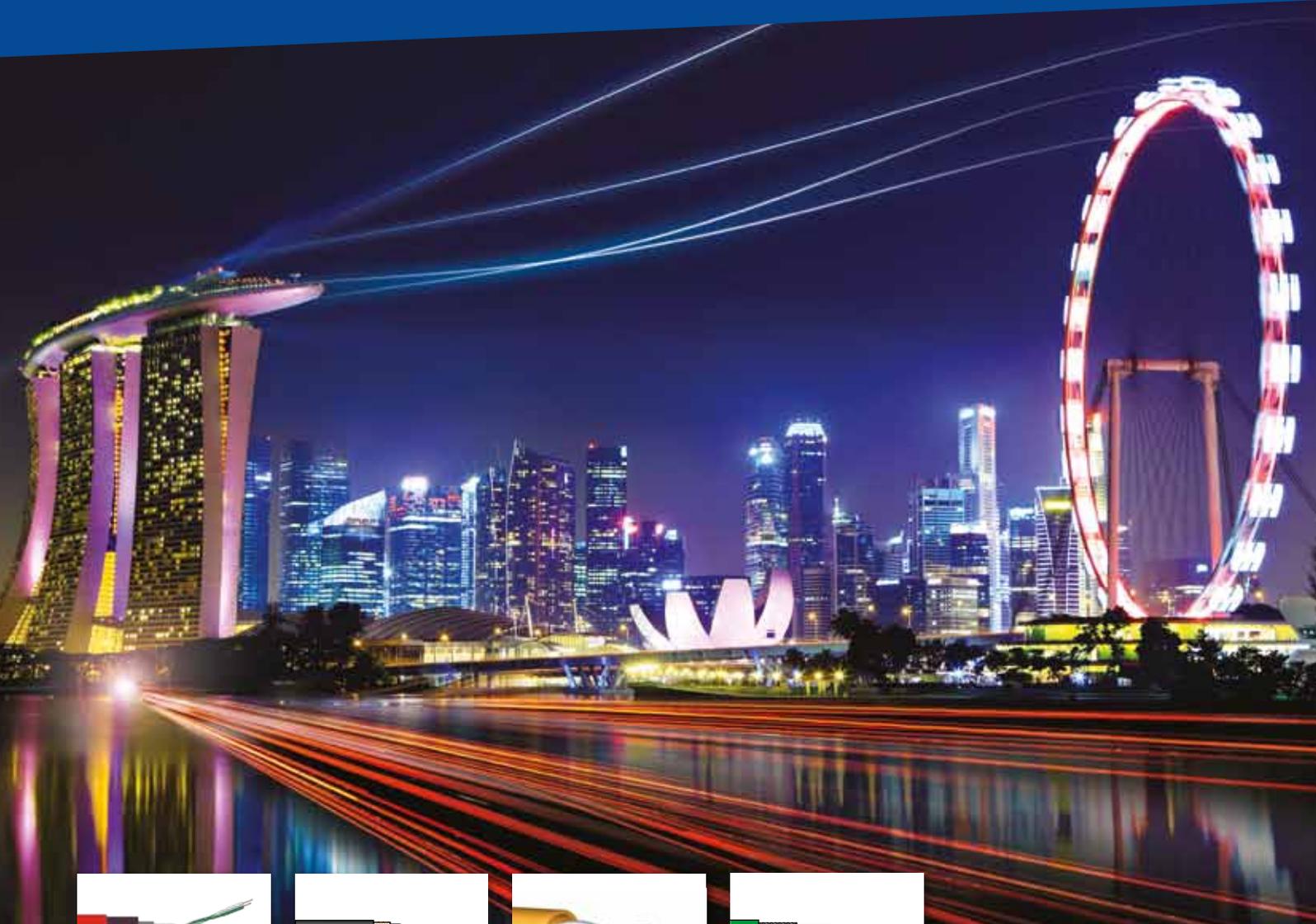
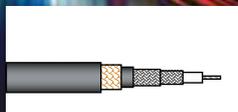


# Multimedia Specials

DATA CABLES FOR INDUSTRIAL, BUILDING & BROADCAST APPLICATIONS



INDUSTRIAL  
COMMUNICATION  
SOLUTIONS



COAXIAL CABLES



BUILDING  
MANAGEMENT SYSTEMS



BROADCASTING &  
STUDIO

# Prysmian Group - Linking the future



As the worldwide leader in the cable industry, Prysmian Group believes in the effective, efficient and sustainable supply of energy and information as a primary driver in the development of communities. With this in mind, we provide major global organisations in many industries with best-in-class cable solutions, based on state-of-the-art technology. Through two renowned commercial brands – Prysmian and Draka – based in almost 100 countries, we're constantly close to our customers, enabling them to further develop the world's energy and telecoms infrastructures, and achieve sustainable, profitable growth.

## What links communications to communities?

Cable solutions to support the development of the world's telecoms infrastructure. As the world's largest producer of telecoms cables, supporting the infrastructures of many of the world's leading telecoms operators, the Prysmian Group delivers optical fibre and copper cabling solutions that help link communications to communities around the globe. Covering voice, video and data transmission, we are world leader in the production of optical fibre, offering unique and fully owned technology. Our portfolio sets the benchmark in global innovation, and is the outcome of continuous multi-million Euro investment in R&D and production in more than 30 facilities worldwide.

# Index

## PRYSMIAN GROUP - LINKING THE FUTURE

<b>1. INDUSTRIAL COMMUNICATION SOLUTIONS</b>	<b>4</b>	<b>3. BUILDING MANAGEMENT SYSTEMS</b>	<b>74</b>
1.1 CanBus 120 Ohm & EIB Bus 100 Ohm	6	3.1 EIA-485	76
1.2 Foundation Fieldbus	9	3.2 Screened Control Cable	78
1.3 Profibus	16	3.3 Max FOH™	81
1.4 Industrial Ethernet	31	3.4 Firetuf™	82
1.5 JAMAK® Industrial Data	43	3.5 Fibre Optic Cables	86
1.6 NOMAK® Industrial Data	47	3.6 Multi-Pair Category Cables	90
1.7 LONAK® Industrial Data	49	<b>4. BROADCASTING &amp; STUDIO</b>	<b>92</b>
1.8 Outside Plant Industrial FO Cables	53	4.1 Video Cables	94
<b>2. COAXIAL CABLES</b>	<b>58</b>	4.2 Audio Cables	98
2.1 CATV Trunk Cables	60	4.3 Camera Cables	101
2.2 CATV Drop Cables	64		
2.3 RG Cables	67		

# 1. Industrial Communication Solutions

## Industrial Communication Solutions

An interesting cabling concept for industrial automation has established itself under the keyword ICS (Industrial Communication Solutions). It concerns the structured cabling of industrial plants similar to the cabling used for office communications.

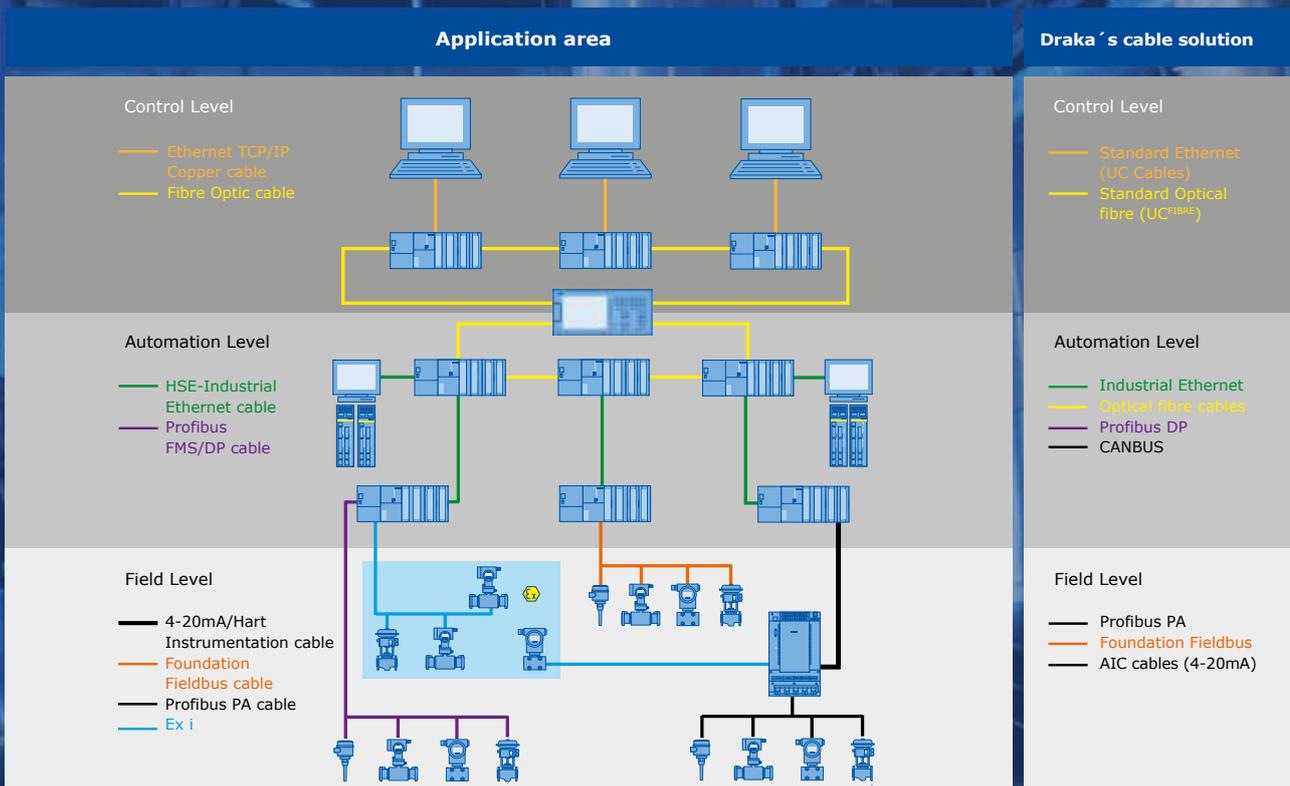
Ethernet in industry is increasingly asserting itself because the communication standard used in countless office applications can be classified today as being simple, cost-effective and highly flexible, as well as having broad support on the system side.

Industrial Ethernet and bussystems are proven standards in the industry. More and more plants are completely equipped with these systems and connected with special cabling, functioning in every environment.

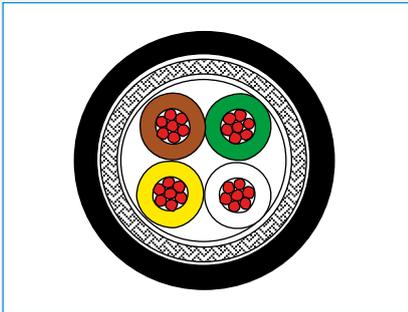
Access to specific areas throughout the network makes adjustments and changes easily manageable.

The Draka brand of Multimedia Specials cables are supplied to almost all of the world's major Industrial projects developments. These cables provide utmost protection and transmission capabilities in very harsh environments.

## Requirements of the cabling



1.1	<b>CanBus 120 Ohm &amp; EIB Bus 100 Ohm</b>	
	Li-2YC11Y 2 x 2 x 0.22m <sup>2</sup> FRNC	6
	Li-09YS(St)C11Y 2 x 0.35m <sup>2</sup> LSZH	7
	EIB Bus 100 Ohm	8
1.2	<b>Foundation Fieldbus</b>	
	FF FC 1x2xAWG16/7 PVC	9
	FF FC 1x2xAWG18/1 PVC	10
	02YSY(St)CY 1x2x1.3/2.55-100 Li PVC	11
	FF FC 1x2xAWG18/7 LSHF-FR	12
	FF FC 1x2xAWG18/1 GST PVC	13
	FF FC 1x2xAWG18/7 SWB PVC	14
	FF FC 1x2xAWG18/7 SWB LSZH	15
1.3	<b>Profibus</b>	
	PB PA FC 1x2xAWG18/1 PVC	16
	PB PA FC 1x2xAWG16/7 PVC	17
	PB PA FC 1x2xAWG16/7 LSHF-FR	18
	PB PA FC 1x2xAWG18/19 PVC	19
	PB PA FC 1x2xAWG18/7 LSHF-FR	20
	PB PA 1x2xAWG18/7 LSHF-FR	21
	PB PA FC 1x2xAWG18/1 GST PVC	22
	PB PA FC 1x2xAWG18/7 SWB PVC	23
	PB DP BASIC 1x2xAWG22/1 LSHF	24
	PB DP FC 1x2xAWG22/1 LSHF-FR	25
	PB DP FC 1x2xAWG22/1 LSHF-FR + PE	26
	PB DP FC 1x2xAWG22/1 PE	27
	PB DP FC 1x2xAWG24/19 PUR	28
	PB DP FC 1x2xAWG24/19 TRAILING PUR	29
	PB DP FC 1x2xAWG22/1 SWB LSHF	30
1.4	<b>Industrial Ethernet</b>	
	UC300 Cat.5e F/UTP SWB LSZH-FR	31
	UC400 Cat.6 F/UTP SWB LSZH-FR	32
	IE ToughCat 5e LSHF-FR	33
	IE ToughCat 5e LSHF-FR MUD	34
	IE ToughCat 7 LSHF-FR	35
	IE ToughCat 7 LSHF-FR MUD	36
	IE ToughCat 7S* Armoured	37
	IE SuperCat 7 HS23 Cat.7 LSHF	38
	IE UC900 SS23 Cat.7 (L)H LSHF-FR	39
	IE UC900 SS23 Cat.7 PE	40
	IE UC900 SS23 Cat.7 PUR	41
	IE UC900 SS27 Cat.7 PUR	42
1.5	<b>JAMAK® Industrial Data</b>	
	JAMAK®	43
	JAMAK®-C LSZH	44
	JAMAK®-HF	45
	JAMAK®-ARM	46
1.6	<b>NOMAK® Industrial Data</b>	
	NOMAK®	47
	NOMAK®-E	48
1.7	<b>LONAK® Industrial Data</b>	
	LONAK® 2 x 1.3 mm <sup>2</sup>	49
	LONAK® 2x2x0.65	50
	LONAK® 2x2x0.8	51
	LONAK® 2 x 1.3 mm <sup>2</sup> ARM	52
1.8	<b>Outside Plant Industrial FO Cables</b>	
	UMNWW_ALPA™	53
	SM-LVLVWV_LEAD	54
	LMNWWG_ALPA™	55
	TF10020_ALP	56
	LTFMSMNWM_NYLON	57



### Application

- The following CanBus cable is suitable for transmission of CanBus signals according to **DIN 19245 and EN 50170**
- The following CanBus cable is suitable for transmission of CanBus signals according to **ISO 11898-2**
- The cable is suited for fixed indoor and outdoor installation and under certain conditions also for mobile use.
- The cable is halogen free, flame retardant and oil resistant. The sheath material is tested in Hydraulic oil
- ARAL VITAM 32, Mobil DTE 13 M, Gear oil ARAL DEGOL BG Plus 320 and Tribol 1710/320.

### Standards

acc. to customer Specification

### Fire Rating

- IEC 60332-1, IEC 60332-3, IEC 60754-1/2

# Li-2YC11Y 2 x 2 x 0.22 mm<sup>2</sup> FRNC

## CanBus-Cable

### Construction

<b>Conductor</b>	stranded bare copper wire, diameter 7 x 0.20 mm (cross section 0.22 mm <sup>2</sup> )	Ø 0.60 mm
<b>Insulation</b>	PE, Wall thickness 0.46 mm	Ø 1.75 ± 0.05 mm
<b>Colour code</b>	Pair 1: 1 x white, 1 x brown	
<b>Core identification</b>	Pair 2: 1 x yellow, 1 x green	
<b>Cable lay up</b>	4 cores twisted to a star quad	Ø 4.2 mm
<b>Wrapping</b>	1 x PET-foil, overlapping	Ø 4.3 mm
<b>Overall screen</b>	Tinned copper braid	Ø 5.0 mm
	Optical coverage ≥ 85%	
<b>Foil</b>	1 x PET-foil under sheath	Ø 5.1 mm
<b>Sheath</b>	PUR Low Smoke Zero Halogen	Ø 6.9 ± 0.2 mm
<b>Sheath colour</b>	Black, RAL 9005	
<b>Outer Diameter</b>	Nom. 6.9 mm	
<b>Weight</b>	Nom. 70 kg/km	
<b>Tensile force N</b>	165	

### Mechanical Properties

<b>Bending radius</b>		
- moving application		≥ 10 x outer diameter of cable
- fixed application		≥ 5 x outer diameter of cable
<b>Operating temperature</b>		- 40°C up to + 85°C
<b>UV resistance</b>		acc. to IEC60068-2-5
<b>Testing of oil resistance of PU sheath material acc. to VDE 0282 Part 10 and EN 60811-2-1 and thermal endurance graph (Arrhenius) and life expectancy of PU sheath material acc. to ISO 2578</b>		
<b>Requirements after aging:</b>		
max. change of tensile strength: -50%		
max. change of elongation at break: -50%		
<b>Mobil DTE 13 M (Hydraulic oil)</b>		150 days at 100°C approx. 24 years at 65°C
<b>Tribol 1710/20 (Gear oil)</b>		≥ 25 years at 20°C 140 days at 100°C approx. 18 years at 65°C ≥ 25 years at 20°C
<b>Ozone resistance</b>		acc. to EN 60811-2-1, clause 8
<b>Smoke density</b>		acc. to EN 50268-2, IEC61034-1 and 2
<b>Corrosivity</b>		EN 50267-1 and 2, IEC 60754-1 and 2

### Electrical Properties at 20°C

<b>Conductor resistance (at 20 ± 5 °C)</b>	≤ 87 Ω/km
<b>Characteristic impedance at 1 MHz</b>	120 Ω ± 15%
<b>Capacitance at 800 Hz (nominal)</b>	41 nF/km
<b>Insulation resistance (at 20 ± 5 °C and 500 V)</b>	≥ 10 GΩxkm
<b>Test voltage (AC, 1 min) Core/core and core/screen</b>	1.2 kV

### Ordering Information

P/N	Product Description	P.U
1003018 CS2878600	CanBus, Li-2YC11Y 2 x 2 x 0.22 mm <sup>2</sup> FRNC	1000m/drum

# Li-09YS(St)C11Y 2 x 0.35 mm<sup>2</sup> LSZH CanBus-Cable

1.1 Canbus 120 Ohm &amp; EIB Bus 100 Ohm

## Construction

<b>Conductor</b>	stranded bare copper wire, diameter 7 x 0.26 mm (cross section 0.35 mm <sup>2</sup> )	Ø 0.78 mm
<b>Insulation</b>	Foam-Skin PP, wall thickness 0.71 mm	Ø 2.2 ± 0.1 mm
<b>Twisting</b>	2 cores + 2 x PP-fillers twisted to the pair	Ø 4.4 mm
<b>Core identification</b>	1x white, 1x green	
<b>Overall screen</b>	1 x PET-Al-foil + tinned stranded drain wires 19 x 0,15 mm + tinned copper braid optical coverage ≥ 65%	Ø 4.6 mm Ø 5.2 mm
<b>Foil</b>	1 x PET-foil under sheath	Ø 5.3 mm
<b>Sheath</b>	PUR Low Smoke Zero Halogen wall thickness 0.75 mm	Ø 6.8 ± 0.2 mm
<b>Sheath colour</b>	Black, RAL 9005	
<b>Outer Diameter</b>	Nom. 6.8 mm	
<b>Weight</b>	Nom. 46.7 kg/km	
<b>Tensile force N</b>	165	

## Mechanical Properties

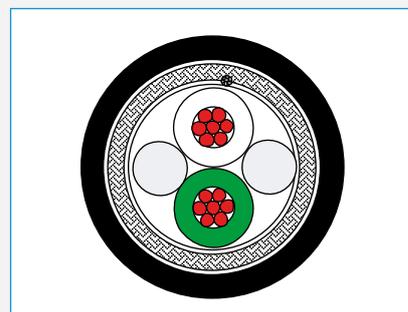
<b>Bending radius during installation</b>		
- without load		≥ 5 x cable diameter
- with load		≥ 10 x cable diameter
<b>Operating temperature</b>		- 30°C up to + 70°C
<b>Storage temperature</b>		-40°C up to 85°C
<b>UV resistance of sheath material</b>		acc. to IEC60068-2-5
<b>Ozone resistance</b>		acc. to EN 60811-2-1, clause 8
<b>Smoke density (light transmittance ≥ 25%)</b>		acc. to EN 50268-2, IEC61034-1 and 2
<b>Corrosivity</b>		acc. EN 50267-1 and 2, IEC 60754-1 and 2
<b>Testing of oil resistance of PU sheath material acc. to VDE 0282 Part 10 and EN 60811-2-1 and thermal endurance graph (Arrhenius) and life expectancy of PU sheath material acc. to ISO 2578</b>		
<b>Requirements after aging:</b>		
max. change of tensile strength: -50%		
max. change of elongation at break: -50%		
Mobil DTE 13 M (Hydraulic oil)		150 days at 100°C approx. 24 years at 65°C ≥ 25 years at 20°C
Tribol 1710/20 (Gear oil)		140 days at 100°C approx. 18 years at 65°C ≥ 25 years at 20°C

## Electrical Properties at 20°C

<b>Conductor resistance (at 20 ± 5 °C)</b>	≤ 54.5 Ω/km
<b>Characteristic impedance at 1 MHz</b>	120 Ω ± 15%
<b>Insulation resistance (at 20 ± 5 °C and 500 V)</b>	≥ 10 GΩxkm
<b>Operating voltage (50 Hz, rms)</b>	60 V
<b>Test voltage (AC, 1 min) Core/core and core/screen</b>	1.2 kV
<b>Transfer impedance (up to 10 MHz, acc. to IEC 62153-4-3)</b>	≤ 10 mΩ/m

## Ordering Information

P/N	Product Description	P.U
1003011 CS2875900	CanBus-Cable, Li-09YS(St)C11Y 2 x 0.35 mm <sup>2</sup> LSZH	1000m/drum



## Application

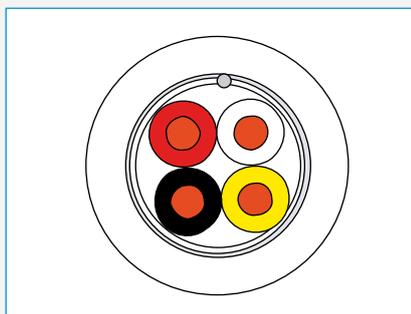
- The following CanBus cable is suitable for transmission of CanBus signals according to **DIN 19245 and EN 50170**
- The following CanBus cable is suitable for transmission of CanBus signals according to **ISO 11898-2**
- The cable is suited for fixed indoor and outdoor installation and under certain conditions also for mobile use.
- The cable is halogen free, flame retardant and oil resistant. The sheath material is tested in Hydraulic oil
- ARAL VITAM 32, Mobil DTE 13 M, Gear oil ARAL DEGOL BG Plus 320 and Tribol 1710/320.

## Standards

acc. to customer Specification

## Fire Rating

- IEC 60332-1, IEC 61034-2, IEC 60754-1/2



### Application

Bus cable for indoor installations in EIB (European Installation Bus) systems. The cable is suitable for installation in ducts, on risers and under data floors. PE insulated plain copper conductors. The cable has an overall Al/PETP-foil screen and a tinned copper drain wire. The overall sheath is made of flame retardant PVC. The pair is colour coded for easy identification.

**1 pair:** black/red **2 pair:** yellow/white

### Fire Rating

- IEC 60332-1

# EIB - BUS, PVC

EIB Bus cables  
Symmetrical data cable for EIB - BUS Systems

### Construction

<b>Conductor</b>	Copper wire, bare 0.5 mm <sup>2</sup> , 0.80 mm Ø
<b>Insulation</b>	PE, 1.6 mm Ø
<b>Conductor identification</b>	Pair 1: red, black, Pair 2: Yellow, white
<b>Pair stranding</b>	2 conductors to the pair
<b>Cable lay up</b>	1 or 2 pairs to the core
<b>Wrapping</b>	1 x PET foil
<b>Overall shielding</b>	Laminated AL-foil + copper drain wire 0.4mm <sup>2</sup>
<b>Rip cord and identification thread</b>	yes
<b>Outer sheath</b>	PVC, alternative LSFROH, white RAL 9010 / green RAL 6018
<b>Outer Diameter</b>	Nom. 5.5 - 7.5 mm
<b>Weight</b>	Nom. 35 - 60 kg/km

### Mechanical Properties

<b>Operating temperature</b>	- 25°C up to + 70°C
<b>Min. Installation temperature</b>	- 5°C
<b>Minimum bending radius</b>	7.5 x D
<b>Smoke density (only for LSFROH types)</b>	acc. to IEC 61034-2
<b>Corrosivity of fire gases (only for LSZH types)</b>	acc. to IEC 60754-1/2

### Electrical Properties at 20°C

<b>Loop DC resistance (max.)</b>	73.2 Ω/km
<b>Insulation resistance (at 500 V, 1 min.)</b>	10 GΩ*km
<b>Mutual capacitance at 800 Hz (max.)</b>	100 nF/km
<b>Inductance</b>	0.65 mH/km
<b>Max. operating voltage DC</b>	800 V
<b>AC Testvoltage, (5 min)</b>	2500 V
<b>AC Testvoltage, (1 min)</b>	4000 V

### Ordering Information

P/N	Product Description	P.U
1003582	EIB BUS Cable PVC, 1x2x0.8	1000m/drum
1003583	EIB BUS Cable PVC, 2x2x0.8	1000m/drum
1003584	EIB BUS Cable LSFROH, 1x2x0.8	1000m/drum
1003585	EIB BUS Cable LSFROH, 2x2x0.8	1000m/drum
1021615	EIB BUS Cable LSFROH GN, 2x2x0.8	1000m/drum

# FF FC 1x2xAWG16/7 PVC

FOUNDATION Fieldbus FC AWG16 FLEX PVC Cable

1.2 Foundation Fieldbus

## Construction

<b>Conductor</b>	stranded bare copper wires, 7x0.51 Ø 1.53 mm, (cross-section AWG16/7)
<b>Insulation</b>	PE, Ø 3.25 mm
<b>Stranding</b>	two cores gn / rd to the Pair
<b>Bedding</b>	PVC, filling the interstices
<b>Static screen</b>	PET-Al-Foil longitudinally applied
<b>Braid</b>	tinned copper braid, coverage approx. 70%
<b>Sheath</b>	PVC, Ø 9.5 mm
<b>Colour</b>	yellow
<b>Outer Diameter</b>	Nom. 9.5 mm
<b>Weight</b>	Nom. 129 kg/km
<b>Tensile force N</b>	270

## Mechanical Properties

<b>Bending radius</b>	
<b>Single bending</b>	≥ 50 mm
<b>Repeated bending</b>	≥ 100 mm
<b>Temperature range</b>	- 40°C to + 70°C
<b>Transport and storage</b>	- 40°C to + 70°C
<b>Installation</b>	- 5°C to + 50°C

## Electrical Properties at 20°C

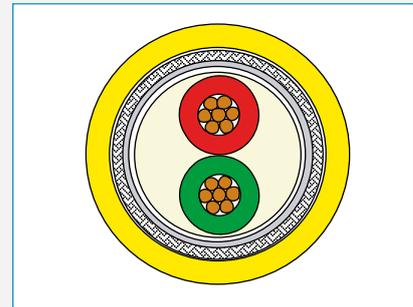
<b>Loop resistance</b>	≤ 28.6 Ω/km
<b>Screen resistance nominal</b>	12 Ω/km
<b>Characteristic impedance (at 31.25 kHz)</b>	100 Ω ± 20 Ω
<b>Mutual capacitance (at 1 kHz)</b>	approx. 60 nF/km
<b>Capacitance unbalance to earth max.</b>	2 nF/km
<b>Insulation resistance</b>	≥ 5 GΩ/km
<b>Test Voltage (DC, 1 min) Core/Core and Core/Screen</b>	1 kV
<b>Operating voltage (RMS)</b>	≤ 100 V
<b>Inductance (nominal)</b>	0.70 mH/km

## Electrical Data at 20°C

Frequency (kHz)	Impedance (Ohm)	Attenuation (dB/100m)	Propagation delay change (µs/km)
7.9-39	-	-	≤ 1.7
31.25	100 ± 20	-	-
39	-	≤ 0.3	-

## Ordering Information

P/N	Product Description	P.U
1025039	FOUNDATION Fieldbus FC AWG16 FLEX PVC Cable, FF FC 1x2xAWG16/7 PVC	1000m/drum



### Application

Spur and trunk cable for flexible installation indoor and outdoor on racks in conduits, FastConnect-Assembly

- UV-resistant
- Silicon free
- Oil and grease resistant

### Standards

- IEC 61158 and IEC 61784
- Cable type A acc. to FOUNDATION Fieldbus

### Fire Rating

- IEC 60332-1



### Application

Spur and trunk cable for fixed installation indoor and outdoor on racks in conduits, FastConnect-Assembly

- UV-resistant
- Silicon free
- Oil and grease resistant

### Standards

- IEC 61158 and IEC 61784
- Cable type A acc. to FOUNDATION Fieldbus

### Fire Rating

- IEC 60332-1

# FF FC 1x2xAWG18/1 PVC

FOUNDATION Fieldbus FC INST PVC Cable

### Construction

<b>Conductor</b>	bare copper wire, Ø 1.05 mm, (cross-section AWG18)
<b>Insulation</b>	foam-skin-PE, Ø 2.55 mm
<b>Stranding</b>	two cores gn / rd to the Pair
<b>Bedding</b>	PVC, filling the interstices
<b>Static screen</b>	PET-Al-Foil longitudinally applied
<b>Braid</b>	tinned copper braid, coverage approx. 70%
<b>Sheath</b>	PVC, Ø 8.0 mm
<b>Sheath Colour</b>	yellow
<b>Outer Diameter</b>	Nom. 8.0 mm
<b>Weight</b>	Nom. 78 kg/km
<b>Tensile force N</b>	175

### Mechanical Properties

<b>Bending radius</b>	
<b>Single bending</b>	≥ 40 mm
<b>Repeated bending</b>	≥ 80 mm
<b>Temperature range</b>	- 40°C to + 70°C
<b>Transport and storage</b>	- 40°C to + 70°C
<b>Installation</b>	- 5°C to + 50°C

### Electrical Properties at 20°C

<b>Loop resistance</b>	≤ 46 Ω/km
<b>Screen resistance nominal</b>	12 Ω/km
<b>Characteristic impedance (at 31.25 kHz)</b>	100 Ω ± 20 Ω
<b>Mutual capacitance (at 1 kHz)</b>	approx. 60 nF/km
<b>Capacitance unbalance to earth max.</b>	2 nF/km
<b>Insulation resistance</b>	≥ 5 GΩkm
<b>Test Voltage (DC, 1 min) Core/Core and Core/Screen</b>	1 kV
<b>Operating voltage (RMS)</b>	≤ 100 V
<b>Inductance (nominal)</b>	0.70 mH/km

### Electrical Data at 20°C

Frequency (kHz)	Impedance (Ohm)	Attenuation (dB/100m)	Propagation delay change (µs/km)
<b>7.9-39</b>	-	-	≤ 1.7
<b>31.25</b>	100 ± 20	-	-
<b>39</b>	-	≤ 0.3	-

### Ordering Information

P/N	Product Description	P.U
1025042	FOUNDATION Fieldbus FC INST PVC Cable, FF FC 1x2xAWG18/1 PVC	1000m/drum

# O2YSY(St)CY 1x2x1.3/2.55-100 Li PVC

## FOUNDATION Fieldbus FC FLEX PVC Cable

1.2 Foundation Fieldbus

### Construction

<b>Conductor</b>	Stranded bare copper wires, 19x0.26 Ø 1.3 mm (Cross-section AWC18/19)
<b>Insulation</b>	Foam-skin-PE, Ø 2.55 mm
<b>Stranding</b>	Two cores gn / rd to the Pair
<b>Bedding</b>	PVC, filling the interstices
<b>Static screen</b>	PET-Al-Foil longitudinally applied
<b>Braid</b>	Tinned copper Braid Coverage approx. 70%
<b>Sheath</b>	PVC, yellow, Ø 8.0 mm
<b>Outer Diameter</b>	Nom. 8.0mm
<b>Weight</b>	Nom. 89 kg/km
<b>Tensile force N</b>	190

### Mechanical Properties

<b>Bending radius</b>	
<b>Single bending</b>	≥ 40 mm
<b>Repeated bending</b>	≥ 80 mm
<b>Temperature range</b>	- 40°C to + 70°C
<b>Transport and storage</b>	- 40°C to + 70°C
<b>Installation</b>	- 5°C to + 50°C

### Electrical Properties at 20°C

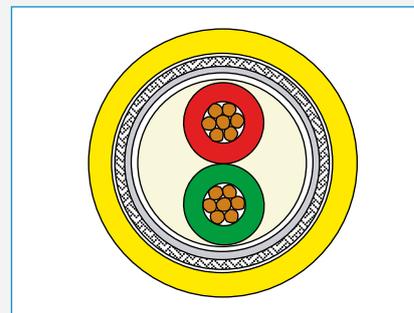
<b>Loop resistance</b>	≤ 43.6 Ω/km
<b>Screen resistance nominal</b>	12 Ω/km
<b>Characteristic impedance (at 31.25 kHz)</b>	100 Ω ± 20 Ω
<b>Mutual capacitance (at 1 kHz)</b>	approx. 60 nF/km
<b>Capacitance unbalance to earth max.</b>	2 nF/km
<b>Insulation resistance</b>	≥ 5 GΩkm
<b>Test Voltage (DC, 1 min) Core/Core and Core/Screen</b>	1 kV
<b>Operating voltage (RMS)</b>	≤ 100 V
<b>Inductance (nominal)</b>	0.70 mH/km

### Electrical Data at 20°C

Frequency (kHz)	Impedance (Ohm)	Attenuation (dB/100m)	Propagation delay change (µs/km)
7.9-39	-	-	≤ 1.7
31.25	100 ± 20	-	-
39	-	≤ 0.3	-

### Ordering Information

P/N	Product Description	P.U
1025041	FOUNDATION Fieldbus FC FLEX PVC Cable, O2YSY(St)CY 1x2x1.3/2.55-100 Li PVC	1000m/drum



### Application

Spur and trunk cable for flexible installation indoor and outdoor on racks in conduits, FastConnect-Assembly

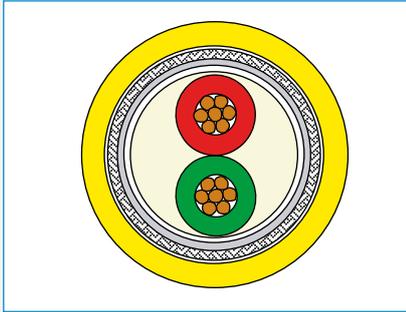
- UV-resistant
- Silicon free
- Oil and Grease resistant

### Standards

- IEC 61158 and IEC 61784
- Cable type A acc. to FOUNDATION Fieldbus

### Fire Rating

- IEC 60332-1



### Application

Spur and trunk cable for flexible installation indoor and outdoor on racks in conduits, FastConnect-Assembly

- UV-resistant
- Silicon free
- Oil and grease resistant

### Standards

- IEC 61158 and IEC 61784
- Cable type A acc. to FOUNDATION Fieldbus

### Fire Rating

IEC 60332-1, IEC 60332-3-24, IEC 61034-2, IEC 60754-1/2

# FF FC 1x2xAWG18/7 LSHF-FR

FOUNDATION Fieldbus FC FLEX LSZH-FR Cable

## Construction

<b>Conductor</b>	stranded bare copper wires, 7x0.40 Ø 1.2 mm, (cross-section AWG18/7)
<b>Insulation</b>	foam-skin-PE, Ø 2.55 mm
<b>Stranding</b>	two cores gn / rd to the Pair
<b>Bedding</b>	halogen free, flame retardant thermoplastic sheathing compound acc. to EN 50290-2-27, filling the interstices
<b>Static screen</b>	PET-Al-Foil longitudinally applied
<b>Braid</b>	tinned copper braid, coverage approx. 70%
<b>Sheath</b>	halogen free, flame retardant thermoplastic sheathing compound acc. to EN 50290-2-27, Ø 8.0 mm
<b>Colour</b>	yellow
<b>Outer Diameter</b>	Nom. 8.0 mm
<b>Weight</b>	Nom. 83 kg/km
<b>Tensile force N</b>	180

## Mechanical Properties

<b>Bending radius</b>	
<b>Single bending</b>	≥ 40 mm
<b>Repeated bending</b>	≥ 80 mm
<b>Temperature range</b>	- 40°C to + 70°C
<b>Transport and storage</b>	- 40°C to + 70°C
<b>Installation</b>	- 5°C to + 50°C

## Electrical Properties at 20°C

<b>Loop resistance</b>	≤ 43.6 Ω/km
<b>Screen resistance nominal</b>	12 Ω/km
<b>Characteristic impedance (at 31.25 kHz)</b>	100 Ω ± 20 Ω
<b>Mutual capacitance (at 1 kHz)</b>	approx. 60 nF/km
<b>Capacitance unbalance to earth max.</b>	2 nF/km
<b>Insulation resistance</b>	≥ 5 GΩkm
<b>Test Voltage (DC, 1 min) Core/Core and Core/Screen</b>	1 kV
<b>Operating voltage (RMS)</b>	≤ 100 V
<b>Inductance (nominal)</b>	0.70 mH/km

## Electrical Data at 20°C

Frequency (kHz)	Impedance (Ohm)	Attenuation (dB/100m)	Propagation delay change (µs/km)
<b>7.9-39</b>	-	-	≤ 1.7
<b>31.25</b>	100 ± 20	-	-
<b>39</b>	-	≤ 0.3	-

## Ordering Information

P/N	Product Description	P.U
1025038	FOUNDATION Fieldbus FC FLEX LSHF-FR Cable, FF FC 1x2xAWG18/7 LSZH-FR	1000m/drum

# FF FC 1x2xAWG18/1 GST PVC

FOUNDATION Fieldbus FC Galvanized Steel Tape Armoured PVC Installation Cable

1.2 Foundation Fieldbus

## Construction

<b>Conductor</b>	bare copper wire, $\emptyset$ 1.05 mm, (cross-section AWG18)
<b>Insulation</b>	foam-skin-PE, $\emptyset$ 2.55 mm
<b>Stranding</b>	two cores gn / rd to the Pair
<b>Bedding</b>	PVC, filling the interstices
<b>Static screen</b>	PET-Al-Foil longitudinally applied
<b>Braid</b>	tinned copper braid, coverage approx. 70%
<b>Sheath</b>	PVC, $\emptyset$ 8.0 mm
<b>Colour</b>	yellow
<b>Wrapping</b>	PP foil overlapping, $\emptyset$ 8.2 mm
<b>Armouring</b>	2 galvanized steel tapes, thickness of tapes 0.10 mm, $\emptyset$ 9.0 mm
<b>Outer sheath</b>	PVC, $\emptyset$ 12.0 mm
<b>Sheath colour</b>	yellow
<b>Outer Diameter</b>	Nom. 12.0 mm
<b>Weight</b>	Nom. 193 kg/km
<b>Tensile force N</b>	175

## Mechanical Properties

<b>Bending radius</b>	
<b>Single bending</b>	$\geq 120$ mm
<b>Repeated bending</b>	$\geq 180$ mm
<b>Temperature range</b>	- 40°C to + 70°C
<b>Transport and storage</b>	- 40°C to + 70°C
<b>Installation</b>	- 5°C to + 50°C

## Electrical Properties at 20°C

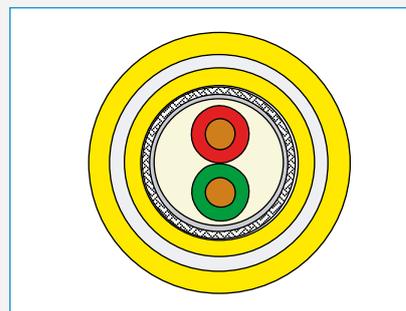
<b>Loop resistance</b>	$\leq 46$ $\Omega$ /km
<b>Screen resistance nominal</b>	12 $\Omega$ /km
<b>Characteristic impedance (at 31.25 kHz)</b>	100 $\Omega \pm 20$ $\Omega$
<b>Mutual capacitance (at 1 kHz)</b>	approx. 60 nF/km
<b>Capacitance unbalance to earth max.</b>	2 nF/km
<b>Insulation resistance</b>	$\geq 5$ G $\Omega$ km
<b>Test Voltage (DC, 1 min) Core/Core and Core/Screen</b>	1 kV
<b>Operating voltage (RMS)</b>	$\leq 100$ V
<b>Inductance (nominal)</b>	0.70 mH/km

## Electrical Data at 20°C

Frequency (kHz)	Impedance (Ohm)	Attenuation (dB/100m)	Propagation delay change ( $\mu$ s/km)
7.9-39	-	-	$\leq 1.7$
31.25	100 $\pm 20$	-	-
39	-	$\leq 0.3$	-

## Ordering Information

P/N	Product Description	P.U
1025043	FOUNDATION Fieldbus FC Galvanized Steel Tape Armoured PVC Installation Cable, FF FC 1x2xAWG18/1 GST PVC	1000m/drum



### Application

Spur and trunk cable for fixed installation indoor and outdoor on racks in conduits, FastConnect-Assembly

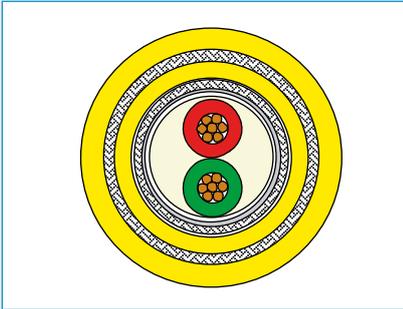
- UV-resistant
- Silicon free
- Oil and grease resistant

### Standards

- IEC 61158 and IEC 61784
- Cable type A acc. to FOUNDATION Fieldbus

### Fire Rating

- IEC 60332-1



### Application

Spur and trunk cable for flexible installation indoor and outdoor on racks in conduits, FastConnect-Assembly

- UV-resistant
- Silicon free
- Oil and grease resistant

### Standards

- IEC 61158 and IEC 61784
- Cable type A acc. to FOUNDATION Fieldbus

### Fire Rating

- IEC 60332-1

# FF FC 1x2xAWG18/7 SWB PVC

FOUNDATION Fieldbus FC FLEX Steel Wire Braid Armoured PVC Cable

## Construction

<b>Conductor</b>	stranded bare copper wires, 7x0.40 Ø 1.2 mm, (cross-section AWG18/7)
<b>Insulation</b>	foam-skin-PE, Ø 2.55 mm
<b>Stranding</b>	two cores gn / rd to the Pair
<b>Bedding</b>	PVC, filling the interstices
<b>Static screen</b>	PET-Al-Foil longitudinally applied
<b>Braid</b>	tinned copper braid, coverage approx. 70%
<b>Sheath</b>	PVC, Ø 8.0 mm
<b>Colour</b>	yellow
<b>Armouring</b>	galvanized steel wire braid, optical coverage 85%, Ø 9.3 mm
<b>Outer sheath</b>	PVC, Ø 12.0 mm
<b>Colour</b>	yellow
<b>Outer Diameter</b>	Nom. 12.0 mm
<b>Weight</b>	Nom. 211 kg/km
<b>Tensile force N</b>	500

## Mechanical Properties

<b>Bending radius</b>	
<b>Single bending</b>	≥ 60 mm
<b>Repeated bending</b>	≥ 120 mm
<b>Temperature range</b>	- 40°C to + 70°C
<b>Transport and storage</b>	- 40°C to + 70°C
<b>Installation</b>	- 5°C to + 50°C

## Electrical Properties at 20°C

<b>Loop resistance</b>	≤ 43.6 Ω/km
<b>Screen resistance nominal</b>	12 Ω/km
<b>Characteristic impedance (at 31.25 kHz)</b>	100 Ω ± 20 Ω
<b>Mutual capacitance (at 1 kHz)</b>	approx. 60 nF/km
<b>Capacitance unbalance to earth max.</b>	2 nF/km
<b>Insulation resistance</b>	≥ 5 GΩkm
<b>Test Voltage (DC, 1 min) Core/Core and Core/Screen</b>	1 kV
<b>Operating voltage (RMS)</b>	≤ 100 V
<b>Inductance (nominal)</b>	0.70 mH/km

## Electrical Data at 20°C

Frequency (kHz)	Impedance (Ohm)	Attenuation (dB/100m)	Propagation delay change (µs/km)
7.9-39	-	-	≤ 1.7
31.25	100 ± 20	-	-
39	-	≤ 0.3	-

## Ordering Information

P/N	Product Description	P.U
1025040	FOUNDATION Fieldbus FC FLEX Steel Wire Braid Armoured PVC Cable, FF FC 1x2xAWG18/7 SWB PVC	1000m/drum

# FF FC 1x2xAWG18/7 SWB LSZH

FOUNDATION Fieldbus FC FLEX Steel Wire Braid Armoured LSZH Cable

## Construction

<b>Conductor</b>	stranded bare copper wires, 7x0.40 Ø 1.2 mm, (cross-section AWG18/7)
<b>Insulation</b>	foam-skin-PE, Ø 2.55 mm
<b>Stranding</b>	two cores blue / orange to the pair
<b>Bedding</b>	LSHF, filling the interstices
<b>Static screen</b>	PET-Al-Foil longitudinally applied
<b>Braid</b>	tinned copper braid, coverage approx. 70%
<b>Sheath</b>	LSZH, Ø 8.0 mm
<b>Colour</b>	grey
<b>Armouring</b>	galvanized steel wire braid, optical coverage 85%, Ø 9.3 mm
<b>Outer sheath</b>	LSZH, Ø 12.0 mm
<b>Colour</b>	grey
<b>Outer Diameter</b>	Nom. 12.0 mm
<b>Weight</b>	Nom. 202 kg/km
<b>Tensile force N</b>	500

## Mechanical Properties

<b>Bending radius</b>	
<b>Single bending</b>	≥ 60 mm
<b>Repeated bending</b>	≥ 120 mm
<b>Temperature range</b>	- 30°C to + 70°C
<b>Transport and storage</b>	- 30°C to + 70°C
<b>Installation</b>	- 5°C to + 50°C

## Electrical Properties at 20°C

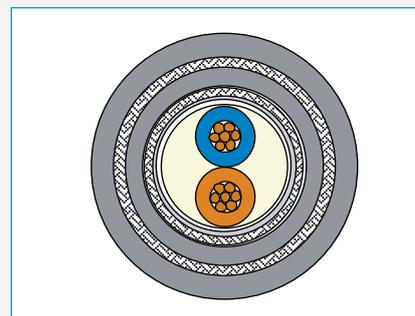
<b>Loop resistance</b>	≤ 43.6 Ω/km
<b>Screen resistance nominal</b>	12 Ω/km
<b>Characteristic impedance (at 31.25 kHz)</b>	100 Ω ± 20 Ω
<b>Mutual capacitance (at 1 kHz)</b>	approx. 60 nF/km
<b>Capacitance unbalance to earth max.</b>	2 nF/km
<b>Insulation resistance</b>	≥ 5 GΩkm
<b>Test Voltage (DC, 1 min) Core/Core and Core/Screen</b>	1 kV
<b>Operating voltage (RMS)</b>	≤ 100 V
<b>Inductance (nominal)</b>	0.70 mH/km

## Electrical Data at 20°C

Frequency (kHz)	Impedance (Ohm)	Attenuation (dB/100m)	Propagation delay change (µs/km)
7.9-39	-	-	≤ 1.7
31.25	100 ± 20	-	-
39	-	≤ 0.3	-

## Ordering Information

P/N	Product Description	P.U
1030290	FOUNDATION Fieldbus FC FLEX Steel Wire Braid Armoured LSZH Cable, FF FC 1x2xAWG18/7 SWB LSZH	1000m/drum



## Application

Spur and trunk cable for flexible installation indoor and outdoor on racks in conduits,

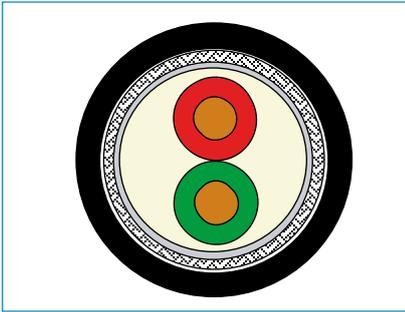
- FastConnect-Assembly
- Halogen free and flame resistant
- UV-resistant
- Silicon free
- Limited oil and grease resistance

## Standards

- IEC 61158 and IEC 61784
- Cable type A acc. to FOUNDATION Fieldbus

## Fire Rating

- IEC 60332-1, IEC 61034-2, IEC 60754-1/2



### Application

Spur and trunk cable for fixed installation indoor and outdoor on racks in dry conduits, FastConnect-Assembly

- UV-resistant
- Silicon free
- Oil and grease resistant

### Standards

- IEC 61158 and IEC 61784
- Cable type A acc. to Profibus PA

### Fire Rating

- IEC 60332-1

# PB PA FC 1x2xAWG18/1 PVC

## PROFIBUS PA FC INST PVC Cable

### Construction

<b>Conductor</b>	bare copper wire, $\emptyset$ 1.05 mm, (cross-section AWG18)
<b>Insulation</b>	foam-skin-PE, $\emptyset$ 2.55 mm
<b>Stranding</b>	two cores gn / rd to the Pair
<b>Bedding</b>	PVC, filling the interstices
<b>Static screen</b>	PET-Al-Foil longitudinally applied
<b>Braid</b>	tinned copper Braid Coverage approx. 70%
<b>Sheath</b>	PVC, $\emptyset$ 8.0 mm
<b>Colour</b>	black
<b>Outer Diameter</b>	Nom. 8.0 mm
<b>Weight</b>	Nom. 87 kg/km
<b>Tensile force N</b>	175

### Mechanical Properties

<b>Bending radius</b>	
<b>single bending</b>	$\geq 40$ mm
<b>repeated bending</b>	$\geq 80$ mm
<b>Temperature range</b>	- 40°C to + 70°C
<b>Transport and storage</b>	- 40°C to + 70°C
<b>Installation</b>	- 5°C to + 50°C

### Electrical Properties at 20°C

<b>Loop resistance</b>	$\leq 46$ $\Omega$ /km
<b>Screen resistance nominal</b>	12 $\Omega$ /km
<b>Characteristic impedance (at 31.25 kHz)</b>	100 $\Omega \pm 20$ $\Omega$
<b>Mutual capacitance (at 1 kHz)</b>	approx. 60 nF/km
<b>Capacitance unbalance to earth max.</b>	2 nF/km
<b>Insulation resistance</b>	$\geq 5$ G $\Omega$ /km
<b>Test Voltage (DC, 1 min) Core/Core and Core/Screen</b>	1 kV
<b>Operating voltage (RMS)</b>	$\leq 100$ V
<b>Inductance (nominal)</b>	0.70 mH/km

### Electrical Data at 20°C

Frequency (kHz)	Impedance (Ohm)	Attenuation (dB/100m)	Propagation delay change ( $\mu$ s/km)
7.9-39	-	-	$\leq 1.7$
31.25	100 $\pm$ 20	-	-
39	-	$\leq 0.3$	-

### Ordering Information

P/N	Product Description	P.U
1025051	PROFIBUS PA FC INST PVC Cable, PB PA FC 1x2xAWG18/1 PVC	1000m/drum

## PB PA FC 1x2xAWG16/7 PVC

PROFIBUS PA FC AWG16 FLEX PVC Cable

1.3 Profibus

## Construction

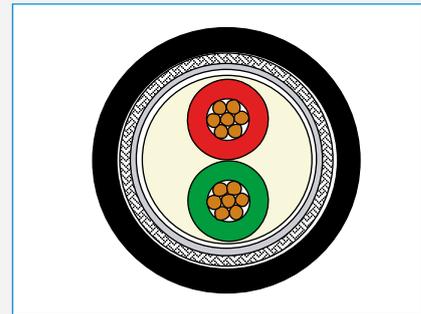
<b>Conductor</b>	stranded bare copper wires, 7x0.51 Ø 1.53 mm, (cross-section AWG16/7)
<b>Insulation</b>	PE, Ø 3.25 mm
<b>Stranding</b>	two cores gn / rd to the Pair
<b>Bedding</b>	PVC, filling the interstices
<b>Static screen</b>	PET-Al-Foil longitudinally applied
<b>Braid</b>	tinned copper braid, coverage approx. 70%
<b>Sheath</b>	PVC, Ø 9.5 mm
<b>Colour</b>	black or blue
<b>Outer Diameter</b>	Nom. 9.5 mm
<b>Weight</b>	Nom. 129 kg/km
<b>Tensile force N</b>	270

## Mechanical Properties

<b>Bending radius</b>	
<b>Single bending</b>	≥ 50 mm
<b>Repeated bending</b>	≥ 100 mm
<b>Temperature range</b>	- 40°C to + 70°C
<b>Transport and storage</b>	- 40°C to + 70°C
<b>Installation</b>	- 5°C to + 50°C

## Electrical Properties at 20°C

<b>Loop resistance</b>	≤ 28.6 Ω/km
<b>Screen resistance nominal</b>	12 Ω/km
<b>Characteristic impedance (at 31.25 kHz)</b>	100 Ω ± 20 Ω
<b>Mutual capacitance (at 1 kHz)</b>	approx. 60 nF/km
<b>Capacitance unbalance to earth max.</b>	2 nF/km
<b>Insulation resistance</b>	≥ 5 GΩkm
<b>Test Voltage (DC, 1 min) Core/Core and Core/Screen</b>	1 kV
<b>Operating voltage (RMS)</b>	≤ 100 V
<b>Inductance (nominal)</b>	0.70 mH/km



## Application

Spur and trunk cable for flexible installation indoor and outdoor on racks in conduits, FastConnect-Assembly

- UV-resistant
- Silicon free
- Oil and grease resistant

## Standards

- IEC 61158 and IEC 61784
- Cable type A acc. to Profibus PA

## Fire Rating

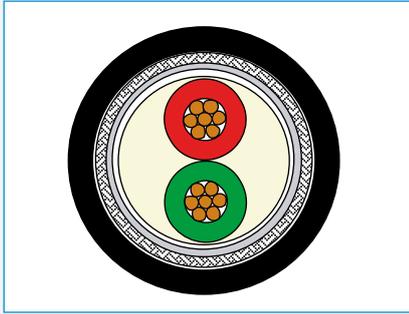
- IEC 60332-1

## Electrical Data at 20°C

Frequency (kHz)	Impedance (Ohm)	Attenuation (dB/100m)	Propagation delay change (µs/km)
7.9-39	-	-	≤ 1.7
31.25	100 ± 20	-	-
39	-	≤ 0.3	-

## Ordering Information

P/N	Product Description	P.U
1025048	PROFIBUS PA FC AWG16 FLEX PVC Cable, PB PA FC 1x2xAWG16/7 PVC	1000m/drum



### Application

Spur and trunk cable for flexible installation indoor and outdoor on racks in conduits, FastConnect-Assembly

- UV-resistant
- Silikon free
- Limited oil and grease resistant

### Standards

- IEC 61158 and IEC 61784
- Cable type A acc. to Profibus PA

### Fire Rating

- IEC 60332-1, IEC 60332-3-24, IEC 61034-2, IEC 60754-1/2

# PB PA FC 1x2xAWG16/7 LSHF-FR

PROFIBUS PA FC AWG16 FLEX LSHF-FR Cable, 100 Ohm

### Construction

<b>Conductor</b>	stranded bare copper wires, 7x0.51 Ø 1.53 mm, (cross-section AWG16/7)
<b>Insulation</b>	PE, Ø 3.25 mm
<b>Stranding</b>	two cores gn / rd to the Pair
<b>Bedding</b>	halogen free, flame retardant thermoplastic sheathing compound acc. to EN 50290-2-27, filling the interstices
<b>Static screen</b>	PET-Al-Foil longitudinally applied
<b>Braid</b>	tinned copper braid, coverage approx. 70%
<b>Sheath</b>	halogen free, flame retardant thermoplastic sheathing compound acc. to EN 50290-2-27, Ø 9.5 mm
<b>Colour</b>	black
<b>Outer Diameter</b>	Nom. 9.5 mm
<b>Weight</b>	Nom. 143 kg/km
<b>Tensile force N</b>	270

### Mechanical Properties

<b>Bending radius</b>	
<b>single bending</b>	≥ 50 mm
<b>repeated bending</b>	≥ 100 mm
<b>Temperature range</b>	- 30°C to + 70°C
<b>Transport and storage</b>	- 30°C to + 70°C
<b>Installation</b>	- 5°C to + 50°C

### Electrical Properties at 20°C

<b>Loop resistance</b>	≤ 28.6 Ω/km
<b>Screen resistance nominal</b>	12 Ω/km
<b>Characteristic impedance (at 31.25 kHz)</b>	100 Ω ± 20 Ω
<b>Mutual capacitance (at 1 kHz)</b>	approx. 60 nF/km
<b>Capacitance unbalance to earth max.</b>	2 nF/km
<b>Insulation resistance</b>	≥ 5 GΩ/km
<b>Test Voltage (DC, 1 min) Core/Core and Core/Screen</b>	1 kV
<b>Operating voltage (RMS)</b>	≤ 100 V
<b>Inductance (nominal)</b>	0.70 mH/km

### Electrical Data at 20°C

Frequency (kHz)	Impedance (Ohm)	Attenuation (dB/100m)	Propagation delay change (µs/km)
7.9-39	-	-	≤ 1.7
31.25	100 ± 20	-	-
39	-	≤ 0.3	-

### Ordering Information

P/N	Product Description	P.U
1027134	PROFIBUS PA FC AWG16 FLEX LSHF-FR Cable, PB PA FC 1x2xAWG16/7 LSHF-FR	1000m/drum

# PB PA FC 1x2xAWG 18/19 PVC

PROFIBUS PA FC FLEX PVC Cable, 100 Ohm

1.3 Profibus

## Construction

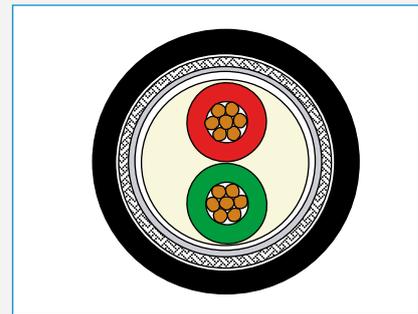
<b>Conductor</b>	Stranded bare copper wires, 19x0.26 Ø 1.3 mm (Cross-section AWG18/19)
<b>Insulation</b>	Foam-skin-PE, Ø 2.55 mm
<b>Stranding</b>	Two cores gn / rd to the Pair
<b>Bedding</b>	PVC, filling the interstices
<b>Static screen</b>	PET-Al-Foil longitudinally applied
<b>Braid</b>	Tinned copper Braid Coverage approx. 70%
<b>Sheath</b>	PVC, black or blue, Ø 8.0 mm
<b>Outer Diameter</b>	Nom. 8.0 mm
<b>Weight</b>	Nom. 89 kg/km
<b>Tensile force N</b>	190

## Mechanical Properties

<b>Bending radius</b>	
Single bending	≥ 40 mm
Repeated bending	≥ 80 mm
Temperature range	- 40°C to + 70°C
Transport and storage	- 40°C to + 70°C
Installation	- 5°C to + 50°C

## Electrical Properties at 20°C

<b>Loop resistance</b>	≤ 43.6 Ω/km
<b>Screen resistance nominal</b>	12 Ω/km
<b>Characteristic impedance (at 31.25 kHz)</b>	100 Ω ± 20 Ω
<b>Mutual capacitance (at 1 kHz)</b>	approx. 60 nF/km
<b>Capacitance unbalance to earth max.</b>	2 nF/km
<b>Insulation resistance</b>	≥ 5 GΩkm
<b>Test Voltage (DC, 1 min) Core/Core and Core/Screen</b>	1 kV
<b>Operating voltage (RMS)</b>	≤ 100 V
<b>Inductance (nominal)</b>	0.70 mH/km



## Application

Spur and trunk cable for flexible installation indoor and outdoor on racks in dry conduits, FastConnect-Assembly

- UV-resistant
- Silicon free
- Oil and grease resistant

## Standards

- IEC 61158 and IEC 61784
- Cable type A acc. to Profibus PA

## Fire Rating

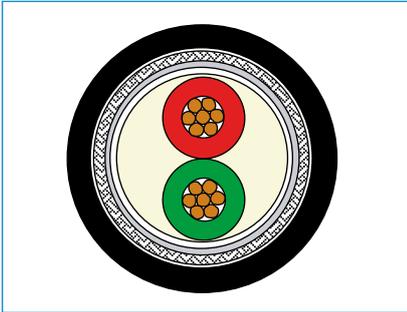
- IEC 60332-1

## Electrical Data at 20°C

Frequency (kHz)	Impedance (Ohm)	Attenuation (dB/100m)	Propagation delay change (µs/km)
7.9-39	-	-	≤ 1.7
31.25	100 ± 20	-	-
39	-	≤ 0.3	-

## Ordering Information

P/N	Product Description	P.U
1025050	PROFIBUS PA FC FLEX PVC Cable, PB PA FC 1x2xAWG 18/19 PVC	1000m/drum



### Application

Spur and trunk cable for flexible installation indoor and outdoor on racks in dry conduits, FastConnect-Assembly

- UV-resistant
- Silicon free
- Limited oil and grease resistant

### Standards

- IEC 61158 and IEC 61784
- Cable type A acc. to Profibus PA

### Fire Rating

- IEC 60332-1, IEC 60332-3-24, IEC 61034-2, IEC 60754-1/2

# PB PA FC 1x2xAWG18/7 LSHF-FR

PROFIBUS PA FC FLEX LSHF-FR Cable, 100 Ohm

## Construction

<b>Conductor</b>	stranded bare copper wires, 7x0.40 Ø 1.2 mm, (cross-section AWG18/7)
<b>Insulation</b>	foam-skin-PE, Ø 2.55 mm
<b>Stranding</b>	two cores gn / rd to the Pair
<b>Bedding</b>	halogen free, flame retardant thermoplastic sheathing compound acc. to EN 50290-2-27, filling the interstices
<b>Static screen</b>	PET-Al-Foil longitudinally applied
<b>Braid</b>	tinned copper braid, coverage approx. 70%
<b>Sheath</b>	halogen free, flame retardant thermoplastic sheathing compound acc. to EN 50290-2-27, Ø 8.0 mm
<b>Colour</b>	black or blue
<b>Outer Diameter</b>	Nom. 8.0 mm
<b>Weight</b>	Nom. 83 kg/km
<b>Tensile Force N</b>	180

## Mechanical Properties

<b>Bending radius</b>	
<b>single bending</b>	≥ 40 mm
<b>repeated bending</b>	≥ 80 mm
<b>Temperature range</b>	- 30°C to + 70°C
<b>Transport and storage</b>	- 30°C to + 70°C
<b>Installation</b>	- 5°C to + 50°C

## Electrical Properties at 20°C

<b>Loop resistance</b>	≤ 43.6 Ω/km
<b>Screen resistance</b>	12 Ω/km
<b>Characteristic impedance (Nominal)</b>	100 Ω ± 20 Ω
<b>Mutual capacitance (at 1 kHz)</b>	approx. 60 nF/km
<b>Capacitance unbalance to earth max.</b>	2 nF/km
<b>Insulation resistance</b>	≥ 5 GΩkm
<b>Test Voltage (DC, 1 min) Core/Core and Core/Screen</b>	1 kV
<b>Operating voltage (RMS)</b>	≤ 100 V
<b>Inductance (nominal)</b>	0.70 mH/km

## Electrical Data at 20°C

Frequency (kHz)	Impedance (Ohm)	Attenuation (dB/100m)	Propagation delay change (µs/km)
7.9-39	-	-	≤ 1.7
31.25	100 ± 20	-	-
39	-	≤ 0.3	-

## Ordering Information

P/N	Product Description	P.U
1025047	1 x 2 x 1.2/2.55-100, PROFIBUS PA FC FLEX LSHF-FR Cable, PB PA FC 1x2xAWG18/7 LSZH-FR BK	1000m/drum
1029194	1 x 2 x 1.2/2.55-100, PROFIBUS PA FC FLEX LSHF-FR Cable, PB PA FC 1x2xAWG18/7 LSZH-FR BU	1000m/drum

# PB PA 1x2xAWG18/7 LSHF-FR

PROFIBUS PA FLEX LSZH-FR Cable, 100 Ohm

1.3 Profibus

## Construction

<b>Conductor</b>	stranded bare copper wires, 7x0.40 Ø 1.2 mm, (cross-section AWG18/7)
<b>Insulation</b>	Polypropylene (PP) Ø 2.0 mm
<b>Stranding</b>	two cores gn / rd to the pair + two fillers
<b>Static screen</b>	PET-Al-Foil longitudinally applied
<b>Drain wire</b>	Tinned Copper 0.5mm <sup>2</sup>
<b>Braid</b>	tinned copper braid, coverage approx. 70%
<b>Sheath</b>	halogen free, flame retardant thermoplastic sheathing compound acc. to EN 50290-2-27 with thermal resistance up to 90°C Ø 7.0 mm
<b>Colour</b>	Blue RAL5015
<b>Outer Diameter</b>	Nom. 7.0 mm
<b>Weight</b>	Nom. 72.3 kg/km
<b>Tensile force N</b>	190

## Mechanical Properties

<b>Bending radius</b>	
single bending	≥ 40 mm
repeated bending	≥ 80 mm
<b>Temperature range</b>	- 40°C to + 90°C
<b>Transport and storage</b>	- 40°C to + 90°C
<b>Installation</b>	- 5°C to + 50°C

## Electrical Properties at 20°C

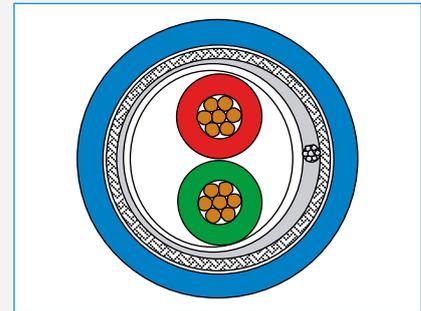
<b>Loop resistance</b>	≤ 43.6 Ω/km
<b>Screen resistance nominal</b>	12 Ω/km
<b>Characteristic impedance (at 31.25 kHz)</b>	100 Ω ± 20 Ω
<b>Mutual capacitance (at 1 kHz)</b>	approx. 60 nF/km
<b>Capacitance unbalance to earth max.</b>	2 nF/km
<b>Insulation resistance</b>	≥ 5 GΩkm
<b>Test Voltage (DC, 1 min) Core/Core and Core/Screen</b>	1 kV
<b>Operating voltage (RMS)</b>	≤ 100 V
<b>Inductance (nominal)</b>	0.70 mH/km

## Electrical Data at 20°C

Frequency (kHz)	Impedance (Ohm)	Attenuation (dB/100m)	Propagation delay change (µs/km)
7.9-39	-	-	≤ 1.7
31.25	100 ± 20	-	-
39	-	≤ 0.3	-

## Ordering Information

P/N	Product Description	P.U
60031151	PROFIBUS PA FLEX LSHF-FR Cable, PB PA 1x2xAWG18/7 LSZH-FR	1000m/drum



### Application

Spur and trunk cable for flexible installation indoor and outdoor on racks in dry conduits,

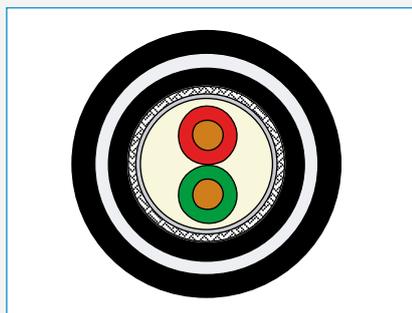
- UV-resistant
- Silicon free
- Limited oil and grease resistant

### Standards

- IEC 61158 and IEC 61784
- Cable type A acc. to Profibus PA

### Fire Rating

- IEC 60332-1, IEC 60332-3-24, IEC 61034-2, IEC 60754-1/2



### Application

Spur and trunk cable for fixed installation indoor and outdoor on racks in conduits, FastConnect-Assembly

- UV-resistant
- Silicon free
- Oil and grease resistant

### Standards

- IEC 61158 and IEC 61784
- Cable type A acc. to Profibus PA

### Fire Rating

- IEC 60332-1

# PB PA FC 1x2xAWG18/1 GST PVC

PROFIBUS PA FC Galvanized Steel Tape Armoured PVC Installation Cable, 100 Ohm

## Construction

<b>Conductor</b>	bare copper wire, Ø 1.05 mm, (cross-section AWG18)
<b>Insulation</b>	foam-skin-PE, Ø 2.55 mm
<b>Stranding</b>	two cores gn / rd to the Pair
<b>Bedding</b>	PVC, filling the interstices
<b>Static screen</b>	PET-Al-Foil longitudinally applied
<b>Braid</b>	tinned copper Braid Coverage approx. 70%
<b>Sheath</b>	PVC, Ø 8.0 mm
<b>Colour</b>	black or blue
<b>Wrapping</b>	PP foil overlapping, Ø 8.2 mm
<b>Armouring</b>	2 galvanized steel tapes, thickness of tapes 0.10 mm, Ø 9.0 mm
<b>Outer sheath</b>	PVC, Ø 12.0 mm
<b>Colour</b>	black or blue
<b>Outer Diameter</b>	Nom. 12.0 mm
<b>Weight</b>	Nom. 193 kg/km
<b>Tensile force N</b>	175

## Mechanical Properties

<b>Bending radius</b>	
<b>Single bending</b>	≥ 120 mm
<b>repeated bending</b>	≥ 180 mm
<b>Temperature range</b>	- 40°C to + 70°C
<b>Transport and storage</b>	- 40°C to + 70°C
<b>Installation</b>	- 5°C to + 50°C

## Electrical Properties at 20°C

<b>Loop resistance</b>	≤ 46 Ω/km
<b>Screen resistance nominal</b>	12 Ω/km
<b>Characteristic impedance (Nominal)</b>	100 Ω ± 20 Ω
<b>Mutual capacitance (at 1 kHz)</b>	approx. 60 nF/km
<b>Capacitance unbalance to earth max.</b>	2 nF/km
<b>Insulation resistance</b>	≥ 5 GΩkm
<b>Test Voltage (DC, 1 min) Core/Core and Core/Screen</b>	1 kV
<b>Operating voltage (RMS)</b>	≤ 100 V
<b>Inductance (nominal)</b>	0.70 mH/km

## Electrical Data at 20°C

Frequency (kHz)	Impedance (Ohm)	Attenuation (dB/100m)	Propagation delay change (µs/km)
7.9-39	-	-	≤ 1.7
31.25	100 ± 20	-	-
39	-	≤ 0.3	-

## Ordering Information

P/N	Product Description	P.U
1025052	PROFIBUS PA FC Galvanized Steel Tape Armoured PVC Installation Cable, PB PA FC 1x2xAWG18/1 GST PVC	1000m/drum

# PB PA FC 1x2xAWG18/7 SWB PVC

PROFIBUS PA FC FLEX Steel Wire Braid Armoured PVC Cable, 100 Ohm

## Construction

<b>Conductor</b>	stranded bare copper wires, 7x0.40 Ø 1.2 mm, (cross-section AWG18/7)
<b>Insulation</b>	foam-skin-PE, Ø 2.55 mm
<b>Stranding</b>	two cores gn / rd to the Pair
<b>Bedding</b>	PVC, filling the interstices
<b>Static screen</b>	PET-Al-Foil longitudinally applied
<b>Braid</b>	tinned copper braid, coverage approx. 70%
<b>Sheath</b>	PVC, Ø 8.0 mm
<b>Colour</b>	black or blue
<b>Armouring</b>	galvanized steel wire braid, optical coverage 85% Ø 9.3 mm
<b>Outer sheath</b>	PVC, Ø 12.0 mm
<b>Colour</b>	black or blue
<b>Outer Diameter</b>	Nom. 12.0 mm
<b>Weight</b>	Nom. 211 kg/km
<b>Tensile force N</b>	500

## Mechanical Properties

<b>Bending radius</b>	
<b>single bending</b>	≥ 60 mm
<b>repeated bending</b>	≥ 120 mm
<b>Temperature range</b>	- 40°C to + 70°C
<b>Transport and storage</b>	- 40°C to + 70°C
<b>Installation</b>	- 5°C to + 50°C

## Electrical Properties at 20°C

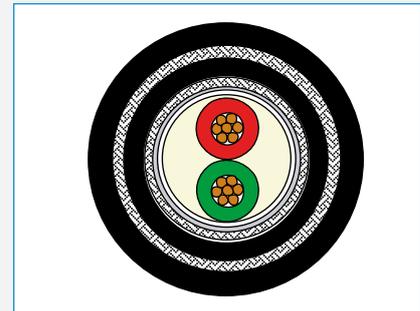
<b>Loop resistance</b>	≤ 43.6 Ω/km
<b>Screen resistance nominal</b>	12 Ω/km
<b>Characteristic impedance (at 31.25 kHz)</b>	100 Ω ± 20 Ω
<b>Mutual capacitance (at 1 kHz)</b>	approx. 60 nF/km
<b>Capacitance unbalance to earth max.</b>	2 nF/km
<b>Insulation resistance</b>	≥ 5 GΩkm
<b>Test Voltage (DC, 1 min) Core/Core and Core/Screen</b>	1 kV
<b>Operating voltage (RMS)</b>	≤ 100 V
<b>Inductance (nominal)</b>	0.70 mH/km

## Electrical Data at 20°C

Frequency (kHz)	Impedance (Ohm)	Attenuation (dB/100m)	Propagation delay change (µs/km)
7.9-39	-	-	≤ 1.7
31.25	100 ± 20	-	-
39	-	≤ 0.3	-

## Ordering Information

P/N	Product Description	P.U
1025049	PROFIBUS PA FC FLEX Steel Wire Braid Armoured PVC Cable, PB PA FC 1x2xAWG18/7 SWB PVC	1000m/drum



### Application

Spur and trunk cable for flexible installation indoor and outdoor on racks in conduits, FastConnect-Assembly

- UV-resistant
- Silicon free
- Oil and grease resistant

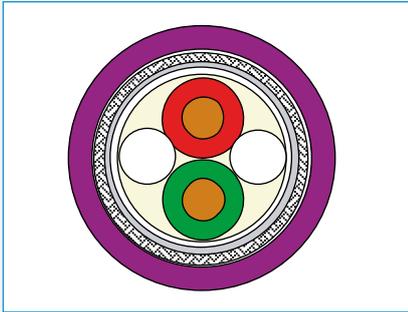
### Standards

- IEC 61158 and IEC 61784
- Cable type A acc. to Profibus PA

### Fire Rating

- IEC 60332-1

## 1.3 Profibus



### Application

Installation cable :

- Halogen free and flame resistant
- Limited segment length (according to PROFIBUS-Net Manual)
- UV-resistant
- Silicon free
- Limited oil and grease resistance

### Standards

- Customer specification
- EN 50170 part 8-2, cable type A, IEC 61158 and IEC 61784

### Fire Rating

- IEC 60332-1, IEC 61034-2, IEC 60754-1/2

# PB DP BASIC 1x2xAWG22/1 LSHF

PROFIBUS DP Basic LSZH Cable, 150 Ohm

### Construction

<b>Conductor</b>	Bare copper wire, $\emptyset$ 0.64 mm, (cross-section 0.32 mm <sup>2</sup> )
<b>Insulation</b>	foam-skin-PE, $\emptyset$ 2.5 mm
<b>Stranding</b>	two cores gn / rd to the pair and two fillers
<b>Wrapping</b>	PET-Foil, $\emptyset$ 5.2 mm
<b>Static screen</b>	PET-Al-Foil longitudinally applied
<b>Braid</b>	tinned copper braid, coverage approx. 60%
<b>Sheath</b>	halogen free, flame retardant thermoplastic sheathing compound acc. to EN 50290-2-27, $\emptyset$ 8.0 mm
<b>Colour</b>	violet RAL 4005
<b>Outer Diameter</b>	Nom. 8.0 mm
<b>Weight</b>	Nom. 71 kg/km
<b>Tensile force N</b>	100

### Mechanical Properties

<b>Bending radius</b>	
<b>single bending</b>	$\geq$ 60 mm
<b>repeated bending</b>	$\geq$ 80 mm
<b>Max. operating voltage</b>	- 25°C to + 80°C
<b>Relative velocity factor NVP</b>	- 25°C to + 80°C
<b>Impedance (at 10 MHz)</b>	- 25°C to + 80°C

### Electrical Properties at 20°C

<b>Loop resistance</b>	$\leq$ 110 $\Omega$ /km
<b>Screen resistance</b>	$\leq$ 9,5 $\Omega$ /km
<b>Characteristic impedance (Nominal)</b>	150 $\Omega$
<b>Mutual capacitance (at 1 kHz)</b>	ca. 28.5 nF/km
<b>Insulation resistance</b>	$\geq$ 5 G $\Omega$ km
<b>Test Voltage (DC, 1 min) Core/Core and Core/Screen</b>	1 kV
<b>Operating voltage (RMS)</b>	$\leq$ 100 V

### Electrical Data at 20°C

Frequency (kHz)	Impedance (Ohm)	Attenuation (dB/100m)
<b>9.6 kHz</b>	270 $\pm$ 27	$\leq$ 0.25
<b>38.4 kHz</b>	185 $\pm$ 18.5	$\leq$ 0.4
<b>1 MHz</b>	-	-
<b>3 MHz</b>	150 $\pm$ 15	-
<b>4 MHz</b>	150 $\pm$ 15	$\leq$ 2.2
<b>16 MHz</b>	150 $\pm$ 15	$\leq$ 4.2
<b>20 MHz</b>	150 $\pm$ 15	$\leq$ 4.7

### Ordering Information

P/N	Product Description	P.U
1026560	PROFIBUS DP Basic LSHF Cable, PB DP BASIC 1x2xAWG22/1 LSHF	1000m/drum

# PB DP FC 1x2xAWG22/1 LSHF-FR

PROFIBUS FC LSHF-FR Cable, 150 Ohm

## Construction

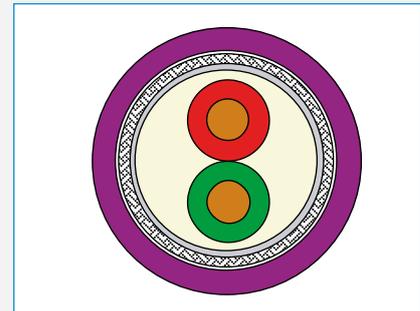
<b>Conductor</b>	bare copper wire, $\emptyset$ 0.64 mm, (cross-section 0.32 mm <sup>2</sup> )
<b>Insulation</b>	foam-skin-PE, $\emptyset$ 2.5 mm
<b>Stranding</b>	two cores gn / rd to the Pair
<b>Bedding</b>	halogen free, flame retardant thermoplastic sheathing compound acc. to EN 50290-2-27, filling the interstices $\emptyset$ 5.4 mm
<b>Static screen</b>	PET-Al-Foil longitudinally applied
<b>Braid</b>	tinned copper braid, coverage approx. 60%
<b>Sheath</b>	halogen free, flame retardant thermoplastic sheathing compound acc. to EN 50290-2-27, violet, $\emptyset$ 8.0 mm
<b>Outer Diameter</b>	Nom. 8.0 mm
<b>Weight</b>	Nom. 83 kg/km
<b>Tensile force N</b>	100

## Mechanical Properties

<b>Bending radius</b>	
single bending	$\geq$ 60 mm
repeated bending	$\geq$ 80 mm
<b>Temperature range</b>	- 25°C to + 80°C
<b>Transport and storage</b>	- 25°C to + 80°C
<b>Installation</b>	- 25°C to + 80°C

## Electrical Properties at 20°C

<b>Loop resistance</b>	$\leq$ 110 $\Omega$ /km
<b>Screen resistance nominal</b>	$\leq$ 9.5 $\Omega$ /km
<b>Characteristic impedance (Nominal)</b>	150 $\Omega$
<b>Mutual capacitance (at 1 kHz)</b>	ca. 28.5 nF/km
<b>Insulation resistance</b>	$\geq$ 5 G $\Omega$ km
<b>Test Voltage (DC, 1 min) Core/Core and Core/Screen</b>	1 kV
<b>Operating voltage (RMS)</b>	$\leq$ 100 V



## Application

Installation cable :

- Halogen free and flame resistant
- Limited segment length (according to PROFIBUS-Net Manual)
- FastConnect-assembly
- UV-resistant
- Silicon free
- Limited oil and grease resistance

## Standards

- Customer specification

## Fire Rating

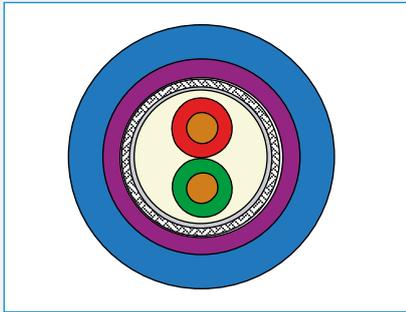
- IEC 60332-1, IEC 60332-3-24, IEC 61034-2, IEC 60754-1/2

## Electrical Data at 20°C

Frequency (kHz)	Impedance (Ohm)	Attenuation (dB/100m)
9.6 kHz	270 $\pm$ 27	$\leq$ 0.25
38.4 kHz	185 $\pm$ 18.5	$\leq$ 0.4
1 MHz	-	-
3 MHz	150 $\pm$ 15	-
4 MHz	150 $\pm$ 15	$\leq$ 2.5
16 MHz	150 $\pm$ 15	$\leq$ 4.2
20 MHz	150 $\pm$ 15	-

## Ordering Information

P/N	Product Description	P.U
1026561	PROFIBUS FC LSHF-FR Cable, PB DP FC 1x2xAWG22/1 LSHF-FR	1000m/drum



### Application

Installation cable (up to inner sheath) :

- Halogen free and flame resistant
- Limited segment length (according to PROFIBUS-Net Manual)
- FastConnect-assembly
- UV-resistant
- Silicon free
- Limited oil and grease resistance

### Standards

- Customer specification

### Fire Rating

Basic cable:

- IEC 60332-1, IEC 60332-3-24, IEC 61034-2, IEC 60754-1/2

# PB DP FC 1x2xAWG22/1 LSHF-FR + PE

PROFIBUS FC LSHF-FR Cable with additional PE-Sheath, 150 Ohm

### Construction

<b>Conductor</b>	bare copper wire, $\emptyset$ 0.64 mm, (cross-section 0.32 mm <sup>2</sup> )
<b>Insulation</b>	foam-skin-PE, $\emptyset$ 2.5 mm
<b>Stranding</b>	two cores gn / rd to the Pair
<b>Bedding</b>	halogen free, flame retardant thermoplastic sheathing compound acc. to EN 50290-2-27, filling the interstices $\emptyset$ 5.4 mm
<b>Static screen</b>	PET-Al-Foil longitudinally applied
<b>Braid</b>	tinned copper braid, coverage approx. 60%
<b>Inner Sheath</b>	halogen free, flame retardant thermoplastic sheathing compound acc. to EN 50290-2-27, violet, $\emptyset$ 8.0 mm
<b>Outer Sheath</b>	PE, blue or black, $\emptyset$ 10.8 mm
<b>Outer Diameter</b>	Nom. 10.8 mm
<b>Weight</b>	Nom. 122 kg/km

### Mechanical Properties

<b>Bending radius</b>	
<b>single bending</b>	$\geq 10 \times D$
<b>repeated bending</b>	$\geq 15 \times D$
<b>Temperature range</b>	- 25°C to + 70°C
<b>Transport and storage</b>	- 25°C to + 70°C
<b>Installation</b>	- 25°C to + 50°C

### Electrical Properties at 20°C

<b>Loop resistance</b>	$\leq 110 \Omega/\text{km}$
<b>Screen resistance</b>	$\leq 9,5 \Omega/\text{km}$
<b>Characteristic impedance (Nominal)</b>	150 $\Omega$
<b>Mutual capacitance (at 1 kHz)</b>	ca. 28.5 nF/km
<b>Insulation resistance</b>	$\geq 5 \text{ G}\Omega/\text{km}$
<b>Test Voltage (DC, 1 min) Core/Core and Core/Screen</b>	1 kV
<b>Operating voltage (RMS)</b>	$\leq 100 \text{ V}$

### Electrical Data at 20°C

Frequency (kHz)	Impedance (Ohm)	Attenuation (dB/100m)
9.6 kHz	270 $\pm$ 27	$\leq 0.25$
38.4 kHz	185 $\pm$ 18.5	$\leq 0.4$
1 MHz	-	-
3 MHz	150 $\pm$ 15	-
4 MHz	150 $\pm$ 15	$\leq 2.2$
16 MHz	150 $\pm$ 15	$\leq 4.2$
20 MHz	150 $\pm$ 15	-

### Ordering Information

P/N	Product Description	P.U
1027325	1 x 2 x 0.64/2.55-150, PROFIBUS FC LSHF-FR Cable with additional PE-Sheath, PB DP FC 1x2xAWG22/1 LSHF-FR + PE	1000m/drum
1027326	1 x 2 x 0.64/2.55-150, PROFIBUS FC LSHF-FR Cable with additional PE-Sheath, PB DP FC 1x2xAWG22/1 LSHF-FR + PE	1000m/drum

# PB DP FC 1x2xAWG22/1 PE

PROFIBUS DP FC PE Sheathed Cable, 150 Ohm

1.3 Profibus

## Construction

<b>Conductor</b>	bare copper wire, $\emptyset$ 0.64 mm, (cross-section 0.32 mm <sup>2</sup> )
<b>Insulation</b>	foam-skin-PE, $\emptyset$ 2.5 mm
<b>Stranding</b>	two cores gn / rd to the Pair
<b>Bedding</b>	halogen free, flame retardant thermoplastic sheathing compound acc. to EN 50290-2-27, filling the interstices $\emptyset$ 5.4 mm
<b>Static screen</b>	PET-Al-Foil longitudinally applied
<b>Braid</b>	tinned copper braid, coverage approx. 70%
<b>Sheath</b>	halogen free, flame retardant thermoplastic sheathing compound acc. to EN 50290-2-27, violet, RAL 4005 $\emptyset$ 8.0 mm
<b>Outer sheath</b>	PE, $\emptyset$ 11.0 mm
<b>Colour</b>	black, RAL 9005
<b>Outer Diameter</b>	Nom. 11.0 mm
<b>Weight</b>	Nom. 113 kg/km
<b>Tensile force N</b>	120

## Mechanical Properties

<b>Bending radius</b>	
<b>single bending</b>	$\geq 60$ mm
<b>repeated bending</b>	$\geq 120$ mm
<b>Temperature range</b>	- 30°C to + 70°C
<b>Transport and storage</b>	- 30°C to + 70°C
<b>Installation</b>	- 5°C to + 50°C

## Electrical Properties at 20°C

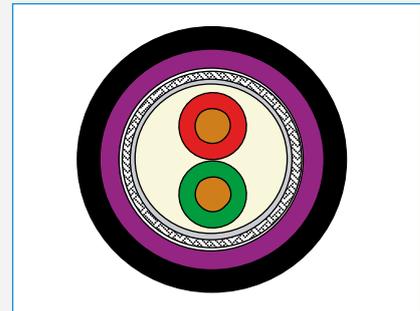
<b>Loop resistance</b>	$\leq 110$ $\Omega$ /km
<b>Screen resistance nominal</b>	12 $\Omega$ /km
<b>Characteristic impedance (nominal)</b>	150 $\Omega$
<b>Mutual capacitance (at 1 kHz)</b>	approx. 28.5 nF/km
<b>Capacitance unbalance to earth max.</b>	1.5 nF/km
<b>Insulation resistance</b>	$\geq 5$ G $\Omega$ km
<b>Test Voltage (DC, 1 min) Core/Core and Core/Screen</b>	1 kV
<b>Operating voltage (RMS)</b>	$\leq 100$ V
<b>Inductance (nominal)</b>	0.90 mH/km

## Electrical Data at 20°C

Frequency (kHz)	Impedance (Ohm)	Attenuation (dB/100m)
9.6 kHz	270 $\pm$ 27	$\leq 0.25$
38.4 kHz	185 $\pm$ 18.5	$\leq 0.4$
1 MHz	-	-
3 MHz	150 $\pm$ 15	-
4 MHz	150 $\pm$ 15	$\leq 2.2$
16 MHz	150 $\pm$ 15	$\leq 4.2$
20 MHz	150 $\pm$ 15	-

## Ordering Information

P/N	Product Description	P.U
1025046	PROFIBUS DP FC PE Sheathed Cable, PB DP FC 1x2xAWG22/1 PE	1000m/drum



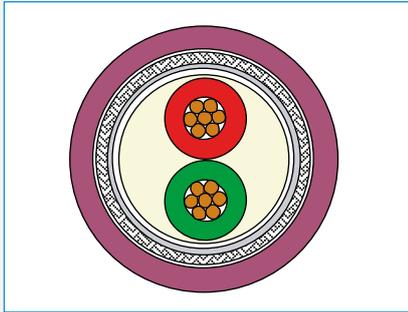
## Application

Outdoor installation cable, also for direct burial :

- Limited segment length (according to PROFIBUS-Net Manual)
- FastConnect-assembly
- UV-resistant
- Silicon free
- Limited oil and grease resistance

## Standards

- EN 50170 part 8-2 Cable type A, IEC 61158 and IEC 61784
- IEC 60754-1/2; IEC 61034



### Application

Flexible cable :

- For mobile use
- FastConnect-assembly
- UV-resistant
- Silicon free
- Oil and grease resistant

### Standards

- EN 50170 part 8-2, cable type A, IEC 61158 and IEC 61784

### Fire Rating

- IEC 60332-1, VDE 0482-265-2-1
- IEC 61034-2, IEC 60754-1/2

# PB DP FC 1x2xAWG24/19 PUR

PROFIBUS DP FC FLEX-PUR Cable, 150 Ohm

## Construction

<b>Conductor</b>	Stranded bare copper wires, AWG24/7, 19 x0.13, Ø 0.65 mm, (Cross-section 0.25 mm <sup>2</sup> )
<b>Insulation</b>	foam-skin-PE, Ø 2.5 mm
<b>Stranding</b>	two cores gn / rd to the pair
<b>Bedding</b>	PVC, filling the interstices, Ø 5.4 mm
<b>Wrapping</b>	non woven Polyester tape
<b>Static screen</b>	PET-Al-Foil spirally applied
<b>Braid</b>	tinned copper braid, coverage approx. 70%
<b>Sheath</b>	PUR, Ø 8.0 mm
<b>Colour</b>	violet, RAL 4005
<b>Outer Diameter</b>	Nom. 8.0 mm
<b>Weight</b>	nom. 70 kg/km
<b>Tensile force N</b>	120

## Mechanical Properties

<b>Bending radius</b>	
single bending	≥ 40 mm
repeated bending	≥ 120 mm
<b>Temperature range</b>	- 40°C to + 70°C
<b>Transport and storage</b>	- 40°C to + 60°C
<b>Installation</b>	- 40°C to + 60°C

## Electrical Properties at 20°C

<b>Loop resistance</b>	≤ 135 Ω/km
<b>Screen resistance nominal</b>	12 Ω/km
<b>Characteristic impedance (Nominal)</b>	150 Ω
<b>Mutual capacitance (at 1 kHz)</b>	< 30 nF/km
<b>Capacitance unbalance to earth max.</b>	1.5 nF/km
<b>Insulation resistance</b>	≥ 5 GΩkm
<b>Test Voltage (DC, 1 min) Core/Core and Core/Screen</b>	1 kV
<b>Operating voltage (RMS)</b>	≤ 100 V
<b>Inductance (nominal)</b>	0.90 mH/km

## Electrical Data at 20°C

Frequency (kHz)	Impedance (Ohm)	Attenuation (dB/100m)
9.6 kHz	270 ± 27	≤ 0.3
38.4 kHz	185 ± 18.5	≤ 0.4
1 MHz	-	-
3 MHz	150 ± 15	-
4 MHz	150 ± 15	≤ 2.5
16 MHz	150 ± 15	≤ 4.9
20 MHz	150 ± 15	-

## Ordering Information

P/N	Product Description	P.U
1025044	PROFIBUS DP FC FLEX-PUR Cable, PB DP FC 1x2xAWG24/19 PUR	1000m/drum

# PB DP FC 1x2xAWG24/19 TRAILING PUR

PROFIBUS DP FC Trailing-Cable, 150 Ohm

1.3 Profibus

## Construction

<b>Conductor</b>	stranded bare copper wires, 19x0.13, Ø 0.65 mm, (cross-section 0.25 mm <sup>2</sup> )
<b>Insulation</b>	foam-skin-PE, Ø 2.5 mm
<b>Stranding</b>	two cores gn / rd to the Pair
<b>Wrapping</b>	PET-Foil
<b>Bedding</b>	PVC, filling the interstices Ø 5,4 mm
<b>Wrapping</b>	non woven Polyestertape
<b>Static screen</b>	PET-Al-Foil spirally applied
<b>Braid</b>	tinned copper braid, coverage approx. 70%
<b>Sheath</b>	PUR, Ø 8.0 mm
<b>Colour</b>	petrol
<b>Outer Diameter</b>	Nom. 8.0 mm
<b>Weight</b>	Nom. 70 kg/km
<b>Tensile force N</b>	100

## Mechanical Properties

<b>Bending radius</b>	
single bending	≥ 40 mm
repeated bending	≥ 120 mm
<b>Bending cycles (at 20°C)</b>	3.000.000
<b>Temperature range</b>	- 40°C to + 60°C
<b>Transport and storage</b>	- 40°C to + 60°C
<b>Installation</b>	- 40°C to + 60°C

## Electrical Properties at 20°C

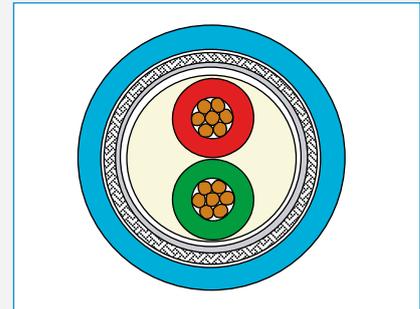
<b>Loop resistance</b>	≤ 133 Ω/km
<b>Screen resistance</b>	≤ 14 Ω/km
<b>Characteristic impedance (Nominal)</b>	150 Ω
<b>Mutual capacitance (at 1 kHz)</b>	ca. 28.5 nF/km
<b>Insulation resistance</b>	≥ 5 GΩkm
<b>Test Voltage (DC, 1 min) Core/Core and Core/Screen</b>	1 kV
<b>Operating voltage (RMS)</b>	≤ 100 V

## Electrical Data at 20°C

Frequency (kHz)	Impedance (Ohm)	Attenuation (dB/100m)
9.6 kHz	270 ± 27	≤ 0.3
38.4 kHz	185 ± 18.5	≤ 0.4
1 MHz	-	-
3 MHz	150 ± 15	-
4 MHz	150 ± 15	≤ 2.5
16 MHz	150 ± 15	≤ 4.9
20 MHz	150 ± 15	-

## Ordering Information

P/N	Product Description	P.U
1026562	PROFIBUS DP FC Trailing-Cable, PB DP FC 1x2xAWG24/19 TRAILING PUR	1000m/drum



## Application

Trailing cable :

- Min. 3.000.000 bending cycles with min. bending radius and a maximum acceleration of 4 m/s<sup>2</sup>
- Limited segment length (according to PROFIBUS-Net Manual)
- FastConnect-assembly
- UV-resistant
- Silicon free
- Oil and grease resistant

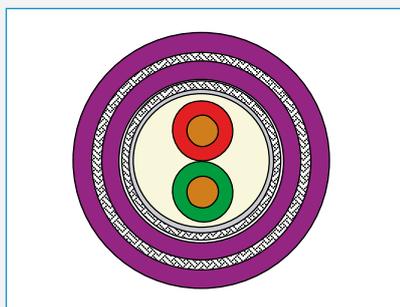
## Standards

- Customer specification
- UL-Listing / 300V Rating / CMX

## Fire Rating

- IEC 60332-1, VDE 0482-265-2-1
- UL1581 VW-1
- IEC 61034-2, IEC 60754-1/2

## 1.3 Profibus



### Application

Armoured indoor and outdoor installation cable:

- Halogen free and flame resistant
- Limited segment length (according to PROFIBUS-Net Manual)
- FastConnect-assembly
- UV-resistant
- Silicon free
- Limited oil and grease resistance

### Standards

- EN 50170 part 8-2, cable type A, IEC 61158 and IEC 61784

### Fire Rating

- IEC 60332-1, IEC 61034-2, IEC 60754-1/2

# PB DP FC 1x2xAWG22/1 SWB LSHF

## PROFIBUS DP FC Steel Wire Braid Armoured LSHF Cable, 150 Ohm

### Construction

<b>Conductor</b>	bare copper wire, $\varnothing$ 0.64 mm, (cross-section 0.32 mm <sup>2</sup> )
<b>Insulation</b>	foam-skin-PE, $\varnothing$ 2.5 mm
<b>Stranding</b>	two cores gn / rd to the Pair
<b>Bedding</b>	halogen free, flame retardant thermoplastic sheathing compound acc. to EN 50290-2-27, filling the interstices $\varnothing$ 5.4 mm
<b>Static screen</b>	PET-Al-Foil longitudinally applied
<b>Braid</b>	tinned copper braid, coverage approx. 70%
<b>Sheath</b>	halogen free, flame retardant thermoplastic sheathing compound acc. to EN 50290-2-27, violet, RAL 4005 $\varnothing$ 12.0 mm
<b>Armouring</b>	EN 50290-2-27, violet, $\varnothing$ 8.0 mm galvanized steel wire braid, optical coverage 85% $\varnothing$ 9.1 mm
<b>Outer sheath</b>	halogen free, flame retardant thermoplastic sheathing compound acc. to EN 50290-2-27, violet, RAL 4005 $\varnothing$ 12.0 mm
<b>Outer Diameter</b>	Nom. 12.0 mm
<b>Weight</b>	Nom. 208 kg/km
<b>Tensile force N</b>	450

### Mechanical Properties

<b>Bending radius</b>	
<b>single bending</b>	$\geq$ 60 mm
<b>repeated bending</b>	$\geq$ 120 mm
<b>Temperature range</b>	- 30°C to + 70°C
<b>Transport and storage</b>	- 30°C to + 70°C
<b>Installation</b>	- 5°C to + 50°C

### Electrical Properties at 20°C

<b>Loop resistance</b>	$\leq$ 110 $\Omega$ /km
<b>Screen resistance nominal</b>	12 $\Omega$ /km
<b>Characteristic impedance (nominal)</b>	150 $\Omega$
<b>Mutual capacitance (at 1 kHz)</b>	approx. 28.5 nF/km
<b>Capacitance unbalance to earth max.</b>	1.5 nF/km
<b>Insulation resistance</b>	$\geq$ 5 G $\Omega$ km
<b>Test Voltage (DC, 1 min) Core/Core and Core/Screen</b>	1 kV
<b>Operating voltage (RMS)</b>	$\leq$ 100 V
<b>Inductance (nominal)</b>	0.90 mH/km

### Electrical Data at 20°C

Frequency (kHz)	Impedance (Ohm)	Attenuation (dB/100m)
9.6 kHz	270 $\pm$ 27	$\leq$ 0.25
38.4 kHz	185 $\pm$ 18.5	$\leq$ 0.4
1 MHz	-	-
3 MHz	150 $\pm$ 15	-
4 MHz	150 $\pm$ 15	$\leq$ 2.2
16 MHz	150 $\pm$ 15	$\leq$ 4.2
20 MHz	150 $\pm$ 15	-

### Ordering Information

P/N	Product Description	P.U
60039258	PROFIBUS DP FC Steel Wire Braid Armoured LSHF Cable, PB DP FC 1x2xAWG22/1 SWB LSHF	1000m/drum

# UC300 Cat.5e F/UTP SWB LSZH-FR

1.4 Industrial Ethernet

Category cable for demanding environments

## Construction

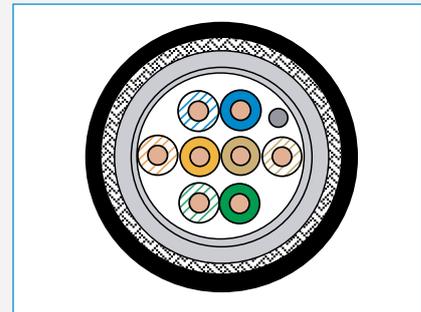
<b>Conductor</b>	Bare copper wire Ø 0.51 mm (AWG24)
<b>Insulation</b>	PE, Nom. Ø 1.03 mm
<b>Twisting</b>	2 cores to the pair
<b>Overall screen</b>	Aluminium Polyester Tape
<b>Drain Wire</b>	Tinned Copper ; Ø 0.495 ± 0.008 mm
<b>Inner Sheath</b>	LSZH-FR
<b>Armouring</b>	0.3mm Galvanised Steel Braid, Coverage 80%
<b>Outer sheath</b>	LSZH-FR
<b>Sheath colour</b>	Black

## Mechanical Properties

<b>Bending radius</b>	Installation	8 x D
<b>Temperature range</b>	During operation	-10°C to + 60°C
	During installation	-10°C to + 60°C

## Electrical Properties at at 20°C± 5°C

<b>Loop resistance</b>	-	≤ 170 Ω/km
<b>Resistance unbalance</b>	-	≤ 2%
<b>Characteristic Impedence</b>	1-130MHz	100 Ω ± 15 ohm
<b>Mutual capacitance</b>	at 800 Hz	Nom. 43 nF/km
<b>Capacitance unbalance</b>	(pair to ground)	≤ 300 pF/km
<b>Nominal Velocity of Propagation</b>	-	0.69c



### Application

- Generic Data transmission. This cable is a Cat5e F/UTP cable is meant for use as installation/horizontal cable in demanding electrical and mechanical environment.

### Standards

- EIA/TIA 568C;
- ISO/IEC 11801 2nd ed.; IEC 61156-5
- EN 50173; EN 50288-3-1

### Fire Rating

- IEC 60332-1, IEC 60332-3-24, IEC 61034-2, IEC 60754-1/2

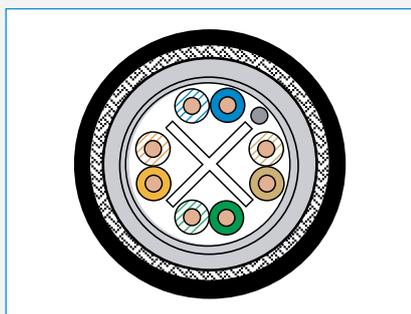
## Electrical Data Nominal at 20°C

F (MHZ)	Max. Ins. Loss (dB/100m)	Min. Return loss (dB)	Pair to Pair		Power Sum		ELFEXT (dB/100m)
			Min. NEXT (dB/100m)	Min ELFEXT (dB/100m)	Min. NEXT (dB/100m)	Min ELFEXT (dB/100m)	
1	-	20	-	-	-	-	-
4	4.1	23	56.3	52	53.3	55	552
10	6.5	25	50.3	44	47.3	47	545.4
16	8.3	25	47.2	39.9	44.2	42.9	543
20	9.3	25	45.8	38	42.8	41	542
31.2	11.7	23.6	42.9	34.1	39.9	37.1	540.4
62.5	17	21.5	38.4	28.1	35.4	31.1	538.6
100	22	20.1	35.3	24	32.3	27	537.6

## Ordering Information

P/N	Product Description	P.U
53048B	UC 300 Cat 5e F/UTP 24 AWG LSZH-FR SWB	500m/drum

## 1.4 Industrial Ethernet



### Application

Generic Data transmission. This cable is a Cat6 F/UTP cable meant for use as installation/horizontal cable in demanding electrical and mechanical environment.

### Standards

- EIA/TIA 568C;
- ISO/IEC 11801 2nd ed.; IEC 61156-5
- EN 50173; EN 50288-3-1

### Fire Rating

- IEC 60332-1, IEC 60332-3-24, IEC 61034-2, IEC 60754-1/2

# UC400 Cat.6 F/UTP SWB LSZH-FR

Category cable for demanding environments

### Construction

<b>Conductor</b>	Bare copper wire Ø 0.57 mm (AWG23)
<b>Insulation</b>	PE, Nom. Ø 0.95 mm
<b>Twisting</b>	2 cores to the pair
<b>Overall Screen</b>	Aluminum Polyester Tape
<b>Inner Sheath</b>	Special Flame retardant and halogen free LSZH-FR
<b>Armouring</b>	0.3mm Galvanised Steel Braid, Coverage 80%
<b>Outer Sheath</b>	Black Special Flame retardant and halogen free LSZH-FR
<b>Sheath Colour</b>	Black

### Mechanical Properties

<b>Bending radius</b>	Installation	8 X D
<b>Temperature range</b>	During operation	-10°C to + 60°C
	During installation	-10°C to + 60°C

### Electrical Properties at 20°C± 5°C

<b>Loop resistance</b>	≤ 110 Ω/km	≤ 176 Ω/km
<b>Resistance unbalance</b>	12 Ω/km	≤ 2%
<b>Insulation resistance</b>	(500 V)	≥ 2000 MΩ*km
<b>Mutual capacitance</b>	at 800 Hz	Nom. 43 nF/km
<b>Capacitance unbalance</b>	(pair/ground)	≤ 1500 pF/km
<b>Test voltage</b>	(DC, 1 min) core/core and core/screen	1000 V

### Electrical Data Nominal at 20°C

F (MHZ)	Attenuation (dB/100m)	NEXT (dB)	ACR (dB/100m)	PS-NEXT (dB)	EL-FEXT (dB/100m)	PS-ELFEXT (dB/100m)	Return loss (dB)
1	2.1	81.3	78.2	77.3	71	68	21.5
4	3.8	71.3	67.4	68.3	59	56	24.5
10	6	65.3	59.3	62.3	51	48	26.5
16	7.6	62.2	54.6	59.2	46.9	43.9	26.5
20	8.5	60.8	52.3	57.8	45	42	26.5
31.2	10.7	57.9	47.1	54.9	41.1	38.1	25.1
62.5	15.5	53.4	37.9	50.4	35.1	32.1	23
100	19.9	50.3	30.4	47.3	31	28	21.6
155.5	25.3	47.4	22.1	44.4	27.2	24.2	20.3
200	29.1	45.8	16.6	42.8	25	22	19.5
250	33	44.3	11.3	41.3	23	20	18.8

### Ordering Information

P/N	Product Description	P.U
61048B	UC 400 Cat 6 F/UTP 23 AWG LSZH-FR SWB, IEC 60332-1	500m/drum

# IE ToughCat 5e LSHF-FR

S/FTP Installation Cable 4x2xAWG24/7 for tougher environments

1.4 Industrial Ethernet

## Construction

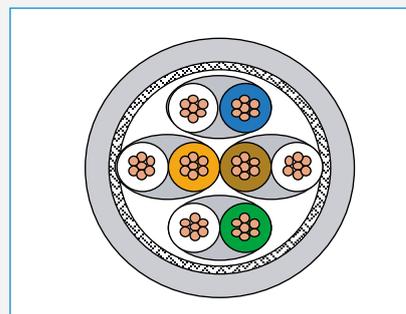
<b>Conductor</b>	Stranded copper wire, cross section 0.22 mm <sup>2</sup> (AWG24/7)
<b>Insulation</b>	PE, Ø 1.4 mm
<b>Twisting</b>	2 cores to the pair
<b>Cable lay up</b>	4 pairs
<b>Pair screen</b>	Al-laminated plastic foil around each pair
<b>Overall screen</b>	Copper braid, tinned Ø 6.2 mm
<b>Sheath</b>	Oil resistant, Fire retardant and halogen free LSZH-FR (SHF1), diameter 7.7 mm
<b>Colour</b>	Grey RAL 7035
<b>Outer Diameter</b>	Nom. 7.7 mm
<b>Weight</b>	Nom. 68 kg/km
<b>Tensile force N</b>	100

## Mechanical Properties

<b>Bending radius</b>	Without load	8 x D
	With load	4 x D
<b>Temperature range</b>	During operation	-40°C to + 85°C
	During installation	-15°C to + 50°C
<b>Fire load</b>	4 pair	670 MJ/km
<b>Maximum tensile load</b>	During operation	No load
	During installation	100 N

## Electrical Properties at 20°C

<b>DC loop resistance</b>	-	≤ 158 Ω/km
<b>Resistance unbalance</b>	-	≤ 2%
<b>Insulation resistance</b>	(500 V)	≥ 5000 MΩxkm
<b>Capacitance</b>	at 800 Hz	Nom. 43 nF/km
<b>Capacitance unbalance</b>	(pair to ground)	≤ 1500 pF/km
<b>Mean Characteristic impedance</b>	@ 100 MHz	100 ± 5 Ω
<b>Nominal velocity of propagation</b>	-	0.75c
<b>Propagation delay</b>	-	≤ 450 ns/100 m
<b>Delay skew</b>	-	≤ 15 ns/100 m
<b>Transfer impedance</b>	at 1 MHz	≤ 10 mΩ /m
	at 10 MHz	≤ 8 mΩ /m
	at 30 MHz	≤ 10 mΩ /m
<b>Coupling attenuation</b>	-	≥ 85 dB



## Application

- Generic Data transmission. This cable is a **Cat5e S/FTP** cable meant for use as installation/horizontal cable in tougher electrical and mechanical environment, including ships and offshore units.

## Standards

- EN 50288-2-1
- Det Norske Veritas (DNV) specification No. 6-827.50-2 and Lloyd Register approval, system, 2002

## Fire Rating

- IEC 60332-1, IEC 60332-3-24, IEC 61034-2, IEC 60754-1/2

## Chemical Resistance

- Mineral oils IRM 902 (IEC60811-2-1) : 7 days/23°C, 4 hours/70°C
- Diesel - IRM 903 (IEC60811-2-1) : 7 days/23°C, 4 hours/70°C

## Certification

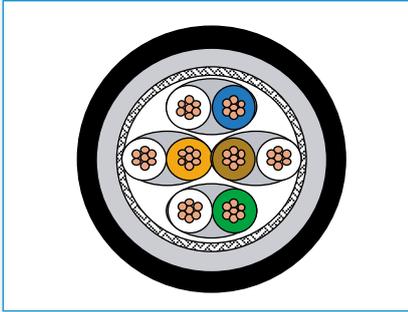
- This cable is certified by: Det Norske Veritas (DNV) and Lloyd Register

## Nominal Transmission Characteristics at 20°C

F (MHZ)	Attenuation (dB/100m)	NEXT (dB)	ACR (dB/100m)	Return loss (dB)	PS-NEXT (dB)	PS-ACR (dB/100m)	ELFEXT (dB/100m)	PS-ELFEXT (dB/100m)
1	2.1	90	88	-	87	85	85	82
4	4.0	90	86	27	87	83	85	82
10	6.3	90	84	30	87	81	79	76
16	8.0	90	82	30	87	79	75	72
20	9.0	90	81	30	87	78	73	70
31.25	11.4	90	79	30	87	76	69	66
62.50	16.5	86	70	30	83	67	63	60
100	21.3	83	62	30	80	59	59	56
155	24.2	81	57	26	78	54	57	54
200	31.5	78	47	25	75	44	53	50
250	35.8	77	41	25	74	38	51	48
300	47.1	73	26	23	70	23	47	44
600	60.1	71	11	20	68	8	44	41

## Ordering Information

P/N	Product Description	P.U
60015830	S/FTP Installation Cable 4x2xAWG24/7 for tougher environments, IE ToughCat 5e LSHF-FR	500m/drum
60011599	S/FTP Installation Cable 4x2xAWG24/7 for tougher environments, IE ToughCat 5e LSHF-FR	1000m/drum



### Application

- Generic Data transmission. This **Cat5e S/FTP** cable is based on our DNV and Lloyd Register certified ToughCat, but with an additional fire retardant, halogen-free, low smoke MUD protecting outer jacket. This cable is meant for use as installation/horizontal cable in tougher electrical and mechanical environment, including ships and offshore units.

### Standards

- EN 50173-1, EN 50288-4-1
- ISO/IEC 11801, IEC 61156-5

### Fire Rating

- MUD protecting outer sheath : IEC 60754-2; IEC 61034, IEC 60332-3-24
- Inner sheath: IEC 60332-1, IEC 60332-3-24, IEC 61034-2, IEC 60754-1/2

### Chemical Resistance

- Mineral oils IRM 902 (IEC60811-2-1) : 7 days/100°C
- Diesel - IRM 903 (IEC60811-2-1) : 7 days/100°C

# IE ToughCat 5e LSHF-FR MUD

S/FTP Installation Cable 4x2xAWG24/7 for tougher environments

### Construction

<b>Conductor</b>	Stranded copper wire, cross section 0.22 mm <sup>2</sup> (AWG24/7)
<b>Insulation</b>	PE, Ø 1.4 mm
<b>Twisting</b>	2 cores to the pair
<b>Cable lay up</b>	4 pairs
<b>Pair screen</b>	Al-laminated plastic foil around each pair
<b>Overall screen</b>	Copper braid, tinned Ø 6.2 mm
<b>Inner Sheath</b>	Oil resistant, Fire retardant and halogen free LSZH-FR (SHF1), diameter 7.7 mm
<b>Colour</b>	Grey RAL 7035
<b>Outer sheath</b>	MUD protecting, diameter 9.5 mm
<b>Colour</b>	Grey RAL 7024
<b>Outer Diameter</b>	Nom. 9.5 mm
<b>Weight</b>	Nom. 100 kg/km
<b>Tensile force N</b>	100

### Mechanical Properties

<b>Bending radius</b>	Without load	8 x D
	With load	4 x D
<b>Temperature range</b>	During operation	-40°C to + 85°C
	During installation	-15°C to + 50°C
<b>Fire load</b>	4 pair	(on request) MJ/km
<b>Maximum tensile load</b>	During operation	No load
	During installation	100 N

### Electrical Properties at 20°C

<b>DC loop resistance</b>	-	≤ 158 Ω/km
<b>Resistance unbalance</b>	-	≤ 2%
<b>Insulation resistance</b>	(500 V)	≥ 5000 MΩxkm
<b>Capacitance</b>	at 800 Hz	Nom. 43 nF/km
<b>Capacitance unbalance</b>	(pair to ground)	≤ 1500 pF/km
<b>Mean Characteristic impedance</b>	@ 100 MHz	100 ± 5 Ω
<b>Nominal velocity of propagation</b>	-	0.75c
<b>Propagation delay</b>	-	≤ 450 ns/100 m
<b>Delay skew</b>	-	≤ 15 ns/100 m
<b>Transfer impedance</b>	at 1 MHz	≤ 10 mΩ /m
	at 10 MHz	≤ 8 mΩ /m
	at 30 MHz	≤ 10 mΩ /m
<b>Delay skew</b>	-	≥ 85 dB

### Nominal Transmission Characteristics at 20°C

F (MHZ)	Attenuation (dB/100m)	NEXT (dB)	ACR (dB/100m)	Return loss (dB)	PS-NEXT (dB)	PS-ACR (dB/100m)	ELFEXT (dB/100m)	PS-ELFEXT (dB/100m)
1	2.1	90	88	-	87	85	85	82
4	4.0	90	86	27	87	83	85	82
10	6.3	90	84	30	87	81	79	76
16	8.0	90	82	30	87	79	75	72
20	9.0	90	81	30	87	78	73	70
31.25	11.4	90	79	30	87	76	69	66
62.50	16.5	86	70	30	83	67	63	60
100	21.3	83	62	30	80	59	59	56
155	24.2	81	57	26	78	54	57	54
200	31.5	78	47	25	75	44	53	50
250	35.8	77	41	25	74	38	51	48
300	47.1	73	26	23	70	23	47	44
600	60.1	71	11	20	68	8	44	41

### Ordering Information

P/N	Product Description	P.U
60015703	S/FTP Installation Cable 4x2xAWG24/7 for tougher environments, IE ToughCat 5e LSHF-FR MUD	500m/drum
60015701	S/FTP Installation Cable 4x2xAWG24/7 for tougher environments, IE ToughCat 5e LSHF-FR MUD	1000m/drum

# IE ToughCat 7 LSHF-FR

S/FTP Installation Cable 4x2xAWG23/7 for tougher environments

## Construction

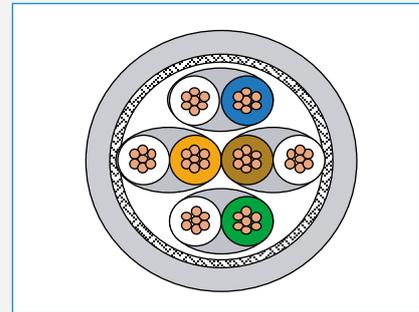
<b>Conductor</b>	Stranded copper wire, cross section 0.27 mm <sup>2</sup> (AWG23/7)
<b>Insulation</b>	PE, Ø 1.6 mm
<b>Twisting</b>	2 cores to the pair
<b>Cable lay up</b>	4 pairs
<b>Pair screen</b>	Al-laminated plastic foil around each pair
<b>Overall screen</b>	Copper braid, tinned Ø 6.6 mm
<b>Sheath</b>	Oil resistant, Fire retardant and halogen free LSHF-FR (SHF1), diameter 8.1 mm
<b>Colour</b>	Grey RAL 7035
<b>Outer Diameter</b>	Nom. 8.1 mm
<b>Weight</b>	Nom. 75 kg/km
<b>Tensile force N</b>	100

## Mechanical Properties

<b>Bending radius</b>	Without load	8 x D
	With load	4 x D
<b>Temperature range</b>	During operation	-40°C to + 85°C
	During installation	-15°C to + 50°C
<b>Fire load</b>	4 pair	670 MJ/km
<b>Maximum tensile load</b>	During operation	No load
	During installation	100 N

## Electrical Properties at 20°C

<b>DC loop resistance</b>	-	≤ 138 Ω/km
<b>Resistance unbalance</b>	-	≤ 2%
<b>Insulation resistance</b>	(500 V)	≥ 5000 MΩxkm
<b>Capacitance</b>	at 800 Hz	Nom. 43 nF/km
<b>Capacitance unbalance</b>	(pair to ground)	≤ 1500 pF/km
<b>Mean Characteristic impedance</b>	@ 100 MHz	100 ± 5 Ω
<b>Nominal velocity of propagation</b>	-	0.76c
<b>Propagation delay</b>	-	≤ 450 ns/100 m
<b>Delay skew</b>	-	≤ 15 ns/100 m
<b>Transfer impedance</b>	at 1 MHz	≤ 10 mΩ /m
	at 10 MHz	≤ 8 mΩ /m
	at 30 MHz	≤ 10 mΩ /m
<b>Coupling attenuation</b>	-	≥ 85 dB



## Application

- Generic Data transmission. This cable is a **Cat7 S/FTP** cable meant for use as installation/horizontal cable in tougher electrical and mechanical environment, including ships and offshore units.

## Standards

- EN 50173-1; EN 50288-4-1
- ISO/IEC 11801; IEC 61156-5
- Det Norske Veritas (DNV) specification No. 6-827.50-2

## Fire Rating

- IEC 60332-1, IEC 60332-3-24, IEC 61034-2, IEC 60754-1/2

## Chemical Resistance

- Mineral oils IRM 902 (IEC60811-2-1) : 7 days/23°C, 4 hours/70°C
- Diesel - IRM 903 (IEC60811-2-1) : 7 days/23°C, 4 hours/70°C

## Certification

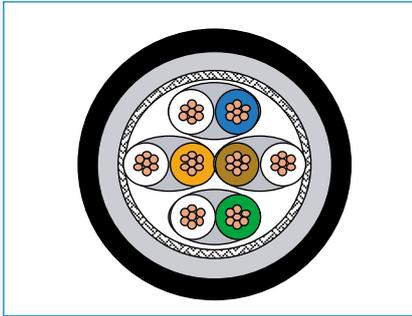
- This cable is certified by: Det Norske Veritas (DNV) and American Bureau of Shipping (ABS)

## Nominal Transmission Characteristics at 20°C

F (MHZ)	Attenuation (dB/100m)	NEXT (dB)	ACR (dB/100m)	Return loss (dB)	PS-NEXT (dB)	PS-ACR (dB/100m)	PS-ELFEXT (dB/100m)	PS-ELFEXT (dB/100m)
1	2.0	90	88	-	87	85	85	82
4	3.6	90	86	27	87	83	85	82
10	5.5	90	84	30	87	81	79	76
16	7.5	90	82	30	87	79	75	72
20	7.7	90	82	30	87	79	73	70
31.25	9.8	90	80	30	87	77	69	66
62.50	14.0	86	72	30	83	69	63	60
100	17.9	83	65	30	80	62	59	56
155	22.4	81	59	26	78	55	57	54
200	25.6	78	52	25	75	49	53	50
250	28.8	77	48	25	74	45	51	48
300	31.6	73	41	23	70	38	47	44
600	45.7	71	25	20	68	22	44	41

## Ordering Information

P/N	Product Description	P.U
60015820	S/FTP Installation Cable 4x2xAWG23/7 for tougher environments, IE ToughCat 7 LSHF-FR	500m/drum
60011619	S/FTP Installation Cable 4x2xAWG23/7 for tougher environments, IE ToughCat 7 LSHF-FR	1000m/drum



### Application

- Generic Data transmission. This **Cat7 S/FTP** cable is based on our DNV and Lloyd Register certified ToughCat, but with an additional fire retardant, halogen-free, low smoke MUD protecting outer jacket. This cable is meant for use as installation/horizontal cable in tougher electrical and mechanical environment, including ships and offshore units.

### Standards

- EN 50173-1; EN 50288-4-1
- ISO/IEC 11801; IEC 61156-5
- Det Norske Veritas (DNV) specification No. 6-827.50-2

### Fire Rating

- MUD protecting outer sheath : IEC 60754-2, IEC 61034, IEC 60332-3-24
- Inner sheath: IEC 60332-1, IEC 60332-3-24, IEC 61034-2, IEC 60754-1/2

### Chemical Resistance

- Mineral oils IRM 902 (IEC60811-2-1): 7 days/100°C
- Diesel - IRM 903 (IEC60811-2-1) : 7 days/100°C

# IE ToughCat 7 LSHF-FR MUD

S/FTP Installation Cable 4x2xAWG23/7 for tougher environments

### Construction

<b>Conductor</b>	Stranded copper wire, cross section 0.27 mm <sup>2</sup> (AWG23/7)
<b>Insulation</b>	PE, Ø 1.6 mm
<b>Twisting</b>	2 cores to the pair
<b>Cable lay up</b>	4 pairs
<b>Pair screen</b>	Al-laminated plastic foil around each pair
<b>Overall screen</b>	Copper braid, tinned Ø 6.6 mm
<b>Inner Sheath</b>	Oil resistant, Fire retardant and halogen free LSZH-FR (SHF1), diameter 8.1 mm
<b>Colour</b>	Grey RAL 7035
<b>Outer sheath</b>	MUD protecting, diameter 10.1 mm
<b>Colour</b>	Grey RAL 7024
<b>Outer Diameter</b>	Nom. 10.1 mm
<b>Weight</b>	Nom. 112 kg/km
<b>Tensile force N</b>	100

### Mechanical Properties

<b>Bending radius</b>	Without load	8 x D
	With load	4 x D
<b>Temperature range</b>	During operation	-40°C to + 85°C
	During installation	-15°C to + 50°C
<b>Fire load</b>	4 pair	(on request) MJ/km
<b>Maximum tensile load</b>	During operation	No load
	During installation	100 N

### Electrical Properties at 20°C

<b>DC loop resistance</b>	-	≤ 138 Ω/km
<b>Resistance unbalance</b>	-	≤ 2%
<b>Insulation resistance</b>	(500 V)	≥ 5000 MΩxkm
<b>Capacitance</b>	at 800 Hz	Nom. 43 nF/km
<b>Capacitance unbalance</b>	(pair to ground)	≤ 1500 pF/km
<b>Mean Characteristic impedance</b>	@ 100 MHz	100 ± 5 Ω
<b>Nominal velocity of propagation</b>	-	0.76c
<b>Propagation delay</b>	-	≤ 450 ns/100 m
<b>Delay skew</b>	-	≤ 15 ns/100 m
<b>Transfer impedance</b>	at 1 MHz	≤ 10 mΩ /m
	at 10 MHz	≤ 8 mΩ /m
	at 30 MHz	≤ 10 mΩ /m
<b>Coupling attenuation</b>	-	≥ 85 dB

### Nominal Transmission Characteristics at 20°C

F (MHZ)	Attenuation (dB/100m)	NEXT (dB)	ACR (dB/100m)	Return loss (dB)	PS-NEXT (dB)	PS-ACR (dB/100m)	PS-ELFEXT (dB/100m)	PS-ELFEXT (dB/100m)
1	2.0	90	88	-	87	85	85	82
4	3.6	90	86	27	87	83	85	82
10	5.5	90	84	30	87	81	79	76
16	7.5	90	82	30	87	79	75	72
20	7.7	90	82	30	87	79	73	70
31.25	9.8	90	80	30	87	77	69	66
62.50	14.0	86	72	30	83	69	63	60
100	17.9	83	65	30	80	62	59	56
155	22.4	81	59	26	78	55	57	54
200	25.6	78	52	25	75	49	53	50
250	28.8	77	48	25	74	45	51	48
300	31.6	73	41	23	70	38	47	44
600	45.7	71	25	20	68	22	44	41

### Ordering Information

P/N	Product Description	P.U
60015695	S/FTP Installation Cable 4x2xAWG23/7 for tougher environments, IE ToughCat 7 LSHF-FR MUD	500m/drum
60015692	S/FTP Installation Cable 4x2xAWG23/7 for tougher environments, IE ToughCat 7 LSHF-FR MUD	1000m/drum

# IE ToughCat 7S\* Armoured

## S/FTP Installation Cable for tougher environments

1.4 Industrial Ethernet

### Construction

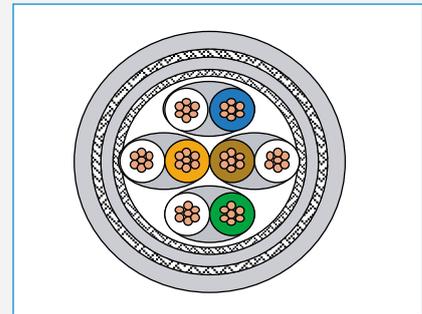
<b>Conductor</b>	Solid copper wire, Ø 0.56 mm (AWG 23)
<b>Insulation</b>	foamskin PE, Ø 1.4 mm
<b>Twisting</b>	2 cores to the pair
<b>Pair screen</b>	Al-laminated plastic foil
<b>Cable lay up</b>	4 pairs (PiMF) to the core
<b>Screen</b>	copper braid, tinned
<b>Inner Sheath</b>	Oil resistant, Fire retardant and halogen free LSZH-FR (SHF1)
<b>Outer sheath</b>	Grey RAL7035
<b>Armouring</b>	Galvanized steel wire braid, Wire diameter 0,25mm
<b>Outer sheath</b>	Oil resistant, Fire retardant and halogen free LSZH-FR (SHF1)
<b>Outer Diameter</b>	Nom. 10.6 mm
<b>Weight</b>	Nom. 168 kg/km

### Mechanical Properties

<b>Bending radius</b>	Installation	8 x D
	Installed	4 x D
<b>Temperature range</b>	During operation	-40°C to + 85°C
	During installation	-15°C to + 50°C
<b>Fire load</b>	4 pair	1540 MJ/km
<b>Maximum tensile load</b>	During operation	No load
	During installation	200 N

### Electrical Properties at 20°C ± 5°C

<b>Loop resistance</b>	-	≤ 150 Ω/km
<b>Resistance unbalance</b>	-	≤ 2%
<b>Insulation resistance</b>	(500 V)	≥ 5000 MΩxkm
<b>Mutual capacitance</b>	at 800 Hz	Nom. 43 nF/km
<b>Capacitance unbalance</b>	(pair/ground)	≤ 1500 pF/km
<b>Characteristic impedance</b>	(1-100 MHz)	100 ± 5 Ω
	(100 - 250) MHz	100 ± 10 Ω
	(250 - 600) MHz	100 ± 15 Ω
<b>Nominal velocity of propagation</b>	-	ca. 79 %
<b>Propagation delay</b>	-	≤ 570 ns/100m
<b>Delay skew</b>	-	≤ 9 ns/100m
<b>Test voltage</b>	(DC, 1 min) core/core and core/screen	1000 V
<b>Transfer impedance(Grade 1)</b>	at 1 MHz	≤ 10 mΩ/m
	at 10 MHz	≤ 10 mΩ/m
	at 30 MHz	≤ 10 mΩ/m
	at 100 MHz	≤ 20 mΩ/m
<b>Coupling attenuation</b>	-	≥ 85 dB



### Application

- Generic Data transmission. This cable is a **Cat7 S/FTP** cable meant for use as installation/horizontal cable in tougher electrical and mechanical environment, including ships and offshore units.

### Standards

- EN 50173-1; EN 50288-4-1
- ISO/IEC 11801; IEC 61156-5
- Det Norske Veritas (DNV) specification No. 6-827.50-2

### Fire Rating

- IEC 60332-1, IEC 60332-3-24, IEC 61034-2, IEC 60754-1/2

### Chemical Resistance

- Mineral oils IRM 902 (IEC60811-2-1) : 7 days/23°C, 4 hours/70°C
- Diesel - IRM 903 (IEC60811-2-1) : 7 days/23°C, 4 hours/70°C

### Certification

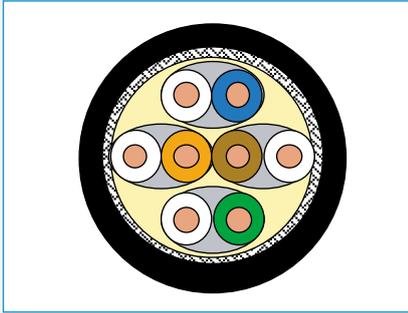
- This cable is based on the unarmoured version certified by: Det Norske Veritas (DNV)

### Electrical Data (Nominal) acc. to Cat.7 (at 20°C)

F (MHZ)	Attenuation (dB/100m)	NEXT (dB)	PS-NEXT (dB)	ACR (dB/100m)	PS-ACR (dB/100m)	ELFEXT (dB/100m)	PS-ELFEXT (dB/100m)	Return loss (dB/100m)
1	1.8	100	97	98	95	105	105	-
4	3.4	100	97	97	94	105	102	27
10	5.4	100	97	95	92	97	94	30
16	6.8	100	97	93	90	93	90	30
20	7.7	100	97	92	89	91	88	30
31.2	9.6	100	97	90	87	87	84	30
62.5	13.7	100	97	86	83	81	78	30
100	17.4	100	97	83	80	77	74	30
125	19.5	95	92	75	72	75	72	26
155.5	21.9	94	91	72	69	73	70	26
175	23.3	93	90	70	67	72	69	25
200	25.0	92	89	67	64	71	68	25
250	28.1	90	87	62	59	69	66	24
300	30.9	89	86	58	55	67	64	24
450	38.3	87	84	48	45	64	61	23
600	44.8	85	82	40	37	61	58	22

### Ordering Information

P/N	Product Description	P.U
60027371	S/FTP Installation Cable for tougher environments, IE ToughCat 7S* Armoured	500m/drum



### Application

- Indoor- and outdoor installations, filled with compound to prevent water penetration
- Primary (Campus), Secondary (Riser), Tertiary (Horizontal)
- IEEE 802.3: 10Base-T; 100Base-T; 1000Base-T; 10GBase-T
- IEEE 802.5 16 MB; ISDN; TPDDI; ATM

### Standards

- EN 50173-1; EN 50288-4-1
- ISO/IEC 11801; IEC 61156-5

### Water Penetration Rating

- IEC 60794-1-2F5, method B

### Fire Rating

- IEC 60332-1, IEC 60332-3-24, IEC 61034-2, IEC 60754-1/2

# IE SuperCat 7 HS23 Cat.7 LSHF

Water resistant S/FTP Installation Cable 4x2xAWG23/1 for Indoor/Outdoor use

### Construction

<b>Conductor</b>	Solid bare copper wire, Ø 0.55 mm (AWG 23)
<b>Insulation</b>	Foam-skin PE, Ø 1.45 mm
<b>Twisting</b>	2 cores to the pair, WBC filled
<b>Pair screen</b>	Al-laminated plastic foil
<b>Cable lay up</b>	4 pairs (PIMF) to the core, swelling yarn and tape
<b>Cable core filling</b>	Special Waterproofing/compound to prevent moisture migration*). To prevent water penetration and to ensure electrical properties even in continuous wet conditions.
<b>Screen</b>	Copper braid, tinned
<b>Sheath</b>	LSZH, UV stabilized, diameter 8.7 mm
<b>Colour</b>	Black, RAL 9011
<b>Outer Diameter</b>	Nom. 8.7 mm
<b>Weight</b>	Nom. 1000 kg/km
<b>Tensile force N</b>	100

### Mechanical Properties

<b>Bending radius</b>	During operation	4 x Outer diameter
	During installation	8 x Outer diameter
<b>Temperature range</b>	During operation	-40°C to + 60°C
	During installation	-10°C to + 50°C
<b>Fire load</b>	-	838 MJ/km
	During operation	-
<b>Maximum tensile load</b>	During installation	100 N

### Electrical Properties at 20°C ± 5°C

<b>Loop resistance</b>	-	≤ 165 Ω/km
<b>Resistance unbalance</b>	-	≤ 2%
<b>Insulation resistance</b>	(500 V)	≥ 2000 MΩ*km
<b>Mutual capacitance</b>	at 800 Hz	Nom. 43 nF/km
<b>Capacitance unbalance</b>	(pair/ground)	≤ 1500 pF/km
<b>Characteristic impedance</b>	(1-100 MHz)	(100 ± 15) Ω
	(100 - 250) MHz	(100 ± 18) Ω
	(250 - 600) MHz	(100 ± 25) Ω
<b>Nominal velocity of propagation</b>	-	ca. 79 %
<b>Propagation delay</b>	-	≤ 550 ns/100m
<b>Delay skew</b>	-	≤ 10 ns/100m
<b>Test voltage</b>	(DC, 1 min) core/core and core/screen	1000 V
<b>Transfer impedance</b>	at 1 MHz	≤ 20 mΩ/m
	at 10 MHz	≤ 30 mΩ/m
	at 30 MHz	≤ 40 mΩ/m
	at 100MHz	≤ 200 mΩ/m
<b>Delay skew</b>	-	≥ 75 dB

### Nominal Transmission Characteristics at 20°C

F (MHZ)	Attenuation (dB/100m)	NEXT (dB)	PS-NEXT* (dB)	ACR (dB/100m)	PS-ACR (dB/100m)	ELFEXT (dB/100m)	PS-ELFEXT (dB/100m)	Return loss (dB)
1	1.8	100	97	98	95	105	105	-
4	3.4	100	97	97	94	105	102	27
10	5.4	100	97	95	92	97	94	30
16	6.8	100	97	93	90	93	90	30
20	7.7	100	97	92	89	91	88	30
31.2	9.6	100	97	90	87	87	84	30
62.5	13.7	100	97	86	83	81	78	30
100	17.4	100	97	83	80	77	74	30
125	19.5	95	92	75	72	75	72	26
155.5	21.9	94	91	72	69	73	70	26
175	23.3	93	90	70	67	72	69	25
200	25.0	92	89	67	64	71	68	25
250	28.1	90	87	62	59	69	66	24
300	30.9	89	86	58	55	67	64	24
450	38.3	87	84	48	45	64	61	23
600	44.8	85	82	40	37	61	58	22
750	52.0	83	80	31	28	59	56	21
900	59.4	82	79	23	20	58	55	20

### Ordering Information

P/N	Product Description	P,U
60014892	Water resistant S/FTP Installation Cable 4x2xAWG23/1 for Indoor/Outdoor use, IE SuperCat 7 HS23 Cat.7 LSHF	500m/drum
60014810	Water resistant S/FTP Installation Cable 4x2xAWG23/1 for Indoor/Outdoor use, IE SuperCat 7 HS23 Cat.7 LSHF	1000m/drum

# IE UC900 SS23 Cat.7 (L)H LSHF-FR

IE S/FTP cable 4x2xAWG23/1 with LSHF-FR moisture barrier sheath

1.4 Industrial Ethernet

## Construction

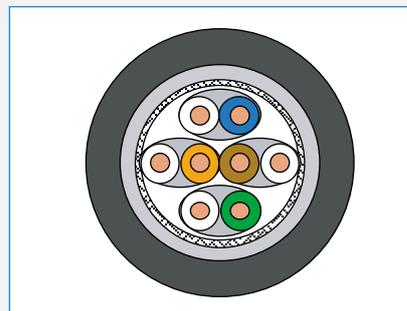
<b>Conductor</b>	bare copper wire, Ø 0.56 mm (AWG 23)
<b>Insulation</b>	foam-skin PE, Ø 1.4 mm
<b>Twisting</b>	2 cores to the pair
<b>Pair screen</b>	Al-laminated plastic foil
<b>Cable lay up</b>	4 pairs (PiMF) to the core
<b>Screen</b>	copper braid, tinned
<b>Sheath</b>	aluminum tape connected with halogen free, flame retardant thermoplastic sheathing compound acc. to EN 50290-2-27, wall thickness 1.5 mm
<b>Colour</b>	black RAL 9005
<b>Outer Diameter</b>	Nom. 9.5 mm
<b>Weight</b>	Nom. 114 kg/km
<b>Tensile force N</b>	350

## Mechanical Properties

<b>Bending radius</b>	Without load	≥ 40 mm
	With load	≥ 80 mm
<b>Temperature range</b>	During operation	-20°C to + 60°C
	During installation	0°C to + 50°C

## Electrical Properties at 20°C ± 5°C

<b>Loop resistance</b>	-	≤ 165 Ω/km
<b>Resistance unbalance</b>	-	≤ 2%
<b>Insulation resistance</b>	(500 V)	≥ 5000 MΩ*km
<b>Mutual capacitance</b>	at 800 Hz	Nom. 43 nF/km
<b>Capacitance unbalance</b>	(pair/ground)	≤ 1500 pF/km
<b>Mean characteristic impedance</b>	100 MHz	100 ± 5 Ω
<b>Nominal velocity of propagation</b>	-	ca. 79 %
<b>Propagation delay</b>	-	427 ns/100m
<b>Delay skew</b>	-	12 ns/100m
<b>Test voltage</b>	(DC, 1 min) core/core and core/screen	1000 V
<b>Transfer impedance</b>	at 1 MHz	10 mΩ/m
	at 10 MHz	10 mΩ/m
	at 30 MHz	30 mΩ/m
	at 100MHz	60 mΩ/m
<b>Coupling attenuation</b>	-	85 dB



## Application

- Primary (Campus), Secondary (Riser), Tertiary (Horizontal)
- IEEE 802.3: 10Base-T; 100Base-T; 1000Base-T; 10GBase-T
- IEEE 802.5 16 MB; ISDN; TPDDI; ATM

## Standards

- EN 50173-1; EN 50288-4-1
- ISO/IEC 11801; IEC 61156-5

## Fire Rating

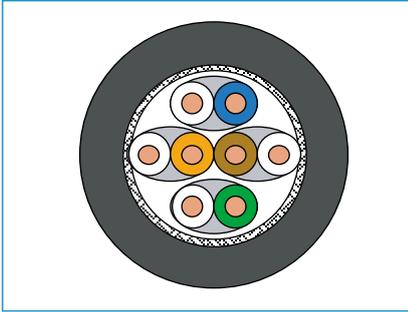
- IEC 60332-1, IEC 60332-3-24, IEC 61034-2, IEC 60754-1/2

## Electrical Data (Nominal) acc. to Cat.7 (at 20°C)

F (MHZ)	Attenuation (dB/100m)	NEXT (dB)	PS-NEXT (dB/100m)	ACR (dB)	PS-ACR (dB)	ELFEXT (dB/100m)	PS-ELFEXT (dB/100m)	Return loss (dB/100m)
1	1.8	100	97	98	95	105	105	-
4	3.4	100	97	97	94	105	102	27
10	5.4	100	97	95	92	97	94	30
16	6.8	100	97	93	90	93	90	30
20	7.7	100	97	92	89	91	88	30
31.2	9.6	100	97	90	87	87	84	30
62.5	13.7	100	97	86	83	81	78	30
100	17.4	100	97	83	80	77	74	30
125	19.5	95	92	75	72	75	72	26
155.5	21.9	94	91	72	69	73	70	26
175	23.3	93	90	70	67	72	69	25
200	25.0	92	89	67	64	71	68	25
250	28.1	90	87	62	59	69	66	24
300	30.9	89	86	58	55	67	64	24
450	38.3	87	84	48	45	64	61	23
600	44.8	85	82	40	37	61	58	22
750	52.0	83	80	31	28	59	56	21
900	59.4	82	79	23	20	58	55	20
1000	63.1	80	77	17	14	57	54	20

## Ordering Information

P/N	Product Description	P.U
60015223	IE S/FTP cable 4x2xAWG23/1 with LSHF-FR moisture barrier sheath, IE UC900 SS23 Cat.7 (L)H LSHF-FR	500m/drum
60015222	IE S/FTP cable 4x2xAWG23/1 with LSHF-FR moisture barrier sheath, IE UC900 SS23 Cat.7 (L)H LSHF-FR	1000m/drum



### Application

- Primary (Campus), Secondary (Riser), Tertiary (Horizontal)
- IEEE 802.3: 10Base-T; 100Base-T; 1000Base-T; 10GBase-T
- IEEE 802.5 16 MB; ISDN; TPDDI; ATM

### Fire Rating

- EN 50173-1; EN 50288-4-1
- ISO/IEC 11801; IEC 61156-5

# IE UC900 SS23 Cat.7 PE

IE S/FTP cable 4x2xAWG23/1 with PE sheath

### Construction

<b>Conductor</b>	bare copper wire, Ø 0.56 mm (AWG 23)
<b>Insulation</b>	foam-skin PE, Ø 1.4 mm
<b>Twisting</b>	2 cores to the pair
<b>Pair screen</b>	Al-laminated plastic foil
<b>Cable lay up</b>	4 pairs (PiMF) to the core
<b>Screen</b>	copper braid, tinned
<b>Sheath</b>	PE, for outdoor installation
<b>Colour</b>	black, RAL 9005
<b>Outer Diameter</b>	Nom. 8.4 mm
<b>Weight</b>	Nom. 95 kg/km
<b>Tensile force N</b>	340

### Mechanical Properties

<b>Bending radius</b>	Without load	≥ 40 mm
	With load	≥ 80 mm
<b>Temperature range</b>	During operation	-55°C to + 60°C
	During installation	-20°C to + 50°C

### Electrical Properties at 20°C ± 5°C

<b>Loop resistance</b>	-	≤ 165 Ω/km
<b>Resistance unbalance</b>	-	≤ 2%
<b>Insulation resistance</b>	(500 V)	≥ 5000 MΩ*km
<b>Mutual capacitance</b>	at 800 Hz	Nom. 43 nF/km
<b>Capacitance unbalance</b>	(pair/ground)	≤ 1500 pF/km
<b>Characteristic impedance</b>	(1-100 MHz)	(100 ± 15) Ω
	(100 - 250) MHz	(100 ± 18) Ω
	(250 - 600) MHz	(100 ± 25) Ω
<b>Nominal velocity of propagation</b>	-	ca. 79 %
<b>Propagation delay</b>	-	≤ 427 ns/100m
<b>Delay skew</b>	-	≤ 12 ns/100m
<b>Test voltage</b>	(DC, 1 min) core/core and core/screen	1000 V
<b>Transfer impedance</b>	at 1 MHz	10 mΩ/m
	at 10 MHz	10 mΩ/m
	at 30 MHz	30 mΩ/m
	at 100MHz	60 mΩ/m
<b>Coupling attenuation</b>	-	85 dB

### Electrical Data (Nominal) acc. to Cat.7 (at 20°C)

F (MHZ)	Attenuation (dB/100m)	NEXT (dB)	PS-NEXT (dB)	ACR (dB/100m)	PS-ACR (dB/100m)	ELFEXT (dB/100m)	PS-ELFEXT (dB/100m)	Return loss (dB)
1	1.8	100	97	98	95	105	105	-
4	3.4	100	97	97	94	105	102	27
10	5.4	100	97	95	92	97	94	30
16	6.8	100	97	93	90	93	90	30
20	7.7	100	97	92	89	91	88	30
31.2	9.6	100	97	90	87	87	84	30
62.5	13.7	100	97	86	83	81	78	30
100	17.4	100	97	83	80	77	74	30
125	19.5	95	92	75	72	75	72	26
155.5	21.9	94	91	72	69	73	70	26
175	23.3	93	90	70	67	72	69	25
200	25.0	92	89	67	64	71	68	25
250	28.1	90	87	62	59	69	66	24
300	30.9	89	86	58	55	67	64	24
450	38.3	87	84	48	45	64	61	23
600	44.8	85	82	40	37	61	58	22
750	52.0	83	80	31	28	59	56	21
900	59.4	82	79	23	20	58	55	20
1000	63.1	80	77	17	14	57	54	20

### Ordering Information

P/N	Product Description	P.U
60011276	IE S/FTP cable 4x2xAWG23/1 with PE sheath, IE UC900 SS23 Cat.7 PE	500m/drum
60011278	IE S/FTP cable 4x2xAWG23/1 with PE sheath, IE UC900 SS23 Cat.7 PE	1000m/drum

# IE UC900 SS23 Cat.7 PUR

IE S/FTP cable 4x2xAWG23/1 with abrasion and oil resistant PUR sheath

1.4 Industrial Ethernet

## Construction

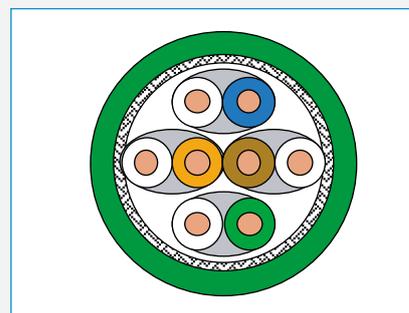
<b>Conductor</b>	bare copper wire, Ø 0.56 mm (AWG 23)
<b>Insulation</b>	foam-skin PE, Ø 1.4 mm
<b>Twisting</b>	2 cores to the pair
<b>Pair screen</b>	Al-laminated plastic foil
<b>Cable lay up</b>	4 pairs (PiMF) to the core
<b>Screen</b>	copper braid, tinned
<b>Sheath</b>	PUR, oil resistant
<b>Colour</b>	green RAL 6018
<b>Outer Diameter</b>	Nom. 7.5 mm
<b>Weight</b>	Nom. 92 kg/km
<b>Tensile force N</b>	340

## Mechanical Properties

<b>Bending radius</b>	Without load	≥ 30 mm
	With load	≥ 60 mm
<b>Temperature range</b>	During operation	-30°C to + 75°C
	During installation	-0°C to + 50°C

## Electrical Properties at 20°C ± 5°C

<b>Loop resistance</b>	-	≤ 150 Ω/km
<b>Resistance unbalance</b>	-	≤ 2%
<b>Insulation resistance</b>	(500 V)	≥ 5000 MΩ*km
<b>Mutual capacitance</b>	at 800 Hz	Nom. 43 nF/km
<b>Capacitance unbalance</b>	(pair/ground)	≤ 1500 pF/km
<b>Characteristic impedance</b>	(1-100 MHz)	(100 ± 5) Ω
	(100 - 250) MHz	(100 ± 10) Ω
	(250 - 600) MHz	(100 ± 15) Ω
<b>Nominal velocity of propagation</b>	-	ca. 79 %
<b>Propagation delay</b>	-	≤ 427 ns/100m
<b>Delay skew</b>	-	≤ 9 ns/100m
<b>Test voltage</b>	(DC, 1 min) core/core and core/screen	1000 V
<b>Transfer impedance</b>	at 1 MHz	5 mΩ/m
	at 10 MHz	5 mΩ/m
	at 30 MHz	10 mΩ/m
	at 100MHz	20 mΩ/m
<b>Coupling attenuation</b>	-	85 dB



## Application

- Primär (Campus), Sekundär (Riser), Tertiär (Horizontal)
- IEEE 802.3: 10Base-T; 100Base-T; 1000Base-T; 10GBase-T
- IEEE 802.5 16 MB; ISDN; TPDDI; ATM

## Standards

- EN 50173-1; EN 50288-4-1
- ISO/IEC 11801; IEC 61156-5

## Fire Rating

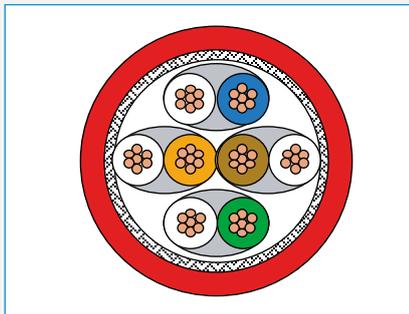
- IEC 60332-1; IEC 60754-2; IEC 61034

## Electrical Data (Nominal) acc. to Cat.7 (at 20°C)

F (MHZ)	Attenuation (dB/100m)	NEXT (dB)	PS-NEXT (dB)	ACR (dB/100m)	PS-ACR (dB/100m)	ELFEXT (dB/100m)	PS-ELFEXT (dB/100m)	Return loss (dB)
1	1.8	100	97	98	95	105	105	-
4	3.4	100	97	97	94	105	102	27
10	5.4	100	97	95	92	97	94	30
16	6.8	100	97	93	90	93	90	30
20	7.7	100	97	92	89	91	88	30
31.2	9.6	100	97	90	87	87	84	30
62.5	13.7	100	97	86	83	81	78	30
100	17.4	100	97	83	80	77	74	30
125	19.5	95	92	75	72	75	72	26
155.5	21.9	94	91	72	69	73	70	26
175	23.3	93	90	70	67	72	69	25
200	25.0	92	89	67	64	71	68	25
250	28.1	90	87	62	59	69	66	24
300	30.9	89	86	58	55	67	64	24
450	38.3	87	84	48	45	64	61	23
600	44.8	85	82	40	37	61	58	22
750	52.0	83	80	31	28	59	56	21
900	59.4	82	79	23	20	58	55	20
1000	63.1	80	77	17	14	57	54	20

## Ordering Information

P/N	Product Description	P.U
60015297	IE S/FTP cable 4x2xAWG23/1 with abrasion and oil resistant PUR sheath, IE UC900 SS23 Cat.7 PUR	500m/drum
60015294	IE S/FTP cable 4x2xAWG23/1 with abrasion and oil resistant PUR sheath, IE UC900 SS23 Cat.7 PUR	1000m/drum



### Application

- Work area and patch cord cable
- IEEE 802.3: 10Base-T; 100Base-T; 1000Base-T; 10GBase-T
- IEEE 802.5 16 MB; ISDN; TPDDI; ATM

### Standards

- EIA/TIA 568A;
- ISO/IEC 11801 2nd ed.; IEC 61156-6
- EN 50173-1; EN 50288-4-2

### Fire Rating

- IEC 60332-1; IEC 60754-2; IEC 61034

### Chemical Resistance

- Oil resistant against Mineral - oil, ASTM - oil
- The sheath material is tested in Hydraulic oil
- ARAL VITAM 32, Mobil DTE 13 M, Gear oil ARAL DEGOL BG Plus 320 and Tribol 1710/320.

# IE UC900 SS27 Cat.7 PUR

IE S/FTP patch cable 4x2xAWG27/7 with abrasion and oil resistant PUR sheath

### Construction

<b>Conductor</b>	stranded bare copper wires, $\varnothing$ 0.42 mm (AWG 27/7)
<b>Insulation</b>	foam-skin Polyethylene, $\varnothing$ 0.98 mm
<b>Twisting</b>	2 cores to the pair
<b>Pair screen</b>	Al-laminated plastic foil
<b>Cable lay up</b>	4 pairs (PIMF) to the core
<b>Screen</b>	copper braid, tinned
<b>Sheath</b>	PUR
<b>Colour</b>	red
<b>Outer Diameter</b>	Nom. 5.9 mm
<b>Weight</b>	Nom. 34 kg/km
<b>Tensile force N</b>	100

### Mechanical Properties

<b>Bending radius</b>	Without load	$\geq 25$ mm
	With load	$\geq 50$ mm
<b>Temperature range</b>	During operation	-35°C to +75°C
	During installation	-5°C to +50°C
<b>UV resistance of sheath material</b>	-	acc. to IEC60068-2-5
<b>Ozone resistance</b>	-	acc. to EN 60811-2-1, clause 8
<b>Smoke density</b>	-	acc. to EN 50268-2, IEC61034-1 and 2
<b>Corrosivity</b>	-	acc. EN 50267-1 and 2, IEC 60754-1 and 2

### Electrical Properties at 20°C $\pm$ 5°C

<b>Loop resistance</b>	-	$\leq 340$ $\Omega$ /km
<b>Resistance unbalance</b>	-	$\leq 3\%$
<b>Insulation resistance</b>	(500 V)	$\geq 2000$ M $\Omega$ *km
<b>Mutual capacitance</b>	at 800 Hz	Nom. 43 nF/km
<b>Capacitance unbalance</b>	(pair/ground)	$\leq 1500$ pF/km
<b>Characteristic impedance</b>	(1-100 MHz)	(100 $\pm$ 15) $\Omega$
	(100 - 250) MHz	(100 $\pm$ 18) $\Omega$
	(250 - 600) MHz	(100 $\pm$ 25) $\Omega$
<b>Nominal velocity of propagation</b>	-	ca. 79 %
<b>Propagation delay</b>	-	$\leq 427$ ns/100m
<b>Delay skew</b>	-	$\leq 12$ ns/100m
<b>Test voltage</b>	(DC, 1 min) core/core and core/screen	1000 V
<b>Transfer impedance</b>	at 1 MHz	25 m $\Omega$ /m
	at 10 MHz	15 m $\Omega$ /m
	at 30 MHz	30 m $\Omega$ /m
<b>Coupling attenuation</b>	-	75 dB

### Electrical Data (Nominal) acc. to Cat.7 (at 20°C)

F (MHZ)	Attenuation (dB/10m)	NEXT (dB)	PS-NEXT (dB)	ACR (dB/100m)	ELFEXT (dB/100m)	PS-ELFEXT (dB/100m)	Return loss (dB)
1	0.3	90	87	90	77	77	23
4	0.6	90	87	89	77	77	24
10	1.0	90	87	89	77	77	25
16	1.3	90	87	89	73	73	25
20	1.4	90	87	89	71	71	25
31.2	1.8	90	87	88	67	67	25
62.5	2.6	90	87	87	61	61	23
100	3.2	87	84	84	57	57	21
125	3.6	85	82	81	55	55	20
155.5	4.0	84	81	80	53	53	19
175	4.3	83	80	79	52	52	19
200	4.6	82	79	77	51	51	18
250	5.1	81	78	76	49	49	18
300	5.6	80	77	74	47	47	17
450	6.9	77	74	70	44	44	17
600	7.9	75	72	67	41	41	17
750	8.7	73	70	64	39	39	-
900	9.7	72	69	62	38	38	-
1000	10.2	71	68	61	37	37	-

### Ordering Information

P/N	Product Description	P.U
60011459	IE S/FTP patch cable 4x2xAWG27/7 with abrasion and oil resistant PUR sheath, IE UC900 SS27 Cat.7 PUR	500m/drum
60014237	IE S/FTP patch cable 4x2xAWG27/7 with abrasion and oil resistant PUR sheath, IE UC900 SS27 Cat.7 PUR	1000m/drum



Symmetrical data cable for industrial control equipment

1.5 JAMAK® Industrial Data

**Construction**

<b>Conductor</b>	Tinned stranded copper 7x 0.29 mm
<b>Insulation</b>	PE (2Y)
<b>Conductor identification</b>	a-conductor blue; b-conductor red
<b>Stranding</b>	2 conductors to pair
<b>Stranding to core</b>	(0+4)
<b>Pair shielding</b>	Laminated AL-foil + copper drain wire 0.5 mm <sup>2</sup>
<b>Overall shielding</b>	2pairs- 48pairs: Laminated AL-foil + copper drain wire 0.5 mm <sup>2</sup> , 1pair: without overall shielding
<b>Outer sheath</b>	PVC (Y), grey
<b>Outer Diameter</b>	Nom. 7.2(2pair) - 28.0(48pair) mm
<b>Weight</b>	Nom. 60(2pair) - 980(48pair) kg/km

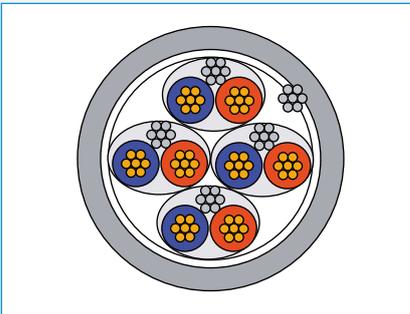
**Mechanical Properties**

<b>Operating temperature</b>	- 30°C to + 70°C
<b>Min. Installation temperature</b>	- 5°C

**Electrical Properties at 20°C**

<b>Loop resistance</b>	81 Ω/km
<b>Insulation resistance (at 500 V, 1 min.)</b>	2 GΩ*km
<b>Capacitance at 800 Hz</b>	85 nF/km
<b>Max. operating voltage</b>	75 V
<b>Relative velocity factor NVP</b>	0.66
<b>Impedance (at 10 MHz)</b>	70 Ω +/- 10 %

Frequency [kHz]	Attenuation [dB/100 m]
9.6	0.3
19.2	0.5
64	0.7
100	0.9
200	1.6
1000	4.5



**Application**

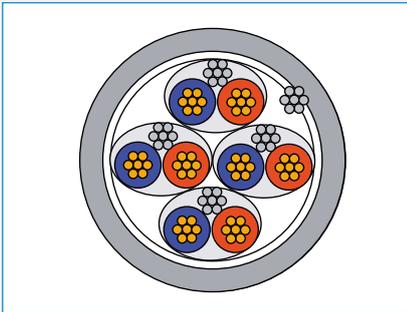
These symmetrical data transmission cables are used in control and supervision centre for industrial sites. They are suitable for fixed installation inside housings.

**Fire Rating**

- Oxygen Index LOI acc. to ASTM-D-2863: no limit
- IEC 60332-1

**Ordering Information**

P/N	Product Description	P.U
1004685	1x(2+1)x0.5, Symmetrical data cable for industrial control equipment, JAMAK®	1000m/drum
1006411-01000DX	2x(2+1)x0.5, Symmetrical data cable for industrial control equipment, JAMAK®	1000m/drum
1005579-00200DX	2x(2+1)x0.5, Symmetrical data cable for industrial control equipment, JAMAK®	200m/drum
1005540-01000DX	4x(2+1)x0.5, Symmetrical data cable for industrial control equipment, JAMAK®	1000m/drum
1005578-00200DX	4x(2+1)x0.5, Symmetrical data cable for industrial control equipment, JAMAK®	200m/drum
1005533-01000DX	8x(2+1)x0.5, Symmetrical data cable for industrial control equipment, JAMAK®	1000m/drum
1005525-00500DX	8x(2+1)x0.5, Symmetrical data cable for industrial control equipment, JAMAK®	500m/drum
1005534-01000DX	12x(2+1)x0.5, Symmetrical data cable for industrial control equipment, JAMAK®	1000m/drum
1005524-00500DX	24x(2+1)x0.5, Symmetrical data cable for industrial control equipment, JAMAK®	500m/drum
1005541-01000DX	24x(2+1)x0.5, Symmetrical data cable for industrial control equipment, JAMAK®	1000m/drum
1005535-00500DX	48x(2+1)x0.5, Symmetrical data cable for industrial control equipment, JAMAK®	500m/drum



### Application

These halogen-free, flame retardant and symmetrical data transmission cables are used in control and supervision center for industrial sites. They are suitable for fixed installation inside housings.

### Fire Rating

- IEC 60332-1; IEC 60754-2; IEC 61034

## JAMAK®-C LSZH

Symmetrical Data Cable for Industrial Control Equipment

### Construction

<b>Conductor</b>	Stranded tinned copper 7x 0.29 mm
<b>Insulation</b>	PE (2Y)
<b>Conductor identification</b>	a-conductor blue; b-conductor red
<b>Stranding</b>	2 conductors to pair
<b>Stranding to core</b>	(0+4)
<b>Pair shielding</b>	Laminated AL-foil + copper drain wire 0.5 mm <sup>2</sup>
<b>Overall shielding</b>	2 Laminated AL-foils with inner copper drain wire 0.5 mm <sup>2</sup>
<b>Outer sheath</b>	LSZH (H), grey (RAL 7035), light resistant
<b>Outer Diameter</b>	Nom. 7.5(2pair) - 30.5(48pair) mm
<b>Weight</b>	Nom. 70(2pair) - 1000(48pair) kg/km

### Mechanical Properties

<b>Operating temperature</b>	- 30°C to + 70°C
<b>Min. Installation temperature</b>	- 5°C

### Electrical Properties at 20°C

<b>Loop resistance</b>	81 Ω/km
<b>Insulation resistance (at 500 V, 1 min.)</b>	2 GΩ*km
<b>Capacitance at 800 Hz</b>	85 nF/km
<b>Max. operating voltage</b>	75 V
<b>Relative velocity factor NVP</b>	0.66
<b>Impedance (at 10 MHz)</b>	70 Ω +/- 10 %

Frequency [kHz]	Attenuation [dB/100 m]
9.6	0.3
19.2	0.5
64	0.7
100	0.9
200	1.6
1000	4.5

### Ordering Information

P/N	Product Description	P.U
1005528-01000DX	2x(2+1)x0.5, Symmetrical Data Cable for Industrial Control Equipment, JAMAK®-C LSZH	1000m/drum
1005529-01000DX	4x(2+1)x0.5, Symmetrical Data Cable for Industrial Control Equipment, JAMAK®-C LSZH	1000m/drum
1005530-01000DX	8x(2+1)x0.5, Symmetrical Data Cable for Industrial Control Equipment, JAMAK®-C LSZH	1000m/drum
1005531-01000DX	24x(2+1)x0.5, Symmetrical Data Cable for Industrial Control Equipment, JAMAK®-C LSZH	1000m/drum
1006195-01000DX	24x(2+1)x0.5, Symmetrical Data Cable for Industrial Control Equipment, JAMAK®-C LSZH	1000m/drum
1006197-00500DX	48x(2+1)x0.5, Symmetrical Data Cable for Industrial Control Equipment, JAMAK®-C LSZH	500m/drum

# JAMAK<sup>®</sup> -HF

## Symmetrical Data Cable for Industrial Control Equipment

1.5 JAMAK<sup>®</sup> Industrial Data

### Construction

<b>Conductor</b>	Tinned stranded copper 7x 0.29 mm
<b>Insulation</b>	PE (2Y)
<b>Conductor identification</b>	a-conductor blue; b-conductor red
<b>Stranding</b>	2 conductors to pair
<b>Stranding to core</b>	(0+4)
<b>Pair shielding</b>	Laminated AL-foil + copper drain wire 0.5 mm <sup>2</sup>
<b>Overall shielding</b>	Laminated AL-foil + copper drain wire 0.5 mm <sup>2</sup>
<b>Outer sheath</b>	LSZH (H), grey
<b>Outer Diameter</b>	Nom. 7.5(2pair) - 30.5(48pair) mm
<b>Weight</b>	Nom. 70(2pair) - 1500(48pair) kg/km

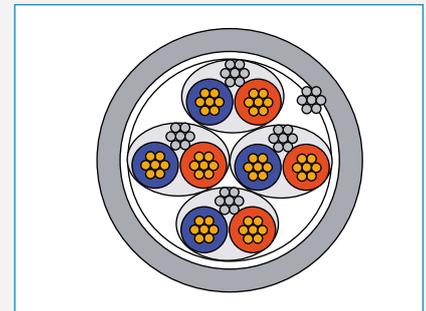
### Mechanical Properties

<b>Operating temperature</b>	- 30°C to + 70°C
<b>Min. Installation temperature</b>	- 5°C

### Electrical Properties at 20°C

<b>Loop resistance</b>	81 Ω/km
<b>Insulation resistance (at 500 V, 1 min.)</b>	2 GΩ*km
<b>Capacitance at 800 Hz</b>	85 nF/km
<b>Max. operating voltage</b>	75 V
<b>Relative velocity factor NVP</b>	0.66
<b>Impedance (at 10 MHz)</b>	70 Ω +/- 10 %

Frequency [kHz]	Attenuation [dB/100 m]
9.6	0.3
19.2	0.5
64	0.7
100	0.9
200	1.6
1000	4.5



### Application

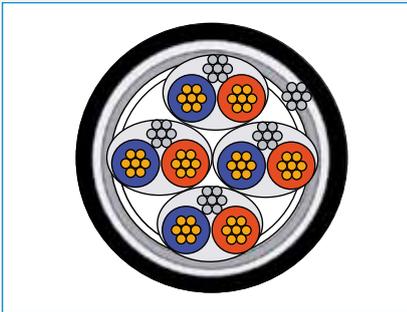
These symmetrical data transmission cables are used in control and supervision center for industrial sites. They are suitable for fixed installation inside housings.

### Fire Rating

- IEC 60332-1; IEC 60754-2; IEC 61034

### Ordering Information

P/N	Product Description	P.U
JAMAK -HF	2x(2+1)x0.5, Symmetrical Data Cable for Industrial Control Equipment, JAMAK <sup>®</sup> -HF	1000m/drum
JAMAK -HF	4x(2+1)x0.5, Symmetrical Data Cable for Industrial Control Equipment, JAMAK <sup>®</sup> -HF	1000m/drum
JAMAK -HF	8x(2+1)x0.5, Symmetrical Data Cable for Industrial Control Equipment, JAMAK <sup>®</sup> -HF	1000m/drum
JAMAK -HF	12x(2+1)x0.5, Symmetrical Data Cable for Industrial Control Equipment, JAMAK <sup>®</sup> -HF	1000m/drum
JAMAK -HF	24x(2+1)x0.5, Symmetrical Data Cable for Industrial Control Equipment, JAMAK <sup>®</sup> -HF	1000m/drum
JAMAK -HF	48x(2+1)x0.5, Symmetrical Data Cable for Industrial Control Equipment, JAMAK <sup>®</sup> -HF	500m/drum



### Application

These symmetrical data transmission cables are used in control and supervision center for industrial sites. The cables with armouring and PE outer sheath are suitable for direct buried installation.

### Fire Rating

- Oxygen Index LOI acc. to ASTM-D-2863: no limit
- IEC 60332-1

### Water Penetration Rating

MIL-C-24640A

# JAMAK®-ARM

## Symmetrical Data Cable for Industrial Control Equipment

### Construction

<b>Conductor</b>	Stranded tinned copper 7x 0.29 mm
<b>Insulation</b>	PE (2Y)
<b>Conductor identification</b>	a-conductor blue; b-conductor red
<b>Stranding</b>	2 conductors to pair (0+4)
<b>Stranding to core</b>	(0+4)
<b>Pair shielding</b>	Laminated AL-foil + copper drain wire 0.5 mm <sup>2</sup>
<b>Overall shielding</b>	Laminated AL-foil + copper drain wire 0.5 mm <sup>2</sup>
<b>Inner sheath</b>	PVC (Y), grey
<b>Armouring</b>	Steel tape, helically wounded
<b>Outer sheath</b>	PE (2Y), black
<b>Outer Diameter</b>	Nom. 13(4pair) - 34.5(48pair) mm
<b>Weight</b>	Nom. 250 (4pair) - 1500(48pair) kg/km

### Mechanical Properties

<b>Operating temperature</b>	- 30°C to + 70°C
<b>Min. Installation temperature</b>	- 5°C

### Electrical Properties at 20°C

<b>Loop resistance</b>	81 Ω/km
<b>Insulation resistance (at 500 V, 1 min.)</b>	2 GΩ*km
<b>Capacitance at 800 Hz</b>	85 nF/km
<b>Max. operating voltage</b>	75 V
<b>Relative velocity factor NVP</b>	0.66
<b>Impedance (at 10 MHz)</b>	70 Ω +/- 10 %

Frequency [kHz]	Attenuation [dB/100 m]
9.6	0.3
19.2	0.5
64	0.7
100	0.9
200	1.6
1000	4.5

### Ordering Information

P/N	Product Description	P.U
1005536-01000DX	4x(2+1)x0.5, Symmetrical Data Cable for Industrial Control Equipment, JAMAK®-ARM	1000m/drum
1005537-01000DX	8x(2+1)x0.5, Symmetrical Data Cable for Industrial Control Equipment, JAMAK®-ARM	1000m/drum
1005538-01000DX	12x(2+1)x0.5, Symmetrical Data Cable for Industrial Control Equipment, JAMAK®-ARM	1000m/drum
1005539-01000DX	24x(2+1)x0.5, Symmetrical Data Cable for Industrial Control Equipment, JAMAK®-ARM	1000m/drum
1005539-01000DX	48x(2+1)x0.5, Symmetrical Data Cable for Industrial Control Equipment, JAMAK®-ARM	1000m/drum

# NOMAK®

## Symmetrical data cable for industrial control equipment

1.6 NOMAK® Industrial Data

### Construction

<b>Conductor</b>	Stranded tinned copper 7x0,29 mm
<b>Insulation</b>	PVC (Y)
<b>Conductor identification</b>	a-conductor orange; b-conductor white (with number printing)
<b>Stranding</b>	2 conductors to pair (0+4)
<b>Stranding to core</b>	
<b>Overall shielding</b>	Laminated AL-foil + tinned copper drain wire 0.5 mm2
<b>Outer sheath</b>	PVC (Y), grey (RAL 7035)
<b>Outer Diameter</b>	Nom. 6.7(2pair) - 23.5(48pair) mm
<b>Weight</b>	Nom. 52(2pair) - 745(48pair) kg/km

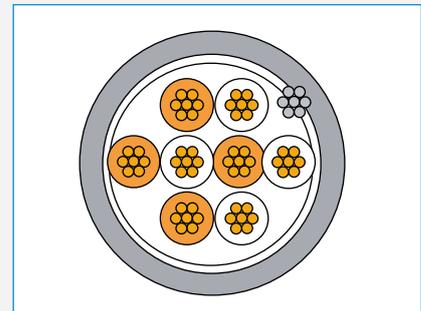
### Mechanical Properties

<b>Operating temperature</b>	- 30°C to + 70°C
<b>Min. Installation temperature</b>	- 5°C

### Electrical Properties at 20°C

<b>Loop resistance</b>	81 Ω/km
<b>Insulation resistance (at 500 V, 1 min.)</b>	100 MΩ*km
<b>Capacitance at 800 Hz</b>	85 nF/km
<b>for 2 and 4 pairs</b>	90 nF/km
<b>Max. operating voltage</b>	75 V
<b>Relative velocity factor NVP</b>	0.60
<b>Impedance (at 10 MHz)</b>	100 Ω +/- 10 %

Frequency [kHz]	Attenuation [dB/100 m]
9.6	0.3
19.2	0.5
64	0.7
100	0.9
200	1.5
1000	2.9



### Application

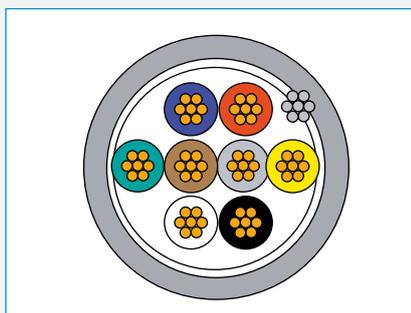
These symmetrical data transmission cables are used in control and supervision centre for industrial sites. They are suitable for fixed installation inside housings.

### Fire Rating

- Oxygen Index LOI acc. to ASTM-D-2863: no limit
- IEC 60332-1

### Ordering Information

P/N	Product Description	P.U
1003555-010000D	2x2x0.5, Symmetrical data cable for industrial control equipment, NOMAK®	1000m/drum
1003555-002000DW	2x2x0.5, Symmetrical data cable for industrial control equipment, NOMAK®	200m/drum
1003575-010000D	4x2x0.5, Symmetrical data cable for industrial control equipment, NOMAK®	1000m/drum
1003575-002000DW	4x2x0.5, Symmetrical data cable for industrial control equipment, NOMAK®	200m/drum
1005542-010000DX	8x2x0.5, Symmetrical data cable for industrial control equipment, NOMAK®	1000m/drum
1005543-010000DX	12x2x0.5, Symmetrical data cable for industrial control equipment, NOMAK®	1000m/drum
1005544-010000DX	24x2x0.5, Symmetrical data cable for industrial control equipment, NOMAK®	1000m/drum
1005545-010000DX	48x2x0.5, Symmetrical data cable for industrial control equipment, NOMAK®	1000m/drum



### Application

These symmetrical data transmission cables are used in control and supervision centre for industrial sites. They are suitable for fixed installation inside housings.

### Fire Rating

- Oxygen Index LOI acc. to ASTM-D-2863: no limit
- IEC 60332-1

# NOMAK®-E

## Symmetrical data cable for industrial control equipment

### Construction

<b>Conductor</b>	Stranded tinned copper 7x0,29 mm	
<b>Insulation</b>	PVC (Y)	
<b>Conductor identification</b>	a-conductor	b-conductor
<b>Pair 1</b>	Blue	Red
<b>Pair 2</b>	Grey	Yellow
<b>Pair 3</b>	Green	Brown
<b>Pair 4</b>	White	Black
<b>Stranding</b>	2 conductors to pair	
<b>Stranding to core</b>	(0+4) each 4-pair bundle with numbered	
<b>Overall shielding</b>	Laminated AL-foil + tinned copper drain wire 0.5 mm <sup>2</sup>	
<b>Outer sheath</b>	PVC (Y), grey (RAL 7035)	
<b>Outer Diameter</b>	Nom. 7.0(2pair) - 23.5(48pair) mm	
<b>Weight</b>	Nom. 55(2pair) - 747(48pair) kg/km	

### Mechanical Properties

<b>Operating temperature</b>	- 30°C to + 70°C
<b>Min. Installation temperature</b>	- 5°C

### Electrical Properties at 20°C

<b>Loop resistance</b>	81 Ω/km
<b>Insulation resistance (at 500 V, 1 min.)</b>	100 MΩ*km
<b>Capacitance at 800 Hz</b>	85 nF/km
<b>for 2 and 4 pairs</b>	90 nF/km
<b>Max. operating voltage</b>	75 V
<b>Relative velocity factor NVP</b>	0.60
<b>Impedance (at 10 MHz)</b>	100 Ω +/- 10 %

Frequency [kHz]	Attenuation [dB/100 m]
9.6	0.3
19.2	0.5
64	0.7
100	0.9
200	1.5
1000	2.9

### Ordering Information

P/N	Product Description	P.U
1003576	2x2x0.5, Symmetrical data cable for industrial control equipment, NOMAK®-E	1000m/drum
1003577	4x2x0.5, Symmetrical data cable for industrial control equipment, NOMAK®-E	200m/drum
1005546-01000DX	8x2x0.5, Symmetrical data cable for industrial control equipment, NOMAK®-E	1000m/drum
1005551-01000DX	12x2x0.5, Symmetrical data cable for industrial control equipment, NOMAK®-E	200m/drum
1005547-01000DX	24x2x0.5, Symmetrical data cable for industrial control equipment, NOMAK®-E	1000m/drum
1006473-01000DX	48x2x0.5, Symmetrical data cable for industrial control equipment, NOMAK®-E	1000m/drum

LONAK® 2 x 1.3 mm<sup>2</sup>

Building automation cable

1.7 LONAK® Industrial Data

## Construction

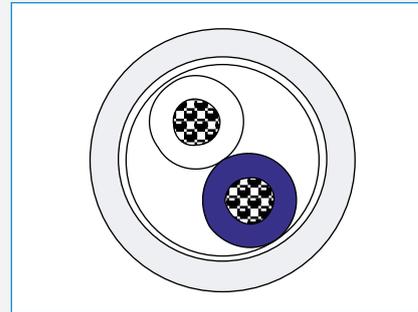
<b>Conductor</b>	Stranded copper wires, tinned 1.3 mm <sup>2</sup> , 7x0.49 mm, Ø 1.47 mm
<b>Insulation</b>	PVC, 2.69 mm Ø
<b>Conductor identification</b>	1 x white, 1 x blue
<b>Pair stranding</b>	2 conductors to the pair
<b>Cable lay up</b>	1 pair to the core
<b>Wrapping</b>	1 x PET foil
<b>Rip cord</b>	yes
<b>Outer sheath</b>	PVC, grey RAL 7035, Ø 7.0 mm
<b>Outer Diameter</b>	Nom. 7.0 mm
<b>Weight</b>	Nom. 70 kg/km

## Mechanical Properties

<b>Operating temperature</b>	- 30°C to + 70°C
<b>Min. installation temperature</b>	- 5°C
<b>Minimum bending radius</b>	10 x D
<b>Minimum bending radius (during pulling)</b>	15 x D
<b>Maximum pulling force</b>	130 N

## Electrical Properties at 20°C

<b>Loop DC resistance (max.)</b>	28 Ω/km
<b>Insulation resistance (at 500 V, 1 min.)</b>	100 MΩ*km
<b>Mutual capacitance at 800 Hz (max.)</b>	72 nF/km
<b>Velocity factor</b>	0.55
<b>Max. operating voltage DC</b>	75 V
<b>Test voltage conductor/conductor</b>	3.5 kV



## Application

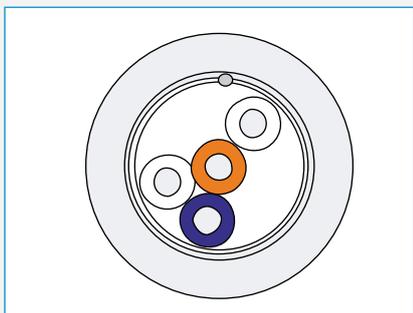
- Fixed indoor installations
- LON cabling
- Building automation

## Fire Rating

- IEC 60332-1

## Ordering Information

P/N	Product Description	P.U
60013675 (1003578) (L432332)	2x1.3 mm <sup>2</sup> , Building automation cable, LONAK® 2 x 1.3 mm <sup>2</sup>	1000m/drum



### Application

- Fixed indoor installations
- LON cabling
- Building automation

### Fire Rating

- IEC 60332-1

## LONAK® 2x2x0.65

### Building automation cable

#### Construction

<b>Conductor</b>	Copper wire, tinned 0.34 mm <sup>2</sup> , Ø 0.65 mm
<b>Insulation</b>	PE, 1.55 mm Ø
<b>Conductor identification</b>	Pair 1: white, blue, Pair 2: white, orange
<b>Stranding</b>	2 conductors to the pair
<b>Cable lay up</b>	2 pairs to the core
<b>Wrapping</b>	1 x PET foil
<b>Overall shielding</b>	Laminated AL-foil + copper drain wire
<b>Rip cord and identification thread</b>	yes
<b>Outer sheath</b>	PVC, grey RAL 7035, Ø 7.1 mm
<b>Outer Diameter</b>	Nom. 7.1 mm
<b>Weight</b>	Nom. 43 kg/km

#### Mechanical Properties

<b>Operating temperature</b>	- 30°C to + 70°C
<b>Min. Installation temperature</b>	- 5°C
<b>Minimum bending radius</b>	10 x D
<b>Minimum bending radius (during pulling)</b>	15 x D
<b>Maximum pulling force</b>	65 N

#### Electrical Properties at 20°C

<b>Loop DC resistance (max.)</b>	106 Ω/km
<b>Insulation resistance (at 500 V, 1 min.)</b>	100 MΩ*km
<b>Mutual capacitance at 800 Hz (max.)</b>	49 nF/km
<b>Velocity factor</b>	0.67
<b>Resistance unbalance (max.)</b>	3 %
<b>Capacitance unbalance (max.)</b>	1600 pF/m
<b>Max. operating voltage DC</b>	75 V
<b>Test voltage conductor/conductor</b>	2 kV DC, 1 min
<b>Test voltage conductor/screen</b>	2 kV DC, 1 min.

#### Ordering Information

P/N	Product Description	P.U
1003579 CS2638100 L432911	2x2x0.65 mm, Building automation cable, LONAK® 2x2x0.65	1000m/drum

# LONAK<sup>®</sup> 2x2x0.8

Building automation cable

1.7 LONAK<sup>®</sup> Industrial Data

## Construction

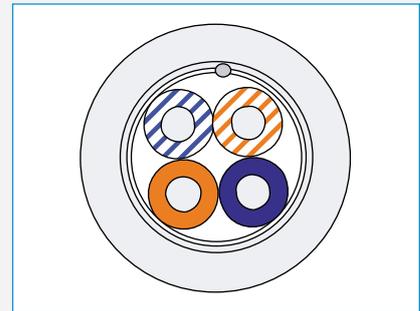
<b>Conductor</b>	Copper wire, tinned 0.5 mm <sup>2</sup> , Ø 0.80 mm
<b>Insulation</b>	PVC, 1.6 mm Ø
<b>Conductor identification</b>	Pair 1: white-blue, blue, Pair 2: white-orange, orange
<b>Stranding</b>	4 conductors to the quad
<b>Cable lay up</b>	1 quad to the core
<b>Wrapping</b>	1 x PET foil
<b>Overall shielding</b>	Laminated AL-foil + copper drain wire
<b>Rip cord and identification thread</b>	yes
<b>Outer sheath</b>	PVC, grey RAL 7035, Ø 7.0 mm
<b>Outer Diameter</b>	Nom. 7.0 mm
<b>Weight</b>	Nom. 54 kg/km

## Mechanical Properties

<b>Operating temperature</b>	- 30°C up to + 70°C
<b>Min. installation temperature</b>	- 5°C
<b>Minimum bending radius</b>	10 x D
<b>Minimum bending radius (during pulling)</b>	15 x D
<b>Maximum pulling force</b>	100 N

## Electrical Properties at 20°C

<b>Loop DC resistance (max.)</b>	73 Ω/km
<b>Insulation resistance (at 500 V, 1 min.)</b>	100 MΩ*km
<b>Mutual capacitance at 800 Hz (max.)</b>	98 nF/km
<b>Velocity factor</b>	0.55
<b>Max. operating voltage DC</b>	75 V
<b>Test voltage conductor/conductor</b>	2.25 kV DC, 1 min.
<b>Test voltage conductor/screen</b>	1.5 kV DC, 1 min.



## Application

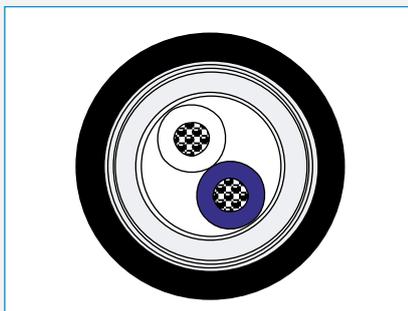
- Fixed indoor installations
- LON cabling
- Building automation

## Fire Rating

- IEC 60332-1

## Ordering Information

P/N	Product Description	P.U
1003580 CS2638200 L432498	2x2x0.8 mm, Building automation cable, LONAK <sup>®</sup> 2x2x0.8	1000m/drum



**Application**

- Fixed indoor installations
- LON cabling
- Building automation

# LONAK® 2 x 1.3 mm<sup>2</sup> ARM

Building automation cable

## Construction

<b>Conductor</b>	Stranded copper wires, tinned 1.3 mm <sup>2</sup> , 7x0.49 mm, Ø 1.47 mm
<b>Insulation</b>	PE, 2.69 mm Ø
<b>Conductor identification</b>	1 x white, 1 x blue
<b>Pair stranding</b>	2 conductors to the pair
<b>Cable lay up</b>	1 pair to the core
<b>Wrapping</b>	1 x PET foil
<b>Rip cord and identification thread</b>	yes
<b>Inner sheath</b>	PVC, grey RAL 7035, Ø 7.0 mm
<b>Wrapping</b>	1 x PET foil
<b>Armouring</b>	2 x galvanized steel tape 15x0.20 mm
<b>Outer sheath</b>	PE, black RAL 9005, Ø 10.3 mm
<b>Outer Diameter</b>	Nom. 10.3 mm
<b>Weight</b>	Nom. 172 kg/km

## Mechanical Properties

<b>Operating temperature</b>	- 30°C up to + 70°C
<b>Min. Installation temperature</b>	- 5°C
<b>Minimum bending radius</b>	10 x D
<b>Minimum bending radius (during pulling)</b>	15 x D
<b>Maximum pulling force</b>	130 N

## Electrical Properties at 20°C

<b>Loop DC resistance (max.)</b>	28 Ω/km
<b>Insulation resistance (at 500 V, 1 min.)</b>	100 MΩ*km
<b>Mutual capacitance at 800 Hz (max.)</b>	72 nF/km
<b>Velocity factor</b>	0.67
<b>Max. operating voltage DC</b>	75 V
<b>Test voltage conductor/conductor</b>	3.5 kV

## Ordering Information

P/N	Product Description	P.U
60013680 (1003581) (L432494)	2x1.3 mm <sup>2</sup> , Building automation cable, LONAK® 2 x 1.3 mm <sup>2</sup> ARM	1000m/drum

# UMNWV

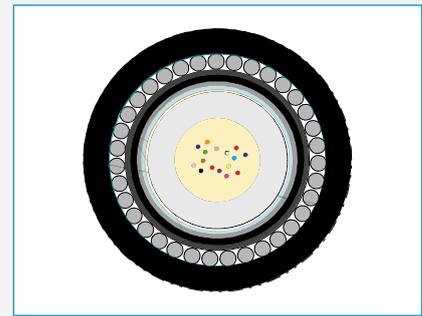
## Steel Wire Armoured ALPA™ Uni-tube Optical Cable



### 1.8 Outside Plant Industrial FO Cables

#### Features

- **Loose Tube:** The secondary coating consists of a central loose tube made of special thermoplastic plastic. Each fibre in the central tube is uniquely identified by a different colour, for fibre counts above 12 fibres a coloured bundle yarn is used.
- **Cable core:** the cable core is covered with water blocking swellable tape.
- **Moisture Barrier:** The cable is completely covered with an aluminium foil applied longitudinally with an overlap. The aluminium foil is bonded to the inner sheath.
- **1st Inner sheath:** The 1st inner sheath consists of HDPE (high density polyethylene) (Black) compound. (Two ripcords underneath).
- **2nd Inner Sheath:** The 2nd inner sheath consists of PA.
- **Armour:** The armour consists of one layer of galvanized soft steelwires (SWA)
- **Outer sheath:** The cable sheath consists of Flame Retardant PVC compound, resistant to UV, Heat & Oil. (Black)



#### Technical Data

No. of Fibres		1 - 24
Loose Tube- Ø	mm	3.1
1st Inner sheath thickness	mm	1.0
2nd Inner sheath thickness	mm	0.5
Dia over 2nd inner sheath	mm	7.1
Armour SWA thickness	mm	1.0
Dia over SWA armour	mm	9.1
Sheath thickness	mm	1.6
Cable Diameter	mm	12.3
Cable Weight	kg/km	280

Please refer to our General Installation, Safety & Handling recommendations before handling.

#### Application

The cable is especially designed for harsh environments. The multi-layer inner sheath system ALPA™: Aluminium/HDPE/PA (nylon) withstands aggressive constituents and fluids that might occur on (petro)chemical plants. (chemical moisture - barrier). The steel wire armour and the PVC outer sheath make the cable suitable for installation under and above ground.

- The ALPA design provides anti-termite protection.
  - The steel wire armour provides rodent protection.
- The outer sheath is of a Flame Retardant, Poly Vinyl Chloride (PVC) compound, resistant to Heat & Oil and UV.

#### Fire Rating

- IEC 60332-1, IEC 60332-3-24

#### Main Characteristics

Test	Standard	Specified value	Acceptance Criteria*
Max. Tension(long term)	IEC 60794-1-2-E1	4000N	$\Delta\alpha \leq 0.05$ dB(MM), no fibre strain
Max. Tension(short term)	IEC 60794-1-2-E1	4800N	$\Delta\alpha \leq 0.05$ dB(MM), no fibre strain
Crush	IEC 60794-1-2-E3	2500N / 100mm, short term	$\Delta\alpha$ reversible
Impact	IEC 60794-1-2-E4	20 Nm, R=200mm, 3 impacts	$\Delta\alpha \leq 0.05$ dB(MM), no damage
Repeated bending	IEC 60794-1-2-E6	R= 20 x cable Ø, 100 cycles	$\Delta\alpha \leq 0.05$ dB(MM), no damage
Cable bend	IEC 60794-1-2-E11	R= 15 x cable Ø, 5 turns, 3cycles	$\Delta\alpha \leq 0.05$ dB(MM), no damage
Water Penetration	IEC 60794-1-2-F5B	sample=3m, water=1m	No water leakage after 24 hour, up to inner sheath
UV resistancy	ISO 4892-2		In ISO
Heat & Oil resistancy	IEC 60811	IRM902 ; 4 hrs, 70°C	
Flame retardancy		Reduced flame propagation	In IEC
Single cable test	IEC 60332-1		
Bundle cable test	IEC 60332-3-24 (Cat C)		
Resistance to nitric acid	Draka - Kema	7 mol/l, 6 weeks	No damage to optical fibers
Resistance to hydrocarbon mixture	Draka - Kema	Metyl-etyl-keton, trichloro-ethene, cyclo-hexane, heptane, toluene	No damage to optical fibers

\* values for single-mode fibres, all optical measurements performed at 1550 nm

Min. bending radius	mm	Without Tension 15 x Cable-Ø	Under Maximum Tension 25 x Cable-Ø
Temperature range	°C	Installation -10 to +50	Transport. & Storage -30 to +70 Operation -30 to +70

#### Ordering Information

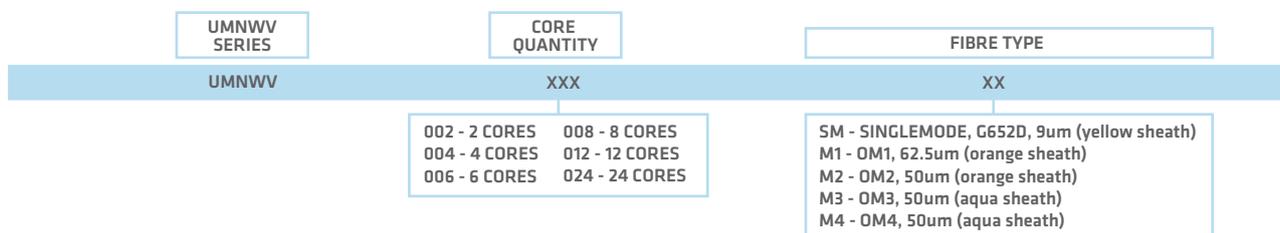
UMNWV SERIES FO Cable part numbers are made up using the table below.

The part number always starts with the letters UMNWV to denote that it is a UMNWV SERIES FO Cable. This is followed by 3 numbers which symbolises the core quantity and then 2 letters to denote the fibre type.

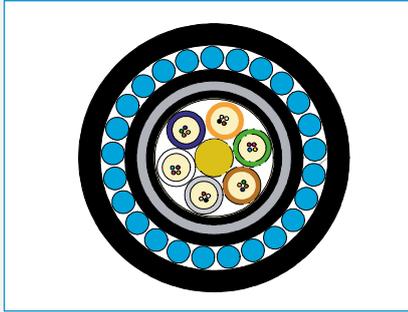
Example of a UMNWV SERIES FO Cable part number:

#### UMNWV008M1

The above example describes an OM1 (62.5um, Orange Sheath) UMNWV SERIES FO Cable, with 8 cores.



## 1.8 Outside Plant Industrial FO Cables



### Application

This cable is especially designed for harsh environments. The steel wire armour and the PVC outer sheath make the cable suitable for installation under and above ground. Swellable water blocking tape over the stranding and water tightness compound within loose tube provide resilient and robust moisture protection to the fibre. Having an outer PVC sheath over an inner lead sheath make this cable relatively flexible, flame retardant, and resistant to chemical solvent, oil, and abrasion.

### Fire Rating

- IEC 60332-1, IEC 60332-3-24

# SM-LVLVWV

Loose Tube Fibre Optic Cable - Dry Core - Lead Sheath - Steel Wire Armour - FR-PVC Sheaths



### Features

- **Central Strength Member (CSM):** glass fiber reinforced plastic rod (FRP), with plastic oversheathing when needed
- **Loose Tube:** thermoplastic material, containing up to 12 fibers and filled with a suitable water tightness compound
- **Filler Elements:** thermoplastic rods, where needed
- **Stranding:** loose tubes (and fillers), SZ stranded around the CSM
- **Cable core:** swellable water blocking tapes are applied over the stranding
- **1st Inner sheath:** Flame retardant PVC (Black)
- **Lead sheath:** lead compound 0,55% antimony
- **2nd Inner sheath:** Flame retardant PVC (Black)
- **Armour:** one layer of galvanized steel wires
- **Outer sheath:** The outer sheath is of a flame retardant PVC compound

### Configuration

No. of Fibres	12	16	24	48	96
No: of tubes/ fillers	2 / 0	4 / 0	4 / 0	4 / 0	8 / 0
Loose Tube / Filler - Ø [mm]	2.1	2.1	2.1	2.4	2.4
CSM - Ø [mm]	2.3	2.3	2.3	2.6	2.6 [4.2]
1st Inner sheath [mm]	1.0	1.0	1.0	1.0	1.0
Lead Sheath [mm]	1.0	1.0	1.0	1.0	1.0
Lead Weight [kg/km]	410	410	410	440	460
2nd Inner sheath [mm]	1.0	1.0	1.0	1.0	1.0
Armor wire [mm]	1.0	1.0	1.0	1.0	1.0
Outer Sheath [mm]	2.0	2.0	2.0	2.0	2.0
Cable Diameter [mm]	19.6	19.6	19.6	20.5	21.9
Cable Weight [kg/km]	980	980	980	1070	1161
Pulling Force Da E 0.05 dB [kN]	7	7	7	8	8

### Main Mechanical and Environmental Characteristics

Test	Standard	Specified value	Acceptance Criteria*
Max. Tension(long term)	IEC 60794-1-2-E1	See configuration	$\Delta\alpha \leq 0.10$ dB
Crush	IEC 60794-1-2-E3	4000 N / 100 mm ; reversible	$\Delta\alpha \leq 0.10$ dB
Impact	IEC 60794-1-2-E4	30 Nm, R= 200 mm, 3 spots	$\Delta\alpha \leq 0.10$ dB
Repeated bending	IEC 60794-1-2-E6	R=20x D, 100 cycle	$\Delta\alpha \leq 0.10$ dB
Cable bend	IEC 60794-1-2-E11	R=15x D	$\Delta\alpha \leq 0.10$ dB
Water Penetration	IEC 60794-1-2-F5B	sample=3m, water column=1m	no water leakage in 24h, up to inner sheath
Flame retardancy		Reduced flame propagation, In IEC	In IEC
Single cable test	IEC 60332-1		
Bundle cable test	IEC 60332-3-24 (Cat C)		

All optical measurements at 1550 nm.

Temperature Range	Transportation & Storage:	- 30 to + 70°C
Temperature range	Installation:	- 10 to + 50°C
	Operation:	- 30 to + 70°C

### Ordering Information

SM-LVLVWV SERIES FO Cable part numbers are made up using the table below.

The part number always starts with the letters SM-LVLVWV to denote that it is a SM-LVLVWV SERIES FO Cable. This is followed by 3 numbers which symbolises the core quantity and then 2 letters to denote the fibre type.

Example of a SM-LVLVWV SERIES FO Cable part number:

**SM-LVLVWV012M1**

The above example describes an OM1 (62.5um, Orange Sheath) SM-LVLVWV SERIES FO Cable, with 12 cores.

SM-LVLVWV SERIES	CORE QUANTITY	FIBRE TYPE
SM-LVLVWV	XXX	XX
	012 - 12 CORES 016 - 16 CORES 024 - 24 CORES 048 - 48 CORES 096 - 96 CORES	SM - SINGLEMODE, G652D, 9um (yellow sheath) M1 - OM1, 62.5um (orange sheath) M2 - OM2, 50um (orange sheath) M3 - OM3, 50um (aqua sheath) M4 - OM4, 50um (aqua sheath)

# LMNWG

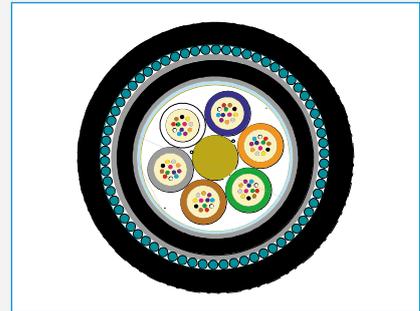
## Steel Wire Armoured ALPA™ Optical Cable



### 1.8 Outside Plant Industrial FO Cables

#### Features

- **Central Strength Member (CSM):** glass fiber reinforced plastic rod (FRP), with plastic overshathing when needed.
- **Loose Tube:** The secondary coating consists of a loose tube made of thermoplastic polyester. Each fibre in a tube is uniquely identified by a different colour.
- **Filler Elements:** thermoplastic rods, where needed.
- **Stranding:** loose tubes (and fillers), SZ stranded around the CSM.
- **Cable core:** the cable core is covered with water blocking swellable tape.
- **Aramid yarns:** are applied to give extra tensile performance.
- **Moisture Barrier:** The cable is completely covered with an aluminium foil applied longitudinally with an overlap. The aluminium foil is bonded to the inner sheath.
- **1st Inner sheath:** The 1st inner sheath consists of HDPE (high density polyethylene) (Black) compound. (Two ripcords underneath).
- **2nd Inner Sheath:** The 2nd inner sheath consists of PA (Black)
- **Armour:** The armour consists of one layer of galvanized steel wire (SWA) with a counter spiral binder.
- **Outer sheath:** Flame Retardant Low Smoke, Zero Halogen compound. This compound is UV, Heat & Oil resistant.



#### Application

The cable is especially designed for harsh environments. The multi-layer inner sheath system ALPA: Aluminium/HDPE/PA (nylon) withstands aggressive constituents and fluids that might occur on (petro)chemical plants. (chemical moisture - barrier). The Steel Wire Armour and FR LSZH sheath make the cable suitable for installation under and above ground.

- The ALPA design provides anti-termite protection.
- The Steel Wire Armour provides rodent protection.

#### Fire Rating

- IEC 60332-1, IEC 60332-3-22

#### Technical Data

No. of Fibres		12	24	48	72	120
Number of tubes / fillers		2 / 4	4 / 2	4 / 2	6 / 0	10 / 0
Number of fibres per tube	mm	6		12		
Loose Tube- Ø	mm	2.1		2.4		
Central Strength member	mm	2.3		2.6		3.0/5.8
1st Inner sheath thickness	mm				1.0	
2nd Inner sheath thickness	mm				0.5	
Dia over 2nd inner sheath	mm	10.8		11.7		14.8
Steel Wire thickness	mm				1.0	
Sheath thickness	mm				2.0	
Cable Diameter	mm	16.8		17.7		20.8
Cable Weight	kg/km	465		510		665

Please refer to our General Installation, Safety & Handling recommendations before handling.

#### Main Characteristics

Test	Standard	Specified value	Acceptance Criteria*
Max. Tension	IEC 60794-1-2-E1	7000 N	$\Delta\alpha \leq 0.05$ dB(MM), no fibre strain
Crush	IEC 60794-1-2-E3	4000N / 100mm, short term	$\Delta\alpha$ reversible
Impact	IEC 60794-1-2-E4	30 Nm, R=200mm, 3 impacts	$\Delta\alpha \leq 0.10$ dB(MM), no damage
Repeated bending	IEC 60794-1-2-E6	R= 20 x cable Ø, 100 cycles	$\Delta\alpha \leq 0.10$ dB(MM), no damage
Cable bend	IEC 60794-1-2-E11	R= 15 x cable Ø, 5 turns, 3cycles	$\Delta\alpha \leq 0.10$ dB(MM), no damage
Torsion	IEC 60794-1-2-E7	$\pm 180^\circ$ , L=1m, 10 cycles	No damage
Water Penetration	IEC 60794-1-2-F5B	sample=3m, water=1m	No water leakage after 24 hour, up to inner sheath
UV resistancy	ISO 4892-2	-	In ISO
Halogen free	IEC 60754-1 IEC 60811	Amount of halogen acid pH value	In IEC
Heat & Oil resistancy	-	IRM902 ; 4 hrs, 70°C	In IEC
Flame retardancy		Reduced flame propagation	
Single cable test	IEC 60332-1		
Bundle cable test	IEC 60332-3-22 (Cat A)		
Resistance to nitric acid	Draka - Kema	7 mol/l, 6 weeks	No damage to optical fibers
Resistance to hydrocarbon mixture	Draka - Kema	Metyl-etyl-ke-ton, trichloro-ethene, cyclo-hexane, heptane, toluene	No damage to optical fibers

\* values for single-mode fibres, all optical measurements performed at 1550 nm

Min. bending radius	mm	Without Tension 15 x Cable-Ø	Under Maximum Tension 25 x Cable-Ø
Temperature range	°C	Installation -10 to +70	Transport. & Storage -40 to +70 Operation -40 to +70

#### Ordering Information

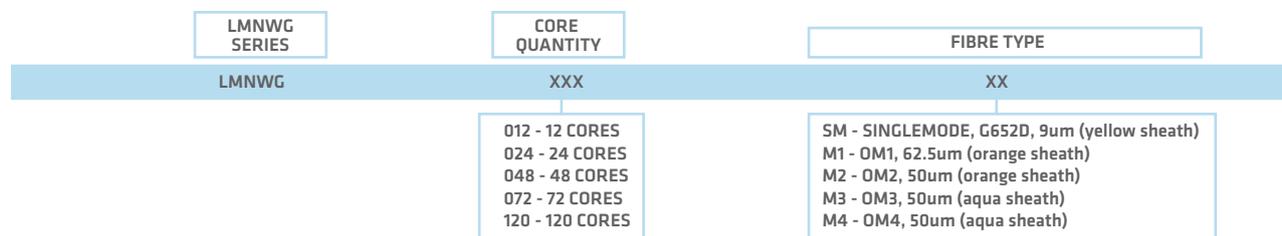
LMNWG SERIES FO Cable part numbers are made up using the table below.

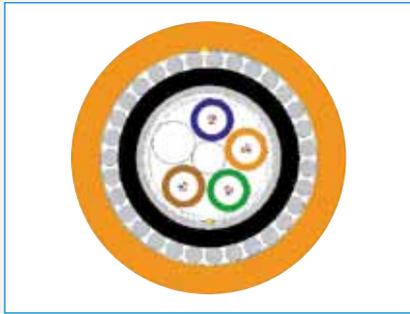
The part number always starts with the letters LMNWG to denote that it is a LMNWG SERIES FO Cable. This is followed by 3 numbers which symbolises the core quantity and then 2 letters to denote the fibre type.

Example of a LMNWG SERIES FO Cable part number:

**LMNWG024M1**

The above example describes an OM1 (62.5um, Orange Sheath) LMNWG SERIES FO Cable, with 24 cores.





### Application

This cable is especially designed for harsh environments. The steel wire armour and the flame retardant zero halogen outer sheath make the cable suitable for installation under and above ground. Its UV stabilized low smoke zero halogen double sheath makes this cable flame retardant and relatively resistant to UV, oil, water and nuclear radiation. This dry core cable employs dual-side copolymer coated aluminum tape and water tightness compound within loose tube to provide resilient and robust moisture protection to the fibre.

### Fire Rating

- IEC 60332-1, IEC 60332-24, IEC 61034-2, IEC 60754-1/2

# TF10020

Dry Core, Aluminium Tape Screened, Steel Wire Armoured, LSZH Double Sheathed, Fibre Optic Cable



### Features

- **Central strength member (CSM):** glass fibre reinforced plastic material, LSZH covered if needed.
- **Tube:** thermoplastic material, containing up to 12 single mode optical fibres and filled with a suitable water tightness compound.
- **Stranding:** The required numbers of elements (tubes or fillers) are SZ stranded around the central strength member.
- **Longitudinal Water Tightness:** dry core
- **Peripheral reinforcement:** glass yarns.
- **Moisture barrier:** both sides copolymer coated aluminiumtape. (Nomaluminium thickness 0.15mm, one rip cord beneath the tape)
- **Inner sheath:** LSZH according to EN 50290-2-27, UV stabilised (Nom thickness: 0.9mm, oxygen index  $\geq$  %25).
- **Armour :** Galvanized steel wire (Nom wire diameter : 0.9 mm, one layer helically polyester tape will applied over the armour )
- **Outer Sheath:** LSZH according to EN 50290-2-27, UV stabilised (one rip cord beneath the sheath, oxygen index  $\geq$  %25)

### Technical Data

No. of Fibres		12	24	48	120
<b>Design</b>		2x6E+3Fillers	4x6E+1Filler	4x12E+1Filler	10x12E
<b>Loose Tube / Filler - Ø</b>	mm	2.0	2.0	2.3	2.3
<b>CSM/Covered</b>	mm	1.5	1.5	1.8	3.0/5.5
<b>Sheath thickness-nom</b>	mm	1.5	1.5	1.5	1.5
<b>Cable Diameter</b>	mm	14.0	14.0	14.9	19.0
<b>Cable Weight</b>	kg/km	321	321	357	544
<b>Max installation tension</b>	N	6000 Nt			
<b>Min. bending radius</b>	mm	Without Tension 15 x Cable-Ø		Under Maximum Tension 20 x Cable-Ø	
<b>Temperature range</b>	°C	Installation -10->+60;	Transport & Storage -40->+70;	Operation -20->+70;	

Please refer to our General Installation, Safety & Handling recommendations before handling.

### Main Characteristics

Test	Standard	Value	Sanction*
<b>Maximum Tension at installation (short term)</b>	IEC 60794-1-2-E1	6000 Nt	$\Delta$ l/l fibre $\leq$ 0.33%, $\Delta\alpha$ reversible
<b>Tension opération max</b>	IEC 60794-1-2-E1	2000 Nt	no fiber strain( $\leq$ 0.05), $\Delta\alpha \leq$ 0.05 dB
<b>Crush</b>	IEC 60794-1-2-E3	2500 N / 100mm, max. 5 min	$\Delta\alpha$ reversible, after test
<b>Impact</b>	IEC 60794-1-2-E4	10 Nm, 3 impacts, r=300mm	$\Delta\alpha \leq$ 0.05 dB (after the test)
<b>Repeated bending</b>	IEC 60794-1-2-E6	R= 20 x cable Ø, 100N, 5 cycles	$\Delta\alpha \leq$ 0.05 dB (after the test)
<b>Cable bend</b>	IEC 60794-1-2-E11	R = 15 x cable Ø	$\Delta\alpha \leq$ 0.05 dB (after the test)
<b>Temperature range</b>	IEC 60794-1-2-F1	-30 -> +60°C	$\Delta\alpha \leq$ 0.05 dB /km
<b>Water Penetration</b>	IEC 60794-1-2-F5B	sample=3m, water=1m	No water leakage after 24 hour (up to inner sheath)

\* values for single-mode fibres, all optical measurements performed at 1550 nm

### Ordering Information

TF10020 SERIES FO Cable part numbers are made up using the table below.

The part number always starts with the letters TF10020 to denote that it is a TF10020 SERIES FO Cable. This is followed by 3 numbers which symbolises the core quantity and then 2 letters to denote the fibre type.

Example of a TF10020 SERIES FO Cable part number:

**TF10020048M1**

The above example describes an OM1 (62.5um, Orange Sheath) TF10020 SERIES FO Cable, with 48 cores.

TF10020 SERIES	CORE QUANTITY	FIBRE TYPE
TF10020	XXX	XX
	012 - 12 CORES 024 - 24 CORES 048 - 48 CORES 120 - 120 CORES	SM - SINGLEMODE, G652D, 9um (yellow sheath) M1 - OM1, 62.5um (orange sheath) M2 - OM2, 50um (orange sheath) M3 - OM3, 50um (aqua sheath) M4 - OM4, 50um (aqua sheath)

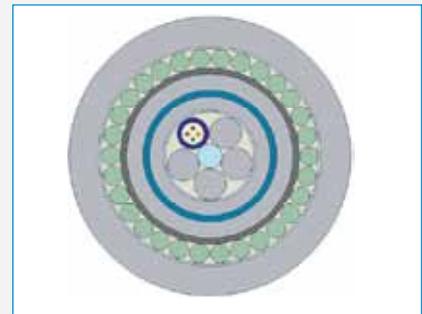
# LTFMSMNWM

## Heavy Armoured Cable Nylon + LSZH Sheath, Chemical/Corrosive Resistant

1.8 Outside Plant Industrial FO Cables

### Features

- **Central Strength Member (CSM):** glass fibre reinforced plastic material (FRP) with PE coating when needed
- **Tube:** thermoplastic material, containing up to 12 optical fibres and filled with a suitable water tightness compound
- **Stranding:** The required numbers of elements (tubes or fillers) are SZ stranded around the central strength member
- **Core Wrapping:** polyester tape (jelly filled)
- **Inner Sheath:** MDPE (P) or LSZH (M)
- **Inner Armour:** Corrugated steel tape
- **Middle Sheath:** HDPE (P) or LSZH (M)
- **Nylon sheath:** Black Nylon Polyamide 12 (PA 12)
- **Outer Armour:** Galvanized steel wire. WB jelly filled
- **Outer Sheath:** LSZH flame retardant to IEC 60332-24



### Technical Data

No. of Fibres		2,4,8	6,12	24,36,48	72	96
Number of fibres per tube		5 x 4	5 x 6	5 x 12	6 x 12	8 x 12
Loose Tube- Ø	mm	2.0 nominal	2.0 nominal	2.0 nominal	2.0 nominal	2.0 nominal
CSM/sheath diameter	mm	1.5 nominal	2.2 nominal	2.0 nominal	2.0 nominal	2.0/3.5 nominal
Inner sheath thickness	mm	0.8 nominal	0.8 nominal	0.8 nominal	0.8 nominal	0.8 nominal
Middle sheath thickness	mm	1.0 nominal	1.0 nominal	1.0 nominal	1.0 nominal	1.0 nominal
Nylon sheath thickness	mm	0.4 nominal	0.4 nominal	0.4 nominal	0.4 nominal	0.4 nominal
Galvanized steel wire	mm	1.0 nominal	1.0 nominal	1.0 nominal	1.0 nominal	1.25 nominal
Outer sheath thickness	mm	1.9 nominal	1.9 nominal	1.9 nominal	1.9 nominal	1.9 nominal
Cable Diameter	mm	17.9 nominal	18.6 nominal	18.6 nominal	20.4 nominal	20.4 nominal
Cable Weight	kg/km	523		523	709	
Max installation tension	N	6000				
Min. bending radius	mm	Without Tension 15 x Cable-Ø		Under Maximum Tension 25 x Cable-Ø		
Temperature range	°C	Installation -5 -> +50;	Transport. & Storage -40 -> +70 ;	Operation -30 -> +70		

Please refer to our General Installation, Safety & Handling recommendations before handling.

### Application

This cable is especially designed for harsh environments. The double armour combination of corrugated steel tape and galvanized steel provide superior crush protection to the fibers. The nylon inner sheath provides anti-termite protection and the galvanized steel wire outer sheath provides anti-rodent protection. Water tightness compound within loose tube reinforced by polyester tape and jelly protects the fibers against chemical, corrosion and moisture.

### Fire Rating

- IEC 60332-1, IEC 60332-24, IEC 61034-2, IEC 60754-1/2

### Main Characteristics

Test	Standard	Specified value	Sanction*
Max. installation tension	IEC 60794-1-2-E1	6000 N	No visible fibre strain, $\Delta\alpha \leq 0.05$ dB
Crush	IEC 60794-1-2-E3	4000N / 100mm	$\Delta\alpha \leq 0.3$ dB(MM), 0.05 dB(SM)
Impact	IEC 60794-1-2-E4	30 Nm, 3 impacts, R=300mm	$\Delta\alpha \leq 0.3$ dB(MM), 0.05 dB(SM)
Temperature Cycling	IEC 60794-1-2-F1	-30 -> +70°C	$\Delta\alpha \leq 0.3$ dB/km(MM), 0.05 dB/km(SM)
Water Penetration	IEC 60794-1-2-F5B	sample=3m, water=1m	No water leakage after 24 hour

\* Values for single-mode fibres, all optical measurements performed at 1550 nm

\* Values for multi-mode fibres, all optical measurements performed at 1300 nm

### Ordering Information

UC<sup>FIBRE™</sup> LTFMSMNWM SERIES FO Cable part numbers are made up using the table below.

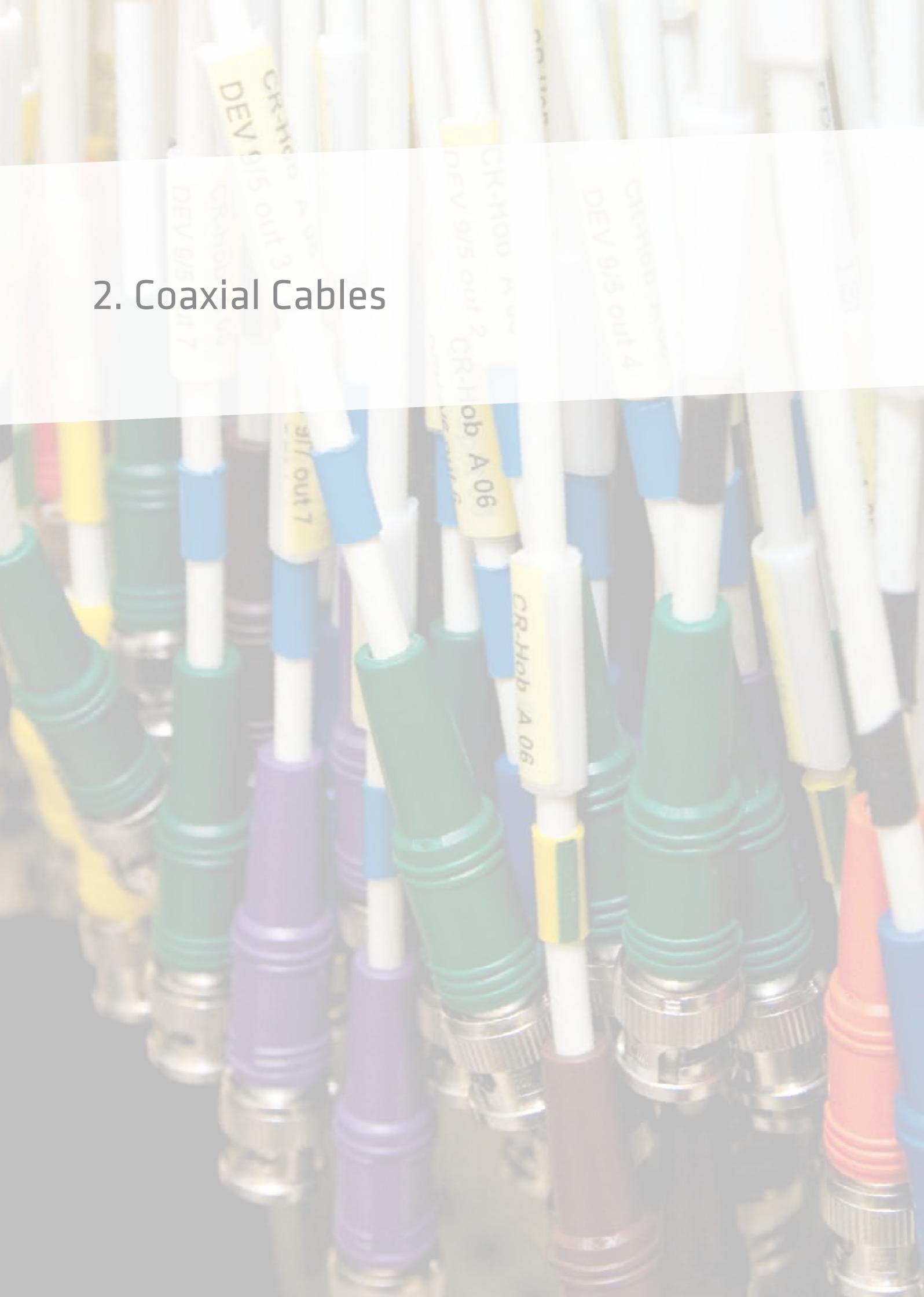
The part number always starts with the letters LTFMSMNWM to denote that it is a UC<sup>FIBRE™</sup> LTFMSMNWM SERIES FO Cable. This is followed by 3 numbers which symbolises the core quantity and then 2 letters to denote the fibre type.

Example of a UC<sup>FIBRE™</sup> LTFMSMNWM SERIES FO Cable part number:

**LTFMSMNWM008M1**

The above example describes an OM1 (62.5um, Orange Sheath) UC<sup>FIBRE™</sup> LTFMSMNWM SERIES FO Cable, with 8 cores.

LTFMSMNWM SERIES	CORE QUANTITY	FIBRE TYPE
LTFMSMNWM	XXX	XX
	002 - 2 CORES 004 - 4 CORES 006 - 6 CORES 008 - 8 CORES 012 - 12 CORES	024 - 24 CORES 036 - 36 CORES 048 - 48 CORES 072 - 72 CORES 096 - 96 CORES
		SM - SINGLEMODE, G652D, 9um (yellow sheath) M1 - OM1, 62.5um (orange sheath) M2 - OM2, 50um (orange sheath) M3 - OM3, 50um (aqua sheath) M4 - OM4, 50um (aqua sheath)



## 2. Coaxial Cables

## 2. Coaxial Cables

### 2.1 CATV Trunk Cables

Coax3 CT 33S (3.3/13.5) 60

Coax4 CT 22A (2.2/9.3) 61

Coax4 CT 22S (2.2/8.8) 62

Coax6 AT 16S A+ 63

### 2.2 CATV Drop Cables

Coax9 AD 11S A+ 64

Coax10 Trishield 65

Coax11 AD 16S 08S A+ 66

### 2.3 RF Cables

RG223 67

RG214 68

RG213 69

RG59 70

RG058 71

RG11 72

RG6 73

# Coax3 CT 33 S (3.3/13.5)

CATV Trunk Cable



### Application

CATV cables are used in trunk lines of CATV and broadband networks between headend and subscriber termination point. They are suitable for direct buried and duct laying.

### Standards

Screening Class A++ acc. to EN 50117-2-3, further EN 50083-2/A1, EN 50117-1

### Flame resistance

IEC 60332-1 (not for cables with PE sheath)

### Construction

<b>Inner conductor</b>	bare copper wire, diameter 3.3 mm
<b>Insulation</b>	gas injected foam PE, diameter 13.3 mm
<b>Outer conductor</b>	welded copper tube, diameter 14.1 mm
<b>Sheath</b>	PE, diameter 17.1 mm ± 0.5 mm black
<b>Printing</b>	DRAKA COMTEQ - COAX3 CT 33 S + meter marking + batch number

### Mechanical Properties

<b>Minimum bending radius</b>	Without load	15 x D (D= outer diameter)
	With load	30 x D (D= outer diameter)
<b>Temperature</b>	During operation	- 40° C to + 70° C
	During storage	- 40° C to + 70° C
	During installation	- 5° C to + 60° C

### Electrical Properties at 20°C

<b>DC resistance</b>	Inner conductor	2.1 Ω/km
	Outer conductor	1.7 Ω/km
<b>Characteristic impedance</b>		75Ω ± 1.5Ω
<b>Velocity ratio</b>		88%
<b>Mutual capacitance</b>		50 pF/m
<b>Screening factor</b>	30 MHz - 1000 MHz	> 120 dB
<b>Transfer impedance</b>	5 MHz - 30 MHz	< 0.8 mΩ/m
<b>Electrical strength</b>	Dielectric	2 kV <sub>DC</sub> 1 min
	Sheath	3.75 kV <sub>DC</sub> 1 min

### Electrical Data (at 20°C)

Attenuation (dB/100m)		Return loss (dB)	
Frequency (MHz)	nominal	Frequency (MHz)	
5	0.4	5 - 30	> 26
50	1.3	30 - 470	> 26
100	1.9	470 - 1000	> 23
200	2.7		
400	4.0		
800	5.8		
862	6.0		
950	6.3		
1350	7.7		
1750	8.9		
2150	10.1		
3000	12.0		

### Technical Data

Product code	Cable type	Weight	Standard delivery length	Drum size	Copper content	Tensile force	Bending radius	Storage
		kg/km	m	*OWD		N	mm	
1002555 (old: CK2683200)	Coax3 CT 33 S PE bk	290	1000	1200/600/710	195	500	175	outside

### Product Code Table

Product Description	Product Code	PG Reference Code	PG Part Number
Coax3 CT 33 S PE		-	60009598
Coax3 CT 33 S PE 500DW	1002555-00500DW	60009277	60016716
Coax3 CT 33 S (3.3/13.5) PE -01000DW	1002555-01000DW	-	60016717

\*OWD (Oneway drum)

# Coax4 CT 22 A (2.2/9.3)

CATV Trunk Cable

## Construction

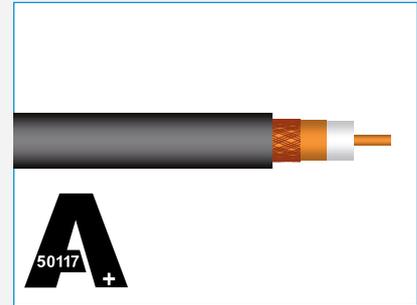
<b>Inner conductor</b>	bare copper wire, diameter 2.2 mm
<b>Insulation</b>	gas injected foam PE, diameter 9.3 mm
<b>Outer conductor</b>	Cu-PET-Cu foil, longitudinal, under bare copper braid , optical coverage 60%, diameter 10.0 mm
<b>Sheath</b>	PE, diameter 12.5 mm ± 0.2 mm black
<b>Printing</b>	DRAKA COMTEQ - COAX4 CT 22 A + meter marking + batch number

## Mechanical Properties

<b>Minimum bending radius</b>	Without load	10 x D (D= outer diameter)
	With load	15 x D (D= outer diameter)
<b>Temperature range</b>	During operation	- 40° C to + 70° C
	During storage	- 40° C to + 70° C
	During installation	- 5° C to + 60° C

## Electrical Properties at 20°C

<b>DC resistance</b>	Inner conductor	4.8 Ω/km
	Outer conductor	5.2 Ω/km
<b>Characteristic impedance</b>		75Ω ± 2Ω
<b>Velocity ratio</b>		85%
<b>Mutual capacitance</b>		52 pF/m
<b>Screening factor</b>	30 MHz - 1000 MHz	> 100 dB
<b>Transfer impedance</b>	5 MHz - 30 MHz	≤ 2.5 mΩ/m
<b>Electrical strength</b>	Dielectric	2 kV <sub>DC</sub> 1 min
	Sheath	3.75 kV <sub>AC</sub> 1 min



## Application

CATV cables are used in trunk lines of CATV and broadband networks between headend and subscriber termination point.

They are suitable for direct buried and duct laying.

## Standards

Screening Class A+ acc. to EN 50117-2-3 (Cenelec SC46XA), further EN 50083-2/A1, EN 50117-1

## Flame resistance

IEC 60332-1 (not for cables with PE sheath)

## Electrical Data (at 20°C)

Attenuation (dB/100m)		Return loss (dB)	
Frequency (MHz)	nominal	Frequency (MHz)	
5	0.65	5 - 30	> 26
50	2.0	30 - 470	> 26
100	2.9	470 - 1000	> 23
200	4.2		
400	6.1		
800	8.9		
862	9.2		
950	9.7		
1350	11.5		
1750	13.6		
2150	15.3		
3000	18.2		

## Technical Data

Product code	Cable type	Weight kg/km	Standard delivery length m	Drum size *OWD	Copper content	Tensile force N	Bending radius mm	Storage
1002558 (old: CK2684100)	Coax4 CT 22 A PE	135	1000	900/450/560	80.5	475	125	outside

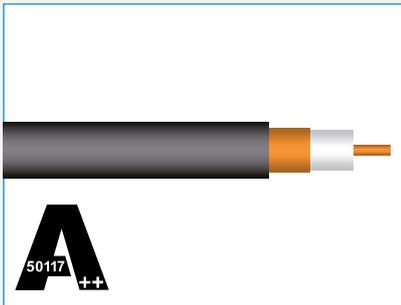
## Product Code Table

Product Description	Product Code	PG Reference Code	PG Part Number
Coax4 CT 22 A PE	-	60013788	60013788
Coax4 CT 22 A PE 1000DW	1002558-01000DW	60013788	60013789

\*OWD (Oneway drum)

# Coax4 CT 22 S (2.2/8.8)

CATV Trunk Cable



### Application

CATV cables are used in trunk lines of CATV and broadband networks between headend and subscriber termination point. They are suitable for direct buried and duct laying.

### Standards

Screening Class A++ acc. to EN 50117-2-3, further EN 50083-2/A1, EN 50117-1

### Construction

<b>Inner conductor</b>	bare copper wire, diameter 2.2 mm
<b>Insulation</b>	gas injected foam PE, diameter 8.8 mm
<b>Outer conductor</b>	welded copper tube, diameter 9.5 mm
<b>Sheath</b>	PE, diameter 12.3 mm ± 0.3 mm black
<b>Printing</b>	DRAKA COMTEQ - COAX4 CT 22 S + meter marking + batch number

### Mechanical Properties

<b>Minimum bending radius</b>	Without load	15 x D (D= outer diameter)
	With load	30 x D (D= outer diameter)
<b>Temperature range</b>	During operation	- 30° C to + 70° C
	During storage	- 40° C to + 70° C
	During installation	- 5° C to + 60° C

### Electrical Properties at 20°C

<b>DC resistance</b>	Inner conductor	4.8 Ω/km
	Outer conductor	2.6 Ω/km
<b>Characteristic impedance</b>		75Ω ± 2Ω
<b>Velocity ratio</b>		88%
<b>Mutual capacitance</b>		50 pF/m
<b>Screening factor</b>	30 MHz - 1000 MHz	> 120 dB
<b>Transfer impedance</b>	5 MHz - 30 MHz	< 0.8 mΩ/m
<b>Electrical strength</b>	Dielectric	2 kV <sub>ac</sub> 1 min
	Sheath	3.75 kV <sub>ac</sub> 1 min

### Electrical Data (at 20°C)

Attenuation (dB/100m)		Return loss (dB)	
Frequency (MHz)	nominal	Frequency (MHz)	
5	0.65	5 - 30	
50	2.0	30 - 470	> 26
100	2.9	470 - 1000	> 26
200	4.2		> 23
400	6.0		
800	8.7		
862	9.1		
950	9.6		
1350	11.3		
1750	13.3		
2150	15.1		
3000	18.0		

### Technical Data

Product code	Cable type	Weight	Standard delivery length	Drum size	Copper content	Tensile force	Bending radius	Storage
		kg/km	m	*OWD		N	mm	
1002559 (old: CK2684200)	Coax4 CT 22 S PE bk	170	1000	1250/630/670	110	500	125	outside

### Product Code Table

Product Description	Product Code	PG Reference Code	PG Part Number
Coax4 CT 22 S PE	-	-	60009599
Coax4 CT 22 S PE 500DW	1002559-00500DW	60009279	60016723
Coax4 CT 22 S PE 1000DW	1002559-01000DW	60009279	60016724
Coax4 CT 22 S PE with messenger	-	60016728	60016728

\*OWD (Oneway drum)

# Coax6 AT 16 S A+

## CATV Trunk Cable

### Construction

<b>Inner conductor</b>	bare copper wire, diameter 1.61 mm
<b>Insulation</b>	gas injected foam PE, diameter 7.15 mm
<b>Outer conductor</b>	Al-PET-foil, longitudinal, bonded to the insulation, under tinned copper braid, optical coverage 70%, + Al-PET foil longitudinal, bonded to the jacket diameter 8.1 mm
<b>Sheath</b>	FRNC, diameter 10.2 mm $\pm$ 0.3 mm black
<b>Printing</b>	DRAKA COAX6 AT 16 S - FRNC Class A+ DIN EN 50117-2-4 KDG 1 TS 153 XXX MM YY+ batch number

XXX = Meter marking  
MM = month of production  
YY = year of production

### Mechanical Properties

<b>Minimum bending radius</b>	Without load	7.5 x D ( D= outer diameter )
	With load	15 x D ( D= outer diameter )
<b>Temperature range</b>	During operation	- 40° C to + 70° C
	During storage	- 40° C to + 70° C
	During installation	- 5° C to + 60° C

### Electrical Properties at 20°C

<b>DC resistance</b>	Inner conductor	8.5 $\Omega$ /km
	Outer conductor	8.0 $\Omega$ /km
<b>Mutual capacitance</b>		53 pF/m
<b>Characteristic impedance</b>		75 $\Omega \pm 2.0 \Omega$
<b>Velocity ratio</b>		84 %
<b>Screening factor</b>	30 MHz - 1000 MHz	> 115 dB
	1000 MHz - 2000 MHz	> 105 dB
	2000 MHz - 3000 MHz	> 105 dB
<b>Transfer impedance</b>	5 MHz - 30 MHz	$\leq 2.5$ m $\Omega$ /m
<b>Electrical strength</b>	Dielectric	2 kV <sub>DC</sub> 1 min
	Sheath	3.75 kV <sub>DC</sub> 1 min

### Electrical Data (at 20°C)

Attenuation (dB/100m)	Frequency (MHz)	nominal	Attenuation (dB/100m)	
			Frequency (MHz)	
5		0.9	5 - 30	> 26
50		2.8	30 - 470	> 26
100		3.9	470 - 1000	> 24
200		5.7	1000 - 3000	> 20
400		8.3		
800		12.2		
862		12.7		
950		13.4		
1350		16.2		
1750		18.9		
2150		21.2		
3000		25.9		

### Technical Data

Product code	Cable type	Weight	Standard delivery length	Drum size	Copper content	Tensile force	Bending radius	Storage
		kg/km	m	*OWD		N	mm	
60043631	Coax6 AT 16 S	89	1000	760/360/420	53.5	300	75	inside

\*PWD (plywood drum)



### Application

CATV cables are used in trunk lines of CATV and broadband networks between headend and subscriber termination point.

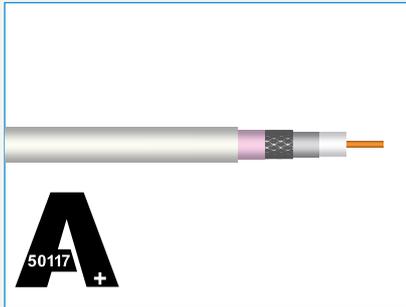
They are suitable for direct buried and duct laying.

### Standards

Screening Class A + acc. to EN 50117-2-3, DIN EN 50117-2-4 further EN 50083-2/A1, EN 50117-1.

## Coax9 AD 11 S A+

CATV Drop Cable



### Application

Drop cables are used in private and commercial TV signal distribution networks and as antenna cable for terrestrial and satellite broadcast systems.

### Standards

Screening Class A+ acc. to EN 50117-2-1, EN 50117-2-2, EN 50117-2-4 and EN 50117-2-5, further EN 50083-2/A1, EN 50117-1

### Flame resistance

IEC 60332-1

### Construction

<b>Conductor</b>	bare copper wire, diameter 1.13 mm
<b>Insulation</b>	gas injected foam PE, diameter 4.8 mm
<b>Outer conductor</b>	Al-PET foil, longitudinal, bonded to the insulation, under tinned copper braid, optical coverage 70%, + Al-PET foil longitudinal, bonded to the sheath, diameter 5.6 mm
<b>Sheath</b>	FRNC, diameter 6.8 mm ± 0.2 mm white
<b>Printing</b>	DRAKA COAX9 AD 11 S FRNC - Class A+ DIN EN 50117-2-4 KDG 1 TS 153 XXX MM YY + batch number

XXX = Meter marking  
MM = month of production  
YY = year of production

### Mechanical Properties

<b>Minimum bending radius</b>	Without load	5 x D ( D= outer diameter )
	With load	10 x D ( D= outer diameter )
<b>Temperature range</b>	During operation	- 40° C to + 70° C
	During storage	- 40° C to + 70° C
	During installation	- 5° C to + 60° C
<b>Corrosivity</b>	-	acc. to IEC 60754-2

### Electrical Properties at 20°C

<b>DC resistance</b>	Inner conductor	19 Ω/km
	Outer conductor	12 Ω/km
<b>Mutual capacitance</b>		52 pF/m
<b>Characteristic impedance</b>		75 Ω ± 3.0 Ω
<b>Velocity ratio</b>		82 %
<b>Screening factor</b>	30 MHz – 1000 MHz	> 115 dB
	1000 MHz – 2000 MHz	> 105 dB
	2000 MHz – 3000 MHz	> 105 dB
<b>Transfer impedance</b>	5 MHz – 30 MHz	≤ 2.5 mΩ/m
<b>Electrical strength</b>	Dielectric	2 kV <sub>oc</sub> 1 min
	Sheath	3.75 kV <sub>DC</sub> 1 min

### Electrical Data (at 20°C)

Attenuation (dB/100m)	Frequency (MHz)	nominal	Attenuation (dB/100m)	Frequency (MHz)
5		1.3	5 – 30	> 26
50		4.1	30 – 470	> 24
100		5.6	470 – 1000	> 20
200		8.2	1000 – 3000	> 18
400		11.8		
800		16.6		
862		17.1		
950		18.1		
1350		21.8		
1750		25.2		
2150		28.3		
3000		34.7		

### Technical Data

Product code	Cable type	Weight	Standard delivery length	Drum size	Copper content	Tensile force	Storage
		kg/km	m	*PWD		N	
60045935	Coax9 AD 11 S FRNC wh	46	100	coil	25.0	120	inside
60045936	Coax9 AD 11 S FRNC wh	46	500	400/120/280	25.0	120	inside
60043630	Coax9 AD 11 S FRNC wh	46	1000	500/200/360	25.0	120	inside

\*PWD (plywood drum)

# Coax10 Trishield A+

## CATV Drop Cable

### Construction

<b>Inner conductor</b>	bare copper wire, diameter 1.0 mm
<b>Insulation</b>	gas injected foam PE, diameter 4.55 mm
<b>Outer conductor</b>	Al-PET foil, longitudinal, bonded to the insulation, under tinned copper braid, optical coverage 70%, + Al-PET foil longitudinal, bonded to the sheath, diameter 5.5 mm
<b>Sheath</b>	FRNC, diameter 6.8 mm ± 0.2 mm white
<b>Printing</b>	DRAKA COAX10 TRISHIELD FRNC - Class A+ DIN EN 50117-2-4 KDG 1 TS 153 XXX MM YY + batch number

XXX = Meter marking  
MM = month of production  
YY = year of production

### Mechanical Properties

<b>Minimum bending radius</b>	Without load	5 x D ( D= outer diameter )
	With load	10 x D ( D= outer diameter )
<b>Temperature range</b>	During operation	- 40° C to + 70° C
	During storage	- 40° C to + 70° C
	During installation	- 5° C to + 60° C
<b>Corrosivity</b>	-	acc. to IEC 60754-2

### Electrical Properties at 20°C

<b>DC resistance</b>	Inner conductor	22 Ω/km
	Outer conductor	14 Ω/km
<b>Mutual capacitance</b>		52 pF/m
<b>Characteristic impedance</b>		75 Ω ± 3.0 Ω
<b>Velocity ratio</b>		82 %
<b>Screening factor</b>	30 MHz - 1000 MHz	> 110 dB
	1000 MHz - 2000 MHz	> 100 dB
	2000 MHz - 3000 MHz	> 100 dB
<b>Transfer impedance</b>	5 MHz - 30 MHz	≤ 2.5 mΩ/m
<b>Electrical strength</b>	Dielectric	2 kV <sub>DC</sub> 1 min
	Sheath	3.75 kV <sub>DC</sub> 1 min

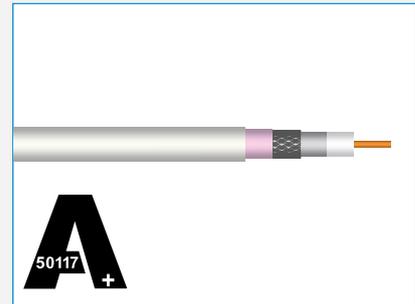
### Electrical Data (at 20°C)

Attenuation (dB/100m)	nominal	Attenuation (dB/100m)	
Frequency (MHz)		Frequency (MHz)	
5	1.6	5 - 30	> 26
50	4.3	30 - 470	> 24
100	6.2	470 - 1000	> 20
200	8.7	1000 - 3000	> 18
400	12.5		
862	18.6		
950	19.8		
1350	23.7		
1750	27.2		
2150	30.5		
3000	36.9		

### Technical Data

Product code	Cable type	Weight	Standard delivery length	Drum size	Copper content	Tensile force	Storage
		kg/km	m	*PWD		N	
60045937	Coax10 Trishield A+ FRNC	44	100	coil	17.4	90	inside
60045938	Coax10 Trishield A+ FRNC	44	500	400/120/280	17.4	90	inside
60043632	Coax10 Trishield A+ FRNC	44	1000	500/200/360	17.4	90	inside

\*PWD (plywood drum)



### Application

Drop cables are used in private and commercial TV signal distribution networks and as antenna cable for terrestrial and satellite broadcast systems.

### Standards

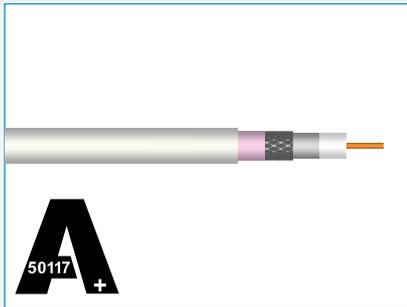
Screening Class A+ acc. to EN 50117-2-1, EN 50117-2-2, EN 50117-2-4 and EN 50117-2-5, further EN 50083-2/A1, EN 50117-1.

### Flame resistance

IEC 60332-1

## Coax11 AD 08 S A+

CATV Drop Cable



### Application

Drop cables are used in private and commercial TV signal distribution networks and as antenna cable for terrestrial and satellite broadcast systems.

### Standards

Screening Class A+ acc. to EN 50117-2-1, EN 50117-2-2, EN 50117-2-4 and EN 50117-2-5, further EN 50083-2/A1, EN 50117-1.

### Flame resistance

IEC 60332-1

### Construction

<b>Inner conductor</b>	bare copper wire, diameter 0.8 mm
<b>Insulation</b>	gas injected foam PE, diameter 3.5 mm
<b>Outer conductor</b>	Al-PET foil, longitudinal, bonded to the insulation, under tinned copper braid, optical coverage 80%, + Al-PET foil longitudinal, bonded to the sheath, diameter 4.1 mm
<b>Sheath</b>	FRNC, diameter 5.1 mm ± 0.2 mm white
<b>Printing</b>	DRAKA COAX11 AD 08 S FRNC - Class A+ DIN EN 50117-2-4 KDG 1 TS 153 XXX MM YY + batch number

XXX = Meter marking  
MM = month of production  
YY = year of production

### Mechanical Properties

<b>Minimum bending radius</b>	Without load	5 x D ( D= outer diameter )
	With load	10 x D ( D= outer diameter )
<b>Temperature range</b>	During operation	- 40° C to + 70° C
	During storage	- 40° C to + 70° C
	During installation	- 5° C to + 60° C
<b>Corrosivity</b>	-	acc. to IEC 60754-2

### Electrical Properties at 20°C

<b>DC resistance</b>	Inner conductor	35 Ω/km
	Outer conductor	15 Ω/km
<b>Mutual capacitance</b>		52 pF/m
<b>Characteristic impedance</b>		75 Ω ± 3.0 Ω
<b>Velocity ratio</b>		82 %
<b>Screening factor</b>	30 MHz – 1000 MHz	> 115 dB
	1000 MHz – 2000 MHz	> 105 dB
	2000 MHz – 3000 MHz	> 105 dB
<b>Transfer impedance</b>	5 MHz – 30 MHz	≤ 2.5 mΩ/m
<b>Electrical strength</b>	Dielectric	2 kVDC 1 min
	Sheath	3.75 kVDC 1 min

### Electrical Data (at 20°C)

Attenuation (dB/100m)	Frequency (MHz)	nominal	Attenuation (dB/100m)	Frequency (MHz)
5		1.9	5 – 30	> 26
50		5.7	30 – 470	> 24
100		7.8	470 – 1000	> 20
200		11.2	1000 – 3000	> 18
400		16.2		
800		22.6		
862		24.3		
950		25.1		
1350		31.0		
1750		36.3		
2150		41.3		
3000		48.8		

### Technical Data

Cable type	Weight	Standard delivery length	Drum size	Copper content	Tensile force	Storage
	kg/km	m	*PWD		N	
Coax11 AD 08 S FRNC	33	100	coil	18.1	95	inside
Coax11 AD 08 S FRNC	33	500	400/120/280	18.1	95	inside
Coax11 AD 08 S FRNC	33	1000	500/200/360	18.1	95	inside

\*PWD (plywood drum)

# RG223

RG-Cables acc. to MIL-C-17F and MIL-C-17G

## Construction

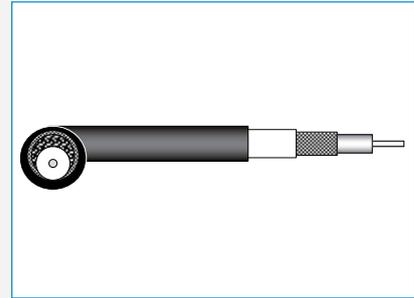
<b>Inner conductor</b>	copper wire, silver plated, diameter 0.90 ± 0.01 mm
<b>Insulation</b>	PE, diameter 2.95 ± 0.05
<b>1<sup>st</sup> braid</b>	silver plated, 96% optical coverage
<b>2<sup>nd</sup> braid</b>	silver plated, 96% optical coverage
<b>Sheath</b>	PVC, diameter 5.40 ± 0.10 mm

## Mechanical Properties

<b>Minimum bending radius</b>	Without load	5 x outer diameter
	With load	10 x outer diameter

## Electrical Properties at 20°C

<b>DC resistance</b>	Inner conductor	29.1 Ω/km
	1 <sup>st</sup> braid	13.5 Ω/km
	2 <sup>nd</sup> braid	15.5 Ω/km
<b>Characteristic impedance</b>		50 Ω ± 2Ω
<b>Velocity ratio</b>		66%
<b>Mutual capacitance</b>		100 pF/m
<b>Maximum operating frequency</b>		12.4 GHz
<b>Operating voltage</b>		1.4 kV <sub>rms</sub>
<b>Test voltage</b>	Inner-/outer conductor	5.0 kV <sub>rms</sub>



## Standards

acc. to MIL-C-17F and MIL-C-17G

## Flame resistance

acc. to IEC 60332-1

## Electrical Data (at 20°C)

Frequency (MHz)	Attenuation (dB/100m)	Max. power rating (Watts)		Return loss (dB)	
		(at ambient temperature 25°C and max. inner conductor temperature of 70°C)		several peaks are allowed	
	nominal	maximum		Frequency (MHz)	
50	9.8	350		100	
400	28.4	86		1 GHz	≥ 27.0
1000	45.9	50		2 GHz	≥ 23.5
3000	83.1	32		4-5 GHz	≥ 21.5
5200	112.7	24		10 GHz	≥ 21.0
5800	120.6	22			≥ 20.0

All other requirements acc. to MIL-C-17F, respectively MIL-C-17G

## Technical Data

Product code	Designation	Type	Brand name	Outer diameter	Weight	Standard delivery length	Drum size	Gross weight	Copper content	Tensile force
				mm	kg/km	m	*PWD	kg		
1002746	2YCCY	0.89s/2.95Ds	M17/84-RG223	5.4	56.4	1000/100	500/200/250	60/6	40.5	240
**1002748	2YCCY	0.89s/2.95Ds	M17/84-RG223	5.4	56.4	2000	760/360/580	124	40.5	240
***1002749	2YCCY	0.89s/2.95Ds	M17/84-RG223	5.4	56.4	2000	760/360/580	124	40.5	240
1002752	2YCCY	0.89s/2.95Ds	M17/84-RG223	5.4	56.4	2000	760/360/580	124	40.5	240

## Product Code Table

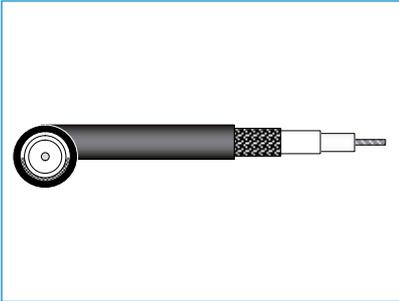
Product Description	Product Code	PG Reference Code	PG Part Number
RG223 MIL-C-17F 1000DW	1002746-01000DW	60014316	60011606
RG223 MIL-C-17F 5000DW	1002746-00500DW	60014316	60011607
RG223 MIL-C-17F	-	60014316	60014316
DR RG223 M17 50 0.90/2.95 PVC BK 250DW	1002746-00250DW	-	60017546

\*PWD (Plywood drum) \*\*RG223 with close tolerance of the characteristic impedance ± 1Ω and special customer marking

\*\*\*RG223 white and with close tolerance of the characteristic impedance ± 1Ω and without marking

# RG214

RG-Cables acc. to MIL-C-17F and MIL-C-17G



### Standards

acc. to MIL-C-17F and MIL-C-17G

### Flame resistance

acc. to IEC 60332-1

### Construction

<b>Inner conductor</b>	stranded copper wires, silver plated 7 x 0.75, diameter 2.25 ± 0.01 mm
<b>Insulation</b>	PE, diameter 7.25 ± 0.15 mm
<b>1<sup>st</sup> braid</b>	silver plated, 94% optical coverage
<b>2<sup>nd</sup> braid</b>	silver plated, 97% optical coverage
<b>Sheath</b>	PVC, diameter 10.80 ± 0.18 mm

### Mechanical Properties

<b>Minimum bending radius</b>	Without load	5 x outer diameter
	With load	10 x outer diameter
<b>Temperature</b>	During operation	- 40° C to + 85° C
	During installation	- 15° C to + 55° C

### Electrical Properties at 20°C

<b>DC resistance</b>	Inner conductor	5.7 Ω/km
	1 <sup>st</sup> braid	9.6 Ω/km
	2 <sup>nd</sup> braid	8.2 Ω/km
<b>Characteristic impedance</b>		50 Ω ± 2Ω
<b>Velocity ratio</b>		66%
<b>Mutual capacitance</b>		100 pF/m
<b>Maximum operating frequency</b>		11 GHz
<b>Operating voltage</b>		3.7 kV <sub>rms</sub>
<b>Test voltage</b>	Inner-/outer conductor	10.0 kV <sub>rms</sub>

### Electrical Data (at 20°C)

Frequency (MHz)	Attenuation (dB/100m)	Max. power rating (Watts) (at ambient temperature 25°C and max. inner conductor temperature of 70°C)	Return loss (dB) several peaks are allowed	
			Frequency (MHz)	
50	4.8	1500	100	≥ 23
100	6.9	920	1000	≥ 20
400	15.2	330	3000	≥ 19
1000	26.7	160	5000	≥ 18
3000	54.8	75		
5200	79.8	61		
5800	86.6	56		

All other requirements acc. to MIL-C-17F, respectively MIL-C-17G

### Technical Data

Product code	Designation	Type	Brand name	Outer diameter	Weight	Standard delivery length	Drum size	Gross weight	Copper content	Tensile force
				mm	kg/km	m	*PWD/ring	kg		N
1002737	2YCCY	2.25Ls/7.25Ds	M17/75-RG214	10.8	200	1000/100	760/360/420	212/20	132.9	730

### Product Code Table

Product Description	Product Code	PG Reference Code	PG Part Number
RG214 MIL-C-17F 100RW	1002737-00100RW	60014305	<b>60014306</b>
DR RG214 M17 50 2.25S/7.25 PVC BK	-	60014305	<b>60014305</b>
DR RG214 M17 50 2.25S/7.25 PVC BK 100DW	1002737-00100DW	60014305	<b>60017543</b>
DR RG214 M17 50 2.25S/7.25 PVC BK 500 DW	1002737-00500DW	60014305	<b>60017544</b>
DR RG214 M17 50 2.25S/7.25PVC BK 1000 DW	1002737-01000DW	60014305	<b>60017545</b>

\*PWD (Plywood drum)

# RG213

RG-Cables acc. to MIL-C-17F and MIL-C-17G

## Construction

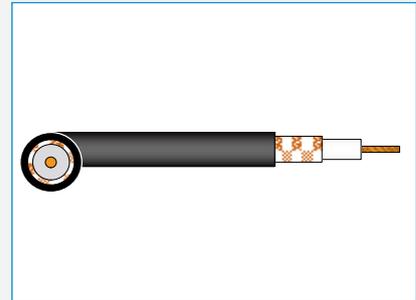
<b>Inner conductor</b>	stranded copper wires, bare 7 x 0.75, diameter 2.25 ± 0.01 mm
<b>Insulation</b>	PE, diameter 7.25 ± 0.05 mm
<b>Braid</b>	bare, 96% optical coverage
<b>Sheath</b>	PVC, diameter 10.30 ± 0.15 mm

## Mechanical Properties

<b>Minimum bending radius</b>	Without load	5 x outer diameter
	With load	10 x outer diameter
<b>Temperature</b>	During operation	- 40° C to + 85° C
	During installation	- 15° C to + 55° C

## Electrical Properties at 20°C

<b>DC resistance</b>	Inner conductor	5.7 Ω
	Outer conductor	3.9 Ω/km
<b>Characteristic impedance</b>		50 Ω ± 2Ω
<b>Velocity ratio</b>		66%
<b>Mutual capacitance</b>		100 pF/m
<b>Operating voltage</b>		3.7 kV <sub>rms</sub>
<b>Test voltage</b>	Inner-/outer conductor	10.0 kV <sub>rms</sub>



## Standards

acc. to MIL-C-17F and MIL-C-17G

## Flame resistance

acc. to IEC 60332-1

## Electrical Data (at 20°C)

Frequency (MHz)	Attenuation (dB/100m)	Max. power rating (Watts) (at ambient temperature 25°C and max. inner conductor temperature of 70°C)	Return loss (dB) several peaks are allowed	
			Frequency (MHz)	
10	1.8	2300		
100	6.8	920	1-1000	28-23.5
200	9.0	570		
400	14.4	380		
1000	24.7	210		
1500	31.5	170		
2000	36.4	140		
3000	46.6	100		
5200	62.0	73		
5800	67.0	67		

All other requirements acc. to MIL-C-17F, MIL-C-17G

## Technical Data

Product code	Designation	Type	Brand name	Outer diameter	Weight	Standard delivery length	Drum size	Gross weight	Copper content	Tensile force
				mm	kg/km		m	*PWD/ring		
1002732	2YCV	2.25L/7.25	M17/074-RG213	10.3	157	1000/100	760/360/420	169/16	86.7	470
1002734	2YCV	2.25L/7.25	M17/074-RG213	10.3	157	1000/100	760/360/420	169/16	86.7	470

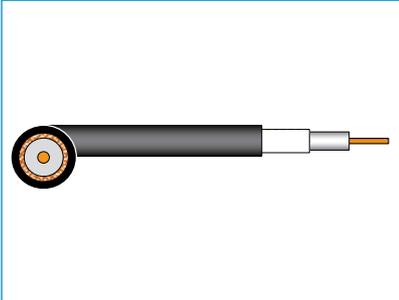
## Product Code Table

Product Description	Product Code	PG Reference Code	PG Part Number
DR RG213 50 2.25S/7.25 PVC BK	-	60017538	<b>60017538</b>
DR RG213 50 2.25S/7.25 PVC BK 5000DW	1002732-005000DW	60017538	<b>60017539</b>
DR RG213 50 2.25S/7.25 PVC BK 10000DW	1002732-010000DW	60017538	<b>60017540</b>

\*PWD (Plywood drum)

## RG59

RG-Cables acc. to MIL-C-17F and MIL-C-17G



### Application

Drop cables are used in private and commercial TV signal distribution networks and as antenna cable for terrestrial and satellite broadcast systems.

### Standards

acc. to MIL-C-17F and MIL-C-17G

### Flame resistance

acc. to IEC 60332-1

### Construction

<b>Inner conductor</b>	copperclad steel wire, diameter 0.59 ± 0.01 mm
<b>Insulation</b>	PE, diameter 3.70 ± 0.05 mm
<b>Outer conductor</b>	
<b>Copper braid</b>	bare, 95% optical coverage
<b>Sheath</b>	PVC, diameter 6.15 ± 0.10 mm black

### Mechanical Properties

<b>Minimum bending radius</b>	Without load	5 x outer diameter
	With load	10 x outer diameter
<b>Temperature</b>	During operation	- 40° C to + 85° C
	During installation	- 15° C to + 55° C

### Electrical Properties at 20°C

<b>Loop resistance</b>		≤ 165 Ω/km
<b>Characteristic impedance</b>		75 Ω ± 3 Ω
<b>Velocity ratio</b>		66%
<b>Mutual capacitance</b>		67 pF/m
<b>Transfer impedance</b>	3 MHz	36 mΩ/m
<b>Operating voltage</b>		1.7 kV <sub>rms</sub>
<b>Test voltage</b>	Inner-/outer conductor	7 kV <sub>rms</sub>

### Electrical Data (at 20°C)

Frequency (MHz)	Attenuation (dB/100m)	Max. power rating (Watts)		Return loss (dB)	
		(ambient temperature 25°C and max. inner conductor temperature of 70°C)		several peaks are allowed	
	nominal	maximum		Frequency (MHz)	
10	3.5	1100			
100	11.0	340			
200	16.0	230			
400	24.0	180		10-300	≥ 26
1000	38.0	105		300-1000	≥ 24

All other requirements acc. to MIL-C-17F, MIL-C-17G

### Technical Data

Product code	Designation	Type	Brand name	Outer diameter	Weight	Standard delivery length	Drum size	Gross weight	Copper content	Tensile force
				mm	kg/km		m			
1002721	2YCY	0.59/3.7 Staku	M17/29-RG59	6.15	53.6	1000/100/500	500/200/310 400/150/303	57/29/5.5	24.7	145
1002726	2YCY	0.59/3.7 Staku	M17/29-RG59	6.15	53.6	1000/100/500	500/200/310 400/150/303	57/29/5.5	24.7	145

### Product Code Table

Product Description	Product Code	PG Reference Code	PG Part Number
RG59 MIL-C-17F 100RW	1002721-00100RW	60026132	60014299
DR RG59 M17 75 0.59/3.7PVC BK 500DW	1002721-00500DW	60017535	60017536
DR RG59 M17 75 0.59/3.7PVC BK 1000DW	1002721-01000DW	60017535	60017537

\*PWD (Plywood drum)

# RG058

RG-Cables acc. to MIL-C-17F and MIL-C-17G

## Construction

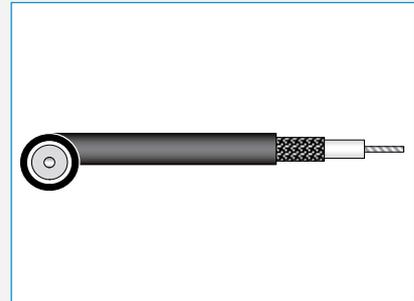
<b>Inner conductor</b>	stranded copper wires, tinned, diameter 0.90 ± 0.01 mm
<b>Insulation</b>	PE, diameter 2.95 ± 0.05 mm
<b>Outer conductor</b>	
<b>Copper braid</b>	tinned, 96% optical coverage
<b>Sheath</b>	PVC, altern. FRNC, diameter 4.95 ± 0.10 mm black

## Mechanical Properties

<b>Minimum bending radius</b>	Without load	5 x outer diameter
	With load	10 x outer diameter
<b>Temperature</b>	During operation	- 40° C to + 85° C
	During installation	- 15° C to + 55° C
<b>Corrosivity</b>	only for FRNC type	IEC 60754-2

## Electrical Properties at 20°C

<b>Loop resistance</b>		≤ 50 Ω
<b>Characteristic impedance</b>		50 Ω ± 2 Ω
<b>Velocity ratio</b>		66%
<b>Mutual capacitance</b>		100 nF/km
<b>Transfer impedance</b>		36 mΩ/m
<b>Operating voltage</b>		1.8 kV <sub>rms</sub>
<b>Test voltage</b>	Inner-/outer conductor	5.4 kV <sub>rms</sub>



## Standards

acc. to MIL-C-17F and MIL-C-17G

## Flame resistance

acc. to IEC 60332-1

## Electrical Data (at 20°C)

Frequency (MHz)	Attenuation (dB/100m)	Max. power rating (Watts)		Return loss (dB)	
		(at ambient temperature 25°C and max. inner conductor temperature of 70°C)		several peaks are allowed	
	nominal	maximum		Frequency (MHz)	
10	4.2	750			
100	15.7	230		50-100	≥ 28
200	23.0	180		100-300	≥ 27
400	34.5	110		300-500	≥ 26
1000	60.0	65		500-1000	≥ 25

All other requirements acc. to MIL-C-17F, MIL-C-17G

## Technical Data

Product code	Designation	Type	Brand name	Outer diameter	Weight	Standard delivery length	Drum size	Gross weight	Copper content	Tensile force
				mm	kg/km					
1002717	2YCV	0.9Lz/2.95z	M17/28-RG058	4.95	37	1000/100	400/120/280	39/3.7	20.4	120
1002919	2YCH	0.9Lz/2.95z	M17/28-RG058 FRNC	4.95	38	1000/100	400/120/280	40/3.8	20.4	120

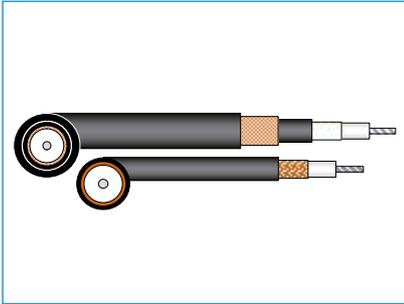
## Product Code Table

Product Description	Product Code	PG Reference Code	PG Part Number
RG058 MIL-C-17F	-	60014295	60014295
RG058 MIL-C-17F 500DW	1002717-00500DW	60014295	60014296
RG058 MIL-C-17F 1000DW	1002717-01000DW	60014295	60014298

\*PWD (Plywood drum)

## RG11

RG-Cables acc. to MIL-C-17F and MIL-C-17G



### Standards

acc. to MIL-C-17F and MIL-C-17G

### Flame resistance

acc. to IEC 60332-1

### Construction RG11 2YCY 1.2Lz/7.25

<b>Inner conductor</b>	stranded copper wires, tinned, diameter 7 x 0.39
<b>Insulation</b>	PE, diameter 7.25 ± 0.05 mm
<b>Braid</b>	bare copper wires, 96% optical coverage
<b>Sheath</b>	PVC, diameter 10.1 ± 0.2 mm

### Construction RG11 + 2nd braid 2YCVCY 1.2Lz/7.25

<b>Inner conductor</b>	stranded copper wires, tinned, 7 x 0.39 mm, diameter 1.17
<b>Insulation</b>	PE, diameter 7.25 ± 0.05 mm
<b>1<sup>st</sup> braid</b>	bare copper wires, 96% optical coverage
<b>1<sup>st</sup> sheath</b>	PVC, diameter 10.1 ± 0.2 mm
<b>2<sup>nd</sup> braid</b>	bare copper wires, 93.5% optical coverage
<b>2<sup>nd</sup> sheath</b>	PVC, diameter 13.5 ± 0.5 mm

### Mechanical Properties

<b>Minimum bending radius</b>	Without load	5 x outer diameter
	With load	10 x outer diameter
<b>Temperature</b>	During operation	- 40° C to + 85° C
	During installation	- 15° C to + 55° C

### Electrical Properties at 20°C

<b>DC resistance</b>	Inner conductor	21 Ω/km
	1 <sup>st</sup> braid	4.0 Ω/km
	2 <sup>nd</sup> braid (only RG11 + 2 <sup>nd</sup> braid)	3.6 Ω/km
<b>Mutual capacitance</b>		67 nF/m
<b>Characteristic impedance</b>		75 Ω ± 3.0 Ω
<b>Velocity ratio</b>		66 %
<b>Operating voltage</b>		≤ 3.6 kV <sub>rms</sub>
<b>Test voltage</b>	Inner-/outer conductor	7.6 kV <sub>rms</sub>
	Between braids (only RG11 + 2 <sup>nd</sup> braid)	2.0 kV <sub>rms</sub>

### Electrical Data (at 20°C)

Frequency (MHz)	Attenuation (dB/100m)	Max. power rating (Watts) (ambient temperature 25°C and max. inner conductor temperature 70°C)
10	1.8	2800
100	6.5	810
200	9.8	450
400	14.1	370
800	22.5	130
1000	25.2	110

All other requirements acc. to MIL-C-17F respectively MIL-C-17G

### Technical Data

Product code	Designation	Type	Brand name	Outer diameter	Weight	Standard delivery length	Drum size	Gross weight	Copper content	Tensile force
				mm	kg/km		m			*PWD/**OWD
1002715	2YCY	1.2Lz/7.25	M17/6-RG11	10.1	135.2	1000	*760/360/420	147	62.6	345
1002707	2YCVCY	1.2Lz/7.25 (+2 <sup>nd</sup> braid)	M17/6-RG11 (+2 <sup>nd</sup> braid)	13.5	270	1000	**1000/500/560	324	139.9	765

### Product Code Table

Product Description	Product Code	PG Reference Code	PG Part Number
DR RG11 75-COAX 1.17/7.25PVC BK 5000DW	1002715-005000DW	60017534	60017534

\*PWD (Plywood drum)

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# RG6

RG-Cables acc. to MIL-C-17F and MIL-C-17G

## Construction

<b>Inner conductor</b>	copperclad steel wire, diameter 0.73 ± 0.01 mm
<b>Insulation</b>	PE, diameter 4.7 ± 0.05 mm
<b>1<sup>st</sup> braid</b>	silver plated, 96% optical coverage
<b>2<sup>nd</sup> braid</b>	bare, 96% optical coverage, diameter 6.2 mm
<b>Sheath</b>	PVC, diameter 8.40 ± 0.15 mm

XXX = Meter marking  
MM = month of production  
YY = year of production

## Mechanical Properties

<b>Minimum bending radius</b>	Without load	5 x D ( D= outer diameter )
	With load	10 x D ( D= outer diameter )
<b>Temperature</b>	During operation	- 40° C to + 85° C
	During installation	- 15° C to + 55° C

## Electrical Properties at 20°C

<b>DC resistance</b>	Inner conductor	105 Ω/km
	1st braid	6.5 Ω/km
	2nd	7.5 Ω/km
<b>Mutual capacitance</b>		67 pF/m
<b>Characteristic impedance</b>		75 Ω ± 3.0 Ω
<b>Velocity ratio</b>		66 %
<b>Operating voltage</b>		≤ 2.4 kV <sub>rms</sub>
<b>Test voltage</b>	Inner-/outer conductor	7.0 kV <sub>rms</sub>

## Electrical Data (at 20°C)

Attenuation (dB/100m)	Attenuation (dB/100m)	Max. power rating (Watts)	
Frequency (MHz)		(ambient temperature 25°C and max. inner conductor temperature 70°C)	
10	3.0	1600	
100	9.8	500	
200	14	430	
400	20	220	
1000	32	150	
2000	47	70	
3000	60	50	

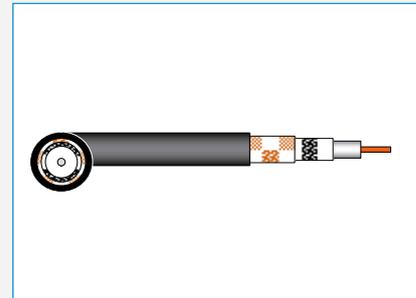
## Technical Data

Product code	Designation	Type	Brand name	Outer diameter	Weight	Standard delivery length	Drum size	Gross weight	Copper content	Tensile force
				mm	kg/km	m	*PWD	kg		N
1002714	2YCCV	0.73/4.7 Ds Staku	M17/2- RG6	8.4	115	1000	760/360 /420	128	70.1	385

## Product Code Table

Product Description	Product Code	PG Reference Code	PG Part Number
RG6 MIL-C-17F		60014290	60014290

\*PWD (Plywood drum)



### Standards

acc. to MIL-C-17F and MIL-C-17G

### Flame resistance

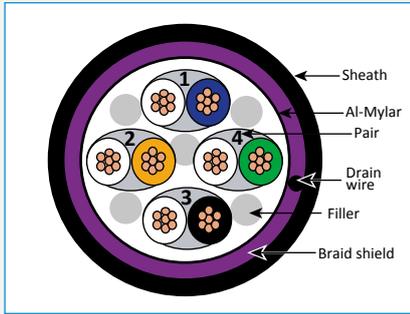
IEC 60332-1

### 3. Building Management Systems



3.1	<b>EIA-485</b>	
	EIA-485 22 & 24 AWG LSZH	76
	EIA-485 22 & 24 AWG SWB LSZH	77
3.2	<b>Screened Control Cable</b>	
	UL 2464 Overall Screen 16-24AWG PVC	78
	UL 2464 Overall Screen 16-24AWG SWB LSZH	79
	UL 2919 INDIV-PAIR Screen 18-24AWG LSZH	80
3.3	<b>Max FOH™</b>	
	Max FOH™ Flexible PAGA & Control Cable	81
3.4	<b>Firetuf™</b>	
	IE Firetuf™ DATA 1P, 2P or 4P LSZH-FR	82
	Firetuf™ OFC-UT-NM Fire Resistant	83
	Universal Central Tube Cable	
	Firetuf™ OFC-UT-CST Fire Resistant	84
	Armoured Central Tube Cable	
	12-96 Core Firetuf™ I10S Fire Resistant	85
	Fibre Optic Cable, LSZH	
3.5	<b>Fibre Optic Cables</b>	
	UC <sup>FIBRE</sup> ™ MT SERIES 2-24 Cores, Indoor	86
	UC <sup>FIBRE</sup> ™ MT SERIES 36,48,96 Cores, Indoor	87
	UC <sup>FIBRE</sup> ™ MTC SERIES, 36 & 48 Cores, Compact	88
	UC <sup>FIBRE</sup> ™ MB SERIES	89
3.6	<b>Multi-Pair Category Cables</b>	
	Category 3 UTP 25/50/100x2x0.5 Multipair	90
	Category 5e 25/50/100x2x0.5 Multipair	91

## EIA-485 22 & 24AWG LSZH Serial Data Communication Cable



### Application

For multidropped, medium-speed, serial data communication in electrically noisy industrial environments.

Application includes industrial networks using RS-485/RS-422 transceivers :

- RS-422 systems for Process Automation (chemicals, brewing, paper mills), factory automation (autos, metal fabrication), HVAC, security, motor control and motion control.

### Fire Rating

- IEC 60332-1, IEC 61034-2, IEC 60754-1/2

### Optional

- PVC / PE

### Construction

<b>Conductor</b>	Stranded Tinned Copper
<b>Insulation</b>	HD-PE
<b>Colour</b>	Pair 1: 1 x white, 1 x blue Pair 2: 1 x white, 1 x orange Pair 3: 1 x white, 1 x black Pair 4: 1 x green
<b>1st screen</b>	1 x AL-Mylar Wrap, overlapping >= 25 %
<b>Drain wire</b>	Stranded Tinned Copper
<b>Braid Shield</b>	Tinned copper
<b>Braid Shield Coverage</b>	≥85%
<b>Sheath</b>	LSZH
<b>Sheath colour</b>	Black

AWG / Pair	22 / 1P	22 / 2P	22 / 3P	22 / 4P	24 / 1P	24 / 2P	24 / 3P	24 / 4P
<b>Conductor Ø mm</b>	0.77				0.61			
<b>Insulation Ø mm</b>	1.8 ± 0.2				1.6 ± 0.08			
<b>Drain wire Ø mm</b>	7 * 0.254				7 * 0.254			
<b>Braid shield</b>	16*6* 0.12mm	16*10* 0.12mm	16*12* 0.12mm	16*12* 0.12mm	16*5* 0.12mm	16*11* 0.12mm	16*9* 0.12mm	16*11* 0.12mm
<b>Sheath Ø mm</b>	6.5	8.2	9.6	10	6.3	8.0	8.5	9.5

### Electrical Specification at 20°C

AWG / Pair	22 / 1P	22 / 2P	22 / 3P	22 / 4P	24 / 1P	24 / 2P	24 / 3P	24 / 4P
<b>Conductor resistance</b>	≤ 58 Ω/km				≤ 89 Ω/km			
<b>Rated Voltage</b>	300 V							

### Mechanical Properties

AWG / Pair	22 / 1P	22 / 2P	22 / 3P	22 / 4P	24 / 1P	24 / 2P	24 / 3P	24 / 4P
<b>Rated temperature</b>	+80°C							

### Ordering Information

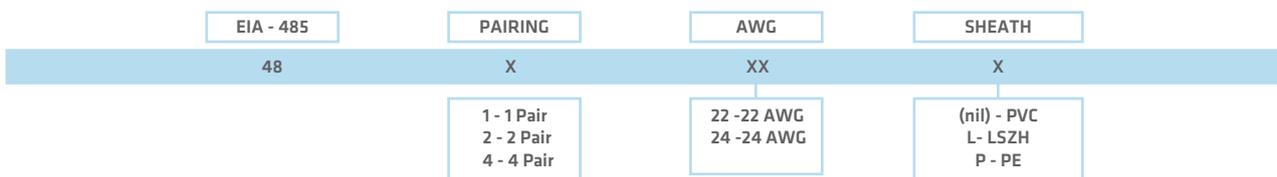
EIA-485 22 & 24 AWG part numbers are made up using the table below.

The part number starts with 48 to denote that it is an EIA-485 cable. The following number shows the number of pairing and the last 2 numbers signifies the AWG. Any letter behind would describe the sheath type.

Example of an EIA-485 part number -

**48422L**

The above example describes an EIA-485 cable with 4 pairing, 22 AWG. Sheath type LSZH.



# EIA-485 22&24 AWG SWB LSZH

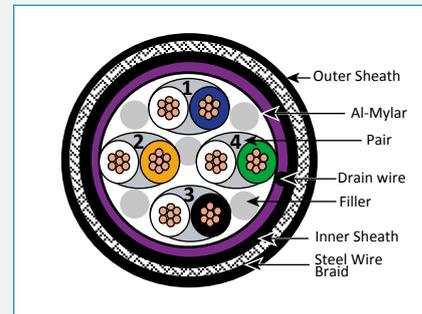
## Serial Data Communication Cable, Armoured

3.1 EIA-485

### Construction

<b>Conductor</b>	Stranded Tinned Copper
<b>Insulation</b>	HD-PE
<b>Colour</b>	Pair 1: 1 x white, 1 x blue Pair 2: 1 x white, 1 x orange Pair 3: 1 x white, 1 x black Pair 4: 1 x green
<b>1st screen</b>	1 x AL-Mylar Wrap, overlapping >= 25 %
<b>Drain wire</b>	Stranded Tinned Copper
<b>Braid Shield</b>	Tinned copper ; coverage >85%
<b>Inner Sheath</b>	LSZH
<b>Braid Armour</b>	Galvanized Steel Wire Braid ; >85%
<b>Outer Sheath</b>	LSZH

AWG / Pair	22 / 1P	22 / 2P	22 / 3P	22 / 4P	24 / 1P	24 / 2P	24 / 3P	24 / 4P
<b>Conductor Ø mm</b>	0.77				0.61			
<b>Insulation Ø mm</b>	1.8 ± 0.2				1.6 ± 0.08			
<b>Drain wire Ø mm</b>	7 *0.254				7 *0.254			
<b>Braid shield</b>	16*6* 0.12mm	16*10* 0.12mm	16*12* 0.12mm	16*12* 0.12mm	16*5* 0.12mm	16*11* 0.12mm	16*9* 0.12mm	16*11* 0.12mm
<b>Inner Sheath Ø mm</b>	6.5	8.2	9.6	10	6.3	8.0	8.5	9.5
<b>Braid Armour Ø mm</b>	7.4	9.4	11.1	11.8	7.5	9.6	10.2	11.3
<b>Outer Sheath Ø mm</b>	11.1	13.0	14.8	15.7	10.8	13.1	13.4	11.8



### Application

For multidropped, medium-speed, serial data communication in electrically noisy industrial environments.

Application includes industrial networks using RS-485/RS-422 transceivers:

- RS-422 systems for Process Automation (chemicals, brewing, paper mills), factory automation (autos, metal fabrication), HVAC, security, motor control and motion control.
- Suitable for outdoor installation due to steel wire braiding.

### Fire Rating

- IEC 60332-1, IEC 61034-2, IEC 60754-1/2

### Optional

- PVC / PE

### Electrical Specification at 20°C

AWG / Pair	22 / 1P	22 / 2P	22 / 3P	22 / 4P	24 / 1P	24 / 2P	24 / 3P	24 / 4P
<b>Conductor resistance</b>	≤ 58 Ω/km				≤ 89 Ω/km			
<b>Rated Voltage</b>	300 V							

### Mechanical Properties

AWG / Pair	22 / 1P	22 / 2P	22 / 3P	22 / 4P	24 / 1P	24 / 2P	24 / 3P	24 / 4P
<b>Rated temperature</b>	+80°C							

### Ordering Information

EIA-485 22 & 24 AWG SWB part numbers are made up using the table below.

The part number starts with 48 to denote that it is an EIA-485 cable. The following number shows the number of pairing and the last 2 numbers signifies the AWG. The following letter describes the sheath type and the alphabet at the end shows that this is a steel wire braided cable.

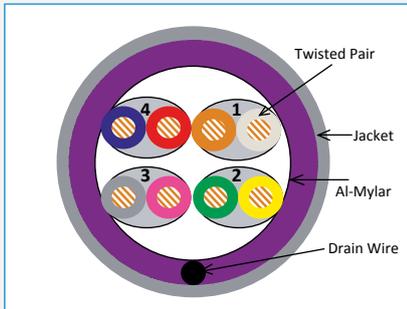
Example of an EIA-485 SWB part number -

**48422LB**

The above example describes an EIA-485 SWB cable with 4 pairing, 22 AWG. Sheath type LSZH, SWB.

EIA - 485	PAIRING	AWG	SHEATH	OUTER JACKET
48	X	XX	X	X
	1 - 1 Pair 2 - 2 Pair 4 - 4 Pair	22 - 22 AWG 24 - 24 AWG	(nil) - PVC L - LSZH P - PE	B - SWB

## 3.2 Screened Control Cable



### Application

For installation requiring flexible connector cable to fulfill measuring, controls & command applications ie Computer Interconnection, Data Transmission, Control Circuits, Industrial Equipment Control, suitable for EIA RS-232 applications.

### Optional

- LSZH

# UL 2464 Overall Screen 16-24AWG PVC

## Overall Screened Data Control Cable

### Technical Details

<b>Conductor</b>	Fully annealed stranded tinned copper per ASTM B-33
<b>Operating Voltage</b>	300V
<b>Insulation</b>	Premium grade SR-PVC
<b>Overall diameter (mm)</b>	0.51 - 1.29 nominal
<b>Insulation Dia. (±0.08mm)</b>	1.1
<b>Twist(Direction)</b>	S
<b>Drain wire(Construction,mm)</b>	7/0.254mm Stranded Tinned Copper
<b>Assembly</b>	Pairs + Drain wire
<b>Al-Mylar Wrap(overlapping, %)</b>	≥25%
<b>Jacket</b>	PVC
<b>Insulation colour</b>	White/Brown, Green/Yellow, Gray/Pink, Blue/Red
<b>Rated Temperature</b>	+80°C

### Cable Dimension

Conductor Size	DC Resistance @ 20°C (Ω/km)	No of Pairs	OD (mm) ± 5%
<b>16 AWG</b>	≤ 14.50	1 Pair	6.50
	≤ 14.50	2 Pairs	9.00
	≤ 14.50	3 Pairs	9.60
<b>18 AWG</b>	≤ 87.0	4 Pairs	11.0
	≤ 23.60	1 Pair	5.60
	≤ 23.60	2 Pairs	8.0
<b>20 AWG</b>	≤ 23.60	3 Pairs	8.2
	≤ 23.60	4 Pairs	10.0
	≤ 36.0	1 Pair	5.00
<b>22 AWG</b>	≤ 36.0	2 Pairs	6.40
	≤ 36.0	3 Pairs	7.70
	≤ 36.0	4 Pairs	8.00
<b>24 AWG</b>	≤ 56.0	1 Pair	4.60
	≤ 56.0	2 Pairs	5.50
	≤ 56.0	3 Pairs	6.40
<b>24 AWG</b>	≤ 56.0	4 Pairs	7.00
	≤ 86.60	1 Pair	4.00
	≤ 86.60	2 Pairs	5.00
<b>24 AWG</b>	≤ 86.60	3 Pairs	5.80
	≤ 86.60	4 Pairs	6.70

### Ordering Information

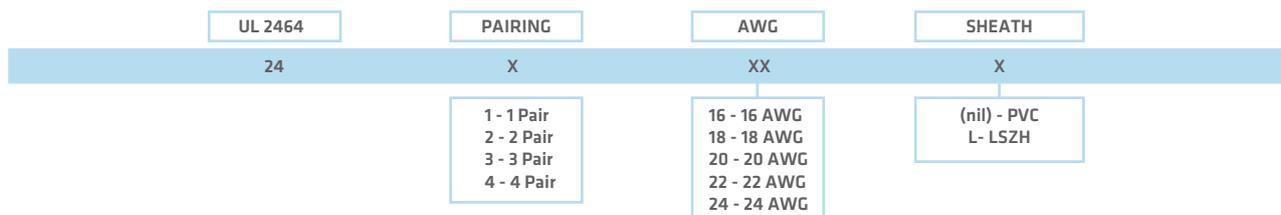
UL 2464 16-24 AWG part numbers are made up using the table below.

The part number starts with 24 to denote that it is an UL 2464 cable. The following number shows the number of pairing and the last 2 numbers signifies the AWG. Any letter behind would describe the sheath type.

Example of an UL 2464 part number -

**24318L**

The above example describes an UL 2464 cable with 3 pairing, 18 AWG. Sheath type LSZH.



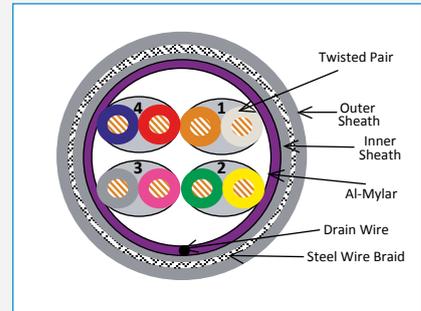
# UL 2464 OVERALL SCREEN 16-24AWG SWB LSZH

3.2 Screened Control Cable

## Overall Screened Data Control Cable, Armoured

Technical Details	
<b>Conductor</b>	Fully annealed stranded tinned copper per ASTM B-33
<b>Operating Voltage</b>	300V
<b>Insulation</b>	Premium grade SR-PVC
<b>Insulation colour</b>	White/Brown, Green/Yellow, Gray/Pink, Blue/Red
<b>Insulation Dia. (±0.08mm)</b>	1.1
<b>Twist(Direction)</b>	S
<b>Drain wire(Construction,mm)</b>	7/0.254mm Stranded Tinned Copper
<b>Assembly</b>	Pairs + Drain wire
<b>Al-Mylar Wrap(overlapping, %)</b>	≥ 25%
<b>Inner Sheath</b>	LSZH
<b>Braid Armour</b>	Galvanized Steel Wire Braid , >85%
<b>Outer Sheath</b>	LSZH
<b>Rated Temperature</b>	+80°C

Cable Dimension				
Conductor Size	DC Resistance @ 20°C (Ω/km)	No of Pairs	Inner Sheath (mm) ± 5%	Outer Sheath over Armour Braid (mm) + 5%
<b>16 AWG</b>	<= 14.50	1 Pair	6.50	8.00
	<= 14.50	2 Pairs	9.00	10.60
	<= 14.50	3 Pairs	9.60	11.30
	<= 14.50	4 Pairs	11.0	12.80
<b>18 AWG</b>	<= 23.60	1 Pair	5.60	7.10
	<= 23.60	2 Pairs	8.0	9.60
	<= 23.60	3 Pairs	8.2	9.90
	<= 23.60	4 Pairs	10.0	11.80
<b>20 AWG</b>	<= 36.0	1 Pair	5.00	6.50
	<= 36.0	2 Pairs	6.40	8.00
	<= 36.0	3 Pairs	7.70	9.40
	<= 36.0	4 Pairs	8.00	9.80
<b>22 AWG</b>	<= 56.0	1 Pair	4.60	6.10
	<= 56.0	2 Pairs	5.50	7.10
	<= 56.0	3 Pairs	6.40	8.10
	<= 56.0	4 Pairs	7.00	8.80
<b>24 AWG</b>	<= 86.60	1 Pair	4.00	5.50
	<= 86.60	2 Pairs	5.00	6.60
	<= 86.60	3 Pairs	5.80	7.50
	<= 86.60	4 Pairs	6.70	8.50



### Application

For installation requiring flexible connector cable to fulfill measuring, controls & command applications ie Computer Interconnection, Data Transmission, Control Circuits, Industrial Equipment Control, suitable for EIA RS-232 applications. Steel wire braid provides outdoor protection against harsh handling.

### Optional

- PVC

## Ordering Information

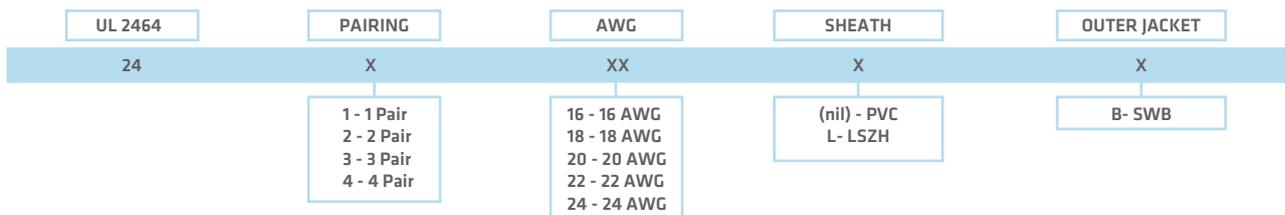
UL 2464 16-24 AWG SWB part numbers are made up using the table below.

The part number starts with 24 to denote that it is an UL 2464 cable. The following number shows the number of pairing and the last 2 numbers signifies the AWG. The following letter describes the sheath type and the alphabet at the end shows that this is a steel wire braided cable.

Example of an UL 2464 SWB part number -

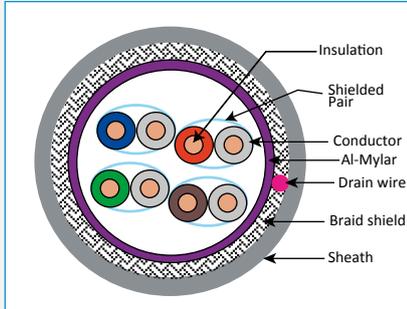
**24220LB**

The above example describes an UL 2464 cable with 2 pairing, 20 AWG. Sheath type LSZH, SWB.



# UL 2919 INDIV-PAIR SCREEN 18-24AWG LSZH

## Individual Pair Screened Control Cable



### Application

Multipairs individual shielded in sensitive EMI environment for general data control & BUS applications.

Can be used for Security & Control Application. Designed to pass UC 1666 burn test.

### Optional:

- PVC / Steel Wire Braid
- High pair counts upon request.

### Technical Details

<b>Conductor</b>	Stranded Tinned Copper , AWG 18, diameter 16 x 0.254 mm
<b>Operating Voltage</b>	300V
<b>Insulation</b>	HD-PE
<b>Insulation colour</b>	Pair 1: 1 x white, 1 x Blue    Pair 2 : 1 x white , 1 x orange Pair 3 : 1 x white , 1 x green    Pair 4 : 1 x white , 1 x brown
<b>1st screen</b>	1 x AL-Mylar Wrap, overlapping >= 25 %
<b>Drain wire</b>	7/0.254mm Stranded Tinned Copper
<b>Coverage</b>	Braid Shield coverage ≥85%
<b>Sheath</b>	LSZH
<b>Sheath colour</b>	Grey
<b>Rated temperature</b>	+80°C

### Cable Dimension

Conductor Size	Conductor Diameter (mm)	DC Resistance @ 20°C (Ω/km)	No. of Pairs	Insulation Diameter (MM)	Braid Shield %	OD (mm) ± 5%
<b>18 AWG</b>	1.17	<= 23.0	1 Pair	<b>2.4 ± 0.2</b>	16 / 11 / 0.12	7.5
		<= 23.0	2 Pairs		16 / 14 / 0.12	10.3
		<= 23.0	4 Pairs		16 / 17 / 0.12	12.8
		<= 36.0	1 Pair		16 / 10 / 0.12	7.0
<b>20 AWG</b>	0.94	<= 36.0	2 Pairs	<b>2.1 ± 0.2</b>	16 / 13 / 0.12	9.3
		<= 36.0	4 Pairs		16 / 15 / 0.12	11.5
		<= 56.0	1 Pair		16 / 09 / 0.12	6.5
		<= 56.0	2 Pairs		16 / 13 / 0.12	8.7
<b>22 AWG</b>	0.76	<= 56.0	4 Pairs	<b>2.0 ± 0.2</b>	16 / 15 / 0.12	11.0
		<= 86.0	1 Pair		16 / 08 / 0.12	5.9
		<= 86.0	2 Pairs		16 / 12 / 0.12	8.6
		<= 86.0	4 Pairs		16 / 14 / 0.12	9.9

### Ordering Information

UL 2919 18-24 AWG part numbers are made up using the table below.

The part number starts with 24 to denote that it is a UL 2919 cable. The following number shows the number of pairing and the last 2 numbers signifies the AWG. Any letter behind would describe the sheath type.

Example of a UL 2919 part number - **29418L**

The above example describes an UL 2919 cable with 4 pairing, 18 AWG. Sheath type LSZH.

UL 2919	PAIRING	AWG	SHEATH
29	X	XX	X
	1 - 1 Pair 2 - 2 Pair 3 - 3 Pair 4 - 4 Pair	18 - 18 AWG 20 - 20 AWG 22 - 22 AWG 24 - 24 AWG	(nil) - PVC L - LSZH

# MAX-FOH™ Flexible PAGA & Control Cable

Public Address General Alarm, Data Control Cable, Fire Resistance



## Fire Characteristics

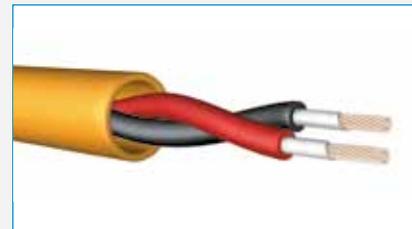
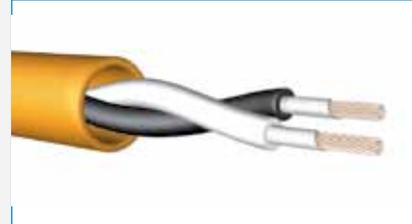
<b>1.5mm<sup>2</sup> Core</b>	Grade A Copper specially protected by fire barrier tape to ensure circuit integrity in fire situations.
<b>Construction</b>	Twisted pair for better signal transmission
<b>Core Insulation</b>	High temperature resistance PE
<b>Outer Sheath</b>	LSZH in accordance to IEC 61034, IEC 60754-1 & 2.

## Main Characteristics

<b>Nominal overall diameter</b>	mm	8.0 (±0.5)
<b>Nominal weight (completed cable)</b>	Kg/km	66
<b>Min bending radius</b>	mm	60
<b>Max pulling tension</b>	kgf	21
<b>Max conductor resistance @ 20°C</b>	Ω/km	12.1
<b>Min insulation resistance @ 20°C</b>	MΩ/km	2000
<b>Dielectric withstand test</b>	kV/min	1/1

## Technical Data

<b>Size</b>	-	2C x 1.5mm <sup>2</sup>
<b>Specification reference</b>	-	IEC 60332-1, IEC 60331, SS299 / BS 6387 CWZ
<b>Conductor material</b>	mm	Plain annealed copper wire to IEC
<b>Max operating temperature</b>	°C	90
<b>No of Wire / Wire Diameter</b>	mm	7 / 0.53
<b>Conductor shape</b>	-	Circular stranded
<b>Insulation</b>	-	Cross-linked PE, XLPE
<b>Insulation thickness</b>	mm	0.5
<b>Core Colour</b>	mm	Black & White OR Black & Red



## Application

Most widely used fire resistance speaker & Audio/Motor control cables, which is highly flexible due to the unique tubing design. Draka MAX-FOH™ flexible speaker cables meets the stringent BS 6387 fire performance standards and can be used in all critical Public Address General Alarm Systems.

## Fire Rating

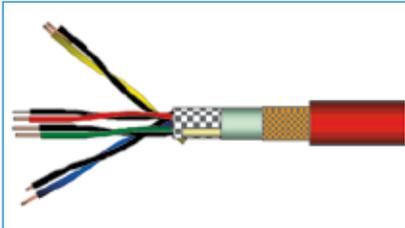
Generally to: ISO/IEC 11801: 95, IEC 61156, EN 50173:95; EN 50288-1, BS 6387

## Optional:

- Steel Wire Braid
- Up to 4 pair x 4mm<sup>2</sup>

## Ordering Information

P/N	Product Description	P.U
PAGA1P15	1P x 1.5mm <sup>2</sup> , PAGA, LSZH	500m/drum
PAGA2P15	2P x 1.5mm <sup>2</sup> , PAGA, LSZH	500m/drum
PAGA1P25	1P x 2.5mm <sup>2</sup> , PAGA, LSZH	500m/drum
PAGA1P25	1P x 2.5mm <sup>2</sup> , PAGA, LSZH	500m/drum



### Application

- Primär (Campus), Sekundär (Riser), Tertiär (Horizontal)
- IEEE 802.3: 10Base-T; 100Base-T;
- IEEE 802.5 16 MB; ISDN; TPDDI; ATM
- RS485 (10Mbits)
- Circuit integrity structured wiring alarm cable, compatible with all known connection systems to EN 50173, part of intelligent building technology

### Standards

Generally to: ISO/IEC 11801: 95, IEC 61156; EN 50173:95; EN 50288-1

### Fire Rating

- IEC 60332-1, IEC 60754-1&2, IEC 61034-2, IEC 60332-3-24, UL 1581 VW 1, BS5839-1 (clause 26.2e), BS8434-2, BSEN 50200, BS4066 part 3, BSEN 20568, IEC60332-3-24, EN50399

### Certification

- Approved to LUL - 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
- LUL STANDARD e4156 part 1 - approved

# IE Firetuf™ DATA 1P, 2P or 4P LSZH-FR

IE SF/UTP 4x2xAWG22/1 cable with circuit integrity behaviour

### Construction

<b>Conductor</b>	bare copper wire, Ø 0.65 mm (AWG 22)
<b>Insulation</b>	PE/Sil Rbr, Ø 1.7 mm
<b>Twisting</b>	2 cores to the pair
<b>Cable lay up</b>	1, 2 or 4 pairs to the core
<b>Fire protection wrapping</b>	glass tape
<b>Screen</b>	copper braid, tinned
<b>Sheath</b>	halogen free, flame retardant thermoplastic sheathing compound acc. to EN 50290-2-27, Ø 10,5 mm
<b>Colour</b>	red RAL 3000
<b>Outer Diameter</b>	Nom. 6.8(1 Pair) - 10.5 (4 Pair) mm
<b>Weight</b>	Nom. 48(1 Pair) - 122 (4 Pair) kg/km
<b>Tensile force N</b>	100

### Mechanical Properties

<b>Bending radius</b>	without load	≥ 42 mm
	with load	≥ 84 mm
<b>Temperature range</b>	during operation	-20°C to + 60°C
	during installation	0°C to + 50°C

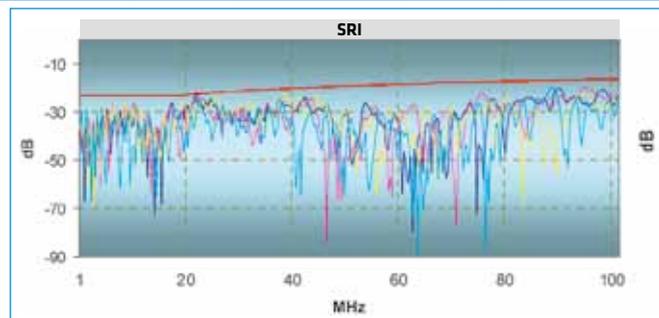
### Fire Tests BC 5839: 2002 & IEC60331

<b>BS5839 enhanced 3 in 1</b>	passed
<b>Continued Data Operation @ 950°</b>	> 2 Hours
<b>BS6387</b>	> 3 Hours
<b>BS EN 50200 (IEC60331)</b>	> 3 Hours

### Electrical Properties at 20°C ± 5°C

<b>Loop resistance</b>	-	≤ 110 Ω/km
<b>Resistance unbalance</b>	-	≤ 2%
<b>Insulation resistance</b>	(500 V) 1 minute	≥ 2000 MΩ*km
<b>Mutual capacitance</b>	at 800 Hz	Nom. 60 nF/km
<b>Capacitance unbalance</b>	(pair/ground)	≤ 1600 pF/km
<b>Characteristic impedance</b>	(at 10) MHz	(100 ± 15) Ω
<b>Nominal velocity of propagation</b>	-	ca. 57 %
<b>Test voltage</b>	(DC, 1 min) core/core and core/screen	1000 V
<b>Transfer Impedance</b>	at 10 MHz	5 mΩ/m

### Electrical Data (Nominal) acc. to Cat.5 (at 20°C)



### Ordering Information

P/N	Product Description	P.U
1010853	J-2Y/2G(St)CH 4x2x0.65 -100, IE SF/UTP 4x2xAWG22/1 cable with circuit integrity behaviour, IE FIRETUF DATA 1P, 2P or 4P LSZH-FR	500mm/drum
1010851	J-2Y/2G(St)CH 1x2x0.65 -100, IE SF/UTP 4x2xAWG22/1 cable with circuit integrity behaviour, IE FIRETUF DATA 1P, 2P or 4P LSZH-FR	500mm/drum
1010852	J-2Y/2G(St)CH 2x2x0.65 -100, IE SF/UTP 4x2xAWG22/1 cable with circuit integrity behaviour, IE FIRETUF DATA 1P, 2P or 4P LSZH-FR	500mm/drum

# Firetuf™ OFC-UT-NM Fire Resistant Universal Central Tube Cable

Indoor/Outdoor non-metallic LSHF-FR sheathed optical cable with 2 – 24 fibres.  
VDE: A/I-DQ(ZN)H



## Fire Rating

Fire resistance tests	
IEC 60331-25 (120)	Fire resistance: 120 minutes at 750 °C (No fibre break)
EN 50200 PH 120	Fire resistance with fire and impact 120 minutes 830 °C (No fibre break)
EN 50200 ANNEX E PH 30	Fire resistance until 15 minutes of fire and impact alone, followed by 15 minutes of fire, impact and water spray at 830 °C (No fibre break)
BS 8434 - 2	Fire resistance until 60 minutes of fire and impact alone, followed by 60 minutes of fire, impact and water spray at 930 °C (No fibre break)
Flame retardant tests	
IEC 60332-1-2	Single vertical wire test
Flame propagation test	
IEC 60332-3-24 = IEC 332-3C	Vertically-mounted bunched wires and cables
Halogen acid & gas tests	
IEC 60754-1	No halogens
IEC 60754-2	No acid matters
Smoke emission tests	
IEC 61034-2	No dense smoke

## Construction

Loose tube	Ø4.0 mm jelly filled loose tube green colored with up to 2 - 24 fibres	
Fibre colour code	1 Red	13 Yellow w/mark per 100 mm
	2 Green	14 White w/mark per 100 mm
	3 Blue	15 Grey w/mark per 100 mm
	4 Yellow	16 Turquoise w/mark per 100 mm
	5 White	17 Orange w/mark per 100 mm
	6 Grey	18 Pink w/mark per 100 mm
	7 Brown	19 Yellow w/mark every 50 mm
	8 Violet	20 White w/mark every 50 mm
	9 Turquoise	21 Grey w/mark every 50 mm
	10 Black	22 Turquoise w/mark every 50 mm
	11 Orange	23 Orange w/mark every 50 mm
	12 Pink	24 Pink w/mark every 50 mm
Fire barrier	Tape(s)	
Strength member	Water blocked E-Glass fibre elements	
Ripcord	1	
Inner sheath	2.5 mm black LSHF-FR sheath according to EN 50290-2-27, UV stabilised	



## Application

The application of this cable is circumstances where a very high degree of fire safety is required as the cable will function during a fire, has limited fire spread, has limited smoke generation and is halogen free.

The typical installation environment is indoor and indoor/outdoor in and between public buildings, in tunnels, metro lines and other places where one need very high degree of fire safety and support for critical communication.

This cable is also suitable shipboard application. The primary means of installation is on cable ladders, raceways and cable trays. The cable may also be pulled or blown into ducts over short distances. The cable can be installed outdoor in the open, but shall be not be installed directly exposed the sun.

## Standards

- ISO 11801 2nd edition, EN 50173-1:2002, IEC 60794-1

## Fire Rating

- IEC 60332-1, IEC 60332-3-24, IEC 61034-2, IEC 60754-1/2

## Physical Properties

Property	Test method	Value
Nominal outer diameter	-	12.1 mm
Nominal weight	-	167 kg/km
Maximum installation tensile strength	E1	2000 N ( $\Delta l/l$ fibre 0.5%, $\Delta \alpha$ reversible) *
Compressive strength (crush)	E3	1500 N / 100 mm, max 5 min ( $\Delta \alpha$ reversible) *
Impact	E7	No fibre break, 5 Nm, 3 impacts, r=300mm
Torsion	E7	5 cycles $\pm$ 1 turn
Kink	E10	The cables do not form a kink when a loop is drawn together to a diameter of 20xD (Cable diameter) mm
Min. bending radius, unloaded	E11	R = 121 mm
Min. bending radius, loaded	-	R = 240 mm
Temperature range	F1	Storage: -30°C to +60°C Installation: 0°C to +50°C Operation: -25°C to +70°C. ( $\Delta \alpha$ 0.05 dB /km)**
Water penetration	F5B	No water leakage after 24 hour, sample=3m, water=1m

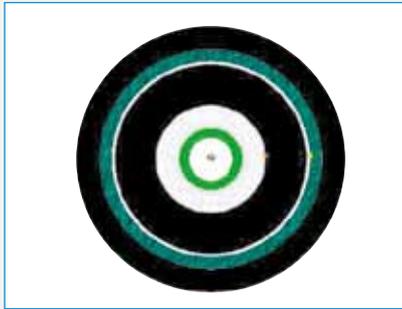
\* Values for single-mode fibres, all optical measurements performed at 1550 nm,

\*\* Values for multi-mode fibres, all optical measurements performed at 850 nm or 1300 nm with 0.10 dB as threshold (tensile and crush will not be performed for MM fibres)

## Ordering Information

P/N	Product Description	P.U
A/I-DQ(ZN)H	Indoor/outdoor non-metallic LSHF-FR sheathed optical cable with 2-24 fibres	4km/drum

## 3.4 Firetuf™



### Application

The application of this cable is circumstances where a very high degree of fire safety is required as the cable will function during a fire, has limited fire spread, has limited smoke generation and is halogen free.

The typical installation environment is indoor and indoor/outdoor in and between public buildings, in tunnels, metro lines and other places where one need very high degree of fire safety and support for critical communication.

This cable is also suitable for shipboard application. The steel tape armouring makes the cable rodent proof.

The primary means of installation are on cable ladders, raceways and cable trays. The cable may however also be directly buried. The cable can be installed outdoor in the open, but shall be not be installed directly exposed the sun.

### Standards

- ISO 11801, EN 50173

### Fire Rating

- IEC 60332-1, IEC 60332-3-24, IEC 61034-2, IEC 60754-1/2

# Firetuf™ OFC-UT-CST Fire Resistant Armoured Central Tube Cable

Indoor/Outdoor steel tape armoured (CST) double LSHF-FR sheathed optical cable with 2 - 24 fibres.  
VDE: A/I-DQ(ZN)H(SR)H



## Fire Rating

### Fire resistance tests

IEC 60331-25 (120)	Fire resistance: 120 minutes at 750 °C (No fibre break)
EN 50200 PH 120	Fire resistance with fire and impact 120 minutes 830 °C (No fibre break)
EN 50200 ANNEX E PH 30	Fire resistance until 15 minutes of fire and impact alone , followed by 15 minutes of fire , impact and water spray at 830 °C (No fibre break)
BS 8434 - 2	Fire resistance until 60 minutes of fire and impact alone , followed by 60 minutes of fire , impact and water spray at 930 °C (No fibre break)

### Flame retardant tests

IEC 60332-1-2	Single vertical wire test
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### Flame propagation test

IEC 60332-3-24 = IEC 332-3C	Vertically-mounted bunched wires and cables
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### Halogen acid & gas tests

IEC 60754-1	No halogens
IEC 60754-2	No acid matters

### Smoke emission tests

IEC 61034-2	No dense smoke
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## Construction

Loose tube	Ø 4.0 mm jelly filled loose tube green colored with up to 2 - 24 fibres		
Fibre colour code	1 Red	13 Yellow w/mark per 100 mm	
	2 Green	14 White w/mark per 100 mm	
	3 Blue	15 Grey w/mark per 100 mm	
	4 Yellow	16 Turquoise w/mark per 100 mm	
	5 White	17 Orange w/mark per 100 mm	
	6 Grey	18 Pink w/mark per 100 mm	
	7 Brown	19 Yellow w/mark every 50 mm	
	8 Violet	20 White w/mark every 50 mm	
	9 Turquoise	21 Grey w/mark every 50 mm	
	10 Black	22 Turquoise w/mark every 50 mm	
	11 Orange	23 Orange w/mark every 50 mm	
	12 Pink	24 Pink w/mark every 50 mm	
Fire barrier	Tape(s)		
Strength member	Water blocked E-Glass fibre elements		
Ripcord	1		
Inner sheath	2.5 mm black LSHF-FR sheath according to EN 50290-2-27 , UV stabilised		
Armouring	Coated and corrosion protected corrugated steel tape (CST), thickness 0.15 mm		
Ripcord	1		
Outer sheath	1.4 mm black LSHF-FR sheath according to EN 50290-2-27, UV stabilised		

## Physical Properties

Property	Test method	Value
Nominal outer diameter	-	17 mm
Nominal weight	-	351 kg/km
Maximum installation tensile strength	E1	2500 N ( $\Delta I/I$ fibre 0.5%, $\Delta \alpha$ reversible) *
Compressive strength (crush)	E3	2500 N / 100 mm, max 5 min ( $\Delta \alpha$ reversible) *
Impact	E7	10 Nm, No fibre break, 3 impacts, r=300mm,
Torsion	E7	5 cycles $\pm$ 1 turn
Kink	E10	The cables do not form a kink when a loop is drawn together to a diameter of 20xD (Cable diameter) mm
Min. bending radius, unloaded	E11	R = 255 mm
Min. bending radius, loaded	-	R = 340 mm
Temperature range	F1	Storage: -40°C to +80°C Installation: 0°C to +50°C Operation: -40°C to +70°C. ( $\Delta \alpha$ 0.05 dB /km)**
Water penetration	F5B	No water leakage after 24 hour, sample=3m, water=1m,

\* Values for single-mode fibres, all optical measurements performed at 1550 nm.

\*\* Values for multi-mode fibres, all optical measurements performed at 850 nm or 1300 nm with 0.10 dB as threshold (tensile and crush will not be performed for MM fibres)

## Ordering Information

P/N	Product Description	P.U
A/I-DQ(ZN)H(SR)H	Indoor/outdoor steel tape armoured (CST) double LSHF-FR sheathed optical cable with 2-24 fibres	4km/drum

# 12-96 Core Firetuf™ I10S Fire Resistant Fibre Optic Cable, LSZH

## Features

- **Central strength member (CSM)** : steel wire with plastic coating when needed.
- **Tube**: thermoplastic material, containing up 4,6 or 12 optical fibres and filled with a suitable water tightness compound.
- **Stranding**: The required numbers of elements (tubes or fillers) are SZ stranded around the central strength member.
- **Longitudinal Water Tightness**: Water Blocking Tape & Yarn.
- **Fire Barriers**: Inner & outer special fire blocking tapes.
- **Armours**: Inner & outer corrugated steel tapes.
- **Sheaths**: Inner & outer LSZH

## Technical Data

No. of Fibres		4,6,12,24	36,48,72	96
Design (Elements × Fibres per Tube)		Up to 4x6	6x6, 4x12, 6x12	8x12
Loose Tube / Filler-Ø	mm	2.1	2.1	2.1
CSM / sheath diameter	mm	2.0	2.2	2.0/3.5
Inner sheath thickness	mm	1.0 nominal	1.0 nominal	1.0 nominal
Outer sheath thickness	mm	2.0 nominal	2.0 nominal	2.0 nominal
Cable Diameter	mm	15.3 nominal	15.3 nominal	16.8 nominal
Cable Weight	kg/km	300	317	340
Max installation tension	N	3000		
Min. bending radius	mm	Without Tension	Under Maximum Tension	
		10 x Cable-Ø	20 x Cable-Ø	
Temperature range	°C	Installation	Transport & Storage	Operation
Flame Retardant		-10->+60;	-10->+60;	-10->+60;
Fire Resistance		IEC 60332-3-24		
		IEC60331-25, In house test up to 800°C, 2hrs.		

Please refer to our General Installation, Safety & Handling recommendations before handling.



## Application

The application of this cable is circumstances where a very high degree of fire safety is required as the cable will function during a fire, has limited fire spread, has limited smoke generation and is halogen free. Widely used in Industrial environment due to its robust construction.

## Standards

- EN 60794-3-10

## Fire Rating

- IEC 60332-1, IEC 61034-2, IEC 60754-1/2

## Optional

- Armouring SWA or SWB

## Main Characteristics

Test	Standard	Value	Sanction*
Max. installation tension	IEC 60794-1-2-E1	3000 N	fibre strain ≤ 0.33%, Δα reversible
Crush (short term)	IEC 60794-1-2-E3	3000 N / 100mm	Δα ≤ 0.3 dB(MM), 0.1 dB(SM)
Temperature range	IEC 60794-1-2-F1	40->+70°C	Δα ≤ 0.3 dB/km(MM), 0.1 dB/km(SM)
Water Penetration	IEC 60794-1-2-F5B	40->+70°C	No water leakage after 24 hour

\* values for single-mode fibres, all optical measurements performed at 1550 nm.

\* values for multi-mode fibres, all optical measurements performed at 1300 nm

## Ordering Information

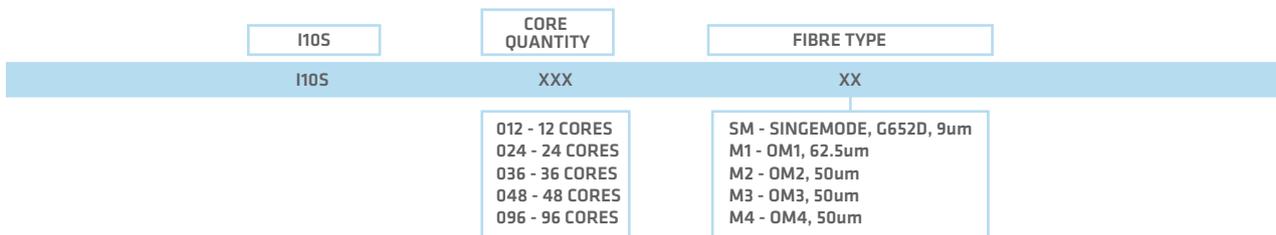
FIRETUF® I10S Fire Resistant FO Cable part numbers are made up using the table below.

The part number always starts with the letters I10S to denote that it is a FIRETUF® I10S Fire Resistant FO Cable. This is followed by 3 numbers which symbolises the core quantity and then 2 letters to denote the fibre type.

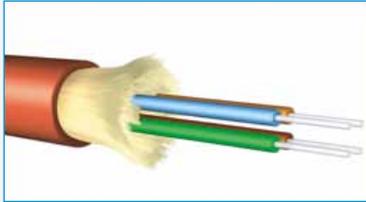
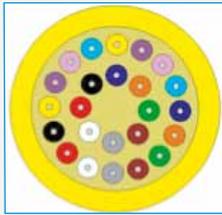
Example of a I10S part number:

**I10S024M1**

The above example describes an OM1 (50um) FIRETUF® I10S Fire resistance FO Cable, with 24 cores.



## 3.5 Fibre Optic Cables



### Overview

One of the most widely used UC<sup>FIBRE™</sup> Indoor cable, MT series is excellent for indoor installation that provides a safe setup against flame propagation and its flexible yet robust construction makes installation at ease.

### Additional Options

- PVC Sheath for indoor applications
- PE Sheath for outdoor applications
- Steel Wire Braiding for armouring protection.

### Fire Rating

- IEC 60332-1, IEC 61034-2, IEC 60754-1/2

# UC<sup>FIBRE™</sup> MT SERIES

2-24 Cores, Indoor Tight Buffer Distribution Cable, LSZH

### Features

- **Tight buffer** : Each fibre is coated to 0.9mm with LSZH
- **Strength Member** : Aramid yarn
- **Outer Sheath** : LSZH compliant to IEC 61034, IEC 60754-1&2, IEC 60332-1 & 60332-3-24
- **Suitable for indoor installation requiring flame retardant, low smoke and halogen free environment**

### Main Characteristics

Test	Standard	Value	Sanction*
<b>Maximum installation load (a few hours)</b>	IEC 60794-1-2-E1	1000 N (2F-8F), 1200N (12F, 24F)	Fibre strain ≤ 0.6%, Δα reversible
<b>Short term tensile strength (some days)</b>	IEC 60794-1-2-E1	600N	Fibre strain ≤ 0.4%, Δα reversible
<b>Max operation tension</b>	IEC 60794-1-2-E1	280N (2F-12F), 340N (24F)	Fibre strain ≤ 0.2%, Δα ≤ 0.4 dB(MM), ≤0.30(SM)
<b>Crush (short term)</b>	IEC 60794-1-2-E3	1000 N / 100mm	Δα ≤ 0.4 dB(MM), ≤0.30(SM), no damage
<b>Temperature range</b>	IEC 60794-1-2-F1	-20 -> +70°C	Δα ≤ 0.6 dB / km(MM), ≤ 0.40dB/km(SM)

\* values for multi-mode fibres, all optical measurements performed at 1300 nm  
values for single-mode fibres, all optical measurements performed at 1550 nm

### Technical Data

No. of Fibres		2,4,6	8	12	24
<b>Design</b>		1×6 TB	1×8 TB	1×12 TB	1×24 TB
<b>Tight buffer</b>	mm	0.9 ± 0.05	0.9 ± 0.05	0.9 ± 0.05	0.9 ± 0.05
<b>Outer sheath thickness</b>	mm	0.7 nominal	0.75 nominal	0.75 nominal	0.9 nominal
<b>Cable Nominal Diameter</b>	mm	4.8 nominal	5.4 nominal	6.2 nominal	8.8 nominal
<b>Cable Weight</b>	kg / km	20	26	33	60
<b>Min. bending radius</b>	mm	Without Tension 10 × Cable-Ø		Under Maximum Tension 20 × Cable-Ø	
<b>Temperature range</b>	°C	Installation -10 -> +60;	Transport. & Storage -40 -> +70 ;		Operation -20 -> +70
<b>Flame Retardant</b>		IEC 60332-3-24			

### Ordering Information

UC<sup>FIBRE™</sup> MT SERIES FO Cable part numbers are made up using the table below.

The part number always starts with the letters MT to denote that it is a UC<sup>FIBRE™</sup> MT SERIES FO Cable. This is followed by 3 numbers which symbolises the core quantity and then 2 letters to denote the fibre type.

Example of a UC<sup>FIBRE™</sup> MT SERIES FO Cable part number:

**MT008M1**

The above example describes an OM1 (62.5um, Orange Sheath) UC<sup>FIBRE™</sup> MT SERIES FO Cable, with 8 cores.

MT SERIES	CORE QUANTITY	FIBRE TYPE
MT	XXX	XX
	002 - 2 CORES 004 - 4 CORES 006 - 6 CORES 008 - 8 CORES 012 - 12 CORES	SM - SINGEMODE, G652D, 9um (yellow sheath) M1 - OM1, 62.5um (orange sheath) M2 - OM2, 50um (orange sheath) M3 - OM3, 50um (aqua sheath) M4 - OM4, 50um (aqua sheath)

# UCFIBRE™ MT SERIES

36,48,96 Cores, Indoor Tight Buffer Distribution Cable, LSZH

3.5 Fibre Optic Cables

## Features

- **Tight buffer:** Each fibre is coated to 0.9mm with LSZH.
- **Strength Member:** Aramid yarn within each sub-unit
- **Sub-unit sheath:** LSZH material
- **Central Strength Member:** FRP with up-coating
- **Core Wrapping:** Polyester tape
- **Outer Sheath:** LSZH compliant to IEC 61034, IEC 60754-1&2, IEC 60332-1 & 60332-3-24
- **Suitable for Indoor Flame Retardant, Low Smoke and Halogen Free Environment**



## Main Characteristics

Test	Standard	Value	Sanction*
<b>Maximum installation load (a few hours)</b>	IEC 60794-1-2-E1	4200 N (36F, 48F), 6600N (96F)	Fibre strain ≤ 0.6%, Δα reversible
<b>Short term tensile strength (some days)</b>	IEC 60794-1-2-E1	2800 N (36F, 48F), 4400N (96F)	Fibre strain ≤ 0.4%, Δα reversible
<b>Max operation tension</b>	IEC 60794-1-2-E1	1400 N (36F, 48F), 2200N (96F)	Fibre strain ≤ 0.2%, Δα ≤ 0.4 dB(MM), ≤ 0.30(SM)
<b>Crush (short term)</b>	IEC 60794-1-2-E3	1000 N / 100mm	Δα ≤ 0.4 dB(MM), ≤ 0.30(SM), no damage
<b>Temperature range</b>	IEC 60794-1-2-F1	-20 -> +70°C	Δα ≤ 0.6 dB /km(MM), ≤ 0.40dB/km(SM)

\* values for multi-mode fibres, all optical measurements performed at 1300 nm  
 values for single-mode fibres, all optical measurements performed at 1550 nm

### Overview

One of the most widely used UCFIBRE™ Indoor cable, MT series is excellent for indoor installation that provides a safe setup against flame propagation and its flexible yet robust construction makes installation at ease.

### Additional Options

- PVC Sheath for indoor applications
- PE Sheath for outdoor applications
- Steel Wire Braiding for armouring protection.

### Fire Rating

- IEC 60332-1, IEC 60332-3-24, IEC 61034-2, IEC 60754-1/2

## Technical Data

No. of Fibres		36	48	96
<b>Design</b>		6x6 TB	4x12 TB	8x12 TB
<b>Tight buffer</b>	mm	0.9 ± 0.05	0.9 ± 0.05	0.9 ± 0.2
<b>Sub-unit Diameter</b>	mm	4.8 ± 0.2	6.0 ± 0.2	6.0 ± 0.2
<b>Cable Nominal Diameter</b>	mm	0.7 nominal	0.65 nominal	0.65 nominal
<b>Sub-unit sheath thickness</b>	mm	1.4 nominal	1.4 nominal	1.5 nominal
<b>Outer sheath thickness</b>	mm	17.7 ± 1.5	17.9 ± 1.5	25.3 ± 1.5
<b>Cable Outer Diameter</b>	kg/km	276	244	538
<b>Min. bending radius</b>	mm	Without Tension 10 × Cable-Ø		Under Maximum Tension 20 × Cable-Ø
<b>Temperature range</b>	°C	Installation -10 -> +60;	Transport. & Storage -40 -> +70 ;	Operation -20 -> +70
<b>Flame Retardant</b>		IEC 60332-3-24		

Please refer to our General Installation, Safety & Handling recommendations before handling.

## Ordering Information

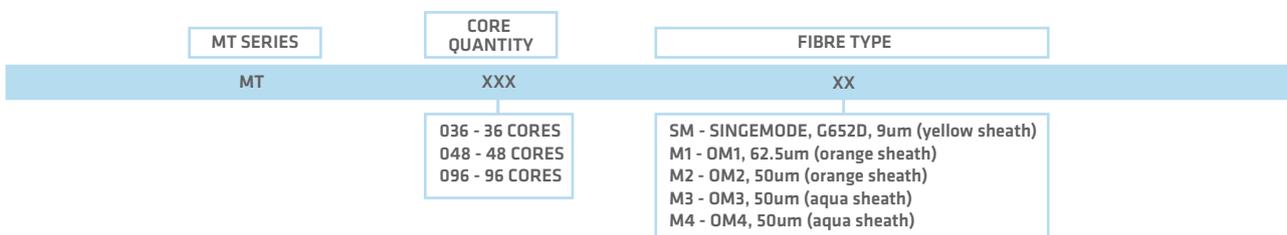
UCFIBRE™ MT SERIES FO Cable part numbers are made up using the table below.

The part number always starts with the letters MT to denote that it is a UCFIBRE™ MT SERIES FO Cable. This is followed by 3 numbers which symbolises the core quantity and then 2 letters to denote the fibre type.

Example of a UCFIBRE™ MT SERIES FO Cable part number:

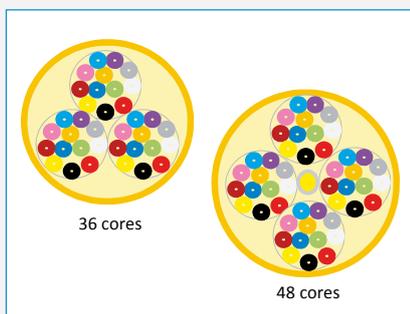
**MT036M1**

The above example describes an OM1 (62.5um, Orange Sheath) UCFIBRE™ MT SERIES FO Cable, with 36 cores.



# UC<sup>FIBRE</sup>™ MTC SERIES, 36 & 48 Cores, COMPACT Indoor

## Tight Buffer Distribution Cable, LSZH



### Fire Rating

- IEC 60332-1, IEC 60332-3-24, IEC 61034-2, IEC 60754-1/2

### Features

- **Tight buffer:** Each fibre is coated to 0.9mm with LSZH.
- **Strength Member:** Aramid yarn
- **Core Wrapping:** Polyester tape
- **Outer Sheath:** LSZH compliant to IEC 61034, IEC 60754-1&2, IEC 60332-1 & 60332-3-24.
- **Suitable for Indoor Flame Retardant Environment.**
- **Up to 40% more compact & lighter than standard indoor types but with lesser tensile load.**

### Main Characteristics

Test	Standard	Value	Sanction*
<b>Maximum installation load (a few hours)</b>	IEC 60794-1-2-E1	1300 N (36F, 48F)	Fibre strain ≤ 0.6%, Δα reversible
<b>Short term tensile strength. (some days)</b>	IEC 60794-1-2-E1	1300 N (36F, 48F)	Fibre strain ≤ 0.4%, Δα reversible
<b>Max operation tension</b>	IEC 60794-1-2-E1	400 N (36F, 48F)	Fibre strain ≤ 0.2%, Δα ≤ 0.4 dB(MM), ≤0.30(SM)
<b>Crush (short term)</b>	IEC 60794-1-2-E3	1000 N / 100mm	Δα ≤ 0.4 dB(MM), ≤0.30(SM), no damage
<b>Temperature range</b>	IEC 60794-1-2-F1	-20 -> +70°C	Δα ≤ 0.6 dB /km(MM), ≤ 0.30dB/km(SM)

\* values for multi-mode fibres, all optical measurements performed at 1300 nm  
values for single-mode fibres, all optical measurements performed at 1550 nm

### Technical Data

No. of Fibres		36	48
<b>Design</b>		6x6 TB	4x12 TB
<b>Tight buffer Size</b>	mm	0.9 ± 0.05	0.9 ± 0.05
<b>Outer sheath thickness</b>	mm	1.2 nominal	1.2 nominal
<b>Cable Outer Diameter</b>	mm	11.0±1.5	12±1.5
<b>Cable Weight</b>	mm	100	140
<b>Min. bending radius</b>	kg / km	Without Tension 10 × Cable-Ø	Under Maximum Tension 20 × Cable-Ø
<b>Temperature range</b>	°C	Installation -10 -> +60;	Transport. & Storage -40 -> +70 ; Operation -20 -> +70
<b>Flame Retardant</b>		IEC 60332-3-24 (3C)	

### Ordering Information

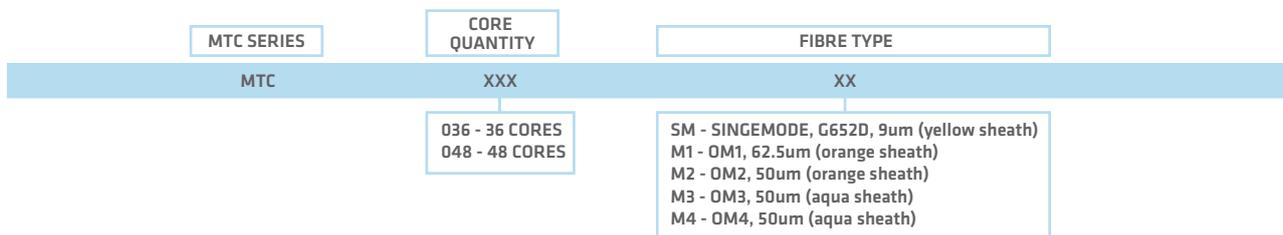
UC<sup>FIBRE</sup>™ MTC SERIES FO Cable part numbers are made up using the table below.

The part number always starts with the letters MTC to denote that it is a UC<sup>FIBRE</sup>™ MTC SERIES FO Cable. This is followed by 3 numbers which symbolises the core quantity and then 2 letters to denote the fibre type.

Example of a UC<sup>FIBRE</sup>™ MTC SERIES FO Cable part number:

**MTC048M4**

The above example describes an OM4 (50um, Aqua Sheath) UC<sup>FIBRE</sup>™ MTC SERIES FO Cable, with 48 cores.



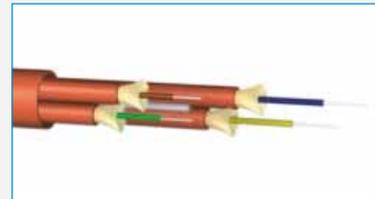
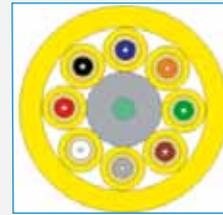
# UC<sup>FIBRE</sup>™ MB SERIES

2-12 Core, Indoor, Breakout, Tight Buffer Distribution Cable, LSZH

3.5 Fibre Optic Cables

## Features

- **Buffer Coating** : LSZH, 0.9mm tight buffered fibre.
- **Strength Member** : Aramid yarn within each sub-unit
- **Sub-unit sheath** : LSZH
- **Central Strength Member** : FRP with up-coating when needed
- **Outer Sheath** : LSZH compliant to IEC 61034, IEC 60754-1&2, IEC 60332-1 & 60332-3-24
- Easy to strip and excellent for use in indoor installations requiring efficient terminations, and also in flame retardant, low smoke and halogen free environments.



## Main Characteristics

Test	Standard	Value	Sanction*
<b>Maximum Tension at installation (short term)</b>	IEC 60794-1-2-E1	600N	$\Delta I/I$ fibre $\leq$ 0.6%, $\Delta\alpha$ reversible
<b>Tension opération max (long term)</b>	IEC 60794-1-2-E1	198N	$\Delta I/I$ fibre $\leq$ 0.2%, $\Delta\alpha \leq$ 0.30 dB(SM) / 0.40 dB(MM)
<b>Crush</b>	IEC 60794-1-2-E3	1000 N / 100mm	$\Delta\alpha \leq$ 0.30 dB(SM) / 0.40 dB(MM) , cable integrity

\* values for multi-mode fibres, all optical measurements performed at 1300 nm  
values for single-mode fibres, all optical measurements performed at 1550 nm

### Overview

MB Series provides easy stripping and terminations in indoor application due to its unique tight buffering of each fibre unit.

### Additional Options

- PVC Sheath (MBV Series) for indoor applications
- PE Sheath (MBP Series) for outdoor applications
- Steel Wire Braiding (MBB Series) for armouring protection

### Fire Rating

- IEC 60332-1, IEC 60332-3-24, IEC 61034-2, IEC 60754-1/2

## Technical Data

No. of Fibres		2,4	6	8	12
<b>Design</b>		Breakout			
<b>Buffer Diameter - Ø</b>	mm	0.9 ± 0.05	0.9 ± 0.05	0.9 ± 0.05	0.9 ± 0.05
<b>CSM/sheath diameter</b>	mm	1.0 nominal	1.0/2.2 nominal	2.0/3.5 nominal	2.0/6.2 nominal
<b>Sub-unit sheath thickness</b>	mm	0.35 nominal	0.35 nominal	0.35 nominal	0.35 nominal
<b>Sub-units diameter</b>	mm	2.0 ± 0.15	2.0 ± 0.15	2.0 ± 0.15	2.0 ± 0.15
<b>Outer sheath thickness</b>	mm	1.0 nominal	1.0 nominal	1.0 nominal	1.0 nominal
<b>Cable Diameter (AxB)</b>	mm	7.0 ± 0.5	8.2 ± 0.5	0.9 ± 0.5	12.3 ± 0.5
<b>Cable Weight</b>	kg / km	48	64	89	149
<b>Min. bending radius</b>		Without Tension 10 × Cable-Ø		Under Maximum Tension 20 × Cable-Ø	
<b>Temperature range</b>	°C	Installation -10 -> +60;		Transport. & Storage -40 -> +70 ;	Operation -20 -> +70
<b>Flame Retardant</b>		IEC 60332-1, IEC60332-3-24			

## Ordering Information

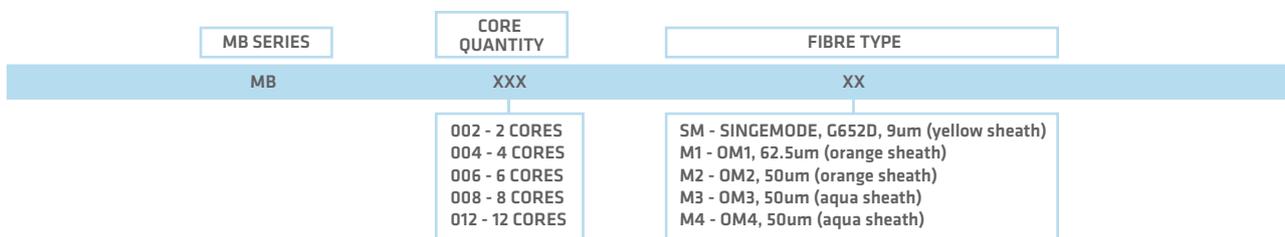
UC<sup>FIBRE</sup>™ MB SERIES FO Cable part numbers are made up using the table below.

The part number always starts with the letters MB to denote that it is a UC<sup>FIBRE</sup>™ MB SERIES FO Cable. This is followed by 3 numbers which symbolises the core quantity and then 2 letters to denote the fibre type.

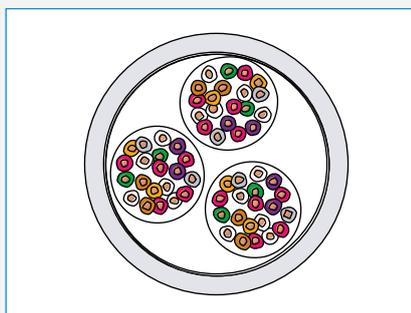
Example of a UC<sup>FIBRE</sup>™ MB SERIES FO Cable part number:

**MB008M3**

The above example describes an OM3 (50um, Aqua Sheath) UC<sup>FIBRE</sup>™ MB SERIES FO Cable, with 8 cores.



## 3.6 Multi-Pair Category Cables



### Application

These cables are used as riser cable in structured cabling networks, most often between distribution frames.

### Standards

- IEC 61156, ISO/IEC 11801 /1995, TIA/EIA 568-A

### Fire Rating

PVC	IEC 60332-1
LSZH	IEC 60332-1, IEC 61034-2, IEC 60754-1/2

# Category 3 UTP 25/50/100x2x0.5 Multipair U/UTP Data Cable

## Construction

<b>Conductor</b>	Solid bare copper wire, diameter 0.5 mm			
<b>Insulation</b>	High-density polyethylene HDPE			
<b>Stranding</b>	25 pairs stranded to sub units. Cables with 100 pairs are built up with 1st layer: 3 basic units, 2nd layer: 7 basic units			
<b>Sub-units no.</b>	One	Two	Three	Four
<b>Pair no.</b>	1 ~ 25	26 ~ 50	51 ~ 75	75 ~ 100
<b>Identification</b>	Pair 1 Blue-White	Pair 10 Grey-Red	Pair 19 Brown-Yellow	
	Pair 2 Orange-White	Pair 11 Blue-Black	Pair 20 Grey-Yellow	
	Pair 3 Green-White	Pair 12 Orange-Black	Pair 21 Blue-Violet	
	Pair 4 Brown-White	Pair 13 Green-Black	Pair 22 Orange-Violet	
	Pair 5 Grey-White	Pair 14 Brown-Black	Pair 23 Green-Violet	
	Pair 6 Blue-Red	Pair 15 Grey-Black	Pair 24 Brown-Violet	
	Pair 7 Orange-Red	Pair 16 Blue-Yellow	Pair 25 Grey-Violet	
	Pair 8 Green-Red	Pair 17 Orange-Yellow	-	
	Pair 9 Brown-Red	Pair 18 Green-Yellow	-	
<b>Wrapping</b>	Mylar Tape			
<b>Sheath</b>	PVC Black, also available on request with LSZH			
<b>Outer Diameter</b>	Nom. 11.4(25pair) - 23.8(100pair PVC) mm			
<b>Tensile force N</b>	Nom. 500(25pair) - 2000(100pair PVC)			

## Mechanical Properties

<b>Minimum bending radius</b>	Without load	4 x D ( D= outer diameter )
	With load	8 x D ( D= outer diameter )
<b>Temperature</b>	During operation	- 20° C to + 60° C
	During operation	0° C to + 50° C

## Electrical Properties at 20°C

<b>Maximum DC Resistance</b>	≤ 95 Ω / km
<b>Minimum Insulation DC Resistance</b>	≥ 5000 M Ω . km
<b>Dielectric Strength (DC)</b>	1KV / min
<b>Conductor resistance maximum unbalance percentage</b>	≤ 2.5 %

## Electrical Data at 20°C

Frequency (MHZ)	Max. Insertion Loss (dB) (nominal value)	Min. Return Loss (dB)	Min. NEXT (Test length> 300 m) (dB) (nominal value)	Min. ELFEXT (dB)	Min. PSELFEXT (dB/100m)	Max. DELAY (dB/100m)
1	26	12	41	39	39	570
4	56	12	32	27	27	552
8	6.7	12	28	21	21	547
10	98	12	26	19	19	545
16	131	12	23	15	15	543

## Technical Data

Type	Outer diameter mm	Standard delivery length m	Tensile force N
25 x 2 x 0.5 Cat. 3 PVC	12.4 ± 1.0	500	500
50 x 2 x 0.5 Cat. 3 PVC	16.8 ± 1.0	500	1000
100 x 2 x 0.5 Cat. 3 PVC	22.8 ± 1.0	500	2000
25 x 2 x 0.5 Cat. 3 LSZH	12.7	500	500
50 x 2 x 0.5 Cat. 3 LSZH	16.1	500	1000
100 x 2 x 0.5 Cat. 3 LSZH	21.9	500	2000

## Ordering Information

P/N	Product Description	P.U
tba	Category 3 U/UTP 25 X 2 X 0.5 Multipair PVC	1000m/drum
tba	Category 3 U/UTP 50 X 2 X 0.5 Multipair PVC	1000m/drum
tba	Category 3 U/UTP 100 X 2 X 0.5 Multipair PVC	1000m/drum
tba	Category 3 U/UTP 25 X 2 X 0.5 Multipair LSZH	1000m/drum
tba	Category 3 U/UTP 50 X 2 X 0.5 Multipair LSZH	1000m/drum
tba	Category 3 U/UTP 100 X 2 X 0.5 Multipair LSZH	1000m/drum

# Category 5e 25/50/100x2x0.5 Multipair 3.6 Multi-Pair Category Cables

## U/UTP Symmetrical Data Cable

### Construction

<b>Conductor</b>	Bare copper wire, diameter 0.52 mm (AWG24)		
<b>Insulation</b>	PE, diameter 0.95 mm		
<b>Twisting</b>	2 cores to pair, diameter 1.9 mm		
<b>Sub unit stranding</b>	5 pairs to subunit + filler, diameter 5.0 mm		
<b>Main unit stranding</b>	5 subunits to a 25" unit + filler		
<b>Identification</b>	PET foil wrapping		
	Pair 1 Blue-White	Pair 10 Grey-Red	Pair 19 Brown-Yellow
	Pair 2 Orange-White	Pair 11 Blue-Black	Pair 20 Grey-Yellow
	Pair 3 Green-White	Pair 12 Orange-Black	Pair 21 Blue-Violet
	Pair 4 Brown-White	Pair 13 Green-Black	Pair 22 Orange-Violet
	Pair 5 Grey-White	Pair 14 Brown-Black	Pair 23 Green-Violet
	Pair 6 Blue-Red	Pair 15 Grey-Black	Pair 24 Brown-Violet
	Pair 7 Orange-Red	Pair 16 Blue-Yellow	Pair 25 Grey-Violet
	Pair 8 Green-Red	Pair 17 Orange-Yellow	-
	Pair 9 Brown-Red	Pair 18 Green-Yellow	-
<b>Sheath</b>	PVC or LSZH, diameter 15.5 mm grey, RAL 7035		
<b>Outer Diameter</b>	Nom. 15.5(25pair) - 35.8(100pair PVC) mm		
<b>Weight</b>	Nom. 207(25pair) LSZH - 920(100pair PVC) kg/km		
<b>Tensile force N</b>	Nom. 500(25 pair) - 2000(100pair)		

### Mechanical Properties

<b>Minimum bending radius</b>	Without load	≥ 60 mm
	With load	≥ 120 mm
<b>Temperature</b>	During operation	- 20° C to + 60° C
	During operation	0° C to + 50° C

### Electrical Properties (Cominal) at 20°C

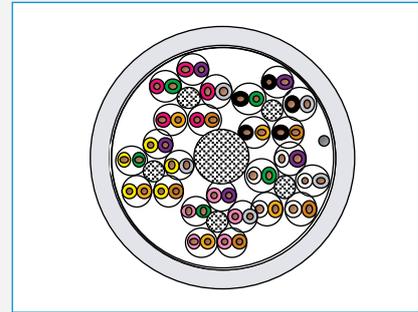
<b>Loop resistance</b>	-	≤ 190 Ω/km
<b>Resistance unbalance</b>	-	≤ 2%
<b>Test voltage</b>	core/core	1000 VDC 1 min
<b>Mutual capacitance</b>	800 Hz	Nom. 48 nF/km
<b>Capacitance unbalance</b>	pair/ground	≤ 1500 pF/km
<b>Mean characteristic impedance</b>	100 MHz	100 Ω ± 5 Ω
<b>Nominal velocity of propagation</b>	-	ca. 67%
<b>Insulation resistance</b>	500 V	≥ 2000 MΩ*km

### Nominal Transmission Characteristics at 20°C

F (MHZ)	Attenuation (dB/100m)	NEXT (dB)	PS-NEXT (dB)	ACR (dB/100m)	PS-ACR (dB/100m)	ELFEXT (dB/100m)	PS-ELFEXT (dB/100m)	Return loss (dB)
1	1.9	71	68	69.1	66.1	68	65	20
4	3.7	62	59	58.3	55.3	56	53	23
10	6.0	56	53	50.0	47.0	48	45	25
16	7.6	53	50	45.4	42.4	44	41	25
20	8.5	51	48	42.5	39.5	42	39	25
31.2	10.7	49	46	38.3	35.3	38	35	24
62.5	15.7	44	41	28.3	25.3	32	29	22
100	19.8	41	38	21.2	18.2	28	25	20
125	22.3	40	37	17.7	14.7	26	23	19

### Ordering Information

P/N	Product Description	P.U
100660014340 (1003301)	S-2YY, 25x2x0.52 Cat.5e, U/UTP Symmetrical Data Cable, Category 5e 25/50/100x2x0.5 Multipair	1000m/drum
tbd (1005651)	S-2YY, 50x2x0.52 Cat.5e, U/UTP Symmetrical Data Cable, Category 5e 25/50/100x2x0.5 Multipair	1000m/drum
tbd	S-2YY, 100x2x0.52 Cat.5e, U/UTP Symmetrical Data Cable, Category 5e 25/50/100x2x0.5 Multipair	1000m/drum
60011227 (1003318)	S-2YH, 25x2x0.52 Cat.5e LSZH, U/UTP Symmetrical Data Cable, Category 5e 25/50/100x2x0.5 Multipair	1000m/drum
60014786 (1003319)	S-2YH, 250x2x0.52 Cat.5e LSZH, U/UTP Symmetrical Data Cable, Category 5e 25/50/100x2x0.5 Multipair	1000m/drum
60025118 (1003320)	S-2YH, 100x2x0.52 Cat.5e LSZH, U/UTP Symmetrical Data Cable, Category 5e 25/50/100x2x0.5 Multipair	1000m/drum



### Application

- IEEE 802.3: 10Base-T; 100Base-T; ISDN; xDSL
- IEEE 802.5 16 MB; ISDN; TPDDI; ATM155Mbit/s

### Standards

- EN 50173, ISO/IEC 11801, IEC 56-5

### Fire Rating

PVC	IEC 60332-1
LSZH	IEC 60332-1, IEC 61034-2, IEC 60754-1/2

## 4. Broadcasting & Studio

# Quality cables for the transmission of digital and analogue audio and video signals to professional levels

RANKED AS NUMBER ONE IN EUROPE, DRAKA IS A LEADING PROVIDER OF PROFESSIONAL BROADCAST AND STUDIO CABLES. SINCE 1958 DRAKA BROADCAST SOLUTIONS HAVE DELIVERED LEVELS OF TECHNICAL EXCELLENCE THAT HAVE PROVEN THEMSELVES IN PRACTICE UNDER THE MOST DEMANDING CONDITIONS.

Draka broadcast cables are optimally tailored to an information and entertainment market which is now spanning the analogue and digital world. Whether broadcasting a regional traffic report by a local radio station or the transmission of a World Class soccer into the world - the success of broadcast production always depends on the reliability of the audio, video, camera and lighting control cables. Draka has decades of experience in the cable manufacturing, research and development in close cooperation with broadcasting professionals.

### Inspiring partnerships

Since the beginning of professional broadcasting, Draka has worked in close cooperation with leading national and international broadcasting companies. Leading edge solutions in the form of high-quality analogue, SDI, HDTV and hybrid fiber optic arise from these partnerships. With 30 billion viewers around the globe, the World Cup 2006 in Germany, for example, was the most-watched event in television history during a period of 4 weeks. Draka delivered the cables necessary for this new record and enabled broadcasts in HDTV for the first time. Draka also supported Euro Masters 2008 in Austria and Switzerland. Draka meets the specifications of national broadcasters as well as with AES/EBU, SMPTE, IEC, EN and VDE.

Leading sound studios are users of Draka cables. Superior quality of sound requires cutting edge technology where cabling is an essential link. In this field, Draka offers modern cable solutions for analogue and digital recording as well as for microphone and speaker cabling. As one of the world's leading manufacturers of passive network cables, Draka can guarantee the high efficiency of passive transmission cables which are produced using the latest technology. For live events, there is only a single chance for a successful performance. There is no alternative to absolute reliability. Draka offers the best solutions for lighting control, sound, microphone and speaker interconnections and can quickly respond to the requirements of production companies in order to guarantee an optimum live performance.

### Comprehensive product line

The studio broadcast solutions of Draka comprise:

- High-precision analogue and digital 75  $\Omega$  video cables
- Analogue and digital multicore audio cables
- Microphone cables, speaker cables
- Lighting control and Sound cables
- Camera cables for studio and outdoor transmission
- Multicore camera cables
- Studio connecting cables
- Hybrid camera cables

## 4. BROADCASTING & STUDIO

### 4.1 Video Cables

0.6/2.8 AF	94
1.0/4.8 AF	95
1.6/7.3 AF	96
HD PRO 0.6/2.8 AF	97

### 4.2 Audio Cables

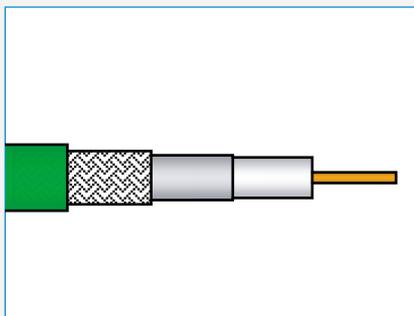
AC10 SS 23/1 nxP	98
AC10 SS 26/7 x pairs	99
XLR PRO FLEX analogue / digital	100

### 4.3 Camera Cables

Triax Cables	101
SMPTE 311M-HD-Hybrid-Camera Cable	103

# 0.6/2.8 AF

## Video Cable 75 Ω



### Application

Video cables are primarily used in closed circuit TV systems and in several studio applications for transmission of image signals.

### Standards

For analogue and digital video signals  
(Composite, component, SDI, SDV, SDTI, HDTV)

### Fire Rating

- PVC: IEC 60332-1
- FRNC: IEC 60332-1/2, IEC 60332-3, IEC 60754-2
- FRNC-C: IEC 60332-3 C

### Construction

<b>Inner conductor</b>	solid copper wire, bare, diameter 0.6 mm
<b>Insulation</b>	Foam-PE, diameter 2.8 mm
<b>Outer conductor</b>	Al-PET-Al-foil under tinned copper braid, diameter 3.4 mm
<b>Sheath</b>	LSZH, diameter 4.5 mm green, RAL 6018
<b>Weight</b>	Nom. 28 kg/km
<b>Tensile force N</b>	60

### Electrical Properties at 20°C

<b>DC resistance</b>	Inner conductor	61 Ω/km
	Outer conductor	17 Ω/km
<b>Mutual capacitance</b>	-	56 pF/m
<b>Characteristic impedance</b>	-	75 Ω ± 0.75 Ω
<b>Velocity ratio</b>	-	78 %
<b>Screening factor</b>	-	> 100 dB

### Nominal Transmission Characteristics at 20°C

Attenuation (dB/100m)		Return loss (dB)	
Frequency (MHz)		Frequency (MHz)	
1	1.2	50 - 300	≥ 26
3	1.9	300 - 3000	≥ 22
5	2.5	3000 - 3500	≥ 18
10	3.5	3500 - 5000	≥ 15
30	5.5	-	-
100	10.0	-	-
200	14.1	-	-
300	17.8	-	-
500	23.0	-	-
800	29.7	-	-
1000	33.2	-	-
1500	41.0	-	-
2250	50.2	-	-
3000	60.9	-	-
3500	65.8	-	-
4000	69.8	-	-
4500	74.0	-	-
5000	77.9	-	-

### Ordering Information

P/N	Product Description	P.U
60014392	0.6/2.8 AF LSZH-C green, Video Cable 75 Ω, 0.6/2.8 AF	1000m/drum

# 1.0/4.8 AF

Video Cable 75 Ω

4.1 Video Cables

## Construction

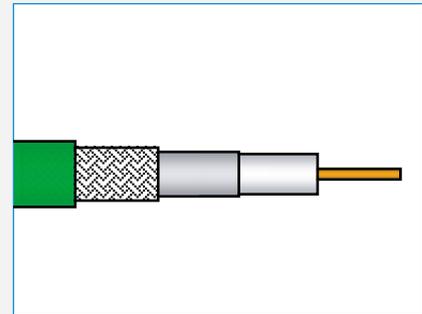
<b>Inner conductor</b>	solid copper wire, bare, diameter 1.0 mm
<b>Insulation</b>	Foam-PE, diameter 4.8 mm
<b>Outer conductor</b>	Al-PET-Al-foil under tinned copper braid, diameter 5.6 mm
<b>Sheath</b>	LSZH, PVC, PUR diameter 7.0 mm green, RAL 6018, blue, RAL 5015
<b>Weight</b>	Nom. 69 kg/km
<b>Tensile force N</b>	140

## Electrical Properties at 20°C

<b>DC resistance</b>	Inner conductor	22 Ω/km
	Outer conductor	7 Ω/km
<b>Mutual capacitance</b>	-	56 pF/m
<b>Characteristic impedance</b>	-	75 Ω ± 0.75 Ω
<b>Velocity ratio</b>	-	78 %
<b>Screening factor</b>	-	≥ 100 dB

## Electrical Data at 20°C

Attenuation (dB/100m)		Return loss (dB)	
Frequency (MHz)		Frequency (MHz)	
1	0.8	50 – 300	≥ 26
3	1.3	300 – 3000	≥ 22
5	1.6	3000 – 3500	≥ 18
10	2.1	3500 – 5000	≥ 15
30	3.5	-	-
100	6.2	-	-
200	8.9	-	-
300	11.3	-	-
500	14.8	-	-
800	18.5	-	-
1000	20.7	-	-
1500	24.9	-	-
2250	31.7	-	-
3000	37.3	-	-
3500	41.5	-	-
4000	47.2	-	-
4500	51.2	-	-
5000	55.1	-	-



## Application

Video cables are primarily used in closed circuit TV systems and in several studio applications for transmission of image signals.

## Standards

For analogue and digital video signals  
(Composite, Component, SDI, SDV, SDTI, HDTV)

## Fire Rating

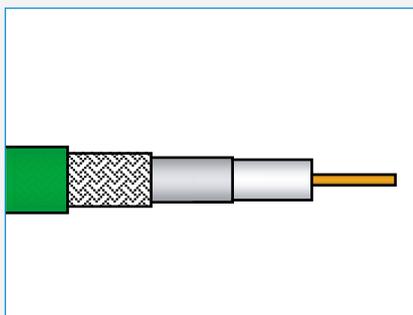
- PVC: IEC 60332-1
- LSZH: IEC 60332-1, IEC 61034-2, IEC 60754-1/2
- LSZH-C: IEC 60332-3 C

## Ordering Information

P/N	Product Description	P.U
1002208 CT2850401	1.0/4.8 AF LSZH-C green, Video Cable 75 Ω, 1.0/4.8 AF	1000m/drum
1002209 CT2850402	1.0/4.8 AF LSZH-C green, Video Cable 75 Ω, 1.0/4.8 AF	1000m/drum
1002210 CT2850405	1.0/4.8 AF LSZH-C green, Video Cable 75 Ω, 1.0/4.8 AF	1000m/drum
1002198 CT2758300	1.0/4.8 AF PVC green, Video Cable 75 Ω, 1.0/4.8 AF	1000m/drum
1002199 CT2758301	1.0/4.8 AF PVC blue, Video Cable 75 Ω, 1.0/4.8 AF	1000m/drum

# 1.6/7.3 AF

## Video Cable 75 Ω



### Application

Video cables are primarily used in closed circuit TV systems and in several studio applications for transmission of image signals.

### Standards

For analogue and digital video signals (Composite, Component, SDI, SDV, SDTI, HDTV)

### Fire Rating

- PVC: IEC 60332-1
- LSZH: IEC 60332-1, IEC 61034-2, IEC 60754-1/2
- LSZH-C: EC 60332-3 C

### Construction

<b>Inner conductor</b>	solid copper wire, bare, diameter 1.6 mm
<b>Insulation</b>	Foam-PE, diameter 7.3 mm
<b>Outer conductor</b>	Al-PET-Al-foil under tinned copper braid, diameter 8.2 mm
<b>Sheath</b>	LSZH, diameter 10.3 mm green, RAL 6018
<b>Weight</b>	Nom. 120(PUR) - 135(LSZH) kg/km
<b>Tensile force N</b>	270

### Electrical Properties at 20°C

<b>DC resistance</b>	Inner conductor	9.5 Ω/km
	Outer conductor	4.3 Ω/km
<b>Mutual capacitance</b>	-	56 pF/m
<b>Characteristic impedance</b>	-	75 Ω ± 0.75 Ω
<b>Velocity ratio</b>	-	78 %
<b>Screening factor</b>	-	≥ 100 dB

### Electrical Data at 20°C

Attenuation (dB/100m)		Return loss (dB)	
Frequency (MHz)		Frequency (MHz)	
1	0.4	50 - 300	≥ 26
3	0.7	300 - 3000	≥ 22
5	0.9	3000 - 3500	≥ 18
10	1.3	3500 - 5000	≥ 15
30	2.2	-	-
100	3.9	-	-
200	5.3	-	-
300	7.0	-	-
500	9.2	-	-
800	11.8	-	-
1000	13.2	-	-
1500	16.9	-	-
2250	22.0	-	-
3000	26.4	-	-
3500	30.6	-	-
4000	36.1	-	-
4500	38.1	-	-
5000	41.3	-	-

### Ordering Information

P/N	Product Description	P.U
1002202 CT2760901	1.6/7.3 AF LSZH-C gn, Video Cable 75 Ω, 1.6/7.3 AF	1000m/drum
1002197 CT2757800	1.6/7.3 AF PVC green, Video Cable 75 Ω, 1.6/7.3 AF	1000m/drum
1002461 CT2757900	1.6/7.3 AF PUR green, Video Cable 75 Ω, 1.6/7.3 AF	1000m/drum
1002462 CT2757902	1.6/7.3 AF PUR blue, Video Cable 75 Ω, 1.6/7.3 AF	1000m/drum

# HD PRO 0.6/2.8 AF

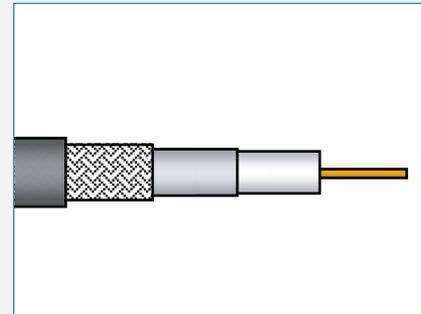
HD Video Cable 75 Ω

## Construction

<b>Inner conductor</b>	solid copper wire, bare, diameter 1.0 mm
<b>Insulation</b>	Foam-PE, diameter 4.8 mm
<b>Outer conductor</b>	Al-PET-Al-foil under tinned copper braid, diameter 5.6 mm
<b>Sheath</b>	LSZH, PVC, PUR diameter 7.0 mm
	green, RAL 6018, blue, RAL 5015
<b>Weight</b>	Nom. 28 kg/km
<b>Tensile force N</b>	60

## Electrical Properties at 20°C

<b>DC resistance</b>	Inner conductor	22 Ω/km
	Outer conductor	7 Ω/km
<b>Mutual capacitance</b>	-	56 pF/m
<b>Characteristic impedance</b>	-	75 Ω ± 0.75 Ω
<b>Velocity ratio</b>	-	78 %
<b>Screening factor</b>	-	≥ 100 dB



### Application

Video cables are primarily used in closed circuit TV systems and in several studio applications for transmission of image signals.

### Standards

- For analogue and digital video signals (Composite, component, SDI, SDV, SDTI, HDTV)

### Fire Rating

- IEC 60332-1/2, IEC 60332-3, IEC 60754-2

## Electrical Data at 20°C

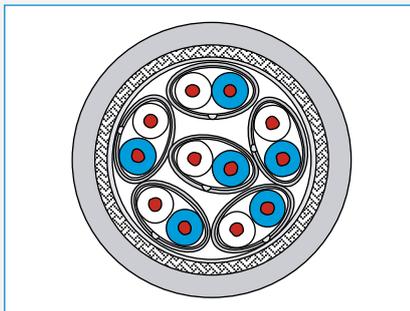
Attenuation (dB/100m)		Return loss (dB)	
Frequency (MHz)		Frequency (MHz)	
1	1.2	50 - 300	≥ 26
3	1.9	300 - 3000	≥ 22
5	2.5	3000 - 3500	≥ 18
10	3.5	3500 - 5000	≥ 15
30	5.9	-	-
100	10.0	-	-
200	14.1	-	-
300	17.8	-	-
500	24.0	-	-
800	29.7	-	-
1000	33.2	-	-
1500	39.6	-	-
2250	50.2	-	-
3000	60.9	-	-
3500	65.8	-	-
4000	69.8	-	-
4500	74.2	-	-
5000	78.9	-	-

## Ordering Information

P/N	Product Description	P.U
1014488	HD PRO 0.6/2.8 AF, HD Video Cable 75 Ω, HD PRO 0.6/2.8 AF	1000m/drum

# AC10 SS 23/1 nxP

## Audio Cable



### Application

Audio cables are used in professional broadcasting systems for the transmission of analogue and digital audio signals.

### Standards

Basing upon ARD-Specification and acc. to AES/EBU-Recommendation.)

### Fire Rating

- VDE 0472 part 804 class B or C and IEC 332-1 or 332-3 cat. CF

### Construction

<b>Conductor</b>	solid copper wire, bare 0.56 mm (cross section 0.26 mm <sup>2</sup> )	Ø AWG23/1
<b>Insulation</b>	Foam-skin-PE	Ø 1.4 mm
<b>Pair stranding</b>	Two cores twisted to the pair	
<b>Pair identification</b>	a - core: white, b - core: blue (the above colours in regular intervals)	
<b>Pair screen</b>	Al-PET-foil, Aluminium outside + solid copper drain wire, tinned	Ø 2.9 mm
<b>Pair insulation of the one pair cable</b>	PET-foil	
<b>Overall screen of the one pair cable</b>	copper braid, tinned	
<b>Pair sheath of the multi-pair cables</b>	halogen free, flame retardant copolymer	
<b>Colour and identification</b>	grey RAL 7001 with number printing	
<b>Sheath</b>	halogen free, flame retardant copolymer	
<b>Sheath colour</b>	grey, RAL 7001	
<b>Outer Diameter</b>	Nom. 4.6(1pair) - 15.6(12pair) mm	
<b>Weight</b>	Nom. 27(1pair) - 320 (12pair) kg/km	
<b>Tensile force N</b>	Nom. 80(1pair) - 725(12pair)	

### Mechanical Properties at 20°C

<b>Bending radius during installation</b>	with load	≥ 15 x cable diameter
	without load	≥ 10 x cable diameter
<b>Temperature range</b>	- 30 °C bis + 70 °C	

### Electrical Properties at 20°C

<b>BendaDC loop resistance</b>	≤ 165 Ω/km	
<b>Insulation resistance</b>	≥ 2000 MΩxkm	
<b>Mutual capacitance at 800 Hz</b>	nom. 45 nF/km	
<b>Capacitance unbalance (pair to ground)</b>	≤ 1200 pF/km	
<b>Velocity ratio</b>	approx. 78 %	
<b>Test voltage (50 Hz, 1 min)</b>	700 V rms	
<b>core/core and core/screen</b>		
<b>Characteristic impedance</b>	6 MHz : 110 Ω ± 10%	
<b>Transfer impedance</b>	up to 10 MHz	≤ 10 mΩ/m
	up to 100 MHz	≤ 100 mΩ/m

### Nominal Transmission Characteristics at 20°C

Frequency (MHz)	Near-end crosstalk (cable length: 300 m) Draka Multimedia Cable - Measurement values		Attenuation Draka Multimedia Cable - Measurement values
	neighbouring pairs [dB]	unneighbouring pairs [dB]	[dB/100m]
0.015	85	95	0.33
1.0	90	90	2.45
4.0	90	90	4.2
10.0	90	90	6.3
20.0	90	90	8.6

### Ordering Information

P/N	Product Description	P,U
1002105 CT7649010	1x2x0.56 PiMF, Audio Cable, AC10 SS 23/1 nxP	1000m/drum
1002115 CT7649710	2x2x0.56 PiMF, Audio Cable, AC10 SS 23/1 nxP	1000m/drum
1002106 CT7649110	3x2x0.56 PiMF, Audio Cable, AC10 SS 23/1 nxP	1000m/drum
1002108 CT7649210	5x2x0.56 PiMF, Audio Cable, AC10 SS 23/1 nxP	1000m/drum
1002109 CT7649310	6x2x0.56 PiMF, Audio Cable, AC10 SS 23/1 nxP	1000m/drum
1002103 CT7648710	8x2x0.56 PiMF, Audio Cable, AC10 SS 23/1 nxP	1000m/drum
1002111 CT7649410	10x2x0.56 PiMF, Audio Cable, AC10 SS 23/1 nxP	1000m/drum
1002113 CT7649510	12x2x0.56 PiMF, Audio Cable, AC10 SS 23/1 nxP	1000m/drum

# AC10 SS 26/7 x pairs

## Audio Cable

### 4.2 Audio Cables

#### Construction

<b>Conductor</b>	stranded copper wires, bare 0.48 mm (cross section 0.14 mm <sup>2</sup> )	Ø AWG26/7 mm
<b>Insulation</b>	Foam-skin-PE	Ø 1.2 mm
<b>Pair stranding</b>	two cores twisted to the pair	Ø 2.4 mm
<b>Pair identification</b>	a - core: white, b - core: blue (the above colours in regular intervals)	
<b>Pair screen</b>	Al-PET-foil, Aluminum inside + stranded copper drain wires, tinned	Ø 2.5 mm
<b>Pair insulation of the one pair cable</b>	PET-foil,	
<b>Pair sheath of the multi-pair cables</b>	FRNC, flame retardant	
<b>Colour and identification</b>	grey RAL 7001 with number printing	
<b>Cable lay up</b>	n pairs twisted in layers	
<b>Overall screen</b>	Al-PET-foil + copper braid, tinned	
<b>Sheath</b>	LSZH-C	
<b>Sheath colour</b>	grey, RAL 7001	
<b>Outer Diameter</b>	Nom. 4.2(1pair) - 19.5(24pair) mm	
<b>Weight</b>	Nom. 23(1pair) - 395(24pair) kg/km	
<b>Tensile force N</b>	Nom. 50(1pair) - 1325(24pair)	

#### Mechanical Properties at 20°C

<b>Bending radius during installation</b>	with load	≥ 10 x cable diameter
	without load	≥ 15 x cable diameter
<b>Temperature range</b>	-	- 30 °C up to + 70 °C
<b>Fire propagation</b>	-	VDE 0472 part 804 class B or C and IEC 332-1 or 332-3 cat. CF

#### Electrical Properties at 20°C

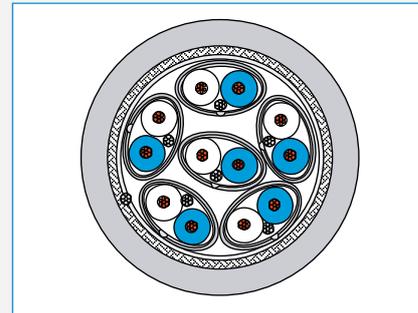
<b>DC loop resistance (at 20 ± 5 °C)</b>	≤ 288 Ω/km	
<b>Insulation resistance (at 20 ± 5 °C and 500 V)</b>	≥ 2000 MΩxkm	
<b>Mutual capacitance at 800 Hz</b>	nom. 45 nF/km	
<b>Capacitance unbalance (pair to ground)</b>	≤ 1200 pF/km	
<b>Velocity ratio</b>	approx. 78 %	
<b>Test voltage (50 Hz, 1 min)</b>	700 V rms	
<b>core/core and core/screen</b>		
<b>Characteristic impedance</b>	6 MHz : 110 Ω ± 10%	
<b>Transfer impedance</b>	up to 10 MHz	≤ 10 mΩ/m
	up to 100 MHz	≤ 100 mΩ/m

#### Electrical Data at 20°C

Frequency (MHz)	Near-end crosstalk (cable length: 300 m) Draka Multimedia Cable - Measurement values		Attenuation Draka Multimedia Cable - Measurement values
	neighbouring pairs [dB]	unneighbouring pairs [dB]	[dB/100m]
0.015	85	85	0.55
1.0	90	85	3.0
4.0	90	90	5.3
10.0	90	90	8.1
20.0	90	85	11.5

#### Ordering Information

P/N	Product Description	P.U
1002123 CT7651411	Li-02YSCH, 1x2x0.48L PiMF, Audio Cable, AC10 SS 26/7 x pairs	1000m/drum
1002147 CT7652410	Li-02YS(St)CH, 2x2x0.48L PiMF, Audio Cable, AC10 SS 26/7 x pairs	1000m/drum
1002125 CT7651511	Li-02YS(St)CH, 3x2x0.48L PiMF, Audio Cable, AC10 SS 26/7 x pairs	1000m/drum
1002129 CT7651613	Li-02YS(St)CH, 4x2x0.48L PiMF, Audio Cable, AC10 SS 26/7 x pairs	1000m/drum
1002131 CT7651710	Li-02YS(St)CH, 6x2x0.48L PiMF, Audio Cable, AC10 SS 26/7 x pairs	1000m/drum
1002142 CT7652111	Li-02YS(St)CH, 8x2x0.48L PiMF, Audio Cable, AC10 SS 26/7 x pairs	1000m/drum
1002134 CT7651811	Li-02YS(St)CH, 10x2x0.48L PiMF, Audio Cable, AC10 SS 26/7 x pairs	1000m/drum
1002137 CT7651911	Li-02YS(St)CH, 12x2x0.48L PiMF, Audio Cable, AC10 SS 26/7 x pairs	1000m/drum
1002140 CT7652011	Li-02YS(St)CH, 16x2x0.48L PiMF, Audio Cable, AC10 SS 26/7 x pairs	1000m/drum
CT...	Li-02YS(St)CH, 20x2x0.48L PiMF, Audio Cable, AC10 SS 26/7 x pairs	1000m/drum
1007975 CT7652311	Li-02YS(St)CH, 24x2x0.48L PiMF, Audio Cable, AC10 SS 26/7 x pairs	1000m/drum



#### Application

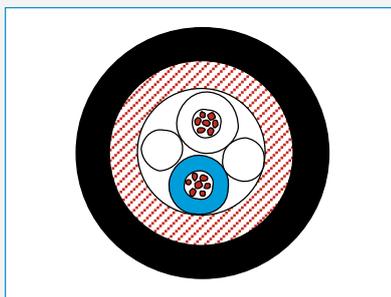
Audio cables are used in professional broadcasting systems for the transmission of analog and digital audio signals.

#### Standards

Basing upon ARD-Specification and acc. to AES/EBU-Recommendation.)

#### Fire Rating

- VDE 0472 part 804 class B or C and IEC 332-1 or 332-3 cat. CF



### Application

Audio cables are used in professional broadcasting systems for the transmission of analogue and digital audio signals.

### Standards

- AES/EBU and analogue Audio

# XLR PRO FLEX analogue / digital

## Construction

<b>Conductor</b>	stranded copper wires, bare, diameter 0.60 mm
<b>Insulation</b>	Foam-PE + skin-layer, diameter 1.5 mm
<b>Identification</b>	a - core: white; b - core: blue
<b>Stranding</b>	two cores twisted to the bundle + cotton filler, diameter 3.0 mm
<b>Screen</b>	spiralled wires, CU bare, diameter 3.2 mm
<b>Sheath</b>	DMC FLEX PVC, diameter 6.5 mm ± 0.2 mm black, RAL 9005
<b>Outer Diameter</b>	Nom. 6.5 mm
<b>Weight</b>	Nom. 50 kg/km
<b>Tensile force N</b>	55

## Mechanical Properties

<b>Minimum bending radius</b>	without load	≥ 4 x D ( D= outer diameter )
	with load	≥ 8 x D ( D= outer diameter )
<b>Temperature range</b>	during operation	- 30° C to + 70° C
	during installation	- 5° C to + 50° C

## Electrical Properties at 20°C

<b>Loop resistance</b>	-	≤ 175 Ω/km
<b>Insulation resistance</b>	500 V	≥ 2000 MΩ*km
<b>Mutual capacitance</b>	800 Hz	nom. 45 nF/km
<b>Velocity ratio</b>	-	ca. 78%
<b>Test voltage</b>	(DC, 1 min) core/core and core/screen	1000 V
<b>Characteristic impedance</b>	6 MHz	110 Ω ± 10 %

## Electrical Data at 20°C

Frequency (MHz)	Attenuation (dB/100m)
0.015	0.3
1.0	1.5
4.0	3.8
10.0	6.0
20.0	8.5

## Ordering Information

P/N	Product Description	P.U
1018270	1x2x0.22 <sup>2</sup> , XLR PRO FLEX analogue / digital	1000m/drum

# Triax Cables

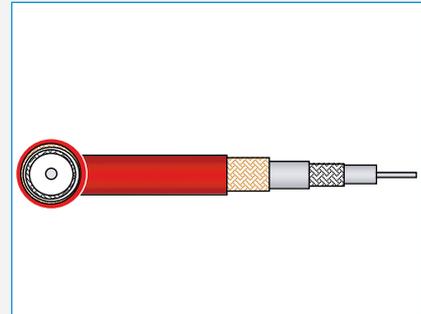
## Triaxial Camera Cables

### Construction

<b>Inner conductor</b>	solid copper wire, silvered or stranded copper wires, silvered
<b>Insulation</b>	Foam-PE
<b>1st outer conductor</b>	copper braid, thick silvered
<b>Insulation</b>	PE
<b>2nd outer conductor</b>	copper braid, bare
<b>Sheath</b>	PVC, PU (standard or reinforced type) or LSZH red, RAL 3000 altern. black or grey
<b>Weight</b>	87(Triax8PU) - 250(Triax 14 PVC) mm
<b>Tensile force N</b>	85(Triax8PU) - 550(Triax 14 PVC)

### Dimensions

	Triax 8	Triax 11, Triax 11/1	AtteTriax 14ation
<b>Inner conductor copper wire, silvered</b>	Ø 1.0 mm	Ø 1.4 mm	-
<b>stranded copper wires, silvered</b>	-	-	Ø 2.2 mm
<b>Insulation foam-PE</b>	Ø 4.5 mm	Ø 6.5 mm	Ø 9.7 mm
<b>Inner screen copper braid, silvered</b>	Ø 5.1 mm	Ø 7.1 mm	Ø 10.5 mm
<b>Insulation PE</b>	Ø 6.6 mm	Ø 8.6 mm	Ø 11.9 mm
<b>Outer screen copper braid, bare</b>	Ø 7.2 mm	Ø 9.2 mm	Ø 12.7 mm
<b>Sheath red, RAL 3000</b>	Ø 8.4 mm	Ø 10.9 mm	Ø 14.5 mm
<b>reinforced, sign/1</b>	Ø 8.9 mm	Ø 12.2 mm	-



### Application

Triaxial camera cables are used in professional studio applications for simultaneous transmission of energy and multiplex image signals between camera head and control system for SDI and HD-SD.

They are available as different types optimized for use inside studios and outdoor application.

### Electrical properties: Triax 8 at 20°C

<b>Characteristic impedance</b>	-	75 Ω ± 3 %
<b>Mutual capacitance</b>	800 Hz	54 pF/m
<b>DC resistance</b>	inner conductor	25 Ω/km
	inner screen	12 Ω/km
	outer screen	10 Ω/km
<b>Insulation resistance</b>	inner conductor/inner screen	≥ 104 MΩ*km
	inner screen/outer screen	≥ 103 MΩ*km
<b>Max. operating voltage</b>	-	300 V
<b>Screening factor</b>	30 - 1000 MHz	≥ 75 dB

### Electrical properties: Triax 11, Triax 11/1 at 20°C

<b>Characteristic impedance</b>	-	75 Ω ± 3 %
<b>Mutual capacitance</b>	800 Hz	54 pF/m
<b>DC resistance</b>	inner conductor	13 Ω/km
	inner screen	10 Ω/km
	outer screen	8 Ω/km
<b>Insulation resistance</b>	inner conductor/inner screen	≥ 104 MΩ*km
	inner screen/outer screen	≥ 103 MΩ*km
<b>Max. operating voltage</b>	-	400 V
<b>Screening factor</b>	30 - 1000 MHz	≥ 75 dB

### Electrical properties: Triax 14

<b>Characteristic impedance</b>	-	75 Ω ± 3 %
<b>Mutual capacitance</b>	800 Hz	54 pF/m
<b>DC resistance</b>	inner conductor	6 Ω/km
	inner screen	6 Ω/km
	outer screen	4 Ω/km
<b>Insulation resistance</b>	inner conductor/inner screen	≥ 104 MΩ*km

## 4.3 Camera Cables

### Electrical Properties: Triax 8 at 20°C

Attenuation (dB/100m) Frequency (MHz)		Return loss (dB) Frequency (MHz)	
1	0.6	1 - 100	1 - 100
10	2.2	100 - 300	100 - 300
20	3.2	-	-
40	4.6	-	-
50	5.1	-	-
60	5.6	-	-
100	7.5	-	-
300	13.8	-	-

### Electrical Data: Triax 11, Triax 11/1 at 20°C

Attenuation (dB/100m) Frequency (MHz)		Return loss (dB) Frequency (MHz)	
1	0.5	1 - 100	1 - 100
10	1.6	100 - 300	100 - 300
20	2.3	-	-
40	3.3	-	-
50	3.7	-	-
60	4.1	-	-
100	5.4	-	-
300	10.3	-	-

### Electrical Data: Triax 14 at 20°C

Attenuation (dB/100m) Frequency (MHz)		Return loss (dB) Frequency (MHz)	
1	0.4	1 - 100	1 - 100
10	1.1	100 - 300	100 - 300
20	1.6	-	-
40	2.3	-	-
50	2.6	-	-
60	2.8	-	-
100	3.8	-	-
300	7.7	-	-

### Ordering Information

P/N	Product Description	P.U
1002223 CT2765700	Triax 8 PVC red, Triaxial Camera Cables, Triax Cables	1000m/drum
1017271 CT2765702	Triax 8 PVC black, Triaxial Camera Cables, Triax Cables	1000m/drum
1002221 CT2765500	Triax 8 PU, Triaxial Camera Cables, Triax Cables	1000m/drum
1002266 CT2853201	Triax 8 LSZH, Triaxial Camera Cables, Triax Cables	1000m/drum
1002268 CT2853203	Triax 8 LSZH reinforced, Triaxial Camera Cables, Triax Cables	1000m/drum
1002226 CT2766400	Triax 11 PVC, Triaxial Camera Cables, Triax Cables	1000m/drum
1002229 CT2766404	Triax 11 PE black, Triaxial Camera Cables, Triax Cables	1000m/drum
1002233 CT2766600	Triax 11 PU red, Triaxial Camera Cables, Triax Cables	1000m/drum
1002234 CT2766601	Triax 11 PU black, Triaxial Camera Cables, Triax Cables	1000m/drum
1002243 CT2767101	Triax 11/1 PU reinforced, Triaxial Camera Cables, Triax Cables	1000m/drum
1002264 CT2850801	Triax 11 LSZH, Triaxial Camera Cables, Triax Cables	1000m/drum
1002236 CT2766700	Triax 14 PVC, Triaxial Camera Cables, Triax Cables	1000m/drum
1002239 CT2766704	Triax 14 PE, Triaxial Camera Cables, Triax Cables	1000m/drum
1002273 CT7666700	Triax 14 LSZH, Triaxial Camera Cables, Triax Cables	1000m/drum
1002240 CT2767000	Triax 14 PU, Triaxial Camera Cables, Triax Cables	1000m/drum

# SMPTE 311M-HD-Hybrid-Camera Cable

## Hybrid-HDTV-Camera Cable

### Construction

<b>Element 1: Auxiliary Conductors AWG20 (4 x 0.6 mm<sup>2</sup>)</b>	
<b>Conductor</b>	tinned stranded copper wires, 19 x 0.20 mm, diameter 1.0 mm
<b>Insulation</b>	HDPE, diameter 1.5 mm
<b>Identification</b>	2 x black, 2 x white
<b>Element 2: Signal Conductors AWG24 (2 x 0.22 mm<sup>2</sup>)</b>	
<b>Conductor</b>	tinned stranded copper wires, 7 x 0.20 mm, diameter 0.6 mm
<b>Insulation</b>	HDPE, diameter 1.1 mm
<b>Identification</b>	1 x red, 1 x grey
<b>Element 3: Fibre Optic Single Mode (2 x 9/125µ)</b>	
<b>Mode field diameter</b>	at 1310 nm, diameter 9.5 µm ± 1 µm
<b>Cladding diameter</b>	diameter 125 µm ± 1 µm
<b>Concentricity error</b>	≤ 1 µm
<b>Coating material</b>	UV-cross-linked Acrylate, diameter 245 µm
<b>Buffer material</b>	Thermoplastic, diameter 0.9 µm ± 0.05 µm
<b>Identification</b>	1 x blue, 1x yellow
<b>Element 4: Strength Member AWG16 (1 x 1.22 mm<sup>2</sup>)</b>	
<b>Conductor</b>	galvanized steel wires, diameter 1.6 mm
<b>Insulation</b>	HDPE, diameter 2.1 mm
<b>Identification</b>	1 x white
<b>Cable lay up</b>	
<b>Stranding</b>	Core: 1 x Element 4, diameter 2.1 mm Layer: 4 x Element 1 + 2 x Element 2 + 2 x Element 3 and in the outer interstices 4 x fibrillated Polypropylene as needed for roundness, diameter 5.2 mm Sequence according to the above drawing
<b>Wrapping</b>	1 x non-woven fabric tape, diameter 5.4 mm
<b>Screen</b>	Copper wire braid, tinned 95% opt. coverage, diameter 5.9 mm
<b>Sheath</b>	PUR or LSZH, diameter 9.2 mm
	black, RAL 9005
<b>Weight</b>	Nom. 115 kg/km
<b>Tensile force N</b>	Nom. 800

### Mechanical Properties at 20°C

<b>Temperature range PUR (LSZH)</b>	during operation	- 40° C to + 70° C (-25°C to +70°C)
<b>Max. humidity</b>	-	95 %

### Electrical Properties at 20°C

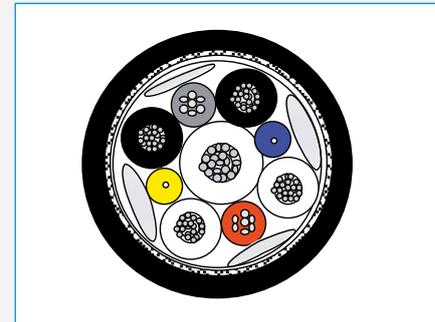
<b>Auxiliary Conductors AWG20 (4 x 0.6 mm<sup>2</sup>)</b>		
<b>DC resistance</b>	-	≤ 35.3 Ω/km
<b>Loop resistance</b>	-	≤ 43 Ω/km
<b>Insulation resistance</b>	-	≥ 104 MΩ*km
<b>Test voltage</b>	-	1750 VAC rms
<b>Operating voltage</b>	-	≤ 300 VAC rms
<b>Signal Conductors AWG24 (2 x 0.22 mm<sup>2</sup>)</b>		
<b>DC resistance</b>	-	≤ 97.5 Ω/km
<b>Loop resistance</b>	-	≤ 184 Ω/km
<b>Insulation resistance</b>	-	≥ 104 MΩ*km
<b>Test voltage</b>	-	1750 VAC rms
<b>Operating voltage</b>	-	≤ 300 VAC rms
<b>Overall screen</b>		
<b>DC resistance</b>	-	≤ 20 Ω/km

### Optical Properties

<b>Fibre Optic Single Mode (2 x 9/125µ)</b>		
<b>Cut-off wavelength</b>	-	1100 - 1350 nm
<b>Attenuation</b>	at 1310 nm	0.5 dB
<b>Dispersion</b>	at 1310 nm	3.5 ps/nm*km

### Ordering Information

P/N	Product Description	P.U
1002458 CT2987000 glossy	SMPTE 311M Hybrid Camera Cable, Hybrid-HDTV-Camera Cable, SMPTE 311M-HD-Hybrid-Camera Cable	1000m/drum
1008069 CT2987002 dull	SMPTE 311M Hybrid Camera Cable, Hybrid-HDTV-Camera Cable, SMPTE 311M-HD-Hybrid-Camera Cable	1000m/drum
1018337 CT7687000	SMPTE 311M Hybrid Camera Cable LSZH, Hybrid-HDTV-Camera Cable, SMPTE 311M-HD-Hybrid-Camera Cable	1000m/drum



### Application

This Hybrid HD Camera Cable 25M 9/125 + 4 x AWG20 + 2 x AWG24 acc. to SMPTE 311M-Standard contains Single-Mode Optical Fibres, Auxiliary- and Signal Conductors. It is used in professional video productions for simultaneous transmission of energy, video, audio and control signals and is intended to interconnect Camera Units and Base Stations in conjunction with the Connector Interface Standard. It is suitable for all new digital camera systems of well-known manufacturers.

### Standards

SMPTE 311M

### Fire Rating

IEC 60332-1, IEC 60754-2, IEC 61034

# Services and related documents

Certified engineers enjoy full vendor support before, during and after completion of their projects.

## Before

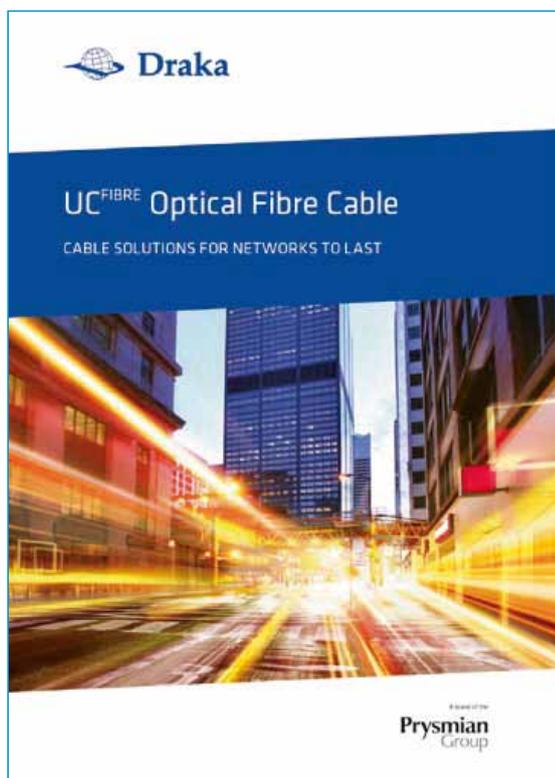
Already before your project commences – we are there to train you on all features of Draka UC cabling system. If you are an experienced professional or still improving your engineering skills – it offers you the right mix of theory and practice to get you going better. Take advantage of a world leading manufacturer's resources.

## During

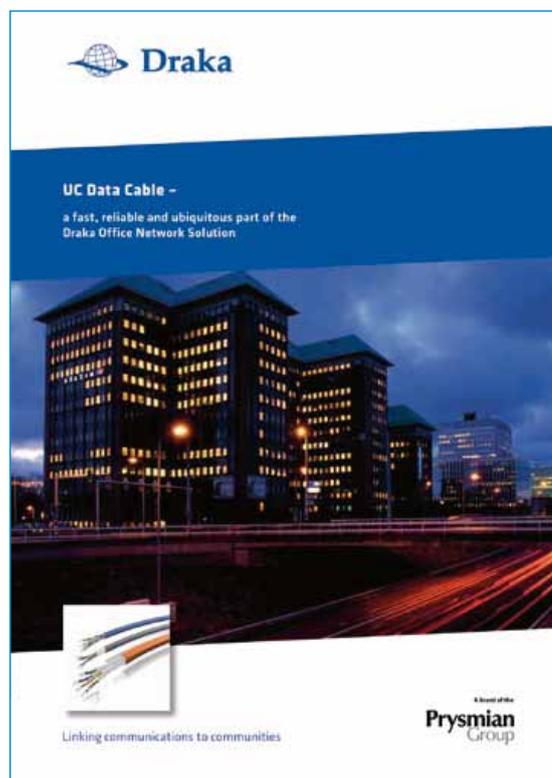
If your project is fully running and you face an issue – trust in our experienced in-field support. You will not be alone if there are questions about testing, standards or installation practices. If there is uncertainty about your specification, we are there to give you support.

## After

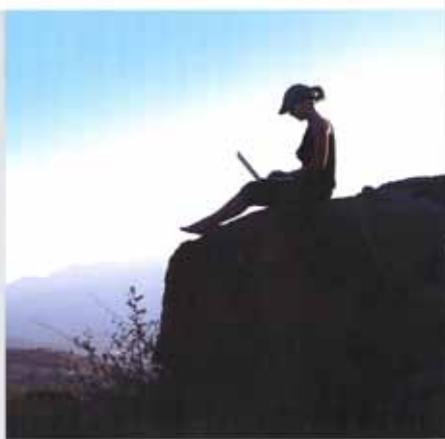
Needless to say – the 3rd party approved Draka solutions are entirely covered by an end-to-end system warranty. Please contact our local offices to enquire about the Draka UC Structure Cabling System Warranty Program.



UC FIBRE™ Optical Fibre Cable



UC Data™ Cable



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