



400 Commonwealth Dr., Warrendale, PA 15096

AEROSPACE MATERIAL SPECIFICATION

Submitted for recognition as an American National Standard

AMS 3648A

Issued 7-1-57
Revised 1-1-87

Superseding AMS 3648

POLYCHLOROTRIFLUOROETHYLENE TUBING Unplasticized

This specification has been declared "CANCELLED" by the Aerospace Materials Division, SAE, as of April 14, 1986. By this action subject specification number and title will be deleted from the active specification index of Aerospace Material Specifications.

SAENORM.COM : Click to view the full PDF of AMS 3648A

This specification is under the jurisdiction of AMS Committee "C P".

SAE Technical Board Rules provide that: "This report is published by SAE to advance the state of technical and engineering sciences. The use of this report is entirely voluntary, and its applicability and suitability for any particular use, including any patent infringement arising therefrom, is the sole responsibility of the user."

AMS documents are protected under United States and international copyright laws. Reproduction of these documents by any means is strictly prohibited without the written consent of the publisher.



AEROSPACE MATERIAL SPECIFICATION

Society of Automotive Engineers, Inc.
400 COMMONWEALTH DRIVE, WARRENDALE, PA. 15096

AMS 3648A
Superseding AMS 3648

Issued 7-1-57
Revised 7-15-77

POLYCHLOROTRIFLUOROETHYLENE TUBING Unplasticized

1. SCOPE:

1.1 Form: This specification covers polychlorotrifluoroethylene in the form of thin wall tubing.

1.2 Application: Primarily for electrical and electronic applications requiring a chemically-inert tubing of the fluorocarbon family, having high dielectric strength and volume resistivity and being free from pinholes and electrical flaws, for use up to 165°C (370°F).

2. APPLICABLE DOCUMENTS: The following publications form a part of this specification to the extent specified herein. The latest issue of Aerospace Material Specifications (AMS) shall apply. The applicable issue of other documents shall be as specified in AMS 2350.

2.1 SAE Publications: Available from Society of Automotive Engineers, Inc., 400 Commonwealth Drive, Warrendale, PA 15096.

2.1.1 Aerospace Material Specifications:

AMS 2350 - Standards and Test Methods

2.2 ASTM Publications: Available from American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.

ASTM D374 - Thickness of Solid Electrical Insulation

ASTM D618 - Conditioning Plastics and Electrical Insulating Materials for Testing

ASTM D792 - Specific Gravity and Density of Plastics by Displacement

ASTM D876 - Testing Nonrigid Vinyl Chloride Polymer Tubing

ASTM D1430 - Polychlorotrifluoroethylene (PCTFE) Plastics

2.3 Government Publications: Available from Commanding Officer, Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, PA 19120.

2.3.1 Military Standards:

MIL-STD-794 - Parts and Equipment, Procedures for Packaging and Packing of

3. TECHNICAL REQUIREMENTS:

3.1 Material: Shall be manufactured from virgin, unplasticized, polymer of polychlorotrifluoroethylene.

3.2 Color: Shall be natural (unpigmented) and may vary from transparent to translucent.

SAE Technical Board rules provide that: "All technical reports, including standards, and practices recommended, are advisory only. Their use by anyone engaged in industry or trade is entirely voluntary. There is no agreement to adhere to any SAE standard or recommended practice, and no commitment to conform to or be guided by any technical report, in formulating and approving technical reports, the Board and its Committees will not investigate or consider patents which may apply to the subject matter. Prospective users of the report are responsible for protecting themselves against liability for infringement of patents."

3.3 Properties: Tubing shall conform to the following requirements; tests shall be performed on the tubing supplied and in accordance with specified test methods, insofar as practicable:

3.3.1 Tensile Strength at 23°C \pm 1 Ø (73°F \pm 2), min	4500 psi (31.0 MPa)	4.5.1
3.3.2 Elongation at 23°C \pm 1 Ø (73°F \pm 2), min	100%	4.5.1
3.3.3 Insulation Resistance at Ø 23°C \pm 1 (73°F \pm 2) and 500 V DC, min	1.0 x 10 ⁷ megohm per ft (3.05 x 10 ⁷ megohm/m)	ASTM D876
3.3.4 Penetration at 165°C \pm 1 (329°F \pm 2) (Start test at 100°C (212°F))	None	ASTM D876
3.3.5 Dielectric Strength at Ø 23°C \pm 1 (73°F \pm 2), min	As calculated from equation in 4.5.2	4.5.2
3.3.6 Heat Resistance (weight loss) at 165°C \pm 1 (329°F \pm 2), max	1.0%	ASTM D876, Method B
3.3.7 Stress Relief (shrinkage) at 165°C \pm 1 (329°F \pm 2), max	1.0%	ASTM D876
3.3.8 Specific Gravity, min	2.05	ASTM D792, Method A
3.3.9 Zero Strength Time Ø at 250°C \pm 2 (482°F \pm 4), min	100 sec	ASTM D1430

3.4 Quality: Tubing shall be uniform in quality and condition, clean, smooth, and free from foreign materials and from imperfections detrimental to fabrication, appearance, or performance of parts.

SAENORM.COM Click to view the full PDF of ams3648a

3.5 Sizes and Tolerances: Unless otherwise specified, the following sizes are standard and the following tolerances apply; measurements shall be made at 20° - 30° C (68° - 86° F) in accordance with ASTM D374, Method C:

TABLE I

Inside Diameter, Inches			Wall Thickness, Inch	
Nominal	Minimum	Maximum	Nominal	Tolerance, plus and minus
0.023	0.020	0.027	0.008	0.002
0.026	0.023	0.030	0.008	0.002
0.028	0.025	0.032	0.008	0.002
0.032	0.029	0.036	0.008	0.002
0.036	0.032	0.040	0.008	0.002
0.040	0.036	0.044	0.008	0.002
0.044	0.040	0.049	0.008	0.002
0.049	0.045	0.054	0.009	0.002
0.056	0.051	0.061	0.009	0.002
0.062	0.057	0.067	0.009	0.002
0.069	0.064	0.074	0.009	0.002
0.077	0.072	0.082	0.009	0.002
0.086	0.081	0.091	0.010	0.002
0.096	0.091	0.101	0.010	0.002
0.107	0.102	0.112	0.010	0.002
0.119	0.114	0.124	0.010	0.002
0.134	0.128	0.141	0.010	0.002
0.151	0.144	0.158	0.011	0.002
0.170	0.162	0.178	0.011	0.002
0.191	0.182	0.198	0.011	0.002
0.214	0.204	0.224	0.011	0.002
0.239	0.229	0.249	0.011	0.002
0.268	0.258	0.278	0.012	0.002
0.300	0.289	0.311	0.012	0.002
0.323	0.313	0.334	0.012	0.002
0.336	0.325	0.347	0.013	0.002
0.387	0.375	0.399	0.015	0.002
0.451	0.438	0.464	0.018	0.003
0.515	0.500	0.530	0.020	0.003
0.643	0.625	0.662	0.025	0.003
0.772	0.750	0.795	0.030	0.004
0.901	0.875	0.927	0.035	0.004
1.030	1.000	1.060	0.035	0.004
1.287	1.250	1.325	0.040	0.005

SAENORM.COM Click to view the full PDF of ams3648A

TABLE I (SI)

Inside Diameter, Millimetres			Wall Thickness, Millimetres	
Nominal	Minimum	Maximum	Nominal	Tolerance, plus and minus
0.58	0.51	0.69	0.20	0.05
0.66	0.58	0.76	0.20	0.05
0.71	0.64	0.81	0.20	0.05
0.81	0.74	0.91	0.20	0.05
0.91	0.81	1.02	0.20	0.05
1.02	0.91	1.12	0.20	0.05
1.12	1.02	1.24	0.20	0.05
1.24	1.14	1.37	0.23	0.05
1.42	1.30	1.55	0.23	0.05
1.57	1.45	1.70	0.23	0.05
1.75	1.63	1.88	0.23	0.05
1.96	1.83	2.08	0.23	0.05
2.18	2.06	2.31	0.25	0.05
2.44	2.31	2.57	0.25	0.05
2.72	2.59	2.84	0.25	0.05
3.02	2.90	3.15	0.25	0.05
3.40	3.25	3.58	0.25	0.05
3.84	3.66	4.01	0.28	0.05
4.32	4.11	4.52	0.28	0.05
4.85	4.62	5.03	0.28	0.05
5.44	5.18	5.69	0.28	0.05
6.07	5.82	6.32	0.28	0.05
6.81	6.55	7.06	0.30	0.05
7.62	7.34	7.90	0.30	0.05
8.20	7.95	8.48	0.30	0.05
8.53	8.26	8.81	0.33	0.05
9.83	9.52	10.13	0.38	0.05
11.46	11.13	11.79	0.46	0.08
13.08	12.70	13.46	0.51	0.08
16.33	15.88	16.81	0.64	0.08
19.61	19.05	20.19	0.76	0.10
22.89	22.22	23.55	0.89	0.10
26.16	25.40	26.92	0.89	0.10
32.69	31.75	33.66	1.02	0.13

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection: The vendor of tubing shall supply all samples and shall be responsible for performing all required tests. Results of such tests shall be reported to the purchaser as required by 4.6. Purchaser reserves the right to perform such confirmatory testing as he deems necessary to ensure that the tubing conforms to the requirements of this specification.

4.2 Classification of Tests:

4.2.1 Acceptance Tests: Tests to determine conformance to tensile strength (3.3.1), elongation (3.3.2), dielectric strength (3.3.5), specific gravity (3.3.8), zero strength time (3.3.9), and tolerance (3.5) requirements are classified as acceptance tests.

4.2.2 Qualification Tests: Tests to determine conformance to all technical requirements of this specification are classified as qualification tests.