

the **Harnessing** components catalogue



ONLINE CHAT

Harnessing and Electro-Mechanical
Solutions for Demanding, Harsh
Environment Applications



Wire and
Cable



Tubing
Products



Harness
Components



Connectors



Earthing
Products



Electro
Mechanical



Additional
Products

Contact Information

Contact Us

IS-Rayfast, IS-Motorsport

Website: www.is-rayfast.com

Telephone: +44 (0)1793 616700

Fax: +44 (0)1793 644304

Email: sales@is-rayfast.com

IS-Sommer

Germany, Switzerland and Austria

Website: www.is-sommer.com

Telephone: +49 71 58 98 127-0

Fax: +49 71 58 98 127-98

Email: info@is-sommer.com

IS-Connect, IS-Motorsport

USA and Canada

Website: www.is-connect.com

Telephone: +1 (317) 244 6643

Fax: +1 (317) 244 6693

Email: sales@is-connect.com

LinkedIn: [linkedin.com/company/is-rayfast-ltd](https://www.linkedin.com/company/is-rayfast-ltd)

Facebook: [facebook.com/IS.Rayfast](https://www.facebook.com/IS.Rayfast)

Twitter: twitter.com/IS_Rayfast

Delivery Options

UK/EU Delivery - Same Day Despatch

Our office hours are Monday to Friday, from 8.00am to 5.30pm (UK). With our aim being to despatch all 'ex-stock' orders placed before 4:30pm the same day. With a 'Next Day' service targeted for delivery where possible, through our agents DPD and UPS.

Some areas have a 2/3 day service, such as central Europe, please contact us for delivery options available to your area.

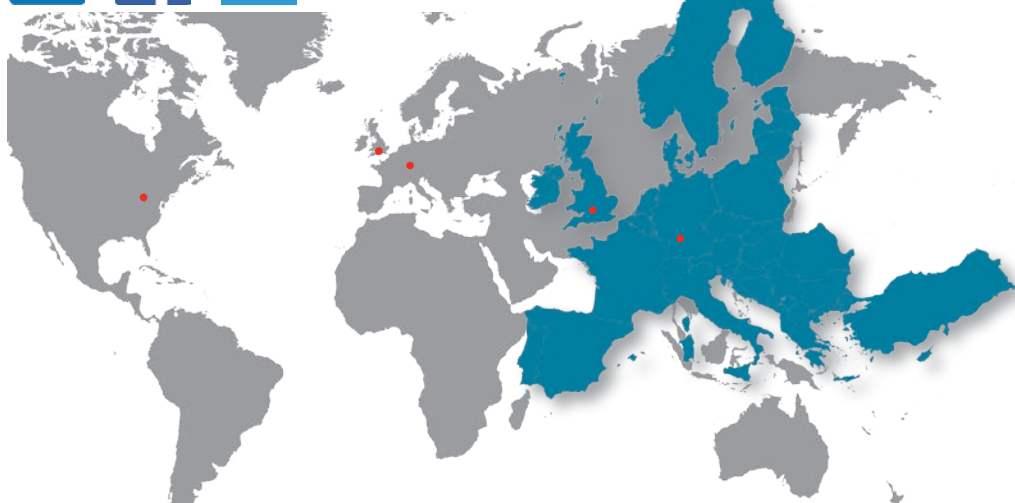
Same Day or Timed Service









Please contact us for more details.

International Delivery

Our long standing partnership with UPS allows us to furnish our international customers with a high quality service from one of the most reputable, global logistics provider in the world. Please contact us for further details about this service.

As part of the IS-Group of companies we have additional satellite warehouse facilities in the USA and Germany.



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Product Overview



Wire and Cable

High performance wire and cable for demanding harsh environments. Range covers primary wire, screened and jacketed multicore, airframe & miniature.



Braided Sleeving

Both wraparound and expandable products offering protection against heat, abrasion, fluids, chemicals and electrical interference.



Screening Braid

High performance EMI/EMC screening braids, including lightweight high strength copper alloy versions. Over-braiding service also available for customer specials.



Multicore Cable

Custom and specialist cables, that are perfect for prototypes, pre-production cables, and ongoing production requirements.



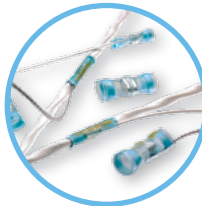
Moulded Parts

Heat-shrink moulded parts and shapes are available in a wide range, including 'micro-boots' and 'Instalite' lightweight boots.



RF and Data Cables

Lightweight and ruggedised Ethernet, quadrx, USB and other data variants. Coaxial/Triaxial cable for video, navigation, communication and Satcom.



Terminals and Splices

Interconnection and termination devices offer a single step, easy to use method of producing high quality wire splicing, solder, crimp and sealing.



Heat Shrink Tubing

Performance tubing for harsh environments and tough commercial applications. Range includes low shrink temperature, to high shrink ratio and LFH tubing.



Cable Markers

Cable markers and identification in a range of styles and materials including heat-shrink, tie-on, wrap-around and self adhesive. Plus software and printers.



Non Shrink Tubing

Suitable for where use of heat guns is not possible or not required. Includes Neoprene, Polyolefin, Silicone, PTFE and PVC materials.



Accessories

Everything to bundle, route and manage wiring assemblies and harnesses. High performance cable ties in a variety of materials for various applications and harsh environments.



Connectors

Range of MIL-DTL spec' including D38999 series III connectors available from the 'Fast Factory'. Plus performance industrial options.



Backshells

Collection of both screened and un-screened backshells for connectors to MIL-DTL specifications, including protective dust caps.



Bonding Leads

Selection of metal braid bonding leads, braids and ropes, with aerospace and general market approvals. Plus high CSA power shunts. Bespoke customer designs a speciality.



Relays and Contactors

A comprehensive relay and contactor inventory, including MIL and Aerospace qualified products. Designed for use in extremes of temp, shock, vibration & altitude.



Switches and Grips

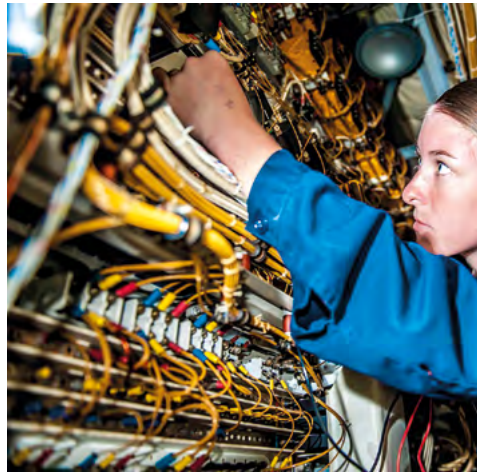
Range of switches, grips and joysticks, from ruggedised industrial to fully aerospace approved switches and switch panels/subsystems.



Adhesives and Tapes

High performance adhesives, fillers, coatings, tapes and cloths designed for operation under the harshest environmental conditions.

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



All your harnessing needs in the one place



Product Portfolio

Distribution Partners and Key Suppliers



Wires & cables using high performance extruded and taped materials. Combined with advanced conductor solutions to allow for lightweight constructions.



Manufacturer of military & aerospace specification lacing tapes, twines and cords as well as a broad range of sleeving and braiding yarns.



Design and manufacture high performance wire and cable, for aerospace, military and electronics applications. EN, MIL and Boeing approved



High Temperature adhesives, fillers, coatings, tapes & cloths. Plus encapsulants and machinable ceramics.



Wide portfolio of high quality airframe and equipment wire and cables according to EN, ASNE, ABS, JN, NFC9-524 or MIL specification standards.



Supplier of wire protection, cable management, specialty fasteners and other solutions, for the protection of critical equipment.



Performance sleeving and shielding solutions that provide bundling & component protection against abrasion, heat, noise and EMI/EMC.



Manufacturer of high performance metal braid and earth bonding leads designed for aerospace, defence, industrial and energy market places.



Specialist Wire & Cable, supplying fire retardant, halogen free, robotic cables, drag chain cables, plus radiation resistant.



Manufactures a range of aircraft/helicopter wires & cables, approved for a variety of EN specifications. Used by major OEMs such as Airbus, Dassault, Augusta..



Switches and Grips, including toggle, vandal resistant, grips, sealed limit switches, custom pendants, rotary and short travel transducers.



Cable management accessories including cable ties and fasteners, cable ducting, grommet edging and tools.



High Performance and lightweight, RF/VIDEO Coaxial/Triaxial cables, high speed DATA cables and MICRO X/Ku Band cable and wire.



'Human-Machine Interface Innovations' for aerospace and defence applications. Switches, illuminated panels and data entry solutions.



Wire & cable, heat shrink tubing, moulded parts, interconnect devices, identification systems, connectors and backshells, plus adhesives, application equipment.

**TE Connectivity
Master
Distributor**

Product Overview

The Supplier of Choice for Electrical Harnessing
Components and Associated products



Customer Services

TO DO BUSINESS WITH US...

Key Account Managers

Technical Support

Internal Sales team

Online Chat

Online Enquiries

Our aim is to provide exemplary customer services that are focused on meeting individual requirements through the provision of...

PHONE US

ONLINE CHAT



We are here to help with your questions offering guidance and help on the best products available, that are the most suitable for your application.

Additionally we offer immediate access to in excess of 8,000 different product lines from an extensive "off the shelf" stock profile.

Added Value

Another key to the continued success of IS-Rayfast is our provision of added value services such as...

Cutting Services

Cut Piece Tubing; Cut Piece Sleeving; Wire and Cable Spooling

Cable Solutions

Custom Multicore cables; Over-braiding Service; Custom Assemblies

Pre-Print Services

Heat Shrinkable Markers; Tie-On Markers; Adhesive Labels

Logistics

Same Day Despatch; Flexible MOQ's; Component Kitting; KanBan + Consignment Stock; Component Sampling

See page 527 for further details...





RoHS

Please contact our sales office for details on RoHS compliant status for the products contained within this catalogue, as due to the various permutations of product available, it has not been possible to include all the detail on these pages.

Order Consolidation

With the broad product range that IS-Rayfast can offer our customers, it facilitates the ability to simplify your procurement.

Why not consolidate your requirements in one easy package. From wire to switches, to heat-shrink tubing, sleeves, cable management, identification methods and services, moulded shapes, plus relays and contactors.

Quality / Customer Approvals

We are fully committed to complying with the latest quality approvals for the customers and markets that we serve, including...



Quality Management System
EN 9120:2010
ISO 9001:2008
EN 9104-001:2013

BAE SYSTEMS

Certificate of approval
BAE/AG/20373/MAA



Airbus Helicopters | Bombardier | GKN
Aerospace | Leonardo | RS Components |
Farnell | Safran | Thales | Zodiac Aerospace

IS-Rayfast Definitions



RoHS Compliant

Symbol indicates that the product meets the Restriction of Hazardous Substances regulations for lead, cadmium, polybrominated biphenyl (PBB), mercury, hexavalent chromium, and polybrominated diphenyl ether (PBDE) flame retardants.



Halogen-Free

Symbol indicates that the product does not contain halogens, identified as Fluorine, Chlorine, Bromine and Iodine above ppm levels as defined by IEC 61249.



Low Fire Hazard

LFH systems are fast becoming part of the specification in many cabling applications throughout industry. Reputable manufacturers define Low Fire Hazard (LFH) products by having ALL of the following properties:

- Highly flame retardant
- Low toxicity
- Low smoke

Product Characteristics



Heat-Shrink Ratio

Symbol indicates the shrink ratio of the product identified. Typically heat shrinkable protective tubing.



Expandable Ratio

Symbol indicates the expansion ratio of the product identified. Typically tubular polymeric braids.



Push Fit

Symbol identifies products that are a push or pull fit onto the cable or substrate being protected.



Cold Applied

Symbol identifies products that do not require heat to install, normally associated with the product type.



Wraparound

Symbol indicates products that wrap around the cable or substrate being protected. Typically polymeric braids.



TE Connectivity

Broad range of wire and cable, heat-shrinkable tubing, moulded parts and shapes. Plus terminals and splices, cable markers and backshells, adhesives, relays and contactors. Deutsch Autosport connectors (USA).

Breyden

Lacing tapes, twines and cords.

Carlisle

High performance wire and cable.

Cotronics

High Temperature adhesives, fillers, coatings, tapes and cloths

Device Technologies Inc.

Protective edging, gaskets.

Draka

Performance wire and cable.

Federal-Mogul SPG

Protective Sleeving and polymeric braids.

Lemo

Connectors.

Nexans

Performance wire and cable

Otto

Switches and Grips.

Panduit

Cable Management Accessories.

PIC Wire & Cable

Lightweight data and coaxial cable.

IS-Motorsport is the IS-Rayfast dedicated brand for the highly demanding international motorsport industry.

Whether you are a large organisation looking for a complete stocking profile for the coming season, or a small independent privateer in need of a small quantity for a one-off repair, IS-Motorsport can provide the solution.

With facilities in Indianapolis (USA) and Swindon (UK), IS-Motorsport has been successfully servicing the UK and USA motorsport industry with its high performance racing products and services, for over 15 years.

Our experience and industry knowledge has developed over the years through working closely with our customers, irrespective of their size, from large international Formula 1 teams to an individual Superbike privateer, and everything in between.

IS-Motorsport are currently involved in: Formula One, Formula E, NASCAR, CART/ IRL, WRC, National Road/Rally, Moto GP, Superbikes, America's Cup and other high performance marine.

We aim to offer our customers access to a wide range of solutions that provide, both enhanced reliability and performance that meet the customer's technical and budgetary requirements.

Our primary focus is to listen closely to our customers, learn from them, understand their present and future needs and keep them up to date with the latest industry developments. By doing this IS-Motorsport can dynamically adapt the extensive product range, personalise customer services and tailor our technical support to ensure we are providing what is required now, but also what will be required in seasons to come.

Company Profile



Company Timeline

- 1975 The company was originally founded as a wholly-owned subsidiary of Raychem (now TE Connectivity).
- 1987 Rayfast Ltd became an independent distributor for Raychem Electronics Division (now TE Connectivity).
- 1994 Rayfast was acquired by the Diploma Group, which enabled the introduction and development of additional franchises, to widen and strengthen the product portfolio.
- 1998 Rayfast entered the European market place, with its sister company Sommer GmbH, to provide a platform for a strong European presence. In the same year Rayfast was also appointed the European Master Distributor for TE Connectivity.
- 2001 Rayfast re-branded and changed its name to IS-Rayfast to incorporate the wider range of products and services offered. Also at this time the IS-Group was formed to accommodate additional company growth, which now incorporates IS-Cabletec, IS-Sommer, IS-Motorsport and IS-Connect, with sites in Europe and USA.
- 2012 To support the company's continued growth, the company moved into new larger premises offering 30,000 sq ft, to facilitate an increase in both warehouse storage capacity and office space.
- 2016 Introduction of new wire and cable franchises and product ranges including Airbus Group and Boeing approved Military and Aerospace wire and cable.



IS-Rayfast Headquarters and Warehouse in Swindon

IS-Rayfast has grown consistently over the years and is now a multi-million pound market leading organisation, supplying high performance, high quality harnessing and electro-mechanical components and services.

Employing over 80 people at our Swindon headquarters, dedicated to sales, distribution, technical support and customer service for an extensive and varied customer base across Europe.

IS-Rayfast as part of the IS-Group are actively involved in the Aerospace, Defence, Energy, Industrial, Marine, Motorsport and Space markets.

The company continues to develop as a market focused distribution company, offering a broad range of high performance, high quality products and services from worldwide, brand of leading manufacturers.





Wire and Cable

Heat-shrink Tubing

Non-shrink Tubing

Braided Sleeving

Screening Braids

Moulded Parts

Terminals and Splices

Wire and Cable Markers

Accessories

Connectors

Backshells

Bonding Leads

Metal Braids

Relays and Contactors

Switches and Grips

Adhesives and Tapes

Application Equipment

Added Value Services

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.

High Performance Wire and Cable

Spec 44	Dual wall, 150°C rated, XL-PVDF	page 14
Spec 55	Single or dual wall, 200°C rated, XL-ETFE	page 20
Spec 55D	Defence Standard 61-12 Part 33/001	page 29
Spec 99M	Dual wall, 120°C rated, LFH, XLPE	page 30
Spec 100	Zero halogen, including Rail EN50306	page 34
PTFE	Single wall, 260°C rated fluorocarbon polymer	page 40
M22759	Mil and Aerospace specification	page 43
M81044	Mil and Aerospace specification	page 48
M27500	Mil and Aerospace specification	page 49
EN Specs	European / Airbus Group specification	page 52
BMS13-XX	Boeing specification	page 56

Power Cable

ZHPCG	Zero Halogen Power Cable	page 62
TR, ZHI, AFR, FTR	Performance flexible power	page 64
SHF260	Ultra flexible power cable	page 65

RF and DATA Cables

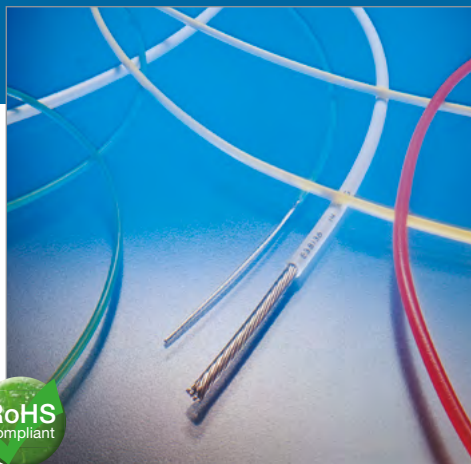
Coaxial cable	Cheminax®	page 66
	RFMates® and VideoMates®	page 70
High speed cable	Ethernet, USB and Quadrax	page 72
Microwave cable	High frequency X and Ku band	page 73

Multicore Cable

Def Stan 61-12 part 25	Zerohal Marine UK Defence standard	page 74
Specialist	Nuclear, Robotics and Sub-Sea	page 76
Custom	Multi-conductor cables, custom designed	page 78

44 Wire

Dual Wall 150°C 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

- -65°C to +150°C

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:

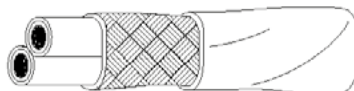
Primary Wire - Dual Wall Single Core



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.

Product Characteristics		Product Performance
Physical	Operating temperature	-65°C to +150°C
	Tensile strength (primary insulation)	28N/mm ² (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

1 ORDERING INFORMATION

Colours:

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

8 Stripes are also available on request and
9 are indicated by additional insulation colour
10 numbers
11 e.g. 92 = White with Red stripe

12 Standard packaging:

13 300m reels for “standard” items. If the product
14 is a non-stock item a Minimum Order Quantity
15 (MOQ) may apply.

16 Ordering Description:

17 Follow steps 1 to 6.

- 18 1 Select the type of wire
19 2 Select the number of conductors
20 3 Select the type of conductor
21 4 Select the wire conductor size
22 5 Select the primary wire insulation colour(s)
23 6 Select the outer jacket colour

24 Ordering Examples:

- 25 • Where a single 22awg 600V white primary
26 wire is required the part number is
27 **44A0111-22-9**
28 • Single 16awg 600V white primary wire,
29 with shield and an outer white jacket is
30 required the part number is **44A1111-16-9-9**
31 • Where two core 600V cable with an overall
32 shield and an outer jacket and a conductor
33 size of 18awg, with core insulation colours
34 red and blue. The outer jacket is white with
35 a red stripe the part number is **44A1121-18-2/6-92**
36 • Three core 600V cable with an overall
37 shield and an outer jacket with conductor
38 size for each of the primary cores is
39 24awg, with core insulation colours red,
40 yellow and blue and outer jacket is white.
41 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

0 - Black

1 - Brown

2 - Red

2L - Pink

3 - Orange

4 - Yellow

5 - Green

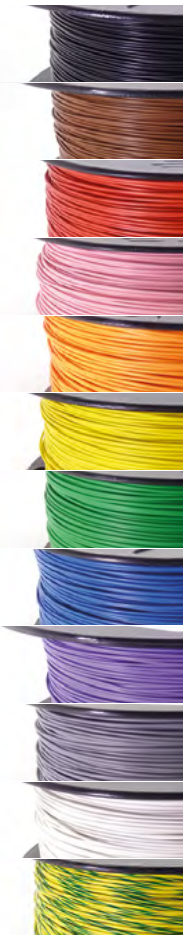
6 - Blue

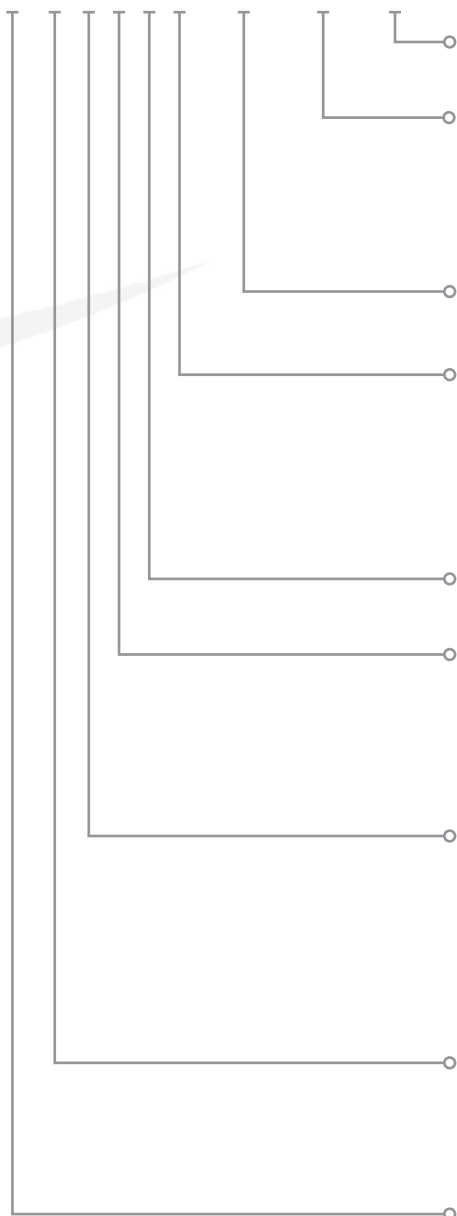
7 - Violet

8 - Grey

9 - White

45 - Yellow/Green



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 150°C rated, XLPVDF
High performance wire and cable

1

600V Primary Wire Dimensions

Conductor Size	Stranding No/mm	Nominal CSA (mm²)	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

2

3

4

5

6

7

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

8

9

10

11

12

13

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

14

15

16

17

18

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 200°C 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

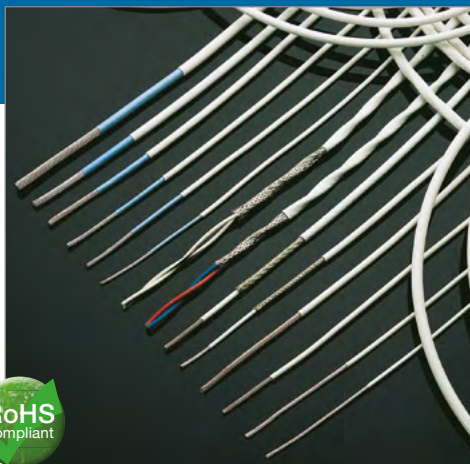
- Resistant to electrical arc tracking in wet or dry conditions
- Single or dual wall construction
- Small size, ultra light weight
- Exceptional chemical resistance

Operating Temperature

- -65°C to +150°C
(Tin plated conductors - standard)
- -65°C to +200°C
(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



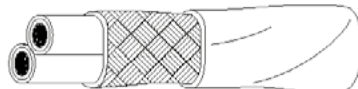
Airframe Wire - Dual Wall



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.

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/mm ² , 125%
	Tensile strength + total elongation	(All primary wire) 35 N/mm ² , 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

1 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

0 - Black

1 - Brown

2 - Red

2L - Pink

3 - Orange

4 - Yellow

5 - Green

6 - Blue

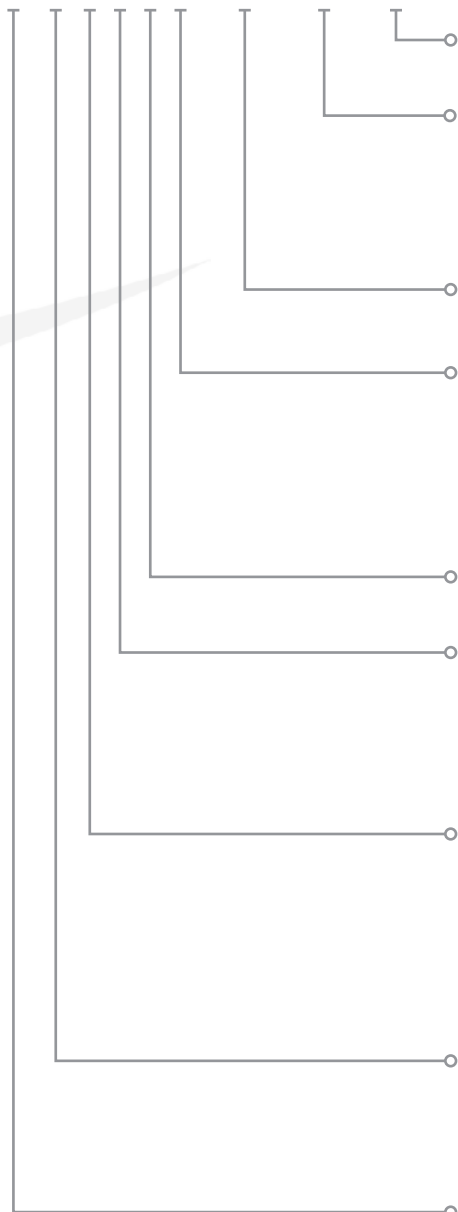
7 - Violet

8 - Grey

9 - White

45 - Yellow/Green



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 200°C rated, XLETFE
High performance wire and cable

600V Primary Wire, Equipment/Interconnect Dimensions

Conductor Size	Stranding No/mm	Nominal CSA (mm²)	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.

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 200°C 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.

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

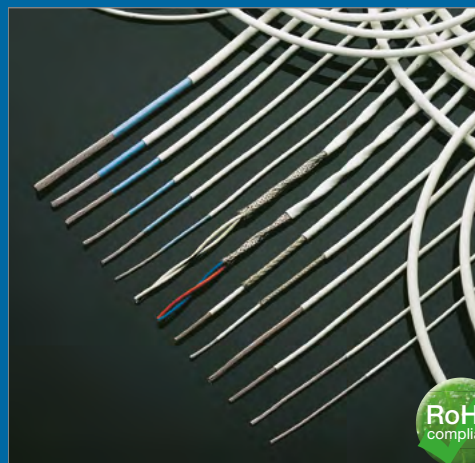
Single or Dual Wall 200°C rated, XLETFE
High performance wire and cable

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

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 -65°C up to +150°C.

***Note:** The 135°C rated single wire without screen or jacket is no longer in the Defence Standard for sizes 001 and 002. For these constructions use the 150°C 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

Wire and Cable

99M Wire

Dual Wall 120°C 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

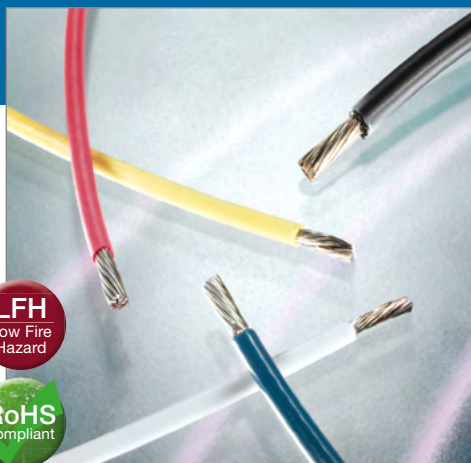
- Low flammability
- Low smoke generation
- Low toxicity index
- Low generation of corrosive gases
- Small size, lightweight

Operating Temperature

- -55°C to +105°C jacketed cable
- -55°C to +120°C wire only

Specifications/Approvals

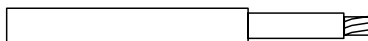
- Def Stan 61-12, Part 18
- Raychem WCD 281



Spec 99 Wire Construction

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

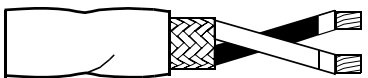
99M011X (600 V) - Primary Wire



99M1111 - Shielded and jacketed



99M1121 - Shielded and Jacketed Twisted Pair



Note

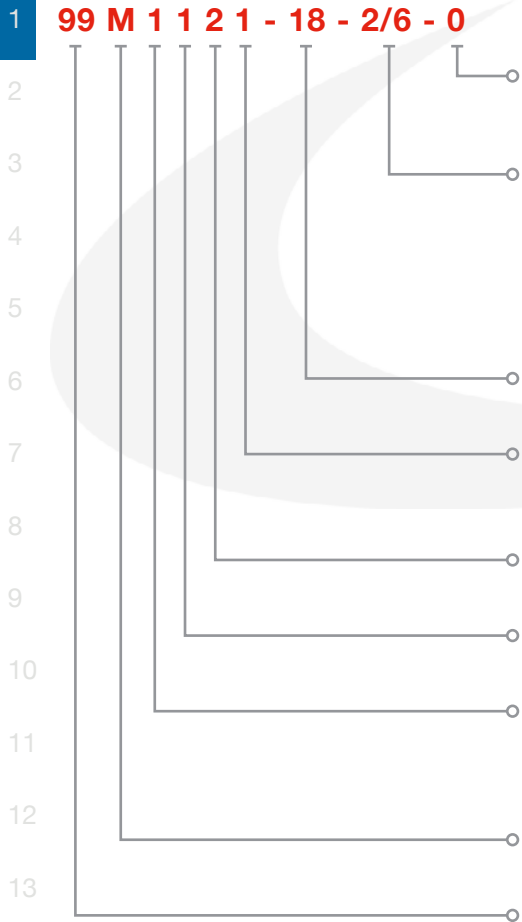
99 Wire is available in a variety of constructions, voltage ratings, sizes and colours. For further assistance regarding your specific wire and cable requirements, please contact us.

Product Characteristics		Product Performance	
Physical	Test	Method	Typical Value
	Temperature rating	BS 3G230	+120°C wire only
	Tensile strength	-	>30 MPa
	Elongation at break	-	>250%
	Notch propagation (0.05 mm notch)	BS 3G230	Pass
	Shrinkage 150°C	BS 3G230	<1%
	Low temperature bend	BS 3G230	-55°C
	Voltage withstand	BS 3G230	2.5 kV
	Insulation resistance (20°C)	BS 3G230	1000 MΩ km (min)
	Pliability rating	Def Stan 61-12 (18)	Pliable
Fluid Resistance	Fuels - aircraft	Def Stan 61-12 (18)	Pass +100°C/72 hours
	Oils - ASTM No.3	Def Stan 61-12 (18)	Pass +50°C/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%

Wire and Cable

99M Wire

Building Your Part Number
Low fire hazard wire and cable



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.

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

Wire and Cable

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.

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 +125°C
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

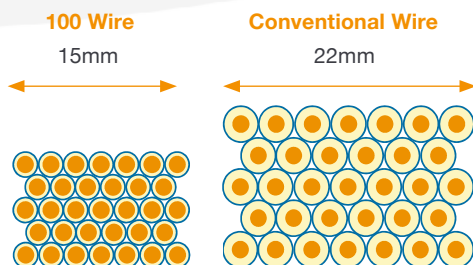
Meets requirements of VG 95218-20 Type E primary wire.



50% Volume Reduction

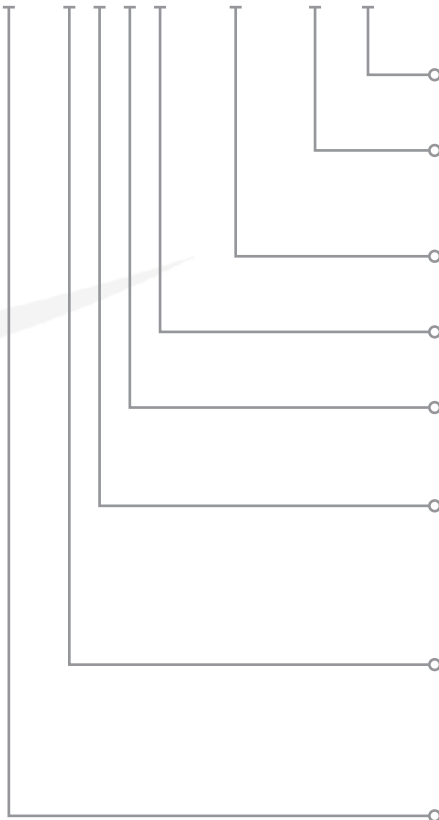
30% Weight Reduction

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.

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 Size0.15mm² 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

Constructions0 = 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

Part Description	Conductor			Finished Wire		
	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

100E Fire Hazard Properties

Test	Method	Result
Flame Propagation - Single cable	IEC 60332-1-2	Charring confined 50-540mm
Flame Propagation - Bunched Cable ($d \geq 12\text{mm}$)	IEC 60332-3-24	Max. burn length 2.5m
Flame Propagation - Bunched Cable ($>6\text{mm}/<12\text{mm}$)	EN 50305 Clause 9.1.1	Max burn length 2.5m
Flame Propagation - Bunched Cable ($d \leq 6\text{mm}$)	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 <10 $\mu\text{S}/\text{mm}$

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

Part Description	Conductor			Finished Wire		
	Cross Sectional Area	Conductor Stranding No./Diam	Max. Diameter	Max. Resistance @ 20°C	Max. Diameter	Max. Weight
100E0111-0.50-X	0.50 mm ²	19/0.18 mm	0.90 mm	40.1 Ω/km	1.45 mm	6.60 kg/km
100E0111-0.75-X	0.75 mm ²	19/0.23 mm	1.15 mm	26.7 Ω/km	1.65 mm	8.90 kg/km
100E0111-1.00-X	1.00 mm ²	19/0.25 mm	1.26 mm	20.0 Ω/km	1.80 mm	10.7 kg/km
100E0111-1.50-X	1.50 mm ²	37/0.23 mm	1.58 mm	13.7 Ω/km	2.13 mm	16.0 kg/km
100E0111-2.50-X	2.50 mm ²	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		Nom. Overall Diameter	Max. Weight
			Min.	Nom.		
100E1111-0.50-X	0.50 mm ²	0.10 mm	0.20 mm	0.38 mm	2.61 mm	17.4 kg/km
100E1111-0.75-X	0.75 mm ²	0.10 mm	0.20 mm	0.38 mm	2.82 mm	20.7 kg/km
100E1111-1.00-X	1.00 mm ²	0.10 mm	0.20 mm	0.38 mm	2.95 mm	23.9 kg/km
100E1111-1.50-X	1.50 mm ²	0.10 mm	0.20 mm	0.38 mm	3.28 mm	31.6 kg/km
100E1111-2.50-X	2.50 mm ²	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

1

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

Part Description	Conductor			Finished Wire		
	Cross Sectional Area	Shield Size	Jacket Thickness Min. 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

6

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

Part Description	Cross Sectional Area	Shield Size	Jacket Thickness Min. 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

10

11

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

Part Description	Cross Sectional Area	Shield Size	Jacket Thickness Min. 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

15

16

17

18

**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)



Wire and Cable

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

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

Operating Temperature Nema HP3

- -75°C to +200°C (Silver plated copper)

Voltage Rating

- 250/300, 600 & 1000 volts

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



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.

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

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		

Wire and Cable
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.

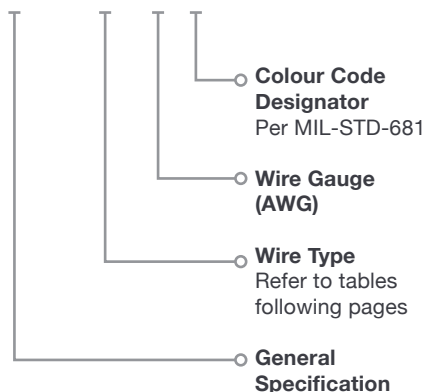
Our experience and knowledge is able to provide you with advice and support on the best product available for your application, whether it is an off the shelf or a bespoke designed cable.



SAE AS22759 • M22759

Equipment Wire
Military and Commercial Aerospace

Part number example...

M22759 34 26 9

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.

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

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

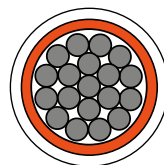
Reference	M27500 Ident.	Conductor Plating	Insulation	Temp. Rating	Voltage Rating	AWG
M22759/80	WB	Tin	Fluoropolymer/Polyimide, 2 Ply	150°C	600 V	26 to 10
M22759/81	WC	Silver, HSCA	Fluoropolymer/Polyimide, 2 Ply	200°C	600 V	26 to 20
M22759/82	WE	Nickel, HSCA	Fluoropolymer/Polyimide, 2 Ply	260°C	600 V	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/Polyimide, 2 Ply	200°C	600 V	26 to 10
M22759/92	WR	Nickel	Fluoropolymer/Polyimide, 2 Ply	260°C	600 V	26 to 10

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%

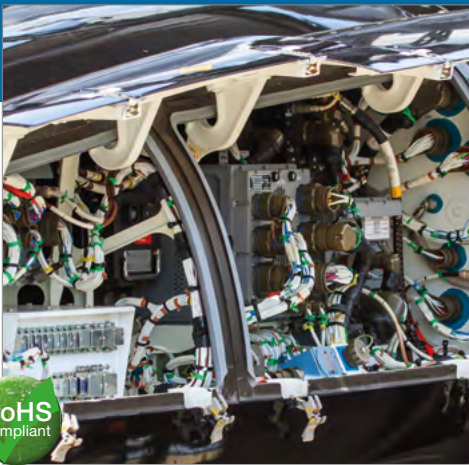


M22759/180 to /192 Composite Taped Wires 'Smooth/Seamless'

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



Part number example...

M81044 12 26 9

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

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

NEMA WC27500 • M27500**Airframe and Equipment Wire
Military and Commercial Aerospace**

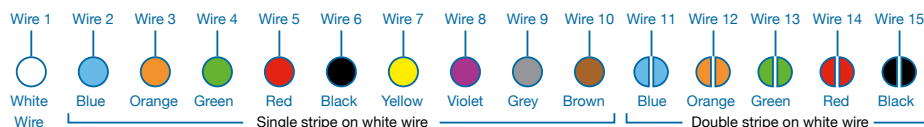
The ANSI/NEMA WC27500 REV A specification is commonly used to describe both shielded and unshielded cable constructions for avionics, aerospace and airframe applications. The specification allows the user a wide variety of construction choices. Circuit identification, conductor size, insulation type,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

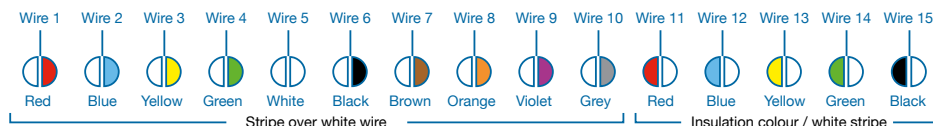
The colour identification charts below should be used in conjunction with the part M27500 numbering guide illustrated over the page.

M27500 Colour Table 3A

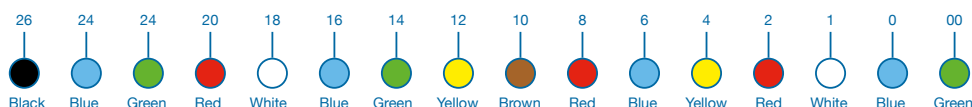
For cables having more than 10 conductors, the wires shall be a white base identified by double colour tracers as illustrated in chart below.

**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.

**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.

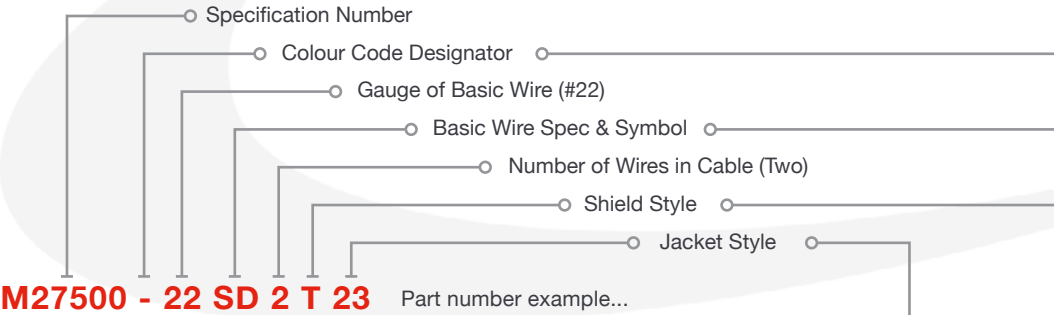


NEMA WC27500 • M27500

Airframe and Equipment Wire
Military and Commercial Aerospace

1 M27500 is low voltage, high temperature
2 cable ideal for use in a variety of both military
3 and commercial applications, including those
4 involving airframes, avionics and ground
5 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 Jacket¹	x2 Jacket¹	Jacket Style	Temp. Limit
00	00	No jacket	-
01	51	Extruded white PVC¹	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
11²	61²	Tape of natural polyimide with FEP wrapped and heat sealed with FEP outer surface	200°C
12²	62²	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
17³	67³	Extruded white ECTFE	150°C
18³	68³	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

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.	#	Specification	#	Specification
U	-	No Shield	-	CA	MIL-W-22759/13	RE	MIL-W-22759/12
T	V	Tin Plated Copper, Round	150°C	CB	MIL-W-22759/14	SA	MIL-W-22759/7
S	W	Silver Plated Copper, Round	200°C	CC	MIL-W-22759/15	SB	MIL-W-22759/32
N	Y	Nickel Copper, Round	260°C	E	MIL-W-22759/2	SC	MIL-W-22759/33
F	Z	Stainless Steel, Round	400°C	EA	MIL-W-22759/1	SD	MIL-W-22759/34
C	R	Heavy Nickel Plated Cu, Round	400°C	JB	MIL-W-22759/28	SE	MIL-W-22759/35
M	K	Silver Plated HSCA, Round	200°C	JC	MIL-W-22759/29	SM	MIL-W-22759/41
P	L	Nickel Plated HSCA, Round	260°C	JD	MIL-W-22759/30	SN	MIL-W-22759/42
G	A	Silver Plated Copper, Flat	200°C	JE	MIL-W-22759/31	SP	MIL-W-22759/43
H	B	Silver Plated HSCA, Flat	200°C	LE	MIL-W-22759/9	SR	MIL-W-22759/44
*	#	Nickel Plated Copper, Flat	260°C	LH	MIL-W-22759/10	SS	MIL-W-22759/45
J	D	Tin Plated Copper, Flat	150°C	MD	MIL-W-81044/5	TA	MIL-W-22759/8
E	X	Nickel Plated HSCA, Flat	260°C	ME	MIL-W-81044/6	TE	MIL-W-22759/16
I	Q	Nickel Chromium Alloy, Flat	400°C	MF	MIL-W-81044/7	TF	MIL-W-22759/17
				MG	MIL-W-81044/8	TG	MIL-W-22759/18
				MH	MIL-W-81044/9	TH	MIL-W-22759/19
				MJ	MIL-W-81044/10	TK	MIL-W-22759/20
				MK	MIL-W-81044/11	TL	MIL-W-22759/21
				ML	MIL-W-81044/12	TM	MIL-W-22759/22
				MM	MIL-W-81044/13	TN	MIL-W-22759/23
				RA	MIL-W-22759/3	VA	MIL-W-22759/5
				RB	MIL-W-22759/4	WA	MIL-W-22759/6
				RC	MIL-W-22759/11		

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

Wire and Cable

EN / ABS / NSA Specs

European Hook-up and Airframe Wire
Military and Commercial Aerospace



- 1 **EN2266** - Hook up airframe wiring, Polyimide tapes and FEP topcoat, with temperature rating -55°C to +200°C.
- 2 **EN2267** - Hook up airframe wiring, polyimide plus PTFE tapes, with temperature rating -65°C to +260°C
- 3 **EN2713** - Hook up airframe wiring, shielded and jacketed wire, with Polyimide & FEP sheath with temperature rating -65°C to +200°C
- 4 **EN2714**- Hook up airframe wiring, shielded and jacketed wire, with Polyimide & PTFE tapes with temperature rating -65°C to +260°C
- 5 **ABS** - 0949, 1354 and 1356
- 6 **NSA** - NSA 935344 and NSA 935348

- 7 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.
- 8
- 9 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.
- 10
- 11 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.
- 12 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.
- 13
- 14 If the specification required is not listed on these pages please contact us as we supply an extensive range of specialist wire and cable.
- 15

16
17
18

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

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, -65°C to +260°C

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

1 EN2713 Hook-up and Airframe Wiring, -55°C to +200°C

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

11 EN2714 Hook-up and Airframe Wiring, -65°C to +260°C

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

ABS Airframe Wiring Lightweight, -55°C to +180°C

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, -68°C to +250°C

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

Wire and Cable

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.

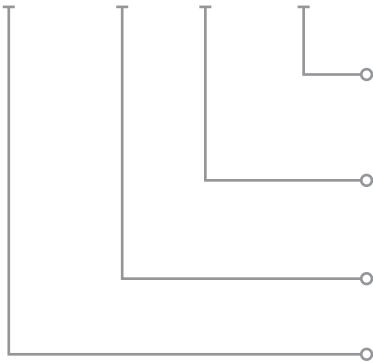
BMS13 cables can operate in temperatures from -65°C to +310°C, data bus from 50-120 ohms and can carry up to 600 volts. You should choose a design of cable based on the needs and conditions of your specific application.

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.

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

1 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

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	DbI' 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

1

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	DbI' Copper Braid	Nickel	PI/PTFE	260°C
54	1	4	22	10	Annealed Copper	Nickel	DbI' Copper Braid	Nickel	PI/PTFE	260°C

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Wire and Cable

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.

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 1.0mm² to 400mm².
- Temperature rating: -25°C up to +105°C.
- Dual wall construction

Approvals & Declarations

EN 45545-2
DIN 5510-2

Voltage Rating

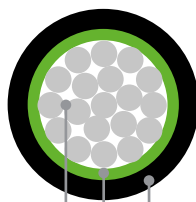
- ZHPCG-15 750/1300V
IEC Class 5 - Flexible cable
- ZHPCG-35 1800/3300V
IEC Class 5 - Flexible cable
- ZHPCG-36 1800/3300V
IEC Class 6 - Very flexible cable

Colours

- Standard jacket colour black
- Colours on request



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



Outer Jacket
Black Zerohal®

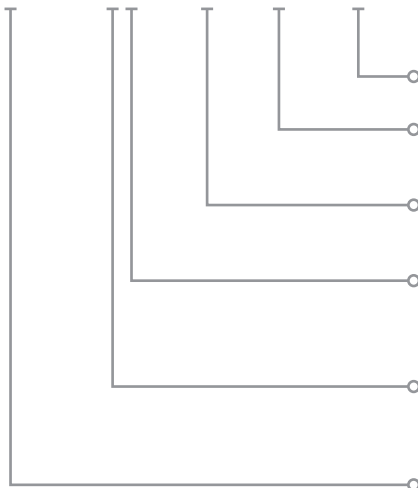
Insulation
Flexible Polyolefin
containing no added
halogens

Conductor
Flexible tin plated
copper special class 5
to IEC 60228

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

1.0mm² to 400mm²

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

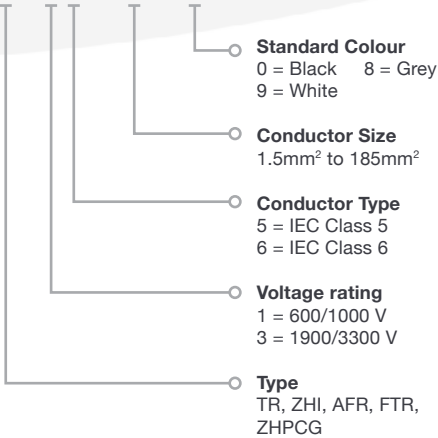
Dual-wall diesel-oil resistant cable originally developed for tank engine compartment applications. Meets the German BWB VG 95218 specification. Conductor sizes 4mm² to 120mm²

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



Part number example...

TR 16 - 16 - 0

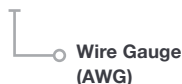


Type	Tensile Strength	Temp. Rating	Colour
TR	20 N/mm²	125°C	Black
ZHI	9 N/mm²	105°C	Black
AFR	18 N/mm²	105°C	Grey
FTR	18 N/mm²	125°C	Black



Part number example...

SHF260-0113-24-9



Colour of cable is white (9) as standard.

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.

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

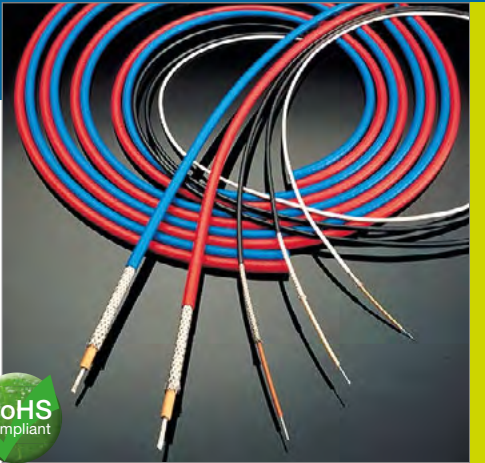
Voltage Rating

- 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 -65°C up to +200°C. 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 -55°C to 125°C 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

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

COAXIAL cableCheminax
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.

Wire and Cable

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 +200°C 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



Up to 70% Lighter than
equivalent RG Cable

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 +200°C 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
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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

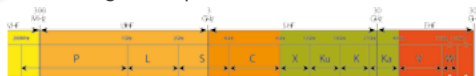
MICROWAVE CablesHigh Frequency Cable Solutions
Overview MicroMATES®**MICRO - X and Ku Band Cable Assemblies**

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.

Electromagnetic Spectrum



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;

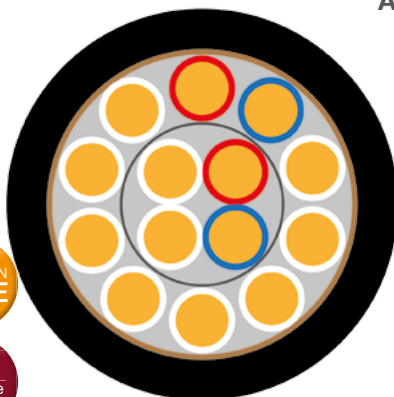
- Component wires approved to Def Stan 61-12 (Part 18). Within this specification, wires are categorised as Type 1 pliable, or Type 2 non-pliable. Component wires 99M0111 are Type 1, pliable wires.
- Jacket material is approved to Def Stan 61-12 (Part 31) (Limited Fire Hazard Sheathing for Electric Cables).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

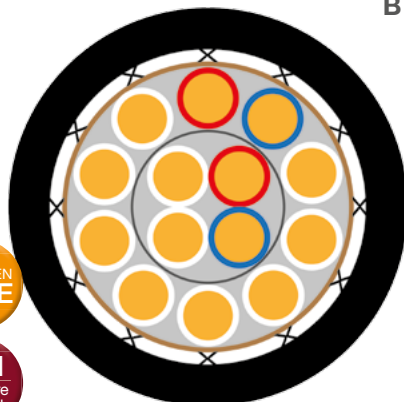
A



HALOGEN
FREE

LFH
Low Fire
Hazard

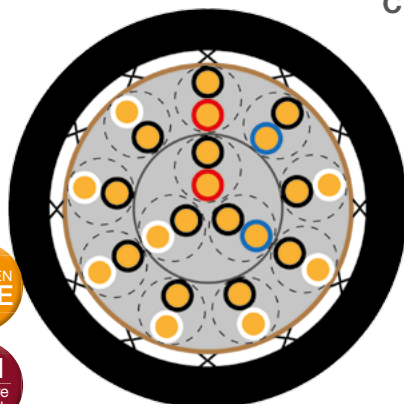
B



HALOGEN
FREE

LFH
Low Fire
Hazard

C



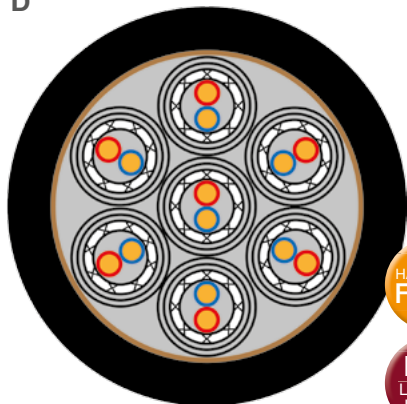
HALOGEN
FREE

LFH
Low Fire
Hazard

Def Stan 61-12 (part 25)

Zerohal Marine Cables
Limited Fire Hazard

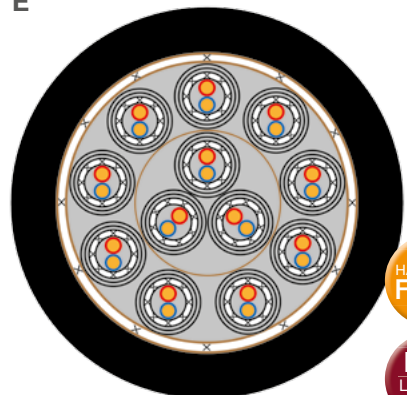
D

HALOGEN
FREELFH
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.

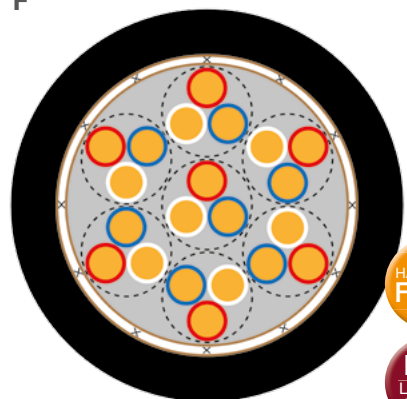
E

HALOGEN
FREELFH
Low Fire
Hazard**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.

F

HALOGEN
FREELFH
Low Fire
Hazard**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.

Multitriples Cables Screened (F)

In multitriples 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

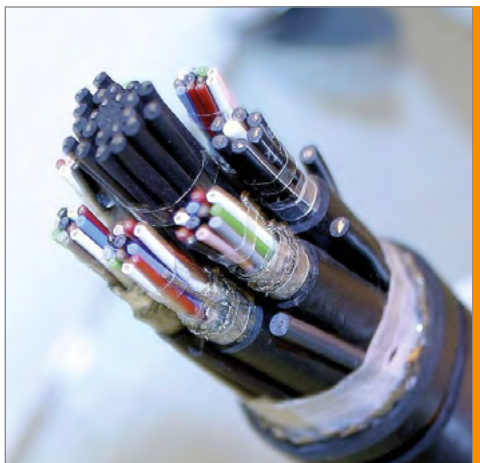
Electrical cables and
composite systems

1 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

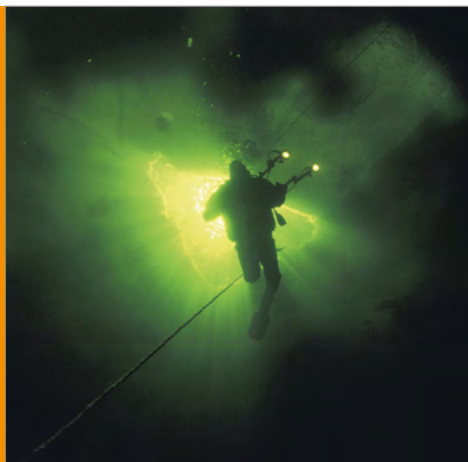
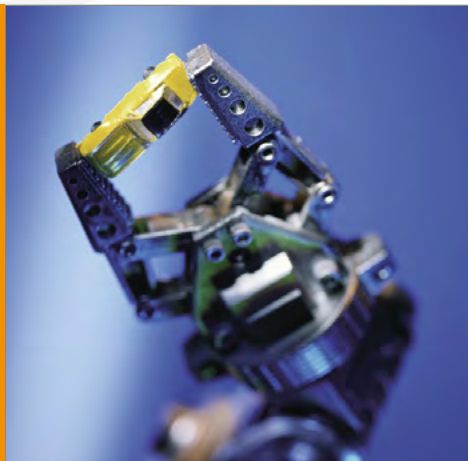
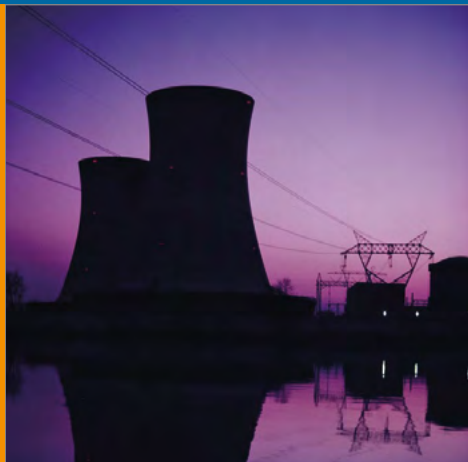
A wide range of special and standard cables designed for your robotic and drag chain applications.

- 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

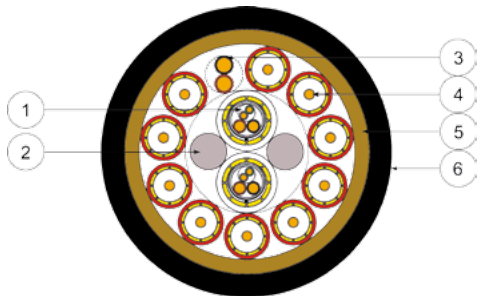
Machine braided optimised EMI screens

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”



Custom Cable Designs

1. Conductor & Primary Wire Selection
Multi-conductor cables

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.

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

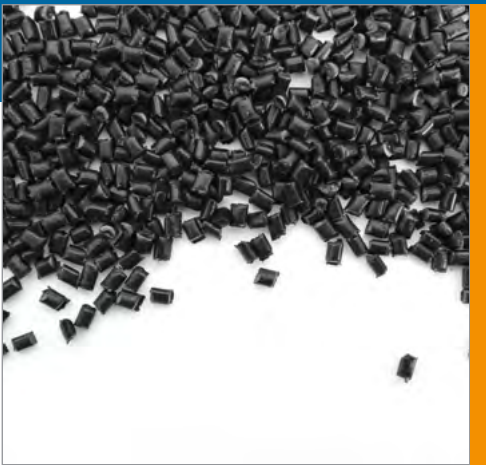
For more information please see relevant cable specifications.

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

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

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.

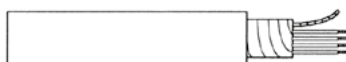
Triple Optimised Braids + Mu Metal Wrap x2

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

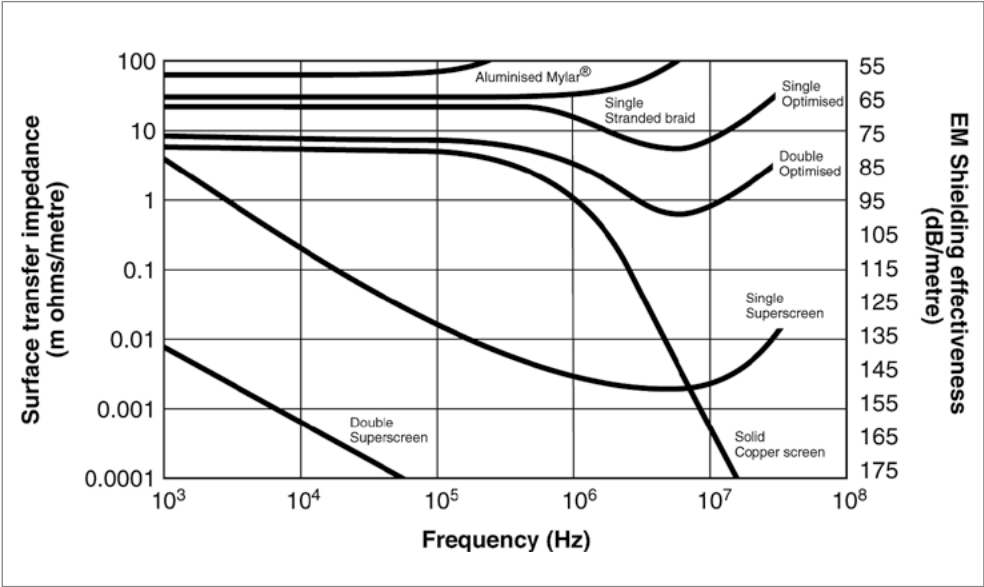


Custom Cable Designs

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

- 1 In addition to those choices already covered there are a number of further design options and components available to cable designers.
- 2 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

- 5 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.
- 7 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

- 9 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.
- 11 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.

**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



Wire and Cable

Heat-shrink Tubing

Non-shrink Tubing

Braided Sleeving

Screening Braids

Moulded Parts

Terminals and Splices

Wire and Cable Markers

Accessories

Connectors

Backshells

Bonding Leads

Metal Braids

Relays and Contactors

Switches and Grips

Adhesives and Tapes

Application Equipment

Added Value Services

INTRODUCTION

Heat Shrinkable Solutions



Comprehensive Range of Heat Shrinkable Tubing

Heat-shrinkable tubing is available in an extensive range of sizes, colours and materials, including Polyolefins, Fluoropolymers, Elastomers and Silicone, many of which are radiation cross-linked to enhance their performance properties. Shrink ratios from 2:1 to 4:1 enable ease of installation, allowing the tubing to be utilised in all environments, from component protection through to rugged high performance electrical systems and field cable repairs. Temperature capabilities range from -75°C to +260°C.

Performance characteristics include chemical and fluid resistance, environmental and vibration protection, abrasion resistance and excellent electrical performance. Heat-shrinkable tubing is also a simple and effective way of improving a products aesthetic appearance.

Typical Features & Benefits

- Mechanical protection
- Chemical/fluid resistance
- Electrical insulation
- Moisture protection
- Strain relief, Flexibility
- Flame-retardant, Low smoke
- High shrink ratio
- Low shrink temperature
- Aesthetic enhancement
- Fast and efficient installation
- Pre-installed adhesives bond to a wide variety of plastics, rubbers and metals.

Cut Piece Service

Many of our tubing products can be supplied pre-cut to length. Please contact our sales office for details.



SELECTION GUIDE		page 90	1
Single Wall			
CGPT	Commercial grade, flame retardant tubing	page 92	2
CRN	Semi-rigid, flame retardant tubing	page 94	
DCPT	Flexible, flame-retardant, dual colour tubing	page 95	3
DR-25	Flexible, chemical & abrasion resistant tubing	page 96	
DR-25-TW	Thin wall version of above	page 97	4
HFT5000	Heat Shrinkable woven tubing	page 98	
LSTT	Low shrink temperature tubing	page 99	5
MT Series	Medical tubing overview	page 100	
RNF-100	General purpose, flame retardant tubing	page 101	6
RNF-3000	3:1 shrink ratio version of above	page 102	
RP-4800	4:1 shrink ratio, flame retardant tubing	page 103	7
RT-375	Optically clear, flame retardant, flexible tubing	page 104	
RT-555	High performance, low out-gassing	page 105	8
RW-175-E	High temperature, chemical resistant tubing	page 106	
RW-200-E	High temperature, fuel resistant, ruggedised tubing	page 107	9
SRFR	Highly flexible silicone tubing, heat-shrinkable	page 108	
TFE	High temperature, heat-shrinkable PTFE tubing	page 109	10
TFER	Higher shrink ratio version of above	page 110	
VERSAFIT®	Highly flame retardant, low shrink temperature	page 111	11
ZHTM	Zerohal, medium wall, LFH tubing	page 112	
ZH-150	Zerohal, high temperature, LFH tubing	page 113	12
ZHT/ZHT-BR	Zerohal, coloured LFH tubing	page 114	
Dual Wall (Encapsulant or Adhesive Lined)			
ATUM	High shrink ratio, adhesive lined tubing	page 115	13
CGAT	Adhesive lined, flexible, tubing	page 116	
D-150 and D-260	Repair sleeves, adhesive lined	page 117	14
HTAT	High temperature, adhesive lined	page 118	
SCL	Semi-rigid, encapsulant lined tubing	page 119	15
SCT	Flame-Retardant, adhesive lined tubing	page 120	

Heat-Shrink Tubing

Selection Guide

Heat Shrinkable
All tubing RoHS compliant

Material	Product	Highly Flexible	Flexible	Semi Rigid	Operating Temperature	Size Range	1.2m Lengths	Spools	Flat Spools	Min. Shrink Ratio
Single Wall										
Polyolefin	CGPT		●		-40°C to +135°C	1.2mm - 102.0mm		●		2:1
Polyolefin	CRN			●	-55°C to +135°C	1.2mm - 19.0mm	●			2:1
Polyolefin	DCPT		●		-55°C to +135°C	3.0mm - 51.0mm		●		2:1
Polyolefin	LSTT		●		-40°C to +125°C	1.6mm - 38.0mm		●		2:1
Polyolefin	RNF-100		●		-55°C to +135°C	1.2mm - 102.0mm	●	●	●	2:1
Polyolefin	RNF-3000		●		-55°C to +135°C	1.5mm - 39.0mm	●	●		3:1
Polyolefin	RP-4800		●		-55°C to +135°C	25.4mm - 102.0mm	●	●		4:1
Polyolefin	VERSAFIT	●			-55°C to +135°C	1.6mm - 104.2mm		●	●	2:1
Elastomer	DR-25		●		-75°C to +150°C	3.2mm - 76.0mm		●		2:1
Elastomer	DR-25-TW	●			-75°C to +150°C	2.4mm - 38.0mm		●		2:1
Fluoroelastomer	RW-200-E		●		-55°C to +200°C	3.2mm - 51.0mm		●		2:1
Silicone	SRFR	●			-75°C to +200°C	2.9mm - 51.0mm		●		1.5:1
Fluoropolymer	RT-375		●		-55°C to +150°C	1.2mm - 25.4mm		●		2:1
Fluoropolymer	RT-555			●	-65°C to +200°C	3.2mm - 50.8mm		●		2:1
Fluoropolymer	RW-175-E			●	-55°C to +175°C	1.2mm - 38.1mm	●	●		2:1
Fluoropolymer	TFE			●	-67°C to +250°C	0.8mm - 11.9mm	●			1.8:1
Fluoropolymer	TFER			●	-67°C to +250°C	2.0mm - 32.0mm	●			3.2:1
Polyolefin/Polyester	HFT5000	●			-40°C to +125°C	12.0mm - 70.0mm		●	●	2:1
Polyolefin	ZH-150		●		-75°C to +150°C	3.0mm - 50.0mm		●		2:1
Polyolefin	ZHT		●		-30°C to +125°C	1.2mm - 80.0mm		●		2:1
Polyolefin	ZHTM		●		-30°C to +105°C	3.0mm - 50.0mm		●		2:1
Dual Wall / Adhesive lined										
Polyolefin	ATUM		●		-55°C to +110°C	3.0mm - 52.0mm	●	●		3:1
Polyolefin	CGAT		●		-30°C to +80°C	3.0mm - 39.0mm	●	●		3:1
Fluoropolymer	D-150			●	-65°C to +150°C	1.1mm - 2.8mm				n/a
Fluoropolymer	D-260			●	-65°C to +260°C	5.16mm - 16.26mm				n/a
Polyolefin	HTAT		●		-55°C to +125°C	4.0mm - 48.0mm	●	●		4:1
Polyolefin	SCL			●	-55°C to +110°C	3.2mm - 25.4mm	●			3:1
Polyolefin	SCT			●	-40°C to +150°C	7.6mm - 17.8mm	●			4:1

Selection Guide

Heat Shrinkable
All tubing RoHS compliant

Min. Shrink Temperature	Black	Clear/Natural	Colours	Comment	Flame Retardant	Halogen Free	UL Approved	CSA	VW-1 (UL/CSA)	Military Specs	FMVSS 302	BR 1326A
Single Wall												
+80°C	●	●	●	General purpose (clear not FR)	●		●	●				
+110°C	●	●		General purpose, semi-rigid	●		●	●		●		
+95°C			●	Dual colour, earth identifier - Green/Yellow	●		●	●				
+65°C	●	●	●	Low shrink temperature for fast recovery							●	
+95°C	●	●	●	High performance and flexible (clear MIL only)	●		●	●		●		
+80°C	●	●	●	Higher shrink ratio (clear not FR)	●		●	●		●		
+95°C	●		●	4:1 shrink ratio tubing (black approved only)	●		●			●		
+70°C	●		●	Highly flame retardant, multi-spec. Low shrink temp.	●		●		●	●		
+150°C	●			Diesel and hydraulic fluid resistant tubing	●					●		
+125°C	●			Thin wall, diesel resistant tubing	●				●	●		
+100°C	●			High temperature, chemical resistant tubing	●					●		
+135°C			●	Very flexible in range of temp, with ablative properties	●		●		●			
+125°C		●		Clear high performance tubing	●		●	●	●	●		
+150°C	●			Fluid and chemical resistant tubing, low outgassing	●		●		●			
+155°C		●		High temperature, thin wall, chemical resistant tubing	●		●		●	●		
+330°C		●		High temperature, chemically inert tubing PTFE	●					●		
+340°C		●		High temperature, chemically inert tubing PTFE	●					●		
+80°C	●			Woven heat shrinkable tubing		●	●				●	
+150°C	●			Zero halogen, LFH tubing	●	●						
+120°C	●		●	Zero halogen, coloured LFH tubing (BR 1326A version)	●	●	●					●
+80°C	●			Zero halogen, medium-wall LFH tubing	●	●				●		●
Dual Wall / Adhesive Lined												
+80°C	●			Adhesive lined performance tubing	●		●			●	●	
+80°C	●	●		Adhesive lined tubing	●		●					
-			●	C-Wrap repair sleeve								
-	●			Wraparound side entry repair	●							
+80°C	●			High temperature adhesive lined tubing	●							
+125°C	●		●	Encapsulant lined tubing			●			●		
+110°C	●			High temperature, adhesive lined tubing	●							

Heat-Shrink Tubing

CGPT

Polyolefin

Commercial grade, flexible tubing

2:1
shrink

A tough and flexible general purpose polyolefin tubing, providing a good blend of chemical, electrical and physical performance properties. Suitable for electrical insulation, strain relief, cable bundling, colour coding, identification of wires, cables and electronic components.

Features & Benefits

- Very good chemical & solvent resistance
- Excellent physical & electrical properties
- Wide range of sizes and colours available

Operating Temperature

- From -40°C to +135°C

Installation

- Minimum shrink temperature +80°C
- Minimum full recovery +120°C

Specifications & Approvals

- UL E35586. 600v, 125°C
- CSA LR 31929, 600v, 125°C

RoHS
compliant

Inside Diameter		Wall Thickness	Pack Size	Part Number
Supplied (mm)	Recovered (mm)	Nom. Recovered	Spools Only	
1.2	0.6	0.45 mm	600m	CGPT-1.2/0.6-Colour-SP
1.6	0.8	0.45 mm	600m	CGPT-1.6/0.8-Colour-SP
2.4	1.2	0.50 mm	300m	CGPT-2.4/1.2-Colour-SP
3.2	1.6	0.50 mm	300m	CGPT-3.2/1.6-Colour-SP
4.8	2.4	0.50 mm	300m	CGPT-4.8/2.4-Colour-SP
6.4	3.2	0.65 mm	150m	CGPT-6.4/3.2-Colour-SP
9.5	4.8	0.65 mm	150m	CGPT-9.5/4.8-Colour-SP
12.7	6.4	0.65 mm	150m	CGPT-12.7/6.4-Colour-SP
19.0	9.5	0.75 mm	150m	CGPT-19/9.5-Colour-SP
25.4	12.7	0.90 mm	60m	CGPT-25.4/12.7-Colour-SP
38.0	19.0	1.00 mm	60m	CGPT-38/19-Colour-SP
51.0	25.4	1.15 mm	30m	CGPT-51/25.4-Colour-SP
76.0	38.0	1.25 mm	15m	CGPT-76/38-Colour-SP
102.0	51.0	1.40 mm	15m	CGPT-102/51-Colour-SP

Wall thickness will be less if tubing recovery is restricted during shrinkage. Clear is not flame retardant

Colours Available

0	2	4	5	6	9	X	45*
Black	Red	Yellow	Green	Blue	White	Clear	Grn/Ylw

* Green/Yellow tubing is available in a range of sizes 3.2/1.6 thru to 38/19 incl. ONLY

3:1
shrink

RoHS
compliant

A tough and flexible general purpose polyolefin tubing, providing a good blend of chemical, electrical and physical performance properties. Suitable for electrical insulation, strain relief, cable bundling, colour coding, identification of wires, cables and electronic components.

Features & Benefits

- Very good chemical & solvent resistance
- Excellent physical & electrical properties
- Wide range of sizes and colours available

Operating Temperature

- From -40°C to +135°C

Installation

- Minimum shrink temperature +80°C
- Minimum full recovery +120°C

Specifications & Approvals

- UL E35586. 600v, 125°C
- CSA LR 31929, 600v, 125°C

Inside Diameter		Wall Thickness	Pack Size	Part Number
Supplied (mm)	Recovered (mm)	Nom. Recovered	Spools Only	
1.5	0.5	0.45 mm	600m	CGPT-1.5/0.5-Colour-SP
3.0	1.0	0.55 mm	300m	CGPT-3/1-Colour-SP
6.0	2.0	0.65 mm	150m	CGPT-6/2-Colour-SP
9.0	3.0	0.75 mm	150m	CGPT-9/3-Colour-SP
12.0	4.0	0.75 mm	150m	CGPT-12/4-Colour-SP
18.0	6.0	0.85 mm	150m	CGPT-18/6-Colour-SP
24.0	8.0	1.00 mm	60m	CGPT-24/8-Colour-SP
39.0	13.0	1.15 mm	60m	CGPT-39/13-Colour-SP

Wall thickness will be less if tubing recovery is restricted during shrinkage.
Clear is not flame retardant

Colours Available



0 2 4 5 6 9 X
Black Red Yellow Green Blue White Clear#

Denotes: Non flame retardant.

Heat-Shrink Tubing

CRN

Polyolefin
Semi-rigid, flame retardant tubing

CRN tubing is ideally suited for strain relief and insulation of potential weak points such as wire splices, crimps and terminations. The flame-retardant material exhibits excellent mechanical and chemical properties. It meets major military and industrial specifications for an all purpose, semi-rigid tubing.

Features & Benefits

- Tough, semi-rigid wire protection
- Flame retardant

Operating Temperature

- From -55°C to +135°C

Installation

- Minimum shrink temperature +110°C
- Minimum full recovery +135°C

2:1
shrink

RoHS
compliant



Specifications & Approvals

- AMS-DTL-23053/6 class 1 (Clear class 2)
- UL E35586, 600v, 125°C
- CSA LR31929, 600v, 125°C (black only)

Inside Diameter		Wall Thickness	Pack Size	Part Number
Supplied (mm)	Recovered (mm)	Nom. Recovered	1.2m Lengths only	
1.2	0.6	0.51 mm	60	CRN-3/64-0-STK
1.6	0.8	0.51 mm	60	CRN-1/16-0-STK
2.4	1.2	0.51 mm	60	CRN-3/32-0-STK
3.2	1.6	0.51 mm	60	CRN-1/8-0-STK
4.8	2.4	0.64 mm	60	CRN-3/16-0-STK
6.4	3.2	0.64 mm	30	CRN-1/4-0-STK
9.5	4.8	0.76 mm	30	CRN-3/8-0-STK
12.7	6.4	0.76 mm	30	CRN1/2-0-STK
19.0	9.5	0.89 mm	30	CRN3/4-0-STK

Wall thickness will be less if tubing recovery is restricted during shrinkage.

Colours Available



0 = Black

X = Clear^s

^s Denotes: Made to special order only, non flame retardant.

DCPT

Polyolefin

Flexible, flame retardant, dual colour

2:1
shrink

3:1
shrink



A tough and flexible general purpose polyolefin tubing, providing a good blend of chemical, electrical and physical performance properties. Suitable for electrical insulation, strain relief, cable bundling, colour coding, identification of wires, cables and other electronic components.

Features & Benefits

- Very good chemical & solvent resistance
- Excellent physical & electrical properties
- Wide range of sizes available

Operating Temperature

- From -55°C to +135°C

Installation

- Minimum shrink temperature +95°C
- Minimum full recovery +120°C

Specifications & Approvals

- UL E35586, 600v, 125°C
- CSA LR31929, 600v, 125°C
- VG 95343 Part 5 Type A

	Inside Diameter		Wall Thickness	Pack Size	Part Number
	Supplied (mm)	Recovered (mm)	Nom. Recovered	Spools Only	
2:1 Shrink Ratio	3.0	1.5	0.51 mm	300m	DCPT 3/1.5-45-SP
	6.0	3.0	0.58 mm	150m	DCPT 6/3-45-SP
	8.0	4.0	0.64 mm	150m	DCPT 8/4-45-SP
	10.0	5.0	0.64 mm	150m	DCPT 10/5-45-SP
	12.0	6.0	0.64 mm	150m	DCPT 12/6-45-SP
	19.0	9.0	0.76 mm	150m	DCPT 19/9-45-SP
	26.0	13.0	0.89 mm	60m	DCPT 26/13-45-SP
	38.0	19.0	1.00 mm	60m	DCPT 38/19-45-SP
	51.0	19.0	1.02 mm	60m	DCPT 51/19-45-SP
3:1 Shrink Ratio	3.0	1.0	0.55 mm	300m	DCPT 3/1-45-SP
	6.0	2.0	0.65 mm	150m	DCPT 6/2-45-SP
	9.0	3.0	0.75 mm	150m	DCPT 9/3-45-SP
	12.0	4.0	0.75 mm	150m	DCPT 12/4-45-SP
	18.0	6.0	0.85 mm	150m	DCPT 18/6-45-SP
	24.0	8.0	1.00 mm	60m	DCPT 24/8-45-SP
	39.0	13.0	1.15 mm	60m	DCPT 39/13-45-SP

Wall thickness will be less if tubing recovery is restricted during shrinkage.

Colours Available



45 = Grn/Ylw

Heat-Shrink Tubing

DR-25

Elastomer

Flexible, abrasion & diesel resistant

2:1
shrink

DR-25 is made from radiation cross-linked elastomeric material, for long term heat resistance. Ideally suited for high performance wiring harnesses. Used in a wide range of military, aerospace and other harsh environment applications.

Features & Benefits

- Excellent chemical & solvent resistance
- Excellent abrasion/mechanical protection
- Compatible with 'System 25' components

Operating Temperature

- From -75°C to +150°C

Installation

- Minimum shrink temperature +150°C
- Minimum full recovery +175°C

Specifications & Approvals

- AMS-DTL-23053/16
- BS 4G-198 Part 3 10A
- VG 95343 Part 5 Type D
- VDE-0341 Part 9005

RoHS
compliant

Inside Diameter		Wall Thickness	Pack Size	Part Number
Supplied (mm)	Recovered (mm)	Nom. Recovered	Spools Only	
3.2	1.6	0.76 mm	100m	DR-25-1/8-0-SP
4.8	2.4	0.84 mm	100m	DR-25-3/16-0-SP
6.4	3.2	0.89 mm	100m	DR-25-1/4-0-SP
9.5	4.8	1.02 mm	100m	DR-25-3/8-0-SP
12.7	6.4	1.22 mm	60m	DR-25-1/2-0-SP
19.0	9.5	1.45 mm	60m	DR-25-3/4-0-SP
25.4	12.7	1.78 mm	30m	DR-25-1-0-SP
38.0	19.0	2.41 mm	15m	DR-25-1-1/2-0-SP
51.0	25.4	2.79 mm	15m	DR-25-2-0-SP
76.0	38.0	3.18 mm	15m	DR-25-3-0-SP

Wall thickness will be less if tubing recovery is restricted during shrinkage.

DR25 is also available as a repair tape, e.g. **T-DR-25-NR1-0**. For more information please contact us. For supply to BS 4G-198 or AMS-DTL23053 add **-BS** or **-MS** suffix to part No respectively.

Colours Available

0 = Black

DR-25-TW

Elastomer

Flexible, abrasion & diesel resistant

2:1
shrink

DR-25-TW is a 'Thin-Wall' version of DR-25 offering similar properties and is ideal for use where space and weight saving are important.

Features & Benefits

- Excellent chemical & solvent resistance
- Excellent abrasion/mechanical protection
- Compatible with 'System 25' components
- Lightweight, thin wall

Operating Temperature

- From -75°C to +150°C

Installation

- Minimum shrink temperature +125°C
- Minimum full recovery +175°C

Specifications & Approvals

- VG-95343 Part 5 Type D
- VDE-0341 Part 9005
- RK 6008/2

Inside Diameter		Wall Thickness	Pack Size	Part Number
Supplied (mm)	Recovered (mm)	Nom. Recovered	Spools Only	
2.4	1.2	0.51 mm	150m	DR-25-TW-3/32-0-SP
3.2	1.6	0.51 mm	150m	DR-25-TW-1/8-0-SP
4.8	2.4	0.51 mm	150m	DR-25-TW-3/16-0-SP
6.4	3.2	0.64 mm	75m	DR-25-TW-1/4-0-SP
9.5	4.8	0.64 mm	75m	DR-25-TW-3/8-0-SP
12.7	6.4	0.64 mm	75m	DR-25-TW-1/2-0-SP
19.0	9.5	0.76 mm	75m	DR-25-TW-3/4-0-SP
25.4	12.7	0.89 mm	30m	DR-25-TW-1-0-SP
31.5	15.0	1.10 mm	30m	DR-25-TW-1-1/4-0-SP
38.0	19.0	1.02 mm	30m	DR-25-TW-1-1/2-0-SP

Wall thickness will be less if tubing recovery is restricted during shrinkage.

Colours Available



0 = Black

Heat-Shrink Tubing

HFT5000

Polyolefin/Polyester construction
Heat-shrinkable fabric tubing

HFT5000 is made from a very flexible heat-shrinkable fabric and shrinks to fit securely around a range of shapes and sizes. Designed to provide mechanical abrasion protection, noise and rattle suppression, for components such as rubber hoses, plastic pipes and harness wiring bundles.

Extremely flexible and resistant to trapping water, heat and humidity. It also provides outstanding abrasion, chafing and cutting protection, even at high temperatures.

Operating Temperature

- From -40°C to +125°C (3000 hours)

Installation

- Minimum shrink temperature +80°C
- Minimum full recovery +110°C

2:1
shrink

HALOGEN
FREE

RoHS
compliant

Specifications & Approvals

- UL E199379 135°C
- FMVSS 302

Inside Diameter		Std Pack Size	Part Number
Supplied (mm)	Recovered (mm)	Spools (SP)	
12.0	6.0	500m	HFT5000-12/6-0-SP
20.0	10.0	400m	HFT5000-20/10-0-SP
30.0	15.0	400m	HFT5000-30/15-0-SP
40.0	20.0	300m	HFT5000-40/20-0-SP
50.0	25.0	200m	HFT5000-50/25-0-SP
60.0	30.0	200m	HFT5000-60/30-0-SP
70.0	35.0	150m	HFT5000-70/35-0-SP

The fully recovered wall thickness will be approximately 1mm and longitudinal shrinkage on full recovery is nominally between 10% and 20%.

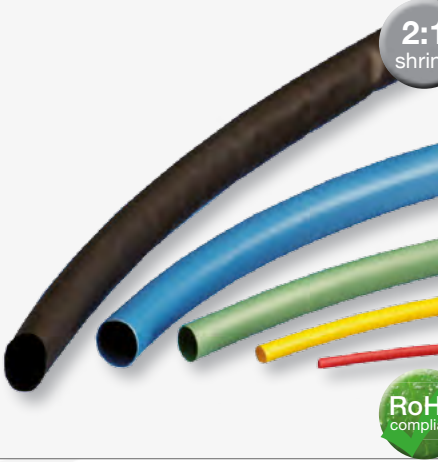
Properties	Test	Results
Abrasion resistance	+23°C, +80°C, +135°C	No wear to underlying rubber hose
(200g load, 0.3mm radius metal blade, 10Hz, 10mm stroke, 144 000 cycles)		
Thermal aging	3000 hrs at +125°C	No deterioration at +80°C
Flammability	MVSS302	Pass
Low temperature flexibility	4 hrs at -40°C and +125°C	No cracking
Cold impact	100mm at -40°C	No cracking
Thermal shock	-40°C and +125°C	No deterioration at +80°C
Fluid resistance:	24hrs immersion at +23°C	No deterioration in abrasion resistance

LSTT

Polyolefin

Low shrink temperature, flexible

2:1 shrink



LSTT is a highly flexible, easy to handle and install low shrink temperature heat-shrinkable tubing. Ideal for covering heat sensitive devices and termination insulation. Meets automotive flame propagation standard MVSS 302.

Features & Benefits

- Rapid recovery at low temperatures
- Good physical & electrical performance
- Not flame retardant

Operating Temperature

- From -40°C to +125°C

Installation

- Minimum shrink temperature +65°C
- Minimum full recovery +110°C

Specifications & Approvals

- FMVSS 302
- RW-2051

Inside Diameter		Wall Thickness	Pack Size	Part Number
Supplied (mm)	Recovered (mm)	Nom. Recovered	Spools	
1.6	0.8	0.50 mm	600m	LSTT-1.6-Colour-SP
2.4	1.2	0.55 mm	300m	LSTT-2.4-Colour-SP
3.2	1.6	0.55 mm	300m	LSTT-3.2-Colour-SP
4.8	2.4	0.55 mm	300m	LSTT-4.8-Colour-SP
6.4	3.2	0.65 mm	150m	LSTT-6.4-Colour-SP
9.5	4.8	0.65 mm	150m	LSTT-9.5-Colour-SP
12.7	6.4	0.65 mm	150m	LSTT-12.7-Colour-SP
19.0	9.5	0.80 mm	150m	LSTT-19.0-Colour-SP
25.4	12.7	0.95 mm	60m	LSTT-25.4-Colour-SP
38.0	19.0	1.05 mm	60m	LSTT-38.0-Colour-SP
52.0	26.0	1.14 mm	60m	LSTT-52.0-0-SP*

Wall thickness will be less if tubing recovery is restricted during shrinkage.

*LSTT-52 is only available in black.

Colours Available

CLEAR

024569X

BlackRed^{NS}Yellow^{NS}Green^{NS}Blue^{NS}White^{NS}Clear^{NS}

^{NS} Denotes Non-Standard colours, may be subject to MOQs.

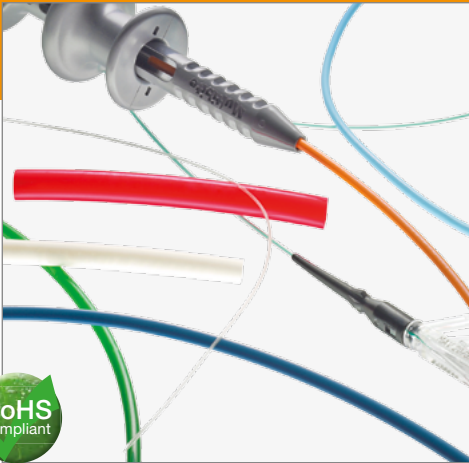
Heat-Shrink Tubing

MT Series

Medical Grade Tubing
Single and Dual Wall

Provides protective insulation for a wide range of medical grade applications, this heat shrink tubing provides a versatile solution for process aids, bonding joints, chemical resistance and electro-mechanical protection for critical medical components.

- Unique formulations for broad range of medical applications.
- Robust and chemical resistant.
- Stable, maintains integrity in high temperature conditions.
- Compliant to RoHS and USP class VI bio-compatibility.
- Select products registered with FDA through master file system (MAF).
- Manufactured to ISO 10993 standards.



There is an extensive range of products available in various sizes, from a max of 12.7mm Ø to a min of 0.6mm Ø over 9 sizes and a selection of colours, please contact us for additional information.

Base Polymer	Product Family	Design Market	Shrink Temp.	Sterilisation				
				Auto-clave	Gamma	EtO	Steam	Dry Heat
PVDF	MT1000	Surgical	175°C	●	●	●	●	●
HDPE	MT2000	Surgical	140°C		●	●		
PVDF	MT3000	Surgical	150°C	●	●	●		●
LDPE	MT5000	Surgical	110°C		●	●		
EMA	MT5500	Surgical	110°C		●	●		
FEP	MT-FEP	Surgical	210°C	●		●	●	●
LDPE	MT-LWA	Interventional	110°C	n/a	n/a	n/a	n/a	n/a

A Wide Range of Medical Applications

Products to suit different material requirements and almost any design situation. Here are just a few examples of the type, capabilities of the MT series of heat shrink products.

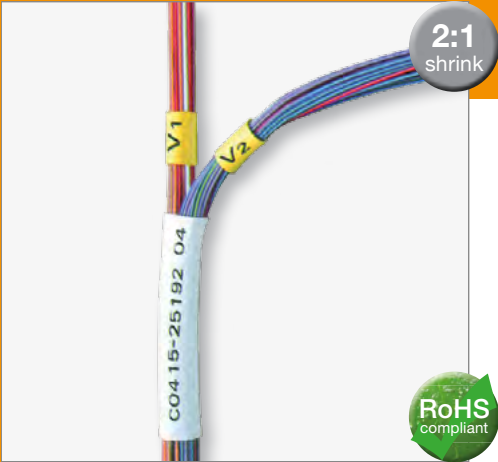
- Abrasion Protection for Medical Instruments - MT1000 and MT3000
- Balloon and Stent Process Aid - MT-LWA
- Laparoscopic-Electrosurgical Device Insulation - MT2000 and MT5000
- Protection and Insulation of Highly Flexible Joints - MT5500 and MT3000



RNF-100

Polyolefin

Flexible, flame retardant



Designed to provide superior mechanical (abrasion, cut-through, strain relief), thermal and fluid resistance performance. Used extensively in military applications for lightweight harness jackets, insulation, identification, colour coding and protection.

Features & Benefits

- Excellent physical, chemical properties
- Superior abrasion and solvent resistance
- Flexible; conforms to irregular shapes

Operating Temperature

- From -55°C to +135°C

Installation

- Minimum shrink temperature +95°C
- Minimum full recovery +121°C

Specifications & Approvals

- AMS-DTL23053/5 class 1 (colours)
- VDE 0341 Part 9005, Type A, B (colours)
- BS 4G 198-3 Type 11B
- UL E35586, 600v, 125°C

Inside Diameter		Wall Thickness	Pack Size		Part Number
Supplied	Recovered	Nom. Recovered	1.2m Sticks	Spools	
1.2 mm	0.6 mm	0.40 mm	60m	600m	RNF-100-3/64-Colour-xx
1.6 mm	0.8 mm	0.43 mm	60m	600m	RNF-100-1/16-Colour-xx
2.4 mm	1.2 mm	0.51 mm	60m	300m	RNF-100-3/32-Colour-xx
3.2 mm	1.6 mm	0.51 mm	60m	300m	RNF-100-1/8-Colour-xx
4.8 mm	2.4 mm	0.51 mm	60m	300m	RNF-100-3/16-Colour-xx
6.4 mm	3.2 mm	0.64 mm	30m	150m	RNF-100-1/4-Colour-xx
9.5 mm	4.8 mm	0.64 mm	30m	150m	RNF-100-3/8-Colour-xx
12.7 mm	6.4 mm	0.64 mm	30m	150m	RNF-100-1/2-Colour-xx
19.1 mm	9.5 mm	0.76 mm	30m	150m	RNF-100-3/4-Colour-xx
25.4 mm	12.7 mm	0.89 mm	30m	60m	RNF-100-1-Colour-xx
38.1 mm	19.1 mm	1.02 mm	12m	60m	RNF-100-1-1/2-Colour-xx
50.8 mm	25.4 mm	1.14 mm	12m	30m	RNF-100-2-Colour-xx
76.2 mm	38.1 mm	1.27 mm	6m	15m	RNF-100-3-Colour-xx
101.6 mm	50.8 mm	1.40 mm	6m	15m	RNF-100-4-Colour-xx

For supply to BS 4G-198 or AMS-DTL23053 add **-BS** or **-MS** suffix to part number respectively.

Wall thickness will be less if recovery is restricted.

Where **xx** is either **STK** (sticks) or **SP** (spools).

Denotes: Non flame retardant.

NS Denotes Non-Standard colours, subject to MOQs.

Colours Available

0	2	4	5	6	9	X	1	3	7	8
Black	Red	Yellow	Green	Blue	White	Clear [#]	Brown ^{NS}	Orange ^{NS}	Violet ^{NS}	Grey ^{NS}

Heat-Shrink Tubing

RNF-3000

Polyolefin
Flexible, flame retardant

High shrink ratio tubing with superior mechanical (abrasion, cut through, strain relief), thermal and fluid resistance performance. Used extensively in military applications for lightweight harness jackets, insulation, identification, colour coding and protection.

Features & Benefits

- Excellent physical, chemical properties
- Superior abrasion and solvent resistance
- Flexible; conforms to irregular shapes

Operating Temperature

- From -55°C to +135°C

Installation

- Minimum shrink temperature +80°C
- Minimum full recovery +120°C

3:1
shrink

RoHS
compliant

Specifications & Approvals

- VG 95343 Part 5 Type A (colours)
- VDE 0341 Part 9005
- BS 4G 198-3 Type 11B
- UL-E35586, 600V, +125°C (colours)

Inside Diameter		Wall Thickness	Pack Size		Part Number
Supplied	Recovered	Nom. Recovered	1.2m Sticks	Spools	
1.5 mm	0.5 mm	0.45 mm	60m	600m	RNF-3000-1.5/0.5-Colour-xx
3.0 mm	1.0 mm	0.55 mm	60m	300m	RNF-3000-3/1-Colour-xx
6.0 mm	2.0 mm	0.65 mm	60m	150m	RNF-3000-6/2-Colour-xx
9.0 mm	3.0 mm	0.75 mm	30m	150m	RNF-3000-9/3-Colour-xx
12.0 mm	4.0 mm	0.75 mm	30m	150m	RNF-3000-12/4-Colour-xx
18.0 mm	6.0 mm	0.85 mm	30m	150m	RNF-3000-18/6-Colour-xx
24.0 mm	8.0 mm	1.00 mm	30m	60m	RNF-3000-24/8-Colour-xx
39.0 mm	13.0 mm	1.15 mm	12m	60m	RNF-3000-39/13-Colour-xx

For supply to BS 4G-198 add -BS suffix to part No.
Wall thickness will be less if tubing recovery is restricted during shrinkage.
Where xx is either STK (sticks) or SP (spools).

Denotes: Non flame retardant.

NS Denotes Non-Standard colours, may be subject to MOQs.

Colours Available

0	2	4	5	6	9	X	1	3	7	8
Black	Red	Yellow	Green	Blue	White	Clear [#]	Brown ^{NS}	Orange ^{NS}	Violet ^{NS}	Grey ^{NS}

4:1
shrink



RoHS
compliant

High shrink ratio tubing, eliminates the need to remove any connectors or transitions. RP4800 provides excellent abrasion and fluid resistance, meeting industrial and military standards.

Features & Benefits

- Excellent mechanical & electrical characteristics
- Excellent chemical & solvent properties
- Large shrink range with 4:1 ratio

Operating Temperature

- From -55°C to +135°C

Installation

- Minimum shrink temperature +95°C
- Minimum full recovery +121°C

Specifications & Approvals

- AMS-DTL23053/5 Class 1
- VG 95343 Part 5 Type A
- VDE 0341 Part 9005 Type A
- UL E35586 600V, 125°C (black only)

Inside Diameter		Wall Thickness	Pack Size		Part Number
Supplied	Recovered	Nom. Recovered	1.2m Sticks	Spools	
25.4 mm	7.0 mm	1.14 mm	30m	60m	RP-4800-No.1-0-xx
50.8 mm	14.0 mm	1.14 mm	6m	60m	RP-4800-No.2-0-xx
76.2 mm	20.6 mm	1.14 mm	6m	30m	RP-4800-No.3-0-xx
101.6 mm	26.7 mm	1.14 mm	6m	30m	RP-4800-No.4-0-xx
25.4 mm	11.7 mm	1.14 mm	30m	60m	RP-4800-No.5-0-xx
60.3 mm	17.3 mm	1.14 mm	6m	60m	RP-4800-No.6-0-xx
76.2 mm	21.3 mm	1.14 mm	6m	30m	RP-4800-No.7-0-xx
95.3 mm	23.6 mm	1.14 mm	6m	30m	RP-4800-No.8-0-xx
114.3 mm	36.8 mm	1.14 mm	6m	30m	RP-4800-No.9-0-xx
38.1 mm	9.5 mm	1.14 mm	6m	60m	RP-4800-No.10-0-xx
19.1 mm	4.6 mm	1.14 mm	30m	60m	RP-4800-No.11-0-xx

For supply to MIL, Def Stan and BS add **-MS** suffix to part No.

Wall thickness will be less if tubing recovery is restricted during shrinkage.

Where **xx** is either **STK** (sticks) or **SP** (spools).

^{NS} Denotes Non-Standard colours, may be subject to MOQs.

Colours Available

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

Heat-Shrink Tubing

RT-375

Fluoropolymer
High clarity, flame retardant & flexible

RT-375 provides protection for wire and cable markers from extreme mechanical and chemical abuse, as well as providing UL VW-1 flame retardance and UV protection. The sleeve provides excellent clarity, allowing full visibility of the marker being protected.

Features & Benefits

- Exceptional clarity
- Excellent chemical and fluid resistance
- High degree of flame retardance

Operating Temperature

- From -55°C to +150°C

Installation

- Minimum shrink temperature +125°C
- Minimum full recovery +150°C

2:1
shrink

RoHS
compliant

Specifications & Approvals

- AMS-DTL 23053/18 Class 2
- BS 4G-198 Part 4 Type 20A
- UL-E85351 VW-1 600V, 150°C
- CSA LR31929 VW-1 600v, 150°C

Inside Diameter		Wall Thickness	Pack Size	Part Number
Supplied (mm)	Recovered (mm)	Nom. Recovered	Spools	
1.2 mm	0.6 mm	0.25 mm	304m	RT-375-3/64-X-SP
1.6 mm	0.8 mm	0.25 mm	304m	RT-375-1/16-X-SP
2.4 mm	1.2 mm	0.25 mm	152m	RT-375-3/32-X-SP
3.2 mm	1.6 mm	0.25 mm	152m	RT-375-1/8-X-SP
4.8 mm	2.4 mm	0.25 mm	152m	RT-375-3/16-X-SP
6.4 mm	3.2 mm	0.30 mm	152m	RT-375-1/4-X-SP
9.5 mm	4.8 mm	0.30 mm	120m	RT-375-3/8-X-SP
12.7 mm	6.4 mm	0.30 mm	120m	RT-375-1/2-X-SP
19.0 mm	9.5 mm	0.43 mm	90m	RT-375-3/4-X-SP
25.4 mm	12.7 mm	0.48 mm	76m	RT-375-1-X-SP
38.1 mm	19.0 mm	0.51 mm	76m	RT-375-1-1/2-X-SP
50.8 mm	25.4 mm	0.51 mm	30m	RT-375-2-X-SP

Wall thickness will be less if tubing recovery is restricted during shrinkage.
For supply to BS 4G-198 add **-BS** suffix to part number.

Colours Available



X = Clear

RT555

Fluoropolymer

Fluid resistant, extended temperature

2:1
shrink



RoHS
compliant

Offers resistance to high temperatures, solvents, corrosive chemicals and radiation. Low out-gassing (successfully tested for NASA out-gassing requirements). Use for insulation and strain relief on equipment and for protection of electronic instruments.

Features & Benefits

- Extreme resistance to hydrocarbons
- Low out-gassing
- Highly flame retardant

Operating Temperature

- From -65°C to +200°C

Specifications & Approvals

- UL-E85381, 185°C for 100,000 hours continuous use, also listed for 200°C for 40,000-hr intermittent exposure.

Installation

- Minimum shrink temperature +150°C
- Minimum full recovery +220°C

Inside Diameter		Wall Thickness	Pack Size	Part Number
Supplied (mm)	Recovered (mm)	Nom. Recovered	Spools	
3.2	1.57	0.30	100m	RT-555-1/8-0-SP
4.8	2.36	0.36	100m	RT-555-3/16-0-SP
6.4	3.18	0.41	100m	RT-555-1/4-0-SP
9.5	4.75	0.48	100m	RT-555-3/8-0-SP
12.7	6.35	0.48	60m	RT-555-1/2-0-SP
15.9	7.95	0.56	60m	RT-555-5/8-0-SP
19.0	9.53	0.69	60m	RT-555-3/4-0-SP
25.4	12.70	0.79	30m	RT-555-1-0-SP
31.8	15.88	0.84	30m	RT-555-1-1/4-0-SP
38.1	19.05	0.94	15m	RT-555-1-1/2-0-SP
50.8	25.40	1.02	15m	RT-555-2-0-SP

Wall thickness will be less if tubing recovery is restricted during shrinking.
Size selection - The largest size that will recover snugly over the component(s).

Colours Available



0 = Black

Heat-Shrink Tubing

RW-175-E

Polyvinylidene Fluoride
High temperature, chemical resistant

2:1
shrink

RW-175-E is an extremely tough, high temperature tubing offering outstanding abrasion and cut-through resistance. Ideal for strain relief and insulating densely packed electrical connections, while allowing visual inspection of covered components.

Features & Benefits

- High temperature performance
- Resistant to most industrial solvents/fuels
- Low out-gassing version also available*

Operating Temperature

- From -55°C to +175°C

Installation

- Minimum shrink temperature +155°C
- Minimum full recovery +175°C

Specifications & Approvals

- AMS-DTL 23053/8*
- VG 95343 Part 5 Type F
- UL-E35586 VW-1 600V, 150°C

RoHS
compliant

Inside Diameter		Wall Thickness	Pack Size		Part Number
Supplied	Recovered	Nom. Recovered	1.2m Stick	Spools	
1.2 mm	0.6 mm	0.25 mm	60m	300m	RW-175-E-3/64-colour-xx
1.6 mm	0.8 mm	0.50 mm	60m	300m	RW-175-E-1/16-colour-xx
2.4 mm	1.2 mm	0.25 mm	60m	150m	RW-175-E-3/32-colour-xx
3.2 mm	1.6 mm	0.25 mm	60m	150m	RW-175-E-1/8-colour-xx
4.8 mm	2.4 mm	0.25 mm	60m	150m	RW-175-E-3/16-colour-xx
6.4 mm	3.2 mm	0.30 mm	30m	75m	RW-175-E-1/4-colour-xx
9.5 mm	4.8 mm	0.30 mm	30m	75m	RW-175-E-3/8-colour-xx
12.7 mm	6.4 mm	0.30 mm	30m	75m	RW-175-E-1/2-colour-xx
19.0 mm	9.5 mm	0.43 mm	30m	75m	RW-175-E-3/4-colour-xx
25.4 mm	12.7 mm	0.48 mm	30m	75m	RW-175-E-1-colour-xx
38.1 mm	19.1 mm	0.51 mm	12m	30m	RW-175-E-1-1/2-colour-xx

Wall thickness will be less if tubing recovery is restricted during shrinkage.
Where xx is either **STK** (sticks) or **SP** (spools).

* Applicable to low out-gassing variant part number 'RW-175' only (not RW-175-E).

Colours Available



X = Clear

O = Black^{NS}

^{NS} Denotes Non-Standard colour, only available for RW-175

RW-200-E

Fluoroelastomer

High temperature, chemically resistant

2:1
shrink



Resilient very high temperature tubing, resistant to a wide range of fuels, lubricants, acids and solvents at elevated temperatures. RW-200-E is highly flame retardant and meets strict military specifications.

Features & Benefits

- Excellent fluid and temperature resistance
- Flexibility at low temperatures
- Highly flame retardant

Operating Temperature

- From -55°C to +200°C

Installation

- Minimum shrink temperature +100°C
- Minimum full recovery +175°C

Specifications & Approvals

- VG 95343 Part 5 Type E
- VDE 0341 Pt 9005
- BS 4G-198 Part 3 Type 12A

Inside Diameter		Wall Thickness	Pack Size	Part Number
Supplied (mm)	Recovered (mm)	Nom. Recovered	Spools	
3.2	1.60	0.76 mm	50m	RW-200-E-1/8-0-SP
4.8	2.40	0.84 mm	50m	RW-200-E-3/16-0-SP
6.4	3.20	0.89 mm	50m	RW-200-E-1/4-0-SP
9.5	4.80	1.02 mm	50m	RW-200-E-3/8-0-SP
12.7	6.40	1.22 mm	30m	RW-200-E-1/2-0-SP
19.0	9.50	1.45mm	30m	RW-200-E-3/4-0-SP
25.4	12.70	1.78 mm	30m	RW-200-E-1-0-SP
38.1	19.10	2.41 mm	15m	RW-200-E-1-1/2-0-SP
50.8	25.40	2.79 mm	15m	RW-200-E-2-0-SP

Wall thickness will be less if tubing recovery is restricted during shrinkage.
For supply to BS 4G-198 add -BS to suffix to part number.

Colours Available



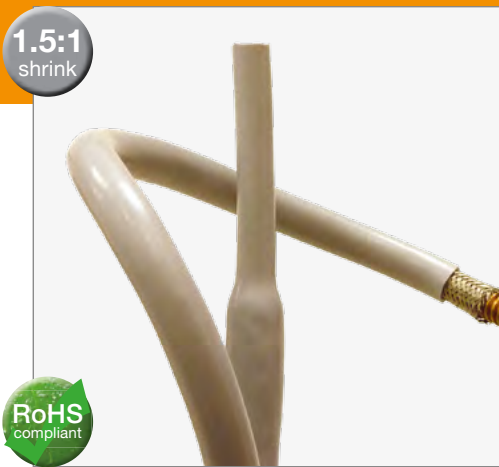
0 = Black

Heat-Shrink Tubing

SRFR

Silicone Rubber

High elasticity & temperature withstand



- 1 Silicone heat shrinkable tubing is highly flexible at extreme temperatures, with an excellent balance of physical and electrical properties.
- 2 SRFR offers physical strength, resists extreme heat shocks & exhibits good thermal insulation.

3 **Features & Benefits**

- 4
- Heat shrinkable at 1.5:1 min. shrink ratio
 - Highly flame retardant
 - Flexible at both high and low temperatures
 - Good chemical & solvent resistance

5 **Operating Temperature**

- From -75°C to +200°C

6 **Installation**

- 7
- Minimum shrink temperature +135°C
 - Minimum full recovery +175°C

Specifications & Approvals

- UL E85381 VW-1 600v, 200°C

Inside Diameter		Wall Thickness	Pack Size	Part Number
Supplied (mm)	Recovered (mm)	Nom. Recovered	Spools	
2.9	1.7	1.0 mm	50m	SRFR-2.9/1.7-8-SP
4.0	2.9	1.0 mm	50m	SRFR-4.0/2.9-8-SP
7.8	4.6	1.0 mm	50m	SRFR-7.8/4.6-8-SP
10.0	6.5	1.5 mm	30m	SRFR-10/6.5-8-SP
15.0	9.6	1.5 mm	30m	SRFR-15/9.6-8-SP
21.0	13.0	2.0 mm	30m	SRFR-21/13-8-SP
29.0	20.0	2.0 mm	15m	SRFR-29/20-8-SP
41.0	27.0	3.0 mm	15m	SRFR-41/27-8-SP
51.0	33.0	3.0 mm	15m	SRFR-51/33-8-SP

Spools are made up of 5m lengths.
Wall thickness will be less if tubing recovery is restricted during shrinkage.

17 **Colours Available**



8 = Grey

1.8:1
shrink

RoHS
compliant

Provides insulation and mechanical protection in extreme thermal and chemical environments, ideal for electrical insulation, hydraulic hoses and couplings, against contamination and corrosion. High mechanical strength and low friction co-efficient makes TFE ideal protection for bearing shafts and similar applications.

Features & Benefits

- Highly flame retardant
- Excellent chemical & solvent resistance

Operating Temperature

- From -67°C to +250°C

Installation

- Minimum shrink temperature +330°C
- Minimum full recovery temperature +340°C

Specifications & Approvals

- AMS-DTL-23053/12 Class 3
- RW-2055

Inside Diameter		Wall Thickness	Pack Size	Part Number
Supplied (mm)	Recovered (mm)	Nom. Recovered	1.2m Lengths	
0.8	0.38	0.23 mm	60m	TFE-30-X-STK
0.9	0.46	0.23 mm	60m	TFE-28-X-STK
1.1	0.56	0.25 mm	60m	TFE-26-X-STK
1.2	0.68	0.25 mm	60m	TFE-24-X-STK
1.4	0.81	0.30 mm	60m	TFE-22-X-STK
1.5	0.99	0.30 mm	60m	TFE-20-X-STK
1.9	1.24	0.30 mm	60m	TFE-18-X-STK
2.3	1.55	0.30 mm	60m	TFE-16-X-STK
3.0	1.83	0.30 mm	60m	TFE-14-X-STK
3.8	2.26	0.30 mm	60m	TFE-12-X-STK
4.8	2.84	0.30 mm	60m	TFE-10-X-STK
6.1	3.58	0.38 mm	30m	TFE-8-X-STK
7.6	4.52	0.38 mm	30m	TFE-6-X-STK
9.4	5.69	0.38 mm	30m	TFE-4-X-STK
10.9	7.06	0.38 mm	30m	TFE-2-X-STK
11.9	8.81	0.38 mm	30m	TFE-0-X-STK

Wall thickness will be less if tubing recovery is restricted during shrinkage.

Colours Available



X = Clear

Heat-Shrink Tubing

TFER

PTFE modified

High temperature, chemically inert

3.2:1
shrink

Provides insulation and mechanical protection in extreme thermal and chemical environments. Ideal for electrical insulation, hydraulic hoses and couplings, against contamination and corrosion. High mechanical strength and low friction co-efficient makes TFER ideal protection for bearing shafts and similar applications.

Features & Benefits

- Highly flame retardant
- Excellent chemical & solvent resistance

Operating Temperature

- From -67°C to +250°C

Installation

- Minimum shrink temperature +330°C
- Minimum full recovery +340°C

Specifications & Approvals

- AMS-DTL-23053/12 Class 5
- RW-2054

RoHS
compliant



Inside Diameter		Wall Thickness	Pack Size	Part Number
Supplied (mm)	Recovered (mm)	Nom. Recovered	1.2m Lengths	
2.0	0.6	0.23 mm	60m	TFER-5/64-X-STK
3.2	1.0	0.25 mm	60m	TFER-1/8-X-STK
6.4	1.6	0.30 mm	30m	TFER-1/4-X-STK
9.5	2.4	0.30 mm	30m	TFER-3/8-X-STK
12.7	3.7	0.38 mm	30m	TFER-1/2-X-STK
15.9	4.5	0.38 mm	30m	TFER-5/8-X-STK
19.0	5.7	0.38 mm	30m	TFER-3/4-X-STK
25.4	7.1	0.38 mm	30m	TFER-1-X-STK
32.0	8.8	0.38 mm	12m	TFER-1-1/4-X-STK

Wall thickness will be less if tubing recovery is restricted during shrinkage.

Colours Available



X = Clear

2:1
shrink

RoHS
compliant

Recommended for electrical insulation and protection of in-line components, terminals and splices, requiring the highest levels of flame retardance. Versafit offers high flexibility for light duty wiring harnesses, as well as mechanical and strain relief protection.

Features & Benefits

- Low shrink temperature
- Highly flame retardant
- 2:1 shrink ratio

Operating Temperature

- From -55°C to +135°C

Specifications & Approvals

- AMS-DTL-23053/5 Classes 1 & 3
- UL E35586 VW-1 600V 125°C
- BS 4G-198 Part 3 Type 11A
- RW-3009

Installation

- Minimum shrink temperature +70°C
- Minimum full recovery +90°C

Inside Diameter		Wall Thickness	Pack Size	Part Number
Supplied (mm)	Recovered (mm)	Nom. Recovered	Spools	
1.63	0.6	0.40 mm	300m	VERSAFIT-3/64-0-SP
1.85	0.8	0.43 mm	300m	VERSAFIT-1/16-0-SP
2.79	1.2	0.51 mm	150m	VERSAFIT-3/32-0-SP
3.43	1.6	0.51 mm	150m	VERSAFIT-1/8-0-SP
5.21	2.4	0.51 mm	150m	VERSAFIT-3/16-0-SP
7.11	3.2	0.64 mm	75m	VERSAFIT-1/4-0-SP
10.16	4.8	0.64 mm	75m	VERSAFIT-3/8-0-SP
13.72	6.4	0.64 mm	75m	VERSAFIT-1/2-0-SP
20.45	9.5	0.76 mm	75m	VERSAFIT-3/4-0-SP
25.53	12.7	0.89 mm	30m	VERSAFIT-1-0-SP
39.88	19.1	1.02 mm	38m	VERSAFIT-1-1/2-0-SP
52.83	25.4	1.14 mm	38M	VERSAFIT-2-0-SP

Wall thickness will be less if tubing recovery is restricted during shrinkage.

For supply to BS 4G-198 add -BS suffix to part number.

Colours Available

0	2	4	5	6	9
Black	Red ^{NS}	Yellow ^{NS}	Green ^{NS}	Blue ^{NS}	White ^{NS}

^{NS} Denotes Non-Standard colours, that may be subject to MOQs and are only available in sizes from 3/64" thru to 1"

Heat-Shrink Tubing

ZHTM

Polyolefin
LFH, medium wall

2:1
shrink

A thicker wall, flexible tubing with excellent fire safety characteristics, combined with low smoke emission and good mechanical and fluid resistance.

Features & Benefits

- Low smoke emission
- Low evolution of acid gases
- No added halogens
- Very flexible
- Low fire hazard

Operating Temperature

- From -30°C to +105°C

Installation

- Minimum shrink temperature +80°C
- Minimum full recovery +121°C

Specifications & Approvals

- BS 4G-198 Part 3 Type 15
- BR 1326A
- VDE 0341 Part 9005

HALOGEN
FREE

RoHS
compliant

Inside Diameter		Wall Thickness	Pack Size	Part Number
Supplied (mm)	Recovered (mm)	Recovered (mm)	Spools	
3.0	1.5	0.70 mm	60m	ZHTM-3/1.5-0-SP
5.0	2.5	0.75 mm	60m	ZHTM-5/2.5-0-SP
8.0	4.0	0.80 mm	60m	ZHTM-8/4-0-SP
12.0	6.0	0.90 mm	30m	ZHTM-12/6-0-SP
18.0	9.0	1.00 mm	30m	ZHTM-18/9-0-SP
24.0	12.0	1.10 mm	30m	ZHTM-24/12-0-SP
40.0	20.0	1.30 mm	30m	ZHTM-40/20-0-SP
50.0	30.0	1.50 mm	30m	ZHTM-50/30-0-SP

Wall thickness will be less if tubing recovery is restricted during shrinkage.
For supply to BS 4G-198 add -BS suffix to part number.

Colours Available



0 = Black



ZH-150 INSTALITE

Polyolefin
LFH, thin wall

2:1
shrink

HALOGEN
FREE

RoHS
compliant

INSTALITE ZH-150 tubing is the first heat shrinkable tubing to combine high-temperature and zero halogen properties in a lightweight material.

Features & Benefits

- Halogen free
- High temperature
- Fluid resistance: Aerospace & Military
- Very flexible
- Ruggedised, abrasion resistant

Operating Temperature

- From -75°C to +150°C

Installation

- Minimum shrink temperature +150°C
- Minimum full recovery +175°C

Specifications & Approvals

- RW-3044

Inside Diameter		Wall Thickness	Pack Size	Part Number
Supplied (mm)	Recovered (mm)	Nom. Recovered	Spools	
3.0	1.5	0.70 mm	150m	ZH150-3/1.5-0-SP
5.0	2.5	0.75 mm	150m	ZH150-5/2.5-0-SP
8.0	4.0	0.80 mm	75m	ZH150-8/4-0-SP
12.0	6.0	0.90 mm	75m	ZH150-12/6-0-SP
18.0	9.0	1.00 mm	75m	ZH150-18/9-0-SP
24.0	12.0	1.10 mm	75m	ZH150-24/12-0-SP
40.0	20.0	1.30 mm	30m	ZH150-40/20-0-SP
50.0	30.0	1.50 mm	30m	ZH150-50/30-0-SP

Wall thickness will be less if tubing recovery is restricted during shrinkage.

Colours Available



0 = Black

Heat-Shrink Tubing

ZHT and ZHT-BR

Polyolefin
LFH, thin wall, colours

A zero-halogen thin wall heat-shrinkable tube available in a range of colours. Specifically designed for railway, transportation, marine, offshore and construction markets

Operating Temperature

- ZHT from -30°C to +125°C
- ZHT-BR from -40°C to +135°C

Installation

- Minimum shrink temperature +80°C
- Minimum full recovery +120°C

ZHT can be supplied as UL approved - File No. E180908. Please specify if UL approval is required on order, together with adding suffix 'UL' to the part number.*

ZHT-BR is approved to BR 1326A.

2:1
shrink

HALOGEN
FREE

RoHS
compliant



Specifications & Approvals

ZHT is LUL approved - Complies with LU Standard 1-085 'Fire Safety Performance of Materials' (as a 'minor use' item).

Inside Diameter		Wall Thick'ns	Pack Size	Part Number	
Supplied (mm)	Recovered (mm)	Nom. Recovered	Spools		
1.2	0.6	0.45 mm	150m	ZHT-1.2-#	-
1.6	0.8	0.43 mm	150m	ZHT-1.6-#	ZHT-BR-1.6-#
2.4	1.2	0.51 mm	150m	ZHT-2.4-#	ZHT-BR-2.4-#
3.2	1.6	0.51 mm	150m	ZHT-3.2-#	ZHT-BR-3.2-#
4.8	2.4	0.51 mm	150m	ZHT-4.8-#	ZHT-BR-4.8-#
6.4	3.2	0.65 mm	75m	ZHT-6.4-#	ZHT-BR-6.4-#
9.5	4.8	0.65 mm	75m	ZHT-9.5-#	ZHT-BR-9.5-#
12.7	6.4	0.65 mm	75m	ZHT-12.7-#	ZHT-BR-12.7-#
19.1	9.5	0.75 mm	30m	ZHT-19.1-#	ZHT-BR-19.1-#
25.4	12.7	0.90 mm	30m	ZHT-25.4-#	ZHT-BR-25.4-#
38.1	19.0	1.00 mm	30m	ZHT-38.1-#	-
50.8	25.4	1.15 mm	30m	ZHT-50.8-#	-

Wall thickness will be less if tubing recovery is restricted during shrinkage.

ZHT and ZHT-BR supplied in spools as standard and ZHT-BR can be supplied in smaller boxed packs.

*Please note that when ordering 'UL' approved ZHT tubing, MOQ's and longer lead times may apply

Colours Available

0	1	2	4	5	6	8	9	X	45
Black	Brown	Red	Yellow	Green	Blue	Grey	White	Clear	Grn/Ylw



ATUM has an internal adhesive coating that, when heated, melts and flows to form a positive environmental barrier to prevent moisture penetration. Used to seal back-end connectors, wire splices, break-outs, cable jackets and electrical components.

- Features & Benefits**
- Environmentally seals and protects
 - Excellent mechanical protection
 - Bonds to plastics, rubbers and metals.

- Operating Temperature**
- From -55°C to +110°C

- Specifications & Approvals**
- AMS-DTL-23053/4 Class 3
 - UL E85381 600v, 110°C (Black only)

- Installation**
- Minimum shrink temperature +80°C
 - Minimum full recovery +110°C

	Inside Diameter		Nom Wall Thickness		Pack Size		Part Number
	Supplied	Recovered	Total Wall	Adhesive Wall	1.2m Sticks	Spools	
ATUM 3:1 Ratio	3.0 mm	1.0 mm	1.00 mm	0.50 mm	30m	150m	ATUM-3/1-0-xx
	6.0 mm	2.0 mm	1.00 mm	0.50 mm	30m	250m	ATUM-6/2-0-xx
	9.0 mm	3.0 mm	1.40 mm	0.60 mm	30m	200m	ATUM-9/3-0-xx
	12.0 mm	4.0 mm	1.78 mm	0.75 mm	30m	200m	ATUM-12/4-0-xx
	19.0 mm	6.0 mm	2.25 mm	0.80 mm	30m	150m	ATUM-19/6-0-xx
	24.0 mm	8.0 mm	2.54 mm	1.00 mm	30m	80m	ATUM-24/8-0-xx
	40.0 mm	13.0 mm	2.54 mm	1.00 mm	12m	60m	ATUM-40/13-0-xx
ATUM 4:1 Ratio	4.0 mm	1.0 mm	1.00 mm	0.50 mm	30m	150m	ATUM-4/1-0-xx
	8.0 mm	2.0 mm	1.00 mm	0.50 mm	30m	200m	ATUM-8/2-0-xx
	12.0 mm	3.0 mm	1.40 mm	0.60 mm	30m	200m	ATUM-12/3-0-xx
	16.0 mm	4.0 mm	1.78 mm	0.75 mm	30m	200m	ATUM-16/4-0-xx
	24.0 mm	6.0 mm	2.25 mm	0.80 mm	30m	80m	ATUM-24/6-0-xx
	32.0 mm	8.0 mm	2.54 mm	1.00 mm	12m	60m	ATUM-32/8-0-xx
	52.0 mm	13.0 mm	2.54 mm	1.00 mm	6m	30m	ATUM-52/13-0-xx

For supply to AMS-DTL23053 add **-MS** suffix to part number.
Wall thickness will be less if tubing recovery is restricted during shrinkage.
Where **xx** is either **STK** (sticks) or **SP** (spools). Standard colour.
Size selection - The largest size that will recover snugly over the component(s).

Colours Available

0 = Black

Heat-Shrink Tubing

CGAT

Commercial Grade, Polyolefin
Adhesive lined

Used to seal back-end connector, wire splices, break outs, cable jackets and electrical components. Includes an internal adhesive coating, that when heated, melts and flows to form a positive environmental barrier to prevent moisture

Features & Benefits

- Environmentally seals and protects
- Excellent mechanical protection
- High strength bonding

Operating Temperature

- From -30°C to +80°C

Installation

- Minimum shrink temperature +80°C
- Minimum full recovery +115°C

3:1
shrink

RoHS
compliant

Specifications & Approvals

- UL E85381, 600v, 80°C
- FMVSS 302

Inside Diameter		Nom Wall Thickness		Pack Size		Part Number
Supplied	Recovered	Total Wall	Adhesive Wall	1.2m Sticks	Spool	
3.0 mm	1.0 mm	1.00 mm	0.50 mm	30m	150m	CGAT-3/1-0-xx
6.0 mm	2.0 mm	1.00 mm	0.50 mm	30m	250m	CGAT-6/2-0-xx
9.0 mm	3.0 mm	1.35 mm	0.60 mm	30m	200m	CGAT-9/3-0-xx
12.0 mm	4.0 mm	1.50 mm	0.70 mm	30m	200m	CGAT-12/4-0-xx
18.0 mm	6.0 mm	1.70 mm	0.80 mm	30m	150m	CGAT-18/6-0-xx
24.0 mm	8.0 mm	1.90 mm	1.00 mm	30m	80m	CGAT-24/8-0-xx
39.0 mm	13.0 mm	2.10 mm	1.00 mm	12m	60m	CGAT-39/13-0-xx

Wall thickness will be less if tubing recovery is restricted during shrinkage.

Where **xx** is either **STK** (sticks) or **SP** (spools).

Size selection - The largest size that will recover snugly over the component(s).

Colours Available



0 = Black

X = Clear^s

^s Denotes: Made to special order only, non flame retardant.

D-150 and D-260

Fluoropolymer Sleeve
Adhesive lined, Repair sleeves



C-Wrap

Heat shrinkable side-entry sleeve designed to repair and seal a damaged wire jacket that is either chafed or has a radial crack or cut on the insulation. Consisting of two pieces: the outer tubing and an adhesive inner layer.

Operating temperature -65°C to +150°C

RAYSEAL

Wraparound self-adhering heat shrinkable repair sleeve with high-temperature adhesive lining, for fast, reliable, sealed repairs to larger gauge cables, maintains the cable jacket properties as close as possible to its original specification.

Operating temperature -65°C to +260°C

Fluid resistance: Resists aggressive fluids used in military and aerospace platforms.

Conductor / Cable		Dimensions (mm)		Colour	Product Reference	
AWG	Wire OD (mm)	Cut Width*	Open Length	-	Part Number	Kit Part No. #

C-WRAP Small Gauge, Side Entry Repair

26 - 24	0.80 - 1.10	20 mm	n/a	Green	D-150-C-11	-
22 - 20	1.10 - 1.50	20 mm	n/a	Red	D-150-C-12	-
18 - 16	1.50 - 2.30	20 mm	n/a	Blue	D-150-C-13	-
14 - 12	2.30 - 2.80	20 mm	n/a	Yellow	D-150-C-14	-

RAYSEAL Wraparound Large Gauge, Side Entry Repair

10 - 8	3.48 - 5.16	45 mm	24.5 (35.6)	Black	D-260-C-A	EF7428-000
6 - 4	5.72 - 7.82	45 mm	31.8 (43.2)	Black	D-260-C-B	EF7429-000
2 - 0	9.04 - 11.81	45 mm	44.5 (55.9)	Black	D-260-C-C	EF7430-000
00 - 000	12.32 - 14.99	45 mm	53.3 (67.8)	Black	D-260-C-D	EF7431-000
0000	14.99 - 16.26	45 mm	63.5 (78.8)	Black	D-260-C-E	EF7432-000

* Cut length is the nominal dimension presented along the length of the cable.

Kit part ref contains abrasive pad, cleaning wipes and PTFE tape.

Heat-Shrink Tubing

HTAT

High Temperature, Polyolefin
Adhesive lined

HTAT has an internal adhesive coating that when heated melts and flows to form a positive environmental barrier to prevent moisture penetration.

Features & Benefits

- Environmentally seals and protects
- Excellent abrasion & mechanical protection
- Bonds to metals, rubbers and plastics including PVC and polyethylene

Operating Temperature

- From -55°C to +125°C

Installation

- Minimum shrink temperature +80°C
- Minimum full recovery +110°C

4:1
shrink

RoHS
compliant

Specifications & Approvals

- RW-2052

Inside Diameter		Nom Wall Thickness		Pack Size		Part Number
Supplied	Recovered	Recovered	Adhesive	1.2m Sticks	Spools	
4.0 mm	1.0 mm	1.00 mm	0.40 mm	30m	150m	HTAT-4/1-0-xx
8.0 mm	2.0 mm	1.00 mm	0.50 mm	30m	75m	HTAT-8/2-0-xx
12.0 mm	3.0 mm	1.40 mm	0.60 mm	30m	75m	HTAT-12/3-0-xx
16.0 mm	4.0 mm	1.75 mm	0.75 mm	30m	50m	HTAT-16/4-0-xx
24.0 mm	6.0 mm	2.25 mm	0.80 mm	30m	50m	HTAT-24/6-0-xx
32.0 mm	8.0 mm	2.50 mm	1.00 mm	12m	30m	HTAT-32/8-0-xx
48.0 mm	13.0 mm	2.55 mm	1.00 mm	6m	30m	HTAT-48/13-0-xx

Wall thickness will be less if tubing recovery is restricted during shrinkage.
Where xx is either STK (sticks) or SP (spools).

Colours Available

0 = Black

SCL

Semi-rigid, Polyolefin
Encapsulant lined

3:1
shrink



RoHS
compliant

Designed to encapsulate components, splices and terminations where moisture resistance and mechanical protection are required. Encapsulant melts and flows to fill surface irregularities of the substrate. While still hot, the tubing can be blocked to form a wire breakout.

Features & Benefits

- Semi-rigid encapsulant lined tubing
- Excellent moisture resistance
- Good chemical & solvent resistance

Operating Temperature

- From -55°C to +110°C

Installation

- Minimum shrink temperature +125°C
- Minimum full recovery +135°C

Specifications & Approvals

- AMS-DTL 23053/4, Class 1
- UL-E35581 600V, 125°C

Inside Diameter		Nominal Wall Thickness		Pack Size	Part Number
Supplied	Recovered	Recovered	Encapsulant	1.2m Stick	
3.2 mm	0.6 mm	0.96 mm	0.51 mm	30m	SCL-1/8-0*-STK
4.8 mm	1.5 mm	1.09 mm	0.64 mm	30m	SCL-3/16-0*-STK
6.4 mm	2.0 mm	1.19 mm	0.69 mm	30m	SCL-1/4-0*-STK
9.5 mm	3.4 mm	1.27 mm	0.76 mm	30m	SCL-3/8-0*-STK
12.7 mm	5.0 mm	1.39 mm	0.89 mm	30m	SCL-1/2-0*-STK
19.0 mm	8.0 mm	1.65 mm	1.02 mm	30m	SCL-3/4-0*-STK
25.4 mm	10.2 mm	1.90 mm	1.02 mm	30m	SCL-1-0*-STK

Wall thickness will be less if tubing recovery is restricted during shrinkage.
Colour as standard is Black (0)*, with optional colour per size, see table below.

Colours Available

0	1	2	4	6	8	9
Black	Brown ^{NS}	Red ^{NS}	Yellow ^{NS}	Blue ^{NS}	Grey ^{NS}	White ^{NS}
All	3.2mm	9.5mm	19.0mm	12.7mm	4.8mm	6.4mm

^{NS} Denotes: Non standard colours available in quoted size only.

Heat-Shrink Tubing

SCT

Flame Retardant, Polyolefin
Adhesive Lined

Specially designed to insulate and seal wire splices and components in a harsh high temperature environment. Formulated to function at an extended temperature range.

Features & Benefits

- Flame retardant and mechanically tough, the tubing provides strain relief and abrasion protection.
- Thick adhesive liner forms an effective barrier against fluids and moisture.

Operating Temperature

- From -40°C to +150°C

Installation

- Minimum shrink temperature +110°C
- Minimum full recovery +135°C

4:1
shrink

RoHS
compliant

Flammability Rating

- ASTM D 2671 procedure B

Inside Diameter		Recovered Wall Thickness		Part Number
Supplied	Recovered	Total Wall	Melt-able Wall	
7.6 mm	1.7 mm	1.52 mm	0.76 mm	SCT-No.1-E6-0-1200
9.0 mm	2.3 mm	1.52 mm	0.76 mm	SCT-No.2-E5-0-1200
11.6 mm	2.5 mm	2.29 mm	1.40 mm	SCT-No.3-E3-0-1200
17.8 mm	4.4 mm	2.54 mm	1.52 mm	SCT-No.4-E2-0-1200

Wall thickness will be less if tubing recovery is restricted during shrinking.
Marking - Tubing will be printed with its numbered size 'e.g. SCT-1' in white.

Colours Available

0 = Black



Wire and Cable

Heat-shrink Tubing

Non-shrink Tubing

Braided Sleeving

Screening Braids

Moulded Parts

Terminals and Splices

Wire and Cable Markers

Accessories

Connectors

Backshells

Bonding Leads

Metal Braids

Relays and Contactors

Switches and Grips

Adhesives and Tapes

Application Equipment

Added Value Services

INTRODUCTION

Non Shrink

Range of Non-Shrink Tubing and Conduit

Suitable for applications where use of heat guns is not possible or not required

Typical Features & Benefits

- Mechanical protection
- Chemical/fluid resistance
- Electrical insulation
- Moisture protection
- Strain relief, Flexibility
- Flame-retardant, Low smoke
- Aesthetic enhancement
- Fast and efficient installation.



Cut Piece Service

Many of our tubing products can be supplied pre-cut to length. Please contact our sales office for details.



Cold Applied Sleeving		1
CR	Neoprene sleeves, pre-cut lengths	page 124
CY	Coloured LFH polyolefin sleeve	page 125
HCTE	Helical ETFE conduit, flame retardant	page 126
SR	Silicone tubing, cold applied	page 127
STW	PTFE thin wall sleeving	page 128
TW	PTFE standard wall sleeving	page 129
UL-Y	UL approved PVC coloured sleeving	page 130
Y	PVC Sleeving, various colours	page 131
		2
		3
		4
		5
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		17
		18

Non-Shrink Tubing

CR

Neoprene Sleeve
Non-shrink, insulating sleeves

- CR sleeves are made from highly elastic extruded Neoprene, pre-lubricated as standard. They are particularly useful for binding ends of braided mains leads into plugs and portable equipment.
- Can be stretched 5x in fitting and 2x in use.

Features & Benefits

Available in a wide range of colours, see chart.

Operating Temperature

- From -65°C to +95°C

Installation

Recommended that best applied using expanding tool, please contact us for details.



COLD Applied

RoHS compliant

Specifications

- BS3858/1 except for light fastness.
- BS3G198 part 1, type 1
- Def Stan 59-15, type D2c

Dimensions			Pack Size	Part Number
As Supplied (mm)	Max Cable (mm)	Length (mm)	Qty	
1.2	2.4	20	1000	CR12x20-Colour
1.5	3.0	20	1000	CR15x20-Colour
2.0	4.0	20	1000	CR20x20-Colour
3.0	6.0	25	1000	CR30x25-Colour
5.0	10.0	25	100	CR50x25-Colour
7.5	15.0	25	100	CR75x25-Colour
10.0	19.8	25	100	CR100x25-Colour
15.0	30.0	25	100	CR150x25-Colour
20.0	40.0	25	100	CR200x25-Colour

Colours Available





This limited fire hazard sleeving is halogen free, making it ideal for protecting wire and cables in areas where smoke and fume emissions must be minimised. Supplied on 100m continuous reels. Low smoke, low toxicity and zero halogen.

Can be stretched 5x in fitting and 2x in use.

Features & Benefits

Available in various colours, see chart

Operating Temperature

- From -25°C to +90°C

Specifications

- Vertical burn test pass: UL 1581
- Smoke density pass: ASTM E-662
- Oxygen index: 37% ISO 4589-2

Ideal for protecting wire and cable in areas where smoke and fume emissions must be minimised.

Internal Diameter	Wire Size	Spool Size	Part Number
As Supplied (mm)	mm ²	m	
1.5	-	100	CY1.5-ZH-Colour
2.0	-	100	CY2.0-ZH-Colour
3.0	0.5 - 0.75	100	CY3.0-ZH-Colour
4.0	1.5 - 2.5	100	CY4.0-ZH-Colour
5.0	2.5 - 4.0	100	CY5.0-ZH-Colour
6.0	6.0	100	CY6.0-ZH-Colour
8.0	10.0	100	CY8.0-ZH-Colour
10.0	16.0	100	CY10.0-ZH-Colour
12.0	35.0	100	CY12.0-ZH-Colour
15.0	50.0	100	CY15.0-ZH-Colour

Colours Available



Black Blue Brown Grey Red White

Non-Shrink Tubing

HCTE

Cross-linked ETFE (Helical Conduit)
Flexible, Flame Retardant, Fluid Resistant

HCTE conduit can be used as an electrical harness component alone or in conjunction with adaptors and heat shrinkable moulded parts, for a totally integrated harness system.

Features & Benefits

- Excellent crush resistance
- Highly flame retardant
- Superior flexibility and fluid resistance

Operating Temperature

- From -55°C to +200°C and up to 300°C for limited periods

Installation

Recommended that no more than 70% of the internal area be occupied by wires in any application.

Specifications & Approvals

- VG 96936 Part 6



Int. Diameter	Ext. Diameter	Weight	Pack Size	Part Number
Minimum (mm)	Maximum (mm)	g/m	Spools	
4.60	8.10	18	60m	HCTE-0187-0-SP
6.90	10.50	22	60m	HCTE-0281-0-SP
7.70	11.80	26	60m	HCTE-0312-0-SP
9.20	12.90	30	60m	HCTE-0375-0-SP
10.80	14.50	37	60m	HCTE-0437-0-SP
12.30	16.50	52	30m	HCTE-0500-0-SP
15.40	19.50	64	30m	HCTE-0625-0-SP
17.90	23.60	74	30m	HCTE-0750-0-SP
21.80	27.20	96	30m	HCTE-0875-0-SP
24.70	31.10	112	30m	HCTE-1000-0-SP
30.70	35.30	130	30m	HCTE-1250-0-SP
36.50	46.50	169	30m	HCTE-1500-0-SP
39.60	50.17	177	15m	HCTE-1625-0-SP
42.67	52.88	191	15m	HCTE-1750-0-SP
49.20	59.23	220	15m	HCTE-2000-0-SP

Colours Available



0 / Black



Silicone rubber has a good resistance to low and high temperatures and has good compatibility with numerous chemicals and excellent ageing characteristics. Extremely useful for cable harnessing because of its high elasticity and flexibility.

Features & Benefits

- Excellent fluid and temperature resistance
- Flexibility at low temperatures
- Wide range of sizes available

Operating Temperature

- From -60°C to +180°C
- Intermittent temperature 250°C

Installation

- Push on application, no heat required

Specifications & Approvals

- BS2848 Type 5 Class 180TB

Inside Diameter	Wall Thickness	Pack Size	Part Number
Nom. Supplied (mm)	Nom. Standard (mm)	Spools (SP)	
0.50	0.5	50m	SR-0.5/0.5-Colour
0.75	0.5	50m	SR-0.75/0.5-Colour
1.00	0.5	50m	SR-1.0/0.5-Colour
1.50	0.5	50m	SR-1.5/0.5-Colour
2.00	0.5	50m	SR-2.0/0.5-Colour
2.50	0.5	50m	SR-2.5/0.5-Colour
3.00	0.5	50m	SR-3.0/0.5-Colour
4.00	0.5	25m	SR-4.0/0.5-Colour
5.00	0.5	25m	SR-5.0/0.5-Colour
6.00	0.5	25m	SR-6.0/0.5-Colour
8.00	0.5	25m	SR-8.0/0.5-Colour
10.00	0.5	25m	SR-10.0/0.5-Colour

Colours Available



Non-Shrink Tubing

STW

PTFE Sleeving
Thin wall, push-on tubing

COLD
Applied



RoHS
compliant

- 1 Provides superior temperature and chemical resistance along with excellent mechanical and electrical properties. The thin wall
- 2 allows protection of wire, splices, electrical connectors and components used in confined spaces and in close proximity to other components.

Features & Benefits

- 4 • Wide temperature performance
- 5 • Excellent chemical resistance
- 6 • Wide range of colours and sizes available

Operating Temperature

- 6 • From -70°C to +260°C

Installation

- 7 • Push on application, no heat required

Specifications & Approvals

- BS2848 Type 6 Class 250T
- Colours conform to BS 6746C

Inside Diameter	Wall Thickness	Order Qty	Pack Size	Part Number
Nom. Supplied (mm)	Nom. Standard (mm)	Minimum	Spools	
0.71	0.15	1000m	500m	STW-22-Colour
0.89	0.18	500m	500m	STW-20-Colour
1.02	0.18	500m	500m	STW-19-Colour
1.14	0.20	500m	500m	STW-18-Colour
1.27	0.20	500m	500m	STW-17-Colour
1.42	0.20	500m	500m	STW-16-Colour
1.57	0.20	500m	500m	STW-15-Colour
1.73	0.20	500m	500m	STW-14-Colour
1.93	0.20	500m	250m	STW-13-Colour
2.16	0.20	500m	250m	STW-12-Colour
2.44	0.20	500m	250m	STW-11-Colour
2.72	0.20	500m	250m	STW-10-Colour
3.02	0.20	300m	150m	STW-9-Colour
3.43	0.20	200m	100m	STW-8-Colour
3.84	0.20	200m	100m	STW-7-Colour
4.29	0.20	200m	50m	STW-6-Colour
4.83	0.25	150m	50m	STW-5-Colour

Colours Available



COLD
Applied

RoHS
compliant

Thicker wall version PTFE tube allows enhanced protection of wire, cable, electrical and electronic components, for commercial and high performance Military and Aerospace systems. As well as having superior temperature and chemical resistance, provides excellent mechanical and electrical properties.

Features & Benefits

- Superior temperature performance
- Excellent chemical resistance
- Wide range of colours and sizes available

Operating Temperature

- From -70°C to +260°C

Installation

- Push on application, no heat required

Specifications & Approvals

- BS2848 Type 6 Class 250T
- Colours conform to BS 6746C

Inside Diameter	Wall Thickness	Order Qty	Pack Size	Part Number
Nom. Supplied (mm)	Nom. Standard (mm)	Minimum	Spools	
0.71	0.25	500m	500m	TW-22-Colour
0.89	0.30	500m	500m	TW-20-Colour
1.02	0.30	500m	500m	TW-19-Colour
1.14	0.30	500m	500m	TW-18-Colour
1.27	0.30	500m	500m	TW-17-Colour
1.42	0.30	500m	500m	TW-16-Colour
1.57	0.30	500m	500m	TW-15-Colour
1.73	0.30	500m	500m	TW-14-Colour
1.93	0.30	250m	250m	TW-13-Colour
2.16	0.30	250m	250m	TW-12-Colour
2.44	0.30	250m	250m	TW-11-Colour
2.72	0.30	200m	200m	TW-10-Colour
3.02	0.38	150m	150m	TW-9-Colour
3.45	0.38	100m	100m	TW-8-Colour
3.84	0.38	100m	100m	TW-7-Colour
4.29	0.38	100m	50m	TW-6-Colour
4.83	0.38	100m	50m	TW-5-Colour

Colours Available



Non-Shrink Tubing

UL-Y

UL Approved, 300V PVC Sleeve
Non-shrink, insulating sleeves

COLD
Applied

This UL approved PVC sleeve is rated by Underwriters Laboratories at 300v. It is highly flame retarded and passes VW1 flame test. It is also approved to UL 224.

Ideal for insulating wire in areas of high temperatures

Features & Benefits

- Passes VW1
- UL 224, file E183946
- Available in various colours

Operating Temperature

- From -40°C to +105°C

Insulation resistance: 10¹² Ohm/cm

Dielectric strength: 25 kV/mm

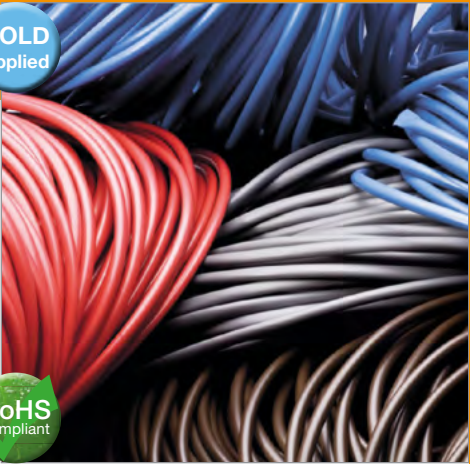
Tensile strength: 22 Mpa

Specifications & Approvals

- UL224 File No. E183946
- Passes VW1 flame test specification

Internal Dia.	Nominal Wall	Spool Size	Part Number
As Supplied (mm)	mm	m	
1.0	0.4	100	UL-Y-1.0-M300-Colour
1.5	0.4	100	UL-Y-1.5-M300-Colour
2.0	0.4	100	UL-Y-2.0-M300-Colour
2.5	0.4	100	UL-Y-2.5-M300-Colour
3.0	0.5	100	UL-Y-3.0-M300-Colour
4.0	0.5	100	UL-Y-4.0-M300-Colour
5.0	0.5	100	UL-Y-5.0-M300-Colour
6.0	0.5	100	UL-Y-6.0-M300-Colour
7.0	0.5	100	UL-Y-7.0-M300-Colour
8.0	0.6	100	UL-Y-8.0-M300-Colour
9.0	0.6	100	UL-Y-9.0-M300-Colour
10.0	0.6	100	UL-Y-10.0-M300-Colour
12.0	0.6	100	UL-Y-12.0-M300-Colour
14.0	0.7	100	UL-Y-14.0-M300-Colour
16.0	0.7	100	UL-Y-16.0-M300-Colour
20.0	0.8	100	UL-Y-20.0-M300-Colour
25.0	0.8	100	UL-Y-25.0-M300-Colour

Colours Available





The Y-105T type PVC sleeving is a flexible general purpose sleeving and is manufactured from premium virgin grade compound in a wide range of sizes. Supplied on continuous coils of 100 metres, please note that reels are also available please contact us.

Ideal for insulating wire in areas where space is at a premium.

Features & Benefits

- Flammability: Self-extinguishing in 30 sec
- Available in various colours

Operating Temperature

- From -40°C to +105°C

Insulation resistance: 10¹² Ohm/cm

Dielectric strength: 25 kV/mm

Specifications & Approvals

- Specification BS2848/3/105T

Internal Dia.	Nom. Wall	Spool Size	Part Number
As Supplied (mm)	mm	m	
1.0	0.5	100	Y-1.0-105T-Colour
1.5	0.5	100	Y-1.5-105T-Colour
2.0	0.5	100	Y-2.0-105T-Colour
3.0	0.5	100	Y-3.0-105T-Colour
4.0	0.5	100	Y-4.0-105T-Colour
5.0	0.5	100	Y-5.0-105T-Colour
6.0	0.5	100	Y-6.0-105T-Colour
7.0	0.5	100	Y-7.0-105T-Colour
8.0	0.5	100	Y-8.0-105T-Colour
9.0	0.5	100	Y-9.0-105T-Colour
10.0	0.5	100	Y-10.0-105T-Colour
12.0	0.5	100	Y-12.0-105T-Colour
15.0	0.5	100	Y-15.0-105T-Colour
20.0	0.5	100	Y-20.0-105T-Colour
25.0	0.5	50	Y-25.0-105T-Colour

Colours Available





Wire and Cable

Heat-shrink Tubing

Non-shrink Tubing

Braided Sleeving

Screening Braids

Moulded Parts

Terminals and Splices

Wire and Cable Markers

Accessories

Connectors

Backshells

Bonding Leads

Metal Braids

Relays and Contactors

Switches and Grips

Adhesives and Tapes

Application Equipment

Added Value Services

INTRODUCTION

Braided Sleeving and Shielding Solutions

Protective Sleeving, Wrap-around and Push-Fit

Range of protective sleeving, providing protection for electrical harnesses, hoses and pipes against heat, abrasion, chemicals fluids and electrical noise.

Protective sleeving comes in a wide variety of constructions, sizes and colours including wrap-around, push-on, heat-shrinkable.

Features & Benefits

- Mechanical protection
- Chemical resistance
- Electrical insulation
- Fluid and solvent resistance
- Moisture protection
- Strain relief, flexibility
- Aesthetic enhancement
- Fast and efficient installation



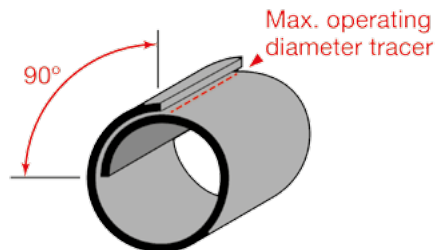
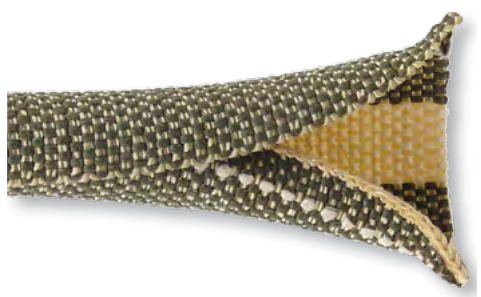
EXPANDO

Expandable braided sleeving



ROUNDIT

Self-wrapping braided sleeving



Maximum application size is determined by wrapping product to obtain a minimum of 90° of overlap. For further information, please contact us. Professional aluminium assembly tools are available to suit application size. Please note that a basic plastic tool is also available FOC on request.

SELECTION GUIDES	page 136	1
Mechanical Protection		
EXPANDO® 686DM	Expandable sleeving, PEEK and PPS	page 140
EXPANDO® HR and HR Plus	Expandable sleeving, high ratio	page 141
EXPANDO® HTNS L/HO	Expandable sleeving, Nomex®, 1:2 ratio	page 142
EXPANDO® HTNS LA/HO	Expandable sleeving, Nomex®, 1:3 ratio	page 143
EXPANDO® PEEK	Expandable sleeving, PEEK	page 144
EXPANDO® PFA	Expandable sleeving, PFA	page 145
EXPANDO® PPS	Expandable sleeving, PPS, low smoke	page 146
EXPANDO® PT and PT Plus	Expandable sleeving	page 147
EXPANDO® TCP V0	Expandable sleeving, low fire hazard	page 148
ROUNDIT® 2000	Self-wrapping sleeving	page 149
ROUNDIT® 2000 FR	Self-wrapping sleeving, flame retardant	page 150
ROUNDIT® 2000 V0	Self-wrapping sleeving, low fire hazard	page 151
ROUNDIT® 2000 NX	Self-wrapping sleeving, high temp'	page 152
ROUNDIT® 2000 NX HT	Self-wrapping sleeving, enhanced high temp	page 153
ROUNDIT® 2000 PTR/VTR	Self-wrapping sleeving, high temp, identifier	page 154
ROUNDIT® 2000 NX GRIP	Self-wrapping sleeving, hook and loop	page 155
Electrical Insulation		
GES 40 and GES 100	Push-fit, silicone coated high temperature	page 156
Roundit 2000® NX HT	Self-wrapping sleeving, high temperature	page 153
Thermal and Fire Insulation		
TST/TSX	Push-fit, silica fibre sleeve	page 157
TEXTALU® 1202	Push-fit aluminised glass fibre sleeve	page 158
THERMOTUBIX® Aerospace	Push-fit silicone coated high temperature sleeve	page 159
ROUNDIT® THERM-A and -B	Push-fit silicone coated high temperature sleeve	page 160
THERM-L-WRAP 66	Wrappable fibreglass fabric and foil wrap	page 161
Electromagnetic Shielding		
ROUNDIT® 2000 NX EMI	Self-wrapping screening and protective braid	page 162
ROUNDIT® 2000 V0 EMI	Self-wrapping screening and protective braid	page 164
ROUNDIT® EMI FMJ	Self-wrapping EMI screening, 95% optical	page 166
ROUNDIT® EMI XWS	Self-wrapping EMI screening	page 168

Product	Type	Markets	Description
Mechanical and Abrasion Protection...			
Expando® 686DM	Tubular	Aero, Def	Optimal solution for use where a combination of abrasion protection and lightweight are required.
Expando® HR & HR Plus	Tubular	Aero, Def	Fray-resistant and flame retardant used for abrasion protection over a range of temp. environments. Low vacuum out-gassing.
Expando® HTNS-L/HO	Tubular	Aero, Def	Low flammability, resists most chemicals. Open braid construction, highly flexible and resistant to trapping moisture.
Expando® HTNS-LA/HO	Tubular	Aero	Higher expansion ratio than HTNS L/HO (1:3)
Expando® Peek	Tubular	Aero, Def	Designed for mechanical protection in temperature extremes and hostile conditions
Expando® PFA	Tubular	Aero, Def	Self-extinguishing, used to encase typical non-flammable wires or cables, low flammability, resists damage from most chemicals.
Expando® PPS	Tubular	Aero, Def	Offers mechanical protection in high temperature areas. Often used for its outstanding properties in extreme environments.
Expando® PT Plus	Tubular	Elec	Highly expandable braid (1:3) with strong mechanical protection; treated to prevent end fraying, available in a variety of colours.
Expando® TCP V0	Tubular	Rail, Elec	Expandable braid (1:2) with strong mechanical protection, with low toxicity and smoke-emission.
Roundit® 2000	Wrappable	Elec	Self-wrapping sleeve with strong mechanical protection; quick and easy installation and removal for assembly and maintenance
Roundit® 2000 FR	Wrappable	Rail	Rail approved self-wrapping sleeve with good mechanical protection; Excellent cut through and abrasion resistance.
Roundit® 2000 V0	Wrappable	Rail	Self-wrapping sleeve with high mechanical protection; Highly flame retardant (UL94 V0) with low toxicity and smoke emission.
Roundit® 2000 NX	Wrappable	Aero, Def, Oil/Gas, Rail	Woven combination of Nomex® and PPS in a flat weave for a rugged and smooth texture, for high temperature cable bundling.
Roundit® 2000 NX HT	Wrappable	Aero, Def, Oil/Gas, Rail	High temp. version of 'NX' differentiated by a wide ivory tracer on the outside. PEEK mono-filaments and Nomex® multi-filaments.
Roundit® 2000 NX PTR/VTR	Wrappable	Aero, Def	Designed with a pink tracer to identify fuel lines (PTR) or a violet tracer to identify fibre optics (VTR); Oil and water repellent.
Roundit® 2000 NX Grip	Wrappable	Aero, Def	Designed with a sewn loop textile attachment method in conjunction with adhesive hook, enables direct attachment.

Approvals	Temp.	Flammability	Construction	Size
... continued				
	-70°C to +200°C	FAR Part 25 § 853 and UL 1441 (VW-1)	PEEK and PPS	3 to 64
	-70°C to +150°C	FAR Part 25 § 853 and UL 1441 (VW-1)	Halar® (E-CTFE) fluoropolymer	2 to 70mm
ASD EN6049-003	-60°C to +240°C	FAR Part 25 § 853 and UL 244 (VW-1)	Nomex®	1 to 40mm
ASD EN6049-003	-60°C to +240°C	FAR Part 25 § 853	Nomex®	2 to 60mm
	-70°C to +260°C	FAR Part 25 § 853	PEEK	2 to 76mm
BMS 13-52 Type IV	-70°C to +260°C	FAR Part 25 § 853	Perfluoroalkoxy (PFA)	1 to 76mm
BMS 13-52 Type III	-70°C to +200°C	FAR Part 25 § 853 and UL 1441 (VW-1)	Polyphenylene Sulfide (PPS)	2 to 64mm
	-70°C to +125°C	Flame retardant	Polyester	2 to 114mm
EN 45545-2	-50°C to +150°C	NF16101 - 16102 DB DIN 5510 & 54837 ASTM E-662 & ASTM E-162	Polyester	4 to 75mm
	-70°C to +125°C	FMVSS-302 Method D45 1333	Polyester	5 to 62mm
EN 45545-2	-50°C to +150°C	NF16101 - 16102 DB DIN 5510 & 54837 ASTM E-662 & ASTM E-162	Polyester	5 to 50mm
EN 45545-2	-50°C to +150°C	NF16101 - 16102 DB DIN 5510 & 54837 ASTM E-662 & ASTM E-162	Polyester	5 to 50mm
ASD EN6049-006 BMS 13-81 Type 1	-60°C to +200°C	FAR Part 25 § 853	Nomex® and PPS	5 to 40mm
ASD EN6049-007	-70°C to +260°C	FAR Part 25 § 853	Nomex® and PEEK	5 to 40mm
ASD EN6049-006.	-60°C to +200°C	FAR Part 25 § 853	Nomex® and PPS	5 to 40mm
	-60°C to +200°C	FAR Part 25 § 853	Nomex® and PPS	5 to 40mm

Product	Type	Markets	Description
Electrical Insulation and Abrasion Resistance...			
GES 40 and GES 100	Tubular	Elec	Highly flexible with relative diametric expansion (1:3), with silicone coating. Offering dielectric strength from 4kV to 10kV.
Roundit® 2000 NX HT	Wrappable	Aero	High temperature version of Roundit 2000 NX. Oil and water repellent - Dielectric 1.5kV
Thermal and Fire Insulation...			
TST/TSX	Tubular	Aero, Def	High temperature resistant, multi-filament pure silica fibre (>99.8%). Heat treated to remove organic content.
Textalu® 1202	Tubular	Elec	Fibreglass sleeve with a heavy aluminium coating for protection in high temperature areas.
Thermotubix Aerospace	Tubular	Aero, Rail	Expands readily to go over fittings and couplings. Protects from molten splash and welding sparks.
Roundit® Therm-A	Wrappable	Aero, Def	Two layer design provides thermal/fire protection and excellent cut-through and abrasion resistance; oils and water repellent.
Roundit® Therm-B	Wrappable	Aero, Def	Three layer design provides increased protection and excellent cut-through and abrasion resistance; oil and water repellent
Therm-L-Wrap® 66	Wrappable	Aero, Def, Oil/Gas	Self-wrappable sleeve with an adhesive closure, offers excellent radiant heat protection and excellent EMI shielding performance.
Electromagnetic Shielding...			
Roundit® 2000 NX EMI	Wrappable	Aero, Def	Multi-layer solution providing mechanical protection and very high EMI shielding; also available with an inner layer of PTFE.
Roundit® 2000 V0 EMI	Wrappable	Rail	Self-wrapping metal solution; flexible and easy to install providing high performance EMI shielding
Roundit® 2000 EMI FMJ	Wrappable	Aero, Rail	Self-wrapping metal solution, with 95% optical coverage; flexible and easy to install providing very high performance EMI shielding
Roundit® 2000 EMI XWS	Wrappable	Aero	Self-wrapping metal solution to optimise weight with EMI shielding performance. C4 (Blue tracer) & C27 (Pink tracer)
Raybraid® 90, 101 and 103	Tubular	Aero, Def	Tubular metal braid for electrical screening of wire bundles, with minimum 90% optical coverage, greater for 101 and 103
HBT90 and HBT99	Tubular	Aero, Def Motorsport	Tubular metal braid for electrical screening, offering up to 99% optical coverage HBT99.
InstaLite® 101 and 103	Tubular	Aero, Motorsport	Lightweight tubular metal alloy braiding for electrical screening of wire bundles, 50% lighter than traditional copper braid

Approvals	Temp.	Flammability	Construction	Size
... continued				
	-60°C to +220°C	UL 1441 (VW-1)	Silicone rubber coated fibreglass sleeving	0.5 to 32mm
ASD EN6049-007	-70°C to +260°C	FAR Part 25 § 853	Nomex® and PEEK	5 to 40mm
... continued				
	-60°C to 950°C	FAR Part 25 § 853	Multi-filament pure silica fibre	0.5 to 36mm
ISO 6722 SAE AS1072 (2)	-40°C to +200°C	FMVSS 302, D45 1333	Fibreglass sleeve with aluminium coating	5 to 22mm
EN 45545-2	-54°C to 260°C	ASTM D-350 B and NF 16101-16102. Fire protection to +1100°C (15min)	Thick wall fibreglass sleeve coated with silicone rubber	8 to 100mm
ASD EN6049-009	-60°C to +260°C	ISO 2685 - 5 min @ +1100°C	Roundit® 2000 NX HT, Silica and Panox®	5 to 32mm
	-60°C to +260°C	ISO 2685 - 15 min @ +1100°C	Fibreglass sleeve coated with silicone rubber outer	5 to 32mm
	-60°C to 200°C	FAR Part 25 § 853	Aluminium outer layer and fibreglass inner layer	8 to 25mm
... continued				
ASD EN6049-008	-60°C to 200°C	FAR Part 25 § 853	Ni plated Cu combined with PPS mono-filaments	5 to 38mm
EN 45545-2	-50°C to 200°C	NF 16101-16102	Ni plated Cu combined with PPS mono-filaments	8 to 45mm
EN 45545-2	-65°C to 200°C	FAR Part 25 § 853 NF 16101-16102	Ni plated Cu combined with PPS mono-filaments	5 to 38mm
C4: EN4674-003 C27: EN4674-004	-65°C to 200°C	FAR Part 25 § 853	Ni plated Cu combined with PPS mono-filaments	5 to 165mm
	101 up to +150°C 103 up to +200°C	-	Series 90 & 101 tinned Cu and series 103 tinned Ni Cu	3 to 30mm
	90 up to +150°C 99 up to +260°C	-	Series 90 tinned Cu and series 99 tinned Ni Cu	3 to 30mm 3 to 40mm
	101 up to +150°C 103 up to +200°C	-	Series 101 tinned Cu alloy and series 103 tinned Ni Cu	3 to 20mm

Braided Sleeving

EXPANDO® 686DM

PEEK and PPS Blend
Expandable braided sleeving

1:2
expand

Featuring a dual mono-filament construction, Expando 686DM blends larger PEEK guard strands with PPS support strands. The inherent properties of the raw materials give Expando 686DM low levels of flammability, toxicity, smoke generation and hard vacuum off gassing.

Expando 686DM is a protective oversleeve designed for mechanical protection in temperature extremes and hostile environmental conditions.

Operating Temperature

- From -70°C to +200°C

HALOGEN
FREE

RoHS
compliant

Specifications & Approvals

- VW-1 according to UL 1441
- FAR Part 25

Recommended Application Range		Weight	Pack Size	Part Number
Minimum Ø (mm)	Maximum Ø (mm)	Nom g/m	Spools	
2	6	209	600	Expando 686 DM 3-X
3	11	447	300	Expando 686 DM 6-X
5	19	925	150	Expando 686 DM 10-X
6	22	1194	150	Expando 686 DM 13-X
13	35	1790	150	Expando 686 DM 19-X
19	45	2387	75	Expando 686 DM 32-X
25	57	2685	75	Expando 686 DM 45-X
38	57	4476	75	Expando 686 DM 51-X
48	76	5072	75	Expando 686 DM 64-X

Where X denote colour code

Properties	Test	Results
Smoke density	ASTM E-662	$D_{mc} = 2.3$
Oxygen index	ASTM D-2863	36.5
Toxicity index	NES 713	1.6
Hard vacuum	ASTM E-595	Pass
Fluid resistance	MIL-I-23053	Retains 91% of original break strength

Colours Available

0 = Black

9 = Natural

EXPANDO® HR and HR Plus

Halar® (E-CTFE) Fluoropolymer
Tough, lightweight expandable sleeving

1:3
expand



Constructed of Halar® (E-CTFE) fluoropolymer that is designed for applications up to 150°C. Inherently flame-retardant, it is a UL recognised component which meets VW-1 requirements and will not melt and drip on direct exposure to flame.

Expando HR is a special purpose, highly reliable solution for military and aerospace applications. It offers good mechanical properties, performs well in both high and low temperature environments and has outstanding chemical resistance.

* Halar is a registered trademark of Solvay Solexis

Specifications & Approvals

- UL Recognised component

Operating Temperature

- From -70°C to +150°C

Recommended Application Range		Weight	Pack Size	Part Number
Minimum Ø (mm)	Maximum Ø (mm)	Nom g/m	Spools	
2	6	4.02	600m	HR-3mm-Colour
3	11	5.96	300m	HR-6mm-Colour
6	19	17.9	150m	HR-13mm-Colour
12	32	26.85	150m	HR-19mm-Colour
19	45	34.31	150m	HR-32mm-Colour
32	70	56.69	75m	HR-45mm-Colour

Fray resistant treatment is denoted by part number **HR-Plus-XX-Colour**

Properties	Test	Results
Melt Temperature	ASTM D-2117	+240°C
Low Temperature flexibility	MIL-DTL-23053E	-70°C
Copper Corrosivity	MIL-I-23053	No Effect
Flammability	FAR Part 25 and UL 1441	VW-1
Smoke Density	ASTM E-1354	D _{mc} =0.30
Hard Vacuum	ASTM E-595	Pass
Fluid resistance	MIL-I-23053	Pass

Colours Available



Black with White tracer

White with Black tracer

Braided Sleeving

EXPANDO® HTNS L/HO

Meta Aramid NOMEX®

Expandable braided sleeving

1:2
expand



HALOGEN
FREE

RoHS
compliant

HTNS-L/HO is a thin wall braided sleeve manufactured from Meta-Aramid Nomex®. Its highly expandable structure allows easy installation over long lengths after fitting of end connectors. Flexible, expandable and non-flammable properties ensure excellent performance in the most diverse and aggressive environments, including excellent resistance to gamma and x-rays.

Expando HTNS-L/HO braided sleeving has an oil and water repellent treatment (HO) to reduce humidity absorption and to improve impermeability to fluids.

* Nomex is a registered trademark of E.I. DuPont de Nemours.

Operating Temperature

- From -60°C to +240°C (continuous) and up to +310°C (short term).

Specifications & Approvals

- EN 6049-003
- PAN 6480P

Recommended Application Range		Weight	Pack Size	Part Number
Minimum Ø (mm)	Maximum Ø (mm)	Nom g/m	Spools	
1	2	2.70	100m	HTNS-L/HO-2mm-Green
2	4	4.00	100m	HTNS-L/HO-4mm-Green
4	8	8.00	100m	HTNS-L/HO-6mm-Green
6	12	12.00	50m	HTNS-L/HO-8mm-Green
8	16	14.00	50m	HTNS-L/HO-10mm-Green
10	20	17.00	50m	HTNS-L/HO-15mm-Green
12	24	22.00	50m	HTNS-L/HO-20mm-Green
15	30	32.50	50m	HTNS-L/HO-25mm-Green
20	40	38.00	50m	HTNS-L/HO-30mm-Green

Properties	Test	Results
Abrasion resistance	EN 6059 Part 403	Pass
Bending strength	50,000 bending cycles at 180°C	Excellent
Flame resistance (self-extinguishing properties)	UL 224 and UL 94	VW-1 and Base material classified VO
	FAR 25 AMDT.25-72 § 853(b)	Pass
Humidity resistance	1000hrs at +150°C	Retains 70% of its original tensile
Water/oil repellent treatment	EN 6059 Part 305	Pass
Fluid resistance	EN 6059 Part 303	Pass

Colours Available



Green

EXPANDO® HTNS LA/HO**Meta Aramid NOMEX®****Expandable braided sleeving****1:3**
expand**HALOGEN**
FREE**RoHS**
compliant

HTNS-LA/HO is a thin wall braided sleeve manufactured from Meta-Aramid Nomex®. Differing from HTNS L/HO by having a different expandable structure offering an increased expansion ratio of 1:3 allows easy installation over long lengths after fitting of end connectors with a limited range of product sizes.

In other respects characteristics and performance is much the same as HTNS L/HO.

* Nomex is a registered trademark of E.I. DuPont de Nemours.

Operating Temperature

- From -60°C to +240°C (continuous) and up to +310°C (short term).

Specifications & Approvals

- EN 6049-003
- PAN 6480P

Recommended Application Range		Weight	Pack Size	Part Number
Minimum Ø (mm)	Maximum Ø (mm)	Nom g/m	Spools	
2	6	5.50	100m	HTNS-LA/HO-5mm-Green
5	15	11.00	100m	HTNS-LA/HO-10mm-Green
8	24	18.00	100m	HTNS-LA/HO-15mm-Green
12	36	22.00	50m	HTNS-LA/HO-25mm-Green
22	60	31.00	50m	HTNS-LA/HO-40mm-Green

Properties	Test	Results
Abrasion resistance	EN 6059 Part 403	Pass
Bending strength	50,000 bend cycles @ +180°C	Excellent
Flame resistance (self-extinguishing properties)	UL 224	VW-1
	UL 94	Base material classified VO
	FAR 25 AMDT.25-72 § 853(b)	Pass
Water/oil repellent treatment	EN 6059 Part 305	Pass
Fluid resistance	EN 6059 Part 303	Pass

Colours Available



Green

Braided Sleeving

EXPANDO® PEEK

Polyetheretherketone
Expandable braided sleeving

Expando® PEEK (polyetheretherketone) is an expandable sleeve designed for aerospace and defence applications.

The inherent properties of PEEK offers low levels of flammability, toxicity, smoke generation and vacuum off-gassing.

Used in the aerospace industry for its outstanding properties in extreme environments. This product should be considered for aircraft, space, military, marine and hostile environment applications.

Operating Temperature

- From -70°C to +260°C

1:2
expand

HALOGEN
FREE

RoHS
compliant



Specifications & Approvals

- VW-1 according to UL 1441

Recommended Application Range		Weight	Pack Size	Part Number
Minimum Ø (mm)	Maximum Ø (mm)	Nom g/m	Spools	
2	6	2.46	600m	Expando-PEEK-3-Colour
3	13	4.17	300m	Expando-PEEK-6-Colour
6	22	11.61	150m	Expando-PEEK-13-Colour
13	29	16.86	150m	Expando-PEEK-19-Colour
19	45	21.94	75m	Expando-PEEK-25-Colour
25	45	23.57	75m	Expando-PEEK-32-Colour
32	64	41.09	75m	Expando-PEEK-45-Colour
38	64	48.07	75m	Expando-PEEK-51-Colour
51	76	55.66	75m	Expando-PEEK-64-Colour

Properties	Test	Results
Melt Temperature	ASTM D-3418	+334°C
Low Temperature flexibility	MIL-DTL-23053E	-70°C
Flammability	UL 1441	VW-1
Smoke Density	ASTM E-662	D _{mc} = 50
Hard Vacuum	ASTM E-595	Pass
Fluid resistance	MIL-I-23053	Pass

Colours Available



Black

Natural

1:3
expandHALOGEN
FREERoHS
compliant**Specifications & Approvals**

- BMS 13-52 Type IV
- FAR Part 25

Expando® PFA is constructed from PFA (perfluoroalkoxy). Offering low flammability and resists damage from most chemicals.

Expando PFA protective over-sleeve is widely used in the aerospace industry for its high temperature capability and ability to retain flexibility at low temperatures.

Tough and lightweight used to protect cable assemblies, hoses and wire harnesses from chafing, cutting and abrading. The open braid construction enables each size to expand to fit several application shapes and diameters and also makes them highly flexible and resistant to trapping water, heat and humidity

Operating Temperature

- From -70°C to +260°C

Recommended Application Range		Weight	Pack Size	Part Number
Minimum Ø (mm)	Maximum Ø (mm)	Nom g/m	Spools	
1	6	7.9	600m	Expando-PFA-3-Natural
2	11	10.8	300m	Expando-PFA-6-Natural
5	16	33.7	150m	Expando-PFA-10-Natural
8	19	40.8	150m	Expando-PFA-13-Natural
10	25	50.6	150m	Expando-PFA-19-Natural
16	38	82.2	75m	Expando-PFA-32-Natural
17	51	101.3	75m	Expando-PFA-45-Natural
19	76	144.4	75m	Expando-PFA-51-Natural

Properties	Test	Results
Melt Temperature	ASTM D-3418	+302°C
Low Temperature flexibility	MIL-DTL-23053E	-70°C
Flammability	FAR Part 25 § 853	Pass
Smoke Density	ASTM E-662	No smoke / No ignition
Hard Vacuum	ASTM E-595	Pass
Fluid resistance	MIL-I-23053	Pass

Colours Available

Natural

Braided Sleeving

EXPANDO® PPS

Polyphenylene Sulfide
Expandable braided sleeving

Designed for mechanical protection in high temperatures environments being rated to +200°C. The inherent properties of PPS offers low levels of flammability, toxicity, smoke generation and hard vacuum off gassing.

The inherent properties of PPS resists damage from high temperature air guns used with heat-shrinkable elements such as strain reliefs, terminations and identification sleeves.

Expando PPS is used in the aerospace industry for its outstanding properties in extreme environments. This product should be considered for aircraft, space, military, marine and hostile environment applications.

Operating Temperature

- From -70°C to +200°C

1:3
expand

HALOGEN
FREE

RoHS
compliant



Specifications & Approvals

- BMS 13-52 Type III
- Meets VW-1 requirements

Recommended Application Range		Weight	Pack Size	Part Number
Minimum Ø (mm)	Maximum Ø (mm)	Nom g/m	Spools	
2	6	3.44	610m	Expando-PPS-3mm-Colour
3	13	5.89	305m	Expando-PPS-6mm-Colour
6	19	12.11	152m	Expando-PPS-13mm-Colour
13	32	14.24	152m	Expando-PPS-19mm-Colour
25	45	26.34	76m	Expando-PPS-32mm-Colour
32	64	28.72	76m	Expando-PPS-45mm-Colour

Properties	Test	Results
Low temperature flexibility	MIL-DTL-23053E	-70°C
Flammability	UL 1441	VW-1
	FAR Part 25	Pass
Smoke Density	ASTM E662	Dmax <50
Copper Corrosivity	MIL-I-23053	No effect
Hard Vacuum	ASTM E-595	Meets industry limits
Fluid resistance	MIL-DTL-23053	Retains >97% of its initial break strength

Colours Available



Black with White tracer White with Black tracer

EXPANDO® PT and PT Plus**Polyester (PET)****Expandable braided sleeving****1:3**
expand**HALOGEN**
FREE**RoHS**
compliant

The open-braid construction enables each size to expand to fit several application shapes and diameters. This open-textile construction also makes them highly flexible and resistant to trapping water, heat and humidity.

Expando PT and Expando PT Plus are braided polyester (PET) sleeves designed for applications up to 125°C. General purpose industrial/commercial products.

The patented 'Plus' treatment makes end termination neater and easier, by creating a webbing between the filaments of the sleeving to reduce end fray during installation and through the life of the product, allowing it to be cut with ordinary scissors.

Specifications & Approvals

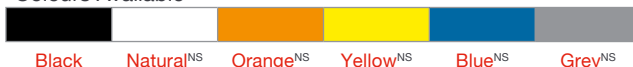
- UL Recognised component

Operating Temperature

- From -70°C to +125°C

Recommended Application Range		Weight	Pack Size	Part Number
Minimum Ø (mm)	Maximum Ø (mm)	Nom g/m	Spools	
2	6	2.62	600m	Expando-PT-3-Colour
3	11	4.32	300m	Expando-PT-6-Colour
6	13	9.90	150m	Expando-PT-10-Colour
6	19	12.60	150m	Expando-PT-13-Colour
13	32	19.64	150m	Expando-PT-19-Colour
19	45	26.19	75m	Expando-PT-32-Colour
32	70	44.20	75m	Expando-PT-45-Colour
38	89	54.02	75m	Expando-PT-51-Colour
45	114	58.17	75m	Expando-PT-64-Colour

Properties	Test	Results
Melt Temperature	ASTM D-2117	+250°C
Low Temperature flexibility	MIL-DTL-23053E	-70°C
Copper Corrosivity	MIL-I-23053	No Effect
Smoke Density	ASTM E-1354	D _{mc} =2.12
Hard Vacuum	ASTM E-595	Pass
Fluid resistance	MIL-I-23053	Pass

Colours Available

^{NS} Non standard colours, MOQ's may apply.

Braided Sleeving

EXPANDO® TCP V0

UL94 V0 rated Polyester
Expandable braided sleeving

1:2
expand



HALOGEN
FREE

RoHS
compliant

An expandable braided sleeve manufactured from modified polyester mono-filaments classified UL 94 V0 which offers excellent flame-retardant properties. It is designed for the protection of tubing and maintenance of wire and cable bundles and commonly used on Rail and Military ground vehicles..

This product has a highly expandable structure which allows for easy installation over long lengths, even after fitting of end connectors.

The properties of the mono-filament ensures excellent performance in the most diverse and hostile environments. The product is used in a wide range of industries including railway and electrical / electronic devices.

Specifications & Approvals

- EN 45545-2

Operating Temperature

- From -50°C to +150°C

Recommended Range		Std Pack Size	Part Number
Minimum Ø (mm)	Maximum Ø (mm)	Spools	
2	5	200m	TCP-V0-3mm-Colour
4	8	200m	TCP-V0-5mm-Colour
5	9	200m	TCP-V0-6mm-Colour
6	12	200m	TCP-V0-8mm-Colour
7	15	100m	TCP-V0-10mm-Colour
10	18	100m	TCP-V0-12mm-Colour
12	23	50m	TCP-V0-15mm-Colour
16	28	50m	TCP-V0-20mm-Colour
21	35	50m	TCP-V0-25mm-Colour
26	45	50m	TCP-V0-30mm-Colour
36	60	50m	TCP-V0-40mm-Colour
45	75	50m	TCP-V0-50mm-Colour

Properties	Test	Results
Fire / Smoke / Toxicity	UL 94 NF 16101 / 16102 ASTM E 662 - ASTM E 162 EN 45545-2	Raw material classified V0 I2 - F1 Zero halogen Pass R22, HL3, R23, HL3

Colours Available



Black with Grey tracer

Grey with Black tracer

ROUNDIT® 2000

Polyester

Self Wrap-around sleeving



Roundit® 2000 is a wrap-around sleeving manufactured from modified mono-filament and textured polyester yarn.

The self-wrapping feature of Roundit® 2000 allows for quick and easy installation and removal of the product for assembly and maintenance applications. Roundit® 2000 may be applied or removed without any manipulation of connectors or fittings and offers an innovative solution in areas where breakouts are required.

Operating Temperature

- From -70°C to +125°C

Specifications & Approvals

- UL Recognised component, versions also available.

Application Range		Weight	Pack Size	Part Number
Min Ø mm	Max Ø mm	g/m	Spools (m)	
1	5	11	150	Roundit-2000-5mm-Black
5	8	14	100	Roundit-2000-8mm-Black
10	13	21	50	Roundit-2000-13mm-Black
13	16	24	35	Roundit-2000-16mm-Black
16	19	28	25	Roundit-2000-19mm-Black
19	25	39	25	Roundit-2000-25mm-Black
25	29	41	25	Roundit-2000-29mm-Black
29	32	45	25	Roundit-2000-32mm-Black
32	38	54	25	Roundit-2000-38mm-Black

Properties	Test	Results
Melt Temperature	ASTM D-276	+256°C
Low Temperature flexibility	MIL-DTL-23053E	-70°C
Copper Corrosivity	MIL-I-23053	No effect
Fire Resistance	FMVSS-302 (D45 1333)	Self-extinguishing, type B
Smoke Density	ASTM E-1354	Please ask for info
Hard Vacuum	ASTM E-595	Pass
Fluid resistance	MIL-I-23053	Pass

Colours Available



Black

Braided Sleeving

ROUNDIT® 2000 FR

Flame Retardant Polyester
Self Wrap-around sleeving



Roundit® 2000 FR is a wrap-around sleeving manufactured from flame-retardant polyester mono-filaments and multi-filaments.

The self-wrapping feature of Roundit® 2000 FR allows for quick and easy installation and removal of the product for assembly and maintenance applications. May be applied or removed without any manipulation of connectors or fittings and offers an innovative solution in areas where breakouts are required.

Roundit® 2000 FR has many applications in the aerospace, motorsport, marine, defence, railway, electronics and manufacturing industries.



HALOGEN
FREE

RoHS
compliant

Specifications & Approvals

- NF16101/16102
- EN 45545-2

Operating Temperature

- From -50°C to +150°C

Application Range		Weight	Pack Size	Part Number
Min Ø mm	Max Ø mm	g/m	Spools (m)	
1	5	9	150m	Roundit-2000FR-5mm-Black
5	8	12	100m	Roundit-2000FR-8mm-Black
8	13	18	50m	Roundit-2000FR-13mm-Black
13	19	25	25m	Roundit-2000FR-19mm-Black
19	25	36	25m	Roundit-2000FR-25mm-Black
25	29	37	25m	Roundit-2000FR-29mm-Black
29	32	43	25m	Roundit-2000FR-32mm-Black
32	38	54	25m	Roundit-2000FR-38mm-Black
38	50	75	25m	Roundit-2000FR-50mm-Black**

** Size 50 is made of two sizes 25 sewn together.

Properties	Test	Results
Oxygen Index	NF EN ISO 4589-2	IO 31.75%
Abrasion Resistance	NF F 63-808	Pass
Fluid resistance	EN 6059-303	No visible degradation
Fire / Smoke / Toxicity	NF 16101 and NF 16102 ASTM E 662 - ASTM E 162 EN 45545-2	I2 - F2 Pass R22, HL3, R23, HL3

Colours Available



Black with White tracer

ROUNDIT® 2000 V0

UL94 V0 Rated Polyester
LFH Wrap-around sleeving



HALOGEN
FREE

RoHS
compliant

Roundit® 2000 V0 is a wrap-around sleeving manufactured from UL 94 V0 rated flame-retardant polyester mono-filaments and multi-filaments.

The self-wrapping feature allows for quick and easy installation and removal of the product for assembly and maintenance applications. Roundit® 2000 V0 may be applied or removed without any manipulation of connectors or fittings and offers an innovative solution in areas where breakouts are required.

Roundit® 2000 V0 has many applications in the aerospace, motorsport, marine, defence, railway, electronics and manufacturing industries.

Specifications & Approvals

- UL94 V0 Rated (raw material)
- EN 45545-2

Operating Temperature

- From -50°C to +150°C

Application Range		Weight	Pack Size	Part Number
Min Ø mm	Max Ø mm	g/m	Spools (m)	
1	5	7	150m	Roundit-2000-V0-5mm-Black
5	8	9	100m	Roundit-2000-V0-8mm-Black
8	13	14	50m	Roundit-2000-V0-13mm-Black
13	19	18	25m	Roundit-2000-V0-19mm-Black
19	25	24	25m	Roundit-2000-V0-25mm-Black
25	29	28	25m	Roundit-2000-V0-29mm-Black
29	32	31	25m	Roundit-2000-V0-32mm-Black
32	38	35	25m	Roundit-2000-V0-38mm-Black
38	50	58	25m	Roundit-2000-V0-50mm-Black

Properties	Test	Results
Oxygen Index	NF EN ISO 4589-2	IO 37%
Fluid resistance:	EN 6059-303	No visible degradation
Abrasion Resistance	ISO 6722	1464 cycles (size 19)
Fire / Smoke / Toxicity	NF 16101 and NF 16102 DB DIN 5510 § 2 & 54 837 BS6853 ASTM E-162 & ASTM E 662 EN 45545-2	I2 - F2 Halogen free S4, SR2, ST2 R = 1.3, A0 = 0.193, OI = 34.9% Pass R22, HL3, R23, HL3

Colours Available



Black with White tracer

Braided Sleeving

ROUNDIT® 2000 NX

Polyphenylene Sulfide and NOMEX®
High temperature wrap-around sleeving



Roundit® 2000 NX is a woven combination of Nomex® and PPS (polyphenylene sulfide). This blend in a flat weave construction gives Roundit 2000 NX a rugged yet smooth texture and appearance for high temperature bundling and abrasion resistance.

Also available as Roundit® 2000 NX RED or Roundit® 2000 NX ORANGE. Designed to identify wire harnesses connected with test equipment taken on board airplanes (Orange) or with weapon systems (Red).

* Nomex is a registered trademark of E.I. DuPont de Nemours.

Operating Temperature

- From -60°C to +200°C (continuous) and up to +220°C (short term).

Specifications & Approvals

- EN 6049-006
- BMS 13-81 Type 1
- DMS2379 Class 4, type 4
- JN1149

Application Range		Weight	Pack Size	Part Number
Min Ø mm	Max Ø mm	g/m	Spools (m)	
1	5	13	150m	Roundit-2000-NX-5mm-Colour
5	8	18	100m	Roundit-2000-NX-8mm-Colour
8	13	26	50m	Roundit-2000-NX-13mm-Colour
16	19	38	25m	Roundit-2000-NX-19mm-Colour
19	25	47	25m	Roundit-2000-NX-25mm-Colour
25	32	65	25m	Roundit-2000-NX-32mm-Colour
32	40	90	25m	Roundit-2000-NX-40mm-Colour

Properties	Test	Results
Classification flammability	ABD 031 & FAR 25 § 853	Conforms - no halogen content
Smoke density/toxicity	NF F 16-101	F3, I4
Water repellent	EN 6059 Part 305	Pass
Abrasion resistant	EN 6059 Part 403	Pass
Dynamic cut-through	EN 6059 Part 405	Pass
Fluid resistance	EN 6059-303	Good resistance

Colours Available



^{NS} Non standard colours, MOQ's may apply.

ROUNDIT® 2000 NX HT**PEEK Mono-filaments and NOMEX®**
High temperature wrap-around sleeving**HALOGEN
FREE****RoHS
compliant**

Roundit® 2000 NX HT is a woven combination of PEEK mono-filaments and Nomex® multi-filaments. It includes an oil and water repellent treatment in order to prevent the absorption of condensation build-up caused by the extreme changes aircraft are subjected to.

The self-wrapping feature allows quick and easy application and removal. The product may also be applied or removed without disturbing connectors or fittings.

This high temperature version is differentiated from the standard Roundit 2000 NX by a wide ivory tracer on the outer side.

* Nomex is a registered trademark of E.I. DuPont de Nemours.

Specifications & Approvals

- EN 6049-007

Operating Temperature

- From -70°C to +260°C

Application Range		Weight	Pack Size	Part Number
Min Ø mm	Max Ø mm	g/m	Spools (m)	
1	5	20	150m	Roundit-2000-NX-HT-5mm-Green
5	8	27	100m	Roundit-2000-NX-HT-8mm-Green
8	13	39	50m	Roundit-2000-NX-HT-13mm-Green
13	19	60	25m	Roundit-2000-NX-HT-19mm-Green
19	25	73	25m	Roundit-2000-NX-HT-25mm-Green
25	32	93	25m	Roundit-2000-NX-HT-32mm-Green
32	40	116	25m	Roundit-2000-NX-HT-40mm-Green

Properties	Test	Results
Flammability & Smoke	ABD 031 & FAR 25 § 853	Conforms - no halogen content
Water repellent	EN 6059 Part 305	Pass
Abrasion resistant	EN 6059 Part 403	Pass
Dynamic cut-through	EN 6059 Part 405	Pass
Vibrations	DO 160B	No cable abrasion
Mould growth	EN 6059 Part 306	Pass
Fluid resistance	EN 6059-303	Good resistance

Colours Available

**Green** with Ivory tracer

Braided Sleeving

ROUNDIT® 2000 NX PTR/VTR

Polyphenylene Sulfide and NOMEX®
High temperature wrap-around sleeving



- 1 Roundit® 2000 NX is a woven combination of Nomex® and PPS (polyphenylene sulfide). This blend in a flat weave construction gives
- 2 Roundit 2000 NX PTR/VTR a rugged yet smooth texture and appearance for high
- 3 temperature bundling and abrasion resistance.
- 4 Roundit® 2000 NX PTR and VTR variants have been designed to help identify fuel lines with a pink tracer (PTR) or a violet tracer to identify fibre optics (VTR).

* Nomex is a registered trademark of E.I. DuPont de Nemours.



Operating Temperature

- From -60°C to +200°C (continuous)

Specifications & Approvals

- EN 6049-006
- BMS 13-81 Type 1
- DMS2379 Class 4, type 4
- JN1149

Application Range		Weight	Pack Size	Part Number
Min Ø mm	Max Ø mm	g/m	Spools (m)	
1	5	13	150m	Roundit-2000-NX-XXX-5mm
5	8	18	100m	Roundit-2000-NX-XXX-8mm
8	13	26	50m	Roundit-2000-NX-XXX-13mm
16	19	38	25m	Roundit-2000-NX-XXX-19mm
19	25	47	25m	Roundit-2000-NX-XXX-25mm
25	32	65	25m	Roundit-2000-NX-XXX-32mm
32	40	90	25m	Roundit-2000-NX-XXX-40mm

Where XXX is replaced with either **VTR** or **PTR** to suit.

Properties	Test	Results
Classification flammability	ABD 031 & FAR 25 § 853	Conforms - no halogen content
Smoke density/toxicity	NF F 16-101	F3, I4
Water repellent	EN 6059 Part 305	Pass
Abrasion resistant	EN 6059 Part 403	Pass
Dynamic cut-through	EN 6059 Part 405	Pass
Fluid resistance	EN 6059-303	Good resistance

Colours Available



VTR - Green with Violet tracer

PTR - Green with Pink tracer

ROUNDIT® 2000 NX GRIP

Polyphenylene Sulfide and NOMEX®
High temperature wrap-around sleeving



Roundit® 2000 NX is a woven combination of Nomex® and PPS (polyphenylene sulfide). This blend in a flat weave construction gives Roundit 2000 NX GRIP a rugged yet smooth texture and appearance for high temperature bundling and abrasion resistance.

Roundit® 2000 NX GRIP features a sewn loop textile attachment method which in conjunction with an adhesive hook installed on the aircraft structure to locate and attach the wire harness. This unique design reduces the space needed between the wire harness and structure compared to standard fixation methods.

* Nomex is a registered trademark of E.I. DuPont de Nemours.

Operating Temperature

- From -60°C to +200°C (continuous)

Application Range		Weight	Pack Size	Part Number
Min Ø mm	Max Ø mm	g/m	Spools (m)	
1	5	21	150m	Roundit-2000-NX-GRIP-5mm
5	8	25	100m	Roundit-2000-NX-GRIP-8mm
8	13	34	50m	Roundit-2000-NX-GRIP-13mm
16	19	46	25m	Roundit-2000-NX-GRIP-19mm
19	25	63	25m	Roundit-2000-NX-GRIP-25mm
25	32	78	25m	Roundit-2000-NX-GRIP-32mm
32	40	90	25m	Roundit-2000-NX-GRIP-40mm

Standard Colour: **Green** (Olive Green)

Properties	Test	Results
Classification flammability	ABD 031 & FAR 25 § 853	Conforms
Smoke density/toxicity	EN2825 and EN2826	Conforms
Water repellent	EN 6059 Part 305	Pass
Abrasion resistant	EN 6059 Part 403	Pass
Dynamic cut-through	EN 6059 Part 405	Pass
Fluid resistance	EN 6059-303	Good resistance

Braided Sleeving

GES 40 and GES 100

Glass fibre, Silicone
High temperature electrical insulation

GES is a braided fibreglass sleeve with a silicone rubber coating designed to provide electrical insulation. The thickness of the silicone coating determines the dielectric strength, which ranges from 4 to 10 kV.

The high flexibility of GES allows relative diametrical expansion (approximately 1:1.3)

This product provides electrical insulation for a wide range of industries and applications, including winding, engines and transformer outlets.

Available in a wide range of sizes from 0.5mm to 32mm diameter, the table below represents our most popular sizes. Please ask for details.

Operating Temperature

- From -60°C to +220°C

Push
fit

HALOGEN
FREE

RoHS
compliant



Specifications

- UL 1441 VW-1
- NF16101-16102
- NF Standard C.93641

Internal Diameter		Pack Size	Part Number	
Nom Ø mm	Tolerance mm	Spools (m)		
1.0	± 0.2	500	GES-40-1-12	GES-100-1-12
2.0	± 0.2	500	GES-40-2-12	GES-100-2-12
3.0	± 0.2	500	GES-40-3-12	GES-100-3-12
4.0	± 0.2	500	GES-40-4-12	GES-100-4-12
5.0	± 0.3	500	GES-40-5-12	GES-100-5-12
6.0	± 0.3	500	GES-40-6-12	GES-100-6-12
8.0	± 0.3	100	GES-40-8-12	GES-100-8-12
10.0	± 0.5	100	GES-40-10-12	GES-100-10-12
12.0	± 0.5	100	GES-40-12-12	GES-100-12-12
16.0	± 0.7	50	GES-40-16-12	GES-100-16-12
20.0	± 1.5	50	GES-40-20-12	GES-100-20-12
25.0	± 2.0	25	GES-40-25-12	GES-100-25-12
28.0	± 2.0	25	GES-40-28-12	n/a

Properties	Test	Results
Dielectric measurements	NF standard C93.641	GES-40 4.0kv average - 2.5kv min. GES-100 10.0kv average - 7.0kv min.
Volume resistivity		10 ¹² ohms/cm

TST and TSX

Pure Silica Fibre

High temperature Thermal sleeving

Push
fitRoHS
compliant

TST and TSX are high temperature resistant, multi-filament pure silica fibre braided sleeving.

TST sleeve is heat-treated to remove organic content. This heat treatment confers excellent thermal properties to the sleeving, thus offering an excellent thermal barrier against heat, fire, molten metal splashes and other projections.

The TSX sleeve has an additional impregnation disappearing above 300°C which prevents end fray and skin irritation when cut.

TST/TSX are both fireproof and radiation-proof.

TST/TSX mainly used in the aircraft, railway, iron and steel, off-shore and nuclear industries.

Operating Temperature

- From -60°C to +1100°C (continuous), with peaks of +1350°C for 30 minutes

Internal Diameter		Weight	Pack Size	Part Number
Min Ø mm	Max. Ø mm	g/m	Spools (m)	
0.5	0.8	2.1	100	TST/TSX-0.5-White
1.0	1.4	3.2	100	TST/TSX-1-White
2.0	2.4	4.2	100	TST/TSX-2-White
4.0	5.0	7.4	100	TST/TSX-4-White
6.0	7.0	11.6	100	TST/TSX-6-White
8.0	9.0	15.8	100	TST/TSX-8-White
10.0	11.0	21.0	50	TST/TSX-10-White
12.0	13.0	22.1	50	TST/TSX-12-White
14.0	15.0	25.2	50	TST/TSX-14-White
16.0	17.0	28.4	25	TST/TSX-16-White
20.0	21.0	35.7	25	TST/TSX-20-White
25.0	26.0	52.5	25	TST/TSX-25-White
35.0	36.0	80.9	25	TST/TSX-35-White

Properties	
Gamma Ray Resistance	Excellent resistance to gamma rays, unaffected by UV and IR rays
Silica Purity	Silica fibre purity >99.8%

Braided Sleeving

TEXTALU® 1202

Glass fibre, Aluminium coating
Thermal Management Sleeving

Push
fit



RoHS
compliant

Textalu® 1202 is an insulating fibreglass sleeving with a heavy aluminium coating designed to protect components in high temperature areas. Offers superior insulation to components that must maintain a stable temperature to assure performance efficiency.

The infra-red emissivity rating of the heavy aluminium coating, combined with its fibreglass braid, ensures temperature stability inside the sleeving despite external fluctuations due to radiant heat.

Fibreglass liner withstand up to +550°C.

Operating Temperature

- From -40°C to +200°C

Specifications & Approvals

- ISO 6722 Heat ageing
- FMVSS 302 flame resistance

Inside Diameter	Wall Thickness	Pack Size	Part Number
Nominal (mm)	mm	Spools (m)	
5.0	0.55	200	TEXTALU-1202-5mm
7.0	0.65	150	TEXTALU-1202-7mm
8.0	0.65	150	TEXTALU-1202-8mm
10.0	0.75	150	TEXTALU-1202-10mm
12.0	0.75	150	TEXTALU-1202-12mm
15.0	0.75	150	TEXTALU-1202-15mm
18.0	1.0	100	TEXTALU-1202-18mm
20.0	1.5	50	TEXTALU-1202-20mm
22.0	1.5	50	TEXTALU-1202-22mm
24.0	1.9	50	TEXTALU-1202-24mm
28.0	2.0	25	TEXTALU-1202-28mm

Standard Colour: Aluminium grey

Properties	Test	Results
Heat ageing	ISO 6722 240h at 225°C	No visible degradation or loss of flex
Flame resistance	FMVSS 302, test method D45 1333	Non flammable, Type A
Fluid resistance • Motor, oil, protection oil, mineral hydraulic, automatic transmission fluid & zinc chloride. • Engine coolant • Unleaded petrol 98 & diesel.	D47 1924 • Immersion for 15s @ 22°C followed by drying period of 24h @ 175°C. • Immersion for 24h @ 118°C • Immersion for 24h @ 40°C	No visible degradation or alteration after being exposed to test cycles

THERMOTUBIX® AerospaceGlass fibre, Silicone
Thermal Management SleevingPush
fitHALOGEN
FREERoHS
compliant

Thermotubix® Aerospace sleeving is a thick wall braided fibreglass sleeve, coated with a specially compounded, flame retardant silicone rubber. Offers effective protection against sustained high temperatures, flames and molten metal splashes.

- Fire protection up to +1100°C (15 min) and +800°C (30 min). SAE-ASTM specifications.
- Flexibility to -54°C
- Highly resistant to hydraulic fluids and lubricating oils

Operating Temperature

- From -54°C to +260°C

Specifications & Approvals

- EN 45545-2
- ASTM E-162; ASTM E-662; BSS 7239 and SMP 800C

Inside Ø	Wall	Pack Size	NATO Spec	Part Number
Nom. (mm)	mm	Spools		
6.0	4.0	30m	-	THERMOTUBIX-6
8.0	4.0	30m	5970-14-455-2318	THERMOTUBIX-8
9.5	4.0	30m	5970-14-455-2322	THERMOTUBIX-9.5
12.7	4.0	30m	5970-14-455-2324	THERMOTUBIX-12.7
16.0	4.0	30m	5970-14-413-6212	THERMOTUBIX-16
22.0	4.0	30m	5970-14-413-6214	THERMOTUBIX-22
25.0	4.0	15m	5970-14-413-6215	THERMOTUBIX-25
32.0	4.0	15m	5970-14-413-6216	THERMOTUBIX-32
38.0	4.0	15m	5970-14-413-6217	THERMOTUBIX-38
45.0	4.0	9m	5970-14-413-6220	THERMOTUBIX-45
51.0	4.0	9m	5970-14-413-6221	THERMOTUBIX-51
57.0	4.0	9m	5970-14-413-6222	THERMOTUBIX-57
64.0	4.0	6m	5970-14-455-2328	THERMOTUBIX-64
89.0	4.0	6m	5970-14-455-2332	THERMOTUBIX-89
101.0	4.0	6m	5970-14-455-2334	THERMOTUBIX-101

Properties	Test	Results
Flammability	ASTM D-350, Method B	Not flammable
Fire / Smoke / Toxicity	NF 16101 & NF 16102 DIN 5510 § 2 & 54837 DIN EN ISO 5659-2 EN 45545-2	I2 F0 S4, SR2, ST2 CIT 8 min: 0.036 / FED 30 min: 0.031 R22, HL3, R23, HL3. >64mm R9 HL3

Braided Sleeving

ROUNDIT® Therm-A and -B

Multi-layer Wrappable
Thermal Management Sleeving

Multi-layer thick wall wrappable sleeving designed for thermal protection and maintenance of wire and cable bundles. Closure of product is secured with fire resistant lacing tape or similar.

Therm-A: Two layer design, comprising Roundit® 2000 NX HT, Silica and panox®. Offering 5 minutes at +1100°C to ISO 2685

Therm-B: Three layer design, comprising fibreglass sleeve coated with silicone rubber, plus Roundit® 2000 NX HT outer. Offering 15 minutes at +1100°C to ISO 2685.

Operating Temperature

- from -60°C to +260°C

Specifications & Approvals

- ASDN EN6049-009 for Therm-A



Diameter	Size Range	Max. Weight	Pack Size	Part Number
Nominal (mm)	Nominal (mm)	(g/m)	Spools (m)	
10.0	5 to 10	336	25	RounditTherm-A-10-5
16.0	10 to 16	336	25	RounditTherm-A-16-5
24.0	16 to 24	361	15	RounditTherm-A-24-5
32.0	24 to 32	436	15	RounditTherm-A-32-5
10.0	5 to 10	360	15	RounditTherm-B-10-5
16.0	10 to 16	495	15	RounditTherm-B-16-5
23.0	16 to 23	580	15	RounditTherm-B-23-5
32.0	23 to 32	710	15	RounditTherm-B-32-5

Standard Colour: 5 Olive green outer

Properties	Test	Results	
Fire resistance	ISO 2685	5 minutes, Therm-A	15 minutes, Therm-B
Flamability/Smoke/toxicity	ABD 031 & FAR 25 § 853	Conforms	
Water repellent	EN 6059-305	Pass	
Abrasion resistance	EN 6059-403	Pass	
Dynamic cut through	EN 6059-405	Pass	
Vibrations	EN 6059-406	Pass	
Fluid resistance	EN 6059-303	Good resistance	

THERM-L-Wrap® 66

Fibreglass fabric with Aluminium Foil
Thermal Management Sleeving



A self-wrapping, reflective sleeve that provides protection from both radiant and convective heat. Composed of a woven fibreglass base fabric and aluminum foil, the product can withstand convective heat soaks up to +200°C and simultaneously protect critical components from radiant or reflected heat.

The unique woven structure imparts a level of flexibility not found in other reflective products. It also allows the product to maintain a circular profile when flexed.

Self-sealing adhesive reinforcement, allows for permanent closure. The adhesive strip acts as a barrier to dirt and fluids while maintaining the full integrity of the finished aluminised sleeve.

Operating Temperature

- From -60°C to +200°C

Application Range		Max. Weight	Part Number
Nominal (mm)	Nominal (mm)	(g/m)	
8.0	10.0	32	Therm-L-Wrap-66-10-Silver-XXX
10.0	13.0	54	Therm-L-Wrap-66-13-Silver-XXX
13.0	16.0	58	Therm-L-Wrap-66-16-Silver-XXX
16.0	19.0	68	Therm-L-Wrap-66-19-Silver-XXX
19.0	25.0	96	Therm-L-Wrap-66-25-Silver-XXX

XXX - Product available in straight cut lengths only, in 10mm increments up to 1 metre

50 to 500mm	± 5 mm	
501 to 1000mm	± 10 mm	

Standard Colour: **Silver**

Properties	Test	Results
Ageing	EN6059-302 (168 hrs. at +200°C)	Pass
Salt Spray	EN2591-307 (96 hrs.)	Pass
Flammability / Smoke / Toxicity	ABD0031 & FAR part 25 § 853	Pass
EMI Performance	Transfer impedance IEC62153-4-3	70dB @ 100 MHz, RO=15mΩ
Thermal Performance	SAE J2302 (Hot box 540°C)	147°C reduction
Resistance to Fluid Spray	EN6059-303	Remained stuck after fluid spray

Braided Sleeving

ROUNDIT® 2000 NX EMI

Polyphenylene Sulfide and NOMEX®
Self-wrapping electromagnetic shielding

Roundit® 2000 NX EMI is a self-wrapping sleeve designed for mechanical protection and EMI shielding of wire and cable bundles. The outer layer, supplies the abrasion resistance, is manufactured from PPS mono-filaments and Nomex® with an oil and water repellent treatment. The inner layer is composed of nickel-plated copper (Cu/Ni), which provides EMI insulation. The outer layer construction with a 100% covering ratio provides excellent cut-through and abrasion resistance.

Also available with an internal layer of PTFE tape, allowing wire harnesses to be protected from the inner metal layer.

Nomex is a registered trademark of E.I. DuPont de Nemours.

Operating Temperature

- From -60°C to +200°C

App. Range		Max Weight		Pack Size	Part Number
Min. (mm)	Max (mm)	A (g/m)	B (g/m)	Spools (m)	
1.0	6.0	79	86	50	ROUNDIT-2000-NX-EMI-*6mm-Green
6.0	11.0	92	102	50	ROUNDIT-2000-NX-EMI-*11mm-Green
11.0	14.0	116	132	25	ROUNDIT-2000-NX-EMI-*14mm-Green
14.0	17.0	149	165	25	ROUNDIT-2000-NX-EMI-*17mm-Green
17.0	23.0	175	196	25	ROUNDIT-2000-NX-EMI-*23mm-Green
23.0	30.0	235	262	25	ROUNDIT-2000-NX-EMI-*30mm-Green
30.0	38.0	305	339	25	ROUNDIT-2000-NX-EMI-*38mm-Green

* = **A** the sleeving comes without internal PTFE layer; * = **B** the sleeving comes with internal PTFE layer

Standard Colour: **Green** (Olive green)



HALOGEN
FREE

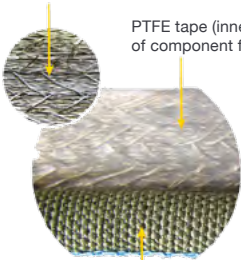
RoHS
compliant

Specifications & Approvals

- ASD EN 6049-008

Braided nickel-plated copper wire
provides EMI insulation

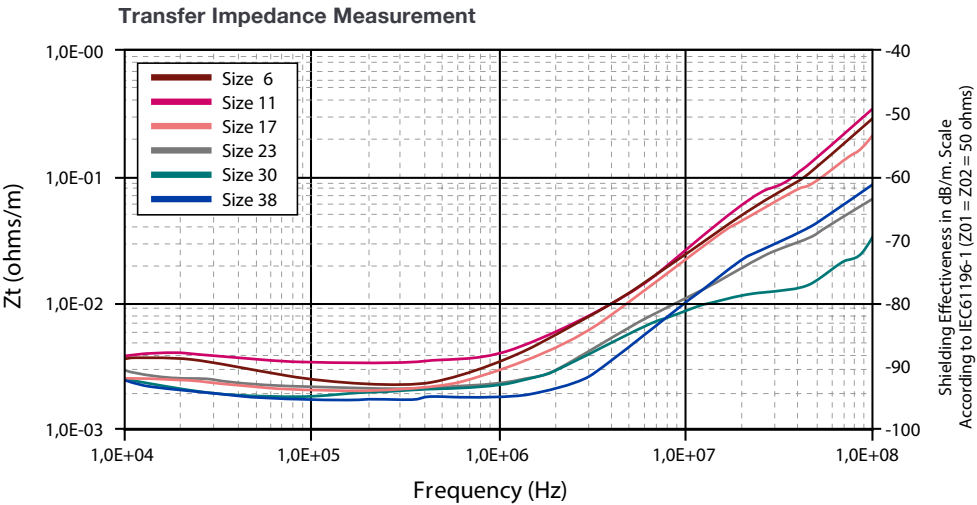
PTFE tape (inner layer) provides protection
of component from the metal



PPS and Nomex® construction with oils and water
repellent treatment

Properties	Test	Results
Rapid change of temperature	EN2591-305	Pass
Flammability / Smoke / Toxicity	ABD 013 & FAR 25 § 853	Conforms
Water repellency	EN 6059 Part 305	Pass
Abrasion resistance	EN 6059 Part 403	Pass
Dynamic cut-through	EN 6059 Part 405	Pass
Fluid resistance <ul style="list-style-type: none">• Jet fuel: JP4 (Otan F44)• Hydraulic fluid: Skydrol 500 B4• Mineral oil: MIL-L-7870A• Synthetic oil: MIL-L-23699• Cleaning fluids: MIL-L-87936• De-icing fluid: MIL-A-8243	EN 6059-303	Good resistance
Salt spray resistance	EN 2591-307 for 500 hours ASTM B355	Pass Class 27 Nickel plated copper
Mould growth	EN 6059 Part 306	Pass

EMI Performance		
Transfer Impedance	IEC 60512-23-3 Triaxial method	Size 11: Ro = 3.45 mΩ/m



Braided Sleeving

ROUNDIT® 2000 V0 EMI

PPS Mono-filaments and Cu/Ni Wire
Self-wrapping electromagnetic shielding



Ro max = 6mΩ
Lt = 1.2nH



Roundit® 2000 V0 EMI is a wrap-around sleeving designed for high performance EMI shielding of wire and cable bundles.

Manufactured from UL 94 V0 rated PPS mono-filaments and nickel plated copper wires class 4 according to ASTM B-355.

The stable construction guarantees the same level of EMI shielding regardless of the diameter on which it is installed within the recommended application range.

Roundit V0 EMI has many applications in the railway, marine and electronics industries.

Operating Temperature

- From -50°C to +200°C

Specifications & Approvals

- EN 45545-2

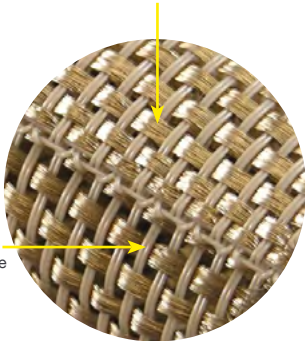
App. Range		Cross	Weight	Pack Size	Part Number
Min. (mm)	Max (mm)	mm²	g/m	Spools (m)	
5.0	8.0	3.5	40	250	ROUNDIT-2000-V0-EMI-8mm-8
8.0	13.0	4.8	55	175	ROUNDIT-2000-V0-EMI-13mm-8
13.0	19.0	5.9	66	125	ROUNDIT-2000-V0-EMI-19mm-8
19.0	25.0	6.9	80	75	ROUNDIT-2000-V0-EMI-25mm-8
25.0	32.0	8.9	105	50	ROUNDIT-2000-V0-EMI-32mm-8
32.0	38.0	10.6	120	35	ROUNDIT-2000-V0-EMI-38mm-8
38.08.0	45.0	11.6	140	35	ROUNDIT-2000-V0-EMI-45mm-8**

** Size 45 has an 80° of overlap (average value) as opposed to normal 90°

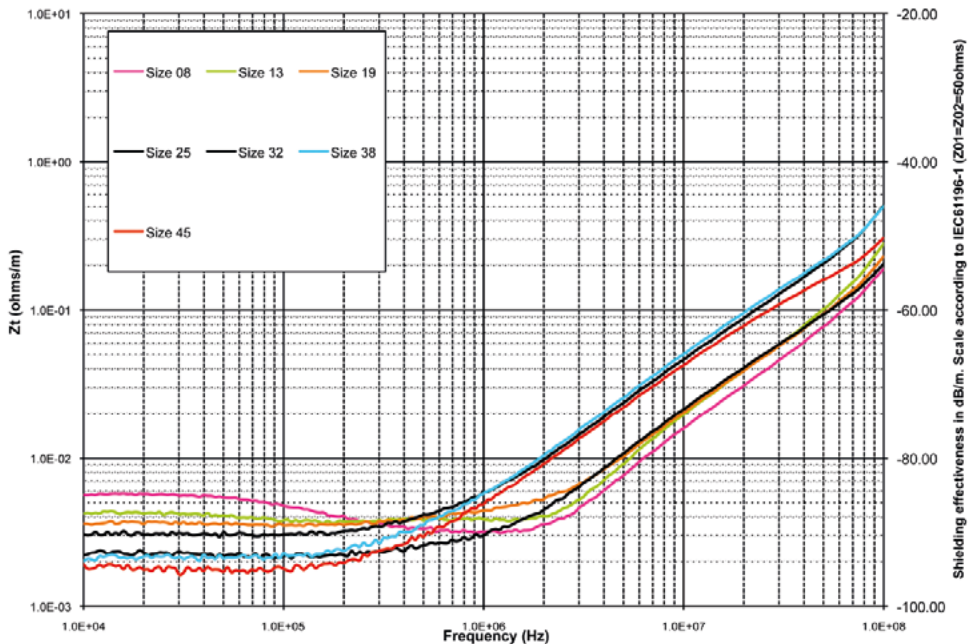
Standard Colour: 8 Light grey

Nickel-plated copper strands are woven to provide high conductivity and ensure EMI shielding.

PPS mono-filaments ensure a highly flexible assembly



Properties	Test	Results
Flammability / Smoke / Toxicity	UL 94 BS6853 DIN 5510 § 2 and 54837 EN 45545-2	Raw material classified V0 Zero halogen toxicity R<1.0 S4,SR2, ST2 R22 HL3 R23 HL3
Nickel plated copper	ASTM B-355	Nickel plated copper, Class 4
Fluid resistance • Hydraulic fluids: NATO.0.156	EN 6059-303 Immersion for 24hrs at +70°C D47 1924	No visible degradation
Salt spray resistance	EN 2591-307 for 96 hours	Pass
EMI Performance		
Resistance measurement	EN 3475-301	R0 max all sizes = 6mΩ
Transfer Impedance	IEC 60096-1 Triaxial method on straight installation	Lt = 1.2 nH

Transfer Impedance Measurement

Braided Sleeving

ROUNDIT® EMI FMJ

PPS Mono-filaments and Cu/Ni Wire
Self-wrapping electromagnetic shielding

95% Optical Coverage

Roundit® EMI FMJ (Full Metal Jacket) is a wrap-around sleeving designed for high performance EMI shielding of wire and cable bundles. Manufactured from PPS mono-filaments and nickel plated copper.

The stable construction guarantees the same level of EMI shielding regardless of the diameter on which it is installed within the recommended application range.

Thanks to its unique geometry and metal insertion, ROUNDIT EMI FMJ is easy to clamp with existing solutions.

Roundit® EMI FMJ has many applications in the aeronautical, space and military industries.

Specifications & Approvals

- EN 45545-2

Operating Temperature

- From -65°C to +200°C

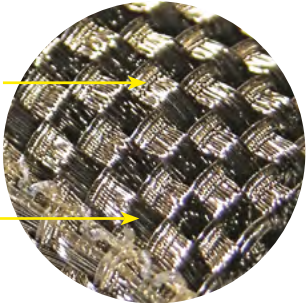
App. Range		Weight	Pack Size	Part Number
Min. (mm)	Max (mm)	g/m	Spools (m)	
1.0	5.0	30	250	ROUNDIT-EMI-FMJ-5mm-8*
5.0	8.0	40	250	ROUNDIT-EMI-FMJ-8mm-8
8.0	13.0	60	175	ROUNDIT-EMI-FMJ-13mm-8
13.0	19.0	85	125	ROUNDIT-EMI-FMJ-19mm-8
19.0	25.0	107	75	ROUNDIT-EMI-FMJ-25mm-8
25.0	32.0	144	50	ROUNDIT-EMI-FMJ-32mm-8
32.0	38.0	169	35	ROUNDIT-EMI-FMJ-38mm-8

* Size 5 is designed for cross-talk applications and complies with a maximum R0 at 8mΩ and a Lt at 1.3 nH. This is delivered with a white ivory line for maximum operating diameter identification. Lightning strike exposure upon request.

Standard Colour: 8 Light grey

Nickel-plated copper strands are woven to provide high conductivity and insure EMI shielding with a 95% optical coverage

PPS mono-filaments ensure aerospace grade temperature and a highly flexible assembly

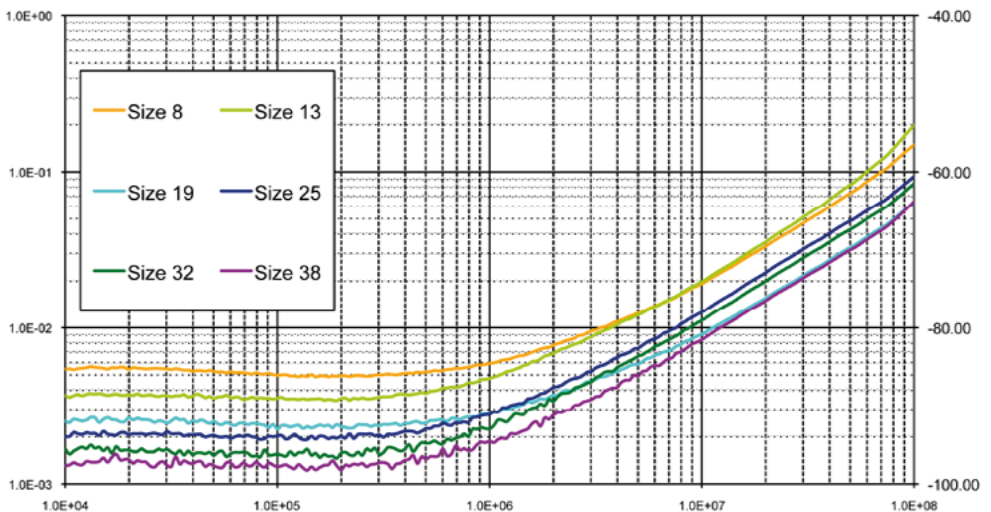


Properties	Test	Results
Rapid change of temperature	EN2591-305	Pass
Flammability / Smoke / Toxicity	ABD 031 & FAR 25 § 853 NF 16101 & 16102 EN 45545-2	Conforms I3 F0 R22 HL3 R23 HL3
Dynamic cut-through	EN 6059 Part 405	Pass
Hard Vacuum	ASTM E-595	Meets standards
Fluid resistance • Jet fuel: JP4 (NATO F44) • Hydraulic fluid: Skydrol 500 B4 • Mineral oil: MIL-L-7870A • Synthetic oil: MIL-L-23699 • Cleaning fluids: MIL-L-87936 • De-icing fluid: MIL-A-8243	EN 6059-303	Pass
Salt spray resistance	EN 2591-307 for 96 hours	Pass
Mould growth	EN 6059 Part 306	Pass

EMI Performance

Resistance Measurement	EN 3475-301	Ro max size 8 - 5.5 mΩ Ro max other sizes - 5 mΩ
Transfer Impedance	IEC 62153-4-3 Triaxial method on straight installation	Lt = 0.6 nH
Lightning	EN 2591-214 - Waveform 1 10KA	Pass

Transfer Impedance Measurement



Braided Sleeving

ROUNDIT® EMI C* XWS B

PPS Mono-filaments and Cu/Ni Wire
Self-wrapping electromagnetic shielding



Ro max = 5mΩ
Lt = 2nH



HALOGEN
FREE

RoHS
compliant

Wrap-around sleeving designed for EMI shielding of wire and cable bundles. Manufactured from PPS mono-filaments and nickel plated copper wire.

C4 blue tracer (Nickel coating is at least 4% total weight of coated wire)

C27 violet tracer (Nickel coating is at least 27% total weight of coated wire)

Supplied with an internal layer of PTFE tape thus allowing wire harnesses/bundles to be protected from the metal.

Thanks to its unique geometry and metal insertion, is easy to clamp with existing solutions.

Operating Temperature

- From -65°C to +200°C

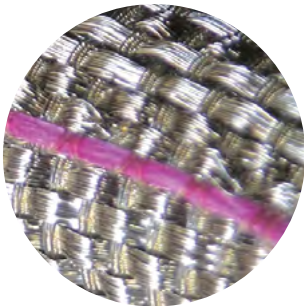
Specifications & Approvals

- C4 offers; ASD EN 4674-003
- C27 offers; ASD EN 4674-004

App. Range		Max. Weight		Pack Size	Part Number
Min. (mm)	Max (mm)	C4 (g/m)	C27 (g/m)	Spools (m)	
1.0	5.0	50	59	200	ROUNDIT-EMI-C*-XWS-B-5-8
5.0	8.0	54	66	150	ROUNDIT-EMI-C*-XWS-B-8-8
8.0	13.0	67	77	125	ROUNDIT-EMI-C*-XWS-B-13-8
13.0	16.0	72	82	75	ROUNDIT-EMI-C*-XWS-B-16-8
16.0	19.0	93	96	75	ROUNDIT-EMI-C*-XWS-B-19-8
19.0	25.0	122	122	75	ROUNDIT-EMI-C*-XWS-B-25-8
25.0	32.0	160	160	50	ROUNDIT-EMI-C*-XWS-B-32-8
32.0	38.0	187	187	35	ROUNDIT-EMI-C*-XWS-B-38-8
38.0	45.0	205	205	35	ROUNDIT-EMI-C*-XWS-B-45-8

* Denotes that either C4 or C27 should be stated

Larger sizes up to 165mm are available in C27 sleeving, made up by assembling two together without the inner PTFE layer, please contact us for more information.



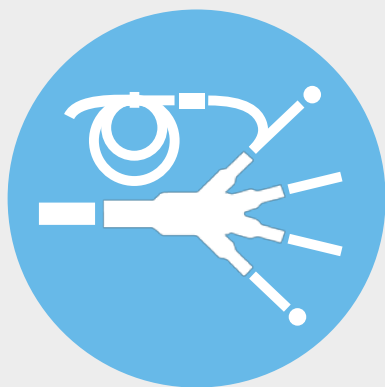
Colours Available



C4 - Blue tracer

C27 - Violet tracer

Properties	Test	Results
Rapid change of temperature	EN6059-308	Pass
Flammability / Smoke / Toxicity	ABD 031 & FAR 25 § 853	Conforms
Dynamic cut-through	EN 6059 Part 405	Pass
Bending	EN 6059 Part 402	Pass
Vibrations	EN 6059 Part 406	Pass
Fluid resistance • Jet fuel: JP4 (NATO F44) • Hydraulic fluid: Skydrol 500 B4 • Mineral oil: MIL-L-7870A • Synthetic oil: MIL-L-23699 • Cleaning fluids: MIL-L-87936 • De-icing fluid: MIL-A-8243	EN 6059-303	Good resistance
Salt spray resistance	C4: EN 2591-307 for 96 hours C27: EN 2591-307 for 500 hours	Pass
Mould growth	EN 6059 Part 306	Pass
EMI Performance		
Resistance Measurement	EN 3475-301	Ro max = 5 mΩ all sizes except size 5 = 6 mΩ
Transfer Impedance	IEC 62153-4-3 Triaxial method	Lt = 2 nH Pass
Lightning	EN 2591-214 C4: Waveform 1 5KA C27: Waveform 1 10KA	Pass



Wire and Cable

Heat-shrink Tubing

Non-shrink Tubing

Braided Sleeving

Screening Braids

Moulded Parts

Terminals and Splices

Wire and Cable Markers

Accessories

Connectors

Backshells

Bonding Leads

Metal Braids

Relays and Contactors

Switches and Grips

Adhesives and Tapes

Application Equipment

Added Value Services

INTRODUCTION

Metal Screening Braids

up to 99% Optical Coverage

Screening braid is a cost effective solution for shielding wire bundles from electromagnetic interference (EMI/EMC). In many applications cable screening is important to either minimise cross-talk within the cable or prevent internal or external sources of interference.

Features & Benefits

- EMI/EMC Protection
- Mechanical protection



Product	Type	Description
Electromagnetic Shielding...		
Raybraid® 90, 101 and 103	Tubular	Tubular metal braid for electrical screening of wire bundles, with up to 99% optical coverage, with minimum of 90%.
InstaLite® 101 and 103	Tubular	Lightweight tubular metal alloy braiding for electrical screening of wire bundles, 50% lighter than traditional copper braid
CSB	Tubular	Commercial grade metal braid for electrical screening, offering a minimum of 90% optical coverage
HBT90 and HBT99	Tubular	Tubular metal braid for electrical screening, offering up to 99% optical coverage HBT99.

Metal Braid EMI/EMC Shielding

RAY-90, -101 and -103	Raybraid® for professional electrical EMI screening	page 174
LWB-101 and -103 Series	INSTALITE® lightweight copper alloy braid	page 176
CSB	Commercial screening braid	page 177
HBT90	Standard grade screening braid	page 178
HBT99	Premium grade screening braid	page 179

Markets	Temp.	Construction	Size
...continued			
Aero, Defence	101 up to +150°C 103 up to +200°C	Series 90 & 101 tinned Cu and series 103 tinned Ni Cu	3.0 to 30.0mm
Aero, Motorsport	101 up to +150°C 103 up to +200°C	Series 101 tinned Cu alloy and series 103 tinned Ni Cu	3.0 to 20.0mm
Commercial/ Industrial	up to 150°C	Tinned copper	3.0 to 30.0mm
Aero, Defence Motorsport	90 up to +150°C 99 up to +260°C	Series 90 tinned Cu and series 99 tinned Ni Cu	3.0 to 30.0mm 3.0 to 40.0mm

Screening Braid

RAYBRAID®

Professional Grade, Tin or Nickel plated Copper
Electromagnetic Screening Braid

Raybraid® 90 has a minimum of 90% optical coverage and is available in a wide range of sizes to cover 2mm to 36mm diameters.

Raybraid® 101 and 103 have a minimum of 93% and maximum of 100% optical coverage and is available in a wide range of sizes to cover 2.5mm to 38mm diameters.

Standard Raybraid 90 and 101 are tinned copper with Raybraid 103 being nickel plated copper for high temperature applications.

Raybraid is supplied on a round tube former which facilitates assembly and is more robust than braid supplied in flattened form.



Operating Temperature

- Raybraid 90 & 101 up to +150°C
- Raybraid 103 above +200°C

Raybraid is fully compatible with Tinel-Lock adaptors for termination of the braid to associated connectors.

Features & Benefits

- Screening military harnesses
- Minimum 90% optical coverage
- 101 and 103 Super flexible
- Good expansion ratio
- Supplied on plastic former to maintain round profile and is more robust than braid supplied in flattened form

CSAmm² and Resistance - General guidelines, ratings based on ambient of 20°C

Size No.	RAY-90			RAY-101			RAY-103	
	CSA mm²	Resistance	Current	CSA mm²	Resistance	Current	CSA mm²	Resistance
-3.0	1.0	28.0 Ω/km	17	1.3	17.00 Ω/km	18	1.3	17.30 Ω/km
-4.0	1.4	18.3 Ω/km	21	2.1	10.30 Ω/km	28	2.1	10.50 Ω/km
-5.0	1.8	13.8 Ω/km	25	-	-	-	-	-
-6.0	2.1	12.2 Ω/km	28	2.7	8.00 Ω/km	34	2.7	8.10 Ω/km
-7.5	-	-	-	4.3	5.20 Ω/km	42	4.3	5.23 Ω/km
-10.0	4.3	6.0 Ω/km	42	5.5	3.96 Ω/km	52	5.5	4.02 Ω/km
-12.5	4.8	6.1 Ω/km	48	6.8	3.23 Ω/km	57	6.8	3.28 Ω/km
-15.0	8.3	3.0 Ω/km	67	-	-	-	-	-
-20.0	12.8	2.2 Ω/km	81	9.7	2.32 Ω/km	69	9.7	2.35 Ω/km
-25.0	16.4	1.6 Ω/km	98	-	-	-	-	-
-30.0	26.0	1.0 Ω/km	125	-	-	-	-	-

Raybraid 90 Tubular Braid - Minimum 90% Optical Coverage

Part Number	Former Ø	Carrier		Strand Size	Cable Bundle		Pack Size	Weight Nom.
	mm	No. of	Ends	AWG/mm	Min. mm	Max. mm	m	kg/km
RAY-90-3.0	3.0 (±0.13)	16	5	36/0.13	2.0	3.5	100	13
RAY-90-4.0	4.0 (±0.25)	16	7	36/0.13	3.0	5.0	100	17
RAY-90-5.0	5.0 (±0.25)	24	6	36/0.13	4.0	6.0	100	21
RAY-90-6.0	6.0 (±0.25)	24	7	36/0.13	5.0	7.0	100	25
RAY-90-10.0	10.0 (±0.25)	24	9	34/0.16	7.0	12.0	100	52
RAY-90-12.5	12.5 (±0.25)	24	10	34/0.16	11.0	13.0	100	65
RAY-90-15.0	15.0 (±0.38)	24	11	32/0.20	13.0	18.0	50	100
RAY-90-20.0	20.0 (±0.38)	36	7	32/0.20	17.0	23.0	50	165
RAY-90-25.0	25.0 (±0.38)	36	9	30/0.25	22.0	28.0	50	207
RAY-90-30.0	30.0 (±0.38)	36	9	28/0.32	27.0	36.0	50	310

Raybraid 101 and **103** Tubular Braid - Minimum 93% Optical Coverage

Part Number	Former Ø	Carrier		Strand Size	Cable Bundle		Pack Size	Weight Nom.
	mm	No. of	Ends	AWG/mm	Min. mm	Max. mm	metres	kg/km
RAY-10X-3.0	3.0 (±0.13)	16	10	38/0.10	2.5	5.0	100	10.3
RAY-10X-4.0	4.0 (±0.25)	24	7	36/0.13	3.5	7.5	100	17.0
RAY-10X-6.0	6.0 (±0.25)	24	9	36/0.13	4.5	9.5	100	25.0
RAY-10X-7.5	7.5 (±0.25)	24	14	36/0.13	7.0	14.0	100	31.0
RAY-10X-10.0	10.0 (±0.25)	36	12	36/0.13	8.0	22.0	100	41.0
RAY-10X-12.5	12.5 (±0.25)	36	15	36/0.13	11.0	24.0	100	51.0
RAY-10X-20.0	20.0 (±0.38)	48	16	36/0.13	16.0	38.0	50	81.0

Notes

For applications that require a limited wire shielding tape which can be wound around a cable for installation and repair, we offer 000W280. Supplied in 4.5m rolls, width 20mm, material tinned copper. For further information on this or other products in our range, or for assistance with your specific requirements, please contact us.

All numeric data shows average or typical values.

Screening Braid

LWB INSTALITE®

Super light, Tin or Nickel plated Copper
Electromagnetic Screening Braid

INSTALITE offers less weight than in a familiar metal braid technology. Offering up to 50% weight savings over traditional copper braids, INSTALITE lightweight braid has excellent electrical shielding performance over a wide frequency range. Made from high performance nickel plated high strength copper alloy.

Since INSTALITE braid uses well established metal braiding, the transition from traditional braids to INSTALITE is easy. The product can be terminated with standard tooling and installation procedures for existing backshells and band straps, making it easy to introduce it into current applications.

Operating Temperature

- LWB 101 -65°C to +150°C Tin plated
- LWB 103 -65°C to +200°C Nickel plated



Up to 50% Lighter
Minimum 85% Optical
Coverage

InstaLite™ 101 and 103 Lightweight Tubular Braid

Part No.	Former Ø	Optical Coverage		Resistance	Cable Bundle		Pack Size	Weight Nom.
	mm	Min.	Nom.	ohms/km	Min.mm	Max.mm	m	kg/km
LWB-10X-3.0	3.0 (±0.13)	90.0 %	93.7 %	28.0	3.0	4.5	100	8.5
LWB-10X-6.0	6.0 (±0.25)	90.0 %	91.3 %	18.0	4.5	8.0	100	15.5
LWB-10X-10.0	10.0 (±0.25)	90.0 %	96.4 %	9.0	8.0	15.0	100	28.0
LWB-10X-20.0	20.0 (±0.25)	85.0 %	86.0 %	7.0	15.0	25.0	50	45.0

Weight excludes that of the former

Up to 50% lighter than
traditional copper braid
Optical Coverage Min. 85% up
to Max. 96%

Better low-frequency
performance than plated fibres
or micro-filaments

INSTALITE-103-10 passes
21kA waveform 5B lightning
protection

Environmental Performance

Salt spray: ASTM B117
Flex endurance: 1000 cycles min., SAE AS4373
method 704 (180° bend)

Comparison LWB-103 vs RAY-103

Tensile strength [N/mm²]	758	220
Break strength [N]	15.2	11.1
DC Resistance [mΩ/m]	9.0	3.5
Weight [kg/km]	28*	41*
Optical coverage [%]	90	93

Figures for braid with nominal diameter of 10.0mm

* Denotes nominal weight



CSB is a commercial screening braid providing exceptional protection for wire and cable harnesses from electromagnetic, electrostatic and radio frequency interference. Available in tin plated copper and provides a minimum optical coverage of 90%. It is supplied on a removable PVC former in order to maintain its physical integrity and to aid application. This product is recommended for wire systems demanding high levels of protection from electromagnetic interference EMI.

CSB Screening braid provides a cost effective method of screening wire bundles, harnesses, cables and conduit systems. The product can also be utilised for earth continuity purposes.

Minimum 90% Optical Coverage

Operating Temperature

- 65°C to +150°C Tin plated

CSB Tubular Braid - Minimum 90% Optical Coverage

Part No.	Internal Dia.	No. of Carriers	Strand Size	Expansion Range		Max. Weight*	Reel Size
	mm			Min. mm	Max. mm		
CSB-030T	3.0	16	0.100	2.5	5.0	14.1	100
CSB-040T	4.0	24	0.127	3.5	7.5	23.2	100
CSB-050T	5.0	24	0.127	3.5	8.5	26.1	100
CSB-060T	6.0	24	0.127	4.5	9.5	29.5	100
CSB-075T	7.5	24	0.127	7.0	14.0	46.3	100
CSB-100T	10.0	36	0.127	8.0	22.0	58.8	100
CSB-125T	12.5	36	0.127	11.0	24.0	75.0	100
CSB-150T	15.0	36	0.127	14.5	30.0	77.2	100
CSB-200T	20.0	48	0.127	16.0	38.0	109.0	50
CSB-250T	25.0	48	0.202	21.0	39.0	218.2	50
CSB-300T	30.0	48	0.202	27.0	40.0	230.0	50
CSB-400T	40.0	48	0.202	36.0	62.0	305.0	50

* Maximum weights are excluding former

Screening Braid

HBT90

Standard Grade, Tin plated Copper
Electromagnetic Screening Braid

HBT90 screening braid is a quality product providing excellent protection for wire and cable harnesses from electromagnetic, interference. Available in tin plated copper, providing minimum optical coverage of 90%. Offering an effective method of screening wire bundles, harnesses and cables.

Supplied on an internal former to aid installation and maintain the shape and form of braid in transit and prior to installation

Operating Temperature

- 65°C to +150°C Tin plated Copper



Minimum 90% Optical
Coverage

HBT90 Standard Tubular Braid - Minimal 90% Optical Coverage

Part Number	Internal Dia.	Strand Size	Expansion Range		VG Cross Ref.	Reel Size
	mm	mm	Min. mm	Max. mm		
HBT90-03.0-2/2-F	3.0	0.127	2.0	3.5	VG 96936 T10 B001A	100
HBT90-04.0-2/2-F	4.0	0.127	3.0	5.0	VG 96936 T10 B002A	100
HBT90-05.0-2/2-F	5.0	0.127	4.0	6.0	VG 96936 T10 B003A	100
HBT90-06.0-2/2-F	6.0	0.127	5.0	7.0	VG 96936 T10 B004A	100
HBT90-10.0-2/2-F	10.0	0.161	7.0	12.0	VG 96936 T10 B005A	100
HBT90-12.5-2/2-F	12.5	0.161	11.0	13.0	VG 96936 T10 B006A	100
HBT90-15.0-2/2-F	15.0	0.202	13.0	18.0	VG 96936 T10 B007A	100
HBT90-20.0-2/2-F	20.0	0.250	17.0	23.0	VG 96936 T10 B008A	50
HBT90-25.0-2/2-F	25.0	0.250	22.0	28.0	VG 96936 T10 B009A	50
HBT90-30.0-2/2-F	30.0	0.320	27.0	36.0	VG 96936 T10 B0010A	50



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HBT99

Premium Grade, Tin or Nickel plated Copper
Electromagnetic Screening Braid



HBT99 screening braid provides exceptional protection for wire and cable harnesses from electromagnetic, electrostatic and radio frequency interference. Available in either tin plated or nickel plated copper, providing optical coverage from 93% to 99%.

Supplied on an internal former to aid installation and maintain the shape and form of braid in transit and prior to installation.

Operating Temperature

- 65°C to +150°C Tin plated Copper
- 65°C to +260°C Nickel plated Copper

up to 99% Optical Coverage,
with Minimum 93%

*Part Number Construction example

HBT99-10.0-2/0-F Tin plated (-2/)
HBT99-10.0-3/0-F Nickel plated (-3/)

HBT99 Premium Tubular Braid - Maximum 99% to Minimum 93%, Optical Coverage

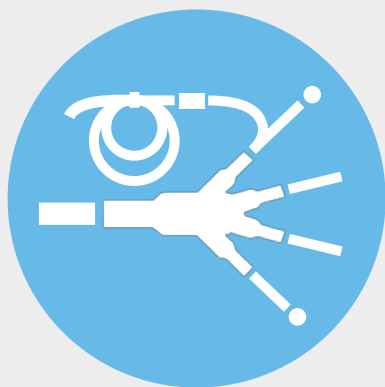
Part Number	Internal Dia.	Strand Size	Expansion Range		VG Cross Ref.	Reel Size
	mm	mm	Min. mm	Max. mm	-2 Tin plated only	m
HBT99-03.0-X/0-F	3.0	0.100	2.5	5.0	VG 96936 T10 A001A	100
HBT99-04.0-X/0-F	4.0	0.127	3.5	7.5	VG 96936 T10 A002A	100
HBT99-05.0-X/0-F	5.0	0.127	3.5	8.5	-	100
HBT99-06.0-X/0-F	6.0	0.127	4.5	9.5	VG 96936 T10 A003A	100
HBT99-07.5-X/0-F	7.5	0.127	7.0	14.0	VG 96936 T10 A004A	100
HBT99-10.0-X/0-F	10.0	0.127	8.0	22.0	VG 96936 T10 A005A	100
HBT99-12.5-X/0-F	12.5	0.127	11.0	24.0	VG 96936 T10 A006A	100
HBT99-15.0-X/0-F	15.0	0.127	14.5	30.0	-	100
HBT99-20.0-X/0-F	20.0	0.127	16.0	38.0	VG 96936 T10 A007A	50
HBT99-25.0-X/0-F	25.0	0.202	21.0	39.0	-	50
HBT99-30.0-X/0-F	30.0	0.202	27.0	40.0	-	50
HBT99-35.0-X/0-F	35.0	0.202	30.0	52.0	-	50
HBT99-40.0-X/0-F	40.0	0.202	36.0	62.0	-	50

For Nickel plated Copper screening braid use -3/ in the part number or -2/ for Tin plated Copper



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Wire and Cable

Heat-shrink Tubing

Non-shrink Tubing

Braided Sleeving

Screening Braids

Moulded Parts

Terminals and Splices

Wire and Cable Markers

Accessories

Connectors

Backshells

Bonding Leads

Metal Braids

Relays and Contactors

Switches and Grips

Adhesives and Tapes

Application Equipment

Added Value Services

Moulded Parts

INTRODUCTION

Heat Shrinkable Boots Transitions and End Caps Glands and Feedthroughs

Based on heat-shrink technology, moulded parts and shapes are available in a vast range of configurations, sizes and materials, from miniature lightweight and space saving straight boots through to large multi-way harness transitions.

Moulded parts can be used to seal and protect harnessing breakouts and terminations from environmental hazards, as well as providing strain relief. Material selection enables full integration and compatibility with other harness components, producing electrical systems that can be used under the most extreme environmental conditions.

Boots

Ideal for providing a high performance environmental seal and mechanical protection between the cable or wire and the connector or connector adaptor.

InstaLite Boots

Offering up to 30% weight savings over similar standard boots, see 202K121 and 222K121 pages in this section. Please note that this range is being expanded, so please contact us for the latest information.

Transitions / Breakouts

Ideal replacement for tapes, mould-in-place epoxies and grease. These moulded parts can be used for cable breakouts, transitions and terminations.

End Caps

Provide optimum waterproofing and environmental protection for sealing cable ends in underwater, underground, or outdoor applications.



Glands and Feedthroughs

Moulded heat shrinkable non screened bulkhead feedthroughs 207Wxxx and CESx available in various configurations for environmentally sealed enclosures.

Also available are a range of screened and non-screened one piece heat shrinkable feedthroughs TCFS and TCFR

Features & Benefits









- Mechanical protection
- Chemical resistance
- Electrical insulation
- Electrical screening
- Fluid and solvent resistance
- Moisture protection
- Strain relief
- Flame-retardant, low smoke
- Extreme temperature performance
- Aesthetic enhancement
- Fast & efficient installation
- Wide range of materials
- Pre-installed adhesives
- Modification options

SELECTION GUIDES	Overview and part numbering	page 184	1
	Material selection	page 220	
Boots			2
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222A111 to 196	Right Angle, Non-lipped	page 189	3
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202K121-25L to 185-25L	Straight - Lipped, INSTALITE	page 191	4
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202D921 to 963	Long Tail, Straight - Lipped	page 196	
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202A111 G07 and 222A111 G07	Straight and Right Angled - Micro Boots	page 198	
204W221 and 224W221	Straight and Right Angled - Micro Boots	page 199	8
203W301 and 223W601	Straight and Right Angled - Micro Boots	page 200	
204W221 G03 and 224W221 G03	Straight and Right Angled - Micro Boots	page 201	9
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204W511-12 and 224W511-12	Straight and Right Angled - Micro Boots	page 203	10
Transitions			
301A011 to 301A048	'T' Transitions	page 204	11
322A112 to 322A158	'T' Transitions	page 205	
342A012 to 342A058	45° Transitions	page 206	12
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End Caps			15
PD Caps and TC Caps	Dual wall and single wall, small	page 212	
101Axxx and SSCx	Standard and thick wall, large	page 214	16
Glands and Feedthroughs			17
207Wxxx	Bulkhead feedthrough, heat-shrink	page 216	
CESx	Cable Entry Seal, heat shrink	page 217	18
TCFS and TCFR	One piece heat shrinkable feedthroughs	page 218	

Moulded Parts

Selection Guide Overview

Part number and visual identifier
Product Type

BOOTS		
Application	Family Description	Typical Shapes
Non-lipped Boots	202A111 to 196 Straight 222A111 to 196 Right Angle	 
Lipped Boots	202K121 to 185 Straight 222K121 to 185 Right Angle	 
Screened Lipped Boots	202S121 to 174 Straight 222S121 to 174 Right Angle	 
Lipped boots, extended tail	202D921 to 963 Straight 222D921 to 963 Right Angle	 

MICRO MOULDED Family







Micro Moulded Lipped Boots	202A111-xx-G07 204W221 203W301-xx-G02 204W221-xx-G03 204W511-12 or -25	
	222A111-xx-G07 224W221 223W601-xx 224221-xx-G03 224W511-12 or -25	

Shown here are our more popular products, for further information on the extensive range of moulded parts and shapes available, or for assistance with your specific requirements, please contact us.

A range of heat guns and adhesives are also available for installing moulded parts and shapes, please refer to the relevant sections in this catalogue.

Moulded parts and shapes material performance characteristics can be found later in this section.

TRANSITIONS

Application	Family Description	Typical Shapes
'T' Transitions	301A011 to 048 322A112 to 158	
45° Transitions	342A012 to 058 342A112 to 138	
30° Transitions	362A014 to 114	
'Y' Transitions	382A012 to 046	
1:3 Transitions	462A011 to 060	
1:4 Transitions	562A011 to 067	

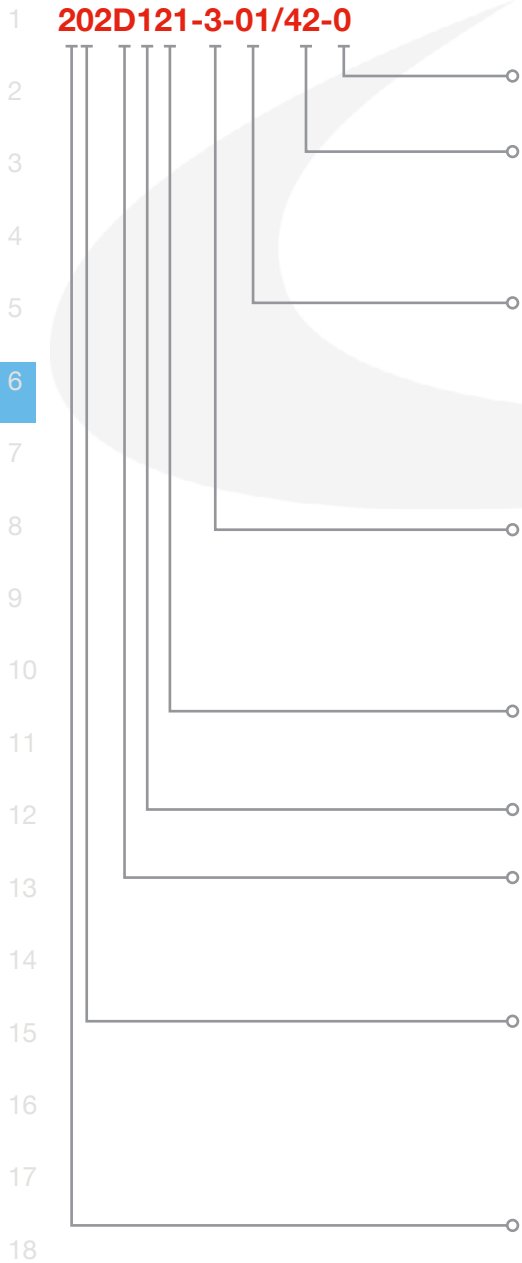
End Caps

Application	Family Description	Typical Shapes
PD and TC End caps	Polyolefin heat shrink Single and dual wall	
End caps	101A011 to 094 SSC-1 to -7	

Moulded Parts

Part Numbering System

Building your part number



Part Numbering example

Colour:

0 Black

Adhesive Coating (Optional):

- /42** General purpose hot melt adhesive
- /86** High performance hot melt adhesive
- /180** Low fire hazard hot melt adhesive
- /225** Pre-coated curing adhesive

Modification (Optional):

- 00** Potting ports
 - 01** One lip removed
 - 02** Two lips removed
 - 11** One lip removed with potting ports
 - 21** Two lips removed with potting ports
 - G** Special constructions / modifications
- Note: Removal of lips will reduce length of boot

Material:

- 3** Semi-rigid polyolefin
- 4** Flexible polyolefin
- 12** Fluoro-elastomer
- 25** Fluid resistant elastomer
- 100** Low fire hazard

Size of Part in Family:

- 11** Smallest through to...
- 99** Largest part

Family Member:

Type of Part

- | | |
|-----------------------|--------------------------|
| -A Non lipped | -K Lipped boots |
| -C Lipped boot | -S Screened |
| -D Lipped boot | -W,P Other shapes |
| -G Lipped boot | |

Angle of Part

- | | |
|--------------------|--------------------|
| Circular | Non circular |
| -0 Straight | -0 Straight |
| -2 90° | -3 90° |
| -4 45° | -5 45° |
| -6 30° | -7 30° |

Number of Openings in the part



Seal, Protect and Strain-Relieve
with Heat-Shrinkable Moulded Parts in
a Range of Shapes and Materials to
Help Withstand Harsh Environments.

In addition to the products reviewed in this
catalogue on the following pages, there is an
extensive range of complimentary shapes and
materials also available outlined below, for
further details please contact us.

- Uniboats
- Rectangular Boots
- Slimline

Moulded Parts

202A111 to 196

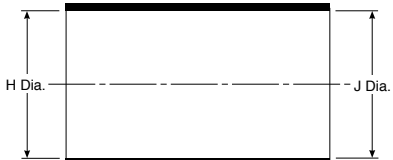
Non-Lipped
Straight, boot

Mechanical protection and strain relief. As the part does not have a lip it can be installed directly onto the connector accessory thread.

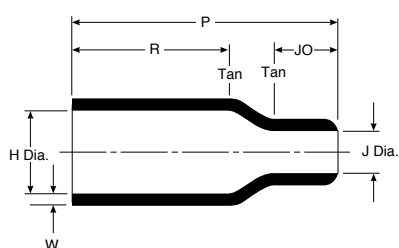
Ordering Information

- Standard colour Black.
- Please specify the product name, size, material, coating and any modifications required, as per Part Numbering System earlier in this section.
- Adhesive lining is optional. If added the entry dimension diameter will be reduced by 1.5mm.
- Moulded parts are individually packaged.
- Dimensions apply to all available materials unless otherwise stated.

As supplied



After Recovery



Product Dimensions Selection Table

Dimension	Dimensions as Supplied				Dimensions After Recovery						
	H		J		H	J	P ±10%	R ±10%	JO ±10%	W ±20%	Weight
Material	3, 4, 25	12, 100	3, 4, 25	12, 100							
Part Number											
202A111	16.5	16.5	16.5	11.9	7.9	3.8	25.0	14.0	6.0	1.3	1.0g
202A121	24.3	22.6	24.6	17.8	9.9	5.3	38.0	22.0	9.0	1.5	3.0g
202A132	28.4	26.2	28.4	20.3	14.2	6.6	51.0	28.0	13.0	1.8	3.6g
202A142	31.0	31.0	31.0	25.4	17.8	7.4	67.0	36.0	18.0	1.8	6.4g
202A153	36.1	36.1	36.1	26.2	21.9	8.6	74.0	41.0	16.0	1.8	11.3g
202A163	42.7	42.7	42.7	27.2	27.4	9.4	99.0	63.0	18.0	2.0	18.0g
202A174	51.8	48.3	51.8	48.3	35.3	16.0	130.0	65.0	42.0	3.3	45.0g
202A185	66.0	66.0	66.0	54.1	43.7	19.6	161.3	90.2	47.8	3.81	-
202A196	86.4	86.4	86.4	71.4	57.2	26.9	212.6	113.0	62.2	4.06	-

All dimensions in mm unless otherwise stated. Weight is based on polyolefin part
Injection and potting ports also available see part number system earlier in this section

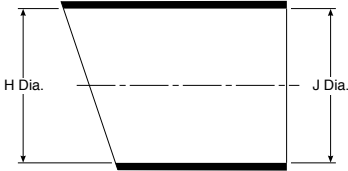
Materials Available

Material	Material Description
-3	Semi-rigid polyolefin
-4	Flexible polyolefin
-12	Fluoro-elastomer
-25	Fluid resistant elastomer
-100	Polyolefin, Zerohal

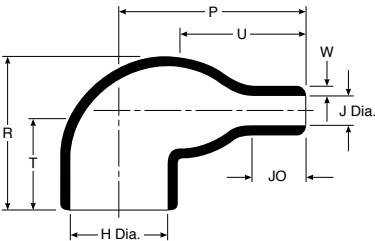
Environmental Adhesives Available

Optional Pre-coat	Optional User Applied
/42 or /86	S-1017 or S-1048
/42 or /86	S-1017 or S-1048
N/A	S-1255-04
/42 or /86 or /225	S-1017 or S-1048 or S-1125
/86 or /180	S-1048 or S-1030

As supplied



After Recovery



Mechanical protection and strain relief. As the part does not have a lip it can be installed directly onto the connector accessory thread.

Ordering Information

- Standard colour Black.
- Please specify the product name, size, material, coating and any modifications required, as per Part Number System earlier in this section.
- Adhesive coating is optional. If added the entry dimension diameter will be reduced by 1.5mm.
- Moulded parts are individually packaged.
- Dimensions apply to all available materials unless otherwise stated.

Product Dimensions Selection Table

Dimension	Dimensions as Supplied				Dimensions After Recovery								Weight
	H	J			H	J	P ±10%	R ±10%	T ±10%	U ±10%	JO ±10%	W ±10%	
Material	All	3, 4, 25	100	12									
Part Number													
222A111	17.8	17.8	10.9	9.9	7.9	3.8	17.3	20.1	-	11.4	4.3	1.02	0.9g
222A121	24.9	24.9	16.0	18.0	10.2	5.3	21.3	22.6	-	14.7	5.8	1.27	1.4g
222A132	30.0	30.0	21.1	20.6	14.2	6.4	26.9	26.7	19.1	17.8	7.1	1.52	2.9g
222A142	32.5	32.5	22.9	22.9	17.3	6.9	36.6	30.5	19.1	24.9	10.2	1.78	5.4g
222A152	36.1	36.1	27.4	26.4	21.8	8.4	43.7	35.1	19.1	30.0	12.7	1.78	7.7g
222A163	43.9	43.9	28.4	27.4	27.4	9.4	53.6	43.9	19.1	34.0	17.3	2.03	13.0g
222A174	53.1	53.1	48.3	46.7	33.8	15.0	75.7	52.8	25.4	53.2	32.0	3.30	31.0g
222A185	67.6	67.6	58.4	54.4	44.2	20.3	97.5	66.0	25.4	71.1	40.6	3.81	-
222A196	87.6	87.6	68.8	63.0	55.4	23.4	128.0	79.2	25.4	87.6	56.4	4.57	-

All dimensions in mm unless otherwise stated. Weight is based on polyolefin part
Injection and potting ports also available see part number system earlier in this section

Materials Available

Material	Material Description
-3	Semi-rigid polyolefin
-4	Flexible polyolefin
-12	Fluoro-elastomer
-25	Fluid resistant elastomer
-100	Polyolefin, Zerohal

Environmental Adhesives Available

Optional Pre-coat	Optional User Applied
/42 or /86	S-1017 or S-1048
/42 or /86	S-1017 or S-1048
N/A	S-1255-04
/42 or /86 or /225	S-1017 or S-1048 or S-1125
/86 or /180	S-1048 or S-1030

Moulded Parts

202K111 to 185

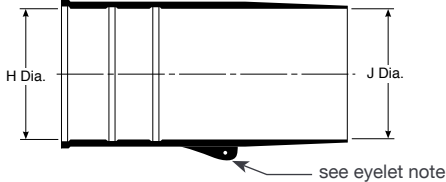
Lipped
Straight, boot

Mechanical protection and strain relief.
Part includes a lip or lips as required, can
be installed onto circular adaptors of the
appropriate shell size.

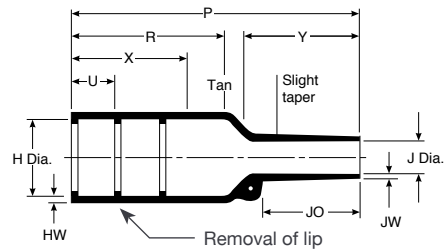
Ordering Information

- Please specify the product name, size, material, coating and any modifications required, as per Part Number System earlier in this section.
- Adhesive coating is optional. If added the entry dimension diameter will be reduced by 1.5mm.
- -12 material is supplied without eyelet, if required add CS-1863 to part number
- If eyelet clip (000W212) is required with potting ports then add CS-1858 to part number

As supplied



After Recovery



Product Dimensions Selection Table

	Dimensions as Supplied				Dimensions After Recovery								Nom. Weight
Dimension	H	J			H	J	P ±10%	R ±10%	U ±10%	JO ±10%	HW ±10%	JW min	
Material		3, 4, 25	12	100									
Part Number													
202K111	17.0	17.0	13.0	14.0	6.9	3.0	39.0	24.0	n/a	10.8	1.3	0.7	1.3g
202K121	24.0	24.0	13.0	14.0	10.4	5.6	38.0	21.0	12.0	8.5	1.9	0.41	2.4g
202K132	30.0	30.0	14.0	15.0	14.2	5.9	55.0	32.0	12.0	11.5	1.8	0.81	4.8g
202K142	31.0	31.0	16.0	18.0	18.0	7.1	67.0	35.0	20.0	17.0	1.8	0.81	9.9g
202K153	36.0	36.0	19.0	21.0	22.4	8.4	80.0	42.0	20.0	19.5	2.0	0.81	12.0g
202K163	43.0	43.0	22.0	25.0	28.2	9.9	99.0	61.0	20.0	21.0	2.2	0.81	20.0g
202K174	60.0	60.0	35.0	39.0	35.1	15.7	130.0	72.0	20.0	39.0	3.3	1.02	44.5g
202K185	66.0	66.0	38.0	42.0	44.5	16.8	170.0	90.0	20.0	51.5	3.8	1.63	-

All dimensions in mm unless otherwise stated. Weight is based on polyolefin part. Injection and potting ports also available see part number system earlier in this section.
202K111 only available with single lip and without eyelet. 202K121 thru 202K153 supplied with two lips only.
Removal of lip(s) will reduce length of the boot, see part numbering page.

Materials Available

Material	Material Description
-3	Semi-rigid polyolefin
-4	Flexible polyolefin
-12	Fluoro-elastomer
-25	Fluid resistant elastomer
-100	Polyolefin, Zerohal

Environmental Adhesives Available

Optional Pre-coat	Optional User Applied
/42 or /86	S-1017 or S-1048
/42 or /86	S-1017 or S-1048
N/A	S-1255-04
/42 or /86 or /225	S-1017 or S-1048 or S-1125
/86 or /180	S-1048 or S-1030

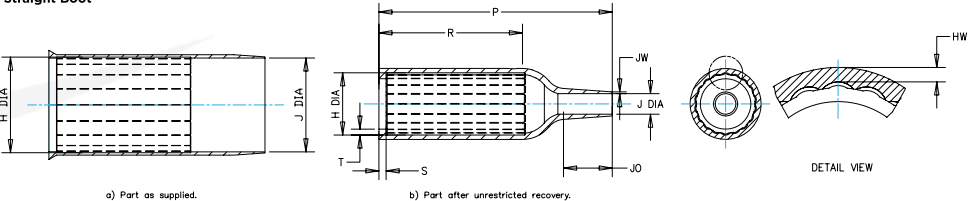
202K121-25L to 185-25L

InstaLite Lipped
Straight, boot

up to 28% LIGHTER

INSTALITE moulded boots advanced materials science drives weight savings and reduces installation time, with high-performance heat shrink shape memory boots.

Straight Boot



InstaLite Product Dimensions Selection Table

	Dim. Supplied		Dimensions After Recovery						Avg. Weight Saving
Dimension	H	J	H	J	P ±10%	R ±10%	HW ±20%	JW min	
Part Number									
202K121-25L	24.0	24.0	10.4	5.6	38.0	21.0	1.3	0.9	20%
202K132-25L	30.0	30.0	14.2	5.9	55.0	32.0	1.3	1.0	20%
202K142-25L	31.0	31.0	18.0	7.1	67.0	35.0	1.2	1.0	20%
202K153-25L	36.0	36.0	22.4	8.4	80.0	42.0	1.5	1.0	23%
202K163-25L	43.0	43.0	28.2	9.9	99.0	61.0	2.0	1.2	28%
202K174-25L	60.0	60.0	35.1	15.7	130.0	72.0	2.3	1.5	22%
202K185-25L	66.0	66.0	44.5	16.8	170.0	90.0	1.8	2.0	21%

All dimensions in mm unless otherwise stated.

INSTALITE boots are a lighter weight alternative to our standard -25 heat shrink boots. Utilising fluid-resistant modified elastomers, the Instalite boots offer semi-rigid, abrasion resistant boots that are up to 28% lighter than standard -25 boots.

The boots offer the same balance of high temperature fluid resistance and long term heat resistance as the standard modified elastomer boots.

Environmental Adhesives Available

Optional Pre-coat	Optional User Applied
/225	S-1125

Moulded Parts

222K121 to 185

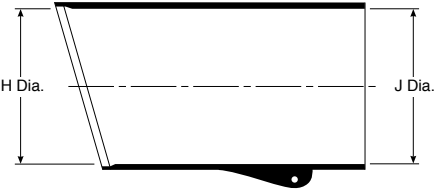
Lipped
Right Angle 90°, boot

Mechanical protection and strain relief.
Part includes a lip or lips as required, can
be installed onto circular adaptors of the
appropriate shell size.

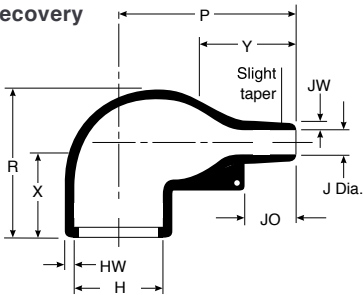
Ordering Information

- Please specify the product name, size, material, coating and any modifications required, as per Part Number System earlier in this section.
- Adhesive coating is optional. If added the entry dimension diameter will be reduced by 1.5mm.
- Dimensions apply to all available materials unless otherwise stated.
- If eyelet clip (000W212) is required with part then add CS-1858 to part number.

As supplied



After Recovery



Product Dimensions Selection Table

Dimension	Dimensions as Supplied				Dimensions After Recovery								Weight
	H		J		H	J	P ±10%	R ±10%	JO ±10%	HW ±10%	JW ±10%		
Material	3, 4, 12, 25	100	3, 4, 25	12, 100									
Part Number													
222K121	24.0	24.0	24.0	14.0	10.4	5.6	25.0	25.0	8.5	1.3	0.5	1.7g	
222K132	30.0	30.0	30.0	15.0	14.2	5.9	32.0	27.0	8.5	1.5	0.8	3.4g	
222K142	31.0	31.0	31.0	18.0	18.0	7.1	39.0	31.0	15.0	1.8	1.0	5.8g	
222K152	36.0	36.0	36.0	21.0	22.4	8.4	46.0	38.0	16.0	1.8	1.0	9.0g	
222K163	43.0	43.0	43.0	25.0	28.2	9.9	55.0	45.0	17.5	2.0	1.0	14.2g	
222K174	60.0	52.0	60.0	39.0	35.1	15.7	80.0	54.0	32.0	3.3	1.8	36.7g	
222K185	66.0	66.0	66.0	42.0	44.5	16.8	108.0	68.0	48.0	3.8	2.0	-	

All dimension in mm unless otherwise stated. Weight is based on polyolefin part.
Injection and potting ports also available see part number system earlier in this section

Materials Available

Material	Material Description
-3	Semi-rigid polyolefin
-4	Flexible polyolefin
-12	Fluoro-elastomer
-25	Fluid resistant elastomer
-100	Polyolefin, Zerohal

Environmental Adhesives Available

Optional Pre-coat	Optional User Applied
/42 or /86	S-1017 or S-1048
/42 or /86	S-1017 or S-1048
N/A	S-1255-04
/42 or /86 or /225	S-1017 or S-1048 or S-1125
/86 or /180	S-1048 or S-1030

222K111-25L to 185-25L

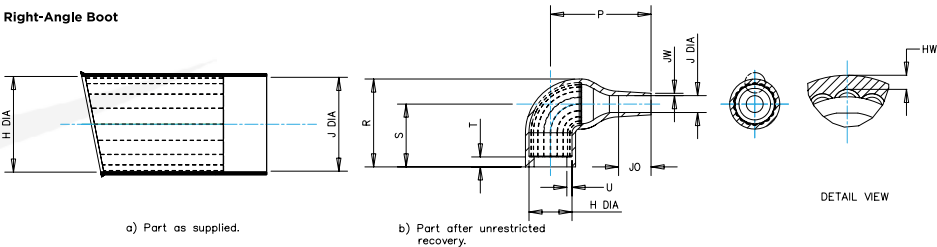
InstaLite Lipped
Right Angle 90°, boot



up to 30% LIGHTER

INSTALITE moulded boots advanced materials science drives weight savings and reduces installation time, with high-performance heat shrink shape memory boots.

Right-Angle Boot



InstaLite Product Dimensions Selection Table

	Dim. Supplied		Dimensions After Recovery							Avg. Weight Saving
Dimension	H	J	H	J	P ±10%	R ±10%	S ±10%	HW ±20%	JW min	
Part Number										
202K121-25L	24.0	24.0	10.4	5.6	25.0	25.0	19.0	1.3	0.9	30%
202K132-25L	30.0	30.0	14.2	5.9	32.0	27.0	20.0	1.3	1.0	26%
202K142-25L	31.0	31.0	18.0	7.1	39.0	31.0	21.0	1.2	1.0	21%
202K153-25L	36.0	36.0	22.4	8.4	46.0	38.0	26.0	1.5	1.0	26%
202K163-25L	43.0	43.0	28.2	9.9	55.0	45.0	30.0	2.0	1.2	21%
202K174-25L	60.0	60.0	35.1	15.7	80.0	54.0	35.0	2.3	1.5	23%
202K185-25L	66.0	66.0	44.5	16.8	108.0	68.0	42.0	1.8	2.0	25%

All dimensions in mm unless otherwise stated.

INSTALITE boots are a lighter weight alternative to our standard -25 heat shrink boots. Utilising fluid-resistant modified elastomers, the Instalite boots offer semi-rigid, abrasion resistant boots that are up to 30% lighter than standard -25 boots.

The boots offer the same balance of high temperature fluid resistance and long term heat resistance as the standard modified elastomer boots.

Environmental Adhesives Available

Optional Pre-coat	Optional User Applied
/225	S-1125

Moulded Parts

202S121 to 174

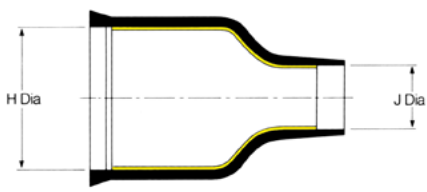
Lipped
Straight, Rayaten® Screened boot

Ideally suited for harness applications where high levels of screening are required between the cable and connector.

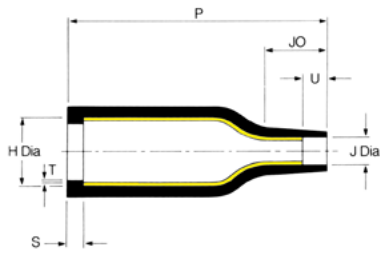
Ordering Information

- Standard colour Black.
- Size selection please refer to table below.
- When ordering specify the product name, size, material and modifications required, as per Part Number System.
- Moulded parts are individually packaged.
- Dimensions apply to all available materials unless otherwise stated.

As supplied



After Recovery



Product Dimensions Selection Table

	Dimensions as Supplied				Dimensions After Recovery								
Dimension	H		J		H	J	P ±10%	R ±10%	S ±10%	T ±10%	U ±10%	JO ±10%	Weight
Material	3, 25	100	3, 25	100									
Part Number													
202S121	20.0	14.0	11.0	10.0	10.4	5.0	45.0	17.0	3.0	1.0	10.0	15.0	4.0g
202S132	24.0	20.0	15.0	12.0	14.2	6.0	60.0	28.0	3.0	1.0	10.0	17.0	7.2g
202S142	31.0	26.0	18.0	14.0	18.0	7.2	72.0	32.0	3.0	1.0	10.0	20.0	10.6g
202S152	36.0	32.0	22.0	20.0	22.4	8.5	85.0	31.0	3.0	1.0	15.0	25.0	15.8g
202S163	43.0	38.0	26.0	24.0	28.2	10.0	110.0	50.0	3.0	1.3	20.0	30.0	27.5g
202S174	47.0	41.0	36.0	32.0	35.1	15.8	135.0	70.0	3.0	1.3	20.0	30.0	70.3g

All dimensions in mm unless otherwise stated. Weight is based on polyolefin part

Materials Available

Material	Material Description
-3C previously 3S	Semi-rigid polyolefin
-25C previously 25S	Fluid resistant elastomer
-100C previously 100S	Zerohal

Environmental Adhesives Available

Optional Pre-coat	Optional User Applied
/42 or /86	S-1017 or S-1048
/42 or /86	S-1017 or S-1048 or S-1125
/86 or /180	S-1048 or S-1030

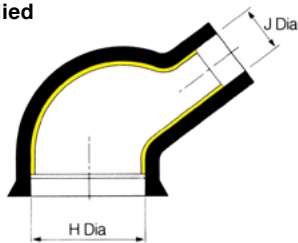
Electrically Conductive Adhesive

The recommended conductive adhesive to be used with screened moulded parts is S-1184 (ordered separately) and can be found in the Adhesives and Tapes section of this catalogue. Installation code of Practice guide is available on request.

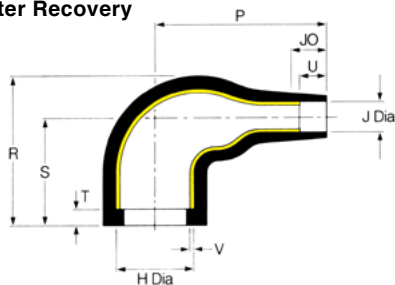
Environmental Sealing Adhesives

A choice of environmental sealing adhesives are available as either a pre-coat or user applied adhesive, see table above. For more information on materials and adhesives, please refer to relevant sections of this catalogue.

As supplied



After Recovery



Ideally suited for harness applications where high levels of screening are required between the cable and connector.

Ordering Information

- Standard colour Black.
- Size selection please refer to table below.
- When ordering specify the product name, size, material and modifications required, as per Part Number System.
- Moulded parts are individually packaged.
- Dimensions apply to all available materials unless otherwise stated.

Product Dimensions Selection Table

	Dimensions as Supplied				Dimensions After Recovery								
Dimension	H		J		H	J	P ±10%	R ±10%	S ±10%	T ±10%	U ±10%	JO ±10%	Weight
Material	3, 25	100	3, 25	100									
Part Number													
222S121	20.0	14.0	11.0	10.0	10.4	5.0	30.0	25.0	19.0	3.0	10.0	15.0	4.0g
222S132	24.0	20.0	15.0	12.0	14.2	6.0	38.0	28.0	20.0	3.0	10.0	17.0	4.7g
222S142	31.0	26.0	18.0	14.0	18.0	7.2	42.0	31.0	21.0	3.0	10.0	18.0	9.2g
222S152	36.0	32.0	22.0	20.0	22.4	8.5	51.0	38.0	26.0	3.0	12.0	20.0	15.1g
222S163	43.0	38.0	26.0	24.0	28.2	10.0	67.0	45.0	30.0	3.0	20.0	28.0	27.6g
222S174	47.0	41.0	36.0	32.0	35.1	15.8	80.0	54.0	36.0	3.0	20.0	31.0	41.0g

All dimensions in mm unless otherwise stated. Weight is based on polyolefin part

Materials Available

Material	Material Description
-3C previously 3S	Semi-rigid polyolefin
-25C previously 25S	Fluid resistant elastomer
-100C previously 100S	Zerohal

Electrically Conductive Adhesive

The recommended conductive adhesive to be used with screened moulded parts is S-1184 (ordered separately) and can be found in the Adhesives and Tapes section of this catalogue. Installation code of Practice guide is available on request.

Environmental Adhesives Available

Optional Pre-coat	Optional User Applied
/42 or /86	S-1017 or S-1048
/42 or /86	S-1017 or S-1048 or S-1125
/86 or /180	S-1048 or S-1030

Environmental Sealing Adhesives

A choice of environmental sealing adhesives are available as either a pre-coat or user applied adhesive, see table above. For more information on materials and adhesives, please refer to relevant sections of this catalogue.

Moulded Parts

202D921 to 963

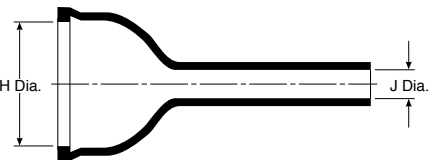
Lipped
Straight, long tail boot

Mechanical protection and cable connector strain relief. Ideal for applications where only a small number of contacts are utilised, resulting in the need for a high ratio boot to match the connector to cable diameter.

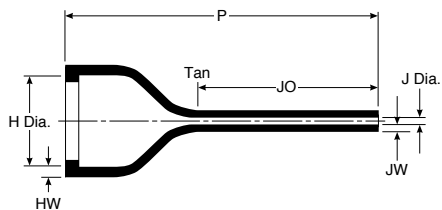
Ordering Information

- Please specify the product name, size, material, coating and any modifications required, as per Part Number System earlier in this section.
- Adhesive coating is optional. If added the entry dimensions will be reduced by 1.5mm.
- Moulded parts are individually packaged.
- Dimensions apply to all available materials unless otherwise stated.

As supplied



After Recovery



Product Dimensions Selection Table

Dimension	Dimensions as Supplied			Dimensions After Recovery						Weight
	H	J		H	J	P $\pm 10\%$	JO $\pm 10\%$	HW $\pm 10\%$	JW $\pm 20\%$	
Material	All	3, 4, 25	12, 100							
Part Number										
202D921	19.3	6.3	4.5	13.0	2.1	60.2	37.6	1.52	1.14	1.9g
202D932	26.1	7.6	5.5	19.1	2.6	74.2	45.0	1.78	1.14	3.7g
202D953	34.2	9.6	6.6	26.0	3.1	84.3	51.1	1.78	1.14	6.4g
202D963	43.6	11.4	7.8	34.1	3.6	99.6	57.7	1.78	1.14	13.0g

All dimensions in mm unless otherwise stated. Weight is based on polyolefin part
Injection and potting ports also available see part number system earlier in this section

Materials Available

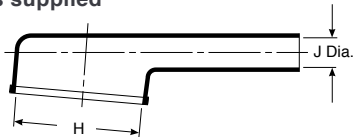
Material	Material Description
-3	Semi-rigid polyolefin
-4	Flexible polyolefin
-12	Fluoro-elastomer
-25	Fluid resistant elastomer
-100	Polyolefin, Zerohal

Environmental Adhesives Available

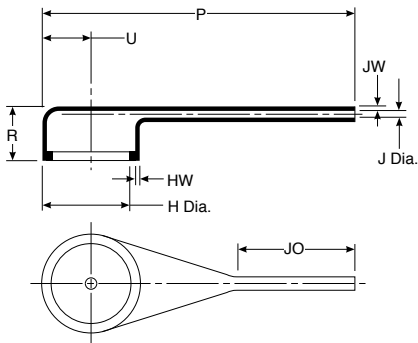
Optional Pre-coat	Optional User Applied
/42 or /86	S-1017 or S-1048
/42 or /86	S-1017 or S-1048
N/A	S-1255-04
/42 or /86 or /225	S-1017 or S-1048 or S-1125
/86 or /180	S-1048 or S-1030

For more information on materials and adhesives, please refer to relevant sections of this catalogue.

As supplied



After Recovery



Mechanical protection and cable connector strain relief. Ideal for applications where only a small number of contacts are utilised, resulting in the need for a high ratio boot to match the connector to cable diameter.

Ordering Information

- Please specify the product name, size, material, coating and any modifications required, as per Part Number System earlier in this section.
- Adhesive coating is optional. If added the entry dimensions will be reduced by 1.5mm.
- Moulded parts are individually packaged.
- Dimensions apply to all available materials unless otherwise stated.

Product Dimensions Selection Table

Dimension	Dimensions as Supplied			Dimensions After Recovery								Weight
	H	J		H	J	P ±10%	R ±10%	U ±10%	JO ±10%	HW ±10%	JW ±10%	
Material	All	3, 4, 25	12, 100									
Part Number												
222D921	19.3	6.3	4.5	13.0	2.1	44.5	16.3	5.6	21.8	1.52	1.14	1.9G
222D932	26.1	7.6	5.6	19.1	2.6	67.3	18.0	8.4	29.2	1.78	1.14	3.7G
222D953	34.2	9.6	6.6	26.0	3.0	81.3	18.8	11.4	36.3	1.78	1.14	6.4G
222D963	43.6	11.4	7.8	34.1	3.6	115.6	21.3	15.5	47.0	1.78	1.14	13.0G

All dimensions in mm unless otherwise stated. Weight is based on polyolefin part
Injection and potting ports also available see part number system earlier in this section

Materials Available

Material	Material Description
-3	Semi-rigid polyolefin
-4	Flexible polyolefin
-12	Fluoro-elastomer
-25	Fluid resistant elastomer
-100	Polyolefin, Zerohal

Environmental Adhesives Available

Optional Pre-coat	Optional User Applied
/42 or /86	S-1017 or S-1048
/42 or /86	S-1017 or S-1048
N/A	S-1255-04
/42 or /86 or /225	S-1017 or S-1048 or S-1125
/86 or /180	S-1048 or S-1030

For more information on materials and adhesives, please refer to relevant sections of this catalogue.

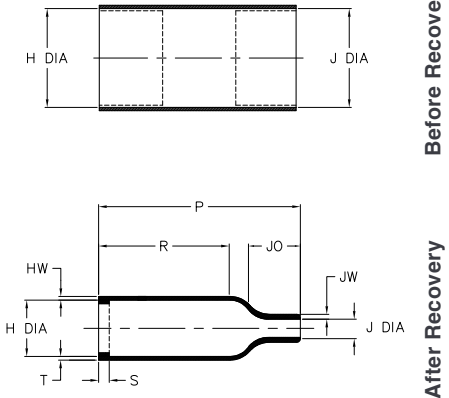
Moulded Parts

Micro Moulded Boots

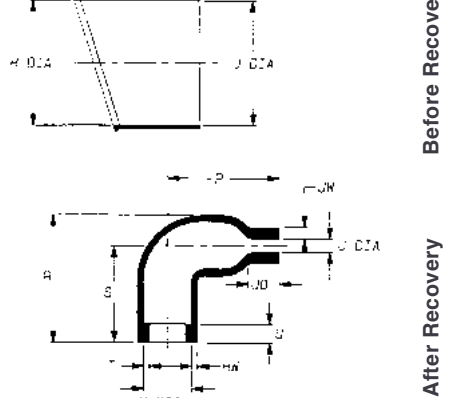
Lipped
Straight and Right Angle 90° boots



202A111-xx-G07



222A111-xx-G07



Product Dimensions Selection Table

Dimensions as Supplied			Dimensions After Recovery								
Dimension	H	J	H	J	P ±10%	R ±10%	S ±10%	T ±20%	JO ±20%	JW ±20%	HW ±20%
Material	25,12*										
Part Number											
202A111-xx-G07	17	17	7.9	2.2	25	14	3.0	1.0	6.0	1.7	1.0
222A111-xx-G07	18	18	7.9	2.2	17	20	15.5	1.7	5.0	1.7	1.0

Note * Please check dimensions for -12 material as may differ, as supplied dimensions may be slightly reduced due to the nature of the material. After recovery sizes are not affected.
All dimensions in millimetres unless otherwise stated.

Materials Available

Material	Material Description
-12	Fluoro-elastomer
-25	Fluid resistant elastomer

Environmental Adhesives Available

Optional Pre-coat	Optional User Applied
/225	S-1255-04
/225	S-1017 or S-1048 or S-1125

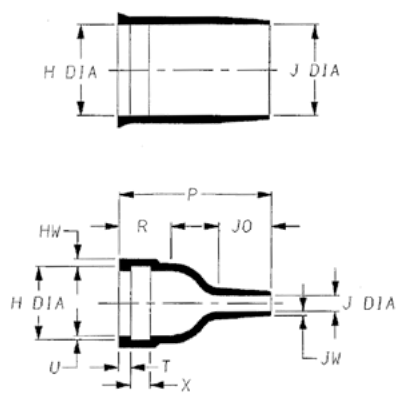
For more information on materials and adhesives, please refer to relevant sections of this catalogue.

Micro Moulded Boots

Lipped
Straight and Right Angle 90° boots



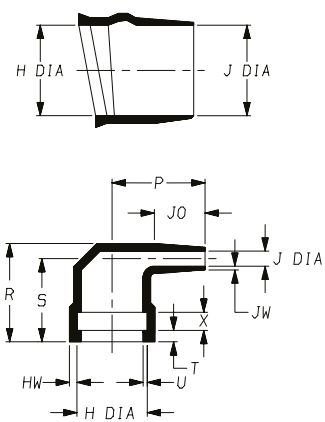
204W221-xx



Before Recovery

After Recovery

224W221-xx



Before Recovery

After Recovery

Product Dimensions Selection Table

Dimensions as Supplied			Dimensions After Recovery										
Dimension	H	J	H	J	P ±10%	R ±10%	S ±10%	T ±10%	U ±10%	X ±10%	JO ±10%	HW ±20%	JW ±20%
Material	25,12*												
Part Number													
204W221-xx	11	11	9.3	2.1	19	6.5	-	1.5	0.55	2.4	6.6	1.0	0.5
224W221-xx	11	11	9.3	2.1	12.3	13	11	1.5	0.55	2.4	6.6	1.0	0.5

Note * Please check dimensions for -12 material as may differ, as supplied dimensions may be slightly reduced due to the nature of the material. After recovery sizes are not affected.
All dimensions in millimetres unless otherwise stated.

Materials Available

Material	Material Description
-12	Fluoro-elastomer
-25	Fluid resistant elastomer

Environmental Adhesives Available

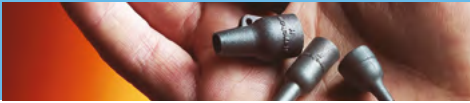
Optional Pre-coat	Optional User Applied
/225	S-1255-04
/225	S-1017 or S-1048 or S-1125

For more information on materials and adhesives, please refer to relevant sections of this catalogue.

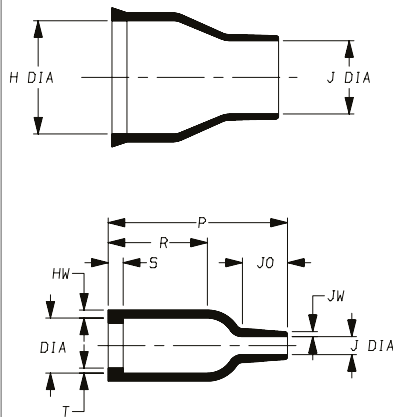
Moulded Parts

Micro Moulded Boots

Lipped
Straight and Right Angle 90° boots



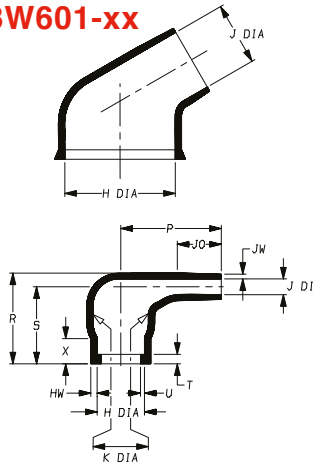
203W301-xx-G02



Before Recovery

After Recovery

223W601-xx



Before Recovery

After Recovery

Product Dimensions Selection Table

Dimensions as Supplied			Dimensions After Recovery											
Dimension	H	J	H	J	K	P ±10%	R ±10%	S ±10%	T ±10%	U ±10%	JO ±10%	HW ±20%	JW ±20%	X ±20%
Material	25, 12*													
Part Number														
203W301-xx-G02	10	6.0	5.8	2.2	-	19	11	1.5	0.5	-	4.5	0.8	0.5	-
223W601-xx	10	6.0	6.3	2.0	7.4	12.5	11.5	9.8	1.2	0.5	6.0	1.0	0.6	3.2

Note * Please check dimensions for -12 material as may differ, as supplied dimensions may be slightly reduced due to the nature of the material. After recovery sizes are not affected.
All dimensions in millimetres unless otherwise stated.

Materials Available

Material	Material Description
-12	Fluoro-elastomer
-25	Fluid resistant elastomer

Environmental Adhesives Available

Optional Pre-coat	Optional User Applied
/225	S-1255-04
/225	S-1017 or S-1048 or S-1125

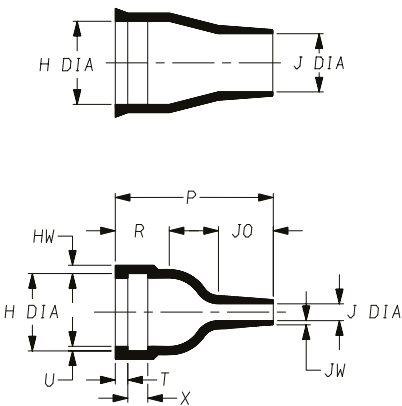
For more information on materials and adhesives, please refer to relevant sections of this catalogue.

Micro Moulded Boots

Lipped
Straight and Right Angle 90° boots



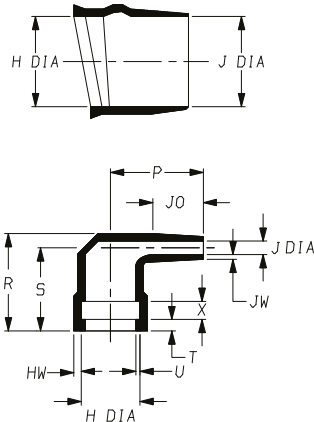
204W221-xx-G03



Before Recovery

After Recovery

224W221-xx-G03



Before Recovery

After Recovery

Product Dimensions Selection Table

Dimensions as Supplied			Dimensions After Recovery										
Dimension	H	J	H	J	P ±10%	R ±10%	S ±10%	T ±10%	U ±10%	X ±10%	JO ±10%	HW ±20%	JW ±20%
Material	25,12*												
Part Number													
204W221-xx-G03	11	11	7.8	1.9	19	6.5		1.5	0.55	2.4	6.6	1.1	0.5
224W221-xx-G03	11	11	7.8	1.9	12.3	13	11	1.5	0.55	2.4	6.6	1.0	0.6

Note * Please check dimensions for -12 material as may differ, as supplied dimensions may be slightly reduced due to the nature of the material. After recovery sizes are not affected.
All dimensions in millimetres unless otherwise stated.

Materials Available

Material	Material Description
-12	Fluoro-elastomer
-25	Fluid resistant elastomer

Environmental Adhesives Available

Optional Pre-coat	Optional User Applied
/225	S-1255-04
/225	S-1017 or S-1048 or S-1125

For more information on materials and adhesives, please refer to relevant sections of this catalogue.

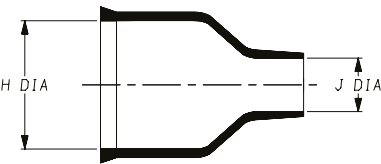
Moulded Parts

Micro Moulded Boots

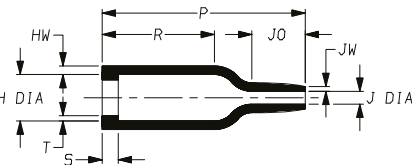
Lipped
Straight and Right Angle 90° boots



204W511-25

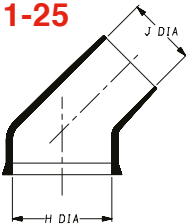


Before Recovery

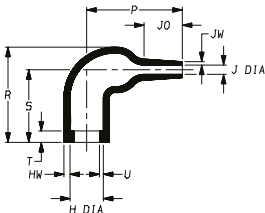


After Recovery

224W511-25



Before Recovery



After Recovery

Product Dimensions Selection Table

Dimensions as Supplied			Dimensions After Recovery									
Dimension	H	J	H	J	P ±10%	R ±10%	S ±10%	T ±20%	U ±20%	JO ±20%	HW ±20%	JW ±20%
Material	25											
Part Number												
204W511-25	24	16	9.2	2.8	38	21	3.0	1.0	-	10	1.6	0.9
224W511-25	24	16	9.2	2.8	25	25	19	3.0	1.0	10	1.6	0.9

As supplied dimensions may be slightly reduced due to the nature of the material. After recovery sizes are not affected.
All dimensions in millimetres unless otherwise stated.

Materials Available

Material	Material Description
-25	Fluid resistant elastomer

Environmental Adhesives Available

Optional Pre-coat	Optional User Applied
/225	S-1017 or S-1048 or S-1125

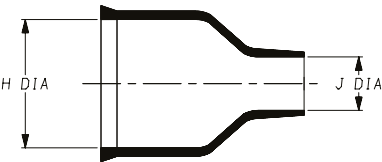
For more information on materials and adhesives, please refer to relevant sections of this catalogue.

Micro Moulded Boots

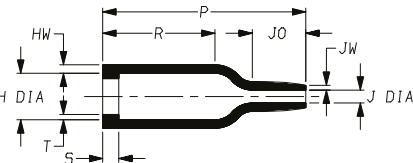
Lipped
Straight and Right Angle 90° boots



204W511-12

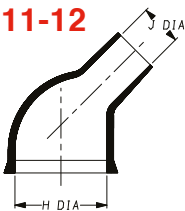


Before Recovery

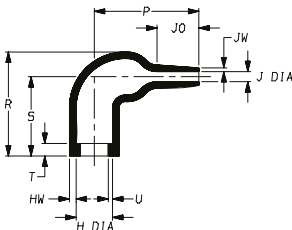


After Recovery

224W511-12



Before Recovery



After Recovery

Product Dimensions Selection Table

Dimensions as Supplied			Dimensions After Recovery									
Dimension	H	J	H	J	P ±10%	R ±10%	S ±10%	T ±20%	U ±20%	JO ±20%	HW ±20%	JW ±20%
Material	12											
Part Number												
204W511-12	22	8.0	9.3	2.8	38	21	3.0	1.0	-	10	1.6	0.9
224W511-12	19	8.0	9.3	2.8	25	25	19	3.0	1.0	10	1.6	0.9

As supplied dimensions may be slightly reduced due to the nature of the material. After recovery sizes are not affected.
All dimensions in millimetres unless otherwise stated.

Materials Available

Material	Material Description
-12	Fluoro-elastomer

Environmental Adhesives Available

Optional Pre-coat	Optional User Applied
/225	S-1255-04

For more information on materials and adhesives, please refer to relevant sections of this catalogue.

Moulded Parts

301A011 to 048

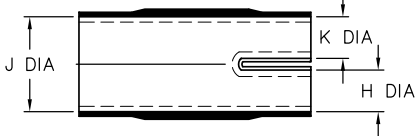
Transitions
'T' Transition, heat shrink boots

Used for mechanical protection and cable strain relief. Ideal for cable harness applications where cable branches and breakouts are required.

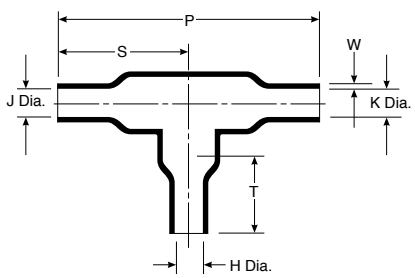
Ordering Information

- Standard colour Black.
- Size selection please refer to table below.
- Packaged individually
- Please specify the product name, size, material, coating and any modifications required, as per Part Number System earlier in this section.
- Adhesive coating is optional. If added the entry dimensions will be reduced by 1.5mm.

As supplied



After Recovery



Product Dimensions Selection Table

Dimensions as Supplied			Dimensions After Recovery					
Dimension	J Nom.	H, K	H, J, K	P ±10%	S ±10%	T ±10%	W ±30%	Weight
Part Number								
301A011	12.0	6.6	3.6	29.7	15.1	-	1.0	0.9g
301A022	24.0	13.2	6.9	58.7	29.5	17.5	1.5	4.1g
301A034	48.0	26.9	13.5	120.1	60.2	35.6	2.3	31.3g
301A048	100.0	55.6	30.2	246.4	123.2	70.9	3.0	253.1g

All dimensions are in mm unless otherwise stated. Weight is based on polyolefin part
Optional 'Injection' (S) and 'Vent' (T) ports indicated above, see part number system earlier in this section.

Materials Available

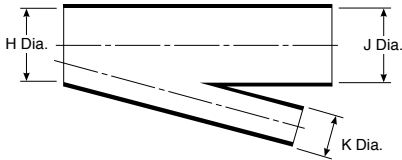
Material	Material Description
-3	Semi-rigid polyolefin
-4	Flexible polyolefin
-12	Fluoro-elastomer
-25	Fluid resistant elastomer
-100	Polyolefin, Zerohal

Environmental Adhesives Available

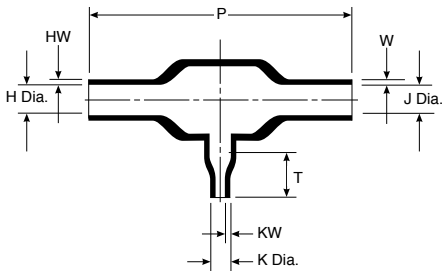
Optional Pre-coat	Optional User Applied
/42 or /86	S-1017 or S-1048
/42 or /86	S-1017 or S-1048
N/A	S-1255-04
/42 or /86 or /225	S-1017 or S-1048 or S-1125
/86 or /180	S-1048 or S-1030

For more information on materials and adhesives, please refer to relevant sections of this catalogue.

As supplied



After Recovery



Used for mechanical protection and cable strain relief. Ideal for cable harness applications where cable branches and breakouts are required.

Ordering Information

- Standard colour Black.
- Size selection please refer to table below.
- Packaged individually
- Please specify the product name, size, material, coating and any modifications required, as per Part Number System earlier in this section.
- Adhesive coating is optional. If added the entry dimensions will be reduced by 1.5mm.

Product Dimensions Selection Table

Dimensions as Supplied			Dimensions After Recovery							
Dimension	H, J	K	H, J	K	P ±10%	T ±10%	U ±10%	HW & JW ±20%	KW ±20%	Weight
Part Number										
322A112	13.2	6.6	6.9	3.6	49.3	19.6	19.6	1.52	1.02	2.7g
322A123	26.9	6.6	12.7	3.6	92.5	31.8	39.6	2.54	1.02	15.0g
322A134	26.9	13.2	13.7	6.1	144.8	50.8	50.8	2.54	1.52	20.9g
322A148	55.6	13.2	26.9	6.9	184.9	63.5	63.5	4.57	1.52	115g
322A158	55.6	26.9	26.9	13.7	203.5	66.0	66.0	4.57	2.54	164g

All dimensions in mm unless otherwise stated. Weight is based on polyolefin part
Optional 'Injection' (S) and 'Vent' (T) ports indicated above, see part number system earlier in this section.

Materials Available

Material	Material Description
-3	Semi-rigid polyolefin
-4	Flexible polyolefin
-12	Fluoro-elastomer
-25	Fluid resistant elastomer
-100	Polyolefin, Zerohal

Environmental Adhesives Available

Optional Pre-coat	Optional User Applied
/42 or /86	S-1017 or S-1048
/42 or /86	S-1017 or S-1048
N/A	S-1255-04
/42 or /86 or /225	S-1017 or S-1048 or S-1125
/86 or /180	S-1048 or S-1030

For more information on materials and adhesives, please refer to relevant sections of this catalogue.

Moulded Parts

342A012 to 058

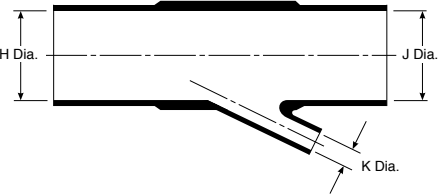
Transitions
45° Transition, heat shrink boots

Used for mechanical protection and cable strain relief. Ideal for cable harness applications where cable branches and breakouts are required.

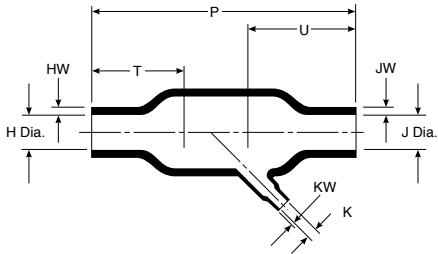
Ordering Information

- Standard colour Black.
- Size selection please refer to table below.
- Packaged individually
- Please specify the product name, size, material, coating and any modifications required, as per Part Number System earlier in this section.
- Adhesive coating is optional. If added the entry dimensions will be reduced by 1.5mm.

As supplied



After Recovery



Product Dimensions Selection Table

Dimensions as Supplied			Dimensions After Recovery							
Dimension	H, J	K	H, J	K	P ±10%	T ±10%	U ±10%	HW & JW ±20%	KW ±20%	Weight
Part Number										
342A012	13.2	6.6	6.9	3.6	49.3	19.6	19.6	1.52	1.02	2.6g
342A024	26.9	6.6	12.7	3.6	92.5	31.8	39.6	2.54	1.02	16.1g
342A034	26.9	13.2	13.7	6.1	144.8	50.8	50.8	2.54	1.52	25.0g
342A048	55.6	13.2	26.9	6.9	184.9	63.5	63.5	4.57	1.52	124g
342A058	55.6	26.9	26.9	13.7	203.7	66.0	66.0	4.57	2.54	138g

All dimensions in mm unless otherwise stated. Weight is based on polyolefin part
Optional 'Injection' (S) and 'Vent' (T) ports indicated above, see part number system earlier in this section.

Materials Available

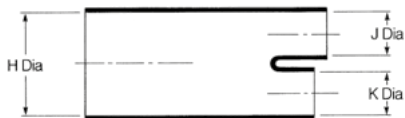
Material	Material Description
-3	Semi-rigid polyolefin
-4	Flexible polyolefin
-12	Fluoro-elastomer
-25	Fluid resistant elastomer
-100	Polyolefin, Zerohal

Environmental Adhesives Available

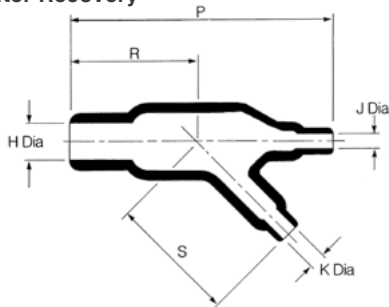
Optional Pre-coat	Optional User Applied
/42 or /86	S-1017 or S-1048
/42 or /86	S-1017 or S-1048
N/A	S-1255-04
/42 or /86 or /225	S-1017 or S-1048 or S-1125
/86 or /180	S-1048 or S-1030

For more information on materials and adhesives, please refer to relevant sections of this catalogue.

As supplied



After Recovery



Used for mechanical protection and cable strain relief. Ideal for cable harness applications where cable branches and breakouts are required.

Ordering Information

- Standard colour Black.
- Size selection please refer to table below.
- Packaged individually
- Please specify the product name, size, material, coating and any modifications required, as per Part Number System earlier in this section.
- Adhesive coating is optional. If added the entry dimensions will be reduced by 1.5mm.

Product Dimensions Selection Table

Dimensions as Supplied			Dimensions After Recovery					Weight
Dimension	H	J, K	H	J,K	P ±10%	R ±10%	S ±10%	
Part Number								
342A112	13.2	6.6	6.1	3.0	45.0	23.0	21.0	2.3g
342A124	26.9	13.2	12.4	6.1	90.0	42.0	43.0	15.9g
342A138	55.6	26.9	25.4	12.4	183.0	96.0	86.0	122g

All dimensions in mm unless otherwise stated. Weight is based on polyolefin part
Optional 'Injection' (S) and 'Vent' (T) ports indicated above, see part number system earlier in this section.

Materials Available

Material	Material Description
-3	Semi-rigid polyolefin
-4	Flexible polyolefin
-12	Fluoro-elastomer
-25	Fluid resistant elastomer
-100	Polyolefin, Zerohal

Environmental Adhesives Available

Optional Pre-coat	Optional User Applied
/42 or /86	S-1017 or S-1048
/42 or /86	S-1017 or S-1048
N/A	S-1255-04
/42 or /86 or /225	S-1017 or S-1048 or S-1125
/86 or /180	S-1048 or S-1030

For more information on materials and adhesives, please refer to relevant sections of this catalogue.

Moulded Parts

362A014 to 114

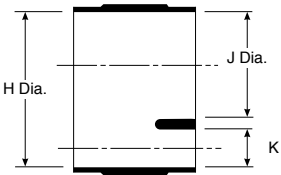
Transitions
30° Transition, heat shrink boots

Used for mechanical protection and cable strain relief. Ideal for cable harness applications where cable branches and breakouts are required.

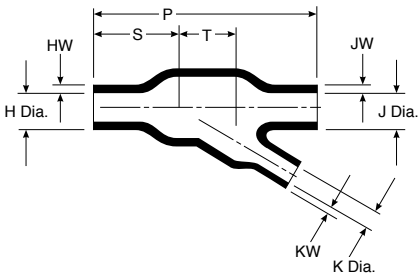
Ordering Information

- Standard colour Black.
- Size selection please refer to table below.
- Packaged individually
- Please specify the product name, size, material, coating and any modifications required, as per Part Number System earlier in this section.
- Adhesive coating is optional. If added the entry dimensions will be reduced by 1.5mm.

As supplied



After Recovery



Product Dimensions Selection Table

Dimensions as Supplied			Dimensions After Recovery							
Dimension	H, J	K	H, J	K	P ±10%	S ±10%	T ±10%	HW & JW ±20%	KW ±20%	Weight
Part Number										
362A014	30.5	20.3	15.7	10.7	82.6	31.8	21.1	2.54	1.78	20.4g
362A024	35.6	15.2	18.3	8.6	63.5	19.1	22.4	2.54	1.52	13.3g
362A114	35.6	10.2	18.8	5.3	61.0	19.1	21.3	2.79	1.52	13.2g

All dimensions in mm unless otherwise stated. Weight is based on polyolefin part
Optional 'Injection' (S) and 'Vent' (T) ports indicated above, see part number system earlier in this section.

Materials Available

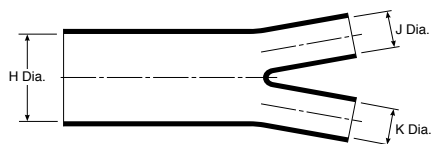
Material	Material Description
-3	Semi-rigid polyolefin
-4	Flexible polyolefin
-12	Fluoro-elastomer
-25	Fluid resistant elastomer
-100	Polyolefin, Zerohal

Environmental Adhesives Available

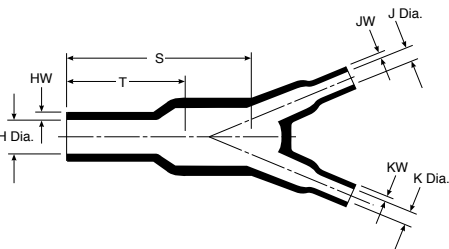
Optional Pre-coat	Optional User Applied
/42 or /86	S-1017 or S-1048
/42 or /86	S-1017 or S-1048
N/A	S-1255-04
/42 or /86 or /225	S-1017 or S-1048 or S-1125
/86 or /180	S-1048 or S-1030

For more information on materials and adhesives, please refer to relevant sections of this catalogue.

As supplied



After Recovery



Used for mechanical protection and cable strain relief. Ideal for cable harness applications where balanced cable branches and breakouts are required.

Ordering Information

- Standard colour Black.
- Size selection please refer to table below.
- Packaged individually
- Please specify the product name, size, material, coating and any modifications required, as per Part Number System earlier in this section.
- Adhesive coating is optional. If added the entry dimensions will be reduced by 1.5mm.

Product Dimensions Selection Table

Dimensions as Supplied			Dimensions After Recovery						
Dimension	H	J, K	H	J,K	S ±10%	T ±10%	HW ±20%	JW & KW ±20%	Weight
Part Number									
382A012	13.2	6.6	6.1	3.3	23.9	15.5	1.52	1.02	1.7g
382A023	26.9	13.2	12.4	6.1	53.3	33.0	2.54	1.52	13.6g
382A034	38.6	26.9	18.0	12.4	78.7	55.9	3.05	2.54	55.5g
382A046	55.6	26.9	25.9	12.7	111.8	71.1	4.57	2.54	93.4g

All dimensions in mm unless otherwise stated. Weight is based on polyolefin part
Optional 'Injection' (S) and 'Vent' (T) ports indicated above, see part number system earlier in this section.

Materials Available

Material	Material Description
-3	Semi-rigid polyolefin
-4	Flexible polyolefin
-12	Fluoro-elastomer
-25	Fluid resistant elastomer
-100	Polyolefin, Zerohal

Environmental Adhesives Available

Optional Pre-coat	Optional User Applied
/42 or /86	S-1017 or S-1048
/42 or /86	S-1017 or S-1048
N/A	S-1255-04
/42 or /86 or /225	S-1017 or S-1048 or S-1125
/86 or /180	S-1048 or S-1030

For more information on materials and adhesives, please refer to relevant sections of this catalogue.

Moulded Parts

462A011 to 060

Transitions

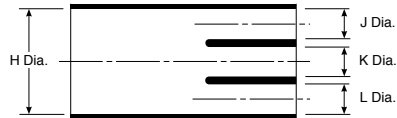
1 to 3 Transition, heat shrink boots

Used for mechanical protection and cable strain relief. Ideal for cable harness applications where multiple cable branches are required.

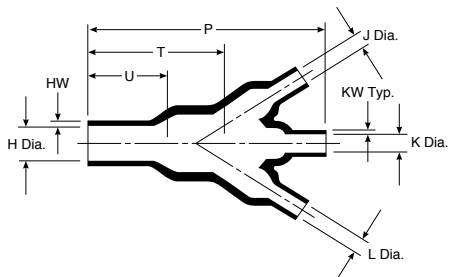
Ordering Information

- Standard colour Black.
- Size selection please refer to table below.
- Packaged individually
- Please specify the product name, size, material, coating and any modifications required, as per Part Number System earlier in this section.
- Adhesive coating is optional. If added the entry dimensions will be reduced by 1.5mm.

As supplied



After Recovery



Product Dimensions Selection Table

Dimensions as Supplied				Dimensions After Recovery						
Dimension	H	J, K, L	H	J, K, L	P ±10%	T ±10%	U ±10%	HW ±20%	KW ±10%	Weight
Part Number										
462A011	13.2	6.6	6.6	3.6	46.2	30.5	15.7	1.52	1.02	2.3g
462A023	26.9	13.2	13.2	6.9	93.2	57.2	33.0	2.54	1.52	16.2g
462A034	38.6	19.3	18.8	9.7	135.1	88.9	45.7	3.05	1.78	38.3g
462A046	55.6	26.9	25.4	12.4	192.0	121.9	71.1	4.57	3.05	143g
462A060	91.4	45.7	54.6	27.4	390.4	254.0	127.0	7.11	4.57	862g

All dimension in mm unless otherwise stated. Weight is based on polyolefin part
Optional 'Injection' (S) and 'Vent' (T) ports indicated above, see part number system earlier in this section.

Materials Available

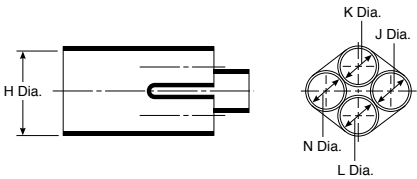
Material	Material Description
-3	Semi-rigid polyolefin
-4	Flexible polyolefin
-12	Fluoro-elastomer
-25	Fluid resistant elastomer
-100	Polyolefin, Zerohal

Environmental Adhesives Available

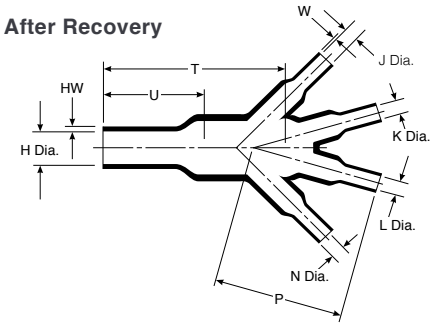
Optional Pre-coat	Optional User Applied
/42 or /86	S-1017 or S-1048
/42 or /86	S-1017 or S-1048
N/A	S-1255-04
/42 or /86 or /225	S-1017 or S-1048 or S-1125
/86 or /180	S-1048 or S-1030

For more information on materials and adhesives, please refer to relevant sections of this catalogue.

As supplied



After Recovery



Used for mechanical protection and cable strain relief. Ideal for cable harness applications where multiple cable branches are required.

Ordering Information

- Standard colour Black.
- Size selection please refer to table below.
- Packaged individually
- Please specify the product name, size, material, coating and any modifications required, as per Part Number System earlier in this section.
- Adhesive coating is optional. If added the entry dimensions will be reduced by 1.5mm.

Product Dimensions Selection Table

Dimensions as Supplied			Dimensions After Recovery							
Dimension	H	J, K, L, N	H	J, K, L, N	P ±10%	T ±10%	U ±10%	HW ±20%	W ±20%	Weight
Part Number										
562A011	13.2	6.6	6.9	3.4	24.1	43.9	18.0	1.52	1.02	3.6g
562A022	19.3	9.4	9.7	5.3	35.6	43.2	23.1	1.78	1.02	6.2g
562A032	19.3	13.2	9.7	6.9	49.3	50.5	25.4	1.78	1.52	13.6g
562A043	26.9	13.2	13.0	6.9	49.3	65.8	33.5	2.54	1.52	18.6g
562A054	38.6	19.3	18.5	9.7	71.9	95.3	46.5	3.05	1.78	54.4g
562A067	55.6	26.9	26.7	13.0	101.6	135.1	65.5	4.57	2.54	150g

All dimensions in mm unless otherwise stated. Weight is based on polyolefin part
Optional 'Injection' (S) and 'Vent' (T) ports indicated above, see part number system earlier in this section.

Materials Available

Material	Material Description
-3	Semi-rigid polyolefin
-4	Flexible polyolefin
-12	Fluoro-elastomer
-25	Fluid resistant elastomer
-100	Polyolefin, Zerohal

Environmental Adhesives Available

Optional Pre-coat	Optional User Applied
/42 or /86	S-1017 or S-1048
/42 or /86	S-1017 or S-1048
N/A	S-1255-04
/42 or /86 or /225	S-1017 or S-1048 or S-1125
/86 or /180	S-1048 or S-1030

For more information on materials and adhesives, please refer to relevant sections of this catalogue.

Moulded Parts

PD Caps

Polyolefin
Encapsulant lined, semi-rigid

1 Inexpensive way to encapsulate crimped
2 electrical connections. Encapsulant lining melts
3 and flows to fill surface irregularities of the
4 substrate. These vibration proof caps are used
5 to insulate and terminate dead-end electrical
6 cables, fixtures, connectors and other electrical
7 components.

Features & Benefits

- Rapid and simple installation
- Splash and moisture resistant

Operating Temperature

- From -55°C to +110°C

Installation

- Minimum shrink temperature +125°C
- Minimum full recovery +135°C

Specifications & Approvals

- UL E85381 600v, 125°C



Length Supplied		Inside Diameter		Wall Thickness	Part Number
Nominal Overall	Minimum Open Barrel	Maximum Supplied	Maximum Recovered	Nominal Recovered	
25.4	12.7	3.18	0.58	1.22	PD-CAP-1/8-0
25.4	15.2	4.75	1.52	1.57	PD-CAP-3/16-0
28.4	15.2	6.35	2.03	1.98	PD-CAP-1/4-0
31.8	18.3	9.53	2.29	2.08	PD-CAP-3/8-0
38.1	21.6	12.7	2.29	2.54	PD-CAP-1/2-0

Wall thickness will be less if tubing recovery is restricted during shrinkage.
All dimensions in millimetres unless otherwise stated.

As Supplied



Fully Recovered



Part Number Example; PD-CAP-1/4-0 6.35mm inside diameter, Black end cap.

Ordering Information

Standard colours:

0=Black

Size selection:

The largest size that will recover snugly over the component(s).

TC Caps

Polyolefin

Flame retardant

2.5:1
shrink



RoHS
compliant

Widely used for wire terminations because of their light weight, small size and durability. Vibration-proof caps are used to insulate and terminate dead-end electrical cables, fixtures, connectors and other electrical equipment.

Features & Benefits

- 2.5:1 Shrink ratio
- Flame retardant
- Rapid and simple installation

Operating Temperature

- From -55°C to +135°C

Specifications & Approvals

- UL E85381 600v, 125°C

Installation

- Minimum shrink temperature +110°C
- Minimum full recovery +135°C

Length Supplied		Inside Diameter		Wall Thickness	Part Number
Nominal Overall	Minimum Open Barrel	Maximum Supplied	Maximum Recovered	Nominal Recovered	
19.1	10.2	1.6	0.8	0.51	TC-CAPS-4001-9
25.4	14.0	3.2	1.3	0.64	TC-CAPS-4003-2
28.6	14.0	6.4	2.5	0.69	TC-CAPS-4005-8

Wall thickness will be less if tubing recovery is restricted during shrinkage.
All dimensions in millimetres unless otherwise stated.

Part Number Example; TC-CAPS-4003-2 25.4mm inside diameter, Red end cap.

Ordering Information

Standard colour:

9=White, 2=Red, 8=Grey. One colour per size only, as per table

Size selection:

The largest size that will recover snugly over the component(s).

Moulded Parts

101A011 to 094

End Caps - Standard Wall
Heat shrinkable

Provide optimum water-proofing and environmental protection for underwater, underground, or outdoor applications. Highly resistant to moisture, fungus and weathering. Used for protecting cable and pipes, or capping unused outlets in transitions, providing an environmental seal when used with adhesive.

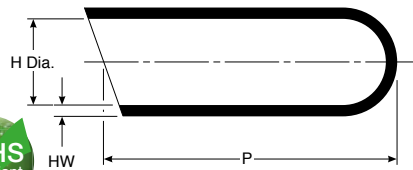
Ordering Information

- Size selection please refer to table below.
- When ordering specify the product name, size, material, coating, as per Part Number System.
- Adhesive coating is optional. If added the entry dimensions will be reduced by 1.5mm.

As supplied



After Recovery



Product Dimensions Selection Table

Dimensions as Supplied		Dimensions After Recovery		
Dimension	H	H	P Nom.	HW ±20%
Part Number				
101A011	5.1	2.00	22.90	1.02
101A021	7.40	3.30	25.40	1.27
101A031	10.20	4.80	30.50	1.52
101A041	15.20	6.40	40.60	1.78
101A062	25.40	11.40	68.80	2.29
101A083	50.80	22.90	101.60	2.79
101A094	83.80	38.10	114.30	3.05

All dimensions in mm unless otherwise stated

Materials Available

Material	Material Description
-3	Semi-rigid polyolefin
-4	Flexible polyolefin
-12	Fluoro-elastomer
-25	Fluid resistant elastomer
-100	Polyolefin, Zerohal

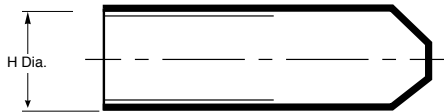
Environmental Adhesives Available

Optional Pre-coat	Optional User Applied
/42 or /86	S-1017 or S-1048
/42 or /86	S-1017 or S-1048
N/A	S-1255-04
/42 or /86 or /225	S-1017 or S-1048 or S-1125
/86 or /180	S-1048 or S-1030

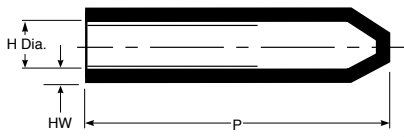
For more information on materials and adhesives, please refer to relevant sections of this catalogue.

SSC-1 to 7
End Caps - Thick Wall
Heat shrinkable

As supplied



After Recovery



These SSC heat shrinkable end caps are made from a thermally stabilised modified polyolefin, which makes them highly resistant to moisture, fungus and weathering

- Electrical insulation to 1000 V
- Temperature rating -40°C to 85°C
- Minimum shrink temperature 121°C

Ordering Information

- Standard colour Black.
- Size selection please refer to table below.
- Packaged individually

Other styles and derivatives are available to special order, please contact for details.

Product Dimensions Selection Table

Dimensions as Supplied		Dimensions After Recovery		
Dimension	H	H	P Nom.	HW ±20%
Part Number				
SSC-1-xx	10.00	4.00	33.50	2.00
SSC-2-xx	20.00	7.50	55.30	2.30
SSC-3-xx	35.00	15.00	89.90	3.00
SSC-4-xx	55.00	25.00	143.20	3.30
SSC-5-xx	75.00	32.00	150.10	3.30
SSC-6-xx	100.00	45.00	162.50	4.00
SSC-7-xx	120.00	70.00	145.00	3.80

All dimensions in mm unless otherwise stated

xx - Ordering Information

** Material	Material Description
XU	Sealing end cap, uncoated
X	Sealing end cap, with adhesive (standard)
XTV	Sealing end cap, with adhesive, plus c/w pressure valve

For more information on materials and adhesives, please refer to relevant sections of this catalogue.

Moulded Parts

207W213 to 256

Non-screened
Bulkhead Feedthrough

Feedthroughs provide an effective pressure seal when used with cables passing from pressurised to non-pressurised areas. Also provide excellent strain relief and bulkhead abrasion protection.

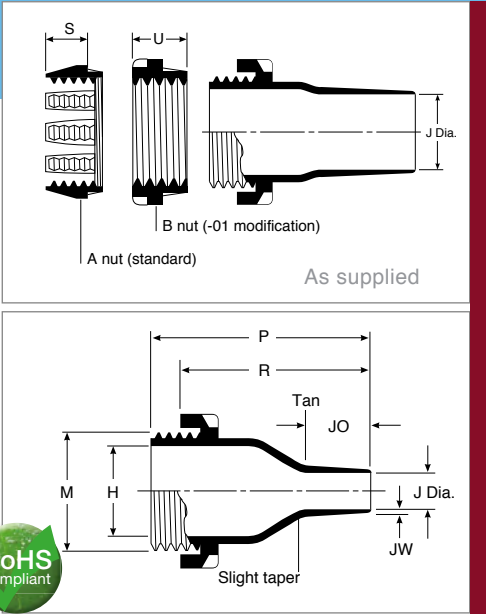
Ordering Information

- Standard colour Black (0).
- Packaged individually
- When ordering specify the product name, size, material, coating and modifications required, as per Part Number System.
- Adhesive coating is optional. If added the entry diameter will be reduced by nominal 1.5mm.

Part number example

207W234-25-01/86-0

Fluid resistant elastomer feedthrough (-25), with nut 'B' modification (-01), hot melt thermoplastic adhesive (/86) and colour black.



Product Dimensions Selection Table

Dimensions as Supplied			Dimensions After Recovery								Weight
Dimension	H	J	H	J	M Thread	P ±10%	R ±10%	S ±20%	U ±10%	JO ±10%	
Part Number											
207W213	13.2	6.6	6.6	3.6	46.2	30.5	15.7	1.52	1.02	1.02	2.3g
207W223	26.9	13.2	13.2	6.9	93.2	57.2	33.0	2.54	1.52	1.52	16.2g
207W234	38.6	19.3	18.8	9.7	135.1	88.9	45.7	3.05	1.78	1.78	38.3g
207W245	55.6	26.9	25.4	12.4	192.0	121.9	71.1	4.57	3.05	3.05	143g
207W256	91.4	45.7	54.6	27.4	390.4	254.0	127.0	7.11	4.57	4.57	862g

All dimensions in mm unless otherwise stated. Weight is based on polyolefin part

Materials and Sealants Available

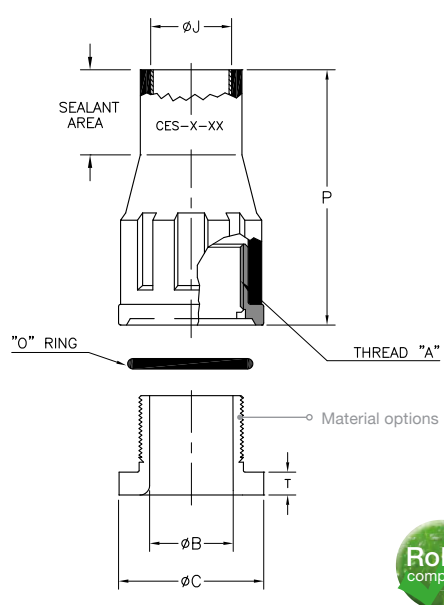
Material reference & description		Adhesive
-3	Semi-rigid polyolefin	/42 or /86
-4	Flexible polyolefin	/42 or /86
-25	Fluid resistant elastomer	/86 or /225
-100	Polyolefin, Zerohal	/86 or /180

- /42 Hot melt polyamide thermoplastic (60°C)
- /180 Hot melt polyolefin (80°C)
- /86 Hot melt thermoplastic (120°C)
- /225 Curing epoxy/polyamide (+150°C)

For user applied adhesives please contact us

CES 1 to 5

Non-screened
Bulkhead Feedthrough



Cable Entry Seals provide a watertight, fume tight seal where cables enter connection boxes, bulkheads or enclosures. Threaded single part assembly CES glands are also available.

- SAE-AS81765/1 Type 1
- Temperature rating -55°C to 90°C
- Minimum shrink temperature 121°C

Ordering Information

- Standard colour Black.
- Size selection please refer to table below.
- Packaged individually

Part number example

CES-3

Standard black nylon cable entry seal, with nose internal (J) diameter 30.48mm supplied and 12.7mm fully recovered.

CES-3-SS

Stainless steel cable entry seal version of CES-3 above

Other styles and derivatives, including multi leg variants and single piece male thread glands, are also available to special order, please contact us for details.

Product Dimensions Selection Table

Dimensions as Supplied		Dimensions After Recovery						
Dimension	J	J	"A Thread"	B ±0.5	C Ref.	P Ref.	T Ref.	Max Panel Thickness
Part Number								
CES-1-xx	12.7	4.07	1"-12 UNF	19.05	35.56	62.23	5.34	6.35
CES-2-xx	19.05	6.35	1"-12 UNF	19.05	35.56	62.23	5.34	6.35
CES-3-xx	30.48	12.7	1 3/8"-12 UNF	27.94	48.26	90.17	7.88	9.65
CES-4-xx	40.64	19.05	2"-8 UN	39.62	68.58	97.79	7.88	12.70
CES-5-xx	70.48	35.06	3 3/8"-8 UN	73.66	104.14	190.50	7.88	19.05

All dimensions in mm unless otherwise stated.

xx - Screw Gland Materials Available

Material	Material Description
Leave Blank	Standard black nylon material, omit the last two X's in the part number
AL	Aluminium 6061-T6 with finish of hard anodize per MIL-A-8652F, Type III, Class 2, Dyed black
SS	Stainless Steel type 316, with finish of passivate per ASTM-A967

Moulded Parts

TCFS and TCFR

Screened and Non-screened
Bulkhead Feedthrough

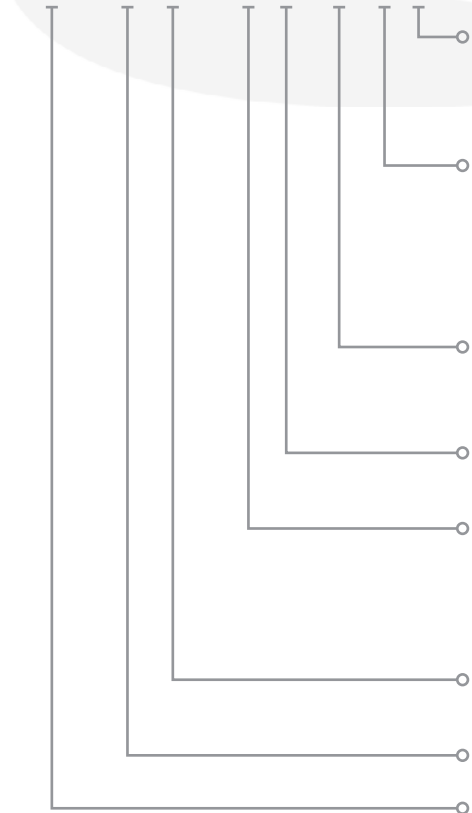
Provides environmental sealing and screen continuity where a cable passes through a bulkhead.

The assembly consists of a specifically designed locknut and O-ring seal, onto the rear of which is pre-installed a heat-shrinkable moulded part.

Feedthrough installation is simply effected by tightening the locknut on the rear of the bulkhead, which compresses the O-ring and ensures that a knife-edge provides electrical contact between the assembly and bulkhead.



TCFS 12 62C - 0 20 100 A H



Part Numbering example

ADHESIVE SYSTEM

- E Epoxy (please contact us)
- H S1030 hot melt
- W S1048 hot melt

MOULDED PART TYPE

- A Straight unscreened
- B 90° unscreened
- C Straight screened
- D 45° screened
- E 90° screened (16 to 36 only)

MOULDED PART MATERIAL

- 25 Semi-rigid elastomer, or 25S if screened
- 100 Low fire hazard, or 100S if screened

THREAD LENGTH

- 20 Standard length (mm)

ASSEMBLY MODIFICATION CODE

- 0 Standard assembly
- 1 Double sided assembly
- 2 Same as 1 but with potting ports
- 3 locknut

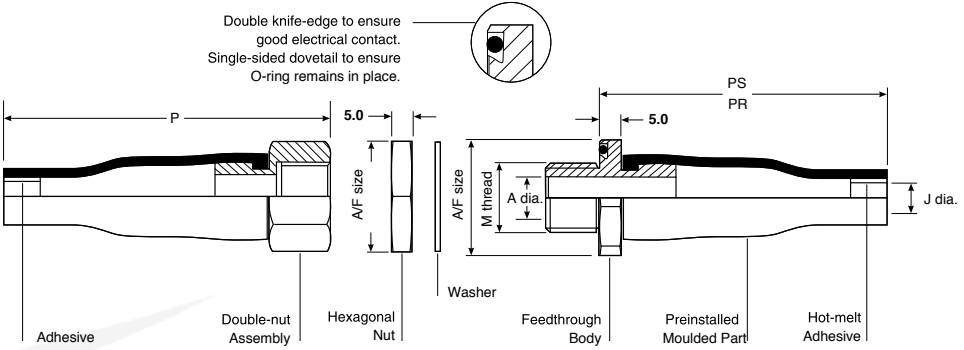
MATERIAL and FINISH

See table opposite

SIZE - See product dimensions table

PART

- TCFR Full length moulded part
- TCFS Shortened moulded part (straight only)



Product Dimensions

Feedthrough Size		J Diameter		M Thread	A Dia.	A/F		P ±10%			Hole Size
Short	Standard	Sup.	Rec.		Max.	Body	Nut	P	PS	PR	
TCFS-12	TCFR-12	6.5	5.0	M12 x 1.5	7.5	24	17	52	50	43	13.0
TCFS-16	TCFR-16	8.5	6.0	M16 x 1.5	10.2	29	22	57	65	48	17.0
TCFS-20	TCFR-20	10.5	7.2	M20 x 1.5	14.0	34	27	61	77	52	21.0
TCFS-24	TCFR-24	16.5	8.5	M24 x 1.5	19.2	38	30	74	90	65	25.0
TCFS-30	TCFR-30	20.5	10.0	M30 x 1.5	24.2	48	36	73	115	64	31.0
TCFS-36	TCFR-36	28.5	15.8	M36 x 1.5	30.2	52	41	104	140	95	37.0
-	TCFR-48	35.5	n/a	M48 x 1.5	40.2	67	55	144	110	135	50.0

PR dimension for shorter TCFR Series | Dimensions in millimetres unless otherwise stated.

S1030 Polyolefin Hot-Melt Adhesive

Operating temperature range -80°C to +80°C
Bonding temperature 120°C
Excellent water blocking and low temperature

S1048 High Performance Hot-Melt Adhesive

Operating temperature range -55°C to +120°C
Bonding temperature 160°C
Good solvent resistance but requires higher temperature to achieve bonding

Screened Versions

Screened versions provide shielding levels better than 80 dB at 100 MHz.

Material and Finish

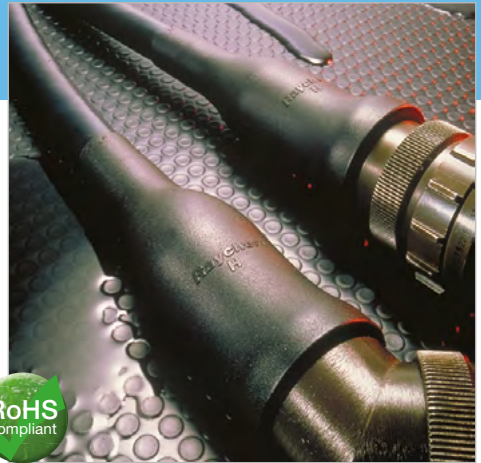
Ref	Description
01W	Nickel aluminium bronze, shotblast
19B	Aluminium alloy - plated cadmium, olive drab, over electroless nickel
19C	Aluminium alloy - plated electroless nickel
62C	Stainless steel - plated electroless nickel

Moulded Parts

Material Selection

Moulded parts and shapes can be manufactured in a wide range of materials, allowing engineers and material specifiers to design electrical harness systems with optimum performance characteristics for any given application. Outlined below are the standard materials available for most moulded parts covered in this section, additional technical details are covered in more detail on the following pages.

Additional specialist materials are also available with details on request. For more information please contact us.



-3 Semi-rigid Polyolefin

A general purpose, heat-shrinkable semi-rigid and flame retardant polyolefin moulding compound.

- Operating temperature -55°C to 135°C
- Flame retardant
- Good resistance to fluid and heat
- UL224, E85381 & SAE-AS81765/1 Type I

-4 Flexible Polyolefin

A general purpose, heat-shrinkable flexible and flame retardant polyolefin moulding compound.

- Operating temperature -55°C to 135°C
- Flame retardant
- Good resistance to fluid and heat
- UL 224, E85381 & SAE-AS81765/1 Type II

-12 Modified Fluoro-elastomer

A high temperature, heat-shrinkable, flexible, flame-retarded, fluoro-elastomeric moulding compound.

- Operating temperature -55°C to 200°C
- Excellent long term fuel immersion resistance
- Fluid resistant and flexible
- Flame retardant

-25 Fluid Resistant Elastomer

A heat-shrinkable, fluid and temperature resistant, elastomeric moulding compound, designed to offer excellent performance in harsh environments.

- Operating temperature -75°C to 150°C
- Chemical and abrasion resistant
- Excellent high temperature fluid resistance
- Flame retardant

-100 Low Fire Hazard Material

A heat-shrinkable, semi-flexible, low-fire hazard moulding compound designed to offer excellent fire safety characteristics combined with low smoke and low acid gas emission.

- Operating temperature -30°C to 105°C
- Low smoke as defined BS G 198 part 5
- Low-toxicity index as defined by NES 713
- High-temperature index defined by ISO 4589-3
- Flame retardant



Designed for use in general harnessing applications where toughness is required and systems are occasionally exposed to fluids or heat. The adhesive-lined parts provide excellent sealing and strain relief at connector-cable terminations and transitions. A wide range of shapes are available in this material. The standard colour is black.

Operating Temperature

- From -55°C to 135°C

Installation

- Minimum shrink temperature 125°C
- Recommended shrink temperature 150°C

Specifications & Approvals

- UL-224, File E85381
- SAE-AS81765/1, Type I
- Def. Stan. 59-97 Issue 3 Type DA (Europe)
- BS-G-198-5-DA (Europe)

Product Characteristics, -3 material

		Specification Requirements	Test Method
Physical	Tensile strength	10.5 MPa (min)	ISO 37; ASTM D 412
	Ultimate elongation	250% (min)	ISO 37; ASTM D 412
	2% secant modulus	80 - 160 MPa	ASTM D 882
	Specific gravity	1.4 (max)	ISO 1183; ASTM D 792
Thermal	Heat aging for 168 hrs @ 175°C	Ultimate elongation 150% (min)	ISO 188, ISO 37
	Heat shock for 4 hrs @ 225°C	No dripping, cracking or flowing	ASTM D 2671
	Low temperature flex @ -55°C	No cracking during mandrel bend	RK-6703, CL 2.7: RT-301
	Flammability	Self-extinguishing	RK-6703, CL 2.8: ASTM D 635
Electrical	Electric strength	8 MV/m (min)	IEC 243
Water absorption	-	0.5% (max)	ISO 62
Fluid resistance	Aviation fuel F40	Tensile strength 8.5 MPa (min) Ultimate elongation 200% (min)	ISO 1817 and ISO 37 after immersion for 24 hrs @ 23°C
	Lubricating oil O-149	Tensile strength 8.5 MPa (min) Ultimate elongation 200% (min)	ISO 1817 and ISO 37 after immersion for 24 hrs @ 23°C
	Phosphate ester hydraulic fluid (DTD 900/4881 A)	Tensile strength 8.5 MPa (min) Ultimate elongation 200% (min)	ISO 1817 and ISO 37 after immersion for 24 hrs @ 23°C

Moulded Parts

-4 Moulded Part Material Flexible Polyolefin

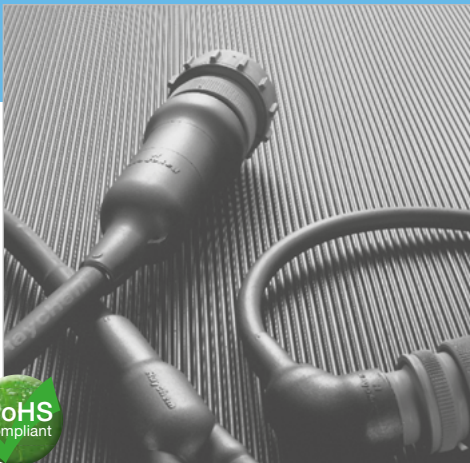
Designed for use in general harnessing applications where toughness is required and systems are occasionally exposed to fluids or heat. The adhesive-lined parts provide excellent sealing and strain relief at connector-cable terminations and transitions. A wide range of shapes are available in this material. The standard colour is black.

Operating Temperature

- From -55°C to 135°C

Installation

- Minimum shrink temperature 105°C
- Recommended shrink temperature 150°C

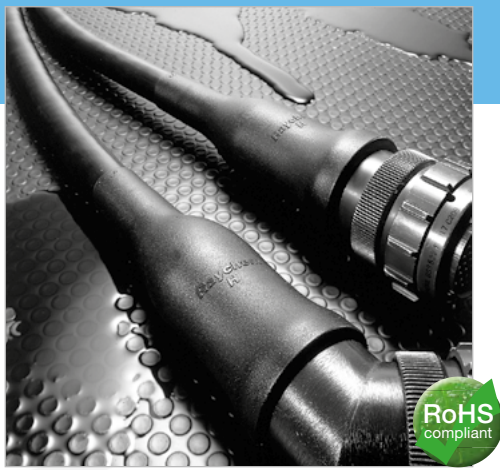


Specifications & Approvals

- UL-224, File E85381
- SAE-AS81765/1, Type II
- SAE-AS85049/ 140, 141, 142

Product Characteristics, -4 material

		Specification Requirements	Test Method
Physical	Tensile strength	1800 psi (min)	ASTM D 412
	Ultimate elongation	400% (min)	ASTM D 412
	Specific gravity	1.3 (max)	ASTM D 792
Thermal	Heat aging for 168 hrs @ 175°C	Ultimate elongation 300% (min)	RT 1304 Sec 4.3.3
	Heat shock for 4 hrs @ 225°C	No dripping, cracking or flowing	RT 1304 Sec 4.3.3
	Low temperature flex @ -55°C	No cracking during mandrel bend	RT 1304 Sec 4.3.3
	Flammability	Average flame time: 120 s (max)	ASTM D 635
Electrical	Dielectric strength	350 V/mil (min)	ASTM D 149
Water absorption	-	0.3% (max)	ASTM D 570
Fluid resistance	JP-4 fuel, aviation gasoline, water, hydraulic fluid	Tensile strength 8.5 MPa psi (min) Ultimate elongation 200% (min)	RT-1304 Sec 4.3.3



Moulded parts and shapes with fluoroelastomers are designed to be used in conjunction with tubing made from fluoroelastomers or multi-conductor cable jackets and a suitable adhesive. This system provides excellent resistance to elevated temperatures and continuous fuel immersion. Available in a wide range of configurations, The standard colour is black.

Operating Temperature

- From -55°C to 200°C

Installation

- Minimum shrink temperature 175°C
- Recommended shrink temperature 220°C

Specifications & Approvals

- Def. Stan. 59-97 Issue 3 Type DD (Europe)
- BS-G-198-5-DD-P (Europe)
- SAE-AS81765/4
- SAE-AS85049/ 140, 141, 142

Product Characteristics, -12 material

		Specification Requirements	Test Method
Physical	Tensile strength	12.4 MPa (min)	ISO 37
	Ultimate elongation	300% (min)	ISO 37
	2% secant modulus	70 MPa (max)	ASTM D 882
	Specific gravity	1.95 (max)	ISO 1183
Thermal	Heat aging for 168 hrs @ 250°C	Ultimate elongation 250% (min)	ISO 188, ISO 37
	Heat shock for 4 hrs @ 300°C	No dripping, cracking or flowing	ASTM D 2671
	Low temperature flex @ -55°C	No cracking during mandrel bend	ASTM D 2671
	Flammability	30 s (max)	ASTM D 635
Electrical	Electric strength	8 MV/m (min)	IEC 243
Water absorption	-	0.5% (max)	ISO 62
Fluid resistance	Aviation fuel F40	Tensile strength 11 MPa (min) Ultimate elongation 200% (min)	ISO 1817 after immersion for 24 hrs @ 23°C
	Lubricating oil O-149	Tensile strength 11 MPa (min) Ultimate elongation 200% (min)	ISO 1817 after immersion for 24 hrs @ 23°C
	Hydraulic fluid H515	Tensile strength 11 MPa (min) Ultimate elongation 200% (min)	ISO 1817 after immersion for 24 hrs @ 23°C

Moulded Parts

-25 and -25L

Moulded Part Material
Fluid resistant modified Elastomer



Designed to be used in conjunction with components such as DR-25 tubing and S1125 adhesive. Being specifically formulated and designed to provide optimum high-temperature fluid resistance and long term heat resistance. This unique balance of properties makes -25 parts particularly suitable for sealing and strain relief at connector-cable terminations and cable to cable transitions on defence vehicle cables and harnesses. The standard colour is black.

Operating Temperature

- From -75°C to 150°C

Installation

- Minimum shrink temperature 135°C
- Recommended shrink temperature 150°C

Specifications & Approvals

- VG95343 Parts 6, 7, 8 and 9 (Europe)
- Def Stan 59-97, Issue 3, Type DE (Europe)
- BSG-198-5-DE-P
- SAE-AS85049/ 140, 141, 142

Product Characteristics, -25 Material

		Specification Requirements	Test Method
Physical	Tensile strength	15 MPa (min)	ASTM D 412
	Ultimate elongation	350% (min)	ASTM D 412
	Specific gravity	1.5 (max)	ASTM D 792
Thermal	Heat aging for 168 hrs @ 150°C	Ultimate elongation 300% (min)	ASTM D 412
	Heat shock for 4 hrs @ 225°C	No dripping, cracking or flowing	ASTM D 2671
	Low temperature flex @ -70°C	No cracking during mandrel bend	ASTM D 2671
	Flammability	120 s (max)	ASTM D 635
Electrical	Electric strength	8 MV/m (min)	ASTM D 149
Fluid resistance	Aviation fuel JP-4 (MIL-T-5624)	Tensile strength 12 MPa (min) Ultimate elongation 300% (min)	ASTM D 412 after immersion for 24 hrs @ 25°C
	Hydraulic fluid (MIL-H-6083)	Tensile strength 12 MPa (min) Ultimate elongation 300% (min)	ASTM D 412 after immersion for 24 hrs @ 25°C
	Diesel fuel (VV-F-800 No.2)	Tensile strength 12 MPa (min) Ultimate elongation 300% (min)	ASTM D 412 after immersion for 24 hrs @ 50°C
	Automotive gasoline (MIL-G-3056)	Tensile strength 12 MPa (min) Ultimate elongation 300% (min)	ASTM D 412 after immersion for 24 hrs @ 25°C



Designed for use with Zerohal cable and tubing for applications where hazard reduction in the event of fire is crucial. The material exhibits excellent fire safety characteristics plus low-smoke and low emission while retaining good mechanical and fluid resistant properties. Parts with adhesive lining provide location, sealing and strain relief of cable connector terminations and cable to cable transitions on harnesses used where there is a need to lower the risk. The standard colour is black.

Operating Temperature

- From -30°C to 105°C

Installation

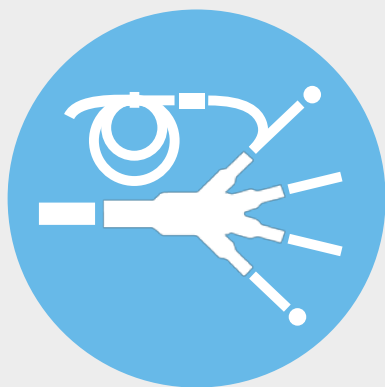
- Minimum shrink temperature 120°C
- Recommended shrink temperature 150°C

Specifications & Approvals

- Def. Stan 59-97, Issue 3, Type DF (Europe)
- BSG 198 Part 5 Type DF (Europe)
- BR1326 listed Class C
- VG95343 Part 29 & 30

Product Characteristics, -100 material

		Specification Requirements	Test Method
Physical	Tensile strength	8 MPa (min)	ISO 37
	Ultimate elongation	200% (min)	ISO 37
	2% secant modulus	130 MPa (max)	ASTM D 882
	Specific gravity	1.5 (max)	ISO 1183
Thermal	Heat aging for 168 hrs @ 150°C	Ultimate elongation 150% (min)	ISO 188, ISO 37
	Heat shock for 4 hrs @ 225°C	No dripping, cracking or flowing	ASTM D 2671
	Low temperature flex @ -30°C	No cracking during mandrel bend	ASTM D 2671
Fire Safety Properties	Limiting oxygen index	29 min.	ISO 4589-2
	Temperature index	250°C (min)	ISO 4589-3
	Flammability	100 s (max.)	ASTM D 635
	Smoke index	20 (max.)	BSG 198 Part 5
	Toxicity index	5)max.) per 100g	NES 713
Electrical	Electric strength	15 MV/m (min)	IEC 243
Water absorption	-	0.75% (max.) @ 23°C 3.5% (max.) @ 70°C	ISO 62
Fluid resistance	ISO 1817 Gasoline fuel	Tensile strength 5 MPa (min) Ultimate elongation 150% (min)	ISO 1817 and ISO 37 after immersion for 24 hrs @ 23°C
	Lubricating oil O-149	Tensile strength 5 MPa (min) Ultimate elongation 150% (min)	ISO 1817 and ISO 37 after immersion for 24 hrs @ 50°C
	Hydraulic fluid H515	Tensile strength 5 MPa (min) Ultimate elongation 150% (min)	ISO 1817 and ISO 37 after immersion for 24 hrs @ 23°C



Wire and Cable

Heat-shrink Tubing

Non-shrink Tubing

Braided Sleeving

Screening Braids

Moulded Parts

Terminals and Splices

Wire and Cable Markers

Accessories

Connectors

Backshells

Bonding Leads

Metal Braids

Relays and Contactors

Switches and Grips

Adhesives and Tapes

Application Equipment

Added Value Services

INTRODUCTION

Repeatable and Consistent Quality, Inspect-ability, Convenience and Speed. Lower Installed Costs

Termination devices offer an inexpensive, single step, easy to use method of producing high quality wire splicing, solder crimp and sealing in one operation, strain relieving and coaxial shield terminations.

A large range of products are available, providing solutions for commercial to harsh environment applications, through to the high performance demands of the Aerospace and Motorsport markets.

Wire to Wire Splicing

Including single piece solder splice to crimp and heat shrink sleeve.

Terminals and Disconnects

DuraSeal® devices are simple and quick to install using a crimp tool and a heat source.

Wire Terminations to Pins, Posts and Tabs

One step solutions for wire connections to pins, posts, tabs and mass wire terminations.

Braid / Shield Termination

Screen grounding terminators offer sealed, insulated and encapsulated solder connection.

Coaxial Cable terminations

Coaxial cable terminators for coaxial cable applications, including printed circuit boards.

Cable to Cable Splicing Kits

SolderShield® wire splicing and shield continuity solutions in a heat-shrinkable insulation sleeve.

Shielded Connector Contacts

SolderTact® controlled soldering contacts help speed installation and reduce installed costs.

Databus Components

MIL-STD-1553B for multiplexing needs.



SELECTION GUIDE	Reference chart	page 230	1
Wire to Wire Splicing	Overview	page 231	
CWT, B-155, D-1744 Series	Single piece solder splice	page 232	2
SGRS Series	Self fixing solder end	page 238	
D-406 Series	DuraSeal® Heat shrinkable, crimp splice	page 239	3
D-436 Series	MiniSeal® Heat shrinkable, crimp splice	page 240	
D-436-Cold Series	MiniSeal® Cold applied, crimp splice	page 242	4
D200 Series	MiniSeal® Heat shrinkable, crimp splice 200°C	page 243	
Terminals & Disconnects	DuraSeal® and SolderGrip®	page 245	5
B-106	DuraSeal® Heat shrinkable, crimp terminals	page 246	
SGRT	SolderGrip® Self fixing, solder ring terminal	page 250	6
Pin, Post & Tabs Termination	SolderSleeve®	page 251	
CWT, B155, D-1XX Series	Heat shrinkable, solder pin, post & tab	page 252	7
Shield Termination	SolderSleeve®	page 254	
CWT and S03 Series	Commercial applications	page 257	8
B-150/1 and B-155 Series	Harsh environment applications, B-155 is RoHS	page 258	
ST18 and ST63 Series	NAS 1747 approved	page 259	9
S01 and S02 Series	M83519 Qualified, Thermo-chromic	page 260	
S063	SAE-AS83519 Approved	page 261	
S096 and S0175 Series	SAE-AS83519 Approved, High Temp, RoHS	page 261	10
S200, B023 Series	SAE-AS83519 Approved, High Temp, RoHS	page 262	
Coaxial Cable Termination	SolderSleeve® Coax Terminators	page 263	11
CWT, B-155 Series	two part, 125°C	page 265	
B-02X, B-04X Series	one part, 150°C	page 266	12
D-181 Series	two part, 150°C	page 267	
D-184 Series	two part, 125°C	page 267	13
D-607 & B-046 Series	One piece PCB Terminators	page 268	
Shielded & Coaxial Splices	SolderShield® Coax Splice	page 270	14
D-150 and B-202 Series	Heat shrinkable, crimp splice with solder shield	page 272	
Shielded Contacts	SolderTacts® Controlled Solder Contacts	page 274	15
D600 Series	MIL-DTL-26482,	page 275	
D600 Series	MIL-DTL-28748	page 276	16
D600 Series	MIL-DTL-38999	page 277	
D600 Series	Sub-miniature	page 279	17
Databus Components	MIL-STD-1553B		
D500 Series	In-Line Micro-couplers	page 280	18
	Cables MIL-AS27500	page 281	

Terminals and Splices

Selection Guide

Overview

Application Type	Conductor			Max Temp.	Product Description	Part Series
	Solder	Crimp	Coil			
Wire to Wire Splicing				125°C	SolderSleeve wire splices	CWT-9000
				125°C	RoHS SolderSleeve wire splices	B-155
				150°C	SolderSleeve wire splices	D-1744
				125°C	SolderGrip closed end connector	SGRS
				125°C	DuraSeal crimp splices	D-406
				155°C	MiniSeal crimp splices	D-436
				200°C	MiniSeal crimp splices	D-200
Terminal Disconnects				125°C	DuraSeal crimp terminals & disconnects	B-106
				150°C	SolderGrip terminals	SGRT
Pin, Post & Tab				125°C	SolderSleeve wire terminators	CWT
				125°C	RoHS SolderSleeve wire terminators	B-155
				150°C	SolderSleeve wire terminators	D-129, D-141
Shield Termination				125°C	SolderSleeve shield terminators	CWT
					SolderSleeve shield terminators	B-15x
					RoHS SolderSleeve shield terminators	B-155
					NAS1747 SolderSleeve shield terminators	ST18
				150°C	NAS1747 SolderSleeve shield terminators	ST63
					SAE-AS83519 SolderSleeve shield terminators	SO63
					M83519, SolderSleeve shield terminators	S01, S02 & SO3
				175°C	SolderSleeve shield terminators	S096
					SolderSleeve shield terminators - Bi-alloy	SO175
				200°C	SolderSleeve shield terminators	S200
Coax Cable Termination				125°C	SolderSleeve coaxial cable terminators	CWT
					RoHS, SolderSleeve coaxial cable terminators	B-155
				150°C	SolderSleeve coaxial cable terminators	B-02x & B-04x
					SolderSleeve coaxial cable terminators	D-181
					SolderSleeve coaxial PCB terminators	D-607 & B-046
Cable to Cable Splicing				150°C	SolderShield cable splices - Multi-conductor	D-150
					SolderShield cable splices - Coaxial	D-150, B-202
Connector Contacts				150°C	SolderTact for MIL-DTL-26482	D-602
					SolderTact for MIL-DTL-28748	D-602, D-610
					SolderTact for MIL-DTL-38999 Series I, III, IV	D-602, D-610
					SolderTact for MIL-DTL-38999 Series II	D-602
					SolderTact for Sub-miniature	D-602
Databus				200°C	Databus micro-couplers - MIL-STD-1553B	D-500

A



SolderSleeve Splicing Devices

CWT, B-155 and D-1744

For crimp free sealed wire to wire splicing. In a single step process they solder, insulate, encapsulate and strain-relieve wire to wire splices, in a wide range of wire sizes.

B



SolderGrip Closed End Connector

SGRS

Closed-end connector utilising a spiral copper coil that grips and compresses the conductors, allows pre-fluxed solder ring to flow to the centre of splicing area, resulting in a high-reliability, repeatable joint.

C



DuraSeal Heat-Shrinkable Crimp Splices

D-406

Designed for OEM harness fabricators, repair and maintenance, plus accessory installations. DuraSeal Nylon crimp splices provide watertight sealing and protection against corrosion, abrasion, and vibration.

D

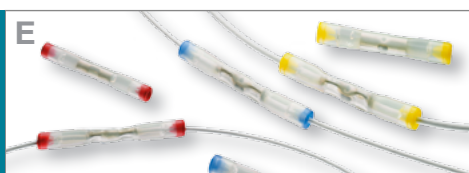


MiniSeal Crimp Splices

D-436

Small, lightweight and low-profile MiniSeal high performance crimp splices, substantially reduce wire bundle size & weight, QPL listed to the MIL-S-81824 specification.

E



Cold Applied Splice

D-436-COLD

Simple one step immersion-resistant crimped in-line splice, that requires no heat. Ideal for Aerospace and Defence applications where performance and reliability is essential. With MIL-Spec approval.

F



200°C MiniSeal Crimp Splices

D-200

Small, lightweight, and low-profile MiniSeal high crimp splices, substantially reduce wire bundle size & weight, QPL listed to the MIL-S-81824 specification and are required by the MIL-W-5088 specification.

Terminals and Splices

SolderSleeve®

Wire to Wire Splicing
Single Piece Solder Splice

SolderSleeve splicing devices which can be used to make sealed or unsealed splices in a single step they solder, insulate, encapsulate and strain relieve a wide range of wire sizes.

Features & Benefits

- Transparent PVDF (D-1744 Series) or Polyolefin (B-155 & CWT Series) sleeve provides encapsulation, inspectability, strain relief and insulation solution.
- Pre-fluxed solder preform provides a controlled soldering process.
- One piece design makes installation easy and lowers the installed cost.
- Thermo-chromic temperature indicator in the D1744 splices facilitates termination and inspection.



Specifications & Approvals

- CWT: UL E87681 and D-5023
- D-1744: NAS-1744 and RT-1404

Product Selection

Product Series	Minimum Wire Rating	Minimum Operating Temp'	Maximum Operating Temp'	Application Environment
CWT Series	85°C	-55°C	125°C	Splash-Proof
D-1744 Series	125°C	-55°C	150°C	Immersion Sealed
B-155	85°C	-55°C	125°C	RoHS Splash-Proof

Application 1:

If there is one size of wire per side and no more than two wires on either side:

- Determine wire gauge sizes for both sides of the splice being made.
- Determine number of wires (one or two wires) for each side of splice.
- Select part numbers from the appropriate table on the following two pages.

Application 2:

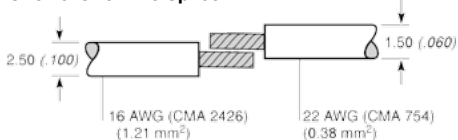
More than two wires on either side (or if you prefer sizes to work with CMA or mm² sizes):

- Turn to 'CMA/mm² Calculation' chart opposite to calculate the total cross section to be spliced.
- Use Splice Selection Guide to select sleeve recommended for that cross section

Notes:

- While all combinations listed will provide satisfactory solder joints, the degree of strain relief obtained depends on the outer diameter of the wires being joined. Refer to Table D for the recommended size ranges for the sleeves.
- Wires 16 AWG (1.2mm²) and larger, having more than 19 strands should be pre-tinned prior to splicing, to obtain the optimum solder joint quality.
- Part selection for wires 26 AWG (0.15mm²) and smaller are also available, please contact us for further information or discuss particular needs.
- Heat guns are recommended for the installation of these devices: HL2010E and CV198X with the correct reflector. See Application Equipment Section.

One-to-One Wire Splice



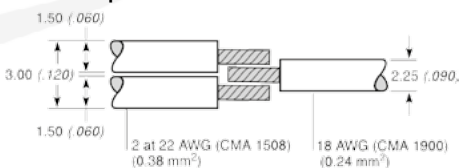
Total CMA = 3180

Total mm² = 1.59

Correct part number selection from tables below
(based on CMA/mm² and nominal jacket wire OD) .

= **CWT-9002, B-155-9002 or D-1744-02**

Multiwire Splice



Total CMA = 3408

Total mm² = 1.71

Correct part number selection from tables below
(based on CMA/mm² and nominal jacket wire OD) .

= **CWT-9003, B-155-9003 or D-1744-03**

CMA/mm² Calculation

To calculate the total circular mil or mm² area of the conductors to be terminated in a single splice, follow these steps:

- 1 Choose either CMA or mm² as your unit of measure for selection purposes and continue to use it for all your criteria.
- 2 List the CMA or mm² for each conductor that will go into the same splice (to assist you, refer to 'Size Selection Guide' table, which provides the CMA of typical conductors).
- 3 Add together the values thus listed, to obtain the total area.
- 4 From 'Splice Selection Guide' table below, select the part number recommended for the total CMA or mm² you have calculated.
- 5 Refer to the examples on this page for further clarification

Size Selection Guide

AWG	28	26	24	22	20	18	16	14	12
CMA	177	304	475	754	1216	900	2426	3831	5874
mm ²	0.09	0.16	0.24	0.38	0.62	0.96	1.23	1.94	2.97

Splice Selection Guide

Product Series	Wire Jacket OD mm		CMA Combined Total		mm ² Combined Total	
	Min.	Max.	Min.	Max.	Min.	Max.
CWT-9001 & B-155-9001	0.4	1.7	450	1500	0.3	0.8
CWT-9002 & B-155-9002	1.3	2.7	1250	3500	0.8	2.0
CWT-9003 & B-155-9003	1.8	4.5	2500	7200	2.0	4.0
CWT-9004 & B-155-9004	2.8	6.0	6100	19000	4.0	6.0
CWT-9005 & B-155-9005	3.2	7.0	12000	25000	6.0	10.0
D-1744-01	0.5	1.9	350	2000	-	-
D-1744-02	0.8	2.8	2000	4000	-	-
D-1744-03	1.3	4.6	4000	10000	-	-
D-1744-04	2.0	7.11	10000	13000	-	-

Terminals and Splices

SolderSleeve®

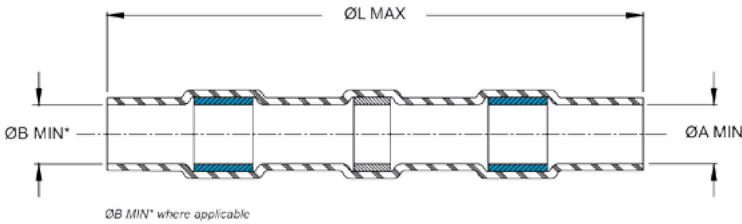
Wire to Wire Splicing
Single Piece Solder Splice

Material

Product Characteristics	Product Performance	
Insulation (D-1744)	Radiation cross linked, heat shrinkable polyvinylidene fluoride	
Insulation (CWT, B-155)	Radiation cross linked, heat shrinkable polyolefin	
Solder and flux (D-1744)	Solder: Sn63 Pb37	Flux: ROL1 per ANSI-J-004
Solder and flux (CWT)	Solder: Sn50 Pb32 Cd18	Flux: ROM1 per ANSI-J-004
Solder and flux (B-155)	Solder: Sn42 Bi58	Flux: ROM1 per ANSI-J-004
Melt-able inserts (B-155, D-1744 & CWT)	Meltable thermoplastic	

Typical Performance

Product Characteristics	Product Performance
Voltage drop	2.0 mV
Tensile strength	Exceeds strength of conductor
Dielectric strength	2.0 kV
Temperature rating (B-155, CWT)	-55°C to +125°C
Temperature rating (D-1744)	-55°C to +150°C
Insulation resistance	1000 megohms



Product Selection

Part Number Ref	ØL (mm)	ØA (mm)	ØB (mm)	Colour Code
CWT-9001 & B-155-9001	26.00	1.70	n/a	Clear
CWT-9002 & B-155-9002	42.00	2.70	n/a	Red
CWT-9003 & B-155-9003	42.00	4.50	n/a	Blue
CWT-9004 & B-155-9004	42.00	6.00	n/a	Yellow
CWT-9005 & B-155-9005	42.00	7.00	n/a	Grey
D-1744-01	29.70	1.90	2.40	n/a
D-1744-02	30.15	2.80	3.15	n/a
D-1744-03	29.60	4.60	5.10	n/a
D-1744-04	30.00	7.11	7.62	n/a

CWT Series Selection Guide - Two Tables

End A Size & No. of Conductors		End B: Size & Number of Conductors							
		26 AWG		24 AWG		22 AWG		20 AWG	
		1	2	1	2	1	2	1	2
26 AWG	1	CWT-9001	CWT-9001	CWT-9001	CWT-9001	CWT-9001	CWT-9002	CWT-9002	CWT-9002
	2	CWT-9001	CWT-9001	CWT-9001	CWT-9002	CWT-9001	CWT-9002	CWT-9002	CWT-9002
24 AWG	1	CWT-9001	CWT-9001	CWT-9001	CWT-9001	CWT-9001	CWT-9002	CWT-9002	CWT-9002
	2	CWT-9001	CWT-9002	CWT-9001	CWT-9002	CWT-9002	CWT-9002	CWT-9002	CWT-9002
22 AWG	1	CWT-9001	CWT-9001	CWT-9001	CWT-9002	CWT-9002	CWT-9002	CWT-9002	CWT-9002
	2	CWT-9002	CWT-9002	CWT-9002	CWT-9002	CWT-9002	CWT-9002	CWT-9002	CWT-9003
20 AWG	1	CWT-9002	CWT-9002	CWT-9002	CWT-9002	CWT-9002	CWT-9002	CWT-9002	CWT-9003
	2	CWT-9002	CWT-9002	CWT-9002	CWT-9002	CWT-9002	CWT-9003	CWT-9003	CWT-9003
18 AWG	1	CWT-9002	CWT-9002	CWT-9002	CWT-9002	CWT-9002	CWT-9002	CWT-9002	CWT-9003
	2	CWT-9003	CWT-9003	CWT-9003	CWT-9003	CWT-9003	CWT-9003	CWT-9003	CWT-9003
16 AWG	1	CWT-9002	CWT-9002	CWT-9002	CWT-9002	CWT-9002	CWT-9003	CWT-9003	CWT-9003
	2	CWT-9003	CWT-9003	CWT-9003	CWT-9003	CWT-9003	CWT-9003	CWT-9003	CWT-9003
14 AWG	1	CWT-9003	CWT-9003	CWT-9003	CWT-9003	CWT-9003	CWT-9003	CWT-9003	CWT-9003
	2	CWT-9004	CWT-9004	CWT-9004	CWT-9004	CWT-9004	CWT-9004	CWT-9004	CWT-9004
12 AWG	1	CWT-9003	CWT-9003	CWT-9003	CWT-9003	CWT-9003	CWT-9003	CWT-9003	CWT-9004
	2	CWT-9005	CWT-9005	CWT-9005	CWT-9005	CWT-9005	CWT-9005	CWT-9005	CWT-9005
10 AWG	1	CWT-9005	CWT-9005	CWT-9005	CWT-9005	CWT-9005	CWT-9005	CWT-9005	CWT-9005

End A Size & No. of Conductors		End B: Size & Number of Conductors								
		18 AWG		16 AWG		14 AWG		12 AWG		10 AWG
		1	2	1	2	1	2	1	2	1
26 AWG	1	CWT-9002	CWT-9003	CWT-9002	CWT-9003	CWT-9003	CWT-9004	CWT-9003	CWT-9005	CWT-9005
	2	CWT-9002	CWT-9003	CWT-9002	CWT-9003	CWT-9003	CWT-9004	CWT-9003	CWT-9005	CWT-9005
24 AWG	1	CWT-9002	CWT-9003	CWT-9002	CWT-9003	CWT-9003	CWT-9004	CWT-9003	CWT-9005	CWT-9005
	2	CWT-9002	CWT-9003	CWT-9002	CWT-9003	CWT-9003	CWT-9004	CWT-9003	CWT-9005	CWT-9005
22 AWG	1	CWT-9002	CWT-9003	CWT-9002	CWT-9003	CWT-9003	CWT-9004	CWT-9003	CWT-9005	CWT-9005
	2	CWT-9002	CWT-9003	CWT-9003	CWT-9003	CWT-9003	CWT-9004	CWT-9003	CWT-9005	CWT-9005
20 AWG	1	CWT-9002	CWT-9003	CWT-9003	CWT-9003	CWT-9003	CWT-9004	CWT-9003	CWT-9005	CWT-9005
	2	CWT-9003	CWT-9003	CWT-9003	CWT-9003	CWT-9003	CWT-9004	CWT-9004	CWT-9005	CWT-9005
18 AWG	1	CWT-9003	CWT-9003	CWT-9003	CWT-9003	CWT-9003	CWT-9004	CWT-9004	CWT-9005	CWT-9005
	2	CWT-9003	CWT-9003	CWT-9003	CWT-9004	CWT-9003	CWT-9004	CWT-9004	CWT-9005	CWT-9005
16 AWG	1	CWT-9003	CWT-9003	CWT-9003	CWT-9003	CWT-9003	CWT-9004	CWT-9004	CWT-9005	CWT-9005
	2	CWT-9003	CWT-9004	CWT-9003	CWT-9004	CWT-9004	CWT-9005	CWT-9004	CWT-9005	CWT-9005
14 AWG	1	CWT-9003	CWT-9003	CWT-9003	CWT-9004	CWT-9003	CWT-9004	CWT-9004	CWT-9005	CWT-9005
	2	CWT-9004	CWT-9004	CWT-9004	CWT-9005	CWT-9004	CWT-9005	CWT-9005	CWT-9005	CWT-9005
12 AWG	1	CWT-9004	CWT-9004	CWT-9004	CWT-9004	CWT-9004	CWT-9005	CWT-9004	CWT-9005	CWT-9005
	2	CWT-9005	CWT-9005	CWT-9005	CWT-9005	CWT-9005	CWT-9005	CWT-9005	CWT-9005	CWT-9005
10 AWG	1	CWT-9005	CWT-9005	CWT-9005	CWT-9005	CWT-9005	CWT-9005	CWT-9005	CWT-9005	CWT-9005

Terminals and Splices

B-155 Series SolderSleeve®

RoHS Wire to Wire Splicing

Single Piece Solder Splice



B-155 Series Selection Guide

End A Size & No. of Conductors		End B: Size & Number of Conductors							
		26 AWG		24 AWG		22 AWG		20 AWG	
		1	2	1	2	1	2	1	2
26 AWG	1	B-155-9001	B-155-9001	B-155-9001	B-155-9001	B-155-9001	B-155-9002	B-155-9002	B-155-9002
	2	B-155-9001	B-155-9001	B-155-9001	B-155-9002	B-155-9001	B-155-9002	B-155-9002	B-155-9002
24 AWG	1	B-155-9001	B-155-9001	B-155-9001	B-155-9001	B-155-9001	B-155-9002	B-155-9002	B-155-9002
	2	B-155-9001	B-155-9002	B-155-9001	B-155-9002	B-155-9002	B-155-9002	B-155-9002	B-155-9002
22 AWG	1	B-155-9001	B-155-9001	B-155-9001	B-155-9002	B-155-9002	B-155-9002	B-155-9002	B-155-9002
	2	B-155-9002	B-155-9002	B-155-9002	B-155-9002	B-155-9002	B-155-9002	B-155-9002	B-155-9003
20 AWG	1	B-155-9002	B-155-9002	B-155-9002	B-155-9002	B-155-9002	B-155-9002	B-155-9002	B-155-9003
	2	B-155-9002	B-155-9002	B-155-9002	B-155-9002	B-155-9002	B-155-9003	B-155-9003	B-155-9003
18 AWG	1	B-155-9002	B-155-9002	B-155-9002	B-155-9002	B-155-9002	B-155-9002	B-155-9002	B-155-9003
	2	B-155-9003	B-155-9003	B-155-9003	B-155-9003	B-155-9003	B-155-9003	B-155-9003	B-155-9003
16 AWG	1	B-155-9002	B-155-9002	B-155-9002	B-155-9002	B-155-9002	B-155-9003	B-155-9003	B-155-9003
	2	B-155-9003	B-155-9003	B-155-9003	B-155-9003	B-155-9003	B-155-9003	B-155-9003	B-155-9003
14 AWG	1	B-155-9003	B-155-9003	B-155-9003	B-155-9003	B-155-9003	B-155-9003	B-155-9003	B-155-9003
	2	B-155-9004	B-155-9004	B-155-9004	B-155-9004	B-155-9004	B-155-9004	B-155-9004	B-155-9004
12 AWG	1	B-155-9003	B-155-9003	B-155-9003	B-155-9003	B-155-9003	B-155-9003	B-155-9003	B-155-9004
	2	B-155-9005	B-155-9005	B-155-9005	B-155-9005	B-155-9005	B-155-9005	B-155-9005	B-155-9005
10 AWG	1	B-155-9005	B-155-9005	B-155-9005	B-155-9005	B-155-9005	B-155-9005	B-155-9005	B-155-9005

End A Size & No. of Conductors		End B: Size & Number of Conductors								
		18 AWG		16 AWG		14 AWG		12 AWG		10 AWG
		1	2	1	2	1	2	1	2	1
26 AWG	1	B-155-9002	B-155-9003	B-155-9002	B-155-9003	B-155-9003	B-155-9004	B-155-9003	B-155-9005	B-155-9005
	2	B-155-9002	B-155-9003	B-155-9002	B-155-9003	B-155-9003	B-155-9004	B-155-9003	B-155-9005	B-155-9005
24 AWG	1	B-155-9002	B-155-9003	B-155-9002	B-155-9003	B-155-9003	B-155-9004	B-155-9003	B-155-9005	B-155-9005
	2	B-155-9002	B-155-9003	B-155-9002	B-155-9003	B-155-9003	B-155-9004	B-155-9003	B-155-9005	B-155-9005
22 AWG	1	B-155-9002	B-155-9003	B-155-9002	B-155-9003	B-155-9003	B-155-9004	B-155-9003	B-155-9005	B-155-9005
	2	B-155-9002	B-155-9003	B-155-9002	B-155-9003	B-155-9003	B-155-9004	B-155-9003	B-155-9005	B-155-9005
20 AWG	1	B-155-9002	B-155-9003	B-155-9003	B-155-9003	B-155-9003	B-155-9004	B-155-9003	B-155-9005	B-155-9005
	2	B-155-9003	B-155-9003	B-155-9003	B-155-9003	B-155-9003	B-155-9004	B-155-9004	B-155-9005	B-155-9005
18 AWG	1	B-155-9003	B-155-9003	B-155-9003	B-155-9003	B-155-9003	B-155-9004	B-155-9004	B-155-9005	B-155-9005
	2	B-155-9003	B-155-9003	B-155-9003	B-155-9004	B-155-9003	B-155-9004	B-155-9004	B-155-9005	B-155-9005
16 AWG	1	B-155-9003	B-155-9003	B-155-9003	B-155-9003	B-155-9003	B-155-9004	B-155-9004	B-155-9005	B-155-9005
	2	B-155-9003	B-155-9003	B-155-9003	B-155-9004	B-155-9004	B-155-9005	B-155-9004	B-155-9005	B-155-9005
14 AWG	1	B-155-9003	B-155-9003	B-155-9003	B-155-9004	B-155-9003	B-155-9005	B-155-9004	B-155-9005	B-155-9005
	2	B-155-9004	B-155-9004	B-155-9004	B-155-9005	B-155-9004	B-155-9005	B-155-9005	B-155-9005	B-155-9005
12 AWG	1	B-155-9004	B-155-9004	B-155-9004	B-155-9004	B-155-9004	B-155-9005	B-155-9004	B-155-9005	B-155-9005
	2	B-155-9005	B-155-9005	B-155-9005	B-155-9005	B-155-9005	B-155-9005	B-155-9005	B-155-9005	B-155-9005
10 AWG	1	B-155-9005	B-155-9005	B-155-9005	B-155-9005	B-155-9005	B-155-9005	B-155-9005	B-155-9005	B-155-9005

D-1744 Selection Guide

Side A Size & No. of Conductors		Side B: Size & Number of Conductors							
		26 AWG		24 AWG		22 AWG		20 AWG	
		1	2	1	2	1	2	1	2
26 AWG	1	D-1744-01	D-1744-01	D-1744-01	D-1744-01	D-1744-01	D-1744-01	D-1744-01	D-1744-02
	2	D-1744-01	D-1744-01	D-1744-01	D-1744-01	D-1744-01	D-1744-02	D-1744-01	D-1744-02
24 AWG	1	D-1744-01	D-1744-01	D-1744-01	D-1744-01	D-1744-01	D-1744-01	D-1744-01	D-1744-02
	2	D-1744-01	D-1744-01	D-1744-01	D-1744-01	D-1744-01	D-1744-02	D-1744-02	D-1744-02
22 AWG	1	D-1744-01	D-1744-01	D-1744-01	D-1744-01	D-1744-01	D-1744-02	D-1744-01	D-1744-02
	2	D-1744-01	D-1744-02	D-1744-01	D-1744-02	D-1744-02	D-1744-02	D-1744-02	D-1744-02
20 AWG	1	D-1744-01	D-1744-01	D-1744-01	D-1744-02	D-1744-01	D-1744-02	D-1744-02	D-1744-02
	2	D-1744-02	D-1744-02	D-1744-02	D-1744-02	D-1744-02	D-1744-02	D-1744-02	D-1744-03
18 AWG	1	D-1744-02	D-1744-02	D-1744-02	D-1744-02	D-1744-02	D-1744-02	D-1744-02	D-1744-03
	2	D-1744-03	D-1744-03	D-1744-03	D-1744-03	D-1744-03	D-1744-03	D-1744-03	D-1744-03
16 AWG	1	D-1744-02	D-1744-02	D-1744-02	D-1744-02	D-1744-02	D-1744-02	D-1744-02	D-1744-03
	2	D-1744-03	D-1744-03	D-1744-03	D-1744-03	D-1744-03	D-1744-03	D-1744-03	D-1744-03
14 AWG	1	D-1744-03	D-1744-03	D-1744-03	D-1744-03	D-1744-03	D-1744-03	D-1744-03	D-1744-03
	2	D-1744-03	D-1744-03	D-1744-03	D-1744-03	D-1744-03	D-1744-03	D-1744-03	D-1744-04
12AWG	1	D-1744-03	D-1744-03	D-1744-03	D-1744-03	D-1744-03	D-1744-03	D-1744-04	D-1744-04
	2	D-1744-04	D-1744-04	D-1744-04	-	D-1744-04	-	-	-

Side A Size & No. of Conductors		Side B: Size & Number of Conductors							
		18 AWG		16 AWG		14 AWG		12 AWG	
		1	2	1	2	1	2	1	2
26 AWG	1	D-1744-02	D-1744-03	D-1744-02	D-1744-03	D-1744-03	D-1744-03	D-1744-03	D-1744-04
	2	D-1744-02	D-1744-03	D-1744-02	D-1744-03	D-1744-03	D-1744-03	D-1744-03	D-1744-04
24 AWG	1	D-1744-02	D-1744-03	D-1744-02	D-1744-03	D-1744-03	D-1744-03	D-1744-03	D-1744-04
	2	D-1744-02	D-1744-03	D-1744-02	D-1744-03	D-1744-03	D-1744-03	D-1744-03	-
22 AWG	1	D-1744-02	D-1744-03	D-1744-02	D-1744-03	D-1744-03	D-1744-03	D-1744-03	D-1744-04
	2	D-1744-02	D-1744-03	D-1744-02	D-1744-03	D-1744-03	D-1744-03	D-1744-03	-
20 AWG	1	D-1744-02	D-1744-03	D-1744-02	D-1744-03	D-1744-03	D-1744-03	D-1744-04	-
	2	D-1744-03	D-1744-03	D-1744-03	D-1744-03	D-1744-03	D-1744-04	D-1744-04	-
18 AWG	1	D-1744-02	D-1744-03	D-1744-03	D-1744-03	D-1744-03	D-1744-03	D-1744-03	-
	2	D-1744-03	D-1744-03	D-1744-03	D-1744-03	D-1744-03	D-1744-04	D-1744-03	-
16 AWG	1	D-1744-03	D-1744-03	D-1744-03	D-1744-03	D-1744-03	D-1744-04	D-1744-03	-
	2	D-1744-03	D-1744-03	D-1744-03	D-1744-03	D-1744-03	D-1744-04	D-1744-04	-
14 AWG	1	D-1744-03	D-1744-03	D-1744-03	D-1744-03	D-1744-03	D-1744-04	D-1744-03	-
	2	D-1744-03	D-1744-04	D-1744-04	D-1744-04	D-1744-04	-	-	-
12AWG	1	D-1744-03	D-1744-03	D-1744-03	D-1744-04	D-1744-03	-	D-1744-04	-

Terminals and Splices

SGRS Closed End Connector

SolderGrip®
Self Fixing Solder End

Features & Benefits

- PVDF insulation sleeve provides encapsulation, inspectability & strain relief.
- Spiral copper coil grips and compresses the conductors for the optimum solder connection.
- Pre-fluxed solder preform provides a controlled soldering process.
- The SGRS series has an adhesive insert to provide immersion sealing performance.
- One piece design.
- Accommodates a wide variety of conductor types, quantities and sizes.
- Colour coded for easy identification.

Solder & Flux Characteristics

- Sn60 Pb40 with ROM 1flux per ANSI-J-STD-004

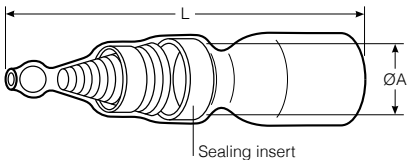
Specifications & Approvals

- UL CUL E87681
- RB-109



Part Number	Wire Range mm ² (CMA)	Max. Current Rating	Length	Colour Code
SGRS-1	0.7 - 2.4 (1400 - 4800)	17 Amps	34.8mm	Green
SGRS-2	2.0 - 4.0 (4000 - 8000)	28 Amps	34.2mm	Red
SGRS-3	3.5 - 8.0 (7000 - 16000)	56 Amps	42.0mm	Blue
SGRS-4	7.5 - 12.0 (15000 - 24000)	84 Amps	41.5mm	Yellow

This product is also available as 'Ring Terminals', please see SGRT later in this section.



Product Characteristics	Product Performance
Voltage drop	<2.0mV
Tensile strength	Exceeds strength of individual conductors
Dielectric strength	2.0kV
Temperature rating	-55°C to +125°C
Insulation resistance after immersion	100 megaohms
Insulation performance	300 mbar (for specific combinations refer to RB-109)
Voltage rating	600V

Notes:

- To calculate mm² or CMA refer to page earlier in this section
- Heat guns are recommended for the installation of these devices: HL2010E and CV198X with the correct reflector added. See Application Equipment Section.

D-406 Series

DuraSeal®

Heat Shrinkable, Crimp Splice

C

RoHS
compliant

Specifications & Approvals

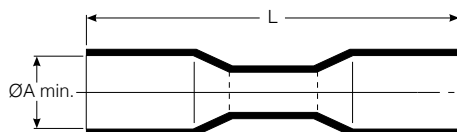
- UL CUL listed 9134, Fire E87681 (C)
- Lloyds listed, File 65 247 HH 02-93
- RB-107

Automotive wiring repair and maintenance
Automotive accessory installations
Marine electronics
Fleet maintenance
Commercial wiring
OEM Harness assembly

Features & Benefits

- Protects splices from water, condensation, salt and corrosion.
- Provides strain relief
- Protects against vibration in rugged environments
- Completely insulates and protects electrical connections
- Adhesive lining provides protection that is more reliable than conventional splices.

Part Number Bulk	Part Number Boxed	Conductor Size AWG	Conductor Size mm ²	Splice Dimension AØ	Splice Dimension L	Colour
D-406-0001	D-406-0001CS100	22 - 18	0.50 - 1.00	3.7	31.5	Red
D-406-0002	D-406-0002CS100	16 - 14	1.50 - 2.50	4.6	31.5	Blue
D-406-0003	D-406-0003CS50	12 - 10	3.00 - 6.00	6.5	37.5	Yellow



Product Characteristics	Product Performance
Operating temperature	-55°C to +125°C
Shrink ratio	Approximately 2:1
Physical properties	Cut through resistance 31 kg Wire pull out Red 11.3 kg; Blue 22.7 kg; Yellow 27.2 kg No cracking after heat aging for 168h @ 160°C
Chemical Resistance	Solvent resistance: Isopropyl alcohol, trichloroethylene, gasoline, battery acid, diesel fuel, motor oil, antifreeze, brake fluid, 5% salt water
Electrical properties	Dielectric strength: 2500 Vac Insulation resistance: 1,000 MΩ at 100VDC

Notes:

- Bulk packs contain 1000 pieces for D-406-0001 & D-406-0002 and 500 pieces for D-406-0003.
- Boxes contain 100 pieces for D-406-0001 & D-406-0002, and 50 pieces for D-406-0003.
- Application tooling: Heat guns with the correct reflector added, together with crimp tools.

Terminals and Splices

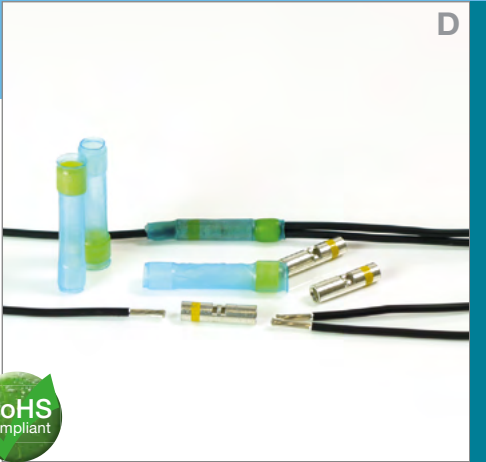
D-436 Series MiniSeal®

Wire to Wire Splicing
Heat Shrinkable, Crimp Splice

Used for wire splicing where size, weight and environmental sealing are critical. MiniSeal crimp splices consist of a plated copper crimp barrel and a separate sealing sleeve. They can be used on a combination of wires, from 1:1 to 10:10 (sealing inserts may be required).

Features & Benefits

- Immersion-resistant crimp splices
- Splices are smaller and lighter than comparable termination products.
- Transparent heat-shrinkable insulation provides protection & strain relief.
- Splice provides sealing to un-etched wire insulations, including Teflon®.
- Low total installation cost.
- Available as both 'Butt' (in-line) splice or 'Stub' (parallel) splice.



Specifications & Approvals


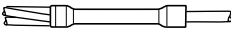
- SAE-AS-81824/1 for D-436-36/37/38
- MIL spec M8184/1

Table A: CMA of Typical Conductors

AWG	28	26	24	22	20	18	16	14	12
CMA	177	304	475	754	1216	1900	2426	3831	5874
mm2	0.09	0.16	0.24	0.38	0.62	0.96	1.23	1.94	2.97

Part Number	MIL Spec Equivalent	mm² Range	Wire Range	Colour Code
D-436-36	M81824/-1-1	0.15 - 0.75	26 - 20 AWG	Red
D-436-37	M81824/-1-2	0.39 - 1.34	20 - 16 AWG	Blue
D-436-38	M81824/-1-3	0.95 - 3.37	16 - 12 AWG	Yellow

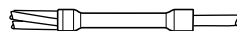
Product Selection Process

- Determine the type of splice required -
Stub (parallel) or Butt (in-line).


- Which crimp barrel plating is required -
Tin plating or Nickel plating
- Calculate the size of crimp barrel required. Using the table above, calculate the total cross section to be spliced by adding the circular mil area (CMA) or square millimetres (mm²) of each wire.
- Stub Splice: Add the CMA or mm2 of all the wires together.
- Butt Splice: Calculate each side separately
- Select the colour code for the size crimp barrel required. Using the table above.
- Determine the type of sealing sleeve required, by ensuring wires fit in the holes of the sealing sleeve inserts.
- Select the part number. Turn to the MiniSeal part number selection tables over this page.
- Using the appropriate table, find the crimp barrel size range and the size and number of wires for your application. Then select the part number for the type required.
- Crimp barrels and sealing sleeves are available separately, please contact us for details.

Notes:

- Application tooling: Heat guns HL2010E and CV198X with the correct reflector added are recommended for the installation of these devices, together with crimp tool 1377. See Application Equipment Section.

BUTT (in-line) Splice - Selection Guide



Part Number		Colour	Crimp Barrel Size Range		Internal Dimensions			
					End 1		End 2	
Tin Plated	Nickel Plated		CMA	mm ²	Sealing Insert mm	Max. No. Wires	Sealing Insert mm	Max. No. Wires
D-436-36	D-436-82	Red	304-1510	0.15-0.75	2.16 Ø	2	2.16 Ø	2
D-436-37	D-436-83	Blue	1058-2680	0.39-1.34	2.79 Ø	2	2.79 Ø	2
D-436-38	D-436-84	Yellow	2375-6755	0.95-3.37	4.32 Ø	2	4.32 Ø	2
D-436-0110	D-436-85	Red	304-1510	0.15-0.75	2.36 Ø	6*	4.06 Ø	2
D-436-52	D-436-86	Blue	1058-2680	0.39-1.34	2.36 Ø	6*	4.06 Ø	2
D-436-53	D-436-87	Yellow	2375-6755	0.95-3.37	2.36 Ø	6*	4.06 Ø	2
D-436-0115	D-436-88	Red	304-1510	0.15-0.75	2.36 Ø	6*	2.36 Ø	6*
D-436-42	D-436-89	Blue	1058-2680	0.39-1.34	2.36 Ø	6*	2.36 Ø	6*
D-436-43	D-436-90	Yellow	2375-6755	0.95-3.37	2.36 Ø	6*	2.36 Ø	6*

* Denotes max 2 wires per hole of insert

STUB (parallel) Splice - Selection Guide



Part Number		Colour	Crimp Barrel Size Range		Internal Ø Dimensions			
					End 1		End 2	
Tin Plated	Nickel Plated		CMA	mm ²	Sealing Insert	Max. No. Wires	Sealing Insert mm	Max. No. Wires
D-436-0128	D-436-0119	Red	304-1510	0.15-0.75	2.16	2	1.01	2
D-436-58	D-436-75	Blue	1058-2680	0.39-1.34	4.56	2	2.28	2
D-436-59	D-436-76	Yellow	2375-6755	0.95-3.37	4.56	2	2.28	2
D-436-60	D-436-77	Blue	1058-2680	0.39-1.34	2.03	10*	6.35	2
D-436-61	D-436-78	Yellow	2375-6755	0.95-3.37	2.03	10*	6.35	2

* Denotes max 2 wires per hole of insert

Product Characteristics	Product Performance
Insulation	Radiation crosslinked, heat-shrinkable polyvinylidene fluoride
Operating temperature	-55°C to +150°C
Dielectric strength	2500 V Max
Insulation resistance after immersion	5000 Mega-ohms
Voltage drop	6.9 mV @ 4.5A vs 8.1 mV for an equal length of wire
Physical properties	Tensile strength exceeds strength of spliced wire

Notes:

- The correct crimp tool AD-1377, must be used for proper installation of these devices.
- Heat guns are recommended for the installation of these devices: HL2010E and CV198X with the correct reflector added. See Application Equipment Section.

Terminals and Splices

D-436-COLD Series

Cold Applied
Gel Sealed, Crimp Splice

Ideal for Aerospace and Defence applications where performance and reliability is essential. Designed to provide an immersion resistant in-line splice on 1:1 wires.

Features & Benefits

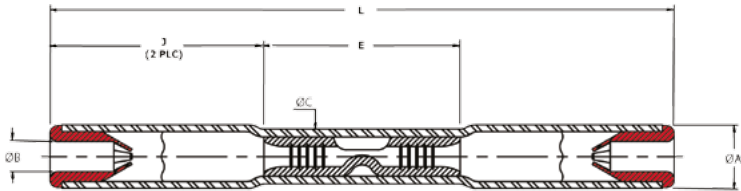
- Simple one-step termination and environmental protection.
- No heating required for installation - safe for use on fuelled aircraft.
- Reliability in a wide variety of environmental conditions.
- Prevent water ingress under permanent pressure/weight.
- Achieve environmental performance while maintaining a small profile and electrical performance.



Specifications & Approvals

- SAE-AMS-DTL-23053/8 insulation sleeve
- SAE-AS81824/12

Part Number	Conductor Size		Splice Dimensions (mm)					End Cap Colour Code
	AWG	mm²	AØ	BØ	E	J	L	
D-436-36-COLD	26 - 20	0.16 - 0.62	4.2	2.0	12.1	12.7	36.8	Red
D-436-37-COLD	18 - 16	0.96 - 1.23	5.1	2.9	14.3	11.8	37.7	Blue
D-436-38-COLD	14 - 12	1.94 - 2.97	5.9	3.8	14.3	11.8	37.7	Yellow



Product Characteristics	Product Performance
Operating temperature	-65°C to +150°C
Dielectric strength	2500 V Max
Insulation resistance after immersion	5000 Mega-ohms minimum
Altitude immersion	75,000 ft
Fluid resistance	MIL-L-7808, MIL-L-23699, MIL-PRF-5605 (Hydraulic), MIL-A-8243, MIL-C-25769 and MIL-T-5624 (JP-5)
Physical properties	Tensile strength exceeds strength of spliced wire

Notes:

- Application Tooling: Cold applied crimp tool AD-1381 or approved M22520/44-01 crimp tool, **must be** used for proper installation of these devices.

D-200 Series

200°C MiniSeal®

Heat Shrinkable, Crimp Splice



Immersion resistant in-line nickel plated sealed crimp splices for 200°C applications. Developed for the growing needs of high temperature applications in the aerospace and defence industry. Provides a small and light, environmental-resistant splice, while meeting SAE-AS81824/1

Provides immersion resistant in-line splice on 1:1 wires for 26 AWG to 12AWG; nickel-plated conductors.

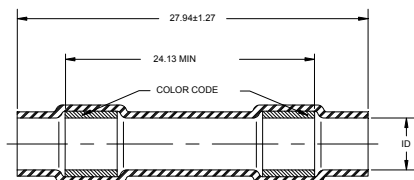
Features & Benefits

- Immersion-resistant crimp splices
- Small size and lightweight
- Provides sealing to unetched wire insulations.
- No need to stagger wire splices.

Specifications & Approvals

- SAE-AS-81824/1 (modified for 200°C applications with heat ageing and thermal shock test temperature of 200°C).

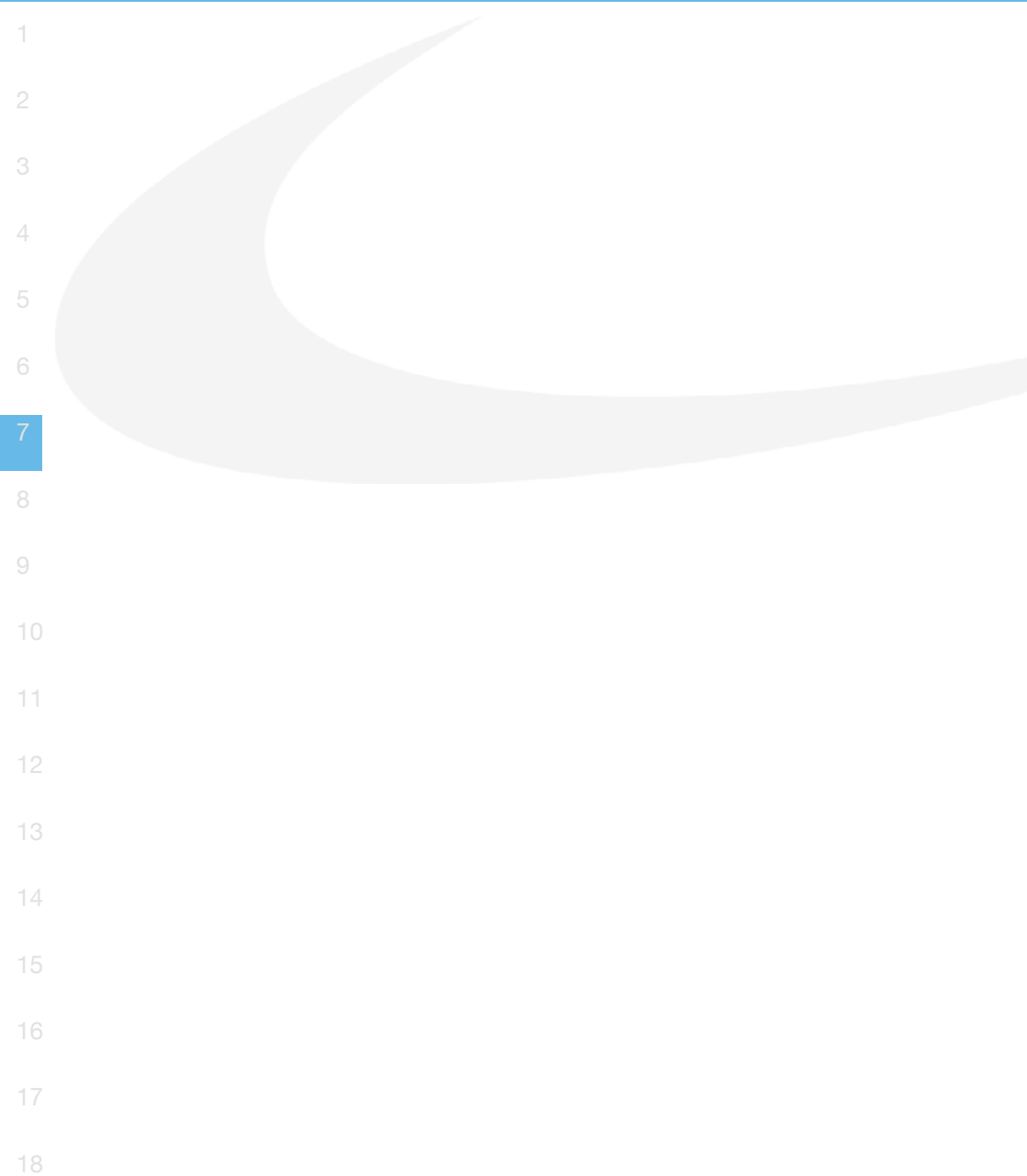
Part Number	MIL Spec Equivalent	Conductor Size		Insulation Sleeve ID Ø		Colour Code	
		AWG	mm ²	Supplied	Recovered		
D-200-82	AS81824/1-1	26 - 20	0.16 - 0.62	2.16	0.64	Red	
D-200-83	AS81824/1-2	20 - 16	0.62 - 1.23	2.79	0.64	Blue	
D-200-84	AS81824/1-3	16 - 12	1.23 - 2.97	4.32	0.64	Yellow	



Product Characteristics	Product Performance
Insulation	Radiation crosslinked, heat-shrinkable modified fluoropolymer
Operating temperature	-55°C to +200°C
Dielectric strength	2500 V Max
Insulation resistance after immersion	5000 Mega-ohms
Voltage drop	6.9 mV @ 4.5A vs 8.1 mV for an equal length of wire
Physical properties	Tensile strength exceeds strength of spliced wire

Notes:

- The correct crimp tool AD-1377, must be used for proper installation of these devices.
- Heat guns are recommended for the installation of these devices: HL2010E and CV198X with the correct reflector added. See Application Equipment Section.



DuraSeal Crimps



RoHS
compliant

DuraSeal Heat Shrinkable Nylon Crimps B-106 Series

DuraSeal terminals and disconnects protect against water, condensation, salt and corrosion. Their tough, heat-shrinkable nylon tubing resists abrasion and cut-through damage, provides strain relief and protects against vibration damage.

DuraSeal products are simple and quick to install using a crimp tool and a heat source. They accommodate a wide range of wire sizes and are colour coded for easy identification, yet are transparent for visual inspection of the finished splice.

Twist-on Soldergrip



SolderGrip Heat Shrinkable Twist-on SGRT

SolderGrip terminals and disconnects utilise a spiral copper coil that grips and compresses the conductors and allows a pre-fluxed solder ring to flow to the centre of the splicing area, resulting in a highly reliable, repeatable joint.

SolderGrip terminals use a durable polyvinylidene fluoride heat-shrinkable tubing that protects the electrical joint and provides insulation and strain relief.

- The SolderGrip technology is a reliable and repeatable means of terminating conductors time after time.
- Can terminate a variety of conductor types (solid and stranded) and platings.
- Multiple conductors can be successfully terminated in a single splice.

Terminals and Splices

B-106 Series

DuraSeal®

Heat Shrinkable, Crimp Terminals

Crimp and Shrink

DuraSeal products insulate and protect electrical connections for numerous applications including;

- OEM wire harness fabrication
- Marine electronics
- Fleet maintenance
- Commercial wiring

Features & Benefits

- Resistance to moisture and abrasion.
- Strain relief.
- Protection from wire pull-out.
- Easy installation.
- Environmental protection.
- Colour coded for identification.
- Transparent for inspection.
- Adhesive lined.



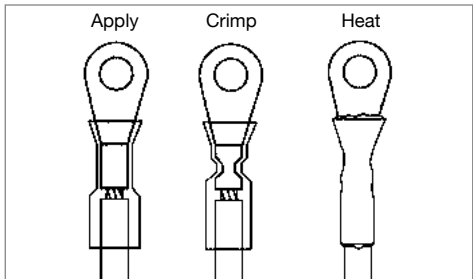
Specifications & Approvals

- UL and CUL 91J4, File E87681
- Lloyds listed, File 65 247 HH 02-93
- UL & CUL E157833 (for B106-3 & B106-4 series only)

Product Characteristics	Product Performance
Operating temperature	-55°C to +125°C
Minimum shrink temperature	180°C
Cut through resistance	31.7kg
Wire pull out after crimping and recovery	Red: 11.3 kg; Blue: 22.7 kg; Yellow: 27.2 kg
Chemical to ASTM D 3032, ESA-603D	Diesel fuel; Brake fluid; Antifreeze; 5% salt water; Motor oil
Chemical resistance	Isopropyl alcohol, trichloroethane, gasoline, battery acid
Dielectric withstand	2500V
Insulation resistance	10 Mega-ohms
Voltage rating	600 Volt max
Physical properties	Tensile strength exceeds strength of spliced wire

Product Installation Process

- 1 Select appropriate size crimp to suit application. For terminal and disconnect terminations, strip wire insulation to expose 6.5mm conductor.
- 2 Securely crimp using AD-1522 crimp tool for pre-insulated crimps.
- 3 Heat terminal or disconnect with appropriate heat gun and reflector until tubing recovers and adhesive flows. Avoid heating ring or fork metallic parts.



Notes:

- The correct crimp tool AD-1522, must be used for proper installation of these devices.
- Heat guns are recommended for the installation of these devices: HL2010E and CV198X with the correct reflector. See Application Equipment Section.

IMPORTANT Ordering Information:

The B-106 Series devices are available in both ‘Boxed’ and ‘Bulk’ packaging

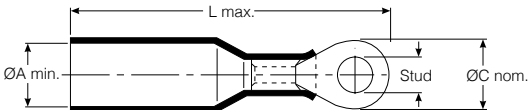
- **BOXED** - Boxed packs of 100 pieces for Blue and Red devices are available by adding **CS100** to the end of the part number. Whilst boxed packs of 50 pieces for the Yellow size are available by adding **CS50** to the end of the part number as illustrated below.

B-106-1601-CS100

B-106-1403-CS50

- **BULK** - The part numbers on the following pages refer to devices supplied in bulk packs of 1,000 pieces for the Blue & Red sizes and 500 pieces for Yellow sizes.

Ring Terminals - Selection Guide



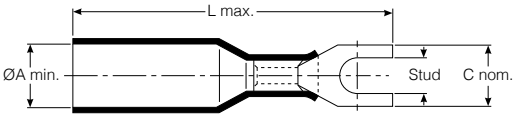
Part Number	Colour	Wire Dimensions			Terminal Dimensions			
		AWG	Insulation		Stud	Ø 'A' mm	'C' mm	'L' mm
B-106-1401	Red	22-18	3.81	1.40	M4	3.81	7.88	32.0
B-106-1501		22-18	3.81	1.40	M5	3.81	9.91	34.0
B-106-1601		22-18	3.81	1.40	M6	3.81	11.94	36.1
B-106-1801		22-18	3.81	1.40	M8	3.81	13.97	39.0
B-106-1991		22-18	3.81	1.40	M10	3.81	17.78	43.2
B-106-1402	Blue	16-14	4.45	2.00	M4	4.57	7.88	33.0
B-106-1502		16-14	4.45	2.00	M5	4.57	9.91	35.1
B-106-1602		16-14	4.45	2.00	M6	4.57	11.94	36.1
B-106-1802		16-14	4.45	2.00	M8	4.57	13.97	40.1
B-106-1992		16-14	4.45	2.00	M10	4.57	17.78	43.9
B-106-1403	Yellow	12-10	6.35	2.79	M4	6.35	7.88	38.1
B-106-1503		12-10	6.35	2.79	M5	6.35	9.91	40.1
B-106-1603		12-10	6.35	2.79	M6	6.35	11.94	41.2
B-106-1803		12-10	6.35	2.79	M8	6.35	13.97	45.2
B-106-1993		12-10	6.35	2.79	M10	6.35	17.78	47.0

All dimensions in millimetres unless otherwise stated.

B-106 Series

DuraSeal®
Heat Shrinkable, Crimp Terminals

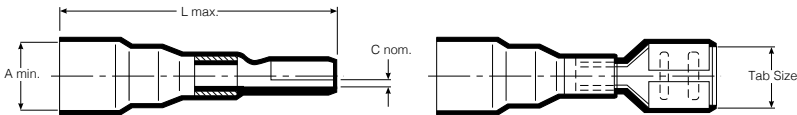
Fork Terminals - Selection Guide



Part Number	Colour	Wire Dimensions			Terminal Dimensions			
		AWG	Max Ø	Min Ø	Stud	Ø 'A' mm	'C' mm	'L' mm
B-106-2401	Red	22-18	3.81	1.40	M4	3.81	7.87	32.0
B-106-2402	Blue	16-14	4.45	2.00	M4	4.57	7.87	35.0
B-106-2403	Yellow	12-10	6.35	2.79	M4	6.35	7.87	38.1
B-106-2502	Blue	16-14	4.45	2.00	M5	4.57	9.91	35.0
B-106-2503	Yellow	12-10	6.35	2.79	M5	6.35	9.91	40.2

All dimensions in millimetres unless otherwise stated.

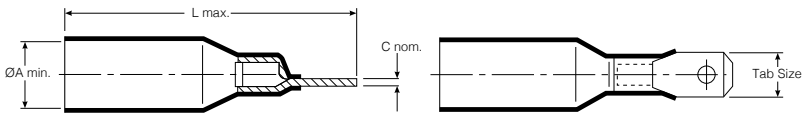
Push-on Terminals - Selection Guide



Part Number	Colour	Wire Dimensions			Terminal Dimensions			
		AWG	Max Ø	Min Ø	Tab Size	Ø 'A' mm	'C' mm	'L' mm
B-106-3631	Red	22-18	3.81	1.40	6.35	3.81	0.81	30.5
B-106-3632	Blue	16-14	4.45	2.00	6.35	4.57	0.81	32.0
B-106-3633	Yellow	12-10	6.35	2.79	6.35	6.35	0.81	33.0
B-106-3281	Red	22-18	3.81	1.40	2.79	3.81	0.51	22.9
B-106-3481	Red	22-18	3.81	1.40	4.75	3.81	0.51	30.5

All dimensions in millimetres unless otherwise stated.

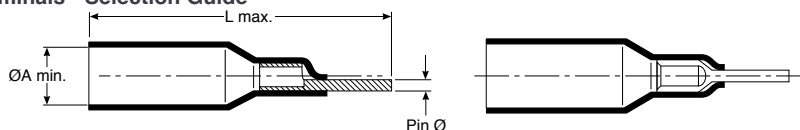
Tab Terminals - Selection Guide



Part Number	Colour	Wire Dimensions			Terminal Dimensions			
		AWG	Max Ø	Min Ø	Tab Size	Ø 'A' mm	'C' mm	'L' mm
B-106-4631	Red	22-18	3.81	1.40	6.35	3.81	0.81	30.5
B-106-4632	Blue	16-14	4.45	2.00	6.35	4.57	0.81	32.0

All dimensions in millimetres unless otherwise stated.

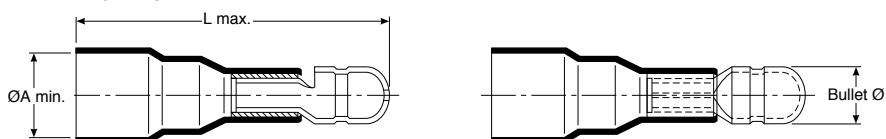
Pin Terminals - Selection Guide



Part Number	Colour	Wire Dimensions			Terminal Dimensions			
		AWG	Max Ø	Min Ø	Pin Ø	Ø 'A' mm	-	'L' mm
B-106-6201	Red	22-18	3.81	1.40	2.00	3.81	-	31.0

All dimensions in millimetres unless otherwise stated.

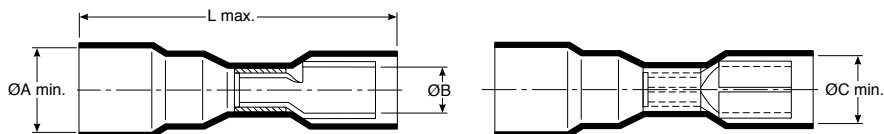
Bullet Terminals (Male) - Selection Guide



Part Number	Colour	Wire Dimensions			Terminal Dimensions			
		AWG	Max Ø	Min Ø	Bullet	Ø 'A' mm	-	'L' mm
B-106-7401	Red	22-18	3.81	1.40	3.81	3.81	-	33.5
B-106-7502	Blue	16-14	4.45	2.00	5.08	4.57	-	34.5

All dimensions in millimetres unless otherwise stated.

Bullet Terminals (Female) - Selection Guide



Part Number	Colour	Wire Dimensions			Terminal Dimensions			
		AWG	Max Ø	Min Ø	Bullet	Ø 'A' mm	'C' mm	'L' mm
B-106-8401	Red	22-18	3.81	1.40	3.81	3.81	5.59	30.5
B-106-8502	Blue	16-14	4.45	2.00	5.08	4.57	6.10	32.5

All dimensions in millimetres unless otherwise stated.

Terminals and Splices

SGRT Series

SolderGrip®
Heat Shrinkable, Self-fixing Terminal

Twist and Heat Termination

For terminating multiple wires to terminals.

Features & Benefits

- Transparent insulation sleeve provides encapsulation, inspectability & strain relief.
- Spiral copper coil grips and compresses the conductors for optimum solder connection.
- Pre-fluxed solder preform provides a controlled soldering process.
- One piece design for easy installation.
- Accommodates a wide variety of conductor types, quantities, sizes and plating types unmatched by other termination techniques.

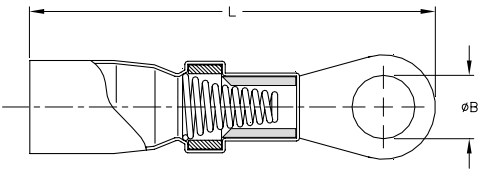


Specifications & Approvals

- MIL-T-7928G
- RB-120

Part Number	Stud Size	Wire Range		Max. Bundle	Max. Rating	Length
	Ø 'B' mm	CMA	mm²	Ø mm	Amps	mm
SGRT-1-02	2.4	1400 - 5000	0.7 - 2.5	4.1	12.5	38.0
SGRT-2-03	3.8	2400 - 6000	1.2 - 3.0	5.0	15.0	38.0
SGRT-2-04	4.3	2400 - 6000	1.2 - 3.0	5.0	15.0	38.0
SGRT-2-05	5.5	2400 - 6000	1.2 - 3.0	5.0	15.0	38.0
SGRT-2-06	6.5	2400 - 6000	1.2 - 3.0	5.0	15.0	38.0
SGRT-3-06	6.5	5000 - 13200	2.5 - 6.6	6.5	33.0	44.5
SGRT-3-08	8.4	5000 - 13200	2.5 - 6.6	6.5	33.0	51.0
SGRT-4-06	6.5	12000 - 22400	6.0 - 11.2	9.0	56.0	44.5
SGRT-4-08	8.5	12000 - 22400	6.0 - 11.2	9.0	56.0	51.0

Product Characteristics	Product Performance
Insulation	Radiation crosslinked, heat-shrinkable polyvinylidene fluoride
Solder and Flux	Sn60 Pb40 with RA flux
Temperature Rating	-55°C to +150°C



Notes:

- Heat guns are recommended for the installation of these devices: HL2010E and CV198X with the correct reflector added. See Application Equipment Section.

Easy One-Step SolderSleeve® Connecting Wire to Pin, Post or Tab Contacts

Each terminator consists of heat-shrinkable sleeve containing pre-fluxed solder preform. To install simply position over the wire/pin and apply heat. The sleeve will shrink and the solder will melt and flow, resulting in a perfectly soldered, insulated and strain relieved termination.

On connectors where there are several pins to be terminated it is possible to position and recover an entire row of solder sleeves in one go. Recommended for use with most connector pins/posts/tabs applications such as LED's, switches, multiple row/pin connectors

Designed for applications with temperatures up to 150°C. SolderSleeve terminators are also available on carrier tape, spaced precisely to match connector terminal spacing, enabling the termination of an entire row of wires at any one time.

SolderSleeve Terminators

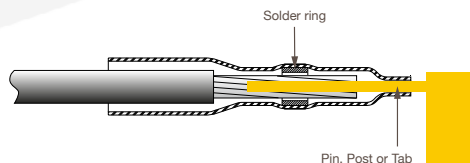
CWT and B155 Series

Offers performance up to +125°C, utilising cross linked, heat-shrinkable polyolefin insulation.

SolderSleeve Terminators

D-129 and D-141 Series

Offers performance up to +150°C utilising cross linked, heat-shrinkable polyvinylidene fluoride insulation.



Terminals and Splices

CWT / B155 / D1xx Series

SolderSleeve®

Wire Termination to Pin, Post & Tabs

Used for discrete terminating of wires to component terminals, such as motor tabs, connector pins or switch terminals.

Features & Benefits

- Transparent insulation sleeve provides encapsulation, strain relief and insulation with inspectability.
- Pre-fluxed solder preform provides controlled soldering process.
- One-piece design provides easy installation and low installed cost.
- A tape carrier option provides convenience and ease of installation.
- UL and CUL recognised.



Only B155-150X RoHS compliant

Specifications & Approvals

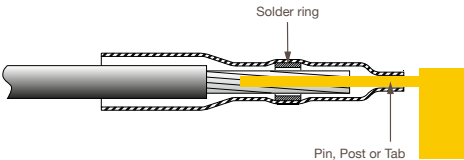
- UL and CUL E87681
- D-5023 and RT-1404
- B-155 series RoHS compliant

Material

Insulation for D-129 and D-141	Radiation crosslinked, heat-shrinkable polyvinylidene fluoride	
Insulation for CWT and B155 Series	Radiation crosslinked, heat-shrinkable polyolefin	
Solder and flux for D-129 and D-141	Sn63 Pb37	Flux: ROM 1 per ANSI-J-004 [RMA flux]
Solder and flux for B155	Sn42Bi58	Flux: ROM 1 per ANSI-J-004 [RA flux]
Solder and flux for CWT-1500 Series	Sn50 Pb32 Cd18	Flux: ROM 1 per ANSI-J-004 [RA flux]

Typical Performance

Temperature rating for CWT / B155 Series	-55°C to +125°C
Temperature rating for D-129 and D-141	-55°C to +150°C
Voltage drop	2.0 mV
Tensile strength	Exceeds strength of conductor
Dielectric strength	2.0 kV
Insulation resistance	1000 M ohms









Notes:

- Heat guns are recommended for the installation of these devices: HL2010E and CV198X with the correct reflector added. See Application Equipment Section.

Terminals and Splices

CWT / B155 / D1xx Series

SolderSleeve®
Wire Termination to Pin, Post & Tabs

Part Number		Wire Size	Terminal Characteristics		
		AWG	Dimensions mm	Shape	
CWT-1501	B155-1501	24	W = up to 0.63		Pin
CWT-1502	B155-1502	20			
CWT-1501	B155-1501	24	W = 0.63 to 0.89		
CWT-1502	B155-1502	22			
CWT-1503	B155-1503	20	W = 0.89 to 1.14		Post
CWT-1502	B155-1502	24 - 22			
CWT-1503	B155-1503	20 - 18	W = 1.14 to 1.52		
CWT-1503	B155-1503	24 - 22			
CWT-1504	B155-1504	20 - 18	W = up to 1.52		Tab
CWT-1501	B155-1501	24 - 20			
CWT-1502	B155-1502	24 - 18	W = 1.27 to 2.28		
CWT-1503	B155-1503	24 - 18	W = 1.77 to 2.79		
CWT-1504	B155-1504	24 - 18	W = 2.54 to 3.8		
CWT-1505	B155-1505	22 - 16	W = 2.28 to 4.7		

Part Number	Wire Size	Terminal Characteristics		
	AWG	Dimensions mm	Shape	
D-141-30*	30 - 26	W = up to 0.61		Pin
D-141-07*	24 - 22			
D-141-31*	20	W = 0.63 to 0.81		
D-141-56	24 - 20	W = 0.76 to 1.27		Post
D-129-05*		W = up to 1.52		
D-129-03*	24 - 20	W = 1.27 to 2.28		Tab
D-129-0043		W = 2.28 to 3.55		

* Denotes available on tape carrier version, please contact us for details.

Notes:

- Heat guns are recommended for the installation of these devices: HL2010E and CV198X with the correct reflector added. See Application Equipment Section.

Terminals and Splices

Shield Termination

SolderSleeve®

Heat Shrinkable, Shield termination

SolderSleeve® shield grounding terminators provide an environmentally sealed, insulated & encapsulated solder connection for a variety of applications. Reliable, versatile and easy to install, resulting in lower installed costs.

SolderSleeve terminators are designed for a wide variety of temperature applications ranging from -65°C to +200°C.

Features & Benefits

- Transparent insulation sleeve provides encapsulation, inspectability & strain relief.
- Pre-fluxed solder preform provides a controlled soldering process.
- One piece design.
- Optional pre-installed ground leads provide convenience & ease installation.
- Quality control temperature indicators.

No Temperature Indicator Versions

CWT Series, entry level version

B-150 and **B-151** Series, high performance version of CWT, low fire hazard applications.

B-155 Series, RoHS compliant, lead free low fire hazard and UL compliant.

ST18 and **ST63****** offers a high degree of environmental protection and meets NAS-1747

B-023 Series, high temperature terminator.

Thermo-chromic Versions

Contain a temperature indicator that exhibits a colour change when temperature is achieved.

SO1**, **SO2**** and **SO3** Series, terminators with thermal indicator, designed for systems operating up to 150°C.

SO96*** Series, With grounding lead or braid strap option.



Only B-155, SO96, SO175 and S200X RoHS compliant

Specifications & Approvals

- UL and CUL E87681
- NAS 1747
- SAE-AS83519/1 & /2

Bi-alloy Versions

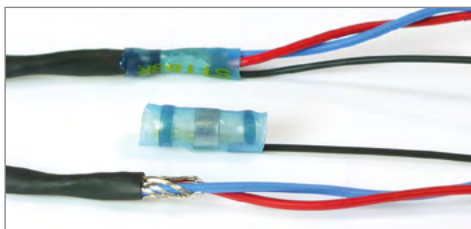
Contain a temperature indicator ring, encircling the solder preform that melts to indicate when the wetting temperature is released.

SO63* and **SO175******* Series, With grounding lead or braid strap option.

S200**** Series, with grounding lead or braid strap option, operating up to 200°C and RoHS compliant.

Notes:

- * Meets performance requirements of SAE-AS83519 and NAS 1747 supplied with Bi Alloy temperature indicator.
- ** Qualified to SAE-AS83519, supplied with thermo-chromic temperature indicator.
- *** Meets performance requirements of SAE-AS83519 and NAS 1747, supplied with thermo-chromic temperature indicator.
- **** Meets performance requirements of SAE-AS83519 and NAS 1747, supplied with Bi-Alloy temperature indicator.
- ***** Qualified to NAS 1747.
- # 514.1920/99 Aerospatiale Matra.



Product Series Selection Guide

Product Series	System Operating Temp.		Cable Rating	Pre-installed Lead	Temperature Indicator	Application Environment
	Min	Max.	Min.	Optional	Type	
CWT	-55°C	125°C	85°C	Yes	None	Commercial grade splash proof
B-150	-55°C	125°C	85°C	No	None	Marine/RMT grade, low fire hazard
B-151	-55°C	125°C	85°C	Yes	None	Marine/RMT grade, low fire hazard
B-155	-55°C	125°C	85°C	Yes	None	RoHS compliant version of CWT
ST18	-55°C	125°C	105°C	No	None	Defence grade NAS approved
ST63	-55°C	150°C	125°C	Yes	None	Defence grade NAS approved
SO63	-55°C	150°C	125°C	Yes & Braid	Bi-Alloy	Defence grade, immersion sealing
SO1	-55°C	150°C	125°C	No	Thermo-chromic	Mil-Spec, immersion sealing
SO2	-55°C	150°C	125°C	Yes	Thermo-chromic	Mil-Spec, immersion sealing
SO3	-55°C	150°C	125°C	Braid	Thermo-chromic	Immersion sealing
SO96	-55°C	175°C	150°C	Yes & Braid	Thermo-chromic	Defence grade, immersion sealing
SO175	-55°C	175°C	175°C	Yes & Braid	Bi-Alloy	Defence grade, immersion sealing
S200	-55°C	200°C	150°C	Yes & Braid	Bi-Alloy	Defence grade, immersion sealing
B-023	-65°C	260°C	175°C	No	None	Defence grade

Product Characteristics Selection Guide

	Product Range	Characteristic	
Insulation	S200	Heat-shrinkable, modified fluoropolymer	
	SO & ST Series	Heat-shrinkable, polyvinylidene fluoride	
	B-150, B-151, CWT	Heat-shrinkable, polyolefin	
	BO23	Heat-shrinkable TFE	
Solder and Flux	SO63, ST63, SO1/2/3	Solder: Sn63 Pb37	Flux: ROL 1
	S200, SO96, SO175	Solder: Sn96 Ag4	Flux: ROM 1
	B-155	Solder: Sn42 Bi58	Flux: ROM 1
	CWT, B-15X, ST18	Solder: Sn50 Pb32 Cd18	Flux: ROM 1
	BO23	Solder: Pb93 Sn5 Ag2	Flux: ROM 1
Ground Lead	B-155, CWT	XL polyethylene	
	B-150, B-151	Zerohal (100G)	
	S200 Series	MIL-C-22759/91 or /87	
	SO, SO175 Series	MIL-W-22759/32 or /41	

Typical Performance

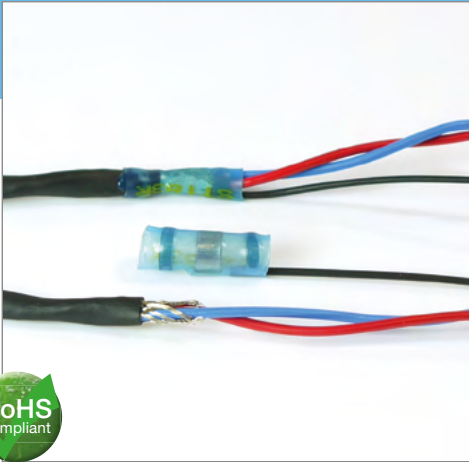
Voltage drop	2.5 mV
Tensile strength	Exceeds strength of ground lead
Dielectric strength	1.0 kV immersed
Insulation resistance	1000 Mega-ohms

Shield Termination

SolderSleeve®
Heat Shrinkable, Shield termination

Product Selection Process

- 1 Select product series from the Product Series Selection Guide on previous page.
- 2 Determine cable dimensions for Jacket OD and Shield OD.
- 3 Optional: Select pre-installed wire lead type from the table below.
- 4 Select part number from the product selection tables on the following pages.



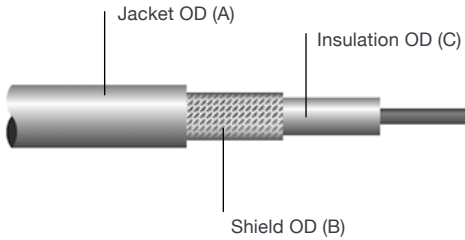
Only B-155, SO96, SO175 and S200X RoHS compliant

Pre-installed Lead Description

Product Series	Approval	Type	Plating	AWG	Length Min.	Colour
S200	SAE-AS83519	M22759/91	Silver	22	150mm	White
ST18, ST63	NAS 1747	55A0111	Tin	20-26	150mm	White/Black
SO63	SAE-AS83519	55A0111	Tin	20-26		
S02	M83519	55A0111	Tin	20-26		
SO96, SO175	SAE-AS83519	55A0813	Nickel	22	150mm	White
B-151	LFH	100G0111	Tin	18	150mm	White
B-155	RoHS	XL polyethylene	Tin	22	150mm	White & Green
CWT	Commercial	XL polyethylene	Tin	22		
SO63, SO96, SO175	SAE-AS83519	Braid Strap	Nickel	22	150mm	Un-insulated
SO3	Commercial	Braid Strap	Tin/Nickel	22		
S200	SAE-AS83519	Braid Strap	Nickel	22		

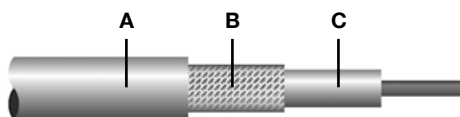
Product Selection Tables:

Please see the following tables for part number cross reference for given size of cable jacket Ø (A); Shield Ø (B) and Insulation Ø (C). Please contact us for more information or advice on correct product if required.



Note:

- Heat guns are recommended for the installation of all these devices on the following pages: HL2010E and CV198X with the correct reflector added. See Application Equipment Section.

**CWT Series Selection Guide - 125°C Rated Commercial Applications**

Cable Diameters			Ordering Description		
A	B	C	No Lead	Pre-installed Lead	
mm	mm	mm		22 AWG White	22 AWG Green
1.70	0.9	0.4	CWT-3801	-	-
1.95	1.1	0.6	CWT-3802	-	-
2.70	1.8	1.3	CWT-3803	CWT-3803-W1	CWT-3803-W2
4.50	2.3	1.8	CWT-3805	CWT-3805-W1	CWT-3805-W2
6.00	3.3	2.8	CWT-3806	CWT-3806-W1	CWT-3806-W2
7.00	3.7	3.2	CWT-3807	CWT-3807-W1	CWT-3807-W2
8.70	4.2	3.7	CWT-3809	CWT-3809-W1	CWT-3809-W2
9.70	6.8	6.0	CWT-3810	-	-
10.70	7.1	6.6	CWT-3811	-	-
13.00	8.9	8.4	CWT-3813	-	-

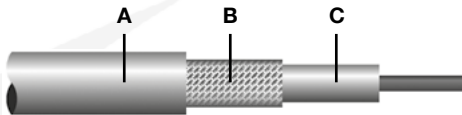
SO3 Series Selection Guide - 150°C Rated, Thermo-chromic Indicator, Commercial Applications

Cable Diameters			Ordering Description	
A	B	C	Pre-installed Braid Strap	
mm	mm	mm	Tin Plated	Nickel Plated
1.95	0.90	0.50	S03-01-R	S03-06-R
2.70	1.40	0.75	S03-02-R	S03-07-R
4.30	2.15	1.25	S03-03-R	S03-08-R
6.00	3.30	1.80	S03-04-R	S03-09-R
7.00	4.30	2.50	S03-05-R	S03-10-R

Terminals and Splices

B-155 and B-15X

Shield Termination SolderSleeve®
Heat Shrinkable, Shield termination



B-155 Series - 125°C Rated

Cable Diameters			Ordering Description		
A	B	C	No Lead	Pre-installed Lead	
mm	mm	mm		22 AWG Green	22 AWG White
1.70	0.9	0.4	B-155-3801	-	-
1.95	1.1	0.6	B-155-3802	-	-
2.50	1.50	1.0	B-155-03	B-155-03-35-22-5	B-155-03-35-22-9
4.30	2.00	1.5	B-155-05	B-155-05-35-22-5	B-155-05-35-22-9
6.00	3.30	2.8	B-155-06	B-155-06-35-22-5	B-155-06-35-22-9
6.40	3.30	2.8	B-155-07	B-155-07-35-22-5	B-155-07-35-22-9
8.70	4.50	4.0	B-155-09	B-155-09-35-22-5	B-155-09-35-22-9
10.00	7.50	4.0	B-155-11	B-155-11-35-22-5	B-155-11-35-22-9
13.00	7.00	6.5	B-155-13	B-155-13-35-22-5	B-155-13-35-22-9



B-15X Series - 125°C Rated Low Fire Hazard

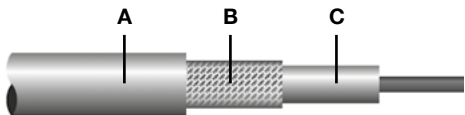
Cable Diameters			Ordering Description	
A	B	C	No Lead	Pre-installed Lead
mm	mm	mm		18 AWG White
3.0	1.5	1.0	B-150-03	-
4.8	2.0	1.5	B-150-05	B-151-05
7.3	3.3	2.8	B-150-07	B-151-07
11.5	4.5	4.0	B-150-11	B-151-11
15.1	7.0	6.5	B-150-13	B-151-13
18.0	9.0	8.0	B-150-17	B-151-17
23.5	12.0	11.0	B-150-23	-
34.0	19.0	17.0	B-150-33	-



ST18 and ST63

NAS 1747 SolderSleeve®

Heat Shrinkable, Shield Termination



ST18 Series - 125°C Rated, NAS 1747 Approved

Cable Diameters			Ordering Description				
A	B	C	No Lead	Pre-installed Lead (White/Black)			
mm	mm	mm		20 AWG	22 AWG	24 AWG	26 AWG
2.65	0.90	0.5	ST18-1-00	ST18-1-55-20-90	ST18-1-55-22-90	ST18-1-55-24-90	ST18-1-55-26-90
3.65	1.40	0.75	ST18-2-00	ST18-2-55-20-90	ST18-2-55-22-90	ST18-2-55-24-90	ST18-2-55-26-90
5.08	2.15	1.25	ST18-3-00	ST18-3-55-20-90	ST18-3-55-22-90	ST18-3-55-24-90	ST18-3-55-26-90
6.45	3.30	1.80	ST18-4-00	ST18-4-55-20-90	ST18-4-55-22-90	ST18-4-55-24-90	ST18-4-55-26-90
7.60	4.30	2.50	ST18-5-00	ST18-5-55-20-90	ST18-5-55-22-90	ST18-5-55-24-90	ST18-5-55-26-90

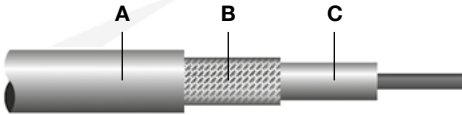
ST63 Series - 150°C Rated NAS 1747 Approved

Cable Diameters			Ordering Description				
A	B	C	No Lead	Pre-installed Lead (White/Black)			
mm	mm	mm		20 AWG	22 AWG	24 AWG	26 AWG
2.65	0.90	0.5	ST63-1-00	ST63-1-55-20-90	ST63-1-55-22-90	ST63-1-55-24-90	ST63-1-55-26-90
3.65	1.40	0.75	ST63-2-00	ST63-2-55-20-90	ST63-2-55-22-90	ST63-2-55-24-90	ST63-2-55-26-90
5.08	2.15	1.25	ST63-3-00	ST63-3-55-20-90	ST63-3-55-22-90	ST63-3-55-24-90	ST63-3-55-26-90
6.45	3.30	1.80	ST63-4-00	ST63-4-55-20-90	ST63-4-55-22-90	ST63-4-55-24-90	ST63-4-55-26-90
7.60	4.30	2.50	ST63-5-00	ST63-5-55-20-90	ST63-5-55-22-90	ST63-5-55-24-90	ST63-5-55-26-90

Terminals and Splices

S01 and S02

Shield Termination SolderSleeve®
Heat Shrinkable, Shield termination

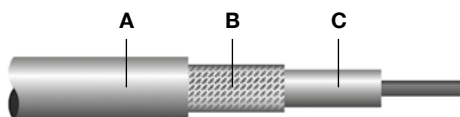


S01 & S02 Series - 150°C Rated, Thermo-chromic Indicator
M83519 Qualified Product Listing Cross Reference

Cable Diameters			Ordering Description					
A	B	C	No Lead		Pre-installed Lead (White/Black)			
mm	mm	mm			20 AWG		22 AWG	
1.95	0.90	0.50	S01-01-R	M83519/1-1	S02-01-R	M83519/2-1	S02-06-R	M83519/2-6
2.70	1.40	0.75	S01-02-R	M83519/1-2	S02-02-R	M83519/2-2	S02-07-R	M83519/2-7
4.30	2.15	1.25	S01-03-R	M83519/1-3	S02-03-R	M83519/2-3	S02-08-R	M83519/2-8
6.00	3.30	1.80	S01-04-R	M83519/1-4	S02-04-R	M83519/2-4	S02-09-R	M83519/2-9
7.00	4.30	2.50	S01-05-R	M83519/1-5	S02-05-R	M83519/2-5	S02-10-R	M83519/2-10

... Continued

Cable Diameters			Ordering Description			
A	B	C	Pre-installed Lead (White/Black)			
mm	mm	mm	24 AWG		26 AWG	
1.95	0.90	0.50	S02-11-R	M83519/2-11	S02-16-R	M83519/2-16
2.70	1.40	0.75	S02-12-R	M83519/2-12	S02-17-R	M83519/2-17
4.30	2.15	1.25	S02-13-R	M83519/2-13	S02-18-R	M83519/2-18
6.00	3.30	1.80	S02-14-R	M83519/2-14	S02-19-R	M83519/2-19
7.00	4.30	2.50	S02-15-R	M83519/2-15	S02-20-R	M83519/2-20

**SO63 Series** - 150°C Rated, Bi-alloy Indicator SAE-AS83519 Approved

Cable Diameters			Ordering Description					
A	B	C	No Lead	Pre-installed Lead (White/Black)				Braid
mm	mm	mm		20 AWG	22 AWG	24 AWG	26 AWG	Nickel
1.95	0.90	0.50	SO63-1-00	SO63-1-55-20-90	SO63-1-55-22-90	SO63-1-55-24-90	SO63-1-55-26-90	SO63-1-01
2.70	1.40	0.75	SO63-2-00	SO63-2-55-20-90	SO63-2-55-22-90	SO63-2-55-24-90	SO63-2-55-26-90	SO63-2-01
4.30	2.15	1.25	SO63-3-00	SO63-3-55-20-90	SO63-3-55-22-90	SO63-3-55-24-90	SO63-3-55-26-90	SO63-3-01
6.00	3.30	1.80	SO63-4-00	SO63-4-55-20-90	SO63-4-55-22-90	SO63-4-55-24-90	SO63-4-55-26-90	SO63-4-01
7.00	4.30	2.50	SO63-5-00	SO63-5-55-20-90	SO63-5-55-22-90	SO63-5-55-24-90	SO63-5-55-26-90	SO63-5-01

SO96 Series - 175°C Rated, Thermo-chromic Indicator SAE-AS83519 Approved

Cable Diameters			Ordering Description		
A	B	C	No Lead	Pre-installed Lead	Braid Strap
mm	mm	mm		22 AWG White/Black	Nickel Plated
1.95	0.90	0.50	SO96-1-00	SO96-1-55-22-90	SO96-1-01
2.70	1.40	0.75	SO96-2-00	SO96-2-55-22-90	SO96-2-01
4.30	2.15	1.25	SO96-3-00	SO96-3-55-22-90	SO96-3-01
6.00	3.30	1.80	SO96-4-00	SO96-4-55-22-90	SO96-4-01
7.00	4.30	2.50	SO96-5-00	SO96-5-55-22-90	SO96-5-01

**SO175 Series** - 175°C Rated, Bi-alloy Indicator SAE-AS83519 Approved

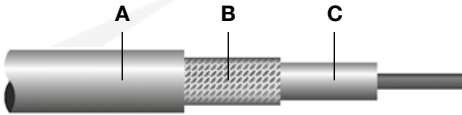
Cable Diameters			Ordering Description		
A	B	C	No Lead	Pre-installed Lead	Braid Strap
mm	mm	mm		22 AWG White/Black	Nickel Plated
1.95	0.90	0.6	SO175-1-00	SO175-1-55-22-90	SO175-1-01
2.70	1.40	1.0	SO175-2-00	SO175-2-55-22-90	SO175-2-01
4.50	2.15	1.5	SO175-3-00	SO175-3-55-22-90	SO175-3-01
6.00	3.30	2.8	SO175-4-00	SO175-4-55-22-90	SO175-4-01
7.00	4.30	2.8	SO175-5-00	SO175-5-55-22-90	SO175-5-01



Terminals and Splices

S200 and B-023

Shield Termination SolderSleeve®
Heat Shrinkable, Shield termination



S200 Series - 200°C Rated, Bi-alloy Indicator, SAE-AS83519 Approved



Cable Diameters			Ordering Description		
A	B	C	No Lead	Pre-installed Lead	Braid Strap
mm	mm	mm		22 AWG White	Nickel Plated
1.90	0.90	0.50	S200-1-00	S200-1-WI-22-9	S200-1-01
2.67	1.40	0.75	S200-2-00	S200-2-WI-22-9	S200-2-01
5.00	2.15	1.25	S200-3-00	S200-3-WI-22-9	S200-3-01
6.40	3.30	1.80	S200-4-00	S200-4-WI-22-9	S200-4-01
6.90	4.30	2.50	S200-5-00	S200-5-WI-22-9	S200-5-01

* Pre-installed braid: Nickel plated copper strands in accordance,with AA59569F36N0031

B-023 Series - 260°C Rated High Temperature Defence Grade Terminator

Cable Diameters		Ordering Description
A	B/C	No Lead
mm	mm	
4.3	3.0	B-023-00
5.5	3.6	B-023-01
7.0	4.5	B-023-02
10.5	6.8	B-023-03
2.4	2.0	B-023-04
3.1	2.4	B-023-07

Coaxial Terminators



SolderSleeve coaxial cable terminators allow reliable, easy terminations in a variety of coaxial cable applications, including printed circuit boards. The insulating and strain-relieving capabilities of SolderSleeve terminators provide the ideal solution to centre-conductor breakage problems. Designed for applications with temperatures up to 150°C.

- Transparent polyvinylidene fluoride or polyolefin insulation sleeve provides encapsulation, strain relief (eliminates centre conductor breakage) and insulation.
- Pre-fluxed solder pre-form provides a controlled soldering process.
- One-piece design provides easy installation and lower installed costs.
- Pre-installed termination leads provide convenience and ease of installation.

One-Piece PCB Terminators



SolderSleeve Coaxial Terminators

B-155 and CWT Series Maximum operating temperature 125°C, for use on cables rated (min) 85°C. Please note that the B-155 series terminator is RoHS compliant.

B-02X/B-04X Series Maximum operating temperature 150°C, for use on cables rated (min) 125°C.

D-181 Series Maximum operating temperature 150°C, for use on cables rated (min) 125°C.

D-184 Series Maximum operating temperature 150°C, for use on cables rated (min) 85°C.

One-Piece PCB Terminators

D-607 Series Matched impedance up to 2.3 GHz, metal body.

B-046 Series Effective transmission up to 100 MHz, pin to ground.

Terminals and Splices

Coaxial Cable Termination

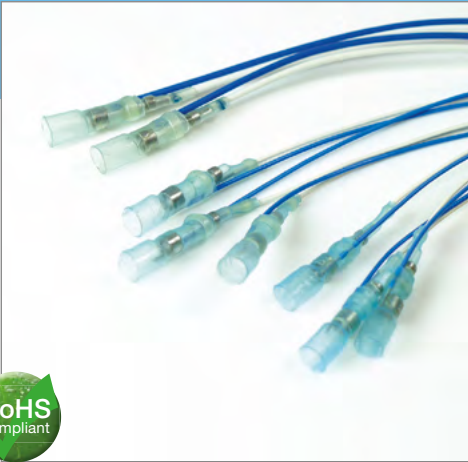
SolderSleeve®

Heat Shrinkable, termination

Used for terminating coaxial cable to component terminals, contacts and solder-less wrap terminals.

Features & Benefits

- Polyvinylidene fluoride or polyolefin insulation sleeve provides encapsulation, inspectability, strain relief and insulation.
- Pre-fluxed solder preform provides controlled soldering process.
- Pre-installed termination leads provide convenience and ease of installation.



Only B155-4XXX-W RoHS compliant

Product Options

Product Series	Operating Temp.	Cable Rating	Cable Shield Plating	Part Selection Table	Pieces per Part
	Max.	Min.			
CWT, B-155	125°C	85°C	Tin, bare copper	A	2 pc
B-02X & B-04X	150°C	125°C	Tin, silver	B	1 pc
D-181	150°C	125°C	Tin, silver	C	2 pc
D-184	125°C	85°C	Tin	D	2 pc

Product Selection Process

- 1 Select product series from the product options table above.
- 2 Select pre-installed lead type from the table illustrated below.
- 3 Determine cable RG number or dimensions.

- 4 Select the part number required from the tables on the following pages;
 - Table A - CWT & B-155 Series
 - Table B - B-02X & B-04X Series
 - Table C - D-181 Series
 - D-184 Series please contact us

Pre-installed Lead Descriptions

Product Series	Lead Type	Plating	AWG	Length	Colour
CWT, B-155	XL polyethylene	Tin	22	150mm	White (cntr), Green (grnd)
B-021, -041, -043	M81822/13 (solder-less wrap)	Silver	24 - 30	150mm	White (cntr), Blue (grnd)
B-020, -040, -044	55A0111 (MIL-W-22759/32)	Tin	20 - 30	150mm	White (cntr), Blue (grnd)
D-181-12, -22, -32	55A0111 (MIL-W-22759/32)	Tin	20 - 30	150mm	White (cntr), white w/black stripe (grnd)
D-181-18, -28	M81822/13	Silver	26 - 30	150mm	White (cntr), blue (grnd)
D-184	55A0111 (MIL-W-22759/32)	Tin	20 - 26	150mm	White (cntr), white w/black stripe (grnd)

Two part SolderSleeve® for conductor and screen, utilising 55A0111 spec wire. Please note that these two components interlink to form a single component.

Product Characteristics

Material		
Insulation for B-02X/B-04X, D-181, D-184	Radiation crosslinked, heat-shrinkable polyvinylidene fluoride	
Insulation for CWT, B-155 Series	Radiation crosslinked, heat-shrinkable polyolefin	
Solder and flux for B-02X, B-04X, D-181	Solder Sn63 Pb37	Flux: ROL 1 per ANSI-J-004 (RMA Flux)
Solder and flux for CWT series, D-184	Solder Sn50 Pb32 Cd18	Flux: ROM1 per ANSI-J-004 (RA Flux)
Solder and flux for B-155 series	Solder: Sn42Bi58	Flux: ROM1 per ANSI-J-004 (RA(Flux)

Typical Performance

Voltage drop	2.0 mV
Tensile strength	Exceeds strength of conductor
Dielectric strength	2.0 kV
Temperature rating for CWT, B-155 & D-184	-55°C to +125°C
Temperature rating for B-02X/B-04X, D-181	-55°C to +150°C
Insulation resistance	1000 M ohms

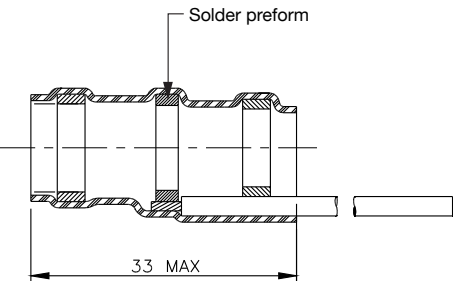
TABLE A - for CWT and B-155 Series

Cable RG No	Dimensions (mm)		Part Number	
	Dielectric OD	Jacket OD	CWT Series	B-155 Series (RoHS)
174	0.80 - 2.30	1.30 - 2.80	CWT-4174-W122-5/9	B-155-4174-W122-5/9
58, 122	2.00 - 2.80	2.50 - 4.40	CWT-4058-W122-5/9	B-155-4058-W122-5/9
59	2.80 - 3.30	3.20 - 6.00	CWT-4059-W122-5/9	B-155-4059-W122-5/9

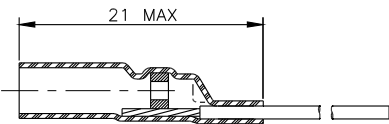


Note: Only B-155 series is RoHS compliant, CWT is not.

Part A, Ground



Part B, Conductor



Terminals and Splices

B-02X and B-04X Series

150°C SolderSleeve®

Heat Shrinkable, termination

TABLE B for B-02X and B-04X Series
Part 1 - Group Selection

RG Cable Number	Dimension Range				One-Piece Coaxial Product Group
	Jacket OD max	Shield OD	Dielectric OD	Conductor OD	
178, 404	3.40	1.30 - 2.30	0.50 - 1.70	0.30 - 0.80	Group 1
179, 316	4.40	1.50 - 2.80	1.20 - 2.50	0.30 - 0.60	Group 2
180, 302, 303	6.30	2.40 - 4.60	1.40 - 4.30	0.30 - 2.80	Group 3

All dimensions in millimetres

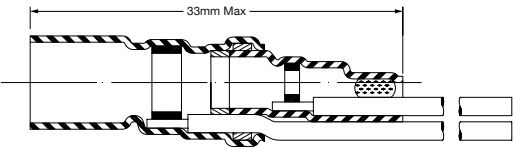
Part 2 - Part Number Selection

One-Piece Coaxial Product Group	Pre-installed Wire Size and Type						
	Type	20 AWG	22 AWG	24 AWG	26 AWG	28 AWG	30 AWG
Group 1	●	-	B-044-22-N	B-044-24-N	B-044-26-N	-	-
	◆	-	-	B-043-24-N	B-043-26-N	B-043-28-N	B-043-30-N
Group 2	●	B-040-20-N	B-040-22-N	B-040-24-N	B-040-26-N	B-040-28-N	B-040-30-N
	◆	-	-	B-041-24-N	B-041-26-N	B-041-28-N	B-041-30-N
Group 3	●	B-020-20-N	B-020-22-N	B-020-24-N	B-020-26-N		--
	◆	-	-	-	B-021-26-N	-	-

Where ● = Stranded (M22759) and ◆ = Solid (M81822) wire

The B-02X and B-04X series uses a one-piece design to terminate coaxial cables rated at 125°C minimum

One Piece Component



Notes:

- Heat guns are recommended for the installation of these devices on both these pages: HL2010E and CV198X with the correct reflector added. See Application Equipment Section.

D-181 and D-184 Series

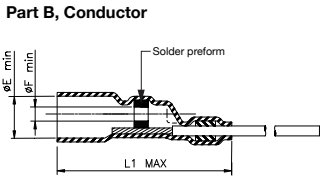
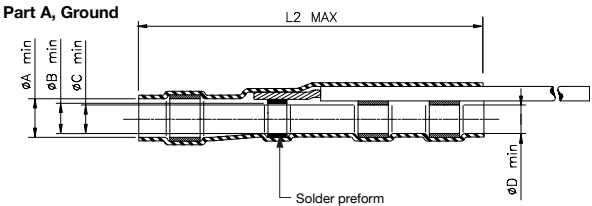
150°C and 125°C SolderSleeve® Two Part
Heat Shrinkable, termination

TABLE C for D-181 Series
Part Number Selection

Part Number	AWG	Min. Dimensions (mm)						Max. Dim. (mm)	
		A	B	C	D	E	F	L1	L2
D-181-1220-90/9	20	3.70	3.20	2.70	2.40	0.71	2.30	17.00	21.50
D-181-1222-90/9	22								
D-181-1224-90/9	24								
D-181-1226-90/9	26								
D-181-1226-6/9	26								
D-181-1230-6/9	30								
D-181-2220-90/9	20	4.50	4.00	3.45	2.90	1.10	3.00	17.00	22.70
D-181-2222-90/9	22								
D-181-2224-90/9	24								
D-181-2226-90/9	26								
D-181-2226-6/9	26								
D-181-2230-6/9	30								
D-181-3220-90/9	20	5.20	4.70	4.45	3.95	1.30	4.00	17.00	21.50
D-181-3222-90/9	22								
D-181-3224-90/9	24								
D-181-3226-90/9	26								
D-181-3226-6/9	26								
D-181-3230-6/9	30								

TABLE D for D-184 Series

D-184-1220-90/9	20	3.70	3.20	2.70	2.40	0.71	2.30	17.00	21.50
D-184-1222-90/9	22								
D-184-1224-90/9	24								
D-184-1226-90/9	26								
D-184-2220-90/9	20	4.50	4.00	3.45	2.90	1.10	3.00	17.00	22.70
D-184-2222-90/9	22								
D-184-2224-90/9	24								
D-184-2226-90/9	26								



Please note that these two components interlink to form a single component.

Terminals and Splices

PCB Coaxial Termination

SolderSleeve®
Heat Shrinkable, termination

Used for the termination of coaxial cable to printed circuit boards.

Features & Benefits

- Provides a completely shielded, low-resistance, matched-impedance termination with a very low Voltage Standing Wave Ratio (D-607 series).
- Polyvinylidene fluoride or polyolefin insulation sleeve provides encapsulation, inspectability, strain relief and insulation.
- Pre-fluxed solder preform provides controlled soldering process.
- One piece design provides easy installation and lower installed costs.
- Pre-installed termination body provides convenience and ease of installation.



Specifications & Approvals

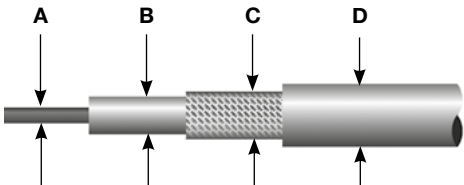
- TE Connectivity RT-1404

Product Options

Product Series	Typical Application Performance	Shield Method	Part Selection Table
D-607	Matched impedance up to 2.3 GHz	Metal body	A
B-046	Effective transmission up to 100 MHz	Pin to ground	B

Product Selection Process

- 1 Select product series from the Product Options table above.
 - 2 Determine cable RG number or outside diameter dimensions.
 - 3 Select the appropriate part number from Table A (D-607 series) or Table B (B-046 series).
- For D-607 (matched impedance) series, determine straight or right angle entry to PCB and grid pattern, then select the appropriate part number from Table A on the next page.
 - For B-046 (PinPak, or pin to ground) series, determine hole spacing and diameter. Refer to Table B for product selection (see illustration right for cable dimensions).



Notes:

- Heat guns are recommended for the installation of these devices: HL2010E and CV198X with the correct reflector added. See Application Equipment Section.

Product Characteristics

Material		
Insulation	Radiation crosslinked, heat-shrinkable polyvinylidene fluoride	
Solder and flux	Solder Sn63 Pb37	Flux: ROL 1 per ANSI-J-004 (RMA Flux)
Termination body/pin	Copper alloy, solder-plated	
Typical Performance		
Voltage drop	2.0 mV	
Tensile strength	Exceeds strength of conductor	
Dielectric strength	2.0 kV	
Temperature rating	-55°C to +150°C	
Insulation resistance	1000 M ohms	

Electrical Performance (typical) D-607 Series Only

Frequency	VSWR (D-607-09, -40)	VSWR (D-607-10)
350 MHz	1.04 max	1.04 max
700 MHz	1.05 max	1.09 max
2.3 GHz	1.09 max	1.12 max

TABLE A for D-607 Series

RG Cable No.	Cable Dimensions Max. Diameter			Part No. Entry to PCB		
	Jacket	Shield	Dielectric	Straight	Right-Angle	Straight
				Grid 5.08	Grid 5.08	Grid 2.54
174, 178, 179, 316, 404	1.5 - 3.55	1.1 - 3.15	0.60 - 2.25	D-607-09	D-607-10	D-607-40*

All dimensions in millimetres

TABLE B for B-046 Series

RG Cable No.	Cable Dimensions (mm)				Pin Dia.	Part Number		
						Spacing Between Pins		
	A	B	C	D (max)	mm	2.54	5.08	6.35
178, 404	0.3 - 0.8	0.5 - 1.7	1.3 - 2.3	3.4	0.6	B-046-14-N	B-046-10-N	B-046-12-N
					0.8		B-046-11-N	B-046-13-N
179, 316	0.3 - 1.6	1.2 - 2.5	1.5 - 2.8	4.4	0.6	B-046-15-N	B-046-66-N	B-046-16-N
					0.8		B-0466-68-N	B-046-18-N

All dimensions in millimetres

Notes:

- Heat guns are recommended for the installation of these devices: HL2010E and CV198X with the correct reflector added. See Application Equipment Section.

Terminals and Splices

Shielded and Coaxial Splices

SolderShield®

Cable to Cable Splicing

SolderShield cable splices meet the growing performance requirements for shielded cable system fabrication and maintenance while minimising electromagnetic interference (EMI). Being one piece products consisting of a flux coated, solder impregnated copper shield braid encased in a heat shrinkable insulation sleeve, with crimp wire connectors.

Conductor splices are made using MiniSeal crimp products which are recognised by MIL-S-81824 and MIL-W-5088.

SolderShield splice kits, are designed for single-conductor or multi-conductor shielded cables and are ideal for fabrication, repair, re-work while restoring the electrical integrity of the cable. SolderShield devices perform even in demanding environments. They are reliable, versatile and easy to install.

Operating Temperature

- From -55°C to +150°C

Applications

Used for splicing a wide range of cables, including coaxial and multi-conductor cables.

Features & Benefits

- Flux-coated solder-impregnated copper shield braid encased in a transparent heat shrinkable insulation sleeve provides a controlled soldering process, encapsulation, inspectability, strain relief and insulation.
- One-piece design provides easy installation and lower installed cost.
- Circumferential (360°) shielding results in EMI protection and shield continuity to or better than the original cable.
- Conductor splices are made using MiniSeal crimp products, recognised by MIL-S-81824 and MIL-W-5088.



Specifications & Approvals

- US: M81824 (conductor splice only)
- UK: RAF AP 1130-2008-1
- TE RT-1404

Product Selection Process

Multi-conductor Cable Splices

- Determine the number of conductors in the cable to be spliced
- Determine the AWG of each conductor, or the minimum jacket OD.
- Determine the conductor plating
- Select the appropriate part number from table A, over the page.

Coaxial Cable Splices

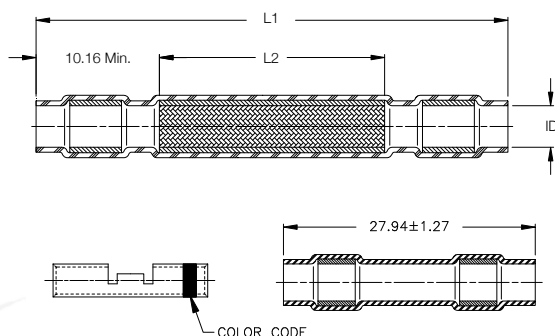
- Determine the cable RG number or cable reference.
- Select appropriate part number from table B, over the page.
- Confirm that dimensional information indicates compatibility with cable being used.

High Temperature Option

D-200 Series

Also available but not detailed here, offering improved operating temperature of -55°C to +200°C, please contact us for more details.





Product Characteristics

Materials

Insulation sleeve	Radiation crosslinked polyvinylidene fluoride
Melt-able inserts	Fluorocarbon based thermoplastic
MiniSeal crimp splice	Base metal: Copper alloy C10200 per ASTM B75 Plating: Tin per MIL-T-10727 or nickel per QQ-N-290
SolderShield shield splice	Base metal: Tin-plated copper wire braid per ASTM B3 Solder & flux coating: Type Sn63 Pb37. Flux: ROM1 per ANSI-J-STD-004 (RA flux)

Electromechanical Performance

Parameter	Test Method	Requirement
Dielectric strength (shield connection)	-	No breakdown or arcing at 1000 Vac (RMS)
Dielectric strength (conductor connection)	-	2.5 kV
Voltage drop	MIL-S-81824	Less than 2 millivolt increase
Insulation resistance (shield)	-	1000 Mega-ohms
Insulation resistance (conductor)	-	5000 Mega-ohms
Tensile strength for MiniSeal	MIL-S-81824	Exceed yield strength of wire
Tensile strength for SolderShield	MIL-S-81824	75% of strength of un-spliced cable
Temperature rating	-	-55°C to 150°C

Environmental Resistance

Salt spray	MIL-STD-202 M101	Meets voltage drop requirement
Heat aging	750 hours at 150°C	Meets all electromechanical requirements
Temperature cycling	MIL-STD-202 M107C	Meets all electromechanical requirements
Altitude immersion	Immersion at 22,860m	Meets insulation resistance requirements
Corrosion resistance	-	No evidence of corrosion after testing in accordance with MIL-STD-202, Method 101, Test condition

Terminals and Splices

D-150 Series, Multi-conductor

SolderShield®
Cable to Cable Splicing

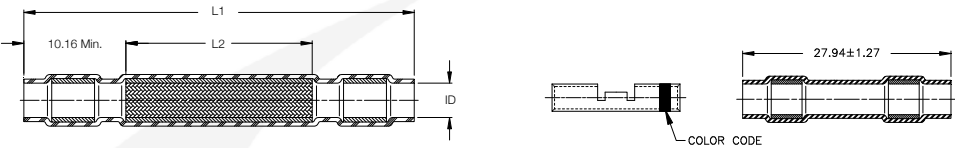
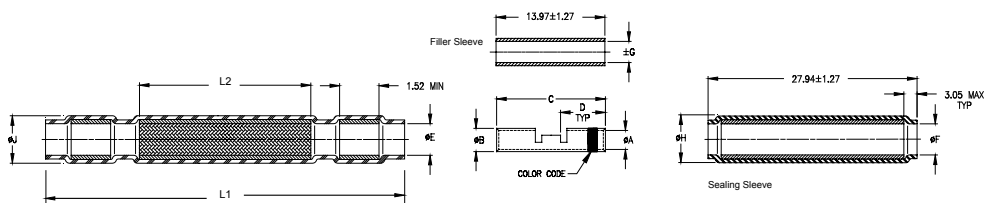


TABLE A: for D-150 Series, Multi-conductor Cable Splices

Part No.		Dimensions			Conductor Splice		
Tin Plated	Nickel Plated	L1	L2	ID	Size Range CMA	Colour Code	Qty per Kit
		Max.	Nom.	Min.	Min Max		
D-150-0168	D-150-0228	80.5	50.0	3.00	304 - 1510	Red	1
D-150-0169	D-150-0229			4.00	779 - 2680	Blue	
D-150-0170	D-150-0230			5.00	1900 - 6755	Yellow	
D-150-0174	D-150-0231	106.0	75.0	4.00	304 - 1510	Red	2
D-150-0175	D-150-0232			5.00	779 - 2680	Blue	
D-150-0176	D-150-0233			6.00	1900 - 6755	Yellow	
D-150-0177	D-150-0234	106.0	75.0	9.00	304 - 1510	Yellow	4
D-150-0178	D-150-0235			4.00	304 - 1510	Red	
D-150-0179	D-150-0236			5.00	779 - 2680	Red	
D-150-0180	D-150-0237			6.00	1900 - 6755	Blue	
D-150-0181	D-150-0238			9.00	1900 - 6755	Yellow	

All dimensions in millimetres



Drawing represent D-150-009X only

TABLE B: for D-150 and B-202 Series, Coaxial Cable Splices

Part No.	RG Cable No.	Cable Ref.	Dimensions			Conductor Splice Qty per Kit
			L1	L2	ID	
		Max	Max.	Nom.	Min.	
D-150-0214	8A, 9B, 11	5012A3311	80.50	50.00	12.00	1
	13, 26, 31	5012E1339				
	115, 144, 149	7518A1311				
	165, 213, 214	-				
	216, 235, 391	-				
	393, 397	-				
D-150-0094	178, 196	5028A1317	80.50	50.00	3.00	1
	179, 187, 188	7528A1317				
	316, 404, M17/138-00001	5030A1317				
	M16/136-00001	7530A1317				
D-150-0095	180, 195	5024A1311	80.50	50.00	4.00	1
	M17/137-00001	7526A1311				
	M17/139-00001	9527A1318				
	-	9530E1014				
D-150-0096	124, 140, 141	5020A1311	80.50	50.00	6.00	1
	159, 302, 303	5022A1311				
	-	7522A1311				
	-	7523D1331				
	-	7542A1311				
B-202-81*	29, 30, 55B	5019D3318	56.00	23.00	7.00	1
	58, 223	5021D1331				
	-	5022A1311				
B-202-82*	59, 62	7523D1331	56.00	23.00	7.00	1
	-	7524A1311				
	-	9524A1311				

All dimensions in millimetres.

* B-202-81/82 kits use solder connectors to terminate the centre conductors. All other kits use crimp connectors

Terminals and Splices

Shielded Connector Contacts

SolderTacts®

Controlled Solder Contacts

One-piece controlled soldering SolderTacts are designed to facilitate faster and more reliable terminations. SolderTacts eliminate the variables associated with crimping, accelerates production while reducing handling and installed costs.

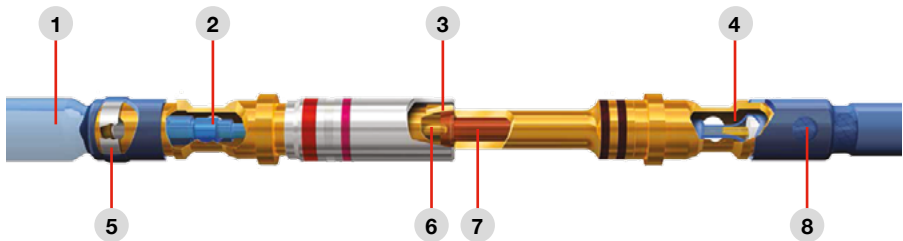
Features & Benefits

- One-piece contact design with integrated soldering technology
- Controlled re-flow soldering process yields reliable consistent terminations
- 360° shielding reduces crosstalk and improves signal transmission.
- Contact fits multiple cable sizes.
- Compatible with a variety of commercial and military connectors.
- 150°C temperature rating.



Specifications & Approvals

- TE D-6002



1. Outer Solder Sleeve

Heat shrinkable insulating sleeve. Cable inserts easily, with no spacers or other parts required.

2. Inner Solder Sleeve

Termination is a heat shrinkable sleeve with a precisely pre-fluxed solder preform conforming to QQ-S-571

3. Connector

The precision outer body meets electrical engagement and contact retention requirements of individual connector systems.

4. Inner Heat shrink

In the terminated signal lead, the inner heat shrink tubing forms tightly around the termination to insulate and strain relieve the connection.

5. Outer Solder Pre-form

Contains precise amounts of solder and flux conforming to QQ-S-571.

6. Inner Pin and Socket

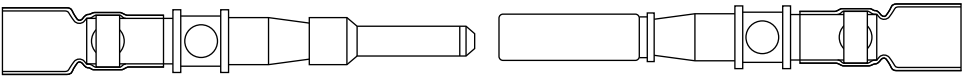
Contacts are permanently fixed within the assembly to provide proper setback and concentricity.

7. Dielectric

The dielectric between inner and outer contacts provides concentricity, electrical integrity, precise mating dimensions and closed entry at the inner socket.

8. Inspection

The shield termination can be inspected through the viewing port.



MIL-DTL-26482 Series Contacts

Part Number	Size	Wire (AWG)	Polarity	Cable Type	Military Specification
D-602-16*	12	24-32	Socket	Coaxial	MIS-20067/5-001
D-602-17*	12	24-32	Pin	Coaxial	MIS-20067/5-001
D-602-46	16	24-30	Pin	Coaxial	-
D-602-47	16	26-32	Socket	Coaxial	-
D-602-56	16	24-30	Pin	Twin Pair	-
D-602-57	16	24-30	Socket	Twin Pair	-

* These SolderTacts contacts are on qualified parts list for indicated specification.

Tooling Selection Guide for MIL-DTL-26482 Contacts

Part Numbers	Eng Standard	Adaptor	Insertion Tool	Removal Tool
D-602-46/47	ES61137	AT-1319-17	AD-1525	AD-1526
D-602-56/57	ES61138	-	(M81969/17-04)	(M81969/19-08)
D-602-16/17	ES61161	-	-	-

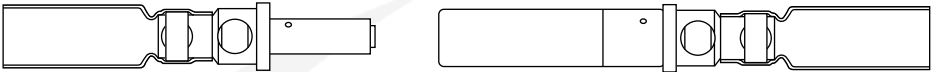


Notes:

- Heat guns are recommended for the installation of these devices: HL2010E and CV198X with the correct reflector added. See Application Equipment Section.

Shielded Connector Contacts

MIL-C-28748 Series SolderTacts®
Controlled Solder Contacts



MIL-C-28748 Series Contacts

Part Number	Size	Wire (AWG)	Polarity	Cable Type	Military Specification
D-602-44	16	26-32	Socket	Coaxial	MIS-20067/2-002 ^a
D-602-45	16	26-32	Pin	Coaxial	MIS-20067/1-001 ^a
D-602-54	16	24-30	Pin	Twin Pair	MIS-20067/4-001 ^a
D-602-55	16	24-30	Socket	Twin Pair	MIS-20067/3-001 ^a
D-602-72	16	26-32	Pin	Coaxial	M39029/79 ^b
D-602-73	16	26-32	Socket	Coaxial	M39029/80 ^b
D-602-76	16	26-32	Socket	Coaxial	M39029/40 ^b
D-602-77	16	26-32	Socket	Coaxial	M39029/41 ^b
D-602-0126	16	24-30	Socket	Twin Pair ^c	-
D-602-0127	16	24-30	Socket	Twin Pair ^c	-
D-602-0172	16	28-32	Socket	Coaxial	-
D-602-0173	16	28-32	Socket	Coaxial	MIS-20067/2-001, 003 ^a
D-610-09	16	16-20	Socket	Power	MIS-20067/8-001 ^a
D-610-10	16	16-20	Socket	Power	MIS-20067/7-001 ^a

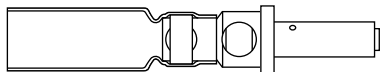
- a. These SolderTacts contacts are on the qualified parts list for indicated specification.
b. These SolderTacts contacts are inter-mateable and inter-mountable with contacts qualified to the indicated specification; they replace crimp-style termination.
c. These SolderTacts contacts are designed for twisted pair cable per MIL-STD-1553B

Tooling Selection Guide for MIL-C-28748 Contacts

Part Numbers	Eng Standard	Adaptor	Repair Wand	Removal Tool
D-602-44/45	ES61133	AT-1319-14	AT-1480	AD-1447
D-602-0172/0173	ES61240	-	-	
D-602-54/55	ES61132	-	-	
D-602-0126/0127	ES61199	-	-	
D-619-09/10	ES61187	AT-1319-15	AT-1571	
D-602-72/73	ES61135	AT-1319-18	AT-1486	
D-602-76/77	ES61164	AT-1319-20	AT-1554	

Contact insertion tool not applicable

Shielded Connector Contacts

MIL-DTL-38999 Series I, III, IV SolderTacts®
Controlled Solder Contacts

MIL-DTL-38999 Series I, III, IV Contacts

Part Number	Size	Wire (AWG)	Polarity	Cable Type	Military Specification
D-602-0122	8	22-24	Pin	Coaxial	M39029/60 ^a
D-602-0123	8	22-24	Socket	Coaxial	M39029/59 ^a
D-602-0140	16	26-30	Pin	Coaxial	M39029/76 ^a
D-602-0141	16	26-30	Socket	Coaxial	M39029/77 ^a
D-602-0142	16	26-30	Pin	Twin Pair	M39029/76 ^a
D-602-0143	16	26-30	Socket	Twin Pair	M39029/77 ^a
D-602-0144	12	34-32	Pin	Coaxial	M39029/28 ^a
D-602-0145	12	24-32	Socket	Coaxial	M39029/75 ^a
D-602-0146	12	22-26	Pin	Twin Pair	M39029/28 ^a
D-602-0147	12	22-26	Socket	Twin Pair	M39029/75 ^a
D-602-0150	12	22-28	Pin	Coaxial	M39029/28 ^a
D-602-0151	12	22-28	Socket	Coaxial	M39029/75 ^a
D-610-1108	8	24-26	Socket	Twin Pair ^b	-
D-610-1109	8	24-26	Pin	Twin Pair ^b	-
D-602-1110	8	22-26	Socket	Triaxial	-
D-602-1111	8	22-26	Pin	Triaxial	-
D-602-1112	8	24-26	Socket	Twin Pair ^b	-
D-602-1113	8	24-26	Pin	Twin Pair ^b	-
D-602-0156-N-1	8	24-26	Pin	Twinaxial ^c	M39029/90 ^a
D-602-0156-N-2	8	24-26	Pin	Twinaxial ^c	M39029/90 ^a
D-602-0156-N-3	8	24-26	Pin	Twinaxial ^c	M39029/90 ^a
D-602-0157-N-1	8	24-26	Socket	Twinaxial ^c	M39029/91 ^a
D-602-0157-N-2	8	24-26	Socket	Twinaxial ^c	M39029/91 ^a
D-602-0157-N-3	8	24-26	Socket	Twinaxial ^c	M39029/91 ^a
D-602-0169-1	8	20	Pin	Twinaxial ^c	M39029/90 ^a
D-602-0170-1	8	20	Socket	Twinaxial ^c	M39029/91 ^a

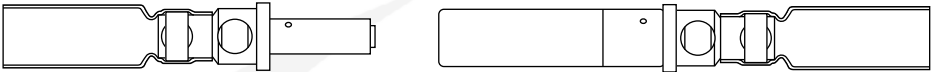
a. These SolderTacts contacts are inter-mateable and inter-mountable with contacts qualified to the indicated specification; they replace crimp-style termination.

b. These SolderTacts contacts are designed for shielded twisted pair cable per MIL-STD-1553B.

c. These SolderTacts contacts are designed for databus contacts per MIL-STD-1553B.

Shielded Connector Contacts

MIL-C-38999 Series II SolderTacts®
Controlled Solder Contacts



MIL-C-38999 Series II Contacts

Part Number	Size	Wire (AWG)	Polarity	Cable Type	Military Specification
D-602-0140	16	26-30	Pin	Coaxial	M39029/76 ^a
D-602-0171	16	26-30	Socket	Coaxial	M39029/77 ^a
D-602-0142	16	26-30	Pin	Twin Pair	M39029/76 ^a
D-602-0174	16	26-30	Socket	Twin Pair	M39029/77 ^a

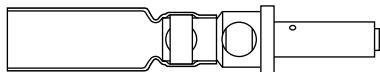
a. These SolderTacts contacts are inter-mateable and inter-mountable with contacts qualified to the indicated specification; they replace crimp-style termination.

Tooling Selection Guide for MIL-C-39999 Series I, II, III, IV. Contacts

Size	Part Numbers (D-602-)	Eng Standard	Adaptor	Repair Wand	Insertion Tool	Removal Tool
16	0140/0141	ES61226	AT-1319-78	AD-1565	M81969/8-07 or M81969/14-03	M81969/8-08 or M81969/14-03
	0142/0143	ES61224	-	-		
	0171	ES61226	AT-1319-27	AD-1572		
	0174	ES61224	-	-		
12	0144/0145	ES61206	AT-1319-24	AD-1566	M81969/8-09 or M81969/14-04	M81969/8-10 or M81969/14-04
	0146/0147	ES61218	-	-		
	0150/0151	ES61223	-	-		
8	0122/0123	ES61179	AT-1319-22	AD-1568	-	M81969/14-06 or ATBX-2277
	1108/1109	ES61172	AT-1319-22 and AT-1319-14	AD-1568 and AD-1480		
	1110/1111	ES61172				
	1112/1113	ES61184				
	0156/0157-X	ES61231				
	0169/0170-X	ES61235				

Notes:

- Heat guns are recommended for the installation of these devices: HL2010E and CV198X with the correct reflector added. See Application Equipment Section.



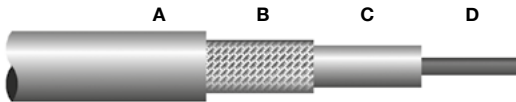
Sub-miniature / Commercial Series Contacts

Part Number	Size	Wire (AWG)	Polarity	Cable Type	A Ø	B Ø	C Ø	D Ø
D-602-0278	16	24-32	Pin	Coaxial	1.52 - 2.92	1.85 - 2.18	0.64 - 1.91	0.23 - 0.74
D-602-0279	16	24-32	Socket	Coaxial	1.52 - 2.92	1.85 - 2.18	0.64 - 1.91	0.23 - 0.74
D-602-0288	16	24-32	Pin	Twin Pair	-	-	0.74 - 1.40	0.23 - 0.74
D-602-0289	16	24-32	Socket	Twin Pair	-	-	0.74 - 1.40	0.23 - 0.74

These SolderTacts contacts belong to the TE “Sub-miniature” series of contacts, which are designed for use in commercial connectors.

Product Selection

Determine which SolderTact is required from the cable dimensions and chart above.



Tooling Selection Guide for Sub-miniature Series Contacts

Part Numbers	Eng Standard	Adapter	Repair Wand	Removal Tool
D-602-0278/0279	ES61170	AT-1319-12	AD-1481	AD-1447
D-602-0288/0289	ES61414	-	-	-

Contact insertion tool not applicable

Notes:

- Heat guns are recommended for the installation of these devices: HL2010E and CV198X with the correct reflector added. See Application Equipment Section.

Terminals and Splices

D500 Databus Components

MIL-STD-1553B

In-line micro-couplers: one & two stub.

The low profile configuration enables avionics system designers to plan for optimum coupler locations. Supplied with Spec 55 databus cables, including EMP hardened versions. Also available assembled with other components into a databus harness.

Features & Benefits

- Environmental sealing
- Lightweight -
- 360° continuous low-impedance
- Potted circuit elements for maximum durability.



Product Selection Guide - Single Stub

Part Numbers	
D-500-0455-1-YYY-ZZZ	
D-500-0465-1-YYY-ZZZ	
D-500-0456-1-YYY-ZZZ	
D-500-0466-1-YYY-ZZZ	
D-500-0457-1-YYY-ZZZ	
D-500-0467-1-YYY-ZZZ	
D-500-0458-1-YYY-ZZZ	
D-500-0468-1-YYY-ZZZ	

Notes

YYY Cable Type

- 612 = 10612 (24 AWG single optimised shield).
613 = 10613 (24 AWG double optimised shield).
614 = 10614 (24 AWG EMP hardened).

- Bus cable
- Stub cable

Product Selection Guide - Double Stub

Part Numbers	
D-500-0455-2-YYY-ZZZ	
D-500-0465-2-YYY-ZZZ	
D-500-0456-2-YYY-ZZZ	
D-500-0466-2-YYY-ZZZ	
D-500-0457-2-YYY-ZZZ	
D-500-0467-2-YYY-ZZZ	
D-500-0458-2-YYY-ZZZ	
D-500-0468-2-YYY-ZZZ	

ZZZ Cable Length

- 012 = 305mm
078 = 1980mm
079 = 2000mm
120 = 3050mm
236 = 6000mm
240 = 6100mm

Databus Components

MIL-STD-1553B

Cables

Spec 55 databus cables meet or exceed the performance requirements of MIL-STD-1553B. Insulation is a high temperature, radiation cross-linked, modified ETFE that can be used in wire constructions rated up to 200°C.

Features & Benefits

- Lightweight
- Highly flexible
- Flame resistant
- Chemical resistant to all aircraft fluids
- Solder iron resistant
- Defined shielding performance.



Product Cable Selection Guide

Cable Type		Part Numbers
24 AWG Single Optimised Shield		10612
24 AWG Double Optimised Shield		10613
24 AWG EMP Hardened		10614

Accessories

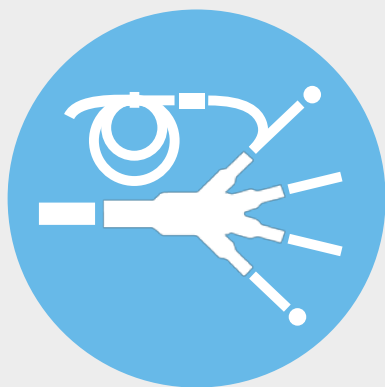
We can also supply the accessory components that may be necessary to complete a databus system.

These include:

- Bus and stub terminators (spliced-in and connectorised D-621 series).
- Cable splice kits.
- EMI/environment-resistant connector caps.
- Braid terminators and strain relief tubing.
- Cable marking materials.

Specifications / Approvals

- MIL-AS27500/32 & /35
- MIL-AS27500/41 & /46



Wire and Cable

Heat-shrink Tubing

Non-shrink Tubing

Braided Sleeving

Screening Braids

Moulded Parts

Terminals and Splices

Wire and Cable Markers

Accessories

Connectors

Backshells

Bonding Leads

Metal Braids

Relays and Contactors

Switches and Grips

Adhesives and Tapes

Application Equipment

Added Value Services

Wire and Cable Markers

INTRODUCTION

Advanced Identification and Labelling Project Solutions

- Heat Shrinkable
- Tie-on Markers
- Adhesive Labels
- Hardware and Software
- Additional Ident Products

Identification and labelling products are increasingly important as the preferred method of identification and traceability, for harness wire and cable, control panel and components.

Our product range covers a multitude of styles and materials including heat-shrinkable markers, tie-on, wrap-around and self-adhesive labels that meet international UL, CSA & Mil-Spec specifications. Products can be marked using a range of state of the art thermal transfer printers.

Applications range from commercial component labelling through to high performance critical systems identification. Typical product performance characteristics include extreme temperature operation, zero halogen, low smoke, low toxicity, chemical resistance, abrasion resistant, electrical insulation, strain relief and UV resistance.



- Mechanical Protection
- Extreme Temperature Performance
- Chemical Resistance
- Fluid & Solvent Resistance
- Moisture protection
- Strain Relief, Flexibility
- Flame-Retardant, Low Smoke
- High Shrink Ratio
- Low shrink Temperature
- Aesthetic Enhancement
- Fast and Efficient Installation

Heat Shrinkable Markers	Selection Guide and Overview	page 286	1
TMS-SCE	Military Grade	page 288	
HT-SCE	High Temp, Low Out gassing	page 289	2
HX-SCE	Low Fire Hazard	page 290	
D-SCE	Fluid resistant	page 291	3
ZHD-SCE	LFH and Fluid resistant	page 292	
UV-SCE	UV resistant	page 293	4
RPS	Commercial Grade	page 294	
TMS-CCUV	UV Protection Sleeve	page 295	5
Tie-on Markers	Selection Guide	page 296	
CM-SCE-TP	Military Grade	page 297	6
HLX125	Low Fire Hazard	page 298	
PM316	Stainless Steel	page 299	7
Adhesive Labels	Selection Guide	page 300	
SBPlus	Self Laminating	page 301	8
PVF	Self laminating	page 302	
MP	Metalised Polyester	page 303	9
MV	Tamper Evident Metalised Polyester	page 304	
WP	White Polyester	page 305	10
TTP	Continuous Polyester	page 306	
RMK-A4	Epoxy Coated	page 307	11
Hardware and Software			
WinTotal	Software	page 308	12
T200 Ident	Printer	page 310	
TE3112	Printer	page 311	13
RIBBON	Thermal Transfer Ribbons	page 312	
Additional Ident Products			14
	Universal Payoff and Push-On Markers	page 314	
	Pre-Print Service	page 315	15
			16
			17
			18

Wire and Cable Markers

Heat Shrink Selection Chart

Cable Identification Markers
Overview



Our cable identification solutions provide a “marked” difference. Heat-shrinkable cable identification marker sleeves are available in a wide variety of configurations, colours and sizes for high performance applications such as military grade, low-fire hazard, fluid resistant, high temperature and commercial use.

Printable cable markers for large wire bundles, cables, pipes and conduits come in a variety of colours and sizes for military, high temperature, and low-fire hazard applications.

Product	UL Recognised	CSA Approved	SAE AS5942	SAE-AMS DTL-23053	SNCF NF F	EN 50343	Operating Temperature		Shrink Ratio	Thermal Printing	White	Yellow	Black	Clear	Non Standard Colours	Sleeve Pre-scored	Description
							Min.	Max.									
TMS-SCE	•	•	•	•			-55°C	135°C	3:1	•	•	•			•	•	MIL Spec
HT-SCE	•		•				-55°C	225°C	2:1	•	•		•			•	High temp. Low gas
HX-SCE			•		•	•	-30°C	105°C	2:1	•	•	•			•	•	Low fire hazard
D-SCE			•	•	•	•	-55°C	135°C	3:1	•	•	•			•	•	Fluid resistant
ZHD-SCE						•	-55°C	125°C	2:1	•	•	•			•	•	LFH & fluid resistant
UV-SCE	•						-55°C	200°C	2:1	•	•	•				•	UV & fire retardant
RPS	•	•	•				-30°C	105°C	3:1	•	•	•				•	Commercial
TMS-CCUV	•	•		•			-55°C	150°C	2:1					•			UV resistant, clear

Available on the range of heat shrinkable identification sleeves, in four standard lengths of 50mm, 25mm, 16mm and 12.5mm. Our in-house ability to score sleeves means we can offer a fast order turnaround.

- **S1** Scored sleeve for 2 x 25mm sleeves
- **S2** Scored sleeve for 3 x 16mm sleeves
- **S3** Scored sleeve for 4 x 12.5mm sleeves

For non-standard lengths please contact us.

Minimum order quantity is based on the pack size of the particular heat shrinkable sleeve.

Perforated score line is made to produce multiple markers from each sleeve. For part numbering add **S1**, **S2** or **S3** to end of the individual part number.

Illustration shows nominal actual size of a 3.2mm Ø marker, using an 11 point Arial font.

Un-scored sleeve



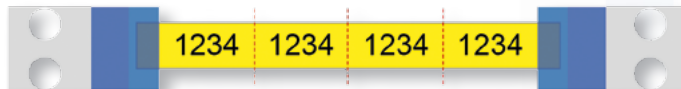
S1 Perforated sleeve for 2 x sleeves



S2 Perforated sleeve for 3 x sleeves



S3 Perforated sleeve for 4 x sleeves



The above represents the standard choices, other options and variants are available, please contact us for information.

3/32	2.4	1
1/8	3.2	2
3/16	4.8	1
1/4	6.4	1
3/8	9.5	1
1/2	12	1
3/4	18	1

Wire and Cable Markers

TMS-SCE

Military Grade
Heat Shrink Identification Sleeves

Military grade wire identification sleeve. Offering thin wall, flame retardant radiation cross linked modified heat shrinkable tubing. Standard colours available are White or Yellow.

Features & Benefits

- Lightweight for aerospace applications.
- CSA certified
- Available as pre-scored marker sleeves

Operating Temperature Range

- -55°C to +135°C

Installation

- Minimum recovery temperature +85°C
- Maximum storage temperature +40°C

Recommended printers:

T200-IDENT-PRINTER and the TE3112.

Approved ribbon:

TMS-RJS-RIBBON-4RPSCE

3:1
shrink

RoHS
compliant

Specifications and Approvals

- SAE AS5942 (print adherence)
- MIL-STD-202 method 215 (solvent resistance)
- SAE-AMS-DTL-23053/5 class 1
- EN45545-2 R24 HL2
- UL STD 224 (File 35586)
- CSA Certified (file 31929)
- NSA 937201 Type MR & MT
- BMS 13-69 Grade A & B

Ordering Description	Supplied Ø mm	Recovered Ø mm	Recommended Range mm	Weight g/10 pcs	Pack Size
TMS-SCE-3/32-2.0-Colour	2.36	0.79	0.81 - 1.90	1.50	250 pcs
TMS-SCE-1/8-2.0-Colour	3.18	1.07	1.11 - 2.66	2.03	250 pcs
TMS-SCE-3/16-2.0-Colour	4.75	1.57	1.75 - 4.06	2.68	250 pcs
TMS-SCE-1/4-2.0-Colour	6.35	2.11	2.31 - 5.46	3.51	250 pcs
TMS-SCE-3/8-2.0-Colour	9.53	3.18	3.47 - 8.12	5.04	250 pcs
TMS-SCE-1/2-2.0-Colour	12.70	4.22	4.64 - 10.79	6.81	250 pcs
TMS-SCE-3/4-2.0-Colour	19.05	6.35	6.99 - 16.25	12.03	250 pcs
TMS-SCE-1-2.0-Colour	25.40	8.46	9.29 - 21.59	15.35	250 pcs
TMS-SCE-1-1/2-2.0-Colour*	38.10	19.05	20.95 - 33.02	27.51	250 pcs
TMS-SCE-2-2.0-Colour*	50.80	25.40	27.94 - 44.95	47.27	250 pcs
TMS-SCE-2-1/4-2.0-Colour	57.15	19.05	22.32 - 50.80	42.06	250 pcs

Alternative packaging sizes also available please ask for details

* Please note that shrink ratio is 2:1

Standard Colours Available



For non standard colours please contact us for details and MOQ's.

HT-SCE

High Temperature and Low Out-gassing
Heat Shrink Identification Sleeves

2:1
shrink



High temperature low out-gassing heat shrinkable wire identification sleeves. Designed for use in high temperature applications or where extreme resistance to fuels, lubricants and cleaning solvents is required.

Features & Benefits

- High continuous operating temperature.
- Extreme fluid resistance.
- Low vacuum out-gassing.
- Available as pre-scored marker sleeves

Operating Temperature Range

- -55°C to +225°C

Installation

- Minimum recovery temperature +200°C
- Maximum storage temperature +40°C

Recommended printers:

T200-IDENT-PRINTER and the **TE3112**.

Approved ribbon:

TMS-RJS-RIBBON-4HT

If black tubing **TMS-RJS-RIBBON-WHT-4HT**

Specifications and Approvals

- SAE AS5942 (print adherence)
- MIL-STD-202G method 215 (solvent resistance)
- UL-224 VW-1 rated
- Low out-gassing 1% max TML, 0.1% max VCM
- NSA 937201 Type MK & ML
- BMS 13-69 Grade C & D

Ordering Description	Supplied Ø mm	Recovered Ø mm	Recommended Range mm	Pack Size
HT-SCE-3/32-2.0-Colour	2.36	0.79	0.81 - 1.90	250 pcs
HT-SCE-1/8-2.0-Colour	3.17	1.57	1.75 - 2.66	250 pcs
HT-SCE-3/16-2.0-Colour	4.74	2.36	2.54 - 4.06	250 pcs
HT-SCE-1/4-2.0-Colour	6.35	3.18	3.40 - 6.00	250 pcs
HT-SCE-3/8-2.0-Colour	9.52	4.74	5.30 - 8.10	250 pcs
HT-SCE-1/2-2.0-Colour	12.70	6.35	6.60 - 11.40	250 pcs
HT-SCE-3/4-2.0-Colour	19.05	9.53	9.90 - 15.30	250 pcs
HT-SCE-1-2.0-Colour	25.40	12.70	13.30 - 23.00	250 pcs
HT-SCE-1-1/2-2.0-Colour	38.10	19.05	20.95 - 34.00	250 pcs

Alternative packaging sizes also available please ask for details.

Standard Colours Available



9

White

0

Black

For non standard colours please contact us for details and MOQ's.

Wire and Cable Markers

HX-SCE

Low Fire Hazard
Heat Shrink Identification Sleeves

Ideal for applications where limited fire hazard characteristics are necessary. The zero halogen material coupled with low smoke and low toxic fume emissions make the product ideal for use in enclosed spaces such as mass transit, marine and industrial installations.

Features & Benefits

- Meets international rail LFH standards.
- High performance print quality.
- Available as pre-scored marker sleeves.

Operating Temperature Range

- -55°C to +105°C

Installation

- Minimum recovery temperature +120°C
- Maximum storage temperature +40°C

Recommended printers:

T200-IDENT-PRINTER and the **TE3112**.

Approved ribbon:

1966-RIBBON



Specifications and Approvals

- SAE AS5942 (print adherence)
- MIL-STD-202G method 215 (solvent resistance)
- EN45545-2 R22/R23/R24 HL3
- LUL 1-085 A3 (Fire Safety Performance)
- NF F 16-101 (Class 1A)
- BS 6853 Cat 1A
- EN 50343 H (Diesel immersion removed)

Ordering Description	Supplied Ø mm	Recovered Ø mm	Recommended Range mm	Pack Size
HX-SCE-2.4-50-Colour	2.36	1.19	1.27 - 1.90	250 pcs
HX-SCE-3.2-50-Colour	3.17	1.58	1.77 - 2.66	250 pcs
HX-SCE-4.8-50-Colour	4.74	2.36	2.54- 4.06	250 pcs
HX-SCE-6.4-50-Colour	6.35	3.18	3.81 - 5.46	250 pcs
HX-SCE-9.5-50-Colour	9.52	4.75	5.59 - 8.12	250 pcs
HX-SCE-12.7-50-Colour	12.70	6.35	6.99- 10.79	250 pcs
HX-SCE-19-50-Colour	19.05	9.53	10.16 - 16.25	250 pcs
HX-SCE-25.4-50-Colour	25.40	12.70	14.29 - 21.59	250 pcs
HX-SCE-38.1-50-Colour	38.10	19.05	20.95 - 33.02	250 pcs

Alternative packaging sizes also available please ask for details

Standard Colours Available



For non standard colours please contact us for details and MOQ's.

D-SCE

Fluid Resistant

Heat Shrink Identification Sleeves

3:1
shrink



Suitable for applications where exposure to organic fluids, especially oils, is required. Designed to operate in these conditions at elevated temperatures for extended periods, making them ideal for rail and construction industries.

Features & Benefits

- Resistance to organic fluids, common fuels, lubricants and solvents.
- Available as pre-scored marker sleeves.

Operating Temperature Range

- -75°C to +135°C

Installation

- Minimum recovery temperature +135°C
- Maximum storage temperature +40°C

Recommended printers:

T200-IDENT-PRINTER and the **TE3112**.

Approved ribbon:

1966-RIBBON

Specifications and Approvals

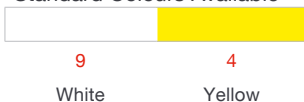
- AMS AS5942 4.1 (print adherence)
- MIL-STD-202G method 215 (solvent resistance)
- SAE AMS DTL 23053/6 Class 1
- EN50343 appendix H
- SNCF NF F 00608 (cat. A & H)

Ordering Description	Supplied Ø mm	Recovered Ø mm	Recommended Range mm	Pack Size
D-SCE-2.4-50-Colour	2.36	0.79	0.81 - 1.90	250 pcs
D-SCE-3.2-50-Colour	3.17	1.07	1.11 - 2.66	250 pcs
D-SCE-4.8-50-Colour	4.74	1.57	1.75 - 4.06	250 pcs
D-SCE-6.4-50-Colour	6.35	2.11	2.31 - 5.46	250 pcs
D-SCE-9.5-50-Colour	9.52	3.18	3.47 - 8.12	250 pcs
D-SCE-12-50-Colour	12.70	4.22	4.64 - 10.79	250 pcs
D-SCE-18-50-Colour	19.05	6.35	6.99 - 16.25	250 pcs
D-SCE-25-50-Colour	25.40	8.46	9.29 - 12.59	250 pcs
D-SCE-38-50-Colour*	38.10	19.05	20.95 - 33.02	250 pcs

Alternative packaging sizes also available please ask for details

* Please note that shrink ratio is 2:1

Standard Colours Available



9
White

4
Yellow

For non standard colours please contact us for details and MOQ's.

Wire and Cable Markers

ZHD-SCE

Halogen Free and Fluid Resistance
Heat Shrink Identification Sleeves

Manufactured using a specially developed radiation cross-linked, zero halogen material. Designed specifically to bridge the gap for installations where the highest performance is demanded from an identification sleeve.

Features & Benefits

- Meets international rail LFH standards
- No Halogens, Sulphur and Nitrogen
- Non-flame propagating
- High performance print quality.
- Available as pre-scored marker sleeves.

Operating Temperature Range

- -55°C to +135°C

Installation

- Minimum recovery temperature +120°C
- Maximum storage temperature +40°C

Recommended printers:

T200-IDENT-PRINTER and the **TE3112**.

Approved ribbon:

1966-RIBBON



Specifications and Approvals

- SAE AS5942 (print adherence)
- MIL-STD-202G method 215 (solvent resistance)
- EN45545-2 R22 HL2
- BS 6853 Cat II
- EN 50343 (Appendix H)

Ordering Description	Supplied Ø mm	Recovered Ø mm	Recommended Range mm	Pack Size
ZHD-SCE-2.4-50-Colour	2.4	1.19	1.27 - 1.90	250 pcs
ZHD-SCE-3.2-50-Colour	3.2	1.58	1.77 - 2.66	250 pcs
ZHD-SCE-4.8-50-Colour	4.8	2.36	2.54- 4.06	250 pcs
ZHD-SCE-6.4-50-Colour	6.4	3.18	3.81 - 5.46	250 pcs
ZHD-SCE-9.5-50-Colour	9.5	4.75	5.59 - 8.12	250 pcs
ZHD-SCE-12.7-50-Colour	12.7	6.35	6.99- 10.79	250 pcs
ZHD-SCE-19-50-Colour	19.0	9.53	10.16 - 16.25	250 pcs
ZHD-SCE-25.4-50-Colour	25.4	12.70	14.29 - 21.59	250 pcs
ZHD-SCE-38.1-50-Colour	38.1	19.05	20.95 - 33.02	250 pcs

Alternative packaging sizes also available please ask for details

Standard Colours Available



For non standard colours please contact us for details and MOQ's.

UV-SCE

UV Resistant, Flame Retardant
Heat Shrink Identification Sleeves

2:1*
shrink

UV
PROTECT

RoHS
compliant

The solution to identify wires and cables where extreme resistance to Ultra Violet (UV) and harsh weather conditions are required. UV-SCE offers outstanding physical performance, mark permanence and excellent legibility after 25,000 hours of UV and moisture exposure, without degradation.

Features & Benefits

- UV Resistant
- Flame retardant polymer compound
- Available as pre-scored marker sleeves.

Operating Temperature Range

- -55°C to +200°C

Installation

- Minimum recovery temperature +135°C
- Maximum storage temperature +40°C

Recommended printers:

T200-IDENT-PRINTER and the **TE3112**.

Approved ribbon:

T300-UV-SCE-RIBBON

Specifications and Approvals

- SAE AS5942 (print adherence)
- MIL-STD-202G method 215 (solvent resistance)
- EN45545-2 Class 3 R24
- IEC 60068-2, -5, procedure B
- NFT 46-019 method A
- BS EN 60068-2-5 B

Ordering Description	ID Supplied	ID Recovered	Recommended Range	Pack Size
UV-SCE-3/32-2.0-Colour	2.4	0.79	0.81 - 1.90	250 pcs
UV-SCE-1/8-2.0-Colour	3.2	1.58	1.75 - 2.66	250 pcs
UV-SCE-3/16-2.0-Colour	4.8	2.36	2.54 - 4.06	250 pcs
UV-SCE-1/4-2.0-Colour	6.4	3.18	3.40 - 6.00	250 pcs
UV-SCE-3/8-2.0-Colour	9.5	4.75	5.30 - 8.10	250 pcs
UV-SCE-1/2-2.0-Colour	12.7	6.35	6.60 - 11.40	250 pcs
UV-SCE-3/4-2.0-Colour	19.0	9.53	9.90 - 15.30	250 pcs
UV-SCE-1-2.0-Colour	25.4	12.70	13.30 - 23.00	250 pcs
UV-SCE-1-1/2-2.0-Colour	38.1	19.05	20.95 - 34.00	250 pcs

Alternative packaging sizes also available please ask for details

Standard Colours Available



9

White

4

Yellow

For non standard colours please contact us for details and MOQ's.

Wire and Cable Markers

RPS

Commercial Grade
Heat Shrink Identification Sleeves

RPS markers are heat-shrinkable marker sleeves for general industrial applications, whilst resistant to abrasion, aggressive cleaning solvents and industrial fluids.

Features & Benefits

- Flame retardant
- Available as pre-scored marker sleeves.

Operating Temperature Range

- -30°C to +105°C

Installation

- Minimum recovery temperature +85°C
- Maximum storage temperature +40°C

Recommended printers:

T200-IDENT-PRINTER and the **TE3112**.

Approved ribbon:

TMS-RJS-RIBBON-4RPSCE

3:1
shrink

RoHS
compliant



Specifications and Approvals

- SAE AS 81531 4.6.2 (print adherence)
- MIL-STD-202 method 215J (solvent resistance)
- UL 224 (file E35586)
- CSA Certified (file 31929)

Ordering Description	Supplied Ø mm	Recovered Ø mm	Recommended Range mm	Pack Size
RPS-22-18/2.0-Colour	3.18	1.07	1.17 - 2.66	250 pcs
RPS-18-12/2.0-Colour	4.75	1.57	1.75 - 4.06	250 pcs
RPS-16-10/2.0-Colour	6.35	2.11	2.31 - 5.46	250 pcs
RPS-8-4/2.0-Colour	9.53	3.18	3.47 - 8.12	250 pcs
RPS-10-2/2.0-Colour	12.70	4.22	4.64 - 10.79	250 pcs
RPS-6-250/2.0-Colour	19.05	6.35	6.99 - 16.25	250 pcs
RPS-1-400/2.0-Colour	25.40	8.46	9.29 - 21.59	250 pcs
RPS-400-1000/2.0-Colour*	38.10	19.05	20.95 - 3.02	250 pcs

Alternative packaging sizes also available please ask for details

* Please note that shrink ratio is 2:1

Standard Colours Available



For non standard colours please contact us for details and MOQ's.

TMS-CCUVMilitary Grade, UV Protection
Cut Piece Clear Heat Shrink Sleeves**2:1**
shrink**UV**
PROTECT**RoHS**
compliant

Designed to provide increased protection for identification products in outdoor applications. The clear heat-shrinkable sleeves provide a barrier to the effects of ultraviolet (UV) radiation and tough resistance to abrasion and fluids.

Standard colour Clear only.

Features & Benefits

- Added UV protection
- Resistance to abrasion and fluids

Operating Temperature Range

- -55°C to +150°C

Installation

- Minimum recovery temperature +150°C
- Maximum storage temperature +40°C

Specifications and Approvals

- UL VW-1 rated
- SAE AMS DTL 23053/18, Class 2

Ordering Description	Supplied Ø mm	Recovered Ø mm	Length mm	Recommended Range mm	Pack Size
TMS-CCUV-SLEEVE-1	3.2	1.6	65	1.80 - 2.80	250 pcs
TMS-CCUV-SLEEVE-2	4.8	2.4	65	2.60 - 3.70	250 pcs
TMS-CCUV-SLEEVE-3	6.4	3.2	65	3.50 - 5.10	250 pcs
TMS-CCUV-SLEEVE-4	9.5	4.8	65	5.00 - 7.00	250 pcs
TMS-CCUV-SLEEVE-5	12.7	6.4	65	6.90 - 10.60	250 pcs
TMS-CCUV-SLEEVE-6	19.0	9.5	65	10.00 - 14.00	250 pcs
TMS-CCUV-SLEEVE-7	25.4	12.7	65	13.30 - 21.00	250 pcs
TMS-CCUV-SLEEVE-8	38.0	19.0	65	21.00 - 33.80	250 pcs

Also available in 32mm and 76mm lengths, in selected sizes, please ask for details

Wire and Cable Markers

Tie-On Selection Chart

Cable Identification Markers
Overview

Tie-On Cable markers are flat, non-adhesive labels that can be used to identify large cables and wire bundles in particularly aggressive environment.



Product	SAE AS 81531	SAE-AMS DTL-23053	EN45545-2	Operating Temperature	Size (mm)	Thermal Print			Standard Colours	Non Standard Colours.	Description
						Metal	White	Yellow			
CM-SCE-TP	•		•	-55°C to +135°C	10.4 and 51.5	•		•	•	•	Polyolefin
HLX125	•	•		-40°C to +105°C	80 x 12.5	•		•	•	•	Zero halogen
PM316				-80°C to +500°C	95 x 12	n/a	•				Stainless Steel

CM-SCE-TP

Military Grade
Tie-On Cable Marker

These non-adhesive labels can be used to identify large cables and wire bundles in particularly aggressive environments. Can be applied post cable termination using cable ties.

Manufactured using specially developed radiation cross-linked flame retarded polymer. Typical installation include mass transit, military and aerospace.

Colours available are White (9) or Yellow (4).

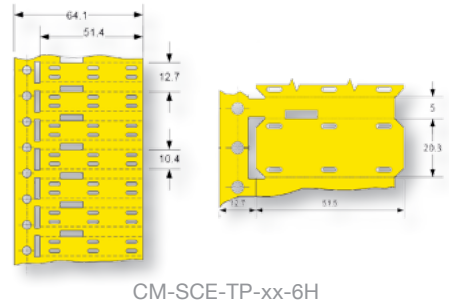
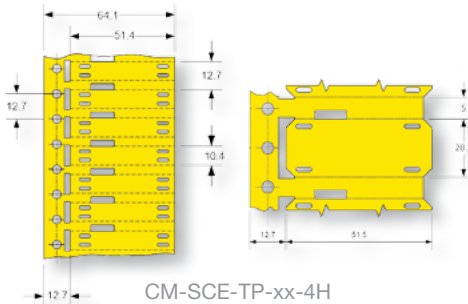
Features & Benefits

- Highly flame resistant - excellent resistance to burning (Oxygen Index 35%).
- Resistant to key industrial and military grade fluids, as defined by RW-2513.

Operating Temperature Range

- -55°C to +135°C

High temperature version **HTCM-SCE-TP** also available offering 225°C please call us.



Ordering Description	Size (inch)	Markable Height mm	Markable Length mm	Recommended Range mm	Pack Size
4 Tie Holes					
CM-SCE-TP-1/4-4H-4 or 9	1/4	6.4	50.80	5.08 to 12.50	250 pcs
CM-SCE-TP-1/2-4H-4 or 9	1/2	12.70	50.80	12.50 and up	250 pcs
6 Tie Holes					
CM-SCE-TP-1/4-6H-4	1/4	6.4	50.80	5.08 to 12.50	250 pcs
CM-SCE-TP-1/2-6H-4 or 9	1/2	12.70	50.80	12.50 and up	250 pcs

Alternative packaging sizes also available please ask for details
Recommended printers: **T200-IDENT-PRINTER** and the **TE3112** printer.
Approved ribbon **1966-RIBBON**

Wire and Cable Markers

HLX125-NEL

Halogen free, Low Fire hazard
Tie-On Cable Marker

Low Fire Hazard, UV stabilised, cross-linked polyolefin Cable Markers, assembled in a Narrow Edge Leading 'NEL' format. Consisting of a continuous strip formed into punched tie on Cable Markers. Cable Markers have perforated edges for easy removal

Markers are printed by a computer-based system and are attached using cable ties. Ideal for applications where low fire hazard characteristics (low smoke, low toxicity and low flammability) are critical.

Standard colours available are White or Yellow.

Features & Benefits

- Recommended for use where combustion of products may endanger personnel or delicate electronics.
- Two formats available.
- Ideal for pre or post termination assembly.

Operating Temperature Range

- -40°C to +105°C



Specifications and Approvals

- SAE AS5942
- MIL-STD-202 Method 215
- London Underground 1-085 A3
- EN45545-2 R22/R23/R24 HL3
- BS 6853 Vehicle cat 1a
- NF F 16-101 Class A1

Ordering Description	Marker Dimensions mm	Printable Area mm	No. Markers Across	Pack Size
HLX125-Colour-4NEL60S	80.0 x 12.5	60.0 x 10.5	4	200 pcs per roll
HLX125-Colour-2NEL60S	80.0 x 12.5	60.0 x 10.5	2	200 pcs per roll

Recommended printers: T200-IDENT-PRINTER and the TE3112 printer.
Approved ribbon 1966-RIBBON

PM316 Metal
Stainless Steel
Tie-On Cable Marker

For additional information on this product, associated part number and options please contact us direct.

Typical sizes are:

- 95 x 12mm, printable area 55 x 10mm
- 85 x 12mm, printable area 50 x 10mm
- 75 x 7mm, printable area 50 x 5mm

Permark® 316 stainless steel markers are recommended for use in highly demanding applications. Using state of the art technology and no inks, the marking process produces a permanent, deep surface mark with a darkened character in high contrast to the background.

Pre-print service option only.

Offering excellent resistance to a variety of hydrocarbons, organic chemicals, acids, alkali and inorganic salts.

Features & Benefits

- Pre-marked to customer requirements.
- Variety of fixing methods possible.
- Mark will endure the lifetime of a Permark stainless steel marker.
- Excellent resistance to weather extremes and high levels of UV light.
- Resistant to corrosive marine and industrial atmospheres.
- Excellent resistance to a variety of hydrocarbons, organic chemicals, acids, alkalis & inorganic salts.

For resistance to a specific chemicals and substances, please contact us.

Operating Temperature Range

- -80°C to +500°C

Ordering Description

As these parts are made to order please contact us for details.

Wire and Cable Markers

Label Selection Chart

Adhesive Identification Labels
Overview

Range of self-adhesive labels available in various forms and colours for either self printing or using our pre-print service.



Product	UL	ASTM D3330	SAE AD 4952	BMS 13-47	Operating Temperature	Size	Thermal Printing	Standard Colours			Non Standard Colours	Description
								White	Metalised	Clear		
SBP	•	•			-40°C to +80°C	Various	•	•				Self-laminating
PVF				•	-40°C to +107°C		•	•				Self-laminating
MP	•		•		-40°C to +150°C		•		•			Metalised polyester
MV	•				-40°C to +150°C		•		•			Temper evident
WP	•		•		-40°C to +150°C		•	•				Polyester
TTP	•	•			-29°C to +150°C		•	•	•	•	•	Polyester
Raymark A4					-40°C to +105°C	A4		•				Ink-jet printable

SBPlusSelf-laminating Labels
Thermal Transfer Printable

Clear vinyl film with a permanent acrylic based adhesive, supplied with a white thermal transfer printable area, which is over-laminated upon application with the clear portion of the label.

Can also be 'flagged' around a wire rather than wrapped. This self-laminating feature protects the printed area from exposure to oil, solvents, water and abrasion.

Printable area is equal to the width of the label and the printable height as identified in the table below.

Standard colour is White with a clear tail.

Specifications and Approvals

- ASTM D3330
- ASTM 3611
- MIL-STD-202 Method 215
- UL969 PGJ12 MH17292

Features & Benefits

- Strong adhesive, prevents lift off and seals.
- Base material allows the printing to remain clear after lamination.
- Designed to withstand exposure to oil, solvents and water.

Operating Temperature Range

- -40°C to +110°C

Ordering Description	Label Size mm		Printable Height mm	Max. Cable OD mm	No. Labels Across	Pack Size
	Height	Width				
SBP050100WE10	25.4	12.7	8.5	5.1	5	10,000
SBP050143WE10	36.5	12.7	12.7	7.6	5	10,000
SBP075094WE10	23.9	19.1	9.5	7.6	4	10,000
SBP080150WE10	38.1	20.3	12.7	7.6	4	10,000
SBP100143WE5	36.5	25.4	12.7	7.6	3	5,000
SBP100225WE5	57.2	25.4	19.1	12.2	3	5,000
SBP100375WE2.5	95.3	25.4	25.4	22.4	3	2,500
SBP100594WE1	151.0	25.4	38.1	35.6	3	1,000
SBP100743WE1	188.9	25.4	38.1	35.6	3	1,000
SBP190319WE2.5	81.0	48.3	19.1	12.2	2	2,500
SBP190594WE1	151.0	48.3	38.1	35.6	2	1,000
SBP200143WE2.5	6.5	50.8	12.7	7.6	2	2,500
SBP200225WE2.5	57.2	50.8	19.1	12.2	2	2,500
SBP200375WE2.5	95.3	50.8	25.4	22.4	2	2,500
SBP200743WE	188.9	50.8	38.1	48.3	2	11,000

Recommended printers **T200-IDENT-PRINTER** and the **TE3112** printer.

Approved ribbon **TMS-RJS-RIBBON-4RPSCE**

Wire and Cable Markers

PVF

Self Laminating Labels
Thermal Transfer Printable

Translucent polyvinyl fluoride film with a permanent acrylic adhesive, designed for wire and cable marking applications that require the ‘self-extinguishing’ properties of polyvinyl fluoride. Supplied with a white printable area, which is over-laminated upon application.

PVF has a low-profile design making it suitable for wrapping onto thin wire gauges as well as excellent conform-ability to round, irregular or flexible surfaces and is ideal for wire & cable identification, including flat ribbon cables that are subject to repeated bending.

Features & Benefits

- Thermal transfer printable
- Excellent UV resistance
- Excellent conform-ability to round, irregular and flexible surfaces.
- High resistance to aging

Operating Temperature Range

- -40°C to +107°C



Specifications and Approvals

- ASTM D1000-76
- AS-81531
- MIL-STD-202 Method 215
- MIL STD 833C
- BMS 13-47
- NGM802AK

Ordering Description	Label Width mm	Label Height mm	Labels Across	Pack Size
PVF050100WE10	12.7	25.4	5	10,000
PVF080150WE10	20.3	38.1	4	10,000
PVF100143WE5	25.4	36.5	3	5,000
PVF200143WE2.5	50.8	36.5	2	2,500
PVF100225WE5	25.4	57.2	3	5,000
PVF190319WE205	48.3	81.0	2	2,500
PVF100375WE2.5	25.4	95.3	3	2,500
PVF200375WE2.5	50.8	65.3	2	2,500
PVF100594WE1	25.4	151.0	3	1,000
PVF100743WE1	25.4	188.9	3	1,000
PVF190594WE1	48.3	151.0	2	1,000
PVF200743WE1	50.8	188.9	2	1,000

Recommended printers: T200-IDENT-PRINTER plus the TE3112 printer
Approved ribbon 1330-3300-10



Specifications and Approvals

- ASTM AS 4952
- MIL-STD-202 Method 215
- FTM-1
- UL969 PGJ12 MH17292
- UL969 PGJ18 MH17292 (Canadian)

MP is a thermal transfer printable metalised polyester film with permanent acrylic adhesive, designed for rating plates and other applications that require a metal look, such as nameplates, equipment labels, detailed product information labels and serial number plates. MP is UL Listed and CSA certified.

Standard colour is Silver, metalised polyester

Features & Benefits

- Thermal transfer printable
- Several die-cut sizes available
- Metalised appearance
- UL listed and CSA certified
- Ideal for rating plate applications

Operating Temperature Range

- -40°C to +150°C

The table below only represents a selection of MP label products available, for a complete list or more detailed information please contact us for details.

Ordering Description	Label Width mm	Label Height mm	Labels Across	Pack Size
MP-080080-10-8A	8.0	8.0	8	10,000
MP-095080-25-8A	9.5	8.0	5	25,000
MP-127111-10-8A	12.7	11.1	5	10,000
MP-165102-10-8A	16.5	10.2	5	10,000
MP-191114-18-8A	19.1	11.4	3	15,000
MP-254045-10-8A	25.4	4.6	3	10,000
MP-254127-10-8A	25.4	12.7	3	10,000
MP-445102-5-8A	44.5	10.2	1	5,000
MP-762508-2.5-8A	76.2	50.8	1	2,500

Recommended printers: T200-IDENT-PRINTER plus the TE3112 printer

Approved ribbon 1330-0607-10

MV

White Polyester Labels
Thermal Transfer Printing

MV is a thermal transfer printable metalised polyester film with a permanent acrylic adhesive, designed with a tamper-evident feature which leaves a 'VOID' footprint when removed. It is ideal for applications such as rating plate and serial number labels that require protection against removal. Standard colour is Silver, metalised polyester.

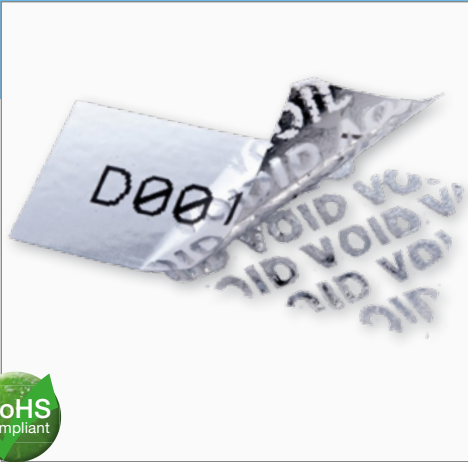
Features & Benefits

- Thermal transfer printable
- Metalised appearance
- Ideal for security applications
- UL recognised

Operating Temperature Range

- -40°C to +150°C

The table below only represents a selection of MV label products available, for a complete list or more detailed information please contact us for details.



Specifications

- MIL-STD-202 Method 215
- AS-81531
- UL969 PGJ12 MH17292

Ordering Description	Label Width mm	Label Height mm	Labels Across	Pack Size
MV-040040-25-8A	4.0	4.0	20	25,000
MV-089047-10-8A	8.9	4.7	5	10,000
MV-095095-10-8A	9.5	9.5	7	10,000
MV-127127-10-8A	12.7	12.7	5	10,000
MV-191114-15-8A	19.1	11.4	3	15,000
MV-254064-10-8A	25.4	6.4	3	10,000
MV-254097-10-8A	25.4	9.7	3	10,000
MV-381191-5-8A	38.1	19.1	2	5,000
MV-508127-8-8A	50.8	12.7	1	5,000
MV-762508-2.5-8A	76.2	50.8	1	2,500
MV-101508-2.5-8A	101.6	50.8	1	2,500
MV-101101-1.3-8A	101.6	101.6	1	1,300

Recommended printers: T200-IDENT-PRINTER and the TE3112 printer.
Approved ribbon 1330-0607-10

WP is a white polyester film with a permanent acrylic adhesive. It is ideal for bar coding, PCB and component labelling, as well as general purpose labelling applications that require a high durability white label. WP is resistant to a variety of solvents while maintaining print quality. It is UL listed and print performance and durability are reliable when used with specified ribbons.

Standard colour available is White.

Features & Benefits

- Ideal for use on PCB component labelling
- Ink receptive topcoat
- Excellent for bar code applications
- UL listed and CSA certified

Operating Temperature Range

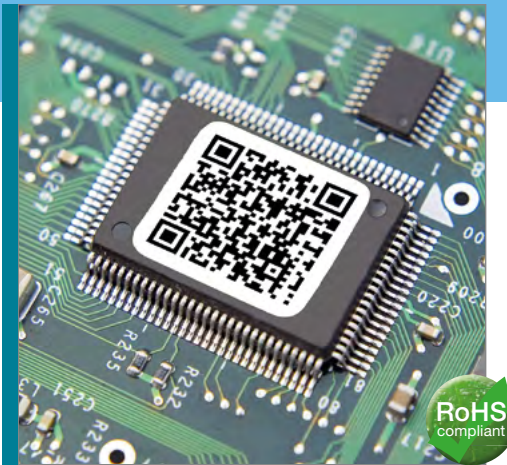
- -40°C to +150°C

The table below only represents a selection of WP label products available, for a complete list or more detailed information please contact us for details.

Ordering Description	Label Width mm	Label Height mm	Labels Across	Pack Size
WP-127111-10-9	12.7	11.1	5	10,000
WP-165051-25-9	16.5	5.1	4	25,000
WP-171171-10-9	17.1	17.1	5	10,000
WP-191064-10-9	19.1	6.4	4	10,000
WP-229064-10-9	22.9	6.4	3	10,000
WP-254064-10-9	25.4	6.4	3	10,000
WP-254127-10-9	25.4	12.7	3	10,000
WP-318064-10-9	31.8	6.4	1	10,000
WP-381191-5-9	38.1	19.1	2	5,000
WP-508127-5-9	50.8	12.7	1	5,000

Recommended printers: T200-IDENT-PRINTER and the TE3112 printer.

Approved ribbon 1330-0607-10



Specifications and Approvals

- ASTM AS 4952
- MIL-STD-202 Method 215
- FTM-1
- UL969 PGJ12 MH17292
- UL969 PGJ18 MH17292 (Canadian)

TTP

Continuous Polyester for Decals
Thermal Transfer Printable

This highly durable system offers the features of ‘Silk Screened’ labels, only without the cost, time and inflexibility involved. The product utilises high performance polyester with permanent adhesive, suitable for panel labels, fascias and decals.

Features & Benefits

- Effective alternative solution for expensive silk-screen printing
- Continuous format
- Several widths and colours available
- Interior and exterior aircraft use including flight entertainment and deck instrumentation.

Operating Temperature Range

- Clear from -40°C to +125°C
- Other from -29°C to +150°C



Specifications and Approvals

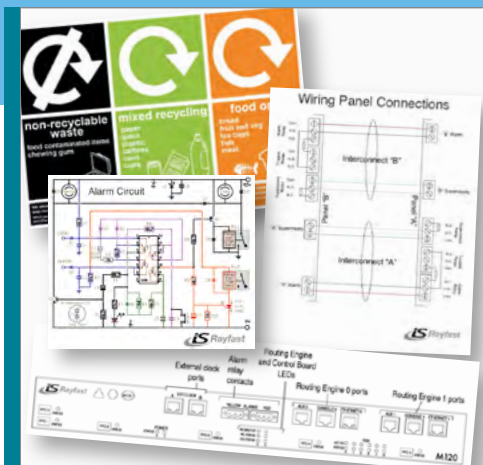
- A-A-59485
- GAT100BB
- UL MH17292 Group PGJ12 (polywhite)

Ordering Description	Label Width mm	Roll Length m	Qty per Pack
Standard adhesive version			
TTP200-Colour-10	50.8	30.48m (100ft)	Continuous Roll
TTP300-Colour-10	73.2	30.48m (100ft)	Continuous Roll
TTP400-Colour-10	101.6	30.48m (100ft)	Continuous Roll
TTP600-Colour-10	152.4	30.48m (100ft)	Continuous Roll
High tack adhesive version			
TTPA200-Colour-10	50.8	30.48m (100ft)	Continuous Roll
TTPA300-Colour-10	73.2	30.48m (100ft)	Continuous Roll
TTPA400-Colour-10	101.6	30.48m (100ft)	Continuous Roll
TTPA600-Colour-10	152.4	30.48m (100ft)	Continuous Roll

Ordering Information: Standard colours: **CL** = Clear, **WE** = White and **MP** = Metalised
Non-Standard: **RD** = Red, **GN** = Green, **BE** = Blue; **OE** = Orange, **BK** = Black and **YW** = Yellow
Recommended printers: **T200-IDENT-PRINTER** and the **TE3112** printer.
Approved ribbon **1330-0607-10**

Raymark RMK A4

Epoxy Coated Labels
Computer Printable



Specifications and Approvals

- MIL-M-81531 (mark permanence)
- MIL-STD-202F Method 215 (solvent resistance)

Raymark is a computer printer label stock with outstanding fluid and abrasion resistance, for ink-jet printers.

When heat-cured after printing, the heat reactive epoxy surface “locks-in” the printed image. Typical applications are rating plate labels, wiring diagrams, component identification and wraparound markers.

Standard colour available is White

Features & Benefits

- Outstanding adhesion to many surfaces
- Outstanding fluid and abrasion resistance.
- Low fire hazard properties
- Indoor use only

Operating Temperature Range

- Wire marking -40°C to +85°C
- Panel marking -40°C to +105°C

Ordering Description	Label Height mm	Label Width mm	No. Labels / reel	Pack Size
RMK-9x25-A4	9	25	132 labels	50 Sheets
RMK-18x35-A4	18	35	48 labels	50 Sheets
RMK-18x50-A4	18	50	36 labels	50 Sheets
RMK-25x50-A4	25	50	27 labels	50 Sheets
RMK-25x75-A4	25	75	18 labels	50 Sheets
RMK-35x75-A4	35	75	12 labels	50 Sheets
RMK-25x100-A4	25	100	10 labels	50 Sheets
RMK-50x100-A4	50	100	5 labels	50 Sheets
RMK-75x150-A4	75	150	3 labels	50 Sheets
RMK-UNCUT-A4	A4	A4	1 label	50 Sheets

A standard pack contains 50 sheets in environmentally sealed package, if opened the labels should be stored at a temperature no greater than +25°C @ ,80% humidity and used within 6 months. An un-opened pack can be stored at a temperature no greater then +35°C and has a recommended shelf life of 12 months.

For full product performance characteristics, refer to product data sheets TH-93269 (UK) and H54584 (USA).

Recommended printers: New Raymark ink jet printer EPSON WF-5190DW.

Also refer to the TE 411-121005 (ribbon/ink matrix)

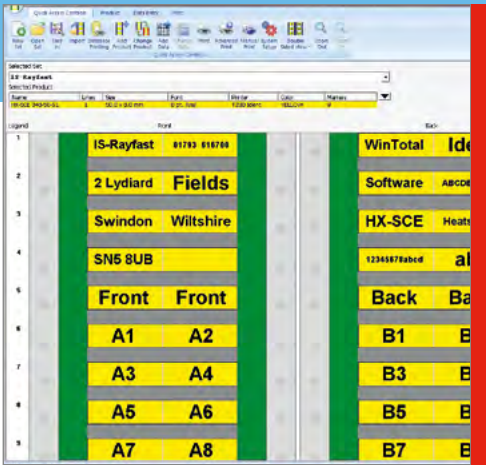
WinTotal
Software Solution
Design and Print

WinTotal is a label/marker design package that makes wire marker printing simple in an industrial environment. Running in the familiar Windows environment, WinTotal v6 has 2,500 standard TE Connectivity (TE) Identification products pre-installed. This makes the creation and printing of Identification sleeves or labels a quick and simple task. Using the advanced editor, it is also possible to create complex layouts that relate to active data fields, giving a true WYSIWYG representation.

WinTotal v6 now fully supports Unicode. This allows for multilingual text to be printed using any or all of the languages required. If a character has a Unicode equivalent, then WinTotal v6 will display and print that character, if it can be written into a Microsoft application, it can be copied into WinTotal v6.

Key Features & Benefits

- Multi-lingual user interface.
- Pre-loaded WYSIWYG templates.
- Graphical user interface with WYSIWYG display
- Clipart gallery with commonly used symbols, on V6 and above only.
- Incremental alpha and numeric fields.
- Accepts and prints data in any language - UniCode data support (V6 only).
- Multiple Label Design Objects: Text, lines, boxes, circles and images.
- Double sided marker printing complete with WYSIWYG display.
- Extensive Barcode and 2D barcode support.
- Advanced label design elements & tools: Text boxes, rich text formatting, variable font size.
- Image files supported (JPG, WMF, BMP).
- Multiple Printers/Printing: Full MAPP (Multiple Application Port Printing). Able to drive multiple printers simultaneously with automatic selection.



System Requirements

Computer	IBM Compatible PC
Processor	1 GHz or higher
RAM	1GB
Screen Resolution	1024 x 768 pixels
Disk Space Required	100MB of free disk space

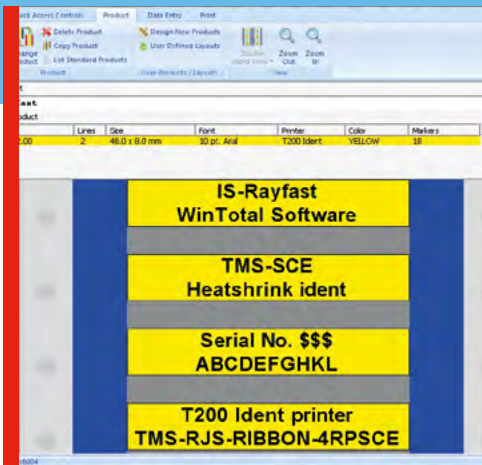
Ordering Information

USB key with licence, once inserted.	WINTOTAL-6-DONGLE
--------------------------------------	-------------------

*RAM requirement is less for earlier Windows operating systems please contact for details

Basic Functionalities

- Toolbar design, 'Keypad' buttons, 'Zoom In/Out'.
- 'Selected Product' list box
- Simplified user interface configurable for both basic and advanced users
- Single file data format: One file now replaces multiple files used in older versions.
- 'System Setup' screen with simplified printer selection: 'Advanced Printer Setup' function shows all settings in one location.



Data Management

- Import data from ASCII or XMT files or from a Windows database
- 'Database printing' function for printing data without importing into WinTotal software
- 'Preview' option to review the import configuration without importing.

Templates

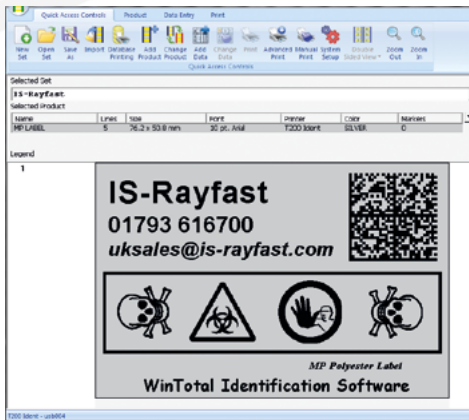
- 'Rotation' option when creating products
- File format supporting importing and exporting of 'User Defined Layouts'.

Supported Languages

Dutch, English, French, German, Italian, Japanese, Korean, Norwegian, Portuguese (Brazil), Russian, Simplified Chinese, Spanish and Turkish.

Note

The WinTotal software package is available to suit a Windows® environment and is constantly being developed in line with operating system updates and technology improvements, please enquire for latest release levels.



Please note that the WINTOTAL-6-DONGLE acts as an authorisation key, the software can be downloaded as a free trial from the TE.com website which this key activates for unrestricted use.

T200-IDENT-PRINTER

Thermal Transfer Printer

Get the most out of your cable identification and labelling. The T200 Ident printer brings together a complete solution for your compact range of thermal transfer printing needs. The increased accuracy and the added flexibility of a movable Media sensor extends the variety of products approved for this printer, while reducing the number of misprints. The T200 is also available as a package with the WINTOTAL Software

Features & Benefits

- Light-weight at 4kg and small footprint
- Automatic calibration
- Simple ribbon and media loading procedure
- Superior print positioning accuracy
- Touch Screen
- Full DHCP and LAN connection

Compact Size

- D322mm x H189mm x W253m

Electrical

- 100 to 240 V | 50/60 Hz | FPC

Operating Conditions

- 5°C to 40°C
- 25 to 85% non-condensing RH

Printing Method

- 300 dpi Thermal Transfer

Printing Speed

- 30, 40, 50, 75, 100 & 125 mm/s (recommended 50 mm/s).

Product Properties

- Print width max: 105.7mm
- Label width 4mm to 105.7mm
- Label height: 5mm to 1,000mm

Approvals & Declarations

- CE, FCC Class A, CB, CCC, UL, GOST

Interfaces

- USB 2.0 (full speed)
- LAN 10/100 Base (Ethernet)



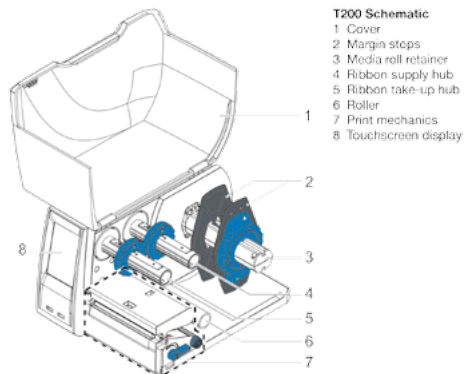
Ordering Information

Standard printer	T200-IDENT-PRINTER
... with Wintotal	T200-IDENT-SWARE-PRINTER

Spare Parts and Accessories

Print head	T200-PRINTHEAD
Drive roller	T200-DR4-DRIVEROLLER
Cutter	T200-CUTTER
Perforator	T200-PERFORATOR
Universal Payoff	UNIVERSAL-PAYOFF

For additional information please give us a call



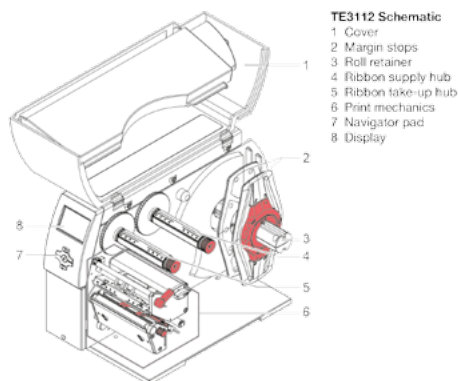
TE3112-PRINTER

Thermal Transfer Printer

**Ordering Information**Standard printer **TE3112-PRINTER****Spare Parts and Accessories**

Print head	TTC-PRINthead-300
Drive roller	TTC-ROLLER
Media Sensor	TTC-3000-MEDIA SENSOR
Cutter	TTC-CUTTER
Perforator	TTC-PERFORATOR
Metal Cover	TE3112-METAL-COVER
Universal Payoff	UNIVERSAL-PAYOFF

For additional information please give us a call

**TE3112 Schematic**

- 1 Cover
- 2 Margin stops
- 3 Roll retainer
- 4 Ribbon supply hub
- 5 Ribbon take-up hub
- 6 Print mechanics
- 7 Navigator pad
- 8 Display

The TE3112 printer is a high performance mid-range identification printer for marking Heat-shrinkable Marker Sleeves, Cable Marker Tags and labels. With a 300 dpi print head, it's capable of marking a broad range of products for use in commercial and industrial environments.

Features & Benefits

- High accuracy printing
- Light-weight at 9kg
- Automatic calibration
- Centre justification of the print media
- Easy to fit accessories
- Prints onto small 2.4mm marker sleeves

Dimensions

- D446mm x H274mm x W242mm

Electrical

- 100 to 240 V | 50/60 Hz
- 250W max, 45W Typical, 9W Power save

Operating Conditions

- 5°C to 40°C
- 10 to 85% non-condensing RH

Printing Method

- 300 dpi Thermal Transfer

Printing Speed

- 30, 40, 50, 75, 100 & 125 mm/s (recommended 50 mm/s).

Product Properties

- Print width max: 105.6mm
- Label width 4mm to 105.6mm
- Label height: 5mm to 4,000mm

Approvals & Declarations

- CE, FCC Class A, CB, CCC, UL, GOST

Interfaces

- USB 2.0 High (full speed)
- LAN 10/100 Base (Ethernet)
- Serial RS 232 C 1.200 up to 230.400 Baud/8 Bit

RIBBONS

Thermal Transfer Printer Ribbons
Product Cross Ref.



It is essential that the combination of printers, products and ribbons are correct, to ensure the best print quality and mark permanence. Each combination has been evaluated for print quality and tested for mark permanence. The table below illustrates the standard ribbons available for the two printers T200 and TE3112.

Compatible Products	Standard Ribbon
Cable Identification Markers	
CM-SCE-TP	1966-RIBBON
D-SCE	1966 RIBBON or TMS-RJS-RIBBON-4DSCE
HLX125	1966-RIBBON
HT-SCE	TMS-RJS-RIBBON-4HT or T300-RIBBON-WH-4HT
HT-SCE (Black)	T300-RIBBON-WH-4HT or TMS-RJS-RIBBON-4HT
HX-SCE	1966-RIBBON
RPS	TMS-RJS-RIBBON-4RPSCE
TMS-SCE	TMS-RJS-RIBBON-4RPSCE
TMS-SCE (Black)	T300-RIBBON-WH (White) or TMS-RJS-RIBBON-4AG (Silver)
TMS-90-SCE	1966-RIBBON
UV-SCE	T300-UV-SCE-RIBBON
ZHD-SCE	1966-RIBBON
Labels	
SBPlus	TMS-RJS-RIBBON-4RPSCE
TTP	1330-0607-10
MP	1330-0607-10
WP	1330-0607-10
MV	1330-0607-10
PVF	1330-3300-10

1966-RIBBON

Ultra-high performance black thermal transfer ribbon that produces the ultimate in print performance.

Ink type: Resin

FEATURES AND BENEFITS

- Ideal for use in environments where marker may come into contact with abrasion, solvent or chemical attack

TMS RJS-RIBBON-4DSCE

High performance black thermal transfer ribbon, for use on D-SCE heat shrinkable sleeves.

Ink type: Wax

FEATURES AND BENEFITS

- TMS RJS-RIBBON-4DSCE printed legends have high resistance to fluids, especially diesel.

TMS RJS-RIBBON-4RPSCE

High durability commercial grade black thermal transfer ribbon, for use with TMS-SCE and RPS heat shrinkable sleeves and SBPlus labels.

Ink type: Wax/Resin

FEATURES AND BENEFITS

- TMS RJS-RIBBON-4RPSCE printed legends have high resistance to abrasion, solvents and chemicals

TMS RJS-RIBBON-4HT

High temperature black thermal transfer ribbon, for use with HT-SCE heat shrinkable sleeves.

Ink type: Resin

FEATURES AND BENEFITS

- TMS RJS-RIBBON-4HT printed legends have excellent resistance to high temperatures.

T300-RIBBON-WH-4HT

A white resin based thermal transfer ribbon, for use on HT-SCE product range.

Ink type: Resin

FEATURES AND BENEFITS

- T300-RIBBON-WH-4HT printed legends have high resistance to abrasion, solvents and chemicals.

1330-0607-10

High durability black resin thermal transfer printable ribbon, ideal for use on pressure sensitive labels.

Ink type: Resin

FEATURES AND BENEFITS

- Excellent resistance to abrasion and chemicals.

1330-3300-10

High durability black resin thermal transfer printable ribbon, ideal for use on pressure sensitive labels.

Ink type: Resin

FEATURES AND BENEFITS

- Excellent resistance to chemicals.

T300-UV-SCE-RIBBON

High performance resin based thermal transfer ribbon, for use on UV-SCE product range.

Ink type: Resin

FEATURES AND BENEFITS

- T300-UV-SCE-RIBBON printed legends have high resistance to abrasion, solvents and chemicals.
- T300-UV-SCE-RIBBON has excellent UV resistance properties.

Wire and Cable Markers

Additional Ident' Products

Printer Universal Payoff and
Push-On Markers

EC9926-000 Universal Payoff

The Universal Payoff is a free standing bench top, or wall mounted stand. Designed to dispense all TE Connectivity identification marker sleeves, cable markers and labels.

Key Features and Benefits

- Free standing bench top.
- Wall mountable for space saving.
- Robust, all metal stand.
- Maximum outside roll diameter 400mm
- Size 300 (D) x 232 (H) x 200 (W) mm
- Weight 2.23kg.

TE Part Number: **EC9926-000**



Pre-Printed Push-On Markers

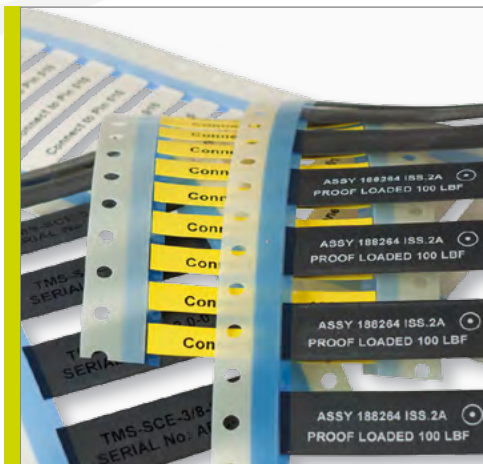
A range of cold applied push-on markers are also available for wire and cable marking, including...

- KTMS-501 heat shrinkable bandolier
- Z-Type Marker
- K-Type Marker
- STD-Type Marker

Please contact us for additional information.



Additional Ident Products

Pre-Print Service
Customised Solutions

We have a full electronic capability, to receive and manipulate customer files for printing. Printing capabilities include logos, barcodes, images and a full range of text fonts.

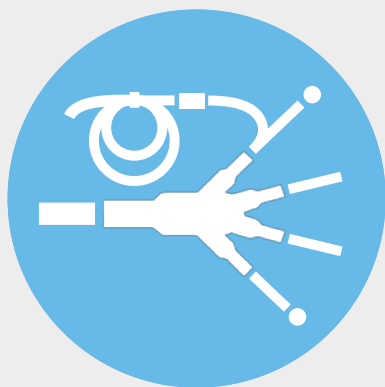
Working closer with our customers providing practical design solutions, full technical support, site visits, system demonstrations and after sales support. Our in-house design and printing capabilities include a full range of text fonts, sequential numbering, logos, barcode, images and personalised graphics.

Heat Shrinkable Sleeves**Metal Photo Labels****Tie-on Cable Markers****Custom Self-adhesive Labels****Pre-printed Markers****Engraved Materials****Complete Sets and Kits****Barcodes and Logos**

Custom designed solutions is an area of particular interest to our customers for their bespoke identification needs. Where awkward shapes or harsh environments require a particular specialist solution, such as;

- Ruggedised label applied to contoured surface that needs to withstand mechanical abrasion, environmental weathering, plus chemical solvent abuse.
- Metalised permanent adhesive labels for evidence of tampering.
- Control switch panel foil for external application, to withstand UV.
- Etched identification diagrams available on various substrates for use where long term harsh environments require a permanently legible solution is required.

For further information on the Pre-print service capabilities available or to discuss your specific labelling requirements, please contact us.



Wire and Cable

Heat-shrink Tubing

Non-shrink Tubing

Braided Sleeving

Screening Braids

Moulded Parts

Terminals and Splices

Wire and Cable Markers

Accessories

Connectors

Backshells

Bonding Leads

Metal Braids

Relays and Contactors

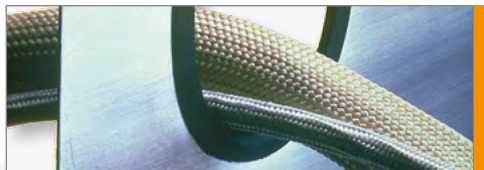
Switches and Grips

Adhesives and Tapes

Application Equipment

Added Value Services

INTRODUCTION



Everything to Manage, Bundle and Route your Wiring

We offer a vast range of cable management accessories, from a select range of manufacturers. Products include: Cable Glands and Feedthroughs, to Cable Ties and Clips, Lacing Tapes and Cords.

With access to a considerable portfolio of cable management products, a solution can be sourced and matched to your specific requirements.

- **Comprehensive solutions**
- **World class quality and reliability**
- **Innovative products and tools**
- **Unmatched Technical support**

Cable Ties

A wide range of cable tie products are available from Nylon to Stainless Steel, used extensively across a broad range of industries and environments to secure and aesthetically enhance wire and cable systems.

Protective Binding and Edging

For managing wire and cable runs through bulkheads utilising high performance materials for demanding applications and environments.

Lacing Tapes and Cords

Lacing tapes and cords are commonly used to secure cable bundles, typically in the Aerospace industry. Available in a wide range of specifications, colours and sizes to meet specific customer requirements.

Specialist Interest

The range of products portrayed on the following pages represents just the most common types that we supply, for more specialist or alternative solutions please contact us.

Plastic Cable Ties	Material Characteristics and Selection Chart	page 320	1
PLT Series	Pan-Ty® Standard profile	page 322	
BT Series	Dome-Top® Low profile, metal barb	page 324	2
CBR Series	Contour-Ty® Parallel entry, outside teeth	page 326	
MS3367	MIL Specification cross reference	page 328	3
Cable Tie Variations		page 330	
Cable Tie Mounts		page 331	4
Harnessing Board Accessories		page 332	
Approvals		page 333	5
Metal Cable Ties			
MLT Series	Pan-Ty® Standard profile	page 334	6
MLTFC and MLTC Series	Dome-Top® Low profile, metal barb	page 336	
AS23190	MIL Specification Cross reference	page 337	7
Protective Binding and Edging			
Spring-Fast® M2529/2	High performance edge protection	page 338	8
GEPR	Silicone rubber edging	page 339	
RAYRIM® and TPEM	Performance heat shrinkable edge protection	page 340	9
GTB	PTFE spiral binding	page 341	
Lacing Tape, Cords and Yarns	Overview and General Information	page 342	10
	Specifying information	page 344	
CID-A-A-52080 to 52084	Braided Lacing Tape	page 345	11
MIL-T-713	Nylon twisted cord	page 346	
MIL-C-572	Nomex® Overbraiding yarn	page 347	12

Cable Tie Selection

Material and Colour Criteria
Selection Table

Characteristic	Test Method	Standard Cable Tie Nylon 6.6	Weather Resistant Nylon 6.6 MIL spec	Heat Stabilised Nylon 6.6	Flame Retardant Nylon 6.6	Weather Resistant Nylon 12
Part No. Suffix	-	-	00	30	60	120
Standard Colour	-	Natural*	Black	Black	Black/Ivory	Black
Mechanical Properties						
Tensile Yield @ 23°C (psi)	ISO 527	12,000	12,000	12,000	11,000	6,700
Water Absorption (24hrs)	ASTM D570	1.2%	1.2%	1.2%	1.1%	0.3%
Radiation Resist' (Rads)	-	1 x 10 ⁵	1 x 10 ⁵	1 x 10 ⁵	1 x 10 ⁵	3.5 x 10 ⁶
Weathering (Years)	-	1 - 2	7 - 9	4 - 5	1 - 2	12 - 15
Impact Resistance	-	Good	Good	Good	Low	Good
Chemical Resistance						
Salts Resistance	-	Low	Good	Low	Low	High
Hydrocarbons Resistance	-	Excellent	Excellent	Excellent	Excellent	Excellent
Acids Resistance	-	Low	Low	Low	Low	Low
Thermal Properties						
Max. Continuous Temp.	UL 746B	85°C	85°C	115°C	100°C	90°C
Min. Continuous Temp.	EN 50146	-60°C	-60°C	-60°C	-40°C	-60°C
Flammability Rating	UL 94	V-2	HB	V-2	V-0	HB
Low Smoke	ASTM E662	Pass	Pass	Pass	Pass	-
Oxygen Index	BS ISO 4589	28	-	28	34	-
Halogen Free	IEC 60754-2	Yes	Yes	Yes	Yes	Yes
Burning Fume Toxicity	BSS-7239	Pass	Pass	Pass	Pass	-
Material Availability by Product Family						
Pan-Ty® Cable Ties	PLT	•	•	•	•	•
Dome-Top® Barb Ty	BT	•	•	•	Ivory only	
Contour-Ty® Cable Ties	CBR	•	•	•	Ivory only	

* Available in other colour choices, including Green, Red, Yellow and Blue.



PLT Series
Low threading force
and multiple locking
tooth design providing
strength and reliability

BT Series
Dome top design with
stainless steel locking barb



Cable Ties Selection

Material and Colour Criteria
Selection Table

Polypropylene	Weather Resistant Polypropylene	TEFZEL®	HALAR®	PEEK	Metal Detectable Nylon 6.6	Metal Detectable Polypropylene
109	100	76	702Y	71	86	186
Green	Black	Aqua Blue	Maroon	Brown	Lt Blue	Blue
4,100	4,100	7,500	7,000	15,200	-	-
0.1%	0.1%	<0.03%	<0.05%	0.5%	1.2%	0.1%
1 x 10 ⁶	1 x 10 ⁶	2 x 10 ⁸	2 x 10 ⁸	1 x 10 ⁹	-	1 x 10 ⁶
1	7 - 9	>15	>15	-	-	1
High	High	Excellent	Excellent	Excellent	Good	High
Excellent	Excellent	Excellent	Excellent	Excellent	Low	Excellent
Good	Good	Excellent	Excellent	Excellent	Excellent	Good
Excellent	Excellent	Excellent	Excellent	Good	Low	Excellent
115°C	115°C	170°C	150°C	260°C	85°C	115°C
-60°C	-60°C	-60°C	-60°C	-60°C	-60°C	-60°C
HB	HB	V-0	V-0	V-0	HB	HB
-	-	-	-	Pass	-	-
-	-	30	52	35	-	-
Yes	Yes	No	No	Yes	Yes	Yes
-	-	-	-	-	-	-
•	•	•	•	•	•	•

CBR Series

Unique low profile head design avoids snags and reduces overall bundle size. Outside serrations and smooth round edges



protect cable bundle, making them ideal for high vibration applications

Please note that TEFZEL is a registered trademark of E.I. du Pont de Nemours and Company. HALAR is a registered trademark of Ausimont USA, Inc.

PLT Series

Pan-Ty® Locking Nylon Cable Ties
Nylon Locking Barb

These cable ties can be used in countless applications wherever you need to bundle wire, cable, or hoses. Available in standard (Natural) and weather resistant (Black) Nylon, with other colours and materials available to special order. Low threading force and multiple locking tooth design providing strength and reliability.

Conforms to testing requirements of Aerospace standard SAE-A23190A and the dimensional requirements of Aerospace standard SAE-AS33671, see listing later in this section.

EN45545-2 approved material denoted by # see table 2 on opposite page.

LFH
Low Fire
Hazard

HALOGEN
FREE

RoHS
compliant



1. Sizing Selection

Part Number	Length mm	Width mm	Thick mm	Max Bundle Ø	Min. Tensile
Sub-Miniature Cross Section Ties					
PLT.6SM-C-Colour	71	1.8	0.8	15mm	36N
Miniature Cross Section Ties					
PLT.7M-C-Colour	79	2.3	0.8	17mm	80N
PLT1M-C-Colour	99	2.5	1.1	22mm	80N
PLT1.5M-C-Colour	142	2.5	1.1	32mm	80N
PLT2M-C-Colour	203	2.5	1.1	51mm	80N
Intermediate Cross Section Ties					
PLT1.5I-C-Colour	142	3.6	1.1	35mm	178N
PLT2I-C-Colour	203	3.6	1.1	51mm	178N
PLT2.5I-C-Colour	246	3.7	1.3	64mm	178N
PLT3I-C-Colour	290	3.7	1.3	76mm	178N
PLT4I-C-Colour	368	3.7	1.3	102mm	178N
Standard Cross Section Ties					
PLT1S-C-Colour	122	4.8	1.3	25mm	222N
PLT1.5S-C-Colour	157	4.8	1.3	38mm	222N
PLT2S-C-Colour	188	4.8	1.3	48mm	222N
PLT2.5S-C-Colour	249	4.8	1.3	64mm	222N
PLT3S-C-Colour	292	4.8	1.3	76mm	222N
PLT4S-C-Colour	368	4.8	1.3	102mm	222N
PLT4.5S-C-Colour	394	4.8	1.3	114mm	222N
PLT5S-C-Colour	445	4.8	1.3	127mm	222N

For applicable hand held application tooling please refer to that section of the catalogue.

Features & Benefits

- One piece construction for consistent performance and reliability.
- Lowest threading force of any one-piece cable tie.
- Curved tip is easy to pick up from flat surfaces and allows faster initial threading to speed installation
- A variety of materials and colours are available for specific applications.
- UL Listed for use in plenum or air handling spaces per NEC (National Electrical Code) specification.

2. Colour / Material Selection

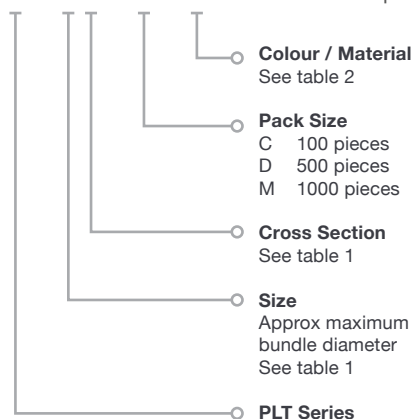
Suffix	Colour	Nylon 6.6
-#	Natural	
0#	Black	Weather resistant
00#	Black	Weather resistant Mil Spec
1#	Brown	
2#	Red	
3#	Orange	
4Y#	Yellow	
5#	Green	
6#	Blue	
7#	Purple	
8#	Grey	
10#	White	
14#	Grey	
20#	Black	
Suffix	Colour	Material
30#	Black	Heat stabilised Nylon 6.6
300#	Black	Heat stabilised, weather Nylon 6.6
60	Black	Flame retardant Nylon 6.6
69#	Ivory	Flame retardant Nylon 6.6
120	Black	Weather resistant Nylon 12
109	Green	Polypropylene
100	Black	Weather resistant Polypropylene
76	Aqua Blue	TEFZEL
702Y	Maroon	HALAR
71	Brown	PEEK

Part Number System

PLT Series cable ties benefit from being available in all colours and materials as identified on the previous page and listed in table 2 on this page.

To construct your part number please refer to the illustration below

PLT 1.5M - C - 00 Part No. example

**Supplementary Products**

Additional products also available in this range:

PRT	Releasable tie
PLC	Clamp tie
PLF	Flag tie
PLM	Marker tie
PLP	Push Mount tie
PLWP	Wing Push Mount tie
PRLWP	Releasable Ladder Wing Push Mount
PRWP	Releasable Wing Push Mount
PLUP	Umbrella Push Mount

Accessories

BT Series

Dome-Top® Barb-Ty Nylon Cable Ties
Steel Locking Barb

Non-serated cable tie with stainless steel barb for high performance applications where a semi-smooth cable tie binding surface is desired. Features a two piece design incl' a stainless steel locking barb (AISI 316 grade) in a nylon cable tie. Offering a high loop tensile strength that exceeds industry standards.

Conforms to testing requirements of Aerospace standard SAE-A23190A and the dimensional requirements of Aerospace standard SAE-AS33671, see listing later in this section.

EN45545-2 approved for all materials shown in table on the opposite page.



1. Sizing Selection

Part Number	Length mm	Width mm	Thick mm	Max Bundle Ø	Min Tensile
Miniature Cross Section Ties					
BT1M-C-Colour	102	2.4	0.9	23	80N
BT1.5M-C-Colour	160	2.4	1.2	38	80N
BT2M-C-Colour	201	2.4	1.2	51	80N
BT4M-C-Colour	361	2.4	1.2	105	80N
Intermediate Cross Section Ties					
BT1.5I-C-Colour	155	3.6	1.0	38	178N
BT2I-C-Colour	203	3.6	1.0	51	178N
BT3I-C-Colour	287	3.6	1.2	76	178N
BT4I-C-Colour	363	3.6	1.2	102	178N
Standard Cross Section Ties					
BT2S-C-Colour	203	4.7	1.1	51	222N
BT3S-C-Colour	305	4.7	1.3	76	222N
BT4S-C-Colour	384	4.7	1.3	102	222N
Light-Heavy Cross Section (straight tip) Ties					
BT2LH-L-Colour	221	7.0	1.7	51	534N
BT3LH-L-Colour	300	7.0	1.7	76	534N
BT4LH-L-Colour	378	7.0	1.7	102	534N
BT5LH-L-Colour	460	7.0	1.7	127	534N
BT6LH-L-Colour	538	7.0	1.7	152	534N
BT7LH-L-Colour	620	7.0	1.7	178	534N
BT8LH-L-Colour	699	7.0	1.7	203	534N
BT9LH-L-Colour	780	7.0	1.7	229	534N

For applicable hand held application tooling please refer to that section of the catalogue.

Features & Benefits

- Dome-Top head features unique patented design with round, smooth edges.
- Stainless steel locking barb, provides consistent performance, reliability and infinite adjustability
- Ribbed and stippled strap body helps prevent lateral movement on the bundle.
- Curved tip threads easily and installs faster. Finger grip ensures positive grip during threading of the tie.
- UL Listed for use in plenum or air handling spaces per NEC.

2. Colour / Material Selection

Suffix	Colour	Nylon 6.6
-	Natural	
0	Black	Weather resistant
00	Black	Weather resistant Mil Spec
1	Brown	
2	Red	
3	Orange	
4Y	Yellow	
5	Green	
6	Blue	
7	Purple	
8	Grey	
10	White	
14	Grey	
20	Black	
Suffix	Colour	Material
30	Black	Heat stabilised Nylon 6.6
300	Black	Heat stabilised, weather Nylon 6.6
69	Ivory	Flame retardant Nylon 6.6

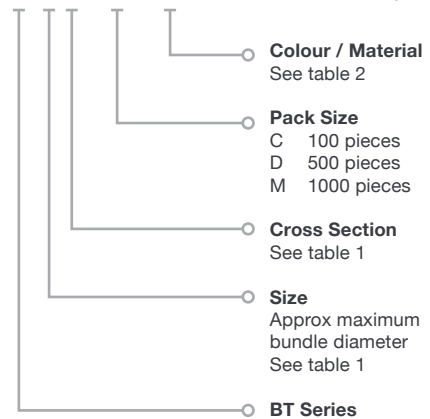
Part Number System

The BT Series of cable ties benefit from being available in numerous colours and materials as identified on earlier in this section and listed in table 2 on this page.

To construct your part number please refer to the illustration below

BT 3 S - C - 00

Part No. example

**Supplementary Products**

Additional products also available in this range:

BC	Clamp tie
BF	Flag tie
BM	Marker tie
BP	Push Mount tie
BW	Wing Push Mount tie
DT	Locking Tie

Accessories

CBR Series

Contour-Ty® Nylon Cable Ties
Parallel-Entry

A superior bundling solution for a wide variety of applications. The low profile head and the parallel-entry design along with outside teeth on tie body make it the ideal tie for use in high vibration applications. The product range includes a variety of materials, as well as several sizes and colours to accommodate a range of applications.

Meets testing requirements of Aerospace Standard SAE-AS23190A and dimensional requirements of SAE-AS33671.

EN45545-2 approved for all materials shown in table on the opposite page.



1. Sizing Selection

Part Number	Length mm	Width mm	Thick mm	Max Bundle Ø	Min Tensile
Miniature Cross Section Ties					
CBR1M-M-XX	104	2.5	1.0	25	80N
CBR1.5M-M-XX	142	2.5	1.1	38	80N
CBR2M-M-XX	183	2.5	1.1	51	80N
Intermediate Cross Section Ties					
CBR1.5I-M-XX	150	3.6	1.0	38	178N
CBR3I-M-XX	264	3.6	1.3	76	178N
CBR4I-M-XX	345	3.6	1.3	102	178N
Standard Cross Section Ties					
CBR2S-C-XX	193	4.8	1.1	51	222N
CBR3S-C-XX	274	4.8	1.3	76	222N
CBR4S-C-XX	356	4.8	1.3	102	222N
Heavy-Standard Cross Section					
CBR2HS-D	203	6.4	1.4	51	378N
Light-Heavy Cross Section (straight tip) Ties					
CBR4LH-TL-XX	371	7.6	1.8	102	534N
CBR6LH-C-XX	531	7.6	1.8	152	534N

For applicable hand held application tooling please refer to that section of the catalogue.

Features & Benefits

- Low profile head, reduces overall bundle size and avoids possible snags.
- Outside teeth, for cable protection, ideal for high vibration applications.
- Parallel entry design, results in lower profile on cable bundles, reduces size of cable tie head.
- Curved tip threads easily and installs faster. Finger grip ensures positive grip during threading of the tie.
- UL Listed for use in plenum or air handling spaces per NEC.

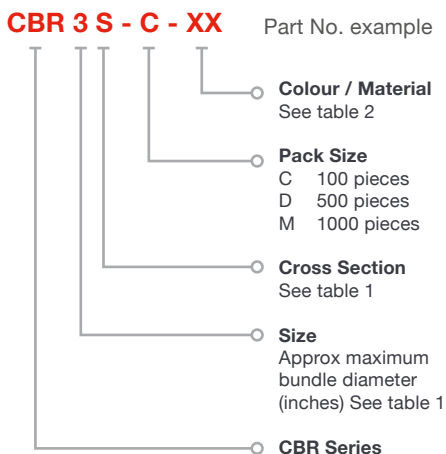
2. Colour / Material Selection

Suffix	Colour	Nylon 6.6
-	Natural	
0	Black	Weather resistant
00	Black	Weather resistant Mil Spec
1	Brown	
2	Red	
3	Orange	
4Y	Yellow	
5	Green	
6	Blue	
7	Purple	
8	Grey	
10	White	
Suffix	Colour	Material
30	Black	Heat stabilised Nylon 6.6
300	Black	Heat stabilised, weather Nylon 6.6
69	Ivory	Flame retardant Nylon 6.6

Part Number System

The CBR Series of cable ties benefit from being available in numerous colours and materials as identified on earlier in this section and listed in table 2 on this page.

To construct your part number please refer to the illustration below



MS3367 Spec Cross Reference
for PLT, BT and CBR Series Nylon Cable Ties
Cross Reference Guide

	MIL Ref	Colour	PLT Series	BT Series	CBR Series
1	MS3367-1-0	Black*	PLT2S-C00, -M00	-	-
2	MS3367-1-1	Brown	PLT2S-C1, -M1	BT2S-M1	-
	MS3367-1-2	Red	PLT2S-C2, -M2	BT2S-M2	-
	MS3367-1-3	Orange	PLT2S-C3, -M3	BT2S-M3	-
3	MS3367-1-4	Yellow	PLT2S-C4, -M4	BT2S-M4	-
	MS3367-1-5	Green	PLT2S-C5, -M5	BT2S-M5	-
	MS3367-1-6	Blue	PLT2S-C6, -M6	BT2S-M6	-
4	MS3367-1-7	Purple	PLT2S-C7, -M7	BT2S-M7	-
	MS3367-1-8	Grey	PLT2S-C8, -M8	BT2S-M8	-
	MS3367-1-9	Natural	PLT2S-C, -M, -VMR	BT2S-C, -M	-
5	MS3367-2-0	Black*	PLT4S-C00	-	-
	MS3367-2-1	Brown	PLT4S-M1	-	-
6	MS3367-2-2	Red	PLT4S-C2, -M2	BT4S-M2	-
	MS3367-2-3	Orange	PLT4S-C3, -M3	BT4S-M3	-
	MS3367-2-4	Yellow	PLT4S-C4Y, -M4Y	BT4S-M4Y	-
7	MS3367-2-5	Green	PLT4S-C5, -M5	BT4S-M5	-
	MS3367-2-6	Blue	PLT4S-C6, -M6	BT4S-M6	-
	MS3367-2-7	Purple	PLT4S-C7, -M7	BT4S-M7	-
8	MS3367-2-8	Grey	PLT4S-C8, -M8	BT4S-M8	-
	MS3367-2-9	Natural	PLT4S-C, -M	BT4S-C, -M	-
9	MS3367-3-0	Black*	PLT4H-L00, -TL00	-	-
	MS3367-3-1	Brown	PLT4H-TL1	-	-
	MS3367-3-2	Red	PLT4H-TL2	-	-
10	MS3367-3-3	Orange	PLT4H-TL3	-	-
	MS3367-3-4	Yellow	PLT4H-TL4	-	-
	MS3367-3-5	Green	PLT4H-TL5	-	-
11	MS3367-3-6	Blue	PLT4H-TL6	-	-
	MS3367-3-9	Natural	PLT4H-L, -C -TL	BT4LH-L, -TL	-
	MS3367-4-0	Black*	PLT1M-C00, M00, XMR00	-	-
12	MS3367-4-0	Black*	PLT1.5M-XMR00	-	-
	MS3367-4-1	Brown	PLT1M-C1, M1, -XMR1	BT1M-M1	-
	MS3367-4-2	Red	PLT1M-C2, M2, -XMR2	BT1M-M2	-
13	MS3367-4-3	Orange	PLT1M-C3, -M3, -XMR3	BT1M-M3	-
	MS3367-4-4	Yellow	PLT1M-C4Y, -M4Y, -XMR4Y	BT1M-M4Y	-
14	MS3367-4-5	Green	PLT1M-C5, -M5, -XMR5	BT1M-M5	-
	MS3367-4-6	Blue	PLT1M-C6, -M6, -XMR6	BT1M-M6	-
	MS3367-4-7	Purple	PLT1M-C7, -M7, -XMR7	BT1M-M7	-
15	MS3367-4-8	Grey	PLT1M-C8, -M8, -XMR8	BT1M-M8	-
	MS3367-4-9	Natural	PLT1M-C, -M, -XMR	BT1M-C, -M, -XMR	-
	MS3367-4-9	Natural	PLT7M-C, -M	-	-
16	MS3367-4-9	Natural	PLT1.5M-XMR	BT1.5M-XMR	-
	MS3367-5-0	Black*	PLT1.5I-M00	-	-
17	MS3367-5-1	Brown	PLT1.5I-C1, -M1	BT1.5I-M1	-
	MS3367-5-2	Red	PLT1.5I-C2, -M2	BT1.5I-M2	-
	MS3367-5-3	Orange	PLT1.5I-C3, -M3	BT1.5I-M3	-
18	MS3367-5-4	Yellow	PLT1.5I-C4Y, -M4Y	BT1.5I-M4Y	-
	MS3367-5-5	Green	PLT1.5I-C5, -M5	BT1.5I-M5	-

MS3367 Spec Cross Reference

for PLT, BT and CBR Series Nylon Cable Ties
Cross Reference Guide

MIL Ref	Colour	PLT Series	BT Series	CBR Series
MS3367-5-6	Blue	PLT1.5I-C6, -M6	BT1.5I-M6	-
MS3367-5-7	Purple	PLT1.5I-C7, -M7	BT1.5I-M7	-
MS3367-5-8	Grey	PLT1.5I-C8, -M8	BT1.5I-M8	-
MS3367-5-9	Natural	PLT1.5-C, -M	BT1.5-C, -M	-
MS3367-6-9	Natural	PLT8LH-L, -C	BT8LH-L, -C	-
MS3367-6-9	Natural	-	BT9LH-L, -C	-
MS3367-7-0	Black*	PLT1.5I-M00	-	-
MS3367-7-1	Brown	PLT3S-M1	-	-
MS3367-7-2	Red	PLT3S-C2, M2	BT3S-C2	-
MS3367-7-3	Orange	PLT3S-M3	-	-
MS3367-7-4	Yellow	PLT3S-M4Y	-	-
MS3367-7-5	Green	PLT3S-M5	-	-
MS3367-7-6	Blue	PLT3S-M6	-	-
MS3367-7-7	Purple	PLT3S-M7	-	-
MS3367-7-8	Grey	PLT3S-M8	-	-
MS3367-7-9	Natural	PLT3S-C, -M	BT3S-C, -M	-
MS3367-8-9	Natural	PLT5H-L, -C	-	-
MS3367-9-9	Natural	PLT6H-L, -C	-	-
MS3367-11-9	Natural	PLT8H-L, -C	-	-
MS3367-30-9	Natural	-	-	CBR1M-M
MS3367-31-9	Natural	-	-	CBR1.5M-M
MS3367-32-1	Brown	-	-	CBR2M-M1
MS3367-32-2	Red	-	-	CBR2M-M2
MS3367-32-3	Orange	-	-	CBR2M-M3
MS3367-32-4	Yellow	-	-	CBR2M-M4Y
MS3367-32-5	Green	-	-	CBR2M-M5
MS3367-32-6	Blue	-	-	CBR2M-M6
MS3367-32-7	Purple	-	-	CBR2M-M7
MS3367-32-9	Natural	-	-	CBR2M-M
MS3367-33-9	Natural	-	-	CBR1.5I-M
MS3367-34-1	Brown	-	-	CBR3I-M1
MS3367-34-2	Red	-	-	CBR3I-M2
MS3367-34-3	Orange	-	-	CBR3I-M3
MS3367-34-4	Yellow	-	-	CBR3I-M4Y
MS3367-34-5	Green	-	-	CBR3I-M5
MS3367-34-6	Blue	-	-	CBR3I-M6
MS3367-34-7	Purple	-	-	CBR3I-M7
MS3367-34-8	Grey	-	-	CBR3I-M8
MS3367-34-9	Natural	-	-	CBR3I-M
MS3367-35-9	Natural	-	-	CBR4I-M
MS3367-36-9	Natural	-	-	CBR2S-M
MS3367-37-9	Natural	-	-	CBR3S-M
MS3367-38-9	Natural	-	-	CBR4S-M
MS3367-39-9	Natural	-	-	CBR2HS-D
MS3367-40-9	Natural	-	-	CBR4LH-TL
MS3367-41-9	Natural	-	-	CBR6LH-C

* Denotes weather resistant to ASTM D 4066-94B

Accessories

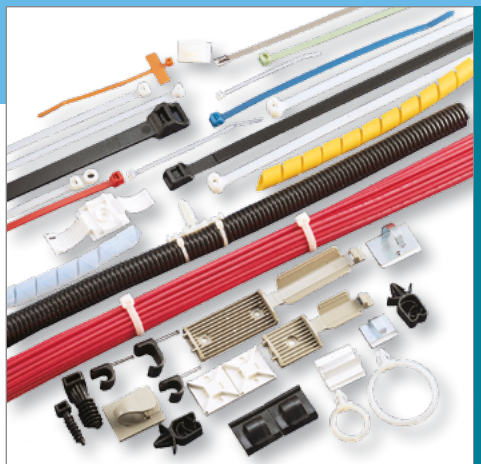
Cable Tie Design Variations

Complementary Product Options
Product Overview

Our range of Nylon cable ties are approved to various application standards, illustrating the quality and commitment to supply a quality product that is fit for purpose in the markets that we serve:

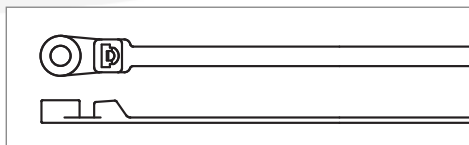
- UL Listed, E56854 and MH29590
- CE EN 50146
- Det Norske Veritas E-6405
- VG 95 387 - 100MS 3367F
- MIL QPL-AS23190-2

For full details please contact us.



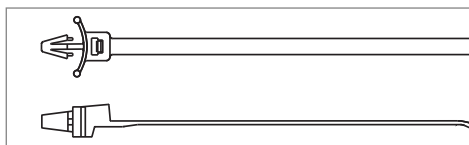
Clamp Ties

Allows for bundling before or after screwing clamp in place. Used to secure a cable bundle to another surface such as a control panel, communication rack, wall or ceiling.



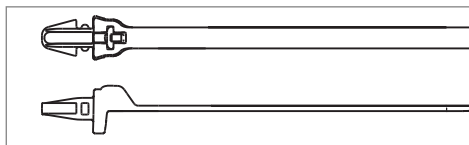
Wing Push Mount Ties

Attached bundles to flat panels, with the wings providing constant tension for a stable, secure and rattle free installation. Single piece moulding for performance and reliability.



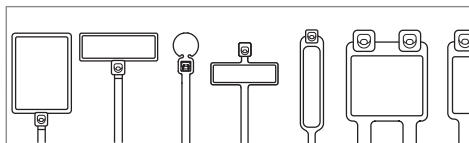
Push Mount Ties

Cable ties, mount and fastener in a single part, used to attach bundles to another surface such as a flat panel. Wingless design allows tie to be used in confined spaces.



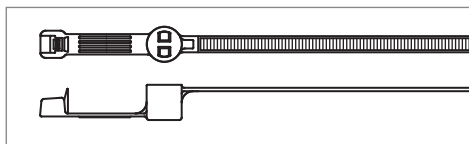
Marker and Flag Ties

Ideal for fastening and identifying bundles at the same time, with a one piece construction for consistent performance and reliability. Various designs available.



Stud Mounted Ties

Integrated mount pushes onto a threaded stud and tie wraps around bundle. Tie can be removed from the stud by turning counterclockwise. Also available as Mid-mount style and Releasable style.

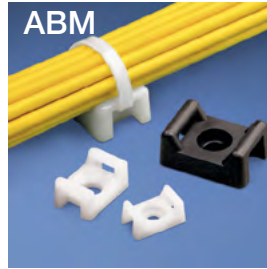


Cable Tie Mounts

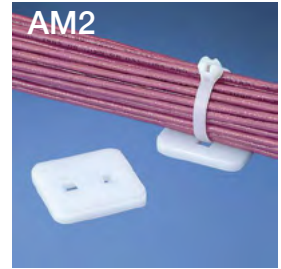
Brief Overview of Selected Accessories



Super Grip Adhesive Back



Screw Applied



Low Profile Hole Mount



Push Barb



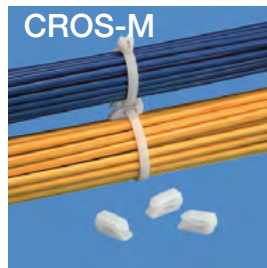
Metal Edge Clip



Swivel Mounts



Stud Applied



Connector Ring Spacers



Vertical Stand-off Post



Harness Push Barb Mount



Combination Mount



Tie Mount Heavy Duty

Harness Board Accessories

Brief Overview of Selected Accessories
Mounts for use Without Cable Ties

1 An extensive range of cable and wire bundling
2 together with harness routing accessories, that
3 we have outlined here as a brief overview of
4 what can be available.

5 Wiring accessories are an integral part of our
6 comprehensive selection of wire management
7 products. We are committed to continually
8 provide innovative, high quality products
9 engineered to speed installation and lower your
10 installed costs.



Wire Bundle Strap



Harness Clip



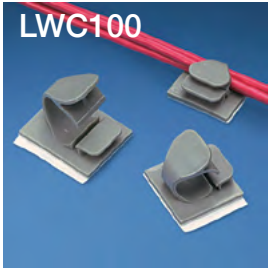
Wire Standoffs



Cable Clamp



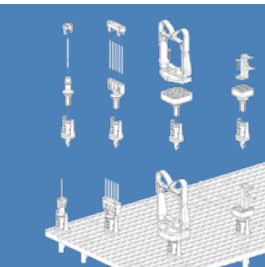
Wire Saddles



Latching Cable Clip



P Clips



Quick-Build™ Harness



Harness Edge Clip



Fibre Networks Saddle

Cable Tie Approvals



Logo (Symbol)	Agency	Spec/Approval	Requirement	Applicable Products
	Underwriters Laboratories, Inc.	File E56854 and MH29590	ZODZ(7), ZODZ(8), ALKW	Most miniature, intermediate, standard, light-heavy and heavy cross section ties are Recognized or Listed in the US and Canada
	Canadian Standards Association	File 031212	C22.2 No. 18.5-02 under the category "Fittings – Positioning Devices"	Most miniature, intermediate, standard, light-heavy and heavy cross section ties are Recognized or Listed in the US and Canada
	Conformity European	Low Voltage Directive 73/23/EEC (amended 93/68/EEC). <i>PAN-TY AND Dome-Top Barb Ty</i> cable ties also meet the requirements from EN50146	CE Marking is required for products sold within the European Union. CE Marking Directives specify the minimum performance of these products. Applying the CE mark signifies compliance with essential requirements of specific directives.	All cable tie products
	ABS (American Bureau of Shipping)	05-HS463235-PDA	2005 Vessel Rules 1-1-4/7.7, 4-8/421.9.3 2001 MODU Rules 4-3-3/5.9.1	PLT Series, BT Series
	Bureau Veritas	Cert 05968/C0 BV1178B/BVN/04 File ACE 14/601/01	Bureau Veritas Rules for the Classification of Steel Ships	PLT Series, BT Series, PRT Series, CBR Series
	Det Norske Veritas	E-6405	Det Norske Veritas' Rules for Classification of Ships and Mobile Offshore Units	PLT Series, PLC Series, PLM Series, PRT Series, PLWP Series, PRWP Series, PRST Series
	Germany (VG) Military	K17/97165	VG 95 387 – 100 MS 3367F	PLT Series, BT Series, SST Series
	Lloyd's Register of Shipping	89/60111 (E3)	Lloyd's Register Type Approval	PLT Series, BT Series, SST Series
	NRC (Nuclear Regulatory Commission)	NRC 10CFR50	Quality Assurance Criteria for Nuclear Plants and Reprocessing Plants	All cable tie products
	Plenum-Rated	Panduit logo	Panduit symbol indicates that the cable ties represented are suitable for use in plenum or air handling spaces in accordance with Sec. 300.22(C) and (D) of the National Electrical Code and Rules 12-010 (3), (4) and (5) and 12-020 of the Canadian Electrical Code, Part I.	Halar (702Y) and select Nylon 6.6 cable ties as noted throughout catalog
	US Military Aerospace Standard	QPL-AS23190-2	SAE spec AS23190	See Military Cross Reference Page B1.95
	AQA International	ISO/TS16949	AQA registration. Quality management system assessment certificate	Tinley Park, Illinois Manufacturing Operations (Cable Tie Division) Quality Management System.

Correct as of February 2017

Accessories

MLT Series

Pan-Steel® Steel Cable Ties
Features and Benefits

Perfect for indoor, outdoor, underground, offshore and RMT applications offering excellent resistance to abrasion, radiation, weathering, corrosion and extreme temperatures. Stainless Steel ties are self-locking for fast cabling and can be installed by hand or with tooling.

Manufactured with fully rounded sides and no sharp edges, making them safe to handle during installation. Strap goes through a secondary process which removes the top and bottom corners of the material.



1. Sizing Selection

Part Number	Length mm	Width mm	Thick mm	Max. Bundle Ø	Min. Tensile
MLT - Standard Cross Section Ties - AISI 304 Stainless Steel					
MLT1S-CP	127	4.6	0.25	25	890N
MLT2S-CP	201	4.6	0.25	51	890N
MLT2.7S-CP	259	4.6	0.25	69	890N
MLT4S-CP	362	4.6	0.25	102	890N
MLT6S-CP	521	4.6	0.25	152	890N
MLT8S-CP	679	4.6	0.25	203	890N
MLT10S-CP	838	4.6	0.25	254	890N
MLT12S-Q	998	4.6	0.25	304	890N
MLT14S-Q	1156	4.6	0.25	355	890N
MLT15S-Q	1250	4.6	0.25	380	890N
MLT - Heavy Cross Section Ties - AISI 304 Stainless Steel					
MLT2H-LP	201	7.9	0.25	51	2000N
MLT2.7H-LP	259	7.9	0.25	69	2000N
MLT4H-LP	362	7.9	0.25	102	2000N
MLT6H-LP	521	7.9	0.25	152	2000N
MLT8H-LP	679	7.9	0.25	203	2000N
MLT10H-LP	838	7.9	0.25	254	2000N
MLT12H-Q	998	7.9	0.25	304	2000N
MLT14H-Q	1156	7.9	0.25	355	2000N

Minimum cable bundle diameter for all sizes is 12.7mm
For applicable hand held application tooling please refer to that section of the catalogue.

Features & Benefits

- Self-locking design can be fastened by hand requiring no fold over or additional installation steps.
- Features fully rounded edges to assure bundle protection and operator safety
- Material options of 304 or 316 grade stainless steel.
- Aggressive locking head provides quicker locking and tighter installation.

2. Colour / Material Selection

Suffix	
-	AISI 304 stainless steel - general purpose
316	AISI 316 stainless steel

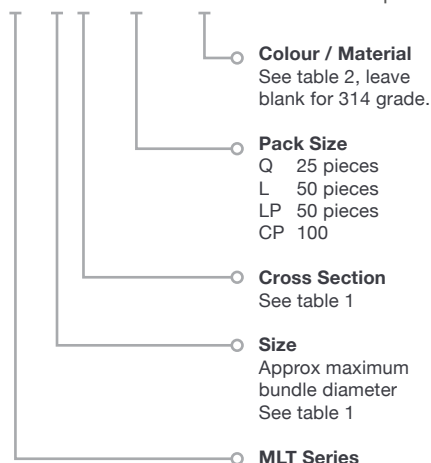
Approvals

- UL Listed E56854
- SAE AS 23190 (formerly MS23109E)
- Det Norske Cert E-6540, E-6539 (AISI 316)
- Lloyds Cert. # 89/60123
- MIL-STD-202
- MIL-STD-167 and MIL-S-901D for Extra heavy and super heavy cross sections.

Part Number System

The MLT Series of cable ties is available in two grades of stainless steel offering resistance for the most corrosive environments.

To construct your part number please refer to the illustration below

MLT 6 S - CP - 316 Part No. example**Additional Variants Available**

- LH. Light Heavy cross section, offering tensile strength up to 1112N.
- EH. Extra Heavy cross section, offering tensile strength up to 3115N.
- SH. Super Heavy cross section, offering tensile strength up to 4005N.

Available in broadly similar sizes as per table opposite. Other lengths are also available to special order.

For enquiries on standard or specials please contact us for further details.

Accessories

MLTFC and MLTC Series

Pan-Steel® Coated Steel Cable Ties

Features and Benefits

MLTFC Polyester Fully Coated.

Polyester coating provides additional edge protection and prevents corrosion between dissimilar metals.

Heavy cross-section is available in six colour options, providing visual indication for easy identification in colour coding applications

MLTC Nylon 11 Selectively Coated

Coating applied to underside and edges, overlapping outside for protective purposes. Black only

LFH
Low Fire
Hazard

HALOGEN
FREE

RoHS
compliant



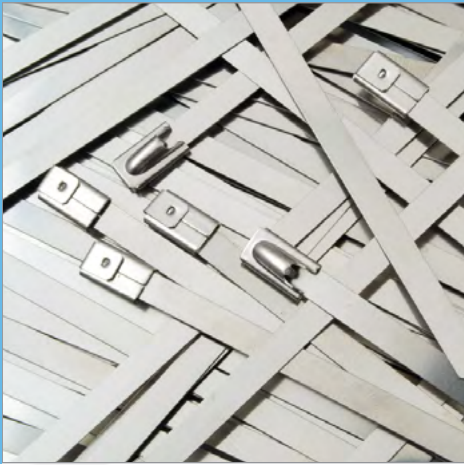
1. Sizing Selection

Part Number	Colour	Length mm	Width mm	Thick [#]	Max. Bundle Ø	Min. Tensile
MLTC - Heavy Cross Section Selectively Coated Ties - AISI 316 Stainless Steel						
MLTC2H-LP316	Black	201	7.9	0.25	51	1112
MLTC4H-LP316	Black	362	7.9	0.25	102	1112
MLTC6H-LP316	Black	521	7.9	0.25	152	1112
MLTFC - Heavy Cross Section Coated Ties - AISI 316 Stainless Steel						
MLTFC2H-LP316RD	Red	201	7.9	0.25	51	1112
MLTFC4H-LP316RD	Red	362	7.9	0.25	102	1112
MLTFC6H-LP316RD	Red	521	7.9	0.25	152	1112
MLTFC2H-LP316YL	Yellow	201	7.9	0.25	51	1112
MLTFC4H-LP316YL	Yellow	362	7.9	0.25	102	1112
MLTFC6H-LP316YL	Yellow	521	7.9	0.25	152	1112
MLTFC2H-LP316GR	Green	201	7.9	0.25	51	1112
MLTFC4H-LP316GR	Green	362	7.9	0.25	102	1112
MLTFC6H-LP316GR	Green	521	7.9	0.25	152	1112
MLTFC2H-LP316BU	Blue	201	7.9	0.25	51	1112
MLTFC4H-LP316BU	Blue	362	7.9	0.25	102	1112
MLTFC6H-LP316BU	Blue	521	7.9	0.25	152	1112
MLTFC2H-LP316WH	White	201	7.9	0.25	51	1112
MLTFC4H-LP316WH	White	362	7.9	0.25	102	1112
MLTFC6H-LP316WH	White	521	7.9	0.25	152	1112
MLTFC2H-LP316	Black	201	7.9	0.25	51	1112
MLTFC4H-LP316	Black	362	7.9	0.25	102	1112
MLTFC6H-LP316	Black	521	7.9	0.25	152	1112
MLTFC8H-LP316	Black	679	7.9	0.25	203	1112

For applicable hand held application tooling please refer to that section of the catalogue.

AS23190 Spec

Cross Reference
for MLT Series Steel Cable Ties



The products listed in the following table meet the various testing requirements of Aerospace Standard SAE-AS23190A (formerly MIL-S-23190E) and the temperature and shock requirements of MIL-STD-202 for details please contact us.

SAE-AS23190A Reference

Mil. Std. Number	MTL Series Pan-Steel®
AS23190/3-1	MLT2S-CP
AS23190/3-1	MLT2S-CP316
AS23190/3-2	MLT4S-CP
AS23190/3-2	MLT4S-CP316
AS23190/3-3	MLT6S-CP
AS23190/3-3	MLT6S-CP316
AS23190/3-4	MLT8S-CP
AS23190/3-4	MLT8S-CP316
AS23190/3-5	MLT2H-LP
AS23190/3-5	MLT2H-LP316
AS23190/3-6	MLT4H-LP
AS23190/3-6	MLT4H-LP316
AS23190/3-7	MLT6H-LP
AS23190/3-7	MLT6H-LP316
AS23190/3-8	MLT8H-LP
AS23190/3-8	MLT8H-LP316
AS23190/3-9	MLT10H-LP
AS23190/3-9	MLT10H-LP316

Accessories

M22529/2
SPRING-FAST®
Protective grommet edging

Spring-Fast® is a composite grommet edging, that provides a fast, safe and effective method of abrasion protection. Currently used throughout the aerospace market.

- No hazardous adhesives and solvents
- Vibration proof
- Abrasion and Chemical resistant
- Long life expectancy

Constructed from a composite of polymer encapsulated stainless steel, further enhanced by an additional polymer cushion. Mechanically locks on to any two axis contour with finger pressure in seconds.

Operating Temperature

- From -40°C to +85°C

Push
fit

RoHS
compliant

Specifications & Approvals

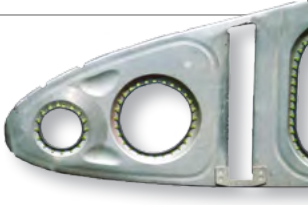
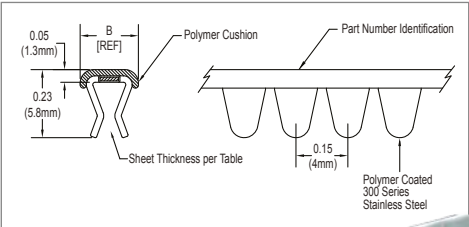
- FAA/CAA Recognised
- UL94 V0 Compliant
- NASM22529 qualified

Sheet Thickness (mm)	Spool Size (feet)	Cushion Width B (mm)	Part Number	
			25 ft Spools	100 ft Spools
0.6 - 0.9	25 or 100	5.1	M22529/2-1R-25	M22529/2-1R-100
0.9 - 1.6	25 or 100	5.1	M22529/2-2R-25	M22529/2-2R-100
1.5 - 1.9	25 or 100	5.1	M22529/2-3R-25	M22529/2-3R-100
1.8 - 2.4	25 or 100	6.1	M22529/2-4R-25	M22529/2-4R-100
2.3 - 2.8	25 or 100	6.1	M22529/2-5R-25	M22529/2-5R-100
2.7 - 3.4	25 or 100	6.1	M22529/2-6R-25	M22529/2-6R-100
4.5 - 5.0	25 or 100	8.1	M22529/2-7R-25	M22529/2-7R-100
6.1 - 6.6	25 or 100	9.7	M22529/2-8R-25	M22529/2-8R-100

Standard Colour: Green, with grey polymer

Properties	Test
Voltage breakdown	1500 Volts @ 60Hz
Flammability	FAR 25.601; FAR 25853 MIL-STD-202F (111A)
Vibration & shock	MIL-STD-1344 Method 2005.1 test condition 6, Letter J, Overall rms G 41.7
Salt spray	2000 Hours (minimum) MIL-STD-202F (101D)

For additional variations of the Spring-Fast® product range, please contact us.



GEPR

Silicone Rubber
Protective edgingPush
fitHALOGEN
FREERoHS
compliant

GEPR protective edging is manufactured from low smoke, low toxicity grade silicone rubber material, making it an ideal product for use in enclosed areas such as marine, defence and rail/mass transit applications.

The tough but very flexible profile is ideally suited to a wide range of applications, offering exceptional reliability in the most demanding of environments. Approved for use on MOD contracts such as Queen Elizabeth class aircraft carriers and Astute class submarines.

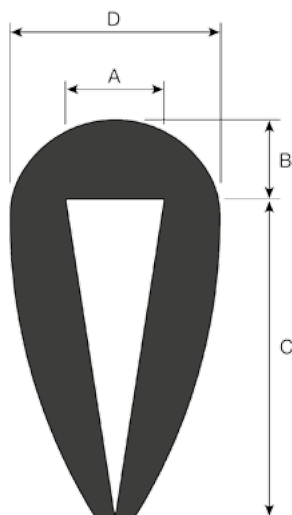
Operating Temperature

- From -40°C to +200°C

Specifications & Approvals

- BS6853 Compliant
- BR1326 Approval

Part Number	Measurements (mm) - nominal				BAE Ref. Number	
	A	B	C	D	ACA	CPC
GEPR-02-25	2.00	3.00	9.00	6.00	-	-
GEPR-03-25	3.00	4.00	13.00	10.66	40073362	15424647
GEPR-05-25	5.00	4.00	16.00	10.66	40073524	15424648
GEPR-10-25	10.00	7.00	24.00	16.00	40073525	-
GEPR-12-25	12.00	10.00	32.00	24.00	40073526	-



Material Characteristics

- Hardness Shore 60
- Smoke density * 0.0049 m²/g
- Toxic fume emission* 0.05 R
- Flammability temp. index* 354°C
- Toxicity approval* BR1326 Class

*BS6853 test method

Ordering Information

When ordering, the part can be referenced either by the appropriate BAE number, or the IS-Rayfast product code as identified below, standard pack size is 25m.

GEPR-XX-25-Black

Accessories

RAYRIM® and TPEM

Polyolefin

Heat Shrinkable Protective Edging

Rayrim® and TPEM are extruded strips internally coated with heat activated adhesive, so that on heating the profile changes from a 'V' to form a 'U' and the adhesive bonds to the substrate profile, typically electrical cabinets and enclosures.

Manufactured from cross-linked Polyolefin, offering a clean and rapid means of covering edges for all round protection. The flexible nature of the product allows application to both internal and external radii, plus straight edges.

Adhesion strength:

RAYRIM 25N/25mm minimum

TPEM 35N/25mm minimum

Operating Temperature

- From -55°C to +80°C



A	B	C	D	E	Std Pack Size		Description	
					(STK)	(SP)	RAYRIM No.	TPEM No.
0.6	0.5	3.5	0.8	1.25	60 pcs	100m	RAYRIM-NR-6-0-*	TPEM-NR-6-0-*
1.0	0.9	4.8	1.6	1.25	60 pcs	100m	RAYRIM-NR-7-0-*	TPEM-NR-7-0-*
2.0	0.9	6.6	2.5	2.25	60 pcs	75m	RAYRIM-NR-8-0-*	TPEM-NR-8-0-*
4.2	0.9	13.5	4.5	2.20	30 pcs	50m	RAYRIM-NR-9-0-*	TPEM-NR-9-0-*

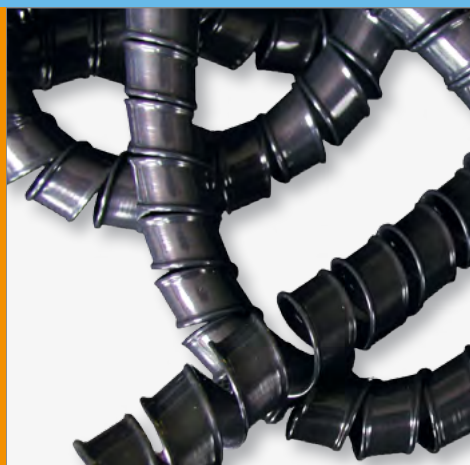
Standard Colour: 0 Black

* Denotes standard pack size required **STK** (1.2m lengths) or **SP** for spools/reels.

Packaging: Non-standard pack sizes are available for stocked products, please ask for details.

Application Range Guide

Plate Gauge	Thickness	Bending Radius	Part Number	
SWG	(mm)	Min. (mm)	RAYRIM No.	TPEM No.
30 - 24	0.31 - 0.56	10	RAYRIM-NR-6-0-*	TPEM-NR-6-0-*
23 - 16	0.61 - 1.63	15	RAYRIM-NR-7-0-*	TPEM-NR-7-0-*
15 - 10	1.83 - 3.25	20	RAYRIM-NR-8-0-*	TPEM-NR-8-0-*
9 - 5	3.66 - 5.38	25	RAYRIM-NR-9-0-*	TPEM-NR-9-0-*



PTFE Spiral binding can be used in many environments for:

- Organising wires
- Harness protection
- Abrasion protection
- Eliminate lacing cord and tie-offs

Features & Benefits

- Re-usable
- Flexible and fast installation
- Allows breakouts and re-routing
- Harness multiple cables into a single manageable bundle

Operating Temperature

- From -70°C to +260°C

Specifications & Approvals

- PAN 6480
- AS41088

ID	Width (W)	Thickness	Ø (D)	Weight	Package	Part Number
Nom. (mm)	Max (mm)	Nom g/m	(mm)	(g/m)	Standard	
3.0 (±0.25)	5.0 (±0.25)	0.75 (±0.08)	1.125	20	100m Reel	GTB-30-Colour
5.0 (±0.40)	5.0 (±0.25)	0.75 (±0.08)	1.125	29	50m Reel	GTB-50-Colour
7.5 (±0.50)	8.0 (±0.40)	0.75 (±0.08)	1.125	40	30m Reel	GTB-75-Colour
10.0 (±0.75)	8.0 (±0.40)	0.75 (±0.08)	1.125	50	15m Bag	GTB-100-Colour
12.5 (±0.80)	10.0 (±0.50)	0.75 (±0.08)	1.125	67	15m Bag	GTB-125-Colour
20.0 (±0.80)	12.5 (±0.65)	1.25 (±0.10)	1.660	210	Bag	GTB-200-Colour
25.5 (±0.80)	25.5 (±0.65)	1.25 (±0.10)	1.660	250	Bag	GTB-255-Colour

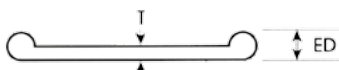
Standard Colour: **Black**

Other Colours: **Natural, Red and Yellow**

Packaging: All reels/bags of spiral binding are supplied in random lengths as standard. The most popular sizes of black spiral binding are held in stock, with low MOQs, plus there is a cut length service available.



SECTION AA



- ID Internal Diameter
- W Strip Width
- T Wall Thickness
- ED Edge Diameter

This product may become distorted during storage and transit, we would advise gently heating (not exceeding 100°C would sufficient) to return the product to its natural state.

Lacing Tape

Cords and Yarns
General Information

We offer a comprehensive range of high performance lacing tapes, cords and braiding yarns, used throughout the aerospace, electronics, medical and many smaller specialist manufacturing industries. The lacing tapes are manufactured to meet the CID A-A-52080-4 (MIL-T-43435) specification and cover the five materials most commonly used:

- Polyamide (Nylon)
- Polyester (Dacron®)
- Polytetrafluoroethylene (Teflon®)
- Glass-fibre
- Heat Resistant Polyamide (Nomex®)

When specifying a lacing tape, performance parameters such as fibre type (raw materials), size (physical dimensions), form (flat or round), finish, tensile strength and colours should be considered.

Colours

The standard lacing tape colours are Natural and Black, dependent on the type of material used. For further information on additional colours available, please contact us.



Approvals Overview

- Airbus NSA 8420
- Boeing BMS-13-54D
- Eurofighter J96.502 and JN1127
- Lockheed
- Panavia 6481
- Raytheon 268-10-11
- Rolls Royce ESW 1900
- Sikorsky SS 7057
- Westland EE 423 (M-T43435T5-3C)

Finishes

The table below shows the finishes that are available that meet the requirements of CID-A-A-52080 to CID-A-A52084 (MIL-T-43435), as well as demanding industrial and commercial applications. Finishes are generally used to improve a lacing tapes physical properties and performance characteristics. Not all finishes are available on all products, for further information please contact us.

1. Material / Finish Selection

Designation			Description
MIL	Gu	Br	
A	U	-1	No Finish
B	W	-2	Micro-crystalline, Fungicidal Wax
C	H	-3	Synthetic Rubber or Elastomer
C	Z	n/a	Flame Retarded Rubber
C	PTH	n/a	Low Out-gassing Rubber
D	T	-4	Teflon
E	R	-5	Vinyl
F	S	-6	Silicone Resin
G	B/G	-7	Liquid Nylon
#	n/a	-8	Self extinguishing

Meets requirements of Finish C
(Gu = Gudebrod and Br = Breyden)

Part Number System - Example

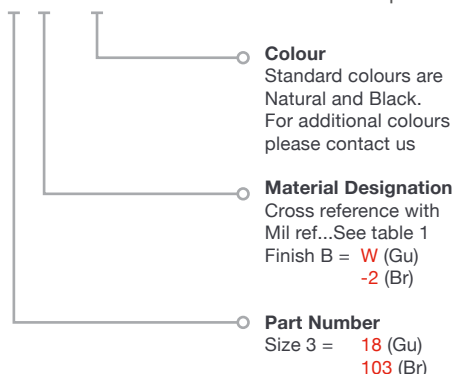
As a guide to constructing your part number identified below is an example based on...

- Type I - Nylon Tape CID-A-A-52080
- MIL ref for Type 1, Size 3, Finish B

Based on premise that a Gudebrod manufactured part is required...

18 W Black

Part No. example



Specifying Information

Lacing Tapes and Yarns

Fibre Type

NYLON Tape CID-A-A-52080 (formerly MIL-T-43435 Type I)

Flat braid manufactured from high tenacity, continuous filament nylon yarn. Temperature range: -55°C to 121°C, melting point 248°C. Available with a variety of finishes as per table.

- General purpose

POLYESTER Tape CID-A-A-52081 (formerly MIL-T-43435 Type II)

Flat braid manufactured from high tenacity, continuous filament polyester yarn. Temperature range -73°C to 177°C, melting point 250°C. Available with a variety of finishes as per table.

- Superior knot tying properties to Nylon
- High temperature performance, available in a range of finishes
- Suitable for aerospace/NASA applications
- Also available 'Pre-shrunk' to reduce longitudinal shrinkage.

TEFLON Tape CID-A-A-52082 (formerly MIL-T-43435 Type III)

Flat braid manufactured from high tenacity, continuous filament Teflon yarn. Temperature range -73°C to 232°C, melting point 327°C. Available with a variety of finishes as per table.

- High temperature performance, available in a range of finishes
- Good resistance to fluids and solvents
- Suitable for aircraft engine applications
- Also available 'Pre-shrunk' to reduce longitudinal shrinkage.

GLASS Tape CID-A-A-52083 (formerly MIL-T-43435 Type IV)

Flat braid manufactured from high tenacity, continuous filament glass yarn coated with Teflon before braiding. Temperature range to -55°C to 427°C, melting point 1150°C. Available with a variety of finishes as per table.

- Extremely high temperature performance
- Very low elongation
- Minimal fibre to fibre abrasion
- Produced from continuous filament electrical grade glass (E-Glass).

NOMEX® Tape CID-A-A-52084 (formerly MIL-T-43435 Type V)

Flat braid manufactured from high tenacity, continuous filament Nomex yarn. Temperature range -55°C to 260°C, melting point 371°C. Available with a variety of finishes as per table.

- Excellent high temperature performance and Non flammable
- Highly resistant to fluids and lubricants
- Suitable for critical aircraft harness applications, identifiable by a green coloured tracer.

NYLON Cord MIL-T-713 Type P, Class 1

Meets or exceeds MIL-T-713 Type P. Round twisted 3 ply nylon cord manufactured from high tenacity, continuous filament yarn. Temperature range -55°C to 121°C. Available with no finish, or micro-crystalline fungicidal wax finish.

NOMEX® Overbraiding Yarn PAA MIL-C-572

Continuous Filament Nomex yarn twisted to form an essentially round bundle. Available unbonded or bonded with a non-corrosive liquid nylon finish. Temperature range -55°C to 260°C, melting point 371°C. Packaged on cardboard tubes or plastic ratchet bobbins for use on New England Butt #2 braiding machines, other packages are available.

- General purpose
- Superior abrasion and fluid resistance

Polyester overbraiding yarn (MIL-C-572 Type PSTR) is also available, please contact us for further information or to discuss further.

Nylon, Polyester and Teflon

Braided Lacing Tapes
Selection Guide**TYPE I • NYLON Tape CID-A-A-52080 Braided Lacing Tape**

Part Number		Size	Breaking Strength	Tape Width		Tape Thickness		Spool Sizes
Br	Gu	Mil-Spec	Kg (Min.)	mm (Min.)	mm (Max.)	mm (Min.)	mm (Max.)	Metres
101	26	1	61.23	4.57	5.59	0.33	0.48	228
102	23	2	36.29	2.51	3.07	0.30	0.46	228
103	18	3	22.68	1.96	2.39	0.28	0.43	457
104	22	4	11.34	1.37	1.68	0.23	0.38	457
105	20	5	6.80	1.14	1.40	0.15	0.36	457
n/a	21	n/a	9.07	1.42	1.73	0.13	0.28	457
n/a	15	n/a	3.18	0.74	0.89	0.03	0.23	457

Standard colours are Natural and Black, for additional colour choices please contact us.
Dimension in Metric unless otherwise stated

TYPE II • POLYESTER Tape CID-A-A-52081 Braided Lacing Tape

Part Number		Size	Breaking Strength	Tape Width		Tape Thickness		Spool Sizes
Br	Gu	Mil-Spec	Kg (Min.)	mm (Min.)	mm (Max.)	mm (Min.)	mm (Max.)	Metres
201	26D	1	61.23	4.57	5.59	0.33	0.48	228
202	23D	2	36.29	2.51	3.07	0.30	0.46	228
203	18D	3	22.68	1.96	2.39	0.28	0.43	457
204	22D	4	11.34	1.37	1.68	0.23	0.38	457
205	21D	5	6.80	1.14	1.40	0.15	0.36	457
n/a	20D	n/a	5.44	1.09	1.35	0.10	0.25	457
n/a	15D	n/a	1.81	0.74	0.89	0.05	0.20	457

Standard colours are Natural and Black, for additional colour choices please contact us.
Dimension in Metric unless otherwise stated

TYPE III • TEFLON Tape CID-A-A-52082 Braided Lacing Tape

Part Number		Size	Breaking Strength	Tape Width		Tape Thickness		Spool Sizes
Br	Gu	Mil-Spec	Kg (Min.)	mm (Min.)	mm (Max.)	mm (Min.)	mm (Max.)	Metres
302	256	2	13.61	2.74	3.35	0.23	0.36	228
304	231	4	6.80	1.5	1.83	0.23	0.36	457
305	n/a	5	4.50	0.58	0.71	0.23	0.36	457
n/a	230	n/a	6.35	0.71	0.86	0.64	0.79	457
n/a	302	n/a	1.81	0.25	-	-	-	457

Standard colours: Natural (Dark Brown) only, Teflon fibres cannot be dyed or coloured.
Finishes available: 'unfinished' and 'synthetic' only
Dimension in Metric unless otherwise stated

Accessories

Glass, Nomex® and Nylon

Braided Lacing Tape and Twisted Cord
Selection Guide

1 TYPE IV • GLASS Tape CID-A-A-52083 Braided Lacing Tape

Part Number		Size	Breaking Strength	Tape Width		Tape Thickness		Spool Sizes
Br	Gu	Mil-Spec	Kg (Min.)	mm (Min.)	mm (Max.)	mm (Min.)	mm (Max.)	Metres
401	26X	1	90.72	5.16	6.30	0.33	0.48	228
402	23X	2	45.36	2.51	3.07	0.33	0.48	228
403	18X	3	34.02	1.96	2.39	0.33	0.48	457
404	22X	4	22.68	1.37	1.68	0.33	0.48	457
405	n/a	5	22.68	1.14	1.40	0.33	0.48	457
n/a	21X	n/a	31.75	1.73	2.11	0.30	0.46	457

Standard colours are Natural (White) and Black, fibreglass cannot be dyed but finish may be pigmented Black.
Dimension in Metric unless otherwise stated

7 TYPE V • NOMEX® Tape CID-A-A-52084 Braided Lacing Tape

Part Number		Size	Breaking Strength	Tape Width		Tape Thickness		Spool Sizes
Br	Gu	Mil-Spec	Kg (Min.)	mm (Min.)	mm (Max.)	mm (Min.)	mm (Max.)	Metres
501	726	1	38.56	4.57	5.59	0.33	0.48	228
502	723	2	22.68	2.51	3.07	0.28	0.43	228
503	718	3	15.88	1.73	2.11	0.23	0.38	457
504	722	4	11.34	1.27	1.55	0.18	0.33	457
n/a	1342	n/a	31.75	2.06	2.51	0.43	0.58	228
n/a	946	n/a	2.27	0.30	-	-	-	457

Standard colours are Natural (off White) with a Green tracer. Additional colour choices with or without tracer please contact us.
Dimension in Metric unless otherwise stated

13 TYPE P • NYLON Cord MIL-T-713 Twisted cord

Part Number		Size	Breaking Strength	Approximate Yield	Diameter		Spool Sizes
Br	Gu	Mil-Spec	Kg (Min.)	Metres per Kg	mm (Min.)	mm (Max.)	Kg
111-2	n/a	1	31.75	273 Wax Finish	0.91	1.12	0.45
111-1	n/a	1	31.75	350 No Finish	0.91	1.12	0.45
112-2	n/a	2	21.77	446 Wax Finish	0.53	0.74	0.45
112-1	n/a	2	21.77	595 No Finish	0.53	0.74	0.45
113-2	n/a	3	14.51	558 Wax Finish	0.48	0.69	0.45
113-1	n/a	3	14.51	744 No Finish	0.48	0.69	0.45

Standard colours are Natural (off White) or Black, no other colours available.
Dimension in Metric unless otherwise stated

MIL-C-572 Nomex®

Overbraiding Yarn
Selection Guide

Continuous Filament Nomex yarn twisted to form an essentially round bundle. Material is available unbonded or bonded with a non-corrosive liquid nylon finish. Temperature range -55°C to 260°C, melting point 371°C.

Material packaged on cardboard tubes or plastic ratchet bobbins for use on New England Butt #2 braiding machines, other packages are available.

Ordering Information

When ordering please specify the denier, finish, colour, number of ply per end x number of ends, material and bobbin requirement, as per example shown below;

200 B Natural 1x4 Nomex® R.

TYPE PAA • NOMEX® MIL-C-572 Overbraiding Yarn

Yarn Size	Number of Filaments	Breaking Strength	Nominal Diameter	Yarn Elongation	Parallel Ends per Bobbin	Spool Sizes
		Kg (Min.)	mm (Min.)			Metres
200 Denier	100	1.24	0.152	35%	1-8	4,572
1200 Denier	600	6.45	0.305	37%	1-4	914.4

Code	Finishes	Comments
U	Untreated	General Purpose
B	Bonded with non-corrosive, flame retardant Polyamide	Superior abrasion resistance. Excellent fluid resistance

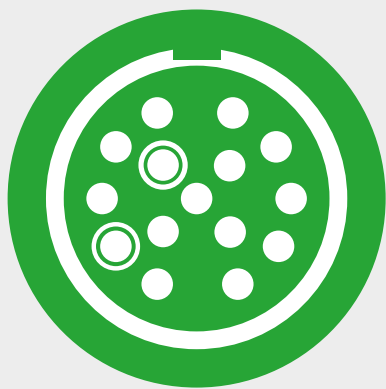
Put-Up	Length tube	Length braid	Width	Height	Tube Ø	Taper
T	133.50	120.65	6.35 tube	47.63	20.96	30°
R	155.58	134.94	46.04 bobbin	44.45	7.94	-

Standard colours are Natural (Off White) Olive Drab, Black and Red, other colours are available in bond dyed form or with unbonded yarn in minimum dye lots, for details please contact us.

Dimension in millimetres unless otherwise stated

TYPE PSTR • POLYESTER Mil-C-572 Overbraiding Yarn

Also available please contact us for details



Wire and Cable

Heat-shrink Tubing

Non-shrink Tubing

Braided Sleeving

Screening Braids

Moulded Parts

Terminals and Splices

Wire and Cable Markers

Accessories

Connectors

Backshells

Bonding Leads

Metal Braids

Relays and Contactors

Switches and Grips

Adhesives and Tapes

Application Equipment

Added Value Services

1 **Range of High Performance**
2 **Connectors**

3 Working closely with suppliers and
4 manufacturers worldwide we offer a
5 comprehensive range of connectors and
6 associated products for the Defence,
7 Aerospace, Marine and Industrial markets.
8 Our breadth of experience and knowledge
9 enables us to provide you with advice and
10 support on the optimum product for your
11 application.

Fast Factory
Quick Response & Turnaround

Through our supply partners we able to offer a
'Fast Factory' quick response and turnaround
supply service to our customers, for key
connector styles, including...
MIL-DTL-38999 Series III • EN 3645
MIL-DTL-26482 Series II
MIL-DTL-83723 Series I and III
Product ranges built in the 'Fast Factory'
are offered on a 2 to 3 weeks lead-time for
quantities of up to 200 pieces and when
required 'Fast Factory' is able to offer 48-hour
production for small batches.
In addition to this, there is a low MOQ for
these items with the aim of offering maximum
flexibility, to help our customers supply
logistics and order consolidation.
The 'Fast Factory' has its own dedicated
teams. This facility serves industries such
as aerospace, defence and marine and
also the rail market and all customers from
other industries requiring high performance
connector products.
'Fast Factory' is a value added service provider
for IS-Rayfast on Deutsch products to serve
the European and EMEA markets. This hub
and facility are capable of delivering and
assembling on demand products.



Materials Selection Guide	for Harsh environments	page 352	1
Military and Aerospace			
MIL-DTL-***	High performance specification connectors	page 354	2
MIL-DTL-38999 Series III	Part numbering guide	page 355	3
Commercial			
DT Series	Family of tough cable to cable connectors	page 356	4

Although not included in these pages, we can also offer a broader range of connector series as outlined below. Please contact us for additional information or to discuss your requirements further.

HDP20 Series



HDP20 connectors are a versatile connector solution for harsh environment applications in the construction, mining, marine, and agricultural industries.

These heavy-duty thermoplastic, circular shaped connectors feature quick connect-disconnect bayonet couplings, silicone seals, and a rear insertion/rear removal contact system.

Offered in two shell sizes and in 19 different configurations, ranging from 2 to 47 cavities and accommodate multiple size contacts & wire sizes.

HD30 Series



HD30 connectors are constructed with a rugged aluminum shell developed to meet the needs of the heavy-duty truck, bus and off-highway industries.

These connectors offer multiple pin configurations that accept contact sizes 4 to 20. HD30 connectors are circular shaped and feature quick connect-disconnect bayonet couplings, silicone seals and a rear insertion/rear removal contact system.

Also offers adaptor and cable clamp modifications that support the wires while reducing strain on the connectors.

DRC Series



DRC connectors are designed for off-road, heavy-duty industrial, recreational, and agricultural applications.

The environmentally sealed, rectangular shaped DRC connectors are offered with insert arrangements of 24, 40, 50, 60, 64, 70, and 76 cavities that accept size 16 and 20 contacts. Several mounting options are available including in-line, flange mount, and PCB mount.

Materials Selection Guide for Harsh Environments

For a connector design to perform in different harsh environments and applications the materials selected are critical to their operation. Connector shells are often metal and can be aluminium, stainless steel, brass, titanium, or even composite to meet the demanding harsh environment conditions.

Common Connector Materials

Aluminium

Effective for the majority of interconnect applications, as satisfies both environmental and interconnect requirements. Aluminium is strong, lightweight, corrosion resistant and cost effective, with a variety of surface finishes available to enable it to satisfy various application requirements and environments.

Nickel Aluminium Bronze

Ideal for marine applications where traditional plating finishes can quickly be eroded by sand and dust revealing weaker base materials, whereas Nickel Aluminium Bronze will remain robust in the harshest of environments.

Stainless Steel

Corrosion resistant steel (CRES) available in 303, 304 and 316 grades, offers excellent corrosion and chemical resistance plus it is stronger than aluminium and needs no additional plating. More expensive than aluminium by 3 to 4 times depending on grade of material.

Brass

Brass is corrosion resistant by design and being relatively soft, machines easily. It has the added advantage of being a non-sparking metal. Brass does not require additional surface treatment but it is often nickel and chrome plated for increased hardness, wear resistance and enhanced appearance.

Composite

Key advantages over alternative materials include light weight, superior corrosion resistance and can be lower cost when manufactured in high volumes. Manufacturers can also plate composites for increased surface hardness and conductivity.

Titanium

Often specified where corrosion resistance and weight are of paramount importance. Titanium is also used in high temperature environments. Substantially higher in cost than aluminium components.

Common Plating Finishes

Cadmium

The historical standard finish of military and industrial connectors offering excellent salt spray corrosion resistance but falls foul of RoHS compliance legislation.

Electroless Nickel

Commonly used on industrial and high temperature applications, where a non-reflective finish and high corrosion resistance is not important.

Black Zinc Nickel

The latest RoHS compliant solution to environmental plating of connectors, offering high levels of compatibility with other plating materials.

Nickel PTFE

A lower cost alternative to Black Zinc Nickel. However, the average bath lifetime of the chemical nickel PTFE is half that of electroless nickel and ten times less than nickel alloy (zinc-nickel).

Shell Materials	Nickel Aluminium Bronze	Stainless Steel	Composite
Salt Spray	2,000 hours	2,000 hours	2,000 hours

Plating Finish	Cadmium	Electroless Nickel	Black Zinc Nickel	Black Zinc Cobalt	Green Zinc Cobalt
Colour	Olive Drab	Shiny Silver	Black (non-reflective)	Black (non-reflective)	Dark Green
Shell Continuity	2.5 mΩ	1.0 mΩ	2.5 mΩ	2.5 mΩ	2.5 mΩ
Durability	500 cycles	500 cycles	500 cycles	500 cycles	500 cycles
Temp Range	-65°C to +175°C max	-65°C to +200°C max	-65°C to +175°C max	-55°C to +125°C max	-55°C to +125°C max
EMI Shielding	>90dB @ 100 MHz	>90dB @ 100 MHz	>90dB @ 100 MHz	>80dB @ 100 MHz	>80dB @ 100 MHz
Shell Conductivity	2.5mV max	1.0mV max	2.5mV max	5.0mV max	5.0mV max
Salt Spray	500 hours	48 hours	500 hours	48 hours	96 hours
RoHS Compliant	No	Yes	Yes	Yes	No



Connectors

MIL-DTL-**** Range

Fast Factory Turnaround
Military and Aerospace

- Key 'Fast Factory' products include...
- MIL-DTL-38999 Series III • EN 3645
- MIL-DTL-26482 Series II
- MIL-DTL-83723 Series I and III

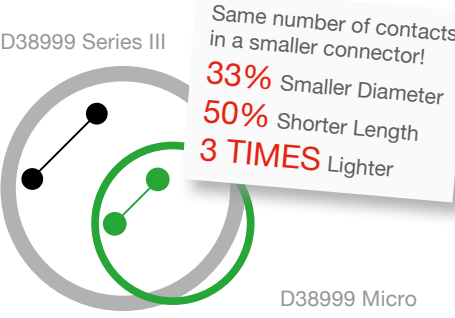
Drawing from our supplier portfolio we have access to a strong inventory of over 5,000 different part numbers of connectors that are maintained on stock. Product ranges built in the 'Fast Factory' are offering assembling on demand products.



A broad range of alternative designs and brands are also available...

...Including MIL-DTL-38999 Micro Derivatives

Because of the widespread popularity of 38999 Series III connectors, manufacturers have used this form for numerous designs to meet a variety of high density, smaller configurations beyond those of MIL-DTL-38999. Offering a familiar, reliable connector and access to a full range of backshells and other accessories.



MIL-DTL-38999 Series III

Connector Part Numbering Guide

Military and Aerospace

Military Designation Part No. example

D38999 / 26 Z E 35 P N -L/C

Connector Style

Standard	/20	Square Flange Receptacle
	/24	Jam Nut Receptacle
	/26	Straight Plug
Hermetic	-	Box Mount Receptacle
	/21	Square Flange Receptacle
	/23	Jam Nut Receptacle
	/25	Solder Flange
	/27	Weld Flange

Material and Finish

Aluminium	F	Electroless Nickel
	G	Space-Grade Electroless Nickel
	T	Nickel PTFE
	W	Olive Drab Cadmium
	Z	Black Zinc Nickel
Composite	M	Electroless Nickel Plated
	J	Olive Drab Cadmium
Stainless Steel	K	Passivated SS, Firewall
	S	Electro-deposited Nickel SS Firewall
	L	Electro-deposited Nickel
Hermetic	Y	Stainless Steel, Passivated
	N	Stainless Steel, Electro-deposited Nickel
	H	Space Grade

Shell Sizes

A (9), B (11), C (13), D (15), E (17), F (19), G (21), H (23), J (25)

Letters = Military | Numbers = DTS Commercial

Insert Arrangements

Contact us for full arrangements table.

Contact Type (MIL-C-39029)

Standard	P = Pin S = Socket H = 1500 cycle pin
	J = 1500 cycle socket A = Less Pin
	B = Less Socket
Hermetic	P = Pin, Solder Cup S = Socket, Solder Cup
	C = PC Tail Pin D = PC Tail Socket
	X = Eyelet Pin Z = Eyelet Socket

Insert Rotation

N = Normal (standard) | U = Universal

For full details & options refer to separate MIL arrangement charts.

Modification Code

OMIT for standard contacts | L/C = Less Contacts

For full list of options please contact us

Connectors

DT Series

Connector Series and Types, Overview
Commercial High Performance

Range of environmentally sealed connectors designed for cable to cable applications. Thermoplastic housings offer a wide operating temperature range plus silicone rear wire and interface seals allow the connectors to withstand conditions of extreme temperature and moisture.

Contact insertion and removal does not require any special tools, with contacts retained in a locked position by integral dielectric fingers. Secondary wedge-locks are assembled at the mating interfaces to provide proper contact positioning.

DT Series - Environmentally sealed connector designed for cable to cable applications on the engine or transmission, under the bonnet, on the chassis or in the cab. On signal level circuits in harsh environment conditions - Size 16 contacts

DTM Series - Feature miniature contacts with enhanced design based on the DT Series. DTM is the connector to be used in harsh environmental applications such as around the engine, transmission and under the bonnet - Size 20 contacts

DTHD Series - Offers an environmentally sealed, single power circuit termination with a current rating from 25 to 100 Amps. The plug features an integral coupling latch that provides tactile and audible feedback during coupling - Size 4, 8 or 12 contact.

DTP Series - Designed for power applications, to fill the need for higher amperage, multi-pin connectors. Offers ability to use multiple 12 gauge contacts, each with a 25 amp continuous capacity, within a single shell - Size 12 contacts

Full Range of Backshells,
Mounting Clips and Accessories
Available for the Complete
Solution

IP68 Rating



DT Series



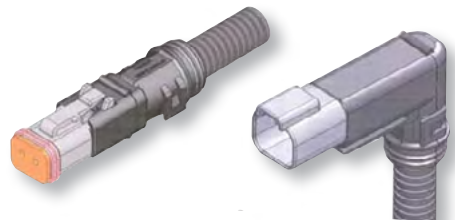
DTM Series

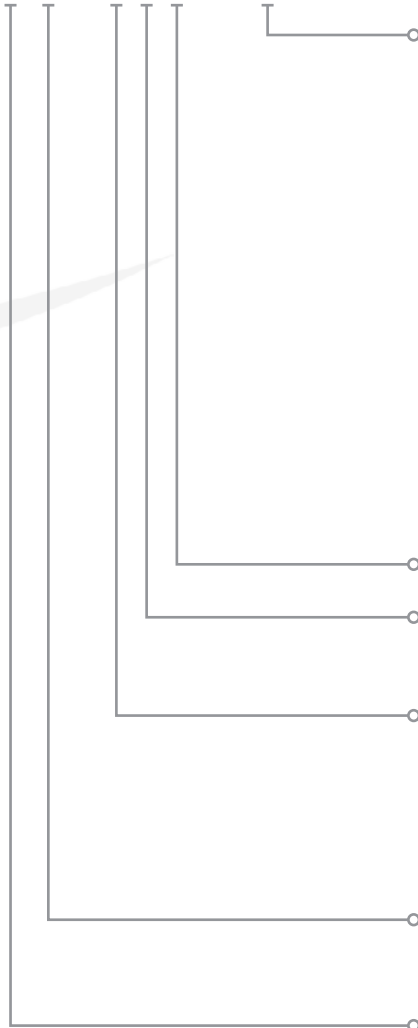


DTHD Series



DTP Series



DT* 06 - 2 S * - XXXX**Part Numbering****Special Modifications**

- B016** Prevents mis-mating for DT12
 - P012** Enhanced front seal
 - E008** DT - Boot adaptor (grey)[#]
 - CE04** DT - Boot adaptor (grey)[§]
 - EP11** DT Plug - Boot adaptor (black)[#]
 - CE13** DT Plug (2,3,4) - Boot adaptor (black)[§]
 - CE14** DT Plug (8,12)- Boot adaptor (black)[§]
 - EE01** DT Receptacle - Boot adaptor (black)[#]
 - CE09** DT Receptacle - Boot adaptor (black)[§]
 - E007** DTM - Boot adaptor (grey)
 - C015** Smaller wire seal
 - E003** Rear cap
 - E004** Black connector body
 - E005** Black connector body and rear cap
- Flange modifications are also available, please contact us for details

[#] Standard wall wire (2.24 to 3.68mm)[§] Thin wall wire (1.35 to 3.05mm)**Polarizing Position** (if applicable)**Contacts**

- P** Pin
- S** Socket

Number of Contacts

- 2, 3, 4, 6, 8 or 12** DT Series, size 16
- 2, 3, 4, 6, 8 or 12** DTM Series, size 20
- 2 or 4** DTP Series, size 12
- 1-4** DTHD Series, size 4
- 1-8** DTHD Series, size 8
- 1-12** DTHD Series, size 12

Style

- 04** Receptacle
- 06** Plug

Series

- DT Series
- M** DTM Series
- P** DTP Series
- HD** DTHD Series

Please note that all DT Series connectors require secondary wedgelocks which are sold separately, see following pages. The wedgelocks help ensure proper contact alignment within each connector.



Connectors

DT Series

WedgeLocks
Required Components

DT style electrical connectors require secondary wedgeLocks which are sold separately. The wedgeLocks help ensure proper contact alignment within each connector. Secondary wedgeLocks are assembled at the mating interface and click into place. If by chance the secondary wedgeLocks are not

properly seated during assembly, they will be pressed into locked position during the mating of the connector.

Adding to the design flexibility of the DT Series, several wedgeLocks offer keying options. WedgeLocks for enhanced seal retention plugs (P012) are also available.



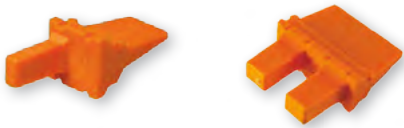
DT Series Receptacle WedgeLocks

W2P*	WedgeLock for 2 way receptacle. *A, B, C, D keying available
W3P*	WedgeLock for 3 way receptacle. *J1939 keying available
W4P*	WedgeLock for 4 way receptacle. *A, B, C, D keying available
W6P	WedgeLock for 6 way receptacle.
W8P	WedgeLock for 8 way receptacle.
W12P	WedgeLock for 12 way receptacle.



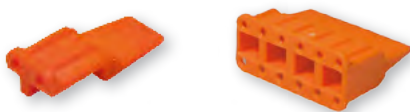
DT Series Plug WedgeLocks

W2S*	WedgeLock for 2 way plug. *A, B, C, D keying available
W3S*	WedgeLock for 3 way plug. *J1939 keying available
W4S*	WedgeLock for 4 way plug. *A, B, C, D keying available
W6S	WedgeLock for 6 way plug.
W8S	WedgeLock for 8 way plug.
W12S	WedgeLock for 12 way plug.



DTM Series Receptacle WedgeLocks

WM-2P*	WedgeLock for 2 way receptacle. *A, B, C, D keying available
WM-3P	WedgeLock for 3 way receptacle.
WM-4P	WedgeLock for 4 way receptacle.
WM-6P	WedgeLock for 6 way receptacle.
WM-8P	WedgeLock for 8 way receptacle.
WM-12P	WedgeLock for 12 way receptacle.



DTM Series Plug WedgeLocks

WM-2S*	WedgeLock for 2 way plug. *A, B, C, D keying available
WM-3S	WedgeLock for 3 way plug.
WM-4S	WedgeLock for 4 way plug.
WM-6S	WedgeLock for 6 way plug.
WM-8S	WedgeLock for 8 way plug.
WM-12S	WedgeLock for 12 way plug.

DT Series

Wedgelocks, Sealing Plugs
Required and Optional Accessories



DTP Series Receptacle Wedgelocks

WP-2P	Wedgelock for 2 way receptacle.
WP-3P	Wedgelock for 3 way receptacle.



DTP Series Plug Wedgelocks

WP-2S	Wedgelock for 2 way plug.
WP-3S	Wedgelock for 3 way plug.



Flange Modification - Receptacles only

Grey		Black	
Std Wall	Thin Wall	Std Wall	Thin Wall
L012	CL03	LE14	CL06

Modification number is applied for housings regardless of the number of ways.



EEC Series PCB Enclosures and Headers

The enclosure features a through hole mounting flange on each side, as well as optional venting. Designed with space to accommodate one or more DT or DTM series interfaces, the headers feature 90° pins. A radial flange seal provides environmental sealing to the enclosure. The headers mate with the DT and DTM standard plugs.



Sealing Plugs

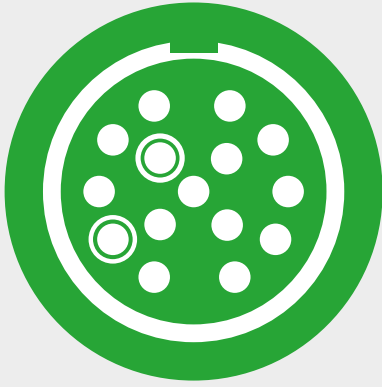
Maintains the environmental integrity of the connector if not all contact positions utilised.

01413-204-2005	Contact size 20
114017	Contact size 16-12
114018	Contact size 8
114019	Contact size 4



Tooling

Various hand crimp tools are available, including the **HDT-04-08** above (four ident crimp) for contact sizes 12, 16 and 20. For additional information or contact size crimp options please contact us.



Wire and Cable

Heat-shrink Tubing

Non-shrink Tubing

Braided Sleeving

Screening Braids

Moulded Parts

Terminals and Splices

Wire and Cable Markers

Accessories

Connectors

Backshells

Bonding Leads

Metal Braids

Relays and Contactors

Switches and Grips

Adhesives and Tapes

Application Equipment

Added Value Services

Circular Backshells

For all your wire and cable screen connection requirements, we have the solutions through our partners, offering an extensive range of circular connector backshells, available in various materials and plating specifications.

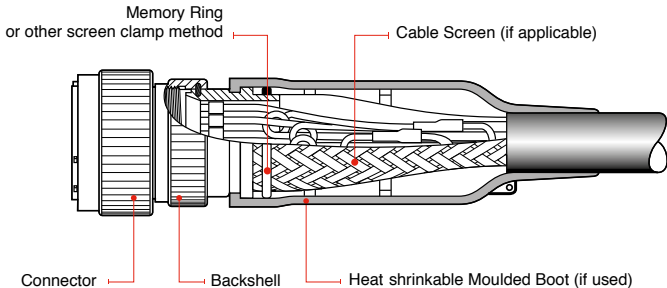
Backshells, or connector adaptors if you prefer, offer high performance sealing and strain relief in demanding applications. We offer a wide range for applications in many industries including Aerospace, Defence, Marine and Mass Transit.

These backshells are available in many configurations to match applications, are easy to install and offer high reliability.

Let us Help you

For your connector adaptors or backshell assemblies, please contact us with the following information where applicable.

- Backshell type.
- Connector part number or specification.
- Connector required or the manufacturer.
- Connector shell size.
- Connector material and plating (this may be in the part number).
- Wire bundle diameter and cable jacket diameter.
- Entry size.
- Angle of backshell, or range required.
- Type of cable screen (e.g. size and number of strands, single or double layer).



Introduction	Selecting material and plating	page 364	1
	Determining the entry size	page 366	2
Screened Backshells	Overview and selection guide	page 367	3
Braided Tail	Pre-terminated with screening braid tail	page 368	4
Tinel-Lock®	Memory ring	page 370	5
Band	Band strap clamp	page 372	6
Roll Spring	Constant force roll spring clamp	page 374	7
Hexashield®	Individual screen clamp	page 376	8
KTKK	Pre-installed with heat shrink boot	page 378	9
Non-Screened Backshells	Overview and selection guide	page 380	10
Solid	Solid	page 381	11
Spin	Spin coupling	page 382	12
Spin-Lock®	Variable angle Spin-Lock®	page 383	13
Connector Accessories	Protective/Dust Caps	page 384	14
			15
			16
			17
			18

Backshells

Selecting Material and Plating

For a backshell or connector design to perform in different demanding environments and applications, the material and plating selected are critical to the optimum performance in any given environment.

To ensure optimum compatibility, select the adaptor material and finish to match those of the connector and or environment, using the 'Material' and 'Plating' tables on these pages.

Of late recent high performance circular connectors and backshells are often manufactured from aluminium with a black zinc nickel Cadmium free plating which are RoHS compliant.

Material Codes

Standard Material Options	Material Part Code		
	Group 1	Group 2	Group 3
Aluminium alloy 6262 / 6082	19	A	1
Nickel Aluminium Bronze DGS 1043 / NES 833 (Marine)	01	B	2
Stainless Steel 303 S31 / 304	62	S	4
Non-Standard Materials	Group 1	Group 2	Group 3
Brass CZ 121	-	-	3
Stainless Steel 316 (Marine)	-	-	46
HDHC Copper CA 104	-	-	5
Black Acetal (cost effective plastic)	-	-	7
PEEK GL30 (30% glass filled) high temperature composite	-	-	73
ULTEM 2300 (30% glass filled) standard composite	-	-	74

Please contact sales office for materials not listed above

Materials

ALUMINIUM (A) - Effective for most applications, as satisfies the majority of environmental and interconnect requirements. Aluminium is strong, lightweight, corrosion resistant and cost effective, with a variety of surface finishes.

NICKEL ALUMINIUM BRONZE (B) - Ideal for marine applications where traditional plating finishes can quickly be eroded revealing weaker base materials, Nickel Aluminium Bronze will remain robust in the harshest of environments.

STAINLESS STEEL (S, 46) - Corrosion resistant steel (CRES) available in 303, 304 and 316 grades, offers excellent corrosion and chemical resistance, plus it is stronger than aluminium and needs no additional plating.

BRASS (3) - Inherently corrosion resistant and being relatively soft, machines easily. It has the added advantage of being non-sparking and does not require additional surface treatment, but it is often nickel and chrome plated for increased hardness, wear resistance .

COMPOSITE (7, 73, 74) - Key advantages include light weight, corrosion resistance and can be lower cost when manufactured in high volumes. Can also be plated for increased surface hardness and conductivity.

Plating Codes

Standard Plating Options	Colour	RoHS	Plating Part Code	
			Group A	Group B
Cadmium, per SAE AMS-QQ-P-416, Type II, Class 3. Over electroless nickel	Olive Drab	No	B	B
Electroless nickel, per SAE AMS-C-26074, Class 4, Grade B.	Silver	Yes	C	C
Anodised hard per MIL-A-8625, Type III, Class 2	Black	Yes	G	D
Anodised, sulphuric, MIL-A-8625, Type II, Class 2	Black	Yes	-	G
Passivated, per SAE AMS-QQ-P-35 or MIL-S-5002 (stainless steel only).	-	Yes	J	J
Zinc Cobalt over Electroless Nickel	Olive Drab	Yes	U	ZB
Unplated Shot Blast (glass bead), for non reflective finish	-	Yes	W	Z
Zinc Nickel passivate over electroless Nickel, ASTM B841 class 1	Black	Yes	Z	ZN
Non-Standard Plating Material	Colour	RoHS	Group A	Group B
Anodise Blue to DEF 03-25	Blue	Yes	-	AB
Anodise Red to DEF 03-25	Red	Yes	-	AR
Electroless Nickel, high Phosphor, BS EN ISO 4527:2003	Silver	Yes	-	CHP
Bright electroless Nickel to MIL-C-26047D, class 4, grade C	Silver	Yes	-	F
Hard anodise Grey	Grey	Yes	-	HA
Iridite conversion of Alocrom 1200, clear/iridescent (aluminium only)	-	Yes	-	
Nickel/PTFE	Black	Yes	-	TN
Unplated clean finish not shot blasted	-	Yes	-	U
Silver plate 5 microns to DEF 03-9	-	Yes	-	V

Plating

CADMIUM (B) - The historical standard finish for military and industrial connectors and backshells, offering excellent salt spray corrosion resistance.

ELECTROLESS NICKEL (C) - Commonly used on industrial and high temperature applications, where a non-reflective finish and high corrosion resistance is not essential.

HARD ANODISED (G) - Used where the need for surface hardness and abrasion resistance is the main criteria. The build up for hard coat anodising is much thicker than your standard anodising.

PASSIVATED (J) - Removes surface contaminants and produces a surface condition which is resistant to corrosive action. Provides a higher degree of corrosion resistance with finished parts retaining the dimension they had prior to treatment.

ZINC COBALT (U) - Offers enhanced corrosion resistance compared to traditional zinc plating of the same thickness. By electroplating zinc and cobalt to the particular metal, the end result is a uniform ductility.

SHOT BLAST (W) - For a non reflective finish.

BLACK ZINC NICKEL (Z) - The latest RoHS compliant solution to environmental plating of connectors and backshells, offering high levels of compatibility with other plating materials.

Backshells

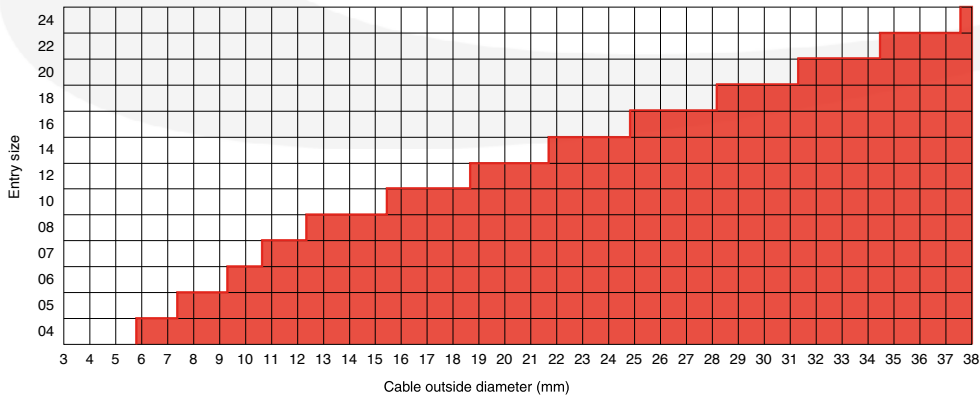
Determine Entry Size

Determining the Entry Size

Once you have the wire bundle size, use the chart below to select entry size. Chart shows the minimum entry sizes for cables from 3 to 38 mm in diameter. In other words, the white spaces on the chart represent all of the cable outside diameters each entry size will fit.

Follow these steps:

- Find the cable diameter on the chart.
- Please note the lowest entry size that will fit the cable diameter.



If the adaptor is shielded or has a Tinel-Lock ring, there are additional considerations, which are noted below.

For further information or assistance on selecting the correct entry size or constructing your required adaptor part number, please contact us.

Braided Tail Backshells

The extreme flexibility of the braid on these backshells accommodates a large range of cable diameters. It is therefore recommended that the standard entry size for any given adaptor part number be specified as indicated on the relevant data sheet. Non standard entry sizes are available to special order. Use the selection chart above to ensure that the standard entry size will pass over the jacketed cable diameter.

Memory Ring Backshells

The cable braid must be opened up to fit onto the outside diameter of the adaptor entry. For optimum performance, select the smallest entry size that will pass over the jacketed cable diameter. Repair of the connector will be easier using the boot and shield rollback if a slightly larger than minimum entry size is used.

The selection chart above shows the minimum entry sizes for cable diameters in the range of 3 mm to 38 mm. This will ensure that the jacketed cable passes through the adaptor. Ensure the braid will open sufficiently to fit the entry size selected and to ensure that the braid and boot can be rolled back.

Screened Backshell Types

**BRAIDED TAIL**

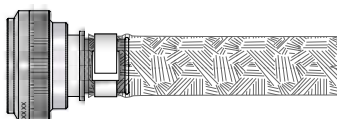
Supplied complete with a braided tail that has been secured by a magna-form crimp ring. Braid shield accommodates a range of cable diameters. This allows a standard entry size to be used with most cable sizes and can be terminated using a SolderSleeve® device.



Braid screen not included

MEMORY RING

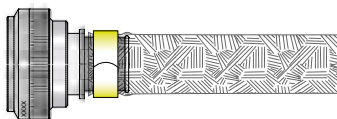
Special shape memory metal ring that shrinks uniformly when heated, offering very secure 360° clamp of the screening braid onto the backshell. Withstands shock, vibration and temperature cycling. Requires specialist tooling.



Braid screen not included

BAND CLAMP

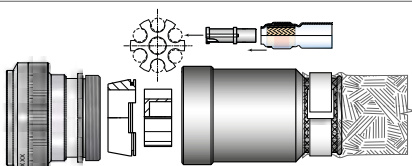
Where the cable screening braid is clamped to the backshell via a mechanical metal strap. Hand tool required.



Braid screen not included

CONSTANT FORCE SPRING (CFS)

Cable screening braid is secured to the backshell via constant force spring wrapped around the braid. Does not need any tooling.



Braid screen not included

INDIVIDUAL SCREEN

This system offers the greatest EMI/EMC integrity, providing 360° shielding in the termination area of each individual wire/cable plus collective screen cable versions (shown). System offers a significant improvement over pigtail termination methods.

**BOOT ASSEMBLY**

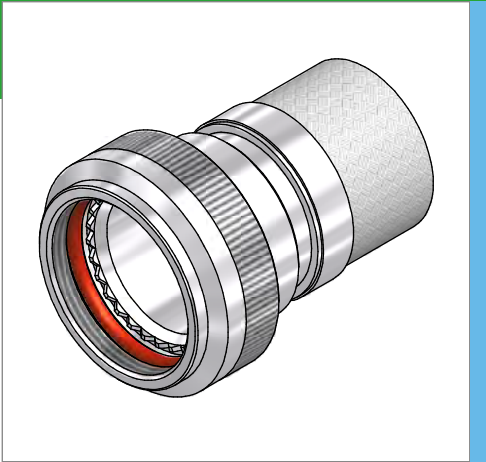
Supplied as a complete assembly utilising Rayatan® heat shrink screened boot technology that includes an internal lining that offers shielding levels better than 80 dB at 100 MHz. Avoiding the requirement for a separate metal screening braid.

Backshells

Braided Tail

Pre-terminated Screening Braid Tail
Screened Backshells

Shielded spin adaptors include tubular braid attached to the rear of the adaptor, that accommodates a range of cable diameters. This allows a standard entry size to be used with most cable sizes and can be terminated to the cable braid using a SolderSleeve® device. Standard braid length is 150mm, longer lengths available please ask for details. Using the part numbering elements on these pages construct your part number, or contact us for details.



208M7 16 - 19 Z 10

Part Numbering example

ENTRY SIZE

See table on opposite page

PLATING CODE

See plating code selection table, Group A see page 365

MATERIAL CODE

See material code selection table, Group 1 see page 364

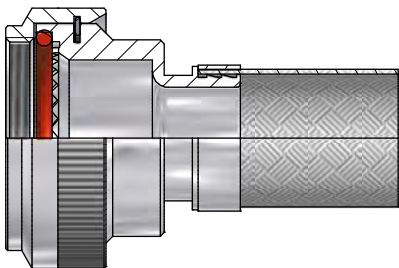
SHELL SIZE

See table on opposite page

FAMILY TYPE DESIGNATION + Angle

See table on opposite page

The above backshell family designations are for the most common applications, for others not listed here please contact us.



Shell Size Selection Table

Part No.	Ind. Ref.	Mil. Ref.	Max Entry Size
08	9	A	04
10	11	B	07
12	13	C	09
14	15	D	10
16	17	E	12
18	19	F	14
20	21	G	16
22	23	H	18
24	25	J	20

Family Type Designation

MIL-C-5015 (MS3100)

218M7 Straight backshell family

218M8 45° backshell family

218M9 90° backshell family

MIL-C-26482 Series I

206M0 Straight backshell family

206M1 45° backshell family

206M2 90° backshell family

MIL-C-38999 Series III & IV.

208M7 Straight backshell family

208M8 45° backshell family

208M9 90° backshell family

MIL-C-38999 Series I & II.

204M0 Straight backshell family

204M1 45° backshell family

204M2 90° backshell family

MIL-C-26482 Series II and

MIL-C-5015 (MS3400)

203M0 Straight backshell family

203M1 45° backshell family

203M2 90° backshell family

208M* - Entry Size Dimensions Table

Entry Size	Internal Dia
03	4.77 mm
04	6.35 mm
05	7.92 mm
06	9.52 mm
07	11.12 mm
08	12.70 mm
09	14.27 mm
10	15.87 mm
11	17.47 mm
12	19.05 mm
13	20.62 mm
14	22.23 mm
15	23.82 mm
16	25.40 mm
17	26.98 mm
18	28.60 mm
20	31.80 mm
21	33.34 mm
22	35.00 mm
24	38.10 mm
28	44.45 mm

Selection tables shown here are for general indicative purposes only, as they represent the MIL-C-38999 Series III & IV family of 'Braided tail' backshells only. For other family type backshells dimensions and characteristics please contact us for details.

The entry size range shown above indicates the most common combinations only, for further options please contact us.

Backshells

Tinel-Lock® Series

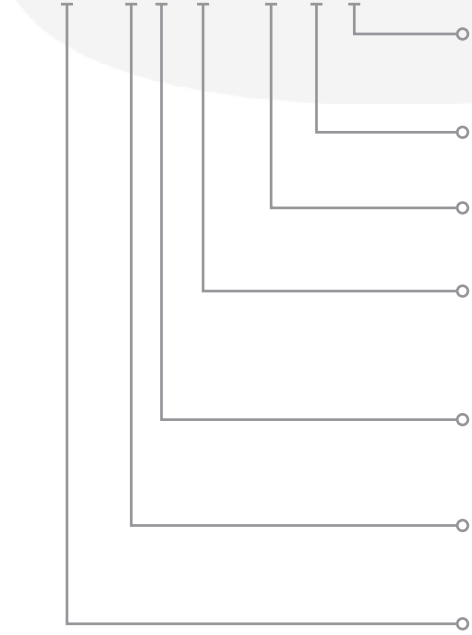
Memory Ring
Screened Backshells

The Tinel-Lock® ring is made from a special shape memory metal that shrinks uniformly when heated and terminates copper braid directly onto the rear of a backshell.

- Withstands severe shock, vibration and temperature cycling
- Low profile, buckle free termination.
- One piece construction
- Operating Range, -65°C to 200°C

Using the part numbering elements below construct your part number, or contact us for details.

TXR40 A Z 00 - 16 10 AI



Part Numbering example

RING DESIGNATION REF

AI, BI or CI See selection table opposite.
Omit if no ring required

ENTRY SIZE

See table on opposite page

SHELL SIZE

See table on opposite page

ANGLE CONFIGURATION

- 00 Straight
- 45 45° angle
- 90 Right angle

PLATING CODE

See plating code selection table, Group A or B
see page 365

MATERIAL CODE

See material code selection table, Group 2 see
page 364

FAMILY TYPE

- TXR18 MIL-DTL-5015D
- TXR21 MIL-DTL-26482 Series I
- TXR40 MIL-DTL-38999 Series III & IV
- TXR41 MIL-DTL-38999 Series I & II
- TXR54 MIL-DTL-26482 Series II and
MIL-DTL-5015G (MS3400)

The above backshell family designations are for the most common applications, for others not listed here please contact us.

TXR40 - Shell Size Selection Table

Part No.	Ind. Ref.	Mil. Ref.	Max Entry Size
08	9	A	04
10	11	B	07
12	13	C	08
14	15	D	10
16	17	E	12
18	19	F	14
20	21	G	16
22	23	H	18
24	25	J	20

Ring Designator Selection Table

Description	Part Ref.
Single Layer	
36 AWG braid	AI
34 AWG braid	AI
32 AWG braid	BI
30 AWG braid	BI
Double Layer	
36 AWG braid	BI
34 AWG braid	BI
32 AWG braid	CI

The outside surface of the ring is marked with a dot of thermo-chromic paint which changes colour when appropriate installation temperature is reached.

'AI' Rings are identified by the absence of coloured a dot, whilst 'BI' rings are marked with a **RED** dot and 'CI' rings are marked with a **BLUE** dot.

TXR40 - Entry Size Dimensions Table

Entry Size	Internal Dia
04	6.35 mm
05	7.92 mm
06	9.53 mm
07	11.10 mm
08	12.70 mm
10	15.88 mm
12	19.05 mm
14	22.23 mm
16	25.40 mm
18	28.58 mm
20	31.75 mm
22	34.93 mm
24	38.10 mm

Selection tables shown here are for general indicative purposes only, as they represent the **TXR40** MIL-C-38999 Series III & IV family of backshells only. For other family type backshells dimensions and characteristics please contact us for details.

The entry size range shown above indicates the most common combinations only, for further options please contact us for details.

Both Backshells and Tinel-Lock® rings are available separately, please contact us for details.



Backshells

Band Strap Series

Band Clamp
Screened Backshells

Band Strap adaptors feature a corrosion-resistant steel band to terminate the cable screen. The resulting 360° overall termination creates an effective electrical connection, providing screen continuity between braid and adaptor.

The terminated cable can then be protected and sealed using a heat-shrinkable moulded part, providing strain relief to the cable.

Using the part numbering elements below construct your part number, or contact us for details.

BND40 A Z 00 - 16 12 V



Part Numbering example

BAND CODE

- V One step standard band (straight)
- U Two step band, contact us for more info

ENTRY SIZE

See table on opposite page

SHELL SIZE

See table on opposite page

ANGLE CONFIGURATION

- 00 Straight
- 45 45° angle
- 90° Right angle

PLATING CODE

See plating code selection table, Group A or B
see page 365

MATERIAL CODE

See material code selection table, Group 2 see
page 364

FAMILY TYPE

- BND18 MIL-DTL-5015 (MS3100)
- BND21 MIL-DTL-26482 Series I
- BND40 MIL-DTL-38999 Series III & IV
- BND41 MIL-DTL-38999 Series I & II
- BND54 MIL-DTL-26482 Series II and
MIL-DTL-5015 (MS3400)

The above backshell family designations are for the most common applications, for others not listed here please contact us.

BND40 - Shell Size Selection Table

Part No.	Ind. Ref.	Mil. Ref.	Max Entry Size
08	9	A	04
10	11	B	07
12	13	C	09
14	15	D	10
16	17	E	12
18	19	F	14
20	21	G	16
22	23	H	18
24	25	J	20

Selection tables shown here are for general indicative purposes only, as they represent the **BND40** MIL-C-38999 Series III & IV family of backshells only. For other family type backshells dimensions and characteristics please contact the sales department.

The entry size range shown above indicates the most common combinations only, for further options please contact us.

Both Backshells and Band Strap are available separately, please contact us for details.

Band straps are constructed from 300 series passivated corrosion resisting steel and offer:

- Low profile design
- Light weight construction
- Space reduction
- Ease of installation

Standard one step band straps 'V' have a band slot width of 6.35mm, with a choice of two tools available **TIE-DEX-II-TOOL** and **M81306/1-01**

The optional two step band strap has a slot width of 6.65mm, with combination tooling kit **TF1700** available.

Please contact us for more information.

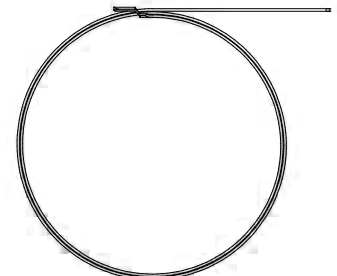
Note: The standard 6.35mm slot width band strap was previously denoted by 'B' suffix.

BND40 - Entry Size Dimensions Table

Entry Size	Nominal Internal Dia
03	4.7 mm
04	6.3 mm
05	7.9 mm
06	9.5 mm
07	11.1 mm
08	12.7 mm
09	14.2 mm
10	15.8 mm
11	17.4 mm
12	19.0 mm
13	20.6 mm
14	22.2 mm
15	23.8 mm
16	25.4 mm
18	28.6 mm
20	31.8 mm
22	35.0 mm
24	38.1 mm



One step band strap - Straight



One step band strap - Pre-coiled

Backshells

CFS Spring Series

Constant Force Spring
Screened Backshells

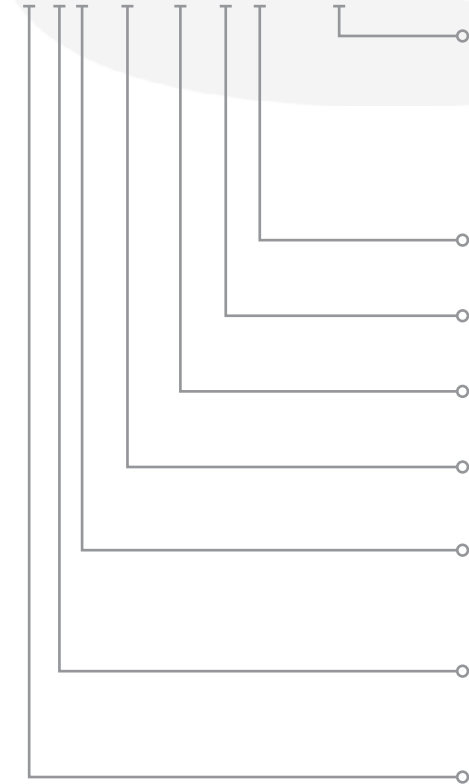
Constant Force Spring adaptors feature a fatigue and corrosion-resistant spring steel band to terminate the cable screen. The resulting 360° termination creates an effective electrical connection, providing screen continuity between braid and adaptor.

The terminated cable can then be protected and sealed using a heat-shrinkable moulded part, providing strain relief to the cable.

Using the part numbering elements below construct your part number, or contact us for details.



91H1-17-08-1-C-HE300



Part Numbering example

SPRING REF

HE050	7.5mm unconstrained
HE100	8.0mm unconstrained
HE200	12.8mm unconstrained
HE300	17.9mm unconstrained
HE400	21.8mm unconstrained
Omit if not required	

PLATING CODE

See plating code table, Group B on page 365

MATERIAL CODE

See material code table, Group 3 on page 364

ENTRY SIZE

See table 'X' on opposite page

SHELL SIZE

See table 'Y' on opposite page

ANGLE CONFIGURATION

1	Straight
2	45° angle
3	Right angle

INTERFACE

H	MIL-DTL-38999 Series III & IV
F	MIL-DTL-38999 Series I & II

SERIES TYPE

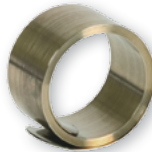
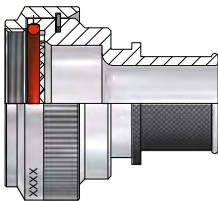
91	Spring termination series
----	---------------------------

CFS Spring Series

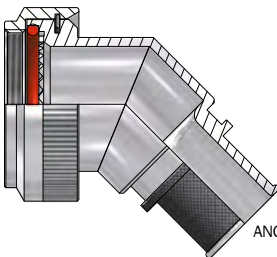
Constant Force Spring
Screened Backshells**91H - Shell Size Selection Table 'Y'**

Part No.	Ind. Ref.	Mil. Ref.	Max Entry Size
09	9	A	04
11	11	B	06
13	13	C	08
15	15	D	10
17	17	E	12
19	19	F	14
21	21	G	16
23	23	H	18
25	25	J	20

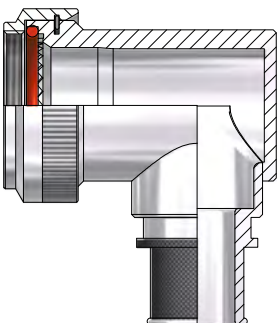
ANGLE 1



ANGLE 2



ANGLE 3

**91H - Entry Size Dimensions Table 'X'**

Entry Size	Internal Dia	Spring Ref
03	4.7 mm	HE050
04	6.3 mm	HE050
05	7.9 mm	HE100
06	9.5 mm	HE100
07	11.1 mm	HE100
08	12.7 mm	HE200
09	14.2 mm	HE200
10	15.8 mm	HE200
11	17.4 mm	HE200
12	19.0 mm	HE300
13	20.6 mm	HE300
14	22.2 mm	HE300
15	23.8 mm	HE300
16	25.4 mm	HE300
17	27.0 mm	HE400
18	28.6 mm	HE400
19	30.2 mm	HE400
20	31.8 mm	HE400
21	33.3 mm	HE400
22	35.0 mm	HE400
23	36.5 mm	HE400
24	38.1 mm	HE400

Selection tables shown here are for general indicative purposes only, as they represent the **91H** MIL-C-38999 Series III & IV family of backshells only. For other family type backshells dimensions and characteristics please contact the sales department.

The entry size range shown above indicates the most common combinations only, for further options please contact us.

Both Backshells and constant force springs are available separately, please contact us for details.

Backshells

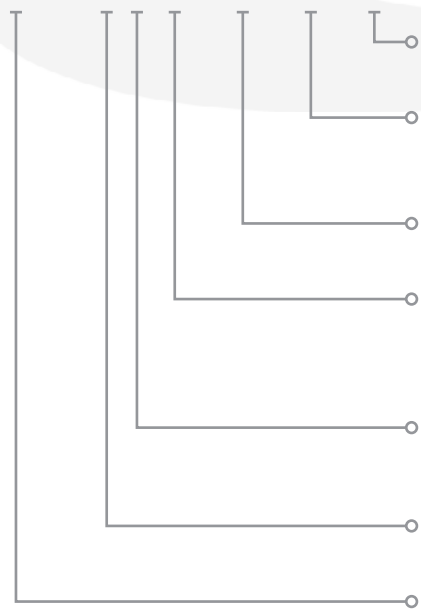
Hexashield® Series

Individual Screens
Screened Backshells

Superior EMC/EMI Shielding Performance
Hexashield is designed to provide optimum EMC protection solutions for both commercial and military applications, representing a significant improvement over pigtail termination methods. Providing 360° EMC shielding on the termination area of each individual cable, Hexashield backshells provide outstanding shielding effectiveness.

Using the part numbering elements below, construct your part number, or contact us for details.

HEX40 - A C 00 - 17 - A6 - 3

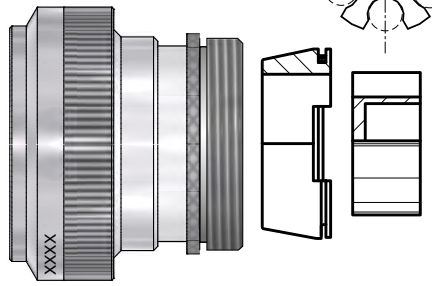


Additional Options Available

The options below are additional references in the part number, for details please contact us.

- Long body (item 4)
- Swept body (items 6 and 8)

360° Shielding Each Cable



Part Numbering example

BACK NUT TYPE

See illustration opposite

FERRULES

Number of ferrules to be fitted. These need to be ordered separately, see info opposite

SHELL SIZE

See table on opposite page

ANGLE CONFIGURATION

- 00** Straight
- 45** 45° angle
- 90°** Right angle

PLATING CODE

- B** Cadmium plated
- C** Electroless Nickel

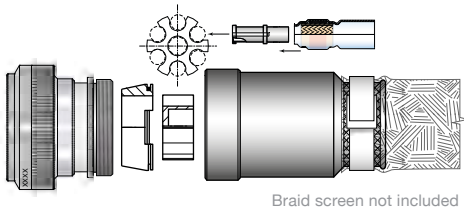
MATERIAL CODE

- A** Aluminium alloy

FAMILY TYPE

- HEX18** MIL-DTL-5015 (MS3100)
- HEX21** MIL-DTL-26482 Series I
- HEX40** MIL-DTL-38999 Series III & IV
- HEX41** MIL-DTL-38999 Series I & II
- HEX54** MIL-DTL-26482 Series II and MIL-DTL-5015 (MS3400)

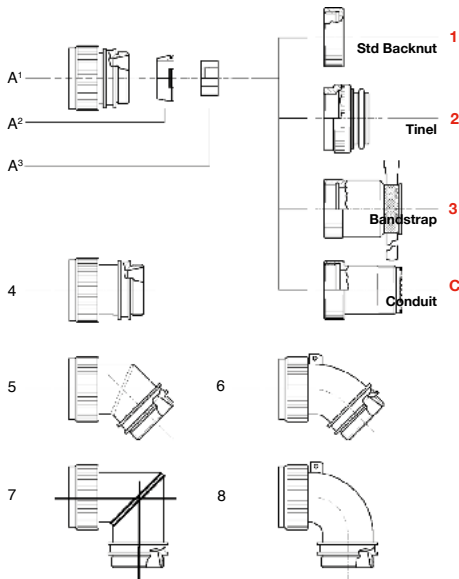
The above backshell family designations are for the most common applications, for others not listed here please contact us.

**Features and benefits**

- Simplified maintenance repair
- Excellent mechanical and environmental resistance
- Efficient strain relief
- Flexibility
- Versatility

EMC Performance

- Withstands 10-kA peak current lightning transients of SAE AE4L-87-3.
- Outperforms traditional pigtail termination, especially in HIRF performance.

**Ferrule Quantity by Shell Size**

Shell Size		Ferrule Quantity	
Ref.	Mil.	Std.	Opt.
09	A	1	-
11	B	2	-
13	C	3	-
15	D	5	-
17	E	6	7
19	F	7	-
21	G	9	11
23	H	10	13
25	J	12	17

Table shown is for indicative purposes only, as represents the MIL-C-38999 Series III & IV family of 'HEX' backshells only. For additional variations please contact us.

Ferrule Kit - Part Numbers

HET-A-02X Shielded cables - for small size cables with heat shrinkable SolderShield terminator.

HET-A-03X Unshielded cables - for small size cable with heat shrinkable sealing sleeve.

HET-A-04X Shielded cables - for larger shield diameter cables with heat shrinkable SolderShield terminator.

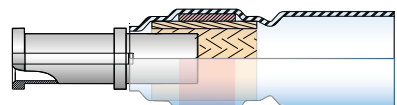
Type of plating

B = Cadmium plated

C = Electroless nickel

HET07-AX Ferrule - solid blank for use when a HET-A is not needed.

For assistance when ordering this product please contact us for more information.



Ferrule with solder sleeve assembled, before shrinking

Backshells

KTKK Series

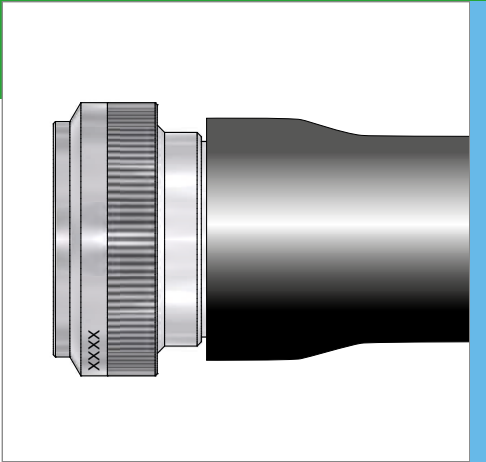
One Piece Heat Shrink Boot Assembly
Heat Shrink Screened Backshells

KTKK boot assemblies are one-part assemblies for screened cables. Constructed from heat-shrinkable screened moulded parts and connector adaptors, the assembly consists of parts already well proven in harsh military environments.

Installation is effected by coupling the adaptor to the connector and shrinking the rear of the moulded part onto the cable with a hot air gun. The moulded part has a hot-melt adhesive pre-installed to provide a bond between the cable jacket and the moulded part.

When used in conjunction with shielded (screened) cables, the assembly provides electrical continuity between the cable shield and the connector with Rayaten® moulded parts. Rayaten moulded parts are shielded, heat shrinkable parts providing shielding levels better than 80 dB at 100 MHz.

The following part number tables are for our most popular ranges that offer screened system 100, low fire hazard, with S1275 conductive adhesive. This selection represents a small selection of what is available in relation to materials and connector types.



Pre-Coated Screening Adhesive Options

Material	Coatings, shielded
Screened System 25, fluid-resistant modified elastomer	S1030 low fire hazard hot melt adhesive
Screened System 100, low fire hazard material	S1275 conductive adhesive for use with Rayaten moulded parts

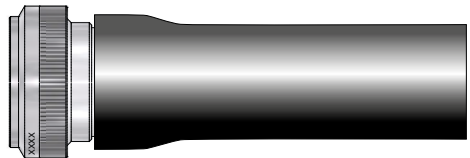
Other common variants include...

MIL-DTL-38999 Series III and IV - Aluminium with Cadmium Plate.

MIL-DTL-38999 Series I and II - Aluminium with Cadmium Plate.

Pattern 602 - Aluminium with Cadmium Plate.

For more information please contact us.



MIL-DTL-38999 Series III & IV Connectors - Nickel Aluminium Bronze



Shell Size	Straight Assemblies		45° Assemblies		90° Assemblies	
	Part Number	Cable Range	Part Number	Cable Range	Part Number	Cable Range
08	KTKK 2610	5.0 - 7.0	KTKK 3130	5.0 - 7.0	-	-
10	KTKK 2611	6.0 - 9.0	KTKK 3131	6.0 - 9.0	KTKK 2621	6.0 - 9.0
12	KTKK 2612	7.2 - 11.0	KTKK 3132	7.2 - 11.0	KTKK 2622	7.2 - 11.0
14	KTKK 2613	7.2 - 11.0	KTKK 3133	7.2 - 11.0	KTKK 2623	7.2 - 11.0
16	KTKK 2614	8.5 - 17.0	KTKK 3134	8.5 - 17.0	KTKK 2624	8.5 - 17.0
18	KTKK 2615	8.5 - 17.0	KTKK 3135	8.5 - 17.0	KTKK 2625	8.5 - 17.0
20	KTKK 2616	10.0 - 21.0	KTKK 3136	10.0 - 21.0	KTKK 2626	10.0 - 21.0
22	KTKK 2617	10.0 - 21.0	KTKK 3137	10.0 - 21.0	KTKK 2627	10.0 - 21.0
24	KTKK 2618	15.8 - 29.0	KTKK 3138	15.8 - 29.0	KTKK 2628	15.8 - 29.0

Pattern 105 Connectors - Aluminium with Cadmium Plate

Shell Size	Straight Assemblies		45° Assemblies		90° Assemblies	
	Part Number	Cable Range	Part Number	Cable Range	Part Number	Cable Range
08	KTKK 0465	5.0 - 7.0	KTKK 0603	5.0 - 7.0	-	-
10	KTKK 0466	6.0 - 9.0	KTKK 0604	6.0 - 9.0	KTKK 1251	6.0 - 9.0
12	KTKK 0467	7.2 - 11.0	KTKK 0605	7.2 - 11.0	KTKK 1252	7.2 - 11.0
14	KTKK 0468	7.2 - 11.0	KTKK 0606	7.2 - 11.0	KTKK 1253	7.2 - 11.0
16	KTKK 0469	8.5 - 17.0	KTKK 0607	8.5 - 17.0	KTKK 1254	8.5 - 17.0
18	KTKK 0470	8.5 - 17.0	KTKK 0608	8.5 - 17.0	KTKK 1255	8.5 - 17.0
20	KTKK 0471	10.0 - 21.0	KTKK 0609	10.0 - 21.0	KTKK 1256	10.0 - 21.0
22	KTKK 0472	10.0 - 21.0	KTKK 0610	10.0 - 21.0	KTKK 1257	10.0 - 21.0
24	KTKK 0473	15.8 - 29.0	KTKK 0611	15.8 - 29.0	KTKK 1258	15.8 - 29.0

Pattern 608 Connectors - Nickel Aluminium Bronze



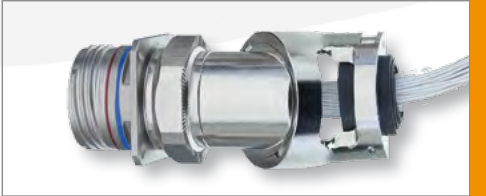
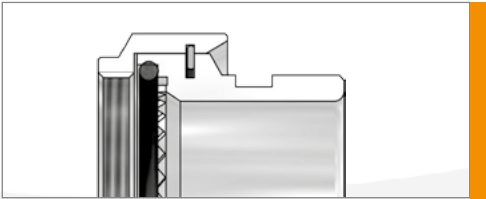
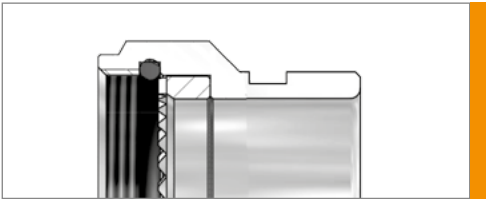
Shell Size	Straight Assemblies		45° Assemblies		90° Assemblies	
	Part Number	Cable Range	Part Number	Cable Range	Part Number	Cable Range
08	KTKK 0444	5.0 - 7.0	KTKK 0580	5.0 - 7.0	-	-
10	KTKK 0445	6.0 - 9.0	KTKK 0581	6.0 - 9.0	KTKK 1021	6.0 - 9.0
12	KTKK 0446	7.2 - 11.0	KTKK 0582	7.2 - 11.0	KTKK 1022	7.2 - 11.0
14	KTKK 0447	7.2 - 11.0	KTKK 0583	7.2 - 11.0	KTKK 1023	7.2 - 11.0
16	KTKK 0448	8.5 - 17.0	KTKK 0584	8.5 - 17.0	KTKK 1024	8.5 - 17.0
18	KTKK 0449	8.5 - 17.0	KTKK 0585	8.5 - 17.0	KTKK 1025	8.5 - 17.0
20	KTKK 0450	10.0 - 21.0	KTKK 0586	10.0 - 21.0	KTKK 1026	10.0 - 21.0
22	KTKK 0451	10.0 - 21.0	KTKK 0587	10.0 - 21.0	KTKK 1027	10.0 - 21.0
24	KTKK 0452	15.8 - 29.0	KTKK 0588	15.8 - 29.0	KTKK 1028	15.8 - 29.0

Backshells

Non-Screened Backshell Types

Suitable for Heat Shrink Boots

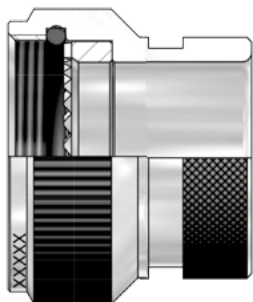
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15
- 16
- 17
- 18
- SOLID**
Solid adaptors are designed for use where no access is required, for example when potting is necessary or a lower space profile is needed. These adaptors have a groove to accommodate heat-shrinkable moulded parts.
 - SPIN-COUPLING**
Have a rotatable coupling nut and a grooved body to accommodate lipped heat-shrinkable moulded parts. Spin-coupling adaptors combined with heat-shrinkable moulded parts provide environmental protection and strain relief for unscreened cable terminations.
 - SPIN LOCK**
A variable angle backshell that enables straight, 45° and right angle 90° cable terminations with the same part. The connector backshell swivelling body rotates around the axis of the cable bundle and locks in position, minimising stress on the wire bundle.



Solid Backshells

2xxMx Series

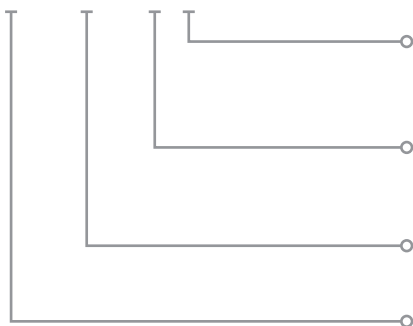
Non-Screened Backshells



Shell Size Selection Table

Part No.	Ind. Ref.	Mil. Ref.	Entry Ø mm
08	9	A	6.35
10	11	B	9.32
12	13	C	12.70
14	15	D	15.88
16	17	E	19.05
18	19	F	20.62
20	21	G	23.80
22	23	H	26.97
24	25	J	30.18

209M3 16 - 19 B



Solid or direct coupling backshells suitable for use with a lipped heat shrinkable boot. The list below represents the family designations for the most common applications, for others not listed here please contact us.

Family Type Designation

MIL-C-5015 (MS3100)

218M5 Straight backshell family

MIL-C-26482 Series I

203M6 Straight backshell family

MIL-C-38999 Series III & IV.

209M3 Straight backshell family

MIL-C-38999 Series I & II.

201M1 Straight backshell family

MIL-C-26482 Series II and

MIL-C-5015 (MS3400)

201M9 Straight backshell family

Patt 603 and BS9522 N0001

225M6 Straight backshell family

Part Numbering example

PLATING CODE

See plating code selection table, Group A on page 365

MATERIAL CODE

See material code selection table, Group 1 on page 364

SHELL SIZE

See table above

FAMILY TYPE

See text above

The backshell family designations are for the most common applications, for others not listed here please contact us.

Backshells

Spin-Coupling Backshells

2xxMx Series
Non-Screened Backshells

Spin-coupling backshells suitable for use with a lipped heat shrinkable boot. The list below represents the family designations for the most common applications, for others not listed here please contact us.

Family Type Designation

MIL-C-5015 (MS3100)
218M6 Straight backshell family

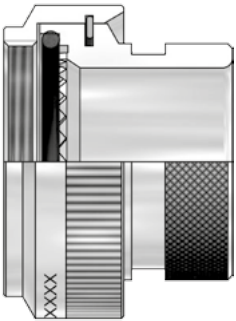
MIL-C-26482 Series I
203M9 Straight backshell family

MIL-C-38999 Series III & IV.
209M4 Straight backshell family

MIL-C-38999 Series I & II.
202M2 Straight backshell family

MIL-C-26482 Series II and
MIL-C-5015 (MS3400)
201M1 Straight backshell family

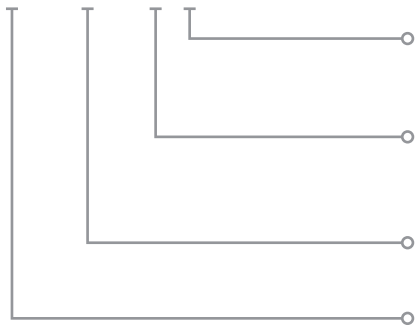
Patt 603 and BS9522 N0001
225M5 Straight backshell family



Shell Size Selection Table

Part No.	Ind. Ref.	Mil. Ref.	Entry Ø mm
08	9	A	6.35
10	11	B	9.52
12	13	C	12.70
14	15	D	15.75
16	17	E	18.92
18	19	F	20.62
20	21	G	23.80
22	23	H	26.97
24	25	J	29.85

209M4 16 - 19 B



Part Numbering example

PLATING CODE

See plating code selection table, Group A on page 365

MATERIAL CODE

See material code selection table, Group 1 on page 364

SHELL SIZE

See table above

FAMILY TYPE

See text above

The backshell family designations are for the most common applications, for others not listed here please contact us.

Spin-Lock Backshells

SLC and SLM Variable Angle
Non-Screened Backshells

The Spin Lock variable angle backshell enables straight, 45° and right angle 90° cable terminations with the same part.

The connector backshell swivelling body rotates around the axis of the cable bundle and locks in position, minimising stress on the wire bundle.

There are many combinations and variants that are possible with numerous part number formats, so for additional information please contact us.

Meets or exceeds SAE-AMS-85049

Dimensions - MIL-C-38999 Series III & IV

Shell	D	E	F	G	H	K	J
08	47.8	48.3	34.8	42.2	45.7	5.94	27.7
10	50.8	52.1	37.3	46.5	47.2	5.94	30.5
12	51.8	55.4	39.1	49.5	49.3	8.45	32.0
14	58.4	60.5	45.5	52.6	53.6	11.6	36.3
16	62.0	64.3	49.0	56.9	57.9	15.6	40.1
18	65.8	70.1	56.1	62.7	64.8	16.1	44.5
20	68.6	71.4	55.4	65.0	67.8	17.7	48.0
22	73.4	80.0	58.2	73.7	75.2	20.9	50.5
24	75.2	82.6	60.7	75.2	77.2	21.7	53.3

Measurements are in millimetres and nominal

The dimensional information above is for our most popular backshell application family, others are available upon request. For further details, including entry size options, materials, platings and options please contact us.

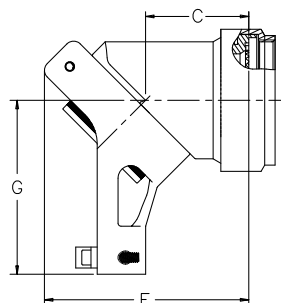
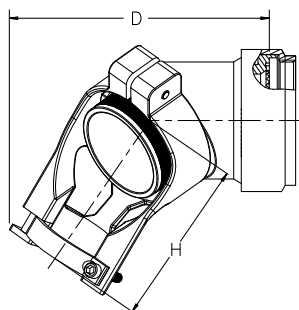
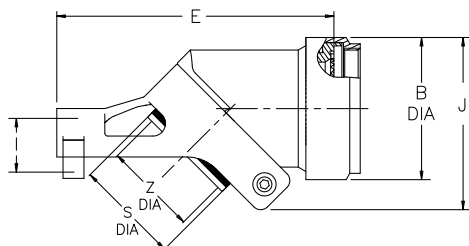
Saddle Clamp Version (as shown)

SLC-40-AB-1610 part No. example

- Entry Size
- Shell Size
- Plating
- Material
- Connector family

MATERIALS

- Base: Aluminum or stainless steel
- Plating: Electroless nickel, cadmium, zinc nickel, or passivated



Backshells

Connector Accessories

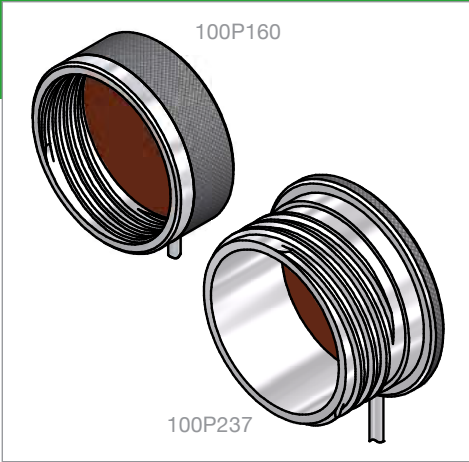
MIL-DTL-38999 III
Protective Caps

Outlined on these two pages are protection caps for MIL-DTL-38999 Series III connectors which represents our most popular dust caps.

100P160 Series
Receptacle protection cap

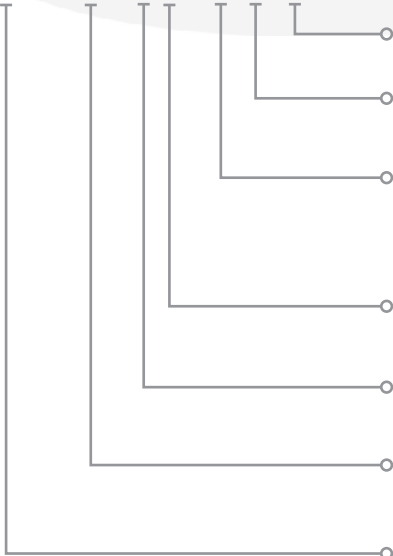
100P237 Series
Plug protection cap

This represents a small proportion of what is available in the complete range, for these variants please contact us for details.



Omit for no attachment

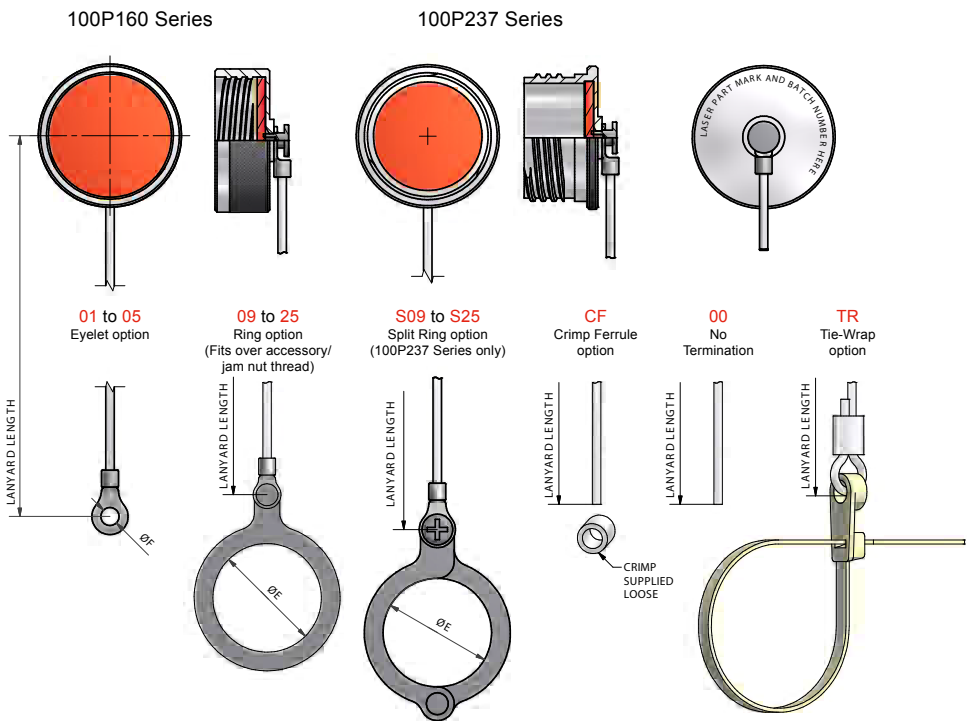
100P160-17-1-B-TC5-17



Part Numbering example

- Attachment**
See illustrations above for code
- LANYARD LENGTH**
In inches, with tolerance +1”/-0”
- LANYARD TYPE**
TC Teflon covered (clear) stainless steel wire rope, available as standard.
For further lanyard options please contact us.
- PLATING CODE**
See plating code table, Group B on page 365.
- MATERIAL CODE**
See material code table, Group 3 on page 364.
- SHELL SIZE**
Range of sizes include
09, 11, 13, 15, 17, 19, 21, 23 and 25
- SERIES**
100P160 Series receptacle protection cap
100P237 Series plug protection cap
100P757 Series arctic grip receptacle cover
100P756 Series arctic grip plug cover
- Other series are available for other connector series, please contact us for details.

Lanyard Attachments



Eyelet

REF.	ØF
01	3.2
02	3.7
03	4.3
04	5.3
05	6.4

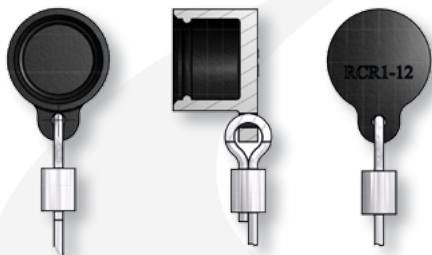
Ring Ref - 160 Series

REF.	ØE
09	18.0
11	21.4
13	25.8
15	28.8
17	32.0
19	35.0
21	38.3
23	41.7
25	44.6

Ring Ref - 237 Series

REF.	SPLIT RING REF	ØE
09	S09	15.1
11	S11	18.0
13	S13	19.4
15	S15	22.6
17	S17	25.8
19	S19	28.8
21	S21	32.0
23	S23	34.1
25	S25	40.1

Elastomer Dust Caps

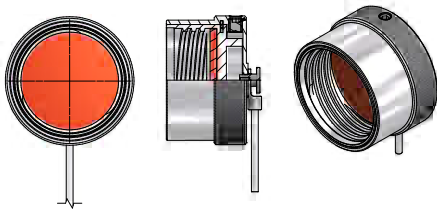


Our caps provide a reliable and durable solution to the protection of connectors whilst in transit or being handled in a wide range of environments. Flexible enough to fit a variety of different sized connectors, they can also be colour coded to greatly increase the ease of identifying corresponding connectors/ connection points.

- Eliminate the potential for damaging other equipment while the cap is not attached to the connector
- Fit to a variety of different connector specifications
- Provide reliable protection while connectors are being transported and handled
- Flexible enough fit different size connectors
- Can be colour coded to identify different connectors and connection points
- Available in Fluorosilicone, Silicone and Neoprene, dependent on application environment, temperature and fluid resistance requirements.

Universal - **100P3188**
MIL-DTL-5015 - **RCR1**
MIL-DTL-26482 - **RCR8**
VG95234 - **RCRQ**

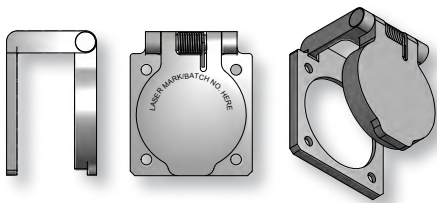
Anti Tamper Dust Caps



Used on data ports of equipment containing sensitive and confidential data. The design allows the outer shell of the cap to spin without uncoupling until it is locked in position with a small key, allowing it to be removed.

MIL-DTL-38999 Series III - **PRC433TL**
Other shell sizes and connector series available.

Self Closing Dust Caps



Ensures the protective cap is not removed or lost from equipment, with strong machined construction.

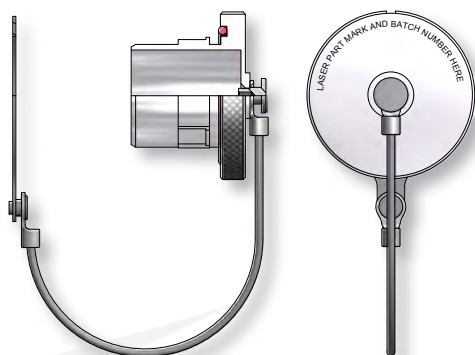
38999 Series III derived square flange receptacle. Other shell sizes and connector series available.

MIL-DTL-38999 Series III - **PC4SCC**

Connector Accessories

MIL-DTL Part Numbering Reference

Protective Caps



As part of our commitment to offering complete harnessing component solutions we can also supply a vast range of accessories such as those illustrated here. Components are sourced from leading edge companies with industry approvals.

- Many parts machined from solid material for reliable strength and performance
- Compatible with Mil-Spec dimensions and performance
- Wide choice of lanyard options available
- Gasket material options available

Please contact us for more information.

MIL-DTL-26482 Series II**PRC3181** series standard receptacle cover**PPC3180** series standard plug cover**MIL-DTL-38999 Series I****PRC27502** series standard receptacle cover**PPC27501** series standard plug cover**MIL-DTL-38999 Series II****PRC27511** series standard receptacle cover**PPC27510** series standard plug cover**MIL-DTL-38999 Series III**

See pages 384-385

MIL-DTL-38999 Series IV**100P608** series standard receptacle cover**100P609** series standard plug cover**MIL-DTL-5015H****100P1240** series standard receptacle cover**100P1167** series standard plug cover**MIL-DTL-5015D****100P820S** series standard receptacle cover**100P1136S** series arctic grip receptacle cover**100P738** series standard plug cover**MIL-DTL-83723 Series III****P83723/60** series standard receptacle cover**P83723/59** series standard plug cover**VG96912****PRC96912** series standard receptacle cover**PPC96912** series standard plug cover**MIL-PRF-39012 BNC/TNC RF Coax****PJCBNC** series standard receptacle cover**PJCTNC** series standard receptacle cover**PPCBNC** series standard plug cover**PPCTNC** series standard plug cover



Wire and Cable

Heat-shrink Tubing

Non-shrink Tubing

Braided Sleeving

Screening Braids

Moulded Parts

Terminals and Splices

Wire and Cable Markers

Accessories

Connectors

Backshells

Bonding Leads

Metal Braids

Relays and Contactors

Switches and Grips

Adhesives and Tapes

Application Equipment

Added Value Services



Flat, Round, Rope, High-Flex, Lightweight and Quick Release

Manufactured by IS-Cabletec who are part of the IS-Group of companies and can offer a range of specialist high performance metal braid and earth bonding leads, designed and approved for aerospace, defence, industrial and energy market applications.

The comprehensive range of high quality metallic products includes customised and market approved bonding leads, flat, round and rope braids, with various options of materials, terminations, insulation and identification:

Custom Projects

In addition to the standard materials used to produce braids and bonding leads it is also possible to utilise even higher performance materials such as stainless steel, silver plated copper and pure nickel.

These 'specialist' materials exhibit properties suitable for the most demanding applications, such as those requiring extreme temperature and corrosion resistance.

Silver-plated Copper:
For applications needing excellent conductivity at temperatures up to 200°C. Particularly suitable for extreme aerospace and space applications.

Stainless Steel:
Offers outstanding corrosion resistance compared to many materials, particularly when in contact with salt water and high temperature capability up to 400°C. Ideal for off-shore and marine applications.

Nickel:
Pure nickel strand can be used at even higher temperatures (649°C) whilst still exhibiting excellent conductivity and corrosion resistance. Nickel is particularly suitable for applications in extreme conditions such as welding, furnaces and power stations.

Market Approvals

Our sister company is a supplier of bonding leads and metal braid to many of the major aerospace and defence companies of Europe and an influential contributor to the development and promotion of the EN4199 European standard for metal braid and bonding leads.

In addition to EN4199, they manufacture products to a comprehensive range of aerospace and defence specifications, some of which are detailed below.

Airbus

ASNE0088 to 0092
Round braid bonding leads, Tin and nickel plated

Typhoon (Eurofighter)

JN1061	Flat braid bonding leads, Ni plated Cu
JN1151	Flat and rope bonding leads, Ni plated Cu
JN1006	Quick release bonding leads, Sn plated Cu
JN1077	Quick release bonding leads, Ni plated Cu
JN1068	Rope bonding leads, Al

Typhoon, Tornado and Hawk

PAN6619 Quick release bonding leads

General

LN9264, CSP48 and AGS2097
Please contact us for more details.

Custom Specialised

CFBA Series	Custom bonding leads	page 392
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Flat Bonding Leads

FBL Series	Flat bonding leads	page 394
CBL150 and CBL260 Series	Flat bonding leads	page 396
LN9264	Bonding leads	page 398
AGS2097	Bonding leads	page 399

Round and Rope Bonding Leads

CFBA4199-004 Series	Round bonding leads	page 400
RBL Series	Rope bonding leads	page 402
CRL260 Series	High flex bonding leads	page 404
CFBA1068 Series	Lightweight bonding leads	page 405

Quick Release

QBL150 Series	Quick release bonding leads	page 406
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Bonding Leads

CFBA Custom Series

Material Options
Customised Bonding Leads

In addition to our standard products we are able to supply fully customised bonding leads, each with their own unique part number.

Our bonding leads are constructed from an extensive range of manufactured braids and ropes combined with components from a multitude of termination, insulation and identification options, resulting in bonding leads specifically tailored to meet the demands of your application.

We aim to keep the minimum order quantities low, lead times short and ensure that our product quality and customer service levels are consistently high.

Please contact us with your requirements.

Material Options

- Plain copper
- Tin-plated copper
- Nickel-plated copper
- Aluminium
- Stainless steel
- Nickel
- Silver plated copper

...other materials available please contact us.

Terminations

- Crimped terminal
- Pressed ferrules

Braid Styles

- Flat
- Round
- Rope
- Layered

Insulation and Identification

- Various materials available, see our heat-shrink tube product range

Cross-sectional Area

- 1.5mm² to 1000mm²



Features & Benefits






- Broad range of materials and options
- Insulation and identification options
- Short lead times
- Low MOQs



Material Selection

	Conductivity	Corrosion Resistance	Max. Operating Temperature*	Applications
Aluminium	Fair	Fair	371°C	Industrial, Aerospace
Plain Copper	Good	Fair	150°C	Industrial, Rail
Tin-plated Copper	Good	Good	150°C	Industrial, Defence
Stainless Steel	Fair	Excellent	400°C	Industrial, Offshore
Nickel-plated Copper	Excellent	Excellent	260°C	Aerospace, Marine
Pure Nickel	Excellent	Excellent	649°C	Aerospace, Industrial
Silver-plated Copper	Excellent	Good	200°C	Aerospace, Space

Standard Terminal Options (others available)

Ring	Forked	Insulated	Pressed	Quick Release
				
Industrial, Defence, Aerospace	Industrial, Defence	Industrial, Defence, Aerospace	Industrial, Defence, Energy	Aerospace, Defence

Current Rating (Tin-plated Copper)

Cross-sectional Area	Current Rating (amps)
1.5	28
2.5	34
6.0	69
10.0	97
16.0	132
25.0	178
50.0	282
100.0	400

These current ratings are based on a temperature rise of 50°C above ambient

Note: Temperature for uninsulated leads, max operating temperature for insulated leads depends on selected material

For additional information on what is possible or should you have a particular design or application in mind please contact our sales office for details.

Colour tracer identification option available.



Bonding Leads

FBL Series

Tin-plated Copper
Flat Bonding Leads

FBL bonding leads are manufactured from tin plated copper flat braid, terminated at each end with a pressed ferrule type connector. The benefit of using pressed ferrules is that you achieve maximum electrical contact with minimum resistance. FBL bonding leads are flexible, robust, durable and reliable; perfect for the most demanding industrial applications. They are available with a wide range of standard lengths and hole sizes, and with or without insulation. In addition, they have low minimum order quantities and short manufacturing lead times

Operating Temperature

- Tin-plated copper: -65°C to +150°C
- Insulated: -40°C to +135°C

Features & Benefits

- Pressed ferrule design
- Durable and robust
- Ready to fit design

Part Numbering example

Insulated:

Leave blank if insulation not required

Hole sizes:

See table for options

Standard Lengths:

Customer specified

Cross Sectional Area:

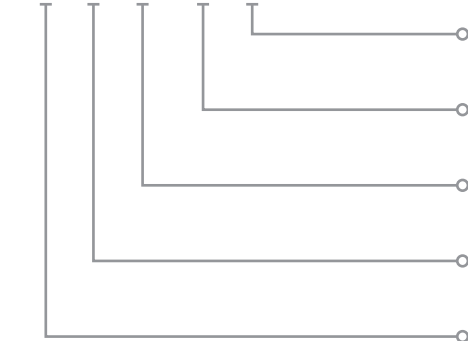
See table for available sizes

Part Reference:

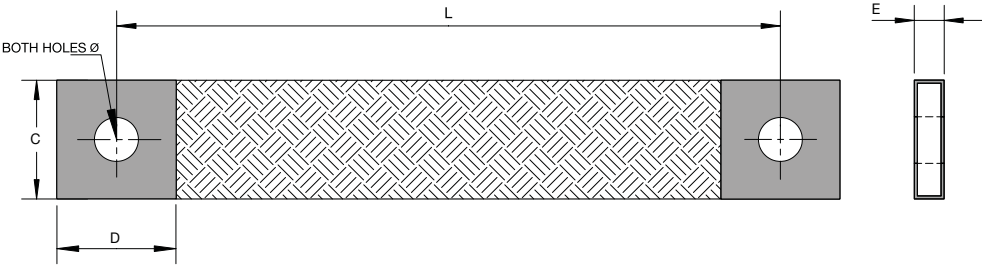
FBL Tin plated copper



FBL-4-200-M6-S



Custom Design:
Other non-standard materials and additional terminal options are available on request, please contact our sales office for information.



Hole Size Availability

Cross-sectional Area	Hole Size							
	M4	M5	M6	M8	M10	M12	M14	M16
	4.5mm	5.5mm	6.5mm	8.5mm	10.5mm	13.0mm	15.0mm	18.0mm
4	✓	✓	✓					
6	✓	✓	✓	✓				
10	✓	✓	✓	✓	✓			
16		✓	✓	✓	✓	✓	✓	
25		✓	✓	✓	✓	✓	✓	✓
35		✓	✓	✓	✓	✓	✓	✓
50			✓	✓	✓	✓	✓	✓

Cross Sectional Area and Dimensional Information

Cross-sectional Area	Strand Size	C	D	E	Maximum Allowable Hole Size	Current Rating
mm ²	mm	mm	mm	mm	mm	amps
4	0.15	10	10	2.0	6.5	50
6	0.15	13	15	2.0	8.5	65
10	0.15	14	13	3.0	10.5	90
16	0.20	19	20	3.5	15.0	125
25	0.15	25	25	4.0	18.0	160
35	0.20	25	25	4.5	18.0	220
50	0.20	25	25	5.0	18.0	260

Bonding Leads

CBL150 and CBL260

Tin & Nickel-plated Copper Braid
Flat Bonding Leads

The CBL range of flat style bonding leads are designed for aerospace and military applications, but are also suitable for higher performance industrial uses.

Available with or without insulation in both tin-plated and nickel-plated copper in a range of cross-sectional areas. They are highly flexible, robust and reliable.

Features & Benefits

- Flexible robust and reliable
- Choice of terminal sizes

Operating Temperature

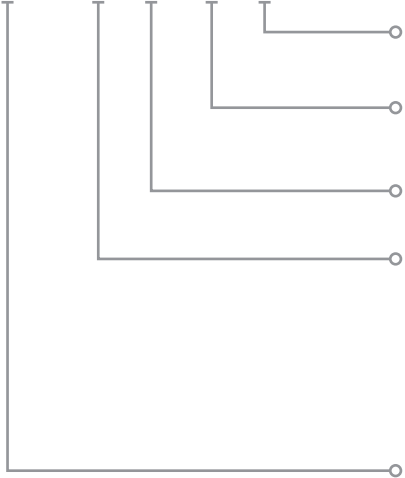
- Tin-plated copper: -65°C to +150°C
- Nickel-plated copper: -65°C to +260°C
- Insulated -65°C to +150°C



Specifications/Approvals

- Manufactured to EN4199-003 design.

CBL260-10-CC-200-S



Part Numbering example

Insulated:

Leave blank if insulation not required

Lengths:

Min. 50mm and above in 25mm increments

Terminal Reference:

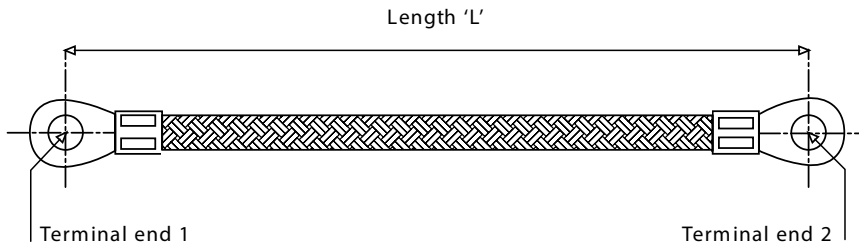
See terminal availability see tables

Cross Sectional Area

1.5	1.5mm ²
4	4mm ²
6	6mm ²
10	10mm ²
16	16mm ²
25	25mm ²

Part Reference:

CBL150	Tin plated copper
CBL260	Nickel plated copper

**Terminal Availability: CBL150 tin-plated copper**

Terminal Code	End Terminals		Availability for Cross-Sectional Area					
	Stud	Hole Ø	1.5mm ²	4.0mm ²	6.0mm ²	10.0mm ²	16.0mm ²	25.0mm ²
A	#6	3.68mm	✓					
B	#8	4.34mm	✓	✓	✓			
C	#10	5.00mm	✓	✓	✓	✓	✓	✓
D	1/4"	6.73mm	✓	✓	✓	✓	✓	✓
E	5/16"	8.33mm		✓	✓	✓	✓	✓
F	3/8"	9.91mm				✓	✓	✓

Terminal Availability: CBL260 nickel-plated copper

Terminal Code	End Terminals		Availability for Cross-Sectional Area					
	Stud	Hole Ø	1.5mm ²	4.0mm ²	6.0mm ²	10.0mm ²	16.0mm ²	25.0mm ²
A	#6	3.68mm	✓	✓				
B	#8	4.34mm	✓	✓	✓			
C	#10	5.00mm	✓	✓	✓	✓		
D	1/4"	6.73mm	✓	✓	✓	✓	✓	
E	5/16"	8.33mm			✓	✓	✓	
F	3/8"	9.91mm					✓	✓

Technical Information for Uninsulated CBL260 (Nickel-plated copper) Leads

Braid cross-section	Min. Tensile Strength	Nom. resistance 100mm Length	Braid Resistance	Nom. Mass 100mm Length	Braid Mass
mm ²	N	mΩ	mΩ per 25mm	g	g per 25mm
1.5	250	1.32	0.308	2.6	0.40
4	600	0.40	0.112	6.3	1.10
6	800	0.24	0.075	10.7	1.63
10	1200	0.14	0.046	18.4	2.90
16	1700	0.09	0.030	28.9	3.93
25	2200	0.06	0.015	43.2	7.85

For information on nominal resistance and mass for non standard lengths please contact us

Bonding Leads

LN9264

Tin and Nickel Plated Copper Braid
Bonding Leads

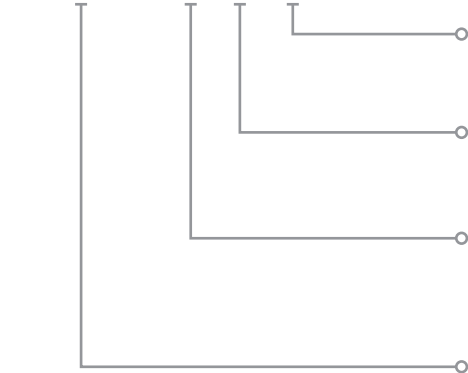
LN9264 is a long established aerospace and defence specification containing a series of uninsulated tin and nickel plated copper bonding leads terminated with a range of crimp style round terminals. They are available in six standard cross-sectional areas and a limited range of lengths.

Operating Temperature

- Tin-plated copper: -65°C to +150°C
- Nickel-plated copper: -65°C to +260°C



CFBA9264-4-160-N



Features & Benefits

- Flat style braid
- Aerospace and military approved

Part Numbering example

Material:

- T Tin plated copper
- N Nickel plated copper

Standard Lengths:

60mm, 80mm, 100mm, 125mm, 160mm, 200mm and 250mm

Cross Sectional Area

- | | | | |
|-----|--------------------|----|-------------------|
| 1.5 | 1.5mm ² | 4 | 4mm ² |
| 6 | 6mm ² | 10 | 10mm ² |
| 16 | 16mm ² | 25 | 25mm ² |

Part Reference:

CFBA9264

Braid cross-section	Current	Resistance @ 20°C	Terminal Hole Ø
mm ²	amps	Ω/1000m	mm
1.5	16	14.2	4.34
4	30	5.3	5.00
6	40	3.5	6.73
10	65	2.1	6.73
16	80	1.3	8.33
25	125	0.85	9.91

AGS2097

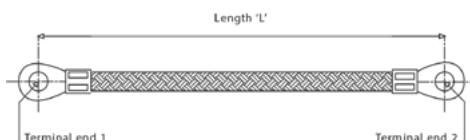
Tin-plated Copper Braid
Bonding Leads

AGS2097 bonding leads are a series of aerospace approved bonding leads, generally, but not exclusively, found on legacy aircraft such as Tornado, Hawk and the C-130 (Hercules).

They are only available with one standard braid size 0.7mm² and a combination of terminal sizes and lengths.

Operating Temperature

- Tin-plated copper: -65°C to +150°



Part Numbering example

Terminal Code
End 2

Standard Lengths:
1" increments, minimum length 3".

Terminal Code
End 1

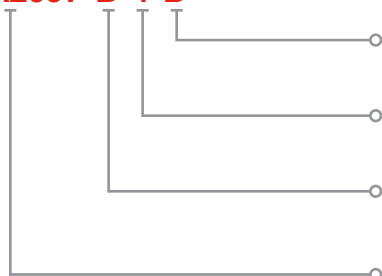
Part Reference:
CFBA2097

Terminal Code	Hole Diameter (mm)
B	3.68
C	5.00
E	6.73
G	8.33
J	9.91

Features & Benefits

- Aerospace approved
- 0.7mm² cross-sectional area
- Multiple lengths

CFBA2097-B-4-B



Bonding Leads

CFBA4199-004 Series

Tin and Nickel-plated Copper Braid
Round Bonding Leads

CFBA4199-004 bonding leads are designed specifically for Aerospace and Military applications. They have undergone extensive mechanical and electrical testing, including flex testing to 250,000 cycles, sinusoidal and random vibration cycles, salt mist testing and temperature cycling.

CFBA4199-004 bonding leads are manufactured from multi-layer round braid and are available in tin-plated and nickel plated copper in a variety of cross-sectional areas, lengths and termination options.

Operating Temperature

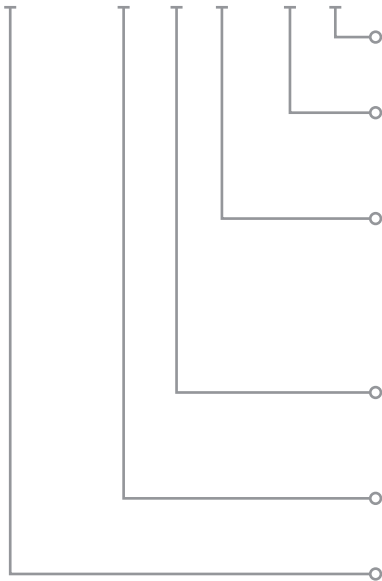
- Tin-plated copper: -65°C to +150°C
- Nickel-plated copper: -65°C to +260°C



Specifications/Approvals

- Tested to EN4199-001

CFBA4199-004-N-7.0-250-E



Part Numbering example

Terminal Code:

E See table opposite

Standard Lengths:

250 See table opposite, other lengths available on request.

Cross Sectional Area

1.4	1.4mm ²
3.5	3.5mm ²
4.5	4.5mm ²
7.0	7.0mm ²
13.0	13mm ²

Material:

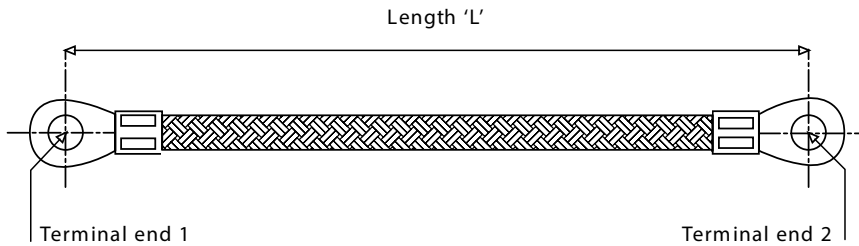
T Tin-plated copper
N Nickel-plated copper

Product standard:

CFBA4199-004

Part Reference:

CFBA4199



Terminal Code	End One		End Two		Availability for Cross-Sectional Area				
	Stud	Hole Ø	Stud	Hole Ø	1.4mm ²	3.5mm ²	4.5mm ²	7.0mm ²	13.0mm ²
A	#6	3.68mm	#6	3.68mm	✓	✓	✓		
B	#8	4.34mm	#8	3.68mm	✓	✓	✓		
C	#10	5.00mm	#6	3.68mm	✓	✓	✓		
D	1/4"	6.73mm	#6	3.68mm	✓	✓	✓		
E	#8	4.34mm	#8	4.34mm	✓	✓	✓	✓	
F	#10	5.00mm	#8	4.34mm	✓	✓	✓	✓	
G	1/4"	6.73mm	#8	4.34mm	✓	✓	✓	✓	
H	#10	5.00mm	#10	5.00mm	✓	✓	✓	✓	✓
J	1/4"	6.73mm	#10	5.00mm	✓	✓	✓	✓	✓
K	1/4"	6.73mm	1/4"	6.73mm	✓	✓	✓	✓	✓
L	5/16"	8.33mm	#10	5.00mm	✓			✓	✓
M	5/16"	8.33mm	5/16"	8.33mm	✓			✓	✓
N	5/16"	8.33mm	1/4"	6.73mm					✓

Standard Lengths	Availability for Cross-Sectional Area				
'L' mm	1.4mm ²	3.5mm ²	4.5mm ²	7.0mm ²	13.0mm ²
63	✓			✓	
80	✓	✓	✓	✓	✓
100	✓	✓	✓	✓	✓
125	✓	✓	✓	✓	✓
160	✓	✓	✓	✓	✓
200	✓	✓	✓	✓	✓
250	✓	✓		✓	✓
315	✓			✓	
400	✓	✓	✓	✓	
500		✓		✓	
630				✓	
800				✓	

Bonding Leads

RBL Series

Tin-plated Copper
Rope Bonding Leads

RBL bonding leads are stranded rope construction assemblies manufactured from annealed copper ETP1 manufactured to BS EN13602. They are robust, highly flexible and durable, making them perfectly suited to dynamic applications and those in high vibration environments.

In addition, RBL bonding leads boast large cross-sectional areas whilst keeping overall diameters to a minimum making them ideal for size restricted applications.

Operating Temperature

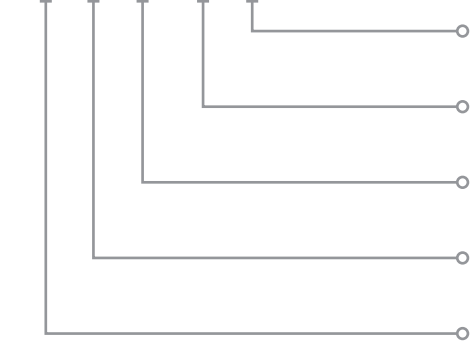
- Tin-plated copper: -65°C to +150°C
- Insulated: -40°C to +135°C



Features & Benefits

- Multi-directional flexibility
- Durable and robust design

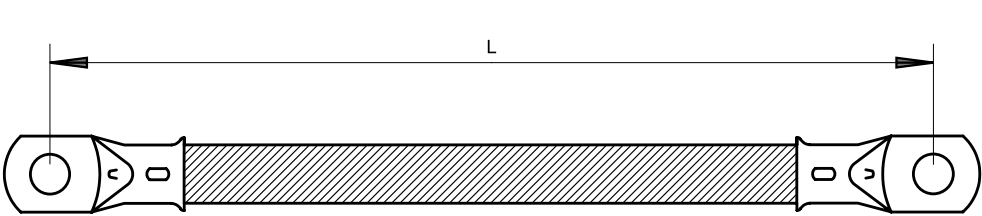
RBL-4-200-M6-S



Part Numbering example

- Insulated:**
Leave blank if insulation not required
- Hole sizes:**
See table for options
- Standard Lengths:**
Customer specified
- Cross Sectional Area:**
See table for available sizes
- Part Reference:**
RBL Tin plated copper

Custom Design:
Other non-standard materials and additional terminal options are available on request, please contact our sales office for information.



Hole Size Availability

Cross-sectional Area (mm²)	Hole Size							
	M4	M5	M6	M8	M10	M12	M14	M16
	4.5mm	5.5mm	6.5mm	8.5mm	10.5mm	13.0mm	15.0mm	18.0mm
4	✓	✓	✓	✓	✓			
6	✓	✓	✓	✓	✓	✓		
10		✓	✓	✓	✓	✓		
16		✓	✓	✓	✓	✓		
25		✓	✓	✓	✓	✓		
35		✓	✓	✓	✓	✓	✓	✓
50		✓	✓	✓	✓	✓	✓	✓

Current Rating Information

Cross-sectional Area	Current Rating
mm²	amps
4	50
6	60
10	80
16	120
25	150
35	200
50	240

Bonding Leads

CRL260 Series

Nickel-plated Copper Braid
High Flex Bonding Leads

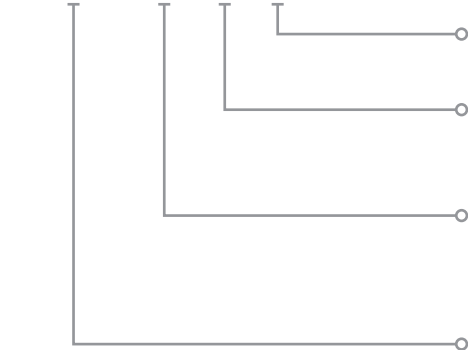
CRL260 bonding leads are designed to withstand exceptional levels of flexing in combination with outstanding resistance to corrosion and salt attack. When tested to the flex endurance test in EN4199-001, they withstand over 5 million cycles. Outperforming other existing aerospace standard leads by more than 5 times. Particularly suited for dynamic applications in exposed areas such as external aircraft doors and flaps.

Operating Temperature

- Nickel-plated copper: -65°C to +260°



CRL260-5.0-200-A



Features & Benefits

- Flex endurance to EN4199-001
- Choice of 5 cross sectional areas
- Choice of terminal sizes

Part Numbering example

Terminal Code:

See terminal availability see table below

Standard Lengths:

Min. 50mm and above
in 25mm increments

Cross Sectional Area

3.5	3.5mm ²	5.0	5mm ²
7.0	7mm ²	10.0	10mm ²
13.0	13mm ²		

Part Reference:

CRL260 Nickel plated copper

Terminal Availability: CRL260 nickel-plated copper

Code	Terminals	Availability for Cross-Sectional Area				
	Hole Ø	3.5mm ²	5.0mm ²	7.0mm ²	10.0mm ²	13.0mm ²
A	3.68mm	✓				
B	5.00mm	✓	✓	✓	✓	✓
C	6.73mm	✓	✓	✓	✓	✓
D	8.33mm	✓	✓	✓	✓	✓
E	9.91mm	✓	✓	✓	✓	✓

CFBA1068 Series

Aluminium Braid
Lightweight Bonding Leads

The CFBA1068 aluminium bonding leads are designed for aerospace applications requiring electrical bonding in combination with lightweight. They are supplied insulated and with a protective chromate conversion coating*, making them particularly suited to applications in contact with aviation fuels. CFBA1068 bonding leads are available in a range of lengths and two sizes of specially formed aluminium terminals.

Operating Temperature

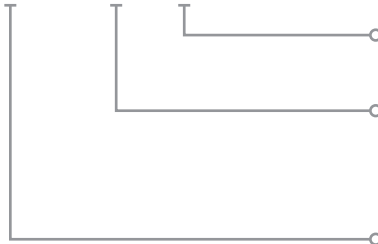
- Aluminium: +200°

Features & Benefits

- Aluminium*
- Lightweight 5mm² cross-sectional area

**Insulated and available with or without Chromate conversion coating.*

CFBA1068-BB-76.2



Part Numbering example

Standard Lengths:

See table below

Terminal Code Reference:

- A** M3 (3.61 to 3.86mm)
- B** M4 (4.90 to 5.16mm)
- C** M5/M6 (6.48 to 7.24mm)

Part Reference:

CFBA1068 Aluminium

Technical Information (nominal values)

Bonding Lead length	Resistance (between terminals)	Mass (uninsulated)
mm	mΩ	(g)
76.2	2.36	4.0
101.6	2.78	4.4
127.5	3.20	4.9
152.4	3.62	5.3
177.8	4.04	5.8
203.2	4.46	6.3
228.6	4.88	6.7
254.0	5.30	7.2

Bonding lead length is between terminal hole centres

Bonding Leads

QBL150 Series

Tin-plated Copper Braid
Quick Release Bonding Leads

The QBL150 quick release bonding lead provides an effective hand-releasable method of earth bonding electrical equipment. They are particularly useful for applications where a temporary connection is required when equipment needs to be removed quickly over multiple times.

QBL bonding leads comprise of a flat tin-plated copper braid with a crimped ring terminal at one end and a BNC or TNC connector at the other. Connection to equipment is via a mating receptacle, mounted on the equipment being earthed.

Operating Temperature

- Tin-plated copper: -55°C to +120°
- Insulated: -55°C to +120°

Features & Benefits

- Fast and easy release.
- Rear and front mounted mating receptacle
- BNC or TNC connector

Part Numbering example

Insulated:

Leave blank if insulation not required

Terminal Code Reference:

- A** M3 (5mm hole)
- B** M4 (6.73mm hole)

Standard Lengths:

Min. 50mm and above in 25mm increments

Connector Code Reference:

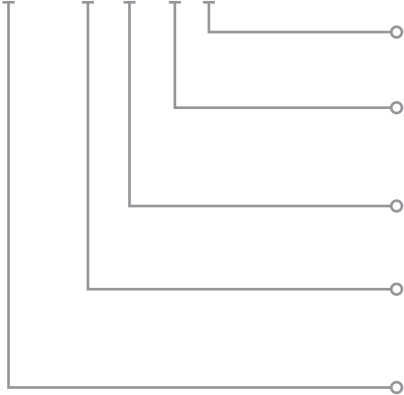
- B** BNC (bayonet)
- T** TNC (threaded)

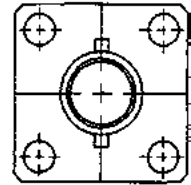
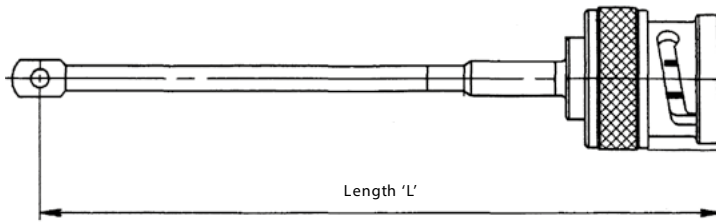
Part Reference:

QBL150 Tin plated copper
Also available as Nickel plated copper, without insulation for higher operating temperatures.



QBL150-B-50-A-S



Front mounted
receptacle**Technical Details: QBL150B (BNC Type)**

Connector	BNC, MIL-C-39012 B (class 2, category c)
Braid	2.64mm ² , Tin plated copper
Current rating	36 amps (for 60 seconds)
Operating temperature	-55°C to +120°C
Insulation	PAN6480K04
Front panel mounting receptacle	QBL150-BF
Rear panel mounting receptacle	QBL150-BR
Ring terminal hole diameter	5mm or 6.73mm

	Length (mm) Terminals						
Nominal	50	75	100	125	150	175	200
Mass (g) 5.0mm hole	-	26.5	27.0	27.5	28.2	28.5	29.5
Mass (g) 6.0mm hole	-	26.9	27.4	27.9	28.6	28.9	29.9
Resistance (mΩ)	0.4	0.6	0.8	1.0	1.2	1.4	1.6

Technical Details: QBL150T (TNC Type)

Connector	TNC, PAN6444A
Braid	2.64mm ² , Tin plated copper
Current rating	36 amps (for 60 seconds)
Operating temperature	-55°C to +120°C
Insulation	PAN6480K04
Front panel mounting receptacle	QBL150-TF
Ring terminal hole diameter	5mm or 6.73mm

	Length (mm) Terminals						
Nominal	50	75	100	125	150	175	200
Mass (g) 5.0mm hole	26.0	26.5	27.0	27.5	28.2	28.8	29.5
Mass (g) 6.0mm hole	26.4	26.9	27.4	27.9	28.6	29.2	29.9
Resistance (mΩ)	0.4	0.6	0.8	1.0	1.2	1.4	1.6



Wire and Cable

Heat-shrink Tubing

Non-shrink Tubing

Braided Sleeving

Screening Braids

Moulded Parts

Terminals and Splices

Wire and Cable Markers

Accessories

Connectors

Backshells

Bonding Leads

Metal Braids

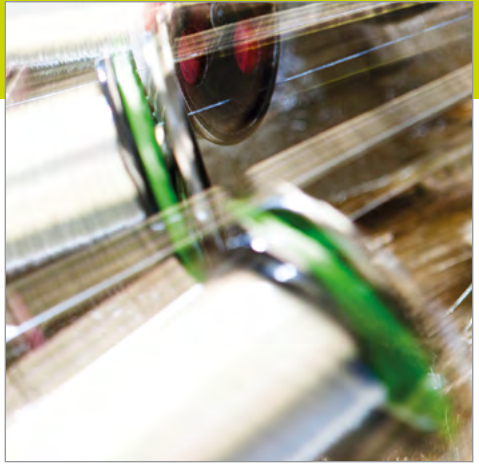
Relays and Contactors

Switches and Grips

Adhesives and Tapes

Application Equipment

Added Value Services



Power Shunts and Custom Designed Metal Braids

Manufactured by IS-Cabletec who are part of the IS-Group of companies and can offer a range of specialist high performance metal braid and earth bonding leads, designed and approved for aerospace, defence, industrial and energy market applications.

The comprehensive range of high quality metallic products includes customised and market approved bonding leads, flat, round and rope braids, with various options of materials, terminations, insulation and identification.

Custom Projects

In addition to the standard materials used to produce braids and bonding leads it is also possible to utilise even higher performance materials such as stainless steel, silver plated copper and pure nickel.

These 'specialist' materials exhibit properties suitable for the most demanding applications, such as those requiring extreme temperature and corrosion resistance.

Silver-plated Copper:

For applications needing excellent conductivity at temperatures up to 200°C. Particularly suitable for extreme aerospace and space applications.

Stainless Steel:

Offers outstanding corrosion resistance compared to many materials, particularly when in contact with salt water and high temperature capability up to 400°C. Ideal for off-shore and marine applications.

Nickel:

Pure nickel strand can be used at even higher temperatures (649°C) whilst still exhibiting excellent conductivity and corrosion resistance.

Nickel is particularly suitable for applications in extreme conditions such as welding, furnaces and power stations.

Power Shunts

Power Shunts	Large braid connectors	page 412
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Braids and Custom

FB Series	Flat braids	page 414
RB and RS Series	Round Braids and Ropes	page 416
HiXP	High expansion braid	page 418
Specialist Services	Over braiding and custom	page 419

Metal Braids

Power Shunts

Custom Solutions
Large Braid Connectors

Power shunts are large cross-sectional area braided connectors, customised and designed to meet the increasing demands of power distribution applications.

They are often produced with multi-layers of flat or round braids to achieve sizes up to 1000mm² and to carry currents in excess of 400 amps.

Used as an alternative to solid bus-bars and power cable assemblies, power shunts are capable of carrying very high currents yet are flexible, robust, easy to install and cost effective.



Ferrule Finishes

Ferrules (end plates) are available with different plated finishes including; Tin, Nickel and Silver.

Features & Benefits

- Large cross-sectional areas
- Broad terminal and braid range
- Space and weight saving
- Cost effective alternative to power cables and solid bus-bars.

Terminations

- High compaction
- Maximum conductivity
- Custom design

Braid Configuration

- Flat or round
- Multi-layered
- High flexibility options
-

Insulation Jacket Options

- Fluid resistant
- High temperature
- Low smoke and toxicity



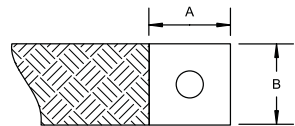
Braid and Termination Selection

	Conductivity	Oxidisation Resistance	Operating Temperature
Plain Copper	Good	Fair	Medium
Tin-plated Copper	Good	Good	Medium
Nickel Plated Copper	Good	Excellent	Good
Silver Plated Copper	Excellent	Good	Good

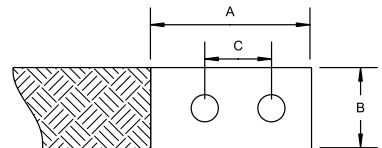
Please use the tables below to establish the cross-sectional area and nominal current rating required for your application, in

conjunction with ferrule type required to match requirements. Please contact us for further information.

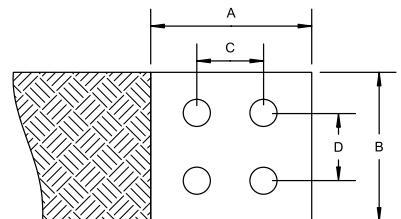
Cross-sectional Area	Nom. Current Rating	A	B
mm ²	amps	mm	mm
100	380	25	25
120	410	30	30
150	450	30	30
200	600	30	30



Cross-sectional Area	Nom. Current Rating	A	B	C
mm ²	amps	mm	mm	mm
150	450	60	30	30
300	760	100	50	50
450	1000	100	50	50
600	1220	120	60	60



Cross-sectional Area	Nom. Current Rating	A	B	C	D
mm ²	amps	mm	mm	mm	mm
300	940	70	70	40	40
500	1280	70	100	50	50
750	1500	70	100	50	50
1000	2000	100	100	50	50



The current rating values in the tables above are based on simple flat braid configurations, for a temperature rise of 50°C above ambient. The actual current rating of a power shunt will vary accordingly to the design and layout of

the final braid configuration. It is recommended that each power shunt be tested and evaluated fully to ascertain its suitability to meet the requirements of its final application.

Metal Braids

FB Custom and Specialised Flat Braids

An extensive range of flat braids from a wide choice of materials, including stainless steel, aluminium, plain copper, tin-plated copper and nickel-plated copper.

The electrical performance of a braid is determined by selecting the correct cross sectional area from the table.

By changing the conductor strand size it is possible to improve the braid flexibility and vibration resistance whilst maintaining its current rating; the smaller the strand size, the more flexible the braid.

Operating Temperature

- Tin-plated copper: -65°C to +150°C
- Nickel-plated copper: -65°C to +260°C
- Insulated: See table
- Other materials - contact us for details



Features & Benefits

- Wide choice of materials
- Highly flexible
- Non-standard versions available
- Wire sizes from 0.05mm to 0.4mm

Part Numbering example

Design Detail:

Custom configuration (Internal use only)

Conductor Material:

- 1 Bare copper
- 2 Tin-plated copper
- 3 Nickel-plated copper
- 4 Phosphor bronze
- 5 Stainless steel
- 6 Oxygen free copper
- 7 Silver plated copper
- 8 Nickel 200
- 9 Aluminium
- 10 Galvanised mild steel
- 11 Monel
- 12 Bright annealed mild steel

Plus many more, please speak to our sales office with your requirements

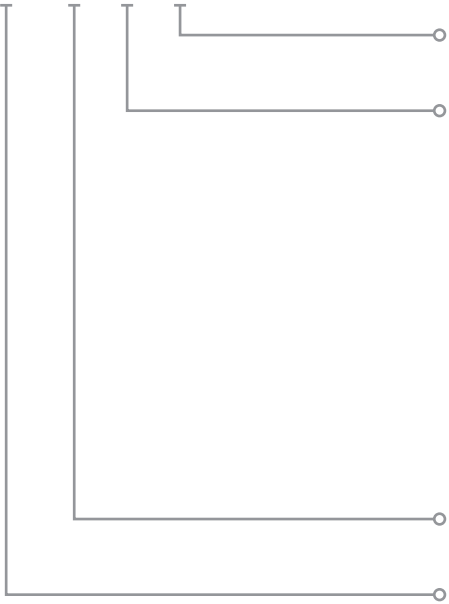
Cross Sectional Area:

See table for standard available sizes

Part Reference:

- FB Flat braid
- FBJ Flat braid with jacket

FB-10.0-5-15/1



Specialist braids are available using numerous conductor materials as identified, such as using nickel and nickel plated copper for increased temperature and corrosion resistance and aluminium for applications requiring weight savings. Flat braids are also available with the option of PVC or zero-halogen extruded

jackets, providing mechanical protection and electrical insulation. There are numerous options and permutations possible with the facilities available, so please contact us for additional information or to discuss your particular requirements.

Standard Flat Braids - Product Details (Un-insulated Tin-plated copper)

Cross-sectional Area	Width and Depth	Current Rating
mm ²	mm	amps
0.5	1.5 x 0.5	12
1.1	2.0 x 0.5	20
2.5	6.0 X 0.8	34
4.0	8.0 X 1.0	53
6.0	10.0 X 1.0	69
10.0	13.0 X 1.3	97
16.0	19.0 X 1.5	132
25.0	25.0 X 2.0	178
35.0	25.0 X 3.5	223
50.0	20.0 X 4.0	282
70.0	32.0 x 5.0	300

Current ratings are based on temperature rise of 50°C above ambient

Insulation Options

Material	Colour Availability	Temperature Rating
PVC	Clear, Black, Red, Green, Yellow, Green, Green/Yellow, Blue, White	-20°C to +70°C
LSZH Low Smoke Zero Halogen	Clear, Black, Red, Green, Yellow, Green, Green/Yellow, Blue, White	-20°C to +80°C

Metal Braids

RB and RS

Custom and Specialised
Round Braids and Ropes

An extensive range of hollow round braids and ropes from a wide choice of materials.

The electrical performance of a braid is determined by selecting the correct cross sectional area from the tables.

Round braids and ropes exhibit multi-axial flexibility, enabling them to be installed in any direction. Rope braids, in particular are strongly recommended for applications needing outstanding flexibility and robustness with maximum flex performance

Operating Temperature

- Tin-plated copper: -65°C to +150°C
- Nickel-plated copper: -65°C to +260°C
- Insulated: See table
- Other materials - contact us for details



Features & Benefits

- Wide choice of materials
- Highly flexible
- Non-standard versions available
- Wire sizes from 0.05mm to 0.4mm

Part Numbering example

Design Detail:

Custom configuration (Internal use only)

Conductor Material:

- 1 Bare copper
- 2 Tin-plated copper
- 3 Nickel-plated copper
- 4 Phosphor bronze
- 5 Stainless steel
- 6 Oxygen free copper
- 7 Silver plated copper
- 8 Nickel 200
- 9 Aluminium
- 10 Galvanised mild steel
- 11 Monel
- 12 Bright annealed mild steel

Plus many more, please speak to our sales office with your requirements

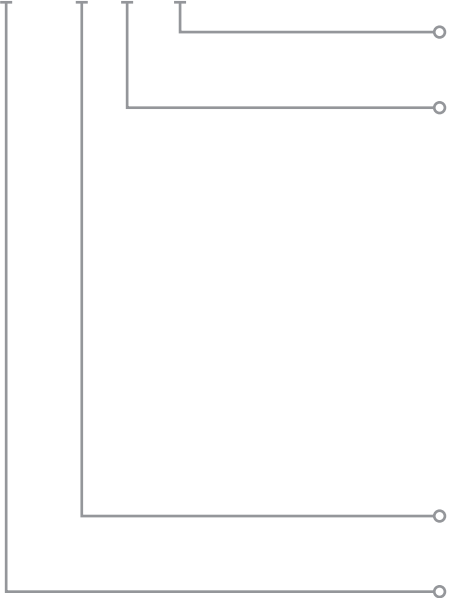
Cross Sectional Area:

See table for standard available sizes

Part Reference:

- RB Round braid
- RBJ Round braid with jacket
- RS Rope strand
- RSJ Rope strand with jacket

RB-10.0-5-15/1



Specialist braids are available using numerous conductor materials as identified, such as using nickel and nickel plated copper for increased temperature and corrosion resistance and aluminium for applications requiring weight savings. Round braids are also available with the option of PVC or zero-halogen extruded

jackets, providing mechanical protection and electrical insulation. There are numerous options and permutations possible with the facilities available, so please contact us for additional information or to discuss your particular requirements.

Standard Hollow Round Braids - Product Details (Un-insulated Tin-plated copper)

Cross-sectional Area	Nom. Diameter	Current Rating*
0.5 mm ²	1.2 mm	12 amps
1.1 mm ²	2.0 mm	20 amps
2.5 mm ²	3.0 mm	30 amps
4.0 mm ²	4.0 mm	50 amps
6.0 mm ²	5.0 mm	60 amps
10.0 mm ²	7.0 mm	80 amps
16.0 mm ²	8.0 mm	110 amps
25.0 mm ²	10.0 mm	130 amps
35.0 mm ²	12.0 mm	180 amps
50.0 mm ²	15.0 mm	230 amps

Standard Rope Strands - Product Details (Un-insulated Tin-plated copper)

2.5 mm ²	2.5 mm	30 amps
4.0 mm ²	3.0 mm	50 amps
6.0 mm ²	4.0 mm	60 amps
10.0 mm ²	4.5 mm	80 amps
16.0 mm ²	5.7 mm	110 amps
25.0 mm ²	7.5 mm	130 amps
35.0 mm ²	9.0 mm	180 amps
50.0 mm ²	11.0 mm	230 amps
70.0 mm ²	13.0 mm	280 amps
95.0 mm ²	15.0 mm	330 amps

*Current ratings are based on temperature rise of 50°C above ambient

Insulation Options - Identified at end of part number e.g. RBJ-010-2-15/1 (BLACK PVC)

Material	Colour Availability	Temperature Rating
PVC	Clear, Black, Red, Green, Yellow, Green, Green/Yellow, Blue, White	-20°C to +70°C
LSZH Low Smoke Zero Halogen	Clear, Black, Red, Green, Yellow, Green, Green/Yellow, Blue, White	-20°C to +80°C

Metal Braids

Hi-XP Braid

High Expansion Braid

High expansion ratio braids are available for applications such as those over cable joints for earthing continuity and mechanical protection. With the number and gauge of wire strands used in the braid to determine the characteristics required, including current rating and cross sectional area.

The selection table shows some common sizes that are achievable, other custom sizes are available subject to specification and quantity required, please contact us for details and MOQ's.

Where mechanical protection is the primary consideration alternative materials are available, such as: Galvanised steel; Stainless steel and Mild steels. Please contact us for further details.



Part Number	Nom. CSA	Current Rating	Wire Ø	Usable Diameter	
	mm ²	Amps	mm	Min. mm	Max. mm
HiXP-6-40-2	6.0	66	0.20	6.0	40.0
HiXP-10-40-2	10.0	90	0.20	10.0	40.0
HiXP-16-60-2	16.0	120	0.30	10.0	60.0
HiXP-25-60-2	25.0	150	0.30	15.0	60.0
HiXP-35-120-2	35.0	200	0.30	20.0	120.0
HiXP-50-120-2	50.0	250	0.30	30.0	120.0
HiXP-95-150-2	95.0	350	0.20	25.0	150.0
HiXP-150-150-2	150.0	500	0.20	40.0	150.0

Typical applications include earth continuity on cable joints, as shown below.



**Material:**

- Bare copper
- Tin plated copper
- Nickel-plated copper
- Phosphor bronze
- Stainless steel
- Oxygen free copper
- Silver plated copper
- Nickel
- Aluminium
- Galvanised mild steel

Over-Braiding Service

Our over-braiding service is designed to offer a comprehensive range of materials and constructions providing an effective braid protection suited to your application, up to 60mm diameter.

The comprehensive over-braiding service facilitates customer free issue material. Or alternatively supplied by us from our own extensive product range of conduit, tubing and substrates.

Whether your need is for mechanical protection, earthing continuity or EMI screening, our engineers are on hand to offer you a product that will perfectly meet your application...

- Cables
- Conduits
- Hoses
- Mechanical Protection
- Armouring
- Screening

Features & Benefits

- Wide choice of materials
- Highly flexible
- Non-standard versions available

Custom Braid Solutions

IS-Cabletec is a specialist manufacturer of high performance metal braided products, customised cables and bespoke assemblies for Aerospace, Defence and Industrial applications.

The extensive on-site facilities at IS-Cabletec enables numerous multicore cable and braiding constructions to be manufactured, which has led to the company becoming the UK's leading manufacturer of EMI screening braids, earth bonding leads, earth leads, copper braids, flexible bus-bars and power shunts.

The aim is to provide our customers with a complete solution to all high performance electrical component needs.





Wire and Cable

Heat-shrink Tubing

Non-shrink Tubing

Braided Sleeving

Screening Braids

Moulded Parts

Terminals and Splices

Wire and Cable Markers

Accessories

Connectors

Backshells

Bonding Leads

Metal Braids

Relays and Contactors

Switches and Grips

Adhesives and Tapes

Application Equipment

Added Value Services

INTRODUCTION

High-Performance Power Management Designed for Reliable Operation in Extremes of Temperature, Shock, Vibration and Altitude

The following pages provides an overview of our relays and contactors range. Products include hermetically sealed MIL Qualified, Electro-mechanical relays such as T05; Half Crystal can 1A to 10A; Mid Range relays 5A to 50A and Time Delay Relays, as well as a high current and high voltage range of relays and contactors, up to 1000 amps and 70kV voltage isolation.

Many of our relays are specifically designed for operation in extremes of temperature, shock, vibration and altitude being qualified to numerous standards:

Military

Specifications such as M39016; M28776; M83536; M6106; M83726; M28750 and associated DSCC drawings.

Aerospace

Specifications such as Airbus ASNE and NSA relays and relay sockets, Boeing BACC, MIL Spec, M83536, M6106, M83726, M12883.

Brands

Agastat, TE, Kilovac, Hartman, Deutsch, CII, Leach, Babcock, Teledyne, Kissling, Finder and many others.

This section of the catalogue is a brief overview of what is available, for more information please contact us.

Military / Aerospace Relays



High Performance Relays



Contactors



MINIATURE

T05 single and double pole	MIL-PRF-39016, MIL-PRF-28776	page 424
.100 Grid	MIL-PRF-39016/17, /18 & 19	

HIGH FREQUENCY

High frequency, low signal	HF Microwave Series	page 425
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CRYSTAL CAN

Full and Half Size	MIL-PRF-5757, MIL-PRF-39016	page 426
Fifth size	MIL-PRF-39016/13, /37 & /38	
Latching versions	MIL-PRF-39016	
Radio frequency		

MID RANGE

5 to 50 amps	MIL-PRF-83536 and MIL-PRF-6106	page 427
Latching types	MIL-PRF-83536 and MIL-PRF-6106	

TIME DELAY

Mid range TD2	MIL-PRF-83726	page 428
Sensing relays	MIL-PRF83726 and others	
Electro-Pneumatic	Miniature, Industrial and Nuclear qualified	

HIGH VOLTAGE Contactors

Aerospace and Electric vehicles	AS9100 and AIAG QS9000	page 429
Military Aerospace and Marine	MIL-PRF-6106 from 200A to 1000A	

SOLID STATE

Solid state relays/contactors	MIL-PRF-28750 and DSCC	page 430
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HIGH PERFORMANCE

Mass Transit	EN61373 and EN50155	page 431
Industrial and Motorsport		

SOCKETS

	MIL-DTL-12883	page 432
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CUSTOM

	Obsolescence service DSCC approved	page 433
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Miniature
Low Signal Relays

Miniature low signal relays are designed to perform under the most demanding environmental conditions in military, aerospace and commercial applications. Stocked signal relays are rated at 1 Amp, all ratings available in a variety of packaging sizes, mounting configurations and termination options. Standard and sensitive coils are available with optional diode suppression.

Features & Benefits

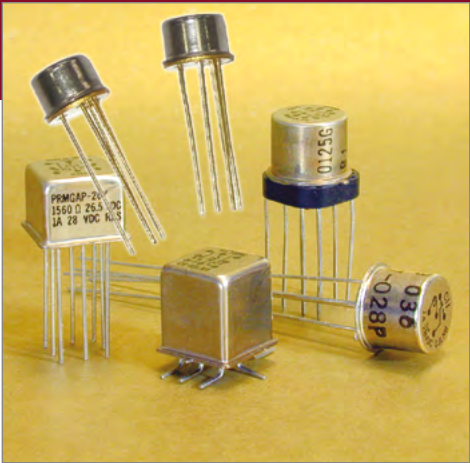
- Miniature hermetically sealed relays
- Non latching
- Through-hole and gull-wing surface mount terminals
- High frequency models capable of switching up through 6 GHz
- Excellent isolation, insertion loss
- Shock and vibration resistant
- MIL-PRF-39016 and MII-PRF-28776 qualification products available
- Low level, to 1 Amp switching

T05 CAN MINIATURE – SPDT and DPDT

A series of ultra miniature relays constructed in a transistor style case, providing superior performance and established reliability patterns. This series is available in a variety of sensitivities, contact configurations and hybrid versions to provide a most versatile element to the circuit designer.

MINI GRID (.100) – DPDT

Ideally suited to the needs of Instrumentation, data acquisition, process control, telecommunications and general purpose requirements. These models are specifically designed for high quality and reliability with versatile switching capabilities and contact forms.



T05 - SPDT and DPDT

Qualification
MIL-PRF-39016/7, /23 & /24
MIL-PRF-39016/10, /25 & /26
MIL-PRF-39016/9, /15 & /20
MIL-PRF-39016/16 & /21
MIL-PRF-28776/5
MIL-PRF-28776/4

0.100 GRID - DPDT

Qualification
Mil-PRF-39016/17, /18 & /19
Mil-PRF-39016/41, /42 & /43

Includes surface mount versions

High Frequency

Low Signal Relays
Microwave



HF Microwave Series - DPDT

Qualification
3 GHz, 1 Amp or less
4 GHz, 1 Amp or less
6 GHz, 1 Amp or less

The MW Series relays are noted for their improved signal repeatability and RF switching capabilities up to the 6 GHz microwave range in a hermetically sealed, sub-miniature package. Excellent signal isolation, stable insertion loss and low VSWR are provided.

Standard versions are available for applications ranging from wireless communications to precision high-speed test equipment. High performance versions are available for even more demanding environments and conditions.

These relays provide microwave frequency switching in a hermetically sealed, sub-miniature package. Both standard and high performance models are offered in 3GHz, 4GHz and 6GHz types. Nominal standard coil power is 367-500mW (model dependent) and 169-250mW for sensitive coils.

Features & Benefits

- Mechanical life expectancy of 10m cycles.
- Standard high performance models are available in 3 GHz, 4 GHz & 6 GHz Types.
- Standard models (MW3, MW4 and MW6) perform in temperature range from -55°C to +85°C plus withstand 10G vibration and 30G shock.
- High performance models (MW3HP, MW4HP and MW6HP) offer extended temperature ratings of -65°C to +125°C whilst providing 30G vibration and up to 100G shock environmental ratings.
- All are available with either standard or sensitive DC coils. Nominal coil power is 367-500mW (model dependent) for standard coils and 169-250mW for sensitive coils
- Signal isolation is 18dB @ 6 GHz (MW6/ MW6HP, 18dB @ 4 GHz (MW4/MW4HP) and 22dB @ 3GHz (MW3/MW3HP).
- Insertion loss is 0.38dB for MW6/MW6HP; 0.27dB for MW4/MW4HP and 0.36dB for MW3/MW3HP

Relays and Contactors

Crystal Can Low Signal Relays

Stocked signal relays are rated at 2 Amp, up to 10 Amp versions, all available in a variety of packaging sizes, mounting configurations and termination options. Available in both latching and non-latching designs. Standard, bifilar and sensitive coils are available with optional diode suppression.

Key Features & Benefits

- Hermetically sealed relays
- Latching, non-latching designs and coaxial types.
- Plain case, mounting brackets or studs.
- Straight pins or solder hooks.
- Excellent isolation, insertion loss and VSWR.
- Shock and vibration resistant.
- Qualified to M5757, M39016, M27245, M27247.
- 2 to 10 Amp ratings.
- 1, 2 and 4 pole versions .

Full and Half Size

Available in a variety of packaging sizes, mounting configurations and termination options. There are both latching and non-latching designs. Standard, bifilar and sensitive coils are available with optional diode suppression.

Fifth Size

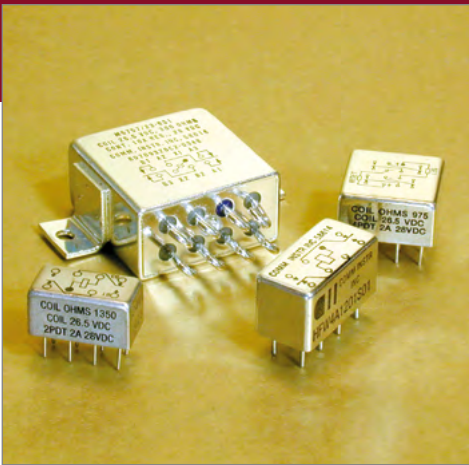
The .150 Grid-space relay, saves space in electronic packaging, with low profile designs at only 8.12mm high. The pin spacing allows you to insert the relay with no intermediate pin spreaders as well as meeting applicable military specifications. Fifth size relays offer internal diode for coil transient suppression and transistor driven models are available.

Magnetic Latching

Versions of crystal can relays.

Radio Frequency

Available as half and full size crystal can relays, supplied with coaxial leads.



Full Size and Half Size

Qualification
MIL-R-5757/10 an /23
MIL-PRF-39016/6 and /22
MIL-PRF-39016/6
MIL-PRF-39016/45
MIL-PRF-39016/40

Fifth Size

Qualification
MIL-R-39016/13, /37 & /38

Latching

Qualification
MIL-PRF-39016/45
MIL-PRF-39016
MIL-PRF-39016/32

Radio Frequency

Description
80 watts full size
80 watts half size

Mid Range

Low Signal Relays

Aerospace and Military Applications



Mid range 5 to 50 Amps

Qualification
MIL-PRF-83536/1 and /2
MIL-PRF-83536/5 and /6
MIL-PRF-83536/9 and /10
MIL-PRF-83536/15 and /16
MIL-PRF-83536/32 and /33
MIL-PRF-83536/36 and /37
MIL-PRF-6106/19
other MIL-PRF-6106

Latching Type

Qualification
MIL-PRF-83536: 2PDT, 5A
MIL-PRF-83536: 2PDT, 10-15A*
MIL-PRF-83536: 4PDT, 10-15A*
MIL-PRF-83536: 3PDT, 25A
MIL-PRF-83536: 4PDT, 12A
MIL-PRF-6106: 1PDT, 25A
MIL-PRF-6106: 3PDT, 25A

*Also available in track mount versions

Mid Range relays offer critical size and weight savings in aircraft applications by providing efficient power switching in a compact package. Relays vary in size from the compact 5 amp package up to a 50 amp version in a 25mm³ enclosure.

The balanced force design with permanent magnet drive, provides the benefit of consistently high contact pressure, reduced bounce and less arcing leading to extended contact life. A variety of coil options are available which allow for AC or DC control.

Terminal styles include socket pins, solder pins and solder hooks. Each series comes with a variety of mounting options.

Key Features & Benefits

- Balanced force design with permanent magnet drive.
- 5 to 50 Amp ratings, within 25mm³ package.
- 1 to 6 pole versions.
- Terminal styles include socket pins, solder pins and solder hooks.
- Hermetically sealed and welded construction.
- Shock and vibration resistant.
- M83536 and M6106 qualified products.

Time Delay
M83726 and other

M83726 series time delay relays are available for delay on operate, or delay on release operation and can be supplied as fixed or resistor adjustable types. These products consist of solid state timing circuits controlling two Form C (DPDT) output contacts rated 10 amps. The internal timing circuit uses R/C controlled oscillator with a programmable digital pulse counter, gating a semiconductor switch to operate the relay. Timing is independent of whether the controlling voltage is a ramp or step function. For adjustable models the user specifies a one decade range in seconds, this range is programmed internally at the time of manufacture.

Key Features & Benefits

- Welded hermetically sealed enclosure occupies about 16.4cm³
- Meets or exceeds electrostatic discharge Mil-STD-1686 Class Non-Sensitive

M83726

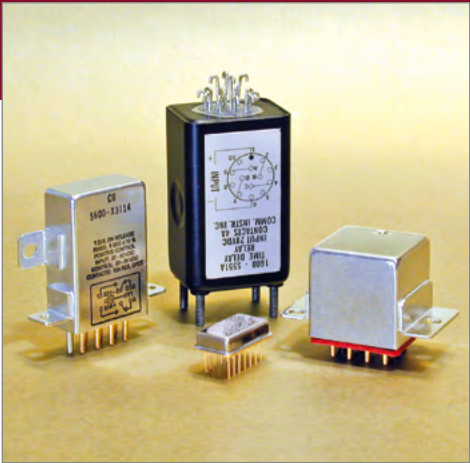
Includes delay on operate, fixed and adjustable; delay-on-release, fixed, adjustable and interval timers with relay or solid state outputs. Contact ratings range from 2 to 10A, with MIL qualification on 10A versions. Also available are MIL approved sub-miniature digital timing modules.

Sensing Relays

Our range also includes AC & DC voltage sensors and AC frequency and phase sensors. All are hermetically sealed, with a variety of mounting options and relay contact outputs.

Electro-Pneumatic Timing Relays

Relays feature high repeat accuracy over voltage and temperature extremes. Hermetically sealed designed for high shock and vibration applications, offering instant recycling with easy linear adjustment. The series features an exclusive dial head adjustment, no needle valves, with delay ranges from milliseconds to 60 minutes.



M83726

Qualification
MIL-PRF-83726/28 to /31
MIL-PRF-83726, 2A
MIL-PRF-83726, 10A
MIL-PRF-83726, SS
MIL-PRF-83726/13, SS
MIL-PRF-83726, Series interval and SS

Sensing

Qualification
Frequency sensor relays
AC Voltage sensor, relay output
MIL-PRF-83726, Phase sensor
DC Voltage sensor

Electro-Pneumatic

Qualification
Miniature, DPDT
Industrial Standard
Nuclear qualified





up to 500 Amps

Qualification

100 to 500 Amps, 12-900 Vdc

200 Amps, 480Vac or 48 Vdc

60 Amps, 600 Vac, 3 Form A

600Vdc SPST-NO Form X

Lightweight up to 1750 Amps

Qualification

MIL-PRF-6106, 200A

MIL-PRF-6106, 400A

MIL-PRF-6106, 500A

MIL-PRF-6106, 1000A

Up to 500 Amps

These contactors offer continuous current ratings up to 500 amps at 900 Volts DC, in a very compact package. Available hermetically or environmentally sealed, with a variety of electrical configurations, power ratings, voltage ratings and mounting styles to make your electrical system more reliable and capable.

Key Features & Benefits

- Suitable for electric drive vehicles, aerospace, military and industrial applications.
- Small lightweight, hermetically sealed units
- Variety of contact arrangements available.
- Latching and non-latching types
- Wide range of mounting and termination styles
- One or two pole, with normally open or normally closed contacts

High Performance Electric Vehicle -

Designed and built in accordance with AS9100.

Electric Vehicle Contactors - Lightweight models designed and built in accordance with AIAG QS9000.

Commercial Aerospace - Designed and built in accordance with AIAG QS9000.

Military Aerospace & Marine - Designed and built in accordance with AIAG QS9000.

Please note that multiple configurations and AC versions are also available

Lightweight Contactors up to 1750 Amps

These hermetically sealed enclosures are available for the most severe environmental conditions or altitudes above 50,000 feet. Designed to meet the applicable requirements of M6106 and/or specific customer requirements.

Solid State Relays

M28750

Products include both AC and DC versions, with output ratings up to 25A. AC relays rated at 2A, 10A & 25A feature zero voltage turn on for reduced EMI. DC relays are offered with ratings up to 2A in several miniature hermetically sealed package configurations, some with optional isolated status lines and/or short circuit protection.

Key Features & Benefits

- Qualified to DSCC Drawing 86031, 88062, 89116, 90091 as appropriate.
- Qualified to MIL-PRF-28750/5, /6, /7, /9 & /10
- TTL & CMOS compatible input.
- Optically coupled all solid state.
- Buffered/current limited input for direct drive from CMOS or TTL logic.
- Replacements for Teledyne M92F and M93F series.



Solid State

Qualification
2A, DSCC Drwg 86031
2A, DSCC Drwg 88062
2A, DSCC Drwg 89116
2A, DSCC Drwg 90091
MIL-PRF- 28750

High Performance Relays

Mass Transit, Motorsport and Industrial

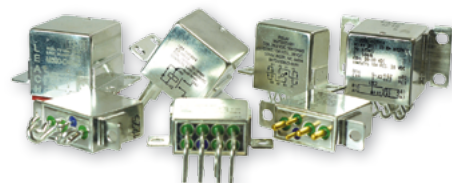


Mass Transit

Description
'Twilight switch'
Electronic step relay
Plug-in, 2 CO & 4 CO
Monitoring relay
Forcibly guided contacts
Modular timers
Multi voltage timers
Timer modules

Industrial and Motorsport

Description
Sub-miniature DIL/PCB relays
Ultra slim PCB relays
Low profile relays
Miniature PCB relay
Safety relay (EN 50205)
Power relays



General high performance relays, for industrial applications such as Plug-in/PCB and high current motorsport high voltage applications.

Mass Transit

Includes relays suitable for Air conditioning; Door control systems; Train light control; Signal control; Control board; and Traffic management applications.

Relays used for rolling stock are subject to increasingly higher technical demands, such as the need for wider operating ranges; higher resistance to shock and vibration; operation over a wider range of temperature and humidity and above all, the fire resistance properties of the relay's constituent parts.

The relays and their sockets and accessories are manufactured using specific insulating materials, which satisfy the requirements of fire protection prescribed by the standard UNI CEI 11170-3 for risk levels LR1 to LR4.

- Conformity to reaction fire test to ISO 11925-2
- Smoke class F2 according to NF F 16-101 (calculated from opacity according to NF X 10-702-2 + NF X 10-702-1 and from Toxicity according to NF X 70-100-1 + NF X 70-100-2).

The resistance against random vibrations and shock of the relays, their sockets and accessories is in compliance with EN61373 standard for Category 1, Class B products. Their resistance to temperature and humidity is in compliance with the prescription of EN 50155 standard, TX class.

Industrial and Motorsport

Includes an overview of Plug-in / PCB relays and relay interface modules, plus coil indication and EMC suppression modules.

Relays and Contactors

Relay Sockets

MIL-DTL-12883

Relay sockets for commercial, military, airborne, ground and shipboard equipment, are manufactured to MIL-DTL-12883 specifications, plus specialised requirements. Supplied in a broad range of military standard and special configurations plus styles for 2 to 25 amp operations. Featuring state of the art ultrasonically bonded interfaces between the dielectric components, which eliminate air paths and provide protection against moisture and degradation.

The product line offers – Low Profile, Extended Height, Micro Miniature, Board Mount, Track Mount and Solder Termination relay socket options.

Low profile sockets are provided in all military configurations and are configured to minimize size and weight. These accept the MIL-C-39029/92 contact family.

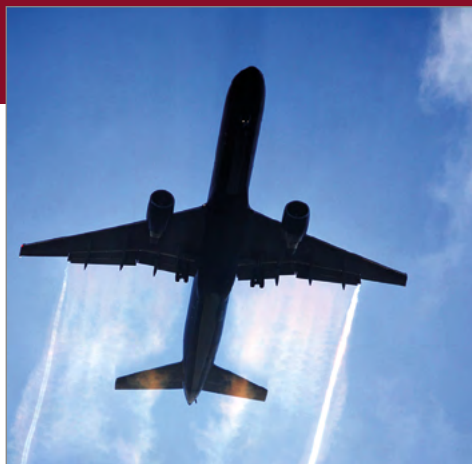
Extended height sockets are configured to accept the longer MIL-C-39029/5 contact, which is standard on many cylindrical connectors and other avionic interconnect systems and allow contact standardization.

Sockets are available with either fixed or loose mounting studs. Studs and hardware supplied with standard QPL-listed sockets are cold rolled steel. Stainless steel is available as an alternative to specify stainless steel an “S” is added to both the QPL number and the catalogue number.

Relay sockets can be top or bottom mounted.

Relay-to-socket positive polarization is provided by specific contact configurations and/or polarizing pins, in accordance with MIL spec requirements.





Please contact our technical support team for those relays that are no longer readily available, as we can supply bespoke DSCC approved relays or contactors to suit your requirements.

We offer a complete portfolio of electro-mechanical relays, standard time delay relays, voltage, current, phase, frequency sensors and power monitors to customer's exact requirements, whether for a new application or a legacy system

Where a standard product does not meet your requirement, in many cases, we can offer custom, fit, form, functional units.

Many are designed to meet or exceed MIL-STD-202, MIL-STD-704 etc and/or are listed on the Qualified Products List (QPL), or have been tested to the requirements of MIL-PRF-24021, MIL-F-26301, MIL-R-5757, MIL-PRF-6106, MIL-PRF-83726 and MIL-V-81995.

Should you have a special enquiry please contact us



Wire and Cable

Heat-shrink Tubing

Non-shrink Tubing

Braided Sleeving

Screening Braids

Moulded Parts

Terminals and Splices

Wire and Cable Markers

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Bonding Leads

Metal Braids

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Added Value Services

INTRODUCTION

Overview

Extended Life-cycle and Reliable Performance

We offer an extensive range of precision switches and operator controls commonly used throughout some of the toughest environments and applications. Typical markets and industries include Defence, Aerospace, Marine, Industrial Equipment, Motorsport, Medical, Communication and Process Control.

The product range covers an array of mechanical, hall effect, sealed and illuminated high performance switching technologies, in a variety of styles including pushbutton, toggle, rocker, slide and rotary.



Custom Illuminated Panels

Supplementary to the range of performance switches and grips outlined in this section, we can also offer a broad range of specialist lighted switches and scratch resistant illuminated panels designed and approved for use in aircraft cockpits and ground defence equipment. For more information on these products and services please contact us or see our website.

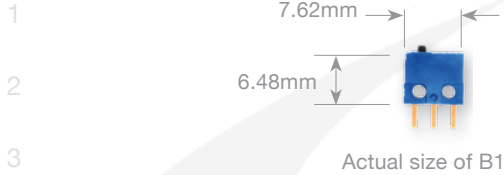


Basic Switches	page 438	1
B1 Series	Ultra Small Subminiature	
B2 Series	Subminiature	2
B3 Series	Double Break Subminiature	
B5 Series	Double Break Miniature	3
B5-7 Series	Double Break Miniature, Two Pole	
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Limit Switches	page 461	18
P6 and P6-3 type	Sealed MIL-PRF-8805	

Switches and Grips

B1 to B2-5 Basic Switches

Product Range Overview
Miniature and Subminiature



B1/B1-5 Series Description

Ultra small subminiature in size, designed to reliably switch low level signals as well as up to 2 amps switching capacity for a minimum of 25,000 cycles. Mechanical life expectancy is in excess of one million cycles. The terminals are available as a double turret solder style, or 0.508mm x 0.635mm PC pins.

The B1 series is also available with integral lever actuators as B1-5 series.

- Ultra-compact: Only 7.62mm width x 6.48mm height x 2.54mm thick
- 1 million cycle life, B1-5 Series
- Low level logic switching capability
- In accordance with MIL-PRF-8805/94
- Available in Military & Commercial grades
- Choice of solder or PC moulded-in terminals

B2/B2-5 Series Description

Can be specified for military or commercial use at cost savings. Offering a choice of turret, quick connect and three lengths of printed circuit board style terminal are available for both the 3.96mm and 5.08mm wide models.

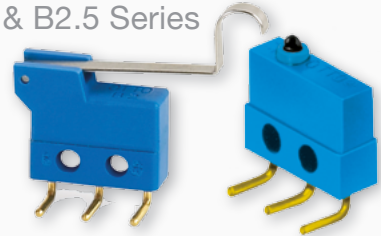
Conforms to and are qualified under MIL-PRF-8805/4, MIL-PRF-8805/106 (high temp -55°C to 205°C) and MIL-PRF-9905/109.

- Choice of 3.96mm & 5.08mm wide models
- Up to 7 amps switching
- Sensitive movement differentials
- Low operating forces
- Choice of 8 terminal styles or wire leads
- Long operating life
- Qualified under MIL-PRF-8805/4, MIL-PRF-8805/106 & MIL-PRF-8805/109
- UL recognized & CSA certified

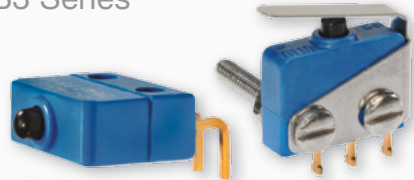
B1 & B1.5 Series



B2 & B2.5 Series



B3 Series



B5 Series



B5-7 Series



B3 and B5-7 Basic SwitchesProduct Range Overview
Miniature and Subminiature**B3 Series Description**

Designed to switch at least one million mechanical cycles, the B3 surpasses the requirements of the military in these categories: contact resistance less than 25mΩ, contact bounce and overall cycle life. Gold plated contacts are available for non-military applications. UL recognized and CSA certified models available.

- Low level switching capability
- Qualified under MIL-PRF-8805/76 & /101
- Choice of widths 3.96mm and 5.08mm
- Available in Commercial & Military grades
- UL Recognized & CSA Certified

B5 Series Description

Miniature in size and feature up to 10 amps switching capability of 100,000 cycles. Mechanical life is one million cycles. The moulded housing is rugged and structurally stable. The terminals are sealed against solder flux entering the switch and are bright acid tin plated for excellent solder-ability.

- High contact pressure
- Constructed under MIL-PRF-8805/7
- Available in Military & Commercial grades
- Choice of 4 terminal styles or wire leads
- UL recognized & CSA certified
- B5-21141 qualified to MS27217-1

B5-7 Series Description

Two switches in one case! The B5-7 series basic switches are miniature in size but feature up to 10 amps switching capability of 100,000 cycles. The moulded housing is rugged and structurally stable. The terminals are sealed against solder flux entering the switch and are bright acid tin plate brass for excellent solder-ability. B5-71 has end terminals; B5-72 has front terminals.

- Double pole, 4-circuit
- Simultaneity of both poles within .004"
- Accordance with MIL-PRF-8805
- Available in Military & Commercial grades
- Choice of end & front terminals

All models are RoHS, WEEE and Reach compliant



Series	Feature	Max Rating	Mechanical Life	Approvals	Circuitry
B1	Ultra Small Subminiature	2A	100,000	n/a	SPST, SPDT
B1-5	Ultra Small Subminiature, with Integral Levers	2A	1,000,000	n/a	SPST, SPDT
B2	Subminiature	7A	50,000 - 250,000 (varies by part)	UL (E61705), CSA (LR43865), DSCC (QPL8805)	SPST, SPDT
B2-5	Subminiature with Integral Levers	7A	100,000	UL (E61705), CSA (LR43865), DSCC (QPL8805)	SPST, SPDT
B3	Double Break Subminiature	8A	1,000,000	UL (E61705), CSA (LR43865), DSCC (QPL8805)	SPST-DB, SPDT-DB
B5	Double Break Miniature	10A	1,000,000	UL (E61705), CSA (LR43865), DSCC (QPL8805)	SPST-DB, SPDT-DB
B5-7	Double Break Miniature, Two Pole	10A	100,000	UL (E61705), CSA (LR43865), DSCC (QPL8805)	DPDT-DB

Please contact us for individual part numbers and specifications or see our website for information.

Switches and Grips

LP3 and LP5 Push-Button

Selection Chart and Range Overview Illuminated Performance Switches

A diverse and comprehensive range of illuminated pushbutton switches, that are both rugged and aesthetically pleasing.

On sealed models, a silicone boot operating on a patented “rolling sleeve” principle, protects the contact area against contamination at the button area. This boot provides long life and smooth operation over a wide temperature range. Sealed terminals protect the contact area from hostile environments and solder flux on both sealed and unsealed models.

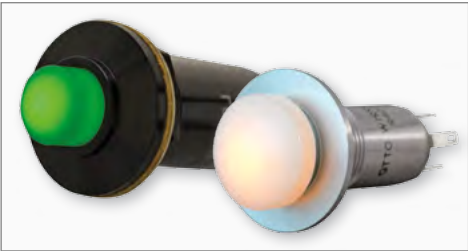


Series	Feature	Max Rating	Seal Rating	Approvals	Circuitry
LP3	LED Lighted	5A	Unsealed or IP64 or IP68S	UL (E61705)	SPST-DB, SPDT-DB
LP5	LED Lighted	5A	Unsealed, IP64 or IP68S	UL (E61705)	SPST, SPDT
LP5-V	LED Lighted, Vandal Resistant	5A	IP64 or IP68S	UL1500 Ignition Protected	SPST, SPDT
LP7-D	LED Lighted, Ruggedised	5A	IP64 or IP68S	n/a	SPST-DB, SPDT-DB
LP9	LED Lighted	5A	IP68S	UL (E61705)	SPST-DB, SPDT-DB
LPL	Indicator Light	n/a	Unsealed or IP64 or IP68S	n/a	n/a

LP3 Description

Momentary action, commercial switch, with the added benefit of reliable LED illumination. Designed for use in off-highway, material handling, industrial controls, marine and demanding commercial applications.

Choose from the standard mounting styles and electrical ratings, or contact us for custom configurations. Available with 5/8” or 15/32” threaded or press fit.



LP5 Description

Alternate action, LED illuminated and sealed, available as front mount or raised dome. The LP5 offers the same rugged, sealed construction as the proven P5 series with the added benefit of reliable LED illumination.

Designed for use in off-highway, material handling, industrial controls, marine and other demanding applications. Available with 5/8” or 15/32” threaded or press fit mounting.



LP5-V Description

Alternate action, LED illuminated ring with metal case and button. Designed to provide attractive, lighted position indication for applications in harsh environments, where security and reliability are paramount.

Features both aluminum and stainless steel cases watertight to IP68S. Momentary action is available in the LP3-V series. Available with 5/8" or 3/4" threaded mounting.

**LP7-D Description**

Momentary action, designed for use in panels, control grips, computers, instruments, heavy equipment and other demanding applications where attractive, highly ruggedised pushbutton switches are required.

Versions include round and square, flush dome and raised dome. The switch series features short behind panel depth. Available with 15/32" threaded mounting.



These pages are a brief overview of what is available in this comprehensive product range, with only a selection illustrated here. All products are RoHS/WEEE/Reach compliant.

Numerous designs include single point, ring or full illumination.

For more information on both standard and custom products available please take a look at our website or contact us for additional information.

LP9 Description

Momentary action, offering a positive tactile feedback, signalling the operator when the switch is operated with the added benefit of reliable LED illumination, point or full illumination.

The LP9 series offers four button versions; flush and raised profile with either a glossy or matte finish. Providing a short behind panel depth. Available with 15/32" threaded mounting.

**LPL Description**

The LPL Indicator Light series offers an excellent means of indicating the activity of a circuit by providing a visual on/off indication of process conditions. Ideally suited as part of a panel mounted indicator for control panels, instrumentation and front panel fault indicators.

Offering anodized aluminum alloy cases with seal options of moisture proof and dust tight to IP64 or watertight to IP68S.



P Series Push-Button

Selection Chart and Range Overview
Performance Switches

A diverse and comprehensive range of pushbutton switches, rugged and aesthetically pleasing. Designs available include illuminated, vandal resistant, dome, shrouded and many more, that are often used in Defence, Aerospace, Off-Road Equipment, Material Handling, Medical, Marine, Industrial and Process Control. Sealed models such as the P1 operate on the patented “rolling sleeve” principle, providing longer life and smoother operation over a wide temperature range. The inherent wiping action breaks welds and wipes the contacts clean on each operation.

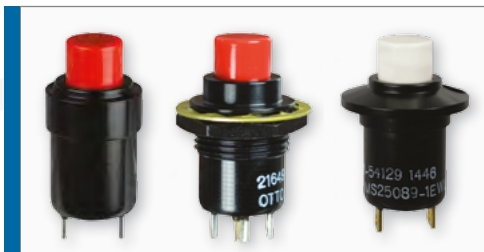


Series	Feature	Max Rating	Seal Rating	Approvals	Circuitry
P1	Mil Grade	10A	MIL-PRF-8805 Design 2, 3 or IP68S	UL (E61705)	SPDT-DB, SPST-DB
P2	Commercial	5A	MIL-PRF-8805 Design 2, 3 or IP68S	n/a	DPST, DPDT
P3	Commercial	10A	IP64 or IP68S & IP69K (Except push- pull)	UL (E61705), CSA (LR43865)	SPDT-DB, SPST-DB
P3-D	Dome Shape	10A	IP64 or IP68S & IP69K	UL (E61705)	SPDT-DB, SPST-DB
P4	1-4 Poles, Custom Pushbutton	8A	IP64 or IP68S	n/a	1 to 4 Poles
P5	Alternate Action	10A	IP64 & MIL-PRF-8805 Design 2, or IP68S	UL (E61705)	SPST, SPDT
P5-D	Dome Shape P5, Ruggedised	10A	IP64 & MIL-PRF-8805 Design 2, or IP68S	UL (E61705)	SPST, SPDT
P7	Subminiature, Mil Grade	5A	IP64 & MIL-PRF-8805 Design 2 or IP68S & MIL-PRF-8805 Design 3	UL (E61705), CSA (LR43865)	SPST-DB, SPDT-DB
P7-D	Dome Shape	5A	IP64 & MIL-PRF-8805 or IP68S	UL (E61705),	SPST-DB, SPDT-DB
P8	Shorter Behind Panel Depth	10A	IP64 or IP68S	UL (E61705), CSA (LR43865)	SPST-DB, SPDT-DB
P9	Dome Shape	5A	IP64 or IP68S & IP69K	UL (E61705), CSA (LR43865)	SPST-DB, SPDT-DB
P9C	Low Level, Lower Cost	100mA @1-32VDC	IP68S	n/a	SPST-DB
P9M	Latching	4A @ 12VDC	IP68S	n/a	SPST-DB
PE	Mil Grade	5A	Unsealed or MIL-PRF-5505 Design 2	n/a	SPST-DB

P1 Description

Offers a mechanical life well beyond the 50,000 cycles MIL-PRF-8805. The double break switching mechanism has an incredibly fast transfer time, reducing arcing and increasing contact life. For use in panel boards, control grips, instruments and where sealed pushbutton switches are required.

Available with 5/8" and 15/32" threaded case or press fit mounting.

**P2 Description**

Three position, offering two steps of momentary switch action plus "rest" (or "off"). Each detent operates an independent set of SPDT contacts in a watertight and dust tight package.

Designed for applications in the high performance commercial market such as the control of two-speed motors.

Available with 5/8" threaded case or press fit mounting.

CUSTOMER
SPECIALS

P1 Custom



P4 Custom

P3 and P3-D Description

A commercial version of the P1 Push button switch, with either momentary or push-pull action. Offering vastly improved life under extreme conditions found in some industrial environments. Available with 5/8" or 15/32" threaded or press fit mounting.

Also available in domed style as P3-D.

Available with 5/8" and 15/32" threaded case or press fit mounting. P3-D only 5/8" threaded.

**P4 Description**

Auxiliary actuators designed for use with B2 and B3 Basic Switches, bushing mount.

Moisture proof at the front panel. Choice of one and two pole configurations and select from a variety of six bezel/bushing mount case styles in clear (silver) or black anodized aluminum.

Buttons are available in nine colours. Basic switches are per MIL-PRF-8805/101.



Switches and Grips

P5 and P8 Push-Button

Selection Chart and Range Overview Performance Switches

P5, P5-D and P5-V Description

Alternate Action switches match the P1, P3 and P8 momentary action models for mixed function. Anodised aluminium alloy case. Design panels with both alternate and momentary action switches with uniform panel appearance. P5 requires less behind the panel space than the P1 and P3 momentary versions.

Available with 5/8" (both) or 15/32" (P5 only) threaded or press fit.



P7 Description

These subminiature switches embrace today's technology requirements by allowing for a large number of switches to fit within a faceplate. Anodised aluminium alloy case.

Numerous mounting styles, including a swaged bushing for installation in aircraft flight control and hand grips and similar applications.

Available with 1/4" or 15/32" threaded or press fit mounting.



P7-D Description

Ruggedised, subminiature momentary switch with contoured sealed dome style pushbutton. Two design versions are offered; flush dome and raised dome button profile. Anodised aluminium alloy case.

One million operations at 1 amp resistive, 50,000 at full rated load of 5 amps resistive or 3 amps inductive.

Available with 15/32" threaded mounting.

P8 and P8-V Description

Momentary action subminiature switch, with push-pull option. P8 series switches offer vastly improved electrical and mechanical life under extreme conditions found in most military and industrial environments. Case is anodised aluminium. P8-V is the vandal resistant version, stainless steel case option.

Available with 5/8", 15/32" or 1/2" threaded or press fit mounting.



P9 and P9-M Description

The P9 Dome series feature a contoured dome style and share similar size and characteristics to the P7 series. Major differences are plastic housing construction and the availability of a shorting bar contact arrangement.

P9-M is the latching maintained version.

Available with 15/32" threaded thermoplastic case or snap-in mounting.

P9C Description

Competitively priced, the P9C pushbutton is a low-level only momentary, normally open, IP68S sealed switch with a dome style pushbutton and a 3 million cycle life. Flush dome and raised dome button profiles are available in either gloss or matte finish.

Available with 15/32" threaded case and features short behind panel depth.



PE and PE2 Description

Operating temperature -55°C to +85°C

PE pushbuttons per MIL-PRF8805/96, with momentary snap-action. Available with black or red button colours and clear or black case colours. PE2 pushbuttons per MIL-PRF8805/99 with momentary snap-action. Available with black, white or red button colours

Available with 1/4" (PE) or 15/32" (PE2) threaded aluminium alloy case mounting.

FG Flip Guard and HDW Hardware

The FG Flip Guard assembly offers a maintained or momentary actuation for pushbutton switches with a 15/32" (12mm) threaded bushing. Supplied with or without flats to prevent rotation during assembly.

The HDW accessories range includes shrouds, panel seals, push button and toggle boots and more.



Switches and Grips

Trim Switches

Selection Chart and Range Overview Performance Switches

A diverse and comprehensive range of trim switches, available in both military and commercial grades, both rugged and aesthetically pleasing. Available with multiple button designs and colours.

Mini Trims - Typically press fit into grips or panels and multiple sealing levels available.

Split Trim - Two action toggles with detent. Each two way switch can operate independently or simultaneously.

Large Trim - Original larger trim switches please contact us for details.



Series	Feature	Actuation	Max Rating	Seal Rating	Circuitry
MT T1	2 Way, centre pushbutton option	Momentary	10mA @ 5VDC	IP64, IP68S MIL-PRF-8805 Design 3	SPST (x2)
MT T1-T	2 Way, tactile feedback	Momentary/Maintained	10mA @ 30VDC	Water resistant per MIL-STD-810F, 506.4	SPST (x2)
MT T4	4 Way	Momentary	10mA @ 5VDC	IP64, IP68S MIL-PRF-8805 Design 3	SPST (x4)
MT T4-T	4 Way, tactile feedback	Momentary with tactile feel	2A @ 28VDC	Water resistant per MIL-STD-810F, 506.4	SPST (x4)
MT T5	4 Way, centre pushbutton	Momentary, lenient option	10mA @ 5VDC	IP64, IP68S MIL-PRF-8805 Design 3	SPST (x5)
MT T8	8 Way	Momentary	10mA @ 5VDC	IP64, IP68S MIL-PRF-8805 Design 3	SPST (x8)
MT T8-T	8 Way, tactile feedback	Momentary with tactile feel	2A @ 28VDC	Water resistant per MIL-STD-810F, 506.4	SPST (x8)
SPT	Two 2 Way trim switches	Momentary with tactile feel	0.6mA @ 15VDC	Water resistant per MIL-STD-810F, 506.4	Two SPST (x2)
T2	2 Way, centre pushbutton option	Momentary with tactile feel	10A @ 28VDC	MIL-PRF-8805 Design 2, resilient Design 4	SPST, DPST Double break x3
T4	4 Way	Momentary with tactile feel	5A @ 30VDC	MIL-PRF-8805 Design 2, resilient Design 4	SPST (x4) multi pole option
T5	4 Way, plus centre pushbutton	Centre maintained	2A @ 28VDC	MIL-PRF-8805 Design 2	SPST (x5) multi pole option

Mini and Split Trim Switches

Product Range Overview
Illuminated Performance Switches**MT T1 and MT T1-T Description**

The T1 Mini Trim is a single pole, double throw, centre off, momentary contact (self return to centre off) switch.

The T1-T Mini Trim is a latching, single pole, single throw, centre off momentary/maintained action contact switch.

Press fit Ø15.2mm or 11/16" threaded case mounting options, as with other MT switches.

**MT T4, MT T4-T and MT T5 Description**

The T4 Mini Trim is a single pole, 4 throw, centre off, momentary contact (self return to centre off). T4-T Tactile switches remain a favourite due to the positive detent indicates circuit transfer to the operator.

The T5 Mini Trim is a single pole, 5 throw centre off momentary contact (self return to centre off), centre pushbutton switch.

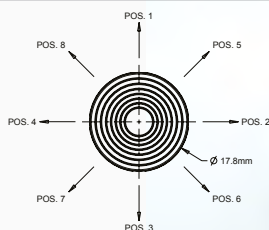


CUSTOMER SPECIALS

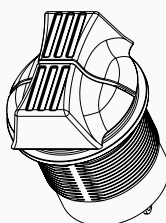
**MT T8 and MT T8-T Description**

The T8 Mini Trim is a single pole, 8 throw, centre off momentary contact (self return to centre off switch). T8-T Tactile switches remain a favourite due to the positive detent indicates circuit transfer to the operator.

Ideal for grip applications in aircraft, ground forces vehicles and off-road equipment.

**SPT Description**

Uses 2 single-pole-single-throw momentary toggles with detent providing a positive click action. Each two-way switch can operate independently or simultaneously. Available in both commercial and military grades and are most ideal for applications in aircraft, but can also be used in medical, unmanned vehicle, construction and agricultural equipment.



Toggle Switches

Selection Chart and Range Overview
Performance Switches

- T1 Series** - Panel sealed and unsealed toggle switches to MIL-PRF-83731.
- T3 Series** - Miniature toggles are rugged, highly reliable switches with snap-action switch.
- T7 Series** - High performance switch, entirely sealed to withstand direct water spray.
- T9 Series** - Suitable for applications in Off-Highway, Aerospace, Commercial & Industrial equipment (MS24523, 24 and MS24658, 59).
- TE Series** - All metal components are corrosion resistant and exceed requirements of MS25224.



Series	Feature	Actuation	Max Rating	Seal Rating	Circuitry
T1	2 or 3 position, 1 to 8 poles, lever lock option	Momentary, Maintained	8A	MIL-PRF-83731	Multi-Pole B2, B3 Basics
T3	Snap action, Lever lock option	Momentary, Maintained	5A	MIL-PRF-83731 15/32" Threaded only	SPST, DPST
T7	Lower cost sealed	Momentary, Maintained	16A	IP68S or IP69K	SPST, SPDT DPST, DPDT
T9	High performance lever lock option	Momentary, Maintained	20A	IP68S or MIL-DTL-3950	SPST, SPDT DPST, DPDT
TE	Snap Action, Non-Teasable	Momentary, Maintained	5A	MIL-DTL-8834	SPST, DPST
TG	Toggle guards to fit standard size toggles such as the T9, prohibiting accidental actuation. They meet requirements of MIL-DTL-7703, MS25224-1/-3 and MS27752-1				

- T1 Description MIL-PRF-83731**
- Available as panel sealed per MIL-PRF-83731 in various configurations and actuator designs. Also available as unsealed toggle featuring B2 and B3 basic switches.
- Mounting is via 15/32", 7/16" or 11/16" threaded collar.

TG Toggle Guards

Offered for 2 and 3 position switches with 15/32-32 threaded bushings with slotted or flat keyways. All models feature spring loaded covers that lock in either the open or closed positions. Moulded plastic cover available in multiple colour choices.

MS approved and QPL'd choices



Toggle Switches

Product Range Overview
Performance Switches**T3 Description** MIL-PRF-83731

These miniature toggles are rugged, highly reliable switches offering positive detent action for safe switching operation. Featuring a snap-action switch mechanism.

Choose sealed one or two pole circuitry, 15/32" sealed or 1/4" unsealed bushing construction, momentary and/or maintained.

In addition to the single turret solder terminal specified in MIL-DTL-83731, we also offer two different lengths of pins for printed circuit soldering.

**T7 Description** IP68S or IP9K

Rugged, high performance sealed switches designed for use under severe conditions found in heavy equipment, industrial control, marine and appliance applications. Offered in single and double pole designs.

In conjunction with the snap-action switch mechanism, the T7 offers non-teasible contact transfer.

Offers numerous actuator stalk or thumb designs. Available with 15/32" threaded mounting.

**T9 Description** MIL-DTL-3950

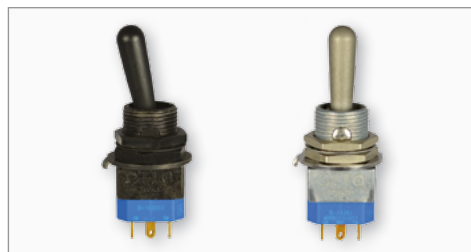
This MIL qualified high performance switch is a logical choice for use in environments where sealing and resistance to shock and vibration are required. Particularly suitable for applications in military, off-highway, aviation, commercial and industrial equipment.

Available in single and double pole configurations with a lever lockout option. Circuitry configurations include two or three positions with many combinations of OFF-ON in momentary and maintained action including ON-ON-ON.

**TE Description** MIL-DTL-8834

A snap-action, non-teasible, positive make and break, panel mount toggle switch. The non-teasible mechanism assures that the switch will actuate and not "hang up" even when actuated very slowly. All metal components are corrosion resistant and designed to exceed all military requirements.

This environmentally sealed switch is available in single and double pole configurations with 15/32 or 1/4-40 bushings. The TE series is ideal in applications for dry circuit, low level and power switching applications.



Switches and Grips

Rocker Switches

Selection Chart and Range Overview Performance Switches

Designed to comply with standards established for Appliances, Marine (ignition protection) and Off-Road Vehicles. Mounting is simple and quick. The snap-in design supports a variety of panel thicknesses. Choose LED, incandescent or neon illumination. Legends can be printed onto a button or lens, or laser etched and back-lit. Custom colours are also available. All switches have a seal rating of IP68S and IP69K. All products are RoHS/WEEE/Reech compliant.

K1 and K2 Description 16A

Rugged, high performance sealed switches designed for use under severe conditions found in marine, appliance, heavy equipment and industrial control applications.

Available with rocker or paddle style switches.

Approved to UL (1054), CSA (LR43865), DEMKO (97-01807), (UL1500) and Ignition protected.

- K1 - SPST, SPDT
- K2 - SPST, SPDT, DPST, DPDT

K3 Description 20A

Attractive and rugged, snap-in rocker for wet and dusty environments.

- SPST, SPDT, DPST, DPDT, SPTT

K4 Description 16A

Entry level, Snap-in toggle for wet and dusty environments.

- SPST, SPDT, DPST, DPDT

K5 Description 20A

Attractive style and rugged construction, snap-in rocker for wet and dusty environments.

- SPST, SPDT, DPST, DPDT, SPTT

U2 Description 10A

The U2-277 and U2-278 rocker switches are designed to run a minimum of one million mechanical cycles and withstand extreme environmental conditions.

- Electrical life >100,000 cycles
- Mechanical life >1,000,000 cycles

K1



K2



K3



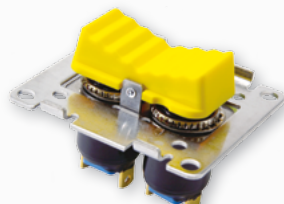
K4



K5



U2



Other Types Switches

Product Range Overview
Performance Switches

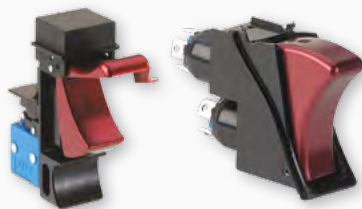
R2



SL



J2



U2

U2 Series Trigger Switches

A selection of Single-step and Two-Step trigger switches are also available, including qualified to M8805/111-1 and -04. Please contact us for specific details and brackets available.

U7 Series - Pendant Switches

The rugged, high performance range of pendant switches is designed for use under severe conditions found in medical, appliance, heavy equipment and industrial control applications. Standard and custom designs are possible, please contact us for details.



All products on these pages are RoHS/WEEE/Reech compliant.

R2 Series - Rotary Switches

Excellent replacement for rocker switches as they offer improved visual position indication, additional lighting options and different styling opportunities on front panels.

Benefiting from being sealed to IP68S, with various illumination options snap-in action in a 1.475" x 0.875" industry standard rocker switch panel opening.

SL Series - Slide Switches

Three position centre 'OFF', with momentary or maintained action available in any combination. Supplied in both commercial and military grades, dust-tight to MIL-PRF-8805 Design 2. Button styles include raised or flush contours.

- FAA/PMA versions available
- 100,000 cycle mechanical & electrical life
- RoHS/WEEE/Reach compliant
- Choice of button colour

J2 Series Transducer

These are strain gauge based designs, force transducer switches. They provide analogue output proportional to the force applied to the button. Normally mounted in a grip and operated by a finger or thumb, common applications include flight control of aircraft, operating ground vehicles, target acquisition and air traffic management.

Various custom designed U2 and U7 type pendant designs are also available, please contact us for details



Switches and Grips

G2 Aero/Mil Grips

Selection Chart and Overview Performance Switches

A comprehensive range of aerospace and military control grips are available. These G2 grips perform every day in some of the toughest applications from military ground vehicles, throttle quadrant and control grips for fixed wing aircraft, to helicopter cyclic collective grips. With the manufacturer being registered to ISO 9001:2008, AS9100C and FAA Part 145 Repair Station.

Military Ground Support Grips

- Custom machined heads available to fit standard handles
- Back lighting options
- Custom head can be outfitted with a variety of standard switches

Flight Control Grips

- B8 & Cobra style grips are made in accordance with MIL-DTL-25561
- Non-reflecting, non-hygroscopic, rugged injection moulded grip
- Choice of termination styles - from integral connectors to wire harnesses
- Threaded interface or tube mounting
- Can be populated with MIL qualified switches, standard or custom configurations

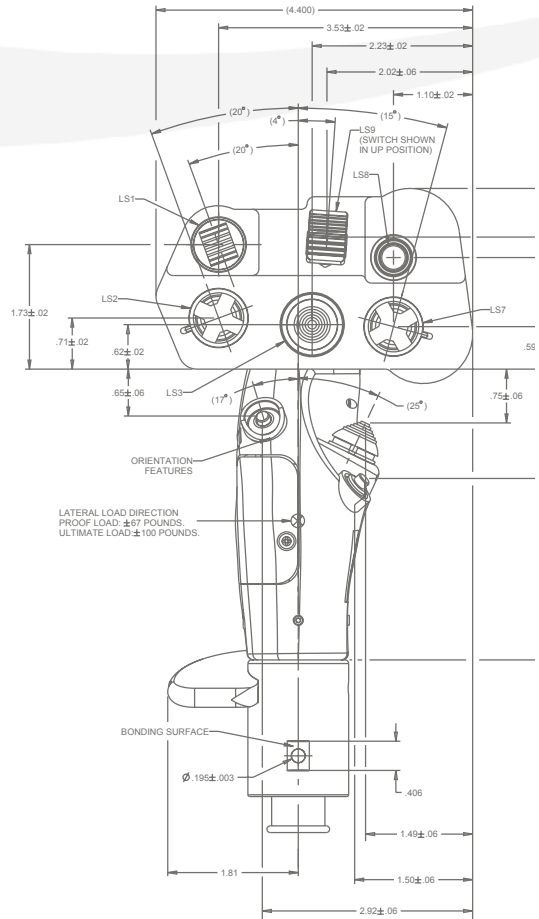
Throttle Control Grips

- Control for fixed-wing aircraft
- Custom toggle & rocker switches can be used to meet high cycle requirements

Helicopter Cyclic & Collective Grips

- Grips have thin-wall, investment cast aluminium construction for high strength and low weight
- Modular construction
- Custom heads & switch mounting plates can be fabricated to fit standard handles
- A variety of button colours & style options available
- Transducer & electro-mechanical trim switch options

For more information on this extensive range, or for assistance with your specific requirements, please contact us.



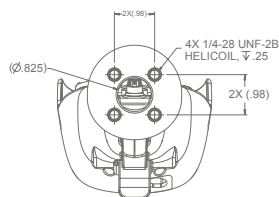
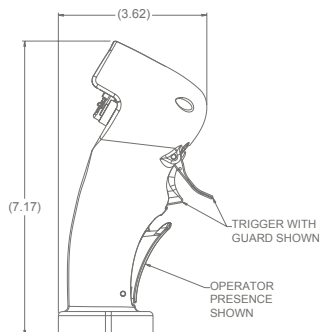
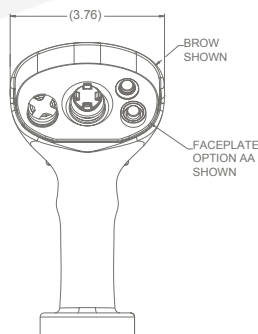
G2 Commander Grips

**Rugged Modular Design
Performance Switches**



Cast from aluminum alloy, the G2 Commander Grip is a rugged industrial control grip suitable for demanding applications. The standard G2 Commander Grip offers nine different faceplate configurations that include pushbutton, toggle, transducer, split trim and Hall effect switches. Thousands of custom faceplate configurations are possible. The grip body has 10 possible switch location options.

The G2 Commander Grip is suitable for use in military, aerospace and industrial applications, and is the ideal solution where durability and dependability are required.



- Standard design eliminates the need for tooling charges
- Available as a fixed grip or can be mounted on a JH or JHM series Hall effect joystick
- Various mounting & termination options available
- Nine standard faceplate configurations that include T3, T4 and T5 toggle switches, P4, P7 and P9 pushbutton switches, K1 rocker switches, SPT split trim switches, J2 transducer switches, FG flip guards, and HTWM, HTL and HTLT Hall effect switches
- Thousands of custom faceplate configurations possible that can accommodate virtually all OTTO pushbutton, rocker, toggle, trim, transducer and thumb wheel switches
- Operator presence and trigger options
- USB output option
- Tested to withstand a 265 lb. load
- Grip sealed to IP68S (subject to change based on switch choice)

For more information on the multiple options available please contact us to discuss your requirements further.

Switches and Grips

G3 Universal Grips

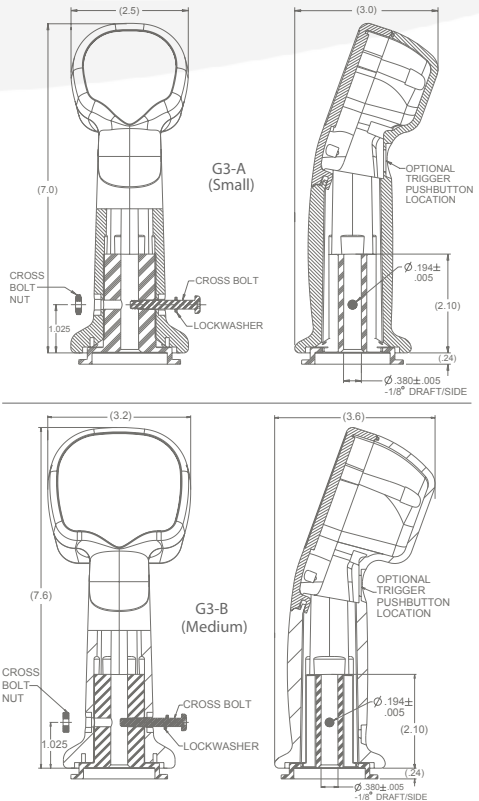
Selection Chart and Overview Performance Switches

The G3 Universal Grips can be customised for top-of-the-line machines requiring high switch content, or to provide only basic control function on lower tier units. The G3 Universal Grips have a modular design and were developed for use with our standard pushbuttons, rockers, toggles, Hall effect switches and the JH and JHM series Hall effect joystick.

Available in both Small and Medium size, they are easily customised with multiple switch configurations, quickly and without tooling charges. Some of the markets for the G3 Universal Grip include Industrial, Medical, Off-Highway and Transportation.

- Modular Design eliminates the need for tooling charges
- Compatible with the JH and JHM series Hall Effect Joysticks
- Small & Medium sizes available
- Accommodates a full line of Pushbutton, Rocker, Toggle, HP Hall Effect & HPL Proportional Output series of switches
- Various mounting & termination styles available
- Includes mounting adaptor with boot ring

For more information on the multiple options available please contact us to discuss your requirements further.



G3 Dual and Commercial Grips

Rugged Modular Design
Performance SwitchesRoHS
compliant

G3 Dual Grip

The G3 dual grip remote is a durable, lightweight, two-handed game style grip. Its ergonomic design allows for comfortable extended use and its moulded body eliminates the need for tooling charges. The G3 dual grip remote accommodates our standard HTL and P7 series switches, with your choice of button styles and colors. The G3 Dual Grip Remote is designed for unmanned vehicles, robotics, and can be used for military applications.

- Standard USB interface
- Readily available options include HTL series and P7/P9 switches
- Lightweight, ergonomic design for comfortable use
- Excellent proportional control
- Switches sealed to IP68S
- Switches have excellent EMI/RFI immunity
- Custom configurations are available, please contact us.



Soft Touch Grips



Palm Grips



Tractor Grips



The ergonomically designed Contour Grip reduces muscle strain allowing for extended use with minimal fatigue and is available in both left-handed and right-handed versions.

G3 Commercial Grips

The G3 range of commercial grips have been designed to serve the agriculture, off-highway, material handling and specialised industrial equipment markets.

Heavy Equipment & Material Handling Grips

- Rugged injection moulded grip can be outfitted with a variety of our switches
- Ergonomic design for extended use
- Custom designs
- Left or right hand orientation available
- Comfortable Soft Touch Grip available

Tractor Grips

- Rugged thermoplastic
- Can be outfitted with a variety of our switches

Agricultural Grips

- Powder-coat, cast aluminum grip and steel mounting bracket
- Can be outfitted with a variety of our switches

Hall Effect Overview

Communication Protocols
USB, CANOPEN® and J1939



Features:

- Standard configuration for both is three analogue input channels & 12 digital input channels with two digital output channels
- CAN power accommodates a 9–32VDC power supply
- I/O extension for up to 40 digital inputs, eight analogue inputs & multiple digital outputs by I²C interface
- Both J1939 & CANopen® versions include a failure monitoring feature
- EMI/RFI per ISO 11898 89/336 ECC, tested to 100V/M
- Operating temperature -40°C to +85°C
- Storage temperature -65°C to +105°C
- All designs are RoHS and WEEE compliant

1 Ultra Reliable

2 Proportional Output

3 Extremely Long Life Cycles

4 Available, in the MILLIONS

Hall Effect switches from an industry leader in the integration of J1939 and CANopen® serial bus communications in on and off-highway operator controls. Having extensive experience implementing CAN operating systems in conjunction with the latest generation of operator controls; replacing traditional electromechanical and hydraulic systems with solid state, digital and analogue electro-hydraulic control systems. Their product line of electro-mechanical switches, Hall effect devices, push buttons and mini joysticks mated to our Hall effect joysticks and control handles provide a CAN based integrated solution for any application.

J1939 offers an industry standard set of defined codes for consistent system integration.

The J1939 Joystick will work in systems running with 250Kbit/sec processing a message approximately every 10ms. J1939 can be configured into three variations (50, 51, 52 are the default addresses). An external resistor change at the connector pins allows multiple joysticks to be used on the same bus. Additional joystick addresses can be added by assigning a unique identification during configuration.

CANopen® provides a greater degree of flexibility in defining device IDs and can be remotely configured. CANopen® can also be configured to run with other system baud rates.

Hall Effect

Product Range Overview
Performance Switches

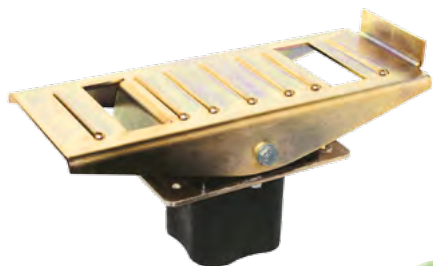
HFNR

RoHS
compliant**HFNR****Hall Effect Forward/Neutral/Reverse Rocker**

Compact, robust and reliable, ideal for grip or panel mount applications. This 3-position switch provides operator comfort by reducing the movement required to change direction or switch gears. Back lighting provides enhanced visibility; making them easy to see in poor lighting or night-time operation.

The electronics are sealed to IP68S, the switch has excellent EMI/RFI immunity and a mechanical life of three million cycles.

HJFC

RoHS
compliant**HJFC****Hall Effect Foot Pedal**

Built to perform under the worst possible conditions. The unique design places Hall effect sensors and electronics behind a solid plastic diaphragm that separates the top and bottom halves of the front pedal, sealing the electronics in an IP68S rated enclosure. The bottom half of the pedal utilises the same proven contact-less analog output Hall effect technology used in our joysticks and is available in J1939 and CANopen(R) formats.

Provides a life of nine million cycles. Customer specified features such as pre-travel and over-travel, along with a minimum and maximum output and are programmable.

HP7 & HP7C

RoHS
compliant**HP7 and HP7C****Hall Effect Pushbutton Switches**

These momentary pushbutton switches utilise Hall effect sensor technology for long life contactless switching, with 10 million cycles. Available in dust tight and moisture proof sealed configurations, these switches can also be watertight sealed to IP68S.

Available in three case and button styles and offered in raised dome, flush dome and exposed dome styles. PC pins or wire leads are standard.

This rugged switch is designed to withstand harsh environments while being subjected to high rates of actuation. Applications that require repeated "jogging" and other continuous operations are prime applications for the HP7 Hall Effect Switch.

Hall Effect

Product Range Overview Performance Switches

HPL

Hall Effect Linear Output Pushbuttons

Utilises Hall Effect technology to provide the user an output proportional to the travel of the button. The HPL delivers up to 10 million cycles. This rugged switch is ideal for applications where a simple on/off control is insufficient and a linear output is desired. Using the HPL, an operator can control the motion of a device as well as the speed of the movement. The HPL switch is an ideal control device for valves and variable speed drives and can be used in industrial control, construction, heavy equipment and material handling applications.

The HPL is offered as a stand-alone switch and in a dual HPL rocker assembly. As with all OTTO switches, a wide variety of case and button styles and colors are offered, along with various termination styles and two levels of sealing. OTTO can provide custom configurations as well as provide the HPL switches installed in a control grip

HPW

Hall Effect Single Axis Paddle

The HPW series is available with 14 output options, offers a self-centering single axis actuator that provides linear change in voltage output in either direction from centre. Options include increasing or decreasing voltage output in either direction (from center position to the full travel position) with single or dual outputs in either direction. The HPW series without detent provides a five million cycle, full forward to full back life and with detent (available with HPW-3) provides a two million cycle full forward to full back life. Electronics are sealed to IP68S, while offering outstanding EMI/RFI immunity.

- Designed for grip, armrest and panel mounting
- 14 output options available
- Self-centering, single axis actuator
- Up to 5 million mechanical life
- Electronics sealed to IP68S
- Optional soft touch coating available

HPL



HPW



Hall Effect

Product Range Overview
Performance Switches

HTL

RoHS
compliant**HTL****Linear Hall Effect Finger Joystick**

The HTL series provides all of the performance of a full size, dual axis joystick in a miniature package that can be mounted in control handles, armrests and panels. The Hall effect sensors are immune to electromagnetic and radio frequency interference up to 100V/M.

The HTL series has excellent tactile feel for improved operator control and is available with either dust tight or IP68S watertight seal. A wide variety of output configurations are available to satisfy different applications.

HTLT

RoHS
compliant**HTLT****Finger Joystick with Pushbutton Option**

The HTLT Series miniature Hall effect joystick is a proportional linear output finger joystick with a pushbutton option. The HTLT features 6 different button styles, multiple output configurations and 3 mounting options including top mount with threaded housing.

Gating options include omni directional square on axis guided feel, gated single axis return to center, gated dual axis return to center and omni directional round smooth feel. The HTLT offers excellent tactile feedback and is available with a mechanical seal of either dust tight or watertight per IP68S. All electronics are sealed to IP68S.

HTW &
HTWERoHS
compliant**HTW and HTWE****Proportional Output Thumbwheel**

HTW is a spring-return-to-centre, single axis thumbwheel with an actuator that provides linear change in voltage output in either direction from the center. Whereas the HTWE offers return-to-end alternative.

Available with eight output options, including increasing and decreasing voltage output from the center position to the full travel position and single or dual (redundant) outputs.

A durable switch providing three million cycle rotational life, sealed to IP68S and excellent EMI /RFI immunity.

Both HTW and HTWE are also available with short behind panel depth versions.

Hall Effect

Product Range Overview Performance Switches

JH

Hall Effect Joysticks

The JH Series Joystick is designed around the rugged mechanism of a traditional 4-way hydraulic joystick, but it utilises contactless Hall effect technology for increased life and more dependable performance in the field. This combination provides performance and features never before available in an electronic joystick.

The JH series uses a field proven dual magnet configuration found in our HPL Linear Output Hall Effect switches. The Hall effect sensors are fully protected against electromagnetic and radio frequency interference (EMI and RFI) up to 100V/M.

JHM

Hall Effect Medium Joystick

The JHM series Medium Hall Effect Joystick is a full function operator control in a package that will fit in an armrest or on a panel. It utilises patented Hall effect technology for unmatched life and reliability. Electronics are sealed and it has an operational life of ten million cycles in all directions. Additional options include CANopen(R) and CAN J1939 versions, multiple analog and digital auxiliary control outputs, redundant sensors and a variety of output configurations, along with a variety of grip and switch options

JHT and JHT-Z

Hall Effect Miniature Joystick

The JHT miniature series Hall Effect joystick's compact design and robust construction is the ideal solution where space is limited and precision control is required. Ideal applications include: robotics, construction equipment, hydraulic controls, medical and surgery equipment, security and surveillance video cameras. The JHT has been tested to five million cycles with no degradation of electrical performance or boot wear. Electronics are sealed to IP68S and the EMI/RFI withstand are per SAE J1113 specifications

Also available with 60° rotational movement of the actuator top, as a JHT-Z.

JH



JHM



JHT & JHT-Z



Sealed Limit Switches

Overview - Sealed Against Immersion and Corrosive Atmosphere

P6

RoHS
compliant**P6-3 Subminiature**

These subminiature sealed limit switches are contained in a rugged aluminum housing with choice of lever, roller or plunger. Featuring the B5 series basic switch, the P6-3 series is able to switch up to 10 amps. The high contact pressure and superior wiping action of the design also makes the P6-3 series an excellent choice when switching logic level loads.

Sealing against water and other liquids is per MIL-PRF-8805. Wire leaded models feature potted leads. The solder terminals are epoxy sealed.

**P6 Limit Switches**

Sealed against immersion and corrosive atmospheres. These switches are designed for rugged duty both mechanically and electrically. A one-piece stainless steel or nickel plated brass housing, sealed at the plunger with an O-ring seal and at the base with a glass-to-metal header option provides true environment-free sealing to comply with MIL-PRF-8805/39, MIL-PRF-8805/40, MIL-PRF-8805/43, MIL-PRF-8805/100 and MIL-PRF-8805/104. Most case parts are grounded for EMI reduction.

The P6 series is available with roller plunger styles for cam or slide actuation and pin plunger for in-line actuation. Please contact us for additional design options.

P6 series features the B2, B3 or B5 series snap-action basic switch. High contact pressure and unique contact design provides low contact resistance for low level switching as well as full rated service.

- Complies with MIL-PRF-8805 sealing
- One-piece housing
- Sealed at plunger with O-rings
- Sealed at base with a glass seal
- EMI reduction construction
- Choice of pin or roller plunger
- Choice of axial or radial leads

Please contact us for additional details on this range of limit switches and modifications available.





Wire and Cable

Heat-shrink Tubing

Non-shrink Tubing

Braided Sleeving

Screening Braids

Moulded Parts

Terminals and Splices

Wire and Cable Markers

Accessories

Connectors

Backshells

Bonding Leads

Metal Braids

Relays and Contactors

Switches and Grips

Adhesives and Tapes

Application Equipment

Added Value Services

INTRODUCTION

Advanced High Temperature Adhesives, Fillers, Coatings, Tape, Cloths, Blankets and Materials

We provide a range of high performance adhesives, fillers, coatings, tapes and cloths designed for operation under the harshest environmental conditions. Ideally suited for insulating and bonding to an extensive range of materials, including metals, ceramics, plastics and glass, with the majority offering the advantage of curing at room temperature.

Found across many industries including Aerospace, Automotive, OEM Electronics, Fabrication and Foundries, with an extensive range of applications covering bonding, potting, sealing, casting, moulding and coating. For whatever the application demands, be it sustained high temperature operation, thermal shock stability, corrosion, abrasion and/or chemical resistance while maintaining excellent electrical and mechanical performance characteristics, we have a solution and technical advice available.

PERFORMANCE

Epoxy thermosetting solutions, with operating temperatures up to 200°C.

EPOXY

Compounds and fillers, with operating temperatures up to 340°C.

CERAMIC

Compounds, fillers and materials, with operating temperatures up to 3000°C.



For assistance please call our technical team...

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S1125	Two part epoxy adhesive up to +150°C	page 473	2
RT125	Two part epoxy adhesive up to +150°C	page 474	
S1017, S1030 and S1048	Hot melt adhesive tape	page 475	3
S1255-04, S1260 and S1305	Hot melt adhesive sealant tape	page 476	
66N, 67N, 68N and SRT	Silicone self-amalgamating tapes	page 477	4
ISK222	Polyimide high temperature adhesive tape	page 479	

HIGH TEMPERATURE SOLUTIONS	temperature range from 200°C to 3000°C	page 480	5
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Epoxies	Selection and Properties Guide, up to 340°C	page 482	6
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Duralco® 130 Series	Thermally conductive	page 485	7
Duralco® 4525IP, 4538 & 4461IP	Ambient Cure	page 486	
Duralco® 4460, 4700 & 4703	Thermal cure	page 487	8
Duralco® 4540, 454/456, 7056AL	Machinable Epoxies	page 488	
Durapot® 860 Series	Potting Compounds	page 489	9
EPOX-EEZ	Twin packs and kits	page 490	

Ceramics	Selection and Properties Guide	page 492	10
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Resbond® 906, 989 and 903HP	Specialist	page 495	11
Resbond® 907GF, 905 and 940	Specialist	page 496	
Resbond® 904, 931 and 950	Specialist	page 497	12
Durabond® 7025, 7032	Ceramic Putties	page 498	
Durapot® 800 Series	Potting Compounds	page 499	13

Flexible Ceramics			14
Rescor® 370, 372, 375FT & 360	Thermal Insulation	page 500	
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Machinable and Castable Ceramics			16
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Adhesives and Tapes

Epoxy and Hot Melt Adhesives

Selection Guide

Product Characteristics

Adhesive Product Characteristics Table - Epoxy/Thermosets

Product	Moulded Part ref.	Type	Operating Temperature	Product Designation	Packaging
S1005	-	Epoxy/polyamide two part paste	-55°C to 135°C	S1005 Kit 1	178ml bottle part A 89ml bottle part B
S1006	-	Epoxy/polyamide two part paste	-55°C to 135°C	S1006 Kit 8	50ml dual syringe
				S1006 Kit 1	Two 15g packs
				S1006 Kit 2	Four 7.5g packs
				S1006 Kit A	Ten 3g packs
S1009	-	Epoxy/polymercaptan two-part paste	-55°C to 135°C	S1009 KIT A	Ten 3g packs
				S1009 KIT 8	50ml dual syringe
S1255-04	-	One-part epoxy tape adhesive	-55°C to 200°C	S1255-04	Tape 19mm x 0.51mm x 30m
S1125	-	Epoxy/polyamide two part paste	-55°C to 150°C	S1125 Kit 1	Five 10g packs*
				S1125 Kit 2	Two 10g packs
				S1125 Kit 3	One 100g pack
				S1125 Kit 4	Five 10g packs
				S1125 Kit 5	One 10g pack
				S1125 Kit 8	50ml dual syringe
	/225	Pre-coated latent curing epoxy/polyamide	-75°C to 150°C	Only on -25 moulded parts	-
S1264	-	Epoxy/polyamide two part paste	-55°C to 150°C	S1264 Kit 1	One 10g pack
				S1264 Kit 8	50ml dual syringe
S1184	-	Two-part electrically conductive epoxy/polyamide	-55°C to 150°C	S1184 Kit 1	Two x 10ml syringes
RT125	-	Two part general purpose adhesive	-55°C to 150°C	RT125-DS-050	50ml dual syringe

* Plus utensils

Adhesives and Tapes

Epoxy and Hot Melt Adhesives

Selection Guide

Product Characteristics

Adhesive Product Characteristics Table (continued) - Epoxy/Thermosets

Product	Pot Life @ 23°C	Curing Conditions	Shelf Life* @ 23°C	Spec. **	Comments
S1005	20 min	24 hr @ 20°C min. or 1 hr @ 95°C	1 year	RK-6611	Flexible low viscosity thermosetting general purpose adhesive.
S1006	1hr	96 hr @ 20°C min. or 1 hr @ 120°C	2 years, 1 year Kit 8	RT-1006 RK-6612 A-A-56031***	General purpose harnessing adhesive. Not used on fluoroelastomer, silicone or PVDF.
S1009	20 min	24 hr @ 20°C min. or 1 hr @ 95°C or 45 min @ 120°C	2 years, 1 year Kit 8	RT-1009	General purpose harnessing adhesive. Not used on fluoroelastomer or silicone.
S1255-04	-	90 min @ 155°C. or 15 min @ 260°C	1 year with refrigeration	RT-1014	One part epoxy tape used with fluoroelastomer harness systems
S1125	1.5 hrs	24 hr @ 20°C min. or 1 hr @ 85°C	18 months	RT-1011 RK-6619 VG-95343	Good fluid resistance epoxy used with system 25 components
/225	-	Cure during installation of moulded parts	36 months	VG-95343 RK-6630	Pre-coated epoxy system for -25 moulded parts
S1264	90 min	24 hr @ 20°C min. or 1 hr @ 85°C	18 months	RT-1012	Tested to NBC requirements
S1184	1 hr	48 hrs @ 20°C or 2 hrs @ 80°C	6 months	RK-6627 RT-1084	Conductive epoxy adhesive for use with screened terminations.
RT125	1.5 hrs	24 hrs @ 20°C or 1 hr @ 85°C	18 months	-	Two part general purpose flexible harnessing adhesive.

* Shelf life from date of manufacture.

** For specific adhesion properties, see product specification sheets.

*** Only S1006 Kit A conforms to A-A-56031.

Adhesive Product Characteristics Table - Hot Melt/Thermoplastics

Product	Moulded Part ref.	Type	Operating Temperature	Product Designation	Packaging
S1017	/42	Hot-melt/polyamide	-20°C to 60°C	S1017	Tape 25mm x 0.3mm x 15m
S1030	/180	Hot-melt polyolefin	-80°C to 80°C	S1030	Tape 20mm x 0.3mm x 10m
S1048	/86	Hot-melt, high performance	-55°C to 120°C	S1048	Tape 25mm x 0.66mm x 30m
S1124	/164	Hot-melt, elastomeric polymer	-55°C to 105°C	S1124	Tape 20mm x 0.46mm x 30m
S1260	n/a	Hot melt,	-55°C to +240°C	S1260	Tape 19mm x 0.33mm x 7.6m
S1297	/97	Hot-melt/polyamide	-20°C to 90°C	S1297	Tape 25mm x 0.3mm x 3m

Sealants Product Characteristics Table - Butyl Sealant

Product	Moulded Part ref.	Type	Operating Temperature	Product Designation	Packaging
S1278	-	Hot-melt grey butyl sealant	-40°C to 90°C	S1278-01	Tape 25mm x 1.57mm x 7.6m
				S1278-02	Tape 95mm x 3.18mm x 3m
S1305	-	Hot-melt grey butyl sealant, flame retardant	-40°C to 90°C	S1305-01	Tape 25mm x 1.57mm x 7.6m

Hot Melt Adhesive and Sealant Tapes

Selection Guide
Product Characteristics

Adhesive Product Characteristics Table (continued) - Hot Melt/Thermoplastics

Product	Pot Life @ 23°C	Curing Conditions	Shelf Life @ 23°C	TE Spec	Comments
S1017	-	120°C	Unlimited	RT-1050/1	General purpose harnessing adhesive. Standard for -3 and -4 moulded parts.
S1030	-	120°C	Unlimited	RT-1050/6 RK-6017	Good low-temperature flexibility. Available as a pre-installed tape for -100 moulded parts.
S1048	-	160°C	Unlimited	RT-1050/3 RK-6626	Requires high temperature to achieve bonding. Highest service temperature for hot-melt.
S1124	-	150°C	Unlimited	RT-1050/13	Requires re-flowing @ 150°C for 90 mins. Designed to bond to -51 moulded parts
S1260	-	150°C	Unlimited	RT-1050/29	Requires re-flowing @ 150°C for 90 mins. Bonds to fluoropolymers and fluoroelastomers
S1297	-	120°C	Unlimited	RW-2019	Standard pre-coated adhesive in CES, CSGA cable entry seals and SST-FR tubing

Adhesive Product Characteristics Table (continued) - Butyl Sealant

Product	Pot Life @ 23°C	Curing Conditions	Shelf Life @ 23°C	TE Spec	Comments
S1278	-	110°C	Unlimited	RW-2020	General purpose sealant and cable breakout area filler
S1305	-	110°C	Unlimited	RW-2020	Halogen-free, flame-retardant sealant & cable breakout area filler

Adhesive/Material Compatibility

Selection Guide Overview
Product Characteristics

Adhesive/Sealant Selection Table....

Substrate Category	Typical Product	Moulded Part Material Dash Number					
		-3	-4	-8	-12	-25	-50
Polyolefin	RNF-100	S1006	S1006	-	-	-	-
	VERSAFIT	S1009	S1009	-	-	-	-
	CRN	S1017	S1017	-	-	-	-
	BSTS	S1030	S1030	-	-	-	-
	SST	S1048	S1048	-	-	-	-
	HR	S1297	S1297	-	-	-	-
Fluoropolymer	PVDF	S1009	S1009	S1009	-	S1125	-
		S1048	S1048	-	-	-	-
		S1125	S1125	-	-	-	-
	RT-555	-	-	-	S1255-04	-	-
	HCTE	-	-	-	S1255-04	S1125	-
	CONVOLEX	-	-	-	S1125	-	-
Vinyl	PVC	S1006	S1006	-	-	-	-
		S1009	S1009	-	-	-	-
		S1017	S1017	-	-	-	-
Elastomer	DR-25	-	-	-	-	S1125	S1125
	NT	S1006	S1006	-	-	-	-
		S1009	S1009	-	-	-	-
		S1017	S1017	-	-	-	-
	NTFR	-	-	-	-	S1125	-
	SFR	-	-	-	-	-	-
	SRFR	-	-	-	-	-	-
	RW-200-E	-	-	-	S1255-04	-	-
	VPB	-	-	-	-	-	S1125
		-	-	-	-	-	S1255-04
Zerohal	XFFR	-	-	-	-	-	-
	ZHTM	-	-	-	-	-	-

For further details on the full range of moulded part materials above, please contact us.

Nuclear - Adhesive/Sealant Selection Table

Substrate Category	Typical Product	Moulded Part Material Dash Number		
		-770	-780	-790
Nuclear Fluoropolymer	RT770	S1264	-	-
	RT780	-	S1255-04	-
	RT790	-	-	S1255-04

Adhesive/Material Compatibility

Selection Guide Overview
Product Characteristics

Adhesive/Sealant Selection Table (Continued)

Substrate Category	Typical Product	Moulded Part Material Dash Number					
		-51	-55	-71	-100	-125	-130
Polyolefin	RNF-100	-	-	S1006	-	-	S1006
	VERSAFIT	-	-	S1009	-	-	S1009
	CRN	-	-	S1017	-	-	S1017
	BSTS	-	-	S1030	-	-	-
	SST	-	-	S1048	-	-	-
	HR	-	-	S1297	-	-	-
Fluoropolymer	PVDF	-	-	S1009	-	S1009	-
		-	-	S1048	-	S1048	-
		-	-	S1125	-	S1125	-
	RT-555	-	S1255-04	-	-	S1255-04	-
	HCTE	-	S1255-04	-	-	-	-
	CONVOLEX	-	S1125	-	-	-	-
Vinyl	PVC	-	-	S1006	-	-	-
		-	-	S1009	-	-	-
		-	-	S1017	-	-	-
Elastomer	DR-25	S1125	-	-	-	-	-
	NT	S1124	-	S1006	-	-	-
		-	-	S1009	-	-	-
		-	-	S1017	-	-	-
	NTFR	S1124	-	-	-	-	-
	SFR	-	-	-	-	-	-
	SRFR	-	-	-	-	-	-
	RW-200-E	-	S1255-04	-	-	S1255-04	-
	VPB	-	-	-	-	-	-
		-	-	-	-	-	-
Zerohal	XFFR	-	-	-	S1030	-	-
	ZHTM	-	-	-	S1030	-	-

For further details on the full range of moulded part materials above, please contact us.

Adhesives and Tapes

S1005, S1006 and S1184

Epoxy Adhesives - Two Part up to 150°C
Overview

S1005 Low-viscosity Adhesive

Two-Part Polyamide Epoxy

Flexible low-viscosity, two part general purpose polyamide epoxy supplied in polythene bottles. Can be mixed by volume or weight. One bottle contains Part A, the pale yellow epoxy and the other bottle contains Part B, the amber polyamide hardener.

Temperature Range: -55°C to +135°C

Packaging:

S1005 Kit 1: 2 bottles, 89ml Part A and 178ml Part B

RoHS
compliant



S1006 High-viscosity Adhesive

Two-Part Polyamide Epoxy

Flexible high-viscosity, two part polyamide epoxy is supplied in a bi-pack to ensure correct mixing. S1006 consists of a pale yellow epoxy resin and an amber polyamide hardener.

Excellent adhesive for polyolefin tubing and moulded parts, aluminium alloy fittings and mild steel, brass and copper.

Temperature Range: -55°C to +135°C

Packaging:

S1006 Kit 1: 2 sachets, 15g each

S1006 Kit 2: 4 sachets, 7.5g each

S1006 Kit A: 10 sachets, 3g each

S1006 Kit 8: 50ml syringe

RoHS
compliant



S1184 Adhesive

Two-Part Highly Conductive Epoxy

A silver loaded adhesive, developed to terminate screened moulded shapes. Can withstand high temperatures and aggressive solvents and fuels.

Once mixed, S1184 has a pot life of approximately 1 hour at 25°C and will cure at room temperature after 24 hours.

Resistivity 0.01Ω/cm

Temperature Range: -55°C to +150°C

Packaging:

S1184: Two 10ml Syringes, 3 x mixing cups and sticks

RoHS
compliant



S1125 Adhesive

Epoxy Two Part Adhesive Kit Selection Overview



Specifications & Approvals

- DIN VG95343 Pt 15

S1125 is a flexible two part epoxy high performance adhesive, developed to match the superior chemical and heat resistance properties of DR-25 heat-shrinkable tubing and -25 heat-shrinkable moulded parts.

Features and Benefits

- High performance, chemical and heat resistant epoxy based adhesive.
- Easy to use and less waste.
- Suitable for use with a range of materials and applications.
- Can be applied directly to the application.
- When mixed the adhesive has a 60 minute workable life at room temperature.

Operating Temperature

-55°C to +150°C

Part Number	Description
S1125 Kit 1	5 sachets, 10g each + accessories
S1125 Kit 2	2 sachets, 10g each
S1125 Kit 3	1 sachet, 100g
S1125 Kit 4	5 sachets, 10g each
S1125 Kit 5	1 sachet, 10g each
S1125 Kit 8	50ml Duo syringe, 3 x mixing nozzles, 5 x mixing cups & sticks, abrasive strips.

Application Equipment

Handgun-050 (1:1)	Duo-syringe application gun
RT-Nozzle-5mm	Duo-syringe static mixing nozzle

Performance Test @ 23°C	Result
Lap Shear (Al/Al)	7KN to RK6619 Clause 2.1
Peel Strength (Aluminium to DR-25)	100N to RK6619 Clause 2.2
Lap shear strength (Al to Al @ +150°C)	1500N to RK6619 Clause 2.1
Solvent Resistance (De-icer, Petrol, Hydraulic Fluid)	Excellent

Installation - To mix both components, remove the plastic separation clip from the centre of the bi-pack and then squeeze the bi-pack thoroughly. When mixed, the adhesive should have a uniform black colour. The separation clip may be used to ensure that the last traces of the epoxy and hardener are squeezed from the corners of the pack.

For best results, adhesive mixed from dual packs, or ejected from duo-syringes without a mixing nozzle, should be dispensed into a separate disposable dish and mixed with a spatula before application to the substrate.

RT125 Adhesive
Epoxy Adhesive

A specially formulated, flexible, two part, room temperature curing adhesive for general purpose wire and harnessing applications. An excellent bond is formed between metals, plastics and most cable insulation materials.

Features and Benefits

- Excellent flexibility, high shear and peel strengths.
- Outstanding chemical and fluid resistance.
- Bonds metals, glass, wood, rubber and many plastics.
- Standard size is 50g, with associated mixing nozzles and dispenser guns.

Operating Temperature

-75°C to +150°C



Part Number	Description
RT125-DS-050	Duo Syringe: 50g
RT-Nozzle-5mm	Mixing nozzle
Handgun-050 (1:1)	Application tool
Prep-and-mix-Kit (5 x 4 items)	Preparation Kit: Dish; Spatula; Clean wipe; Abrasive strip

Typical Performance @ 23°C	Description
Lap Shear (Al/Al)	20 MPa
Peel Strength (XLPE/XLPE)	370 N / 25mm
Peel Strength after thermal shock (4hrs@215°C)	370 N / 25mm
Dynamic Shear (backshell/boot/cable. Shell size 22)	520N
Solvent Resistance (De-icer, Petrol, Hydraulic Fluid)	Excellent

Related Products

A wide range of general purpose adhesives and sealants for a broad range of applications is available. From simple bonding applications to small volume potting, complex and flexible sealing and beyond, we can offer the solution for your epoxy adhesive requirements.

- RT110 fast setting epoxy adhesive
- RT112 non-sag, fast setting epoxy sealant
- RT152 low viscosity, optically clear epoxy resin
- RT183 electrically conductive epoxy adhesive.
- TriPatch wraparound epoxy repair system



RoHS
compliant

S1017

Hot-Melt Thermoplastic Adhesive Tape

A general purpose adhesive supplied in tape form for easy application to cable substrates. Tough yet flexible adhesive, suitable for bonding polyolefins, vinyls, neoprene and metals such as steel and aluminium.

Available as a pre-coat designation /42

Temperature Range: -20°C to +60°C

Packaging:

S1017: 25mm x 0.3mm x 15m roll



RoHS
compliant

S1030

Hot-Melt Adhesive Tape

Non-flame-retarded polyolefin based hot-melt adhesive tape. Recommended for high flexibility at temperatures as low as -80°C. The tape is often pre-applied to low fire hazard moulded parts.

Recommended for use with polyurethane materials and -25 / -100 moulded parts, plus DR-25, RNF and RW-175 heat shrink tubing. Plus FDR jacketed cabled.

Available as a pre-coat designation /180

Temperature Range: -80°C to +80°C

Packaging:

S1030: 20mm x 0.3mm x 10m roll



RoHS
compliant

S1048

Hot-Melt Adhesive Tape

Generally used as a high strength hot-melt adhesive. Will adhere extremely well to most cable jacket materials such as ZHTM, DR-25, or RNF, after enough heat has been applied at the installation stage to ensure complete flow and wetting of the adhesive to a substrate.

Available as pre-coat /86

Temperature Range: -55°C to +120°C

Packaging:

S1048: 25mm x 0.66mm x 30m roll

Adhesives and Tapes

S1255-04, S1260 and S1297

Hot Melt Adhesive Tapes

Overview

S1255-04

High Temperature Adhesive Tape

Single part epoxy tape developed to match the superior chemical and heat resistance properties of our fluoro-elastomeric high performance materials.

For use with System 200 and 300 components and for Fluoroelastomer cable applications

Temperature Range: -55°C to +200°C

Packaging:

S1255-04: 20mm x 0.5mm x 30m roll

S1260

Hot-Melt Adhesive Tape

Fast, permanent field repairs to high temperature PTFE wire and cable. Made from an environmentally resistant modified fluoropolymer.

Particularly suitable for aerospace and defence applications where resistance to solvents and fluids is essential. Suited for power cables with fluoropolymer and fluoroelastomer insulations and jackets.

Temperature Range: -55°C to +240°C

Packaging:

S1260: 19mm x 0.33mm x 7.6m roll

S1297

Hot-Melt Thermoplastic Adhesive Tape

Hot-melt thermoplastic pre-coat adhesive designed for use with heavy duty boots and cable entry seals. It is suitable for bonding to various cable jacket substrates including Polyethylene, PVC, Polychloroprene and metals such as Steel and Aluminium.

Can be used with CES, cable entry seals.

Available as a pre-coat designation /97

Temperature Range: -20°C to +90°C

Packaging:

S1297: 25mm x 0.3mm x 3m roll

For more detailed information please contact us.



66N, 67N, 68N Silicone Tapes

Range of Silicone Elastomer Tapes
Self-amalgamating



A wide range of silicone elastomer tapes, which self-amalgamate at ambient temperature. These tapes are used for sealing, connecting and finishing the cut ends of sleeves exposed to high temperature. These products can also be used to provide local protection to connection accessories and other wiring harness components.

Features and Benefits

- Good fluid resistance.
- Self-amalgamating.
- Local protection.
- Shelf life: One year after date of manufacture.

Operating Temperature

From -60°C to +250°C

Specifications & Approvals

- 66N & 67N: ABS 5334
- 67N: A-A-59163
- 68N: ASNA 5107

Part Number	Thickness	Width	Colour	Glass Tape Substrate	Reel Size	NATO Specification
Tape-66-N	0.3mm	19mm	Red/Brown	No	15m	5970-14-467-8824
Tape-67-N	0.5mm	19mm	Black	No	15m	5970-14-474-7041
Tape-68-N	0.5mm	19mm	Red/Brown	Yes	15m	5970-14-464-7312

25mm and 50mm width options are also available, please contact for details

Recommended time for amalgamation

Temperature	250°C	200°C	150°C	127°C	120°C
Time in minutes	15 min	20 min	35 min	80 min	120 min

Technical Performance

Property	Test Method	66N	67N	68N
Operating temperature range	-	From -60°C to +250°C		
Elongation at break	-	500 to 600%	200 to 300%	26%
Tensile strength	-	50 N	16.3 N	90 N
Average dielectric strength	NFC 26.225	13 KV/mm	16 KV/mm	17 KV/mm
Fluid Resistance				
<ul style="list-style-type: none"> • Jet Fuel (JP5) • Hydraulic fluid (Skydrol 500B4) • Mineral Oil (NATO 0142) • Synthetic Oil (NATO 0156) • Cleaning Fluids MIL C 87836 25% Propanol + 75% White Spirit Foran 141 B • Cooling Fluid (MIL-A-8243)	The silicone tape amalgamated on its support immersed for a few seconds	No deterioration to the amalgamated tape		

Adhesives and Tapes

SRT Silicone Tape

Silicone Rubber
Self-amalgamating

SRT is a Silicone Rubber based material that is a tough, resilient, self-amalgamating tape, ideal for covering irregular shapes and objects. It can also be used for masking ends and sections of shafts and tubes.

Features and Benefits

- Tough and flexible.
- High temperature performance to 260°C.
- Provides void free insulation.
- Recommended for powder coating, E-coating, plating and anodising.
- Range of sizes, thicknesses and colours.
- No adhesive.
- Waterproof.

Operating Temperature

-54°C to +260°C



Specifications & Approvals

- ASTM D-2000 Classification FC, FE, GE
- MIL-STD-417, TA

Part Number	Width	Thickness	Length	Colour
SRT0750-20	19.05 mm	0.51 mm	11 m	Black
SRT1000-20	25.40 mm	0.51 mm	11 m	Grey
SRT1000-30	25.40 mm	0.76 mm	11 m	Orange
SRT1500-20	38.10 mm	0.51 mm	11 m	Red
SRT1500-30	38.10 mm	0.76 mm	11 m	Blue
SRT1750-20	44.45 mm	0.51 mm	11 m	Green
SRT2000-20	50.80 mm	0.51 mm	11 m	Yellow
SRT2000-30	50.80 mm	0.76 mm	11 m	White

Technical Performance

Description	ASTM Test Method	Results
Hardness	-	45 to 55 Shore A
Tensile strength	ASTM D-412	700 PSI
Percent elongation at break	-	300%
Cold brittle point	ASTM D-2137	-65°C

Note: SRT is made from a commercial grade silicone, it is not suitable for direct food and medical contact, such as internal medical applications.

ISKT22 Polyimide Tape**High temperature
Adhesive Tape**

This high temperature film tape offers optimum performance in electrical and thermal insulation. It offers flame resistant and electrical protection, can be used as a wire and cable wrap, as well as for solder masks.

Features and Benefits

- Mechanical stability under extreme temperature.
- Excellent electrical and thermal insulation properties.
- Resistance to most chemicals, solvents, lubricants and fuels.
- Short term temperature withstand 315°C.

Operating Temperature

-73°C to +260°C

(Adhesive backing rated at 200°C)

Specifications & Approvals

- UL Approval E113238
- ASTM D3652 and D-3759

Part Number	Width	Length	Colour
ISKT22-4mm	4.0 mm	33 m	Amber
ISKT22-8mm	8.0 mm	33 m	Amber
ISKT22-0375	9.5 mm	33 m	Amber
ISKT22-0500	12.7 mm	33 m	Amber

Also available in a wide range of alternative sizes, please contact us for details

Technical Performance

Description	ASTM Test Method	Results
Film thickness	D-3652	0.03 mm
Adhesive thickness	D-3652	0.04 mm
Total thickness	D-3652	0.07 mm
Adhesive	-	Crosslinked Silicone
Breaking strength	-	5.4 Kg/cm
Elongation at break	D-3759	60%
Adhesion to Steel	-	0.3 Kg/cm
Dielectric strength	-	7,500 Volts
Insulation class	-	'H' 180°C

High Temperature Solutions

Overview

Adhesives, tapes, fillers, coatings & cloth



Ultra High Temperature Adhesives

Extensive range of speciality compounds for electrical, structural and industrial applications

We provide a range of high performance adhesives, fillers, coatings, tapes and cloths designed for operation under the harshest environmental conditions.

The products are ideally suited for insulating and bonding to an extensive range of materials, including metals, ceramics, plastics and glass, with the majority offering the advantage of curing at room temperature.

The products can be found across many industries including Aerospace, Automotive, OEM Electronics, Fabrication and Foundries, with an extensive range of applications covering bonding, potting, sealing, casting, moulding and coating.

For whatever the application demands, be it sustained high temperature operation, thermal shock stability, corrosion, abrasion and/or chemical resistance while maintaining excellent electrical and mechanical performance characteristics, we have a solution.

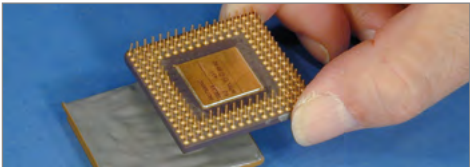
Duralco® High Temperature Epoxies
Bonding and Filling to 340°C

Resbond® High Temperature
Ceramics, Adhesives, Fillers and
Coatings to 3,000°C

Information on the two above product ranges can be found in this section. Please note that not all product is supplied in syringes (dispensing tubes) as shown, these are available as an option on request. Please contact us for details.

EPOXY

Including; Electrically conductive, Thermally conductive, Low viscosity, Ambient cure, Machinable, Specialist, Potting compounds.



CERAMIC

Including; Electrically resistant, Thermally conductive, Ultra temperature, Metallic adhesives, Putties, Potting compounds.



FLEXIBLE Ceramics

Including; Thermal insulation, Fabrics and tapes, Ceramic paper, Liquid hardener.



MACHINABLE Ceramics

Including; High strength alumina and glass ceramic.



Miscellaneous

Including; Thread locker and pipe sealant, installation instructions.



High Temperature Epoxies

Maximum Operating Temp. up to 340°C
Properties and Part Selection

Selection Table - Epoxy-Based Adhesive Properties

Features	Conductive		Room Temperature Cure			
Product Ref	120	132IP	4461IP	4525IP	4538	7050
Properties	Super electrically conductive	Highly thermally conductive	Low viscosity adhesive	Electrically resistant, general purpose	Super flexible stress free adhesive	Nylon bonder, bonds most plastics
Maximum Temp. °C	260	260	260	260	230	205
Components Colour	Silver	Silver	Amber	Black	Tan	Black
Viscosity cps	25,000	36,500	600	25,000	10,000	20,000
Density gm/cc	3.8	1.8	1.1	1.7	1.0	1.3
Hardness Shore 'D'	70	75	90	90	60 - 80	70
Tensile Strength psi	6,500	7,200	9,500	10,000	6,000	5,000
Thermal Conductivity (W/m°C)	7.2	5.7	0.57	1.9	1.0	0.65
Thermal Expansion (x 10 ⁻⁵ / °C)	5.4	8.0	5.4	3.3	6.0	4.8
Dielectric Strength kV/mm	N/A	3.9	17.55	17.55	17.55	15.6
Volume Resistivity ohm-cm	0.00008	106	10 ¹³	10 ¹⁵	10 ¹⁴	10 ¹⁴
Heat Distortion °C	210	210	210	210	75	75
Elongation %	0.2	0.2	5.0	2.0	12 - 100	3.0
Thermal Stability % (1000hr @ 200°C)	0.2	0.2	0.2	0.05	0.5	0.5
Shrinkage % max	0.2	0.8	0.8	0.2	0.8	0.8
Moisture Absorption % 30 Days	0.2	0.2	0.15	0.1	0.5	0.2
Mix Ratio (by weight)	100:3.4	100:8	100:17	100:8	100:120	100:10
Working Time 25 gms (mins. @ 24°C)	30	30	30	30	90	30
Cure (hrs. @ 24°C)	16 - 24	16 - 24	16 - 24	16 - 24	16 - 24	4 - 16
Cure (mins. @ 120°C)	7	5	5	5	60	1 - 2 hrs

Selection Table - Epoxy-Based Adhesive Properties (Continued)

Features	Thermal Cure			Machinable		Single
Product Ref	4460	4700	4703	4540	454B	4420
Properties	High temp. low viscosity	High temp. adhesive and casting	Ultra temp. tooling repairs	Liquid metal, casting and repairs	Non-sag putty, adhesive	One component structural
Maximum Temp. °C	315	315	340	260	230	230
Components Colour	Amber	Black	Black	Silver	Silver	Grey
Viscosity cps	600	40,000	50,000	30,000	100,000	Paste
Density gm/cc	1.1	1.8	1.8	1.9	1.9	1.2
Hardness Shore 'D'	90	94	95	80	80	75
Tensile Strength psi	10,300	11,100	11,800	10,000	10,000	7,000
Thermal Conductivity (W/m°C)	0.57	1.9	2.6	5.0	5.0	1.2
Thermal Expansion (x 10 ⁻⁵ / °C)	6.4	6.4	6.8	8.0	8.0	4.5
Dielectric Strength volt/mil	19.5	21.45	17.55	3.9	3.9	15.6
Volume Resistivity ohm-cm	10 ¹⁴	10 ¹⁴	10 ¹⁰	10 ⁸	10 ¹⁰	10 ¹⁰
Heat Distortion °C	260	300	320	225	200	175
Elongation %	5.0	2.0	2.0	1.2	1.2	1.5
Thermal Stability % (1000hr @ 200°C)	0.1	0.1	0.02	0.5	0.5	0.6
Shrinkage % max	0.5	0.2	0.1	0.1	0.2	0.3
Moisture Absorption % 30 Days	0.1	0.02	0.15	0.2	0.2	0.5
Mix Ratio (by weight)	100:80	100:28	100:22	100:9	100:11	N/A
Working Time 25 gms (mins. @ 24°C)	N/A	N/A	N/A	30	30	N/A
Cure (hrs. @ 24°C)	N/A	N/A	N/A	16 - 24	16 - 24	N/A
Cure (mins. @ 120°C)	4 hours	4 hours	4 - 6 hours	8	10	30

Electrically Conductive Epoxy

Duralco® Product and Properties Guide
Electrical and Industrial Applications

Duralco® Conductive adhesives and potting compounds provide the conductivity required for many high temperature electronic and industrial applications. They will bond to glass, ceramics, metals and plastics, offering excellent resistance to most chemicals and solvents.

Applications include solder replacement, semi-conductor bonding, shielding, electronics, circuit board repair, etc.

Duralco 120 - 260°C Silver based

Epoxy that cures at room temperature to form electrically conductive bond lines for use up to 260°C. Ideal for forming electrically conductive bonds, attaching heat sensitive components and as a solder replacement.

Duralco 122 - 260°C Nickel based

Nickel filled adhesive and casting epoxy is specially formulated to provide an economical alternative to silver filled conductive epoxies. Ideal for use in applications where the ultimate in electrical conductivity is not required.

Duralco 124 - 340°C Ultra Temp, Silver based

Two component, silver filled adhesive for High Power applications. Mix & cure with mild heat.

Duralco 125 - 230°C Flexible, Silver based

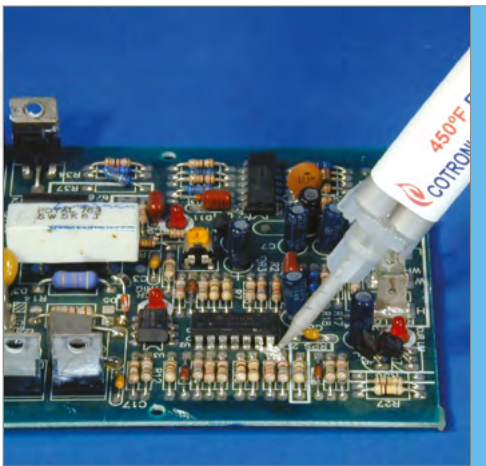
Easy to use, “one to one”, applicator kit. Just dispense, mix and apply this smooth creamy paste and cure at room temperature. Bonds to most metals, ceramics and plastics to form stress free, electrically conductive bonds.

Duralco 126 - 230°C One part, Silver filled

A single component highly conductive epoxy specifically designed for production applications. No mixing, no mess, just dispense and heat cure. Commonly used in automatic dispensing equipment.

Duralco 127 - 200°C Graphite based

Easy to use, “one to one”, applicator kit. Just dispense, mix and apply. This smooth creamy paste cures at room temperature and is ideal for low cost production applications. Can be used in automatic dispensing equipment.



Performance Chart

Part Number	Volume Resistance	Thermal Conductivity	Cure Cycle Hours @	Cure Cycle Minutes @	Size
	Ω-cm	W/m°C	25°C	95°C	oz
120	0.0*	7.20	16-24	10	2
122	0.7	2.16	16-24	10	4
124	0.002	7.20	4@120°C	N/A	2
125	0.002	5.76	16-24	20	1
126	0.002	7.20	1/2@135°C	10@160°C	2
127	0.02	3.60	16-24	20	2.5

* Denotes 0.00008 actual

Thermally Conductive Epoxy

Duralco® Product and Properties Guide
Electrical and Industrial Applications

Duralco® Thermally Conductive adhesives and potting compounds provide the heat dissipation required for many high temperature electronic and industrial applications. These ultra temperature adhesives combine a unique polymer system and specially thermally conductive fillers to provide continuous service up to 340°C. They have excellent adhesion to glass, ceramics, metals and plastics. Resistant to most chemicals and solvents.

Duralco 128 - 260°C Ceramic based

Is a highly thermally conductive, electrically resistant adhesive potting compound. Just mix the resin and hardener, apply and cure at room temperature. Curing may be accelerated with mild heat.

Duralco 132IP - 260°C Aluminium based

An Aluminium metal filled epoxy that cures at room temperature to form machinable, thermally conductive bond lines, providing the max. heat transfer available in a 260°C epoxy system. Can be supplied as a no-sag putty, Duralco 132P, for heat tracing applications.

Duralco 133 - 315°C Aluminium based

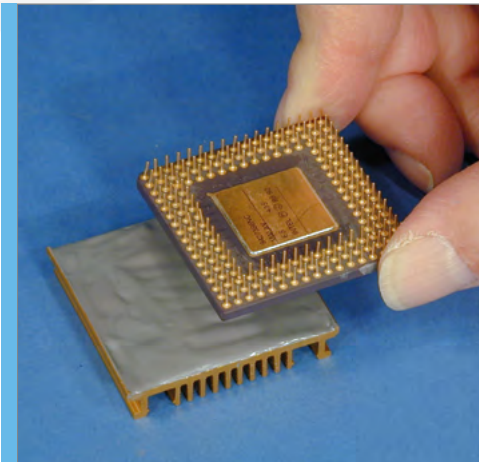
A two component, heat curing, Aluminium filled, conductive epoxy. Cures with mild heat to form thermally conductive bond lines and heat transfer medium. It is readily machinable and ideal for all kinds of repairs and as a construction material.

Duralco 134 - 260°C Ceramic based Grease

Non-hardening, electrically insulating and thermally conductive grease. Ideal for use between components and heat sinks. Retains its paste like consistency, enabling parts to be easily removed and replaced and will not dry out even after extended periods of time.

Duralco 135 - 260°C Aluminium Grease

Filled with an ultra fine, aluminium metal powder to provide the maximum possible heat transfer rate in a non-hardening grease. Commonly used in many industrial applications where electrical resistance is not critical.



Performance Chart

Part Number	Volume Resistance	Thermal Conductivity	Colour	Cure Cycle Hours @	Size
	Ω-cm	W/m°C		25°C	oz
128	10 ¹⁶	4.32	Tan	16-24	8
132IP	10 ⁵	5.76	Silver	16-24	16
132P	10 ⁵	5.76	Silver	16-24	8
133	10 ⁵	5.76	Silver	4@120°C	16
134	10 ¹⁶	5.04	Tan	N/A	8
135	N/A	5.76	Grey	N/A	4*

* Also available 8 oz

Adhesives and Tapes

Ambient Cure Epoxies

Duralco® Product and Properties Guide
Electrical and Industrial Applications

Duralco 4525IP

260°C Electrically Resistant

Cures at room temperature, or in 5 minutes at 120°C, to provide high temperature stability, high bond strength, low shrinkage, low moisture absorption and excellent chemical and electrical resistance. Ideal for high performance bonding, potting, sealing, repairs and casting.

Duralco 4525IP-1

Pint kit

Duralco 4525IP-2

Gallon kit

Also available in pre-measured kits, please contact us for details.



Duralco 4538

230°C Super Flexible

Provides a high level of thermal shock and vibration resistance, sound absorption and excellent adhesion to dissimilar substrates.

Offers the flexibility of silicones and chemical stability of epoxies. Can be tailored by varying the mix ratio of resin to hardener, resulting in the flexibility required.



Duralco 4538-1

Pint kit

Duralco 4538-2

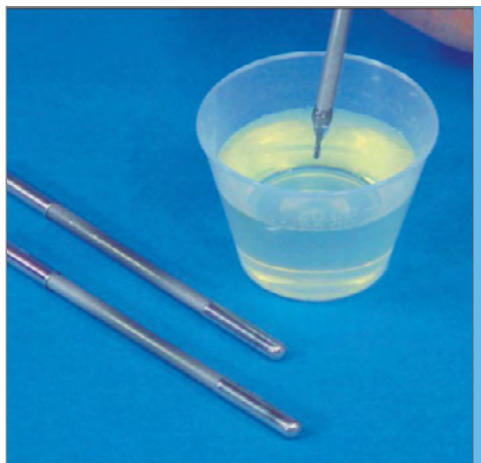
Gallon kit

Also available in pre-measured kits.

Duralco 4461IP

260°C Low Viscosity

A free flowing liquid adhesive, ideal for ultra thin bond lines, impregnating, coating and encapsulation. Cures at room temperature.



Duralco 4461IP-1

Pint kit

Duralco 4461IP-2

Gallon kit

Slow setting version

Duralco 4461SS-1

Pint kit

Duralco 4461SS-2

Gallon kit

Also available in pre-measured kits, please contact us for details.

Thermal Cure Epoxies

Duralco® Product and Properties Guide
Electrical and Industrial Applications

Duralco 4460

315°C Low Viscosity

For encapsulating and impregnation with a superior temperature rating, forms a protective coating, seals and protects against moisture, chemicals and corrosion. Provides high bond strength, high temperature stability and low moisture absorption. Commonly found in aerospace, electronic, appliance, instrumentation and equipment applications

Duralco 4460-1 Pint kit
Duralco 4460-2 Gallon kit

Also available in pre-measured kits.

Duralco 4700

315°C Bonding Adhesive

An exceptionally durable epoxy, 4700 has excellent adhesion to metals, glass, ceramics and most plastics. This superior adhesive has high electrical resistance, low moisture absorption, high temperature stability and excellent chemical resistance. Requires thermal cure cycle.

Duralco 4700-1 Pint kit
Duralco 4700-2 Gallon kit

Also available in pre-measured kits, please contact us for details.

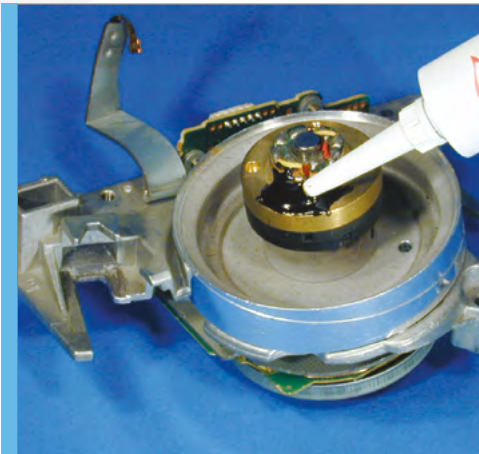
Duralco 4703

340°C Adhesive Tooling Compound

A composite of unique high temperature resins, metallic and ceramic particles, 4703 provides the ultimate in stability and strength in high temperature environments. It has excellent resistance to most chemicals, solvents and acids and is easily machined to close tolerances. Requires a thermal cure cycle.

Duralco 4703-1 Pint kit
Duralco 4703-2 Gallon kit.

Also available in pre-measured kits, please contact us for details.



Machinable Epoxies

Duralco® Product and Properties Guide
Electrical and Industrial Applications

Duralco 4540

260°C Liquid Metal

4540 is a pourable Aluminium metal filled epoxy that offers outstanding adhesion, ductility, thermal conductivity and shock resistance. Just mix and apply. No solvents. No out gassing. Either room temperature or thermal cure cycle. Has excellent resistance to chemicals and solvents.

Duralco 4540-1 Pint kit

Duralco 4540-2 Gallon kit



Durabond 454 and 456

260°C Machinable Non-Sag Putty

A smooth, creamy putty that cures at room temperature to form a highly machinable, composite. Ideal for patching leaking pipes, valves and fittings, repairing pumps.

Duralco 454B-1 0.5Kg

Duralco 454B-2 2.0Kg

Duralco RK454 (Aluminium) applicator kit*

Duralco RK456 (Stainless) applicator kit*



*Repair kit consists of 2.5 oz Resin, 0.6 oz Hardener, Sandpaper, Mixing Sticks, Reinforcement Screen.

Bond-IT® 7056AL

230°C Instant Metal

A unique super fast setting, machinable repair epoxy. Dispensed via a hand held, side by side dispenser tube, it will not drip or sag when applied and will cure in 4-8 minutes at room temperature. Bond-IT has excellent adhesion to smooth, rough or porous surfaces, most plastics, metals, ceramics, glass, wood and cures to form a hard, durable, machinable epoxy that can be machined, tapped or drilled.



Ordering Information:

7056AL-1 2 oz Applicator kit

7056AL-2 8 oz Applicator kit

Epoxy Potting Compounds

Durapot® Product and Properties Guide
Electrical and Industrial Application

Performance Chart

Part Number	Volume Resistance	Thermal Conductivity	Accelerated Cure Cycle	Standard Cure Cycle
	$\Omega\text{-cm}$	$\text{W/m}^2\text{C}$		Hours
861IP	10^{13}	0.57	5 min@120	16-24
862	10^{14}	0.57	60min@175	4 @ 120
863	10^{14}	1.30	1-2hrs@175	4 @ 120
864	10^{14}	1.00	1-2hrs@120	24
865IP	10^{15}	2.88	10 min@120	4-16
866	10^{15}	0.22	10 min@120	24
868	10^{14}	0.57	60 min@175	2-4 @120

Notes: Post cures at 120°C will improve moisture resistance for Durapot 861, 864, 865 and 866.

Durapot 861IP**260°C Low Viscosity**

A 100% reactive compound that provides excellent penetration, even in tightly wound coils. Just mix and cure at room temperature to provide excellent electrical, moisture and chemical resistance.

Durapot 862**315°C High Temperature Low Viscosity**

High temperature version of 861IP

Durapot 863**340°C Ultra High Temperature**

Offers unique properties stemming from a cross-linked, inorganic-organic polymer system. It is a 100% reactive and can be used to 340°C after curing at 175°C. Offers excellent dielectric properties, heat stability, moisture and solvent resistance.

Durapot 864**230°C Flexible, Low Viscosity**

Provides the flexibility required for severe thermal shock applications. Bonds to dissimilar materials, including treated Teflon® and other difficult to bond plastics. Has the ability to impregnate and bond fibre optical bundles.

Durapot 865IP**260°C Thermally Conductive Compound**

Designed for applications requiring high heat flows and rapid thermal dissipation, excellent chemical resistance and high temperature stability. Used for thermally conductive casting, embedding, impregnating and encapsulation.

Durapot 866**260°C Thermally Insulating Compound**

Convenient two part, room temperature curing system. Offers a low density, non-porous foam for high temperature applications.

Durapot 868**260°C High Temperature & Flexible**

Ideal for thermal shock applications, stress free potting and bonding. Offers high electrical resistance, at high temperatures

Epoxy Twin Packs and Kits

EPOX-EEZ® Twin Pack Cartridges
Ambient Curing Adhesives

High performance, high temperature epoxies are available in easy to use EPOX-EEZ twin pack cartridges. Just place the cartridge into the applicator gun, snap on a mixer tube and squeeze to apply.

The completely measured and fully mixed adhesive will cure at room temperature to provide up to 260°C service.

No more time consuming weighing and measuring. Ideal for use in any high temperature application.



Ordering Information

Part No.	Description	4525	4461	4537	4538	4540
ETSK	Starter pack with re-usable applicator gun and one cartridge of each epoxy indicated.	•	•	•		•
EETPxxxx	Twin pack refills package of 4 x 2oz cartridges, plus mixer nozzles. Specify part number required.	•	•	•		•
DK104	1:1 Applicator gun and plunger for			•	•	
DK106	4:1 Applicator gun and plunger for	•	•			•
190-620	Disposable mixer tube nozzles.	•	•	•	•	•

	All Purpose 260°C	Low Viscosity 260°C	Fast Set 230°C	Easy to machine 260°C
Properties	4525	4461	4537	4540
Hardness (Shore D)	80	75	60	80
Viscosity (cps)	40,000	800	10,000	30,000
Tensile Strength (psi)	10,000	9,500	6,000	10,000
Thermal Cond. (W/m°C)	1.87	0.58	1.01	4.32
Dielectric Strength (kV/mm)	17.5	17.5	17.5	9.75
Vol. Resistivity (ohm-cm)	10 ¹⁵	10 ¹³	10 ¹¹	10 ⁸
Shrinkage (% max.)	0.2	1	0.2	0.1
Absorption (30 days %)	0.05	0.15	0.2	0.2
Therm. Stab. (1000hrs 90°C)	0.05	0.2	0.6	0.5
Colour	Black	Amber	Blue	Grey
Cure Cycle - hours @ 25°C	16	16	1-4	16
- minutes @ 120°C	5	5	3	8

Epoxy Twin Packs and Kits

EPOX-EEZ® Pre-Measured Kits
Just Mix and Apply

Package Contents:

- 10 Pots of epoxy resin - 10g or 25g
- 10 Syringes of pre-measured hardener
- 10 Mixing sticks

High temperature epoxy formulations are packaged in convenient, easy to use pre-measured kits, with no measuring, mess or waste.

EPOX-EEZ resins are supplied in specially designed rigid mixing cups and the hardeners supplied in pre-measured disposable syringes.

Just inject one syringe of hardener into one jar of resin, mix, use and discard. Consistent results are always obtainable.

Job sized EPOX-EEZ pre-measured kits are the most economical, easy to use epoxy system available. The ideal choice for production bonding, potting and sealing.

Ordering Information:

EE xxxx -10 Pre-Measured Kit @ 10 units x 10g

EE xxxx -25 Pre-Measured Kit @ 10 units x 25g

Where 'xxxx' is the Duralco system number, for example... **EE-4461-10**.

Part No.	Cure Temp		System Description	Temp	Colour
	Room Temp	4hrs @ 120°C			
EE-128-x	●		Ceramic based thermally conductive	260°C	Grey
EE-132-x	●		Aluminium based thermally conductive	260°C	Silver
EE-861-x	●		Low viscosity potting compound	260°C	Amber
EE-4460-x		●	Low viscosity encapsulant adhesive	315°C	Amber
EE-4461-x	●		Low viscosity encapsulant adhesive	260°C	Amber
EE-4540-x	●		Aluminium filled machinable & repair epoxy	260°C	Silver
EE-4525-x	●		Electrically resistant adhesive	260°C	Black
EE-4538-x	●		Flexible epoxy bonds dissimilar materials	230°C	Amber
EE-4700-x		●	High temperature adhesive	315°C	Black
EE-4703-x		●	Ultra high temperature adhesive	340°C	Black

High Temperature Ceramics

Maximum Operating Temp. up to 340°C
Properties and Part Selection

Selection Table - Ceramic-Based Adhesive Properties

Features	Elec. Resistant		Therm. Conductive		Single Component		
Properties	919	920	908	906	989	903HP	907GF
Properties	Elec. resistant	Therm cond.	Dual cond.	High expand	General purpose	Hi-Bond strength	Fire proof
Service Temperature	1540°C	1650°C	1650°C	1650°C	1650°C	1790°C	1260°C
Base	MgO	Al ₂ O ₃	Al ₂ O ₃	MgO	Al ₂ O ₃	Al ₂ O ₃	MICA
Compression Strength psi	4500	4500	3000	3000	3000	7000	1500
Flexural Strength psi	450	450	1100	1500	1100	3500	1250
Thermal Expansion (x 10 ⁻⁶ / °C)	4.7	8.1	8.1	12.6	8.1	7.2	8.1
Thermal Conductivity W/m°C	0.6	2.2	2.2	5.7	2.2	5.7	0.9
Dielectric Strength kV/mm	10.53	10.53	7.8	9.75	7.8	9.75	5.65
Volume Resistivity ohm-cm	10 ¹¹	10 ¹¹	10 ¹⁰	10 ⁹	10 ⁸	10 ¹⁰	10 ⁹
Components	2	2	2	2	1	1	1
Mix Ratio (by weight)	100:13	100:14	100:33	100:42	n/a	n/a	n/a
Colour	Tan	White	White	White	White	White	Grey
Consistency	Paste	Paste	Paste	Paste	Paint	Paint	Paste

Not sure which ceramic is best for you, then try our selector kit...



High Temperature Ceramics

Maximum Operating Temp. up to 340°C
Properties and Part Selection

Selection Table - Ceramic-Based Adhesive Properties (Continued)

Features	Silica	Fast Set	Ultra Temperature		Metallic		
Properties	905	940	904	931	950	952	954
Properties	Low expansion	Zircon	Zirconia	Graphite	Alumina	Nickel	Stainless
Service Temperature	1370°C	1100°C	2200°C	2980°C	650°C	1100°C	1100°C
Base	SiO ₂	Zircon	ZrO ₂	Carbon	Aluminium	Nickel	316SS
Compression Strength psi	3200	4000	6000	3000	4000	5000	4500
Flexural Strength psi	2100	1800	3000	1500	3000	3000	2500
Thermal Expansion (x 10 ⁻⁶ / °C)	0.5	8.1	7.4	7.4	18.0	7.2	18.0
Thermal Conductivity W/m°C	1.9	1.15	1.4	8.6	6.3	2.0	1.4
Dielectric Strength kV/mm	7.8	4.87	9.75	Cond.	Cond.	Cond.	Cond.
Volume Resistivity ohm-cm	10 ¹¹	10 ⁸	10 ⁸	Cond.	Cond.	Cond.	Cond.
Components	2	2	1	2	2	2	2
Mix Ratio (by weight)	100:60	100:28	n/aA	100:35	100:60	100:120	100:25
Colour	White	Tan	Tan	Black	Grey	Grey	Grey
Consistency	Paste	Paste	Paint	Paste	Paste	Paste	Paste

Resbond® 970 Kit**Ceramic Adhesive Selector Kit**

This selector kit contains seven 4 oz sample bottles of speciality adhesives (901 fibre based, 919 Electrically Resistant, 940 Fast Setting Ceramic, 950 Metallic Aluminium, 989 General Purpose, 7030 High Strength and 907GF Adhesive and Putty).

The 970N Selector Kit is the ideal choice for simplifying product evaluation and selection.

Resbond 970N Selection Kit

Electrically Resistant Ceramics

Resbond® Product and Properties Guide
Electrical and Industrial Applications

Resbond® 919

1530°C Electrically Resistant

Formulated with proprietary ceramic binders to offer an adhesive with exceptionally high electrical resistance. These binders maintain their high electrical resistance and dielectric strength even when exposed to temperatures up to 1530°C. Commonly used for electrical insulation when potting, sealing or coating ignitors, thermocouples, heating coils, instrumentation etc.

Resbond 919-1 2 pints

Resbond 919-2 Gallon



Resbond® 920

1650°C Thermally Conductive

Offers both high thermal conductivity and the superior electrical resistance of Resbond 919. It is based on conductive Alumina ceramic and should be used whenever rapid dissipation of heat is required. Resbond 920 has a dielectric strength of 10.53 kV/mm, volume resistivity of 10^{11} ohm-cm (at room temperature) and a thermal conductivity of 2.2 Watts/m°C.

Resbond 920-1 2 pints

Resbond 920-2 Gallon



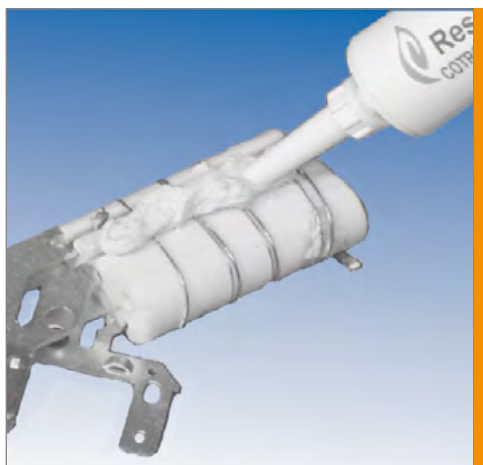
Resbond® 908

1650°C Electrically Resistant & Thermally Conductive

A high purity, Alumina-based adhesive, with excellent electrical and moisture resistance, plus good thermal conductivity. Just mix the resin and it's activator for a readily dispensable smooth creamy paste. Ideal for bonding, potting and encapsulating delicate electronic assemblies, sensors and instrumentation, and any general purpose high temperature application.

Resbond 908-1 Pint

Resbond 908-2 2 pints



High Temperature Ceramics

Resbond® Product and Properties Guide
Electrical and Industrial Application

Resbond® 906

1650°C High Expansion Adhesive

Magnesia based adhesive formulated for bonding high expansion materials for use to 1650°C, it bonds to steel, stainless, aluminium, brass, copper, silver, nickel and other high expansion materials. It will cure at room temperature to form a highly thermally conductive bond.

Resbond 906-1	Pint
Resbond 906-2	2 pints
Resbond 906T-1	Thinner - pint

Resbond® 989

1650°C General Purpose

A single component 1650°C Alumina based general purpose adhesive. It has a smooth creamy consistency and cures at room temperature to form strong bonds to ceramics, graphite, metals and glass. It is resistant to oxidation, electricity, molten metals, most chemicals and solvents.

Resbond 989-1	2 Pints
Resbond 989-2	Gallon
Resbond 989T-1	Thinner - pint

Resbond® 903HP

1790°C Single Component

High temperature Alumina adhesive, developed for high strength bonding of any combination of dense, non porous ceramics, glass and non-reactive metals. It is a smooth, creamy paste that can be brushed, trowled or sprayed on.

Resbond 903HP-1	Pint
Resbond 903HP-2	2 pints
Resbond 903HP-3	Thinner - pint



Adhesives and Tapes

High Temperature Ceramics

Resbond® Product and Properties Guide
Electrical and Industrial Applications

Resbond® 907GF

1280°C Fireproof Adhesive and Sealant

A moist, fireproof adhesive sealant, applied via a standard caulking cartridge, 907GF has excellent adhesion to clean steel, stainless, iron and most metals, plus ceramics, ceramic cloth, tape and gaskets. Applications include repair and sealing of exhaust systems, pipe joints, stacks, flues, fire bricks, mortar etc.

Resbond 907GF-1 1/2 Pint

Resbond 907GF-2 2 Pints

Resbond 907GF-5 3 x 4oz dispenser tubes

Resbond 907GF-6 11 oz caulking cartridge

Resbond® 905

1370°C Low Expansion Adhesive

Specifically formulated for bonding low expansion and thermal shock resistant ceramics. The thermal expansion closely matches that of Quartz, Fused Silica, Corderlite and Lithium-Alumina ceramics. Used as a replacement for standard ceramic adhesives that may crack or weaken on thermal cycling.

Resbond 905-1 Pint

Resbond 905-2 2 Pints

Resbond 905T-1 Thinner (pint)

Resbond® 940 Range

up to 1530°C Fast Setting Adhesives

Fast setting, customisable adhesives are designed to eliminate costly errors caused by bonding adhesive and substrate with mismatched physical properties. Choose from Standard, High Temperature, Low Expansion, High Expansion and Stainless Steel.

Resbond 940 1100°C Standard

Resbond 940HT 1530°C High temperature

Resbond 940LE 1370°C Low expansion

Resbond 940HE 980°C High expansion

Resbond 940SS 1100°C Stainless Steel



High Temperature Ceramics

Resbond® Product and Properties Guide
Electrical and Industrial Application

Resbond® 904

2200°C Zirconia Adhesive and Coating

Designed as a smooth creamy paste that is easily brushed on to ceramics, graphite, metals, etc. to form adhesive bonds and coatings that will provide continuous protection.

- Resbond 904-1 Pint
- Resbond 904-2 2 Pints
- Resbond 904-4 Thinner - pint

Resbond® 931

3000°C Graphite Adhesive

Bonds graphite or carbon components with 99% pure graphite. Just apply and cure at 120°C. Resbond 931 has excellent adhesion to graphite and other porous surfaces, forming graphite bonds with strengths measuring in excess of 2500 psi.

- Resbond 931-1 Pint
- Resbond 931-2 2 Pints
- Resbond 931-3 Gallon kit
- Resbond 931-4 Thinner - pint
- Resbond 931S Graphite sealer - pint

Resbond® 950 Range

1100°C Metallic Adhesives

These three metallic composite adhesives offer some of the ductility and impact resistance associated with soldering and welding. Just mix, apply and cure at room temperature with no odours or VOC's.

- Resbond 950 650°C Aluminium
- Resbond 952 1100°C Nickel
- Resbond 954 1100°C Stainless Steel
- Resbond 954OD Minimised porosity

Available as an adhesive or putty in various sizes. Please contact us for further details.



Ceramic Putties

Durabond® Product and Properties Guide
Electrical and Industrial Applications

Durabond® 7025

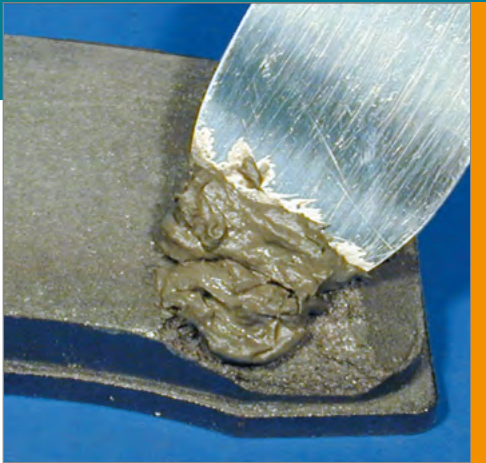
530°C Aluminium Putty

A corrosion resistant putty with active Aluminium that provides excellent resistance to most chemicals and solvents.

Can form a smooth surface that is ideal for any high temperature repair, rebuilding, production, manufacturing, industrial, automotive or equipment application.

Durabond 7025-1 1 lb kit

Durabond 7025-2 2 lb kit



Durabond® 7032

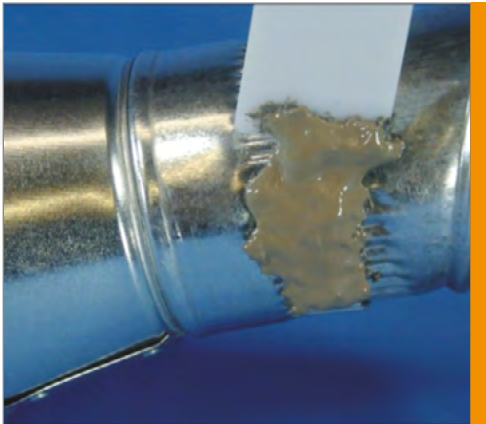
1100°C Stainless Steel Putty

Repairs and seals high temperature equipment with the ease of Cotronics' high performance systems. Hardening starts in just 60 minutes.

Durabond 7032 is machinable and resistant to most chemicals and solvents, ideal for high temperature repairs, rebuilding, filling holes, plugging leaks in a variety of maintenance and industrial applications.

Durabond 7032-1 1 lb kit

Durabond 7032-2 2 lb kit



Ceramic Putties Features Table

Product	7025	7032
Service Temperature	530°C	1100°C
Base	Aluminium	Stainless Steel
Compression Strength psi	4,800	5,400
Bond Strength (psi @ room temperature)	1,400 @ 540°C	1,200 @ 530°C
Thermal Expansion (10 ⁻⁶ / °C)	18	18
Thermal Conductivity (W/m°C)	4.32	1.44
Components	2	1
Mix Ratio	100:55	N/A
Viscosity	Putty	Putty
Density (g/cc)	2.2	3.5
Cure @ room temperature (hours)	16	16

Ceramic Potting Compounds

Durapot® Product and Properties Guide
Electrical and Industrial Application**Durapot® 800 Range****High Performance Encapsulating and Embedding Materials**

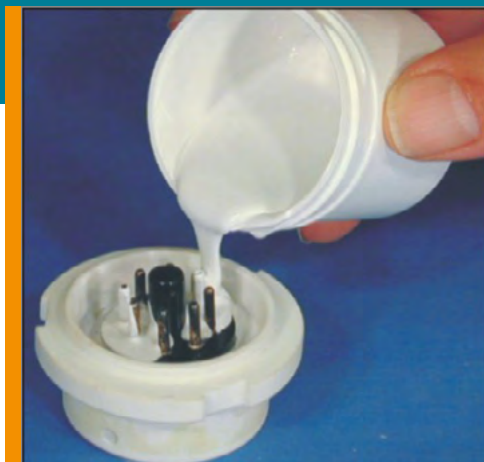
These high temperature potting compounds offer temperature stability plus excellent chemical, solvent and electrical resistance. Durapot 800 series is available packaged in either Quart (US), or Gallon (US) packs, with the exception of 821 which is packaged as either Pint or Quart.

Cure times can be accelerated by mild heat (65°C to 95°C), whilst post cures @ 120°C will improve moisture resistance for 801, 808, 809, 814 and 821.

Durapot® 801	1840°C Pure Alumina
Durapot® 804	1650°C 96% Alumina
Durapot® 805	1650°C 96% Alumina
Durapot® 809	1530°C Electrically resistant
Durapot® 810	1650°C Thermally conductive
Durapot® 814	1100°C High Speed setting
Durapot® 821	1370°C Low Expansion

Unique High Performance Potting Compounds

up to **13.65 kV/mm**
dielectric strength

**Ceramic Potting Compounds Features Table**

Product	801	804	805	809	810	814	821
Special Feature	Pure Alumina	Small Parts	Large Castings	High Dielectric	Therm. Cond.	Fast Cure	Low Expansion
Base	99% Alumina	96% Alumina	96% Alumina	MgO	Alumina	Zirconia Silicate	Fused Silica
Temperature Limit °C	1800	1650	1650	1530	1650	1100	1370
Volume Resistivity (ohm-cm)	10 ¹⁵	10 ¹⁰	10 ¹⁰	10 ¹¹	10 ¹¹	10 ⁸	10 ⁸
Dielectric Strength (kV/mm)	13.65	6.82	6.82	10.53	10.53	4.88	4.88
Thermal Expansion (10 ⁻⁶ / °C)	7.74	7.20	7.20	4.68	8.10	8.10	0.54
Thermal Conductivity (W/m°C)	1.15	1.15	1.44	0.57	2.16	1.15	0.72
Pot Life	15 min	30 min	30 min	20 min	20 min	20 min	20 min
Cure Time @ room temp.	24 hrs	24 hrs	24 hrs	24 hrs	24 hrs	24 hrs	24 hrs
Mix Ratio	100:44	100:19	100:12	100:13	100:13	100:30	100:44

Flexible Ceramics

Rescor® Thermal Insulation Overview

Rescor® 370

1650°C Ceramic Blanket

Rescor ceramic fibre blanket insulation is a strong, lightweight, flexible blanket made from asbestos-free, extra long ceramic fibres, which are cross linked to produce excellent handling strength. Provides outstanding thermal insulation, low heat storage, high resiliency, high mechanical and thermal shock resistance and sound absorption.



Rescor® 372

1650°C Wrap-It Mouldable Sheets

Combine high purity fibres with proprietary, inorganic binders in an economical wet felt form. Wrap-It is cut to shape, moulded and dried to form a light-weight, resilient, highly efficient, thermal insulation that is also resistant to most chemicals and solvents. Just air dry to form strong free standing shapes. Wrap-It will not crack or flake, has excellent thermal shock resistance and is not wet by molten metals.



Rescor® 375FT

1260°C Thermal Stop Tape

Thermal Stop is a high purity, aluminium oxide based ceramic fibre, uniquely bonded to a 0.05mm thick layer of aluminium foil. The ceramic fibres have a melting point of 1760°C and will provide up to 1260°C continuous service. Often used for pipe duct wrap, expansion joints and repairs, insulation equipment, plastic moulds, pilot plant, lab units and such like.



Rescor® 360

1480°C Ceramic Board

Made from asbestos free, high purity, refractory fibres, that have a melting point of between 1760°C to 1980°C. They are thoroughly interlaced in the production process and bonded with an inorganic binder. Strong, rigid, free standing shapes and parts are easily constructed. Just cut, saw or drill.



Flexible Ceramics

Thermeez® Fabrics and Tapes
Overview



Thermeez® 399

1100°C Fabrics and Tapes

Rescor 399 Silica products are woven from 96% pure Silica fibre are inorganic and will not smoke when exposed to heat. Ideal for thermal and electrical insulation, handling molten metals, hose or wire covers, gaskets, expansion joints etc.



Thermeez® 398

340°C Nomex®, Kevlar®, Aramid Fabrics

Thermeez 398 fabrics, tapes or sleeving are woven from Nomex or Kevlar brand of Aramid fibres. They are exceptionally strong, temperature resistant, flame retardant and will remain flexible while in use from -40°C to 340°C. Provides short term service to 450°C. Thermeez 398 Aramid fabrics are resistant to fungi, bacteria, mildew and abrasion. 398 is non-allergenic and lightweight.



Thermeez® 390

1260°C Ultra-Temp Ceramic Tape

Ultra-Temp Ceramic Tape is made from asbestos-free aluminium oxide based, high purity refractory fibres. Can be used to temperatures exceeding 1260°C and offers outstanding high temperature stability. Designed to replace asbestos based products which were limited in use at 650°C. Ultra-Temp tapes can be cut with ordinary scissors and formed into complex shapes.



Thermeez® 391

1430°C Ultra-Temp Tape and Cloth

Ultra-Temp 391 is woven from continuous filament, high alumina, ceramic fibres. These uniquely woven ceramic fibre cloths, tapes and sleeving, form materials with flexibility and strength. Excellent chemical and electrical resistance.

Flexible Ceramics

Thermeez® Fabrics and Tapes
Overview

Thermeez® 395 and 397
815°C Tape, Cloth and Sleeve

Thermeez woven ceramic fibre products are ideal for thermal insulators, padding, gaskets, flexible curtains, liquid metal splash protection, expansion joints, sleeving for flexible wire insulation, hoses, thermocouples and induction coils.

Thermeez 395 and 397 fabrics are high strength, flexible, durable, dimensionally and chemically stable and offer excellent electrical resistance.

Thermeez products are user friendly and unlike fibreglass, non-irritating to the skin. They are also non-toxic, meet OSHA requirements, will not burn and are resistant to molten metal sparks and splashes, most chemicals and solvents.



395/7-21	Tape	1" x 1/32" x 100'
395/7-22	Tape	2" x 1/32" x 100'
395/7-23	Tape	3" x 1/32" x 100'
395/7-41	Tape	1" x 1/16" x 100'
395/7-42	Tape	2" x 1/16" x 100'
395/7-43	Tape	3" x 1/16" x 100'
395/7-81	Tape	1" x 1/8" x 100'
395/7-82	Tape	2" x 1/8" x 100'
395/7-83	Tape	3" x 1/8" x 100'
395/7-21PS	Adhsv' Tape	1" x 1/32" x 50'
395/7-22PS	Adhsv' Tape	2" x 1/32" x 50'
395/7-23PS	Adhsv' Tape	3" x 1/32" x 50'
395/7-41PS	Adhsv' Tape	1" x 1/16" x 50'
395/7-42PS	Adhsv' Tape	2" x 1/16" x 50'
395/7-43PS	Adhsv' Tape	3" x 1/16" x 50'
395/7-81PS	Adhsv' Tape	1" x 1/8" x 50'
395/7-82PS	Adhsv' Tape	2" x 1/8" x 50'
395/7-83PS	Adhsv' Tape	3" x 1/8" x 50'
395C/7C-1	Woven Cloth	40" x 1/16" x 5'
395C/7C-2	Woven Cloth	40" x 1/16" x 15'
395C/7C-3	Woven Cloth	40" x 1/16" x 50'
395C/7C-5	Woven Cloth	40" x 1/8" x 25'
395T/7T-0	Sleeving	1/8" ID. x 100'
395T/7T-1	Sleeving	1/4" ID. x 100'
395T/7T-2	Sleeving	3/8" ID. x 100'
395T/7T-3	Sleeving	1/2" ID. x 100'
395T/7T-4	Sleeving	3/4" ID. x 100'
395T/7T-5	Sleeving	1" ID. x 100'
395T/7T-6	Sleeving	1.5" ID. x 50'
395T/7T-7	Sleeving	2" ID. x 50'
395R-1	Braided Rope	3/8" DIA. x 100'
395R-2	Braided Rope	1/2" DIA. x 100'
395R-3	Braided Rope	1" DIA. x 50'



When ordering, specify Thermeez **395** for 595°C service or Thermeez **397** for 815°C service

Machinable**Rescor® Blocks and Shapes
Overview****Rescor® 902****1150°C Alumina Silicate**

Fine grained ceramic that is readily machinable, providing excellent electronic, mechanical and thermal properties. It is inert to oxidising and reducing atmospheres, resistant to most acids, chemicals, solvents and has excellent thermal shock resistance.

Ideal for rapid prototypes, fabrication of electrical insulators, furnace components, brazing, soldering, welding fixtures etc.

Rescor® 914**430°C Glass Ceramic**

A dense and vacuum tight, glass ceramic composite that is readily machinable, with no post machining heat treatment required.

Inert to oxidising and reducing atmospheres and usable to 540°C maximum. Offers excellent mechanical and electrical properties and has a dielectric strength of 18kV/mm.

Rescor® 915**980°C MACOR® Glass Ceramic**

A dense vacuum tight, glass ceramic composite that is readily machinable and usable up to 980°C. Can be ground, sawn, turned, milled, drilled etc. Will provide dense zero porosity parts in-house.

Use in critical medical and high vacuum applications. No post machining heat treatments required.

Rescor® 960**1650°C Ultra High Temperature**

96% Alumina, machinable ceramic, offering the convenience and economy of an in-house capability for Alumina parts. The chemical, thermal and electrical properties are equivalent to standard high performance Alumina ceramics.

For information on castable ceramics please contact us for details.

Miscellaneous Sealants

Resbond® Thread Lock and Pipe Sealant Overview

Resbond® 907TS Series

1150°C Thread Locker & Pipe Sealant

Viscosities and strengths to meet your toughest sealant needs, for use from -150°C to 1150°C.

Easy to use with no measuring, or mess and economical as just one bottle can provide up to 2000 applications. Cures at room temperature.

Offers high temperature stability and high bond strength providing excellent adhesion, sealing most metals and ceramic parts.

Resbond® 507TS GEL

260°C Thread Locker & Pipe Sealant

The perfect alternative to traditional anaerobic sealants that are limited to 150°C. Easy to use and thermally stable, prevents vibration loosening and seals pipes and threads.

All purpose two part epoxy Teflon® sealant, just mix (100 parts resin to 15 parts hardener) and apply. Cures in 4 hours at room temperature to form thermally stable, electrically insulating and chemically resistant bonds.



Features	Low Viscosity	Standard	High Strength	High Viscosity	Epoxy Teflon
Properties	907TS Green	907TS Blue	907TS Red	907TS Gold	507TS GEL
Typical Uses	Penetrates fine openings	General purpose	Prevents vibration and loosening	Fills large gaps and grooves	General purpose
Viscosity (cps)	2,000	5,000	7,000	15,000	35,000
Shear Strength (PSI)	370	400	450	500	1,200
Breaking Torque (inch/lbs)	80	180	250	300	500
Gap Fill (mm)	0.076	0.127	0.254	0.762	0.254
Typical Applications Include	Small set screws, adjustment screws, fasteners and instrumentation	Medium screws, nuts, bolts, pipe threads and fittings.	Large fasteners and set screws, pipe threads, studs and bearings.	For difficult applications, flanges, bolts, pipe threads and large nuts.	All purpose two component epoxy Teflon for difficult applications.

Epoxy Adhesives

Outlined below are some key points to follow during the application of our epoxy adhesives and compounds.

Preparation Clean surfaces of all grease, oil, dirt, old coatings, rust etc. Roughen surface to improve adhesion. For best results use Resbond 105RS solvent or 105RP surface preparation. Re-stir all resins and hardeners to ensure a uniform, homogeneous product. Warming resins to 35°C - 50°C will reduce the viscosity and ease mixing.

Mix Ratio All measurements are by weight. Follow instructions supplied on the product label for the exact mix ratios. Weight = (total weight) - (weight of container). Weigh out the resin and hardener into separate clean containers. Combine the resin and hardener. Mix slowly and thoroughly, making sure to scrape the sides of the container to ensure complete mix. Do not whip air into mix! Apply and heat cure as directed, if applicable.

Vacuum Degassing Special additives have been incorporated into these Epoxy systems to eliminate the need for vacuum degassing. Warming resin and letting the mixture stand for several minutes before use normally removes most of any remaining trapped air. Vacuum degassing need only be employed for critical applications. NOTE: The use of warmed resin may reduce working time.

Adhesive Applications Apply with a trowel or dispensing syringe. Use bond lines from 0.13mm to 0.25mm. Disposable syringes are available, please contact us.

Potting and Casting Applications Pour slowly, in a thin continuous stream, to allow the air to escape. The material should be allowed to flow around and under components. A fast pour may trap air pockets.

Curing Follow the curing procedures listed on product labels for these systems. Optimum high temperature properties are only obtained when following the recommended cure cycles. Post cure for 4 hours at 90°C to 120°C to enhance any room temperature curing system's properties.

Ceramic Adhesives

Outlined below are some key points to follow during the application of our ceramic adhesives and compounds.

Preparation of Non-Porous Materials Clean surfaces of all grease, oil, dirt, old coatings, rust etc. Roughen surface to improve adhesion. For best results degrease with Resbond 105RS solvent and dry thoroughly.

Preparation of Porous Materials Clean surfaces of all grease, oil, dirt, old coatings, rust etc. Roughen surface to improve adhesion. For best results use Resbond 105RS solvent or 105RP surface preparation. Moisten the surface to be bonded with a solution of 50% ceramic thinner and 50% clear water (Use the thinner for the specific adhesive system selected).

Mix Ratio Pre-mix adhesive thoroughly prior to use, following instructions on the label. DO NOT whip air into the mix. For two component systems, mix the powder and activator according to weight ratio on the label.

Apply Adhesive Use a spatula, brush or by dipping, completely wetting surfaces, IMMEDIATELY press the surfaces together. If necessary clamp or fix to maintain uniform distances while curing. Typically a joint gap of between is 0.25mm to 0.50mm is recommended. Excess adhesive can be removed with a damp cloth. Bond testing with sample pieces for your specific application is recommended.

Curing Let joint air set 1 to 4 hours. Cure a minimum of 2 hours at 90°C. Avoid excessively fast heating. It may cause adhesive to bubble and form a weak bond. Always follow the product's specific instructions as shown on the product label. These products will not out-gas after a complete cure.

Post Cure To develop maximum strength, solvent and moisture resistance, post cure for 1 hour at 120°C followed by 1 hour at 315°C to 370°C. A second cure will provide maximum strength, solvent and moisture resistance.

Potting Applications For potting applications request instructions for our ceramic potting materials.



Wire and Cable

Heat-shrink Tubing

Non-shrink Tubing

Braided Sleeving

Screening Braids

Moulded Parts

Terminals and Splices

Wire and Cable Markers

Accessories

Connectors

Backshells

Bonding Leads

Metal Braids

Relays and Contactors

Switches and Grips

Adhesives and Tapes

Application Equipment

Added Value Services

Application Equipment

INTRODUCTION

The correct tool for the job

Every day, you count on your application tooling to be reliable and accurate. We go to great lengths to ensure that each of our offered products upholds these standards and remains simple and easy to use.

The range of application equipment is designed and engineered specifically for cutting, stripping, preparation and installation of a wide range of electrical interconnection products. These tools provide optimum performance and control features for maximum capability and production efficiency.



Hot Air Guns		1
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CV1981-ATPID	Digital Heavy Duty heat gun	page 513
PR Series	Reflectors	page 514
Hot Jet S	Compact heat gun	page 515
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AD-1377-S and AD-1381-1	For MiniSeal and Cold Applied devices	page 516
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HL1920E

Electronic Thermocouple Control
General Purpose Heat Gun

HL1920E-230V-UK

Variable Temperature

A mid level functional hot air gun, finished to a high level of quality with optimum weight balance and long life. Complete with variable temperature and electronic thermocouple control for flexible use and maximum reliability and 2000 watts of power.

Design benefits from soft grip handle, dual air filters and three stage switch.

Non slip ears on reverse of unit to facilitate hands free bench working.

Technical specifications

Output: 2000 W

Temperature: 80 - 600°C

Airflow rate: 150 - 500 l/min

Setting 1 150 l/min.

Setting 2 150 - 300 l/min.

Setting 3 300 - 500 l/min.

Temperature adjustment: in 9 steps by thumbwheel

Dimensions (L x W x H): 253 x 84.5 x 200 mm

Power supply: 220 - 230 V, 50/60 Hz

Protection class (without protective earth terminal): II

Motor: Brush motor

Heating element: Ceramic heating element

Thermostat: No

Thermal fuse: Yes

Power cord length: 2.20 m

Weight: 840 g

For availability of 110V versions including the HL1910E-110V-UK please contact us for additional information.

Reflector Nozzle

Soldering nozzle 10mm

Reduction nozzle 9mm

Reduction nozzle 14mm

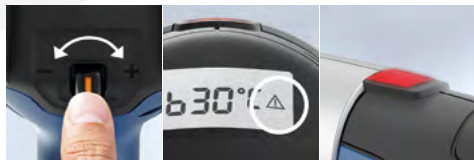


Part Number	Description
HL1920E-230V-UK	Heat Gun, boxed

Accessories	
HL1802-070519	Reflector Nozzle
HL1802-070616	Soldering nozzle 10mm
HL1802-070618	Reduction nozzle 9mm
HL1802-070717	Reduction nozzle 14mm
HL1802-ADAPT-PR	Adaptor to fit PR Series

HL2020E

Electronic Thermocouple Control
General Purpose Heat Gun



Part Number	Description
HL2020E-230V-UK	Heat Gun, boxed
HL2020E-230V-UK-CASE	Heat Gun with case

Accessories	
HL1802-070519	Reflector Nozzle
HL1802-070616	Soldering nozzle 10mm
HL1802-070618	Reduction nozzle 9mm
HL1802-070717	Reduction nozzle 14mm
HL1802-ADAPT-PR	Adaptor to fit PR Series



HL2020E-230V-UK

Heat Gun with LCD Temp Display

Electronically controlled hot air gun delivering 2200 watts of power. Regulates temperature from 80 to 630 °C and provides user convenience with its LCD display, which enables temperature selection in controlled increments. Plus a residual heat indicator warns the user that the outlet nozzle is still hot.

Precision adjustable heat and powerful blower make this high-end tool the ideal choice for virtually any application – shrinking on cable sleeves, welding, shaping and many other challenging jobs.

Non slip ears on back of unit to facilitate hands free bench working.

Technical specifications

Output: 2200 W

Temperature: 80 - 630°C

Airflow rate: 150 - 500 l/min

Setting 1 150 l/min.

Setting 2 150 - 300 l/min.

Setting 3 300 - 500 l/min.

Temperature setting:

Variable in 10 °C steps by joystick Temperature display: LCD display

Dimensions (L x W xH): 253 x 85.5 x 200mm

Power supply: 220 - 230 V, 50/60 Hz

Protection class (without earth terminal): II

Motor: Brush motor

Heating element: Ceramic heating element

Thermostat: Yes

Thermal fuse: Yes

Power cord length: 2.20 m

Weight: 880 g

For availability of 110V versions please contact us for additional information.

Application Equipment

CV1981-ST and CV1983-ST

Electronic Thermocouple Control
Heavy Duty Heat Guns

Designed for intensive everyday use the CV1981 and CV1983 heat guns are the entry level of our 'Heavy Duty' range of hot air guns, with variable temperature dial. These units are rugged and robust, plus the ability to operate for extended periods.

Use the PR Series of reflectors and adaptors, illustrated later in this section.

Standard CV1981-ST Technical specifications

Output: 1600 W

Temperature: 40 - 650°C

Airflow rate (Max): 240 l/min

Temperature setting:

Variable 20°C - 650°C via dial to rear of unit

Dimensions: 340mm long x 90mm Ø body, with handle 56mm Ø

Protection class (without earth terminal): II

Power supply: 220 - 230 V, 50/60 Hz and also available as a 120V model

Weight: 1.0kg excluding power lead

High Power CV1983-ST

Technical specifications

Output: 2300 or 3400 W

Temperature: 40 - 650°C

Airflow rate (Max): 500 l/min

Temperature setting:

Variable 20°C - 700°C via dial to rear of unit

Dimensions: 340mm long x 90mm Ø body, with handle 56mm Ø

Protection class (without earth terminal): II

Power supply: 220 - 230 V, 50/60 Hz

Weight: 1.1kg excluding power lead

The larger diameter nozzle of the CV1983-ST model requires an adaptor (AD-1962) to use the PR Series reflectors. For the standard manufactured heat gun and adaptors please contact us for more information.



Part Number	Description
CV1981 - 120 volt	
CV1981-ST-120V1600W-CEE	1600W, CEE plug
CV1981-ST-120V1600W-US	1600W, US plug
CV1981 230 volt	
CV1981-ST-230V1600W-UK	1600W, UK plug
CV1981-ST-230V1600W-EU	1600W, EU plug
CV1983 120 volt	
CV1983-ST-120V2400W-CEE	2300W, CEE plug
CV1983 230 volt	
CV1983-ST-230V2300W-UK	2300W, UK plug
CV1983-ST-230V2300W-EU	2300W, EU plug
CV1983-ST-230V3400W-UK	3400W, UK plug

Please note that all these CV1981 and CV1983 heat guns are especially modified for use directly with the PR Series range of industry standard reflectors. The images shown are for illustrative purpose only and do not necessarily reflect the CV1981 and CV1983 heat guns.

CV1981-ATPID**Digital, Electronic Thermocouple Control
Heavy Duty Heat Gun****Product Benefits****Everything easy**

Intuitive handling with proven digital operating unit.

Everything in view

Clearly visible information on the large display panel.

Everything is Automatic

The set temperature reaches its level automatically, voltage fluctuations are compensated.

Everything under control

The temperature measurement probe guarantees a precise temperature.

Everything flexible

The air volume can be adjusted independently, temperature automatically maintained.

Everything really clean

The air filters on both sides can easily be removed and cleaned.

Everything really cool

Protective tube for greater work safety.

Everything handled perfectly

Soft parts and low weight ensure optimum handling

The CV1981-ATPID is an intelligent yet robust hot air tool for welding and shrinking plastic. It is designed for the needs of even the most demanding professional, incorporating an ergonomic design, secure handling and a modern look. Every tool undergoes stringent quality checks prior to leaving the factory.

This high quality hot air tool is equipped for any use. Its universal areas of application are virtually unlimited and will continue to prove its merit in any weather conditions as it is just as effective outside as it is indoors - all during continuous operation.

- Closed loop controlled temperature
- Open loop controlled air volume
- Intelligent digital operating unit
- Ergonomic handling
- Modern design

Practical storage case included with ample space to accommodate the tool and accessories.

Use the PR Series of reflectors and adaptors, illustrated on the following pages.

Part Number	Description
-------------	-------------

CV1981 AT - 120 volt

CV1981-ATPID-120V1600W-CEE	1600W, CEE plug
CV1981-ATPID-120V1600W-US	1600W, US plug

CV1981 AT - 230 volt

CV1981-ATPID-230V1600W-UK	1600W, UK plug
CV1981-ATPID-230V1600W-EU	1600W, EU plug

Item	Value
Operating Voltage (V)	230
Temperature	40°C to 650°C
Output	1600 watts
Air flow (Litres/Min.)	120 to 240
Nozzle Diam. (mm)	33.28
Dimensions (mm)	L 335 x Ø 90 (handle Ø 56)
Net Weight (Kg)	1.0

PR Series Reflectors

For CV1981 and CV1983 Heat Guns
Heat Gun Accessories

The PR series of accessories will fit both the CV1981-ST and CV1981-ATPID heat guns, whilst the CV1983-ST heat gun will require an adaptor part AD1962 to use the PR reflectors.

Made from stainless steel these specifically designed reflectors offer the optimum means of uniformly applying heat to shrink tubing, devices and moulded parts.

A separate 107 Series of reflectors is also available for use with the CV and Hot Jet range of heat guns. As illustrated on relevant pages.



PR Series Reflectors - Fits CV1981 and CV1983

Part Number	Description
PR-12 reflector	Tubing: 6mm to 25mm Ø
PR-13 reflector	Tubing up to 6mm Ø
PR-13C reflector	Tubing up to 6 - 12mm Ø
PR-21 reflector	Tubing up to 6 - 25mm Ø
PR-24 reflector	Tubing and moulded parts 25mm to 35mm Ø
PR-24A reflector	Tubing and moulded parts 35mm to 60mm Ø
PR-25 reflector	SolderSleeve products up to 6mm Ø
PR-25D reflector	SolderSleeve products 6mm to 12mm Ø
PR-26 nozzle	Miniature SolderSleeve products
PR-33 reflector	SolderSleeve products 20mm to 27mm
PR-34 reflector	SolderSleeve products 12mm to 20mm
PR-51 nozzle	Special narrow nozzle for moulded part transitions 21.5mm x 3.5mm
AD-1962 adaptor	Suits larger barrel CV1983, to facilitate use of the PR series reflectors
105.509 adaptor	Converts standard leister heat gun to use PR Series reflectors

Hot Jet S

Electronic Thermocouple Control
Compact & Lightweight Heat Gun



The Hot Jet S is compact, lightweight and portable, ideal for use in confined spaces such as engine compartments and electronic equipment. The powerful Hot Jet S has variable airflow and temperature settings, allowing controlled installation of small diameter tubing, moulded parts and solder sleeves.

- Built in potentiometer
- Step-less, electronically controlled temperature
- Step-less, electronically controlled air flow
- Low noise 59dB
- Flexible, integrated tool stand

Technical specifications

Output: 460 W
Temperature: 20 - 600°C
Airflow rate: 20 - 80 l/min

Dimensions: 325mm long x 70mm Ø body, with handle 40mm Ø

Protection class (without earth terminal): II
Power supply: 220 - 230 V, 50/60 Hz and also available as a 120V model
Weight: 0.6kg with power lead

Part Number	Description
HOT-JET-S-120V	120V / 460W, with EU plug
HOT-JET-S-230V	230V / 460W, without plug

Please state whether EU or UK or US plug required

107 Series reflectors - Fits Hot Jet S

Part Number	Description
107.324	12 x 10 mm sieve reflector, push fit on 5mm tubular nozzle
107.310	35 x 20 mm sieve reflector, push fit
107.311	50 x 35 mm sieve reflector, push fit
107.312	25 x 35 mm spoon reflector
107.339	17 x 34 mm soldering nozzle
107.315	70 x 12mm folding reflector
107.144	Ø 5 mm tubular nozzle

107.324



107.310



107.311



107.312



107.144



Application Equipment

AD-1377-S and AD-1381-1

Hand Crimp Tools
Compact and Rugged Tooling

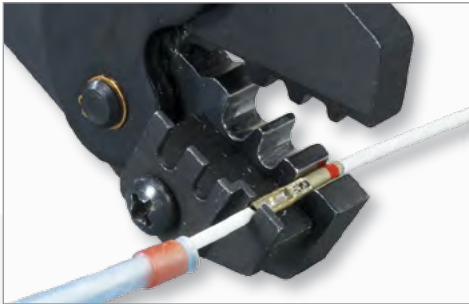
AD-1377-S MiniSeal® Crimp Tool

Fits all the MiniSeal crimp barrels and other low profile environmental splices. Covers the wire range AWG of 16-12 (yellow), 20-16 (blue) and 26-20 (red) splices for low profile environmental splice applications. Includes a locator which holds the splice in the correct location while either wire is being terminated. The rugged construction of the tool assures repeatability and long life.

The tool is calibrated with standard gauge pins or with calibration gauge AD-1386. The drawing supplied with the tool defines appropriate cavity dimensions as diameters for the “Go” and “No Go” conditions.

Overall length: 230mm
Weight: 350g

MiniSeal® Crimp Tool



AD-1381-1 Cold Applied Crimp Tool

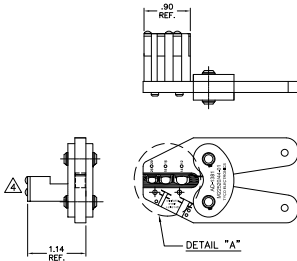
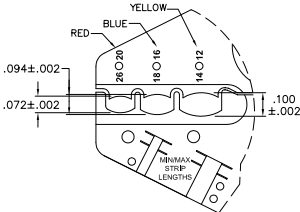
Specifically designed for the TE Connectivity's Cold Applied splices, in applications where a heat source is not allowed. A calibration gauge is also available.

A locator block is configured to hold the splice in the correct position while the wire is being terminated. The rugged construction of the tool assures repeatability and long life.

The tool is calibrated with standard gauge pins or with the calibration gauge AD-1382. The drawing supplied with the tool defines appropriate cavity dimensions as diameters for the “Go” and “No Go” conditions.

Overall length: 230mm
Weight: 350g

Cold Applied Crimp Tool



DuraSeal® Crimp Tool

AD-1522-1

Hand Crimp Tool

Compact and Rugged Tooling

**AD-1522-1 DuraSeal® Crimp Tool**

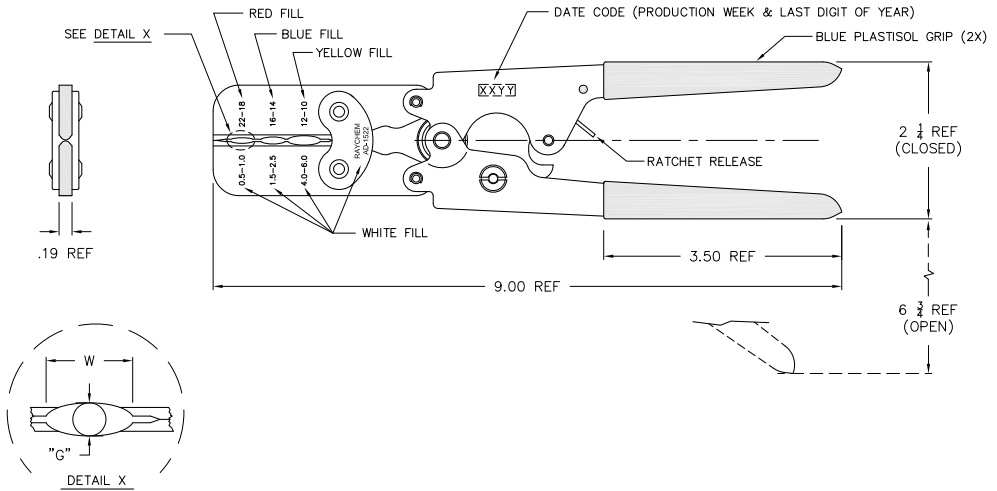
The AD-1522-1 crimp tool can be used on all DuraSeal splices and terminals, from 22 to 10 AWG. It has a pre-set crimp depth that provides the optimum combination of tensile strength and insulation integrity in the finished splice.

Built-in ratchet system ensures full cycling of the tool and prevents early release.

The tool is calibrated with standard gauge pins or with calibration gauge AE-2245. The drawing supplied with the tool defines appropriate cavity dimensions as diameters for the "Go" and "No Go" conditions.

Overall length: 230mm

Weight: 350g



Custom Stripmaster®

Wire Stripping Tool
Hand Operated

Custom Stripmaster®

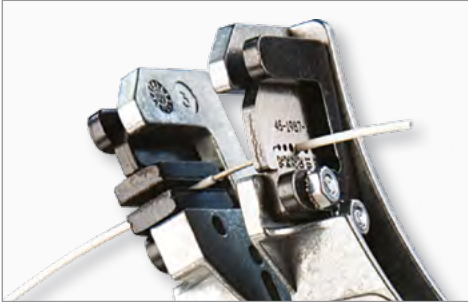
Offers fast accurate wire stripping with its one step, squeeze action stripping and unique precision blade design. This lightweight stripper is made from sturdy die-cast zinc, is designed for maximum mobility and high productivity in all types of stripping applications. Can be customised with choice of gripper pads and blade sets to match your particular stripping requirements.

- Die-type blades allow precision stripping
- Counter-bores maintain wire alignment while the tool actuates, ensuring the conductor is not damaged.

Custom Stripmaster® Lite

At 3/4 of the size of the Custom Stripmaster®, its compact size more comfortably fits the human hand and offers a shorter stroke, which increases wire stripping productivity.

- Up to 50% lighter than full size versions
- Requiring 1/3 less hand pressure



Series	Features
45-170 Series	Without short stop latch and wire stop
45-169 thru 45-188	Includes grit-type pads (standard)
45-369 thru 45-388	Includes file-type pads
45-469 thru 45-488	Includes parallel-type pads
45-631 thru 45-641	Includes grit-type pads (standard)

Custom Stripmaster®

Tool Part Number	Blade Part Number	Description
Teflon 600V wire and cable		
45-176	L-5559	10-14 AWG
45-177	L-5560	12-26 AWG
45-178	L-5561	26-30 AWG
PVC type wire and cable		
45-170	L-5210	10-14 AWG
45-171	L-5211	12-26 AWG
45-172	L-5436	26-30 AWG
Wrapped wire and cable		
45-169	L-9300	24-30 AWG

Custom Stripmaster® Lite

Tool Part Number	Blade Part Number	Description
Teflon 600V wire and cable		
45-638	LB-918	10-14 AWG
45-639	LB-919	12-26 AWG
45-640	LB-920	26-30 AWG
PVC type wire and cable		
45-632	LB-912	10-14 AWG
45-633	LB-913	12-26 AWG
45-634	LB-914	26-30 AWG
Wrapped wire and cable		
45-169	LB-911	24-30 AWG

Wire Type.	Gauge Size	Tool Part No.	Blade Part No.	Frame (Handle Colour)	Gripper No.
600V Primary wire					
55A011X; M22759/32/33; M22759/44/45/46	26-30 AWG	45-178	L-5561	L-5617 (Black Handle)	LB198
	16-26 AWG	45-1987	45-1987-1	L-5617 (Black Handle)	LB198
	10-14 AWG	45-1611	45-1611-1	L-5616 (Red Handle)	LB197
44A011X; M81044/12/13	26-30 AWG	45-178	L-5561	L-5617 (Black Handle)	LB198
	16-26 AWG	45-1987	45-1987-1	L-5617 (Black Handle)	LB198
	10-14 AWG	45-1611	45-1611-1	L-5616 (Red Handle)	LB197
600V Airframe wire					
55A081X; M22759/34/35; M22759/41/42/43	26-30 AWG	45-178	L-5561	L-5617 (Black Handle)	LB198
	16-26 AWG	45-1987	45-1987-1	L-5617 (Black Handle)	LB198
	10-14 AWG	45-1611	45-1611-1	L-5616 (Red Handle)	LB198
44A081X; M81044/9/10	16-26 AWG	45-174	L-5563	L-5617 (Black Handle)	LB198
	10-14 AWG	45-173	L-5562	L-5616 (Red Handle)	LB197
Defence Standard 600V Primary wire					
55D021X	16-24 AWG	45-1773	L-1773-1	L-5617 (Black Handle)	LB198
55D011X	12-14 AWG	45-1774	L-1774-1	L-5616 Red Handle)	LB197
1000V Primary wire					
44A021X	26-30 AWG	45-178	L-5561	L-5617 (Black Handle)	LB198
	16-26 AWG	45-177	L-5560	L-5617 (Black Handle)	LB198
	10-14 AWG	45-176	L-5559	L-5616 (Red Handle)	LB197
2500V Primary wire					
44A031X	16-26 AWG	45-171	L-5211	L-5617 (Black Handle)	LB198
	10-14 AWG	45-170	L-5210	L-5616 (Red Handle)	LB197
Dual wall 600V and 750V Equipment wire					
44M9976	16-26 AWG	45-1927	45-1927-1	L-5617 (Black Handle)	LB198
	12-14 AWG	45-1928	45-1928-1	L-5616 (Red Handle)	LB197
99M0111	16-26 AWG	45-1927	45-1927-1	L-5617 (Black Handle)	LB198
	12-14 AWG	45-1928	45-1928-1	L-5616 (Red Handle)	LB197
100G0111	16-26 AWG	45-1927	45-1927-1	L-5617 (Black Handle)	LB198
	12-14 AWG	45-1928	45-1928-1	L-5616 (Red Handle)	LB197
FlexLite Commercial Wire					
FLDWC031X	26-30 AWG	-	-	L-5617 (Black Handle)	LB198
	16-26 AWG	45-1987	45-1987-1	L-5617 (Black Handle)	LB198
	10-14 AWG	45-1611	45-1611-1	L-5616 (Red Handle)	LB197
FLHTC031X	16-26 AWG	45-1987	45-1987-1	L-5617 (Black Handle)	LB198
	10-14 AWG	45-1611	45-1611-1	L-5616 (Red Handle)	LB197
FLTWC031X	16-26 AWG	45-1987	45-1987-1	L-5617 (Black Handle)	LB198
	10-14 AWG	-	-	L-5616 (Red Handle)	LB197

Application Equipment

Ergo Elite Stripmaster®

Wire Stripping Tool
Hand Operated

The Ergo-Elite Stripmaster® wire stripper offers a light-weight ergonomically engineered wire stripper for the aerospace industry.

The tilted stripping head in this sleek design provides better leverage and clear view for wire positioning. The advanced jaw position ensures a quality strip, eliminates potential scraping of the inner conductor, while leaving squared shoulders on a wide range of wire gauges.

- Constructed of rigid polyurethane reinforced with carbon fibre, providing excellent strength at 40% the weight of metal hand tools.
- Unmatched MIL-Spec precision blades with a patented revolutionary design
- One-step stripping action, grips, cuts and removes wire insulation with unmatched precision in one effortless squeeze.
- Smaller handle span for better overall balance and control.
- Comfort grip handles designed to give better leverage and reduce pressure point distress.



Ergo Elite Stripmaster®

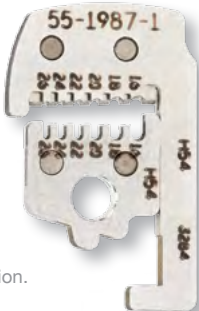
Tool Part No.	Blade Part No.	Wire Type		Gauge Size
55-1987	55-1987-1	44A011x	M81044/12 and 13	16-24 AWG Range
		55A011x	M22759/32-35 inclusive	
		55A081x	M22759/41-46 inclusive	
55-1773	55-1773-1	55D012x	-	

Ergo-Elite Accessories

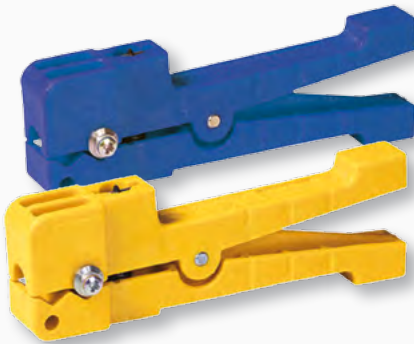
Cat No.	Features
LB-4617	Tool only, less blades
LB-4618	Tool with grit pad, less blades
LB-4619	Tool with parallel pad, less blades
LB-4620	Gripper set, Grit
LB-4621	Gripper set, Parallel
LB-1904	Wire stop
IA-5170	Blade cover, Purple
IA-5171	Blade cover, Red
IA-5172	Blade cover, Green
IA-5173	Blade cover, Blue

Patented two-piece constructed blades meet Military Stripping Specifications. An outer counter-bore hole is sized to the insulation outside diameter, while the inner cutting hole cuts through the insulation assuring nick-free wire stripping time after time.

- Squared shoulders at insulation cut.
- Aggressive blade design for minimal tool stress and grip force.
- Advanced cutting hole design with blade holes tangent to stationary gripper surface.
- Stainless steel construction.



Coaxial and Ringer®

Screened Wire Stripping Tool
Hand Operated**Ringer® Shielded Cable Strippers**

Precision stripping for non-round shielded cable and other outer cable jackets, including Teflon® insulations.

- Spring-loaded cutting head holds cable with consistently accurate tension, removing any need for adjustment.
- V-notch jaw automatically positions and holds cable, increasing cutting accuracy.
- Wire guide roller maintains stripping head alignment, producing a square, clean cut.
- Not recommended for layered wrapped cable constructions.

**Coaxial Cable Strippers**

Lightweight and compact, cost effective stripper that is simple to operate.

- Adjustable blades can be set for any depth to help ensure nick-free strips.
- Use with multi-conductor cable, tightly wrapped stranded cables, CATV cable, CB antenna cable, SO, SJ, SJT and other flexible power cords.

Ringer® Shielded Cable Strippers

Description	Colour	Blade Part No.	Tool Part No.
5 Mil insulation, includes blade - Up to 0.127mm	Orange	K-6492	45-401
8-10 Mil insulation, includes blade - 0.2 to 0.25mm	Yellow	K-6493	45-402
Cable diameter, up to 3.2mm	Blue	Sold separately	45-400
Cable diameter, from 3.0 to 5.6mm	Red	Sold separately	45-403
Cable diameter, Up to 7.6mm	Green	Sold separately	45-404

A wide range of blades and cutting depths are available, please contact us for more details.

45-160 Series - Coaxial Cable Strippers

Description	Typical Cable	Colour	Blade Set No.	Slitting Blade	Tool No.
Cable diameter, up to 3.2mm	RG-174, RG-187	Grey	L-9225	L-9212	45-162
Cable diameter, from 3.2 to 5.6mm	RG-58	Blue	L-9225	L-9212	45-163
Cable diameter, from 6.4 to 14.3mm	RG-8	Blue	L-9226	L-9214	45-164
Cable diameter, from 4.8 to 8.0mm	RG-59, UTP	Black	L-9225	L-9212	45-165

A set of blades consists of three straight blades and one round slitting blade. For additional details on product and spares please contact us.

Application Equipment

T®-Cutter and MiniLite-Strip®

Wire Cutter and Fibre Cable Stripper Tools
Hand Operated

T®-Cutter Wire Cutters

- Shear-type blades for square, clean cuts.
- Corrosion resistant, black oxide finish
- Tough steel construction and ground cutting surfaces assure long service life.
- Premium T-Cutter wire cutters offer cushion grip handles and plier nose

T®-Cutter Lite Wire Cutters

- Knife-type blades for a shear-type cut
- Lightweight compact design
- Cushioned ESD Grip
- Perfect for copper and aluminium wire



T®-Cutters - Wire and cable

Tool Part No.	Wire range	
45-123	Up to 13mm Ø fine-stranded cable and 10 AWG solid wire (2.6mm Ø)	T-Cutter Standard
45-260	Up to 13mm Ø fine-stranded cable and 10 AWG solid wire (2.6mm Ø)	T-Cutter Lite

Selecting the proper tool for your wire and cable ensures the quality and consistency desired in a production environment. There are also ergonomic advantages. Using the proper tool and blade produces a clean cut through the insulation allowing minimal hand force to actuate the tool and break away the insulation.



T-Cutter Tools



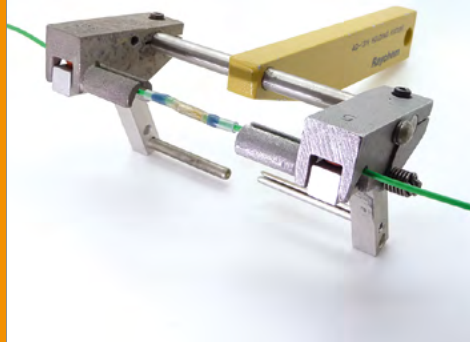
Wrong Tool

MiniLite-Strip® Fibre Optic Stripper

- Shear-type blades permit square, clean cuts with no ragged strands.
- Corrosion resistant, black oxide finish
- Tough steel construction and ground cutting surfaces assure long service life.
- Premium T-Cutter wire cutters offer cushion grip handles and plier nose

Tool Part No.	Wire range
45-352	Small V-notch to remove buffer and coating material from 125u fibre. Large stripping V-notch to strip outer jacket.



AD-1319-9 and AD-5000**Holding Fixture and Tinel Installation Tool
Installation Tooling**

Part Number	Description
AD-1319-9	Holding fixture

Accessories - SolderTact®

AT-1319-22	38999 Size 8 Contact
AT-1319-78	38999 Size 16 Contact
AT-1319-12	Subminiature Contact
AT-1319-14	748 Contact
AT-1319-19	723 Contact
AT-1319-17	482 Size 16 Contacts

AD-1319-9 Holding Fixture

This useful hand held tool is used to quickly and accurately install heat-shrinkable devices and SolderTact shielded contacts.

This tool simplifies and speeds installation of devices and SolderTact shielded contacts. Fixture consists of two wire clamps that are easily adjusted to center and secure the wire or cable for installation. SolderTact contacts require an adaptor (AT-1319-XX) that replaces one of the clamps. The distance between the adaptor and remaining clamp should be approximately 38 mm.

Specifications

Dimension: 180 x 150 mm approx.
Weight: 300g

Applicable Product Range

- SolderSleeve splices
- DuraSeal splices
- MiniSeal splices
- One-Step BNC/TNC connectors
- Shield terminators: D-100-XX, D-144-XX, SO63, SO96
- SolderTact contacts: D-602-XX

**AD-5000-TINEL-ASSY Installation Tool**

The AD-5000 tool is a manually operated resistance-heating tool designed to install the Tinel-Lock rings in screened terminations. Intended for small batches, the tool makes for easy and consistently quickly installations, with cycle time typically 5 to 15 seconds, depending on ring size and braid type on the termination.

The tool accommodates Tinel-Lock rings from size TR04 to TR24. Various electrode (jaws) types can be used to install other ring sizes and types.

Specifications

Supply 220-240 V, 50 Hz (2A fuse)
Dimension: 340 x 320 x 170 mm
Weight: 4.2kg

Tooling for Nylon Ties

Tool Controlled Tension Cut Off
Product Range Guide

Features & Benefits

- Tool controlled tension provides flush cut off and speeds installation for lower installed costs.
- Lightweight and balanced.
- Simple to change tension adjustment and easy to operate.
- Replacement blades available.
- No special maintenance required.

For details of the cable ties used, refer to the cable management section, pages 320 to 333, of this catalogue.



Part Number	Used with Cable Ties	Weight	Features
GTS-E	Sub-Miniature Miniature Intermediate Standard	295g	Ergonomic design with low handle force. Colour identification: Black trigger handle, cushion sleeve and selector knob.
GTH-E	Standard Heavy-Standard Light-Heavy Heavy	337g	Ergonomic design with low handle force. Colour identification: Red trigger handle, cushion sleeve and selector knob.
GTS2B	Miniature Intermediate Standard	327g	Metal tool with durable powder coated finish. Smaller hand span version GS2BL also available.
GS4H	Standard Heavy standard Light-heavy Heavy	454g	Metal tool with durable powder coated finish. Colour identification: Red trigger handle and selector knob, in grey metal housing.
GS4H121W	Standard Heavy standard Light-heavy Heavy	454g	Provides greater tension capacity, especially on 175 lb strength cable ties, for a tighter bundle. Colour identification: Green trigger handle and selector knob.
GS4EH	Light-heavy Heavy Extra heavy	454g	Grey metal housing with durable powder coated finish. Colour identification: Blue trigger handle and selector knob

Tooling for Metal Ties

Tool Controlled Tension Cut Off
Product Range Overview

A broad range of hand tool solutions are available for stainless steel ties, range includes hand operated and battery or pneumatic assisted. They are all designed to maximise efficiency and ensure consistency of installation.

Below is a selection of what we can supply, for more information on these and other products in the range please contact us.

For details of the cable ties used, refer to the cable management section, pages 334 to 337, of this catalogue.



Part Number	Used with Cable Ties	Features
GS4MT	Standard Light-Heavy Heavy	Single handed operation for fast installation. Qualified per MIL Standard MS90387-3. Automatically tensions & cuts off tie when pre-determined tension is reached.
ST2MT	Standard Light-Heavy Heavy Extra-Heavy	Rugged, lightweight, easy-to-operate pliers-type tool provides mechanical advantage. Cable tie side entry for immediate positioning of tie and tool.
RT2HT	Extra-Heavy Extra Heavy 15 Super Heavy	Cable tie side entry for immediate positioning of tie and tool to speed installation. Multi-position rear handle provides flexibility for a one or two hand installation.
RT2HTN	Extra-Heavy Extra Heavy 15 Super Heavy	As RT2HT but with narrow nose design for applications requiring installations in tight confined spaces.
PPTMT	Standard Light-Heavy Heavy	Pneumatic hand tool. Automatically tensions and cuts off tie when pre-determined tension is reached, for more reliable and consistent installations.
PBTMT	Heavy Extra Heavy Super Heavy	Battery powered installation tool. Ergonomic tool design provides a compact lightweight body, reducing operator fatigue.





Wire and Cable

Heat-shrink Tubing

Non-shrink Tubing

Braided Sleeving

Screening Braids

Moulded Parts

Terminals and Splices

Wire and Cable Markers

Accessories

Connectors

Backshells

Bonding Leads

Metal Braids

Relays and Contactors

Switches and Grips

Adhesives and Tapes

Application Equipment

Added Value Services

Cable Solutions

Specialist Customer Cable

Custom Assemblies

IS-Group have manufacturing capabilities to work with our customers to deliver assembled solutions for challenging applications. Our flexible approach enables us to provide a wide range of high quality sub assemblies, prototypes, space models and pre-production trials for sub assembly solutions.

Typical lead times from three to four weeks.



- Low MOQ policy
- Rapid response
- Product drawings
- Short lead times
- Design assistance
- Full traceability

Capabilities include fly leads, connector assemblies, swaged latch release and swaged wire assemblies, plus integration of the vast array of harness assembly components that we supply.



Over-Braiding Services

Within the group we also have the ability to offer our over-braiding service for multiple customer specified cables, conduits or pipes. Whether they are customer supplied or all part of the one stop service we can provide.

Please see the Metal Braids section of this catalogue for additional information.

Custom Multicore

The IS-Group also have manufacturing capabilities to facilitate the design and supply of customer specific multi-core cables from short run sampling to full production runs.

Our aim is to manufacture and deliver high quality custom designed, machine built cable within five to six weeks of receiving an order.

For more information please refer to the 'Custom Cable Designs' pages in the Wire and Cable section of this catalogue or contact us to discuss in more detail.





Heat-Shrink Markers

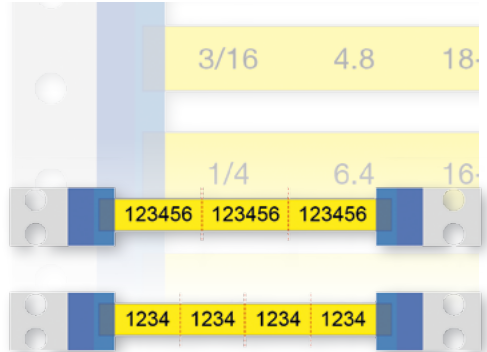
Marker sleeves can be thermally printed with customer specified identification, presented in ladder format for ease of handling and installation. These can be pre-scored to facilitate multiple idents per ladder sleeve.

The use of different materials and printer ribbons facilitates the suitability of the marker in many harsh environments that can offer both chemical and fire resistance.



Tie-On Markers

Much like the heat shrinkable marker sleeves these tie-on markers can also be thermally printed in their CM-SCE-TP and HLX125-NEL formats, whilst the Permark® 316 markers are permanently marked with a darkened character in high contrast to the background, which are pre-printed as per customer requirements.



Bespoke Adhesive labels

An expansive selection of material and print solutions exist that can accommodate multiple application demands and environmental conditions.

Bespoke customer specific labels can be produced on various substrates suitable for applications such as electrical cabinet diagrams and die-cut adhesive labels to unique signage requirements.

The possibilities are only limited by the imagination, please call us to discuss your project requirements.



Added Value Services

Cutting Services

Customer Defined Supplied Lengths
Wire, Cable, Tubing and Sleeving

Spooling

We can re-spool wire and tubing that we have in stock onto smaller reels, that suits the application environment that our customers have, this also helps to facilitate the onward processing for some of our customers.

In total we currently have four spooling machines that allows us to handle numerous jobs from the large regular runs to the smaller demand led batches.



Cut to Length Tubing

Many customers with specific applications that require pre-cut set lengths of tubing can be accommodated with our 'Cut to Length' service that can consistently cut heat shrink or cold applied tubing accurately to length.

Cut lengths can range from as little as 2mm long for small diameter thin wall tubing, up to a nominal 1,000mm although not limited to this. These can in turn be consolidated in to kit form as a selection of colours, lengths and for convenience.



Kitting

A key area where we can support our customers is in the provision of kits of component parts, assembled for individual needs. These can typically be 'job kits' for installation by the customers field service engineers, or on-line picking kits for reduced process times.

Typical kits and services have included a 100% pre-fitted assembly test which is then grouped with a set of associated components and bagged as a complete service kit for a high end aerospace customer.

Kits can be supplied in various formats from bags to boxes.

Please call us to discuss your particular requirements.





Delivery Options

UK/EU Delivery - Same Day Despatch

Our office hours are Monday to Friday, from 8.00am to 5.30pm. With our aim being to despatch all 'ex-stock' orders placed before 4:30pm the same day. With a 'Next Day' service targeted for delivery where possible, through our agents DPD and UPS.

Some areas have a 2/3 day service, such as central Europe, please contact us for delivery options available to your area.

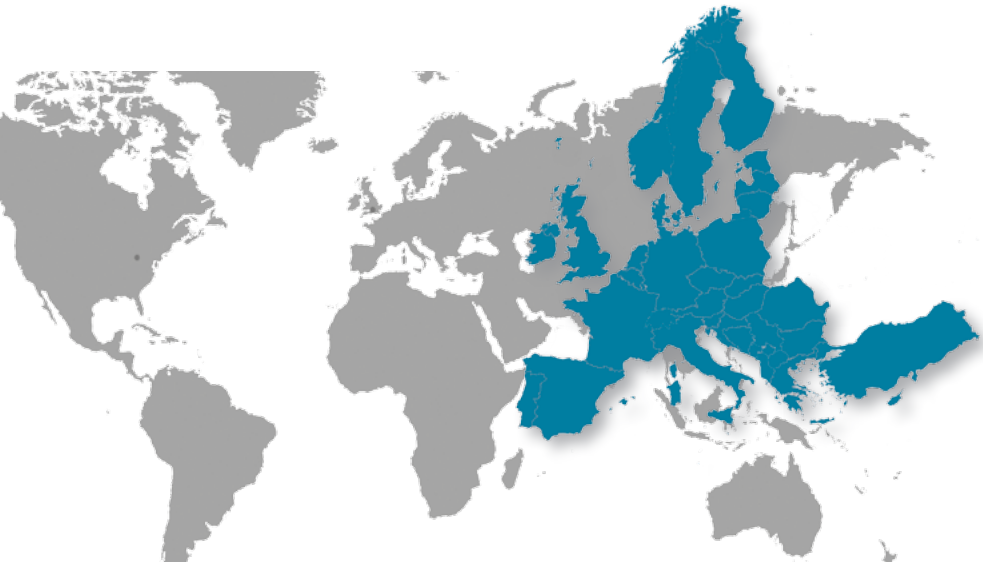
Same Day or Timed Service

Please contact us for more details.

International Delivery

Our long standing partnership with UPS allows us to furnish our international customers with a high quality service from one of the most reputable, global logistics provider in the world. Please contact us for further details about this service.

As part of the IS-Group of companies we have additional satellite warehouse facilities in the USA and Germany.





Consignment Stock

Our warehouse facilities in Swindon will allow us to store your stock securely, giving you the confidence to call off your consigned stock on a just in time basis. This will allow you to plan your workloads with confidence and ensure that your company benefits from maximised cash flows and logistic benefits.

Flexible MOQs

As a franchised distributor to many manufacturers, we are able to offer lower MOQs and competitive stock packages. Where possible we like to understand all of your business needs for our products and work in partnership with our customers to arrange low MOQs and stock packages that can be called off, as and when required.

Component Sampling

Unlike many of our competitors our flexibility in pack sizes and cut lengths allows us to provide customers with FREE evaluation samples. As we understand that sometimes the only way to decide whether one component or another is suitable for a particular application is to physically try it out.

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Engineering Notation

The prefixes and symbols numeric values:

		Multiplying Factor	
Prefix	Symbol	Scientific	Conventional
tera	T	10^{12}	1,000,000,000,000
giga	G	10^9	1,000,000,000
mega	M	10^6	1,000,000
kilo	k	10^3	1,000
hecto	h	10^2	100
deca	da	10^1	10
deci	d	10^{-1}	0.1
centi	c	10^{-2}	0.01
milli	m	10^{-3}	0.001
micro	μ	10^{-6}	0.000001
nano	n	10^{-9}	0.000000009
pico	p	10^{-12}	0.000000000001
femto	f	10^{-15}	0.000000000000001
atto	a	10^{-18}	0.000000000000000001

Wire Bundle Multiplication Factors

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 & 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

Conversion Factors

The formulas below convert imperial to metric and visa-versa:

Volume
Cubic inches x 16.39 = Cubic centimetres
Cubic centimetres x 0.06102 = Cubic inches
Cubic feet x 0.02832 = Cubic metres
Cubic metres x 35.31 = Cubic feet
Cubic yard x 0.7645549 = Cubic metre
Cubic metre x 1.307951 = Cubic yard
Quart (US) x 2 = Pint (US)
Pint (US) x 0.8327 = Pint (UK)

Mass
Ounces x 28.35 = Grams
Grams x 0.03527 = Ounces
Pounds (lb) x 0.4536 = Kilograms
Kilograms x 2.205 = Pounds (lb)
Kilograms/km x 0.6214 = Pounds/kft
Pounds/kft x 1.4881 = Kilograms/km
Stones x 6.3503 = Kilograms
Tons x 1016.0469 = Kilograms
Tons x 1.016 = Metric tones

Length
Milli-inches x 25.40 = micrometres
Inches x 25.40 = Millimetres
Millimetres x 0.03937 = Inches
Feet x 0.3048 = Metres
Miles x 1.609 = Kilometres
Kilometres x 0.6214 = Miles
Ohms/km x 0.3048 = Ohms/kft
Chains x 20.1168 = Metres

Power
Foot pounds force per sec x 1.3558 = Watts
Horsepower x 745.700 = Watts
Foot pounds force per sec x 0.0014 = Kilowatts
Horsepower x 1.0139 = Metric horsepower

Energy
Btus x 1,055.0559 = Joules
Joules x 0.000948 = BTUs
Btus x 778.169 = Foot pounds
Foot pounds x 0.00128 = BTUs

Pressure
PSI x 0.0689 = Bar
Bar x 14.5047 = PSI
Pascal x 0.000145 = PSI
PSI x 6,894.76 = Pascal
Bar x 1.0197 = Kilogram / Centimetre ²
Kilogram / Centimetre ² x 0.9801 = Bar

Area
Square inches x 645.16 = Square millimetres
Square inches x 6.4516 = Square centimetres
Square centimetres x 0.1550 = Square inches
Square feet x 929.0304 = Square centimetres
Square feet x 0.0929 = Square metres
Square metres x 10.76 = Square feet
Square miles x 2.59 = Square kilometres
Square kilometres x 0.3861 = Square miles
Circular mils x 0.7854 = Square mil

Adhesives and Tapes

Useful data for adhesives, potting compounds and coatings.

Viscosity Comparison	
Approx. Viscosity	Material
1	Water
10	Kerosene
100	Corn Oil
200	Maple Syrup
500	Castor Oil
1,000	Glycerin
3,000	Honey
10,000	Molasses
50,000	Ketchup
250,000	Peanut Butter
1,000,000	Shortening

Typical Coverage	
Coverage	Film Thickness
300 F ² /Qt.	0.001"
150 F ² /Qt.	0.002"
100 F ² /Qt.	0.003"
60 F ² /Qt.	0.005"
45 F ² /Qt.	0.007"
30 F ² /Qt.	0.010"

Bead Length	
Bead Width	Approx Length
1/4"	80 ft
3/8"	37 ft
1/2"	21 ft
5/8"	13 ft

As dispensed from 11oz caulking cartridge

Hardness Durometer		
Material	Shore A	Shore D
Gum Eraser	30	-
Pink Eraser	40	-
Rubber Stamp	50	15
Pencil Eraser	60	-
Rubber Heel	70	30
Rubber Sole	80	-
Printer Roller	90	-
PVC	100	55
Fir Plywood	-	78
Hardwood	-	86
Glass	-	90

Conversion Table	
Multiplication Factors	
Density	
lb / ft ³ x 16.02 = kg/m ³	
lb / in ³ x 0.016 = g/cm ³	
Heat Loss	
Btu / hr ft ² x 3.155 = W/m ²	
Btu / hr ft ² x 0.271 = g cal/hr cm ²	
Thermal Conductivity	
Btu in / ft ² °F x 0.144 = W/m °C	
W / m°C x 6.93 = Btu in/hr ft ² °F	
Thermal Expansion	
x10 ⁻⁸ / °F x 1.8 = x10 ⁻⁸ / °C	
Dielectric Strength	
Volts/mil x 0.039 = kV/mm	

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Contact Us

IS-Rayfast, IS-Motorsport

Website: www.is-rayfast.com

Telephone: +44 (0)1793 616700

Fax: +44 (0)1793 644304

Email: sales@is-rayfast.com

IS-Sommer

Germany, Switzerland and Austria

Website: www.is-sommer.com

Telephone: +49 71 58 98 127-0

Fax: +49 71 58 98 127-98

Email: info@is-sommer.com

IS-Connect, IS-Motorsport

USA and Canada

Website: www.is-connect.com

Telephone: +1 (317) 244 6643

Fax: +1 (317) 244 6693

Email: sales@is-connect.com

LinkedIn: linkedin.com/company/is-rayfast-ltd

facebook: facebook.com/IS.Rayfast

Twitter: twitter.com/IS_Rayfast



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2 Lydiard Fields, Swindon, Wiltshire, SN5 8UB, UK.