

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Low Voltage Cable

with type designation(s)
LKM-HF 250V, LKAM-HF 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 60332-3-22 (2009-02)
IEC 60754-1/2 (2011-11)
IEC 61034-1/2 (2013-07/2013-09)

Application :

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

Type	Voltage class (V)	Temp. class (°C)
LKM-HF 250V	150/250	90
LKAM-HF 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: Sjävvåg, 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-13589**
 File No: **827.20**
 Job Id: **262.1-015115-1**

Product description

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

Construction:

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

LKM-HF:

Number of cores x conductor cross-section mm ²	Overall diameter nominal mm ²
2x0,5	6,1
3x0,5	6,4
4x0,5	6,9
5x0,5	7,5
7x0,5	8,1
10x0,5	10,4
12x0,5	10,7
14x0,5	11,2
16x0,5	11,8
19x0,5	12,3
20x0,5	13,0

Number of cores x conductor cross-section mm ²	Overall diameter nominal mm ²
24x0,5	14,5
27x0,5	14,8
32x0,5	15,3
37x0,5	16,4
61x0,5	17,5
2x0,75	6,5
3x0,75	6,9
4x0,75	7,4
5x0,75	8,1
7x0,75	8,7
10x0,75	11,2

Number of cores x conductor cross-section mm ²	Overall diameter nominal mm ²
12x0,75	11,6
14x0,75	12,3
16x0,75	13,0
19x0,75	13,6
20x0,75	14,3
24x0,75	15,9
27x0,75	16,3
32x0,75	16,8
37x0,75	18,3
61x0,75	19,8

LKAM-HF:

Number of cores x conductor cross-section mm ²	Overall diameter nominal mm ²
2x0,5	6,1
3x0,5	6,4
4x0,5	6,9
5x0,5	7,5
7x0,5	8,1
10x0,5	10,4
12x0,5	10,7
14x0,5	11,2
16x0,5	11,7
19x0,5	12,3
20x0,5	13,2

Number of cores x conductor cross-section mm ²	Overall diameter nominal mm ²
24x0,5	14,4
27x0,5	14,7
32x0,5	15,4
37x0,5	16,5
61x0,5	17,3
2x0,75	6,6
3x0,75	6,9
4x0,75	7,4
5x0,75	8,1
7x0,75	9,1
10x0,75	11,2

Number of cores x conductor cross-section mm ²	Overall diameter nominal mm ²
12x0,75	11,8
14x0,75	12,3
16x0,75	12,9
19x0,75	13,5
20x0,75	16,8
24x0,75	15,9
27x0,75	16,2
32x0,75	17,0
37x0,75	18,2
61x0,75	19,7

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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

Data sheet: HBKQ 9. Spec. 65 & 66 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 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-HF or LKAM-HF - 250 V – IEC 60332-3-22 – 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