SAE Aerospace
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AEROSPACE MATERIAL SPECIFICATION

SAE AMS-DTL-23053/7 REV. A

Issued 1999-07
Revised 2012-08

Superseding AMS-DTL-23053/7

Insulation Sleeving, Electrical, Heat Shrinkable, Polyethylene Terephthalate, Non-Crosslinked

FSC 5970

RATIONALE

Revise to include comments received by the government and industry, update references, align specification with SAE guidelines, and review specification for known technical problems.

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 polyethylene terephthalate.

Continuous operating temperature range: -76 °F (-60 °C) to +275 °F (+135 °C).

Classification: The heat shrinkable sleeving shall be furnished in the following classes, as specified (See 6.4a and 6.8):

Class 1 - Single longitudinal seam, thermally bonded
Class 2 - Spirally wound, resin bonded

Color: The heat shrinkable sleeving shall be furnished in clear, as manufactured. The acquiring activity may specify colors for Class 2 sleeving only (See 6.2b). Colors shall conform to Class I of MIL-STD-104. (See 1.2.1 and 3.4.2.1)

Longitudinal change:

Class 1: 30 percent maximum
Class 2: 35 percent maximum

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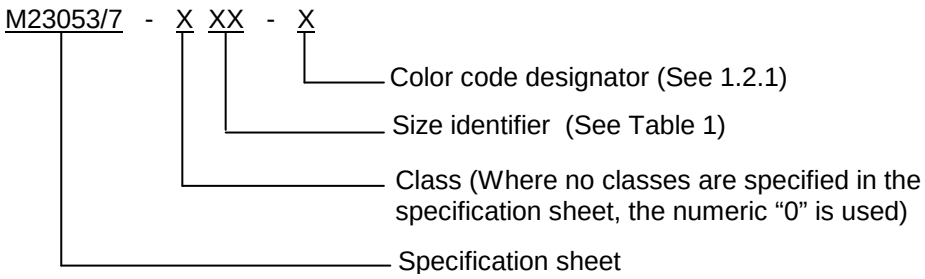
Military part number: The military part number shall consist of the basic number of this specification sheet and dash numbers as follows:



Example: Class 1, 0.125 inches (3.2 mm), as supplied ID sleeving shall be identified as M23053/7-103-C.

TABLE 1 - CONSTRUCTION DETAILS, INCHES (MM) 1/

Military part number 1/	As supplied ID minimum	After unrestricted shrinkage	
		ID maximum	Wall Thickness 2/
Class 1			
M23053/7-101-C		No longer	Manufactured
M23053/7-102-C		No longer	Manufactured
M23053/7-103-C	0.125 (3.18)	0.088 (2.24)	0.0027 ± 0.0004(0.0687 ± 0.0102)
M23053/7-104-C	0.187 (4.75)	0.131 (3.33)	0.0027 ± 0.0004(0.0687 ± 0.0102)
M23053/7-105-C	0.250 (6.35)	0.175 (4.45)	0.0027 ± 0.0004(0.0687 ± 0.0102)
M23053/7-106-C	0.375 (9.53)	0.263 (6.68)	0.0027 ± 0.0004(0.0687 ± 0.0102)
M23053/7-107-C	0.500 (12.70)	0.350 (8.89)	0.0027 ± 0.0004(0.0687 ± 0.0102)
M23053/7-108-C	0.750 (19.05)	0.525 (13.33)	0.0027 ± 0.0004(0.0687 ± 0.0102)
M23053/7-109-C	1.000 (25.40)	0.700 (17.78)	0.0027 ± 0.0004(0.0687 ± 0.0102)
M23053/7-110-C	1.375 (34.93)	0.963 (24.46)	0.0027 ± 0.0004(0.0687 ± 0.0102)
M23053/7-111-C	1.500 (38.10)	1.050 (26.67)	0.0027 ± 0.0004(0.0687 ± 0.0102)
M23053/7-112-C	2.000 (50.80)	1.400 (35.56)	0.0027 ± 0.0004(0.0687 ± 0.0102)
M23053/7-113-C	2.500 (63.50)	1.750 (44.45)	0.0027 ± 0.0004(0.0687 ± 0.0102)
M23053/7-114-C	3.000 (76.20)	2.100 (53.34)	0.0027 ± 0.0004(0.0687 ± 0.0102)
M23053/7-115-C	4.000 (101.60)	2.800 (71.12)	0.0027 ± 0.0004(0.0687 ± 0.0102)
Class 2			
M23053/7-201-*	0.015 (.381)	0.011 (0.28)	3/
M23053/7-202-*	0.020 (.508)	0.015 (0.38)	
M23053/7-203-*	0.025 (.635)	0.019 (0.48)	
M23053/7-204-*	0.030 (.762)	0.023 (0.58)	
M23053/7-205-*	0.042 (1.06)	0.032 (0.81)	
M23053/7-206-*	0.046 (1.17)	0.035 (0.89)	
M23053/7-207-*	0.062 (1.57)	0.047 (1.19)	
M23053/7-208-*	0.093 (2.36)	0.070 (1.78)	
M23053/7-209-*	0.125 (3.18)	0.094 (2.39)	
M23053/7-210-*	0.187 (4.75)	0.140 (3.56)	
M23053/7-211-*	0.250 (6.35)	0.188 (4.78)	
M23053/7-212-*	0.312 (7.92)	0.234 (5.94)	
M23053/7-213-*	0.375 (9.53)	0.281 (7.14)	
M23053/7-214-*	0.500 (12.70)	0.375 (9.53)	
M23053/7-215-*	0.625 (15.88)	0.469 (11.91)	
M23053/7-216-*	0.750 (19.05)	0.563 (14.30)	
M23053/7-217-*	1.000 (25.40)	0.750 (19.05)	

TABLE 1 - CONSTRUCTION DETAILS, INCHES (MM) 1/

Military part number 1/	As supplied ID minimum	After unrestricted shrinkage	
		ID maximum	Wall Thickness 2/
Class 2			
M23053/7-218-*	1.125 (28.58)	0.844 (21.44)	3/
M23053/7-219-*	1.250 (31.75)	0.938 (23.83)	
M23053/7-220-*	1.375 (34.93)	1.032 (26.21)	
M23053/7-221-*	1.500 (38.10)	1.125 (28.58)	
M23053/7-222-*	1.750 (44.45)	1.313 (33.35)	
M23053/7-223-*	2.000 (50.80)	1.500 (38.10)	

1/ Diameter limits for the object to be enclosed shall be no less than 85 percent of the as supplied diameter.
2/ Class 1 wall thickness measurements shall be made away from the seam.
3/ Because of irregular shrinkdown of Class 2 sleevings, wall thickness shall be determined “as supplied” as follows:

Nominal ID (as supplied)		Wall thickness range (as supplied)	
Inch	(mm)	Inch	(mm)
0.015 to 0.061	(0.381 to 1.549)	0.0015 to 0.004	(0.038 to 0.102)
0.062 to 0.074	(1.575 to 1.880)	0.0015 to 0.005	(0.038 to 0.127)
0.075 to 0.094	(1.905 to 2.388)	0.0015 to 0.006	(0.038 to 0.152)
0.095 to 0.124	(2.413 to 3.150)	0.0015 to 0.008	(0.038 to 0.203)
0.125 to 2.000	(3.175 to 50.800)	0.0015 to 0.010	(0.033 to 0.254)

The acquisition activity (See 6.2) may specify the exact wall thickness required within each range.

Wall thickness tolerance (as supplied)

Wall		Tolerance	
Inch	(mm)	Inch	(mm)
0.0015	(0.381)	± 0.0005	(0.0127)
0.0016 to 0.003	(0.041 to 0.076)	± 0.0008	(0.0203)
0.0031 to 0.005	(0.079 to 0.127)	± 0.0010	(0.0254)
0.0051 to 0.010	(0.130 to 0.254)	± 0.0015	(0.0381)

4/ The asterisk in the part number shall be replaced by color code designations (See 1.2.2).

Unrestricted shrinkage: Test method 4.6.2.2; 320 °F ± 4 (160 °C ± 2) for 5 minutes.

TABLE 2 - PHYSICAL PROPERTIES

Characteristic	Requirement	Test procedure and conditions
As supplied:		
ID, minimum	Table 1	4.6.3.1.1
Restricted shrinkage	No cracks	4.6.6 320 °F ± 4 (160 °C ± 2)
Voltage withstand	Pass	4.6.6.3
Color stability, Class 2	Pass	4.6.15 302 °F ± 4 (150 °C ± 2), 48 hours
Clarity stability, clear sleeving	Pass	4.6.16, 302 °F ± 4 (150 °C ± 2), 24 hours
Heat shock	No cracks, flowing or dripping	4.6.8 356 °F ± 4 (180 °C ± 2)
After unrestricted shrinkage:		
ID, maximum	Table 1	4.6.3.1.2
Wall thickness	Table 1	4.6.3.2
Seam strength, Class 1, PPI (Kg/m), minimum	25 (450)	4.6.2 ASTM D882, Method A
Tensile strength, psi (MPa), minimum	20 000 (138)	4.6.13 ASTM D638, 20 inches/minute
Ultimate elongation, percent, minimum	50	4.6.13 ASTM D638, 20 inches/minute
Dielectric strength, volts/mil (Kv/mm) minimum	2500 (98.4)	4.6.2 ASTM D2671
Volume resistivity, 0hm-cm, minimum	10^{14}	4.6.2 ASTM D876
Specific gravity, minimum	1.3	4.6.2 ASTM D792
Corrosion	No corrosion	4.6.10.1 and 4.5.10.2, 311 °F ± 4 (155 °C ± 2), 16 hours
Low temperature flexibility	No cracking	4.6.7.1 -76 °F + 2 (-60 °C ± 1)
Water absorption, percent, maximum	0.8	4.6.2 ASTM D570, 24 hrs at 73 °F (23 °C)
Heat resistance, properties after:		4.6.9 302 °F ± 4° (150 °C ± 2), 336 hours