Fiber Optic Cables

The Quality Connection
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17 LEONI GigaLine® I-V(ZN)H 2x1...
18 LEONI GigaLine® I-V(ZN)H n...
19 LEONI GigaLine® I-V(ZN)HH 2x1...
20 LEONI GigaLine® I-V(ZN)HH n...

22 Fiber optic universal cables
23 LEONI GigaLine® U-VQ(ZN)BH n...
24 LEONI GigaLine® U-DQ(ZN)BH n... 1750 N
25 LEONI GigaLine® U-DQ(ZN)BH n... 2500 N
26 LEONI GigaLine® U-DH nxm...
27 LEONI GigaLine® U-DQ(ZN)BH nxm...
28 LEONI GigaLine® U-DQ(ZN)(L)H n...
LEONI GigaLine® U-DQ(ZN)HWH n...

29 LEONI GigaLine® U-DQ(ZN)(L)H nxm...
LEONI GigaLine® U-DQ(ZN)WH nxm...

30 Fiber optic outdoor cables
31 LEONI A-DQ(ZN)B2Y n... 1750 N
32 LEONI A-DQ(ZN)B2Y n... 2500 N
33 LEONI A-DQ(ZN)B2Y nxm...
34 LEONI A-DQ(ZN)2Y nxm...
35 LEONI A-DQ(ZN)2YW2Y nxm...
36 LEONI A-DQ(ZN)(L)2Y n...
37 LEONI A-DQ(ZN)2YW2Y n...
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44 LEONI U-DQ(ZN)11Y n...
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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.
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  
**OH** 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:**
- 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

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:

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>8400511H</td>
<td>I-V(ZN)H 2x1G50/125 2.7B600/0.7F1200</td>
</tr>
<tr>
<td>84025067L</td>
<td>U-DQ(ZN)BH 12G62.5/125 1750 N 3.2B200/0.9F500</td>
</tr>
<tr>
<td>84316727B</td>
<td>A-DQ(ZN)B2Y 12x12E9/125 0.36F3.5/0.22H18</td>
</tr>
</tbody>
</table>

Single fiber cores:

- **0**: tight buffered fiber TB900
- **1**: semi-tight fiber STB900
- **6**: superstrip fiber LB900

Multi-loose tubes:

- **A**: 0.38F3.5/0.28H18 OS1
- **B**: 0.36F3.5/0.22H18 OS1
- **F**: 3.0B500/1.0F500 OM2
- **G**: 2.7B500/0.8F1000 OM2+
- **H**: 2.7B600/0.7F1200 OM2++
- **I**: 2.5B1500/0.7F500 OM3
- **J**: 2.5B3500/0.7F500 OM3+
- **L**: 3.2B200/0.9F500 OM1
- **M**: 3.0B300/0.8F800 OM1+

Fiber optic cables from LEONI Fiber Optics fulfill 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

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

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

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
### Appropriate 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 temperature stability, 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 temperature stability, 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

<table>
<thead>
<tr>
<th>No. of fiber</th>
<th>(with ring marking)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>red</td>
</tr>
<tr>
<td>2</td>
<td>green</td>
</tr>
<tr>
<td>3</td>
<td>blue</td>
</tr>
<tr>
<td>4</td>
<td>yellow</td>
</tr>
<tr>
<td>5</td>
<td>white</td>
</tr>
<tr>
<td>6</td>
<td>grey</td>
</tr>
<tr>
<td>7</td>
<td>brown</td>
</tr>
<tr>
<td>8</td>
<td>violet</td>
</tr>
<tr>
<td>9</td>
<td>turquoise</td>
</tr>
<tr>
<td>10</td>
<td>black</td>
</tr>
<tr>
<td>11</td>
<td>orange</td>
</tr>
<tr>
<td>12</td>
<td>pink</td>
</tr>
<tr>
<td>13</td>
<td>red</td>
</tr>
<tr>
<td>14</td>
<td>green</td>
</tr>
<tr>
<td>15</td>
<td>blue</td>
</tr>
<tr>
<td>16</td>
<td>yellow</td>
</tr>
<tr>
<td>17</td>
<td>white</td>
</tr>
<tr>
<td>18</td>
<td>grey</td>
</tr>
<tr>
<td>19</td>
<td>brown</td>
</tr>
<tr>
<td>20</td>
<td>violet</td>
</tr>
<tr>
<td>21</td>
<td>turquoise</td>
</tr>
<tr>
<td>22</td>
<td>transparent (no ring marking)</td>
</tr>
<tr>
<td>23</td>
<td>orange</td>
</tr>
<tr>
<td>24</td>
<td>pink</td>
</tr>
</tbody>
</table>
**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

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

**Geometry/mechanical properties**
- Core diameter (µm): 50 ± 2.5
- Cladding diameter (µm): 125 ± 2
- Coating diameter (µm): 245 ± 10
- Core non-circularity (%): < 5

**Transmission properties**

<table>
<thead>
<tr>
<th>Fiber type</th>
<th>Wavelength (nm)</th>
<th>Attenuation max. (dB/km)</th>
<th>Bandwidth OFL min. (MHz · km)</th>
<th>Effective group of refraction</th>
<th>Numerical aperture</th>
</tr>
</thead>
<tbody>
<tr>
<td>F (OM2)</td>
<td>850</td>
<td>3.0</td>
<td>500</td>
<td>1.483</td>
<td>0.200 ± 0.020</td>
</tr>
<tr>
<td>G (OM2+)</td>
<td>850</td>
<td>2.7</td>
<td>1000</td>
<td>1.478</td>
<td>0.200 ± 0.015</td>
</tr>
<tr>
<td>H (OM2++)</td>
<td>850</td>
<td>2.7</td>
<td>1200</td>
<td>1.483</td>
<td>0.200 ± 0.015</td>
</tr>
<tr>
<td>I (OM3)</td>
<td>850</td>
<td>2.5</td>
<td>1500</td>
<td>1.483</td>
<td>0.200 ± 0.015</td>
</tr>
<tr>
<td>J (OM3+)</td>
<td>850</td>
<td>2.5</td>
<td>3500</td>
<td>1.483</td>
<td>0.200 ± 0.015</td>
</tr>
</tbody>
</table>

**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 diameter (µm): 125 ± 2
- Coating diameter (µm): 245 ± 10
- Core non-circularity (%): < 5

**Transmission properties**

<table>
<thead>
<tr>
<th>Fiber type</th>
<th>Wavelength (nm)</th>
<th>Attenuation max. (dB/km)</th>
<th>Bandwidth OFL min. (MHz · km)</th>
<th>Effective group of refraction</th>
<th>Numerical aperture</th>
</tr>
</thead>
<tbody>
<tr>
<td>L (OM1)</td>
<td>850</td>
<td>3.2</td>
<td>200</td>
<td>1.497</td>
<td>0.275 ± 0.015</td>
</tr>
<tr>
<td>M (OM1+)</td>
<td>850</td>
<td>3.0</td>
<td>350</td>
<td>1.497</td>
<td>0.275 ± 0.015</td>
</tr>
</tbody>
</table>
### Single-mode fiber E9/125 (matched cladding type)
acc. to ITU-T Rec. G.652.D 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

Additional fiber types e.g. ITU-T G.655 or ITU-T G.657.A or B on request

**Geometry/mechanical properties**

<table>
<thead>
<tr>
<th>Property</th>
<th>Type A</th>
<th>Type B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mode field diameter (at 1310 nm) (µm)</td>
<td>9.2 ± 0.4</td>
<td>Core/Clad concentricity error (µm)</td>
</tr>
<tr>
<td>Cladding diameter (µm)</td>
<td>125 ± 0.7</td>
<td>Eccentricity of coating (µm)</td>
</tr>
<tr>
<td>Coating diameter (µm)</td>
<td>245 ± 10</td>
<td>Screen-Test</td>
</tr>
<tr>
<td>Cladding non-circularity (%)</td>
<td>&lt; 1</td>
<td></td>
</tr>
</tbody>
</table>

**Transmission properties**

<table>
<thead>
<tr>
<th>Property</th>
<th>Fiber type A for semi-tight and tight buffered fibers</th>
<th>Fiber type B for multi-fiber loose tubes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wavelength (nm)</td>
<td>1310</td>
<td>1310</td>
</tr>
<tr>
<td>Attenuation max. (dB/km)</td>
<td>0.38</td>
<td>0.36</td>
</tr>
<tr>
<td>Dispersion coefficient max. (ps/nm · km)</td>
<td>3.5</td>
<td>0.28</td>
</tr>
<tr>
<td>Zero dispersion wavelength (nm)</td>
<td>1302 – 1322</td>
<td>1302 – 1322</td>
</tr>
<tr>
<td>Dispersion slope (ps/nm² · km)</td>
<td>≤ 0.090</td>
<td>≤ 0.090</td>
</tr>
<tr>
<td>Cutoff wavelength (cabled) (nm)</td>
<td>≤ 1260</td>
<td>≤ 1260</td>
</tr>
<tr>
<td>Polarization mode dispersion (ps/√km)</td>
<td>≤ 0.2</td>
<td>≤ 0.2</td>
</tr>
<tr>
<td>Effective group of refraction</td>
<td>1.4695</td>
<td>1.4701</td>
</tr>
</tbody>
</table>

**Applications and link lengths**

<table>
<thead>
<tr>
<th>Type according to IS 11801: 09/2002</th>
<th>F</th>
<th>G</th>
<th>G50/125</th>
<th>J</th>
<th>L</th>
<th>M</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gigabit Ethernet 1000BASE-SX (850 nm)</td>
<td>OM2</td>
<td>OM2+</td>
<td>OM2+</td>
<td>OM3</td>
<td>OM1</td>
<td>OM1+</td>
</tr>
<tr>
<td>Gigabit Ethernet 1000BASE-LX (1300 nm)</td>
<td>500 m</td>
<td>525 m</td>
<td>750 m</td>
<td>1,000 m</td>
<td>1,500 m</td>
<td>350 m</td>
</tr>
<tr>
<td>Gigabit Ethernet 10GBASE-SX (850 nm)</td>
<td>550 m</td>
<td>1,000 m</td>
<td>2,000 m</td>
<td>550 m</td>
<td>550 m</td>
<td>550 m</td>
</tr>
<tr>
<td>10 Gigabit Ethernet 10GBASE-LX4 (1310 nm WDM)</td>
<td>300 m*</td>
<td>300 m</td>
<td>300 m</td>
<td>300 m</td>
<td>300 m</td>
<td>300 m</td>
</tr>
</tbody>
</table>

* 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

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

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

### Disposable drums (wood)

<table>
<thead>
<tr>
<th>Type</th>
<th>Flange-Ø (mm)</th>
<th>Core-Ø (mm)</th>
<th>Width over all (mm)</th>
<th>Winding width (mm)</th>
<th>Drilling (mm)</th>
<th>Reel weight approx. (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>K3000</td>
<td>300</td>
<td>212</td>
<td>103</td>
<td>90</td>
<td>51</td>
<td>0.7</td>
</tr>
<tr>
<td>H5001</td>
<td>500</td>
<td>400</td>
<td>116</td>
<td>100</td>
<td>46</td>
<td>3.5</td>
</tr>
<tr>
<td>H5005</td>
<td>500</td>
<td>312</td>
<td>331</td>
<td>315</td>
<td>80</td>
<td>3.7</td>
</tr>
<tr>
<td>H6007</td>
<td>600</td>
<td>312</td>
<td>335</td>
<td>315</td>
<td>80</td>
<td>5.0</td>
</tr>
<tr>
<td>H6008</td>
<td>600</td>
<td>313</td>
<td>410</td>
<td>390</td>
<td>80</td>
<td>4.6</td>
</tr>
<tr>
<td>H7601</td>
<td>760</td>
<td>313</td>
<td>415</td>
<td>390</td>
<td>80</td>
<td>8.5</td>
</tr>
<tr>
<td>H7603</td>
<td>760</td>
<td>470</td>
<td>544</td>
<td>520</td>
<td>80</td>
<td>12.0</td>
</tr>
<tr>
<td>H1001</td>
<td>1000</td>
<td>500</td>
<td>590</td>
<td>560</td>
<td>80</td>
<td>15.0</td>
</tr>
<tr>
<td>G1201</td>
<td>1200</td>
<td>600</td>
<td>790</td>
<td>645</td>
<td>80</td>
<td>74</td>
</tr>
<tr>
<td>G1401</td>
<td>1400</td>
<td>800</td>
<td>700</td>
<td>600</td>
<td>82</td>
<td>193</td>
</tr>
<tr>
<td>G1601</td>
<td>1600</td>
<td>1000</td>
<td>1100</td>
<td>900</td>
<td>80</td>
<td>240</td>
</tr>
</tbody>
</table>
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 fulfill 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**
- **Outer jacket**: Tight buffered or semi-tight fiber  
- **Strain relief elements**: non-metallic (aramid)

**Temperature range**
- **Transport and storage**: −25 °C to +70 °C  
- **Installation**: −5 °C to +50 °C  
- **Operation**: −10 °C to +70 °C

**Mechanical properties**
- **min. bending radius**:  
  - static: 30 mm  
  - dynamic: 60 mm

**Outer-Ø** | **Type** | **Weight** | **max. pull force** | **max. crush resistance** | **Fire load**
---|---|---|---|---|---
<table>
<thead>
<tr>
<th>mm</th>
<th>kg/km</th>
<th>long-term N</th>
<th>long-term N/dm</th>
<th>MJ/m</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.6</td>
<td>I-V(ZN)H 1...</td>
<td>2.9</td>
<td>200</td>
<td>100</td>
</tr>
<tr>
<td>1.8</td>
<td>I-V(ZN)H 1...</td>
<td>3.7</td>
<td>200</td>
<td>100</td>
</tr>
<tr>
<td>2.0</td>
<td>I-V(ZN)H 1...</td>
<td>5.0</td>
<td>300</td>
<td>100</td>
</tr>
<tr>
<td>2.1</td>
<td>I-V(ZN)H 1...</td>
<td>5.1</td>
<td>300</td>
<td>100</td>
</tr>
<tr>
<td>2.4</td>
<td>I-V(ZN)H 1...</td>
<td>5.7</td>
<td>400</td>
<td>150</td>
</tr>
<tr>
<td>2.8</td>
<td>I-V(ZN)H 1...</td>
<td>7.9</td>
<td>400</td>
<td>150</td>
</tr>
<tr>
<td>2.9</td>
<td>I-V(ZN)H 1...</td>
<td>8.0</td>
<td>400</td>
<td>150</td>
</tr>
<tr>
<td>3.0</td>
<td>I-V(ZN)H 1...</td>
<td>8.1</td>
<td>400</td>
<td>150</td>
</tr>
<tr>
<td>3.4</td>
<td>I-V(ZN)H 1...</td>
<td>12.0</td>
<td>400</td>
<td>150</td>
</tr>
</tbody>
</table>

* acc. to TS 0011/96 Deutsce Telekom

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

16 www.leoni-fiber-optics.com
**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.

**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

**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**

**Cross section**
- **Outer jacket**: Tight buffered or semi-tight fiber
- **Strain relief elements**: non-metallic (aramid)

**Mechanical properties**
- **min. bending radius**: static 30 mm, dynamic 60 mm

<table>
<thead>
<tr>
<th>Outer dimension</th>
<th>Type</th>
<th>Weight (kg/km)</th>
<th>max. pull force (N)</th>
<th>max. crush resistance (N/dm)</th>
<th>Fire load (MJ/m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.6 x 3.3</td>
<td>I-V(ZN)H 2x1...</td>
<td>5.8</td>
<td>400</td>
<td>200</td>
<td>0.18</td>
</tr>
<tr>
<td>1.8 x 3.7</td>
<td>I-V(ZN)H 2x1...</td>
<td>7.4</td>
<td>400</td>
<td>200</td>
<td>0.20</td>
</tr>
<tr>
<td>2.0 x 4.1</td>
<td>I-V(ZN)H 2x1...</td>
<td>7.4</td>
<td>400</td>
<td>200</td>
<td>0.22</td>
</tr>
<tr>
<td>2.1 x 4.3</td>
<td>I-V(ZN)H 2x1...</td>
<td>9.0</td>
<td>400</td>
<td>400</td>
<td>0.24</td>
</tr>
<tr>
<td>2.4 x 4.9</td>
<td>I-V(ZN)H 2x1...</td>
<td>12.6</td>
<td>400</td>
<td>400</td>
<td>0.31</td>
</tr>
<tr>
<td>2.8 x 5.7</td>
<td>I-V(ZN)H 2x1...</td>
<td>15.8</td>
<td>600</td>
<td>600</td>
<td>0.36</td>
</tr>
<tr>
<td>3.0 x 6.1</td>
<td>I-V(ZN)H 2x1...</td>
<td>17.5</td>
<td>600</td>
<td>6x00</td>
<td>0.38</td>
</tr>
</tbody>
</table>

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
  - orange for multi-mode, yellow for single-mode
- **Cross section**
  - Outer jacket
  - Tight buffered or semi-tight fiber
  - Strain relief elements

**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**

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

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

**Temperature range**
- Transport and storage: –25 °C to +70 °C
- Installation: –5 °C to +50 °C
- Operation: –10 °C to +70 °C

**Mechanical properties**
- Min. bending radius: 35 mm (static), 65 mm (dynamic)

**Cross section**
- Outer jacket
- Tight buffered or semi-tight fiber
- Strain relief elements
- Subcable jacket

**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

**Subcable**

<table>
<thead>
<tr>
<th>Subcable</th>
<th>Outer dimension</th>
<th>Type</th>
<th>Weight</th>
<th>max. pull force</th>
<th>max. crush resistance</th>
<th>Fire load</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>mm</td>
<td>mm</td>
<td>kg/km</td>
<td>N/dm</td>
<td>MJ/m</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1.7</td>
<td>2.8 x 4.5</td>
<td>I-V(ZN)HH 2x1…</td>
<td>16.5</td>
<td>400</td>
<td>400</td>
</tr>
<tr>
<td></td>
<td>1.8</td>
<td>2.9 x 4.7</td>
<td>I-V(ZN)HH 2x1…</td>
<td>17.5</td>
<td>400</td>
<td>400</td>
</tr>
<tr>
<td></td>
<td>2.0</td>
<td>3.1 x 5.2</td>
<td>I-V(ZN)HH 2x1…</td>
<td>19.0</td>
<td>600</td>
<td>400</td>
</tr>
<tr>
<td></td>
<td>2.1</td>
<td>3.1 x 5.2</td>
<td>I-V(ZN)HH 2x1…</td>
<td>19.0</td>
<td>600</td>
<td>400</td>
</tr>
<tr>
<td></td>
<td>2.5</td>
<td>3.7 x 6.2</td>
<td>I-V(ZN)HH 2x1…</td>
<td>26.0</td>
<td>600</td>
<td>600</td>
</tr>
<tr>
<td></td>
<td>2.8</td>
<td>4.0 x 6.8</td>
<td>I-V(ZN)HH 2x1…</td>
<td>32.0</td>
<td>600</td>
<td>600</td>
</tr>
</tbody>
</table>

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

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

Cross section

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 □

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

### 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)

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

### 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)

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

**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

**Cross section**
- Outer jacket
- Ripcord
- Tight buffered fiber
- Tape
- Central strength member
- Strain relief elements and rodent protection

**Number of fibers n**

<table>
<thead>
<tr>
<th>n</th>
<th>4</th>
<th>6</th>
<th>8</th>
<th>10</th>
<th>12</th>
<th>16</th>
<th>20</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outer-Ø (mm)</td>
<td>8.5</td>
<td>8.5</td>
<td>8.5</td>
<td>9.7</td>
<td>9.7</td>
<td>10.1</td>
<td>10.1</td>
</tr>
<tr>
<td>Weight (kg/km)</td>
<td>85</td>
<td>85</td>
<td>85</td>
<td>105</td>
<td>105</td>
<td>110</td>
<td>110</td>
</tr>
<tr>
<td>Fire load (MJ/m)</td>
<td>0.75</td>
<td>0.75</td>
<td>0.75</td>
<td>0.85</td>
<td>0.85</td>
<td>0.87</td>
<td>0.87</td>
</tr>
</tbody>
</table>
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
- Outer jacket
- Loose tube, gel filled
- Strain relief elements and rodent protection

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

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

Fire performance
- Flame retardancy: IEC 60332-1
- Smoke density: IEC 61034
- Halogen-free: IEC 60754-2
- No toxic and corrosive fumes

<table>
<thead>
<tr>
<th>No. of fibers max.</th>
<th>Outer-Ø (mm)</th>
<th>Weight (kg/km)</th>
<th>Fire Load (MJ/m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>7.0</td>
<td>48</td>
<td>0.70</td>
</tr>
<tr>
<td>24</td>
<td>7.5</td>
<td>55</td>
<td>0.72</td>
</tr>
</tbody>
</table>

www.leoni-fiber-optics.com
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.

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

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

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

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

Cross section
- Outer jacket
- Loose tube, gel filled
- Ripcord
- Strain relief elements
- and rodent protection

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

<table>
<thead>
<tr>
<th>No. of fibers max.</th>
<th>Outer-Ø (mm)</th>
<th>Weight (kg/km)</th>
<th>Fire Load (MJ/m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>9.2</td>
<td>105</td>
<td>0.92</td>
</tr>
<tr>
<td>24</td>
<td>9.7</td>
<td>115</td>
<td>1.15</td>
</tr>
</tbody>
</table>
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

**Cross section**
- **Outer jacket**
- **Central strength member**
- **Ripcord**
- **Loose tube, gel filled**

**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

**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

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

[U-DH nxm...](#)
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

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 6000 N
- **max. crush resistance**: long-term 3000 N/dm

Mechanical properties

Table:

| 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    | ...

Aufbau
- **Outer jacket**: Loose tube, gel filled
- **Central strength member**:,
- **Ripcord**: Strain relief elements and rodent protection

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**:
**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 |

<table>
<thead>
<tr>
<th><strong>Construction</strong></th>
<th><strong>Mechanical properties</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Cable core</td>
<td>Loose tube, gel filled</td>
</tr>
<tr>
<td>E-glass yarn</td>
<td>water-absorbent, as non-metallic strain relief elements</td>
</tr>
<tr>
<td>Aluminium tape</td>
<td>for transversal water resistance</td>
</tr>
<tr>
<td>Cable jacket</td>
<td>halogen-free and flame-retardant material</td>
</tr>
<tr>
<td>Color of jacket</td>
<td>yellow</td>
</tr>
<tr>
<td></td>
<td>Outside diameter</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Weight</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>min. bending radius</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>max. pull force</td>
</tr>
<tr>
<td></td>
<td>max. crush resistance</td>
</tr>
</tbody>
</table>

**LEONI GigaLine® U-DQ(ZN)HWH n...**

Rodent secure and 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. | 84 030 |

<table>
<thead>
<tr>
<th><strong>Construction</strong></th>
<th><strong>Mechanical properties</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Cable core</td>
<td>Loose tube, gel filled</td>
</tr>
<tr>
<td>Strain relief elements</td>
<td>non-metallic (E-glass yarn), water-absorbent</td>
</tr>
<tr>
<td>Inner jacket</td>
<td>halogen-free and flame-retardant material</td>
</tr>
<tr>
<td>Corrugated steel tape</td>
<td>as rodent protection</td>
</tr>
<tr>
<td>Outer jacket</td>
<td>halogen-free and flame-retardant material</td>
</tr>
<tr>
<td>Color of jacket</td>
<td>yellow</td>
</tr>
<tr>
<td></td>
<td>Outside diameter up to 24 fibers</td>
</tr>
<tr>
<td></td>
<td>Weight up to 24 fibers</td>
</tr>
<tr>
<td></td>
<td>min. bending radius static</td>
</tr>
<tr>
<td></td>
<td>dynamic</td>
</tr>
<tr>
<td></td>
<td>max. pull force long-term</td>
</tr>
<tr>
<td></td>
<td>max. crush resistance long-term</td>
</tr>
</tbody>
</table>
**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**

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**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 for transversal water resistance.
- **Aluminium tape**: for transversal water resistance.
- **Cable jacket (yellow)**: halogen-free and flame-retardant material.

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

**Mechanical properties**
- **min. bending radius**: static 15 x outside diameter.
- **max. pull force**: long-term 3000 N.
- **max. crush resistance**: long-term 1500 N/dm.

---

**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.

<table>
<thead>
<tr>
<th>No. of tubes n</th>
<th>1 x m</th>
<th>2 x m</th>
<th>3 x m</th>
<th>4 x m</th>
<th>5 x m</th>
<th>6 x m</th>
<th>8 x m</th>
<th>10 x m</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outer-Ø (mm)</td>
<td>12.7</td>
<td>12.7</td>
<td>12.7</td>
<td>12.7</td>
<td>16.5</td>
<td>16.5</td>
<td>16.5</td>
<td>16.5</td>
</tr>
<tr>
<td>Weight (kg/km)</td>
<td>220</td>
<td>220</td>
<td>220</td>
<td>220</td>
<td>305</td>
<td>305</td>
<td>305</td>
<td>305</td>
</tr>
</tbody>
</table>

**Mechanical properties**
- **min. bending radius**: static 15 x outside diameter.
- **max. pull force**: long-term 3000 N.
- **max. crush resistance**: long-term 2000 N/dm.

---

www.leoni-fiber-optics.com
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

**Temperature range**
- **Transport and storage**: –25 °C to +70 °C
- **Installation**: –5 °C to +50 °C
- **Operation**: –20 °C to +60 °C

**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

**Cross section**
- Outer jacket
- Loose tube, gel filled
- Strain relief elements and rodent protection

**Fire performance**
- Jacket is halogen-free
- No toxic and corrosive fumes

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

<table>
<thead>
<tr>
<th>No. of fibers max.</th>
<th>Outer-Ø (mm)</th>
<th>Weight (kg/km)</th>
<th>Fire load (MJ/m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>7.0</td>
<td>38</td>
<td>1.50</td>
</tr>
<tr>
<td>24</td>
<td>7.5</td>
<td>43</td>
<td>1.70</td>
</tr>
</tbody>
</table>

www.leoni-fiber-optics.com
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. 84321
Standardization IEC 60794-3

Construction

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cable core</td>
<td>Loose tube, gel filled</td>
</tr>
<tr>
<td>Armouring</td>
<td>multi-functional, strengthened E-glass yarn</td>
</tr>
<tr>
<td></td>
<td>water-absorbent as non-metallic strain relief element and as rodent protection</td>
</tr>
<tr>
<td>Cable jacket</td>
<td>PE-jacket with imprint</td>
</tr>
<tr>
<td>Color of jacket</td>
<td>black</td>
</tr>
</tbody>
</table>

Temperature range

<table>
<thead>
<tr>
<th>Condition</th>
<th>Temperature Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transport and storage</td>
<td>–25 °C to +70 °C</td>
</tr>
<tr>
<td>Installation</td>
<td>–5 °C to +50 °C</td>
</tr>
<tr>
<td>Operation</td>
<td>–20 °C to +60 °C</td>
</tr>
</tbody>
</table>

Mechanical properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Static</th>
<th>Dynamic</th>
<th>Long-term</th>
</tr>
</thead>
<tbody>
<tr>
<td>min. bending radius</td>
<td>15 x outside diameter</td>
<td>20 x outside diameter</td>
<td>2500 N</td>
</tr>
<tr>
<td>max. pull force</td>
<td>3000 N/dm</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Cross section

- Outer jacket
- Loose tube, gel filled
- Ripcord
- Strain relief elements
- and rodent protection

Fire performance

- Jacket is halogen-free
- No toxic and corrosive fumes

Remarks

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

<table>
<thead>
<tr>
<th>No. of fibers max.</th>
<th>Outer-Ø (mm)</th>
<th>Weight (kg/km)</th>
<th>Fire load (MJ/m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>9.2</td>
<td>85</td>
<td>1.50</td>
</tr>
<tr>
<td>24</td>
<td>9.7</td>
<td>95</td>
<td>1.60</td>
</tr>
</tbody>
</table>

www.leoni-fiber-optics.com
**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**: multi-functional, strengthened E-glass yarn
- **Armouring**: water-absorbent as non-metallic strain relief element and 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

**Mechanical properties**
- **min. bending radius**: static 15 x outside diameter
- **max. pull force**: long-term 4000 N
- **max. crush resistance**: long-term 3000 N/dm

**Cross section**
- **Outer jacket**
- **Water-absorbent fleece**
- **Loose tube, gel filled**
- **Ripcord**
- **Strain relief elements**
- **and rodent protection**
- **Central strength member**

**Fire performance**
Jacket is halogen-free
No toxic and corrosive fumes

**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 | ...
<table>
<thead>
<tr>
<th></th>
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<th></th>
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</thead>
<tbody>
<tr>
<td>No. of fibers max.</td>
<td>12</td>
<td>24</td>
<td>36</td>
<td>48</td>
<td>60</td>
<td>72</td>
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<td>120</td>
<td>144</td>
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<tr>
<td>Outer-Ø (mm)</td>
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<td>11.4</td>
<td>11.4</td>
<td>11.4</td>
<td>11.4</td>
<td>12.3</td>
<td>13.7</td>
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<td>115</td>
<td>115</td>
<td>115</td>
<td>115</td>
<td>135</td>
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<td>4.1</td>
<td>4.5</td>
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**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.** 84300

**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**
- **Outer jacket**
- **Water-absorbent fleece**
- **Loose tube, gel filled**
- **Core filling**
- **Strain relief elements**
- **Central strength member**

**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.

---

**Table: Parameters**

<table>
<thead>
<tr>
<th>No. of tubes n</th>
<th>1 x m</th>
<th>2 x m</th>
<th>3 x m</th>
<th>4 x m</th>
<th>5 x m</th>
<th>6 x m</th>
<th>8 x m</th>
<th>10 x m</th>
<th>12 x m</th>
<th>16 x m</th>
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<td>11.4</td>
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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
Outer jacket
Corrugated steel tape
Inner jacket
Water-absorbent fleece
Loose tube, gel filled
Strain relief elements
Central strength member

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 | ...
<table>
<thead>
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<td>24</td>
<td>36</td>
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<td>144</td>
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<td>370</td>
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<td>10.4</td>
<td>10.4</td>
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<td>13.1</td>
<td>13.8</td>
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<td></td>
</tr>
</tbody>
</table>
**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

---

**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

---

**Cross section**
- Outer jacket
- Aluminium tape
- Ripcord
- Loose tube, gel filled
- Strain relief elements

---

**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.**

<table>
<thead>
<tr>
<th>No. of fibers max.</th>
<th>Outer-Ø (mm)</th>
<th>Weight (kg/km)</th>
<th>Fire load (MJ/m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>10.8</td>
<td>128</td>
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</tr>
<tr>
<td>24</td>
<td>11.3</td>
<td>135</td>
<td>1.62</td>
</tr>
</tbody>
</table>
**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

**Temperature range**
- **Transport and storage**: –40 °C to +70 °C
- **Installation**: –5 °C to +50 °C
- **Operation**: –40 °C to +70 °C

**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**
  - long-term: 2500 N/dm

**Cross section**
- Outer jacket
- Corrugated steel tape
- Inner jacket
- Loose tube, gel filled
- Strain relief elements

**Fire performance**
Jacket is halogen-free
No toxic and corrosive fumes
**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

**Temperature range**
- **Transport and storage**: – 40 °C to +70 °C
- **Installation**: – 5 °C to +55 °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: 3000 N
- **max. crush resistance**
  - long-term: 1500 N/dm

**Cross section**
- Outer jacket
- Aluminium tape
- Ripcord
- Loose tube, gel filled
- Strain relief elements
- Central strength element

**Fire performance**
- Jacket is halogen-free
- No toxic and corrosive fumes

---

**No. of fibers n**

<table>
<thead>
<tr>
<th>1 x m</th>
<th>2 x m</th>
<th>3 x m</th>
<th>4 x m</th>
<th>5 x m</th>
<th>6 x m</th>
<th>8 x m</th>
<th>10 x m</th>
<th>12 x m</th>
<th>...</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>24</td>
<td>36</td>
<td>48</td>
<td>60</td>
<td>72</td>
<td>96</td>
<td>120</td>
<td>144</td>
<td></td>
</tr>
</tbody>
</table>

**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
Outer jacket
Corrugated steel tape
Ripcord
Loose tube, gel filled
Strain relief elements
Central strength element

Temperature range
Transport and storage  – 40 °C to +70 °C
Installation  – 5 °C to +55 °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  3000 N
max. crush resistance  long-term  2000 N/dm

Fire performance
Jacket is halogen-free
No toxic and corrosive fumes

No. of fibers n

<table>
<thead>
<tr>
<th>No. of fibers max.</th>
<th>1 x m</th>
<th>2 x m</th>
<th>3 x m</th>
<th>4 x m</th>
<th>5 x m</th>
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<td>Outer-Ø (mm)</td>
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<tr>
<td>Weight(kg/km)</td>
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<tr>
<td>Fire load (MJ/m)</td>
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</tbody>
</table>

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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).

<table>
<thead>
<tr>
<th>Cable jacket material</th>
<th>TPE-O (FRNC)</th>
<th>TPE-U (PUR)</th>
<th>PVC</th>
<th>PE</th>
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<tr>
<td>Material properties</td>
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<td>Halogen-free</td>
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<td>Abrasion resistance</td>
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<td>-</td>
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<td>Low fume generation</td>
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<td>Saline solutions</td>
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<td>+</td>
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</tr>
</tbody>
</table>

**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, CH₄, N₂, O₂, low gas permeation, CO₂, H₂, 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

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

**Thermal properties**
- **Transport and storage**: – 25 °C to +70 °C
- **Installation**: – 5 °C to +50 °C
- **Operating temperature**: – 20 °C to +60 °C

**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

**Cross section**
- **Outer jacket**: Loose tube, gel filled
- **Ripcord**: Inner fire protection tape
- **Armouring**: Outer fire protection tape

**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

**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)**

<table>
<thead>
<tr>
<th>No. of fibers max.</th>
<th>Outer-Ø (mm)</th>
<th>Weight (kg/km)</th>
<th>Fire load (MJ/m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>10.3</td>
<td>115</td>
<td>1.03</td>
</tr>
<tr>
<td>24</td>
<td>10.8</td>
<td>125</td>
<td>1.28</td>
</tr>
</tbody>
</table>

42 www.leoni-fiber-optics.com
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

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

Thermal properties

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

Mechanical properties

<table>
<thead>
<tr>
<th>min. bending radius (static)</th>
<th>15 x outside diameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>max. pull force (dynamic)</td>
<td>20 x outside diameter</td>
</tr>
<tr>
<td>max. crush resistance (long-term)</td>
<td>1750 N</td>
</tr>
<tr>
<td>max. crush resistance (long-term)</td>
<td>2500 N/dm</td>
</tr>
</tbody>
</table>

Cross section

- Outer jacket
- Corrugated steel tape
- Inner jacket
- Central loose tube, gel filled
- Inner fire protection tape
- Outer fire protection tape

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

System integrity

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

<table>
<thead>
<tr>
<th>No. of fibers max.</th>
<th>Outer-Ø (mm)</th>
<th>Weight (kg/km)</th>
<th>Fire load (MJ/m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>12.5</td>
<td>210</td>
<td>1.60</td>
</tr>
<tr>
<td>24</td>
<td>12.5</td>
<td>210</td>
<td>1.60</td>
</tr>
</tbody>
</table>

www.leoni-fiber-optics.com  43
**Construction**
- Cable core: Loose tube, gel filled
- Strain relief: Aramid yarns
- Cable jacket: Polyurethane (PUR)
- Color of jacket: black

**Mechanical properties**
- Min. bending radius: static 15 x outside diameter
- Max. pull force: dynamic 20 x outside diameter
- Max. crush resistance: long-term 2500 N
- Resistance to impact: long-term 3000 N/dm
- 5 impacts/3 Nm

**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

**Chemical properties**
- Very good resistance to oil, fuel, acid and base

**Cross section**
- PUR-Outer jacket
- Loose tube, gel filled
- Strain relief elements

**Order-No.** 84 023

**Standardization** DIN VDE 0888, Part 6 and IEC 60794-2

**No. of fibers max.**

<table>
<thead>
<tr>
<th>No. of fibers max.</th>
<th>Outer-Ø (mm)</th>
<th>Weight (kg/km)</th>
<th>Fire load (MJ/m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>6.5</td>
<td>36</td>
<td>0.55</td>
</tr>
<tr>
<td>24</td>
<td>7.7</td>
<td>50</td>
<td>0.76</td>
</tr>
</tbody>
</table>
**Mobile field cable (Tactical cable)**

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

**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 properties**
Very good resistance to oil, fuel, acid and base

**Cross section**
- PUR-Outer jacket
- Strain relief elements
- PUR-Inner jacket
- Semi-tight fiber
- Strain relief elements

**Fire performance**
- Flame retardancy: IEC 60332-1

**Order-No.** 84 950 003

**Standardization**
- BWB TL 6020-0001 certified and prEN 17700

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**LEONI Fiber Optics**

**Special cables**

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

**Order-No.** 84 950 003

**Standardization**
- BWB TL 6020-0001 certified and prEN 17700

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**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

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**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**
- PUR-Outer jacket
- Water-absorbent fleece
- Tight buffered fiber
- Strain relief elements
- Central strength member

**Temperature range**
- **Transport and storage**: –55 °C to +80 °C
- **Installation**: –5 °C to +55 °C
- **Operation**: –40 °C to +70 °C

**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

**Fire performance**
- Flame retardancy IEC 60332-1

**Chemical properties**
Very good resistance to oil, fuel, acid and base

---

**No. of fibers n**

<table>
<thead>
<tr>
<th>Outer-Ø (mm)</th>
<th>4</th>
<th>6</th>
<th>8</th>
<th>10</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight(kg/km)</td>
<td>32</td>
<td>32</td>
<td>52</td>
<td>67</td>
<td>67</td>
</tr>
<tr>
<td>Fire load (MJ/m)</td>
<td>0.50</td>
<td>0.50</td>
<td>0.75</td>
<td>0.95</td>
<td>0.95</td>
</tr>
</tbody>
</table>

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**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: 800 N/dm
- Resistance to impact: 10 impacts/2 Nm
- Drag chain test: 5 000 000 cycles

**Cross section**
- PVC Outer jacket
- Tight buffered or semi-tight fiber
- PVC subcable jacket
- Strain relief elements

**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)

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