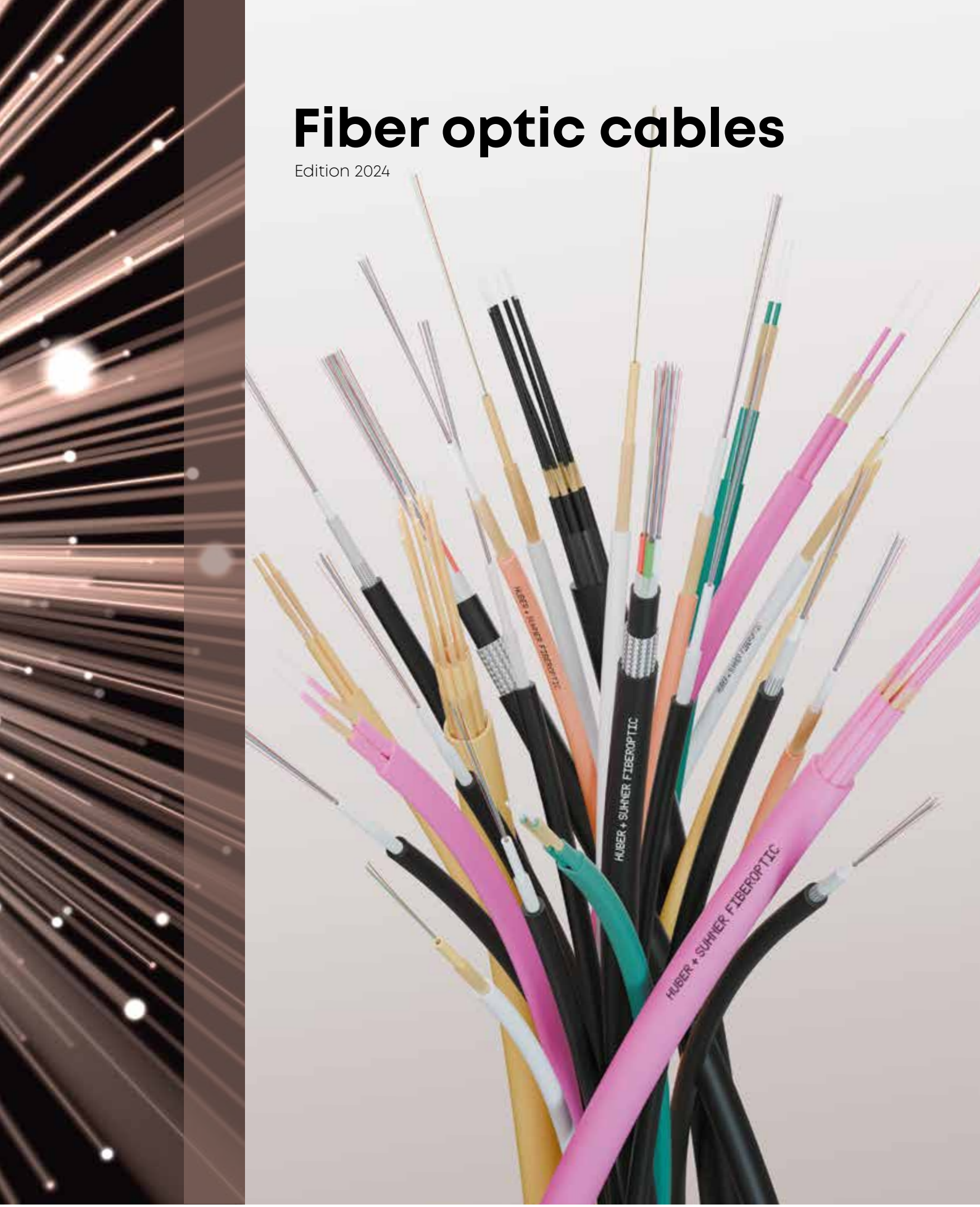
Fiber optic cables

Edition 2024



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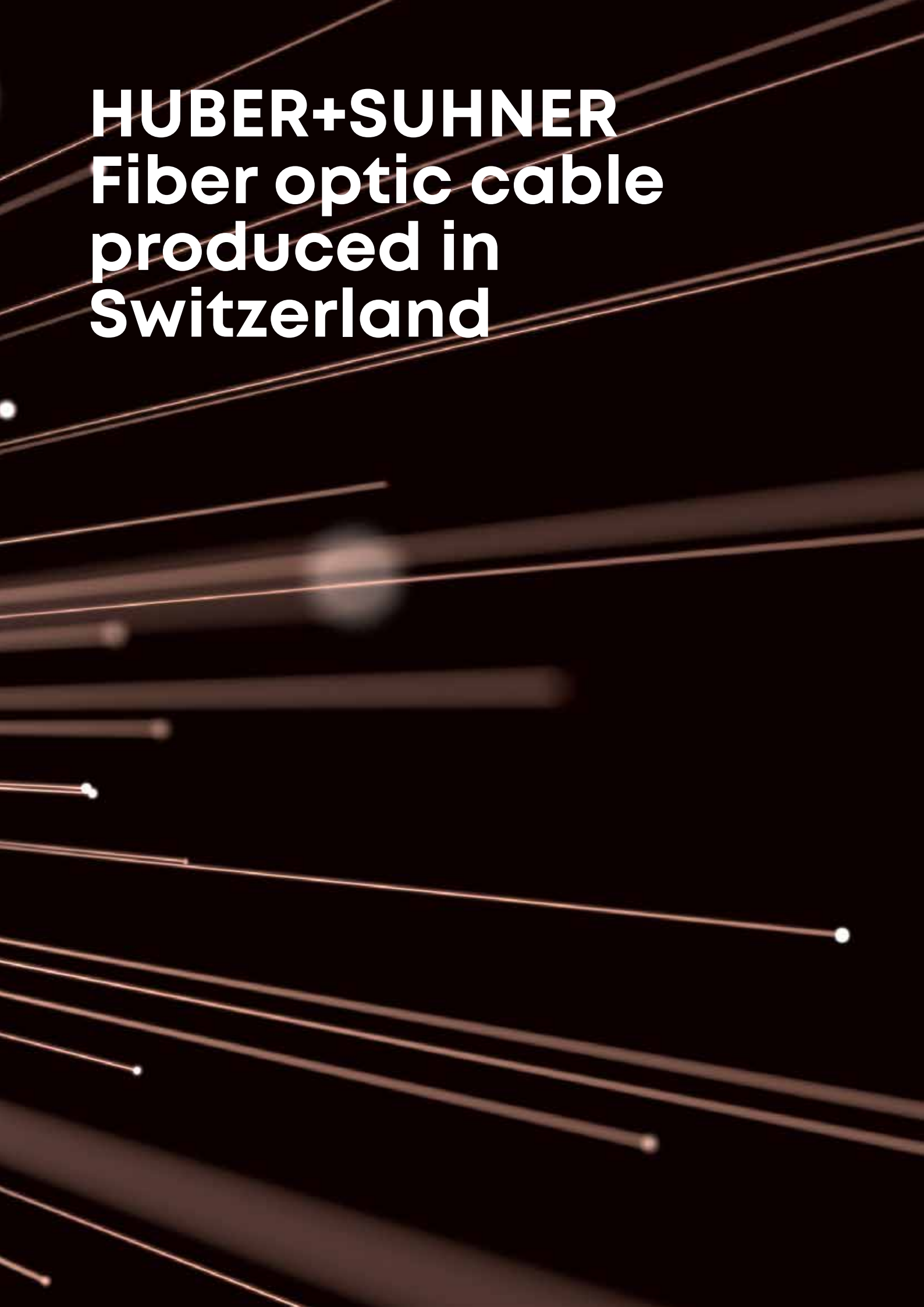
HUBER+SUHNER Fiber optic cable produced in Switzerland



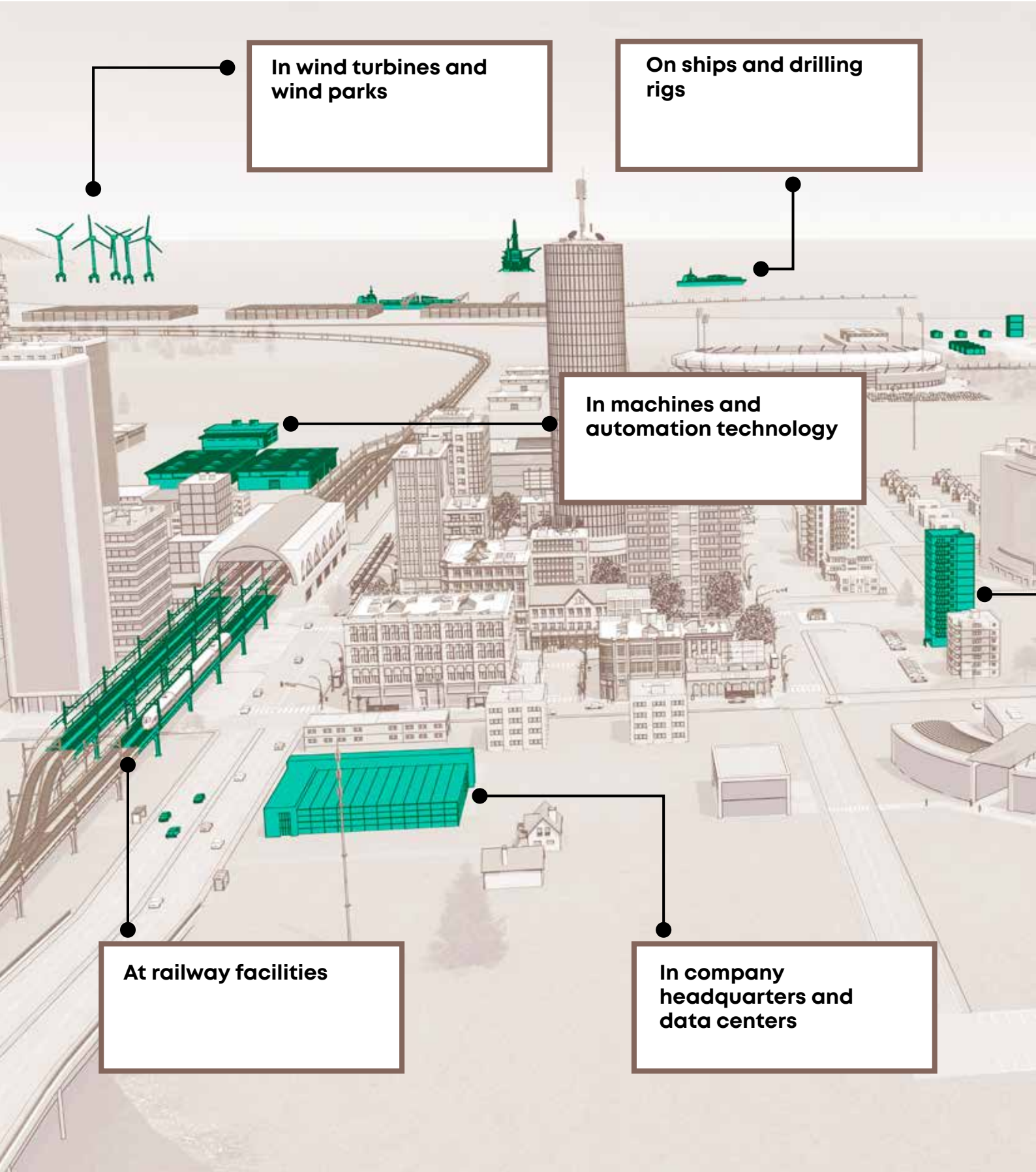
Connecting – today and beyond

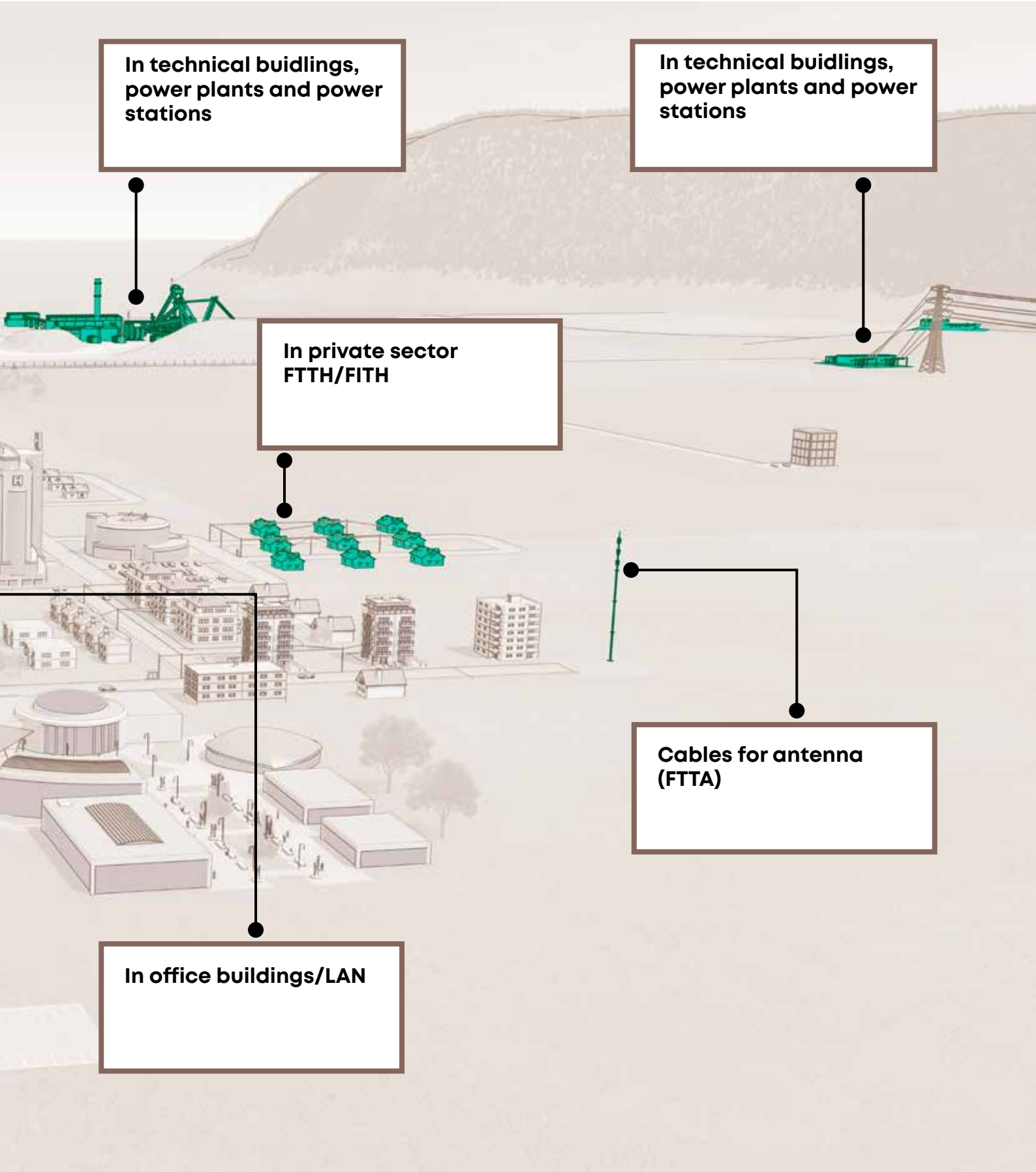
Your partner for system solutions

HUBER+SUHNER is a leading international producer and supplier of electrical and optical interconnectivity components and systems. Core capabilities in radio frequency, fiber optic and low frequency technology are united under a single roof.

HUBER+SUHNER offers a wide range of fibre optical cables, optimised for fix or mobile applications at indoor and outdoor areas. Due to new market demands innovative products are developed and tested according to international standards, which fulfil high mechanical and thermal conditions as well as fire requirements.

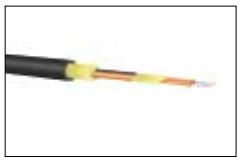
Applications




In technical buidlings, power plants and power stations
In technical buidlings, power plants and power stations
In private sector FTTH/FITH
Cables for antenna (FTTA)
In office buildings/LAN

Energy

Ruggedised breakout cables



- TWINFLEX
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- TWINFIX
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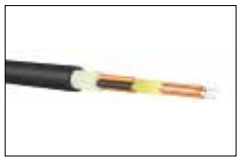

- QUADFIX
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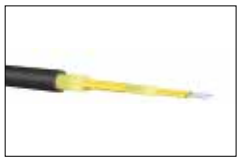

- Rugged minicord breakout cables
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Steel-armoured loose tube cables

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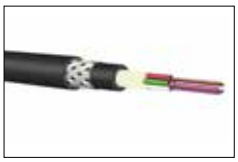

HVDC cables

- Simplex
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- Breakout
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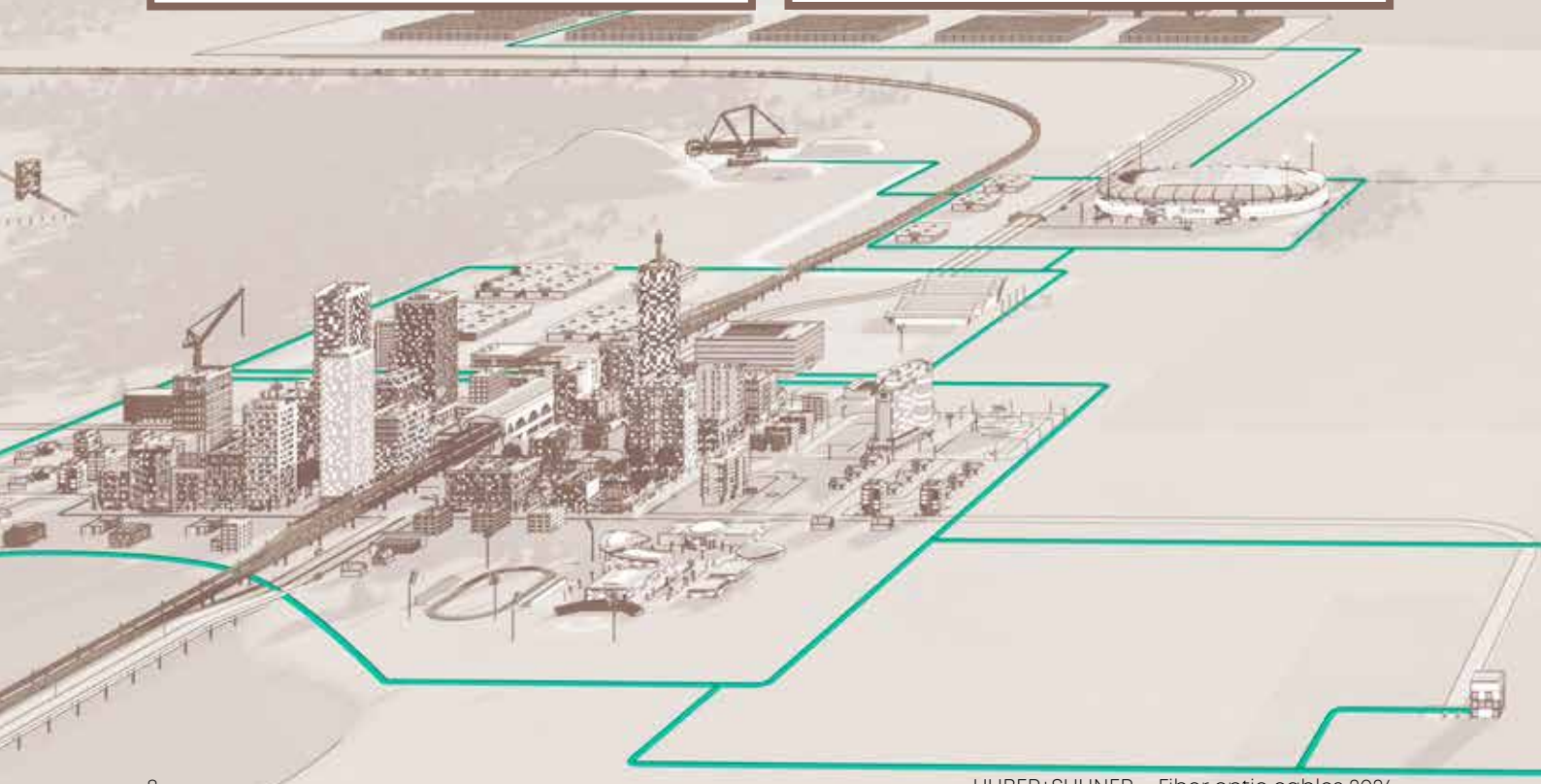

Mining

Mobile field cables

- Riser construction
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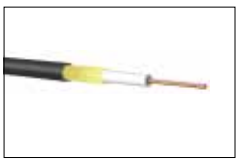

- Loose tube construction
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Drag chain cables

- Drag chain cable
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- RADOX® drag chain cable
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Ruggedised breakout cable

- Rugged minicord breakout cable
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Broadcast

TWINFLEX and rugged minicord breakout cables

- Rugged minicord breakout cable
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Drag chain cable

- Drag chain cable
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Mobile field cables

- Riser-construction
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- Loose tube construction
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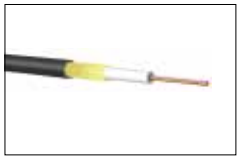

Oil & Gas

Loose tube cables

- RADOX® loose tube cable
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- Steel-armoured loose tube cable
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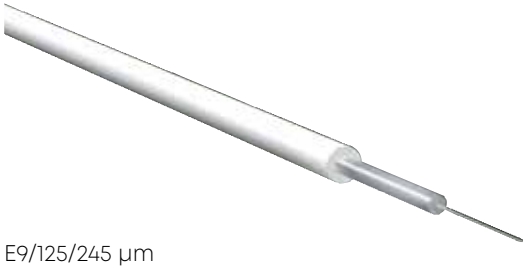
Specification single-mode fiber



E9/125/245 µm

Optical characteristics single-mode fiber

Conditions			E9/125	E9/125 A1[1)]	E9/125 A2	E9/125 A3
Standards according ITU-T			G.652.D	G.657.A1[1)]	G.657.A2	G.657.A2/B3
Attenuation typical (in cable)	1310 nm	dB/km	≤ 0.33	≤ 0.32	≤ 0.35	≤ 0.35
	1383 nm	dB/km	≤ 0.33	≤ 0.32	≤ 0.35	≤ 0.35
	1550 nm	dB/km	≤ 0.20	≤ 0.20	≤ 0.21	≤ 0.21
	1625 nm	dB/km	≤ 0.22	≤ 0.22	≤ 0.23	≤ 0.23
Attenuation maximum (in cable)	1310 nm	dB/km	≤ 0.40	≤ 0.40	≤ 0.40	≤ 0.40
	1383 nm	dB/km	≤ 0.40	≤ 0.40	≤ 0.40	≤ 0.40
	1550 nm	dB/km	≤ 0.25	≤ 0.25	≤ 0.25	≤ 0.25
	1625 nm	dB/km	≤ 0.25	≤ 0.25	≤ 0.25	≤ 0.25
Cable cut-off wavelength λcc	standard	nm	≤ 1260	≤ 1260	≤ 1260	≤ 1260
Chromatic dispersion	1285 – 1330 nm	ps/nm × km	≤ 3.50	≤ 3.50	≤ 3.50	≤ 3.50
	1550 nm	ps/nm × km	≤ 18	≤ 18	≤ 18	≤ 18
Zero dispersion wavelength λo			1300 – 1324	1300 – 1324	1300 – 1324	1300 – 1324
Zero dispersion slope S0 at λo			≤ 0.092	≤ 0.092	≤ 0.092	≤ 0.092
Polarisation mode dispersion	link value	ps/√km	≤ 0.06	≤ 0.04	≤ 0.06	≤ 0.06
	individual	ps/√km	≤ 0.20	≤ 0.10	≤ 0.20	≤ 0.20
Mode-field diameter	1310 nm	µm	9.2 ± 0.4	9.2 ± 0.4	8.4 – 9.5	8.2 – 9.5
	1550 nm	µm	10.3 ± 0.4	10.3 ± 0.4	9.3 – 10.5	9.2 – 10.5
Group index of refraction typical	1310 nm		1.466	1.466	1.466	1.466
	1550 nm		1.467	1.467	1.467	1.467
Macrobending loss r = 5.0 mm, 1 turn	1550 nm	dB	–	–	–	≤ 0.15
	1625 nm	dB	–	–	–	≤ 0.45
Macrobending loss r = 7.5 mm, 1 turn	1550 nm	dB	–	–	≤ 0.50	≤ 0.08
	1625 nm	dB	–	–	≤ 1.0	≤ 0.25
Macrobending loss r = 10 mm, 1 turn	1550 nm	dB	–	≤ 0.75	≤ 0.1	≤ 0.03
	1625 nm	dB	–	≤ 1.50	≤ 0.2	≤ 0.1
Macrobending loss r = 15 mm, 10 turn	1550 nm	dB	–	≤ 0.10	≤ 0.03	≤ 0.02
	1625 nm	dB	–	≤ 0.50	≤ 0.1	≤ 0.05

Single-mode fibers used for preterminated indoor cables fulfil standard ITU-T G.652.D and ITU-T G.657.A1.

[1)] For cables with semi-tight and tight tubes: 1310 nm ≤ 0.40 dB/km
1550 nm ≤ 0.30 dB/km
1625 nm ≤ 0.50 dB/km

Geometrical characteristics

		E9/125	E9/125 A1	E9/125 A2	E9/125 A3
Cladding diameter	µm	125 ± 0.7			
Coating diameter (uncoloured)	µm	242 ± 7			
Concentricity error core/cladding	µm	≤ 0.5			
Concentricity error cladding/coating	µm	≤ 12.0			
Cladding non-circularity	%	≤ 0.7			
Coating non-circularity	%	≤ 5			

Mechanical and environmental characteristics

			E9/125	E9/125 A1	E9/125 A2	E9/125 A3
Coating material			acrylate			
Tensile proof test (fiber elongation ≤ 1 %)		N (kpsi)	≥ 8.8 (100)			
Operation temperature range −60 to 85 °C	1310, 1550 and 1625 nm	Δ dB/km	≤ 0.05			
Water immersion 23 °C for 30 days	1310, 1550 and 1625 nm	Δ dB/km	≤ 0.05			

Specifications

Standards	**E9/125** – ITU-T G.652.D – IEC 60793-2-50 B-652.D – DIN VDE 0888 Part 3	**E9/125 A1** – ITU-T G.657.A1 – IEC 60793-2-50 B-657.A1	**E9/125 A2** – ITU-T G.657.A2 – IEC 60793-2-50 B-657.A2	**E9/125 A3** – ITU-T G.657.B3 – IEC 60793-2-50 B-657.B3

Specification multimode fiber

G50/125/245 µm

Optical characteristics multimode fiber

Fiber class				**G50/125**			
Fiber class available by H+S				OM2 standard	OM3 F	OM4 G	OM5*) H
Bandwidth (overfilled launch) min.		850 nm	MHz × km	500	1500	3500	3500
		1300 nm	MHz × km	500	500	500	500
1 Gigabit Ethernet 1000BASE –	SX	850 nm	m	500	1000	1500	
	LX	1300 nm	m	550	550	550	
10 Gigabit Ethernet 10GBASE	SX	850 nm	m	–	300	550	
	LX4	1300 nm	m	–	300	300	
Bending loss at 850/1300 nm	r =	37,5 mm	dB	0.1/0.2 [1)]			
	r =	15,0 mm	dB	0.1/0.3 [1)]			
	r =	7,5 mm	dB	0.2/0.5 [1)]			
Attenuation typical (in cable)		850 nm	dB/km	2.3			
		1300 nm	dB/km	0.5			
Attenuation maximum (in cable)		850 nm	dB/km	≤ 2.7			
		1300 nm	dB/km	≤ 1.0			
Effective group index of refraction		850 nm		1.482			
		1300 nm		1.477			
Numerical aperture				0.200 ± 0.015			

*) With specified fiber parameters for wave length multiplexing between 850 nm and 950 nm.
1) OM2, OM3, OM4 and OM5 BendOptimised is a HUBER+SUHNER standard

Geometrical characteristics

Fiber class		G50/125			
		OM2	OM3	OM4	OM5
Core diameter	µm	50 ± 2.5			
Cladding diameter	µm	125 ± 1			
Coating diameter (uncoloured)	µm	242 ± 10			
Concentricity error core/cladding	µm	≤ 1.0			
Core non-circularity	µm	≤ 5			
Cladding non-circularity	%	≤ 1			
Coating non-circularity	%	≤ 5			

Mechanical and environmental characteristics

Fiber class		G50/125			
		OM2	OM3	OM4	OM5
Coating material		acrylate			
Tensile proof test at fiber elongation ≤ 1 %	N (kpsi)	≥ 8.8 (100)			
Temperature range max. Δ 0.1 dB/km 850/1300 nm	°C	−60 bis +85			
Water immersion max. Δ 0.2 dB/km 850/1300 nm		23 °C more than 30 days			

Specifications

Fiber class	G50/125			
	OM2	OM3	OM4	OM5
Standards [1]	ITU-T G.651.1 IEC 60793-2-10			
	A1-OM2b	A1-OM3b	A1-OM4b	A1-OM5b

[1] The suffix „a“ (e.g. A1-OM2a) specifies fibers with traditional macrobund loss performance levels; the suffix „b“ (e.g. A1-OM3b) specifies fibers with enhanced macrobund loss performance levels.

Specification multimode fiber

G62.5/125/245 µm

Optical characteristics multimode fiber

Fiber class				**G62.5/125**	
				OM1	**OM2**
				standard	D
Bandwidth (overfilled launch) min.		850 nm	MHz × km	200	500
		1300 nm	MHz × km	500	500
1 Gigabit Ethernet 1000BASE –	SX	850 nm	m	275	550
	LX	1300 nm	m	550	550
Attenuation typical (in cable)		850 nm	dB/km	2.6	
		1300 nm	dB/km	0.5	
Attenuation maximum (in cable)		850 nm	dB/km	≤ 3	
		1300 nm	dB/km	≤ 1.0	
Effective group index of refraction		850 nm		1.496	
		1300 nm		1.491	
Numerical aperture				0.275 ± 0.015	

Geometrical characteristics

Fiber class		G62.5/125	
		OM1	OM2
Core diameter	µm	62.5 ± 3	
Cladding diameter	µm	125 ± 2	
Coating diameter (uncoloured)	µm	245 ± 10	
Concentricity error core/cladding	µm	≤ 1.5	
Core non-circularity	µm	≤ 6	
Cladding non-circularity	%	≤ 1	
Coating non-circularity	%	≤ 6	

Mechanical and environmental characteristics

Fiber class		G62.5/125	
		OM1	OM2
Coating material		acrylate	
Tensile proof test at fiber elongation ≤ 1 %	N (Kpsi)	≥ 8.8 (100)	
Temperature range max. Δ 0.1 dB/km 850/1300 nm	°C	−60 to +85	
Water immersion max. Δ 0.2 dB/km 850/1300 nm		23 °C more than 30 days	

Specifications

Fiber class	G62.5/125	
	OM1	OM2
Standards	IEC 60793-2-10 A1-OM1	—

Specification multimode fiber

H200/230/500 µm

Optical characteristics multimode step index fiber (HCS)

Fiber class			**H200/230/500 µm**
Bandwidth (overfilled launch)	850 nm	MHz × km	≥ 20
Attenuation typical (in cable)	850 nm	dB/km	5
Attenuation maximum (in cable)	850 nm	dB/km	10
Numerical aperture			0.37 ± 0.02

Geometrical characteristics

Fiber class		**H200/230/500 µm**
Core diameter	µm	200 ± 4
Cladding diameter	µm	230 + 0/–10
Coating diameter (uncoloured)	µm	500 ± 30
Concentricity error core/cladding	µm	≤ 5

Mechanical and environmental characteristics

Fiber class		**H200/230/500 µm**
Coating material		Tefzel
Tensile proof test at a fiber elongation of ≤ 1 %	N (Kpsi)	≥ 8.8 (100)
Operation temperature range max. Δ 0.1 dB/km 850/ 1300 nm	°C	–65 bis +125

Specifications

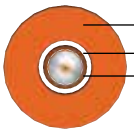
Fiber class	**H200/230/500 µm**
Standards	IEC 60793-2-30 A3c

Specification Single-mode OptiRibbon

Conditions			**E9A2R**
Standards according ITU-T			G.657.A2
Attenuation typical (in cable)	1310 nm	dB/km	≤ 0.4
	1383 nm	dB/km	≤ 0.4
	1550 nm	dB/km	≤ 0.3
	1625 nm	dB/km	≤ 0.34
Attenuation maximum (in cable)	1310 nm	dB/km	≤ 0.35
	1383 nm	dB/km	≤ 0.35
	1550 nm	dB/km	≤ 0.4
	1625 nm	dB/km	≤ 0.55
Cable cut-off wavelength λcc	Standard	nm	≤ 1260
Chromatic dispersion	1285 – 1330 nm	ps/nm × km	≤ 3.50
	1550 nm	ps/nm × km	≤ 18
Zero dispersion wavelength λo			1300 – 1324
Zero dispersion slope S0 at λo			≤ 0.092
Polarisation mode dispersion	link value	ps/√km	≤ 0.20
	individual	ps/√km	≤ 0.20
Mode-field diameter	1310 nm	µm	8.6
	1550 nm	µm	9.3-10.5
Group index of refraction typical	1310 nm		1.466
	1550 nm		1.467
Macrobending loss r = 5.0 mm, 1 turn	1550 nm	dB	-
	1625 nm	dB	-
Macrobending loss r = 7.5 mm, 1 turn	1550 nm	dB	≤ 0.50
	1625 nm	dB	≤ 1.0
Macrobending loss r = 10 mm, 1 turn	1550 nm	dB	≤ 0.1
	1625 nm	dB	≤ 0.2
Macrobending loss r = 15 mm, 10 turn	1550 nm	dB	≤ 0.03
	1625 nm	dB	≤ 0.1

Terms and definitions

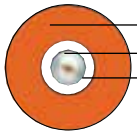
CH-tube (semi-tight tube) without jelly 0.9 mm
Standard tube for pigtails



tube Ø 0.9 mm
coloured fiber 250 µm
dry

Features
- Easiest stripping up to 2 m
- No cleaning (jelly-free)
- No memory effect
- High kink resistance

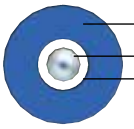
CW-tube (semi-tight tube) jelly-filled 0.9 mm
Standard tube for simplex, duplex and breakout cables



tube Ø 0.9 mm
fiber 245 µm
jelly filling

Features
- Easiest stripping up to 1 m
- Good thermal and mechanical features
- High flexibility
- Small bending radius

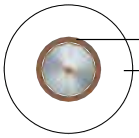
F-tube (tight tube) 0.9 mm
For various cable designs, e.g. riser, drag chain



tube Ø 0.9 mm
fiber 245 µm
buffer layer Ø 400 µm

Features
- Mechanically rugged
- Easy stripping approx. 30 mm
- Wide temperature range

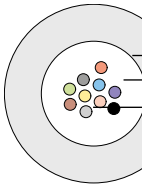
V-tube (tight buffered tube) 0.6 mm



coloured fiber 250 µm
acrylate layer Ø 600 µm

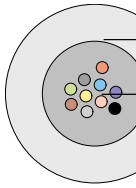
Features
- Easy stripping approx. 30 mm
- Wide temperature range

BQ Mini-multi-fiber loose tube, dry/jelly-free cable



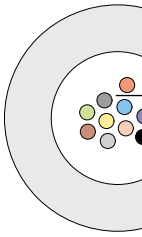
tube Ø 2.2 mm
dry
2 to 12 coloured fibers

BW Mini-multi-fiber loose tube, jelly-filled



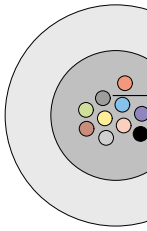
tube Ø 2.2 mm
jelly
2 to 12 coloured fibers

Q Multi-fiber loose tube, dry/jelly-free cable

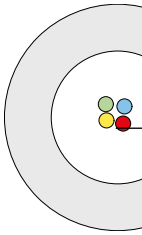


tube Ø 2.8 mm
dry
2 to 24 coloured fibers

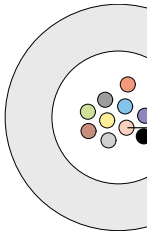
W Multi-fiber loose tube, jelly-filled



tube Ø 2.8 mm
jelly
2 to 24 coloured fibers



MH – Micro tube
tube Ø 1.25 mm or Ø 1.75 mm
dry
up to 24 coloured fibers



EW – Flexible loose tube
tube Ø 3.0 mm
jelly
2 to 12 coloured fibers

Cable jacket materials

Designation	Polyolefine flame retardant	Polyethylene	Polyurethane flame retardant	Polyurethane	Polybutylenterephtalate	Thermoplastic elastomer	Cross-linked thermoplastic
Abbreviation	LSFH™	LDPE	PUR/TPU	PUR/TPU	PBT	TPE	RADOX®
HUBER+ SUHNER code	H	Y	U	Z	N	X	R

Combustion properties

halogen-free	yes	yes	yes	yes	yes	yes	yes
Flame retardant	yes	no	yes	no	no	no	yes
Smoke emission	low	low	strong	strong	strong	medium	low
Corrosive gases	low	no	low	low	no	no	no

Mechanical properties

Abrasion resistance	medium	good	good	good	good	good	medium
Flexibility	medium	low	high	high	low	medium	medium
Hardness	medium	hard	soft	soft	hard	hard	soft

Resistance against

Oil/fuel [1]	good/ satisfactory [2]	good / satisfactory	satisfactory	good	good	good	very good
Water	good/ satisfactory [2]	very good	satisfactory	good	satisfactory	satisfactory	very good
Weathering [3]	good	very good	good	very good	satisfactory	good	very good

Information given in this table is based on plastic materials used for cable jackets. Properties and resistance for cables cannot be derived from it.

[1] This information is meant as decision guidance to the best of our today's knowledge, it is based on typical values. The resistance of cables has to be verified due to the wide variety of oils and fuels.
[2] Depending on the cable design different types of LSFH™ materials are used for the cable jacket.
[3] The UV resistance depends highly on the colour of the plastic used, black offers the best resistance.

HUBER+SUHNER cable code

XXX–										total number of optical fibers in cable, always indicated with two or three digits
	1-24									1 to 24 optical fibers per multifiber loose tube
		E9/								single-mode fiber 9/125/245 µm
		E9A2/								single-mode fiber low bend 9/125/245 µm A2
		E9A2S/								single-mode fiber low bend 9/125/200 µm A2
		E9A3/								single-mode fiber low bend 9/125/245 µm A3
		G50/								multimode fiber 50/125/250 µm
		G62/								multimode fiber 62.5/125/250 µm
		H200/								step-index fiber HCS 200/230/500 µm
		R								Flex Ribbon
		SR								Flex Ribbon with 200 µm SMF
			F							tight tube 0.9 mm
			V							tight tube up to 0.6 mm
			CW							semi-tight tube 0.9 mm, jelly-filled
			CH							semi-tight tube 0.9 mm, dry or empty tube
			W							multifiber loose tube, jelly-filled Ø 2.80 mm
			Q							multifiber loose tube, jelly-free – dry block Ø 2.80 mm
			BW							mini multifiber loose tube, jelly-filled Ø 2.20 mm
			BQ							mini multifiber loose tube, jelly-free – dry block Ø 2.20 mm
			EW							flexible loose tube jelly-filled
			MW							micro multifiber loose tube, jelly-filled
			MH							micro multifiber loose tube, jelly-free
			MQ							micro multifiber loose tube, jelly-free, dry block
				J						strain relief for each separate optical fiber
				SN						central strength member, non-metallic
					DN					decentralised strength member, non-metallic
					(ZN)					strain-relief, non-metallic (aramide)
					(ZNG)					glass roving for strain relief/rodent protection
						A–				steel wire armouring
						H–				outer jacket material LSFH™
						R–				beam crosslinked (RADOX®)
						I–				mica tape (flame barrier)
						K–				anti-termite
						U–				outer jacket material PUR, flame retardant (FR)
						V–				outer jacket material PE (HD-PE)
						X–				outer jacket material TPE
						Y–				outer jacket material PE (LD-PE)
						Z–				outer jacket material PUR
						L–				anti–rodent
						A				outer jacket figure 0
							Δ			colour of outer jacket please refer to cable colour chart
								XX		diameter of the cable (1/10 mm)
									–xx	options 1 to 5, see next page
02– 48–	 12	G50/ E9/	CW BQ	J SN	 (ZNG)	H– H–	M G	27 96	–F	example I example II

HUBER+SUHNER cable code

Rules

- For cables where each 0.6 or 0.9 mm tube is individually strain relieved (code = J) , the termination diameter is specified. For cables where all tubes have a common strain relief (code = ZN or ZNG) the cable diameter is specified. By individual and common strain relief in the same cable, the termination diameter gets specified.
- The fiber colour is only indicated if not standard
- All options follow the basic code:
  basic key – 1st – 2nd – 3rd – 4th option
- The cable code has no spaces
- Items not used are left out

FFiber and cable colours Δ	
A	red
B	green
C	blue
D	orange
E	yellow
F	white
G	black
H	grey
I	brown
K	violet
L	heather violet
M	turquoise
N	light blue
O	ochre-brown
P	purple
Q	yellow-green
R	olive-green
S	lime green
T	transparent
U	nature (milky or beige)
Y	pink
Z	black with orange stripes

1st option: fiber class or bandwidth length-product MHz × km, 850/1300 nm		
	G50	G62
Standard without indication	OM2	OM1
-D		OM2: 500/500
-E	OM2: 600/1200	
-F	OM3: 1500/500	
-G	OM4: 3500/500	
-H	OM5 : 3500/500	

Classes please see under section «fiber types»

2nd option: fiber colour	
-FΔ	fiber colours refer to fiber colour chart (1 to 12)
-FΔG	fiber colours with ring mating (13 to 24)

3rd option: special information	
-UN	UL–listed OFNG: General purpose UL1685
-UR	UL–listed OFNR: Riser cable UL1666
-UP	UL–listed OFNP: Plenum cable UL910

4th option: electrical elements (hybrid cable)			
+XX-			number of conductors respectively units
	C		electrical conductor, copper cords
		XX	conductor cross section (1/10 mm^2)
+02-	C	15	example

5th option: CPR classification	
#B	Main class B2ca
#C	Main class Cca
#D	Main class Dca
#E	Main class Eca
#F	Main class Fca

DIN/VDE 0888 cable code

Application	A	outdoor cable
	AT	divideable outdoor cable
	I	indoor cable
	U	universal cable
Tube type	B	loose tube jelly-free
	D	loose tube with jelly
	F	fiber
	H	loose tube jelly-free and 1 fiber
	V	tight tube (acc. vde)
	W	loose tube with jelly and 1 fiber
Cable design	B	corrugated steel
	Q	dry and longitudinal watertight
	(ZN)	strain-relief non-metallic
	(ZS)	strain-relief with steel
	I	mica tape/flame barrier
	(SR)	overlapping steel grooved belt
Jacket material	H	acc. LSFH (FRNC, LSOH etc.)
	R	RADOX
	Y	PVC, polyvinylchlorid
	2Y	PE, polyethylene
	4Y	PA, polyamide
	11Y	PUR, polyurethane, rubber-like e.g. for drag chain
Quantity of fiber resp. tube	n	amount of fiber
	n × m	amount of loose tube × amount of fiber per tube
Fiber type	E	single-mode fiber (glass/glass)
	G	multimode graded index fiber (glass/glass)
	S	multimode step index fiber (glass/glass)
	K	PCF, multimode step index fiber (glass/plastic)
	GK	PCF, multimode graded index fiber (glass/plastic)
	P	POF, plastic fiber (plastic/plastic)
Core diameter	µm	diameter (e.g. 9, 50, 62.5, 200, ...)
Cladding diameter	µm	diameter (e.g. 125, 230, ...)
Attenuation	dB/km	attenuation at wave length
Wave length	A	650 nm
	B	850 nm
	F	1300 nm
	H	1550 nm
Bandwidth	MHz × km	bandwidth with MM fibers (POF MHz × 100 m)
	ns/km	at SM fibers also ps/nm × km

Colour codes

Colour code for fiber
according to standard

Number	Swisscom [1] **(H+S standard)**	DIN [2] / IEC 60304	**ANSI/TIA-598**	IEC [3]
1	red	red	blue	blue
2	green	green	orange	yellow
3	yellow	blue	green	red
4	blue	yellow	brown	white
5	white	white	gray	green
6	violet	gray	white	violet
7	orange	brown	red	orange
8	black	violet	black	gray
9	gray	turquoise	yellow	turquoise
10	brown	black	violet	black
11	heather violet	orange	heather violet	brown
12	turquoise	heather violet	turquoise	heather violet

Multifiber loose tube up to 24 fibers, fiber number 13 to 24 with black rings.

Note: Orders of fiber optic cables with different fiber types (combination SM/MM):
unless otherwise specified, the first colours of the colour code are assigned to the smaller fiber type.
Example of a cable with 4xE9, 8xG50: red, green, yellow, blue = E9 fiber, remaining colours = G50 fiber

Stranding
according to Swisscom [1]

Multifiber loose tube elements

1	red
2	green
3	weiss 1
4	white 2
5	white 3
...	... etc.
dummies	black

Semi-tight tubes 0.9 mm according to HUBER+SUHNER [1]

E9/125	yellow
G50/125	orange
G62/125	blue
G50/125 OM3	turquoise
G50/125 OM4	heather violet
G50/125 OM5	lime green

Inscription
standard according to HUBER+SUHNER

xxxxxxxx zzzzzz/yy
HUBER+SUHNER FIBEROPTIC . x ... [m] 000000

xxxxxxxx	item number (8 digits)
zzzzzz	production number (7 digits)
yy	production year
. × ...	amount of fibers × fiber type
00000 m	consecutive numbering

Single-fiber cables according to HUBER+SUHNER [1]

E9/125	yellow
G50/125	orange
G62/125	orange
G50/125 OM3	turquoise
G50/125 OM4	heather violet
G50/125 OM5	lime green

[1] H+S standard, unless otherwise specified
[2] DIN VDE V 0888-100-1-1
[3] IEC 60794-2

Reel information

Plastic reels (Polypropylene)

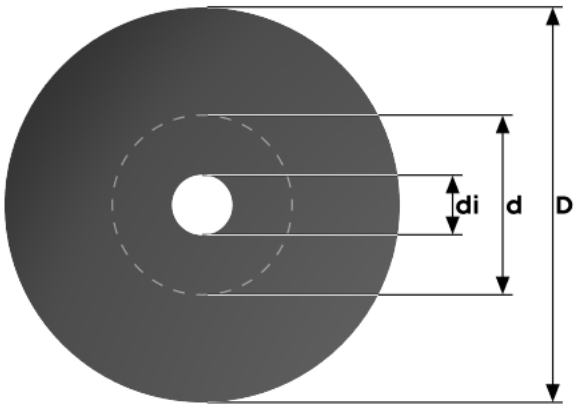
Reel designation	Flange-Ø D [mm]	Reel core-Ø d [mm]	Hole-Ø di [mm]	Width B[mm]	Reel weight [kg]
LWL 2	235	158	25.4	108	0.5
LWL 3	265	175	25.4	168	0.7
DIN 250	250	160	22.0	200	1.0
HS 400	395	180	60	185	1.5
HS 401	395	180	60	280	1.6
HS 600	595	350	80	500	7.5
HS 800	795	450	80	750	19.0
FO 1000	1000	500	80	780	28.5
FO 1200	1200	500	80	812	55.0

Plywood reels

Reel designation	Flange-Ø D [mm]	Reel core-Ø d [mm]	Hole-Ø di [mm]	Width B[mm]	Reel weight [kg]
Nr. 14	500	250	50	325	3.5
Nr. 15	700	312	82	422	8.2

Solid wood reels

Reel designation	Flange-Ø D [mm]	Reel core-Ø d [mm]	Hole-Ø di [mm]	Width B[mm]	Reel weight [kg]
LHL1400	1400	700	80	856	95



Conformity and certificate

RoHS conformity

The HUBER+SUHNER companies aim to comply with all relevant legal requirements at all time. This also holds true for the European Union Directive 2011/65/EU restriction of the use of certain hazardous substances in electrical and electronic equipment commonly referred to as the Restriction of Hazardous Substances Directive or RoHS. We are proud to state that we are able to supply components fully compliant with the RoHS directive.

This directive restricts the use of six hazardous materials: Lead (Pb), Mercury (Hg), Cadmium (Cd), hexavalent Chromium (Cr VI), and two types of brominated flame retardants, Polybrominated Biphenyls (PBB) and Polybrominated Diphenyl Ethers (PBDE) in the manufacture of various types of electronic and electrical equipment to reduce generation of toxic waste from discarded electrical and electronic equipment.

RoHS
compliant

ISO Certificate

High-quality products and supplier relationships have always been a top priority for HUBER+SUHNER. After having already been confirmed by the Swiss forerunner movement, the HUBER+SUHNER quality system was very soon acknowledged by the international ISO quality certificate. This much sought-after certificate according to ISO 9001, which must be earned over and over again, has been awarded to HUBER+SUHNER without interruption since 1990. The fact that HUBER+SUHNER is also prepared to meet specific customer quality standards exceeding those of ISO 9001 is amply proved by a large number of successfully passed customer audits.

ZERTIFIKAT ◆ CERTIFICATE ◆ 認證證書 ◆ СЕРТИФИКАТ ◆ CERTIFICADO ◆ CERTIFICAT

CERTIFICATE

Certificate Registration No.: **12 100/104 59758 TMS** / Order No.: **707110028**

The Certification Body
of TÜV SÜD Management Service GmbH
certifies that the organization

HUBER+SUHNER
HUBER+SUHNER AG
Degersheimerstr. 14
9100 Herisau
Switzerland

for the scope

Development, sales, distribution and manufacturing of cables, connectors, assemblies, antennas and systems as well as other passive and active components for electrical and optical connectivity for the industrial, communication and transportation markets

including the sites see enclosure

has established and applies
a Quality and Environmental Management System.

Performance of audits has furnished proof that these
management systems meet the requirements of the following standards:

DIN EN ISO 9001:2015
DIN EN ISO 14001:2015

The certificate is valid from **2023-12-07** until **2026-12-06**.

Fred Wenke
Head of Certification Body
Munich, 2023-11-29

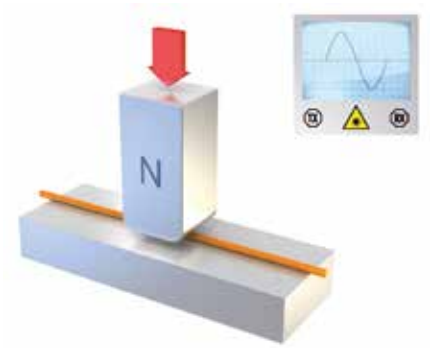
Page 1 of 5

Test procedures

Tensile performance

Examines the behaviour of the attenuation and/or the fiber elongation strain as a function of the load on a cable design which may occur during installation (short term load or maximum specified load for the cable) and operation (long term load). This method is intended to be non-destructive.

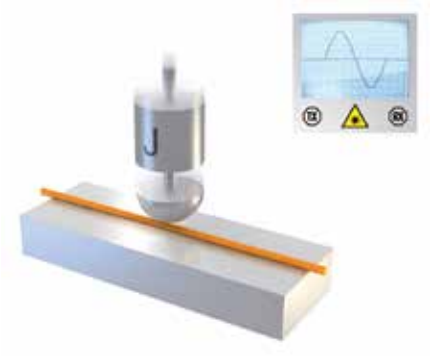
Standards: IEC 60794-1-21 E1 (former IEC 60794-1-2 E1)



Crush resistance

Examines the ability of an optical fiber cable to withstand crushing (transverse compression load) for long term (operation) and for short term (installation) loads. The load is uniformly applied on the cable sample.

Standards: IEC 60794-1-21 E3A (former IEC 60794-1-21 E3A)



Impact

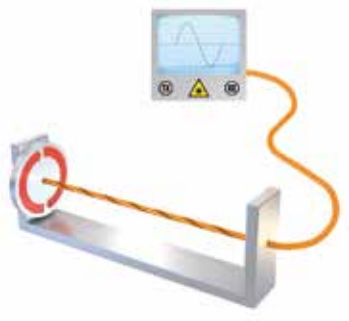
Examines the ability of an optical fiber cable to withstand impacts such as dropping of tools or stones.

Standards: IEC 60794-1-21 E4 (former IEC 60794-1-2 E4)

Repeated bending

Examines the ability of an optical fiber cable to withstand repeated bending. The stress occurs by repeated bending the cable back and forth by 90°.

Standards: IEC 60794-1-21 E6 (former IEC 60794-1-2 E6)



Torsion

Examines the ability of a fibre optic cable to withstand mechanical twisting. The primary purpose of this procedure is to measure any variation in the optical power transmittance of a fiber when the cable is subjected to external torsional forces. A secondary purpose is to evaluate the possibility of physical damage that may occur as a result of such stresses.

Standards: IEC 60794-1-21 E7 (former IEC 60794-1-2 E7)

Bend

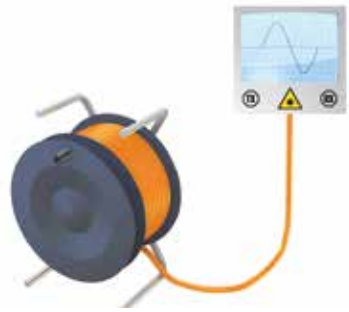
Examines the ability of an optical fiber cable or cable element to withstand bending around a test mandrel.

Standards: IEC 60794-1-111 E11A (succession IEC 60794-1-21 E11A and IEC 60794-1-2 E11A)

Kink

Examines the minimum loop diameter at the onset of the kinking of an optical fiber cable.

Standards: IEC 60794-1-21 E10 (former IEC 60794-1-2 E10)

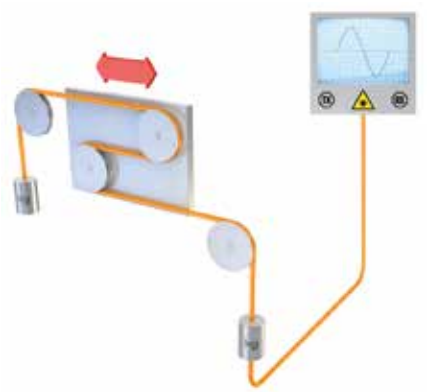


Coiling capability

Shows the ability of a fiber optic cable to withstand multiple coiling and uncoiling on a reel. The purpose is to measure variation of the optical power transmittance of a fiber and to evaluate possible physical damage when the cable is coiled and uncoiled on a reel.

Standards: IEC 60794-1-21 E33

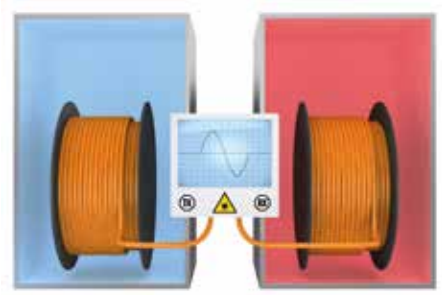
Test procedures



Flexing

Examines the ability of a fiber optic cable to withstand repeated flexing in service. The primary purpose of this procedure is to measure any variation in the optical power transmittance of a fiber when the cable is subjected to external bending and tensional forces. A secondary purpose is to evaluate the possibility of physical damage that may occur as a result of such stresses. This is a specialised test intended for specific types of cable, such as elevator cable or the like.

Standards: IEC 60794-1-21 E8 (former IEC 60794-1-2 E8)



Temperature cycling (change)

Long length cables
Examines the stability behaviour of the attenuation of cables submitted to temperature changes. Test conditions for temperature-dependent measurements simulate the worst conditions.

Standards: IEC 60794-1-201 F1
(succession IEC 60794-1-22 F1 and IEC 60794-1-2 F1)

Short length cables (i.e. cables for patchcords)
Examines the attenuation behaviour (change in attenuation) when optical fibre cables for use in patch cords are subjected to temperature cycling.

Standard: IEC 60794-1-212 F12
(succession IEC 60794-1-22 F12 and IEC 60794-2-50, AnnexE)

method A method B

Water penetration

Examines the ability of a cable to block water migration along a specified length.

Standards: IEC 60794-1-22 F5A/B/C (former IEC 60794-1-2 F5A/B)

Ageing

Examines the lifetime behaviour of the attenuation of cables, or physical attributes specified in the detail specification.

Standards: IEC 60794-1-22 F9 (former IEC 60794-1-2 F9)

Fire propagation on a vertical single cable

Cables for information transmission inside buildings installed on the surface of walls are a potential source for fire propagation.
A 60 cm long cable is mounted vertically. The flame must extinguish itself and the fire damage must not reach the upper end of sample.

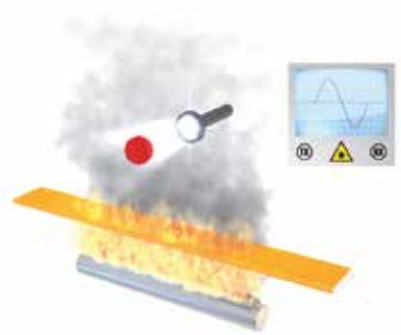
Standards: IEC 60332-1-2
(DIN VDE 0472-804B)
(VDE 0482-265)

Fire propagation on a vertical cable bundle

Depending on the volume of flammable material the cable bundles are fixed on a 3.5 m long ladder and a test flame is applied at the base during 20 minutes. The height of fire damage must not exceed 2.5 m. This simulates a simplified chimney effect in a cable duct. Cables which pass this test have a improved characteristics regarding fire propagation.

Standards: IEC 60332-3-*
(DIN VDE 0472-804C)
(VDE 0482-332...)

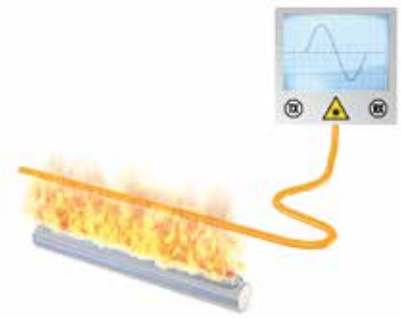
*Part (category)	Volume of combustible material [l/m]	Flame application time [min]
-22 (A)	7.0	40
-23 (B)	3.5	40
-24 (C)	1.5	20
-25 (D)	0.5	20



Smoke emission

In a defined test environment the cable is exposed to an open fire of burning alcohol. The smoke density is determined with an optical transmission measurement. This test allows a statement of the expected line-of-sight obstruction in case of fire.

Standards: IEC 61034-2
(DIN VDE 0472-816)
(DIN VDE 0482-268)



Fire test with circuit integrity

A test fire is applied horizontally from a distance of 60 cm to a single suspended cable during a specified time. The test is passed when there was continuous circuit integrity and no extremely increased attenuation values during and after the test respectively. For instance FE 90 cables have endured at least 90 minutes, «FE» stands for flame exposure.
This fire test shows the functional integrity duration (minutes) of a mechanically unloaded connection with a flame exposure of minimum 750 °C in a dry environment.

Standards: IEC 60331-25
DIN VDE 0472-814

Test procedures

Measurement of the heat release and smoke production during the flame spread test

The cable bundles will be secured to a 3.5 m ladder to suit the quantity of inflammable material. A test flame acts on the lower end of the cable samples for 20 minutes. The following parameters are measured:

- Smoke production
- Flaming droplets
- Heat release rate
- Total heat release
- Fire growth rate
- Flame spread

The main class and parts of the additional classes are dependent on the measured parameters.

Standard: EN 50399

Fire with shock, circuit integrity

In addition to the fire test with circuit integrity, a test flame is applied to a specified test layout and the cable is exposed to mechanical impacts at regular intervals.
This test simulates how many minutes a cable exposed to fire of at least 830 °C and mechanical impacts keeps minimum insulation efficiency (circuit integrity) in a dry environment.

Standards: IEC 60331-2 (former IEC 60331-31)

Corrosive fire gases and free of halogen

Flammable materials are combusted at over 900 °C. Resulting fire gases are washed out in water bottles and the corrosivness of this solution is determined by means of ph-values and electric conductivity.
Halogen-free products contain hardly any elements of fluorine, chlorine, bromine or jodine. Materials containing halogen can release a considerable quantity of corrosive gases. These gases can cause consequential damage to the surrounding area as well as respiratory problems.

Standards: IEC 60754-1/60754-2
(DIN VDE 0472-813)
(VDE 0482-267)
DIN VDE 0472-815

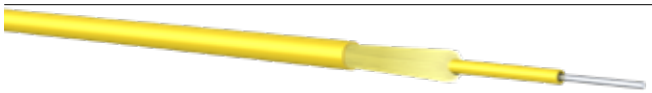
Construction Products Regulation (CPR)

The Construction Products Regulation[1]) defines uniform classification for all cables permanently installed within anytype of building or structure and regulates the conditions for the placing or making available on the European market.

Class	Classification / Test methods	Additional classifications / Test methods					
Aca	Heat of combustion (EN ISO 1716)	—					
B1ca	Heat release, flame spread (EN 50399, EN 60332-1-2)	s1a s1b s1 s2 s3	Smoke production (EN 50399, EN 61034-2)	d0 d1 d2	Flaming droplets (EN 50399)	a1 a2 a3	Acidity (EN 60754-2)
B2ca							
Cca							
Dca							
Eca	Flame spread (EN 60332-1-2)	—					
Fca	does not meet Eca	—					

[1]) Regulation (EU) No. 305/2011 of the European Parliament and of the Council of 9 March 2011 laying down harmonised conditions for the marketing of construction products and repealing Council Directive 89/106/EEC

CPR products

Simplex cable	Product	Reaction to fire				Catalogue page
						
1.7mm simplex cable LSFH material with 0.9mm semi-tight tube (CW-tube)	01-.../CWJH-..17	Dca	s1a	d0	a1	52
2.0 mm simplex cable LSFH material with 0.9mm semi-tight tube (CW-tube)	01-.../CWJH-...20	Dca	s1a	d0	a1	52
2.4 mm simplex cable LSFH material with 0.9mm semi-tight tube (CW-tube)	01-.../CWJH-...24	Dca	s1a	d0	a1	52
2.7 mm simplex cable LSFH material with 0.9mm semi-tight tube (CW-tube)	01-.../CWJH-...27	Dca	s1a	d0	a1	52
3.0 mm simplex cable LSFH material with 0.9mm semi-tight tube (CW-tube)	01-.../CWJH-...30	Dca	s1a	d0	a1	n/a
1.9 mm simplex cable LSFH material with 0.9mm semi-tight tube (CH-tube)	01-.../CHJH-...19	Dca	s1	d0	a1	54
1.9 mm simplex cable LSFH material with 0.6mm tight tube (V-tube)	01-.../VJH-...19	B2ca	s1a	d0	a1	56
2.0 mm simplex cable LSFH material with 0.9mm tight tube (F-tube)	01-.../FJH-...20	Dca	s1a	d0	a1	n/a
2.7 mm simplex cable LSFH material with 0.9mm tight tube (F-tube)	01-.../FJH-...27	Dca	s1a	d0	a1	n/a

Duplex cable	Product	Reaction to fire				Catalogue page
1.7mm duplex fig.8 LSFH material with 0.9mm semi-tight tube (CW-tube)	02-.../CWJH-...17	Dca	s1a	d0	a1	56
2.0 mm duplex fig.8 LSFH material with 0.6mm tight tube (V-tube)	02-.../VJH-...20	B2ca	s1	d0	a1	58
2.0 mm duplex fig.8 LSFH material with 0.9mm semi-tight tube (CW-tube)	02-.../CWJH-...20	Dca	s1a	d0	a1	56
2.7mm duplex fig.8 LSFH material with 0.9mm semi-tight tube (CW-tube)	02-.../CWJH-...27	Dca	s1a	d0	a1	56
2.0 mm duplex fig.0 LSFH material with 0.9mm semi-tight tube (CW-tube)	02-.../CWJH-A...20	Dca	s1a	d0	a1	60
2.7mm duplex fig.0 LSFH material with 0.9mm semi-tight tube (CW-tube)	02-.../CWJH-A...27	Dca	s1a	d0	a1	60

Duplex round / Mini duplex round	Product	Reaction to fire				Catalogue page
2.1 mm Duplex round LSFH jacket with 0.6 mm tight tube	02-.../V(ZN)H-...21	Dca	s1a	d0	a1	62
2.1 mm Duplex round LSFH jacket with 0.6 mm tight tube	02-.../V(ZN)H-...21	B2ca	s1a	d0	a1	62
1.6 mm Mini duplex round LSFH jacket with 2 optical fibers	02-.../(ZN)H-...16	B2ca	s1a	d0	a1	64

Breakout cable	Product	Reaction to fire				Catalogue page
1.4 mm breakout cable LSFH jacket with 8 x 1.4 mm	08-.../VJSNH-...14	Dca	s1a	d0	a1	n/a
1.4 mm breakout cable LSFH jacket with 12 x 1.4 mm	12-.../VJSNH-...14	Dca	s2	d2	a1	66
1.4 mm breakout cable LSFH jacket with 16 x 1.4 mm	16-.../VJSNH-...14	Dca	s1a	d2	a1	66
1.4 mm breakout cable LSFH jacket with 18 x 1.4 mm	18-.../VJSNH-...14	Dca	s1a	d2	a1	n/a
1.4 mm breakout cable LSFH jacket with 24 x 1.4 mm	24-.../VJSNH-...14	Cca	s1a	d0	a1	66
2.0 mm breakout cable LSFH jacket with 4 x 2.0 mm	04-.../CWJSNH-...20	Dca	s1a	d0	a1	68
2.0 mm breakout cable LSFH jacket with 8 x 2.0 mm	08-.../CWJSNH-...20	Cca	s1a	d2	a1	68
2.0 mm breakout cable LSFH jacket with 12 x 2.0 mm	12-.../CWJH-...20	Cca	s1a	d2	a1	68
2.0 mm breakout cable LSFH jacket with 24 x 2.0 mm	24-.../CWJH-...20	Cca	s1a	d1	a1	68

FTTH / FITH indoor cable	Product	Reaction to fire				Catalogue page
2.3 mm mini-indoor cable LSFH jacket with 4 x E9 low bend	04-.../MH(ZN)H-...23	Dca	s1a	d0	a1	72
2.3 mm mini-indoor cable LSFH jacket with 4 x E9 low bend	04-.../MH(ZN)H-...23	Cca	s1a	d0	a1	72
2.3 mm mini-indoor cable LSFH jacket with 1 x E9 low bend	01-.../MH(ZN)H-...23	B2ca	s1a	d0	a1	74
2.3 mm mini-indoor cable LSFH jacket with 2 x E9 low bend	02-.../MH(ZN)H-...23	B2ca	s1a	d0	a1	74
2.3 mm mini-indoor cable LSFH jacket with 4 x E9 low bend	04-.../MH(ZN)H-...23	B2ca	s1a	d0	a1	74
2.3 mm mini-indoor cable LSFH jacket with 6 x E9 low bend	06-...S/MH(ZN)H-...23	B2ca	s1a	d0	a1	74
2.8 mm mini-indoor cable LSFH jacket with 12 x E9 low bend	12-.../MH(ZN)H-...28	B2ca	s1a	d0	a1	76
2.8 mm mini-indoor cable LSFH jacket with 24 x E9 low bend	24-...S/MH(ZN)H-...28	B2ca	s1a	d0	a1	76
2.8 mm mini-indoor cable LSFH jacket with 4 x E9 low bend 0.6 mm	04-.../V(ZN)H-...28	Dca	s1a	d0	a1	78
2.7 mm simplex cable LSFH jacket with 1 x E9 low bend 0.9 mm semi-tight tube	01-.../CWJH-...27	Dca	s1a	d0	a1	80

Optipack simplex; harness cable for MPO / MTP®	Product	Reaction to fire				Catalogue page
2.0 mm multifiber patch cable LSFH jacket with 12 optical fibers	12-.../(ZN)H-...20	Dca	s1a	d0	a1	82
3.0 mm multifiber patch cable LSFH jacket with 12 optical fibers	12-.../(ZN)H-...30	Dca	s1a	d0	a1	82
3.0 mm multifiber patch cable LSFH jacket with 24 optical fibers	24-.../(ZN)H-...30	Dca	s1a	d0	a1	82
3.6 mm multifiber patch cable LSFH jacket with 24 optical fibers	24-.../(ZN)H-...36	Dca	s1a	d0	a1	82

CPR products

Optipack DJ; ruggedised harness cable for MPO / MTP®	Product	Reaction to fire				Catalogue page
2.0 mm multifiber patch cable LSFH jacket with 12 optical fibers	12-.../(ZN)HH-...20	Cca	s1a	d0	a1	84
2.0 mm multifiber patch cable LSFH jacket with 12 optical fibers	12-.../(ZN)HH-...20	B2ca	s1a	d0	a1	84
3.0 mm multifiber patch cable LSFH jacket with 24 optical fibers	24-.../(ZN)HH-...30	B2ca	s1a	d0	a1	84
3.0 mm multifiber patch cable LSFH jacket with 24 optical fibers	24-.../(ZN)HH-...30	Cca	s1a	d0	a1	84

Optipack breakout; trunk cable for MPO/MTP	Product	Reaction to fire				Catalogue page
Optipack breakout 2.0 mm LSFH jacket up to 4 x 12 optical fiber	48-12.../(ZN)SNH-...20	B2ca	s1a	d0	a1	92
Optipack breakout 2.0 mm LSFH jacket up to 4 x 12 optical fiber	48-12.../(ZN)SNH-...20	Cca	s1a	d0	a1	92
Optipack breakout 2.0 mm LSFH jacket up to 6 x 12 optical fiber	72-12.../(ZN)SNH-...20	B2ca	s1a	d0	a1	92
Optipack breakout 2.0 mm LSFH jacket up to 6 x 12 optical fiber	72-12.../(ZN)SNH-...20	Cca	s1a	d0	a1	92
Optipack breakout 2.0 mm LSFH jacket up to 8 x 12 optical fiber	96-12.../(ZN)SNH-...20	B2ca	s1a	d0	a1	92
Optipack breakout 2.0 mm LSFH jacket up to 8 x 12 optical fiber	96-12.../(ZN)SNH-...20	Cca	s1a	d0	a1	92
Optipack breakout 2.0 mm LSFH jacket up to 12 x 12 optical fiber	144-12.../(ZN)SNH-...20	B2ca	s1a	d0	a1	92
Optipack breakout 2.0 mm LSFH jacket up to 12 x 12 optical fiber	144-12.../(ZN)SNH-...20	Cca	s1a	d0	a1	92
Optipack breakout 3.0 mm LSFH jacket up to 4 x 12 optical fiber	48-12.../(ZN)SNH-...30	B2ca	s1a	d0	a1	n/a
Optipack breakout 3.0 mm LSFH jacket up to 12 x 12 optical fiber	144-12.../(ZN)SNH-...30	B2ca	s1b	d0	a1	n/a
Optipack breakout 3.0 mm LSFH jacket up to 4 x 24 optical fiber	96-24.../(ZN)SNH-...30	B2ca	s1a	d0	a1	94
Optipack breakout 3.0 mm LSFH jacket up to 4 x 24 optical fiber	96-24.../(ZN)SNH-...30	Cca	s1a	d0	a1	94
Optipack breakout 3.0 mm LSFH jacket up to 6 x 24 optical fiber	144-24.../(ZN)SNH-...30	B2ca	s1a	d0	a1	94
Optipack breakout 3.0 mm LSFH jacket up to 6 x 24 optical fiber	144-24.../(ZN)SNH-...30	Cca	s1a	d0	a1	94
Optipack breakout 3.0 mm LSFH jacket up to 12 x 24 optical fiber	288-24.../(ZN)SNH-...30	B2ca	s1a	d0	a1	94
Optipack breakout 3.0 mm LSFH jacket up to 12 x 24 optical fiber	288-24.../(ZN)SNH-...30	Cca	s1a	d0	a1	94

Optipack breakout universal; trunk cable for MPO/MTP	Product	Reaction to fire				Catalogue page
Optipack universal 2.0 mm LSFH jacket up to 4 x 12 optical fiber	48-12.../(ZN)SN(ZNG)H-...20	Cca	s1a	d0	a1	100
Optipack breakout 2.0 mm LSFH jacket up to 6 x 12 optical fiber	72-12.../(ZN)SN(ZNG)H-...20	Cca	s1a	d0	a1	100
Optipack breakout 2.0 mm LSFH jacket up to 8 x 12 optical fiber	96-12.../(ZN)SN(ZNG)H-...20	B2ca	s1a	d0	a1	100
Optipack breakout 2.0 mm LSFH jacket up to 8 x 12 optical fiber	96-12.../(ZN)SN(ZNG)H-...20	Cca	s1a	d0	a1	100
Optipack breakout 2.0 mm LSFH jacket up to 12 x 12 optical fiber	144-12.../(ZN)SN(ZNG)H-...20	B2ca	s1a	d0	a1	100
Optipack breakout 2.0 mm LSFH jacket up to 12 x 12 optical fiber	144-12.../(ZN)SN(ZNG)H-...20	Cca	s1a	d0	a1	100
Optipack breakout 3.0 mm LSFH jacket up to 12 x 24 optical fiber	288-24.../(ZN)SN(ZNG) H-...30	B2ca	s1a	d0	a1	100
Optipack breakout 3.0 mm LSFH jacket up to 12 x 24 optical fiber	288-24.../(ZN)SN(ZNG) H-...30	Cca	s1a	d0	a1	100

Loose tube construction with rodent protection up to 24 optical fibers dry blocker jelly-free	Product	Reaction to fire				Catalogue page
Central loose tube cable 7.0 mm LSFH coloured up to 24 optical fibers (dry blocker)	24-24.../Q(ZNG)H-...70	Cca	s1a	d1	a1	104
Central loose tube cable 7.0 mm LSFH coloured up to 24 optical fibers (dry blocker)	24-24.../Q(ZNG)H-...70	Dca	s1a	d1	a1	104
Central loose tube cable 8.5 mm LSFH coloured up to 24 optical fibers (dry blocker)	24-24.../Q(ZNG)H-...85	Dca	s1a	d0	a1	106
Central loose tube cable 12.0 mm LSFH coloured up to 24 optical fibers (dry blocker)	24-24.../Q(ZNG)H-...120	B2ca	s1a	d0	a1	106
TWINTUBE loose tube cable 8.8 mm LSFH coloured up to 2 x 12 optical fibers jelly-free (dry blocker)	24-12.../BQ(ZNG)H-...88	Cca	s1a	d0	a1	108
TWINTUBE loose tube cable 9.4 mm LSFH coloured up to 2 x 12 optical fibers jelly-free (dry blocker)	48-24.../Q(ZNG)H-...94	Dca	s1a	d2	a1	108

Loose tube cable with rodent protection up to 144 optical fibers (stranded construction) dry blocker jelly-free	Product	Reaction to fire				Catalogue page
Stranded loose tube cable 10.0 mm LSFH up to 48 optical fibers dry blocker	48-.../BQSN(ZNG)H-...100	Cca	s1a	d0	a1	110
Stranded loose tube cable 9.6 mm LSFH up to 48 optical fibers dry blocker	48-.../BQSN(ZNG)H-...96	Dca	s1a	d0	a1	112
Stranded loose tube cable 11.0 mm LSFH up to 72 optical fibers dry blocker	72-.../BQSN(ZNG)H-...110	Cca	s1a	d0	a1	110
Stranded loose tube cable 10.6 mm LSFH up to 72 optical fibers dry blocker	72-.../BQSN(ZNG)H-...106	Dca	s2	d0	a1	112
Stranded loose tube cable 12.6 mm LSFH up to 96 optical fibers dry blocker	96-.../BQSN(ZNG)H-...126	Cca	s1a	d0	a1	110
Stranded loose tube cable 12.2 mm LSFH up to 96 optical fibers dry blocker	96-.../BQSN(ZNG)H-...122	Dca	s2	d0	a1	112
Stranded loose tube cable 15.0 mm LSFH up to 144 optical fibers dry blocker	144-.../BQSN(ZNG)H-...150	Cca	s1b	d0	a1	110
Stranded loose tube cable 14.5 mm LSFH up to 144 optical fibers dry blocker	144-.../BQSN(ZNG)H-...145	Eca				112

Loose tube construction with rodent protection up to 24 optical fibers dry blocker jelly-filled	Product	Reaction to fire				Catalogue page
Central loose tube cable 7.0 mm LSFH up to 24 optical fibers	24-24.../W(ZNG)H-...70	Dca	s2	d1	a1	116
Central loose tube cable 8.5 mm LSFH up to 24 optical fibers	24-24.../W(ZNG)H-...85	Dca	s1a	d0	a1	116
Central loose tube cable 8.5 mm RADOX up to 24 optical fibers	24-24.../W(ZNG)R-...85	Cca	s1a	d0	a1	170
TWINTUBE loose tube cable 9.4 mm LSFH up to 2 x 12 optical fibers	48-24.../W(ZNG)H-...94	Dca	s2	d2	a1	118

CPR products

Loose tube cable with rodent protection up to 48 optical fibers (stranded construction) jelly-filled	Product	Reaction to fire				Catalogue page
Stranded loose tube cable 9.6 mm LSFH up to 48 optical fibers	48-.../BWSN(ZNG)H-...96	Dca	s1a	d0	a1	120

Glass-armoured riser cable	Product	Reaction to fire				Catalogue page
Glass-armoured riser cable 4.8 mm tight tube	02-.../F(ZNG)H-...48	Dca	s2	d0	a1	126
Glass-armoured riser cable 5.5 mm tight tube	02-.../F(ZNG)H-...55	Dca	s1a	d0	a1	126
Riser cable 6.0 mm tight tube	02-.../FSN(ZN)H-G60	Dca	s1a	d0	a1	n/a
Glass-armoured riser cable 7.0 mm tight tube	02-.../F(ZNG)H-...70	Dca	s1a	d1	a1	126

Ruggedised breakout cable	Product	Reaction to fire				Catalogue page
Ruggedised breakout cable 7.5 mm LSFH simplex cable 2 x 2.2 mm	02-.../FJ(ZNG)H-...22	Dca	s1a	d0	a1	154
Ruggedised breakout cable 9.0 mm LSFH simplex cable 4 x 2.2 mm	04-.../FJSN(ZNG)H-...22	Cca	s1a	d0	a1	158

UL products

Glass-armoured riser cable	Product	Approval	Catalogue page
Glass-armoured riser cable 4.8 mm tight tube	02-.../F(ZNG)H-...48	OFNR	126
Glass-armoured riser cable 5.5 mm tight tube	02-.../F(ZNG)H-...55	OFNR	126
Glass-armoured riser cable 7.0 mm tight tube	02-.../F(ZNG)H-...70	OFNR	126

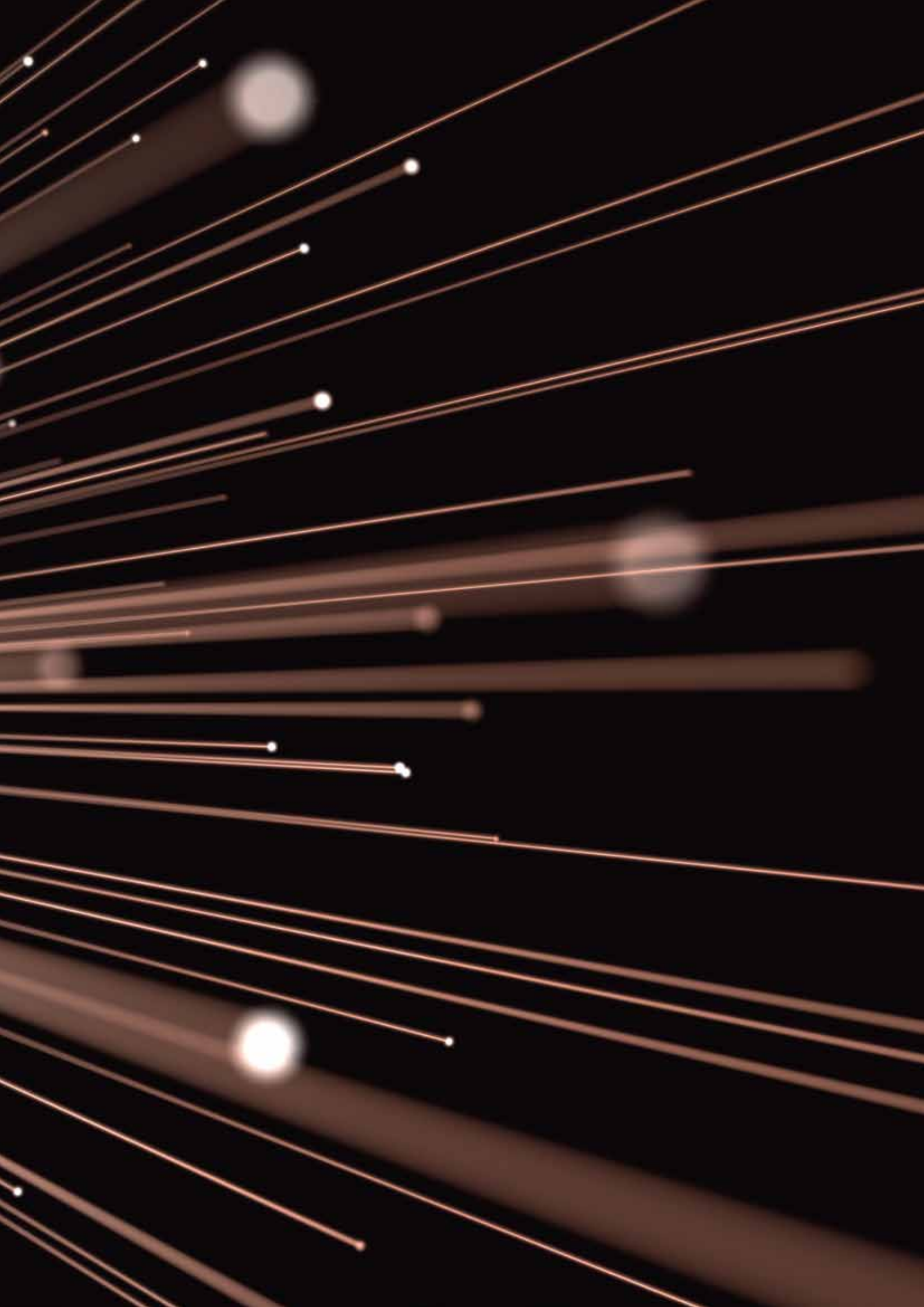
Ruggedised breakout cable	Product	Approval	Catalogue page
Ruggedised breakout cable 7.5 mm LSFH simplex cable 2 x 2.2 mm	02-.../FJ(ZNG)H-...22	OFN	154
Ruggedised breakout cable 9.0 mm LSFH simplex cable 4 x 2.2 mm	04-.../FJSN(ZNG)H-...22	OFN	158

Central loose tube cable with rodent protection up to 24 optical fibers	Product	Approval	Catalogue page
Cental loose tube cable 7.0 mm LSFH up to 24 optical fibers dry blocker	24-.../Q(ZNG)H-...70	OFNR	104
Cental loose tube cable 8.5 mm LSFH up to 24 optical fibers	24-.../W(ZNG)H-...85	OFNR	116

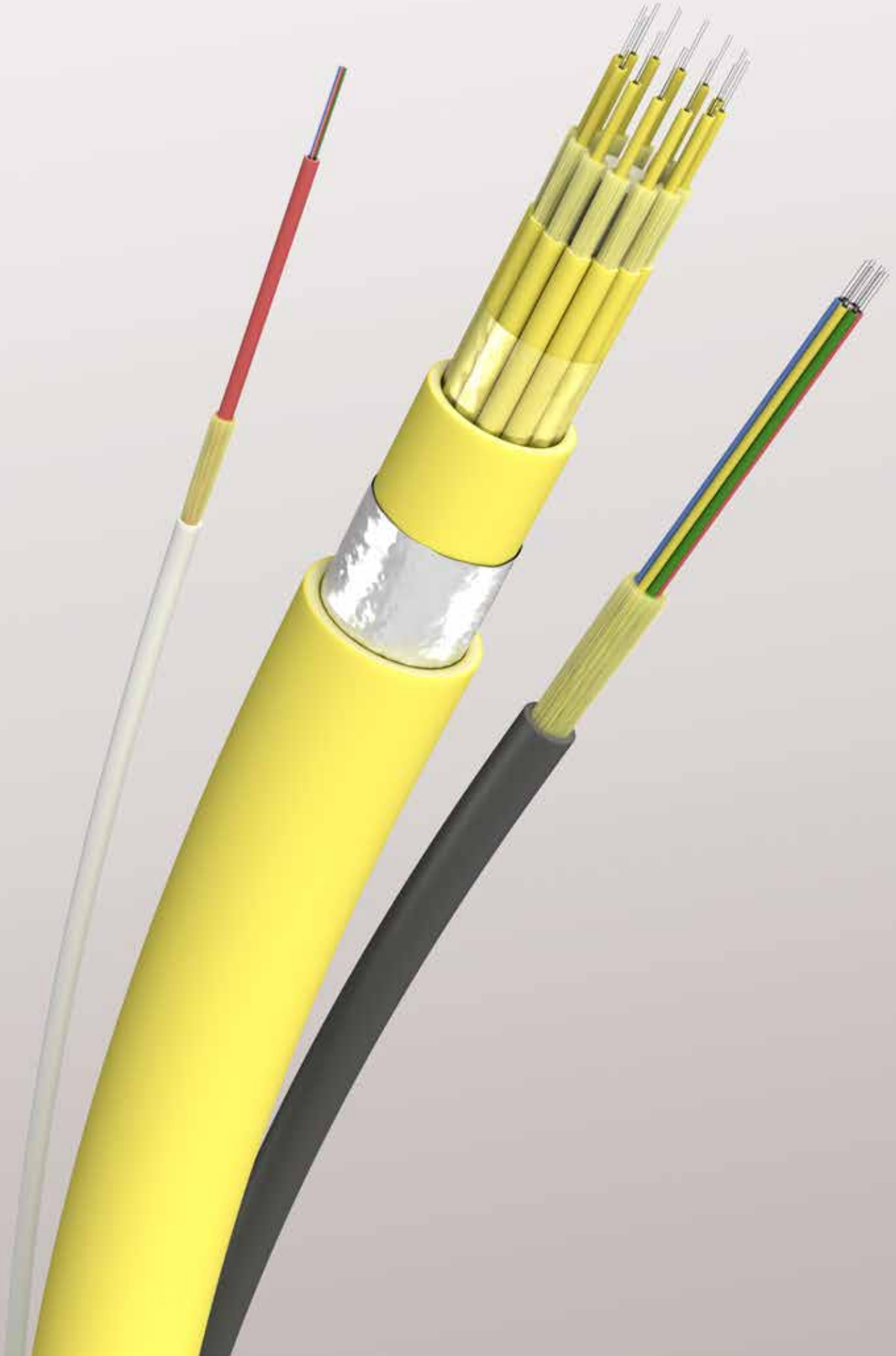
Jelly-free loose tube cable Cca/UL	Product	Approval	Catalogue page
Stranded loose tube cable 10.0 mm LSFH up to 48 optical fibers dry blocker	48-.../BQSN(ZNG)H-...100	OFNR	110

DNV GL products

Fire resistant breakout cable	Product	Approval	Catalogue page
2.0 mm fire resistant breakout cable LSFH jacket with 4 x 2.0 mm	04-.../CWJSNHIH-...20	TAE 0000192	70
2.0 mm fire resistant breakout cable LSFH jacket with 8 x 2.0 mm	08-.../CWJSNHIH-...20	TAE 0000192	70
2.0 mm fire resistant breakout cable LSFH jacket with 12 x 2.0 mm	12-.../CWJSNHIH-...20	TAE 0000192	70



Indoor cables



Indoor cables

	Cable type	Page	Ordering key	Weight kg/km	Number of fibers
	Semi-tight tubes 0.9 mm	48	01-.../CH-...9	0.8	1
	Tight tubes 0.9 mm	50	01-.../F-...9	0.8	1
	Tight tubes 0.6 mm	52	01-.../V-T6-...	0.3	1
	Simplex	54	01-.../VJH-...14 01-.../CWJH-...17 01-.../CWJH-...20 01-.../CWJH-...24 01-.../CWJH-...27	2.0 3.0 4.0 5.3 7.0	1 1 1 1 1
	Simplex 1.9 mm B2ca	56	01-.../VJH-...19	4.0	1
	Duplex Figure 8 (Zip Cord)	58	02-.../VJH-...14 02-.../FJH-...17 02-.../CWJH-...17 02-.../CWJH-...20 02-.../CWJH-...27	4.4 6.5 6.6 9.0 14.3	2 2 2 2 2
	Duplex Figure 8 (Zip Cord) B2ca	60	02-.../VJH-...20	9.0	2
	Duplex figure 0	62	02-.../VJH-A...14 02-.../CWJH-A...20 02-.../CWJH-A...27	9.4 19 24	2 2 2
	Duplex round	64	02-.../V(ZN)H-...21 02-.../V(ZN)H-...21	4.3 4.3	2 2
	Mini duplex round	66	02-.../(ZN)H-...16	3.1	2
	Breakout 1.4 mm	68	12-.../VJSNH-...14 16-.../VJSNH-...14 24-.../VJSNH-...14	83 76 105	12 16 24
	Breakout 2.0 mm	70	04-.../CWJSNH-...20 08-.../CWJSNH-...20 12-.../CWJSNH-...20 24-.../CWJSNH-...20	48 84 146 190	4 8 12 24

p = passed

Tube Ø mm	Ø Single-fiber cable mm	Jacket Ø mm	Jacket material	Direct connector assembly	Tensile strength N	Crush resistance N/dm	Temperature range in service °C	Fire propagation IEC 60332-1-2	Fire propagation IEC 603332-3	CPR 2011/305/EU
0.9		0.9	LSFH™	·	20	1000	−25 bis +75			
0.9		0.9	TPE	·	20	1000	−40 bis +85			
0.6		0.6	Acrylat	·	20	500	−40 bis +85			
0.6		1.4	LSFH™	·	150	2000	−25 bis +70			
0.9		1.7	LSFH™	·	150	3000	−25 bis +70	p		Dca-s1a, d0, a1
0.9		2.0	LSFH™	·	400	3000	−25 bis +70	p	p	Dca-s1a, d0, a1
0.9		2.4	LSFH™	·	400	5000	−25 bis +70	p	p	Dca-s1a, d0, a1
0.9		2.7	LSFH™	·	400	5000	−10 bis +70	p	p	Dca-s1a, d0, a1
0.6		1.9	LSFH	*	400	1500	−25 to +70	p		B2ca-s1a, d0, a1
0.6	1.4	1.4 × 3.0	LSFH™	·	300	7500	−25 bis +70			
0.9	1.7	1.7 × 3.5	LSFH™	·	300	10 000	−40 bis +70	p	p	
0.9	1.7	1.7 × 3.5	LSFH™	·	300	4000	−25 bis +70	p	p	Dca-s1a, d0, a1
0.9	2.0	2.0 × 4.1	LSFH™	·	800	6000	−25 bis +70	p	p	Dca-s1a, d0, a1
0.9	2.7	2.7 × 5.5	LSFH™	·	800	10 000	−25 bis +70	p	p	Dca-s1a, d0, a1
0.6	2.0	2.0 × 4.1	LSFH™	·	200	300	−25 bis +70	p		B2ca-s1, d0, a1
0.6	1.4	2.3 × 3.7	LSFH™	·	300	9000	−25 bis +70			
0.9	2.0	3.1 × 5.2	LSFH™	·	800	7000	−25 bis +70	p	p	Dca-s1a, d0, a1
0.9	2.7	3.5 × 6.2	LSFH™	·	800	10 000	−25 bis +70	p	p	Dca-s1a, d0, a1
0.6		2.1	LSFH™	·	200	5000	−25 bis +70	p	p	Dca-s1a, d0, a1
0.6		2.1	LSFH™	·	200	500	−25 bis +70	p		B2ca-s1a,d0,a1
		1.6	LSFH™	·	200	1000	−25 bis +70	p		B2ca-s1a, d0, a1
0.6	1.4	9.0	LSFH™	·	3000	12 000	−25 to +70	p	p	Dca-s2, d2, a1
0.6	1.4	9.0	LSFH™	·	4000	12 000	−25 to +70	p	p	Dca-s1a, d2, a1
0.6	1.4	10.6	LSFH™	·	5000	9000	−25 to +70	p	p	Cca-s1a, d0, a1
0.9	2.0	7	LSFH™	·	1200	7500	−25 to +70	p	p	Dca-s1a, d0, a1
0.9	2.0	9.2	LSFH™	·	2400	7500	−25 to +70	p	p	Cca-s1a, d2, a1
0.9	2.0	12	LSFH™	·	4000	7500	−25 to +70	p	p	Cca-s1a, d2, a1
0.9	2.0	14	LSFH™	·	7200	4000	−25 to +70	p	p	Cca-s1a, d1, a1

Indoor cables (continuance)

	Cable type	Page	Ordering key	Weight kg/km	Number of fibers
	Feuerbeständiges Breakout-Kabel 2.0 mm	72	04-.../CWJSNHIH-...20 08-.../CWJSNHIH-...20 12-.../CWJSNHIH-...20	108 147 216	4 8 12
	FRONTLINE Microtube	74	01-E9A2/MH(ZN)H-...23 02-E9A2/MH(ZN)H-...23 04-E9A2/MH(ZN)H-...23 06-E9A2S/MH(ZN)H-...23 12-E9A2/MH(ZN)H-...28 24-E9A2S/MH(ZN)H-...28	5.2 5.2 5.2 5.2 9.0 9.0	1 2 4 6 12 24
	FRONTLINE Inhome	76	04-E9A2/V(ZN)H-...28	8.0	4
	FRONTLINE Simplex	78	01-E9A2/CWJH-...27-FG	7	1
	FRONTLINE Facade	80	04-.../MH(ZN)H(G)H-55 06-...S/MH(ZN)H(G)H-55 12-.../MH(ZN)H(G)H-55 24-...S/MH(ZN)H(G)H-55	29.1 29.1 29.1 29.1	4-24 4-24 4-24 4-24
	OptiPack-Simplex	82	12-.../(ZN)H-...20 12-.../(ZN)H-...30 24-.../(ZN)H-...30 24-.../(ZN)H-...36	3.6 8.0 8.3 11	8 od. 12 8 od. 12 24 24
	OptiPack-DJ	84	08-.../(ZN)HH-...20 12-.../(ZN)HH-...20 24-.../(ZN)HH-...30	22 22 32	8 12 24
	OptiPack-Breakout	86	24/48-.../(ZN)SNH-...20 72-.../(ZN)SNH-...20 96-.../(ZN)SNH-...20 144-.../(ZN)SNH-...20	46 70 93 108	24/48 72 96 144
	OptiPack-Breakout	88	48/96-.../(ZN)SNH-...30 144-.../(ZN)SNH-...30 288-.../(ZN)SNH-...30	80 118 189	48/96 144 288
	OptiRibbon-DJ	90	24-2x12E9A2R/(ZN)HH-...30 12-12E9A2R/(ZN)HH-...20	22 32	12 24
	OptiSlim-Breakout	92			

p = passed

Tube Ø mm	Ø Single-fiber cable mm	Jacket Ø mm	Jacket material	Direct connec-tor assembly	Tensile strength N	Crush resis-tance N/dm	Temperature range in service °C	Fire propagation IEC 60332-1-2	Fire propagation IEC 603332-3	CPR 2011/305/EU
0.9 0.9 0.9	2.0 2.0 2.0	10.0 12.0 15.0	LSFH™ LSFH™ LSFH™	· · ·	1200 2400 4000	4000 4000 4000	–25 to +70 –25 to +70 –25 to +70	p p p	p p p	
1.25 1.25 1.25 1.25 1.75 1.75		2.3 2.3 2.3 2.3 2.8 2.8	LSFH™ LSFH™ LSFH™ LSFH™ LSFH™ LSFH™	· · · · · ·	400 400 400 400 400 400	1000 1000 1000 1000 500 500	–10 to +60 –10 to +60 –10 to +60 –10 to +60 –10 to +60 –10 to +60	p p p p p p		B2ca-s1a, d0, a1 B2ca-s1a, d0, a1 B2ca-s1a, d0, a1 B2ca-s1a, d0, a1 B2ca-s1a, d0, a1 B2ca-s1a, d0, a1
0.6		2.8	LSFH™	·	400	2000	–40 to +70	p	p	Dca-s1a, d0, a1
0.9		2.7	LSFH™	·	400	7000	–25 b to is +70	p	p	Dca-s1a, d0, a1
		5.5 5.5 5.5 5.5	LSFH™ LSFH™ LSFH™ LSFH™	· · · ·	1000 1000 1000 1000	1000 1000 1000 1000	–25 to +70 –25 to +70 –25 to +70 –25 to +70	p p p p		
		2.0 3.0 3.0 3.6	LSFH™ LSFH™ LSFH™ LSFH™	· · · ·	200 200 500 500	1000 1000 5000 5000	–10 to +60 –10 to +60 –10 to +60 –10 to +60	p p p p		Dca-s1a, d0, a1 Dca-s1a, d0, a1 Dca-s1a, d0, a1 Dca-s1a, d0, a1
	2.0 2.0 3.0	4.0 4.0 4.9	LSFH LSFH LSFH	· · ·	500 500 500	2000 2000 2000	–25 to +70 –25 to +70 –25 to +70	p p p		*/** */** */**
	2.0 2.0 2.0 2.0	6.6 8.0 9.6 10.3	LSFH™ LSFH™ LSFH™ LSFH™	· · · ·	600 800 1000 1400	5000 5000 5000 5000	–20 to +70 –20 to +70 –20 to +70 –20 to +70	p p p p		*/** */** */** */**
	3.0 3.0 3.0	9.3 11.0 14.0	LSFH™ LSFH™ LSFH™	· · ·	600 800 1400	5000 5000 5000	–20 to +70 –20 to +70 –20 to +70	p p p		*/** */** */**
		2.0/4.0 3.0/4.9	LSFH™ LSFH™	· ·	200 200	2000 2000	–25 to +70 –25 to +70	p	p	B2ca-s1a,d0,a1 oder Cca-s1a,d0,a1

* B2ca-s1a, d0, a1
** Cca-s1a, d0, a1

Semi-tight tubes 0.9 mm

Properties
- Metal-free indoor cable
- For direct connector assembly
- Tube can be stripped up to 2 m in one piece
- Tight bending radii
- High flexibility
- Halogen-free and non-corrosive fire gases
- Jelly-free, dry

Applications
- Pigtail assemblies for fusion or mechanical splicing within distribution frames and termination boxes
- Mini patch cables within protected enclosures
- For termination with passive optical components such as connectors

Design1

Tube	coloured fiber in dry tube (jelly free)	
Tube material	halogen-free (LSFH)	
Tube colour	E9	yellow
	G50 – OM2	orange
	G50 – OM3	turquoise
	G50 – OM4	heather violet
	G50 – OM5	lime green
	G62.5 – OM1	blue
	other colours on request	

According to IEC 60794-1-2

Ordering information

01-.../CH-...9	H-... 1/125

Please see page 198.

Specification		
Tube type		**Semi-tight tube dry**
Tube Ø	mm	0.9
Approx. weight	kg/km	0.8

Mechanical properties				
Tensile strength	during installation	N	20	IEC 60794-1-2 E1
	in service	N	10	
Min. bend radius [1]	during installation	mm	25	IEC 60794-1-2 E11
	in service	mm	25	
Crush resistance	short-term	N/dm	1000	IEC 60794-1-2 E3
	long-term	N/dm	500	
Impact resistance	Wp = 0.74 J	impact	3	IEC 60794-1-2 E4
Kink resistance	r = 5 mm		passed	IEC 60794-1-2 E10
Torsion	± 360°, length = 1000 mm, F = 5 N	cycles	3	IEC 60794-1-2 E7

Thermal properties				
Temperature range	during installation	°C	−10 to +50	IEC 60794-1-22 F12
	in service	°C	−25 to +75	
	in storage	°C	−40 to +75	

Combustion properties			
Fire load	MJ/m	0.02	
2011/65/EC (RoHS)		compliant	

[1] Smaller bending radius are possible with E9/125 LowBend (ITU G.657) and G50/125-OM3/OM4 BendOptimised.

Tight tubes 0.9 mm

Properties
- Metal-free indoor cable
- For direct connector assembly
- Tube can be stripped up to 30 mm in one piece
- Tight bending radii
- For high mechanical and thermal stability
- Halogen-free and non-corrosive fire gases
- Improved crush resistance

Applications
- Patch cable within distribution frames and termination boxes
- In thermally and mechanically critical environments
- For mobile or flexible systems

Design

Tube	buffer layer on fiber	
Tube material	halogen-free (TPE)	
Tube colour	E9	yellow
	G50 – OM2	orange
	G50 – OM3	turquoise
	G50 – OM4	heather violet
	G50 – OM5	lime green
	G62.5 – OM1	blue
	other colours on request	

According to IEC 60794-1-2

Ordering information

01-.../F-...9	V-... 1/125

Please see page 198.

Specification		
Tube type		**Tight tube**
Tube Ø	mm	0.9
Approx. weight	kg/km	0.8

Mechanical properties				
Tensile strength	during installation (r ≥ 25 mm)	N	20	IEC 60794-1-2 E1
	in service (r ≥ 25 mm)	N	10	
Min. bend radius [1]	during installation	mm	25	IEC 60794-1-2 E11
	in service	mm	25	
Crush resistance	short-term	N/dm	1000	IEC 60794-1-2 E3
	long-term	N/dm	500	
Impact resistance	Wp = 0.74 J, r = 25 mm	Schläge	100	IEC 60794-1-2 E4
Torsion	± 7200°, length = 1000 mm, F = 5 N	cycles	3	IEC 60794-1-2 E7

Thermal properties				
Temperature range	during installation	°C	–10 to +60	IEC 60794-1-22 F12
	in service	°C	–40 to +85	
	in storage	°C	–40 to +60	

Combustion properties			
Fire load	MJ/m	0.02	
2011/65/EC (RoHS)		compliant	

[1] Smaller bending radius are possible with E9/125 LowBend (ITU G.657) and G50/125-OM3/OM4 BendOptimised.

Tight tubes 0.6 mm

Properties
- Metal-free indoor cable
- For direct connector assembly
- Tube can be stripped up to 30 mm in one piece
- Tight bending radii
- For high thermal stability
- Halogen-free and non-corrosive fire gases

Applications
- Data cable in distribution network – FTTH
- Installation in indoor area

Design

Tube	coloured fiber with a transparent buffer layer	
Tube material	acrylat	
Tube colour	E9	yellow
	G50 – OM2	orange
	G50 – OM3	turquoise
	G50 – OM4	heather violet
	G50 – OM5	lime green
	G62.5 – OM1	blue
	other colours on request	

According to IEC 60794-1-2

Ordering information

01-.../V-T6-...	V-... 1/125

Please see page 198.

Specification		
Tube type		**Tight tube**
Tube Ø	mm	0.6
Approx. weight	kg/km	0.3

Mechanical properties				
Tensile strength	during installation	N	20	IEC 60794-1-2 E1
	in service	N	10	
Min. bend radius [1]	during installation	mm	25	IEC 60794-1-2 E11
	in service	mm	25	
Crush resistance	short-term	N/dm	500	IEC 60794-1-2 E3
	long-term	N/dm	250	

Thermal properties				
Temperature range	during installation	°C	–10 to +60	IEC 60794-1-22 F12
	in service	°C	–40 to +85	
	in storage	°C	–40 to +60	

Combustion properties		
Fire load	MJ/m	0.007
2011/65/EC (RoHS)		compliant

[1] Smaller bending radius are possible with E9/125 LowBend (ITU G.657) and G50/125-OM3/OM4 BendOptimised.

Simplex cables

Properties
- Metal-free indoor cable
- Each fiber strain relieved
- For direct connector assembly with strain relief
- Tight bending radii
- High flexibility
- Halogen-free and non-corrosive fire gases
- Low fire load for high safety requirements

Applications
- Patch cables for data centers
- Installation in indoor area
- Measurement cable withstanding mechanical loading
- Data cable in distribution centres
- Strain-relieved pigtail
- Ideal for applications involving safety requirements in case of fire

Design

Tube	tight buffered tube 0.6 mm, stripped up to 30 mm semi-tight tubes 0.9 mm, stripped up to 1 m	
Strain relief	aramide yarn	
Jacket material	LSFH™	
Tube colour	E9	yellow
	G50 – OM2	orange
	G50 – OM3	turquoise
	G50 – OM4	heather violet
	G50 – OM5	lime green
	G62.5 – OM1	orange

According to IEC 60794-1-2

Ordering information

01-.../VJH-...14	I-V(ZN)H - 1.../125
01-.../CWJH-...17	I-W(ZN)H - 1.../125
01-.../CWJH-...20	I-W(ZN)H - 1.../125
01-.../CWJH-...24	I-W(ZN)H - 1.../125
01-.../CWJH-...27	I-W(ZN)H - 1.../125

Please see page 198, 199.

Specification								
CPR main class				Dca	Dca	Dca	Dca	
Jacket Ø		mm	1.4	1.7	2.0	2.4	2.7	
Tube type			Tight tube	Semi-tight tube				
Tube Ø		mm	0.6	0.9	0.9	0.9	0.9	
Approx weight		kg/km	2.0	3.0	4.0	5.3	7.0	

Mechanical properties								
Tensile strength	during installation	N	150	150	400	400	400	IEC 60794-1-2 E1
	in service	N	100	100	200	200	200	
Min. bend radius [1]	during installation	mm	25	50	50	50	50	IEC 60794-1-2 E11
	in service	mm	25	25	25	25	25	
Crush resistance	short-term	N/dm	2000	3000	3000	5000	5000	IEC 60794-1-2 E3
	long-term	N/dm	500	1000	1000	1000	1000	
Impact resistance	Wp = 0.5 J Wp = 0.74 J Wp = 1.0 J	impacts	10	3	3	10	20	IEC 60794-1-2 E4
Repeated bending	r = 25 mm	cycles	1000	5000	5000	1000	5000	IEC 60794-1-2 E6

Thermal properties					
Temperature range	during installation	°C	–10 to +50	–10 to +50	IEC 60794-1-22 F12
	in service	°C	–25 to +70	–10 to +70	
	in storage	°C	–40 to +70	–40 to +70	

Combustion properties								
Fire load		MJ/m	0.05	0.08	0.10	0.15	0.17	
Fire propagation	on vertical single cable			p	p	p	p	IEC 60332-1-2
	on vertical cable bundle				p	p	p	IEC 60332-3-25
Smoke density			p	p	p	p	p	IEC 61034-2
Halogen acid gas	jacket material		p	p	p	p	p	IEC 60754-1
Degree of acidity passed	jacket material		p	p	p	p	p	IEC 60754-2
2011/65/EC (RoHS)			compliant					
(EU) No 305/2011 (CPR)				Dca-s1a, d0, a1				EN 50575

p = passed

[1] Smaller bending radius are possible with E9/125 LowBend (ITU G.657) and G50/125-OM3/OM4 BendOptimised.

Simplex cables 1.9 mm B2ca

Properties
- Metal-free indoor cable
- Each fiber strain relieved
- For direct connector assembly with strain relief
- Tight bending radii
- High flexibility
- Halogen-free and non-corrosive fire gases
- Low fire load for high safety requirements
- Cable construction according to DTAG specification

Applications
- Patch cables for data centers
- Installation in indoor area
- Measurement cable withstanding mechanical loading
- Data cable in distribution centres
- Strain-relieved pigtail
- Ideal for applications involving safety requirements in case of fire

Design

Tube	tight tube 0.6 m, strippted up to 30mm	
Strain relief	aramide yarn	
Jacket material	LSFH™	
Tube colour	E9	yellow
	G50 – OM2	orange
	G50 – OM3	turquoise
	G50 – OM4	heather violet
	G50 – OM5	lime green
	G62.5 – OM1	orange

According to IEC 60794-1-2

Ordering information

01-.../VJH-...19	I-V(ZN)H - 1.../125

Please see page 199.

Specification			
CPR main class			B2ca
Jacket Ø		mm	1.9
Tube Ø		mm	0.6
Approx weight		kg/km	4.0

Mechanical properties				
Tensile strength	during installation	N	400	IEC 60794-1-2 E1
	in service	N	200	
Min. bend radius [1]	during installation	mm	20	IEC 60794-1-2 E11
	in service	mm	15	
Crush resistance	short-term long-term	N/dm	1500 -	IEC 60794-1-2 E3
Impact resistance	Wp = 0.74 J Wp = 1.5 J	impacts	 3	IEC 60794-1-2 E4

Thermal properties				
Temperature range	during installation	°C	–10 to +50	IEC 60794-1-22 F12
	in service	°C	–25 to +70	
	in storage	°C	–25 to +70	

Combustion properties				
Fire load		MJ/m	0.06	
Fire propagation	on vertical single cable		p	IEC 60332-1-2
	on vertical cable bundle			IEC 60332-3-25
Smoke density			p	IEC 61034-2
Halogen acid gas	jacket material		p	IEC 60754-1
Degree of acidity	jacket material		p	IEC 60754-2
2011/65/EC (RoHS)				
(EU) No 305/2011 (CPR)			B2ca-s1a, d0, a1	EN 50575

p = passed

[1] Smaller bending radius are possible with E9/125 LowBend (ITU G.657) and G50/125-OM3/OM4 BendOptimised.

Duplex figure 8 (zip cord)

Properties
- Metal-free indoor cable
- Each fiber strain relieved
- For direct connector assembly with strain relief
- Tight bending radii
- For high thermal stability
- Halogen-free and non-corrosive fire gases
- Low fire load for high safety requirements

Applications
- Installation in indoor area
- Patch cable in distribution centres
- Data cable in distribution networks
- Ideal for applications involving safety requirements in case of fire

Design

Tube	2 semi-tight tubes 0.9 mm 2 tight tubes 0.6 mm/0.9 mm	
Strain relief	aramide yarn	
Jacket material	LSFH™	
Tube colour	E9	yellow
	G50 – OM2	orange
	G50 – OM3	turquoise
	G50 – OM4	heather violet
	G50 – OM5	lime green
	G62.5 – OM1	orange

According to IEC 60794-1-2

Ordering information

02-.../VJH-...14	I-V(ZN)H - 2 x 1.../125
02-.../FJH-...17	I-V(ZN)H - 2 x 1.../125
02-.../CWJH-...17	I-W(ZN)H - 2 x 1.../125
02-.../CWJH-...20	I-W(ZN)H - 2 x 1.../125
02-.../CWJH-...27	I-W(ZN)H - 2 x 1.../125

Please see page 200, 201.

Specification								
CPR main class					Dca	Dca	Dca	
Jacket Ø		mm	1.4 × 3.0	1.7 × 3.5	1.7 × 3.5	2.0 × 4.1	2.7 × 5.5	
Single-fiber cable Ø		mm	1.4	1.7	1.7	2.0	2.7	
Tube type			tight tube	tight tube	semi-tight tube	semi-tight tube	semi-tight tube	
Tube Ø		mm	0.6	0.9	0.9	0.9	0.9	
Channel marking on single-fiber			inscription on one side					
Approx weight		kg/km	4.4	6.5	6.6	9.0	14.3	

Mechanical properties								
Tensile strength	during installation	N	300	300	300	800	800	IEC 60794-1-2 E1
	in service	N	2 × 100	2 × 100	2 × 100	2 × 200	2 × 200	
Min. bend radius [1]	during installation	mm	25	50	50	50	50	IEC 60794-1-2 E11
	in service	mm	25	25	25	25	25	
Crush resistance	short-term	N/dm	7500	10 000	10 000	10 000	10 000	IEC 60794-1-2 E3
	long-term	N/dm	2500	4000	4000	5000	5000	
Impact resistance	Wp = 0.74 J Wp = 1.0 J	impacts	10	40	40	 20	 20	IEC 60794-1-2 E4
Repeated bending	r = 25 mm weight = 0.5 kg	cycles	1000	5000	5000	5000	10 000	IEC 60794-1-2 E6

Thermal properties								
Temperature range	during installation	°C	–10 to +50	–10 to +50	–10 to +50	–10 to +50	–10 to +50	IEC 60794-1-22 F1
	in service	°C	–25 to +70	–40 to +70	–25 to +70	–25 to +70	–10 to +70	
	in storage	°C	–40 to +70	–40 to +70	–40 to +70	–40 to +70	–25 to +70	

Combustion properties								
Fire load		MJ/m	0.10	0.13	0.13	0.22	0.34	
Fire propagation	on a vertical single cable				p	p	p	IEC 60332-1-2
	on a vertical cable bundle				p	p	p	IEC 60332-3-25
Halogen acid gas	jacket material		p	p	p	p	p	IEC 60754-1
Degree of acidity	jacket material		p	p	p	p	p	IEC 60754-2
2011/65/EC (RoHS)			compliant					
(EU) No 305/2011 (CPR)					Dca-s1a, d0, a1			EN 50575

p = passed

[1] Smaller bending radius are possible with E9/125 LowBend (ITU G.657) and G50/125-OM3/OM4 BendOptimised.

Duplex figure 8 (zip cord) B2ca

Properties
- Metal-free indoor cable
- Each fiber strain relieved
- For direct connector assembly with strain relief
- Tight bending radii
- For high thermal stability
- Halogen-free and non-corrosive fire gases
- Low fire load for high safety requirements

Applications
- Installation in indoor area
- Patch cable in distribution centres
- Data cable in distribution networks
- Ideal for applications involving safety requirements in case of fire

Design

Tube	2 tight tubes 0.6 mm	
Strain relief	aramide yarn	
Jacket material	LSFH™	
Tube colour	E9	yellow
	G50 – OM2	orange
	G50 – OM3	turquoise
	G50 – OM4	heather violet
	G50 – OM5	lime green
	G62.5 – OM1	orange

According to IEC 60794-1-2

Ordering information

02-.../VJH-...20	I-V(ZN)H - 2 x 1.../125

Please see page 200.

Specification		
CPR main class		B2ca
Jacket Ø	mm	2.0 x 4.1
Single-fiber cable Ø	mm	2.0
Tube type		Tight tube
Tube Ø	mm	0.6
Channel marking on single-fiber		inscription on one side
Approx weight	kg/km	9.0

Mechanical properties				
Tensile strength	during installation	N	200	IEC 60794-1-2 E1
	in service	N	2 x 100	
Min. bend radius [1]	during installation	mm	50	IEC 60794-1-2 E11
	in service	mm	30	
Crush resistance		N/dm	300	IEC 60794-1-2 E3
Impact resistance	Wp = 1.5 J	impacts	3	IEC 60794-1-2 E4
Kink resistance	r = 10 mm		p	IEC 60794-1-2 E6

Thermal properties				
Temperature range	during installation	°C	-10 to +50	IEC 60794-1-22 F1
	in service	°C	-25 to +70	
	in storage	°C	–40 to +70	

Combustion properties				
Fire load		MJ/m	0.15	
Fire propagation	on a vertical single cable		p	IEC 60332-1-2
Halogen acid gas	jacket material		p	IEC 60754-1
Degree of acidity	jacket material		p	IEC 60754-2
2011/65/EC (RoHS)			compliant	
(EU) No 305/2011 (CPR)			B2ca-s1, d0, a1	EN 50575

p = passed

[1] Smaller bending radius are possible with E9/125 LowBend (ITU G.657) and G50/125-OM3/OM4 BendOptimised.

Duplex cables figure 0

Properties
- Metal-free indoor cable
- Each fiber strain relieved
- For direct connector assembly with strain relief
- Tight bending radii
- Low fire load for high safety requirements
- Halogen-free and non-corrosive fire gases

Applications
- Installation in indoor area
- Patch cable in distribution centres
- Data cable in distribution networks
- Ideal for applications involving safety requirements in case of fire

Design

Tube	2 simplex cables with semi-tight tubes 0.9 mm 2 simplex cables with tight tubes 0.6 mm	
Strain relief	aramide yarn	
Jacket material	LSFH™	
Tube colour	E9	yellow
	G50 – OM2	orange
	G50 – OM3	turquoise
	G50 – OM4	heather violet
	G50 – OM5	lime green
	G62.5 – OM1	orange

According to IEC 60794-1-2

Ordering information

02-.../VJH-A...14	I-V(ZN)HH - 2 x 1.../125
02-.../CWJH-A...20	I-W(ZN)HH - 2 x 1.../125
02-.../CWJH-A...27	I-W(ZN)HH - 2 x 1.../125

Please see page 201.

Specification					
CPR main class			Dca	Dca	
Jacket Ø	mm	2.3 × 3.7	3.1 × 5.2	3.5 × 6.2	
Single-fiber cable Ø	mm	1.4	2.0	2.7	
Tube type		Tight tube	Semi-tight tube	Semi-tight tube	
Tube Ø	mm	0.6	0.9	0.9	
Channel marking on single cable		numbered	numbered	coloured	
Approx. weight	kg/km	9.4	13.7	24	

Mechanical properties						
Tensile strength	during installation	N	300	800	800	IEC 60794-1-2 E1
	in service	N	2 × 100	2 × 200	2 × 200	
Min. bend radius [1]	during installation	mm	25	50	50	IEC 60794-1-2 E11
	in service	mm	25	25	25	
Crush resistance	short-term	N/dm	9000	7000	10 000	IEC 60794-1-2 E3
	long-term	N/dm	4000	5000	5000	
Impact resistance	Wp = 1.0 J	impacts	50	20	20	IEC 60794-1-2 E4
Repeated bending	r = 25 mm, weight = 0.5 kg	cycles	10 000	10 000	10 000	IEC 60794-1-2 E6

Thermal properties						
Temperature range	during installation	°C	–10 to +50	–10 to +50	–10 to +50	IEC 60794-1-22 F12
	in service	°C	–25 to +70	–10 to +70	–10 to +70	
	in storage	°C	–25 to +70	–25 to +70	–25 to +70	

Combustion properties						
Fire load		MJ/m	0.22	0.33	0.45	
Fire propagation	on a vertical single cable		p	p	p	IEC 60332-1-2
	on a vertical cable bundle		p	p	p	IEC 60332-3-25
Halogen acid gas	jacket material		p	p	p	IEC 60754-1
Degree of acidity	jacket material		p	p	p	IEC 60754-2
2011/65/EC (RoHS)			compliant			
(EU) No 305/2011 (CPR)				Dca-s1a, d0, a1		EN 50575

p = passed

[1] Smaller bending radius are possible with E9/125 LowBend (ITU G.657) and G50/125-OM3/OM4 BendOptimised.

Duplex round cables (LC uniboot compatible)

Properties
- Metal-free indoor cable
- Strain relieve with aramide yarn
- For direct connector assembly
- Tight bending radii
- High flexibility
- Low smoke, halogen free and self-extinguishing
- LC uniboot compatible

Applications
- Patch cables for data centers
- Duplex cable for LC uniboot

Design

Tube	2 tight buffered tubes 0.6 mm	
Strain relief	aramide yarn	
Jacket material	LSFH™	
Tube colour	E9 low bend	yellow
	G50 – OM3	turquoise
	G50 – OM4	heather violet
	G50 – OM5	lime green

According to IEC 60794-1-2

Ordering information

02-.../V(ZN)H-...21	I-V(ZN)H - 2 x 1.../125

Please see page 201.

Specification					
CPR main class			Dca	B2ca	
Jacket Ø		mm	2.1	2.1	
Tube type			Tight tube	Tight tube	
Tube Ø		mm	0.6	0.6	
Approx. weight		kg/km	4.3	5.0	

Mechanical properties					
Tensile strength	during installation	N	200	200	IEC 60794-1-2 E1
	in service	N	100	100	
Min. bend radius	during installation	mm	10	15	IEC 60794-1-2 E11
	in service	mm	15	15	
Crush resistance	short-term	N/dm	5000	500	IEC 60794-1-2 E3
	long-term	N/dm	900	500	
Kink resistance	r = 3 mm r = 5 mm		p	 p	IEC 60794-1-2 E10

Thermal properties				
Temperature range	during installation	°C	–10 to +50	IEC 60794-1-22-F1
	in service	°C	–25 to +70	
	in storage	°C	–25 to +70	

Combustion properties					
Fire load		MJ/m	0.11	0.1	
Fire propagation	on a vertical single cable		p	p	IEC 60332-1-2
	on a vertical cable bundle		p		IEC 60332-3-25
Halogen acid gas	jacket material		p	p	IEC 60754-1
Degree of acidity	jacket material		p	p	IEC 60754-2
2011/65/EC (RoHS)			compliant	compliant	
(EU) No 305/2011 (CPR)			Dca-s1a, d0, a1	B2ca-s1a, d0, a1	EN 50575

p = passed

Mini-Duplex round cable (VSFF* connector compatible)

Properties
- Metal-free indoor cable
- Strain relieve with aramide yarn
- For direct connector assembly
- Tight bending radii
- High flexibility
- Low smoke, halogen free and self-extinguishing
- VSFF*-connector compatible

Applications
- Patch cables for data centers
- Duplex cable for LC-XD-, MDC- or SN-connector

Design

Strain relief	non metallic	
Jacket material	LSFH™	
Tube colour	E9 low bend	yellow
	G50 – OM4	heather violet
	G50 – OM5	lime green

According to IEC 60794-1-2

Ordering information

02-.../(ZN)H-...16	I-F(ZN)H - 2 x .../125

Please see page 202.

* VSFF – Very Small Form Factor

Specification				
CPR main class			B2ca	
Jacket Ø		mm	1.6	
No. of fibers			2	
Approx. weight		kg/km	3.1	

Mechanical properties				
Tensile strength	during installation	N	200	IEC 60794-1-2 E1
	in service	N	100	
Min. bend radius	during installation	mm	15	IEC 60794-1-2 E11
	in service	mm	10	
Crush resistance	short-term	N/dm	1000	IEC 60794-1-2 E3
	long-term	N/dm	150	
Kink resistance	r = 3 mm		p	IEC 60794-1-2 E10

Thermal properties				
Temperature range	during installation	°C	–10 to +50	IEC 60794-1-22-F12
	in service	°C	–25 to +70	
	in storage	°C	–40 to +70	

Combustion properties				
Fire load		MJ/m	0.08	
Fire propagation	on a vertical single cable		p	IEC 60332-1-2
	on a vertical cable bundle		p	IEC 60332-3-25
Halogen acid gas	jacket material		p	IEC 60754-1
Degree of acidity	jacket material		p	IEC 60754-2
2011/65/EC (RoHS)			compliant	
(EU) No 305/2011 (CPR)			B2ca-s1a, d0, a1	EN 50575

p = passed

Breakout cables 1.4 mm

Properties
- Metal-free indoor cable
- Each fiber strain relieved
- For direct connector assembly with strain relieved
- Ripcord for easy jacket removal
- Low smoke, halogen-free and self-extinguishing
- Optimised outer-diameter construction

Applications
- Installation in indoor areas
- Data cable in distribution networks
- For installations in cable ducts
- For horizontal and collapsed backbone cabling
- Terminations possible for SFF connectors only

Design

Cable design	central strength member, non-metallic 12 to 24 single-fiber cables with tight buffered tube 0.6 mm strain relief (aramide yarn) separating tape and 1 ripcord	
Channel marketing	single-fiber cable numbered	
Jacket material	LSFH™	
Tube/jacket colour	E9	yellow
	G50 – OM3	turquoise
	G50 – OM4	heather violet
	G50 – OM5	lime green
	G62.5 – OM1	orange

According to IEC 60794-1-2

Ordering information

12-.../VJSNH-...14	I-V(ZN)HH - 12.../125
16-.../VJSNH-...14	I-V(ZN)HH - 16.../125
24-.../VJSNH-...14	I-V(ZN)HH - 24.../125

Please see page 202.

Specification		12	16	24	
CPR main class		Dca	Dca	Cca	
Jacket Ø	mm	9.0	9.0	10.6	
Single-fiber cable Ø	mm	1.4	1.4	1.4	numbered
Tube Ø	mm	0.6	0.6	0.6	
Approx. weight	kg/km	83	76	105	

Mechanical properties						
Tensile strength	during installation	N	3000	4000	5000	IEC 60794-1-2 E1
	in service	N	12 × 70	16 × 70	24 × 70	
Min. bend radius	during installation	mm	130	130	160	IEC 60794-1-2 E11
	in service	mm	90	90	100	
Crush resistance	short-term	N/dm	12 000	12 000	9000	IEC 60794-1-2 E3
	long-term	N/dm	3000	3000	3000	
Impact resistance	Wp = 2.21 J	impacts	100	100	100	IEC 60794-1-2 E4
Repeated bending	r = 100 mm r = 200 mm	cycles	2000	2000	2000	IEC 60794-1-2 E6

Thermal properties				
Temperature range	during installation	°C	–10 to +60	IEC 60794-1-22 F1
	in service	°C	–25 to +70	
	in storage	°C	–25 to +70	

Combustion properties						
Fire load		MJ/m	2.2	2.3	3.1	
Fire propagation	on a vertical single cable		p	p	p	IEC 60332-1-2
	on a vertical cable bundle		p	p	p	IEC 60332-3-25
Smoke density			p	p	p	IEC 61034-2
Halogen acid gas	jacket material		p	p	p	IEC 60754-1
Degree of acidity	jacket material		p	p	p	IEC 60754-2
2011/65/EC (RoHS)			compliant	compliant	compliant	
(EU) No 305/2011 (CPR)			Dca-s2,d2,a1	Dca-s1a,d2,a1	Cca-s1a,d0,a1	EN 50575

p = passed

Breakout cables 2.0 mm

Properties
- Metal-free indoor cable
- Each fiber strain relieved
- For direct connector assembly with strain relief
- Ripcord for easy jacket removal
- Low smoke, halogen-free and self-extinguishing
- Cable with improved fire performance

Applications
- Installation in indoor areas
- Data cable in distribution networks
- For installation in cable ducts
- Deal for applications involving high safety requirements in case of fire
- For horizontal and collapsed backbone cabling

Design

Cable design	central strengh member, non-metallic 4 to 24 single-fiber cables with semi-tight tubes strain relief (aramide yarn) separating tape and 1 ripcord	
Channel marketing	single-fiber cable numbered	
Jacket material	LSFH™	
Tube/jacket colour	E9	yellow
	G50 – OM2	orange
	G50 – OM3	turquoise
	G50 – OM4	heather violet
	G50 – OM5	lime green
	G62.5 – OM1	orange

According to IEC 60794-1-2

According to IEC 60794-1-2

04-.../CWJSNH-...20	I-W(ZN)HH - 4.../125
08-.../CWJSNH-...20	I-W(ZN)HH - 8.../125
12-.../CWJSNH-...20	I-W(ZN)HH - 12.../125
24-.../CWJSNH-...20	I-W(ZN)HH - 24.../125

Please see page 202.

Specification		4	8	12	24	
CPR main class		Dca	Cca	Cca	Cca	
Jacket Ø	mm	7.0	9.2	12.0	14.0	
Single-fiber cable Ø	mm	2.0	2.0	2.0	2.0	numbered
Tube Ø	mm	0.9	0.9	0.9	0.9	
Approx. weight	kg/km	48	84	154	191	

Mechanical properties							
Tensile strength	during installation	N	1200	2400	4000	7200	IEC 60794-1-2 E1
	in service	N	4 × 100	8 × 100	12 × 100	24 ×100	
Min. bend radius	during installation	mm	100	120	180	240	IEC 60794-1-2 E11
	in service	mm	70	80	120	140	
Crush resistance	short-term	N/dm	7500	7500	7500	4000	IEC 60794-1-2 E3
	long-term	N/dm	2000	2000	2000	2000	
Impact resistance	Wp = 2.21 J, r = 25 mm	impacts	50	50	50	50	IEC 60794-1-2 E4
Torsion	± 360°, l = 1000 mm; m = 2 kg	cycles	25 000	25 000	25 000	25 000	IEC 60794-1-2 E7

Thermal properties				
Temperature range	during installation	°C	−10 to +60	IEC 60794-1-22 F12
	in service	°C	−25 to +70	
	in storage	°C	−40 to +70	

Combustion properties							
Fire load		MJ/m	1.09	1.72	3.40	4.1	
Fire propagation	on a vertical single cable		p	p	p	p	IEC 60332-1-2
	on a vertical cable bundle		p	p	p	p	IEC 60332-3-24
Smoke density			p	p	p	p	IEC 61034-2
Halogen acid gas	jacket material		p	p	p	p	IEC 60754-1
Degree of acidity	jacket material		p	p	p	p	IEC 60754-2
2011/65/EC (RoHS)			compliant				
(EU) No 305/2011 (CPR)			Dca-s1a, d0,a1	Cca-s1a,d2,a1		Cca-s1a, d1,a1	EN 50575

p = passed

Fire resistant breakout cables 2.0 mm

Properties
- Metal-free indoor cable
- Each fiber strain relieved
- For direct connector assembly with strain relief
- Ripcord for easy jacket removal
- Low smoke, halogen-free and self-extinguishing
- Cable with improved fire performance

Applications
- Installation in indoor areas
- Data cable in distribution networks
- For installation in cable ducts
- Ideal for applications involving high safety requirements in case of fire
- For horizontal and collapsed backbone cabling

Design

Cable design	central strengh member, non-metallic 4 to 12 single-fiber cables with semi-tight tubes separating tape and 1 ripcord	
Channel marketing	single-fiber cable numbred	
Jacket material	LSFH™ – double jacket with flame barrier	
Tube/jacket colour	E9	yellow
	G50 – OM2	orange
	G50 – OM3	turquoise
	G50 – OM4	heather violet
	G50 – OM5	lime green
	G62.5 – OM1	orange

According to IEC 60794-1-2

Ordering information

04-.../CWJSNHIH-...20	I-W(ZN)HIH - 4.../125
08-.../CWJSNHIH-...20	I-W(ZN)HIH - 8.../125
12-.../CWJSNHIH-...20	I-W(ZN)HIH - 12.../125

Please see page 203.
* Cable types with DNV approval article number just on request.

DNV approvals and certificate number TAE00004ST.

Specification		**4**	**8**	**12**	
Jacket Ø	mm	10.0	12.0	15.0	
Single-fiber cable Ø	mm	2.0	2.0	2.0	numbered
Tube Ø	mm	0.9	0.9	0.9	
Approx. weight	kg/km	108	147	216	

Mechanical properties						
Tensile strength	during installation	N	1200	2400	4000	IEC 60794-1-2 E1
	in service	N	4 × 100	8 × 100	12 × 100	
Min. bend radius	during installation	mm	145	175	220	IEC 60794-1-2 E11
	in service	mm	95	115	145	
Crush resistance	short-term	N/dm	4000	4000	4000	IEC 60794-1-2 E3
	long-term	N/dm	2000	2000	2000	
Impact resistance	Wp = 2.21 J, r = 25 mm	impacts	50	50	50	IEC 60794-1-2 E4
Repeated bending	r = 100 mm	cycles	1000	1000	1000	IEC 60794-1-2 E6

Thermal properties				
Temperature range	during installation	°C	–10 to +60	IEC 60794-1-22 F12
	in service	°C	–25 to +70	
	in storage	°C	–40 to +70	

Combustion properties						
Fire load		MJ/m	2.50	3.35	5.00	
Fire propagation	on a vertical single cable		p	p	p	IEC 60332-1-2
	on a vertical cable bundle		p	p	p	IEC 60332-3-24
Fire test	with circuit integrity (CI)	min.	180	180	180	IEC 60331-25
Fire test	with circuit integrity (CI) with shock	min.	180	180	180	IEC 60331-31
Smoke density			p	p	p	IEC 61034-2
Halogen acid gas	jacket material		p	p	p	IEC 60754-1
Degree of acidity	jacket material		p	p	p	IEC 60754-2
2011/65/EC (RoHS)			compliant			

p = passed

FRONTLINE Microtube

Properties
- Metal-free indoor cable
- Strain relieved with aramide yarn
- Ripcord for easy jacket removal
- No need for cleaning the fibers (jelly free)
- Tight bending radii
- Halogen-free and non-corrosive fire gases
- Easy stripping

Applications
- Data cable in distribution network – FTTH
- Installation in indoor areas
- For horizontal and collapsed backbone cabling

Design

Cable design	microtube dry up to 6 fibers
Strain relief	aramide yarn
Jacket material	LSFH™
Jacket colour	white/grey/yellow

According to IEC 60794-1-2

Ordering information

01-1E9A2/MH(ZN)H-...23	I-B(ZN)H - 1.../125
02-1E9A2/MH(ZN)H-...23	I-B(ZN)H - 2.../125
04-1E9A2/MH(ZN)H-...23	I-B(ZN)H - 4.../125
06-1E9A2S/MH(ZN)H-...23	I-B(ZN)H - 6.../125
12-1E9A2/MH(ZN)H-...28	I-B(ZN)H - 12.../125
24-1E9A2S/MH(ZN)H-...28	I-B(ZN)H - 24.../125
12-1E9A2/MQ(ZN)H-...28#D	I-BQ(ZN)H - 12.../125

Please see page 203.

HInweis
FRONTLINE Microtubex längswasserdichte Version (12-12E9A2/MQ(ZN)H-...28#D)

Specification							
CPR main class			B2ca				
Number of fibers			1, 2 or 4	6	12	24	
Fiber Ø		µm	250	200	250	200	
Jacket Ø		mm	2.3	2.3	2.8	2.8	
Approx. weight		kg/km	5.2	5.2	9.0	9.0	

Mechanical properties					
Tensile strength	during installation	N	400		IEC 60794-1-2 E1
	in service	N	200	100	
Min. bend radius	during installation	mm	10	15	IEC 60794-1-2 E11
	in service	mm	10	15	
Crush resistance	short-term	N/dm	1000	500	IEC 60794-1-2 E3
	long-term	N/dm	500	300	
Impact resistance	Wp = 1 J	impacts	3		IEC 60794-1-2 E4
Kink resistance	r = 5 mm		p		IEC 60794-1-2 E10

Thermal properties				
Temperature range	during installation	°C	−5 to +50	IEC 60794-1-22 F1
	in service	°C	−10 to +60	
	in storage	°C	−20 to +70	

Combustion properties				
Fire load		MJ/m	0.09	
Fire propagation	on a vertical single calbe		p	IEC 60332-1-2
	on a vertical calbe bundle		p	IEC 60332-3-25
Smoke density			p	IEC 61034-2
Halogen acid gas	jacket material		p	IEC 60754-1
Degree of acidity	jacket material		p	IEC 60754-2
2011/65/EC (RoHS)			compliant	
(EU) No 305/2011 (CPR)			B2ca-s1a, d0, a1	EN 50575

p = passed

FRONTLINE Inhome

Properties
- Metal-free indoor and outdoor cable
- Strain relieved with aramide yarn
- For direct connector assembly
- Tight bending radii
- Halogen-free and non-corrosive fire gases
- Optimised outer-diameter construction

Applications
- Data cable in distribution network – FTTH
- Installation in indoor areas
- For horizontal and collapsed backbone cabling

Design

Cable design	4 tight tubes buffered 0.6 mm, easy stripping
Strain relief	aramide yarn
Jacket material	LSFH™
Jacket colour	grey

According to IEC 60794-1-2

Ordering information

04-E9A2/V(ZN)H-...28	I-V(ZN)H - n x n .../125

Please see page 204.

Specification				
CPR main class			Dca	
Number of fibers		mm	4	
Jacket Ø			2.8	
Tube Ø		mm	0.6	coloured
Approx. weight		kg/km	8	

Mechanical properties				
Tensile strength	during installation	N	400	IEC 60794-1-2 E1
	in service	N	200	
Min. bend radius	during installation	mm	7.5	IEC 60794-1-2 E11
	in service	mm	7.5	
Crush resistance	short-term	N/dm	2000	IEC 60794-1-2 E3
	long-term	N/dm	1000	
Impact resistance	Wp = 1 J	impacts	5	IEC 60794-1-2 E4
Repeated bending	r = 30 mm	cycles	5000	IEC 60794-1-2 E6
Kink resistance	r = 6 mm	cycles	p	IEC 60794-1-2 E10
Coiling capability	lenght = 100 m/r = 70 mm	cycles	3	HUBER+SUHNER

Thermal properties				
Temperature range	during installation	°C	−20 to +70	IEC 60794-1-22 F1
	in service	°C	−40 to +70	
	in storage	°C	−40 to +70	

Combustion properties				
Fire load		MJ/m	0.19	
Fire propagation	on a vertical single cable		p	IEC 60332-1-2
Smoke density			p	IEC 61034-2
Halogen acid gas	jacket material		p	IEC 60754-1
Degree of acidity	jacket material		p	IEC 60754-2
2011/65/EC (RoHS)			compliant	
(EU) No 305/2011 (CPR)			Dca-s1a, d0, a1	EN 50575

p = passed

FRONTLINE Simplex

Properties
- Metal-free indoor cable
- Strain relief with aramide yarn
- Tube can be stripped up to 1 m in one piece
- For direct connector assembly
- Tight bending radii
- Low smoke, halogen-free and non-corrosive
- Jacket material according to UL94V-0

Applications
- Data cable in distribution network – FTTH
- Installation in indoor areas
- For horizontal and collapsed backbone cabling

Design

Cable design	1 semi-tight tube
Strain relief	aramide yarn
Jacket material	LSFH™
Jacket colour	white/grey

According to IEC 60794-1-2

Ordering information

01-E9A2/CWJH-...27-FG	I-V(ZN)H - 1.../125

Please see page 204.

Specification				
CPR main class			Dca	
Jacket Ø		mm	2.7	
Tube Ø		mm	0.9	
Approx. weight		kg/km	7.0	

Mechanical properties				
Tensile strength	during installation	N	400	IEC 60794-1-2 E1
	in service	N	200	
Min. bend radius 1)	during installation	mm	50	IEC 60794-1-2 E11
	in service	mm	25	
Crush resistance	short-term	N/dm	7000	IEC 60794-1-2 E3
	long-term	N/dm	5000	
Impact resistance	Wp = 1.0 J	impacts	20	IEC 60794-1-2 E4
Repeated bending	r = 25 mm	cycles	5000	IEC 60794-1-2 E6

Thermal properties				
Temperature range	during installation	°C	−10 to +50	IEC 60794-1-22 F12
	in service	°C	−25 to +70	
	in storage	°C	−25 to +70	

Combustion properties				
Fire load		MJ/m	0.17	
Fire propagation	on a vertical single cable		p	IEC 60332-1-2
	on a vertical cable bundle		p	IEC 60332-3-25
Halogen acid gas	jacket material		p	IEC 60754-1
Degree of acidity	jacket material		p	IEC 60754-2
2011/65/EC (RoHS)			compliant	
(EU) No 305/2011 (CPR)			Dca-s1a, d0, a1	EN 50575

p = passed

[1] Smaller bending radius are possible with E9/125 LowBend (ITU G.657) and G50/125-OM3/OM4 BendOptimised.

FRONTLINE Facade

Properties
- Metal-free indoor and outdoor cable
- Jelly-free, dry
- Low smoke, halogen-free and non-corrosive

Applications
- FTTH cable for installation on external facades
- For indoor and outdoor installation
- Application for building cabling

Design

Cable design	Mikroader, trocken, bis 24 Fasern
Strain relief	aramide yarn
Jacket material	LSFH™
Jacket colour	grey

According to IEC 60794-1-2

Ordering information

04-.../MH(ZN)H(G)H-55	U-B(ZN)HH-1 x4 /125
06-...S/MH(ZN)H(G)H-55	U-B(ZN)HH-1 x6 /125
12-.../MH(ZN)H(G)H-55	U-B(ZN)HH-1 x12 /125
24-...S/MH(ZN)H(G)H-55	U-B(ZN)HH-1 x24 /125

Please see page 204.

Specification					
CPR main class		mm	5.5		
Jacket Ø			4, 6	12, 24	
Tube Ø		µm	250, 200	250, 200	
Approx. weight		kg/km	29.1		

Mechanical properties				
Tensile strength	during installation	N	1000	IEC 60794-1-21 E1
	in service	N	1000	
Min. bend radius 1)	during installation	mm	55	IEC 60794-1-21 E11
	in service	mm	55	
Crush resistance	short-term	N/dm	1000	IEC 60794-1-21 E3
	long-term	N/dm	500	
Impact resistance	Wp = 1.0 J	impacts	3	IEC 60794-1-2 E4
Repeated bending	r = 25 mm	cycles	500	IEC 60794-1-2 E6

Thermal properties				
Temperature range	during installation	°C	–10 to +60	IEC 60794-1-22 F1
	in service	°C	–25 to +70	
	in storage	°C	–25 to +70	

Combustion properties				
Fire load		MJ/m	0.4	
Fire propagation	on a vertical single cable		p	IEC 60332-1-2
	on a vertical cable bundle		p	IEC 60332-3-25
Halogen acid gas	jacket material		p	IEC 60754-1
Degree of acidity	jacket material		p	IEC 60754-2
2011/65/EC (RoHS) incl. amendments – including 2015/863 and 2017/2102			compliant	
EC) No 1907/2006 (REACh)			compliant	EN 50575

p = passed

*** Inner cable**
The inner cable corresponds to TS 0311-96 Part 9 Sector 3.
(EU) No 305/2011 (CPR) acc. to EN 50575 B2ca-s1a,d0,a1

OptiPack Simplex

Properties
- Metal-free indoor cable
- Strain relief with aramide yarn
- For direct connector assembly with strain relief
- Tight bending radii
- Low smoke, halogen free and self-extinguishing
- Optimised outer-diameter construction
- Ruggedised and non-ruggedised cable construction

Applications
- Data center
- Fits multifiber connectors (as MPO/MTP®)

Design

Strain relief	aramide yarn	
Jacket material	LSFH™	
Tube colour	E9 low bend	yellow
	G50 – OM3	turquoise
	G50 – OM4	heather violet
	G50 – OM5	lime green

According to IEC 60794-1-2

Ordering information

08-.../(ZN)H-...20	I-F(ZN)H - 8.../125
12-.../(ZN)H-...20	I-F(ZN)H - 12.../125
24-.../(ZN)H-...30	I-F(ZN)H - 24.../125
08-.../(ZN)H-...30	I-F(ZN)H - 8.../125
12-.../(ZN)H-...30	I-F(ZN)H - 12.../125

Please see page 204, 205.

Specification							
CPR main class			Dca	Dca	Dca	Dca	
Type			Non-ruggedised		ruggedised		
No. of fibers			8 or 12	24	8 or 12	24	
Jacket Ø		mm	2.0	3.0	3.0	3.6	
Approx weight		kg/km	3.6	8.0	8.3	11.0	

Mechanical properties							
Tensile strength	during installation	N	200	200	500	500	IEC 60794-1-2 E1
	in service	N	100	100	200	200	
Min. bend radius	during installation	mm	20	20	20	20	IEC 60794-1-2 E11
	in service	mm	10	10	10	10	
Crush resistance	during installation	N/dm	1000	1000	5000	5000	IEC 60794-1-2 E3
	in service	N/dm	200	200	1000	1000	
Impact resistance	Wp = 0.5 J	impacts	50	50			IEC 60794-1-2 E4
	Wp = 1.0 J				50	50	
Kink resistance	r = 5 mm		b	b	b	b	IEC 60794-1-2 E10

Thermal properties				
Temperature range	during installation	°C	–10 to +50	IEC 60794-1-22 F12
	in service	°C	–10 to +60	
	in storage	°C	–20 to +70	

Combustion properties							
Fire load		MJ/m	0.07	0.17	0.18	0.24	
Fire propagation	on a vertical single cable on a vertical cable bundle		p p	p p	p p	p p	IEC 60332-1-2 IEC 60332-3-25
Smoke density			p	p	p	p	IEC 61034-2
Halogen acid gas	jacket material		p	p	p	p	IEC 60754-1
Degree of acidity	jacket material		p	p	p	p	IEC 60754-2
2011/65/EC (RoHS)			compliant				
(EU) No 305/2011 (CPR)			Dca-s1a, d0, a1				EN 50575

p = passed

OptiPack-DJ

Properties
- Metal-free indoor cable
- Strain relieve with aramide yarn
- Robust double jacket construction
- For direct connector assembly
- Tight bending radii
- Low smoke, halogen free and self-extinguishing

Applications
- Data center
- Fits multifiber connectore as (wie MPO®/MTP)
- Installation in indoor areas

Design

Cable design	2 up to 24 fibers Inner jacket LSFH Rip cord	
Jacket material	LSFH™	
Standard colour cable	E9 low bend	yellow
	G50 – OM3	turquoise
	G50 – OM4	heather violet
	G50 – OM5	lime green

According to IEC 60794-1-2

Ordering information

08-.../(ZN)HH-...20	I-F(ZN)HH - 8.../125
12-.../(ZN)HH-...20	I-F(ZN)HH - 12.../125
24-.../(ZN)HH-...30	I-F(ZN)HH - 24.../125

See page 205.

Specification					
CPR main class			B2ca or Cca	B2ca or Cca	
No. of fibers			8 or 12	24	
Jacket Ø inner / outer		mm	2.0/4.0	3.0/4.9	
Approx. weight		kg/km	19	32	

Mechanical properties					
Tensile strength	during installation	N	500	500	IEC 60794-1-2 E1
	in service	N	200	200	
Min. bending radius	during installation	mm	15	15	IEC 60794-1-2 E11
	in service	mm	15	15	
Crush resistance	short-term	N/dm	2000	2000	IEC 60794-1-2 E3
	long-term	N/dm	100	100	
Impact resistance	Wp = 0.5 J	Im-pacts	50	50	IEC 60794-1-2 E4
Kink resistance	r = 10 mm		p	p	IEC 60794-1-2 E10

Thermal properties				
Temperature range	during installation	°C	–10 up to +50	IEC 60794-1-22 F1
	in service	°C	–25 up to +70	
	in storage	°C	–25 up to +70	

Combustion properties					
Fire load		MJ/m	0.6	0.7	
Fire propagation	on a vertical single cable		p	p	IEC 60332-1-2
	on a vertical cable bundle		p	p	IEC 61034-2
Halogen acid gas	jacket material		p	p	IEC 60754-1
Degree of acidity	jacket material		p	p	IEC 60754-2
2011/65/EC (RoHS)			compliant		
(EU) No 305/2011 (CPR)			B2ca-s1a,d0,a1 or Cca-s1a,d0,a1		EN 50575

p = passed

OptiPack breakout

Properties
- Single tubes with 8 or12 fibers
- Metal-free indoor cable
- Strain relieved with aramide yarn
- Ripcord for easy jacket removal
- Low smoke, halogen-free and self-extinguishing
- Cable with improved fire performance

Applications
- Installation in indoor areas
- Data center in distribution networks
- Ideal for applications involving high safety requirements in case of fire
- For horizontal and collapsed backbone cabling
- Fits multi fiber connectors (MPO/MTP®)

Design

Cable design	central strength member, non-metallic 16 to 144 optical fibers strain relief (aramide yarn) separating tape and 1 ripcord	
Jacket material	LSFH™	
Channel marketing	single-fiber cable numbered	
Tube/jacket colour	E9 low bend	yellow
	G50 – OM3	turquoise
	G50 – OM4	heather violet
	G50 – OM5	lime green

According to IEC 60794-1-2

Ordering information

16-8.../(ZN)SNH-...20	I-F(ZN)HH 2 x 8/125	24-12.../(ZN)SNH-...20	I-F(ZN)HH 2 x 12/125
32-8.../(ZN)SNH-...20	I-F(ZN)HH 4 x 8/125	48-12.../(ZN)SNH-...20	I-F(ZN)HH 4 x 12/125
48-8.../(ZN)SNH-...20	I-F(ZN)HH 6 x 8/125	72-12.../(ZN)SNH-...20	I-F(ZN)HH 6 x 12/125
64-8.../(ZN)SNH-...20	I-F(ZN)HH 8 x 8/125	96-12.../(ZN)SNH-...20	I-F(ZN)HH 8 x 12/125
96-8.../(ZN)SNH-...20	I-F(ZN)HH 12 x 8/125	144-12.../(ZN)SNH-...20	I-F(ZN)HH 12 x 12/125

Please see page 206.

Specification							
CPR main class			B2ca or Cca				
No. of fibers		8 fiber	16/32	48	64	96	
		12 fiber	24/48	72	96	144	
Jacket Ø		mm	6.6	8.0	9.6	10.3	
Single cable Ø		mm	2.0	2.0	2.0	2.0	numbered
Approx. Weight		kg/km	46	70	93	108	

Mechanical properties							
Tensile strength	during installation	N	600	800	1000	1400	IEC 60794-1-2 E1
	in service	N	4 x 100	6 x 100	8 x 100	12 x 100	
Min. bend radius	during installation	mm	90	110	130	150	IEC 60794-1-2 E11
	in service	mm	60	70	90	100	
Crush resistance	short-term	N/dm	5000	5000	5000	5000	IEC 60794-1-2 E3
	long-term	N/dm	1000	1000	1000	1000	
Impact resistance	Wp = 1.0 J	impacts	50	50	50	50	IEC 60794-1-2 E4
Kink resistance	r = 20 mm r = 30 mm		p	p	 p	 p	IEC 60794-1-2 E10

Thermal properties				
Temperature range	during installation	°C	–10 to +50	IEC 60794-1-22 F12
	in service	°C	–20 to +70	
	in storage	°C	–20 to +70	

Combustion properties							
Fire load		MJ/m	0.97	1.2	1.75	2.07	
Fire propagation	on a vertical single cable on a vertical cable bundle		p p	p p	p p	p p	IEC 60332-1-2 IEC 60332-3-25
Smoke density			p	p	p	p	IEC 61034-2
Halogen acid gas	jacket material		p	p	p	p	IEC 60754-1
Degree of acidity	jacket material		p	p	p	p	IEC 60754-2
2011/65/EC (RoHS)			compliant				
(EU) No 305/2011 (CPR)			B2ca-s1a,d0,a1 or Cca-s1a,d0,a1				EN 50575

p = passed

OptiPack breakout

Properties
- Single tubes with 24 fibers
- Metal-free indoor cable
- Strain relieved with aramide yarn
- Ripcord for easy jacket removal
- Low smoke, halogen-free and self-extinguishing
- Cable with improved fire performance

Applications
- Installation in indoor areas
- Data cable in distribution networks
- Ideal for applications involving high safety requirements in case of fire
- For horizontal and collapsed backbone cabling
- Fits multi-fiber connectors (MPO/MTP®)

Design

Cable design	central strength member, non-metallic 48 to 288 optical fibers strain relief (aramide yarn) separating tape and 1 ripcord	
Jacket material	LSFH™	
Channel marketing	single-fiber cable numbred	
Tube/jacket colour	E9 Low Bend	yellow
	G50 – OM3	turquoise
	G50 – OM4	heather violet
	G50 – OM5	lime green

According to IEC 60794-1-2

Ordering information

96-24.../(ZN)SNH-...30	I-F(ZN)HH 4 x 24/125
144-24.../(ZN)SNH-...30	I-F(ZN)HH 6 x 24/125
288-24.../(ZN)SNH-...30	I-F(ZN)HH 12 x 24/125

Please see page 206.

Specification						
CPR main class			B2ca or Cca			
No. of fibers			96	144	288	
Jacket Ø		mm	9.3	10.8	14.0	
Single cable Ø		mm	3.0	3.0	3.0	numbered
Approx. Weight		kg/km	78	118	189	

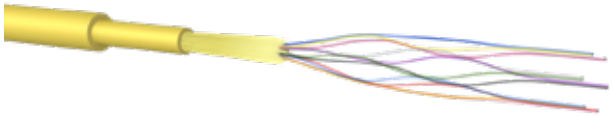
Mechanical properties						
Tensile strength	during installation	N	600	800	1400	IEC 60794-1-2 E1
	in service	N	4 x 100	6 x 100	12 x 100	
Min. bend radius	during installation	mm	130	160	200	IEC 60794-1-2 E11
	in service	mm	90	110	135	
Crush resistance	short-term	N/dm	5000	5000	5000	IEC 60794-1-2 E3
	long-term	N/dm	1000	1000	1000	
Impact resistance	Wp = 2.21 J	impacts	50	50	50	IEC 60794-1-2 E4
Kink resistance	r = 30 mm		p	p	p	IEC 60794-1-2 E10

Thermal properties				
Temperature range	during installation	°C	–10 to +60	IEC 60794-1-22 F1
	in service	°C	–20 to +70	
	in storage	°C	–40 to +70	

Combustion properties						
Fire load		MJ/m	1.35	2.5	3.1	
Fire propagation	on a vertical single cable		p	p	p	IEC 60332-1-2
	on a vertical cable bundle		p	p	p	IEC 60332-3-25
Smoke density			p	p	p	IEC 61034-2
Halogen acid gas	jacket material		p	p	p	IEC 60754-1
Degree of acidity	jacket material		p	p	p	IEC 60754-2
2011/65/EC (RoHS)			compliant			
(EU) No 305/2011 (CPR)			B2ca-s1a,d0,a1 or Cca-s1a,d0,a1			EN 50575

p = passed

OptiRibbon-DJ



Properties
- Metal-free indoor cable
- Strain relieve with aramide yarn
- Robust double jacket construction
- For direct connector assembly
- Tight bending radii
- Low smoke, halogen free and self-extinguishing

Applications
- Data center
- Fits multifiber connectore as (wie MPO®/MTP)
- Installation in indoor areas

Design

Cable design	2 up to 24 fibers Inner jacket LSFH Rip cord	
Jacket material	LSFH™	
Tube/jacket colour	E9 OptiRibbon	yellow

According to IEC 60794-1-2

Ordering information

12-1x12E9A2R/(ZN)HH-...20#C	I-F(ZN)HH- 1x12.../125
24-2x12E9A2R/(ZN)HH-...30#C	I-F(ZN)HH- 1x24.../125

Please see page 207.

Specification					
CPR main class			B2ca or Cca	B2ca or Cca	
No. of fibers			8 or 12	24	
Jacket Ø inner / outer		mm	2.0/4.0	3.0/4.9	
Approx. weight		kg/km	22	32	

Mechanical properties					
Tensile strength	during installation	N	500	500	IEC 60794-1-2 E1
	in service	N	200	200	
Min. bending radius	during installation	mm	15	15	IEC 60794-1-2 E11
	in service	mm	15	15	
Crush resistance	short-term	N/dm	2000	2000	IEC 60794-1-2 E3
	long-term	N/dm	100	100	
Impact resistance	Wp = 0.5 J	Im-pacts	50	50	IEC 60794-1-2 E4
Kink resistance	r = 10 mm		p	p	IEC 60794-1-2 E10

Thermal properties				
Temperature range	during installation	°C	–10 up to +50	IEC 60794-1-22 F1
	in service	°C	–25 up to +70	
	in storage	°C	–25 up to +70	

Combustion properties					
Fire load		MJ/m	0.6	0.7	
Fire propagation	on a vertical single cable		p	p	IEC 60332-1-2
	on a vertical cable bundle		p	p	IEC 61034-2
Halogen acid gas	jacket material		p	p	IEC 60754-1
Degree of acidity	jacket material		p	p	IEC 60754-2
2011/65/EC (RoHS)			compliant		
(EU) No 305/2011 (CPR)			B2ca-s1a,d0,a1 or Cca-s1a,d0,a1		EN 50575

p = passed

OptiSlim-Breakout

Properties
- Single tubes with 12/24 fibers
- Metal-free indoor cable
- Strain relieved with aramide yarn
- Ripcord for easy jacket removal
- Low smoke, halogen-free and self-extinguishing
- Cable with improved fire performance

Applications
- Installation in indoor areas
- Data cable in distribution networks
- Ideal for applications involving high safety requirements in case of fire
- For horizontal and collapsed backbone cabling
- Fits multi-fiber connectors (MPO/MTP®)

Ausführung

Cable design	central strength member, non-metallic 24 up 576 fibers strain relief (aramide yarn) separating tape and 1 ripcord	
Jacket material	LSFH™	
Channel marketing	single-fiber cable numbred	
Tube/jacket colour	E9 Low Bend	yellow
	G50 – OM3	turquoise
	G50 – OM4	heather violet
	G50 – OM5	lime green

According to IEC 60794-1-2

Ordering information on request

Specification						
CPR main class			Cca			
No. of fibers	12 fibers		24 - 72	96 - 144	288	
	24 fibers*		144	288	576	
Jacket Ø		mm	7.8	9.2	12.3	
Single cable Ø		mm	1.7	1.7	1.7	numbered
Approx. weight		kg/km	5.2	6.8	10.7	

Mechanical properties						
Tensile strength	during installation	N	800	1000	1400	IEC 60794-1-2 E1
	in service	N	6 x 100	12 x 100	24 x 100	
Min. bend radius	during installation	mm	120	135	185	IEC 60794-1-2 E11
	in service	mm	80	90	125	
Crush resistance	short-term	N/dm	3000	3000	3000	IEC 60794-1-2 E3
	long-term	N/dm	1000	1000	1000	
Impact resistance	Wp = 1.0 J	impacts	50	50	50	IEC 60794-1-2 E4
Kink resistance	r = 20 mm		p	p	p	IEC 60794-1-2 E10

Thermal properties				
Temperature range	during installation	°C	–10 to +50	IEC 60794-1-22 F12
	in service	°C	–20 to +70	
	in storage	°C	–20 to +70	

Combustion properties						
Fire load		MJ/m	1.2	1.75	2.07	
Fire propagation	on a vertical single cable		p	p	p	IEC 60332-1-2
	on a vertical cable bundle		p	p	p	IEC 61034-2
Smoke density			p	p	p	IEC 60754-1
Halogen acid gas	jacket material		p	p	p	IEC 60754-2
2011/65/EC (RoHS) incl. amendments			compliant			
(EU) No 305/2011 (CPR)			Cca-s1a,d0,a1			EN 50575

p = passed

*only E9/125

Universal cables

Universal cables

	Cable type	Page	Ordering key	Weight kg/km	Amount of fibers
	Optipack universal cable up to 288 fibers	100	24-12.../(ZN)SN(ZNG)H-...20 48-12.../(ZN)SN(ZNG)H-...20 72-12.../(ZN)SN(ZNG)H-...20 96-12.../(ZN)SN(ZNG)H-...20 144-12.../(ZN)SN(ZNG)-...20 288-24.../(ZN)SN(ZNG) H-...30	117 117 135 144 160 276	up to 24 up to 48 up to 72 up to 96 up to 144 up to 288
	Jelly-free – dry block multifiber loose tube up to 24 fibers	102	12-.../BQ(ZN)H-...35 24-.../Q(ZN)H-...50	11.4 25	up to 12 up to 24
	Jelly-free – dry block glass-armoured multi-fiber loose tube up to 24 fibers	104 106	24-.../Q(ZNG)H-...70#D 24-.../Q(ZNG)H-...70#C 24-.../Q(ZNG)H-...85 24-.../Q(ZNG)H-...120	50 57 83 178	up to 24 up to 24 up to 24 up to 24
	Jelly-free – dry block glass-armoured multi-fiber loose tube twin-tube up to 48 fibers	108	48-.../Q(ZNG)H-...94 24-.../BQ(ZNG)H-...88	101 92	up to2 x 24 up to 2 x 12
	Jelly-free – dry block glass-armoured multi-fiber loose tube up to 144 fibers	110	24-.../BQSN(ZNG)H-...100 48-.../BQSN(ZNG)H-...100 72-.../BQSN(ZNG)H-...110 96-.../BQSN(ZNG)H-...126 144-.../BQSN(ZNG)H-...150	100 100 120 148 217	up to 24 up to 48 up to 72 up to 96 up to 144
	Jelly-free – dry block glass-armoured multi-fiber loose tube up to 144 fibers	112	24-.../BQSN(ZNG)H-...96 48-.../BQSN(ZNG)H-...96 72-.../BQSN(ZNG)H-...106 96-.../BQSN(ZNG)H-...122 144-.../BQSN(ZNG)H-...145	100 100 120 148 217	up to 24 up to 48 up to 72 up to 96 up to 144
	Non-armoured multi-fiber loose tube up to 24 fibers	114	12-.../BW(ZN)H-...35 24-.../W(ZN)H-...50	10.3 27	up to 12 up to 24
	Glass-armoured multi-fiber loose tube up to 24 fibers	116	24-.../W(ZNG)H-...70 24-.../W(ZNG)H-...85 24-.../W(ZNG)H-...120	55 83 178	up to 24 up to 24 up to 24
	Glass-armoured multi-fiber loose tube twin-tube up to 48 fibers	118	48-.../W(ZNG)H-...94	101	up to 2 x 24

p = passed

Multifiber loose tube-Ø mm	Jacket Ø mm	Jacket material	Rodent protection	Tensile strength N	Crush resistance N/dm	Temperature range (in service) °C	Fire propagation IEC 60332-1-2	Fire propagation IEC 60332-3	CPR 2011/305/EU
	9.8	LSFH™	p	9000	3000	-40 to +70	p		On request
	9.8	LSFH™	p	9000	3000	-40 to +70	p		On request
	10.8	LSFH™	p	9000	3000	-40 to +70	p		On request
	11.9	LSFH™	p	9000	3000	-40 to +70	p		On request
	12.4	LSFH™	p	9000	3000	-40 to +70	p		On request
	16.0	LSFH™	p	9000	3000	-40 to +70	p		On request
2.2	3.5	LSFH™		900	3000	−25 to +70			
2.8	5.0	LSFH™		1000	3000	−5 to +70			
2.8	7.0	LSFH™	p	2000	5000	−40 to +70	p	p	Dca-s1a, d2, a1
2.8	7.0	LSFH™	p	2000	5000	−40 to +70	p	p	Cca-s1a, d0, a1
2.8	8.5	LSFH™	p	3000	8000	−40 to +70	p	p	Dca-s1a, d0, a1
2.8	12.0	LSFH™	P	9000	11000	−40 to +70	p	p	B2ca-s1a, d0, a1
2.8	8.8 x 9.4	LSFH™	p	3000	8000	−20 to +70	p	p	Dca-s1a, d0, a1
2.2	8.8	LSFH™	p	3000	8000	−20 to +70	p	p	Cca-s1a, d0, a1
2.2	10	LSFH™	p	9000	6000	−40 to +70	p		Cca-s1a, d0, a1
2.2	10	LSFH™	p	9000	6000	−40 to +70	p		Cca-s1a, d0, a1
2.2	11	LSFH™	p	9000	6000	−40 to +70	p		Cca-s1a, d0, a1
2.2	12.6	LSFH™	p	9000	6000	−40 to +70	p		Cca-s1a, d0, a1
2.2	15	LSFH™	p	9000	6000	−40 to +70	p		Cca-s1b,d0,a1
2.2	9.6	LSFH™	p	9000	6000	−40 to +70	p	p	Dca-s1a, d0, a1
2.2	9.6	LSFH™	p	9000	6000	−40 to +70	p	p	Dca-s1a, d0, a1
2.2	10.6	LSFH™	p	9000	6000	−40 to +70	p	p	Dca-s2, d0, a1
2.2	12.2	LSFH™		9000	6000	−40 to +70	p	p	Dca-s2, d0, a1
2.2	14.5	LSFH™		9000	6000	−40 to +70	p	p	Eca
2.2	3.5	LSFH™	p	900	3000	−40 to +70			
2.8	5.0	LSFH™		1000	3000	−40 to +70			
2.8	7.0	LSFH™	p	2000	5000	−40 to +70	p	p	Dca-s2,d1,a1
2.8	8.5	LSFH™	p	3000	8000	−40 to +70	p	p	Dca-s1a,d0,a1
2.8	12.0	LSFH™	p	9000	11000	−40 to +70	p	p	Eca
2.8	8.8 × 9.4	LSFH™	p	3000	8000	−20 to +70	p	p	Dca-s2, d2, a1

Universal cables

	Cable type	Page	Ordering key	Weight kg/km	Amount of fibers
	Glass-armoured multi-fiber loose tube up to 144 fibers	120	24-.../BWSN(ZNG)H-...96 48-.../BWSN(ZNG)H-...96 72-.../BWSN(ZNG)H-...106 96-.../BWSN(ZNG)H-...122 144-.../BWSN(ZNG)H-...145	109 109 119 151 220	up to 24 up to 48 up to 72 up to 96 up to 144
	Steel-armoured multi-fiber loose tube upt to 24 fibers	122	24-.../W(ZN)HAH-...80	82	up to 24
	Steel-armoured multi-fiber loose tube, TWINTUBE up to 48 fibers	122	48-.../W(ZNG)HAH-...125	200	up to 2 x 24
	Steel-armoured multi-fiber loose tube up to 72 fibers	124	48-.../BWSN(ZNG)HAH-...130 72-.../BWSN(ZNG)HAH-...140	220 246	up to 48 up to 72
	Glass-armoured riser cable with 2 fibers	126	02-.../F(ZNG)H-...48 02-.../F(ZNG)H-...55 02-.../F(ZNG)H-...70	26 35 55	2 2 2
	Glass-armoured riser cable with 4 fibers	128	04-.../FSN(ZNG)H-...55	33	4
	Steel-armoured riser cable up to 4 fibers	130	04-.../FSN(ZNG)HAH-...85	101	up to 4

Multifiber loose tube-Ø mm	Jacket Ø mm	Jacket material	Rodent protection	Tensile strength N	Crush resistance N/dm	Temperature range (in service) °C	Fire propagation IEC 60332-1-2	Fire propagation IEC 60332-3	CPR 2011/305/EU
2.2 2.2 2.2 2.2 2.2	9.6 9.6 10.6 12.2 14.5	LSFH™ LSFH™ LSFH™ LSFH™ LSFH™	p p p p p	9000 9000 9000 9000 9000	6000 6000 6000 6000 6000	–40 to +70 –40 to +70 –40 to +70 –40 to +70 –40 to +70	p p p p p	p p p p p	Dca-s1a, d0, a1 Dca-s1a, d0, a1
2.8	8.0	LSFH™	p	3000	4000	–40 to +70	p	p	
2.8	12.5	LSFH™	p	3000	8000	–20 to +70	p	p	
2.2 2.2	13.0 14.0	LSFH™ LSFH™	p p	9000 9000	8000 8000	–40 to +70 –40 to +70	p p	p p	
0.9 0.9 0.9	4.8 5.5 7.0	LSFH™ LSFH™ LSFH™	p p p	1000 1000 1000	20 000 20 000 20 000	–40 bis +75 –40 bis +75 –40 bis +75	p p p	p p p	Dca-s2,d0,a1 Dca-s1a,d0,a1 Dca-s2,d1,a1
0.9	5.5	LSFH™	p	1000	20 000	–40 bis +75	p	p	
0.9	8.5	LSFH™	p	2000	10 000	–40 bis +70	p		

p = passed

OptiPack universal cable

Propterties
- Single cables with 8, 12 or 24 fibers
- Metal-free indoor cable
- Strain relieved with aramide yarn
- Rip cord for easy jacket removal
- Low smoke, halogen-free and self-extinguishing
- Cable with improved fire performance

Applications
- Data cable in distribution networks
- Ideal for applications involving high safety requirements in case of fire
- For horizontal and collapsed backbone cabling
- Fits multifiber connectors (MPO®/MTP)

Design

Cable design	central strength member, non-metallic 16 to 288 optical fibers strain relief (aramide yarn) separating tape and 1 ripcord
Strain relief and rodent protection	glass roving
Jacket material	LSFH™
Standard colour cable jacket	colour coded

According to IEC 60794-1-2

Ordering information

16-8.../(ZN)SN(ZNG)H-...20	U-F(ZN)HBH 2 x 8/125	24-12.../(ZN)SN(ZNG)H-...20	U-F(ZN)HBH 2 x 12/125
32-8.../(ZN)SN(ZNG)H-...20	U-F(ZN)HBH 4 x 8/125	48-12.../(ZN)SN(ZNG)H-...20	U-F(ZN)HBH 4 x 12/125
48-8.../(ZN)SN(ZNG)H-...20	U-F(ZN)HBH 6 x 8/125	72-12.../(ZN)SN(ZNG)H-...20	U-F(ZN)HBH 6 x 12/125
64-8.../(ZN)SN(ZNG)H-...20	U-F(ZN)HBH 8 x 8/125	96-12.../(ZN)SN(ZNG)H-...20	U-F(ZN)HBH 8 x 12/125
96-8.../(ZN)SN(ZNG)H-...20	U-F(ZN)HBH 12 x 8/125	144-12.../(ZN)SN(ZNG)H-...20	U-F(ZN)HBH 12 x 12/125
		288-24.../(ZN)SN(ZNG)H-...30	U-F(ZN)HBH 12 x 24/125

Please see page 208.

Specification								
CPR main class			On request					
No. of fibers		mm	24/48	72	96	144	288	
Cable jacket Ø		mm	9.8	10.8	11.9	12.4	16.0	
Single cable Ø		mm	2.0	2.0	2.0	2.0	3.0	numbered
Approx. weight		kg/km	117	135	144	160	276	

Mechanical properties								
Tensile strength	during installation	N	9000	9000	9000	9000	9000	IEC 60794-1-2 E1
	in service	N	4 x 100	6 x 100	8 x 100	12 x 100	12 x 100	
Min. bending radius [1]	during installation	mm	130	150	160	180	240	IEC 60794-1-2 E11
	in service	mm	90	100	110	150	160	
Crush resistance	short-term	N/dm	3000	3000	3000	3000	3000	IEC 60794-1-2 E3
	long-term	N/dm	1500	1500	1500	1500	1500	
Impact resistance	Wp = 2.21 J	Impacts	50	50	50	50	50	IEC 60794-1-2 E4

Thermal properties				
Temperature range	during installation	°C	–10 to +50	IEC 60794-1-22 F12
	in service	°C	–40 to +70	
	in storage	°C	–40 to +70	

Combustion properties								
Fire load		MJ/m	1.4	1.45	1.6	1.8	3.3	
Fire propagation	on a vertical single cable		p	p	p	p	p	IEC 60332-1-2
Smoke density			p	p	p	p	p	IEC 61034-2
Halogen acid gas	jacket material		p	p	p	p	p	IEC 60754-1
Degree of acidity	jacket material		p	p	p	p	p	IEC 60754-2
2011/65/EC (RoHS)			compliant					
(EU) No 305/2011 (CPR)			classes on request					EN 50575

p = passed

Jellyfree multifiber loose tube cables

Properties
- Metal-free indoor and outdoor cable
- Jelly-free
- Strain relief with aramide yarn
- Ripcord for easy jacket removal
- Low smoke, halogen-free and self-extinguishing
- Low fire load for high safety requirements
- No need for cleaning the fibers

Applications
- Data cable in distribution networks
- For vertical applications up to 500 m
- For installation in cable ducts

Design

Cable design	dry multifiber loose tube with 2 up to 24 fibers 1 ripcord	
Strain relief	aramide yarn	
Fiber colour	according to colour code	
Jacket material	LSFH™	
Jacket colour	E9	yellow
	G50 – OM2	orange
	G50 – OM3	turquoise
	G 50 – OM4	heather violet
	G50 – OM5	lime green
	G62.5 – OM1	orange

According to IEC 60794-1-2

Ordering information

12-.../BQ(ZN)H-...35	I-BQ(ZN)H - 1 x n/125
24-.../Q(ZN)H-...50	I-BQ(ZN)H - 1 x n/125

Please see page 208.

Specification					
Jacket Ø		mm	3.5	5.0	
Number of fibers			2 to 12	2 to 24	
Multifiber loose tube		mm	2.2	2.8	
Approx. weight		kg/km	11.4	25.0	

Mechanical properties					
Tensile strength	during installation	N	900	1000	IEC 60794-1-2 E1
	in service	N	250	400	
Min. bend radius	during installation	mm	50	80	IEC 60794-1-2 E11
	in service	mm	35	50	
Crush resistance	short-term	N/dm	3000	3000	IEC 60794-1-2 E3
	long-term	N/dm	1500	1500	

Thermal properties					
Temperature range	during installation	°C	–10 to +50	–10 to +50	IEC 60794-1-22 F1
	in service	°C	–25 to +70	–5 to +70	
	in storage	°C	–25 to +70	–25 to +70	

Combustion properties					
Fire load		MJ/m	0.24	0.63	
Smoke density				p	IEC 61034-2
Halogen acid gas	jacket material		p	p	IEC 60754-1
Degree of acidity	jacket material		p	p	IEC 60754-2
2002/95/EC (RoHS)			compliant		

p = passed

Jelly-free glass-armoured multifiber loose tube cable

Properties
- Metal-free indoor and outdoor cable
- Jelly-free, no need for cleaning the fibers
- Rodent-protected, glass-armoured
- Low smoke, halogen-free and self-extinguishing
- Longitudinal and transversal watertight cable

Applications
- Data cable in distribution networks
- For vertical applications up to 500 m
- For installation in cable ducts
- For high safety requirements in case of fire

Design

Cable design	dry multifiber loose tube with up to 24 fibers
Strain relief and rodent protection	glass-roving
Fiber colour	according to colour code
Jacket material	LSFH™
Jacket colour	colour coded

According to IEC 60794-1-2

Ordering information

24-.../Q(ZNG)H-...70*	U-BQ(ZN)H 1 x n/125
24-.../Q(ZNG)H-...85	U-BQ(ZN)H 1 x n/125

See page 209.

Approvals
*UL approval acc. to OFNR/OFNG/OFN

Specification					
CPR main class			Cca	Dca	
Cable jacket Ø		mm	7.0	8.5	
No. of fibers			2 to 24		
Multifiber loose tube		mm	2.8		
Approx. weight		kg/km	57	55	

Mechanical properties					
Tensile strength	during installation	N	2000	3000	IEC 60794-1-2 E1
	in service	N	1200	1500	
Min. bending radius	during installation	mm	110	130	IEC 60794-1-2 E11
	in service	mm	70	80	
Crush resistance	short-term	N/dm	5000	8000	IEC 60794-1-2 E3
	long-term	N/dm	2000	3000	
Impact resistance	Wp = 1 J	Impacts	100	30	IEC 60794-1-21 E4
Torsion	± 180 °	Cycles	20000		IEC 60794-1-21 E4
Water penetration	h = 1 m, 24 h, p < 3 m		p	p	IEC 60794-1-2 F5B

Thermal properties					
Temperature range	during installation	°C	−10 to +50		IEC 60794-1-22 F1
	in service	°C	−40 to +70		
	in storage	°C	−40 to +70		

Combustion properties					
Fire load		MJ/m	0.7	1.5	
Fire propagation	on a vertical single cable		p	p	IEC 60332-1-2
Fire propagation	on a vertical cable bundle		p	p	IEC 60332-3-25
Smoke density			p	p	IEC 61034-2
2011/65/EC (RoHS)			compliant		
(EU) No 305/2011 (CPR)			Cca-s1a,d1,a12	Dca-s1a,d0,a1	EN 50575

p = passed

Jelly-free glass-armoured multifiber loose tube cables B2ca

Properties
- Metal-free indoor and outdoor cable
- Jelly-free, no need for cleaning the fibers
- Rodent-protected, glass-armoured
- Low smoke, halogen-free and self-extinguishing
- Longitudinal and transversal watertight cable

Applications
- Data cable in distribution networks
- For vertical applications up to 500 m
- For installation in cable ducts
- For high safety requirements in case of fire

Design

Cable design	dry multifiber loose tube with up to 24 fibers
Strain relief and rodent protection	glass-roving
Fiber colour	according to colour code
Jacket material	LSFH™
Jacket colour	colour coded

According to IEC 60794-1-2

Ordering information

24-.../Q(ZNG)H-...120	U-BQ(ZN)H 1 x n/125

Please see page 210.

Specification			
CPR main class		Dca	
Jacket Ø	mm	12.0	
Number of fibers		2 to 24	
Multifiber loose tube	mm	2.8	
Approx. weight	kg/km	178	

Mechanical properties				
Tensile strength	during installation	N	9000	IEC 60794-1-2 E1
	in service	N	4500	
Min. bend radius	during installation	mm	180	IEC 60794-1-2 E11
	in service	mm	120	
Crush resistance	short-term	N/dm	11000	IEC 60794-1-2 E3
	long-term	N/dm	3000	
Impact resistance	Wp = 1 J Wp = 4.4 J Wp = 4.5 J	impacts	500	IEC 60794-1-2 E4
Water penetration	h = 1 m, 24 h, p < 3 m		p	IEC 60794-1-2 F5B

Thermal properties				
Temperature range	during installation	°C	–10 to +50	IEC 60794-1-22 F1
	in service	°C	–40 to +70	
	in storage	°C	–40 to +70	

Combustion properties				
Fire load		MJ/m	3.1	
Fire propagation	on a vertical single cable		p	IEC 60332-1-2
Fire propagation	on vertical cable bundle		p	IEC 60332-3-25
Smoke density			p	IEC 61034-2
2011/65/EC (RoHS)			compliant	
(EU) No 305/2011 (CPR)			B2ca-s1a,d0,a1	EN 50575

p = passed

TWINTUBE Jelly-free loose tube cables with glass-armouring

Properties

- Metal-free indoor and outdoor cable
- Jelly-free, no need for cleaning the fiber
- Rodent-protected, glass-armoured
- Ripcord for easy jacket removal
- Low smoke, halogen-free and self-extinguishing
- Longitudinal and transversal watertight cable

Applications

- For installations directly in the ground and in mechanically unprotected environments
- As data cable in distribution networks
- For installation outdoor, in wet cable ducts and pipes
- Ideal for applications involving high safety requirements in case of a fire

Design

Cable design	2 multifiber loose tubes, jelly-filled with 2 x 12 or 2 x 24 fibers 2 ripcords
Strain relief and rodent protection	glass-roving
Jacket material	LSFH™
Jacket colour	colour coded

According to IEC 60794-1-2

Ordering information

48-.../Q(ZNG)H-...94	U-BQ(ZN)H 2 x n/125
24-.../BQ(ZNG)H-...88	U-BQ(ZN)H 2 x n/125

Please see page 210.

Specification					
CPR main class			Dca	Cca	
Jacket Ø		mm	8.8 × 9.4	8.8	
Number of fibers			2 × 24	2 × 12	
Multifiber loose tube		mm	2.8	2.2	
Approx. weight		kg/km	101	92	

Mechanical properties					
Tensile strength	during installation	N	3000		IEC 60794-1-2 E1
	in service	N	1500		
Min. Min. bend radius	during installation	mm	150 [1]	135	IEC 60794-1-2 E11
	in service	mm	100 [1]	90	
Crush resistance	short-term	N/dm	8000 [1]		IEC 60794-1-2 E3
	long-term	N/dm	4000 [1]		
Water penetration	h = 1 m, 24 h, p < 3 m		p		IEC 60794-1-2 F5B

Thermal properties					
Temperature range	during installation	°C	−10 to +50		IEC 60794-1-22 F1
	in service	°C	−20 to +70		
	in storage	°C	−40 to +70		

Combustion properties					
Fire load		MJ/m	1.85	1.1	
Fire propagation	on a vertical single cable		p		IEC 60332-1-2
Halogen acid gas	jacket material		p		IEC 60754-1
Degree of acidity	jacket material		p		IEC 60754-2
2011/65/EC (RoHS)			compliant		
(EU) No 305/2011 (CPR)			Dca-s1a, d0, a1	Cca-s1a,d0,a1	EN 50575

p = passed

1) refers to the flat side of the cable

Jelly-free loose tube cable Cca

Properties
- Metal-free indoor and outdoor cable
- Jelly-free, no need for cleaning the fiber
- Rodent protection, glass-armoured
- Ripcord for easy jacket removal
- Jacket material according to UL 94V-0
- Low smoke, halogen-free and self-extinguishing
- Longitudinal and transversal watertight cable

Applications
- Data cable in distribution networks
- For applications involving high safety requirements in case of fire.

Design

Cable design	4 to 12 multifiber loose tube, jelly-free with 2 to 12 fibers strength member 2 ripcords
Strain relief and rodent protection	glass-roving
Jacket material	LSFH™
Jacket colour	colour coded

According to IEC 60794-1-2

Ordering information

24-.../BQSN(ZNG)H-...100*	U-BQ(ZN)H 12 x n/125
48-.../BQSN(ZNG)H-...100*	U-BQ(ZN)H 12 x n/125
72-.../BQSN(ZNG)H-...110	U-BQ(ZN)H 12 x n/125
96-.../BQSN(ZNG)H-...126	U-BQ(ZN)H 12 x n/125
144-.../BQSN(ZNG)H-...150	U-BQ(ZN)H 12 x n/125

See page 211.

*OFNR listed

Specification		**4**	**6**	**8**	**12**	
CPR main class		Cca				
No. of fibers		24/48	72	96	144	
Jacket-Ø	mm	10.0	11.0	12.6	15.0	
Multifiber loose tube	mm	2.2				
Approx. weight	kg/km	113	135	169	242	

Mechanical properties							
Tensile strength	during installation	N	9000	9000	9000	9000	IEC 60794-1-2 E1
	in service	N	4000	4000	4000	4000	
Min bending radius	during installation	mm	140	160	180	220	IEC 60794-1-2 E11
	in service	mm	100	110	120	150	
Crush resistance	short-term	N/dm	6000	6000	6000	6000	IEC 60794-1-2 E3
	long-term	N/dm	3000	3000	3000	3000	
Impact resistance	Wp = 2.21 J	impacts	50	50	50	50	IEC 60794-1-2 E4
Water penetration	h = 1 m, 24 h, p < 3 m		p	p	p	p	IEC 60794-1-2 F5A

Thermal properties				
Temperature range	during installation	°C	−10 to +50	IEC 60794-1-22 F1
	in service	°C	−40 to +70	
	in storage	°C	−40 to +70	

Combustion properties							
Fire load		MJ/m	1.5	1.8	2.5	3.6	
Flame propagation	on a vertical single cable		p	p	p	p	IEC 60332-1-2
Smoke density			p	p	p	p	IEC 61034-2
Halogen acid gas	jacket material		p	p	p	p	IEC 60754-1
Degree of acidity	jacket material		p	p	p	p	IEC 60754-2
2011/65/EC (RoHS)			compliant				
(EU) No 305/2011 (CPR)			Cca-s1a,d0,a1			Cca-s1b,d0,a1	EN 50575

p = passed

Jelly-free glass-armoured multifiber loose tube cables

Properties
- Metal-free indoor and outdoor cable
- Jelly-free, no need for cleaning the fiber
- Rodent protection, glass-armoured
- Ripcord for easy jacket removal
- Low smoke, halogen-free and self-extinguishing
- Longitudinal and transversal watertight cable

Applications
- Data cable in distribution networks
- For applications involving high safety requirements in case of fire

Design

Cable design	4 to 12 multifiber loose tube, jelly-free with 2 to 12 fibers strength member 2 ripcords
Strain relief and rodent protection	glass-roving
Jacket material	LSFH™
Jacket colour	colour coded

According to IEC 60794-1-2

Ordering information

24-.../BQSN(ZNG)H-...96	U-BQ(ZN)H 2 x n/125
48-.../BQSN(ZNG)H-...96	U-BQ(ZN)H 4 x n/125
72-.../BQSN(ZNG)H-...106	U-BQ(ZN)H 6 x n/125
96-.../BQSN(ZNG)H-...122	U-BQ(ZN)H 8 x n/125
144-.../BQSN(ZNG)H-...145	U-BQ(ZN)H 12 x n/125

Please see page 210.

Specification		4	**6**	**8**	**12**	
CPR main class		Dca			Eca	
Number of fibers		24/48	72	96	144	
Jacket Ø	mm	9.6	10.6	12.2	14.5	
Multifiber loose tube	mm	2.2				
Approx. weight	kg/km	109	119	151	220	

Mechanical properties							
Tensile strength	during installation	N	9000	9000	9000	9000	IEC 60794-1-2 E1
	in in service	N	4000	4000	4000	4000	
Min. bend radius	during installation	mm	140	160	180	220	IEC 60794-1-2 E11
	in service	mm	100	110	120	150	
Crush resistance	short-term	N/dm	6000	6000	6000	6000	IEC 60794-1-2 E3
	long-term	N/dm	3000	3000	3000	3000	
Impact resistance	Wp = 2.21 J	impact	50	50	50	50	IEC 60794-1-2 E4
Water penetration	h = 1 m, 24 h, p < 3 m		p	p	p	p	IEC 60794-1-2 F5A

Thermal properties				
Temperature range	during installation	°C	−10 to +50	IEC 60794-1-22 F1
	in service	°C	−40 to +70	
	in storage	°C	−40 to +70	

Combustion properties							
Fire load		MJ/m	1.9	2.3	3.0	4.3	
Fire propagation	on a vertical single cable		p	p	p	p	IEC 60332-1-2
Fire propagation	on vertical cable bundle		p	p	p	p	IEC 60332-3-25
Smoke density			p	p	p	p	IEC 61034-2
Halogen acid gas	jacket material		p	p	p	p	IEC 60754-1
Degree of acidity	jacket material		p	p	p	p	IEC 60754-2
2011/65/EC (RoHS)			compliant				
(EU) No 305/2011 (CPR)			Dca-s1a,d0,a1	Dca-s2,d0,a1		Eca	EN 50575

p = passed

Non-armoured multifiber loose tube cables

Properties
- Metal-free indoor and outdoor cable
- Strain relief with aramide yarn
- Ripcord for easy jacket removal
- Low smoke, halogen-free and self-extinguishing
- For use in ducts and in unprotected environment

Applications
- Data cable in distribution networks
- Installation in indoor and outdoor areas
- For installation in cable ducts

Design

Cable design	multifiber loose tube with 2 up to 24 fibers, jelly-filled 1 ripcord
Strain relief	aramide yarn
Fiber colour	according to colour code
Jacket material	LSFH™
Jacket colour	black

According to IEC 60794-1-2

Ordering information

12-.../BW(ZN)H-...35	U-D(ZN)H 1 x n/125
24-.../W(ZN)H-...50	U-D(ZN)H 1 x n/125

Please see page 211.

Specification					
Jacket Ø		mm	3.5	5.0	
Number of fibers			2 to 12	2 to 24	
Multifiber loose tube		mm	2.2	2.8	
Approx. weight		kg/km	10	27	

Mechanical properties					
Tensile strength	during installation	N	900	1000	IEC 60794-1-2 E1
	in service	N	250	400	
Min. bend radius	during installation	mm	52.5	80	IEC 60794-1-2 E11
	in service	mm	35	50	
Crush resistance	short-term	N/dm	3000	3000	IEC 60794-1-2 E3
	long-term	N/dm	1000	1500	
Impact resistance	Wp = 1.4 J Wp = 2.21 J	impacts	50	 50	IEC 60794-1-2 E4
Repeated bending	r = 35 mm/1 kg r = 50 mm/1 kg	cycles	5000	 5000	IEC 60794-1-2 E6

Thermal properties					
Temperature range	during installation	°C	−10 to +50		IEC 60794-1-22 F1
	in service	°C	−40 to +70		
	in storage	°C	−40 to +70		

Combustion properties					
Fire load		MJ/m	0.43	0.71	
Smoke density				p	IEC 61034-2
Halogen acid gas	jacket material		p	p	IEC 60754-1
Degree of acidity	jacket material		p	p	IEC 60754-2
2011/65/EC (RoHS)			compliant		

p = passed

Glass-armoured multifiber loose tube cables

Properties
- Metal-free indoor and outdoor cable
- Rodent protection, glass-armoured
- For high mechanical requirements
- Low smoke, halogen-free and self-extinguishing
- Low fire load for high safety requirments
- Longitudinal and transversal watertight cable

Applications
- For installation directly in the ground and in mechanically unprotected environments
- Data cable in distribution networks
- For installation outdoor, in wet cable ducts and pipes
- Ideal for high safety requirements in case of a fire.

Design

Cable design	multifiber loose tube up to 24 fibers, jelly-filled
Strain relief and rodent protection	glass-roving
Fiber colour	according to colour code
Jacket material	LSFH™
Jacket colour	black

Gemäss IEC 60794-1-2

Ordering information

24-.../W(ZNG)H-...70	U-DQ(ZN)H 1 x n/125
24-.../W(ZNG)H-...85 *	U-DQ(ZN)H 1 x n/125
24-.../W(ZNG)H-...120	U-DQ(ZN)H 1 x n/125

Please see page 212, 213, 214.

Approvals
* UL listed acc. OFN/OFNG

Specification						
CPR main class			Dca	Dca		
Jacket Ø		mm	7.0	8.5	12.0	
Number of fibers			2 to 24	2 to 24	2 to 24	
Multifiber loose tube		mm	2.8			
Approx. weight		kg/km	55	83	178	

Mechanical properties						
Tensile strength	during installation	N	2000	3000	9000	IEC 60794-1-2 E1
	in service	N	1200	1500	4500	
Min. bend radius	during installation	mm	110	130	180	IEC 60794-1-2 E11
	in service	mm	70	80	120	
Crush resistance	short-term	N/dm	5000	8000	11 000	IEC 60794-1-2 E3
	long-term	N/dm	2000	3000	6000	
Impact resistance	Wp = 1.5 J Wp = 4.41 J Wp = 4.5 J	impacts	100	 30	 500	IEC 60794-1-2 E4
Repeated bending	2.5 kg	cycles R = mm	2000 60	5000 50	5000 100	IEC 60794-1-2 E6
Torsion	± 1440°, 1 length 1 m	cycles	50	50	5	IEC 60794-1-2 E7
Water penetration	h = 1 m, 48 h, p < 3 m		p	p	p	IEC 60794-1-2 F5B

Thermal properties				
Temperature range	during installation	°C	−10 to +50	IEC 60794-1-22 F1
	in service	°C	−40 to +70	
	in storage	°C	−40 to +70	

Combustion properties						
Fire load		MJ/m	1.2	1.5	3.1	
Fire propagation	on a vertical single cable		p	p	p	IEC 60332-1-2
Fire propagation	on a vertical cable bundle		p	p	p	IEC 60332-3-24
Fire test	with circuit integrity (CI)	min.	180	180	180	IEC 60331-25
Smoke density			p	p	p	IEC 61034-2
Halogen acid gas	jacket material		p	p	p	IEC 60754-1
Degree of acidity	jacket material		p	p	p	IEC 60754-2
2011/65/EC (RoHS)			compliant			
(EU) No 305/2011 (CPR)			Dca-s2,d1,a1	Dca-s1a,d0,a1		EN 50575

p = passed

TWINTUBE Glass-armoured multifiber loose tube cables

Properties
- Metal-free indoor and outdoor cable
- Rodent-protected, glass-armoured
- Ripcord for easy jacket removal
- Low smoke, halogen-free and self-extinguishing
- Longitudinal and transversal watertight cable

Applications
- For installations directly in the ground and in mechanically unprotected environments
- As data cable in distribution networks
- For installation outdoor, in wet cable ducts and pipes
- Ideal for applications involving high safety requirements in case of a fire

Design

Cable design	2 multifiber loose tubes, jelly-filled with 2 x 24 fibers 2 ripcords
Strain relief and rodent protection	glass-roving
Jacket material	LSFH™
Jacket colour	black

According to IEC 60794-1-2

Ordering information

48-.../W(ZNG)H-...94	U-DQ(ZN)H 2 x n/125

Please see page 215.

Specification				
CPR main class			Dca	
Jacket Ø		mm	8.8 × 9.4	
Number of fibers			2 × 24	
Multifiber loose tube		mm	2.8	
Approx. weight		kg/km	101	

Mechanical properties				
Tensile strength	during installation	N	3000	IEC 60794-1-2 E1
	in service	N	1500	
Min. bend radius	during installation	mm	150 [1)]	IEC 60794-1-2 E11
	in service	mm	100 [1)]	
Crush resistance	short-term	N/dm	8000 [1)]	IEC 60794-1-2 E3
	long-term	N/dm	4000 [1)]	
Water penetration	h = 1 m, 24 h, p < 3 m		p	IEC 60794-1-2 F5B

Thermal properties				
Temperature range	during installation	°C	−10 to +50	IEC 60794-1-22 F1
	in service	°C	−20 to +70	
	in storage	°C	−40 to +70	

Combustion properties				
Fire load		MJ/m	1.85	
Fire propagation	on a vertical single cable		p	IEC 60332-1-2
Fire test	with circuit integrity (CI)	min.	180	IEC 60331-25
Halogen acid gas	jacket material		p	IEC 60754-1
Degree of acidity	jacket material		p	IEC 60754-2
2011/65/EC (RoHS)			compliant	
(EU) No 305/2011 (CPR)			Dca-s2, d2, a1	EN 50575

p = passed

Glass-armoured multifiber loose tube cables

Properties
- Metal-free indoor and outdoor cable
- Rodent protection, glass-armoured
- Ripcord for easy jacket removal
- Low smoke, halogen-free and self-extinguishing
- Longitudinal and transversal watertight cable

Applications
- Data cable in distribution networks
- For applications involving high safety requirements in case of fire

Design

Cable design	4 to 12 multifiber loose tube, jelly-filled with 2 to 12 fibers strength member 2 ripcords
Strain relief and rodent protection	glass-roving
Jacket material	LSFH™
Jacket colour	black (optional with 2 orange stripes)

According to IEC 60794-1-2

Ordering information

24-.../BWSN(ZNG)H-...96	U-DQ(ZN)H 2 x n/125
48-.../BWSN(ZNG)H-...96	U-DQ(ZN)H 4 x n/125
72-.../BWSN(ZNG)H-...106	U-DQ(ZN)H 6 x n/125
96-.../BWSN(ZNG)H-...122	U-DQ(ZN)H 8 x n/125
144-.../BWSN(ZNG)H-...145	U-DQ(ZN)H 12 x n/125

Please see page 215.

Specification			4	6	8	12	
CPR main class			Dca				
Number of fibers			24/48	72	96	144	
Jacket Ø		mm	9.6	10.6	12.2	14.5	
Multifiber loose tube			2.2				
Approx. weight		kg/km	109	119	151	220	

Mechanical properties							
Tensile strength	during installation	N	9000	9000	9000	9000	IEC 60794-1-2 E1
	in service	N	4000	4000	4000	4000	
Min. bend radius	during installation	mm	140	160	180	220	IEC 60794-1-2 E11
	in service	mm	100	110	120	150	
Crush resistance	short-term	N/dm	6000	6000	6000	6000	IEC 60794-1-2 E3
	long-term	N/dm	3000	3000	3000	3000	
Impact resistance	Wp = 2.21 J	impact	50	50	50	50	IEC 60794-1-2 E4
Water penetration	h = 1 m, 24 h, p < 3 m		p	p	p	p	IEC 60794-1-2 F5A

Thermal properties				
Temperature range	during installation	°C	−10 to +50	IEC 60794-1-22 F1
	in service	°C	−40 to +70	
	bei in storage	°C	−40 to +70	

Combustion properties							
Fire load		MJ/m	1.9	2.3	3.0	4.3	
Fire propagation	on a vertical single cable		p	p	p	p	IEC 60332-1-2
Fire propagation	on a vertical cable bundle		p	p	p	p	IEC 60332-3-25
Fire test with circuit integrity			90min	90min		90min	IEC 60331-25
Smoke density			p	p	p	p	IEC 61034-2
Halogen acid gas	jacket material		p	p	p	p	IEC 60754-1
Degree of acidity	jacket material		p	p	p	p	IEC 60754-2
2011/65/EC (RoHS)			compliant				
(EU) No 305/2011 (CPR)			Dca-s1a,d0,a1				EN 50575

p = passed

Simplex and TWINTUBE Steel-armoured multifiber loose tube cables

Simplex – up to 24 fibers

TWINTUBE – up to 48 fibers

Properties

- Steel-armoured indoor and outdoor cable
- Rodent-protected (steel-armoured)
- For high mechanical and thermal requirements
- Low smoke, halogen-free and self-extinguishing
- Low fire load for high safety requirements

Applications

- For outdoor and indoor installations and in mechanically unprotected environments
- Data cable in distribution networks
- For installations directly in the ground

Design

Cable design	1 to 2 multifiber loose tubes, jelly-filled with 2 to 48 fibers
Strain relief	aramid yarn/glass-roving
Rodent protection	steel-armoured
Jacket material	LSFH™
Jacket colour	black

According to IEC 60794-1-2

Ordering information

24-.../W(ZN)HAH-...80	U-DQ(ZN)H(ZS)H 1 x n/125
48-.../W(ZNG)HAH-...125	U-DQ(ZN)H(ZS)H 2 x n/125

Please see page 215.

Specification		Simplex	TWINTUBE	
Jacket Ø	mm	8.0	12.5	
Number of fibers		2 to 24	up to 2 x 24	
Multifiber loose tube	mm	2.8		
Approx. weight	kg/km	82	200	

Mechanical properties					
Tensile strength	during installation	N	3000	3000	IEC 60794-1-2 E1
	in service	N	1500	1500	
Min. bend radius	during installation	mm	120	190 [1]	IEC 60794-1-2 E11
	in service	mm	80	125 [1]	
Crush resistance	short-term	N/dm	4000	8000 [1]	IEC 60794-1-2 E3
	long-term	N/dm	2000	4000 [1]	

Thermal properties					
Temperature range	during installation	°C	–10 to +50	–10 to +50	IEC 60794-1-22 F1
	in service	°C	–40 to +70	–20 to +70	
	in storage	°C	–40 to +70	–40 to +70	

Combustion properties					
Fire load		MJ/m	1.32	3.35	
Fire propagation	on a vertical single cable		p	p	IEC 60332-3-22
Fire propagation	on a vertical cable bundle		p	p	IEC 60332-3-25
Smoke density			p	p	IEC 61034-2
Halogen acid gas	jacket material		p	p	IEC 60754-1
Degree of acidity	jacket material		p	p	IEC 60754-2
Fire test	with circuit integrity (CI)	min.	180	180	IEC 60331-25
2011/65/EC (RoHS)			compliant		

p = passed

[1] refers to the flat side of the cable

Steel-armoured multifiber loose tube cables

Properties
- Steel-armoured indoor and outdoor cable
- Rodent-protected (steel-armoured)
- For use in ducts and unprotected environment
- For high mechanical requirements
- Low smoke, halogen-free and self-extinguishing

Applications
- For outdoor and indoor installations and in mechanically unprotected environments
- Data cable in distribution networks
- For installations directly in the ground

Design

Cable design	4 to 6 multifiber loose tube, jelly-filled with 2 to 12 fibers strength member 2 ripcords
Strain relief	glass-roving
Rodent protection	steel-armoured
Jacket material	LSFH™
Jacket colour	black

According to IEC 60794-1-2

Ordering information

24-.../BWSN(ZNG)HAH-...130	U-DQ(ZN)H(ZS)H 2 x n/125
48-.../BWSN(ZNG)HAH-...130	U-DQ(ZN)H(ZS)H 4 x n/125
72-.../BWSW(ZNG)HAH-...140	U-DQ(ZN)H(ZS)H 6 x n/125

Please see page 215.

Specification			4	6	
Jacket Ø		mm	13.0	14.0	
Number of fibers			24/48	72	
Multifiber loose tube			2.2		
Approx. weight		kg/km	220	246	

Mechanical properties					
Tensile strength	during installation	N	9000	9000	IEC 60794-1-2 E1
	in service	N	4000	4000	
Min. bend radius	during installation	mm	200	210	IEC 60794-1-2 E11
	in service	mm	130	140	
Crush resistance	short-term	N/dm	6000	6000	IEC 60794-1-2 E3
	long-term	N/dm	3000	3000	
Impact resistance	Wp = 2.21 J	impacts	50	50	IEC 60794-1-2 E4

Thermal properties				
Temperature range	during installation	°C	−10 to +50	IEC 60794-1-22 F1
	in service	°C	−40 to +70	
	in storage	°C	−40 to +70	

Combustion properties					
Fire load		MJ/m	3.6	4.1	
Fire propagation	on a vertical single cable		p	p	IEC 60332-1-2
Fire propagation	on a vertical cable bundle cable		p	p	IEC 60332-3-25
Halogen acid gas	jacket material		p	p	IEC 60754-1
Degree of acidity	jacket material		p	p	IEC 60754-2
2011/65/EC (RoHS)			compliant		

p = passed

Glass-armoured riser cables

Properties
- Metal-free indoor and outdoor cable
- Rodent-protected, glass-armoured
- For vertical appcications
- For direct connector assembly
- Halogen-free and self-extinguishing
- Low fire load for high safety requirements
- Longitudinal and transversal watertight cable

Applications
- For FTTA installation
- Data cable in distribution networks

Design

Cable design	2 tight tubes
Strain relief and rodent protection	glass-armoured
Jacket material	LSFH™
Jacket colour	black

According to IEC 60794-1-2

Ordering information

02-.../F(ZNG)H-...48	UT-V(ZN)H 2...
02-.../F(ZNG)H-...55	UT-V(ZN)H 2...
02-.../F(ZNG)H-...70	UT-V(ZN)H 2...

Please see page 216.

Approvals
UL listed acc. OFNR

Specification						
CPR main class			Dca	Dca	Dca	
Number of Fiber			2	2	2	
Jacket Ø		mm	4.8	5.5	7.0	
Tube Ø		mm	0.9	0.9	0.9	coloured
Approx. weight		kg/km	26	35	55	

Mechanical properties						
Tensile strength	during installation	N	1000	1000	1000	IEC 60794-1-2 E1
	in service	N	500	500	500	
Min. bend radius [1]	during installation	mm	70	70	70	IEC 60794-1-2 E11
	in service	mm	40	40	40	
Crush resistance Single-mode	short-term	N/dm	20 000	20 000	20 000	IEC 60794-1-2 E3
	long-term	N/dm	6000	6000	6000	
Crush resistance Multimode	short-term	N/dm	20 000	20 000	20 000	IEC 60794-1-2 E3
	long-term	N/dm	7500	6000	6000	
Water penetration	h = 1 m, 24 h, p < 3 m		p	p	p	IEC 60794-1-2 F5B

Thermal properties						
Temperature range	during installation	°C	−40 to +70	−25 to +75	−25 to +75	IEC 60794-1-22 F1
	in service	°C	−40 to +75	−40 to +75	−40 to +75	
	in storage	°C	−40 to +75	−40 to +75	−40 to +75	

Combustion properties						
Fire load		MJ/m	0.46	0.67	1.2	
Fire propagation	on a vertical single cable		p	p	p	IEC 60332-1-2
	on a vertical cable bundle		p	p	p	IEC 60332-3-25
	on a vertical cable bundle		p	p	p	UL 1666
Halogen acid gas	Jacket material		p	p	p	IEC 60754-1
Degree of acidity	Jacket material		p	p	p	IEC 60754-2
2011/65/EC (RoHS)			compliant			
(EU) No 305/2011 (CPR)			Dca-s2,d0,a1	Dca-s1a,d0,a1	Dca-s1a,d1,a1	EN 50575
Hazard level 3					compliant	EN 45545

[1] Smaller bending radius are possible with E9/125 LowBend (ITU G.657) and G50/125-OM3/OM4 BendOptimized.

Glass-armoured riser cables

Properties
- Metal-free indoor and outdoor cable
- Rodent-protected, glass-armoured
- Rip cord for easy jacket removal
- For direct connector assembly
- Halogen-free and self-extinguishing
- Low fire load for high safety requirements
- Longitudinal and transversal watertight cable

Applications
- For FTTA installation
- Data cable in distribution networks

Design

Cable design	central strength member (non-meallic) 4 tight tubes 1 rip cord
Strain relief and rodent protection	glass-armoured
Jacket material	LSFH™
Jacket colour	black

According to IEC 60794-1-2

Ordering information

04-.../FSN(ZNG)H-...55	UT-V(ZN)H 4...

Please see page 216.

Specification					
Fiber type			E9	G50, G62	
Number of Fiber			4		
Jacket Ø		mm	5.5		
Tube Ø		mm	0.9		coloured
Approx. weight		kg/km	33		

Mechanical properties					
Tensile strength	during installation	N	1000		IEC 60794-1-2 E1
	in service	N	500		
Min. bend radius [1]	during installation	mm	83		IEC 60794-1-2 E11
	in service	mm	60		
Crush resistance Single-mode	short-term	N/dm	20 000	6000	IEC 60794-1-2 E3
	long-term	N/dm	3000	2000	
Impact resistance	Wp = 1.53 J	Impacts	100	200	IEC 60794-1-2 E4
Repeated bending	r = 40 mm, weight = 1 kg	cycles	10 000		IEC 60794-1-2 E6
Flexing	r = 100 mm, weight = 1.5 kg	cycles	20 000		IEC 60794-1-2 E8
Torsion	± 360°, l = 1000 mm	cycles	1000		IEC 60794-1-2 E7
Water penetration	h = 1 m, 24 h, p < 3 m		p		IEC 60794-1-2 F5B

Thermal properties				
Temperature range	during installation	°C	−25 to +75	IEC 60794-1-22 F1
	in service	°C	−40 to +75	
	in storage	°C	−40 to +75	

Combustion properties				
Fire load		MJ/m	0.7	
Fire propagation	on a vertical single cable		p	IEC 60332-1-2
	on a vertical cable bundle		p	IEC 60332-3-24
	on a vertical cable bundle		p	UL 1666
Halogen acid gas	Jacket material		p	IEC 60754-1
Degree of acidity	Jacket material		p	IEC 60754-2
2011/65/EC (RoHS)			compliant	

p = passed

[1] Smaller bending radius are possible with E9/125 low bend (ITU G.657) and G50/125-OM2/OM3/OM4 bend optimized.

Steel-armoured riser cable

Properties
- Steel-armoured indoor and outdoor cable
- Rodent-protected, steel-armoured
- For usage in ducts and unprotected environment
- For direct connector assembly
- Low smoke, halogen-free and self-extinguishing
- For high mechanical requirements

Applications
- For FTTA installation
- For indoor and outdoor installation in mechanical unprotected environment
- Data cable in distribution networks

Design

Cable design	central strength member (non-metallic) 4 tight tubes 1 rip cord
Strain relief and rodent protection	glass-armoured
Jacket material	LSFH™
Jacket colour	black

According to IEC 60794-1-2

Ordering information

04-.../FSN(ZNG)HAH-...85	UT-V(ZN)H(ZS)H 4...

Please see page 216.

Specification		
Fiber type		E9, G50, G62
Number of Fiber		4
Jacket Ø	mm	8.5
Tube Ø	mm	0.9
Approx. weight	kg/km	101

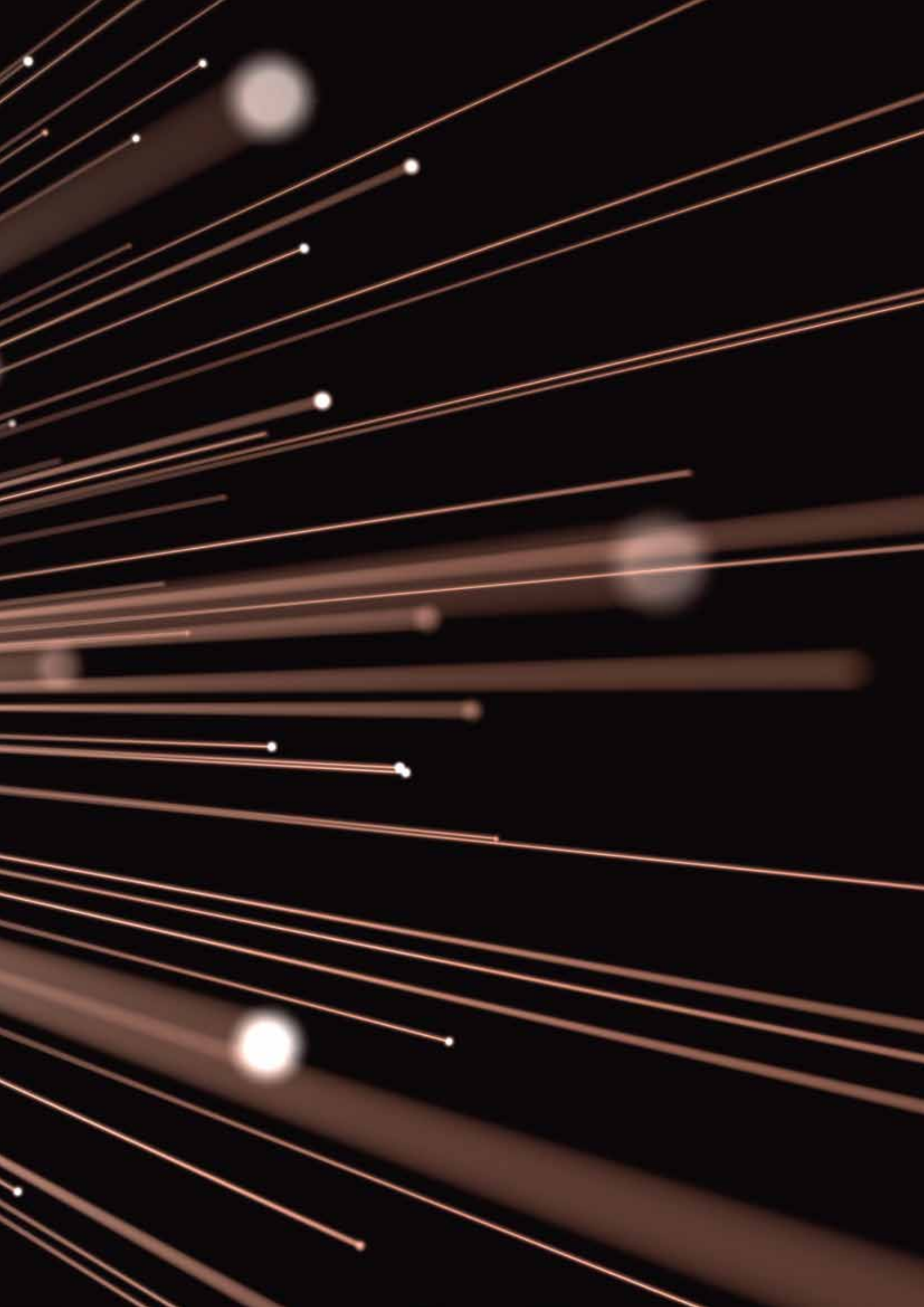
Mechanical properties				
Tensile strength	during installation	N	2000	IEC 60794-1-2 E1
	in service	N	1000	
Min. bend radius [1]	during installation	mm	130	IEC 60794-1-2 E11
	in service	mm	85	
Crush resistance	short-term	N/dm	10 000	IEC 60794-1-2 E3
	long-term	N/dm	1000	

Thermal properties				
Temperature range	during installation	°C	−25 to +75	IEC 60794-1-22 F1
	in service	°C	−40 to +75	
	in storage	°C	−40 to +75	

Combustion properties				
Fire load		MJ/m	1.2	
Fire propagation	on a vertical single cable		p	IEC 60332-1-2
Halogen acid gas	Jacket material		p	IEC 60754-1
Degree of acidity	Jacket material		p	IEC 60754-2
2011/65/EC (RoHS)			compliant	

p = passed

[1] Smaller bending radius are possible with E9/125 low bend (ITU G.657) and G50/125-OM2/OM3/OM4 bend optimized.



Outdoor cables

Outdoor cables

	Cable type	Page	Ordering key	Weight kg/km	Amount of fibers
	Non-armoured multifiber loose tube up to 24 fibers	136	24-.../W(ZN)Y-...50	20	2 up to 24
	Glass-armoured multifiber loose tube up to 24 fibers	138	24-.../W(ZNG)Y-...70 24-.../W(ZNG)Y-...85 24-.../W(ZNG)Y-...120	63 63 135	2 up to 24 2 up to 24 2 up to 24
	Glass-armoured multifiber loose tube TWINTUBE, up to 48 fibers	140	48-.../W(ZNG)Y-...94	69	up to 48
	Steel-armoured multifiber loose tube up to 24 fibers	142	24-.../W(ZN)YAY-...80	70	2 up to 24
	Steel-armoured multifiber loose tube TWINTUBE up to 48 fibers	142	48-.../W(ZNG)YAY-...125	152	up to 48

p = passed

Multifiber loose tube Ø mm	Jacket Ø mm	Jacket material	Rodent protection	Tensile strength N	Crush resistance N/dm	Temperature range (in service) °C
2.8	5.0	PE		1000	3000	−40 to +70
2.8 2.8 2.8	7.0 8.5 12.0	PE PE PE	p p p	2000 3000 9000	5000 10 000 12 000	−40 to +70 −40 to +70 −40 to +70
2.8	8.8 × 9.4	PE	p	3000	8000	−20 to +70
2.8	8.0	PE	p	3000	4000	−40 to +70
2.8	12.5	PE	p	3000	8000	−20 to +70

Non-armoured multifiber loose tube cables

Properties
- Metal-free outdoor cable
- Strain relieved with aramide yarn
- For use in ducts and unprotected environment
- High chemical resistance against acids and alkalies
- Halogen-free and non-corrosive fire gases

Applications
- Data cable in distribution networks
- For outdoor installations in humid and wet cable ducts

Design

Cable design	multifiber loose tube with 2 up to 24 fibers, jelly-filled
Strain relief	aramide yarn
Jacket material	PE
Jacket colour	black or colour coded

According to IEC 60794-1-2

Ordering information

up to 24-.../W(ZN)Y-...50	A-D(ZN)2Y 1 x n/125

Please see page 217.

Specification				
Jacket Ø		mm	5.0	
Number of fibers			2 to 24	
Multifiber loose tube		mm	2.8	
Approx. weight		kg/km	20	

Mechanical properties				
Tensile strength	during installation	N	1000	IEC 60794-1-2 E1
	in service	N	400	
Min. bend radius	during installation	mm	80	IEC 60794-1-2 E11
	in service	mm	50	
Crush resistance	short-term	N/dm	3000	IEC 60794-1-2 E3
	long-term	N/dm	1500	
Impact resistance	Wp = 2.21 J	impacts	50	IEC 60794-1-2 E4
Repeated bending	r = 50 mm/1 kg	cycles	5000	IEC 60794-1-2 E6

Thermal properties				
Temperature range	during installation	°C	–10 to +50	IEC 60794-1-22 F1
	in service	°C	–40 to +70	
	in storage	°C	–40 to +70	

Combustion properties				
Fire load		MJ/m	0.75	
2011/65/EC (RoHS)			compliant	

p = passed

Glass-armoured multifiber loose tube cables

Properties
- Metal-free outdoor cable
- Rodent protection, glass-armoured
- For use in ducts and in unprotected environment
- High chemical resistance against acids and alkalies
- For high mechanical and thermal stability
- Halogen-free and non-corrosive fire gases
- Longitudinal and transversal watertight cable

Applications
- For installation directly in the ground and in mechanically unprotected environments
- Data cable in distribution networks
- For installation outdoor, in wet cable ducts and pipes

Design

Cable design	multifiber loose tube with 2 up to 24 fibers, jelly-filled
Strain relief and rodent protection	glass-roving
Jacket material	PE
Jacket colour	black

According to IEC 60794-1-2

Ordering information

up to 24-.../W(ZNG)Y-...70	A-DQ(ZN)2Y 1 x n/125
up to 24-.../W(ZNG)Y-...85	A-DQ(ZN)2Y 1 x n/125
up to 24-.../W(ZNG)Y-...120	A-DQ(ZN)2Y 1 x n/125

Please see page 217, 218.

Specification						
Jacket Ø		mm	7.0	8.5	12.0	
Number of fibers each bundle			2 to 24			
Multifiber loose tube		mm	2.8			
Approx. weight		kg/km	42	62	135	

Mechanical properties						
Tensile strength	during installation	N	2000	3000	12 000	IEC 60794-1-2 E1
	in service	N	1200	1500	6000	
Min. bend radius	during installation	mm	110	130	180	IEC 60794-1-2 E11
	in service	mm	70	80	120	
Crush resistance	short-term	N/dm	5000	10 000	12 000	IEC 60794-1-2 E3
	long-term	N/dm	2000	3000	6000	
Impact resistance	Wp = 4.41 J Wp = 4.5 J	impacts	10	30	 100	IEC 60794-1-2 E4
Repeated bending	r = 80 mm r = 120 mm	cycles	3000	5000	 5000	IEC 60794-1-2 E6
Torsion	± 1440° ± 360°	cycles	3	3	 3	IEC 60794-1-2 E7
Water penetration	h = 1 m, 24 h, p < 3 m		p	p	p	IEC 60794-1-2 F5B

Thermal properties						
Temperature range	during installation	°C	−10 to +50	−10 to +50	−10 to +50	IEC 60794-1-22 F1
	in service	°C	−40 to +70	−40 to +70	−40 to +70	
	in storage	°C	−40 to +70	−40 to +70	−25 to +70	

Combustion properties						
Fire load		MJ/m	1.3	1.6	3.4	
2011/65/EC (RoHS)			compliant			

p = passed

TWINTUBE glass-armoured multifiber loose tube cables

Properties
- Metal-free outdoor cable
- Rodent-protected, glass-armoured
- For use in ducts and unprotected environment
- Ripcord for easy jacket removal
- High chemical resistance against acids and alkalies
- Halogen-free and non-corrosive fire gases
- Longitudinal and transversal watertight cable

Applications
- For installations directly in the ground and in mechanically unprotected environments
- Data cable in distribution networks
- For installation outdoor, in wet cable ducts and pipes

Design

Cable design	2 multifiber loose tubes, jelly-filled with up to 2 × 24 fibers 2 ripcords
Strain relief and rodent protection	glass-roving
Jacket material	PE
Jacket colour	black

According to IEC 60794-1-2

Ordering information

up to 48-.../W(ZNG)Y-...94	A-DQ(ZN)2Y 2 x n/125

Please see page 219.

Specification				
Jacket Ø		mm	8.8 × 9.4	
Number of fibers			2 × 24	
Multifiber loose tube		mm	2.8	
Approx. weight		kg/km	69	

Mechanical properties				
Tensile strength	during installation	N	3000	IEC 60794-1-2 E1
	in service	N	1500	
Min. bend radius	during installation	mm	150 [1]	IEC 60794-1-2 E11
	in service	mm	100 [1]	
Crush resistance	short-term	N/dm	8000 [1]	IEC 60794-1-2 E3
	long-term	N/dm	4000 [1]	
Repeated bending	r = 150 mm, weight = 5 kg	cycles	5000 [1]	IEC 60794-1-2 E6
Water penetration	h = 1 m, 24 h, p < 3 m		p	IEC 60794-1-2 F5B

Thermal properties				
Temperature range	during installation	°C	−10 to +50	IEC 60794-1-22 F1
	in service	°C	−20 to +70	
	in storage	°C	−40 to +70	

Combustion properties			
Fire load	MJ/m	1.8	
2011/65/EC (RoHS)		compliant	

p = passed

1) refers to the flat side of the cable

TWINTUBE and Simplex Steel-armoured multifiber loose tube cables

Simplex – up to 24 fibers

TWINTUBE – up to 48 fibers

Properties

- Steel-armoured outdoor cable
- Rodent-protected (steel-armoured)
- High chemical resistance against acids and alkalies
- Halogen-free and non-corrosive fire gases

Applications

- For outdoor installations and in mechanically unprotected environments
- Data cable in distribution networks
- For installations directly in the ground

Design

Cable design	1 to 2 multifiber loose tubes, jelly-filled with 2 to 48 fibers
Strain relief	aramid yarn/glass-roving
Rodent protection	steel-armoured
Jacket material	PE
Jacket colour	black

According to IEC 60794-1-2

Ordering information

up to 24-.../W(ZN)YAY-...80	A-DQ(ZN)2Y(ZS)2Y 2 x n/125
up to 48-.../W(ZNG)YAY-...125	A-DQ(ZN)2Y(ZS)2Y 2 x n/125

Please see page 219.

Specification		Simplex	TWINTUBE	
Jacket Ø	mm	8.0	12.5	
Number of fibers		up to 24	up to 2 × 24	
Multifiber loose tube	mm	2.8	2.8	
Approx. weight	kg/km	70	152	

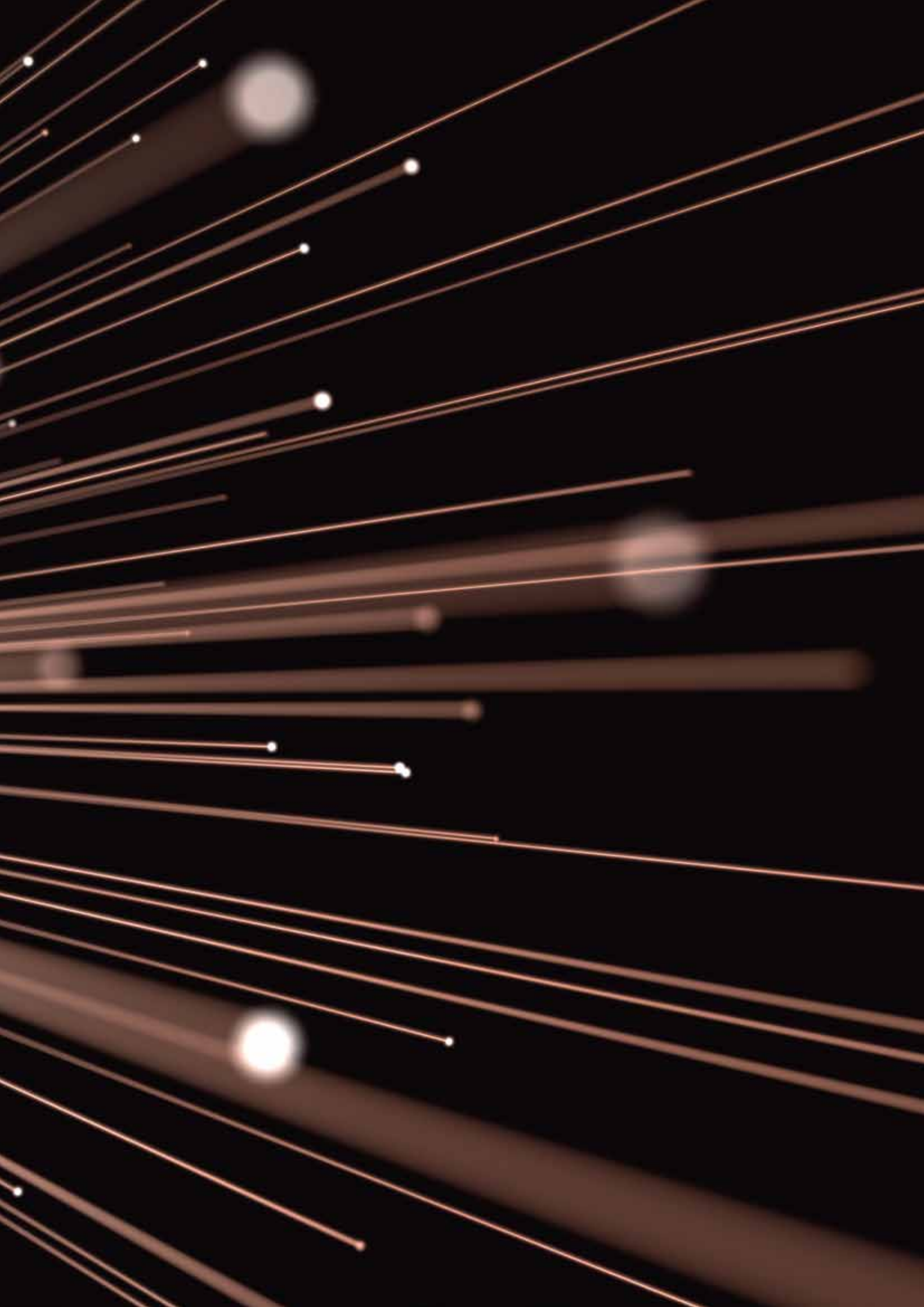
Mechanical properties					
Tensile strength	during installation	N	3000	3000	IEC 60794-1-2 E1
	in service	N	1500	1500	
Min. bend radius	during installation	mm	120	190*	IEC 60794-1-2 E11
	in service	mm	80	125*	
Crush resistance	short-term	N/cm	4000	8000*	IEC 60794-1-2 E3
	long-term	N/cm	2000	4000*	
Impact resistance	Wp = 4.41 J	impacts	50		IEC 60794-1-2 E4
	Wp = 15 J	impacts		3	

Thermal properties					
Temperature range	during installation	°C	–10 to +50	–10 to +50	IEC 60794-1-22 F1
	in service	°C	–40 to +70	–20 to +70	
	in storage	°C	–40 to +70	–40 to +70	

Combustion properties				
Fire load	MJ/m	1.78	3.51	
2011/65/EC (RoHS)		compliant		

p = passed

* refers to the flat side of the cable



Special cables

Special cables

	Cable type	Page	Ordering key	Weight kg/km	Amount of fibers
	Simplex cables with tight tube	150	01-.../FJZ-...19	3	1
	Rugged simplex cables	152	01-.../FJH(ZN)Z-...27	40	1
	TWINFLEX and rugged minicord breakout cables	154	02-.../FJ(ZN)Z-...17 02-.../...(ZN)Z-...22	28 46	2 2
	Quadflex	156	04-.../FJSN(ZNG)Z-...22	72	4
	TWINFIX	158	02-.../...(ZNG)H-...22 02-.../...(ZNG)R-...22	61	2 2
	RADOX® TWINFIX	160	02-.../...(ZNG)R-...22	68	4
	TWINFIX Railway	162	02-.../FJ(ZNG)R-...22#HL3	68	1
	QUADFIX glass-armoured breakout cables	164	04-.../FJSN(ZNG)H-...22 04-H200/VJSN(ZNG) H-...22	91 87	1 1
	HVDC-Simplex	166	01-.../FH-...20 01-.../VH-...20	4.5 4.5	1 1
	HVDC breakout	168	16-.../FSNH-...20 16-.../VSNH-...20 18-.../FSNH-...20 18-.../VSNH-...20	138 138 162 162	16 16 18 18
	OptiFlex	170	12-.../EW(ZN)Z-...60	26	up to 12
	Mobile field cables	172	02-.../FSN(ZN)Z-...56 04-.../FSN(ZN)Z-...56 08-.../FSN(ZN)Z-...68 12-.../FSN(ZN)Z-...80	24 26 40 53	2 4 8 12
	Rugged multifiber loose tube	174	24-.../Q(ZNG)Z-...70	44	up to 24

Tube Ø mm	Simplex cable Ø mm	Jacket Ø mm	Jacket material	Direct connector termination	Tensile strength N	Crush resistance N/dm	Temperature range in service °C	Fire propagation IEC 60332-1-2	Fire propagation IEC 60332-3	CPR 2011/305/EU
0.9		1.9	TPU	·	180	10 000	–40 to +85			
0.9	2.7	6.0	TPU	·	4000	20 000	–25 to +70			
0.9 0.9	1.7 2.2	6.0 7.5 × 8	TPU TPU	· ·	2000 2000	6000 6000	–40 to +70 –40 to +70			
0.9	2.2	9.0	TPU	·	2000		-40 to +70			
0.9 0.9	2.2 2.2	7.5x7.2 7.5x7.2	LSFH™ RA-DOX®	· ·	2000 4000	6000 6000	-40 to +70 -45 to +75	p p	p p	Dca-s1a, d0, a1
0.9	2.2	7.5×7.2	RADOX	·	4000	2000	–40 to +75	b	p	
0.9		2.0	LSFH™	·	100	1000	–45 to +85	b	p	
0.9 0.5	2.2 2.2	9 9	LSFH™ LSFH™		1000 1000	4000 4000	-40 to +70 -40 to +70	p p	p p	Cca-s1a, d0, a1
0.9 0.5		2.0 2.0	LSFH™ LSFH™	·	100 100	1000 3000	–45 to +85 –45 to +85	p p	p p	
0.9 0.5 0.9 0.5	2.0 2.0 2.0 2.0	12.0 12.0 13.0 13.0	LSFH™ LSFH™ LSFH™ LSFH™	· · · ·	700 700 1000 1000	10000 10000 10000 10000	–45 to +85 –45 to +85 –45 to +85 –45 to +85	p p p p		
3.0		6.0	TPU	·	4000	10000	-45 to +85			
0.9 0.9 0.9 0.9		5.6 5.6 6.8 8.0	TPU TPU TPU TPU	· · · ·	4000 4000 4000 4000	21 000 21 000 21 000 10 000	–60 to +85 –60 to +85 –60 to +85 –60 to +85			
2.8		7.0	TPU		2500	9000	–45 to +85			

Special cables

	Cable type	Page	Ordering key	Weight kg/km	Amount of fibers
	RADOX® glass-armoured multifiber loose tube cables (DNV)	178	24-.../W(ZNG)R-...-85	88	up to 24
	Steel armoured multifiber loose tube cable (DNV)	180	24-.../W(ZN)HAR-...82	115	up to 24 up to 24
	Steel armoured multi-fiber loose tube cable	180	24-.../Q(ZN)HAU-...80	100	up to 24
	Drag chain cables	182	12-.../FSN(ZN)YZ-...130	128	up to 12
	RADOX® drag chain cable	184	12-.../FSN(ZN)YR-...130	160	up to 12
	Hybrid cables	186	04-.../CWJSNH-...27+...-C15 08-.../CWJSNH-...27+...-C15 60-.../WSN(ZNG)Y-...150+...-C... 96-.../WSN(ZNG)Y-...180+...-C...		up to 4 up to 8 up to 60 up to 96

p = passed

Tube Ø mm	Simplex cable Ø mm	Jacket Ø mm	Jacket material	Direct connector termination	Tensile strength N	Crush resistance N/dm	Temperature range in service °C	Fire propagation IEC 60332-1-2	Fire propagation IEC 60332-3	CPR 2011/305/EU
2.8		8.5	RADOX		3000	10 000	–60 to +85	p	p	Cca-s1a, d0, a1
2.8		8.2	RADOX		3750	8000	–50 to +85	p	p	
2.8		8.0	TPU		3000	4000	–70 to 85	p		
0.9		13.0	TPU	·	4000	4000	–50 to +85			
0.9		13.0	RADOX	·	4000	1500	–30 to +85	p		
0.9 0.9 3.0 3.0	2.7 2.7 2.5 2.5	10.0 13.0 15.0 8.0	LSFH™ LSFH™ PE PE	· ·	2000 4000 9000 13 000	10 000 10 000 8000 8000	–20 to +70 –20 to +70 –40 to +70 –40 to +70	p p	p	

Simplex cables with tight tube

Properties
- Metal-free indoor and outdoor cable
- Strain relieved with aramide yarn
- For direct connector assembly with strain relief
- Tight bend radii
- For high mechanical and thermal stability
- Halogen-free and non-corrosive fire gases

Applications
- For outdoor and indoor installations
- Patch cable in distribution centres

Design

Tube	tight tube 0.9 mm	
Strain relief	aramide yarn	
Jacket material	TPU	
Jacket colour	E9	yellow
	G50 – OM2	orange
	G50 – OM3	turquoise
	G50 – OM4	heather violet
	G62.5 – OM1	orange

According to IEC 60794-1-2

Ordering information

01-.../FJZ-...19	A-V(ZN)11Y 1...

Please see page 220.

Specification				
Jacket Ø		mm	1.9	
Tube Ø		mm	0.9	
Approx. weight		kg/km	3	

Mechanical properties				
Tensile strength	during installation	N	180	IEC 60794-1-2 E1
	in service	N	90	
Min. bend radius [1]	during installation	mm	50	IEC 60794-1-2 E11
	in service	mm	25	
Crush resistance	short-term	N/dm	10 000	IEC 60794-1-2 E3
	long-term	N/dm	2000	
Impact resistance	Wp = 0.74 J	impacts	30	IEC 60794-1-2 E4
Repeated bending	r = 30 mm, weight = 1 kg	cycles	2500	IEC 60794-1-2 E6

Thermal properties				
Temperature range	during installation	°C	–10 to +50	IEC 60794-1-22 F12
	in service	°C	–40 to +85	
	in storage	°C	–40 to +85	

Combustion properties			
Fire load	MJ/m	0.11	
2011/65/EC (RoHS)		compliant	

[1] Smaller bending radius are possible with E9/125 LowBend (ITU G.657) and G50/125-OM3/OM4 BendOptimized.

Rugged simplex cables

Properties
- Metal-free indoor and outdoor cable
- Strain relieved with aramide yarn
- For direct connector assembly with strain relief
- High chemical resistance against acids and alkalies
- For high mechanical and thermal stability
- Halogen-free and non-corrosive fire gases
- Improved crash resistance

Applications
- Industry LAN
- Mobile data cablings in harsh environment
- Machinery cablings, drag chains

Design

Cable design	1 single-fiber cable with tight tubes
Strain relief	aramide yarn
Jacket material	Inner jacket LSFH / Outer jacket TPU
Jacket colour	According to colour code

According to IEC 60794-1-2

Ordering information

01-.../FJH(ZN)Z-...27	AT-V(ZN)H(ZN)11Y 1...

Please see page 220.

Specification				
Jacket Ø		mm	6.0	
Single-fiber cable Ø		mm	2.7	
Tube Ø		mm	0.9	
Approx. weight		kg/km	40	

Mechanical properties				
Tensile strength	during installation	N	4000	IEC 60794-1-2 E1
	in service	N	1500	
Min. bend radius	during installation	mm	90	IEC 60794-1-2 E11
	in service	mm	60	
Crush resistance	short-term	N/dm	20 000	IEC 60794-1-2 E3
	long-term	N/dm	10 000	
Impact resistance	Wp = 2.25 J	impacts	150	IEC 60794-1-2 E4
Repeated bending	r = 30 mm, weight = 2.5 kg	cycles	10 000	IEC 60794-1-2 E6
Flexing	r = 77 mm velocity = 2.2 m/s L = 2 m	cycles	100 000	HUBER+SUHNER drag chain test

Thermal properties				
Temperature range	during installation	°C	−10 to +60	IEC 60794-1-22 F1
	in service	°C	−25 to +70	
	in storage	°C	−40 to +70	

Combustion properties				
Fire load		MJ/m	0.57	
Halogen acid gas	Jacket material		p	IEC 60754-1
Degree of acidity	Jacket material		p	IEC 60754-2
2011/65/EC (RoHS)			compliant	

p = passed

TWINFLEX and rugged minicord breakout cables

Rugged minicord breakout

TWINFLEX

Properties
- Metal-free indoor and outdoor cable
- For direct connector assembly with strain relief
- Strain relieved with aramide yarn
- Ripcord for easy jacket removal
- Halogen-free and non-corrosive fire gases
- Improved crush resistance
- For high thermal and mechanical stability
- High chemical resistance against acids and alkalies
- High abrasive resistance

Applications
- For flexible, moved and fixed use
- Industrial Ethernet and LAN
- Machine cabling, drag chains
- As control or data cable in factory automation
- Mobile data cabling for harsh environment
- Connection to outdoor devices

Design

Cable design	2 Single-fiber cables with tight tubes 1 ripcord
Strain relief	aramide yarn
Jacket material	TPU
Jacket colour	black

According to IEC 60794-1-2

Ordering information

Rugged minicord breakout	02-.../FJ(ZN)Z-...17	AT-V(ZN)H(ZN)11Y 2...
TWINFLEX	02-.../...(ZN)Z-...22	AT-V(ZN)Z(ZN)11Y 2...

Please see page 220.

Conformance
TWINFLEX cables with H200 meet PROFINET specification.

Specification							
Cable type			rugged minicord break-out		TWINFLEX		
Fiber types			E9, G50, G62	H200	G50, G62	H200	
Jacket Ø		mm	6.0		7.5 × 8.0		
Single-fiber cable Ø		mm	1.7		2.2		
Tube Ø		mm	0.9	0.9	0.9	0.5	
Channel marking on single-fiber			numbered		black and orange with arrows		
Approx. weight		kg/km	28		46		

Mechanical properties							
Tensile strength	during installation	N	2000	2000	2000	2000	IEC 60794-1-2 E1
	in service	N	1000	500	1000	1000	
Min. bend radius	during installation	mm	25	25	40	60	IEC 60794-1-2 E11
	in service	mm	25	25	25	50	
Crush resistance	short-term	N/dm	6000	2000	6000	6000	IEC 60794-1-2 E3
	long-term	N/dm	2000	1000	2000	2000	
Impact resistance	Wp = 1.5 J Wp = 2.2 J	im-pacts	200	200	 200	 200	IEC 60794-1-2 E4
Repeated bending	r = 30 mm/10 kg r = 60 mm/1 kg	cycles	20 000		 10 000	 10 000	IEC 60794-1-2 E6
Flexing	r = 77 mm	cycles	100 000				HUBER+SUHNER [1]
Flexing	r = 70 mm r = 80 mm	cycles			100 000	100 000	IEC 60794-1-2 E8 IEC 60794-1-2 E8
Torsion	± 360° ± 1440°	cycles	 3		100	10	IEC 60794-1-2 E7

Thermal properties					
Temperature range	during installation	°C	−20 to +60	−10 to +60	IEC 60794-1-22 F1
	in service	°C	−40 to +70	−20 to +70	
	in storage	°C	−40 to +70	−25 to +70	

Combustion properties							
Fire load		MJ/m	0.6	0.6	0.75	0.75	
2011/65/EC (RoHS)			compliant				

Conformance							
PROFINET	Specification [2]					yes	

[1] Drag chain test
[2] Standard with H+S marking. According to PROFINET specification with PROFINET marking (PROFINET Type C 2K200/230)

QUADFLEX

Properties
- Metal-free outdoor cable
- For direct connector assembly with strain relief
- Strain relieved with aramide yarn
- Ripcord for easy jacket removal
- Halogen-free and non-corrosive fire gases
- Improved crush resistance
- UV resistant, suitable for outdoor usage
- For high thermal and mechanical stability
- High chemical resistance against acids and alkalies
- High abrasive resistance

Applications
- For flexible, moved and fixed use
- Industrial Ethernet and LAN
- Machine cabling, drag chains
- As control or data cable in factory automation
- Mobile data cabling for harsh environment
- Connection to outdoor devices

Design

Cable design	4 single-fiber cables with tight tubes
Strain relief	aramide yarn
Jacket material	TPU
Jacket colour	black

According to IEC 60794-1-2

Ordering information

04-.../FJSN(ZN)Z-...22	AT-V(ZN)H(ZN)11Y4...

Please see page 221.

Specification			
Cable type		QUADFLEX	
Fiber types		E9, G50, G62	
Jacket Ø	mm	9.0	
Single-fiber cable Ø	mm	2.2	
Tube Ø	mm	0.9	
Approx. weight	kg/km	72	

Mechanical properties				
Tensile strength	during installation	N	2000	IEC 60794-1-2 E1
	in service	N	1000	
Min. bend radius	during installation	mm	60	IEC 60794-1-2 E11
	in service	mm	40	
Crush resistance	short-term	N/dm	6000	IEC 60794-1-2 E3
	long-term	N/dm	2000	
Impact resistance	Wp = 2.2 J	im-pacts	200	IEC 60794-1-2 E4

Thermal properties				
Temperature range	during installation	°C	−20 to +60	IEC 60794-1-22 F1
	in service	°C	−40 to +70	
	in storage	°C	−40 to +70	

Combustion properties			
Fire load	MJ/m	1.5	
2011/65/EC (RoHS)		compliant	

TWINFIX

Properties
- Metal-free indoor and outdoor cable
- For direct connector assembly with strain relief
- Rodent-protected, glass-armoured
- Easy stripping
- Low smoke, halogen-free and self-extinguishing
- Improved crush resistance
- For high thermal and mechanical stability
- UV protected, suitable for outdoor use
- Longitudinal and transversal watertight cable

Applications
- For fixed installation
- Industrial Ethernet and LAN
- Machine cabling
- As control or data cable in factory automation
- Data cabling for harsh environment
- Connection to outdoor devices
- LSFH™ – for applications involving high safety requirements in case of fire

Design

Cable design	2 single-fiber cables with tight tubes
Strain relief	glass-armoured
Jacket material	LSFH™
Jacket colour	black

According to IEC 60794-1-2

Ordering information

02-.../...(ZNG)H-...22	UT-VQ(ZN)H(ZN)H 2...
02-.../...(ZNG)R-...22	UT-VQ(ZN)H(ZN)H 2...
02-.../...(ZNG)H-...22_UN (optional)	

Please see page 221.

Approvals
UL listed acc. OFN/OFNG

Specification					
CPR main class			Dca		
Cable type			TWINFIX		
Fiber types			E9 G50, G62	H200	
Jacket Ø		mm	7.5 × 7.2	7.5 × 7.2	
Single-fiber cable Ø		mm	2.2	2.2	
Tube Ø		mm	0.9	0.9	
Channel marking on single-fiber			black and orange with arrows		
Approx. weight		kg/km	61	67	

Mechanical properties					
Tensile strength	during installation	N	2000	2000	IEC 60794-1-2 E1
	in service	N	1000	1000	
Min. bend radius	during installation	mm	40	105	IEC 60794-1-2 E11
	in service	mm	25	70	
Crush resistance	short-term	N/dm	6000	6000	IEC 60794-1-2 E3
	long-term	N/dm	2000	2000	
Impact resistance	Wp = 2.2 J	impacts	200	200	IEC 60794-1-2 E4
Repeated bending	r = 60 mm/1 kg	cycles	10 000	10 000	IEC 60794-1-2 E6
Torsion	± 360°	cycles	10	10	IEC 60794-1-2 E7
Water penetration	h = 1 m, 24 d, p < 3 m		p	p	IEC 60794-1-2 F5A

Thermal properties					
Temperature range	during installation	°C	–10 to +60	–10 to +60	IEC 60794-1-22 F1
	in service	°C	–40 to +70	–20 to +70	
	in storage	°C	–45 to +70	–25 to +70	

Combustion properties					
Fire load		MJ/m	1.15	1.1	
Fire propagation	on a vertical cable bundle		p	p	IEC 60332-3-24
Fire test	with circuit integrity (CI)	min	90	90	IEC 60331-25
Halogen acid gas	Jacket material		p	p	IEC 60754-1
Degree of acidity	Jacket material		p	p	IEC 60754-2
2011/65/EC (RoHS)			compliant		

Conformance					
PROFINET	specification [1]			yes	
(EU) No 305/2011 (CPR)			Dca-s1a, d0, a1		EN 50575

p = passed

[1] Standard black jacket and with H+S marking. According to PROFINET specification with green jacket and PROFINET marking (PROFINET Type B 2K200/230)

RADOX® TWINFIX

Properties
- Metal-free indoor and outdoor cable
- For direct connector assembly with strain relief
- Rodent-protected, glass-armoured
- Easy stripping
- Low smoke, halogen-free and self-extinguishing
- Improved crush resistance
- For high thermal and mechanical stability
- UV-protected, suitable for outdoor use
- Longitudinal and transversal watertight cable

Applications
- For fixed installation
- Industrial Ethernet and LAN
- Machine cabling
- As control or data cable in industrial plants
- Cabling in harsh environment conditions
- Connection to outdoor devices

Design

Cable design	2 single-fiber cables with tight tubes
Strain relief	glass-armoured
Jacket material	RADOX®
Jacket colour	black

According to IEC 60794-1-2

Ordering information

02-.../...(ZNG)R-...22	UT-VQ(ZN)H(ZN)H 2...

Please see page 221.

Specification					
Cable type			TWINFIX		
Fiber types			E9 G50	H200	
Jacket Ø		mm	7.5 × 7.2	7.5 × 7.2	
Single-fiber cable Ø		mm	2.2	2.2	
Tube Ø		mm	0.9	0.9	
Channel marking on single-fiber			black and orange with arrows		
Approx. weight		kg/km	68	68	

Mechanical properties					
Tensile strength	during installation	N	4000	4000	IEC 60794-1-2 E1
	in service	N	2 x 100	2 x 100	
Min. bend radius	during installation	mm	40	70	IEC 60794-1-2 E11
	in service	mm	25	40	
Crush resistance	short-term	N/dm	12000	6000	IEC 60794-1-2 E3
	long-term	N/dm	2000	2000	
Impact resistance	Wp = 2.2 J	impacts	50	200	IEC 60794-1-2 E4
Repeated bending	r = 60 mm/1 kg	cycles	10 000	10 000	IEC 60794-1-2 E6
Torsion	± 360°	cycles	15000	15000	IEC 60794-1-2 E7
Water penetration	h = 1 m, 24 d, p < 3 m		p	p	IEC 60794-1-2 F5A

Thermal properties					
Temperature range	during installation	°C	−20 to +70	−20 to +70	IEC 60794-1-22 F1
	in service	°C	−45 to +75	−50 to +75	
	in storage	°C	−45 to +75	−50 to +75	

Combustion properties					
Fire load		MJ/m	0.8	0.8	
Fire propagation	on a vertical cable bundle		p	p	IEC 60332-3-25
Halogen acid gas	Jacket material		p	p	IEC 60754-1
Degree of acidity	Jacket material		p	p	IEC 60754-2
2011/65/EC (RoHS)			compliant		
Hazard level 3			compliant		EN 45545

p = passed

TWINFIX Railway

Properties
- Metal-free indoor and outdoor cable
- For direct connector assembly with strain relief
- Rodent-protected, glass-armoured
- Easy stripping
- Low smoke, halogen-free and self-extinguishing
- Improved crush resistance
- For high thermal and mechanical stability
- UV-protected, suitable for outdoor use
- Longitudinal and transversal watertight cable
- HL3 certified

Applications
- Rolling stock
- In-carriage solutions
- Bus networks
- IP based networks

Design

Cable design	2 single-fiber cables with tight tubes
Strain relief	glass-armoured
Jacket material	RADOX®
Jacket colour	black

According to IEC 60794-1-2

Ordering information

02-.../FJ(ZNG)R-...22#HL3	UT-VQ(ZN)H(ZN)H 2...

Please see page 221.

Specification					
Cable type			TWINFIX		
Fiber types			E9 G50	H200	
Jacket Ø		mm	7.5 × 7.2	7.5 × 7.2	
Single-fiber cable Ø		mm	2.2	2.2	
Tube Ø		mm	0.9	0.9	
Channel marking on single-fiber			black and orange with arrows		
Approx. weight		kg/km	68	68	

Mechanical properties					
Tensile strength	during installation	N	4000	4000	IEC 60794-1-2 E1
	in service	N	2 x 100	2 x 100	
Min. bend radius	during installation	mm	40	70	IEC 60794-1-2 E11
	in service	mm	25	40	
Crush resistance	short-term	N/dm	12000	6000	IEC 60794-1-2 E3
	long-term	N/dm	2000	2000	
Impact resistance	Wp = 2.2 J	impacts	50	200	IEC 60794-1-2 E4
Repeated bending	r = 60 mm/1 kg	cycles	10 000	10 000	IEC 60794-1-2 E6
Torsion	± 360°	cycles	15000	15000	IEC 60794-1-2 E7
Water penetration	h = 1 m, 24 d, p < 3 m		p	p	IEC 60794-1-2 F5A

Thermal properties					
Temperature range	during installation	°C	−20 to +70	−20 to +70	IEC 60794-1-22 F1
	in service	°C	−45 to +75	−50 to +75	
	in storage	°C	−45 to +75	−50 to +75	

Combustion properties					
Fire load		MJ/m	0.8	0.8	
Fire propagation	on a vertical cable bundle		p	p	IEC 60332-3-25
Halogen acid gas	Jacket material		p	p	IEC 60754-1
Degree of acidity	Jacket material		p	p	IEC 60754-2
2011/65/EC (RoHS)			compliant		
Hazard level 3			compliant		EN 45545

p = passed

QUADFIX glass-armoured breakout cables

Properties
- Metal-free indoor and outdoor cable
- Rodent-protected, glass-armoured
- For direct connector assembly with strain relief
- Easy stripping
- UV-protected, suitable for outdoor use
- For high thermal and mechanical stability
- Low smoke, halogen-free and self-extinguishing
- Improved crush resistance
- Longitudinal and transversal watertight cable

Applications
- For fixed installation
- Industrial Ethernet and LAN
- As control or data cable in industrial plants
- Cabling in harsh environment conditions
- LSFH™ – for applications involving high safety requirements in case of fire

Design

Cable design	4 single-fiber cables with tight tubes
Strain relief	glass-armoured
Jacket material	LSFH™
Jacket colour	black

According to IEC 60794-1-2

Ordering information

04-.../FJSN(ZNG)H-...22	UT-VQ(ZN)H(ZN)H 4...
04-H200/VJSN(ZNG)H-...22	UT-VQ(ZN)H(ZN)H 4...

Please see page 221.

Approvals
UL listed acc. OFN/OFNG

Specification					
CPR main class			Cca		
Cable type			QUADFIX		
Fiber types			E9 G50, G62	H200	
Jacket Ø		mm	9	9	
Single-fiber cable Ø		mm	2.2	2.2	
Tube Ø		mm	0.9	0.5	
Approx. weight		kg/km	91	87	

Mechanical properties					
Tensile strength	during installation	N	2000	2000	IEC 60794-1-2 E1
	in service	N	1000	1000	
Min. bend radius	during installation	mm	135	135	IEC 60794-1-2 E11
	in service	mm	90	90	
Crush resistance	short-term	N/dm	15 000	6000	IEC 60794-1-2 E3
	long-term	N/dm	4000	2000	
Impact resistance	Wp = 2.2 J	impacts	200	200	IEC 60794-1-2 E4
Water penetration	h = 1 m, 24 h, p < 3 m		p	p	IEC 60794-1-2 F5A

Thermal properties					
Temperature range	during installation	°C	−10 to +60	−10 to +60	IEC 60794-1-22 F1
	in service	°C	−40 to +70	−20 to +70	
	in storage	°C	−40 to +70	−25 to +70	

Combustion properties					
Fire load		MJ/m	1.63	1.62	
Fire propagation	on a vertical cable bundle		p	p	IEC 60332-3-24
Fire test	with circuit integrity (CI)	min	180		IEC 60331-25
Halogen acid gas	Jacket material		p	p	IEC 60754-1
Degree of acidity	Jacket material		p	p	IEC 60754-2
2011/65/EC (RoHS)			compliant	compliant	
(EU) No 305/2011 (CPR)			Cca-s1a, d0, a1		EN 50575

p = passed

HVDC-Simplex

Properties
- Metal-free indoor and outdoor cable
- Strain relief with aramide yarn
- For direct connector assembly with strain relief
- Tight bending radii
- For high thermal and mechanical stability
- Halogen-free and non-corrosive fire gases

Applications
- Installation in indoor and outdoor areas
- Patch cables in distribution centres

Design

Tube	Tight tube 0.9 mm, 0.5 mm
Jacket material	LSFH
Jacket colour	black

According to IEC 60794-1-2

Ordering information

01-.../FH-...20	I-VH 1...
01-.../VH-...20	I-VH 1...

Please see page 222.

Specification					
Fiber types			E9, G50, G62	H200	
Jacket Ø		mm	2.0	2.0	
Tube Ø		mm	0.9	0.5	
Approx. weight		kg/km	4.5	4.5	

Mechanical properties					
Tensile strength	during installation	N	100	100	IEC 60794-1-2 E1
	in service	N	50	50	
Min. bend radius	during installation	mm	20	30	IEC 60794-1-2 E11
	in service	mm	15	20	
Crush resistance	short-term	N/dm	1000	3000	IEC 60794-1-2 E3
	long-term	N/dm	250	1000	
Impact resistance	Wp = 0.74 J	impacts	10	3	IEC 60794-1-2 E4
Repeated bending	r = 30 mm, weight = 1 kg	cycles	100	1000	IEC 60794-1-2 E6

Thermal properties					
Temperature range	during installation	°C	−25 to +75	−25 to +75	IEC 60794-1-22 F12
	in service	°C	−45 to +85	−45 to +85	
	in storage	°C	−45 to +85	−55 to +85	

Combustion properties					
Fire load		MJ/m	0.11	0.47	
Fire propagation	on a vertical single cable		p		IEC 60332-1-2
2011/65/EC (RoHS)			compliant	compliant	

HVDC breakout cable

Properties
- Metal-free indoor cable
- Low smoke, halogen free and self-extinguishing
- Aramide-free cable construction

Applications
- Installation in indoor areas
- Data cable in distribution centres
- For installation in cable ducts
- Ideal for applications involving high safety requirements in case of fire

Design

Cable design	central strength member, non metallic, 16 to 18 single-fiber cables with tight tube, separating tape
Channel marking	single-fiber cable numbered
Jacket material	LSFH™
Tube/jacket colour	black

According to IEC 60794-1-2

Ordering information

16-.../FSNH-...20	I-VHH 16...
16-.../VSNH-...20	I-VHH 16...
18-.../FSNH-...20	I-VHH 18...
18-.../VSNH-...20	I-VHH 18...

Specification		**16**	**16**	**18**	**18**	
Jacket-Ø	mm	12.0	12.0	13.0	13.0	
Single-fiber cable Ø	mm	2.0	2.0	2.0	2.0	
Tube Ø	mm	0.9	0.5	0.9	0.5	numbered
Approx. weight	kg/km	138	138	162	162	
Fiber type		E9, G50, G62	H200	E9, G50, G62	H200	

Mechanical properties							
Tensile strength	during installation	N	700	700	1000	1000	IEC 60794-1-2 E1
	in service	N	16 × 15	16 × 15	18 × 15	18 × 15	
Min. bend radius	during installation	mm	180	180	200	200	IEC 60794-1-2 E11
	in service	mm	120	120	160	160	
Crush resistance	short-term	N/dm	10 000	10 000	10 000	10 000	IEC 60794-1-2 E3
	long-term	N/dm	2000	2000	2000	2000	
Repeated bending	R=120mm, m=4.5kg	cycles	1000	1000			IEC 60794-1-21 E6
	R=150mm, m=2.0kg	cycles	1000				
Kink resistance	R=20mm		p	p			IEC 60794-1-21 E10
Flexing	R=240mm	cycles	100	100			IEC 60794-1-21 E8
Coiling capability	l=100m, R=120mm	cycles	5	5			HUBER+SUHNER
Impact resistance	Wp=1J, r=25mm	impacts	10	10	10	10	IEC 60794-1-21 E4
Torsion	±180°, l=1000mm, m=4kg	cycles	10	10			IEC 60794-1-21 E4

Thermal properties				
Temperature range	during installation	°C	−25 to +70	IEC 60794-1-22 F12
	in service	°C	−25 to +85	
	in storage	°C	−45 to +85	

Combustion properties							
Fire load		MJ/m	3.4	3.4	3.7	3.7	
Fire propagation	on a vertical single cable		p	p	p	p	IEC 60332-1-2
Halogen acid gas	Jacket material		p	p	p	p	IEC 60754-1
Degree of acidity	Jacket material		p	p	p	p	IEC 60754-2
2011/65/EC (RoHS)			compliant				

p = passed

OptiFlex

Properties
- For direct connector assembly
- Strain relief with aramide yarn
- UV-protected, suitable for outdoor use
- Metal-free
- High abrasive resistance

Applications
- Data cabling for harsh environment
- Military tactical field use
- Field video broadcast

Design

Cable design	Loose tube cable with flexible loose tube, jelly-filled, with 2 to 12 fibers
Strain relief	Aramide yarn
Fiber colour	According to colour code
Jacket material	TPU
Jacket colour	black

According to IEC 60794-1-2

Ordering information

12-.../EW(ZN)Z-...60	A-DQ(ZN)11Y - 1 x n/125

Please see page 222.

Specification			
Jacket Ø	mm	6.0	
No. of fibers		2 to 12	
Loose tube		Flex	
Approx. weight	kg/km	26	
Fiber type		E9 , G50	

Mechanical properties				
Tensile strength	during installation	N	4000	IEC 60794-1-21 E1
	in service	N	2000	
Min. bend radius	during installation	mm	60	IEC 60794-1-2 E11
	in service	mm	60	
Crush resistance	short-term	N/dm	10 000	IEC 60794-1-2 E3
	long-term	N/dm	2000	
Repeated bending	R=25mm, m=5kg	cycles	20 000	IEC 60794-1-21 E6
Flexing	R=120mm, m=1kg	cycles	100 000	IEC 60794-1-21 E8
Coiling capability	l=100m, R=80mm	cycles	100	HUBER+SUHNER
Impact resistance	Wp=2.21J	impacts	20	IEC 60794-1-21 E4
Torsion	±360°, l=1000mm	cycles	100 000	IEC 60794-1-21 E4

Thermal properties				
Temperature range	during installation	°C	–25 to +85	IEC 60794-1-22 F1
	in service	°C	–45 to +85	
	in storage	°C	–60 to +85	

Combustion properties			
Fire load	MJ/m	3.4	
2011/65/EC (RoHS)		compliant	

p = passed

Mobile field cables

Properties
- High tensile strength
- For direct connector assembly
- Excellent coiling capability
- High chemical resistance against acids and alkalies
- For high mechanical and thermal stability
- Halogen-free and non-corrosive fire gases
- Improved crush resistance
- UV-protected, suitable for outdoor use
- Metal-free
- Easy stripping
- High tensile strength, high abrasion and cut resistance

Applications
- Fixed or mobile data cabling (MASTERLINE mobile)
- Data cabling for harsh environment
- Military tactical field use
- Field video broadcast
- Machine cabling, drag chains

Design

Cable design	2, 4, 8 and 12 tight tubes
Strain relief	aramide yarn
Jacket material	TPU
Jacket colour	black

According to IEC 60794-1-2

Ordering information

02-…/FSN(ZN)Z-…56	AT-V(ZN)11Y 2…
04-…/FSN(ZN)Z-…56	AT-V(ZN)11Y 4…
08-…/FSN(ZN)Z-…68	AT-V(ZN)11Y 8…
12-…/FSN(ZN)Z-…80	AT-V(ZN)11Y 12…

Please see page 222.

Specification							
Number of Fiber			2	4	8	12	
Jacket Ø		mm	5.6	5.6	6.8	8.0	
Tube Ø		mm	0.9	0.9	0.9	0.9	coloured
Approx. weight		kg/km	24	26	40	53	

Mechanical properties								
Tensile strength	during installation		N	4000	4000	4000	4000	IEC 60794-1-2 E1
	in service		N	2000	2000	2000	2000	
Min. bend radius	during installation		mm	90	90	90	120	IEC 60794-1-2 E11
	in service		mm	45	45	45	80	
Crush resistance	short-term	E9 G50	N/dm	21 000 19 000	21 000 19 000	21 000 19 000	10 000 10 000	IEC 60794-1-2 E3
	long-term	E9 G50	N/dm	6000 8000	6000 8000	6000 2000	2000 2000	
Repeated bending	r = 50 mm, weight = 2 kg r = 80 mm, weight = 5 kg		cycles	20 000	20 000	20 000	 20 000	IEC 60794-1-2 E6
Flexing	r = 100 mm, weight = 1 kg r = 120 mm, weight = 2 kg r = 80 mm, weight = 1.5 kg		cycles	100 000	100 000	 100 000	 100 000	IEC 60794-1-2 E8
Impact resistance	Wp = 2.21 J		im-pacts	300	300	300	300	IEC 60794-1-2 E4
Coiling capability	length = 500 m/r = 45 mm length = 500 m/r = 80 mm length = 100 m/r = 80 mm		cycles	5	5	 5	 5	HUBER+SUHNER
Torsion	± 1440°, l = 1000 mm ± 360°, l = 1000 mm		cycles	1000	1000	1000	 1000	IEC 60794-1-2 E7

Thermal properties				
Temperature range	during installation	°C	−45 to +85	IEC 60794-1-22 F1
	in service	°C	−60 to +85	
	in storage	°C	−60 to +85	

Combustion properties						
Fire load	MJ/m	0.5	0.5	0.75	0.7	
2011/65/EC (RoHS)		compliant				

p = passed

Special cables

Rugged multifiber loose tube (jelly-free)

Properties
- Metal- and jelly-free cable
- Rodent-protected, glass-armoured
- For mobile applications
- No need for cleaning the fibers
- Longitudinal and transversal watertight cable

Applications
- Fixed or mobile data cabling
- Data cabling for harsh environment
- Machine cabling, drag chains

Design

Cable design	dry multifiber loose tube with 2 up to 24 fibers
Strain relief and rodent protection	glass-roving
Jacket material	TPU
Jacket colour	black

According to IEC 60794-1-2

Ordering information

24-.../Q(ZNG)Z-...70	A-BQ(ZN)11Y 1 x n/125

Please see page 222.

Specification			
Number of Fiber	mm	2 to 24	
Jacket Ø	mm	7.0	
Tube Ø	mm	2.8	coloured
Approx. weight	kg/km	44	

Mechanical properties				
Tensile strength	during installation	N	2500	IEC 60794-1-2 E1
	in service	N	1500	
Min. bend radius	during installation	mm	50	IEC 60794-1-2 E11
	in service	mm	70	
Crush resistance	short-term	N/dm	9000	IEC 60794-1-2 E3
	long-term	N/dm	2000	
Impact resistance	Wp = 1.5 J	impacts	100	IEC 60794-1-2 E4
Repeated bending	r = 50 mm, weight = 2 kg	cycles	10 000	IEC 60794-1-2 E6
Flexing	r = 120 mm velocity = 1.4 m/s	cycles	100 000	IEC 60794-1-2 E8
Water penetration	h = 1 m, 24 h, p < 3 m		passed	IEC 60794-1-2 F5B

Thermal properties				
Temperature range	during installation	°C	−25 to +70	IEC 60794-1-22 F1
	in service	°C	−45 to +85	
	in storage	°C	−45 to +85	

Combustion properties			
Fire load	MJ/m	0.58	
2011/65/EC (RoHS)		compliant	

RADOX® glass-armoured multifiber loose tube cables (DNV)

Properties

- Metal-free rodent-protected indoor and outdoor cable
- High flexibility and form stability
- UV and ozone resistance
- High abrasion and soldering iron resistance
- Halogen-free cable with improved behaviour in case of fire
- Meets requirements for circuit integrity in case of fire
- Best oil and fluid resistance

Applications

- Ideal for applications involving safety requirements in case of fire
- Rolling stock in railway
- Oil and gas platforms

Design

Cable design	multifiber loose tube up to 24 fibers, jelly-filled RADOX® cable
Strain relief	glass-roving
Jacket material	RADOX®
Jacket colour	black

According to IEC 60794-1-2

Ordering information

24-.../W(ZNG)R-...85	U-DQ(ZN)R 1 x n/125

Please see page 223.
* Cable types with DNV approval article number just on request.

DNV approvals and certificate number TAE00004ST.

Specification				
CPR Main class			Cca	
Jacket Ø			8.5	
Number of Fiber			2 to 24	
Approx. weight		kg/km	88	

Mechanical properties				
Tensile strength	during installation	N	3000	IEC 60794-1-2 E1
	in service	N	1500	
Min. bend radius	during installation	mm	130	IEC 60794-1-2 E11
	in service	mm	80	
Crush resistance	short-term	N/dm	10 000	IEC 60794-1-2 E3
	long-term	N/dm	2500	
Impact resistance	Wp = 4.41 J	impacts	15	IEC 60794-1-2 E4
Water penetration	h = 1 m, 24 h, p < 3 m		p	IEC 60794-1-2 F5B

Thermal properties				
Temperature range	during installation	°C	–10 to +50	IEC 60794-1-22 F1
	in service	°C	–60 to +85	
	in storage	°C	–60 to +85	

Combustion properties				
Fire load		MJ/m	1	
Fire propagation	on a vertical single cable		p	IEC 60332-1-2
Fire propagation	on a vertical cable bundle		p	IEC 60332-3-25
Fire test	with circuit integrity (CI)	min.	180	IEC 60331-25
Smoke density			p	IEC 61034-2
Halogen acid gas	Jacket material		p	IEC 60754-1
Degree of acidity	Jacket material		p	IEC 60754-2
2011/65/EC (RoHS)			compliant	
EU) No 305/2011 (CPR)			Cca-s1a, d0, a1	EN 50575
Hazard level 3			compliant	EN 45545

p = passed

RADOX®

- Meets LSFH properties.
- RADOX® jacket material compliant to EM 104 specification of EN 50264-1 for railway rolling stock application.
- Fully compliant to CEN/TS 45545-2 for fire safety in railway applications.
- Meets the increased requirements of SHF2 (SHF Mud) and fulfills flame, fire, oil and mud resistance acc. NEK 606.
- NEK 606 standard for offshore oil and gas, ship and marine apllications.
- Application acc. NEK 606: outdoor cable for emergency systems – operational during fire.

Steel armoured multifiber loose tube cable (DNV)

Properties
- Steel armoured indoor and outdoor cable
- With rodent protection (steel armoured)
- For high mechanical and thermal requirements
- Low smoke*, halogen-free and self-extinguishing
- Low fire load for high safety requirements

Applications
- For outdoor and indoor installations and in mechanically unprotected environments
- Data cable in distribution networks
- For installations directly in the ground

Design

Cable design	1 multifiber loose tube, jelly-filled (RADOX®, LSFH™), jelly-free (TPU) up to 24 fibers
Strain relief	aramid yarn
Rodent protection	steel armoured
Jacket material	RADOX®
Jacket colour	black

According to IEC 60794-1-2

Ordering information

24-.../W(ZN)HAR-...82 (RADOX®)	U-DQ(ZN)H(ZS)R 1 x n/125

Please see page 223
* Cable types with DNV approval article number just on request.

DNV approvals and certificate number TAE00004ST.

Specification		RADOX®	
Jacket Ø	mm	8.2	
Number of Fiber		2 to 24	
Multifiber loose tube	mm	standard	
Approx. weight	kg/km	115	

Mechanical properties				
Tensile strength	during installation	N	3750	IEC 60794-1-2 E1
	in service	N	2000	
Min. bend radius	during installation	mm	120	IEC 60794-1-2 E11
	in service	mm	80	
Crush resistance	short-term	N/dm	8000	IEC 60794-1-2 E3
	long-term	N/dm	2000	
Impact resistance	Wp = 4.5 J	impacts	50	IEC 60794-1-2 E4
Repeated bending	R=110 / weigth = 2.5kg	cycles	10 000	IEC 60794-1-21 E6
Kink resistance	Radius	mm	10	IEC 60794-1-21 E10
Torsion	± 180	cycles	70 000	IEC 60794-1-21 E7

Thermal properties				
Temperature range	during installation	°C	−20 to +70	IEC 60794-1-22 F1
	in service	°C	−50 to +85	
	in storage	°C	−50 to +85	

Combustion properties				
Fire load		MJ/m	1.25	
Fire propagation	on a vertical single cable		p	IEC 60332-1-2
Fire propagation	on a vertical cable bundle		p	IEC 60332-3-25
Fire test	with circuit integrity (CI) min		90	IEC 60331-25
Smoke density			p	IEC 61034-2
Halogen acid gas	Jacket material		p	IEC 60754-1
Degree of acidity	Jacket material		p	IEC 60754-2
2011/65/EC (RoHS)			compliant	

p = passed

Steel armoured multifiber loose tube cable

Properties
- Steel armoured indoor and outdoor cable
- With rodent protection (steel armoured)
- For high mechanical and thermal requirements
- Low smoke*, halogen-free and self-extinguishing
- Low fire load for high safety requirements

Applications
- For outdoor and indoor installations and in mechanically unprotected environments
- Data cable in distribution networks
- For installations directly in the ground

Design

Cable design	1 multifiber loose tube, jelly-filled (RADOX®, LSFH™), jelly-free (TPU) up to 24 fibers
Strain relief	aramid yarn
Rodent protection	steel armoured
Jacket material	TPU
Jacket colour	black

According to IEC 60794-1-2

Ordering information

24-.../Q(ZN)HAU-...80 (TPU)	U-Q(ZN)H(ZS)11Y

Specification			TPU	
Jacket Ø		mm	8.0	
Number of Fiber			2 to 24	
Multifiber loose tube		mm	standard	
Approx. weight		kg/km	100	

Mechanical properties				
Tensile strength	during installation	N	3000	IEC 60794-1-2 E1
	in service	N	1500	
Min. bend radius	during installation	mm	120	IEC 60794-1-2 E11
	in service	mm	80	
Crush resistance	short-term	N/dm	4000	IEC 60794-1-2 E3
	long-term	N/dm	2000	
Impact resistance	Wp = 4.5 J	impacts	50	IEC 60794-1-2 E4

Thermal properties				
Temperature range	during installation	°C	−20 to +70	IEC 60794-1-22 F1
	in service	°C	−70 to +85	
	in storage	°C	−70 to +85	

Combustion properties				
Fire load		MJ/m	1.1	
Fire propagation	on a vertical single cable		p	IEC 60332-1-2
2011/65/EC (RoHS)			compliant	

p = passed

Drag chain cables

Properties
- Strain relieved with aramide yarn
- For direct connector assembly
- High chemical resistance against acids and alkalies
- For high mechanical and thermal stability
- Halogen-free and non-corrosive fire gases
- Improved crush resistance
- Metal-free

Applications
- Medium to large drag chains
- Cabling in industrial applications
- As control or data cable in industry robots, cranes, production lines and automation systems
- Cable design allows for a permanent load with more than one million drag chain cycles

Design

Cable design	up to 12 tight tubes strength member
Strain relief and rodent protection	aramide yarn
Jacket material	TPU (optional TPU flame retardant)
Jacket colour	black

According to IEC 60794-1-2

Ordering information

12-.../FSN(ZN)YZ-...130	AT-V(ZN)2Y11Y 12.../125
12-.../FSN(ZN)YU-...130 (flame retardant outer jacket)	AT-V(ZN)2Y11Y 12.../125

Please see page 223.

Specification					
Fiber types		mm	E9	G50, G62.5	
Jacket Ø		mm	13	13	
Tube Ø		mm	0.9	0.9	coloured
Approx. weight		kg/km	132	132	

Mechanical properties					
Tensile strength	during installation	N	4000	4000	IEC 60794-1-2 E1
	in service	N	2000	2000	
Min. bend radius	during installation	mm	200	200	IEC 60794-1-2 E11
	in service	mm	100	100	
Crush resistance	short-term	N/dm	4000	4000	IEC 60794-1-2 E3
	long-term	N/dm	2000	2000	
Repeated bending	r = 100 mm, weight = 5 kg	cycles	10000	10000	IEC 60794-1-2 E6
Felxing	r = 120 mm velocity = 0.5 m/s L = 2.0 m	cycles	100 000	100 000	IEC 60794-1-2 E8
Flexing	r = 100 mm velocity = 2 m/s L = 2.0 m	cycles	1 000 000	1 000 000	HUBER+SUHNER drag chain test

Thermal properties					
Temperature range	during installation	°C	–10 to +50	–10 to +50	IEC 60794-1-22 F1
	in service	°C	–40 to +85	–30 to +85	
	in storage	°C	–40 to +85	–40 to +85	

Combustion properties				
Fire load		MJ/m	3.49	
Fire propagation	on a vertical single cable		p	IEC 60332-1-2
Fire propagation	on a vertical cable bundle		p	IEC 60332-3-25
2011/65/EC (RoHS)			compliant	

p = passed

* only with TPU flame retardant outer jacket

RADOX® drag chain cable

Properties
- Strain relieved with aramide yarn
- For direct connector assembly
- High chemical resistance against acids and alkalies
- For high mechanical and thermal stability
- Halogen-free and non-corrosive fire gases
- Improved crush resistance
- Metal-free
- Weld bead resistant calbe outer jacket

Applications
- Medium to large drag chains
- Cabling in industrial applications
- As control or data cable in industry robots, cranes, production lines and automation systems
- Cable design allows for a permanent load with more than one million drag chain cycles

Design

Cable design	up to 12 tight tubes strength member
Strain relief and rodent protection	aramide yarn
Jacket material	RADOX®
Jacket colour	black

According to IEC 60794-1-2

Ordering information

12-.../FSN(ZN)YR-...130	AT-V(ZN)2YR 12.../125

Please see page 223.

Specification				
Fiber types		mm	E9.G50	
Jacket Ø		mm	13	
Tube Ø		mm	0.9	coloured
Approx. weight		kg/km	160	

Mechanical properties				
Tensile strength	during installation	N	4000	IEC 60794-1-2 E1
	in service	N	2000	
Min. bend radius	during installation	mm	200	IEC 60794-1-2 E11
	in service	mm	100	
Crush resistance	short-term	N/dm	15 000	IEC 60794-1-2 E3
	long-term	N/dm	5000	
Repeated bending	r = 100 mm, weight = 5 kg	cycles	5000	IEC 60794-1-2 E6
Flexing	r = 120 mm velocity = 0.5 m/s L = 2.0 m	cycles	25 000	IEC 60794-1-2 E8

Thermal properties				
Temperature range	during installation	°C	−10 to +50	IEC 60794-1-22 F1
	in service	°C	−30 to +85	
	in storage	°C	−40 to +85	

Combustion properties				
Fire load		MJ/m	4.6	
Fire propagation	on a vertical single cable		p	IEC 60332-1-2
Fire propagation	on a vertical cable bundle		p	IEC 60332-3-25
2011/65/EC (RoHS)			compliant	

p = passed

Hybrid cables (on request)

Hybrid breakout cable

Hybrid multifiber loose tube cable

Properties

- Custom designed cable configuration
- Each fiber strain relieved
- High chemical resistance against acids and alkalies
- Tube can be stripped up to 2 m in one piece
- For high mechanical requirements
- Low smoke, halogen-free and self extinguishing
- Hybrid multifiber loose tube cables are rodent protected (glass-armoured)

Applications

- As data and power cable for industry, LAN, video, telephone or customer-specific applications
- Installation outdoors, in moist, wet cable ducts
- With LSFH™ jacket ideal for applications involving high safety requirements in case of a fire (installation indoors)

Design of hybrid breakout cables

Cable design	single-fiber semi-tight tubes, orange, numbered
Conductor	1.5 mm² up to 4 conductors
Strain relief	aramide yarn
Jacket material	LSFH™
Jacket colour	black

Design of hybrid multifiber loose tube cables

Cable design	multifiber loose tubes
Conductor	1.5 mm² up to 4 conductors 2.5 mm² up to 4 conductors
Strain relief	glass armoured
Jacket material	PE (optional LSFH™)
Jacket colour	black

According to IEC 60794-1-2

Ordering information

Hybrid breakout cables 04-.../CWJSN(ZN)H-...27+...-C15 08-.../CWJSN(ZN)H-...27+...-C15	IT-W(ZN)HH 4...+...x1.5 IT-W(ZN)HH 8...+...x1.5
Hybrid multi-fiber loose tube cables, PE jacket/LSFH™ to 60-.../WSN(ZNG).-...150+...-C... to 96-.../WSN(ZNG).-...180+...-C.	A-DQ(ZN)2Y 5 x .../125 + ...x... A-DQ(ZN)2Y 8 x .../125 + ...x...

Hybrid cable order on request.

Specification fiber optic components							
			4-way breakout	**8-way breakout**	**5-way multifiber loose tube**	**8-way multifiber loose tube**	
Jacket Ø		mm	10.0	13.0	15.0	18.0	
Single-fiber cable Ø/multifiber loose tube Ø		mm	2.7	2.7	2.8	2.8	
Channel marking on single-fiber			numbered		coloured		

Specification conductor							
Outer Ø conductor [1]	1.5 mm² 2.5 mm²	mm mm	2.7	2.7	2.7 3.5	2.7 3.5	
Rated voltage U_0 /U	1.5 mm² 2.5 mm²	V V	600/1000 600/1000				
Electrical resistance	1.5 mm² 2.5 mm²	Ω/km	13.7	13.7	13.7 8.2	13.7 8.2	
Jacket material			RADOX 125, halogen-free				

Mechanical properties							
Tensile strength	during installation	N	2000	4000	9000	13000	IEC 60794-1-2 E1
	in service	N	1000	2000	4500	6500	
Min. bend radius	during installation	mm	150	200	225	270	IEC 60794-1-2 E11
	in service	mm	100	130	150	180	
Crush resistance	short-term	N/dm	10 000	10 000	8000	8000	IEC 60794-1-2 E3
	long-term	N/dm	2000	2000	3000	3000	
Impact resistance	r = 25 mm Wp = 2.21 J Up = 4.41 J	impacts	50	50	100 100	100 100	IEC 60794-1-2 E4

Thermal properties					
Temperature range	during installation	°C	−10 to +50	−10 to +50	IEC 60794-1-22 F1
	in service	°C	−20 to +70	−40 to +70	
	in storage	°C	−25 to +70	−40 to +70	

Combustion properties					
Fire propagation	p	p	p [2]	p [2]	IEC 60332-1
2011/65/EC (RoHS)	compliant				

p = passed

Other hybrid cable types available upon request.

[1] Customer-specific order of colours for conductors. Available colours are black, red, white, blue, yellow/green
[2] Only applies to LSFH™, PE jacket material 'not passed'

Empty tube cables

	Cable type	Page	Ordering key	Weight kg/km	No. of empty tubes
	Simplex empty tube cable with LSFH™	190	00-0/CHJH-...14-4 00-0/CHJH-...17-4 00-0/CHJH-...20-4 00-0/CHJH-...21-8 00-0/CHJH-...21-11	2.0 3.0 4.4 4.0 3.3	1 1 1 1 1
	Simplex empty tube cable with LSFH™	192	00-0/CHJH-...30-13 00-0/CHJH-...36-19	7.5 10.5	1 1
	Simplex empty tube cable with TPU	194	00-0/CHJZ-...19-4 00-0/CHJZ-...21-11	2.7 5.0	1 1
	Simplex empty tube cable with RADOX®	196	00-0/CHJR-...21-4 00-0/CHJR-...21-8 00-0/CHJR-...30-11	4.5 3.9 9.3	1 1 1

p = passed

Outer-Ø empty tube mm	Inner-Ø empty tube mm	Jacket Ø mm	Jacket material	Tensile strength N	Crush resistance N/dm	Temperature range (in service) °C
0.8 0.9 0.9 1.3 1.4	0.4 0.4 0.4 0.8 1.1	1.4 1.7 2.0 2.1 2.1	LSFH™ LSFH™ LSFH™ LSFH™ LSFH™	150 150 150 150 150	5000 5000 5000 5000 5000	−20 to +70 −20 to +70
1.9 2.7	1.3 1.9	3.0 3.6	LSFH™ LSFH™	100 100	2000 2000	−20 to +70 −20 to +70
0.9 1.4	0.4 1.1	1.9 2.7	TPU TPU	100 250	1000 5000	−40 to +85 −40 to +85
0.9 1.3 1.4	0.4 0.8 1.1	2.1 2.1 3.0	RADOX® RADOX® RADOX®	400 100 200	5000 2000 10 000	−40 to +85 −30 to +85 −50 to +85

Simplex empty tube cables with LSFH™

Properties
- Metal-free indoor cable
- For direct connector assembly with stain relief
- Tight bending radii
- High flexibility
- Halogen free and non-corrosive fire gases

Applications
- Installation in indoor area
- Strain reliefed divider cables
- Fiber and tube protection in divider systems

Design

Empty tube	Depending on the inner diameter of the empty tube suitable to push-in fibers or tubes
Stain relief	metal free
Jacket material	LSFH™
Jacket colour	yellow
	orange
	turquoise
	heather violet
	lime green
	black

According to IEC 60794-1-21

Ordering information

00-0/CHJH-...14-4	H-(ZN)H - 0
00-0/CHJH-...17-4	H-(ZN)H - 0
00-0/CHJH-...20-4	H-(ZN)H - 0
00-0/CHJH-...21-8	H-(ZN)H - 0
00-0/CHJH-...21-11	H-(ZN)H - 0

Please see page 224.

Specification								
Jacket Ø		mm	1.4	1.7	2.0	2.4	2.7	
Empty tube outer Ø		mm	0.8	0.9	0.9	1.3	1.4	
Empty tube inner Ø		mm	0.4	0.4	0.4	0.8	1.1	
Approx. weight		kg/km	2.0	3.0	4.4	4.0	3.3	

Mechanical properties								
Tensile strength	during installation	N	150	150	150	150	150	IEC 60794-1-2 E1
	in service	N	100	100	100	100	100	
Min. bending radus[1]	during installation	mm	25	25	25	25	25	IEC 60794-1-2 E11
	in service	mm	25	25	25	25	25	
Crush resistance	short-term	N/dm	5000	5000	5000	5000	5000	IEC 60794-1-2 E3
	long-term	N/dm	500	500	500	500	500	
Impact resistance	Wp = 0.5 J	Impacts	20	20	20	20	20	IEC 60794-1-2 E4
Repeated bending	r = 5 mm		b	b	b	b	b	IEC 60794-1-2 E6

Thermal properties				
Temperature range	during installation	°C	-5 to +50	IEC 60794-1-22 F12
	in service	°C	-20 to +70	
	in storage	°C	-20 to +70	

Combustion properties								
Fire load		MJ/m	0.04	0.06	0.10	0.11	0.10	
Halogen acid gas	jacket material		p	p	p	p	p	IEC 60754-1
Degree of acidity	jacket material		p	p	p	p	p	IEC 60754-2
2011/65/EC (RoHS)			compliant					

p = passed

[1] Smaller bending radius possible at E9/125 low bend (ITU G.657) and G50/125-OM2/OM3/OM4 bend optimized.

Simplex empty tube cables with LSFH™

Properties
- Metal-free indoor cable
- For direct connector assembly with stain relief
- Tight bending radii
- High flexibility
- Halogen free and non-corrosive fire gases

Applications
- Installation in indoor area
- Strain reliefed divider cables
- Fiber and tube protection in divider systems

Design

Empty tube	Depending on the inner diameter of the empty tube suitable to push in 12 or 24 Fasern
Strain relief	metal free
Jacket material	LSFH™
Jacket colour	yellow
	orange
	turquoise
	heather violet
	lime green
	black

Accordingto IEC 60794-1-21

Ordering information

00-0/CHJH-...30-13	H-(ZN)H - 0
00-0/CHJH-...36-19	H-(ZN)H - 0

Please see page 224.

Specification					
Jacket Ø		mm	3.0	3.6	
Empty tube outer Ø		mm	1.9	2.7	
Empty tube inner Ø		mm	1.3	1.9	
Approx. weight		kg/km	7.5	10.5	

Mechanical properties					
Tensile strength	during installation	N	100	100	IEC 60794-1-2 E1
	in service	N	70	70	
Min. bending radus[1]	during installation	mm	25	25	IEC 60794-1-2 E11
	in service	mm	25	25	
Crush resistance	short-term	N/dm	2000	2000	IEC 60794-1-2 E3
	long-term	N/dm	500	500	

Thermal properties				
Temperature range	during installation	°C	-5 to +50	IEC 60794-1-22 F12
	in service	°C	-20 to +70	
	in storage	°C	−20 to +70	

Combustion properties					
Fire load		MJ/m	0.18	0.20	
Halogen acid gas	jacket material		p	p	IEC 60754-1
Degree of acidity	jacket material		p	p	IEC 60754-2
2011/65/EC (RoHS)			compliant		

p = passed

[1] Smaller bending radius possible at E9/125 low bend (ITU G.657) and G50/125-OM2/OM3/OM4 bend optimized.

Simplex empty tube cables with TPU

Properties
- Metal-free indoor cable
- For direct connector assembly with stain relief
- Tight bending radii
- High flexibility
- Halogen free and non-corrosive fire gases

Applications
- Strain reliefed divider cables
- Fiber and tube protection in divider systems

Design

Empty tube	Depending on the inner diameter of the empty tube suitable to push-in fibers or tubes
Strain relief	metal free
Jacket material	TPU
Jacket colour	yellow
	orange
	turquoise
	heather violet
	lime green
	black

According to IEC 60794-1-21

Ordering information

00-0/CHJZ-...19-4	H-(ZN)11Y - 0
00-0/CHJZ-...27-11	H-(ZN)11Y - 0

Please see page 224.

Specification					
Jacket Ø		mm	1.9	2.7	
Empty tube outer Ø		mm	0.9	1.4	
Empty tube inner Ø		mm	0.4	1.1	
Approx. weight		kg/km	2.7	5.0	

Mechanical properties					
Tensile strength	during installation	N	100	250	IEC 60794-1-2 E1
	in service	N	50	170	
Min. bending radius[1]	during installation	mm	25	25	IEC 60794-1-2 E11
	in service	mm	25	25	
Crush resistance	short-term	N/dm	1000	5000	IEC 60794-1-2 E3
	long-term	N/dm	500	1000	
Impact reistance	Wp = 0.74 J	Im-pacts	20	20	

Thermal properties					
Temperature range	during installation	°C	-10 to +50	-20 to +60	IEC 60794-1-22 F12
	in service	°C	-40 to +85	-40 to +85	
	in storage	°C	-40 to +85	-40 to +85	

Combustion properties					
Fire load		MJ/m	0.05	0.09	
Halogen acid gas	jacket material		p	p	IEC 60754-1
Degree of acidity	jacket material		p	p	IEC 60754-2
2011/65/EC (RoHS)			konform		

p = passed

[1] Smaller bending radius possible at E9/125 low bend (ITU G.657) and G50/125-OM2/OM3/OM4 bend optimized.

Simplex empty tube cables with RADOX®

Properties
- Metal-free indoor cable
- For direct connector assembly with stain relief
- Tight bending radii
- High flexibility
- Halogen free and non-corrosive fire gases
- Low fire load for high safety requirements

Applications
- Strain reliefed divider cables
- Fiber and tube protection in divider systems

Design

Empty tube	Depending on the inner diameter of the empty tube suitable to push-in fibers or tubes
Strain relief	Metallfrei
Jacket material	RADOX®
Jacket colour	yellow
	orange
	turquoise
	heather violet
	lime green
	black

According to IEC 60794-1-21

Ordering information

00-0/CHJR-...21-4	H-(ZN)R - 0
00-0/CHJR-...21-8	H-(ZN)R - 0
00-0/CHJR-...30-11	H-(ZN)R - 0

Please see page 225.

Specification						
Jacket Ø		mm	2.1	2.1	3.0	
Empty tube outer Ø		mm	0.9	1.3	1.4	
Empty tube inner Ø		mm	0.4	0.8	1.1	
Approx. weight		kg/km	4.5	3.9	9.3	

Mechanical properties						
Tensile strength	during installation	N	400	100	200	IEC 60794-1-2 E1
	in service	N	200	50	100	
Min. bending radius[1]	during installation	mm	25	25	25	IEC 60794-1-2 E11
	in service	mm	25	25	25	
Crush resistance	short-term	N/dm	5000	2000	10 000	IEC 60794-1-2 E3
	long-term	N/dm	3000		4000	

Thermal properties						
Temperature range	during installation	°C	-25 to +60	-20 to +50	-20 to +60	IEC 60794-1-22 F12
	in service	°C	-40 to +85	-30 to +85	-50 to +85	
	in storage	°C	-40 to +85	-40 to +85	-40 to +75	

Combustion properties						
Fire load		MJ/m	0.07	0.09	0.13	
Halogen acid gas	jacket material		p	p	p	IEC 60754-1
Degree of acidity	jacket material		p	p	p	IEC 60754-2
2011/65/EC (RoHS)			konform			

p = passed

[1] Smaller bending radius possible at E9/125 low bend (ITU G.657) and G50/125-OM2/OM3/OM4 bend optimized.

Order information for indoor cables

Semi-tight tubes 0.9 mm
available as standard only: 2000 m

Item no.	Cable type	Description
22521983	01-E9/CH-E9-FE	semi-tight tube Ø 0.9 mm, 1 x 9/125 µm G.652.D, tube and fiber color yellow
84065234	01-E9A2/CH-E9-FG	semi-tight tube Ø 0.9 mm, 1 x 9/125 µm G.652.D/G.657.A1, tube yellow and fiber color black
22520626	01-G50/CH-D9-FD	semi-tight tube Ø 0.9 mm, 1 x G50/125 µm OM2, tube and fiber color orange
85010138	01-G50/CH-M9-F-FM	semi-tight tube Ø 0.9 mm, 1 x G50/125 µm OM3, tube and fiber color turquoise
84121373	01-G50/CH-L9-G-FL	semi-tight tube Ø 0.9 mm, 1 x G50/125 µm OM4, tube and fiber color heather violet
22520967	01-G62/CH-C9-FC	semi-tight tube Ø 0.9 mm, 1 x G62.5/125 µm OM1, tube and fiber color blue

On request: up to 12 different colours for all different fiber types available; up to 24 different colours with ring marking for all different fiber types available.

Tight tubes 0.9 mm
available as standard only: 2000 m

Item no.	Cable type	Description
22521478	01-E9/F-E9	tight tube Ø 0.9 mm, 1 x 9/125 µm G.652.D/G.657.A1, yellow
23012983	01-E9/F-F9	tight tube Ø 0.9 mm, 1 x 9/125 µm G.652.D/G.657.A1, white
84145050	01-E9A2/F-E9-FG	tight tube Ø 0.9 mm, 1 x 9/125 µm G.657.A2, yellow
85001241	01-E9A2/F-F9	tight tube Ø 0.9 mm, 1 x 9/125 µm G.657.A2, white
22521479	01-G50/F-D9	tight tube Ø 0.9 mm, 1 x 50/125 µm OM2, orange
22523050	01-G62/F-C9	tight tube Ø 0.9 mm, 1 x 62.5/125 µm OM1, blue

Tight tubes 0.6 mm
available as standard only: 2000 m

Item no.	Cable type	Description
84077172	01-E9A2/V-T6-FA	tight tube Ø 0.6 mm, 1 x 9/125 µm G.657.A2, red
84077173	01-E9A2/V-T6-FB	tight tube Ø 0.6 mm, 1 x 9/125 µm G.657.A2, green
84077174	01-E9A2/V-T6-FE	tight tube Ø 0.9 mm, 1 x 9/125 µm G.657.A2, yellow
84077175	01-E9A2/V-T6-FC	tight tube Ø 0.6 mm, 1 x 9/125 µm G.657.A2, blue

Simplex cables 1.4 mm
LSFH™ jacket with tight tube 0.6 mm

Item no.	Cable type	Description
84099204	01-E9A2/VJH-E14-FG	simplex cable Ø 1.4 mm, 1 x 9/125 µm G.657.A2, tight tube 0.6 mm, LSFH yellow
84093690	01-G50/VJH-M14-F	simplex cable Ø 1.4 mm, 1 x 50/125 µm OM3, tight tube 0.6 mm, LSFH turquoise
tbd	01-G50/VJH-L14-G	simplex cable Ø 1.4 mm, 1 x 50/125 µm OM4, tight tube 0.6 mm, LSFH heather violet

Simplex cables 1.7 mm

LSFH™ jacket with semi-tight tube 0.9 mm

Item no.	Cable type	Description
85020782	01-E9/CWJH-E17#D	simplex cable Ø 1.7 mm, 1 x 9/125 µm G.652.D/G.657.A1, semi tight tube 0.9 mm, LSFH yellow
84078975	01-E9A2/CWJH-E17-FG#D	simplex cable Ø 1.7 mm, 1 x 9/125 µm G.657.A2, semi tight tube 0.9 mm, LSFH yellow

Simplex cables 2.0 mm

LSFH™ jacket with semi-tight tube 0.9 mm

Item no.	Cable type	Description
84012397	01-E9/CWJH-E20#D	simplex cable Ø 2.0 mm, 1 x 9/125 µm G.652.D/G.657.A1, semi tight tube 0.9 mm, LSFH yellow
84044941	01-E9/CWJH-N20#D	simplex cable Ø 2.0 mm, 1 x 9/125 µm G.652.D/G.657.A1, semi tight tube 0.9 mm, LSFH light blue
84065255	01-E9A2/CWJH-E20-FG#D	simplex cable Ø 2.0 mm, 1 x 9/125 µm G.657.A2, semi tight tube 0.9 mm, LSFH yellow
84000564	01-G50/CWJH-D20#D	simplex cable Ø 2.0 mm, 1 x 50/125 µm OM2, semi tight tube 0.9 mm, LSFH orange
84033249	01-G50/CWJH-M20-F#D	simplex cable Ø 2.0 mm, 1 x 50/125 µm OM3, semi tight tube 0.9 mm, LSFH turquoise
84121677	01-G50/CWJH-L20-G#D	simplex cable Ø 2.0 mm, 1 x 50/125 µm OM4, semi tight tube 0.9 mm, LSFH heather violet
84000565	01-G62/CWJH-D20#D	simplex cable Ø 2.0 mm, 1 x 62.5/125 µm OM1, semi tight tube 0.9 mm, LSFH orange

Simplex cables 2.4 mm

LSFH™ jacket with semi-tight tube 0.9 mm

Item no.	Cable type	Description
85020593	01-E9/CWJH-E24#D	simplex cable Ø 2.4 mm, 1 x 9/125 µm G.652.D/G.657.A1, semi tight tube 0.9 mm, LSFH yellow
84003837	01-G50/CWJH-D24#D	simplex cable Ø 2.4mm, 1 x 50/125 OM2, semi tight tube 0.9 mm, LSFH orange

Simplex cables 2.7 mm

LSFH™ jacket with semi-tight tube 0.9 mm

Item no.	Cable type	Description
22523125	01-E9/CWJH-E27#D	simplex cable Ø 2.7mm, 1 x 9/125 µm G.652.D/G.657.A1, semi tight tube 0.9 mm, LSFH yellow
84086802	01-E9A2/CWJH-E27-FG#D	simplex cable Ø 2.7mm, 1 x 9/125 µm G.657.A2, semi tight tube 0.9 mm, LSFH yellow
22523126	01-G50/CWJH-D27#D	simplex cable Ø 2.7mm, 1 x 50/125 µm OM2, semi tight tube 0.9 mm, LSFH orange
22523127	01-G62/CWJH-D27#D	simplex cable Ø 2.7mm, 1 x 62.5/125 µm OM1, semi tight tube 0.9 mm, LSFH orange

Simplex cables 1.9 mm B2ca

LSFH™ jacket with semi-tight tube and tight tube

Item no.	Cable type	Description
t.b.d.	01-E9/CHJH-E19	simplex cable Ø 1.9 mm, 1 x 9/125 µm G.652.D/G.657.A1, semi tight tube 0.9 mm, LSFH yellow
85175570	01-E9A2/VJH-F19#B	simplex cable Ø 1.9 mm, 1 x 9/125 µm G.657.A2, tight tube 0.6 mm, LSFH white

Order information for indoor cables

Duplex cable figure 8 – 1.4 mm
LSFH™ jacket with tight tube 0.6 mm

Item no.	Cable type	Description
84065738	02-E9/VJH-E14	duplex cable figure 8 Ø 1.4 x 3.0 mm, 2 x 9/125 µm G.652.D/G.657.A1, tight tube 0.6 mm, LSFH yellow
84126462	02-E9A2/VJH-E14-FG	duplex cable figure 8 Ø 1.4 x 3.0 mm, 2 x 9/125 µm G.657.A2, tight tube 0.6mm, LSFH yellow
84145087	02-G50/VJH-M14-F	duplex cable figure 8 Ø 1.4 x 3.0 mm, 2 x 50/125 µm OM3, tight tube 0.6mm, LSFH turquoise
84146528	02-G50/VJH-L14-G	duplex cable figure 8 Ø 1.4 x 3.0 mm, 2 x 50/125 µm OM4, tight tube 0.6mm, LSFH heather violet

Duplex cable figure 8 – 1.7 mm
LSFH™ jacket with tight tube 0.9 mm

Item no.	Cable type	Description
23040758	02-E9/FJH-E17	duplex cable figure 8 Ø 1.7 x 3.4 mm, 2 x 9/125 µm G.652.D/G.657.A1, tight tube 0.9 mm, LSFH yellow
84127588	02-E9A2/FJH-E17-FG	duplex cable figure 8 Ø 1.7 x 3.4 mm, 2 x 9/125 µm G.657.A2, tight tube 0.9 mm, LSFH yellow
23040759	02-G50/FJH-D17	duplex cable figure 8 Ø 1.7 x 3.4 mm, 2 x 50/125 µm OM2, tight tube 0.9 mm, LSFH orange
84005418	02-G50/FJH-M17-F	duplex cable figure 8 Ø 1.7 x 3.4 mm, 2 x 50/125 µm OM3, tight tube 0.9 mm, LSFH turquoise
84121679	02-G50/FJH-L17-G	duplex cable figure 8 Ø 1.7 x 3.4 mm, 2 x 50/125 µm OM4, tight tube 0.9 mm, LSFH heather violet
23040760	02-G62/FJH-D17	duplex cable figure 8 Ø 1.7 x 3.4 mm, 2 x 62.5/125 µm OM1, tight tube 0.9 mm, LSFH orange

Duplex cable figure 8 (zip cord) – 1.7 mm
LSFH™ jacket with semi-tight tube 0.9 mm

Item no.	Cable type	Description
85024637	02-E9/CWJH-E17#D	duplex cable figure 8 Ø 1.7 x 3.4 mm, 2 x 9/125 µm G.652.D/G.657.A1, semi tight tube 0.9 mm, LSFH yellow
85029964	02-E9A2/CWJH-E17-FG#D	duplex cable figure 8 Ø 1.7 x 3.4 mm, 2 x 9/125 µm G.657.A2, semi tight tube 0.9 mm, LSFH yellow
85030614	02-G50/CWJH-M17-F#D	duplex cable figure 8 Ø 1.7 x 3.4 mm, 2 x 50/125 µm OM3, semi tight tube 0.9 mm, LSFH turquoise
85068795	02-G50/CWJH-L17-G#D	duplex cable figure 8 Ø 1.7 x 3.4 mm, 2 x 50/125 µm OM4, semi tight tube 0.9mm, LSFH heather violet

Duplex cable figure 8 (zip cord) – 2.0 mm
LSFH™ jacket with semi-tight tube 0.9 mm

Item no.	Cable type	Description
84008151	02-E9/CWJH-E20#D	duplex cable figure 8 Ø 2.0 x 4.1 mm, 2 x 9/125 µm G.652.D/G.657.A1, semi tight tube 0.9 mm, LSFH yellow
84065256	02-E9A2/CWJH-E20-FG#D	duplex cable figure 8 Ø 2.0 x 4.1 mm, 2 x 9/125 µm G.657.A2, semi tight tube 0.9 mm, LSFH yellow
84008152	02-G50/CWJH-D20#D	duplex cable figure 8 Ø 2.0 x 4.1 mm, 2 x 50/125 µm OM2, semi tight tube 0.9 mm, LSFH orange
84008169	02-G50/CWJH-M20-F#D	duplex cable figure 8 Ø 2.0 x 4.1 mm, 2 x 50/125 µm OM3, semi tight tube 0.9 mm, LSFH turquoise
84121856	02-G50/CWJH-L20-G#D	duplex cable figure 8 Ø 2.0 x 4.1 mm, 2 x 50/125 µm OM4, semi tight tube 0.9 mm, LSFH heather violet
84008153	02-G62/CWJH-D20#D	duplex cable figure 8 Ø 2.0 x 4.1 mm, 2 x 62.5/125 µm OM1, semi tight tube 0.9 mm, LSFH orange

Duplex cable figure 8 (zip cord) B2ca - 2.0mm
LSFH™ jacket with tight tube

Item no.	Cable type	description
85217628	02-E9/VJH-E20#B	duplex cable figure 8 Ø 2.0 x 4.1 mm, 2 x 9/125 µm G.652.D/G.657.A1, tight tube 0.6 mm, LSFH yellow

Duplex cable figure 8 (zip cord) – 2.7 mm

LSFH™ jacket with semi-tight tube 0.9 mm

Item no.	Cable type	Description
22523202	02-E9/CWJH-E27#D	duplex cable figure 8 Ø 2.7 x 5.4 mm, 2 x 9/125 µm G.652.D/G.657.A1, semi tight tube 0.9 mm, LSFH yellow
22523203	02-G50/CWJH-D27#D	duplex cable figure 8 Ø 2.7 x 5.4 mm, 2 x 50/125 µm OM2, semi tight tube 0.9 mm, LSFH orange
84005133	02-G50/CWJH-M27-F#D	duplex cable figure 8 Ø 2.7 x 5.4 mm, 2 x 50/125 µm OM3, semi tight tube 0.9 mm, LSFH turquoise
22523204	02-G62/CWJH-D27#D	duplex cable figure 8 Ø 2.7 x 5.4 mm, 2 x 62.5/125 µm OM1, semi tight tube 0.9 mm, LSFH orange

Duplex cable figure 0 – 1.4 mm

LSFH™ jacket with tight tube 0.6 mm

Item no.	Cable type	Description
84149009	02-E9/VJH-AE14	duplex cable figure 0 Ø 2.3 x 3.7 mm, 2 x 9/125 µm G.652.D/G.657.A1, tight tube 0.6mm, LSFH yellow
84148983	02-E9A2/VJH-AE14-FG	duplex cable figure 0 Ø 2.3 x 3.7 mm, 2 x 9/125 µm G.657.A2, tight tube 0.6mm, LSFH yellow
84153026	02-G50/VJH-AM14-F	duplex cable figure 0 Ø 2.3 x 3.7 mm, 2 x 50/125 µm OM3, tight tube 0.6mm, LSFH turquoise
84153207	02-G50/VJH-AL14-G	duplex cable figure 0 Ø 2.3 x 3.7 mm, 2 x 50/125 µm OM4, tight tube 0.6mm, LSFH heather violet

Duplex cable figure 0 – 2.0 mm

LSFH™ jacket with semi-tight tube 0.9 mm

Item no.	Cable type	Description
23039888	02-E9/CWJH-AE20#D	duplex cable figure 0 Ø 3.1 x 5.2 mm, 2 x 9/125 µm G.652.D/G.657.A1, semi tight tube 0.9 mm, LSFH yellow
84073839	02-E9A2/CWJH-AE20-FG#D	duplex cable figure 0 Ø 3.1 x 5.2 mm, 2 x 9/125 µm G.657.A2, semi tight tube 0.9 mm, LSFH yellow
23039889	02-G50/CWJH-AD20#D	duplex cable figure 0 Ø 3.1 x 5.2 mm, 2 x 50/125 µm OM2, semi tight tube 0.9 mm, LSFH orange
84005553	02-G50/CWJH-AM20-F#D	duplex cable figure 0 Ø 3.1 x 5.2 mm, 2 x 50/125 µm OM3, semi tight tube 0.9 mm, LSFH turquoise
84121859	02-G50/CWJH-AL20-G#D	duplex cable figure 0 Ø 3.1 x 5.2 mm, 2 x 50/125 µm OM4, semi tight tube 0.9 mm, LSFH heather violet
23039891	02-G62/CWJH-AD20#D	duplex cable figure 0 Ø 3.1 x 5.2 mm, 2 x 62.5/125 µm OM1, semi tight tube 0.9 mm, LSFH orange

Duplex cable figure 0 – 2.7 mm

LSFH™ jacket with semi-tight tube 0.9 mm

Item no.	Cable type	Description
22523252	02-E9/CWJH-AE27#D	duplex cable figure 0 Ø 3.5 x 6.2 mm, 2 x 9/125 µm G.652.D/G.657.A1, semi tight tube 0.9 mm, LSFH yellow
22523253	02-G50/CWJH-AD27#D	duplex cable figure 0 Ø 3.5 x 6.2 mm, 2 x 50/125 µm OM2, semi tight tube 0.9 mm, LSFH orange
84005135	02-G50/CWJH-AM27-F#D	duplex cable figure 0 Ø 3.5 x 6.2 mm, 2 x 50/125 µm OM3, semi tight tube 0.9 mm, LSFH turquoise
22523254	02-G62/CWJH-AD27#D	duplex cable figure 0 Ø 3.5 x 6.2 mm, 2 x 62.5/125 µm OM1, semi tight tube 0.9 mm, LSFH orange

Duplex cables round 2.1 mm

LSFH™ jacket with tight tube 0.6 mm for LC uniboot

Item no.	Cable type	Description
84107633	02-E9A2/V(ZN)H-E21#D	duplex round cable Ø 2.1 mm, 2 x 9/125 µm G.657.A2, tight tube 0.6 mm, LSFH yellow
84107634	02-G50/V(ZN)H-M21-F#D	duplex round cable Ø 2.1 mm, 2 x 50/125 µm OM3, tight tube 0.6 mm, LSFH turquoise
84124505	02-G50/V(ZN)H-L21-G#D	duplex round cable Ø 2.1 mm, 2 x 50/125 µm OM4, tight tube 0.6 mm, LSFH heather violet

Order information for indoor cables

Mini-duplex-round cable 1.6mm
LSFH™ jacket with coloured fiber for VSFF-connector

Item no.	Cable type	Description
85159194	02-E9A2/(ZN)H-E16#B	mini-duplex round cable Ø 1.6mm, 2 x 9/125µm G.657.A2, LSFH yellow
85159195	02-G50/(ZN)H-L16-G#B	mini-duplex round cable Ø 1.6mm, 2 x 50/125µm OM4, LSFH heather violet

Breakout cable – 1.4 mm
LSFH™ jacket with tight tube 0.6 mm

Item no.	Cable type	Description
84127584	12-E9/VJSNH-E14#D	breakout cable 1.4mm / Ø 9.0 mm, 12 x 9/125 µm G.652.D/G.657.A1, tight tube 0.6mm, LSFH yellow
84150017	12-G50/VJSNH-M14-F#D	breakout cable 1.4mm / Ø 9.0 mm, 12 x 50/125 µm OM3, tight tube 0.6mm, LSFH turquoise
84150018	12-G50/VJSNH-L14-G#D	breakout cable 1.4mm / Ø 9.0 mm, 12 x 50/125 µm OM4, tight tube 0.6mm, LSFH heather violet
84127585	16-E9/VJSNH-E14#D	breakout cable 1.4mm / Ø 9.0 mm, 16 x 9/125 µm G.652.D/G.657.A1, tight tube 0.6mm, LSFH yellow
84137530	18-E9/VJSNH-E14#D	breakout cable 1.4mm / Ø 9.5mm, 18 x 9/125 µm G.652.D/G.657.A1, tight tube 0.6mm, LSFH yellow
84127586	24-E9/VJSNH-E14#C	breakout cable 1.4mm / Ø 10.6mm, 24 x 9/125 µm G.652.D/G.657.A1, tight tube 0.6mm, LSFH yellow
84144533	24-E9A2/VJSNH-E14-FG#C	breakout cable 1.4mm / Ø 10.6 mm, 24 x 9/125 µm G.657.A2, tight tube 0.6mm, LSFH yellow
84138289	24-G50/VJSNH-M14-F#C	breakout cable 1.4mm / Ø 10.6 mm, 24 x 9/125 µm OM3, tight tube 0.6mm, LSFH turquoise
84135616	24-G50/VJSNH-L14-G#D	breakout cable 1.4mm / Ø 10.6 mm, 24 x 50/125 µm OM4, tight tube 0.6mm, LSFH heather violet

Breakout cable – 2.0 mm
LSFH™ jacket with semi-tight tube 0.9 mm

Item no.	Cable type	Description
84008843	04-E9/CWJSNH-E20#D	breakout cable 2.0 mm / Ø 7.0 mm, 4 x 9/125 µm G.652.D/G.657.A1, semi tight tube 0.9 mm, LSFH yellow
84008846	04-G50/CWJSNH-D20#D	breakout cable 2.0 mm / Ø 7.0 mm, 4 x 50/125 µm OM2, semi tight tube 0.9 mm, LSFH orange
84033250	04-G50/CWJSNH-M20-F#D	breakout cable 2.0 mm / Ø 7.0 mm, 4 x 50/125 µm OM3, semi tight tube 0.9 mm, LSFH turquoise
84121850	04-G50/CWJSNH-L20-G#D	breakout cable 2.0 mm / Ø 7.0 mm, 4 x 50/125 µm OM4, semi tight tube 0.9 mm, LSFH heather violet
84008847	04-G62/CWJSNH-D20#D	breakout cable 2.0 mm / Ø 7.0 mm, 4 x 62.5/125 µm OM1, semi tight tube 0.9 mm, LSFH orange
84009199	08-E9/CWJSNH-E20#C	breakout cable 2.0 mm / Ø 9.0 mm, 8 x 9/125 µm G.652.D/G.657.A1, semi tight tube 0.9 mm, LSFH yellow
84009200	08-G50/CWJSNH-D20#C	breakout cable 2.0 mm / Ø 9.0 mm, 8 x 50/125 µm OM2, semi tight tube 0.9 mm, LSFH orange
84033251	08-G50/CWJSNH-M20-F#C	breakout cable 2.0 mm / Ø 9.0 mm, 8 x 50/125 µm OM3, semi tight tube 0.9 mm, LSFH turquoise
84121854	08-G50/CWJSNH-L20-G#C	breakout cable 2.0 mm / Ø 9.0 mm, 12 x 9/125 µm G.657.A2, semi tight tube 0.9 mm, LSFH heather violet
84009201	08-G62/CWJSNH-D20#C	breakout cable 2.0 mm / Ø 9.0 mm, 12 x 50/125 µm OM1, semi tight tube 0.9 mm, LSFH orange
84009443	12-E9/CWJSNH-E20#C	breakout cable 2.0 mm / Ø 12.0 mm, 12 x 9/125 µm G.652.D/G.657.A1, semi tight tube 0.9 mm, LSFH yellow
84073652	12-E9A2/CWJSNH-E20-FG	breakout cable 2.0 mm / Ø 12.0 mm, 12 x 9/125 µm G.657.A2, semi tight tube 0.9 mm, LSFH yellow
84009444	12-G50/CWJSNH-D20#C	breakout cable 2.0 mm / Ø 12.0 mm, 12 x 50/125 µm OM2, semi tight tube 0.9 mm, LSFH orange
84033252	12-G50/CWJSNH-M20-F#C	breakout cable 2.0 mm / Ø 12.0 mm, 12 x 50/125 µm OM3, semi tight tube 0.9 mm, LSFH turquoise
84121855	12-G50/CWJSNH-L20-G#C	breakout cable 2.0 mm / Ø 12.0 mm, 12 x 50/125 µm OM4, semi tight tube 0.9 mm, LSFH heather violet
84009445	12-G62/CWJSNH-D20#C	breakout cable 2.0 mm / Ø 12.0 mm, 12 x 62.5/125 µm OM1, semi tight tube 0.9 mm, LSFH orange
85063202	24-E9/CWJSNH-E20#C	breakout cable 2.0 mm / Ø 14.0 mm, 24 x 9/125 µm G.652.D/G.657.A1, semi tight tube 0.9 mm, LSFH yellow

Breakout cable – fire resistance – 2.0 mm
LSFH™ jacket with semi-tight tube 0.9 mm

Item no.	Cable type	Description
84018102	04-E9/CWJSNHIH-E20	fire resistant breakout cable 2.0 mm / Ø 10.0 mm, 4 x 9/125 µm G.652.D/G.657.A1, semi tight tube0.9 mm, LSFH yellow
84018103	04-G50/CWJSNHIH-D20	fire resistant breakout cable 2.0 mm / Ø 10.0 mm, 4 x 50/125 µm OM2, semi tight tube 0.9 mm, LSFH orange
84150417	04-G50/CWJSNHIH-L20-G	fire resistant breakout cable 2.0 mm / Ø 10.0 mm, 4 x 50/125 µm OM4, semi tight tube 0.9 mm, LSFH heather violet
84018104	04-G62/CWJSNHIH-D20	fire resistant breakout cable 2.0 mm / Ø 10.0 mm, 4 x 62.5/125 µm OM1, semi tight tube 0.9 mm, LSFH orange
84018106	08-E9/CWJSNHIH-E20	fire resistant breakout cable 2.0 mm / Ø 12.0 mm, 8 x 9/125 µm G.652.D/G.657.A1, semi tight tube 0.9 mm, LSFH yellow
84018107	08-G50/CWJSNHIH-D20	fire resistant breakout cable 2.0 mm / Ø 12.0 mm, 8 x 50/125 µm OM2, semi tight tube 0.9 mm, LSFH orange
85001062	08-G50/CWJSNHIH-L20-G	fire resistant breakout cable 2.0 mm / Ø 12.0 mm, 8 x 50/125 µm OM4, semi tight tube 0.9 mm, LSFH heather violet
84018108	08-G62/CWJSNHIH-D20	fire resistant breakout cable 2.0 mm / Ø 12.0 mm, 8 x 62.5/125 µm OM1, semi tight tube 0.9 mm, LSFH orange
84018109	12-E9/CWJSNHIH-E20	fire resistant breakout cable 2.0 mm / Ø 15.0 mm, 12 x 9/125 µm G.652.D/G.657.A1, semi tight tube 0.9 mm, LSFH yellow
84018110	12-G50/CWJSNHIH-D20	fire resistant breakout cable 2.0 mm / Ø 15.0 mm, 12 x 50/125 µm OM2, semi tight tube 0.9 mm, LSFH orange
84150427	12-G50/CWJSNHIH-L20-G	fire resistant breakout cable 2.0 mm / Ø 15.0 mm, 12 x 50/125 µm OM4, semi tight tube 0.9 mm, LSFH heather violet
84018111	12-G62/CWJSNHIH-D20	fire resistant breakout cable 2.0 mm / Ø 15.0 mm, 12 x 62.5/125 µm OM1, semi tight tube 0.9 mm, LSFH orange

FRONTLINE Microtube - 2.3 mm
LSFH™ jacket up to 4 fiber

Item no.	Cable type	Description
85024198	04-4E9A2/MH(ZN)H-H23#D	FTTH microtube cable Ø 2.3 mm, 4 x 9/125 µm G.657.A2, microtube 1.25 mm, LSFH grey
85018124	04-E9A2/MH(ZN)H-E23#D	FTTH microtube cable Ø 2.3 mm, 4 x 9/125 µm G.657.A2, microtube 1.25 mm, LSFH yellow

FRONTLINE Microtube - 2.3 mm
LSFH™ jacket up to 6 fibers

Item no.	Cable type	Description
85158960	01-1E9A2/MH(ZN)H-F23#B	FTTH microtube cable Ø 2.3 mm, 1 x 9/125 µm G.657.A2, microtube 1.25 mm, LSFH white
85158961	02-2E9A2/MH(ZN)H-F23#B	FTTH microtube cable Ø 2.3 mm, 2 x 9/125 µm G.657.A2, microtube 1.25 mm, LSFH white
85158958	04-4E9A2/MH(ZN)H-F23#B	FTTH microtube cable Ø 2.3 mm, 4 x 9/125 µm G.657.A2, microtube 1.25 mm, LSFH white
85158962	06-6E9A2S/MH(ZN)H-F23_ DIN#B	FTTH microtube cable Ø 2.3 mm, 6 x 9/125 µm G.657.A2, microtube 1.25 mm, LSFH white

FRONTLINE Microtube - 2.8 mm
LSFH™ jacket up to 24 fibers

Item no.	Cable type	Description
85158990	12-12E9A2/MH(ZN)H-F28#B	FTTH microtube cable Ø 2.8 mm, 12 x 9/125 µm G.657.A2, microtube 1.75 mm, LSFH white
85158989	24-24E9A2S/MH(ZN)H-F28#B	FTTH microtube cable Ø 2.8 mm, 12 x 9/125 µm G.657.A2, microtube 1.75 mm, LSFH white

Order information for indoor cables

FRONTLINE Inhome - 2.8 mm
LSFH™ jacket with tight tube 0.6 mm

Item no.	Cable type	Description
84067597	04-E9A2/V(ZN)H-H28#D	FTTH indoor cable 2.8 mm, 4 x 9/125 µm G.657.A2, tight tube 0.6 mm, LSFH light grey
84089089	04-E9A2/V(ZN)H-E28#D	FTTH indoor cable 2.8 mm, 4 x 9/125 µm G.657.A2, tight tube 0.6 mm, LSFH yellow

FRONTLINE Simplex - 2.7 mm
LSFH™ jacket with semi-tight tube 0.9 mm

Item no.	Cable type	Description
84075437	01-E9A2/CWJH-H27-FG#D	simplex cable Ø 2.7 mm, 1 x 9/125 µm G.657.A2, semi tight tube 0.9 mm, LSFH light grey
85021554	01-E9A3/CWJH-F27-FG_blank	simplex cable Ø 2.7 mm, 1 x 9/125 µm G.657.A2/B3, semi tight tube 0.9 mm, LSFH white, no labelling

FRONTLINE Facade
LSFH™ jacket with microtube up to 24 Fasern

Art.-Nr.	Kabeltyp	Bezeichnung
85214841	04-4E9A2/MH(ZN)H(G)H-H55#Fb	FTTH microtube cable Ø 2.3 mm, outdoor jacket Ø 5.5 mm, 1 x 9/125 µm G.657.A2, microtube 1.25 mm, LSFH white
tbd.	06-...S/MH(ZN)H(G)H-55	FTTH microtube cable Ø 2.3 mm, outdoor jacket Ø 5.5 mm, 1 x 9/125 µm G.657.A2, microtube 1.25 mm, LSFH white
tbd.	12-.../MH(ZN)H(G)H-55	FTTH microtube cable Ø 2.8 mm, outdoor jacket Ø 5.5 mm, 12 x 9/125 µm G.657.A2, microtube 1.75 mm, LSFH white
tbd.	24-...S/MH(ZN)H(G)H-55	FTTH microtube cable Ø 2.8 mm, outdoor jacket Ø 5.5 mm, 12 x 9/125 µm G.657.A2, microtube 1.75 mm, LSFH white

Optipack 8 - 2.0 mm
Multi-fiber patch cable
LSFH™ jacket with 8 fibers for MTP®/MPO

Item no.	Cable type	Description
85072218	08-E9A2/(ZN)H-E20_TIA#D	Optipack cable Ø 2.0 mm, 8 x 9/125 µm G.657.A2, LSFH yellow, TIA fiber colour code
85072217	08-G50/(ZN)H-M20-F_TIA#D	Optipack cable Ø 2.0 mm, 8 x 50/125 µm OM3, LSFH turquoise, TIA fiber colour code
85070835	08-G50/(ZN)H-L20-G_TIA#D	Optipack cable Ø 2.0 mm, 8 x 50/125 µm OM4, LSFH heather violet, TIA fiber colour code

Optipack 12 - 2.0 mm
Multi-fiber patch cable
LSFH™ jacket with 12 fibers for MTP®/MPO

Item no.	Cable type	Description
85065690	12-E9A2/(ZN)H-E20#D	Optipack cable Ø 2.0 mm, 12 x 9/125 µm G.657.A2, LSFH yellow
85068193	12-G50/(ZN)H-M20-F#D	Optipack cable Ø 2.0 mm, 12 x 50/125 µm OM3, LSFH turquoise
85068194	12-G50/(ZN)H-L20-G#D	Optipack cable Ø 2.0 mm, 12 x 50/125 µm OM4, LSFH heather violet

Optipack 12 – 3.0 mm
Multi-fiber patch cable
LSFH™ jacket with 12 fibers for MTP®/MPO

Item no.	Cable type	Description
84138650	12-E9A2/(ZN)H-E30#D	Optipack cable Ø 3.0 mm, 12 x 9/125 µm G.657.A2, LSFH yellow
84150817	12-G50/(ZN)H-M30-F #D	Optipack cable Ø 3.0 mm, 12 x 50/125 µm OM3, LSFH turquoise
84144927	12-G50/(ZN)H-L30-G#D	Optipack cable Ø 3.0 mm, 12 x 50/125 µm OM4, LSFH heather violet

Optipack 24 - 3.0 mm
Multi-fiber patch cable
LSFH™ jacket with 12 fibers for MTP®/MPO

Item no.	Cable type	Description
85067999	24-E9A2/(ZN)H-E30#D	Optipack cable Ø 3.0 mm, 24 x 9/125 µm G.657.A2, LSFH yellow
85068195	24-G50/(ZN)H-M30-F#D	Optipack cable Ø 3.0 mm, 24 x 50/125 µm OM3, LSFH turquoise
85068196	24-G50/(ZN)H-L30-G#D	Optipack cable Ø 3.0 mm, 24 x 50/125 µm OM4, LSFH heather violet

Optipack DJ 12 - 4.0mm
Multi-fiber patch cable
LSFH jacket with 12 fibers for MTP®/MPO

Item no.	Cable type	Description
85137705	12-E9A2/(ZN)HH-E20#B	Optipack double jacket Ø 2.0 / 4.0mm, 12 x 9/125µm G.657.A2, LSFH yellow
85137707	12-G50/(ZN)HH-M20-F#B	Optipack double jacket Ø 2.0 / 4.0mm, 12 x 50/125µm OM3, LSFH turquoise
85120659	12-G50/(ZN)HH-L20-G#B	Optipack double jacket Ø 2.0 / 4.0mm, 12 x 50/125µm OM4, LSFH heather violet
85120366	12-E9A2/(ZN)HH-E20#C	Optipack double jacket Ø 2.0 / 4.0mm, 12 x 9/125µm G.657.A2, LSFH yellow
85140646	12-G50/(ZN)HH-M20-F#C	Optipack double jacket Ø 2.0 / 4.0mm, 12 x 50/125µm OM3, LSFH turquoise
85140644	12-G50/(ZN)HH-L20-G#C	Optipack double jacket Ø 2.0 / 4.0mm, 12 x 50/125µm OM4, LSFH heather violet

Optipack DJ 24 - 4.9mm
Multi-fiber patch cable
LSFH jacket with 24 fibers for MTP®/MPO

Item no.	Cable type	Description
85102544	24-E9A2/(ZN)HH-E30#B	Optipack double jacket Ø 3.0 / 4.9mm, 24 x 9/125µm G.657.A2, LSFH yellow
t.b.d.	24-G50/(ZN)HH-M30-F#B	Optipack double jacket Ø 3.0 / 4.9mm, 24 x 50/125µm OM3, LSFH turquoise
85103329	24-G50/(ZN)HH-L30-G#B	Optipack double jacket Ø 3.0 / 4.9mm, 24 x 50/125µm OM4, LSFH heather violet
85114654	24-E9A2/(ZN)HH-E30#C	Optipack double jacket Ø 3.0 / 4.9mm, 24 x 9/125µm G.657.A2, LSFH yellow
85114655	24-G50/(ZN)HH-L30-G#C	Optipack double jacket Ø 3.0 / 4.9mm, 24 x 50/125µm OM4, LSFH heather violet

Order information for indoor cables

Optipack 8 – breakout – 2.0 mm up to 96 fibers
Multifiber breakout cable
LSFH™ jacket with 8 fibers for MTP®/MPO

Item no.	Cable type	Description
85092255	24-8E9A2/(ZN)SNH-E20_TIA#B	Optipack breakout cable 2.0 mm / Ø 6.6 mm, 24 x 9/125µm G.657.A2, LSFH yellow, TIA fiber colour code
85095525	24-8G50/(ZN)SNH-L20-G_ TIA#B	Optipack breakout cable 2.0 mm / Ø 6.6 mm, 24 x 50/125µm OM4, LSFH heather violet, TIA fiber colour code
85096626	48-8E9A2/(ZN)SNH-E20_TIA#B	Optipack breakout cable 2.0 mm / Ø 7.6 mm, 48 x 9/125µm G.657.A2, LSFH yellow, TIA fiber colour code
85080353	48-8G50/(ZN)SNH-M20-F_TIA#B	Optipack breakout cable 2.0 mm / Ø 7.6 mm, 48 x 50/125µm OM3, LSFH turquoise, TIA fiber colour code
85096624	48-8G50/(ZN)SNH-L20-G_ TIA#B	Optipack breakout cable 2.0 mm / Ø 7.6 mm, 48 x 50/125µm OM4, LSFH heather violet, TIA fiber colour code
85095524	96-8E9A2/(ZN)SNH-E20_TIA#B	Optipack breakout cable 2.0 mm / Ø 10.8 mm, 96 x 9/125µm G.657.A2, LSFH yellow, TIA fiber colour code
85095516	96-8G50/(ZN)SNH-L20-G_ TIA#B	Optipack breakout cable 2.0 mm / Ø 10.8 mm, 96 x 50/125µm OM4, LSFH heather violet, TIA fiber colour code

Optipack 12 – breakout – 2.0 mm up to 144 fibers
Multifiber breakout cable
LSFH™ jacket with 12 fibers for MTP®/MPO

Item no.	Cable type	Description
85092254	24-12E9A2/(ZN)SNH-E20#B	Optipack breakout cable 2.0 mm / Ø 6.6 mm, 24 x 9/125 µm G.657.A2, LSFH yellow
85089314	48-12E9A2/(ZN)SNH-E20#B	Optipack breakout cable 2.0 mm / Ø 6.6 mm, 48 x 9/125 µm G.657.A2, LSFH yellow
85093505	48-12G50/(ZN)SNH-M20-F#B	Optipack breakout cable 2.0 mm / Ø 6.6 mm, 48 x 50/125 µm OM3, LSFH turquoise
85092256	48-12G50/(ZN)SNH-L20-G#B	Optipack breakout cable 2.0 mm / Ø 6.6 mm, 48 x 50/125 µm OM4, LSFH heather violet
85092006	72-12E9A2/(ZN)SNH-E20#B	Optipack breakout cable 2.0 mm / Ø 7.6 mm, 72 x 9/125 µm G.657.A2, LSFH yellow
t.b.d.	72-12G50/(ZN)SNH-M20-F#B	Optipack breakout cable 2.0 mm / Ø 7.6 mm, 72 x 50/125 µm OM3, LSFH turquoise
85111308	72-12G50/(ZN)SNH-L20-G#B	Optipack breakout cable 2.0 mm / Ø 7.6 mm, 72 x 50/125 µm OM4, LSFH heather violet
85092007	96-12E9A2/(ZN)SNH-E20#B	Optipack breakout cable 2.0 mm / Ø 9.2 mm, 96 x 9/125 µm G.657.A2, LSFH yellow
85112192	96-12G50/(ZN)SNH-L20-G#B	Optipack breakout cable 2.0 mm / Ø 9.2 mm, 96 x 9/125 µm OM4, LSFH heather violet
85089316	144-12E9A2/(ZN)SNH-E20#B	Optipack breakout cable 2.0 mm / Ø 10.3 mm, 144 x 9/125 µm G.657.A2, LSFH yellow
85096572	144-12G50/(ZN)SNH-M20-F#B	Optipack breakout cable 2.0 mm / Ø 10.3 mm, 144 x 50/125 µm OM3, LSFH turquoise
85092017	144-12G50/(ZN)SNH-L20-G#B	Optipack breakout cable 2.0 mm / Ø 10.3 mm, 144 x 50/125 µm OM4, LSFH heather violet

Optipack 24 – breakout – 3.0 mm up to 288 fibers
Multifiber breakout cable
LSFH™ jacket with 24 fibers for MTP®/MPO

Item no.	Cable type	Description
85089597	96-24E9A2/(ZN)SNH-E30#B	Optipack breakout cable 3.0 mm / Ø 9.3mm, 96 x 9/125 µm G.657.A2, LSFH yellow
85096647	96-24G50/(ZN)SNH-L30-G#B	Optipack breakout cable 3.0 mm / Ø 9.3mm, 96 x 50/125 µm OM4, LSFH heather violet
85092021	144-24E9A2/(ZN)SNH-E30#B	Optipack breakout cable 3.0 mm / Ø 11.0mm, 144 x 9/125 µm G.657.A2, LSFH yellow
t.b.d.	144-24G50/(ZN)SNH-L30-G#B	Optipack breakout cable 3.0 mm / Ø 11.0mm, 144 x 50/125 µm OM4, LSFH heather violet
85089610	288-24E9A2/(ZN)SNH-E30#B	Optipack Breakout -Kabel 3.0 mm / Ø 14.0 mm, 288 x 9/125 µm G.657.A2, LSFH yellow
85096653	288-24G50/(ZN)SNH-M30-F#B	Optipack breakout cable 3.0mm / Ø 14.0 mm, 288 x 50/125 µm OM3, LSFH turquoise
t.b.d.	288-24G50/(ZN)SNH-L30-G#B	Optipack breakout cable 3.0mm / Ø 14.0 mm, 288 x 50/125 µm OM4, LSFH heather violet

OptiRibbon-DJ - 4.0 mm / 4.9 mm

Multifiber cable

LSFH™ jacket with 24 fibers for MTP®/MPO

Item no.	Cable type	Description
tbd.	12-12E9A2R/(ZN)HH-...20#C	OptiRibbon-DJ, double jacket Ø 2.0 / 4.0mm, 12-1x12E9A2R/125µm G.657.A2, LSFH yellow
85226047	24-2x12E9A2R/(ZN)HH-E30#C	OptiRibbon-DJ, double jacket Ø 2.0 / 4.0mm, 24-2x12E9A2R/125µm G.657.A2, LSFH yellow

Order information for universal cables

Optipack universal – breakout cable – 2.0 and 3.0 mm up to 288 fibers

Fiber bundle - rugged breakout cable
LSFH™ jacket with 8, 12 or 24 fibers for MTP®/MPO

Item no.	Cable type	Description
85137891	48-12E9A2/(ZN)SN(ZNG)H-G20#C	Optipack universal breakout cable 2.0 mm / Ø 9.8 mm, 48 x 9/125 µm G.657.A2, LSFH black
85146330	48-12G50/(ZN)SN(ZNG)H-G20-G#C	Optipack universal breakout cable 2.0 mm / Ø 9.8 mm, 48 x 50/125 µm OM4, LSFH black
85137977	72-12E9A2/(ZN)SN(ZNG)H-G20#C	Optipack universal breakout cable 2.0 mm / Ø 10.8 mm, 72 x 9/125 µm G.657.A2, LSFH black
85146331	72-12G50/(ZN)SN(ZNG)H-G20-G#C	Optipack universal breakout cable 2.0 mm / Ø 10.8 mm, 72 x 50/125 µm OM4, LSFH black
85137978	96-12E9A2/(ZN)SN(ZNG)H-G20#C	Optipack universal breakout cable 2.0 mm / Ø 11.9 mm, 96 x 9/125 µm G.657.A2, LSFH black
85146332	96-12G50/(ZN)SN(ZNG)H-G20-G#C	Optipack universal breakout cable 2.0 mm / Ø 11.9 mm, 96 x 50/125 µm OM4, LSFH black
85117733	144-12E9A2/(ZN)SN(ZNG)H-G20#C	Optipack universal breakout cable 2.0 mm / Ø 12.4 mm, 144 x 9/125 µm G.657.A2, LSFH black
85146333	144-12G50/(ZN)SN(ZNG)H-G20-G#C	Optipack universal breakout cable 2.0 mm / Ø 12.4 mm, 144 x 50/125 µm OM4, LSFH black
85151966	288-24E9A2/(ZN)SN(ZNG)H-G30#B	Optipack universal breakout cable 3.0 mm / Ø 16.0 mm, 288 x 9/125 µm G.657.A2, LSFH black

Jelly-free – dry block non-armoured multifiber loose tube cables – up to 12 fibers

with LSFH™ jacket 3.5 mm

Item no.	Cable type	Description
84097664	12-12E9/BQ(ZN)H-E35	jelly-free non-armoured loose tube cable Ø 3.5 mm, 12 x 9/125 µm G.652.D, loose tube 2.2 mm, LSFH yellow
84078253	12-12G50/BQ(ZN)H-G35	jelly-free non-armoured loose tube cable Ø 3.5 mm, 12 x 50/125 µm OM2, loose tube 2.2 mm, LSFH black
84097603	12-12G50/BQ(ZN)H-M35-F	jelly-free non-armoured loose tube cable Ø 3.5 mm, 12 x 50/125 µm OM3, loose tube 2.2 mm, LSFH turquoise
84121860	12-12G50/BQ(ZN)H-L35-G	jelly-free non-armoured loose tube cable Ø 3.5 mm, 12 x 50/125 µm OM4, loose tube 2.2 mm, LSFH heather violet

Jelly-free – dry block non-armoured multifiber loose tube cables – up to 24 fibers

with LSFH™ jacket 5.0 mm

Item no.	Cable type	Description
22523600	12-12E9/Q(ZN)H-E50	Jjlly-free non-armoured loose tube cable Ø 5.0 mm, 12 x 9/125 µm G.652.D, loose tube 2.8 mm, LSFH yellow
22521597	12-12G50/Q(ZN)H-D50	jelly-free non-armoured loose tube cable Ø 5.0 mm, 12 x 50/125 µm OM2, loose tube 2.8 mm, LSFH orange
84075870	12-12G50/Q(ZN)H-M50-F	jelly-free non-armoured loose tube cable Ø 5.0 mm, 12 x 50/125 µm OM3, loose tube 2.8 mm, LSFH turquoise
85017189	12-12G50/Q(ZN)H-L50-G	jelly-free non-armoured loose tube cable Ø 5.0 mm, 12 x 50/125 µm OM4, loose tube 2.8 mm, LSFH heather violet
22521598	12-12G62/Q(ZN)H-D50	jelly-free non-armoured loose tube cable Ø 5.0 mm, 12 x 62.5/125 µm OM1, loose tube 2.8 mm, LSFH orange
85030580	24-24E9/Q(ZN)H-E50	jelly-free non-armoured loose tube cable Ø 5.0 mm, 24 x 9/125 µm G.652.D, loose tube 2.8 mm, LSFH yellow
85030582	24-24G50/Q(ZN)H-M50-F	jelly-free non-armoured loose tube cable Ø 5.0 mm, 24 x 50/125 µm OM3, loose tube 2.8 mm, LSFH turquoise
85030583	24-24G50/Q(ZN)H-L50-G	jelly-free non-armoured loose tube cable Ø 5.0 mm, 24 x 50/125 µm OM4, loose tube 2.8 mm, LSFH heather violet

Jelly-free – dry block glass-armoured multifiber loose tube cables - up to 24 fibers
with LSFH™-cable jacket 7.0 mm CPR-class Cca

Item no.	Cable type	Description
85103589	06-6E9/Q(ZNG)H-E70#C	jelly-free glass-armoured loose tube cable Ø 7.0 mm, 6 x 9/125µm G.652.D, loose tube 2.8 mm, LSFH yellow
85103600	06-6G50/Q(ZNG)H-M70-F#C	jelly-free glass-armoured loose tube cable Ø 7.0 mm, 6 x 50/125µm OM3, loose tube 2.8 mm, LSFH turquoise
85103601	06-6G50/Q(ZNG)H-L70-G#C	jelly-free glass-armoured loose tube cable Ø 7.0 mm, 6 x 50/125µm OM4, loose tube 2.8 mm, LSFH heather violet
85103602	12-12E9/Q(ZNG)H-E70#C	jelly-free glass-armoured loose tube cable Ø 7.0 mm, 12 x 9/125µm G.652.D, loose tube 2.8 mm, LSFH yellow
85103603	12-12G50/Q(ZNG)H-M70-F#C	jelly-free glass-armoured loose tube cable Ø 7.0 mm, 12 x 50/125µm OM3, loose tube 2.8 mm, LSFH turquoise
85103604	12-12G50/Q(ZNG)H-L70-G#C	jelly-free glass-armoured loose tube cable Ø 7.0 mm, 12 x 50/125µm OM4, loose tube 2.8 mm, LSFH heather violet
85103605	24-24E9/Q(ZNG)H-E70#C	jelly-free glass-armoured loose tube cable Ø 7.0 mm, 24 x 9/125µm G.652.D, loose tube 2.8 mm, LSFH yellow
85103606	24-24G50/Q(ZNG)H-M70-F#C	jelly-free glass-armoured loose tube cable Ø 7.0 mm, 24 x 50/125µm OM3, loose tube 2.8 mm, LSFH turquoise
85103607	24-24G50/Q(ZNG)H-L70-G#C	jelly-free glass-armoured loose tube cable Ø 7.0 mm, 24 x 50/125µm OM4, loose tube 2.8 mm, LSFH heather violet

Jelly-free – dry block glass-armoured multifiber loose tube cables – up to 24 fibers
with LSFH™ jacket 7.0 mm

Item no.	Cable type	Description
85020587	12-12E9/Q(ZNG)H-G70#D	jelly-free glass-armoured loose tube cable Ø 7.0 mm, 12 x 9/125 µm G.652.D, loose tube 2.8 mm, LSFH black
85008099	12-12E9A2/Q(ZNG)H-G70#D	jelly-free glass-armoured loose tube cable Ø 7.0 mm, 12 x 9/125 µm G.657.A2, loose tube 2.8 mm, LSFH black
85026736	12-12E9A2/Q(ZNG)H-G70-UR	jelly-free glass-armoured loose tube cable Ø 7.0 mm, 12 x 9/125 µm G.657.A2, loose tube 2.8 mm, LSFH black, UL rating OFN/OFNG
85026737	12-12G50/Q(ZNG)H-G70-UR	jelly-free glass-armoured loose tube cable Ø 7.0 mm, 12 x 50/125 µm OM2, loose tube 2.8 mm, LSFH black, UL rating OFN/OFNG
85026277	12-12G50/Q(ZNG)H-G70-F#D	jelly-free glass-armoured loose tube cable Ø 7.0 mm, 12 x 50/125 µm OM3, loose tube 2.8 mm, LSFH black
85026738	12-12G50/Q(ZNG)H-G70-F-UR	jelly-free glass-armoured loose tube cable Ø 7.0 mm, 12 x 50/125 µm OM3, loose tube 2.8 mm, LSFH black, UL rating OFN/OFNG
85026278	12-12G50/Q(ZNG)H-G70-G#D	jelly-free glass-armoured loose tube cable Ø 7.0 mm, 12 x 50/125 µm OM4, loose tube 2.8 mm, LSFH black
85026739	12-12G50/Q(ZNG)H-G70-G-UR	jelly-free glass-armoured loose tube cable Ø 7.0 mm, 12 x 50/125 µm OM4, loose tube 2.8 mm, LSFH black, UL rating OFN/OFNG
85024090	12-12G62/Q(ZNG)H-G70#D	jelly-free glass-armoured loose tube cable Ø 7.0 mm, 12 x 62.5/125 µm OM1, loose tube 2.8 mm, LSFH black
85026740	12-12G62/Q(ZNG)H-G70-UR	jelly-free glass-armoured loose tube cable Ø 7.0 mm, 12 x 62.5/125 µm OM1, loose tube 2.8 mm, LSFH black, UL rating OFN/OFNG
85030630	24-24E9/Q(ZNG)H-G70#D	jelly-free glass-armoured loose tube cable Ø 7.0 mm, 24 x 9/125 µm G.652.D, loose tube 2.8 mm, LSFH black
85029988	24-24E9A2/Q(ZNG)H-G70#D	jelly-free glass-armoured loose tube cable Ø 7.0 mm, 24 x 9/125 µm G.657.A2, loose tube 2.8 mm, LSFH black
85030631	24-24G50/Q(ZNG)H-G70#D	jelly-free glass-armoured loose tube cable Ø 7.0 mm, 24 x 50/125 µm OM2, loose tube 2.8 mm, LSFH black
85024091	24-24G62/Q(ZNG)H-G70#D	jelly-free glass-armoured loose tube cable Ø 7.0 mm, 24 x 62.5/125 µm OM1, loose tube 2.8 mm, LSFH black

Order information for universal cables

Jelly-free – dry block glass-armoured multifiber loose tube cables - up to 24 fibers
with LSFH™ jacket 12.0 mm

Item no.	Cable type	Description
85078322	12-12E9/Q(ZNG)H-E120#B	Jelly-free glass-armoured loose tube cable Ø 12.0 mm, 12 x 9/125 µm G.652.D, loose tube 2.8 mm, LSFH yellow
85091344	12-12G50/Q(ZNG)H-M120-F#B	Jelly-free glass-armoured loose tube cable Ø 12.0 mm, 12 x 50/125 µm OM3, loose tube 2.8 mm, LSFH turquoise
85091346	12-12G50/Q(ZNG)H-L120-G#B	Jelly-free glass-armoured loose tube cable Ø 12.0 mm, 12 x 50/125 µm OM4, loose tube 2.8 mm, LSFH heather violet
85091343	24-24E9/Q(ZNG)H-E120#B	Jelly-free glass-armoured loose tube cable Ø 12.0 mm, 24 x 9/125 µm G.652.D, loose tube 2.8 mm, LSFH yellow
85091345	24-24G50/Q(ZNG)H-M120-F#B	Jelly-free glass-armoured loose tube cable Ø 12.0 mm, 24 x 50/125 µm OM3, loose tube 2.8 mm, LSFH turquoise
85091347	24-24G50/Q(ZNG)H-L120-G#B	Jelly-free glass-armoured loose tube cable Ø 12.0 mm, 24 x 50/125 µm OM4, loose tube 2.8 mm, LSFH heather violet

Jelly-free – dry block TWINTUBE glass-armoured multifiber loose tube cables - up to 48 fibers
with LSFH™ jacket 9.4 mm

Item no.	Cable type	Description
85085349	24-12E9/Q(ZNG)H-E94#D	TWINTUBE glass-armoured loose tube cable Ø 9.4 mm, 24 x 9/125 µm G.652.D, loose tube 2.8 mm, LSFH yellow
85085351	24-12G50/Q(ZNG)H-L94-G#D	TWINTUBE glass-armoured loose tube cable Ø 9.4 mm, 24 x 50/125 µm OM4, loose tube, 2.8 mm, LSFH heather violet
85108189	24-12E9/BQ(ZNG)H-E88#C	TWINTUBE glass-armoured loose tube cable Ø 8.8 mm, 24 x 9/125 µm G.652.D, loose tube, 2.2 mm, LSFH yellow
85108134	24-12G0/BQ(ZNG)H-L88-G#C	TWINTUBE glass-armoured loose tube cable Ø 8.8 mm, 24 x 50/125 µm OM4, loose tube, 2.2 mm, LSFH heather violet

Jelly-free - glass-armoured multifiber loose tube cables - up to 144 fibers
with LSFH™ jacket

Item no.	Cable type	Description
85065362	48-12E9/BQSN(ZNG)H-G96#D	jelly-free glass-armoured loose tube cable Ø 9.6 mm, 48 x 9/125 µm G.652.D, loose tube 2.2 mm, LSFH black
85087167	48-12E9/BQSN(ZNG)H-E96#D	jelly-free glass-armoured loose tube cable Ø 9.6 mm, 48 x 9/125 µm G.652.D, loose tube 2.2 mm, LSFH yellow
85087168	48-12G50/BQSN(ZNG)H-M96-F#D	jelly-free glass-armoured loose tube cable Ø 9.6 mm, 48 x 50/125 µm OM3, loose tube 2.2 mm, LSFH turquoise
85087169	48-12G50/BQSN(ZNG)H-L96-G#D	jelly-free glass-armoured loose tube cable Ø 9.6 mm, 48 x 50/125 µm OM4, loose tube 2.2 mm, LSFH heather violet
85065360	72-12E9/BQSN(ZNG)H-G106#D	jelly-free glass-armoured loose tube cable Ø 10.6mm, 72 x 9/125 µm G.652.D, loose tube 2.2 mm, LSFH black
85065361	72-12G50/BQSN(ZNG)H-G106-G#D	jelly-free glass-armoured loose tube cable Ø 10.6mm, 72 x 50/125 µm OM4, loose tube 2.2 mm, LSFH black
85064348	96-12E9/BQSN(ZNG)H-G122#D	jelly-free glass-armoured loose tube cable Ø 12.2 mm, 96 x 9/125 µm G.652.D, loose tube 2.2 mm, LSFH black
85071047	96-12E9/BQSN(ZNG)H-E122#D	jelly-free glass-armoured loose tube cable Ø 12.2 mm, 96 x 9/125 µm G.652.D, loose tube 2.2 mm, LSFH yellow
85065359	96-12G50/BQSN(ZNG)H-G122-G#D	jelly-free glass-armoured loose tube cable Ø 12.2 mm, 96 x 50/125 µm OM4, loose tube 2.2 mm, LSFH black
85080531	96-12G50/BQSN(ZNG)H-L122-G#D	jelly-free glass-armoured loose tube cable Ø 12.2 mm, 96 x 50/125 µm OM4, loose tube 2.2 mm, LSFH heather violet
85030405	144-12E9/BQSN(ZNG)H-G145#E	jelly-free glass-armoured loose tube cable Ø 14.5mm, 144 x 9/125 µm G.652.D, loose tube 2.2 mm, LSFH black
85064347	144-12G50/BQSN(ZNG)H-G145-G#E	jelly-free glass-armoured loose tube cable Ø 14.5mm, 144 x 50/125 µm OM4, loose tube 2.2 mm, LSFH black

Jelly-free – glass-armoured multifiber loose tube cables - up to 144 fibers

with LSFH™ jacket

Item no.	Cable type	Description
85118114	24-12E9/BQSN(ZNG)H-G100#C	jelly-free glass-armoured loose tube cable Ø 10.0 mm, 24 x 9/125 µm G.652.D, loose tube 2.2 mm, LSFH black
85115193	24-12E9/BQSN(ZNG)H-E100#C	jelly-free glass-armoured loose tube cable Ø 10.0 mm, 24 x 9/125 µm G.652.D, loose tube 2.2 mm, LSFH yellow
85128546	24-12E9/BQSN(ZNG)H-Z100#C	jelly-free glass-armoured loose tube cable Ø 10.0 mm, 24 x 9/125 µm G.652.D, loose tube 2.2 mm, LSFH black with 2 orange stripes
85118115	24-12G50/BQSN(ZNG)H-M100-F#C	jelly-free glass-armoured loose tube cable Ø 10.0 mm, 24 x 50/125 µm OM3, loose tube 2.2 mm, LSFH turquoise
85115194	24-12G50/BQSN(ZNG)H-L100-G#C	jelly-free glass-armoured loose tube cable Ø 10.0 mm, 24 x 50/125 µm OM4, loose tube 2.2 mm, LSFH heather violet
85103930	48-12E9/BQSN(ZNG)H-G100#C	jelly-free glass-armoured loose tube cable Ø 10.0 mm, 48 x 9/125 µm G.652.D, loose tube 2.2 mm, LSFH black
85115191	48-12E9/BQSN(ZNG)H-E100#C	jelly-free glass-armoured loose tube cable Ø 10.0 mm, 48 x 9/125 µm G.652.D, loose tube 2.2 mm, LSFH yellow
85137884	48-12E9/BQSN(ZNG)H-Z100#C	jelly-free glass-armoured loose tube cable Ø 10.0 mm, 48 x 9/125 µm G.652.D, loose tube 2.2 mm, LSFH black with 2 orange stripes
85115192	48-12G50/BQSN(ZNG)H-L100-G#C	jelly-free glass-armoured loose tube cable Ø 10.0 mm, 48 x 50/125 µm OM4, loose tube 2.2 mm, LSFH heather violet
85125938	72-12E9/BQSN(ZNG)H-G110#C	jelly-free glass-armoured loose tube cable Ø 11.0 mm, 72 x 9/125 µm G.652.D, loose tube 2.2 mm, LSFH black
85112820	72-12E9/BQSN(ZNG)H-E110#C	jelly-free glass-armoured loose tube cable Ø 11.0 mm, 72 x 9/125 µm G.652.D, loose tube 2.2 mm, LSFH yellow
85125547	72-12E9/BQSN(ZNG)H-Z110#C	jelly-free glass-armoured loose tube cable Ø 11.0 mm, 72 x 9/125 µm G.652.D, loose tube 2.2 mm, LSFH black with 2 orange stripes
85112821	96-12E9/BQSN(ZNG)H-E126#C	jelly-free glass-armoured loose tube cable Ø 12.6 mm, 96 x 9/125 µm G.652.D, loose tube 2.2 mm, LSFH yellow
85112819	144-12E9/BQSN(ZNG)H-E150#C	jelly-free glass-armoured loose tube cable Ø 15.0 mm, 144 x 9/125 µm G.652.D, loose tube 2.2 mm, LSFH yellow
85127962	144-12E9/BQSN(ZNG)H-Z150#C	jelly-free glass-armoured loose tube cable Ø 15.0 mm, 144 x 9/125 µm G.652.D, loose tube 2.2 mm, LSFH black with 2 orange stripes

Non-armoured multifiber loose tube cables – up to 12 fibers

with LSFH™ jacket 3.5 mm

Item no.	Cable type	Description
84047624	04-4E9/BW(ZN)H-G35	non-armoured loose tube cable Ø 3.5 mm, 4 x 9/125 µm G.652.D, loose tube 2.2 mm, LSFH black
84047675	04-4G50/BW(ZN)H-G35	non-armoured loose tube cable Ø 3.5 mm, 4 x 50/125 µm OM2, loose tube 2.2 mm, LSFH black
84041870	12-12E9/BW(ZN)H-G35	non-armoured loose tube cable Ø 3.5 mm, 12 x 9/125 µm G.652.D, loose tube 2.2 mm, LSFH black
84041871	12-12G50/BW(ZN)H-G35	non-armoured loose tube cable Ø 3.5 mm, 12 x 50/125 µm OM2, loose tube 2.2 mm, LSFH black/125 µm OM2, Ø 3.5 mm, jacket LSFH black
84047681	12-12G50/BW(ZN)H-G35-F	non-armoured loose tube cable Ø 3.5 mm, 12 x 50/125 µm OM3, loose tube 2.2 mm, LSFH black
84148346	12-12G50/BW(ZN)H-G35-G	non-armoured loose tube cable Ø 3.5 mm, 12 x 50/125 µm OM4, loose tube 2.2 mm, LSFH black

Order information for universal cables

Non-armoured multifiber loose tube cables – up to 24 fibers
with LSFH™ jacket 5.0 mm

Item no.	Cable type	Description
84108343	02-2G62/W(ZN)H-G50	non-armoured loose tube cable Ø 5.0 mm, 2 x 62.5/125 µm OM1, loose tube 2.8 mm, LSFH black
84108894	02-2H200/W(ZN)H-G50	non-armoured loose tube cable Ø 5.0 mm, 2 x 200/230/500µm HCS H200, loose tube 2.8 mm, LSFH black
84108346	04-4E9/W(ZN)H-G50	non-armoured loose tube cable Ø 5.0 mm, 4 x 9/125 µm G.652.D, loose tube 2.8 mm, LSFH black
84069256	04-4G50/W(ZN)H-G50	non-armoured loose tube cable Ø 5.0 mm, 4 x 50/125 µm OM2, loose tube 2.8 mm, LSFH black
84108341	04-4G62/W(ZN)H-G50	non-armoured loose tube cable Ø 5.0 mm, 4 x 62.5/125 µm OM1, loose tube 2.8 mm, LSFH black
84108344	08-8G50/W(ZN)H-G50	non-armoured loose tube cable Ø 5.0 mm, 8 x 50/125 µm OM2, loose tube 2.8 mm, LSFH black
85021644	12-12G50/W(ZN)H-G50-F	non-armoured loose tube cable Ø 5.0 mm, 12 x 50/125 µm OM3, loose tube 2.8 mm, LSFH black
85021642	24-24G50/W(ZN)H-G50-F	non-armoured loose tube cable Ø 5.0 mm, 24 x 50/125 µm OM3, loose tube 2.8 mm, LSFH black

Glass-armoured multifiber loose tube cables – up to 24 fibers
with LSFH™ jacket 7.0 mm

Item no.	Cable type	Description
85002413	12-12E9/W(ZNG)H-G70#D	glass-armoured loose tube cable Ø 7.0 mm, 12 x 9/125 µm G.652.D, loose tube 2.8 mm, LSFH black
85008736	12-12E9/W(ZNG)H-G70-UR	glass-armoured loose tube cable Ø 7.0 mm, 12 x 9/125 µm G.652.D, loose tube 2.8 mm, LSFH black, UL rating OFN/OFNG
85003105	12-12G50/W(ZNG)H-G70#D	glass-armoured loose tube cable Ø 7.0 mm, 12 x 50/125 µm OM2, loose tube 2.8 mm, LSFH black
85019849	12-12G50/W(ZNG)H-G70-F#D	glass-armoured loose tube cable Ø 7.0 mm, 12 x 50/125 µm OM3, loose tube 2.8 mm, LSFH black
85024024	12-12G62/W(ZNG)H-G70	glass-armoured loose tube cable Ø 7.0 mm, 12 x 62.5/125 µm OM1, loose tube 2.8 mm, LSFH black
85003102	24-24E9/W(ZNG)H-G70#D	glass-armoured loose tube cable Ø 7.0 mm, 24 x 9/125 µm G.652.D, loose tube 2.8 mm, LSFH black
85014307	24-24G50/W(ZNG)H-G70#D#D	glass-armoured loose tube cable Ø 7.0 mm, 24 x 50/125 µm OM2, loose tube 2.8 mm, LSFH black
85019851	24-24G50/W(ZNG)H-G70-F	glass-armoured loose tube cable Ø 7.0 mm, 24 x 50/125 µm OM3, loose tube 2.8 mm, LSFH black
85024025	24-24G62/W(ZNG)H-G70#D	glass-armoured loose tube cable Ø 7.0 mm, 24 x 62.5/125 µm OM1, loose tube 2.8 mm, LSFH black

Glass-armoured multifiber loose tube cables – up to 24 fibers
with LSFH™ jacket 8.5 mm

Item no.	Cable type	Description
85016377	02-2H200/W(ZNG)H-G85	glass-armoured loose tube cable Ø 8.5 mm, 2 x 200/230/500µm HCS H200, loose tube 2.8 mm, LSFH black
84126548	04-4E9/W(ZNG)H-G85#D	glass-armoured loose tube cable Ø 8.5 mm, 4 x 9/125 µm G.652.D, loose tube 2.8 mm, LSFH black
22523601	04-4G50/W(ZNG)H-G85#D	glass-armoured loose tube cable Ø 8.5 mm, 4 x 50/125 µm OM2, loose tube 2.8 mm, LSFH black
84033253	04-4G50/W(ZNG)H-M85-F#D	glass-armoured loose tube cable Ø 8.5 mm, 4 x 50/125 µm OM3, loose tube 2.8 mm, LSFH turquoise
22523603	04-4G62/W(ZNG)H-G85#D	glass-armoured loose tube cable Ø 8.5 mm, 4 x 62.5/125 µm OM1, loose tube 2.8 mm, LSFH black
84090674	06-6G50/W(ZNG)H-G85#D	glass-armoured loose tube cable Ø 8.5 mm, 6 x 50/125 µm OM2, loose tube 2.8 mm, LSFH black
84134847	06-6G50/W(ZNG)H-G85-UR	glass-armoured loose tube cable Ø 8.5 mm, 6 x 50/125 µm OM2, loose tube 2.8 mm, LSFH black, UL rating OFN/OFNG
84099044	06-6G50/W(ZNG)H-M85-F#D	glass-armoured loose tube cable Ø 8.5 mm, 6 x 50/125 µm OM3, loose tube 2.8 mm, LSFH turquoise
85001045	06-6G50/W(ZNG)H-L85-G#D	glass-armoured loose tube cable Ø 8.5 mm, 6 x 50/125 µm OM4, loose tube 2.8 mm, LSFH heather violet
84145412	06-6G62/W(ZNG)H-G85#D	glass-armoured losse tube cable Ø 8.5 mm, 6 x 62.5/125 µm OM1, loose tube 2.8 mm, LSFH black
84080161	08-8E9/W(ZNG)H-G85#D	glass-armoured loose tube cable Ø 8.5 mm, 8 x 9/125 µm G.652.D, loose tube 2.8 mm, LSFH black
22523602	08-8G50/W(ZNG)H-G85#D	glass-armoured loose tube cable Ø 8.5 mm, 8 x 50/125 µm OM2, loose tube 2.8 mm, LSFH black
22523604	08-8G62/W(ZNG)H-G85	glass-armoured loose tube cable Ø 8.5 mm, 8 x 62.5/125 µm OM1, loose tube 2.8 mm, LSFH black
22523654	12-12E9/W(ZNG)H-G85#D	glass-armoured loose tube cable Ø 8.5 mm, 12 x 9/125 µm G.652.D, loose tube 2.8 mm, LSFH black
22521943	12-12G50/W(ZNG)H-G85#D	glass-armoured loose tube cable Ø 8.5 mm, 12 x 50/125 µm OM2, loose tube 2.8 mm, LSFH black
84003589	12-12G50/W(ZNG)H-G85-F#D	glass-armoured loose tube cable Ø 8.5 mm, 12 x 50/125 µm OM3, loose tube 2.8 mm, LSFH black
84005134	12-12G50/W(ZNG)H-M85-F#D	glass-armoured loose tube cable Ø 8.5 mm, 12 x 50/125 µm OM3, loose tube 2.8 mm, LSFH turquoise
84098491	12-12G50/W(ZNG)H-G85-G#D	glass-armoured loose tube cable Ø 8.5 mm, 12 x 50/125 µm OM4, loose tube 2.8 mm, LSFH black
84121676	12-12G50/W(ZNG)H-L85-G#D	glass-armoured loose tube cable Ø 8.5 mm, 12 x 50/125 µm OM4, loose tube 2.8 mm, LSFH heather violet
84127251	24-24E9/W(ZNG)H-G85#D	glass-armoured loose tube cable Ø 8.5 mm, 24 x 9/125 µm G.652.D, loose tube 2.8 mm, LSFH black
84134851	24-24E9/W(ZNG)H-G85-UR	glass-armoured loose tube cable Ø 8.5 mm, 24 x 9/125 µm G.652.D, loose tube 2.8 mm, LSFH black
84127282	24-24G50/W(ZNG)H-G85#D	glass-armoured loose tube cable Ø 8.5 mm, 24 x 50/125 µm OM2, loose tube 2.8 mm, LSFH black
84134852	24-24G50/W(ZNG)H-G85-UR	glass-armoured loose tube cable Ø 8.5 mm, 24 x 50/125 µm OM2, loose tube 2.8 mm, LSFH black, UL rating OFN/OFNG
84137563	24-24G50/W(ZNG)H-G85-F#D	glass-armoured loose tube cable Ø 8.5 mm, 24 x 50/125 µm OM3, loose tube 2.8 mm, LSFH black

Order information for universal cables

Glass-armoured multifiber loose tube cables – up to 24 fibers
with LSFH™ jacket 12 mm

Item no.	Cable type	Description
84021028	12-12E9/W(ZNG)H-Z120	glass-armoured loose tube cable Ø 12.0 mm, 12 x 9/125 µm G.652.D, loose tube 2.8 mm, LSFH black with 2 orange stripes
84021029	12-12G50/W(ZNG)H-Z120-F	glass-armoured loose tube cable Ø 12.0 mm, 12 x 50/125 µm OM3, loose tube 2.8 mm, LSFH black with 2 orange stripes

TWINTUBE glass-armoured multifiber loose tube cables – up to 48 fibers
with LSFH™ jacket

Item no.	Cable type	Description
23041032	24-12E9/W(ZNG)H-G94#D	TWINTUBE glass-armoured loose tube cable Ø 9.4 mm, 24 x 9/125 µm G.652.D, loose tube 2.8 mm, LSFH black
23038139	24-12G50/W(ZNG)H-G94#D	TWINTUBE glass-armoured loose tube cable Ø 9.4 mm, 24 x 50/125 µm OM2, loose tube 2.8 mm, LSFH black
84003522	24-12G50/W(ZNG)H-M94-F#D	TWINTUBE glass-armoured loose tube cable Ø 9.4 mm, 24 x 50/125 µm OM3, loose tube 2.8 mm, LSFH turquoise
84066472	24-12G50/W(ZNG)H-G94-F#D	TWINTUBE glass-armoured loose tube cable Ø 9.4 mm, 24 x 50/125 µm OM3, loose tube 2.8 mm, LSFH black
84121635	24-12G50/W(ZNG)H-L94-G#D	TWINTUBE glass-armoured loose tube cable Ø 9.4 mm, 24 x 50/125 µm OM4, loose tube 2.8 mm, LSFH heather violet
23041033	24-12G62/W(ZNG)H-G94#D	TWINTUBE glass-armoured loose tube cable Ø 9.4 mm, 24 x 62.5/125 µm OM1, loose tube 2.8 mm, LSFH black

Glass-armoured mini multifiber loose tube cables – up to 144 fibers
with LSFH™ jacket

Item no.	Cable type	Description
85030051	24-12E9/BWSN(ZNG)H-G96#D	glass-armoured loose tube cable Ø 9.6 mm, 24 x 9/125 µm G.652.D, loose tube 2.2 mm, LSFH black
85032261	24-12G50/BWSN(ZNG)H-G96-F#D	glass-armoured loose tube cable Ø 9.6 mm, 24 x 50/125 µm OM3, loose tube 2.2 mm, LSFH black
85020262	48-12E9/BWSN(ZNG)H-G96#D	glass-armoured loose tube cable Ø 9.6 mm, 48 x 9/125 µm G.652.D, loose tube 2.2 mm, LSFH black
85063647	48-12G50/BWSN(ZNG)H-G96-F#D	glass-armoured loose tube cable Ø 9.6 mm, 48 x 50/125 µm OM3, loose tube 2.2 mm, LSFH black
85032252	48-12G50/BWSN(ZNG)H-G96-G#D	glass-armoured loose tube cable Ø 9.6 mm, 48 x 50/125 µm OM4, loose tube 2.2 mm, LSFH black
85029362	72-12E9/BWSN(ZNG)H-G106	glass-armoured loose tube cable Ø 10.6 mm, 72 x 9/125 µm G.652.D, loose tube 2.2 mm, LSFH black
85029364	96-12E9/BWSN(ZNG)H-G122	glass-armoured loose tube cable Ø 12.2 mm, 96 x 9/125 µm G.652.D, loose tube 2.2 mm, LSFH black
85029363	120-12E9/BWSN(ZNG)H-G136	glass-armoured loose tube cable Ø 13.6 mm, 120 x 9/125 µm G.652.D, loose tube 2.2 mm, LSFH black
85023058	144-12E9/BWSN(ZNG)H-G145	glass-armoured loose tube cable Ø 14.5 mm, 144 x 9/125 µm G.652.D, loose tube 2.2 mm, LSFH black

TWINTUBE steel-armoured multifiber loose tube cables – up to 48 fibers
with LSFH™ jacket 12.5 mm

Item no.	Cable type	Description
84075229	24-12E9/W(ZNG)HAH-G125	TWINTUBE steel-armoured loose tube cable Ø 12.5mm, 24 x 9/125 µm G.652.D, loose tube 2.8 mm, LSFH black
84141130	24-12G62/W(ZNG)HAH-G125	TWINTUBE steel-armoured loose tube cable Ø 12.5mm, 24 x 50/125 µm OM2, loose tube 2.8 mm, LSFH black

Steel-armoured multifiber loose tube cables – up to 24 fibers
with LSFH™ jacket 8 mm

Item no.	Cable type	Description
85002232	04-4E9/W(ZN)HAH-G80	steel-armoured loose tube cable Ø 8.0 mm, 4 x 9/125 µm G.652.D, loose tube 2.8 mm, LSFH black
85008296	04-4G50/W(ZN)HAH-G80	steel-armoured loose tube cable Ø 8.0 mm, 4 x 50/125 µm OM2, loose tube 2.8 mm, LSFH black
84100820	04-4G62/W(ZN)HAH-G80	steel-armoured loose tube cable Ø 8.0 mm, 4 x 62.5/125 µm OM1, loose tube 2.8 mm, LSFH black
84139047	06-6E9/W(ZN)HAH-G80	steel-armoured loose tube cable Ø 8.0 mm, 6 x 9/125 µm G.652.D, loose tube 2.8 mm, LSFH black
85001987	06-6G62/W(ZN)HAH-G80	steel-armoured loose tube cable Ø 8.0 mm, 6 x 62.5/125 µm OM1, loose tube 2.8 mm, LSFH black
84126592	12-12E9/W(ZN)HAH-G80	steel-armoured loose tube cable Ø 8.0 mm, 12 x 9/125 µm G.652.D, loose tube 2.8 mm, LSFH black
84136457	12-12G50/W(ZN)HAH-G80	steel-armoured loose tube cable Ø 8.0 mm, 12 x 50/125 µm OM2, loose tube 2.8 mm, LSFH black
84122522	12-12G62/W(ZN)HAH-G80	steel-armoured loose tube cable Ø 8.0 mm, 12 x 62.5/125 µm OM1, loose tube 2.8 mm, LSFH black

Steel-armoured multifiber loose tube cables – up to 72 fibers
with LSFH™ jacket

Item no.	Cable type	Description
85030099	48-12E9/BWSN(ZNG)HAH-G130	steel-armoured loose tube cable Ø 13.0 mm, 48 x 9/125 µm G.652.D, loose tube 2.2 mm, LSFH black
85030100	72-12E9/BWSN(ZNG)HAH-G140	steel-armoured loose tube cable Ø 14.0 mm, 72 x 9/125 µm G.652.D, loose tube 2.2 mm, LSFH black

Order information for universal cables

Glass-armoured riser cables – 2 fibers
LSFH™ jacket with tight tube 0.9 mm

Item no.	Cable type	Description
84118844	02-E9A2/F(ZNG)H-G48	glass-armoured riser cable Ø 4.8 mm, 2 x 9/125 µm G.657.A2, tight tube 0.9 mm, LSFH black
84142653	02-E9A2/F(ZNG)H-G48-UR	glass-armoured riser cable Ø 4.8 mm, 2 x 9/125 µm G.657.A2, tight tube 0.9 mm, LSFH black, UL rating OFN/OFNG
84130268	02-G50/F(ZNG)H-G48-F	glass-armoured riser cable Ø 4.8 mm, 2 x 50/125 µm OM3, tight tube 0.9 mm, LSFH black
84080315	02-E9/F(ZNG)H-G55	glass-armoured riser cable Ø 5.5 mm, 2 x 9/125 µm G.652.D/G.657.A1, tight tube 0.9 mm, LSFH black
84128336	02-E9A1/F(ZNG)H-G55-UR	glass-armoured riser cable Ø 5.5 mm, 2 x 9/125 µm G.652.D/G.657.A1, tight tube 0.9 mm, LSFH black, UL rating OFN/OFNG
84066685	02-G50/F(ZNG)H-G55	glass-armoured riser cable Ø 5.5 mm, 2 x 50/125 µm OM2, tight tube 0.9 mm, LSFH black
84128340	02-G50/F(ZNG)H-G55-UR	glass-armoured riser cable Ø 5.5 mm, 2 x 50/125 µm OM2, tight tube 0.9 mm, LSFH black, UL rating OFN/OFNG
84129729	02-G62/F(ZNG)H-G55#D	glass-armoured riser cable Ø 5.5 mm, 2 x 62.5/125 µm OM1, tight tube 0.9 mm, LSFH black
84080314	02-E9/F(ZNG)H-G70	glass-armoured riser cable Ø 7.0 mm, 2 x 9/125 µm G.652.D/G.657.A1, tight tube 0.9 mm, LSFH black
84128357	02-E9/F(ZNG)H-G70-UR	glass-armoured riser cable Ø 7.0 mm, 2 x 9/125 µm G.652.D/G.657.A1, tight tube 0.9 mm, LSFH black, UL rating OFN/OFNG
84125119	02-G50/F(ZNG)H-G70	glass-armoured riser cable Ø 7.0 mm, 2 x 50/125 µm OM2, tight tube 0.9 mm, LSFH black
84066684	02-G50/F(ZNG)H-G70-UR	glass-armoured riser cable Ø 7.0 mm, 2 x 50/125 µm OM2, tight tube 0.9 mm, LSFH black, UL rating OFN/OFNG

Glass-armoured riser cables – 4 fibers
LSFH™ jacket with tight tube 0.9 mm

Item no.	Cable type	Description
84104260	04-E9/FSN(ZNG)H-G55	glass-armoured riser cable Ø 5.5 mm, 4 x 9/125 µm G.652.D/G.657.A1, tight tube 0.9 mm, LSFH black
84075876	04-G50/FSN(ZNG)H-G55	glass-armoured riser cable Ø 5.5 mm, 4 x 50/125 µm OM2, tight tube 0.9 mm, LSFH black
84129724	04-G62/FSN(ZNG)H-G55	glass-armoured riser cable Ø 5.5 mm, 4 x 62.5/125 µm OM1, tight tube 0.9 mm, LSFH black

Steel-armoured riser cables – 4 fibers
LSFH™ jacket with tight tube 0.9 mm

Item no.	Cable type	Description
85153091	04-G50/FSN(ZNG) HAH-G85-F	steel-armoured riser cable Ø 8.5 mm, 4 x 50/125 µm OM3, tight tube 0.9 mm, LSFH black

Order information for outdoor cables

Non-armoured multifiber loose tube cables – up to 24 fibers
with PE jacket 5.0 mm

Item no.	Cable type	Description
84150182	04-4E9/W(ZN)Y-G50	non-armoured loose tube cable Ø 5.0 mm, 4 x 9/125 µm G.652.D, loose tube 2.8 mm, LDPE black
22520723	04-4G50/W(ZN)Y-G50	non-armoured loose tube cable Ø 5.0 mm, 4 x 50/125 µm OM2, loose tube 2.8 mm, LDPE black
84150184	08-8E9/W(ZN)Y-G50	non-armoured loose tube cable Ø 5.0 mm, 8 x 9/125 µm G.652.D, loose tube 2.8 mm, LDPE black
22520688	08-8G50/W(ZN)Y-G50	non-armoured loose tube cable Ø 5.0 mm, 8 x 50/125 µm OM2, loose tube 2.8 mm, LDPE black
84150192	12-12E9/W(ZN)Y-G50	non-armoured loose tube cable Ø 5.0 mm, 12 x 9/125 µm G.652.D, loose tube 2.8 mm, LDPE black
22521250	12-12G50/W(ZN)Y-G50	non-armoured loose tube cable Ø 5.0 mm, 12 x 50/125 µm OM2, loose tube 2.8 mm, LDPE black
85001052	24-24E9/W(ZN)Y-G50	non-armoured loose tube cable Ø 5.0 mm, 24 x 9/125 µm G.652.D, loose tube 2.8 mm, LDPE black

Glass-armoured multifiber loose tube cables – up to 24 fibers
with PE jacket 7.0 mm

Item no.	Cable type	Description
85108006	12-12E9/W(ZNG)Y-G70	glass-armoured loose tube cable Ø 7.0 mm, 12 x 9/125 µm G.652.D, loose tube 2.8 mm, LDPE black
85108007	24-24E9/W(ZNG)Y-G70	glass-armoured loose tube cable Ø 7.0 mm, 24 x 9/125 µm G.652.D, loose tube 2.8 mm, LDPE black

Order information for outdoor cables

Glass-armoured multifiber loose tube cables – up to 24 fibers
with PE jacket 8.5 mm

Item no.	Cable type	Description
22521811	02-2G50/W(ZNG)Y-G85	glass-armoured loose tube cable Ø 8.5 mm, 2 x 50/125 µm OM2, loose tube 2.8 mm, LDPE black
22521749	02-2G62/W(ZNG)Y-G85	glass-armoured loose tube cable Ø 8.5 mm, 2 x 62.5/125 µm OM1, loose tube 2.8 mm, LDPE black
22523652	02-2H200/W(ZNG)Y-G85	glass-armoured loose tube cable Ø 8.5 mm, 2 x 200/230/500µm HCS H200, loose tube 2.8 mm, LDPE black
22523661	04-4E9/W(ZNG)Y-G85	glass-armoured loose tube cable Ø 8.5 mm, 4 x 9/125 µm G.652.D, loose tube 2.8 mm, LDPE black
22521750	04-4G50/W(ZNG)Y-G85	glass-armoured loose tube cable Ø 8.5 mm, 4 x 50/125 µm OM2, loose tube 2.8 mm, LDPE black
22521751	04-4G62/W(ZNG)Y-G85	glass-armoured loose tube cable Ø 8.5 mm, 4 x 62.5/125 µm OM1, loose tube 2.8 mm, LDPE black
22523653	04-4H200/W(ZNG)Y-G85	glass-armoured loose tube cable Ø 8.5 mm, 4 x 200/230/500 µm HCS H200, loose tube 2.8 mm, LDPE black
22521752	06-6G50/W(ZNG)Y-G85	glass-armoured loose tube cable Ø 8.5 mm, 6 x 50/125 µm OM2, loose tube 2.8 mm, LDPE black
22521753	06-6G62/W(ZNG)Y-G85	glass-armoured loose tube cable Ø 8.5 mm, 6 x 62.5/125 µm OM1, loose tube 2.8 mm, LDPE black
23017688	08-8E9/W(ZNG)Y-G85	glass-armoured loose tube cable Ø 8.5 mm, 8 x 9/125 µm G.652.D, loose tube 2.8 mm, LDPE black
22521754	08-8G50/W(ZNG)Y-G85	glass-armoured loose tube cable Ø 8.5 mm, 8 x 50/125 µm OM2, loose tube 2.8 mm, LDPE black
22521755	08-8G62/W(ZNG)Y-G85	glass-armoured loose tube cable Ø 8.5 mm, 8 x 62.5/125 µm OM1, loose tube 2.8 mm, LDPE black
22521756	12-12E9/W(ZNG)Y-G85	glass-armoured loose tube cable Ø 8.5 mm, 12 x 9/125 µm G.652.D, loose tube 2.8 mm, LDPE black
22521757	12-12G50/W(ZNG)Y-G85	glass-armoured loose tube cable Ø 8.5 mm, 12 x 50/125 µm OM2, loose tube 2.8 mm, LDPE black
23027099	12-12G50/W(ZNG) Y-G85-F	glass-armoured loose tube cable Ø 8.5 mm, 12 x 50/125 µm OM3, loose tube 2.8 mm, LDPE black
22521758	12-12G62/W(ZNG)Y-G85	glass-armoured loose tube cable Ø 8.5 mm, 12 x 62.5/125 µm OM1, loose tube 2.8 mm, LDPE black
84024359	24-24E9/W(ZNG)Y-G85	glass-armoured loose tube cable Ø 8.5 mm, 24 x 9/125 µm G.652.D, loose tube 2.8 mm, LDPE black
84024360	24-24G50/W(ZNG)Y-G85	glass-armoured loose tube cable Ø 8.5 mm, 24 x 50/125 µm OM2, loose tube 2.8 mm, LDPE black
85010701	24-24G50/W(ZNG) Y-G85-F	glass-armoured loose tube cable Ø 8.5 mm, 24 x 50/125 µm OM3, loose tube 2.8 mm, LDPE black

Glass-armoured multifiber loose tube cables – up to 24 fibers
with PE jacket 12 mm

Item no.	Cable type	Description
22523657	12-12E9/W(ZNG)Y-Z120	glass-armoured loose tube cable Ø 12.0 mm, 12 x 9/125 µm G.652.D, loose tube 2.8 mm, LDPE black with 2 orange stripes
22523655	12-12G50/W(ZNG)Y-Z120	glass-armoured loose tube cable Ø 12.0 mm, 12 x 50/125 µm OM2, loose tube 2.8 mm, LDPE black with 2 orange stripes
22523656	12-12G62/W(ZNG)Y-Z120	glass-armoured loose tube cable Ø 12.0 mm, 12 x 62.5/125 µm OM1, loose tube 2.8 mm, LDPE black with 2 orange stripes
84072782	24-24E9/W(ZNG)Y-Z120	glass-armoured loose tube cable Ø 12.0 mm, 24 x 9/125 µm G.652.D, loose tube 2.8 mm, LDPE black with 2 orange stripes

TWINTUBE glass-armoured multifiber loose tube cables – up to 48 fibers
with PE jacket 9.4 mm

Item no.	Cable type	Description
23038137	24-12E9/W(ZNG)Y-G94	TWINTUBE glass-armoured loose tube cable Ø 9.4 mm, 24 x 9/125 µm G.652.D, loose tube 2.8 mm, LDPE black
23038138	24-12G50/W(ZNG)Y-G94	TWINTUBE glass-armoured loose tube cable Ø 9.4 mm, 24 x 50/125 µm OM2, loose tube 2.8 mm, LDPE black
23041030	24-12G50/W(ZNG)Y-G94-F	TWINTUBE glass-armoured loose tube cable Ø 9.4 mm, 24 x 50/125 µm OM3, loose tube 2.8 mm, LDPE black
84118482	24-12G50/W(ZNG)Y-G94-G	TWINTUBE glass-armoured loose tube cable Ø 9.4 mm, 24 x 50/125 µm OM4, loose tube 2.8 mm, LDPE black
23041031	24-12G62/W(ZNG)Y-G94	TWINTUBE glass-armoured loose tube cable Ø 9.4 mm, 24 x 62.5/125 µm OM1, loose tube 2.8 mm, LDPE black

Steel-armoured multifiber loose tube cables– up to 24 fibers
with PE jacket 8.0 mm

Item no.	Cable type	Description
84144111	04-4G50/W(ZN)YAY-G80	steel-armoured loose tube cable Ø 8.0 mm, 4 x 50/125 µm OM2, loose tube 2.8 mm, LDPE black
85023197	04-4G62/W(ZN)YAY-G80	steel-armoured loose tube cable Ø 8.0 mm, 4 x 62.5/125 µm OM1, loose tube 2.8 mm, LDPE black
84092334	06-6G50/W(ZN)YAY-G80	steel-armoured loose tube cable Ø 8.0 mm, 6 x 50/125 µm OM2, loose tube 2.8 mm, LDPE black
84145972	08-8G62/W(ZN)YAY-G80	steel-armoured loose tube cable Ø 8.0 mm, 8 x 62.5/125 µm OM1, loose tube 2.8 mm, LDPE black
22523660	12-12E9/W(ZN)YAY-G80	steel-armoured loose tube cable Ø 8.0 mm, 12 x 9/125 µm G.652.D, loose tube 2.8 mm, LDPE black
22523658	12-12G50/W(ZN)YAY-G80	steel-armoured loose tube cable Ø 8.0 mm, 12 x 50/125 µm OM2, loose tube 2.8 mm, LDPE black
22523659	12-12G62/W(ZN)YAY-G80	steel-armoured loose tube cable Ø 8.0 mm, 12 x 62.5/125 µm OM1, loose tube 2.8 mm, LDPE black
tbd	24-24E9/W(ZN)YAY-G80	steel-armoured loose tube cable Ø 8.0 mm, 24 x 9/125 µm G.652.D, loose tube 2.8 mm, LDPE black

TWINTUBE steel-armoured multifiber loose tube cables – up to 48 fibers
with PE jacket 12.5 mm

Item no.	Cable type	Description
tbd	24-12E9/W(ZNG)YAY-G125	steel-armoured loose tube cable Ø 12.5mm, 24 x 9/125 µm G.652.D, loose tube 2.2 mm, HDPE black
85030532	24-12G50/W(ZNG)YAY-D125	steel-armoured loose tube cable Ø 12.5mm, 24 x 50/125 µm OM2, loose tube 2.2 mm, HDPE black
85032029	24-12G62/W(ZNG)YAY-G125	steel-armoured loose tube cable Ø 12.5mm, 24 x 62.5/125 µm OM1, loose tube 2.2 mm, LDPE black

Order information for special cables

Simplex cables 1.9 mm
PUR jacket with tight tube 0.9 mm

Item no.	Cable type	Description
84032682	01-E9/FJZ-E19	simplex cable Ø 1.9 mm, 1 x 9/125 µm G.652.D / G.657-A1, tight tube 0.9 mm, PUR yellow
84063323	01-E9A2/FJZ-E19-FG	simplex cable Ø 1.9 mm, 1 x 9/125 µm G.657.A2, tight tube 0.9 mm, PUR yellow
84032683	01-G50/FJZ-D19	simplex cable Ø 1.9 mm, 1 x 50/125 µm OM2, tight tube 0.9 mm, PUR orange
84068995	01-G50/FJZ-D19-F	simplex cable Ø 1.9 mm, 1 x 50/125 µm OM3, tight tube 0.9 mm, PUR orange
84037265	01-G62/FJZ-D19	simplex cable Ø 1.9 mm, 1 x 62.5/125 µm OM1, tight tube 0.9 mm, PUR orange

Rugged simplex cables 6.0 mm
PUR jacket with 2.7 mm/tight tube 0.9 mm

Item no.	Cable type	Description
22523102	01-G50/FJH(ZN)Z-D27	rugged simplex cable 2.7 mm / Ø6.0 mm, 1 x 50/125 µm OM2, tight tube 0.9 mm, PUR orange
22523103	01-G62/FJH(ZN)Z-B27	rugged simplex cable 2.7 mm / Ø6.0 mm, 1 x 62.5/125 µm OM1, tight tube 0.9 mm, PUR grün
84020985	01-H200/FJH(ZN)Z-D27	rugged simplex cable 2.7 mm / Ø6.0 mm, 1 x 200/230/500 µm HCS H200, tight tube 0.9 mm, PUR orange

Rugged minicord breakout cables
PUR jacket with simplex 1.7 mm/tight tube 0.9 mm

Item no.	Cable type	Description
84010318	02-E9/FJ(ZN)Z-G17	rugged minicord breakout cable 1.7mm / Ø 6.0 mm, 2 x 9/125 µm G.652.D/G.657.A1, tight tube 0.9 mm, PUR black
84080260	02-E9A2/FJ(ZN)Z-G17-FG	rugged minicord breakout cable 1.7mm / Ø 6.0 mm, 2 x 9/125 µm G.657.A2, tight tube 0.9 mm, PUR black
23037747	02-G50/FJ(ZN)Z-G17	rugged minicord breakout cable 1.7mm / Ø 6.0 mm, 2 x 50/125 µm OM2, tight tube 0.9 mm, PUR black
23037748	02-G62/FJ(ZN)Z-G17	rugged minicord breakout cable 1.7mm / Ø 6.0 mm, 2 x 62.5/125 µm OM1, tight tube 0.9 mm, PUR black
23037749	02-H200/FJ(ZN)Z-G17	rugged minicord breakout cable 1.7mm / Ø 6.0 mm, 2 x 200/230/500 µm HCS H200, tight tube 0.5 mm, PUR black

TWINFLEX
PUR jacket with simplex 2.2 mm/tight tube 0.9 mm

Item no.	Cable type	Description
84045039	02-G50/FJ(ZN)Z-G22	TWINFLEX non-armoured breakout cable 2.2 mm / Ø 7.5 x 8.0 mm, 2 x 50/125 µm OM2, tight tube 0.9 mm, PUR black
84045188	02-G62/FJ(ZN)Z-G22	TWINFLEX non-armoured breakout cable 2.2 mm / Ø 7.5 x 8.0 mm, 2 x 62.5/125 µm OM1, tight tube 0.9 mm, black
84045184	02-H200/VJ(ZN)Z-G22	TWINFLEX non-armoured breakout cable 2.2 mm / Ø 7.5 x 8.0 mm, 2 x 200/230/500µm HCS H200, tight tube 0.9 mm, PUR black
84057089	02-POF980/M(ZN)Z-G22	TWINFLEX non-armoured breakout cable 2.2 mm / Ø 7.5 x 8.0 mm, 2 x POF 980/1000 µm, LSFH black

QUADFLEX

PUR jacket with simplex 2.2 mm / tight tube 0.9 mm

Item no.	Cable type	Description
85174901	04-E9/FJSN(ZN)Z-G22	TWINFLEX non-armoured breakout cable 2.2 mm / Ø 9.0 mm, 4 x 9/125 µm G.652.D/G.657.A1, tight tube 0.9 mm, PUR black
85165466	04-E9/FJSN(ZN)Z-E22	TWINFLEX non-armoured breakout cable 2.2 mm / Ø 9.0 mm, 4 x 9/125 µm G.652.D/G.657.A1, tught tube 0.9 mm, PUR yellow
85174807	04-G50/FJSN(ZN)Z-G22-G	TWINFLEX non-armoured breakout cable 2.2 mm / Ø 9.0 mm, 4 x 50/125 µm OM4, tight tube 0.9 mm, PUR black

TWINFIX

LSFH™ jacket with simplex 2.2 mm/tight tube 0.9 mm

Item no.	Cable type	Description
84118658	02-E9/FJ(ZNG)H-G22#D	TWINFIX glass-armoured breakout cable 2.2 mm / Ø 7.5 x 7.2 mm, 2 x 9/125 µm G.652.D/G.657.A1, tight tube 0.9 mm, LSFH black
84045041	02-G50/FJ(ZNG)H-G22#D	TWINFIX glass-armoured breakout cable 2.2 mm / Ø 7.5 x 7.2 mm, 2 x 50/125 µm OM2, tight tube 0.9 mm, LSFH black
84125961	02-G50/FJ(ZNG)H-G22-UN	TWINFIX glass-armoured breakout cable 2.2 mm / Ø 7.5 x 7.2 mm, 2 x 50/125 µm OM2, tight tube 0.9 mm, LSFH black, UL rating OFN/OFNG
84045187	02-G62/FJ(ZNG)H-G22#D	TWINFIX glass-armoured breakout cable 2.2 mm / Ø 7.5 x 7.2 mm, 2 x 62.5/125 µm OM1, tight tube 0.9 mm, LSFH black
84125963	02-G62/FJ(ZNG)H-G22-UN	TWINFIX glass-armoured breakout cable 2.2 mm / Ø 7.5 x 7.2 mm, 2 x 62.5/125 µm OM1, tight tube 0.9 mm, LSFH black, UL rating OFN/OFNG
84043741	02-H200/VJ(ZNG)H-G22	TWINFIX glass-armoured breakout cable 2.2 mm / Ø 7.5 x 7.2 mm, 2 x 200/230/500µm HCS H200, tight tube 0.9 mm, LSFH black
84057090	02-POF980/M(ZNG)H-G22	TWINFIX glass-armoured breakout cable 2.2 mm / Ø 7.5 x 7.2 mm, 2 x POF 980/1000µm, LSFH black

RADOX® TWINFIX

RADOX ® jacket with simplex 2.2 mm/tight tube 0.9 mm

Item no.	Cable type	Description
85022456	02-G50/FJ(ZNG)R-G22	RADOX® TWINFIX glass-armoured breakout cable 2.2 mm / Ø 7.5 x 7.2 mm, 2 x 50/125 µm OM2, tight tube 0.9 mm, RADOX® black
85102458	02-G50/FJ(ZNG)R-D22-F	RADOX® TWINFIX glass-armoured breakout cable 2.2 mm / Ø 7.5 x 7.2 mm, 2 x 50/125 µm OM3, tight tube 0.9 mm, RADOX® orange

TWINFIX Railway

RADOX ® jacket with simplex 2.2 mm/tight tube 0.9 mm

Item no.	Cable type	Description
85201752	02-G50/FJ(ZNG)R-D22-F#HL3	TWINFIX glass-armoured breakout cable 2.2 mm/Ø 7.5 x 7.2 mm, 2 x 50/125 µm OM2, tight tube 0.9 mm, RADOX® orange

QUADFIX

LSFH™ jacket with simplex 2.2 mm/tight tube 0.9 mm

Item no.	Cable type	Description
84102119	04-E9/FJ(ZNG)H-G22#C	QUADFIX glass-armoured breakout cable 2.2 mm / Ø 9.0 mm, 4 x 9/125 µm G.652.D/G.657.A1, tight tube 0.9 mm, LSFH black
84092090	04-G50/FJ(ZNG)H-G22#C	QUADFIX glass-armoured breakout cable 2.2 mm / Ø 9.0 mm, 4 x 50/125 µm OM2, tight tube 0.9 mm, LSFH black
84092091	04-G62/FJ(ZNG)H-G22#C	QUADFIX glass-armoured breakout cable 2.2 mm / Ø 9.0 mm, 4 x 62.5/125 µm OM1, tight tube 0.9 mm, LSFH black
tbd	04-H200/VJ(ZNG)H-G22#C	QUADFIX glass-armoured breakout cable 2.2 mm / Ø 9.0 mm, 4 x 200/230/500µm HCS H200, tight tube 0.5mm, LSFH black

Order information for special cables

HVDC-Simplex
LSFH – cable jacket with tight tube

Item no.	Cable type	Description
85091707	01-H200/VH-G20	simplex cable Ø 2.0 mm, 1 x 200/230/500 µm HCS H200, tight tube 0.5 mm, LSFH black
85089356	01-G62/FH-G20	simplex cable Ø 2.0 mm, 1 x 62.5/125 µm OM1, tight tube 0.9 mm, LSFH black

Optiflex
PUR – cable jacket with loose tube

Item no.	Cable type	Description
85138084	12-12E9A2/EW(ZN)Z-G60	Optiflex Ø 6.0 mm, 12 x 9/125 µm G.657.A2, loose tube 3.0 mm, PUR black

Mobile field cables
PUR jacket with tight tube 0.9 mm

Item no.	Cable type	Description
84096489	02-E9/FSN(ZN)Z-G56	mobile field cable Ø 5.6 mm, 2 x 9/125 µm G.652.D/G.657.A1, tight tube 0.9 mm, PUR black
84096494	02-G50/FSN(ZN)Z-G56	mobile field cable Ø 5.6 mm, 2 x 50/125 µm OM2, tight tube 0.9 mm, PUR black
85023837	02-G50/FSN(ZN)Z-G56-F	mobile field cable Ø 5.6 mm, 2 x 50/125 µm OM3, tight tube 0.9 mm, PUR black
84035585	04-E9/FSN(ZN)Z-G56	mobile field cable Ø 5.6 mm, 4 x 9/125 µm G.652.D/G.657.A1, tight tube 0.9 mm, PUR black
84035586	04-G50/FSN(ZN)Z-G56	mobile field cable Ø 5.6 mm, 4 x 50/125 µm OM2, tight tube 0.9 mm, PUR black
84035587	04-G62/FSN(ZN)Z-G56	mobile field cable Ø 5.6 mm, 4 x 62.5/125 µm OM1, tight tube 0.9 mm, PUR black
84016109	08-E9/FSN(ZN)Z-G68	mobile field cable Ø 6.8 mm, 8 x 9/125 µm G.652.D/G.657.A1, tight tube 0.9 mm, PUR black
84016115	08-G50/FSN(ZN)Z-G68	mobile field cable Ø 6.8 mm, 8 x 50/125 µm OM2, tight tube 0.9 mm, PUR black
84013027	08-G62/FSN(ZN)Z-G68	mobile field cable Ø 6.8 mm, 8 x 62.5/125 µm OM1, tight tube 0.9 mm, PUR black
84016119	12-E9/FSN(ZN)Z-G80	mobile field cable Ø 8.0 mm, 12 x 9/125 µm G.652.D/G.657.A1, tight tube 0.9 mm, PUR black
84016120	12-G50/FSN(ZN)Z-G80	mobile field cable Ø 8.0 mm, 12 x 50/125 µm OM2, tight tube 0.9 mm, PUR black
84038810	12-G62/FSN(ZN)Z-G80	mobile field cable Ø 8.0 mm, 12 x 62.5/125 µm OM1, tight tube 0.9 mm, PUR black

Rugged multifiber loose tube cables – up to 24 fibers (dry block)
with 7.0 mm PUR jacket

Item no.	Cable type	Description
85027090	12-12E9/Q(ZNG)Z-G70	jelly-free rugged loose tube cable Ø 7.0 mm, 12 x 9/125 µm G.652.D, loose tube 2.8 mm,PUR black
tbd	12-12G50/Q(ZNG)Z-G70	jelly-free rugged loose tube cable Ø 7.0 mm, 12 x 50/125 µm OM2, loose tube 2.8 mm, PUR black
tbd	12-12G62/Q(ZNG)Z-G70	jelly-free rugged loose tube cable Ø 7.0 mm, 12 x 62.5/125 µm OM1, loose tube 2.8 mm, PUR black
85096167	24-24E9/Q(ZNG)Z-G70	jelly-free rugged loose tube cable Ø 7.0 mm, 24 x 9/125 µm G.652.D, loose tube 2.8mm, PUR black

RADOX® glass-armoured multifiber loose tube cables – up to 24 fibers
with 8.5 mm RADOX jacket

Item no.	Cable type	Description
85029474	04-4E9A2/W(ZNG)R-G85#C	RADOX glass-armoured loose tube cable Ø 8.5 mm, 4 x 9/125 µm G.657.A2, loose tube 2.8 mm, RADOX black
85001138	12-12E9A2/W(ZNG)R-G85#C	RADOX glass-armoured loose tube cable Ø 8.5 mm, 12 x 9/125 µm G.657.A2, loose tube 2.8 mm, RADOX black
85001358	12-12G50/W(ZNG)R-C85-F#C	RADOX glass-armoured loose tube cable Ø 8.5 mm, 12 x 50/125 µm OM3, loose tube 2.8 mm, RADOX blue
85007541	24-24E9A2/W(ZNG)R-G85#C	RADOX glass-armoured loose tube cable Ø 8.5 mm, 24 x 9/125 µm G.657.A2, loose tube 2.8 mm, RADOX black
85086714	24-24G50/W(ZNG)R-G85#C	RADOX glass-armoured loose tube cable Ø 8.5 mm, 24 x 9/125 µm G.657.A2, loose tube 2.8 mm, RADOX black

Steel-armoured loose tube cable
with RADOX® jacket

Item no.	Cable type	Description
85078690	12-12E9/W(ZN)HAR-G82	steel-armoured loose tube cable Ø 8.2mm, 12 x 9/125 µm G.652.D, loose tube 2.8 mm, RADOX black
85088374	12-12G50/W(ZN)HAR-G82	steel-armoured loose tube cable Ø 8.2mm, 12 x 50/125 µm OM2, loose tube 2.8 mm, RADOX black
85086715	24-24E9/W(ZN)HAR-G82	steel-armoured loose tube cable Ø 8.2mm, 24 x 9/125 µm G.652.D, loose tube 2.8 mm, RADOX black
85086717	24-24G50/W(ZN)HAR-G82-F	steel-armoured loose tube cable Ø 8.2mm, 24 x 50/125 µm OM3, loose tube 2.8 mm, RADOX black
85161286	24-24G50/W(ZN)HAR-G82-G	steel-armoured loose tube cable Ø 8.2mm, 24 x 50/125 µm OM4, loose tube 2.8 mm, RADOX black

Drag chain cables – up to 12 fibers
PUR jacket with tight tube 0.9 mm

Item no.	Cable type	Description
84104254	04-G50/FSN(ZN)YZ-G130	drag chain cable Ø 13.0 mm, 4 x 50/125 µm OM2, tight tube 0.9 mm, PUR black
84074001	04-G50/FSN(ZN)YZ-G130-F	drag chain cable Ø 13.0 mm, 4 x 50/125 µm OM3, tight tube 0.9 mm, PUR black
84006996	06-G50/FSN(ZN)YZ-G130	drag chain cable Ø 13.0 mm, 6 x 50/125 µm OM2, tight tube 0.9 mm, PUR black
84006999	06-G62/FSN(ZN)YZ-G130	drag chain cable Ø 13.0 mm, 6 x 62.5/125 µm OM1, tight tube 0.9 mm, PUR black
84006997	08-G50/FSN(ZN)YZ-G130	drag chain cable Ø 13.0 mm, 8 x 50/125 µm OM2, tight tube 0.9 mm, PUR black
84034417	12-E9/FSN(ZN)YZ-G130	drag chain cable Ø 13.0 mm, 12 x 9/125 µm G.652.D/G.657.A1, tight tube 0.9 mm, PUR black
84006998	12-G50/FSN(ZN)YZ-G130	drag chain cable Ø 13.0 mm, 12 x 50/125 µm OM2, tight tube 0.9 mm, PUR black
84007000	12-G62/FSN(ZN)YZ-G130	drag chain cable Ø 13.0 mm, 12 x 62.5/125 µm OM1, tight tube 0.9 mm, PUR black

Drag chain cables – up to 12 fibers
RADOX® jacket with tight tube 0.9 mm

Item no.	Cable type	Description
85078691	12-E9/FSN(ZN)YR-G130	drag chain cable Ø 13.0 mm, 12 x 9/125 µm G.652.D/G.657.A1, tight tube 0.9 mm, RADOX black

Order information for empty tube cables

Simplex empty tube cables
LSFH™ jacket

Item no.	Cable type	Description
85159893	00-0/CHJH-E14-4	empty tube cable Ø 1.4 mm, inner diameter 0.4 mm, LSFH yellow
85159898	00-0/CHJH-G14-4	empty tube cable Ø 1.4 mm, inner diameter 0.4 mm, LSFH black
85159894	00-0/CHJH-L14-4	empty tube cable Ø 1.4 mm, inner diameter 0.4 mm, LSFH heather violet
85159894	00-0/CHJH-L14-4	empty tube cable Ø 1.4 mm, inner diameter 0.4 mm, LSFH heather violet
85141612	00-0/CHJH-E17-4	empty tube cable Ø 1.7 mm, inner diameter 0.4 mm, LSFH yellow
85141529	00-0/CHJH-G17-4	empty tube cable Ø 1.7 mm, inner diameter 0.4 mm, LSFH black
85141610	00-0/CHJH-D17-4	empty tube cable Ø 1.7 mm, inner diameter 0.4 mm, LSFH orange
85141615	00-0/CHJH-M17-4	empty tube cable Ø 1.7 mm, inner diameter 0.4 mm, LSFH turquoise
85141665	00-0/CHJH-L17-4	empty tube cable Ø 1.7 mm, inner diameter 0.4 mm, LSFH heather violet
85141607	00-0/CHJH-E20-4	empty tube cable Ø 2.0 mm, inner diameter 0.4 mm, LSFH yellow
85141605	00-0/CHJH-G20-4	empty tube cable Ø 2.0 mm, inner diameter 0.4 mm, LSFH black
85141524	00-0/CHJH-D20-4	empty tube cable Ø 2.0 mm, inner diameter 0.4 mm, LSFH orange
85141636	00-0/CHJH-M20-4	empty tube cable Ø 2.0 mm, inner diameter 0.4 mm, LSFH turquoise
85141697	00-0/CHJH-L20-4	empty tube cable Ø 2.0 mm, inner diameter 0.4 mm, LSFH heather violet
85005757	00-0/CHJH-E21-8	empty tube cable Ø 2.1 mm, inner diameter 0.8 mm, LSFH yellow
85025992	00-0/CHJH-G21-8	empty tube cable Ø 2.1 mm, inner diameter 0.8 mm, LSFH black
84048394	00-0/CHJH-D21-8	empty tube cable Ø 2.1 mm, inner diameter 0.8 mm, LSFH orange
85005758	00-0/CHJH-M21-8	empty tube cable Ø 2.1 mm, inner diameter 0.8 mm, LSFH turquoise
85005756	00-0/CHJH-L21-8	empty tube cable Ø 2.1 mm, inner diameter 0.8 mm, LSFH heather violet
85141631	00-0/CHJH-E21-11	empty tube cable Ø 2.1 mm, inner diameter 1.1 mm, LSFH yellow
85141611	00-0/CHJH-G21-11	empty tube cable Ø 2.1 mm, inner diameter 1.1 mm, LSFH black
85141606	00-0/CHJH-D21-11	empty tube cable Ø 2.1 mm, inner diameter 1.1 mm, LSFH orange

Simplex empty tube cables
LSFH™ jacket

Item no.	Cable type	Description
85025010	00-0/CHJH-G30-13	empty tube cable Ø 3.0 mm, inner diameter 1.3 mm, LSFH black
85007894	00-0/CHJH-M30-13	empty tube cable Ø 3.0 mm, inner diameter 1.3 mm, LSFH turquoise
85012786	00-0/CHJH-L30-13	empty tube cable Ø 3.0 mm, inner diameter 1.3 mm, LSFH heather violet
85085522	00-0/CHJH-G36-19	empty tube cable Ø 3.6 mm, inner diameter 1.9 mm, LSFH black

Simplex empty tube cables
TPU jacket

Item no.	Cable type	Description
84087504	00-0/CHJZ-D19	empty tube cable Ø 1.9 mm, inner diameter 0.4 mm, TPU orange
84065752	00-0/CHJZ-G27-11	empty tube cable Ø 2.7 mm, inner diameter 1.1 mm, TPU black
85159007	00-0/CHJZ-D27-11	empty tube cable Ø 2.7 mm, inner diameter 1.1 mm, TPU orange

Simplex empty tube cables
RADOX® jacket

Item no.	Cable type	Description
85114180	00-0/CHJR-E21-4	empty tube cable Ø 2.1 mm, inner diameter 0.4 mm, RADOX yellow
84080679	00-0/CHJR-G21-4	empty tube cable Ø 2.1 mm, inner diameter 0.4 mm, RADOX black
85009075	00-0/CHJR-G21-8	empty tube cable Ø 2.1 mm, inner diameter 0.8 mm, RADOX black
84081040	00-0/CHJR-G30-11	empty tube cable Ø 3.0 mm, inner diameter 1.1 mm, RADOX black

Technical terms English – German

Tubes	**Adern**
Tight tube	Vollader
Semi-tight tube	Kompaktader
Suitable for direct connector assembly	Für direkte Steckermontage geeignet
High kink resistance	Hohe Knickfestigkeit
Tight bending radii	Enge Biegeradien
Up to … m can be stripped in one piece	Abisolierbarkeit der Ader … m
Optimal for pigtail assemblies for splicing purpose	Optimal für einseitig konfektionierte Leitungen zu Spleisszwecken
High flexibility	Hohe Flexibilität
Suited for high termical requirements	Breiter Einsatztemperaturbereich

Indoor cables	**Innenkabel**
Single-fiber cable	Simplexkabel (Einzelfaserkabel)
Duplex	Duplexkabel (2-fasrig)
Breakout	Breakout
Riser	Riser
Tactical field cable	Taktisches Feldkabel
Metal-free indoor cable	Metallfreies Innenkabel
Each fiber is strain-relieved	Jeder LWL zugentlastet
Single-fiber cable easy to separate	Einfach zu trennender Mantelsteg
Easy jacket strippability	Mantel gut absetzbar
Suitable for direct connector assembly	Für direkte Steckermontage geeignet
Self-extinguishing, low smoke and halogen-free jacket material	Selbstverlöschendes, halgogenfreies und raucharmes Mantelmaterial
Self-extinguishing, low smoke and halogen-free	Selbstverlöschend, halogenfrei und raucharm
Up to … m can be stripped in one piece	Abisolierbarkeit der Ader in … m an einem Stück
Crush resistant	Trittfest
For high mechanical and thermic requirements	Für hohe mechanische und thermische Ansprüche
Tight tube cable design	Volladeraufbau
Suitable for repeated cable winding	Geeignet für wiederholtes Auf- und Abwickeln
Suited for highest mechanical and thermical requirements	Für höchste mechanische und thermische Ansprüche
Jacket material complies UL94V-0	Mantelmaterial UL94V-0
Tight bending radii	Enge Biegeradien
Compact design saves conduit space	Kompaktes Design, platzsparend
Specification for singlemode at …nm, for multimode at … nm	Spezifikationswerte für Single-mode bei … nm, für Multimode bei … nm

Multi-fiber loose tube	**Bündeladerkabel**
Loose tube cable	Hohladerkabel
Multifiber loose tube cable	Bündeladerkabel
Jelly-free	Gelfrei (trocken)
Metal-free outdoor cable	Metallfreies Aussenkabel
Metal-free indoor cable	Metallfreies Innenkabel
Longitudinal and transversal watertight cable design	Längs- und querwasserdichter Kabelaufbau
Good mechanical resistance	Gute mechanische Festigkeit
High chemical resistance against acids and alkaline solutions	Hohe chemische Beständigkeit gegen Säuren und Laugen
Jelly-free multifiber loose tube design	Trockener Bündeladeraufbau
Good stripping characteristics/properties	Gute Abisolierbarkeit
Installation directly in the ground and in mechanically unprotected environment	Für Verlegung direkt ins Erdreich und in mechanisch ungeschützter Umgebung
Rodant-protected	Nagetiergeschützt
Increased compressive strength	Erhöhte Querdruckfestigkeit
Self-extinguishing, low smoke and halogen-free	Selbstverlöschend, raucharm und halogenfrei
Roving armouring	Glasroving-Armierung
Steel armouring	Strahldraht-Armierung
Non-metallic armouring	Nichtmetallische Armierung
Plastic armouring (rodent protection)	Kunststoff-Armierung (Nagetierschutz)
No need for cleaning the fibers	Keine Reinigung der Fasern erforderlich
For vertical applications	Für vertikale Anwendungen
Easy stripping and installation	Einfache Abisolierbarkeit und Installation
Low fire load for high safety requirements	Geringe Brandlast für hohe Sicherheitsanforderungen

Technical terms English – German

Special terms	Spezialbegriffe
Standard cable	Standardkabel
PE-tube	PE-Röhrchen
Metal-free single-fiber cable	Metallfreies Einzelfaserkabel
Metal-free empty tube cable	Metallfreies, leeres Hohladerkabel
Metal-free loose tube cable	Metallfreies Bündeladerkabel
Not stranded loose tube cable	Unverseiltes Bündeladerkabel
Small fire load	Geringe Brandlast
Resistance against rodent attacks	Nagetiersicher
No contamination of installation material because of jelly	Keine Verschmutzung von Installationsmaterial durch Gel
Cleaning of the fiber not necessary (time saving)	Reinigung der Faser nicht notwendig (Zeitersparnis)
Mechanically resistant	Mechanisch widerstandsfähig
Rip cord	Aufreissfaden

For technical data	Für Technische Daten
Tensile strength	Zugbeanspruchung
Minimum bending radius	Min. Biegeradius
Compressive strength	Querdruckfestigkeit
Short-term	Kurzzeitig
Long-term	Dauernd
Impact strength	Schlagfestigkeit
Repeated bending strength	Wechselbiegefestigkeit
Torsion strength	Torsionsfestigkeit
Coiling capability	Trommelbarkeit
Drag chain capability	Schleppkettentauglichkeit
Water tightness	Längswasserdichtheit
Temperature range	Temperaturbereich
Fire propagation	Brandfortleitung
Fire test with circuit integrity (CI)	Brandtest mit Funktionserhalt (FE)
Fire load	Brandlast
In service	In Betrieb
During installation	Bei Verlegung
On storage	Bei Lagerung
Cycles	Zyklen
Specifications for single-mode at … nm, for multimode at … nm	Spezifikationswerte für Single-mode bei … nm, für Multimode bei … nm

Glossary

AADSL	Asymmetric Digital Subscriber Line – a communication technique for digital broadband transmission of Internet contents for end-users
Access Network	Sub network for customer access to a carrier network, up to 20 km (12 miles)
Access Node	Network point for the access transfer – usually built as central office including ODR's
APC	Angled Physical Contact is a angled polished endface (usually 8°), so that the reflected light is not travelling back in the fiber, but can escape sidways. Thereby an even lower back reflexion can be achieved as with UPC.
CCTV	Closed Circuit Television – describes a video surveillance system in industrial applications
CTB	Cable Termination Box
CPR	Construction Products Regulation
CWDM	Coarse Wavelength Division Multiplexing – various wavelengths are sent through the fiber at the same time. CWDM does not require the same network complexity as DWDM. CWDM is a cost-effective solution for metropolitan area and access networks. According to ITU proposal up to 18 channels can be used in the wavelength range from 1270 to 1610 nm.
DIN	German Institute of Standardisation
DMD	Differential Mode Delay
DSL, DSLx	Digtital Subcriber Line – describes different techniques for transmitting data over two or four copper wires of the phone line, so called network termination, with high speed.
DSLAM	Digtital Subcriber Line Access Multiplexer – part of required infrastructure for operation of DSL. DSLAM's are located at a place where all the lines of network terminations are connected.
DWDM	Dense Wavelength Division Multiplexing – WDM using a lot of different wavelength in a wavelength range with a small channel spacing. Commercial DWDM systems put 32 wavelength through one fiber, which corresponds, at a rate of 10 Giagabits/s per signal to a total rate of 320 Gigabits/s.
EFM	Ethernet in the First Mile – using the Ethernet protocol in the access network. The working group for EFM (standard IEEE 802.3ah) wants to replace ATM from the access network.
EN	European Standard
Ethernet	Ethernet for data transmission of 10Mb/s. It is the most widely-used data protocol for premises networks.
FT	Fiber Tray – a splice or distribution cassette with telescopic and hinged functionality holding fibers, splice connections and/or adapters. The FT has lateral fiber access to adapters called Side Access.
FTTB	Fiber-To-The-Building – network access with optical fibers to the building
FTTC	Fiber-To-The-Curb – network access with optical fibers to the curb
FTTD	Fiber-To-The-Desk – structured building cabling system (LAN) using optical fibers up to the workplace
FTTH	Fiber-To-The-Home – network access with optical fibers to the home
FTTO	Fiber-To-The-Office – structured building cabling system (LAN) using optical fibers up to the office
FTTP	Fiber-To-The-Premises – network access with optical fibers to the premises
Fiber	Optical fibers are dielectric waveguides which light is transmitted through the core. The cladding has a lower refractive index than the core. Thus the light is refracted at the boundary layer and is guided through the core. The fibers are made of silica (silica glass – pure silicon dioxide) or plastic (e.g. PMMA). The fiber is protected against mechanical damage and humidity with a special plastic coating. Today optical fibers are used to transmit data, to transmit power in the material processing, for illumination and reproduction purposes and in the measurement technique.

Glossary

FrontAccess	Access to fibers and adapters from the front of the rack, where usually a door is located
GPON	Gigabit-Capable Passive Optical Network
HCS	Hard Clad Silica are optical fibers with a step index profile and with a core made of common mineral glass and the cladding of a special plastic. A known fiber type has a core diameter of 200 µm and a cladding diameter of 230 µm. The fibers are used for short distances and in particular for industrial cabling.
HDTV	High Definition TeleVision – television with high resolution (16:9), 1920 × 1080 pixels
IEC	International Electrotechnical Commission
IEEE	Institute of Electrical and Electronics Engineers, Inc. www.ieee.org
IP	Internet Protocol
IPxx	Describes the degree of protection by housings according IEC 60529 (DIN 40050). As protection the immersion of water and particles is specified and digits are assigned to it. The first digit describes the protection of particles with 0 to 6 and the second digit the protection against water with 0 to 8. For example IP67 describes the protection against particles with approx. 50 µm and against water maximal 1m below the surface for 30 minutes.
ITU	International Telecommunication Union
LAN	Local Area Network – for the transmission of information between independent terminal units
LSFH™	Low smoke and free of halogen are characteristics of material behaviour. LSFH™® is a Trademark of HUBER+SUHNER AG. Usually these materials are flame retardant and self-extinguishing, they are made of polyethylene and metalhydroxide additives. Similar abbreviations are LSOH and LSZH.
LWL	Optical wave guides, also called optical fibres, are dielectric wave guides which transmit light through their cores. The cladding surrounding the core has a lower index of refraction (density) than the core. This causes the light at the interface to be totally reflected and to be carried through the core of the optical wave guide. Optical wave guides are made of mineral glass (quartz glass – pure silicon dioxide) or plastic (especially PMMA), depending on the specific application. The cladding is surrounded by a protective layer to prevent mechanical damage. It is made of special plastic, which also protects the fibre against moisture. Today, optical wave guides are especially applied as a medium for transmitting data through optical fibres, for transmitting power in the field of material processing and in medicine, for lighting and imaging purposes and in metrology.
MAN	Metropolitan Area Network – Inter-regional network for the transmission of information
MPO	Multifiber push-on - an optical connector, standardised under IEC 61754-7:2008 (multimode only) which provides an interface for up to 72 fibers in a single unit, utilising individual rows of 12 fibers in a polymeric ferrule.
MTP®	Mechanical transfer push-pull – an enchanced version of the MPO connector offering higher optical performance, repeatability and reliability
Multimode	That is a fiber whose core diameter compared to the wavelength of the light is big. Typical core diameters are 50 µm (EU standard) and 62.5 µm (US standard). In the core a big number of waves can propagate. As a result of many paths signal interference occurs based on running time differences. Multimode fibers are suitable for data transmission over shorter distances.
NT	Network Termination – network termination with fiber or copper technique
NZDSF	Non-Zero Dispersion – Shifted Fiber
OAN	Optical Access Network – access network using optical fibers
PE	Polyethylene is made of ethene by polymerisation and a thermoplastic. Polyethylene is used for cable jackets, that have a high protection against environmental influences. The material is halogen-free and can be recycled without concern.

PCF	Polymer Cladded Fiber
PON	Passive Optical Network – an all optical network architecture without electrical/optical conversion and vice versa
PMD	Polarisation Mode Dispersion
POF	Plastic Optical Fiber/Polymer Optical Fiber
Primary coating	First buffer around the fiber protecting the fiber against humidity and mechanical stress; typically 250 µm
PUR	Polyurethanes are thermoplastics that are produced from a dialcohol and a polyisocyanate by polyaddition. Because of the excellent mechanical characteristics some polyurethane are suitable for application, where a high abrasive resistance, a high mechanical flexibility and a good fluid resistance are required.
Secondary coating	Second buffer around the fiber; typically 900 µm
Single-mode	The light travels through the fiber only in one wave, because the core diameter is small compared to the wavelength of the light (approx. 9 µm). Thus long distances and high data volume are possible with the fiber.
Splice	Permanent joint between 2 optical fibers ruptured in a plane, created by fusion, clamping or gluing
UL94	Is defined as a material test from Underwriters Laboratories Inc, (www.ul.com) testing inflammable material in regards to the fiber behaviour. Therefore after exposing a test rot to fire for 60 seconds the self-extinguishing behaviour is analyzed. V describes the test with a vertical test rod, whereas H is with a horizontally fixed rod. The behaviour of the vertical test is classified into 0, 1 or 2 with 0 showing the best self-extinguishing behaviour.
VDSL	Very High Speed Digital Subscriber Line – VSDL is the fastest of all DSL technologies. It allows a data transmission up to 52 Mbit/s over a phone line, though the usable transmission bandwidth declines with the length of the line. For the maximal speed the length may not exceed 300 m; with 900 m it reduces to half and with 1.4 km to a fourth. The speed of the data transmission enables to offer triple play via VDSL including television channels, internet and voice traffic. Planned application of VDSL is the transmission of HDTV, whereas also several channels can be transmitted simultaneously.
VoIP	Voice over IP – uses the internet to transport the voice
WAN	Wide Area Network – world-spanning network for the transmission of information (long-haul)
WDM	Wavelength Division Multiplexing – WDM using a lot of different wavelength in a wavelength range with a small channel spacing and transmitted through the same fiber simultaneously

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