

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Low Voltage Cable

with type designation(s)

**BFOU (i) S3 or BFOU (i) S3/S7/S103 250 V,
BFOU (c) S4 or BFOU (c) S4/S8/S104 250 V,
BFOU (i&c) 250V**

Issued to

**Habia Cable AB
Söderfors, Sweden**

is found to comply with

DNV rules for classification – Ships, offshore units, and high speed and light craft

Application :

Instrumentation, communication and control. Fire resistant.

Products approved by this certificate are accepted for installation on all vessels classed by DNV.

Type	Rated voltage (V)	Temp. class (°C)
BFOU (i) S3 or BFOU (i) S3/S7/S103 250 V	250	90
BFOU (c) S4 or BFOU (c) S4/S8/S104 250 V	250	90
BFOU (i&c) 250V	250	90

Issued at **Høvik** on **2022-12-07**

This Certificate is valid until **2027-12-02**.

for **DNV**

DNV local station: **Sweden CMC**

Approval Engineer: **Ivar Bull**

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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.



Product description

Types:

BFOU (i) S3 or BFOU (i) S3/S7/S103 250 V,
BFOU (c) S4 or BFOU (c) S4/S8/S104 250 V
BFOU (i&c) 250V

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
EMC cables (optional): Copper polyester tape under braid
Metal covering: Tinned copper wire braid, coverage density min 90%
Outer sheath: SHF2 or SHF2 Mud

No of cores:	Cross sectional area [mm ²]
1, 2, 4, 8, 12, 16, 19, 24 Pairs (i), (c), (i&c)	0,75 1,5 2,5
1, 2, 4, 8, 12, 16, 19, 24 Triples (i), (c), (i&c)	0,75 1,5 2,5
1 Quad (i&c)	0,75 1,5 2,5

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 Bundles of Cables or Wires) are fulfilled without any additional measures.

Type Approval documentation

Tests carried out

Standard	Release	General description	Limitation
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	Minimum 120 min+15 min cooling down time
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.
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 1: Determination of the halogen acid gas content	Halogen free: pH > 4,3 Conductivity < 10µS/mm

IEC 61034-1/2	2019-11	Measurement of smoke density of cables burning under defined conditions – Part 1: Test apparatus Part 2: Test procedure and requirements	Low smoke Light transmittance >60%
IEC 60092-350	2014-08	Annex E: Cold bend test and impact test for low temperature behaviour	Cold bend: -40°C Cold impact: -35°C
IEC 60811-504	2012	Electric and optical fibre cables - Test methods for non-metallic materials - Part 504: Mechanical tests - Bending tests at low temperature for insulation and sheaths	Cold bend: -60°C Mandrel 5xOD No cracks
NEK TS 606 Ed6	2022-03	Cables for offshore installations - Halogen-free low smoke flame-retardant / fire-resistant (HFFR-LS). Technical specification.	Mud resistance test: IRM903 100°C 7d. Calcium Bromide 70°C 56d. EDC 95/11 70°C 56d

Marking of product

HABIA CABLE AB – “S3/S7/S103 BFOU (i) EMC M or S4/S8/S104 BFOU (c) EMC M” or BFOU (i&c) EMC M – 250V – “size” – IEC 60331-1/2 [120min] - IEC 60332-3-22 – “Part No.” – “Year” – “Week” – “Batch code”

Italic = optional when applicable

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