



400 Commonwealth Drive, Warrendale, PA 15096-0001

AEROSPACE MATERIAL SPECIFICATION



AMS-DTL-23053/12

Issued

JUL 1999

Insulation Sleeving, Electrical, Heat Shrinkable,
Polytetrafluoroethylene

FSC 5970

NOTICE

This document has been taken directly from U.S. Military Specification MIL-DTL-23053/12C 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-23053/12C. 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.

SAE Technical Standards 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."

SAE reviews each technical report at least every five years at which time it may be reaffirmed, revised, or cancelled. SAE invites your written comments and suggestions.

Copyright 1999 Society of Automotive Engineers, Inc.
All rights reserved.

Printed in U.S.A.

QUESTIONS REGARDING THIS DOCUMENT:
TO PLACE A DOCUMENT ORDER:
SAE WEB ADDRESS:

(724) 772-7121
(724) 776-4970
<http://www.sae.org>

FAX: (724) 776-0243
FAX: (724) 776-0790

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 polytetrafluoroethylene.

Continuous operating temperature range: -67°C (-88°F) to +250°C (+482°F).

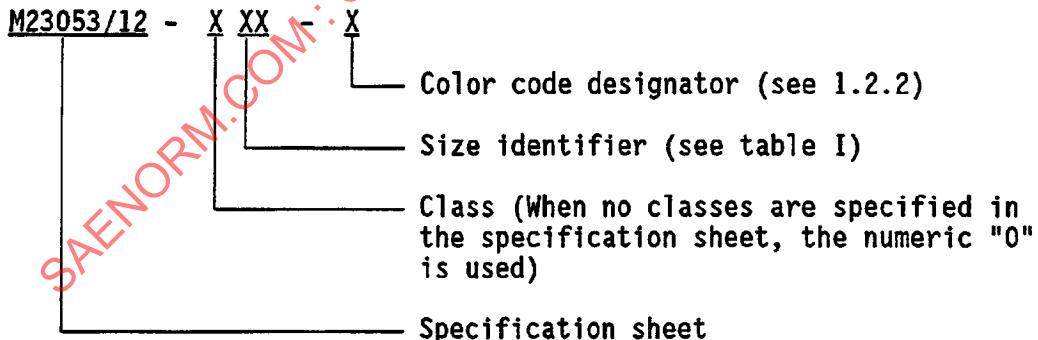
Class: The sleeving shall be furnished in the following classes, as specified (see 6.2a):

- Class 1 - Thick wall sleeving
- Class 2 - Standard wall sleeving
- Class 3 - Thin wall sleeving
- Class 4 - Very thin wall sleeving
- Class 5 - High shrink, thin wall

Color: The sleeving shall be furnished in clear (transparent milk white to light tan) or in the color specified by the acquiring activity. Colors shall conform to the requirements of Class I of MIL-STD-104.

Longitudinal change: ± 20 percent

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



Example: Thin walled (Class 3), 0.430 inch (10.9 mm) as supplied ID, clear sleeving shall be identified as M23053/12-327-C.

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

Military part number	As supplied ID minimum	After unrestricted shrinkage	
		ID maximum	Wall thickness <u>2/</u>
<u>Class 1</u>			
M23053/12-101-*	.166(4.22)	.130(3.30)	.030 ± .005(.762 ± .127)
M23053/12-102-*	.250(6.35)	.193(4.90)	.030 ± .005(.762 ± .127)
M23053/12-103-*	.333(8.46)	.257(6.53)	.030 ± .005(.762 ± .127)
M23053/12-104-*	.415(10.54)	.320(8.13)	.030 ± .005(.762 ± .127)
M23053/12-105-*	.498(12.65)	.383(9.73)	.030 ± .005(.762 ± .127)
M23053/12-106-*	.580(14.73)	.448(11.38)	.030 ± .006(.762 ± .152)
M23053/12-107-*	.666(16.92)	.510(12.95)	.030 ± .006(.762 ± .152)
M23053/12-108-*	.748(19.00)	.572(14.53)	.030 ± .006(.762 ± .152)
M23053/12-109-*	.830(21.08)	.637(16.18)	.030 ± .006(.762 ± .152)
M23053/12-110-*	.915(23.24)	.700(17.78)	.032 ± .006(.813 ± .152)
M23053/12-111-*	1.000(25.40)	.764(19.41)	.040 ± .007(1.02 ± .178)
M23053/12-112-*	1.170(29.72)	.891(22.63)	.045 ± .007(1.14 ± .178)
M23053/12-113-*	1.330(33.78)	1.020(25.91)	.050 ± .008(1.27 ± .203)
<u>Class 2</u>			
M23053/12-201-*	.050(1.27)	.027(.069)	.012 ± .002(.305 ± .051)
M23053/12-202-*	.055(1.40)	.032(0.81)	.012 ± .002(.305 ± .051)
M23053/12-203-*	.060(1.52)	.039(0.99)	.016 ± .003(.406 ± .076)
M23053/12-204-*	.065(1.65)	.043(1.09)	.016 ± .003(.406 ± .076)
M23053/12-205-*	.076(1.93)	.049(1.24)	.016 ± .003(.406 ± .076)
M23053/12-206-*	.085(2.16)	.054(1.37)	.016 ± .003(.406 ± .076)

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

Military part number	As supplied ID minimum	After unrestricted shrinkage	
		ID maximum	Wall thickness 2/
M23053/12-207-*	.110(2.79)	.067(1.70)	.016 ± .003(.406 ± .076)
M23053/12-208-*	.120(3.05)	.072(1.83)	.016 ± .003(.406 ± .076)
M23053/12-209-*	.130(3.30)	.080(2.03)	.016 ± .003(.406 ± .076)
M23053/12-210-*	.140(3.56)	.080(2.03)	.016 ± .003(.406 ± .076)
M23053/12-211-*	.150(3.81)	.089(2.26)	.016 ± .003(.406 ± .076)
M23053/12-212-*	.170(4.32)	.101(2.57)	.016 ± .003(.406 ± .076)
M23053/12-213-*	.191(4.85)	.112(2.84)	.016 ± .003(.406 ± .076)
M23053/12-214-*	.205(5.21)	.124(3.15)	.020 ± .004(.508 ± .102)
M23053/12-215-*	.215(5.46)	.130(3.30)	.020 ± .004(.508 ± .102)
M23053/12-216-*	.240(6.10)	.141(3.58)	.020 ± .004(.508 ± .102)
M23053/12-217-*	.270(6.86)	.158(4.01)	.020 ± .004(.508 ± .102)
M23053/12-218-*	.302(7.67)	.178(4.52)	.020 ± .004(.508 ± .102)
M23053/12-219-*	.320(8.13)	.198(5.03)	.020 ± .004(.508 ± .102)
M23053/12-220-*	.370(9.40)	.224(5.69)	.020 ± .004(.508 ± .102)
M23053/12-221-*	.390(9.91)	.249(6.32)	.020 ± .004(.508 ± .102)
M23053/12-222-*	.410(10.41)	.260(6.60)	.020 ± .004(.508 ± .102)
M23053/12-223-*	.430(10.92)	.278(7.06)	.020 ± .004(.508 ± .102)
M23053/12-224-*	.450(11.43)	.311(7.90)	.020 ± .004(.508 ± .102)
M23053/12-225-*	.470(11.94)	.329(8.36)	.020 ± .004(.508 ± .102)
M23053/12-226-*	.470(11.94)	.347(8.81)	.020 ± .004(.508 ± .102)
M23053/12-227-*	.470(11.94)	.334(8.48)	.025 ± .006(.635 ± .152)
M23053/12-228-*	.560(14.22)	.399(10.13)	.025 ± .006(.635 ± .152)
M23053/12-229-*	.655(16.64)	.462(11.73)	.025 ± .006(.635 ± .152)
M23053/12-230-*	.750(19.05)	.524(13.31)	.025 ± .006(.635 ± .152)
M23053/12-231-*	.930(23.62)	.655(16.64)	.030 ± .006(.762 ± .152)
M23053/12-232-*	1.125(28.58)	.786(19.96)	.035 ± .008(.889 ± .203)
M23053/12-233-*	1.310(33.27)	.911(23.14)	.035 ± .008(.889 ± .203)
M23053/12-234-*	1.500(38.10)	.036(26.31)	.035 ± .008(.899 ± .203)
<u>Class 3</u>			
M23053/12-301-*	.034(0.86)	.015(0.38)	.009 ± .002(.229 ± .051)
M23053/12-302-*	.038(0.97)	.018(0.46)	.009 ± .002(.229 ± .051)
M23053/12-303-*	.046(1.17)	.022(0.56)	.010 ± .003(.254 ± .076)
M23053/12-304-*	.050(1.27)	.027(0.69)	.010 ± .002(.254 ± .076)
M23053/12-305-*	.055(1.40)	.032(0.81)	.012 ± .003(.305 ± .076)
M23053/12-306-*	.060(1.52)	.039(0.99)	.012 ± .003(.305 ± .076)
M23053/12-307-*	.065(1.65)	.043(1.09)	.012 ± .003(.305 ± .076)
M23053/12-308-*	.076(1.93)	.049(1.24)	.012 ± .003(.305 ± .076)
M23053/12-309-*	.085(2.16)	.054(1.37)	.012 ± .003(.305 ± .076)

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

Military part number	As supplied ID minimum	After unrestricted shrinkage	
		ID maximum	Wall thickness 2/
M23053/12-310-*	.093(2.36)	.061(1.55)	.012 ± .003(.305 ± .076)
M23053/12-311-*	.110(2.79)	.067(1.70)	.012 ± .003(.305 ± .076)
M23053/12-312-*	.120(3.05)	.072(1.83)	.012 ± .003(.305 ± .076)
M23053/12-313-*	.140(3.56)	.080(2.03)	.012 ± .003(.305 ± .076)
M23053/12-314-*	.150(3.81)	.089(2.26)	.012 ± .003(.305 ± .076)
M23053/12-315-*	.153(3.89)	.096(2.44)	.012 ± .003(.305 ± .076)
M23053/12-316-*	.170(4.32)	.101(2.57)	.012 ± .003(.305 ± .076)
M23053/12-317-*	.191(4.85)	.112(2.84)	.012 ± .003(.305 ± .076)
M23053/12-318-*	.205(5.21)	.124(3.15)	.015 ± .004(.381 ± .102)
M23053/12-319-*	.215(5.46)	.130(3.30)	.015 ± .003(.381 ± .076)
M23053/12-320-*	.240(6.10)	.141(3.58)	.015 ± .004(.381 ± .102)
M23053/12-321-*	.270(6.86)	.158(4.01)	.015 ± .004(.381 ± .102)
M23053/12-322-*	.302(7.67)	.178(4.52)	.015 ± .004(.381 ± .102)
M23053/12-323-*	.320(8.13)	.198(5.03)	.015 ± .004(.381 ± .102)
M23053/12-324-*	.370(9.40)	.224(5.69)	.015 ± .004(.381 ± .102)
M23053/12-325-*	.390(9.91)	.249(6.32)	.015 ± .004(.381 ± .102)
M23053/12-326-*	.410(10.41)	.260(6.60)	.015 ± .004(.381 ± .102)
M23053/12-327-*	.430(10.92)	.278(7.06)	.015 ± .004(.381 ± .102)
M23053/12-328-*	.450(11.43)	.311(7.90)	.015 ± .004(.381 ± .102)
M23053/12-329-*	.470(11.94)	.329(8.36)	.015 ± .004(.381 ± .102)
M23053/12-330-*	.470(11.94)	.347(8.81)	.015 ± .004(.381 ± .102)
<u>Class 4</u>			
M23053/12-401-*	.050(1.27)	.025(0.64)	.006 ± .002(.152 ± .051)
M23053/12-402-*	.055(1.40)	.031(0.79)	.006 ± .002(.152 ± .051)
M23053/12-403-*	.060(1.52)	.038(0.97)	.006 ± .002(.152 ± .051)
M23053/12-404-*	.065(1.65)	.043(1.09)	.006 ± .002(.152 ± .051)
M23053/12-405-*	.076(1.93)	.046(1.17)	.006 ± .002(.152 ± .051)
M23053/12-406-*	.085(2.16)	.054(1.37)	.006 ± .002(.152 ± .051)
M23053/12-407-*	.093(2.36)	.057(1.45)	.006 ± .002(.152 ± .051)
M23053/12-408-*	.110(2.79)	.063(1.60)	.006 ± .002(.152 ± .051)
M23053/12-409-*	.120(3.05)	.072(1.83)	.008 ± .002(.203 ± .051)
M23053/12-410-*	.140(3.56)	.080(2.03)	.008 ± .002(.203 ± .051)
M23053/12-411-*	.150(3.81)	.089(2.26)	.008 ± .002(.203 ± .051)
M23053/12-412-*	.170(4.32)	.099(2.51)	.008 ± .002(.203 ± .051)
M23053/12-413-*	.191(4.85)	.110(2.79)	.008 ± .002(.203 ± .051)
M23053/12-414-*	.205(5.21)	.122(3.10)	.008 ± .002(.203 ± .051)
M23053/12-415-*	.215(5.46)	.130(3.30)	.008 ± .002(.203 ± .051)
M23053/12-416-*	.240(6.10)	.139(3.53)	.008 ± .002(.203 ± .051)
M23053/12-417-*	.270(6.86)	.154(3.91)	.008 ± .002(.203 ± .051)

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

Military part number	As supplied ID minimum	After unrestricted shrinkage	
		ID maximum	Wall thickness 2/
M23053/12-418-*	.302(7.67)	.172(4.37)	.010 ± .003(.254 ± .076)
M23053/12-419-*	.320(8.13)	.192(4.88)	.010 ± .003(.254 ± .076)
M23053/12-420-*	.370(9.40)	.214(5.44)	.010 ± .003(.254 ± .076)
M23053/12-421-*	.390(9.91)	.241(6.12)	.010 ± .003(.254 ± .076)
M23053/12-422-*	.410(10.41)	.260(6.60)	.010 ± .003(.254 ± .076)
M23053/12-423-*	.430(10.92)	.270(6.86)	.010 ± .003(.254 ± .076)
M23053/12-424-*	.450(11.43)	.301(7.65)	.010 ± .003(.254 ± .076)
M23053/12-425-*	.470(11.94)	.329(8.36)	.012 ± .003(.305 ± .076)
M23053/12-426-*	.470(11.94)	.347(8.81)	.012 ± .003(.305 ± .076)
Class 5			
M23053/12-501-*	.078(1.98)	.025(.64)	.009 ± .002(.229 ± .051)
M23053/12-502-*	.125(3.18)	.037(.94)	.012 ± .002(.305 ± .051)
M23053/12-503-*	.187(4.75)	.050(1.27)	.012 ± .002(.305 ± .051)
M23053/12-504-*	.250(6.35)	.063(1.60)	.012 ± .002(.305 ± .051)
M23053/12-505-*	.312(7.92)	.078(1.98)	.012 ± .002(.305 ± .051)
M23053/12-506-*	.375(9.53)	.096(2.44)	.012 ± .002(.305 ± .051)
M23053/12-507-*	.438(11.13)	.112(2.84)	.012 ± .002(.305 ± .051)
M23053/12-508-*	.500(12.70)	.144(3.66)	.015 ± .004(.381 ± .102)
M23053/12-509-*	.562(14.27)	.155(3.94)	.015 ± .004(.381 ± .102)
M23053/12-510-*	.625(15.88)	.178(4.52)	.015 ± .004(.381 ± .102)
M23053/12-511-*	.687(17.45)	.198(5.03)	.015 ± .004(.381 ± .102)
M23053/12-512-*	.750(19.05)	.224(5.69)	.015 ± .004(.381 ± .102)
M23053/12-513-*	.875(22.23)	.244(6.20)	.015 ± .004(.381 ± .102)
M23053/12-514-*	1.000(25.40)	.278(7.06)	.015 ± .004(.381 ± .102)
M23053/12-515-*	1.250(31.75)	.347(8.81)	.015 ± .004(.381 ± .102)
M23053/12-516-*	1.500(38.10)	.400(10.16)	.015 ± .004(.381 ± .102)
M23053/12-517-*	1.750(44.45)	.450(11.43)	.015 ± .004(.381 ± .102)
M23053/12-518-*	2.000(50.80)	.520(13.21)	.020 ± .005(.508 ± .127)
M23053/12-519-*	2.250(57.15)	.585(14.86)	.020 ± .005(.508 ± .127)
M23053/12-520-*	2.500(63.50)	.650(16.51)	.020 ± .005(.508 ± .127)
M23053/12-521-*	2.750(69.85)	.710(18.03)	.020 ± .005(.508 ± .127)
M23053/12-522-*	3.000(88.90)	.775(19.68)	.020 ± .005(.508 ± .127)
M23053/12-523-*	3.250(82.50)	.835(21.21)	.020 ± .005(.508 ± .127)
M23053/12-524-*	3.500(88.90)	.900(22.86)	.020 ± .005(.508 ± .127)
M23053/12-525-*	3.750(92.95)	.960(24.38)	.020 ± .005(.508 ± .127)
M23053/12-526-*	4.000(101.6)	1.025(26.03)	.020 ± .005(.508 ± .127)

- 1/ Diameter limits for the 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 designators (see 1.2.2).

Unrestricted shrinkage: Test method 4.6.5; 350° ± 4°C (662° ± 8°F) for 10 minutes.

TABLE II. Physical properties. 1/

Characteristic	Requirement	Test procedure and conditions
<u>As supplied:</u>		
ID, minimum	Table I	4.6.3
Heat shock	No cracks, flowing or dripping	4.6.8 400° ± 5°C (752° ± 9°F)
Restricted shrinkage	Pass	4.6.6.1.2 350° ± 4°C (662° ± 7.2°F), 5 minutes
Voltage withstand	Pass	4.6.6.2
<u>After unrestricted shrinkage:</u>		
ID, maximum	Table I	4.6.3
Wall thickness	Table I	4.6.3
Tensile strength, psi (MPa), minimum	2,500(17.3)	4.6.13 ASTM D638, 2 inches/minute
Ultimate elongation, percent, minimum	200	4.6.13 ASTM D638, 2 inches/minute
Dielectric strength, volts/mil (kV/mm), minimum	800(31.5)	4.6.2 ASTM D2671