

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Low Voltage Cable

with type designation(s)

**RTE4XHOHAM1 150/250 V, RTE4XOHAM1 150/250 V, FTE4XHOHAM1 150/250 V,
 FTE4XOHAM1 150/250 V, RTE4XHOHH2M1 150/250 V, RTE4XOHH2M1 150/250 V,
 FTE4XHOHH2M1 150/250 V, FTE4XOHH2M1 150/250 V**

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 (V) | Temp. class (°C) |
|-------------------------------|-------------------|------------------|
| RTE4XHOHAM1 150/250 V | 250 | 90 |
| RTE4XOHAM1 150/250 V | 250 | 90 |
| FTE4XHOHAM1 150/250 V | 250 | 90 |
| FTE4XOHAM1 150/250 V | 250 | 90 |
| RTE4XHOHH2M1 150/250 V | 250 | 90 |
| RTE4XOHH2M1 150/250 V | 250 | 90 |
| FTE4XHOHH2M1 150/250 V | 250 | 90 |
| FTE4XOHH2M1 150/250 V | 250 | 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: **TAE0000277**
 Revision No: **1**

Product description

RTE4XOHAM1 150/250 V, FTE4XOHAM1 150/250 V,
 RTE4XOHH2M1 150/250 V, RTE4XHOHAM1 150/250 V
 FTE4XOHH2M1 150/250 V, FTE4XHOHAM1 150/250 V,
 RTE4XHOHH2M1 150/250 V, FTE4XHOHH2M1150/250 V

Construction

Conductors: Tinned or plain stranded copper class 2 or class 5
 Core insulation: Mica Tape + HF XLPE
 Communication pair: Optional
 Screen: Collective or individual/collective screen of Aluminium/Polyester tape with tinned copper drain wire
 Metal covering: Galvanized steel wire braid "A" or tinned copper wire braid "H2"
 Outer sheath: SHF1

| No of Elements: | Cross sectional area [mm ²] |
|--|---|
| 1, 2, 3, 4, 7, 8, 12, 14, 19, 20 pairs | 0,50 0,75 1,0 1,5 2,5 mm ² |
| 1, 3, 6, 7, 10, 12, 14 triples | 0,50 0,75 1,0 1,5 2,5 mm ² |

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 60092-376 | 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 | Minimum 120 min+15 min cooling down time, for cables with overall diameter exceeding 20mm |

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| | Release | General description | Limitation |
|----------------|--------------------|---|---|
| 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 |
| 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 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% |

Marking of product

Year - CAMUNA CAVI – RTE4XHOHAM1 150/250 V – Size – IEC 60331-1<or>2 – IEC 60332-3-22 – Lot. No. or

Year - CAMUNA CAVI – RTE4XOHAM1 150/250 V – Size – IEC 60331-1<or>2 – IEC 60332-3-22 – Lot. No.

or

Year - CAMUNA CAVI – FTE4XHOHAM1 150/250 V – Size – IEC 60331-1<or>2 – IEC 60332-3-22 – Lot. No. or

Year - CAMUNA CAVI – FTE4XOHAM1 150/250 V – Size – IEC 60331-1<or>2 – IEC 60332-3-22 – Lot. No.

or

Year - CAMUNA CAVI – RTE4XHOHH2M1 150/250 V – Size – IEC 60331-1<or>2 – IEC 60332-3-22 – Lot. No. or

Year - CAMUNA CAVI – RTE4XOHH2M1 150/250 V – Size – IEC 60331-1<or>2 – IEC 60332-3-22 – Lot. No. or

Year - CAMUNA CAVI – FTE4XHOHH2M1 150/250 V – Size – IEC 60331-1<or>2 – IEC 60332-3-22 – Lot. No. or

Year - CAMUNA CAVI – FTE4XOHH2M1 150/250 V – 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



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- 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