

# RSP, Inc.

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## EL Lamp Design Guide

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Ryan Screen Printing (RSPI) is your trusted source for EL lamps, membrane switches, plastic injection molding, rubber keypads, turn-key assemblies and more.

EL lamps are used for lighting displays, membrane switches, and advertising. They are reasonably priced compared to fiber optics and offer design flexibility.

RSPI has over 50 years of manufacturing and design experience. We work closely with the customer, the engineer and the production team to make sure every project is completed to specifications and on-time.

If you need additional information please contact us directly at (414) 546-4417.

### Operation

The definition of an EL lamp (Electro Luminescent lamp) is a capacitor structure with a phosphor sandwiched between two electrodes. One part of the electrode is transparent to allow light to pass. Once voltage is sent through an inverter across the electrodes it generates a changing electric field within the phosphor which then causes the phosphor to light.

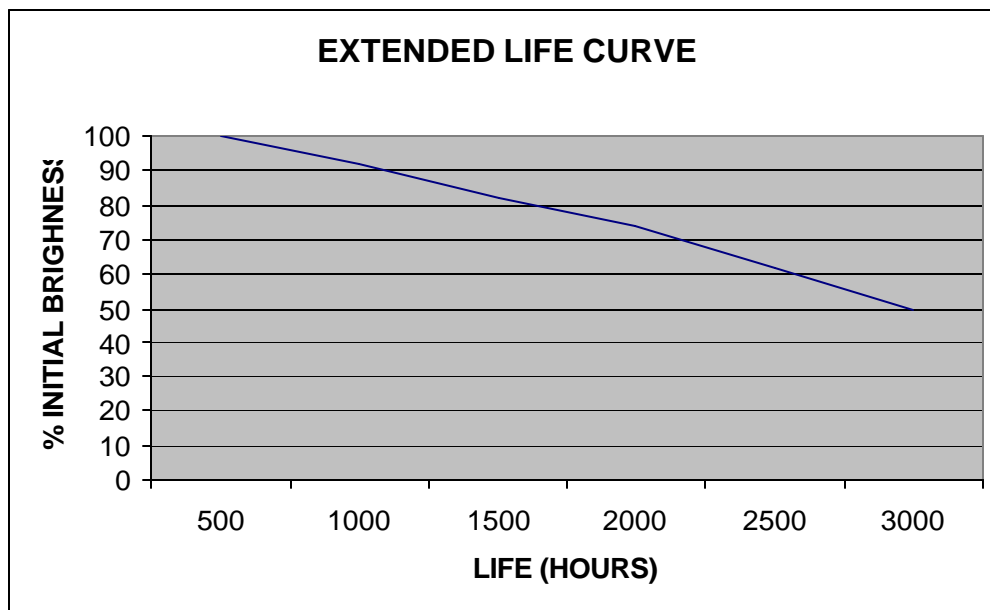
It takes anywhere from 100 volts to 400 volts to light an EL lamp. There also has to be a high enough frequency to light the lamps; this frequency is anywhere from 100 hertz to 1,000 hertz. You get this voltage and frequency using a small inverter which takes the DC voltage and changes it to AC voltage. The inverter sends out the correct frequency to allow the lamp to light. The typical power consumption of an EL is less than .25 MA at 115V AC per one square centimeter. When the voltage is increased to an EL lamp the light then gets brighter; when the frequency is changed the color of the EL lamp changes.

### Colors

The color of light emitted from an EL can vary depending on the phosphors that are used. Some common colors are blue/green and yellow/green, white, blue and orange.

### Life

The life of an EL lamp varies based on the way it is used. EL lamps have a half life; once they reach their half life the brightness starts to fade rapidly. If the light is just being turned on when you hit a key on a switch the lamp will take a very long time to reach its half life, approximately 3000-5000 hours depending upon the quality of the phosphor used. EL lamps are not a good choice if the lamp is on for an extended period of time. To help expand the life of an EL lamp you can have it fade or flash, this could double the life of the lamp.



El lamps can be applied to many different materials such as paper, plastic, and glass.

### Requirements

Below are the necessary border requirements for designing a membrane switch;

- A) Minimum distance from edge of part = .090"
- B) Minimum distance from edges and cutouts from the edge of lit area = .045"
- C) Minimum distance from clear area to lit area = .25"

It is important to match your inverter to the EL lamp to help ensure a bright and efficient lamp with a long useful life. In most cases, a stock inverter to drive EL foil lamps will be compatible with EL lamps produced by RSPI. If brightness and long life are desired, best results will be achieved with output voltages between 80Vrms – 120Vrms and frequencies between 400 Hz - 60 Hz. For optimal performance, the EL lamp should be characterized so that nominal driving voltage and frequency ranges can be determined. The matching inverter can then be selected and validated for the EL lamp.

### Inverter Sources

- o JKL Components Corporation – Distributed by Digikey <http://www.digikey.com>