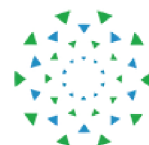


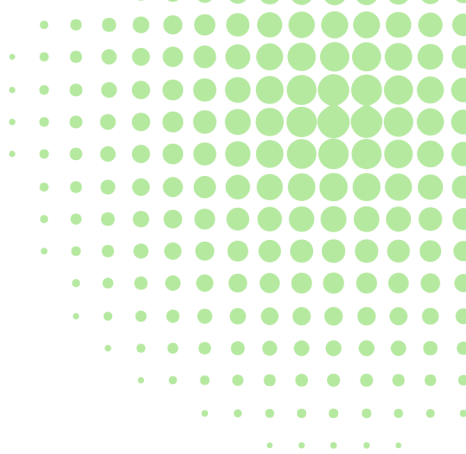
Energy-Efficient Commercial and Industrial LED Luminaires

BUILDER'S GUIDE

GLOBAL SUPPLY SOLUTIONS



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Federal Energy Management Program

Commercial and industrial light-emitting diode (LED) luminaires are a product category covered by Federal Energy Management Program (FEMP) efficiency requirements. Federal laws and requirements mandate that agencies purchase ENERGY STAR-qualified products or FEMP-designated products in all product categories covered by these programs and in any acquisition actions that are not specifically exempted by law.

FEMP's acquisition guidance and efficiency requirements apply to LED luminaires used to provide general or ambient lighting in commercial and industrial buildings that meet the product qualification criteria for indoor-troffer (#7), indoor-linear ambient (#8), and high-bay (#9) applications in the Design Lights Consortium's (DLC).

Source: Energy.gov

Find Product Efficiency Requirements

Federal purchases must meet or exceed the minimum efficiency requirements in Table 1. These requirements are given in luminous efficacy (LE), which is measured in lumens per watt (lm/W). A higher number indicates a more efficient product (i.e., more light output per unit of power input).

TABLE 1. EFFICIENCY REQUIREMENTS FOR COMMERCIAL AND INDUSTRIAL LED LUMINAIRES

LUMINAIRE TYPE	MINIMUM LIGHT OUTPUT	LE
Commercial: Linear Ambient [a]	≥ 375 lm/ft.	≥ 128 lm/W
Commercial: 1 ft. x 4 ft. Troffers	≥ 1,500 lm	≥ 120 lm/W
Commercial: 2 ft. x 2 ft. Troffers	≥ 2,000 lm	≥ 123 lm/W
Commercial: 2 ft. x 4 ft. Troffers	≥ 3,000 lm	≥ 132 lm/W
Industrial: Low Bay	≥ 5,000 to < 10,000 lm	≥ 125 lm/W
Industrial: High Bay	≥ 10,000 lm	≥ 155 lm/W

[a] Includes luminaires with both direct and indirect lighting components.

Linear ambient luminaire types include luminaires with both direct and indirect lighting components. Product performance for luminaires using fluorescent lamps must be determined in accordance with Illuminating Engineering Society (IES) LM-79-08: Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products.

Save More Than \$21 by Buying a FEMP Designated Product

FEMP has calculated the energy savings for a representative commercial and industrial LED luminaire, meeting FEMP’s efficiency requirements.

Commercial 2-ft. x 4-ft. LED Luminaires

A commercial 2-ft. x 4-ft. LED luminaire is cost-effective at the required efficiency level if priced no more than \$21 above a less efficient model. The best available model saves up to \$40. Table 2 compares three types of product purchases and calculates the lifetime cost savings of purchasing efficient models. Federal purchasers can assume products that meet FEMP-designated efficiency requirements are life-cycle cost-effective.

TABLE 2. LIFETIME SAVINGS FOR EFFICIENT COMMERCIAL 2-FT. X 4-FT. LED LUMINAIRES			
PERFORMANCE	BEST AVAILABLE	REQUIRED MODEL	LESS EFFICIENT
Luminous Efficacy (LE)	154	132	115
Annual Energy Cost	\$10	\$12	\$14
Lifetime Energy Cost	\$120	\$139	\$160
Lifetime Cost Savings (per lamp)	\$40	\$21	*****

Determine When FEMP-Designated Products are Cost-Effective

An efficient product is cost-effective when the lifetime energy savings (from avoided energy costs over the product's life, discounted to present value) exceed the additional up-front cost (if any) compared to a less efficient option.

FEMP considers up-front costs and lifetime energy savings when setting required efficiency levels. Federal purchasers can assume FEMP-designated products are life-cycle cost-effective.

In high-use applications or when energy rates are above the federal average, purchasers may save more if they specify products that exceed federal efficiency requirements (e.g., the best available model).

Claim an Exception to Federal Purchasing Requirements

Products meeting FEMP-designated efficiency requirements may not be life cycle cost-effective in certain low-use applications or in locations with very low rates for electricity or natural gas. However, for most applications, purchasers will find that energy-efficient products have the lowest life cycle cost.

Agencies may claim an exception to federal purchasing requirements through a written finding that no FEMP-designated product is available to meet functional requirements, or that no such product is life cycle cost-effective for the specific application.

Get additional information on [federal product purchasing requirements](#).

Incorporate Federal Acquisition Regulation Language in Contracts

These mandatory requirements apply to all forms of procurement, including construction guide and project specifications; renovation, repair, energy service, and operation and maintenance (O&M) contracts; lease agreements; acquisitions made using purchase cards; and solicitations for offers.

Federal Acquisition Regulation (FAR) Part 23.206 requires agencies to insert the clause at FAR section 52.223-15 into contracts and solicitations that deliver, acquire, furnish, or specify energy-consuming products for use in federal government facilities. To comply with FAR requirements, it is recommended that agencies incorporate efficiency and energy performance requirements into both the technical specification and evaluation sections of solicitations.

Requirements to purchase energy-efficient products can sometimes be perceived as in conflict with other acquisition requirements, including Buy American, Small Business, or other set-asides. These requirements are not mutually exclusive.

If you run into problems trying to meet multiple procurement requirements, please reach out to Force Global Supply for assistance.

LEARN MORE ABOUT [Contract Language for Energy-Consuming Product Purchases](#)

Making Informed Product Choices

LEDs are a relatively new lighting product type that many consumers have not experienced purchasing. Being an “unknown” commodity makes buying or specifying LEDs more challenging. Fortunately, there are many resources that provide performance data, test reports, case studies, and product information that federal buyers can use to make more informed purchasing decisions.

The U.S. Department of Energy (DOE) sponsors a voluntary testing and labeling program for solid-state lighting called LED Lighting Facts. Through this program, DOE partners with lighting manufacturers to improve product quality and ensure consumers that the performance of LED lamps, luminaires, and retrofit kits is accurately represented.

DOE and its partners achieve this through verification testing by accredited independent laboratories and using a standardized label with five metrics (light output, watts input, efficiency, correlated color temperature, and color rendering index). Manufacturing partners pledge to use the LED Lighting Facts label and logo in accordance with DOE guidelines.

Energy Efficient Commercial Lighting

Another resource is the DLC, an organization that promotes quality and performance for commercial sector lighting. DLC's members and other stakeholders have established technical requirements for 36 LED lighting applications, including troffers, linear ambient (suspended), and industrial luminaires.

[As a non-profit, the DLC is committed to improving energy efficiency for commercial lighting throughout North America.]

DLC's technical requirements address other quality and performance issues associated with luminaires such as correlated color temperature, color rendering index, power factor, total harmonic distortion, and lumen maintenance. All troffers, linear ambient, and industrial luminaires meeting DLC's standard technical requirements are covered by five-year manufacturers' warranties. LED luminaires meeting these requirements can be easily found in DLC's Qualified Products List, a searchable online database with more than 120,000 solid-state lighting products.

In addition, luminaire efficiencies are listed in manufacturers' product catalogs, technical specifications, and photometric reports. If luminaire efficiency is not listed, buyers may calculate it using luminous flux (measured light output) and luminaire watts input (measured power input) using the following equation:

$$LE = (\text{Luminous Flux}) / (\text{Luminaire Watts Input})$$

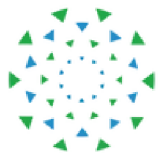
Special Considerations for Design and Installation

- Efficient design includes providing adequate lighting for the application and tasks using the lighting levels recommended by the Illuminating Engineering Society of North America.
- Buyers should follow building code requirements, which may have limits to watts per square foot as well as prescriptive requirements, and take care not to over-light a space, a practice that wastes both energy and money.
- Compare efficiencies (LEs) only between like products.
- Luminaire size and style may be selected for various reasons based on the application, including aesthetics, light output, and light distribution.
- Comparing the efficiencies of unlike products can lead to selecting the wrong luminaire for the lighting application.

Using Products More Efficiently

- In addition to selecting the optimal luminaire for the application, building operators should operate lighting only when needed.
- Using lighting controls such as occupancy sensors, task tuning, and dimming when daylight is present (where applicable) should be considered to facilitate further energy savings.
- Unlike fluorescent luminaires, the components in LED luminaires have very long lives that, in general, do not need replacing. This feature greatly reduces the maintenance requirements and related costs for LED luminaires.
- Some LED luminaires can last up to 100,000 hours under normal operating conditions—much longer than any other light source. Because of this, facilities engineering and maintenance personnel need to adopt different maintenance approaches.

For example, the amount of light emitted by LED luminaires will depreciate over time and eventually reach a point where the spaces in which they are installed become underlit. Typically this occurs when lumen output drops to 70% or less of the original level. It is important to check light levels periodically.



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Force Global Supply is a division of Force Energy Group, which has completed over 1,000 energy efficiency projects in 44 states over the last ten years. Leveraging those long-standing relationships with manufacturers Force Global Supply procures our clients' required specs, at their required scale, at a fraction of the cost.

Who are we?

Force Global Supply (FGS) is an industry-leading supplier of electrical and building materials. We specialize in LED lighting, and other building supply needs straight from factory, direct to builders and developers.

What do we do?

We supply developers, builders, and contractors with a wide selection of lighting, electrical, HVAC, and other building supplies to meet any of your commercial real estate or construction needs. From traditional solutions to modern designs, we have something for everyone.

Why Choose Us?

At FGS, we find solutions to achieve outstanding success in competitive markets through Factory Direct Pricing on electrical and building supplies to our clients through our tenured relationship with factories around the world.

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