

Category 5E



Category 6



Category 5E and Category 6 Cable Comparison

Category 5E and Category 6 cable are types of twisted pair cabling which are used in applications such as networking, telecommunication, serial communication, etc. Ethernet Networking is the most common application for this type of cable. There are three main differences between Category 5E and Category 6 cables, Ethernet Network Bandwidth, Ethernet Network Speeds, and Crosstalk.

Ethernet Network Bandwidth

Ethernet Network Bandwidth is measured in Megahertz (MHz). MHz is a frequency measurement of the electrical signal that is sent over the cable. Category cable standards, such as Category 5E and Category 6, define a minimum bandwidth that must be supported by the cable.

The Category 5E standard states that the cabling must support a minimum bandwidth of 100MHz on all four pairs. Many cables on the market are built to exceed this minimum standard.

The Category 6 standard states that the cabling must support a minimum bandwidth of 250MHz on all four pairs. Many cables on the market are built to exceed this minimum standard.

Ethernet Network Speeds

Ethernet Network speeds are measured in Megabit per second (Mbps). Mbps is a measurement of the amount of data that is transferred within a set period of time. There are several different standards that are used for Ethernet communication which vary in maximum speed. The most widely used are the following.

10Base-T - 10Mbps

100Base-TX - 100Mbps

1000Base-T (Gigabit) - 1000Mbps (1 Gbit/s)

Category 5E cabling supports up to Gigabit Ethernet, 1000Base-T, and is suitable for Ethernet Network installations in most environments. Most existing networks use Cat5E cabling.

Category 6 cabling supports the same Ethernet applications as Category 5E and also offers the added benefit of "future-proofing" to a network installation. Category 6 cabling supports a larger bandwidth and higher speeds than Category 5E cable. This added support provided by Category 6 will be suitable for future applications requiring larger bandwidth and higher speeds than Gigabit Ethernet. New installs, or network upgrades may benefit from the use of Category 6 cabling.

Crosstalk

Crosstalk is electromagnetic interference from one twisted pair to another. As bandwidth and speeds increase, so does the potential of crosstalk negatively impacting the signal being sent over the cable. The twisting of the pairs in Category 5E and Category 6 cabling is a measure that is taken to prevent crosstalk. In each pair the signal on one conductor has the opposite polarity of the signal on the other conductor. The opposite polarities of the signals allows the interference to be "cancelled" out. Category 6 cable has a tighter twist per inch than Category 5E cable. This tighter twist per inch allows Category 6 cable to support higher bandwidth and higher speeds.

Crosstalk is measured at different points in the cable to give an accurate representation of the interference. Below are a few common crosstalk measurements.

Near End Crosstalk (NEXT) - Interference measured between two pairs in a cable measured at the same end of the cable as the transmitter.

Power-sum Near End Crosstalk (PS-NEXT) - The sum of the Near End Crosstalk of three wire pairs as they affect the fourth pair in a cable.

Equal-Level Far End Crosstalk (ELFEXT) - Interference measured between two pairs in a cable measured at the opposite end of the cable from the transmitter.

Power-sum Equal-Level Far End Crosstalk (PS-ELFEXT) - The sum of the Equal-Level Far End Crosstalk of three wire pairs as they affect the fourth pair in a cable.



	Category 5E Cable	Category 6 Cable
Maximum Cable Length:	100m*	
Conductor AWG:	24AWG	22-24AWG
Cable Outer Diameter:	≈5.5mm	≈6.0mm
Number of Conductors:	8	
Conductor Colour Code: (T568B Pinout)	White-Orange Orange White-Green Blue White-Blue Green White-Brown Brown	
Bandwidth:	100MHz	250MHz
Impedance:	100Ω ± 15%	
Attenuation (Min. at 100MHz):	22dB	19.8dB
Networking Applications:	10Base-T 100Base-T 1000Base-T	
NEXT (Min. at 100MHz):	35.3dB	44.3dB
PS-NEXT (Min. at 100MHz):	32.3dB	42.3
ELFEXT (Min. at 100MHz):	23.8dB	27.8
PS-ELFEXT (Min. at 100MHz):	20.8dB	24.8
Return Loss (Min. at 100MHz):	20.1dB	20.1dB
Delay Skew (Max. per 100m):	45ns	45ns

*The TIA 568 standard defines the maximum distance of a channel to be 100m with 90m of horizontal cabling and 10m for work area patch cords and equipment cords in the telecommunications room. Stranded conductor cabling attenuates 20% more than the solid conductor cabling. The recommended maximum distance of a stranded conductor cable is 76m, solid conductor cable should be used for cables longer than 76m.

Please Note: The specifications in this document are based on the Cat5E and Cat6 standards. Many cables are built to exceed these standards.

