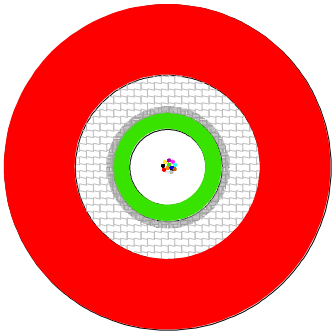
Firetuf™ OFC-UT-NM Fire resistant Universal Central Tube Cable, variant in red

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 = 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

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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 (Δl/l fibre ≤0.5%, Δα reversible) *
Compressive strength (crush)	E3	1500 N / 100 mm, max 5 min (Δα reversible) *
Impact	E7	No fibre break; 5 Nm, 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 = 121 mm
Min. bending radius, loaded	-	R = 240 mm
Temperature range	F1	Storage: -30°C to +60°C Installation: 0°C to +50°C Operation: -25°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)

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%.

C31: MaxCap-BB-OM3 multimode fibre

Properties of cabled bend insensitive OM3 fibre

General and application

This fibre is a laser-optimised, bend-insensitive graded-index multimode OM3 fibre suitable for transmission speeds of 10 Gb/s or higher. It has a 50 µm core diameter and a 125 µm cladding diameter. The fibre is optimised for maximum transmission properties at 850 nm; but is also well suited for 1300 nm systems. This fibre is fully compliant to the OM3 specification. The fibre supports 1000 m link length for a 1000BASE-SX system and 300 m for 10GBASE-SX, as well as 550 m for a 1000BASE-LX system. The outstanding bending performance of this fibre supports future compact cable management.

Standards

IEC 60793-2-10: type A1a.2	ITU G.651.1	TIA/EIA-492 AAAC
ISO/IEC 11801 category OM3	EN 60793-2-10: type A1a.2	ANSI/TIA/EIA-568.C
ISO/IEC 24764	EN 50173-1 category OM3	IEEE 802.3

Optical properties

Attribute	*Measurement method*	*Units*	*Limits*
Attenuation limit according to IEC 60793-2-10, 850 nm	IEC 60793-1-40	dB/km	≤ 2.5
Attenuation limit according to IEC 60793-2-10, 1300 nm	IEC 60793-1-40	dB/km	≤ 0.8
Inhomogeneity of OTDR trace for any two 1000 metre fibre lengths	IEC 60793-1-40	dB/km	Max. 0.1
Numerical aperture	IEC 60793-1-43	-	0.200 ± 0.015

Cable attenuation

Maximum attenuation value of cable at 850 nm	IEC 60793-1-40	dB/km	≤ 3.0
Maximum attenuation value of cable at 1300 nm	IEC 60793-1-40	dB/km	≤ 1.0

Attenuation variation vs bending

Fibre bending loss R=7.5 mm 850/1300 nm	IEC 60793-1-40	dB	≤ 0.2 / ≤ 0.5
Fibre bending loss R=15 mm 850/1300 nm	IEC 60793-1-40	dB	≤ 0.1 / ≤ 0.3

Bandwidth

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

Group index of refraction

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

C31: MaxCap-BB-OM3 multimode fibre

Geometrical properties

Attribute	*Measurement method*	*Units*	*Limits*
Core diameter	IEC 60793-1-20	µm	50 ± 2
Cladding diameter	IEC 60793-1-20	µm	125.0 ± 1.0
Cladding non-circularity	IEC 60793-1-20	%	≤ 0.7
Core non-circularity	IEC 60793-1-20	%	≤ 5
Core-cladding concentricity error	IEC 60793-1-20	µm	≤ 1
Primary coating diameter – uncoloured	IEC 60793-1-21	µm	242 ± 5
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	$1.3 \leq F_{peak.strip} \leq 8.9$