

# TYPE APPROVAL CERTIFICATE

**This is to certify:**

**That the Low Voltage Cable**

with type designation(s)

**BFOU (i) S3 or BFOU (i) S3/S7 250 V, BFOU (c) S4 or BFOU (c) S4/S8 250 V**

Issued to

**Helkama Bica Oy**  
**Kaarina, Finland**

is found to comply with

**Det Norske Veritas' Rules for Classification of Ships, High Speed & Light Craft and Det Norske Veritas' Offshore Standards**

- IEC 60092-376 (2003-05)**
- IEC 60331-1/2 (2009-05)**
- IEC 60332-3-22 (2009-02)**
- IEC 60754-1/2 (2011-11)**
- IEC 61034-1/2 Ed. 3.1 (2013-06)**
- NEK TS 606 (2009-05)**

**Application :**

**Instrumentation, communication and control.**

**Fire resistant. Flame retardant in bunch Cat. A. Halogen free. Low smoke.**

**Mud resistant.**

| Type                                       | Voltage class (V) | Temp. class (°C) |
|--|-------------------|------------------|
| <b>BFOU (i) S3 or BFOU (i) S3/S7 250 V</b> | <b>250</b>        | <b>90</b>        |
| <b>BFOU (c) S4 or BFOU (c) S4/S8 250 V</b> | <b>250</b>        | <b>90</b>        |

This Certificate is valid until **2019-06-30**.

Issued at **Høvik** on **2015-06-01**

for **DNV GL**

DNV GL local station: **Turku**

Approval Engineer: **Ivar Bull**

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**Marit Laumann**  
**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. If any person suffers loss or damage which is proven to have been caused by any negligent act or omission of the Society, then the Society shall pay compensation to such person for his proven direct loss or damage. However, the compensation shall not exceed an amount equal to ten times the fee charged for the service in question. The maximum compensation shall never exceed USD 2 million. In this provision the "Society" shall mean DNV GL AS as well as all its direct and indirect owners, affiliates, subsidiaries, directors, officers, employees, agents and any other person or entity acting on behalf of DNV GL AS.

Certificate No: **E-14077**  
 File No: **827.20**  
 Job Id: **262.1-018083-1**

## Product description

Type: BFOU (i) S3 or BFOU (i) S3/S7 250 V, BFOU (c) S4 or BFOU (c) S4/S8 250 V

Construction:

Conductors: Tinned, stranded copper class 2 or class 5  
 Core insulation: Mica-tape + EPR  
 Screen: Copper polyester tape w/ tinned copper drain wire  
 Bedding: Halogen-free compound  
 Metal covering: Tinned copper wire braid  
 Outer sheath: SHF2 or SHF2 Mud

| No of cores:   | Cross sectional area [mm <sup>2</sup> ] |
|--|---|
| 1, 2, 3, 4, 7, 8, 10, 12, 14, 16, 19, 24, 27, 30, 32, 37 pairs   | 0,5 & 0,75 & 1,0 & 1,5                  |
| 1, 2, 3, 4, 7, 8, 10, 12, 14, 16, 19, 24, 27, 30, 32, 37 triples | 0,5 & 0,75 & 1,0 & 1,5                  |

## Application/Limitation

This type of cable is fire resistant according to IEC 60331-1/2.

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 sheets: See approval letter  
 Test reports: See approval letter

## Tests carried out

| Standard       | Release | General description  | Limitation                 |
|----------------|---------|--|----------------------------|
| IEC 60092-350  | 2008-02 | 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  | 2011-08 | Electrical installations in ships - Part 353: Power cables for rated voltages 1 kV and 3 kV  | 0,6/1 kV                   |
| IEC 60331-1/2  | 2009-05 | Fire resistance / Circuit integrity – Test for method for fire with shock at temperature of at least 830°C for cables rated up to and including 0,6/1 kV                         | Minimum 90+15 minutes      |
| 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 |

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| Standard      | Release | General description  | Limitation  |
|---------------|---------|--|---|
| 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:<br>pH > 4,3<br>Conductivity < 10µS/mm   |
| IEC 61034-1/2 | 2013-07 | Measurement of smoke density of cables burning under defined conditions – Test apparatus, procedure and requirements                     | Low smoke<br>Light transmittance ≥60%   |
| NEK 606 Ed. 4 | 2009-05 | Cables for offshore installations. Halogen-free and/or mud resistant. Technical specification.   | Mud resistance test:<br>IRM903 100°C 7d.<br>Calcium Bromide 70°C 56d.<br><u>Oil based mud:</u><br>Carbo Sea 70°C 56d or<br>EDC 95/11 70°C 56d |

### Marking of product

Helkama Bica Oy – RFOU (i) S1/S5 or RFOU (c) S2/S6 – 250V – IEC 60331-1/2 - IEC 60332-3-22 - Month – Year – Lot No.

### Periodical assessment

The scope of the retention/renewal survey is to verify that the conditions stipulated for the Type approval is complied with and that no alterations are made to the product design or choice of materials.

The main elements of the survey are:

- Inspection on factory samples, selected at random from the production line (where practicable)
  - Results from Production Sample Tests (PST) and Routines (RT) checked (if not available tests according to PST and RT to 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.
- Survey to be performed at least every second year.

END OF CERTIFICATE