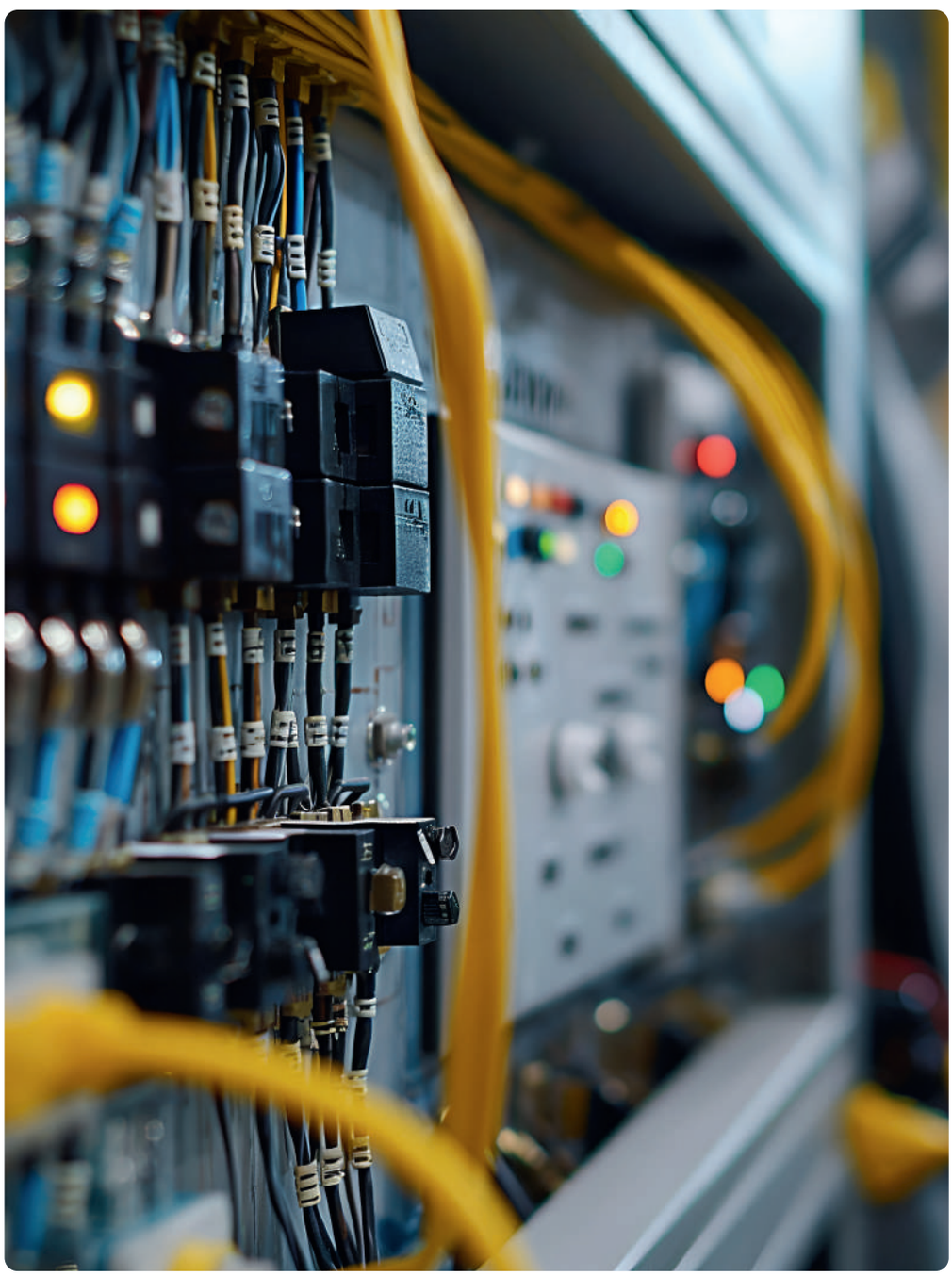
INDUSTRIAL CABLES AND SPECIALS



prysmian

The planet's pathways

About Prysmian

Prysmian is a global cabling solutions provider leading the energy transition and digital transformation. By leveraging its wide geographical footprint and extensive product range, its track record of technological leadership and innovation, and a strong customer base, the company is well-placed to capitalise on its leading positions and win in new, growing markets. Prysmian's business strategy perfectly matches key market drivers by developing resilient, high-performing, sustainable and innovative cable solutions in the segments of Transmission, Power Grid, Electrification and Digital Solutions. Prysmian is a public company listed on the Italian Stock Exchange, with almost 150 years of experience, about 30,000 employees, 108 plants and 26 R&D centres in over 50 countries, and sales of over €15 billion in 2023.

World-Leading Cable Solutions

The widest range of products, services, technologies and know-how.

The Group's activities are divided into four business divisions, as follows:

Transmission
which includes the Submarine Power and Land HVDC

Power Grid
which includes the HVAC business unit and Power Distribution and Overhead Lines

Electrification
which includes the Industrial & Construction and Specialties

Digital Solutions
which includes the following business units: Fiber and Optical Cables, Connectivity, Multimedia & Inside Plant cables (MMS).

Digital Solutions

Bridge The Digital Divide With Premium Data Solutions

Connecting Communities To A New World

The world is in the midst of a data explosion. Across the globe, people are sharing, purchasing, downloading, streaming, connecting and communicating in the digital sphere. Living and working digitally is the new normal. And for network operators, this means managing an exponential increase in bandwidth to meet the world's rising demand. At Prysmian, our Digital Solutions business unit is building modern day networks that provide robust physical infrastructure, trusted IT security and long-term reliability.

Our commitment to the digital transformation

At Prysmian, our Digital Solutions are realising the infrastructure of today and tomorrow, helping the world to meet its most pressing challenges. By pushing the boundaries of digitalisation, we will seize the opportunities offered by this new market trend and lead the digital transformation that is happening worldwide.

Digitalisation

Data networks must support the exponential demands of IoT, 5G, connected buildings, Industry 4.0 and more. Ensuring high-speed connectivity in the core network, within data centres or at the edge.

Network congestion

As the world demands more speed, our networks become increasingly overcrowded.

Fast-paced, competitive markets

Our customers often work in markets that shift rapidly, and need to set themselves apart from the competition.

Energy transition

The world needs cleaner and 'greener' energy supplies and telecoms networks. Fibre networks are the most sustainable of technologies.

MAIN SPECIALS ENVIRONMENTS

Industrial (factory floor)

Here the focus is to have a robust cable, to be installed among or within machines, conecting sensors and/or actuators (motors, valves, etc). Exposition to UV can be small to moderated, but oil and mechanical stress are to be expected.

Tunnel, metro, underground

In this case, the cables will be laid on the route of metro tunnels or similar, on J-hooks, trails, ladder, trays. The LSHF feature is a must, and not rare, some hard flame reaction grade (like CPR Cca or higher, and frequently, droplets) For some models, we even have certificate from LUL (London Underground)

Marine/Shipboard/Offshore

On these environments, it is expected to have presence of Oil, UV /sunlight, mechanical stress and safety (low smoke, fire retardant), installed in platforms, ships, port and heavy structures related. We have LSZH or MUD jackets, with good resistance to oil/chemical compounds. Often requires certification from DNV/GL or ABS.

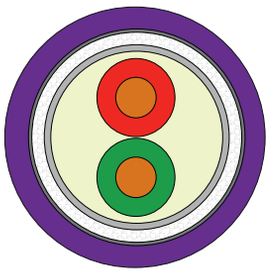
Outdoor

To connect devices using external trays or galleries, direct buried or other applications exposed to weather conditions direcly. Here UV, moisture or rodent / thermite protetion is necessary. Fire protection is typically not required. Jackets with polyethylene (PE) are best, but PVC and PUR can be used in some cases. Solar park cables (PV automation) are in this family.

Fire resistant

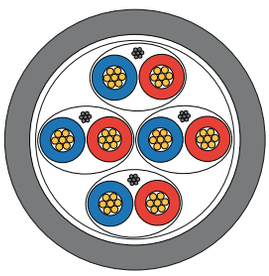
The cable in this case must keep the lines integer (nor open, nor short circuit) during the fire. It is not the same thing as fire retardant, where the insulation is not evaluated during the fire, only the damage in cable after the fire (safety). Special compounds are used in the insulation and jacket.

MAIN PRODUCT LINES



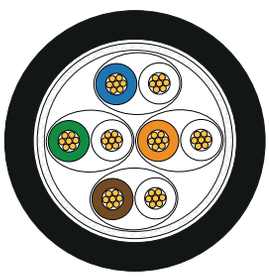
BUS cables

RS485, RS232, Profibus, CANBUS, MODBUS, AI-S, Devicenet, Fieldbus Foundation, etc Normally with few pairs (mostly 1P), slow transmission speed (typical <10Mbps), most used to connect sensors, motor driver, PLCs, things that need to communicate status, in a simple architecture, using digital signal. The frequencies are normally lower (compared to datacom), with range from some kHz to few MHz. Most important parameters: pair capacitance, resistance, AWG copper size/area, protocol to be used.



Command Cables

NOMAK, JAMAK, LiYCY, Li-02Y, Tray Cables (TC) Those are used to send electrical commands to some valves, automatic doors, dry contacts and other hard equipments in analog automation.This means the most important aspects to identify are copper size, capacitance and voltage rating, once this signal is very low frequency.



Cables for high speed special networks

Profinet, Ethernet/IP, EtherCAT, ToughCAT, SuperCAT, Industrial Ethernet (IE) Cables for links of higher speed (100Mbps ou mais), connecting machinery controllers one to another, or to higher levels like SAP, SCADA systems, it is the use of category cables in the factory floor. In general, they are Cat 5E, Cat 6 (100M-1Gbps) ou Cat 7 (for 10Gbps). Here the agressors are more severe than office applications, with oil, abrasion, UV, so regular office cables are not recommended. We have a good set of category cables specially rated for industrial stress.

Hybrids

Cables that groups at least 2 or more elements of : twited pair, optical fiber, power elements, coaxial, command copper wires. Those cables are mainly project-driven, and the application and installation need to be very clear to us before offering. Those cables are designed by customers to simplify the infrastructure and/or installation. One example is FTTA application, with DC elements + Optical cable altogether.

Symbols in this catalogue

Here you will find some symbols to help identifying the suitability of cable models to environment aggressors - like chemicals, UV, flame, etc. They are ranked as None, Limited, Basic, Good and Super. For more details, please refer to the specific cable datasheet.

No
Not protected and will deteriorate quickly

Basic
Can stay for short time, but not recommended

Good
Suitable for most cases, good lifespan

Super
Excellent protection and great lifespan, support severe cases

Fire Protection

We are able to provide IEC 60332-1 and IEC 60332-3, and also UL FT2 and FT4. For some models, we have a CPR grades like E_{ca}, D_{ca} and C_{ca}.

Chemical Resistance

For chemical resistance, we have different jackets that can withstand oils like IRM901, 902 or 903. The best chemical resistance is with our MUD jacket, which is even up to NEK 606 SHF2 stress limits (e.g. mining residuals).

Sunlight

We have different jackets for different UV exposition instensity, from 300h to 4000h accelerated aging, we can deliver a realiable product to face the outdoor environment. We recommend for higher exposure, to use black sheath to ensure maximum endurance.

Water Contact

A radial water protection might be possible to be offered when longitudinal is not, preventing the income of moisture in case of damage to jacket during the installation.

Mechanical Strength

For higher mechanical stress, we recommend the application of SWB (steel wire braid) and SWA (Steel wire armour), or thick jackets (e.g. Yv PVC).

Mechanical Strength

Our models are not gas/vapour tight, but according to IEC 60079-14, they can be used with proper sealing elements and proper connectors (continuous jacket acc. UL1277).

Certifications

Some environments might require specific certifications, so we list below the most relevant ones.

Industrial Application

In some cases, it can be requestedthat cable complies with some UL AWM Style. Those styles are related to UL 758, which is focused on industrial components (that normally are part of a bigger assembly or machine). Normally it is mentioned a Style ” like AWM Style 21238 or another 4 or 5 digits number. This Style dictates the cable construction, dimensional limits and environmental rating (flame, temperature, voltage). This UL 758 is different from traditional UL444, used in data cables for office cabling, with flame ratings like CM, CMP, CMR, etc. Nevertheless, we also have some models in our ICS Specials that have UL 444 certification (FT4). Most of our UL 758 and 444 cables are in Industrial Ethernet portfolio.

Marine/Offshore

Here the most relevant certifications required are DNVDNV-GL and ABS. The cable is submitted to some flame, transmission and physical tests to proof whether it is wappropriate to marine/offshore environments. We have some category cables (Ethernet), Optical cables and coaxial cables with such labels.

Tunnel, Mining, Subway (Metro)

For those environments, a specific CPR level might be required or a certification like LUL (London Underground) which is very hard to obtain and it is very respected in the market. It follows the standard LUL S S-11-085.

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BUS Cables

Even being developed in early 80‘s and being around for decades, the digital protocols are still a strong pillar in industry and used in automation, connecting sensors, actuators, panels, etc.
Those called Legacy cables are also a handful part of our MMS ICS solution and offered with many different protections, according to the end application.
Typically operating with 1 or 2 pairs, they operate digitally with dedicated protocols, with hundreds of kbps or few Mbps speed for short lenghts. It is usual to ha-ve a trunk-spur architecture, making it simple to derive new connections from main line.

BUS Cable

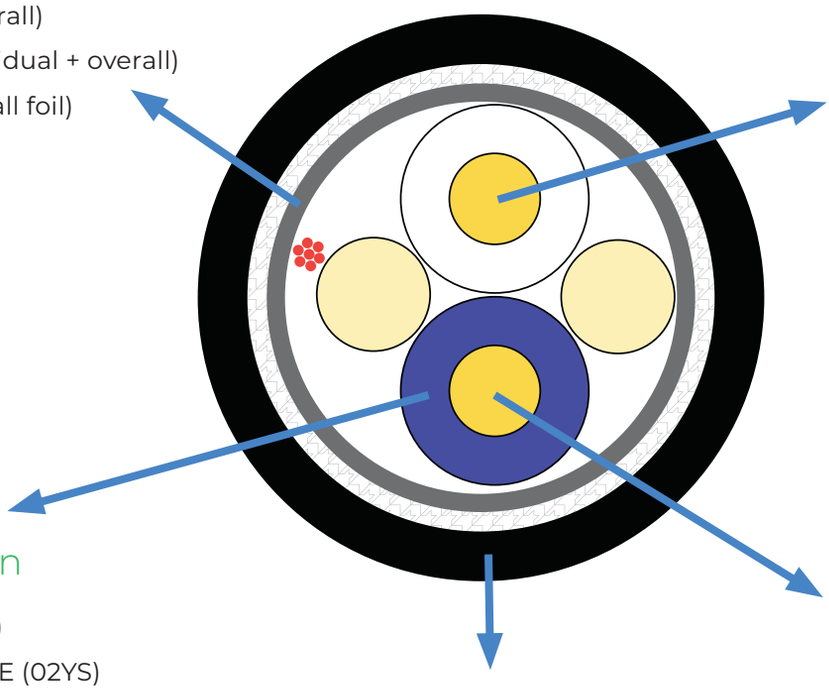
Bus cables are part of legacy systems still active and live. We are able to provide different versions using many conductor sizes, jackets and screening types. Most of BUS systems work with 1 or 2 pairs, in a trunk-drop (or stub) network, to transmit digital protocols from kbps to few Mbps in long distance (up to 1900m in some cases).

Screening

SF/UTP (overall)
S/FTP (individual + overall)
F/UTP (overall foil)

Conductor Size

AWG26/1 and /7
AWG24/1 and /7
AWG22/1 , /7 and /19
AWG20/7
AWG18/1 and /7
0.75mm² class 5
1mm² class 5
1.5mm² class 5



Insulation

Solid PE (2Y)
FoamSkin PE (02YS)
Solid PP (9Y)
XLPE (2X)

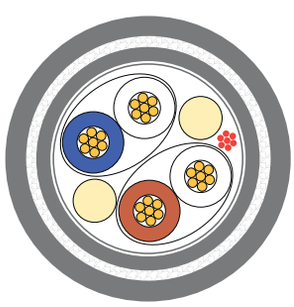
Conductor Type

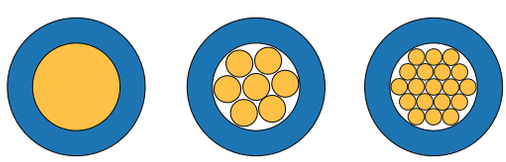
BC (Bare Copper)
TC (Tinned copper)

Jacket

PVC
LSHF
LSHF-FR
PUR/MUD
PE
ATAR

Armouring with **Steel Wire braid (SWB)** is also possible. A second jacket is applied. This provides a more robust cable for harsh environments and small rodent action.





Solid
AWG23/1

Flexible
AWG23/7

Extraflex
AWG23/19
AWG23/24

BUS Cable

RS485

Designed to provide a physical layer (PHY) for digital serial communication, the ANSI/TIA Recommended Standard 485 (or RS-485 for short) cable is able to run up to 1200m (at 93kbps) or up to 10Mbps for 40m.
It is composed by twisted pairs, a screen and a jacket. See below some different possiblities for your application.
Our RS485 cables can be supplied in 1P, 2P, 3P, 4P or eventually higher count. The 2P design, when not individually shielded, is the quad design (10 '= 4x1, grouped).

RS485 AWG24/7 LSHF

Feature	Description
Conductor	BC 7x0.2mm
Insulation	PE, Ø 1.75mm
Layup	1P: twisted pair, 2P: 4 core as quad (10)
Screen	Overall - Foil+Braid + drain wire (SF/UTP)
Jacket	LSHF, Ø 5.9mm (1P), 6.9mm (2p)
Impedance	120 Ω
Capacitance	Max 60 nF/km

60332-1 | Basic | Limit | None | Good | -40/+70

RS485 AWG22/7 2P Pimf SWB PVC

Feature	Description
Conductor	TC 7x0.26mm
Insulation	PE, Ø 1.75mm
Layup	2 shielded pairs+ fillers
Screen	Individual+ Overall Foil+Braid + drain wire (S/FTP)
Jacket	Inner: PVC, Ø 9.0mm Armor: D.25mm-steel wire braid Outer: PVC Ø 13.0mm
Impedance	120 Ω
Capacitance	Max 60 nF/km

60332-1 | Good | Good | None | Super | -20/+70

RS485 AWG16/7 1P SWB MUD

Feature	Description
Conductor	BC, 1.5mm²
Insulation	Solid PP, Ø 4.4mm
Layup	1 twisted pair+ fillers
Screen	Overall Foil+Braid + drain wire (SF/UTP)
Jacket	Inner: LSHF, Ø 11.0mm Armor: galvanized steel wire braid Outer: MUD Ø 16.0mm
Impedance	120 Ω
Capacitance	Max 60 nF/km

60332-1 | Good | Good | None | Super | -40/+90

BUS Cable

RS485

Designed to provide a physical layer (PHY) for digital serial communication, the ANSI/TIA Recommended Standard 485 (or RS-485 for short) cable is able to run up to 1200m (at 93kbps) or up to 10Mbps for 40m. It is composed by twisted pairs, a screen and a jacket. See below some different possiblities for your application. Our RS485 cables can be supplied in 1P, 2P, 3P and 4P with conductor size ranging from AWG24 to AWG16.

RS485 PVC/LSHF/SHF1

Feature	Description
Conductor	Tinned Copper (AWG22~AWG16)
Insulation	Foam PE
Layup	1P ~ 4P twisted pairs
Screen	Overall - Foil+Braid + drain wire (SF/UTP)
Jacket	PVC/LSHF/SHF1
Overall	1P x AWG22 (6.5mm)
Diameter	1P x AWG16 (10.0mm)
Impedance	120 Ω
Capacitance (Cond. To Cond.)	Nom. 12.5 pF/ft
Capacitance (Cond. To Shield)	Nom. 23.0 pF/ft

60332-1 60332-3C (Optional) | Good (Optional) | None | -20/+70 | Good (Optional)

RS485 SWB PVC/LSHF/SHF1

Feature	Description
Conductor	Tinned Copper (AWG24~AWG16)
Insulation	Foam PE
Layup	1P ~ 4P twisted pairs
Screen	Overall - Foil+Braid + drain wire (SF/UTP)
Jacket	Inner Sheath: PVC/LSHF/SHF1 Armor: Steel Wire Braid (SWB) Outer Sheath: PVC/LSHF /SHF1
Overall	1P x AWG 24 (11.0mm)
Diameter	2P x AWG 24 (13.0mm) 1P x AWG22 (11.0mm) 1P x AWG16 (15.0mm)
Impedance	120 Ω
Capacitance (Cond. To Cond.)	Nom. 12.5 pF/ft
Capacitance (Cond. To Shield)	Nom. 23.0 pF/ft

60332-1 60332-3C (Optional) | Good (Optional) | Super | -20/+70 | Good (Optional)

Standards

EIA/TIA RS-485

PVC : IEC 60332-1

LSHF : IEC 60332-1 ,IEC 60754-1 & 2, IEC 61034-2

SHF1 : IEC 60332-3C, IEC60754-1 & 2 , IEC 61034-2 , IRM902

BUS Cable

RS485 Fire Resistant

Designed to provide a physical layer (PHY) for digital serial communication, the ANSI/TIA Recommended Standard 485 (or RS-485 for short) cable is able to run up to 1200m (at 93kbps) or up to 10Mbps for 40m. It is composed by twisted pairs, a screen and a jacket. See below some different possiblities for your application. Our RS485 cables can be supplied in 1P, 2P, 3P and 4P with conductor size ranging from AWG24 to AWG16.

RS485 Fire Resistant SHF1

Feature	Description
Conductor	Tinned Copper (AWG24~AWG16)
Insulation	Foam PE
Fire Barrier	Mica Tape
Layup	1P ~ 4P twisted pairs
Screen	Overall - Foil+Braid + drain wire (SF/UTP)
Jacket	PVC/LSHF/SHF1
Overall	1P x AWG22 (8.0mm)
Diameter	1P x AWG16 (13.4mm)
Impedance	120 Ω
Capacitance (Cond. To Cond.)	Nom. 12.5 pF/ft
Capacitance (Cond. To Shield)	Nom. 23.0 pF/ft

60332-3C · Good (Optional) · None · -20/+70 · Good (Optional)

RS485 Fire Resistant SWB SHF1

Feature	Description
Conductor	Tinned Copper (AWG24~AWG16)
Insulation	Foam PE
Fire Barrier	Mica Tape
Layup	1P ~ 4P twisted pairs
Screen	Overall - Foil+Braid + drain wire (SF/UTP)
Jacket	Inner Sheath: PVC/LSHF/SHF1 Armor: Steel Wire Braid (SWB) Outer Sheath: PVC/LSHF /SHF1
Overall	1P x AWG22 (12.5mm)
Diameter	1P x AWG16 (16.5mm)
Impedance	120 Ω
Capacitance (Cond. To Cond.)	Nom. 12.5 pF/ft
Capacitance (Cond. To Shield)	Nom. 23.0 pF/ft

60332-3C · Good (Optional) · Super · -20/+70 · Good (Optional)

Standards

EIA/TIA RS-485

IEC 60331-23 (90 min at 750°C)

SHF1 : IEC 60332-3C ,IEC60754-1 & 2 , IEC 61034-2 , IRM902

BUS Cable

RS485 for Direct Buried

We also have the RS485 models to be directly buried, exposed to UV and biological attack. This is especially useful, for example, in photovoltaic (PV) stations, and other green energy facilities. Those cables have dielectric protection against small rodents and thermites (ATAR), plus a protection against radial water penetration (e,g. jacket damage).

RS485 1P/2P ATAR

Feature	Description
Conductor	Bare AWG24/7 (Ø 0.5mm)
Insulation	PE, Ø 1.75mm
Layup	1P or 2P grouped+ swellable yarns
Screen	Overall Foil+ drain wire (SF/UTP)
ATAR layer	PA12 jacket
Outer jacket	Black PE, Ø 5.8mm (1P), 7.5mm (2P)
Impedance	120 Ω
Capacitance	Max 60 nF/km

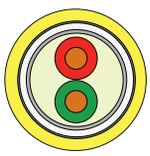
RS485 CST

Feature	Description
Conductor	Bare AWG24/7 (Ø 0.6mm)
Insulation	PE, Ø 1.75mm
Layup	1P or 2P grouped+ swellable tape
Screen	Overall Foil+ drain wire (SF/UTP)
Rodent layer	Corrugated Steel Tape (CST)
Outer jacket	Black PE, Ø 10mm (2P)
Impedance	120 Ω
Capacitance	Max 60 nF/km

BUS Cable

Fieldbus Foundation

Our Foundation Fieldbus (FF) cables are designed to provide a physical layer (PHY) for fieldbus H1 communication up to 31.25 kbps x 1900m, acc IEC 61158-2 / IEC 61784-1 Communication Profile CP 1/1, and ISA/SP50. It is composed by one pair, with minimum section of 0.8mm^2. Our FF cables can be supplied in 1P to 16P (acc to cross-section). Some designs based on EN50288-7 are available.



FF FC AWG18 PVC

Feature	Description
Conductor	Solid 1.05mm
Insulation	Foam Skin PE, Ø 2.55mm
Layup	1P: twisted pair + PVC bedding
Screen	Overall - Foil+Braid (SF/UTP)
Jacket	PVC, Ø8.0mm
Impedance	100 Ω @ 31.25kHz
Capacitance	Max 60 nF/km
Attenuation	0.3dB/100m @ 39kHz
DC resistance	Max 24Ω/km

60332-1 | Good | Good | None | Good | -40/+70

FF 1.5mm2 PVC SWB (EN 50288-7 based)

Feature	Description
Conductor	Bare Copper 7x0.53mm
Insulation	Solid PP Ø 3.25mm (90°C, 300/500V)
Layup	Twisted Pair
Screen	Overall Foil+ drain wire (SF/UTP)
Jacket	Inner: PVC, Ø 8.6mm Armor: Steel 0.3mm wire braid Outer: PVC Ø 12.6mm
Impedance	100 Ω @ 31.25kHz
Capacitance	Max 60 nF/km
Attenuation	0.3dB/100m @ 39kHz
DC resistance	Max 24Ω/km

60332-3 | Good | Good | None | Super | -10/+80

FF 2P 1mm2 PimF SWB LSHF-FR

Feature	Description
Conductor	BC, 7x0.43mm
Insulation	Solid PP, Ø 2.8mm
Layup	Foil shielded pairs w/ drain wire
Screen	Individual: Alum Foil+PET Foil +drain Overall Foil+ drain wire
Wrap	Mineral flame retardant tape
Jacket	Inner: LSHF, Ø 12.9mm Armor: galvanized steel wire braid Outer: LSHF-FR Ø 16.9mm
Impedance	100 Ω @ 31.25kHz
Capacitance	Max 60 nF/km
Attenuation	0.3dB/100m @ 39kHz
DC resistance	Max 24Ω/km

60332-3 | Good | Good | None | Super | -25/+90

BUS Cable

Fieldbus Foundation–XLPE

Our Foundation Fieldbus (FF) cables are designed to provide a physical layer (PHY) for fieldbus H1 communication up to 31.25 kbps x 1900m, acc IEC 61158-2 / IEC 61784-1 Communication Profile CP 1/1, and ISA/SP50. It is composed by one pair, with minimum section of AWG18.

FF LSHF/SHF1

Feature	Description
Conductor	Bare Copper (AWG18 & AWG16)
Insulation	XLPE
Layup	1P ~ 4P twisted pairs
Screen	Overall Foil Screen +drain wire (1 P) Individual Foil Screen +drain wire(2-4 P)
Jacket	LSHF/SHF1
Outer Diameter	1P x AWG18 (9.0mm) 1P x AWG16 (13.0mm)
Impedance	100 Ω @ 31.25kHz
Capacitance	Max 80 pF/m
Attenuation	0.3dB/100m @ 39kHz
DC resistance	≤ 18.1 Ω/km (18 AWG) ≤ 12.1 Ω/km (16 AWG)

60332-3C | Good (Optional) | None | -20/+90 | Good (Optional)

FF SWA LSHF/SHF1

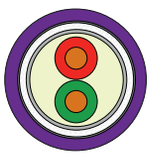
Feature	Description
Conductor	Bare Copper (AWG18 & AWG16)
Insulation	XLPE
Layup	1P ~ 4P twisted pairs
Screen	Overall Foil Screen +drain wire (1 P) Individual Foil Screen +drain wire(2-4 P)
Jacket	Inner Sheath: LSHF/SHF1 Armor: Steel Wire Armour (SWA) Outer Sheath: LSHF /SHF1
Outer Diameter	1P x AWG18 (13.0mm) 1P x AWG16 (13.5mm)
Impedance	100 Ω @ 31.25kHz
Capacitance	Max 80 pF/m
Attenuation	0.3dB/100m @ 39kHz
DC resistance	≤ 18.1 Ω/km (18 AWG) ≤ 12.1 Ω/km (16 AWG)

60332-3C | Good (Optional) | Super | -20/+90 | Good (Optional)

BUS Cable

PROFIBUS DP

The Profibus DP is part of Profibus Technology family, and works with decentralized perypherls (DP), connecting with high speed PLCs, devices and controllers, up to 12 Mbps, and can work as a trunk segment for PB PA elements. Cable has 1 pair screened, operating from 3-20MHz. It is acc IEC 61158-2 / IEC 61784-1 Communication Profile Type 3. We have PB DP models in PVC and PUR also available upon request. Designs based on EN50288-7 are possible.



PB DP FC LSHF-FR

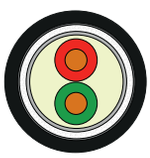
Feature	Description
Conductor	Solid Bare copper, 0.64mm
Insulation	Foam Skin PE, Ø 2.5mm
Layup	Twisted pair + LSHF bedding
Screen	Foil+Braid (SF/UTP)
Jacket	LSHF, Ø8.0mm
Impedance	150 Ω @ 1MHz
Capacitance	Max 30 nF/km
Attenuation	2.5 dB/100m @ 4MHz 0.3 dB/100m @ 31 kHz
DC resistance	Max 55Ω/km

PB DP Basic SWB LSHF

Feature	Description
Conductor	Bare, stranded, 7x0.26mm
Insulation	Foam-skin PE, Ø 2.55mm
Layup	Twisted pair + round fillers
Screen	Aluminum Foil+ Braid
1st Jacket	Flame retardant LSHF
Jacket	Armor: galvanized steel wire braid + LSHF-FR jacket Ø 12mm
Impedance	150 Ω @ 1MHz
Capacitance	Max 30 nF/km
Attenuation	2.5 dB/100m @ 4MHz 0.3 dB/100m @ 31 kHz
DC resistance	Max 55Ω/km

BUS Cable
PROFIBUS PA

Profibus PA is member of Profibus family, focused on field level sensors, valves, while powering them remotely, as intrinsically safe (Ex) areas. PB PA cables provide a physical layer (PHY) for connection of 31.25 kbps x 1900m, acc IEC 61158-2 Type 1/ IEC 61784-1 (CPF 3/2). Uses a single pair, minimum 0.8mm² AWG18, shielded. Can be connected with PB DP buses. Some designs based on EN50288-7 are available, with Steel Wire Braid (SWB) of 0.3mm wires.



PB PA FC AWG18 PVC

Feature	Description
Conductor	Solid 1.05mm
Insulation	Foam Skin PE, Ø 2.55mm
Layup	Twisted pair + PVC bedding
Screen	Overall - Foil+Braid (SF/UTP)
Jacket	PVC, Ø8.0mm
Impedance	100 Ω @ 31.25kHz
Capacitance	Max 60 nF/km
Attenuation	0.3dB/100m @ 39 kHz
DC resistance	Max 23Ω/km
Propagation	≤ 1700ns/km

60332-1 | Good | Good | None | Good | -40/+70

PB PA FC SWB LSHF-FR AWG18/7

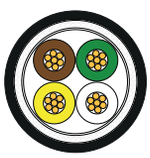
Feature	Description
Conductor	BC, 7x0.4mm
Insulation	Foam-Skin PE, Ø 2.55mm
Layup	Twisted pairs + PVC bedding
Screen	Individual: Alum Foil+PET Foil +drain Overall Foil+ drain wire
Wrap	Mineral flame retardant tape
Jacket	Inner: LSHF, Ø 12.9mm Armor: galvanized steel wire braid Outer: LSHF-FR Ø 16.9mm
Impedance	100 Ω @ 31.25kHz
Capacitance	Max 60 nF/km
Attenuation	0.3dB/100m @ 39 kHz
DC resistance	Max 23Ω/km
Propagation	≤ 1700ns/km

60332-3 | Good | Good | None | Super | -25/+90

BUS Cable

CANBUS

The CAN protocol is described on ISO 11898-2, from 1 Mbps (30m) to 50 kbps (1km), of course depending on the conductor section. Our FF cables can be supplied in 1P to 16P (acc to cross-section). Some designs based on EN50288-7 are available.



CANBUS 0.22mm²

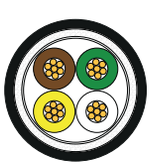
Feature	Description
Conductor	Stranded 7x0.2mm
Insulation	Solid PE, Ø 1.75mm
Layup	2 twisted pair + PET foil wrap
Screen	Tinned copper Braid + non-woven tape
Jacket	PUR, PVC or LSHF , Ø6.9mm
Impedance	120 Ω @ 1 MHz
Capacitance	Typical 42 nF/km

60332-1 | Basic | Good | None | Good | -40/+70

CANBUS 0.35mm² PUR-NR

Feature	Description
Conductor	Bare Copper 7x0.26mm
Insulation	Foam Skin PP Ø 2.2mm
Layup	Twisted Pair + plastic fillers
Screen	Overall Foil+ braid + drain wire Wrap in PET foil
Jacket	Non-halogenated jacket Ø 6.8mm
Impedance	120 Ω @ 1 MHz
Capacitance	Typical 42 nF/km

No | Super | No | None | Super | -20/+85



CANBUS 0.22mm² PBT

Feature	Description
Conductor	Stranded, BC, 7x0.2mm
Insulation	PE Ø 1.75mm
Layup	1 pair + Plastic fillers
Wrap	PET foil
Screen	Tinned copper braid + plastic tape
Jacket	PBT, Ø 6.4mm
Impedance	120 Ω @ 1 MHz
Capacitance	Typical 42 nF/km

None | Good | No | None | Super | -25/+70

BUS Cable

DeviceNET

This ODVA protocol, sending data in one pair and DC power in another pair. The data link layer uses CAN as protocol, up to 64 devices. The connection can deliver 125 kbps to 500 kbps, being the maximum length depending to cable version: Thin or Thick. Other jacket materials can be offered (PVC, PUR, etc).

Devicenet Thin LSHF

Feature	Description
Conductor	Stranded tinned, flexible, 19 elements
Insulation	PE Ø 1.75mm (AWG24/19) PE Ø 1.4mm (AWG22/19)
Screen	Individual foil + Overall Braid
Jacket	LSHF, Ø 6.9mm
Impedance	120 Ω @ 1 MHz
Capacitance	Typical 43 nF/km

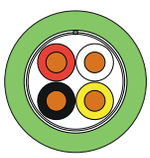
Devicenet Thick LSHF

Feature	Description
Conductor	Stranded tinned, flexible, 19 elements
Insulation	PE Ø 3.7mm (AWG18/19) PP Ø 2.9mm (AWG15/19)
Screen	Individual foil + Overall Braid
Jacket	LSHF, Ø 12mm
Impedance	120 Ω @ 1 MHz
Capacitance	Typical 43 nF/km

BUS Cable

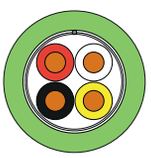
EIB

European Installation Bus (EIB) cables are used in building automation, connecting sensors and actuators in BMS (Building Management Systems) like heating, lighting, air conditioning, etc. Those cables are made of 1 quad (1Q) of 4 wires, shielded and jacketed with flare retardant materials.



EIB 0.8mm LSHF

Feature	Description
Conductor	Solid , 0.8mm
Insulation	PE, Ø 1.6mm
Wrap	Individual foil + Overall Braid
Screen	AL foil + drain wire
Jacket	LSHF-FR, with ripcord Ø 5.4mm (1P), Ø 7.4mm (1Q)
Inductance	0.65mH/km
Capacitance	< 100 nF/km
Voltage test	4kVac x 1min 2.5kVac x 5min



EIB 0.8mm PVC

Feature	Description
Conductor	Solid , 0.8mm
Insulation	PE, Ø 1.6mm
Wrap	Individual foil + Overall Braid
Screen	AL foil + drain wire
Jacket	PVC, with ripcord Ø 5.4mm (1P), Ø 7.4mm (1Q)
Inductance	0.65mH/km
Capacitance	< 100 nF/km
Voltage test	4kVac x 1min 2.5kVac x 5min

Industrial Ethernet (IE)

As true heir of legacy protocols, the Ethernet protocol is well stablished in industry and can provide both bandwidth and standardization to modern systems, allowing IP communication between PLCs, remotes and industrial network devices. Being 2P (Cat 5, for 100BASE-T) or 4P (1Gbps and above), the IE portfolio from Draka can offer robustness, jacket protection and transmission performance in state of art.

We have UL 758 (AWM Style) and UL 444 (Listed) certifications for some models, making it possible to shor-ten the full system approval.

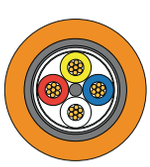
Made of 2P bundled as a quad, the IE Profinet cable can deliver 100BASE-TX (100Mbps) link. Its construction can be Type A (Static, no movement), B (Occasional movement, vibration) and C (Drag chain) according to its flexibility. The FC (Fast Connect) design allows a quick cable preparation, considering a controlled bedding diameter with PET tape to protect cable core from cutting tool.

IE FC PVC

Feature	Description
Conductor	Solid AWG22/1, Ø 0.64mm Flex AWG22/7 (0.75mm)
Insulation	PE, Ø 1.5mm
Layup	4 wires as quad + PET foil wrap + PVC bedding
Screen	Overall - Foil+Braid (SF/UTP)
Jacket	PVC, Ø6.5mm

IE FC Trail PUR (Type C)

Feature	Description
Conductor	Solid AWG22/19, Ø 0.75mm
Insulation	PE, Ø 1.5mm
Layup	4 wires as quad + fillers + PET foil wrap + bedding
Screen	Overall - Foil+Braid (SF/UTP)
Jacket	PVC, Ø6.5mm



IE UL13 PLTC FT4

Feature	Description
Conductor	Stranded tinned AWG22/7, Ø 0.75mm
Insulation	PE, Ø 1.5mm
Layup	4 wires as quad + PET foil wrap + PVC bedding
Screen	Overall - Foil+Braid (SF/UTP)
Jacket	PVC, Ø6.5mm

Industrial Ethernet

Profinet

Made of 2P bundled as a quad, the IE Profinet cable can deliver 100BASE-TX (100Mbps) link. Its construction can be Type A, B and C according to its flexibility. Specially designed for PROFINET protocol used in wide range of industrial application Ethernet Applications, such as wiring of machines, equipment, instruments and control cabinets.

PROFINET PUR (Type R)

Feature	Description
Conductor	Stranded Tinned Copper AWG22/19
Insulation	HDPE, Ø 1.5mm
Layup	4 wires as quad + fillers + PET foil wrap
Screen	Overall - Foil+Braid (SF/UTP)
Jacket	PUR, Ø 6.5mm
Flexibility	5 million drag chain and torsion application
Impedance	Nom.100 Ω acc. To IEC 61156-5
Delay Skew	≤ 20ns/100m

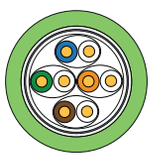
60332-1 Good -40/+80

Typ	Installation
A	Static, no movement
R	Highly Flexible, drag chain & robots

For applications where 4P Category cables are necessary in shop floor, industry networks and rela-ted, we have Cat 5E, Cat 7 and Cat 7A models with different jackets and screening levels.

C6 SF/FTP PVC CMG

Feature	Description
Conductor	Solid AWG24
Insulation	Foam Skin PE, Ø 1.23mm
Screen	Individual + Overall
Inner Jacket	PVC Ø 6.0mm + Foil + Braid
Outer Jacket	PVC Ø 8.0mm

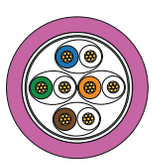


C6 SF/FTP PVC CMG

Feature	Description
Conductor	Solid AWG22
Insulation	Foam Skin PE, Ø 1.56mm
Screen	Individual + Overall
Inner Jacket	PVC Ø 7.3mm + Foil + Braid
Outer Jacket	PVC Ø 9.6mm

C6A S/FTP PVC

Feature	Description
Conductor	Stranded AWG23/7
Insulation	Foam Skin PE, Ø 1.58mm
Screen	Individual + Overall + non-woven tape
Outer Jacket	PVC, Ø 8.7mm
UL AWM	Style 2461 (80°C, 300V, FT2)



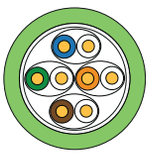
C6A S/FTP PVC

Feature	Description
Conductor	Stranded AWG26/7
Insulation	Foam Skin PE, Ø 1.0mm
Screen	Individual + Overall
Outer Jacket	PVC, Ø 6.0mm

Industrial Ethernet

Category Cables

UL AWM (Application Wiring Material) is focused on components which will be used later as part of a certified system or equipment, from a washing machine, a calculator, or even a critical mission device. An insulated wire or complete cable can be also be considered a component and have its design described by a specific UL AWM Style.



IE C7 PUR AWG23

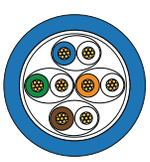
Feature	Description
Conductor	Solid AWG23/1, Ø 0.56mm
Insulation	Foam Skin PE, Ø 1.4mm
Screen	Individual + Overall
Layup	4 pairs + braid + non-woven tape
Outer Jacket	PUR Ø 7.5mm

FT2 60332-1 | Good | Good | AWM 21238 | 300V | -20/+80

IE C5E 4P PUR AWG26

Feature	Description
Conductor	Stranded AWG26/7
Insulation	Foam Skin PE, Ø 0.95mm
Screen	Overall
Layup	4 pairs + Foil + Braid + non-woven tape
Outer Jacket	PUR Ø 6.4mm

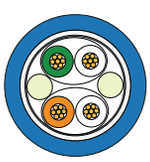
FT2 60332-1 | Good | Good | AWM 20930 | 300V | -20/+80



IE C6A AWG26 PUR

Feature	Description
Conductor	Stranded AWG26/7
Insulation	Foam Skin PE, Ø 1.0mm
Screen	Individual + Overall
Layup	4 pairs + braid
Jacket	PVC, Ø 6.3mm

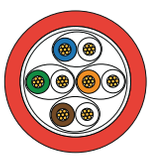
FT2 60332-1 | Good | Good | AWM 20963 | 300V | -40/+80



IE C6A AWG26 PUR

Feature	Description
Conductor	Stranded AWG26/7
Insulation	Foam Skin PE, Ø 1.0mm
Screen	Overall
Layup	2 pairs + fillers + braid + nonwoven tape
Jacket	PUR, Ø 5.6mm

FT2 60332-1 | Good | Good | AWM 21576 | 1000V | -30/+80



IE 900 SS26 PUR

Feature	Description
Conductor	Solid AWG26/7, Ø 0.5mm
Insulation	Foam Skin PE, Ø 1.0mm
Screen	Individual + Overall
Layup	4 pairs + braid
Outer Jacket	PUR Ø 6.0mm

60332-1 | Good | Good | None | Good | -40/+80

IE 10G Flex (Drag chain)

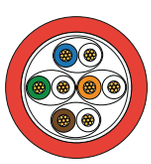
Feature	Description
Conductor	Stranded AWG26/7
Layup	4 pairs + separator + PET tape
Screen	No
Innen Jacket	LSHF + braid + non-woven tape
Outer Jacket	PUR Ø 8.0mm

Tested with bending radius of 100mm, acceleration of 4m/s², up to 3 Million cycles at 20°C.

PatchPro Flex C7

Feature	Description
Conductor	Stranded AWG26/7
Insulation	Foam Skin PE, Ø 1.0mm
Screen	Individual + Overall
Layup	4 pairs + braid + non-woven tape
Jacket	HF Rubber, flexible, Ø 6.4mm

N/A | Basic | Basic | No | 60V | -20/+60



IE Patch Flex PUR

Feature	Description
Conductor	Stranded AWG26/7 (Ø 0.4mm)
Insulation	Foam Skin PE, Ø 0.98mm
Screen	Individual + Overall
Layup	4 pairs + braid
Jacket	PUR, Ø 5.8mm

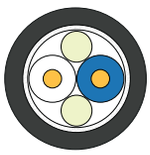
No | Super | Basic | No | 30V | -30/+80

Application as patchcord for indoor areas in in-dustrial environment

Industrial Ethernet

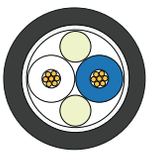
Single Pair Ethernet

After decades of legacy bus cables in factory field level, it is now possible to extend the benefits of Ethernet communication to sensors, actuators and give IP proto-col to bottom of automation pyramid. For that, we bring the Draka S1NGLE portfolio, to connect Ethernet over 1P category cables to industry 4.0 and smart buildings. PVC and PUR jackets are recommended for industrial application and are certified according to UL 758, as FT2 flame, 300V rating and 80°C rated. LSHF version is intended for smart buildings and are CPR D_{ca} and C_{ca}.



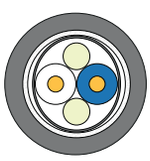
S1NGLE 1000

Feature	Description
Conductor	Solid AWG18
Insulation	Foam Skin PE, Ø 2.5mm
Screen	Foil + Braid
Application	10 Mbps x 1000m
Outer Jacket	PVC, PUR or LSHF-FR Ø 7.2mm



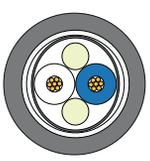
S1NGLE 400

Feature	Description
Conductor	Stranded AWG22/
Insulation	Foam Skin PE, Ø 1.8mm
Screen	Foil + Braid
Application	10 Mbps x 250m, 100Mbps x 40m
Outer Jacket	PVC, PUR or LSHF-FR Ø 5.8mm



S1NGLE PLUS

Feature	Description
Conductor	Solid AWG23
Insulation	Foam Skin PE, Ø 1.4mm
Screen	Foil + Braid
Application	10 Mbps x 100m, 100Mbps x 40m
Outer Jacket	PVC, PUR or LSHF-FR Ø 5.1mm



S1NGLE 15 - patchcord

Feature	Description
Conductor	Stranded AWG26/7
Insulation	Foam Skin PE, Ø 1.1mm
Screen	Foil + Braid
Application	10-1000 Mbps x 15m
Outer Jacket	PVC, PUR or LSHF-FR Ø 4.3mm

We are members of System Alliance, a group of top companies working to promote, develop and interconnect the SPE solutions.

Single Pair Ethernet
System Alliance

For harsh outdoor applications, where UV, moisture and/or biological attack are expected. Also applicable are the cables from ToughCAT portfolio, which can be checked in Marine/Shipboard section of this catalog.

SuperCAT 5E, 6

Feature	Description
Conductor	Solid AWG23/1, Ø 0.56mm
Insulation	Foam Skin PE, Ø 1.4mm
Screen	Individual + Overall
Layup	4 pairs + braid + non-woven tape
Outer Jacket	PUR Ø 7.5mm

No · Good · Super · Longitudinal · Good · -40/+80

IE 10G Flex (Drag chain)

Feature	Description
Conductor	Stranded AWG26/7
Layup	Foam Skin PE, Ø 0.95mm
Screen	Overall
Innen Jacket	4 pairs + Foil + Braid + non-woven tape
Outer Jacket	PUR Ø 6.4mm

No · Good · Super · Longitudinal · Good · -40/+80

SuperCAT 7 (patent)

Feature	Description
Conductor	Stranded AWG26/7
Insulation	Foam Skin PE, Ø 1.0mm
Screen	Individual + Overall
Layup	4 pairs + braid
Jacket	PVC, Ø 6.3mm

FT2 60332-1 · Good · Good · AWM 20963 · 30V · -40/+80

Gigabit ATAR-F

Feature	Description
Conductor	Bare AWG24/1
Insulation	Solid PE, Ø 1.0mm
Screen	Yes. UTP version also available
Layup	4 pairs grouped + swellable yarns
ATAR layer	PA12
Outer jacket	PE

This cable is designed for directly buried installation, with anti-rodent and anti-thermite dielectric protection.

No · Good · Super · Radial · Good · -40/+80

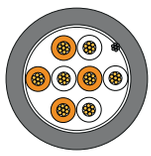
Control and Instrumentation

Symmetrical cables (twisted pairs) for industrial control for up to 75V, for digital and low level analog signals. The conductors are stranded tinned copper 0.5mm², insulated with PE and twisted as pairs. Cable is composed by subunits of 4P each, grouped with overall screen of AL/PET foil + tinned copper drain wire (0.5mm²).

NOMAK-E

Feature	Description
Conductor	Stranded 7x0.29mm
Insulation	PE, Ø 1.4mm
Layup	Twisted pairs in groups of 4
Screen	Overall - Foil+ tinned copper drain wire
Jacket	PVC or LSHF-FR
Impedance	100 Ω @ 10MHz
Capacitance	Max 100 nF/km, typ 80
DC resistance	42 Ω/km

Nomak-E has pairs identified with different insulati-on colors, not numbered



NOMAK

Feature	Description
Conductor	Stranded 7x0.29mm
Insulation	PE, Ø 1.4mm
Layup	Twisted pairs in groups of 4
Screen	Overall - Foil+ tinned copper drain wire
Jacket	PVC or LSHF-FR
Impedance	100 Ω @ 10MHz
Capacitance	Max 100 nF/km, typ 80
DC resistance	42 Ω/km

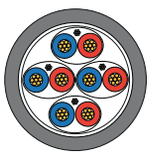
Nomak is insulated with orange and white colors, and pair is numbered

Pairs	Outer Diameter (mm)
2	6.1
4	7.1
8	9.8
12	11.7
24	16.2

Control and Instrumentation

JAMAK

Symmetrical cables (with shielded twisted pairs) for industrial control for up to 75V, for digital and low level analog signals. Each pair is shielded with AL/PET foil with Tinned Copper drain wire and PET foil.



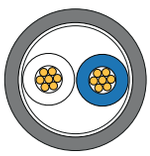
JAMAK

Feature	Description
Conductor	Stranded 7x0.29mm
Insulation	PE, Ø 1.6mm
Layup	Group of shielded pairs
Screen	Individual + overall
Jacket	PVC or LSHF-FR
Impedance	70 Ω @ 10MHz
Capacitance	Typical 85 nF/km
DC resistance	42 Ω/km

Pairs	Design	Outer Diameter (mm)
1	1x(2+1)x0.5	5.5
2	2x(2+1)x0.5	7.5
4	4x(2+1)x0.5	9.7
8	8x(2+1)x0.5	12.9
12	12x(2+1)x0.5	14.5
16	16x(2+1)x0.5	16.2
24	24x(2+1)x0.5	20.1

60332-1 OK Basic None Basic -20/+70

Symmetrical bus cable for LON networks for building automation and home automation (indoor application).



LONAK 2x1.3mm²

Feature	Description
Conductor	Stranded 7x0.49mm
Insulation	PE, Ø 2.7mm
Layup	1 twisted pair
Screen	No. Wrapped with PET tape
Jacket	PVC or LSHF-FR, Ø 7mm
Impedance	70 Ω @ 10MHz
Capacitance	Typical 45 nF/km
DC resistance	28 Ω/km

LONAK 2x2x0.8mm

Feature	Description
Conductor	Stranded 7x0.49mm,Ø 0.8mm
Insulation	PVC, Ø 1.6mm
Layup	1 quad with 4 wires, wraped with PET
Screen	Overall AL/PET + drain wire
Jacket	PVC or LSHF-FR, Ø 7mm
Impedance	70 Ω @ 10MHz
Capacitance	Typical 45 nF/km
DC resistance	28 Ω/km

LONAK 2x2x0.65mm

Feature	Description
Conductor	Stranded 7x0.26mm, Ø 0.65mm
Insulation	PE, Ø 1.55mm
Layup	2 twisted pairs
Screen	Overall AL/PET + drain wire
Jacket	PVC or LSHF-FR, Ø 7mm
Impedance	70 Ω @ 10MHz
Capacitance	Typical 45 nF/km
DC resistance	28 Ω/km

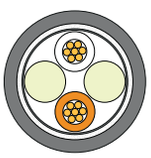
Control and Instrumentation

BMS cables

Symmetrical cables for Building Management Systems (BMS) and other similar analog applications where capacitance and flame protection are the most relevant aspects, and regular signal voltage is up to 60V. Nevertheless, the voltage surge protection class is up to 300V (UL 758). They are in-tended for indoor installation.

LiHCH 1mm²

Feature	Description
Conductor	Stranded 7x0.43mm
Insulation	LSHF, Ø 2.0mm
Layup	4x1: Quad; 2x1: 1 pair + 2 fillers
Screen	Tinned copper braid
Jacket	LSHF-FR, Ø 7.4mm
Capacitance	130 nF/km



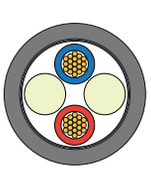
LiHCH 1mm²

Feature	Description
Conductor	Stranded 7x0.45mm
Insulation	LSHF, Ø 2.0mm
Layup	4x1: Quad; 2x1: 1 pair + 2 fillers
Screen	No. Wrapped with PET tape
Jacket	PVC, Ø 7.4mm
Capacitance	120 nF/km

Li2Y(St) 1.5mm²

Based on EN 50288-7

Feature	Description
Conductor	Flexible bare copper 1.5mm²
Insulation	PE, Ø 2.5mm, numbered
Layup	1 or 2 pair, PET tape wrap each
Screen	ÁL/PET foil + drain wire
Jacket	PVC or LSHF-FR Ø 7.7mm (1P), Ø 11.9mm (2P)
Capacitance	100 nF/km

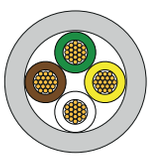


LiYY 0.25mm²

Feature	Description
Conductor	Flexible class 5, 0.25mm²
Insulation	PVC, Ø 1.2mm
Layup	1 pair, 1 triple or 1 quad
Screen	No. PET tape wraped
Jacket	PVC Ø 4.6mm
Capacitance	70 nF/km

UL2464

Screened Multi-Pairs cable suitable for Audio, Control, Instrument and Building Management System (BMS).Suitable for analog applications where capacitance and flame protection are the most relevant aspects, and regular signal voltage is up to 60V. Nevertheless, the voltage surge protection class is up to 300V . They are intended for indoor installation.



UL2464 PVC/LSZH

Feature	Description
Conductor	Bare Copper (AWG24 ~ AWG16)
Insulation	SR-PVC
Layup	1P ~ 10P twisted pairs
Screen	Overall Foil Screen
Drain Wire	Stranded Tinned Copper
Jacket	LSHF/PVC

60332-1 -20/+70

Pairs	Colour Code Chart
1	White x Brown
2	Green x Yellow
3	Grey x Pink
4	Blue x Red
5	White x Green
6	Blue x White
7	Red x Orange
8	Red x Green
9	Red x Blue
10	Red x Brown

Standards

UL2464

LSHF : IEC 60332-1 ,IEC 60754-1 & 2, IEC 61034-2

PVC : IEC 60332-1

Design	Outer Diameter (mm)	Design	Outer Diameter (mm)
1P x AWG24	4.0	2P x AWG20	6.5
1P x AWG22	4.6	3P x AWG24	5.8
1P x AWG20	5.0	3P x AWG22	6.5
1P x AWG18	5.6	3P x AWG20	7.7
1P x AWG16	6.2	6P x AWG20	10.5
2P x AWG24	5.0	8P x AWG20	11.0
2P x AWG22	5.5	10P x AWG24	9.0

Control and Instrumentation

Security and Alarm Cable

Suitable for a wide range of applications, including security systems, sound and intercom systems, low voltage circuits, fire and burglar alarm systems, smoke alarm systems,window and door switches and single line telephones. It is flexible so it bands easily.Voltage Rating upto 300V.

SXACS Series LSHF

Feature	Description
Conductor	Bare Copper (AWG24 ~ AWG12)
Insulation	XLPE
Layup	1P ~ 2P twisted pairs
Screen	Overall Foil Screen
Drain Wire	Stranded Tinned Copper
Jacket	Jacket LSHF/PVC CMR
Outer Diameter	1P x AWG22 (3.8mm) 1P x AWG20 (4.2mm) 1P x AWG16 (5.2mm)

60332-1 -20/+75

SACS Series PVC CMR/LSHF

Feature	Description
Conductor	Bare Copper (AWG24 ~ AWG12)
Insulation	PVC
Layup	1P ~ 2P twisted pairs
Screen	Overall Foil Screen
Drain Wire	Stranded Tinned Copper
Jacket	Jacket LSHF/PVC CMR
Outer Diameter	1P x AWG22 (3.8mm) 1P x AWG20 (4.2mm) 1P x AWG16 (5.2mm)

60332-1 -20/+75

SACU Series PVC CMR/LSHF

Feature	Description
Conductor	Bare Copper (AWG24 ~ AWG12)
Insulation	PVC
Layup	1P ~ 2P twisted pairs
Jacket	LSHF/PVC CMR
Outer Diameter	1P x AWG22 (3.7mm) 1P x AWG20 (4.1mm) 1P x AWG16 (5.1mm)

Pair	Colour Code Chart
1	Black x Red
2	White x Green

Standards

LSHF : IEC 60332-1 ,IEC 60754-1 & 2, IEC 61034-2

PVC CMR : NEC Article Type FPLR,CL3R, CMR

60332-1 -20/+75

Control and Instrumentation

Fire Alarm Cable

Engineered as lifelines to safety systems and securing buildings. Suitable for commercial fire alarms, monitoring and detection systems, audio, control and notification circuits. Voltage Rating <upto 300V. Designed with rip cords for easy jacket removal.

FAES Series LSHF

Feature	Description
Conductor	Solid Bare Copper (AWG24 ~ AWG12)
Insulation	PE
Layup	1P ~ 2P twisted pairs
Screen	Overall Foil Screen
Drain Wire	Stranded Tinned Copper
Jacket	LSHF
Outer Diameter	1P x AWG22 (3.5mm) 1P x AWG20 (3.9mm) 2P x AWG16 (7.3mm)

60332-1 -20/+75

FACS Series PVC CMR/LSHF

Feature	Description
Conductor	Solid Bare Copper (AWG24 ~ AWG12)
Insulation	PVC
Layup	1P ~ 2P twisted pairs
Screen	Overall Foil Screen
Drain Wire	Stranded Tinned Copper
Jacket	LSHF/PVC CMR
Outer Diameter	1P x AWG22 (3.3mm) 1P x AWG20 (3.7mm) 1P x AWG16 (4.8mm))

60332-1 -20/+75

FACU Series PVC CMR/LSHF

Feature	Description
Conductor	Solid Bare Copper (AWG24 ~ AWG12)
Insulation	PVC
Layup	1P ~ 2P twisted pairs
Jacket	LSHF/PVC CMR
Outer Diameter	1P x AWG22 (3.2mm) 1P x AWG20 (3.6mm) 1P x AWG16 (4.7mm)

Pair	Colour Code Chart
1	Black x Red
2	White x Green

Standards

LSHF : IEC 60332-1 ,IEC 60754-1 & 2, IEC 61034-2

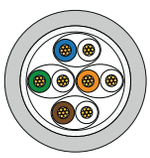
PVC CMR : NEC Article Type FPLR,CL3R, CMR

60332-1 -20/+75

Marine & Shipboard

Installing cables in offshore and marine environments means having the cable prepared to endure environment stresses and the right raw materials to stand in long term. We have SHF1 cables in copper (category cables) and optical fiber with our Oceanline product family.

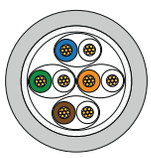
From the many category cables in our portfolio, the Toughcat are the ones with high mechanical and environmental resistance resistance— in the LSHF jacket and even more in MUD jacket version. Our jackets are SHF1.



ToughCAT 5e

Feature	Description
Conductor	Stranded AWG24/7
Insulation	Foam Skin PE, Ø 1.4mm
Layup	4 shielded pairs + Braid
Screen	Individual + Overall (S/FTP)
Jacket	LSHF-FR, Ø6.2mm

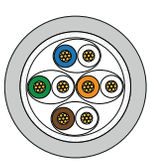
60332-3 | Good | Good | None | Good | -40/+80 | D_{ca} CPR



ToughCAT 7

Feature	Description
Conductor	Stranded AWG23/7
Insulation	Foam Skin PE, Ø 1.6mm
Layup	4 shielded pairs + Braid
Screen	Individual + Overall (S/FTP)
Jacket	LSHF-FR, Ø6.6mm

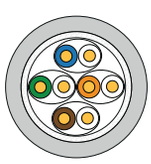
60332-3 | Good | Good | None | Good | -40/+80 | D_{ca} CPR



ToughCAT 7S

Feature	Description
Conductor	Stranded AWG24/7
Insulation	Foam Skin PE, Ø 1.4mm
Layup	4 shielded pairs + Braid
Screen	Individual + Overall (S/FTP)
Jacket	LSHF-FR, Ø6.2mm

60332-3 | Good | Good | None | Good | -40/+80 | D_{ca} CPR



ToughCAT 7A

Feature	Description
Conductor	Solid AWG23
Insulation	Foam Skin PE, Ø 1.4mm
Layup	4 shielded pairs + Braid
Screen	Individual + Overall (S/FTP)
Jacket	LSHF-FR, Ø7.8mm

60332-3 | Good | Good | None | Good | -40/+80 | D_{ca} CPR

DNV ABS

Marine & Shipboard

ToughCAT MUD

From the many category cables in our portfolio, the Toughcat are the ones with high mechanical and environmental resistance resistance— in the LSHF jacket and even more in MUD jacket version. Our jackets are SHF1.

ToughCAT 5e MUD

Feature	Description
Conductor	Stranded AWG24/7
Insulation	Foam Skin PE, Ø 1.4mm
Layup	4 shielded pairs + Braid
Screen	Individual + Overall (S/FTP)
Jacket	LSHF Ø7.6mm+ MUD jacket, Ø9.6mm

60332-3 | Good | Good | None | Good | -40/+80

ToughCAT 7 MUD

Feature	Description
Conductor	Stranded AWG23/7
Insulation	Foam Skin PE, Ø 1.6mm
Layup	4 shielded pairs + Braid
Screen	Individual + Overall (S/FTP)
Jacket	LSHF Ø8.0mm+ MUD jacket, Ø10.1mm

60332-3 | Good | Good | None | Good | -40/+80

ToughCAT 7S MUD

Feature	Description
Conductor	Solid AWG23/1
Insulation	Foam Skin PE, Ø 1.4mm
Layup	4 shielded pairs + Braid
Screen	Individual + Overall (S/FTP)
Jacket	LSHF Ø7.6mm+ MUD jacket, Ø9.6mm

60332-3 | Good | Good | None | Good | -40/+80

ToughCAT 7AS MUD

Feature	Description
Conductor	Solid AWG23/1
Insulation	Foam Skin PE, Ø 1.4mm
Layup	4 shielded pairs + Braid
Screen	Individual + Overall (S/FTP)
Jacket	LSHF Ø7.8mm+ MUD jacket, Ø9.8mm

60332-3 | Good | Good | None | Good | -40/+80

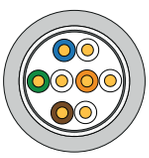
We also have Category cables for marine applications with SHF1 single jacket, as part of our Oceanline portfolio, according to IEC 61156 and ISO/IEC 11801 standards.

Our **Oceanline 5e PUR** double jacket can be used for months directly submerse in seawater, for IP monitoring cameras underwater, typically used in sea farming like shrimp and salmon cultures. Its glossy jacket can avoid formation of algae and the waterblock tape prevents radial water income.

Oceanline 5e PUR

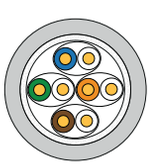
Sea water submerse

Feature	Description
Conductor	Stranded AWG24/7
Insulation	Foam Skin PE, Ø 1.4mm
Layup	4 shielded pairs + Braid
Screen	Individual + Overall (S/FTP)
Jacket	LSHF Ø8.3mm
Protection	Water block (swellable) tape
Outer jacket	PUR, black, Ø 11.3mm



Oceanline 300

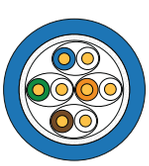
Feature	Description
Conductor	Bare, solid AWG24
Insulation	PE, Ø 1.1mm
Layup	4 twisted pairs + screen
Screen	Overall (SF/UTP) foil + braid
Jacket	LSHF Ø 6.6mm



Oceanline 900

Cat 7 SHF1

Feature	Description
Conductor	Bare, solid AWG23
Insulation	Foam-Skin PE, Ø 1.4mm
Layup	4 shielded pairs + Braid
Screen	Individual + Overall (S/FTP)
Jacket	LSHF Ø 7.5mm



Oceanline 10G

Feature	Description
Conductor	Bare, solid AWG23
Insulation	Foam-Skin PE, Ø 1.4mm
Layup	4 shielded pairs + Braid
Screen	Individual + Overall (S/FTP)
Jacket	LSHF—SHF1, Ø 7.3mm

Marine & Shipboard

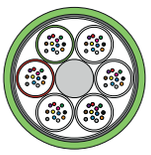
Oceanline - Optical Fiber for Marine

We have four optical cables for marine and shipboard installation, being two based on tight buffer element and two based on loose tube.

Oceanline OLF01

Feature	Description
Buffer	Tight (0.9mm)
Strength member	Aramid yarns
Outer Sheath	LSHF-FR, SHF1, Ø4.5-8.0mm
Max Tension	1000N
Crush	1000N

60332-1 Good UV Good Good Good -40/+70



Oceanline OLF03

Feature	Description
Buffer	Stranded Loose Tubes
Strength member	Fiber Glass yarns
Outer Sheath	LSHF-FR, SHF1, Ø 11.2mm
Max Tension	5000N
Crush	2500N

60332-3 Good UV Good Good Good -20/+60

Oceanline OLF02

Feature	Description
Buffer	Tight (0.9mm) inside 2.0mm subu-nits (breakout)
Strength member	Aramid yarns
Outer Sheath	LSHF-FR, SHF1, Ø7.5-12mm
Max Tension	1300N

60332-1 Good UV Good None Good -40/+70

Oceanline OLF04

Feature	Description
Buffer	Central Loose Tube
Strength member	Fiber Glass yarns
Outer Sheath	LSHF-FR, SHF1, Ø7.5-12mm
Max Tension	3000N
Crush	3000N

60332-3 Good UV Good Good Good -20/+60

Our RF cables are based on MIL-C-17G standard, regarding electrical properties.

RG213

Feature	Description
Conductor	Stranded, 7x0.75, Ø 2.25mm
Insulation	PE, Ø 7.25mm
Braid	Bare copper, 96% cover
Attenuation	24.7 dB/100m @ 1GHz
Jacket	LSHF-FR, Ø10.3mm
Impedance	50 Ω (for RF)
Capacitance	100 pF/m

RG214

Feature	Description
Conductor	Silver plated, 7x0.75, Ø 2.25mm
Insulation	PE, Ø 7.25mm
Braid	1st: silvered 94%, 2nd: silvered 97%
Attenuation	28.4dB/100m @ 1GHz
Jacket	LSHF-FR, Ø10.8mm
Impedance	50 Ω (for RF)
Capacitance	100 pF/m

RG223

Feature	Description
Conductor	Silver plated, Ø 0.9mm
Insulation	PE, Ø 2.95mm
Braid	1st: silvered 96%, 2nd: silvered 96%
Attenuation	45.9dB/100m @ 1GHz
Jacket	LSHF-FR, Ø 5.4mm
Impedance	50 Ω (for RF)
Capacitance	100 pF/m

Oceanline 2.7/7.3 AF

Feature	Description
Conductor	Bare Copper, Ø 2.71mm
Insulation	PE, Ø 7.25mm
Braid	AL-PET-AL foil + tinned copper braid
Attenuation	13.6 dB/100m @ 1GHz
Jacket	LSHF-FR, Ø 10.3mm
Impedance	50 Ω (for RF)
Capacitance	100 pF/m

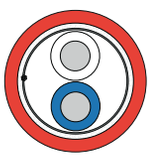
Fire Resistant

We have MMS cables that suport fire resistance situations, where the integrity of the cable must be kept while in big fire situation, like alarms, fire protections and critical system. This is our Firetuff family. They are compliant with most stringent standards and passes the following tests:

- Low Smoke: BSEN 50268, IEC 61034-2,
- Halogen Free: IEC 60754-1&2
- Flame Retardant: IEC 60332-1, IEC 60332-3-24, BS4066 part 3, UL 1581 VW 1
- Circuit Integrity: BS5839-1 2002 (clause 26.2e); BS8434-2; BSEN 50200, IEC60331
- BS5839 enhanced 3 in 1 test Passed
- Continued data operation @ 950°C > 2 hours
- BS6387 CWZ Passed
- BS EN 50200 (IEC60331) >3 hours

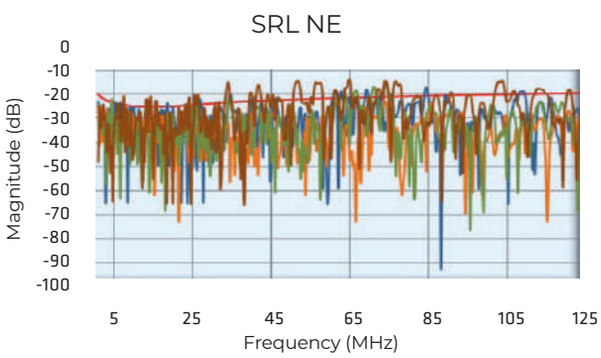
Approved by LU (London Underground) – Independently tested by BRE Global.
Fire resistant BS5839-1 (clause 26.2e); BS8434-2; BSEN 50200
Flame retardant BS4066 part 3; Smoke emission BSEN 20568
LUL-Flammability, smoke & fume 2-01001-002
LU STANDARD e4156 part 1 – Approval ref TLL TLL-ENGENG-MATTSMATTS-0076 (dated 21/06/2007)

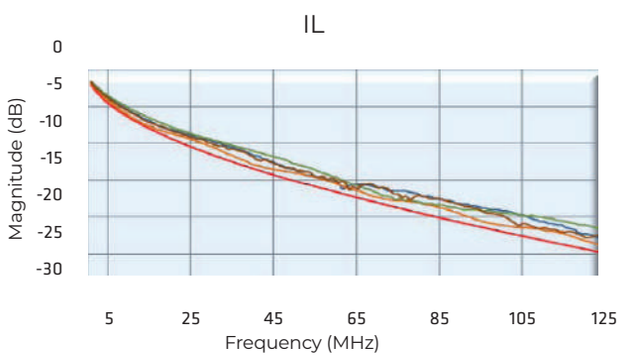
Firetuff copper is a datacable with 1 to 4P that achieves up to Cat 5 performance (ISO 11801 class D:1995). They are all AWG22 solid, with braid and special polymers to withstand extreme fire tem-peratures. Those cables are for indoor only, not having special protection against chemicals, water or UV.



Firetuff 1-4P

Feature	Description
Conductor	Solid 0.65mm
Insulation	PE/Silicon Rubber, Ø 1.7mm
Layup	1 to 4 twisted pairs
Screen	Overall - Foil+Braid (SF/UTP)
Jacket	LSHF material 1P: Ø 6.8mm 2P: Ø 8.2mm 4P: Ø 10.5mm





When used in a Channel, it is advisable to approve a 100m sample and run a performance trial on the system before installation.
Typical structured characteristic impedance is 100 Ω±15, due to fire resistant insulation, it may have variances along the link length.

SRL < -15dB, NVP is 57%

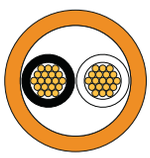
Fire Resistant

Public Address General Alarm

MAX-FOH Flexible PAGA & PAGAS Cable

Engineered to be rugged, flexible, reliable, and fire resistant for public address/general alarm systems.

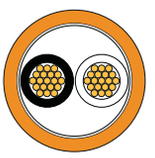
Suitable for all critical Public Address General Alarm Systems. Voltage Rating upto 300V.



MAX-FOH™ Flexible PAGA Cable

Feature	Description
Conductor	Conductor Stranded Bare Copper (1.0mm² ~ 2.5mm²)
Fire Barrier	Mica Tape
Insulation	XLPE
Ins. Colour	2 Core : Black and White Multi-Core : Black and White (with Core numbering)
Layup	2 Cores ~ 4 Cores
Jacket	LSHF
Outer Diameter	2C x 1.0mm² (7.5mm) 2C x 1.5mm² (8.0mm) 2C x 2.5mm² (9.0mm)

60332-3A -20/+90 60331-23



MAX-FOH™ Flexible PAGA Cable

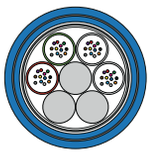
Feature	Description
Conductor	Conductor Stranded Bare Copper (1.0mm² ~ 2.5mm²)
Fire Barrier	Mica Tape
Insulation	XLPE
Ins. Colour	1 Pair : Black and White Multi-Pair : Black and White (with Pair numbering)
Screen	Overall Foil Screen
Drain Wire	Stranded Tinned Copper
Layup	1P ~ 4P
Jacket	LSHF
Outer Diameter	1P x 1.0mm² (9.8mm) 1P x 1.5mm² (10.0mm) 1P x 2.5mm² (11.5mm)

60332-3A -20/+90 60331-23

Standards

LSHF : IEC 60332-3A ,IEC 60754-1 & 2, IEC 61034-2

Fire Resistant : BS 6387 CWZ & IEC 60331-23



Firetuff LT NM

Dielectric, Multitube

Feature	Description
Buffer	Loose tube, Ø 2.3mm
Layup	Stranded tubes aroujnd FRP
Crush	2000 N/10cm
Pulling	4000 N (short), 1500 N (long)
Jacket	Two LSHF-FR jackets

60332-3 60331-25(90) Basic Good -20/+70

Firetuff UT NM

Dielectric, Unitube

Feature	Description
Buffer	Loose tube, Ø 4.0mm
Layup	Central tube
Crush	1500 N/10cm
Pulling	2000 N (short)
Jacket	LSHF-FR

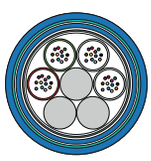
60332-3 60331-25 Basic Good -25/+70

Firetuff UT CST

Steel Tape, Unitube

Feature	Description
Buffer	Loose tube, Ø 4.0mm
Layup	Central tube, 2 jackets
Crush	5000 N/10cm
Pulling	3500 N (short)
Jacket	Corrugated Steel tape + LSHF jacket

60332-3 60331-25 Basic Good -40/+70



Firetuff LT CST

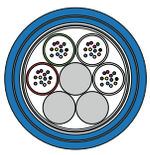
Steel Tape, Multitube

Feature	Description
Buffer	Loose tube, Ø 2.3mm
Layup	Stranded loose tubes
Crush	4000 N/10cm
Pulling	2700 N (short), 900N (long)
Jacket	Corrugated Steel tape + LSHF jacket

60332-3 60331-25(90) Basic Good -40/+80

Fire Resistant

Firetuff Optical



Firetuff LT NM

Dielectric, Multitube

Feature	Description
Buffer	Loose tube, Ø 2.3mm
Layup	Stranded tubes aroujnd FRP
Crush	2000 N/10cm
Pulling	4000 N (short), 1500 N (long)
Jacket	Two LSHF-FR jackets

60332-3 60331-25(90) Basic Good -20/+70

Firetuff UT NM

Dielectric, Unitube

Feature	Description
Buffer	Loose tube, Ø 4.0mm
Layup	Central tube
Crush	1500 N/10cm
Pulling	2000 N (short)
Jacket	LSHF-FR

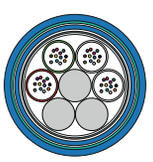
60332-3 60331-25 Basic Good -25/+70

Firetuff UT CST

Steel Tape, Unitube

Feature	Description
Buffer	Loose tube, Ø 4.0mm
Layup	Central tube, 2 jackets
Crush	5000 N/10cm
Pulling	3500 N (short)
Jacket	Corrugated Steel tape + LSHF jacket

60332-3 60331-25 Basic Good -40/+70



Firetuff LT CST

Steel Tape, Multitube

Feature	Description
Buffer	Loose tube, Ø 2.3mm
Layup	Stranded loose tubes
Crush	4000 N/10cm
Pulling	2700 N (short), 900N (long)
Jacket	Corrugated Steel tape + LSHF jacket

60332-3 60331-25(90) Basic Good -40/+80

Fire Resistant

Fire Resistant Fiber Optic Cable

Engineered for harsh environments. Suitable for mission critical application in tunnels, metro lines, and (petro) chemical plants. Being very chemical resistant, it able to withstands aggressive constituents and fluids that might occur on (petro) chemical plants.

Firetuff LTFIPNWM Series SWA LSHF

Steel Wire Armour, Multitube

Feature	Description
Buffer	Loose tube, Ø 2.3mm
Layup	Stranded Loose Tube
Crush	4000 N/10cm
Pulling	5000 N (short)
Inner Sheath	Water Blocking Tape + HDPE + Nylon (PA)
Armour	Steel Wire Armour
Jacket	LSHF (Heat, Oil & UV Resistant)

60332-3 60331-25 Basic Super -40/+70 Good

Firetuff ALPAM Series SWA LSHF

Steel Wire Armour, Multitube

Feature	Description
Buffer	Loose tube, Ø 2.3mm
Layup	Stranded Loose Tube
Crush	3000 N/10cm
Pulling	6000 N (short)
Inner Sheath	Aluminium Tape + HDPE + Nylon (PA)
Armour	Steel Wire Armour
Jacket	LSHF (Heat, Oil & UV Resistant)

60332-3 60331-25 Basic Super -40/+70 Good

Standards

IEC 60794-3-10 , TIA 598

Flame Retardant LSHF : IEC 60332-3-24, IEC 60754-1/2 & IEC 61034-2

Fire Resistant : BS 6387 (180 min at 950°C) & IEC 60331-25 (90 min at 750°C)

Hybrid and Composite

Hybrid and Composite

More offered models

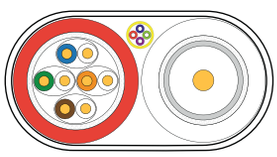
Our composite cables can contain optical elements, DC power elements, coaxial and/or twisted pair components, grouped and protected under one sheath. MMS hybrid cables have focus on DC low voltage (max 60V, 6mm²) indoor application, for DAS (Distributed Antenna System), Wifi Ac-cess Points (WAP), CCTV or future-proof cabling (using copper today and having fiber passed for tomorrow).

LN12

OF + DC power, DAS

Feature	Description
Fibre	Loose Tube 1-12 OF, Ø4mm
Power	4mm², LSHF insulated
Layup	1 fibre + 2 power + filler, around GRP
Screen	Al-PET foil + drain wire
Jacket	LSHF-FR, Ø12.8mm

60332-1 | Basic | Basic | None | Basic | -10/+60 | C_{ca} CPR



DLC 141

OF + DC power + Coax

Feature	Description
Fibre	4 x tight buffer OF
Coax	Video 75Ω Coax10 (1.0/4.55)
Data	1 x UC900 C7 AWG23
Dimension	15.5 x 8.7mm
Jacket	LSHF-FR, white

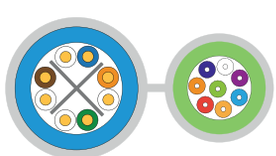
60332-1 | Basic | No | None | Basic | -20/+60 | E_{ca} CPR

DN 13

BUS + DC, EV/motor

Feature	Description
BUS	PVC, shielded, AWG24/7, Ø 4mm
Power	4mm², XLPE insulated, Ø 4mm
Layup	1 bus + 3 power, around filler, PVC bedding
Wrap	PET Tape, overall
Jacket	LSHF-FR, Ø13.8mm

60332-1 | Basic | Good | None | Good | -15/+90



DL12

UTP + OF, building/home

Feature	Description
Fibre	2-12 Tight buffered OF (D39)
Data	C6 U/UTP AWG23/1
Layup	Data + Fibre, in Fig 8 jacket
Tests	Tensile: 1000N, Crush: 3000N
Jacket	LSHF-FR, 15x7.1mm

60332-1 | Basic | Basic | None | Basic | -10/+50 | C_{ca} CPR

draka

A Prysmian Brand