

TYPE APPROVAL CERTIFICATE

Certificate No:
TAE000038G
Revision No:
1

This is to certify:

That the Electric Power Cable

with type designation(s)

RFOU P1 0,6/1kV, RFOU P1/P8 0,6/1 kV, RFOU-VFD 0,6/1kV, RFOU-VFD 1,8/3kV

Issued to

Untel Kablolari San. ve Tic. A.S.

Dilovasi, Turkey

is found to comply with

DNV GL rules for classification – Ships, offshore units, and high speed and light craft

Application :

Low voltage power cables.

Products approved by this certificate are accepted for installation on all vessels classed by DNV.

Type	Rated voltage (kV)	Temp. class (°C)
RFOU P1 0,6/1kV	0,6/1	90
RFOU P1/P8 0,6/1 kV	0,6/1	90
RFOU-VFD 0,6/1kV	0,6/1	90
RFOU-VFD 1,8/3kV	1,8/3	90

Issued at **Høvik** on **2021-07-29**

for **DNV**

This Certificate is valid until **2024-01-17**.

DNV local station: **Istanbul**

Approval Engineer: **Ivar Bull**

Marta Alonso Pontes
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: RFOU P1 0,6/1kV or RFOU P1/P8 0,6/1 kV
RFOU-VFD 0,6/1kV, RFOU-VFD 1,8/3kV

Construction:
Conductors: Tinned stranded copper class 2 or class 5
Earth conductors: 3x distributed earth conductors in interstices (VFD cables)
Core insulation: EPR or HEPR
Inner covering: Halogen free compound
Metal covering: Tinned copper wire braid / Cu-PET tape + tcwb (VFD cables)
Outer sheath: SHF2 MUD/ SHF2

RFOU P1 0,6/1kV or RFOU P1/P8 0,6/1 kV

No of cores:	Cross sectional area [mm ²]
1	1,5 – 400
2	1,5 – 240
3	1,5 – 300
4, 5	1,5 – 240
7, 10, 14, 19, 24, 30, 37	1,5 – 2,5

RFOU-VFD 0,6/1kV and RFOU-VFD 1,8/3kV

No of cores:	Cross sectional area [mm ²]
3 / 3E	10 – 240 / 4-50

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.

General power and lighting.
Flame retardant in bunch Cat. A. Halogen free. Low smoke.
Mud resistant.

Type Approval documentation

Data sheet: FR 72-016 rev.0 01.05.2010
RFOU-VFD Cable 0,6/1kV and 1,8/3kV Rev 0 Mar 15.2021
Test report: Type test report
TYPE TEST PROCEDURE & PLAN RFOU VFD 1,8/3kV dated 26.06.2021

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	Electrical installations in ships - Part 353: Power cables for rated voltages 1 kV and 3 kV	
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.	

Standard	Release	General description	Limitation
EC 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	Charred portion of sample does not exceed 2,5m above bottom edge of burner.
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 61034-1/2	2013-06	Measurement of smoke density of cables burning under defined conditions – Test apparatus, procedure and requirements	Low smoke Light transmittance >60%
NEK TS 606	2009	Cables for offshore installations. Halogen-free and/or mud resistant. Technical specification.	

Marking of product

ÜNTEL – RFOU (NEK 606 P1 or P1/P8)– size – 0,6/1 kV - IEC 60332-3-22 - Lot No or
 ÜNTEL – RFOU VFD 0,6/1kV or 1,8/3kV size – 0,6/1 kV - IEC 60332-3-22 – Lot No

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