DNV·GL

TYPE APPROVAL CERTIFICATE

Certificate No:
TAE00000U3
Revision No:
4

This is to certify:

That the Data transmission cables and systems

with type designation(s)
MG cat 3 Fire resistant,
MG cat 5, cat 5e Fire resistant,
MG cat 6, cat 6A Fire resistant,
MG cat 7, 7A Fire resistant,
MG 1200 MHz Fire resistant,
MG cat 8, Fire resistant

Issued to
TELDOR Cables & Systems Ltd.
Israel, **Israel**

is found to comply with
DNV GL rules for classification – Ships, offshore units, and high speed and light craft

Application :

Fire resistant category cable suitable for horizontal floor wiring.
Products approved by this certificate are accepted for installation on all vessels classed by DNV GL.

Issued at **Høvik** on **2021-02-08**

This Certificate is valid until **2025-12-30**.
DNV GL local station: **Haifa**

Approval Engineer: **Ivar Bull**

for **DNV GL**
Digitally Signed By: Low, Hanwee
Location: DNV GL Høvik, Norway
on behalf of

Marta Alonso Pontes
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.

LEGAL DISCLAIMER: Unless otherwise stated in the applicable contract with the holder of this document, or following from mandatory law, the liability of DNV GL AS, its parent companies and subsidiaries as well as their officers, directors and employees ("DNV GL") arising from or in connection with the services rendered for the purpose of the issuance of this document or reliance thereon, whether in contract or in tort (including negligence), shall be limited to direct losses and under any circumstance be limited to 300,000 USD.

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Product description

Category cables suitable for horizontal floor wiring.

Cable types	Design standards	Cross section	Conductor type ref IEC 60228	Shielding
MG cat 3, 5	IEC 61156-2	24 AWG(0.204mm^2)	Class 1 or 2	F/UTP, U/FTP, F/FTP, S/FTP, SF/UTP, SF/FTP
MG cat 5e	IEC 61156-5	24 AWG(0.204mm^2)	Class 1 or 2	F/UTP, U/FTP, F/FTP, S/FTP, SF/UTP, SF/FTP
MG cat 6	IEC 61156-5	23 AWG(0.246mm^2) 22 AWG(0.324mm^2)	Class 1 or 2	F/UTP, U/FTP, F/FTP, S/FTP, SF/UTP, SF/FTP
MG cat 6A, 7, 7A	IEC 61156-5	23 AWG(0.246mm^2) 22 AWG(0.324mm^2)	Class 1 or 2	U/FTP, F/FTP, S/FTP, SF/FTP
MG 1200MHz	IEC 61156-7	23 AWG(0.246mm^2) 22 AWG(0.324mm^2)	Class 1 or 2	U/FTP, F/FTP, S/FTP, SF/FTP
MG cat 8	IEC 61156-9	23 AWG(0.246mm^2) 22 AWG(0.324mm^2)	Class 1 or 2	U/FTP, F/FTP, S/FTP, SF/FTP

Construction

Conductor	Bare annealed or tinned copper solid or stranded
Insulation	Solid or cellular Polyolefine + fire resistant tape
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
Outer sheath	SHF1, SHF2 or SHF2 MUD, single or double layer

Optional Constructions:

- Cat3 to Cat 5e cables:
  Single cables: 4-25 Pair cables
  Multi cables: 2-12 cores or jacketed cables cabled together

- Cat 6 to 1200MHz Cables:
  Single cables: 4 Pair cables
  Multi cables: 2-12 cores or jacketed cables cabled together

Electrical data at 20°C

Category 3		
Frequency MHz	Attenuation dB/100m	NEXT dB
1	2.6	41
4	5.6	32
10	9.8	26
16	13.1	23

Category 5		
Frequency MHz	Attenuation dB/100m	NEXT dB
1	2.1	62
4	4.3	53
10	6.6	47
16	8.2	44
20	9.2	42
31.25	11.8	40
62.50	17.1	35
100	22.0	32

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Category 5e		
Frequency MHz	Attenuation dB/100m	NEXT dB
1	2.1	65
4	4.1	56
10	6.5	50
16	8.3	47
20	9.3	46
31.25	11.7	43
62.50	17.0	38
100	22.0	35

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

Category 6A		
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 7A		
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

Category 8		
Frequency MHz	Attenuation dB/100m	NEXT dB
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
2000	90.5	56.0

Application/Limitation

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

This type of cable is fire resistant according to IEC 60331-23.

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.

In order to achieve a transmission compliant with Category 7and above, cables shall be installed with suitable termination equipment according to manufacturer's recommendations.

Type Approval documentation

Datasheets See approval letter J-66 dated 2015-12-11.
Test reports: See approval letter J-66 dated 2015-12-11.
Teldor test report 9MGF545101 witnessed by DNVGL dated 2019-01-21.
Intertek test report 103821623CRT-001b Cat 8 cable dated 19-February-2019
Intertek test report 103346441CRT-002a Cat 8 cable dated 29-January-2019
Intertek test report 103346441CRT-002b Cat 8 cable dated 26-January-2019

Tests carried out Tests carried out

Standard	Release	General description	Limitation
IEC 61156-1 Ed. 3.1	2009-10	Multicore and symmetrical pair/quad cables for digital communications – Part 1: Generic specification	

Standard	Release	General description	Limitation
IEC 61156-2 Ed.3.0	2010-04	Multicore and symmetrical pair/quad cables for digital communications – Part 2: Symmetrical pair/quad cables with transmission characteristics up to 100 MHz - Horizontal floor wiring - Sectional specification	
IEC 61156-5 Ed. 3.0	2020-04	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), 6A (500 MHz), 7 (600MHz), 7A (1000 MHz)
IEC 61156-6 Ed. 4.0	2020-04	Multicore and symmetrical pair/quad cables for digital communications - Part 6: Symmetrical pair/quad cables with transmission characteristics up to 1 000 MHz - Work area wiring – Sectional specification	Reference to requirement for category cable: 6 (250MHz), 6A (500 MHz), 7 (600MHz), 7A (1000 MHz)
IEC 61156-7 Ed.1.1	2012-12	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	
IEC 61156-8 Ed.1.1	2013-05	Multicore and symmetrical pair/quad cables for digital communications - Part 8: Symmetrical pair/quad cables with transmission characteristics up to 1 200 MHz - Work area wiring - Sectional specification	
IEC 61158-9 Ed.1.0	2016-01	Multicore and symmetrical pair/quad cables for digital communications - Part 9: Cables for channels with transmission characteristics up to 2 GHz - Sectional specification	
IEC 60092-350 Ed.5.0	2020-01	Electrical installations in ships - Part 350: General construction and test methods of power, control and instrumentation cables for shipboard and offshore applications	
IEC 60092-360 Ed. 2.0	2021-01	Electrical installations in ships - Part 360: Insulating and sheathing materials for shipboard and offshore units, power, control, instrumentation and telecommunication cables.	
IEC 60331-23	1999-04	Tests for electric cables under fire conditions – Circuit integrity – Part 23: Procedures and requirements – Electric data cables	180 minutes flame application + 15 minutes cooling down. Additional testing of transmission properties

Standard	Release	General description	Limitation
			under fire ref Table
IEC 60332-3-22 Ed.2.0	2018-07	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 Ed.2.0	2018-07	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 Category C
IEC 60754-1 Ed.3.1	2019-11	Test on gases evolved during combustion of materials from cables - Part 1: Determination of the halogen acid gas content	Low Halogen:
IEC 60754-2 Ed.2.1	2019-11	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 61034-1/2 Ed.3.2	2019-11	Measurement of smoke density of cables burning under defined conditions – Test apparatus, procedure and requirements	Low smoke
IEC 60332-1-1/2/3 Ed.1.1	2015-07	Tests on electric and optical fibre cables under fire conditions - Part 1-1: Test for vertical flame propagation for a single insulated wire or cable	
IEC 60332-2-1/2 Ed.1.0	2004-07	Tests on electric and optical fibre cables under fire conditions - Part 2-1: Test for vertical flame propagation for a single small insulated wire or cable	
ANSI/TIA-568-C.2 ANSI/TIA-568.2-D	2014-04 2018-09	Balanced Twisted-Pair Telecommunication Cabling and Components Standard	
NEK TS 606	2016	Cables for offshore installations – halogen-free low smoke flame-retardant / fire resistant (HFFR-LS)	Category a,b,c,d Mud resistance test: IRM902/3 100°C 7d. Calcium Bromide 70°C 56d or Carbo Sea 70°C 56d EDC 95-11 70°C 56d
IEC 60092-350 Ed.5.0	2020-01	Annex E: Cold bend test and impact test for low temperature behavior	Cold bend: -40°C Cold impact: -35°C
CSA C22.2 No. 03	2009	4.12 Flexibility at any specified temp.	Cold Bend: -40°C
CSA C22.2 No. 03	2009	4.13 Abnormal low temperature – impact	Cold Impact: -35°C

Transmission properties during fire:

Cable Category	Typical transmission performance	Minimum transmission performance
3	Category 3	Category 3
5	Category 5	Category 5
5e	Category 5e	Category 5
6	Category 6	Category 5
6A	Category 6A	Category 5
7	Category 6A	Category 5
7A	Category 6A	Category 5
1200	Category 6A	Category 5
8	Category 8	Category 5

Marking of product

TELDOR MG No. of cores x No. of pairs, Cross-section, Type P/N, meter mark – IEC 60331-23[180min] - IEC 60332-3-22/24 – LOT 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) and selected type tests (ref. to applicable class programs) checked (if not available these tests shall 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