



DET NORSKE VERITAS

TYPE APPROVAL CERTIFICATE

CERTIFICATE NO. **E-12222**

This is to certify that the
Electric Power Cable

with type designation(s)
AFITOX SM BC/SM AS 0,6/1 kV

Manufactured by
NEXANS BRASIL S/A.
Rio de Janeiro RJ, Brazil

is found to comply with
Det Norske Veritas' Rules for Classification of Ships, High Speed & Light Craft and Det Norske Veritas' Offshore Standards
IEC 60092-353 (2011-08)
IEC 60332-3-22 (2009-02)
IEC 60331-21 (1999-04)
IEC 60754-1/2 (2011-11)
IEC61034-1/2 (2005-04/2005-04)

Application
General power, lighting and control
Flame retardant in bunch; cat A
Fire resistant
Halogen free
Low smoke

Voltage class (kV) 0,6/1
Temp. class (°C) 90

This Certificate is valid until **2016-12-31**.

Issued at **Høvik** on **2013-01-23**

DNV local station: **Rio de Janeiro, SiO**

Approval Engineer: **Kjersti Bakke**

for **Det Norske Veritas AS**

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.
If any person suffers loss or damage which is proved to have been caused by any negligent act or omission of Det Norske Veritas, then Det Norske Veritas shall pay compensation to such person for his proved direct loss or damage. However, the compensation shall not exceed an amount equal to ten times the fee charged for the service in question, provided that the maximum compensation shall never exceed USD 2 million. In this provision "Det Norske Veritas" shall mean the Foundation Det Norske Veritas as well as all its subsidiaries, directors, officers, employees, agents and any other acting on behalf of Det Norske Veritas.

Product description

AFITOX SM BC and SM AS and SM BC-F and SM AS-F 0,6/1 kV

Construction:
 Conductors: Tinned or Plain, stranded copper class 2 or class 5(-F)
 Core insulation: Mica tape + HF-XLPE
 Inner covering: Halogen free compound
 Metal covering: Galv. Steel or Plain (or Tinned) copper wire braid
 Outer sheath: SHF1

Number of cores x conductor cross- section mm ²	Overall diameter class 2	Overall diameter class 5
	Nominal mm	Nominal mm
1 x 4	9,0	8,5
1 x 6	9,5	9,5
1 x 10	10,5	10,5
1 x 16	11,5	12,0
1 x 25	13,5	14,0
1 x 35	15,0	16,0
1 x 50	16,5	18,0
1 x 70	18,5	20,5
1 x 95	20,0	22,0
1 x 120	22,0	24,5
1 x 150	24,0	27,0
1 x 185	26,5	29,0
1 x 240	29,0	32,0
2 x 1,5	13,5	13,5
2 x 2,5	15,0	15,0
2 x 4	16,0	16,0
2 x 6	17,5	18,0
2 x 10	18,5	20,0
2 x 16	21,0	23,0
2 x 25	25,0	27,0
3 x 1,5	14,5	14,5
3 x 2,5	15,5	15,5
3 x 4	17,0	17,0
3 x 6	18,0	19,0
3 x 10	19,5	21,5
3 x 16	22,5	24,5
3 x 25	26,5	28,5
3 x 35	29,0	32,5
3 x 50	32,0	37,5
3 x 70	37,5	42,5
3 x 95	41,5	47,0
3 x 120	46,0	52,5
3 x 150	50,0	58,0
3 x 185	55,0	62,5
3 x 240	61,5	69,0
4 x 1,5	15,5	15,5
4 x 2,5	17,0	17,0

Number of cores x conductor cross- section mm ²	Overall diameter class 2	Overall diameter class 5
	Nominal mm	Nominal mm
4 x 4	18,0	18,0
4 x 6	19,5	20,5
4 x 10	21,5	23,0
4 x 16	24,5	26,5
4 x 25	28,5	31,5
4 x 35	31,5	36,0
4 x 50	35,5	41,0
4 x 70	41,0	47,5
4 x 95	46,0	51,5
4 x 120	50,5	58,5
4 x 1,0	15,0	15,0
5 x 1,0	16,0	16,0
7 x 1,0	17,0	17,0
10 x 1,0	21,0	21,0
12 x 1,0	21,5	21,5
14 x 1,0	23,0	23,0
16 x 1,0	24,0	24,0
19 x 1,0	25,0	25,0
20 x 1,0	27,5	27,5
24 x 1,0	29,0	29,0
25 x 1,0	29,0	29,5
27 x 1,0	29,5	29,5
30 x 1,0	30,5	30,5
37 x 1,0	33,0	33,0
5 x 1,5	17,0	17,0
7 x 1,5	18,0	18,0
10 x 1,5	22,5	22,5
12 x 1,5	23,0	23,0
14 x 1,5	24,0	24,0
16 x 1,5	25,0	25,0
19 x 1,5	26,5	26,5
20 x 1,5	29,0	29,0
24 x 1,5	30,5	30,5
25 x 1,5	30,5	31,5
27 x 1,5	31,5	31,5
30 x 1,5	32,5	32,5
37 x 1,5	35,5	35,0

Application/Limitation

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.

Type Approval documentation

Data sheet: FICAP DS-0403 Rev.6 dated 2003-06-20
 FICAP DS-0403-A dated 2003-11-13
 Test reports: FICAP HPE-0403 dated 2003-03-26

Tests carried out

Standard	Release	General description	Limitation
IEC 60092-350	2008-02	General construction and test methods of power, control and instrumentation cables for shipboard and offshore applications	
IEC 60092-351	2004-04	Insulating materials for shipboard and offshore units, power, control, instrumentation, telecommunication and data cables	
IEC 60092-353	2011-08	<i>Electrical installations in ships - Part 353: Power cables for rated voltages 1 kV and 3 kV</i>	0,6/1 kV
IEC 60092-359	1999-08	Sheathing materials for shipboard power and telecommunication cables	
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	Minimum 90 min. flame application + 15 min. cooling period.
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	2005-04	Measurement of smoke density of cables burning under defined conditions – Test apparatus, procedure and requirements	Light transmittance > 60%

Marking of product

NEXANS FICAP - AFITOX SM BC or SM AS or SM BC-F or SM AS-F - Size - 0,6/1 kV – IEC 60332-3-22

Certificate Retention Survey

The scope of the retention/renewal survey 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 survey 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.

Survey shall be performed at least every second year.

END OF CERTIFICATE