TYPE APPROVAL CERTIFICATE

Certificate no.:
TAE00000GH
Revision No:
3

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, MGD 1200 MHz, MGD Cat 8

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

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

Application:

Cables for Work Area cabling between work station and communication outlet. Armoured (Optional).
Products approved by this certificate are accepted for installation on all vessels classed by DNV.

Issued at **Høvik** on **2024-11-14**

for **DNV**

This Certificate is valid until **2029-09-30**.
DNV local unit: **Haifa**

Approval Engineer: **Ivar Bull**

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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

MGD solid conductor cables.
Cables suitable for Work Area cabling, such as cables used between workstation and communication outlet.

Cable types	Design standard	Cross section	Conductor type ref IEC 60228	Shielding
MGD cat 3, 5	IEC 61156-2	26AWG (0,129mm^2) 24 AWG (0.204mm^2)	Solid or Stranded	F/UTP, U/FTP, F/FTP, S/FTP, SF/UTP, SF/FTP
MGD cat 5e	IEC 61156-5	26 AWG (0,129mm^2) 24 AWG (0.204mm^2) 23 AWG(0.246 mm^2) 22 AWG(0.324 mm^2)	Solid or Stranded	F/UTP, U/FTP, F/FTP, S/FTP, SF/UTP, SF/FTP
MGD cat 6	IEC 61156-5	26 AWG (0,129mm^2) 24 AWG (0.204mm^2) 23 AWG(0.246 mm^2) 22 AWG(0.324 mm^2)	Solid or Stranded	F/UTP, U/FTP, F/FTP, S/FTP, SF/UTP, SF/FTP
MGD cat 6A, 7, 7A	IEC 61156-5	26 AWG (0,129mm^2) 24 AWG (0.204mm^2) 23 AWG(0.246 mm^2) 22 AWG(0.324 mm^2)	Solid or Stranded	U/FTP, F/FTP, S/FTP, SF/FTP
MGD 1200MHz	IEC 61156-7	26 AWG (0,129mm^2) 24 AWG (0.204mm^2) 23 AWG(0.246 mm^2) 22 AWG(0.324 mm^2)	Solid or Stranded	F/FTP, S/FTP, F/FTP, SF/FTP
MGD cat 8(8.1,8.2)	IEC 61156-10	26 AWG (0,129mm^2) 24 AWG (0.204mm^2) 23 AWG(0.246 mm^2) 22 AWG(0.324 mm^2)	Solid or Stranded	F/FTP, S/FTP, F/FTP, SF/FTP

The cables also meet and comply with TIA 568.2-D standard

Construction :

Conductor	Bare annealed copper or tinned annealed copper
Insulation	Solid or cellular Polyolefine
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 or SHF2
Metallic covering	B: braided galvanized steel wire
	R: corrugated steel tape
	W: served steel wire
	P: Bronze wire braid
	C: Copper wire braid
	T: Tinned copper wire braid
Outer sheath	SHF1 or 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 Cat 8 Cables:
Single cables: 4 Pair cables
Multi cables: 2-12 cores or jacketed cables cabled together

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
62.50	25.6	35
100	33.0	32

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 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 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
400	65.1	36.3
500	74.0	34.8

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 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

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

Cat 8		
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	75.4
200	26.5	70.9
250	29.7	69.4
300	32.7	68.2

Cat 8		
400	38.0	66.4
500	42.8	64.9
600	47.1	63.7
1000	61.9	60.4
2000	90.5	55.9

Optional: Cold bend per CSA 22.2 @ -40ºC and Cold Impact per CSA 22.2 @ -35ºC

Application/Limitation

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

Termination itself shall be in the outer sheath of the cable and conductors should be locked in place to avoid damage from vibration.

To achieve a transmission compliant with Category of cable , 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 stranded conductor, rev 14/12 date 2012-06-08 (multipair versions not a part of the type approval)

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
Flame test report Category A dated 23.01.2014
9MG0246 Cat 6A Solid armoured Cold bend & Cold Impact dated 18.10.2016
9MGC186 Cat 6 Stranded Cold bend & Cold Impact dated 15.10.2015
9MGC186 Cat 6 Stranded Cold bend & Cold Impact dated 09.03.2016
Teldor Mud and hydraulic oil resistance test NEK 606-2022 dated 24.08.2024.
ISO/IEC 11801 - 1 for Category 8.2 dated 23-02-2023
Intertek report 103822513CRT-019a ANSI/TIA - 568.2 - D for Category 8.2 dated 23-02-2023

Tests carried out

Standard	Release	General description	Limitation
DNV CP-0403	2021-09	Data communication cables - category cables	
IEC 61156-1	2023-03	Multicore and symmetrical pair/quad cables for digital communications – Part 1: Generic specification	

Standard	Release	General description	Limitation
IEC 61156-2	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 61156-3	2008-11	Multicore and symmetrical pair/quad cables for digital communications – Part 3: Work area cable - Sectional specification	
IEC 61156-5	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	
IEC 61156-6	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	2023-02	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 analogue communication cables	
IEC 61156-8	2023-02	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 61156-10	2016-04	Multicore and symmetrical pair/quad cables for digital communications – Part 10: Cables for cords with transmission characteristics up to 2 GHz–Sectional specification	
ANSI/TIA 568.2-D	2018-09	Balanced Twisted-Pair Telecommunication Cabling and Components	
ISO/IEC 11801-1	2017-11	Generic cabling for customer premises Part 1: General requirements	Category 8.2
IEC 60092-350	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	2021-01	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	2018-07	Tests on electric 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 60332-3-24	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	Charred portion of sample does not exceed 2,5m above bottom edge of burner.
IEC 60754-1	2019-11	Test on gases evolved during combustion of materials from cables – Determination of the amount of halogen acid gas	Low Halogen: <0,5% Halogen

Standard	Release	General description	Limitation
IEC 60754-2	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
IEC 61034-1/2	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	2015-07	Tests on electric and optical fibre cables under fire conditions Test for vertical flame propagation for a single small, insulated wire or cable	
IEC 60092-350	2020-01	Annex E: Cold bend test and impact test for low temperature behaviour	Cold bend: -40°C Cold impact: -35°C
CSA C22.2 No. 03	2009	Flexibility at any specified temp.	Cold bend: -40°C
CSA C22.2 No. 03	2009	Abnormal low temperature – impact	Cold impact: -35°C
NEK 606 Ed. 5	2022-03	Cables for offshore installations. Halogen-free and/or mud resistant. Technical specification.	Mud resistance test: Required Max variations ±: IRM902 & 903 100°C 7d. TS & E@B, weight & vol.: ±30% Calc. Bromide 70°C 56d. TS & E@B: ±25%, weight: ±15%, vol.: ±20% Oil based mud: , EDC 95/11 (Carbo Sea) 70°C 56d TS & E@B ±30%, weight & vol.: ±25% Hydraulic/Gear 100°C 7d. TS & E@B, weight & vol.: ±30%

Marking of product

TELDOR MGD No. of cores x No. of pairs, Cross-section, Armor (Optional), Type P/N, meter mark –
IEC 61156-6 - IEC 60332-3-22 or IEC 60332-3-24 – 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