DNV·GL

Certificate No:
TAE00002BM

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Low Voltage Cable

with type designation(s)
TCX (I) & (C) 250 V

Issued to
Nexans Deutschland GmbH
Mönchengladbach Nordrhein-Westfalen, Germany

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 (V) **150/250**
Temp. class (°C) **90**

Issued at **Hamburg** on **2017-11-16**

This Certificate is valid until **2022-11-15**.
DNV GL local station: **Essen**

Approval Engineer: **Carsten Hunsalz**

for **DNV GL**
Digitally Signed By: Schaarmann, Arne
Location: DNV GL Hamburg, Germany
Signing Date: 24.11.2017 , on behalf of

Oliver Darley
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: TCX (I) & (C) 250 V
Construction:
Conductors: Plain or tinned stranded copper class 2 or class 5
Core insulation: XLPE
Inner covering: Lapped (opt. extruded)
Metal covering: Plain or tinned copper wire braid
Outer sheath: SHF1

Number of cores x conductor cross-section	Overall Ø Min. TCX(C)	Overall Ø Max. TCX(C)	Overall Ø Min. TCX(I)	Overall Ø Max. TCX(I)
mm^2	mm	mm	mm	mm
1 x 2 x 0,5	6,2	7,4	6,2	7,4
2 x 2 x 0,5	6,8	8,0	8,8	10,5
3 x 2 x 0,5	8,8	10,5	9,2	11,0
4 x 2 x 0,5	9,6	11,0	10,0	12,0
5 x 2 x 0,5	10,0	12,0	11,0	13,0
7 x 2 x 0,5	11,5	13,0	12,0	14,0
10 x 2 x 0,5	13,5	16,0	14,5	16,5
12 x 2 x 0,5	14,5	16,5	15,0	17,0
14 x 2 x 0,5	15,0	17,0	16,0	18,0
19 x 2 x 0,5	17,0	19,5	18,5	21,0
24 x 2 x 0,5	19,0	21,5	20,5	23,0
27 x 2 x 0,5	19,5	22,5	21,5	24,5
30 x 2 x 0,5	20,5	23,0	22,5	25,0
37 x 2 x 0,5	22,5	25,5	24,5	27,5
1 x 3 x 0,5	6,4	7,8	6,4	7,8
2 x 3 x 0,5	9,6	11,0	10,0	12,0
3 x 3 x 0,5	9,6	11,0	10,0	12,0
4 x 3 x 0,5	10,5	12,0	11,0	13,0
7 x 3 x 0,5	13,0	15,0	13,5	16,0
10 x 3 x 0,5	15,5	18,0	16,5	18,5
14 x 3 x 0,5	18,0	20,5	18,5	21,0
24 x 3 x 0,5	22,5	25,5	23,5	26,5
27 x 3 x 0,5	23,5	26,5	25,0	28,0
30 x 3 x 0,5	24,5	27,5	26,0	29,0
37 x 3 x 0,5	27,0	30,5	28,5	32,0
1 x 2 x 0,75	7,0	8,2	7,0	8,2
2 x 2 x 0,75	7,8	9,2	10,0	12,0
3 x 2 x 0,75	10,0	12,0	10,5	12,5
4 x 2 x 0,75	11,0	13,0	11,5	13,5
7 x 2 x 0,75	14,0	16,0	14,5	16,5
10 x 2 x 0,75	16,5	18,5	17,0	19,5
12 x 2 x 0,75	17,5	20,0	18,5	21,0
14 x 2 x 0,75	18,0	20,5	19,0	21,5
19 x 2 x 0,75	21,0	23,5	22,0	24,5
24 x 2 x 0,75	23,0	26,0	24,5	27,5
27 x 2 x 0,75	24,5	27,5	25,5	28,5

Number of cores x conductor cross-section	Overall Ø Min. TCX(C)	Overall Ø Max. TCX(C)	Overall Ø Min. TCX(I)	Overall Ø Max. TCX(I)
mm^2	mm	mm	mm	mm
30 x 2 x 0,75	25,5	28,5	27,0	30,0
37 x 2 x 0,75	28,0	31,5	29,5	33,0
1 x 3 x 0,75	7,2	8,6	7,2	8,6
2 x 3 x 0,75	11,0	13,0	11,5	13,5
3 x 3 x 0,75	11,0	13,0	11,5	13,5
4 x 3 x 0,75	12,5	14,5	13,5	15,5
7 x 3 x 0,75	16,0	18,5	17,0	19,0
10 x 3 x 0,75	18,5	21,0	19,5	22,0
14 x 3 x 0,75	21,0	24,0	22,5	25,0
24 x 3 x 0,75	27,0	30,5	28,5	31,5
27 x 3 x 0,75	28,5	32,0	30,0	33,5
30 x 3 x 0,75	30,0	33,5	31,0	35,0
37 x 3 x 0,75	32,5	36,5	34,5	38,0
1 x 2 x 1,0	7,4	8,6	7,4	8,6
2 x 2 x 1,0	8,4	9,8	10,5	12,5
3 x 2 x 1,0	10,5	12,5	11,5	13,0
4 x 2 x 1,0	12,0	14,0	12,5	14,5
7 x 2 x 1,0	15,0	17,0	15,5	18,0
10 x 2 x 1,0	17,5	20,0	18,5	21,0
12 x 2 x 1,0	18,5	21,0	19,5	22,0
14 x 2 x 1,0	19,5	22,5	20,5	23,0
19 x 2 x 1,0	22,5	25,5	23,5	26,5
24 x 2 x 1,0	25,0	28,0	26,0	29,5
27 x 2 x 1,0	26,5	29,5	27,5	31,0
30 x 2 x 1,0	27,5	31,0	29,0	32,0
37 x 2 x 1,0	30,0	33,5	31,5	35,0
1 x 3 x 1,0	7,8	9,2	7,8	9,2
2 x 3 x 1,0	12,0	14,0	12,5	14,5
3 x 3 x 1,0	12,0	14,0	12,5	14,5
4 x 3 x 1,0	13,0	15,0	14,5	16,5
7 x 3 x 1,0	17,0	19,5	18,0	20,5
10 x 3 x 1,0	20,0	22,5	21,0	23,5
14 x 3 x 1,0	23,0	26,0	24,0	27,0
24 x 3 x 1,0	29,5	33,0	30,5	34,0
27 x 3 x 1,0	31,0	34,5	32,0	36,0

Number of cores x conductor cross-section	Overall Ø Min. TCX(C)	Overall Ø Max. TCX(C)	Overall Ø Min. TCX(I)	Overall Ø Max. TCX(I)
mm^2	mm	mm	mm	mm
30 x 3 x 1,0	32,5	36,0	34,0	37,5
37 x 3 x 1,0	35,5	39,5	37,5	41,5
1 x 2 x 1,5	8,4	9,8	8,4	9,8
2 x 2 x 1,5	9,4	11,0	12,0	14,0
3 x 2 x 1,5	12,5	14,5	13,5	15,5
4 x 2 x 1,5	14,0	16,5	14,5	17,0
7 x 2 x 1,5	17,0	19,5	17,5	20,0
10 x 2 x 1,5	20,5	23,0	21,0	23,5
12 x 2 x 1,5	21,5	24,5	22,5	25,0
14 x 2 x 1,5	22,5	25,5	23,5	26,5
19 x 2 x 1,5	26,0	29,0	27,0	30,5
24 x 2 x 1,5	29,0	32,5	30,5	34,0
27 x 2 x 1,5	30,5	34,0	32,0	35,5
30 x 2 x 1,5	32,0	36,0	33,5	37,0
37 x 2 x 1,5	35,5	39,5	37,0	41,0
1 x 3 x 1,5	8,8	10,5	8,8	10,5
2 x 3 x 1,5	13,5	15,5	14,5	17,0
3 x 3 x 1,5	14,0	16,5	14,5	17,0
4 x 3 x 1,5	15,5	18,0	16,0	18,5
7 x 3 x 1,5	20,0	22,5	20,5	23,0
10 x 3 x 1,5	23,0	26,0	24,0	27,0
14 x 3 x 1,5	26,5	30,0	27,5	31,0
24 x 3 x 1,5	34,0	38,0	36,0	40,0
27 x 3 x 1,5	36,5	40,5	38,0	42,0
30 x 3 x 1,5	38,0	42,0	39,5	43,5
37 x 3 x 1,5	42,0	46,5	43,5	48,0

Number of cores x conductor cross-section	Overall Ø Min. TCX(C)	Overall Ø Max. TCX(C)	Overall Ø Min. TCX(I)	Overall Ø Max. TCX(I)
mm^2	mm	mm	mm	mm
1 x 2 x 2,5	9,4	11,0	9,4	11,0
2 x 2 x 2,5	10,5	12,0	14,5	16,5
3 x 2 x 2,5	14,5	17,0	15,0	17,5
4 x 2 x 2,5	16,0	18,5	17,0	19,0
7 x 2 x 2,5	19,5	22,5	20,0	23,0
10 x 2 x 2,5	23,5	26,5	24,0	27,0
12 x 2 x 2,5	25,0	28,0	26,0	29,0
14 x 2 x 2,5	26,0	29,5	27,0	30,5
19 x 2 x 2,5	30,5	34,0	31,0	35,0
24 x 2 x 2,5	33,5	37,5	35,5	39,5
27 x 2 x 2,5	36,0	40,0	37,0	41,5
30 x 2 x 2,5	37,5	42,0	39,0	43,5
37 x 2 x 2,5	41,5	46,0	43,0	47,5
1 x 3 x 2,5	9,8	11,5	9,8	11,5
2 x 3 x 2,5	16,0	18,5	17,0	19,0
3 x 3 x 2,5	16,5	18,5	17,0	19,0
4 x 3 x 2,5	18,0	20,5	18,5	21,0
7 x 3 x 2,5	22,5	25,5	23,5	26,5
10 x 3 x 2,5	26,5	30,0	27,5	31,0
14 x 3 x 2,5	31,0	34,5	32,0	35,5
24 x 3 x 2,5	40,0	44,5	41,5	46,0
27 x 3 x 2,5	42,5	47,0	43,5	48,5
30 x 3 x 2,5	44,5	49,0	45,5	50,5
37 x 3 x 2,5	49,0	54,0	50,5	55,5

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.

Control and instrumentation.
Flame retardant in bunch Cat. A. Halogen free. Low smoke.

Type Approval documentation

Data sheets: Dimension of TCX (C) class2 dated 2009-02-16
Dimension of TCX (C) FLEXISHIP (class5) dated 2009-02-16
Dimension of TCX (I) class2 dated 2009-02-16
Dimension of TCX (I) FLEXISHIP (class5) dated 2009-02-16
Dimension of 5x2x0,5mm2 TCX (C)+(I) dated 2017-05-09

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 60092-376	2017-05	Cables for control and instrumentation circuits 150/250 V (300 V)	

Standard	Release	General description	Limitation
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 60332-1-2	2015-07	Tests on electric and optical fibre cables under fire conditions – Part 1-2: Test for vertical flame propagation for a single insulated wire or cable –Procedure for 1 kW pre-mixed flame	
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.
IEC 60754-1	2011-11	Test on gases evolved during combustion of materials from cables - Part 1: Determination of the halogen acid gas content	Low Halogen: <0,5% Halogen
IEC 60754-2	2011-11	Test on gases evolved during combustion of materials from cables – Determination of the degree of acidity of gases evolved during the combustion of materials taken from electric cables by measuring pH and conductivity	Halogen free: pH > 4,3 Conductivity < 10µS/mm
IEC 60684-2	2011-08	Clause 45.2 Methods of determination of low levels of fluorine	HF max 0,1%
IEC 61034-1/2	2013-07 2013-09	Measurement of smoke density of cables burning under defined conditions – Test apparatus, procedure and requirements	Low smoke Light transmittance >60%

Marking of product

NEXANS TCX (I) or (C) - size – 150/250 V – 90C – IEC 60092-376 – IEC 60332-3-22 – CE(Symbol) Order-No.

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