DET NORSKE VERITAS

TYPE APPROVAL CERTIFICATE

CERTIFICATE NO. **E-13119**

This is to certify that the
Data transmission cables and systems

with type designation(s)
MGD-1 cat 6, MGD-1 cat 6A, MGD-1 cat 7, MGD-1 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
IEC 61156-6 (2010-01)
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
Cables suitable for work area cabling, such as cables used between work station and communication outlet. Flame retardant in bunch; cat A or Cat C. Halogen free. Low smoke

Type	Voltage (kV)	Temp. class (°C)
MGD-1 cat 6		
MGD-1 cat 6A		
MGD-1 cat 7		
MGD-1 cat 7A		

This Certificate is valid until **2018-06-30**.

Issued at **Høvik** on **2014-03-28**

DNV local station: **Piraeus**

Approval Engineer: **Ivar Bull**

for **Det Norske Veritas AS**
Digitally Signed By: Laumann, Marit
Location: DNV Høvik, Norway
Signing Date: 2014-03-28

Marit Laumann
Head of Section

Product description

Cables suitable for work area cabling, such as cables used between work station and communication outlet.

Cable types ;	Design standard	Cross section	Conductor type ref IEC 60228	Shielding
MGD cat 6	IEC 61156-6	26 AWG (0,138mm^2), 24 AWG (0,205 mm^2), 23 AWG (0,246 mm^2), 22 AWG (0,324 mm^2)	Stranded conductor Class 2	U/UTP (not screened) U/FTP F/FTP S/FTP
MGD cat 6A	IEC 61156-6	26 AWG (0,138mm^2), 24 AWG (0,205 mm^2), 23 AWG (0,246 mm^2), 22 AWG (0,324 mm^2)	Stranded conductor Class 2	U/FTP F/FTP S/FTP
MGD cat 7	IEC 61156-6	26 AWG (0,138mm^2), 24 AWG (0,205 mm^2), 23 AWG (0,246 mm^2), 22 AWG (0,324 mm^2)	Stranded conductor Class 2	S/FTP
MGD cat 7A	IEC 61156-6	26 AWG (0,138mm^2), 24 AWG (0,205 mm^2), 23 AWG (0,246 mm^2), 22 AWG (0,324 mm^2)	Stranded conductor Class 2	S/FTP

Construction

Conductor	Bare annealed copper or tinned annealed copper class 2
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
Metallic covering	B: braided steel wire R: corrugated steel tape W: served steel wire P: Bronze wire braid
Outer sheath	SHF1

Electrical data at 20° C

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

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 in order to avoid damage from vibration. 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 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 Cat. A dated 23.01.2014
Report 9MGD240XXX Category 7 STRANDED 26AWG SFTP SHF1 IEC60332-3-22. Dated 6/2-2014
BREGLOBAL Report No 287633-1 dated 28 August 2013

Tests carried out

Standard	Release	General description	Limitation
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 60092-359	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:

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 condctivity	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

Marking of product

TELDOR MDG-1- [...] No. of Pairs, Cross-Section, Armor, Type, P/N, METER MARK – IEC 60332-3-22 – IEC 60332-3-24 – Lot No.

	Armour	Type	Transmission properties	Pair count	Cond.	Awg	Color
MGD-1	B: braided steel wire R: corrugated steel tape W: served steel wire helically wound P: Bronze wire braid	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	R: Tinned copper stranded B: Bare copper solid T: Tinned copper solid S: Bare copper stranded	26=26AWG 24=24AWG 23=23AWG 22=22AWG 20=20AWG 18=18AWG 16=16AWG	XX: alpha-betic numeric

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

Survey shall be performed at least every second year.

END OF CERTIFICATE