DNV·GL

Certificate No:
TAE00003G6

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Low Voltage Cable

with type designation(s)
250V FR-(FA-)MPYCY & FR-(FA-)MPYCYE & FR-(FA-)MPYCY-S & FR-(FA-)MPYCYSLA & FR-(FA-)TTPYCY & FR-(FA-)TTPYCY-S & FR-(FA-)TTPYCYSLA & FR-(FA-)TTPYCY-SLA

Issued to
Seoul Electric Wire Co., Ltd.
Eumseong-gun, Chungcheongbuk-do, Republic of Korea

is found to comply with
DNV GL rules for classification – Ships, offshore units, and high speed and light craft
IEC 60092-376 (2017-05)

Application :

Instrumentation and communication.

Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV GL.
Rated voltage (V) 250
Temp. class (°C) 90

Issued at **Busan** on **2019-04-09**
This Certificate is valid until **2022-12-31**.
DNV GL local station: **Seoul**

Approval Engineer: **Eun Jin Lee**

for **DNV GL**

Andreas Kristoffersen
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: **262.1-003852-5**
Certificate No: **TAE00003G6**

Product description

Type : 250V FR-(FA-)MPYCY & FR-(FA-)MPYCYE & FR-(FA-)MPYCY-S & FR-(FA-)MPYCYSLA & FR-(FA-)TTPYCY & FR-(FA-)TTPYCY-S & FR-(FA-)TTPYCYSLA & FR-(FA-)TTPYCY-SLA

Conductors:	Tinned stranded copper class 2 or class 5
Core insulation:	EPR + Mica
Individual shield :	Tinned copper wire braid ('-S'type only)
	Aluminium laminated tape with a drain wire ('-SLA' type only)
Common shield :	Aluminium laminated tape with a drain wire ('SLA' type only)
Inner sheath:	PVC
Metal covering :	Galvanized steel wire (C)
Outer sheath :	PVC

Number of cores x conductor cross-section mm²
FR-(FA-)MPYCY
2 x 1,0
4 x 1,0
7 x 1,0
12 x 1,0
19 x 1,0
27 x 1,0
37 x 1,0
44 x 1,0
77 x 1,0
2 x 1,5
4 x 1,5
7 x 1,5
12 x 1,5
19 x 1,5
27 x 1,5
37 x 1,5
44 x 1,5
77 x 1,5
2 x 2,5
4 x 2,5
7 x 2,5
12 x 2,5
19 x 2,5
27 x 2,5
37 x 2,5
44 x 2,5
77 x 2,5
FR-(FA-)MPYCYE
2 x 1,0 + E
4 x 1,0 + E
7 x 1,0 + E
12 x 1,0 + E
19 x 1,0 + E

Number of cores x conductor cross-section mm²
27 x 1,0 + E
37 x 1,0 + E
44 x 1,0 + E
77 x 1,0 + E
2 x 1,5 + E
4 x 1,5 + E
7 x 1,5 + E
12 x 1,5 + E
19 x 1,5 + E
27 x 1,5 + E
37 x 1,5 + E
44 x 1,5 + E
77 x 1,5 + E
2 x 2,5 + E
4 x 2,5 + E
7 x 2,5 + E
12 x 2,5 + E
19 x 2,5 + E
27 x 2,5 + E
37 x 2,5 + E
44 x 2,5 + E
77 x 2,5 + E
FR-(FA-)MPYCY-S
2 x 1,0
4 x 1,0
7 x 1,0
12 x 1,0
19 x 1,0
27 x 1,0
37 x 1,0
44 x 1,0
2 x 1,5
4 x 1,5

Number of cores x conductor cross-section mm²
7 x 1,5
12 x 1,5
19 x 1,5
27 x 1,5
37 x 1,5
44 x 1,5
2 x 2,5
4 x 2,5
7 x 2,5
12 x 2,5
19 x 2,5
27 x 2,5
37 x 2,5
44 x 2,5
FR-(FA-)MPYCYSLA
2 x 1,0
4 x 1,0
7 x 1,0
12 x 1,0
19 x 1,0
27 x 1,0
37 x 1,0
44 x 1,0
2 x 1,5
4 x 1,5
7 x 1,5
12 x 1,5
19 x 1,5
27 x 1,5
37 x 1,5
44 x 1,5
2 x 2,5
4 x 2,5

Number of cores x conductor cross-section mm²
7 x 2,5
12 x 2,5
19 x 2,5
27 x 2,5
37 x 2,5
44 x 2,5
FR-(FA-)TTPYCY
1 x 2 x 0,75
1 x 3 x 0,75
1 x 4 x 0,75
2 x 2 x 0,75
4 x 2 x 0,75
7 x 2 x 0,75
10 x 2 x 0,75
14 x 2 x 0,75
19 x 2 x 0,75
24 x 2 x 0,75
30 x 2 x 0,75
37 x 2 x 0,75
48 x 2 x 0,75
1 x 2 x 1,0
1 x 3 x 1,0
1 x 4 x 1,0
2 x 2 x 1,0
4 x 2 x 1,0
7 x 2 x 1,0
10 x 2 x 1,0
14 x 2 x 1,0
19 x 2 x 1,0
24 x 2 x 1,0
30 x 2 x 1,0
37 x 2 x 1,0
48 x 2 x 1,0
1 x 2 x 1,5

Number of cores x conductor cross-section mm²
1 x 3 x 1,5
1 x 4 x 1,5
2 x 2 x 1,5
4 x 2 x 1,5
7 x 2 x 1,5
10 x 2 x 1,5
14 x 2 x 1,5
19 x 2 x 1,5
24 x 2 x 1,5
30 x 2 x 1,5
37 x 2 x 1,5
48 x 2 x 1,5
FR-(FA-)TTPYCY-S
2 x 2 x 0,75
4 x 2 x 0,75
7 x 2 x 0,75
10 x 2 x 0,75
14 x 2 x 0,75
19 x 2 x 0,75
24 x 2 x 0,75
30 x 2 x 0,75
37 x 2 x 0,75
48 x 2 x 0,75
2 x 2 x 1,0
4 x 2 x 1,0
7 x 2 x 1,0
10 x 2 x 1,0
14 x 2 x 1,0
19 x 2 x 1,0
24 x 2 x 1,0
30 x 2 x 1,0
37 x 2 x 1,0
48 x 2 x 1,0
2 x 2 x 1,5

Number of cores x conductor cross-section mm²
4 x 2 x 1,5
7 x 2 x 1,5
10 x 2 x 1,5
14 x 2 x 1,5
19 x 2 x 1,5
24 x 2 x 1,5
30 x 2 x 1,5
37 x 2 x 1,5
48 x 2 x 1,5
FR-(FA-)TTPYCYSLA
1 x 2 x 0,75
1 x 3 x 0,75
1 x 4 x 0,75
2 x 2 x 0,75
4 x 2 x 0,75
7 x 2 x 0,75
10 x 2 x 0,75

Number of cores x conductor cross-section mm²
14 x 2 x 0,75
19 x 2 x 0,75
24 x 2 x 0,75
30 x 2 x 0,75
37 x 2 x 0,75
48 x 2 x 0,75
1 x 2 x 1,0
1 x 3 x 1,0
1 x 4 x 1,0
2 x 2 x 1,0
4 x 2 x 1,0
7 x 2 x 1,0
10 x 2 x 1,0
14 x 2 x 1,0
19 x 2 x 1,0
24 x 2 x 1,0
30 x 2 x 1,0
37 x 2 x 1,0
48 x 2 x 1,0

Number of cores x conductor cross-section mm²
1 x 2 x 1,5
1 x 3 x 1,5
1 x 4 x 1,5
2 x 2 x 1,5
4 x 2 x 1,5
7 x 2 x 1,5
10 x 2 x 1,5
14 x 2 x 1,5
19 x 2 x 1,5
24 x 2 x 1,5
30 x 2 x 1,5
37 x 2 x 1,5
48 x 2 x 1,5
FR-(FA-)TTPYCY-SLA
1 x 2 x 0,75
1 x 3 x 0,75

Number of cores x conductor cross-section mm²
1 x 4 x 0,75
2 x 2 x 0,75
4 x 2 x 0,75
7 x 2 x 0,75
10 x 2 x 0,75
14 x 2 x 0,75
19 x 2 x 0,75
24 x 2 x 0,75
30 x 2 x 0,75
37 x 2 x 0,75
48 x 2 x 0,75
1 x 2 x 1,0
1 x 3 x 1,0
1 x 4 x 1,0
2 x 2 x 1,0
4 x 2 x 1,0
7 x 2 x 1,0
10 x 2 x 1,0
14 x 2 x 1,0

Number of cores x conductor cross-section mm²
19 x 2 x 1,0
24 x 2 x 1,0
30 x 2 x 1,0
37 x 2 x 1,0
48 x 2 x 1,0
1 x 2 x 1,5
1 x 3 x 1,5
1 x 4 x 1,5
2 x 2 x 1,5
4 x 2 x 1,5
7 x 2 x 1,5
10 x 2 x 1,5
14 x 2 x 1,5
19 x 2 x 1,5
24 x 2 x 1,5
30 x 2 x 1,5
37 x 2 x 1,5
48 x 2 x 1,5

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 for 'FA- ' type only.

Type Approval documentation

Tests carried out

Standard	Release	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 60092-376	2017-05	Cables for control and instrumentation circuits 150/250V(300V)	
IEC 60331-1/-2	2009-05	Fire resistance / Circuit integrity – Test method for fire *with shock* at temperature of at least 830ºC for cables rated up to and including 0,6/1 kV	@ 830 °C w/shock (120)
IEC 60332-1	2015-07	Test for vertical flame propagation for a single insulated wire or cable	
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

Marking of product

250V – Type designation – Size – IEC 60331(120) – IEC 60332-1 – SEOUL – Year of manufacture – Length

For 'FA-' type,
250V – Type designation – Size – IEC 60331(120) – IEC 60332-1 – IEC 60332-3 A – SEOUL – 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, PSTand 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

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