

General Information

FLATLITE® is an electroluminescent lamp material that emits light when connected to an E-Lite Power Supply. Specially processed phosphor crystals are sandwiched between a very thin aluminum electrode and a clear top electrode. When these two panels are connected to an AC power source the resulting field causes the phosphor to glow. Unlike traditional sources of illumination, FLATLITE® is not a resistive light source, but rather functions more as a capacitor. To change the intensity of FLATLITE®, the voltage and frequency of the power supply output is varied. A distinctive, thin scribe line down the center of the rear electrode is an E-Lite Technologies proprietary design, allowing for extremely long (up to 700 feet) continuous strips of FLATLITE® lamp. There is no appreciable change in the temperature of the lamp when operating.

Physical Characteristics

FLATLITE® is manufactured in rolls 30" wide and 1200' long. It is fabricated in two colors: White and Green/Blue. The lamp is encapsulated in a protective laminate that creates a flexible panel that is 0.028" thick, and is nominally 1/4" wider than the lamp material itself. Standard lamp widths are 1/4", 1/2", 1", 2", 3", 6", 9", 12", 15", 18", 21", 24", and 30". Standard coil lengths of continuous material for strips 6" wide or less are 100' and 300'. Standard coil lengths for material 9" wide or greater is 50'.

Electrical Characteristics

Electroluminescent lamps must be illuminated with alternating current. E-Lite Power Supplies have been specifically developed to power FLATLITE® lamps at the most efficient ratings, and MUST be used for proper operation of the product. At the nominal recommended operating parameters for high brightness applications, the lamp is driven with 280VAC at 650Hz. The current draw at this brightness is 0.0003 Amps per square inch of illuminated surface. For lower required brightness applications, the voltage and frequency may be reduced, to the point where 120VAC at 60Hz is all that is necessary to light the product for night light installations.

Light Emitting Characteristics

The output of the FLATLITE® lamp is measured at the surface of the lamp, in units known as foot-lamberts. The foot-lambert is a measure of luminance. A foot-lambert is equal to the reflected brilliance of one foot-candle on a ground glass surface. At full brightness, the unfiltered green-blue FLATLITE® lamp has an average luminance of 24 foot-lamberts, the unfiltered white FLATLITE® lamp has an average luminance of 20 foot-lamberts. Unlike traditional lamps; FLATLITE® does not emit light as a point source. The brightness of a point source lamp decreases at a rate equal to the inverse of the square of the distance from the source. That is: $1/\text{Distance}^2$, but electroluminescent lamps are a field source, and therefore, the decrease in perceived brightness over distance is considerably less. This is due to the fact that the lamp is a true lambertian emitter; in other words: a field of light. Traditional lamps unsuccessfully attempt to compensate for the point source inefficiency by utilizing diffusion lenses. For this reason, FLATLITE® outperforms a lamp of greater point brilliance in practical use. The nature of the lamp as a lambertian emitter also creates three other important performance features: there is no impact on night vision after looking directly at the lamp; the eye is able to discern changes in width when approaching the lamp; and the lamp is visible from a greater distance in fog or smoke than any other type of light source.

Environment Considerations

FLATLITE® with an all-purpose laminate is suitable for outdoor, damp or humid installations with an ambient temperature between -20°F and 140°F. Performance and life of the lamp may begin to deteriorate outside of these parameters. See Installation Guidelines for more details.

Useful Life Assessment

The useful life of a FLATLITE® lamp varies by application, and is contingent on brightness, duty cycle and ambient temperature. The closer to the maximum brightness FLATLITE® is operated at, and the higher the ambient temperature, the shorter the useful life of the lamp. Unlike other light sources, FLATLITE® never burns out completely; the lamp slowly loses brightness over time. It is recommended that for most common applications that the lamp be replaced every 5,000 - 10,000 hours to enjoy the full utility of the product. Critical high intensity signage applications may require replacement after 3,000 hours; however, in aisle lighting applications, the lamp is generally effective well in excess of 20,000 hours.

DESIGN AND APPLICATION GUIDELINES

Installation Guidelines FLATLITE® should always be installed in a manner that protects the lamp from damage. In safety critical situations, Underwriter's Laboratories requires a minimum 1/16" flame resistant polycarbonate. For other applications we recommend utilizing a polycarbonate shield of no less than 40mil thickness. For applications in extremely harsh or wet locations, or that require the immersion of the lamp in a liquid, the lamp must be protected by a waterproof enclosure or extrusion. When installed on a metal surface, and powered from an AC source, the installation surface must be earth grounded. In some sensitive applications, installing the lamp on a thin acoustic foam may be necessary to ensure silent operation.

Color Options FLATLITE® is produced in two stock colors, green/blue and white. The white lamp has a pink hue when not illuminated, the green/blue lamp is off-white when not illuminated. Florescent red, orange, yellow, green, blue and magenta overlays are available from the factory. Any Rosco™ or Lee™ type polycarbonate color filters can be installed over the lamp, in lenses or with an adhesive, to create nearly any color desired.

Encapsulation FLATLITE® lamps are encapsulated in laminate. This process provides for electrical insulation and protection from moisture. The standard all-purpose laminate is appropriate for use in most applications, including damp or humid locations. The finished width of the lamp, including laminate is 1/4' more than the nominal size. Anytime the lamp is cut to size or terminated, the raw edge or terminal must be sealed with an E-Lite recommended product.

Power Supplies FLATLITE® is designed to be operated exclusively by E-Lite's proprietary power supplies and inverters. These units are sized by lamp area. The largest power supply available can light 12,500 in² of FLATLITE®. This does not limit the size of applications, just the size of the individual lamps. Additional area can be lit with additional power supplies. Multiple lamp widths and colors can be supplied by a single power supply. E-Lite Technologies has a range of standard AC power supplies in addition to Low Voltage DC Power Supplies for vehicles, aircraft and other applications:

<u>Input Voltage</u>	<u>Lamp Capacity</u>
120/240 VAC	100 - 12,500 in ² :
9 VDC	4.5- 36 in ²
12 VDC	16 - 4800 in ²
24 - 28 VDC	16 - 12,500 in ²

Lamp connection is typically via Molex™ Mini-Fit™ connectors and 18 ga. stranded copper wire. Input power connection is via universal grounded AC appliance inlet (for AC Power supplies), Coaxial inlet for (12 & 24VDC Systems) and 9V Battery Snap Connectors (for 9VDC Supplies). 28 VDC and 120/240 VAC system controllers with emergency battery back up are also available for 120 - 3,000 in² lamps.

Ambient Light Considerations To determine if FLATLITE® is appropriate for your installation, measure the foot candle level at the installation surface. Generally, the lamp will be effective when operated at full brightness (280 VAC, 650 Hz) when installed on light surfaces in areas that have an ambient light level of 30 foot-candles or less. As the reflected brilliance of the surrounding surfaces decreases, a lower operating brilliance of the lamp will be required for equivalent effectiveness. In total darkness, the lamp is generally effective for most decorative applications at 8 foot lamberts or less. The lower the operating brightness, the longer the useful life of the product.

Creating Shapes with FLATLITE® The lamp can be cut and fabricated into nearly any shape, including creating open spaces in the lamp surface. After the lamp is cut, it must be re-laminated with the proper encapsulation material, When creating shapes, the lamp area on either side of the scribe line must be balanced to achieve even light output. Symmetric shapes are the most efficient use of the lamp. Asymmetric designs of large lamps may result in uneven brilliance; smaller lamps are more forgiving, depending upon the shape. The lamp may also be folded, curved or bent on the axis perpendicular to the scribe line.

