DNV·GL

Certificate No:
TAE000025C

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Low Voltage Cable

with type designation(s)
S101 RFOU(i) H-M 250V, S102 RFOU(c) H-M 250V

Issued to
Controlcavi Industria S.r.l.
FERENTINO, Italy

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

Application :

Instrumentation, communication and control.

Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV GL.

Type	Rated voltage (V)	Temp. class (°C)
S101 RFOU(i) H-M 250V	250	90
S102 RFOU(c) H-M 250V	250	90

Issued at **Høvik** on **2017-09-26**
This Certificate is valid until **2022-06-30**.
DNV GL local station: **Milan**

Approval Engineer: **Ivar Bull**

for **DNV GL**

Andreas Kristoffersen
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.

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Job Id: **262.1-010304-3**
Certificate No: **TAE000025C**

Product description

S101 RFOU(i) H-M or S102 RFOU(c) H-M 250 V

Construction:

Conductors:	Tinned flexible copper class 2 or class 5
Core insulation:	EPR
Screen:	Copper polyester tape w/ tinned copper drain wire. Common (c), Individual (i)
Bedding:	Halogen free compound
Metal covering:	Tinned copper wire braid
Outer sheath:	SHF2 H-M (Oils & Muds resistant) Tested with Total AZOLLA 68 hydraulic oil.

No of Elements:	Cross sectional area [mm2]
1, 2, 4, 7, 8, 12, 16, 19, 24, 32 pairs	0,75 1,0 1,5 mm^2
1, 2, 4, 7, 8, 12, 16, 19, 24, 32 triples	0,75 1,0 1,5 mm^2

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

Tests carried out

	Release	General description	Limitation
DNVGL-CP-0399	2016-03	Class Programme Electric cables	
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.	Including: Ozone resistance
IEC 60092-376	2017-05	Electrical installations in ships - Part 376: Cables for control and instrumentation circuits 150/250 V (300 V)	
IEC 60332-1-2	2015-07	Tests on eletric cables under fire conditions. Test for vertical flame propagation for a single insulated wire or cable.	
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
IEC 60684-2	2011-08	Flexible insulating sleeving – Part 2:	Fluorine content <

	Release	General description	Limitation
DNVGL-CP-0399	2016-03	Class Programme Electric cables	
		Methods of test.	0,1%
IEC 61034-1/2	2013-07 2013-09	Measurement of smoke density of cables burning under defined conditions – Test apparatus, procedure and requirements	Low smoke Light transmittance ≥60%
CSA C22.2 No. 38.05	2007-03	Thermoset Insulated Wires and cables. Cold bending & impact tests	Cold bend: -40°C Cold impact: -40°C
CSA C22.2 No. 0.3-01	2005-01	Test Methods	
NEK 606 Ed.5	2016	Cables for offshore installations halogen-free, low smoke,flame retardant/fire resistant. Technical specification.	
UL 1581	2013-01	Reference Standard for Electrical Wires, Cables, and Flexible Cords. Paragraph 1200.1: Sunlight resistance Carbon arc and Xenon arc test.	720h. Max tensile strenght and elongation@break decay 20%.

Marking of product

S101 RFOU(i) H-M or S102 RFOU(c) H-M – size – 250 V – IEC 60092-376 – NEK 606 – IEC 60331-1/2 – IEC 60332-3-22 Cat A – Year - meter mark - QA 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