

TYPE APPROVAL CERTIFICATE

This is to certify:**That the Electric Power Cable**

with type designation(s)

CPNBS & C(OS)PNBS & C(OBS)PNBS 0,6/1 kV

Issued to

TMC Co., Ltd**CHUNGNAM, Republic of Korea**

is found to comply with

Det Norske Veritas' Rules for Classification of Ships, High Speed & Light Craft and Det Norske Veritas' Offshore Standards**IEEE 1580 (2010)****IEC 60332-3-22 (2009-02)****Application :****Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV GL.****Voltage class (kV) 0,6/1****Temp. class (°C) 100/110**This Certificate is valid until **2019-11-30**.Issued at **Busan** on **2015-12-01**for **DNV GL**DNV GL local station: **Seoul**Approval Engineer: **Eun Sook Kim**

Baeg Soon Choi
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.

Job Id: **262.1-003643-2**
Certificate No: **TAE00000TA**

Product description

Type: CPNBS & C(OS)PNBS & C(OBS)PNBS 0,6/1 kV
Construction:
Conductors: Tinned, flexible stranded copper
Core insulation: XLPO (Type P & X110)
Screening: AL/PS tape + tinned copper drain wire (OS) or Tinned copper wire braid (OBS)
Inner sheath: Type N
Metal covering: Bronze wire braid
Outer sheath: Type N

Number of cores x conductor cross-section AWG/MCM	Overall Diameter Approx. mm	Overall Diameter Approx. inches
CPNBS		
2 x 18	13,1	0,516
3 x 18	14,2	0,559
4 x 18	15,0	0,591
5 x 18	15,9	0,626
6 x 18	16,8	0,661
7 x 18	16,8	0,661
8 x 18	17,7	0,697
10 x 18	20,5	0,807
12 x 18	20,9	0,823
14 x 18	22,8	0,898
16 x 18	23,7	0,933
19 x 18	24,6	0,969
20 x 18	25,1	0,988
24 x 18	28,6	1,126
30 x 18	29,9	1,177
37 x 18	31,7	1,248
44 x 18	34,7	1,366
60 x 18	37,7	1,484
91 x 18	45,2	1,780
2 x 16	14,1	0,555
3 x 16	14,6	0,575
4 x 16	15,4	0,606
5 x 16	16,3	0,642
6 x 16	17,3	0,681
7 x 16	17,3	0,681
8 x 16	18,2	0,717
10 x 16	22,2	0,874
12 x 16	22,7	0,894
14 x 16	23,5	0,925
16 x 16	24,5	0,965
19 x 16	25,4	1,000
20 x 16	26,0	1,024
24 x 16	29,7	1,169
30 x 16	31,1	1,224
37 x 16	32,9	1,295
44 x 16	36,1	1,421
60 x 16	39,2	1,543
91 x 16	47,1	1,854

Number of cores x conductor cross-section AWG/MCM	Overall Diameter Approx. mm	Overall Diameter Approx. inches
2 x 14	14,8	0,583
3 x 14	15,4	0,606
4 x 14	16,3	0,642
5 x 14	17,3	0,681
6 x 14	18,4	0,724
7 x 14	18,4	0,724
8 x 14	20,1	0,791
10 x 14	23,7	0,933
12 x 14	24,2	0,953
14 x 14	25,1	0,988
16 x 14	26,1	1,028
19 x 14	27,2	1,071
20 x 14	28,9	1,138
24 x 14	31,9	1,256
30 x 14	33,4	1,315
37 x 14	35,4	1,394
44 x 14	39,0	1,535
60 x 14	44,0	1,732
91 x 14	52,5	2,067
2 x 12	15,8	0,622
3 x 12	16,4	0,646
4 x 12	17,4	0,685
5 x 12	19,3	0,760
6 x 12	20,5	0,807
7 x 12	20,5	0,807
8 x 12	22,8	0,898
10 x 12	25,6	1,008
12 x 12	26,2	1,031
14 x 12	27,2	1,071
16 x 12	29,5	1,161
19 x 12	30,7	1,209
20 x 12	31,5	1,240
24 x 12	34,7	1,366
30 x 12	36,4	1,433
37 x 12	38,7	1,524
44 x 12	44,2	1,740
60 x 12	48,2	1,898
91 x 12	57,7	2,272
2 x 10	17,2	0,677

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Number of cores x conductor cross-section	Overall Diameter Approx.	Overall Diameter Approx.
AWG/MCM	mm	inches
3 x 10	18,0	0,709
4 x 10	19,9	0,783
5 x 10	22,3	0,878
6 x 10	23,8	0,937
7 x 10	23,8	0,937
8 x 10	25,2	0,992
10 x 10	29,6	1,165
12 x 10	30,3	1,193
14 x 10	31,6	1,244
16 x 10	33,0	1,299
19 x 10	34,4	1,354
20 x 10	35,2	1,386
24 x 10	39,1	1,539
30 x 10	41,1	1,618
37 x 10	45,3	1,783
44 x 10	50,1	1,972
60 x 10	56,3	2,217
91 x 10	65,7	2,587
C(OS)PNBS		
3 x 20	13,1	0,516
4 x 20	14,5	0,571
5 x 20	15,2	0,598
6 x 20	15,9	0,626
3 x 18	14,1	0,555
4 x 18	14,9	0,587
6 x 18	16,7	0,657
25 x 18	28,5	1,122

Number of cores x conductor cross-section	Overall Diameter Approx.	Overall Diameter Approx.
AWG/MCM	mm	inches
3 x 16	14,5	0,571
4 x 16	15,3	0,602
5 x 16	16,2	0,638
12 x 16	22,6	0,890
3 x 14	15,3	0,602
7 x 14	18,3	0,720
4 x 12	17,3	0,681
3 x 10	17,9	0,705
C(OBS)PNBS		
4 x 20	14,9	0,587
3 x 18	15,0	0,591
4 x 18	15,8	0,622
7 x 18	17,4	0,685
12 x 18	22,6	0,890
20 x 18	25,7	1,012
15 x 16	24,6	0,969
2 x 14	15,4	0,606
3 x 14	16,0	0,630
5 x 14	17,9	0,705
7 x 14	19,7	0,776
14 x 14	25,7	1,012
19 x 14	28,9	1,138
30 x 14	34,2	1,346
44 x 14	39,8	1,567
60 x 14	44,8	1,764
91 x 14	53,3	2,098

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

Type test according to IEEE 1580, IEEE 1202, UL 1309 and IEC 60332-3-22.

Marking of product

TMC – CPNBS or C(OS)PNBS or C(OBS)PNBS – Size – 0,6/1 kV

Periodical assessment

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.



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Survey to be performed at least every second year.

END OF CERTIFICATE