Certificate no.:
TAE000054Y

TYPE APPROVAL CERTIFICATE

This is to certify:

that the High Voltage Cable

with type designation(s)
BiTcrane® SHORE POWER (N)TSCGEW11Y 3x70+2x35/2+(8x2,5)C+12G62,5/125 6/10 kV,
BiTcrane® SHORE POWER (N)TSCGEW11Y 3x95+2x50/2+(8x2,5)C+12G62,5/125 6/10 kV,
BiTcrane® SHORE POWER (N)TSCGEW11Y 3x120+2x70/2+(8x2,5)C+12G62,5/125 6/10 kV,
BiTcrane® SHORE POWER (N)TSCGEW11Y 3x185+2x95/2+(8x2,5)C+12G62,5/125 6/10 kV

issued to

Zaklady Kablowe BITNER Sp. z o.o.

Kraków, Małopolskie, **Poland**

is found to comply with

DNV rules for classification – Ships, offshore units, and high speed and light craft

Application:

High Voltage Shore Connection cable for HVSC systems.
Products approved by this certificate are accepted for installation on all vessels classed by DNV.

Type	Rated voltage (kV)	Temp. class (°C)
BiTcrane® SHORE POWER (N)TSCGEW11Y 3x70+2x35/2+(8x2,5)C+12G62,5/125 6/10 kV	**6/10 kV**	**90**
BiTcrane® SHORE POWER (N)TSCGEW11Y 3x95+2x50/2+(8x2,5)C+12G62,5/125 6/10 kV	**6/10 kV**	**90**
BiTcrane® SHORE POWER (N)TSCGEW11Y 3x120+2x70/2+(8x2,5)C+12G62,5/125 6/10 kV	**6/10 kV**	**90**
BiTcrane® SHORE POWER (N)TSCGEW11Y 3x185+2x95/2+(8x2,5)C+12G62,5/125 6/10 kV	**6/10 kV**	**90**

Issued at **Høvik** on **2025-11-17**

This Certificate is valid until **2030-11-16**.

for **DNV**

DNV local unit: **Katowice CMC**

Approval Engineer: **Ivar Bull**

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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.

Product description

BiTcrane® SHORE POWER (N)TSCGEW11Y 3x70+2x35/2+(8x2,5)C+12G62,5/125 6/10 kV,
BiTcrane® SHORE POWER (N)TSCGEW11Y 3x95+2x50/2+(8x2,5)C+12G62,5/125 6/10 kV,
BiTcrane® SHORE POWER (N)TSCGEW11Y 3x120+2x70/2+(8x2,5)C+12G62,5/125 6/10 kV,
BiTcrane® SHORE POWER (N)TSCGEW11Y 3x185+2x95/2+(8x2,5)C+12G62,5/125 6/10 kV

Construction:

Power conductors:	Tinned copper Class 5
Conductor screen	Semi conducting tape and compound
Core insulation:	EPR
Insulation screen:	Semi conducting compound
Fillers	Central filler
Earth cores x2	Tinned copper wires, class 5, semi-conductive layer
Pilot element (150/250V)	Tinned copper Class 5, 1 to 8x 2,5mm2
Core Insulation	EPR
Optical fibers	6 to 12 fibres in G62,5/125 - OM1 acc. to IEC 60793-2-10
Screen around pilot and fibre elements	Tinned copper wire braid
Inner sheath:	Thermoplastic polyurethane TPU
Outer sheath:	Polyurethane TPU according to EN-50363-10-2

Application/Limitation

Cable is tested according to IEC/IEEE 80005.1 (2019) AMD 2: 2023 5000 cycles at room temperature.
Minimum dynamic bending radius, reeling application : 12x OD (Cable outer diameter)
Conductor resistance after dynamic test is not measured ref. DNV-CP-0417 Flexible cables.
Attenuation of optic fibres before and after dynamic test are not measured. No broken fibres after 5000 cycles.
Cable is tested for both IRM903 and IRM 902 for 168h @100C.

Type Approval documentation

Tests carried out

Standard	Release	General description	Limitation
IEC/IEEE 80005-1:	2019+A1:2022 +A2:2023CSV	Utility connections in port Part 1: High voltage shore connection (HVSC) systems General requirements	Annex A (informative) Ship-to-shore connection cable. 5000 dynamic cycles at room temperature with bending diameter 10xD. Tensile force 15 N/mm2 of power cores. Acceptance criteria: - Max 20% broken conductor strands. - No broken optical fibres. - PD at 1.73U0 after test shall be maximum 10pC.
DNV CP-0401	2021-08	Electric high voltage cables	tan(d) measurements as function of voltage (#11) and temperature(#12). Heat cycle test + PD test (#13) Impulse withstand test followed by a HV test(#14)
IEC 60092-350	2020-01	Electrical installations in ships - Part 350: General construction and test methods of power, control and instrumentation cables for shipboard and offshore applications	

Standard	Release	General description	Limitation
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 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 up to 30 kV.	
IEC 60332-1-2(2004) AMD1(2015)	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.	Flame retardant small scale. Distance between the lower edge of the top support and the onset of charring > 50 mm and charring not to extend downwards > 540 mm from the lower edge of the top support.
EN ISO 4892-2	2013-06	Plastics - Methods of exposure to laboratory light sources - Part 2: Xenon-arc lamps (ISO 4892-2:2013)	Test method A. 720h. Max tensile strength and elongation@break decay 30%.
ISO 4649	2007	Rubber, vulcanized or thermoplastic — Determination of abrasion resistance using a rotating cylindrical drum device	
IEC 60092-350	2020-01	Annex E: Cold impact test for low temperature behaviour	Cold impact: -40 °C
NEK TS606 Ed6	2022-03	Cables for offshore installations - halogen-free low smoke flame-retardant / fire-resistant (HFFR-LS). Technical specification.	Enhanced oil resistance test: IRM902 100°C 7d. IRM903 100°C 7d.
EN 50563-10-2		Additional test ageing in water	168h @80°C
EN 50563-10-2		Saponification value	
EN 50563-10-2		Tear resistance	

Marking of product

Example:
BiTcrane® SHORE POWER (N)TSCGEW11Y 3x185+2x95/2+(8x2,5)C+12G62,5/125 - 6/10 kV - IEC/IEEE 80005-1 <ID number> CE RoHS + meters marking - IEC 60332-1 - <Lot N°> - Minimum dynamic bend radius 12 x OD – 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) 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