de Havilland Inc.

Material Specification

TITLE:	**GLASS FABRIC, SILICONE RUBBER COATED, SELF-EXTINGUISHING**
SPECIFICATION NUMBER:	**DHMS F 5.08**
ISSUE:	**A**
AMENDMENT:	**---**
DATE:	**January 16, 1998**
PAGE:	**1 of 9**

Prepared by: Reviewed by:

SIGNED ORIGINAL ON FILE

E. Gorobinskaia
Materials Technology

Spyridon Cacoutis
Chief, Advanced Composites
& Chemical Technology

Approved by:

Leonard K. John
Manager
Materials Technology

Martyn Rix
Manager
Quality Assurance

REVISION RECORD

Issue	Page	Description and Reason for Change
A	All	This is a complete revised issue. Detailed changes have not been noted.

1 SCOPE

This specification covers the requirements for a high temperature resistant, self-extinguishing, one side silicone rubber coated, glass fabric.

2 APPLICABLE DOCUMENTS

The following documents form 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 Standard #191 - Textile Test Methods

2.1.2 Military Specification

MIL - H - 83282 - Hydraulic Fluid, Fire Resistant, Synthetic Hydrocarbon Base, Aircraft

MIL - L - 23699 - Lubricating Oil, Aircraft Turbine Engine, Synthetic Base

2.1.3 Federal Aviation Administration

FAR 25.853(a), APP. F, PART I(1)(i) - Flammability Requirements

Amd.25-86

FAR 25.853(d), APP. F, PART V - Flammability Requirements

Amd.25-86

2.2 Boeing Material Specifications

BMS 3-11 G - Hydraulic Fluid, Fire Resistant

3 REQUIREMENTS

3.1 Materials

The materials used in the manufacture of this product shall be of high quality, suitable for the purpose, and shall conform to applicable requirements, as specified herein.

3.2 Coated Glass Fabric

The self-extinguishing silicone coating shall be evenly applied to one side and fully vulcanized to the glass fabric.

3.3 Colour

The colour of the finished product shall be red.

3.4 Physical Properties

3.4.1 Storage Life - The storage life of the product shall be 10 years from the date of manufacture when stored at $70^{o} \pm 5^{o}F$ ($21^{o} \pm 3^{o}C$) and 50 ± 5% Relative Humidity.

3.4.2 The coated glass fabric shall meet the requirements of **Table 1**:

Table 1: Coated Glass Fabric

Properties	Requirements	Test Method
Weight, (max)	15 oz/sq. yd.	FTMS-191 Method 5041
Breaking Strength, (min), Warp direction Fill direction	 150 lbs/inch width 115 lbs/inch width	FTMS-191 Method 5100 (Grab)
Abrasion Resistance, (min)	275 cycles	FTMS-191 Method 5306
Coating Adhesion, (min), Warp direction	3 lbs/inch	FTM-191 Method 5970
Flammability After Flame Burn Length Drippings	 15 sec. Maximim 6 inches, Maximum 3 sec. Maximum	FAR 25.853(a), APP. F, PART I(1)(i), Amd.25-86
Smoke Density	50 Ds. Maximum	FAR 25.853(d), APP. F, PART V, Amd.25-86

3.5 Fluid Resistance

The coated glass fabric shall be resistant to the penetration of fluids when tested as per **Para. 4.2**.

3.6 Low Temperature Flexibility

The coated glass fabric shall show no cracking, peeling, delaminating, or loss of flexibility when tested per **Para. 4.3**.

3.7 Dimensions

The coated glass fabric shall be furnished in a width of 37 ± 1 inch and a roll length not shorter than six yards.

3.8 Workmanship

The silicone rubber coated glass fabric shall be processed in accordance with the best practice for the manufacture of a high quality, self-extinguishing, silicone rubber coated glass fabric. The finished product shall be uniform in quality, colour and performance, and shall be free from lumps, tears, permanent wrinkles, coating starved areas, foreign matter, or any other imperfections which would adversely affect its appearance or serviceability.

4 TEST PROCEDURES

4.1 General

Unless otherwise specified, all tests shall be performed at $72^{o} \pm 5^{o}$ F ($23^{o} \pm 3^{o}$ C) and 50 ± 5% Relative Humidity. At least three specimens shall be used per test and the results averaged.

4.2 Fluid Resistance

The coated glass fabric shall be exposed to MIL-L-23699 lubricating oil, MIL-H-83282 hydraulic fluid, and synthetic phosphate ester hydraulic fluid to BMS 3-11 G Type IV, Class 1, as specified herein. The coated side of the glass fabric shall be in contact with the test fluid.

Form a basin for each of the test fluids by taking an 8 x 8 inch specimen and form a 6 x 6 inch base with 1 inch sides. Corners can be formed by folding the coated fabric and then stapling the upper fold, above the fluid level, to form a vertical wall.

Pour the test fluid into the basin to a 1/2 inch depth. Maintain at $72^{o} \pm 5^{o}$ F ($21^{o} \pm 2^{o}$ C) for seven days. No fluid should leak from the basin. Staining of the uncoated side is acceptable.

4.3 Low Temperature Flexibility

Flexibility of the coated glass fabric at low temperature shall be determined by aging a 2 x 2 inch specimen for 30 mins. at $-65^{o} \pm 2^{o}$ F ($-54^{o} \pm 1^{o}$ C) and then rapidly bending 180^{o} around a 1/4 inch diameter mandrel.

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 product for de Havilland evaluation tests.

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 No changes in the method of manufacture and/or formulation shall be made without notification and prior written approval of de Havilland Materials Technology and Quality Assurance Departments.

5.1.5 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 batch of product one copy of an Acceptance Test Report showing actual test data conformance to the acceptance tests specified in **Table 2**. The report shall include the supplier's batch identification.

5.3.3 de Havilland Inc. reserves the right to perform 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, per **Section 3**, will be returned to the supplier at the supplier's expense.

Table 2: Qualification and Acceptance Tests

Property	Paragraph	Qualification	Acceptance
Weight	**Table 1**	x	
Breaking Strength	**Table 1**	x	x
Coating Adhesion	**Table 1**	x	x
Flammability	**Table 1**	x	x

Table 2: Qualification and Acceptance Tests

Property	Paragraph	Qualification	Acceptance
Smoke Density	Table 1	x	
Abrasion Resistance	Table 1	x	
Fluid Resistance	Para. 3.5	x	
Low Temperature Flexibility	Para. 3.6	x	
Dimensions	Para. 3.7	x	x
Workmanship	Para. 3.8	x	x

5.4 Definitions

5.4.1 Batch - A batch shall be all the product produced in a single production run from the same lot of raw materials under the same fixed conditions and submitted for inspection at one time.

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
- Manufacturer's Material Designation
- Width in yards
- Total Quantity

7 PREPARATION FOR DELIVERY

7.1 Preservation and Packing

The self-extinguishing silicone coated glass fabric shall be tightly rolled, with no creases, around a tube not less than 1 inch in diameter. It shall be packaged in such a manner as to ensure that the product during shipment and storage, shall be protected from exposure to weather and normal transportation hazards.

7.2 Identification

7.2.1 Each roll of impregnated fabric shall be identified with a label or marking, securely affixed to the inside of the core or with a removable tag.

7.2.2 The label or removable tag shall use characters of a size such as to be clearly legible and which will not be obliterated by normal handling. Each label or tag shall show the following information:

- Glass Fabric, Silicone Rubber Coated
- DHMS F5.08, Issue, Amendment
- Manufacturer's Material Designation
- Purchase Order Number
- Lot and Batch Number
- Width and Length of the Fabric in yards
- Date of Manufacture

7.3 Shipping Documentation

7.3.1 Each shipping container shall have the exterior legibly marked with the following information in such a manner that the markings shall not smear or be obliterated during normal handling or use:

- Glass Fabric, Silicone Rubber Coated
- DHMS F5.08, latest Issue & Amendment
- Manufacturer's Material Designation
- de Havilland Purchase Order Number
- Width and Length of Fabric
- Number of Rolls
- Acceptance Test Report.

7.3.2 Containers shall be prepared for shipment in accordance with commercial practice to assure carrier acceptance and safe transportation to the point of delivery.

7.3.3 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 from 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.

NOTE: 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.	MATERIALS SAFETY DATA SHEET NO	PRODUCT QUALIFICATION SHEET NO.	DATE OF PRODUCT APPROVAL
Culver City Composites Corp. 5915 Rodeo Road, Los Angeles, CA 90016 Ph: (310) 841-5200 800-344-9966 Fax: (310) 204-0685	2127-2	N/A	PQS #1	April 19, 1984
Fabri Cote 724 East 60th Street, Los Angeles, Calif., 90001 Ph: (213) 232-2147 Fax: (213) 233-7048	2127-2	N/A	PQS #2	January 16, 1998