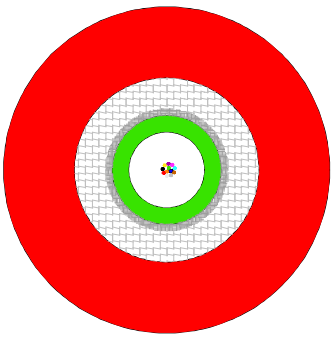
Firetuf™ OFC-UT-NM Fire resistant Universal Central Tube Cable, variant in red

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 into ducts.
The cable can be installed outdoor in the open, but shall be not be installed directly exposed to the sun.

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 OFC-UT-NM CI-LSHF I/O <fibre count> <fibre type> <fibre brand> <item number> 05 <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	-	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)

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Prysmian group material code	Prysmian Group material description	Fibre count	Fibre type	Fibre data sheet
	OFC UT NM 08 OM1 C02-1	8	MM fiber 62.2/125 OM1	C02
	OFC UT NM 12 OM3 C31-1	12	MaxCap-BB-OM3	C31
	OFC UT NM 12 OS2 C03-1	12	ESMF single mode G.652.D	C03

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

C32: MaxCap-BB-OM4 Multimode Fibre

Specifications of cabled bend-insensitive OM4 fibre

General and Application

Prysmian MaxCap BendBright® OM4, 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® OM4 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.3	ISO/IEC 11801 category OM4
TIA/EIA-492 AAAD	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	≥ 3500
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	≥ 4700

Multimode System Reach

Transmission Distance*	1000BASE-SX	1100 m
	10GBASE-SR	550 m
	40GBASE-SR4	190 m
	100GBASE-SR10	190 m
	100GBASE-SR4	100 m

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

C32: MaxCap-BB-OM4 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 ≤ 3.0
Peak strip force	IEC 60793-1-32	N	≥ 1.3 ≤ 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