Certificate No:
TAE00004D9

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Low Voltage Cable

with type designation(s)
S103 BFOU (i) 150/250 V, S103 BFOU (i) M 150/250 V, S104 BFOU (c) 150/250 V, S104 BFOU (c) M 150/250 V, BFOU (i+c) 150/250 V, BFOU (i+c) M 150/250 V, BFCU (i) 150/250 V, BFCU (i) M 150/250 V, BFCU (c) 150/250 V, BFCU (c) M 150/250 V, BFCU (i+c) 150/250 V, BFCU (i+c) M 150/250 V

Issued to
Prysmian Cavi e Sistemi Italia S.r.l.
Milano, MI, Italy

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.

Type	Rated voltage (V)	Temp. class (°C)
S103 BFOU (i) 150/250 V, S103 BFOU (i) M 150/250 V, S104 BFOU (c) 150/250 V, S104 BFOU (c) M 150/250 V, BFOU (i+c) 150/250 V, BFOU (i+c) M 150/250 V	150/250	90
BFCU (i) 150/250 V, BFCU (i) M 150/250 V, BFCU (c) 150/250 V, BFCU (c) M 150/250 V, BFCU (i+c) 150/250 V, BFCU (i+c) M 150/250 V	150/250	90

Issued at **Hamburg** on **2021-10-19**
This Certificate is valid until **2026-10-18**.
DNV local station: **Italy/Malta CMC**

Approval Engineer: **Carsten Hunsalz**

for **DNV**

Arne Schaarmann
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.

Product description

NEK Type:
S103 BFOU (i) 150/250 V, S103 BFOU (i) M 150/250 V, S104 BFOU (c) 150/250 V, S104 BFOU (c) M 150/250 V, BFOU (i+c) 150/250 V, BFOU (i+c) M 150/250 V, BFCU (i) 150/250 V, BFCU (i) M 150/250 V, BFCU (c) 150/250 V, BFCU (c) M 150/250 V, BFCU (i+c) 150/250 V, BFCU (i+c) M 150/250 V same as

IEC Type: CU/MGT/EPR/IS/SHF2/TCWB or GSWB/SHF2, CU/MGT/EPR/IS/SHF2/TCWB or GSWB/SHF2 MUD, CU/MG/EPR/OS/SHF2/TCWB or GSWB/SHF2, CU/MGT/EPR/OS/SHF2/TCWB or GSWB/SHF2 MUD, CU/MGT/EPR/IS/OS/SHF2/TCWB or GSWB/SHF2, CU/MGT/EPR/IS/OS/SHF2/TCWB or GSWB/SHF2 MUD

Construction:

Conductors:	Tinned, stranded copper class 2 or class 5
Core insulation:	Mica tape + HF-EPR
Screen:	Copper/polyester tape w/tinned copper drain wire
Inner covering or sheath:	Halogen free compound
Metal covering:	Tinned copper wire braid or galvanized steel wire braid
Sheath:	SHF 2 or SHF 2 MUD

Number of cores x conductor cross-section
mm^2
1 x 2 x 0,75
2 x 2 x 0,75
4 x 2 x 0,75
7 x 2 x 0,75
8 x 2 x 0,75
12 x 2 x 0,75
16 x 2 x 0,75
19 x 2 x 0,75
24 x 2 x 0,75
32 x 2 x 0,75
1 x 2 x 1,0
2 x 2 x 1,0
4 x 2 x 1,0
7 x 2 x 1,0
8 x 2 x 1,0

Number of cores x conductor cross-section
mm^2
12 x 2 x 1,0
16 x 2 x 1,0
19 x 2 x 1,0
24 x 2 x 1,0
32 x 2 x 1,0
1 x 2 x 1,5
2 x 2 x 1,5
4 x 2 x 1,5
7 x 2 x 1,5
8 x 2 x 1,5
12 x 2 x 1,5
16 x 2 x 1,5
19 x 2 x 1,5
24 x 2 x 1,5
32 x 2 x 1,5

Number of cores x conductor cross-section
mm^2
1x2x2,5
1 x 3 x 0,75
3 x 3 x 0,75
4 x 3 x 0,75
7 x 3 x 0,75
12 x 3 x 0,75
16 x 3 x 0,75
19 x 3 x 0,75
24 x 3 x 0,75
1 x 3 x 1,0
3 x 3 x 1,0
4 x 3 x 1,0

Number of cores x conductor cross-section
mm^2
7 x 3 x 1,0
12 x 3 x 1,0
16 x 3 x 1,0
19 x 3 x 1,0
24 x 3 x 1,0
1 x 3 x 1,5
3 x 3 x 1,5
4 x 3 x 1,5
7 x 3 x 1,5
12 x 3 x 1,5
16 x 3 x 1,5
19 x 3 x 1,5
24 x 3 x 1,5
1x3x2,5

Application/Limitation

Control and instrumentation.

This type of cable is fire resistant in accordance with IEC Publication 60331.

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.

Fire resistant. Flame retardant Cat. A. Halogen free. Low smoke.
Mud resistant. Cold bend -40°C. Cold impact -35°C.

Type Approval documentation

Tests carried out

Standard	Issued	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 60092-376	2017-05	Cables for control and instrumentation circuits 150/250 V (300 V)	

Standard	Issued	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 60331-1	2018-03	Tests for electric cables under fire conditions - Circuit integrity - Part 1: Test method for fire with shock at a temperature of at least 830 °C for cables of rated voltage up to and including 0,6/1,0 kV	For cables with an overall diameter exceeding 20 mm
IEC 60331-2	2018-03	Tests for electric cables under fire conditions - Circuit integrity - Part 2: Test method for fire with shock at a temperature of at least 830 °C for cables of rated voltage up to and including 0,6/1,0 kV	For cables with an overall diameter not exceeding 20 mm
IEC 60331-21	1999-04	Tests for electric cables under fire conditions – Circuit integrity – Part 21: Procedures and requirements – Cables of rated voltage up to and including 0,6/1,0 kV	For cables with an overall diameter not exceeding 20 mm
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	Charred portion of sample does not exceed 2,5m above bottom edge of burner.
IEC 60332-1-2	2015-07	Tests on eletric cables under fire conditions. Test for vertical flame propagation for a single insulated wire or cable.	
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%
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%
CSA C22.2 No. 03	2009	4.12 Flexibility at any specified temperature	Cold bend: - 40°C
CSA C22.2 No. 03	2009	4.13 Abnormal low temperature – impact	Cold impact: -35°C
NEK TS 606	2016	Cables for offshore installations. Halogen-free and/or mud resistant. Technical specification.	

Marking of product

Example:

PRYSMIAN (P) - S103 BFOU (i) 150/250 V SHF2 or S103 BFOU (i) M 150/250 V SHF2 MUD - Size - IEC 60331-1/2/21 - IEC 60332-3-22 – Year - Meter marking

Place of Production

Prysmian Cavi e Sistemi Italia S.r.l., Merlino, Italy

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