

## SPEC 44

### Product Facts

- Dual wall construction
- 600, 1000 and 2500 voltage rating
- Small size, light weight
- Resistant to most chemicals and electrical arc tracking



### Applications

SPEC 44 wire has a dual wall construction which combines the outstanding physical and electrical characteristics of radiation crosslinked polyalkene with the excellent mechanical and chemical properties of radiation cross-linked polyvinylidene fluoride (PVDF).

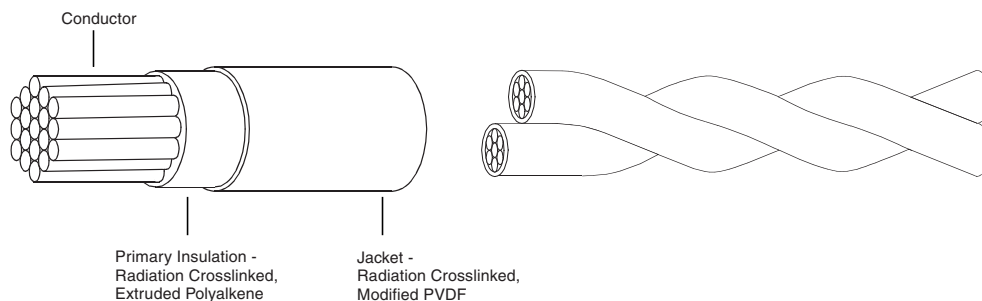
The result is a wire insulation system that offers a 150°C [302°F] temperature rating, small size, light weight, solder iron resistance, and resistance to most solvents, fuels and lubricants.

SPEC 44 wire and cable is highly flame retardant, non-melting, does not cold flow,

and though mechanically very tough, is easy to handle and install using conventional tools.

Originally developed for aerospace and military requirements in applications of high density and complex circuitry, SPEC 44 wire and cable now finds wide use throughout industry, in commercial and military electronics, avionics, on satellites, aircraft, helicopters, ships, trains, military ground systems, and offshore platforms where environmental conditions demand consistently reliable performance. In airframe applications SPEC 44 constructions can

offer a modern dimensional replacement for PVC/Nylon/ Glass braid type wire and cables. SPEC 44 wire is offered in a wide range of sizes in stranded conductors, standard materials available being tin or silver-plated copper and high strength copper alloy. Voltage ratings of 600, 1000 and 2500 volts are available as standard. Shielded and jacketed versions include single and multi-conductor constructions and flat braid shields where further size and weight savings are achieved.



Available in:	Americas	Europe	Asia Pacific
	■	■	■

## SPEC 44 (Continued)

### Physical Characteristics

#### Small Size

SPEC 44 equipment wire, 600 volt rated has a 0.19 [.008] nominal wall thickness compared to 0.25 [.010] and 0.38 [.015] for equivalent PTFE and PVC wires in MIL-DTL-16878, SAE AS22759 or BS 3G210.

#### Light Weight

Because of the thin wall and low density of the insulation materials considerable weight savings are made over similarly rated PTFE wires, eg:- 44A0111-22AWG equipment wire 4.45 grams/meter max  
22 AWG PTFE equipment wire, AS-81044  
5.54 grams/meter max

#### General Handling

The flexibility of SPEC 44 and the ease with which it takes a 'set' makes it one of the easiest of the 'high performance' wires to install. Stripping is done with conventional die blade strippers.

The tin-plated conductor usually specified is easily soldered or crimped. The insulation may be easily printed and does not need etching before potting.

#### Lengths

SPEC 44 is available in long continuous lengths and can be supplied for use on automatic cut and strip wire preparation machines.

### Specifications/Approvals

AS-81044, NEMA-WC-27500 (Cables)  
Def Stan. 61-12 Part 18 - Type 1 pliable (Maintenance Range)  
Def Stan. 61-12 Part 26 All types  
VG 95218 Parts 20, 21, 22, 23 and 1000  
NATO Stock Numbers (NSN's) exist for most standard constructions  
Civil Aviation Authority Accessory Approval E11623  
TE Specification 44

### Typical Properties

Temperature rating	-65°C to +150°C [-85°F to +302°F]
Voltage rating (thin wall)	600 V
Voltage rating (thick wall)	2500 V
Tensile strength and elongation of insulation	28 N/mm <sup>2</sup> , (4000 PSI), 230%
Notch propagation, 0.05mm notch	Pass
Solder iron resistance (370°C, 1 minute)	Pass
Shrinkage, 300°C	<1%
Low temperature bend	-65°C [-85°F]
Voltage withstand (thin wall)	2500 V
Resistance: fuels, oils, solvents	Pass

## SPEC 44 (Continued)

### Environmental Performance

#### Temperature Rating

SPEC 44 wire and cable is rated for continuous operation from -65°C to +150°C [-85°F to +302°F] and for short periods at temperatures as high as 300°C [572°F]. Heat ageing tests are routinely performed at temperatures of 200°C [392°F] (168 hr) and 300°C [572°F] (6 hr). In addition SPEC 44 insulation will not shrink back under repeated cycling.

#### Mechanical Performance

SPEC 44 wire provides better cut through resistance than some wires with much thicker walls. 600 volt equipment wire 44A0111 (0.19 mm wall) has 40% greater cut through resistance than 600 volt PTFE insulated wire (0.25 mm wall).

#### Solder Iron/Overload Resistance

The radiation crosslinking of the materials used in SPEC 44 makes them non-melting at high temperature. As a result SPEC 44 wire is resistant to prolonged contact with solder irons and is resistant to current overloads which would melt most thermoplastic insulation.

#### Chemical Resistance

The irradiated dual wall construction of SPEC 44 wire is highly resistant to many acids, alkalis, hydrocarbon solvents, fuels, lubricants, water, and many missile fuels and oxidizers.

#### Cold Flow

Radiation cross-linking of SPEC 44 prevents cold flow of the insulation — a recognized problem of some uncrosslinked materials.

#### Voltage Ratings

Standard available voltage ratings for SPEC 44 wire are 600 volts (0.19 mm wall thickness), 1000 volts (0.28 mm wall) and 2500 volts (0.48 mm wall).

#### Electrical Arc Track Resistance

SPEC 44 insulation demonstrates a resistance to arc tracking under both wet and dry conditions at aircraft system voltages.

#### Low Outgassing

For use in space applications, special constructions of SPEC 44 wire are available with low outgassing characteristics, for use in an environment of high vacuum and high temperature.

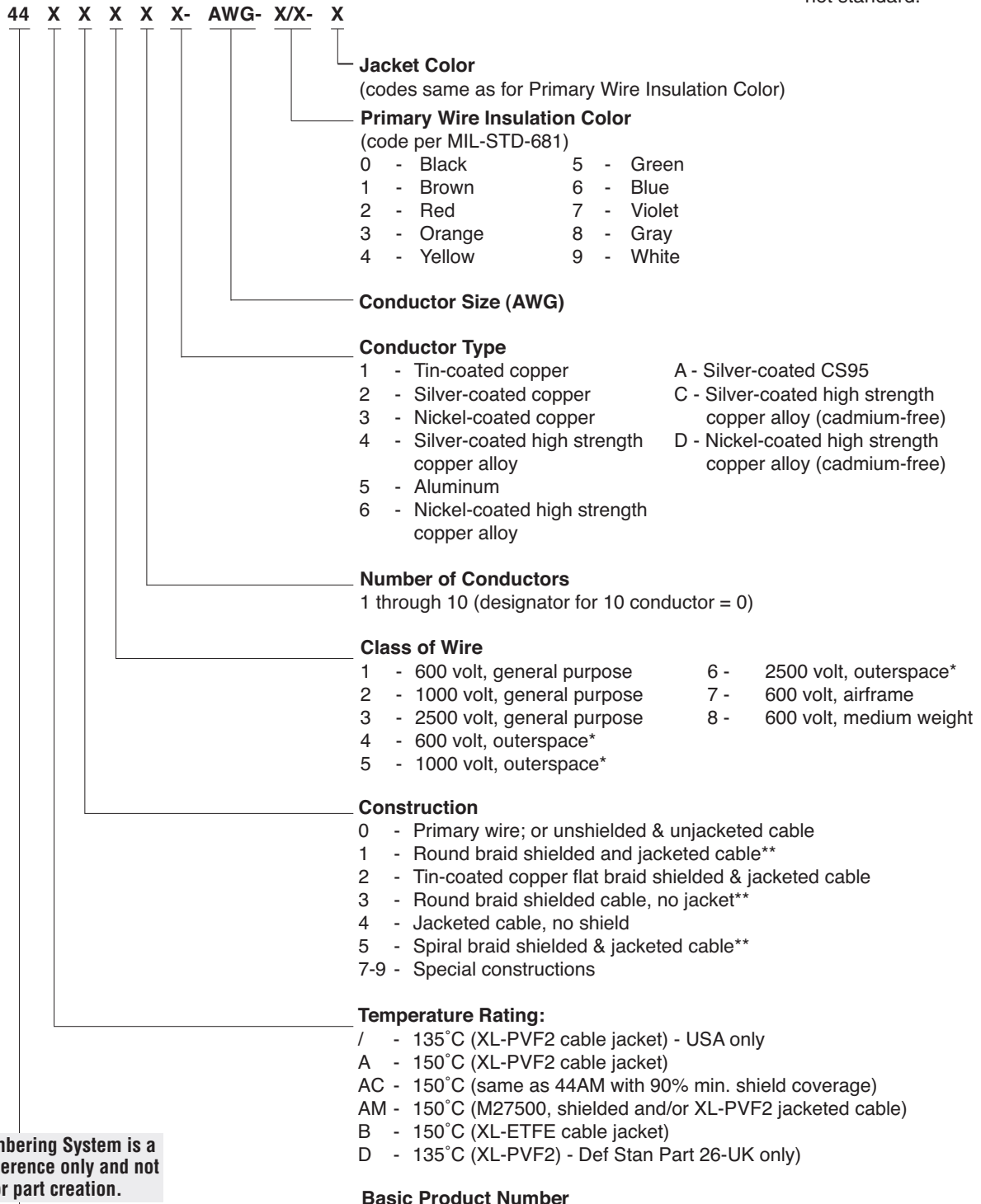
### Fire Hazard Performance

Flammability	Federal Aviation Reg FAR-25	Pass
	BS EN 50265 Vertical Flammability	Pass
	S424 14751 (Swedish chimney)	Pass
	NFC 32070 (2) (French chimney)	Pass
	IEC 60332 part 3 (Cable ladder)	Pass
Smoke/Toxicity Index	Smoke Index, Def Stan 61-12 (18)	6 per meter of wire
	Toxicity Index, Def Stan 61-12 (18)	0.8 per meter of wire
	BS EN 1S0-4589 Part 2	30% Oxygen
	BS EN 1S0-4589 Part 3	
	Temperature Index, NES 715	>300°C [572°F]

## SPEC 44 (Continued)

### Part Numbering System

Cross items that are not standard.



**Part Numbering System is a cross reference only and not meant for part creation.**

\* Classes 4, 5 and 6 available only as "44/" constructions. 44/7xxx and 44A7xxx will be available as indicated on the applicable SCD.  
\*\*Shield coating same as conductor coating except: - for Conductor Type 4, 6, C and D, shield shall be tin-coated copper for standard products

Typical ordering example	3 conductors, brown, yellow with green stripe, blue, white jacket. If 600 volt, round braid, 20 AWG tinned conductor, 44A1131-20-1/45/6-9.
Ordering information	Other constructions and custom designed wire and cable are available on request.

## SPEC 44 (Continued)

### NEMA WC-27500 Cable Part Numbering System

M27500 X AWG XX X X XX

Basic Specification Number

Component Wire ID/Shield Coverage Code

#### Shield Coverage

85%	90%
-	C
A	D
B	E
F	H
G	J
K	M
L	N
P	R
S	T
U	V

#### Component Wire Identification

Colored Stripes on White Wire  
(9/96/93/95/92/90/94/97/98/91... etc.)  
Solid Color Wires (9/6/3/5/2/0/4/7/8/1...etc.)  
Band Marks on Solid Colors (by AWG)  
Alternate Colored Stripes  
(92/96/94/95/9/90/91/93/97/98...etc)  
Alternate Solid Colors (2/6/4/5/9/0/1/3/7/8...etc.)  
Number Marking on Solid Colors (by AWG)  
Number Marking on White Wires  
Band Marks on Colored Stripes (by AWG)  
Band Marks on White Wires  
Non-standard color - defined by customer

Conductor Size (AWG)

Basic Wire Spec Code (MIL-W-81044) and Slash Sheet

MD - M81044/5 (44A0712)  
ME - M81044/6 (44A0711)  
MF - M81044/7 (44A0714)  
MG - M81044/8 (44A0812)  
MH - M81044/9 (44A0811)  
MJ - M81044/10 (44A0814)  
MK - M81044/11 (44A0112)  
ML - M81044/12 (44A0111)  
MM - M81044/13 (44A0114)

Number of Component Wires

Shield Material and Style Code

U - No shield  
T - Tin-coated copper, round  
J - Tin-coated copper, flat  
S - Silver-coated copper, round  
G - Silver-coated copper, flat  
N - Nickel-coated copper, round

Jacket Material and Style Code

00 - No jacket  
08 - Crosslinked, white PVDF  
23 - Crosslinked, white Modified ETFE

Example: M27500-22ML3T08 = 44AM1131-22-9/96/93-9

Tyco Electronics Part No.

Military Part No.

Part Numbering System is a  
cross reference only and not  
meant for part creation.

**SPEC 44** (Continued)

**Primary Wires/Twisted Pair**

**44A011X (600 V)**  
Primary Wire

**44A021X (1000 V)**  
Primary Wire

Wire Size (AWG)	Stranding		CSA (mm <sup>2</sup> )	44A011X (600 V)		44A021X (1000 V)	
	(mm)	#/AWG		Nom. OD	Max. Weight (g/m) lb/kft	Nom. OD	Max. Weight (g/m) lb/kft
30	7/0.10	7/38	0.06	0.68 [0.027]	1.06 [0.71]	0.81 [0.032]	1.34 [0.9]
28	7/0.13	7/36	0.09	0.76 [0.030]	1.43 [0.96]	0.89 [0.035]	1.64 [1.1]
26*	19/0.10	19/38	0.15	0.86 [0.034]	2.08 [1.4]	1.02 [0.040]	2.38 [1.6]
24	19/0.13	19/36	0.25	1.02 [0.040]	2.98 [2.0]	1.17 [0.046]	3.57 [2.4]
22	19/0.16	19/34	0.40	1.19 [0.047]	4.46 [3.0]	1.37 [0.054]	5.20 [3.5]
20	19/0.20	19/32	0.60	1.40 [0.055]	6.70 [4.5]	1.57 [0.062]	7.59 [5.1]
18	19/0.25	19/30	1.00	1.65 [0.065]	10.12 [6.8]	1.85 [0.073]	11.46 [7.7]
16	19/0.29	19/29	1.25	1.83 [0.072]	12.80 [8.6]	2.06 [0.081]	14.58 [9.8]
14	19/0.36	19/27	2.00	2.26 [0.089]	19.64 [13.2]	2.49 [0.098]	21.88 [14.7]
12	37/0.32	37/28	3.00	2.74 [0.108]	30.06 [20.0]	2.97 [0.117]	32.89 [22.1]
10	37/0.40	37/26	5.00	3.28 [0.129]	46.28 [31.1]	3.71 [0.146]	52.98 [35.6]
8	133/0.29	133/29	8.30	—	—	5.23 [0.206]	91.97 [61.8]

\*For 44A0211-26 the stranding is 7/0.16mm 7/34 AWG


**44A031X (2500 V)**  
Primary Wire

**44A081X (600 V)**  
Airframe Wire

**44A012X (600 V)**  
Twisted Pair

Wire Size (AWG)	Stranding		CSA (mm <sup>2</sup> )	44A031X (2500 V)		44A081X (600 V)		44A012X (600 V)	
	(mm)	#/AWG		Nom. OD	Max. Weight (g/m) lb/kft	Nom. OD	Max. Weight (g/m) lb/kft	Nom. OD	Max. Weight (g/m) lb/kft
30	7/0.10	7/38	0.06	—	—	—	—	1.37 [0.054]	2.38 [1.6]
28	7/0.13	7/36	0.09	—	—	—	—	1.52 [0.060]	3.13 [2.1]
26	19/0.10	19/38	0.15	1.35 [0.053]	3.13 [2.1]	1.22 [0.048]	2.98 [2.0]	1.73 [0.068]	4.31 [2.9]
24	19/0.13	19/36	0.25	1.44 [0.057]	4.46 [3.0]	1.37 [0.054]	3.87 [2.6]	2.03 [0.080]	6.39 [4.3]
22	19/0.16	19/34	0.40	1.75 [0.069]	6.40 [4.3]	1.57 [0.062]	5.65 [3.8]	2.38 [0.094]	9.37 [6.3]
20	19/0.20	19/32	0.60	1.98 [0.078]	9.08 [6.1]	1.78 [0.070]	8.04 [5.4]	2.79 [0.110]	13.98 [9.4]
18	19/0.25	19/30	1.00	2.23 [0.088]	12.95 [8.7]	2.03 [0.080]	11.91 [8.0]	3.30 [0.130]	21.27 [14.3]
16	19/0.29	19/29	1.25	2.46 [0.097]	16.22 [10.9]	2.26 [0.089]	14.73 [9.9]	3.65 [0.144]	26.93 [18.1]
14	19/0.36	19/27	2.00	2.92 [0.115]	24.10 [16.2]	2.74 [0.108]	22.17 [14.9]	4.52 [0.178]	42.25 [28.4]
12	37/0.32	37/28	3.00	3.32 [0.131]	36.01 [24.2]	3.20 [0.126]	32.59 [21.9]	5.48 [0.216]	65.91 [44.3]
10	37/0.40	37/26	5.00	4.09 [0.161]	54.32 [36.5]	3.94 [0.155]	52.08 [35.0]	—	—
8	133/0.29	133/29	8.30	96.20 [0.219]	96.73 [65.0]	92.94 [0.214]	93.46 [62.8]	—	—

# SPEC 44 (Continued)

## Shielded and Jacketed Cable



44A111X (600 V)  
1 Conductor



44A121X (1000 V)  
1 Conductor

Wire Size (AWG)	Stranding		44A111X (600 V)		44A121X (1000 V)	
	(mm)	#/AWG	Nom. OD	Max. Weight (g/m) lb/kft	Nom. OD	Max. Weight (g/m) lb/kft
30	7/0.10	7/38	1.54 [0.061]	5.21 [3.5]	—	—
28	7/0.13	7/36	1.61 [0.063]	5.80 [3.9]	—	—
26	19/0.10	19/38	1.57 [0.065]	6.84 [4.6]	1.73 [0.068]	6.85 [4.6]
24	19/0.13	19/36	1.83 [0.072]	8.63 [5.8]	1.98 [0.078]	9.67 [6.5]
22	19/0.16	19/34	2.01 [0.079]	10.71 [7.2]	2.24 [0.088]	12.35 [8.3]
20	19/0.20	19/32	2.26 [0.089]	14.73 [9.9]	2.54 [0.100]	17.41 [11.7]
18	19/0.25	19/30	2.62 [0.103]	20.68 [13.9]	2.82 [0.111]	22.62 [15.2]
16	19/0.29	19/29	2.79 [0.110]	24.55 [16.5]	3.02 [0.119]	26.64 [17.9]
14	19/0.36	19/27	3.22 [0.127]	34.08 [22.9]	3.45 [0.136]	36.16 [24.3]
12	37/0.32	37/28	3.70 [0.146]	47.77 [32.1]	4.14 [0.155]	49.56 [33.3]

Other sizes are also available in some constructions depending on conductor type and construction required.



44A181X (600 V)  
1 Conductor



44A112X (600 V)  
2 Conductor

Wire Size (AWG)	44A181X (600 V)		44A112X (600 V)	
	Nom. OD	Max. Weight (g/m) lb/kft	Nom. OD	Max. Weight (g/m) lb/kft
30	—	—	2.23 [0.088]	8.20 [5.8]
28	—	—	2.38 [0.094]	9.40 [6.6]
26	—	—	2.59 [0.102]	12.05 [8.1]
24	2.26 [0.089]	11.76 [7.9]	2.99 [0.118]	16.82 [11.3]
22	2.57 [0.101]	15.48 [10.4]	3.35 [0.132]	21.57 [14.5]
20	2.77 [0.109]	19.19 [12.9]	3.76 [0.148]	27.97 [18.8]
18	3.02 [0.119]	24.11 [16.2]	4.32 [0.170]	38.24 [25.7]
16	3.25 [0.128]	28.13 [18.9]	4.67 [0.184]	44.94 [30.2]
14	3.73 [0.147]	38.69 [26.0]	5.53 [0.218]	64.28 [43.2]
12	4.19 [0.165]	52.38 [35.2]	6.50 [0.256]	91.51 [61.5]

Other sizes are also available in some constructions depending on conductor type and construction required.

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