BOMBARDIER

de Havilland
Material Specification

TITLE:	**FLUOROSILICONE ADHESIVE/SEALANT ONE PART**
SPECIFICATION NUMBER:	**DHMS A 6.15**
ISSUE:	**C**
AMENDMENT:	**1**
DATE:	**October 17, 2016**
PAGE:	**1 of 8**

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FLUOROSILICONE ADHESIVE/SEALANT
ONE PART

REVISION RECORD

Issue	Page	Description and Reason for Change
A		This is a complete revised issue. Detail changes have not been noted.
Amd. 1	2	Para. 3.1.3: Storage Life requirements changed.
	7	QPL: storage life details added.
Amd. 2	2	Para. 3.1.3: Storage life amended.
	3	Para. 3.2.1: Curing time amended.
		Para. 3.2.2: Shore A value revised.
		Para. 3.2.3: Failure mode altered.
		Para. 4.2: Cure time revised.
	5	Para. 7.2: Additional sizes added.
B	4	Removed Peel test as acceptance test from Table 1
	QPL	Added note to specify materials can be procuredto DSC 584
C		Updated section 5 to standardize with BA specifications. Product designation changed: Was: RTV 730 Now: RTV 730 FS
Amd. 1	QPL	Updated Dow Corning address, added distributor address

1 SCOPE

This specification covers the requirements for fluorosilicone adhesive/sealant, room temperature vulcanizing, one component, for bonding of fluorosilicone materials or protecting silicone bond lines against di-ester based fluids.

2 APPLICABLE DOCUMENTS

The following document shall form part of this specification of the adhesive defined 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 stated, the current issue shall be used.

2.1 Military Specifications

MIL-C-27725	Coating, Corrosion-preventive, for Aircraft Integral Fuel Tanks

2.2 de Havilland Specifications

DHLP 3010	Hardness
DHLP 3051	180^{o} Peel Test For Adhesives
DHMS C4.01	Fluid Resistant, Epoxy Primer, "F19"

2.3 American Society for Testing and Materials

ASTM D1002-72	Strength Properties of Adhesive in Shear by Tension Loading
ASTM D903	Test Method for Peel or Stripping Strength of Adhesive Bonds

3 REQUIREMENTS

3.1 Properties of Liquid Phase

3.1.1 Material: Materials used in the manufacture of this product shall be of the highest quality and suitable for the intended purpose.

3.1.2 Components: The adhesive/ sealant shall be an one-component system and shall cure upon exposure to moisture in the air.

3.1.3 Storage Life: The storage life of the adhesive/ sealant shall be as specified in the QPL for each product. The storage life shall be from the date of shipment when stored in original containers. The maximum time from date of manufacture to date of shipment shall be 12 months.

3.1.4 Tack Free Time: The adhesive/ sealant shall be usable for up to 15 minutes.

3.1.5 Working Characteristics: The adhesive/ sealant, at any production volume shall be of a smooth, paste like consistency suitable for hand application.

3.2 Properties of Solid Phase

3.2.1 Curing Time: The adhesive/ sealant shall cure to handle consistently within 7 days and attain a Shore A hardness of 34 minimum.

3.2.2 Hardness: The adhesive/sealant after curing for 7 days at 77 ˚F and 50% R.H., shall have an instantaneous hardness value of not less than 34 Shore A when tested per **Para.4.1**.

3.2.3 Peel Strength: The average peel strength of three specimens, prepared and tested per **Para.4.2** shall be 10 lb/inch minimum and shall exhibit 80% minimum cohesive failure when tested at 77 ˚F and 50%R.H.

3.2.4 Resistance to Jet Fuel: After exposure to Jet Fuel (JP-4) as described in **Para.4.3**, the cured adhesive/ sealant shall exhibit no more than 7% increase in swelling and a reduction in hardness of -5 Shore A.

4 TEST METHODS

4.1 Hardness

Prepare a test specimen 2" x 6" x 0.25" thick per **Para.3.2.2**. The surface shall be as smooth as possible. Place the specimen on a hard, horizontal surface. Hold the durometer at least 0.5 in. from any edge of the specimen. Apply the presser foot t o the specimen as rapidly as possible without shock, keeping the foot parallel to obtain firm contact between presser foot and specimen. Make five measurements of hardness at different positions on the specimen at least 0.25 inch apart and determine the median value or the arithmetic mean.

4.2 Peel Strength

Prepare the test specimen using a 0.063" 2024T3 aluminum for the rigid material and a piece of stainless screen for the flexible member. For better adhesion, the aluminum panel may be primed prior to bonding using "F19" primer, DHMS C4.01, and, the stainless steel screen shall be immersed in MEK to remove any foreign material. Apply a layer of adhesive/ sealant 20 to 40 mils thick, on the aluminum surface. Join the surfaces using enough pressure to displace the air. The bond line shall be at least 20 mil thick. Allow to cure for 10 days minimum. Test the peel strength as per ASTM D903.

4.3 Resistance to Jet Fuel

Immerse 5 pieces, 2" x 6" x 0.5" of fully cured sealant (7 days) into Jet Fuel (JP-4) for 24 hours. Measure the change in hardness per **Para.4.1** and the dimensional change after immersion in the Jet Fuel.

4.3.1

5 MATERIAL QUALIFICATION REQUIREMENTS

5.1 Request For Qualification

All requests for qualification to this specification shall be addressed to Bombardier Aerospace Materials and Processes Engineering Department for approval.

All material qualification shall be site specific.

An audit of the manufacturers and/or test facilities by Materials and Processes Engineering may be necessary prior to approval.

5.2 Qualification testing

Potential suppliers shall submit a written qualification test report based on 3 batches/lots of materials showing compliance with the requirements contained in section 3. The test report shall contain actual numerical test values, average test results as well as failure modes where applicable.

5.2.1 A sample shall be submitted for testing at the discretion of Bombardier Aerospace Materials and Processes Engineeing for evaluation.

5.3 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.

5.4 Process Control Document

5.4.1 The manufacturer shall develop and maintain a Process Control Document (PCD). The PCD shall define the manufacturing and quality control requirements and procedures for assuring consistent, uniform and compliant products. The PCD shall identify baseline chemical constituents, in-process test procedures and requirements, and manufacturing procedures. All specifications and test procedures employed during the process shall also be listed and issue/date controlled.

5.4.2 When qualification has been granted, the PCD shall be signed by the supplier and Bombardier Aerospace Materials and Processes Engineering and shall not be changed without prior written approval.

5.4.3 The PCD and all production data shall be available to any Bombardier Aerospace auditors when requested.

5.5 Qualification Approval

5.5.1 Upon review of supplier's data, PCD and BA tests, the supplier will be advised either of product qualification or reasons for disqualification.

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

5.5.3 No changes in the method of manufacture and/or formulation shall be made without notification and prior written approval of Materials and Processes Engineering Department.

5.5.4 Re-qualification of the product may be requested by the Bombardier Materials and Process Engineering if there are any changes in the method of manufacture and/or formulation.

6 QUALITY ASSURANCE REQUIREMENTS

6.1 Batch/Lot Acceptance Tests

6.1.1 The manufacturer/supplier is responsible for the performance of all sampling, inspection and testing of each batch/lot as specified in **Table 1.**

6.1.2 The manufacturer/supplier shall issue with each batch of product one copy of an Acceptance Test Report showing actual test data conformance to the acceptance tests specified in **Table 1**. The report shall include the supplier's batch identification, materials specification and date of testing.

6.1.3 Bombardier Aerospace Materials and Processes Engineering 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 will be returned to the supplier at the supplier's expense.

6.1.4 The manufacturer/supplier shall certify with a Certificate Conformance that each batch of each shipment meets the requirements of this specification.

6.2 Purchaser Batch/Lot acceptance tests

6.2.1 The purchaser is required to perform , inspection and testing of each batch/lot as specified in **Table 1.**

TABLE 1. Qualification and Batch Acceptance Tests

Properties	Paragraph	Qualification (Supplier)	Acceptance (supplier and purchaser)
Storage Life	Para.3.1.3	x	
Application Life	Para.3.1.5	x	
Curing Time	Para.3.2.1	x	x
Hardness	Para.3.2.2	x	x
Peel Strength	Para.3.2.3	x	
Resistance to Jet Fuel	Para.3.2.4	x	

6.3 Definition

6.3.1 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.

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

7 ORDERING DATA

7.1 Prerequisite

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

7.2 Procurement Documents

Procurement documents should specify the following:

- Title, Number Issue and Amendment Number of this Specification
- Type and Size of Container (Imperial or U.S. measure)
- Total Quantity (Imperial or U.S. measure)
- Acceptance Test Report.

8 PREPARATION FOR DELIVERY

8.1 Preservation and Packing

The adhesive shall be packed in such a manner as to assure that, during shipment and storage, the product will be protected against damage from exposure to hazards which would affect adversely the property conformance to **Section 3** of this specification.

8.2 Packaging

The adhesive/ sealant shall be supplied in 2.8, 4.7 oz tubes or 5.1 oz cartridges.

8.3 Marking

Each container shall be legibly marked with the following information:

- Adhesive/ Sealant, Silicone (conforms to DHMS A6.15)
- Manufacturer's Name and Product Identification
- Date of Manufacture
- Batch Number
- Net Quantity (Imperial or U.S. measure)

8.4 Shipping Documentation

The shipping document shall show:

- de Havilland Purchase Order No.
- Specification Number
- Number of Containers
- Batch Number
- Total Quantity (Imperial or U.S. measure)
- Acceptance Test Reports

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

9 HEALTH AND SAFETY DATA

When supplying samples for qualification per **Para.5.1.2**, the supplier shall submit a Materials Safety Data Sheet as per the Ontario Occupational Health and Safety Act, Workplace Hazardous Materials Information System (WHMIS) Regulations, which complies with the Canada Hazardous Products Act, Controlled Products Regulations.

Materials Technology, de Havilland Inc. must ensure that copies are provided to, and approved by, the Materials Safety Committee, Industrial Hygiene and Safety, de Havilland Inc.

These requirements are prerequisites to inclusion of any product on the Qualified Products List.

Any changes in the formulation of the material requires resubmission of the Material Safety Data Sheet.

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QUALIFIED PRODUCTS LIST

MANUFACTURER'S NAME AND ADDRESS	MANUFACTURER'S PRODUCT IDENTIFICATION NO.	MATERIAL SAFETY DATA SHEET NO.	DE HAVILLAND QUALIFICATION SHEET NO.	DATE OF PRODUCT APPROVAL
General Electric 1920 Silicone Drive Pickering, Ontario (905) 427-5675	FRV 1106 Storage Life: 6 months @80°F (27°C), unopened	1343	PQS #1	April 21, 1994
Dow Corning Corporation 2200 W. Salzburg Rd. Midland MI USA 48686-0994 **Distributor**: Paisley Products of Canada Inc. 40 Upton Rd. Scarborough, ON M1L 2B8 Canada	730 FS Storage Life: 12 months @90°F (32°C) or below	2039	PQS #2	April 21, 1994

NOTE:

MATERIALS CAN BE PROCURED UNDER DSC 584 WITH SUPPLIER'S C OF C.