

P | Cabling

# Cables and Lines

Intelligent Cabling with Copper and Fiber Optic Cables



Members of METZ CONNECT

# Cable concepts with perspective

Globally, the importance of networks is ever increasing. The principles of universal, transparent information – from everywhere and at any time – and communication with devices mapping different processes – define more and more our everyday life. And all of this depends on reliable connection technology. To establish perfect connections, is the core competence of METZ CONNECT.

The decision between fiber-optic or copper data cables as ideal solution for connection to the workstation depends on many factors such as the application environment, the previous network base and the planning period. Whatever you decide, either fiber-optic or copper data cables from METZ CONNECT, optimally tailored to the requirements of all structural levels of local networks, you are always on the safe side for the future.

## Freedom of choice

For each application, the right equipment: Whether you need high transmission power, electromagnetic compatibility (EMC) or optimum fire protection properties – we can supply you with the optimum data cable for every application! We support you and give you advice on all aspects of mounting and installation.

## Speed

The requirements of modern networks are very high. Speed and transmission properties are becoming more and more important. Gigabit Ethernet offers enormous potentials for the future. Planning security is an important factor, because today's cable concepts must be able to accommodate also tomorrow's further developments.

The cables and lines from METZ CONNECT support future-oriented and structured cabling. The product range adapted to many fields of application, ranging from Cat.6 to Cat.7 and Cat.7<sub>A</sub>, allows maximum transmission rates.

Our cable series are designed such that each cable also allows cable sharing (mixed operation) at the level of the respective lower transmission class.

Jointly with our innovative partner Draka, this allows us to offer you cable concepts perfectly tuned to one another and with perspective – We realize ideas!

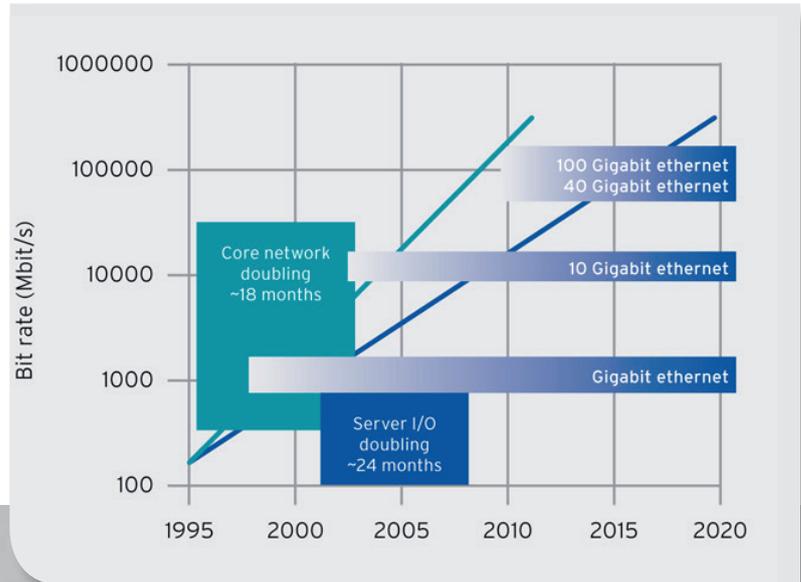
Type	Bandwidth	Class	Category	
GC400	1 GBit	E	Cat.6	
GC600	10 GBit	E <sub>A</sub>	Cat.6 <sub>A</sub>	
GC1000	10 GBit	F	Cat.7	
GC1200	10 GBit	F <sub>A</sub>	Cat.7 <sub>A</sub>	
GC1500	10 GBit	F <sub>A</sub>	Cat.7 <sub>A</sub>	

# Application in LAN – Local Area Network

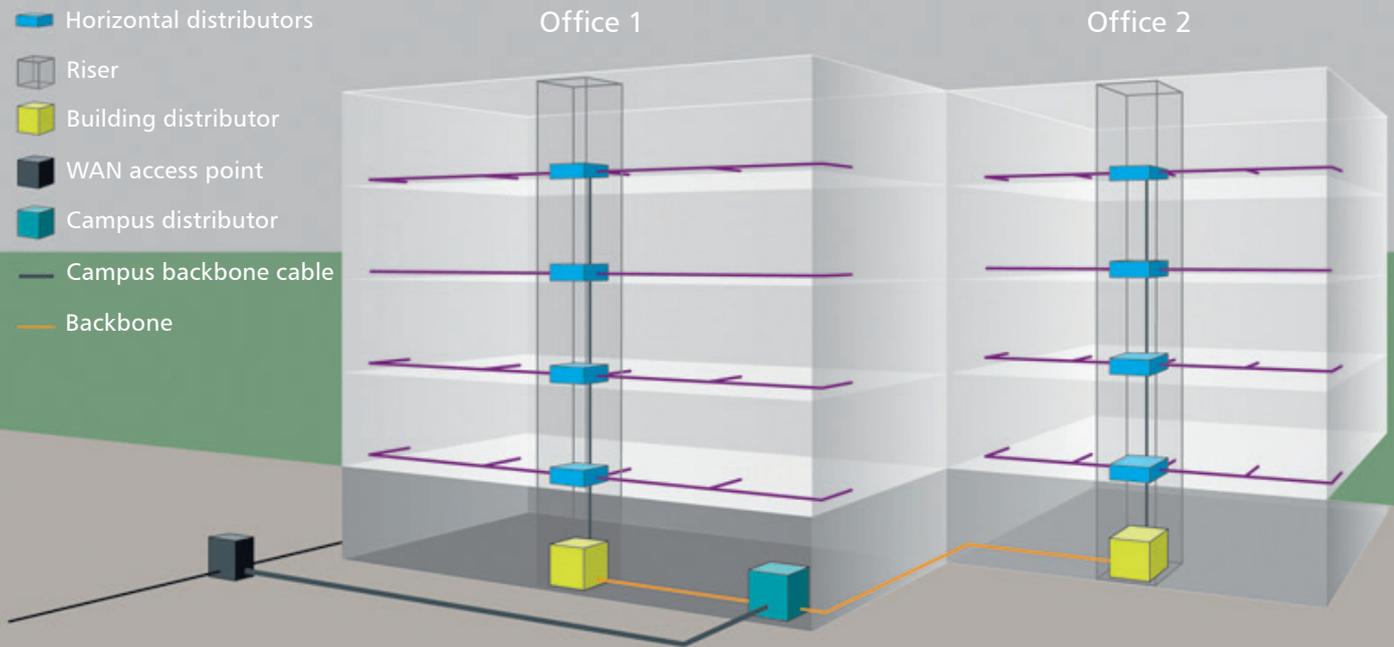
## Flexibility

Our high-quality cables are used wherever the objective is to achieve high-speed data transmission in local networks (LAN). To this end, the cables are used for standardized and manufacturer-independent networks – whether token ring, Ethernet, ISDN, TPDDI, Fast Ethernet 100BaseTX, ATM, Gigabit Ethernet 1000BaseT or even 10 GbE. In addition to voice and data communication, our solutions are also suitable for video communication.

Our product range comprises, among other things, installation and connection cables, tested for compatibility using common connection components. We thus guarantee maximum operational reliability.



- Horizontal cables (FTTD)
- Horizontal distributors
- Riser
- Building distributor
- WAN access point
- Campus distributor
- Campus backbone cable
- Backbone



# Application in data centers

Every data center is subject to a particular structure. There are different environments that have different requirements, for each of which specific solutions must be found.

Data center backbones are already today equipped with fiber-optic technology. Due to their low attenuation, fiber-optic cables offer the basic requirement for backbone data connections over large distances and at high data rates.

At a data center, they are already today the infrastructure component that has to carry the highest data traffic load.

As soon as the changeover to 10 GBit Ethernet will have been made at the client level, a data center backbone as connection between the access and distribution levels and also equipped with 10 GBit Ethernet will soon become a bottleneck. Even though distances of up to 100 m can also be achieved at 10 GBits/s with copper data cables, laser-optimized multimode fibers of the OM3 or OM4 type are expected to provide more security for the future. 40 GBit Ethernet – as well as 100 GBit Ethernet – are based on a multilane version of OM3 and OM4 connections. An infrastructure designed today for fiber-optic cables according to OM4 can be expanded later on to a network suitable for 40 GBit Ethernet and more.

Specifically for the protected, but demanding environment of data centers, small dimensions and simple installation are required. Here METZ CONNECT can offer new and innovative cables for such high-fiber applications. These highly advanced cables have been developed for use with cutting edge connection technology on the market, such as that of the MPO/MTP® connections. The cables are available in different designs with different fiber types and thus meet all high-fiber cabling requirements in data centers.



# Application in industry

Convergence of the worlds of office and industrial cabling is gaining momentum. Ethernet is becoming more and more mainstream also in industrial automation. Although bus solutions are still encountered, Ethernet has the additional advantage of also offering the option of managing communication. Local access to each individual point in the network makes adjustments and changes a manageable undertaking that promises low downtimes and increased productivity.

Our fiber-optic and copper data cables are the right choice for Ethernet in the rough industrial environment. This is where the advantages of our cables come fully into play in terms of their mechanical, chemical and climatic stability.



## Important cabling standards

### International standardization

- ▶ ISO/IEC 11801 (2011) Information Technology Application-neutral cabling systems
- ▶ ISO/IEC 24702 (2006) Information Technology Industrial cabling
- ▶ ISO/IEC 24764 (2010) Information Technology Data center cabling
- ▶ ISO/IEC 15018 (2004) Information Technology Home cabling

### European standardization

- ▶ EN 50173-1 (2011) Information Technology Part 1: General section
- ▶ EN 50173-2 (2011) Information Technology Part 2: Office cabling
- ▶ EN 50173-3 (2011) Information Technology Part 3: Industrial cabling
- ▶ EN 50173-4 (2011) Information Technology Part 4: Home cabling
- ▶ EN 50173-5 (2011) Information Technology Part 5: Data center cabling
- ▶ prEN 50173-6 (2012) Information Technology Part 6: Application independent communication cabling systems



# Fire behavior

For years, flame retardance has been part of the minimum requirements of interior cables. Frequently PVC cables were used. Despite their low inflammability, they do not prevent fire propagation. They can even release strongly corrosive and toxic gases. High-quality LSHF (FRNC) materials having substantially improved properties in the event of a fire provide a proven and future-proof alternative to PVC cables.

## Protective LSHF sheath (Low Smoke Halogen Free)

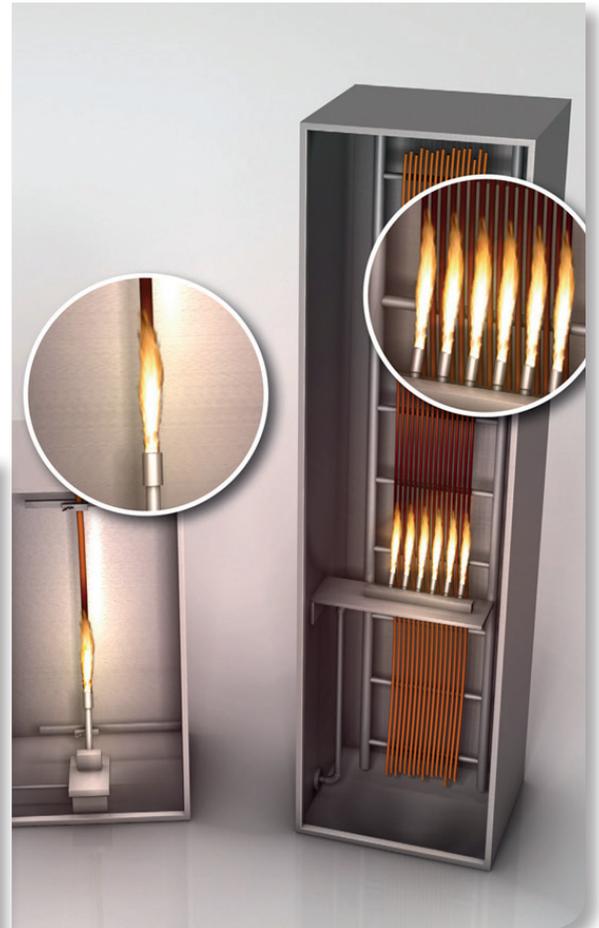
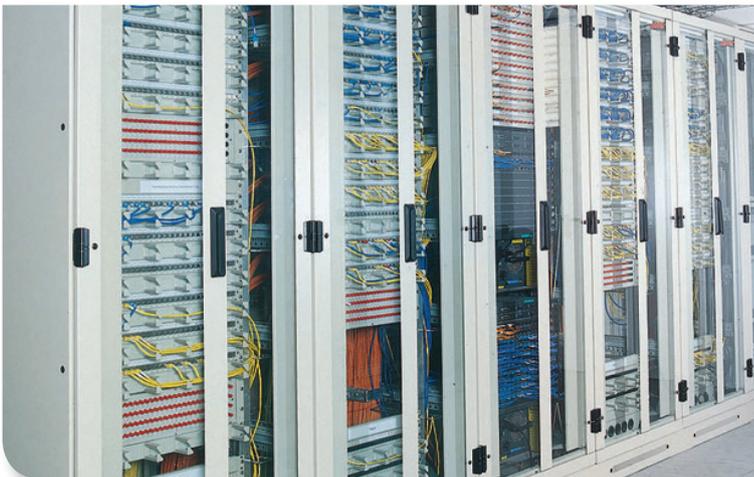
What are the advantages of halogen-free cables?

- In the event of a fire, no corrosive gases that could cause substantial damage to man and buildings are released.
- No hydrogen chloride gas forming hydrochloric acid upon reaction with water is formed.
- The proportion of toxic gases is minimized, i.e., no irritation of the mucous membranes and eyes
- Halogen-free cables have low inflammability and low fire propagation, thus avoiding the dreaded wick effect.
- Due to the small amount of smoke, escape routes remain visible for people escaping from a fire and for the fire brigade.

## Safety areas

Maximum safety precautions in cabling are required in places with large gatherings of people, e.g. hospitals, airports, schools, department stores, hotels, in installations with a high concentration of commodity values and wherever a breakdown would result in high costs, e.g. industrial plants, electric power stations, EDP centers, banks, power plants and generally in alarm, signal and control systems.

Behavior in case of fire	International standard	Data cable with LSHF sheathing	Data cable with LSHF-FR sheathing
Fire behavior/fire propagation on individual cable samples	IEC 60332-1	✓	✓
Fire propagation on loose tube cable	IEC 60332-3-24		✓
Corrosivity of fire gases	IEC 60754-2	✓	✓
Measurement of the smoke-gas density	IEC 61034-1	✓	✓





# Bend-insensitive single-mode OS2 fiber with reduced OH absorption: BendBright-XS®

The BendBright-XS® fiber is distinguished by a particularly high bend insensitivity. In addition, it belongs to the so-called Low Water-Peak fibers having reduced OH absorption, thus exhibiting low attenuation over the entire wavelength range between 1260 and 1625 nm. This combination allows unlimited use for a large number of applications.

Apart from its use in office installations – as patch or connection cable – the BendBright-XS® fiber offers important advantages to the network installer for fiber-to-the-home networks. Thus, both the bending radii and the minimum bending radii in wall and corner mounting can be reduced.

Moreover, their extended macrobending behavior guarantees that all transmission bands up to 1625 nm (L band) are also available for future use. Thus, BendBright-XS® fibers guarantee future-proof fiber-optic cabling.

Product features	Advantages
Low macrobending losses at very small radii ( $\leq 15$ mm)	<ul style="list-style-type: none"> <li>• More compact installations, since fiber overlengths can be stowed away with smaller radii.</li> <li>• Installation errors in fiber management systems or splice boxes have fewer adverse effects</li> </ul>
Compatible with installations containing standard single-mode fibers (G.652.D)	<ul style="list-style-type: none"> <li>• The BendBright-XS® fiber can be spliced using settings of the fusion splice program similar to those of other G.652 fibers</li> <li>• The BendBright-XS® can be spliced with other G.652 fibers almost loss-free using standard fusion splice devices</li> </ul>

The fiber complies with or surpasses the following international specifications:

- IEC 60793-2-50 type B.1.3 and B6\_a/b
- ITU-T recommendations G.657.A2, G.657.B2 (2009) and G.652.D (2009)

It is down-compatible with all G.652 fibers currently in use for fiber-optic networks.

SM fiber types 9/125 $\mu$ m	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 for the access network"				
Category	G.657.A		G.657.B	
Fiber type	Compatible with G.652		Incompatible with G.652	
Applications	<ul style="list-style-type: none"> <li>• Outdoor installations and building cabling</li> <li>• All bandwidths: 1260 to 1625 nm</li> <li>• No range limitation</li> </ul>		<ul style="list-style-type: none"> <li>• Building cabling</li> <li>• Limited bandwidths: 1310, 1550 and 1625 nm</li> </ul>	
Subcategory	A.1	A.2	B2	B3
Bending performance	10-fold improvement compared with G.652	10-fold improvement compared with G.657.A1	10-fold improvement compared with G.657.A1	3-fold improvement compared with G.657.B2 for 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: MaxCap-BB<sup>®</sup> OM2, OM3 and OM4

The MaxCap-BB<sup>®</sup>-OMx fibers are distinguished by a particularly high bend insensitivity. In addition, due to their special structure, they are optimized in particular for high-bit-rate transmissions by means of VCSEL laser.

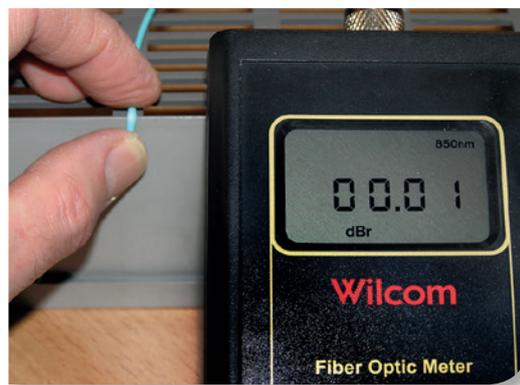
All versions (OM2, OM3 and OM4) are gradient fibers having a core of 50  $\mu\text{m}$  and an outer diameter of 125  $\mu\text{m}$ . MaxCap-BB<sup>®</sup>-OM2 fibers are fully compatible with conventional standard OM2 fibers. However, mixed use of OM2, OM3 and OM4 is not possible, due to their different refractive index profiles and thus different mode distributions.

### MaxCap-BB<sup>®</sup>-OM3 compared with standard OM3 multimode fiber in bending test

2-mm interior cable tested at an angle of 90°



Standard OM3: 2.75 dB



MaxCap-BB-OM3: 0.01 dB



# Optical properties of OpDAT cables

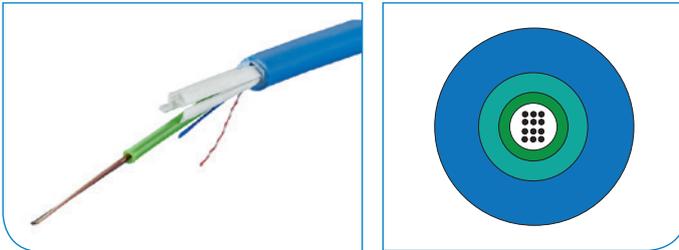
With SM fiber type		BendBright-XS <sup>®</sup>
ISO/IEC 11801/EN 50173		OS2
IEC 60793-2-50		B.1.3 and B6_b
ITU-T		G.657.A2, G.657.B2 and G.652.D
Attenuation	from 1310 to 1625 nm	≤ 0.38 dB/km
Bending loss with 1 winding of R = 7.5 mm	at 1550 nm	≤ 0.5 dB/km
Bending loss with 10 windings of R = 15 mm	at 1550 nm	≤ 0.03 dB/km
Bending loss with 100 windings of R = 25 mm	at 1310/1550/1625 nm	≤ 0.01 dB/km
Range	1000BASE LX 10GBASE L 10GBASE EW/ER 40GBASE LR4 100GBASE ER4	5 km 10 km 40 km 10 km 10 km

With MM fiber type		MaxCap-BB <sup>®</sup> -OM2	MaxCap-BB <sup>®</sup> -OM3	MaxCap-BB <sup>®</sup> -OM4
ISO/IEC 11801 / EN 50173		OM2	OM3	OM4
IEC 60793-2-10/ EN 60793-2-10		A1.a.1	A1.a.2	A1.a.3
TIA/ANSI-492		AAAB	AAAC	AAAD
OFL bandwidth [MHz x km]	at 850 nm at 1300 nm	≥ 500 ≥ 500	≥ 1500 ≥ 500	≥ 3500 ≥ 500
EMB bandwidth [MHz x km]	at 850 nm	-	≥ 2000	≥ 4700
Attenuation [dB/km]	at 850 nm at 1300 nm	≤ 2.7 ≤ 0.8	≤ 3.0 ≤ 1.0	≤ 3.0 ≤ 1.0
Bending loss with 2 windings of R = 7.5 mm	at 850 nm at 1300 nm	≤ 0.2 dB ≤ 0.5 dB	≤ 0.2 dB ≤ 0.5 dB	≤ 0.2 dB ≤ 0.5 dB
Bending loss with 2 windings of R = 15 mm	at 850 nm at 1300 nm	≤ 0.1 dB ≤ 0.3 dB	≤ 0.1 dB ≤ 0.3 dB	≤ 0.1 dB ≤ 0.3 dB
Bending loss with 2 windings of R = 75 mm	at 850 nm at 1300 nm			
Range	100BASE 1000BASE SX 1000BASE LX 10GBASE SW/SR 10GBASE LX4 40GBASE SR4	2 000 m 550 m 550 m 82 m 300 m -	2 000 m 1 000 m 550 m 300 m 300 m 100 m	2 000 m 1 000 m 550 m 550 m 300 m 150 m

# Installation cables

These cables have been designed for both indoor and outdoor use. They have an LSHF or LSHF-FR outer sheath, making them perfectly suitable for indoor use, where only limited flame propagation requirements apply. All used fibers are bend insensitive.

## OpDAT universal cable U-DQ(ZN)BH



### Cable structure

Cable with gel-filled loose tube. Sheathed glass rovings guarantee a sufficiently high tensile strength and a certain rodent protection. The cable is provided with a blue FireBur® LSHF sheath and is longitudinally waterproof.

Properties			
Number of loose tubes/fibers	1x4, 1x8, 1x12	1x24	4x12
Cable diameter (mm)	7.5	8.0	13.0
Weight (kg/km)	55	60	145
Installation tensile strength (N)	1500		
Smallest bending radius (mm)	60	160	
Compressive strength (N)	2 000		3 000
Operating temperature range (°C)	-30 to +70		-40 to +70
Color Cable sheath	OS2	Blue	
	OM2	Blue	
	OM3	Blue	
	OM4	Blue	

### Fields of application

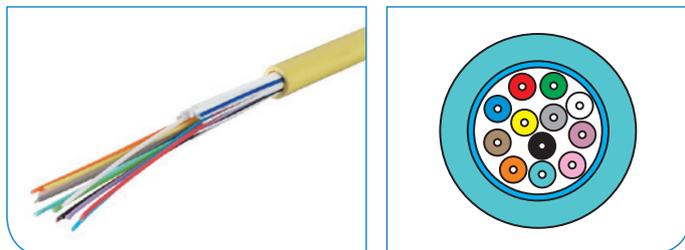
Suitable for medium to large distances in the LAN backbone, where robust and compact cables of medium compressive strength are required. The cable is suitable for installation in cable ducts, protective tubes and tunnels.

P/N	Color	Feature 1	Feature 2	EAN No.
150U04900000M	Blue	4 fibers	OS2	4250184172390
150U04500000M	Blue	4 fibers	OM3	4250184145363
150U04200000M	Blue	4 fibers	OM2	4250184145318
150U08900000M	Blue	8 fibers	OS2	4250184175193
150U08500000M	Blue	8 fibers	OM3	4250184151883
150U08200000M	Blue	8 fibers	OM2	4250184145325
150U12900000M	Blue	12 fibers	OS2	4250184145424
150U12700000M	Blue	12 fibers	OM4	4250184145417
150U12500000M	Blue	12 fibers	OM3	4250184145387
150U12200000M	Blue	12 fibers	OM2	4250184145332
150U24900000M	Blue	24 fibers	OS2	4250184150244
150U24700000M	Blue	24 fibers	OM4	4250184168089
150U24500000M	Blue	24 fibers	OM3	4250184145394
150U48900000M	Blue	48 fibers	OS2	4250184175209
150U48500000M	Blue	48 fibers	OM3	4250184145400



# Installation cables

## OpDAT mini breakout cable U-VQ(ZN)H



### Cable structure

Cable with easily detachable tight-buffered cable. A waterproof layer of sheathed glass rovings gives the cable the required tensile strength. The cable is provided with a FireRes®-LSHF-FR sheath.

### Fields of application

The cable is used in horizontal cabling in LAN backbones and where robust and easy-to-mount cabling is required. The cable is suitable for installation in cable ducts, protective tubes and cable troughs.

### Properties

Number of fibers	4	12	24
Cable diameter (mm)	5.4	7.1	8.7
Weight (kg/km)	29	53	79
Installation tensile strength (N)	440	900	1400
Smallest bending radius (mm)	50	50	60
Compressive strength (N)	2000		
Operating temperature range (°C)	-40 to +70		
Cable sheath color	OS2	Yellow	
	OM2	Orange	
	OM3	Aqua	
	OM4	Purple	

P/N	Color	Feature 1	Feature 2	EAN No.
150M049000000M	Yellow	4 fibers	OS2	4250184168621
150M045000000M	Aqua	4 fibers	OM3	4250184168645
150M047000000M	Purple	4 fibers	OM4	4250184168638
150M129000000M	Yellow	12 fibers	OS2	4250184145455
150M125000000M	Aqua	12 fibers	OM3	4250184145431
150M127000000M	Purple	12 fibers	OM4	4250184145448
150M249000000M	Yellow	24 fibers	OS2	4250184168652
150M245000000M	Aqua	24 fibers	OM3	4250184168676
150M247000000M	Purple	24 fibers	OM4	4250184168669

# Connecting cables

## Duplex cables for patch cords, connecting lines and pigtails

The cables are available with 900- $\mu\text{m}$  tight-buffered cables, aramide strain relief and an LSHF outer sheath. They are also highly suitable as connecting lines in indoor FTTH systems.

In addition, these cables are halogen-free and low-smoke and comply with the fire propagation regulation according to IEC 60332-3-24. The duplex cable is available in two designs.

With easily strippable tight-buffered fiber for general application. Ideally suitable for field-assembled connectors. All used fibers are bend insensitive.

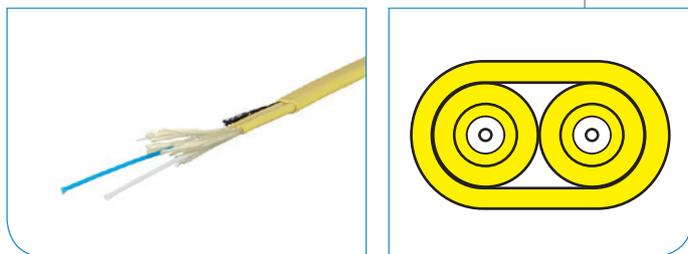
### Cable structure

The cables consist of two dry tight-buffered fibers, aramide as strain relief and a FireRes™ outer sheath.

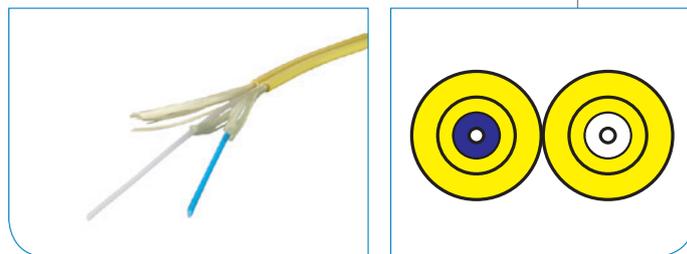
### Fields of application

Patch cables and connecting lines, in particular those for small-sized connectors with a ferrule diameter of 1.25 mm such as the LC connectors.

### OpDAT breakout cable I-V(ZN)HH



### OpDAT patch cable I-V(ZN)H



Properties		OpDAT patch cable I-V(ZN)H
Number of fibers		2
Cable diameter (mm)		3x5
Weight (kg/km)		18
Installation tensile strength (N)		240
Smallest bending radius (mm)		20
Compressive strength (N)		1000
Operating temperature range (°C)		-40 to +70
Color Cable sheath	OS2	Yellow
	OM2	Orange
	OM3	Aqua

P/N	Color	Feature 1	Feature 2	EAN No.
150B022000000M	Orange	2 fibers	OM2	4250184145462
150B025000000M	Aqua	2 fibers	OM3	4250184145479
150B029000000M	Yellow	2 fibers	OS2	4250184145486

Properties		OpDAT patch cable I-V(ZN)H
Number of fibers		2
Cable diameter (mm)		2.0x4.2
Weight (kg/km)		9
Installation tensile strength (N)		240
Smallest bending radius (mm)		7,5
Compressive strength (N)		2 000
Operating temperature range (°C)		-40 to +70
Color Cable sheath	OS2	Yellow
	OM2	Orange
	OM3	Aqua
	OM4	Purple

P/N	Color	Feature 1	Feature 2	EAN No.
150H1000M	Orange	2 fibers	OM2	4250184145554
150J1000M	Aqua	2 fibers	OM3	4250184145561
150S1000M	Purple	2 fibers	OM4	4250184150237
150P1000M	Yellow	2 fibers	OS2	4250184145578



## Sustainable cabling

10 GBit Ethernet is the next higher protocol after 1000Base T and is 10 times faster, has a higher bandwidth and higher performance. Transmission according to 10 GBit Ethernet is based on a "full-duplex mode" – i.e., across all cable pairs simultaneously in both directions (bidirectional) at transmission rates of 2.5 Gbits per pair.

Cables that are suitable for this must also comply with the "Alien Crosstalk" properties, apart from the transmission characteristics known from 1 GbE.

### Fault detection

Ethernet is working on the basis of a fault detection system. The receiver keeps requesting data packets until transmission has been completed without faults. In a malfunctioning system, the same information is transmitted again, resulting in transmission at a reduced speed.

From a certain noise level, transmission will break down. 10GbE has the lowest reserves of all Ethernet methods.

This is why high-quality components are required.



### System reserves

The aim of cabling standards is to ensure problem-free interaction of the individual components by means of defined system reserves. This allows plug-and-play up to 100 m of cabling by means of standardized components.

With 10GbE, this system reserve is maintained with components that are well-tuned to one another. With increasing bandwidth, the noise grows, independently of the components used. The system reserves defined in cabling standards such as TIA constitute the minimum required for minimum operational reliability.

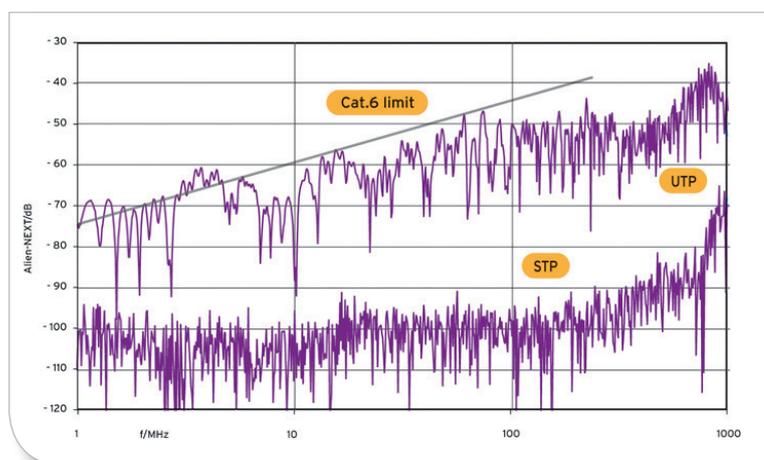
### Alien (Exogenous) Crosstalk

Alien Crosstalk is understood as meaning perturbation of the transmitted signal by superposition with noise introduced by all surrounding pairs. A larger distance between the pairs actually decreases the noise level in U/UTP cables, thus almost fulfilling the test criteria.

### Shielding

A method for improving the system reserve is based on shielding. The introduction of alien crosstalk can be completely suppressed by shielding of the components involved. The proven, patented foil wrapping method exactly provides the high-quality degree of shielding required for this.

This product selection makes the alien crosstalk test superfluous, which is also confirmed in the cabling standard.



Alien crosstalk requires shielding

## Sustainable cabling

### Signal delay and skew delay

The increased Gigabit Ethernet requirements have also increased the importance of signal delay and skew delay. The skew delay designates the transmission difference between the transmission times of two or more pairs.

### Transmission security

Due to the high data rates, data transmissions become increasingly susceptible to interferences. Insufficient cable quality creates additional sources of interferences, increasing the risk of transmission errors. Despite the high-speed protocol, the available data rates are not fully exploited and the network performance is not used. This is why you should opt for high-quality data cables with minimized interference susceptibility. You should invest in the future-proof power of your network.

## EMC – Electromagnetic compatibility

EMC defines the capability of a device of working satisfactorily in an electromagnetic environment without exerting an adverse effect (interference radiation) on other systems. In particular those interferences that act on its own system and thus cause, for example, a system failure are problematical. 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 telephone communication, stationary radio or radio/television stations, hand-held walkie-talkies and industrial HF sources. The use of cables with high-quality shielding saves later adjustment in case of subsequent installations.

### Shielding classes in copper cabling

To be able to evaluate the effect of shielding and non-shielding, measurement quantities are required that allow a comparison. The decisive factor for optimum shielding is the use of high-quality materials and the degree of shielding.

In IEC 61156-6, the parameters coupling attenuation and transfer impedance have been defined as shielding parameters.



# EMC – Electromagnetic compatibility

IEC61156-5 divides the transfer impedance into grade 1 (PiMF with braid) and grade 2 (PiMF). However, many users see this as too abstract.

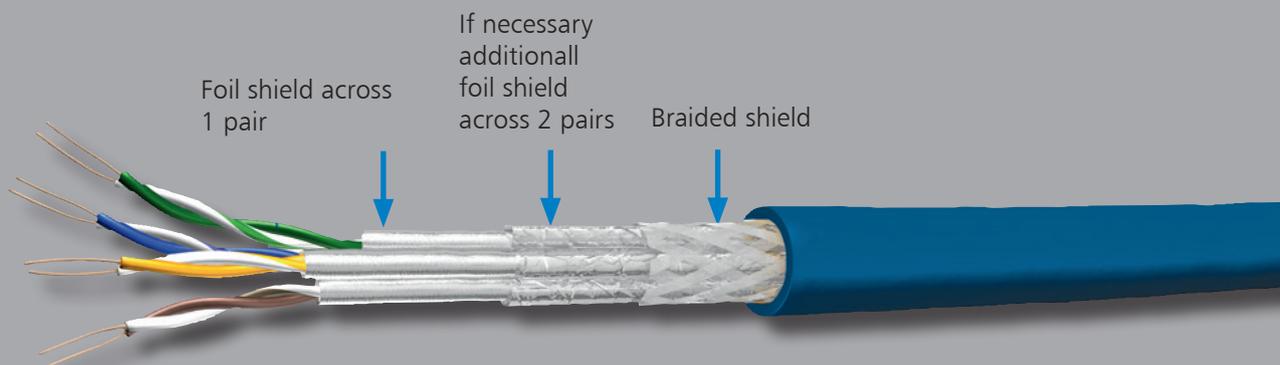
This is why, especially for the needs of structured cabling, the coupling attenuation parameter has been defined in IEC 62153-4-5, which defines a combination of the effect of the shield (if available) and the electrical symmetry of the line circuits. This allows coupling attenuation to be seen as application-oriented simulation of network operation.

The table shows a comparison of the cable requirements for structured cabling, the assignment of the cable designs to the performance classes corresponding to typical measurement results.

This clearly shows that a UTP cable suppresses interference voltages by a factor of 100 (= 40 dB), but an S/FTP cable does so by a factor of 30000 (= 85 dB).

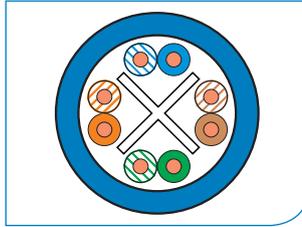
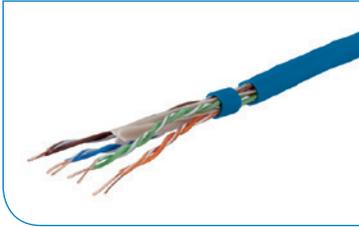
Cable design	Transfer impedance		Coupling attenuation 30 MHz - 100 MHz
S/FTP	Grade 1: f/MHz	RK/mΩ/m	Type 1: 85 dB
	1	10	
	10	10	
	30	30	
	100	60	
U/FTP	Grade 2:	RK/mΩ/m	Type 2: 55 dB
	1	50	
	10	100	
	30	200	
	100	1 000	
U/UTP	n/a		Type 3: 40 dB

Limit values for shield parameters according to IEC 61156-6



# Copper data cables

## GC400 SL23 Cat.6 U/UTP LSHF



### Properties

Outer diameter (mm)	5.3
Fire load (MJ/km)	316
Weight (kg/km)	36
Tensile strength (N)	100
Bending radius (mm)	
without strain relief	≥ 21.2
with strain relief	≥ 42.4
Copper index	18.1
Operating temperature range (°C)	
static	-20 to +60
moving	0 to +50

P/N	Color	Feature 1	Feature 2	EAN No.
1308406032140	Blue	305 m	box	4250184175216
1308406032141	Blue	500 m	drum	4250184175223
1308406032142	Blue	1000 m	drum	4250184175230

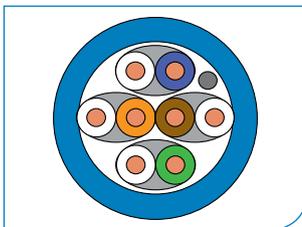
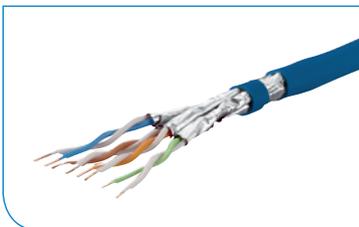
### Cable structure

Copper wire insulated with polyethylene, 4 pairs (PiMF) per core, 2 wires twisted to a pair, protective sheath LSHF (FRNC), flame-retardant to IEC60332-1; IEC60754-2 and IEC 61034.

### Fields of application

Copper data installation cables in the primary, secondary and tertiary areas in 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.

## GC600 F1 23 Cat.6<sub>A</sub> U/FTP 4P LSHF



### Properties

Outer diameter (mm)	7.0
Fire load (MJ/km)	732
Weight (kg/km)	46
Tensile strength (N)	100
Bending radius (mm)	
without strain relief	≥ 4 x 7.0
with strain relief	≥ 8 x 7.0
Copper index	21
Operating temperature range (°C)	
static	-20 to +60
moving	0 to +50

P/N	Color	Feature 1	Feature 2	EAN No.
1308436A3214M	Blue	xx m	drum	4250184175384
1308436A32141	Blue	500 m	drum	4250184175391
1308436A32142	Blue	1000 m	drum	4250184175407

### Cable structure

Copper wire insulated with polyethylene, 4 twisted pairs (PiMF) per core, 2 wires twisted to a pair, protective sheath LSHF (LSOH), flame-retardant to IEC60332-1; IEC60754-2 and IEC 61034.

### Fields of application

Copper data installation cables for use in the primary, secondary and tertiary areas in structured building cabling according to EN 50173-1, EN 50288-10-1, ISO/IEC 11801 Ed.2, IEC 61156-5 and EIA/TIA 568-C.2.



# Copper data cables

## GC1000 plus23 Cat.7 S/FTP 4P und 2x4P LSHF



Properties	simplex	duplex
Outer diameter (mm)	7.3	7.2 x 15.0
Fire load (MJ/km)	590	1 190
Weight (kg/km)	54.5	109.2
Tensile strength (N)	110	220
Bending radius (mm) without strain relief with strain relief	$\geq 40$ $\geq 80$	
Copper index	26	52
Operating temperature range (°C) static moving	-20 to +60 0 to +50	

P/N	Color	Feature 1	Feature 2	EAN No.
130842703214M	Blue	xx m	simplex	4250184175261
1308427032141	Blue	500 m	drum	4250184175247
1308427032142	Blue	1000 m	drum	4250184175254

### Cable structure

Copper wire insulated with foam-skin-polyethylene, 4 twisted pairs (PiMF) per core, 2 wires twisted to a pair, pair shielding plastic compound foil, aluminum-coated, copper braid tin-plated, protective sheath LSHF (FRNC), flame-retardant to IEC60332-1; IEC60754-2 and IEC 61034.

### Fields of application

Copper data installation cables in the primary, secondary and tertiary areas in structured building cabling according to EN 50173-1, EN 50288-4-1, ISO/IEC 11801 Ed.2, IEC 61156-5.

P/N	Color	Feature 1	Feature 2	EAN No.
1308427032144	Blue	xx m	duplex	4250184175285
1308427032143	Blue	500 m	drum	4250184175278

## GC1000 pro23 Cat.7 S/FTP 4P LSHF-FR



Properties	
Outer diameter (mm)	7.5
Fire load (MJ/km)	585
Weight (kg/km)	75.0
Tensile strength (N)	100
Bending radius (mm) without strain relief with strain relief	$\geq 30$ $\geq 60$
Copper index	38
Operating temperature range (°C) static moving	-20 to +60 0 to +50

P/N	Color	Feature 1	Feature 2	EAN No.
130842703414M	Blue	xx m	simplex	4250184175315
1308427034141	Blue	500 m	drum	4250184175292
1308427034142	Blue	1000 m	drum	4250184175308

### Cable structure

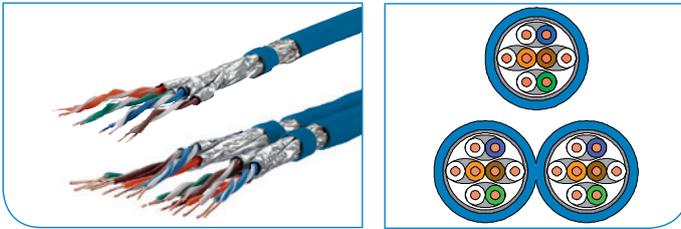
Copper wire insulated with foam-skin-polyethylene, 4 twisted pairs (PiMF) per core, 2 wires twisted to a pair, pair shielding plastic compound foil, aluminum-coated, copper braid tin-plated, protective sheath LSHF FR (FRNC-FR) = Low Smoke Halogen Free, flame-retardant to IEC60332-1; IEC60332-3-24; IEC60754-2 and IEC 61034.

### Fields of application

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

# Copper data cables

## GC1200 pro22 Cat.7<sub>A</sub> S/FTP 4P und 2x4P LSHF-FR



Properties	simplex	duplex
Outer diameter (mm)	7.8	16.4
Fire load (MJ/km)	650	1 300
Weight (kg/km)	65.1	131
Tensile strength (N)	120	240
Bending radius (mm) without strain relief	≥ 32	
with strain relief	≥ 64	
Copper index	34.9	69.8
Operating temperature range (°C) static	-20 to +60	
moving	0 to +50	

P/N	Color	Feature 1	Feature 2	EAN No.
1308427A3424M	Blue	xx m	simplex	4250184175445
1308427A34241	Blue	500 m	drum	4250184175438
1308427A34242	Blue	1 000 m	drum	4250184175421

P/N	Color	Feature 1	Feature 2	EAN No.
1308427A34244	Blue	xx m	duplex	4250184175469
1308427A34243	Blue	500 m	drum	4250184175452

### Cable structure

Copper wire insulated with foam-skin-polyethylene, 4 twisted pairs (PiMF) per core, 2 wires twisted to a pair, pair shielding plastic compound foil, aluminum-coated, copper braid tin-plated, protective sheath LSHF FR (FRNC-FR) = Low Smoke Halogen Free, flame-retardant to IEC 60332-1; IEC 60754-2; IEC 61034 und IEC 60332-3-24.

### Fields of application

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

## GC1500 pro22 Cat.7<sub>A</sub> S/FTP 4P LSHF-FR



Properties	
Outer diameter (mm)	8.5
Fire load (MJ/km)	674
Weight (kg/km)	73.0
Tensile strength (N)	150
Bending radius (mm) without strain relief	≥ 34
with strain relief	≥ 68
Copper index	45
Operating temperature range (°C) static	-20 to +60
moving	0 to +50

P/N	Color	Feature 1	Feature 2	EAN No.
1308427A3414M	Blue	xx m	simplex	4250184175353
1308427A34141	Blue	500 m	drum	4250184175360
1308427A34142	Blue	1 000 m	drum	4250184175377

### Cable structure

Copper wire insulated with foam-skin-polyethylene, 4 twisted pairs (PiMF) per core, 2 wires twisted to a pair, pair shielding plastic compound foil, aluminum-coated, copper braid tin-plated, protective sheath LSHF FR (FRNC-FR) = Low Smoke Halogen Free, flame-retardant to IEC 60332-1; IEC 60754-2; IEC 61034 and IEC 60332-3-24.

### Fields of application

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



# Your three individual warranty packages

Take advantage of the modular warranty package of METZ CONNECT, which will be prepared especially for you, depending on the situation.

## Warranty package 1: Advanced

The Advanced package gives a 10-year warranty on compliance with the technical properties of the C6<sub>A</sub> module, E-DAT C6<sub>A</sub> and E-DAT module systems and compliance with Class E<sub>A</sub> and on the transfer property of 10 GBit according to IEEE802.3an up to 500 MHz.

## Warranty package 2: Premium

The Premium warranty includes all features mentioned in the Advanced package. In addition, it is extended to 15 years and guarantees the transfer property of the link as 10 GBit according to IEEE802.3an up to 500 MHz when using the cables recommended by METZ CONNECT.

## Warranty package 3: Premium plus

In the Premium plus package, the Premium warranty period can be extended from 15 years to 20 years.

## Requirements

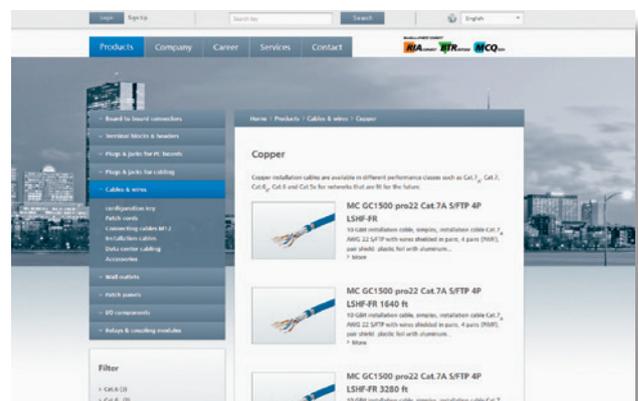
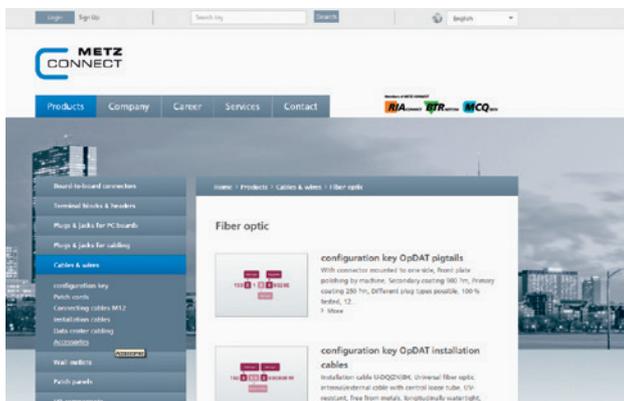
To be able to use the warranty packages, you must meet the following conditions:

- Assembly must be made by METZ CONNECT certified installation firms only.
- For each completed installation, the certified installer must draw up a measurement and acceptance certificate for the link performance.
- For the Advanced package, a test report of the link must be in possession of METZ CONNECT.
- The Premium warranty requires installation of the cables recommended by METZ CONNECT.
- To be able to use the Premium plus package, another successful acceptance measurement by a METZ CONNECT certified installer is required after the 15 years.

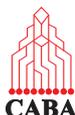
# Detailed knowledge in a matter of seconds

Our website [www.metz-connect.com](http://www.metz-connect.com) offers comprehensive information on all technical details.

Here you will find data sheets and also all configurators for our cables and lines <http://www.metz-connect.com/de/cables-wires/configuration-key>.



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



**We realize ideas**

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