



Standard Specification for Crosslinked Chlorinated Polyolefin Heat-Shrinkable Tubing for Electrical Insulation¹

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1. Scope

1.1 This specification covers flexible crosslinked chlorinated polyolefin heat-shrinkable tubing used for electrical insulating purposes. It is supplied in an expanded form and will shrink to the specified diameter when heated.

NOTE 1—This standard does not have a similar or equivalent IEC standard.

1.2 The values stated in inch-pound units are to be regarded as the standard accept for temperature, which is stated in degrees Celsius. SI values in parentheses are for information only.

2. Referenced Documents

2.1 ASTM Standards:

D 412 Test Methods for Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers—Tension²

D 1711 Terminology Relating to Electrical Insulation³

D 2671 Test Methods for Heat-Shrinkable Tubing for Electrical Use⁴

~~D 3636 Practice for Sampling and Judging Quality of Solid Electrical Insulating Materials⁴~~ Practice for Sampling and Judging Quality of Solid Electrical Insulating Materials⁴

E 176 Terminology of Fire Standards⁵

2.2 Military Standards:⁶

MIL-H-5606 Hydraulic Fluid Petroleum Base, Aircraft, Missile and Ordnance

MIL-T-5624 Turbine Fuel, Aviation, Grades JP4 and JP5

MIL-L-7808 Lubrication Oil, Aircraft, Turbine Engine, Synthetic Base

MIL-L-23699 Lubrication Oil, Aircraft, Turbine Engines, Synthetic Base

MIL-A-8243 Anti-Icing and De-Icing Defrosting Fluid

MIL-G-5572 Fuel, Aviation, Grades 100 and 130

2.3 Federal Standard: Federal Standards:

SS-S-550 Sodium Chloride, Technical, for Water Softening Units⁶

3. Terminology

~~3.1 Definitions: For definitions of terms used in this standard, refer to Terminology D 1711.~~

~~3.1.1 For definitions pertaining to electrical insulation, refer to Terminology D 1711.~~

~~3.1.2 For definitions pertaining to fire issues, refer to Terminology E 176.~~

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *chlorinated polyolefin, n*—a polymer or polymer blend based on chlorinated polyolefin(s), chlorinated olefin copolymer(s) or chlorinated polybutadiene polymer(s).

4. Classification

4.1 *Type I*—Normal operating temperature.

¹ This specification is under the jurisdiction of ASTM Committee ~~D-9~~D09 on Electrical and Electronic Insulating Materials and is the direct responsibility of Subcommittee D09.07 on Flexible and Rigid Insulating Materials.

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² *Annual Book of ASTM Standards*, Vol 09.01.

³ *Annual Book of ASTM Standards*, Vol 10.01.

⁴ *Annual Book of ASTM Standards*, Vol 10.02.

⁵ Available from Naval Publications and Forms Center, 5801 Tabor Ave., Philadelphia, PA 19120.

⁶ *Annual Book of ASTM Standards*, Vol 04.07.

⁶ Available from Naval Publications and Forms Center, 5801 Tabor Ave., Philadelphia, PA 19120.

4.2 *Type II*—Extended operating temperature.

5. Ordering Information

5.1 When ordering to this specification the purchaser must state the type, class, and size of the tubing required.

6. Materials and Manufacture

6.1 The compound used in the manufacture of this heat-shrinkable tubing shall be based on chlorinated polyolefin as defined in Section 3, Terminology. The finished compound shall be free of foreign matter other than antioxidants, flame retardants, processing aids, crosslinking agents, pigments or other additives as appropriate.

6.2 The tubing shall be extruded, crosslinked and then expanded to the required dimensions.

7. Chemical Property Requirements Chemical Property Requirements

7.1 The material shall conform to the chemical requirements specified in Tables 1 and 2.

7.2 Every lot of material manufactured requires testing for flammability, but the other chemical property requirements may be tested less frequently or with a frequency agreed upon by the purchaser and seller.

8. Other Property Requirements

8.1 The material shall conform to the mechanical, thermal, and electrical requirements of Table 3.

8.2 Every lot of material manufactured shall be tested for heat shock, tensile strength, and elongation, but other requirements may be tested less frequently or with a frequency agreed upon by the purchaser and seller.

9. Dimensions—Dimensional Requirements

9.1 Both Type I and Type II tubing shall conform to the dimensional requirements of Tables 4 and 5.

10. Workmanship, Finish, and Appearance—Workmanship

10.1 Chlorinated polyolefin heat-shrinkable tubing shall be homogeneous and free from flaws and defects and from foreign matter that may compromise its performance.

11. Sampling

11.1 A lot is defined as that material which is processed at the same time and under essentially the same conditions in accordance with this specification and submitted for inspection at one time.

11.2 Inspect a quantity of the end item selected at random from each lot in accordance with Practice D 3636 and Table 1.

12. Tests and Retests

12.1 If the results of any test do not conform to the requirements prescribed in this specification, make two additional tests on different specimens from the same lot.

12.2 If the results of either of the two additional tests do not conform to the requirements, the lot of material may be rejected at the option of the purchaser. A notice of nonconformance of material based on tests made according to this specification should be reported to the manufacturer promptly and in writing.

12.3 Rejected tubing may be replaced or reworked to correct the nonconformances and resubmitted for inspection. Before resubmitting, furnish to the inspector full particulars concerning previous rejection and action taken to correct the nonconformances.

13. Test Methods

13.1 Use the test methods described in Test Methods D 2671 unless stated otherwise in Table 2 or Table 3.

13.2 To recover heat-shrinkable tubing in this specification, use a time of 10 min and a temperature of $175 \pm 1^\circ\text{C}$ ($347 \pm 2^\circ\text{F}$).

TABLE 1 Sampling Table for Lot Acceptance Tests

Property	Requirement	Inspection Level	AQL	Sampling Unit of Sleeving, ft (m)
Inside diameter as supplied	Table 4	S-3	1.0	4 (1.2)
Inside diameter after unrestricted shrinkage	Table 4	S-3	1.0	4 (1.2)
Wall thickness after shrinkage	Table 4	S-3	1.0	4 (1.2)
Longitudinal change	Table 4	S-2	1.0	4 (1.2)
Straight length size, min	16.1 herein	S-3	1.0	single straight length
Workmanship	10.1 herein	I	4.0	4 (1.2)