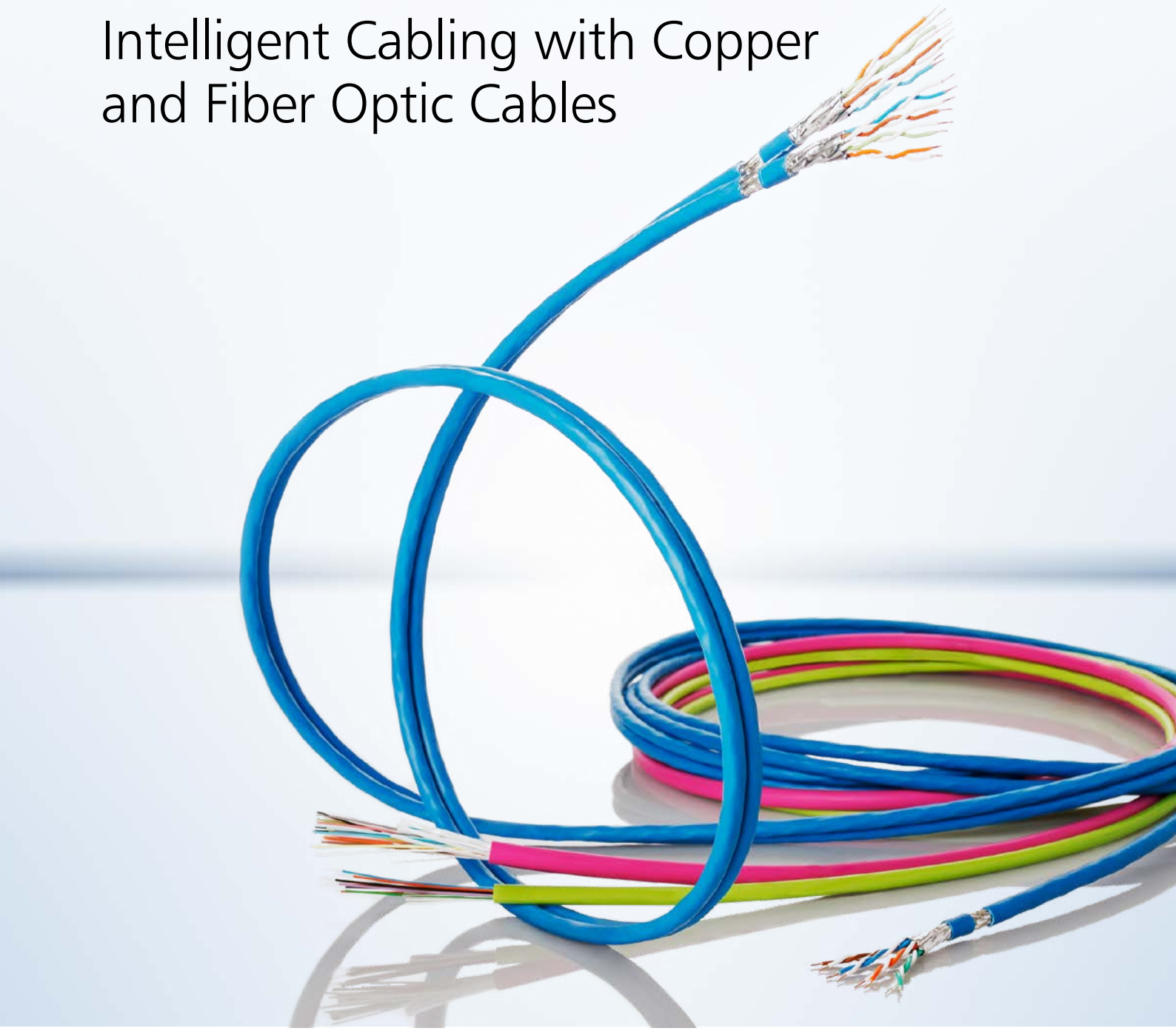
METZ CONNECT

We realize ideas

Cables and lines - Intelligent Cabling with Copper and Fiber Optic Cables



P | Cabling

Cable concepts with a perspective

The world is becoming more and more networked. Consistent as well as transparent information - available everywhere and at all times - devices that communicate with other devices to depict processes - all of this is increasingly determining our daily lives. All this requiresreliable connection technology. Creating perfect connections - that is the core competence of METZ CONNECT.

The decision between fiber optic or copper data cables as the ideal solution for the workplace depends on many factors: deployment environment, network technology and the planning horizon. Whatever you opt for, with fiber optic (FO) or copper data cables from METZ CONNECT, which are optimally tailored to the requirements of all structural levels of local networks, you'll be on the safe side in the future.

Freedom of choice

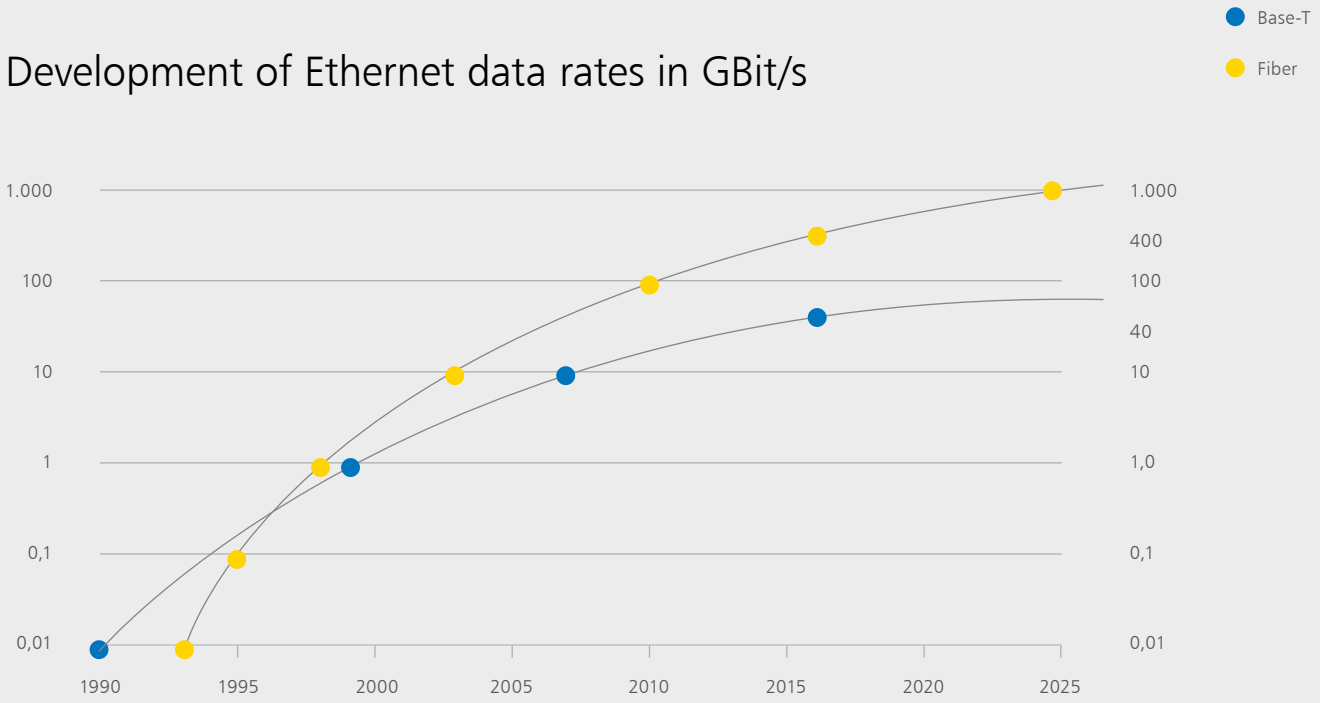
The proper equipment for every application: Whether the requirement is a high transmission performance, electromagnetic compatibility (EMC) or the best fire protection properties - with us you will find the optimum data cable for every application. We will support you in all questions regarding the assembly and installation.

Speed

The demands on modern networks are very high. Speed and transmission characteristics are becoming increasingly important. Gigabit Ethernet thereby offers an enormous potential for the future. Planning certainty is an important factor, because modern cable concepts must also offer room for tomorrow's technical developments. The cables and lines from METZ CONNECT support a future-proof and structured cabling. The product range from Cat.6 over Cat.7 up to Cat.7_A, is tailored to the needs of many applications and allows the highest level of transmission speeds. Our cable series are designed in such a way that cable sharing (mixed operation) in the lower transmission speed class is also possible with every cable. Together with our innovative partner Draka, we can offer you perfectly coordinated cable concepts with a modern perspective - **We realize ideas!**

TYPE	BANDWIDTH	CLASS	CATEGORY	
GC400	1 GBit	E	Cat.6	
GC600	10 GBit	E_A	Cat.6_A	
GC1000	10 GBit	F	Cat.7	
GC1300	10/25 GBit	F_A	Cat.7_A	

Development of Ethernet data rates in GBit/s



IMPORTANT STANDARDS FOR THE CABLING

STANDARDIZATION			INTERNATIONAL	EUROPE
Generic cabling systems	Part 1	General requirements	ISO/IEC 11801-1	EN 50173-1
	Part 2	Office spaces	ISO/IEC 11801-2	EN 50173-2
	Part 3	Industrial spaces	ISO/IEC 11801-3	EN 50173-3
	Part 4	Homes	ISO/IEC 11801-4	EN 50173-4
	Part 5	Data centre spaces	ISO/IEC 11801-5	EN 50173-5
	Part 6	Distributed building services	ISO/IEC 11801-6	EN 50173-6
Cabling installation	Part 1	Installation specification and Quality assurance	ISO/IEC 14763-2	EN 50174-1
	Part 2	Installation planning and practices inside buildings		EN 50174-2
	Part 3	Installation planning and practices outside buildings		EN 50174-3
Telecommunications bonding networks for buildings and other structures			ISO/IEC 30129	EN 50310

Products and solutions

We provide solutions today. For the innovations of tomorrow.

APPLICATION IN THE LAN - LOCAL AREA NETWORK

Our high-quality cables are always used where a high-speed data transmission in local area networks (LAN) is required. The cables are thereby used for structured and application neutral networks - Ethernet 100 BaseT, 1000 BaseT and 10 GBit Ethernet. In addition to the voice and data communication applications our solutions are suitable for the remote power supply of various terminal devices through Power over Ethernet (4PPoE up to 100 W) and HighEnd 4K video (e.g. HDBaseT).

Our product range includes installation and connection cables that have been tested for compatibility with the commercially available connection components. This ensures a maximum degree of operational reliability.

APPLICATION IN THE DATA CENTRE

Every data centre has its own special structure. There are different environments with different requirements, which require the development of customized solutions.

As soon as the change to 10 GBit Ethernet is carried out at the client level, a data centre Backbone which is also designed for 10 GBit Ethernet, will quickly become a bottleneck for the connection between the access and distribution layer. Although distances of up to 100 m at 10 GBit/s, or 30 m at 25 and 40 GBit/s can be achieved with copper data cables, laser-optimized multimode type OM3, OM4 and new OM5 fiber technology offer a significantly higher future proofness today. With OM5 fiber technology it is possible to transmit up to 40 GBit/s per multimode fiber.

40 GBit Ethernet and 100 GBit Ethernet, as well as future 50, 100, 200 and 400 GBit Ethernet - are based on multi-lane variants of OM3, OM4 and OM5 connections. A modern infrastructure designed with fiber optic cables according to OM4 or OM5 can thus also be expanded to a 25 GBit fiber Ethernet compatible network and beyond at a later point in time.

Specific to the protected but demanding data centre environment is the demand for a small size and easy installation options. Here, METZ CONNECT can offer new and innovative cables for such high-fiber count applications. These advanced cables are designed for use with the most advanced connection technology on the market. The cables are available in various versions with different fiber types, and thus meet all requirements for high fiber count cabling in the data centre.

INDUSTRIAL APPLICATIONS

The world of office and industrial cabling is converging at an ever-increasing pace. Ethernet is also becoming increasingly established in the field of industrial automation. In addition to the bus solutions that are still in use, however, Ethernet offers the possibility of managing the communication. Selective access to every single point in the network enables the easy performance of adjustments and changes, thus promising low downtimes as well as productivity gains.

Our FO and copper data cables are the right choice for Ethernet applications in harsh industrial environments. This is where the cables are able to demonstrate their advantages in terms of mechanical, chemical and climatic resistance.

EU CONSTRUCTION PRODUCTS DIRECTIVE (BAUPVO)/(CPR)

The new EU Construction Products Directive - in short BauPVo - replaced the previous Construction Products Directive 89/106/EEC (BPR) in July 2013, and has been adopted as a European Directive in all EU member states since July 1, 2017. The aim was to create a common technical language by adopting the standards, which defines uniform product and testing standards through technical specifications. The Construction Product Regulation (CPR) refers to all cables that are manufactured or distributed for the fixed and permanent installation in buildings, and whose performance affects the performance characteristics of the building.

CE marking

Under EU law, only the procedures for proving that a product also fulfils these requirements will be harmonised. The definition of security requirements remains the responsibility of the national authorities.

This means that:
- a declaration of performance for cables (DoP declaration of performance) must be provided
- the conformity with the declaration of performance of the product has been declared with the required information (fire behaviour).
- all affected products are provided with a CE identification marking.

Adoption of the CPR euro classes into the national regulation

An essential component of the CE marking prescribed by law is the indication of fire classes. Cables are assigned to Euroclasses from A_{ca} to F_{ca} according to their fire behaviour, which is tested according to the current EN50399 test standard. Compliance with these test criteria is monitored, and certified by independent institutions, so-called notified bodies.

According to building supervisory requirements and the classification of fire behaviour classes according to DIN EN 13501-6:2014-07, a minimum requirement of class E_{ca} is required in Germany, which means normally flammable.

With regard to this requirement, the ZVEI has issued recommendations for the use of the new Euro performance classes. Cables of the classes F_{ca} or D_{ca} are intended for general use, provided no special fire situations are to be expected.

Cables of class $B2_{ca}$ and C_{ca} are provided precisely for situations where it is obviously necessary to increase the level of fire protection (hospitals, kindergartens).

Essential features of the cables under the BauPVo

Performance features of BauPVo are:
- Fire behaviour of building products
- Release of hazardous substances

These support the requirements for the:
- Construction sector
- Hygiene, health, environmental protection

Safety requirements for cables in the event of fire

The construction work must be planned and carried out in such a way, that in the event of a fire:
- the development and spreading of fire and smoke is minimized within the building,
- the spreading of fire is limited to neighbouring buildings,
- persons present can leave the construction site, or can be saved by other measures,
- the safety of the rescue teams is considered

Product solutions

All cables for the building cabling from METZ CONNECT are classified, and the corresponding information according to CPR Euroclasses is stored in the data sheet.

In this context, we will continue to offer new products for high or very high fire protection requirements in the future.

Innovative cable solutions -

for more safety

Fire class $B2_{ca}$
Building with a very high security requirement

Fire class C_{ca}
Building with a high security requirement

Fire class D_{ca}
Building with a medium security requirement

Fire class E_{ca}
Building with a low security requirement

FIRE BEHAVIOR

For years, flame retardancy has been one of the minimum requirements for indoor cables. PVC cables are often used. Although they are highly fire retardant they will not prevent the fire spreading. They can even release highly corrosive and toxic gases. High-quality LSHF (FRNC) materials with significantly improved properties offer a proven and future-proof alternative to PVC cables in the event of fire.

Protective LSHF sheath

(Low Smoke Halogen Free)

What advantages to halogen-free cables offer?

- In case of fire, no corrosive gases are released, which could cause considerable damage to people and buildings.
- No hydrogen chloride gas which combines with water to form hydrochloric acid is created.
- The share of toxic gases is reduced to minimum, i.e. no irritation of the mucous membranes and the eyes.
- Halogen-free cables are Flame Retardant and have low fire propagation characteristics, which avoids the dreaded fuse effect.
- Through a lack of smoke, escape routes will remain visible for fleeing persons and the fire brigade.

Safety spring

The highest security precautions in cabling apply in places with large accumulations of people, e.g. hospitals, airports, schools, department stores, hotels, in facilities with high concentrations of material assets, and everywhere where an interrupted operation would cause high costs, for example, in Industrial plants, powerplants, EDP centres, banks, power stations, and fundamentally in alarm, signalling, control and monitoring systems.

Bend-insensitive single-mode fiber OS2 with reduced OH absorption

The SM fiber used by METZ CONNECT is characterized by an exceptionally high bending resistance. In addition, it belongs to the so-called low-water peak fibers with reduced OH absorption and thus has a low attenuation over the entire wavelength range between 1260 and 1625 nm. Together, this allows unlimited use for a variety of applications.

In addition to being used in office installations - as a patch or connection cable - the bend-insensitive SM fiber for Fiber-to-the-Home networks offer significant advantages for the network installer. In this way, both the bending radii in fiber guiding areas and the minimum bending radii for the wall and corner mounting can be reduced.

Furthermore, their extended macro bending behaviour ensures that all transmission bands up to 1625 nm (L-band) are also available for future use. Therefore METZ CONNECT guarantees a future-proof FO cabling.

PRODUCT CHARACTERISTICS	ADVANTAGES
Low macro bending losses with very small radii "(15 mm)"	More compact installations, so fiber overlenghts can be stored with smaller radii. Installation errors in fiber management systems or splice cassettes have lower negative effects
Compatible to installations with standard single mode fibers (G.652.D)	The fiber can be spliced with similar fusion splice programs just like other G.652 fibers. It can be spliced almost loss-free with other G.652 fibers using standard fusion splicers.

The fiber meets or exceeds the following international specifications:

- IEC 60793-2-50 type B1.3 and B6_a
- ITU-T Recommendations G.657.A1 and G.652.D

It is backwards compatible with all G.652 fibers already used in optical networks.

SM FIBER TYPES 9/125 µm	DESIGNATIONS ACCORDING TO			MAX. ATTENUATION ACCORDING TO IEC 60793-2-50	
	EN 50173 ISO 11801	IEC 60793-2-50	ITU-T	1310 nm	1550 nm
Standard Fiber	OS2	B1.1	G.652.A/B	0.4 dB/km	0.4 dB/km
Low-Water-Peak fiber	OS2	B1.3	G.652.C/D	0.4 dB/km	0.4 dB/km
Bend-insensitive fiber	OS2	B6_a/B6_b	G.657.A/B	0.4 dB/km	0.4 dB/km

ITU-T G.657: "CHARACTERISTICS OF A BENDING-LOSS INSENSITIVE SINGLE-MODE OPTICAL FIBRE AND CABLE"

Category	G.657.A		G.657.B	
Fiber type	Compatible with G.652		Not compatible with G.652	
Applications	Outdoor facilities and building wiring all bandwidths: 1260 to 1625 nm no range limitation		Building wiring restricted bandwidths: 1310, 1550 and 1625 nm	
Subcategory	A1	A2	B2	B3
Bending capacity	10-fold improvement compared to G.652	10 fold improvement compared to G.657.A1	10 fold improvement compared to G.657.A1	3-fold improvement compared to G.657.B2 at 10 mm
Radius	15 and 10 mm	15, 10 and 7.5 mm	15, 10 and 7.5 mm	10, 7.5 and 5 mm

Bend-insensitive and laser-optimized multimode fibers:

The MaxCap-BB®-OMx fibers are characterized by an exceptionally high bending resistance. In addition, their special design makes them especially optimized for high-bit-rate transmissions using VCSEL lasers.

All variants (OM3, OM4 and OM5) are gradient fibers with a core of 50 μm and an outer diameter of 125 μm. However, a mixing of OM3 and OM4 is not possible due to the different refractive index profiles and thus the different mode distributions.

Bend-insensitive OM3 fiber compared to normal OM3 fiber during the bending test (attenuation measurement)

OM3 multimode fiber without stress

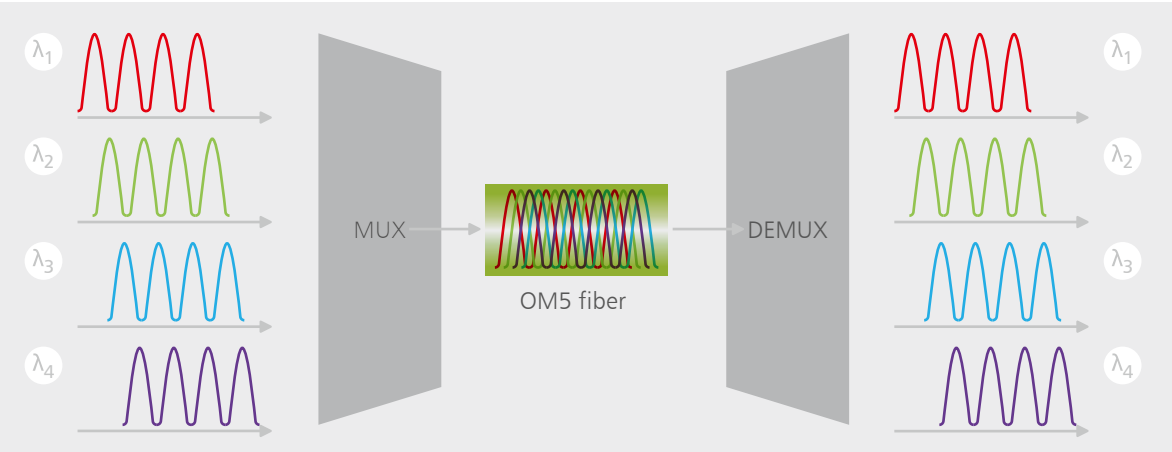
OM3 multimode fiber with stress

MaxCap-BB®-OM3 fiber without stress

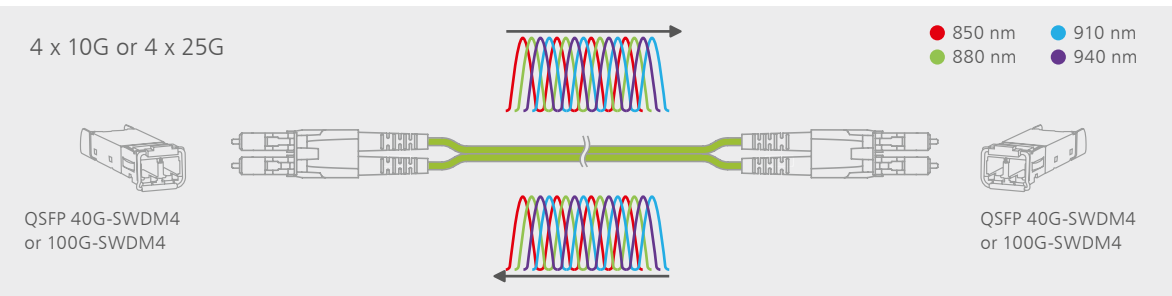
MaxCap-BB®-OM3 fiber with stress

OM5 - future-proof multimode fiber for data centers

Previously, multimode fibers were only operated with a narrow band at 850 or 1300 nm. In order to satisfy the rapidly increasing demand for more and more band widths, the new OM5 fiber type was developed with very good transmission properties in a band range of 100 nm: in the range from 850 to 950 nm, four wavelengths can be transmitted simultaneously with the aid of the so-called wavelength multiplexes.



The keyword here is Shortwave Wavelength Division Multiplexing (SWDM), a method that enables four times the previous transmission performance. Thereby, 40 GBit/s with 4 wavelengths of 10 GBit/s each can be transmitted via one transmitting and one receiving fiber. Or even 100 GBit/s through 4 times 25 GBit/s.



OM5 fibers in conjunction with SWDM transceivers thus increase capacities without having to do without the proven LC duplex connectors.

Cabling of buildings or data centers with OM5 support all previous applications just like OM4 or OM3. Both plugs and cables are fully compatible. However, the OM5 fiber in combination with the corresponding transceivers offer a longer range.

WideCap-OM5 also has very good macro bending properties. The fiber meets or exceeds the following international specifications:

- IEC 60793-2-10: type A1a.4
- ITU-T G.651.1
- TIA/EIA-492 AAAE
- ISO/IEC 11801 category OM5 (in progress)

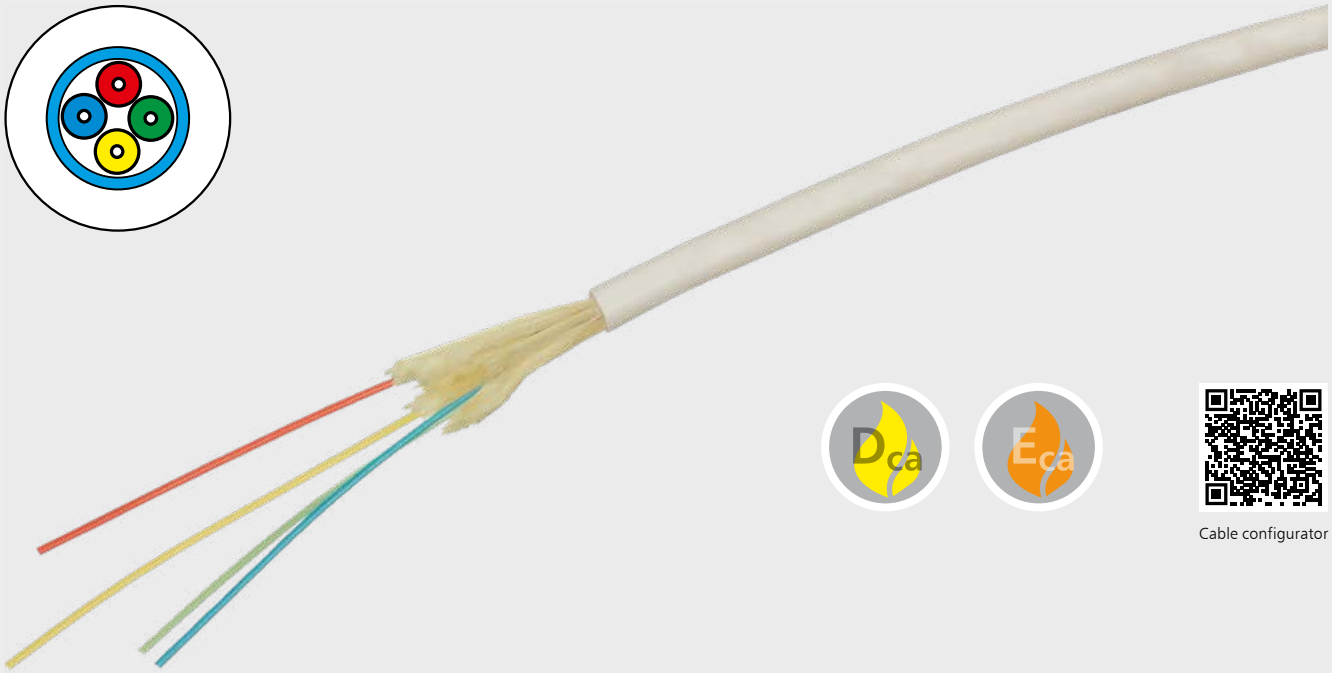
In February 2017, the TIA (Telecommunications Industry Association) determined the color lime green to identify the OM5 fiber in the USA. The respective European standards are being worked on.

Optical properties of OpDAT cables

WITH SM FIBER TYPE			OS2
ISO/IEC 11801/EN 50173			OS2
IEC 60793-2-50			B1.3 and B6_a
ITU-T			G.657.A1 and G.652.D
Attenuation		from 1310 to 1625 nm	≤ 0.38 dB/km
Bending loss with 1 turn with R = 10 mm		with 1550 nm	≤ 0.75 dB/km
Bending loss at 10 turns with R = 15 mm		with 1550 nm	≤ 0.25 dB/km
Maximum range (depending on the transceivers used)		1000BASE-LX10 1310 nm 10GBASE-LR 1310 nm 10GBASE-ER 1550 nm 40GBASE-LR4 1310 nm 100GBASE-ER4 1550 nm	10 km 10 km 40 km 10 km 40 km

WITH MM FIBER TYPE		OM3	OM4	OM5
ISO/IEC 11801/EN 50173		OM3	OM4	OM5
IEC 60793-2-10/ EN 60793-2-10		A1.a.2	A1.a.3	A1.a.4
TIA/ANSI-492		AAAC	AAAD	AAAE
Bandwidth OFL [MHz x km]	850 nm 953 nm 1300 nm	≥ 1500 - ≥ 500	≥ 3500 - ≥ 500	≥ 3500 ≥ 1850 ≥ 500
Bandwidth EMB [MHz x km]	with 850 nm with 953 nm with 1300 nm	> 2000 - > 1500	> 4700 - > 3500	> 4700 > 2470 > 3500
Attenuation [dB/km]	with 850 nm with 1300 nm	≤ 3.0 ≤ 1.0	≤ 3.0 ≤ 1.0	≤ 2.5 ≤ 0.7
Bending loss at 2 turns with R = 7.5 mm	with 850 nm with 1300 nm	≤ 0.2 dB ≤ 0.5 dB	≤ 0.2 dB ≤ 0.5 dB	≤ 0.2 dB ≤ 0.5 dB
Bending loss at 2 turns with R = 15 mm	with 850 nm with 1300 nm	≤ 0.1 dB ≤ 0.3 dB	≤ 0.1 dB ≤ 0.3 dB	≤ 0.1 dB ≤ 0.3 dB
Maximum range (depending on the transceivers used)	1000BASE-LX 1000BASE-SX 10GBASE-LX4 10GBASE-SR 40GBASE-SR4 40GBASE-SWDM4 100GBASE-SR4 100GBASE-SR10 100GBASE-SWDM4	550 m 1000 m 300 m 300 m 100 m - 70 m 100 m -	550 m 1100 m 300 m 400 m 150 m - 100 m 150 m -	550 m 1100 m 300 m 550 m 190 m 300 m 100 m 190 m 300 m

Installation cable



Cable configurator

OpDAT Mini Breakout Cable Compact

Compact mini-breakout cable for horizontal and backbone cabling.

Cable design

The cable contains 4 coloured semitight buffered fibers (Ø 0.9 mm) and aramid yarn for strain relief. The cable sheath is halogen free with a low smoke emission and self-extinguishing properties.

Areas of application

Typical application is the cabling in the building (Fiber-in-the-Home) as a continuation of the fiber from the house transfer point of the FTTH network (Fiber-to-the-Home).

CHARACTERISTICS

Number of fibers		4
Cable diameter		4.2 mm
Weight		16 kg/km
max. Tensile strength during the installation		1000 N
smallest bending radius during the operation		15 mm
Transverse compressive strength		3000 N
Temperature range during the operation		-25 to +70 °C
Color Cable sheath	OS2	white

Installation cable

Cable configurator

OpDAT Mini Breakout Cable U-VQ(ZN)H

Mini-breakout cables are mainly designed for indoor use. They have an LSHF-FR outer sheath. The cables are UV-resistant, metal-free, water and moisture-resistant. All fibers inside are bend-insensitive.

Cable design

The cables with tight buffered fibers and glasroving elements as a strain relief have a flame retardant, halogen free outer sheath. A waterproof layer of coated glass rovings gives the cable the necessary tensile strength. The cable is equipped with a FireRes®-LSHF-FR jacket.

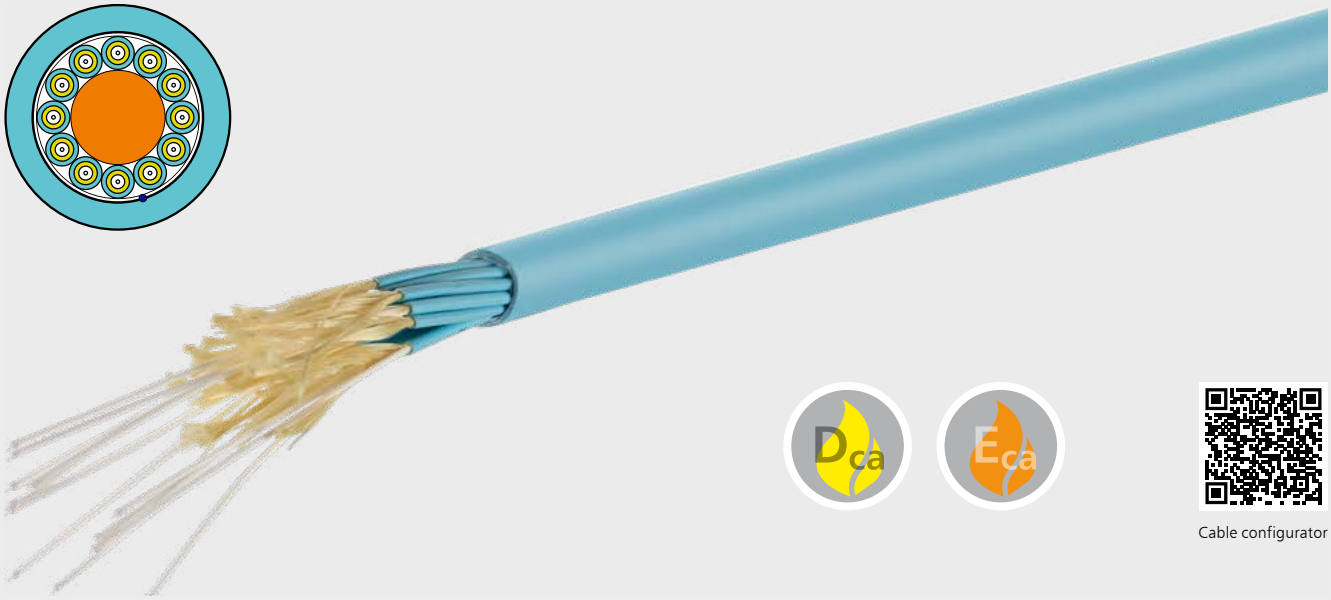
Areas of application

Possible applications are short distance connections, backbone and distribution cabling. They are primarily intended for the laying in pipes, cable trays and cable ducts indoors, but can also be used outdoors.

CHARACTERISTICS

Number of fibers		2	4	12	24
Cable diameter		4,6 mm	5,2 mm	7,0 mm	8,5 mm
Weight		19 kg/km	27 kg/km	48 kg/km	73 kg/km
max. Tensile strength during the installation		325 N	440 N	900 N	1400 N
smallest bending radius during the operation		50 mm	50 mm	50 mm	60 mm
Transverse compressive strength					2000 N
Temperature range during the operation					-40 to +70 °C
Color Cable sheath	OM3	-			aqua
	OM4	-			violet
	OM5	-			lime green
	OS2				yellow

Installation cable



Cable configurator

OpDAT Breakout Cable I-V(ZN)HH

Breakout cables are designed for indoor use. They have an LSHF-FR outer sheath. For risers and as distribution cables, the individual cables can be split individually by opening the common cable sheath. The cables are UV-resistant, metal-free, water and moisture-resistant. All fibers used are bend-insensitive.

Cable design

Single cable with full cores and aramid strain relief for the direct assembly of FO connectors.

Areas of application

They are primarily intended for the laying in pipes, cable trays and cable ducts indoors, but can also be used outdoors.

CHARACTERISTICS

Number of fibers		4	8	12	24
Cable diameter		7.5 mm	10 mm	12.5 mm	14.5 mm
Weight		60 kg/km	100 kg/km	160 kg/km	210 kg/km
max. Tensile strength during the installation		1300 N	2400 N	3500 N	4500 N
smallest bending radius during the operation		75 mm	100 mm	150 mm	175 mm
Transverse compressive strength					1 500 N / 100 mm
Temperature range during the operation					-20 to +70 °C
Color Cable sheath	OM3				aqua
	OM4				violet
	OM5				lime green
	OS2				yellow

Installation cable

Cable configurator

OpDAT Universal Cable U-DQ(ZN)BH

These cables have been designed for indoor and outdoor use. The universal cables have an LSHF or LSHF-FR covering making them ideal for indoor use with limited requirements for flame propagation. All fibres are bend-insensitive.

Cable design

Cable with gel-filled bundle tube. Coated glass rovings guarantee a sufficiently high tensile strength and a certain rodent protection. The cable has a FireBur® LSHF jacket and is longitudinally watertight.

Areas of application

Suitable for medium to long distances in the LAN backbone, where robust and compact cables with medium compressive strength are required. The cable is suitable for installation in cable conduits, protection tubes and tunnels. For outdoor use, the installation in a sand bed or in protective pipes is recommended.

CHARACTERISTICS

Number of bundles/fibers		1 x 4, 1 x 8, 1 x 12, 1x24	4 x 12
Cable diameter		7.3 mm	13.0 mm
Weight		55 kg/km	140 kg/km
max. Tensile strength during the installation		3000 N	6000 N
smallest bending radius during the operation		73 mm	260 mm
Transverse compressive strength		3500 N	3000 N
Temperature range during the operation		-30 to +70 °C	-40 to +70 °C
Color Cable sheath	OM3	aqua	blue or aqua
	OM4		violet
	OM5		lime green
	OS2		yellow

Outdoor cable

Cable configurator

OpDAT Outdoor Cable

Rugged outdoor cable with loose tube multi-fibre design for underground or in-pipe cabling.

Cable design

The non-metal cable has a glass roving sheath used for strain relief which gives it longitudinal watertightness. The LLDPE covering also means that the cable has high tensile strength and is resistant to UV radiation and rodents.

Areas of application

The areas of application for this cable are underground use and pipes, as well as in primary wiring.

CHARACTERISTICS		
Number of bundles/fibers	4, 12, 24	48 (4x12f)
Cable diameter	6.70 mm	11 mm
Weight	40 kg/km	103 kg/km
max. Tensile strength during the installation	3000 N	5000 N
smallest bending radius during the operation	67 mm	190 mm
Transverse compressive strength	2000 N/100mm	3000 N/100mm
Temperature range during the operation	-30 to +70 °C	-30 to +70 °C
Color Cable sheath		black

Installation cable

Cable configurator

OpDAT Industrial Cable I-V(ZN)Y11Y

OM3 New!

Cable design

Two individual cables with strain relief elements, enclosed within a common outer covering, duplex cable with excellent abrasion and chemical resistance for connecting or shunting cables; resistant to UV radiation, oil and ozone. Watertight.

Areas of application

For use in industrial applications.

Please note that the cable is not intended for use as bulk cable and should be used only with connectors.

CHARACTERISTICS

Number of bundles/fibers		2
Cable diameter		9.40 mm
Weight		approximately 80 kg/km
max. Tensile strength during the installation		600 N
smallest bending radius during the operation		94 mm
Transverse compressive strength		1000 N
Temperature range during the operation		-10 to +70 °C
Color Cable sheath	OM3	aqua
	OM2	orange
	OS2	yellow

Product overview OpDAT cables

MODE TYPE OF THE FIBER	FIBER CLASS	NUMBER OF FIBERS	SPLITTING	COLOR	P/N
Mini breakout cable compact	OS2	4	4x1	white	150C049000000M
Mini breakout cable	OM3	4	4x1	aqua	150M045000000M
		12	12x1	aqua	150M125000000M
		24	24x1	aqua	150M245000000M
	OM4	4	4x1	violet	150M047000000M
		12	12x1	violet	150M127000000M
		24	24x1	violet	150M247000000M
	OM5	4	4x1	lime green	150M048000000M
		12	12x1	lime green	150M128000000M
		24	24x1	lime green	150M248000000M
	OS2	2	2x1	yellow	150M029000000M
		4	4x1	yellow	150M049000000M
		12	12x1	yellow	150M129000000M
		24	24x1	yellow	150M249000000M
Breakout cable	OM3	4	4x1	aqua	150B045000000M
		8	8x1	aqua	150B085000000M
		12	12x1	aqua	150B125000000M
		24	24x1	aqua	150B245000000M
	OM4	4	4x1	aqua	150B047000000M
		8	8x1	aqua	150B087000000M
		12	12x1	aqua	150B127000000M
		24	24x1	aqua	150B247000000M
	OM5	4	4x1	lime green	150B048000000M
		8	8x1	lime green	150B088000000M
		12	12x1	lime green	150B128000000M
		24	24x1	lime green	150B248000000M
	OS2	4	4x1	yellow	150B049000000M
		8	8x1	yellow	150B089000000M
		12	12x1	yellow	150B129000000M
		24	24x1	yellow	150B249000000M
Universal cable	OM3	4	1x4	aqua	150U045000000M
		8	1x8	aqua	150U085000000M

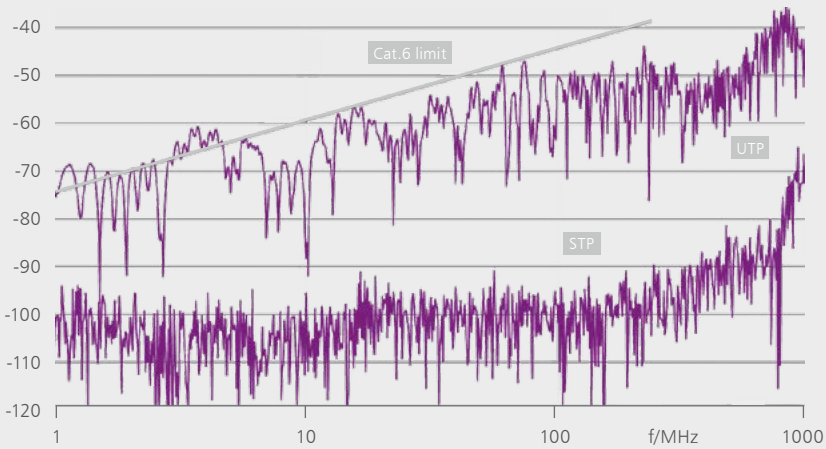
Product overview OpDAT cables

MODE TYPE OF THE FIBER	FIBER CLASS	NUMBER OF FIBERS	SPLITTING	COLOR	P/N
Universal cable	OM3	12	1x12	aqua	150U125000000M
		24	1x24	aqua	150U245000000M
		48	4x12	blue or aqua	150U485000000M
	OM4	4	1x4	violet	150U047000000M
		8	1x8	violet	150U087000000M
		12	1x12	violet	150U127000000M
		24	1x24	violet	150U247000000M
		48	4x12	blue or violet	150U487000000M
	OM5	4	1x4	lime green	150U048000000M
		8	1x8	lime green	150U088000000M
		12	1x12	lime green	150U128000000M
		24	1x24	lime green	150U248000000M
		48	4x12	lime green	150U488000000M
	OS2	4	1x4	yellow	150U049000000M
		8	1x8	yellow	150U089000000M
		12	1x12	yellow	150U129000000M
		24	1x24	yellow	150U249000000M
		48	4x12	yellow	150U489000000M
Outdoor cable	OM3	4	1x4	black	150A045000000M
		12	1x12	black	150A125000000M
		24	1x24	black	150A245000000M
	OM4	4	1x4	black	150A047000000M
		12	1x12	black	150A127000000M
		24	1x24	black	150A247000000M
	OS2	4	1x4	black	150A049000000M
		12	1x12	black	150A129000000M
		24	1x24	black	150A249000000M
		48	4x12	black	150A489000000M
Industry cable	OM2	2	2x1	orange	150I022000000M
	OM3	2	2x1	aqua	150I025000000M
	OS2	2	2x1	yellow	150I029000000M

Future-proof cabling

10 GBit Ethernet is the next higher protocol after 1000BaseT and is 10 times faster, has a higher bandwidth and a higher performance. Transmission to 10 GBit Ethernet is based on "full duplex operation" - i.e. over all pairs of a cable simultaneously in both directions (bi-directional) with transmission rates of 2.5 GBit per pair. In addition to the transmission parameters known from 1 Gb Ethernet, cables that are to be suitable for this must also comply with the "Alien-Crosstalk" properties.

Alien Crosstalk requires shielding



Alien (Exogenious) Crosstalk

Alien Crosstalk is the interference of the transmitted signal through superimposition with the noise that is coupled in from all surrounding lines by a larger outside diameter of thesheath. A larger distance between the lines through a larger sheathing diameter actually creates an interference level reduction for U/UTP cables, so that the test criteria are almost fulfilled.

Error detection

Ethernet works on the basis of an error detection system. The recipient will continue to request data packets until the transmission is completed without errors. In the event of a malfunctioning system, the same information is retransmitted, which slows down the transmission: At a certain level of interference, the transmission will collapse. 10Gb Ethernet has the lowest reserves of all Ethernet processes. As a result, high quality components are required.

System reserves

The aim of the cabling standards is to ensure a problem-free interaction of the individual components through defined system reserves. This will enable a plug-and-play for up to 100 m of cabling with standardized components. With 10 GBit Ethernet, this system reserve will continue to be available if the components are well matched to each other. With an increasing bandwidth the noise also increases, independent of the components used. The system reserves defined in cabling standards such as TIA represent the minimum of what is necessary for the minimum operational safety.

Shielding

A method for improving the system reserve is based on shielding. The coupling of Alien-Cross-talk can be completely suppressed by shielding the involved components. The proven and patented film wrapping process produces the high-quality degree of shielding required for this. With this product selection, the testing for Alien-Crosstalk is obsolete, which is also confirmed by the cabling standard.

Signal Delay and Time Differences

Due to increased demands on Gigabit-Ethernet the importance of signal delay (delay) and of the delay time differences (skew) are also increasing. The time difference is the transmission difference between the transmission times of two or more pairs.

Transmission safety

Data transmissions are becoming increasingly susceptible to interference due to high data rates. Insufficient cable quality creates additional sources of interference and increases the risk of transmission errors. Despite the high-speed protocol, available data rates are not fully exploited and the performance of the network remains unutilized. You should therefore rely on high-quality data cables with a minimized susceptibility to interference. Invest into the future-proof performance of your network.

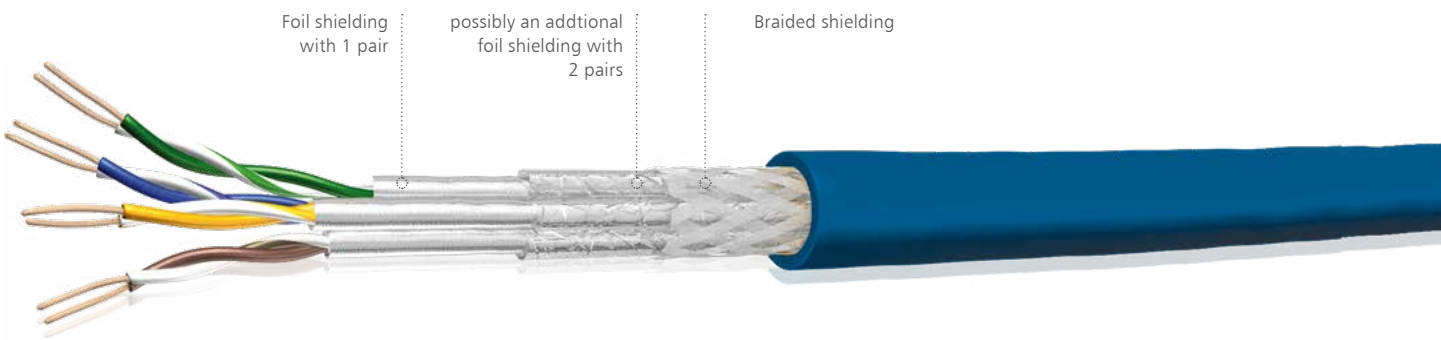
EMC - Electromagnetic compatibility

EMC defines the ability of a device to function satisfactorily in an electromagnetic environment without exerting a negative influence (interference radiation) on other systems. The main problem are malfunctions that affect your own system from the outside and thus cause a system failure, for example. The network environment contains various potential high-frequency interference sources in the frequency range from 80.0 MHz to 2.0 GHz, such as mobile radio, stationary radio or television broadcast transmitters, hand-held radiotelephones and industrial RF sources. The use of high-quality shielded cables omits subsequent adjustments for retrofit installations.

Shielding classes for Copper cabling

The assessment of the effect of shielding and non-shielding, requires measurement variables that allow a representative comparison. The use of high-quality materials and the degree of shielding are decisive for an optimal shielding.

In IEC 61156-5 the parameters coupling loss and coupling resistance were defined as shielding characteristics. IEC 61156-5 distinguishes the coupling resistance in grade 1 (PiMF with braiding) and grade 2 (PiMF). However, many users find it too abstract. Especially for the requirements of structured cabling, the characteristic coupling loss was defined in IEC 62153-4-5, which defines a combination of the shielding effect (if present) and the electrical symmetry of the line circuits. Coupling attenuation can thus be regarded as an application-oriented simulation of the network operation.



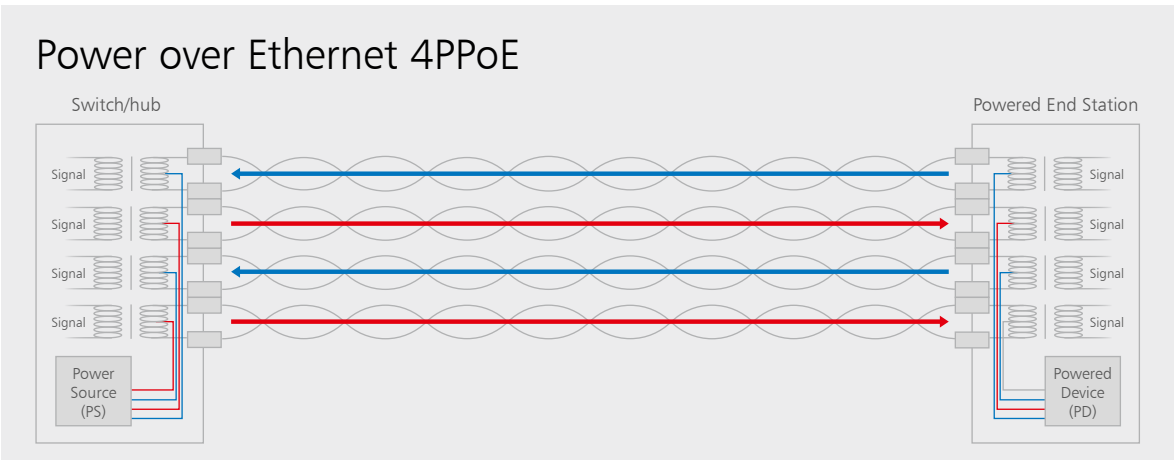
CABLE HARNESS DESIGN			COUPLING RESISTANCE		COUPLING LOSS 30 MHz - 100 MHz
S/FTP	Grade 1: f/MHz	1 10 30 100	RK/mΩ/m	10 10 30 60	Type 1: 85 dB
U/FTP	Grade 2: f/MHz	1 10 30 100	RK/mΩ/m	50 100 200 1000	Type 2: 55 dB
U/UTP		n/a		n/a	Type 3: 40 dB

Limit values for shielding parameters according to IEC 61156-5

The table shows a comparison of requirements for cables for the structured cabling, whereby the assignment of the cable types to the performance classes corresponds to the typical measurement results. This shows that although a UTP cable suppresses interference voltages by a factor of 100 (= 40 dB), an S/FTP cable brings it to a factor of 30 000 (= 85 dB).

Remote Powering, Power over Ethernet 4PPoE

Remote powering via data networks will allow the power supply of up to 100 watts. This is almost five times as much as previously. The corresponding standard IEEE 802.3bt is currently being worked on. With 4PPoE, more powerful devices can be powered via network cables. This enables the omitting of a parallel power cabling. However, the twisted-pair copper cables heat up and their insertion loss increases. It is important to take this into account from the very beginning of a cabling project. This creates new demands for the installation of data networks. Therefore, the cable heating and through a remote powering to be accounted for during a cabling project. Thick cable bundles and heat accumulation in cable ducts should be avoided. Higher temperatures increase the line resistance and attenuates the signal transmission, which reduces the possible line distance of a link. The heating of the cable by the current transmission can increase the attenuation of a cable to such an extent that a data transmission is severely restricted or even impossible. We recommend using larger conductor cross-sections and shielded cables for longer cabling distances. These heat up less excessively.

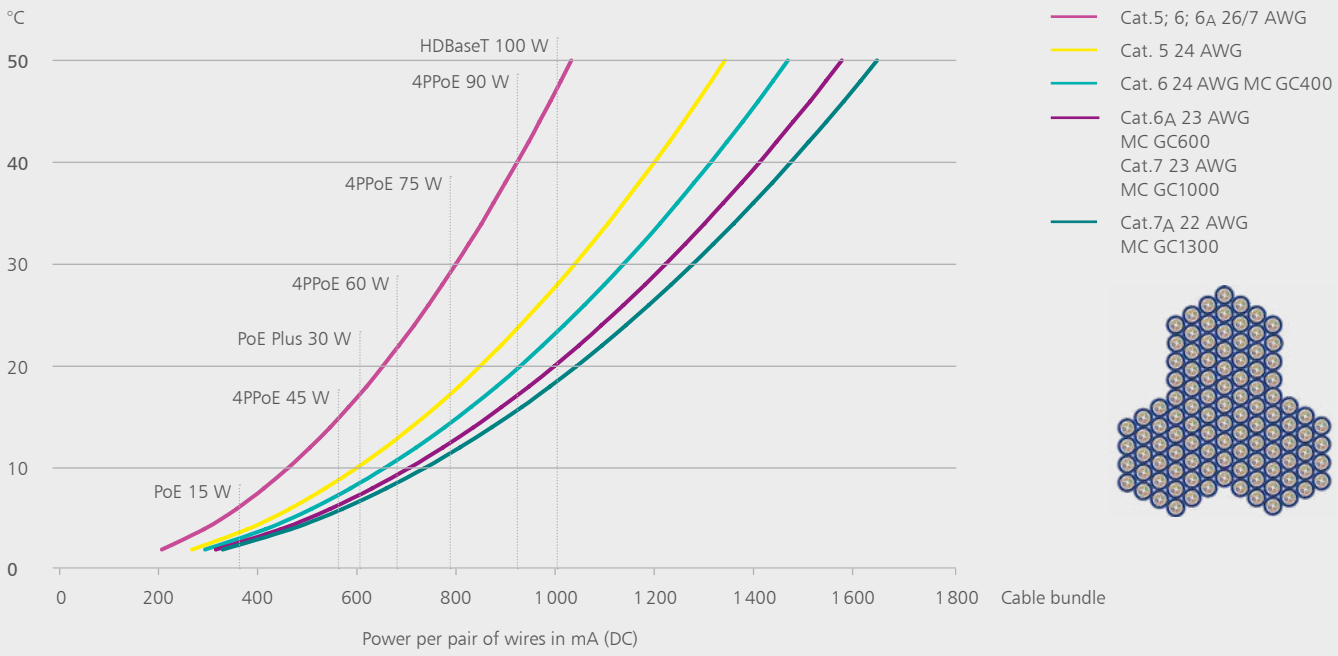


TEMPERATURE RISE FOR CABLES BY CATEGORY IN RELATION TO THE NUMBER OF LOADED WIRE PAIRS (1000 MA/PAIR) (4PPOE WITH 100 W)

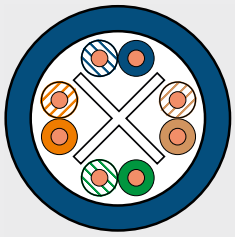
CABLE CATEGORY	Cat.5; 6; 6A	Cat.5	Cat.6	Cat.6A	Cat.7	Cat.7A
Wire diameter	26/7 AWG	24 AWG	24 AWG	23 AWG	23 AWG	22 AWG
METZ CONNECT cable type	Patch cord 130845xxyy DCCS 26/1		MC GC400	MC GC600	MC GC1000 DCCS 23/1	MC GC1300
Number of pairs with 1000 mA load						Temperature increase °C
24	2,8	1,7	1,4	1,2	1,2	1,1
48	5,6	3,3	2,8	2,4	2,4	2,2
96	11,3	6,7	5,5	4,8	4,8	4,4
144	16,9	10	8,3	7,2	7,2	6,7
192	22,6	13,3	11,1	9,6	9,6	8,9
200	23,5	13,9	11,6	10	10	9,3
236	27,7	16,4	13,6	11,8	11,8	10,9
284	33,4	19,7	16,4	16,4	14,2	13,1
332	39	23,1	19,2	16,6	16,6	15,4
380	44,7	26,4	21,9	19	19	17,6
400	47	27,8	23,1	20	20	18,5

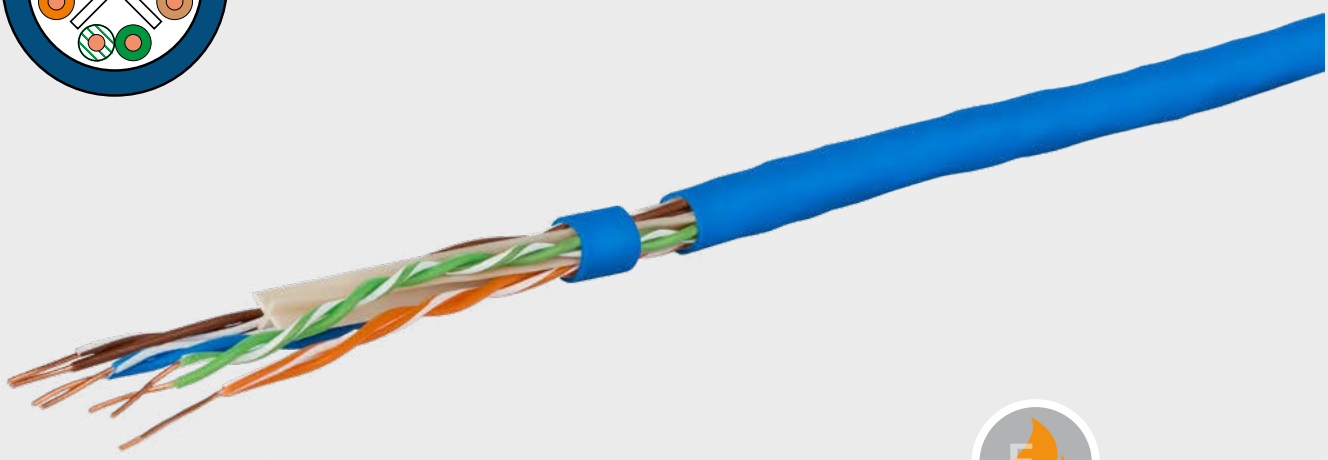
The temperature rise (°C) is based on a current load of 1000 mA in each pair of loaded wires, and the data on the assumed DC resistances of the individual cable types.

Worst case temperature increase in a 100th cable bundle



Copper data cable





GC400 SL23 Cat.6 U/UTP LSHF

Cable design

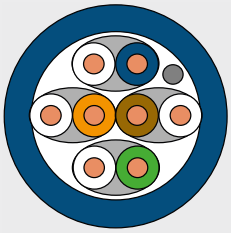
Copper wire insulated with polyethylene, stranding 4 pairs to core with non-metallic separation element in the core, 2 wires per pair, protective sheath LSHF (FRNC), Flame Retardant to IEC 60332-1; IEC 60754-2 and IEC 61034.

Areas of application

Data copper installation cable for use in primary, secondary and tertiary areas in the structured building cabling according to EN 50173-1, EN 50288-6-1, ISO/IEC 11801 Ed.2, IEC 61156-5 and EIA/TIA 568-C.2

CHARACTERISTICS		
Outer diameter (mm)		5.3
Fire load (MJ/km)		316
Weight (kg/km)		36
Tensile force (N)		100
Bending radius (mm)	without strain relief	≥ 21.2
	with strain relief	≥ 42.4
Cu number		18.1
Operating temperature range (°C)	resting	-20 to +60
	moved	0 to +50
Fire class		Eca

Copper data cable



GC600 F1 23 Cat.6_A U/FTP 4P LSHF

Cable design

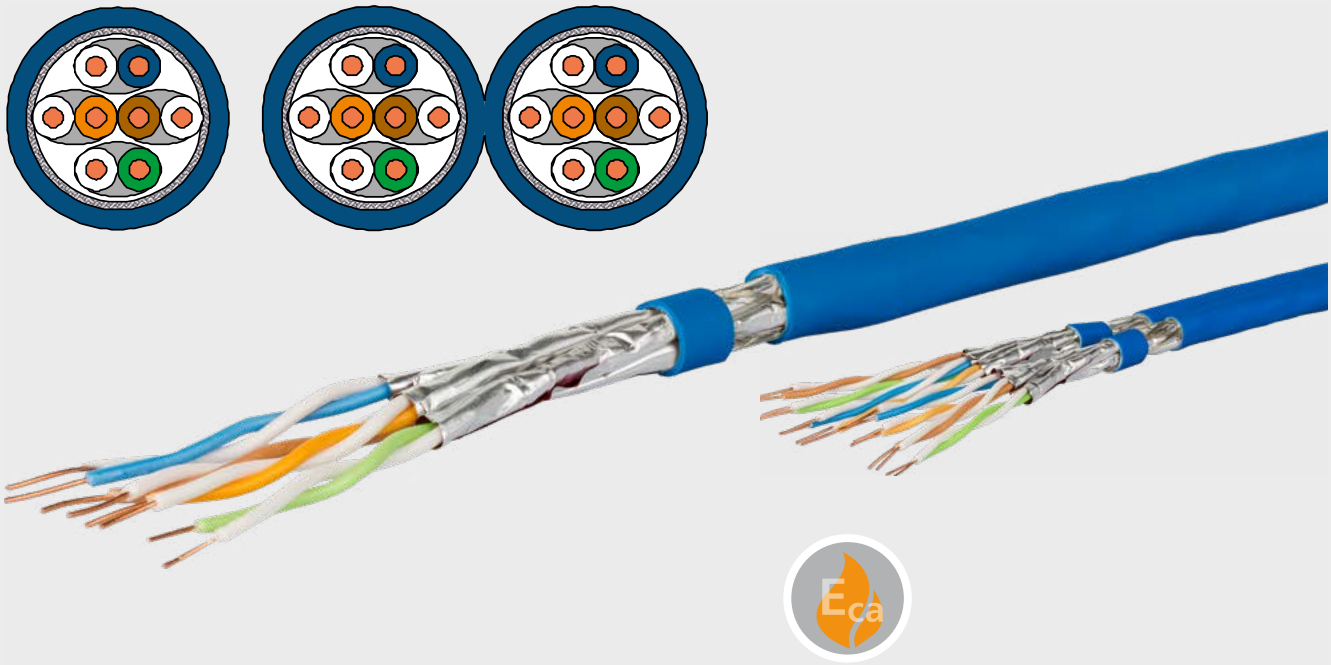
Copper wire insulated with polyethylene, stranding 4 pairs to core with non-metallic separation element in the core, 2 wires per pair, primary sheath LSHF, interrupted film as separation layer to the protective sheath, protective sheath LSHF (FRNC), flame-resistant pursuant to IEC 60332-1; IEC 60754-2 and IEC 61034.

Areas of application

Data copper installation cable for use in primary, secondary and tertiary areas in the structured building cabling according to EN 50173-1, EN 50288-11-1, ISO/IEC 11801 Ed.2, IEC 61156-5 and EIA/TIA 568-C.2.

CHARACTERISTICS		
Outer diameter (mm)		7.0
Fire load (MJ/km)		732
Weight (kg/km)		46
Tensile force (N)		100
Bending radius (mm)	without strain relief	≥ 28
	with strain relief	≥ 56
Cu number		21
Operating temperature range (°C)	resting	-20 to +60
	moved	0 to +50
Fire class		Eca

Copper data cable



GC1000 plus23 Cat.7 S/FTP 4P und 2 x 4P LSHF

Cable design

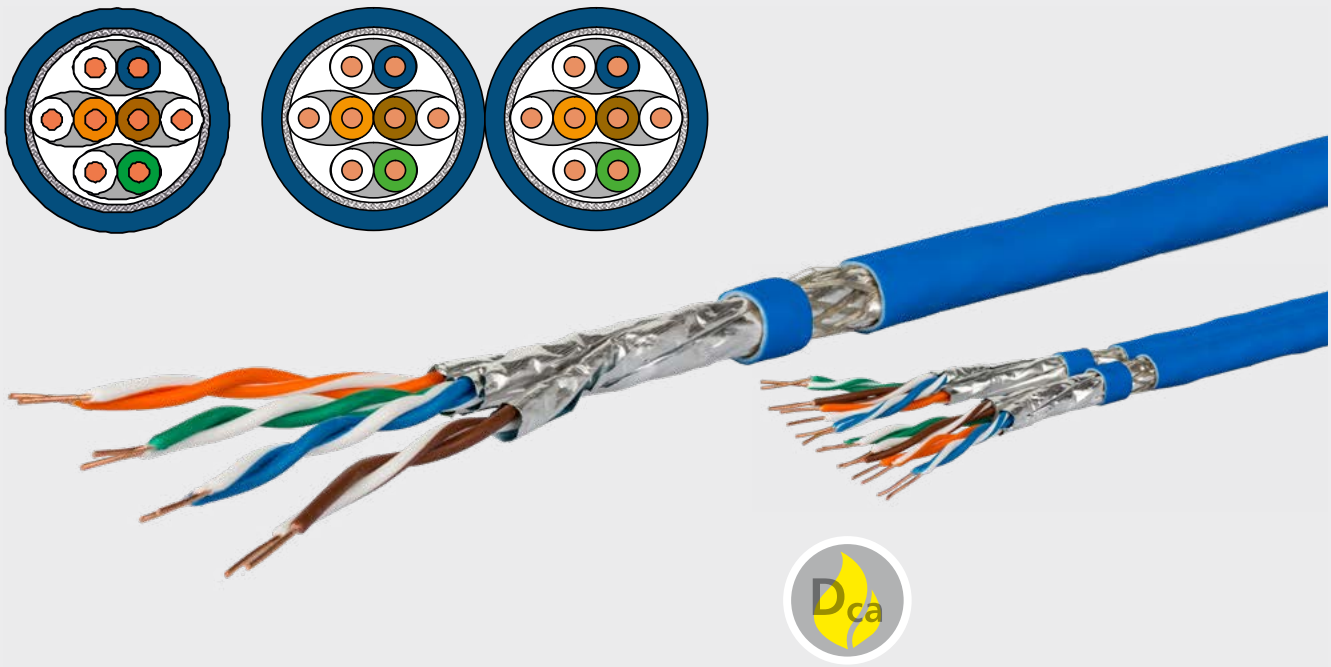
Copper wire insulated with foam-skin polyethylene, stranding 4 pairs (PiMF) to core, 2 cores to pair, pair shielding plastic composite foil, aluminium coated, copper braiding tin-plated, protective sheath LSHF (FRNC), Flame Retardant to IEC 60332-1; IEC 60754-2 and IEC 61034.

Areas of application

Data copper installation cable for use in primary, secondary and tertiary areas in the structured building cabling according to EN 50173-1, EN 50288-4-1, ISO/IEC 11801 Ed.2 and IEC 61156-5.

CHARACTERISTICS		SIMPLEX	DUPLEX
Outer diameter (mm)		7,0	15,0
Fire load (MJ/km)		590	1 190
Weight (kg/km)		54,5	109,2
Tensile force (N)		110	220
Bending radius (mm)	without strain relief	≥ 40	
	with strain relief	≥ 80	
Cu number		26	52
Operating temperature range (°C)	resting	-20 to +60	
	moved	0 to +50	
Fire class		E_{ca}	

Copper data cable



MC GC1300 pro22 Cat.7_A S/FTP 4P und 2 x 4P LSHF-FR

Cable design

Copper wire insulated with foam-skin polyethylene, stranding 4 pairs (PiMF) to core, 2 cores to pair, pair shielding plastic composite foil, aluminium coated, copper braiding tin-plated, protective sheath LSHF-FR (FRNC-FR) = Low Smoke Halogen Free Flame Retardant, Flame Retardant according to IEC 60332-1; IEC 60754-2; IEC 61034 and IEC 60332-3-24.

Areas of application

Data copper installation cable for use in primary, secondary and tertiary areas in the structured building cabling according to EN 50173-1, EN 50288-9-1, ISO/IEC 11801 Ed.2, IEC 61156-5.

CHARACTERISTICS		SIMPLEX	DUPLEX
Outer diameter (mm)		7,5	15,1
Fire load (MJ/km)		660	1 350
Weight (kg/km)		66	123
Tensile force (N)		140	280
Bending radius (mm)	without strain relief	≥ 30	≥ 60,4
	with strain relief	≥ 60	≥ 120,8
Cu number		35	70
Operating temperature range (°C)	resting		-20 to +60
	moved		0 to +50
Fire class			D_{ca}

Product overview copper

TYPE	BANDWITH	CLASS	CATEGORY	AWG	PAIRS	PACKING	P/N
	10 GBit	F	Cat.7	23/1	4P	Drum: 500 m	1308427032141
	10 GBit	F	Cat.7	23/1	4P	Drum: 1000 m	1308427032142
GC1000plus23 LSHF	10 GBit	F	Cat.7	23/1	2x4P	Drum: 500 m	1308427032143
	10 GBit	F	Cat.7	23/1	2x4P	Drum: xx m	1308427032144
	10 GBit	F	Cat.7	23/1	4P	Drum: xx m	130842703214M
	25/10 GBit	FA	Cat.7_A	22/1	4P	Drum: 500 m	1308427B34141
	25/10 GBit	FA	Cat.7_A	22/1	4P	Drum: 1000 m	1308427B34142
GC1300pro LSHFFR	25/10 GBit	FA	Cat.7_A	22/1	2x4P	Drum: 500 m	1308427B34143
	25/10 GBit	FA	Cat.7_A	22/1	2x4P	Drum: xx m	1308427B34144
	25/10 GBit	FA	Cat.7_A	22/1	4P	Drum: xx m	1308427B3414M
	10 GBit	EA	Cat.6_A	23/1	4P	Drum: 500 m	1308436A32141
GC600 F1 23 LSHF	10 GBit	EA	Cat.6_A	23/1	4P	Drum: 1000 m	1308436A32142
	10 GBit	EA	Cat.6_A	23/1	4P	Drum: xx m	1308436A3214M
	1 GBit	E	Cat.6	23/1	4P	Box: 305 m	1308406032140
GC400 SL U/UTP LSHF	1 GBit	E	Cat.6	23/1	4P	Drum: 500 m	1308406032141
	1 GBit	E	Cat.6	23/1	4P	Drum: 1000 m	1308406032142

Detailed knowledge within seconds

Our website www.metz-connect.com will provide you with comprehensive information on all technical details.

Here, you will find data sheets and also all connectors for our cables and lines at:
www.metz-connect.com/en/configurator-copper-and-fiber-optique-cables

Notes:

Online cable configurator –

quick and easy.

Whether you're planning a new network cable system or expanding an existing installation – the fastest and simplest route to an individual data network is to use pre-assembled installation cables.

That's exactly what the METZ CONNECT cable configurators offer in a convenient online tool.

Attractive design, simple, intuitive operation and the ability to run directly in your browser without installing any additional software. Just a few options to select and you're ready to set up a wide range of cable assemblies for configuring and requesting structured cabling.

You get all the key information for every configuration: article number, brief description, tender text and sale price. The list price can be discounted directly using your discount level.

Various cable types can be configured: from pre-assembled fibre optic installation cable to fibre optic patch cable to IP-protected copper and fibre optic lines. A wide range of configurations is possible. Added features include a selection of suitable patch fields and the option to see detailed product information sheets.

Wide range of production depth in Fiber optics and copper manufacture

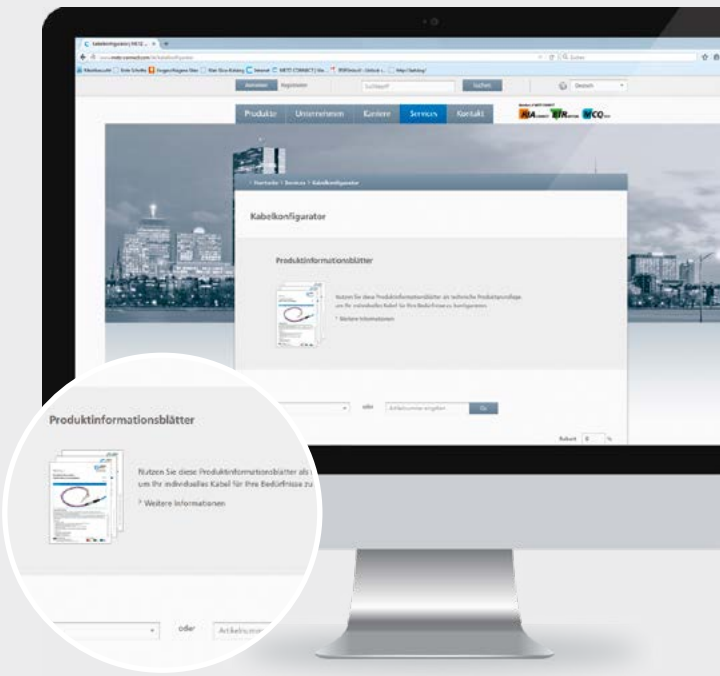
METZ CONNECT's cable configurator is always at the cutting edge. It is regularly expanded with new functions and product options.

Please give us a call if your specific cabling needs cannot be realised in the cable configurator. Our wide range of fibre optics products which we manufacture in-house helps us to specify your special cable specifications.

More information is available in our product information sheets for the cable configurator. These provide all the product specification details. This includes information about the actual design of pre-assembled installation cable (VIK), the different variants for cable distributors and associated order numbers.

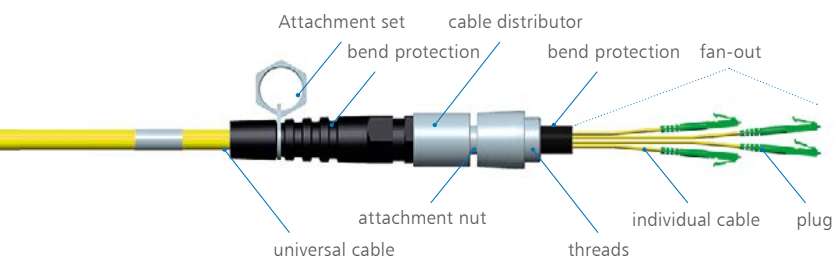
Dimensions and packaging types are provided in addition to mechanical data and performance values for individual components. Detailed information is given on fan-out protection variants and attachment options for the cables.

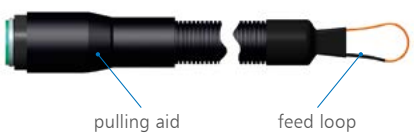
Of course, METZ CONNECT optical parameters, such as insertion and return loss, are also specified in the product information.



Excerpt from the product information: „VIK with universal cable".

Design (labelling)





Specifications

up to 12 fibers

up to 24 fibers

up to 48 fibers

METZ CONNECT GmbH is member of the following organizations and associations.

METZ CONNECT GmbH
Im Tal 2
78176 Blumberg
Germany

Phone +49 7702 533-0
Fax +49 7702 533-189

info@metz-connect.com
www.metz-connect.com

METZ CONNECT USA Inc.
200 Tornillo Way
Tinton Falls, NJ 07712
USA
Phone +1-732-389-1300
Fax +1-732-389-9066

METZ CONNECT France SAS
28, Rue Schweighaeuser
67000 Strasbourg
France
Phone +33 3886 17073
Fax +33 3886 19473

METZ CONNECT Zhongshan Ltd.
Ping Chang Road
Ping Pu Industrial Park
Sanxiang Town
Zhongshan City, 528463
Guangdong Province
China
Phone +86 760 86365055
Fax +86 760 86365050

METZ CONNECT Asia Pacific Ltd.
Suite 1803, 18/F
Chinachem Hollywood Centre,
1 Hollywood Road, Central
Hong Kong
Phone +852 26 027 300
Fax +852 27 257522

899354-01 | 03/2020