DNV·GL

Certificate No:
TAE00002E1

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Electric Power Cable

with type designation(s)
LKSM-EMC, LKSM-VFD 1,8/3kV

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 :

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

Type	Rated voltage (kV)	Temp. class (°C)
LKSM-EMC	0,6/1	90
LKSM-VFD 1,8/3kV	1,8/3	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: **TAE00002E1**

Product description

Type: LKSM-EMC 0,6/1 kV & LKSM-VFD 1,8/3 kV

Construction:

Conductor: Plain (optional tinned) stranded copper class 2 or class 5
Core insulation: XLPE
Inner covering: Tape wrapping
EMC Screen: Copper tape 100% coverage
Metal covering: Plain (optional tinned) copper wires braid
Outer sheath: SHF1 or SHF2

LKSM-EMC 0,6/1 kV

No of cores:	Cross sectional area [mm^2]
3, 4	1,5 - 120

LKSM-VFD 1,8/3 kV

No of cores:	Cross sectional area [mm^2]
1	16 - 300
3	16 - 240
3 + E	95-150 / 16-25

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

	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 60092-353	2016-09	Electrical installations in ships - Part 353: Power cables for rated voltages 1 kV and 3 kV	
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

	Release	General description	Limitation
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%
IEC 61196-1	2005	Coaxial communication cables - Part 1: Generic specification - General, definitions and requirements	Transfer impedance typical value 26dB over 1mOhm at 100MHz[20mOhm/m]

Marking of product

HELKAMA - LKSM-EMC – size - 0,6/1 kV– IEC 60332-3-22 - Lot No. or
HELKAMA - LKSM-VFD – size – 1,8/3 kV – 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