DNV·GL

Certificate No:
TAE00000G3

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Low Voltage Cable

with type designation(s)
S3 BFOU (i), S3/S7 BFOU (i), S4 BFOU (c), S4/S8 BFOU (c)

Issued to
Zhongtian Technology Industrial Wire & Cable System Co.,Ltd.
Nantong, China

is found to comply with
Det Norske Veritas' Rules for Classification of Ships, High Speed & Light Craft and Det Norske Veritas' Offshore Standards

Application :

Instrumentation and communication.

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

Type	Voltage class (V)	Temp. class (°C)
S3 BFOU (i), S3/S7 BFOU (i)	150/250 V	90
S4 BFOU (c), S4/S8 BFOU (c)	150/250 V	90

This Certificate is valid until **2019-10-01**.

Issued at **Høvik** on **2015-10-02**

for **DNV GL**

DNV GL local station: **Nantong CMC**

Approval Engineer: **Georgy Abramenko**

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.

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Job Id: **262.1-013634-1**
Certificate No: **TAE00000G3**

Product description

Construction:

Conductors:	Tinned or plain stranded copper class 2
Core insulation:	Fire resistant tape + EPR
Individual/common screen:	Copper backed polyester type with stranded copper drain wire
Inner covering:	Halogen free compound
Braid armour:	Copper wire braid
Outer sheath:	SHF2 SHF MUD

No of Elements:	Cross sectional area [mm^2]
Pairs: 1 2 3 4 7 10 12 14 16 19 24 27 30 37	0,75 1,5 2,5
Triads: 1 2 3 4 7 10 12 14 16 19 24 27 30 37	0,75 1,5 2,5
Quads (S2, S2/S6 RFOU only): 1	0,75 1,5 2,5

Application/Limitation

This cable is fire resistant according to IEC 60331.

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

Tests carried out

Standard	Issued	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 60092-360	2014-04	Electrical installations in ships - Part 360: Insulating and sheathing materials for shipboard and offshore units, power, control, instrumentation and telecommunication cables.	
IEC 60092-376	2003-05	Cables for control and instrumentation circuits 150/250 V (300 V)	
IEC 60331-1/2	2009-05	Fire resistance / Circuit integrity – Test for method for fire with shock at temperature of at least 830ºC for cables rated up to and including 0,6/1 kV	Minimum 90 min
IEC 60331-21	1999-04	Tests for electric cables under fire conditions – Circuit integrity – Part 21: Procedures and requirements – Cables of rated voltage up to and including 0,6/1,0 kV	Minimum 90 min + 15 min cooling down time
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 60332-1-2	2006-07	Tests on electric cables under fire conditions. Test for vertical flame propagation for a single insulated wire or cable.	
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	Halogen free: pH > 4,3

Standard	Issued	General description	Limitation
		degree of acidity of gases evolved during the combustion of materials taken from electric cables by measuring pH and conductivity	Conductivity < 10µS
IEC 61034-1/2	2013-07/09	Measurement of smoke density of cables burning under defined conditions – Test apparatus, procedure and requirements	Low smoke
NEK 606 Ed. 4	2009-05	Cables for offshore installations. Halogen-free and/or mud resistant. Technical specification.	Mud resistance test: IRM903 100□C 7d. Calcium Bromide 70□C 56d. Carbo Sea 70□C 56d or EDC 95/11 70□C 56d
IEC 60092-350	2008-02	Annex E: Procedure 8.9.1: Temperature requirements	Cold bend: -40°C Cold impact: -35°C

Marking of product

Zhongtian Technology Industrial Wire and Cable System Co. LTD – S3 BFOU(i) – 150/250 V – IEC 60331-1/2 - IEC 60332-3-22 Cat. A – Year, or
Zhongtian Technology Industrial Wire and Cable System Co. LTD – S3/S7 BFOU(i) – 150/250 V – IEC 60331-1/2 - IEC 60332-3-22 Cat. A – Year, or
Zhongtian Technology Industrial Wire and Cable System Co. LTD – S4 BFOU(c) – 150/250 V - IEC 60331-1/2 - IEC 60332-3-22 Cat. A – Year, or
Zhongtian Technology Industrial Wire and Cable System Co. LTD – S4/S8 RFOU(c) – 150/250 V - IEC 60331-1/2 - IEC 60332-3-22 Cat. A – Year.

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 Routine Tests (RT) checked
- (if RT- and PST-test reports are 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
- Ensure traceability between manufacturer's product type marking and Type Approval Certificate.

Periodical assessment shall be performed at least every second year.

END OF CERTIFICATE