



Certificate No. 03-002003/031705

TYPE APPROVAL CERTIFICATE

This is to certify that this product complies with the Rules for the classification of ships, Part 1 - General requirements, Chapter 3 - Type approval of products.

TYPE AND DESCRIPTION OF PRODUCT:

SHIPBOARD POWER AND CONTROL SCREENED CABLE HALOGEN FREE AND FLAME RETARDANT

LKSM-VFD 1,8/3 kV
LKSM-VFD-SHF2 1,8/3 kV

MANUFACTURER:

HELKAMA BICA Oy
Lakimiehenkatu 4
FI-20780 Kaarina
FINLAND

ADDITIONAL PLACES OF PRODUCTION:

HELKAMA Bica Oy, Lasitehtaankatu 12, FI-10960 Hanko, FINLAND

THE PRODUCT MEETS FOLLOWING RULES/REGULATIONS:

CRS RULES FOR THE CLASSIFICATION OF SHIPS, PART 12 - ELECTRICAL EQUIPMENT

Helkama specification: HBKQ 9 spec. 61 and 111

Technical specification:

Design standard: IEC 60092-353 Ed.4.0 (2016-09),
Single and multicore non-radial field power cable 1,8/3 kV

Other standards:

- testing: IEC 60092-350 Ed.5.0 (2020-01), General constructions and testing requirements
- insulation: IEC 60092-360 Ed.1.0 (2021-01), Insulating materials for shipboard power cables
- sheathing: IEC 60092-360 Ed.1.0 (2021-01),
Sheathing materials for shipboard power and telecommunication cables

FURTHER DETAILS OF THE PRODUCT AND CONDITIONS FOR CERTIFICATION ARE GIVEN OVERLEAF.

APPROVAL IS VALID UNTIL: **2028-02-10**

Place and date: Split, 2024-02-11

Seal

Marinko Popović, dipl.ing.

NOTE: This certificate is not valid for equipment, the design or manufacture of which has been varied or modified from the specimen tested. The manufacturer should notify Croatian Register of Shipping of any modification or changes to the product in order to obtain a valid certificate.

DETAILED PRODUCT DESCRIPTION:

- Halogen-free, flame retardant, screened power and control cable designed to meet requirements for Variable Frequency Drives.
- LKSM-VFD/ LKSM-VFD-SHF2 1.8/3 kV
- Rated voltage: AC voltages: $U_0=1.8$ kV, $U=3$ kV, Highest system voltage, $U_m=3,6$ kV
DC voltages: $U_0=2,7$ kV, $U=4,5$ kV
- Max. conductor temp. 90°C
- Min. installation temp. $- 15^{\circ}\text{C}$

<u>No of Cores</u>	<u>Cross sectional area (mm²)</u>
1	10 mm ² - 300 mm ²
2	10 mm ² - 300 mm ²
3	10 mm ² - 300 mm ²
4	10 mm ² - 300 mm ²
3+PE	10 - 300 mm ² + (PE) 4 - 50 mm ²

APPLICATION / LIMITATIONS:

Fixed installations in marine, offshore and industrial use.

TYPE APPROVAL DOCUMENTATION:

Helkama Cable Data Sheet Specification HBKQ 9. Spec 61/111 LKSM-VFD/LKSM-VFD-SHF2 1.8/3 kV	2023-01-10
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Test report:

TT_lksm_VFD 3 x 16, Tt doc_i (s.f)/TTT_LKSM-VFD 3 x 16
Helkama Test report for SHF2 sheathed cables dated 19.03.2012.

MARKING OF PRODUCT:

For conductor sizes 10 – 300 mm²

LOT ##### LKSM-VFD/ LKSM-VFD-SHF2 "number of core" x "size of conductor" mm²
1,8/3 kV + 90°C IEC 60092-353, 60332-3-22 HELKAMA "month-year" and "length marking"

For cables with additional PE conductors

LOT ##### LKSM-VFD/LKSM-VFD-SHF2 "number of core" x "size of conductor" mm² + 3 x "PE conductor size" mm²
1,8/3 kV + 90°C IEC 60092-353, 60332-3-22 HELKAMA "month-year" and "length marking"

Note: Cables with conductor of IEC 60228 class 5 shall be marked on the sheath with "cl. 5"

Note: Cables with tinned conductor shall be marked on the sheath with "CuSn"

CONDITIONS FOR CERTIFICATION:

NON