

TYPE APPROVAL CERTIFICATE

This is to certify:**That the Low Voltage Cable**

with type designation(s)
BS-FFRC-HF

Issued to

**Bosung Silicone Co., Ltd.,
Gyeonggi-do, Korea**

is found to comply with

DNV GL rules for classification – Ships, offshore units, and high speed and light craft

IEC 60092-376 (2003-05)

IEC 60332-3-22 (2009-02)

IEC 60754-1/2 (2011-11)

IEC 61034-1/2 Ed. 3.1 (2013-06)

Application :

Control and instrumentation cables. Flame retardant. Halogen free. Low smoke.

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

Rated voltage (V) 150/250 (300)

Temp. class (°C) 90

Issued at **Busan** on **2018-01-12**

This Certificate is valid until **2023-01-11**.

DNV GL local station: **Seoul**

for **DNV GL**

Approval Engineer: **Eun Sook Kim**

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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: BS-FFRC-HF 150/250 V

Conductors: Stranded tinned annealed copper, Class 2
Insulation: HEPR
Shield: Tinned copper wire braid
Outer sheath: SHF2

Number of cores x conductor cross-section(mm ²)
2 x 0,75
3 x 0,75
4 x 0,75
5 x 0,75
7 x 0,75
12 x 0,75
14 x 0,75
16 x 0,75
19 x 0,75

Number of cores x conductor cross-section(mm ²)
20 x 0,75
2 x 1,0
3 x 1,0
4 x 1,0
5 x 1,0
7 x 1,0
12 x 1,0
2 x 1,5
3 x 1,5

Number of cores x conductor cross-section(mm ²)
4 x 1,5
5 x 1,5
7 x 1,5
12 x 1,5
2 x 2,5
3 x 2,5
4 x 2,5
12 x 2,5
14 x 2,5

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.

Type Approval documentation

Tests carried out

Standard	Release	General description	Limitation
IEC 60092-350	2014	General construction and test methods of power, control and instrumentation cables for shipboard and offshore applications	Additional aging test on pieces of completed cables (compatibility test) at 130°C Additional insulation resistance constant measurement at 120°C
IEC 60092-360	2014	Insulating and sheathing materials for shipboard and offshore units, power, control, instrumentation and telecommunication cables	Additional tests: mechanical properties after aging without conductor at 151°C for insulation and after aging at 151°C for sheath
IEC 60092-376	2003-05	Cables for control and instrumentation circuits 150/250 V (300 V)	
IEC 60332-1-2	2004-07	Tests on electric and optical fibre cables under fire conditions – Part 1-2: Test for vertical flame propagation for a single insulated wire or 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 halogen acid gas content	Low Halogen: <0,5% Halogen

Job Id: **262.1-026119-1**
Certificate No: **TAE00001Z7**

Standard	Release	General description	Limitation
IEC 60754-2	2011-11	Test on gases evolved during combustion of materials from cables – Determination of acidity(by pH measurement) and conductivity	Halogen free: pH $\geq$ 4,3 Conductivity $\leq$ 10 μ S
IEC 61034-2	2005-04	Measurement of smoke density of cables burning under defined conditions – Test apparatus, procedure and requirements	Low smoke
IEC 60684-2	2003-05	Flexible insulating sleeving – Part 2: Methods of test.	Fluorine content < 0,1%

Marking of product

BOSUNG SILICONE – BS-FFRC-HF – Size – 150/250 V – Manufacturing date

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

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