

TYPE APPROVAL CERTIFICATE

This is to certify:**That the Data transmission cables and systems**

with type designation(s)

**TKSEA ARMoured LAN S/FTP 23AWG FLEX LSZH CABLE Cat 6A,
TKSEA ARMoured LAN S/FTP 23AWG FLEX LSZH CABLE Cat 7**

Issued to

**TecniKabel S.p.A.
Volpiano TO, Italy**

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****Product(s) approved by this certificate is/are accepted for installation on all vessels classed
by DNV GL.**Issued at **Høvik** on **2018-06-04**This Certificate is valid until **2023-05-15**.DNV GL local station: **Milan**for **DNV GL**Approval Engineer: **Ivar Bull**

**Andreas Kristoffersen
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.



Product description

Type(s):	TKSEA ARMOURED LAN S/FTP 23AWG FLEX LSZH CABLE Cat 6A, TKSEA ARMOURED LAN S/FTP 23AWG FLEX LSZH CABLE Cat 7
Conductors:	Stranded bare copper 0,28mm ²
Core insulation:	Cellular Polyolefine
Individual Screen:	Pairs assembled with Aluminum/Polyester or Aluminum/Polyester/Aluminum Tape.
Common screen:	Tinned, Copper wire braid
Inner sheath:	SHF1 or SHF2
Armour:	Galvanized steel wire braid (GSWB) or Tinned copper wire braid (TCWB) or Bronze wire braid (BWB)
Outer sheath:	SHF1 or SHF2 or SHF2 MUD
Conductor resistance @20C	≤69,5 Ohm/km
Characteristic impedance	100±5 Ohm @ 100MHz

For further technical data please see datasheet.

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.

Operation:	-40°C + 70°C (SHF1) -40°C + 90°C (SHF2 & SHF2 MUD)
Installation:	-10°C + 50°C
Minimum bending radius:	10x OD (static) 20x OD (Dynamic)

Type Approval documentation

Tests carried out

Standard	Issued	General description	Limitation
DNVGL-CP-0403	2015-12	DNV GL Class Program for Data communication cables – category cables	
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 60332-3-22	2009-02	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.
EN 50305 9.2	2002	Railway applications - Railway rolling stock cables having special fire performance - Test methods	Toxicity of evolved gas <3

Job Id: **262.1-026162-1**
Certificate No: **TAE00002X0**

Standard	Issued	General description	Limitation
UL 2565-99 Cycle 1		ASTM D 2565 – 99 SUNLIGHT RESISTANCE (XENON ARC TEST)	41,5 W/m ² 300-400nm. Temp. 63 °C. 18min spray/102min dry Duration 720 h. Max change in E@B $\pm$ 40%
IEC 60092-360	2014-04	Electrical installations in ships - Part 360: Insulating and sheathing materials for shipboard and offshore units, power, control, instrumentation and telecommunication cables.	SHF1. SHF2: IRM 902 100° C 24 h
NEK TS 606 Ed5	2016	Cables for offshore installations. Halogen- free and/or mud resistant. Technical specification.	SHF2 MUD versions: IRM902 100°C 7d. IRM903 100°C 7d. Calcium Bromide 70°C 56d. EDC 95/11 70°C 56d

Marking of product

TECNIKABEL (V) – ITALY - month/year - TKSEA ARMoured (type of armouring) LAN S/FTP 23AWG FLEX LSZH CABLE (Cat 6A or Cat 7) SHF1 or SHF2 or SHF2 MUD RESISTANT - DNV GL - metric marking - IEC 60332-3-22

(V) = Volpiano plant.

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