

TYPE APPROVAL CERTIFICATE

This is to certify:

That the High Voltage Cable

with type designation(s)

CEF/DA&SA, CEH**/DA&SA, CEV**/DA&SA**

Issued to

**Hebei Huatong Wires & Cables Group Co., Ltd.
Tangshan, China**

is found to comply with

DNV GL rules for classification – Ships, offshore units, and high speed and light craft

Application :

Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV GL.

Rated voltage (kV) 3,6/6 6/10 8,7/15

Temp. class (°C) 90

Issued at **Hamburg** on **2017-08-10**

This Certificate is valid until **2022-08-09**.

DNV GL local station: **Tianjin**

for **DNV GL**

Approval Engineer: **Carsten Hunsalz**

Duy Nam Le
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.



Product description

Type: CEF22/DA&SA, CEH22/DA&SA, CEV22/DA&SA, CEF32/DA&SA, CEH32/DA&SA, CEV32/DA&SA, CEF92/DA&SA, CEH92/DA&SA, CEV92/DA&SA 3,6/6 kV, 6/10 kV and 8,7/15kV

Construction:

Conductors: Metal coated, stranded copper
Core insulation: Semi-conducting compound, EPR , Semi-conducting compound, Copper tape layer
Inner sheath: SE1 (CEF) or SH (CEH) or ST2 (CEV)
Metal covering: Galv. Steel armour tape (22)
Galv. Steel armour wire (32)
Galv. Steel wire braid (92)
Outer sheath: ST2

CEF22/DA&SA, CEH22/DA&SA, CEV22/DA&SA

Number of cores x conductor cross-section	Overall Dia- meter min.	Overall Dia- meter max.
mm ²	mm	mm
CEF22/DA&SA CEH22/DA&SA CEV22/DA&SA 3,6/6 kV		
1 x 10	20,0	26,0
1 x 16	21,5	27,0
1 x 25	22,5	29,0
1 x 35	23,5	30,0
1 x 50	25,0	31,5
1 x 70	27,0	34,0
1 x 95	28,5	36,0
1 x 120	30,5	38,0
1 x 150	32,0	39,5
1 x 185	33,5	42,0
1 x 240	36,5	45,0
1 x 300	38,5	47,5
1 x 400	42,0	51,5
1 x 500	45,5	55,5
1 x 630	50,5	61,0
3 x 10	38,5	47,5
3 x 16	41,0	50,0
3 x 25	44,0	53,5
3 x 35	46,0	57,5
3 x 50	49,0	60,0
3 x 70	52,5	64,5
3 x 95	57,0	70,0
3 x 120	60,5	73,5
3 x 150	64,0	77,5

Number of cores x conductor cross-section	Overall Dia- meter min.	Overall Dia- meter max.
mm ²	mm	mm

Number of cores x conductor cross- section	Overall Dia- meter min.	Overall Dia- meter max.
mm ²	mm	mm
CEF22/DA&SA CEH22/DA&SA CEV22/DA&SA 6/10 kV		
1 x 16	22,5	28,0
1 x 25	23,5	29,5
1 x 35	24,5	31,0
1 x 50	26,0	32,5
1 x 70	28,0	35,0
1 x 95	29,5	37,0
1 x 120	31,5	39,0
1 x 150	33,0	40,5
1 x 185	34,5	43,0
1 x 240	37,0	45,5
1 x 300	39,5	48,5
1 x 400	43,0	52,5
1 x 500	46,0	56,0
1 x 630	51,0	62,0
3 x 16	43,0	52,5
3 x 25	45,5	55,5
3 x 35	48,0	59,0
3 x 50	51,0	62,5
3 x 70	54,5	67,0
3 x 95	59,0	72,0
3 x 120	62,5	76,0
3 x 150	65,5	79,5

Number of cores x conductor cross- section	Overall Dia- meter min.	Overall Dia- meter max.
mm ²	mm	mm

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CEF22/DA&SA CEH22/DA&SA CEV22/DA&SA 8,7/15 kV		
1 x 25	26,0	32,0
1 x 35	27,0	34,0
1 x 50	28,5	35,0
1 x 70	30,0	37,5
1 x 95	32,0	39,5
1 x 120	33,5	41,5
1 x 150	35,0	43,0
1 x 185	37,0	45,5
1 x 240	39,5	48,5
1 x 300	42,0	51,0
1 x 400	45,5	55,0

CEF22/DA&SA CEH22/DA&SA CEV22/DA&SA 8,7/15 kV		
1 x 500	48,5	59,0
1 x 630	53,0	64,5
3 x 25	51,5	62,0
3 x 35	53,5	64,5
3 x 50	56,5	68,0
3 x 70	60,5	72,5
3 x 95	64,5	77,5
3 x 120	68,0	81,5
3 x 150	71,5	85,5

CEF32/DA&SA, CEH32/DA&SA, CEV32/DA&SA

Number of cores x conductor cross-section	Overall Dia- meter min.	Overall Dia- meter max.
mm ²	mm	mm
CEF32/DA&SA CEH32/DA&SA CEV32/DA&SA 3,6/6 kV		
1 x 10	21,5	27,5
1 x 16	22,5	29,0
1 x 25	24,0	30,5
1 x 35	25,0	31,5
1 x 50	26,5	33,5
1 x 70	28,0	35,5
1 x 95	31,0	39,0
1 x 120	32,5	40,5
1 x 150	34,0	42,0
1 x 185	36,0	44,5
1 x 240	38,5	47,5
1 x 300	42,0	51,5
1 x 400	45,0	55,5
1 x 500	49,0	59,5
1 x 630	53,5	65,0
3 x 10	41,5	51,0
3 x 16	44,0	54,0
3 x 25	47,0	57,5
3 x 35	49,0	60,0
3 x 50	52,0	64,0
3 x 70	55,5	68,5
3 x 95	60,0	73,5
3 x 120	63,5	77,5
3 x 150	68,0	82,5

Number of cores x conductor cross- section	Overall Dia- meter min.	Overall Dia- meter max.
mm ²	mm	mm
CEF32/DA&SA CEH32/DA&SA CEV32/DA&SA 6/10 kV		
1 x 16	23,5	30,0
1 x 25	24,5	31,5
1 x 35	26,0	33,0
1 x 50	27,5	34,5
1 x 70	29,5	37,5
1 x 95	31,5	39,5
1 x 120	33,0	41,5
1 x 150	35,0	43,5
1 x 185	36,5	45,5
1 x 240	39,5	48,5
1 x 300	42,5	52,0
1 x 400	46,0	56,0
1 x 500	49,0	60,0
1 x 630	54,0	66,0
3 x 16	46,0	56,0
3 x 25	49,0	59,5
3 x 35	51,0	63,0
3 x 50	54,0	66,0
3 x 70	58,0	70,5
3 x 95	62,0	75,5
3 x 120	67,0	81,0
3 x 150	70,0	84,5

Number of cores x conductor cross-section	Overall Dia- meter min.	Overall Dia- meter max.
mm ²	mm	mm

Number of cores x conductor cross- section	Overall Dia- meter min.	Overall Dia- meter max.
mm ²	mm	mm

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CEF32/DA&SA CEH32/DA&SA CEV32/DA&SA 8,7/15 kV		
1 x 25	27,0	34,0
1 x 35	28,5	35,5
1 x 50	30,5	38,0
1 x 70	32,0	40,0
1 x 95	34,0	42,0
1 x 120	35,5	44,0
1 x 150	37,0	45,5
1 x 185	39,0	48,0
1 x 240	43,0	52,0
1 x 300	45,0	55,0
1 x 400	48,5	59,0

CEF32/DA&SA CEH32/DA&SA CEV32/DA&SA 8,7/15 kV		
1 x 500	51,5	62,5
1 x 630	56,5	68,5
3 x 25	54,5	65,5
3 x 35	57,0	68,5
3 x 50	59,5	72,0
3 x 70	63,5	76,5
3 x 95	68,5	82,5
3 x 120	72,0	86,5
3 x 150	75,5	90,5

CEF92/DA&SA, CEH92/DA&SA, CEV92/DA&SA

Number of cores x conductor cross-section	Overall Dia- meter min.	Overall Dia- meter max.
mm ²	mm	mm
CEF92/DA&SA CEH92/DA&SA CEV92/DA&SA 3,6/6 kV		
1 x 10	19,5	25,5
1 x 16	21,0	26,5
1 x 25	22,0	28,5
1 x 35	23,0	29,5
1 x 50	24,5	31,0
1 x 70	26,5	33,5
1 x 95	28,0	35,5
1 x 120	30,0	37,5
1 x 150	31,5	39,0
1 x 185	33,5	42,0
1 x 240	36,5	45,0
1 x 300	38,5	47,5
1 x 400	42,0	51,5
1 x 500	45,5	55,5
1 x 630	50,5	61,0
3 x 10	38,5	47,5
3 x 16	41,0	50,0
3 x 25	44,0	53,5
3 x 35	46,0	56,5
3 x 50	49,0	60,0
3 x 70	52,5	64,5
3 x 95	57,0	70,0
3 x 120	60,5	73,5
3 x 150	64,0	77,5

Number of cores x conductor cross- section	Overall Dia- meter min.	Overall Dia- meter max.
mm ²	mm	mm
CEF92/DA&SA CEH92/DA&SA CEV92/DA&SA 6/10 kV		
1 x 16	22,0	27,5
1 x 25	23,0	29,0
1 x 35	24,0	30,5
1 x 50	25,5	32,0
1 x 70	27,5	34,0
1 x 95	29,0	36,5
1 x 120	31,0	38,5
1 x 150	33,0	40,5
1 x 185	34,5	43,0
1 x 240	37,0	45,5
1 x 300	39,5	48,5
1 x 400	43,0	52,5
1 x 500	46,0	56,0
1 x 630	51,0	62,0
3 x 16	43,0	52,5
3 x 25	45,5	55,5
3 x 35	48,0	59,0
3 x 50	51,0	62,5
3 x 70	54,5	67,0
3 x 95	59,0	72,0
3 x 120	62,5	76,0
3 x 150	65,5	79,5

Number of cores x conductor cross-section	Overall Dia- meter min.	Overall Dia- meter max.
mm ²	mm	mm

Number of cores x conductor cross- section	Overall Dia- meter min.	Overall Dia- meter max.
mm ²	mm	mm

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CEF92/DA&SA CEH92/DA&SA CEV92/DA&SA 8,7/15 kV		
1 x 25	25,5	31,5
1 x 35	26,5	33,5
1 x 50	28,0	34,5
1 x 70	29,5	37,0
1 x 95	31,5	39,0
1 x 120	33,5	41,5
1 x 150	35,0	43,0
1 x 185	37,0	45,5
1 x 240	39,5	48,5
1 x 300	42,0	51,0
1 x 400	45,5	55,0

CEF92/DA&SA CEH92/DA&SA CEV92/DA&SA 8,7/15 kV		
1 x 500	48,5	59,0
1 x 630	53,0	64,5
3 x 25	51,5	62,0
3 x 35	53,5	64,5
3 x 50	56,5	68,0
3 x 70	60,5	72,5
3 x 95	64,5	77,5
3 x 120	68,5	81,5
3 x 150	71,5	85,5

Application/Limitation

General power.

The following applies to SA type cables only:

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

Standard	Release	General description	Limitation
IEC 60092-350	2014-08	General construction and test methods of power, control and instrumentation cables for shipboard and offshore applications	
IEC 60092-354	2014-08	Electrical installations in ships - Part 354: Single- and three-core power cables with extruded solid insulation for rated voltages 6 kV (Um = 7,2 kV) up to 30 kV (Um = 36 kV)	
IEC 60092-360	2014-04	Electrical installations in ships - Part 360: Insulating and sheathing materials for shipboard and offshore units, power, control, instrumentation and telecommunication cables.	
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	Charred portion of sample does not exceed 2,5m above bottom edge of burner.

*SA type only

Marking of product

Hebei Huatong Wires & Cables Group Co.,Ltd. – CEF22/DA or CEF22/SA or CEH22/DA or CEH22/SA or CEV22/DA or CEV22/SA or CEF32/DA or CEF32/SA or CEH32/DA or CEH32/SA or CEV32/DA or CEV32/SA or CEF92/DA or CEF92/SA or CEH92/DA or CEH92/SA or CEV92/DA or CEV92/SA - size – 3,6/6 kV or 6/10 kV or 8,7/15kV – IEC 60332-3-22* – Lot no.

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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 Routine Tests (RT) checked (if not available tests according to 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.

Periodical assessment is to be performed after 2 years and after 3.5 years. A renewal assessment will be performed at renewal of the certificate.

END OF CERTIFICATE