

TYPE APPROVAL CERTIFICATE

This is to certify:**That the Low Voltage Cable**

with type designation(s)
S112 SFOU(i) H-M 250V, S113 SFOU(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.**

Fire, mechanical shocks and water spray resistant BS 7846 Cat. F3

After burning: Water submersion 15 minutes @1000V.

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)
S112 SFOU(i) H-M 250V	250	95
S113 SFOU(c) H-M 250V	250	95

Issued at **Høvik** on **2017-09-26**

This Certificate is valid until **2022-06-30**.

DNV GL local station: **Milan**

for **DNV GL**

Approval Engineer: **Ivar Bull**

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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.



Product description

Type: S112 SFOU(i) H-M 250 V, S113 SFOU(c) H-M 250 V

Construction:

Conductors:	Tinned, annealed flexible copper class 2 or Class 5
Core insulation:	Mica tape + enhanced silicone rubber
Individual screen (if any)	Copper/polyester tape w/tinned copper drain wire + overall PET tape
Collective screen:	Copper/polyester tape w/tinned copper drain wire
Firebar protection	Overall fibreglass tapes overlapped 50%
Inner sheath:	Halogen free compound
Metal covering:	Tinned copper wire braid
Sheath:	SHF2 H-M (Oils & Muds resistant) Tested with Total AZOLLA 68 hydraulic oil

No of Elements:	Cross sectional area [mm ²]
2, 4, 8, 12, 14, 16, 19, 24, 30 pairs	0,75 1,5 2,5 mm ²
1, 2, 3, 4, 7, 10, 12, 16, 19 triples	0,75 1,5 2,5 mm ²

Application/Limitation

This type of cable is fire resistant in accordance with IEC Publication 60331 series and BS 7846(2000) Cat F3.

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 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	120 min
IEC 60332-1-2	2015-07	Tests on electric 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

Job Id: **262.1-010304-3**
 Certificate No: **TAE000025E**

	Release	General description	Limitation
DNVGL-CP-0399	2016-03	Class Programme Electric cables	
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: Methods of test.	Fluorine content < 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	
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%.
NEK 606 Ed.5	2016	Cables for offshore installations halogen-free, low smoke, flame retardant/fire resistant. Technical specification.	Modified NEK606 design with additional layers for increased fire protection
BS 7846	2000	Electric cables – 600/1000V armoured fire resistant cables having thermosetting insulation and low emission of smoke and corrosive gases when affected by fire.	Cat F3: 120 minutes @ 830°C @ 250 V with impact. + 15 min water spray with fire and impact. In addition : after burning: 15 minutes water submersion @ rated voltage.

Marking of product

CCI – S112 SFOU(i) H-M or S113 SFOU(c) H-M – Size –150/250V – IEC 60092-376 – NEK 606 - IEC 60332-3-22 Cat.A – BS 7846:2000 Cat F3 –year – meter - QA No.

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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