

CATEGORY 6A CABLE - ISOLATION WRAP VS SHIELDING

Category 6A cable features a number of innovations that enable it to deliver superior performance over Category 6. However, the isolation wrap or the aluminum foil(s) that can be used for Cat 6A unshielded solutions may occasionally cause confusion as it can look very similar to foil shielding.

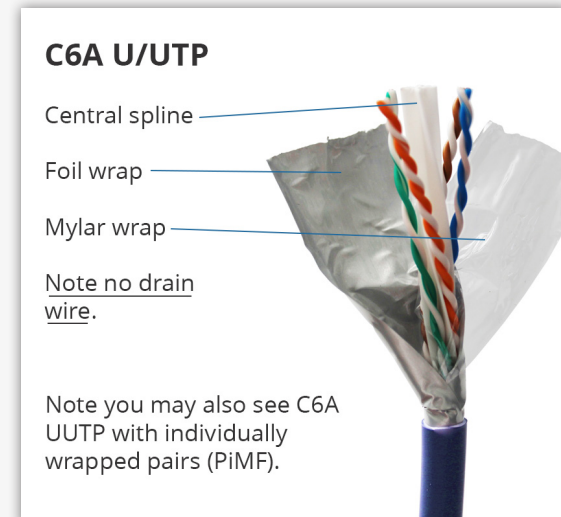
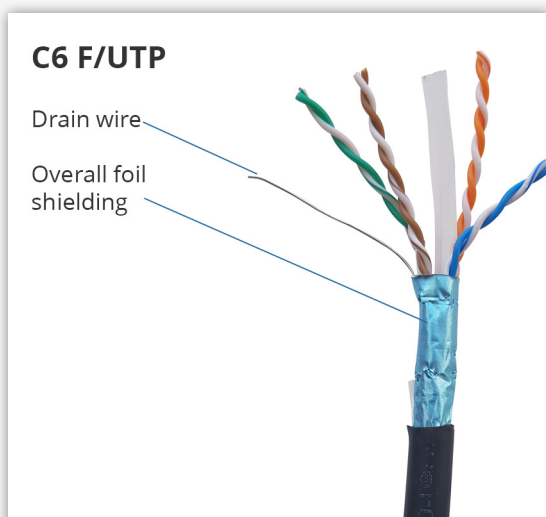
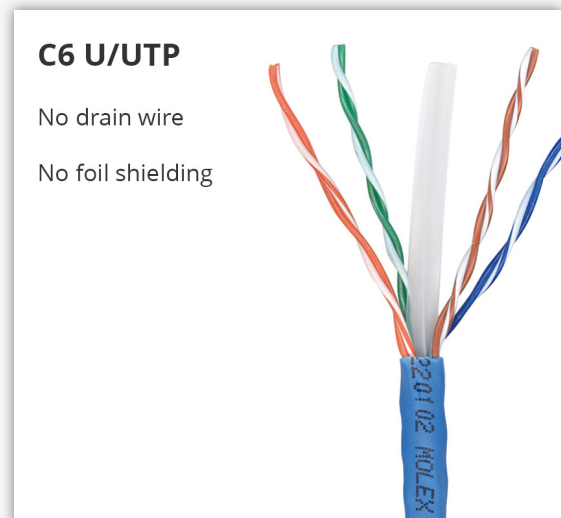
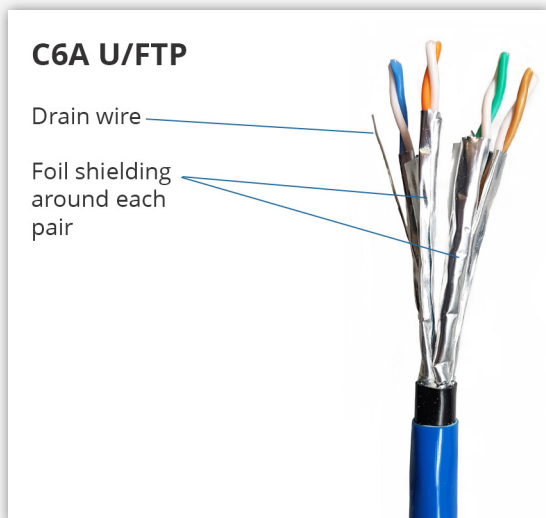
How C6A improves on C6

Category 6A was developed to “augment” the performance of Category 6 data cabling, supporting 10 Gigabit transmission speeds up to 100m. A number of innovations were implemented to achieve this, including precision manufacturing, tighter twist rates and the inclusion of an “isolation wrap” or aluminum tape to Cat 6A unshielded cables. The isolation wrap is designed to provide protection from Alien Crosstalk (ANEXT or AXT) and improved return loss. As a side benefit, it also provides superior NEXT,

FEXT and ACRF values, which are critically important for short links.

With Cat 6A unshielded cables, Isolation wraps or aluminum foils can surround the individual cable pairs, or all four pairs. Constructed from metallic or non-metallic materials, they can appear visually similar to foil shielding. However, it’s important to realize that they are not the same thing as shielding as they do not provide the same benefits and do not require the same handling.

Cable shielding comes in two forms – foil shielding, which can surround individual pairs or all four pairs (U/FTP or F/UTP) and an overall metal braid (S/FTP or S/UTP). These two types can be used independently or together. Shielding protects signals from EMI (electromagnetic interference) and RFI (radio frequency interference). By minimizing the effect of



interference, the signal remains clearer and more reliable.

In the process of protecting the inner cable from these signals, the metallic shields can act as an antenna, picking up external electromagnetic signals and causing signal degradation, or build up an electrical charge that can potentially cause electric shocks. In order to dissipate these energies shielded cable must always be grounded. However C6A UTP cable does not need to be grounded. The lack of a drain wire is one way you can tell the difference between foil shielding and an isolation wrap. The cable Category and shielding type should also be printed on the jacket, along with the manufacturer name and other key information.

Not all C6A is built the same

International Standards define the performance and parameters C6A components need to deliver, but do not specify the design. How this performance is achieved is the prerogative of the manufacturers, and cable construction can vary quite significantly between vendors. For example isolation wraps for Cat 6A unshielded cables can be plastic and/or metal, continuous or non-continuous longitudinal or wrapped, with spacers between the wires and/or between the pairs.

Non-metallic wraps or tapes offer lower performance – specifically very low NEXT & FEXT (near-end and far-end crosstalk) performance, lower heat dissipation and are generally physically bigger, resulting in a larger outer diameter.

Another issue can present when cables are bundled. Different separation techniques used by different manufacturers can mean the proximity between adjacent cables is uneven and ANEXT cannot be properly controlled. In practice this means bundles comprising cables from different vendors may fail performance tests, even though those same cables pass the same tests when bundled with the same type.

As well as presenting a practical issue in the field, interoperability is required by International Standards. However the ANEXT test method required in the cabling Standards does not include interoperability verification, so this issue may not be apparent until it's too late.

When to use shielded C6A

Category 6A is designed to be future-ready, providing support for high-speed connection, PoE and increasing numbers of wireless connections.

International Standards now recommend Category 6A for all new installations, especially those supporting healthcare, education, data centers and intelligent building functionality.

Shielding is additionally required for installation in areas generating high levels of EMI or RFI, such as data centres, test labs, hospitals, and industrial settings. Shielding also helps heat dissipate more efficiently, making it ideal for higher-powered PoE applications.

Molex Connected Enterprise Solutions recommends installation of fully shielded cabling systems for all 10G Base-T applications, as this is the safest solution and provides the best performance under any conditions.

Molex PowerCat 6A System

- achieves ANSI/TIA-568-D.2 Cat 6A and ISO/IEC 11801 Class EA requirements for cabling systems performance to support IEEE 10GBASE-T networks
- has been tested and qualified in the Molex test lab
- Delivers PoE performance qualified in accordance with the 802.3bt-2018 standard for four-pair PoE (includes Type 1 and Type 2 as well as 3 (60W) and Type 4 (90W))

Molex does not require field ANEXT testing for its C6A System (both shielded and unshielded) in order to qualify for the warranty. Compliance with International Standards is usually met by design.

Molex PowerCat 6A U/UTP cable is FULLY interoperable with any other Category 6A cable in the same bundle.

You can find videos showing how to terminate various types of cable in our videos page here: molexces.com/resource-library/videos, including C6A UTP, C6A F/UTP and C6A U/FTP.

If you have any questions about the construction of our cables or termination processes, please reach out to your local technical support or sales teams.

More information

Read more about Alien Crosstalk here: molexces.com/blog/what-is-alien-crosstalk/

Or explore the Molex PowerCat 6A range here: molexces.com/products/copper/cat6a/