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400 Commonwealth Drive, Warrendale, PA 15096-0001

AEROSPACE MATERIAL SPECIFICATION

SAE AMS 3570E

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Superseding AMS 3570D

Foam, Flexible Polyurethane Open Cell, Medium Flexibility

1. SCOPE:

1.1 Form:

This specification covers two types of an open-cell, medium-flexibility polyurethane foam in the form of sheet, strip, and shapes.

1.2 Application:

These products have been used typically for general interior padding, cushioning, and vibration insulation, but usage is not limited to such applications.

1.3 Classification:

Foam furnished to this specification shall be classified as follows:

Type 1 - Polyurethane Foam - Ester
Type 2 - Polyurethane Foam - Ether

1.3.1 Type 2 shall be supplied unless Type 1 is ordered.

1.4 Safety - Hazardous Materials:

While the materials, methods, applications, and processes described or referenced in this specification may involve the use of hazardous materials, this specification does not address the hazards which may be involved in such use. It is the sole responsibility of the user to ensure familiarity with the safe and proper use of any hazardous materials and to take necessary precautionary measures to ensure the health and safety of all personnel involved.

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2. APPLICABLE DOCUMENTS:

The following publications form a part of this specification to the extent specified herein. The applicable issue of referenced publications shall be the issue in effect on the date of the purchase order.

2.1 ASTM Publications:

Available from ASTM, 1916 Race Street, Philadelphia, PA 19103-1187.

ASTM D 3574 Testing Flexible Cellular Materials - Slab, Bonded, and Molded Urethane Foams

2.2 U.S. Government Publications:

Available from DODSSP, Subscription Services Desk, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094, except as specified in 2.2.1.

MIL-STD-2073-1 DOD Materiel, Procedures for Development and Application of Packaging Requirements

2.2.1 Federal Aviation Administration Regulations: Available from Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

FAR Part 25.853 Airworthiness Standards: Transport Category Airplanes, Compartment Interiors

3. TECHNICAL REQUIREMENTS:

3.1 Material:

Shall be a flexible polyurethane foam free from contamination and from foreign and scrap materials.

3.1.1 Finish: All surfaces of sheet and strip shall have a cut finish.

3.1.2 Color: Shall be natural.

3.1.3 Non-Toxicity: Foam shall be non-toxic and shall not cause any harmful effects when in prolonged contact with human skin.

3.2 Properties:

Foam shall conform to the requirements shown in Table 1, 3.2.8, and 3.2.9; tests shall be performed in accordance with specified test methods on the foam supplied, insofar as practicable.

TABLE 1 - Properties

Paragraph	Property	Requirement	Test Method
3.2.1	Density		ASTM D 3574, Test A
3.2.1.1	Type 1	1.9 to 2.5 pounds/cubic foot (30.5 to 40.0 kg/m^3)	
3.2.1.2	Type 2	2.1 to 2.9 pounds/cubic foot (33.5 to 46.5 kg/m^3)	
3.2.2	Indentation Force Deflection Test - Specified Deflection 25% Compression		ASTM D 3574, Test B$_1$
3.2.2.1	Type 1	45 to 75 pounds/50 square inches (6.2 to 10.3 kPa/320 cm^2)	
3.2.2.2	Type 2	50 to 80 pounds/50 square inches (6.9 to 11.0 kPa/320 cm^2)	
3.2.3	Resiliency, Type 1 or 2, time for recovery to 95% original thickness, maximum	5 seconds	4.5.1
3.2.4	Flammability, Type 1 or 2, burn rate maximum (See 8.2)	Pass	FAR 25.853, (b-2), Appendix F, (e)
3.2.5	Compression Set:		ASTM D 3574, Test D; compress specimen to 75% of original thickness
3.2.5.1	Percent of Original Thickness, Type 1 or 2, maximum	20%	
3.2.6	Hydrolytic Stability:		
3.2.6.1	Change in Load Deflection for 25% Compression, maximum		
3.2.6.1.1	Type 1	50%	ASTM D 3574, Test J$_1$
3.2.6.1.2	Type 2	40%	ASTM D 3574, Test J$_2$
3.2.6.2	Compression Set, maximum		ASTM D 3574, Test D

TABLE 1 - Properties (Continued)

Paragraph	Property	Requirement	Test Method
3.2.6.2.1	Type 1	30%	
3.2.6.2.2	Type 2	25%	
3.2.6.3	Evidence of Surface Deterioration	No tackiness, exudation, or cracking	
3.2.7	Low-Temperature Compression Set:		4.5.2
3.2.7.1	Percent of Original Thickness, maximum		
3.2.7.1.1	Type 1	30%	
3.2.7.1.2	Type 2	25%	

3.2.8 Weather Resistance: When specified, foam shall have weather resistance acceptable to purchaser, determined by a procedure agreed upon by purchaser and vendor.

3.2.9 Corrosion: Foam shall not have a corrosive effect on other materials when exposed to conditions normally encountered in service. Discoloration of contacting metal shall not be considered objectionable. Method of test and standards for acceptance shall be as agreed upon by purchaser and vendor.

3.3 Quality:

Foam, as received by purchaser, shall be uniform in quality and condition, homogeneous, and free from foreign materials and from imperfections detrimental to usage of the foam.

3.3.1 Voids: The foam shall contain no surface voids larger in diameter than the sheet thickness or 1/2 inch (12.7 mm), whichever is smaller.

3.4 Tolerances:

Thickness of sheet and strip shall not vary from the nominal by more than ±1/16 inch (±1.6 mm).

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection:

The manufacturer of foam shall supply all samples for required tests and shall be responsible for performing all required tests. Purchaser reserves the right to sample and to perform any confirmatory testing deemed necessary to ensure that the foam conforms to the requirements of this specification.

4.2 Classification of Tests:

4.2.1 Acceptance Tests: Tests for requirements shown in Table 2 are acceptance tests and shall be performed on each lot.

TABLE 2 - Acceptance Tests

Requirement	Paragraph Reference Type 1	Paragraph Reference Type 2
Density	3.2.1.1	3.2.1.2
Indentation Force Deflection	3.2.2.1	3.2.2.2
Resiliency	3.2.3	3.2.3
Flammability	3.2.4	3.2.4
Tolerances	3.4	3.4

4.2.2 Preproduction Tests: Tests for all technical requirements are preproduction tests and shall be performed prior to or on the initial shipment of foam to a purchaser, when a change in ingredients and/or processing requires reapproval as in 4.4.2, and when purchaser deems confirmatory testing to be required.

4.2.2.1 For direct U.S. Military procurement, substantiating test data and, when requested, preproduction test material shall be submitted to the cognizant agency as directed by the procuring activity, contracting officer, or request for procurement.

4.3 Sampling and Testing:

Shall be as follows:

4.3.1 For Acceptance Tests: Sufficient foam shall be taken at random from each lot to perform all required tests. The number of determinations for each requirement shall be as specified in the applicable test procedure or, if not specified therein, not less than three.

4.3.1.1 A lot shall be all foam of the same thickness and density produced in a single production run from the same batches of raw materials and presented for manufacturer's inspection at one time. A lot shall not exceed 200 pounds (91 kg) or 2000 board feet (4.7 m^3) of foam.

4.3.1.2 When a statistical sampling plan has been agreed upon by purchaser and vendor, sampling shall be in accordance with such plan in lieu of sampling as in 4.3.1 and the report of 4.6 shall state that such plan was used.

4.3.2 For Preproduction Tests: Shall be as agreed upon by purchaser and vendor.

4.4 Approval:

4.4.1 Sample foam shall be approved by purchaser before foam for production use is supplied, unless such approval be waived by purchaser. Results of tests on production foam shall be essentially equivalent to those on the approved sample.

4.4.2 Manufacturer shall use ingredients, manufacturing procedures, processes, and methods of inspection on production foam which are essentially the same as those used on the approved sample. If necessary to make any change in ingredients, in type of equipment for processing, or in manufacturing procedures, manufacturer shall submit for reapproval a statement of the proposed changes in ingredients and/or processing and, when requested, sample foam. Production foam made by the revised procedure shall not be shipped prior to receipt of reapproval.

4.5 Test Methods:

4.5.1 Resiliency: Specimens having top and bottom surface dimensions greater than the thickness shall be compressed to 25% of original thickness, held in the compressed state for 1 minute ± 0.1, and the load removed. The time to recover to 95% of original thickness shall be measured.

4.5.2 Low-Temperature Compression Set: Dry specimens for not less than 16 hours in a desiccator before testing. Place specimens in a cold chamber which is at -40 °C ± 1 (-40 °F ± 2) for 5 hours ± 0.1. At the end of this period and while still in the cold chamber, compress specimens in accordance with ASTM D 3574, Test D, to 75% of original thickness, maintain this compression for 1 minute ± 0.1, release the load, and, after 1 minute ± 0.1 recovery time, measure the thickness of specimens. Calculate the compression set as a percentage of the original thickness.

4.6 Reports:

The supplier of foam shall furnish with each shipment a report showing the results of tests to determine conformance to the acceptance test requirements and stating that the foam conforms to the other technical requirements. This report shall include the purchase order number, lot number, AMS 3570E, manufacturer's compound number, and quantity.

4.7 Resampling and Retesting:

If any specimen used in the above tests fails to meet the specified requirements, disposition of the foam may be based on the results of testing three additional specimens for each original nonconforming specimen. Failure of any retest specimen to meet the specified requirements shall be cause for rejection of the foam represented. Results of all tests shall be reported.