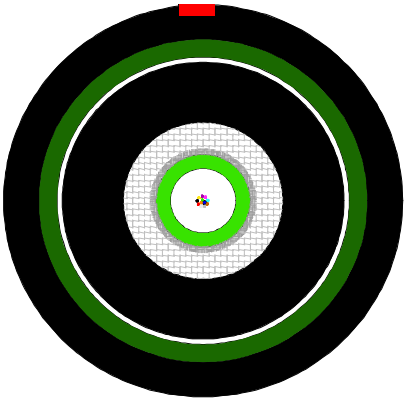
# Firetuf™ OFC-UT-CST Fire resistant Armoured Central Tube Cable

## Indoor/Outdoor steel tape armoured (CST) double LSHF-FR sheathed optical cable with 2 – 24 fibres.
## VDE: A/I-DQ(ZN)H(SR)H



OFC-UT-CST 1X24E9/125

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 for shipboard application.
The steel tape armouring makes the cable rodent proof.
The primary means of installation are on cable ladders, raceways and cable trays. The cable may however also be directly buried. The cable can be installed outdoor in the open, but shall be not be installed directly exposed to the sun.

## Standards

ISO 11801, EN 50173, IEC 60794-1, IEC 60794-2-

## 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 = IEC 332-3C | Vertically-mounted bunched wires and cables |
| **Halogen acid & gas tests** | |
| IEC 60754-1 | No halogens |
| IEC 60754-2 | No acid matters |
| **Smoke emission tests** | |
| IEC 61034-2 | No dense smoke |

# Firetuf™ OFC-UT-CST Fire resistant Armoured Central Tube Cable

## 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 | | | |
| Inner sheath | 2.5 mm black LSHF-FR sheath according to EN 50290-2-27, UV stabilised | | | |
| Armouring | Coated and corrosion protected corrugated steel tape (CST), thickness 0.15 mm | | | |
| Ripcord | 1 | | | |
| Outer sheath | 1.4 mm black with red stripe LSHF-FR sheath according to EN 50290-2-27, UV stabilised | | | |
| Print legend | Draka Firetuf OFC-UT-CST CI-LSHF I/O <fibre count> <fibre type> <fibre brand> <item number> <batch number> ISO11801 EN50173-1 IEC60794-1 IEC61034-2 IEC60754-1+2 IEC60332-3-24 EN50200e PH30 EN50200 PH120 BS8434-2 IEC60331-25 <Transmission class> Prysmian Group | | | |

## Physical properties

**IEC 60794-1**

| Property | Test method | Value |
|---|---|---|
| Nominal outer diameter | - | 17 mm |
| Nominal weight | - | 351 kg/km |
| Maximum installation tensile strength | E1 | 3500 N (Δl/l fibre ≤0.5%, Δα reversible) * |
| Compressive strength (crush) | E3 | 5000 N / 100 mm, max 5 min (Δα reversible ) * |
| Impact | E7 | 50 Nm, No fibre break, 3 impacts, r=300mm, |
| 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 20xD (Cable diameter) mm |
| Min. bending radius, unloaded | E11 | R = 255 mm |
| Min. bending radius, loaded | - | R = 340 mm |
| Temperature range | F1 | Storage: -40°C to +80°C<br>Installation: 0°C to +50°C<br>Operation: -40°C to +70°C. (Δ α 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)

# Firetuf™ OFC-UT-CST Fire resistant Armoured Central Tube Cable

| Prysmian group material code | Prysmian Group material description | Fibre count | Fibre type | Fibre data sheet |
|---|---|---|---|---|
| | OFC UT CST 12 OM3 C31-1 | 12 | MaxCap-BB-OM3 | C31 |
| | OFC UT CST 24 OM3 C31-1 | 24 | MaxCap-BB-OM3 | C31 |
| | OFC UT CST 12 OS2 C03-1 | 12 | ESMF single mode G.652.D | C03 |
| | OFC UT CST 24 OS2 C03-1 | 24 | ESMF single mode G.652.D | C03 |

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

# C31: MaxCap-BB-OM3 Multimode Fibre

## Specifications of cabled bend-insensitive OM3 fibre

### General and Application

Prysmian MaxCap BendBright® OM3, laser-optimised, bend-insensitive, graded-index multimode fibres are designed for transmission speeds of 10 Gb/s and beyond. It is suitable for systems operating at 850 nm and 1300 nm wavelengths. MaxCap BendBright® OM3 fibres incorporate BendBright® technology to deliver enhanced macro-bending performance. Prysmian multimode fibres are produced with proprietary Plasma Chemical Vapour Deposition (PCVD) process.

### Standards

| | |
|---|---|
| IEC 60793-2-10: type A1a.2 | ISO/IEC 11801 category OM3 |
| TIA/EIA-492 AAAC | ANSI/TIA/EIA-568.C |
| ITU G.651.1 | ISO/IEC 24764 |

### Cabled Fibre Attenuation

| Attribute | Measurement method | Units | Limits |
|---|---|---|---|
| Attenuation at 850 nm | IEC 60793-1-40 | dB/km | ≤ 3.0 |
| Attenuation at 1300 nm | IEC 60793-1-40 | dB/km | ≤ 1.0 |

### Optical Specifications (Bare Fibre)

| Attribute | Measurement method | Units | Limits |
|---|---|---|---|
| Attenuation at 850 nm | IEC 60793-1-40 | dB/km | ≤ 2.5 |
| Attenuation at 1300 nm | IEC 60793-1-40 | dB/km | ≤ 0.7 |
| Attenuation Difference btw. 1380 nm and 1300 nm | IEC 60793-1-40 | dB/km | ≤ 3.0 |
| Point Discontinuity at 850 nm and 1300 nm | IEC 60793-1-40 | dB | ≤ 0.1 |
| Numerical Aperture | IEC 60793-1-43 | - | 0.200 ± 0.015 |

### Bending Loss

| | | | |
|---|---|---|---|
| Mandrel Radius =7.5 mm, 2 turns at 850/1300 nm | IEC 60793-1-40 | dB | ≤ 0.2 / ≤ 0.5 |
| Mandrel Radius =15 mm, 2 turns at 850/1300 nm | IEC 60793-1-40 | dB | ≤ 0.1 / ≤ 0.3 |

### Bandwidth

| | | | |
|---|---|---|---|
| Overfilled Launch Modal Bandwidth (OFL) at 850 nm | IEC 60793-1-41 | MHz • km | ≥ 1500 |
| Overfilled Launch Modal Bandwidth (OFL) at 1300 nm | IEC 60793-1-41 | MHz • km | ≥ 500 |
| Effective Modal Bandwidth (EMB) at 850 nm | IEC 60793-1-49 | MHz • km | ≥ 2000 |

### Multimode System Reach

| | | |
|---|---|---|
| Transmission Distance* | 1000BASE-SX | 1000 m |
| | 10GBASE-SR | 300 m |
| | 40GBASE-SR4 | 140 m |
| | 100GBASE-SR10 | 140 m |
| | 100GBASE-SR4 | 70 m |

*Indicated link distances require total connector loss ≤ 1.0 dB, and VCSEL spectral bandwidth of ≤ 0.45 nm

# C31: MaxCap-BB-OM3 Multimode Fibre

## Geometrical Specifications

| Attribute | Measurement method | Units | Limits |
|---|---|---|---|
| Core diameter | IEC 60793-1-20 | µm | 50 ± 2.5 |
| Core non-circularity | IEC 60793-1-20 | % | ≤ 5 |
| Core-cladding concentricity error | IEC 60793-1-20 | µm | ≤ 1 |
| Cladding diameter | IEC 60793-1-20 | µm | 125.0 ± 1.0 |
| Cladding non-circularity | IEC 60793-1-20 | % | ≤ 0.7 |
| Coating diameter – uncoloured | IEC 60793-1-21 | µm | 242 ± 7 |
| Coating diameter - coloured | IEC 60793-1-21 | µm | 250 ± 15 |
| Coating non-circularity | IEC 60793-1-21 | % | ≤ 5 |
| Coating-cladding concentricity error | IEC 60793-1-21 | µm | ≤ 10 |

## Mechanical Specifications

| Attribute | Measurement method | Units | Limits |
|---|---|---|---|
| Proof stress level | IEC 60793-1-30 | GPa | ≥ 0.7 (1%) |
| Average strip force | IEC 60793-1-32 | N | ≥ 1.0<br>≤ 3.0 |
| Peak strip force | IEC 60793-1-32 | N | ≥ 1.3<br>≤ 8.9 |

## Group Index of Refraction

| | | | |
|---|---|---|---|
| Typical Group index of refraction at 850 nm | IEC 60793-1-22 | - | 1.482 |
| Typical Group index of refraction at 1300 nm | IEC 60793-1-22 | - | 1.477 |