Certificate No:
TAE00004EJ

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Category cables

with type designation(s)
Leoni SeaLine Cat 6 / Cat 6A, Leoni SeaLine Cat 7 - arctic grade

Issued to
LEONI Special Cables GmbH
Friesoythe, Niedersachsen, **Germany**

is found to comply with
DNV 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.

Issued at **Hamburg** on **2022-01-12**
This Certificate is valid until **2027-01-11**.
DNV local station: **Hamburg – CMC North/East**

Approval Engineer: **Carsten Hunsalz**

for **DNV**

Arne Schaarmann
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

LEONI SeaLine® Leoni part number (for example L45467-J416-C1036) Cat. 6 / Cat 6A and Cat. 7 cables

Conductor	Solid or stranded bare copper wire
Insulation	PE foam with skin
Cabling	Twisted pairs with aluminum foil and central strain relief (plastic tape optional)
Metallic covering	Tinned copper wire braid (> 65 % coverage)
Inner-sheath (optional)	SHF1 (optional (if SWB or SWA))
Metallic covering (optional)	SWB - Steel wire braid (optional) SWA - Steel wire armouring (optional)
Sheath	SHF1 - artic grade

List refers to specification Version 2021-04-28 / F45052-F7700:

CAT 6 / CAT 6A / CAT 7 cables:

LEONI Type Designation	AWG	Conductor cross section mm²	Nominal overall diameter in mm	optional metal covering *)	sheath material
02YSCH 4X2X0.76/1.8-100 LI PIMF	22	0.34	10.0	-	SHF1
02YSCH(Z)H 4X2X0.76/1.8-100 LI PIMF	22	0.34	12.6	SWB	SHF1
02YSCHBH 4X2X0.76/1.8-100 LI PIMF	22	0.34	13.6	SWA	SHF1
02YSCH 4X2X0.65/1.6-100 PIMF	22	0.34	8.6	-	SHF1
02YSCH(Z)H 4X2X0.65/1.6-100 PIMF	22	0.34	11.1	SWB	SHF1
02YSCHBH 4X2X0.65/1.6-100 PIMF	22	0.34	12.1	SWA	SHF1
02YSCH 4X2X0.70/1.58-100 LI PIMF	23	0.29	8.6	-	SHF1
02YSCH(Z)H 4X2X0.70/1.58-100 LI PIMF	23	0.29	11.1	SWB	SHF1
02YSCHBH 4X2X0.70/1.58-100 LI PIMF	23	0.29	12.1	SWA	SHF1
02YSCH 4X2X0.60/1.43-100 PIMF	23	0.29	8.7	-	SHF1
02YSCH(Z)H 4X2X0.60/1.43-100 PIMF	23	0.29	11.2	SWB	SHF1
02YSCHBH 4X2X0.60/1.43-100 PIMF	23	0.29	12.2	SWA	SHF1

Duplex cable

LEONI Type Designation	AWG	Conductor cross section mm²	Nominal overall diameter in mm	optional metal covering *)	sheath material
02YSC H 2X4X2X0.76/1.8-100 LI PIMF	22	0.34	see data sheet	-	SHF1
02YSC H 2X4X2X0.65/1.6-100 PIMF	22	0.34	see data sheet	-	SHF1
02YSC H 2X4X2X0.70/1.58-100 LI PIMF	23	0.29	see data sheet	-	SHF1
02YSC H 2X4X2X0.60/1.43-100 PIMF	23	0.29	see data sheet	-	SHF1

*) SWB - Steel wire braid
SWA - Steel wire armouring

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.

Due to the low cross section of these cables, extra precautions shall be made during installation. In order to achieve a transmission link compliant with Category 7, cables shall be installed with suitable termination equipment according to manufacturer's recommendations.

Horizontal cables Cat. 6 / 6A and 7 (can also be used for work area wiring)
Flame retardant in bunch; cat A. Low smoke
Outer sheath SHF1 - artic grade

Operating temperature: -65°C to +80°C

Type Approval documentation

Test report: LEONI test report, dated 2021-11-25

Specification: 2021-04-28 / F45052-F7700

Tests carried out

Standard	Release	General description	Limitation
DNV-CP-0403	2021-09	DNV Type approval program for Data communication cables – category cables	Ref. IEC 61156-5 standard Category 6/6A and 7.
IEC 61156-5	2020-04	Multicore and symmetrical pair/quad cables for digital communications – Part 5: Symmetrical pair/quad cables with transmission characteristics up to 1 000 MHz – Horizontal wiring – Sectional specification	Reference to requirement for category cable: 6 (250/MHz), 6A (500MHz), 7 (600MHz),
IEC 61156-6	2020-04	Multicore and symmetrical pair/quad cables for digital communications – Part 6: Symmetrical pair/quad cables with transmission characteristics up to 1 000 MHz – Work area wiring – Sectional specification	Reference to requirement for category cable: 6 (250MHz), 6A (500MHz), 7 (600MHz),
IEC 60332-1-2	2015-07	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	
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	Bunch test Category A
IEC 60092-350	2020-01	General construction and test methods of power, control and instrumentation cables for shipboard and offshore applications	Annex E Cold bend: -65°C

Marking of product

“sequential length in meter” * LEONI L SeaLine® * Leoni part number * nomenclature (type designation) CAT6 or CAT6A or CAT7 IEC 60332-3-22 SHF1 * “internal order number”

Example:
00020m * LEONI L SeaLine® * L45467-J416-C1036 * 02YSCH 4X2X0.6/1.43-100 PIMF CAT7 IEC 60332-3-22 SHF1 * 239472

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