Certificate no.:
TAE00004UY

TYPE APPROVAL CERTIFICATE

This is to certify:

that the High Voltage Cable

with type designation(s)
RNEDAFLEX-AMP 3X(50~240)+nX(25~120)/n+(3~9X1,5(2,5)C+6FO(62,5/125)

issued to
Hebei Huatong Wires & Cables Group Co., Ltd.
Tangshan, Hebei Province, China

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

Application:

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

Rated voltage (kV)	**6/10(12) and 8,7/15(17,5)**
Temp. class (°C)	**90**

Issued at **Høvik** on **2024-02-01**

This Certificate is valid until **2029-01-31**.

for **DNV**

DNV local unit: **Dalian NB & CMC**

Approval Engineer: **Carsten Hunsalz**

Product description

High Voltage Ship to Shore Connection Cable

Type: RNEDAFLEX-AMP 6/10(12)kV

3X50+1X25+(3~9X1,5(2,5)C+6FO(62,5/125)	3X50+3X25/3+(3~9X1,5(2,5)C+6FO(62,5/125)
3X70+1X35+(3~9X1,5(2,5)C+6FO(62,5/125)	3X70+3X35/3+(3~9X1,5(2,5)C+6FO(62,5/125)
3X95+1X50+(3~9X1,5(2,5)C+6FO(62,5/125)	3X95+3X50/3+(3~9X1,5(2,5)C+6FO(62,5/125)
3X120+1X70+(3~9X1,5(2,5)C+6FO(62,5/125)	3X120+3X70/3+(3~9X1,5(2,5)C+6FO(62,5/125)
3X150+1X95+(3~9X1,5(2,5)C+6FO(62,5/125)	3X150+3X95/3+(3~9X1,5(2,5)C+6FO(62,5/125)
3X185+1X95+(3~9X1,5(2,5)C+6FO(62,5/125)	3X185+3X95/3+(3~9X1,5(2,5)C+6FO(62,5/125)
3X240+1X120+(3~9X1,5(2,5)C+6FO(62,5/125)	3X240+3X120/3+(3~9X1,5(2,5)C+6FO(62,5/125)
3X50+2X25/2+(3~9X1,5(2,5)C+6FO(62,5/125)	
3X70+2X35/2+(3~9X1,5(2,5)C+6FO(62,5/125)	
3X95+2X50/2+(3~9X1,5(2,5)C+6FO(62,5/125)	
3X120+2X70/2+(3~9X1,5(2,5)C+6FO(62,5/125)	
3X150+2X95/2+(3~9X1,5(2,5)C+6FO(62,5/125)	
3X185+2X95/2+(3~9X1,5(2,5)C+6FO(62,5/125)	
3X240+2X120/2+(3~9X1,5(2,5)C+6FO(62,5/125)	

Type: RNEDAFLEX-AMP 8,7/15(17,5)kV

3X50+1X25+(3~9X1,5(2,5)C+6FO(62,5/125)	3X50+3X25/3+(3~9X1,5(2,5)C+6FO(62,5/125)
3X70+1X35+(3~9X1,5(2,5)C+6FO(62,5/125)	3X70+3X35/3+(3~9X1,5(2,5)C+6FO(62,5/125)
3X95+1X50+(3~9X1,5(2,5)C+6FO(62,5/125)	3X95+3X50/3+(3~9X1,5(2,5)C+6FO(62,5/125)
3X120+1X70+(3~9X1,5(2,5)C+6FO(62,5/125)	3X120+3X70/3+(3~9X1,5(2,5)C+6FO(62,5/125)
3X150+1X95+(3~9X1,5(2,5)C+6FO(62,5/125)	3X150+3X95/3+(3~9X1,5(2,5)C+6FO(62,5/125)
3X185+1X95+(3~9X1,5(2,5)C+6FO(62,5/125)	3X185+3X95/3+(3~9X1,5(2,5)C+6FO(62,5/125)
3X240+1X120+(3~9X1,5(2,5)C+6FO(62,5/125)	3X240+3X120/3+(3~9X1,5(2,5)C+6FO(62,5/125)
3X50+2X25/2+(3~9X1,5(2,5)C+6FO(62,5/125)	
3X70+2X35/2+(3~9X1,5(2,5)C+6FO(62,5/125)	
3X95+2X50/2+(3~9X1,5(2,5)C+6FO(62,5/125)	
3X120+2X70/2+(3~9X1,5(2,5)C+6FO(62,5/125)	
3X150+2X95/2+(3~9X1,5(2,5)C+6FO(62,5/125)	
3X185+2X95/2+(3~9X1,5(2,5)C+6FO(62,5/125)	
3X240+2X120/2+(3~9X1,5(2,5)C+6FO(62,5/125)	

Power cores:	3 x 50 mm^2 to 3 x 240 mm^2
Conductors:	Plain or tinned copper class 5
Cond. Screening:	Non-metallic extruded semi-conducting layer
Core insulation:	EPR
Insul. Screening:	Non-metallic extruded semi-conducting layer
Earth cores:	nX(25 mm^2 to 120 mm^2)/n (n=1 or n=2 or n=3)
Conductors:	Plain or tinned copper class 5
Cond. Screening:	Non-metallic extruded semi-conducting layer
Pilot elements:	150/250V 3 to 9X1,5 mm^2 or 3 to 9X2,5 mm^2
Conductors control cores:	Plain or tinned copper class 5
Insulation control cores:	EPR
Fibre-elements:	6 optical fibre 62,5/125 in tube, protected with layer of kevlar yarn (separate or combined with pilot elements)
Screen around pilot (and fibre- elements):	Separator tape and tinned copper braid
Outer sheath:	TPU

Application/Limitation

Cable according to IEC/ISO/IEEE 80005-1 for high voltage shore connection (HVSC) systems to supply the ship with electrical power from shore.

Please note that IEC/ISO/IEEE 80005-1 (2023) states 6/10(12) kV as standard voltage for ship to shore connection cables.

Type Approval documentation

Tests carried out

Standard	Release	General description	Limitation
IEC/ISO/IEEE 80005-1	2023-08	Utility connections in port – Part 1: High Voltage Shore Connection (HVSC) Systems – General requirements	
IEC 60092-350	2020-01	General construction and test methods of power, control and instrumentation cables for shipboard and offshore applications	
IEC 60092-354	2020-02	Electrical installations in ships - Part 354: Single- and three-core power cables with extruded solid insulation for rated voltages 6 kV (Um = 7,2 kV) up to 30 kV (Um = 36 kV)	partly
IEC 60092-376	2017-05	Electrical installations in ships – Part 376: Cables for control and instrumentation circuits 150/250 V (300 V)	partly
IEC 60793-2-10	2019-05	Optical fibres – Part 2-10: Product specifications – Sectional specification for category A1 multimode fibres	
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 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
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%

Marking of product

Example:

Hebei Huatong Wires and Cables Group Co., Ltd RNEDAFLEX-AMP 6/10kV 3X185+2X95/2+(5X2,5)C+6FO(62,5/125) IEC/ISO/IEEE 80005-1 - SHORE CONNECTION CABLE. DANGER! HIGH VOLTAGE

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