

TYPE APPROVAL CERTIFICATE

This is to certify:

That the High Voltage Cable

with type designation(s)

RFOU P2 or RFOU P2/P9 3.6/6 kV, RFOU P3 or RFOU P3/P10 6/10 kV, RFOU P4 or RFOU P4/P11 8.7/15 kV, RFOU P19 or RFOU P19/21 12/20 kV

Issued to

Nexans (Suzhou) Cable Solutions Co.,Ltd
Suzhou Jiangsu, China

is found to comply with

DNV GL rules for classification – Ships

DNV GL offshore standards

DNV GL rules for classification – High speed and light craft

Application :

Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV GL.

Type	Voltage (kV)	Temp. class (°C)
RFOU P2 or RFOU P2/P9 3.6/6 kV	3.6/6	90
RFOU P3 or RFOU P3/P10 6/10 kV	6/10	90
RFOU P4 or RFOU P4/P11 8.7/15 kV	8.7/15	90
RFOU P19 or RFOU P19/21 12/20 kV	12/20	90

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

Issued at **Hamburg** on **2016-08-04**

DNV GL local station: **Shanghai CMC**

for **DNV GL**

Approval Engineer: **Carsten Hunsalz**

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Duy Nam Le
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.

Product description

Type: RFOU P2 or RFOU P2/P9 3.6/6 kV
RFOU P3 or RFOU P3/P10 6/10 kV
RFOU P4 or RFOU P4/P11 8.7/15 kV
RFOU P19 or RFOU P19/21 12/20 kV

Construction:

Conductors: Tinned, stranded copper class 2 or class 5
Core insulation: EPR
Screening: Tinned copper wire braid
Inner covering: Halogen-free compound
Metal covering: Tinned copper wire braid
Outer sheath: SHF2 or SHF Mud

Voltage U ₀ / U [kV]			
3,6/6	6/10	8,7/15	12/20
P2/P9	P3/P10	P4/P11	P19/P21
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 400	1 x 400	1 x 400

Voltage U ₀ / U [kV]			
3,6/6	6/10	8,7/15	12/20
P2/P9	P3/P10	P4/P11	P19/P21
3 x 10			
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		

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. Halogen free. Low smoke

Type Approval documentation

Job Id:
Certificate No: **TAE00001AJ**

Tests carried out

Standard	Issued	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 60092-354	2003-06	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 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 – Determination of the amount of halogen acid gas	Low Halogen: <0,5% Halogen
IEC 60754-2	2011-11	Test on gases evolved during combustion of materials from cables – Determination of the degree of acidity of gases evolved during the combustion of materials taken from electric cables by measuring pH and conductivity	Halogen free: pH > 4,3 Conductivity < 10µS
IEC 61034-1/2	2005-04	Measurement of smoke density of cables burning under defined conditions – Test apparatus, procedure and requirements	Low smoke
NEK TS 606	2009-05	Mud resistant	

Marking of product

Nexans 448 – 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 – size – IEC 60332-3-22 – Lot No.

Periodical assessment

The scope of the retention/renewal survey 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 survey 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.

Survey to be performed at least every second year.

END OF CERTIFICATE