



# TYPE APPROVAL CERTIFICATE

Certificate no.:  
**TAE00000JG**  
Revision No:  
**2**

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## This is to certify:

**that the Flame Retardant, Fire Resistant, (optional) Metallic or Dielectric Armoured Fibre Optic Cable**

with type designation(s)  
**Fire Resistant Fibre Optic Cable**

issued to  
**Belcom Cables Ltd.**  
**Elsenham, Essex, United Kingdom**

is found to comply with  
**DNV rules for classification – Ships, offshore units, and high speed and light craft**

## Application:

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**Fibre Optical Cable for use in Marine and Offshore installations. Fire Resistant – Armoured Products approved by this certificate are accepted for installation on all vessels classed by DNV.**

Issued at **Høvik** on **2026-03-12**

This Certificate is valid until **2030-10-05**.

for **DNV**

DNV local unit: **UK & Ireland CMC & VMC**

Approval Engineer: **Ivar Bull**

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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 USD 300 000.

## Product description

Fire Resistant Fibre Optic Cable  
 Multi loose tube, single loose tube or tight buffered

|                              |  |
|------------------------------|--|
| Construction                 | Tight buffered dry core or loose-tubes [max 36 fibers per tube]  |
| Central strength member      | Dielectric or steel  |
| Peripheral strength member   | Aramid or glass yarn   |
| Inner sheath                 | SHF1 or SHF2 or SHF2 MUD   |
| Metallic covering (optional) | Braided galvanized steel wire Corrugated steel tape Served (Galvanized) steel wire<br>Bronze wire braid Copper wire braid Tinned copper wire braid |
| Outer sheath (optional)      | 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<br>1300                  |        |        |                             | 1310<br>1550<br>1625                               | 1550<br>1625                     | 1310<br>1550<br>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<br>Tight buffer | dB/km | 3,5 @ 850 nm<br>1,2@1300 nm  |        |        | 3,5 @ 850 nm<br>1,5@1300 nm | 0,4 @ 1310 nm<br>0,3 @ 1550 nm                     | -                                | 0,4 @ 1310 nm<br>0,3 @ 1550 nm                     |         |
| Max attenuation<br>Loose tube   | µm    | 2,8 @ 850 nm<br>0,9 @1300 nm |        |        | 3,2 @ 850 nm<br>1,0@1300 nm | 0,37 @ 1310 nm<br>0,22 @ 1550 nm<br>0,25 @ 1625 nm | 0,22 @ 1550 nm<br>0,26 @ 1625 nm | 0,37 @ 1310 nm<br>0,22 @ 1550 nm<br>0,25 @ 1625 nm |         |

For more details please see datasheet.

## Manufactured by

DNV Id: 10096273

## Application/Limitation

|                                |                 |
|--------------------------------|-----------------|
| Temperature window:            |                 |
| Min. Installation temperature: | -30°C           |
| Operation temperature:         | -40°C to + 80°C |
| Storage temperature:           | -40°C to + 80°C |

This cable is fire resistant in accordance with EN 50200 and BS 6387.

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.

## Type Approval documentation

### Tests carried out

| Standard         | Release | General description  | Limitation  |
|------------------|---------|--|---|
| DNV-CP-0402      | 2021-09 | DNV Class programme Optical fibre cables   |   |
| IEC 60793-2-10   | 2019-05 | Optical fibres - Part 2-10: Product specifications - Sectional specification for category A1 multimode fibres  |   |
| IEC 60793-2-50   | 2018-12 | 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            |   |
| EN 50200 Annex E | 2015-12 | Method for test for fire resistance to fire of unprotected small cables for use in emergency circuits. Annex E: Guidance for using optional water spray protocol.                          | 15 min fire with mechanical shocks - 15 min fire with mechanical shocks and water. Attenuation increase during fire test shall not be higher than 3 dB ref IEC 60092-378.                               |
| IEC 60332-1-2    | 2025-06 | Tests on electric and optical fibre cables under fire conditions - Part 1-2: Test for vertical flame propagation for a single insulated wire or cable - Procedure for 1 kW pre-mixed flame | Flame retardant small scale. Distance between the lower edge of the top support and the onset of charring > 50 mm and charring not to extend downwards > 540 mm from the lower edge of the top support. |
| 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:<br>pH > 4,3<br>Conductivity < 10µS/mm   |
| IEC 61034-1/2    | 2019-11 | Measurement of smoke density of cables burning under defined conditions –<br>Part 1: Test apparatus<br>Part 2: Test procedure and requirements   | Low smoke<br>Light transmittance >60%   |

| Standard             | Release | General description   | Limitation  |
|----------------------|---------|---|---|
| NEK TS606 Ed7        | 2025-03 | Cables for offshore installations - halogen-free low smoke flame-retardant / fire-resistant (HFFR-LS). Technical specification.                                   | Mud resistance test:<br>Required Max variations ±:<br>IRM902 & 903 100°C 7d.<br>TS & E@B,<br>Weight & vol.: ±30%<br>Calc. Bromide 70°C 56d.<br>TS & E@B: ±25%,<br>Weight: ±15%, vol.: ±20%<br>Oil based mud:<br>EDC 95/11 70°C 56d<br>TS & E@B ±30%,<br>Weight & vol.: ±25%   |
| BS 6387              | 2013-12 | Test method for resistance to fire of cables required to maintain circuit integrity under fire conditions   | Clause 6: Resistance to fire alone. 180min@923°C<br>Incr. in avg. att. 0,20dB.<br>Clause 7: Resistance to fire with water: 15min fire+15min fire with water @643°C.<br>Incr. in avg. att. 0,06dB.<br>Clause 8: Resistance to fire with mech. Shock: 15min fire with mech shock @ 946°C.<br>Incr. in avg. att. 0,06dB. |
| CSA C22.2 No. 03     | 2009    | Flexibility at any specified temp.  | Cold bend: -40°C  |
| CSA C22.2 No. 03     | 2009    | Abnormal low temperature – impact   | Cold impact: -35°C  |
| IEC 60332-1-1 Ed.1.1 | 2015-07 | Tests on electric and optical fibre cables under fire conditions - Part 1-1: Test for vertical flame propagation for a single insulated wire or cable - Apparatus |   |

### Marking of product

Armada, PN, No. of fibres - Type of Fibres - Armour Type - EN 50200 - BS 6387- IEC 60332-3-22/24 - SHF1 or SHF2 or SHF2 MUD - YoM - BATCH

### Periodical assessment

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

The main elements of the assessment 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.

Periodical assessment is to be performed after 2 years and after 3.5 years. A renewal assessment will be performed at renewal of the certificate.

END OF CERTIFICATE