

## Description

tML® is a patented, modular cabling system consisting of the three key components module, trunk cable and rack mount enclosure. The system components are 100 percent manufactured, pre-assembled and tested in Germany. They enable plug-and-play installation on site – especially in data centres, but also in industrial environments – within the shortest possible time. Heart of the system are the rear MPO/MTP® and Telco connectors, which can be used to connect at least six or twelve ports at a time. Depending on the module configuration, transfer rates of up to 400G are currently possible with SR4. The fibre optic and TP modules can be used together in a module carrier with a very high port density. The tde offers its tML® cabling system as a proven tML® standard system and in the highly innovative variants tML® 12, tML® 24, tML® 32 and now tML® 24+ System for extreme scalability and very easy migration to higher transmission rates such as 40G, 100G, 200G, 400G and 800G and more.

The tML® - FO trunk cable is intended for the connection of two tML®- FO Modules.

## Technical Data

The tML®- FO trunk cable is preterminated with MPO/MTP®connectors on both ends. The end faces of the connectors are optimized by means of Lasercleaving and machine polish. The MPO/MTP®plug has a defined fiber height of 1 - 3.5µ. The max. adjacent fiber height difference is 0.2µm and for all fibers 0.3µm. All system components (modules, trunk cables and patch cords) are co-ordinated for the reaching of the performance particularly. The fan-out unit is optimized for tML® - Cable Mounting Bracket for Fan-out Units. The module is marked with sequential serial number and article number.

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### FO Connectors

|              |   |
|--------------|---|
| Type         | MPO/MTP® Female Push Pull Locking (Magenta) |
| Ferrule      | 12 Fiber MM Elite® ferrule, PPS             |
| Boot colour  | Black                                       |
| Manufacturer | tde/US Conec                                |

### Optical Performance

| Fiber       | Type     | Wavelength   | Insertion loss typ. | Insertion loss max. | Return loss min. |
|-------------|----------|--------------|---------------------|---------------------|------------------|
| 50/125µ OM4 | MPO/MTP® | 850 /1300 nm | ≤ 0.12 dB           | 0.25 dB             | 35 dB            |

### FO Fan-Out

|                    |                         |
|--------------------|-------------------------|
| Fan-out length     | 50 mm                   |
| Ø Fan-out          | 16 mm                   |
| Ø Single unit      | 3.0 mm                  |
| Single unit length | 78 ± 5 cm (not stepped) |

# tML® - FO Trunk Cable 1x MPO Female/1x MPO Female 12G50/125µ OM4 LSHF, Type C, Length: xxx

## FO Cables

|                     |   |
|---------------------|---|
| Temperature range   | Storage -25 to +70°C, IEC 60794-1-22 F1 |
|                     | Pulling in -10 to +50°C                 |
|                     | Operation -25 to +60°C                  |
| Tensile performance | IEC 60794-1-21 E1                       |
| Crush resistance    | IEC 60794-1-21 E3                       |
| Impact              | IEC 60794-1-21 E4                       |
| Repeated bending    | IEC 60794-1-21 E6                       |
| Torsion             | IEC 60794-1-21 E7                       |
| Bend                | IEC 60794-1-21 E11                      |
| Water penetration   | IEC 60794-1-22 F5                       |

## General characteristics

|                                   |   |
|-----------------------------------|---|
| Sheath colour                     | green, similar to RAL 6016                        |
| Zero halogen, non corrosive gases | IEC 60754-1/-2, EN 60754-1/-2, VDE 0482-754-1/-2  |
| Flame propagation                 | IEC 60332-1-2, EN 60332-1-2, VDE 0482-332-1-2     |
| Flame spread                      | IEC 60332-3-24, EN 50266-2-4, VDE 0482-266-2-4    |
| Smoke density                     | IEC 61034-1/-2, EN 61034-1/-2, VDE 0482-1034-1/-2 |
| Reaction to fire (Euroclasses)    | EN 13501-6: D <sub>ca</sub> -s2,d1,a1             |

|                             |   |
|-----------------------------|---|
| Cabletype                   | Universal U-DQ(ZN)BH for indoor and outdoor use   |
|                             | non metallic, dry interstices, rodent protection, flame retardant, in accordance with IEC 60332.1 and IEC 60332.3 C |
| Fibertype                   | Corning G50/125 OM4   |
| No. of fibers               | 12  |
| Loose tube                  | 1   |
| Sheath ø                    | 7.6 mm  |
| Weight                      | 67 kg/km  |
| Bending radius              | 115 mm  |
| Tensile load short term     | 3.000 N   |
| Tensile load continuous     | 1.000 N   |
| Crush resistance short term | 3.000 N   |
| Crush resistance continuous | 5.000 N   |
| Fire load                   | 275 kWh/km  |

# tML® - FO Trunk Cable 1x MPO Female/1x MPO Female 12G50/125µ OM4 LSHF, Type C, Length: xxx

|  |           |
|--|-----------|
|  | 990 MJ/km |
|--|-----------|

## Length tolerances (prefabricated with plugs)

|                                   |          |
|-----------------------------------|----------|
| Tolerances for lengths up to 40m  | ± 100 cm |
| Tolerances for lengths up to 100m | ± 100 cm |
| Tolerances for lengths from 100m  | ± 2%     |

## FO Fiber

|   |                                       |
|---|---------------------------------------|
| Attenuation typical (cabled)  | 850 nm: 2.5 / 1300 nm: 0.5 dB/km      |
| Attenuation maximum (cabled)  | 850 nm: 2.7 / 1300 nm: 0.7 dB/km      |
| OFL bandwidth as per TIA/EIA 455-204 and IEC 60793-1-41                   | 850 nm: 3500 / 1300 nm: 500 MHz x km  |
| High-Performance EMB bandwidth as per TIA/EIA 455-220A and IEC 60793-1-49 | 850 nm: 4700 / 1300 nm: 4700 MHz x km |
| Refractive Index  | 850 nm: 1.480 / 1300 nm: 1.479        |

## Technical properties

| Bending radius | No. of windings (turns) | Max. induced attenuation               |
|----------------|-------------------------|--|
| 37.5 mm        | 100                     | 850 nm: ≤ 0.05 / 1300 nm: ≤ 0.15 dB/km |
| 15 mm          | 2                       | 850 nm: ≤ 0.1 / 1300 nm: ≤ 0.3 dB/km   |
| 7.5 mm         | 2                       | 850 nm: ≤ 0.2 / 1300 nm: ≤ 0.5 dB/km   |

## Geometrical and mechanical characteristics

|                                  |                  |
|----------------------------------|------------------|
| Numerical Aperture               | 0.200 +/- 0.015  |
| Core Ø                           | 50.0 +/- 2.5 µm  |
| Maximum Core Non-Circularity     | 5 %              |
| Cladding Ø                       | 125.0 +/- 1.0 µm |
| Maximum Cladding Non-Circularity | 1.0 %            |

**tML® - FO Trunk Cable 1x MPO Female/1x MPO Female 12G50/125µ OM4 LSHF, Type C, Length: xxx**

|   |              |
|---|--------------|
| Maximum Cladding/Core Concentricity Error | 1.5 µm       |
| Maximum Coating Concentricity Error       | 12 µm        |
| Coating Ø                                 | 242 +/- 5 µm |
| Test load                                 | 100 kpsi     |

| Art.-No.             | Description  |
|----------------------|--|
| TML-MP/MP50B12G4-xxx | tML® - FO Trunk Cable 1x MPO Female/1x MPO Female 12G50/125µ OM4 LSHF, Type C, Length: xxx |
| TML-MP/MP50B24G4-xxx | tML® - FO Trunk Cable 2x MPO Female/2x MPO Female 24G50/125µ OM4 LSHF, Type C, Length: xxx |
| TML-MP/MP50B48G4-xxx | tML® - FO Trunk Cable 4x MPO Female/4x MPO Female 48G50/125µ OM4 LSHF, Type C, Length: xxx |
| TML-MP/MP50B72G4-xxx | tML® - FO Trunk Cable 6x MPO Female/6x MPO Female 72G50/125µ OM4 LSHF, Type C, Length: xxx |
| TML-MP/MP50B96G4-xxx | tML® - FO Trunk Cable 8x MPO Female/8x MPO Female 96G50/125µ OM4 LSHF, Type C, Length: xxx |