DNV·GL

Certificate No:
TAE000007Z

TYPE APPROVAL CERTIFICATE

This is to certify:

That the High Voltage Cable

with type designation(s)
FE4H1M1AM1 & FE4H1OM1AM1 3,6/6 kV, FE4H1M1AM1 & FE4H1OM1AM1 6/10 kV, FE4H1M1AM1 & FE4H1OM1AM1 8,7/15 kV

Issued to
PRYSMIAN CAVI E SISTEMI ITALIA SRL Stab.to di Merlino
Merlino LO, Italy

is found to comply with
Det Norske Veritas' Rules for Classification of Ships, High Speed & Light Craft and Det Norske Veritas' Offshore Standards

Application :

Power.
Flame retardant Cat. A. Halogen free. Low smoke.

Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV GL.

Type	Voltage (kV)	Temp. class (°C)
FE4H1M1AM1 & FE4H1OM1AM1 3,6/6 kV	3,6/6	90
FE4H1M1AM1 & FE4H1OM1AM1 6/10 kV	6/10	90
FE4H1M1AM1 & FE4H1OM1AM1 8,7/15 kV	8,7/15	90

This Certificate is valid until **2019-09-06**.

Issued at **Høvik** on **2015-09-07**

for **DNV GL**

DNV GL local station: **Milan**

Approval Engineer: **Ivar Bull**

Marit Laumann
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.

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Product description

FE4H1M1AM1 & FE4H1OM1AM1 3,6/6 kV,
FE4H1M1AM1 & FE4H1OM1AM1 6/10 kV,
FE4H1M1AM1 & FE4H1OM1AM1 8,7/15 kV

Construction:

Conductors:	Tinned or plain, stranded copper class 5 (flexible) or class 2
Core insulation:	XLPE (E4)
Metallic screen:	Copper tape screen
Filler:	LSOH
Inner covering:	LSOH compound - SHF1
Metal covering:	Galvanised steel wire braid (only three core cable) or plain/tinned copper wire braid
Bedding:	Halogen free compound (spaced configuration)
Outer sheath:	SHF1

MV-FHFX/A-series - FE4H1M1AM1 & FE4H1OM1AM1 3,6/6 kV:

	No of cores:	Cross sectional area [mm^{2}]
FE4M1AM1	1	16 – 300
FE4M1AM1 (Spaced config.)	1	16 – 300
FE4OM1AM1	3	16 – 300

MV-FHFX/A-series - FE4H1M1AM1 & FE4H1OM1AM1 6/10 kV:

	No of cores:	Cross sectional area [mm^{2}]
FE4H1M1AM1	1	25– 300
FE4H1M1AM1 (Spaced config.)	1	25 – 300
FE4H1OM1AM1	3	16 – 300

MV-FHFX/A-series - FE4H1M1AM1 & FE4H1OM1AM1 8,7/15 kV:

	No of cores:	Cross sectional area [mm^{2}]
FE4H1M1AM1	1	25 – 300
FE4H1M1AM1 (Spaced config.)	1	25 – 300
FE4H1OM1AM1	3	25 – 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 Bunches of Cables or Wires) are fulfilled without any additional measures.

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 60092-360	2014-04	Electrical installations in ships - Part 360: Insulating and sheathing materials for shipboard and offshore units, power, control, instrumentation and telecommunication cables.	
IEC 60092-354	2014-08	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)	
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 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/mm
IEC 61034-1/2	2013-07 2013-09	Measurement of smoke density of cables burning under defined conditions – Test apparatus, procedure and requirements	Low smoke Light transmittance ≥60%
IEC 60684-2	2003-05	Flexible insulating sleeving – Part 2: Methods of test.	Fluorine content < 0,1%
IEC 60092-350	2014-08	Annex E: Cold bend test and impact test for low temperature behaviour	Cold bend: -40°C Cold impact -35°C

Marking of product

PRYSMIAN (P) – MV-FHFX/A or MV-HFX/A 3,6/6 kV or MV-FHFX/A or MV-HFX/A 6/10 kV or MV-FHFX/A or MV-HFX/A 8,7/15 kV - Size – IEC 60332-3-22 – IEC 60092-354 - Year

Periodical assessment

The scope of the Periodical assessment is to verify that the conditions stipulated for the Type approval is complied with and that no alterations are made to the product design or choice of materials.

The main elements of the Periodical assessment are:

- Inspection on factory samples, selected at random from the production line (where practicable)
- Results from Production Sample Tests (PST) and Routines (RT) checked (if not available tests according to PST and 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 to be performed at least every second year.

END OF CERTIFICATE