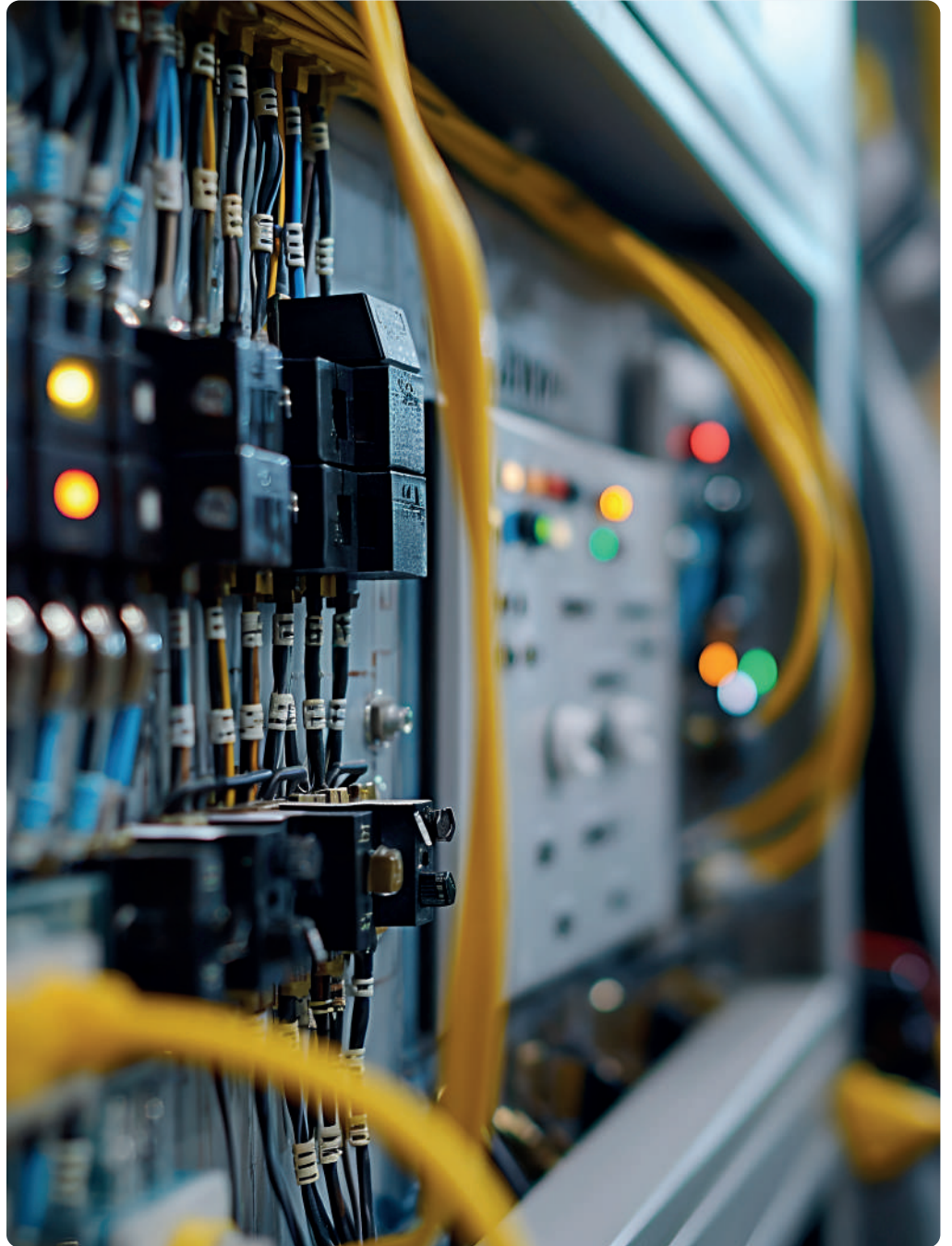


# INDUSTRIAL CABLES AND SPECIALS



# 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, connecting 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

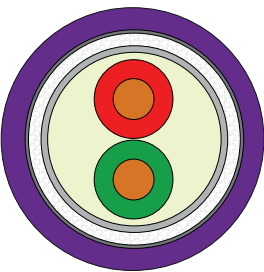
To connect devices using external trays or galleries, direct buried or other applications exposed to weather conditions directly. Here UV, moisture or rodent / thermite protection is necessary. Fire protection is typically not required. Jackets with polyethylene (PE) are best, but PVC and PUR can be 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.

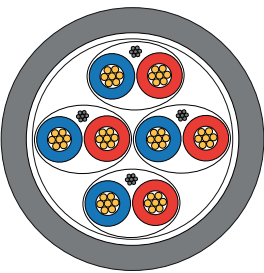


# Main product lines



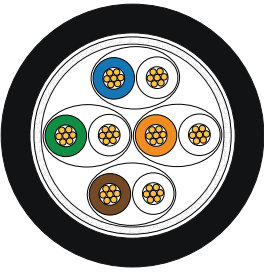
## BUS cables

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 : twisted 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	Basic	Good	Super
			
Not protected and will deteriorate quickly	Can stay for short time, but not recommended	Suitable for most cases, good lifespan	Excellent protection and great lifespan, support severe cases

---

	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 <sub>ca</sub> , D <sub>ca</sub> and C <sub>ca</sub> .
	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).
	We have different jackets for different UV exposition intensity, from 300h to 4000h accelerated aging, we can deliver a reliable product to face the outdoor environment. We recommend for higher exposure, to use black sheath to ensure maximum endurance.
	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.
	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).
	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 requested that 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 DNV-DNV-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.



Index

<b>BUS Cables</b>	
RS485	12
Foundation Fieldbus	16
PB DP and PB PA	18
CANBUS	20
Devicenet & EIB	21
<b>Industrial Ethernet</b>	
Profinet	25
ToughCAT, UL AWM and UL 444 models	27
Draka SINGLE (Single Pair Ethernet)	30
Outdoor Cables (SuperCAT)	31
<b>Control and Instrumentation</b>	
NOMAK	33
JAMAK	34
LONAK	35
LiYCY, LiHCH and others	36
<b>Marine &amp; Shipboard</b>	
Copper Datacables	41
Optical Cables	44
<b>Fire Resistant and Tunnel</b>	
Copper Cables	47
Optical Cables	49
<b>Hybrid and Composite</b>	
Main Constructions	53



# 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 lengths. 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)

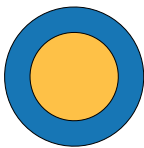
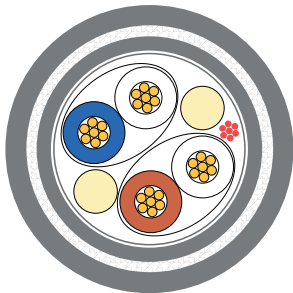
## Jacket

- PVC
- LSHF
- LSHF-FR
- PUR/MUD
- PE
- ATAR

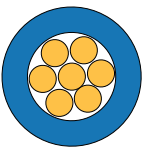
## Conductor Type

- BC (Bare Copper)
- TC (Tinned copper)

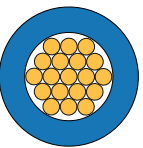
Armouring with **Steel Wire braid (SWB)** is also possible. A second jacket is applied. This provides a more robust cable for harsh environments and small rodent action.



**Solid**  
AWG23/1

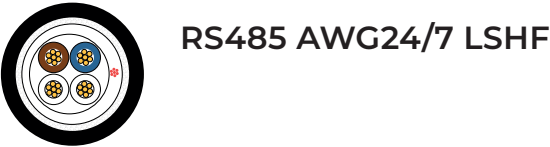


**Flexible**  
AWG23/7



**Extraflex**  
AWG23/19  
AWG23/24

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 possibilities 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).



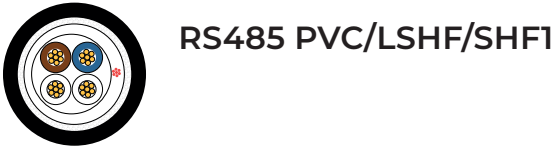
Feature	Description
Conductor	BC 7x0.2mm
Insulation	PE, Ø 1.75mm
Layup	1P: twisted pair, 2P: 4 core as quad (10)
Screen	Overall - Foil+Braid + drain wire (SF/UTP)
Jacket	LSHF, Ø 5.9mm (1P), 6.9mm (2p)
Impedance	120 Ω
Capacitance	Max 60 nF/km



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



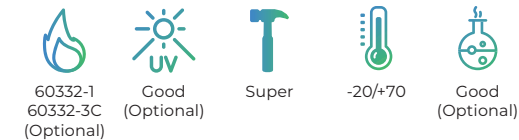
Designed to provide a physical layer (PHY) for digital serial communication, the ANSI/TIA Recommended Standard 485 (or RS-485 for short) cable is able to run up to 1200m (at 93kbps) or up to 10Mbps for 40m. It is composed by twisted pairs, a screen and a jacket. See below some different possibilities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



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



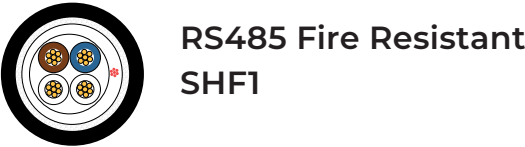
Feature	Description
Conductor	Tinned Copper (AWG24~AWG16)
Insulation	Foam PE
Layup	1P ~ 4P twisted pairs
Screen	Overall - Foil+Braid + drain wire (SF/UTP)
Jacket	Inner Sheath: PVC/LSHF/SHF1 Armor: Steel Wire Braid (SWB) Outer Sheath: PVC/LSHF /SHF1
Overall	1P x AWG 24 (11.0mm)
Diameter	2P x AWG 24 (13.0mm) 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



**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



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 possibilities for your application. Our RS485 cables can be supplied in 1P, 2P, 3P and 4P with conductor size ranging from AWG24 to AWG16.



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



**Standards**  
EIA/TIA RS-485  
IEC 60331-23 (90 min at 750°C)  
SHF1 : IEC 60332-3C ,IEC60754-1 & 2 , IEC 61034-2 , IRM902

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 termites (ATAR), plus a protection against radial water penetration (e.g. jacket damage).



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



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





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 0.8mm². Our FF cables can be supplied in 1P to 16P (acc to cross-section). Some designs based on EN50288-7 are available.



Table with 2 columns: Feature, Description. Rows include 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), and DC resistance (Max 24Ω/km).



Table with 2 columns: Feature, Description. Rows include 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), and DC resistance (Max 24Ω/km).

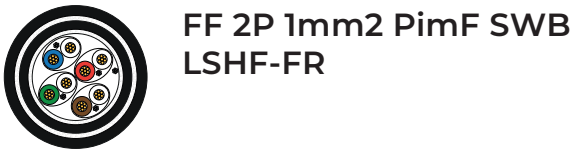


Table with 2 columns: Feature, Description. Rows include Conductor (BC, 7x0.43mm), Insulation (Solid PP, Ø 2.8mm), Layup (Foil shielded pairs w/ drain wire), Screen (Individual: Alum Foil+PET Foil +drain; Overall Foil+ drain wire), Wrap (Mineral flame retardant tape), Jacket (Inner: LSHF, Ø 12.9mm; Armor: 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), and DC resistance (Max 24Ω/km).



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.



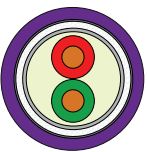
Table with 2 columns: Feature, Description. Rows include Conductor (Bare Copper (AWG18 & AWG16)), Insulation (XLPE), Layup (1P ~ 4P twisted pairs), Screen (Overall Foil Screen +drain wire (1 P); Individual Foil Screen +drain wire(2-4 P)), Jacket (LSHF/SHF1), Outer Diameter (1P x AWG18 ( 9.0mm); 1P x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



Table with 2 columns: Feature, Description. Rows include 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), and DC resistance (≤ 18.1 Ω/km (18 AWG); ≤ 12.1 Ω/km (16 AWG)).



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

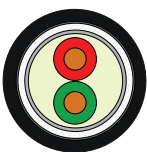


PB DP Basic SWB LSHF

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	Aarmor: 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



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

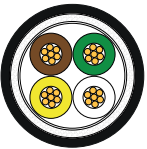


PB PA FC SWB LSHF-FR  
AWG18/7

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

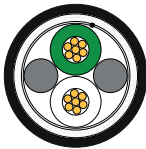


The CAN protocol is described on ISO 11898-2, from 1 Mbps (30m) to 50 kbps (1km), of course depending on the conductor section. Our FF cables can be supplied in 1P to 16P (acc to cross-section). Some designs based on EN50288-7 are available.



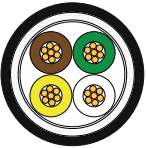
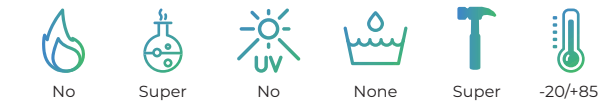
CANBUS 0.22mm²

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



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



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



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

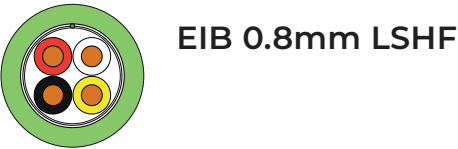




BUS Cable

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.



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

  
60332-1

  
Good

  
N/A

  
None

  
Basic

  
-15/+70



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

  
60332-1

  
N/A

  
N/A

  
None

  
Good

  
-15/+70

# Industrial Ethernet (IE)

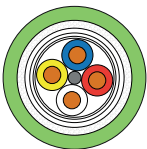
As true heir of legacy protocols, the Ethernet protocol is well established in industry and can provide both bandwidth and standardization to modern systems, allowing IP communication between PLCs, remotes and industrial network devices. Being 2P (Cat 5, for 100BASE-T) or 4P (1Gbps and above), the IE 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.



# 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 (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



60332-1



Good



Good



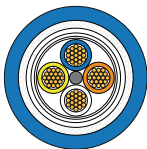
None



Good



-25/+80



## 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



No



Good



No



None



Super



-40/+80



## 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



60332-1



Good



Good



None



Good



-25/+80






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.

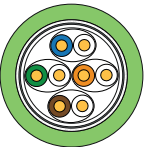


PROFINET PUR (Type R)

Feature	Description	Typ	Installation
Conductor	Stranded Tinned Copper AWG22/19	A	Static, no movement
Insulation	HDPE, Ø 1.5mm	R	Highly Flexible, drag chain & robots
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		








60332-1Good-40/+80

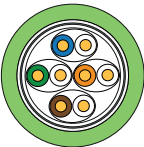
For applications where 4P Category cables are necessary in shop floor, industry networks and rela-ted, we have Cat 5E, Cat 7 and Cat 7A models with different jackets and screening levels.



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

CMG/FT4BasicGoodNoneGood-20/+80



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

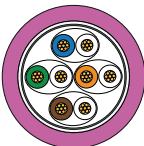
CMG/FT4BasicGoodNoneGood-20/+80



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)

FT2GoodGoodNoneGood-40/+80



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

CMGoodNoneNoneGood-20/+80



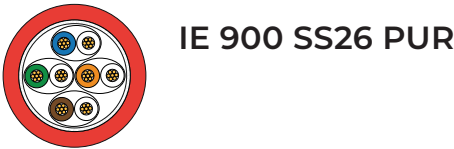
UL AWM (Application Wiring Material) is focused on components which will be used later as part of a certified system or equipment, from a washing machine, a calculator, or even a critical mission device. An insulated wire or complete cable can be also be considered a component and have its design described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



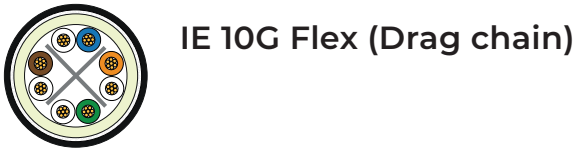
Feature	Description
Conductor	Solid AWG23/1, Ø 0.56mm
Insulation	Foam Skin PE, Ø 1.4mm
Screen	Individual + Overall
Layup	4 pairs + braid + non-woven tape
Outer Jacket	PUR Ø 7.5mm



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



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



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.



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



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



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



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

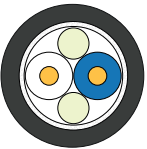


Application as patchcord for indoor areas in in-dustrial environment

Industrial Ethernet

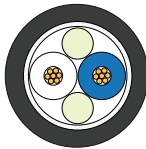
Single Pair Ethernet

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 SINGLE 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<sub>ca</sub> and C<sub>ca</sub>.



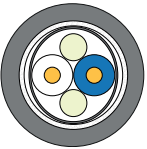
SINGLE 1000

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



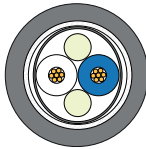
SINGLE 400

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



SINGLE 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



SINGLE 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.

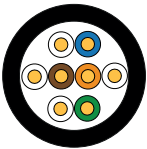


Single Pair Ethernet  
System Alliance

Industrial Ethernet

Outdoor only cables

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



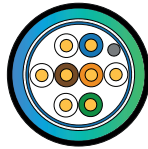
AWM  
20963



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



No



Good



Super



Radial



Good

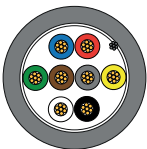


-40/+80

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



Symmetrical cables (twisted pairs) for industrial control for up to 75V, for digital and low level analog signals. The conductors are stranded tinned copper 0.5mm<sup>2</sup>, 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 (0.5mm<sup>2</sup>).



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



60332-1



OK



Basic



None

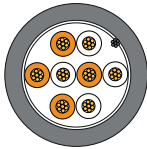


Basic



-40/+70

Nomak-E has pairs identified with different insulation 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



60332-1



OK



Basic



None



Basic



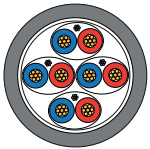
-40/+70

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



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	Pairs	Design	Outer Diameter (mm)
Conductor	Stranded 7x0.29mm	1	1x(2+1)x0.5	5.5
Insulation	PE, Ø 1.6mm	2	2x(2+1)x0.5	7.5
Layup	Group of shielded pairs	4	4x(2+1)x0.5	9.7
Screen	Individual + overall	8	8x(2+1)x0.5	12.9
Jacket	PVC or LSHF-FR	12	12x(2+1)x0.5	14.5
Impedance	70 Ω @ 10MHz	16	16x(2+1)x0.5	16.2
Capacitance	Typical 85 nF/km	24	24x(2+1)x0.5	20.1
DC resistance	42 Ω/km			

60332-1

OK

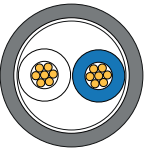
Basic

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

60332-1

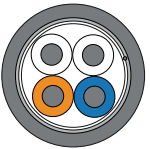
OK

No

None

Basic

-20/+60



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

60332-1

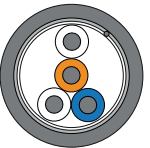
OK

No

None

Basic

-30/+70



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

60332-1

OK

No

None

Basic

-30/+70

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.

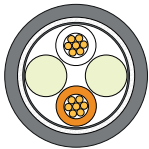
LiHCH 1mm²



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

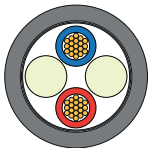


Based on EN 50288-7

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

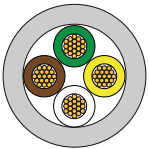


Feature	Description
Conductor	Flexible class 5, 0.25mm²
Insulation	PVC, Ø 1.2mm
Layup	1 pair, 1 triple or 1 quad
Screen	No. PET tape wrapped
Jacket	PVC Ø 4.6mm
Capacitance	70 nF/km



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



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

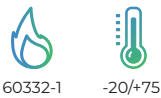
Design	Outer Diameter (mm)	Design	Outer Diameter (mm)
1P x AWG24	4.0	2P x AWG20	6.5
1P x AWG22	4.6	3P x AWG24	5.8
1P x AWG20	5.0	3P x AWG22	6.5
1P x AWG18	5.6	3P x AWG20	7.7
1P x AWG16	6.2	6P x AWG20	10.5
2P x AWG24	5.0	8P x AWG20	11.0
2P x AWG22	5.5	10P x AWG24	9.0



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	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)



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)



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

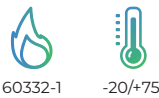
**Standards**  
LSHF : IEC 60332-1 ,IEC 60754-1 & 2, IEC 61034-2  
PVC CMR : NEC Article Type FPLR,CL3R, CMR



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.

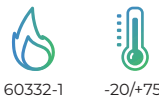
FAES Series LSHF

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)



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))

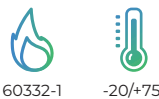


FACU Series PVC CMR/LSHF

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





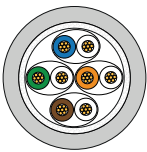
# Marine & Shipboard

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.



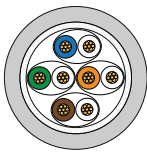
# Marine & Shipboard ToughCAT

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.



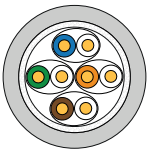
## ToughCAT 5e

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



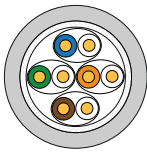
## ToughCAT 7

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



## ToughCAT 7S

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, Ø7.6mm

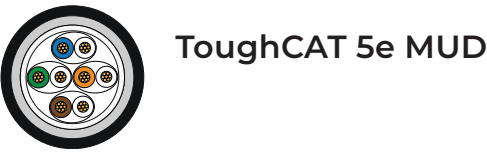


## ToughCAT 7A

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



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



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



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



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



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

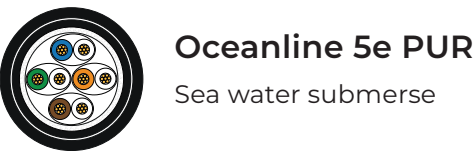
None

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 submerge 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.



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

N/A

Good

Basic

Good

Good

-40/+80



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

60332-3

Good

Good

None

Basic

-20/+60



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

60332-3

Good

None

None

Basic

-20/+60



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

60332-3

Good

Basic

None


Basic

-20/+60

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


60332-3


Good

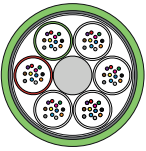
Good

Good

Good


-40/+70








Oceanline OLF03


Feature	Description
Buffer	Stranded Loose Tubes
Strength member	Fiber Glass yarns
Outer Sheath	LSHF-FR, SHF1, Ø11.2mm
Max Tension	5000N
Crush	2500N


60332-3


Good

Good

Good

Good

-20/+60





Oceanline OLF02

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

60332-3

Good

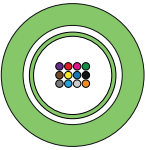
Good

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

Good

Good

Good


-20/+60



Marine & Shipboard


Marine Coaxial cables


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


60332-1


None

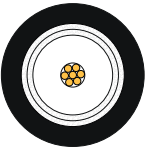
Basic

None

Good


-45/+85








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


60332-1


Basic


Basic

None

Good


-45/+85








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


60332-1


None

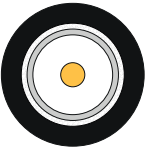
Basic

None

Good


-45/+85








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


60332-3


Basic

Basic

None

Good

-45/+85





# 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:

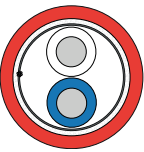
- Low Smoke: BSEN 50268, IEC 61034-2,
- Halogen Free: IEC 60754-1&2
- Flame Retardant: IEC 60332-1, IEC 60332-3-24, BS4066 part 3, UL 1581 VW 1
- Circuit Integrity: BS5839-1 2002 (clause 26.2e); BS8434-2; BSEN 50200, IEC60331
- BS5839 enhanced 3 in 1 test Passed
- Continued data operation @ 950°C > 2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



# Fire Resistant Firetuff Ethernet

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



60332-1



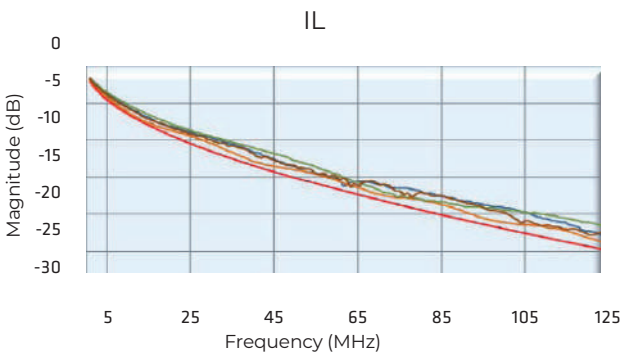
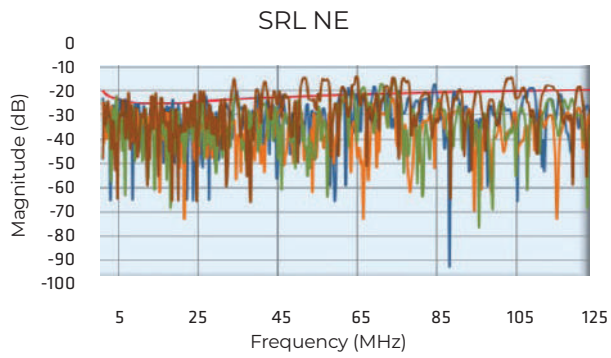
60331



Good



-20/+60



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  $\Omega \pm 15$ , due to fire resistant insulation, it may have variances along the link length.

SRL < -15dB, NVP is 57%



Fire Resistant  
Public Address General Alarm

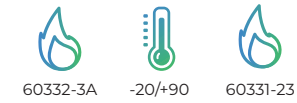
MAX-FOH Flexible PAGA & PAGAS Cable

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.



Feature	Description
Conductor	Conductor Stranded Bare Copper (1.0mm <sup>2</sup> ~ 2.5mm <sup>2</sup> )
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 1.0mm <sup>2</sup> (7.5mm) 2C x 1.5mm <sup>2</sup> (8.0mm) 2C x 2.5mm <sup>2</sup> (9.0mm)



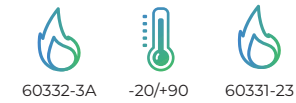
**Standards**

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

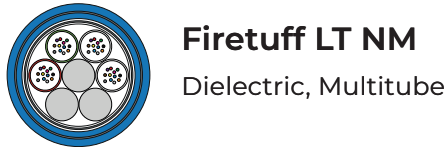
Fire Resistant : BS 6387 CWZ & IEC 60331-23



Feature	Description
Conductor	Conductor Stranded Bare Copper (1.0mm <sup>2</sup> ~ 2.5mm <sup>2</sup> )
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 1.0mm <sup>2</sup> (9.8mm) 1P x 1.5mm <sup>2</sup> (10.0mm) 1P x 2.5mm <sup>2</sup> (11.5mm)



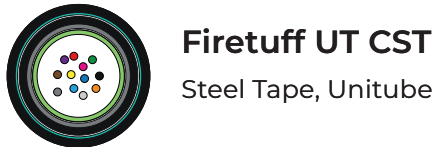
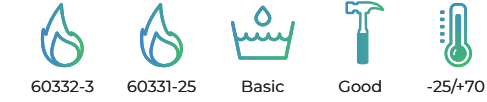
Fire Resistant  
Firetuff Optical



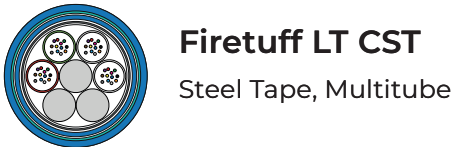
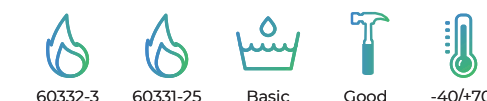
Feature	Description
Buffer	Loose tube, Ø 2.3mm
Layup	Stranded tubes aroujnd FRP
Crush	2000 N/10cm
Pulling	4000 N (short), 1500 N (long)
Jacket	Two LSHF-FR jackets



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



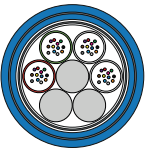
Feature	Description
Buffer	Loose tube, Ø 4.0mm
Layup	Central tube, 2 jackets
Crush	5000 N/10cm
Pulling	3500 N (short)
Jacket	Corrugated Steel tape + LSHF jacket



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



Fire Resistant  
Firetuff Optical



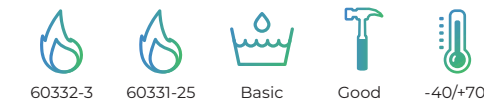
**Firetuff LT NM**  
Dielectric, Multitube

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



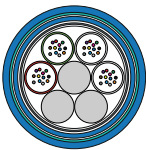
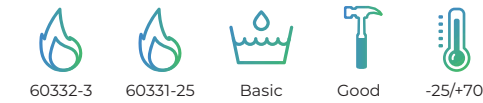
**Firetuff UT CST**  
Steel Tape, Unitube

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



**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



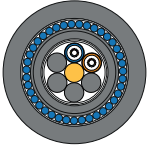
**Firetuff LT CST**  
Steel Tape, Multitube

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



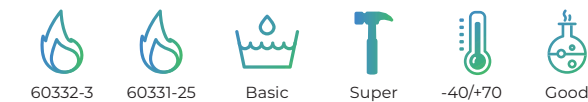
Fire Resistant  
Fire Resistant Fiber Optic Cable

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.



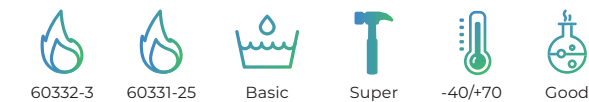
**Firetuff LTFIPNWM Series  
SWA LSHF**  
Steel Wire Armour, Multitube

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)



**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)



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)

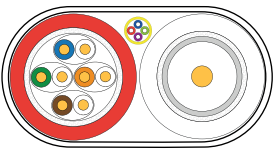


Our composite cables can contain optical elements, DC power elements, coaxial and/or twisted pair components, grouped and protected under one sheath. MMS hybrid cables have focus on DC low voltage (max 60V, 6mm²) indoor application, for DAS (Distributed Antenna System), Wifi Ac-cess Points (WAP), CCTV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



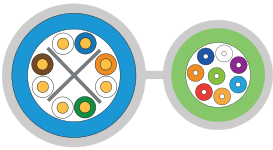
**DLC 141**  
OF + DC power + Coax

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



**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



**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



**draka**

A Prysmian Brand