

ENLIGHTEN AND INSPIRE

Energy Focus sets the new standard in healthcare lighting

Flicker-free LED lighting for healthcare facilities



Energy Focus offers the highest efficacy LED lighting products.

Energy Focus offers 150 lumen-per-watt LED lighting products. This allows healthcare facilities to maximize energy savings by reducing electricity consumption by more than 50% from legacy lighting technologies.



Sustainability in hospital environments

Healthcare facilities are among a community's most critical facilities. The rotation of workers at such buildings, from doctors and nurses to staff and cleaning crews, operates on a 24/7/365 basis, ensuring hospitals and treatment clinics are always in working order for times of emergency and moments of healing. The cost of running a large hospital facility is astounding. Electricity, air quality, ventilation and temperature control all contribute to the expenses of keeping these buildings operational. Although healthcare facilities only account for <1% of all commercial buildings in the U.S., they consume 4.3% of the total delivered energy used by the commercial sector.¹ As hospitals grow to accommodate more patients, their costs rise exponentially.

Hospitals in the U.S. spend, on average, \$1.67 on electricity per square foot. Lighting alone accounts for 15% of a hospital's electricity budget.² For an average-size hospital building (75,000 square feet) that's an expenditure of \$18,000 for lighting alone. For a large hospital building (650,000 square feet), it costs \$160,000 to keep the lights on.

When faced with these statistics, the benefits of switching to LEDs are obvious. LEDs diminish electricity, maintenance, and replacement costs, and their superior quality and efficiency are reflected in a healthier environment. LEDs do not contain hazardous mercury, and their higher efficiency results in decreased CO² emissions and an overall lesser impact on the energy grid—decreasing the need for fossil fuels.^{4,5} The light output of LEDs is the closest spectral match to sunlight, providing the safest, whitest, easiest light to see.⁶

LEDs require less energy to produce more light than other systems and high-quality LED lighting products can last upward of ten years at 24/7 operation.³ As the technology continues to improve, so will the lights' efficiency and lifespan.

Health benefits of LED lighting

LEDs provide a closer match to natural sunlight. This results in better color differentiation, brighter whites, better color saturation and overall better color vision.⁹ Bright light is essential for reducing staff errors and is important for the safety of elderly patients.¹⁴ Easier color differentiation can help doctors and nurses with their examinations and surgeries and provide a more comfortable environment for patients.

Additionally, the light from LEDs provides brighter white light with more blue content to effectively suppress melatonin during waking hours.¹⁰ By suppressing melatonin with the right kind of quality light during the day, patients and staff can feel more awake and alert, resulting in increased productivity, improved mood and cascading effects of healthier metabolisms and immune systems.^{12,13} It is equally important to avoid light at night, especially in patient rooms or for shift workers when they are home sleeping.¹⁵ This cycle of bright white light provided by LEDs during awake hours and avoiding light during resting hours perpetuates a healthy sleep/wake cycle that is crucial for patient recovery, staff efficiency and overall health and wellness.



Not all LEDs are created equal

A recent article in *Facility Executive* magazine on lighting maintenance accurately points out that “LEDs are only worth the investment if they hold true to their performance promises. A lamp that boasts an energy efficiency increase of up to 90% compared to other lighting options isn’t beneficial if it doesn’t function.”¹¹ The article guides decision-makers to “check your source, inquire about lamp testing, look up UL registration numbers and search for DLC qualifications,” strong advice that is particularly impactful for a healthcare facility with sensitive mechanical equipment. Energy Focus products offer high power factor, low total harmonic distortion, low EMI, flicker-free LED lighting that is guaranteed not to interfere with your medical equipment and provide added safety and health benefits.



Hazards of flicker in lighting

Flicker is a result of modulating the current to electric light sources. While electronic ballast-driven fluorescents made dramatic reductions in flicker from their magnetic ballast-driven predecessors, most LED products reintroduced high flicker rates into our indoor environments.¹⁶ While the human visual threshold is around 50Hz, meaning that if a light source is flickering faster than 50 times per second we cannot 'see' it, this sub-tropic ('invisible') flicker can cause many issues.

Everyone is sensitive to flicker to some degree. For most people, flicker may contribute to headaches, eye strain and fatigue; acute symptoms that may vary from mildly distracting to severely uncomfortable. In one study, visual triggers such as flicker account for 38% of reported migraines.¹⁸ However, certain people, such as those on the autism spectrum, experience visual hypersensitivity, where lighting triggers can result in heightened symptoms. Flicker can also induce seizures in people with photosensitive epilepsy. While there are no standards that require lighting manufacturers to remove flicker, IEEE recommends less than 5% flicker to mitigate risks to these populations.⁸ Many patients with traumatic head injuries experience light sensitivity as well, making flicker a crucial concern for lighting in healthcare facilities.

In addition to negative health effects, flicker can also cause technology to malfunction, creating safety hazards for important healthcare machinery. Flicker can cause stroboscopic effect, or aliasing, a visual phenomenon where continuous motion of an object appears at a series of instantaneous locations. This can pose a hazard with fast-moving machinery or even in robotic surgeries.⁷ Other mechanical equipment, such as barcode scanners, will not function under flickering lights. From security cameras, to recorded medical procedures, to scanning identification badges or prescriptions, flicker can introduce unnecessary safety hazards to a healthcare facility.

Energy Focus products are flicker-free

Energy Focus is committed to providing high-quality, flicker-free LED light for optimal health and safety, even when dimming.*

LED product reliability and longevity

The operating temperature for an LED lamp strongly influences both the lifetime and safety capabilities of the lamps. LED lighting products are only truly sustainable for healthcare facilities if they perform to strict specifications.

By ensuring low temperatures both through component design, as well as structure, any hazards can be avoided. Energy Focus uses a D-channel aluminum extrusion in contact with heat-generating components for superior thermal dissipation, meaning the lamps stay cool throughout operation. The aluminum backbone also provides sturdy structural support that will not bend, break, melt or bow.

Compatibility with fluorescent ballast-driven lamps is a concern, especially with lamps that claim to be ‘plug-and-play’; compatible with existing ballasts. A lamp can operate at a higher-than-ideal temperature if the ballast overdrives the lamp, causing failure or premature wear-out. Only Energy Focus offers the dual-mode Intellitube, which can operate with or without a ballast. All of our product lines can operate directly off the line voltage; resulting in maximum energy savings, lowest operating temperatures, and safest performance. Energy Focus products are UL, cUL, DLC, FCC, ANSI, RoHS compliant.



*Less than 1% in normal conditions; less than 5% when dimming

About Energy Focus

Energy Focus is an industry-leading innovator of energy-efficient LED lighting technology. As the creator of the only flicker-free LED products available, our lighting solutions provide significant and measurable benefits over conventional and fluorescent lighting, including extensive energy savings, safety and health benefits, and improved aesthetics.

As a long-standing partner with the U.S. government, Energy Focus has a proud history delivering energy-efficient LED products to the U.S. Navy. Every unit we ship is subject to rigorous testing in the most adverse conditions possible, ensuring unparalleled quality and reliability. Our family of customers and partners include national, state and local U.S. government agencies as well as Fortune 500 companies across education, healthcare, retail and manufacturing industries. Energy Focus is headquartered in Solon, Ohio.



To contact an Energy Focus representative to visit your healthcare facility and find a customized lighting solution, please call [800.327.7877](tel:800.327.7877) or email customerservice@energyfocus.com

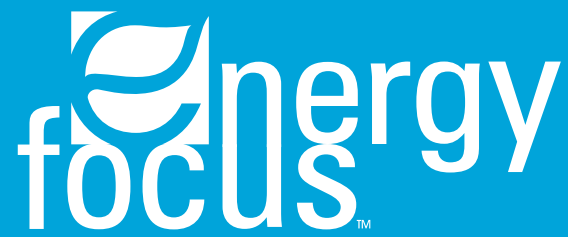


Proven Performance

In the world's most demanding applications

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CERTIFICATIONS



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