

TYPE APPROVAL CERTIFICATE

This is to certify:**That the Electric Power Cable**

with type designation(s)

**F-RFOU P1(VFD)&F-RFOU P1/P8(VFD) 0,6/1kV, F-RFOU P1(VFD)&F-RFOU P1/P8(VFD)
0,6/1(1,8/3)kV**

Issued to

**Prysmian Tianjin Cables Co., Ltd.
Tianjin, China**

is found to comply with

DNV GL 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 GL.**

Type	Voltage class (kV)	Temp. class (°C)
F-RFOU P1(VFD)&F-RFOU P1/P8(VFD) 0,6/1kV	0,6/1	90
F-RFOU P1(VFD)&F-RFOU P1/P8(VFD) 0,6/1(1,8/3)kV	0,6/1 (1,8/3)	90

This Certificate is valid until **2021-12-31**.Issued at **Hamburg** on **2017-01-25**DNV GL local station: **Tianjin**for **DNV GL**Approval Engineer: **Holger Jansen**

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Joannis Papanuskas
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

Type: F-RFOU P1 (VFD) & F-RFOU P1/P8 (VFD) 0,6/1 kV
F-RFOU P1 (VFD) & F-RFOU P1/P8 (VFD) 0,6/1 (1,8/3) kV

Conductors: Tinned, stranded copper class 2 or class 5 (type F-)
Core insulation: HF-HEPR
Inner covering: Halogen free compound
Metal covering: Tinned copper wire braid armour + PET/Copper, tape 100% coverage (VFD)
Outer sheath: SHF2 or SHF Mud

Number of cores x conductor cross- section	Overall diameter Nominal	Number of cores x conductor cross- section	Overall diameter Nominal
mm ²	mm	mm ²	mm
0,6/1 kV		0,6/1 (1,8/3) kV	
3 x 25/16	28,5	3 x 25/16	32,9
3 x 35/16	30,1	3 x 35/16	35,2
3 x 50/25	35,1	3 x 50/25	39,3
3 x 70/35	39,6	3 x 70/35	43,5
3 x 95/50	43,9	3 x 95/50	48,0
3 x 120/60	49,1	3 x 120/60	53,4
3 x 150/75	54,5	3 x 150/75	57,7
3 x 185/95	60,0	3 x 185/95	61,9
3 x 25 + 3 x 6	28,0	3 x 25 + 3 x 6	32,9
3 x 35 + 3 x 6	30,0	3 x 35 + 3 x 6	35,3
3 x 50 + 3 x 10	35,3	3 x 50 + 3 x 10	39,3
3 x 70 + 3 x 16	40,3	3 x 70 + 3 x 16	43,5
3 x 95 + 3 x 16	43,3	3 x 95 + 3 x 16	47,9
3 x 120 + 3 x 25	50,0	3 x 120 + 3 x 25	52,9
3 x 150 + 3 x 35	54,9	3 x 150 + 3 x 35	57,6
3 x 185 + 3 x 35	59,1	3 x 185 + 3 x 35	60,8

Application/Limitation

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.

General power and lighting. Control. Halogen free. Low smoke. Cold bend -40°C. Cold impact -35°C
Flame retardant in bunch Cat. A. Mud resistant

Type Approval documentation

Tests carried out

Standard	Release	General description	Limitation
IEC 60092-350	2014-08	General construction and test methods of power, control and instrumentation cables for shipboard and offshore applications	
IEC 60092-353	2011-08	Single and multicore non-radial field power cables with extruded solid insulation for rated Voltages of 1 kV and 3 kV	

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Standard	Release	General description	Limitation
IEC 60092-360	2014-04	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	2009-02	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 60684-2	2011-08	Flexible insulating sleeving – Part 2: Methods of test	Fluorine content < 0,1%
IEC 60754-1	2011-11	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	2011-11	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
IEC 61034-1/2	2013-06	Measurement of smoke density of cables burning under defined conditions – Test apparatus, procedure and requirements	Low smoke
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 installation. Halogen-free low smoke and flame-retardant / fire resistant (HFFR-LS) Technical specification.	
IEC62153-4-3	2013-10	Metallic communication cable test methods - Part 4-3: Electromagnetic compatibility (EMC) - Surface transfer impedance - Triaxial method	
IEC62153-4-4	2015-04	Metallic communication cable test methods - Part 4-4: Electromagnetic compatibility (EMC) – Shielded screening attenuation, test method for measuring of the screening attenuation a_s up to and above 3 GHz	

Marking of product

PRYSMIAN PT – TEOF F-RFOU P1 VFD or F-RFOU P1/P8 VFD – Size – 0,6/1kV – IEC 60332-3-22 Cat.A – Year

Periodical assessment



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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