

TYPE APPROVAL CERTIFICATE

This is to certify:**That the High Voltage Cable**with type designation(s)
TFOI or TFOI EMC or TFOI VFD

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.****Voltage (kV) 3.6/6 6/10 8.7/15 12/20**
Temp. class (°C) 90This Certificate is valid until **2018-12-31**.Issued at **Hamburg** on **2016-08-04**DNV GL local station: **Shanghai CMC**Approval Engineer: **Carsten Hunsalz**for **DNV GL**

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: TFOI or TFOI EMC or TFOI VFD 3.6/6 kV
TFOI or TFOI EMC or TFOI VFD 6/10 kV
TFOI or TFOI EMC or TFOI VFD 8.7/15 kV
TFOI or TFOI EMC or TFOI VFD 12/20 kV

Construction:

Conductors: Tinned or plain stranded copper class 2 or class 5
Core insulation: XLPE
Screening: Cu tape screen
Earth conductors 3x distributed earth conductors in interstices (VFD types)
Inner covering: Halogen-free compound
EMC screen (if any) Cu/PET tape screen (EMC and VFD types)
Metal covering: Tinned or plain copper wire braid
Outer sheath: SHF 1

TFOI:

Voltage U_0 / U [kV]			
3,6/6	6/10	8,7/15	12/20
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 400	1 x 400	1 x 400

TFOI or TFOI EMC :

Voltage U_0 / U [kV]			
3,6/6	6/10	8,7/15	12/20
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	3 x 150	
3 x 185			

TFOI VFD :

Voltage U_0 / U [kV]			
3,6/6	6/10	8,7/15	12/20
3x10 + 3x4			
3x16+ 3x6	3x16+ 3x6		
3x25+ 3x6	3x25+ 3x6	3x25+ 3x6	
3x35+3x10	3x35+3x10	3x35+3x10	3x35+3x10
3x50+3x10	3x50+3x10	3x50+3x10	3x50+3x10
3x70+3x16	3x70+3x16	3x70+3x16	3x70+3x16
3x95+3x25	3x95+3x25	3x95+3x25	3x95+3x25
3x120+3x25	3x120+3x25	3x120+3x25	3x120+3x25
3x150+3x35	3x150+3x35	3x150+3x35	
3x185+3x35			

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.

Type Approval documentation

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 ($U_m = 7,2$ kV) up to 30 kV ($U_m = 36$ 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 < 10 μ S
IEC 61034-1/2	2005-04	Measurement of smoke density of cables burning under defined conditions – Test apparatus, procedure and requirements	Low smoke

Job Id:
Certificate No: **TAE00001AH**

Marking of product

Nexans 448 - TFOI 3,6/6 kV or TFOI 6/10 kV or TFOI 8,7/15 kV or TFOI 12/20 kV – size – IEC 60332-3-22 - Lot No. or

Nexans 448 - TFOI EMC 3,6/6 kV or TFOI EMC 6/10 kV or TFOI EMC 8,7/15 kV or TFOI EMC 12/20 – size – IEC 60332-3-22 - Lot No. or

Nexans 448 - TFOI VFD 3,6/6 kV or TFOI VFD 6/10 kV or TFOI VFD 8,7/15 kV or TFOI VFD 12/20 kV – size – IEC 60332-3-22 - Lot No. or

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