

TYPE APPROVAL CERTIFICATE

Certificate No:
TAE00002ZG
Revision No:
2

This is to certify:

That the High Voltage Cable

with type designation(s)

**TEOF or Exzhellent 606 P102 RFOU & TEOF or Exzhellent 606 P102 RFOU M 3,6/6 kV,
TEOF or Exzhellent 606 P103 RFOU & TEOF or Exzhellent 606 P103 RFOU M 6/10 kV,
TEOF or Exzhellent 606 P104 RFOU & TEOF or Exzhellent 606 P104 RFOU M 8,7/15 kV,
TEOF or Exzhellent 606 P112 RFOU & TEOF or Exzhellent 606 P112 RFOU M 12/20 kV**

Issued to

PRYSMIAN CABLES SPAIN, S.A.

Vilanova i la Geltrú, Barcelona, Spain

is found to comply with

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

Application :

General power.

Products approved by this certificate are accepted for installation on all vessels classed by DNV.

Type	Rated voltage (kV)	Temp. class (°C)
TEOF or Exzhellent 606 P102 RFOU & TEOF or Exzhellent 606 P102 RFOU M 3,6/6 kV	3,6/6	90
TEOF or Exzhellent 606 P103 RFOU & TEOF or Exzhellent 606 P103 RFOU M 6/10 kV	6/10	90
TEOF or Exzhellent 606 P104 RFOU & TEOF or Exzhellent 606 P104 RFOU M 8,7/15 kV	8,7/15	90
TEOF or Exzhellent 606 P112 RFOU & TEOF or Exzhellent 606 P112 RFOU M 12/20 kV	12/20	90

Issued at **Høvik** on **2023-07-01**

for **DNV**

This Certificate is valid until **2028-06-30**.

DNV local unit: **Area NB/CMC Iberia**

Approval Engineer: **Ivar Bull**

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Frederik Tore Elter
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.

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 300,000 USD.



Product description

TEOF or Exzhellent 606 P102 RFOU & TEOF or Exzhellent 606 P102 RFOU M 3,6/6 kV,
 TEOF or Exzhellent 606 P103 RFOU & TEOF or Exzhellent 606 P103 RFOU M 6/10 kV,
 TEOF or Exzhellent 606 P104 RFOU & TEOF or Exzhellent 606 P104 RFOU M 8,7/15 kV,
 TEOF or Exzhellent 606 P112 RFOU & TEOF or Exzhellent 606 P112 RFOU M 12/20 kV

Construction:
 Conductors: Tinned annealed, stranded copper Class 2 or Class 5
 Core insulation: EPR
 Inner sheath: SHF2
 Metal covering: Tinned copper wire braid
 Outer sheath: SHF2 or SHF Mud

Single core

Voltage U0 / U [kV]				
3,6/6	6/10	8,7/15	12/20	18/30
RFOU P102	RFOU P103	RFOU P104	RFOU P112	-
-	-	-	-	-
-	-	-	-	-
1 x 25	1 x 25	1 x 25	-	-
1 x 35	1 x 35	1 x 35	1 x 35	-
1 x 50	1 x 50	1 x 50	1 x 50	-
1 x 70	1 x 70	1 x 70	1 x 70	-
1 x 95	1 x 95	1 x 95	1 x 95	-
1 x 120	1 x 120	1 x 120	1 x 120	-
1 x 150	1 x 150	1 x 150	1 x 150	-
1 x 185	1 x 185	1 x 185	1 x 185	-
1 x 240	1 x 240	1 x 240	1 x 240	-
1 x 300	1 x 300	1 x 300	1 x 300	-

3 core

Voltage U0 / U [kV]				
3,6/6	6/10	8,7/15	12/20	18/30
RFOU P102	RFOU P103	RFOU P104	RFOU P112	-
-	-	-	-	-
-	-	-	-	-
3 x 25	3 x 25	3 x 25	-	-
3 x 35	3 x 35	3 x 35	3 x 35	-
3 x 50	3 x 50	3 x 50	3 x 50	-
3 x 70	3 x 70	3 x 70	3 x 70	-
3 x 95	3 x 95	3 x 95	3 x 95	-
3 x 120	3 x 120	3 x 120	3 x 120	-
3 x 150	3 x 150	3 x 150	3 x 150	-
3 x 185	3 x 185	3 x 185	3 x 185	-
3 x 240	3 x 240	3 x 240	3 x 240	-
3 x 300	3 x 300	3 x 300	3 x 300	-

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 Bundles of Cables or Wires) are fulfilled without any additional measures.

Type Approval documentation

Data sheets: TEOF RFOU - TEOF RFOU 3,6/6 kV
 TEOF RFOU - TEOF RFOU 6/10 kV
 TEOF RFOU - TEOF RFOU 8,7/15 kV rev. 00 dated 05/11.
 TEOF RFOU - TEOF RFOU 12/20 kV rev. 00 dated 05/11.

Test report dated 17.05.1996

Tests carried out

Standard	Release	General description	Limitation
DNV CP-0399	2021-08	Electric cables.	
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	
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	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	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 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 1: Determination of the halogen acid gas content	Halogen free: pH > 4,3 Conductivity < 10µS/mm
IEC 61034-1/2	2019-11	Measurement of smoke density of cables burning under defined conditions – Part 1: Test apparatus. Part 2: Test procedure and requirements	Low smoke Light transmittance >60%
NEK TS606 Ed6	2022-03	Cables for offshore installations - halogen-free low smoke flame-retardant / fire-resistant (HFFR-LS). Technical specification.	Mud resistance test: IRM903 100°C 7d. Calcium Bromide 70°C 56d. EDC 95/11 70°C 56d
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: -40°C

Marking of product

PRYSMIAN SAP –

TEOF or Exzhellent 606 RFOU (P102) & TEOF or Exzhellent 606 RFOU M (P102) 3,6/6 kV,
 TEOF or Exzhellent 606 RFOU (P103) & TEOF or Exzhellent 606 RFOU M (P103) 6/10 kV,
 TEOF or Exzhellent 606 RFOU (P104) & TEOF or Exzhellent 606 RFOU M (P104) 8,7/15 kV,
 TEOF or Exzhellent 606 RFOU (P112) & TEOF or Exzhellent 606 RFOU M (P112) 12/20 kV
 - size – IEC 60332-3-22 - Lot No.

SAP = Santa Perpetua Plant.

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