

# TYPE APPROVAL CERTIFICATE

---

## This is to certify:

That the **Data transmission cables and systems**

with type designation(s)

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

Conductors: Solid or stranded bare copper 0,28mm<sup>2</sup>  
Core insulation: Cellular Polyolefine  
Individual Screen: Pairs assembled with Aluminum/Polyester or Aluminum/Polyester/Aluminum Tape.  
Common screen: Tinned, Copper wire braid  
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)  
15x OD (Dynamic)

Pull maximum: 100 N

## Type Approval documentation

### Tests carried out

| Standard       | Issued  | General description                                                                                                                                                     | Limitation                                                                  |
|----------------|---------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|
| DNV-CP-0403    | 2021-09 | DNV 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:<br><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:<br>pH > 4,3<br>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<br>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<br>Cycle 1 |         | ASTM D 2565 – 99<br>SUNLIGHT RESISTANCE<br>(XENON ARC TEST)                                                                                                                                                                                                   | 41,5 W/m <sup>2</sup> 300-400nm.<br>Temp. 63 °C. 18min<br>spray/102min dry<br>Duration 720 h. Max<br>change in E@B ±40% |
| IEC 60092-360         | 2021-01 | Electrical installations in ships - Part 360:<br>Insulating and sheathing materials for shipboard<br>and offshore units, power, control,<br>instrumentation and telecommunication cables.                                                                     | SHF1.<br><br>SHF2:<br>IRM 902° 100° C 24 h                                                                              |
| NEK TS 606 Ed5        | 2016    | Cables for offshore installations. Halogen-free<br>and/or mud resistant. Technical specification.                                                                                                                                                             | SHF2 MUD versions:<br><br>IRM902 100°C 7d.<br>IRM903 100°C 7d.<br>Calcium Bromide 70°C<br>56d.<br>EDC 95/11 70°C 56d    |
| IEC 60092-350         | 2020-01 | Electrical installations in ships - Part 350: General<br>construction and test methods of power, control<br>and instrumentation cables for shipboard and<br>offshore applications<br>Annex E: Cold bend test and impact test for low<br>temperature behaviour | Cold bend: -65°C<br>Cold impact: -55°C                                                                                  |

### Marking of product

TECNIKABEL (V) – ITALY - month/year - TKSEA LAN S/FTP 23AWG CL 1 or CL 2 FLEX LSZH CABLE (Cat 5e or Cat 6 or Cat 6A or Cat 7 or Cat 7A) SHF1 or SHF2 or SHF2 MUD – Approval marks - metric marking - IEC 60332-3-22 or

TECNIKABEL (V) – ITALY - month/year - TKSEA ARCTIC LAN S/FTP 23AWG CL 1 or CL 2 FLEX LSZH CABLE (Cat 5e or Cat 6 or Cat 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