

CL-500A

Measures Effects of LED Street Lighting on Sleep Patterns



Can the color of street lights affect your sleep? This question required research by highly trained electrical engineers. CR Engineers of Fountain Hills, Arizona, set out to measure lighting color levels emitted by LED street lights in the City of Phoenix; in particular, the level of blue energy. CR Engineers is a consulting electrical engineering firm employing highly skilled individuals with hands-on technical backgrounds in various areas of electrical expertise. Their experience exceeds 1,000 projects ranging from low-cost residential designs for local architects to large projects with construction costs over \$25 million.

Light emitting diode (LED) lighting systems are used in a variety of ways, from consumer homes to street lights in major urban areas. The City of Phoenix received public concern regarding the LED street lights and how they were affecting resident sleep patterns. LED lights appear white but have a high level of short wavelength light or blue energy. Many confirmed studies have unequivocally linked ocular exposure to blue – rich light to decreased serum blood levels of melatonin and corresponding negative effects upon sleep cycles. Luminous intensities and spectral content components directly correlate with melatonin suppression. CR Engineers set out to get answers.

To research the effects of blue lights and measure the lighting color levels, CR Engineers used Konica Minolta's CL-500A Illuminance Spectrophotometer. Using the CL-500A, they measured the lighting color levels of the City of Phoenix LED street lights; with a special attention to its blue content. John Alcorn, Vice President/Electrical Engineer for CR Engineers, "Given that there were some high-pressure sodium street lights in the area, we collected data with both types of street lights on, then collected data again with the LED street lights off. This was for a comparison of the blue light levels. Data showed that there were elevated blue light levels from the LED lights when measurements were taken directly underneath the LED street light, but blue light levels were zero next to the residence. We concluded that blue light was not affecting the resident."



LED street lights

The CL-500A provides readings for all colors of the spectrum when measuring a certain light, but breaks out all colors of the light being measured. For instance, LED lights have a measurement for blue light, red light, yellow light, etc. "For this project, we needed a blue light reading, and the CL-500A made it very simple and easy to obtain it," John Alcorn said.

The CL-500A was used to take measurements under each street light (LED or HPS) as well as measurements around the resident's home. The LED street light was turned off, and measurements were taken. Twenty measurements were taken overall - ten with the LED street lights on and ten with them off and the HPS Street lighting on.

Konica Minolta's CL-500A helped CR Engineers test their lighting and identify a solution quickly and easily. By doing so, the residents of Phoenix can have confidence in their city.



Konica Minolta CL-500A

"The benefit of using the CL-500A was that it provided a single reading of the blue light, which was exactly what we needed to measure."

-John Alcorn, Vice President/Electrical Engineer for CR Engineers Inc.