

[INCH-POUND]

MIL-DTL-23053/5C  
17 June 1996  
SUPERSEDING  
MIL-I-23053/5B  
01 May 1986

DETAIL SPECIFICATION SHEET

INSULATION SLEEVING, ELECTRICAL, HEAT SHRINKABLE,  
POLYOLEFIN, FLEXIBLE, CROSSLINKED

This specification is approved for use by all  
Departments and Agencies of the Department of Defense.

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  
polyolefin.

Continuous operating temperature range: Classes 1 and 2: -55°C (-67°F) to +135°C  
(+275°F); Class 3: -25°C (-13°F) to +125°C (+257°F).

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

- Class 1 - Flame resistant
- Class 2 - Flammable (clear only)
- Class 3 - Highly flame resistant

Color: Class 2 shall be furnished in clear. Classes 1 and 3 shall be furnished  
in colors only. Colors shall conform to the requirements of Class 1  
of MIL-STD-104.

Longitudinal change: Classes 1, 2: ± 5 percent, Class 1 - overexpanded sleeving  
+5, -50 percent; Class 3: +1, -10 percent.

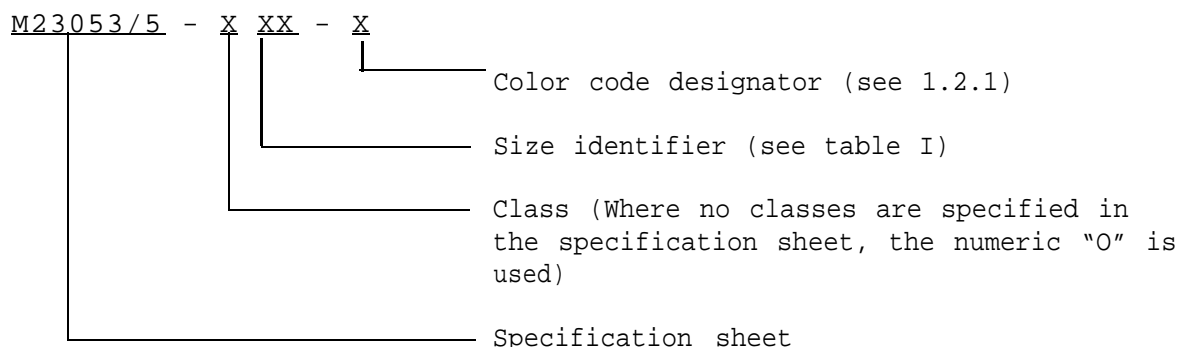
Military part number: The Military part number shall consist of the basic  
number of this specification sheet and dash numbers as follows:

AMSC N/A

FSC 5970

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

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Example: Class 1, gray (slate), 0.250 inch (6.35 mm) as supplied ID sleeving shall be identified as M23053/5-106-8.

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

Military part number 3/	As supplied ID minimum	After unrestricted shrinkage	
		ID maximum	Wall thickness 2/
<u>Class 1</u>			
M23053/5-101-*	.046(1.17)	.023 (.58)	.016 ± .003 (.406 ± .076)
M23053/5-102-*	.063(1.60)	.031 (.79)	.017 ± .003 (.432 ± .076)
M23053/5-103-*	.093(2.36)	.046 (1.17)	.020 ± .003 (.508 ± .076)
M23053/5-104-*	.125(3.18)	.062 (1.58)	.020 ± .003 (.508 ± .076)
M23053/5-105-*	.187(4.75)	.093 (2.36)	.020 ± .003 (.508 ± .076)
M23053/5-106-*	.250(6.35)	.125 (3.18)	.025 ± .003 (.635 ± .076)
M23053/5-107-*	.375(9.53)	.187 (4.75)	.025 ± .003 (.635 ± .076)
M23053/5-108-*	.500(12.7)	.250 (6.35)	.025 ± .003 (.635 ± .076)
M23053/5-109-*	.750(19.1)	.375 (9.53)	.030 ± .003 (.762 ± .076)
M23053/5-110-*	1.000(25.4)	.500 (12.7)	.035 ± .005 (.889 ± .076)
M23053/5-111-*	1.500(38.1)	.750 (19.1)	.040 ± .006 (1.016 ± .152)
M23053/5-112-*	2.000(50.8)	1.000 (25.4)	.045 ± .007 (1.143 ± .178)
M23053/5-113-*	3.000(76.2)	1.500 (38.1)	.050 ± .008 (1.270 ± .203)
M23053/5-114-*	4.000(101.6)	2.000 (50.8)	.055 ± .009 (1.397 ± .229)
Class 1 OVEREXPANDED			
M23053/5-115-*	1.000(25.4)	.275 (6.99)	.045 ± .007 (1.143 ± .178)
M23053/5-116-*	2.000(50.8)	.550 (14.0)	.045 ± .007 (1.143 ± .178)
M23053/5-117-*	3.000(76.2)	.810 (20.6)	.045 ± .007 (1.143 ± .178)
M23053/5-118-*	4.000(101.6)	1.050 (26.7)	.045 ± .007 (1.143 ± .178)
M23053/5-119-*	1.000(25.4)	.462 (1107)	.045 ± .007 (1.143 ± .178)
M23053/5-120-*	2.375(60.3)	.680 (17.3)	.045 ± .007 (1.143 ± .178)
M23053/5-121-*	3.000(76.2)	.840 (21.3)	.045 ± .007 (1.143 ± .178)
M23053/5-122-*	3.750(95.3)	.930 (23.62)	.045 ± .007 (1.143 ± .178)
M23053/5-123-*	4.500(114.3)	1.450 (36.83)	.045 ± .007 (1.143 ± .178)

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

Military part number 3/	As supplied ID minimum	After unrestricted shrinkage	
		ID maximum	Wall thickness 2/
<u>Class 2</u>			
M23053/5-201-C	.046(1.17)	.023 (.58)	.016 ± .003 (.406 ± .076)
M23053/5-202-C	.063(1.60)	.031 (.79)	.017 ± .003 (.432 ± .076)
M23053/5-203-C	.093(2.36)	.046 (1.17)	.020 ± .003 (.508 ± .076)
M23053/5-204-C	.125(3.18)	.062 (1.58)	.020 ± .003 (.508 ± .076)
M23053/5-205-C	.187(4.75)	.093 (2.36)	.020 ± .003 (.508 ± .076)
M23053/5-206-C	.250(6.35)	.125 (3.18)	.025 ± .003 (.635 ± .076)
M23053/5-207-C	.375(9.53)	.187 (4.75)	.025 ± .003 (.635 ± .076)
M23053/5-208-C	.500(12.7)	.250 (6.35)	.025 ± .003 (.635 ± .076)
M23053/5-209-C	.750(19.1)	.375 (9.53)	.030 ± .003 (.762 ± .076)
M23053/5-210-C	1.000(25.4)	.500 (12.7)	.035 ± .005 (.889 ± .127)
M23053/5-211-C	1.500(38.1)	.750 (19.1)	.040 ± .006 (1.016 ± .152)
M23053/5-212-C	2.000(50.8)	1.000 (25.4)	.045 ± .007 (1.143 ± .178)
M23053/5-213-C	3.0000(76.2)	1.500 (38.1)	.050 ± .008 (1.270 ± .203)
M23053/5-214-C	4.000(101.6)	2.000 (50.8)	.055 ± .009 (1.397 ± .229)
<u>Class 3</u>			
M23053/5-301-*	.046(1.17)	.023 (.58)	.016 ± .003 (.406 ± .076)
M23053/5-302-*	.063(1.60)	.031 (.79)	.017 ± .003 (.432 ± .076)
M23053/5-303-*	.093(2.36)	.046 (1.17)	.020 ± .003 (.508 ± .076)
M23053/5-304-*	.125(3.18)	.062 (1.58)	.020 ± .003 (.508 ± .076)
M23053/5-305-*	.187(4.75)	.093 (2.36)	.020 ± .003 (.508 ± .076)
M23053/5-306-*	.250(6.35)	.125 (3.18)	.025 ± .003 (.635 ± .076)
M23053/5-307-*	.375(9.53)	.187 (4.75)	.025 ± .003 (.635 ± .076)
M23053/5-308-*	.500(12.7)	.250 (6.35)	.025 ± .003 (.635 ± .076)
M23053/5-309-*	.750(19.1)	.375 (9.53)	.030 ± .003 (.762 ± .076)
M23053/5-310-*	1.000(25.4)	.500 (12.7)	.035 ± .005 (.889 ± .127)
M23053/5-311-*	1.500(38.1)	.750 (19.1)	.040 ± .006 (1.016 ± .152)

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 condition
<u>As supplied:</u>		
ID, minimum	Table I	4.6.3
Heat shock	No cracks, flowing or dripping	4.6.8 Classes 1 and 2: 250° ± 3°C (482° ± 6°F); Class 3: 225° ± 3°C (437° ± 6°F)
Secant modulus, psi (MPa), max.	25,000 (172.4)	4.6.12.1, 2 percent strain, ASTM D882
Concentricity	70% minimum (50% minimum for over expanded sizes)	4.6.3.3
Color stability	Pass	4.6.15 175° ± 2°C (347° ± 4°F), 24 hours
Clarity stability Clear	Pass	4.6.16 175° ± 2°C (347° ± 4°F), 24 hours
Restricted shrinkage	No cracks	4.6.6.1.1 175° ± 2°C (347° ± 4°F)
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	1,500 (10.3)	4.6.13 ASTM D638, 20 inches/minute
Ultimate elongation, percent, minimum	200	4.6.13 ASTM D638, 20 inches/minute
Dielectric strength, Volts/roil (Kv/mm), minimum	500 (19.7)	4.6.2 ASTM D2671

TABLE II. Physical properties. 1/ - Continued

Characteristic	Requirement	Test procedure and condition
Volume resistivity, Ohm-cm, minimum	$10^{14}$	4.6.2 ASTM D876
Dielectric constant, maximum 3/	Classes 1 & 3 - 3.1 Class 2 - 2.7	4.6.2 ASTM D150
Specific gravity, maximum	Class 1 - 1.35 Class 2 - 1.00 Class 3 - 1.50	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 4.6.10.2 175° ± 2°C (347° ± 4°F), 16 hours
Low temperature flexibility	No cracking	4.6.7.1 Classes 1 & 2: -55° ± 1°C (-67° + 2°F); Class 3: -25° ± 1°C (-13° ± 2°F)
Flammability	Class 1 - self- extinguishing within one minute and no more than 25 percent of in- dicator flag burned or char- red. No drip- ping, flowing of large sizes;  Class 2 - N/A;  Class 3 - 4/	4.6.14 Procedure B ASTM D2671          4.6.14 Procedure C ASTM D2671

TABLE II. Physical properties. 1/ - Continued

Characteristic	Requirement	Test procedure and condition
Heat resistance, property after:		4.6.9 for 168 hours, Classes 1 & 2: 175° ± 2°C (347° ± 4°F) Class 3: 150° ± 2°C (302° ± 4°F)
Ultimate elongation, percent, minimum	100	
Fluid resistance, property after:		
Tensile strength, psi (MPa), minimum	1,000 (6.9)	4.6.11
Dielectric strength volt/roil (Kv/mm), minimum	400 (15.8)	
Fungus resistance 2/	No growth	4.6.2 ASTM G21

- 1/ Unless otherwise specified, the stated requirements, test conditions and procedures are for all classes.
- 2/ MIL-I-23053/5 materials do not normally support fungus growth. Performance of this requirement is at the option of the acquisition activity (see 6.2k).
- 3/ Dielectric constant is a requirement only when specified in acquisition document (see 6.2f).
- 4/ Record whether any flaming or glowing particles or flaming drops fall from the specimen. If more than 25 percent of the indicator flag is burned away or charred (brown scorching and soot shall be ignored) after all of the five applications of flame or if flaming or glowing particles or flaming drops fall from the specimen at any time and ignite the cotton (flameless charring of the cotton shall be ignored), the specimen shall be judged to have conveyed flame and shall be considered as failing. In addition, any specimen which continues to flame or glow from one flame application longer than one minute shall not be acceptable.

Storage life conditions: Supplier shall certify to storage at 18° to 35°C (65° to 95°F) for 5 years. Conformance to 3.5. See 3.5.2 for storage life extension.

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Intended use: Heat shrinkable flexible polyolefin sleeving is used for light duty harness jackets, wire color coding, marking or identification.

NOTE :

- a. Flammability - Class 2 heat shrinkable sleeveings described in this specification sheet have not been flame retarded and will burn readily. These sleeveings (Class 2) shall not be considered for acquisition when flame resistance is required.

Custodians

Army - ER

Navy - AS

Air Force - 85

Preparing activity:

Navy - AS

(Project 5970-1129-05)

Review activities:

Army - AR, ME, MI

Navy - EC, MC

Air Force - 99

DLA - GS

MISC - DS