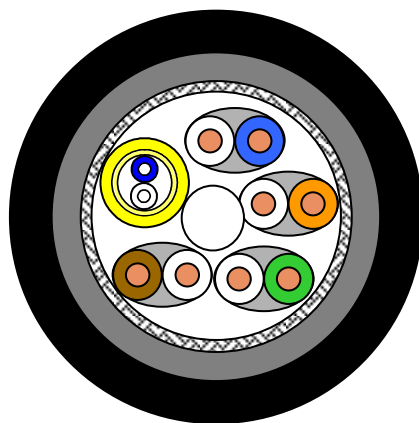




Part.no: BC-10-004

Date 07/10-2011

Bergen Cabling DNV approved Maritime LAN Hybrid cable S/FTP Cat.7 + 2 OS2 single mode fibres with MUD sheet



Application

Generic Data transmission. This cable is a **Cat7 S/FTP** cable meant for use as installation/horizontal cable in tougher electrical and mechanical environment, including ships and offshore units. The cable has an additional fire retardant, halogen-free low smoke MUD protected outer sheet. The cable is tested up to 900 MHz and will give good margin for application like 10 Gigabit Ethernet at a bandwidth up to 500 MHz.

Singlemode 2 fiber cable with aramid yarns strength , fulfills the new ITU G.657 A2, G.657 B2 as well as G.652.A-B-C and D

Standards

EN 50173-1; EN 50288-4-1

ISO/IEC 11801 Class F and OS2,

Det Norske Veritas (DNV) spesification No. 262.1-010028

IEC 60793-2-50, B6 a and b

IEC 60793-1-xx (See separate datasheet for fiber part below)

Fire rating

Inner sheet: LSHF-FR (SHF1) :

IEC 60754-1 and 2; IEC 61034, IEC 60332-3-24

MUD protection outer sheet:

IEC 60754-1, IEC 61034, IEC 60332-3-24



Construction copper

Conductor	Solid copper wire, \varnothing 0.56 mm (AWG 23)
Insulation	Foamskin PE, \varnothing 1.4 mm
Twisting	2 cores to the pair
Pair screen	Al-laminated plastic foil
Cable lay up	4 pairs (PiMF) to the core
	1 pair OS2 fiber under the braid
Screen	copper braid, tinned
Sheath, inner	Oil resistant, Fire retardant and halogen free LSHF-FR (SHF1).
Sheath outer	MUD protecting

Chemical resistance

Mineral oils IRM 902 (IEC60811-2-1) : 7 days/100°C

Diesel - IRM 903 (IEC60811-2-1) : 7 days/100°C

Mechanical properties

Bending radius	Without load	8 x D
Fiber element better than copper	With load	4 x D
Temperature range	During operation	-40°C to + 85°C
	During installation	-15°C to + 50°C
Fire load	4 pair	On request
Maximum tensile load	During operation	No load
	During installation	200 N

Electrical properties

at 20°C± 5°C

Loop resistance		$\leq 150 \Omega/\text{km}$
Resistance unbalance		$\leq 2\%$
Insulation resistance	(500 V)	$\geq 5000 \text{ M}\Omega \cdot \text{km}$
Mutual capacitance	at 800 Hz	Nom. 43 nF/km
Capacitance unbalance	(pair/ground)	$\leq 1500 \text{ pF}/\text{km}$
Characteristic impedance	(1-100 MHz)	$(100 \pm 5) \Omega$
	(100 - 250) MHz	$(100 \pm 10) \Omega$
	(250 - 600) MHz	$(100 \pm 15) \Omega$
Nominal velocity of propagation		ca. 79 %
Propagation delay		$\leq 570 \text{ ns}/100\text{m}$
Delay skew		$\leq 9 \text{ ns}/100\text{m}$
Test voltage	(DC, 1 min) core/core and core/screen	1000 V
Transfer impedance(Grade 1)	at 1 MHz	$\leq 10 \text{ m}\Omega/\text{m}$
	at 10 MHz	$\leq 10 \text{ m}\Omega/\text{m}$
	at 30 MHz	$\leq 10 \text{ m}\Omega/\text{m}$
	at 100MHz	$\leq 20 \text{ m}\Omega/\text{m}$
Coupling attenuation		$\geq 85 \text{ dB}$



Technical Data

Description	Variant	Colour	Outer diameter (D) mm	Delivery form	Weight kg/km		BC Part No.
Maritime LAN Cat.7 S/FTP 4x2/0.56	MUD protected	Dark Grey	11,2	Reel 500m	138		10-004

Certification

DNV approved for Maritime and Offshore. Certificate NO: TBN

Electrical data (nominal)

acc. to Cat.7 (at 20°C)

F (MHZ)	Attenuation (dB/100m)	NEXT (dB)	PS-NEXT (dB)	ACR (dB/100m)	PS-ACR (dB/100m)	ELFEXT (dB/100m)	PS-ELFEXT (dB/100m)	Return loss (dB)
1,0	1,8	100	97	98	95	105	105	-
4,0	3,4	100	97	97	94	105	102	27
10,0	5,4	100	97	95	92	97	94	30
16,0	6,8	100	97	93	90	93	90	30
20,0	7,7	100	97	92	89	91	88	30
31,2	9,6	100	97	90	87	87	84	30
62,5	13,7	100	97	86	83	81	78	30
100,0	17,4	100	97	83	80	77	74	30
125,0	19,5	95	92	75	72	75	72	26
155,5	21,9	94	91	72	69	73	70	26
175,0	23,3	93	90	70	67	72	69	25
200,0	25,0	92	89	67	64	71	68	25
250,0	28,1	90	87	62	59	69	66	24
300,0	30,9	89	86	58	55	67	64	24
450,0	38,3	87	84	48	45	64	61	23
600,0	44,8	85	82	40	37	61	58	22
750,0	52,0	83	80	31	28	59	56	21
900,0	59,4	82	79	23	20	58	55	20

Specification of the 2 single mode fibres in the hybrid cable

Enhanced bend insensitive, low water peak fibre; G.657.A2 and G.657.B2

General and application

This enhanced low macro bending sensitive, low water peak fibre, gives unsurpassed bending performance. The preferred use of the BendBright^{XS} fibre is in office installations, for patch cords, interconnection cables and for Fibre-to-the-Home networks. The BendBright^{XS} offers reduced bending radii for many cables types. The fibre fulfils the new ITU G.657 A2 and G.657 B2 specification (edition 2009), as well as G.652.D. The low macro bending sensitivity further guarantees that the 1625 nm window (L-band) will be available for future use in this bandwidth hungry environment



Standards and Norms

IEC 60793-2-50 Category B6_a and B6_b	EN 50 173-1:2007, cat. OS2
EN 60793-2-50: Class B6_a and B6_b	ISO/IEC 11801:2002, cat. OS2
ITU Recommendation G.657.A2 and G.657.B2 (2009)	ISO/IEC 24702:2006 cat. OS2 and OS1
ITU Recommendation G.652 designations A, B, C and D (2009)	IEEE 802.3 – 2002 incl. 802.3ae

Attenuation (cabled fibre)

IEC 60793-1-40

1310 nm	≤ 0.38 dB/km
1383 nm *	≤ 0.38 dB/km
1550 nm	≤ 0.23 dB/km
1625 nm	≤ 0.25 dB/km
Inhomogeneity of OTDR trace for any two 1000 metre fibre lengths	Max. 0.1 dB/km

* Including H2-ageing according to IEC 60793-2-50, type B.1.3, @1383nm

Group index of refraction

IEC 60793-1-22

Group index of refraction at 1310 nm and 1550 nm	1.467
Group index of refraction at 1625 nm	1.468

Other properties

IEC 60793-1-xx

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
Proof stress level	IEC/EN 60793-1-30	GPa	≥ 0.7 (≈ 1 %)
Strip force (peak)	IEC/EN 60793-1-32	N	1.2 ≤ F _{peak,strip} ≤ 8.9
Static fatigue, aged n _s		-	>23
Chromatic dispersion coefficient: In the interval 1285 nm – 1330 nm	IEC/EN 60793-1-42	ps/km • nm	≤ 3.7
At 1550 nm			≤ 18.5
At 1625 nm			≤ 23.0
Zero dispersion wavelength, λ ₀		nm	1300 - 1324
Zero dispersion slope		ps/(nm ² • km)	≤ 0.092
Cut-off wavelength	IEC/EN 60793-1-44	λ _{cc} nm	≤ 1260 *
Mode field diameter at 1310 nm	IEC/EN 60793-1-45	µm	8.8 ± 0.4
Mode field diameter at 1550 nm		µm	9.8 ± 0.5
Macro bending loss 10 turns on a mandrel R = 15 mm, @1550nm 10 turns on a mandrel R = 15 mm, @1625nm 1 turn on a mandrel R = 10 mm, @1550nm 1 turn on a mandrel R = 10 mm, @1625nm 1 turn on a mandrel R = 7.5 mm, @1550nm 1 turn on a mandrel R = 7.5 mm, @1625nm	IEC/EN 60793-1-47	dB	≤ 0.03 ≤ 0.1 ≤ 0.1 ≤ 0.2 ≤ 0.5 ≤ 1.0
Polarisation mode dispersion (PMD) coefficient, cabled	IEC/EN 60793-1-48	ps/√km	≤ 0.1
PMD ₀ Link Design Value**	IEC/EN 60794-3	ps/√km	≤ 0.06

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

** according to IEC 60794-3, Ed3 (Q=0.01%)

All measurements in accordance with ITU-T G650 recommendations.