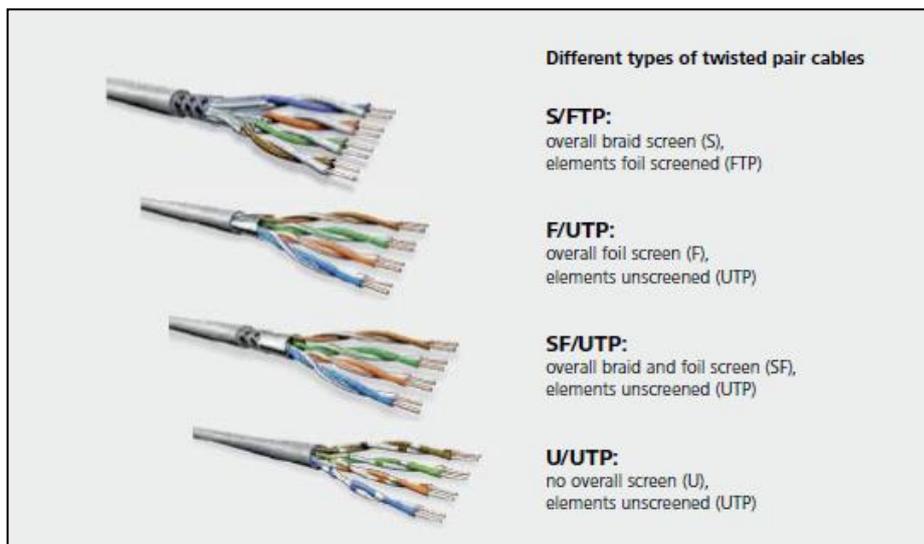


House cabling made the easy way - the trend towards structured cabling in residential buildings

Part 4: Laying cables

Every house, whether it is a single family dwelling or a skyscraper, requires a solid foundation on which it stands. No solid foundation, no building! The foundation for every cabling system are (not surprisingly) cables, distributors and connecting components. Therefore, many companies work by the principle "a lot helps a lot" and use cables for frequencies up to 1,200 MHz or even 1,500 MHz. In order to be able to lay the thick and relatively rigid cables in the confined space of a one-bedroomed apartment, they are bent, kinked and twisted – and then give a performance which is well below that of a Cat. 6_A system cable which, although only designed for frequencies up to 500 MHz, is perfectly adapted to the patch panel and outlet and therefore supplies the full power for which the customer pays.

Copper data cables are used by far the most frequently in residential buildings. That is not surprising because almost all appliances that the user possesses in a residential building have the famous RJ45 connection. They therefore rely on cables with four twisted wire pairs. The older Ethernet variants for 10 and 100 Mbit/s used two wire pairs (one for sending, one for receiving), the newer ones as of Gigabit Ethernet use all four. Transmission and reception now take place on all four pairs and in both directions simultaneously. Once more it becomes obvious that data



technology has developed from telephone technology – in the classic telephone, a double wire also served for transmission in both directions simultaneously. And, like in the telephone, there are shielded and unshielded cable versions.

Cable designations in accordance with DIN EN 50173-1:2011

U/UTP: unshielded cable consisting of four twisted pairs and a plastic cable sheath. Additional plastic separating bands ensure the constantly correct position of the wire pairs depending on the version.

F/UTP: with unshielded wire pairs and a common foil shield

SF/UTP: with unshielded wire pairs and a common shield made out of a mesh of fine, tinned copper wires as well as a common foil shield

S/FTP: with one foil shield per wire pair and a common shield made out of a mesh of fine, tinned copper wires, similar to that of a coaxial antenna cable.

Shielded cables offer a much greater useful frequency range than unshielded cables and have better protection against high frequency electromagnetic interferences. These will therefore be used mainly in single family homes or in the individual apartments of apartment blocks.

Class and Category

„Class“ means something completely different than „category“. The class (or category link in American English) always applies to the installed link, the category as such applies only to one single component, e.g. the cable or the outlet; the component is tested and verified by either the labs of the manufacturer or independent verification labs.

The installed link is always tested according to classes (or category links).

Cabling classes according to ISO/IEC:

Class D: frequency range up to 100 MHz, for data rates up to 1 Gbps

Class E: frequency range up to 250 MHz, for data rates up to 1 Gbps

Class E_A: frequency range up to 500 MHz, for data rates up to 10 Gbps

Class F: frequency range up to 600 MHz, for multi-media applications

Class F_A: frequency range up to 1,000 MHz, for multi-media applications

Component categories according to ISO/IEC:

Category 5: frequency range up to 100 MHz, for data rates up to 1 Gbps

Category 6: frequency range up to 250 MHz, for data rates up to 1 Gbps

Category 6_A: frequency range up to 500 MHz, for data rates up to 10 Gbps

Category 7: frequency range up to 600 MHz, for multi-media applications

Category 7_A: frequency range up to 1,000 MHz, for multi-media applications

Glass fiber cables (fibr optic cable or FOC for short) will preferably be used to connect the individual apartments in apartment blocks with the central distributor. Glass fibers are immune to electromagnetic interference and have no problems with earthing and potential equalisation with their metal-free structure. They also allow much greater cable lengths than copper cables. They are also useful for retrofits when you do not want to knock off the wall plaster to lay the new cables.

In the bending radii-insensitive version, glass fibers can be laid in very thin cables in confined spaces such as behind skirting boards or in corners underneath the wallpaper. The user then connects his terminal unit via a so-called media converter which has a copper and a glass fiber connection or it uses an installation switch. This has four RJ45 connections for terminal units on the front and the glass fibers and the power supply are connected at the rear. It is similar to two double outlets when installed.

Wherever you want to use glass fibers, it is important that the same fiber type is used consistently within a laying stretch. Today, glass fiber cables can be ordered conveniently pre-assembled,



Telegärtner FITH OAD/S Outlet



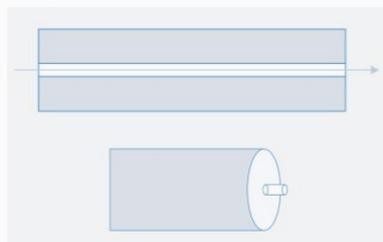
there is no need for tiresome plug assembly with grinding and polishing of the plug end faces or splicing work. The cables are delivered in the right length and fitted with plugs at the ends and can be laid and connected directly. Whichever type of cable you choose, the laying requires a certain amount of

caution. This includes observing the permissible bending radii, avoiding kinks, pressure and traction stress and protecting the cables against cold and moisture. It is worth using quality

Single mode and multi mode fibers

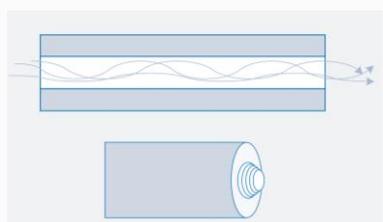
Two glass fiber types are basically distinguished: Single mode fibers in which, simply speaking, one light beam is underway, and multi mode fibers in which several light beams are underway simultaneously by different routes

Single mode fibers



(code letter "E" on the cable sheath) lead from outside into the building up to the mains termination and further to the electronic appliances.

Multi mode fibers



are only used where copper cables should not be used due to their cable diameter, the shorter cable length or due to potential drag. Today's multi-mode performance classes OM3 and OM4 are used equally in residential building, they differ above all in very high

Important: Only fibers of the same type may be connected with each other.

products which have the necessary reserves relevant to practice and which match or even surpass the required nominal values not only under laboratory conditions but also in the harsh practical installation. This only works if all the components, cable, outlet, distributor and patch cord, are exactly adapted to each other. Only then can the cabling provide the full power for which it was planned.

Whether you want a new installation or a retrofit, copper or glass fiber cables - Telegärtner has the right products.