

TYPE APPROVAL CERTIFICATE

Certificate no.:
TAE00004W5
Revision No:
1

This is to certify:

that the **High Voltage Cable**

with type designation(s)

RFOI 3,6/6(7,2) kV, RFOI 6/10 12) kV, RFOI 8,7/15 (17,5) kV, RFOI 12/20(24) kV

issued to

Unika Universal Kablo San. ve Tic. A.S.
ISTANBUL, Türkiye

is found to comply with

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

Application:

High 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)
RFOI 3,6/6(7,2) kV	3,6/6(7,2)	90
RFOI 6/10 12) kV	6/10(12)	90
RFOI 8,7/15 (17,5) kV	8,7/15(17,5)	90
RFOI 12/20(24) kV	12/20(24)	90

Issued at **Høvik** on **2025-01-23**

This Certificate is valid until **2029-05-20**.

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

Types:

RFOI 3,6/6(7,2) kV
 RFOI 6/10 12) kV
 RFOI 8,7/15 (17,5) kV
 RFOI 12/20(24) kV
 RFOI 3,6/6(7,2) kV

Construction:

Conductors: Tinned or plain stranded copper class 2 or class 5
 Conductor screen: Semi conducting material
 Core insulation: EPR
 Insulation screen: Semi conducting material and copper tape
 Bedding/Inner covering: Halogen free compound
 Braid armour: Bare or tinned copper wire braid
 Outer sheath: SHF1

Single cores :

Voltage U ₀ / U [kV]				
3,6/6	6/10	8,7/15	12/20	18/30
1 x 10				
1 x 16	1 x 16			
1 x 25	1 x 25	1 x 25		
1 x 35	1 x 35	1 x 35	1 x 35	
1 x 50	1 x 50	1 x 50	1 x 50	-
1 x 70	1 x 70	1 x 70	1 x 70	-
1 x 95	1 x 95	1 x 95	1 x 95	-
1 x 120	1 x 120	1 x 120	1 x 120	-
1 x 150	1 x 150	1 x 150	1 x 150	-
1 x 185	1 x 185	1 x 185	1 x 185	-
1 x 240	1 x 240	1 x 240	1 x 240	-
1 x 300	1 x 300	1 x 300	1 x 300	-
-	1 x 400	-	-	-
-	1 x 500	-	-	-
-	1 x 630	-	-	-

3 cores :

Voltage U ₀ / U [kV]				
3,6/6	6/10	8,7/15	12/20	18/30
-				
3 x 16	3 x 16			
3 x 25	3 x 25	3 x 25		
3 x 35	3 x 35	3 x 35	3 x 35	
3 x 50	3 x 50	3 x 50	3 x 50	-
3 x 70	3 x 70	3 x 70	3 x 70	-
3 x 95	3 x 95	3 x 95	3 x 95	-
3 x 120	3 x 120	3 x 120	3 x 120	-
3 x 150	3 x 150	-	-	-
3 x 185	3 x 185	-	-	-
3 x 240	3 x 240	-	-	-
-	3 x 300	-	-	-

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.

Type Approval documentation

Data sheets: Marine and offshore cables RFOI 3,6/6 kV 6/10kV 8,7/15kV 12/20kV dated 25.07.2024
 DNV Template dimensional data

Test reports: RFOI 6/10 kV Test report witnessed by DNV dated 27.05.2024
 RFOU 3,6/6 kV 8,7/15kV 12/20kV Test report witnessed by DNV dated 15.05.2024
 RFOI 12/20 3x35mm² test report Unika incl. Cold bend/Cold impact test witnessed by DNV 08.11.24

Tests carried out

Standard	Issued	General description	Limitation
IEC 60092-350	2020-01	General construction and test methods of power, control and instrumentation cables for shipboard and offshore applications	

Standard	Issued	General description	Limitation
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 60092-354	2020-02	Electrical installations in ships – Part 354: Single- and three-core power cables with extruded solid insulation for rated voltages 6 kV (Um = 7,2 kV) up to 30 kV (Um = 36 kV)	
IEC 60332-1-2	2018-03	Tests on electric cables under fire conditions. Test for vertical flame propagation for a single insulated wire or cable.	
IEC 60332-3-22	2018-07	Tests on electric 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 +AMD1:2019 CSV	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 60754-2:2011 +AMD1:2019 CSV	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&2:2005 +AMD1:2013 +AMD2:2019 CSV	2019-11	Measurement of smoke density of cables burning under defined conditions – Test apparatus, procedure and requirements	Low smoke Light transmittance >60%

Marking of product

Unika – RFOI – 3,6/6kV or 6/10kV or 8,7/15kV or 12/20kV – No of conductors x size - IEC 60332-3-22 Cat. A – Year or batch number

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