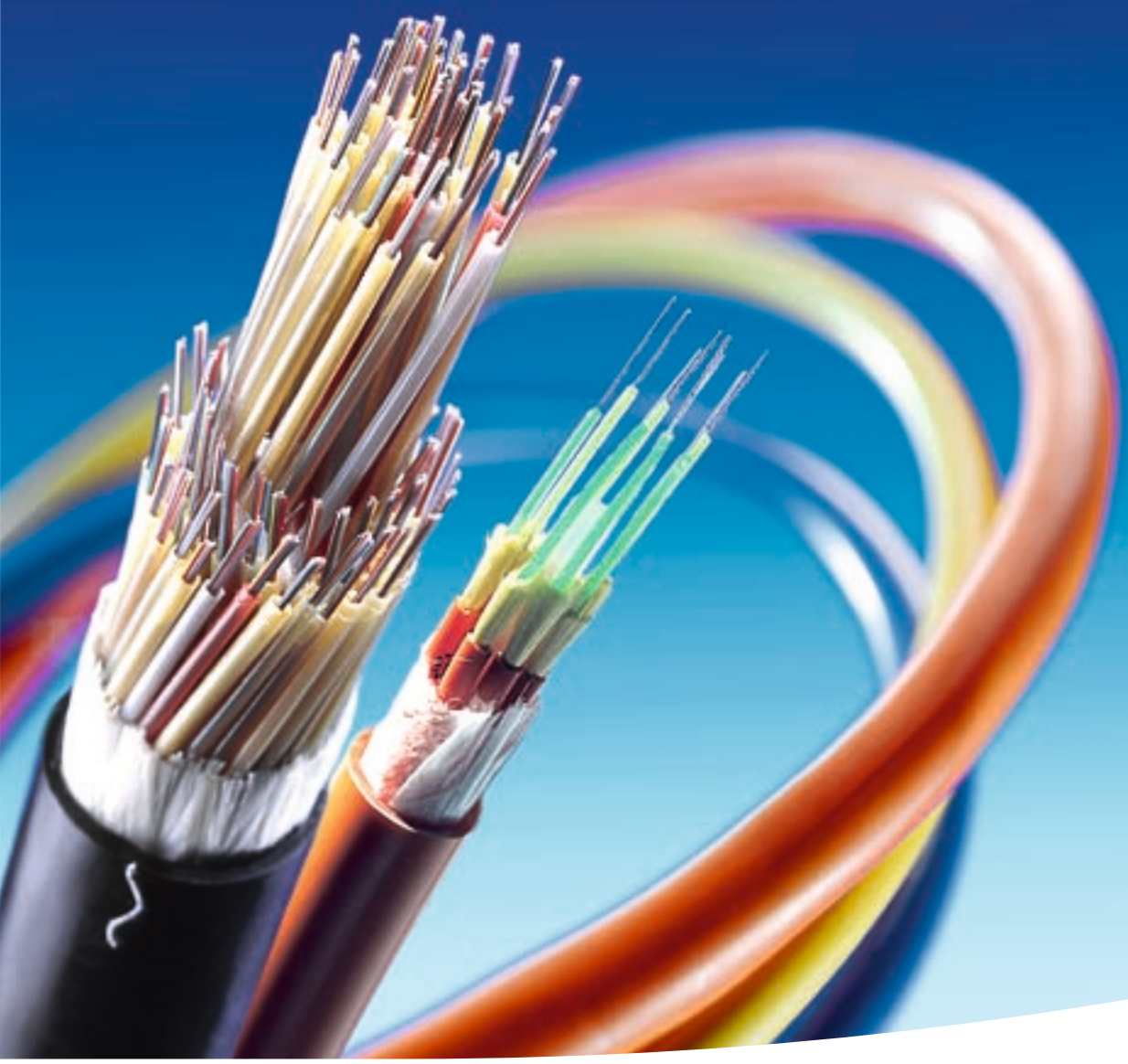
Fiber Optic Cables

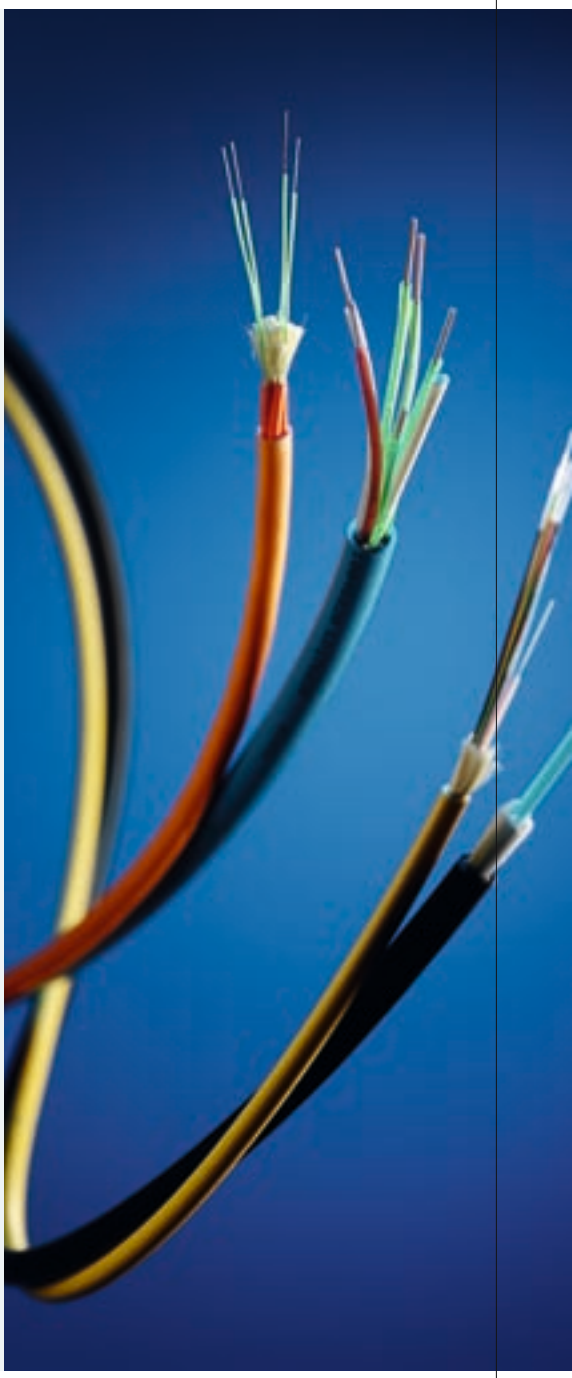


The Quality Connection

LEONI

Edition: July 2007
Subject to change and error.

Contents



The LEONI GigaLine®-Concept

New, faster network protocols and the further development of active and passive network components to match make constantly rising transmission rates possible. A key element of such nets are the cables used. LEONI Fiber Optics fully concentrates on the cable and regards it as our core competence.

Over the past few years we have managed to constantly increase the quality of our fiber optic cables through improvements and process optimization. We do not only keep pace with constantly changing technical requirements by means of state-of-the-art and most flexible technologies but we have also been leading in the areas of further development and innovations. Fiber optic cables of the LEONI GigaLine® series are both technically and economically optimal passive components for company networks as well as for telecommunications.

It is our demand to be better than others. This is one of the reasons why the customer and his individual demands always come first. By being in steady contact with our customer we achieve a plus in product and service quality which is reflected in the LEONI Q-Line series.

LEONI GigaLine® – which means:

- **Best quality**
  Continuously developing and improving productivity.
- **Ease of installation**
  Extremely rugged cables which can be installed both time and cost efficiently.
- **Flexibility**
  Customized cable designs and a wide variety of sheath materials.
- **Availability**
  Delivery at short notice without delivery charge.
- **Technical support**
  Comprehensive instruction and individual help for all of your questions.

Quality and environment

LEONI Quality management

A consistently high level of quality is indispensable for our products. This means that the entire process at LEONI – from a product's planning to its completion – is subjected to permanent monitoring. Our quality management system is certified in accordance with DIN/ISO 9001 and QA 9000/VDA 6.1 and is permanently monitored.

Environmentally friendly and safe

Halogen-free versions of all the cables in our range are also available, of course. Not only does this reduce the strain on the environment, it also means less smoke and corrosive emissions in the event of a fire – for your safety.

LEONI Environmental management

For us, business success with ecological responsibility is not a contradiction in terms. As such, environmental protection is an intrinsic element of our corporate activities. Our environmental management system is certified as complying with DIN EN ISO 14001, confirming that our environmental policy is effectively implemented.

Fire protection for cable

All the fiber optic cables for inhouse cabling in this catalogue are made in **FRNC (LSFROH)** versions.

FR	Flame Retardant
NC	Non Corrosive
LS	Low Smoke
0H	Zero Halogen

There is good reason for this – safety for persons, buildings and installations in the case of fire. LEONI GigaLine® data cables with a sheath made of halogen-free and flame-retardant material are the better alternative to PVC in this respect, as their mechanical properties are fully guaranteed.

PVC used to be a preferred choice of cable sheath material for cost reasons. Initially PVC displays good flame-inhibiting properties; its exposure to flames is accompanied, however, by severe loss of plasticizer components through vaporization, reducing the flame-retardant effect. Furthermore, the halogens contained in PVC can result in the emission of toxic dioxin, which along with carbon monoxide emissions constitutes a major hazard for people.

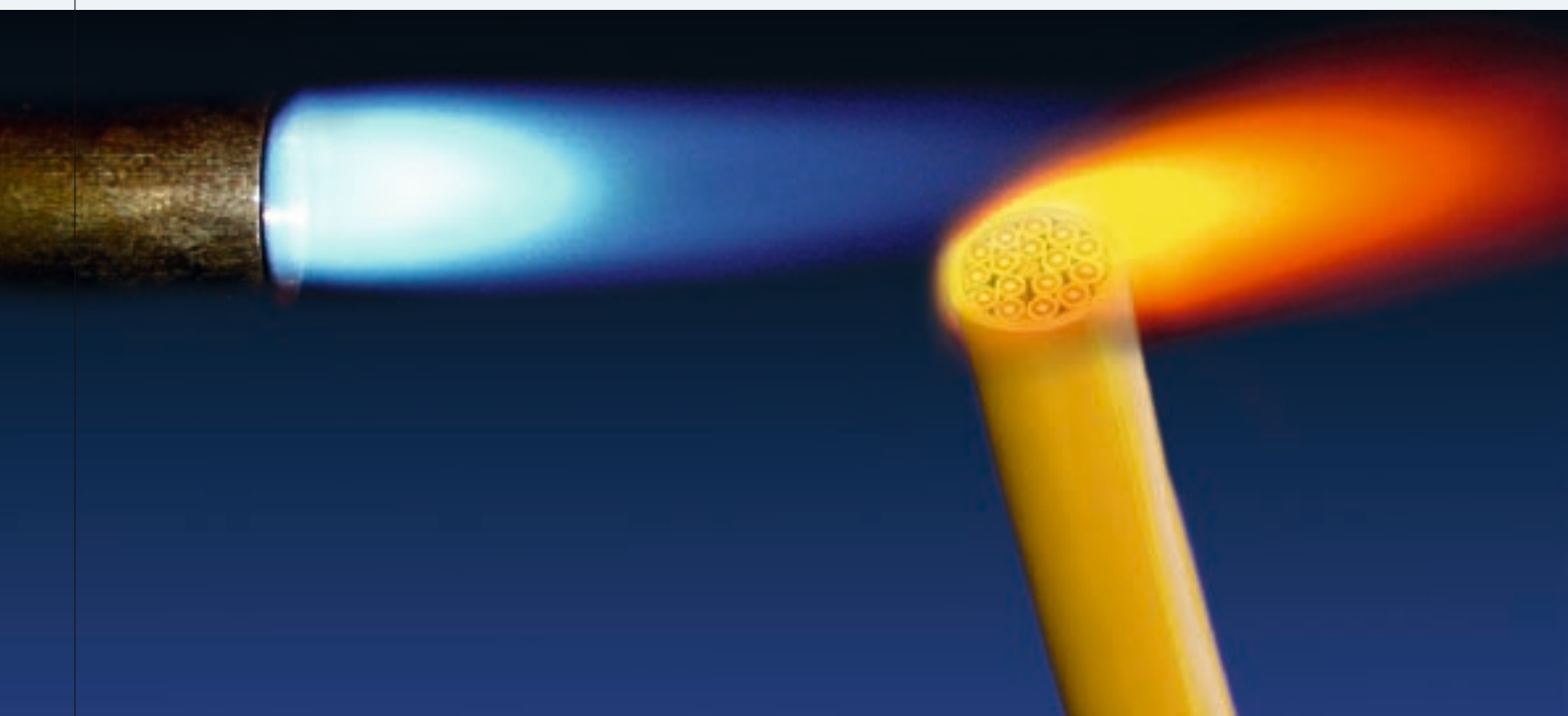
In a fire PVC also results in the formation of chloric acid gas, which is highly corrosive and attacks both metal surfaces and reinforced concrete. The damage caused to a building by corrosion is generally greater by a multiple than that caused by the actual fire.

Advantages of FRNC cables compared to PVC cables:
FRNC contains absolutely no halogen and is non-corrosive, for that reason no dioxins and no corrosive gases are emitted. Exposure to flames creates water vapor, which absorbs heat and therefore quenches the burning cable.

All LEONI GigaLine® fiber optic indoor and outdoor cables pass the extensive fire behavior tests laid down in IEC 60332-1 (DIN VDE 0472 Part 804 B) and in addition to the stricter bundle fire test according to IEC 60332-3, Category A durchgeführt (DIN VDE 0472 Part 804 C).

Smoke production of FRNC is very small compared to PVC and is measured compliant with IEC 61034-1 and 61034-2. Both tests are necessary for verification of minimum smoke production. Absence of halogen is tested in accordance with IEC 60754-2. The most dangerous component for people in the event of a fire is carbon monoxide. FRNC produces only about 1/5th of the volume of carbon monoxide created by PVC.

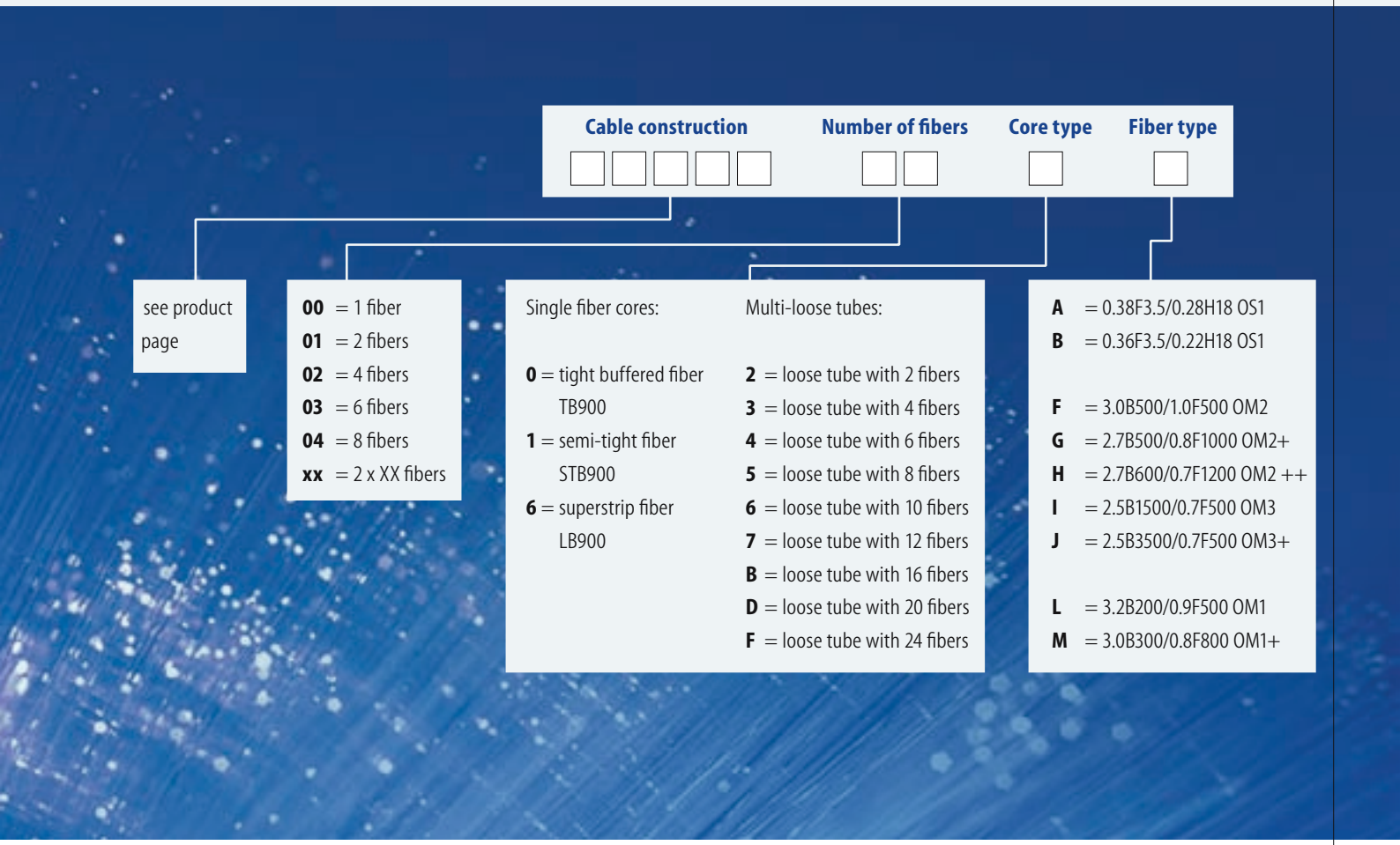
The advantages of FRNC cables at a glance:
- no self-propagation of fire along the cable
- relatively low toxicity of gases emitted in a fire
- no production of corrosive gases
- no dioxins in the remains of the fire
- minimum smoke production



Order number coding

Ordering examples:

8	4	0	0	5	0	1	1	H	■ I-V(ZN)H 2x1G50/125 2.7B600/0.7F1200
8	4	0	2	5	0	6	7	L	■ U-DQ(ZN)BH 12G62.5/125 1750 N 3.2B200/0.9F500
8	4	3	1	6	7	2	7	B	■ A-DQ(ZN)B2Y 12x12E9/125 0.36F3.5/0.22H18



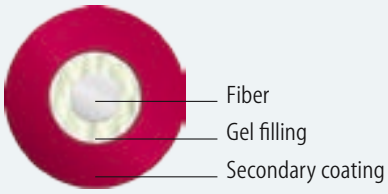
Standards

Fiber optic cables from LEONI Fiber Optics fulfil one or several of the following standards:

- DIN VDE 0888
- DIN VDE 0899
- DIN VDE 0472
- DIN VDE 0473
- EN 50 173
- EN 187 000 to 187 105
- EN 188 000
- ITU-T Rec G.651 to G.657
- IEC 60793 and 60794

Fiber optic cores

STB900 – Semi-Tight Buffered fiber

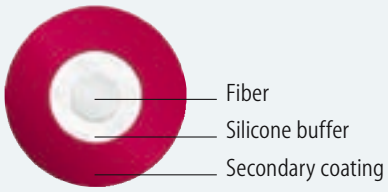


V-...

Properties/Applications

- For splicing as pigtail
- As connection cables in equipment and distribution cabinets
- High flexibility
- Very good kink resistance
- Longitudinal waterproof due to gel filling
- Available without gel filling for pigtails (STB900U)
- Ease of installation and assembly (2000 mm and more can be stripped in one piece)
- Primary and secondary coating available in 12 colors

TB900 – Tight Buffered fiber

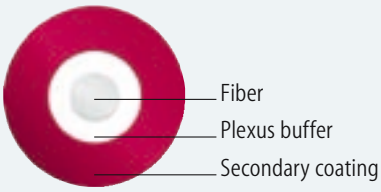


V-...

Properties/Applications

- In equipment and distributor cabinets as two-sided ready assembled cable
- Resistant against temperature fluctuations
- High resistance to external mechanical loads as bending, transverse pressures,... and environmental influences
- Easy consistent stripping of buffer (up to 80 mm in one piece)
- Installation-friendly, because of no gel filling

LB900 – Superstrip fiber



V-...

Properties/Applications

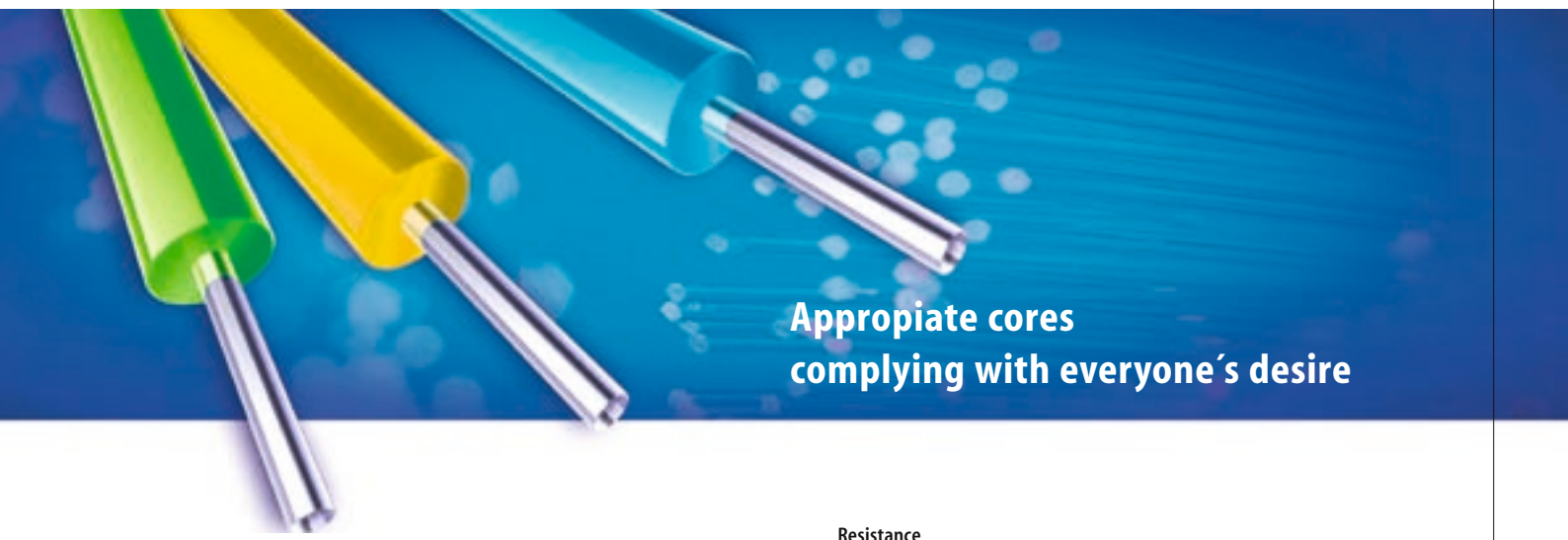
- For splicing as pigtail
- For Indoor cables in equipment and distribution cabinets as well as on cable trays
- High flexibility
- Very good kink resistance
- Installation-friendly, because of no gel filling
- Ease of installation and assembly (1000 mm and more can be stripped in one piece)
- Primary and secondary coating available in 12 colours

Thermal properties

Transport and storage	–20 °C to +50 °C
Installation	+5 °C to +40 °C
Operation	–10 °C to +60 °C

Mechanical properties

min. bending radius	30 mm
max. pull force long-term	5 N
max. crush resistance long-term	200 N

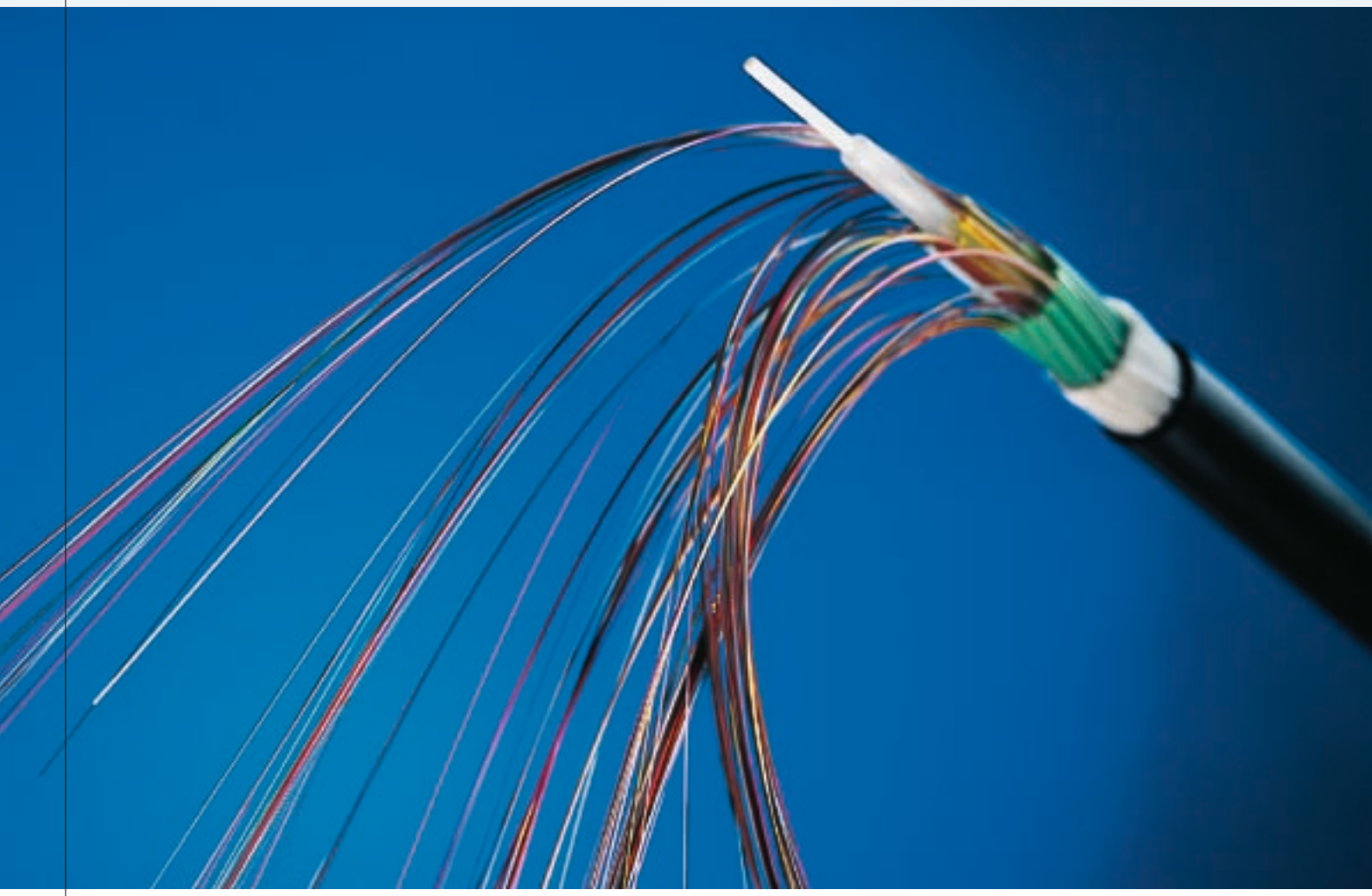


Appropiate cores complying with everyone´s desire

Core	Ø [µm]	Type	Order-No.	Stripable in one piece	Softness	Resistance to temperature cycling	Ease of installation	Suitable for splicing	Note/Application
TB500A	500	Mini tight buffered fiber, upcoated	**8499998Z**	up to 50 mm	+++	+++	++	No	miniaturized indoor cables adapted for SFFC (Small Form Factor Connector, i.e. MT-RJ), high temperaturstability, ideal for stripping machines
TB600	600	Mini tight buffered fiber	**84950116**	up to 80 mm	++	++	+	No	miniaturized indoor cables adapted for SFFC (Small Form Factor Connector, i.e. MT-RJ)
TB600A	600	Mini tight buffered fiber, upcoated	**8499998Y**	up to 50 mm	+++	+++	++	No	miniaturized indoor cables adapted for SFFC (Small Form Factor Connector, i.e. MT-RJ), high temperaturstability, ideal for stripping machines
TB900A	900	Tight buffered fiber, upcoated	**8499998X**	up to 50 mm	+++	+++	++	No	indoor cables for extreme temperature changes, not to be used for fusion splicing, ideal for stripping machines
STB900U unfilled	900	Semi-tight buffered fiber, dry core	**84998009**	up to 2.000 mm	++	+	+++	Yes	ideal for assembling pigtails, available in 12 distinguishable colours
STB900H	900	Semi-tight buffered fiber, dry core, flame-retardant (FRNC)	**84998007**	up to 1.000 mm	++	++	+++	Yes	indoor cables ideal for assembling pigtails, available in 12 distinguishable colours
Loose tube	1400	Loose tube, gel-filled	**84997101**	up to 2.000 mm	++	++	+	Yes	trailing cables and for extreme temperature stress

Fiber optic color code for multi-fiber loose tubes

Standard code of LEONI Fiber Optics GmbH according to IEC 60 304



No. of fiber	
1	red
2	green
3	blue
4	yellow
5	white
6	grey
7	brown
8	violet
9	turquoise
10	black
11	orange
12	pink

No. of fiber	(with ring marking)
13	red
14	green
15	blue
16	yellow
17	white
18	grey
19	brown
20	violet
21	turquoise
22	**transparent** (no ring marking)
23	orange
24	pink

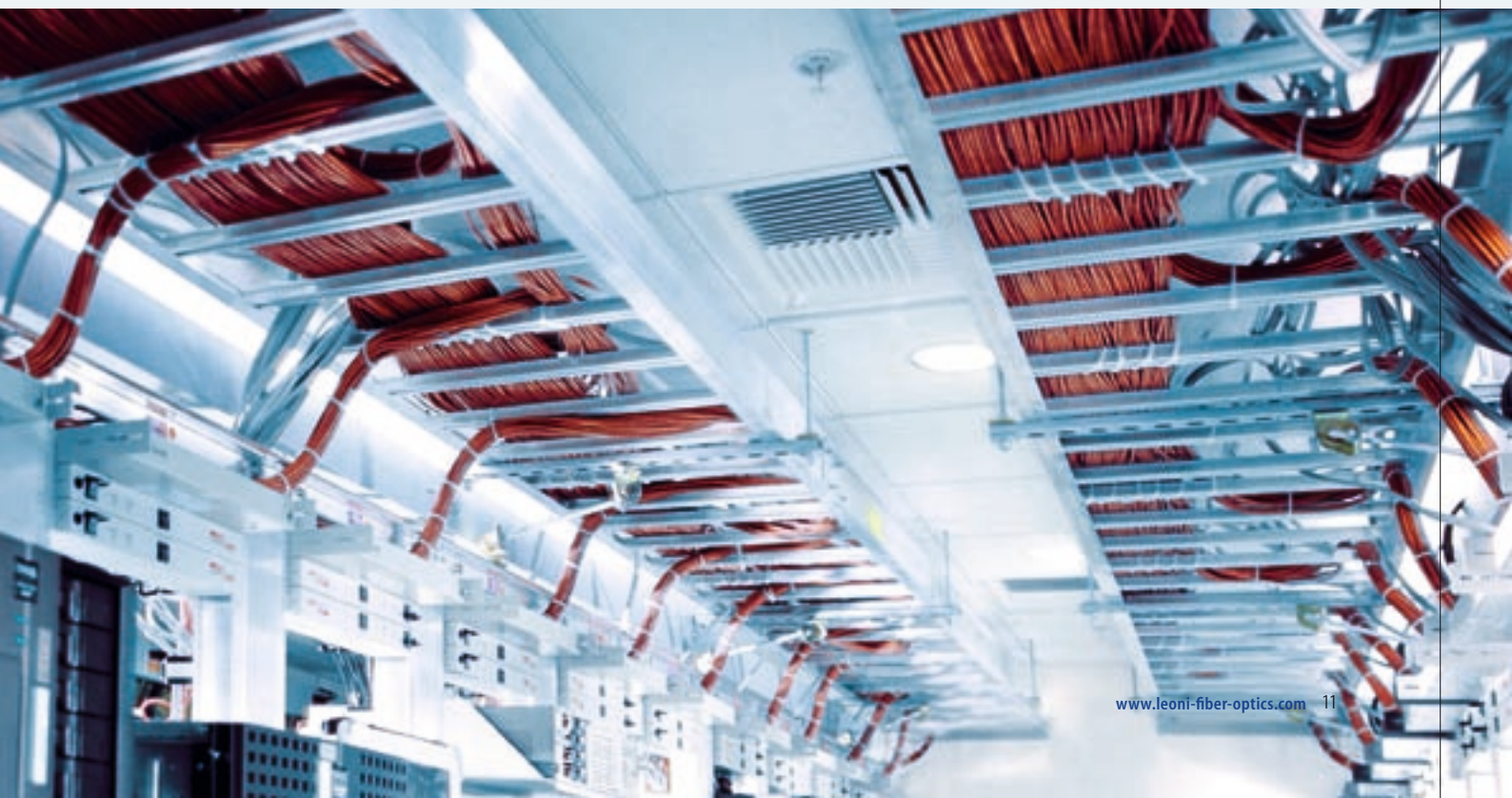
Pictograms

Flame-retardant and halogen-free jacket
The outer jacket of the cable is self-extinguishing and not fire conductive. The halogen-free jacket material develops neither toxic nor corrosive combustion gases in the case of a fire.

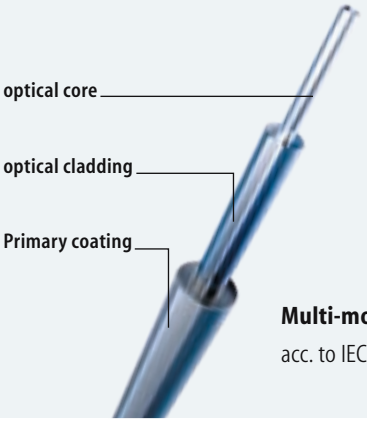
Rodent proof
The cable core is protected respectively secured against damage due to rodents.

Longitudinally waterproof
Water in the cable core cannot spread in the longitudinal direction.

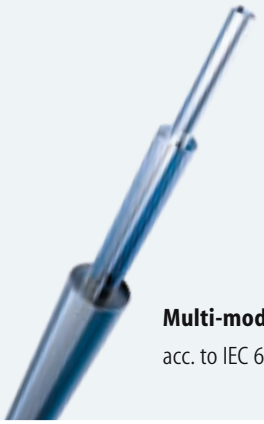
Transversely waterproof
Diffusion of water in the transverse direction of the cable core is prevented.



Fiber specification



Multi-mode fiber G50/125
acc. to IEC 60 793-2-10



Multi-mode fiber G62.5/125
acc. to IEC 60 793-2-10

G50/125 **Multi-mode fiber G50/125** acc. to IEC 60 793-2-10

Geometry/mechanical properties

Core diameter (µm)	50 ± 2.5	Cladding non-circularity (%)	< 1
Cladding diameter (µm)	125 ± 2	Core/Clad concentricity error (µm)	< 1.5
Coating diameter (µm)	245 ± 10	Eccentricity of coating (µm)	< 10
Core non-circularity (%)	< 5	Screen-Test	1 % stretching at 1 s (≙ 100 kpsi)

Transmission properties	**Fiber type F (OM2)**		**Fiber type G (OM2+)**		**Fiber type H (OM2++)**		**Fiber type I (OM3)**		**Fiber type J (OM3+)**	
Wavelength (nm)	850	1300	850	1300	850	1300	850	1300	850	1300
Attenuation max. (dB/km)	3.0	1.0	2.7	0.8	2.7	0.7	2.5	0.7	2.5	0.7
Bandwidth OFL min. (MHz · km)	500	500	500	1000	600	1200	1500	500	3500	500
Effective group of refraction	1.483	1.478	1.483	1.478	1.483	1.478	1.483	1.478	1.483	1.475
Numerical apperture	0.200 ± 0.020		0.200 ± 0.015		0.200 ± 0.015		0.200 ± 0.015		0.200 ± 0.015	

G62.5/125 **Multi-mode fiber G62.5/125** acc. to IEC 60 793-2-10

Geometry/mechanical properties

Core diameter (µm)	62.5 ± 3	Cladding non-circularity (%)	< 1
Cladding diameter (µm)	125 ± 2	Core/Clad concentricity error (µm)	< 1.5
Coating diameter (µm)	245 ± 10	Eccentricity of coating (µm)	< 10
Core non-circularity (%)	< 5	Screen-Test	1 % stretching at 1 s (≙ 100 kpsi)

Transmission properties	**Fiber type L (OM1)**		**Fiber type M (OM1+)**	
Wavelength (nm)	850	1300	850	1300
Attenuation max. (dB/km)	3.2	0.9	3.0	0.8
Bandwidth OFL min. (MHz · km)	200	500	350	550
Effective group of refraction	1.497	1.493	1.497	1.493
Numerical apperture	0.275 ± 0.015		0.275 ± 0.015	

Single-mode fiber E9/125
(matched cladding type)
acc. to ITU-T Rec. G.652 and IEC 60 793-2-50

E9/125 **Single-mode fiber E9/125 (matched cladding type)** acc. to ITU-T Rec. G.652.D and IEC 60 793-2-50

acc. to ITU-T G.652.D additional fiber types e.g. ITU-T G.655 or ITU-T G.657.A or B on request

Geometry/mechanical properties

Mode field diameter (at 1310 nm) (µm)	9.2 ± 0.4	Core/Clad concentricity error (µm)	< 0.5
Cladding diameter (µm)	125 ± 0.7	Eccentricity of coating (µm)	< 12
Coating diameter (µm)	245 ± 10	Screen-Test	1 % Dehnung für 1 s (≙ 100 kpsi)
Cladding non-circularity (%)	< 1		

Transmission properties	**Fiber type A** for semi-tight and tight buffered fibers		**Fiber type B** for multi-fiber loose tubes	
Wavelength (nm)	1310	1550	1310	1550
Attenuation max. (dB/km)	0.38	0.28	0.36	0.22
Dispersion coefficient max. (ps/nm · km)	3.5	18	3.5	18
Zero dispersion wavelength (nm)	1302 – 1322		1302 – 1322	
Dispersion slope (ps/nm^2 · km)	≤ 0.090		≤ 0.090	
Cutoff wavelength (cabled) (nm)	≤ 1260		≤ 1260	
Polarization mode dispersion (ps/$\sqrt{\text{km}}$)	≤ 0.2		≤ 0.2	
Effective group of refraction	1.4695	1.4701	1.4695	1.4701

Applications and link lenghts

	G50/125					G62,5/125	
	F	**G**	**H**	**I**	**J**	**L**	**M**
Type according to IS 11801: 09/2002	OM2	OM2+	OM2++	OM3	QM3+	OM1	OM1+
Gigabit Ethernet 1000BASE-SX (850 nm)	500 m	525 m	750 m	1,000 m	1,500 m	350 m	400 m
Gigabit Ethernet 1000BASE-LX (1300 nm)	550 m	1,000 m	2,000 m	550 m	550 m	550 m	1,000 m
10 Gigabit Ethernet 10GBASE-SX (850 nm)				300 m✖	550 m		
10 Gigabit Ethernet 10GBASE-LX4 (1310 nm WDM)				300 m	300 m		

✖ 10 GE link length acc. to ISO 11801.2

Packaging

Drums

Fiber optic cables of higher cross-section are usually delivered on wooden drums of the KTG Kabeltrommel GmbH & Co. KG, Köln. They are provided on loan exclusively under the conditions of this company which we will send to you upon request.

Standard wooden reels

Type	Flange-Ø (mm)	Core-Ø (mm)	Width over all (mm)	Winding width (mm)	Reel weight approx. (kg)	Max. load max. (kg)
KT081	800	400	520	400	31	400
KT101	1000	500	710	560	71	900
KT121	1250	630	890	670	144	1700
KT141	1400	710	890	670	175	2000
KT161	1600	800	1100	850	280	3000
KT181	1800	1000	1100	840	380	4000
KT201	2000	1250	1350	1045	550	5000
KT221	2240	1400	1450	1140	710	6000
KT250	2500	1400	1450	1140	875	7500

If requested we can deliver fiber optic cables on the following disposable drums:

Disposable drums (wood)

Type	Flange-Ø (mm)	Core-Ø (mm)	Width over all (mm)	Winding width (mm)	Drilling (mm)	Reel weight approx. (kg)
K3000	300	212	103	90	51	0.7
H5001	500	400	116	100	46	3.5
H5005	500	312	331	315	80	3.7
H6007	600	312	335	315	80	5.0
H6008	600	313	410	390	80	4.6
H7601	760	313	415	390	80	8.5
H7603	760	470	544	520	80	12.0
H1001	1000	500	590	560	80	15.0
G1201	1200	600	790	645	80	74
G1401	1400	800	700	600	82	193
G1601	1600	1000	1100	900	80	240

Fiber optic indoor cables

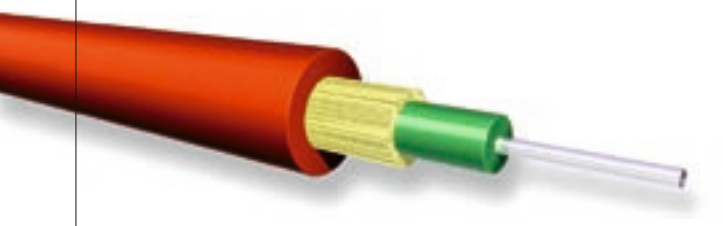
LEONI GigaLine®-fiber optic indoor cables are used in the building backbone and the horizontal cabling of a generic cabling system. In the rising area for connecting the individual floors of a building, fiber optic indoor cables with multi-mode fibers are used mostly to achieve higher data rates over larger distances. With a view to the rising requirements of users in the future, "fiber to the desk", i.e. fiber optic cabling up to the workplace, is the adequate solution.

To fulfil the strict fire protection requirements in the indoor area, fiber optic indoor cables with halogen-free and flame-retardant jacket are required because they guarantee that fire does not spread through the cables and no corrosive and toxic gases arise.

Flexibility, highly reduced weight, small outside diameter and sturdiness are requirements on fiber optic indoor cables varying according to operating area, which are fulfilled with cables from the LEONI GigaLine® series.

The design variety of the LEONI GigaLine® fiber optic indoor cables is demonstrated with simplex and dual cables, the mini break-out cable as well as the break-out cables in the flat and round versions.

LEONI GigaLine® I-V(ZN)H 1...



Simplex cable

Application

Because of the small diameter and high flexibility, ideal as patch cable in distribution systems as well as for connecting terminals.

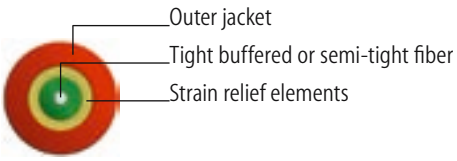
Order-No. **84 003** □□ □ □

Standardization DIN VDE 0888, Part 4 and IEC 60 794-2

Construction

Cable core	Tight buffered fiber (TB), semi-tight fiber (STB) or superstrip (LB)
Strain relief elements	non-metallic (aramid)
Cable jacket	halogen-free and flame-retardant material
Color of jacket	orange for multi-mode, yellow for single-mode ➔ other colors possible

Cross section



Temperature range

Transport and storage	–25 °C to +70 °C
Installation	–5 °C to +50 °C
Operation	–10 °C to +70 °C

Fire performance

Flame retardancy	IEC 60332-1 and IEC 60332-3 Cat. A
Smoke density	IEC 61034
Halogen-free	IEC 60754-2

No toxic and corrosive fumes

Mechanical properties

min. bending radius	static	30 mm
	dynamic	60 mm

Outer-Ø	Type	Weight	max. pull force long-term	max. crush resistance long-term	Fire load
mm		kg/km	N	N/dm	MJ/m
1.6	I-V(ZN)H 1...	2.9	200	100	0.09
1.8	I-V(ZN)H 1...	3.7	200	100	0.10
2.0	I-V(ZN)H 1...	5.0	300	100	0.11
2.1	I-V(ZN)H 1...	5.1	300	100	0.12
2.4	I-V(ZN)H 1...✖	5.7	400	150	0.16
2.8	I-V(ZN)H 1...	7.9	400	150	0.18
2.9	I-V(ZN)H 1...	8.0	400	150	0.20
3.0	I-V(ZN)H 1...	8.1	400	150	0.21
3.4	I-V(ZN)H 1...✖	12.0	400	150	0.32

✖ acc. to TS 0011/96 Deutsche Telekom

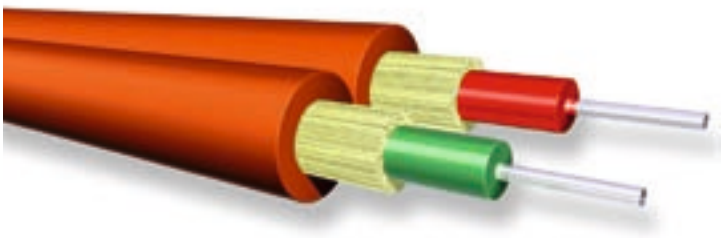
All simplex cables are available with TB, STB and LB cores.
Order-No. on request.

LEONI GigaLine® I-V(ZN)H 2x1...

Duplex cable

Application

Because of the small diameter and high flexibility, ideal as patch cable in distribution systems as well as for connecting terminals.



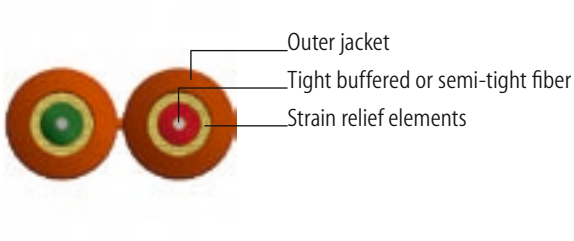
Order-No. **84 005** □□ □ □

Standardization DIN VDE 0888, Part 6 and IEC 60 794-2

Construction

Cable core	Tight buffered fiber (TB), semi-tight fiber (STB) or superstrip (LB)
Strain relief elements	non-metallic (aramid)
Cable jacket	halogen-free and flame-retardant material
Color of jacket	orange for multi-mode, yellow for single-mode ➔ other colors possible

Cross section



Temperature range

Transport and storage	–25 °C to +70 °C
Installation	–5 °C to +50 °C
Operation	–10 °C to +70 °C

Fire performance

Flame retardancy	IEC 60332-1 and IEC 60332-3 Cat. A
Smoke density	IEC 61034
Halogen-free	IEC 60754-2

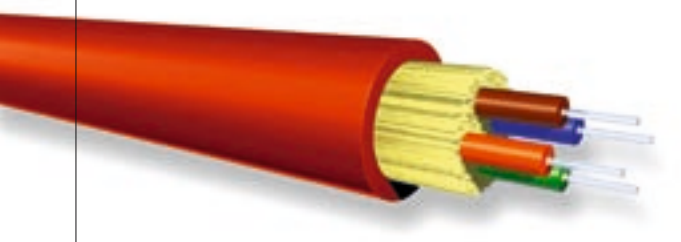
No toxic and corrosive fumes

Mechanical properties

min. bending radius	static	30 mm
(over flat side)	dynamic	60 mm

Outer dimension	Type	Weight	max. pull force	max. crush resistance	Fire load
mm		kg/km	N	long-term N/dm	long-term MJ/m
1.6 x 3.3	I-V(ZN)H 2x1...	5.8	400	200	0.18
1.8 x 3.7	I-V(ZN)H 2x1...	7.4	400	200	0.20
2.0 x 4.1	I-V(ZN)H 2x1...	7.4	400	200	0.22
2.1 x 4.3	I-V(ZN)H 2x1...	9.0	400	400	0.24
2.4 x 4.9	I-V(ZN)H 2x1...	12.6	400	400	0.31
2.8 x 5.7	I-V(ZN)H 2x1...	15.8	600	600	0.36
3.0 x 6.1	I-V(ZN)H 2x1...	17.5	600	6s00	0.38

All duplex cables are available with TB, STB and LB cores.
Order-No. on request.



LEONI GigaLine® I-V(ZN)H n...

Mini-breakout-cable

Application

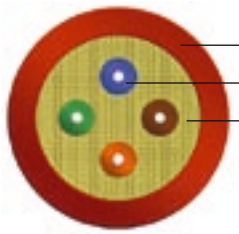
Because of its high flexibility and small dimensions ideal for fiber to the desk (FTTD).
Non-metallic indoor cable for direct plug assembly.

Order-No. **84 026** □□ □ □
Standardization DIN VDE 0888, Part 6 and IEC 60 794-2

Construction

Cable core	Tight buffered fiber (TB), semi-tight fiber (STB) or superstrip (LB)
Strain relief elements	non-metallic (aramid)
Cable jacket	halogen-free and flame-retardant material
Color of jacket	orange for multi-mode, yellow for single-mode

Cross section



Temperature range

Transport and storage	–25 °C to +70 °C
Installation	–5 °C to +50 °C
Operation	–10 °C to +70 °C

Fire performance

Flame retardancy	IEC 60332-1 and IEC 60332-3 Cat. A
Smoke density	IEC 61034
Halogen-free	IEC 60754-2

No toxic and corrosive fumes

Mechanical properties

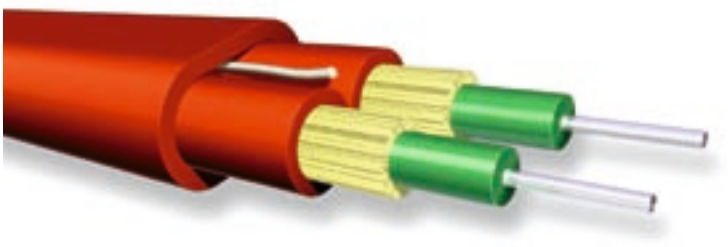
max. pull force	long-term	800 N
max. crush resistance	long-term	300 N/dm

Number of fibers n	2	4	6	8	12	16	24
Outer-Ø (mm)	4.2	5.6	5.9	6.1	7.0	8.4	9.4
Weight (kg/km)	14	21	25	30	38	59	72
min. bending radius static (mm)	40	55	60	60	70	85	95
min. bending radius dynamic (mm)	65	85	90	90	95	120	135
Fire load (MJ/m)	0.45	0.47	0.50	0.52	0.55	0.74	0.92

All mini-breakout cables flat are available with TB, STB and LB cores.
Order-No. on request.

LEONI GigaLine® I-V(ZN)HH 2x1...

Breakout-cable, flat



Application

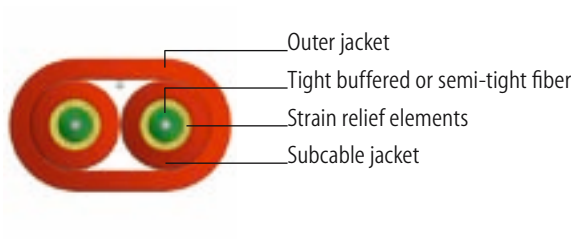
Light, thin and robust indoor cable for use as patch cable in distribution systems, as connection cable for terminals as well as for fiber to the desk.
For direct connector assembly.

Order-No. **84 011** □□ □ □
Standardization DIN VDE 0888, Part 6 and IEC 60 794-2

Construction

Cable core	two single fiber cables (TB, STB or LB) lying parallel to one another with strain relief elements (aramid) and halogen-free, flame-retardant jacket (Ø see table)
Cable jacket	halogen-free and flame-retardant material
Color of jacket	orange for multi-mode, yellow for single-mode

Cross section



Temperature range

Transport and storage	–25 °C to +70 °C
Installation	–5 °C to +50 °C
Operation	–10 °C to +70 °C

Fire performance

Flame retardancy	IEC 60332-1 and IEC 60332-3 Cat. A
Smoke density	IEC 61034
Halogen-free	IEC 60754-2

no toxic and corrosive fumes

Mechanical properties

min. bending radius	static	35 mm
(over flat side)	dynamic	65 mm

Subcable	Outer dimension	Type	Weight	max. pull force long-term	max. crush resistance long-term	Fire load
mm	mm			kg/kmN	N/dm	MJ/m
1.7	**2.8 x 4.5**	I-V(ZN)HH 2x1...	16.5	400	400	0.58
1.8	**2.9 x 4.7**	I-V(ZN)HH 2x1...	17.5	400	400	0.60
2.0	**3.1 x 5.2**	I-V(ZN)HH 2x1...	19.0	600	400	0.63
2.1	**3.1 x 5.2**	I-V(ZN)HH 2x1...	19.0	600	400	0.63
2.5	**3.7 x 6.2**	I-V(ZN)HH 2x1...	26.0	600	600	0.65
2.8	**4.0 x 6.8**	I-V(ZN)HH 2x1...	32.0	600	600	0.83

All breakout cables flat are available with TB, STB and LB cores.
Order-No. on request.

LEONI GigaLine® I-V(ZN)HH n...

Breakout-cable

Application

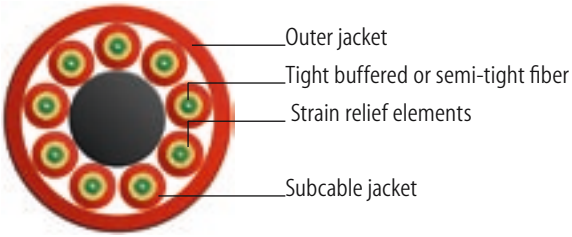
Non-metallic, robust cable for installation in the rising and horizontal area.
For direct connector assembly.

Order-No. **see table**
Standardization DIN VDE 0888, Part 6 and IEC 60 794-2

Construction

Cable core	Stranded single elements designed as tight buffered (TB), semi-tight fibers (STB) or superstrip (LB), gel filled with strain relief elements (aramid) and halogen-free, flame-retardant jacket (diameter see table)
Cable jacket	halogen-free and flame-retardant material
Color of jacket	orange for multi-mode, yellow for single-mode

Cross section



Temperature range

Transport and storage	–25 °C to +70 °C
Installation	–5 °C to +50 °C
Operation	–10 °C to +70 °C

Fire performance

Flame retardancy	IEC 60332-1 and IEC 60332-3 Cat. A
Smoke density	IEC 61034
Halogen-free	IEC 60754-2

No toxic and corrosive fumes

Remarks

Available with a non-metallic rodent protection (B)

Subcable 1.8 mm

Core: TB600

Tight buffered fiber with Ø 600 µm

Order-No. 84 015 □□ Z □

Number of fibers n	2	4	6	8	10	12	16	18
Outer-Ø (mm)	5.7	5.7	7.0	8.3	9.6	11.0	10.7	11.3
Weight (kg/km)	38	38	60	72	84	96	105	120
min. bending radius static (mm)	60	60	70	85	95	110	110	115
min. bending radius dynamic (mm)	85	85	105	125	145	165	160	170
max. pull force long-term (N)	600	600	800	800	800	800	1000	1000
max. crush resistance (N/dm)	800	800	800	800	800	800	800	800
Fire load (MJ/m)	0.96	0.96	1.09	1.15	1.24	1.32	1.48	1.65

Subcable 2.1 mm

Tight buffered fiber, semi-tight fiber or superstrip core with Ø 900 µm

Order-No. 84 013 □□ 0 □ (TB)

or **84 013 □□ 1 □** (STB)

or **84 013 □□ 6 □** (LB)

Number of fibers n	2	4	6	8	10	12	16	18	20	24	26
Outer-Ø (mm)	7.0	7.0	8.2	9.6	11.0	12.5	12.0	13.0	14.5	15.0	15.5
Weight (kg/km)	40	45	65	95	135	155	140	160	205	210	225
min. bending radius static (mm)	70	70	80	95	110	125	120	130	145	150	155
min. bending radius dynamic (mm)	95	95	120	145	165	190	180	195	220	225	235
max. pull force long-term (N)	800	800	1000	1000	1000	1000	1000	1000	1000	1000	1000
max. crush resistance (N/dm)	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Fire load (MJ/m)	1.10	1.10	1.18	1.31	1.42	1.57	1.62	2.00	2.10	2.35	2.45

Subcable 2.5 mm

Core: TB900 or STB900

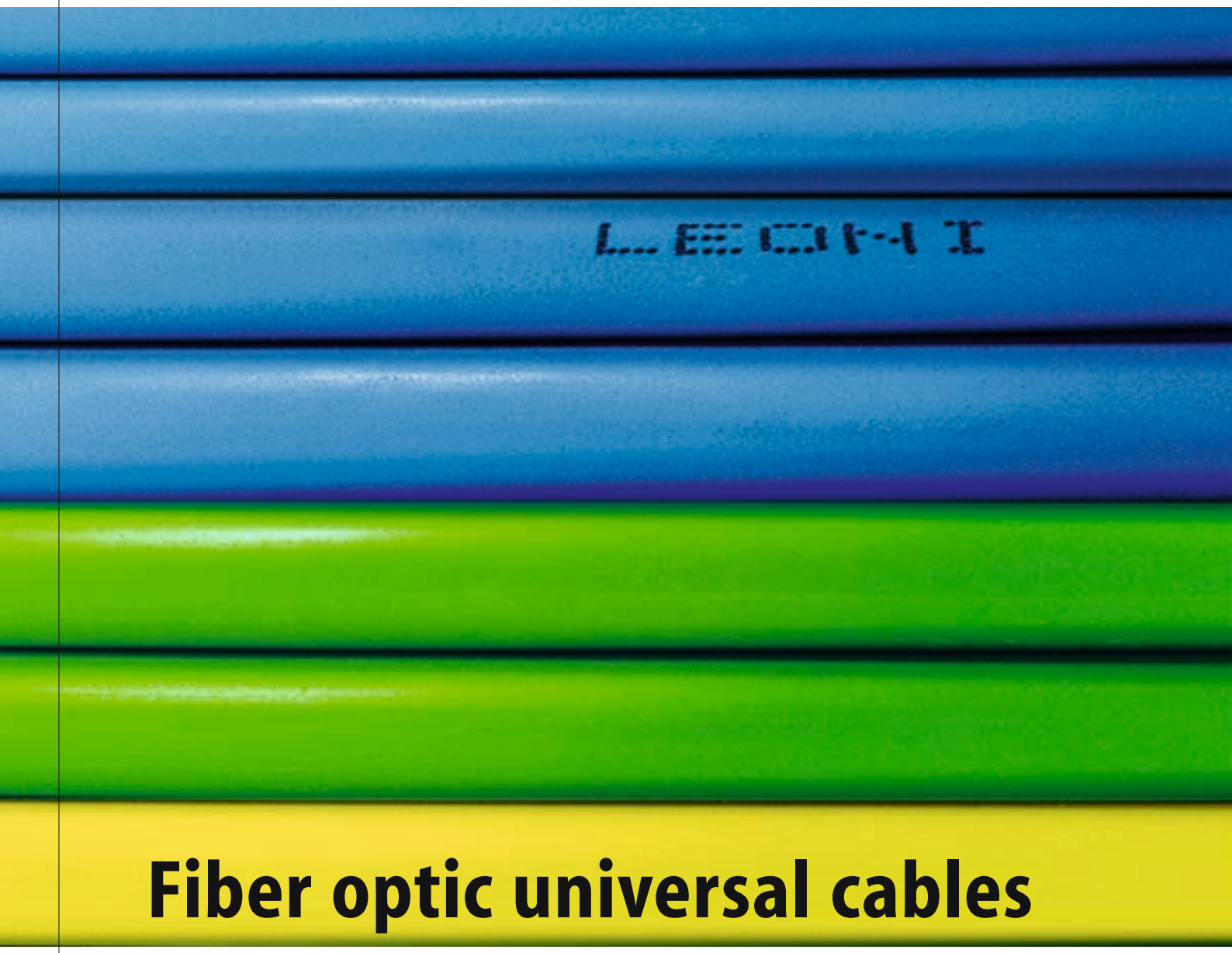
Tight buffered fiber, semi-tight fiber or superstrip core with Ø 900 µm

Order-No. 84 010 □□ 0 □ (TB)

or **84 010 □□ 1 □** (STB)

or **84 010 □□ 6 □** (LB)

Number of fibers n	2	4	6	8	10	12	16	18	20	24	26
Outer-Ø (mm)	7.5	7.5	9.0	11.0	13.0	14.5	14.0	14.5	16.0	17.5	18.0
Weight (kg/km)	45	50	75	110	160	182	160	175	225	245	260
min. bending radius static (mm)	75	75	90	110	130	145	140	145	160	175	180
min. bending radius dynamic (mm)	115	115	135	165	195	215	210	215	240	260	270
max. pull force long-term (N)	800	800	1200	1200	1200	1200	1200	1200	1200	1200	1200
max. crush resistance (N/dm)	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
Fire load (MJ/m)	1.20	1.20	1.36	1.52	1.68	1.80	1.84	1.92	2.16	2.48	2.50



Fiber optic universal cables

Universal cables which can be used both in the indoor and in the outdoor area of local area networks (LAN) are recommended for campus and building backbone. Interfaces between campus area and the buildings are not required when using universal cables, and thus the time-consuming splicing is not necessary, which in turn has positive effects on installation times and costs of LAN cabling.

Integration of a metallic humidity barrier can also make a further contribution to reducing costs. Universal cables with aluminium tape or steel armour are suitable for running directly in the ground, so that it is not necessary to use a HDPE protective conduit.

The halogen-free and flame-retardant cable jacket of the LEONI GigaLine® universal cables guarantees compliance with the strict fire protection requirements on cables in the inhouse area.

A smaller outer diameter, a lower weight and smaller bending radius are advantages of universal cables in comparison to outdoor cables. Thus it is possible to install clearly larger lengths in one piece, e.g. in conduits, ducts or on cable trays. Non-metallic reinforcements with glass yarns or metallic armourings with corrugated steel tape offer protection against rodents and humidity.

LEONI GigaLine® U-VQ(ZN)BH n...

Rodent protected universal cable with central tube (2500 N)

Application

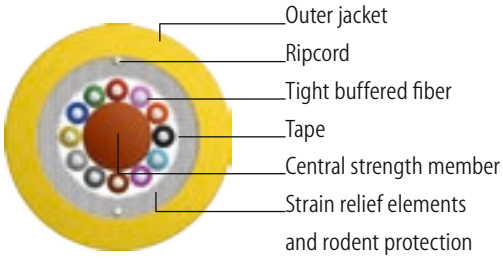
Non-metallic flexible and light cable for enhanced tensile load, that can be used both inside and outside buildings.
Installation in cable ducts, on cable trays or in cable conduits.
To be used in areas with circuit integrity requirements.

Order-No. **84 950 165** ☐
Standardization DIN VDE 0888, Part 6

Construction

Cable core	Central strength member with stranding elements, designed as tight buffered (TB) and if necessary fillers
Armouring	water absorbent as non-metallic strain relief elements and as rodent protection
Cable jacket	halogen-free and flame-retardant material
Color of jacket	yellow

Cross section



Temperature range

Transport and storage	–25 °C to +70 °C
Installation	–5 °C to +55 °C
Operation	–20 °C to +60 °C

Fire performance

Flame retardancy	IEC 60332-1 and IEC 60332-3 Cat. A
Smoke density	IEC 61034
Halogen-free	IEC 60754-2

no toxic and corrosive fumes

Mechanical properties

min. bending radius	static	15 x outside diameter
	dynamic	20 x outside diameter
max. pull force	long-term	2500 N
max. crush resistance	long-term	1000 N/dm

Number of fibers n	4	6	8	10	12	16	20
Outer-Ø (mm)	8.5	8.5	8.5	9.7	9.7	10.1	10.1
Weight (kg/km)	85	85	85	105	105	110	110
Fire load (MJ/m)	0.75	0.75	0.75	0.85	0.85	0.87	0.87

LEONI GigaLine® U-DQ(ZN)BH n... 1750 N

Rodent protected universal cable with central tube (1750 N)

Application

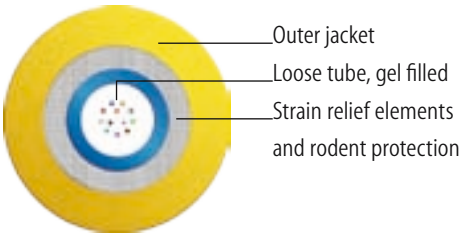
Non-metallic, light and flexible cable that can be used both inside and outside buildings.
Installation in cable ducts, on cable trays or in cable conduits.

Order-No. **84 025** □□ □ □
Standardization DIN VDE 0888, Part 6

Construction

Cable core	Loose tube, gel filled
Armouring	multi-functional E-glass yarn, water-absorbent as non-metallic strain relief elements and as rodent protection
Cable jacket	halogen-free and flame-retardant material
Color of jacket	yellow

Cross section



Temperature range

Transport and storage	–25 °C to +70 °C
Installation	–5 °C to +50 °C
Operation	–20 °C to +60 °C

Fire performance

Flame retardancy	IEC 60332-1
Smoke density	IEC 61034
Halogen-free	IEC 60754-2

no toxic and corrosive fumes

Mechanical properties

min. bending radius	static	15 x outside diameter
	dynamic	20 x outside diameter
max. pull force	long-term	1750 N
max. crush resistance	long-term	1500 N/dm

No. of fibers max.	Outer-Ø (mm)	Weight (kg/km)	Fire Load (MJ/m)
12	7.0	48	0.70
24	7.5	55	0.72

LEONI GigaLine® U-DQ(ZN)BH n... 2500 N

Rodent protected universal cable with central tube (2500 N)

Application

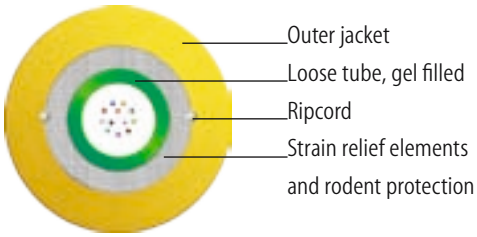
Non-metallic flexible and light cable for enhanced tensile load, that can be used both inside and outside buildings.
Installation in cable ducts, on cable trays or in cable conduits.

Order-No. **84 032** □□ □ □
Standardization DIN VDE 0888, Part 6

Construction

Cable core	Loose tube, gel filled
Armouring	multi-functional, strengthened E-glass yarn, water-absorbent as non-metallic strain relief elements and as rodent protection
Cable jacket	halogen-free and flame-retardant material
Color of jacket	yellow

Cross section



Temperature range

Transport and storage	–25 °C to +70 °C
Installation	–5 °C to +50 °C
Operation	–20 °C to +60 °C

Fire performance

Flame retardancy	IEC 60332-1 and IEC 60332-3 Cat. A
Smoke density	IEC 61034-1 / -2
Halogen-free	IEC 60754-2

no toxic and corrosive fumes

Mechanical properties

min. bending radius	static	15 x outside diameter
	dynamic	20 x outside diameter
max. pull force	long-term	2500 N
max. crush resistance	long-term	3000 N/dm

No. of fibers max.	Outer-Ø (mm)	Weight (kg(km)	Fire Load (MJ/m)
12	9.2	105	0.92
24	9.7	115	1.15

LEONI GigaLine® U-DH nxm...

Universal cable with stranded loose tubes

Application

Non-metallic cable that can be used both inside and outside buildings.
Installation in cable ducts, on cable trays or in cable conduits.

Order-No. **84 029** □□ □ □
Standardization DIN VDE 0888, Part 6

Construction

Cable core	Central strength member (FRP) with stranding elements, designed as gel filled loose tubes and if necessary fillers
Cable jacket	halogen-free and flame-retardant material
Color of jacket	yellow

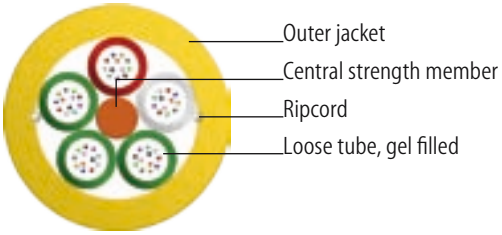
Temperature range

Transport and storage	–25 °C to +70 °C
Installation	–5 °C to +55 °C
Operation	–25 °C to +60 °C

Mechanical properties

min. bending radius	static	15 x outside diameter
	dynamic	20 x outside diameter
max. pull force	long-term	1500 N
max. crush resistance	long-term	2000 N/dm

Cross section



Fire performance

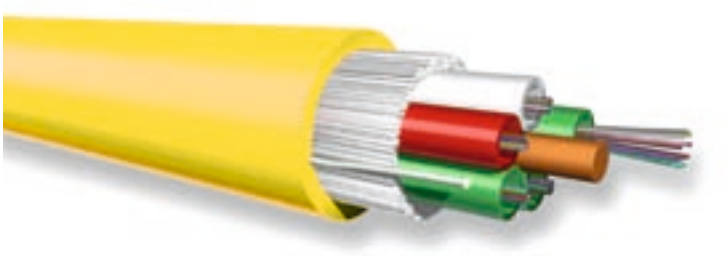
Flame retardancy	IEC 60332-1
Smoke density	IEC 61034 and IEC 61034-2
Halogen-free	IEC 60754-2

no toxic and corrosive fumes

No. of tubes n	1 x m	2 x m	3 x m	4 x m	5 x m	6 x m	7 x m	8 x m
No. of fibers max.	12	24	36	48	60	72	84	96
Outer-Ø (mm)	10.5	10.5	10.5	10.5	10.5	11.0	11.7	12.4
Weight (kg/km)	105	105	105	105	105	125	130	145
Fire Load (MJ/m)	2.2	2.2	2.2	2.2	2.2	2.6	2.9	3.0

LEONI GigaLine® U-DQ(ZN)BH nxm...

Rodent protected universal cable with stranded loose tubes



Application

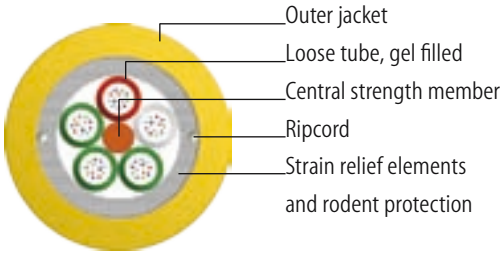
Non-metallic cable that can be used both inside and outside buildings. Installation in cable ducts, on cable trays or in cable conduits.

Order-No. 84 033 □□ □ □
Standardization DIN VDE 0888, Part 6

Construction

Cable core	Central strength member with stranding elements, designed as gel filled loose tubes and if necessary fillers
Armouring	multi-functional, strengthened E-glass yarn, water-absorbent as non-metallic strain relief elements and as rodent protection
Cable jacket	halogen-free and flame-retardant material
Color of jacket	yellow

Aufbau



Temperature range

Transport and storage	–25 °C to +70 °C
Installation	–5 °C to +55 °C
Operation	–25 °C to +60 °C

Fire performance

Flame retardancy	IEC 60332-1 and IEC 60332-3 Cat. A
Smoke density	IEC 61034
Halogen-free	IEC 60754-2

No toxic and corrosive fumes

Mechanical properties

min. bending radius	static	15 x outside diameter
	dynamic	20 x outside diameter
max. pull force	long-term	6000 N
max. crush resistance	long-term	3000 N/dm

No. of tubes	1 x m	2 x m	3 x m	4 x m	5 x m	6 x m	8 x m	10 x m	12 x m	...
No. of fibers max.	12	24	36	48	60	72	96	120	144	
Outer-Ø (mm)	12.5	12.5	12.5	12.5	12.5	13.4	14.4	15.9	17.7	
Weight (kg/km)	185	185	185	185	185	200	225	250	305	
Fire load (MJ/m)	3.1	3.1	3.1	3.1	3.1	3.3	3.3	3.7	4.5	

LEONI GigaLine® U-DQ(ZN)(L)H n...

Transversal water protected universal cable with central tube

Application

Cable that can be used both inside and outside buildings. Installation in cable ducts, on cable trays, in conduits or directly in the ground.

Order-No. 84 034 □□ □ □

Construction

Cable core	Loose tube, gel filled
E-glass yarn	water-absorbent, as non-metallic strain relief elements
Aluminium tape	for transversal water resistance
Cable jacket	halogen-free and flame-retardant material
Color of jacket	yellow

Mechanical properties

Outside diameter	up to 12 fibers	10.5 mm
	up to 24 fibers	11.0 mm
Weight	up to 12 fibers	150 kg/km
	up to 24 fibers	155 kg/km
min. bending radius	static	15 x outside diameter
	dynamic	20 x outside diameter
max. pull force	long-term	2500 N
max. crush resistance	long-term	1000 N/dm

LEONI GigaLine® U-DQ(ZN)HWH n...

Rodent secure and transveral water protected universal cable with central tube

Application

Cable that can be used both inside and outside buildings. Installation in cable ducts, on cable trays, in conduits or directly in the ground.

Order-No. 84 030 □□ □ □

Construction

Cable core	Loose tube, gel filled
Strain relief elements	non-metallic (E-glass yarn), water-absorbent
Inner jacket	halogen-free and flame-retardant material
Corrugated steel tape	as rodent protection
Outer jacket	halogen-free and flame-retardant material
Color of jacket	yellow

Mechanical properties

Outside diameter	up to 24 fibers	12.5 mm
Weight	up to 24 fibers	210 kg/km
min. bending radius	static	15 x outside diameter
	dynamic	20 x outside diameter
max. pull force	long-term	1750 N
max. crush resistance	long-term	2500 N/dm

LEONI GigaLine® U-DQ(ZN)(L)H nxm...

Transversal water protected universal cable with stranded loose tubes

Application

Cable that can be used both inside and outside buildings.
Installation in cable ducts, on cable trays, in conduits or directly in the ground.

Order-No. 84 035 □□ □ □

Construction

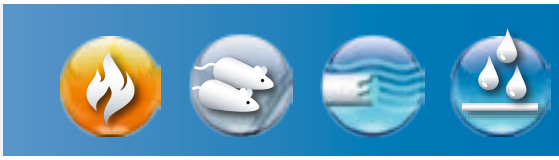
Cable core	Central strength member with stranding elements, designed as gel filled loose tubes and if necessary fillers
E-glass yarn	water-absorbent as non-metallic strain relief elements and as rodent protection
Aluminium tape	for transversal water resistance
Cable jacket (yellow)	halogen-free and flame-retardant material

Mechanical properties

min. bending radius	static	15 x outside diameter
	dynamic	20 x outside diameter
max. pull force	long-term	3000 N
max. crush resistance	long-term	1500 N/dm

No. of tubes n	1 x m	2 x m	3 x m	4 x m	5 x m	6 x m	8 x m	10 x m	12 x m	...
Outer-Ø (mm)	12.1	12.1	12.1	12.1	12.1	13.0	14.4	15.9	17.7	
Weight (kg/km)	200	200	200	200	200	215	245	270	325	

LEONI GigaLine® U-DQ(ZN)WH nxm...



Rodent secure and transversal water protected universal cable with stranded loose tubes

Application

Cable that can be used both inside and outside buildings.
Installation in cable ducts, on cable trays, in conduits or directly in the ground.

Order-No. 84 037 □□ □ □

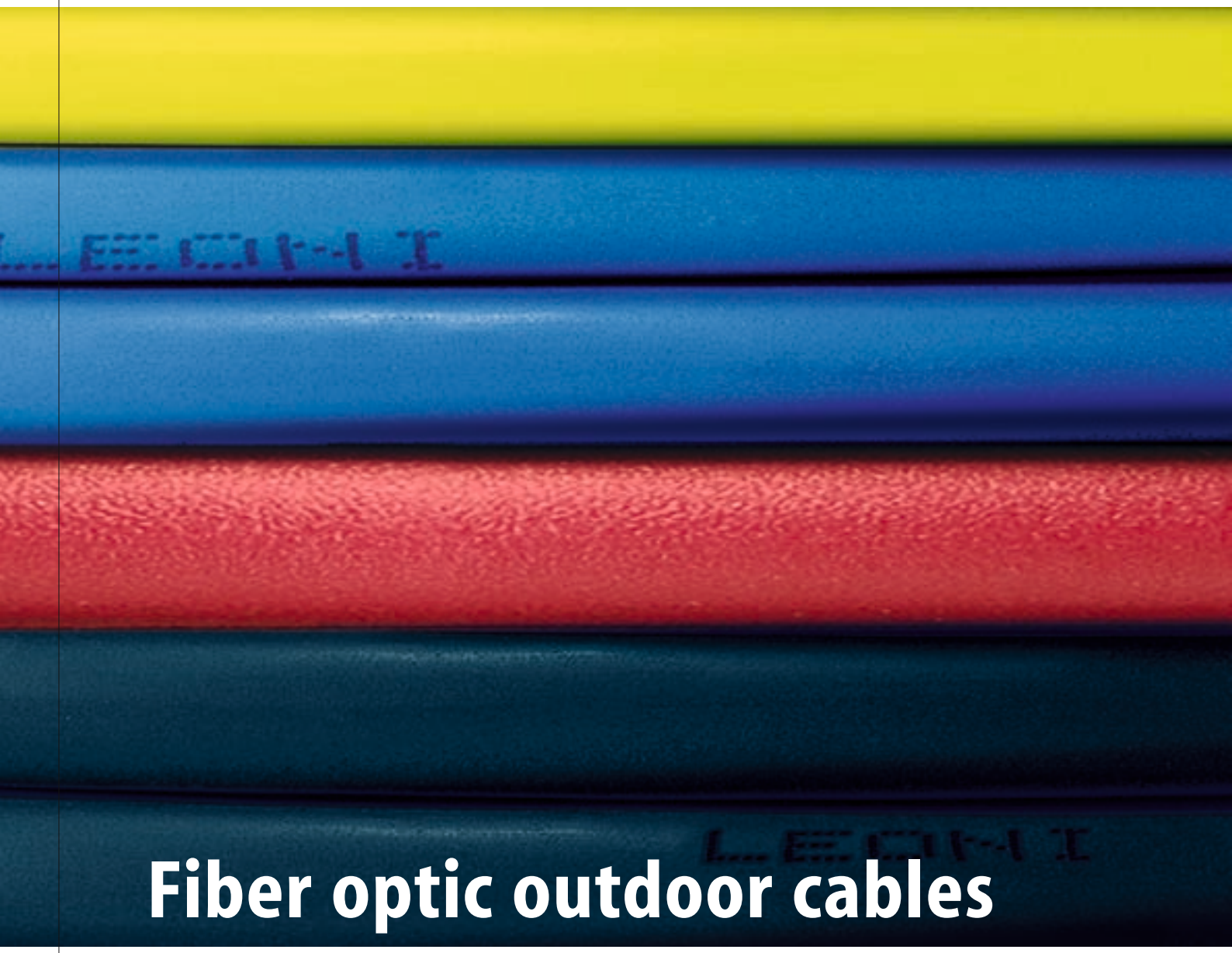
Construction

Cable core	Central strength member with stranding elements, designed as gel filled loose tubes and if necessary fillers
E-glass yarn	water-absorbent as non-metallic strain relief elements and as rodent protection
Corrugated steel tape	as rodent protection
Cable jacket (yellow)	halogen-free and flame-retardant material

Mechanical properties

min. bending radius	static	15 x outside diameter
	dynamic	20 x outside diameter
max. pull force	long-term	3000 N
max. crush resistance	long-term	2000 N/dm

No. of tubes n	1 x m	2 x m	3 x m	4 x m	5 x m	6 x m	8 x m	10 x m
Outer-Ø (mm)	12.7	12.7	12.7	12.7	12.7	16.5	16.5	16.5
Weight (kg/km)	220	220	220	220	220	305	305	305



Fiber optic outdoor cables

LEONI fiber optic outdoor cables are used in the campus area of local networks (LAN) as well as for bridging over the long distances in the MAN (Metropolitan Area Network) and WAN (Wide Area Network).

Especially high mechanical demands with regard to sturdiness and resistance are placed on outdoor cables to guarantee stability towards environmental influences such as frost and humidity. LEONI Fiber Optics offers the suitable cable for different ambient conditions.

Non-metallic or metallic reinforcement protects the fibers against destruction by rodents and serves as a humidity barrier. The outer cladding, used as standard and made of black PE (polyethylene), is halogen-free and UV resistant. LEONI outdoor cables are certified according to the symbol test in accordance with DIN VDE 0888, Part 3.

LEONI A-DQ(ZN)B2Y n… 1750 N

Rodent protected outdoor cable with central tube (1750 N)

Application

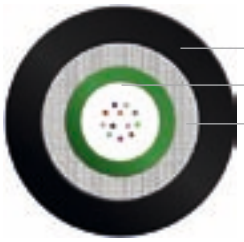
Light, flexible and non-metallic outdoor cable for the backbone. For pulling into conduits, installation on cable trays or directly in the ground.

Order-No. **84 305** □□ □ □
Standardization IEC 60 794-3

Construction

Cable core	Loose tube, gel filled
Armouring	multi-functional E-glass yarn, water-absorbent as strain relief elements and as rodent protection
Cable jacket	PE-jacket with imprint
Color of jacket	black

Cross section



Temperature range

Transport and storage	–25 °C to +70 °C
Installation	–5 °C to +50 °C
Operation	–20 °C to +60 °C

Fire performance

Jacket is halogen-free
No toxic and corrosive fumes

Mechanical properties

min. bending radius	static	15 x outside diameter
	dynamic	20 x outside diameter
max. pull force	long-term	1750 N
max. crush resistance	long-term	1500 N/dm

Remarks

The jacket material PE offers good protection against transverse water ingress.

No. of fibers max.	Outer-Ø (mm)	Weight (kg/km)	Fire load (MJ/m)
12	7.0	38	1.50
24	7.5	43	1.70

LEONI A-DQ(ZN)B2Y n... 2500 N

Rodent protected outdoor cable with central tube (2500 N)

Application

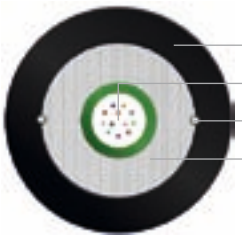
Non-metallic construction for pulling into conduits, installation on cable trays or directly in the ground.

Order-No. **84 321** □□ □ □
Standardization IEC 60 794-3

Construction

Cable core	Loose tube, gel filled
Armouring	multi-functional, strengthened E-glass yarn water-absorbent as non-metallic strain relief element and as rodent protection
Cable jacket	PE-jacket with imprint
Color of jacket	black

Cross section



Temperature range

Transport and storage	–25 °C to +70 °C
Installation	–5 °C to +50 °C
Operation	–20 °C to +60 °C

Fire performance

Jacket is halogen-free
No toxic and corrosive fumes

Mechanical properties

min. bending radius	static	15 x outside diameter
	dynamic	20 x outside diameter
max. pull force	long-term	2500 N
max. crush resistance	long-term	3000 N/dm

Remarks

The jacket material PE offers good protection against transerve water ingress.
Higher pull forces on request.

No. of fibers max.	Outer-Ø (mm)	Weight (kg/km)	Fire load (MJ/m)
12	9.2	85	1.50
24	9.7	95	1.60

LEONI A-DQ(ZN)B2Y nxm...

Rodent protected outdoor cable
with stranded loose tubes (dry interstices)

Application

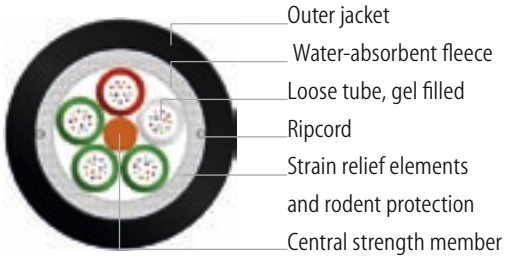
Non-metallic, robust outdoor cable. Installation-friendly because of the cable core kept free of grease. For pulling into conduits, installation on cable trays or directly in the ground.

Order-No. **84 316** □□ □ □
Standardization DIN VDE 0888, Part 3 and IEC 60 794-3

Construction

Cable core	Central strength member with stranding elements, designed as gel filled loose tubes and if necessary fillers
Water-absorbent fleece	
Armouring	multi-functional, strengthened E-glass yarn water-absorbent as non-metallic strain relief element and as rodent protection
Cable jacket	PE-jacket with sinter marking
Color of jacket	black

Cross section



Temperature range

Transport and storage	–40 °C to +70 °C
Installation	–5 °C to +50 °C
Operation	–40 °C to +60 °C

Fire performance

Jacket is halogen-free
No toxic and corrosive fumes

Mechanical properties

min. bending radius	static	15 x outside diameter
	dynamic	20 x outside diameter
max. pull force	long-term	4000 N
max. crush resistance	long-term	3000 N/dm

Remarks

The jacket material PE offers good protection against transverse water ingress.
Higher pull forces on request.
Also available with aluminium- or corrugated steel tape.

No. of tubes n	1 x m	2 x m	3 x m	4 x m	5 x m	6 x m	8 x m	10 x m	12 x m	...
No. of fibers max.	12	24	36	48	60	72	96	120	144	
Outer-Ø (mm)	11.4	11.4	11.4	11.4	11.4	12.3	13.7	15.2	17.0	
Weight (kg/km)	115	115	115	115	115	135	165	205	255	
Fire load (MJ/m)	4.1	4.1	4.1	4.1	4.1	4.5	5.0	5.5	6.2	

LEONI A-DF(ZN)2Y nxm...

Core-filled outdoor cable with stranded loose tubes

Application

Non-metallic, robust outdoor cable for primary cabling and the backbone area. For pulling into conduits, installation on cable trays or directly in the ground.

Order-No. **84 300** □□ □ □

Standardization DIN VDE 0888, Part 3 and IEC 60 794-3

Construction

Cable core	Central strength member with stranding elements, designed as gel filled loose tubes and if necessary fillers; cable core filled with water-blocking gel
Water-absorbent fleece	
Strain relief elements	E-glass yarn
Cable jacket	PE-jacket with sinter marking
Color of jacket	black

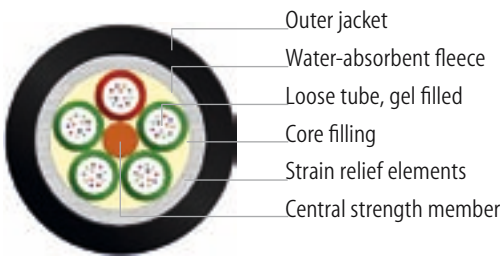
Temperature range

Transport and storage	–40 °C to +70 °C
Installation	–5 °C to +50 °C
Operation	–40 °C to +60 °C

Mechanical properties

min. bending radius	static	15 x outside diameter
	dynamic	20 x outside diameter
max. pull force long-term	≤ 7 stranding elements	3000 N
	> 7 stranding elements	4000 N
max. crush resistance	long-term	3000 N/dm

Cross section



Fire performance

Jacket is halogen-free

No toxic and corrosive fumes

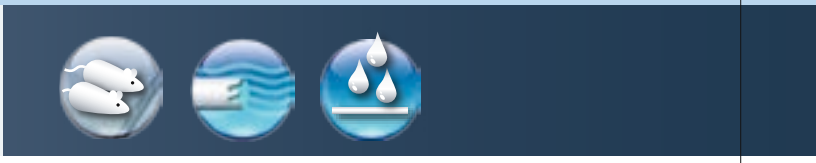
Remarks

The jacket material PE offers good protection against transverse water ingress.

Also available with aluminium- or corrugated steel tape and copper elements.

No. of tubes n	1 x m	2 x m	3 x m	4 x m	5 x m	6 x m	8 x m	10 x m	12 x m	16 x m	...
No. of fibers max.	12	24	36	48	60	72	96	120	144	192	
Outer-Ø (mm)	11.4	11.4	11.4	11.4	11.4	12.3	13.7	15.2	17.0	16.8	
Weight (kg/km)	120	120	120	120	120	145	175	220	270	275	
Fire load (MJ/m)	4.3	4.3	4.3	4.3	4.3	4.6	5.1	5.7	6.5	7.4	

LEONI A-DF(ZN)2YW2Y nxm...



Rodent secure core-filled outdoor cable with stranded loose tubes

Application

Robust outdoor cable for primary cabling and the backbone area. For pulling into conduits, installation on cable trays or directly in the ground.

Order-No. **84 310** □□ □ □

Standardization DIN VDE 0888, Part 3 and IEC 60 794-3

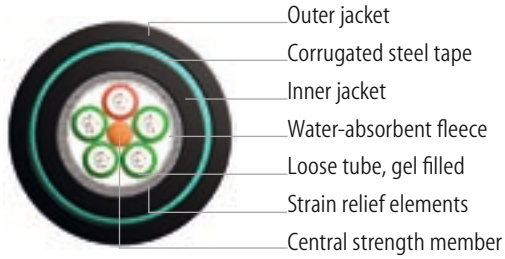
Construction

Cable core	Central strength member with stranding elements, designed as gel filled loose tubes and if necessary fillers; cable core filled with water-blocking gel
Water-absorbent fleece	
Strain relief elements	E-glass yarn
Inner jacket (black)	PE-jacket
Corrugated steel tape	as rodent protection
Cable jacket	PE-jacket with sinter marking
Color of jacket	black

Temperature range

Transport and storage	–40 °C to +70 °C
Installation	–5 °C to +50 °C
Operation	–40 °C to +60 °C

Cross section



Fire performance

Jacket is halogen-free

No toxic and corrosive fumes

Mechanical properties

min. bending radius	static	15 x outside diameter
	dynamic	20 x outside diameter
max. pull force long-term	≤ 7 stranding elements	3000 N
	> 7 stranding elements	4000 N
max. crush resistance	long-term	3000 N/dm

No. of tubes n	1 x m	2 x m	3 x m	4 x m	5 x m	6 x m	8 x m	10 x m	12 x m	16 x m	...
No. of fibers max.	12	24	36	48	60	72	96	120	144	192	
Outer-Ø (mm)	16.7	16.7	16.7	16.7	16.7	18.8	18.8	21.8	21.8	21.8	
Weight (kg/km)	275	275	275	275	275	335	335	355	370	380	
Fire load (MJ/m)	10.4	10.4	10.4	10.4	10.4	12.0	12.0	12.5	13.1	13.8	

LEONI A-DQ(ZN)(L)2Y n...

Transversal water protected outdoor cable with central tube

Application

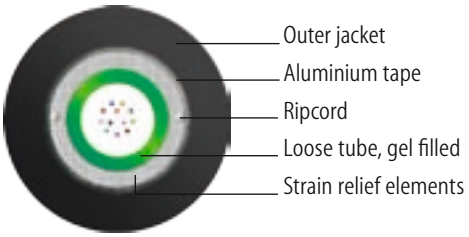
Light outdoor cable with diffusion barrier.
Installation in cable ducts, on cable trays, in conduits or directly in the ground.

Order-No. **84 333** □□ □ □
Standardization DIN VDE 0888, Part 3 and IEC 60 794-3

Construction

Cable core	Loose tube, gel filled
E-glass yarn	water-absorbent, as non-metallic strain relief elements
Aluminium tape	for transversal water resistance
Cable jacket	PE-jacket with imprint
Color of jacket	black

Cross section



Temperature range

Transport and storage	–25 °C to +70 °C
Installation	–5 °C to +50 °C
Operation	–20 °C to +60 °C

Fire performance

Jacket is halogen-free
No toxic and corrosive fumes

Mechanical properties

min. bending radius	static	15 x outside diameter
	dynamic	20 x outside diameter
max. pull force	long-term	2500 N
max. crush resistance	long-term	1000 N/dm

No. of fibers max.	Outer-Ø (mm)	Weight (kg/km)	Fire load (MJ/m)
12	10.8	128	1.42
24	11.3	135	1.62

LEONI A-DQ(ZN)2YW2Y n...

Rodent protected and transversal water protected outdoor cable with central tube

Application

Robust outdoor cable for installation in cable ducts, on cable trays, in conduits or directly in the ground.

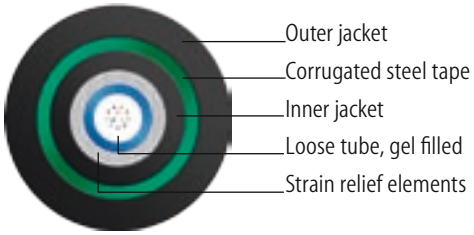
Order-No. **84 331** □□ □ □

Standardization DIN VDE 0888, Part 3 and IEC 60 794-3

Construction

Cable core	Loose tube, gel filled
E-glass yarn	water-absorbent, as non-metallic strain relief elements
Inner jacket (black)	PE-jacket
Corrugated steel tape	as rodent protection
Cable jacket	PE-jacket with imprint
Color of jacket	black

Cross section



Temperature range

Transport and storage	–40 °C to +70 °C
Installation	–5 °C to +50 °C
Operation	–40 °C to +70 °C

Fire performance

Jacket is halogen-free

No toxic and corrosive fumes

Mechanical properties

Outside diameter	up to 24 fibers	13.0 mm
Cable weight	up to 24 fibers	170 kg/km
min. bending radius	static	15 x outside diameter
	dynamic	20 x outside diameter
max. pull force long-term	long-term	1200 N
max. crush resistance	long-term	2500 N/dm

LEONI A-DQ(ZN)(L)2Y nxm...

Transversal water protected outdoor cable with stranded loose tubes

Application

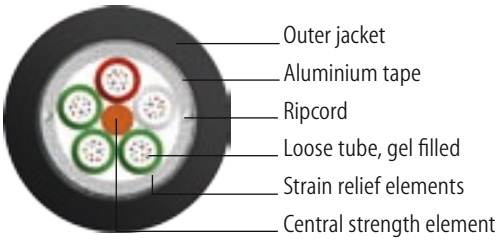
Ligh outdoor cable with diffusion barrier.
Installation in cable ducts, on cable trays, in conduits or directly in the ground.

Order-No. **84 326** □□ □ □
Standardization DIN VDE 0888, Part 3 and IEC 60 794-3

Construction

Cable core	Central strength member with stranding elements, designed as gel filled loose tubes and if necessary fillers
E-glass yarn	water-absorbent, as non-metallic strain relief elements
Aluminium tape	for transversal water resistance
Cable jacket	PE jacket with sinter printing
Color of jacket	black

Cross section



Temperature range

Transport and storage	– 40 °C to +70 °C
Installation	– 5 °C to +55 °C
Operation	– 40 °C to +60 °C

Fire performance

Jacket is halogen-free
No toxic and corrosive fumes

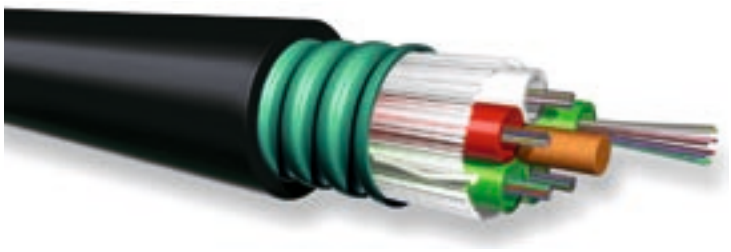
Mechanical properties

min. bending radius	static	15 x outside diameter
	dynamic	20 x outside diameter
max. pull force	long-term	3000 N
max. crush resistance	long-term	1500 N/dm

No. of fibers n	1 x m	2 x m	3 x m	4 x m	5 x m	6 x m	8 x m	10 x m	12 x m	...
No. of fibers max.	12	24	36	48	60	72	96	120	144	
Outer-Ø (mm)	12.1	12.1	12.1	12.1	12.1	13.0	14.4	15.9	17.7	
Weight(kg/km)	140	140	140	140	140	165	200	245	300	
Fire load (MJ/m)	4.9	4.9	4.9	4.9	4.9	5.6	5.9	6.4	7.2	

LEONI A-DQ(ZN)W2Y nxm...

Transversal water protected outdoor cable with stranded loose tubes



Application

Robust outdoor cable for installation in cable ducts, on cable trays, in conduits or directly in the ground.

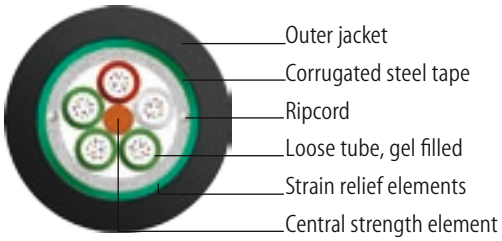
Order-No. **84 334** □□ □ □

Standardization DIN VDE 0888, Part 3 and IEC 60 794-3

Construction

Cable core	Central strength member with stranding elements, designed as gel filled loose tubes and if necessary fillers
E-glass yarn	water-absorbent, as non-metallic strain relief elements
Corrugated steel tape	as rodent protection
Cable jacket	PE jacket with sinter printing
Color of jacket	black

Cross section



Temperature range

Transport and storage	– 40 °C to +70 °C
Installation	– 5 °C to +55 °C
Operation	– 40 °C to +60 °C

Fire performance

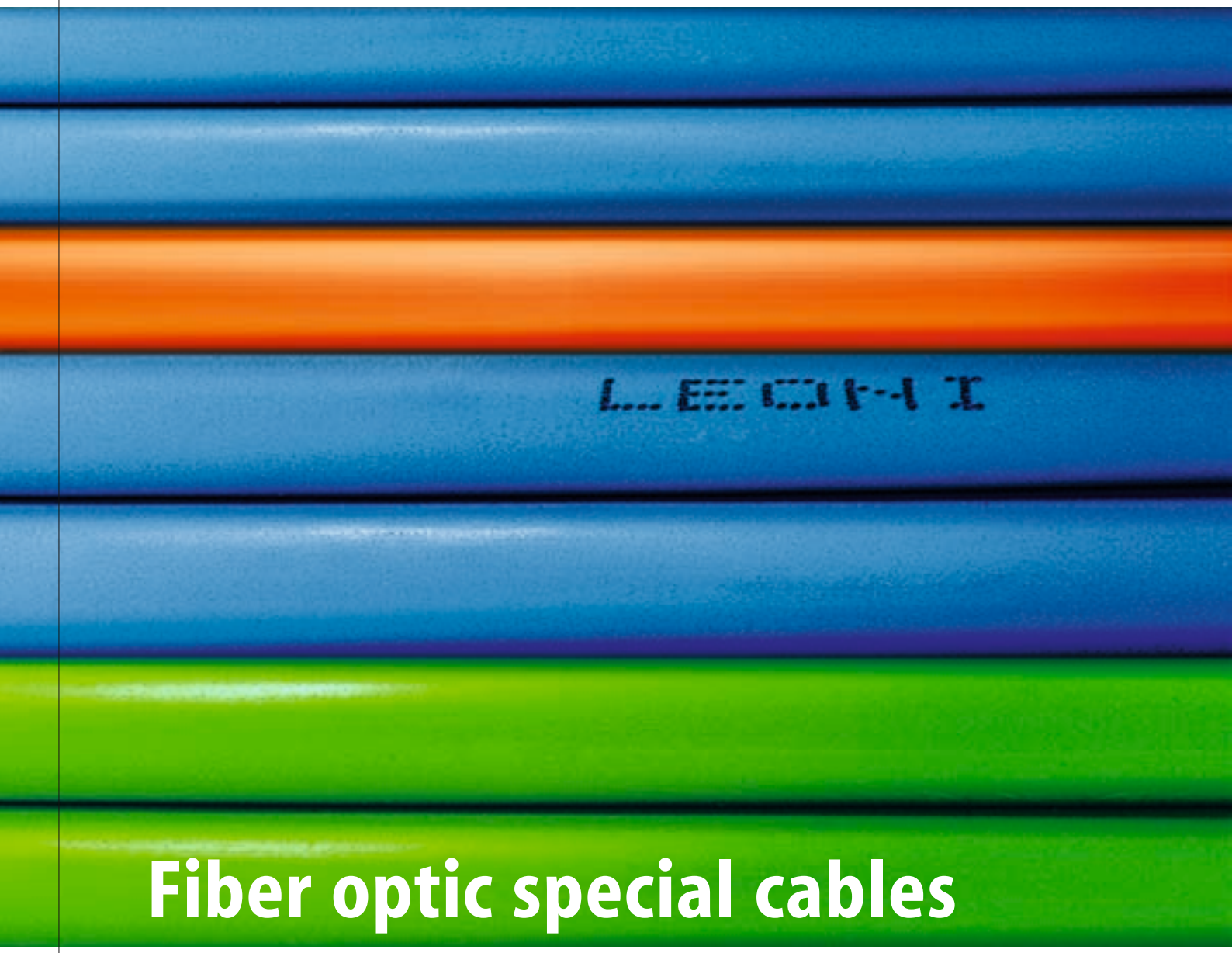
Jacket is halogen-free

No toxic and corrosive fumes

Mechanical properties

min. bending radius	static	15 x outside diameter
	dynamic	20 x outside diameter
max. pull force	long-term	3000 N
max. crush resistance	long-term	2000 N/dm

No. of fibers n	1 x m	2 x m	3 x m	4 x m	5 x m
No. of fibers max.	12	24	26	48	60
Outer-Ø (mm)	12.7	12.7	12.7	12.7	12.7
Weight(kg/km)	220	220	220	220	220
Fire load (MJ/m)	4.6	4.6	4.6	4.6	4.6



Fiber optic special cables

Fiber optic cables for special applications
LEONI customers shall expect the high quality they are used to even in case of special requirements and use.

We offer customized "tailor-made" solutions in addition to fiber optic cables for local networks and the telecommunications sector. Comprehensive know how, years of experience and highly flexible production processes make it possible for us to manufacture the right cable for even the most demanding application.

No matter whether you require the cable for mobile use in the field or cables providing system integrity in the event of fire – we have the solution.

Jacketing material

Balancing application and fire protection criteria

The sheath material is designed to protect the fiber optic cables from mechanical, thermal or chemical effects and prevent the penetration of moisture. On the other hand, in case of fire the materials should not spread the fire, and there should be no build up of toxic and corrosive fumes.

Halogen-free and flame-retardant materials should be used to protect equipment, buildings and above all people. PUR and PVC are the solution of choice for use in hard industrial environments because of their high resistance to oil and their abrasion resistance. PE is commonly used as a sheath material in outdoor applications.

It is often difficult to fulfill all the requirements with one single sheath material. To find the best solution given the conditions on site, LEONI Fiber Optics offers a choice of four standard materials.

If your application criteria cannot be met with the cable designs and materials that appear in this catalogue, please contact us. It is often possible to meet additional requirements by making specific changes to the sheath design (for example, aluminum tape or special material mixtures).

Cable jacket material	**TPE-O** (FRNC)	**TPE-U** (PUR)	**PVC**	**PE**
Material properties				
Non-aging	+	+	+	+
Halogen-free	+	+	– –	+
Non-flammability	+	+	+	– –/●
Elasticity	–	+	●	–
Abrasion resistance	–	++	+	+/–
Low fume generation	++	●	–	– –/●
Low emission of corrosive gases	++	●	– –	+/●
Low fume toxicity	++	●	– –	+/●
No toxicological risk	++	●	–	+/●
General resistance to				
UV light	1)	1)	1)	1)
Water absorption	–	–	+	+
Gas diffusion	–	2)		●
Fuels	–	+	+/–	+
Petroleum/lubricants	–	++	●	+
Organic solvents	–	+ 3)	–	+ 4)
Alcohol	–	–	+	+
Oxidants	–	–	+	–
Acids	+	– –	+	++
Alkaline solutions	+	– –	+	+
Saline solutions		–	+	+

Note: Instead of FRNC (flame retardant non corrosive) the expression LSOH or LSZH (low smoke zero halogene) is often used.

++ excellent
+ good
● depends on recipe
– weak
– – inadequate

1) increase in UV resistance by addition of black color pigments or UV stabilizers

2) permeation depends on type of gas, e.g. Ar, CH_4, N_2, O_2 low gas permeation, CO_2, H_2, He higher gas permeation

3) low swelling in saturated hydrocarbons, significant swelling in aromatic hydrocarbons and aliphatic esters cause swelling, highly polar organic solvents dissolve causing extreme swelling

4) swelling in aliphatic and aromatic hydrocarbons and in chlorinated hydrocarbons

5) non resistant to chlorinated hydrocarbons, resistant to hydrocarbons and aliphatic and aromatic solvents

LEONI*fire secured* U-D(ZN)BH n...2500 N

Rodent protected universal cable with central tube (2500 N) and system integrity

Application

Non-metallic, light and flexible cable with enhanced strain relief that can be used both inside and outside buildings.
Installation in cable ducts, on cable trays or in cable conduits.

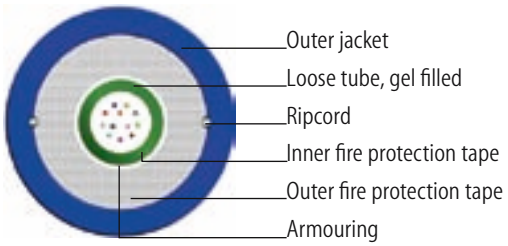
Order-No. **84 040** □□ □ □
Standardization DIN VDE 0888, Part 6

System integrity for at least 90 minutes in the event of a fire

Construction

Cable core	Loose tube, gel filled
Inner fire barrier	
Armouring	multi-functional, strengthened E-glass yarn covering, water-absorbent as non-metallic strain relief element and as rodent protection
Cable jacket	halogen-free and flame-retardant material
Color of jacket	blue

Cross section



Thermal properties

Transport and storage	– 25 °C to +70 °C
Installation	– 5 °C to +50 °C
Operating temperature	– 20 °C to +60 °C

Fire performance

Flame retardancy	IEC 60332-1 and IEC 60332-3 Cat. A
Smoke density	IEC 61034-1 / -2
Halogen-free	IEC 60754-2

no toxic and corrosive fumes

Mechanical properties

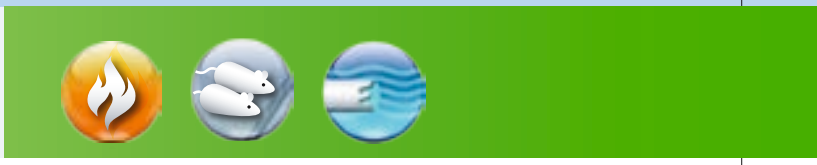
min. bending radius	static	15 x outside diameter
	dynamic	20 x outside diameter
max. pull force	long-term	2500 N
max. crush resistance	long-term	3000 N/dm

System integrity (CDE test report)

acc. to IEC 60 331-11 and -25	90 min
EN 50200	

No. of fibers max.	Outer-Ø (mm)	Weight (kg/km)	Fire load (MJ/m)
12	10.3	115	1.03
24	10.8	125	1.28

LEONI*fire secured* U-DQ(ZN)HWH n...



Rodent protected and transversal water protected universal cable with central tube (2500 N) and system integrity

Application

Mechanical robust cable with enhanced strain relief that can be used both inside and outside buildings.
Installation in cable ducts, on cable trays or in cable conduits.

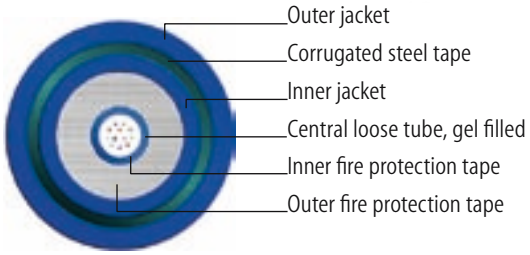
Order-No. **84 047** □□ □ □
Standardization DIN VDE 0888, Part 6

System integrity for at least 120 minutes in the event of a fire

Construction

Cable core	Loose tube, gel filled
Inner fire barrier	
Strain relief elements	non-metallic (E-glass yarn), water-absorbent
Inner jacket	halogen-free and flame-retardant material
Corrugated steel tape	as outer fire barrier and as rodent protection
Cable jacket	halogen-free and flame-retardant material
Color of jacket	blue

Cross section



Thermal properties

Transport and storage	– 25 °C to +70 °C
Installation	– 5 °C to +50 °C
Operating temperature	– 20 °C to +60 °C

Fire performance

Flame retardancy	IEC 60332-1 and IEC 60332-3 Cat. A
Smoke density	IEC 61034-1/-2
Halogen-free	IEC 60754-2

no toxic and corrosive fumes

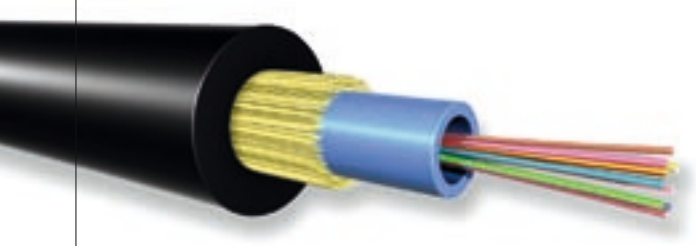
Mechanical properties

min. bending radius	static	15 x outside diameter
	dynamic	20 x outside diameter
max. pull force	long-term	1750 N
max. crush resistance	long-term	2500 N/dm

System integrity

acc. to IEC 60 331-11 and -25 EN 50200	120 min

No. of fibers max.	Outer-Ø (mm)	Weight (kg/km)	Fire load (MJ/m)
12	12.5	210	1.60
24	12.5	210	1.60



LEONI U-DQ(ZN)11Y n...

Mobile universal cable with central tube

Application

Light, flexible and non-metallic cable that can be used both inside and outside buildings. Installation in cable ducts, on cable trays or in cable conduits. Suitable for a flexible use in hard industrial environments.

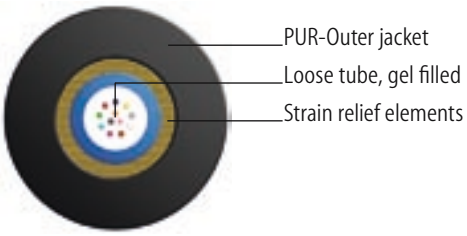
Order-No. **84 023** □□ □ □

Standardization DIN VDE 0888, Part 6 and IEC 60 794-2

Construction

Cable core	Loose tube, gel filled
Strain relief	Aramid yarns
Cable jacket	Polyurethane (PUR)
Color of jacket	black

Cross section



Temperature range

Transport and storage	–25 °C to +70 °C
Installation	–25 °C to +50 °C
Operation	–25 °C to +70 °C

Fire performance

Cable is self-extinguishing

Halogen-free IEC 60754-2

No toxic and corrosive fumes

Mechanical properties

min. bending radius	static	15 x outside diameter
	dynamic	20 x outside diameter
max. pull force	long-term	2500 N
max. crush resistance	long-term	3000 N/dm
Resistance to impact		5 impacts/3 Nm

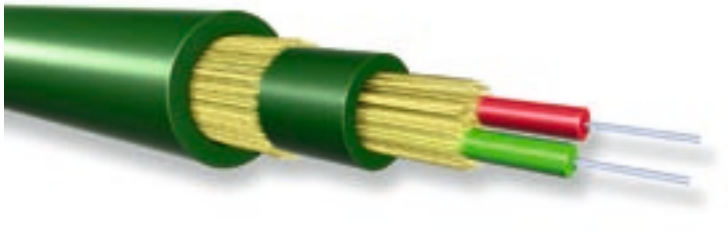
Chemical properties

Very good resistance to oil, fuel, acid and base

No. of fibers max.	Outer-Ø (mm)	Weight (kg/km)	Fire load (MJ/m)
12	6.5	36	0.55
24	7.7	50	0.76

LEONI A-V(ZN)11Y(ZN)11Y 2...

Mobile field cable (Tactical cable)



Application

Suitable for military tactical field use and commercial applications (i. e. television broadcast or mining).

Order-No. **84 950 003** ☐

Standardization BWB TL 6020-0001 certified and prEN 177000

Construction

Cable core	Semi-tight fiber, gel filled (STB)
Strain relief elements	non-metallic (aramid)
Inner and outer jacket	Polyurethane (PUR)
Color of jacket	green or customer-specific

Temperature range

Transport and storage	–55 °C to +80 °C
Installation	–5 °C to +50 °C
Operation	–40 °C to +70 °C

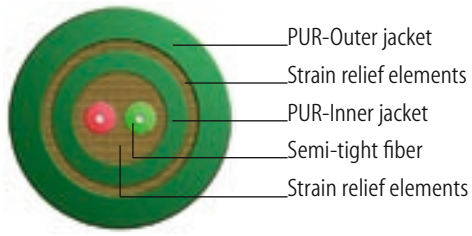
Mechanical properties

Outside diameter		6.0 mm
Weight		30 kg/km
min. bending radius	static & dynamic	25 mm
max.pull force	long-term	2000 N
max. crush resistance	long-term	1000 N/dm
Resistance to impact		30 impacts/2 Nm

Chemical porperties

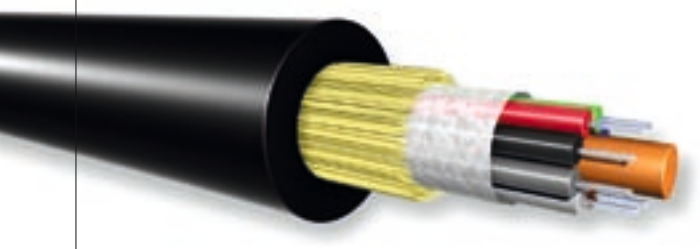
Very good resistance to oil, fuel, acid and base

Cross section



Fire performance

Flame retardancy	IEC 60332-1



LEONI A-V(ZN)11Y n...

Mobile outdoor cable

Application

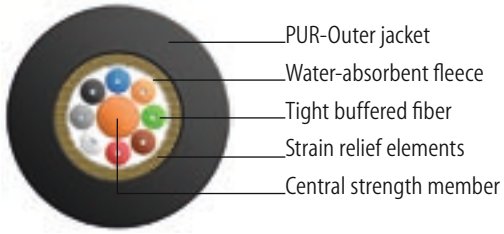
For mobile and flexible use indoor and outdoor. Suitable within drag chains in hard industrial environments. For direct connector assembly.

Order-No. **84 950 232** ☐
Standardization DIN VDE 0888, Part 6 and IEC 60 794-2

Construction

Cable core	Central strength member (FRP) with stranding elements, designed as tight buffered fiber (TB) and if necessary fillers
Strain relief	Aramid yarns
Cable jacket	Polyurethane (PUR)
Color of jacket	black

Cross section



Temperature range

Transport and storage	–55 °C to +80 °C
Installation	–5 °C to +55 °C
Operation	–40 °C to +70 °C

Fire performance

Flame retardancy IEC 60332-1

Chemical properties

Very good resistance to oil, fuel, acid and base

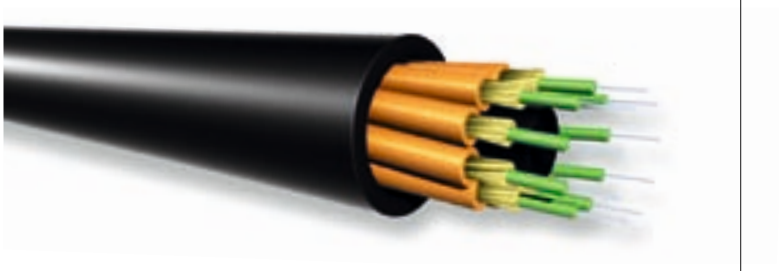
Mechanical properties

min. bending radius	static & dynamic	25 mm
max. pull force	long-term	2000 N
max. crush resistance	long-term	1000 N/dm
Resistance to impact		50 impacts/2 Nm
Drag chain test		1 000 000 cycles

No. of fibers n	4	6	8	10	12
Outer-Ø (mm)	6.0	6.0	7.5	8.8	8.8
Weight(kg/km)	32	32	52	67	67
Fire load (MJ/m)	0.50	0.50	0.75	0.95	0.95

LEONI AT-V(ZN)YY...

Breakout-cable for drag chains



Application

Robust FO drag chain cable that can be used both inside and outside buildings and in hard industrial environments.
For direct connector assembly.

Order-No. **84 206** □□ □ □
Standardization DIN VDE 0888, Part 6 and IEC 60 794-2

Construction

Cable core	Stranded single elements designed as tight buffered (TB) or semi-tight fibers (STB), gel filled with strain relief elements (aramid) and halogen-free, flame-retardant jacket (2.5 mm diameter)
Color	orange for multi-mode, yellow for single-mode
Cable jacket	Polyvinylchlorid (PVC)
Color of jacket	black

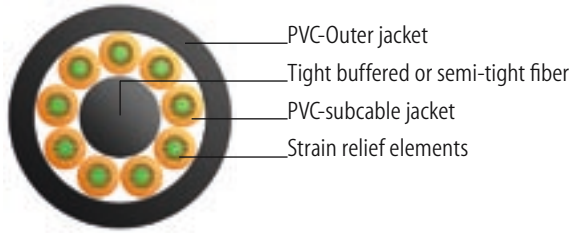
Temperature range

Transport and storage	–25 °C to +80 °C
Installation	–5 °C to +50 °C
Operation	–20 °C to +80 °C

Mechanical properties

Max. crush resistance	long-term	800 N/dm
Resistance to impact		10 impacts/2 Nm
Drag chain test		5 000 000 cycles

Cross section



Fire performance

Flame retardancy IEC 60332-1

Chemical properties

Good resistance to oil, fuel, acid and base

Remarks

The cable is also available with a Polyurethane jacket (PUR)

No. of fibers n	2	4	6	8	10	12
Outer-Ø (mm)	8.9	8.9	9.0	11.0	13.0	14.5
Weight (kg/km)	45	50	75	110	160	18
min. bending radius static (mm)	95	95	95	115	135	150
min. bending radius dynamic (mm)	140	140	140	175	205	225
max. pull force (N)	800	800	1200	1200	1200	1200
Fire load (MJ/m)	1.20	1.20	1.36	1.52	1.68	1.84

POF & PCF fiber optic cables

LEONI Fiber Optics has been involved in the development and production of plastic fiber optic cables for quite some time. The LEONI iQ-Line product line was introduced primarily to provide an optimal solution for the industrial applications market. In addition to our line of standard products, which continue to deliver dependable performance in the field, we can also offer you tailored cable solutions to meet your exact requirements.

Contact:
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E-mail fiber-optics@leoni.com

Plastics are attracting increasing attention as a means to transmit information. Pure fiber optics (POF – Polymer Optical Fiber) and plastic-coated glass fiber optics with step index profile have been on the market for years.

They have been used primarily in high-range digital audio systems, the automotive industry, some segments of lighting technology, medical technology, and on bus systems in industrial applications. Bus system applications are found primarily where there are significant EMC issues and the transmission path is relatively short.

Compared to conventional glass fiber optics, plastic fiber optics have the advantage of greater flexibility (high alternate bending stress with small bend radii), and they are also a low-cost connection and transmission solution. These factors are particularly important in mechanical engineering and automation applications. Plastic fiber optics also have all the essential properties – including low EMC susceptibility, perfect galvanic isolation, low susceptibility to electronic surveillance, no cross talk, low weight, etc. – that are generally associated with fiber optics.

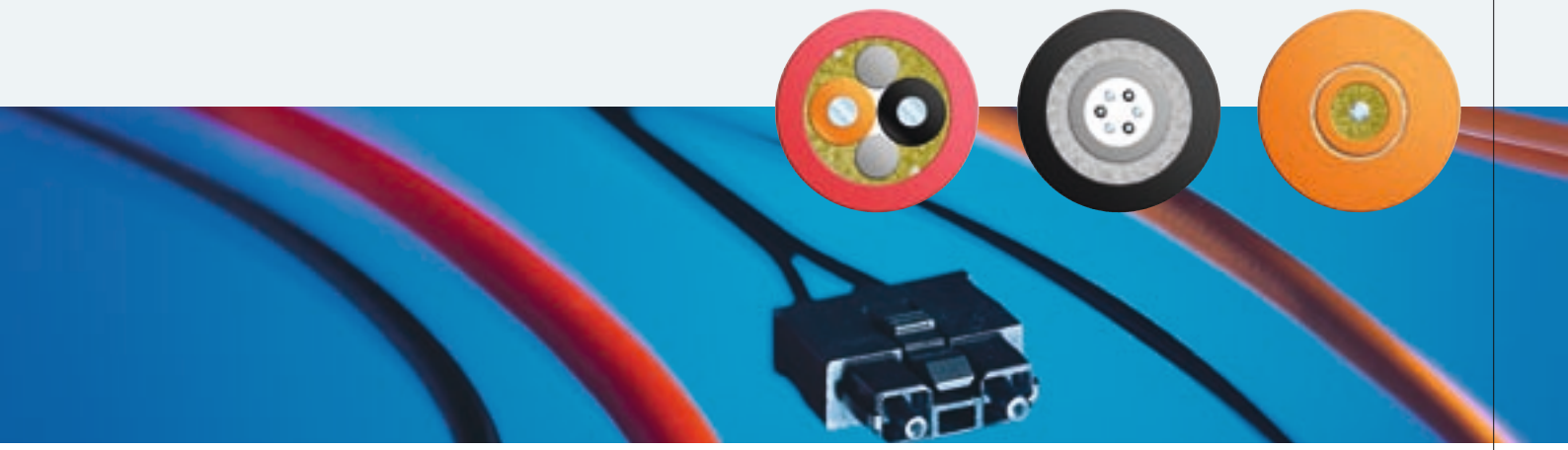
Compared to common single-mode and multi-mode fiber optics, plastic fiber optics have higher attenuation, which reduces their range, and they have smaller bandwidth. The latest developments (e.g. gradient index POF), which are currently in the market introduction phase, show that there is still significant potential for improved performance.

With the introduction of Ethernet technology and LAN networking in industrial applications, designers and planners have been taking a closer look at POF and PCF.

The distances that can now be bridged are 70m for POF fibers and 500 m for PCF fibers, and this is regarded as sufficient for industrial applications. If you consider that the average length from the floor distribution board to a workstation in a local network is 45m, then it would appear that using POF/PCF is not so unrealistic. Solutions are already available for small office and home networks.

Once the necessary hardware is available in sufficient quantities and at an affordable price, POF/PCF will certainly become an attractive option in many office networks. Despite the drive towards higher and higher bandwidths, 100 Mbit/sec Ethernet connections will be adequate for most applications in the near future, especially if the user focuses on the cost-benefit aspect.

The "LEONI iQ-Line" offers you various cable designs using plastic or PCF fiber optics to enhance our existing broad range of fiber optic cables and to allow you to select the best transmission medium for your application.



LEONI *iQ-Line*® Intelligence for Industries

LEONI online

It is also always worth having a look
at our website:
www.leoni-fiber-optics.com

On the website of LEONI Fiber Optics you can discover current information on the company, on our range of products and the multifarious applications provided. Furthermore you will be informed about our fair dates, quality management ect.

We are looking forward to your visit.

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