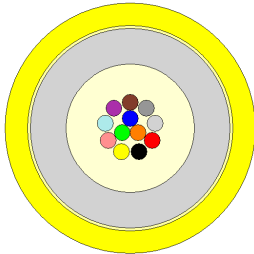


## Unitube Mini Cables for use in Ducts

### Cable Design

IEC/EN 60794



- not to scale -

- **Loose Tube:** thermoplastic material, containing optical fibres and filled with a suitable water tightness compound. Fibres are uniquely colour coded to identify the fibres within the tubes. For 24 or more fibres in a tube, fibres are grouped in 12 fibre bundles, identified by coloured yarns combined with ring marking on the fibres.
- **Strength members:** aramid yarns are applied in the cable.
- **Outer sheath:** consists of halogen free high-density polyethylene compound.

This loose tube dielectric optical cable is designed for outdoor installation in ducts and microducts by blowing techniques.

### Technical data

| No. of Fibres    |         | 6   | 8 | 12   | 24 | 36  | 48 |
|------------------|---------|-----|---|------|----|-----|----|
| Loose Tube- Ø    | mm      | 2.4 |   | 3.1  |    | 3.3 |    |
| Sheath thickness | mm      |     |   | 0.4  |    |     |    |
| Cable Diameter   | mm      | 3.2 |   | 3.9  |    | 4.2 |    |
| Cable Weight     | kg / km | 10  |   | 12.5 |    | 15  |    |

### Main characteristics

| Test                             | Standard          | Specified value                                  | Acceptance Criteria <sup>(3)</sup>                            |
|----------------------------------|-------------------|--------------------------------------------------|---------------------------------------------------------------|
| Tensile Performance              | IEC 60794-1-2-E1  | 250 N                                            | $\Delta\alpha \leq 0.05$ dB                                   |
| Crush                            | IEC 60794-1-2-E3  | 1500N, 100mm plate/plate 1min.                   | $\Delta\alpha \leq 0.05$ dB, no damage                        |
| Impact                           | IEC 60794-1-2-E4  | 5 Nm, R=200mm, 3 impacts                         | no damage                                                     |
| Torsion                          | IEC 60794-1-2-E7  | $\pm 180^\circ$ , L=1m, 10 cycles                | $\Delta\alpha \leq 0.05$ dB, no damage                        |
| Kink                             | IEC 60794-1-2-E10 | min diameter=10x cable Ø                         | no damage                                                     |
| Repeated bending                 | IEC 60794-1-2-E6  | R= 15x cable Ø, 100 cycles, 20N                  | no damage                                                     |
| Cable bend                       | IEC 60794-1-2-E11 | R= 10x cable Ø, 5 turns, 3 cycles <sup>(1)</sup> | $\Delta\alpha \leq 0.05$ dB, no damage                        |
| Temperature range <sup>(2)</sup> | IEC 60794-1-2-F1  | -30 to +60°C<br>-40 to +70°C                     | $\Delta\alpha \leq 0.05$ dB<br>$\Delta\alpha \leq 0.10$ dB    |
| Water Penetration                | IEC 60794-1-2-F5B | sample=3m, water=1m                              | no water leakage after 24h                                    |
| Min. bending radius              | mm                | Without Tension<br>15 x Cable-Ø                  | Under Maximum Tension<br>25 x Cable-Ø                         |
| Temperature range                | °C                | Installation<br>-10 to +50                       | Transport. & Storage<br>-40 to +70<br>Operation<br>-30 to +60 |

<sup>(1)</sup> at room temperature  $23^\circ\text{C} \pm 2^\circ\text{C}$  <sup>(2)</sup> temperature cycling test shall be performed on cable coil (without drum)

<sup>(3)</sup> all optical measurements at 1550 nm (SMF) and 1300 nm (MMF). Acceptance criteria for MM fibres  $\leq 0.5$  dB for all tests instead of 0.05 dB (SMF).

### Optical Characteristics

According to standard IEC 61280-4-1 and IEC 61280-4-2.

Optical measurements at 1550nm and 1310nm for single-mode fibres.

Optical measurements at 1300nm and 850nm for multi-mode fibres.

All final OTDR measurements shall be delivered in digital format to Cern identified with cable type and ID no.

## Identification

### Fibre Colours

| No.    | 1                | 2                  | 3                   | 4                 | 5                  | 6                   | 7                  | 8                  | 9                   | 10                | 11                | 12                |
|--------|------------------|--------------------|---------------------|-------------------|--------------------|---------------------|--------------------|--------------------|---------------------|-------------------|-------------------|-------------------|
| Colour | red              | white              | yellow              | blue              | green              | violet              | brown              | black              | orange              | aqua              | pink              | grey              |
|        |                  |                    |                     |                   |                    |                     |                    |                    |                     |                   |                   |                   |
| No.    | 13               | 14                 | 15                  | 16                | 17                 | 18                  | 19                 | 20                 | 21                  | 22                | 23                | 24                |
| Colour | red <sup>1</sup> | white <sup>1</sup> | yellow <sup>1</sup> | blue <sup>1</sup> | green <sup>1</sup> | violet <sup>1</sup> | brown <sup>1</sup> | white <sup>4</sup> | orange <sup>1</sup> | aqua <sup>1</sup> | pink <sup>1</sup> | grey <sup>1</sup> |
|        |                  |                    |                     |                   |                    |                     |                    |                    |                     |                   |                   |                   |
| No.    | 25               | 26                 | 27                  | 28                | 29                 | 30                  | 31                 | 32                 | 33                  | 34                | 35                | 36                |
| Colour | red <sup>2</sup> | white <sup>2</sup> | yellow <sup>2</sup> | blue <sup>2</sup> | green <sup>2</sup> | violet <sup>2</sup> | brown <sup>2</sup> | white <sup>5</sup> | orange <sup>2</sup> | aqua <sup>2</sup> | pink <sup>2</sup> | grey <sup>2</sup> |
|        |                  |                    |                     |                   |                    |                     |                    |                    |                     |                   |                   |                   |
| No.    | 37               | 38                 | 39                  | 40                | 41                 | 42                  | 43                 | 44                 | 45                  | 46                | 47                | 48                |
| Colour | red <sup>3</sup> | white <sup>3</sup> | yellow <sup>3</sup> | blue <sup>3</sup> | green <sup>3</sup> | violet <sup>3</sup> | brown <sup>3</sup> | white <sup>6</sup> | orange <sup>3</sup> | aqua <sup>3</sup> | pink <sup>3</sup> | grey <sup>3</sup> |
|        |                  |                    |                     |                   |                    |                     |                    |                    |                     |                   |                   |                   |

<colour><sup>1</sup> with black ring marks every 50mm <colour><sup>2</sup> with double black ring marks every 50mm <colour><sup>3</sup> with triple black ring marks every 50mm  
 <colour><sup>4</sup> with black ring marks every 25mm <colour><sup>5</sup> with double black ring marks every 25mm <colour><sup>6</sup> with triple black ring marks every 25mm

### Yarn Colouring

| No.       | 1   | 2     | 3      | 4    |
|-----------|-----|-------|--------|------|
| Colour    | red | white | yellow | blue |
|           |     |       |        |      |
| 12SM+12MM | SM  | MM    |        |      |

### Sheath Colour

| Fibre  | G.652.D | G.657.A1 | G.657.A2 | G.651 OM2 | G.651 OM3 | G.651 OM4 | SM + MM |
|--------|---------|----------|----------|-----------|-----------|-----------|---------|
| Colour | yellow  | yellow   | yellow   | orange    | aqua      | magenta   | green   |
|        |         |          |          |           |           |           |         |

### Sheath Marking:

The outer sheath is marked in 1 meter intervals as follows

**OPTICAL FIBRES - <cern code> - <fibre count> <fibre type> PCVD/APVD P-FREE - PE - ZH -  
 DRAKA/JN-URE / <cable id number> - <yyyy>/<mm> - <length marking>m**

| Article no. | Sheath marking sample                                                                                                         |
|-------------|-------------------------------------------------------------------------------------------------------------------------------|
| 60055602    | OPTICAL FIBRES - XCMS022 - 6 G.657A2 PCVD/APVD P-FREE - PE - ZH - DRAKA/JN-URE / 1234567 - 2017/03 - 1234 m                   |
| 60045970    | OPTICAL FIBRES - XCMS002 - 12 G.657A2 PCVD/APVD P-FREE - PE - ZH - DRAKA/JN-URE / 1234567 - 2017/03 - 1234 m                  |
| 60046074    | OPTICAL FIBRES - XCMS014 - 24 G.657A2 PCVD/APVD P-FREE - PE - ZH - DRAKA/JN-URE / 1234567 - 2017/03 - 1234 m                  |
| 60024482    | OPTICAL FIBRES - XCMS024 - 24 G.652D PCVD/APVD P-FREE - PE - ZH - DRAKA/JN-URE / 1234567 - 2017/03 - 1234 m                   |
| 60024088    | OPTICAL FIBRES - XCML024 - 24 G.651.1/OM3 PCVD/APVD P-FREE - PE - ZH - DRAKA/JN-URE / 1234567 - 2017/03 - 1234 m              |
| 60029316    | OPTICAL FIBRES - XCMIO24 - 12 G.652D + 12 G.651.1/OM3 PCVD/APVD P-FREE - PE - ZH - DRAKA/JN-URE / 1234567 - 2017/03 - 1234 m  |
| 60049053    | OPTICAL FIBRES - XCMX008 - 12 G.657A2 + 12 G.651.1/OM3 PCVD/APVD P-FREE - PE - ZH - DRAKA/JN-URE / 1234567 - 2017/03 - 1234 m |
| 60050849    | OPTICAL FIBRES - XCMS020 - 48 G.657A2 PCVD/APVD P-FREE - PE - ZH - DRAKA/JN-URE / 1234567 - 2017/03 - 1234 m                  |

## Logistic

### Packing:

Plastic drums with protection.

### Delivery Length:

Standard delivery length is 4km

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