

Definitions and normative requirements for different categories and classes of channels.**International standardization overview.**

Copper cabling categories	Corresponding classes	Applications	European norms	International standards	Americans standards
Cat 5,5	D	Commercial building telecommunications cabling standard	EN 50 173-1	IS 11801	EIA/TIA 568-B.1
Cat 6	E				EIA/TIA-568-B.2-1
Cat 7	F				None

About the use of terms channel, classes and categories**Definition of a channel**

A channel is the transmission path between equipments such as a LAN hub and the terminal equipment...

According to EIA, ISO and CENELEC standards, a channel is composed of 90 m of cable and 10 m of cords and four connectors.

EX: Insertion loss of a channel = Ins loss /4 connectors + Ins loss/ 90m cable + Ins loss / 10 m cords.

It should be designed such as to satisfy a minimum required performance class (ex : D, E or F) or category (5, 6 or 7) of channel.

Categories and classes

The term "category" is used in american standards ANSI/EIA to define all the different types of channel, link and components.

In ISO 11801 and EN 50 173 serie , the term "classes" applies only for "channel", and the term "categories" applies to components (cables and connectors)...

Example : classe E, according to IS 11 801 and EN 50 173, is composed of categorie 6 componants (cables and connectors)

Comparison between different classes of balanced cabling according to the standards, at key frequencies.

Length of the horizontal cable : 90 m, length of cords and jumpers: 10 m, parameters at 20° C, impedance 100 ohms

Categories	Standard References	Bandwidth	Insertion loss*	NEXT*	Return loss *	ELFEXT*	ACR* min (NEXT- IL)
Cat 5	TIA/EIA-568-B.1 Annex D	100 MHz	21,6 dB	27,1dB	8,0 dB	17,0 dB	5,5 dB
Cat 5e	TIA/EIA-568-B.1	100 MHz	24 dB	30,1 dB	10,0 dB	17,4 dB	6,1 dB
Cat 6	568-B.2-1	250 MHz	35,9 dB	33,1 dB	8,0 dB	15,3 dB	-2,8 dB
Cat 7				NONE			

* at the frequency corresponding to the bandwidth

Length of the channel : 100 m, parameters at 20 °C, impedance 100 ohms

Classes	Standard reference	Bandwidth	Insertion loss*	NEXT*	Return loss *	ELFEXT*	ACR* min (NEXT- IL)
D	IS 11801	100 MHz	24 dB	30,1dB	10,0 dB	17,4 dB	6,1 dB
E		250 MHz	35,9 dB	33,1 dB	8,0 dB	15,3 dB	-2,8 dB
F		600 MHz	54,6 dB	51,2 dB	8,0 dB	31,3 dB	-3,4 dB

* at the frequency corresponding to the bandwidth

Length of the horizontal cabling : 100 m, parameters at 20° C, impedance 100 ohms

Categories	Standard reference	Bandwith	Insertion loss *	NEXT*	Return loss *	ELFEXT*	ACR* min (NEXT- IL)
Classe D	EN 50173-1	100 MHz	24 dB	30,1dB	10,0 dB	17,4 dB	6,1 dB
Classe E		250 MHz	35,9 dB	33,1 dB	8,0 dB	15,3 dB	-2,8 dB
Classe F		600 MHz	54,6 dB	51,2 dB	8,0 dB	31,3 dB	-3,4 dB

* at the frequency corresponding to the bandwidth

Conclusions

Les performances d'un canal de classe D selon l'ISO et le CENELEC sont identiques à celles de la catégorie 5e de l'EIA/TIA

Les performances d'un canal de classe E selon l'ISO et le CENELEC sont identiques à celles de la catégorie 6 de l'EIA/TIA

La différence de performances entre les catégories 5 et 5e de l'EIA est infime.

Frequently asked questions(EIA and IEEE article extracts)**Do I need all the bandwidth of class E/catégorie 6 ?**

The bandwidth is defined as the highest frequency up to which the **ratio Attenuation/crosstalk** is greater than zero.

Current applications running at 1 Gb/s are pushing the limits of class D/cat5e cabling.

As steaming media applications such as video and multi-media become commun place, the demands for faster data rates will increase and span new applications that will benefit from the higher bandwidth offered by category 6.

Will class E/cat 6 cabling supersede class D/ cat 5e ?

Analyst predictions indicate that 80 to 90 percent for all new installations will be cabled with class E/ cat 6 ...

The fact that class E/cat 6 channel requirements are backward compatible to class D /cat5e makes it very easy for customers to choose the class E ..

When should I recommend or install class E versus class D ?

It is always better to install the best cabling available, because it is always difficult and expensive to replace cabling inside walls, in duct under floors and other difficult place to access.

Is there a use for class E /category 6 in the residential market ?

This class is very effective in the residential market to support higher internet access speeds while facilitating.

What future for the class F / category 7 ?

According to the IEEE studies ,the cat 7 only covers 0,03 % of the needs of the global market . In the United States this class is not used.

In West Europe, in year 2002, it represented 1,0 % of the market when optical cabling represented 1,5 % ; the countries concerned are : Germany, Austria, Switzerland ...