

PAL, NTSC and SECAM: What's the Difference?

When TV was first designed, there was a set of standards used to control how the information was sent from the broadcasting station to the TV, and how the TV interpreted this information into a picture on the TV screen. In North America, this standard is known as NTSC which stands for National Television Systems Committee. There are also two other types of standards used around the world; PAL (Phase Altering Line) and SECAM (Sequential Color with Memory).

The systems used vary by country and/or region, but they all use one of the three standards: PAL, NTSC, or Secam. Digital cable, VHS, DVD, and Blu-ray also adhere to these color information standards. PAL TVs are only compatible with a PAL signal or other Pal components. The same is true for NTSC and SECAM. It's not possible to use a PAL TV with a NTSC Blu-ray Player or vice-versa. If you wanted to use your NTSC player to watch movies on a PAL or SECAM TV, you'd need to use an [external video converter](#). Let's take a look at the differences between these three systems.

NTSC

This American Standard was the first ever used. It was developed in 1941 and re-engineered to include color in 1953. It utilizes 525 scan lines at 30 frames per second. Only 486 of the actual lines are visible on the screen while the remaining are used for synchronizing and balancing the image. NTSC's refresh rate is 60hz. NTSC is also the only system that requires a tint control on the TV

PAL

This color system uses 576 scan lines and 25 frames per second to produce the finished picture. Introduced in Europe in the 1960's, PAL was an attempt to improve on the NTSC standard and it has remained the European standard (in most cases) up until this very day. PAL has varying versions including PAL B/G and PAL I. This system has a 50hz refresh rate.

SECAM

The newest of the three color systems, SECAM was developed and released in the 60's. Mostly used in Russia, eastern Europe and Africa, SECAM utilizes the same resolution as PAL at 576 lines and 25 frames per second. This color system is the only one to use FM frequency modulation which allows it to transmit over a longer range. Like PAL, SECAM also has a 50hz refresh rate.

Clearly there are differences (and similarities) between the three standard systems. Thanks to a higher frame rate, NTSC enjoys a smoother image. PAL and SECAM both use an extra scan lines and therefor have better resolution.

Does it Really Matter?

Overall, it does matter. The three systems are not compatible, which means you need to be sure your audio/video components use the same standard to be compatible with your TV and with the satellite and/or digital cable signal. There is, of course, a couple exceptions. [Multisystem TVs](#) are able of decoding all three color systems and feature tuners for each. In addition, [Region Free Blu-ray & DVD Players](#) usually come equipped with internal PAL/NTSC conversion, which allows them to be used with any TV.

If you're living in the same region and using locally purchased audio/video components and accessories, there's really no need to even think about PAL, NTSC and SECAM. However, it's always nice to have a slight knowledge of how the three differ and why.

Electrical Differences

Most people will not be able to easily tell the difference between NTSC and PAL. The main difference starts with the electrical power system that runs behind the color transmissions. In the United States, electrical power is generated at 60 hertz. The signal behind the NTSC broadcast format is set to send out 60 fields per second. Most televisions use an interlaced system, so the NTSC signal sends out 30 lines of the image, followed by another 30 alternating lines. Basically, that results in 30 frames of a complete image appearing every single second.

In Europe and other countries, electrical power is generated at 50 hertz. Televisions that utilize PAL as the broadcast format only produce 25 frames of a complete image appearing every single second. This causes problems with the proper display of motion, as it makes actors move a bit faster because of the difference in frames per second that are showing movement. If you are trying to watch a PAL movie on a NTSC television, you need to add 5 frames per second, or the motion of the film will be very jerky or slow.

Resolution Quality

The other main difference between NTSC and PAL is resolution quality. While PAL produces fewer frames per second than NTSC, it produces more lines. An NTSC television will broadcast 525 lines of resolution, while a PAL television will broadcast 625 lines of resolution. As the lines of resolution increase, so does the amount of visual information. This produces better picture quality and screen resolution. If you were to try to convert an NTSC movie to PAL, black bars would most likely be added to compensate for the smaller screen aspect. The black bars would resemble what you would see in a widescreen or letterbox movie.