



Does High Color Rendering Index (CRI) Mean Accurate Color Rendering?

► The Seven-Phosphor Advantage

If you were to evaluate a red jacket under incandescent or home lighting, it would appear to be a warmer red than that same jacket viewed outdoors. This would lead you to believe that colors viewed in home lighting aren't necessarily representative of the true color. This is because incandescent light, Illuminant A, is high in red and yellow energy but low in green and blue. Daylight, on the other hand, contains more evenly balanced amounts of all colors making it a better choice for color rendering. Yet both light sources could theoretically have the same color rendering index (CRI).

That's what could happen when light sources are selected based on CRI alone. Why?...CRI (calculated by lamp manufacturers) compares the light source to be evaluated against an arbitrary reference. Depending on the color temperature of the light sources being tested (say under 5000 degrees Kelvin), the arbitrary reference would be a Planckian radiator similar to tungsten halogen or home lighting. This light source accents reds, oranges and yellows while weakening blues and greens. So your arbitrary reference, assigned a CRI of 100, is already poor at rendering color. When the light source compared is 5000 degrees Kelvin or greater, it is compared to a phase of daylight (which renders color more accurately) instead of tungsten halogen which has the highest CRI, yet poor color rendering capabilities.

What can you do? Ask your lamp supplier for the spectral power distribution curves (SPD). The curves display the amount of color energy within a light source. So the more evenly balanced the curve across the visible spectrum (red, orange, yellow, green, blue, indigo and violet or ROY G BIV), the better the light source renders color. If, however, the curve is higher in some areas of the spectrum, as is the case with incandescent, which has high red energy and little blue/green energy, the greater the distortion of color — regardless of the CRI.

The patented seven-phosphor coating on the GretagMacbeth fluorescent daylight technology provides the best daylight simulation available in a fluorescent source. Several independent studies have confirmed this. The coating ensures an evenly balanced spectral power distribution curve. So you'll get a high CRI and accurate color rendering compared to natural daylight. GretagMacbeth uses the CIE Assessment of Daylight Simulators, CIE Publication 51. This is a far more accurate method of determining the quality of a daylight simulator. More information on color and color rendering is available in our book *Fundamentals of Color and Appearance* (see page 22).