LED/SSL MEASUREMENT

Typical quantities for LED measurements of interest are luminous flux, luminous intensity, x, y, dominate wavelength, peak wavelength, FWHM and for white LEDs, CRI. Total luminous flux is the most important parameter for non-directional characterization of an LED for luminous efficacy performance.

The most common method for measuring the total luminous flux of any source including OLEDs and LEDs is using an integrating sphere spectrometer. The integrating sphere spectrometer is calibrated with a standard of total spectral flux employing the comparison method made simple with application-based software, a calibrated standard lamp of known output, commonly referred to as the "comparison method". The results of this comparison determine the light output test lamp.

For directional applications, LED intensity and spatial distribution are the most important parameters. For intensity measurements a precision entrance port into a near cosine sphere detector is configured for Condition A or B measurements where the device is located 31.6 cm or 10 cm respectively away from the entrance port of the sphere intensity head. The head is coupled with a spectrometer with application based software calibrated for spectral intensity responsivity. Spatial distribution is a measurement of intensity as a function of viewing angle. This measurement is traditional performed by holding the test lamp stationary and swinging a small-aperture detector in an arc about the DUT. A complete hemispherical characterization of the device can be assembled by rotating the plane of measurement with respect to the device, and repeating this test for a number of meridional angular scans. Another common method is holding the detection system stationary and rotating the DUT in a goniometric stage. The data normalized to the normal reading and typically imported into ray tracing programs for device modeling.

Solid State Lighting Testing

Total luminous flux is the spatially integrated, photopically weighted, total light output from a lamp. Total luminous flux is the most important parameter for **non-directional**, general lighting products.

For directional lamps, such as reflector lamps, intensity and beam angle are the most important parameters. Solid state lighting is a movement to replace, when environmentally and commercially viable, general lighting applications with LEDs and LED-based illuminators. With solid state light the lamp luminous efficacy will be one of the factors for integrating these types of sources into mainstream general light applications.

The most common method for measuring the total luminous flux
of light sources is using an integrating sphere spectrometer. The reading from the detection system is compared to a similar reading obtained from a calibrated standard lamp of known output, commonly referred to as the "comparison method". Today this is commonly done in software. The results of this comparison determine the light output of the LED lighting assembly or LED cluster. Typical quantities of interest are luminous flux, luminous efficacy, chromaticity, color temperature and CRI. For color LED based systems luminous flux, luminous efficacy, FWHM, chromaticity, color temperature, dominant wavelength, and purity are measured.