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THIRD ANGLE PROJECTION



ISSUED 2000-06

PREPARED BY SAE SUBCOMMITTEE AE-8D



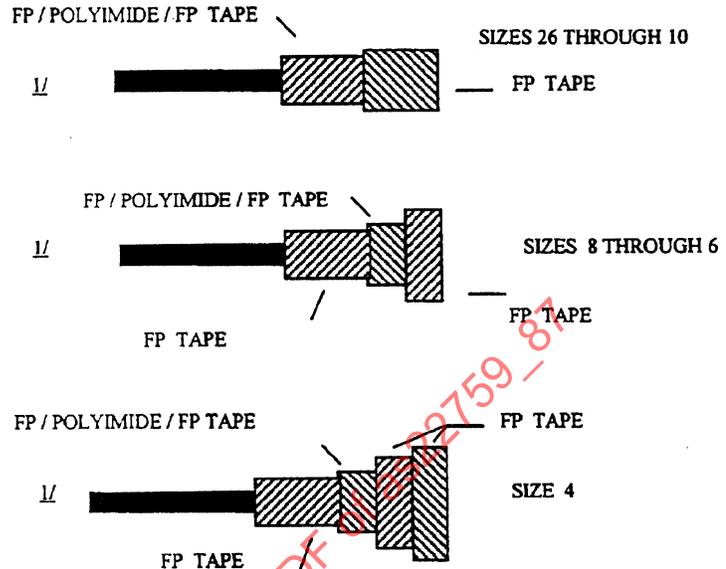
**AEROSPACE STANDARD**

WIRE, ELECTRICAL, POLYTETRAFLUOROETHYLENE/POLYIMIDE INSULATED, NORMAL WEIGHT, NICKEL COATED, COPPER CONDUCTOR, 260°C, 600 VOLTS

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SHEET 1 OF 8

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THE REQUIREMENTS FOR ACQUIRING THE PRODUCT 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-W-22759.



FP - Fluorocarbon Polymer, modified Polytetrafluoroethylene (PTFE)

1/ Small diameter stranded nickel coated copper conductor (sizes 26 to 4)

FIGURE 1. GENERAL CONFIGURATION.

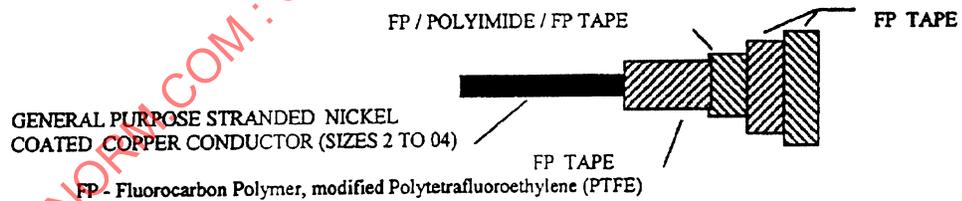


FIGURE 2. GENERAL CONFIGURATION

TABLE I. CONSTRUCTION DETAILS.

Part No. <sup>1/</sup>	Wire Size	Conductor			Finished Wire			
		Stranding (number of strands x AWG gauge of strands)	Diameter (in.)		Resistance at 20° C (68°F) (ohms/ 1000 ft max.)	Diameter (in.)		Weight (lb./1000 Ft) (Max.)
			MIN.	MAX.		Min.	Max.	
M22759/87-26-*	26	19 x 38	0.0175	0.0204	42.2	0.033	0.037	1.55
M22759/87-24-*	24	19 x 36	0.0225	0.0244	25.9	0.038	0.042	2.15
M22759/87-22-*	22	19 x 34	0.0285	0.0314	16.0	0.043	0.047	3.00
M22759/87-20-*	20	19 x 32	0.0365	0.0394	9.77	0.051	0.055	4.55
M22759/87-18-*	18	19 x 30	0.0455	0.0494	6.10	0.061	0.065	6.70
M22759/87-16-*	16	19 x 29	0.0515	0.0554	4.76	0.068	0.073	8.60
M22759/87-14-*	14	19 x 27	0.0645	0.0694	3.00	0.081	0.086	12.95
M22759/87-12-*	12	37 x 28	0.0835	0.0894	1.98	0.100	0.105	20.1
M22759/87-10-*	10	37 x 26	0.106	0.112	1.24	0.122	0.127	31.4
M22759/87-8-*	8	133 x 29	0.158	0.169	0.694	0.180	0.188	57.6
M22759/87-6-*	6	133 x 27	0.198	0.212	0.436	0.219	0.229	88.3
M22759/87-4-*	4	133 x 25	0.250	0.268	0.275	0.276	0.288	143.0
M22759/87-2-*	2	665 x 30	0.320	0.340	0.177	0.344	0.364	222.0
M22759/87-1-*	1	817 x 30	0.366	0.380	0.144	0.388	0.408	289.0
M22759/87-01-*	0	1045 x 30	0.395	0.425	0.113	0.420	0.450	345.0
M22759/87-02-*	00	1330 x 30	0.440	0.476	0.089	0.475	0.505	432.0
M22759/87-03-*	000	1665 x 30	0.500	0.540	0.071	0.530	0.560	542.0
M22759/87-04-*	0000	2109 x 30	0.565	0.605	0.056	0.590	0.630	681.0

<sup>1/</sup> Part Number: The asterisks in the part number column of Table I shall be replaced by color code designators in accordance with MIL-STD-681. Examples: M22759/87-20-93 is a 20 AWG white with orange stripe.

TABLE II. WIRE INSULATION MATERIALS. <sup>1/</sup>

Tape Code	Thickness (Nom)	Material
1	0.0020	0.0005 (FP) / 0.0010 (Polyimide) / 0.0005 (FP)
2	0.0010	FP (Skived)
3	0.0020	FP (Skived)
4	0.0020	FP (Unsintered)
5	0.0025	FP (Unsintered)
6	0.0030	FP (Unsintered)

<sup>1/</sup> Physical properties of FP tapes (skived and unsintered) shall be in accordance with MIL-W-22759 requirements.

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TABLE III. PHYSICAL PROPERTIES OF FP/POLYIMIDE/FP TAPES.

Tensile Strength	19,000 lb./in sq. (average minimum)
Tensile Modulus	350,000 lb./in sq. (average minimum)
Elongation	40 percent (average minimum)
Dielectric Strength	4,000 volts/mil (average minimum)
0.0005 FP Layer (bottom)	Distinguishable color (next to conductor) May be used at manufacturer's option

TABLE IV. TAPE OVERLAP REQUIREMENTS. 1/

Wire Size	Wrap 1			Wrap 2			Wrap 3			Wrap 4			Nominal Wall Thickness (mils)
	Tape Code	Percent Overlap		Tape Code	Percent Overlap		Tape Code	Percent Overlap		Tape Code	Percent Overlap		
		Min	Max										
26	1	50.5	54.0	4	50.5	54.0							7.4
24	1	50.5	54.0	4	50.5	54.0							7.4
22	1	50.5	54.0	4	50.5	54.0							7.4
20	1	50.5	54.0	4	50.5	54.0							7.4
18	1	50.5	54.0	4	50.5	54.0							7.4
16	1	50.5	54.0	5	50.5	54.0							8.3
14	1	50.5	54.0	5	50.5	54.0							8.3
12	1	50.5	54.0	6	50.5	54.0							9.1
10	1	50.5	54.0	6	50.5	54.0							9.1
8	2	20.5	35.0	1	50.5	55.0	6	67.0	71.0				13.2
6	2	20.5	35.0	1	50.5	55.0	6	67.0	71.0				13.2
4	3	20.5	35.0	1	50.5	55.0	6	50.5	54.0	6	50.5	54.0	16.2
2	3	20.5	35.0	1	50.5	55.0	6	50.5	54.0	6	50.5	54.0	16.2
1	3	20.5	35.0	1	50.5	55.0	6	50.5	54.0	6	50.5	54.0	16.2
1/0	3	20.5	35.0	1	50.5	55.0	6	50.5	54.0	6	50.5	54.0	16.2
2/0	3	20.5	35.0	1	50.5	55.0	6	50.5	54.0	6	50.5	54.0	16.2
3/0	3	20.5	35.0	1	50.5	55.0	6	50.5	54.0	6	50.5	54.0	16.2
4/0	3	20.5	35.0	1	50.5	55.0	6	50.5	54.0	6	50.5	54.0	16.2

<sup>1/</sup> Wrap 1 is innermost tape which is in contact with the conductor. Wraps 2, 3, and 4 are progressively further away from the conductor core.

TABLE V. FLUID TABLE.

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Test Fluid	Test temperature (°C (°F))	Immersion time (hrs.)
A. MIL-A-8243 Anti - icing and Deicing Defrosting Fluid, undiluted	48 - 50 (118 - 122)	20
B. MIL-A-8243 Anti - icing and Deicing Defrosting Fluid, diluted 60/40 (fluid/water) ratio	48 - 50 (118 - 122)	20
C. MIL-C-43616, Cleaning Compound, Aircraft Surface, Type I	48 - 50 (118 - 122)	20
D. ASTM D1153, Methyl Isobutyl Ketone (For use in Organic Coatings)	20 - 25 (68 - 77)	168
E. SAE AS 1241, Fire Resistant Hydraulic Fluid for Aircraft	48 - 50 (118 - 122)	20
F. MIL-L-7808, Lubricating Oil, Aircraft Turbine Engine, Synthetic Base	118 - 121 (244 - 250)	30
G. MIL-C-87937, Cleaning Compound, Aerospace Equipment, Type II or Type IV, undiluted	63 - 68 (145 - 154)	20
H. MIL-C-87937, Cleaning Compound, Aerospace Equipment, Type II or Type IV, diluted 25/75 (fluid/water) ratio	63 - 68 (145 - 154)	20
I. TT-S-735, Standard Test Fluids: Hydrocarbon, Type I	20 - 25 (68 - 77)	168
J. TT-S-735, Standard Test Fluids: Hydrocarbon, Type II	20 - 25 (68 - 77)	168
K. TT-S-735, Standard Test Fluids: Hydrocarbon, Type IV	20 - 25 (68 - 77)	168
L. Dielectric - coolant Fluid Synthetic Silicate Ester Base, Monsanto Coolanol 25 or approved equivalent.	20 - 25 (68 - 77)	168
M. MIL-G-3056, Gasoline, Automotive, Combat	20 - 25 (68 - 77)	168

RATINGS:

Temperature rating: 260°C (500°F) maximum continuous conductor temperature.  
Voltage rating: 600 volts (rms.) at sea level

ADDITIONAL REQUIREMENTS:

Wet arc propagation resistance (Test required for initial qualification only): Test in accordance with MIL-STD-2223 Method 3006. Measure the damage of the bundle along the axis. The wire is acceptable if the following criteria are met:

1. A minimum of 67 wires pass the dielectric test.
2. Three wires or less fail the dielectric test in any one bundle.
3. Actual damage to the wire is not more than 3 inches in any test bundle.

Dry arc propagation resistance (Test required for initial qualification only): Test in accordance with MIL-STD-2223 Method 3007. Measure the damage of the bundle along the axis. The wire is acceptable if the following criteria are met:

1. A minimum of 67 wires pass the dielectric test.
2. Three wires or less fail the dielectric test in any one bundle.
3. Actual damage to the wire is not more than 3 inches in any test bundle.

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Blocking: 260°C ± 2°C (500°F ± 3.6°F)

Color: In accordance with MIL-STD-104, class 1; except as noted below. White preferred. Conformity of color to the limits of MIL-STD-104 shall not be required after oven exposure.

Munsell color limits for UV laser markable wire

Color	Hue		Value		Chroma	
	From	To	From	To	From	To
Black	2.5RN	2.5RN	7	8.5	N/A	N/A
Blue	5PB	7.5B	7	8	4	6
Green	2.5G	7.5G	7	9	2	6
Red	10RP	5R	7	8	4	6
Yellow	5Y	10Y	8	9	4	6
Brown	2.5YR	7.5R	7	9	2	4
Orange	10R	2.5YR	6	7	8	10
Violet	2.5P	7.5R	7	8	4	8
Gray	Same as Black		Same as Black		Same as Black	

Color striping or banding durability: 125 cycles (250 strokes), 250 grams weight

Conductor strand adhesion: Not required

Continuous lengths: Schedule B

Dynamic cut-through (Test required for initial qualification only): Test in accordance with ASTM D 3032, Section 22. Blade shall be the standard cutting blade except the cutting edge radius shall be 0.005 ± 0.001 inch. Minimum average dynamic cut-through (lbs) shall be as follows:

Wire Size	23±5°C	150±5°C	200±5°C	260±5°C
26	10 lbs.	8 lbs.	6 lbs.	4 lbs.
20	25 lbs.	20 lbs.	15 lbs.	10 lbs.
16	25 lbs.	20 lbs.	15 lbs.	10 lbs.

Flammability: Test in accordance with MIL-STD-2223, Method 1006, Procedure A.

Requirements:

- Duration of after-flame 3 seconds (max)
- Flame travel 3.0 inches (max)
- No flaming of tissue

Forced Hydrolysis: (Test required for initial qualification only) 2000 hours at 70°C. Test 5 samples of AWG size 20 only in accordance with SAE AS4373 method 602. All 5 samples must pass the dielectric test as listed in method 602.

High frequency spark test: (When used in lieu of Impulse dielectric test) Test in accordance with MIL-STD-2223 Method 3008, 5.7 kilovolts (rms.) Test 100 percent of the wire.

Humidity resistance: After humidity exposure wire shall meet the requirements for initial insulation resistance.

Identification of product: Not required for size 26. Color code designator not required.

Identification durability: 125 cycles (250 strokes), 250 grams weight.