



TYPE APPROVAL CERTIFICATE

Certificate no.:
TAE00000GF
Revision No:
4

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 1200MHz, 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:

Cable suitable for horizontal floor wiring. 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**

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 AS, its parent companies and their subsidiaries as well as their officers, directors and employees ("DNV") 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 USD 300 000.

Product description

MGD solid conductor cables.

Cables suitable for Horizontal Floor wiring between work area communication outlet and communication closet.

| Cable types | Design standards | Cross section | Conductor type ref IEC 60228 | Shielding |
|--------------------|------------------|---|---------------------------------|--|
| MGD cat 3, 5 | IEC 61156-2 | 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 | 24 AWG (0.204 mm 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 | 23 AWG (0.246mm 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 | 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 | 23 AWG (0.246 mm ²) 22 AWG (0.324 mm ²) | Solid | F/FTP, S/FTP, SF/FTP |
| MGD cat 8(8.1,8.2) | IEC 61156-9 | 23 AWG (0.246 mm ²) 22 AWG (0.324 mm ²) | Solid | F/FTP, S/FTP, SF/FTP |

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

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 (Optional) | SHF1 or SHF2 |
| Metallic covering (Optional) | 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

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 |

| 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 |

| 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 |
| 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 @ -40°C and Cold Impact per CSA 22.2 @ -35°C.

Application/Limitation

Temperature window

Operation : -40°C to +85 °C

Installation: -15°C to +50°C

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 Bundles 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 6A stranded
DB5D04s2601 – 9dnv002108 cat7 stranded
DB5F04S2601 – 9DNV005108 cat 7A 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 6A solid dated 2012-02-05
DB5F04B2203 cat 7A dated 2011-12-18
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.
Intertek report 103822513CRT-019b 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 | |
| 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 | |

| Standard | Release | General description | Limitation |
|------------------|---------|---|--|
| 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 61156-9 | 2016-04 | Multicore and symmetrical pair/quad cables for digital communications – Part 9: Symmetrical pair/quad cables with transmission characteristics up to 2000 MHz – Horizontal floor 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 | Cat 8.2 cable |
| 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. |

| Standard | Release | General description | Limitation |
|-------------------|---------|---|---|
| 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 |
| 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 | |
| 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% |
| IEC 60092-350 | 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 | Flexibility at any specified temp. | Cold bend: -40°C |
| CSA C22.2 No. 03 | 2009 | Abnormal low temperature – impact | Cold impact: -35°C |

Marking of product

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

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

Survey shall be performed at least every second year.

END OF CERTIFICATE