

de Havilland Inc.

Material Specification

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| TITLE: | CARPET, AIRCRAFT |
| SPECIFICATION NUMBER: | DHMS F 5.06 |
| ISSUE: | F |
| AMENDMENT: | --- |
| DATE: | JANUARY 8, 1997 |
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REVISION RECORD

| Issue | Page | Description and Reason for Change |
|-------|------|---|
| F | | This is a complete revised issue. Detail changes have not been noted. |

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1 SCOPE

This specification covers the requirements of carpet for use in aircraft interiors.

1.1 Classification

Carpet supplied to this specification shall be single level, loop pile of the following classes and grades, as specified on the purchase order.

| | | |
|--------------|---------|-------------|
| <u>Class</u> | Class 1 | Woven Pile |
| | Class 2 | Tufted Pile |

| | | |
|--------------|---------|--|
| <u>Grade</u> | Grade 1 | Flame Resistant |
| | Grade 2 | Self-Extinguishing |
| | Grade 3 | Self-Extinguishing with Anti-Static Filament |

2 APPLICABLE DOCUMENTS

The following document forms a part of this specification to the extent specified herein. In the event of conflicting requirements between this and the specifications listed below, the requirements of this specification shall govern. Where a specific issue of a document is not specified, the current issue shall be used.

2.1 U.S. Government Specifications

2.1.1 Federal Standards - Federal Test Method - Textile Test Method
Standard 191a

2.1.2 Federal Aviation Administration
FAR 25.853(b) Amd.25-23 - Flammability Requirements
FAR 25.853(a), APP. F, PART I(1)(ii) - Flammability Requirements
Amd.25-86

2.2 U.K. Wool Specification

International Wool Secretariat Test Method No. 122 - Abrasion Resistance of Wool Carpets.

3 REQUIREMENTS

3.1 General

For qualification purpose, the vendor shall submit five 6.5" x 10.5" samples of the initial batch of material manufactured to this specification for approval of design, colour and texture. One sample shall be designated as the Master Standard. The remaining four samples shall be used as Working Standards. de Havilland Inc. will assign A Design Standard Number to these samples.

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3.2 Materials

The materials used in construction of carpet shall be of the lightest weight possible consistent with properties that meet the requirements set forth in this specification, and shall be free of imperfections and blemishes that may adversely affect serviceability and appearance. The carpet shall be free of offensive odours, and resistant to mildew.

3.2.1 Pile - The pile yarn shall be made of 100 per cent wool, staple or filament nylon, or blends of these fibers.

Wool pile yarn shall be a thoroughly scoured carpet type fiber, which has never been reclaimed from any woven, tufted, knitted, or felted product.

Filament nylon shall a continuous filament carpet type fiber, which has never been reclaimed from any woven, tufted, knitted or felted product.

The pile shall be dyed with materials and in a manner so the finished carpet shall meet the requirements for colour fastness per [Para.3.4](#).

Grade 3 carpet construction shall include a tin-plated carpet wire, stainless steel fibre, or other conductive type components that will blend in with the carpet pile to provide a permanent capability of dissipating a static electric charge generated by a person walking on the carpet as noted in [Para.3.9](#) Electrostatic Propensity.

3.2.2 Backing Yarns - Backing yarns shall be furnished from either synthetic or natural woven fibers and shall be strong and dimensionally stable, suitable for aircraft use.

3.2.3 Backing Reinforcement and Back Coating

Grade 1 -The backing reinforcement shall be a woven or knitted fabric with a weight not greater than 8 oz. per square yard.

The woven or knitted fabric backing shall be bonded securely to the backing with a synthetic resin or natural or synthetic latex compound. The backing shall not separate from the carpet when tested per [Para.4.4](#).

Grade 2 and Grade 3 - The back coating shall not weigh more than 15 oz. per square yard and shall be a flame retardant, low smoke emission compound. The back coating shall not separate from the carpet when tested per [Para.4.4](#).

3.3 Color and Matching

The colour and pattern shall be as specified by de Havilland and shall match the standard sample submitted by the vendor for approval. For the initial, and all subsequent Purchase Orders, this approval shall be determined by comparison with colour reference standards viewed in a calibrated light source which has been mutually agreed upon by the supplier and purchaser. Both "North Sky Daylight (7500K)" and "Horizon Sunlight (2300K)" shall be used.

After final approval the sample shall be cross-referenced to the applicable DS82 code number and the DHMS F5.06 class and grade as noted in [Table 1](#).

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Table 1:

| Colour | DHMS F5.06 Class & Grade | DS82 Code No.'s |
|---------------|---|------------------------|
| Brown | Class 1 Grade 2 | -06-170-014 |
| Blue | Class 1 Grade 2 | -06-670-015 |
| Brown | Class 1 Grade 3 | -06-170-026 |
| Blue | Class 1 Grade 3 | -06-270-027 |
| Blue/Grey | Class 1 Grade 3 | -06-680-101 |
| Beige | Class 1 Grade 3 | -06-910-102 |
| Burgundy/Grey | Class 1 Grade 3 | -06-200-103 |

3.4 Colourfastness to Light

The finished carpet shall have a rating of "good" when tested to Federal Test Method Std. 191A, Method 5660, for 40 fading hours.

3.5 Shrinkage

The carpet shall not shrink more than 1% in the fill direction nor 2% in the warp direction when tested per **Para.4.1**.

3.6 Wear Resistance

The carpet pile shall not be worn to the backing after 3000 rubs when tested in accordance with I.W.S Test Method No.122.

3.7 Flammability

The carpet shall meet the following requirement of:

Grade 1 - FAR 25.853(b) Amd.25-23

Grade 2 & 3 - FAR 25.853(a), APP. F, PART I(1)(ii), Amd.25-86

3.8 Cleanability

The carpet shall not show any appreciable colour change compared to a control sample when cleaned per **Para.4.2**. The washed sample shall meet the flammability requirement set forth in **Para.3.7**.

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3.9 Electrostatic Propensity

The carpet, when tested per **Para.4.3**, shall have a maximum static voltage of 3000 volts.

3.10 Closeness of Weave

The backing of the carpet shall not be visible when it is bent around a 2" diameter round in either the warp or fill direction.

3.11 Serging

The carpet shall be serged along any cut edge when specified on the purchase order.

4 TEST PROCEDURES

4.1 Shrinkage

Two test specimens, approximately 10" x 10", shall be cut with the length and width parallel to the warp and fill of the carpet. The specimens shall be measured and immersed flat in distilled water at room temperature for 24 hours, then hung up to dry for 48 hours. The distance between the sides shall be measured and the percent shrinkage calculated.

4.2 Cleanability

Two 12" x 16" carpet specimens shall be immersed or spray washed using warm water (110°F) and a detergent. The carpet shall be rinsed after washing by immersion or spray, using warm water. The washing and rinsing shall be repeated ten times and then the specimen shall be dried at 100°F. The washed specimens of carpet shall be compared to an unwashed control specimen and any differences in colour noted. The washed specimen shall be treated for flammability per **Para.3.7**.

4.3 Electrostatic Propensity

4.3.1 Test Equipment -

- electrometer, Keithley Model 600A, or equivalent
- resistance voltage divider, Keithley Model 6103A, or equivalent (1000 to 1)
- Psychrometer, Bendix Model 566, or equivalent
- aluminum ground plate 36 x 36 (+5,-0) inches, with a suitable ground connection
- synthetic foam rubber pad 38 x 38 x 0.25 inches
- leather soled shoes with rubber heels (to be used exclusively for this test).

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4.3.2 Test Procedure -

The carpet specimen used for this test shall be 36 x 36 (+5,-0) inches and shall be conditioned prior to testing by exposure to 70 ± 2°F and 20-40% humidity for a minimum of 24 hours.

Testing shall be performed in an environment of 70 ± 2°F, with a relative humidity of 20-40%. If the test results are between 2400 and 3000 volts, the same carpet specimen shall be reconditioned at 70 ± 2°F and 20% ± 2% humidity for 24 hours. Retesting shall be performed at 70 ± 2°F and 20 ± 2% relative humidity.

The carpet specimen shall be centrally positioned on the synthetic foam rubber pad to prevent grounding between the aluminum plate and the carpet.

The aluminum ground plate shall be free of dirt and grease and shall be positioned on the floor with a ground lead from the plate to the electrometer.

The rubber pad, with the carpet specimen uppermost, shall be placed on the ground plate.

Prior to being donned by the test operator, the test shoes shall be lightly sanded to remove any glaze or residual coating from previous use.

To operator shall stand on the carpet specimen without additional support and hold the voltage divider probe contact tip firmly between the thumb and forefinger. With each foot, the operator shall employ a backward wiping motion with strokes of approximately twelve inches and a repetition rate of approximately two strokes per second for approximately one minute, covering the entire surface of the specimen.

4.4 **Backing Adhesion**

The test samples, 3" x 12", shall be cut from the carpet sample. The test samples shall be fastened to a 14" x 14" piece of clean aluminum with double sided carpet tape. The tape shall be laid out so that the entire area of the test sample is fastened by the tape. The edges of the test samples shall be rolled down using a suitable roller. Each test sample shall be peeled away from the carpet tape and the condition of backing shall be noted.

5 **QUALITY ASSURANCE**

5.1 **Qualification**

- 5.1.1 A supplier is responsible for the performance of all qualification testing, as specified in **Table 2** of this specification.
- 5.1.2 A supplier desiring qualification shall submit one copy of a report showing actual qualification test data and a sufficient quantity of materials to de Havilland and Standards Engineering for evaluation test.
- 5.1.3 Upon review of supplier's data and de Havilland tests, the supplier will be advised either of product qualification or reason for disqualification.
- 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 Materials Technology Department de Havilland Inc.

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5.1.6 Requalification 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 the qualification data applicable to this specification for consideration. The similar specification may be a government, company, or other specification where the requirements are similar to this specification.

5.3 Acceptance Tests

5.3.1 Unless otherwise specified in the contract or purchase order, the supplier is responsible for all Acceptance Tests, as specified in **Table 2** of this specification.

5.3.2 The supplier, performing Acceptance Tests per **Para.5.3.1** shall furnish with each lot of product one copy of Acceptance Test Report to de Havilland Quality Assurance Department showing actual test data conformance to the acceptance test specified in **Table 2**. The report shall include the supplier's lot identification.

5.3.3 de Havilland Inc. reserves the right any or all of the tests set forth in this specification to ensure that the product continues to meet specification requirements. Any product not meeting the requirements of this specification will be returned to the supplier at the supplier's expense

Table 2: Qualification and Acceptance Tests

| Property | Paragraph | Qualification | Acceptance |
|--------------------------|-------------------|---------------|------------|
| Materials | Para.3.2 | x | x |
| Colour and Matching | Para.3.3 | x | x |
| Colourfastness to Light | Para.3.4 | x | |
| Shrinkage | Para.3.5 | x | |
| Wear Resistance | Para.3.6 | x | |
| Flammability | Para.3.7 | x | |
| Cleanability | Para.3.8 | x | x |
| Electrostatic Propensity | Para.3.9 | x | |
| Closeness of Weave | Para.3.10 | x | |
| Backing Adhesion | Para.3.2.3 | x | x |

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5.4 Definitions

5.4.1 Batch is defined as the end product of all the raw materials mixed and/or manufactured at the same time and place. The weight or volume may vary, depending upon the capacity of the manufacturer's facilities.

5.4.2 Lot is defined as the total quantity of product in a shipment taken from the same batch.

6 ORDERING DATA

6.1 Prerequisite

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

6.2 Procurement Documents

Procurement documents shall specify the following:

- Title, Number, Issue and Amendment Number of this Specification
- Carpet Class, Grade and Colour
- DS82 Number
- Width and Length of Carpet
- Total Quantity

7 PREPARATION FOR DELIVERY

Prior to the shipment of material, a 16" x 16" sample, taken from the lot of material to be shipped, shall be forwarded to de Havilland Inc. for approval.

7.1 Preservation and Packing

The carpet shall be tightly rolled around a tube or pole of no less than 2" in diameter. The end of the pole shall be flush or not protrude more than 1" beyond the maximum width of the carpet. To prevent the material from unwinding, the roll shall be secured with cotton tape or twine. The rolled and tied carpet shall then be wrapped in clean, heavy gauge, kraft paper, with the end and all seams sealed with gummed tape. Carpets not manufactured locally, which are to be shipped by general transportation, shall be further protected by being enclosed in a suitable shipping container with packing, to prevent damage to the carpet.

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7.2 Identification

Each carpet wrapped or container shall be legibly marked with the following information:

- Manufacturer's Name and Product Identification
- Carpet Class, Grade and Colour
- DS82 Number
- Width and Length of the Carpet
- de Havilland Product Specification
- Lot Number

7.3 Shipping Documentation

The shipping document shall show:

- de Havilland Purchase Order Number
- Specification Number
- Manufacturer's Product Identification
- Carpet Class, Grade and Colour
- DS82 Number
- Width and Length of Carpet
- Number of rolls or containers
- Acceptance Test Report
- Lot Number

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QUALIFIED PRODUCTS LIST

| MANUFACTURER'S NAME AND ADDRESS | MANUFACTURER'S PRODUCT IDENTIFICATION NO. | MATERIALS SAFETY DATA SHEET NO | PRODUCT QUALIFICATION SHEET NO. | DATE OF PRODUCT APPROVAL |
|---|--|---|---------------------------------------|--------------------------------|
| Class 1, Grade 3 | | | | |
| Mohasco Carpet Corp., 1755 The Exchange, Atlanta, GA., 30339 (404) 951-6000 | AZ1955 R/01 Blue AZ1955 R/02 Brown/Black | N/A | PQS #2 | August 29, 1979 |
| Elite Carpets Limited, P.O. Box 540, Ste. Therese, Quebec. J7E 4K2 (514) 435-6581 | DH1041A H542 Brown DH1041B H662/2 Blue/Grey DH1041B H677/1 Beige | N/A | PQS #4 | Feb. 12, 1985 |