DNV·GL

Certificate No:
TAE00002E9

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Low Voltage Cable

with type designation(s)
LKM-FRHF, LKAM-FRHF, LKM-FRSHF2, LKAM-FRSHF2

Issued to
HELKAMA BICA OY
Kaarina, Finland

is found to comply with
DNV GL rules for classification – Ships, offshore units, and high speed and light craft

Application :

Unarmoured control and instrumentation cable. Fire resistant.
Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV GL.

Type	Rated voltage (V)	Temp. class (°C)
LKM-FRHF	150/250	90
LKAM-FRHF	150/250	90
LKM-FRSHF2	150/250	90
LKAM-FRSHF2	150/250	90

Issued at **Høvik** on **2018-03-02**
This Certificate is valid until **2022-12-31**.
DNV GL local station: **Turku**

Approval Engineer: **Ivar Bull**

for **DNV GL**

Andreas Kristoffersen
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.

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Job Id: **262.1-009055-6**
Certificate No: **TAE00002E9**

Product description

Type:	LKM-FRHF, LKAM-FRHF, LKM-FRSHF2, LKAM-FRSHF2
Construction:	
Conductors:	Plain (optional tinned) stranded copper class 2 or class 5
Core insulation:	Mica + XLPE
Inner covering:	Tape
Metal covering: (LKAM)	Polyester coated aluminium with tinned copper drain wire
Outer sheath:	SHF1 or SHF2

No of cable elements:	conductor cross-section mm^2
2, 3, 4, 7, 8, 10, 12, 14, 16, 19, 20, 24, 27, 30, 32, 37 cores	0,75

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

Tests carried out

Standard	Release	General description	Limitation
DNVGL-CP-0399	2016-03	Class Programme Electric cables	
IEC 60092-376	2017-05	Electrical installations in ships - Part 376: Cables for control and instrumentation circuits 150/250 V (300 V)	
IEC 60331-1/2	2009-05	Fire resistance / Circuit integrity – Test for method for fire with shock at temperature of at least 830ºC for cables rated up to and including 0,6/1 kV	180 min
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 90 min. flame application + 15 min. cooling period.
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-FRHF or LKAM-FRHF - 250 V - IEC 60331-1/2 - IEC 60332-3-22 – Lot No
HELKAMA - size - LKM-FRSHF2 or LKAM-FRSHF2 - 250 V - IEC 60331-1/2 - IEC 60332-3-22 – Lot No

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