

TYPE APPROVAL CERTIFICATE

This is to certify:

That the High Voltage Cable

with type designation(s)

RFOU P2/P9 3.6/6 kV,

RFOU P3/P10 6/10 kV,

RFOU P4/P11 8.7/15 kV,

RFOU P19/21 12/20 kV,

RFOU P20/P22 18/30 kV

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 :

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

Type	Rated voltage (kV)	Temp. class (°C)
RFOU P2/P9 3.6/6 kV	3.6/6	90
RFOU P3/P10 6/10 kV	6/10	90
RFOU P4/P11 8.7/15 kV	8.7/15	90
RFOU P19/21 12/20 kV	12/20	90
RFOU P20/P22 18/30 kV	18/30	90

Issued at Høvik on 2020-08-19

This Certificate is valid until 2024-01-17.

for DNV GL

DNV GL 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 GL AS, its parent companies and subsidiaries as well as their officers, directors and employees ("DNV GL") 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.



Job Id: **262.1-034191-1**
 Certificate No: **TAE000038B**
 Revision No: **1**

Product description

Types: RFOU P2/P9 3,6/6 kV
 RFOU P3/P10 6/10 kV
 RFOU P4/P11 8,7/15 kV
 RFOU P19/P21 12/20 kV
 RFOU P20/P22 18/30 kV

Construction:

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

RFOU single core cables:

CSA [mm ²]	Voltage U0 / U [kV]				
	3,6/6 P2/P9	6/10 P3/P10	8,7/15 P4/P11	12/20 P19/P21	18/30 P20/P22
1 x 10	-				
1 x 16	-	-			
1 x 25					
1 x 35					
1 x 50					
1 x 70					
1 x 95					
1 x 120					
1 x 150					
1 x 185					
1 x 240					
1 x 300					
1 x 400	-	-	-		-

RFOU Three core cables:

CSA [mm ²]	Voltage U0 / U [kV]				
	3,6/6 P2/P9	6/10 P3/P10	8,7/15 P4/P11	12/20 P19/P21	18/30 P20/P22
3 x 10	-				
3 x 16	-	-			
3 x 25					
3 x 35					
3 x 50					
3 x 70					
3 x 95					
3 x 120					
3 x 150					
3 x 185	-	-	-	-	-
3 x 240	-	-	-	-	-
3 x 300	-	-	-	-	-
3 x 400	-	-	-	-	-

 = Approved variants

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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.

Power.
Flame retardant Cat.A. Halogen free. Low smoke.
Mud resistant.

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 60092-354	2014-08	Electrical installations in ships - Part 354: Single- and three-core power cables with extruded solid insulation for rated voltages 6 kV ($U_m = 7,2$ kV) up to 30 kV ($U_m = 36$ 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.	
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.	

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Marking of product

ÜNTEL – RFOU P2/P9 3,6/6 kV or RFOU P3/P10 6/10 kV or RFOU P4/P11 8,7/15 kV or
RFOU P19/P21 12/20 kV or RFOU P20/P22 18/30 kV– size - 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