DNV·GL

Certificate No:
**TAE000034Z**

# TYPE APPROVAL CERTIFICATE

## This is to certify:

**That the Low Voltage Cable**

with type designation(s)
**LKM-FLH 250V, LKM-FLH-SHF2 250V**

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

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

## Application :

**Control. Instrumentation and Communication.**
**Products approved by this certificate are accepted for installation on all vessels classed by DNV GL.**

| Type | Rated voltage (V) | Temp. class (°C) |
|---|---|---|
| LKM-FLH 250V | 150/250V | 90 |
| LKM-FLH-SHF2 250V | 150/250V | 90 |

Issued at **Høvik** on **2019-03-24**
This Certificate is valid until **2022-12-31**.
DNV GL local station: **Shanghai**

Approval Engineer: **Ivar Bull**

for **DNV GL**

**Trond Sjåvåg**
**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: **262.1-009055-7**
Certificate No: **TAE000034Z**

## Product description

Type: LKM-FLH 250 V and LKM-FLH-SHF2 250 V

Construction:

Conductor: Plain (optional tinned) stranded copper class 2 or class 5
Insulation: XLPE
Outer sheath: SHF1 or SHF2

| Number of cores x conductor cross-section [mm$^{2}$] |
|---|
| 2X1,5 + 2x0,75 |
| 3X1,5 + 3x0,75 |
| 3X1,5 + 4x0,75 |
| 4X1,5 + 4x0,75 |
| 2X2,5 + 2x0,75 |
| 3X2,5 + 3x0,75 |
| 3X2,5 + 4x0,75 |
| 4X2,5 + 4x0,75 |

## 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

## Tests carried out

| Standard | Release | General description | Limitation |
|---|---|---|---|
| DNVGL-CP-0399 | 2016-03 | Class Programme Electric cables | |
| 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 60092-376 | 2017-05 | Electrical installations in ships - Part 376: 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 |

| Standard | Release | General description | Limitation |
|---|---|---|---|
| IEC 61034-1/2 | 2013-07<br>2013-09 | Measurement of smoke density of cables burning under defined conditions – Test apparatus, procedure and requirements | Low smoke<br>Light transmittance ≥60% |

## Marking of product

HELKAMA 3 - size - LKM-FLH - 250 V – IEC 60332-3-22 – Lot. No. or
HELKAMA 3 - size - LKM-FLH-SHF2 - 250 V – 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