

TYPE APPROVAL CERTIFICATE**This is to certify:****That the Data transmission cables and systems**

with type designation(s)

MGD Cat 3, MGD Cat 5, Cat 5e, MGD cat 6, Cat 6A, MGD cat 7, Cat 7A

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****Application :****Cables suitable for work area cabling between work station and communication outlet.****Flame retardant in bunch; cat A or Cat C. Halogen free. Low smoke.****MUD resistant (optional)****Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV GL.**Issued at **Høvik** on **2017-06-26**for **DNV GL**This Certificate is valid until **2019-09-27**.DNV GL local station: **Haifa**Approval Engineer: **Ivar Bull****Andreas Kristoffersen**
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.



Job Id: **262.1-011466-3**
 Certificate No: **TAE00000GG**
 Revision No: **2**

Product description

MGD stranded cables.

Stranded conductors suitable for work area cabling between work station and communication outlet.

Cable types	Design standards	Cross section	Conductor type ref IEC 60228	Shielding
MGD cat 3, 5	IEC 61156-3	26 AWG(0.138mm ²) 24 AWG(0.204mm ²) 23 AWG(0.246mm ²) 22 AWG(0.324mm ²)	Stranded class 2	U/UTP, F/UTP, U/FTP, F/FTP, S/FTP, SF/UTP, SF/FTP
MGD cat 5e	IEC 61156-6	26 AWG(0.138mm ²) 24 AWG(0.204mm ²) 23 AWG(0.246mm ²) 22 AWG(0.324mm ²)	Stranded class 2	U/UTP, F/UTP, U/FTP, F/FTP, S/FTP, SF/UTP, SF/FTP
MGD cat 6	IEC 61156-6	26 AWG(0.138mm ²) 24 AWG(0.204mm ²) 23 AWG(0.246mm ²) 22 AWG(0.324mm ²)	Stranded class 2	U/UTP, F/UTP, U/FTP, F/FTP, S/FTP, SF/UTP, SF/FTP
MGD cat 6A, 7, 7A	IEC 61156-6	26 AWG(0.138mm ²) 24 AWG(0.204mm ²) 23 AWG(0.246mm ²) 22 AWG(0.324mm ²)	Stranded class 2	U/FTP, F/FTP, S/FTP, SF/FTP

Construction

Conductor	Bare annealed or tinned copper class 2
Insulation	Solid or cellular polyolefin
Not screened	U/UTP
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 or SHF2 or SHF 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 Cat 7A Cables:
 - Single cables: 4 Pair cables
 - Multi cables: 2-12 cores or jacketed cables cabled together

Electrical characteristics at 20°C

Category 3		
Frequency MHz	Attenuation dB/100m	NEXT dB
1	3.9	41
4	8.4	32
10	14.7	26
16	19.6	23

Category 5		
Frequency MHz	Attenuation dB/100m	NEXT dB
1	3.1	62
4	6.4	53
10	9.9	47
16	12.3	44
20	13.8	42
31.25	17.7	40

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62.50	25.6	35
100	33.0	32

400	65.1	36.3
500	74.0	34.8

Category 5e		
Frequency MHz	Attenuation dB/100m	NEXT dB
1	3.2	65
4	6.0	56
10	9.5	50
16	12.1	47
20	13.5	46
31.25	17.1	43
62.50	24.8	38
100	32.0	35

Category 7		
Frequency MHz	Attenuation dB/100m	NEXT dB
1	3.0	78.0
4	5.6	78.0
10	8.8	78.0
16	11.1	78.0
31.25	15.6	78.9
62.5	22.3	75.5
100	28.5	72.4
150	35.3	69.8
200	41.2	67.9
250	46.5	66.4
300	51.3	65.2
400	60.0	63.4
500	67.9	61.9
600	75.1	60.7

Category 6		
Frequency MHz	Attenuation dB/100m	NEXT dB
1	3.1	75.3
4	5.8	66.3
10	5.9	60.4
16	11.4	57.2
31.25	16.0	52.9
62.5	22.8	48.4
100	29.9	45.3
150	37.4	42.7
200	43.8	40.8
250	49.7	39.3

Category 7 _A		
Frequency MHz	Attenuation dB/100m	NEXT dB
1	3.0	78.0
4	5.6	78.0
10	8.7	78.0
16	10.9	78.0
31.25	15.5	78.0
62.5	21.9	78.0
100	27.8	78.0
150	34.2	76.0
200	39.7	74.0
250	44.5	72.5
300	49.0	71.2
400	57.0	69.4
500	64.2	67.9
600	70.6	66.7
1000	92.9	63.4

Category 6 _A		
Frequency MHz	Attenuation dB/100m	NEXT dB
1	3.1	75.3
4	5.8	66.3
10	5.9	60.3
16	11.4	57.2
31.25	16.0	52.9
62.5	22.8	48.4
100	29.9	45.3
150	37.4	42.7
200	43.8	40.8
250	49.7	39.3
300	55.1	38.1

Application/Limitation

Temperature window

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

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In order to achieve a transmission compliant with Category 7 and above, 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 DB balanced pair non-armored copper cables – stranded conductors, rev 12/12 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
 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 61156-1	2007-06	Multicore and symmetrical pair/quad cables for digital communications – Part 1: Generic specification	
IEC 61156-3	2008-11	Multicore and symmetrical pair/quad cables for digital communications – Part 3: Work area cable - Sectional specification	
IEC 61156-6	2010-01	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 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	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	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 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 or Carbo Sea 70°C 56d.

Marking of product

TELDOR MGD No. of cores x No. of pairs, Cross-section, Type P/N, meter mark – IEC 60332-22 OR IEC 60332-2-2 – LOT No.

Family	TYPE	Transmission Properties	Pair Count	Stranded Cond.	AWG	Flame Rating	Options
MGD	1=U/U TP 2=F/U TP 3=SF/ UTP 4=U/F TP 5=F/FT P 6=S/F TP 7=SF/ FTP	3=CAT3 5=CAT5 E=CAT5e B=CAT 6 C=CAT 6A D=CAT 7 F=CAT 7A G=1200M Hz	NN Core count in multi cables	R=TC Stranded (Tinned copper) S=BC Stranded (bare copper) B=BC Solid (bare copper) T=TC Solid (tinned copper)	26=26A WG 24=24A WG 23=23A WG 22=22A WG	A=IEC60332-3-22 (Cat.A) C=IEC60332-3-24 (Cat.C)	XX Alpha numeric

Periodical assessment

The scope of the retention/renewal survey 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



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- Ensure traceability between manufacturer's product type marking and Type Approval Certificate.

Survey shall be performed at least every second year.

END OF CERTIFICATE