

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Electric Power Cable

with type designation(s)

SIENOPYR FR M2XCH & M2XCH-J & (L) M2XCH & (L) M2XCH-J, SIENOPYR FR M2XCH 1,8/3 kV

Issued to

Prysmian Kabel und Systeme GmbH
Neustadt b. Coburg, Bayern, Germany

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	Rated voltage (kV)	Temp. class (°C)
SIENOPYR FR M2XCH & M2XCH-J & (L) M2XCH & (L) M2XCH-J	0,6/1	90
SIENOPYR FR M2XCH 1,8/3 kV	1,8/3	90

Issued at **Hamburg** on **2018-11-06**

This Certificate is valid until **2023-11-05**.

for **DNV GL**

DNV GL local station: **Augsburg**

Approval Engineer: **Carsten Hunsalz**

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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

Type: SIENOPYR FR M2XCH 0,6/1 kV, SIENOPYR FR M2XCH-J 0,6/1 kV, SIENOPYR FR (L) M2XCH 0,6/1 kV & SIENOPYR FR (L) M2XCH-J 0,6/1 kV, SIENOPYR FR M2XCH 1,8/3 kV

Construction:

Conductors: Plain stranded copper
Core insulation: XLPE
Inner covering: Extruded Halogen free compound or Polyester tape ((L) type)
Metal covering: Copper wire braid
Outer sheath: SHF1

0,6/1 kV

Number of cores x conductor cross-section	Overall Diameter nominal Extruded	Overall Diameter nominal tape
mm ²	mm	mm
1 x 1,5	-	6,4
1 x 2,5	-	6,8
1 x 4	-	7,3
1 x 6	-	7,9
1 x 10	-	9,0
1 x 16	-	10,0
1 x 25	-	12,1
1 x 35	-	13,2
1 x 50	-	15,3
1 x 70	-	17,8
1 x 95	-	19,8
1 x 120	-	20,8
1 x 150	-	23,8
1 x 185	-	25,5
2 x 0,75	10,1	8,7
2 x 1,0	10,4	9,1
2 x 1,5	11,5	9,7
2 x 2,5	12,4	10,9
2 x 4	13,4	12,1
2 x 6	15,1	13,2
2 x 10	17,1	15,6
2 x 16	19,3	18,0
2 x 25	22,8	21,5
3 x 0,75	10,5	9,1
3 x 1,0	11,1	9,6
3 x 1,5	12,0	10,2
3 x 2,5	12,9	11,6
3 x 4	14,1	12,8
3 x 6	15,8	13,9
3 x 10	18,2	16,7
3 x 16	20,3	19,0
3 x 25	24,7	-
3 x 35	27,8	-
3 x 50	31,2	-
3 x 70	36,0	-
3 x 95	40,2	-

Number of cores	Overall	Overall
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Number of cores x conductor cross-section	Overall Diameter nominal Extruded	Overall Diameter nominal tape
mm ²	mm	mm
3 x 120	43,2	-
3 x 150	48,6	-
3 x 185	54,0	-
3 x 25*	-	20,9
3 x 35*	-	22,3
3 x 50*	-	25,2
3 x 70*	-	29,4
3 x 95*	-	32,4
3 x 120*	-	36,1
3 x 150*	-	40,2
3 x 185*	-	44,1
4 x 0,75	11,6	9,7
4 x 1,0	12,0	10,2
4 x 1,5	12,8	11,2
4 x 2,5	13,8	12,5
4 x 4	15,7	13,8
4 x 6	17,2	15,7
4 x 10	19,6	18,2
4 x 16	22,2	20,8
4 x 25	27,5	-
4 x 35	30,3	-
4 x 50	34,2	-
4 x 70	39,9	-
4 x 95	44,3	-
4 x 120	47,4	-
4 x 150	54,1	-
4 x 185	59,6	-
4 x 25*	-	24,1
4 x 35*	-	25,3
4 x 50*	-	28,8
4 x 70*	-	33,1
4 x 95*	-	37,4
4 x 120*	-	41,1
4 x 150*	-	45,4
4 x 185*	-	51,0

Number of cores	Overall	Overall
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x conductor cross-section	Diameter nominal Extruded	Diameter nominal tape
mm ²	mm	mm
5 x 0,75	12,3	10,4
5 x 1,0	12,8	11,3
5 x 1,5	13,6	12,3
5 x 2,5	15,3	13,4
7 x 0,75	13,0	11,7
7 x 1,0	13,6	12,3
7 x 1,5	15,1	13,2
7 x 2,5	16,5	15,0
10 x 0,75	-	14,8
10 x 1,0	-	15,5
10 x 1,5	-	16,9
10 x 2,5	-	18,6
14 x 0,75	-	15,8

* Cables marked are sector shaped

x conductor cross-section	Diameter nominal Extruded	Diameter nominal tape
mm ²	mm	mm
14 x 1,0	-	16,8
14 x 1,5	-	18,3
14 x 2,5	-	20,4
19 x 0,75	-	17,7
19 x 1,0	-	18,6
19 x 1,5	-	20,3
19 x 2,5	-	22,4
24 x 0,75	-	20,4
24 x 1,0	-	21,4
24 x 1,5	-	23,4
24 x 2,5	-	26,7
37 x 0,75	-	23,0
37 x 1,0	-	24,3
37 x 1,5	-	28,1

1,8/3 kV

Number of cores x conductor cross-section	Overall Diameter nominal
mm ²	mm
3 x 50	37,0
3 x 70	41,0
3 X 95	45,0
3 x 120	48,0
3 X 150	53,0
3 X 185	57,0

Number of cores	conductor cross-section
1 to 4	10 mm ² to 240 mm ²

Application/Limitation

General power and lighting. Control. Halogen free. Low smoke.

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	Issued	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	2016-09	Electrical installations in ships - Part 353: Power cables for rated voltages 1 kV and 3 kV	
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	2013-06	Measurement of smoke density of cables burning under defined conditions – Test apparatus, procedure and requirements	Low smoke Light transmittance >60%
IEC 60332-1-2	2015-07	Tests on electric cables under fire conditions. Test for vertical flame propagation for a single insulated wire or cable.	
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.

Marking of product

Prysmian Kabel und Systeme GmbH – SIENOPYR FR M2XCH or SIENOPYR FR M2XCH-J or SIENOPYR FR (L) M2XCH or SIENOPYR FR (L) M2XCH-J – 0,6/1 kV or SIENOPYR FR M2XCH 1,8/3 kV – size – IEC 60332-3-22

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