

Summary of Preferred Wire and Cable (Notes 1 through 3) (Page 1 of 2)

	Specification	Refer to Page No.
Insulation Selection Guideline		16-3
Color Code Designators for Wire	MIL-STD-681	16-5
MIL-W-22759 Wire, PTFE Insulated (Polytetrafluoroethylene), Copper or Copper Alloy		16-6
Silver Coated, 600 Volt, 200°C	MIL-W-22759/11	16-7
Nickel Coated, 600 Volt, 260°C	MIL-W-22759/12	16-7
Silver Coated, 600 Volt, 200°C (High Strength)	MIL-W-22759/22	16-7
Nickel Coated, 600 Volt, 260°C (High Strength)	MIL-W-22759/23	16-7
Silver Coated, 1000 Volt, 200°C	MIL-W-22759/9	16-8
Silver Coated, 1000 Volt, 200°C (High Strength)	MIL-W-22759/20	16-8
MIL-W-22759 Wire, ETFE Insulated (Ethylene Tetrafluoroethylene), Copper or Copper Alloy		
Tin Coated, 600 Volt, 150°C, Medium Weight Insulation	MIL-W-22759/16	16-9
Tin Coated, 600 Volt, 150°C, Lightweight Insulation	MIL-W-22759/18	16-9
Crosslinked ETFE, Tin Coated, 600 Volt, 150°C, Lightweight	MIL-W-22759/32	16-10
Crosslinked ETFE, Tin Coated, 600 Volt, 150°C, Normal weight	MIL-W-22759/34	16-11
Crosslinked ETFE, Silver Coated, 600 Volt, 200°C, Lightweight	MIL-W-22759/44	16-10
Crosslinked ETFE, Silver Coated, 600 Volt, 200°C, Normal weight	MIL-W-22759/43	16-11
Crosslinked ETFE, Silver Coated, 600 Volt, 200°C, Lightweight (High Strength)	MIL-W-22759/33	16-10
Crosslinked ETFE, Silver Coated, 600 Volt, 200°C, Normal weight (High Strength)	MIL-W-22759/35	16-11
Crosslinked ETFE, Nickel Coated, 600 Volt, 200°C, Lightweight	MIL-W-22759/45	16-10
Crosslinked ETFE, Nickel Coated, 600 Volt, 200°C, Normal weight	MIL-W-22759/41	16-11
MIL-W-81381 Wire, FEP Fluorocarbon/Polyimide Insulated, Copper or Copper Alloy		16-12
Silver Coated, 600 Volt, 200°C	MIL-W-81381/7	16-13
Nickel Coated, 600 Volt, 200°C	MIL-W-81381/8	16-13
Tin Coated, 600 Volt, 150°C	MIL-W-81381/21	16-13
Silver Coated, 600 Volt, 200°C	MIL-W-81381/9	16-13
Nickel Coated, 600 Volt, 200°C	MIL-W-81381/10	16-13

See notes on page 16-2.

Summary of Preferred Wire and Cable (Notes 1 through 3) (Page 2 of 2)

	Specification	Refer to Page No.
S-311-P-13 Wire, High Voltage, Crosslinked Polyalkene Over Crosslinked PVDF Insulation, Copper Conductor, Tin Coated		16-14
600 Volt, 135°C	S-311-P-13/1	16-14
1000 Volt, 135°C	S-311-P-13/2	16-14
2500 Volt, 135°C	S-311-P-13/3	16-14
Multiconductor Cable Shielded and unshielded, jacketed and unjacketed	MIL-C-27500	16-15
Radio Frequency Coaxial Cable Flexible and Semi-Rigid	MIL-C-17	16-16
J-W-1177 Magnet Wire, Copper, Enamel Coated		16-17
Polyurethane Overcoated with Polyamide, 130°C	J-W-1177/9	16-17
Polyester-Imide or Polyester-Amide-Imide, 180°C	J-W-1177/12	16-17
Polyester Overcoated with Polyamide-Imide, 200°C	J-W-1177/14	16-17
Polyimide-Coated, 200°C	J-W-1177/15	16-17

Notes:

1. All wire and cable may be used in Grade 1 or 2 applications.
2. The following are common trade names for insulations: PTFE & FEP, DuPont™ Teflon, ETFE and Crosslinked ETFE DuPont™ Tefzel, Polyvinylidene Fluoride (PVDF, PVF₂) Penwalt™ Kynar, Polyester DuPont™ Dacron, Polyimide DuPont™ Kapton, Polyamide DuPont™ Nylon.
3. Wire size AWG24 and larger is preferred for conductors used in interconnecting cable and harness assemblies. High strength copper alloy shall be used for size AWG24 and smaller.

Insulation Selection Guidelines (Page 1 of 2)

Insulation Types	Advantages	Disadvantages
FEP and PTFE (DuPont™ Teflon)	<ol style="list-style-type: none"> 1. Excellent high temperature properties. PTFE Teflon is preferred for solder applications. FEP is preferred for jacket material. 2. Non-flammable. 3. Good outgassing characteristics. 4. Most flexible of all insulations. 5. Good weatherability, resists moisture absorption and atomic oxygen erosion. 	<ol style="list-style-type: none"> 1. Susceptible to cold flow when stressed (bent) over tight radius or when laced too tightly. 2. Degraded by solar radiation above 5×10^5 RADS. 3. FEP has poor cut through resistance. 4. Heaviest insulation.
ETFE (DuPont™ Tefzel)	<ol style="list-style-type: none"> 1. Withstands physical abuse during and after installation. 2. Good high and low temperature properties. 3. High flex life. 4. Good outgassing characteristics. 5. Fair cold flow properties 	<ol style="list-style-type: none"> 1. Some ETFE insulations fail flammability in a 30% oxygen environment. 2. Insulation tends to soften at high temperature. 3. Degraded by gamma radiation above 10^6 rads
Crosslinked ETFE (DuPont™ Tefzel)	<ol style="list-style-type: none"> 1. Higher strength than normal ETFE. 2. Resistant to cold flow and abrasion. 3. More resistant to radiation effects. (to 5×10^7 RADS) 4. Higher maximum temperature than normal ETFE. Tin Coating = 150°C Max Silver Coating = 200°C Max 5. Good outgassing characteristics. 	<ol style="list-style-type: none"> 1. Some ETFE insulations fail flammability in a 30% oxygen environment. 2. Less flexible than extruded ETFE.
Aromatic Polyimide (DuPont™ Kapton)	<ol style="list-style-type: none"> 1. Lightest weight wire insulation material. Commonly used with FEP or PTFE Teflon to form layered insulation tapes. 2. Excellent physical thermal and electric properties. Excellent cut-through resistance and cold flow resistance. 3. Excellent radiation resistance (to 5×10^9 RADS). 4. Good outgassing characteristics. 	<ol style="list-style-type: none"> 1. Inflexibility - difficult to strip. 2. Absorbs moisture. Degraded by atomic oxygen. Poor weatherability. 3. Prone to wet-arc and dry-arc tracking from abrasions and cuts. 4. More difficult to flex. 5. Not stable to ultraviolet radiation.

Insulation Selection Guidelines (Page 2 of 2)

Insulation Types	Advantages	Disadvantages
Crosslinked Polyalkene	<ol style="list-style-type: none"> 1. Dual extrusion which is fused by sintering. Combines excellent abrasion and cut through resistance of Polyvinylidene Fluoride (PVDF, PVF₂ - Penwalt Corp TM Kynar) with Polyolefin for greater flexibility and improved heat resistance. Polyalkene is used mainly as a primary insulation under an outer jacket such as crosslinked ETFE or crosslinked PVDF/PVF₂. 2. High dielectric constant, used in high voltage applications. 3. PVDF has good radiation resistance (to 10⁸ RADS). 4. More resistant to cold flow. 5. Good outgassing characteristics. 	<ol style="list-style-type: none"> 1. Lower maximum conductor temperature rating. (135°C for GSFC S-311-P-13) (150°C for MIL-W-81044) 2. Reduced flexibility.

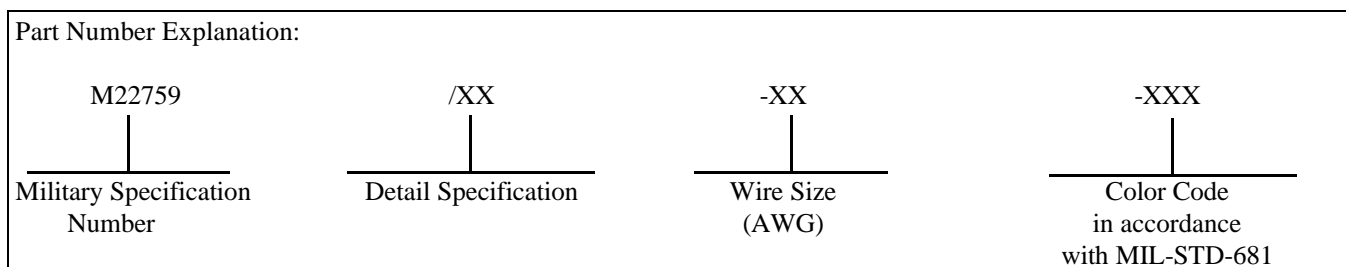
Color Code Designators for Wire According to MIL-STD-681

Base Color	1st Stripe	2nd Stripe	Designator
Black			0
Brown			1
Red			2
Orange			3
Yellow			4
Green			5
Blue			6
Violet			7
Gray			8
White			9
White	Black		90
White	Brown		91
White	Red		92
White	Orange		93
White	Yellow		94
White	Green		95
White	Blue		96
White	Violet		97
White	Gray		98

Base Color	1st Stripe	2nd Stripe	Designator
White	Black	Brown	901
White	Black	Red	902
White	Black	Orange	903
White	Black	Yellow	904
White	Black	Green	905
White	Black	Blue	906
White	Black	Violet	907
White	Black	Gray	908
White	Brown	Red	912
White	Brown	Orange	913
White	Brown	Yellow	914
White	Brown	Green	915
White	Brown	Blue	916
White	Brown	Violet	917
White	Brown	Gray	918
White	Red	Orange	923
White	Red	Yellow	924
White	Red	Green	925
White	Red	Blue	926
White	Red	Violet	927
White	Red	Gray	928

Base Color	1st Stripe	2nd Stripe	Designator
White	Orange	Yellow	934
White	Orange	Green	935
White	Orange	Blue	936
White	Orange	Violet	937
White	Orange	Gray	938
White	Yellow	Green	945
White	Yellow	Blue	946
White	Yellow	Violet	947
White	Yellow	Gray	948
White	Green	Blue	956
White	Green	Violet	957
White	Green	Gray	958
White	Blue	Violet	967
White	Blue	Gray	968

MIL-W-22759 Wire, Fluoropolymer-Insulated, Copper or Copper Alloy (Notes 1, 2)



Notes:

1. Flammability properties of these wires are controlled by the applicable specifications. However, applications in Space Transportation System (STS) payloads may require that the specific STS flammability hazards be addressed. Users are advised to consult the appropriate project systems safety officer.
2. Due to the cold flow phenomena of teflon insulation, the designer is advised to not route teflon insulated wires over sharp edges and tight turns, or apply tight stitches and tie wraps to cable assemblies.

**MIL-W-22759 Wire, Extruded PTFE (Note 1)
Fluoropolymer Insulated, 600 Volt**

Conductor			Copper	Copper	High Strength Copper	High Strength Copper
Coating			Silver (Note 2)	Nickel	Silver (Note 2)	Nickel
Max Temperature			200°C	260°C	200°C	260°C
Specification			MIL-W-22759/11	MIL-W-22759/12	MIL-W-22759/22	MIL-W-22759/23
Wire Size, AWG	Stranding (Number of Strands x AWG Size of Strands)	Finished Wire Diameter (Inches)	Part Number (Note 3)	Part Number (Note 3)	Part Number (Note 3)	Part Number (Note 3)
28	7 x 36	0.033 ± 0.002	M22759/11-28-XX	M22759/12-28-XX	M22759/22-28-XX	M22759/23-28-XX
26	19 x 38	0.038 ± 0.002	M22759/11-26-XX	M22759/12-26-XX	M22759/22-26-XX	M22759/23-26-XX
24	19 x 36	0.043 ± 0.002	M22759/11-24-XX	M22759/12-24-XX	M22759/22-24-XX	M22759/23-24-XX
22	19 x 34	0.049 ± 0.002	M22759/11-22-XX	M22759/12-22-XX	M22759/22-22-XX	M22759/23-22-XX
20	19 x 32	0.058 ± 0.002	M22759/11-20-XX	M22759/12-20-XX	M22759/22-20-XX	M22759/23-20-XX
18	19 x 30	0.068 ± 0.002	M22759/11-18-XX	M22759/12-18-XX	X	X
16	19 x 29	0.075 ± 0.002	M22759/11-16-XX	M22759/12-16-XX		
14	19 x 27	0.090 ± 0.002	M22759/11-14-XX	M22759/12-14-XX		
12	19 x 25	0.111 ± 0.003	M22759/11-12-XX	M22759/12-12-XX	X	X
10	37 x 26	0.139 ± 0.004	M22759/11-10-XX	M22759/12-10-XX		
8	133 x 29	0.202 ± 0.004	M22759/11-8-XX	M22759/12-8-XX		

Notes:

- Wire may be used in Grade 1 and 2 applications.
- Silver-coated copper is susceptible to cuprous oxide corrosion ("red plague") when produced, stored or used in a moist or high humidity environment. The environment for this wire must be controlled.
- Part number: The X in the part number column shall be replaced by color code designators in accordance with MIL-STD-681. Refer to page 16-5.
Examples: Size 20, white - M22759/9-20-9; white with orange stripe - M22759/9-20-93.

**MIL-W-22759 Wire, Extruded PTFE (Note 1)
Fluoropolymer Insulated, 1000 Volt**

Conductor			Copper	High Strength Copper
Coating			Silver (Note 2)	Silver (Note 2)
Max Temperature			200°C	200°C
Specification			MIL-W-22759/9	MIL-W-22759/20
Wire Size, AWG	Stranding (Number of Strands x AWG Size of Strands)	Finished Wire Diameter (Inches)	Part Number (Note 3)	Part Number (Note 3)
28	7 x 36	0.043 ± 0.002	M22759/9-28-XX	M22759/20-28-XX
26	19 x 38	0.048 ± 0.002	M22759/9-26-XX	M22759/20-26-XX
24	19 x 36	0.053 ± 0.002	M22759/9-24-XX	M22759/20-24-XX
22	19 x 34	0.060 ± 0.002	M22759/9-22-XX	M22759/20-22-XX
20	19 x 32	0.068 ± 0.002	M22759/9-20-XX	M22759/20-20-XX
18	19 x 30	0.078 ± 0.002	M22759/9-18-XX	
16	19 x 29	0.085 ± 0.002	M22759/9-16-XX	
14	19 x 27	0.100 ± 0.003	M22759/9-14-XX	
12	19 x 25	0.120 ± 0.004	M22759/9-12-XX	
10	37 x 26	0.141 ± 0.004	M22759/9-10-XX	
8	133 x 29	0.207 ± 0.003	M22759/9-8-XX	

Notes:

- Wire may be used in Grade 1 and 2 applications.
- Silver-coated copper is susceptible to cuprous oxide corrosion (“red plague”) when produced, stored or used in a moist or high humidity environment. The environment for this wire must be controlled.
- Part number: The X in the part number column shall be replaced by color code designators in accordance with MIL-STD-681. Refer to page 16-5. Examples: Size 20, white - M22759/9-20-9; white with orange stripe - M22759/9-20-93.

**MIL-W-22759 Wire, Extruded ETFE (Notes 1, 2)
Fluoropolymer Insulated, 600 Volt**

Insulation Thickness Type		Medium Weight		Lightweight	
Conductor		Copper		Copper	
Coating		Tin		Tin	
Max Temperature		+150°C		+150°C	
Specification		MIL-W-22759/16		MIL-W-22759/18	
Wire Size, AWG	Stranding (Number of Strands x AWG Size of Strands)	Part Number (Note 3)	Finished Wire Diameter (Inches)	Part Number (Note 3)	Finished Wire Diameter (Inches)
26	19 x 38	---	---	M22759/18-26-XX	0.032 ± 0.002
24	19 x 36	M22759/16-24-XX	0.045 ± 0.002	M22759/18-24-XX	0.036 ± 0.002
22	19 x 34	M22759/16-22-XX	0.052 ± 0.002	M22759/18-22-XX	0.043 ± 0.002
20	19 x 32	M22759/16-20-XX	0.060 ± 0.002	M22759/18-20-XX	0.051 ± 0.002
18	19 x 30	M22759/16-18-XX	0.071 ± 0.002	M22759/18-18-XX	0.061 ± 0.002
16	19 x 29	M22759/16-16-XX	0.079 ± 0.002	M22759/18-16-XX	0.070 ± 0.002
14	19 x 27	M22759/16-14-XX	0.093 ± 0.002	M22759/18-14-XX	0.085 ± 0.002
12	37 x 28	M22759/16-12-XX	0.114 ± 0.003	M22759/18-12-XX	0.107 ± 0.003
10	37 x 26	M22759/16-10-XX	0.139 ± 0.003	M22759/18-10-XX	0.134 ± 0.003
8	133 x 29	M22759/16-8-XX	0.199 ± 0.003	X	X
6	133 x 27	M22759/16-6-XX	0.250 ± 0.003		
4	133 x 25	M22759/16-4-XX	0.312 ± 0.004		
2	665 x 30	M22759/16-2-XX	0.388 ± 0.004		
1	817 x 30	M22759/16-1-XX	0.431 ± 0.005		
0	1045 x 30	M22759/16-01-XX	0.479 ± 0.006		
00	1330 x 30	M22759/16-02-XX	0.546 ± 0.007		

Notes:

1. Wire may be used in Grade 1 and 2 applications.
2. Some ETFE (Ethylene Tetrafluoroethylene) insulated wire has been found to fail flammability testing in a 30% oxygen environment.
3. Part number: The X in the part number column shall be replaced by color code designators in accordance with MIL-STD-681. Refer to page 16-5. Examples: Size 20, white - M22759/16-20-9; white with orange stripe - M22759/16-20-93.

**MIL-W-22759 Wire, Lightweight, Crosslinked (Notes 1, 2)
ETFE, Fluoropolymer Insulated, 600 Volt**

Conductor			Copper	Copper	Copper	High Strength Copper
Coating			Tin	Silver (Note 3)	Nickel	Silver (Note 3)
Max Temperature			150°C	200°C	200°C	+200°C
Specification			MIL-W-22759/32	MIL-W-22759/44	MIL-W-22759/45	MIL-W-22759/33
Wire Size, AWG	Stranding (Number of Strands x AWG Size of Strands)	Finished Wire Diameter (Inches)	Part Number (Note 4)	Part Number (Note 4)	Part Number (Note 4)	Part Number (Note 4)
30	7 X 38	0.024 ± 0.002	M22759/32-30-XX			M22759/33-30-XX
28	7 x 36	0.027 ± 0.002	M22759/32-28-XX	M22759/44-28-XX	M22759/45-28-XX	M22759/33-28-XX
26	19 x 38	0.032 ± 0.002	M22759/32-26-XX	M22759/44-26-XX	M22759/45-26-XX	M22759/33-26-XX
24	19 x 36	0.037 ± 0.002	M22759/32-24-XX	M22759/44-24-XX	M22759/45-24-XX	M22759/33-24-XX
22	19 x 34	0.043 ± 0.002	M22759/32-22-XX	M22759/44-22-XX	M22759/45-22-XX	M22759/33-22-XX
20	19 x 32	0.050 ± 0.002	M22759/32-20-XX	M22759/44-20-XX	M22759/45-20-XX	M22759/33-20-XX
18	19 x 30	0.060 ± 0.002	M22759/32-18-XX	M22759/44-18-XX	M22759/45-18-XX	
16	19 x 29	0.068 ± 0.002	M22759/32-16-XX	M22759/44-16-XX	M22759/45-16-XX	
14	19 x 27	0.085 ± 0.003	M22759/32-14-XX	M22759/44-14-XX	M22759/45-14-XX	
12	37 x 28	0.103 ± 0.004	M22759/32-12-XX	M22759/44-12-XX	M22759/45-12-XX	

Notes:

- Wire may be used in Grade 1 and 2 applications.
- Some ETFE (Ethylene Tetrafluoroethylene) insulated wire has been found to fail flammability testing in a 30% oxygen environment.
- Silver-coated copper is susceptible to cuprous oxide corrosion (“red plague”) when produced, stored or used in a moist or high humidity environment. The environment for this wire must be controlled.
- Part number: The X in the part number column shall be replaced by color code designators in accordance with MIL-STD-681. Refer to page 16-5. Examples: Size 20, white - M22759/32-20-9; white with orange stripe - M22759/32-20-93.

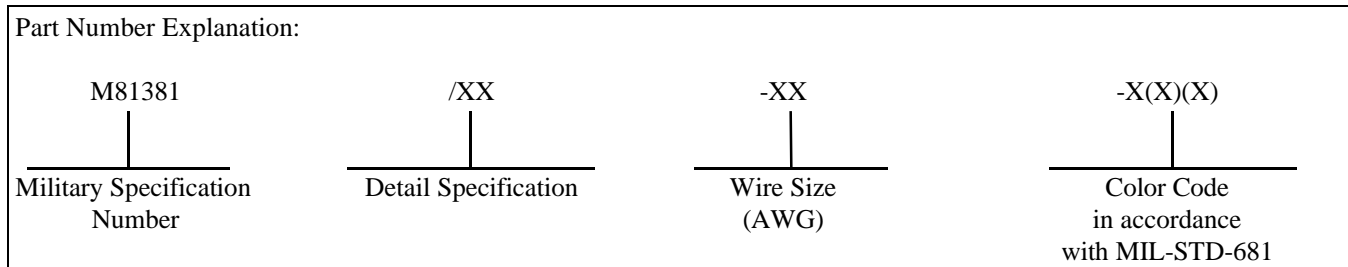
**MIL-W-22759 Wire, Normal Weight, Crosslinked (Notes 1, 2)
ETFE Fluoropolymer Insulated, 600 Volt**

Conductor			Copper	Copper	Copper	High Strength Copper
Coating			Tin	Silver (Note 3)	Nickel	Silver (Note 3)
Max Temperature			150°C	2000°C	200°C	200°C
Specification			MIL-W-22759/34	MIL-W-22759/43	MIL-W-22759/41	MIL-W-22759/35
Wire Size, AWG	Stranding (Number of Strands x AWG Size of Strands)	Finished Wire Diameter (Inches)	Part Number (Note 4)	Part Number (Note 4)	Part Number (Note 4)	Part Number (Note 4)
26	19 x 38	0.040 ± 0.002		M22759/43-26-XX	M22759/41-26-XX	M22759/35-26-XX
24	19 x 36	0.045 ± 0.002	M22759/34-24-XX	M22759/43-24-XX	M22759/41-24-XX	M22759/35-24-XX
22	19 x 34	0.050 ± 0.002	M22759/34-22-XX	M22759/43-22-XX	M22759/41-22-XX	M22759/35-22-XX
20	19 x 32	0.058 ± 0.002	M22759/34-20-XX	M22759/43-20-XX	M22759/41-20-XX	M22759/35-20-XX
18	19 x 30	0.070 ± 0.003	M22759/34-18-XX	M22759/43-18-XX	M22759/41-18-XX	X
16	19 x 29	0.077 ± 0.003	M22759/34-16-XX	M22759/43-16-XX	M22759/41-16-XX	
14	19 x 27	0.094 ± 0.003	M22759/34-14-XX	M22759/43-14-XX	M22759/41-14-XX	
12	37 x 28	0.111 ± 0.003	M22759/34-12-XX	M22759/43-12-XX	M22759/41-12-XX	
10	37 x 26	0.134 ± 0.004	M22759/34-10-XX	M22759/43-10-XX	M22759/41-10-XX	
8	133 x 29	0.195 ± 0.008	M22759/34-8-XX	M22759/43-8-XX	M22759/41-8-XX	
6	133 x 27	0.241 ± 0.010	M22759/34-6-XX	M22759/43-6-XX	M22759/41-6-XX	
4	133 x 25	0.310 ± 0.010	M22759/34-4-XX	M22759/43-4-XX	M22759/41-4-XX	

Notes:

- Wire may be used in Grade 1 and 2 applications.
- Some ETFE (Ethylene Tetrafluoroethylene) insulated wire has been found to fail flammability testing in a 30% oxygen environment.
- Silver-coated copper is susceptible to cuprous oxide corrosion ("red plague") when produced, stored or used in a moist or high humidity environment. The environment for this wire must be controlled.
- Part number: The X in the part number column shall be replaced by color code designators in accordance with MIL-STD-681. Refer to page 16-5. Examples: Size 20, white - M22759/34-20-9; white with orange stripe - M22759/34-20-93.

MIL-W-81381 Wire, FEP, Fluorocarbon/Polyimide (Notes 1 through 3) (Page 1 of 2)
Insulated, Copper or Copper Alloy



Notes: (Continued on page 16-13)

1. Wire may be used in Grade 1 and 2 applications.
2. Tape code: .1/1/.1=0.1 mil Fluorinated Ethylene Propylene (FEP) fluorocarbon resin/1 mil Polyimide film/0.1 mil FEP fluorocarbon. Minimum overlap 50%.
3. MIL-W-81381 wire may be preferred for its light weight and excellent mechanical, electrical, and radiation resistance properties. However, the insulation of this wire has known reliability problems in certain applications. Extended exposure to moisture or alkaline cleaning chemicals has been shown to degrade the insulation's mechanical strength, resulting in flaking of the outer insulation tape, and cracking from vibration or movement stress when installed around tight radius bends. The resulting degradation may lead to flashover, arc tracking, and shorting, which may ignite the insulation.

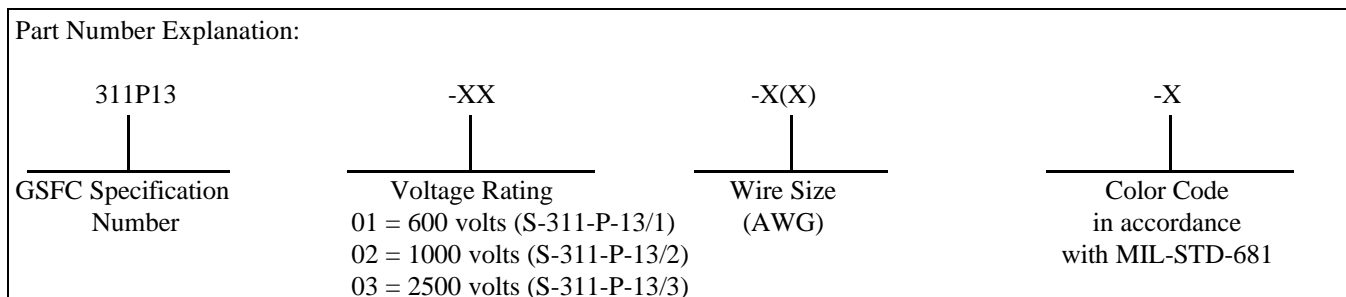
MIL-W-81381 Wire, FEP, Fluorocarbon/Polyimide (Notes 1 through 3) (Page 2 of 2)
Insulated, Copper or Copper Alloy

Conductor				Copper	Copper	High Strength Copper	High-Strength Copper	Copper
Coating				Silver (Note 1)	Nickel	Silver (Note 4)	Nickel	Tin
Max Temperature				200°C	200°C	200°C	200°C	150°C
Specification				MIL-W-81381/7	MIL-W-81381/8	MIL-W-81381/9	MIL-W-81381/10	MIL-W-81381/21
Wire Size, AWG	Stranding (Number of Strands x AWG Size of Strands)	Finished Wire Diameter (Inches)		Part Number (Note 5)	Part Number (Note 5)	Part Number (Note 5)	Part Number (Note 5)	Part Number (Note 5, 6)
		Min.	Min.					
30	7 x 38	0.023	0.026	X	X	M81381/9-30-XX	M81381/10-30-XX	X
28	7 x 36	0.026	0.029	X	X	M81381/9-28-XX	M81381/10-28-XX	X
26	19 x 38	0.031	0.034	M81381/7-26-XX	M81381/8-26-XX	M81381/9-26-XX	M81381/10-26-XX	M81381/21-26-XX
24	19 x 36	0.034	0.037	M81381/7-24-XX	M81381/8-24-XX	M81381/9-24-XX	M81381/10-24-XX	M81381/21-24-XX
22	19 x 34	0.041	0.044	M81381/7-22-XX	M81381/8-22-XX	M81381/9-22-XX	M81381/10-22-XX	M81381/21-22-XX
20	19 x 32	0.049	0.052	M81381/7-20-XX	M81381/8-20-XX	M81381/9-20-XX	M81381/10-20-XX	M81381/21-20-XX
18	19 x 30	0.059	0.062	M81381/7-18-XX	M81381/8-18-XX	X	X	M81381/21-18-XX
16	19 x 29	0.065	0.068	M81381/7-16-XX	M81381/8-16-XX	X	X	M81381/21-16-XX
14	19 x 27	0.078	0.082	M81381/7-14-XX	M81381/8-14-XX	X	X	M81381/21-14-XX
12	37 x 28	0.097	0.101	M81381/7-12-XX	M81381/8-12-XX	X	X	M81381/21-12-XX
10	37 x 26	0.127	0.124	M81381/7-10-XX	M81381/8-10-XX	X	X	M81381/21-10-XX

Notes:

4. Silver-coated copper is susceptible to cuprous oxide corrosion (“red plague”) when produced, stored or used in a moist or high humidity environment. The environment for this wire must be controlled.
5. Part number: The color code suffix shall be replaced by color code designators in accordance with MIL-STD-681 except that opaque dark yellow as defined in MIL-W-81381 shall be designated by the letter N, and unpigmented polyimide resin insulation shall be designated by the letter C. Examples: Size 20, opaque dark yellow - M81381/9-20-N; same with orange stripe - M81381/9-20-N3. Unpigmented insulation is preferred (no modified aromatic polyimide resin coating). Refer to page 16-5 for a listing of MIL-STD-681 color coding.
6. For MIL-W-81381/21 finished wire diameter, 24 AWG through 10 AWG, add 0.001 to the value shown.

**GSFC S-311-P-13 Wire, High Voltage, Crosslinked Polyalkene Over Crosslinked PVDF Insulation, (Notes 1, 2)
Tin Coated Copper, 135°C**



Type Destination	Wire Size, AWG	600 Volt			1000 Volt			2500 Volt		
		Stranding (Number of Strands x AWG Size of Strands)	Finished Wire Diameter (max)		Stranding (Number of Strands x AWG Size of Strands)	Finished Wire Diameter (max)		Stranding (Number of Strands x AWG Size of Strands)	Finished Wire Diameter (max)	
			In.	(mm)		In.	(mm)		In.	(mm)
311P13-XX-30-X	30	7 x 38	0.028	(.71)	---	---	---	---	---	---
311P13-XX-28-X	28	7 x 36	0.031	(.79)	7 x 36	0.034	(.86)	---	---	---
311P13-XX-26-X	26	7 x 34	0.035	(.89)	7 x 34	0.041	(1.08)	---	---	---
311P13-XX-24-X	24	19 x 36	0.041	(1.04)	19 x 36	0.046	(1.17)	19 x 36	0.059	(1.50)
311P13-XX-22-X	22	19 x 34	0.048	(1.22)	19 x 34	0.053	(1.35)	19 x 34	0.071	(1.80)
311P13-XX-20-X	20	19 x 32	0.056	(1.42)	19 x 32	0.061	(1.55)	19 x 32	0.080	(2.03)
311P13-XX-18-X	18	19 x 30	0.066	(1.68)	19 x 30	0.074	(1.88)	19 x 30	0.090	(2.29)
311P13-XX-16-X	16	19 x 29	0.074	(1.88)	19 x 29	0.082	(2.08)	19 x 29	0.100	(2.54)
311P13-XX-14-X	14	19 x 27	0.090	(2.29)	19 x 27	0.098	(2.49)	19 x 27	0.118	(3.00)
311P13-XX-12-X	12	37 x 28	0.122	(2.84)	19 x 25	0.127	(3.23)	19 x 25	0.148	(3.71)
311P13-XX-10-X	10	---	---	---	37 x 26	0.142	(3.61)	37 x 26	0.165	(4.19)
311P13-XX-8-X	8	---	---	---	133 x 29	0.208	(5.28)	133 x 29	0.228	(5.79)
311P13-XX-6-X	6	---	---	---	---	---	---	133 x 27	0.278	(7.06)
311P13-XX-4-X	4	---	---	---	---	---	---	133 x 25	0.336	(8.53)
311P13-XX-2-X	2	---	---	---	---	---	---	665 x 30	0.398	(10.1)
311P13-XX-0-X	0	---	---	---	---	---	---	1045 x 30	0.448	(12.4)
311P13-XX-00-X	00	---	---	---	---	---	---	1330 x 30	0.560	(14.2)

Notes:

1. For use in Grade 1 and 2 applications.
2. Primary insulation is crosslinked extruded Polyalkene. Jacket is crosslinked extruded PVDF.

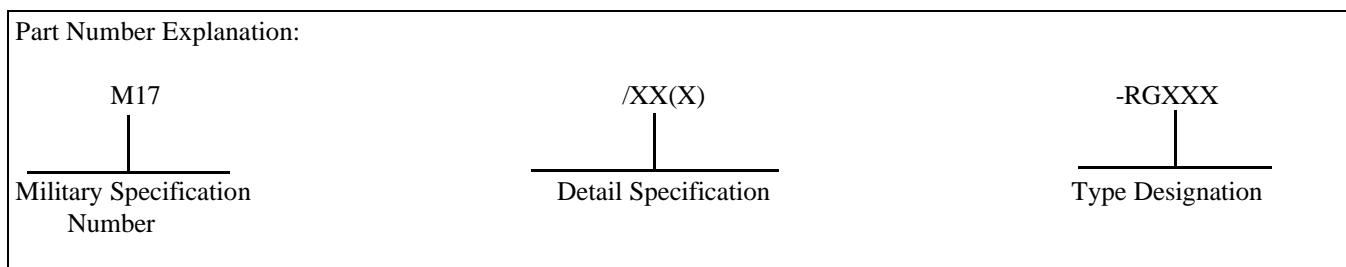
MIL-C-27500 Multiconductor Cable, Shielded and Unshielded, Jacketed and Unjacketed (Note 1)

Part number explanation (Note 2).						
<u>M27500</u>	<u>X</u>	<u>XX</u>	<u>XX</u>	<u>X(X)</u>	<u>X</u>	<u>XX</u>
Military Specification <u>Number</u>	<u>Braid Coverage</u>	<u>Wire AWG</u>	<u>Basic Wire Insulation Type</u>	<u>No. Of Wires</u>	<u>Shield Style and Material</u>	<u>Outer Jacket</u>
	- = 85% C = 90% (Note 3)	26 thru 2/0 (All conductors are same AWG)	(Note 4) <u>PTFE Teflon</u> LE=Mil-W-22759/9 RC=Mil-W-22759/11 RE=Mil-W-22759/12 TK=Mil-W-22759/20 TM=Mil-W-22759/22 TN=Mil-W-22759/23	1 thru 10 (Note 5)	Round Shield with normal strength copper strands (Note 6) U = No Shield <u>Single Shield</u> S=Silver T= Tin	00=No Jacket <u>Single Jacket</u> 06=PTFE Teflon (White) 09=FEP Teflon (White) 23=Crosslinked ETFE (White)
			<u>ETFE</u> TE=Mil-W-22759/16 TG=Mil-W-22759/18		<u>Double Shield</u> W=Silver V=Tin	<u>Double Jacket (Note 7)</u> 59=FEP Teflon (White) 73=Crosslinked ETFE (White)
			<u>Crosslinked ETFE</u> SB=Mil-W-22759/32 SM=MIL-W-22759/41 SC=Mil-W-22759/33 SP=MIL-W-22759/43 SD=Mil-W-22759/34 SR=MIL-W-22759/44 SE=Mil-W-22759/35 SS=MIL-W-22759/45			

Notes:

1. Cable may be used in Grade 1 or Grade 2 applications.
2. Part number explanation is for preferred construction. Use M22759/11 (Symbol RC) or M22759/33 (Symbol SC) for base wire with silver coated copper single shield (Symbol S) and FEP teflon single jacket (Symbol 09) as first choice. Other options are shown on page 16-3. Example of complete part number with above options for three #22 AWG conductors: M27500-22RC3S09 or M27500-22SC3S09. Consult MIL-C-27500 for other options.
3. Designation shown for braid coverage includes preferred conductor identification method (white base color with color spiral stripe.) Optional solid identification color coding is available.
4. Basic wire types are for preferred MIL-W-22759 wire contained in this section.
5. Single conductor cable must be shielded and/or jacketed. Otherwise, use one of the basic wire types listed in this section.
6. Flat style shield and other shield materials are available. Consult MIL-C-27500.
7. The double jacket symbol shall only be used in conjunction with a double shield symbol. The first jacket appears between the two shields and the second jacket over the outer shield. Both jackets are the same material.

MIL-C-17 Radio Frequency Coaxial Cable, Flexible and Semi-Rigid (Notes 1, 2)



Generic Type Designation	Part Number	Type	Impedance (Ohms)	Operating Frequency Max (Ghz)	Working Voltage Max (Vrms)	Shielding	Connector Accommodation Series	Temperature Range	Capacitance, Max (pF/ft)	Diameter (Inches)	
										Min	Max
RG142/U	M17/60-RG142	Flexible	50 ± 2	12.4	1,400	Double Braid	SMA,TNC,N	-55°C to +200°C	29.3 nominal	0.190	0.20
RG178/U	M17/93-RG178		50 ± 2	3	750	Single Braid	SMA		32	0.067	0.075
RG180/U	M17/95-RG180		95 ± 5	3	1,100	Single Braid	SMA (Note 3, 4)		17.4	0.137	0.145
RG302/U	M17/110-RG302		75 ± 3	3	1,700	Single Braid	SMA (Note 3, 4)		22	0.197	0.207
RG303/U	M17/111-RG303		50 ± 2	3	1,400	Single Braid	SMA, TNC		32	0.165	0.175
RG316/U	M17/113-RG316		50 ± 2	3	900	Single Braid	SMA,TNC		32	0.094	0.102
RG393/U	M17/127-RG393		50 ± 2	11	1,875	Double Braid	SMA (Note 3)		32	0.380	0.400
RG400/U	M17/128-RG400		50 ± 2	12.4	1,400	Double Braid	SMA,TNC,N		32	0.190	0.200
----	M17/152-00001		50 ± 2	12.4	900	Double Braid	SMA		32	0.110	0.118
RG402/U	M17/130-RG402		Semi-Rigid	50 ± 1	20	1,900	Copper Tubing		SMA	-40°C to	29.9
RG405/U	M17/133-RG405	Semi-Rigid	50 ± 1.5	20	1,500	Copper Tubing	SMA	+125°C	32	0.0855	0.0875

Notes:

1. For use in Grade 1 and 2 applications.
2. All cable has solid PTFE dielectric core. Flexible cable has FEP jacket. Semi-rigid cable outer conductor (shield) is bare copper.
3. Accommodating preferred connector is 50 ohm SMA soldercup type.
4. There are no 75 ohm or 95 ohm impedance connectors to accommodate this cable. Due to impedance mismatch, performance ratings are not applicable.

J-W-1177 Magnet Wire (Notes 1, 2)

Part Number Explanation:				
M1177	/X(X)	02	C	0XX
Federal Specification Number	Detail Specification Number	Two Digit Type Code 02 - Heavy Insulation	Single Letter Conductor Code C - Copper	Three Digit Size Code (Use AWG size of bare wire preceded by appropriate number of zeros)

Specification		J-W-1177/9 (Notes 3, 4)		J-W-1177/12		J-W-1177/14		J-W-1177/15	
Temperature Class (°C)		130		180		200		220	
Insulation Coating		Solderable Polyurethane Overcoated with Polyamide, Round		Polyester-Imide or Polyester-Amide-Imide, Round		Polyester, Polyester-Imide or Polyester-Amide-Imide, Overcoated with Polyamide-Imide, Round		Polyimide-Coated, Round	
AWG	Maximum Overall Diameter (inches)	Part Number	Minimum Breakdown Voltage (volts)	Part Number	Minimum Breakdown Voltage (volts)	Part Number	Minimum Breakdown Voltage (volts)	Part Number	Minimum Breakdown Voltage (volts)
14	0.0682	M1177/9-02C014	5700	M1177/12-02C014	6325	M1177/14-02C014	6325	M1177/15-02C014	6325
16	0.0545	M1177/9-02C016	5400	M1177/12-02C016	6000	M1177/14-02C016	6000	M1177/15-02C016	6000
18	0.0437	M1177/9-02C018	5125	M1177/12-02C018	5700	M1177/14-02C018	5700	M1177/15-02C018	5700
20	0.0351	M1177/9-02C020	4850	M1177/12-02C020	5400	M1177/14-02C020	5400	M1177/15-02C020	5400
22	0.0281	M1177/9-02C022	4625	M1177/12-02C022	5125	M1177/14-02C022	5125	M1177/15-02C022	5125
24	0.0227	M1177/9-02C024	4375	M1177/12-02C024	4850	M1177/14-02C024	4850	M1177/15-02C024	4850
26	0.0182	M1177/9-02C026	4150	M1177/12-02C026	4600	M1177/14-02C026	4600	M1177/15-02C026	4600
28	0.0147	M1177/9-02C028	3950	M1177/12-02C028	4375	M1177/14-02C028	4375	M1177/15-02C028	4375
30	0.0119	M1177/9-02C030	3725	M1177/12-02C030	4150	M1177/14-02C030	4150	M1177/15-02C030	4150
32	0.0098	M1177/9-02C032	3175	M1177/12-02C032	3525	M1177/14-02C032	3525	M1177/15-02C032	3525
34	0.0078	M1177/9-02C034	2675	M1177/12-02C034	2975	M1177/14-02C034	2975	M1177/15-02C034	2975
36	0.0063	M1177/9-02C036	2275	M1177/12-02C036	2525	M1177/14-02C036	2525	M1177/15-02C036	2525
38	0.0051	M1177/9-02C038	1925	M1177/12-02C038	2150	M1177/14-02C038	2150	M1177/15-02C038	2150
40 (Note 2)	0.0040	M1177/9-02C040	1625	M1177/12-02C040	1800	M1177/14-02C040	1800	M1177/15-02C040	1800
42 (Note 2)	0.0032	M1177/9-02C042	1375	M1177/12-02C042	1525	M1177/14-02C042	1525	M1177/15-02C042	1525
44 (Note 2)	0.0027	M1177/9-02C044	1175	M1177/12-02C044	1300	M1177/14-02C044	1300	M1177/15-02C044	1300

Notes:

1. Magnet wire is intended for use in magnetic devices, rotating equipment and similar applications where a tough film-type insulation providing adequate mechanical protection is desired.
2. For Grade 1 programs, only wire sizes 14 through 38 are acceptable.
3. Some QPL suppliers of J-W-1177/9 substitute /42 wire when /9 is ordered. The /42 wire has a temperature rating of 155°C. This substitution is acceptable to GSFC.
4. Due to outgassing concerns of the Nylon coating, M1177/9 wire and M1177/42 wire may not be acceptable for devices with open type construction.

THIS PAGE INTENTIONALLY LEFT BLANK