

## The colour rendering index at the LED test bench

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LED lights bear a three-figure photometric code. One of these figures is a colour rendering index. Explanations.

### What is colour rendering?

In our environment, we perceive the colours of objects according to the light source that illuminates them. They absorb, release or reflect coloured radiation, thereby creating a sensation of colour.

In nature, this radiation is produced by **the sun's rays**. They form the **visible spectrum**, or **white light**. A green pencil looks green because it absorbs all of the wavelengths contained in white light, except for green, which it reflects. This is called **colour rendering**.

In order to avoid altering our perception with **artificial light sources**, **lighting professionals** must ensure the **quality of the white light** of their lighting solutions. For this purpose, the International Commission on Illumination (CIE) has developed a **measurement method** in the form of a **colour rendering index**, or **CRI**.

### The colour rendering index: a key value in lighting engineering

In lighting engineering, the CRI enables **colour rendering using a tested light source** to be compared with rendering under natural light. It is calculated between **0 and 100** with a **palette of 8 colours** (R1 to R8), with 100 being the CRI that can reproduce all colour shades, and 0 being the absence of all recognizable colours.

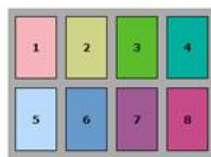


Image: Color Rendering Index color palette

*Color Rendering Index color palette*

#### How to select a suitable CRI?

It depends on the **intended use**. A CRI of 20 is sufficient for the illumination of a **parking lot**, but it should be increased to 40 for a **hallway**, to 80 for **living areas**, and even higher for **precision trades** such as medicine or watchmaking.



The CRI must not be confused with colour temperature. Also found in the photometric code, this value defines the **general hue of the white**: a cold hue above 6000K, and warm at 2700K. Changing the phosphorescent powder for warm whites increases the emission of lower wavelengths (orange-red). This often produces better CRIs, although rendering may be lower (~10% loss, or 5 points of CRI).

### CRI and LED lighting, a question of realism

CRI calculation was standardized in the 1950s to test fluorescent and discharge lamps. The procedure is poorly suited for the **more recent LED technologies**.

LEDs emit a **discontinuous spectrum** which **distorts the value of the CRI** relative to real perception, whether positively or negatively. Some lighting engineers have added **7 other reference colours** (R9 to R15), while the American NIST (National Institute of Standards and Technologies) uses a palette of **less-saturated colours**, the Colour Quality Scale (CQS).

Published on 30 August 2016

Category:  
Lighting techniques

Tags:  
colour rendering index - LED

PDF generated on 05 September 2025

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### The colour rendering index at the LED test bench



Image: Color Quality Scale colors

At LEC, we have chosen **realism**. We do not test CRI, but select LEDs with photometric characteristics that **suit the needs** of our facilities. This provides us the opportunity to offer **improved CRIs** within the context of **specific projects**. This has been the key to the **efficiency and durability** of our lighting solutions for nearly 40 years.

To learn more about our lighting projects, discover our [latest news](#).