

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Data transmission cables and systems

with type designation(s)
DC cat 6, DC cat 6A, DC cat 7, DC cat 7A, DC 1200MHz

Issued to

TELDOR Cables & Systems Ltd.
Israel, Israel

is found to comply with

Det Norske Veritas' Rules for Classification of Ships, High Speed & Light Craft and Det Norske Veritas' Offshore Standards

Type Approval Programme No. 6-827.50-2

IEC 61156-5 Ed. 2.0 (2009-02)

IEC 60332-3-22 (2009-02)

IEC 60332-3-24 (2009-02)

IEC 60754-1 (2011-11)

IEC 60754-2 (2011-11)

IEC61034-1/2 (2005-04/2005-04)

Application :

Cable suitable for horizontal floor wiring

Flame retardant in bunch; cat A or cat C. Halogen free. Low smoke

Inner sheath SHF1. Outer sheath SHF2 or SHF Mud.

Type	Voltage (kV)	Temp. class (°C)
DC cat 6		
DC cat 6A		
DC cat 7		
DC cat 7A		
DC 1200MHz		

This Certificate is valid until **2016-06-30**.

Issued at **Høvik** on **2014-10-13**

for **DNV GL**

DNV GL local station: **Piraeus**

Approval Engineer: **Ivar Bull**

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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. If any person suffers loss or damage which is proven to have been caused by any negligent act or omission of the Society, then the Society shall pay compensation to such person for his proven direct loss or damage. However, the compensation shall not exceed an amount equal to ten times the fee charged for the service in question. The maximum compensation shall never exceed USD 2 million. In this provision the "Society" shall mean DNV GL AS as well as all its direct and indirect owners, affiliates, subsidiaries, directors, officers, employees, agents and any other person or entity acting on behalf of DNV GL AS.

Certificate No: **E-13708**
 File No: **827.50**
 Job Id: **262.1-014430-2**

Product description

DC solid cables

Cables suitable for horizontal floor wiring; between work area communication outlet and the communication closet.

Cable types ;	Design standard	Cross section	Conductor type ref IEC 60228	Shielding
DC cat 6	IEC 61156-5	23 AWG (0,246mm ²), 22 AWG (0,324 mm ²)	Solid conductor Class 1	U/UTP (not screened) U/FTP F/FTP S/FTP
DC cat 6A	IEC 61156-5	23 AWG (0,246mm ²), 22 AWG (0,324 mm ²)	Solid conductor Class 1	U/FTP F/FTP S/FTP
DC cat 7	IEC 61156-5	23 AWG (0,246 mm ²) 22 AWG (0,324 mm ²)	Solid conductor Class 1	S/FTP
DC cat 7A	IEC 61156-5	23 AWG (0,246 mm ²) 22 AWG (0,324 mm ²)	Solid conductor Class 1	S/FTP
DC 1200 Mhz	IEC 61156-7	22 AWG (0,324mm ²)	Solid conductor Class 1	S/FTP

Construction

Conductor	Bare annealed copper or tinned annealed copper class 1
Insulation	Solid /cellular Polyolefin
Individual screen	*/FTP cables have individual foil screen
Common screen	S/*TP cables have a common braid screen F/*TP cables have a common foil screen SF/*TP cables have a common foil screen and a braid screen
Inner sheath	SHF1
Metallic covering	B: braided galvanized steel wire R: corrugated steel tape W: served steel wire P: Bronze wire braid
Outer sheath	SHF2 or SHF MUD, single or double layer.

Electrical data given at 20°C

Category 6		
Frequency MHz	Attenuation dB/100m	NEXT dB
1	2.0	75.3
4	3.8	66.3
10	6.0	60.3
16	7.6	57.2
31.25	10.7	52.9

62.5	15.4	48.4
100	19.8	45.3
150	24.7	42.7
200	29.0	40.8
250	32.8	39.3

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Category 6 _A		
Frequency MHz	Attenuation dB/100m	NEXT dB
1	2.0	75.3
4	3.8	66.3
10	5.9	60.3
16	7.5	57.2
31.25	10.5	52.9
62.5	15.0	48.4

100	19.1	45.3
150	23.7	42.7
200	27.6	40.8
250	31.1	39.3
300	34.3	38.1
400	40.1	36.3
500	45.3	34.8

Category 7		
Frequency MHz	Attenuation dB/100m	NEXT dB
1	2.0	78.0
4	3.7	78.0
10	5.9	78.0
16	7.4	78.0
31.25	10.4	78.9
62.5	14.9	75.5

100	19.0	72.4
150	23.6	69.8
200	27.5	67.9
250	31.0	66.4
300	34.2	65.2
400	40.0	63.4
500	45.3	61.9
600	50.1	60.7

Category 7 _A		
Frequency MHz	Attenuation dB/100m	NEXT dB
1	2.1	78.0
4	3.7	78.0
10	5.8	78.0
16	7.3	78.0
31.25	10.3	78.0
62.5	14.6	78.0

100	18.5	78.0
150	22.8	76.0
200	26.5	74.0
250	29.7	72.5
300	32.7	71.2
400	38.0	69.4
500	42.8	67.9
600	47.1	66.7
1000	61.9	63.4

1200 MHz		
Frequency MHz	Attenuation dB/100m	NEXT dB
1	1.9	78.0
4	3.5	78.0
10	5.4	78.0
16	6.8	78.0
31.25	9.6	78.0
62.5	13.7	78.0

100	17.5	76.0
200	25.3	71.5
250	28.5	70.0
300	31.5	68.8
400	36.9	67.0
500	41.8	65.5
600	46.3	64.3
1000	62.0	61.0
1200	69.0	59.8

Application/Limitation

Temperature window
 Operation/storage: -40°C to +85 °C
 Installation: -15°C to +50°C

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For solid conductors proper termination is required in order to avoid damage to the cable due to vibration. Termination itself shall be in the outer sheath of the cable and conductors should be locked in place in order to avoid damage due to vibrations
In order to achieve a transmission compliant with Category 7, cables shall be installed with suitable termination equipment according to manufacturer's recommendations.

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

Datasheets Data transmission cable and system type DC balanced pair armored copper cables, rev 14/12 date 2012-06-08

Type test DB1B04R2401 – 9DNV001108 cat 6 stranded
DB2C04S2601 – 9DNV004108 cat 6_A stranded
DB5D04s2601 – 9dnv002108 cat7 stranded
DB5F04S2601 – 9DNV005108 cat 7_A stranded
DB5G04B2201- 9DNV003108 1200MHz solid
DC-W5D04B2303 cat 7 solid dated 2012-04-12
DB-1B04B2303 cat 6 solid, dated 2012-02-05
DB-3C04B2303 cat 6_A solid dated 2012-02-05
DB5F04B2203 cat 7A dated 2011-12-18
Flame test report Category A dated 23.01.2014
Mud resistance test NEK 606 dated 23.01.2014.

Tests carried out

Standard	Release	General description	Limitation
IEC 61156-5	2009-05	Multicore and symmetrical pair/quad cables for digital communications – Part 5: Symmetrical pair/quad cables with transmission characteristics up to 1 000 MHz – Horizontal floor wiring – Sectional specification	Reference to requirement for category cable: 6 (250MHz), 6 _A (500 MHz), 7 (600MHz), 7 _A (1000 MHz)
IEC 61156-7	2003-05	Multicore and symmetrical pair/quad cables for digital communications - Part 7: Symmetrical pair cables with transmission characteristics up to 1 200 MHz - Sectional specification for digital and analog communication cables	1200 MHz
IEC 60092-359	1999-08	Sheathing materials for shipboard power 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	Bunch test Category A
IEC 60332-3-24	2009-02	Tests on electric and optical fibre cables under fire conditions – Part 3-24: Test for vertical flame spread of vertically-mounted bunched wires or cables – Category C	Bunch test
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:

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IEC 60754-2	1999-07	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 61034-1/2	2005-04	Measurement of smoke density of cables burning under defined conditions – Test apparatus, procedure and requirements	Low smoke
NEK 606 Ed. 4	2009-05	Cables for offshore installations. Halogen-free and/or mud resistant. Technical specification.	Mud resistance test: IRM903 100°C 7d. Calcium Bromide 70°C 56d. Carbo Sea 70°C 56d.

Marking of product

TELDOR DC-[...] No. of Pairs, Cross-Section, Armor, Type, P/N, METER MARK – IEC 60332-3-22 or IEC 60332-3-24 – Lot No.

DC	Armour	Type	Transmission properties	Pair count	Cond.	Awg	Color
DC	B: Braided stainless steel wire R: Corrugated copolymer coated steel tape W: Served galvanized steel wire P: Braided Bronze wire	1: U/UTP 2: F/UTP 3: SF/UTP 4: U/FTP 5: F/FTP 6: S/FTP 7: SF/FTP	A: Multipair B: cat 6 C: Cat 6A D: cat 7 F: cat 7A G: 1200 MHz	NN	B: Bare copper solid T: Tinned copper solid S: Bare copper solid R: Tinned copper stranded	26=26AWG 24=24AWG 23=23AWG 22=22AWG 20=20AWG 18=18AWG 16=16AWG	XX alphabetic numeric

Periodical assessment

The scope of the Periodical assessment 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 Routine Tests (RT) checked
- (if RT- and PST-test reports are 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
- Ensure traceability between manufacturer's product type marking and Type Approval Certificate.

Survey shall be performed at least every second year.

END OF CERTIFICATE