

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Electric Power Cable

with type designation(s)

RTE4OAM1 0,6/1 kV, FTE4OAM1 0,6/1 kV, RTE4OH2M1 0,6/1 kV, FTE4OH2M1 0,6/1 kV

Issued to

Camuna Cavi S.r.l.
Edolo BS, Italy

is found to comply with

DNV GL rules for classification – Ships, offshore units, and high speed and light craft
DNV GL class programme DNVGL-CP-0399 – Type approval – Electric cables

Application :

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

Type	Rated voltage (kV)	Temp. class (°C)
RTE4OAM1 0,6/1 kV	0,6/1	90
FTE4OAM1 0,6/1 kV	0,6/1	90
RTE4OH2M1 0,6/1 kV	0,6/1	90
FTE4OH2M1 0,6/1 kV	0,6/1	90

Issued at **Høvik** on **2018-04-02**

for **DNV GL**

This Certificate is valid until **2023-04-01**.

DNV GL local station: **Milan**

Approval Engineer: **Georgy Abramenko**

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.



Job Id: **262.1-012883-8**
 Certificate No: **TAE0000279**
 Revision No: **1**

Product description

Type: RTE4OAM1 0,6/1 kV, FTE4OAM1 0,6/1 kV, RTE4OH2M1 0,6/1 kV, FTE4OH2M1 0,6/1 kV

Construction

Conductors: Tinned or Plain stranded copper class 2 or class 5
 Core insulation: Mica Tape + HF XLPE
 Inner covering: Halogen free compound
 Metal covering: Tinned copper wire braid "H2" (single conductors)
 Tinned copper wire braid "H2" or Galvanized steel wire braid "A" (multiple conductors)
 Outer sheath: SHF1

No of cores:	Cross sectional area [mm ²]
2, 3, 4, 5, 7, 10, 12, 14, 16, 19, 20, 24, 25, 27, 30, 37	1,0 1,5 2,5

Application/Limitation

This cable is fire resistant according to IEC 60331.

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.](#)
[Test reports.](#)

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.	
IEC 60092-353	2016-09	Electrical installations in ships - Part 353: Power cables for rated voltages 1 kV and 3 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 120 min+15 min cooling down time, for cables with overall diameter exceeding 20mm
IEC 60331-21	1999-04	Tests for electric cables under fire conditions – Circuit integrity – Part 21: Procedures and requirements – Cables of rated voltage up to and including 0,6/1,0 kV	Minimum 90 min. test + 15 minutes cooling down time.

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	Release	General description	Limitation
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	2003-05	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 $\geq 60\%$

Marking of product

Year - CAMUNA CAVI – RTE4OAM1 0,6/1 kV – Size – IEC 60331-1<or>2 - IEC 60332-3-22 – Lot. No.
or
Year - CAMUNA CAVI – FTE4OAM1 0,6/1 kV – Size – IEC 60331-1<or>2 - IEC 60332-3-22 – Lot. No.
or
Year - CAMUNA CAVI – RTE4OH2M1 0,6/1 kV – Size – IEC 60331-1<or>2 - IEC 60332-3-22 – Lot. No.
or
Year - CAMUNA CAVI – FTE4OH2M1 0,6/1 kV – Size – IEC 60331-1<or>2 - IEC 60332-3-22 – Lot. 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