

TYPE APPROVAL CERTIFICATE

This is to certify:**That the Electric Power Cable**

with type designation(s)
eta plus - ELC Cable – Uo/U 1,8/3 kV – Special cables for BWTS

Issued to

Eta plus electronic gmbh
Nürtingen, Germany

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

Application :

Special power cable for BWTS UV lamps.

Products approved by this certificate are accepted for installation on all vessels classed by DNV GL.

Rated voltage (kV) 1,8/3

Temp. class (°C) 90

Issued at **Høvik** on **2018-06-12**

This Certificate is valid until **2023-06-11**.

DNV GL local station: **Augsburg**

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.



Job Id: **262.1-028973-1**
Certificate No: **TAE00002Y7**

Name & place of manufacturer

DNVGL Id: 192676

Product description

eta plus - ELC Cable – Uo/U 1,8/3 kV – Special cables for BWTS

Product description :

Construction:

Conductors: Tinned copper class 5

Core insulation: XLPE

Inner covering: PET foil helically applied

EMC screen: Tinned copper wire braid

Outer sheath: SHF 1

No of cores:	Cross sectional area [mm ²]
2	4

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.

DNV GL rules and IEC 60092-353 requires minimum cross sectional area 10mm² for 1,8/3kV cables. These special constructions with 4 mm² conductors is accepted as special cable for UV lamps.

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.	
IEC 60092-353	2016-09	Electrical installations in ships - Part 353: Power cables for rated voltages 1 kV and 3 kV	
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	
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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DNVGL-CP-0399	2016-03	Class Programme Electric cables	
IEC 60684-2	2011-08	Flexible insulating sleeving – Part 2: Methods of test Clause 45.1 Methods of determination of low levels of chlorine, and/or Bromine and/or iodine Clause 45.2 Methods of determination of low levels of fluorine	HF max 0,1% [0,02% can be detected]
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

Eta plus ELC Cable Uo/U 1,8/3.0 kV – 4mm² - Special cable for BWTS - IEC 60092-353 – IEC 60332-3-22 - Art.No. 8045A - YY/WW – DNV GL Id: 192676

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