

TYPE APPROVAL CERTIFICATE

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

with type designation(s)

CPN & C(OS)PN & C(OBS)PN 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**DNV GL local station: **Seoul**Approval Engineer: **Eun Sook Kim**for **DNV GL**

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: **TAE00000T9**

Product description

Type: CPN & C(OS)PN & C(OBS)PN 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)
Outer sheath: Type N

Number of cores x conductor cross-section	Overall Diameter Approx.	Overall Diameter Approx.
AWG/MCM	mm	inches
CPN		
2 x 18	8,6	0,339
3 x 18	9,0	0,354
4 x 18	9,8	0,386
5 x 18	10,7	0,421
6 x 18	11,6	0,457
7 x 18	11,6	0,457
8 x 18	12,5	0,492
10 x 18	15,3	0,602
12 x 18	15,7	0,618
14 x 18	16,5	0,650
16 x 18	17,4	0,685
19 x 18	18,3	0,720
20 x 18	18,8	0,740
24 x 18	22,3	0,878
30 x 18	23,6	0,929
37 x 18	25,4	1,000
44 x 18	28,4	1,118
60 x 18	31,4	1,236
91 x 18	37,4	1,472
2 x 16	8,9	0,350
3 x 16	9,4	0,370
4 x 16	10,2	0,402
5 x 16	11,1	0,437
6 x 16	12,1	0,476
7 x 16	12,1	0,476
8 x 16	13,0	0,512
10 x 16	15,9	0,626
12 x 16	16,4	0,646
14 x 16	17,2	0,677
16 x 16	18,2	0,717
19 x 16	19,1	0,752
20 x 16	19,7	0,776
24 x 16	23,4	0,921
30 x 16	24,8	0,976
37 x 16	26,6	1,047
44 x 16	29,8	1,173
60 x 16	32,9	1,295
91 x 16	39,3	1,547
2 x 14	9,6	0,378
3 x 14	10,2	0,402

Number of cores x conductor cross-section	Overall Diameter Approx.	Overall Diameter Approx.
AWG/MCM	mm	inches
4 x 14	11,1	0,437
5 x 14	12,1	0,476
6 x 14	13,2	0,520
7 x 14	13,2	0,520
8 x 14	14,9	0,587
10 x 14	17,4	0,685
12 x 14	17,9	0,705
14 x 14	18,8	0,740
16 x 14	19,8	0,780
19 x 14	20,9	0,823
20 x 14	22,6	0,890
24 x 14	25,6	1,008
30 x 14	27,1	1,067
37 x 14	29,1	1,146
44 x 14	32,7	1,287
60 x 14	36,2	1,425
91 x 14	44,7	1,760
2 x 12	10,6	0,417
3 x 12	11,2	0,441
4 x 12	12,2	0,480
5 x 12	14,1	0,555
6 x 12	15,3	0,602
7 x 12	15,3	0,602
8 x 12	16,5	0,650
10 x 12	19,3	0,760
12 x 12	19,9	0,783
14 x 12	20,9	0,823
16 x 12	23,2	0,913
19 x 12	24,4	0,961
20 x 12	25,2	0,992
24 x 12	28,4	1,118
30 x 12	30,1	1,185
37 x 12	32,4	1,276
44 x 12	36,4	1,433
60 x 12	40,4	1,591
91 x 12	49,9	1,965
2 x 10	12,0	0,472
3 x 10	12,8	0,504
4 x 10	14,7	0,579
5 x 10	16,0	0,630
6 x 10	17,5	0,689

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Number of cores x conductor cross-section	Overall Diameter Approx.	Overall Diameter Approx.
AWG/MCM	mm	inches
7 x 10	17,5	0,689
8 x 10	18,9	0,744
10 x 10	23,3	0,917
12 x 10	24,0	0,945
14 x 10	25,3	0,996
16 x 10	26,7	1,051
19 x 10	28,1	1,106
20 x 10	28,9	1,138
24 x 10	32,8	1,291
30 x 10	34,8	1,370
37 x 10	37,5	1,476
44 x 10	42,3	1,665
60 x 10	48,5	1,909
91 x 10	57,9	2,280
C(OS)PN		
3 x 20	8,6	0,339
4 x 20	9,3	0,366
5 x 20	10,0	0,394
6 x 20	10,9	0,429
3 x 18	9,1	0,358
4 x 18	9,9	0,390
6 x 18	11,7	0,461
25 x 18	22,4	0,882
3 x 16	9,5	0,374
4 x 16	10,3	0,406

Number of cores x conductor cross-section	Overall Diameter Approx.	Overall Diameter Approx.
AWG/MCM	mm	inches
5 x 16	11,2	0,441
12 x 16	16,5	0,650
3 x 14	10,3	0,406
7 x 14	13,3	0,524
4 x 12	12,3	0,484
3 x 10	12,9	0,508
C(OBS)PN		
4 x 20	9,7	0,382
3 x 18	9,8	0,386
4 x 18	10,6	0,417
7 x 18	12,4	0,488
12 x 18	16,5	0,650
20 x 18	19,6	0,772
15 x 16	18,5	0,728
2 x 14	10,4	0,409
3 x 14	11,0	0,433
5 x 14	12,9	0,508
7 x 14	14,7	0,579
14 x 14	19,6	0,772
19 x 14	22,8	0,898
30 x 14	28,1	1,106
44 x 14	33,7	1,327
60 x 14	37,2	1,465
91 x 14	45,7	1,799

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 – CPN or C(OS)PN or C(OBS)PN – 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.

Survey to be performed at least every second year.



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END OF CERTIFICATE