

TYPE APPROVAL CERTIFICATE

This is to certify:**That the Low Voltage Cable**with type designation(s)
As listed on page 2

Issued to

Kukdong Electric Wire Co., Ltd.
Jincheon-gun Chungcheongbuk-do, Korea

is found to comply with

DNV GL rules for classification – Ships, offshore units, and high speed and light craft
JIS C 3410:2010
IEC 60331**Application :****Instrumentation and communication. Control. Fire resistant.****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 **2018-01-25**This Certificate is valid until **2022-06-30**.for **DNV GL**DNV GL local station: **Seoul**Approval Engineer: **Eun Jin Lee**

Michael Jost Auf der Stroth
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 : FR-MPYC, FR-TTPYC, FR-MPYC-S, FR-TTPYCS, FR-TTPYC-S, FR-MPYCSLA, FR-TTPYCSLA, FR-TTPYC-SLA, FR-TTPYC-SSLA

FR-FA-MPYC, FR-FA-TTPYC, FR-FA-MPYC-S, FR-FA-TTPYCS, FR-FA-TTPYC-S, FR-FA-MPYCSLA, FR-FA-TTPYCSLA, FR-FA-TTPYC-SLA, FR-FA-TTPYC-SSLA

Conductors : Tinned annealed stranded copper conductor, Class 2
Core insulation : EPR + Mica
Shield : Copper wire common shield braid ('S' type only)
Copper wire individual shield braid ('-S' type only)
Aluminum mylar common shield with drain wire ('SLA' type only)
Aluminum mylar individual shield with drain wire ('-SLA' type only)
Aluminum mylar common/individual shield with drain wire ('-SSLA' type only)
Inner sheath : ST2
Metal covering : Galvanized steel wire braid (C), painted

Number Of Cores X Conductor-section
mm ²
FR-MPYC, FR-FA-MPYC
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
FR-MPYCSLA, FR-FA-MPYCSLA
2 x 1.0
4 x 1.0
5 x 1.0
7 x 1.0
9 x 1.0
12 x 1.0
16 x 1.0
19 x 1.0
27 x 1.0
33 x 1.0
37 x 1.0
44 x 1.0
FR-MPYC-S,

Number Of Cores X Conductor-section
mm ²
FR-FA-MPYC-S
2 x 1.0
4 x 1.0
5 x 1.0
7 x 1.0
9 x 1.0
12 x 1.0
16 x 1.0
19 x 1.0
27 x 1.0
33 x 1.0
37 x 1.0
44 x 1.0
FR-TTPYC, FR-FA-TTPYC (Pair)
1 x 0.75
1 Tr x 0.75
1 Qd x 0.75
2 x 0.75
4 x 0.75
7 x 0.75
10 x 0.75
14 x 0.75
19 x 0.75

Number Of Cores X Conductor-section
mm ²
24 x 0.75
30 x 0.75
37 x 0.75
48 x 0.75
FR-TTPYCSLA, FR-FA-TTPYCSLA (Pair)
1 x 0.75
1 Tr x 0.75
1 Qd x 0.75
2 x 0.75
4 x 0.75
7 x 0.75
10 x 0.75
14 x 0.75
19 x 0.75
24 x 0.75
30 x 0.75
37 x 0.75
48 x 0.75
FR-TTPYC-SLA/-SSLA, FR-FA-TTPYC-SLA/-SSLA (Pair)
2 x 0.75

Number Of Cores X Conductor-section
mm ²
4 x 0.75
7 x 0.75
10 x 0.75
14 x 0.75
19 x 0.75
24 x 0.75
30 x 0.75
37 x 0.75
48 x 0.75
FR-TTPYCS, FR-FA-TTPYCS (Pair)
1 x 0.75
1 Tr x 0.75
1 Qd x 0.75
2 x 0.75
4 x 0.75
7 x 0.75
10 x 0.75
14 x 0.75
19 x 0.75
24 x 0.75
30 x 0.75
37 x 0.75
48 x 0.75

Number Of Cores X Conductor- section
mm ²
FR-TTPYC-S, FR-FA-TTPYC- S (Pair)
2 x 0.75

Number Of Cores X Conductor- section
mm ²
4 x 0.75
7 x 0.75
10 x 0.75

Number Of Cores X Conductor- section
mm ²
14 x 0.75
19 x 0.75
24 x 0.75

Number Of Cores X Conductor- section
mm ²
30 x 0.75
37 x 0.75
48 x 0.75

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 measure for 'FA-' type only.

Type Approval documentation

Tests carried out

Standard	Issued	Limitation
JIS C3410	2010	
IEC 60331-1	2009	@ 830 °C w/shock, 120min
IEC 60331-21	1999	@ 750°C/90 min. test
IEC 60332-1	2004	
IEC 60332-3-22	2009	Bunch test Cat.A 'FA-' type only.
CSA C22.2 No. 03		For '-ICE' type only: Cold bend (-40°C) Cold impact (-35 °C)

Marking of product

250 V – FR-MPYC or FR-TTPYC or FR-MPYC-S or FR-TTPYCS or FR-TTPYC-S or FR-MPYCSLA or FR-TTPYCSLA or FR-TTPYC-SLA or FR-TTPYC-SSLA – Size – Kukdong – IEC 60331** – Year of manufacture – Length

250 V – FR-FA-MPYC or FR-FA-TTPYC or FR-FA-MPYC-S or FR-FA-TTPYCS or FR-FA-TTPYC-S or FR-FA-MPYCSLA or FR-FA-TTPYCSLA or FR-FA-TTPYC-SLA or FR-FA-TTPYC-SSLA – Size – Kukdong – IEC 60332-3 Cat.A – IEC 60331** – Year of manufacture – Length

*If "-ICE" symbol is added, cable has cold resistant property.

** For O.D. > 20mm, IEC 60331-1(120min)

For O.D. ≤ 20mm, IEC60331-21(90min)

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



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Certificate No: **TAE000023B**

- 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