

The Truth About LED Lighting





Let Yourself Go!

LED technology can let your lighting creativity run free.

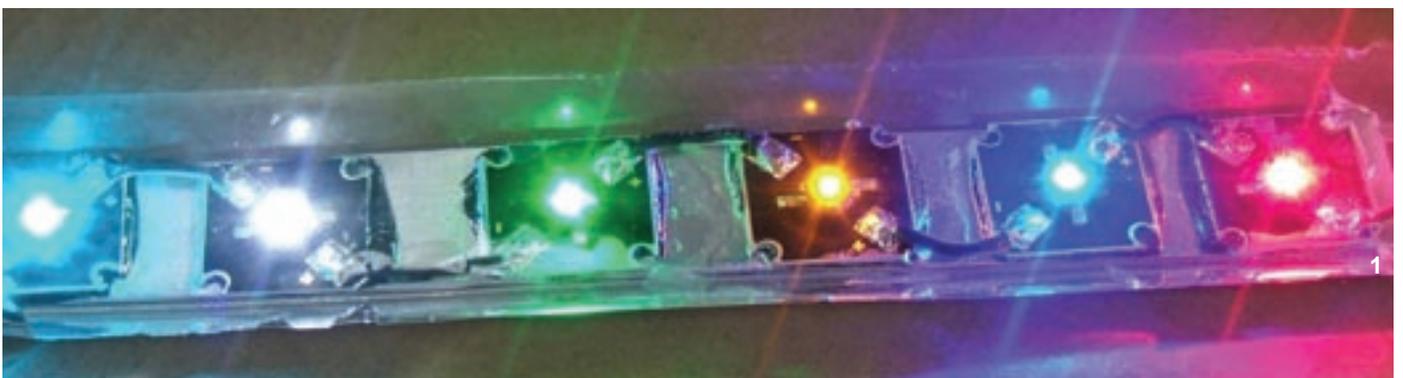
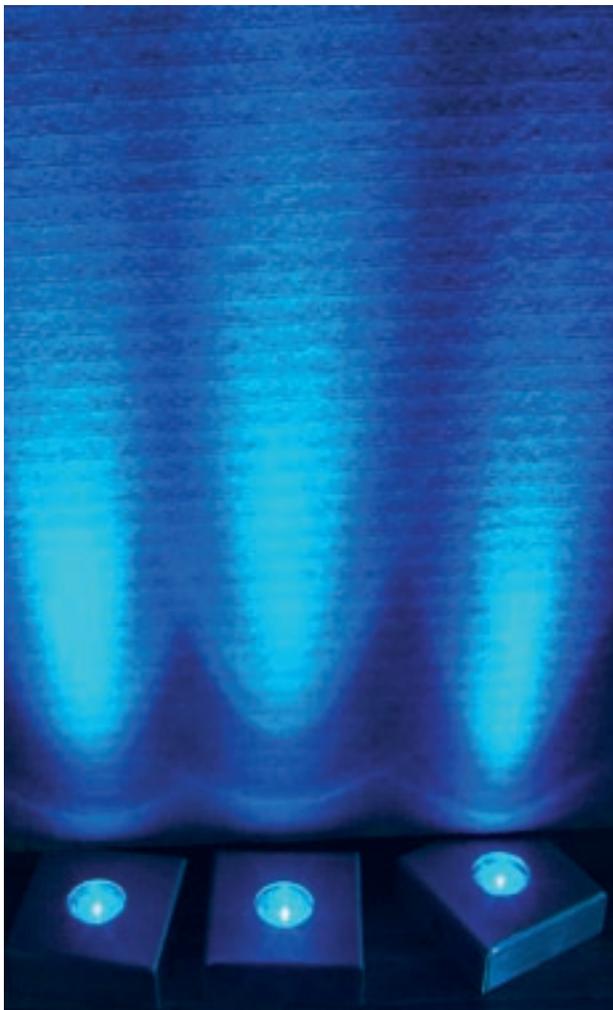
Almost any application you can imagine can be created by Gemini One Five Luminaires.

Perform magic with white or colored LEDs. Eliminate large obtrusive

fixtures. Create dramatically different sources of light that disappear from view.

Gemini One Five brings designs to life with custom-made, high-power LED lighting systems. Standard products are available as well.

Color and white-light LEDs like the ones above and below can be used in a range of applications, including decorative, accent and task lighting.





Did you know?

The power supply, more than the LED or fixture, determines lighting system efficiency, reliability and flexibility over time.

Three Success Factors

The first two factors are selecting the correct LED and designing the fixture to remove heat.

There are a multitude of LEDs on the market to select from, including low power LEDs of 100 ma and less and high power LEDs of 350ma and up.

LEDs always look their best on Day 1, but LEDs from different manufacturers will vary quite a bit over time.

Independent testing confirms whether the LED manufacturer's extrapolated performance data are accurate or not. Only time will tell since the half-light of an LED—50,000 hours—is

5.7 years when run 24/7/365.

A Take-Charge Driver Gets Behind the Wheel

The most important success factor, however, is properly powering the LEDs to ensure optimum performance and long life. LEDs are current-driven devices and should be powered by a driver that regulates current, not voltage, which compensates for field conditions and the LED's changing electrical properties. It's similar to cruise control in an automobile that maintains a constant speed over hills and valleys.

There are other ways to power LEDs, but using a driver rewards you with a lighting system that showcases your capabilities.

Some Like It Hot. Not!

In many cases, however, the driver is the weak link because it's usually an afterthought. It can introduce inefficiencies that impair performance and shorten system life.

In fact, the efficiency of some drivers is as low as 20 percent. This oversight adds up to four additional watts of power consumption for every watt of LEDs.

Gemini One Five partners with Semper Fi Power Supply to deliver drivers that:

- Perform reliably, they are warranted for up to 10 years.

- Perform safely due to low voltage and low current output, and thermal, short circuit and overload circuit protection.
- Power LEDs up to 1000 ma, 350ma is the standard.
- Optimize system efficiency (up to 95 percent).
- Extend LED life (50,000 hour half-light).
- Dim to adjust color and intensity (integral, 0-10 volt, PWM or SF-120 DIM).



Gemini One Five Luminaires

Gemini One Five integrates Luxeon® High Power LEDs into all standard luminaires. High Power LEDs generate sufficient lumen output to make LEDs a suitable choice for task and accent lighting applications, and make dimming feasible.

LED lighting is based on solid state technology. There are no lamps to replace, so Gemini One Five modularizes its designs, allowing LED modules to be swapped out without replacing the entire fixture.

A Match Made in...

Luxeon sorts its LEDs into 'bin codes' before shipping to identify by performance characteristics because batches vary quite

a bit. Gemini One Five performs additional binning to ensure that LEDs are matched for optimal uniformity.

Gemini One Five also incorporates a one-week "burn-in" to stress and weed-out components that would fail prematurely.

LEDs are not a panacea. They will not replace all lighting technologies because of cost, but white-light LEDs can be the proper choice for many lighting projects.

While colored light catches the eye and is fun and artistic, white light is functional and mainstream.

Whether using white or colored LEDs, Gemini One Five LED drivers are warranted for 10 years when powered by a Semper Fi Power Supply. Power Supplies can be specified for use with any input voltage/frequency around the world.

Electronics are susceptible to power quality issues over time.

Semper Fi transformers serve as a big filter that increases both life expectancy and efficiency.

Driver/Power Supply Specifics

- Overload, open, thermal, and short circuit protection are standard.
- Drivers are set at 350 ma or optional 700 ma or 1,000 ma settings.
- Coils are covered by Semper Fi's 25-year warranty.
- Drivers are warranted for five or 10 years.
- Battery back up options are available.
- Drivers and power supplies are Indoor/Outdoor/IC rated.
- Are suitable for retrofit and new construction projects.
- Power Supplies can be built for use with any input voltage/frequency around the world.



**Semper Fi Power Supply
low voltage transformer**



LED Fact or Fiction?

Do LEDs really last 100,000 hours?

So everyone says, but plan on LEDs to produce half of their rated light output, or half-light, after 50,000 hours.

Can LEDs be integrated into existing fixtures?

LEDs must evacuate their heat, otherwise they will produce less than rated light output and could fail prematurely. There's a correlation between fixture cost and degree of heat evacuation.

Do LEDs produce high lumens per watt?

Lumen output is increasing, but current technology achieves higher output by driving the LED harder, requiring materials that can handle heat and/or additional heat

White LEDs go through a one-week "burn in" to ensure they are matched and will not fail prematurely in the field.

evacuation.

Heat affects LED performance, so driving LEDs harder increases the complexity and cost of the entire system. There are no "cheap" solutions. This is why Gemini One Five has standardized on the most reliable LED on the

market for lighting products—350ma, 1.5 watt.

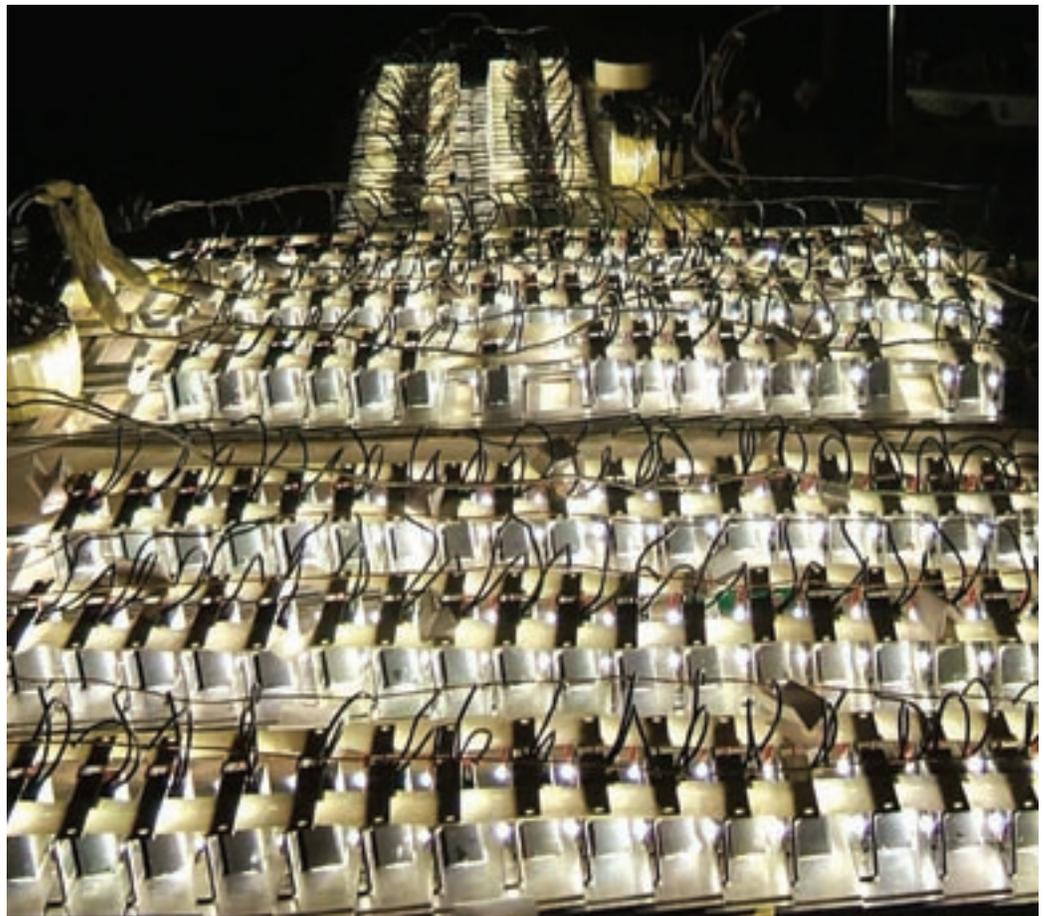
Because LED beams are cool, heat isn't a problem.

The beam of light is cool, but the LED unit generates considerable heat so must be heatsinked to

ensure proper performance and reliability over time.

LEDs are highly efficient due to their low power requirements.

Yes, when powered properly.
Call 800-660-2320 with additional questions.





A Comprehensive Package Of LED Benefits

Which Are Right for Your Projects?

- **Rugged:** no filament, good for extreme environments.
- **Powerful:** generates impressive lumens per watt.
- **Safe:** operates on low voltage and low current.
- **Long lived:** offers 50,000 hour half-light.
- **Styling opportunities:** allows design flexibility.
- **Small size:** broadens design possibilities, think outside the box.
- **No UV:** won't fade colors or valuables.
- **Cool beam:** eliminates fire hazard, safe for children, pets and valuables.
- **Environmentally friendly:** no mercury, no disposable lamp issues, offers solar powered option.
- **No maintenance:** no relamping costs, ideal for inconvenient locations.
- **Directional beam:** projects more light onto targeted surface so requires less energy and saves money.
- **Saturated colors and intensities:** catches the eye, sets the mood, eliminates filters and their inherent light losses, paint with light.
- **Warm (3000K), cool (5000K+) and RGB white light available:** help make LEDs suitable for residential and commercial task and accent lighting.
- **Instant on:** even in cold ambient temperatures.
- **Full range dimming:** saves energy, lengthens lamp life, sets mood.
- **DC powered:** compatible with solar and battery power.
- **No EMI emissions:** won't affect sensitive electronic equipment.

There's more...

The initial cost of LED lighting is higher than incandescent lighting.

But the life-cycle cost of an LED lighting system, which includes initial cost, energy consumption and maintenance, is lower than incandescent lighting. LED lighting can be the proper choice for lighting projects.

The following comparison shows the cost advantage of LEDs over low voltage incandescent lighting.

Based on operating 10 hours/day, 365 days a year at \$0.16 kWh, a 4.5 watt Gemini One Five Lu-

minaire costs \$2.63 a year to operate. A 12 volt, 20 watt ESX lamp dimmed at 10 volts costs \$8.76 a year to operate under the same conditions.

A 4.5 watt Gemini One Five Luminaire using a 10 degree beam spread produces 20 foot-candles at 9 to 10 feet.

The 20 watt, 12 degree, 5000 hour rated lamp dimmed to 10 volts produces 18 foot-candles at 9 to 10 feet off the surface.

High Power LEDs make wide-spread application of LED lighting possible.



Model PK LED shows that proper design helps manage heat that is safe to the touch and prolongs LED life.



Capitalize on White Light LEDs

Functional, white-light LEDs can be appropriate for many lighting projects.

LEDs are available in:

- Warm White (3000K).
- Cool White (5000K+).
- RGB (Red, Green, Blue).

Red, Green and Blue all have different half lights, so you will need to adjust each color over time to maintain the desired white light.

Easily Control Color And Intensity

Because High Power LEDs generate so much light, there may be occasions when you want to dim. Besides setting mood, dimming will extend LED life since they will run cooler, thus minimizing the affects of damaging heat on performance and half-light.

Dim to adjust color and intensity with integral, 0-10 volt, PWM or SF-120 DIM modules.

All standard drivers incorporate an integral dimmer to independently adjust light output from an individual driver, even when wired to other drivers.

Analog 0-10 volt and Digital PWM dimming are standard on all remote (RPK) drivers.

Standard dimmers require the SF-120-DIM interface that is used in conjunction with your favorite dimmer and all RPK (remote) drivers.

Gemini One Five Luminaires recommends that you contact Semper Fi Power if you need a power supply to current- or voltage-drive other manufacturers' LEDs.



Drive for Success

What do you want to know about applying LED lighting to a project? Call Gemini One Five Luminaires at 800-660-2320 or visit www.geminionefive.com for answers you can trust.

