DNV·GL

Certificate No:
TAE00000XD

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Electric Power Cable

with type designation(s)
FRA-DPI & FRA-TPI & FRA-FPI & FRA-DPIE & FRA-TPIE & FRA-DPIS & FRA-TPIS

Issued to
TMC Co., Ltd
CHUNGNAM, Republic of Korea

is found to comply with
Det Norske Veritas' Rules for Classification of Ships, High Speed & Light Craft and Det Norske Veritas' Offshore Standards
IEC 60092-353 (2011-08)
IEC 60092-360 (2014-04)
IEC 60331-1/2 (2009-05)
IEC 60332-3-22 (2009-02)
IEC 60754-1/2 (2011-11)
IEC 61034-1/2 Ed. 3.1 (2013-06)

Application :

General power and lighting. Halogen free. Low smoke. Flame retardant Cat.A,
Cold bend (-40 °C)/ Cold impact(-35°C)

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

Voltage class (kV) **0,6/1**
Temp. class (°C) **90**

This Certificate is valid until **2021-06-30**.

Issued at **Busan** on **2016-07-01**

for **DNV GL**

DNV GL local station: **Seoul**

Approval Engineer: **Jong Yun Kim**

Baeg Soon Choi
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: **262.1-004829-3**
Certificate No: **TAE00000XD**

Product description

Type : FRA-DPI & FRA-TPI & FRA-FPI & FRA-DPIE & FRA-TPIE & FRA-DPIS & FRA-TPIS 0,6/1 kV

Conductors:	Tinned stranded copper class 2
Core insulation:	HEPR + Mica
Common shield:	Tinned copper wire braid ('S' type only)
Outer sheath:	SHF1

Number of cores x conductor cross-section mm²
FRA-DPI
2 x 1,5
2 x 2,5
2 x 4
2 x 6
2 x 10
2 x 16
2 x 25
2 x 35
2 x 50
2 x 70
2 x 95
2 x 120
2 x 150
2 x 185
2 x 240
2 x 300
FRA-TPI
3 x 1,5
3 x 2,5
3 x 4
3 x 6
3 x 10
3 x 16
3 x 25
3 x 35

Number of cores x conductor cross-section mm²
3 x 50
3 x 70
3 x 95
3 x 120
3 x 150
3 x 185
3 x 240
3 x 300
FRA-FPI
4 x 1,5
4 x 2,5
4 x 4
4 x 6
4 x 10
4 x 16
4 x 25
4 x 35
4 x 50
4 x 70
4 x 95
4 x 120
4 x 150
4 x 185
4 x 240
4 x 300

Number of cores x conductor cross-section mm²
FRA-DPIE
2 x 1,5 + E
2 x 2,5 + E
2 x 4 + E
2 x 6 + E
2 x 10 + E
2 x 16 + E
FRA-TPIE
3 x 1,5 + E
3 x 2,5 + E
3 x 4 + E
3 x 6 + E
3 x 10 + E
3 x 16 + E
FRA-DPIS
2 x 1,5
2 x 2,5
2 x 4
2 x 6
FRA-TPIS
3 x 1,5
3 x 2,5
3 x 4
3 x 6

Application/Limitation

This type of cable is fire resistant in accordance with IEC Publication 60331.

The requirement of SOLAS Chapter II-1 Part D Reg. 45, 5.2 to limit Fire Propagation along Bunches of Cables or Wires are fulfilled without any additional measures.

Type Approval documentation

Tests carried out

Standard	Issued	Limitation
IEC 60092-350	2014	
IEC 60092-353	2011	
IEC 60092-360	2014	
IEC 60331-1/-2	2009	
IEC 60332-3-22	2009	Bunch test Cat.A
IEC 60754-1	2011	Low Halogen : < 0.5% halogen
IEC 60754-2	2011	Halogen free : pH > 4.3 Conductivity < 10µS
IEC 60684-2	2003	Max. 0,1 %
IEC 61034-2	2005	Low smoke (Min. 60 %)
CSA C22.2	2010	Cold bend (-40 °C) Cold impact(-35°C)

Marking of product

0,6/1 kV – Type designation – Size – IEC 60331 – IEC 60332 Cat.A – TMC – Year of manufacture – Length

Periodical assessment

The scope of the retention/renewal survey is to verify that the conditions stipulated for the Type Approval Certificate are complied with and that no alterations are made to the design and/or the material of product.

The main elements of the survey are:

- Inspection on factory samples, selected at random from the production line (where practicable)
- Check of the results from Production Sample Tests(PST) and Routine Tests(RT) (if not available, PST and RT are to be carried out)
- Review of type approval documentation
- Review of possible changes in design, material and performance
- Ensuring traceability between manufacturer's product type marking and Type Approval Certificate

Survey is to be performed at least every second year.

END OF CERTIFICATE