

# Color Temperature

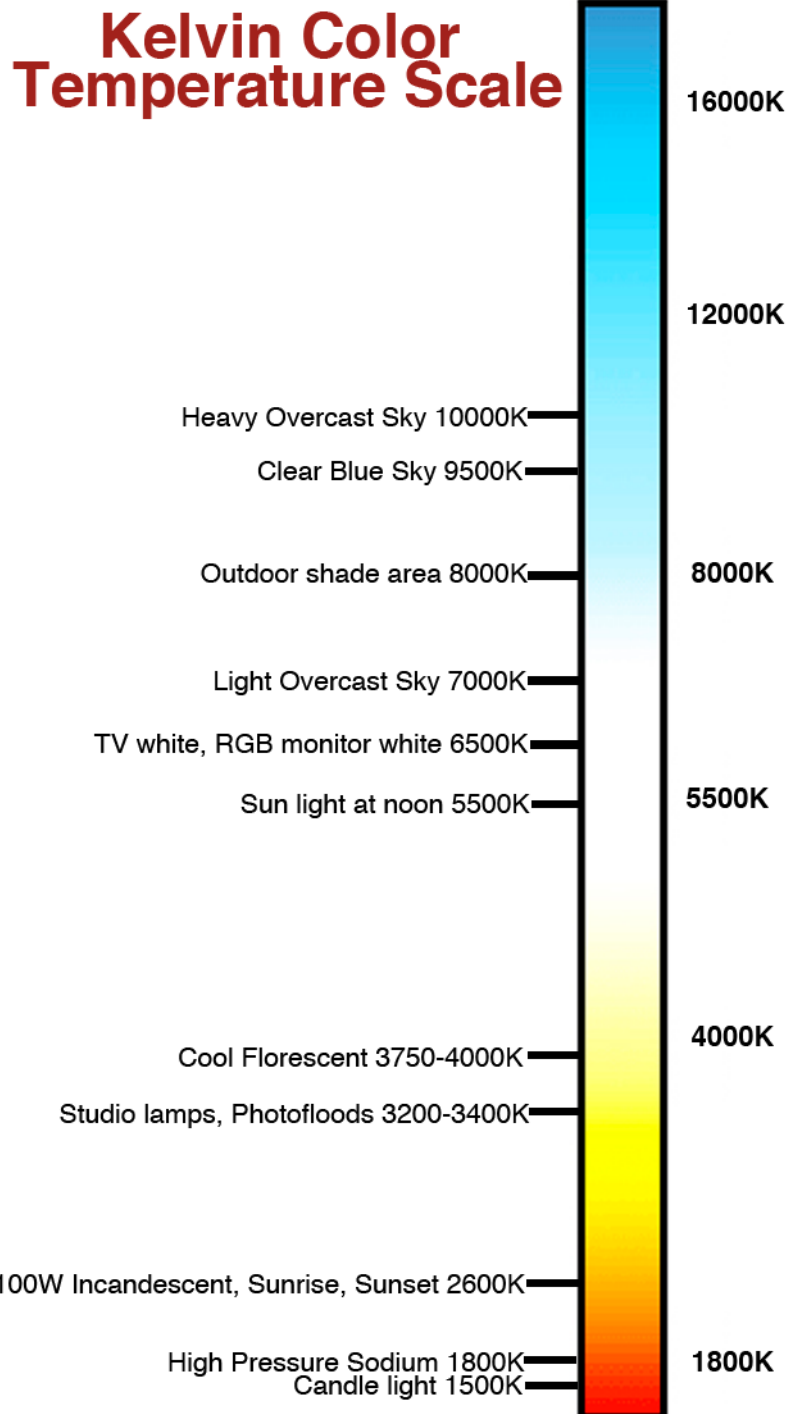
Color temperature is usually used to mean white balance, white point or a means of describing the color of white light. This is a very difficult concept to explain, because—”Isn’t white always white?”

The human brain is incredibly adept at quickly correcting for changes in the color temperature of light; many different kinds of light all seem “white” to us. When moving from a bright daylight environment to a room lit by a candle all that will appear to change, to the naked eye, is the light level. Yet record these two situations shooting color film, digital photographs or with tape in an unbalanced camcorder and the outside images will have a blueish hue and the inside images will have a heavy orange cast. The brain quickly adjust to the changes, making what is perceived as white appear white, whereas film, digital images and camcorders are balanced for one particular color and anything that deviates from this will produce a color cast.

## A GUIDE TO COLOR TEMPERATURE

The color of light is measured by the Kelvin scale. This is a scientific temperature scale used to measure the exact temperature of objects. If you heat a carbon rod to 3,200 degrees, it glows orange. At

4,800 degrees it will glow a greenish color and at 5,600 degrees Kelvin it will begin to appear blue. But light itself has no heat; so for photography it is just a measurement of the hue of a specific type of light source.



The average noon daylight (5500K) is white. This is the color temperature that will record white objects as white in color and all other colors in that image will appear natural on film, in digital images or video tape. If you shoot in conditions that have a higher temperature, such as high mountains on a snowy day, the image will start to become bluer. Shoot in conditions below the 5500K, such as late in the afternoon during the summer, temperature and images will increasingly become more orange.

## **INCANDESCENT LIGHTS**

These color shifts don't just relate to daylight conditions, artificial light also introduce a different full array of color cast.

Incandescent lights give a very warm orange to yellowish color cast. A common 100-watt light bulb, for example, is only about 2600 to 2,850K. A candle flame is even more red – at about 1,900K.

## **FLUORESCENT LIGHTS**

Videos or photographs taken under standard fluorescent lights often exhibit a greenish-blue cast. Fluorescent lamps belong to the group of lighting devices that are glass tubes filled with metal vapor with electrodes at each end.

Unlike tungsten-type lights, standard fluorescent lamps have a broken spectrum. Instead of a relatively smooth mix of colors from infrared to ultraviolet, fluorescent light has sharp bands or spikes of color—primarily in the blue-green areas. Even though the eye will not notice these spikes, color shifts can result with video.

## **TV & COMPUTER MONITORS**

Professional TV monitors use a standardized set of SMPTE color phosphors that create “white” at 6,500K. This is bluer than sunlight, and much bluer than incandescent light.

The color temperature of most home TV sets is considerably higher than 6,500K – commonly 7,100K in the United States and 9,300K in Japan. TV sets sold in most European countries are much closer to the 6,500K standard.

One of the reasons for the high color temperature in U.S. and Japanese sets is the consumer desire for bright, saturated colors, which are easier to create when there is a large blue component in the phosphor mix used to coat the screen.

## **WHITE BALANCE**

If you photograph with a film and want to have realistic Color Balance in a daylight setting, you should use daylight film that matches the Color Temperature of daylight. If you shoot with a film indoors with incandescent lighting, you would either choose Tungsten film to balance the Color Temperature. If you are shooting digitally, however, achieving Color Balance in any lighting situation is just a matter of setting the “White Balance” in the camera.

To set the “white balance” on a camcorder, find the white balance button. Closely point the camera lens towards a white paper and activate the button.

Digital camera often have an array of white balance settings such as incandescent, fluorescent, direct sunlight and flash. Set this “white” to the correct lighting

conditions and all other colors are corrected to the newly adjusted white.

## **CREATIVE WHITE BALANCE**

White balance can be creatively altered for a camcorder by using paper or cards which are other than white. For example: this is a balanced landscape.



Using a slightly blue paper or card to “white balance” creates a much warmer color cast.



You may want to experiment with other color paper and cards to create a much better color cast under other light conditions.