DNV·GL

Certificate No:
TAE000025W

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Data transmission cables and systems

with type designation(s)
SeaLine® PROFIBUS (MUD RES) 02YSH(ST)CH 1x2x1.2/2.55-100 LI MUD Res

Issued to
LEONI Special Cables GmbH
FRIESOYTHE, Germany

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

Application :

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

Issued at **Hamburg** on **2017-08-02**
This Certificate is valid until **2022-08-01**.
DNV GL local station: **Leer**

for **DNV GL**

Approval Engineer: **Carsten Hunsalz**

Duy Nam Le
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: **262.1-022111-1**
Certificate No: **TAE000025W**

Product description

Halogen free, foamed polyethylene insulated, copper wire shielded and FRNC sheathed data cable

Rated voltage peak:	100 V
Temperature range:	-40° C up to 80° C
Conductor:	Stranded bare copper conductor
Insulation:	Foamed polyethylene (PE) with skin
Inner-Jacket:	Thermoplastic copolymer (FRNC)
Screen:	Tinned copper wire braiding
Outer sheath:	SHF2 cross-linked copolymer (FRNC)

Number of cores: 2 Cross-section: 18/7 AWG (0,89 mm²)

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.

Profibus
Flame retardant in bunch; Cat. A. Halogen free. Low smoke.

Type Approval documentation

Test report :	Leoni test report dated 04.07.2017, 06.07.2015, LABCO No. 17-0204 Index 0 dated 28.04.2017 CURRENTA No. 16/0988 +16/0989 dated 01.06.2016 MPA No. 2012-B-5326/03/04/06/07, No. 20150728 VDE 111109-9021-0001/215305 dated 24.02.2016
Data sheet:	L45467-J20-C226-EN, L45467-J20-C236-EN

Tests carried out

Standard	Release	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)
EN 50290-2-23	2014-09	Communication cables - Part 2-23: Common design rules and construction - Polyethylene insulation for multi-pair cables used in access telecommunication networks: Outdoor cables	
EN 50290-2-27	2011-06	Communication cables -- Part 2-27: Common design rules and construction - Halogen free flame retardant thermoplastic sheathing compounds	
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.	
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	

Standard	Release	General description	Limitation
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	Bunch test Category A
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 60684-2	2011-08	Clause 45.2 Methods of determination of low levels of fluorine	HF max 0,1%
IEC 61034-1/2	2005-04	Measurement of smoke density of cables burning under defined conditions – Test apparatus, procedure and requirements	Low smoke Light transmittance >60%
NEK TS 606	2016	Cables for offshore installations. Halogen-free and/or mud resistant. Technical specification.	Mud resistance test for cable types with SHF2 MUD sheath: IRM903 100°C 7d. Calcium Bromide 70°C 56d. Carbo Sea 70°C 56d.

Marking of product

"sequential length in meter" * LEONI SeaLine® Profibus PA ES * Leoni part number *
Type designation * IEC 60332-3-22 * "internal order number"

Example:

00020m * LEONI SeaLine® Profibus PA ES * L45467-J20-C226 * 02YSH(ST)CH 1x2x1.2/2.55-100 LI MUD Res * IEC 60332-3-22 * 130180

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