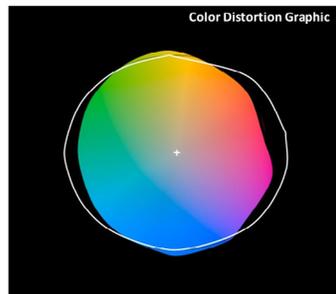
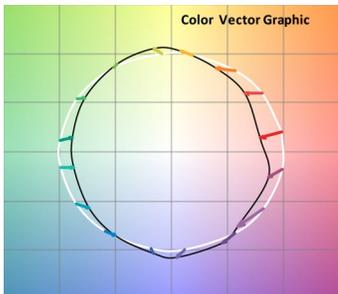




## LED REMOTE PHOSPHOR LINEAR LIGHTING

Horner's remote phosphor technology, coupled with red enhancement and high CRI, provides seamless, superior inspection solutions. Instead of placing the phosphor directly on the LED, we use a remote phosphor technology that places the phosphor away from the LED. With numerous advantages (including longer life, higher efficacy, better color consistency and even light distribution), this creates a smooth, singular light source - no pinpoint LEDs. Our technology also has a higher efficacy than phosphor-based red enhancement solutions. Inspection processes that require color recognition or inspection of red, purple or brown subjects will further benefit from the red enhanced light output.

### TM30 COLOR REPRESENTATION



### REMOTE PHOSPHOR

Typical phosphor converted LED lighting starts with a blue LED light source. Phosphor is added to the LED package to convert the blue light into a mixture of light that appears white. The phosphors help create green, yellow and red light components that makeup the white light.

We use a unique process for combining the phosphor with the LED. Instead of placing the phosphor directly on the LED, we use a remote phosphor technology that places the phosphor away from the LED. This has numerous advantages including longer life, higher efficacy, better color consistency and even light distribution.

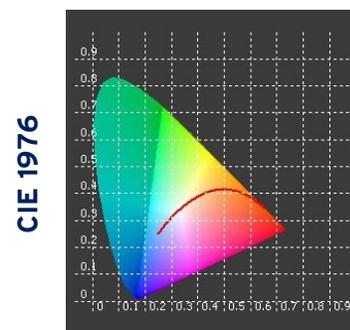
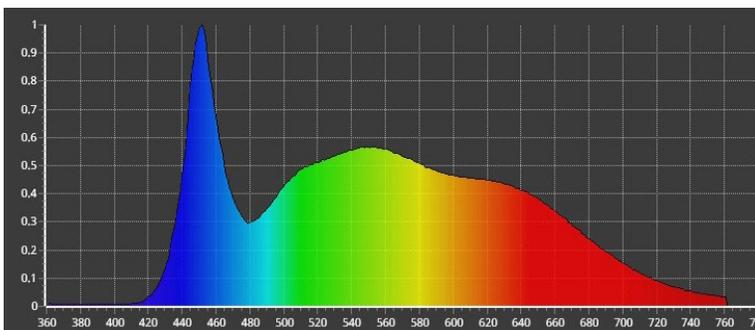
### CRI

CRI is often used to judge the ability of a light to produce accurate colors. The CRI can help evaluate light sources but there are often

other details that need to be considered. CRI testing basically bounces the light source off 14 different colors. The light reflected is compared to its accuracy against a black body light (basically an incandescent bulb). 100 is the best possible match in color, the lower the number the less accurate the colors. You will notice the sample colors are mostly lighter and pastel colors.

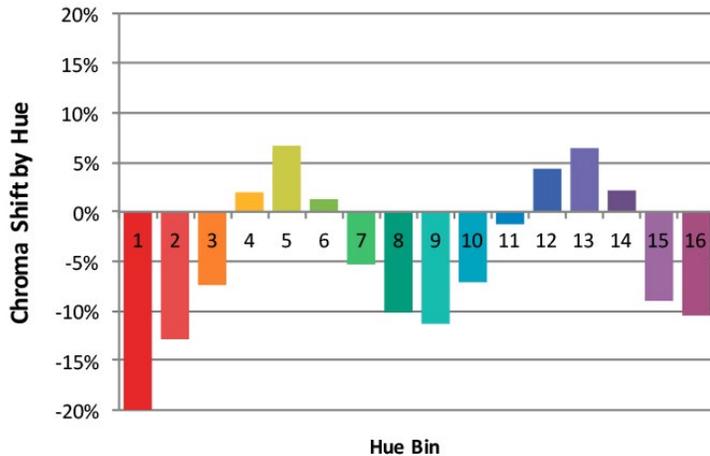
LED lighting often does poorly with the R9 color accuracy. For general lighting a R9 value of greater than zero is often considered acceptable. Horner's red enhanced remote phosphor lighting can often improve this R9 value to 50 to 70.

The CRI is only one aspect of light quality - the spectrum from red enhanced lighting produces 3 peaks; these peaks slightly over saturate blue, green and red colors. Red, green/yellow, and blue lighting components of a light source, however, are important for perceived and objective light quality.



# ADVANTAGES OF HIGH CRI REMOTE PHOSPHOR

## TM30 CHROMA SHIFT



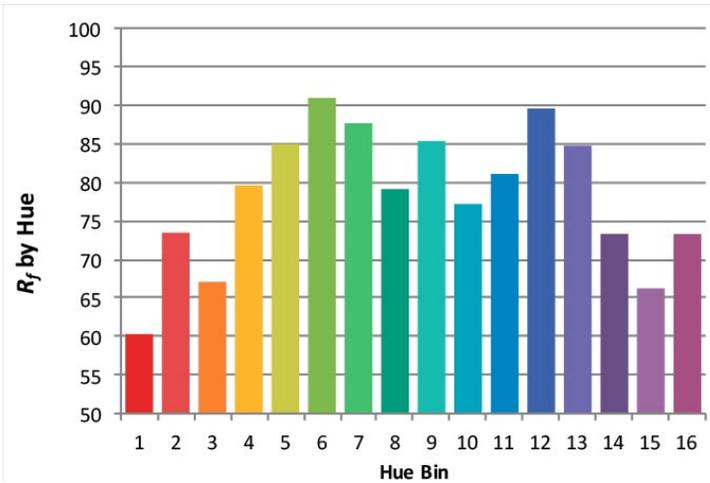
## IN THE FIELD

Tasks that require color matching and color inspection can benefit from high CRI lighting. Task where color matching, 3D vision around these colors also improves as more shades of the object can be visually observed. Inspections involving colorful painted surfaces, wire colors, chemical indicators or furniture finishes can benefit from higher cri, remote phosphor lighting.

The FAA has researched lighting for visual inspections. Their document titled, Design of the Aircraft Inspection/Maintenance Visual Environment recommend high CRI task lighting for use during inspection. This lets them see changes in metal color for corrosion or heat damage.

Remote phosphor lighting by itself provides excellent benefits including longer life, higher efficacy, better color consistency and a more even output. Inspection processes that require color recognition or inspection of red, purple or brown subjects will further benefit from the high CRI light output. When remote phosphor technology is combined with Horner's unique red enhancement technology it produces a high CRI light that is objectively and subjectively better light quality.

## TM30 FIDELITY



## CRI TESTING SOURCE COLORS

