Certificate No:
TAE00004KV

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Electric Power Cable

with type designation(s)
RFOU VFD E 0,6/1kV (1,8/3kV)

Issued to
Changzhou Marine Cable Co., Ltd. (CMC)
CHANGZHOU, JIANGSU, China

is found to comply with

Application :

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

Rated voltage (kV)	**0,6/1 (1,8/3)**
Temp. class (°C)	**90**

Issued at **Høvik** on **2022-11-10**
This Certificate is valid until **2027-11-09**.
DNV local unit: **Nanjing NB & CMC**

Approval Engineer: **Carsten Hunsalz**

for **DNV**

Frederik Tore Elter
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.

LEGAL DISCLAIMER: Unless otherwise stated in the applicable contract with the holder of this document, or following from mandatory law, the liability of DNV AS, its parent companies and their subsidiaries as well as their officers, directors and employees ("DNV") arising from or in connection with the services rendered for the purpose of the issuance of this document or reliance thereon, whether in contract or in tort (including negligence), shall be limited to direct losses and under any circumstance be limited to 300,000 USD.

Product description

Type: RFOU VFD E 0,6/1kV (1,8/3kV)

Construction:

Conductors:	Tinned, stranded copper class 2 or class 5
Core insulation:	EPR
Collective screen:	tape + copper wire braid
Inner covering:	Halogen-free compound
Armour / braid:	Tinned copper wire braid
Outer sheath:	SHF2

Number of cores x conductor cross-section	Overall diameter Nominal
mm^2	mm
3 x 10	26,2
3 x 16	28,6
3 x 25	31,6
3 x 35	34,8
3 x 50	38,2
3 x 70	42,9
3 x 95	48,7
3 x 120	52,3
3 x 150	56,0
3 x 185	60,9

Number of cores x conductor cross-section	Overall diameter Nominal
mm^2	mm
3 x 10 + 3 x 4	27,4
3 x 16 + 3 x 6	30,0
3 x 25 + 3 x 6	31,6
3 x 35 + 3 x 6	34,8
3 x 50 + 3 x 10	38,2
3 x 70 + 3 x 16	42,9
3 x 95 + 3 x 16	48,7
3 x 120 + 3 x 25	52,3
3 x 150 + 3 x 25	56,0
3 x 185 + 3 x 35	60,9

Application/Limitation

General power

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.

Flame retardant Cat. A. Halogen free. Low smoke.
SHF2 Enhanced oil resistance

Type Approval documentation

Tests carried out

Standard	Release	General description	Limitation
IEC 60092-350	2020-01	General construction and test methods of power, control and instrumentation cables for shipboard and offshore applications	
IEC 60092-353	2016-09	Electrical installations in ships - Part 353: Power cables for rated voltages 1 kV and 3 kV	
IEC 60092-360	2021-01	Electrical installations in ships - Part 360: Insulating and sheathing materials for shipboard and offshore units, power, control, instrumentation and telecommunication cables.	
IEC 60332-1-2	2015-07	Tests on electric and optical fibre cables under fire conditions – Part 1-2: Test for vertical flame propagation for a single insulated wire or cable –Procedure for 1 kW pre-mixed flame	
IEC 60332-3-22	2018-07	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	2019-11	Test on gases evolved during combustion of materials from cables - Part 1: Determination of the halogen acid gas content	Low Halogen: <0,5% Halogen

Standard	Release	General description	Limitation
IEC 60754-2	2019-11	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	Clause 45.2 Methods of determination of low levels of fluorine	Fluorine content < 0,1%
IEC 61034-1/2	2019-11	Measurement of smoke density of cables burning under defined conditions – Test apparatus, procedure and requirements	Low smoke Light transmittance ≥60%
NEK TS 606	2022	Cables for offshore installations. -halogen-free low smoke flame-retardant / fire-resistant (HFFR-LS). Technical specification.	SHF2 Enhanced oil resistance: (Sheath Code E)

Marking of product

Changzhou Marine Cable Co., Ltd. RFOU VFD E 0,6/1kV (1,8/3kV) - size - 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) checked (if not available tests according to RT to 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