

## 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.

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.

### FO Connectors

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

### Optical Performance

Fiber	Type	Wavelength	Insertion loss typ.	Insertion loss max.	Return loss min.
9/125µ OS2	MPO/MTP®APC	1310 / 1550 nm	≤ 0.10 dB	0.20 dB	75 dB

### FO Fan-Out

Fan-out length	50 mm
Ø Fan-out	approx 16 - 19 mm
Ø Single unit	3.0 mm

# tML® - FO Trunk Cable 4x MPO Female/4x MPO Female 48E9/125µ OS2 LSHF, Type C, Length: xxx

Single unit length	78 ± 5 cm (not stepped)
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## 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, no 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: E <sub>ca</sub>

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 E9/125 G.652.D
No. of fibers	48
Loose tube	4
Sheath ø	11.4 mm
Weight	149 kg/km
Bending radius	175 mm
Tensile load short term	9.000 N
Tensile load continuous	5.000 N

# tML® - FO Trunk Cable 4x MPO Female/4x MPO Female 48E9/125µ OS2 LSHF, Type C, Length: xxx

Crush resistance short term	5.000 N
Crush resistance continuous	3.000 N
Fire load	616 kWh/km
	2218 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

Maximum attenuation (cabled)	1310 nm: 0.34 / 1383 nm: 0.34* dB/km (*post hydrogen aging performance)
Maximum Chromatic Dispersion	3.5 ps/(nm x km)
Zero Dispersion Wavelength $\lambda_0$	1304 $\leq \lambda_0 \leq$ 1324 nm
Maximum Zero Dispersion Slope $S_0$	0.092 ps/(nm <sup>2</sup> x km)
Mode-Field Diameter	9.2 +/- 0,4 µm
Maximum Cable Cut-off Wavelength $\lambda_{CC}$	1260 nm
PDM Link Design Value	$\leq$ 0.04 ps/ $\sqrt$ km
Max. individual fibre PMD	$\leq$ 0.1 ps/ $\sqrt$ km
Max. individual cable PMD	$\leq$ 0.2 ps/ $\sqrt$ km
Refractive Index	1.4676

## Mechanical properties

Cladding diameter	125.0 +/- 1.0 µm
Maximum Core/Cladding Concentricity Error	0.5 µm
Maximum Cladding Non-Circularity	0.7 %
Coating diameter	245 +/-5 µm
Maximum Cladding/Coating Concentricity Error	12 µm

# tML® - FO Trunk Cable 4x MPO Female/4x MPO Female 48E9/125µ OS2 LSHF, Type C, Length: xxx

Operating temperature range	-60 to +85°C
Test load	100 kpsi

Art.-No.	Description
TML-MP/MP09B12Exxx	tML® - FO Trunk Cable 1x MPO Female/1x MPO Female 12E9/125µ OS2 LSHF, Type C, Length: xxx
TML-MP/MP09B24Exxx	tML® - FO Trunk Cable 2x MPO Female/2x MPO Female 24E9/125µ OS2 LSHF, Type C, Length: xxx
TML-MP/MP09B48Exxx	tML® - FO Trunk Cable 4x MPO Female/4x MPO Female 48E9/125µ OS2 LSHF, Type C, Length: xxx
TML-MP/MP09B72Exxx	tML® - FO Trunk Cable 6x MPO Female/6x MPO Female 72E9/125µ OS2 LSHF, Type C, Length: xxx
TML-MP/MP09B96Exxx	tML® - FO Trunk Cable 8x MPO Female/8x MPO Female 96E9/125µ OS2 LSHF, Type C, Length: xxx