
Join the Discussion: OLED Lighting Frequently Asked Questions

OLEDWorks University Course Insights



Understanding the Benefits of OLED Lighting

OLED lighting's unique characteristics enable a range of benefits that are critical to the many applications they inspire. Their lightweight and thin profile enables innovative and functional designs. OLEDs are also a healthy light source, producing bright illumination free of glare, harmful blue light, and UV. Finally, OLEDs are produced using organic, sustainable materials.

The OLED panels appear very thin, where is the heat sink?

Unlike alternative solutions, OLED does not require a heat sink. They naturally operate at cool-to-the-touch temperatures, enabling the thin profile you see.



LEDs use pretty harmful gases in manufacturing, do OLEDs?

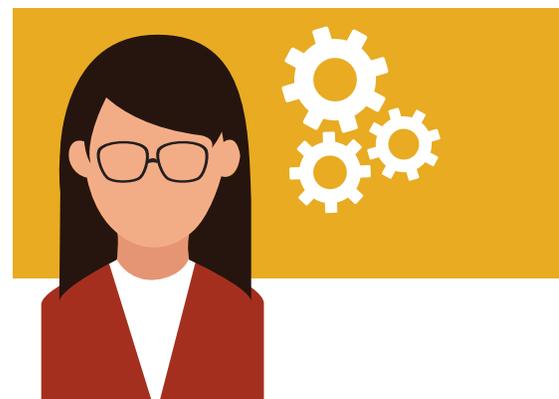
No, there are no toxic gasses used in OLED fabrication. OLEDs are deposited by physical evaporation, not chemical vapor deposition. OLED light technology from OLEDWorks meets the European Union's stringent RoHS and REACH directives for hazardous materials.

During the course, you mentioned stacked OLED solutions, do six stacks of OLED add up to a lot of thickness?

No, the entire OLED coating would be thinner than a human hair. An OLED panel is essentially the thickness of the glass, for a total thickness of about 2mm.

The Technology of OLED Lighting

OLED stands for organic light emitting diode and is a form of solid state lighting composed of thin carbon-based organic layers that produce excellent light with crisp and even illumination.



What are the organic materials in OLEDs?

There are a wide array of organic materials used in OLEDs. All exhibit some form of semiconducting behavior when assembled into a thin film. Some classes of organics conduct positive charges (or holes well p-type) while others conduct negative charges (or electrons well n-type).

What does one stack of OLEDs consist of?

The main component of a stack is an emitter region. There can be six stacks, or emitter regions/layers, in a modern-day OLED device.

What types of substrates are used in OLED panels?

Glass is the ideal substrate solution for OLEDs. Plastics do not have suitable barrier properties to withstand the long lifetimes of OLED technology and they do not provide the needed moisture barrier for OLED applications.

Do OLEDs require a driver? If so, how many OLED panels can one driver handle and do they follow the same rules as LED drivers?

Yes, OLEDs require a driver and some driver configurations support two OLED panels. OLED drivers require a common cathode (LEDs typically use a common anode). Like LED drivers, they use constant current, but with lower currents than are typical of LEDs (in the range of a few hundred mA), and a higher voltage (24 V vs 12 V).

What is the average lifetime of an OLED panel?

OLEDs in general have long lifetimes, however, the lifetime of a panel depends on how bright you run them. At 100 lumens, panels have an L70 of 100,000 hours, which equates to over 10 years of continuous operation before the light were to degrade to 70% of it's initial brightness.

What layer of the OLED structure impacts the light output/brightness?

All layers are optimized to balance current delivery to the emission layer. The material properties in the emission layer also control the light output and brightness.

Do OLEDs experience degradation of light as a function of turning them on and off? At the end of an OLED panel's lifetime does the light intensity fade like LEDs do?

OLED degradation is directly related to the amount of current they have seen. OLEDs fade gradually. They do not suddenly stop operating like an incandescent light bulb (see page 3 for additional lifetime information).

What is the candella per square meter of an OLED panel?

For a general lighting panel, the typical candella per square meter (or nits) is 3000 - 8500 Cd/m².



Are there any concerns with OLEDs color-shifting over time and is the color temperature selected when specifying the fixture?

The current state-of-the-art OLED panels have excellent color stability (see page 3 for additional lifetime information). The color temperature is determined when the OLED is manufactured. OLEDWorks' standard offerings are 3000 K and 4000 K. Custom color temperatures are also available.

Why are OLEDs not at the same efficacies as LEDs?

OLED lighting is a newer solid state lighting technology than LED, and is still benefitting from breakthroughs in research. Five years ago, OLED efficacies were 45 lm/W. They are now as high as 85 lm/W and continue to climb.

Diving into the Applications of OLEDs

General lighting and transportation are the industries experiencing the greatest OLED lighting adoption, due to its appealing structure and design. OLED lighting also brings unique solutions across automation, hospitality, healthcare, appliances, agriculture and custom artistic installations.

Are OLED panels dimmable?

Yes. They are 0 - 10 V dimmable, similar to other solid state lighting technologies. They dim down to 1%, which makes them an ideal solution for automated buildings. OLEDs dim to warm color temperatures (unlike inorganic LEDs, which dim to cool color temperatures).

Can OLED panels be deposited on a curved substance?

Panels can be processed flat on a flexible substrate during manufacturing, such as Corning® Willow® glass, which can bend in one radial direction.

I've seen OLED panels that are completely transparent, how does that work and are there plans to continue the development of transparent OLEDs?

The cathode in the OLED can be made to be semi-transparent. This will allow for the fabrication of a transparent OLED. OLEDWorks is continuing to watch the market pull on this, it is very interesting technology.

How often are OLED panels used in commercial applications versus residential applications?

Currently about 80% of the fixtures being produced with OLEDs focus on commercial applications such as office, hospitality, retail and similar spaces. We do see increasing interest in the residential market going forward, particularly with growth in support of home/remote office workspaces, as well as undercabinet and specialty residential fixtures.



How are mirrored OLEDs created and are OLED panels high quality enough to use in a vanity?

OLED panels naturally have a mirrored finish from the metal used for the OLED cathode. We believe OLEDs produce a quality sufficient for vanity applications. The conversation about OLED lighting in vanity mirrors comes up often and we're excited to see these products make their way to the market.

Can OLED panels be used in series/parallel to one another?

Yes, series is the most common. Parallel can also be done, but we recommend active current control (division) between the panels.

Is double-sided emission possible with OLED panels?

Yes, but you get half the photons going one way and half another, so the overall brightness is lower.

How do lighted brand logos created with OLED panels work?

The OLED anode is patterned, and the OLED only lights up in the designated logo area. OLED logo panels can be part of a larger fixture with other OLED panels, or as a standalone panel for interior commercial and automotive applications. The unique nature of an OLED provides a very uniform, high-contrast, light that makes the logo very prominent.



Where is OLED Lighting Technology Going?

So what's next for OLED lighting? From technological advancements, to new applications, to global adoption - the future is looking bright for OLEDs.

Do you think the lifetimes of OLEDs will increase in the future?

OLED lifetimes will continue to benefit from new materials and device formulations, and will continue to increase in the future.

In terms of brightness, in 10 years do you think we will be at 120 lm/w?

Our team of OLED engineers thinks we will be there in less than 5 years.

What are the key developments in OLED technology that we can expect over the next ten years?

- Increased efficacy, due to continued development of new formulations and stack structures
- New substrates, including further development of flexible panels, and techniques to improve the light extraction layer.
- The development of higher performance materials including blue phosphorescent emitters for further improvement of efficacy and stability
- Tunability across white color temperatures

Additional Resources on OLED Lighting

Explore our below resources for you to continue your OLED lighting journey.

[The OLEDWorks Newsletter](#)

The OLEDWorks Newsletter is a twice monthly email including the latest OLEDWorks news, blog content, eBooks or whitepapers, Channel Partner highlights and more.

[The OLED Lighting Marketplace](#)

Did you know there is already an extensive collection of commercially available OLED fixtures? Visit the OLED Lighting Marketplace for the latest fixtures that are sure to enhance your next design project.

[Talk to an OLED Lighting Expert](#)

Do you see an opportunity for OLED lighting in your next project? Set a meeting with a member of our team to discuss how we can work together and make that vision a reality.

