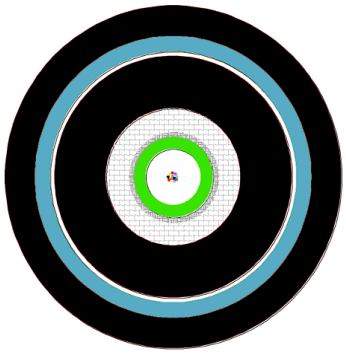
Firetuf™ OFC-UT-CST Fire resistant Armoured Central Tube Cable, variant in red

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 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, 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	

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IEC 61034-2 No dense smoke

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 red 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 red LSHF-FR sheath according to EN 50290-2-27, UV stabilised			
Print legend	Draka Firetuf by Prysmian Group FO I/O CT CST 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	-	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 Installation: 0°C to +50°C 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)

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Product codes – ordering information

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

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

Properties of cable with standard Enhanced SM fibre

ESMF, low water peak single mode fibre G652D, OS2

General and application

The optical fibres are made of a high grade doped silica core surrounded by a silica cladding.

They are coated with a dual layer, UV cured acrylate based coating.

This enhanced single mode fibre provides improved performance across the entire 1260 nm to 1625 nm wavelength spectrum due to its low attenuation in 1383 nm, the water-peak region.

Standards and Norms

IEC / EN 60793-2-50 Category B.1.3	EN 50 173-1:2007, cat. OS2 and OS1
ITU-T Recommendation G.652.D and C, B, A	ISO / IEC 11801:2002, cat. OS2 and OS1
IEEE 802.3 – 2002 incl. 802.3ae	ISO / IEC 24702: 2006, cat. OS2 and OS1

Optical properties

Attribute	Measurement method	Units	Limits
Mode field diameter at 1310 nm	IEC/EN 60793-1-45	µm	9.0 ± 0.4
Mode field diameter at 1550 nm		µm	10.1 ± 0.5
Chromatic dispersion coefficient:	IEC/EN 60793-1-42		
In the interval 1285 nm – 1330 nm		ps/km • nm	≤ |3|
At 1550 nm		ps/km • nm	≤ 18.0
At 1625 nm		ps/km • nm	≤ 22.0
Zero dispersion wavelength, λ_0		nm	1300 - 1322
Zero dispersion slope		ps/(nm^2 • km)	≤ 0.090
Cut-off wavelength	IEC/EN 60793-1-44	λ_{cc} nm	≤ 1260 *
Polarisation mode dispersion (PMD) coefficient	IEC/EN 60793-1-48	ps/√km	≤ 0.5
PMD_Q Link Design Value (computed with Q=0.01%, N=20)	IEC/EN 60794-3	ps/√km	≤ 0.2

** guaranteed value according to the ITU-T (ATM G650) method*

Attenuation

Attribute	Measurement method	Units	Limits
Maximum attenuation value of cable in the interval 1310 nm – 1625 nm	IEC/EN 60793-1-40	dB/km	≤ 0.39
Maximum attenuation value of cable at 1550 nm	IEC/EN 60793-1-40	dB/km	≤ 0.25
Local discontinuity at 1310 and 1550 nm	IEC/EN 60793-1-40	dB	Max. 0.1

Attenuation variation vs Bending

Attribute	Measurement method	Units	Limits
100 turns on a R=25 mm mandrel at 1310 & 1550 nm	IEC/EN 60793-1-47	dB	≤ 0.05
100 turns on a R=30 mm mandrel at 1625 nm	IEC/EN 60793-1-47	dB	≤ 0.05

Group index of refraction

Attribute	Measurement method	Units	Values
1310 nm	IEC/EN 60793-1-22	-	1.467
1550 nm	IEC/EN 60793-1-22	-	1.468
1625 nm	IEC/EN 60793-1-22	-	1.468

Geometrical properties

Attribute	Measurement method	Units	Limits
Cladding diameter	IEC/EN 60793-1-20	µm	125.0 ± 0.7
Cladding non-circularity	IEC/EN 60793-1-20	%	≤ 0.7
Core (MDF) -cladding concentricity error	IEC/EN 60793-1-20	µm	≤ 0.5
Primary coating diameter – ColorLock®^{XS} and natural	IEC/EN 60793-1-21	µm	242 ± 7
Primary coating non-circularity	IEC/EN 60793-1-21	%	≤ 5
Primary coating-cladding concentricity error	IEC/EN 60793-1-21	µm	≤ 12

Mechanical properties

Attribute	Measurement method	Units	Limits
Proof stress level	IEC/EN 60793-1-30	GPa	≥ 0.7 (≈ 1 %)
Strip force (peak)	IEC/EN 60793-1-32	N	$1.2 \leq F_{peak.strip} \leq 8.9$
Dynamic fatigue resistance aged and unaged	IEC / EN 60793-1-33	(N_d)	≥ 20
Static fatigue, aged	IEC / EN 60793-1-33	(N_s)	≥ 23

All measurements in accordance with ITU-T G650 recommendations