DNV·GL

Certificate No:
TAE00003NZ

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Data transmission cables and systems

with type designation(s)
LanMarin 4 pairs Cat.5e S/FTP AWG 24/7,
LanMarin 4 pairs Cat.6 F/UTP AWG 23/1,
LanMarin 4 pairs Cat.7 S/FTP AWG23/7

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 :

Data communication cable. Installation / Horizontal cable.

Products approved by this certificate are accepted for installation on all vessels classed by DNV GL.

Issued at **Høvik** on **2019-09-12**
This Certificate is valid until **2024-06-30**.
DNV GL local station: **Oslo Maritime and CAP**

Approval Engineer: **Ivar Bull**

for **DNV GL**

Trond Sjåvåg
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: **262.1-017406-3**
Certificate No: **TAE00003NZ**

Name and place of manufacturer :

DNVGL Id.: 10024443

Product description

Type(s):	**S/FTP 4 pairs AWG24/7**
Standards	**Category 5e,** IEC 61156-6
Conductors:	Stranded bare opper
Core insulation:	Polyethylene
Screen:	Al/polyester tape (individual), tinned copper (overall)
Outer sheath:	SHF1 UV- resistant or SHF2 or SHF2 MUD or SHF2 Artic grade

Type(s):	**F/UTP 4 pairs AWG23/1**
Standards	**Category 6,** IEC 61156-5
Conductors:	Solid bare copper
Core insulation:	Polyethylene
Overall screen:	Al/polyester tape with tinned copper drain wire
Inner sheath:	SHF1
Outer sheath:	SHF1 UV- resistant or SHF2 or SHF2 MUD

Type(s):	**S/FTP 4 pairs AWG23/7**
Standards	**Category 7,** Installation cable according to EN 50288-4-2 / IEC 61156
Conductors:	Plain, stranded copper
Core insulation:	Cellular Polyolefine CEI EN 50290-2-23 PE cellular Insulation
Screen:	Al/polyester tape (individual), tinned copper (overall)
Outer sheath:	SHF1 UV- resistant or SHF2 or SHF2 MUD or SHF2 Artic grade

Cat.7 S/FTP AWG23/7 cable:

Frequency MHz	Attenuation, Max (acc EN) [dB/100m]	NEXT [dB/100m]	Return Loss [dB/100m]
1	2,2	100	35
4	3,8	100	31
10	5,9	95	38
16	7,4	90	32
20	8,4	90	32
31,25	10,5	90	31
62,5	15,3	85	27
100	18,1	82	34
155	23,2	80	28
200	26,6	77	25
300	33,3	71	23
600	50,1	67	21

Characterics tic impedance 100 $\pm$ 5 Ohm
DC-loop resistance 139 Ohm/km

Cat.6 F/UTP AWG23/1 cable:

Frequency MHz	Attenuation, Max (acc EN) [dB/100m]	NEXT [dB/100m]	Return Loss [dB/100m]
4	3,6	73,4	
10	5,6	66,1	
16	7,2	68	
20	8,1	59,5	29,6
31,25	10,2	61,5	31
62,5	14,4	61,3	35,4

Frequency MHz	Attenuation, Max (acc EN) [dB/100m]	NEXT [dB/100m]	Return Loss [dB/100m]
100	18,3	48,1	29,8
155	23,1	49,3	27,2
200	26,6	42	25,8
250	29,6	41,3	23

Cat.5e F/FTP AWG24/7 cable:

Frequency MHz	Attenuation, Max (acc EN) [dB/100m]	NEXT [dB/100m]	Return Loss [dB/100m]
1	2	98,7	
4	3,9	103,6	
8	5,5	104	
10	6,2	104,8	
16	7,9	103,4	
20	8,9	100	34,2
25	10,1	98,1	36
31,25	11,3	98,6	33,5
62,5	16,1	98,8	37,4
100	20,2	102	31,6

Application/Limitation

Temperature window (for Cat.7 cable only):
Operation: - 65°C to +80°C
Installation: - 25°C to +80°C

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	Issued	General description	Limitation
DNVGL-CP-0403	2019-07	Data communication cables - category cables	
IEC 60332-3-22	2018-07	Tests on electric 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	2011-11	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	2011-11	Test on gases evolved during combustion of materials from cables - Part 2: Determination of acidity (by pH measurement) and conductivity	Halogen free: pH > 4,3 Conductivity < 10µS/mm

IEC 61034-1/2	2013-07 2013-09	Measurement of smoke density of cables burning under defined conditions – Test apparatus, procedure and requirements	Low smoke Light transmittance >60%
IEC 60092-350	2014-08	Annex E: Procedure And 8.10: Temperature requirements	Cold bend: -65°C Cold impact: -65°C

Marking of product

NEK Kabel (week/year) - LanMarin – Cat 7- S/FTP 4 pairs AWG23/7 SHF1 or SHF2 or SHF2 MUD or SHF2 Artic grade – IEC 60332-3-22 – Lot – meter marking or

NEK Kabel (week/year) - LanMarin Cat 6 – F/UTP 4 pairs AWG23/1 SHF1 or SHF2 or SHF2 MUD or SHF2 Artic grade – IEC 60332-3-22 – DNVGL – Lot – meter marking or

NEK Kabel (week/year) - LanMarine Cat 5e – S/FTP 4 pairs AWG24/7 SHF1 or SHF2 or SHF2 MUD or SHF2 Artic grade – IEC 60332-3-22 – DNVGL – Lot – 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