

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 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.

Issued at **Høvik** on **2022-05-04**

This Certificate is valid until **2027-05-03**.

DNV local station: **Milan**

Approval Engineer: **Ivar Bull**

for **DNV**

Trond Sjøvåg
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

Types:

TKSEA ARMoured LAN S/FTP 23AWG FLEX LSZH CABLE Cat 5e. Optional: Arctic grade LAN -65°C,
TKSEA ARMoured LAN S/FTP 23AWG FLEX LSZH CABLE Cat 6. Optional: Arctic grade LAN -65°C,
TKSEA ARMoured LAN S/FTP 23AWG FLEX LSZH CABLE Cat 6A. Optional: Arctic grade LAN -65°C,
TKSEA ARMoured LAN S/FTP 23AWG FLEX LSZH CABLE Cat 7. Optional: Arctic grade LAN -65°C,
TKSEA ARMoured LAN S/FTP 23AWG FLEX LSZH CABLE Cat 7A. Optional: Arctic grade LAN -65°C

Conductors: Solid or stranded bare copper 0,28mm²
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)
-65°C + 90 °C (arctic SHF2)
Installation: -10°C + 50°C
-20°C + 50 °C (arctic SHF2)
Minimum bending radius: 10x OD (static)
20x OD (Dynamic)

Type Approval documentation

Tests carried out

Standard	Issued	General description	Limitation
DNV-CP-0403	2021-09	DNV GL Class Program for Data communication cables – category cables	
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 2: Determination of acidity (by pH measurement) and conductivity	Halogen free: pH > 4,3 Conductivity < 10µS/mm
IEC 61034-1/2	2019-11	Measurement of smoke density of cables burning under defined conditions – Test apparatus, procedure and requirements	Low smoke Light transmittance >60%
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.
EN 50305 9.2	2002	Railway applications - Railway rolling stock cables having special fire performance - Test methods	Toxicity of evolved gas <3

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 ±40%
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.	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
IEC 60092-350	2020-01	Electrical installations in ships - Part 350: General construction and test methods of power, control and instrumentation cables for shipboard and offshore applications Annex E: Cold bend test and impact test for low temperature behaviour	Cold bend: -65°C Cold impact: -55°C

Marking of product

TECNIKABEL (V) – ITALY - month/year - TKSEA ARMoured (type of armouring) LAN S/FTP 23AWG CL1 or CL2 FLEX LSZH CABLE (Cat 5e or Cat 6 or 6A or Cat 7 or Cat 7A) SHF1 or SHF2 or SHF2 MUD RESISTANT – Approval marks - metric marking - IEC 60332-3-22 or

TECNIKABEL (V) – ITALY - month/year - TKSEA ARMoured (type of armouring) ARCTIC LAN S/FTP 23AWG CL1 or CL2 FLEX LSZH CABLE (Cat 5e or Cat 6 or 6A or Cat 7 or Cat 7A) - SHF2 -65°C/+90°C - Approval marks - 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