

## MILITARY SPECIFICATION

## CABLE, ELECTRICAL SHIELDED AND UNSHIELDED, AEROSPACE

This amendment forms a part of Military Specification MIL-C-27500F, dated 3 October 1983, and is approved for use by all Departments and Agencies of the Department of Defense.

## PAGE 1

1.2: Delete "7" and substitute "10" in the unjacketed, jacketed, shielded, shielded and jacketed classifications.

\* 1.2.1, delete and substitute:

"1.2.1 Cable designation. Cable shall be identified by a combination of digits and letters (not to exceed 15), in accordance with the following (see 3.4.1).

M27500	A	22	AA	3	T	10
Specification number (see 1.2.1.1)	Identification method of cable wire (see 1.2.1.1.1)	Conductor size (see 1.2.1.2)	Basic wire specification (see 1.2.1.3)	Number of wires in cable (see 1.2.1.4)	Shield style and material (see 1.2.1.5)	Jacket material (see 1.2.1.6)

Example: M27500A22AA3T10"

Following 1.2.1.1, add:

"1.2.1.1.1 Identification method of cable wire. If other than the preferred identification method is used, cite the letter "A" for optional identification, method 1 (see 3.2.1.1.2) or the letter "B" for optional identification, method 2 (see 3.2.1.1.3)."

1.2.1.4, delete and substitute:

"1.2.1.4 Number of wires per cable. The number of wires per cable shall be as designated and shall be 1 to 10 for shielded or shielded and jacketed cables and 2 to 10 for unshielded unjacketed or unshielded jacketed cables. The designation 0 shall be used to indicate a cable containing 10 basic wires."

## PAGE 2

1.2.1.6, under jacket material table, line 5: Delete "type III, grade E, MIL-M-20693" and substitute "ASTM D4066".

1.2.1.6, add the following notes:

"2/ Jacket material 02 is not to be used for cables having a diameter of 0.251 inch or greater.

3/ Jacket materials 08 and 10 are not to be used for cables having a diameter of 0.401 inch or greater".

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## PAGE 5

- 2.2: Add "ASTM F777 Resistance of Electrical Wire Insulation Materials to Flame at 60".

## 3.2.1, delete and substitute:

"3.2.1 Basic wire. Wire used in the construction of the cable shall be qualified to the basic wire specification (see table I) before cabling. The producer of the finished cable shall be a qualified source under the applicable basic wire specification, or shall be responsible that qualified wire from a qualified source was used in the construction of the cable and be required to furnish on request a test report from the manufacturer of the basic wire, plus a letter certifying that the component wire meets all the individual component wire specification requirements from the builder of the cable. Color added to the insulation (as helical stripe or circumferential band) for the purpose of wire number identification shall not degrade the wire insulation as evidenced by failure to meet the requirements herein. Unless otherwise specified (see 6.2), the manufacturer of the cable is responsible for assuring that the basic wire meets the wire specification requirements prior to being fabricated into cable."

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## 3.2.1.1.3, delete and substitute:

"3.2.1.1.3 Optional identification, method 2. The insulation on each wire in the cable shall be the same solid color. The color shall denote wire size in accordance with table IIIC. In order to identify each wire in the cable, color bands shall be applied in accordance with table IIID. Color of the bands shall be a contrasting color to the base color of the insulation. The narrow bands shall be 0.030 inch to 0.120 inch wide, the wide bands shall be twice the width of the narrow bands, and spaced 0.030 inch to 0.120 inch apart in a group. Group separation shall be 0.38 to 1.50 inch. The distance between the beginning of one group and the end of the next group shall be three inches maximum."

## 3.2.2, delete and substitute:

"3.2.2 Cable layup. The required number of wires for multiconductor construction determined by the cable designation shall be cabled with a left-hand lay. The lay of the individual wires shall be not less than eight nor more than 16 times the outside diameter of the unshielded, unjacketed cable. The basic wire shall not be spliced. When cables are cut, wires will maintain proper sequence and shall not splay more than twice the diameter of the cable."

## 3.2.3.1.2, delete and substitute:

"3.2.3.1.2 Strand size. Braided shields with round copper and copper alloy wires shall conform to shield group B for cables with component wires per MIL-W-81044/8 through /13, MIL-W-22759/16 through /19 and /28 and /29. MIL-W-22759/32 through /43 and all MIL-W-81381 specification sheets. All other braided shields shall conform to shield group A. The cable O. D. referred to in Groups A and B shall be nominal outside diameter (equal to basic wire diameter multiplied by factor B in the case of unshielded, unjacketed cables with no fillers.)(For stainless steel braids see 3.2.3.1.4 and for flat shields see 3.2.3.2).

Group A Cable O. D.	Group B Cable O. D.	Shield size
to .060 in.	to .250 in.	38 AWG
.061 - .310 in.	.251 - .400 in.	36 AWG
.311 - .750 in.	.401 to 1.000 in.	34 AWG
.751 in. and larger	1.001 in. and larger	32 AWG"

## PAGE 9

## 3.2.4.1.8, delete and substitute:

"3.2.4.1.8 Extruded crosslinked polyvinylidene fluoride. Jackets of extruded and crosslinked polyvinylidene fluoride shall be in accordance with table IV. The tensile strength and elongation of the jacket shall be 4,000 lbf/in<sup>2</sup> minimum and 200 percent minimum, respectively and shall be tested in accordance with 4.5.11.1."

PAGE 10

3.3.8, delete and substitute:

"3.3.8 Flammability. Cable specimens with all jacket materials loaded with sufficient weight to remain taut throughout test shall not burn for more than 30 seconds nor more than three inches."

3.4 <sup>1</sup> delete and substitute:

"3.4.1 Cable product identification. The only cable product identification shall consist of the cable designation as determined by 1.2.1 and the manufacturer's code designation in accordance with publications H4-1 and H4-2."

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4.3.1, delete and substitute:

"4.3.1 Quality conformance inspection sampling. Sampling tests shall consist of the tests listed in table VI."

PAGE 14

4.5.9.1: Delete in its entirety.

PAGE 15

4.5.9.3 Delete title and substitute "Crosslinked verification-air oven and thermal shock."

4.5.9.3: Delete last sentence.

4.5.11, delete and substitute:

"4.5.11 Jacket wall thickness. Specimens of finished cable with jacket material listed in table IV shall be measured for wall thickness of jacket in accordance with method 1013 of FED-STD-228 except for tape wrapped jacket constructions use Method 1018 of FED-STD-228."

PAGE 17

4.8, delete and substitute:

"4.8 Flammability. Finished cable shall be tested in accordance with ASTM F777. The period of flame application shall be 15 seconds for wire sizes 30 through 18, 30 seconds for sizes 16 through 12, 1 minute for sizes 10 through 4 and 2 minutes for larger sizes."

4.8.1: Delete in its entirety.

4.8.2: Delete in its entirety.

PAGE 18

5.1: Add "Level C packaging shall be used unless otherwise specified."

6.2.1e: Delete.

6.2.1, add the following:

"g. Applicable levels of preservation, packaging and packing. (see 5.1)."

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TABLE IIIA, delete and substitute:

"Table IIIA. Circuit identification colors for basic wires in accordance with MIL-W-8777, MIL-W-22759, MIL-W-25038, MIL-W-81044 or MIL-W-81381.

Number of wires in cable	Identification colors for respective wires in cable (See 3.2.1.1.1 or 3.2.1.1.2)									
	Wire number									
	1	2	3	4	5	6	7	8	9	10
1	Basic (white)									
2	White 1/	Blue								
3	White I/	Blue	Orange							
4	White I/	Blue	Orange	Green						
5	White I/	Blue	Orange	Green	Red					
6	White I/	Blue	Orange	Green	Red	Black				
7	White I/	Blue	Orange	Green	Red	Black	Yellow 2/			
8	White I/	Blue	Orange	Green	Red	Black	Yellow 2/	Violet		
9	White I/	Blue	Orange	Green	Red	Black	Yellow 2/	Violet	Gray	
10	White I/	Blue	Orange	Green	Red	Black	Yellow 2/	Violet	Gray	Brown 3/

1/ Except where preferred color on basic wire specification sheet is not white.

2/ Where basic wire is MIL-W-81381, a brown helical stripe shall be used.

3/ Where basic wire is MIL-W-81381, a brown and white stripe shall be used."

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Table IIID, delete and substitute:

"Table IIID. Circumferential band configuration for wire number identification (See 3.2.1.1.3).










WIRE NUMBER	BAND GROUP CONFIGURATION	NUMBER OF BANDS
1	NO MARKING	NONE
2		2 NARROW
3		3 NARROW
4		4 NARROW
5		5 NARROW
6		6 NARROW
7		7 NARROW
8		1 WIDE 1 NARROW
9		1 WIDE 2 NARROW
10		1 WIDE 3 NARROW

TABLE IV, delete and substitute:

"TABLE IV. Jacket wall thickness.

Diameter of cable beneath jacket (inches)	Jacket material <sup>1/</sup>			
	01	02	06	05, 09, 14 15, 17, 18 20, 21
	Inches Min Max			
Up to 0.150	0.010 - .020	0.005 - .009	0.010 - .015	0.007 - .012
0.151 to 0.200	0.015 - .025	0.006 - .010	0.010 - .015	0.010 - .016
0.201 to 0.250	0.020 - .030	0.007 - .011	0.010 - .015	0.010 - .016
0.251 to 0.300	0.025 - .035		0.010 - .015	0.010 - .016
0.301 to 0.400	0.030 - .040		0.015 - .025	0.013 - .020
0.401 to 0.500	0.040 - .050		0.015 - .025	0.013 - .020
0.501 to 0.600	0.050 - .065		0.020 - .030	0.020 - .030
0.601 to 0.700	0.060 - .075		0.020 - .030	0.020 - .030
0.701 to 0.750	0.070 - .085		0.020 - .030	0.020 - .030
0.751 to 0.800	0.075 - .090		0.020 - .030	0.020 - .035
0.801 to 1.000	0.080 - .095		0.020 - .030	0.020 - .035
Over 1.000	10 - 12.5% of diameter of cable beneath jacket		0.020 - .030	0.020 - .035

Diameter of cable beneath jacket (inches)	Jacket material <sup>1/</sup>			
	08, 10	11, 22	12	23
	Inches Min Max			
Up to 0.150	0.005 - .010	0.0035 - .0055	0.003 - .0055	0.005 - .010
0.151 to 0.200	0.006 - .012	0.0035 - .0055	0.003 - .0055	0.006 - .011
0.201 to 0.250	0.007 - .014	0.0035 - .0055	0.003 - .0055	0.007 - .012
0.251 to 0.300	0.007 - .014	0.0035 - .0055	0.003 - .0055	0.007 - .013
0.301 to 0.400	0.007 - .014	0.006 - .009	0.0045 - .0075	0.008 - .014
0.401 to 0.500		0.006 - .009	0.0045 - .0075	0.009 - .017
0.501 to 0.600		0.0095 - .0135	0.007 - .011	0.010 - .018
0.601 to 0.700		0.0095 - .0135	0.007 - .011	0.012 - .022
0.701 to 0.750		0.0095 - .014	0.007 - .011	0.014 - .024
0.751 to 0.800		0.0095 - .014	0.007 - .011	0.014 - .024
0.801 to 1.000		0.0095 - .014	0.007 - .011	0.016 - .030
Over 1.000				0.020 - .040

<sup>1/</sup> Jacket materials not shown shall have a minimum wall thickness of 0.010 inch."

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TABLE V, delete and substitute:

\*TABLE V. Thermal shock and aging stability

Jacket materials	Thermal shock and aging stability temperature
01	136°C
05, 09	230°C
04, 10	150°C
11, 12, 22	230°C
14, 15	180°C
17, 18	180°C
20, 21	285°C
8, 58	180°C
23, 73	230°C

TABLE VI, delete and substitute:

\*TABLE VI. Quality conformance inspection.

Group	Test	Requirement	Test method
I	Shield coverage	3.2.3.4	4.5.5
	Braid angle	3.2.3.3	4.5.5
	Identification of product	3.4	4.5.1
	Jacket wall thickness	3.2.4	4.5.11
	Cable jacket removability (styles 11, 12, and 22 only)	3.2.4	4.5.17
	Cable diameter	3.6	4.6
	Cable weight	3.7	4.7
II	Cold bend	3.3.4	4.5.6
	Thermal shock	3.3.5	4.5.9
	Aging stability	3.3.5.1	4.5.9.2
	Heat resistance	3.3.6	4.5.10
	Blocking	3.3.7	4.5.15
	Flammability	3.3.8	4.8
	Crosslinked verification	3.3.11	4.5.9.3

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TABLE VIII, delete and substitute:

\*TABLE VIII Cable and geometry factors.

No. of conductors	A	B	G
1	1.00	1.0	1.00
2	2.00	1.8	1.64
3	2.16	2.1	1.95
4	2.73	2.4	2.27
5	3.00	2.7	2.59
6	3.00	3.0	2.87
7	3.00	3.0	2.91
8	3.72	3.4	3.38
9	4.05	3.6	3.55
10	4.08	3.8	3.65

Custodians:

Army - CR

Navy - AS

Air Force - 85

Review activities:

Army - AR, MI

Navy -

Air Force - 11, 99

DLA - IS, ES

Agent:

DLA - ES

Preparing activity:

Air Force - 85

(Project 6145-0879)