DNV·GL

Certificate No:
TAE00003ZD

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Data transmission cables and systems

with type designation(s)
TKSEA FIRE RESISTANT ARMOURED CANBUS LSZH CABLE.

Issued to
TecniKabel S.p.A.
Torino, 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. CANBus. Fire resistant. Armoured.
Products approved by this certificate are accepted for installation on all vessels classed by DNV GL.

Issued at **Høvik** on **2020-05-08**
This Certificate is valid until **2025-05-07**.
DNV GL local station: **Milan**

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: **262.1-032872-1**
Certificate No: **TAE00003ZD**

Product description

TKSEA FIRE RESISTANT ARMOURED CANBUS CABLE (1 or 2 pairs)

Rated voltage peak:	100 V	
Conductor:	Stranded bare copper	
Insulation:	Foam-Skin Polyolefine + Mica tape	
Individual Screen:	Aluminum/Polyester tape (for one pair only)	
Collective Screen:	Tinned copper wire braid ⩾ 80% coverage	(for one pair only)
Collective Screen:	A. Aluminum/Polyester tape B. Tinned copper wire braid ⩾ 80% coverage	(for two pair only) (for two pair only)
Inner sheath:	SHF1	
Armour:	Galvanized steel wire braid (GSWB) or Tinned copper wire braid (TCWB) or Bronze wire braid (BWBB	
Outer sheath:	SHF1 or SHF2 or SHF2 MUD RESISTANT	
Number of cores:	One or two pairs 0,75 mm²	
Earth conductor:	1x 0,75 mm² (one pair only)	

Application/Limitation

This type of cable is fire resistant accordint to IEC 60331-23.

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 Temperature Window -40°C + 70°C (SHF1)
-40°C + 90°C (SHF2 & SHF2 MUD

Type Approval documentation

Tests carried out

Standard	Issued	General description	Limitation
IEC 61158-2	2014-07	Industrial communication networks - Fieldbus specifications - Part 2: Physical layer specification and service definition	Standard test cable 12.8.2 a) to g)
IEC 60332-1-2	2004-07	Tests on electric and optical fibre cables under fire conditions – Part 1-2: Test for vertical flame propagation for a single insulated wire or cable – Procedure for 1 kW pre-mixed flame	
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

Standard	Issued	General description	Limitation
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 60331-23	1999-04	Tests for electric cables under fire conditions – Circuit integrity – Part 23: Procedures and requirements – Electric data cables	Duration of FR test 180min+15 min cooling down. Requred <20% change Char. Imp and Attenuation
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.
EN 50305 9.2	2002	Railway applications - Railway rolling stock cables having special fire performance - Test methods	Toxicity of evolved gas <3
ASTM-D-2565-16 Cycle 1		ASTM D 2565 – 99 16 SUNLIGHT RESISTANCE (XENON ARC TEST)	41,5 W/m2 300-400nm. Temp. 63 °C. 18min spray/102min dry Duration 720 h. Max change in E@B +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
CAN/CSA C 22-2 N. 210.2 M90	2005	Cold bend test	-40 °C

Marking of product

TECNIKABEL (A) – ITALY - month/year – TKSEA ARMOURED (Type of armouring) FIRE RESISTANT CANBUS 1x2x0,75 mm² /0,75mm² LSZH CABLE SHF1 or SHF2 or SHF2 MUD RESISTANT - DNV GL TAE00003ZD – IEC 60331-23 [180+15min] - IEC 60332-3-22 - metric marking or

TECNIKABEL (A) – ITALY - month/year – TKSEA ARMOURED (Type of armouring) FIRE RESISTANT CANBUS 2x2x0,75 mm² LSZH CABLE SHF1 or SHF2 or SHF2 MUD RESISTANT - DNV GL TAE00003ZD – IEC 60331-23 [180+15min] - IEC 60332-3-22 - metric 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) checked (if not available tests according to RT to 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