

5.4 Rework of Damaged or Defective Coatings

5.4.1 Touch up small nicks, pinholes, pits or scratches by brush using a suitable liquid epoxy enamel (F22 according to PPS 34.41) or polyurethane enamel (F24 according to PPS 34.03) to match the colour and surface gloss of the F28 coating.

5.4.2 Completely strip coatings with major defects by abrasive blasting according to PPS 17.02. After stripping, reprocess the parts according to the original processing sequence.

5.5 Protection for Transport or Storage

5.5.1 Use protective wrapping material (see Materials section, paragraph 4.1.3) to individually wrap coated parts which are to be transported or stored and place the parts in cardboard boxes to provide protection against damage.

6 Requirements

6.1 Examine coated surfaces for damage, such as nicks and scratches, and defects, such as pits, pinholes, peeling or other irregularities, that impair appearance or protective qualities. The finished coating shall exhibit a smooth uniform gloss appearance according to the class specified on the engineering drawing (Class 1: High Gloss, Class 2: Semi Gloss, and Class 3: Low Gloss). Coatings with damage, defects, irregularities or inappropriate gloss are unacceptable and must be reworked according to section 5.4.

6.2 The film thickness of the cured coating as measured with a film thickness gauge or suitable micrometer shall be as listed below. Check the thickness at random selected points. Refer coatings failing to meet the film thickness requirements to Bombardier (Toronto Site) MRB or Bombardier (Toronto Site) delegated MRB for disposition.

Type 1: 0.002" - 0.005" Type 2: 0.008" -0.012"

7 Safety Precautions

7.1 **The safety precautions specified herein are specific to Bombardier (Toronto Site) 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 powder coat spraying areas.**

7.4 **Wear protective respiratory equipment according to PPS 13.13, as applicable.**

7.5 **Ensure spray booths and spray rooms are equipped with suitable exhaust systems.**

7.6 **Do not have open flames or unprotected lights in areas where powder coating application operations are carried out. Do not use infra-red or other heat lamps in the spray booths (i.e., any area where powder coating is being applied).**

8 Personnel Requirements

8.1 This PPS has been categorized as a “Controlled Special Process” by PPS 13.39. Refer to PPS 13.39 for personnel requirements.

Flow Chart 1. Surface Preparation and Coating