

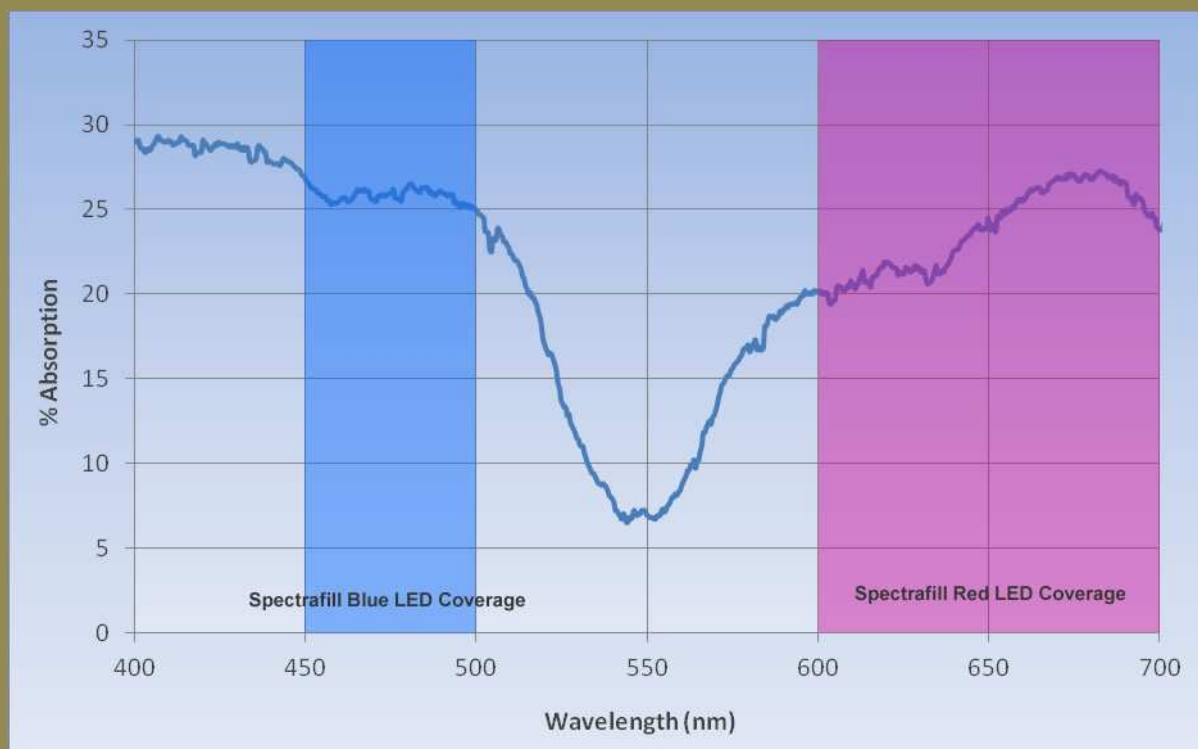
LEDs for Plant Growth

Photosynthesis in plants requires sunlight in addition to water and carbon-di-oxide. Light provides essential energy needed to convert carbon-di-oxide and water into various carbohydrates that get incorporated into the plant. Photosynthesis pigments in plants have different energy requirements in different wavelength bands. The most prominent pigment, chlorophyll, for example, absorbs more light in the red and blue portions of the electromagnetic spectrum than it does in the green part. Enhanced reflection of un-absorbed green light makes plants appear green.



For plants grown indoors with artificial lighting, it is more energy efficient to provide illumination whose spectral characteristics match the absorption spectrum of photosynthetic pigments. Doing so also increases the rate of plant growth because the incident light contains photons that have a better match to the energetics of photosynthesis reactions.

A typical absorption spectrum of green leaved plants is shown below. It shows a prominent broad dip in the green region and high absorption in wavelength regions above 600 nm and below 500 nm.



Of all artificial light sources currently available, LEDs are the most efficient. These small solid-state light sources convert electrical power to electromagnetic radiation at efficiencies as high as 80%. However, most commercial LEDs are narrowband light emitters so their spectral coverage is severely limited. Constructing a suitable LED-based plant grow light that adequately covers the high reaction yield portions of the photosynthesis absorption spectrum thus requires a number of LEDs emitting at different wavelengths.

Electrospell's broadband Spectrafill™ LEDs generate light with spectral coverage that is especially suited to the photosynthesis requirements of most plants and green algae. Spectrafill red LED provides light in the 600 to 700 nm band whereas Spectrafill blue LED provides light in the 450 to 500 nm band, as seen above. The red LED can be used alone or together with the blue LED to produce tailored spectrum light for indoor plant growth systems. In addition to considerable energy savings, compared to illumination with incandescent lamps, such a system also provides light that is matched to the photosynthesis requirements of most plant species, resulting in faster growing, healthier plants. Electrospell also provides reference designs for digital control of LEDs, thermal interface compounds to keep LEDs cool and optics for implementing high quality lighting systems.

Electrospell's Spectrafill™ LEDs are available in a number of package styles to suit different integration requirements. These include traditional 5mm diameter through-hole epoxy packaging, R3528 SMD packaging (shown below) and power LED packaging.



Complete details, including datasheets are available from Electrospell's website: <http://www.electrospell.com>. Free samples are available immediately for evaluation purposes. For price and availability information as well as for sample requests please contact Electrospell at info@electrospell.com or sales@electrospell.com.