

# Advantages Of U/FTP Over F/UTP

## Category 6a Cabling Systems

### Technical Information

#### U/FTP Has Smaller Overall Diameter

Because U/FTP cable does not require a centre spline separating the wire pairs to maintain pair geometry, the cable overall diameter (OD) is much smaller than F/UTP cables. Without the centre spline, the U/FTP cable is more flexible and easier to work with during installation. It also takes up less room in the conduit than the F/UTP.

#### U/FTP is Easier to Terminate

In F/UTP cables the NEXT loss and FEXT loss (crosstalk between the pairs) is controlled by the twists or lay-length. Due to crosstalk coupling, higher frequencies require twisted pairs in shorter lay lengths or twists, with each pair having a different twist from the other. In U/FTP cables the NEXT loss and FEXT loss are primarily controlled by the individual foil shields. As a result, the twists or lay lengths can be longer or looser with each pair similar to the other. The benefits of looser twists or longer lay lengths is lower DC resistance per cable length and easier to untwist for termination. The lower DC resistance is also important for better PoE/PoH support. [PoE stands for Power over Ethernet and PoH stands for Power over HDBaseT.]

#### U/FTP Cable has Lower Delay Skew than F/UTP

Because U/FTP cables have similar lay lengths/twists, the propagation delay skew is very small. Lower delay skews provide higher margins which minimises the amount of re-transmission of the data and maximizes the data rate.

#### U/FTP Cables Provide Better PoE/PoH Support

As stated above, because U/FTP cables have looser twists with longer lay lengths, this lowers the DC resistance on the cable. This is important for PoE/PoH. Also, the individual foil shields provide better heat dissipation which is critical for PoE/PoH support. The shields minimise temperature increases experienced with PoE/PoH.

#### U/FTP Cables Provide Better Performance

The individual foil shields on each pair improves the overall cable performance as compared to a F/UTP shielded cable.

The AL foils minimise crosstalk between the pairs. With F/UTP cables, crosstalk is actually increased because the signal is reflected off the overall foil shield inside the cable, negatively affecting cable performance. This results in significantly lower NEXT and ACR-F margins with F/UTP vs U/FTP. [This means significantly higher NEXT loss and FEXT loss.]

Additionally, U/FTP Cat 6a cables use a Foam PE insulation on the wire conductors while the F/UTP uses the typical solid PE insulation. F/UTP cables have to use solid insulation to avoid deformation of the insulation during the tighter wire twists (shorter lay) twinning process. The cellular insulation (FPE) used with U/FTP Cat 6a has a lower dielectric constant resulting in a higher velocity of propagation; and lower dielectric losses resulting in lower attenuation than F/UTP.

#### U/FTP Cables Better to Install

Tests have shown that the individual foil shield in U/FTP cables maintains the shape and form of the twisted pair, so the distance between each wire and the ground (= the foil shield) is virtually constant thus minimising the effect of installation. F/UTP cables are much more vulnerable to installation abuse as the position of the pairs inside the cable may be changed, affecting the proximity of the pairs and their position relative to the overall foil shield, thus changing the transmission properties of the pairs. The above, combined with the low margins available in the cable before installation may cause frequent Link and Channel failures.

#### Other Advantages of U/FTP compared to F/UTP

All pairs twisted in long lay lengths:

- Easier to untwist – shortening termination time
- Lower DC resistance per cable length => better PoE support
- Lower delay skew (8~15 nS/100m)

Each pair wrapped with a metal foil:

- Better heat dissipation => better PoE support
- Extremely high NEXT loss and FEXT loss
- High tolerance to cable abuse during installation

Foamed insulation:

- Lower dielectric constant => Higher velocity of propagation (Vp)
- Lower dielectric losses => lower attenuation

