

# TYPE APPROVAL CERTIFICATE

**This is to certify:****That the Electric Power Cable**with type designation(s)  
**XFCK, XFOK, XFBK, XFCK(C), XFOK(C), XFBK(C)**

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**  
**IEC 60092-353 (2016-09)****Application :****Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV GL.****Rated voltage (kV) 0.6/1****Temp. class (°C) 90**Issued at **Busan** on **2018-02-12**This Certificate is valid until **2023-02-11**.for **DNV GL**DNV GL local station: **Seoul**Approval Engineer: **Eun Jin Lee**

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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 : XFCK, XFOK, XFBK, XFCK(C), XFOK(C), XFBK(C) 0.6/1kV

|                     |                                                                    |
|---------------------|--------------------------------------------------------------------|
| Conductor :         | Stranded plain or tinned copper, class2                            |
| Insulation :        | XLPE + Mica tape                                                   |
| Collective screen : | Cu/PS tape with drain wire ((C) type only)                         |
| Inner covering :    | Halogen free compound                                              |
| Armour :            | Metal wire braid<br>(C : Galvanized steel, O : Copper, B : Bronze) |
| Outer sheath :      | SHF2                                                               |

| Type                                        | Conductor cross section (mm <sup>2</sup> ) | No. of cores              |
|---------------------------------------------|--------------------------------------------|---------------------------|
| XFCK, XFOK, XFBK, XFCK(C), XFOK(C), XFBK(C) | 1.0~400                                    | 1C (except XFCK, XFCK(C)) |
|                                             | 1.0~300                                    | 2C, 3C, 4C                |
|                                             |                                            | 2C+E, 3C+E, 4C+E          |
|                                             | 1.0, 1.5, 2.5                              | 5C~44C                    |

## 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.

## Type Approval documentation

### Tests carried out

| Standard       | Issued | General description                                                                                                                                                                                                                                                               | Limitation                                                   |
|----------------|--------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|
| IEC 60092-350  | 2014   | General construction and test methods of power, control and instrumentation cables for shipboard and offshore applications                                                                                                                                                        |                                                              |
| IEC 60092-353  | 2016   | Power cables for rated voltages 1kV and 3kV                                                                                                                                                                                                                                       |                                                              |
| IEC 60332-1    | 2015   | Test for vertical flame propagation for a single insulated wire or cable                                                                                                                                                                                                          |                                                              |
| IEC 60332-3-22 | 2009   | 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 Cat.A                                             |
| IEC 60331-21   | 1999   | Tests for electric cables under fire conditions – Circuit integrity – Part 21: Procedures and requirements – Cables of rated voltage up to 0,6/1,0 kV                                                                                                                             | @ 750 °C/90 min. test                                        |
| IEC 60331-1/-2 | 2009   | Fire resistance / Circuit integrity – Test method for fire <i>with shock</i> at temperature of at least 830°C for cables rated up to and including 0,6/1 kV                                                                                                                       | @ 830 °C w/shock (120 min)                                   |
| IEC 60754-1/-2 | 2011   | Test on gases evolved during combustion of materials from cables<br>– Determination of the amount of halogen acid gas<br>– Determination of the degree of acidity of gases evolved during the combustion of materials taken from electric cables by measuring pH and conductivity | Low halogen<br>: <0.5%<br>Halogen free<br>: ≥4.3pH, ≤10μS/mm |

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|                  |      |                                                                                                                          |                        |
|------------------|------|--------------------------------------------------------------------------------------------------------------------------|------------------------|
| IEC 60684-2      | 2011 | Flexible insulating sleeving – Part 2:<br>Methods of test.                                                               | Fluorine content <0.1% |
| IEC 61034        | 2013 | Measurement of smoke density of cables<br>burning under defined conditions–Test<br>apparatus, procedure and requirements | Low smoke >60%         |
| UL 1581          | 2015 | UV sunlight resistant                                                                                                    | 720hrs                 |
| IEC 60092-360    | 2014 | Oil resistant                                                                                                            | 24hrs @ 100°C          |
| CSA C22.2 No. 03 | 2009 | 5.11 Flexibility at any specified<br>temperature                                                                         | Cold bend: -40°C       |
| CSA C22.2 No. 03 | 2009 | 5.12 Abnormal low temperature – impact                                                                                   | Cold impact: -35°C     |

### Marking of product

0.6/1kV – Type designation – Size – Kukdong – IEC 60332 Cat.A – IEC 60331(120) – 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

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