

Category 7 / Class F twisted pair copper cabling

Two major international standards, ISO and IEC, are working in tandem groups dealing with separate elements of the overall cabling system and subsequently using different designation terms. The cooperative ISO/IEC group defines link and channel requirements and uses the “class” designation. The IEC further defines component performance requirements based on ISO/IEC class requirements and then designates them on a “category” basis. So in the ISO/IEC defined Category 7/Class F, “class” refers to link and channel performance and “category” defines component performance. The link and channel requirements for class F are defined in edition 2 of the ISO/IEC 11801 standard, which also defines class D and class E. According to ‘11801, the link performance of class F is specified to 600MHz. However, there is a pending amendment to 11801, which creates a new class. This pending class F_A extends the upper frequency to 1000MHz, and is targeted to support the next generation of data applications beyond 10GBASE-T as well as demanding applications like broadband video, which has frequency requirements of 862MHz.

Category 7/class F cabling is based on S/FTP cable (see figure 1). This design virtually eliminates crosstalk between pairs, allowing the superior transmission of “noisy” high-speed, high frequency applications, such as 10GBASE-T. In fact, 1000MHz-capable S/FTP cable will support speeds well in excess of 10Gb/s. In addition to internal crosstalk protection, S/FTP cable provides robust alien crosstalk resistance, basically eliminating the cable-to-cable interference that can occur in 10Gb/s UTP cables. The same noise resistance properties make this cable ideal in high EMI (electro-magnetic interference) environments, such as industrial and medical imaging facilities.

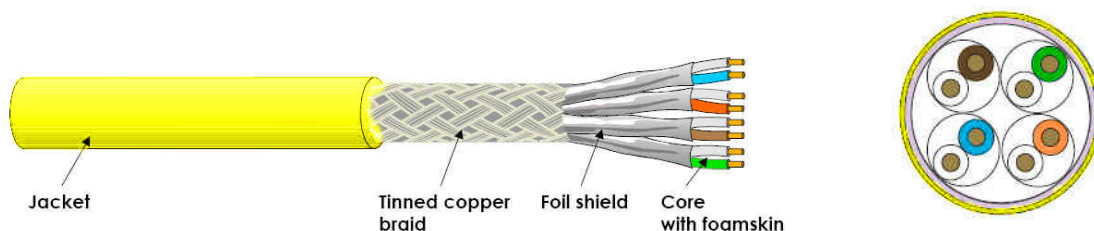


Figure-1 S/FTP Cable

There are two basic connector options for category 7/class F. IEC 60603-7-7 defines an RJ-style category 7 connector. This switched connector is specified to 600MHz. IEC 61076-3-104 and IEC 61076-3-104 Ed.2.0 standardize on the same non-RJ interface, specified in the second edition to 1000MHz. Several new "Cat. 7" connectors are under development (e.g.: AMP, BKS, Siemon, Telesafe, T&B). IEC/TC48 is currently discussing new standard proposals.

Why implement Category 7 / Class F?

Cabling infrastructure represents just 5-7 percent of an overall network's cost and is expected to support 2-3 iterations of active electronics. With 10GBASE-T standards ratified, 10Gb/s active electronics may be available in as little as 2 years. Any cabling infrastructure installed today should be capable of supporting 10Gb/s transmissions. Both UTP and F/UTP (Screened) Category 6 cabling, will meet this need and offer approximately a 10 year life cycle. They are not, however, expected to support the next generation of application speeds beyond 10Gb/s.

Category 7/class F on the other hand, can be expected to provide at least a 15 year lifecycle, based on performance headroom. Although the actual performance requirements of an application beyond 10GBASE-T are not yet known, solutions targeted to meet pending class F_A can support speeds far beyond 10Gb/s and are expected to meet the next application.

Additionally, Category 7/class F cabling can significantly increase physical layer security. The same features that eliminate crosstalk and EMI concerns also prevent the emanation of data signals from within the cable to nearby areas. In non-secure copper cabling, these radiated signals can be intercepted, creating a significant security breach.