

# TYPE APPROVAL CERTIFICATE

Certificate no.:  
**TAE0000389**  
Revision No:  
**2**

## This is to certify:

that the **Low Voltage Cable**

with type designation(s)

**RFOU (i) S1/S5/S101 250 V, RFOU (c) S2/S6/S102 250 V, RFOU (i+c) 250 V**

issued to

**Untel Kablolari San. ve Tic. A.S.**  
**Dilovası, Türkiye**

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.

Type	Rated voltage (V)	Temp. class (°C)
RFOU (i) S1/S5/S101 250 V	250	90
RFOU (c) S2/S6/S102 250 V	250	90
RFOU (i+c) 250 V	250	90

Issued at **Høvik** on **2025-08-19**

This Certificate is valid until **2029-01-16**.

DNV local unit: **Istanbul**

Approval Engineer: **Ivar Bull**



for **DNV**

This document has been digitally signed and will therefore not have handwritten signature

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: RFOU (i) S1/S5/S101 250 V, RFOU (c) S2/S6/S102 250 V, RFOU (i+c) 250 V

**Construction:**

Conductors: Tinned, stranded copper class 2 or class 5  
 Core insulation: EPR or HEPR  
 Screen: Copper polyester tape w/ tinned copper drain wire  
 Bedding: Halogen-free compound  
 Metal covering: Tinned copper wire braid  
 Outer sheath: SHF Mud

Number of pairs x conductor cross-section	Overall diameter Approx.	Overall diameter Approx.	Overall diameter Approx.
mm <sup>2</sup>	mm	mm	mm
	RFOU(i)	RFOU(c)	RFOU(i+c)
1 x 2 x 0,75	10,1	10,1	
2 x 2 x 0,75	14,7	13,8	15,0
4 x 2 x 0,75	16,8	15,6	17,1
7 x 2 x 0,75	19,6	17,9	19,9
10 x 2 x 0,75	24,4	22,2	24,9
14 x 2 x 0,75	26,5	23,9	26,8
19 x 2 x 0,75	29,3	26,4	29,6
24 x 2 x 0,75	34,6	30,5	34,9
1 x 3 x 0,75	10,5	10,5	
2 x 3 x 0,75	16,1	14,9	16,4
4 x 3 x 0,75	18,3	17,0	18,8
7 x 3 x 0,75	21,7	19,8	22,0
14 x 3 x 0,75	27,0	24,7	27,3
19 x 3 x 0,75	29,4	26,6	29,7
24 x 3 x 0,75	33,0	29,5	33,3
1 x 2 x 1,5	11,3	11,3	
2 x 2 x 1,5	17,0	15,9	17,3
4 x 2 x 1,5	19,6	18,0	19,9
7 x 2 x 1,5	23,0	21,1	23,3
10 x 2 x 1,5	29,0	26,4	29,3
14 x 2 x 1,5	31,6	28,6	32,3
19 x 2 x 1,5	35,8	32,1	36,1
24 x 2 x 1,5	41,8	37,8	42,1
1 x 3 x 1,5	11,8	11,8	
2 x 3 x 1,5	18,7	17,4	19,0

Number of pairs x conductor cross-section	Overall diameter Approx.	Overall diameter Approx.	Overall diameter Approx.
mm <sup>2</sup>	mm	mm	mm
	RFOU(i)	RFOU(c)	RFOU(i+c)
4 x 3 x 1,5	21,6	19,9	21,9
7 x 3 x 1,5	25,5	23,4	25,8
10 x 3 x 1,5	32,7	29,5	33,0
14 x 3 x 1,5	36,0	32,4	36,3
19 x 3 x 1,5	40,1	36,3	40,4
24 x 3 x 1,5	47,2	42,3	47,5
1 x 2 x 2,5	12,1	12,1	
2 x 2 x 2,5	18,6	17,3	18,9
4 x 2 x 2,5	21,3	19,8	21,8
7 x 2 x 2,5	25,4	23,2	25,7
10 x 2 x 2,5	32,5	29,2	32,8
14 x 2 x 2,5	35,7	32,1	36,0
19 x 2 x 2,5	39,6	36,0	40,1
24 x 2 x 2,5	46,9	42,0	47,2
1 x 3 x 2,5	12,8	12,8	
2 x 3 x 2,5	20,4	19,1	20,7
4 x 3 x 2,5	23,6	22,0	23,9
7 x 3 x 2,5	28,2	25,9	28,5
10 x 3 x 2,5	36,5	33,1	37,0
14 x 3 x 2,5	40,0	36,3	40,3
19 x 3 x 2,5	44,7	40,4	45,0
24 x 3 x 2,5	52,5	47,6	52,8
1 x 4 x 0,75	10,1	10,1	
1 x 4 x 1,5	11,3	11,3	
1 x 4 x 2,5	12,1	12,1	

### 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.

Instrumentation, communication and control.  
 Flame retardant in bunch Cat. A. Halogen free. Low smoke.  
 Mud resistant.

### Type Approval documentation

Data sheet: FR 72-040 rev.0 01.05.2010  
 FR 72-042 rev.0 01.05.2010  
 FR 72-056 I REV. 0 REV. TAR. 01.11.2011 I Sf. ½  
 RFOU (i) S101 and RFOU(c) S102 dated 23.08.2024  
 Type test report

### Tests carried out

Standard	Release	General description	Limitation
DNV CP-0399	2021-08	Electric cables.	
IEC 60092-350	2020-01	Electrical installations in ships - Part 350: General construction and test methods of power, control and instrumentation cables for shipboard and offshore applications	
IEC 60092-360	2021-01	Electrical installations in ships - Part 360: Insulating and sheathing materials for shipboard and offshore units, power, control, instrumentation and telecommunication cables	
IEC 60092-376	2025-04	Electrical installations in ships - Part 376: Cables for control and instrumentation circuits 150/250 V (300 V)	
IEC 60332-1-2(2004) AMD1(2015)	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.	Flame retardant small scale. Distance between the lower edge of the top support and the onset of charring > 50 mm and charring not to extend downwards > 540 mm from the lower edge of the top support.
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	Charred portion of sample does not exceed 2,5m above bottom edge of burner.
IEC 60754-1	2019-11	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	2019-11	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	2019-11	Measurement of smoke density of cables burning under defined conditions – Part 1: Test apparatus Part 2: Test procedure and requirements	Low smoke Light transmittance >60%

Standard	Release	General description	Limitation
NEK TS606 Ed7	2025-03	Cables for offshore installations - halogen-free low smoke flame-retardant / fire-resistant (HFFR-LS). Technical specification.	Mud resistance test: Required Max variations ±: IRM902 & 903 100°C 7d. TS & E@B, Weight & vol.: ±30% Calc. Bromide 70°C 56d. TS & E@B: ±25%, Weight: ±15%, vol.: ±20% Oil based mud: <b>EDC 95/11 70°C 56d</b> TS & E@B ±30%, Weight & vol.: ±25%

### Marking of product

ÜNTEL – RFOU (i) (NEK 606 S101/S1/S5) or RFOU (c) (NEK 606 S102/S2/S6) or RFOU (i+c) – size – 250 V - IEC 60332-3-22

### 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