DNV·GL

Certificate No:
TAE00001S5

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Data transmission cables and systems

with type designation(s)
Profibus cable 1&2 pairs 0.35mm2 SHF2, Profibus cable 1&2 pairs 0.35mm2 MUD

Issued to
AP Solutions Oy
Rovaniemi, Finland

is found to comply with
DNV GL rules for classification – Ships, offshore units, and high speed and light craft

Application :

PROFIBUS compatible cable for marine applications.

Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV GL.

This Certificate is valid until **2022-02-14**.

Issued at **Høvik** on **2017-02-15**
DNV GL local station: **Helsinki** 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.

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Job Id: **262.1-025097-1**
Certificate No: **TAE00001S5**

Product description

PROFIBUS CABLE 1&2 PAIRS 0.35MM2 SHF2,
PROFIBUS CABLE 1&2 PAIRS 0.35MM2 SHF2 MUD

Conductors: Plain stranded copper
Core insulation: Foam skin polyolefin
Screen Aluminium tape + Tinned copper wire braid
Outer sheath: SHF2 or SHF2 MUD

Operating temperature: -40C to +90C.

Table 107-Cable specifications as per IEC 61158-2 ed. 2 (2014):
Industrial communication networks.Fieldbus specifications. Part 2: Physical layer specifications and service definition

Cable parameter	**Type A**	**Type B**	**PROFIBUS MARIN**
Impedance	135 to 165 Ω (f = 3 to 20 MHz)	100 to 130 Ω (f > 100kHz)	@3-20 MHz: 150 ± 15Ω @38,4 kHz:185±18,5Ω @9,6 kHz: 250 ± 25Ω
Capacity	< 30 pF/m	< 60 pF/m	30 pF/m @800Hz
Resistance	< 110 Ω/km	not specified	<55 Ω / km (plain copper)
Conductor cross-sectional area	≥ 0,34 mm²	≥ 0,22 mm²	0,35 mm²
Colour of sheath non-IS	Violet	Not specified	Black or violet
Colour of inner cable conductor A (RxD/TxD-N)	Green	Not specified	Green
Colour inner cable conductor B (RxD/TxD-P)	Red	Not specified	Red

Table 108-Maximum cable length for the different transmission speeds

Item	**Unit**	**Value**								
Data rate	kbit/s	9,6	19,2	93,75	187,5	500	1500	3000	6000	12000
Cable type A	m	1200	1200	1200	1000	400	200	100	100	100
Cable type B	m	1200	1200	1200	600	200	70	Not permissible		

Manufactured by

TECNIKABEL S.p.A.
Via Brandizzo, 243
10088 - VOLPIANO (TO)
ITALY

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.

By the termination of the cables all parts of the cable to be kept through into the termination point as for coax cables.

Type Approval documentation

Tests carried out

Standard	**Release**	**General description**	**Limitation**

Standard	Release	General description	Limitation
IEC 60332-1	2004-07	Tests on electric and optical fibre cables under fire conditions – Part 1-1:Test for vertical flame propagation for a single insulated wire or cable – Apparatus	Flame retardant small scale
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.
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	2005-04	Measurement of smoke density of cables burning under defined conditions – Test apparatus, procedure and requirements	Light transmittance > 60%
IEC 61158-2 ed. 1	2014-07	Industrial communication networks - Fieldbus specifications - Part 2: Physical layer specification and service definition	Cable specifications as per item 22.1.2.2
EN 50305		Toxicity of evolved gas	<3
DIN VDE 0472 Part 805 B		Ozone resistant	
NEK 606 Ed. 4	2009-05	Cables for offshore installations. Halogen-free low smoke flame retardant / fire resistant (HFFR-LS). Technical specification.	Mud resistance test: IRM903 100°C 7d. Calcium Br 70°C 56d. Oil based mud: EDC 95/11 70°C 56d

Marking of product

APS FINLAND – WEEK/YEAR - PROFIBUS CABLE 1&2 PAIRS 0.35MM2 SHF2 – 100 V – LS0H – IEC 60332-3-22 – (METRIC MARKING) M OR

APS FINLAND – WEEK/YEAR - PROFIBUS CABLE 1&2 PAIRS 0.35MM2 SHF2 MUD – 100 V – LS0H — IEC 60332-3-22 - (METRIC MARKING) M

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