

Aerospace | Defence | Energy | Commercial | Marine | Motorsport



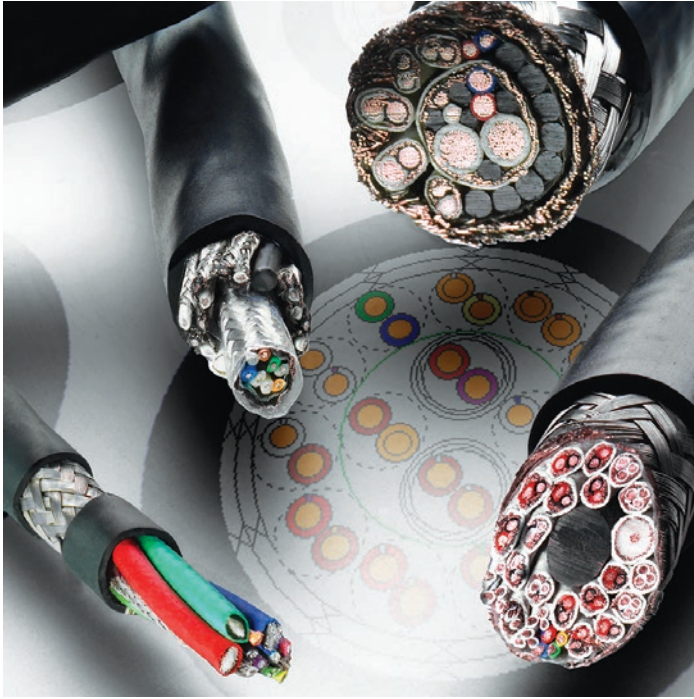
Custom Multicore Cable

Custom Cable Designs



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





Detailed design specifications & drawings

Machine cabled components

Wide selection of stocked wire components

Machine braided optimised EMI screens

Choice of heat-shrink or extruded jacket.

Low MOQ's

Coiled and prepared 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.

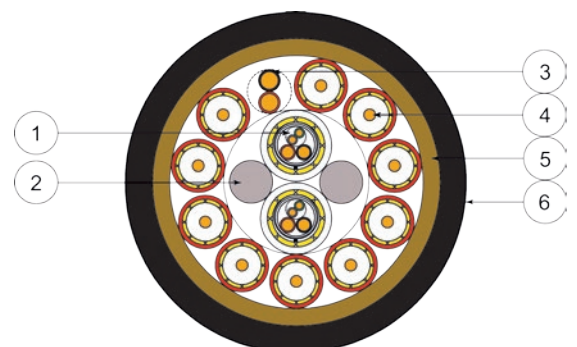
The solution is our Prototype Cable Service, the result of investment in plant and machinery combined with the excellent in-house knowledge of our production and design team.

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.



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

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.

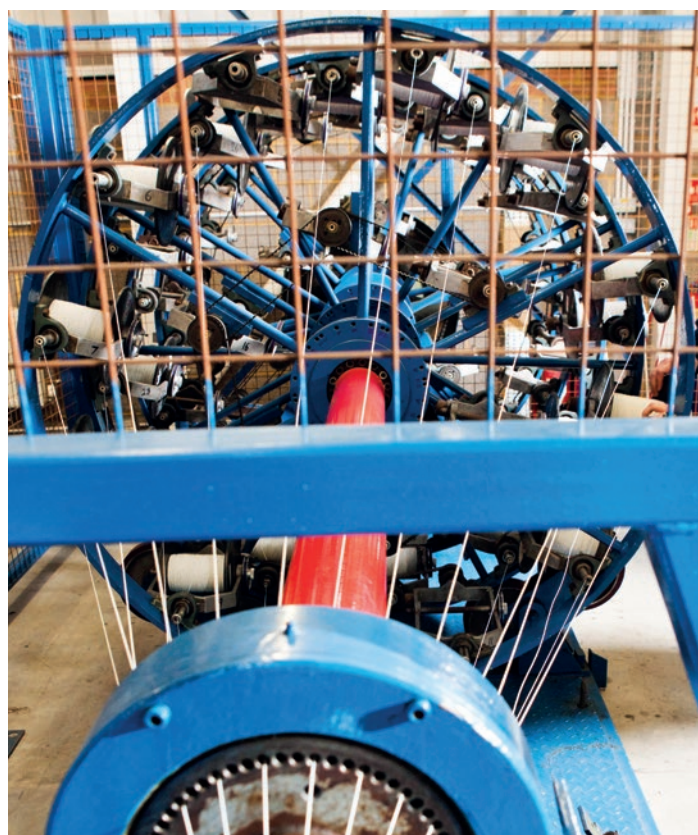
Listed below are our most popular wires, but we have also provided unique multicore cables that have included the following wires and cable combinations...

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

For more information please see relevant cable specifications.

CONDUCTOR Selection Guide

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



Typical 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

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.



Typical HEAT-SHRINK Jacket Selection - Prototype Cables

Heat-shrink Type	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

Typical EXTRUDED Jacket Selection - Production Cables

Extruded Material	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

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

-67°C to +260°C

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

-65°C to +200°C

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

FDR 25

-40°C to +150°C

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

-55°C to +125°C

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

-20°C to +200°C

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

-30°C to + 105°C

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

Electromagnetic Screen Selection

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

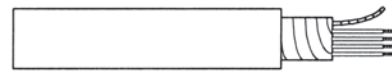
As above but with interlayer of screening, known as Super screened, this cable is suitable for very high protection levels EMP/Tempest.

Triple Optimised Braids + Mu Metal Wrap x2

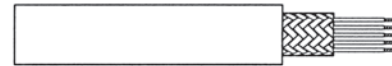
The double and triple Super screened cable is recommended for the severest of environmental applications.

Screening Options

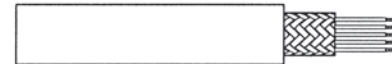
Aluminised Polyester



Single Braid



Single Optimised Braid



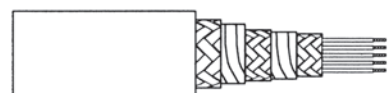
Double Optimised Braid



Double Optimised Braids with Mu metal wrap



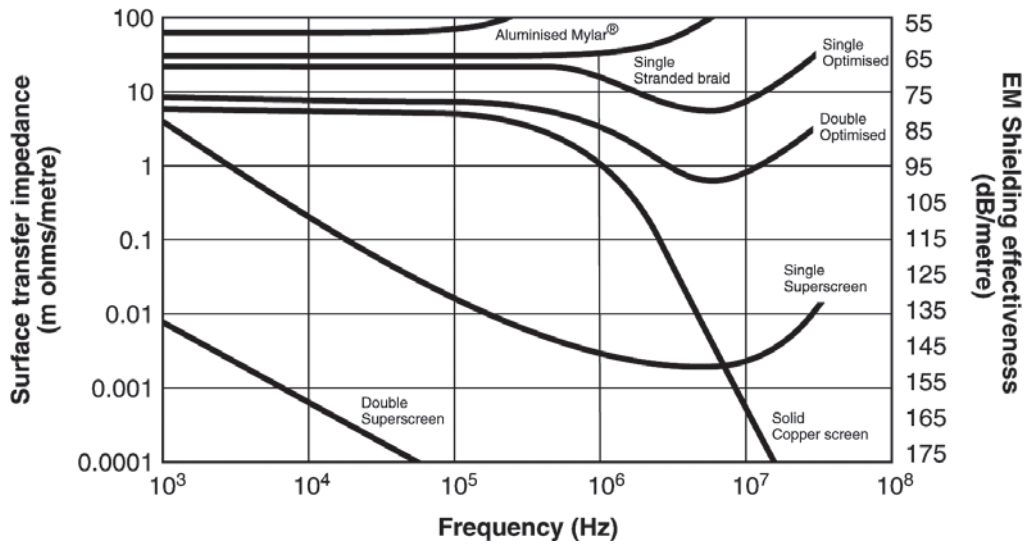
Triple Optimised Braids with double Mu metal wrap





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.

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

Design Options

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.

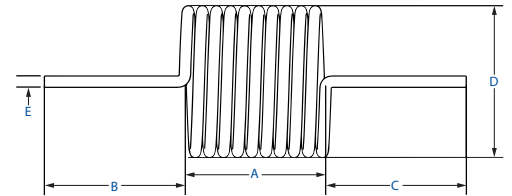


Fillers

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.



Extended coil cord length is typically between 2 to 3 times the retracted coil cord length, subject to dimensions A and D, in conjunction with construction method, materials used and conductor size.



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.

Wire Bundle Multiplication Factors for 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: 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.)

$$D = 1.2 \sqrt{(3 \times 1.19^2 + 5 \times 1.40^2 + 1 \times 1.65^2)}$$

$$D = 1.2 \sqrt{(3 \times 1.42 + 5 \times 1.96 + 1 \times 2.72)}$$

$$D = 1.2 \sqrt{(4.26 + 9.80 + 2.72)}$$

$$D = 1.2 \sqrt{(16.78)}$$

$$D = 1.2 \times 4.10$$

$$D = 4.92\text{mm}$$

Cable Diameters for Equal Size Wires

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 & 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
De-rating 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

Specialist Cables

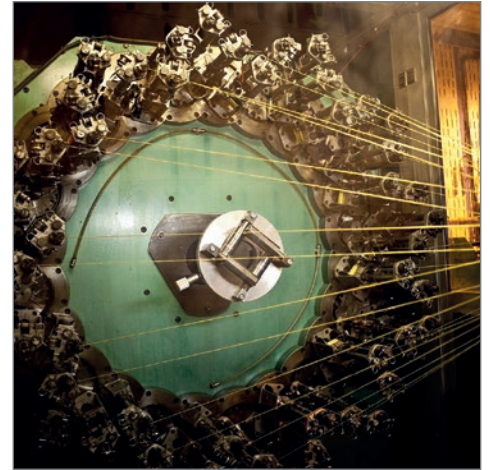
Electrical Cables and Composite Systems



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.

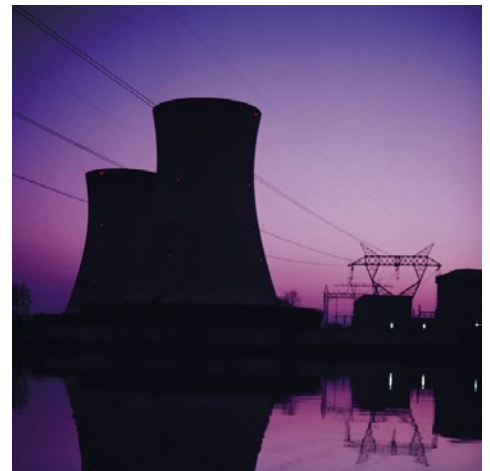
The more complex the application, the more bespoke cables have to be produced. We select manufacturers with many years of experience of materials such as PVC, PUR, Rubber, Silicone, TPE and Low smoke halogen-free compounds, from basic multi-core cables to composite cables we can help to design a cable 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.



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.

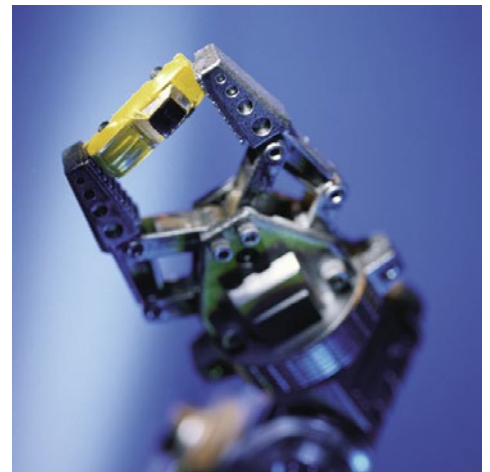
- Flame retardant to IEC 332.1 & 332.3
- Resist radiation doses up to 200 Mrads.
- Cables in accordance to Cogema La Hague and Cogema Melox specification (centre for the enrichment and re-treatment of uranium).
- Cable types 10 Nouvelle Generation.
- Mulrad 2 cables.
- Cables for nuclear robotics.



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

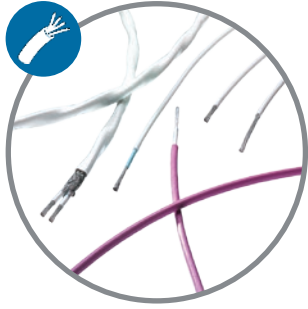
Providing both composite electrical and optical cables for many applications such as ROVs, seabed vehicle umbilicals to ship and submarine.

- 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



Product Linecard

Harnessing and Electro-Mechanical Solutions



Wire and Cable



Multicore Cable



Data Cable



Heat Shrink Tubing



Non Shrink Tubing



Braided Sleeving



Screening Braid



Moulded Parts



Terminals Splices



Cable Markers



Accessories



Connectors



Metal Braids



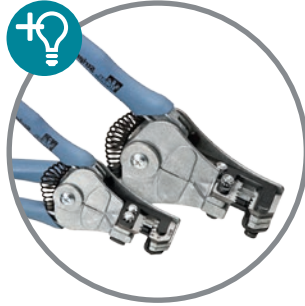
Relays



Switches



Adhesives & Tapes

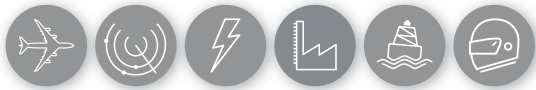


Application Tools

Broad range of harnessing and electro-mechanical solutions for demanding, harsh environment applications..

Supporting customers needs and wants for a complete solution..

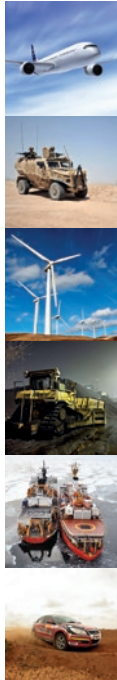
Commitment to customer service and quality, providing innovation, technical support and cost effective solutions...



Working closely with suppliers and manufacturers worldwide we offer a comprehensive range of high performance components and associated products for the Aerospace, Defence, Energy, Industrial, Marine and Motorsport markets. Our experienced internal and external sales teams offers leading customer service and support.

With immediate access to in excess of 8000 product lines from an extensive 'off the shelf' stock profile for next day delivery as standard, along with flexible MOQ's and pack sizes.

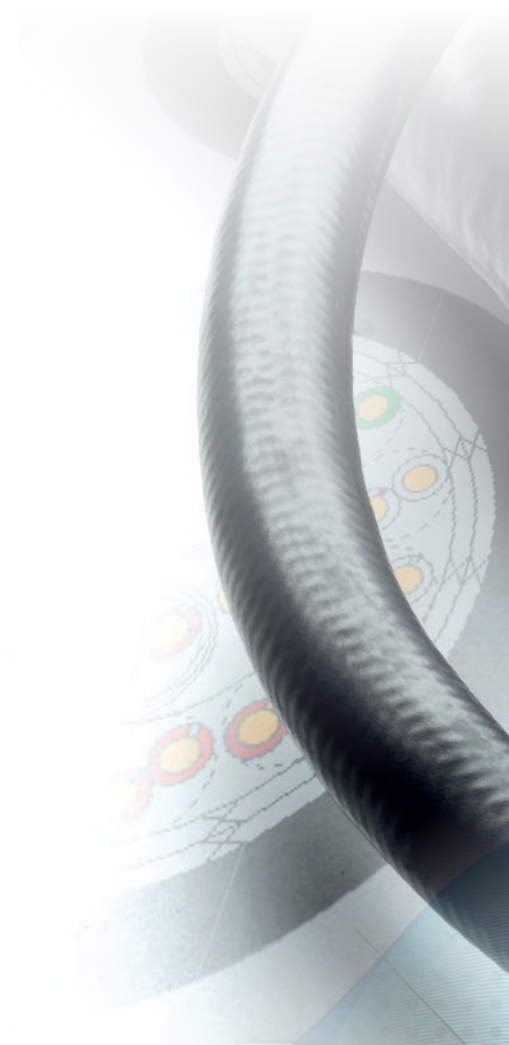
We are fully committed to complying with the latest quality approvals for the customers and markets we serve, including ISO9001:2008 and AS9120:2010.



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