

# TYPE APPROVAL CERTIFICATE

**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**

Issued to  
**Untel Kablolari San. ve Tic. A.S.**  
**Dilovasi, Turkey**

is found to comply with  
**Det Norske Veritas' Rules for Classification of Ships, High Speed & Light Craft and Det Norske Veritas' Offshore Standards**  
**IEC 60092-353 (2011-08)**  
**IEC 60332-3-22 (2009-02)**  
**IEC 60754-1/2 (2011-11)**  
**IEC 61034-2 (2005-04)**  
**NEK TS 606 (2009-05)**

**Application :**

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

Type	Voltage class (kV)	Temp. class (°C)
RFOU P1 0,6/1kV	0,6/1	90
RFOU P1/P8 0,6/1 kV	0,6/1	90

This Certificate is valid until **2018-12-31**.

Issued at **Høvik** on **2014-08-05**

DNV GL local station: **Istanbul**

Approval Engineer: **Ivar Bull**



for **DNV GL**  
 Digitally Signed By: Sjøvåg, Trond

Location: DNV Høvik, Norway

...Signing Date: 2014-08-06... on behalf of .....

**Marit Laumann**  
**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. If any person suffers loss or damage which is proven to have been caused by any negligent act or omission of the Society, then the Society shall pay compensation to such person for his proven direct loss or damage. However, the compensation shall not exceed an amount equal to ten times the fee charged for the service in question. The maximum compensation shall never exceed USD 2 million. In this provision the "Society" shall mean DNV GL AS as well as all its direct and indirect owners, affiliates, subsidiaries, directors, officers, employees, agents and any other person or entity acting on behalf of DNV GL AS.

Certificate No: **E-13493**  
 File No: **827.10**  
 Job Id: **262.1-014256-1**

## Product description

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

Construction:

Conductors: Tinned stranded copper class 2 or class 5  
 Core insulation: EPR or HEPR  
 Inner covering: Halogen free compound  
 Metal covering: Tinned copper wire braid  
 Outer sheath: SHF MUD

Number of cores x cross-section mm <sup>2</sup>	Overall diameter mm
1 x 1,5	8,8
1 x 2,5	9,4
1 x 4	10,0
1 x 6	10,5
1 x 10	11,4
1 x 16	12,7
1 x 25	14,7
1 x 35	16,0
1 x 50	17,8
1 x 70	19,7
1 x 95	22,1
1 x 120	23,7
1 x 150	25,8
1 x 185	28,3
1 x 240	31,4
1 x 300	34,8
1 x 400	39,3
2 x 1,5	12,8
2 x 2,5	14,0
2 x 4	15,2
2 x 6	16,4
2 x 10	18,2
2 x 16	20,6
2 x 25	24,0
2 x 35	26,4
2 x 50	30,2
2 x 70	34,4
2 x 95	39,4
2 x 120	43,0
2 x 150	47,4
2 x 185	52,4
2 x 240	59,0

Number of cores x cross-section mm <sup>2</sup>	Overall diameter mm
3 x 1,5	13,4
3 x 2,5	14,7
3 x 4	16,2
3 x 6	17,3
3 x 10	19,4
3 x 16	22,0
3 x 25	25,6
3 x 35	28,2
3 x 50	32,7
3 x 70	37,2
3 x 95	42,1
3 x 120	46,4
3 x 150	50,7
3 x 185	56,5
3 x 240	63,1
3 x 300	69,6
4 x 1,5	14,8
4 x 2,5	15,9
4 x 4	17,4
4 x 6	18,8
4 x 10	21,0
4 x 16	23,8
4 x 25	28,1
4 x 35	31,0
4 x 50	36,3
4 x 70	40,8
4 x 95	47,0
4 x 120	51,0
4 x 150	56,4
4 x 185	62,4
4 x 240	69,8
5 x 1,5	16,0

Number of cores x cross-section mm <sup>2</sup>	Overall diameter mm
5 x 2,5	17,0
5 x 4	18,9
5 x 6	20,2
5 x 10	22,8
5 x 16	26,0
5 x 25	30,5
5 x 35	34,3
5 x 50	40,0
5 x 70	45,2
5 x 95	51,5
5 x 120	56,6
5 x 150	62,1
5 x 185	68,8
5 x 240	77,6
7 x 1,5	17,0
10 x 1,5	20,8
14 x 1,5	22,6
19 x 1,5	24,8
24 x 1,5	28,6
30 x 1,5	30,8
37 x 1,5	32,8
7 x 2,5	18,2
10 x 2,5	22,6
14 x 2,5	24,3
19 x 2,5	26,8
24 x 2,5	31,2
30 x 2,5	34,0
37 x 2,5	36,2

## 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.

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## Type Approval documentation

Data sheet: FR 72-016 rev.0 01.05.2010  
Test reports: Type test report

### Tests carried out

Standard	Release	General description	Limitation
IEC 60092-350	2008-02	General construction and test methods of power, control and instrumentation cables for shipboard and offshore applications	
IEC 60092-351	2004-04	Insulating materials for shipboard and offshore units, power, control, instrumentation, telecommunication and data cables	
IEC 60092-353	2011-08	Electrical installations in ships - Part 353: Power cables for rated voltages 1 kV and 3 kV	0,6/1 kV
IEC 60092-359	1999-08	Sheathing materials for shipboard power and telecommunication cables	
IEC 60332-3-22	2009-02	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	2011-11	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	2005-04	Measurement of smoke density of cables burning under defined conditions – Test apparatus, procedure and requirements	Low smoke Light transmittance ≥60%

### Marking of product

ÜNTEL – RFOU (NEK 606 P1 or P1/P8) – size – 0,6/1 kV

### Periodical assessment

The scope of the periodical assessment is to verify that the conditions stipulated for the Type approval is complied with and that no alterations are made to the product design or choice of materials.

The main elements of the periodical assessment are:

- Inspection on factory samples, selected at random from the production line (where practicable)
- Results from Production Sample Tests (PST) and Routines (RT) checked (if not available tests according to PST and 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 to be performed at least every second year.

END OF CERTIFICATE