INTRODUCTION

High Performance Wire and Cable

Comprehensive Range of High Performance Wire and Cable for Harsh Environments

An extensive portfolio of wire and cable products are available in a wide range of conductor sizes, constructions and colours. The product range covers primary wire, screened and jacketed multi-core, airframe, coaxial, miniature and custom cables.

Typical characteristics include chemical and fluid resistance, lightweight, highly flexible and excellent electrical and mechanical performance. Temperature capabilities range from -65°C to +260°C allowing products to be used in a wide variety of markets and applications.

The current stock profile also contains a large selection of Aerospace wire and cables, including XLETFE, XLPE/XLPVDF and Hybrid constructions for use in the majority of today's commercial and military aircraft fleets.

Typical Features & Benefits

- Chemical resistance
- Electrical insulation
- Fluid & solvent resistance
- Flexibility
- Flame-retardant, Low Smoke
- Lightweight
- Extreme temperature performance
- Materials available to suit a wide range of markets and applications

We are committed to supplying an extensive range of wire and cable products using the latest insulation technologies, with a wide choice of constructions, conductor sizes and colours.

High Performance Wire and Cable

Selection of wire and cable for Aerospace, Defence, Marine and other challenging environment applications, where durable, light weight and strength is required.

Thin wall technology offering up to 33% space savings and up to 50% reduction in weight for your given wire bundle, compared to conventional wire.

Complete range of wires and cables for both commercial and military aerospace applications, Airbus Group and Boeing approved.

Power

Flexible high performance power cables.

Controlled Electrical Cables

Probably the lightest, toughest and most flexible range of wire and cable available for harsh environment applications.

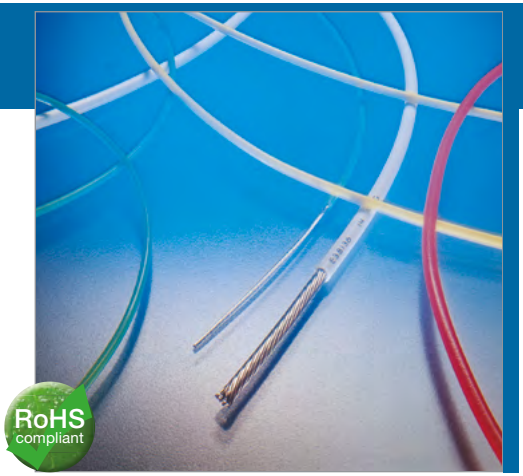
Multicore Cable

Specialist application multicore cables for tough environments and custom build solutions for those special projects.

CONTENTS

44 Wire

Dual Wall 150ºC rated, XL-PVDF
High performance wire and cable



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 temperature rating, small size, light weight, solder iron resistance, and resistance to most solvents, fuels and lubricants.

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.

Features & Benefits

- Dual wall construction
- 600,1000 & 2500 voltage ratings
- Small, lightweight and flexible
- Low smoke and low corrosive gas generation
- Resistance to most chemicals and electrical arc tracking

Operating Temperature

- -65ºC to +150ºC

Specifications/Approvals

- SAE AS81044 (wires)
- NEMA-WC-27500 (cables)
- Def Stan 61-12, Part 18 (maintenance)
- Def Stan 61-12, Part 26
- VG 95218 parts 20, 21, 22, 23 and 1000
- NATO stock numbers available for most standard constructions

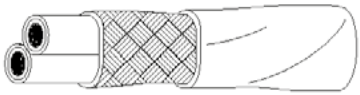
Spec 44 Wire Construction

A wide range of Spec 44 wire constructions are available, the most commonly used are:

Primary Wire - Dual Wall Single Core

Twisted Single Cores

Screened & Jacketed Twisted Pair



Note

44 Wire is available in an extensive variety of constructions, voltage ratings, sizes and colours. For further assistance regarding your specific wire and cable requirements, please contact us.

sales@is-rayfast.com | +44(0)1793 616700

44 Wire

Dual Wall 150°C rated, XL-PVDF
High performance wire and cable

Product Characteristics		Product Performance
Physical	Operating temperature	-65°C to +150°C
	Tensile strength (primary insulation)	28N/mm² (4000psi)
	Ultimate elongation	230% (min)
	Electrical arc tracking	Tested to ASTM-D-3032
	Solder iron resistance at +370°C, 1 min.	Pass
	Notch propagation, 0.05mm notch	Pass
	Shrinkage @ +300°C	<1%
	Low temperature bend	-65°C
	Fuels, oils & solvents resistance	Pass
Electrical	Voltage rating	600V, 1000V & 2500V
	Insulation resistance (min)	1500MΩ/km (5000MΩ/1000ft)
	Voltage withstand	2500V, 3000V & 5000V 5 min. 50 - 60Hz
Flammability	Federal aviation reg. FAR-25	Pass
	SAE AS81044	Pass
	BS EN 50265 Vertical Flammability	Pass
	S-424 14751 (Swedish chimney)	Pass
	NFC-32070 (2) (French chimney)	Pass
	IEC-60332 Part 3 (cable ladder)	Pass
Smoke/Toxicity	Smoke index, Def Stan 61-12 Part 18	6.0 units per metre of wire
	Toxicity index, Def Stan 61-12 Part 18	0.8 units per metre of wire
	BS EN 150-4589 pt2/pt3 oxygen index	>30% Oxygen
	Temperature index, NES 715	>300°C

44 Wire

Ordering

High performance wire and cable

ORDERING INFORMATION

Colours:

0 = Black	5 = Green
1 = Brown	6 = Blue
2 = Red	7 = Violet
2L = Pink	8 = Grey
3 = Orange	9 = White
4 = Yellow	45 = Yellow/Green

Stripes are also available on request and are indicated by additional insulation colour numbers

e.g. 92 = White with Red stripe

Standard packaging:

300m reels for “standard” items. If the product is a non-stock item a Minimum Order Quantity (MOQ) may apply.

Ordering Description:

Follow steps 1 to 6.

1 Select the type of wire
2 Select the number of conductors
3 Select the type of conductor
4 Select the wire conductor size
5 Select the primary wire insulation colour(s)
6 Select the outer jacket colour

Ordering Examples:

- Where a single 22awg 600V white primary wire is required the part number is **44A0111-22-9**
- Single 16awg 600V white primary wire, with shield and an outer white jacket is required the part number is **44A1111-16-9-9**
- Where two core 600V cable with an overall shield and an outer jacket and a conductor size of 18awg, with core insulation colours red and blue. The outer jacket is white with a red stripe the part number is **44A1121-18-2/6-92**
- Three core 600V cable with an overall shield and an outer jacket with conductor size for each of the primary cores is 24awg, with core insulation colours red, yellow and blue and outer jacket is white. The part number is **44A1131-24-2/4/6-9**

ADDITIONAL INFORMATION

The page opposite illustrates how to build your own part number and is intended as a cross reference only. For further information or assistance please contact us.

Standard Wire Insulation Colours

sales@is-rayfast.com | +44(0)1793 616700

44 A 1 1 2 1 - 22 - 0/9 - 9

Part Numbering example

JACKET COLOUR
(codes same as for Primary wire colour below)

PRIMARY WIRE INSULATION COLOUR

0	Black	5	Green
1	Brown	6	Blue
2	Red	7	Violet
3	Orange	8	Grey
4	Yellow	9	White

CONDUCTOR SIZE (AWG)
30 to 0000

CONDUCTOR TYPE

1	Tin plated copper
2	Silver plated copper
3	Nickel plated copper
4	Silver plated high strength copper alloy
5	Aluminium
6	Nickel coated high strength copper alloy

NUMBER of CONDUCTORS
1 through 10 (designator for 10 conductor = 0)

VOLTAGE

1	600 volt, general purpose
2	1000 volt, general purpose
3	2500 volt, general purpose
7	600 volt, airframe (normal weight)
8	600 volt, airframe (medium weight)

CONSTRUCTION

0	Primary wire; or unshielded & unjacketed
1	Round braid shielded & jacketed
2	Tin-plated flat braid shielded & jacketed
3	Round braid shielded NO jacket
4	Jacketed NO shield (2 core or more only)
5	Spiral braid shielded & jacketed
7-9	Special constructions

TYPE

A	150°C (XL-PVF2 cable jacket)
B	150°C (XL-ETFE cable jacket)
D	135°C (XL-PVF2) - Def Stan 61-12 pt 26
/	135°C (XL-PVF2 cable jacket) - USA only

BASIC PRODUCT NUMBER
Spec 44 high performance wire

44 Wire

Dual Wall 150ºC rated, XLPVDF
High performance wire and cable

600V Primary Wire Dimensions

Conductor Size	Stranding No/mm	Nominal CSA (mm^2)	Nominal Dia. (mm)	Max Weight (g/m)	Ordering Description
30	7/0.102	0.06	0.69	1.06	44A0111-30-X
28	7/0.127	0.09	0.76	1.48	44A0111-28-X
26	19/0.102	0.15	0.86	2.08	44A0111-26-X
24	19/0.127	0.25	1.02	2.98	44A0111-24-X
22	19/0.160	0.40	1.19	4.46	44A0111-22-X
20	19/0.203	0.60	1.40	6.70	44A0111-20-X
18	19/0.254	1.00	1.65	10.12	44A0111-18-X
16	19/0.287	1.25	1.83	12.80	44A0111-16-X
14	19/0.361	2.00	2.26	19.64	44A0111-14-X
12	37/0.320	3.00	2.74	30.06	44A0111-12-X

1000V Primary Wire Dimensions

Conductor Size	Stranding No/mm	Nominal Dia. (mm)	Max Weight (g/m)	Ordering Description
26	19/0.010	1.02	2.38	44A0211-26-X
24	19/0.127	1.17	3.57	44A0211-24-X
22	19/0.160	1.37	5.21	44A0211-22-X
20	19/0.203	1.57	7.54	44A0211-20-X
18	19/0.254	1.85	11.46	44A0211-18-X
16	19/0.287	2.06	14.58	44A0211-16-X
14	19/0.361	2.49	21.88	44A0211-14-X
12	37/0.320	2.97	32.89	44A0211-12-X

600V Single Core Screened & Jacketed Cable Dimensions

Conductor Size	Stranding No/mm	Nominal Dia. (mm)	Max Weight (g/m)	Ordering Description
30	7/0.102	1.40	4.18	44A1111-30-X-X
28	7/0.127	1.47	4.92	44A1111-28-X-X
26	19/0.102	1.65	5.83	44A1111-26-X-X
24	19/0.127	1.83	8.20	44A1111-24-X-X
22	19/0.160	2.00	10.30	44A1111-22-X-X
20	19/0.203	2.26	14.02	44A1111-20-X-X
18	19/0.254	2.62	19.70	44A1111-18-X-X
16	19/0.287	2.79	23.40	44A1111-16-X-X
14	19/0.361	3.22	32.50	44A1111-14-X-X
12	37/0.320	3.71	45.67	44A1111-12-X-X

sales@is-rayfast.com | +44(0)1793 616700

44 Wire

Dual Wall 150ºC rated, XLPVDF
High performance wire and cable

600V Twisted Pair Primary Wire Dimensions

Conductor Size	Stranding No/mm	Nominal Dia. (mm)	Max Weight (g/m)	Ordering Description
30	7/0.102	1.37	2.38	44A0121-30-X/X
28	7/0.127	1.52	3.13	44A0121-28-X/X
26	19/0.102	1.73	4.38	44A0121-26-X/X
24	19/0.127	2.03	6.26	44A0121-24-X/X
22	19/0.160	2.38	9.37	44A0121-22-X/X
20	19/0.203	2.79	14.07	44A0121-20-X/X
18	19/0.254	3.30	21.25	44A0121-18-X/X
16	19/0.287	3.65	26.88	44A0121-16-X/X
14	19/0.361	4.52	41.24	44A0121-14-X/X
12	37/0.320	5.48	63.13	44A0121-12-X/X

600V 2-Core Screened & Jacketed Cable Dimensions

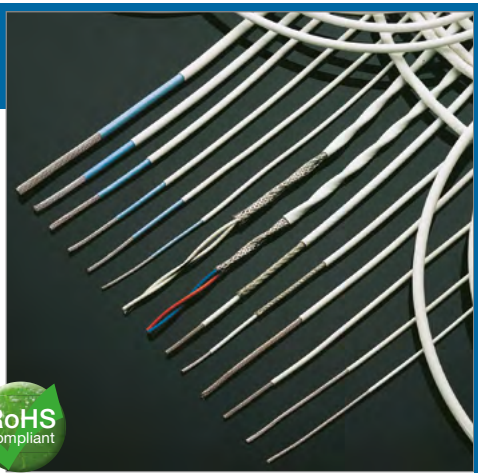
Conductor Size	Stranding No/mm	Nominal Dia. (mm)	Max Weight (g/m)	Ordering Description
30	7/0.10	2.23	8.74	44A1121-30-X/X-X
28	7/0.127	2.38	10.10	44A1121-28-X/X-X
26	19/0.102	2.59	11.49	44A1121-26-X/X-X
24	19/0.127	2.99	16.12	44A1121-24-X/X-X
22	19/0.160	3.35	20.59	44A1121-22-X/X-X
20	19/0.203	3.76	26.71	44A1121-20-X/X-X
18	19/0.254	4.32	36.56	44A1121-18-X/X-X
16	19/0.287	4.67	42.98	44A1121-16-X/X-X
14	19/0.361	5.53	61.34	44A1121-14-X/X-X

600V 3-Core Screened & Jacketed Cable Dimensions

Conductor Size	Stranding No/mm	Nominal Dia. (mm)	Max Weight (g/m)	Ordering Description
28	7/0.127	2.49	13.26	44A1131-28-X/X/X-X
26	19/0.102	2.82	18.85	44A1131-26-X/X/X-X
24	19/0.127	3.15	24.66	44A1131-24-X/X/X-X
22	19/0.160	3.56	32.14	44A1131-22-X/X/X-X
20	19/0.203	3.99	40.78	44A1131-20-X/X/X-X
18	19/0.254	4.57	53.02	44A1131-18-X/X/X-X
16	19/0.287	4.98	67.31	44A1131-16-X/X/X-X
14	19/0.361	5.89	85.88	44A1131-14-X/X/X-X

55 Wire

Single or Dual Wall 200ºC rated, XL-ETFE
High performance wire and cable



55 wire is insulated with modified radiation cross-linked ETFE polymer and combines the easy handling of a flexible thin wall wire, with excellent scrape abrasion and cut-through characteristics.

The single wall construction is currently used extensively throughout industry, applications include commercial wiring, avionics, satellites, aircraft, helicopters and high performance military and motorsport electronics or wherever there is a demand for reliable performance under extreme conditions.

The dual wall airframe construction also available, is commonly used on numerous commercial and military aircraft programmes throughout the world.

Features & Benefits

- Resistant to electrical arc tracking in wet or dry conditions
- Single or dual wall construction
- Small size, ultra light weight
- Exceptional chemical resistance

Operating Temperature

- -65ºC to +150ºC
  (Tin plated conductors - standard)
- -65ºC to +200ºC
  (Silver/Nickel plated conductors)

Specifications/Approvals

- SAE AS22759/32-35 & 41-46 (wires)
- NEMA-WC-27500 (cables)
- Def Stan 61-12, Part 33
- VG95218 Part 20, Type 21, Type A; Part 22, Type A; Part 23, Type A; Part 1001 & 1002
- VDE 9426, 9427, 9428
- British Standards 3G233
- Boeing BMS 13-48
- Airbus ABS 0820 to 0826
- NASA preferred product list
- European Space Agency 3901/012, 3901/020 and 3901/022

Spec 55 Wire Construction

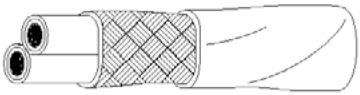
A wide range of 55 spec wire constructions are available, the most commonly used are:

Equipment Wire - Single Wall

Airframe Wire - Dual Wall

Twisted Single Cores

Screened & Jacketed Twisted Pair



Note

55 Wire is available in an extensive variety of constructions, sizes and colours. For further assistance regarding your specific wire and cable requirements, please contact us.

sales@is-rayfast.com | +44(0)1793 616700

55 Wire

Single or Dual Wall 200°C rated, XL-ETFE
High performance wire and cable

	Product Characteristics	Product Performance
Physical	Operating temp (Tin plated conductor)	-65°C to +150°C
	Operating temp (silver or nickel plated conductor)	-65°C to +200°C
	Thermal endurance	200°C for 10,000 hours
	Scrape abrasion (BS3G 233)	>100 cycles at +150°C
	Flexible endurance (Boeing BSS 7324)	>1000 cycles
	Tensile strength + core elongation	(Airframe wire only) 35 N/mm², 125%
	Tensile strength + total elongation	(All primary wire) 35 N/mm², 75%
	Notch propagation BS3G 230 0.05mm notch	Pass
	Solder iron resistance (370°C, 1 minute)	Pass
	Solder ability, tin plated copper conductor BS3G 233 conditions	<0.8 secs to wet
	Shrinkage @ +200°C	<1%
	Water absorption	<0.03%
	Permittivity 1 KHz (ASTM D150)	2.7
	Dissipation factor (ASTM D150)	0.001
Electrical	Voltage rating	600V RMS
Vertical Flammability	After burn	0 secs
	Burn length	57mm
60° Flammability	FAA FAR 25 APP.F	Pass
	Oxygen index	>40%

55 Wire

Ordering

High performance wire and cable

ORDERING INFORMATION

Colours:

0 = Black	5 = Green
1 = Brown	6 = Blue
2 = Red	7 = Violet
2L = Pink	8 = Grey
3 = Orange	9 = White
4 = Yellow	45 = Yellow/Green

Stripes are also available on request and are indicated by additional insulation colour numbers

e.g. 92 = White with Red stripe

Standard packaging:

300m reels for “standard” items. If the product is a non-stock item a Minimum Order Quantity (MOQ) will apply.

Ordering Description:

Follow steps 1 to 6.

1 Select the type of wire required
2 Select the number of conductors required
3 Select the type of conductor required
4 Select the wire gauge size required
5 Select the primary wire insulation colour(s)
6 Select the outer jacket colour required

Ordering Examples:

- Where a single 26awg 600V white primary wire is required. The part number is **55A0111-26-9**
- Where a single 20awg 600V white primary wire, with shield and an outer white jacket is required. The part number is **55A1111-20-9-9**
- Where two core 450V cable with an overall shield and an outer jacket and a conductor size of 24awg, each with a separate coloured insulation e.g. red and blue. The outer jacket required is white. The part number is **55M1424-24-2/6-9**
- Three core 600V cable with an overall shield and an outer jacket with conductor size for each of the primary cores is 18awg, with core insulation colours red, blue and white. Outer jacket is white. The part number is **55A1131-18-2/6/9-9**

ADDITIONAL INFORMATION

The opposite page illustrates how to build your own part number. For further information or assistance please contact us.

Standard Wire Insulation Colours

sales@is-rayfast.com | +44(0)1793 616700

55 A 1 1 2 1 - 20 - 2/6 - 9

Part Numbering example

JACKET COLOUR
(codes same as for Primary wire colour below)

PRIMARY WIRE INSULATION COLOUR

0	Black	5	Green
1	Brown	6	Blue
2	Red	7	Violet
3	Orange	8	Grey
4	Yellow	9	White

CONDUCTOR SIZE (AWG)
30 to 0000

CONDUCTOR TYPE

1	Tin plated copper
2	Silver plated copper
3	Nickel plated copper
4	Silver plated high strength copper alloy
6	Nickel coated high strength copper alloy
A	Silver coated ultra HSCA

NUMBER of CONDUCTORS
1 through 10 (designator for 10 conductor = 0)

VOLTAGE

1	600 volt, lightweight
2	600 volt, medium weight
4	450 volt (55M 20-30 AWG only)
7	1000 volt, heavy duty, airframe
8	600 volt, normal weight, airframe

CONSTRUCTION

0	Primary wire; or unshielded & unjacketed
1	Round braid shielded & jacketed
2	Flat braid shielded & jacketed
3	Round braid shielded NO jacket
4	Jacketed NO shield (2 core or more only)
5	Spiral braid shielded & jacketed
6-9	Special constructions

TYPE

A	General purpose
AC	General purpose, 90% shield coverage
D	Defence standard 61-12 Part 33
M	450V (typical application Motorsport)

BASIC PRODUCT NUMBER
Spec 55 high performance wire

55 Wire

Single or Dual Wall 200ºC rated, XLETFE
High performance wire and cable

600V Primary Wire, Equipment/Interconnect Dimensions

Conductor Size	Stranding No/mm	Nominal CSA (mm^2)	Nominal Dia. (mm)	Max Weight (g/m)	Ordering Description
30	7/0.10	0.06	0.61	0.98	55A0111-30-X
28	7/0.13	0.09	0.68	1.35	55A0111-28-X
26	19/0.10	0.16	0.81	2.08	55A0111-26-X
24	19/0.13	0.24	0.94	2.98	55A0111-24-X
22	19/0.16	0.38	1.09	4.17	55A0111-22-X
20	19/0.20	0.62	1.27	6.40	55A0111-20-X
18	19/0.25	0.96	1.52	9.67	55A0111-18-X
16	19/0.29	1.23	1.73	12.35	55A0111-16-X
14	19/0.36	1.94	2.16	19.34	55A0111-14-X
12	37/0.32	2.97	2.62	29.32	55A0111-12-X

600V Primary Wire, Airframe Dimensions

Conductor Size	Stranding No/mm	Nominal Dia. (mm)	Max Weight (g/m)	Ordering Description
26*	19/0.10	1.01	2.53	55A0814-26-X
24*	19/0.13	1.14	3.42	55A0814-24-X
22	19/0.16	1.27	4.76	55A0811-22-X
20	19/0.20	1.47	6.99	55A0811-20-X
18	19/0.25	1.78	10.71	55A0811-18-X
16	19/0.29	1.96	13.39	55A0811-16-X
14	19/0.36	2.40	20.54	55A0811-14-X
12	37/0.32	2.82	30.51	55A0811-12-X
10	37/0.40	3.40	48.22	55A0811-10-X
08	133/0.29	4.20	89.72	55A0811-08-X

Note*: Conductor type Silver plated high strength copper alloy (SPHSCA).

450V Primary Wire, Light Weight Equipment Dimensions

Conductor Size	Stranding No/mm	Nominal Dia. (mm)	Max Weight (g/m)	Ordering Description
30	7/0.10	0.51	0.87	55M0414-30-X
28	7/0.12	0.58	1.19	55M0414-28-X
26	19/0.10	0.69	1.80	55M0414-26-X
24	19/0.12	0.81	2.68	55M0414-24-X

Note: 55M0414 constructions are ideally suited for the performance demands of the Motorsport industry.

sales@is-rayfast.com | +44(0)1793 616700

600V Twisted Pair, Equipment/Interconnect Dimensions

Conductor Size	Stranding No/mm	Nominal Dia. (mm)	Max Weight (g/m)	Ordering Description
30	7/0.10	1.22	1.94	55A0121-30-X/X
28	7/0.13	1.37	2.68	55A0121-28-X/X
26	19/0.10	1.63	4.32	55A0121-26-X/X
24	19/0.13	1.88	6.11	55A0121-24-X/X
22	19/0.16	2.18	8.64	55A0121-22-X/X
20	19/0.20	2.54	13.38	55A0121-20-X/X
18	19/0.25	3.05	20.20	55A0121-18-X/X
16	19/0.29	3.45	25.80	55A0121-16-X/X
14	19/0.36	4.32	39.67	55A0121-14-X/X
12	37/0.32	5.23	60.10	55A0121-12-X/X

600V Twisted Pair, Airframe Dimensions

Conductor Size	Stranding No/mm	Nominal Dia. (mm)	Max Weight (g/m)	Ordering Description
26*	19/0.10	2.03	5.29	55A0824-26-X/X
24*	19/0.13	2.29	6.30	55A0824-24-X/X
22	19/0.16	2.54	10.08	55A0821-22-X/X
20	19/0.20	2.95	14.40	55A0821-20-X/X
18	19/0.25	3.56	22.76	55A0821-18-X/X
16	19/0.29	3.91	31.44	55A0821-16-X/X
14	19/0.36	4.78	43.22	55A0821-14-X/X
12	37/0.32	5.64	61.24	55A0821-12-X/X
10	37/0.40	6.81	96.94	55A0821-10-X/X

Note*: Conductor type Silver plated high strength copper alloy (SPHSCA).

450V Twisted Pair, Light Weight Equipment Dimensions

Conductor Size	Stranding No/mm	Nominal Dia. (mm)	Max Weight (g/m)	Ordering Description
30	7/0.10	1.03	1.77	55M0424-30-X/X
28	7/0.12	1.17	2.42	55M0424-28-X/X
26	19/0.10	1.37	3.66	55M0424-26-X/X
24	19/0.12	1.63	5.44	55M0424-24-X/X

Note: 55M0424 constructions are ideally suited for the performance demands of the Motorsport industry.

55 Wire

Single or Dual Wall 200ºC rated, XLETFE
High performance wire and cable

600V Single Core Screened & Jacketed, Equipment/Interconnect

Conductor Size	Stranding No/mm	Nominal Dia. (mm)	Max Weight (g/m)	Ordering Description
30	7/0.10	1.45	5.06	55A1111-30-X-X
28	7/0.13	1.52	5.80	55A1111-28-X-X
26	19/0.10	1.65	6.84	55A1111-26-X-X
24	19/0.13	1.78	8.20	55A1111-24-X-X
22	19/0.16	1.93	10.33	55A1111-22-X-X
20	19/0.20	2.13	13.40	55A1111-20-X-X
18	19/0.25	2.39	17.86	55A1111-18-X-X
16	19/0.29	2.59	21.73	55A1111-16-X-X
14	19/0.36	3.02	30.36	55A1111-14-X-X
12	37/0.32	3.48	42.41	55A1111-12-X-X

600V Single Core Screened & Jacketed, Airframe

Conductor Size	Stranding No/mm	Nominal Dia. (mm)	Max Weight (g/m)	Ordering Description
26*	19/0.10	1.85	7.88	55A1814-26-X-X
24*	19/0.13	1.98	9.37	55A1814-24-X-X
22	19/0.16	2.13	11.75	55A1811-22-X-X
20	19/0.20	2.34	14.88	55A1811-20-X-X
18	19/0.25	2.62	19.79	55A1811-18-X-X
16	19/0.29	2.82	23.81	55A1811-16-X-X

Note*: Conductor type Silver plated high strength copper alloy (SPHSCA).

450V Single Core Screened & Jacketed, Light Weight Equipment

Conductor Size	Stranding No/mm	Nominal Dia. (mm)	Max Weight (g/m)	Ordering Description
30	7/0.10	1.17	3.61	55M1414-30-X-X
28	7/0.12	1.24	4.12	55M1414-28-X-X
26	19/0.10	1.34	4.92	55M1414-26-X-X
24	19/0.12	1.47	6.50	55M1414-24-X-X

Note: 55M1414 constructions are ideally suited for the performance demands of the Motorsport industry.

sales@is-rayfast.com | +44(0)1793 616700

55 Wire

Single or Dual Wall 200ºC rated, XLETFE
High performance wire and cable

600V 2-Core Screened & Jacketed, Equipment/Interconnect

Conductor Size	Stranding No/mm	Nominal Dia. (mm)	Max Weight (g/m)	Ordering Description
30	7/0.10	2.06	8.03	55A1121-30-X/X-X
28	7/0.13	2.21	9.37	55A1121-28-X/X-X
26	19/0.10	2.46	11.75	55A1121-26-X/X-X
24	19/0.13	2.72	14.58	55A1121-24-X/X-X
22	19/0.16	3.02	18.15	55A1121-22-X/X-X
20	19/0.20	3.43	24.10	55A1121-20-X/X-X
18	19/0.25	3.94	32.63	55A1121-18-X/X-X
16	19/0.29	4.34	39.73	55A1121-16-X/X-X
14	19/0.36	5.21	57.13	55A1121-14-X/X-X
12	37/0.32	6.17	81.98	55A1121-12-X/X-X

600V 2-Core Screened & Jacketed, Airframe

Conductor Size	Stranding No/mm	Nominal Dia. (mm)	Max Weight (g/m)	Ordering Description
26*	19/0.10	2.87	14.28	55A1824-26-X/X-X
24*	19/0.13	3.12	16.36	55A1824-24-X/X-X
22	19/0.16	3.43	20.68	55A1821-22-X/X-X
20	19/0.20	3.84	27.08	55A1821-20-X/X-X
18	19/0.25	4.39	36.45	55A1821-18-X/X-X
16	19/0.29	4.80	42.85	55A1821-16-X/X-X

Note*: Conductor type Silver plated high strength copper alloy (SPHSCA).

450V 2-Core Screened & Jacketed, Light Weight Equipment

Conductor Size	Stranding No/mm	Nominal Dia. (mm)	Max Weight (g/m)	Ordering Description
30	7/0.10	1.68	5.51	55M1424-30-X/X-X
28	7/0.12	1.82	6.72	55M1424-28-X/X-X
26	19/0.10	2.02	8.93	55M1424-26-X/X-X
24	19/0.12	2.28	11.54	55M1424-24-X/X-X

Note: 55M1414 constructions are ideally suited for the performance demands of the Motorsport industry.

55 Wire

Single or Dual Wall 200ºC rated, XLETFE
High performance wire and cable

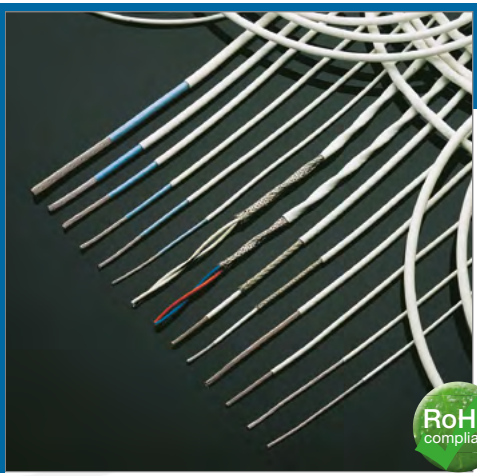
600V Three Core Screened & Jacketed, Equipment/Interconnect

Conductor Size	Stranding No/mm	Nominal Dia. (mm)	Max Weight (g/m)	Ordering Description
30	7/0.10	2.16	9.54	55A1131-30-X/X/X-X
28	7/0.13	2.31	11.33	55A1131-28-X/X/X-X
26	19/0.10	2.59	14.47	55A1131-26-X/X/X-X
24	19/0.13	2.87	18.34	55A1131-24-X/X/X-X
22	19/0.16	3.20	23.71	55A1131-22-X/X/X-X
20	19/0.20	3.63	32.36	55A1131-20-X/X/X-X
18	19/0.25	4.19	45.34	55A1131-18-X/X/X-X
16	19/0.29	4.62	55.78	55A1131-16-X/X/X-X
14	19/0.36	5.61	80.53	55A1131-14-X/X/X-X
12	37/0.32	6.60	115.58	55A1131-12-X/X/X-X

sales@is-rayfast.com | +44(0)1793 616700

55D Wire

Defence Standard 61-12 Part 33/001
High performance wire and cable



55D wire is an Aerospace wire, a range of which is held in stock by IS-Group to service the needs of the UK Aerospace and Defence Market. These products are manufactured and released in accordance with the latest Defence Standard 61-12 part 33/001 with a temperature rating of -65ºC up to +150ºC.

***Note:** The 135ºC rated single wire without screen or jacket is no longer in the Defence Standard for sizes 001 and 002. For these constructions use the 150ºC rated construction 55D0110-24-9 with copper alloy conductor.

Primary Equipment Wire

Part Number	NATO Stock Number	Defence Reference
55D0110-24-9*	6145-99-038-4091	DSP33/001-1S-002-1U
55D0111-22-9	6145-99-038-3954	DSP33/001-1T-004-1U
55D0111-20-9	6145-99-038-3955	DSP33/001-1T-006-1U

Primary Airframe Wire

Part Number	NATO Stock Number	Defence Reference
55D0214-24-9	6145-99-038-3911	DSP33/001-2P-002-1U
55D0211-22-9	6145-99-038-3912	DSP33/001-2T-004-1U
55D0211-20-9	6145-99-038-3913	DSP33/001-2T-006-1U

Single Screened & Jacketed Airframe Cable

Part Number	NATO Stock Number	Defence Reference
55D1114-24-9-9	6145-99-038-4017	DSP33/001-1P-002-1SJ
55D1111-22-9-9	6145-99-038-4018	DSP33/001-1T-004-1SJ
55D1111-20-9-9	6145-99-038-4019	DSP33/001-1T-006-1SJ

Twisted Pair Screened & Jacketed Airframe Cable

Part Number	NATO Stock Number	Defence Reference
55D1124-24-2/6-9	6145-99-038-4025	DSP33/001-1P-002-2SJ
55D1121-22-2/6-9	6145-99-038-4026	DSP33/001-1T-004-2SJ
55D1121-20-2/6-9	6145-99-038-4027	DSP33/001-1T-006-2SJ

99M Wire

Dual Wall 120ºC rated wire, Modified Polyester
Low fire hazard wire and cable

Type 99M wire has a dual wall construction of radiation cross-linked modified polyester. This combines excellent mechanical performance and chemical resistance with a range of enhanced fire hazard properties. Type 99M wire is designed to meet the stringent low fire hazard performance being specified by the UK Naval Defence Standard Authority for ship wiring and cabling.

Designed to be compatible with modern wiring and harnessing techniques. It is a flexible wire with virtually no spring back once set. It is easily stripped with tools such as conventional die-blade strippers.

Features & Benefits

- Low flammability
- Low smoke generation
- Low toxicity index
- Low generation of corrosive gases
- Small size, lightweight

Operating Temperature

- -55ºC to +105ºC jacketed cable
- -55ºC to +120ºC wire only

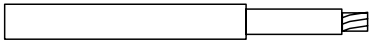
Specifications/Approvals

- Def Stan 61-12, Part 18
- Raychem WCD 281

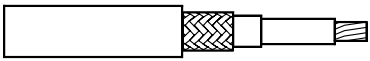
Spec 99 Wire Construction

A wide range of 99 spec wire constructions are available, the most commonly used are:

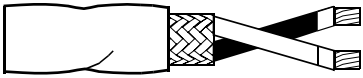
99M011X (600 V) - Primary Wire



99M1111 - Shielded and jacketed



99M1121 - Shielded and Jacketed
Twisted Pair



Note
99 Wire is available in a variety of constructions, voltage ratings, sizes and colours. For further assistance regarding your specific wire and cable requirements, please contact us.

sales@is-rayfast.com | +44(0)1793 616700

99M Wire

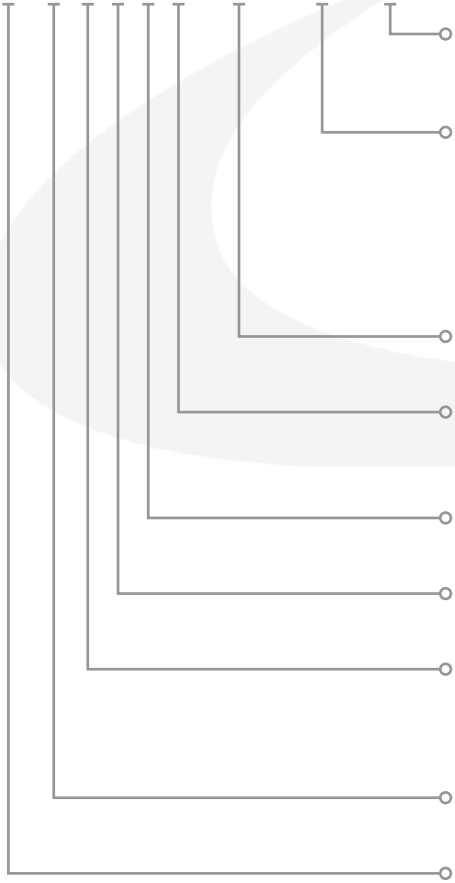
Dual Wall 120ºC rated wire, Modified Polyester
Low fire hazard wire and cable

Product Characteristics		Product Performance	
Physical	**Test**	**Method**	**Typical Value**
	Temperature rating	BS 3G230	+120ºC wire only
	Tensile strength	-	>30 MPa
	Elongation at break	-	>250%
	Notch propagation (0.05 mm notch)	BS 3G230	Pass
	Shrinkage 150ºC	BS 3G230	<1%
	Low temperature bend	BS 3G230	-55ºC
	Voltage withstand	BS 3G230	2.5 kV
	Insulation resistance (20ºC)	BS 3G230	1000 MΩ km (min)
	Pliability rating	Def Stan 61-12 (18)	Pliable
Fluid Resistance	Fuels - aircraft	Def Stan 61-12 (18)	Pass +100ºC/72 hours
	Oils - ASTM No.3	Def Stan 61-12 (18)	Pass +50ºC/7 days
Electrical	Voltage rating	-	600V (0.2mm wall thickness)
	Voltage rating	-	1000V (0.3mm wall thickness)
Fire Hazard Properties	Flammability	BS 3G230	Pass
	Toxicity index	Def Stan 61-12 (18)	0.1 per metre of wire
	Smoke index	Def Stan 61-12 (18)	8 per metre of wire
	Acid gas equivalent	TDE 76/P/76	<1.5%

99M Wire

Building Your Part Number
Low fire hazard wire and cable

99 M 1 1 2 1 - 18 - 2/6 - 0



Part Numbering example

JACKET COLOUR
0 Black supplied as standard (codes same as for Primary wire colour below)

PRIMARY WIRE INSULATION COLOUR

0	Black	5	Green
1	Brown	6	Blue
2	Red	7	Violet
2L	Pink	8	Grey
3	Orange	9	White
4	Yellow	45	Yellow/Green

CONDUCTOR SIZE (AWG)
28 to 12

CONDUCTOR TYPE
1 Tin plated copper
9 Bare copper

NUMBER of CONDUCTORS
1 through 10 (designator for 10 conductor = 0)

VOLTAGE
1 600 volt, lightweight equipment wire

CONSTRUCTION
0 Primary wire; or unshielded & unjacketed
1 Round braid shielded & jacketed
9 Special constructions

TYPE
M Military wire

BASIC PRODUCT NUMBER
Spec 99 LFH High performance wire

Standard packaging:

99 Wire is supplied on a range of reel sizes, dependent on gauge size. If the product is a non stock item a Minimum Order Quantity (MOQ) will apply.

sales@is-rayfast.com | +44(0)1793 616700

99M Wire

Dual Wall 120ºC rated wire, Modified Polyester
Low fire hazard wire and cable

600V Primary Wire Dimensions (all dimensions are in mm)

Conductor Size	Stranding No/mm	Nominal CSA (mm^2)	Nominal Dia. (mm)	Max Weight (g/m)	Ordering Description
28	7/0.12	0.09	0.72	1.50	99M0111-28-0
26	19/0.10	0.15	0.90	2.18	99M0111-26-0
24	19/0.12	0.25	0.98	3.45	99M0111-24-0
22	19/0.15	0.40	1.13	4.90	99M0111-22-0
20	19/0.20	0.60	1.40	7.56	99M0111-20-0
18	19/0.25	1.00	1.65	10.40	99M0111-18-0
16	19/0.30	1.25	1.90	16.50	99M0111-16-0
14	37/0.25	2.00	2.25	20.70	99M0111-14-0
12	37/0.30	3.00	2.60	27.10	99M0111-12-0

600V Single Core Screened & Jacketed Dimensions (all dimensions are in mm)

Conductor Size	Stranding No/mm	Nominal Dia. (mm)	Max Weight (g/m)	Ordering Description
26	19/0.10	1.80	8.29	99M1111-26-X-0
24	19/0.12	1.90	9.80	99M1111-24-X-0
22	19/0.15	2.05	12.00	99M1111-22-X-0
20	19/0.20	2.30	16.00	99M1111-20-X-0
18	19/0.25	2.55	21.30	99M1111-18-X-0
16	19/0.30	2.95	29.20	99M1111-16-X-0
14	37/0.25	3.13	34.80	99M1111-14-X-0
12	37/0.30	3.48	43.10	99M1111-12-X-0

600V 2-Core Screened & Jacketed Dimensions (all dimensions are in mm)

Conductor Size	Stranding No/mm	Nominal Dia. (mm)	Max Weight (g/m)	Ordering Description
28	7/0.10	2.49	11.66	99M1121-28-X/X-0
26	19/0.10	2.79	15.82	99M1121-26-X/X-0
24	19/0.12	2.99	17.82	99M1121-24-X/X-0
22	19/0.15	3.29	22.11	99M1121-22-X/X-0
20	19/0.20	3.84	30.04	99M1121-20-X/X-0
18	19/0.25	4.34	38.14	99M1121-18-X/X-0
16	19/0.30	4.84	52.91	99M1121-16-X/X-0
14	37/0.25	5.54	64.86	99M1121-14-X/X-0
12	37/0.30	6.24	81.38	99M1121-12-X/X-0

100 Wire

Halogen Free, Low Smoke

Introduction

Range of high performance wire and cable that meet the demanding requirements of various standards including German Specification VG 95218-20 (100G wire) and European Rail standard EN50306 (100E wire).

Characteristics include being extremely flexible, tough and resistant to a variety of fluids meeting the limited fire hazard requirements. Insulation materials are mechanically strong and durable whilst being smaller and lighter.

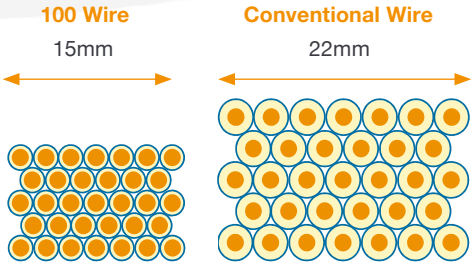
Zero Halogen, light weight wire and cable for signal and equipment wire for low voltage applications.

The construction is a dual wall combination of formulated polymer blends. Developed to meet demanding specification requirements, whilst maintaining the desirable features of small size, lightweight, flexibility and non-wrinkling.

50% Volume Reduction

30% Weight Reduction

Compared to conventional wire



35 x 1mm² wires > 50% reduction in bulk of wiring and > 30% reduction in the weight of wiring

Conventional cables use filled soft polymer insulations, which by the nature of the insulation have to be thick wall. 100E wire uses engineered polymers to greatly reduce wall thickness by ~5 times.

Product Features

- Zero halogen, thin wall, high temperature
- Small size and lightweight
- Excellent handling and flexibility
- Outstanding resistance to oils, plus scrape abrasion and cut through.
- Voltage rating: 300V and 750V.
- Conductor cores 0.5mm² to 2.5mm².
- Continuous operating temperature:
  Wire; -55°C to +125C
  Cable: -30°C to +105°C
- Dual wall construction

100E Wire Approvals

EN50306-2 Thin wall single core wires, 300 volts.

EN50306-3 Single core and multi-core cables (pairs, triples and quads) screened and thin wall sheathed.

EN50306-4 Multi-core and Multi-pair cables standard wall sheathed, screened or unscreened (thicker outer jacket).

100G Wire Approvals

Meets requirements of VG 95218-20 Type E primary wire.

sales@is-rayfast.com | +44(0)1793 616700

100E 1 1 1 1 - 0.50 - 9 - 0

Part Numbering example

Outer Jacket Colour
0 = Black

Core Insulation Colour
9 = White, available for 100E
All standard colours available for 100G wire

Conductor Size
0.15mm² to 4.00mm²

Conductor Type
1 = Tin Plated Copper

Number of Conductors
1 to 4 for 100E wire and cable
1 through 10 (designator for 10 conductors = 0)

100E Class of Wire
1 = 300V

100G Class of Wire
1 = 750V/1300V equipment wire

Constructions
0 = Primary wire plus unscreened and unjacketed cables
1 = Round braid, screened & jacketed
4 = Jacketed, no screen

Base Wire
Spec 100E - Approved to EN50306 Rail
Spec 100G - Available to VG 95218

100G Wire

Halogen Free, Low Smoke
Fire Hazard Properties and Part Numbering

100G Fire Hazard Properties

Test	Method	Result
Toxicity	Def. Standard 02-713	3.5
Smoke Density	IEC 1034 part 1 and 2	95% light transmittance
Halogen content	DIN VDE 0472 pt 815	Non-detected
Corrosivity of combustion gasses	DIN VDE 0472 part 813, IEC 754-2	5.0 pH, <4 µS/mm conductivity
Flammability	VG 95218 part 2	< 15 sec after burn < 150 mm burn length

100G Ordering Information

	Conductor			Finished Wire		
Part Description	Cross Sectional Area	Conductor Stranding No./Diam	Max. Diameter	Max. Resistance @ 20°C	Max. Diameter	Max. Weight
100G0111-0.15-*	0.15 mm²	19/0.10 mm	0.50 mm	133.0 Ω/km	1.08 mm	2.59 kg/km
100G0111-0.25-*	0.25 mm²	19/0.13 mm	0.63 mm	83.3 Ω/km	1.19 mm	3.59 kg/km
100G0111-0.40-*	0.40 mm²	19/0.16 mm	0.79 mm	50.5 Ω/km	1.38 mm	5.18 kg/km
100G0111-0.50-*	0.50 mm²	19/0.18 mm	0.90 mm	40.1 Ω/km	1.45 mm	6.60 kg/km
100G0111-0.60-*	0.60 mm²	19/0.20 mm	1.01 mm	31.1 Ω/km	1.57 mm	7.40 kg/km
100G0111-0.75-*	0.75 mm²	19/0.23 mm	1.15 mm	24.7 Ω/km	1.65 mm	8.90 kg/km
100G0111-1.00-*	1.00 mm²	19/0.25 mm	1.26 mm	20.0 Ω/km	1.80 mm	10.70 kg/km
100G0111-1.20-*	1.20 mm²	19/0.29 mm	1.42 mm	15.3 Ω/km	1.98 mm	13.60 kg/km
100G0111-1.50-*	1.50 mm²	37/0.23 mm	1.58 mm	12.9 Ω/km	2.13 mm	16.00 kg/km
100G0111-2.00-*	2.00 mm²	37/0.25 mm	1.82 mm	9.8 Ω/km	2.41 mm	20.30 kg/km
100G0111-2.50-*	2.50 mm²	37/0.29 mm	2.01 mm	8.0 Ω/km	2.63 mm	25.70 kg/km
100G0111-3.00-*	3.00 mm²	37/0.32 mm	2.24 mm	6.4 Ω/km	2.86 mm	31.00 kg/km
100G0111-4.00-*	4.00 mm²	56/0.30 mm	2.57 mm	4.9 Ω/km	3.17 mm	43.60 kg/km

sales@is-rayfast.com | +44(0)1793 616700

100E Fire Hazard Properties

Test	Method	Result
Flame Propagation - Single cable	IEC 60332-1-2	Charring confined 50-540mm
Flame Propagation - Bunched Cable (d≥ 12mm)	IEC 60332-3-24	Max. burn length 2.5m
Flame Propagation - Bunched Cable (>6mm/<12mm)	EN 50305 Clause 9.1.1	Max burn length 2.5m
Flame Propagation - Bunched Cable (d ≤6mm)	EN 50305 Clause 9.1.2	Max burn length 1.5m
Smoke Testing	EN 61034-2	3m cube 90% min. transmittance
Toxicity	EN 50305 Clause 9.2	Index max.6
Fluorine Content	IEC 60684-2 Cl 45.2	<0.1% Fluorine
Evolution of HCL	EN 60754-1	<0.5% HCL
Acid Gas Emission	EN 60754-2	pH >4.3 conductivity <10µS/mm

100E EN50306-2 Thin Wall Single Core Wires 300 volts

	Conductor			Finished Wire		
Part Description	Cross Sectional Area	Conductor Stranding No./Diam	Max. Diameter	Max. Resistance @ 20°C	Max. Diameter	Max. Weight
100E0111-0.50-X	0.50 mm²	19/0.18 mm	0.90 mm	40.1 Ω/km	1.45 mm	6.60 kg/km
100E0111-0.75-X	0.75 mm²	19/0.23 mm	1.15 mm	26.7 Ω/km	1.65 mm	8.90 kg/km
100E0111-1.00-X	1.00 mm²	19/0.25 mm	1.26 mm	20.0 Ω/km	1.80 mm	10.7 kg/km
100E0111-1.50-X	1.50 mm²	37/0.23 mm	1.58 mm	13.7 Ω/km	2.13 mm	16.0 kg/km
100E0111-2.50-X	2.50 mm²	37/0.29 mm	2.01 mm	8.21 Ω/km	2.63 mm	25.7 kg/km

100E EN50306-3 Single Core Cables, Screened and Thin Wall Sheathed

Part Description	Cross Sectional Area	Shield Size	Jacket Thickness Min.	Jacket Thickness Nom.	Nom. Overall Diameter	Max. Weight
100E1111-0.50-X	0.50 mm²	0.10 mm	0.20 mm	0.38 mm	2.61 mm	17.4 kg/km
100E1111-0.75-X	0.75 mm²	0.10 mm	0.20 mm	0.38 mm	2.82 mm	20.7 kg/km
100E1111-1.00-X	1.00 mm²	0.10 mm	0.20 mm	0.38 mm	2.95 mm	23.9 kg/km
100E1111-1.50-X	1.50 mm²	0.10 mm	0.20 mm	0.38 mm	3.28 mm	31.6 kg/km
100E1111-2.50-X	2.50 mm²	0.10 mm	0.20 mm	0.38 mm	3.88 mm	49.3 kg/km

100E Wire

Halogen Free, Low Smoke
Fire Hazard Properties and Part Numbering

100E EN50306-3 Two Core Cables, Screened and Thin Wall Sheathed

	Conductor		Finished Wire			
Part Description	Cross Sectional Area	Shield Size	Jacket Thickness Min.	Jacket Thickness Nom.	Nom. Overall Diameter	Max. Weight
100E1121-0.50-X	0.50 mm²	0.13 mm	0.20 mm	0.38 mm	4.14 mm	32.5 kg/km
100E1121-0.75-X	0.75 mm²	0.13 mm	0.20 mm	0.38 mm	4.56 mm	39.0 kg/km
100E1121-1.00-X	1.00 mm²	0.13 mm	0.20 mm	0.38 mm	4.81 mm	47.0 kg/km
100E1121-1.50-X	1.50 mm²	0.13 mm	0.20 mm	0.38 mm	5.48 mm	64.4 kg/km
100E1121-2.50-X	2.50 mm²	0.13 mm	0.20 mm	0.38 mm	6.48 mm	95.2 kg/km

100E EN50306-3 Three Core Cables, Screened and Thin Wall Sheathed

Part Description	Cross Sectional Area	Shield Size	Jacket Thickness Min.	Jacket Thickness Nom.	Nom. Overall Diameter	Max. Weight
100E1131-0.50-X	0.50 mm²	0.13 mm	0.20 mm	0.38 mm	4.36 mm	42.0 kg/km
100E1131-0.75-X	0.75 mm²	0.13 mm	0.20 mm	0.38 mm	4.82 mm	52.2 kg/km
100E1131-1.00-X	1.00 mm²	0.13 mm	0.20 mm	0.38 mm	5.09 mm	62.3 kg/km
100E1131-1.50-X	1.50 mm²	0.13 mm	0.20 mm	0.38 mm	5.81 mm	85.9 kg/km
100E1131-2.50-X	2.50 mm²	0.13 mm	0.20 mm	0.38 mm	6.86 mm	129 kg/km

100E EN50306-3 Four Core Cables, Screened and Thin Wall Sheathed

Part Description	Cross Sectional Area	Shield Size	Jacket Thickness Min.	Jacket Thickness Nom.	Nom. Overall Diameter	Max. Weight
100E1141-0.50-X	0.50 mm²	0.13 mm	0.25 mm	0.38 mm	4.72 mm	85.8 kg/km
100E1141-0.75-X	0.75 mm²	0.13 mm	0.25 mm	0.38 mm	5.22 mm	101 kg/km
100E1141-1.00-X	1.00 mm²	0.13 mm	0.30 mm	0.43 mm	5.62 mm	123 kg/km
100E1141-1.50-X	1.50 mm²	0.13 mm	0.38 mm	0.48 mm	6.53 mm	168 kg/km
100E1141-2.50-X*	2.50 mm²	0.13 mm	0.46 mm	0.61 mm	7.96 mm	250 kg/km

sales@is-rayfast.com | +44(0)1793 616700

EN50306-4 Multi-Core and Multi-Pair Cables, Screened and Standard Wall Sheathed

Custom designed cables (specials). Due to the potential number of parts possible, these will be created as EPD cables. Rail specifications EN50306-4 multi-core and multi-pair cables are standard wall sheathed.

- Unscreened, sheathed for either exposed or protected wiring (0.5mm^2 to 2.50 mm^2, number of cores from 2 to 48). Conforms with table 1 of EN50306-4 (Class 1P or 1E)
- Screened, sheathed for either exposed or protected wiring (0.5mm^2 to 2.50 mm^2, number of cores from 2 to 8). Conforms with table 3 of EN50306-4 (Class 3P or 3E)
- Screened, sheathed for either exposed or protected wiring (0.5mm^2 to 1.50 mm^2, number of cores from 2 to 7). Conforms with table 3 of EN50306-4 (Class 5P or 5E)

PTFE Wire

NEMA HP3 (MIL-W-16878) **and BS 3G 210**
Equipment wire

Polytetrafluoroethylene (PTFE) is a fluorocarbon polymer insulation material that allows wiring systems to be used and operated in the most demanding of environments.

PTFE is resistant to lubricants and fuels, very flexible, plus it has excellent thermal and electrical properties. Particularly suitable for applications requiring high levels of thermal and chemical resistance.

Features & Benefits

- Mechanically tough and flexible
- Excellent temperature performance
- Very high dielectric performance
- Non flammable / Flame resistant
- Excellent chemical resistance
- Silver and Nickel plated conductors
- Water repellent

Operating Temperature BS 3G 210

- -75ºC to +190ºC (Silver plated copper)
- -75ºC to +260ºC (Nickel plated copper)

Operating Temperature Nema HP3

- -75ºC to +200ºC (Silver plated copper)

Voltage Rating

- 250/300, 600 & 1000 volts

Specifications/Approvals

- BS 3G 210 Type A, B and C
- Nema HP3 Type ET, E and EE (formerly known as MIL-W-16878)

For more information on the current PTFE stock profile, technical data, or assistance with your specific PTFE wire and cable requirements, please contact us.

BS 3G 210 Equipment Wire

BS 3G 210	Voltage Rating (RMS)	Conductor Plating	
		Silver	Nickel
TYPE A	300 V	A	NA
TYPE B	600 V	B	NB
TYPE C	1000 V	C	NC

Nema HP3 Equipment Wire

Nema HP3 (MIL-W-16878)	Voltage Rating (RMS)	Nema HP3 Replaces Mil
Type ET	250 V	MIL-W-16878/6
Type E	600 V	MIL-W-16878/4
Type EE	1000 V	MIL-W-16878/5

sales@is-rayfast.com | +44(0)1793 616700

PTFE Wire

NEMA HP3 (MIL-W-16878) **and BS 3G 210**
Equipment wire

BS 3G 210 Part Numbering

BS 3G210-A-20(19/0.20)-6 example

BS 3G210 Type			
A	300V Silver	NA	300V Nickel
B	600V Silver	NB	600V Nickel
C	1000V Silver	NC	1000V Nickel

AWG	Strands	A/NA	B/NB	C/NC
32	7/0.080	•	•	•
30	1/0.250	•		
30	7/0.100	•	•	•
28	1/0.320	•		
28	7/0.120	•	•	•
26	1/0.400	•	•	
26	7/0.150	•	•	•
26	19/0.100	•	•	•
24	7/0.200	•	•	•
24	19/0.120	•	•	•
23	1/0.600		•	
22	19/0.150	•	•	•
20	19/0.200	•	•	•
19	1/0.900			•
18	19/0.250		•	•
16	19/0.300			•
14	19/0.335			•
12	19/0.450			•
10	37/0.400			•

Colour Codes					
0	Black	4	Yellow	8	Grey
1	Brown	5	Green	9	White
2	Red	6	Blue	2L	Pink
3	Orange	7	Violet		

Nema HP3 Part Numbering

HP3-EXBGE9 example

NEMA Type	
ET	250 V
E	600 V
EE	1000 V

Construction	
W	Wrapped
X	Extruded

Conductor Material	
B	Silver plated Cu
C	Nickel plated Cu
D	Silver plated high strength Cu alloy
E	Nickel plated high strength Cu alloy
F	Silver plated Cu clad steel
G	Nickel plated Cu clad steel

AWG Size					
A	32	H	18	R	4
B	30	J	16	S	2
C	28	K	14	T	1
D	26	L	12	U	0
E	24	M	10	W	00
F	22	N	8	Y	000
G	20	P	6	Z	0000

Stranding					
A	1	L	133	T	1330
B	7	P	665	V	1672
E	19	R	817	W	2109
G	37	S	1045		

Colour Codes					
0	Black	4	Yellow	8	Grey
1	Brown	5	Green	9	White
2	Red	6	Blue		
3	Orange	7	Violet		

Military and Aerospace Wire

SAE AS22759
SAE AS81044
SAE AS27500
EN Specs Airbus Group
BMS13-XX Boeing

Working closely with partnered QPL'd manufacturers worldwide we offer a comprehensive range of wires and cables, plus associated products for the Defence and Aerospace markets.

Our customer service team includes specialists by sector and by product, to provide the best customer support possible.

We offer a wide selection of military and aerospace specification wires and cables, plus custom designed products.

Our experience and knowledge is able to provide you with advice and support on the best product available for your application, whether it is an off the shelf or a bespoke designed cable.

sales@is-rayfast.com | +44(0)1793 616700

SAE AS22759 • M22759

Equipment Wire
Military and Commercial Aerospace

M22759/5 to /12	Extruded PTFE
M22759/13 to /15	Extruded FEP, with PVDF outer
M22759/16 to /19	Extruded ETFE insulation
M22759/20 to /31	Extruded PTFE insulation
M22759/32 to /46	Extruded XL-ETFE insulation
M22759/80 to /92	Composite taped
M22759/180 - /192	Composite taped, smooth

SAE AS22759 wire is a fluoropolymer insulated single conductor wire that is ideal for a wide variety of military aerospace applications. Since AS22759 wire is built to meet military specifications, it is also the premier choice for many commercial applications.

SAE AS22759 wire boasts high performance and reliability in severe wind and moisture prone (SWAMP) zones such as engine nacelles as well as areas that require overload stability, low smoke emission and fire resistance, such as aircraft cabins.

SAE AS22759 wire can carry up to 1000 volts, and is capable of operating in extreme temperature ranges from -55°C to +260°C.

IS-Group offers many different configurations of AS22759 wire. Choose copper or high strength copper alloy conductors coated with tin, silver, or nickel. We also provide a wide selection of insulation material options to meet your needs.

Some of the distinctive characteristics offered by AS22759 wire are:

- Excellent thermal stability
- High reliability
- High break strength and flex life
- High abrasion resistance
- AS22759 wire is available in sizes ranging from 30 to 0000 AWG.

Note: This specification was formerly listed under MIL-W-22759 and is supplied in full compliance with the SAE AS22759 specification.

Part number example...

M22759 34 26 9

- **Colour Code Designator** Per MIL-STD-681
- **Wire Gauge (AWG)**
- **Wire Type** Refer to tables following pages
- **General Specification**

SAE AS22759 • M22759

Equipment Wire
Military and Commercial Aerospace

M22759/5 to /12 Extruded PTFE Insulation

Reference	M27500 Identifier	Conductor Plating	Insulation	Temp. Rating	Volt. Rating	AWG
M22759/5	VA	Silver	Extruded PTFE*	200°C	600 V	24 to 20
M22759/6	WA	Nickel	Extruded PTFE*	260°C	600 V	24 to 20
M22759/7	SA	Silver	Extruded PTFE*	200°C	600 V	24 to 8
M22759/8	TA	Nickel	Extruded PTFE*	260°C	600 V	24 to 8
M22759/9	LE	Silver	Extruded PTFE	200°C	1000 V	28 to 10
M22759/10	LH	Nickel	Extruded PTFE	260°C	1000 V	28 to 8
M22759/11	RC	Silver	Extruded PTFE	200°C	600 V	28 to 8
M22759/12	RE	Nickel	Extruded PTFE	260°C	600 V	28 to 8

* Denotes mineral filled PTFE insulation

M22759/13 to /15 Extruded FEP Insulation, with PVDF outer

Reference	M27500 Identifier	Conductor Plating	Insulation	Temp. Rating	Volt. Rating	AWG
M22759/13	CA	Tin	Extruded FEP/PVDF	135°C	600 V	24 to 10
M22759/14	CB	Tin	Extruded FEP/PVDF	135°C	600 V	26 to 12
M22759/15	CC	Silver HSCA	Extruded FEP/PVDF	135°C	600 V	26 to 20

M22759/16 to /19 Extruded ETFE Insulation

Reference	M27500 Identifier	Conductor Plating	Insulation	Temp. Rating	Voltage Rating	AWG
M22759/16	TE	Tin	Extruded ETFE	150°C	600 V	24 to 00
M22759/17	TF	Silver HSCA	Extruded ETFE	150°C	600 V	26 to 20
M22759/18	TG	Tin	Extruded ETFE	150°C	600 V	26 to 10
M22759/19	TH	Silver HSCA	Extruded ETFE	150°C	600 V	26 to 20

sales@is-rayfast.com | +44(0)1793 616700

M22759/20 to /31 Extruded PTFE Insulation

Reference	M27500 Identifier	Conductor Plating	Insulation	Temp. Rating	Volt. Rating	AWG
M22759/20	TK	Silver HSCA	Extruded PTFE	200°C	1000 V	28 to 20
M22759/21	TL	Nickel HSCA	Extruded PTFE	260°C	1000 V	28 to 20
M22759/22	TM	Silver HSCA	Extruded PTFE	200°C	600 V	28 to 20
M22759/23	TN	Nickel HSCA	Extruded PTFE	260°C	600 V	28 to 20
M22759/28	JB	Silver	Extruded PTFE/Polyimide	200°C	600 V	28 to 10
M22759/29	JC	Nickel	Extruded PTFE/Polyimide	260°C	600 V	28 to 10
M22759/30	JD	Silver HSCA	Extruded PTFE/Polyimide	200°C	600 V	28 to 20
M22759/31	JE	Nickel HSCA	Extruded PTFE/Polyimide	260°C	600 V	28 to 10

M22759/32 to /46 Extruded XL-ETFE Insulation

Reference	M27500 Identifier	Conductor Plating	Insulation	Temp. Rating	Voltage Rating	AWG
M22759/32	SB	Tin	Extruded XL-ETFE	150°C	600 V	30 to 12
M22759/33	SC	Silver HSCA	Extruded XL-ETFE	200°C	600 V	30 to 20
M22759/34	SD	Tin	Extruded XL-ETFE Dual Wall*	150°C	600 V	24 to 00
M22759/35	SE	Silver HSCA	Extruded XL-ETFE Dual Wall	200°C	600 V	26 to 20
M22759/41	SM	Nickel	Extruded XL-ETFE Dual Wall*	200°C	600 V	26 to 00
M22759/42	SN	Nickel HSCA	Extruded XL-ETFE Dual Wall	200°C	600 V	26 to 20
M22759/43	SP	Silver	Extruded XL-ETFE Dual Wall*	200°C	600 V	26 to 00
M22759/44	SR	Silver	Extruded XL-ETFE	200°C	600 V	28 to 12
M22759/45	SS	Nickel	Extruded XL-ETFE	200°C	600 V	28 to 12
M22759/46	ST	Nickel HSCA	Extruded XL-ETFE	200°C	600 V	28 to 20

* Denotes polymeric braid as outer sheath on certain sizes

SAE AS22759 • M22759

Composite Taped Equipment Wire
Military and Commercial Aerospace

Composite Insulated - Cables address a number of issues associated with Polyimide and XL-ETFE wire and cable. Namely that of insulation thickness and consequent space and weight savings, without sacrificing the mechanical and thermal performance of the wire.

Series /80 to /92 wire offers...

Approximate 5% weight saving over XL-ETFE

M22759/80 to /92 Composite Taped Wires

Reference	M27500 Ident.	Conductor Plating	Insulation	Temp. Rating	Voltage Rating	AWG
M22759/80	WB	Tin	Fluoropolymer/Polyimide, 2 Ply	150°C	600 V	26 to 10
M22759/81	WC	Silver, HSCA	Fluoropolymer/Polyimide, 2 Ply	200°C	600 V	26 to 20
M22759/82	WE	Nickel, HSCA	Fluoropolymer/Polyimide, 2 Ply	260°C	600 V	26 to 20
M22759/83	WF	Silver	Fluoropolymer/Polyimide, 4 Ply	200°C	600 V	2 to 0000
M22759/84	WG	Nickel	Fluoropolymer/Polyimide, 4 Ply	260°C	600 V	2 to 0000
M22759/85	WH	Tin	Fluoropolymer/Polyimide, 4 Ply	150°C	600 V	2 to 0000
M22759/86	WJ	Silver	Fluoropolymer/Polyimide, 2 Ply	200°C	600 V	26 to 10
			Fluoropolymer/Polyimide, 3 Ply			8 to 6
			Fluoropolymer/Polyimide, 4 Ply	260°C		4 to 0000
M22759/87	WK	Nickel	Fluoropolymer/Polyimide, 2 Ply	260°C	600 V	26 to 10
			Fluoropolymer/Polyimide, 3 Ply			8 to 6
			Fluoropolymer/Polyimide, 4 Ply			4 to 0000
M22759/88	WL	Tin	Fluoropolymer/Polyimide, 2 Ply	150°C	600 V	26 to 10
			Fluoropolymer/Polyimide, 3 Ply			8 to 6
			Fluoropolymer/Polyimide, 4 Ply			4 to 0000
M22759/89	WM	SIlver HSCA	Fluoropolymer/Polyimide, 2 Ply	200°C	600 V	26 to 20
M22759/90	WN	Nickel HSCA	Fluoropolymer/Polyimide, 2 Ply	260°C	600 V	26 to 20
M22759/91	WP	Silver	Fluoropolymer/Polymide, 2 Plyi	200°C	600 V	26 to 10
M22759/92	WR	Nickel	Fluoropolymer/Polyimide, 2 Ply	260°C	600 V	26 to 10

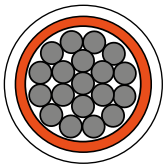
sales@is-rayfast.com | +44(0)1793 616700

Composite 'Smooth/Seamless' - Technological advances in recent years has enabled an improved 'Smooth' version of composite taped wires, that offers all the advantages of tape wrap found on the /80 to /92 series but with the smooth appearance and characteristics of an extrusion.

These /180 to /192 series wires offer superior performance characteristics over the 80 to 92 series in that...

Marking Contrast up by circa 9%

Scrape Abrasion resistance up by approx 47%

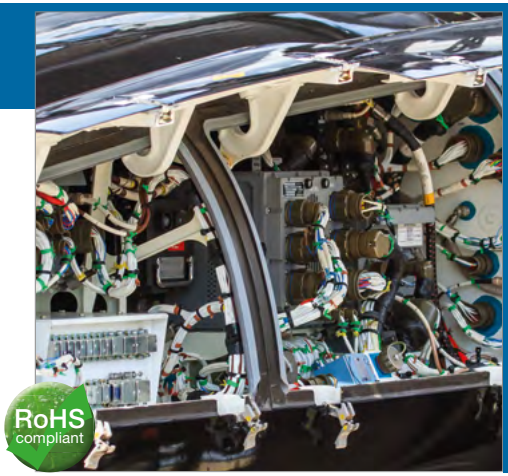


M22759/180 to /192 Composite Taped Wires 'Smooth/Seamless'

Reference	M27500 Ident.	Conductor Plating	Insulation	Temp. Rating	Voltage Rating	AWG
M22759/180	DB	Tin	Fluoropolymer/Polyimide, 2 Ply	150°C	600 V	26 to 10
M22759/181	DC	Silver, HSCA	Fluoropolymer/Polyimide, 2 Ply	200°C	600 V	26 to 20
M22759/182	DE	Nickel, HSCA	Fluoropolymer/Polyimide, 2 Ply	260°C	600 V	26 to 20
M22759/183	DF	Silver	Fluoropolymer/Polyimide, 4 Ply	200°C	600 V	2 to 0000
M22759/184	DG	Nickel	Fluoropolymer/Polyimide, 4 Ply	260°C	600 V	2 to 0000
M22759/185	DH	Tin	Fluoropolymer/Polyimide, 4 Ply	150°C	600 V	2 to 0000
M22759/186	DJ	Silver	Fluoropolymer/Polyimide, 2 Ply	200°C	600 V	26 to 10
			Fluoropolymer/Polyimide, 3 Ply			8 to 6
			Fluoropolymer/Polyimide, 4 Ply	260°C		4 to 0000
M22759/187	DK	Nickel	Fluoropolymer/Polyimide, 2 Ply	260°C	600 V	26 to 10
			Fluoropolymer/Polyimide, 3 Ply			8 to 6
			Fluoropolymer/Polyimide, 4 Ply			4 to 0000
M22759/188	DL	Tin	Fluoropolymer/Polyimide, 2 Ply	150°C	600 V	26 to 10
			Fluoropolymer/Polyimide, 3 Ply			8 to 6
			Fluoropolymer/Polyimide, 4 Ply			4 to 0000
M22759/189	DM	SIlver, HSCA	Fluoropolymer/Polyimide, 2 Ply	200°C	600 V	26 to 20
M22759/190	DN	Nickel, HSCA	Fluoropolymer/Polyimide, 2 Ply	260°C	600 V	26 to 20
M22759/191	DP	Silver	Fluoropolymer/Polyimide, 2 Ply	200°C	600 V	26 to 10
M22759/192	DR	Nickel	Fluoropolymer/Polyimide, 2 Ply	260°C	600 V	26 to 10

SAE AS81044 • M81044

PVDF Equipment Wire
Military and Commercial Aerospace



SAE AS81044 wire is an extremely versatile and reliable stranded single-conductor insulated lead wire with an impressive operating range of -65°C to 150°C and a maximum voltage rating of 600V. This wire offers a resistance to cut-through, abrasion, cold flow and common chemicals and has low smoke characteristics. This wire is ideal for cable construction, routing in conduits, or in protected areas of avionics and airframe compartments.

Originally developed for military and aerospace applications and is now commonly used in aircraft, ground support equipment, military vehicles, shipboard and missile platforms. This wire offers high density ratios which allow your application to meet strict weight requirements.

There are also various commercial and industry applications for AS81044 like harness wiring or most applications requiring a high density cable.

With conductor coatings including tin and silver, as well as high strength copper alloy,

Part number example...

M81044 12 26 9

- **General Specification**
- **Wire Type** Refer to following chart below
- **Wire Gauge (AWG)**
- **Colour Code Designator** Per MIL-STD-681

M81044/5 to /13 Extruded XL Polyvinylidene Fluoride Insulation

Reference	M27500 Ident.	Conductor Plating	Jacket Insulation	Temp. Rating	Voltage Rating	AWG
M81044/5	MD	Silver	Extruded XL-PVDF	150°C	600 V	24 to 0
M81044/6	ME	Tin	Extruded XL-PVDF	150°C	600 V	24 to 0
M81044/7	MF	Silver, HSCA	Extruded XL-PVDF	150°C	600 V	26 to 20
M81044/8	MG	Silver	Extruded XL-PVDF	150°C	600 V	24 to 0
M81044/9	MH	Tin	Extruded XL-PVDF	150°C	600 V	24 to 0
M81044/10	MJ	Silver, HSCA	Extruded XL-PVDF	150°C	600 V	26 to 20
M81044/11	MK	Silver	Extruded XL-PVDF	150°C	600 V	30 to 12
M81044/12	ML	Tin	Extruded XL-PVDF	150°C	600 V	30 to 12
M81044/13	MM	Silver, HSCA	Extruded XL-PVDF	150°C	600 V	30 to 20

sales@is-rayfast.com | +44(0)1793 616700

NEMA WC27500 • M27500

Airframe and Equipment Wire
Military and Commercial Aerospace

The ANSI/NEMA WC27500 REV A specification is commonly used to describe both shielded and unshielded cable constructions for avionics, aerospace and airframe applications. The specification allows the user a wide variety of construction choices. Circuit identification, conductor size, insulation type, number of conductors, shielding material and jacket compound may all be specified.

QPL is required for WC 27500 in addition to the basic component wires. The producer of the finished cable must be a qualified source under the applicable basic wire specification or must provide evidence that Qualified wire was used in the construction of the cable.

The colour identification charts below should be used in conjunction with the part M27500 numbering guide illustrated over the page.

M27500 Colour Table 3A

For cables having more than 10 conductors, the wires shall be a white base identified by double colour tracers as illustrated in chart below.

Wire 1	Wire 2	Wire 3	Wire 4	Wire 5	Wire 6	Wire 7	Wire 8	Wire 9	Wire 10	Wire 11	Wire 12	Wire 13	Wire 14	Wire 15
White Wire	Blue	Orange	Green	Red	Black	Yellow	Violet	Grey	Brown	Blue	Orange	Green	Red	Black
	Single stripe on white wire									Double stripe on white wire				

M27500 Colour Table 3B

For cables having 1-4 and 6-10 wires colour designation is based on stripe over white wire. Whilst wire 5 has no stripe. Wires 11 to 15 colour designation indicates insulation colour with a white stripe.

Wire 1	Wire 2	Wire 3	Wire 4	Wire 5	Wire 6	Wire 7	Wire 8	Wire 9	Wire 10	Wire 11	Wire 12	Wire 13	Wire 14	Wire 15
Red	Blue	Yellow	Green	White	Black	Brown	Orange	Violet	Grey	Red	Blue	Yellow	Green	Black
	Stripe over white wire									Insulation colour / white stripe				

M27500 Colour Table 3C - Wire Sizes Identification

Cables colour code identification by AWG size. In accordance with MIL-STD686. For MIL-DTL-81381 basic wire, the insulation colour may be opaque dark yellow or unpigmented polyimide resin colour.

26	24	24	20	18	16	14	12	10	8	6	4	2	1	0	00
Black	Blue	Green	Red	White	Blue	Green	Yellow	Brown	Red	Blue	Yellow	Red	White	Blue	Green

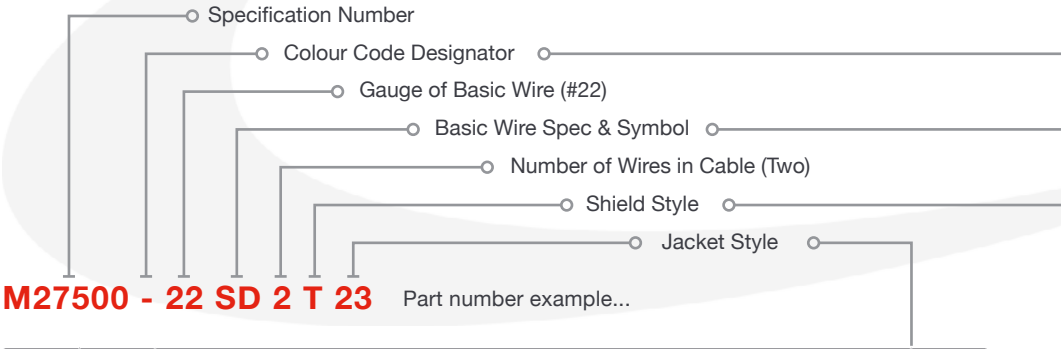
NEMA WC27500 • M27500

Airframe and Equipment Wire
Military and Commercial Aerospace

M27500 is low voltage, high temperature cable ideal for use in a variety of both military and commercial applications, including those involving airframes, avionics and ground support equipment.

(Note: This specification was formerly listed under MIL-C-27500 and MIL-DTL-27500.

for more information on the different types of M27500 cable offered please contact us.



x1 Jackt'	x2 Jackt'	Jacket Style	Temp. Limit
00	00	No jacket	-
01	51	Extruded white PVC[1]	90°C
02	52	Extruded clear polyamide in accordance with ASTM D4066	105°C
03	53	White polyamide braid with clear polyamide finisher over a polyester tape	105°C
04	54	Polyester braid impregnated with high temp finishers over polyester tape	150°C
05	55	Extruded Clear FEP	200°C
06	56	Extruded or taped and heat sealed white PTFE	260°C
07	57	White PTFE glass braid impregnated & coated with PTFE finisher over pre-sintered PTFE tape	260°C
08	58	Crosslinked white Extruded polyvinylidene fluoride (PVDF)	150°C
09	59	Extruded white FEP	200°C
10	60	Extruded Clear PVF	125°C
11[2]	61[2]	Tape of natural polyimide with FEP wrapped and heat sealed with FEP outer surface	200°C
12[2]	62[2]	Tape of natural polyimide with FEP wrapped and heat sealed with Polyamide outer surface	200°C
14	64	Extruded white ETFE (Tefzel)	150°C
15	65	Extruded clear ETFE (Tefzel)	150°C
16	66	Braid of aromatic polyamide with high-temp finisher over presintered PTFE Tape	200°C
17[3]	67[3]	Extruded white ECTFE	150°C
18[3]	68[3]	Extruded clear ECTFE	150°C
20	70	Extruded white perfluoroalkoxy (PFA)	260°C
21	71	Extruded clear perfluoroalkoxy (PFA)	260°C
22	72	Polyimide tape with clear FEP wrapped and heat sealed with opaque polyimide outer surface	200°C
23	73	White crosslinked extruded modified XLETFE	200°C
24	74	White PTFE tape wrapped over tape layer of natural polyimide combined with FEP & heat sealed	200°C

sales@is-rayfast.com | +44(0)1793 616700

85% Shield	90% Shield	M27500 Cable Terminology	Component Wire ID Method
-	C	Preferred, table 3A	White wire with colour stripes. Wire 1 no stripe. Wires 11-15 double stripes
F	H	Preferred, table 3B	White wire with colour stripes. Wires 11-15 insulation is colour, stripe is white
A	D	Opt' method A, table 3A	Solid coloured wire. Wires 11-15 have a stripe in a lighter shade of base colour
G	J	Opt' method A, table 3B	Solid coloured wire. Wires 11-15 insulation is first colour, stripe is second colour
B	E	Opt' method B, table 3C	Wire colour based on AWG size. Band of contrasting colour denotes wire number
K	M	Opt' method C, table 3C	Wire colour based on AWG size. No's of contrasting colour printed denotes wire No.
L	N	Opt' method D	White wires with numbers of contrasting colour printed to denote wire number

Symbol	x2 Shield	Shield Style	Max Temp.
U	-	No Shield	-
T	V	Tin Plated Copper, Round	150°C
S	W	Silver Plated Copper, Round	200°C
N	Y	Nickel Copper, Round	260°C
F	Z	Stainless Steel, Round	400°C
C	R	Heavy Nickel Plated Cu, Round	400°C
M	K	Silver Plated HSCA, Round	200°C
P	L	Nickel Plated HSCA, Round	260°C
G	A	Silver Plated Copper, Flat	200°C
H	B	Silver Plated HSCA, Flat	200°C
*	#	Nickel Plated Copper, Flat	260°C
J	D	Tin Plated Copper, Flat	150°C
E	X	Nickel Plated HSCA, Flat	260°C
I	Q	Nickel Chromium Alloy, Flat	400°C

#	Specification
CA	MIL-W-22759/13
CB	MIL-W-22759/14
CC	MIL-W-22759/15
E	MIL-W-22759/2
EA	MIL-W-22759/1
JB	MIL-W-22759/28
JC	MIL-W-22759/29
JD	MIL-W-22759/30
JE	MIL-W-22759/31
LE	MIL-W-22759/9
LH	MIL-W-22759/10
MD	MIL-W-81044/5
ME	MIL-W-81044/6
MF	MIL-W-81044/7
MG	MIL-W-81044/8
MH	MIL-W-81044/9
MJ	MIL-W-81044/10
MK	MIL-W-81044/11
ML	MIL-W-81044/12
MM	MIL-W-81044/13
RA	MIL-W-22759/3
RB	MIL-W-22759/4
RC	MIL-W-22759/11

#	Specification
RE	MIL-W-22759/12
SA	MIL-W-22759/7
SB	MIL-W-22759/32
SC	MIL-W-22759/33
SD	MIL-W-22759/34
SE	MIL-W-22759/35
SM	MIL-W-22759/41
SN	MIL-W-22759/42
SP	MIL-W-22759/43
SR	MIL-W-22759/44
SS	MIL-W-22759/45
TA	MIL-W-22759/8
TE	MIL-W-22759/16
TF	MIL-W-22759/17
TG	MIL-W-22759/18
TH	MIL-W-22759/19
TK	MIL-W-22759/20
TL	MIL-W-22759/21
TM	MIL-W-22759/22
TN	MIL-W-22759/23
VA	MIL-W-22759/5
WA	MIL-W-22759/6

Notes and Comments	
1	PVC materials shall not be used for aerospace
2	Not for Naval Air Systems Command usage
3	Inactive for new design

EN / ABS / NSA Specs

European Hook-up and Airframe Wire
Military and Commercial Aerospace

EN2266 - Hook up airframe wiring, Polyimide tapes and FEP topcoat, with temperature rating -55ºC to +200ºC.

EN2267 - Hook up airframe wiring, polyimide plus PTFE tapes, with temperature rating -65ºC to +260ºC

EN2713 - Hook up airframe wiring, shielded and jacketed wire, with Polyimide & FEP sheath with temperature rating -65ºC to +200ºC

EN2714- Hook up airframe wiring, shielded and jacketed wire, with Polyimide & PTFE tapes with temperature rating -65ºC to +260ºC

ABS - 0949, 1354 and 1356

NSA - NSA 935344 and NSA 935348

European Standards (ENs) are governed by three European Standardization Organisations (ESOs): CEN, CENELEC or ETSI. Such standards are recognised as a collaborative effort in technical standardisation per EU Regulation 1025/2012.

For supply chain experience, IS-Group has strategic Mil/Aero franchises with existing international status suppliers. Plus the ability to help design, engineer and supply industry leading products.

IS-Group supplies a variety of EN-compliant hook-up wires for high temperature aerospace applications that are available in single and multi-core designs.

Different polyimide/PTFE insulation and jacketing provide excellent resistance to aircraft fluids, chemicals and more. These cables are UV markable and they also have low smoke density and toxicity.

If the specification required is not listed on these pages please contact us as we supply an extensive range of specialist wire and cable.

EN2266 Hook-up and Airframe Wiring, -55ºC to +200ºC

Reference	Family	Construction	AWG
115V AC Single Core			
EN2266-005A	CF-U	Nickel plated copper. Insulation Polyimide tapes and FEP topcoat	26 to 10
115V AC Multi-Cores - Twisted Cable			
EN2266-003B	PF	Cores: 2 x EN2266 basic cores twisted cable	26 to 10
EN2266-003C	QF	Cores: 3 x EN2266 basic cores twisted cable	26 to 10
EN2266-003D	RF	Cores: 4 x EN2266 basic cores twisted cable	26 to 10
115V AC Multi-Cores - Polyimide plus Fluoropolymer top coat			
EN2266-008B	DRP	Cores: 2 x EN2267-009A (DRA) basic cores twisted cable	26 to 14
EN2266-008C	DRT	Cores: 3 x EN2267-009A (DRA) basic cores twisted cable	26 to 12
EN2266-008D	DRQ	Cores: 4 x EN2267-009A (DRA) basic cores twisted cable	26 to 14

EN2267 Hook-up and Airframe Wiring, -65ºC to +260ºC

Reference	Family	Construction	AWG
115V AC Single Core			
EN2267-008A	DM	Nickel plated copper. Insulation Polyimide + PTFE tapes	26 to 06
EN2267-007A	DMA	Nickel plated copper. Insulation Polyimide + PTFE tapes, UV proof	26 to 06
115V AC Multi-Cores			
EN2267-007B	PN	Cores: 2 x EN2267-007 (DMA) basic cores twisted cable	26 to 06
EN2267-007C	QL	Cores: 3 x EN2267-007 (DMA) basic cores twisted cable	26 to 06
EN2267-007D	RK	Cores: 4 x EN2267-007 (DMA) basic cores twisted cable	26 to 06
115V AC Single Core			
EN2267-010A	DR	Nickel plated copper. Insulation Polyimide + PTFE tapes	26 to 02
EN2267-009A	DRA	Same construction as DR but not sensitive to UV	26 to 02
115V AC Multi-Cores			
EN2267-009B	DRB	Cores: 2 x EN2267 (DRA) basic cores twisted cable	26 to 02
EN2267-009C	DRC	Cores: 3 x EN2267 (DRA) basic cores twisted cable	26 to 02
EN2267-009D	DRD	Cores: 4 x EN2267 (DRA) basic cores twisted cable	26 to 08
230V AC Multi-Cores - Ultra Lightweight			
EN2267-011	DZB	Cores: 2 x EN2267-012 (DZ) basic cores twisted cable	10, 12, 16
EN2267-011	DZC	Cores: 3 x EN2267-012 (DZ) basic cores twisted cable	10, 12, 16
230V AC Single Core - Ultra Lightweight			
EN2267-012	DZ	Nickel plated copper, Insulation Polyimide + PTFE tapes	10, 12, 16

EN2713 • EN2714 Spec

European Hook-up and Airframe Wire
Military and Commercial Aerospace

EN2713 Hook-up and Airframe Wiring, -55ºC to +200ºC

Reference	Family	Construction	AWG
115V AC Shielded & Jacketed - Nickel plated copper spiral shield and Polyimide & FEP sheath			
EN2713-007A	SJ-U	EN2266 basic core, plus shield and sheath	26 to 10
EN2713-007B	TK-U	2 x EN2266 basic core, plus shield and sheath	26 to 10
EN2713-007C	UD-U	3 x EN2266 basic core, plus shield and sheath	26 to 12
EN2713-003D	VL	4 x EN2266 basic core, plus shield and sheath	26 to 10
115V AC Shielded & Jacketed - Spiral screen silver plated copper and Polyimide tapes plus FEP top coat			
EN2713-011A	SJB	Cores: 1 x EN0261-CFA (DRA) basic core	26 to 10
EN2713-011B	TKB	Cores: 2 x EN0261-CFA (DRA) basic cores twisted cable	26 to 14
EN2713-011C	UDB	Cores: 3 x EN0261-CFA (DRA) basic cores twisted cable	26 to 14
EN2713-011D	VLB	Cores: 4 x EN0261-CFA (DRA) basic cores twisted cable	26 to 16
115V AC Shielded & Jacketed - Silver plated copper spiral shield and Polyimide & Fluoropolymer top coat			
EN2713-012A	MNA	Cores: 1 x EN2267-009A (DRA) basic core	26 to 10
EN2713-012B	MNB	Cores: 2 x EN2267-009A (DRA) basic cores twisted cable	26 to 14
EN2713-012C	MNC	Cores: 3 x EN2267-009A (DRA) basic cores twisted cable	26 to 14
EN2713-012D	MND	Cores: 4 x EN2267-009A (DRA) basic cores twisted cable	26 to 16

EN2714 Hook-up and Airframe Wiring, -65ºC to +260ºC

Reference	Family	Construction	AWG
115V AC Shielded & Jacketed - Nickel plated copper spiral shield and Polyimide & PTFE tapes			
EN2714-011A	GJ	Cores: 1 x EN2267-007 (DMA) basic core	26 to 10
EN2714-011B	MH	Cores: 2 x EN2267-007 (DMA) basic cores twisted cable	26 to 10
EN2714-011C	UU	Cores: 3 x EN2267-007 (DMA) basic cores twisted cable	26 to 10
EN2714-011D	VV	Cores: 4 x EN2267-007 (DMA) basic cores twisted cable	26 to 14
EN2714-012E	MJ	Cores: 5 x EN2267-007 (DMA) basic cores twisted cable	18 to 12
115V AC Shielded & Jacketed - Nickel plated copper braided shield and Polyimide & PTFE tapes			
EN2714-013A	MLA	Cores: 1 x EN2267-009A (DRA) basic core	26 to 10
EN2714-013B	MLB	Cores: 2 x EN2267-009A (DRA) basic cores twisted cable	26 to 10
EN2714-013C	MLC	Cores: 3 x EN2267-009A (DRA) basic cores twisted cable	26 to 10
EN2714-013D	MLD	Cores: 4 x EN2267-009A (DRA) basic cores twisted cable	26 to 14
EN2714-014E	MME	Cores: 5 x EN2267-009A (DRA) basic cores twisted cable	18 to 12
EN2714-014X	MMX	Cores: 6 to 10 available on request	18 to 10

sales@is-rayfast.com | +44(0)1793 616700

ABS Airframe Wiring Lightweight, -55ºC to +180ºC

Reference	Family	Construction	AWG
115V AC Single Core			
ABS 0949	AD	Nickel plated copper clad aluminium (24-4), Nickel plated alu'	24 to 000
ABS 1354	ADA	Same construction as AD but not sensitive to UV	24 to 000
115V AC Multi-Cores			
ABS 1354	ADB	Cores: 2 x ABS 1354 (ADA) basic cores twisted cable	24 to 000
ABS 1354	ADC	Cores: 3 x ABS 1354 (ADA) basic cores twisted cable	24 to 000
ABS 1354	ADD	Cores: 4 x ABS 1354 (ADA) basic cores twisted cable	24 to 000
115V AC Shielded & Jacketed - Nickel plated copper spiral shield, with Polyimide + PTFE tapes			
ABS 1356	VNA	Cores: 1 x ABS 1354 (ADA) basic core	24 to 10
ABS 1356	VNB	Cores: 2 x ABS 1354 (ADA) basic cores twisted cable	24 to 10
ABS 1356	VNC	Cores: 3 x ABS 1354 (ADA) basic cores twisted cable	24 to 10
ABS 1356	VND	Cores: 4 x ABS 1354 (ADA) basic cores twisted cable	24 to 14

NSA Data Transmission Coaxial, -68ºC to +250ºC

Reference	Family	Construction	AWG
Coaxial Cables			
NSA 935344	XE	Si plated Cu covered steel, dielectric PTFE, shield Si plated Cu braid, PTFE jacket	50
NSA 935348	XK	Si plated Cu covered steel, dielectric PTFE, shield Si plated Cu braid, FEP jacket	75

Boeing 13-XX Spec Wire

Boeing
Military and Commercial Aerospace

Boeing Specification Wire (BMS 13) products are some of the most reliable and trusted wires and cables available for the aerospace and military industries. All of our Boeing Specification Wire products are designed and tested to meet Boeing specifications for use in most areas of construction. Whether you are transmitting power, data, or signals, IS-Group has a Boeing Specification wire to meet your needs.

We offer all types of BMS13 cable available in various configurations and made from the highest quality materials. You can choose conductors made from high strength copper alloy, silver coated, nickel coated, tin-plated and more.

BMS13 cables can operate in temperatures from -65°C to +310°C, data bus from 50-120 ohms and can carry up to 600 volts. You should choose a design of cable based on the needs and conditions of your specific application.

Some conditions to consider should include:

- Primary function of the cable (fibre optic, databus, general use, etc.)
- Movement, chafing and vibration
- Insulation material, thickness and weight (heavyweight or lightweight)
- Pressurised or unpressurised environments
- Corrosion, fire and temperature resistance
- Resistance to fluids and chemicals
- Conductor or shield coating material

Part number example...

BMS13-XX TXX CXX GXXXX

Part Numbering example

Wire Size (AWG)
Choose a number between the minimum and maximum provided in the charts.

Class (Number of Conductors)
Choose a number between the minimum and maximum provided in the charts.

Type
See charts

BMS Specification

BMS 13-48	BMS 13-65	BMS 13-78
BMS 13-55	BMS 13-67	BMS 13-80
BMS 13-58	BMS 13-71	BMS 13-83
BMS 13-60	BMS 13-72	

We have only illustrated the two most popular wire and cable charts, being BMS 13-48 & BMS 13-60. Please contact us for the availability other versions.

sales@is-rayfast.com | +44(0)1793 616700

BMS 13-48 Extruded XL-ETFE, 600V Wire and Cable -65°C to +150°C

Type	Class		Wire Size		Conductor		Shield		Jacket Material
	Min.	Max.	Min.	Max.	Material	Plating	Material	Plating	
1	1	5	24	10	Annealed Copper	Tin	-	-	-
2	1	5	24	16	HSCA	Nickel	-	-	-
3	1	5	24	10	Annealed Copper	Tin	Copper	Tin	XL-ETFE
4	2	5	24	12	Annealed Copper	Tin	-	-	XL-ETFE
5	1	5	24	16	HSCA	Silver	-	-	-
6	1	5	24	16	HSCA	Silver	Copper	Tin	XL-ETFE
7	2	5	24	16	HSCA	Silver	-	-	XL-ETFE
8	1	6	24	0000	Annealed Copper	Tin	-	-	-
9	1	6	24	16	HSCA	Silver	-	-	-
10	1	7	24	0000	Annealed Copper	Tin	-	-	-
11	1	6	24	16	HSCA	Silver	-	-	-
12	1	4	24	8	Annealed Copper	Tin	Copper	Tin	XL-ETFE
13	1	6	24	16	HSCA	Silver	Copper	Tin	XL-ETFE
14	2	5	24	12	Annealed Copper	Tin	-		XL-ETFE
15	1	4	24	12	Annealed Copper	Tin	Copper	Tin	XL-ETFE
16	1	6	24	10	Annealed Copper	Tin	-	-	-
17	2	5	20	12	Annealed Copper	Tin	-	-	XL-ETFE
18	1	4	20	12	Annealed Copper	Tin	Copper	Tin	XL-ETFE
19	1	6	24	16	HSCA	Silver	-	-	-
20	2	5	20	18	HSCA	Silver	-	-	XL-ETFE
21	1	4	20	18	HSCA	Silver	Copper	Tin	XL-ETFE
22	1	6	24	16	HSCA	Nickel	-	-	-
23	1	6	24	16	HSCA	Nickel	-	-	-
24	1	4	24	16	HSCA	Nickel	Copper	Tin	XL-ETFE
25	1	5	24	12	Annealed Copper	Tin	Flat Copper	Tin	XL-ETFE
26	1	5	24	16	HSCA	Nickel	Flat Copper	Tin	XL-ETFE
27	1	4	24	12	Annealed Copper	Tin	Flat Copper	Tin	XL-ETFE
28	1	5	24	16	HSCA	Silver	Flat Copper	Tin	XL-ETFE
29	1	5	24	16	HSCA	Nickel	Copper	Tin	XL-ETFE
30	2	5	24	16	Annealed Copper	Nickel	-	-	XL-ETFE

BMS 13-48 Spec

Boeing ETFE 600V
Military and Commercial Aerospace

BMS 13-48 Continued

Type	Class		Wire Size		Conductor		Shield		Jacket Material
	Min.	Max.	Min.	Max.	Material	Plating	Material	Plating	
31	1	6	24	16	HSCA	Nickel	-	-	-
32	1	6	24	16	HSCA	Nickel	Copper	Tin	XL-ETFE
33	2	5	20	18	HSCA	Nickel	-	-	XL-ETFE
34	1	4	20	18	HSCA	Nickel	Copper	Tin	XL-ETFE
35	1	6	24	12	Annealed Copper	Silver	-	-	-
36	1	6	24	12	Annealed Copper	Silver	Copper	Tin	XL-ETFE
37	1	4	24	16	HSCA	Nickel	Dble Cu Braid	Tin	XL-ETFE
38	1	4	22	10	Annealed Copper	Tin	Dble Cu Braid	Tin	XL-ETFE
39	1	4	24	16	HSCA	Nickel	Flat Copper	Tin	XL-ETFE
40	1	5	22	10	Annealed Copper	Tin	Copper	Nickel	XL-ETFE
41	1	5	24	16	HSCA	Silver	Copper	Nickel	XL-ETFE
42	1	6	22	8	Annealed Copper	Tin	Copper	Nickel	XL-ETFE
43	1	6	24	8	HSCA	Silver	Copper	Nickel	XL-ETFE
44	1	4	22	10	Annealed Copper	Tin	Copper	Nickel	XL-ETFE
45	1	4	20	12	Annealed Copper	Tin	Copper	Nickel	XL-ETFE
46	1	4	20	18	HSCA	Silver	Copper	Nickel	XL-ETFE
47	1	4	24	16	HSCA	Nickel	Copper	Nickel	XL-ETFE
48	1	5	22	12	Annealed Copper	Tin	Flat Copper	Nickel	XL-ETFE
49	1	5	24	16	HSCA	Nickel	Flat Copper	Nickel	XL-ETFE
50	1	4	22	12	Annealed Copper	Tin	Flat Copper	Nickel	XL-ETFE
51	1	5	24	16	HSCA	Silver	Flat Copper	Nickel	XL-ETFE
52	1	5	24	16	HSCA	Nickel	Copper	Nickel	XL-ETFE
53	1	6	24	16	HSCA	Nickel	Copper	Nickel	XL-ETFE
54	1	4	20	18	HSCA	Nickel	Copper	Nickel	XL-ETFE
55	1	6	22	12	Annealed Copper	Silver	Copper	Nickel	XL-ETFE
56	1	4	24	16	HSCA	Nickel	Copper	Nickel	XL-ETFE
57	1	4	22	10	Annealed Copper	Tin	Copper	Nickel	XL-ETFE
58	1	5	24	16	HSCA	Nickel	Copper	Nickel	XL-ETFE
59	1	7	22	0000	Annealed Copper	Nickel	-	-	-
60	1	5	22	10	Annealed Copper	Nickel	Flat Copper	Nickel	ETFE XL-ETFE

sales@is-rayfast.com | +44(0)1793 616700

BMS 13-60 Arc Resistant, 600V Wire and Cable, -65°C up to +260°C

Type	Class		Wire Size		Conductor		Shield		Jacket Material	Max. Temp
	Min.	Max.	Min.	Max.	Material	Plating	Material	Plating		
1	1	8	22	0000	Annealed Copper	Tin	-	-	-	150°C
2	1	4	22	10	Annealed Copper	Tin	Copper Braid	Tin	PI/PTFE	150°C
3	2	4	22	10	Annealed Copper	Tin	-	-	PI/PTFE	150°C
4	1	8	24	16	HSCA	Nickel	-	-	-	260°C
5	1	4	24	16	HSCA	Nickel	Copper Braid	Tin	PI/PTFE	150°C
			14	10	Annealed Copper					
6	2	4	24	16	HSCA	Nickel	-	-	PI/PTFE	260°C
7	1	8	22	0000	Annealed Copper	Nickel	-	-	-	260°C
8	1	6	22	10	Annealed Copper	Nickel	Copper Braid	Nickel	PI/PTFE	260°C
9	2	4	22	10	Annealed Copper	Nickel	-	-	PI/PTFE	260°C
	5	8	22	18						
10	1	8	24	16	HSCA	Nickel	-	-	-	260°C
11	1	6	24	16	HSCA	Nickel	Copper Braid	Nickel	PI/PTFE	260°C
12	2	4	24	16	HSCA	Nickel	-	-	PI/PTFE	260°C
13	1	6	22	10	Annealed Copper	Tin	Copper Braid	Tin	PI/PTFE	150°C
14	2	6	22	10	Annealed Copper	Tin	-	-	PI/PTFE	150°C
15	1	6	24	16	HSCA	Nickel	Copper Braid	Tin	PI/PTFE	150°C
			22	10	Annealed Copper					
16	2	6	24	16	HSCA	Nickel	-	-	PI/PTFE	260°C
17	1	6	22	10	Annealed Copper	Nickel	Copper Braid	Nickel	PI/PTFE	260°C
18	2	6	22	10	Annealed Copper	Nickel	-	-	PI/PTFE	260°C
19	1	8	22	0000	Annealed Copper	Nickel	-	-	PI/PTFE	260°C
20	1	5	22	10	Annealed Copper	Nickel	Copper Braid	Nickel	PI/PTFE	260°C
21	2	4	22	10	Annealed Copper	Nickel	-	-	PI/PTFE	260°C
22	1	3	8	0000	EC Aluminium	-	-	-	PI/PTFE	175°C
23	10	10	18	18	HSCA	Nickel	-	-	PI/PTFE	260°C
24	7	7	20	20	Annealed Copper	Tin	Copper Braid	Nickel	PI/PTFE	150°C
25	1	4	24	16	HSCA	Nickel	Double Cu Braid	Nickel	PI/PTFE	260°C
26	1	3	24	16	HSCA	Nickel	Dbl' Flat Cu Braid	Tin	PI/PTFE	150°C
27	1	3	22	16	HSCA	Nickel	Double Cu Braid	Nickel	PI/PTFE	260°C

Pi - Polyimide

Boeing 13-60 Spec Wire

Boeing
Military and Commercial Aerospace

BMS 13-60 Continued

Type	Class		Wire Size		Conductor		Shield		Jacket Material	Max. Temp
	Min.	Max.	Min.	Max.	Material	Plating	Material	Plating		
28	1	8	22	10	Annealed Copper	Tin	-	-	-	150°C
29	1	8	22	10	Annealed Copper	Nickel	-	-	-	260°C
30	1	8	24	16	HSCA	Nickel	-	-	-	260°C
31	1	6	22	16	Annealed Copper	Tin	Flat Copper Braid	Tin	PI/PTFE	150°C
32	1	6	24	16	HSCA	Nickel	Flat Copper Braid	Tin	PI/PTFE	150°C
33	1	6	22	16	HSCA	Tin	Flat Copper Braid	Tin	PI/PTFE	150°C
34	1	6	24	16	HSCA	Nickel	Flat Copper Braid	Tin	PI/PTFE	150°C
35	1	8	26	16	HSCA	Silver	-	-	-	200°C
36	1	6	26	16	HSCA	Silver	Flat Copper Braid	Silver	PI/PTFE	200°C
37	1	6	26	16	HSCA	Nickel	Flat Copper Braid	Silver	PI/PTFE	200°C
38	1	6	22	10	Annealed Copper	Nickel	Flat Copper	Silver	PI/PTFE	200°C
39	1	8	26	12	HSCA	Silver	-	-	-	200°C
40	1	6	26	16	HSCA	Silver	Flat Copper	Silver	PI/PTFE	200°C
41	1	6	24	16	HSCA	Nickel	Flat Copper	Silver	PI/PTFE	200°C
42	1	6	22	10	Annealed Copper	Nickel	Flat Copper	Silver	PI/PTFE	200°C
43	1	6	22	10	Annealed Copper	Nickel	Flat Copper	Silver	PI/PTFE	200°C
44	1	4	22	16	Annealed Copper	Nickel	-	-	-	260°C
45	1	4	24	10	HSCA	Nickel	-	-	-	260°C
46	1	4	24	16	HSCA	Nickel	Copper Braid	Nickel	PI/PTFE	260°C
47	1	4	20	10	Annealed Copper	Nickel	Copper Braid	Nickel	PI/PTFE	260°C
48	1	4	24	16	HSCA	Nickel	DBL' Copper Braid	Nickel	PI/PTFE	260°C
49	1	4	22	10	Annealed Copper	Nickel	DBL' Copper Braid	Nickel	PI/PTFE	260°C
50	1	4	26	16	HSCA	Nickel	Copper Braid	Nickel	PI/PTFE	260°C
51	1	4	26	16	HSCA	Nickel	Flat Copper	Nickel	PI/PTFE	260°C
52	1	4	22	10	Annealed Copper	Nickel	Flat Copper	Nickel	PI/PTFE	260°C
53	1	3	22	16	HSCA	Nickel	Dbl' Copper Braid	Nickel	PI/PTFE	260°C
54	1	4	22	10	Annealed Copper	Nickel	Dbl' Copper Braid	Nickel	PI/PTFE	260°C

sales@is-rayfast.com | +44(0)1793 616700

ZHPCG Cable
Zero Halogen Power Cable

Type ZHPCG-15/-35

Halogen free cable with good oil resistance and resistance to water. It is particularly suitable to the Mass Transit, Marine and Off-Shore industries where its low fire hazard performance and flexibility are key to a successful installation.

For further details and information regarding non-standard colours please contact us.

CK0226 Rail Cable

EN45545-2 rail approved Zero Halogen Power Cables, available as 750V/1300V or 1800V/3300 rated.

Halogen free cable with good oil resistance and resistance to water, making them ideal for the Rail Market, where its low fire hazard performance and flexibility are key to a successful installation.

For further details and information regarding rail approved CK0226 cable non-standard colours please contact us.

Product Features

- Zero halogen
- Small size and lightweight
- Excellent handling and flexibility
- Outstanding resistance to oils, plus scrape abrasion and cut through.
- Voltage rating: 750V/1300V or 1800V/3300
- Conductor cores 1.0mm^2 to 400mm^2.
- Temperature rating: -25°C up to +105°C.
- Dual wall construction

Approvals & Declarations

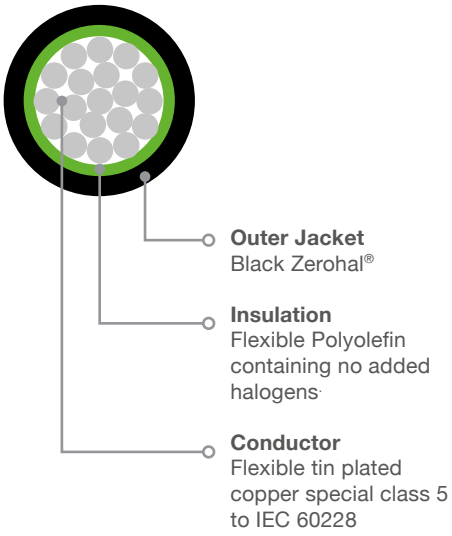
EN 45545-2
DIN 5510-2

Voltage Rating

- ZHPCG-15 750/1300V
  IEC Class 5 - Flexible cable
- ZHPCG-35 1800/3300V
  IEC Class 5 - Flexible cable
- ZHPCG-36 1800/3300V
  IEC Class 6 - Very flexible cable

Colours

- Standard jacket colour black
- Colours on request



sales@is-rayfast.com | +44(0)1793 616700

Fire Hazard Performance		
EN45545		
Test	Method	Result
Flammability - small scale	IEC 60332-1-2	Charring confined to between 50mm and 540mm
Flammability - large scale	Clause 9.1.2 EN50305	Max. burn length 1.5m
Smoke - large scale	EN 61034-2	3m cube box 90% min. transmittance
Toxicity	Clause 9.2 EN50305	Index max. 6
DIN 5510-2		
Flammability - small scale	IEC 60332-1-2	Pass
Flammability - large scale	EN50305	Pass
Smoke - $3m^3$	EN 61034-2	Pass
PH & Conductivity	EN50267-2-2	Pass
Evolution of HCl	EN50267-2-1	Pass
Fluorine Content	EN60684-2	Pass
Toxicity	Clause 9.2 EN50305	Pass

Part number example...

ZHPCG - 35 - 16.0 - 0 CK0226

Part Numbering example

Denotes Rail if required

Jacket Colour
0 = Black, standard colour

Conductor Size
1.0mm^2 to 400mm^2

Conductor Type
5 = IEC Class 5 flexible
6 = IEC Class 6 very flexible

Voltage rating
1 = 750/1300 V
3 = 1800/3300 V

Product Family
ZHPCG 15, 35 or 36

Power Cables
Flexible

Range of flexible power cables insulated and jacketed using materials that provide improved performance over other materials available, such as CSP/EPR, silicone, or PCP/Butyl.

Features & Benefits

- Size and weight savings
- Excellent flexibility
- Resistance to solvents and chemicals
- Corona resistance
- Arc-resistance of materials

Type TR16

General purpose, single-wall, 125°C construction normally specified for use inside cabinets in protected areas. Conductor sizes 2.5mm² to 95mm²

Type ZHI15

Halogen-free cable with good oil resistance, particularly suitable for use in offshore, ship and mass transit applications where low-fire-hazard performance is required. Conforms to Defence Standard 61-12 part 31 specification. Conductor sizes 1.5mm² to 400mm²

Type AFR35

A single-extrusion, abrasion resistant, flame and fuel-resistant, radiation cross-linked polyolefin cable. Conductor sizes 1.5mm² to 400mm²

Type FTR16

Dual-wall diesel-oil resistant cable originally developed for tank engine compartment applications. Meets the German BWB VG 95218 specification. Conductor sizes 4mm² to 120mm²

For further details and information regarding non-standard colours please contact us.

Part number example...

TR 16 - 16 - 0

Standard Colour
0 = Black 8 = Grey
9 = White

Conductor Size
1.5mm² to 185mm²

Conductor Type
5 = IEC Class 5
6 = IEC Class 6

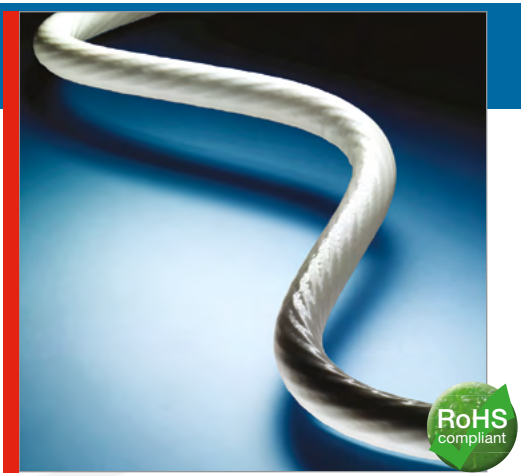
Voltage rating
1 = 600/1000 V
3 = 1900/3300 V

Type
TR, ZHI, AFR, FTR, ZHPCG

Type	Tensile Strength	Temp. Rating	Colour
TR	20 N/mm²	125°C	Black
ZHI	9 N/mm²	105°C	Black
AFR	18 N/mm²	105°C	Grey
FTR	18 N/mm²	125°C	Black

sales@is-rayfast.com | +44(0)1793 616700

SHF260
Highly Flexible



SHF-260 is a highly flexible premium performance power cable, for applications requiring up to 1000 volts (rms).

The need for a combination of high temperature and high performance in wire insulation has become a critical factor in today's platforms. This is especially true in large diameter power feeder applications where temperature and durability are key.

The highly flexible nature of SHF-260 allows the cable to be bent and routed in extremely tight areas with no wrinkling or cracking of the insulation. This results in being able to run shorter distances, reducing the stress on the contact and reducing the mating and de-mating forces normally associated with large shell diameter circular connectors, such as MIL-C-5015 and MIL-C-83723 connectors.

Its ability to route in tight spaces may allow the user to go "up" in AWG sizes and eliminate the need to split power, where routing and bending previously prevented the user from doing so.

Part number example...

SHF260-0113-24-9

Wire Gauge (AWG)

Colour of cable is white (9) as standard.

Applications

Typical uses include both primary and secondary power distribution applications where high amperage is needed.

Features & Benefits

- Handles down to a 6x bend radius
- All extruded fluoropolymer based insulation system
- Outstanding chemical and fluid resistance when tested to SAE-AS-22759/41
- Corona resistant when tested to ASTM D1868
- Arc resistant to the SAE-AS-22759
- Available in sizes from 0000 to 24 AWG
- Meets FAR Part 25 flammability

Operating Temperature

- -65°C to +260°C

Voltage Rating

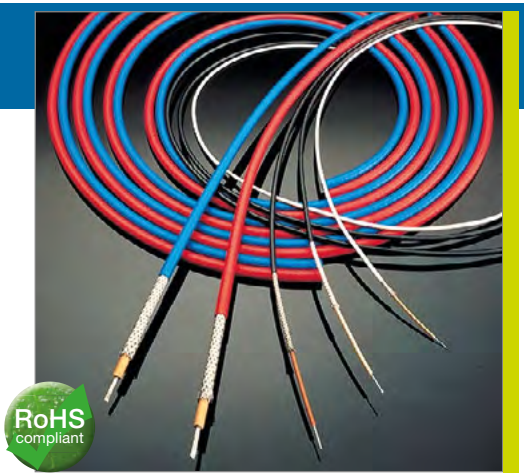
- 1000 volts (rms)

Thermal Properties	
Life Cycle	290°C for 500 hours
Cold Bend	-65°C for 4 hours
Thermal Shock Resistance	Accordance with SAE AS 22759 using an oven temperature of 260°C
Physical Properties	
Insulation elongation	150% minimum
Tensile Strength	2000 PSI
Fire Hazard Properties	
Smoke	SAE AS 22759

COAXIAL Cables

Cheminax

Introduction



Cheminax controlled electrical cables are used in the aircraft and aerospace industries. They have a wide range of applications in missiles, avionics, radio frequency and microwave systems, computers, security & surveillance systems and communications.

Cheminax coaxial cables were designed to solve interconnect problems in electronic systems, such as computers, military equipment and other areas of high-density packing, where cables are required to perform to more exacting specifications than standard radio grade (RG) or UL recognised (UR) constructions.

Cheminax coaxial cables offer a smaller and lighter solution than both standard RG and UR cables.

Features & Benefits

- Small size, light weight
- Low capacitance and attenuation
- High velocity of propagation
- High flexibility

Operating Temperature

Available with an operating temperature from -65ºC up to +200ºC. Temperature rating varies depending on materials used in specific construction.

Other Cheminax coaxial cable material options are available, for additional information please refer to the following pages for part number configuration.

Thermorad - Is a general purpose jacket material which is unaffected by most common chemicals and solvents and is suitable for use during NBC decontamination, with a typical operating temperature between -55ºC to 125ºC depending on dielectric material. Thermorad is highly flame retardant and has an overall balance of physical and chemical properties.

CCS - copper clad steel
HSCA - high strength copper alloy

Standard coax cables - dimensions and electrical properties

Part Number	Impedance (Ohms)	Capacitance (pF/m)	Attenuation (dB/100m)		Conductor (mm)	Nom. Dielectric Dia. (mm)	Nom.. Cable Dia. (mm)	Nom. Weight (kg/ 100m)
			100MHz	400MHz				
5020A1311-0	50 Ω	84.0	15.84	34.45	19/0.20	2.70	3.80	2.2
5024A1311-0	50 Ω	83.7	23.76	50.34	19/0.127	1.70	2.70	1.1
5026A1311-0	50 Ω	85.3	30.98	64.79	7/0.15	1.20	2.10	0.9
5028A1317-0	50 Ω	87.9	38.92	79.70	7/0.127	0.97	1.85	0.6
7524A1311-0	75 Ω	56.4	14.53	31.84	19/0.127	2.80	3.80	1.9
7528A1317-0	75 Ω	56.0	22.81	48.38	7/0.127	1.65	2.60	1.0
7530A1317-9	75 Ω	57.0	28.00	58.84	7/0.10	1.35	2.30	0.8
0024A0311-0	100 Ω	44.3	46.32	-	19/0.127	1.40	3.99	2.4

sales@is-rayfast.com | +44(0)1793 616700

75 26 A 1 3 1 4 - 0

Part Numbering example

JACKET COLOUR

0	Black	6	Blue
1	Brown	7	Violet
2	Red	8	Grey
3	Orange	9	White
4	Yellow	9X	Translucent white
5	Green	X	Clear

CONDUCTOR TYPE

1	Tin plated copper	7	Tin plated CCS
2	Silver plated copper	8	Silver plated CCS
3	Nickel plated copper	9	Bare copper
4	Silver plated HSCA	0	Other
5	Aluminium	A	Silver coated CS95
6	Nickel coated HSCA		

DIELECTRIC MATERIAL

1	Rayfoam L	6	Modified XL-ETFE
2	Rayfoam H	7	Flex XL-ETFE
3	Rayolin F	8	Rayfoam M
4	Modified FEP	0	Other

OUTER JACKET MATERIAL

1	General purpose PVF^2	6	Modified XL-ETFE
2	Outer space PVF^2	7	Flex XL-ETFE
3	Thermorad F & S	8	Zerohal & Thermorad
4	Modified FEP	9	None
5	ETFE (Un-crosslinked)	0	Other

CONSTRUCTION

1	Round braid	6	Triax other
2	Flat braid	7	Other
3	Two round braids	8	Composite shield
4	Two shields (other)	9	Core only
5	Triax round braids	0	Other

VARIATION

A	Standard	U	Low loss
B	Sequential PNs	W	Water blocked
S	Outer space		

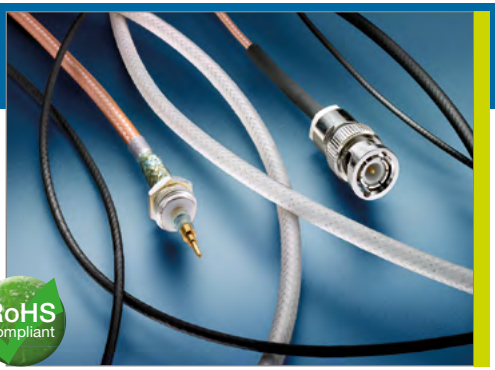
CONDUCTOR SIZE (AWG)
Always 2 digits - 0X if under 10 AWG

IMPEDANCE
Always 2 digits - last 2 digits if over 100 ohms
0X (1 digit) if under 10 ohms

COAXIAL Cables

Cheminax

Alternatives to RG cables



Alternative Solutions

The comprehensive lists below is provided as a quick guide for high performance upgrades to standard RG & UR cables, with a brief comment on benefits and key features. To complement the mechanical and electrical features of Cheminax miniature coaxial cables please refer to the electrical interconnect section of this catalogue.

RG/U	Alternatives	Comments
4	5020A3311-0	Small, light
	5018D3311-0	Improved electricals
5	5018D3311-0	Small, light
8	5012E1339-0	Dimensionally similar
11	7518A1311-0	Small, light
29	5020A1311-0	Small, light
31	5012E1339-0	Dimensionally similar
55	5020A3311-0	Small, light
	5018D3311-0	Improved electricals
58	5021D1331-0	Dimensionally similar
	5020A1311-0	Small, light
	5018A1311-0	Improved electricals
59	7523D1331-0	Dimensionally similar
	7524A1311-0	Small, light
	7520A1311-0	Improved electricals
62	9524A1311-0	Small, light
63	2524A1311-0	Small, light
87	5012A3311-0	Small, light
89	5012A3311-0	Small, light
115	5012A3311-0	Small, light
122	5020A1311-0	Improved electricals
124	7524A1311-0	Small, light
133	9524A1311-0	Small, light
140	7524A1311-0	Small, light
141	5020A1311-0	Small, light
142	5019D3318-0	Small, light
	5018D3311-0	Improved electricals
144	7518A1311-0	Small, light
149	7518A1311-0	Small, light

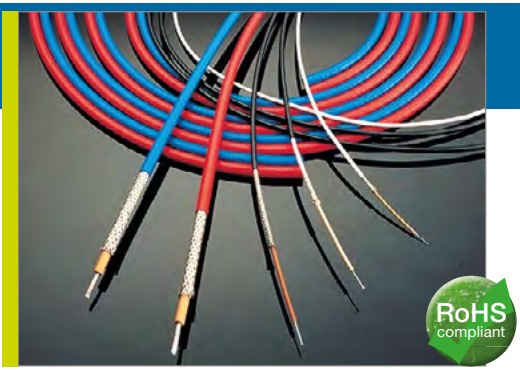
RG/U	Alternatives	Comments
159	5020A1311-0	Small, light
174	5026A1311-0	Small, light
	5024A1311-0	Improved electricals
178	5030A1317-0	Small, light
	5028A1317-0	Improved electricals
179	7530A1317-0	Small, light
	7528A1317-0	Improved electricals
180	9530E1014-0	Small, light
	9527A1318-9	Improved electricals
188	5026A1311-0	Small, light
	5024A1311-0	Improved electricals
210	9524A1311-0	Small, light
213	5012E1339-0	Dimensionally similar
214	5012A3311-0	Small, light
223	5019D3318-0	Small, light
	5018D3311-0	Improved electricals
225	5012A3311-0	Small, light
235	5012A3311-0	Small, light
279	7524A1311-0	Dimensionally similar
282	5024A1311-0	Small, light
302	7524A1311-0	Small, light
303	5020A1311-0	Small, light
304	5018A1311-0	Small, light
316	5026A1311-0	Small, light
	5024A1311-0	Improved electricals
393	5012A3311-0	Small, light
400	5020A3311-0	Small, light
	5018D3311-0	Improved electricals
403	5030A5314-0	Small, light

sales@is-rayfast.com | +44(0)1793 616700

COAXIAL cable

Cheminax

Alternatives to RG cables



Alternative Solutions

The comprehensive lists below is provided as a quick guide for high performance upgrades to standard RG & UR cables, with a brief comment on benefits and key features. To complement the mechanical and electrical features of Cheminax miniature coaxial cables please refer to the electrical interconnect section of this catalogue.

UR	Alternatives	Comments
43	5020A1311-0	Small, light
57	7518A1311-0	Small, light
65	7518A1311-0	Small, light
67	5012E1339-0	Dimensionally similar
70	7524A1311-0	Small, light
72	5020A1311-0	Small, light
76	5020A1311-0	Small, light
84	7524A1311-0	Small, light
90	7522A1311-0	Small, light
95	5026A1311-0	Small, light
96	9524A1311-0	Dimensionally similar
102	5012E1339-0	Dimensionally similar
104	7522A1311-0	Small, light
105	7518A1311-0	Small, light
106	7222A1311-0	Small, light
107	5012E1339-0	Small, light
108	5020A1311-0	Small, light
109	5026A1311-0	Small, light
110	5030A1317-0	Small, light
111	7530A1317-0	Small, light
112	5012A3311-0	Small, light
113	7518A1311-0	Small, light
116	5026A1311-0	Small, light
117	7524A1311-0	Small, light
200	7524A1311-0	Dimensionally similar
201	7522A1311-0	Dimensionally similar
202	7522A1311-0	Dimensionally similar
203	7520A1311-0	Small, light
204	7518A1311-0	Dimensionally similar

UR	Alternatives	Comments
205	7518A1311-0	Dimensionally similar
207	7524A1311-0	Small, light
208	7524A1311-0	Small, light
210	7524A1311-0	Small, light
301	5020A1311-0	Small, light
306	7524A1311-0	Small, light

Note: To complement the mechanical and electrical features of Cheminax miniature coaxial cables please refer to the electrical interconnect section of this catalogue.

RF COAXIAL Cables

50 Ohm Cables
Overview RFMATES®

Up to 80% Lighter than equivalent RG Cable

RF - 50 Ohm coaxial and triaxial cables designed and manufactured to meet the most stringent electrical and mechanical performance criteria. Ideal for advanced electronic applications including lightweight, low loss, high flexibility, high EMI immunity, high temperature and high corrosive resistance. All RF cables are Skydrol resistant.

Meets Requirements of
FAR Part 23 and 25, Appendix F
Mil-C-17 (as applicable)

More flexible | Tighter bend radius | Smaller outside diameter | Lower attenuation

Offers up to +200ºC operating temperature, subject to cable specification.

Part No.	Conductor	Loss @ 1.0 GHz	Min. Bend Radius	Diam. mm	Weight /100m	Shielding
S22089	10awg stranded SPC	11.5 dB/100m	63.50 mm	11.05	26.8 Kg	-90 dB
S55122	12awg stranded SPC	16.7 dB/100m	39.37 mm	7.87	12.4 Kg	-90 dB
S33141	14awg stranded SPC	22.0 dB/100m	35.56 mm	6.86	9.7 Kg	-90 dB
S65161	16awg stranded SPC	25.9 dB/100m	25.40 mm	4.95	5.2 Kg	-110 dB
S44191	20awg stranded SPC	38.7 dB/100m	25.40 mm	4.95	6.4 Kg	-90 dB
S86208	21awg stranded SPC	46.3 dB/100m	16.51 mm	3.30	2.9 Kg	-80 dB
S67163	15awg solid SPC	22.0 dB/100m	30.48 mm	5.72	8.0 Kg	-90 dB
S44193	19awg solid SPC	36.4 dB/100m	25.40 mm	4.95	6.4 Kg	-90 dB
S88207	20awg solid SPC	42.0 dB/100m	16.51 mm	3.30	2.8 Kg	-80 dB
S46191	20awg stranded TPC	70.5 dB/100m	25.40 mm	4.95	4.0 Kg	-75 dB
S40501	24awg solid SCCS	63.6 dB/100m	16.00 mm	2.54	2.1 Kg	-110 dB
Triax Cable						
L8620TX	21awg stranded SPC	49.5 dB/100m	21.59 mm	4.39	4.3 Kg	-90 dB
L2201TX	20awg stranded SPC	66.9 dB/100m	31.75 mm	6.22	8.9 Kg	-75 dB

Cable comparison between standard RG cable and RF-Mates performance cable.

Standard **RG393**

Performance **PIC UH67193**

sales@is-rayfast.com | +44(0)1793 616700

VIDEO COAXIAL Cables

75 Ohm Cables
Overview VideoMATE®

VIDEO - 75 Ohm and Triaxial Cables
Our 75 ohm coaxial and triaxial video cables are lightweight, low loss, flexible and easy to terminate. They are specifically designed and manufactured for reliable performance in aircraft systems and other harsh environments involving high temperature, strong EMI and/or corrosive materials. All 75 ohm video cables are Skydrol resistant.

Meets Requirements of
FAR Part 23 and 25, Appendix F
Mil-C-17 (as applicable)

More flexible | Tighter bend radius | Smaller outside diameter | Lower attenuation

Offers up to +200ºC operating temperature, subject to cable specification.

Part No.	Conductor	Application Notes	Loss (dB/100m)	Diam. mm	Weight /100m	Shielding
V75268	26awg Stranded SPC	RS170 Video RG179 Replacement	16.4 @ 100 MHz	3.10	1.9 kg	-50 dB
V76261	26awg Stranded SPC	RS170 Video RG179 Replacement	16.4 @ 100 MHz	3.10	1.7 kg	-90 dB
V73263	26awg Stranded SPC	SMPTE 292M Video	66.6 @ 1.45 GHz	3.18	2.2 kg	-110 dB
V78209	20awg Stranded SPC	SMPTE 424M Video	62.3 @ 3.0 GHz	5.36	4.7 kg	-90 dB
Triaxial Cable						
L7626TX	26awg Stranded SPC	RS170 Video	18.0 @ 100 MHz	3.99	3.3 kg	-90

CONNECTOR SOLUTIONS
Also available

The Best Made Solution

PIC V75268

PIC V78209

PIC L7626TX

High Speed DATA Cables

Cat 5e, 6, 6A and USB solutions
Overview DataMATES®

High quality, high performance engineered electronic high speed data cables and interconnect solutions for demanding military, aerospace and motorsport applications. These products are designed and manufactured to meet stringent electrical and mechanical performance criteria including EMI immunity, lightweight, low loss, high temperature and harsh environment.

Meets Requirements of
FAR Part 23 and 25, Appendix F

The part reference table below represents a brief overview of the range only, for additional information or details of Cat 7 cables please contact us.

High Speed Data Cables - characteristics and properties overview

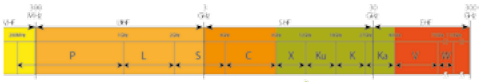
Cable Family	Capability	Part No.	Rating	Data Pairs	Conductors	Dia. mm	Weight /100m
DataMATES® PLUS	-55°C to +200°C >76m distance Better shielding Better corrosion	E10224	Cat 5e	1 pair	24awg stranded SPC	4.14	3.2kg
		E40424		2 pairs		5.28	4.1kg
		E50824	Cat 6	4 pairs		6.73	7.4kg
		E6A0824	Cat 6, 6a	4 pairs		6.99	7.9kg
DataMATES® BASE	150°C temp. >61m distance Laser markable	E12224	Cat 5e	1 pair	24awg stranded TPC	3.71	2.4kg
		E12424		2 pairs		5.28	3.4kg
		E6A2824	Cat 6, 6a	4 pairs		6.99	6.8kg
DataMATES® LITE	200°C temp. >54m distance Very light Very flexible	E13226	Cat 5e	1 pair	26awg stranded SPCA	3.40	2.5kg
		E13426		2 pairs		3.99	2.9kg
		E6A3824	Cat 6, 6a	4 pairs	24awg SPC	6.60	7.1kg
		E6A3826		4 pairs	26awg SPC	5.59	5.2kg
QUADRAX							
DataMATES® QUAD	10% lighter Lower Loss Easier termination	E51424	Quadrax	4 Core	24awg SPCA	4.06	3.3kg
		E51426			26awg SPCA	3.48	2.7kg
		E50424			24awg SPC	4.32	4.0kg
USB 2.0							
DataMATES® USB	up to 200°C temp EIA-364; USB 2.0 Skydrol resistant RoHS compliant FAR pt 23 & 25 (F)	USB2422	Data pair impedance 90Ω	2 data pairs	24-22awg	4.57	3.6
		USB2624		2 data pairs	26-24awg	4.17	3.3

sales@is-rayfast.com | +44(0)1793 616700

MICROWAVE Cables

High Frequency Cable Solutions
Overview MicroMATES®

Electromagnetic Spectrum



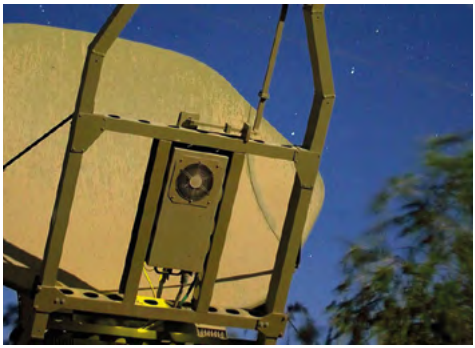
MICRO - X and Ku Band Cable Assemblies

Provides high bandwidth for data and support satellite communications. These High Frequency cables are rated to a minimum 200°C on all materials and offer reduced weight, decreased loss and improved EMI performance.

Designed specifically to serve Ku Band & X Band applications, these cables feature: Inner flat or strip braid; High temperature polyamide foil; Dual braided shields and Silver plated copper throughout.

Correct cable assembly is critical to realising the full benefits of the cable and connector technology. Our service ensures the best performance solution.

Part No.	Max. Freq.	VOP	Diam. mm	Weight /100m	Shielding	Loss @ 1GHz /100m	Loss @ 12GHz /100m	Loss @ 18GHz /100m
HT77300F	18 GHz	77.0%	7.62	13.1 kg	-90 dB	16.4 dB	64.0 dB	81.0 dB
HT77210F	26 GHz	76.5%	5.28	4.5 kg	-90 dB	24.9 dB	96.8 dB	122.4 dB
HH85295F	18 GHz	84.0%	7.49	12.8 kg	-110 dB	13.8 dB	49.9 dB	62.3 dB
HH85210F	26 GHz	85.0%	5.33	6.5 kg	-90 dB	21.6 dB	83.8 dB	105.0 dB



- Certified Test Process & Equipment
- Phase-matched Ship Sets
- Qualified Assembly Experts
- ISO 9001; AS 9100 Certification
- Complete traceability
- Improved Supply Chain Efficiency

Def Stan 61-12 (part 25)

Zerohal Marine Cables
Limited Fire Hazard

IS-Group offer a comprehensive portfolio of high performance cables designed for today's modern range of warships and submarines.

Zerohal Marine Cables

The cables briefly described over these two pages are manufactured and approved to UK Defence Standard 61-12 (Part 25) and have been widely adopted as the basis for lightweight Limited Fire Hazard (LFH) cables by the UK Navy and many other Navies worldwide. Limited Fire Hazard Cables are designed to minimise the risk associated with the generation of smoke and toxic fumes during a fire.

Def Stan 61-12 (Part 25) Spec Summary

Cables manufactured and approved to Def Stan 61-12 (part 25) use component wires and cable jackets approved to specifications which independently impose performance limits on the generation of smoke and fumes in fire.

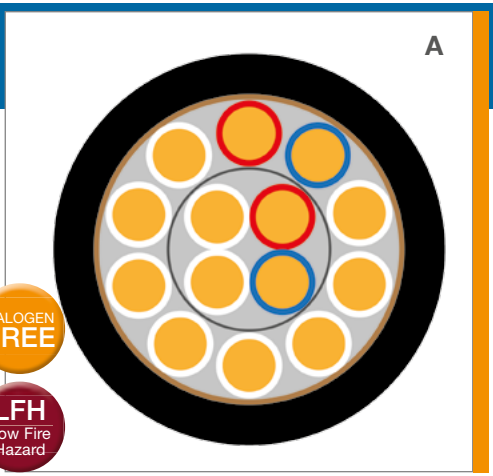
Def Stan 61-12 (Part 25) cables employ;

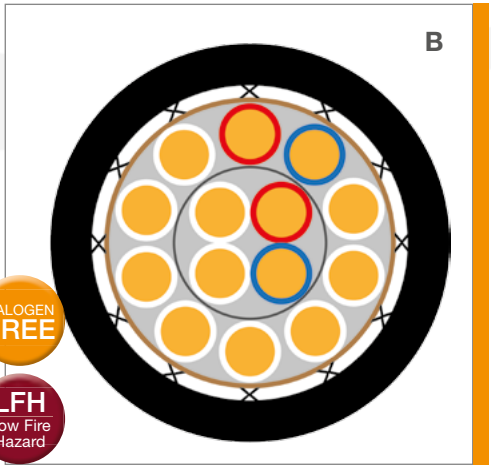
- Component wires approved to Def Stan 61-12 (Part 18). Within this specification, wires are categorised as Type 1 pliable, or Type 2 non-pliable. Component wires 99M0111 are Type 1, pliable wires.
- Jacket material is approved to Def Stan 61-12 (Part 31) (Limited Fire Hazard Sheathing for Electric Cables). Zerohal jacket material is fully approved to this specification.

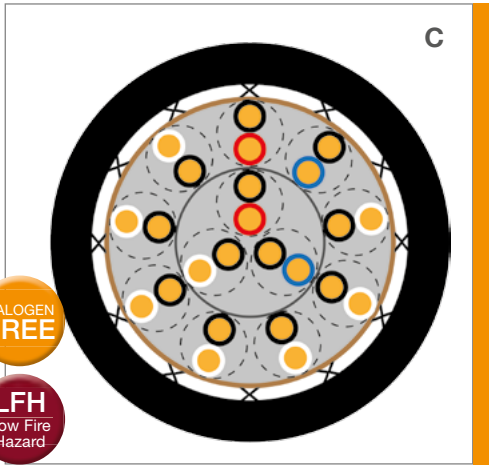
Def Stan 61-12 (Part 25) details a number of specific cable constructions. Alternative cable constructions utilising optional component layout or specialised shielding are available on request. Alternative constructions use approved wires and jackets and will meet the full performance requirements of Def Stan 61-12 (Part 25).

Other LFH Specification Approvals

- MSV 34411, 34412, 34430, 34435, 34436 (Netherlands)
- Mil-C-24640, PMS 400 (USA)





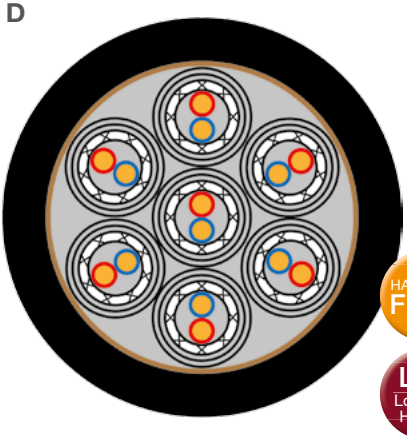


sales@is-rayfast.com | +44(0)1793 616700

Def Stan 61-12 (part 25)

Zerohal Marine Cables
Limited Fire Hazard

D



HALOGEN FREE

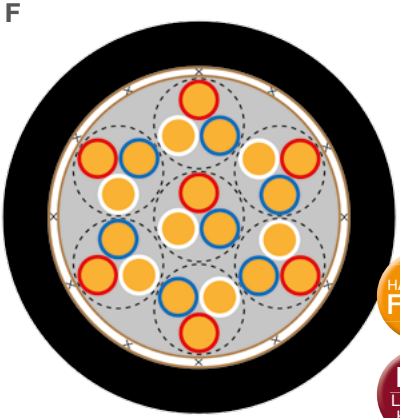
LFH Low Fire Hazard

E

HALOGEN FREE

LFH Low Fire Hazard

F



HALOGEN FREE

LFH Low Fire Hazard

Multicore Cables (A & B)

- 2 core - one Red & one Blue.
- 3 core - one Red, one Blue & one White.
- Others - 2 adjacent marker cores - one Red (pilot core), one Blue (direction core), remainder all White in each cable layer.

Where a single core is used in the centre of the cable, its colour shall be White. All cores in a multicore cable having four or more cores, shall be identified by means of numbers in a contrasting colour.

Multipair Cables, Screened (C)

- For each layer the First pair has 1 core Black, 1 core Red (pilot pair).
- Second pair has 1 core Black, 1 core Blue (direction pair).
- All other pairs have 1 core Black, 1 core White.

Where one pair is used in the centre, the colours shall be 1 core Black, 1 core White. Where the cable consists of one pair only, the colours shall be 1 core Red, 1 core Blue and not numbered. All pairs shall also be identified by means of numbers in a contrasting colour, starting from black numbered 1 of the first pair.

Multipair Cables, Screened (D & E)

Each pair shall have one core Red, one core Blue with an overall shield and double mylar wrap. Pairs shall be identified by means of numbering in black ink on outer mylar wrap.

Multitriple Cables Screened (F)

In multitriple cables, each triple shall have one core Red, one core Blue, one core White with the White core numbered sequentially in Black.

Mains Colour Cables

- 2 core - 1 Blue & 1 Brown
- 3 core - 1 Blue, 1 Brown & 1 Yellow/Green

Cable Sheath Marking

Each cable sheath shall be marked with the relevant NATO Stock Number, the component wire conductor stranding, year of manufacture and manufacturer's name in accordance with Def Stan 61-12 (Part 25).

SPECIALIST Cables

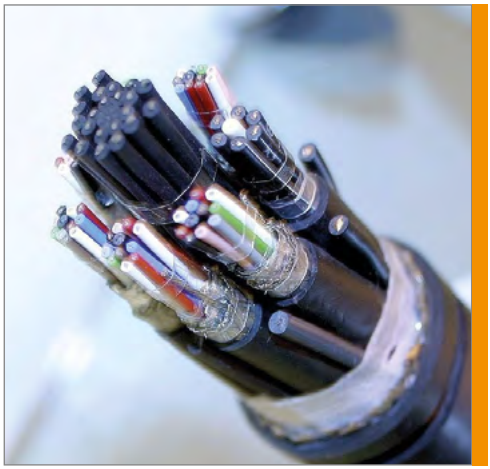
Electrical cables and composite systems

Introduction

Used in a wide variety of demanding industrial and commercial applications, including factory automation and robotics, materials handling, processing, packaging and building services.

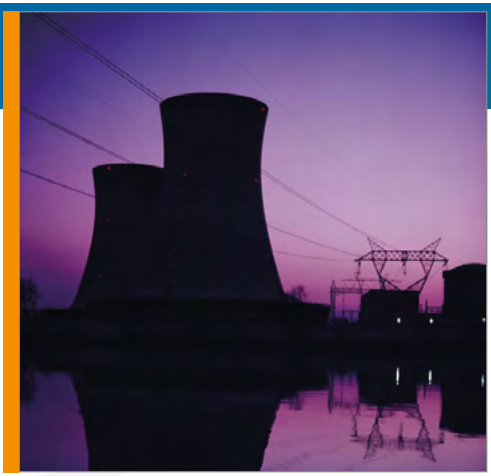
As a distributor we ensure the end product is of the highest order. All of the specialist cables we supply have been tested by the manufacturer to meet stringent quality and durability requirements. Such testing ensures reliability on site, making for cost effective installation.

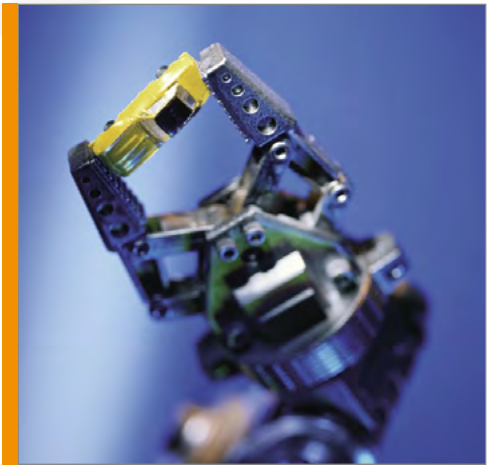
The more complex the application, the more bespoke cables have to be produced. We select manufacturers with many years of experience of materials such as PVC, PUR, Rubber, Silicone, TPE and Low smoke halogen-free compounds, from basic multi-core cables to composite cables we can help to design a cable to a customer's exact requirements. Of course, a custom cable does not always have to be highly complex and from printing customer details to a change of outer sheath colour, we are always willing to assist in solving your requirements.

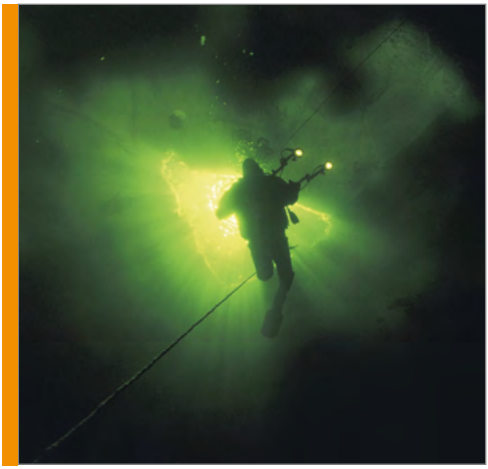


SPECIALIST Cables

Special electric cables and composite cables systems







Nuclear

Complete range of cables for all aspects of nuclear engineering: power, control, coaxial, telecoms, umbilical, or composite. Cables can be individually or overall shielded, armoured and reinforced.

- Flame retardant to IEC 332.1 & 332.3
- Resist radiation doses up to 200 Mrads.
- Cables in accordance to Cogema La Hague and Cogema Melox specification (centre for the enrichment and re-treatment of uranium).
- Cable types 10 Nouvelle Generation.
- Mulrad 2 cables.
- Cables for nuclear robotics.

Robotics

A wide range of special and standard cables designed for your robotic and drag chain applications.

- F3 for short drag chain applications.
- F1X for long distance and fast drag chains
- F1 for continuous bending and torsional applications with high speed acceleration.
- F1 Gold, for extreme conditions
- UL extra flexible cables
- BUS cables / MultiBUS cables
- Umbilicals
- Composites cables

SubSea

Providing both composite electrical and optical cables for many applications such as ROVs, seabed vehicle umbilicals to ship and submarine.

- ROV tethers
- Umbilicals fixed and mobile equipment
- Trenching and burying machines
- Detection and sonar
- Oceanographic and buoy
- Mooring line and stay
- Onboard power and instrumentation
- Floating cables

Custom Cable Designs

Introduction and Overview

Multi-conductor cables

Multi-conductor cables provide high performance custom designed solutions for the most demanding applications and environments, including but not limited to Aerospace, Marine and Industrial markets.

Consideration should be given to the selection of components used in the cable, to ensure the right combination of physical, chemical and electrical properties is achieved to meet your specific application requirements.

High-performance component wires and miniature coaxial cables are combined with unique cable jacket materials to meet the requirements of demanding environments. We can provide a rapid response to any design requests, supported by the highest quality manufacturing standards.

Services offered include...

- Prototype cable production
- Full production

Prototyping Service

Cable engineers and buyers can spend valuable time and resource sourcing relatively short lengths of high-performance bespoke multi-core cables. Increasingly however, they are burdened by large minimum order quantities and extended lead times, commonly demanded by today's cable manufacturers.

The solution is our Prototype Cable Service, the result of investment in plant and machinery combined with the excellent in-house knowledge of our production and design team.

By using our novel combination of machine cabled components insulated with a heat-shrink jacket, we aim to build and deliver your cable within 4 weeks of receiving your order for cable designs made from stocked components.

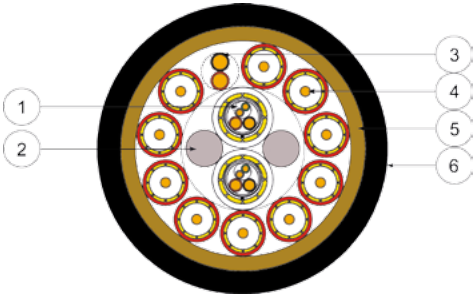
Full Production Service

Subject to minimum order quantities the possible range of extruded jacket material is extended to include additional highly controlled performance materials.

Please see following pages for an essential overview of possibilities, for more information please contact us.

- Customised cable designs
- Detailed design specifications & drawings
- Machine cabled components
- Wide selection of stocked wire components
- Machine braided optimised EMI screens
- Choice of cross-linked heat-shrink jackets
- Low minimum order quantities
- Coiled and prepared cables

"Our aim is to manufacture and deliver high quality machine built customised cables within 6 to 8 weeks of receiving an order"



sales@is-rayfast.com | +44(0)1793 616700

Custom Cable Designs

1. Conductor & Primary Wire Selection
Multi-conductor cables

We stock many wire constructions, gauges and colours, all of which are available for forming part of our customised multicore cable design and build service.

The choice of primary wire is the first step to designing a cable and is critical to its final performance.

Listed below are our most popular wires, but we have also provided unique multicore cables that have included the following wires and cable combinations...

- Flexible power
- Ethernet, USB and Quadrax
- Coaxial and Triaxial RF and Video cable
- Optical fibres

For more information please see relevant cable specifications.

1a. CONDUCTOR Selection

Conductor size (AWG)	No. Strands / Diameter	Conductor OD (mm) nominal	Cross sectional area (mm^2)	Resistance (Tinned Cu) Ω/km max @ 20°C	Current carrying capacity (amps) 30°C rise above 20°C ambient
30	7/0.10	0.30	0.06	356.0	2.2
28	7/0.13	0.38	0.09	225.0	2.9
26	19/0.10	0.50	0.16	135.0	4.1
24	19/0.13	0.63	0.24	86.0	5.5
22	19/0.16	0.80	0.38	53.2	7.4
20	19/0.20	1.00	0.62	32.4	10.0
18	19/0.25	1.25	0.96	20.4	14.0
16	19/0.29	1.44	1.23	15.8	15.5
14	19/0.36	1.80	1.94	9.9	21.0
12	37/0.32	2.24	2.97	6.6	28.0

Current carrying capacities are for a single wire and should be de-rated for bundles and / or higher ambient temperature than 20°C. Contact IS-Group for further information.

1b. PRIMARY WIRE Selection Examples

Wire Type	Temp. Range °C	Voltage Rating	Chemical Resistance	Abrasion Resistance	Flexibility	Characteristics
PTFE wire	-75 to +260	300V, 600V, 1000V	Excellent	Good	Fair	High Temperature, Chemical Resistance
44 Wire	-65 to +150	600V, 1000V, 2500V	Very Good	Very Good	Good	Tough, Flexible, Small Size, Lightweight
55 Wire	-65 to +200	450V, 600V	Very Good	Excellent	Fair	Ultra lightweight, Arc Tracking Resistant
99 Wire	-55 to +125	600V, 1000V	Good	Good	Fair	Low Flammability, Toxicity and Smoke
100 Wire	-40 to +125	300V	Good	Good	fair	Low Fire Hazard and Halogen Free

Custom Cable Designs

2. Cable Jacket Selection
Multi-conductor cables

There is an unrivalled selection of medium to high performance cable jacket materials covering a wide operating temperature range, for various applications.

We offer the unique choice of a cross-linked heat-shrink jacket for short run and prototype cables or an extruded jacket for larger scale production requirements. In both cases, the combination of the right primary wire with a matched cable jacket will produce the optimum solution for your specific cable application.

2a. HEAT-SHRINK Jacket Selection Prototype Cables

	Temperature Range °C	Chemical Resistance	Abrasion Resistance	Flexibility	Typical Application
PTFE	-67 to +250	Excellent	Good	Fair	Aerospace, Industrial Sensors, Thermocouples
RW-200-E	-55 to +200	Very Good	Good	Good	Military, Aerospace, Industrial
DR-25	-75 to +150	Very Good	Fair	Very Good	Aerospace, Autosport, Military
RNF-100	-55 to +135	Good	Good	Good	Military, Industrial, Commercial
ZHTM	-30 to +105	Fair	Good	Good	Marine, Rail and Mass Transit
VERSAFIT	-55 to +135	Fair	Fair	Good	General Purpose, Commercial

2b. EXTRUDED Jacket Selection Production Cables

	Temperature Range °C	Chemical Resistance	Abrasion Resistance	Flexibility	Typical Application
PTFE	-67 to +260	Excellent	Good	Fair	Aerospace, Industrial Sensors, Thermocouples
FEP	-65 to +200	Excellent	Good	Good	Instrumentation, Industrial, Commercial
FDR 25	-40 to +150	Very Good	Fair	Very Good	Aerospace, Autosport, Military
THERMORAD	-55 to +125	Good	Good	Good	Military, Industrial, Commercial
ZEROHAL	-30 to +105	Good	Good	Good	Marine, Rail and Mass Transit
POLYURETHANE	-25 to +80	Fair	Fair	Very Good	General Purpose, Commercial

sales@is-rayfast.com | +44(0)1793 616700

Building Blocks Shortlist

This guide is designed to help you identify the building blocks necessary to create a custom multicore cable design;

- What is your application/end use?
- What temperature rating is required?
- How many components are needed?
- What is each component used for (data, signal or power)?
- What would be the conductor size of the components?
- Are there any electrical shielding (EMI) requirements? If so, please list specifics such as component and or cable shielding.
- Are there specific flexibility, mechanical, or fluid resistance requirements? If so, please list specifics and rank the order of importance.
- Do you require specific or continuous lengths?
- Is there a customer specification involved? If so, please provide a copy.
- List any time lines and annual usage estimates.

PTFE -67ºC to +260ºC

Polytetrafluoroethylene (PTFE) is a fluorocarbon polymer insulation material that allows wiring systems to be used and operated in the most demanding of environments. Resistant to lubricants and fuels, very flexible, plus it has excellent thermal and electrical properties. Particularly suitable for applications requiring high levels of thermal and chemical resistance.

FEP -65ºC to +200ºC

Fluorinated Ethylene Propylene (FEP) specialised material for low temperature flexibility, enhanced abrasion resistance. Can be over moulded.

FDR 25 -40ºC to +150ºC

Highly flame retardant and qualified to VG standards. Originally designed for use in compartments exposed to hot diesel fuels and vibration. Fluid resistant, flexible, high temperature.

THERMORAD F -55ºC to +125ºC

General purpose material unaffected by most common chemicals and solvents. Highly flame retardant and has an overall balance of physical and chemical properties.

THERMORAD HTF -20ºC to +200ºC

Very high temperature fluoroelastomer, fluid resistant. Excellent stability during continuous high temperature exposure to adverse chemical environments, ideal for aircraft fuel tanks and engine cables.

ZEROHAL -30ºC to + 105ºC

LFH (Low Fire Hazard), halogen-free cable jacket material developed and approved to the most exacting requirements for low fire hazard cables in many countries.

Custom Cable Designs

3. Electromagnetic Screen Selection

Multi-conductor cables

The screening of cables is important, whether to minimise cross-talk within the cable, the prevention of interference from external sources, or the elimination of radiation from the cable itself.

Effective design of cables to provide shielding over a broad frequency spectrum is complex and must be tailored to specific electromagnetic environments. From simple aluminised Polyester, to more complex and comprehensive shielding incorporating plated copper braids and Mu metal wraps.

Conventional braiding methods can be improved by computer optimisation, which can give many times the shielding performance of a basic shield with minimal weight penalty or increase in optical coverage. Super screened cable combines Mu metal wraps with optimised braids to provide even further enhanced performance, especially at low frequencies.

Aluminised Mylar

Offers first level of protection for standard Electrostatic screening applications.

Single Braid

Increased screening level offering low level EMI and low sensitivity environments.

Single Optimised Braid

Further improved braid screen for sensitive lines and high EMI work.

Double Optimised Braid

Two layers of braid screen offering protection for highly sensitive lines and severe EMI.

Double Optimised Braids + Mu Metal Wrap

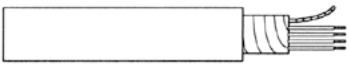
As above but with interlayer of screening, known as Super screened, this cable is suitable for very high protection levels EMP/Tempest.

Triple Optimised Braids + Mu Metal Wrap x2

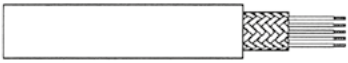
The double and triple Super screened cable is recommended for the severest of environmental applications.

3. Screening Options

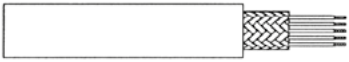
Aluminised Polyester



Single Braid

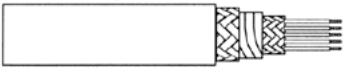


Single Optimised Braid



Double Optimised Braid

Double Optimised Braids with Mu metal wrap



Triple Optimised Braids with double Mu metal wrap

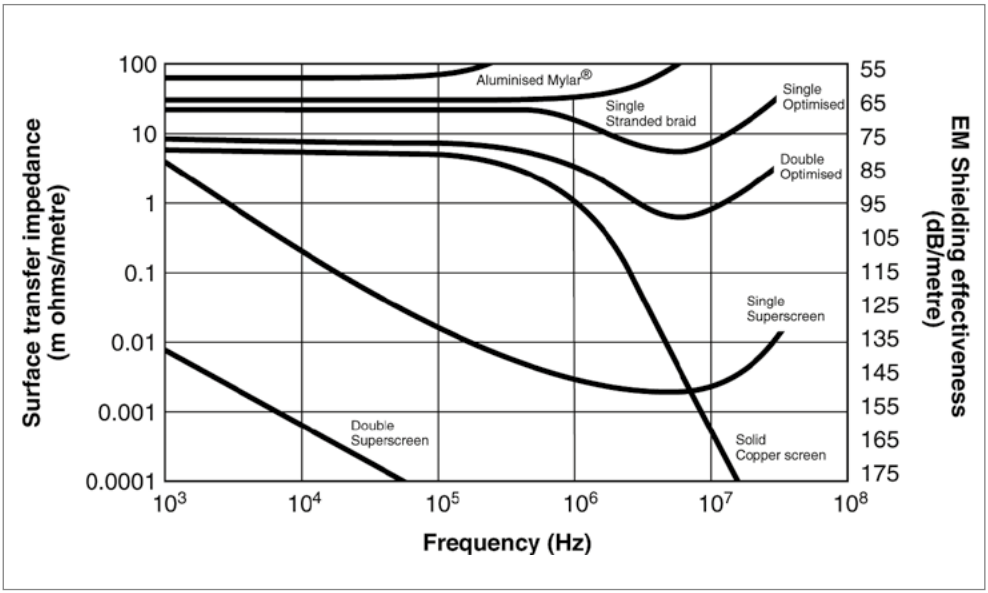
sales@is-rayfast.com | +44(0)1793 616700

Custom Cable Designs

3. Electromagnetic Screen Selection
Multi-conductor cables

The problems of shielding cables are complex but with the introduction of double and triple optimised braids we have the solution for the most difficult shielding issues. Shielding of cables without degrading cable flexibility can be provided for coaxial and multi-conductor cables. To complement this range of cables we can offer cable terminations, connectors, shielded moulded parts and connector back fittings to give a total screening performance.

3. Screening Performance of Various Types of Screen Constructions



Note: For further information, technical data or assistance with your specific application requirements, please contact us.

Custom Cable Designs

4. Design Options

Multi-conductor cables

In addition to those choices already covered there are a number of further design options and components available to cable designers.

Careful consideration must be given to the selection of these options and components to achieve the right combination of physical, chemical and electrical properties and to ensure that the finished cable is perfectly designed for its intended application.

Coiled Cables

Coiled or extensible cables are utilised for applications needing a combination of a high degree of flexibility, space constraints and the need to be extended and retracted.

The ability to supply cable designs as extensible cables using a wide range of coil diameters lengths facilitates the provision of cable for equipment such as headsets and communication equipment for example.

Tape Wrap

This option of a spirally or longitudinally applied tape material wrapped around insulated or uninsulated wire used as a mechanical barrier and a means of bundling the multicore cable.

Tape wraps are often used between wire conductors and braided screens.

Fillers

A non-functional component used to fill large interstices within a cable, thus providing a concentric construction. A ‘filler’ can be a solid core of polymer made from the same or similar material as the cable components.

Lay Length

A term used in cable manufacturing to denote the distance of advance of one member, or a group of spirally twisted members in one turn, measured axially. The lay of any helical element of a cable or conductor is the axial length of a turn of the helix of that element. Altering the lay length of a cable can result in a change in the cables flexibility.

Binder

A spiral wrapping of a thread to hold together the members of a cable as an alternative to a tape wrap.

Strain Relief

A tread or rope, usually manufactured from Kevlar, located down the centre of a cable to provide strain relief to its wire components after installation.

Drain Wire

An uninsulated conductor laid over the components of a foil-shielded cable and used as a ground connection.

sales@is-rayfast.com | +44(0)1793 616700

Wire Bundle Multiplication Factors Equal Size Wires

The table right provides multiplication factors for wire bundles of 1 to 61. To determine the approximate diameter of a wire bundle when the wires are all the same size, find the factor for the number of wires in the bundle and multiply the wire diameter by that factor.

Calculation of Wire Bundle Different Size Wires

To determine the wire bundle diameter when using wires of different sizes, follow steps:

1. Determine the number of wires in the wire bundle.
2. Find the diameter of the wires in the Wire and Cable section of this catalogue.
3. Calculate the cable bundle outside diameter by using the example below.

Example: A bundle of wires containing:

- 3 wires of 44A0111-22 (@ 1.19mm dia.)
- 5 wires of 44A0111-20 (@ 1.40mm dia.)
- 1 wire of 44A0111-18 (@ 1.65mm dia.)

$D = 1.2 \sqrt{(3 \times 1.19^2 + 5 \times 1.40^2 + 1 \times 1.65^2)}$
$D = 1.2 \sqrt{(3 \times 1.42 + 5 \times 1.96 + 1 \times 2.72)}$
$D = 1.2 \sqrt{(4.26 + 9.80 + 2.72)}$
$D = 1.2 \sqrt{(16.78)}$
$D = 1.2 \times 4.10$
$D = 4.92\text{mm}$

Number of Wires	Multiplication Factor
1	1.00
2	2.00
3	2.16
4	2.41
5	2.70
6, 7	3.00
8	3.60
9, 10, 11, 12	4.00
13, 14	4.41
15, 16	4.70
17, 18, 19	5.00
20, 21	5.31
22, 23, 24	5.61
25, 26, 27	6.00
28, 29, 30	6.41
31, 32, 33	6.70
34, 35, 36, 37	7.00
38, 39 40	7.31
41, 42, 43, 44	7.61
45, 46, 47, 48	8.00
49, 50, 51, 52	8.41
53, 54, 55, 56	8.70
57, 58, 59, 60, 61	9.00

Resistance and Current Carrying Capacity

Conductor Size (AWG) Tinned Cu	30	28	26	24	22	20	18	16	14	12
Max Resistance Ohms/km @ 20°C	356	225	135	86.0	53.2	32.4	20.4	15.8	9.9	6.6
Current Carrying Capacity (amps)	2.2	2.9	4.1	5.5	7.4	10.	14.0	15.5	21.0	28.0

Current carrying capacity for 30°C rise above 20°C ambient

Current Carrying Capacity Multiplying Factor for multicore cables of the same size													
Number of Cores	**2**	**3**	**4**	**7**	**9**	**12**	**15**	**18**	**21**	**24**	**27**	**30**	**37**
Derating Factor	0.825	0.73	0.66	0.54	0.49	0.43	0.39	0.36	0.33	0.31	0.29	0.28	0.26