Certificate No:
TAE00004CU

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Electric Power Cable

with type designation(s)
PICI, PIOI, PIBI, PICI(C), PIOI(C), PIBI(C), PIOI(I/C), FX-PIOI-EMC, (FX-)PIOI-VFD

Issued to
LS Cable & System Ltd (Donghae Plant)
Donghae-si, Gangwon-do, Korea, Republic of

is found to comply with
DNV rules for classification – Ships, offshore units, and high speed and light craft
IEC 60092-353 (2016-09)

Application :

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

Power and control cable

Type	Rated voltage (kV)	Temp. class (°C)
PICI, PIOI, PIBI, PICI(C), PIOI(C), PIBI(C), PIOI(I/C), FX-PIOI-EMC	0.6/1	90
(FX-)PIOI-VFD	0.6/1 and 1.8/3	90

Issued at **Busan** on **2021-11-22**
This Certificate is valid until **2026-11-21**.
DNV local station: **Seoul**

Approval Engineer: **Eun Jin Lee**

for **DNV**

Hanwee Low
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

Type designation : 0.6/1kV PICI, PIOI, PIBI, PICI(C), PIOI(C), PIBI(C), PIOI(I/C), FX-PIOI-EMC, 0.6/1kV (FX-)PIOI-VFD, 1.8/3kV (FX-)PIOI-VFD

Conductors:	Tinned stranded copper, class 2, Class 5 for 'FX-' type
Insulation:	HF HEPR
Screen:	(C): Collective screen with drain wire, Aluminium/polyester tape
	(I): Individual screen, Tinned annealed copper wire braid
Inner sheath:	SHF1
Armor :	Galvanized steel(C), Bronze(B) or Copper(O) wire braid
	-EMC or -VFD: Copper wire braid &Copper/polyester tape with 100% coverage
Outer sheath:	SHF1

Cable type	No. of Pairs	Conductor size(mm^2)
PICI, PIOI, PIBI, PICI(C), PIOI(C), PIBI(C)	1C	1.5~630
	2C, 2C+E, 3C, 3C+E, 4C, 4C +E	1.5~500
	5C, 6C, 10C	1.5~6
PIOI(C), PIOI(I/C)	1P, 5P, 10P	1.5~6
FX-PIOI-EMC	3C	1.5~300
0.6/1kV (FX-)PIOI-VFD	3C+3E	2.5~300
	3C	1.5~300
1.8/3kV (FX-)PIOI-VFD	3C, 3C+3E	10~300

Application/Limitation

The requirements of SOLAS Chapter II-1 Part D Reg. 45.5.2 to limit Fire Propagation along Bunches of Cables or Wires are fulfilled without any additional measures.

Type Approval documentation

Tests carried out

Standard	Release	General description	Limitation
IEC 60092-353	2016	Power cables for rated voltages 1kV and 3kV	
IEC 60092-360	2021	Insulating and sheathing materials for shipboard and offshore units, power, control, instrumentation, telecommunication cables	
IEC 60332-1	2015	Test for vertical flame propagation for a single insulated wire or cable	
IEC 60332-3-22	2018	Test for vertical flame spread of vertically mounted bunched wires or cables	Cat. A
IEC 60754-1/2	2019	Test on gases evolved during combustion of materials from cables – Determination of the amount of halogen acid gas / Determination of the degree of acidity of gases evolved during the combustion of materials taken from electric cables by measuring pH and conductivity	Low Halogen <0,5% Halogen free ≥4,3pH, ≤10µS/mm
IEC 61034-1/2	2019	Measurement of smoke density of cables burning under defined conditions – Test apparatus, procedure and requirements	Low smoke >60%
IEC 60092-350 Annex E	2020	Cold bend test and impact test for low temperature behaviour	Cold bend: -40°C Cold impact: -40°C

Marking of product

[HIS]-RATING-TYPE-SIZE-LS CABLE-YEAR-LENGTH-STANDARD
EX) [HIS] 0.6/1KV PIOI(C) 1X120 LS CABLE 2015 XXXM IEC60332 CAT.A

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