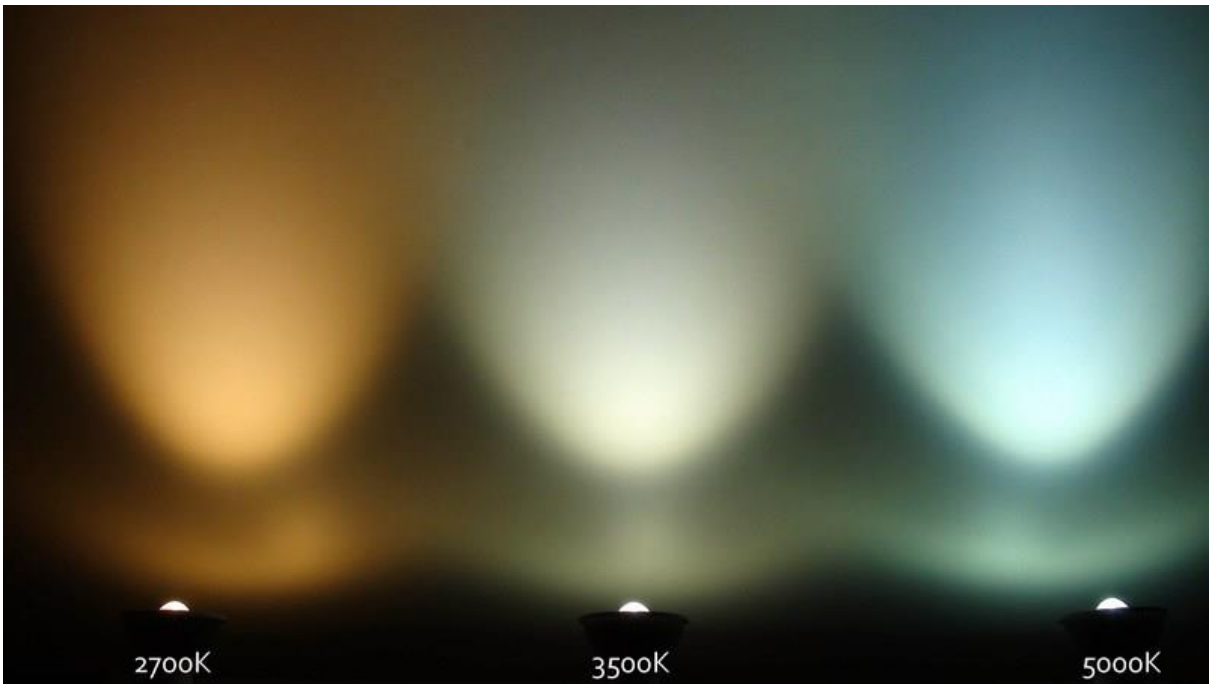
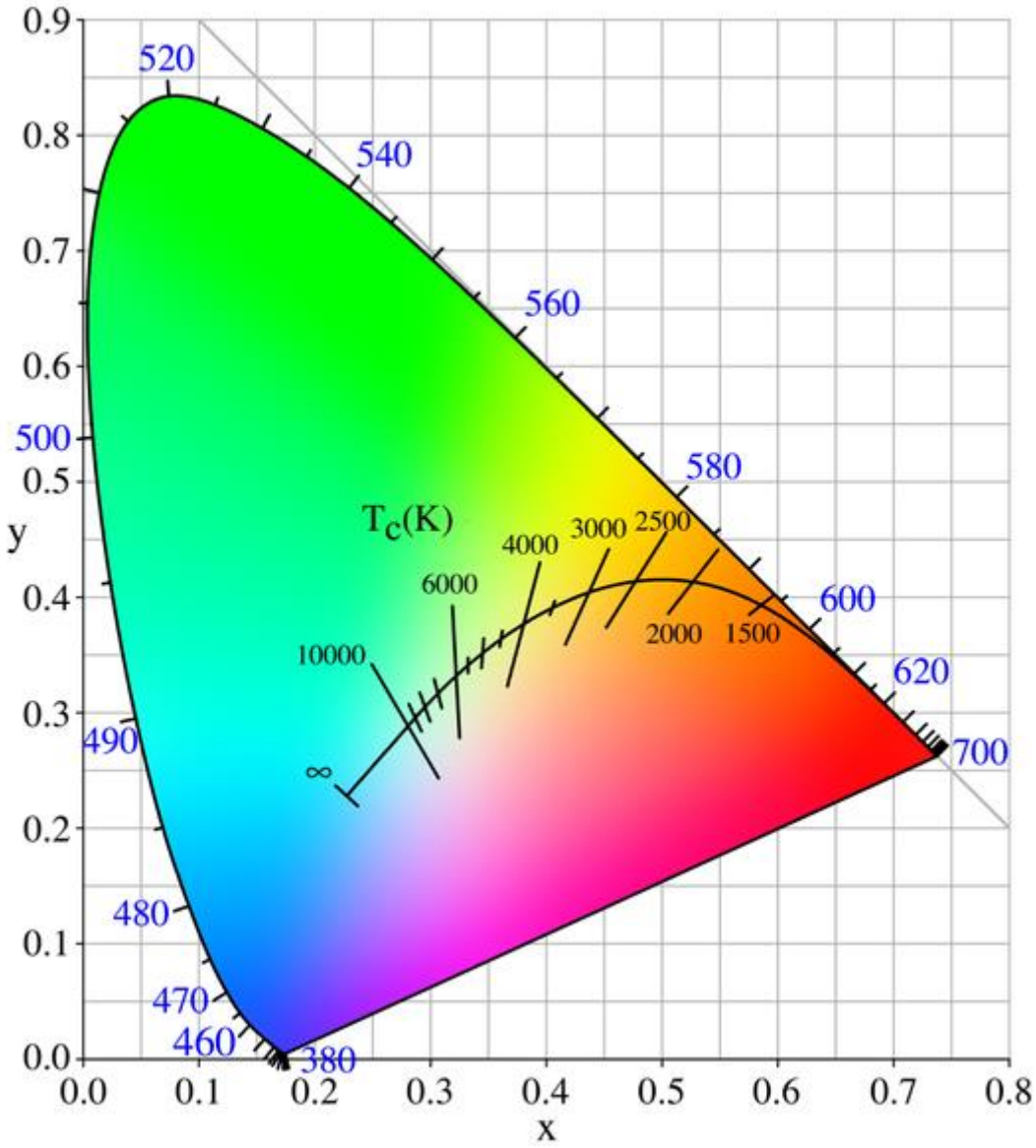
Correlated Color Temperature (CCT)

The CCT or Correlated Color Temperature is a specification of the color appearance of the light emitted by a light source, relating its color to the color of light from a reference source when heated to a particular temperature, measured in degrees Kelvin (K). The CCT rating for a light is a general "warmth" or "coolness" measure of its appearance. However, opposite to the temperature scale, lamps with a CCT rating below 3200 K are usually considered "warm" light sources, while those with a CCT above 4000K are usually considered "cool" in appearance.

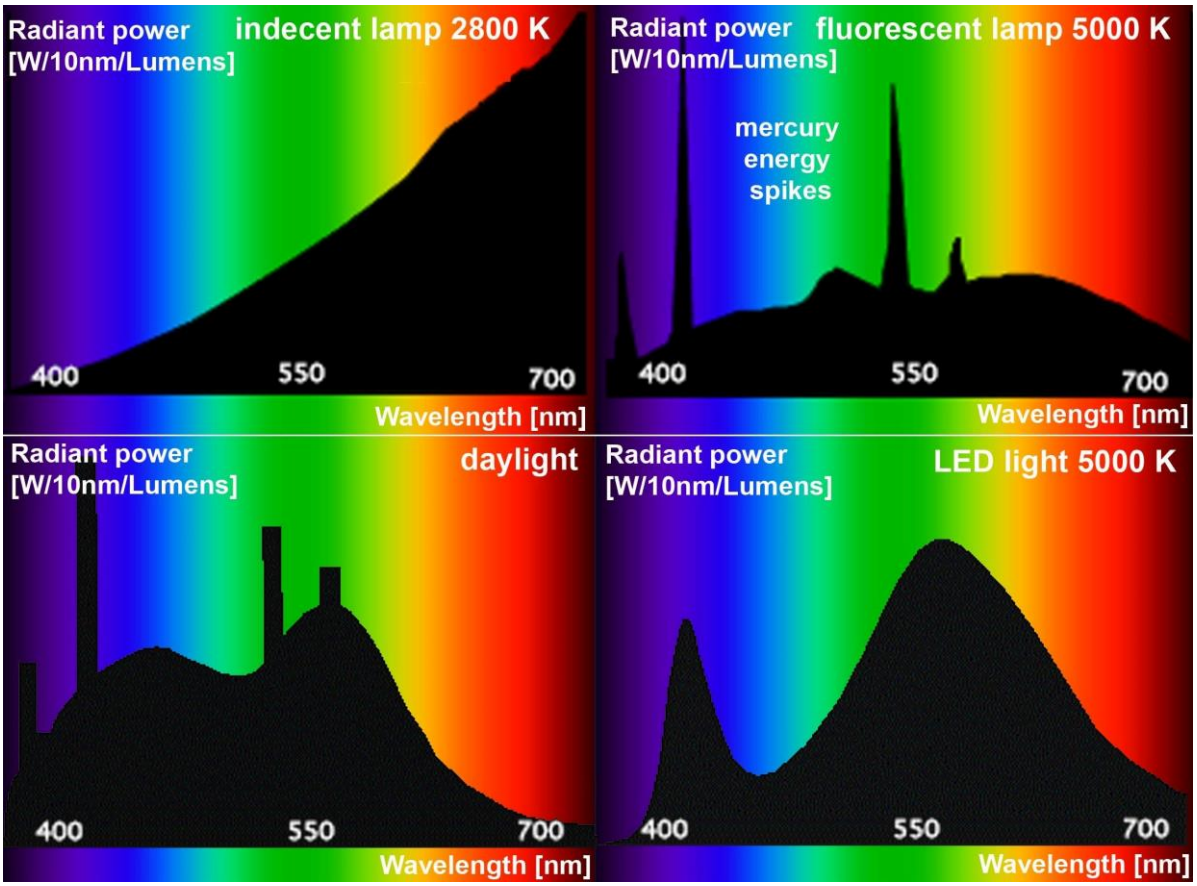


For example the daylight color temperature changes thru the day. At sunrise and sunset the CCT is around 3000K. On the other hand at noon the CCT is on the highest level around 5500K or higher. The color temperature of light has important effects on human beings. For the places where people are gathering such as coffee shops, restaurants, and hotel lobbies the warmer light color around 3000K is desired. The warmer color of light causes people to relax. For the places where people should be more focused on their work, like in classrooms, offices and conference rooms the light color temperature should be cooler around 4000K. LED lights have the best possibilities to tune the desired CCT.

The color temperature of light is represented by chromaticity diagram on which the wavelengths of the light and its intensity to the human eye meets with the color temperature. If you look on the chromaticity diagram you can see that warmer temperature colors have more red and orange hues and coolest colors have more blue hues.



Very interesting way of representing the intensity of each wavelength is made with spectral power distributions diagrams. From diagrams below we can see the distribution of four different sources of light. If we compare the artificial light sources with daylight we can conclude that the light for LED light source has the best approximation with daylight.


Radiant power
[W/10nm/Lumens]
indecent lamp 2800 K
400
550
700
Wavelength [nm]
Radiant power
[W/10nm/Lumens]
fluorescent lamp 5000 K
mercury
energy
spikes
400
550
700
Wavelength [nm]
Radiant power
[W/10nm/Lumens]
daylight
400
550
700
Wavelength [nm]
Radiant power
[W/10nm/Lumens]
LED light 5000 K
400
550
700
Wavelength [nm]