BOMBARDIER

de Havilland

Material Specification

TITLE:	**COATING, POWDER**
SPECIFICATION NUMBER:	**DHMS C 4.10**
ISSUE:	**C**
AMENDMENT:	**2**
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PAGE:	**1 of 8**

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REVISION RECORD

Iss.	Page	Description and Reason for Change
A	8	Para. 7.1 was added regarding MSDS.
Amd.1		Para. 8 was revised regarding MSDS.
B	8	Addition of new supplier
Amd.1		
C		Clerical changes.
		Added new supplier Protech Powder Coatings
Amd. 1	8	Correction:Was "Protect", Now: "Protech"
Amd. 2	3	Para. 3.3: Class 2 gloss revised.
		Para. 3.6: Pencil hardness revised.
	6	Adhesion requirement removed.
	8	Prism PS-0114-G was PS-114-G.
	8	Prism colour Silver Polyester was Massey Silver.

1 SCOPE

This specification covers the requirements for a pigmented powder coating. The de Havilland designation for this coating is F28. This coating is intended for application on metal substrates.

1.1 Classification

Powder coatings supplied to this specification shall be one of the following types and classes, as specified on the applicable drawing or Purchase Order.

Types

Type I - electrostatic spray application

Type II - fluidized bed application

Class

Class 1 - high-gloss

Class 2 - semi-gloss

Class 3 - low-gloss

2 APPLICABLE DOCUMENTS

The following document shall form part of this specification of the coating defined herein. In the event of conflicting requirements between this and the requirement listed below, the requirement of this specification shall govern. Where a specific issue of a document is not stated, the current issue shall be used.

2.1 Specifications and Standards

MIL-5-18729	-	Steel Plate, Sheet and Strip, Alloy 4130, Aircraft Quality
Federal Standard 595a	-	Colours
MIL-C-5541B	-	Chemical Conversion Castings for Aluminum Alloys
AMS 4260	-	Aluminum Alloy Coatings, Investment 75i-0.3Mg (356-T6)

2.2 Test Standards

ASTM B117	-	Salt Spray (fog) Testing
ASTM D523	-	Specular Gloss
ASTM D1729	-	Visual Evaluation of Color Differences of Opaque materials
ASTM D2794	-	Resistance of Organic Coatings to Effect of Rapid Deformation (Impact Resistance)
Federal Test Method Std.	-	Paint, Varnish, Lacquer and Related
No. 141a		Materials: Methods of Inspection, Sampling and Testing
De Havilland Std. DS82	-	Colour/Texture Coordination

3 REQUIREMENTS FOR APPLIED COATINGS

3.1 Colour

The colour, per Federal Standard 595a or DS82, of the coated parts shall be as specified on the applicable drawing or purchase order. The colour, when tested to Federal Standard 141a, Method 4249.1 (or ASTM D1729), shall match the colour chip standard agreed upon by the purchaser and vendor.

3.2 Thickness

The thickness of the applied coating shall be as follows:

Type 1, electrostatic spray : 0.002-0.005 in.

Type 2, fluidized bed : 0.008-0.012 in.

3.3 60 Degree Specular Gloss

When tested to Federal Standard 141a, method 6101 (or ASTM D523), the specular gloss value of the applied coating shall meet the following requirements:

Class 1 - 90 minimum

Class 2 - 21-89

Class 3 - 20 maximum

3.4 Corrosion Resistance

Steel test panels, prepared per para. 4.1, shall be free from corrosion and blisters after exposure to 5% salt spray for 1,000 hours, as described in Federal Standard 141a, Method 6061 (or ASTM B117).

3.5 Abrasion Resistance

Steel test panels, prepared per par a. 4.1 and tested as specified in Federal Standard 141, Method 6193, shall not show penetration to the metal substrate nor more than 0.060g loss of weight after 1,000 cycles, using a 1OOOg load and CS-17 wheels.

3.6 Pencil Hardness

Steel or aluminum test panels, prepared per para. 4 and tested as shown in Figure 1, shall not be softer than a pencil hardness of H.

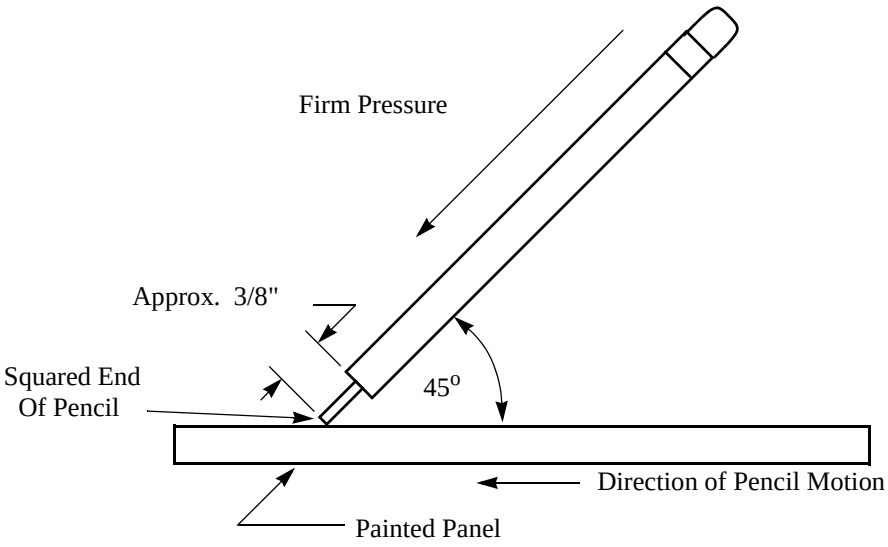

FIGURE 1. PENCIL HARDNESS

3.7 Impact Resistance

Steel test panels, prepared per para. 4.1, shall be subjected to impact, using a Gardner Impact Tester as described in ASTM D2794. The coating shall not exhibit any cracking or flaking after a direct impact of 50 in.lb. for Type 1 or 120 in.lb. for Type II.

3.8 Flexibility

Steel test panels, prepared per para. 4.1, shall not exhibit cracking or flaking when bent over a 0.5 in. diameter mandrel in accordance with Federal Standard 141a, Method 6221.

3.9 Adhesion

Aluminum test pieces, prepared per para. 4.2, shall exhibit no removal from the substrate when tested in accordance with Federal Test Method Standard 141a, Method 6301.1.

4 TEST PANELS

4.1 Steel

Test panels shall be 4130 steel sheet, 0.032"T, commercial quality or conforming to MIL-S-18729, approximate size 3" x 6". They shall be abrasive blasted and degreased immediately prior to coating. The coating shall be applied by electrostatic spray (Type 1) or fluidized bed technique (Type 2) to the appropriate thickness given in para. 3.2. The coating shall be allowed to dry before testing. At least two panels shall be used for each test.

4.2 Aluminum

Test pieces of 356-T6 aluminum alloy, conforming to AMS 4260, shall be given a chromate conversion treatment in accordance with MIL-C-5541B, Class 1A. The powder coating shall be applied as in para. 4.1.

5 QUALITY ASSURANCE PROVISIONS

5.1 Qualification Tests

5.1.1 A supplier is responsible for the performance of all qualification testing, as specified in **Table 1** of this specification.

5.1.2 A supplier desiring qualification shall submit one (1) copy of a report showing actual qualification test data and a sufficient quantity of test panels for de Havilland evaluation tests.

5.1.3 Upon review of a supplier's data and de Havilland tests, the supplier will be advised either of product qualification or reasons for failure.

5.1.4 Products that are qualified will be listed in the Qualified Products List of this specification.

5.1.5 No changes in the method of manufacture and/or formulation shall be made without notification and prior written approval of Bombardier Aerospace Toronto, Materials Technology Department.

5.1.6 Re-qualification of the product may be requested by the purchaser if there are any changes in the method of manufacture and/or formulation.

5.2 Qualification by Similarity

Where a product has been qualified to another similar specification, the supplier may submit this qualification test data in lieu of performing a separate qualification test as required by para. 5.1 of this specification. The similar specification may be a government, company or other specification, where the requirements are similar to those of this specification.

5.3 Acceptance Tests

Unless otherwise specified in the contract or purchase order, the supplier is responsible for all Batch Acceptance Tests, as specified in Table 1 of this specification.

TABLE 1. Qualification and Acceptance Tests

Test	Paragraph	Qualification	Acceptance
Colour	3.1		x
Thickness	3.2	x	
60 Degree Specular Gloss	3.3	x	
Corrosion Resistance	3.4	x	
Abrasion Resistance	3.5	x	
Pencil Hardness	3.6	x	
Impact Resistance	3.7	x	
Flexibility	3.8	x	x
Adhesion	3.9		

6 ORDERING DATA

6.1 Prerequisite

Coatings furnished under this specification for production use shall be qualified and listed on the Qualified Products List prior to the issuing of a Purchase Order.

6.2 Procurement Documents

Procurement documents shall specify the following:

- Title, Number, Issue and Amendment Number of this Specification
- Type and Class of Coating
- Colour
- Part Number and Quantity
- Acceptance Test Report.

7 SHIPPING DOCUMENTATION

The shipping document shall show:

- De Havilland Purchase Order Number
- Specification Number, Type and Colour
- Quantity
- Number of containers or packages
- Batch number
- Acceptance Test Report

Each shipment shall contain a copy of the Material Safety Data Sheet.

8 HEALTH AND SAFETY DATA

When supplying samples for qualification per Para. 5.1.2, the supplier shall submit a Material Safety Data Sheet (MSDS) complying with the "Controlled Products Regulations" of the Hazardous Products Act (also known as W.H.M.I.S. Regulations). The document must state all hazardous ingredients, safe-handling procedures, first-aid measures, fire and explosion data, re-activity data, physical properties, preparation information and procedures for storage and disposal.

This (MSDS) must then be supplied with a completed DH 4339 "Application To Introduce A New Material" form to the Material Safety Committee.

Upon receipt of DH 4340 "Recommendation" form that approves the use of the material, it can then be included on the Qualified Products List.

Any changes in the formulation of the material require a re-submission of the Material Safety Data Sheet.

QUALIFIED PRODUCTS LIST

MANUFACTURER'S NAME AND ADDRESS	MANUFACTURER'S PRODUCT IDENTIFICATION NO.	DE HAVILLAND QUALIFICATION SHEET NO.	MSDS #	DATE OF PRODUCT APPROVAL
	Type 1			
Canadian Coatings, 7498 l9th Street, St. Michel, Montreal, Que.	Powdura Epoxy N1OB G108	PQS #1		July 11, 1978
	Powdura Polyurethane N24B G101	PQS #2		July 11, 1978
Prism Powder Coatings Ltd 321 Edgeley Blvd. Concord, Ontario, L4K 3Y2 Tel. (905) 660-5361	PS-0114-G (Polyester) Colour : Silver Polyester	PQS # 3		Aug. 11, 1999
Protech Powder Coatings 150 Klondike Dr. North York, Ontario M9L 1X3	EW511N60 Colour: Pearl Black	PQS #4		Dec 7, 2007