

TYPE APPROVAL CERTIFICATE**This is to certify:****That the Low Voltage Cable**

with type designation(s)

RFOU(i) S1 or RFOU (i) S1/S5 250 V, RFOU (c) S2 or RFOU (c) S2/S6 250 V

Issued to

**Habia Cable AB
Söderfors, Sweden**

is found to comply with

DNV GL rules for classification – Ships and offshore units**Application :****Instrumentation, communication and control.****Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV GL.**

Type	Voltage class (V)	Temp. class (°C)
RFOU(i) S1 or RFOU (i) S1/S5 250 V	250	90
RFOU (c) S2 or RFOU (c) S2/S6 250 V	250	90

This Certificate is valid until **2020-10-08**.Issued at **Høvik** on **2015-10-09**for **DNV GL**DNV GL local station: **Stockholm**Approval Engineer: **Ivar Bull**

**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.

Job Id: **262.1-017534-1**
 Certificate No: **TAE00000F1**
 Revision No: **1**

Product description

Type: RFOU(i) S1 or RFOU (i) S1/S5 250 V, RFOU (c) S2 or RFOU (c) S2/S6 250 V

Construction:

Conductors: Tinned, stranded copper class 5
 Core insulation: 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 ²]
1, 2, 4, 6, 8, 12, 16, 19, 24, 32 pairs	0,75
1, 2, 4, 5, 8, 10, 12, 16, 19, 24, 32 pairs	1,5
1, 2, 4, 5, 12 pairs	2,5
1, 2, 4, 6, 8, 12, 16, 19, 24 triples	0,75
1, 2, 4, 8, 12, 16, 24 triples	1,5

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

Data sheets: See approval letter
 Test reports: See approval letter

Tests carried out

Standard	Release	General description	Limitation
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 60092-376	2003-05	Cables for control and instrumentation circuits 150/250 V (300 V)	
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

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Standard	Release	General description	Limitation
IEC 61034-1/2	2013-07	Measurement of smoke density of cables burning under defined conditions – Test apparatus, procedure and requirements	Low smoke Light transmittance $\geq 60\%$
NEK 606 Ed. 4	2009-05	Cables for offshore installations. Halogen-free and/or mud resistant. Technical specification.	Mud resistance test: IRM903 100°C 7d. Calcium Bromide 70°C 56d. <u>Oil based mud:</u> EDC 95/11 70°C 56d
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
IEC 60811-506	2012	Electric and optical fibre cables - Test methods for non-metallic materials - Part 506: Mechanical tests - Impact test at low temperature for insulations and sheaths	Cold impact: -60°C No cracks. Insulation HV tested 3,6kV DC 5 min in water. No insulation breakdown.

Marking of product

HABIA CABLE AB – RFOU(i) S1 or S1/S5 or RFOU (c) S2 or S2/S6 - size – 250V – IEC 60332-3-22 - Month – Year

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