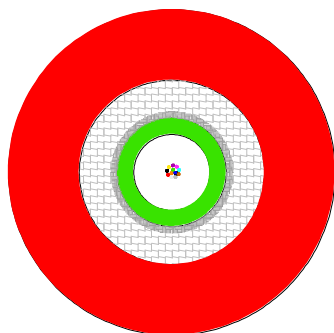


Firetuf™ OFC-UT-NM Fire resistant Universal Central Tube Cable, variant in red

Indoor/Outdoor non-metallic LSHF-FR sheathed optical cable with 2 – 24 fibers. VDE: A/I-DQ(ZN)H



3rd party verification of the fire tests by BUREAU VERITAS December 2014

Application and installation

The application of this cable is circumstances where a very high degree of fire safety is required as the cable will function during a fire, has limited fire spread, has limited smoke generation and is halogen free.

The typical installation environment is indoor and indoor/outdoor in and between public buildings, in tunnels, metro lines and other places where one need very high degree of fire safety and support for critical communication.

This cable is also suitable shipboard application.

The primary means of installation is on cable ladders, raceways and cable trays. The cable may also be pulled or blown into ducts over short distances. The cable may also be installed outdoor in the open, as the cable sheath is UV stabilised. However we do recommend the cable to be covered in order avoid tampering. The UV stabilisation of the cable sheath insure more than 15 years of safe operation in the open when installed in Northern Europe or the UK.

Standards

ISO 11801 2nd edition, EN 50173-1:2002, IEC 60794-1

Fire rating

Fire resistance tests

| | |
|------------------------|--|
| IEC 60331-25 (120) | Fire resistance: 120 minutes at 750 °C (No fibre break) |
| EN 50200 PH 120 | Fire resistance with fire and impact 120 minutes 830 °C (No fibre break) |
| EN 50200 ANNEX E PH 30 | Fire resistance until 15 minutes of fire and impact alone , followed by 15 minutes of fire , impact and water spray at 830 °C (No fibre break) |
| BS 8434 - 2 | Fire resistance until 60 minutes of fire and impact alone , followed by 60 minutes of fire , impact and water spray at 930 °C (No fibre break) |

Flame retardant tests

| | |
|---------------|---------------------------|
| IEC 60332-1-2 | Single vertical wire test |
|---------------|---------------------------|

Flame propagation test

| | |
|------------------|---|
| IEC 60332-3-24 = | Vertically-mounted bunched wires and cables |
| IEC 332-3C | |

Halogen acid & gas tests

| | |
|-------------|-----------------|
| IEC 60754-1 | No halogens |
| IEC 60754-2 | No acid matters |

Smoke emission tests

| | |
|-------------|----------------|
| IEC 61034-2 | No dense smoke |
|-------------|----------------|

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Construction

| | | | | |
|-------------------|--|-----------|----|------------------------------|
| Loose tube | Ø4.0 mm jelly filled loose tube green colored with up to 2 - 24 fibres | | | |
| Fibre colour code | 1 | Red | 13 | Yellow w/mark per 100 mm |
| | 2 | Green | 14 | White w/mark per 100 mm |
| | 3 | Blue | 15 | Grey w/mark per 100 mm |
| | 4 | Yellow | 16 | Turquoise w/mark per 100 mm |
| | 5 | White | 17 | Orange w/mark per 100 mm |
| | 6 | Grey | 18 | Pink w/mark per 100 mm |
| | 7 | Brown | 19 | Yellow w/mark every 50 mm |
| | 8 | Violet | 20 | White w/mark every 50 mm |
| | 9 | Turquoise | 21 | Grey w/mark every 50 mm |
| | 10 | Black | 22 | Turquoise w/mark every 50 mm |
| | 11 | Orange | 23 | Orange w/mark every 50 mm |
| | 12 | Pink | 24 | Pink w/mark every 50 mm |
| Fire barrier | Tape(s) | | | |
| Strength member | Water blocked E-Glass fibre elements | | | |
| Ripcord | 1 | | | |
| Sheath | 2.5 mm red LSHF-FR sheath according to EN 50290-2-27, UV stabilised | | | |
| Print legend | Draka Firetuf by Prysmian Group FO I/O CT LSHF-FR 2.0 kN <Fibre count> <Fibre type><Fibre brand><Item No>22<Batch Number> <Meter mark> | | | |

Physical properties

IEC 60794-1

| Property | Test method | Value |
|---------------------------------------|-------------|---|
| Nominal outer diameter | - | 12.1 mm |
| Nominal weight | - | 167 kg/km |
| Maximum installation tensile strength | E1 | 2000 N ($\Delta l/l$ fibre $\leq 0.5\%$, $\Delta\alpha$ reversible) * |
| Compressive strength (crush) | E3 | 1500 N / 100 mm, max 5 min ($\Delta\alpha$ reversible) * |
| Impact | E7 | No fibre break; 5 Nm, 3 impacts, $r=300$ mm, |
| Torsion | E7 | 5 cycles ± 1 turn |
| Kink | E10 | The cables do not form a kink when a loop is drawn together to a diameter of $20 \times D$ (Cable diameter) mm |
| Min. bending radius, unloaded | E11 | $R = 121$ mm |
| Min. bending radius, loaded | - | $R = 240$ mm |
| Temperature range | F1 | Storage: -30°C to $+60^{\circ}\text{C}$ Installation: 0°C to $+50^{\circ}\text{C}$ Operation: -25°C to $+70^{\circ}\text{C}$. ($\Delta\alpha$ 0.05 dB/km)** |
| Water penetration | F5B | No water leakage after 24 hour, sample=3m, water=1m, |

* Values for single-mode fibres, all optical measurements performed at 1550 nm,

** Values for multi-mode fibres, all optical measurements performed at 850 nm or 1300 nm with 0.10 dB as threshold (tensile and crush will not be performed for MM fibres)

Product codes – ordering information

| Prysmian group material | Prysmian Group material description | Draka Material code | Fibre count | Fibre type | Fibre data sheet |
|-------------------------|-------------------------------------|---------------------|-------------|------------|------------------|
|-------------------------|-------------------------------------|---------------------|-------------|------------|------------------|

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| | | | | | |
|------|--|--|--|--|--|
| code | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

Delivery form: Wooden drum with protection.
Standard delivery length: 4 km with a tolerance of -+ 5%.

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C02: General purpose 62.5 µm fibre

Properties of cabled OM1 fibre for use at 850 nm and at 1300 nm

General and application

This fibre is a graded-index multimode fibre suitable for transmission speeds of up to 10 Gb/s (33m 10GBASE-SX). It has a 62.5 µm core diameter and a 125 µm cladding diameter. The fibre is designed for use at 850 and/or 1300 nm.

This fibre is suitable for use in premises wiring application like LAN's with video, data and or voice services using LED, VCSEL and Fabry-Perot laser sources.

Standards

| | |
|------------------------------|---|
| IEC 60793-2-10 Category A1b | ISO/IEC 11801 category OM1. |
| EN 60793-2-10: type A1b | IEEE 802.3 - 2002. with amendment 802.3ae - 2002. |
| TIA/EIA-492 AAAA | ANSI/TIA/EIA-568.B.3 – 2000 |
| EN 50173-1:2007 category OM1 | IBM™ Fibre Optic Channel Links; ESCON™ |

Optical properties

| Attribute | Measurement method | Units | Limits |
|--|--------------------|-------|----------|
| Attenuation limit according to IEC 60793-2-10, 850 nm | IEC 60793-1-40 | dB/km | ≤ 3.5 |
| Attenuation limit according to IEC 60793-2-10, 1300 nm | IEC 60793-1-40 | dB/km | ≤ 1.5 |
| Inhomogeneity of OTDR trace for any two 1000 metre fibre lengths | IEC 60793-1-40 | dB/km | Max. 0.1 |

Cable attenuation

| | | | |
|---|----------------|-------|-------|
| Maximum attenuation value of cable at 850 nm | IEC 60793-1-40 | dB/km | ≤ 3.2 |
| Maximum attenuation value of cable at 1300 nm | IEC 60793-1-40 | dB/km | ≤ 1.0 |

Bandwidth

| | | | |
|---|----------------|----------|-------|
| Overfilled (OFL) modal bandwidth at 850 nm | IEC 60793-1-41 | MHz • km | ≥ 200 |
| Overfilled (OFL) modal bandwidth at 1300 nm | IEC 60793-1-41 | MHz • km | ≥ 600 |
| Effective Modal Bandwidth (EMB) at 850 nm | IEC 60793-1-49 | MHz • km | - |

Group index of refraction

| | | | |
|--------------------------------------|----------------|---|-------|
| Group index of refraction at 850 nm | IEC 60793-1-22 | - | 1.496 |
| Group index of refraction at 1300 nm | IEC 60793-1-22 | - | 1.491 |

C02: General purpose 62.5 μm fibre

Geometrical properties

| Attribute | Measurement method | Units | Limits |
|--|--------------------|-------|-------------|
| Core diameter | IEC 60793-1-20 | μm | 62.5 ± 2.5 |
| Cladding diameter | IEC 60793-1-20 | μm | 125.0 ± 1.0 |
| Cladding non-circularity | IEC 60793-1-20 | % | ≤ 1.0 |
| Core non-circularity | IEC 60793-1-20 | % | ≤ 5 |
| Core-cladding concentricity error | IEC 60793-1-20 | μm | ≤ 1.5 |
| Primary coating diameter – uncoloured | IEC 60793-1-21 | μm | 242 ± 7 |
| Primary coating diameter - coloured | IEC 60793-1-21 | μm | 250 ± 15 |
| Primary coating non-circularity | IEC 60793-1-21 | % | ≤ 5 |
| Primary coating-cladding concentricity error | IEC 60793-1-21 | μm | ≤ 6 |

Mechanical properties

| Attribute | Measurement method | Units | Limits |
|-----------------------------|--------------------|-------|-------------------------------------|
| Proof stress level | IEC 60793-1-30 | GPa | ≥ 0.7 (≈ 1 %) |
| Typical average strip force | IEC 60793-1-32 | N | 1.7 |
| Strip force (peak) | IEC 60793-1-32 | N | 1.3 ≤ F _{peak.strip} ≤ 8.9 |

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