Certificate no.:
TAE000051U

TYPE APPROVAL CERTIFICATE

This is to certify:

that the Low Voltage Cable

with type designation(s)
SFOU(c), SFOU(i), SFOU(i/c)

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

Application:

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

Rated voltage (V)	**250**
Temp. class (°C)	**90**

Issued at **Busan** on **2025-03-28**

This Certificate is valid until **2030-03-27**.

for **DNV**

DNV local unit: **Seoul**

Approval Engineer: **Eun Jin Lee**

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 USD 300 000.

Product description

Type: SFOU(c), SFOU(i), SFOU(i/c) 250V

Conductors:	Tinned stranded copper, class 2
Insulation:	XLPE + mica tape
Screen:	Cu/PS tape with drain wire(individual for '(i)', overall for '(c)')
Inner covering:	Extruded halogen free thermoset
Braid armour:	Tinned copper wire braid
Outer sheath:	SHF2

Number of cores x conductor cross-section
mm^2
SFOU(c)
Pairs
1 x 0.75
2 x 0.75
4 x 0.75
7 x 0.75
8 x 0.75
10 x 0.75
12 x 0.75
16 x 0.75
24 x 0.75
1 x 1.0
2 x 1.0
4 x 1.0
7 x 1.0
8 x 1.0
10 x 1.0
12 x 1.0
16 x 1.0
24 x 1.0

Number of cores x conductor cross-section
mm^2
1 x 1.5
2 x 1.5
4 x 1.5
7 x 1.5
8 x 1.5
10 x 1.5
12 x 1.5
16 x 1.5
24 x 1.5
1 x 2.5
2 x 2.5
4 x 2.5
7 x 2.5
8 x 2.5
10 x 2.5
12 x 2.5
16 x 2.5
24 x 2.5
Triads
2 x 1.0

Number of cores x conductor cross-section
mm^2
SFOU(i)/SFOU(i/c)
Pairs
1 x 0.75
2 x 0.75
4 x 0.75
7 x 0.75
8 x 0.75
10 x 0.75
12 x 0.75
16 x 0.75
24 x 0.75
1 x 1.0
2 x 1.0
4 x 1.0
7 x 1.0
8 x 1.0
10 x 1.0
12 x 1.0
16 x 1.0
24 x 1.0

Number of cores x conductor cross-section
mm^2
1 x 1.5
2 x 1.5
4 x 1.5
7 x 1.5
8 x 1.5
10 x 1.5
12 x 1.5
16 x 1.5
24 x 1.5
1 x 2.5
2 x 2.5
4 x 2.5
7 x 2.5
8 x 2.5
10 x 2.5
12 x 2.5
16 x 2.5
24 x 2.5
Triads
2 x 1.0

Application/Limitation

This cable is fire resistant according to IEC 60331.

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 60092-376	2017	Cables for control and instrumentation circuits 150/250V(300V)	
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	Flame retardance in bunch	Cat. A
IEC 60331-1 & 2	2018	Tests for electric cables under fire conditions - Circuit integrity - Part 1: Test method for fire with shock at a temperature of at least 830 °C for cables of rated voltage up to and including 0,6/1,0 kV and with an overall diameter exceeding 20 mm	@ 830 ˚C w/shock (120 mins)
IEC 60684-2	2011	Flexible insulating sleeving – Part 2: Methods of test.	Fluorine content <0.1%

Standard	Release	General description	Limitation
IEC 60754-1/2	2019	Determination of the amount of halogen acid gas/ Determination of 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 61034-2	2019	Measurement of smoke density of cables during under conditions	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: -35°C
UL1581	2019	UV resistance	720 hrs

Marking of product

250V – Cable type – Size – LS Cable – Year of manufacture – IEC 60331(120 min) – IEC 60332-3A – Length

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