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AEROSPACE MATERIAL SPECIFICATION

SAE AMS-DTL-23053/18

Issued JUL 1999

Insulation Sleeving, Electrical, Heat Shrinkable, Modified Fluoropolymer, Crosslinked

FSC 5970

NOTICE

This document has been taken directly from U.S. Military Specification MIL-DTL-23053/18B and contains only minor editorial and format changes required to bring it into conformance with the publishing requirements of SAE technical standards. The initial release of this document is intended to replace MIL-DTL-23053/18B. Any part numbers established by the original specification remain unchanged.

The original Military Specification was adopted as an SAE standard under the provisions of the SAE Technical Standards Board (TSB) Rules and Regulations (TSB 001) pertaining to accelerated adoption of government specifications and standards. TSB rules provide for (a) the publication of portions of unrevised government specifications and standards without consensus voting at the SAE Committee level, and (b) the use of the existing government specification or standard format.

Under Department of Defense policies and procedures, any qualification requirements and associated qualified products lists are mandatory for DOD contracts. Any requirement relating to qualified products lists (QPL's) has not been adopted by SAE and is not part of this SAE technical document.

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The requirements for acquiring the sleeving described herein shall consist of this specification sheet and the issue of the following specification listed in that issue of the Department of Defense Index of Specifications and Standards (DODISS) specified in the solicitation: MIL-DTL-23053.

REQUIREMENTS:

Polymer type: The base polymer used in formulating this sleeving shall be a copolymer or terpolymer of polyvinylidene fluoride.

Continuous operating temperature range: Class 1: -55°C (-67°F) to +175°C (+347°F). Classes 2 and 3: -55°C (-67°F) to +150°C (+302°F).

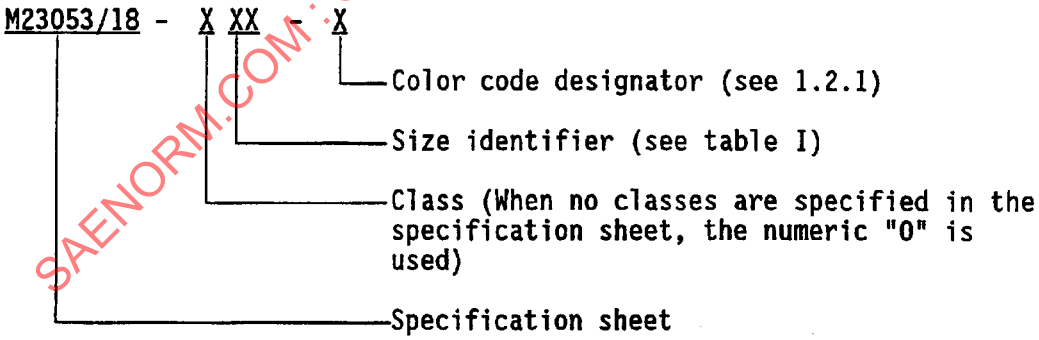
Color: The sleeving shall be supplied in colors and clear. Colors shall conform to the requirements of Class 1 of MIL-STD-104.

Class: The sleeving shall be furnished in the following classes, as specified (see 6.2a):

Class 1 - Semi-rigid. (Secant Modulus over 100,000 psi (690(Mpa).
Class 2 - Flexible. (Secant modulus over 25,000 to 100,000 psi (172 to 690 Mpa)
Class 3 - Very flexible. (Secant modulus to 25,000 psi (172 Mpa) Maximum.)

Longitudinal Change: +5, -10 percent; overexpanded sleeving: -15 percent.

Military part number: The Military part number shall consist of the basic number of this specification sheet and dash numbers as follows:



Example: Class 1, 0.250 inch (6.35 mm) as supplied ID sleeving shall be identified as M23053/18-106-C.

TABLE I. Construction details, inches (mm). 1/

Military part number	As supplied ID minimum	After unrestricted shrinkage	
		ID maximum	Wall thickness 2/
Class 1			
M23053/18-101-*	.046(1.17)	.023(.58)	.010 ± .002(.254 ± .051)
M23053/18-102-*	.063(1.60)	.031(.79)	.010 ± .002(.254 ± .051)
M23053/18-103-*	.093(2.36)	.046(1.17)	.010 ± .002(.305 ± .051)
M23053/18-104-*	.125(3.18)	.062(1.58)	.010 ± .002(.305 ± .051)
M23053/18-105-*	.187(4.75)	.093(2.36)	.010 ± .002(.305 ± .051)
M23053/18-106-*	.250(6.35)	.125(3.18)	.012 ± .003(.356 ± .076)
M23053/18-107-*	.375(9.53)	.187(4.75)	.012 ± .003(.356 ± .076)
M23053/18-108-*	.500(12.7)	.250(6.35)	.012 ± .003(.356 ± .076)
M23053/18-109-*	.750(19.1)	.375(9.53)	.017 ± .003(.432 ± .076)
M23053/18-110-*	1.000(25.4)	.500(12.7)	.019 ± .003(.483 ± .076)
M23053/18-111-*	1.500(38.1)	.750(19.1)	.020 ± .003(.508 ± .076)
M23053/18-112-*	2.000(50.8)	1.000(25.4)	.020 ± .003(.508 ± .076)
Class 2			
M23053/18-201-*	.046(1.17)	.023(.58)	.010 ± .002(.254 ± .051)
M23053/18-202-*	.063(1.60)	.031(.79)	.010 ± .002(.254 ± .051)
M23053/18-203-*	.093(2.36)	.046(1.17)	.010 ± .002(.305 ± .051)
M23053/18-204-*	.125(3.18)	.062(1.58)	.010 ± .002(.305 ± .051)
M23053/18-205-*	.187(4.75)	.093(2.36)	.010 ± .002(.305 ± .051)
M23053/18-206-*	.250(6.35)	.125(3.18)	.012 ± .003(.356 ± .076)
M23053/18-207-*	.375(9.53)	.187(4.75)	.012 ± .003(.356 ± .076)
M23053/18-208-*	.500(12.7)	.250(6.35)	.012 ± .003(.356 ± .076)
M23053/18-209-*	.750(19.1)	.375(9.53)	.017 ± .003(.432 ± .076)
M23053/18-210-*	1.000(25.4)	.500(12.7)	.019 ± .003(.483 ± .076)

TABLE I. Construction details, inches (mm). 1/ - Continued

Military part number	As supplied ID minimum	After unrestricted shrinkage ID maximum	After unrestricted shrinkage Wall thickness 2/
OVEREXPANDED SLEEVING			
M23053/18-211-*	.093(2.36)	.031(.79)	.017 ± .003(.432 ± .076)
M23053/18-212-*	.187(4.75)	.062(1.58)	.020 ± .003(.508 ± .076)
M23053/18-213-*	.375(9.53)	.125(3.18)	.020 ± .003(.508 ± .076)
M23053/18-214-*	.750(19.1)	.250(6.35)	.025 ± .003(.635 ± .076)
M23053/18-215-*	1.000(25.4)	.333(8.46)	.030 ± .005(.762 ± .127)
Class 3			
M23053/18-301-*	.046(1.17)	.023(.58)	.010 ± .002(.254 ± .051)
M23053/18-302-*	.063(1.60)	.031(.79)	.010 ± .002(.254 ± .051)
M23053/18-303-*	.093(2.36)	.046(1.17)	.010 ± .002(.305 ± .051)
M23053/18-304-*	.125(3.18)	.062(1.58)	.010 ± .002(.305 ± .051)
M23053/18-305-*	.187(4.75)	.093(2.36)	.010 ± .002(.305 ± .051)
M23053/18-306-*	.250(6.35)	.125(3.18)	.012 ± .003(.356 ± .076)
M23053/18-307-*	.375(9.53)	.187(4.75)	.012 ± .003(.356 ± .076)
M23053/18-308-*	.500(12.7)	.250(6.35)	.012 ± .003(.356 ± .076)
M23053/18-309-*	.750(19.1)	.375(9.53)	.017 ± .003(.432 ± .076)
M23053/18-310-*	1.000(25.4)	.500(12.7)	.019 ± .003(.483 ± .076)

1/ Diameter limits for object to be enclosed shall be as recommended in technical data.

2/ Wall thickness values are less when shrinkage is restricted.

3/ The asterisk in the part number shall be replaced by color code designations (see 1.2.1).

Unrestricted shrinkage: Test method 4.6.5: 200° ± 2°C (392° ± 4°F) for 3 minutes.

TABLE II. Physical properties. 1/

Characteristic	Requirement	Test procedure and conditions
As supplied:		
ID, minimum	Table 1	4.6.3
Heat shock	No cracks, flowing or dripping	4.6.8 275° ± 3°C (527° ± 6°F)
Secant modulus, psi (MPa)		
Class 1	100,000(690) min	4.6.12.1, 2 percent strain, ASTM D882
Class 2	25,000(172.4) to 100,000 (690)	
Class 3	25,000(172.4) max	
Restricted shrinkage	No cracks	4.6.6.1.1 200° ± 2°C (392° ± 4°F)
Voltage withstand	Pass	4.6.6.2
Clarity stability	Pass	4.6.16 200° ± 1°C (392° ± 2°F), 24 hours
Concentricity, min.	70% (50% for over expanded sizes)	4.6.3.3
Melting Point, °C (°F), min.		ASTM D4951 2/
Class 1	140 (284)	
Class 2	140 (284)	
Class 3	90 (194)	
After unrestricted shrinkage:		
ID, maximum	Table 1	4.6.3
Wall thickness	Table 1	4.6.3

Table II. Physical properties. 1/ - Continued

Characteristic	Requirement	Test Procedure and conditions
Tensile strength, psi (MPa), minimum Class 1 Class 2 Class 3	 3500 (24.3) 2500 1500 (9.4)	4.6.13 ASTM D638, 2 inches/min.
Ultimate elongation, percent, minimum	Class 1 200 Class 2-300 Class 3-200	4.6.13 ASTM D638, 2 inches/min.
Dielectric strength, volts/mil (Kv/mm), minimum	400(15.7)	4.6.2 ASTM D2671
Volume resistivity, ohm-cm, minimum	10^{11}	4.6.2 ASTM D876
Specific gravity, maximum	2.00	4.6.2 ASTM D792
Water absorption, percent, maximum	0.5	4.6.2 ASTM D570, 24 hrs. at 23°C
Corrosion	No corrosion	4.6.10.1 and 4.6.10.2 160° ± 2°C (320° ± 4°F), 16 hours
Low temperature flexibility	No cracking	4.6.7.1 -55° ± 1°C (-67° ± 2°F) 3/
Flammability	4/	4.6.14 Procedure C ASTM D2671
Heat resistance, property after:		4.6.9 Class 1: 250° ± 3°C (482° ±5°F) for 168 hours. Classes 2 & 3: 225° ± 2°C(437° ± 4° F), for 168 hours
Ultimate elongation, percent, minimum	Class 1-100 Class 2-250 Class 3-100	
Fluid resistance, property after:		4.6.11