DNV·GL

Certificate No:
TAE00003WW

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Fiber optical cable

with type designation(s)
AIAI & AIAI breakout, AICI

Issued to
NEK Kabel AS
LØRENSKOG, Norway

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

Application :

Fiber optic cable. Tight buffered.
Products approved by this certificate are accepted for installation on all vessels classed by DNV GL.

Issued at **Høvik** on **2020-03-12**
This Certificate is valid until **2025-03-11**.
DNV GL local station: **Oslo Maritime and CAP**

Approval Engineer: **Ivar Bull**

for **DNV GL**

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.

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Job Id: **262.1-033277-1**
Certificate No: **TAE00003WW**

Name & place of manufacturer
DNVGL Id: 144689

Product description
Tight buffered fiber optic cables:
NEK606 Type F104 AICI (steel wire braid)
AIAI (Strength member of yarn)
AIAI breakout: 8 x fiber tubes with Aramid yarn protection and LSZH sub unit sheath assembled in a concentric layer around a central member.
Outer sheath: SHF1

SPECIFICATION OF OPTICAL FIBERS:

Optical fibre		MM50/OM2 MM50/OM3		MM62/OM1	MM50/OM4	SM10/G652.D
Core diameter		50 ± 2.5 µm		62.5 ± 2.5 µm	50 ± 2.5 µm	-
Core non-circularity		≤ 5%		≤ 6%	≤ 5%	-
Core/Cladding concentricity error		≤ 1 µm		≤ 1.5 µm	≤ 1 µm	≤ 0.5 µm
Cladding diameter		125 ± 1.0 µm		125 ± 2 µm	125 ± 1.0 µm	125 ± 0.7 µm
Cladding non-circularity		≤ 0.7%		≤ 1%	≤ 0.7%	≤ 0.7%
Primary coating diameter		242 ± 5 µm		245 ± 10 µm	242 ± 5 µm	242 ± 7 µm
Core non-circularity		≤ 5%		≤ 6%	≤ 5%	≤ 5%
Coating concentricity error		≤ 6 µm		≤ 10 µm	≤ 6 µm	≤ 6 µm
Proof test		≥8.8 N / ≥ 1 % / ≥ 100 Kpsi				
Mode Field Diameter (µm)	1310 nm	-	-	-	-	9.0 ± 0.4
	1550 nm	-	-	-	-	10.1 ± 0.5
Attenuation Coefficient (dB/Km)	850 nm	≤ 2.5	≤ 2.5	≤ 2.7	≤ 2.89	-
	1300 nm	≤0.7	≤0.7	≤0.7	≤0.80	-
	1310 nm	-	-	-	-	≤ 0.35
	1383 nm	-	-	-	-	≤ 0.35
	1460 nm	-	-	-	-	≤ 0.25
	1550 nm	-	-	-	-	≤ 0.21
	1625 nm	-	-	-	-	< 0.23
Bandwidth (MHz.Km)	850 nm	≥700	≥ 1500	≥ 200	≥ 3500	-
	1300 nm	≥ 500	≥ 500	≥ 500	≥ 500	-
Effective Modal Bandwith (EMB) @850nm			>2000 MHz*km		-	
Numerical Aperture		0.200 ± 0.015		0.275 ± 0.015	0.200 ± 0.015	-
Group Index of Refraction	850 nm	-	-	-	-	-
	1300 nm	-	-	-	-	-
	1310 nm	-	-	-	-	1.467
	1550 nm	-	-	-	-	1.468
Chromatic Dispersion Coefficient (ps/nm.Km)	1285 – 1330 nm	-	-	-	-	≤ |3|
	1550 nm	-	-	-	-	≤ 18
	1625 nm	-	-	-	-	≤ 22
Zero Dispersion Wavelength (nm)		-	-	-	-	1300 - 1322
Zero Dispersion Slope (ps / nm^2 Km)		-	-	-	-	≤ 0.090
Cable Cut-Off Wavelength (nm)		-	-	-	-	≤ 1260
PMD (ps/√ Km)	1550 nm	-	-	-	-	< 0.1

Application/Limitation
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

Operation:	-40°C to +70°C
Installation:	-10°C to +70°C

Cable not to be continously submerged in water.

Type Approval documentation

Tests carried out

Tested according to IEC 60794-1/-2, IEC 60332-3-22, IEC 60754-1/2, IEC 61034-1/2, IEC 60092-360 .

Marking of product

NEK KABEL - AICI or AIAI or AIAI breakout - FIBER OPTIC CABLE [Fibre type and Number of fibres] – IEC 60332-3-22 - Lot No - meter marking.

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