

DNV

DET NORSKE VERITAS

TYPE APPROVAL CERTIFICATE

CERTIFICATE NO. E-9237

This Certificate consists of 4 pages

This is to certify that the

Electric Cable, Power Current

with type designation(s)

**CS 90 MBZH MarineLine & MarineLine+ & MarineFlex YOZp
0,6/1 kV**

Manufactured by

Twentsche Kabelfabriek BV
HAAKSBERGEN, Netherlands

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 (2001-04)

IEC 60332-3-22 (2000-10)

IEC 60754-2 (1997-04)

IEC 61034-2 (2005-04)

Application

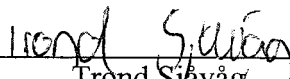
General power lighting. Halogen free. Low smoke.

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

Place and date

Høvik, 2008-11-21

for **DET NORSKE VERITAS AS**



Trond Sjøvåg
Head of Section



Local Office
DNV Rotterdam

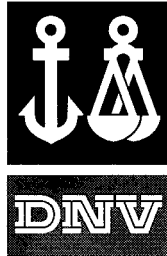
This Certificate is valid until

2012-06-30


Erik Hoffmann
Surveyor

Notice: 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.



Cert. No.: E-9237
File No.: 827.10

Product description

Type: CS 90 MBZH MarineLine YOZp 0,6/1 kV
CS 90 MBZH MarineLine+ YOZp 0,6/1 kV
CS 90 MBZH MarineFlex YOZp 0,6/1 kV

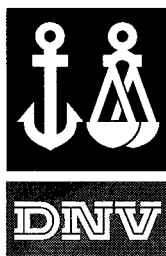
Construction:

Conductors: Plain stranded copper class 2, round or sector shaped* or class 5 (MarineFlex)
Core insulation: XLPE
Inner covering: Non hygroscopic tape or Halogen free filler (MarineLine+ and MarineFlex)
Metal covering: Tinned or plain copper wire braid
Outer sheath: SHF1

Number of cores x conductors cross section mm ²	Overall diameter mm
MarineLine	
1 x 1,5	5,8
1 x 2,5	6,2
1 x 4	6,8
1 x 6	7,3
1 x 10	8,1
1 x 16	9,3
1 x 25	11,2
1 x 35	13,1
1 x 50	14,8
1 x 70	16,9
1 x 95	18,9
1 x 120	20,9
1 x 150	23,0
1 x 185	25,5
1 x 240	28,5
2 x 1,5	9,0
2 x 2,5	9,9
2 x 4	11,1
2 x 6	12,5
2 x 10	14,3

Number of cores x conductors cross section mm ²	Overall diameter mm
2 x 16	16,6
2 x 25	20,1
2 x 35	23,3
3 x 1,5	9,4
3 x 2,5	10,4
3 x 4	11,7
3 x 6	13,2
3 x 10	15,1
3 x 16	17,5
3 x 25	21,3
3 x 35*	21,6
3 x 50*	23,9
3 x 70*	28,0
3 x 95*	32,1
3 x 120*	35,5
3 x 150*	39,7
3 x 185*	42,8
3 x 240*	49,4
4 x 1,5	10,2
4 x 2,5	11,4
4 x 4	12,7

Number of cores x conductors cross section mm ²	Overall diameter mm
4 x 6	14,7
4 x 10	16,7
4 x 16	19,3
4 x 25	23,6
5 x 1,5	11,2
5 x 2,5	12,4
6 x 1,5	12,1
7 x 1,5	12,1
7 x 2,5	14,0
8 x 1,5	14,0
10 x 1,5	13,9
12 x 1,5	15,6
16 x 1,5	16,1
19 x 1,5	18,1
24 x 1,5	19,0
27 x 1,5	22,7
MarineLine+	
2 x 1,5	10,7
2 x 2,5	11,8



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Number of cores x conductors cross section mm ²	Overall diameter mm
2 x 4	12,8
2 x 6	14,7
2 x 10	16,2
2 x 16	18,4
2 x 25	22,1
3 x 1,5	11,4
3 x 2,5	12,3
3 x 4	14,1
3 x 6	15,4
3 x 10	17,2
3 x 16	19,5
3 x 25	23,3
4 x 1,5	12,1
4 x 2,5	13,9

Number of cores x conductors cross section mm ²	Overall diameter mm
4 x 4	15,1
4 x 6	16,7
4 x 10	18,5
4 x 16	21,2
4 x 25	25,5
5 x 1,5	12,9
5 x 2,5	14,9
MarineFlex	
1 x 35	13.2
1 x 50	14.9
1 x 70	17.1
1 x 95	18.7
1 x 120	20.7
1 x 150	23.0

Number of cores x conductors cross section mm ²	Overall diameter mm
1 x 185	28.1
1 x 240	31.5
3 x 35	26,9
3 x 50	30,7
3 x 70	36,0
3 x 95	39,7
3 x 120	43,9
3 x 150	49,1
3 x 185	60,1
3 x 240	67,4
4 x 35	29,6
4 x 50	34,2
4 x 70	39,6
4 x 95	43,8

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.

Type Approval documentation

Data sheets:

CS 90 MBZH MarineLine YOZp HALOGEN FREE 0,6/1 kV dated 2008-10-31 and 2008-11-04

CS 90 MBZH MarineLine+ YOZp HALOGEN FREE 0,6/1 kV dated 2008-10-31

CS 90 MBZH MarineFlex YOZp HALOGEN FREE 0,6/1 kV dated 2008-10-31

Test reports:

Rapport no. 301 dated 2004-10-12

Tests carried out

Type tested in accordance with IEC 60092-353, IEC 60332-3-22, IEC 60754-2 and IEC 61034-1/2



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Marking of product

Product to be marked:

TKF- Size - 0,6/1 kV - CS 90 - mbzh - MarineLine YOZp HALOGEN FREE
TKF- Size - 0,6/1 kV - CS 90 - mbzh - MarineLine+ YOZp HALOGEN FREE
TKF - Size - 0,6/1 kV - CS 90 - mbzh - MarineFlex YOZp HALOGEN FREE

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 to be performed at least every second year.

END OF CERTIFICATE