

# TYPE APPROVAL CERTIFICATE

**This is to certify:**

**That the Low Voltage Cable**

with type designation(s)  
**LKM-FRHF 250V, LKAM-FRHF 250V**

Issued to  
**HELKAMA BICA OY**  
**Kaarina, Finland**

is found to comply with  
**Det Norske Veritas' Rules for Classification of Ships, High Speed & Light Craft and Det Norske Veritas' Offshore Standards**

**IEC 60331-1/2 (2009-05)**  
**IEC 60332-3-22 (2009-02)**  
**IEC 60754-1/2 (2011-11)**  
**IEC 61034-1/2 (2013-07/2013-09)**

**Application :**

**Control and Instrumentation.**  
**Fire resistant. Flame retardant Cat. A. Halogen free. Low smoke.**

Type	Voltage class (V)	Temp. class (°C)
LKM-FRHF 250V	150/250	90
LKAM-FRHF 250V	150/250	90

This Certificate is valid until **2019-06-30**.  
 Issued at **Høvik** on **2015-02-17**

DNV GL local station: **Turku**

Approval Engineer: **Marta Alonso Pontes**



for **DNV GL**

Digitally Signed By: Sjøvåg, Trond  
 Location: DNV GL Høvik, Norway  
 Signing Date: 2015-02-18, on behalf of

**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. If any person suffers loss or damage which is proven to have been caused by any negligent act or omission of the Society, then the Society shall pay compensation to such person for his proven direct loss or damage. However, the compensation shall not exceed an amount equal to ten times the fee charged for the service in question. The maximum compensation shall never exceed USD 2 million. In this provision the "Society" shall mean DNV GL AS as well as all its direct and indirect owners, affiliates, subsidiaries, directors, officers, employees, agents and any other person or entity acting on behalf of DNV GL AS.

Certificate No: **E-13592**  
File No: **827.20**  
Job Id: **262.1-015115-1**

## Product description

Type: LKM-FRHF 250V or LKAM-FRHF 250V

Construction:

Conductor: Plain (optional tinned), stranded, annealed copper class 2 or class 5  
Insulation: MICA tape + XLPE  
Inner covering: Wrapped tapes of non-hydrosopic material  
Collective screen: Aluminium/polyester tape with tinned copper drain wire (LKAM type)  
Outer sheath: SHF1

### LKM-FRHF:

Number of cores x conductor cross- section	Overall diameter nominal
mm <sup>2</sup>	mm <sup>2</sup>
2x0,75	8,3
3x0,75	8,8
4x0,75	10,0
5x0,75	10,8
7x0,75	11,7
10x0,75	14,9
12x0,75	15,4
14x0,75	16,4

Number of cores x conductor cross- section	Overall diameter nominal
mm <sup>2</sup>	mm <sup>2</sup>
16x0,75	17,3
19x0,75	18,1
20x0,75	19,2
24x0,75	21,4
27x0,75	21,8
32x0,75	23,0
37x0,75	24,8
61x0,75	28,9

### LKAM-FRHF:

Number of cores x conductor cross- section	Overall diameter nominal
mm <sup>2</sup>	mm <sup>2</sup>
2x0,75	8,3
3x0,75	8,8
4x0,75	9,9
5x0,75	10,8
7x0,75	11,7
10x0,75	14,9
12x0,75	15,4
14x0,75	16,3

Number of cores x conductor cross- section	Overall diameter nominal
mm <sup>2</sup>	mm <sup>2</sup>
16x0,75	17,2
19x0,75	18,1
20x0,75	19,2
24x0,75	21,3
27x0,75	21,7
32x0,75	22,9
37x0,75	24,7
61x0,75	28,7

## 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.

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## Type Approval documentation

Data sheet: HBKQ 9. Spec. 63 & 67 dated 24.9.2012/dk

Test reports: Helkama reports dated 2006-03-08  
Helkama reports dated 2014-02-07

## Tests carried out

Standard	Release	General description	Limitation
IEC 60092-376	2003-05	Cables for control and instrumentation circuits 150/250 V (300 V)	
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 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. flame application + 15 min. cooling period.
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 - size - LKM-FRHF or LKAM-FRHF - 250 V – IEC 60332-3-22 – IEC 60331-1/2 – Lot.no

## Periodical assessment

The scope of the periodical assessment survey 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 Routines (RT) checked (if 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
- Ensuring traceability between manufacturer's product type marking and Type Approval Certificate.

Periodical assessment to be performed at least every second year.

END OF CERTIFICATE