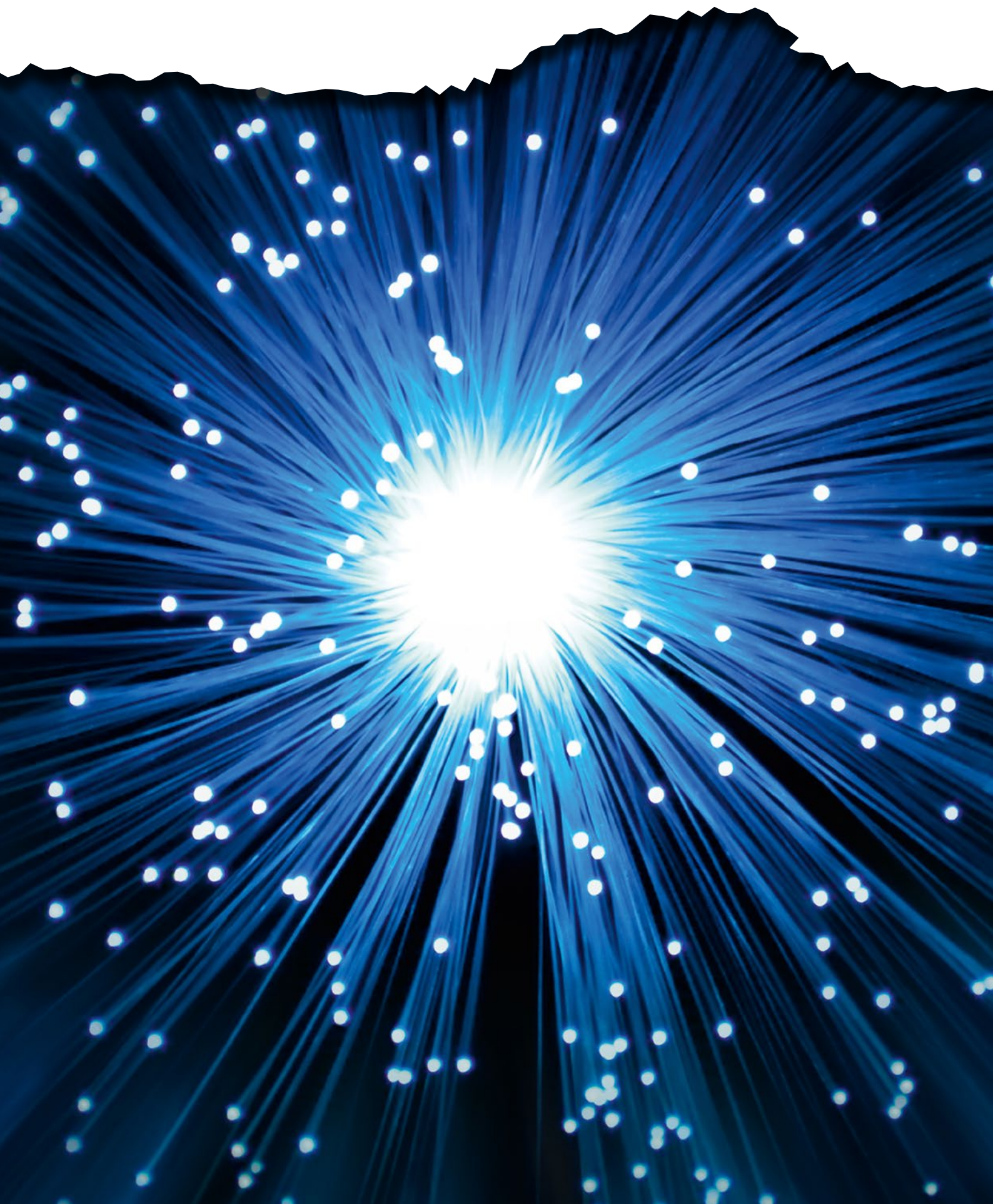


Product catalogue 2026

# Fiber optic cables





Dear Customers,

since 1910 we have been supplying the cables which help you to solve your problems through communication. Enclosed, please, find a new comprehensive catalogue containing the basic product line of our company.

We tried not only to include the standard products that you probably know very well, but some innovations and brand new products as well. Despite the catalogue is considered as a complete presentation of our production, not all variants can be published and included.

For some special products, please, contact our Sales Department that will provide you with any information requested. Let us advice you of the fact that all cable parameters in this catalogue are for information only.

All rights reserved.



Lenka Mádlová  
Head of Commercial Department – Member of board

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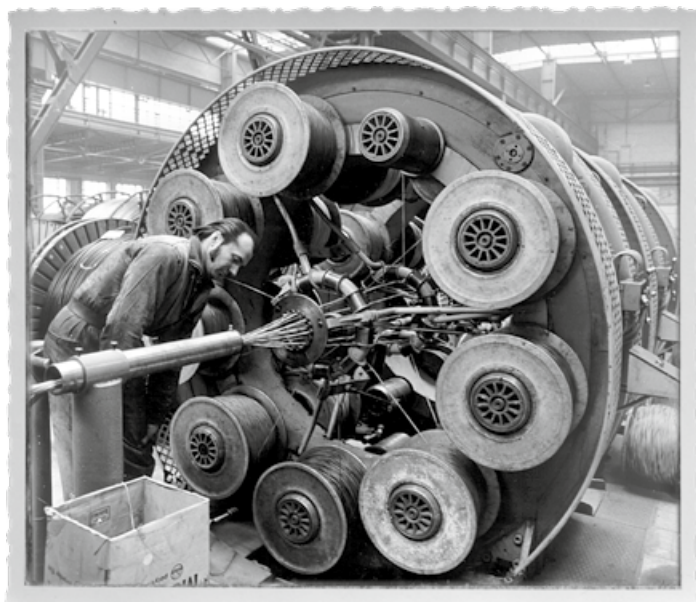
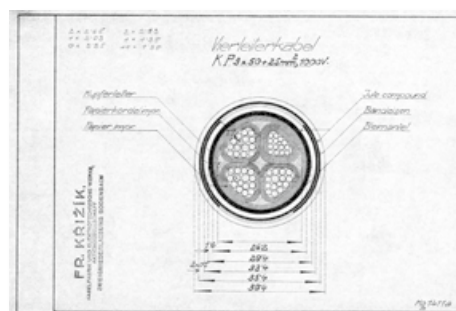
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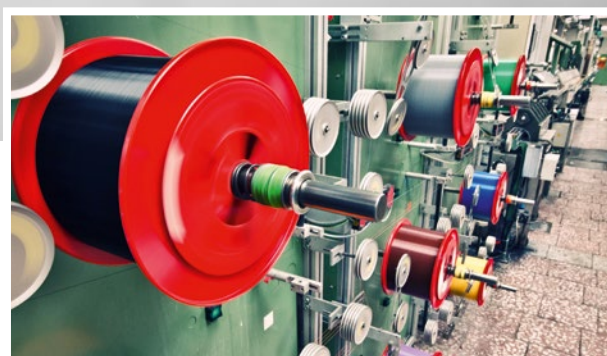
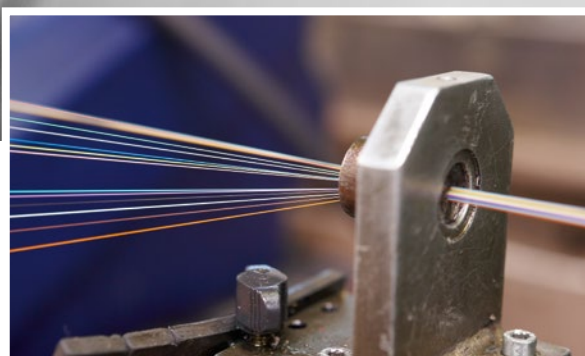
# History and present of **KABELOVNA** Děčín Podmokly



KDP was founded in 1909 and 1910 as a branch of the Bergmann cable plants in Berlin, the original name of the company being „Rakouské Bergmannovy závody spol. s r.o., Vídeň, továrna Podmokly“.

From the very outset the plant manufactured all types of power and communications cables with lead casing and the relevant cable sets, as well as rubber-insulated conductors, dynamo wires and insulation pipes with accessories. Company activity at that time also included projects involving electrical equipment and its installation.

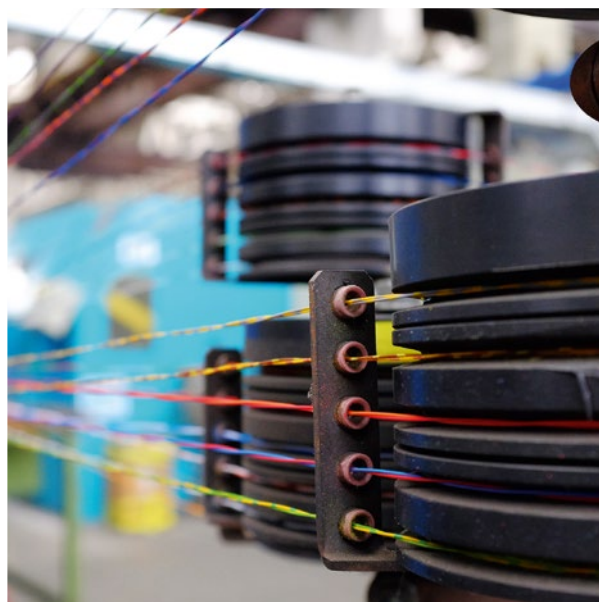
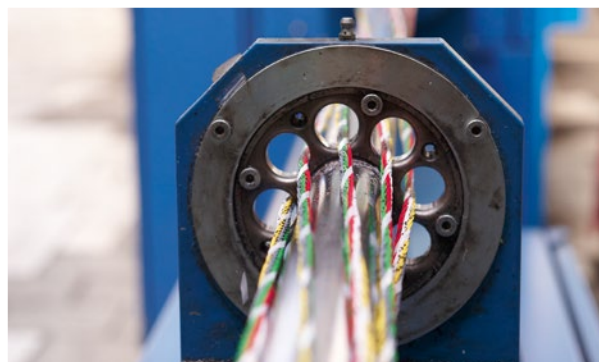




The cable factory came into the hands of Anglo-Pragobanka as part of Křižík a spol. Praha after the First World War and this company reconstructed the entire business. The production of trunk communications cables got underway at this time. The cable factory and neighbouring copper works were then merged in 1932 as the „Měďárna, kabelovna a elektrotechnické závody Křižík-Chaudoir, Praha“. However, the production programme at the cable factory did not change too radically.

The company was nationalised after 1945. It was later incorporated as part of KABLO Kladno and its specialisation amplified. The main production programme became the manufacture of communications cables and in 1961 KABLO Děčín became the monopoly producer of cables for local and long-distance telecommunications networks using top-of-the-range technology. The company was privatised after 1990, became independent again and returned to its traditional name of KABELOVNA Děčín-Podmokly, a.s. SIEMENS AG then entered the company in 1992. The result of mutual cooperation here was considerable modernisation of production technology, the expansion of the range produced and the strengthening of KABELOVNA Děčín-Podmokly, a.s. on global markets.

SIEMENS sold its share in KABELOVNA to American venture-capital fund Bancroft Eastern Europe Fund L.P. in July 2000, before this company in turn sold its share to American company CDT (Cable Design Technology) in December 2001. CDT then merged with American company BELDEN in 2004, the newly-founded company taking on the name of Belden CDT Inc. 2007 the cable works is sold to Wilms Gruppe, the company is divided into Kabelovna Děčín Podmokly, s.r.o. and KDP Assembly, s.r.o.




# History

|                     |  |
|---------------------|--|
| <b>4. 9. 1909</b>   | Execution of contract on establishment of company „Rakouské Bergmannovy závody, Berlín, elektrotechnická společnost, s. r. o.“ with branch in Vienna.  |
| <b>27. 6. 1911</b>  | Launch of Production – 750 employees. Production of power and communication cables, cable sets and accessories, rubber wires and insulation tubes including accessories.   |
| <b>05/1919</b>      | The company was acquired by „Elektrotechnické závody František Křížik, Praha, a. s.“<br>Initiation of remote communication cables production.  |
| <b>03/1930</b>      | The company completely burnt down. Production restored at the end of year 1930.  |
| <b>05/1945</b>      | The company came under national control of Křížik a. s. corporation. Then it was nationalized and became a part of national company KABLO Bratislava. Production of power and communication cables with lead coating, rubberized wires and coil wires. |
| <b>1. 1. 1950</b>   | Establishment of national company KABLO Děčín.   |
| <b>1959</b>         | Production of remote communication cables.   |
| <b>1961</b>         | KABLO Děčín became a monopoly producer of communication cables for local networks.   |
| <b>1982–1984</b>    | Construction of new hall to expand the production of communication cables.   |
| <b>1985</b>         | Termination of power cables production.  |
| <b>1988</b>         | Initiation of optic cables production.   |
| <b>31. 12. 1990</b> | Privatization, establishment of incorporated company.<br>The original name KABELOVNA Děčín Podmokly, a. s. was used.   |
| <b>1992</b>         | Company share acquisition by SIEMENS AG.   |
| <b>1994</b>         | Initiation of cable assemblies production.   |
| <b>1995</b>         | ISO 9001 certification completed.  |
| <b>1996</b>         | Initiation of installation cables production.  |
| <b>1996</b>         | Czech Republic Quality Award.  |
| <b>1998</b>         | ISO 14001 certification completed.   |
| <b>2000</b>         | Establishment of subsidiary company KDP Kabeltechnik Berlin, GmbH.   |
| <b>2000</b>         | Sale of SIEMENS AG share to investment fund BANCROFT CZ.   |
| <b>2001</b>         | CDT Pittsburgh becomes a majority owner of the company.  |
| <b>2002</b>         | Complete renewal of optic cable assortment.  |
| <b>2003</b>         | Initiation of data cable production.   |
| <b>2004</b>         | Merge with Belden company, Belden CDT inc. was established.  |
| <b>2007</b>         | Wilms Gruppe becomes a new owner of KABELOVNA.   |
| <b>2010</b>         | KABELOVNA Děčín Podmokly, s.r.o. celebrates 100 <sup>th</sup> Anniversary.   |
| <b>2015</b>         | New portfolio of cable constructions.  |
| <b>1. 1. 2016</b>   | KABELOVNA Děčín Podmokly, s.r.o. has become a member of FTTH Council.  |
| <b>2022</b>         | KDP has become a member of Association of Cable Manufacturers.   |

# Certificates and CPR

KDP

**KDP®**  
WORLD CONNECTING CABLES

**DECLARATION OF PERFORMANCE**

No. 2/23

|   |  |
|---|--|
| 1. Unique identification code of the product-type:                              | JIA-DG(BN)/SRH 12,24 (ZNOU)  |
| 2. Intended uses:   | Communication fiber optic cable  |
| 3. Manufacturer:  | KABELOVNÁ Řežba Podmokly, s.r.o., Ústecká 840/33, 405 33 Děčín 5, CZECH REPUBLIC |
| 4. Authorized representative:   | -  |
| 5. System's AVCP:   | T <sup>A</sup>   |
| 6. Harmonised standard:   | EN 50575:2014+A1:2016  |
| Notified bodies:  | ELEKTROTECHNIKY ŽUKŮŠEJNE ŮSTAV s.p.,<br>No 1014                                 |
| 7. Declared performance(s):   | Reaction to fire B2Csl-LBdLst<br>Dangerous substances NPD                        |
| 8. Appropriate Technical Documentation and/or Specific Technical Documentation: | Test report No.: 21274D-0102 16.12.2021  |

The performance of the product identified above is in conformity with the set of declared performances.  
This declaration of performance is issued, in accordance with Regulation (EU) No 305/2011, under the sole responsibility of the manufacturer identified above.

Place of issue: DČÚn

Date of issue: 9.2.2023

Signed for and on behalf of the manufacturer:

Ing. Lenka Mádlová

Function:

Commercial director

KABELOVNA ŘEZBA PODMOKLY, S.R.O.  
ÚSTECKÁ 840/33 | 405 33 DĚČÍN  
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E-mail: [sales@kabelovna-rezba.cz](mailto:sales@kabelovna-rezba.cz)  
[www.kabelovna-rezba.cz](http://www.kabelovna-rezba.cz)

Souhlasíme s vyhlášením certifikačního postupu ISO 9001:2015 a ISO 14001:2015  
Přístup k registraci u certifikační společnosti navedený registračním číslem - IČV nebo IČO, viz číslo účtu



# CERTIFICATE

**Management system as per**  
**EN ISO 14001 : 2015**

**TÜV NORD**

The Certification Body TÜV NORD CERT GmbH hereby confirms as a result of the audit, assessment and certification decision according to ISO/IEC 17021-1:2015, that the organization

**KABELOVNA Děčín Podmokly, s.r.o.**  
**Ústecká 840/33**  
**405 33 Děčín**  
**Czech Republic**



**KDP**  
WORLD CONNECTING CABLES

operates a management system in accordance with the requirements of ISO 14001 : 2015 and will be assessed for conformity within the 3 year term of validity of the certificate.

Scope

**Production and testing of metallic and optical cables.**

Certificate Registration No. 44 104 950276  
Audit report No. 2006/0222

Valid from 08.03.2023  
Valid until 07.03.2026  
Initial certification 1995



Certification Body  
**TÜV NORD CERT GmbH**

Praha, 10.02.2023

Validity can be verified at <https://www.tuv-nord.de/de/kunden/management-zertifizierung/zertifikat Datenbank>.

TÜV NORD CERT GmbH

Am TÜV 1

43037 Essen

[www.tuv-nord-cert.com](http://www.tuv-nord-cert.com)






# CERTIFICATE

Management system as per  
**EN ISO 9001 : 2015**

The Certification Body TÜV NORD CERT GmbH hereby confirms as a result of the audit,  
 assessment and certification decision according to ISO/IEC 17021-1:2015, that the organisation

**KABELOVNÁ Děčín Podmokly, s.r.o.**  
**Ústecká 84033**  
**406 33 Děčín**  
**Czech Republic**



**KDP**<sup>®</sup>  
 WORLD CONNECTING CABLES

operates a management system in accordance with the requirements of ISO 9001 : 2015 and will be assessed  
 for conformity within the 2 year term of validity of the certificate.

Signed

Certificate Registration No. 44 100 950276  
 Audit report No. 300302022



Certification Body  
 at TÜV NORD CERT GmbH

Valid from 04.03.2023  
 Valid until 03.03.2026  
 Initial certification 1995

Prague, 10.02.2023

Production and testing of metallic and optical cables.

Validity can be verified at <https://www.tuv-nord.de/de/unternehmen/certifizierung/zertifizierten-kunden>.

TÜV NORD CERT GmbH
Am TÜV 1
4307 Essen
[www.tuv-nord-cert.com](http://www.tuv-nord-cert.com)








## 1. TIGHT BUFFERED CABLES

- SIMPLEX
- DUPLEX
- HEAVY DUPLEX
- BREAKOUT

# SIMPLEX

**Specification:** 16×1, 17×1, 11×1, 12×1, 14×1, 15×1, 18×1, 19×1, 13×1, Z026, Z174



Indoor



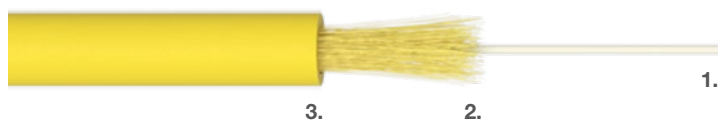
FTTx



Data center



Halogen free



## Description of materials:

**1.** FR-LSZH buffered optical fiber. **2.** Waterblocking aramid yarn. **3.** FR-LSZH outer jacket.

### Temperature range

**Installation** -5 to +50 °C

**Operation** -5 to +50 °C

**Storage** -5 to +50 °C

| Design code | Simplex diameter [mm] | Cable weight [kg/km] | Max. load (installation) [N] | Crush resistance [N/10 cm] |
|-------------|-----------------------|----------------------|------------------------------|----------------------------|
| <b>16×1</b> | 1.6                   | 3                    | 100                          | 500                        |
| <b>17×1</b> | 1.7                   | 3                    | 100                          | 500                        |
| <b>11×1</b> | 1.8                   | 4                    | 100                          | 500                        |
| <b>12×1</b> | 2.0                   | 5                    | 100                          | 500                        |
| <b>14×1</b> | 2.4                   | 7                    | 250                          | 500                        |
| <b>15×1</b> | 2.5                   | 7                    | 300                          | 500                        |
| <b>18×1</b> | 2.8                   | 8                    | 400                          | 500                        |
| <b>19×1</b> | 2.9                   | 9                    | 300                          | 500                        |
| <b>13×1</b> | 3.0                   | 9                    | 300                          | 500                        |
| <b>Z026</b> | 2.3                   | 6                    | 250                          | 500                        |
| <b>Z174</b> | 2.6                   | 8                    | 300                          | 500                        |

# DUPLEX

**Specification:** 26×1, 21×1, 22×1, 24×1, 28×1, 23×1, Z175



Indoor



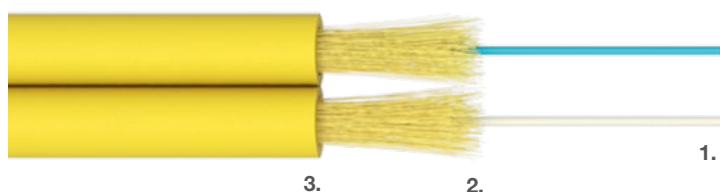
FTTx



Data center



Halogen free



## Description of materials:

**1.** FR-LSZH buffered optical fibers. **2.** Waterblocking aramid yarn. **3.** FR-LSZH outer jacket.

### Temperature range

|              |              |
|--------------|--------------|
| Installation | -5 to +50 °C |
| Operation    | -5 to +50 °C |
| Storage      | -5 to +50 °C |

| Design code | Cable outer diameter [mm] | Cable weight [kg/km] | Max. load (installation) [N] | Crush resistance [N/10 cm] |
|-------------|---------------------------|----------------------|------------------------------|----------------------------|
| <b>26×1</b> | 1.6 × 3.4                 | 6                    | 200                          | 1,000                      |
| <b>21×1</b> | 1.8 × 3.8                 | 7                    | 200                          | 1,000                      |
| <b>22×1</b> | 2.0 × 4.3                 | 9                    | 200                          | 1,000                      |
| <b>24×1</b> | 2.4 × 5.1                 | 12                   | 500                          | 1,000                      |
| <b>28×1</b> | 2.8 × 5.9                 | 17                   | 500                          | 1,000                      |
| <b>23×1</b> | 3.0 × 6.3                 | 20                   | 500                          | 1,000                      |
| <b>Z175</b> | 2.6 × 5.6                 | 14                   | 500                          | 1,000                      |

# HEAVY DUPLEX

**Specification:** 32×1, 34×1, 38×1, Z176, Z235, Z279



Indoor



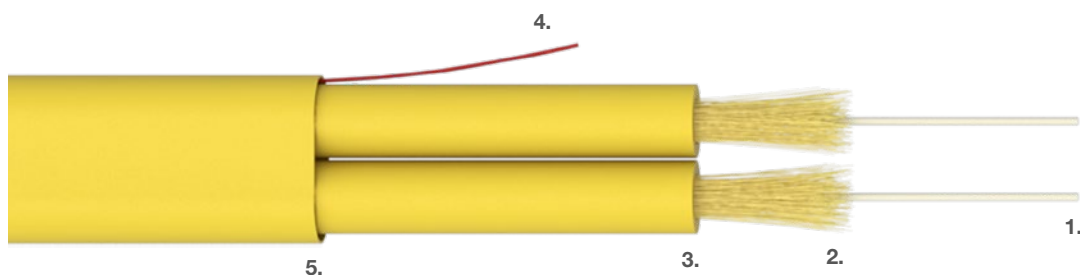
FTTx



Data center



Halogen free



## Description of materials:

- 1.** FR-LSZH buffered optical fibers. **2.** Waterblocking aramid yarn. **3.** FR-LSZH inner jacket. **4.** Rip-Cord.  
**5.** FR-LSZH outer jacket, UV stable.

| Temperature range | 32×1, 34×1, 38×1, Z176 | Z235, Z279    |
|-------------------|------------------------|---------------|
| Installation      | 0 to +50 °C            | -15 to +50 °C |
| Operation         | 0 to +50 °C            | -20 to +70 °C |
| Storage           | 0 to +50 °C            | -20 to +70 °C |

| Design code | Cable outer diameter [mm] | Cable weight [kg/km] | Max. load (installation) [N] | Crush resistance [N/10 cm] |
|-------------|---------------------------|----------------------|------------------------------|----------------------------|
| <b>32×1</b> | 3.0 × 5.0                 | 19                   | 200                          | 1,000                      |
| <b>34×1</b> | 3.6 × 6.0                 | 28                   | 500                          | 1,000                      |
| <b>38×1</b> | 4.2 × 7.0                 | 35                   | 500                          | 1,000                      |
| <b>Z176</b> | 3.6 × 6.2                 | 28                   | 600                          | 1,000                      |
| <b>Z235</b> | 3.0 × 5.0                 | 18                   | 200                          | 1,000                      |
| <b>Z279</b> | 4.2 × 7.0                 | 33                   | 500                          | 1,000                      |

# BREAKOUT STANDARD

**Specification:** 41×1, 42×1, 44×1, 49×1



Indoor



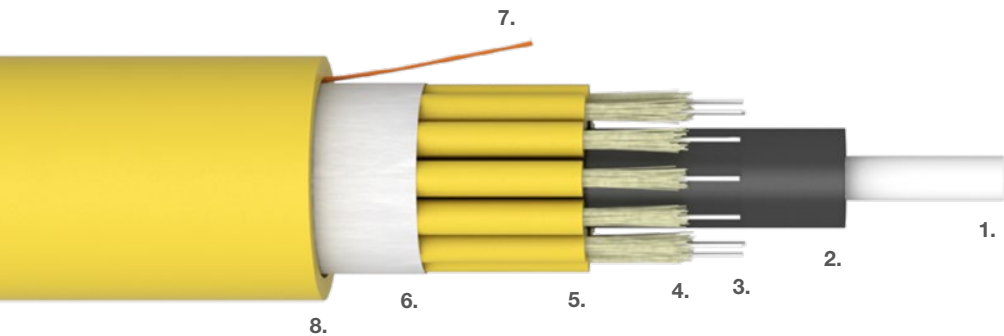
FTTx



Data center



Halogen free



## Description of materials:

1. Central FRP strength member. 2. PE coating for central FRP strength member when necessary.
3. FR-LSZH buffered optical fibers. 4. Waterblocking aramid yarn. 5. Simplex cable. 6. Water-swellable tape.
7. Rip-Cord. 8. FR-LSZH outer jacket, UV stable.

| Temperature range | 41×1, 49×1    | 42×1, 44×1    |
|-------------------|---------------|---------------|
| Installation      | -5 to +40 °C  | -5 to +50 °C  |
| Operation         | -5 to +50 °C  | -20 to +60 °C |
| Storage           | -25 to +60 °C | -20 to +60 °C |

| Design code | Max. fiber count | Simplex diameter [mm] | Cable outer diameter [mm] | Cable weight [kg/km] | Max. load (installation) [N] | Crush resistance [N/10 cm] |
|-------------|------------------|-----------------------|---------------------------|----------------------|------------------------------|----------------------------|
| 41×1        | 36               | 1.8                   | 15.0                      | 226                  | 3,500                        | 2,000                      |
| 42×1        | 24               | 2.0                   | 14.3                      | 197                  | 4,000                        | 1,500                      |
| 44×1        | 24               | 2.4                   | 16.8                      | 277                  | 4,000                        | 1,500                      |
| 49×1        | 24               | 2.9                   | 19.7                      | 334                  | 5,300                        | 1,500                      |

# BREAKOUT NO CSM

**Specification:** 82×1



Indoor



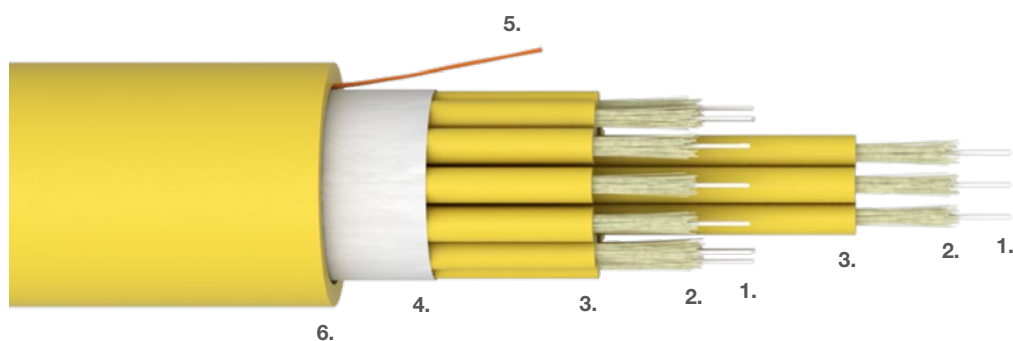
FTTx



Data center



Halogen free



## Description of materials:

**1.** FR-LSZH buffered optical fibers. **2.** Waterblocking aramid yarn. **3.** Simplex cable. **4.** Water-swellable tape. **5.** Rip-Cord. **6.** FR-LSZH outer jacket, UV stable.

### Temperature range

|              |               |
|--------------|---------------|
| Installation | -5 to +50 °C  |
| Operation    | -20 to +60 °C |
| Storage      | -20 to +60 °C |

| Design code | Max. fiber count | Simplex diameter [mm] | Cable outer diameter [mm] | Cable weight [kg/km] | Max. load (installation) [N] | Crush resistance [N/10 cm] |
|-------------|------------------|-----------------------|---------------------------|----------------------|------------------------------|----------------------------|
| 82×1        | 24               | 2.0                   | 14.3                      | 192                  | 300                          | 1,000                      |

# BREAKOUT IMPROVED

**Specification:** 42×8, 44×8



Indoor



FTTx



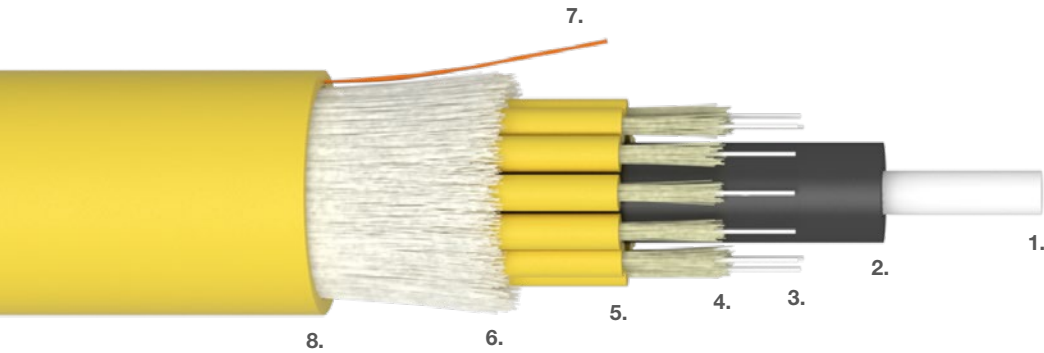
Data center



Halogen free



High tensile

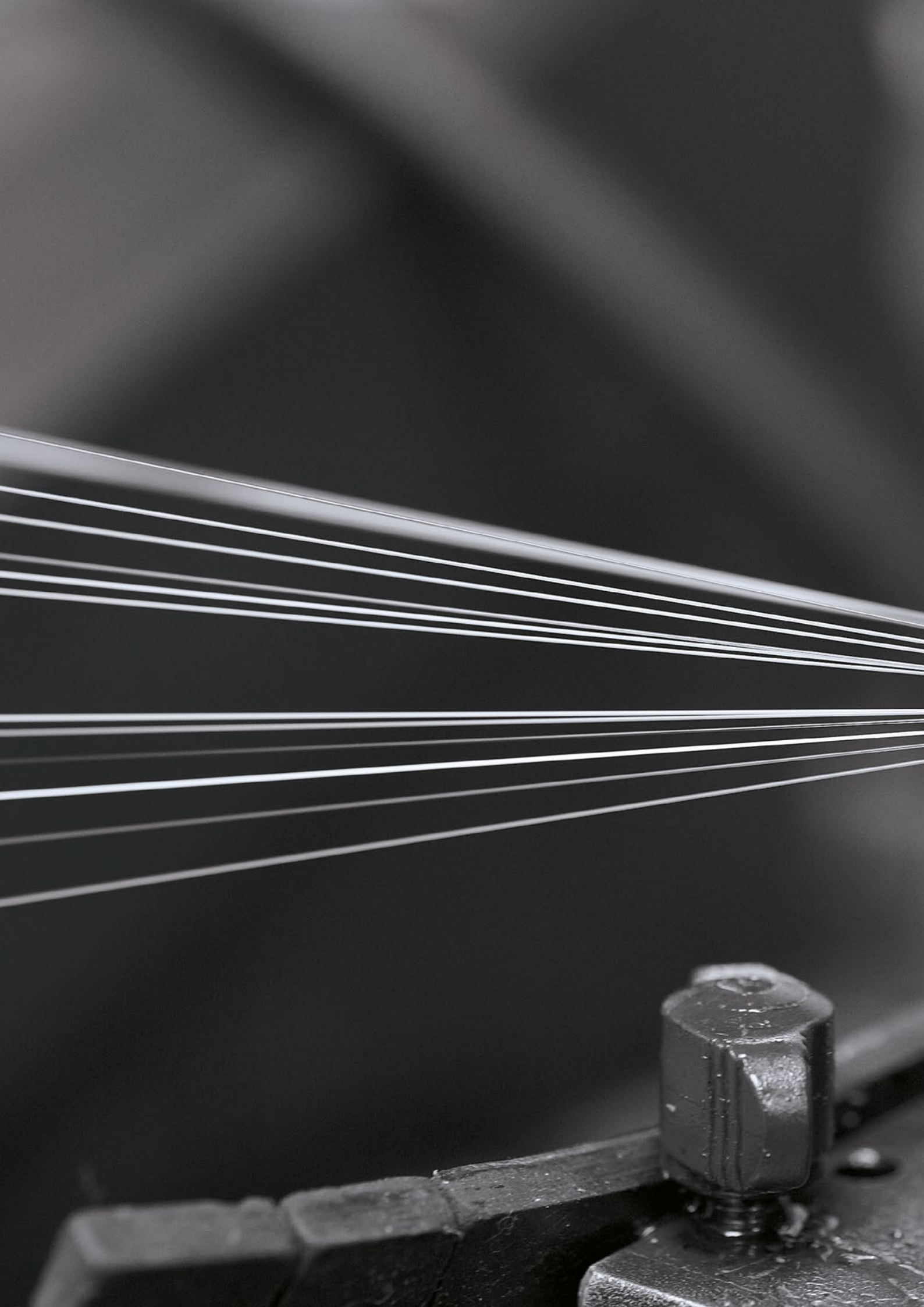


## Description of materials:

1. Central FRP strength member. 2. PE coating for central FRP strength member when necessary.
3. FR-LSZH buffered optical fibers. 4. Waterblocking aramid yarn. 5. Simplex cable.
6. Waterblocking E-glass yarn. 7. Rip-Cord. 8. FR-LSZH outer jacket, UV stable.

| Temperature range | 42×8          | 44×8          |
|-------------------|---------------|---------------|
| Installation      | -5 to +40 °C  | -5 to +40 °C  |
| Operation         | -20 to +60 °C | -5 to +50 °C  |
| Storage           | -20 to +60 °C | -25 to +60 °C |

| Design code | Max. fiber count | Simplex diameter [mm] | Cable outer diameter [mm] | Cable weight [kg/km] | Max. load (installation) [N] | Crush resistance [N/10 cm] |
|-------------|------------------|-----------------------|---------------------------|----------------------|------------------------------|----------------------------|
| 42×8        | 24               | 2.0                   | 15.4                      | 246                  | 4,500                        | 2,000                      |
| 44×8        | 24               | 2.4                   | 18.1                      | 334                  | 5,500                        | 2,000                      |





## 2. DROP CABLES

- DROP
- FLAT DROP
- FLAT DROP FIG. 8

# DROP

**Specification:** 7A01, Z236, Z237, Z449



Indoor



Outdoor



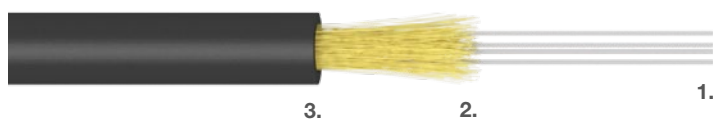
FTTx



Halogen free



Aerial



## Description of materials:

**1.** Optical fibers. **2.** Aramid yarn. **3.** FR-LSZH outer jacket, UV stable.

### Temperature range

**Installation** -5 to +50 °C

**Operation** -20 to +60 °C

**Storage** -20 to +60 °C

| Design code            | Fiber count | Cable outer diameter [mm] | Cable weight [kg/km] | Max. load (installation) [N] | Crush resistance [N/10 cm] |
|------------------------|-------------|---------------------------|----------------------|------------------------------|----------------------------|
| <b>7A01</b>            | 1–6         | 3.0                       | 10                   | 500                          | 1,000                      |
| <b>7A01</b>            | 8–12        | 3.4                       | 12                   | 500                          | 1,000                      |
| <b>7A01</b>            | 16          | 3.7                       | 14                   | 500                          | 1,000                      |
| <b>7A01</b>            | 24          | 4.0                       | 16                   | 500                          | 1,000                      |
| <b>Z236</b>            | 1–12        | 3.4                       | 13                   | 700                          | 1,000                      |
| <b>Z237</b>            | 2           | 3.0                       | 11                   | 1,000                        | 1,000                      |
| <b>Z237</b>            | 4           | 3.2                       | 11                   | 1,000                        | 1,000                      |
| <b>Z237</b>            | 8           | 3.2                       | 12                   | 1,000                        | 1,000                      |
| <b>Z237</b>            | 12          | 3.4                       | 13                   | 1,000                        | 1,000                      |
| <b>NEW</b> <b>Z449</b> | 4           | 2,8                       | 7                    | 400                          | 1,000                      |

# FLAT DROP

Specification: Z041, Z043

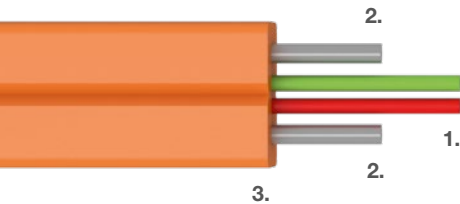
Indoor

Outdoor

FTTx

Halogen free

Aerial



## Description of materials:

1. Optical fibers. 2. Steel wire or FRP. 3. FR-LSZH outer jacket, UV stable.

### Temperature range

|              |               |
|--------------|---------------|
| Installation | -15 to +50 °C |
| Operation    | -30 to +70 °C |
| Storage      | -30 to +70 °C |

| Design code | Fiber count | Cable outer diameter [mm] | Cable weight [kg/km] | Max. load (installation) [N] | Crush resistance [N/10 cm] |
|-------------|-------------|---------------------------|----------------------|------------------------------|----------------------------|
| Z041        | 2           | 2 × 3.0                   | 10                   | 300                          | 4,000                      |
| Z043        | 2           | 2 × 3.0                   | 8                    | 100                          | 4,000                      |

# FLAT DROP FIG. 8

**Specification:** Z042, Z046



Indoor



Outdoor



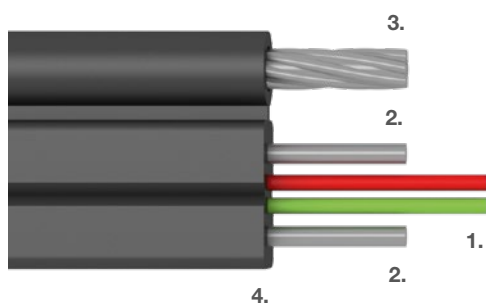
FTTx



Halogen free



Aerial

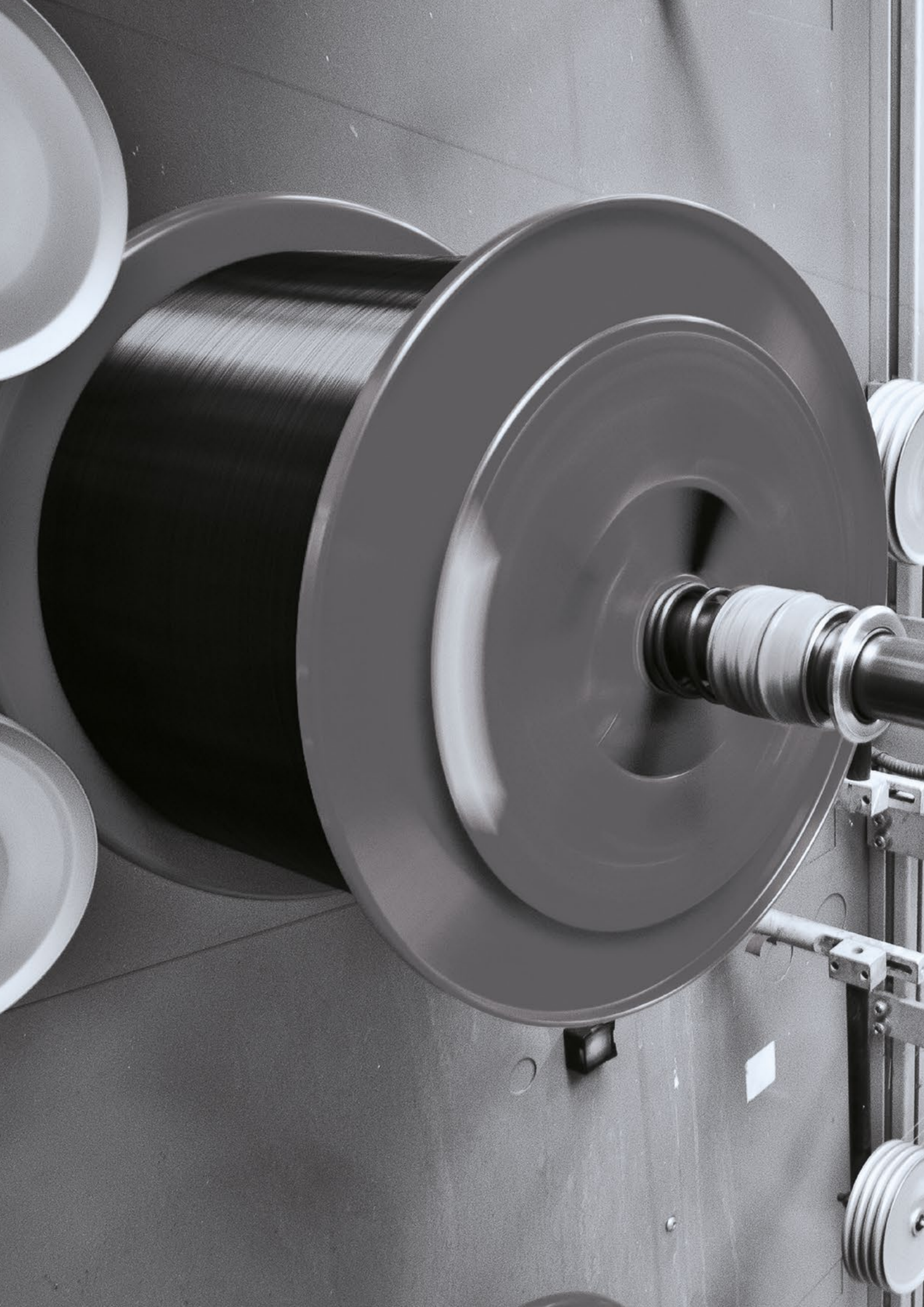


## Description of materials:

- 1.** Optical fibers. **2.** Steel wire or FRP. **3.** Steel wire messenger Ø 1.0 mm.  
**4.** FR-LSZH outer jacket, UV stable.

| Design code | Fiber count | Cable outer diameter [mm] | Cable weight [kg/km] | Max. load (installation) [N] | Crush resistance [N/10 cm] |
|-------------|-------------|---------------------------|----------------------|------------------------------|----------------------------|
| <b>Z042</b> | 2           | 2 × 5.2                   | 20                   | 800                          | 4,000                      |
| <b>Z046</b> | 2           | 2 × 5.2                   | 18                   | 800                          | 4,000                      |







### 3. CLT CABLES

- STANDARD
- IMPROVED
- FRP
- CST SINGLE
- CST DOUBLE
- SWA
- MICRO

# CLT STANDARD

**Specification:** AE00, BE00, AE02, BE02



Indoor



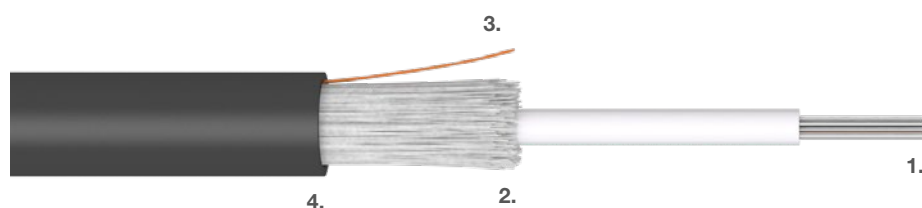
Outdoor



FTTx



Halogen free



## Description of materials:

- 1.** Gel filled PBT loose tube with optical fibers. **2.** Waterblocking E-glass yarn. **3.** Rip-Cord.  
**4.** FR-LSZH or PE outer jacket, UV stable.

### Temperature range

|              |               |
|--------------|---------------|
| Installation | -15 to +50 °C |
| Operation    | -20 to +70 °C |
| Storage      | -20 to +70 °C |

| Design code | Max. fiber count | Loose tube diameter [mm] | Cable size [mm] | Cable weight [kg/km] | Max. load (installation) [N] | Crush resistance [N/10 cm] |
|-------------|------------------|--------------------------|-----------------|----------------------|------------------------------|----------------------------|
| <b>AE00</b> | 12               | 2.5                      | 5.4             | 27                   | 1,100                        | 2,000                      |
| <b>BE00</b> | 24               | 3.0                      | 5.8             | 31                   | 1,100                        | 2,000                      |
| <b>AE02</b> | 12               | 2.5                      | 5.4             | 35                   | 1,100                        | 2,000                      |
| <b>BE02</b> | 24               | 3.0                      | 6.4             | 48                   | 1,100                        | 2,000                      |

# CLT IMPROVED

**Specification:** AR00, BR00, AR02, BR02

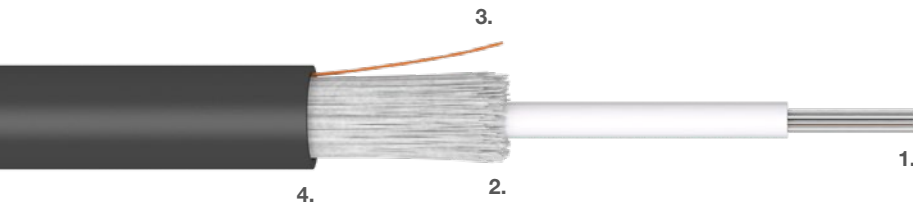
Indoor

Outdoor

FTTx

Halogen free

High tensile



## Description of materials:

- 1. Gel filled PBT loose tube with optical fibers.
- 2. Waterblocking E-glass yarn.
- 3. Rip-Cord.
- 4. FR-LSZH or PE outer jacket, UV stable.

### Temperature range

|              |               |
|--------------|---------------|
| Installation | -15 to +50 °C |
| Operation    | -20 to +70 °C |
| Storage      | -20 to +70 °C |

| Design code | Max. fiber count | Loose tube diameter [mm] | Cable size [mm] | Cable weight [kg/km] | Max. load (installation) [N] | Crush resistance [N/10 cm] |
|-------------|------------------|--------------------------|-----------------|----------------------|------------------------------|----------------------------|
| AR00        | 12               | 2.5                      | 6.5             | 39                   | 2,000                        | 2,000                      |
| BR00        | 24               | 3.0                      | 7.7             | 52                   | 2,500                        | 2,000                      |
| AR02        | 12               | 2.5                      | 6.5             | 50                   | 2,000                        | 2,000                      |
| BR02        | 24               | 3.0                      | 7.7             | 68                   | 2,500                        | 2,000                      |

# CLT FRP

**Specification:** BF01, BF02



Indoor



Outdoor



FTTx



Halogen free



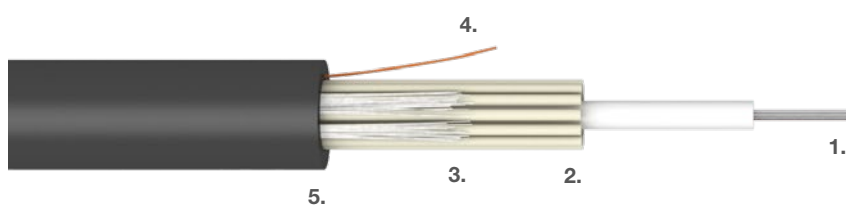
Armoured



Dielectric



Direct burial



## Description of materials:

1. Gel filled PBT loose tube with optical fibers. 2. FRP dielectric strength member.
3. Waterblocking E-glass yarn. 4. Rip-Cord. 5. FR-LSZH or PE outer jacket, UV stable.

### Temperature range

**Installation** -15 to +50 °C

**Operation** -40 to +70 °C

**Storage** -40 to +70 °C

| Design code | Max. fiber count | Loose tube diameter [mm] | Cable size [mm] | Cable weight [kg/km] | Max. load (installation) [N] | Crush resistance [N/10 cm] |
|-------------|------------------|--------------------------|-----------------|----------------------|------------------------------|----------------------------|
| <b>BF01</b> | 24               | 3.0                      | 7.4             | 53                   | 2,300                        | 2,000                      |
| <b>BF02</b> | 24               | 3.0                      | 7.4             | 65                   | 2,300                        | 2,000                      |

# CLT CST

**Specification:** BH01, BH02, Z144, Z145



Indoor



Outdoor



FTTx



Halogen free



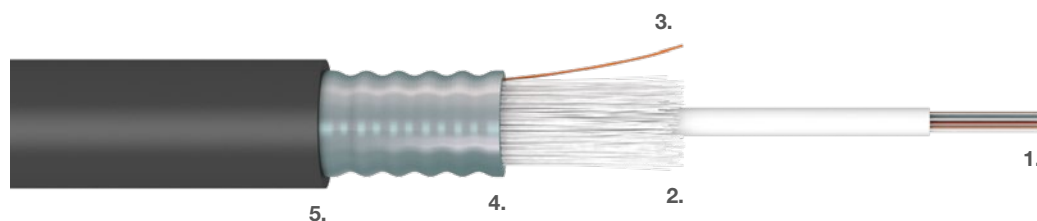
Armoured



Antirodent



Direct  
burial



## Description of materials:

- 1.** Gel filled PBT loose tube with optical fibers. **2.** Waterblocking E-glass yarn. **3.** Rip-Cord.  
**4.** Corrugated steel tape. **5.** FR-LSZH or PE outer jacket, UV stable.

### Temperature range

|              |               |
|--------------|---------------|
| Installation | -15 to +50 °C |
| Operation    | -40 to +70 °C |
| Storage      | -40 to +70 °C |

| Design code | Max. fiber count | Loose tube diameter [mm] | Cable size [mm] | Cable weight [kg/km] | Max. load (installation) [N] | Crush resistance [N/10 cm] |
|-------------|------------------|--------------------------|-----------------|----------------------|------------------------------|----------------------------|
| <b>BH01</b> | 24               | 3.0                      | 9.9             | 98                   | 2,500                        | 6,000                      |
| <b>BH02</b> | 24               | 3.0                      | 10.1            | 120                  | 2,500                        | 6,000                      |
| <b>Z144</b> | 24               | 3.0                      | 7.7             | 70                   | 1,100                        | 5,000                      |
| <b>Z145</b> | 24               | 3.0                      | 7.9             | 87                   | 1,100                        | 3,000                      |

# CLT CST DOUBLE JACKET

**Specification:** BIPI, BIF2, BIP2



Indoor



Outdoor



FTTx



Halogen free



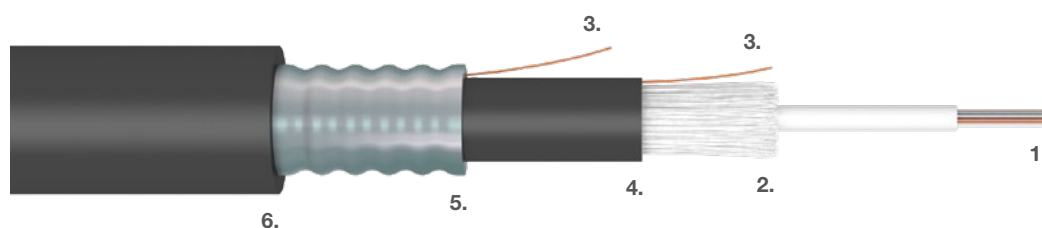
Armoured



Antirodent



Direct  
burial



## Description of materials:

- 1.** Gel filled PBT loose tube with optical fibres. **2.** Waterblocking E-glass yarn. **3.** Rip-Cord.  
**4.** FR-LSZH or PE inner jacket. **5.** Corrugated steel tape. **6.** FR-LSZH or PE outer jacket, UV stable.

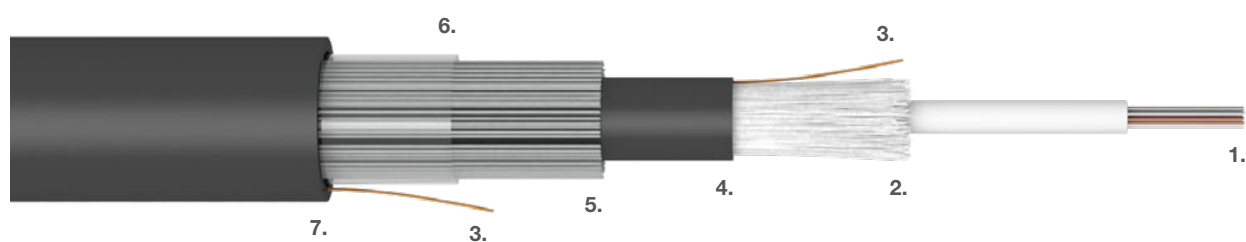
### Temperature range

|              |               |
|--------------|---------------|
| Installation | -15 to +50 °C |
| Operation    | -40 to +70 °C |
| Storage      | -40 to +70 °C |

| Design code | Max. fiber count | Loose tube diameter [mm] | Cable size [mm] | Cable weight [kg/km] | Max. load (installation) [N] | Crush resistance [N/10 cm] |
|-------------|------------------|--------------------------|-----------------|----------------------|------------------------------|----------------------------|
| <b>BIPI</b> | 24               | 3.0                      | 10.5            | 106                  | 1,100                        | 6,000                      |
| <b>BIF2</b> | 24               | 3.0                      | 10.5            | 138                  | 1,100                        | 6,000                      |
| <b>BIP2</b> | 24               | 3.0                      | 10.5            | 131                  | 1,100                        | 6,000                      |

# CLT SWA

**Specification:** BWPI, BWP2, BWFI, BWF2



## Description of materials:

1. Gel filled PBT loose tube with optical fibers. 2. Waterblocking E-glass yarn. 3. Rip-Cord.
4. FR-LSZH or PE inner jacket. 5. Steel Wire Armour (SWA). 6. Water-swellable tape.
7. FR-LSZH or PE outer jacket, UV stable.

### Temperature range

|              |               |
|--------------|---------------|
| Installation | -15 to +50 °C |
| Operation    | -30 to +70 °C |
| Storage      | -30 to +70 °C |

| Design code | Max. fiber count | Loose tube diameter [mm] | Cable size [mm] | Cable weight [kg/km] | Max. load (installation) [N] | Crush resistance [N/10 cm] |
|-------------|------------------|--------------------------|-----------------|----------------------|------------------------------|----------------------------|
| BWPI        | 24               | 3.0                      | 11.0            | 199                  | 4,000                        | 4,000                      |
| BWP2        | 24               | 3.0                      | 11.0            | 208                  | 4,000                        | 4,000                      |
| BWFI        | 24               | 3.0                      | 11.0            | 231                  | 4,000                        | 4,000                      |
| BWF2        | 24               | 3.0                      | 10.0            | 222                  | 4,000                        | 4,000                      |

# CLT MICRO

**Specification:** Z044, Z008, Z006, Z238



Indoor



Outdoor



FTTx



Halogen free



Duct



Air blown



## Description of materials:

**1.** Optical fibres. **2.** Gell filled PBT loose tube. **3.** Low Friction Polymer.

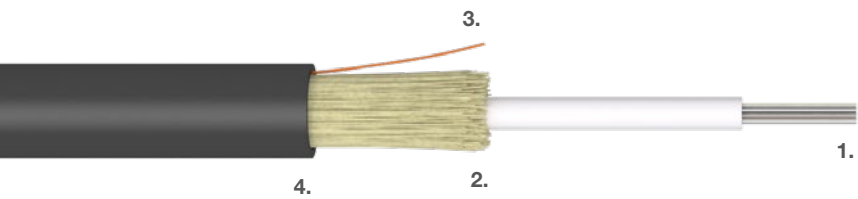
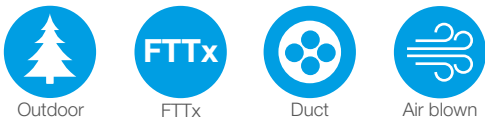
### Temperature range

|              |               |
|--------------|---------------|
| Installation | -5 to +50 °C  |
| Operation    | -20 to +70 °C |
| Storage      | -20 to +70 °C |

| Design code | Max. fiber count | Loose tube diameter [mm] | Cable size [mm] | Cable weight [kg/km] | Max. load (installation) [N] | Crush resistance [N/10 cm] |
|-------------|------------------|--------------------------|-----------------|----------------------|------------------------------|----------------------------|
| <b>Z044</b> | 4                | 2.0                      | 2.0             | 4                    | 70                           | 1,000                      |
| <b>Z008</b> | 12               | 2.5                      | 2.5             | 6                    | 70                           | 1,000                      |
| <b>Z006</b> | 12               | 2.8                      | 2.8             | 8                    | 70                           | 1,000                      |
| <b>Z238</b> | 24               | 3.2                      | 3.2             | 11                   | 250                          | 1,000                      |

# CLT MICRO

**Specification:** AL00, Z339, Z366



### Description of materials:

1. Gel filled PBT loose tube with optical fibers. 2. Waterblocking aramid yarn. 3. Rip-Cord.  
4. PE outer jacket, UV stable.

#### Temperature range

|              |               |
|--------------|---------------|
| Installation | -15 to +50 °C |
| Operation    | -20 to +70 °C |
| Storage      | -20 to +70 °C |

| Design code | Max. fiber count | Loose tube diameter [mm] | Cable size [mm] | Cable weight [kg/km] | Max. load (installation) [N] | Crush resistance [N/10 cm] |
|-------------|------------------|--------------------------|-----------------|----------------------|------------------------------|----------------------------|
| AL00        | 12               | 2.3                      | 3.4             | 10                   | 250                          | 1,000                      |
| Z339        | 12               | 1.7                      | 2.5             | 5                    | 90                           | 700                        |
| Z366        | 24               | 2.5                      | 3.5             | 10                   | 90                           | 700                        |





## 4. MLT CABLES

- MICROCABLES
- STANDARD
- IMPROVED
- CST
- SWA
- ADSS
- FIG. 8

# MICROCABLES

**Specification:** Z019, TM01, TM02, QM01, QM02, WM01, WM02, Z202, Z108



Indoor



Outdoor



FTTx



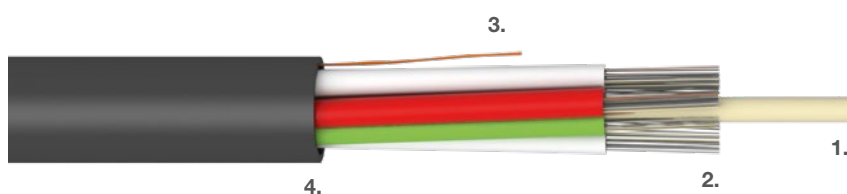
Halogen free



Air blown



Duct



## Description of materials:

- 1.** FRP dielectric central strength member. **2.** Gel filled PBT loose tube with optical fibers.  
**3.** Rip-Cord. **4.** FR-LSZH or PE outer jacket, UV stable.

### Temperature range

|              |               |
|--------------|---------------|
| Installation | -15 to +50 °C |
| Operation    | -30 to +70 °C |
| Storage      | -40 to +70 °C |

| Design code | Max. fiber count | Loose tube diameter [mm] | Cable size [mm] | Cable weight [kg/km] | Max. load (installation) [N] | Crush resistance [N/10 cm] |
|-------------|------------------|--------------------------|-----------------|----------------------|------------------------------|----------------------------|
| <b>Z019</b> | 60               | 1.5                      | 5.2             | 22                   | 250                          | 1,500                      |
| <b>TM01</b> | 72               | 1.5                      | 5.8             | 29                   | 700                          | 1,500                      |
| <b>TM02</b> | 72               | 1.5                      | 6.8             | 49                   | 700                          | 1,500                      |
| <b>QM01</b> | 96               | 1.5                      | 6.5             | 40                   | 1,400                        | 1,500                      |
| <b>QM02</b> | 96               | 1.5                      | 7.5             | 62                   | 1,400                        | 1,500                      |
| <b>WM01</b> | 144              | 1.5                      | 8.6             | 62                   | 1,500                        | 1,500                      |
| <b>WM02</b> | 144              | 1.5                      | 9.6             | 91                   | 1,500                        | 1,500                      |
| <b>Z202</b> | 144              | 1.5                      | 7.1             | 43                   | 450                          | 1,500                      |
| <b>Z108</b> | 192              | 1.5                      | 8.0             | 53                   | 700                          | 1,500                      |

# MICROCABLES

Specification: Z049



Outdoor



FTTx



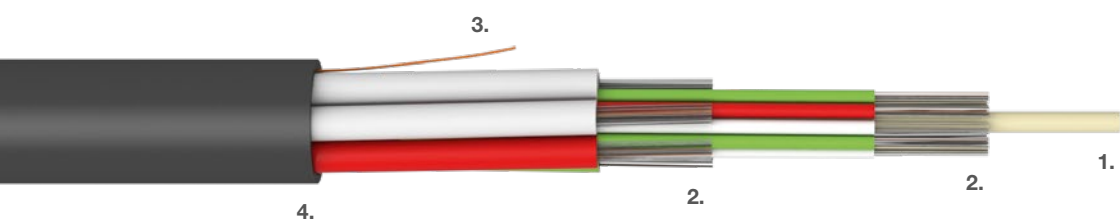
Halogen free



Air blown



Duct



## Description of materials:

1. FRP dielectric central strength member. 2. Gel filled PBT loose tube with optical fibers.  
 3. Rip-Cord. 4. PE outer jacket, UV stable.

### Temperature range

|              |               |
|--------------|---------------|
| Installation | -15 to +50 °C |
| Operation    | -30 to +70 °C |
| Storage      | -40 to +70 °C |

| Design code | Max. fiber count | Loose tube diameter [mm] | Cable size [mm] | Cable weight [kg/km] | Max. load (installation) [N] | Crush resistance [N/10 cm] |
|-------------|------------------|--------------------------|-----------------|----------------------|------------------------------|----------------------------|
| Z049        | 288              | 1.5                      | 10.2            | 87                   | 1,100                        | 1,500                      |

# MICROCABLES

**Specification:** UM01, UM02, CM01, CM02, PM01, PM02, RM01, RM02, VM01, VM02



Indoor



Outdoor



FTTx



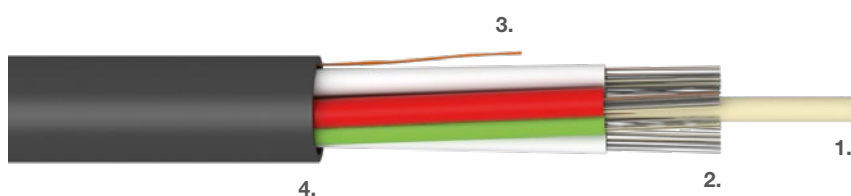
Halogen free



Air blown



Duct



## Description of materials:

- 1.** FRP dielectric central strength member. **2.** Gel filled PBT loose tube with optical fibers.  
**3.** Rip-Cord. **4.** FR-LSZH or PE outer jacket, UV stable.

### Temperature range

|              |               |
|--------------|---------------|
| Installation | -15 to +50 °C |
| Operation    | -40 to +70 °C |
| Storage      | -40 to +70 °C |

| Design code | Max. fiber count | Loose tube diameter [mm] | Cable size [mm] | Cable weight [kg/km] | Max. load (installation) [N] | Crush resistance [N/10 cm] |
|-------------|------------------|--------------------------|-----------------|----------------------|------------------------------|----------------------------|
| UM01        | 60               | 1.7                      | 5.7             | 27                   | 320                          | 1,500                      |
| UM02        | 60               | 1.7                      | 6.7             | 53                   | 320                          | 1,500                      |
| CM01        | 72               | 1.7                      | 6.2             | 33                   | 680                          | 1,500                      |
| CM02        | 72               | 1.7                      | 7.2             | 61                   | 680                          | 1,500                      |
| PM01        | 96               | 1.7                      | 7.4             | 50                   | 2,400                        | 1,500                      |
| PM02        | 96               | 1.7                      | 8.4             | 84                   | 2,400                        | 1,500                      |
| RM01        | 144              | 1.7                      | 9.6             | 76                   | 2,200                        | 1,500                      |
| RM02        | 144              | 1.7                      | 10.6            | 119                  | 2,200                        | 1,500                      |
| VM01        | 216              | 1.7                      | 9.5             | 72                   | 1,000                        | 900                        |
| VM02        | 216              | 1.7                      | 10.5            | 105                  | 1,000                        | 900                        |

# MICROCABLES

**Specification:** DM01, DM02, KM01, KM02, SM01, SM02



Indoor



Outdoor



FTTx



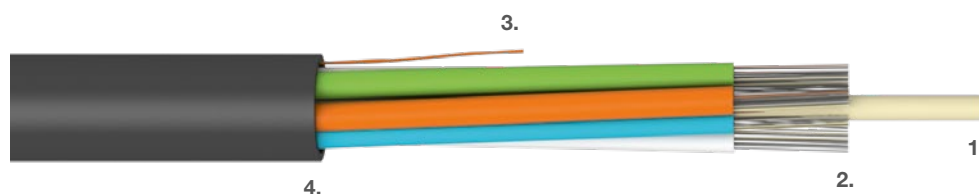
Halogen free



Air blown



Duct



## Description of materials:

- 1.** FRP dielectric central strength member. **2.** Gel filled PBT loose tube with optical fibers.  
**3.** Rip-Cord. **4.** FR-LSZH or PE outer jacket, UV stable.

### Temperature range

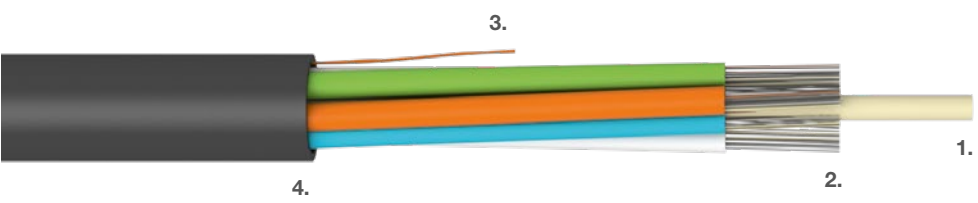
|              |               |
|--------------|---------------|
| Installation | -15 to +50 °C |
| Operation    | -30 to +70 °C |
| Storage      | -40 to +70 °C |

| Design code | Max. fiber count | Loose tube diameter [mm] | Cable size [mm] | Cable weight [kg/km] | Max. load (installation) [N] | Crush resistance [N/10 cm] |
|-------------|------------------|--------------------------|-----------------|----------------------|------------------------------|----------------------------|
| <b>DM01</b> | 144              | 2.5                      | 8.7             | 58                   | 200                          | 1,000                      |
| <b>DM02</b> | 144              | 2.5                      | 9.7             | 87                   | 200                          | 1,000                      |
| <b>KM01</b> | 192              | 2.5                      | 10.2            | 83                   | 1,000                        | 1,000                      |
| <b>KM02</b> | 192              | 2.5                      | 11.2            | 117                  | 1,000                        | 1,000                      |
| <b>SM01</b> | 288              | 2.5                      | 13.3            | 138                  | 1,500                        | 1,000                      |
| <b>SM02</b> | 288              | 2.5                      | 14.3            | 182                  | 1,500                        | 1,000                      |

# MICROCABLES 200μm

**Specification:** Z393, Z024, Z045, Z025

Outdoor
 FTTx
 Halogen free
 Air blown
 Duct



## Description of materials:

- 1.** FRP dielectric central strength member. **2.** Gel filled PBT loose tube with up to 24 200μm optical fibers.
- 3.** Rip-Cord. **4.** PE outer jacket, UV stable.


### Temperature range

|              |               |
|--------------|---------------|
| Installation | -5 to +50 °C  |
| Operation    | -20 to +60 °C |
| Storage      | -20 to +60 °C |


| Design code | Max. fiber count | Loose tube diameter [mm] | Cable size [mm] | Cable weight [kg/km] | Max. load (installation) [N] | Crush resistance [N/10 cm] |
|-------------|------------------|--------------------------|-----------------|----------------------|------------------------------|----------------------------|
| <b>Z393</b> | 96               | 1.7                      | 5.2             | 27                   | 500                          | 50                         |
| <b>Z024</b> | 144              | 1.7                      | 6.2             | 34                   | 700                          | 1,500                      |
| <b>Z045</b> | 192              | 1.7                      | 7.4             | 47                   | 900                          | 1,500                      |
| <b>Z025</b> | 288              | 1.7                      | 9.6             | 79                   | 2,500                        | 1,500                      |

# MICROCABLES 200µm

Specification: Z436, Z437, Z022




Outdoor




FTTx




Halogen free



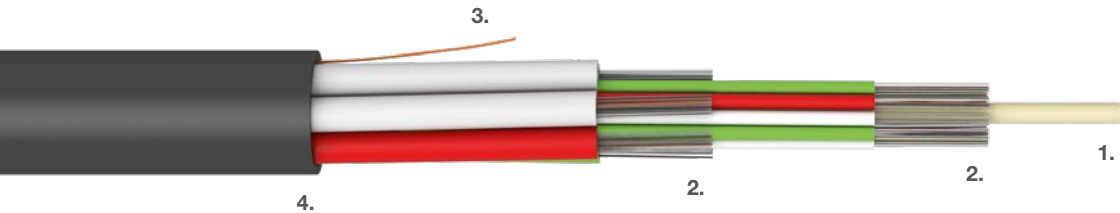
Air blown



Duct



High count



### Description of materials:

1. FRP dielectric central strength member. 2. Gel filled PBT loose tube with up to 24 200µm optical fibers. 3. Rip-Cord. 4. PE outer jacket, UV stable.

#### Temperature range

|              |               |
|--------------|---------------|
| Installation | -15 to +50 °C |
| Operation    | -30 to +70 °C |
| Storage      | -40 to +70 °C |

| Design code | Max. fiber count | Loose tube diameter [mm] | Cable size [mm] | Cable weight [kg/km] | Max. load (installation) [N] | Crush resistance [N/10 cm] |
|-------------|------------------|--------------------------|-----------------|----------------------|------------------------------|----------------------------|
| Z436        | 432              | 1.7                      | 9.8             | 81                   | 500                          | 500                        |
| Z437        | 576              | 1.7                      | 11.4            | 109                  | 800                          | 500                        |
| Z022        | 864              | 1.7                      | 14.4            | 165                  | 700                          | 1,000                      |

# MLT STANDARD

**Specification:** Z022, Z304



Indoor



Outdoor



Halogen free



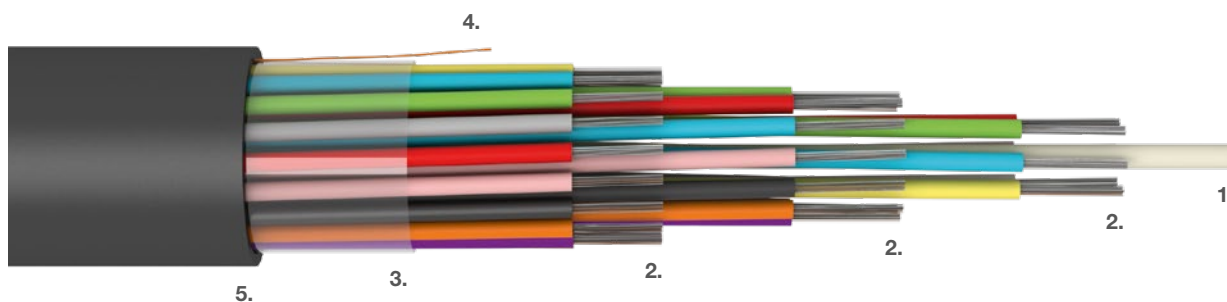
Air blown



Duct



High count



## Description of materials:

- 1.** FRP dielectric central strength member. **2.** Gel filled PBT loose tube with optical fibres.  
**3.** Water-swellable tape. **4.** Rip-Cord. **5.** FR-LSZH or PE outer jacket, UV stable.

### Temperature range

|              |               |
|--------------|---------------|
| Installation | -15 to +50 °C |
| Operation    | -40 to +70 °C |
| Storage      | -40 to +70 °C |

| Design code | Max. fiber count | Loose tube diameter [mm] | Cable size [mm] | Cable weight [kg/km] | Max. load (installation) [N] | Crush resistance [N/10 cm] |
|-------------|------------------|--------------------------|-----------------|----------------------|------------------------------|----------------------------|
| <b>Z022</b> | 432              | 1.7                      | 14.4            | 157                  | 700                          | 1,000                      |
| <b>Z304</b> | 432              | 1.7                      | 15.4            | 216                  | 700                          | 1,000                      |

# MLT STANDARD

Specification: Z349, Z350

Indoor

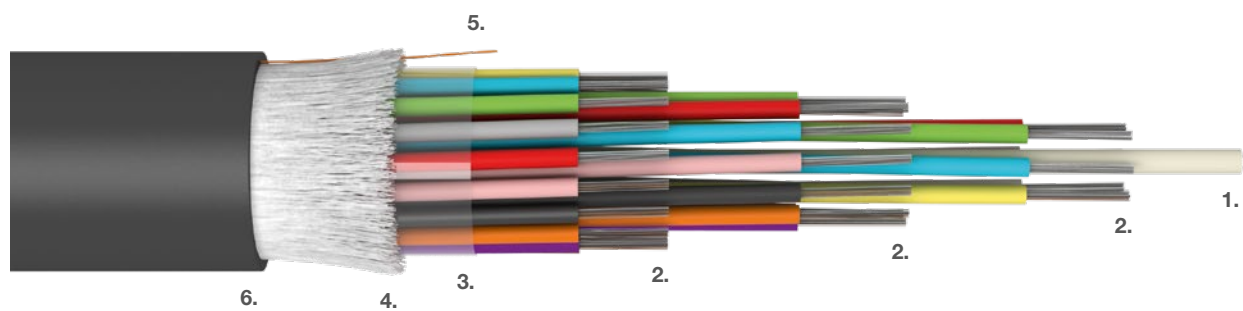
Outdoor

Halogen free

Air blown

Duct

High count



## Description of materials:

- 1. FRP dielectric central strength member. 2. Gel filled PBT loose tube with optical fibers.
- 3. Water-swellable tape. 4. Waterblocking E-glass yarn. 5. Rip-Cord. 6. FR-LSZH or PE outer jacket, UV stable.

### Temperature range

|              |               |
|--------------|---------------|
| Installation | -15 to +50 °C |
| Operation    | -30 to +70 °C |
| Storage      | -30 to +70 °C |

| Design code | Max. fiber count | Loose tube diameter [mm] | Cable size [mm] | Cable weight [kg/km] | Max. load (installation) [N] | Crush resistance [N/10 cm] |
|-------------|------------------|--------------------------|-----------------|----------------------|------------------------------|----------------------------|
| Z349        | 864              | 2.5                      | 21.7            | 353                  | 4,700                        | 2,000                      |
| Z350        | 864              | 2.5                      | 21.7            | 407                  | 4,500                        | 2,000                      |

# MLT STANDARD

**Specification:** UE01, UE02, CE01, CE02, PE01, PE02, RE01, RE02, VE01, VE02



Indoor



Outdoor



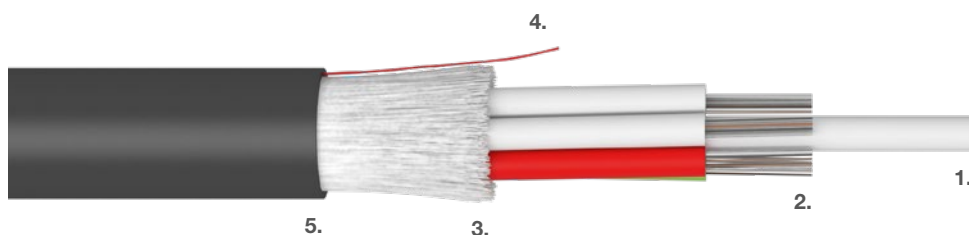
Halogen free



FTTx



Duct



## Description of materials:

- 1.** FRP dielectric central strength member. **2.** Gel filled PBT loose tube with optical fibers.  
**3.** Waterblocking E-glass yarn. **4.** Rip-Cord. **5.** FR-LSZH or PE outer jacket, UV stable.

### Temperature range

|              |               |
|--------------|---------------|
| Installation | -15 to +50 °C |
| Operation    | -40 to +70 °C |
| Storage      | -40 to +70 °C |

| Design code | Max. fiber count | Loose tube diameter [mm] | Cable size [mm] | Cable weight [kg/km] | Max. load (installation) [N] | Crush resistance [N/10 cm] |
|-------------|------------------|--------------------------|-----------------|----------------------|------------------------------|----------------------------|
| UE01        | 60               | 1.7                      | 8.3             | 58                   | 1,300                        | 2,000                      |
| UE02        | 60               | 1.7                      | 8.3             | 75                   | 1,300                        | 2,000                      |
| CE01        | 72               | 1.7                      | 8.8             | 67                   | 2,000                        | 2,000                      |
| CE02        | 72               | 1.7                      | 8.8             | 86                   | 2,000                        | 2,000                      |
| PE01        | 96               | 1.7                      | 10.0            | 90                   | 4,300                        | 2,000                      |
| PE02        | 96               | 1.7                      | 10.0            | 111                  | 4,300                        | 2,000                      |
| RE01        | 144              | 1.7                      | 12.2            | 127                  | 7,300                        | 2,000                      |
| RE02        | 144              | 1.7                      | 12.2            | 154                  | 7,300                        | 2,000                      |
| VE01        | 216              | 1.7                      | 11.9            | 117                  | 2,200                        | 2,000                      |
| VE02        | 216              | 1.7                      | 11.9            | 146                  | 2,200                        | 2,000                      |

# MLT STANDARD

**Specification:** LE01, LE02, FE01, FE02, GE01, GE02, HE01, HE02, IE00, IE02



Indoor



Outdoor



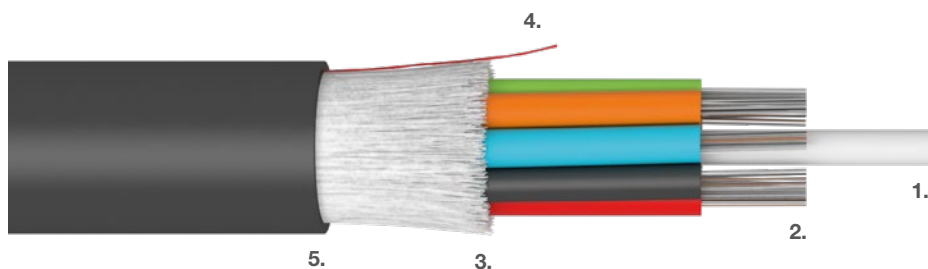
Halogen free



FTTx



Duct



## Description of materials:

- 1.** FRP dielectric central strength member. **2.** Gel filled PBT loose tube with optical fibers.  
**3.** Waterblocking E-glass yarn. **4.** Rip-Cord. **5.** FR-LSZH or PE outer jacket, UV stable.

### Temperature range

**Installation** -15 to +50 °C

**Operation** -40 to +70 °C

**Storage** -40 to +70 °C

| Design code | Max. fiber count | Loose tube diameter [mm] | Cable size [mm] | Cable weight [kg/km] | Max. load (installation) [N] | Crush resistance [N/10 cm] |
|-------------|------------------|--------------------------|-----------------|----------------------|------------------------------|----------------------------|
| LE01        | 48               | 2.3                      | 8.9             | 63                   | 1,000                        | 2,000                      |
| LE02        | 48               | 2.3                      | 8.9             | 83                   | 1,000                        | 2,000                      |
| FE01        | 72               | 2.3                      | 10.6            | 89                   | 1,900                        | 2,000                      |
| FE02        | 72               | 2.3                      | 10.6            | 112                  | 1,900                        | 2,000                      |
| GE01        | 96               | 2.3                      | 11.9            | 113                  | 2,500                        | 2,000                      |
| GE02        | 96               | 2.3                      | 11.9            | 141                  | 2,500                        | 2,000                      |
| HE01        | 144              | 2.3                      | 14.8            | 170                  | 4,000                        | 2,000                      |
| HE02        | 144              | 2.3                      | 14.8            | 206                  | 4,000                        | 2,000                      |
| IE00        | 216              | 2.3                      | 15.6            | 223                  | 3,300                        | 2,000                      |
| IE02        | 216              | 2.3                      | 15.6            | 223                  | 3,300                        | 2,000                      |

# MLT STANDARD

**Specification:** Z438



Indoor



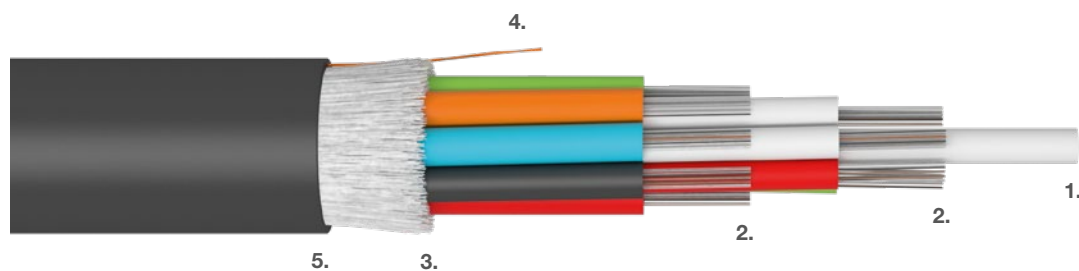
Outdoor



FTTx



Duct



## Description of materials:

- 1.** FRP dielectric central strength member. **2.** Gel filled PBT loose tube with optical fibers.  
**3.** Waterblocking E-glass yarn. **4.** Rip-Cord. **5.** PE outer jacket, UV stable.

### Temperature range

|              |               |
|--------------|---------------|
| Installation | -15 to +50 °C |
| Operation    | -20 to +70 °C |
| Storage      | -20 to +70 °C |

| Design code | Max. fiber count | Loose tube diameter [mm] | Cable size [mm] | Cable weight [kg/km] | Max. load (installation) [N] | Crush resistance [N/10 cm] |
|-------------|------------------|--------------------------|-----------------|----------------------|------------------------------|----------------------------|
| <b>Z438</b> | 288              | 1.7                      | 13.2            | 144                  | 3,200                        | 1,000                      |

# MLT STANDARD

Specification: Z090, Z182

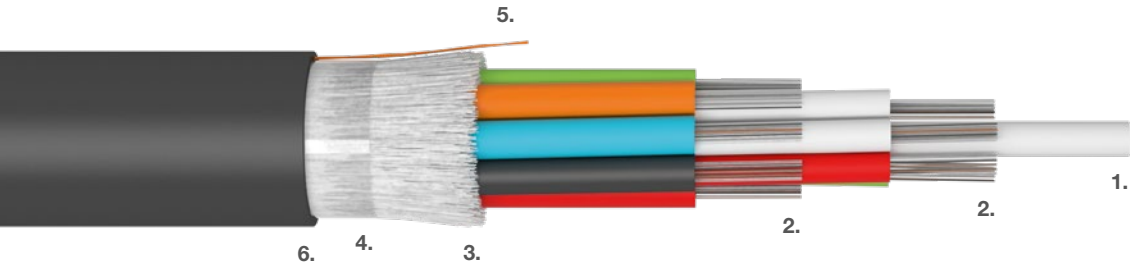
Indoor

Outdoor

Halogen free

FTTx

Duct



## Description of materials:

- 1. FRP dielectric central strength member.
- 2. Gel filled PBT loose tube with optical fibers.
- 3. Waterblocking E-glass yarn.
- 4. Water-swellable tape.
- 5. Rip-Cord.
- 6. FR-LSZH or PE outer jacket, UV stable.

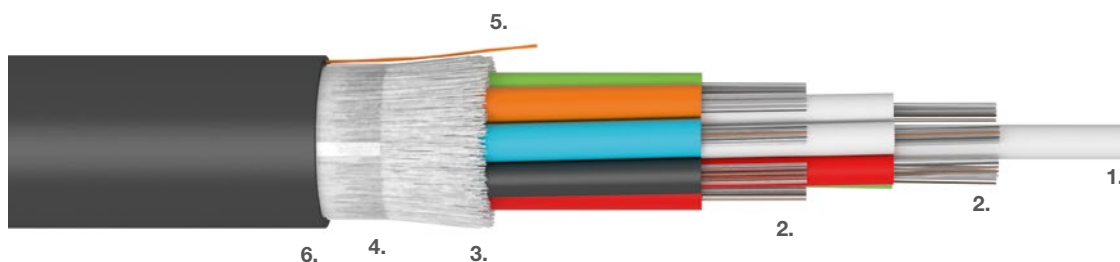
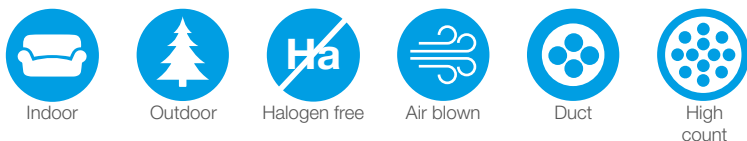
### Temperature range

|              |               |
|--------------|---------------|
| Installation | -15 to +50 °C |
| Operation    | -40 to +70 °C |
| Storage      | -40 to +70 °C |

| Design code | Max. fiber count | Loose tube diameter [mm] | Cable size [mm] | Cable weight [kg/km] | Max. load (installation) [N] | Crush resistance [N/10 cm] |
|-------------|------------------|--------------------------|-----------------|----------------------|------------------------------|----------------------------|
| Z090        | 288              | 2.3                      | 17.7            | 236                  | 4,400                        | 2,000                      |
| Z182        | 288              | 2.3                      | 17.7            | 279                  | 4,400                        | 2,000                      |

# MLT STANDARD

**Specification:** DE01, DE02, KE01, KE02, SE01, SE02



## Description of materials:

- 1.** FRP dielectric central strength member. **2.** Gel filled PBT loose tube with optical fibers.  
**3.** Waterblocking E-glass yarn. **4.** Water-swellaable tape. **5.** Rip-Cord. **6.** FR-LSZH or PE outer jacket, UV stable.

### Temperature range

|              |               |
|--------------|---------------|
| Installation | -15 to +50 °C |
| Operation    | -30 to +70 °C |
| Storage      | -40 to +70 °C |

| Design code | Max. fiber count | Loose tube diameter [mm] | Cable size [mm] | Cable weight [kg/km] | Max. load (installation) [N] | Crush resistance [N/10 cm] |
|-------------|------------------|--------------------------|-----------------|----------------------|------------------------------|----------------------------|
| DE01        | 144              | 2.5                      | 11.7            | 73                   | 2,000                        | 1,500                      |
| DE02        | 144              | 2.5                      | 11.7            | 102                  | 2,000                        | 1,500                      |
| KE01        | 192              | 2.5                      | 13.1            | 98                   | 3,200                        | 1,500                      |
| KE02        | 192              | 2.5                      | 13.1            | 132                  | 3,200                        | 1,500                      |
| SE01        | 288              | 2.5                      | 16.2            | 157                  | 5,200                        | 1,500                      |
| SE02        | 288              | 2.5                      | 16.2            | 201                  | 5,200                        | 1,500                      |

# MLT IMPROVED

**Specification:** CR01, CR02, PR01, PR02, RR01, RR02, VR01, VR02



Indoor



Outdoor



Halogen free



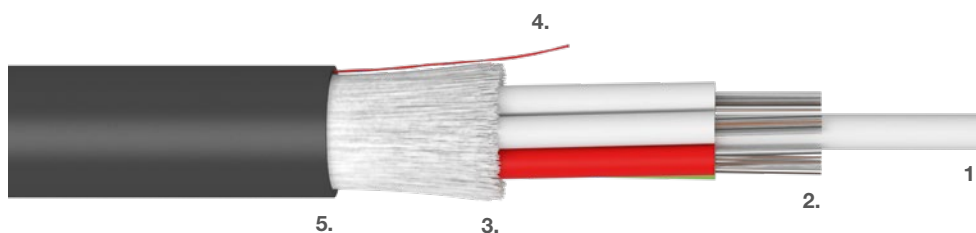
FTTx



Duct



High tensile



## Description of materials:

- 1.** FRP dielectric central strength member. **2.** Gel filled PBT loose tube with optical fibers.  
**3.** Waterblocking E-glass yarn. **4.** Rip-Cord. **5.** FR-LSZH or PE outer jacket, UV stable.

### Temperature range

|              |               |
|--------------|---------------|
| Installation | -15 to +50 °C |
| Operation    | -40 to +70 °C |
| Storage      | -40 to +70 °C |

| Design code | Max. fiber count | Loose tube diameter [mm] | Cable size [mm] | Cable weight [kg/km] | Max. load (installation) [N] | Crush resistance [N/10 cm] |
|-------------|------------------|--------------------------|-----------------|----------------------|------------------------------|----------------------------|
| <b>CR01</b> | 72               | 1.7                      | 9.6             | 83                   | 3,700                        | 2,000                      |
| <b>CR02</b> | 72               | 1.7                      | 9.4             | 101                  | 3,700                        | 2,000                      |
| <b>PR01</b> | 96               | 1.7                      | 10.8            | 108                  | 7,300                        | 2,000                      |
| <b>PR02</b> | 96               | 1.7                      | 10.8            | 130                  | 7,300                        | 2,000                      |
| <b>RR01</b> | 144              | 1.7                      | 12.8            | 150                  | 11,500                       | 2,000                      |
| <b>RR02</b> | 144              | 1.7                      | 12.8            | 179                  | 11,500                       | 2,000                      |
| <b>VR01</b> | 216              | 1.7                      | 12.4            | 133                  | 4,000                        | 2,000                      |
| <b>VR02</b> | 216              | 1.7                      | 12.4            | 166                  | 4,000                        | 2,000                      |

# MLT IMPROVED

**Specification:** LR01, LR02, FR01, FR02, GR01, GR02, HR01, HR02



Indoor



Outdoor



Halogen free



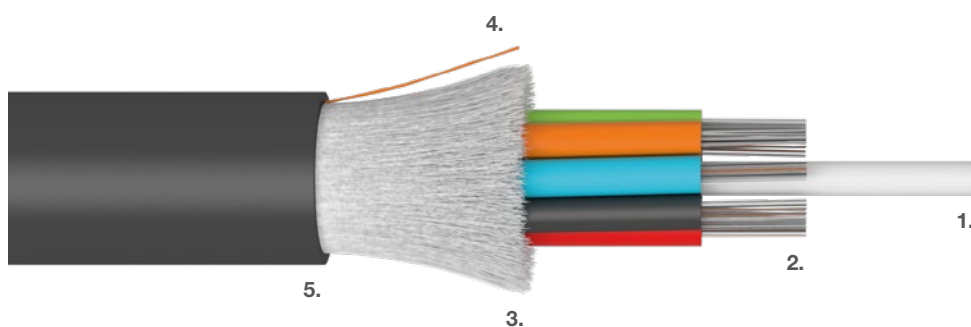
FTTx



Duct



High tensile



## Description of materials:

- 1.** FRP dielectric central strength member. **2.** Gel filled PBT loose tube with optical fibers.  
**3.** Waterblocking E-glass yarn. **4.** Rip-Cord. **5.** FR-LSZH or PE outer jacket, UV stable.

### Temperature range

|              |               |
|--------------|---------------|
| Installation | -15 to +50 °C |
| Operation    | -40 to +70 °C |
| Storage      | -40 to +70 °C |

| Design code | Max. fiber count | Loose tube diameter [mm] | Cable size [mm] | Cable weight [kg/km] | Max. load (installation) [N] | Crush resistance [N/10 cm] |
|-------------|------------------|--------------------------|-----------------|----------------------|------------------------------|----------------------------|
| LR01        | 48               | 2.3                      | 9.5             | 75                   | 2,000                        | 2,000                      |
| LR02        | 48               | 2.3                      | 9.5             | 95                   | 2,000                        | 2,000                      |
| FR01        | 72               | 2.3                      | 10.9            | 100                  | 3,200                        | 2,000                      |
| FR02        | 72               | 2.3                      | 10.9            | 124                  | 3,200                        | 2,000                      |
| GR01        | 96               | 2.3                      | 12.4            | 133                  | 5,500                        | 2,000                      |
| GR02        | 96               | 2.3                      | 12.4            | 161                  | 5,500                        | 2,000                      |
| HR01        | 144              | 2.3                      | 15.4            | 199                  | 10,000                       | 2,000                      |
| HR02        | 144              | 2.3                      | 15.4            | 235                  | 10,000                       | 2,000                      |

# MLT IMPROVED

Specification: IR01, IR02

Indoor

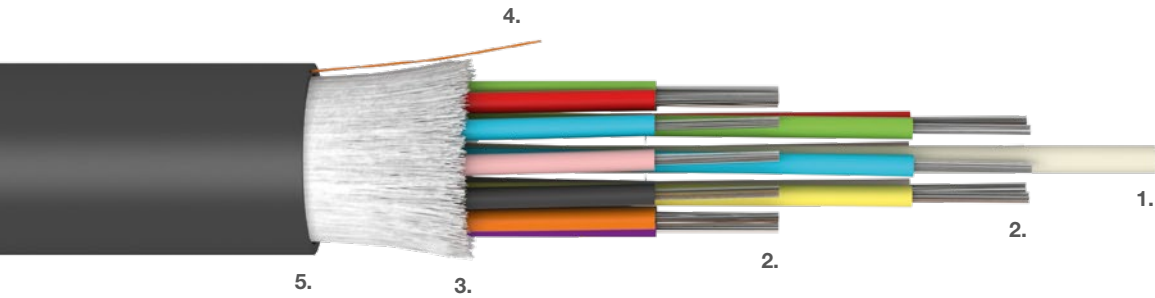
Outdoor

Halogen free

FTTx

Duct

High tensile



## Description of materials:

- 1.** FRP dielectric central strength member. **2.** Gel filled PBT loose tube with optical fibers.  
**3.** Waterblocking E-glass yarn. **4.** Rip-Cord. **5.** FR-LSZH or PE outer jacket, UV stable.

### Temperature range

|              |               |
|--------------|---------------|
| Installation | -15 to +50 °C |
| Operation    | -40 to +70 °C |
| Storage      | -40 to +70 °C |

| Design code | Max. fiber count | Loose tube diameter [mm] | Cable size [mm] | Cable weight [kg/km] | Max. load (installation) [N] | Crush resistance [N/10 cm] |
|-------------|------------------|--------------------------|-----------------|----------------------|------------------------------|----------------------------|
| IR01        | 216              | 2.3                      | 15.8            | 201                  | 6,000                        | 2,000                      |
| IR02        | 216              | 2.3                      | 15.8            | 242                  | 6,000                        | 2,000                      |

# MLT CST

**Specification:** CH01, CH02, PH01, PH02, RH01, RH02



Indoor



Outdoor



Halogen free



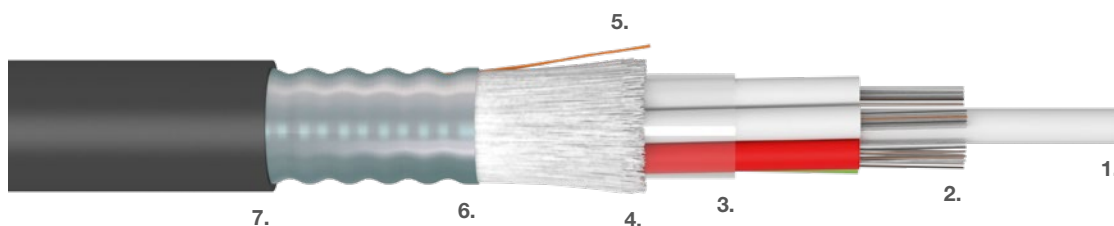
Armoured



Direct burial



Antirodent



## Description of materials:

1. FRP dielectric central strength member. 2. Gel filled PBT loose tube with optical fibers.
3. Water-swellable tape. 4. Waterblocking E-glass yarn. 5. Rip-Cord. 6. Corrugated steel tape.
7. FR-LSZH or PE outer jacket, UV stable.

### Temperature range

|              |               |
|--------------|---------------|
| Installation | -15 to +50 °C |
| Operation    | -40 to +70 °C |
| Storage      | -40 to +70 °C |

| Design code | Max. fiber count | Loose tube diameter [mm] | Cable size [mm] | Cable weight [kg/km] | Max. load (installation) [N] | Crush resistance [N/10 cm] |
|-------------|------------------|--------------------------|-----------------|----------------------|------------------------------|----------------------------|
| CH01        | 72               | 1.7                      | 10.1            | 107                  | 1,800                        | 3,500                      |
| CH02        | 72               | 1.7                      | 10.1            | 127                  | 1,800                        | 2,000                      |
| PH01        | 96               | 1.7                      | 12.1            | 141                  | 3,800                        | 2,000                      |
| PH02        | 96               | 1.7                      | 12.1            | 165                  | 3,800                        | 2,000                      |
| RH01        | 144              | 1.7                      | 14.1            | 186                  | 5,600                        | 3,500                      |
| RH02        | 144              | 1.7                      | 14.1            | 216                  | 5,600                        | 2,000                      |

# MLT CST

**Specification:** LH01, LH02, FH01, FH02, GH01, GH02, HH01, HH02



Indoor



Outdoor



Halogen free



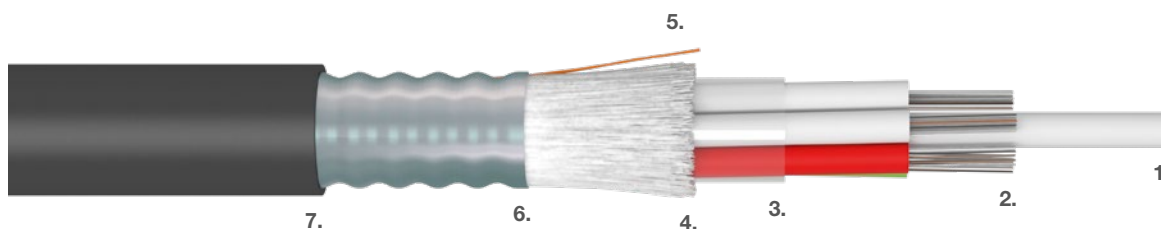
Armoured



Direct burial



Antirodent



## Description of materials:

1. FRP dielectric central strength member. 2. Gel filled PBT loose tube with optical fibers.
3. Water-swellable tape. 4. Waterblocking E-glass yarn. 5. Rip-Cord. 6. Corrugated steel tape.
7. FR-LSZH or PE outer jacket, UV stable.


### Temperature range

|              |               |
|--------------|---------------|
| Installation | -15 to +50 °C |
| Operation    | -40 to +70 °C |
| Storage      | -40 to +70 °C |


| Design code | Max. fiber count | Loose tube diameter [mm] | Cable size [mm] | Cable weight [kg/km] | Max. load (installation) [N] | Crush resistance [N/10 cm] |
|-------------|------------------|--------------------------|-----------------|----------------------|------------------------------|----------------------------|
| LH01        | 48               | 2.3                      | 11.5            | 125                  | 1,200                        | 4,500                      |
| LH02        | 48               | 2.3                      | 11.5            | 151                  | 1,200                        | 2,500                      |
| FH01        | 72               | 2.3                      | 12.5            | 150                  | 2,100                        | 4,500                      |
| FH02        | 72               | 2.3                      | 12.5            | 178                  | 2,100                        | 2,500                      |
| GH01        | 96               | 2.3                      | 14.5            | 186                  | 2,600                        | 4,500                      |
| GH02        | 96               | 2.3                      | 14.5            | 219                  | 2,600                        | 2,500                      |
| HH01        | 144              | 2.3                      | 16.5            | 250                  | 4,500                        | 4,500                      |
| HH02        | 144              | 2.3                      | 16.5            | 289                  | 4,500                        | 2,500                      |

# MLT CST


**Specification:** VH01, VH02




Indoor




Outdoor




Halogen free



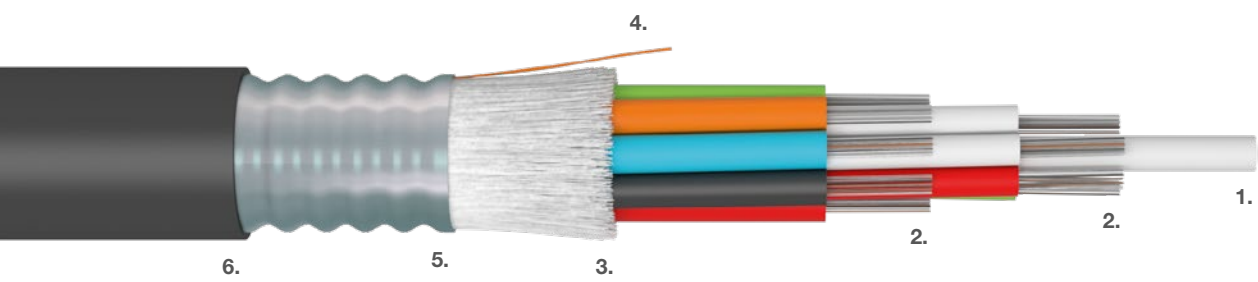
Armoured



Direct burial



Antirodent



## Description of materials:

- 1.** FRP dielectric central strength member. **2.** Gel filled PBT loose tube with optical fibers.
- 3.** Waterblocking E-glass yarn. **4.** Rip-Cord. **5.** Corrugated steel tape. **6.** FR-LSZH or PE outer jacket, UV stable.

### Temperature range

|              |               |
|--------------|---------------|
| Installation | -15 to +50 °C |
| Operation    | -45 to +70 °C |
| Storage      | -45 to +70 °C |

| Design code | Max. fiber count | Loose tube diameter [mm] | Cable size [mm] | Cable weight [kg/km] | Max. load (installation) [N] | Crush resistance [N/10 cm] |
|-------------|------------------|--------------------------|-----------------|----------------------|------------------------------|----------------------------|
| VH01        | 216              | 1.7                      | 14.5            | 195                  | 2,200                        | 6,000                      |
| VH02        | 216              | 1.7                      | 14.5            | 228                  | 2,200                        | 6,000                      |

# MLT CST DOUBLE JACKET

**Specification:** LIPI, LIP2, LIF2, FIPI, FIP2, FIF2

Indoor

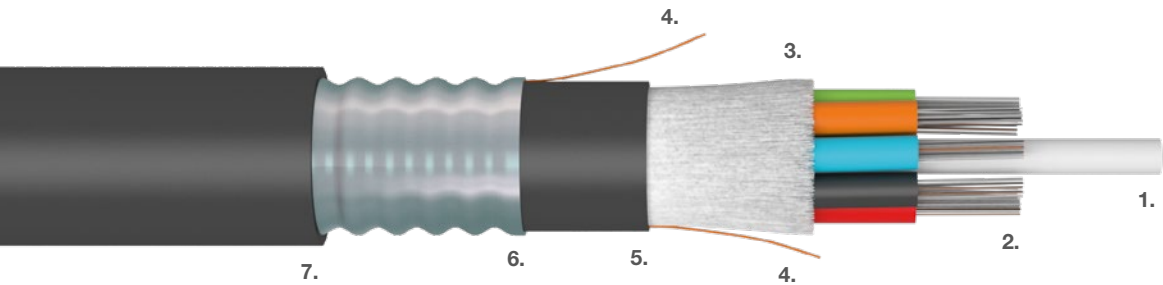
Outdoor

Halogen free

Armoured

Direct burial

Antirodent



## Description of materials:

- 1.** FRP dielectric central strength member. **2.** Gel filled PBT loose tube with optical fibers.
- 3.** Waterblocking E-glass yarn. **4.** Rip-Cord. **5.** FR-LSZH or PE inner jacket.
- 6.** Corrugated steel tape. **7.** FR-LSZH or PE outer jacket, UV stable.

### Temperature range

|              |               |
|--------------|---------------|
| Installation | -15 to +50 °C |
| Operation    | -45 to +70 °C |
| Storage      | -45 to +70 °C |

| Design code | Max. fiber count | Loose tube diameter [mm] | Cable size [mm] | Cable weight [kg/km] | Max. load (installation) [N] | Crush resistance [N/10 cm] |
|-------------|------------------|--------------------------|-----------------|----------------------|------------------------------|----------------------------|
| LIPI        | 48               | 2.3                      | 13.5            | 166                  | 1,500                        | 6,000                      |
| LIP2        | 48               | 2.3                      | 13.5            | 196                  | 1,500                        | 4,000                      |
| LIF2        | 48               | 2.3                      | 13.5            | 209                  | 1,500                        | 4,000                      |
| FIPI        | 72               | 2.3                      | 14.5            | 197                  | 3,000                        | 6,000                      |
| FIP2        | 72               | 2.3                      | 14.5            | 230                  | 3,000                        | 4,000                      |
| FIF2        | 72               | 2.3                      | 14.5            | 246                  | 3,000                        | 4,000                      |

# MLT CST DOUBLE JACKET

**Specification:** GIPI, GIF2, HIPI, HIF2



Indoor



Outdoor



Halogen free



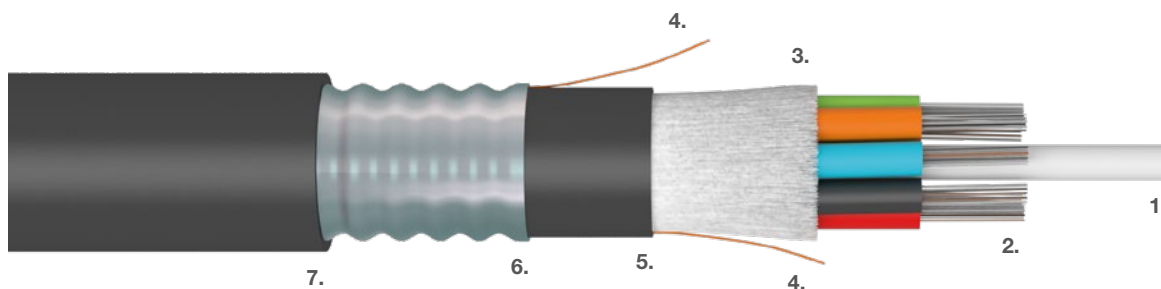
Armoured



Direct burial



Antirodent



## Description of materials:

1. FRP dielectric central strength member. 2. Gel filled PBT loose tube with optical fibers.
3. Waterblocking E-glass yarn. 4. Rip-Cord. 5. FR-LSZH or PE inner jacket.
6. Corrugated steel tape. 7. FR-LSZH or PE outer jacket, UV stable.

### Temperature range

|              |               |
|--------------|---------------|
| Installation | -15 to +50 °C |
| Operation    | -45 to +70 °C |
| Storage      | -45 to +70 °C |

| Design code | Max. fiber count | Loose tube diameter [mm] | Cable size [mm] | Cable weight [kg/km] | Max. load (installation) [N] | Crush resistance [N/10 cm] |
|-------------|------------------|--------------------------|-----------------|----------------------|------------------------------|----------------------------|
| <b>GIPI</b> | 96               | 2.3                      | 16.5            | 240                  | 4,000                        | 6,000                      |
| <b>GIF2</b> | 96               | 2.3                      | 16.5            | 296                  | 4,000                        | 4,000                      |
| <b>HIPI</b> | 144              | 2.3                      | 19.5            | 323                  | 7,000                        | 6,000                      |
| <b>HIF2</b> | 144              | 2.3                      | 19.5            | 393                  | 7,000                        | 4,000                      |

# MLT SWA

**Specification:** LWPI, LWF2, FWPI, FWF2, GWPI, GWF2, HWPI, HWF2



Indoor



Outdoor



Halogen free



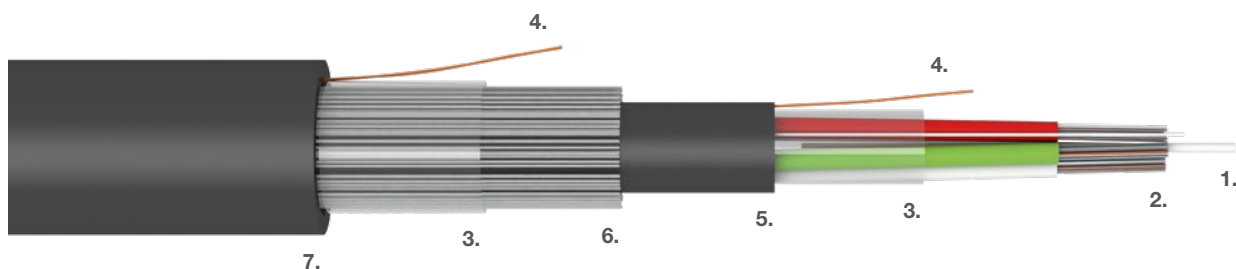
Armoured



Direct burial



High tensile



## Description of materials:

1. FRP dielectric central strength member. 2. Gel filled PBT loose tube with optical fibers.
3. Water-swellable tape. 4. Rip-Cord. 5. FR-LSZH or PE inner jacket. 6. Steel Wire Armour (SWA).
7. FR-LSZH or PE outer jacket, UV stable.

### Temperature range

**Installation** -15 to +50 °C

**Operation** -40 to +70 °C

**Storage** -40 to +70 °C

| Design code | Max. fiber count | Loose tube diameter [mm] | Cable size [mm] | Cable weight [kg/km] | Max. load (installation) [N] | Crush resistance [N/10 cm] |
|-------------|------------------|--------------------------|-----------------|----------------------|------------------------------|----------------------------|
| <b>LWPI</b> | 48               | 2.3                      | 13.2            | 278                  | 4,000                        | 4,500                      |
| <b>LWF2</b> | 48               | 2.3                      | 13.2            | 317                  | 4,000                        | 4,500                      |
| <b>FWPI</b> | 72               | 2.3                      | 14.7            | 334                  | 6,500                        | 4,500                      |
| <b>FWF2</b> | 72               | 2.3                      | 14.7            | 380                  | 6,500                        | 4,500                      |
| <b>GWPI</b> | 96               | 2.3                      | 16.0            | 392                  | 7,500                        | 4,500                      |
| <b>GWF2</b> | 96               | 2.3                      | 16.0            | 442                  | 7,500                        | 4,500                      |
| <b>HWPI</b> | 144              | 2.3                      | 18.9            | 516                  | 8,500                        | 4,500                      |
| <b>HWF2</b> | 144              | 2.3                      | 18.9            | 579                  | 8,500                        | 4,500                      |

# ADSS

**Specification:** ASOI, Z159, Z194



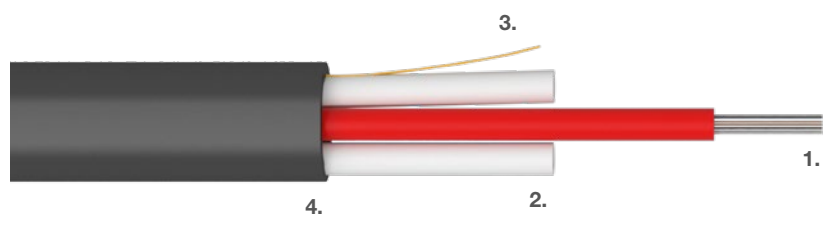
Outdoor



Dielectric



Aerial



## Description of materials:

- 1.** Gel filled PBT loose tube with optical fibers. **2.** FRP periferal strength member.
- 3.** Rip-Cord. **4.** PE outer jacket, UV stable.

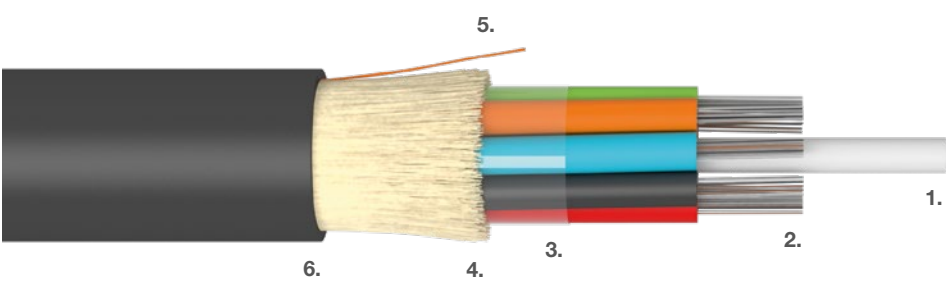
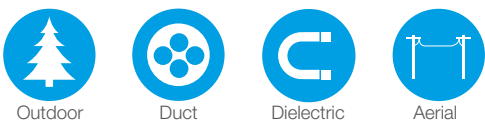
### Temperature range

|              |               |
|--------------|---------------|
| Installation | -15 to +50 °C |
| Operation    | -40 to +70 °C |
| Storage      | -40 to +70 °C |

| Design code | Max. fiber count | Loose tube diameter [mm] | Cable size [mm] | Cable weight [kg/km] | Max. load (installation) [N] | Crush resistance [N/10 cm] |
|-------------|------------------|--------------------------|-----------------|----------------------|------------------------------|----------------------------|
| <b>ASOI</b> | 12               | 2.0                      | 4.2 × 7.8       | 36                   | 1,600                        | 4,000                      |
| <b>Z159</b> | 24               | 1.7                      | 9.1 × 3.8       | 36                   | 1,300                        | 4,000                      |
| <b>Z194</b> | 48               | 3.5                      | 12.5 × 5.5      | 75                   | 2,500                        | 2,500                      |

# ADSS – Light 2.6 kN

**Specification:** N3HI, N4HI, N5HI, N6HI



## Description of materials:

- 1.** FRP dielectric central strenght member. **2.** Gel filled PBT loose tube with optical fibers.  
**3.** Water-swellable tape. **4.** Waterblocking aramid yarn. **5.** Rip-Cord. **6.** PE outer jacket, UV stable.

### Temperature range

|              |               |
|--------------|---------------|
| Installation | -15 to +50 °C |
| Operation    | -40 to +70 °C |
| Storage      | -40 to +70 °C |

| Design code | Max. fiber count | Loose tube diameter [mm] | Cable size [mm] | Cable weight [kg/km] | Max. load (installation) [N] | Crush resistance [N/10 cm] |
|-------------|------------------|--------------------------|-----------------|----------------------|------------------------------|----------------------------|
| N3HI        | 48               | 2.0                      | 8.9             | 63                   | 3,000                        | 1,500                      |
| N4HI        | 72               | 2.0                      | 9.8             | 80                   | 3,000                        | 1,500                      |
| N5HI        | 96               | 2.0                      | 11.2            | 100                  | 3,000                        | 1,500                      |
| N6HI        | 144              | 2.0                      | 13.6            | 145                  | 3,000                        | 1,500                      |

# ADSS 3 kN

**Specification:** N3XI, N4XI, N5XI, N6XI



Outdoor



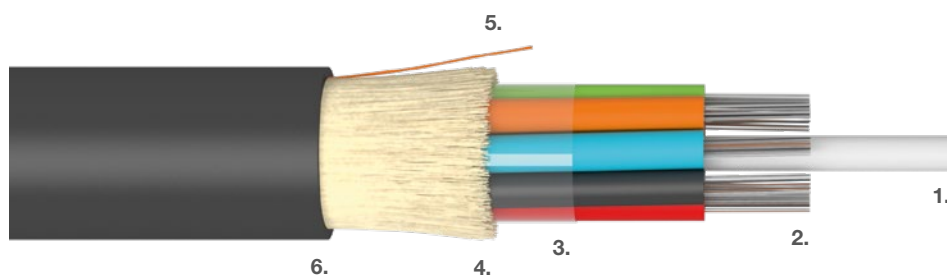
Duct



Dielectric



Aerial



## Description of materials:

- 1.** FRP dielectric central strenght member. **2.** Gel filled PBT loose tube with optical fibers.  
**3.** Water-swellable tape. **4.** Waterblocking aramid yarn. **5.** Rip-Cord. **6.** PE outer jacket, UV stable.

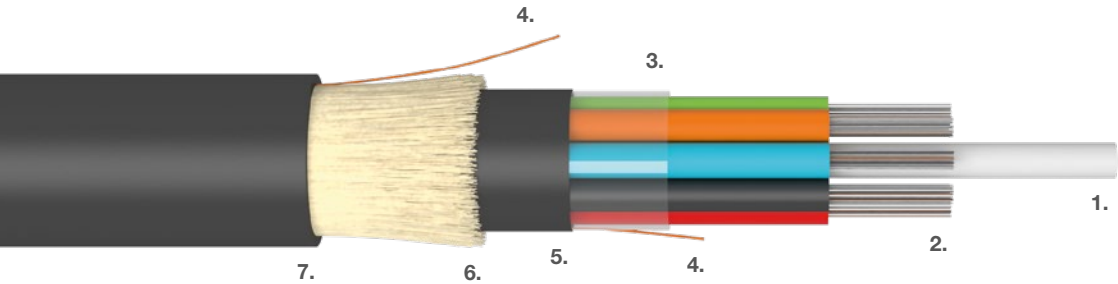
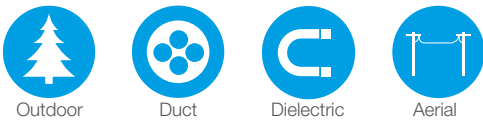
### Temperature range

|              |               |
|--------------|---------------|
| Installation | -15 to +50 °C |
| Operation    | -40 to +70 °C |
| Storage      | -40 to +70 °C |

| Design code | Max. fiber count | Loose tube diameter [mm] | Cable size [mm] | Cable weight [kg/km] | Max. load (installation) [N] | Crush resistance [N/10 cm] |
|-------------|------------------|--------------------------|-----------------|----------------------|------------------------------|----------------------------|
| <b>N3XI</b> | 48               | 2.5                      | 10.2            | 81                   | 3,000                        | 3,000                      |
| <b>N4XI</b> | 72               | 2.5                      | 11.9            | 112                  | 3,000                        | 3,000                      |
| <b>N5XI</b> | 96               | 2.5                      | 13.3            | 135                  | 3,000                        | 3,000                      |
| <b>N6XI</b> | 144              | 2.5                      | 16.4            | 203                  | 3,000                        | 3,000                      |

# ADSS 6 kN

**Specification:** N3YI, N4YI, N5YI, N6YI



## Description of materials:

- 1.** FRP dielectric central strenght member. **2.** Gel filled PBT loose tube with optical fibers.
- 3.** Water-swellable tape. **4.** Rip-Cord. **5.** PE inner jacket. **6.** Waterblocking aramid yarn.
- 7.** PE outer jacket, UV stable.

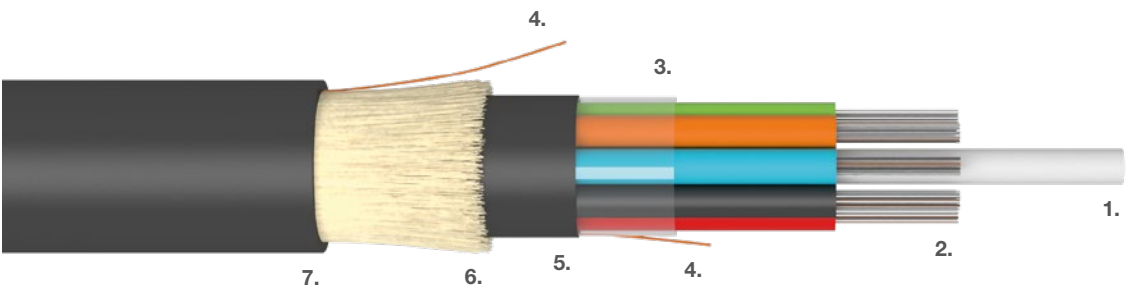
### Temperature range

|              |               |
|--------------|---------------|
| Installation | -15 to +50 °C |
| Operation    | -40 to +70 °C |
| Storage      | -40 to +70 °C |

| Design code | Max. fiber count | Loose tube diameter [mm] | Cable size [mm] | Cable weight [kg/km] | Max. load (installation) [N] | Crush resistance [N/10 cm] |
|-------------|------------------|--------------------------|-----------------|----------------------|------------------------------|----------------------------|
| N3YI        | 48               | 2.5                      | 12.2            | 115                  | 6,000                        | 3,000                      |
| N4YI        | 72               | 2.5                      | 13.8            | 159                  | 6,000                        | 3,000                      |
| N5YI        | 96               | 2.5                      | 15.3            | 178                  | 6,000                        | 3,000                      |
| N6YI        | 144              | 2.5                      | 18.4            | 268                  | 6,000                        | 3,000                      |

# ADSS 10 kN

**Specification:** N4ZI, N5ZI, N6ZI, N9ZI



## Description of materials:

**1.** FRP dielectric central strenght member. **2.** Gel filled PBT loose tube with optical fibers. **3.** Water-swellable tape. **4.** Rip-Cord. **5.** PE inner jacket. **6.** Waterblocking aramid yarn. **7.** PE outer jacket, UV stable.

### Temperature range

|              |               |
|--------------|---------------|
| Installation | -15 to +50 °C |
| Operation    | -40 to +70 °C |
| Storage      | -40 to +70 °C |

| Design code | Max. fiber count | Loose tube diameter [mm] | Cable size [mm] | Cable weight [kg/km] | Max. load (installation) [N] | Crush resistance [N/10 cm] |
|-------------|------------------|--------------------------|-----------------|----------------------|------------------------------|----------------------------|
| N4ZI        | 72               | 2.8                      | 15.5            | 195                  | 10,000                       | 3,000                      |
| N5ZI        | 96               | 2.8                      | 17.0            | 225                  | 10,000                       | 3,000                      |
| N6ZI        | 144              | 2.8                      | 20.5            | 316                  | 10,000                       | 3,000                      |
| N9ZI        | 288              | 2.5                      | 22.2            | 367                  | 10,000                       | 3,000                      |

# ADSS 15 kN

**Specification:** N4RI, N5RI, N6RI, N7RI, N7SI



Outdoor



Duct



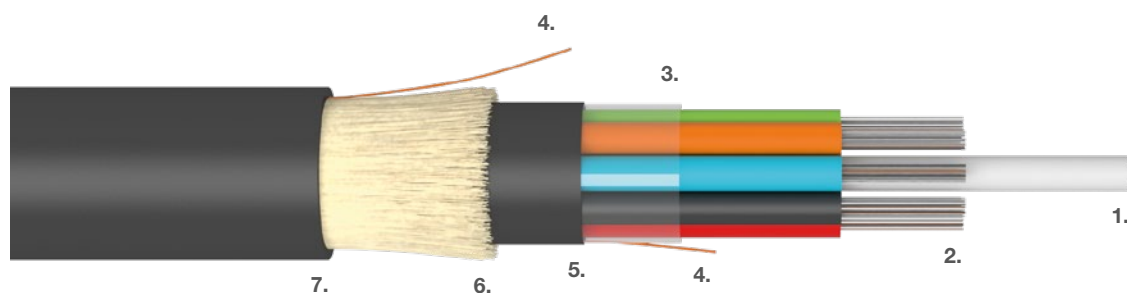
Dielectric



Aerial



High tensile



## Description of materials:

**1.** FRP dielectric central strenght member. **2.** Gel filled PBT loose tube with optical fibers. **3.** Water-swellable tape. **4.** Rip-Cord. **5.** PE inner jacket. **6.** Waterblocking aramid yarn. **7.** PE outer jacket, UV stable.

### Temperature range

|              |               |
|--------------|---------------|
| Installation | -15 to +50 °C |
| Operation    | -40 to +70 °C |
| Storage      | -40 to +70 °C |

| Design code | Max. fiber count | Loose tube diameter [mm] | Cable size [mm] | Cable weight [kg/km] | Max. load (installation) [N] | Crush resistance [N/10 cm] |
|-------------|------------------|--------------------------|-----------------|----------------------|------------------------------|----------------------------|
| <b>N4RI</b> | 72               | 2.8                      | 15.6            | 203                  | 15,000                       | 3,000                      |
| <b>N5RI</b> | 96               | 2.8                      | 17.1            | 237                  | 15,000                       | 3,000                      |
| <b>N6RI</b> | 144              | 2.8                      | 20.6            | 339                  | 15,000                       | 3,000                      |
| <b>N7RI</b> | 216              | 2.8                      | 20.9            | 337                  | 15,000                       | 3,000                      |
| <b>N7SI</b> | 216              | 2.8                      | 19.0            | 281                  | 15,000                       | 3,000                      |

# FIG.8

**Specification:** A860, A862, Z187



Indoor



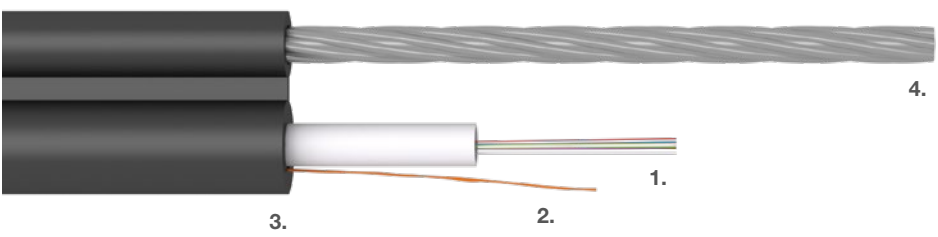
Outdoor



Halogen free



Aerial



## Description of materials:

- 1. Gel filled PBT loose tube with optical fibers.
- 2. Rip-Cord.
- 3. FR-LSZH or PE outer jacket, UV stable.
- 4. Steel wire messenger.

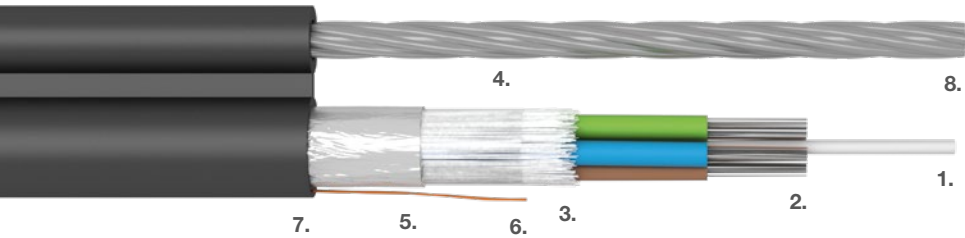
### Temperature range

|              |               |
|--------------|---------------|
| Installation | -15 to +50 °C |
| Operation    | -30 to +70 °C |
| Storage      | -30 to +70 °C |

| Design code | Max. fiber count | Loose tube diameter [mm] | Cable size [mm] | Cable weight [kg/km] | Max. load (installation) [N] | Crush resistance [N/10 cm] |
|-------------|------------------|--------------------------|-----------------|----------------------|------------------------------|----------------------------|
| A860        | 12               | 2.5                      | 6.1 × 11.7      | 57                   | 1,000                        | 1,000                      |
| A862        | 12               | 2.5                      | 6.1 × 11.7      | 80                   | 1,000                        | 1,000                      |
| Z187        | 24               | 4.5                      | 8.5 × 18.0      | 140                  | 3,000                        | 2,000                      |

# FIG.8

**Specification:** L83A, F83A, G83A, H83A



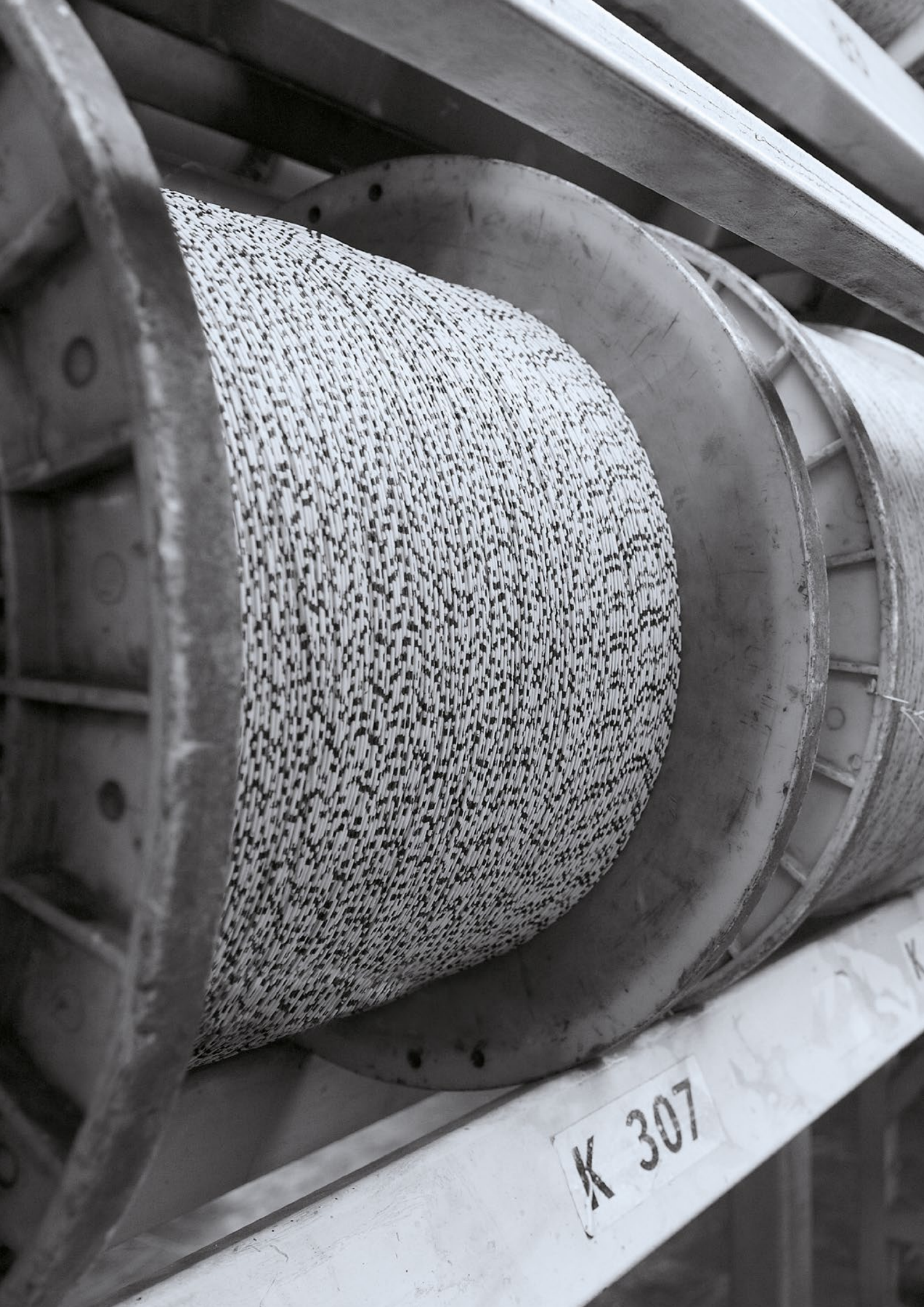
## Description of materials:

1. FRP dielectric central strenght member. 2. Gel filled PBT loose tube with optical fibers.  
3. Waterblocking E-glass yarn. 4. Water-swellable tape. 5. Moisture barrier. 6. Rip-Cord.  
7. PE outer jacket, UV stable. 8. Steel wire messenger.

### Temperature range

|              |               |
|--------------|---------------|
| Installation | -15 to +50 °C |
| Operation    | -30 to +70 °C |
| Storage      | -30 to +70 °C |

| Design code | Max. fiber count | Loose tube diameter [mm] | Cable size [mm] | Cable weight [kg/km] | Max. load (installation) [N] | Crush resistance [N/10 cm] |
|-------------|------------------|--------------------------|-----------------|----------------------|------------------------------|----------------------------|
| L83A        | 48               | 2.3                      | 11.1 × 20.7     | 161                  | 5,000                        | 2,000                      |
| F83A        | 72               | 2.3                      | 13.1 × 22.7     | 192                  | 5,000                        | 2,000                      |
| G83A        | 96               | 2.3                      | 14.1 × 23.7     | 216                  | 5,000                        | 2,000                      |
| H83A        | 144              | 2.3                      | 17.1 × 26.7     | 283                  | 5,000                        | 2,000                      |



K 307

## 5. SPECIAL CABLES

- FIRE RESISTANT 🔥
- CPR 🔥
- TUNNELS AND SUBWAY
- HYBRID
- UNDERWATER
- ARMoured MICRODUCT
- FLES TUBE
- TRACER WIRE

# FIRE RESISTANT – FSC 90 min.

**Specification:** CLT – Z297; MLT – Z298, Z299, Z300



Indoor



Outdoor



Halogen free



Armoured



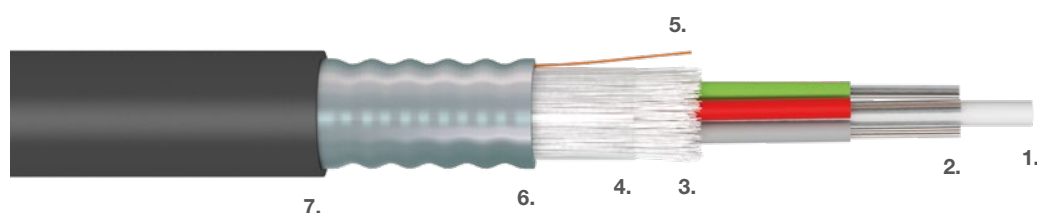
Duct



Fire resistant



Antirodent



## Description of materials:

1. FRP dielectric central strenght member. 2. Gel filled PBT loose tube with optical fibers.
3. Waterblocking E-glass yarn. 4. Water-swellaable tape. 5. Rip-Cord. 6. Corrugated steel tape.
7. FR-LSZH outer jacket, UV stable.

| Temperature range | Z297          | Z298, Z299, Z300 |
|-------------------|---------------|------------------|
| Installation      | -15 to +50 °C | -15 to +50 °C    |
| Operation         | -30 to +70 °C | -40 to +70 °C    |
| Storage           | -30 to +70 °C | -40 to +70 °C    |

| Design code | Max. fiber count | Loose tube diameter [mm] | Cable size [mm] | Cable weight [kg/km] | Max. load (installation) [N] | Crush resistance [N/10 cm] |
|-------------|------------------|--------------------------|-----------------|----------------------|------------------------------|----------------------------|
| <b>Z297</b> | 24               | 3.0                      | 8.9             | 112                  | 1,500                        | 3,000                      |
| <b>Z298</b> | 72               | 1.7                      | 12.1            | 179                  | 3,000                        | 2,500                      |
| <b>Z299</b> | 96               | 1.7                      | 13.1            | 213                  | 6,000                        | 2,500                      |
| <b>Z300</b> | 144              | 1.7                      | 15.1            | 284                  | 10,000                       | 2,500                      |

# FIRE RESISTANT – FSC 180 min.

**Specification:** CLT – Z281; Z285 – distribution cable; MLT – Z282, Z283, Z284



Indoor



Outdoor



Halogen free



Armoured



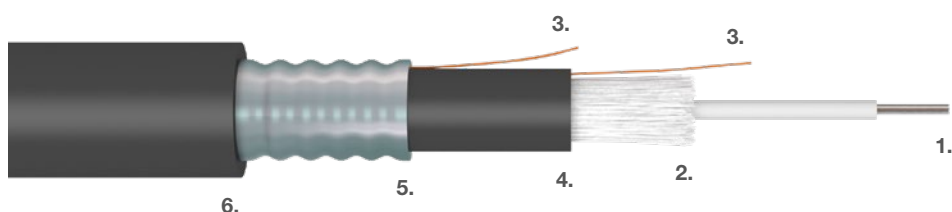
Duct



Fire resistant



Antirodent



## Description of materials:

- 1.** Gel filled PBT loose tube with optical fibers. **2.** Waterblocking E-glass yarn. **3.** Rip-Cord.  
**4.** FR-LSZH inner jacket, UV stable. **5.** Corrugated steel tape. **6.** FR-LSZH outer jacket, UV stable.

| Temperature range | Z281          | Z285          | Z282, Z283, Z284 |
|-------------------|---------------|---------------|------------------|
| Installation      | -15 to +50 °C | -15 to +50 °C | -15 to +50 °C    |
| Operation         | -30 to +80 °C | -20 to +80 °C | -40 to +80 °C    |
| Storage           | -40 to +80 °C | -20 to +80 °C | -40 to +80 °C    |

| Design code | Max. fiber count | Loose tube diameter [mm] | Cable size [mm] | Cable weight [kg/km] | Max. load (installation) [N] | Crush resistance [N/10 cm] |
|-------------|------------------|--------------------------|-----------------|----------------------|------------------------------|----------------------------|
| <b>Z281</b> | 24               | 3.2                      | 12.5            | 211                  | 2,000                        | 5,000                      |
| <b>Z285</b> | 24               | 0.9 – buffer             | 17.5            | 333                  | 3,000                        | 5,000                      |
| <b>Z282</b> | 72               | 1.7                      | 15.5            | 291                  | 3,000                        | 5,000                      |
| <b>Z283</b> | 96               | 1.7                      | 16.5            | 336                  | 6,000                        | 5,000                      |
| <b>Z284</b> | 144              | 1.7                      | 18.5            | 421                  | 8,800                        | 5,000                      |

# CPR – Simplex

**Specification:** ZNx1 Classification CPR Cca



Fire resistant



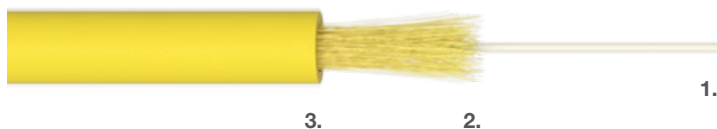
Indoor



FTTx



Halogen free



## Description of materials:

**1.** FR-LSZH buffered optical fiber. **2.** Waterblocking aramid yarn. **3.** FR-LSZH outer jacket.

### Temperature range

|              |              |
|--------------|--------------|
| Installation | -5 to +50 °C |
| Operation    | -5 to +50 °C |
| Storage      | -5 to +50 °C |

| Design code     | Fiber count | Cable outer diameter [mm] | Cable weight [kg/km] | Max. load (installation) [N] | Crush resistance [N/10 cm] |
|-----------------|-------------|---------------------------|----------------------|------------------------------|----------------------------|
| <b>NEW</b> ZNx1 | 1           | 3.0                       | 9                    | 300                          | 500                        |

# CPR – Duplex

**Specification:** ZNx0 Classification CPR Cca

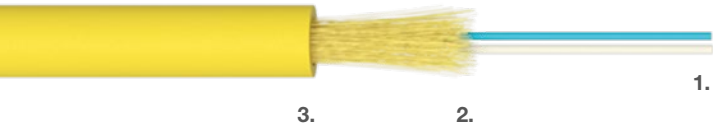
CPR

Fire resistant

Indoor

FTTx

Halogen free



## Description of materials:

**1.** FR-LSZH buffered optical fiber. **2.** Waterblocking aramid yarn. **3.** FR-LSZH outer jacket.

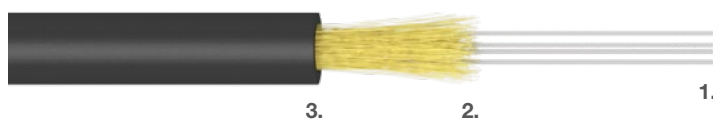
### Temperature range

|              |              |
|--------------|--------------|
| Installation | -5 to +50 °C |
| Operation    | -5 to +50 °C |
| Storage      | -5 to +50 °C |

| Design code | Fiber count | Cable outer diameter [mm] | Cable weight [kg/km] | Max. load (installation) [N] | Crush resistance [N/10 cm] |
|-------------|-------------|---------------------------|----------------------|------------------------------|----------------------------|
| ZNx0        | 2           | 2.8                       | 8                    | 280                          | 1,000                      |

# CPR – DROP

**Specification:** ZN02 Classification CPR Dca



## Description of materials:

**1.** Optical fibers. **2.** Aramid yarn. **3.** FR-LSZH outer jacket, UV stable.

### Temperature range

|              |               |
|--------------|---------------|
| Installation | -5 to +50 °C  |
| Operation    | -20 to +60 °C |
| Storage      | -20 to +60 °C |

| Design code | Fiber count | Cable outer diameter [mm] | Cable weight [kg/km] | Max. load (installation) [N] | Crush resistance [N/10 cm] |
|-------------|-------------|---------------------------|----------------------|------------------------------|----------------------------|
| <b>ZN02</b> | 24          | 4.0                       | 16                   | 700                          | 1,000                      |

# CPR – CLT

**Specification:** ZN06 Classification CPR Dca

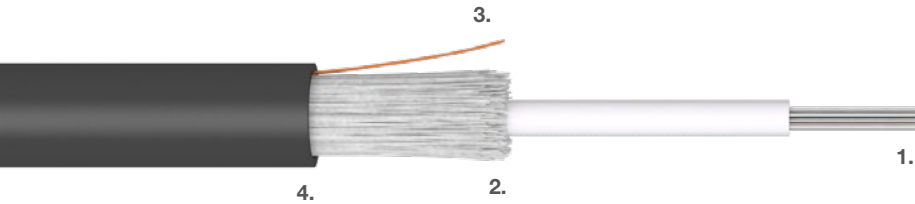
CPR  
Fire resistant

Indoor

Outdoor

FTTx

Halogen free



## Description of materials:

- 1. Gel filled PBT loose tube with optical fibers.
- 2. Waterblocking E-glass yarn.
- 3. Rip-Cord.
- 4. FR-LSZH outer jacket, UV stable.

### Temperature range

|              |               |
|--------------|---------------|
| Installation | -15 to +50 °C |
| Operation    | -20 to +70 °C |
| Storage      | -20 to +70 °C |

| Design code | Max. fiber count | Loose tube diameter [mm] | Cable size [mm] | Cable weight [kg/km] | Max. load (installation) [N] | Crush resistance [N/10 cm] |
|-------------|------------------|--------------------------|-----------------|----------------------|------------------------------|----------------------------|
| ZN06        | 4-12             | 2.5                      | 5.4             | 37                   | 1,100                        | 2,000                      |

# CPR – CLT

**Specification:** ZN05 Classification CPR Dca



Fire resistant



Indoor



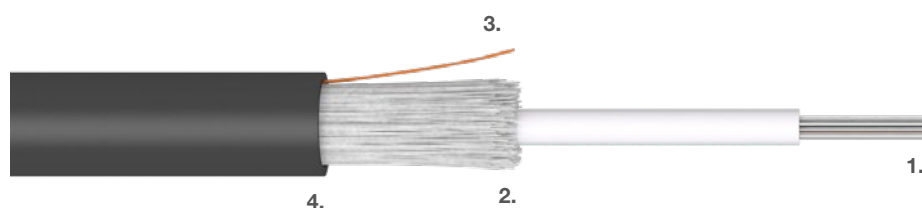
Outdoor



FTTx



Halogen free



## Description of materials:

- 1.** Gel filled PBT loose tube with optical fibers. **2.** Waterblocking E-glass yarn. **3.** Rip-Cord.  
**4.** FR-LSZH outer jacket, UV stable.

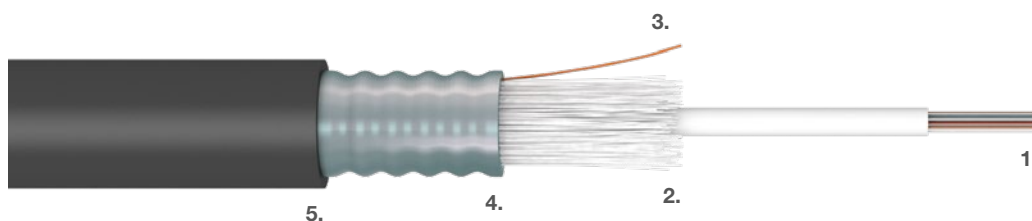
### Temperature range

|              |               |
|--------------|---------------|
| Installation | -15 to +50 °C |
| Operation    | -20 to +70 °C |
| Storage      | -20 to +70 °C |

| Design code | Fiber count | Loose tube diameter [mm] | Cable size [mm] | Cable weight [kg/km] | Max. load (installation) [N] | Crush resistance [N/10 cm] |
|-------------|-------------|--------------------------|-----------------|----------------------|------------------------------|----------------------------|
| <b>ZN05</b> | 4-24        | 3.0                      | 6.4             | 51                   | 1,100                        | 2,000                      |

# CPR – CLT CST – FSC 90 min.

**Specification:** ZN01 for 12F or 24F Classification CPR B2ca, for 1–24F Classification CPR Cca



## Description of materials:

- 1.** Gel filled PBT loose tube with optical fibers. **2.** Waterblocking E-glass yarn. **3.** Rip-Cord.  
**4.** Corrugated steel tape. **5.** FR-LSZH outer jacket, UV stable.

### Temperature range

|              |               |
|--------------|---------------|
| Installation | -15 to +50 °C |
| Operation    | -20 to +70 °C |
| Storage      | -20 to +70 °C |

| Design code | Max. fiber count | Loose tube diameter [mm] | Cable size [mm] | Cable weight [kg/km] | Max. load (installation) [N] | Crush resistance [N/10 cm] |
|-------------|------------------|--------------------------|-----------------|----------------------|------------------------------|----------------------------|
| <b>ZN01</b> | 1–24             | 3.0                      | 10.1            | 124                  | 2,500                        | 4,500                      |

# CPR – CLT CST

**Specification:** ZN07 for 4–24F Classification CPR Dca



Fire resistant



Indoor



Outdoor



FTTx



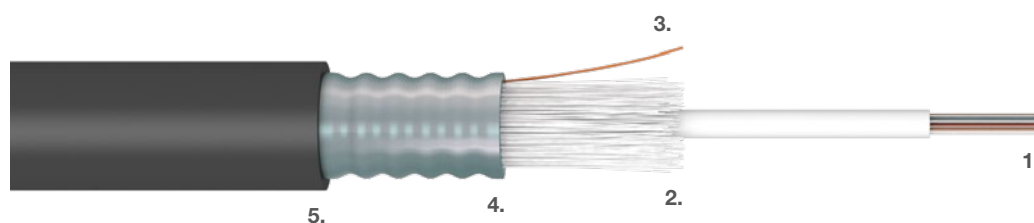
Halogen free



Armoured



Antirodent



## Description of materials:

- 1.** Gel filled PBT loose tube with optical fibers. **2.** Waterblocking E-glass yarn. **3.** Rip-Cord.  
**4.** Corrugated steel tape. **5.** FR-LSZH outer jacket, UV stable.

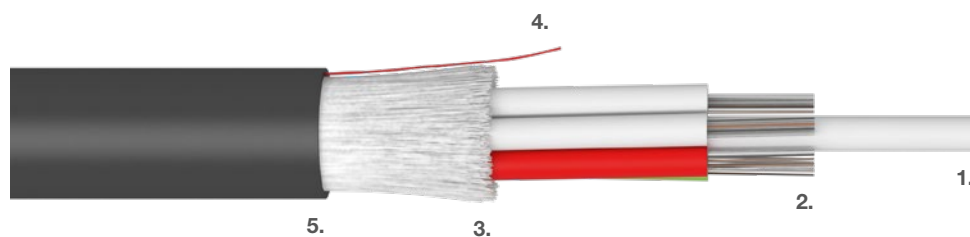
### Temperature range

|              |               |
|--------------|---------------|
| Installation | -15 to +50 °C |
| Operation    | -20 to +70 °C |
| Storage      | -20 to +70 °C |

| Design code | Fiber count | Loose tube diameter [mm] | Cable size [mm] | Cable weight [kg/km] | Max. load (installation) [N] | Crush resistance [N/10 cm] |
|-------------|-------------|--------------------------|-----------------|----------------------|------------------------------|----------------------------|
| <b>ZN07</b> | 4–24        | 3.0                      | 7.9             | 90                   | 1,100                        | 3,000                      |

# CPR – MLT

**Specification:** ZN03 for 12 fibers Classification CPR Cca for 12–144 fibers Classification CPR Dca



## Description of materials:

- 1.** FRP dielectric central strength member. **2.** Gel filled PBT loose tube with optical fibers.  
**3.** Waterblocking E-glass yarn. **4.** Rip-Cord. **5.** FR-LSZH outer jacket, UV stable.

### Temperature range

|              |               |
|--------------|---------------|
| Installation | -15 to +50 °C |
| Operation    | -40 to +70 °C |
| Storage      | -40 to +70 °C |

| Design code | Max. fiber count | Loose tube diameter [mm] | Cable size [mm] | Cable weight [kg/km] | Max. load (installation) [N] | Crush resistance [N/10 cm] |
|-------------|------------------|--------------------------|-----------------|----------------------|------------------------------|----------------------------|
| <b>ZN03</b> | 12–48            | 1.7                      | 7.9             | 71                   | 1,300                        | 2,000                      |
| <b>ZN03</b> | 12–72            | 1.7                      | 8.8             | 90                   | 2,000                        | 2,000                      |
| <b>ZN03</b> | 96               | 1.7                      | 10.0            | 116                  | 4,300                        | 2,000                      |
| <b>ZN03</b> | 144              | 1.7                      | 12.2            | 171                  | 7,300                        | 2,000                      |

# CPR – MLT CST

**Specification:** ZN04 for 12F Classification B2ca and a 12–72F Classification CPR Cca



Fire resistant



Indoor



Outdoor



FTTx



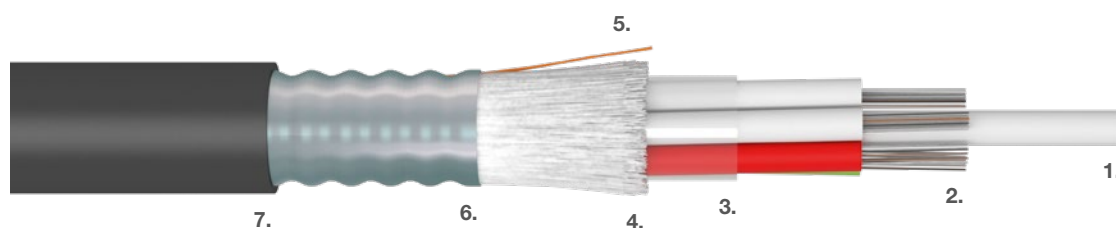
Halogen free



Armoured



Antirodent



## Description of materials:

1. FRP dielectric central strength member. 2. Gel filled PBT loose tube with optical fibers.
3. Water-swellable tape. 4. Waterblocking E-glass yarn. 5. Rip-Cord. 6. Corrugated steel tape.
7. FR-LSZH or PE outer jacket, UV stable.

### Temperature range

|              |               |
|--------------|---------------|
| Installation | -15 to +50 °C |
| Operation    | -40 to +70 °C |
| Storage      | -40 to +70 °C |

| Design code | Fiber count | Loose tube diameter [mm] | Cable size [mm] | Cable weight [kg/km] | Max. load (installation) [N] | Crush resistance [N/10 cm] |
|-------------|-------------|--------------------------|-----------------|----------------------|------------------------------|----------------------------|
| <b>ZN04</b> | 12–48       | 1.7                      | 10.5            | 132                  | 1,300                        | 2,000                      |
| <b>ZN04</b> | 12–72       | 1.7                      | 10.5            | 142                  | 1,800                        | 2,000                      |

# CPR – MLT SWA

**Specification:** ZN08 Classification CPR B2ca 72F.

CPR

Fire resistant

Indoor

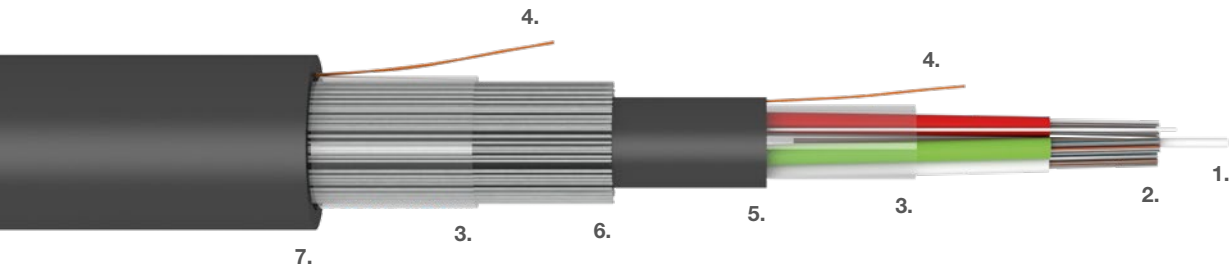
Outdoor

FTTx

Halogen free

Armoured

Antirodent



## Description of materials:

- 1. FRP dielectric central strength member.
- 2. Gel filled PBT loose tube with optical fibers.
- 3. Water-swellable tape.
- 4. Rip-Cord.
- 5. FR-LSZH inner jacket.
- 6. Steel Wire Armour (SWA).
- 7. FR-LSZH outer jacket, UV stable.

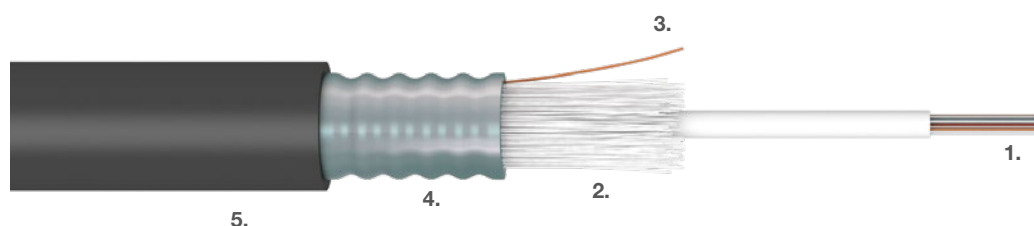
### Temperature range

|              |               |
|--------------|---------------|
| Installation | -15 to +50 °C |
| Operation    | -40 to +70 °C |
| Storage      | -40 to +70 °C |

| Design code     | Fiber count | Loose tube diameter [mm] | Cable size [mm] | Cable weight [kg/km] | Max. load (installation) [N] | Crush resistance [N/10 cm] |
|-----------------|-------------|--------------------------|-----------------|----------------------|------------------------------|----------------------------|
| <b>NEW</b> ZN08 | 72          | 1.7                      | 13              | 322                  | 4,000                        | 2,000                      |

# TUNNELS and SUBWAY – CLT Fire Resistant Cable CST Armoured – FSC 90 min.

**Specification:** Z297 Classification CPR Dca



## Description of materials:

**1.** Gel filled PBT loose tube with optical fibers. **2.** Waterblocking E-glass yarn. **3.** Rip-Cord.  
**4.** Corrugated steel tape. **5.** Black FR-LSZH outer jacket, UV stable.

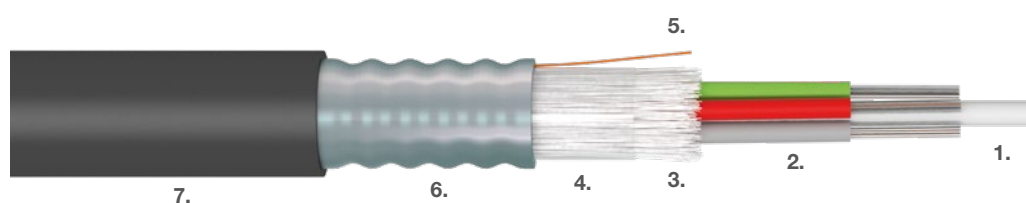
### Temperature range

|              |               |
|--------------|---------------|
| Installation | -15 to +50 °C |
| Operation    | -30 to +70 °C |
| Storage      | -30 to +70 °C |

| Design code     | Max. fiber count | Loose tube diameter [mm] | Cable size [mm] | Cable weight [kg/km] | Max. load (installation) [N] | Crush resistance [N/10 cm] |
|-----------------|------------------|--------------------------|-----------------|----------------------|------------------------------|----------------------------|
| <b>NEW</b> Z297 | 24               | 3.0                      | 8.9             | 112                  | 1,500                        | 3,000                      |

# TUNNELS and SUBWAY – MLT Fire Resistant Cable CST Armoured – FSC 90 min.

**Specification:** Z300 Classification CPR Dca



## Description of materials:

**1.** FRP dielectric central strength member (OD 2.5 mm), PE coated (OD 5.2 mm). **2.** Gel filled PBT loose tube with optical fibres. **3.** Waterblocking E-glass yarn. **4.** Water-swellable tape. **5.** Rip-Cord. **6.** Corrugated steel tape. **7.** FR-LSZH outer jacket, UV stable.

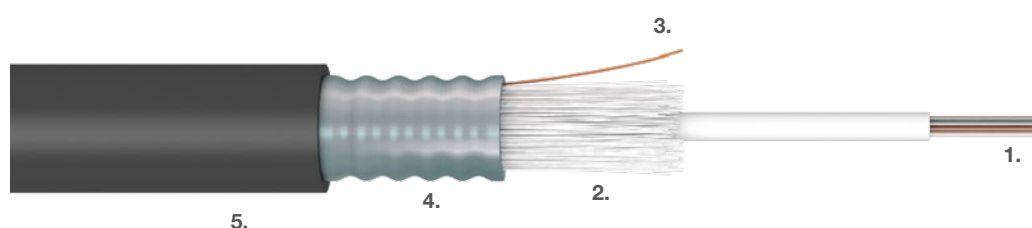
### Temperature range

|              |               |
|--------------|---------------|
| Installation | -15 to +50 °C |
| Operation    | -40 to +70 °C |
| Storage      | -40 to +70 °C |

| Design code     | Max. fiber count | Loose tube diameter [mm] | Cable size [mm] | Cable weight [kg/km] | Max. load (installation) [N] | Crush resistance [N/10 cm] |
|-----------------|------------------|--------------------------|-----------------|----------------------|------------------------------|----------------------------|
| <b>NEW</b> Z300 | 144              | 1.7                      | 15.1            | 284                  | 10,000                       | 2,500                      |

# TUNNELS and SUBWAY – CLT Fire Resistant Cable CST Armoured – FSC 90 min.

**Specification:** ZN01 for 12F or 24F Classification CPR B2ca, for 1–24F Classification CPR Cca



## Description of materials:

- 1.** Gel filled loose tube with optical fibres. **2.** Waterblocking E-glass yarn. **3.** Rip-Cord.  
**4.** Corrugated steel tape. **5.** FR-LSZH outer jacket, UV stable.

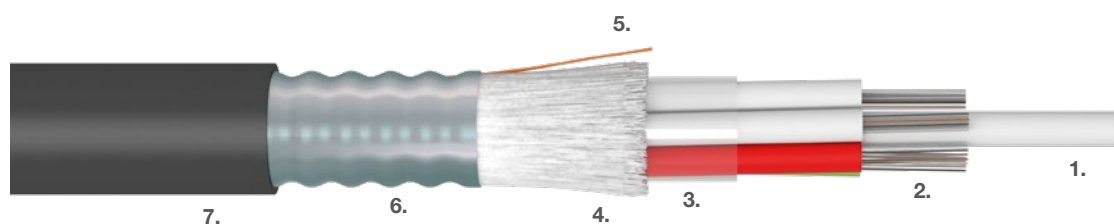
### Temperature range

|              |               |
|--------------|---------------|
| Installation | -15 to +50 °C |
| Operation    | -20 to +70 °C |
| Storage      | -20 to +70 °C |

| Design code     | Max. fiber count | Loose tube diameter [mm] | Cable size [mm] | Cable weight [kg/km] | Max. load (installation) [N] | Crush resistance [N/10 cm] |
|-----------------|------------------|--------------------------|-----------------|----------------------|------------------------------|----------------------------|
| <b>NEW</b> ZN01 | 1–24             | 3.0                      | 10.1            | 124                  | 2,500                        | 4,500                      |

# TUNNELS and SUBWAY – MLT Fire Resistant Cable CST Armoured – FSC 90 min.\*

**Specification:** ZN04 for 12F Classification B2ca and a 12–72F Classification CPR Cca



## Description of materials:

1. FRP dielectric central strength member (OD 3.0 mm).
2. Gel filled PBT loose tube with optical fibers.
3. Water-swellable tape.
4. Waterblocking E-glass yarn.
5. Rip-Cord.
6. Corrugated steel tape.
7. FR-LSZH or PE outer jacket, UV stable.

### Temperature range

|              |               |
|--------------|---------------|
| Installation | -15 to +50 °C |
| Operation    | -40 to +60 °C |
| Storage      | -40 to +60 °C |

\*Available in Autumn 2025

| Design code     | Fiber count | Loose tube diameter [mm] | Cable size [mm] | Cable weight [kg/km] | Max. load (installation) [N] | Crush resistance [N/10 cm] |
|-----------------|-------------|--------------------------|-----------------|----------------------|------------------------------|----------------------------|
| <b>NEW</b> ZN04 | 12–48       | 1.7                      | 10.5            | 132                  | 1,300                        | 2,000                      |
| <b>NEW</b> ZN04 | 12–72       | 1.7                      | 10.5            | 142                  | 1,800                        | 2,000                      |

# TUNNELS and SUBWAY – MLT Fire Resistant Cable SWA Armoured – FSC 90 min.\*

**Specification:** ZN08 Classification CPR B2ca

CPR  
Fire resistant

Indoor

Outdoor

FTTx

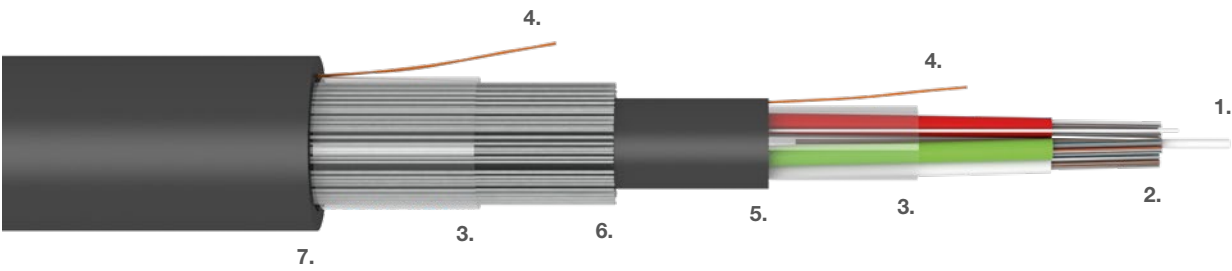
Ha  
Halogen free

Armoured

Antirodent

Fire resistant

Tunnels and subway



## Description of materials:

- 1. FRP dielectric central strength member. 2. Gel filled PBT loose tube with optical fibers.
- 3. Water-swellable tape. 4. Rip-Cord. 5. Black FR-LSZH inner jacket. 6. Steel Wire Armour (SWA).
- 7. Black FR-LSZH outer jacket, UV stable.

### Temperature range

|              |               |
|--------------|---------------|
| Installation | -15 to +50 °C |
| Operation    | -40 to +70 °C |
| Storage      | -40 to +70 °C |

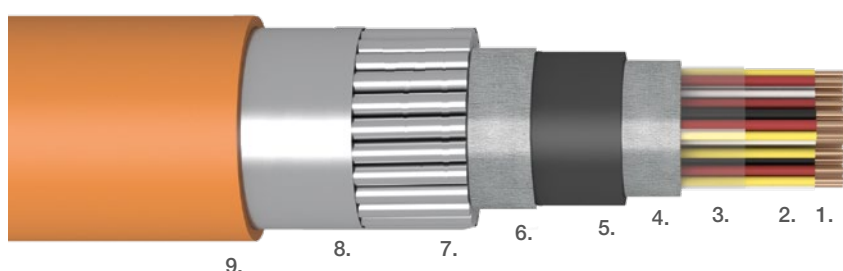
\*Available in Autumn 2025

| Design code | Fiber count | Loose tube diameter [mm] | Cable size [mm] | Cable weight [kg/km] | Max. load (installation) [N] | Crush resistance [N/10 cm] |
|-------------|-------------|--------------------------|-----------------|----------------------|------------------------------|----------------------------|
| NEW ZN08    | 72          | 1.7                      | 13              | 322                  | 4,000                        | 2,000                      |

# TUNNELS and SUBWAY – Metallic cable – AJ-HHAH

...x2x... P LG (...AL) FRNC CPR B2ca s1a d1 a1

**Specification:** TP 02.01.23 – KDP – 01/23



## Description of materials:

1. Copper wire. 2. Core insulation – solid PE. 3. Wrapping plastic tape. 4. FR tape.
5. FRNC inner jacket, black. 6. FR tape. 7. Armor aluminium wires. 8. Fe/Zn tape.
9. FRNC outer jacket, orange.

Each 2 wires twisted to a pair.

## Application

- » transmission of electric signal of telecommunication, controlling and protecting purposes of control circuit
- » for using in area danger of fire
- » for indoor and outdoor installations, tunnels or collectors, direct burial placing with highest tension or supporting without carrying wire
- » grasp or free placing in areas with alternating electromagnetic field danger
- » standard, wet or moist ambient, spraying water and fleet immersion, dropping water with pH 7÷11

### Environmental conditions

|  |                 |
|--|-----------------|
| Temperature ranges for laying and assembly | –5 °C           |
| Operation and store temperatures           | –40 °C ÷ +65 °C |
| Permitted minimum bending radius           | min. 10D        |
| Cable lifetime                             | min. 40 years   |

*D – outside cable diameter*

*Packing on drums.*

# HYBRID

**Specification:** Z001



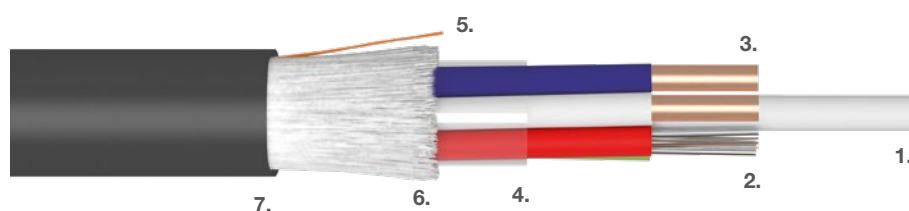
Outdoor



FTTx



Duct



## Description of materials:

- 1.** FRP dielectric central strength member. **2.** Gel filled PBT loose tube with optical fibers.  
**3.** Cu pair. **4.** Water-swellable tape. **5.** Rip-Cord. **6.** Waterblocking E-glass yarn. **7.** PE outer jacket UV stabile.

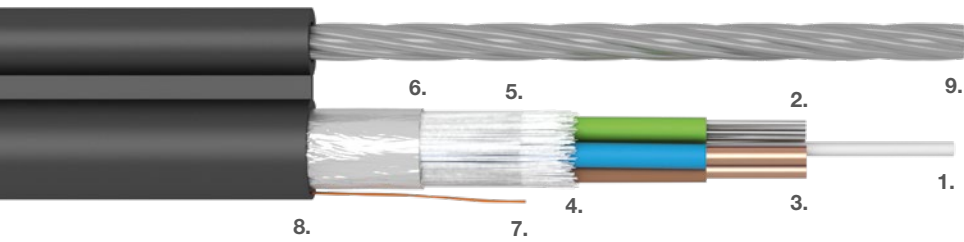
### Temperature range

|              |               |
|--------------|---------------|
| Installation | -15 to +50 °C |
| Operation    | -40 to +70 °C |
| Storage      | -40 to +70 °C |

| Design code | Max. fiber count | Loose tube diameter [mm] | Cable size [mm] | Cable weight [kg/km] | Max. load (installation) [N] | Crush resistance [N/10 cm] |
|-------------|------------------|--------------------------|-----------------|----------------------|------------------------------|----------------------------|
| <b>Z001</b> | 60               | 2.3                      | 10.7            | 94                   | 2,500                        | 2,000                      |

# HYBRID

Specification: Z047



## Description of materials:

1. FRP dielectric central strenght member. 2. Gel filled PBT loose tube with optical fibers.  
3. Cu wire 4. Waterblocking E-glass yarn. 5. Water-swellable tape. 6. Moisture barrier.  
7. Rip-Cord. 8. PE outer jacket, UV stable. 9. Steel wire messenger.

### Temperature range

|              |               |
|--------------|---------------|
| Installation | -15 to +50 °C |
| Operation    | -40 to +70 °C |
| Storage      | -40 to +70 °C |

| Design code | Max. fiber count | Loose tube diameter [mm] | Cable size [mm] | Cable weight [kg/km]  | Max. load (installation) [N] | Crush resistance [N/10 cm] |
|-------------|------------------|--------------------------|-----------------|---|------------------------------|----------------------------|
| Z047        | 12-36            | 2.5                      | 21.1 × 11.2     | 218 (12 F + 3 Cu)<br>206 (24 F + 2 Cu)<br>194 (36 F + 1 Cu) | 5,000                        | 2,000                      |

# HYBRID

**Specification:** Z078, Z130



Indoor



Outdoor



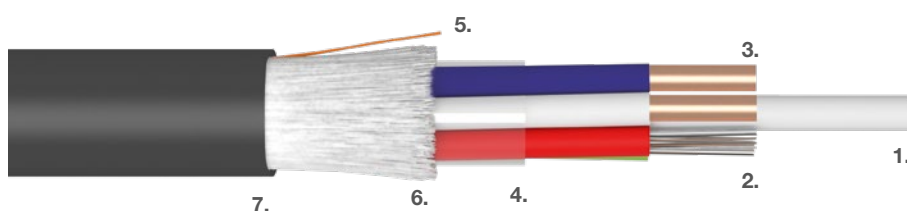
Halogen free



FTTx



Duct



## Description of materials:

- 1.** FRP dielectric central strength member. **2.** Gel filled PBT loose tube with optical fibers.  
**3.** Cu wire 1.4/2.6 mm. **4.** Water-swellable tape. **5.** Rip-Cord. **6.** Waterblocking E-glass yarn.  
**7.** FR - LSZH or PE outer jacket, UV stable.

### Temperature range

|              |               |
|--------------|---------------|
| Installation | -15 to +50 °C |
| Operation    | -40 to +70 °C |
| Storage      | -40 to +70 °C |

| Design code | Max. fiber count | Loose tube diameter [mm] | Cable size [mm] | Cable weight [kg/km]  | Max. load (installation) [N] | Crush resistance [N/10 cm] |
|-------------|------------------|--------------------------|-----------------|---|------------------------------|----------------------------|
| <b>Z078</b> | 12–36            | 2.5                      | 10.5            | 126 (12 F + 3 Cu)<br>110 (24 F + 2 Cu)<br>94 (36 F + 1 Cu)  | 2,000                        | 2,000                      |
| <b>Z130</b> | 12–36            | 2.5                      | 10.5            | 150 (12 F + 3 Cu)<br>134 (24 F + 2 Cu)<br>117 (36 F + 1 Cu) | 2,000                        | 2,000                      |

# HYBRID

**Specification:** Z131, Z132



Indoor



Outdoor



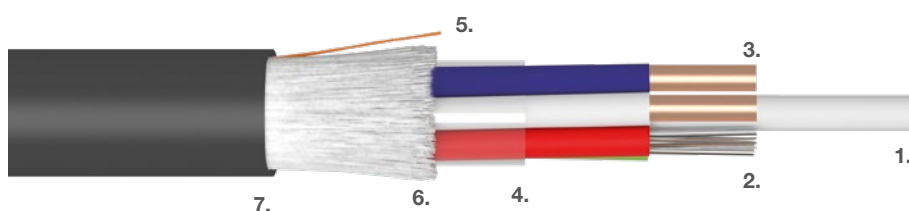
Halogen free



FTTx



Duct



## Description of materials:

- 1.** FRP dielectric central strenght member. **2.** Gel filled PBT loose tube with optical fibers.
- 3.** Cu wire 1.8/2.7 mm. **4.** Water-swellable tape. **5.** Rip-Cord. **6.** Waterblocking E-glass yarn.
- 7.** FR-LSZH or PE outer jacket, UV stable.

### Temperature range

|              |               |
|--------------|---------------|
| Installation | -15 to +50 °C |
| Operation    | -40 to +70 °C |
| Storage      | -40 to +70 °C |

| Design code | Max. fiber count | Loose tube diameter [mm] | Cable size [mm] | Cable weight [kg/km]  | Max. load (installation) [N] | Crush resistance [N/10 cm] |
|-------------|------------------|--------------------------|-----------------|---|------------------------------|----------------------------|
| <b>Z131</b> | 24–36            | 2.5                      | 10.6            | 146 (12 F + 3 Cu)<br>125 (24 F + 2 Cu)<br>105 (36 F + 1 Cu) | 1,900                        | 2,000                      |
| <b>Z132</b> | 24–36            | 2.5                      | 10.6            | 170 (12 F + 3 Cu)<br>150 (24 F + 2 Cu)<br>129 (36 F + 1 Cu) | 1,900                        | 2,000                      |

# HYBRID

**Specification:** Z212



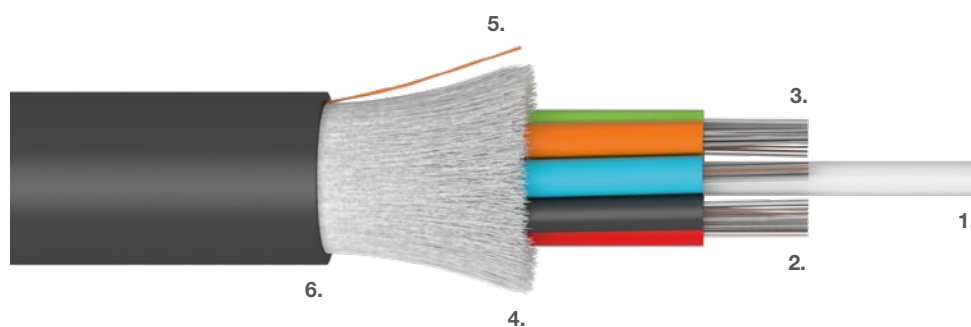
Outdoor



FTTx



Duct



## Description of materials:

- 1.** FRP dielectric central strength member. **2.** Gel filled PBT loose tube with optical fibers.  
**3.** Cu wire 1.4/3.0 mm. **4.** Waterblocking E-glass yarn. **5.** Rip-Cord. **6.** PE outer jacket, UV stable.

### Temperature range

|              |               |
|--------------|---------------|
| Installation | -15 to +50 °C |
| Operation    | -40 to +70 °C |
| Storage      | -40 to +70 °C |

| Design code | Max. fiber count | Loose tube diameter [mm] | Cable size [mm] | Cable weight [kg/km] | Max. load (installation) [N] | Crush resistance [N/10 cm] |
|-------------|------------------|--------------------------|-----------------|----------------------|------------------------------|----------------------------|
| <b>Z212</b> | 24               | 3.0                      | 13.1            | 176                  | 2,700                        | 2,000                      |

# HYBRID

Specification: Z320

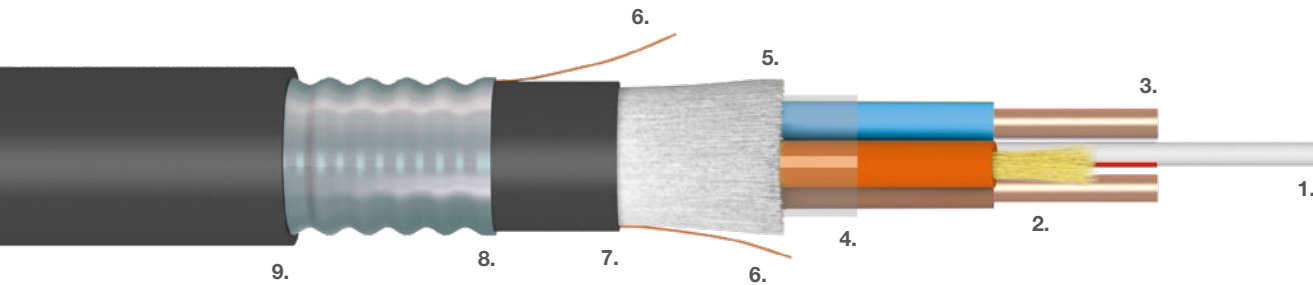
Outdoor

FTTx

Duct

Armoured

Antirodent



## Description of materials:

- 1. FRP dielectric central strenght member.
- 2. Simplex.
- 3. Cu wire 1.8/2.8 mm
- 4. Water-swellable tape.
- 5. Waterblocking E-glass yarn.
- 6. Rip-Cord.
- 7. PE inner jacket, UV stable.
- 8. Corrugated steel tape.
- 9. PE outer jacket, UV stable.

### Temperature range

|              |               |
|--------------|---------------|
| Installation | -15 to +50 °C |
| Operation    | -40 to +70 °C |
| Storage      | -40 to +70 °C |

| Design code | Max. fiber count | Simplex diameter [mm] | Cable size [mm] | Cable weight [kg/km] | Max. load (installation) [N] | Crush resistance [N/10 cm] |
|-------------|------------------|-----------------------|-----------------|----------------------|------------------------------|----------------------------|
| Z320        | 2                | 2.8                   | 15.5            | 249                  | 2,000                        | 5,000                      |

# HYBRID

**Specification:** TM5I, QM5I, WM5I



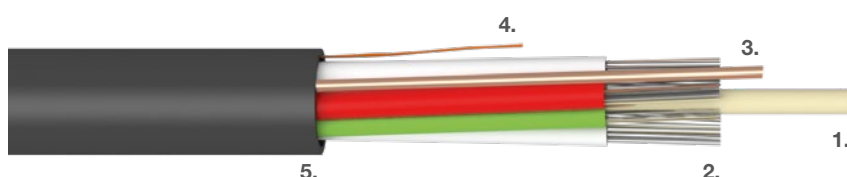
Outdoor



FTTx



Duct



## Description of materials:

- 1.** FRP dielectric central strenght member. **2.** Gel filled PBT loose tube with optical fibers.  
**3.** Cu wire (AWG 24). **4.** Rip-Cord. **5.** PE outer jacket, UV stable.

### Temperature range

|              |               |
|--------------|---------------|
| Installation | -15 to +50 °C |
| Operation    | -30 to +70 °C |
| Storage      | -40 to +70 °C |

| Design code | Max. fiber count | Loose tube diameter [mm] | Cable size [mm] | Cable weight [kg/km] | Max. load (installation) [N] | Crush resistance [N/10 cm] |
|-------------|------------------|--------------------------|-----------------|----------------------|------------------------------|----------------------------|
| <b>TM5I</b> | 72               | 1.5                      | 5.8             | 31                   | 700                          | 1,500                      |
| <b>QM5I</b> | 96               | 1.5                      | 6.5             | 42                   | 1,400                        | 1,500                      |
| <b>WM5I</b> | 144              | 1.5                      | 8.6             | 63                   | 1,500                        | 1,500                      |

# UNDERWATER

Specification: BWPI

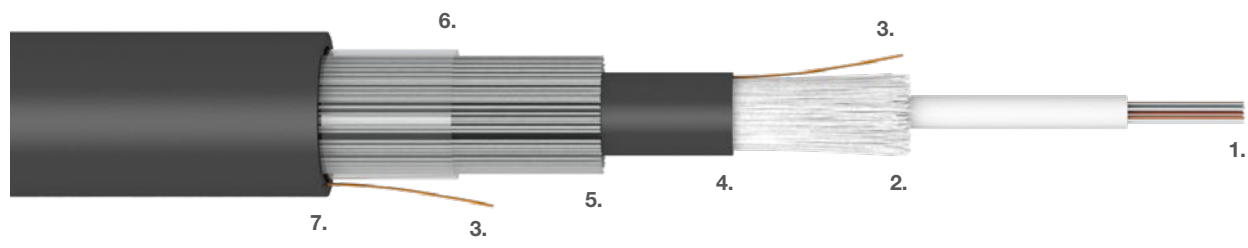
Underwater

Outdoor

FTTx

Armoured

Antirodent



## Description of materials:

- 1. Gel filled PBT loose tube with optical fibers.
- 2. Waterblocking E-glass yarn.
- 3. Rip-Cord.
- 4. PE inner jacket.
- 5. Steel Wire Armour (SWA).
- 6. Water-swellable tape.
- 7. PE outer jacket, UV stable.

### Temperature range

|              |               |
|--------------|---------------|
| Installation | -15 to +50 °C |
| Operation    | -30 to +70 °C |
| Storage      | -30 to +70 °C |

| Design code | Max. fiber count | Loose tube diameter [mm] | Cable size [mm] | Max. water depth [m] | Cable weight [kg/km] | Max. load (installation) [N] | Crush resistance [N/10 cm] |
|-------------|------------------|--------------------------|-----------------|----------------------|----------------------|------------------------------|----------------------------|
| BWPI        | 24               | 3.0                      | 11.0            | 150                  | 199                  | 4,000                        | 4,000                      |

# UNDERWATER

**Specification:** LXPK, FXPK, GXPK, HXPK, IXPk



Underwater



Outdoor



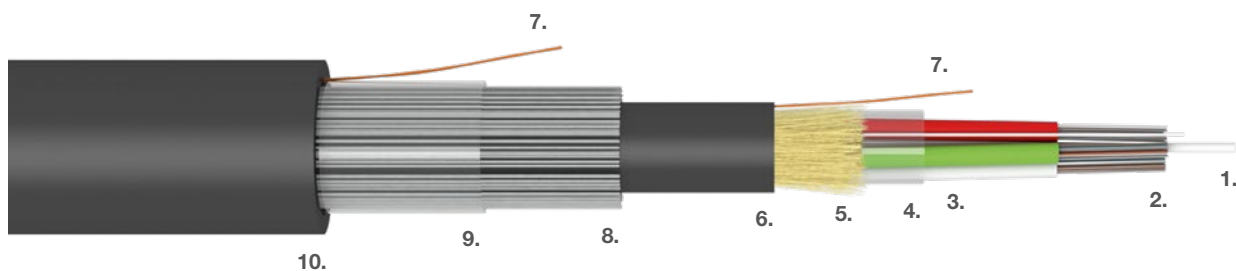
FTTx



Armoured



Antirodent



## Description of materials:

- 1.** FRP dielectric central strength member. **2.** Gel filled PBT loose tube with optical fibers.
- 3.** Gel filling. **4.** PET foil. **5.** Waterblocking aramid yarn. **6.** PE inner jacket, UV stable. **7.** Rip-Cord.
- 8.** Steel Wire Armour (SWA). **9.** Water-swellable tape. **10.** PE outer jacket, UV stable.

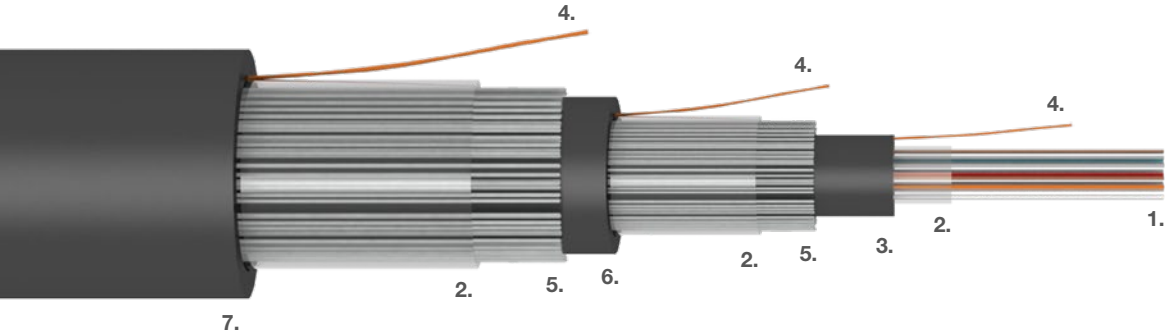
### Temperature range

|              |               |
|--------------|---------------|
| Installation | -15 to +50 °C |
| Operation    | -40 to +70 °C |
| Storage      | -40 to +70 °C |

| Design code | Max. fiber count | Loose tube diameter [mm] | Cable size [mm] | Max. water depth [m] | Cable weight [kg/km] | Max. load (installation) [N] | Crush resistance [N/10 cm] |
|-------------|------------------|--------------------------|-----------------|----------------------|----------------------|------------------------------|----------------------------|
| <b>LXPK</b> | 48               | 2.3                      | 13.8            | 200                  | 299                  | 5,000                        | 5,000                      |
| <b>FXPK</b> | 72               | 2.3                      | 15.0            | 150                  | 348                  | 7,500                        | 5,000                      |
| <b>GXPK</b> | 96               | 2.3                      | 16.3            | 140                  | 410                  | 8,500                        | 5,000                      |
| <b>HXPK</b> | 144              | 2.3                      | 19.2            | 130                  | 540                  | 12,000                       | 5,000                      |
| <b>IXPK</b> | 216              | 2.3                      | 19.6            | 100                  | 566                  | 9,000                        | 4,000                      |

# UNDERWATER

Specification: Z439



## Description of materials:

1. Gel filled loose tube with optical fibers. 2. Water-swellable tape. 3. PE inner jacket, UV stable.  
4. Rip-Cord. 5. Steel Wire Armour (SWA). 6. PE intermediate jacket, UV stable. 7. PE outer jacket, UV stable.

### Temperature range

|              |               |
|--------------|---------------|
| Installation | -15 to +50 °C |
| Operation    | -30 to +70 °C |
| Storage      | -30 to +70 °C |

| Design code | Max. fiber count | Loose tube diameter [mm] | Cable size [mm] | Max. water depth [m] | Cable weight [kg/km] | Max. load (installation) [N] | Crush resistance [N/10 cm] |
|-------------|------------------|--------------------------|-----------------|----------------------|----------------------|------------------------------|----------------------------|
| Z439        | 24               | 3.0                      | 16.2            | 180                  | 502                  | 6,500                        | 5,500                      |

# UNDERWATER

**Specification:** Z388



Underwater



Outdoor



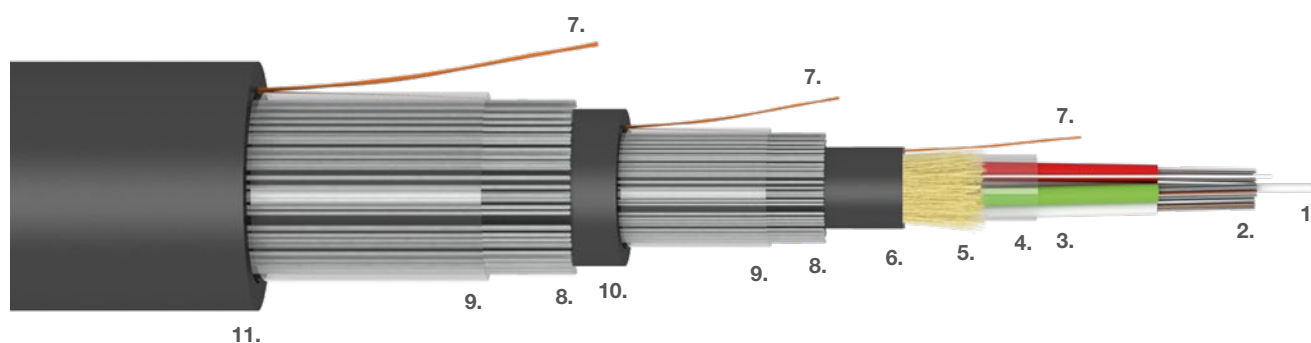
FTTx



Armoured



Antirodent



## Description of materials:

- 1.** FRP dielectric central strength member. **2.** Gel filled PBT loose tube with optical fibers.  
**3.** Gel filling. **4.** PET foil. **5.** Waterblocking aramid yarn. **6.** PE inner jacket, UV stable. **7.** Rip-Cord.  
**8.** Steel Wire Armour (SWA). **9.** Water-swellable tape. **10.** PE intermediate jacket, UV stable.  
**11.** PE outer jacket, UV stable.

### Temperature range

|              |               |
|--------------|---------------|
| Installation | -15 to +50 °C |
| Operation    | -40 to +70 °C |
| Storage      | -40 to +70 °C |

| Design code | Max. fiber count | Loose tube diameter [mm] | Cable size [mm] | Max. water depth [m] | Cable weight [kg/km] | Max. load (installation) [N] | Crush resistance [N/10 cm] |
|-------------|------------------|--------------------------|-----------------|----------------------|----------------------|------------------------------|----------------------------|
| <b>Z388</b> | 48               | 2.3                      | 19.0            | 90                   | 654                  | 14,000                       | 8,000                      |

# ARMoured MICRODUCT

**Specification:** Z387, Z410



Outdoor



FTTx



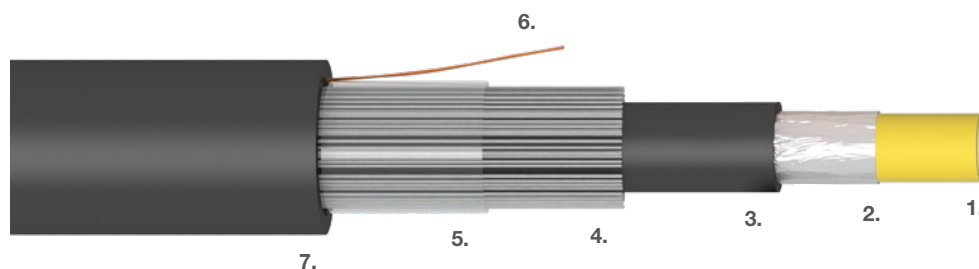
Armoured



Antirodent



Direct  
burial



## Description of materials:

**1.** Microduct. **2.** Moisture barrier. **3.** PE inner jacket, UV stable. **4.** Steel Wire Armour (SWA). **5.** Water-swellable tape. **6.** Rip-Cord. **7.** PE outer jacket, UV stable.

### Temperature range

|              |               |
|--------------|---------------|
| Installation | -15 to +50 °C |
| Operation    | -40 to +70 °C |
| Storage      | -40 to +70 °C |

| Design code | Outer jacket thickness [mm] | Microduct diameter [mm] | Cable size [mm] | Cable weight [kg/km] |
|-------------|-----------------------------|-------------------------|-----------------|----------------------|
| <b>Z387</b> | 1.5                         | 12/10                   | 21.3±0.4        | 564                  |
| <b>Z410</b> | 1.5                         | 14/12                   | 23.8±0.4        | 725                  |

# FLES TUBE

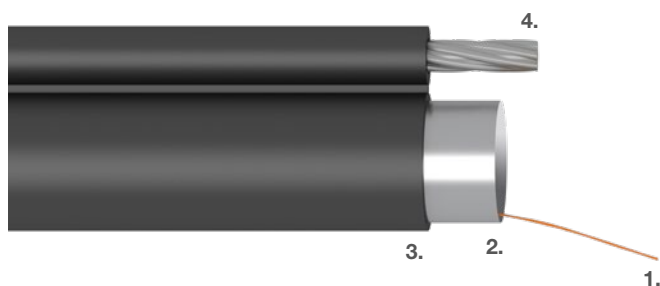
**Specification:** FLES 3.0/8.5, FLES 4.32/20



Outdoor



Aerial



## Description of materials:

**1.** Pulling element. **2.** Moisture barrier. **3.** PE outer jacket, UV stable. **4.** Steel Wire messenger.

### Temperature range

|              |               |
|--------------|---------------|
| Installation | -15 to +50 °C |
| Operation    | -30 to +70 °C |
| Storage      | -40 to +70 °C |

| Design code         | Inner diameter [mm] | Max. width of cable [mm] | Max. height of cable [mm] | Supporting element diameter [mm] | Max. load (installation) [N] |
|---------------------|---------------------|--------------------------|---------------------------|----------------------------------|------------------------------|
| <b>FLES 3.0/8.5</b> | 8.5 ± 0.5           | 14,0                     | 23.5                      | 3.15                             | 8,600                        |
| <b>FLES 4.32/20</b> | 20.0 ± 1.0          | 26.0                     | 38.5                      | 4.32                             | 16,000                       |

# TRACER WIRE

**Specification:** Tracer wire 0.8/1.5, Tracer wire 1.13/2.8



Outdoor



Direct  
burial



## Description of materials:

**1.** Copper wire. **2.** PE outer jacket, UV stable.

### Temperature range

**Installation** -15 to +50 °C

**Operation** -40 to +70 °C

**Storage** -40 to +70 °C

| Design code          | Wire diameter [mm] | Outer diameter [mm] | Cable weight [kg/km] | Cu content [kg/km] |
|----------------------|--------------------|---------------------|----------------------|--------------------|
| Tracer wire 0.8/1.5  | 0.8                | 1.5                 | 6                    | 5                  |
| Tracer wire 1.13/2.8 | 1.13               | 2.8                 | 14                   | 10                 |

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03011


## 6. GENERAL SPECIFICATION

- COLOUR CODE CHARTS
- CODE TABLE
- STRIPABILITY OF THE TIGHT BUFFERED FIBER
- USED ABBREVIATIONS
- PROPERTIES OF THE CABLE SHEATH
- CHEMICAL RESISTANCE TABLE
- FIRE PROPERTIES

# Colour Code Charts

## IEC 60304 (Standard)


### Tight Buffer

|   |   |   |   |   |   |   |  |   |   |   |   |
|---|---|---|---|---|---|---|--|---|---|---|---|
| 1   | 2   | 3   | 4   | 5   | 6   | 7   | 8  | 9   | 10  | 11  | 12  |
|  |  |  |  |  |  |  |  |  |  |  |  |
| red   | green   | blue  | yellow  | white   | grey  | brown   | violet   | aqua  | black   | orange  | pink  |
| 13  | 14  | 15  | 16  | 17  | 18  | 19  | 20   | 21  | 22  | 23  | 24  |
|  |  |  |  |  |  |  |  |  |  |  |  |
| red<br>+ black<br>strip   | green<br>+ black<br>strip   | blue<br>+ black<br>strip  | yellow<br>+ black<br>strip  | white<br>+ black<br>strip   | grey<br>+ black<br>strip  | brown<br>+ black<br>strip   | violet<br>+ black<br>strip   | aqua<br>+ black<br>strip  | black<br>+ white<br>strip   | orange<br>+ black<br>strip  | pink<br>+ black<br>strip  |

### Loose Tube

|   |   |   |   |   |   |   |  |   |   |   |   |
|---|---|---|---|---|---|---|--|---|---|---|---|
| 1   | 2   | 3   | 4   | 5   | 6   | 7   | 8  | 9   | 10  | 11  | 12  |
|    |    |    |    |    |    |    |    |    |    |    |    |
| red   | green   | blue  | yellow  | white   | grey  | brown   | violet   | aqua  | black   | orange  | pink  |
| 13  | 14  | 15  | 16  | 17  | 18  | 19  | 20   | 21  | 22  | 23  | 24  |
|  |  |  |  |  |  |  |  |  |  |  |  |
| red<br>+ black<br>strip   | green<br>+ black<br>strip   | blue<br>+ black<br>strip  | yellow<br>+ black<br>strip  | white<br>+ black<br>strip   | grey<br>+ black<br>strip  | brown<br>+ black<br>strip   | violet<br>+ black<br>strip   | aqua<br>+ black<br>strip  | natur<br>+ black<br>strip   | orange<br>+ black<br>strip  | pink<br>+ black<br>strip  |

### Multi Loose Tube – Tubes Colour Code























|   |   |   |   |
|---|---|---|---|
| 1   | 2   | 3   |   |
|  |  |  |  |
| red   | green   | natur   | white   |

Note: Different colour sequences available on request.

# Colour Code Charts

## TIA/EIA 598

### Tight Buffer

|   |   |   |   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1   | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  | 11  | 12  |
|  |  |  |  |  |  |  |  |  |  |  |  |
| blue  | orange  | green   | brown   | grey  | white   | red   | black   | yellow  | violet  | pink  | aqua  |
| 13  | 14  | 15  | 16  | 17  | 18  | 19  | 20  | 21  | 22  | 23  | 24  |
|  |  |  |  |  |  |  |  |  |  |  |  |
| blue<br>+ black<br>strip  | orange<br>+ black<br>strip  | green<br>+ black<br>strip   | brown<br>+ black<br>strip   | grey<br>+ black<br>strip  | white<br>+ black<br>strip   | red<br>+ black<br>strip   | black<br>+ white<br>strip   | yellow<br>+ black<br>strip  | violet<br>+ black<br>strip  | pink<br>+ black<br>strip  | aqua<br>+ black<br>strip  |

### Loose Tube

|   |   |   |   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1   | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  | 11  | 12  |
|    |    |    |    |    |    |    |    |    |    |    |    |
| blue  | orange  | green   | brown   | grey  | white   | red   | black   | yellow  | violet  | pink  | aqua  |
| 13  | 14  | 15  | 16  | 17  | 18  | 19  | 20  | 21  | 22  | 23  | 24  |
|  |  |  |  |  |  |  |  |  |  |  |  |
| blue<br>+ black<br>strip  | orange<br>+ black<br>strip  | green<br>+ black<br>strip   | brown<br>+ black<br>strip   | grey<br>+ black<br>strip  | white<br>+ black<br>strip   | red<br>+ black<br>strip   | natur<br>+ black<br>strip   | yellow<br>+ black<br>strip  | violet<br>+ black<br>strip  | pink<br>+ black<br>strip  | aqua<br>+ black<br>strip  |

### Loose Tube Cables – Sheath Colour

All Cables



black

### Tight Buffer Cables – Sheath Colour

SM E9/125    G62,5/125 OM1    G50/125 OM2    G50/125 OM3    G50/125 OM4



yellow



blue



orange



aqua



violet

Note: Different sheath colour available on request.

# Code table

## TIGHT BUFFER CABLES

| Position | 1 Character                                       | 2 Character                                 | 3 Character                           | 4 Character                            |
|----------|---|---|---------------------------------------|--|
|          | 0 Fiber in tight SP                               | 0 Buffer only                               | A Acrylate buffer                     | 0 LDPE jacket                          |
|          | 1 Simplex cable                                   | 1 Ø simplex 1.8 mm                          | B                                     | 1 LSZH jacket                          |
|          | 2 Duplex cable                                    | 2 Ø simplex 2.0 mm                          | C –                                   | 2 LSZH jacket + FRP members in jacket  |
|          | 3 Heavy-duplex cable                              | 3 Ø simplex 3.0 mm                          | D –                                   | 3 LDPE jacket + FRP members in jacket  |
|          | 4 Break-out cable                                 | 4 Ø simplex 2.4 mm                          | E –                                   | 4 LSZH / SWA / LSZH                    |
|          | 5 Distribution cable                              | 5 Ø simplex 2.5 mm                          | F LSZH Free-tight buffer              | 5 LSZH / SWA / HDPE                    |
|          | 6 Multi-distribution cable                        | 6 Ø simplex 1.6 mm                          | G –                                   | 6 PVC jacket – inner / universal cable |
|          | 7 Drop cable                                      | 7 Ø simplex 1.7 mm                          | H –                                   | 7 PUR jacket – inner / outdoor         |
|          | 8 Break-out cable without central strenght member | 8 Ø simplex 2.8 mm                          | – –                                   | 8 LSZH / glass yarn / LSZH             |
|          | 9 Quadplex cable                                  | 9 Ø simplex 2.9 mm                          | – –                                   | 9 PUR jacket outdoor only              |
|          |   | A Distribution cable – Aramid               | S LSZH Free-strip (semi-tight) buffer | A HDPE jacket                          |
|          |   | D Distribution cable – Standard             |                                       |  |
|          |   | E Distribution cable – E-glass              | T LSZH Tight buffer                   | B Buffer                               |
|          |   | S Distribution cable – CST                  | – –                                   | S E-glass yarn under jacket            |
|          |   | V Distribution cable – waterblocking Aramid |                                       | K Aramid yarn under jacket             |
|          |   | U Subunits with fibers                      | X LSZH Shielded buffer                | – –                                    |
|          |   | Y –   | Y –                                   | Y HDPE jacket + FRP elements in jacket |
|          |   | Z –   | Z –                                   | Z –                                    |
|          | Z (+number) custom designs                        |   | 0 Fiber without buffer                |  |

## LOOSE TUBE CABLES

| Position | 1 Character                     | 2 Character                                       | 3 Character                    | 4 Character                           |
|----------|---------------------------------|---|--------------------------------|---------------------------------------|
|          | A CLT max. 12 fibers            | 0 –   | 0 –                            | 0 LDPE outer jacket, dry core         |
|          | B CLT max. 24 fibers            | 1 FIG.8 + CST one jacket                          | 1 –                            | 1 LDPE outer jacket, filled core      |
|          | C MLT 6 × 1.7 mm [6×12] – 72    | 2 FIG.8 + CST two jackets                         | 2 Messenger 2.0 mm             | 2 LSZH outer jacket, dry core         |
|          | D MLT 6 × 2.3 mm [6×24] – 144   | 3 4 × 12 in relation to „N“ in the column 1       | 3 Messenger 3.0 mm             | 3 LSZH outer jacket, filled core      |
|          | E MLT 18 × 1.5 mm [18×12] – 216 | 4 6 × 12 in relation to „N“ in the column 1       | 4 Messenger 4.5 mm             | 4 PA outer jacket, dry core           |
|          | F MLT 6 × 2.3 mm [6×12] – 72    | 5 8 × 12 in relation to „N“ in the column 1       | 5 Grounding conductor in core  | 5 PA outer jacket, filled core        |
|          | G MLT 8 × 2.3 mm [8×12] – 96    | 6 12 × 12 in relation to „N“ in the column 1      | 6 Messenger 1.6 mm             | 6 PE / PA outer jacket, dry core      |
|          | H MLT 12 × 2.3 mm [12×12] – 144 | 7 18 × 12 in relation to „N“ in the column 1      | 7 FRP messenger                | 7 PE / PA outer jacket, filled core   |
|          | I MLT 18 × 2.3 mm [18×12] – 216 | 8 FIG. 8  | 8 FRP members in core          | 8 LSZH / PA outer jacket, dry core    |
|          | J MLT 5 × 2.3 mm [5×12] – 60    | 9 24 × 12 in relation to „N“ in the column 1      | 9 FeZn wires in jacket         | 9 LSZH / PA outer jacket, filled core |
|          | K MLT 8 × 2.3 mm [8×24] – 192   | A Aramid (WB)                                     | A –                            | A AL + PE outer jacket, dry core      |
|          | L MLT 4 × 2.3 mm [4×12] – 48    | B –   | B Inner PA jacket              | B AL + PE outer jacket, filled core   |
|          | M MLT 36 × 2.3 mm [36×12] – 432 | C CST one jacket with aramid under jacket         | C Inner PVC jacket             | C –                                   |
|          | N ADSS                          | D CST two jacket with aramid under jacket         | D Supporting element FeZn wire | D –                                   |
|          | P MLT 8 × 1.7 mm [8×12] – 96    | E E-glass   | E –                            | E –                                   |
|          | Q MLT 8 × 1.5 mm [8×12] – 96    | F FRPA  | F Inner FRNC jacket            | F –                                   |
|          | R MLT 12 × 1.7 mm [12×12] – 144 | G –   | G –                            | G PUR outer jacket, dry core          |
|          | S MLT 12 × 2.3 mm [12×24] – 288 | H CST one jacket with E-glass yarns under jacket  | H –                            | H PUR outer jacket, filled core       |
|          | T MLT 6 × 1.5 mm [6×12] – 72    | I CST two jackets with E-glass yarns under jacket | I –                            | I HDPE outer jacket, dry core         |
|          | U MLT 5 × 1.7 mm [5×12] – 60    | J –   | J –                            | J –                                   |
|          | V MLT 18 × 1.7 mm [18×12] – 216 | K –   | K –                            | K HDPE outer jacket, filled core      |
|          | W MLT 12 × 1.5 mm [12×12] – 144 | L Attenuated (lower tensile strenght and jacket)  | L Inner Al/PE                  | L –                                   |
|          | X New custom designs            | M Micro cable (without strenght members)          | M –                            | M –                                   |
|          | Y MLT 12 × 2.8 mm [12×24] – 288 | N –   | N –                            | N –                                   |
|          | Z (+number) custom designs      | P (jacket – aramid – jacket)                      | P Inner PE jacket              | P PVC outer jacket, dry core          |
|          |                                 | Q (jacket – E-glass – jacket)                     | Q –                            | Q PVC outer jacket, filled core       |
|          |                                 | R Improved resistance                             | R 15 kN – 2 jackets            | R –                                   |
|          |                                 | S Self-supporting nonmetallic strength member     | S –                            | S –                                   |
|          |                                 | T Self-supporting dielectric member – two jackets | T –                            | T Track resistant HDPE                |
|          |                                 | U –   | U                              | U –                                   |
|          |                                 | V –   | V                              | V –                                   |
|          |                                 | W SWA two jackets – without strenght members      | W                              | W –                                   |
|          |                                 | X SWA two jackets – aramid on core                | X 3 kN – 1 jacket              | X –                                   |
|          |                                 | Y SWA two jackets – E-glass on core               | Y 6 kN – 2 jackets             | Y –                                   |
|          |                                 | Z –   | Z 9 kN – 2 jackets             | Z –                                   |

# Stripability of the Tight Buffered Fiber

|                       |                               |
|-----------------------|-------------------------------|
| <b>TIGHT (CODE T)</b> | stripability up to 10 cm      |
| <b>FREE (CODE F)</b>  | stripability more than 100 cm |

## Used Abbreviations

|                |  |
|----------------|--|
| <b>LSZH</b>    | LOW <b>S</b> MOKE, <b>Z</b> ERO <b>H</b> ALOGEN                                  |
| <b>LS0H</b>    | LOW <b>S</b> MOKE, <b>Z</b> ERO <b>H</b> ALOGEN                                  |
| <b>LSHF</b>    | LOW <b>S</b> MOKE, <b>H</b> ALOGEN <b>F</b> REE                                  |
| <b>HFFR</b>    | <b>H</b> ALOGEN <b>F</b> REE, <b>F</b> LAME <b>R</b> ETARDANT                    |
| <b>FRNC</b>    | <b>F</b> IRE <b>R</b> ETARDANT, <b>N</b> ON- <b>C</b> ORROSIVE                   |
| <b>FR-LSZH</b> | <b>F</b> IRE <b>R</b> ETARDANT – LOW <b>S</b> MOKE, <b>Z</b> ERO <b>H</b> ALOGEN |

## Properties of the Cable Sheath

|                                       | <b>LDPE</b> | <b>HDPE</b> | <b>PA</b> | <b>FR-LSZH</b> | <b>PUR</b> |
|---------------------------------------|-------------|-------------|-----------|----------------|------------|
| <b>Flexibility</b>                    | Medium      | Low         | Low       | High           | Very High  |
| <b>Water Resistance</b>               | High        | High        | Medium    | Medium         | Medium     |
| <b>Abrasion Resistance</b>            | High        | High        | High      | Low            | High       |
| <b>UV Radiation Resistance</b>        | High        | High        | Low       | High           | High       |
| <b>Brittleness in Low Temperature</b> | Medium      | Medium      | Low       | Medium         | Very Low   |

# Chemical Resistance Table (@ 20 °C)

|                                | LDPE | HDPE | PA | FR-LSZH | PUR |
|--------------------------------|------|------|----|---------|-----|
| Acids, Dilute or Weak          | E    | E    | F  | N       | G   |
| Acids*, Strong or Concentrated | E    | E    | N  | N       | F   |
| Alcohols, Aliphatic            | E    | E    | N  | N       | F   |
| Aldehydes                      | G    | G    | F  | F       | G   |
| Bases                          | E    | E    | F  | G       | N   |
| Esters                         | G    | G    | E  | N       | N   |
| Hydrocarbons, Aliphatic        | F    | G    | E  | F       | E   |
| Hydrocarbons, Aromatic         | F    | G    | E  | N       | N   |
| Hydrocarbons, Halogenated      | N    | F    | G  | N       | N   |
| Ketones                        | G    | G    | E  | N       | N   |
| Oxidizing Agents, Strong       | F    | F    | N  | N       | N   |
| Salts                          | E    | E    | E  | G       | E   |
| Crude Oil                      | N    | N    | G  | F       | F   |
| Kerosene                       | F    | F    | E  | N       | F   |
| Mineral Oil                    | G    | G    | E  | N       | F   |

\* For oxidizing acids, see „Oxidizing Agents, strong“.

**E**

30 days of constant exposure causes no damage. Plastic may tolerate for years.

**G**

Little or no damage after 30 days of constant exposure to the reagent.

**F**

Some effect after 7 days of constant exposure to the reagent.  
The effect may be crazing, cracking, loss of strength or discoloration, depending on the plastic.

**N**

Not recommended. Immediate damage may occur. Depending on the plastic, the effect may be severe crazing, cracking, loss of strength, discoloration deformation, dissolution or permeation loss.

Note: This table must be considered as an orientation.

## Fire properties

|                                 |      | METHOD                                 | COMMENT  |
|---------------------------------|------|--|--|
| Fire properties – Flammability  | pass | EN 60332-3-22 (cat. A)<br>EN 50266-2-2 | - 40 min exposure to flame<br>- length of the burned sample max. 2.5 m |
| Fire properties – Acid gases    | pass | EN 60754-1<br>EN 60754-2               | - min. pH 4.3<br>- max. 10 µS/mm                                       |
| Fire properties – Smoke density | pass | EN 61034-1<br>EN 61034-2               | - min. 60 %  |

Note: Valid for all FR-LSZH sheaths.

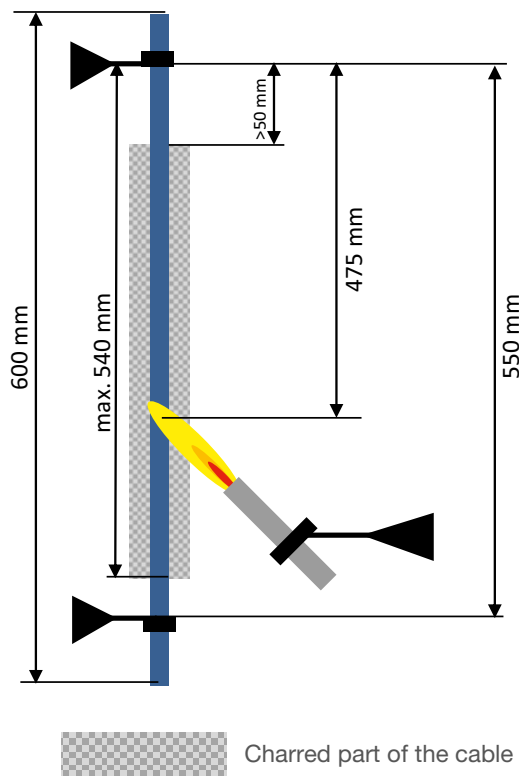
# Fire Properties

## FLAME-RETARDANT

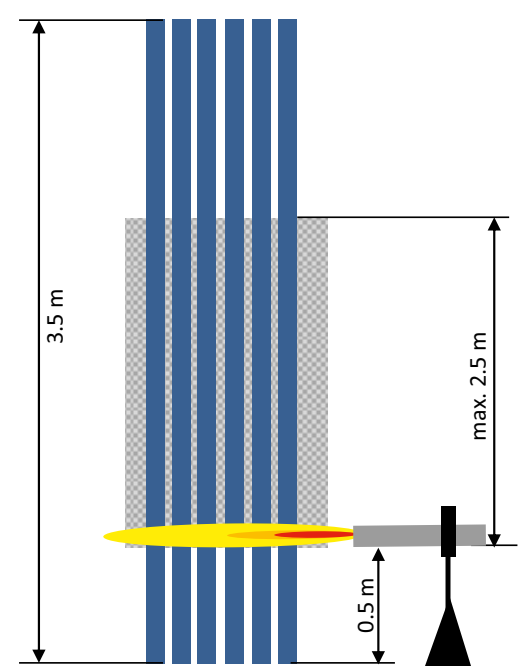
The cable must meet the requirements of the test specified in IEC standard 60332-3 or IEC 60332-1. The cable does not propagate fire and is self-extinguishing.

Notice: You can not assume that if the cable passes the test according 60332-1, a bundle of such cables passing a test 60332-3.

TEST ACC.  
TO IEC 60332-1



TEST ACC.  
TO IEC 60332-3



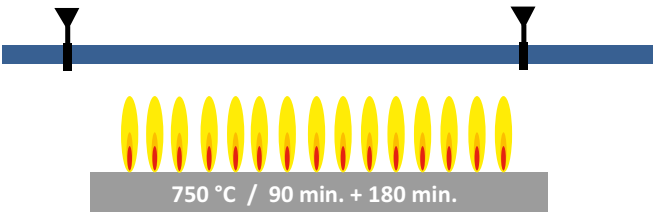
| Cable Diameter   | Burning Time |
|------------------|--------------|
| ≤ 25 mm          | 60 sec       |
| ≥ 25 mm; ≤ 50 mm | 120 sec      |

| Category | Amount of Burning Material | Burning Time |
|----------|----------------------------|--------------|
| A*       | 7.0 lt/m                   | 40 min       |
| B        | 3.5 lt/m                   | 40 min       |
| C        | 1.5 lt/m                   | 20 min       |
| D        | 0.5 lt/m                   | 20 min       |

\* KDP Cables

## FIRE-RESISTANT

The cable must meet the requirements test specified in standard IEC 60331-11 and 25. The cable must be functional a minimum of 90 minutes in direct fire.







## 7. INSTALLATION AND MANIPULATION

- INTRODUCTION
- MANIPULATION AND STORAGE
- REWINDING/UNWINDING OF CABLE
- BEND RADIUS OF CABLE
- PULL STRENGTH OF CABLE
- VERTICAL INSTALLATION
- TWIST OF CABLE

# Introduction

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It is very easy to damage optical cables if manipulation with them is incorrect or if important installation procedures are not followed.

The information stated below should be taken into consideration when installing and manipulating with optical cables. Violating any of the basic rules can result in worsening of the cable's transfer characteristics or it can permanently damage it and shorten its lifetime. The handbook can also serve as a guideline for solving problem not only related to the installation of new cables but also for possible problems of cables, which have already been installed.

There is an assumption that the customer has general knowledge about the design of optical cables and the terminology related to it. If necessary, please contact KDP.

Symbols Used:



RECOMMENDED



NOT RECOMMENDED

# Manipulation and Storage

The drums with the cables cannot be thrown from any heights!  
The drums with optical cables have to always stand on the edges of the head, secured with a wedge to prevent movement. The only time when it is not necessary to secure the drums with a wedge is when the drums are mutually secured between each other by standing them crosswise. /Pic. 1

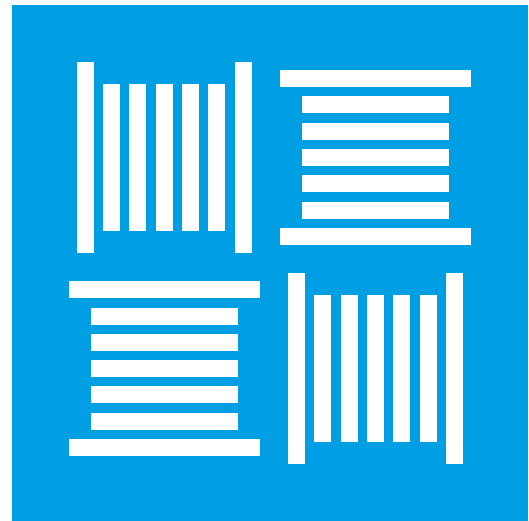
It is possible to store HEAVYDUPLEX, SIMPLEX, DUPLEX type cables and coils with cables up to 4mm in diameter by laying them on the head. However, the cable has to be fastened by shrink wrap to prevent the loosening of individual cable coils.

Cables intended for internal use can only be stored in closed areas without humidity. Cables for universal and outdoor use can be stored in outdoor conditions. However, the cable ends have to be waterproof. However, if the cable is on a plywood spool, it has to be stored in such a manner so as to prevent the effects of water on the spool.

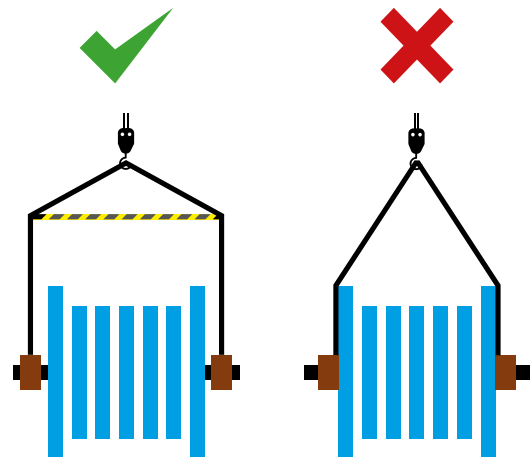
When manipulating with the drums using a crane, a spacer rod has to be placed between the load bearing ropes, so that the ropes do not exert pressure on the cable through the side drums. /Pic. 2

When lifting the drums using a forklift, the drums can only be gripped from the sides and only when the skids of the forklift are long enough for the head of the drum to be positioned on it with a safe overhang. /Pic. 3

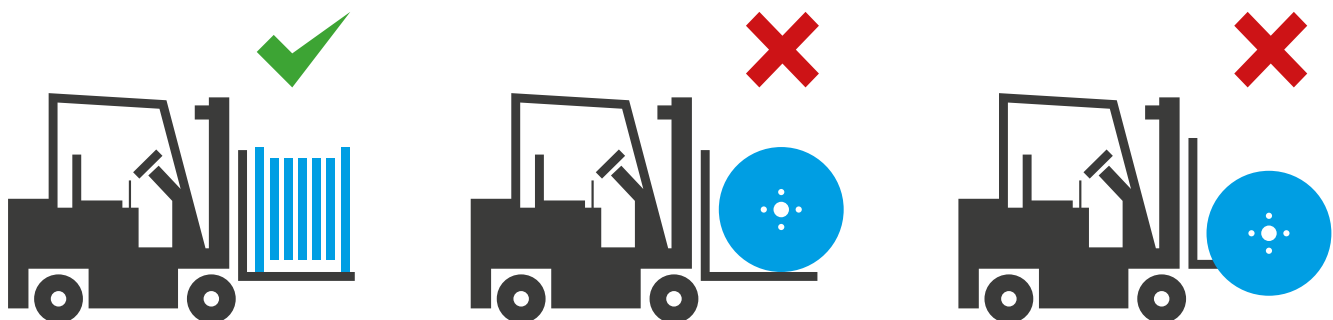
It is only possible to roll the drums short distances and only on a hard and flat surface.



Pic. 1



Pic. 2

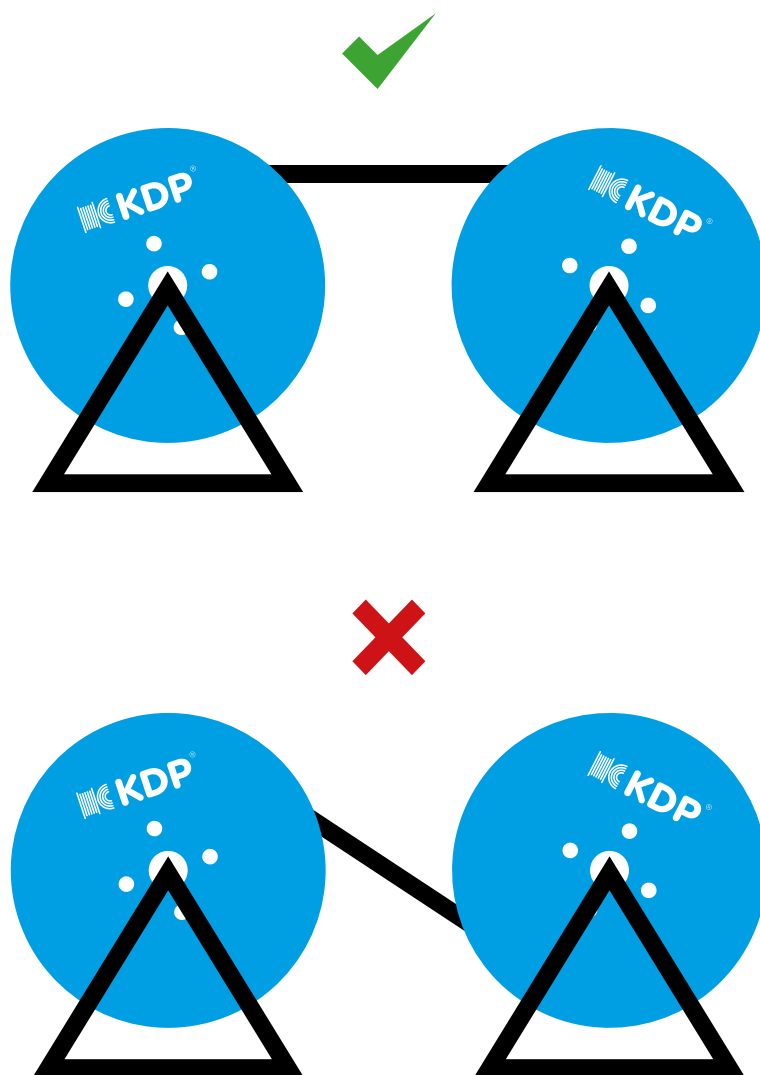


Pic. 3

## Rewinding/Unwinding of Cable

The rewinding and unwinding of cables is only possible in temperature above 5 °C. If for any reason, it is necessary to unwind the cable in a lower temperature, the cable has to be left at a minimum temperature of 20 °C for at least 24 hours beforehand. For rewinding the cable, the winding (bending) direction of the cable has to be maintained, unwinding cannot form an “S” shape. /Pic. 4

When unwinding the cable, it is necessary to maintain continuous pull without variation. Unwinding without pull can then lead to the loosening of individual rolls and to the consequent mutual under pull, possibly to the uncontrolled, sharp tugging of the cable, resulting in the damaging of the optical fibers.

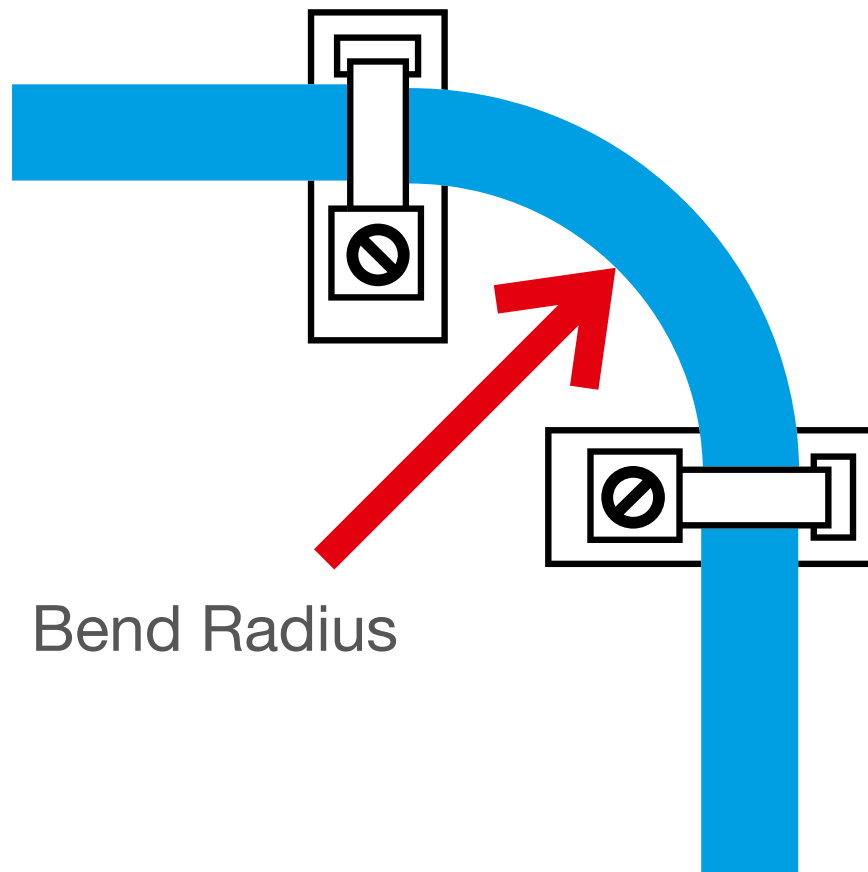


Pic. 4

## Bend Radius of Cable

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This value is defined by the cable manufacturer and exceeding this value can cause invisible fiber damage, which does not have to be evident immediately following installation, but later on. Therefore, it is important to follow the minimum bend diameter not only during in-stallation but also for a cable, which has already been installed.



Pic. 5

## Pull Strength of Cable

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Unless stated otherwise, all optical cables manufactured at KDP are designed for conditions under which there is not pull strain exerted during operations, or only such a pull that the fiber in the cable is not strained (such an option is stated in the cable specification). If the straining of cables takes place in operations, we recommend consulting such situation with KDP prior to cable installation.

The maximum pull defined is for the purpose of cable installation and this value should never be exceeded! It is not force that snaps the cable in two, but the limit which guarantees that the fibers will not be damaged.

For checking purposes, upon installation, it is strongly recommended to place a mid-cable and a pull cable measuring pull for the continuous monitoring of the current cable pull. If necessary, also record a video of the course of installation, which then significantly aids in resolving consequent problems following installation. In order to decrease resistance when dragging, it is suitable to use a lubricant. Prior to use, verify that it is compatible with the material of the cable coating.

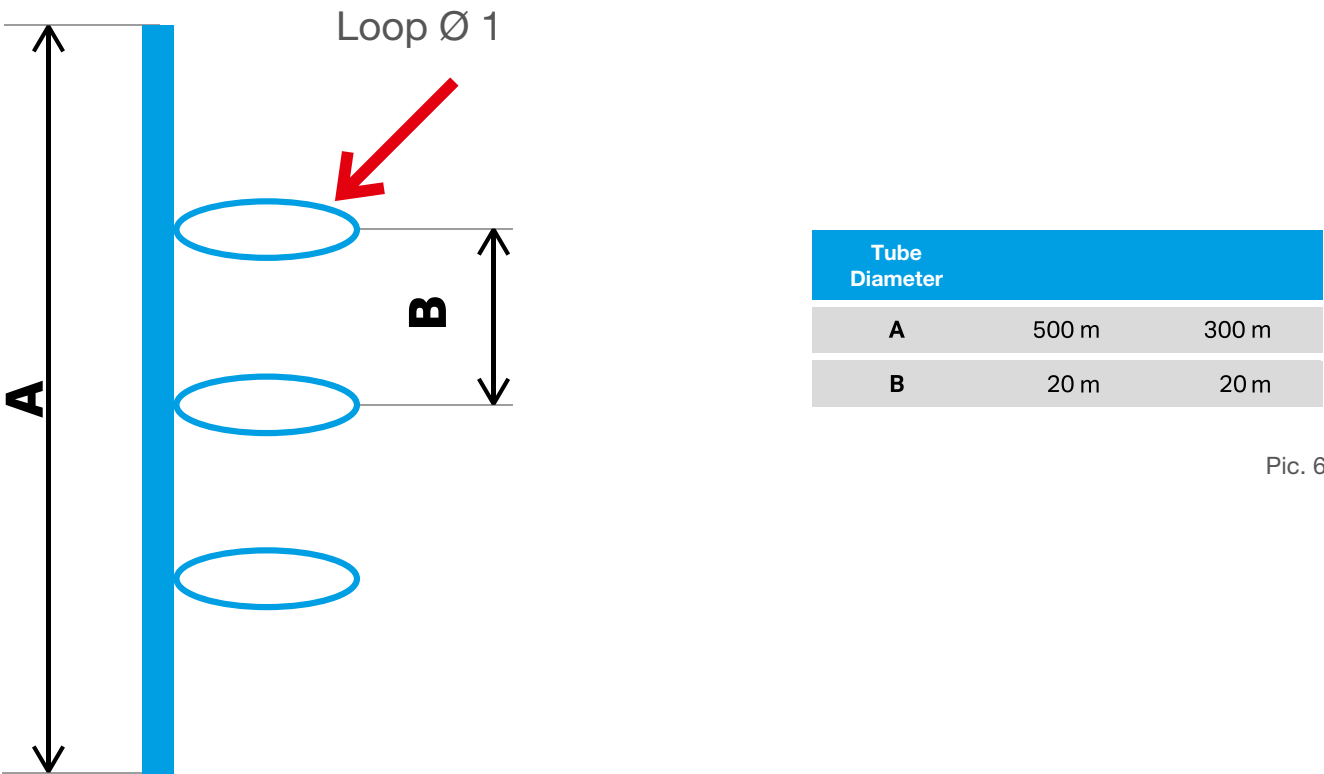
# Vertical Installation

A gel, resistant to dripping up to 70 °C for a period of 24 hours, is used in optical KDP cables. This gel is also excludes oil and maintains its characteristics for the entire lifetime of the cable. Therefore, it is possible to install optical cables with independent secondary protection, a gel-filled tube, vertically, either as a construction with one central tube as well as multi-tube cables. This does not apply for multi-tubes, where the inner cable tube (the space between the individual tubes) is filled with gel. We do not recommend installing such cables vertically.

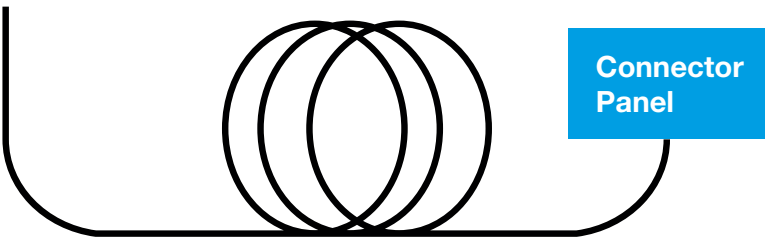
Conditions for the bend radius of the pull strength and other parameters are the same as for any common horizontal installation. The procedure applies for installation outdoors as well as indoors, sewage systems, etc.

The vertical placement of cables has to be fastened by clamps, to prevent sliding. The maximum distance between individual clamps has to be such, where the weight of the cables between the clamps exceeds the pull strength and does not strain the fibers in the cable. Horizontal loops will form on vertically running cable as a relief element and protection against the possible movement of the cable in case of vibration of the load bearing construction against fixed mounting in the lower part of the cable. The distance of the loops depends on the inner diameter of the tubes in the cable. /Pic. 6

If the cable in the lower part directly enters into the connector panel, it should enter by 3 loops. The purpose of this is to compare the change in the lengths of cables given the change in temperatures. This is from the lower part of the panel. /Pic. 7



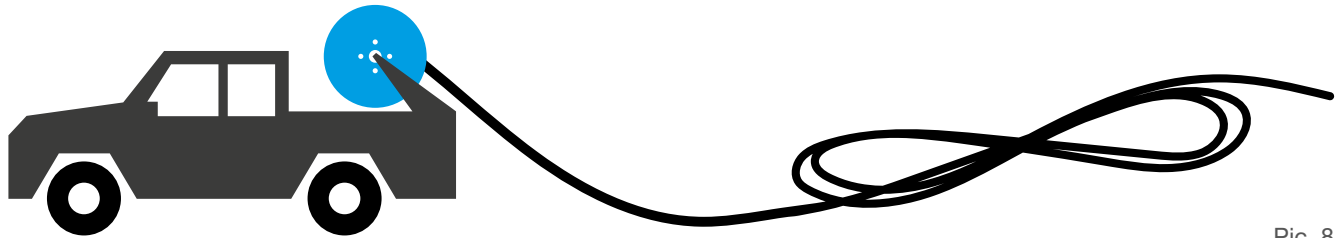
Pic. 6



Pic. 7

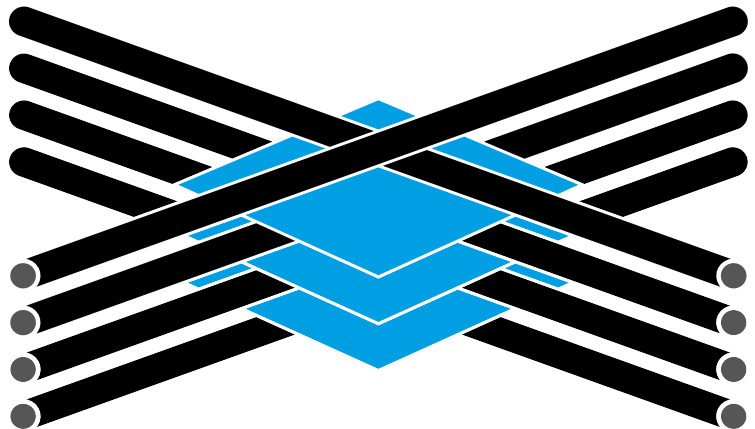
# Twist of Cable

Avoid twisting the cable during installation because this can cause stress to the fiber. If you install a cable longer than 30 m and you are pulling it through a narrower section (for example, underground), unwind the cable beforehand. Place cables freely in a figure eight on the floor. /Pic. 8. Placing cables in a loop prevents twisting. The diameter of the loop should be 2–4 m, depending on the rigidity of the cable. The length of the figure eight is 8–10 m.



Pic. 8

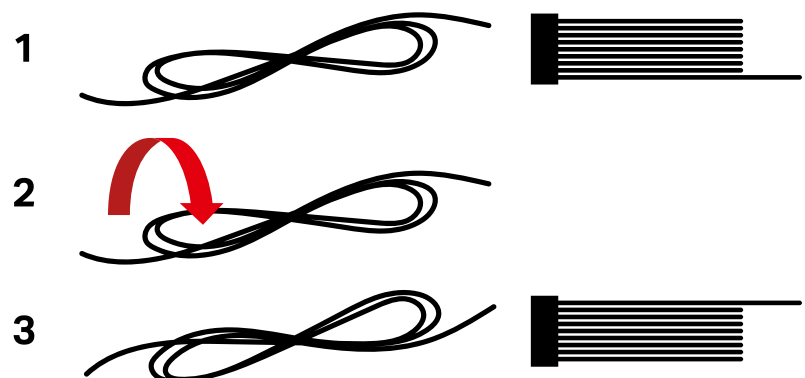
It is recommended to place for example, cardboard paper between individual rolls.  
Pic. 9



Pic. 9

Prior to taking the cable from the figure eight, tilt it by 180°, with the aid of other individuals, so that the beginning of the cable is facing upward. /Pic. 10

After pulling it through, do not wind it back up onto the drum, but place it back in a figure eight for further laying.



Pic. 10

## This image shows a single sheet of white paper with horizontal blue ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.





 KDP |  KDP - World Connecting Cables

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