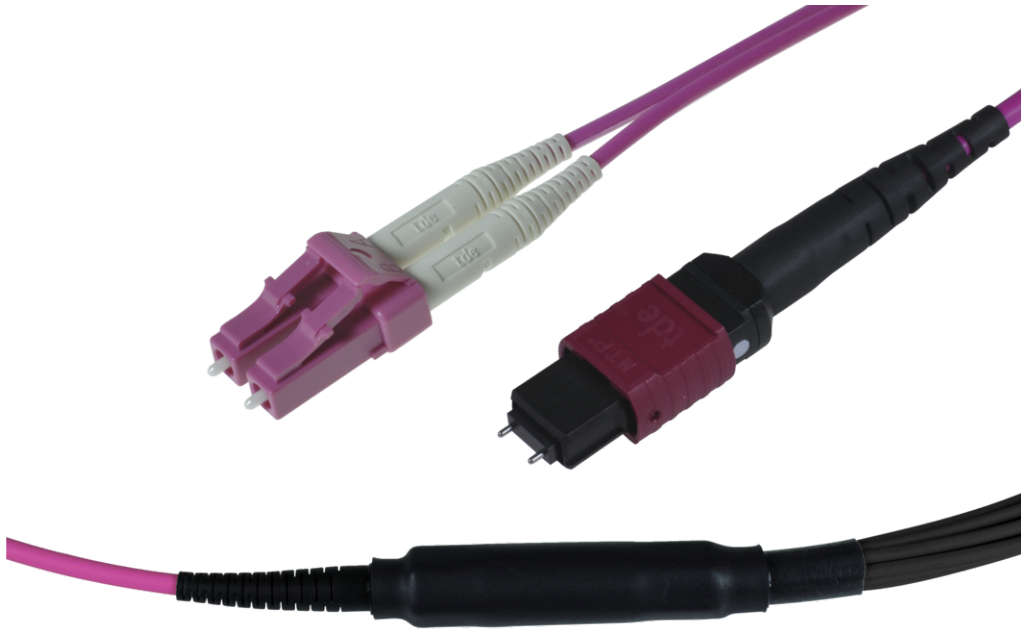


tML<sup>®</sup> - FO Fan-out Cable MPO/MTP<sup>®</sup> with Pins/6x LC Duplex 12G50/125 $\mu$  OM4 LSOH, Length: xx



## tML<sup>®</sup> - tde Modular Link

tML<sup>®</sup> 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<sup>®</sup> 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<sup>®</sup> cabling system as a proven tML<sup>®</sup> standard system and in the highly innovative variants tML<sup>®</sup> Xtended, tML<sup>®</sup> 24 System and now tML<sup>®</sup> 32 System for extreme scalability and very easy migration to higher transmission rates such as 40G, 100G, 200G and 400G.

The tML<sup>®</sup> - FO Fan-out Cable MPO/MTP<sup>®</sup> is for the use with tML<sup>®</sup>- FO Trunk Cables.



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tML<sup>®</sup> - FO Fan-out Cable MPO/MTP<sup>®</sup> with Pins/6x LC Duplex 12G50/125 $\mu$  OM4 LSOH, Length: xx

## Technical Data

The end faces of the connectors are optimized by means of Lasercleaving and machine polish. The MPO/MTP<sup>®</sup> plug has a defined fiber height of 1 - 3.5 $\mu$ . The max. adjacent fiber height difference is 0.2 $\mu$ m and for all fibers 0.3 $\mu$ m. All system components (fan-out cables or modules, trunk cables and patch cords) are co-ordinated for the reaching of the performance particularly. The fanout cable is marked with sequential serial number and article number.

Cable	Round cable, loose tube, LSOH, magenta
Fan-out unit	Metal
Entry	1 x MPO/MTP <sup>®</sup> Male Push Pull (magenta)
Exit	6 x LC Duplex (magenta)
Pin-out	Crossover (TIA/EIA-568-B.1 Methode C)
Tests	Interferometer, Insertion Loss, Return Loss and Visual Final Inspection; all measured values are electronically archived
	QS-Managementsystem ISO 9001, ISO 14001 and TL 9000

## FO Connectors

Connector Type	LC Unibody Duplex
Housing	Plastic, Magenta
Ferrule	Zirkonia Staight Split, Spring-loaded Axially
Ferrule Hole	126 $\mu$
Mating Cycles	1.000
Operating Temperature	-40°C up to +75°C
Strain Relief to	100 N
Manufacturer	tde
Simplex / Duplex Clip	with Duplex Clip

## Optical performance

Fiber	Type	Wavelength	Insertion loss typ.	Insertion loss max.	Return loss min.
50/125 $\mu$ OM4	LC	850 nm	< 0.07 dB	0.15 dB	35 dB

## FO Connectors

The end faces of the connectors are optimized by means of Lasercleaving and machine polish. The MPO/MTP<sup>®</sup> plug has a defined fiber height of 1 - 3.5 $\mu$ . The max. adjacent fiber height difference is 0.2 $\mu$ m and for all fibers 0.3 $\mu$ m.

## Connector

Type	MPO/MTP <sup>®</sup> Male Push Pull Locking with Elite Pins (magenta)
Ferrule	12 Fiber MM Elite <sup>®</sup> ferrule, PPS
Boot colour	Black
Manufacturer	tde/US Conec

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## Optical Performance

Fiber	Type	Wavelength	Insertion loss typ.	Insertion loss max.	Return loss min.
50/125 $\mu$ OM4	MPO/MTP <sup>®</sup>	850 /1300 nm	$\leq$ 0.12 dB	0.25 dB	35 dB

## FO Fan-Out

Length Fan-Out	40 mm
Max. $\varnothing$ Fan-Out	10 mm
Parallel fibers	12

## FO Cables

Standards	EN 50173-5
	IEC 60794-2-20
	ISO/IEC 24764
Flame resistance	IEC 60332-1-2
	IEC 60332-2-2
	IEC 60754-1
	IEC 60754-2
	IEC 61034

## Cable construction

Type	IVH12G50-OM4
Loose tube	12 coated fibers within PVC-core tube
Wall thickness PVC-tube	0.20 mm – 0.25 mm
Fiber type	MM-OM4, 50/125 $\mu$ , Corning ClearCurve OM4
Strength members	Aramid yarn
Outer jacket	LSZH (Halogen free, low smoke, flame retardant thermoplastic compound)
Jacket color	Magenta, RAL 4003
Identification	"t d e – IVH12G50-MPO-OM4 LSZH" and sequential meter marking + Lot number

## Physical properties

Outer diameter cable	3.0 $\pm$ 0.1 mm
Diameter PVC-core tube	1.8 $\pm$ 0.1 mm
Max. tensile load	300 N
Min. bending radius	30 mm
Temperature range (storage, installation, operation)	-20°C to +70°C

## FO Fiber

## tML<sup>®</sup> - FO Fan-out Cable MPO/MTP<sup>®</sup> with Pins/6x LC Duplex 12G50/125 $\mu$ OM4 LSOH, Length: xx

Type	Corning ClearCurve <sup>®</sup> 50/125 $\mu$ OM4 multimode fiber
Optimized Data Rate over Distance	40/100 Gb over 170 m* 10 Gb/s over 550 m 1 Gb/s over 1100 m
Standard Compliance	ISO/IEC 11801: type OM4 fiber** IEC 60793-2-10: type A1a.3 fiber** TIA/EIA: 492AAAD ITU: ITU G651.1
*	Distances specified in the 40G/100G per IEEE 802.3ba standard are 150m on OM4 and 100m on OM3; Corning fibers are manufactured to tighter dispersion specifications and thereby support the extended distances shown in the table (assuming cable attenuation $\leq$ 3.0 dB/km and same 1.0 dB of connector loss for OM3 that the standard requires for OM4)
**	Assumes IEC draft standard is harmonized with 492AAAD which was approved by TIA

### Optical Specifications

Bandwidth	High Performance EMB* (MHz.km): 4700 at 850 nm only Legacy Performance EMB** (MHz.km): 3500 at 850 nm / 500 at 1300 nm
Attenuation	At 850 nm max. $\leq$ 2.3 dB/km At 1300 nm max. $\leq$ 0.6 dB/km
Macrobend Loss	Mandrel Radius (mm): 37.2 / 15 / 7.5 Number of Turns: 100 / 2 / 2 Induced Attenuation (dB) at 850 nm: $\leq$ 0.05 / $\leq$ 0.1 / 0.2 Induced Attenuation (dB) at 1300 nm: $\leq$ 0.15 / $\leq$ 0.3 / $\leq$ 0.5
Numerical Aperture	0.200 $\pm$ 0.015
*	Ensured via miniEMBc, per TIA/EIA 455-220A and IEC 60793-1-49, for high performance laser-based systems (up to 10Gb/s)
**	OFL BW, per TIA/EIA 455-204 and IEC 60793-1-41, for legacy and LED-based systems (typically up to 100 Mb/s)

### Dimensional Specifications

Core Diameter	50.0 $\pm$ 2.5 $\mu$ m
Cladding Diameter	125.0 $\pm$ 1.0 $\mu$ m
Core-Clad Concentricity	$\leq$ 1.5 $\mu$ m
Cladding Non-Circularity	$\leq$ 1.0%
Core Non-Circularity	$\leq$ 5.0%
Coating Diameter	242 $\pm$ 5 $\mu$ m
Coating-Cladding Concentricity	$<$ 12 $\mu$ m

### Environmental

Environmental Test	Test Condition	Induced Attenuation 850 nm & 1300 nm (dB/km)
Temperature Dependence	-60°C to +85°C	$\leq$ 0.10
Temperature Humidity Cycling	-10°C to +85°C and 4% to 98% RH	$\leq$ 0.10
Water Immersion	23°C $\pm$ 2°C	$\leq$ 0.20
Heat Aging	85°C $\pm$ 2°C	$\leq$ 0.20
Damp Heat	85°C at 85% RH	$\leq$ 0.20
Operating Temperature Range	-60°C to +85°C	

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## Mechanical Specifications

Proof Test	The entire fiber length is subjected to a tensile stress $\geq 100$ kpsi (0.7 GN/m <sup>2</sup> ).
Length	Fiber lengths available up to 17.6 km/spool.

## Performance Characterizations

Refractive Index Difference	1%
Effective Group Index of Refraction	850 nm: 1.480 1300 nm: 1.479
Fatigue Resistance Parameter (nd)	20
Coating Strip Force	Dry: 0.6 lbs (2.7N) Wet: 14 days in 23°C water soak: 0.6 lbs (2.7N)
Chromatic Dispersion	Zero Dispersion Wavelength ( $\lambda_0$ ): 1295 nm $\leq \lambda_0 \leq$ 1315 nm Zero Dispersion Slope ( $S_0$ ): $\leq 0.101$ ps/(nm <sup>2</sup> *km)

## Product variants & accessories

Art.-No.	Description
TML-LC/MPP09112Exx	tML <sup>®</sup> - FO Fan-out Cable MPO/MTP <sup>®</sup> with Pins/6x LC Duplex 12E9/125 $\mu$ LSOH, Length: xx
TML-LC/MPP50112G3-xx	tML <sup>®</sup> - FO Fan-out Cable MPO/MTP <sup>®</sup> with Pins/ 6x LC Duplex 12G50/125 $\mu$ OM3 LSOH, Length: xx
TML-LC/MPP50112G4-xx	tML <sup>®</sup> - FO Fan-out Cable MPO/MTP <sup>®</sup> with Pins/6x LC Duplex 12G50/125 $\mu$ OM4 LSOH, Length: xx
TML-LC/MPP50112Gxx	tML <sup>®</sup> - FO Fan-out Cable MPO/MTP <sup>®</sup> with Pins/6x LC Duplex 12G50/125 $\mu$ OM2 LSOH, Length: xx
TML-LC/MPP62112Gxx	tML <sup>®</sup> - FO Fan-out Cable MPO/MTP <sup>®</sup> with Pins/6x LC Duplex 12G62,5/125 $\mu$ OM1 LSOH, Length: xx