tML® - FO Trunk Cable 2x MPO Female/2x MPO Female 24G62,5/125µ OM1 LSHF, Type C, Length xxx

## tML® - tde Modular Link

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 200G 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® Xtended, tML® 24 System and now tML® 32 System for extreme scalability and very easy migration to higher transmission rates such as 40G, 100G, 200G and 400G.

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

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# 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 hieght 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.

## FO Connectors

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.

### Connector

| | |
|---|---|
| Type | MPO/MTP® Female Push Pull Locking (Beige) |
| Ferrule | 12 Fiber MM Elite® ferrule, PPS |
| Boot colour | Black |
| Temperature range | -40°C to +75°C |
| Manufacturer | tde/US Conec |

### Optical Performance

| Fiber | Type | Wavelength | Insertion loss typ. | Insertion loss max. | Return loss min. |
|---|---|---|---|---|---|
| 50/125µ OM2 | MPO/MTP® | 850 nm | ≤ 0.25 dB | 0.45 dB | 20 dB |
| 62.5/125µ OM1 | MPO/MTP® | 850 nm | ≤ 0.25 dB | 0.45 dB | |

## FO Fan-Out

| | |
|---|---|
| Fan-out length | 50 mm |
| Ø Fan-out | 16 mm |
| Ø Single unit | 3.8 mm |
| Single unit length | 78 ± 5 cm (not stepped) |

## FO Cables

### Standards

| | |
|---|---|
| ISO 11801 2nd edition | EN 187 000 |
| IEC 60794-2 | IEC 60794-2-20 |
| EN 50 173-1 | IEC 60794-2-21 |

# tML® - FO Trunk Cable 2x MPO Female/2x MPO Female 24G62,5/125µ OM1 LSHF, Type C, Length xxx

## Construction

| | |
|---|---|
| Cabletype | Universal U-DQ(ZN)BH for indoor and outdoor use |
| Central strength member | ø2.5 mm FRP rod |
| Lose tube | ø2.3 mm jelly filled loose tubes, with 2 – 12 fibers each, up to 22 tubes in two layers, for lay-up |
| Water blocking | The core is water blocked using swellable tape and tread |
| Wrapping | Polyester nonwoven |
| Strain Relief | Glasroving elements |
| Ripcord | Polyester ripcord for easy slitting of the sheath |
| Sheath | 1.5 mm blue FireBur®, UV stabilized, EN 50290-2-27 |

## Fire rating

| | |
|---|---|
| IEC 60332-1-2 | Single vertical wire test |
| IEC 60754-1 | No halogens |
| IEC 60754-2 | No acid matters |
| IEC 61034-2 | No dense smoke |

## Heat of combustion

| Fiber count; 6 fiber/tube | Fiber count; 8 fiber/tube | Fiber count; 12 fiber/tube | MJ/km | KWh/m |
|---|---|---|---|---|
| 6-36 | 8-48 | 12-72 | 2200 | 0.61 |

## Physical properties

| | | |
|---|---|---|
| Tensile strength (dynamic) | E1 | 6000 N |
| Tensile strength (permanent) | E1 | 4000 N |
| Compressive strength (crush) | E3 | 3000N |
| Impact | E4 | 25 Nm |
| Torsion | E7 | 5 cycles ± 1 turn |
| Kink | E10 | The cables do not form a kink when a loop is drawn together to a diameter 12 times the cable nominal diameter |
| Temperature range | F1 | The cables can bear temperature cycling between -40°C to +70°C. |
| | | The cables will operate without any attenuation variation (≤0.05 dB) in the temperature interval -30°C to +60°C. |
| | | The cables will operate with a maximum attenuation variation of 0.1 dB/km in the temperature interval -40°C to +70°C. |
| Water penetration | F5B | No water on free end |

## Mechanical properties

| Fiber count; 6 fiber/tube | Fiber count; 8 fiber/tube | Fiber count; 12 fiber/tube | Nominal diameter | Nominal cable weight | Minimum bending radius |
|---|---|---|---|---|---|

# tML® - FO Trunk Cable 2x MPO Female/2x MPO Female 24G62,5/125µ OM1 LSHF, Type C, Length xxx

| | | | | | |
|---|---|---|---|---|---|
| 6-36 | 8-48 | 12-72 | 13.0mm | 145 kg/km | 160mm |

## FO Fiber

| | |
|---|---|
| Type | Draka OM1 62.5/125µm multimode fiber (C02) |

| | | |
|---|---|---|
| Standards and Norms | IEC 60793-2-10 Category A1b | ISO/IEC 11801 category OM1. |
| | EN 60793-2-10: type A1b | IEEE 802.3 - 2002. with amendment 802.3ae - 2002. |
| | TIA/EIA-492 AAAB | ANSI/TIA/EIA-568.B.3 – 2000 |
| | EN 50173-1:2007 category OM1 | IBM™ Fiber Optic Channel Links; ESCON™ |

### Attenuation (of cable with fibers) according to IEC 60793-1-40

| | |
|---|---|
| 850 nm | ≤ 3.2 dB/km |
| 1300 nm | ≤ 1.0 dB/km |
| Inhomogeneity of OTDR trace for any two 1000 metre fiber lengths | Max. 0.2 dB/km |

### Bandwidth according to IEC 60793-1-41

| | |
|---|---|
| 850 nm | 200 MHz*km |
| 1300 nm | 600 MHz*km |

### Group index of refraction according to IEC 60793-1-22

| | |
|---|---|
| Group index of refraction at 850 nm | 1.496 |
| Group index of refraction at 1300 nm | 1.491 |

### Other properties according to IEC 60793-1-xx

| Attribute | Measurement method | Limits |
|---|---|---|
| Core diameter | IEC/EN 60793-1-20 | 62.5 ± 2.5 µm |
| Cladding diameter | IEC/EN 60793-1-20 | 125.0 ± 1.0 µm |
| Cladding non-circularity | IEC/EN 60793-1-20 | ≤ 1.0% |
| Core non-circularity | IEC/EN 60793-1-20 | ≤ 5% |
| Core -cladding concentricity error | IEC/EN 60793-1-20 | ≤ 1.5 µm |
| Primary coating diameter - uncoloured | IEC/EN 60793-1-21 | 242 ± 7 µm |
| Primary coating diameter - coloured | IEC/EN 60793-1-21 | 250 ± 15 µm |
| Primary coating non-circularity | IEC/EN 60793-1-21 | ≤ 5% |
| Primary coating-cladding concentricity error | IEC/EN 60793-1-21 | ≤ 10 µm |
| Proof stress level | IEC/EN 60793-1-30 | ≥ 0.7 (≈ 1 %) |

| | | |
|---|---|---|
| Typical average strip force | IEC/EN 60793-1-32 | 1.7 N |
| Strip force (peak) | IEC/EN 60793-1-32 | 1.3 N ≤ Fpeak.strip ≤ 8.9 N |
| Numerical aperture | IEC/EN 60793-1-43 | 0.200 ± 0.015 |

## Product variants & accessories

| Art.-No. | Description |
|---|---|
| TML-MP/MP62B12Gxxx | tML® - FO Trunk Cable 1x MPO Female/1x MPO Female 12G62,5/125µ OM1 LSHF, Type C, Length xxx |
| TML-MP/MP62B24Gxxx | tML® - FO Trunk Cable 2x MPO Female/2x MPO Female 24G62,5/125µ OM1 LSHF, Type C, Length xxx |

  