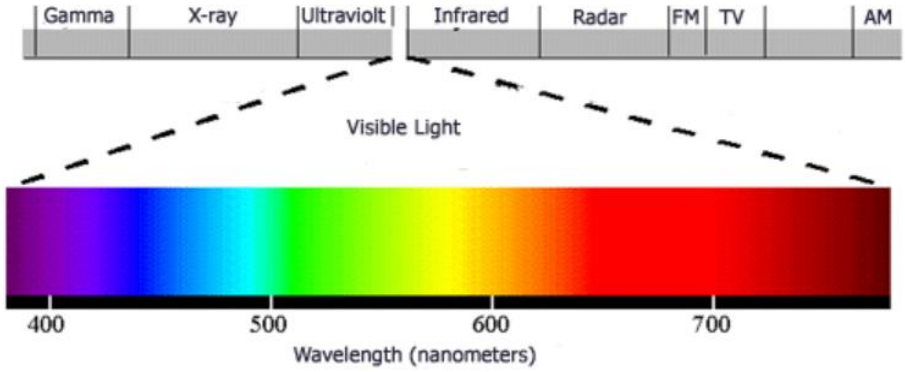
The highest quality Roll-down and Energy Saving products

Geric Holdings LED Lighting

CRI (Colour Rendering Index)

Colour Rendering Index is a sometimes overlooked specification item of LED lights. However it is not always easily understood and this document was created in an effort to explain this important property to our customers so that they can use this knowledge when evaluating LED products and making purchasing decisions.

To fully understand CRI we first need to look at the physics of light and colour. So what is light? We see light and colours around us in the world due the reflection of the sunlight bouncing back from objects and then received by (the retina in) our eyes. The sunlight itself is nothing but electromagnetic waves of a very high frequency of which a portion of it is visible to the human eye. More formally then the visible part of the electromagnetic spectrum is composed of radiation with wavelengths from approximately 400 to 750 nanometers. The blue part of the visible spectrum is the shorter wavelength and the red part is the longer wavelength with all colour gradations in between.



Colour	Wavelength	Frequency
green	495–570 nm	526–606 THz
yellow	570–590 nm	508–526 THz
orange	590–620 nm	484–508 THz
red	620–750 nm	400–484 THz

Daylight (light from the sun) is light in its natural form. We see light and colours around us in the world due the reflection of the sunlight bouncing back from objects and then received by (the retina in) our eyes. To get a perfect colour picture we need all visible light (as from the sun) to shine on the objects to get the perfect reflection. E.g. we see the red of a red rose since the rose reflects the red but absorbs most of the other colours of the visible light spectrum. But what if the sun did not include red light? Then there would have been no red light for the rose to reflect back to our eyes and with all the other colours absorbed by the rose it would have looked like a black rose to the human eye. What we can clearly see from this is that to see colour in its most natural form requires that light sources other than the sun, such as incandescent light, fluorescent light, or LED light as closely as possible give light across the full visible light spectrum as the sun does to make sure we can see all the colours.

Colour rendering is the term we use to describe this phenomena of how a light source makes the colour of an object appear to human eyes and how well subtle variations in colour shades are revealed. The Colour Rendering Index (CRI) is a scale from 0 to 100 percent indicating how accurate a "given" light source is at rendering colour when compared to a "reference" light source.

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CRI (Colour Rendering Index) is in essence a scale from 0 to 100 percent indicating how accurate a "given" light source is at rendering colour when compared to the ideal source, the sun. The sun is thus our reference point all other light sources are compared to, and since the sun is the perfect light source, its CRI is 100 percent. This clearly illustrates why a higher CRI value for a light source is better than a lower CRI value since it gets closer to the ideal source, the sun.

This can be further illustrated by the following example clearly indicating how a light source with a CRI of 85 gives a much better colour rendering than a light source with CRI 70. Note the muted colours on the right compared to the brighter colours on the left.

With this background, we can now look at a more formal definition of CRI: **The colour rendering index (CRI) of a light source is a quantitative measure of its ability to reproduce the colours of various objects faithfully in comparison with an ideal or natural light source.**

In general terms, CRI is a measure of a light source's ability to show object colours "realistically" or "naturally" compared to a familiar reference source. We know that the ideal reference is daylight, but since incandescent light is so close to daylight, you will find some references quoting incandescent light as the reference source.

Which CRI to choose?

After perusing the above the answer that comes up in one's mind is probably 100. However, CRI of 100 in an LED source has not yet been developed! Also, CRI in the 90's is possible but very expensive.

Also consider the following;
- LED lighting with CRI values greater than 90 means the colour accuracy and reproduction of these LEDs is nearly perfect making them an excellent choice for art galleries and photography or anywhere where extreme colour accuracy is required.
- A CRI index greater than 80 is considered very good.
- Fluorescent lamps and CFL sources are considered very poor in CRI running in the low 70's.

CRI of Geric Holdings LED lights

The majority of the Geric Holdings lights has a CRI in the mid-80s which gives a good balance between quality and price. This is considered very good CRI and unless extreme colour accuracy is required, this should be more than adequate for your needs.

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