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MILITARY SPECIFICATION

BAFFLE AND INERTING MATERIAL, AIRCRAFT FUEL TANK

This specification is approved for use by Aeronautical Systems Division and is available for use by all Departments and Agencies of the Department of Defense

1. SCOPE

1.1 Scope. This specification covers the requirements for a reticulated polyurethane foam for explosion suppression in aircraft fuel tanks and dry bay areas (cavities).

1.2 Classification. The baffle material shall be of the following types, as specified (see 6.2):

Type I - Orange, 1.8 lbs/ft^3, nominal 10 pores per inch, polyester

Type II - Yellow, 1.3 lbs/ft^3, nominal 15 pores per inch, polyester

Type III - Red, 1.3 lbs/ft^3, nominal 25 pores per inch, polyester

Type IV - Dark Blue, 1.3 lbs/ft^3, nominal 15 pores per inch, polyether

Type V - Light Blue, 1.3 lbs/ft^3, nominal 25 pores per inch, polyether

2. APPLICABLE DOCUMENTS

2.1 Issues of documents. The following documents, of the issue in effect on date of invitation for bids or request for proposal, form a part of this specification to the extent specified herein:

Beneficial Comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: ASD/ENESS, Wright-Patterson AFB, OH 45433 by using the self-addressed Standardization document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

SPECIFICATIONS

Federal

L-P-378	Plastic Sheet and Strip, Thin Gauge, Polyefin
QQ-A-250/12	Aluminum Alloy 7075, Plate and Sheet
TT-S-735	Standard Test Fluids, Hydrocarbon
UU-P-268	Paper, Kraft, Wrapping
PPP-B-636	Box, Shipping, Fiberboard

Military

MIL-P-116	Preservation, Methods of
MIL-G-5572	Gasoline, Aviation, Grades 80/87, 100/130, 115/145
MIL-H-5606	Hydraulic Fluid, Petroleum Base, Aircraft, Missile, and Ordnance
MIL-T-5624	Turbine Fuel, Aviation, Grades JP-4 and JP-5
MIL-L-7808	Lubricating Oil, Aircraft Turbine Engine, Synthetic Base, NATO Code Number O-148
MIL-L-22851	Lubricating Oil, Aircraft Piston Engine, (Ashless Dispersant)
MIL-I-27686	Inhibitor, Icing, Fuel System
MIL-T-83133	Turbine Fuel, Aviation, Kerosene Type Grade JP-8

STANDARDS

Military

MIL-STD-129	Marking for Shipment and Storage
MIL-STD-794	Parts and Equipment, Procedures for Packaging of
MIL-STD-831	Test Reports, Preparation of

DRAWING

Scott Paper Company

YH102-067x54	Porosity Tester

PUBLICATION

Air Force Technical Order

T.O. 42B-1-1	Quality Control of Fuels and Lubricants

(Copies of specifications, standards, drawing, and publications required by contractors in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

2.2 Other publications. The following documents form a part of this specification to the extent specified herein. Unless otherwise indicated, the issue in effect on date of invitation for bids or request for proposal shall apply.

American Society for Testing and Materials

G23-75	Recommended Practice for Operating Light and Water Exposure Apparatus (carbon-arc type) for Exposure of Nonmetallic Materials.
D1564-71	Standard methods of Testing Flexible Cellular Materials - Slab Urethane Foam
D1692-76	Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Cellular Plastics Using a Specimen Supported by a Horizontal Screen
D2276-73	Particulate Contaminant in Aviation Turbine Fuels

(Application for copies should be addressed to the American Society for Testing and Materials, 1916 Race Street, Philadelphia PA 19103.)

3. REQUIREMENTS

3.1 Qualification. Baffle material furnished under this specification shall be a product which is qualified for listing on the applicable qualified products list at the time set for opening of bids. (See 4.4 and 6.4)

3.1.1 Requalification. Before any change is made in the quality, composition, source of ingredients, or source of supply of the final produce, the contractor or manufacturer must contact the qualifying activity to determine if requalification is required.

3.2 Materials. The raw materials used in processing the baffle material shall be of the highest quality and standards for commercially available products of this type and shall be of the same formulation as that used in the qualification sample. The end product shall be a flexible urethane foam which is suitable for use in aircraft fuel tanks.

3.2.1 Thermal decomposition. Product toxicological data relating to thermal decomposition shall be submitted for review by military medical authority who will determine if any use restrictions exist on the safety of personnel.

3.2.2 Tracer element. A tracer element shall be incorporated into the foam formulation of each vendor for identification purposes. The tracer element selected shall be submitted to the qualifying activity for approval and shall be unique to each vendor. The vendor shall also provide the analytical test procedures which will be used to identify the tracer element.

3.3 Age. The maximum time of delivery from the manufacturer shall not exceed 1 year. If the time since manufacture exceeds 6 months, the baffle material shall be inspected, and there shall be no evidence of discoloration resulting in surface deterioration. Discoloration of urethane foams with age and exposure to ultraviolet light is a normal occurrence and does no necessarily indicated deterioration.

3.4 Coloring pigments. Coloring pigments shall not be readily extractable when the baffle material is used in contact with fuels conforming to MIL-G-5572, MIL-T-5624, and MIL-T-83133.

3.5 Infrared spectrum analysis. An infrared spectrum analysis shall be performed in accordance with 4.6.22 and reported for the finished baffle material.

3.6 Physical properties and characteristics. The physical properties and characteristics of the baffle material at time of manufacture shall be suitable for the purpose intended and in accordance with table 1.

3.7 Performance. The baffle material shall meet the following performance requirements:

3.7.1 Fluid immersion. The fluid immersion test shall be performed in accordance with 4.6.17. The baffle material shall not undergo more than 30 percent loss in dry tension properties after 8 weeks' exposure or more than 50 percent loss after 24 weeks' exposure to grade JP-4 turbine fuel conforming to MIL-T-5624 at 71.1°C (160°F). In addition, the type IV and V baffle materials shall also not undergo more than 60 percent loss in wet tension properties after 24 weeks' exposure at 71.1° +/-2.8°C (160°C +/-5°F) to grade JP-5 turbine fuel. When exposed to grade JP-5 turbine fuel at 93.3°C (200°F) for a period of 4 weeks, the baffle material shall not undergo more than 30 percent loss in dry tension properties. When exposed to grade JP-4 turbine fuel at 23.9 +/-2.8°C (75° +/-5°F) for a period of 4 weeks, types IV and V baffle material shall not undergo more than 60 percent loss in wet tensile strength, compression load deflection, elongation, and tear resistance in accordance with 4.6.17f. All other test data required shall be on a report basis.

3.7.2 Hydrolytic stability. The baffle material shall meet the following hydrolytic stability criteria (see 4.6.18):

3.7.2.1 The types I, II, and III material shall withstand exposure to a temperature of 93.3°C +/-2.8°C (200 +/-5°F) and 95 percent relative humidity for a period of 4 days with no more than 75 percent loss in tensile strength. Type IV and V material shall withstand exposure to 93.3°C +/-2.8°C (200°F +/-5°F) and 95 percent relative humidity for a period of six weeks with no more than 75 percent loss in tensile strength.

TABLE I. Physical properties and characteristics.

Property	Requirements					Test
	Type I	Type II	Type III	Type IV	Type V	
Color	Orange	Yellow	Red	Dark Blue	Light Blue	4.6.2
Density range (lb/ft^3)	1.70 to 2.00	1.20 to 1.45	1.20 to 1.45	1.20 to 1.45	1.20 to 1.45	4.6.3
Porosity (Air pressure drop)	7 to 15	8 - 18	20-30	8 - 18	24-34	4.6.4
Air Pressure drop (inches of water)	0.190 to 0.285	0.140-0.230	0.250-0.330	0.140-0.230	0.270-0.370	4.6.4
Tensile strength (psi)	15 (Min)	15 (Min)	15 (Min)	10 (Min)	15 (Min)	4.6.5
Tensile stress at 200 percent elongation (psi)	10 (Min)	10 (Min)	10 (Min)	----	----	4.6.5
Ultimate elongation	220 (Min)	220 (Min)	220 (Min)	100 (Min)	100 (Min)	4.6.5
Tear resistance (Pounds per inch)	5 (Min)	5 (Min)	5 (Min)	3 (Min)	3 Min)	4.6.6
Constant deflection compression set (Percent)	30 (Max)	35 (Max)	35 (Max)	30 (Max)	30 (Max)	4.6.7
Compression load deflection at 25 percent deflection (psi)	0.40 (Min)	0.30 (Min)	0.30 (Min)	0.35 (Min)	0.35 (Min)	4.6.8
65 percent deflection (psi)	0.60 (Min)	0.50 (Min)	0.50 (Min)	0.60 (Min)	0.60 (Min)	
Load deflection curve from 0 to 80 percent deflection	Report	Report	Report	Report	Report	4.6.8.1
Fuel displacement (Volume - percent)	3.0 (Max)	2.5 (Max)	2.5 (Max)	2.5 (Max	2.5 (Max)	4.6.9
Fluid retention (Volume - percent) Fuel	2.5 (Max)	2.5 (Max)	5.0 (Max)	2.5 (Max)	5.0 (Max)	4.6.10
Water	Report	Report	Report	Report	Report	4.6.10.1
Flammability (Inches/Minute)	10 (Max)	15 (Max)	15 (Max)	15 (Max)	15 (Max)	4.6.11
Extractable materials (Weight-Percent)	3.0 (Max)	3.0 (Max)	3.0 (Max)	3.0 (Max)	3.0 (Max)	4.6.12
Volume increase after fluid age (Volume - percent)						4.6.13
Type I fluid	0 -5	0 - 5	0 - 5	0 - 15	0 - 15	
Type III fluid	0 - 12	0 - 12	0 - 12	0 - 37	0 - 37	
Grade JP-4 turbine fuel	0 - 10	0 - 10	0 to 10	0 - 25	0 - 25	
Low temperature flexibility		No cracking	or Breaking of	Strands		4.6.14
Entrained solid contamination (Milligrams/cubic foot)	11.0 (Max)	11.0 (Max)	11.0 (Max)	11.0 (Max)	11.0 (Max)	4.6.15
Steam autoclave exposure (Maximum Tensile Loss in Percent)	40 (Max)	40 (Max)	40 (Max)	30 (Max)	30 (Max)	4.6.16

3.7.2.2 The types I, II and III material shall withstand exposure to 71.1°C +/-2.8°C (160°F +/- 5°F) and 95 +/- 5 percent relative humidity for a period of 4 weeks with a maximum loss in tensile strength of 95 percent. Types IV and V materials shall withstand exposure to 71.1°C +/- 2.8°C (160 +/- 5°F) and 95 +/- 5 percent relative humidity for a period of 24 weeks with a maximum loss in tensile strength of 50 percent.

3.7.2.3 The type I, II, and III material shall withstand immersion in pure distilled water at 71.1°C +/- 2.8°C (160° +/- 5°F) for 4 weeks with maximum loss in tensile strength in pure distilled water at 71.1°C +/- 2.8°C (160° +/- 5°F) for 24 weeks with maximum loss in tensile strength of 80 percent.

3.7.2.4 The material shall withstand exposure to dry heat. Maximum allowable loss in tensile strength shall be 75 percent after four weeks at 121.1°C (250°F).

3.7.3 Flame arrestor characteristics. The minimum acceptable flame arrestor characteristics criteria shall be as follows (See 4.6.19.2):

Single void ignition overpressure limit at 3 psig initial pressure for:

a. Types I, II and IV baffle material at 10 and 20 percent ignition void: 15 psig maximum.

b. Types III and V baffle material at 30 and 35 percent void: 15 psid maximum

3.7.3.1 Minimum arrestor thickness. The minimum arrestor thickness (Tm) required to prevent flame propagation for types III and V material shall be:

a. At 0 psig initial pressure and combustion volume of 16.7 percent shall be 3 inches maximum.

b. At 3 psig initial pressure and combustion volume of 16.7 percent shall be 5 inches maximum.

3.7.4 Corrosion and adhesion. The baffle material shall neither adhere to nor show any evidence of pitting, erosion, or corrosion to metal plates when exposed in contact with QQ-A-250/12 Aluminum Alloy (7075) as specified in 4.6.20.

3.7.5 Sunshine. The baffle material shall be exposed to sunshine as specified in 4.6.21, and the results and samples submitted to the qualifying activity on a report basis.

3.8 Dimensions and tolerances. Baffle material shall be produced in the following standard size buns:

Type I - 40 x 80 x 8 inches

Types II, III, V - 44 x 110 x 12 inches

Type IV - 44 x 110 x 8 inches

3.8.1 Optional bun sizes. Optional bun sizes of the baffle material may also be produced by the manufacturer provided the following sizes are included: 40 x 80 x 8 inch size for types II, III, IV, and V, 44 x 110 x 8 inch size for types I, II, III, and IV. Production tolerance limits on bun sizes shall be as follows:

a. Thickness +/- 1/8 inch

b. Length and width + 1, - 0 inch

3.9 Identification of product. The baffle material shall be sealed in a clean polyethylene bag as it comes off the production line. A labeled card shall be provided inside the bag which clearly identifies the manufacturer's part number, date of manufacture, production run number, loaf, and bun number. Where applicable, the government contract or order number shall be included. There shall be no color coding or marking on the bun surface.

3.10 Workmanship. The baffle material shall be fabricated in accordance with high-grade manufacturing practices covering this type of material. The baffle material shall be suitable for its intended use and free of defects which may affect its performance. It shall be of a uniform color and free from excessive voids.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for Inspection. Unless otherwise specified in the contract, the contractor is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract, the contractor may use his or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

4.2 Classification of tests. The inspection and testing of the baffle material shall be classified as follows:

a. Qualification tests . . . . . See 4.4

b. Quality conformance inspection . . . . . See 4.5

4.3 Test conditions

4.3.1 Temperature and humidity. Unless otherwise specified herein, all tests shall be conducted under known conditions of temperature and relative humidity. Prior to physical property testing, specimens shall be preconditioned in the test environment a minimum of 30 minutes.

4.3.2 Test fluids. Unless otherwise specified herein, the test fluids shall be of known properties and certified in accordance with the referenced military specification. The turbine fuels conforming to MIL-T-5624 may be obtained from the qualifying activity along with a certified test report defining, as a minimum, the specific gravity, distillation, aromatic content, existent gum, sulfur content, Reid vapor pressure (grade JP-4 turbine fuel only), and anti-icing additive level in accordance with MIL-I-27686.

4.3.3 Basic property testing. Unless otherwise specified herein, all basic property tests shall be in accordance with the applicable sections specified in Part 28 of ASTM D1564-71. In the case where more than one specimen is tested, the average shall be determined. However, all values shall be reported for all but production testing. Unless otherwise specified, all sample specimens shall be tested in the dry condition. In the case where fuel wet testing is required (special tension, tear resistance, and compression load deflection tests) the specimen should be removed from the test fluid immediately prior to property testing, drained of excess fuel, and then tested.

4.3.4 Specimen cutting. Unless otherwise specified herein, specimen cutting shall be by die or saw cutting.

4.4 Qualification testing (See 6.2)

4.4.1 Test sample. The specific bun of material chosen for the qualification tests shall be typical of future production buns in terms of density and porosity (air pressure drop). Unless otherwise specified herein, this bun shall be selected from near the mid range in allowable porosity properties.

4.4.1.1 Test specimens

4.4.1.1.1 Test section location. All test specimens shall be prepared from production material within the test section locations specified herein.

4.4.1.1.1.1 For qualification and process control tests. For qualification and process control tests, the test section shall consist of a full-size bun which has been sectioned to provide for all the qualification test samples and test specimens. All qualification test specimens used shall be from the same machine run of production material and from the specified area defined under 4.6. Where practicable, the material used shall be representative of the mid range in density and pore size (air pressure drop) for the given product.

4.4.1.1.1.2 For production and lot testing. For production and lot testing, the test section shall consist of a section approximately 15 inches long by the normal bun height and width which has been processed along with normal production material. Location of the specific test samples within the test section shall be in accordance with the guidelines specified under 4.6. Specimen measurements shall be in accordance with ASTM D1564-71.

4.4.1.1.2 Quantity of specimens. Unless otherwise specified herein, three specimens per sample shall be tested. The value reported shall be the average of those observed. If any value deviates more than 20 percent from the average value, two additional specimens shall be tested and the average for all five values shall be reported.

4.4.2 Test report, disposition of test specimens, and data for the qualifying activity. The following shall be furnished in the qualifying activity as a qualification package:

a. Test report. A qualification test report shall be prepared in accordance with MIL-STD-831 and shall include at least the following:

(1) A tabulation of all qualification test data, including production test data on the qualification foam run. All values obtained shall be included as well as sample calculations.

(2) Details of any failures

b. Disposition of test specimens. All test specimens used in the qualification tests shall be submitted to the qualifying activity, except those subjected to the following tests:

(1) Tension tests (4.6.5)

(2) Tear resistance test (4.6.6)

(3) Flammability test (4.6.11)

(4) Steam autoclave exposure test (4.6.16)

(5) Flame arrestor tests (4.6.19)

(6) Infrared spectrum analysis test (4.6.22)

In addition, the following material shall be submitted to the qualifying activity:

(1) A sample from the qualification test bun(s): Size 40 x 40 x 8 inches (types I and IV) or 50 x 44 x 12 inches (types II, III, and V).

(2) Retention samples (6 x 6 x 6 inches) near the bottom, middle, and top of the porosity range and porosity (air pressure drop) specimens.

(3) Sufficient material (approximately four buns of type I or two buns of types II, III, IV, and V for the flame arrestor tests specified in 4.6.19.

(4) Corrosion and adhesion metal test specimens (see 4.6.20).

c. Other data. The manufacturer shall include as a part of the qualification report any information defined I 6.4.1 that may not have been available at the time of the submittal of the letter of request for testing. Also, any applicable data or information which may relate to the qualification or future procurements of the material shall be included.

4.4.3 Qualification tests. The qualification tests shall consist of all the tests described under 4.6.

4.5 Quality conformance inspections. Quality conformance inspections shall consist of the following tests:

a. Production tests . . . . . See 4.5.1

b. Lot tests . . . . . See 4.5.2

c. Process control tests . . . . . See 4.5.3

d. Examination of product . . . . . See 4.6.1

4.5.1 Production tests. Production tests shall be conducted on each run of material (see 6.3.1) produced. The minimum testing frequency shall be every 300 linear feet of types I, II, and III baffle material and every 180 linear feet of types IV and V baffle material. The following production tests shall be conducted:

a. Color test . . . . . See 4.6.2

b. Density test . . . . . See 4.6.3

c. Porosity (air pressure drop) test . . . . See 4.6.4

d. Tensile strength and elongation tests . . See 4.6.5

e. Entrained solid contamination tests . . See 4.6.15

f. Steam autoclave exposure test . . . . . See 4.6.16

The steam autoclave exposure test specified in 4.6.16 shall be conducted once for each machine run to verify the hydrolytic stability characteristics of the material.

4.5.2 Lot tests. In addition to the production tests specified in 4.5.1, the compression load deflection test specified in 4.6.8 and the fuel retention test interval, whichever occurs first. The test results shall be submitted to the qualifying activity for review.

4.5.2.1 Rejection and retest. Failure of any of the test specimens to conform to the applicable requirements of 3.6 and table I shall require a retest of the property which failed on an additional set of test specimens from the same test section. Additional testing will be authorized by the qualifying activity in order to isolate the extent of defective material. In the event of failure of any of the retested specimens, the material represented by those specimens shall be rejected.

4.5.3 Process control tests. In addition to the production and lot tests, the following tests shall be conducted on production material at 12-month intervals, and the results shall be forwarded to the qualifying activity:

a. Tensile stress test . . . . . See 4.6.5

b. Tear resistance test . . . . . See 4.6.6

c. Fuel and water retention tests . . . . . See 4.6.10.1

d. Flammability tests . . . . . See 4.6.11

e. Volume swell in JP-4 for types IV and V . . . . See 4.6.13

f. Fluid immersion in JP-4 at 23.9°C (75°F) for 4 weeks (types IV and V) . . . . . See 4.6.17

g. Hydrolytic stability tests for types I, II, and III at 160°F for 6 weeks . . . . . See 4.6.18

h. Hydrolytic stability tests for type IV and V at 200°F for 6 weeks . . . . . See 4.6.18.1

4.5.3.1 Process control samples and data. The following samples, if requested, and production data shall be forwarded to the qualifying activity along with the process control test data:

a. Retention test specimens (4.6.10) and porosity (air pressure drop) test specimens (4.6.4).

b. Samples from the process control bun, size 20 x 20 inches by the bun height.

c. If requested, a copy of the production test data on all baffle material produced during the previous 12 months.

4.5.3.2. Rejection and retest. Failure of any of the test specimens to conform to the process control requirements specified herein shall require a retest of one additional set of test specimens for the property that failed from the same test section. In the event of failure of any of the retested specimens, production shall be halted and no

additional baffle material accepted until the reason for failure has been determined and corrective action taken. The qualifying activity shall be notified of any test failures encountered.

4.6 Test methods

4.6.1 Examination of product. Each finished bun of material shall be visually inspected for consistency of cell structure, color, complete reticulation, obvious voids, or surface imperfections and the dimensional tolerances specified in 3.8 prior to final packaging. Criteria for rejection of buns shall be any exterior surface defects that could seriously affect the end function of the product, such as:

a. Excessive cleaves, voids, or splits.

b. Holes larger than 0.5 inch diameter and of 0.5 inch depth, not to exceed four per bun and no closer than 2 feet.

c. Level of non-reticulation not to exceed 0.43 percent of the total surface area or 0.07 percent of the total volume, based on the standard size bun.

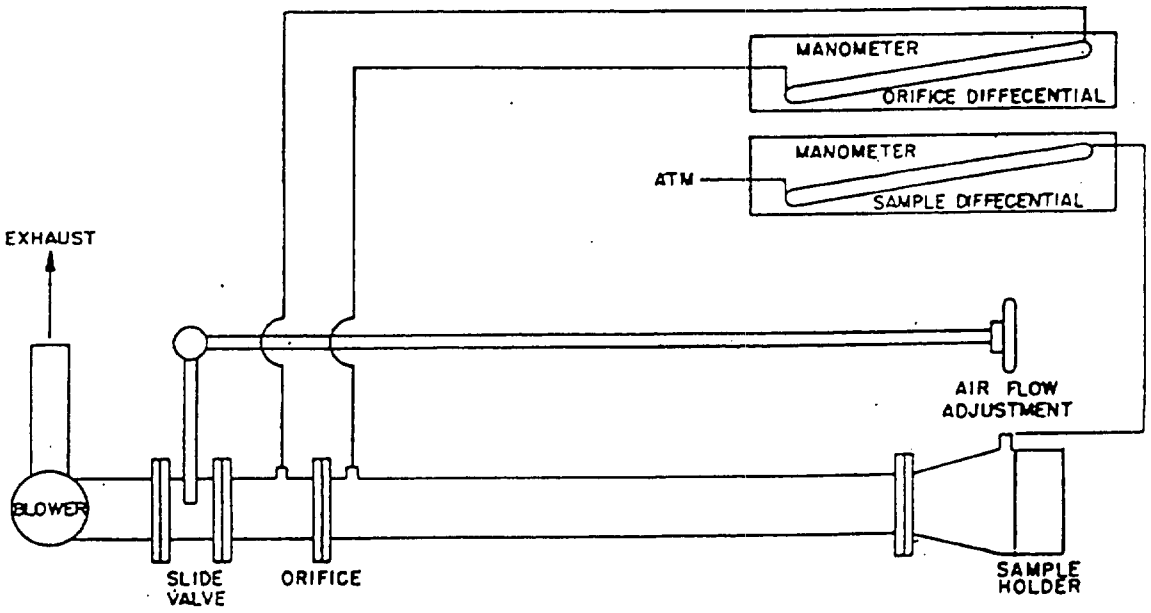
4.6.2 Color test. Testing for color shall be by visual analysis. The baffle material shall be of a uniform bright color as specified in table I. Any unusual color variations over the foam surface shall be cause for rejection, especially distinct surface darkening due to dirt, contamination, or surface deterioration.

4.6.3 Density test. One test specimen shall be tested in accordance with ASTM D1564-71 (Suffix W). Specimen size shall be 3 x 7 x 10 inches, such that the 3-inch dimension is in the direction of the width (see 6.3.3) and the 7-inch dimension is in the direction of rise (6.3.4) of the test section. The results shall be reported to the nearest 0.1 pound per cubic foot.

4.6.4 Porosity (air pressure drop) test. The pore size shall be determined by the air pressure drop technique specified herein. Two specimens for each production and lot sample shall be run. For qualification, three specimens shall be tested. The cylindrical specimen shall be 10 inches in diameter by 1 +/-0.02 inch thick, where the 1-inch dimension is in the height direction of the test section. For production and lot testing, the porosity test specimens shall be taken within the top and bottom three inches of the test section height (foaming height). For qualification testing, the three specimens shall be taken from the same location but from the upper, middle, and lower portions of the bun height. Pressure drop measurements shall be made using a porosity test jig (see figure 1 for details) which has been properly calibrated. Calibration shall be conducted on a daily basis using a special pressure drop screen in order to determine the reference setting for the orifice differential manometer. Prior to sample testing, both manometers shall be adjusted to zero with no airflow. The specimen shall then be inserted into the sample holder until it is properly seated into the cutout. The blower shall be started and the airflow set to coincide with the daily reference calibration setting on the orifice differential manometer. Next read the sample pressure drop (uncorrected) to the nearest 0.005 inch on the 4-inch manometer (designated sample differential). The value shall then be corrected for thickness (if other than 1.00 inch thickness) by dividing it by the measured sample thickness. This corrected air pressure drop shall then be compared to the porosity curve (figure 2) in order to determine the average pore size for the sample specimen. The sample pressure drop and average pore size shall be reported. Note: The porosity values shown on figure 2 are assigned and do not necessarily relate directly to the actual number of pores per lineal inch.

4.6.5 Tensile strength, tensile stress, and ultimate elongation tests. Tension tests including tensile strength, tensile stress at 200 percent elongation, and ultimate elongation shall be conducted in accordance with ASTM D1564-71

entitled: "Die for Stamping Tension Specimens". The approximate size of the dry specimen shall be 5.5 by 1 by 0.5 inches thick. For all but qualification, three specimens per sample shall be tested. If any value deviates more than 20 percent from the average, two additional specimens shall be tested and the average of all five reported. For qualification, 10 specimens shall be tested and all values reported. In addition, a copy of the recorded traces shall be included in the test report. The tensile strength and stress shall be reported in pounds per square inch, and ultimate elongation in percent. Tension specimens shall be taken from the upper half of the test section, and the orientation shall be such that the 1/2 inch dimension is always in the direction of rise (see 6.3.4) and the largest dimension (5.5 inches) is always in the machine direction (see 6.3.5). For special fuel wet tension tests the specimens shall be identical to those for dry testing. Specimen cross sectioned areas shall be measured on the dry specimen prior to test fluid exposure and recorded for later usage. When testing the specimen should be removed from the fluid prior to tension tests, drained, and immediately tested. Do no allow the sample to air dry as it will drastically affect the test results. Original dry specimen measurements taken prior to fluid exposure shall be used for calculating the wet tensile strength.



NOTE: FOR DETAILS, SEE SCOTT PAPER COMPANY DRAWING YH102-067X 54, EQUIVALENT.

FIGURE 1. Scott porosity test jig.

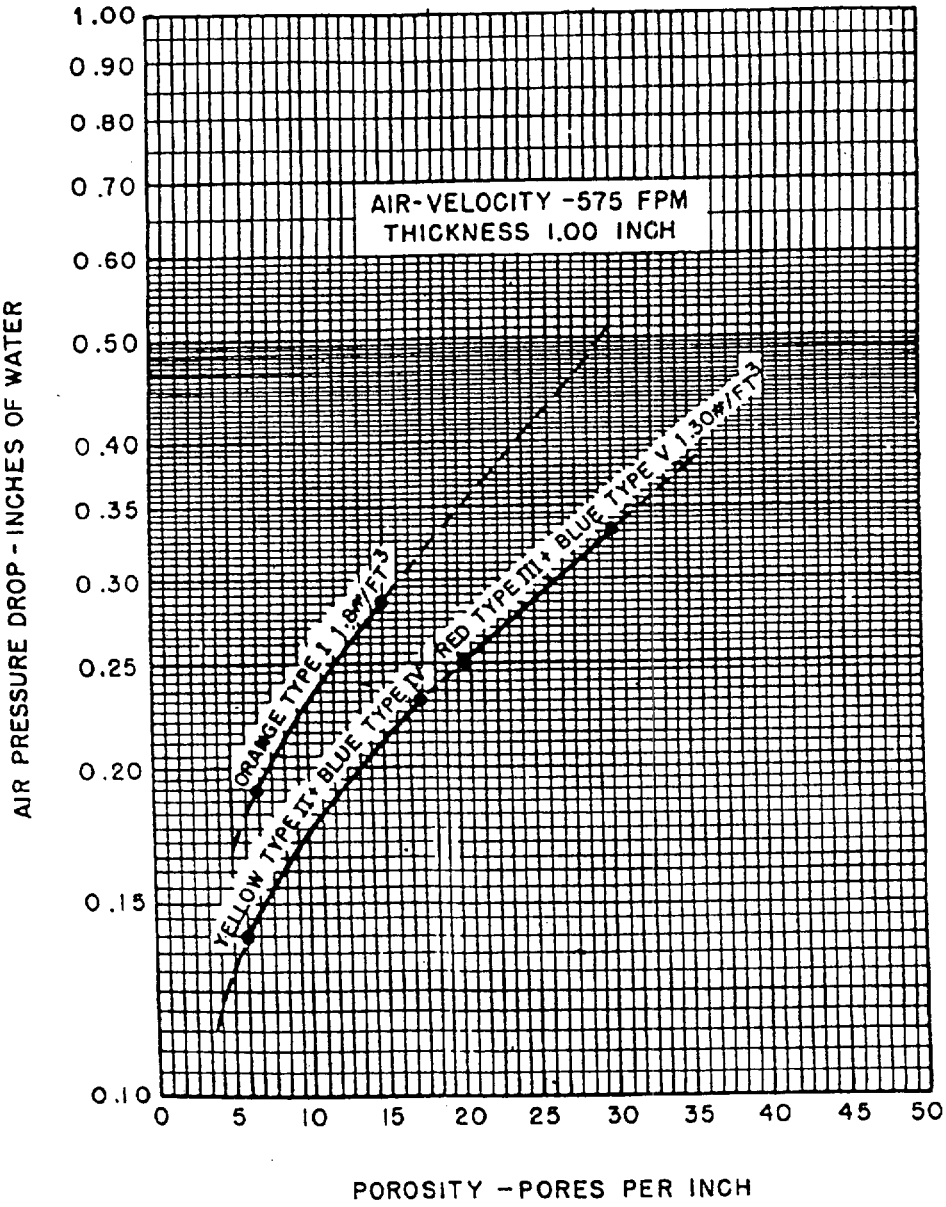


FIGURE 2. Porosity curve.

4.6.6 Tear resistance test. Three specimens shall be tested in accordance with ASTM D1564-71 (suffix G) using a crosshead speed of 20 inches per minute. Dry specimen size shall be 6 by 1 by 1 inch where the 6-inch dimension is in the machine direction and the slit cut is parallel to the direction of rise. The tear resistance shall be reported in pounds per lineal inch of thickness. Specimens shall be cut from 1-inch thick slabs of material. For fuel wet tear resistance tests the specimen shall be tested immediately after removal from the fluid. Original dry specimen measurements taken prior to fluid exposure shall be used for calculating the wet tear resistance.

4.6.7 Constant deflection compression set test. Three specimens shall be tested in accordance with method B of ASTM D1564-71 at a 50 percent deflection. Sample size shall be 4 by 4 by 3 inches. The three specimens shall be cut from the same 3-inch-thick slab located in the middle of the test section (bun) height and adjacent to the specimens used in the compression load deflection test specified in 4.6.8. The specimens shall be tested (compressed) in the direction of rise (3-inch dimension). Results for all specimens shall be reported in percent of original thickness.

4.6.8 Compression load deflection test. Three specimens shall be tested in accordance with ASTM D1564-71 (suffix D) at the 25- and 65- percent deflection level after 1 minute at each deflection point. Specimen size shall be

4 by 4 by 3 inches and taken near the middle of the bun height such that the 3-inch dimension is in the direction of material rise. New material shall be aged for a minimum of 96 hours following thermal reticulation prior to compression load deflection testing. Tests shall be conducted in the direction of material rise. Prior to testing, the specimens shall be preflexed twice to 80 percent compression. A copy of the recorded traces for each test shall be included in the test report and results reported in pounds per square inch. For wet compression load deflection properties the test specimen shall be tested immediately after removal from the fluid. The original dry specimen measurements taken prior to fluid exposure shall be used for determining the wet compression load deflection properties.

4.6.8.1 Load deflection curve. For qualification and process control testing, load deflection curves shall be recorded for the specimens specified in 4.6.8 during both preflexing up to 80 percent deflection. The recorded curves shall be submitted to the qualifying activity with the test specimens as specified herein.

4.6.9 Fuel displacement test. One sample per test shall be run using grade JP-5 turbine fuel conforming to MIL-T-5624, and the average reported as the fuel displacement. The test shall be conducted at standard conditions using a standard 1,000 ml capacity cylinder having 10- to 20- ml graduations. Each specimen shall be cut into a cylindrical shape having a diameter approximately equal to that of the graduated cylinder and a length sufficient to fill the test cylinder to the 900-ml mark. Specimens shall be cut in the direction of the material rise (bun height). Fuel shall be added to the 900-ml mark in the graduated cylinder and the specimen slowly added until it is completely immersed. The specimen shall be immersed for a period of 24 hours to obtain maximum swelling effects. The new fluid level shall be noted and the increase in milliliters shall be recorded. The displacement shall be calculated as follows:

$$\text{Percent Volume Displacement} = \frac{\text{milliliters increase} \times 100}{\text{original fluid volume}}$$

4.6.9.1 Calculated fuel displacement. The theoretical volume replacement of the material as calculated from the following formula and based on the material density specified in 4.6.3 shall be reported:

$$\text{Percent displacement (volume)} = \frac{\text{material density (lbs/ft}^3\text{)} \times 100}{\text{density of polyol(s) polymer (lbs/ft}^3\text{)}}$$

Fuel and water retention tests

4.6.10.1 Fuel retention tests. Fuel retention shall be determined on a 6 by 6 by 6 inch specimen using grade JP-5 turbine fuel conforming to MIL-T-5624 having a specific gravity of 0.788 to 0.845. Four specimens shall be cut from the center of the test section (bun) height directly adjacent to each other. These shall be identified at the top surface, and two each shall be identified for the fuel retention test specified herein and the water retention test specified in 4.6.10.2. A porosity test specimen shall be taken directly above the type I materiel retention specimens and tested as specified in 4.6.4 to establish the effective porosity. For types II, III, IV and V material, porosity specimens shall be taken directly above and below the retention specimens and tested as specified in 4.6.4. All retention and porosity (air pressure drop) specimens shall be properly labeled on the top surface and submitted to the qualifying activity if requested. One fuel retention specimen shall be tested in accordance with the following procedure, and all applicable data shall be recorded:

a. The specimen shall be preconditioned at a temperature of 23.9° +/- 2.8°C (75° +/-5°F) for a minimum of 30 minutes, weighed to the nearest 0.1 gram, and the dimensions measured in accordance with ASTM D1564-71. The grade JP-5 test fluid shall be prefiltered through a 0.8-micron filter as specified in 4.6.15 and then adequately preconditioned at the test temperature. Just prior to use, the fluid shall be tested for specific gravity (density) and temperature.

b. The retention test apparatus shall be sized to approximately 7 by 7 by 10 inches and shall have a means of draining the fuel from the bottom at the rate of 500 +/- 50 cc/minute. The draining drop rate in this particular apparatus should approximate 0.5 inch per minute. The test fluid shall be charged in the container to a level which corresponds to approximately 0.5 inch above the top of the specimen.

c. Next, the specimen shall be slowly placed into the container such that the specimen is oriented in the direction of rise (bun height) and supported off the bottom of the container by two glass rods and spaced 0.5 inch from all sides of the container. Fuel shall then be drained at the prescribed rate until flow ceases and the specimen then allowed to drain in this position for an additional 2 minutes.

d. The specimen shall then be carefully removed from the container and weighed to the nearest 0.1 gram. Care should be taken not to spill the fluid from the bottom surface of the specimen when removing from the test rig. Using the specimen weights before and after fluid wetting in grams, specimen volume in cubic centimeters, and fuel density in grams per cubic centimeter, the percent volume retention shall be calculated as follows:

$$\text{Percent retention} = \frac{(\text{wet specimen weight} - \text{dry specimen weight}) \times 100}{\text{specimen volume} \times \text{density of fuel}}$$

e. All values, including test fluid temperature, shall be reported.

4.6.10.2 Water retention test. Using one water retention specimen specified in 4.6.10.1, the volume percent retention shall be determined using the same procedure. The test fluid shall be unused distilled water which has been tested for temperature and density just prior to use. CAUTION: Do no run more than two tests per batch of water.

4.6.11 Flammability test. Five specimens shall be tested in accordance with the procedures specified in ASTM D-1692-76. Specimen size shall be 6 x 2 x 0.5 inches. Flammability specimens shall be taken from the upper half of the test section, and the orientation shall be such that the 6-inch dimension is in the machine direction (length) and

the 1/2 inch dimension is in the direction of rise (height). All test values shall be reported and the average flammability shall be calculated in inches per minute.

4.6.12 Extractable material test. The extractable material test shall be conducted on one test specimen. The specimen size shall be 1 x 1 x 2 inches and cut by means of a saw of die. Preconditioning of the specimen shall include drying at 90°C (194°F) for 15 minutes and then cooling the specimen in a desiccator for a minimum of 30 minutes. Immediately following the preconditioning, the specimen shall be weighed to the nearest 0.10 milligram. The specimen shall then be placed in a 60-ml volume Soxhlet extraction tube which is connected to a water-jacketed condensor. Several standard boiling stones and .125 ml of type III test fluid conforming to TT-S-735 shall be added to a 250-ml florence flask and the flask attached to the extraction tube. The heating unit shall be activated and the fluid allowed to reflux for a period of 3 hours. Following reflux, the specimen shall be removed, dried at 90°C (194°F) for 15 minutes, cooled in a desiccator for 30 minutes and then weighed. The percentage of extractable material shall be calculated as follows:

$$\text{Percent extractables} = \frac{(\text{original specimen weight} - \text{final weight}) \times 100}{\text{original specimen weight}}$$

4.6.13 Volume swell test. One specimen for each test fluid shall be tested for volume changes after immersion for 24 hours at 23.9° +/-2.8°C (75° +/-5°F) in type I test fluid conforming to TT-S-735, type III test fluid conforming to TT-S-735 and grade JP-4 turbine fuel conforming to MIL-T-5624. Sample size shall be 6 by 6 by 6 inches. The samples shall be taken from the same approximate location in the test section as the retention test specimens specified in 4.6.10. Dry and wet measurements shall be made on the test specimens in accordance with ASTM D1564-71. Following immersion, the specimens shall be removed and immediately measured wet for the final volume. All values for the specimen including original and wet volumes shall be reported and the percent volume increase from the original and wet measurements shall be calculated.

4.6.14 Low temperature flexibility test. Three 2 by 0.5 by 12 inch specimens shall be preconditioned in air along with a 3-inch diameter rod to a temperature of 48.3°C (-55°F) for 1 hour. Each specimen shall be cut such that the 12-inch dimension is in the machine direction. At the end of the conditioning period and without removing the specimens from the chamber, each specimen shall be bent around the rod. Any evidence of breaking or cracking of foam strands shall be cause for failure.

4.6.15 Entrained solid contamination tests. Solid contamination tests shall be conducted on a hot-wire-cut cylindrical specimen having dimensions of 9.25 inches in diameter and 8 inches in height. The 8-inch dimension shall be cut in the direction of rise (bun height). For material having more than 8 inches in bun height, the specimen shall be taken from the lower portion of the test section. Testing shall be conducted using a U.S. Testing Company model 6523 dry cleaning machine having a tumbler rotation speed of 45 rpm. The specimen shall be positioned in the center of the tumbler. The test cycle shall be 5 minutes using a 4-liter charge of type I fluid conforming to TT-S-735 which has been prefiltered through a 0.8 micron Millipore Filter Corporation filter. Upon completion of the test cycle, the specimen shall be positioned slightly above the fluid level and allowed to drain for 5 minutes prior to removal. The test fluid shall then be tested for level of solid contamination in accordance with Appendix A2 (laboratory filtration) of ASTM D2276-73 or 5-23, 5-24, and 5-47 through 5-52 of T.O. 42B-1-1. Following filtration of the test fluid and just prior to removal of the filter pad from the apparatus, the filter and contamination shall be neutralized of static charge with a Nuclear Products Company Model 2U500 air deionizer, or equal (see 6.5). This step should help to reduce the loss of particles from the filter pad during transfer to the drying oven. Each Millipore filter used shall be dried at 90°C (194°F) for a minimum of 15 minutes and then cooled for a minimum of 15 minutes. A minimum of one control filter shall be run for each set of samples. Test results shall be reported in milligrams per cubic foot of material.

4.6.16 Steam autoclave exposure test. Testing shall be conducted in accordance with ASTM D1564-71 steam autoclave test, condition B, for types I, II, III, IV, and V materials. Types I, II, and III shall be tested for 5 hours at 121.1°C +/-2.8°C (250° +/-5°F), and types IV and V shall be tested for 10 hours at 121.1°C +/-2.8°C (250° +/-5°F). Tension tests as specified in 4.7.4 shall be conducted on five control specimens and five exposed specimens. Prior to testing, exposed specimens shall be post-dried for 30 minutes at 71.1°C (160°F) and then cooled at room temperature for 30 minutes. For all but production testing the results for tensile, stress, and elongation shall be reported before and after exposure, and the average percent change in tensile strength calculated. For production, the average values for tensile strength and elongation before and after exposure shall be reported as well as the percent change in tensile strength.

4.6.17 Fluid immersion tests. Fluid exposure tests shall be conducted on the baffle material under the following conditions:

a. Grade JP-5 turbine fuel conforming to MIL-T-5624 for 4 weeks at 93.3° +/-2.8°C (200° +/-5°F)

b. Grade JP-4 turbine fuel conforming to MIL-T-5624 for 24 weeks at 71.1° +/-2.8°C (160° +/-5°F).

c. Hydraulic fluid conforming to MIL-H-5606 for 4 weeks at 71.1°C +/-2.8°C (160°F +/-5°F)

d. Lubricating oil conforming to MIL-L-7808 for 4 weeks at 71.1°C +/-2.8°C (160°F +/-5°F)

e. Grade 1100 lubricating oil conforming to MIL-L-22851 for 4 weeks at 71.1°C +/-2.8°C (160°F +/-5°F)

f. Grade JP-4 turbine fuel conforming to MIL-T-5624 for 4 weeks at 23.9°C (75°F) (type IV and V foam only).

4.6.17.1 Tests in accordance with 4.6.17.a through e shall be conducted in loosely capped jars using approximately 900 +/- 25ml of fluid for each six specimens (types I, II, III foams) and for each nine specimens (types IV, V foam) for each sampling frequency. Specimens shall be taken from the upper half of the test section as specified in 4.6.5. The testing frequency for each condition shall be every 4 weeks. The grade JP-4 and JP-5 turbine fuels shall include three specimens tension-tested as specified in 4.6.5, three specimens tested in accordance with the steam autoclave exposure test as specified in 4.6.16. and in the case of the types IV and V foams three additional specimens shall be tension-tested while fuel wetted in accordance with 4.6.5. Prior to dry tension and steam autoclave testing, the specimens shall be rinsed in petroleum ether, dried for 30 minutes at 71.1°C (160°F), and cooled at room temperature. Wet tension tests shall be run immediately after removal from the test fluid. All values for original, final (dry and wet), and percent change of tension properties shall be reported.

4.6.17.2 Fuel (JP-4) immersion tests in accordance with 4.6.17.f shall be accomplished in containers sufficient to provide complete immersion for all tension, CLD, and tear specimens. Following the 4-weeks exposure at 23.9°C (75°F) (room temperature), three each specimens shall be immediately tested for wet tension properties in accordance with 4.6.5, wet compression load deflection properties in accordance with 4.6.8 and wet tear resistance properties in accordance with 4.6.6. All values and averages shall be reported and the percent change from the original dry test properties shall be calculated.

4.6.18 Hydrolytic stability tests. The following tests shall be conducted to characterize the hydrolytic stability of the baffle material:

4.6.18.1 The baffle material shall be exposed to 93.3° +/-2.8°C (200°F +/-5°F) and 95 +/- 5 percent relative humidity until failure. Types I, II, and III baffle material shall be exposed for 8 days (or failure) and testing

frequency shall be at 2, 4, 5, 6, 7, and 8 days; and thereafter, 1 day intervals. Types IV and V baffle material shall be exposed for 24 weeks (or failure) and testing frequency shall be at 1, 2, 3, 4, 5, 6, and 8 weeks; and thereafter, 2 week intervals. Tests shall be conducted in loosely capped glass jars using 50 mls of distilled water for each 900 mls of container volume and nine (maximum) tension specimens for each sampling jar. Specimens shall be supported above the water and the water level maintained throughout the test. A minimum of two specimens for each exposure time shall be tension tested.

4.6.18.2 The baffle material shall be exposed to 71.1°C +/-2.8°C (160°F +/-5°F) and 95 +/-5 percent relative humidity. Types I, II, and III baffle material shall be exposed for 6 weeks (or failure) and testing frequency shall be 2, 3, 4, 5, and 6 weeks, and thereafter, 1 week intervals until failure. Types IV and V baffle material shall be exposed for 24 weeks (or failure) and testing frequency shall be at 4 week intervals. Tests shall be conducted in either a humidity cabinet or loosely capped jars with 50 mls of distilled water for each 900 mls of container volume. Three tension specimens shall be tested for each sampling frequency.

4.6.18.3 The baffle material shall be immersed in pure distilled water at 71.1°C +/-2.8°C (160° +/-5°F). Types I, II, and III baffle material shall be immersed for 6 weeks (or failure) and testing frequency shall be at 2 week intervals until failure. Types IV and V baffle material shall be immersed for 24 weeks (or failure) and testing frequency shall be a 4 week intervals until failure. Three specimens shall be tested for each sampling frequency. Testing shall be conducted in loosely capped jars using 900 +/- 25 mls of water for each nine tension specimens.

4.6.18.4 The baffle material shall be exposed to dry heat at 121.1°C +/-2.8°C (250° +/-5°F). Baffle material shall be exposed for 8 weeks and testing frequency shall be at 2 week intervals. A minimum of two tension specimens shall be tested for each sampling frequency.

4.6.18.5 All tension test values and averages as specified in 4.6.5 shall be reported. The percent loss in tensile strength for types I, II, and III material for tests specified in 4.6.18.2, 4.6.18.3 and 4.6.18.4 shall be calculated after 4 weeks exposure and for the test specified in 4.6.18.1 after 4 days exposure. For types IV and V material the percent loss in tensile strength for tests specified in 4.6.18.2 and 4.6.18.3 shall be calculated after 24 weeks, and for 4.6.18.2 test after 4 weeks exposure, and for 4.6.18.1 test after 6 weeks exposure. Prior to testing, all exposed specimens shall be dried for 30 minutes at 71.1°C (160°F) and then cooled at room temperature.

4.6.19 Flame arrestor tests. The flame arrestor characteristics of the baffle materiai shall be defined using a small scale flame tube type apparatus having a minimum total volume of 5 cubic feet and a 100 square inch cross sectional area. The following parameters shall be satisfied in all the testing:

a. Stoichiometric propane/air mixture (4.5 to 5.2 volume percent propane) verified by bomb sampling.

b. Spark ignition source having a minimum of 0.25 millijoules energy

c. Dry arrestor material

d. Minimum instrumentation shall include: pressure rise, combustion temperature indication, and visual, photographic, or photocell indication of flame penetration downstream of arrestor.

e. Combustion relief area shall be 80 percent of cross-sectional area or greater. The material used for the testing shall be taken from a given bun which has been sufficiently tested to establish its air pressure drop (porosity) characteristics. The material shall always be oriented in the test apparatus to permit flame penetration in the

direction of porosity testing (direction of rise or bun height).

If possible, baffle material used shall be in the lower half of the air pressure drop range. For example type I: 0.190 to 0.235; type II: 0.140 to 0.185; type III: 0.250 to 0.290; type IV: 0.140 to 0.185; type V: 0.250 to 0.290 inch of water.

4.6.19.1 The material shall always be slightly oversized, 2 percent maximum when installed and restraints used to avoid arrestor movement during testing. The combustible mixture on each test shall be verified by bomb sampling and shall meet the following minimum criteria for pressure rise:

$P_{(min)} = (8xP_0)\ 0.7$ where P_0 = initial pressure of system in psia. The following definition shall apply (see figure 3):

V_c = combustion (ignition) volume

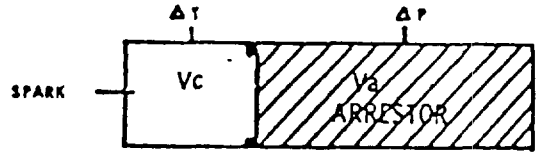
V_a = arrestor volume

V_v = void volume downstream of arrestor

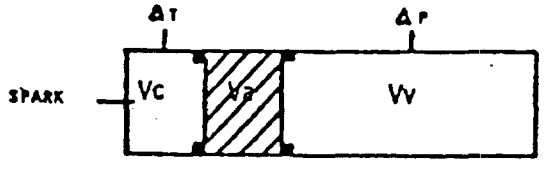
V_r = relief volume = $V_a + V_v$

V_t = total volume of apparatus = $V_c + V_r$

T_m = minimum arrestor thickness required to prevent flame propagation from V_c to V_v.



(a) TYPICAL SET-UP FOR SINGLE VOID IGNITIONS



(b) TYPICAL SET-UP FOR ARRESTOR THICKNESS TESTS

FIGURE 3. Flame arrestor apparatus

4.6.19.2 The following testing shall be conducted and all data results shall be reported for each test condition (see figure 3 for typical flame arrestor apparatus):

4.6.19.2.1 Single void ignitions shall be conducted at 3 psig (17.6 psia) initial pressure with percent combustion volumes (percent Vc) of:

a. Types I, II, and IV: 5, 10, 15, 20, 30, 40, and 50 volume percent

b. Types III and V: 10, 20, 30, 35, 40, 50, and 60 volume percent

A minimum of one test shall be conducted for a given condition and all data such as bomb and system pressure rise, test temperature, extent and location of arrestor damage, and any other related information shall be submitted to the qualifying activity. A plot of pressure rise versus (percent) combustion volume shall be submitted for each initial pressure condition. Repeat test may be conducted on the material provided the damaged (burned) arrestor is replace after each test. All tests shall be conducted at standard temperatures and conditions.

4.6.19.2.2 The amount of arrestor (thickness) required to prevent flame propagation from V_c to V_v when the combustion volume (V_c) is set at 9.1 and 16.7 volume percent and 0 and 3 psig initial pressures shall be determined. Testing shall be conducted at 1 inch thick intervals and at the minimum required arrestor thickness (T_m), a minimum of two tests shall be conducted. Repeat tests may be run only if material is undamaged. All data including system and bomb pressure rise, test temperatures, extent and location of arrestor damage, and any other related information shall be reported. The ratio of arrestor volume to combustion volume or V_a/V_c shall be calculated for each minimum arrestor thickness (T_m).

4.6.20 Corrosion and adhesion test. One 4 by 3 by 3 inch baffle material specimen cut such that the 4 inch dimension is in the direction of material rise shall be exposed in contact with 7075 aluminum alloy in accordance with specification QQ-A-250/12 for 14 days at 23.9°C +/-2.8°C (75°F +/- 5°F) (room temperature) and 95 +/-5 percent relative humidity.

4.6.20.1 Two sets of metallic plates shall be used having a surface finish of 5-15 micro-inch finish obtained by lapping. The roughness shall be determined by a profilometer or equivalent instrument. The roughness reading is the arithmetical average (AA) of the deviations in the surface expressed in micro-inches measured normal to the surface. For these tests the surface finish should be as follows:

5-15 micro-inch measure perpendicular to the lay at a roughness-width cutoff rating of 0.030 inch and a maximum roughness-width rating of 0.015 inch. One set shall be clamped together with the baffle material specimen such that the baffle material is compressed from 4 to 3 inches in thickness in contact with the polished surfaces. This set along with the extra plates (controls) shall then be exposed for 14 days at room temperature and 95 +/- 5 percent relative humidity in a sealed container or humidity cabinet. Test specimens should be oriented such that the metal plates are vertical in order to minimize moisture condensation and pooling on the plate surfaces. At the termination of the test, there shall be no adhesion of the baffle material to the metal plates nor shall there be any evidence of pitting, erosion, corrosion, or bad discoloration as a result of the material contact, as determined by the following procedures. The basis for the comparison shall be the exposed set of control plates.

a. The surfaces of the plates which were in contact with the material shall be inspected for such things as discoloration, deposits, and pitting. If any of these conditions exists, the surface of the plates shall be washed in precipitation naphtha. Deposits determined as urethane materials or elements there from which can be removed by this process shall be construed as adhesion.

b. If any other marks remain on the surface of the plates after being washed in precipitation naphtha as specified in 4.6.20(a), the surfaces shall be lightly polished with a nonabrasive cloth buff. Any pits or eroded marks remaining after this process shall be construed to be corrosion. Discoloration or staining (marks which do not physically affect the surface of the plates and which easily wash of buff off) shall not be considered detrimental.

4.6.21 Sunshine test. The baffle material shall be tested for up to 100 hours exposure to the accelerated weathering produced by a carbon arc lamp in accordance with ASTM G23-75. Five samples (slabs) of material, approximately 8 by 2 by 2 inches thick, shall be cut from the upper one-third of the test section and adjacent to or near the qualification test specimens as specified in 4.6.5. These five samples shall be exposed for test periods of 20, 40, 80, and 100 hours of continuous spectral radiation. Sample slabs shall be positioned such that the radiation source is directed at the top surface. At the end of each test period, a sample shall be cut into four 1/2-inch thick slabs, identified, and each slab subjected to the tension tests specified in 4.6.5 using as many dumbell specimens as a sample slab will provide. All values shall be reported, and the percent loss in tensile strength for a given exposure time and depth shall be calculated. In addition, the extent and depth of visible discoloration to each sample slab shall be reported. Test specimens and any unused exposed material shall be forwarded to the qualifying activity for examination. All details relating to the test condition and equipment used shall be provided including model numbers, type of carbon arc sources, filters, distance of sample slabs from the light source, sample (drum) rotation speed, test temperature, and humidity.

4.6.22 Infrared spectrum analysis test. The baffle material shall be characterized (identified) by an infrared spectrometer using a frustrated multiple internal reflectance (FMIR) technique. The spectrum shall be of such detail as to clearly distinguish it from a standard polyether foam. A reference polyether spectrum shall be included for comparison. The following criteria shall be satisfied where applicable:

a. Baseline of the spectrum determined at 5 microns wavelength shall be a minimum of 95 percent transmittance.

b. Scan speed shall be such as to obtain optimum resolution.

c. a 45° KRS-5 prism, Perkin-Elmer Corporation part number 186-1595, or equivalent and FMIR attachment, Perkin-Elmer Corporation part number 186-0174, or equivalent shall be used to maintain the specimen for analysis. All equipment used as well as details of test procedure and instrument settings such as scan speed, slot opening shall be identified for future reference.

4.7 Inspection of preparation for delivery. Inspection of the preservation, packaging, packing, and marking for shipment shall be in accordance with the requirements of Section 5.

5. PACKAGING

5.1 Preservation and Packaging. The baffle material (buns) shall be preserved and packaged in accordance with MIL-P-116, method III.

5.1.1 Buns. The finished types I, II, and III material (buns) shall be enclosed and sealed in a 4-mil polyethylene (plastic) wrap. The finished types IV and V material (buns) shall be enclosed and sealed in a 4 mil black polyethylene (plastic) wrap. Both the polyethylene and the black polyethylene shall conform to L-P-378, type I, class 1, grade B. If tape sealing is used, it shall be Permacel masking tape number 785, or equivalent.

5.2 Packing. Packing shall be level A, B, or C as specified (see 6.2).

5.2.1 Level A. Buns preserved and packaged as specified in 5.1, shall be packed in quantities of one, two, or three each (or equivalent volume) in a weather-resistant exterior container selected from and in accordance with MIL-STD-794.

5.2.2 Level B. Buns preserved and packaged as specified in 5.1, shall be packed as specified in 5.2.1 except containers shall be of the domestic types. If containers conforming to PPP-B-636 are used, the total size limitation specified may be waived.

5.2.3 Level C. Buns preserved and packaged as specified in 5.1, shall be packed in quantities of one, two, or three each (or equivalent volume) in a manner to insure acceptance by common carrier and afford protection against physical and mechanical damage during shipment from the supply source to the first receiving activity for immediate use. Minimum overwrap for each unit package quantity shall be Kraft paper conforming to UU-P-268 or equivalent, or equivalent opaque material to preclude exposure to sunlight. This level shall comply with uniform freight classification rules and regulations or other carrier regulations as applicable to the mode of transportation.

5.3 Marking. Marking shall be in accordance with MIL-STD-129. The nomenclature shall be as follows:

BAFFLE MATERIAL, AIRCRAFT FUEL TANK

5.3.1 Additional marking. In addition to the nomenclature, each unit package or container shall contain the following information:

Specification No.

Type of Baffle Material

Manufacturer's Part No.

Date of Manufacture

6. NOTES

6.1 Intended use. The baffle material covered by this specification is intended for use in aircraft fuel tanks using gasoline or kerosene type fuels at temperatures from -48.3° to +71.1°C (-55° to +160°F) for explosion and fire suppression. Types IV and V baffle material may be used in dry bay areas (cavities) up to 71.1°C (160°F) (vapor). Temperatures greater than 71.1°C (160°F) and high humidity conditions will shorten the service life. Use of types I, II, and III baffle material in dry bay areas is not recommended.

6.1.1 Storage life. The storage life of the baffle material covered by this specification is not limited, provided it is maintained in the original sealed polyethylene bag plus opaque overwrap at temperatures below 32.2°C (90°F). Storage should be in an area out of direct sunlight and outside weather, including high humidity and temperature. The material should be inspected for evidence of discoloration or surface deterioration (loss in tensile properties) prior to use.

6.1.2 Electrostatic compatibility. The user is cautioned that due to their low electrical conductivity properties, the baffle materials covered by this specification can generate static electricity during certain aircraft fuel system operations. Electrostatic discharges can be generated when fuel or a fuel/air mixture (mist) is directly impinged upon the foam. This charging mechanism is more conducive when the fuel has a low electrical conductivity

property. Special consideration should be given when designing the foam kit to ensure that direct impingement of fuel or fuel/air mixture is eliminated. Electrostatic compatibility of the foam kit design should be verified through tests using a turbine fuel with low electrical conductivity properties.

6.2 Ordering data. Procurement documents should specify the following:

a. Title, number, and date of this specification

b. Type baffle material required (see 1.2) and size (see 3.8)

c. Location and conditions for testing (see 4.4)

d. Level of packing required (see 5.2)

6.3 Definitions. For the purpose of this specification, the following definitions shall apply:

6.3.1 Run of material. Any continuous batch of product or a machine run produced over any continuous time period, the maximum run time being a 12-hour period. When production is interrupted for 2 or more hours, this will constitute a new run.

6.3.2 Lot. Fifteen machine runs of product.

6.3.3 Test section width. The standard width direction on a bun (40 or 44 inches).

6.3.4 Direction of rise. The height direction relative to the standard bun (the 8 - or 12-inch direction).

6.3.5 Machine direction. The lengthwise direction during production or the longest dimension relative to the standard bun size.

6.4 Products requiring qualification. With respect to products requiring qualification, awards will be made only for products which are at the time set for opening of bids, qualified for inclusion in the applicable Qualified Products List whether or not such products have actually been so listed by that date. The attention of the suppliers is called to this requirement, and manufacturers are urged to arrange to have the products that they propose to offer to the Federal Government tested for qualification in order that they may be eligible to be awarded contracts or orders for the products covered by this specification. The activity responsible for Qualified Products List is the Aeronautical Systems Division, Deputy for Engineering, Attn: ASD/ENFEF, Wright-Patterson Air Force Base, OH 45433 and information pertaining to qualification of products may be obtained from that activity.

6.4.1 The qualification tests contained in the specification are considered adequate to insure that the baffle material procured under this specification is satisfactory for the intended purpose provided the material are similar to polyurethane reticulated foam. The qualifying activity may specify additional testing for materials submitted for qualification approval with chemical and mechanical properties not anticipated in the preparation of this specification. These tests may include, but not necessarily be limited to, the following: ballistic response (gunfire) fuel flow and pumpdown, venting, icing, fuel system compatibility, and electrical conductivity properties.

6.5 Air deionizer. An available source for the model 2U500 air deionizer specified in 4.6.15 is the Nuclear Products Company, 2519 N. Merced Avenue, South El Monte, CA 91733.

6.6 Marginal indicia. Asterisks are not used in this revision to identify changes with respect to the previous issue, due to the extensiveness of the changes.

Custodian:
Air Force - 11

Review Activity:
Army - AV, MR
Air Force - 99

Preparing activity:
Air Force - 11

Project 9330-B086