Certificate no.:
TAE00004YR

TYPE APPROVAL CERTIFICATE

This is to certify:

that the High Voltage Cable

with type designation(s)
PROTOLON(SC) (N)TSCGEWOEU

issued to
Prysmian Kabel und Systeme GmbH
Neustadt b. Coburg, Bayern, **Germany**

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

Application:

Cables for high voltage shore connection (HVSC) systems
Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV.

Rated voltage (kV)	**6/10 (12)**
Temp. class (°C)	**90**

Issued at **Hamburg** on **2024-11-22**
This Certificate is valid until **2029-11-21**.
DNV local unit: **Augsburg**

for **DNV**

Approval Engineer: **Carsten Hunsalz**

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 USD 300 000.

Product description

High Voltage Ship to Shore Connection Cable

Type: PROTOLON(SC) (N)TSCGEWOEU 3x185+1x95+1x(5x2,5ST+4x3G62,5LWL)C red 6/10 kV
PROTOLON(SC) (N)TSCGEWOEU 3x185+1x95+1x(7x2,5ST)C+1x(12G62,5LWL) red 6/10kV
PROTOLON(SC) (N)TSCGEWOEU 3x185+2x95/2+1x(5x2,5ST+2x3G62,5LWL)C red 6/10 kV
PROTOLON(SC) (N)TSCGEWOEU 3x185+2x95/2+1x(5x2,5ST)C red 6/10 kV
PROTOLON(SC) (N)TSCGEWOEU 3x120+1x70+1x(7x2,5ST)C+1x(12G62,5LWL) red 6/10 kV
PROTOLON(SC) (N)TSCGEWOEU 3x95+2x50/2+1x(4x2,5ST+2x3G62,5)C red 6/10 kV
PROTOLON(SC) (N)TSCGEWOEU 3x70+1x35+2x(4x2,5ST+2x3G62,5LWL)C red 6/10 kV

Power cores:	6/10kV (3 x 185 mm^2 or 3 x 120 mm^2 or 3 x 95 mm^2 or 3 x 70 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:	(1 x 95 mm^2 or 2 x 95/2 mm^2 or 1 x 70 mm^2 or 2 x 50/2 mm^2 or 1 x 35 mm^2)
Conductors:	Plain or tinned copper class 5
Cond. Screening:	semi-conductive tape
Pilot elements:	150/250V (7 x 2,5mm2 or 5 x 2,5 mm^2 or 4 x 2,5 mm^2)
Conductors control cores:	Plain or tinned copper class 5
Insulation control cores:	HEPR
Fibre-elements:	2x3 or 4x3 or 1x12 optical fibre 62,5/125 in tube, protected with layer of kevlar yarn
Screen around pilot element (including or not including optical fibers):	AL/PE tape with CuSN drain wires or tinned copper braid
Outer sheath system:	Inner part EPR (waterproof) Outer part SH

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.

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	Including: -Bending test -Sunlight-resistance test -Abrasion test -Flame Propagation test -Behaviour at low temperature -Resistance test
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	

Marking of product

Example:

JKZ/… PROTOLON(SC) (N)TSCGEWOEU 3x185+1x95+1x(5x2,5ST+ 4x3G62,5LWL)C 6/10 kV MADE IN GERMANY
IEC/ISO/IEEE 80005-1 – 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