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INTERNATIONAL
400 Commonwealth Drive, Warrendale, PA 15096-0001

AEROSPACE MATERIAL SPECIFICATION

SAE AMS 3255

Issued DEC 1995
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Sealing Tape, Polytetrafluoroethylene, Expanded (EPTFE) Oil and Water Resistant

1. SCOPE:

1.1 Form:

This specification establishes the requirements for an expanded polytetrafluoroethylene (EPTFE) in the form of sealing tape requiring no curing.

1.2 Application:

This tape has been used typically for sealing aircraft access panels, pressure barriers, and mold line surface close-out panels where gaskets are required, but usage is not limited to such applications. The tape is resistant to aircraft fuels, fluids and lubricants, and is capable of withstanding long-term exposure from -65 to +450 °F (-54 to +232 °C) with short term exposures up to 600 °F (315 °C).

1.3 Classification:

Sealing tape is classified as follows:

Class 1: Continuous, ribbed
Class 2: Continuous, nonribbed
Class 3: Continuous, nonribbed moldable

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 latest issue of SAE publications shall apply. The applicable issue of other publications shall be the issue in effect on the date of the purchase order.

2.1 SAE Publications:

Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

AMS 2629	Fluid, Jet Reference
AMS 3020	Oil, Reference, for 'L' Stock Rubber Testing
AMS 3021	Fluid, Reference, for Testing Di-Ester (Polyol) Resistant Material
AMS 4045	Aluminum Alloy Sheet and Plate, 5.6Zn 2.5Mg 1.6Cu 0.23Cr (7075-T6 Sheet, 7075-T651 Plate), Solution and Precipitation Heat Treated

2.2 ASTM Publications:

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

ASTM D 792	Specific Gravity (Relative Density) and Density of Plastics by Displacement
ASTM F 152	Tension Testing of Nonmetallic Gasket Materials

2.3 U.S. Government Publications:

Available from DODSSP, Subscription Services Desk, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.

MIL-A-8243	Anti-Icing and Deicing-Defrosting Fluids
MIL-C-5541	Chemical Conversion Coating on Aluminum Alloys
MIL-C-27725	Coating, Corrosion Preventive for Aircraft Integral Fuel Tanks
MIL-H-83282	Hydraulic Fluid, Fire Resistant, Synthetic Hydrocarbon Base, Aircraft, Metric, Nato Code Number H-537
MIL-L-23699	Lubricating Oil, Aircraft Turbine Engine, Synthetic Base
MIL-P-19834	Plates, Identification, Metal Foil, Adhesive Backed
MIL-STD-2073-1	DOD Materiel, Procedures for Development and Application of Packaging Requirements

3. TECHNICAL REQUIREMENTS:

3.1 Material:

Sealing tape shall be fabricated from virgin expanded polytetrafluoroethylene. The tape shall contain no additives that will alter or detract from the properties of the polytetrafluoroethylene. Mechanical modification of the polytetrafluoroethylene used to improve physical and mechanical properties is permissible. The tape shall be applied in accordance with MIL-P-19834 using a double-sided adhesive tape.

3.2 Color:

Shall be gray or white and may exhibit varied color within the product.

3.3 Properties:

The sealing tape shall conform to the requirements shown in Table 1, determined in accordance with specified test methods.

TABLE 1 - Properties

Property	Requirement	Test Method
Density Range	0.4 to 0.9 gram/cc	ASTM D 792/4.5.3
Corrosion Resistance	No evidence of corrosion or deterioration of sealing tape	4.5.4
Tensile Strength		4.5.5
Bulk, min	1000 psi (6.9 MPa)	
Matrix, min	3000 psi (20.7 MPa)	
Fluid Stability/Tensile Strength, min	3000 psi (20.7 MPa)	4.5.6
Low Temperature Flexibility	No evidence of cracking or loss of adhesion	4.5.7
Material Storage	Unlimited - No change of properties	3.4.1
Material with Adhesive, Storage	No loss of adhesive properties for two years	3.4.1

3.4 Quality:

The sealing tape, as received by purchaser, shall visually appear smooth and uniform. The surface shall have no irregularities, such as wrinkles, creases, cracks, or gouges, visible to the naked eye and shall be free from imperfections detrimental to usage of the tape.

3.4.1 Storage: Sealing tape, stored in protective wrapping and at ambient temperature shall meet the requirements in accordance with Table 1.

3.5 Sizes and Tolerances:

3.5.1 Profile: Class 1 Continuous Ribbed Sealing Tape: Shall conform to Figure 1 and shall be supplied in the sizes and to the tolerances shown in Table 2.

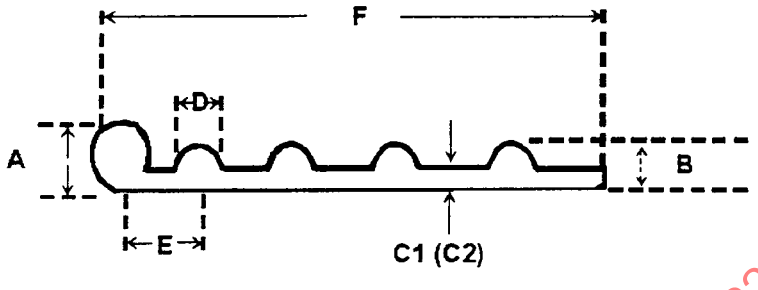


FIGURE 1 - Continuous Ribbed Sealing Tape

TABLE 2 - Continuous Ribbed Sealing Tape, Sizes and Tolerances

Feature	Dimension in Inches	Dimensions in Millimeters
A	0.099 ± 0.008	2.51 ± 0.20
B	0.047 ± 0.008	1.19 ± 0.20
C1	0.020 ± 0.002	0.51 ± 0.05
C2	0.012 ± 0.002	0.30 ± 0.05
D	0.080 ± 0.004	2.03 ± 0.10
E	0.250 ± 0.010 (4 places)	6.35 ± 0.25 (4 places)
F(1)	As specified by purchaser	

NOTE: (1) Standard width 1.10 or 1.62 inch ± 0.040 (27.9 or 41.1 mm ± 1.0)

3.5.2 Class 2 Continuous Non-Ribbed Sealing Tape: Shall conform to Figure 2 and shall be supplied in the standard sizes and to the tolerances shown in Table 3.

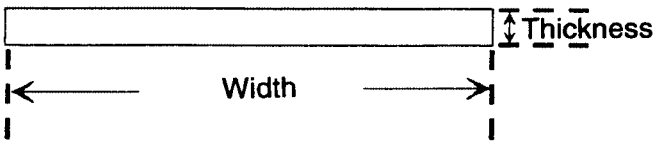


FIGURE 2 - Continuous Non-Ribbed Sealing Tape

TABLE 3 - Continuous Ribbed Sealing Tape, Sizes and Tolerances

Thickness Inch	Thickness Millimeters	Width Inch	Width Millimeters
0.010 ± 0.003	0.25 ± 0.08	0.25 to 5.0 ± 0.040	6.4 to 127 ± 1.0
0.020 ± 0.003	0.51 ± 0.08	0.25 to 5.0 ± 0.040	6.4 to 127 ± 1.0
0.040 ± 0.005	1.02 ± 0.13	0.25 to 5.0 ± 0.040	6.4 to 127 ± 1.0
0.065 ± 0.005	1.65 ± 0.13	0.25 to 5.0 ± 0.040	6.4 to 127 ± 1.0
0.125 ± 0.010	3.18 ± 0.25	0.25 to 5.0 ± 0.040	6.4 to 127 ± 1.0

3.5.3 Class 3 Continuous, Non-Ribbed Moldable Sealing Tape: Shall conform to Figure 3 and shall be supplied in the standard sizes and to the tolerances shown in Table 4.

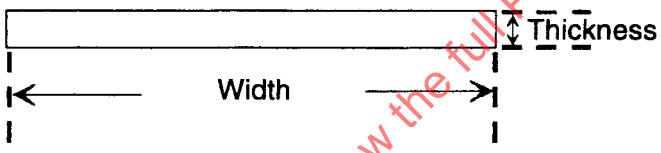


FIGURE 3 - Continuous Non-Ribbed Moldable Sealing Tape, Sizes and Tolerances

TABLE 4 - Continuous Non-Ribbed Moldable Sealing Tape, Sizes and Tolerances

Thickness Inch	Thickness Millimeters	Width Inch	Width Millimeters
0.050 ± 0.020	1.27 ± 0.51	0.150 ± 0.030	3.81 ± 0.76
0.070 ± 0.020	1.78 ± 0.51	0.250 ± 0.030	6.35 ± 0.76
0.090 ± 0.020	2.29 ± 0.51	0.320 ± 0.030	8.12 ± 0.76
0.120 ± 0.030	3.05 ± 0.76	0.460 ± 0.050	11.68 ± 1.27
0.210 ± 0.030	5.33 ± 0.76	0.590 ± 0.050	14.99 ± 1.27
0.240 ± 0.030	6.10 ± 0.76	0.720 ± 0.070	18.29 ± 1.78
0.300 ± 0.050	7.62 ± 1.27	0.810 ± 0.070	20.57 ± 1.78
0.370 ± 0.050	9.40 ± 1.27	1.030 ± 0.120	26.16 ± 3.05

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection:

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

4.1.1 Complete inspection records shall be kept and be available to the purchaser in accordance with the contract or purchase order. The records shall contain all data necessary to determine compliance with specified requirements.

4.2 Classification of Tests:

4.2.1 Acceptance Tests: Color (3.2), density (3.3), tensile strength (3.3) and quality (3.4) are acceptance tests and shall be performed on each lot.

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

4.2.3 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 sealing tape 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 sealing tape produced in a single production run from the same batches of raw materials, under the same fixed conditions, and presented for manufacturer's inspection at one time.

4.3.1.2 A statistical sampling plan, acceptable to purchaser, may be used in lieu of sampling as in 4.3.1.

4.3.2 For Preproduction Tests: Acceptable to purchaser.

4.4 Approval:

4.4.1 Sample sealing tape shall be approved by purchaser before sealing tape for production use is supplied, unless such approval be waived by purchaser. Results of tests on production sealing tape 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 tape 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 proposed changes in ingredients and/or processing, and, when requested, sample tape. Production tape made by the revised procedure shall not be shipped prior to receipt of approval.

4.5 Test Methods:

Shall be as follows:.

4.5.1 Standard Test Conditions: Standard laboratory conditions shall be 77 °F (25 °C) and 50% ± 5 relative humidity.

4.5.2 Standard Tolerances: Standard tolerances shown in Table 5 shall apply for all testing.

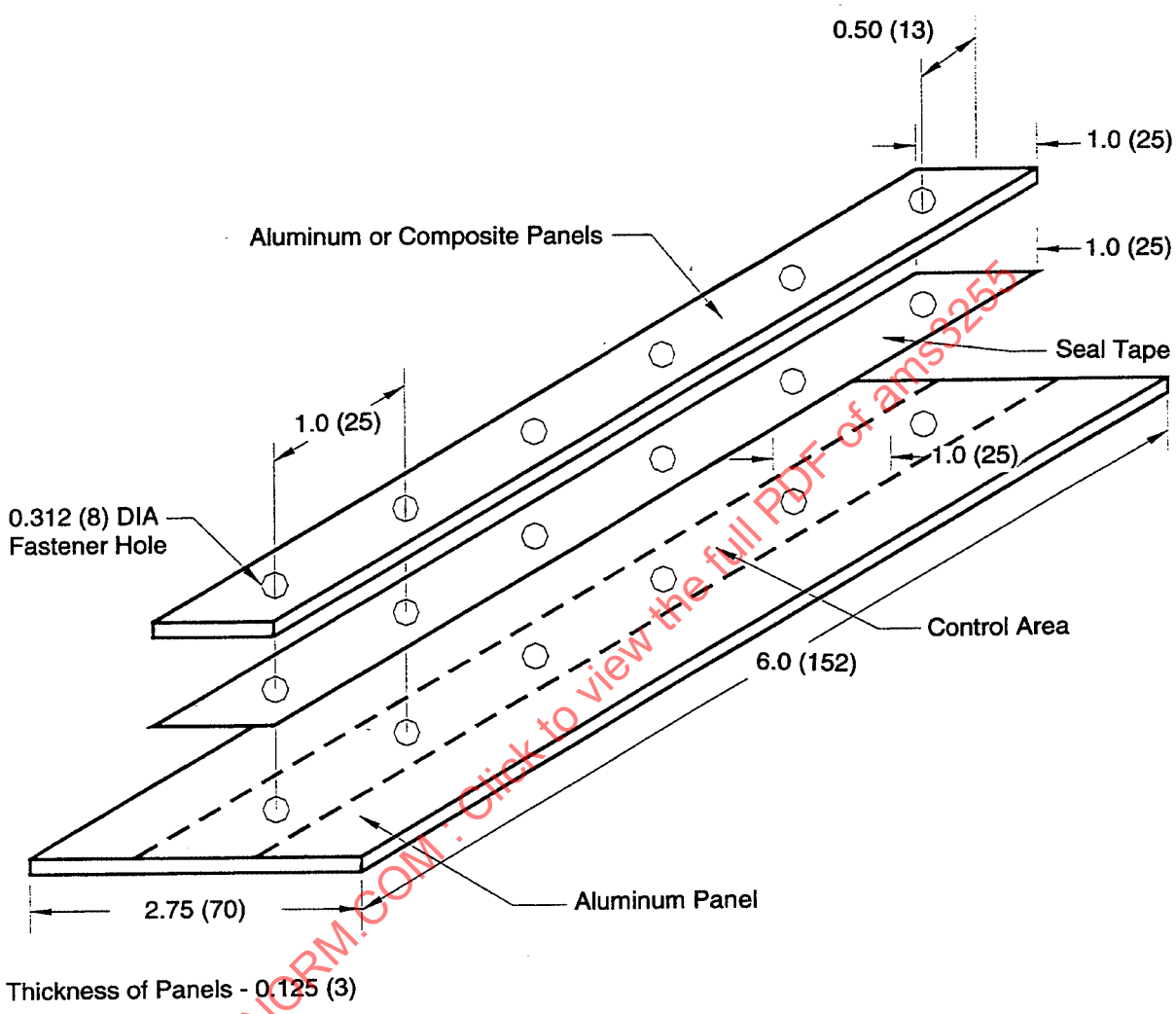
TABLE 5 - Standard Tolerances

Measurement Units	Tolerances
Temperatures	±5 °F (±3 °C)
Day	±2 hours
Hour	± 5 minutes
Minute	±10 seconds
Inches (mm)	±0.010 inch (±0.25 mm)

4.5.3 Density: Three strips of sealing tape shall be cut from a standard, as manufactured, roll of Class 1 sealing tape. Determine tape density in accordance with ASTM D 792 and report the average value for preproduction tests.

4.5.4 Corrosion Test:

4.5.4.1 Prepare ten AMS 4045 aluminum alloy panels 0.125 x 2.75 x 6.0 inches (3.2 x 70 x 152 mm), five AMS 4045 aluminum alloy panels, 0.125 x 1.0 x 6.0 inches (3.2 x 25 x 152 mm), and five carbon woven cloth/epoxy laminate panels, 0.125 x 1.0 x 6.0 inches (3.2 x 25 x 152 mm) (See Figure 4). Clean by a method which results in surfaces free from water-break.



Dimensions in inches (mm)

FIGURE 4 - Corrosion Test Specimen

4.5.4.2 A controlled area, 1.0 x 6.0 inches (25 x 152 mm), shall be masked in the center on one side of each of the large aluminum panels. The unmasked surfaces of each aluminum panel shall be treated in accordance with MIL-C-5541, Class 1A, followed by coating all aluminum and laminate panels with MIL-C-27725 corrosion preventive coating.

4.5.4.3 After coating has cured, Class 1 sealing tape shall be installed in accordance with the manufacturer's recommended procedure and as shown in Figure 4. The tape shall extend the width and length of the smaller panel and be secured in place using stainless steel fasteners; tighten to 65 inch-pounds ± 2 (7.3 N·m ± 0.2).

4.5.4.4 Immerse the test assemblies vertically in a covered glass vessel containing a two layer liquid, consisting of 3% by weight aqueous solution of sodium chloride and AMS 2629 jet reference fluid, so that two inches of the test assembly is exposed to each fluid layer and the remainder is exposed to the air/vapor mixture above the fluid.

4.5.4.5 Condition the immersed test assemblies by heating to 140 °F (60 °C), holding at temperature for 12 days, followed by 60 hours at 160 °F (71 °C) and six hours at 180 °F (82 °C).

4.5.4.6 Following fluid exposure, let panels cool to room temperature, disassemble, and examine for corrosion of the panel surfaces and deterioration of the sealing tape.

4.5.5 Tensile Strength:

4.5.5.1 Bulk Test: Ten tensile specimens shall be cut from an as-manufactured roll of Class 1 sealing tape in accordance with ASTM F 152, Method C. Tensile tests shall be conducted in accordance with ASTM F 152, Method C. Report the average value and inspect.

4.5.5.2 Matrix Strength: Ten tensile specimens shall be cut from an as-manufactured roll of Class 1 sealing tape, in accordance with ASTM F 152, Method C. Compress the specimens by applying a compressive stress of 2500 psi ± 25 (17.2 MPa ± 0.17) and hold for two minutes prior to tensile testing. Tensile tests shall be conducted in accordance with ASTM F 152, Method C. Report the average value.

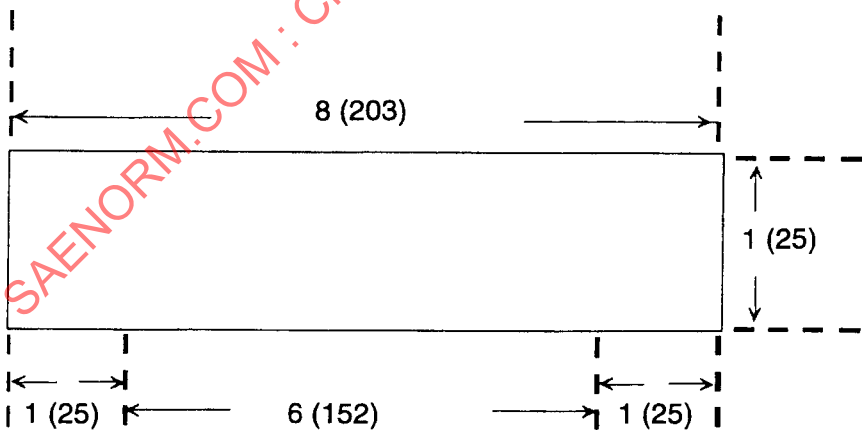
4.5.6 Fluid Stability/Tensile Strength:

4.5.6.1 Five strips of tape shall be cut from an as-manufactured roll of Class 1 sealing tape for each fluid exposure and/or condition specified in Table 6. The strips shall be long enough to cut tensile specimens in accordance with ASTM F 152, Method C.

TABLE 6 - Fluid Stability Test Parameters

Test Fluid	Temperature/Duration
AMS 2629	-65 °F (-54 °C) for 8 hours Ambient for 14 days 140 °F (60 °C) for 14 days
AMS 3020	-65 °F (-54 °C) for 8 hours 160 °F (71 °C) for 14 days
AMS 3021	-65 °F (-54 °C) for 8 hours 160 °F (71 °C) for 14 days
MIL-A-8243	-65 °F (-54 °C) for 8 hours 160 °F (71 °C) for 14 days
MIL-L-23699	-65 °F (-54 °C) for 8 hours 250 °F (121 °C) for 7 days
MIL-H-83282	-65 °F (-54 °C) for 8 hours 250 °F (121 °C) for 7 days

4.5.6.2 A compressive stress load of 2500 psi ± 25 (17.2 MPa ± 0.17) shall be applied to the strips of sealing tape and maintain two minutes.



Dimensions in inches (mm)

FIGURE 5 - Fluid Stability Test Specimen

4.5.6.3 After the sealing tape has been compressed, one surface of the tape shall be prewetted with the appropriate test fluid in accordance with Table 6 and reclamped. The clamped assemblies shall then be exposed to test conditions specified in Table 6. Assemblies exposed to test fluids shall be totally immersed in fluid during test unless otherwise stated in test method.

4.5.6.4 After removing strips from clamped assemblies, cut five tensile specimens in accordance with ASTM F 152, Method C, for each test condition in Table 6. Test the specimens within 15 minutes after removal from clamped assemblies.

4.5.6.5 When fluid immersion is specified, the specimens shall be immersed in 400 mL of fluid.

4.5.6.6 Tensile tests shall be conducted at standard test conditions on all specimens in accordance with ASTM F 152, Method C, with a jaw separation rate of 20 inches ± 1 per minutes (8.5 mm/s ± 0.4). Report the average value for each test condition.

4.5.7 Low Temperature Flexibility:

4.5.7.1 Four AMS 4045 aluminum alloy panels, 0.040 x 2.75 x 6.0 inches (1.0 x 70.0 X 152 mm) shall be cleaned to provide a surface free of water-break. Apply a strip of sealant tape 1 x 6 inches (25 x 152 mm) to the center of each panel in accordance with MIL-P-19834, using pressure sensitive adhesive.

4.5.7.2 Stabilize the panels and test jig (See Figure 6) at -65 °F ± 2 (-54 °C ±1) for two hours. While at this temperature, test the specimens by the placing the specimen in the slot in the jig with sealant tape side facing up and rapidly bending it once around the curved surface of the jig. Examine each specimen for evidence of sealant tape cracking or loss of adhesion.

4.6 Reports:

The supplier of the sealing tape shall furnish with each shipment a report from the manufacturer showing the results of tests to determine conformance to the acceptance test requirements, and stating that sealing tape conforms to other technical requirements. This report shall include the purchase order number, lot number, AMS 3255, classification, manufacturer's identification and quantity.

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