Certificate No:
TAE00004MK

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Data transmission cables and systems

with type designation(s)
HELKAMA CAN Bus 1x2x0,75mm2 120 ohm,
HELKAMA CAN Bus 2x2x0,75mm2 120 ohm

Issued to
Helkama Bica Oy
Kaarina, **Finland**

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

Application :

Data communication cable. CAN Bus.
Products approved by this certificate are accepted for installation on all vessels classed by DNV.

Issued at **Høvik** on **2023-05-08**
This Certificate is valid until **2028-05-07**.
DNV local unit: **Turku FIS**

Approval Engineer: **Ivar Bull**

for **DNV**

Frederik Tore Elter
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.

LEGAL DISCLAIMER: Unless otherwise stated in the applicable contract with the holder of this document, or following from mandatory law, the liability of DNV AS, its parent companies and their subsidiaries as well as their officers, directors and employees ("DNV") arising from or in connection with the services rendered for the purpose of the issuance of this document or reliance thereon, whether in contract or in tort (including negligence), shall be limited to direct losses and under any circumstance be limited to 300,000 USD.

Name and place of manufacturer :

DNV Id.: 10659766

Product description

Type(s):	**HELKAMA CAN Bus 1x2x0,75mm2 120 ohm,** **HELKAMA CAN Bus 2x2x0,75mm2 120 ohm**
Standards	ISO 11898
Conductors:	Stranded plain copper conductor, annealed class 5
Core insulation:	Special polyolefin.
Screen:	Tinned copper braid. Coverage 80 %
Outer sheath:	SHF1

Voltage: 30 V
Impedance: 120±15 ohm
DC-loop resistance: ⩽ 52 ohm/km @+20C (one pair)
⩽ 53 ohm/km @+20C (two pair)

For more details of transmission properties, please refer to technical datasheet.

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.

Temperature window:
Operation: - 25°C to +80°C

Type Approval documentation

Tests carried out

Standard	Issued	General description	Limitation
ISO 11898-1	2015	Road vehicles — Controller area network (CAN) — Part 1: Data link layer and physical signalling	
IEC 60332-3-22	2018-07	Tests on electric cables under fire conditions - Part 3-22: Test for vertical flame spread of vertically-mounted bunched wires or cables - Category A	Charred portion of sample does not exceed 2,5m above bottom edge of burner.
IEC 60754-1	2019-11	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	2019-11	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	2019-11	Measurement of smoke density of cables burning under defined conditions – Test apparatus, procedure and requirements	Low smoke Light transmittance >80%

Marking of product

HELKAMA CAN Bus 1x2x0,75 mm^2 120ohm – Batch number – meter marking - IEC 60332-3-22 or
HELKAMA CAN Bus 2x2x0,75 mm^2 120ohm – Batch number – meter marking - IEC 60332-3-22

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