# TYPE APPROVAL CERTIFICATE

Certificate No:
**TAE00002EC**
Revision No:
**1**

## This is to certify:

**That the Low Voltage Cable**

with type designation(s)
**RFA-FRHF, RFA-FRSHF2, RFA-FRHF(i), RFA-FRSHF2(i)**

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 :

**Unarmoured control and instrumentation cable. Fire resistant.**
**Products approved by this certificate are accepted for installation on all vessels classed by DNV.**

| Type | Rated voltage (V) | Temp. class (°C) |
|---|---|---|
| RFA-FRHF, RFA-FRSHF2 | 150/250 | 90 |
| RFA-FRHF(i), RFA-FRSHF2(i) | 150/250 | 90 |

Issued at **Høvik** on **2023-01-01**

This Certificate is valid until **2027-12-31**.
DNV local unit: **Finland CMC**

Approval Engineer: **Ivar Bull**

for **DNV**

Digitally Signed By: Elter, Frederik Tore
Location: DNV Høvik, Norway

**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.

## Product description

| | |
|---|---|
| Type: | RFA-FRHF, RFA-FRSHF2,<br>RFA-FRHF(i), RFA-FRSHF2(i) |
| Construction: | |
| Conductors: | Plain (optional tinned) stranded copper class 2 or class 5 |
| Core insulation: | Mica + XLPE |
| Individual screen: ((i) variants) | Polyester coated aluminium with tinned copper drain wire |
| Inner covering: | Tape |
| Metal covering: | Polyester coated aluminium with tinned copper drain wire |
| Outer sheath: | SHF1 or SHF2 |

| No of cable elements: | conductor cross-section $mm^2$ |
|---|---|
| 1, 2, 3, 4, 7, 8, 10, 12, 14, 16, 19, 24, 27, 30, 32, 37 pairs | 0,75 – 1,0 - 1,5 - 2,5 |
| 1 Triple | 0,75 – 1,0 - 1,5 - 2,5 |
| 1 quad | 0,75 – 1,0 - 1,5 - 2,5 |

## 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

Data sheet: HBKQ 9.Spec. 57, 58, 121 and 122.
Test reports: Helkama reports dated 2006-03-08
Helkama report 25658.bak RFE-HF(i) 4X2X0,75 dated 2014-02-07
Delta EMC Test report dated 25 January 2011. Project no.: N312910

## Tests carried out

| Standard | Release | General description | Limitation |
|---|---|---|---|
| DNV CP-0399 | 2021-08 | Electric cables. | |
| IEC 60092-350 | 2020-01 | Electrical installations in ships - Part 350: General construction and test methods of power, control and instrumentation cables for shipboard and offshore applications | |
| IEC 60092-360 | 2021-01 | 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 | Cables for control and instrumentation circuits 150/250 V (300 V) | |
| IEC 60331-1/2 | 2018-03 | Tests for electric cables under fire conditions - Circuit integrity - Part 1: Test method for fire with shock at a temperature of at least 830 °C for cables of rated voltage up to and including 0,6/1,0 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 60332-1-2 | 2015-07 | Tests on electric and optical fibre cables under fire conditions – Part 1-2: Test for vertical flame propagation for a single insulated wire or cable – Procedure for 1 kW pre-mixed flame | |
| IEC 60332-3-22 | 2018-07 | 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 | Charred portion of sample does not exceed 2,5m above bottom edge of burner. |

| Standard | Release | General description | Limitation |
|---|---|---|---|
| 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:<br><0,5% Halogen |
| IEC 60754-2 | 2019-11 | Test on gases evolved during combustion of materials from cables - Part 1: Determination of the halogen acid gas content | Halogen free:<br>pH > 4,3<br>Conductivity < 10µS/mm |
| IEC 60684-2 | 2011-08 | Flexible insulating sleeving – Part 2: Methods of test<br>Clause 45.1 Methods of determination of low levels of chlorine, and/or Bromine and/or iodine<br>Clause 45.2 Methods of determination of low levels of fluorine | HCl + HBr + HJ max 0,5%<br>[0,014% can be detected]<br><br>HF max 0,1%<br>[0,02% can be detected] |
| IEC 61034-1/2 | 2019-11 | Measurement of smoke density of cables burning under defined conditions –<br>Part 1: Test apparatus<br>Part 2: Test procedure and requirements | Low smoke<br>Light transmittance >60% |

## Marking of product

HELKAMA - size - RFA-FRHF or RFA-FRSHF2 - 250 V - IEC 60331-1/2 - IEC 60332-3-22 – Lot No or
HELKAMA - size - RFA-FRHF(i) or RFA-FRSHF2(i) - 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