



Certificate no.:  
**TAE00004Z5**

# TYPE APPROVAL CERTIFICATE

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## This is to certify:

that the **Lightweight Electric Cable**

with type designation(s)  
**BS-FFRC-HFX**

issued to

**Bo Sung Silitech Co., Ltd.**  
**Gyeyang-gu,, Incheon, Korea, Republic of**

is found to comply with

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

## Application:

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

**Rated voltage (kV)** 0.6/1(1.2)  
**Temp. class (°C)** 90

Issued at **Busan** on **2024-10-30**

This Certificate is valid until **2029-10-29**.

for **DNV**

DNV local unit: **Seoul**

Approval Engineer: **Eun Jin Lee**

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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.

LEGAL DISCLAIMER: Unless otherwise stated in the applicable contract with the holder of this document, or following from mandatory law, the liability of DNV AS, its parent companies and their subsidiaries as well as their officers, directors and employees ("DNV") arising from or in connection with the services rendered for the purpose of the issuance of this document or reliance thereon, whether in contract or in tort (including negligence), shall be limited to direct losses and under any circumstance be limited to USD 300 000.

## Product description

Type : 0.6/1kV BS-FFRC-HFX, BS-FFRC-HFX(C), BS-FFRC-HFX(I/C)

|                     |                                                   |
|---------------------|---------------------------------------------------|
| Conductor :         | Stranded tinned annealed copper, Class 5          |
| Insulation :        | High temperature thermoplastic elastomer          |
| Individual screen : | AL/mylar tape with drain wire (for 'I' type only) |
| Drain wire :        | 0.5sqmm Tinned copper wire (for 'C' type only)    |
| Braid screen :      | Tinned annealed copper wire                       |
| Outer sheath :      | SHF2                                              |

|                                                           |            |                         |
|-----------------------------------------------------------|------------|-------------------------|
| No. of cores x conductor cross section [mm <sup>2</sup> ] | 16C x 0.75 | 14C x 1.5               |
| <b>BS-FFRC-HFX</b>                                        | 19C x 0.75 | 15C x 1.5               |
| 2C x 0.5                                                  | 20C x 0.75 | 16C x 1.5               |
| 3C x 0.5                                                  | 27C x 0.75 | 19C x 1.5               |
| 4C x 0.5                                                  | 30C x 0.75 | 20C x 1.5               |
| 5C x 0.5                                                  |            |                         |
| 6C x 0.5                                                  | 2C x 1.0   | 2C x 2.5                |
| 7C x 0.5                                                  | 3C x 1.0   | 3C x 2.5                |
| 8C x 0.5                                                  | 4C x 1.0   | 4C x 2.5                |
| 10C x 0.5                                                 | 5C x 1.0   | 5C x 2.5                |
| 12C x 0.5                                                 | 6C x 1.0   | 6C x 2.5                |
| 14C x 0.5                                                 | 7C x 1.0   | 7C x 2.5                |
| 15C x 0.5                                                 | 8C x 1.0   | 8C x 2.5                |
| 16C x 0.5                                                 | 10C x 1.0  | 10C x 2.5               |
| 19C x 0.5                                                 | 12C x 1.0  | 12C x 2.5               |
| 20C x 0.5                                                 | 14C x 1.0  | 14C x 2.5               |
| 27C x 0.5                                                 | 15C x 1.0  |                         |
| 37C x 0.5                                                 | 16C x 1.0  | <b>BS-FFRC-HFX(C)</b>   |
|                                                           | 19C x 1.0  | 1 ~ 10 Pair x 0.5       |
|                                                           | 20C x 1.0  | 1 ~ 8 Pair x 0.75       |
|                                                           | 27C x 1.0  | 1 ~ 8 Pair x 1.0        |
|                                                           |            | 1 ~ 5 Pair x 1.5        |
| 2C x 0.75                                                 |            | 1 ~ 3 Pair x 2.5        |
| 3C x 0.75                                                 | 2C x 1.5   |                         |
| 4C x 0.75                                                 | 3C x 1.5   | <b>BS-FFRC-HFX(I/C)</b> |
| 5C x 0.75                                                 | 4C x 1.5   | 2 ~ 9 Pair x 0.5        |
| 6C x 0.75                                                 | 5C x 1.5   | 2 ~ 7 Pair x 0.75       |
| 7C x 0.75                                                 | 6C x 1.5   | 2 ~ 7 Pair x 1.0        |
| 8C x 0.75                                                 | 7C x 1.5   | 2 ~ 4 Pair x 1.5        |
| 10C x 0.75                                                | 8C x 1.5   | 2 ~ 3 Pair x 2.5        |
| 12C x 0.75                                                | 10C x 1.5  |                         |
| 14C x 0.75                                                | 12C x 1.5  |                         |
| 15C x 0.75                                                |            |                         |

## Application/Limitation

The requirement of SOLAS Amendments Chapter II-1, Part D, Reg. 45, 5.2(provision to be taken to limit Fire Propagation along Bundles of cables or wires) are fulfilled without any additional measures.

## Type Approval documentation

### Tests carried out

| Standard       | Release | General description                                                                                                                                                     | Limitation                     |
|----------------|---------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|
| DNV-CP-0400    | 2021-09 | Lightweight electric cables                                                                                                                                             | Relevant parts.                |
| IEC 60092-360  | 2021    | Insulating and sheathing materials for shipboard and offshore units, power, control, instrumentation, telecommunication cables                                          |                                |
| IEC 60332-1    | 2015    | Test for vertical flame propagation for a single insulated wire or cable - Apparatus                                                                                    |                                |
| IEC 60332-3-22 | 2018    | 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          |
| BS 3G 230      | 2000    | General requirements for aircraft electric cables (second series) _Fluid immersion                                                                                      | Fluid immersion: 72hrs at 70°C |

| Standard                 | Release | General description                                                                                               | Limitation                                         |
|--------------------------|---------|-------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|
|                          |         |                                                                                                                   | -IRM902, 903<br>-Diesel(F-76)<br>- 3.5% salt water |
| IEC 60684-2              | 2011    | Flexible insulating sleeving – Part 2: Methods of test.                                                           | Fluorine content <0,1%                             |
| IMO FTPC Annex 1, Part 2 |         | Toxicity index                                                                                                    |                                                    |
| ISO 5659-2               | 2017    | Plastics - Smoke generation - Part 2: Determination of optical density by a single-chamber test                   | Ds4 150 max and Dmax 150.<br>VOF4 max.300          |
| IEC 61034-2              | 2019    | Measurement of smoke density of cables burning under defined conditions - Part 2: Test procedure and requirements | Min. 70%                                           |

### Marking of product

0.6/1(1.2)kV – Type designation – IEC 60332-3 Cat.A – Size – BO SUNG SILITECH – Year of manufacture – Length

### Periodical assessment

The scope of the periodical assessment is to verify that the conditions stipulated for the Type approval are complied with and that no alterations are made to the product design or choice of materials.

The main elements of the assessment are:

- Inspection on factory samples, selected at random from the production line (where practicable)
- Results from Routine tests (RT) and selected type tests (ref. to applicable class programs) checked (if not available these tests shall be carried out)
- Review of type approval documentation
- Review of possible change in design, materials 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