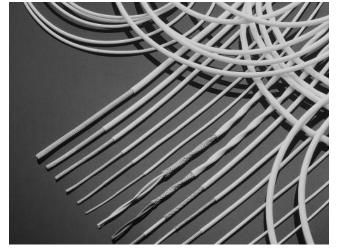


#### **SPEC 55**

# **Product Facts**

- Resistant to electrical arc tracking in wet or dry conditions
- Single or dual wall constructions
- Small size, ultra light weight
- Exceptional chemical resistance
- -65°C to 200°C [-85°F to 392°F]



### **Applications**

SPEC 55 wire is insulated with modified radiation cross-linked ETFE polymer. It has a temperature rating of -65°C to 200°C [-85°F to 392°F] continuous using a silver plated copper conductor, and combines the easy handling of a flexible wire with excellent scrape abrasion and cut-through characteristics.

The dual wall airframe construction of SPEC 55 wire is currently used on numerous aircraft programs. It has a choice of two total wall thicknesses, 0.25 [.010] (55A08XX 10 mil) and 0.2 [.008] (55A02XX 8 mil). Both have a contrasting core color to act as a damage indicator. Chosen for its balance of properties. SPEC 55 wire has outstanding resistance to chemicals and solvents, excellent electrical arc track resistance, and is not susceptible to UV and moisture degradation. Single wall equipment wire constructions are available in 0.10 [.004] (55/03XX 4 mil) and 0.15 [.006] (6 mil) wall thicknesses for use inside black boxes where flexibility and solderiron resistance make it a wire which is very easy to install reliably.

Both single and dual wall insulated wires are available

in twisted pairs, triples, etc., and as shielded and jacketed cables.

# Physical Characteristics Size and Weight

SPEC 55 wire provides one of the most comprehensive wiring product ranges for aerospace users, with a wide choice of conductor sizes and insulation wall thicknesses. The dual wall airframe wire has an insulation wall thickness of either 0.2 [.008] or 0.25 [.010] for robustness in unprotected harnesses and has excellent wire to wire abrasion properties.

The single wall equipment wire has a 0.15 [.006] wall thickness for use inside equipment and protected harnesses. For high density, interconnect wiring, the 450 volt 55M041X series of equipment wire has a nominal 0.1 [.004] wall and provides considerable weight and size savings over other comparable wires.

#### Handling

The excellent flexibility and handleability makes SPEC 55 the ideal wire to install, both in new aircraft and equipment and for maintenance purposes. The wire is easily stripped with conventional tooling. The insulation is readily marked

by hot stamp, ink jet or laser, and can be potted without pre-etching.

# SPEC 55PC Wire and Cable Insulation System

This product was originally developed to meet Boeing's material standard BMS13-48 for the 777 airliner. SPEC 55PC provides lightweight, compact insulation that matches the proven performance of our SPEC 55 wire. Today, 55PC is specified and utilized on the majority of aerospace platforms worldwide.

TE's rigorous, statistical-process-controlled manufacturing has produced wiring that is rugged and versatile enough for a wide range of commercial and defense aerospace applications, including electronic hook-ups in harsh, open airframe environments.

SPEC 55PC wire and cable systems feature an 8-mil airframe wire that is lighter and smaller than typical 10-mil wire, with little reduction in key mechanical performance features. SPEC 55PC wire offers flame resistance superior to FAA standards and also resists scrape abrasion, notch, propagation, cut-through, and electrical arc tracking.

- Meets Boeing material standard BMS 13-48.
- Exceeds FAR 25 test requirements for flame resistance and smoke density.

Available in:

Americas

Europe

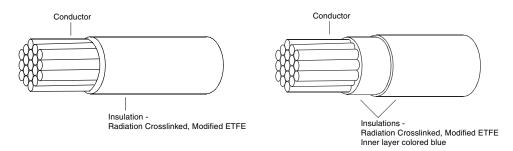
Asia Pacific

Catalog 1654025

Revised 5-12



# **Specifications**



SPEC 55 Insulation System - Single Wall

SPEC 55 Insulation System - Dual Wall

Defense Standard 61-12 Part 33 Issue 5	
Part 1001 and Part 1002	
VDE 9426, 9427, 9428	
British Standard 3G233	
Boeing BMS 13-48	
Airbus ABS 0820 to 0826	
NASA preferred product list	
European Space Agency 3901/012, 3901/020 and 3901/022	
TE Specification 55	
Civil Aviation Authority Accessory Approval E11623	
Contact TE for applicable product.	

# **Typical Properties**

Temperature rating	(Tin plated conductor)	-65°C to +150°C [-85°F to +302°F]		
	(Silver or nickel plated conductor)	-65°C to +200°C [-85°F to +392°F]		
Thermal endurance	e	200 °C [392°F], 10000 h		
Scrape abrasion (E	3S 3G233)	>100 cycles at 150°C [302°F]		
Flexing endurance	(Boeing BSS 7324)	>1000 cycles		
Voltage rating		600 V, 1000V		
Tensile strength +	elongation (core only)	(Dual wall wire) 35 N/mm², 125% min.		
Tensile strength + total elongation (core & primary jacket)		(Dual wall wire) 35 N/mm <sup>2</sup> , 75% min.		
Notch propagation BS 3G230 0.05 mm notch		Pass		
Solder iron resistar	nce (370 °C, 1 minute)	Pass		
Solderability -	Tin plated copper conductor BS 3G233 conditions	<0.8 secs to wet		
Shrinkage		<1%		
Long term water re	esistance	Will not hydrolyze		
Permitivity 1 KHz (ASTM D150)		2.7		
Dissipation factor (ASTM D150)		0.001		
FAR 25 Afterburn (sec) Burn length		<del>O</del> 30 sec. max. 75 mm [3 in.] max.		



#### **Environmental Performance**

#### **Temperature Rating**

SPEC 55 wire and cable is rated for continuous operation from -65°C to +200°C [-85°F to +392°F] and for short periods at temperatures as high as 400°C [752°F].

#### **Mechanical Performance**

Radiation crosslinking of the SPEC 55 insulation significantly improves the following mechanical characteristics; scrape (sharp edges), cross wire abrasion, cut-through resistance and creep resistance.

# Solder Iron/Overload Resistance

Radiation crosslinking ensures that the insulation resists melting at high temperatures. As a result SPEC 55 wire is resistant to hot solder irons and current overloads which would melt most thermoplastic insulation.

#### **Chemical Resistance**

SPEC 55 is unaffected by all commonly used chemicals, eg. fuels, hydraulic fluids, defluxing agents, cleaners, coolants and de-icers. It also shows excellent resistance to weathering (UV, ozone, pollutants, water).

#### **Space Wire**

SPEC 55 is available in special versions suitable for use in outer space meeting both ESA and NASA requirements for outgassing.

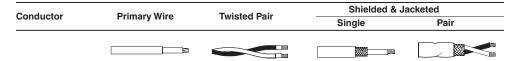
#### **Flammability**

Special additives increase the flame retardance of SPEC 55 compared to unirradiated ETFE so that it meets the latest high performance tests, eg. BS 3G230 and vertical test FAR25.

# Electrical Arc Tracking Resistance

SPEC 55 insulation demonstrates resistance to arc tracking under both wet and dry conditions at aircraft system voltages.

SPEC 55 Wire & Cable: Standard Constructions, Nominal Sizes, Strandings, Diameters and Weights



#### 55PC - Extra Light Weight Constructions

For applications where weight is critical, light weight tight tolerance conductors and insulation are available. These are manufactured using statistical process control methods and achieve weights that are equal or lighter than the equivalent polyimide/PTFE constructions.



55A - AWG Conductor: Equipment/Interconnect Wires & Cables

Wire	01	55	55A011X		N012X
Size (AWG)	Stranding (mm)	Nom. OD	Max. Weight (g per m/lbs per kft)	Nom. OD	Max. Weight (g per m/lbs per kft)
30	7/0.102	0.61 [0.024]	0.98 [0.66]	1.27 [0.048]	1.94 [1.3]
28	7/127	0.68 [0.027]	1.35 [0.91]	1.42 [0.054]	2.68 [1.8]
26	19/102	0.81 [0.032]	2.08 [1.4]	1.67 [0.064]	4.16 [2.8]
24	19/127	0.94 [0.037]	2.98 [2.0]	1.93 [0.074]	5.96 [4.0]
22	19/0.16	1.09 [0.043]	4.17 [2.8]	2.23 [0.086]	8.63 [5.8]
20	19/0.203	1.27 [0.050]	6.40 [4.3]	2.66 [0.102]	13.24 [8.9]
18	19/0.25	1.52 [0.060]	9.67 [6.5]	3.20 [0.122]	20.09 [13.5]
16	19/287	1.73 [0.068]	12.35 [8.3]	3.58 [0.138]	25.75 [17.3]
14	19/0.36	2.20 [0.085]	19.34 [13.0]	4.47 [0.172]	39.58 [26.6]
12	37/0.32	2.62 [0.103]	29.32 [19.7]	5.38 [0.208]	59.97 [40.3]
10	37/0.403	3.25 [0.128]	47.32 [31.8]	6.65 [0.256]	96.58 [64.9]
8	133/0.287	4.77 [0.188]	87.50 [58.8]	9.80 [0.376]	178.58 [120.0]

	Į.	55A111X		55A112X
Wire Size (AWG)	Nom. OD	Max. Weight (g per m/lbs per kft)	Nom. OD	Max. Weight (g per m/lbs per kft)
30	1.51 [0.057]	5.06 [3.4]	2.12 [0.081]	8.03 [5.4]
28	1.59 [0.060]	5.80 [3.9]	2.27 [0.087]	9.37 [6.30]
26	1.71 [0.065]	6.85 [4.6]	2.53 [0.097]	11.75 [7.9]]
24	1.84 [0.070]	8.19 [5.5]	2.80 [0.107]	14.58 [9.8]
22	1.99 [0.076]	10.27 [6.9]	3.07 [0.119]	18.15 [12.2]
20	2.20 [0.084]	13.40 [9.0]	3.50 [0.135]	24.10 [16.2]
18	2.45 [0.094]	17.86 [12.0]	4.10 [0.155]	32.60 [21.9]
16	2.67 [0.102]	21.73 [14.6]	4.43 [0.171]	39.73 [26.7]
14	3.10 [0.119]	30.36 [20.4]	5.30 [0.205]	57.13 [38.4]
12	3.55 [0.137]	42.41 [28.5]	6.30 [0.243]	81.98 [55.1]
10	4.20 [0.161]	62.65 [42.1]	7.40 [0.291]	123.63 [83.1]
8	5.80 [0.223]	110.42 [74.2]	10.60 [0.417]	226.15 [152.0]

## 55A - AWG Conductor: Airframe Wires & Cables

Wire Ottomation		55A081X		55 <i>A</i>	\082X
Size (AWG)	Stranding (mm)	Nom. OD	Max. Weight (g per m/lbs per kft)	Nom. OD	Max. Weight (g per m/lbs per kft)
26	19/102	1.01 [0.040]	2.5 [1.7]	2.10 [0.080]	5.06 [3.4]
24	19/127	1.14 [0.045]	3.4 [2.3]	2.33 [0.090]	6.84 [4.6]
22	19/0.16	1.27 [0.050]	4.8 [3.2]	2.64 [0.102]	9.98 [6.7]
20	19/0.203	1.47 [0.058]	7.0 [4.7]	3.07 [0.118]	14.73 [9.9]
18	19/0.25	1.78 [0.070]	10.7 [7.2]	3.63 [0.140]	21.88 [14.7]
16	19/287	1.96 [0.077]	13.4 [9.0]	4.06 [0.156]	27.53 [18.5]
14	19/0.36	2.40 [0.094]	20.5 [13.8]	4.90 [0.190]	42.26 [28.4]
12	37/0.32	2.82 [0.111]	30.5 [20.5]	5.80 [0.224]	63.00 [42.3]
10	37/0.403	3.40 [0.134]	48.3 [32.4]	7.10 [0.272]	98.96 [66.5]

	55A181X			55A182X
Wire Size (AWG)	Nom. OD	Max. Weight (g per m/lbs per kft)	Nom. OD	Max. Weight (g per m/lbs per kft)
26	1.71 [0.073]	7.89 [5.3]	2.63 [0.113]	14.29 [9.6]
24	1.84 [0.078]	9.37 [6.3]	2.80 [0.123]	16.37 [11.0]
22	1.99 [0.084]	11.76 [7.9]	3.07 [0.135]	20.68 [13.9]
20	2.20 [0.092]	14.88 [10.0]	3.50 [0.151]	27.08[18.2]
18	2.45 [0.103]	19.79[13.3]	4.10 [0.173]	36.46 [24.5]
16	2.67 [0.111]	23.81[16.0]	4.43 [0.189]	42.86 [28.8]
14	3.10 [0.128]	33.03 [22.2]	6.30 [0.225]	61.61 [41.4]
12	3.55 [0.145]	45.09 [30.3]	6.30 [0.259]	85.42 [57.4]
10	4.20 [0.168]	66.97[45.0]	— [0.308]	127.54 [85.7]

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### 55PC - AWG Conductor: **Statistical Process Controlled Airframe Wires & Cables**

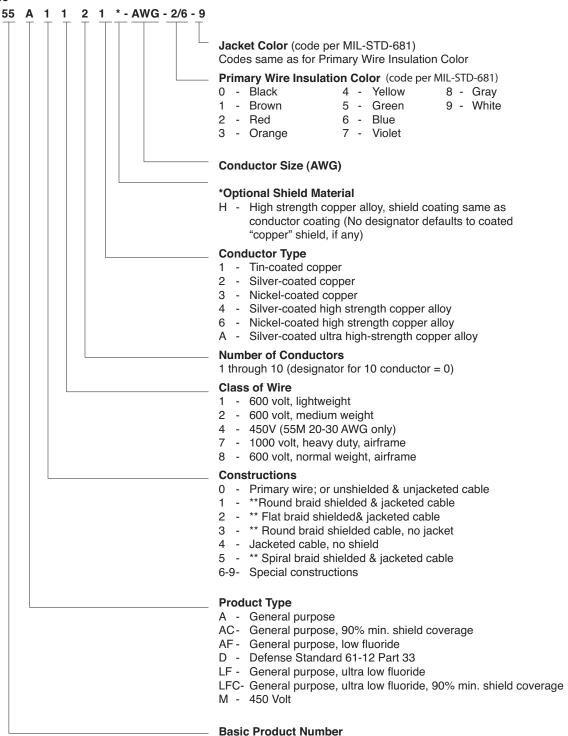
Wire Stranding Size (mm)		55F	55PC021X		C022X
		Nom. OD	Target Weight (g per m/lbs per kft)	Nom. OD	Target Weight (g per m/lbs per kft)
26	19/102	0.087 [0.035]	2.05 [1.38]	_	_
24	19/127	1.00 [0.0395]	2.95 [1.98]	2.00 [0.079]	5.95 [4.00]
22	19/0.16	1.15 [0.0455]	4.31 [2.90]	2.31 [0.091]	8.74 [5.87]
20	19/0.203	1.37 [0.0540]	6.51 [4.38]	2.74 [0.108]	13.2 [8.87]
18	19/0.25	1.61 [0.0635]	9.81 [6.59]	3.22 [0.127]	19.84 [13.33]
16	19/287	1.80 [0.0710]	12.46 [8.37]	3.60 [0.142]	25.21 [16.94]
14	19/.036	2.18 [0.0860]	19.17 [12.88]	4.36 [0.172]	38.80 [26.07]
12	37/0.32	2.66 [0.1047]	29.36 [19.73]	5.30 [0.209]	59.42 [39.93]
10	37/0.403	3.27 [0.1290]	46.31 [31.12]	6.55 [0.258]	93.92 [62.99]

	55PC121X			C122X
Wire Size (AWG)	Nom. OD	Target Weight (g per m/lbs per kft)	Nom. OD	Target Weight (g per m/lbs per kft)
26	1.52 [0.064]	6.54 [4.4]	2.33 [0.100]	11.34 [7.62]
24	1.65 [0.069]	7.86 [5.28]	2.89 [0.109]	13.90 [9.34]
22	1.80 [0.075]	9.81 [6.59]	2.89 [0.122]	17.89 [12.02]
20	2.00 [0.083]	12.83 [8.62]	3.30 [0.139]	23.84 [16.02]
18	2.23 [0.093]	17.01 [11.43]	3.78 [0.158]	32.10 [21.57]
16	2.44 [0.100]	20.36 [13.68]	4.16 [0.174]	39.00 [26.21]
14	2.79 [0.116]	28.69 [19.28]	4.92 [0.204]	55.21 [37.10]
12	3.30 [0.135]	40.73 [27.37]	5.92 [0.243]	80.23 [53.45]
10	3.98 [0.159]	59.90 [40.25]	7.39 [0.297]	123.65 [83.09]

X = 1 -Tin plated copper conductor.
 4 -Silver plated high strength copper alloy conductor. (Recommended for size 24 & 26 in airframe applications and mandatory for CAA release.)



# **Part Numbering System** 55A and 55LF — **General Purpose**



- for Conductor Type 4, shield shall be tin-coated cooper

- for Conductor Types 6 and A, flat braid only, shield shall be tin-coated copper

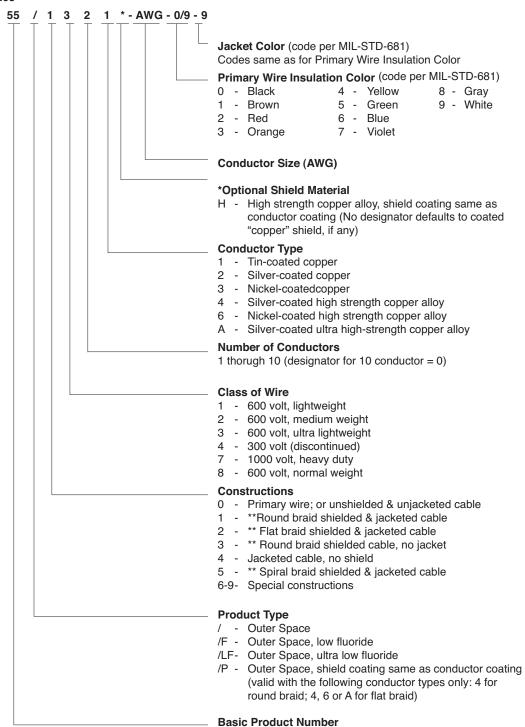
The UK manufactures and supply large volumes of 55Mx4x4 (450 volt) construction wires and cables for Aerospace and Multisport applications.

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

<sup>\*\*</sup>Except for p/ns with Shield Material designation "H", shield coating same as conductor coating, except:



# Part Numbering System 55/ — Outer Space

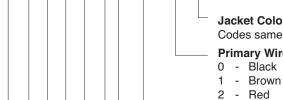


<sup>\*\*</sup>For 55/: Except for p/ns with Shield Material designation "H", shield coating same as conductor coating, **except**: - for Conductor Type 4, shield shall be tin-coated cooper; - for Conductor Types 6 and A, flat braid only, shield shall be tin-coated copper. For 55/P, /LF: Shield coating same as conductor coating.

For product released to ESCC 3901/012, 3901/020 and/or 3901/022, please refer to TE for product designation and construction.

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

55 PC 1 1 2



4 \* - AWG - 2/6 - 9

Jacket Color (code per MIL-STD-681)

Codes same as for Primary Wire Insulation Color

**Primary Wire Insulation Color** (code per MIL-STD-681)

4 - Yellow 8 - Gray 5 - Green 9 - White

6 - Blue Orange 7 -Violet

#### Conductor Size (AWG)

#### \*Optional Shield Material

H - High strength copper alloy, shield coating same as conductor coating (No designator defaults to coated "copper" shield, if any)

#### **Conductor Type**

- 1 Tin-coated copper
- Silver-coated copper
- Nickel-coated copper
- Silver-coated high strength copper alloy
- Aluminum
- Nickel-coated high strength copper alloy
- Silver-coated ultra high-strength copper alloy

#### **Number of Conductors**

1 through 10 (designator for 10 conductor = 0)

0 - 10 conductors

#### Class of Wire

- 600 volt, lightweight, general purpose, single wall
- 600 volt, medium weight, general purpose
- 600 volt, lightweight, general purpose, dual wall
- 1000 volt, heavy duty, airframe, general purpose
- 600 volt, normal weight, airframe, general purpose

#### Constructions

- 0 Primary wire; or unshielded & unjacketed cable
- \*\*Round braid screened & jacketed cable
- \*\* Flat braid screened & jacketed cable
- \*\* Round braid, screened cable, no jacket
- Jacketed cable, no shield
- \*\* Spiral braid shielded & jacketed cable
- 6-9- Special constructions

### **Product Type**

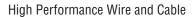
- PC- Process Control
- PCF- Process Control, low fluoride
- PCFL-Process Control, low fluoride (lite)
- PCL Process Control (lite)
- PCT- Process Control (stripping thread under jacket, and shield, if any)
- PLF Process Control, ultra low fluoride
- PLFL-Process Control, ultra low fluoride (lite)

#### **Basic Product Number**

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

9-17

<sup>\*\*</sup>Except for p/ns with Shield Material designation "H", shield coating same as conductor coating, except: For 55PCL - for conductor type 6, flat braid only, shield shall be tin-coated copper For 55PC and 55PCT - for conductor Type 4 and A, shield shall be tin-coated cooper for Conductor Type 6, flat braid only, shield shall be tin-coated copper





Typical Ordering Example	3 conductors, red, yellow, blue, 600 volt equipment wire with overall round braid, 20 AWG tinned conductor and white jacket: total part number is 55A1131-20-2/4/6-9.
Ordering Information	A list of stock policy items can be identified by contacting TE.

# SPEC 55 Part Numbering System — General

Temperature Rating	Conductor Material	AWG Range Available	Part Number	MIL-SPEC No.
600-V Lightweight Single	-wall Hookup Wire, .152 [.006] Nominal Wall			
150°C [302°F]	Tin-coated copper	12–30	55A0111	M22759/32
200°C [392°F]	Silver-coated copper	12–28	55A0112	M22759/44
200°C [302°F]	Nickel-coated copper	12–28	55A0113	M22759/45
200°C [392°F]	Silver-coated high-strength alloy	20–30	55A0114	M22759/33
200°C [392°F]	Nickel-coated high-strength alloy	20–28	55A0116	M22759/46
600-V Lightweight Dual-v	vall Airframe Wire, .203 [.008] Nominal Wall			
150°C [302°F]	Tin-coated copper	6–26	55A0211	_
200°C [392°F]	Silver-coated copper	10–26	55A0212	_
200°C [392°F]	Nickel-coated copper	10–26	55A0213	_
200°C [392°F]	Silver-coated high-strength alloy	18–30	55A0214	_
200°C [392°F]	Nickel-coated high-strength alloy	16–26	55A0216	_
600-V Dual-wall Airframe	Wire, .254 [.010] Nominal Wall			
150°C [302°F]	Tin-coated copper	00–24	55A0811	M22759/34
200°C [392°F]	Silver-coated copper	00–26	55A0812	M22759/43
200°C [392°F]	Nickel-coated copper	00–26	55A0813	M22759/41
200°C [392°F]	Silver-coated high-strength alloy	20–26	55A0814	M22759/35
200°C [392°F]	Nickel-coated high-strength alloy	20–26	55A0816	M22759/42
1000-V Medium-Weight D	ual-wall Airframe Wire, .381 [.015] Nominal Wall			
150°C [302°F]	Tin-coated copper	10–24	55A0711	_
200°C [392°F]	Silver-coated copper	16–24	55A0712	_
200°C [392°F]	Nickel-coated copper	16–24	55A0713	_
200°C [392°F]	Silver-coated high-strength alloy	16–24	55A0714	_
200°C [392°F]	Nickel-coated high-strength alloy	16–26	55A0716	_



# **SPEC 55 Cable Constructions**

	Number of	Component	Shield	Part N	lumber
Construction	Components	Conductor <sup>1</sup>	Material <sup>1</sup>	Light Wt. <sup>2</sup>	Medium Wt.
	2–10	1	_	55*01X1-AWG-Y	55*08X1-AWG-Y
		2	_	55*01X2-AWG-Y	55*08X2-AWG-Y
Unshielded, unjacketed		3	_	55*01X3-AWG-Y	55*08X3-AWG-Y
urijacketeu		4	_	55*01X4-AWG-Y	55*08X4-AWG-Y
		6	_	55*01X6-AWG-Y	55*48X6-AWG-Y
	2–10	1	_	55*41X1-AWG-Y	55*48X1-AWG-Y
		2	_	55*41X2-AWG-Y	55*48X2-AWG-Y
Unshielded, jacketed		3	_	55*41X3-AWG-Y	55*48X3-AWG-Y
acketeu		4	_	55*41X4-AWG-Y	55*48X4-AWG-Y
		6	_	55*41X6-AWG-Y	55*48X6-AWG-Y
	1–10	1	1	55*11X1-AWG-Y	55*18X1-AWG-Y
Shielded	ZVV/AV/AVA	2	2	55*11X2-AWG-Y	55*18X2-AWG-Y
(round braid),		3	3	55*11X3-AWG-Y	55*18X3-AWG-Y
jacketed		4	1	55*11X4-AWG-Y	55*18X4-AWG-Y
		6	3	55*11X6-AWG-Y	55*18X6-AWG-Y
	1–10	1	1	55*21X1-AWG-Y	55*28X1-AWG-Y
Shielded		2	1	55*21X2-AWG-Y	55*28X2-AWG-Y
(flat braid),		3	1	55*21X3-AWG-Y	55*28X3-AWG-Y
acketed		4	1	55*21X4-AWG-Y	55*28X4-AWG-Y
		6	1	55*21X6-AWG-Y	55*28X6-AWG-Y

<sup>&</sup>lt;sup>1</sup>Type of conductor or shield material: 1 = tin-coated copper

X = no. of wire components
 Y = color code
 For complete part number, see Part Numbering System on page 9-15.

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<sup>2 =</sup> silver-coated copper

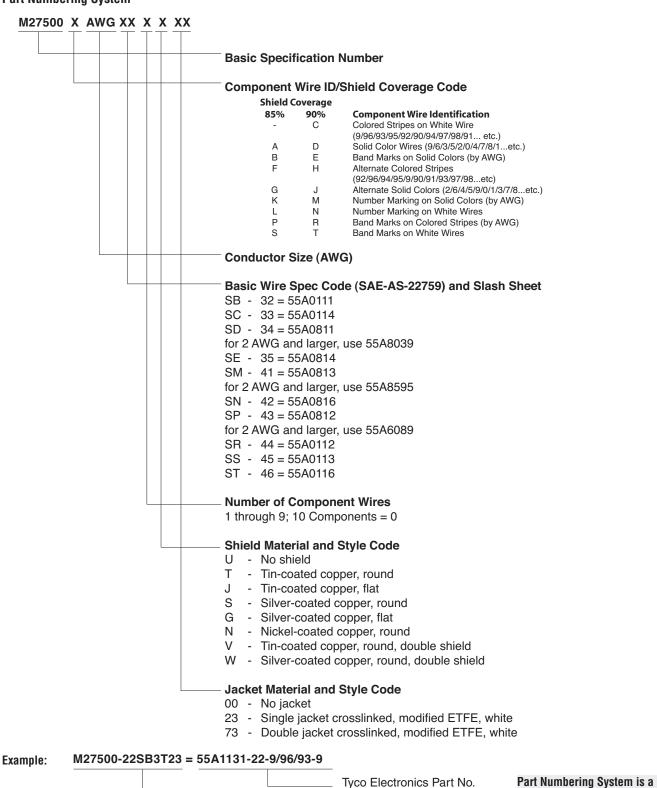
<sup>3 =</sup> nickel-coated copper

<sup>4 =</sup> silver-coated high-strength copper alloy 6 = nickel-coated high-strength copper alloy

<sup>\* =</sup> A or PC



# NEMA WC-27500 Cable Part Numbering System



9-20

Catalog 1654025 Revised 5-12

www.te.com

Canada: +1 (905) 475-6222 Mexico/C. Am.: +52 (0) 55-1106-0800 Latin/S. Am.: +54 (0) 11-4733-2200

Military Part No.

UK: +44 (0) 800-267666 France: +33 (0) 1-3420-8686 Netherlands: +31 (0) 73-6246-999 China: +86 (0) 400-820-6015

cross reference only and not

meant for part creation.

# 单击下面可查看定价,库存,交付和生命周期等信息

# >>TE Connectivity(泰科)