

**TYPE APPROVAL CERTIFICATE****This is to certify:****That the Electric Power Cable**with type designation(s)  
**LKM-FRHF 0,6/1 kV**

Issued to

**Helkama Bica (Shanghai) Co. Ltd.**  
**Shanghai 020, China**

is found to comply with

**Det Norske Veritas' Rules for Classification of Ships, High Speed & Light Craft and Det Norske Veritas' Offshore Standards****Application :****General power and lighting. Control.****Fire resistant. Flame retardant in bunch cat A. Halogen free. Low smoke.****Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV GL.****Voltage class (kV) 0,6/1**  
**Temp. class (°C) 90**This Certificate is valid until **2019-07-15**.Issued at **Høvik** on **2015-07-16**DNV GL local station: **Shanghai**Approval Engineer: **Ivar Bull**for **DNV GL**

---

**Marit Laumann**  
**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: LKM-FRHF 0,6/1 kV

Construction:

Conductor: Plain, stranded, annealed copper class 2 or class 5

Core insulation: Mica tape + XLPE

Sheath: SHF1

No of cores:	Cross sectional area [mm <sup>2</sup> ]
1	1 - 300
2	1 - 95
3	1 - 95
4	1 - 95
5	1 - 70
7, 10, 12, 14, 16, 19, 24, 27, 37	1, 1,5 2,5

## Application/Limitation

This type of cable is fire resistant in accordance with IEC Publication 60331.

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

Data sheets: Specification HBKQ 9.SPEC.23 dated 2011-06-30  
 Main drawing, appendix1 to HBKQ 9.SPEC.23 dated 2011-06-30  
 Technical specification, appendix2 for HBKQ 9.SPEC.23 dated 2011-06-30.  
 Technical specification, appendix3 for HBKQ 9.SPEC.23 dated 2011-06-30.

Test reports: Helkama test document LKM-FRHF/TT\_1\_5 and LKM-FRHF/TT\_70 dated 1999-11-03.  
 CT07-0310-2 dated 2007-04-09

## 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 60092-360	2014-04	Electrical installations in ships - Part 360: Insulating and sheathing materials for shipboard and offshore units, power, control, instrumentation and telecommunication cables.	
IEC 60092-353	2011-08	Electrical installations in ships - Part 353: Power cables for rated voltages 1 kV and 3 kV	0,6/1 kV
IEC 60331-21	1999-04	Tests for electric cables under fire conditions - Circuit integrity - Part 21: Procedures and requirements - Cables of rated voltage up to and including 0,6/1,0 kV	Minimum 120 min + 15 min cooling down time

Job Id: **262.1-001606-4**  
Certificate No: **TAE000006B**

Standard	Release	General description	Limitation
IEC 60331-1/2	2009-05	Fire resistance / Circuit integrity – Test for method for fire with shock at temperature of at least 830°C for cables rated up to and including 0,6/1 kV	Minimum 90 min+15 min cooling down time
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 - Part 1: Determination of the halogen acid gas content	Low Halogen: <0,5% Halogen
IEC 60754-2	2011-11	Test on gases evolved during combustion of materials from cables - Part 2: Determination of acidity (by pH measurement) and conductivity	Halogen free: pH > 4,3 Conductivity < 10µS/mm
IEC 61034-1/2	2013-07 2013-09	Measurement of smoke density of cables burning under defined conditions – Test apparatus, procedure and requirements	Low smoke Light transmittance ≥60%

### Marking of product

HELKAMA 3- LKM-FRHF – Size – 0,6/1 kV – IEC 60331 – IEC 60332 Cat. A – Lot no.

### Periodical assessment

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

The main elements of the Periodical assessment are:

- Inspection on factory samples, selected at random from the production line (where practicable)
- Results from Production Sample Tests (PST) and Routine Tests (RT) checked
- (if RT- and PST-test reports are not available, tests according to PST and RT to be carried out)
- Review of type approval documentation
- Review of possible change in design, materials and performance
- Ensure traceability between manufacturer's product type marking and Type Approval Certificate.

Periodical assessment shall be performed at least every second year.

END OF CERTIFICATE