

TYPE APPROVAL CERTIFICATE

This is to certify:**That the Electric Power Cable**with type designation(s)
1.8/3 kV FP-RUOU, FP-RUOYU

Issued to

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

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.****Rated voltage (kV) 1.8/3****Temp. class (°C) 90**Issued at **Busan** on **2020-03-06**This Certificate is valid until **2025-03-05**.for **DNV GL**DNV GL local station: **Seoul**Approval Engineer: **Dong Ho Park**

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.



Product description

Type: 1.8/3 kV FP-RUOU, LV Power & Control Cables
1.8/3 kV FP-RUOYU, LV VFD Cables

Conductors: Tinned annealed copper, Class 5
Core insulation: EPR (R)
Inner sheath: SHF2 (U)
Metal covering: Tinned copper wire braid (O),
Copper/polyester tape plus tinned Copper wire braid (OY)
Outer sheath: SHF2 (U)

Number of cores x conductor cross- section mm ²	Number of cores x conductor cross- section mm ²	Number of cores x conductor cross- section mm ²
FP-RUOU		
1 x 10	2 x 150	3 x 50 + 3E x 10
1 x 16	2 x 185	3 x 70 + 3E x 16
1 x 25	2 x 240	3 x 95 + 3E x 16
1 x 35	2 x 300	3 x 120 + 3E x 25
1 x 50	3 x 10	3 x 150 + 3E x 25
1 x 70	3 x 16	3 x 185 + 3E x 35
1 x 95	3 x 25	3 x 240 + 3E x 50
1 x 120	3 x 35	3 x 300 + 3E x 50
1 x 150	3 x 50	3 x 10
1 x 185	3 x 70	3 x 16
1 x 240	3 x 95	3 x 25
1 x 300	3 x 120	3 x 35
2 x 10	3 x 150	3 x 50
2 x 16	3 x 185	3 x 70
2 x 25	3 x 240	3 x 95
2 x 35	3 x 300	3 x 120
2 x 50	FP-RUOYU	3 x 150
2 x 70	3 x 10 + 3E x 4	3 x 185
2 x 95	3 x 16 + 3E x 6	3 x 240
2 x 120	3 x 25 + 3E x 6	3 x 300
	3 x 35 + 3E x 6	

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 Bundles of Cables or Wires) are fulfilled without any additional measures.

Type Approval documentation

Tests carried out

Standard	Release	General description	Limitation
IEC 60092-350	2014-08	General construction and test methods of power, control and instrumentation cables for shipboard and offshore applications	
IEC 60092-353	2016-09	Power cables for rated voltages 1kV and 3kV	

Job Id: **262.1-029312-1**
Certificate No: **TAE00003U1**

Standard	Release	General description	Limitation
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 60754-1	2011	Test on gases evolved during combustion of materials from cables – Determination of the amount of halogen acid gas	Low Halogen <0,5%
IEC 60754-2	2011	Test on gases evolved during combustion of materials from cables – Determination of the degree of acidity of gases evolved during the combustion of materials taken from electric cables by measuring pH and conductivity	Halogen free ≥4,3pH, ≤10μS/mm
IEC 61034-1/2	2013-06	Measurement of smoke density of cables burning under defined conditions – Test apparatus, procedure and requirements	Low smoke >60%
IEC 60092-350 Annex E	2014-08	Low temperature test of sheath (optional)	Cold bend (-40 °C) / Cold impact (-35 °C)
UL 1581	2009	Sunlight resistant –Section 1200	720 hrs, only for sheath
NEK TS 606	2016	Cables for offshore installations	Oil resistant – Category a

Marking of product

Voltage rating – Type designation – Size – LS CABLE – Year of manufacture – 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