DNV·GL

Certificate No:
TAE000007C

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Electric Power Cable

with type designation(s)
TP(IS-OS)PCPEAS/TS/BS, TP(IS)PCPEAS/TS/BS, TP(IS-OS)PCPEAS/TS/BS, TT(OS)PCPEAS/TS/BS, TT(IS)PCPEAS/TS/BS & TT(IS-OS)PCPEAS/TS/BS 0,6/1 kV

Issued to
Conductores Monterrey, S.A. de C.V. /Viakon
SAN NICOLAS DE LOS GARZA NUEVO LEÓN, Mexico

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 :

Instrumentation and communication. Control.

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) **95**

This Certificate is valid until **2019-06-30**.

Issued at **Høvik** on **2015-07-27**

for **DNV GL**

DNV GL local station: **Long Beach**

Approval Engineer: **Marta Alonso Pontes**

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.

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Product description

Type: TP(IS-OS)PCPEAS/TS/BS, TP(IS)PCPEAS/TS/BS, TP(OS)PCPEAS/TS/BS, TT(OS)PCPEAS/TS/BS, TT(IS)PCPEAS/TS/BS & TT(IS-OS)PCPEAS/TS/BS 0,6/1 kV

Construction:

Conductors: Tinned stranded copper flexible

Core insulation: Type P (XLPO)

Inner covering: Polyester tape

Inner sheath: Type CPE

Metal covering: Aluminium or tinned copper or bronze wire braid

Outer sheath: Type CPE

Number of pairs (TP) or Triads (TT)	Cross-section	Overall diameter Nominal
	AWG or MCM	mm
TP(IS-OS)PCPEAS/TS/BS		
1	18	12
2	18	20
3	18	20
4	18	23
5	18	25
6	18	27
7	18	27
8	18	29
10	18	33
12	18	34
14	18	36
16	18	37
17	18	39
19	18	39
20	18	41
24	18	46
1	16	12
2	16	20
3	16	22
4	16	24
5	16	26
6	16	28
7	16	28
8	16	30
10	16	35
12	16	36
14	16	37
16	16	39
17	16	41
19	16	41
20	16	44
24	16	49

Number of pairs (TP) or Triads (TT)	Cross-section	Overall diameter Nominal
	AWG or MCM	mm
1	14	13
2	14	23
3	14	24
4	14	26
5	14	29
6	14	31
7	14	31
8	14	33
10	14	38
12	14	39
14	14	40
16	14	44
17	14	46
19	14	46
20	14	48
24	14	54
1	12	15
2	12	25
3	12	26
4	12	29
5	12	31
6	12	34
7	12	34
8	12	36
10	12	41
12	12	44
14	12	46
16	12	48
17	12	52
19	12	52
20	12	55
24	12	60
1	10	17
2	10	29

Number of pairs (TP) or Triads (TT)	Cross-section	Overall diameter Nominal
	AWG or MCM	mm
3	10	31
4	10	33
5	10	36
6	10	39
7	10	39
8	10	42
10	10	52
12	10	53
14	10	56
16	10	58
17	10	61
19	10	61
20	10	64
24	10	72
TP(IS)PCPEAS/TS/BS		
1	18	11,9
2	18	19,3
3	18	20,2
4	18	22,7
5	18	24,4
6	18	26,2
7	18	26,2
8	18	28,9
10	18	33,0
12	18	33,9
14	18	35,4
16	18	37,1
17	18	38,9
19	18	38,9
20	18	40,6
24	18	46,2
1	16	12,4
2	16	20,2

Number of pairs (TP) or Triads (TT)	Cross-section	Overall diameter Nominal
	AWG or MCM	mm
3	16	22,2
4	16	23,9
5	16	25,7
6	16	28,5
7	16	28,5
8	16	30,4
10	16	34,8
12	16	35,8
14	16	37,5
16	16	39,3
17	16	41,1
19	16	41,1
20	16	44,6
24	16	49,0
1	14	13,9
2	14	22,8
3	14	23,9
4	14	25,7
5	14	28,7
6	14	30,8
7	14	30,8
8	14	32,9
10	14	37,9
12	14	39,0
14	14	40,8
16	14	44,4
17	14	46,5
19	14	46,5
20	14	48,6
24	14	55,1
1	12	14,9
2	12	24,7
3	12	25,9
4	12	29,0
5	12	31,3
6	12	33,7
7	12	33,7
8	12	36,1
10	12	41,8
12	12	44,5
14	12	46,6
16	12	48,9
17	12	52,8
19	12	52,8
20	12	55,2
24	12	60,9

Number of pairs (TP) or Triads (TT)	Cross-section	Overall diameter Nominal
	AWG or MCM	mm
1	10	16,5
2	10	29,0
3	10	30,5
4	10	32,9
5	10	35,7
6	10	38,6
7	10	38,6
8	10	41,5
10	10	51,3
12	10	52,8
14	10	55,3
16	10	58,1
17	10	61,0
19	10	61,0
20	10	63,9
24	10	72,1
TP(OS)PCPEAS/TS/BS		
1	18	11,9
2	18	15,5
3	18	17,2
4	18	18,9
5	18	20,2
6	18	22,6
7	18	22,6
8	18	24,0
10	18	27,8
12	18	28,9
14	18	30,1
16	18	31,4
17	18	32,2
19	18	32,8
20	18	33,6
24	18	36,5
1	16	12,4
2	16	16,2
3	16	18,7
4	16	19,8
5	16	22,3
6	16	23,7
7	16	23,7
8	16	25,2
10	16	29,3
12	16	30,5

Number of pairs (TP) or Triads (TT)	Cross-section	Overall diameter Nominal
	AWG or MCM	mm
14	16	31,8
16	16	33,1
17	16	34,0
19	16	34,7
20	16	35,5
24	16	38,7
1	14	13,9
2	14	17,3
3	14	20,1
4	14	22,3
5	14	23,9
6	14	25,6
7	14	25,6
8	14	28,3
10	14	31,8
12	14	33,0
14	14	34,5
16	14	36,1
17	14	37,0
19	14	37,8
20	14	38,8
24	14	43,8
1	12	14,9
2	12	19,5
3	12	22,9
4	12	24,2
5	12	26,1
6	12	29,0
7	12	29,0
8	12	30,9
10	12	34,8
12	12	36,3
14	12	38,0
16	12	39,8
17	12	40,8
19	12	41,7
20	12	44,4
24	12	48,4
1	10	16,5
2	10	23,0
3	10	25,8
4	10	28,5
5	10	30,7
6	10	33,0
7	10	33,0

Number of pairs (TP) or Triads (TT)	Cross-section	Overall diameter Nominal
	AWG or MCM	mm
8	10	35,3
10	10	40,1
12	10	41,9
14	10	45,4
16	10	47,6
17	10	48,8
19	10	51,4
20	10	52,8
24	10	57,6
TT(IS-OS)PCPEAS/TS/BS		
1	18	12,4
2	18	19,9
3	18	21,9
4	18	23,4
5	18	25,1
6	18	28,0
7	18	28,0
8	18	29,8
10	18	34,0
12	18	34,9
14	18	36,5
16	18	38,2
17	18	40,0
19	18	40,0
20	18	41,8
24	18	47,5
1	16	12,9
2	16	21,9
3	16	22,9
4	16	24,6
5	16	27,5
6	16	29,4
7	16	29,4
8	16	31,4
10	16	35,9
12	16	36,9
14	16	38,6
16	16	40,5
17	16	43,9
19	16	43,9
20	16	45,9
24	16	52,0

Number of pairs (TP) or Triads (TT)	Cross-section	Overall diameter Nominal
	AWG or MCM	mm
1	14	14,5
2	14	23,6
3	14	24,7
4	14	27,6
5	14	29,7
6	14	31,9
7	14	31,9
8	14	34,1
10	14	39,3
12	14	40,4
14	14	43,8
16	14	45,9
17	14	48,1
19	14	48,1
20	14	51,9
24	14	57,0
1	12	15,5
2	12	25,7
3	12	28,0
4	12	30,1
5	12	32,5
6	12	35,1
7	12	35,1
8	12	37,6
10	12	45,0
12	12	46,3
14	12	48,4
16	12	52,3
17	12	54,9
19	12	54,9
20	12	57,4
24	12	63,2
1	10	17,2
2	10	30,2
3	10	31,8
4	10	34,4
5	10	37,3
6	10	40,3
7	10	40,3
8	10	44,9
10	10	53,5
12	10	55,1
14	10	57,7
16	10	60,6
17	10	63,6
19	10	63,6

Number of pairs (TP) or Triads (TT)	Cross-section	Overall diameter Nominal
	AWG or MCM	mm
20	10	66,7
24	10	75,3
TT(IS)PCPEAS/TS/BS		
1	18	12,4
2	18	20,2
3	18	22,1
4	18	23,8
5	18	25,6
6	18	28,5
7	18	28,5
8	18	30,4
10	18	34,7
12	18	35,7
14	18	37,3
16	18	39,1
17	18	41,0
19	18	41,0
20	18	44,4
24	18	48,8
1	16	12,9
2	16	22,1
3	16	23,2
4	16	24,9
5	16	27,9
6	16	29,9
7	16	29,9
8	16	32,0
10	16	36,7
12	16	37,7
14	16	39,5
16	16	41,4
17	16	45,0
19	16	45,0
20	16	47,0
24	16	53,2
1	14	14,5
2	14	23,8
3	14	25,0
4	14	28,0
5	14	30,1
6	14	32,4
7	14	32,4
8	14	34,7

Number of pairs (TP) or Triads (TT)	Cross-section	Overall diameter Nominal
	AWG or MCM	mm
10	14	40,0
12	14	41,2
14	14	44,7
16	14	46,9
17	14	49,1
19	14	49,1
20	14	53,0
24	14	58,3
1	12	15,5
2	12	25,9
3	12	28,3
4	12	30,5
5	12	33,0
6	12	35,6
7	12	35,6
8	12	38,2
10	12	45,7
12	12	47,1
14	12	50,8
16	12	53,3
17	12	55,9
19	12	55,9
20	12	58,5
24	12	64,5
1	10	17,2
2	10	30,4
3	10	32,0
4	10	34,7
5	10	37,7
6	10	40,8
7	10	40,8
8	10	45,5
10	10	54,3
12	10	55,9
14	10	58,5
16	10	61,5
17	10	64,6
19	10	64,6
20	10	67,8
24	10	76,6
TT(IS-		

Number of pairs (TP) or Triads (TT)	Cross-section	Overall diameter Nominal
	AWG or MCM	mm
OS)PCP EAS/TS/ BS		
1	18	12
2	18	20
3	18	22
4	18	24
5	18	26
6	18	28
7	18	28
8	18	30
10	18	35
12	18	36
14	18	37
16	18	39
17	18	41
19	18	41
20	18	44
24	18	49
1	16	13
2	16	22
3	16	23
4	16	25
5	16	28
6	16	30
7	16	30
8	16	32
10	16	37
12	16	38
14	16	39
16	16	41
17	16	45
19	16	45
20	16	47
24	16	53
1	14	14
2	14	24
3	14	25
4	14	28
5	14	30
6	14	32
7	14	32

Number of pairs (TP) or Triads (TT)	Cross-section	Overall diameter Nominal
	AWG or MCM	mm
8	14	35
10	14	40
12	14	41
14	14	45
16	14	47
17	14	51
19	14	51
20	14	53
24	14	58
1	12	15
2	12	26
3	12	28
4	12	31
5	12	33
6	12	36
7	12	36
8	12	38
10	12	46
12	12	47
14	12	51
16	12	53
17	12	56
19	12	56
20	12	58
24	12	65
1	10	17
2	10	30
3	10	32
4	10	35
5	10	38
6	10	41
7	10	41
8	10	45
10	10	54
12	10	56
14	10	59
16	10	62
17	10	65
19	10	65
20	10	68
24	10	77

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 1580-2010 and IEC 60332-22

Marking of product

Product marking: CME WIRE AND CABLE TP(IS-OS)sizePCPE(1) or TP(IS)sizePCPE(1) or TP(OS)sizePCPE(1) or TT(IS-OS)sizePCPE(1) or TT(IS)sizePCPE(1) or TT(OS)sizePCPE(1) - #(2) – 600/1000V

(1) AS or TS or BS, depending on the armour material
(2) # equals to number of pairs or triads

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 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.

Assessment to be performed at least every second year.

END OF CERTIFICATE