



Certificate No:
TAE00004AX

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Fiber optical cable

with type designation(s)
Armada Fibre Optic cable. Unarmored Fire resistant.

Issued to
Belcom Cables Ltd.
Elsenham, Essex, United Kingdom

is found to comply with
DNV GL rules for classification – Ships and offshore units
DNV GL class programme DNVGL-CP-0402 – Type approval – Optical fibre cables

Application :

Fiber Optic cable. Unarmored Fire resistant.
Products approved by this certificate are accepted for installation on all vessels classed by DNV.

Issued at **Høvik** on **2021-08-23**

for **DNV**

This Certificate is valid until **2026-08-22**.

DNV local station: **Manchester**

Approval Engineer: **Ivar Bull**

Marta Alonso Pontes
Head of Section

This Certificate is subject to terms and conditions overleaf. Any significant change in design or construction may render this Certificate invalid. The validity date relates to the Type Approval Certificate and not to the approval of equipment/systems installed.

LEGAL DISCLAIMER: Unless otherwise stated in the applicable contract with the holder of this document, or following from mandatory law, the liability of DNV AS, its parent companies and their subsidiaries as well as their officers, directors and employees ("DNV") arising from or in connection with the services rendered for the purpose of the issuance of this document or reliance thereon, whether in contract or in tort (including negligence), shall be limited to direct losses and under any circumstance be limited to 300,000 USD.



Product description

Armada Fire resistant Fibre Optic cable, flame retardant, low smoke, halogen free

Multi loose tube or single loose tube or multi tight buffered and combination.

Construction	Tight buffered dry core or loose-tubes [max 36 fibers per tube]
Fire resistant layer	Fire resistant tape
Central strength member	Dielectric or steel
Outer sheath	SHF1 or SHF2 or SHF MUD, single or double layer

Fiber code	Units	3	4	5	6	7	8	9	10
Standard designation		Multimode				Singlemode			
ISO/IEC 11801		OM4	OM3	OM2	OM1	-	-	OS2	-
ANSI TIA/EIA		AAAD	AAAC	AAAB	AAAA	-	-	-	-
IEC 60793-2-10		A1a.3	A1a.2	A1a.1	A1b	-	-	-	-
ITU-T		-	-	-	-	G657.A2	G655	G652.D	G657.A1
IEC 60793-2-50		-	-	-	-	B6_a2	B4	B1.3	B6_a1
Operating wavelength	nm	850 1300				1310 1550 1625	1550 1625	1310 1550 1625	
Core diameter	µm	50±2,5	50±2,5	50±2,5	62,5±3				
MFD @1310 nm	µm	-	-	-	-	8,6±0,4	-	9,2±0,4	8,6±0,4
MFD @1550 nm	µm	-	-	-	-	9,6±0,6	9,6±0,6	10,4±0,6	9,8±0,5
Cladding	µm	125±1			125±2	125±0,7			
Coating	µm	245±10				245±5			
Max attenuation Tight buffer	dB/km	3,5 @ 850 nm 1,2 @ 1300 nm			3,5 @ 850 nm 1,5 @ 1300 nm	0,4 @ 1310 nm 0,3 @ 1550 nm	-	0,4 @ 1310 nm 0,3 @ 1550 nm	
Max attenuation Loose tube	µm	2,8 @ 850 nm 0,9 @ 1300 nm			3,2 @ 850 nm 1,0 @ 1300 nm	0,37 @ 1310 nm 0,22 @ 1550 nm 0,25 @ 1625 nm	0,22 @ 1550 nm 0,26 @ 1625 nm	0,37 @ 1310 nm 0,22 @ 1550 nm 0,25 @ 1625 nm	

For more details please see datasheet.

Application/Limitation

This type of cable is fire resistant in accordance with IEC 60331-25.

The requirements of SOLAS Amendments Chapter II-1, Part D, Reg. 45, 5.2 (provision to be taken to limit Fire Propagation along Bunches of Cables or Wires) are fulfilled without any additional measures.

Temperature window :
 Min. Installation temperature : -30°C
 Operation temperature : -40°C to + 85°C
 Storage temperature : -40°C to + 85°C

*) Note regarding Safe Return to Port of passenger vessels: When DNV Rules Part 6.2.11 items 3.3.4.2 and 5.3.2.1 require fire resistant cables, these shall be tested according to IEC 60331-1/2.

Type Approval documentation

Datasheet Armada fire-resistant low-halogen low smoke fiber optic communication cable FOFRDNV0721.
 Rev 2, July 2021

Type tests Bre global test report ; DA-6MT002EDK1W01 report no 277021-1
 Bre global test report ; DA-MLD144DDJ1R01 report no 277021-5
 DA6MT002EDK1W01; dated 2012-01-02
 DA-MLD144DDJ1R01 ; dated 2012-01-02
 Test report dated 2016-06-21.

Tests carried out

Standard	Release	General description	Limitation
IEC 60793-2-10	2011-03	Optical fibres - Part 2-10: Product specifications - Sectional specification for category A1 multimode fibres	
IEC 60793-2-50	2008-05	Optical fibres - Part 2-50: Product specifications - Sectional specification for class B single-mode fibres	
IEC 60092-360	2021-01	Electrical installations in ships - Part 360: Insulating and sheathing materials for shipboard and offshore units, power, control, instrumentation and telecommunication cables	
IEC 60331-25	1999-04	Tests for electric cables under fire conditions – Circuit integrity – Part 25: Procedures and requirements – Optical fibre cables *)	Minimum 90 min. + 15 min. cool down time.
IEC 60332-3-22	2018-07	Tests on electric and optical fibre cables under fire conditions - Part 3-22: Test for vertical flame spread of vertically mounted bunched wires or cables - Category A	Charred portion of sample does not exceed 2,5m above bottom edge of burner.
IEC 60332-3-24	2018-07	Tests on electric and optical fibre cables under fire conditions – Part 3-24: Test for vertical flame spread of vertically-mounted bunched wires or cables – Category C	Charred portion of sample does not exceed 2,5m above bottom edge of burner.
IEC 60754-1	2019-11	Test on gases evolved during combustion of materials from cables - Part 1: Determination of the halogen acid gas content	Low Halogen: <0,5% Halogen
IEC 60754-2	2019-11	Test on gases evolved during combustion of materials from cables - Part 1: Determination of the halogen acid gas content	Halogen free: pH > 4,3 Conductivity < 10µS/mm
IEC 61034-1/2	2019-11	Measurement of smoke density of cables burning under defined conditions – Part 1: Test apparatus Part 2: Test procedure and requirements	Low smoke Light transmittance >60%

Standard	Release	General description	Limitation
NEK TS606 Ed5	2016	Cables for offshore installations - halogen-free low smoke flame-retardant / fire-resistant (HFFR-LS). Technical specification.	Mud resistance test: IRM903 100°C 7d. Calcium Brom. 70°C 56d. Oil based test fluid: EDC 95/11 70°C 56d

Marking of product

Belcom Armada, Fiber type, No. of tubes/tights, No. of fibers in tube, jacket type(s), Water blocking type, Certification No., meter marking, Batch/Lot, Flame rating.

Periodical assessment

The scope of the retention/renewal survey is to verify that the conditions stipulated for the Type approval is complied with and that no alterations are made to the product design or choice of materials.

The main elements of the survey are:

- Inspection on factory samples, selected at random from the production line (where practicable)
- Results from Routine tests (RT) and selected type tests (ref. to applicable class programs) checked (if not available these tests shall be carried out) Review of type approval documentation
- Review of possible change in design, materials and performance
- Ensuring traceability between manufacturer’s product type marking and Type Approval Certificate.

Survey to be performed at least every second year.

END OF CERTIFICATE