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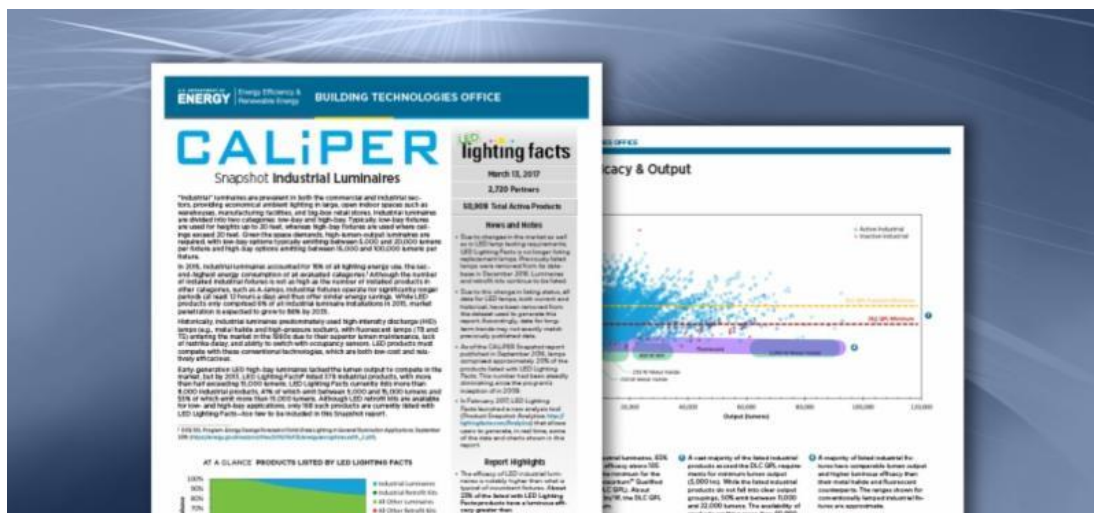
U.S. DEPARTMENT OF ENERGY

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A New Report on LED Industrial Luminaires

Industrial luminaires are prevalent in both the commercial and the industrial sectors, providing economical ambient lighting in large, open indoor spaces such as warehouses, manufacturing facilities, and big-box retail stores. Historically, industrial luminaires predominately used high-intensity discharge lamps (mostly metal halide), with fluorescent lamps (T8s and T5s) entering the market in the 1990s, due to their superior lumen maintenance, lack of restrike delay, and controllability. LED industrial products must compete with these conventional technologies, which are both low-cost and relatively efficacious.

DOE's [CALiPER program](#) has released a [new Snapshot report](#) on LED industrial luminaires. The last time a Snapshot report included industrial fixtures was in April 2014. A lot has changed since then. For one thing, DOE's [LED Lighting Facts](#)[®] database — upon which all Snapshots are based — now has almost four times the number of products listed, and the average efficacy of listed products has increased by more than 25%.



These changes are also apparent when specifically considering industrial luminaires, which are divided into two categories: low-bay and high-bay. Typically, low-bay fixtures are used for heights up to 20 feet, whereas high-bay fixtures are used where ceilings exceed 20 feet in height. Given the space demands of industrial applications, high-lumen-output luminaires are required, with low-bay options typically emitting between 5,000 and 20,000 lumens per fixture and high-bay options emitting between 15,000 and 100,000 lumens per fixture.

In June 2014, the mean efficacy for industrial luminaires was 93 lm/W, whereas today it's about 20% higher, at 115 lm/W. Approximately 23% of the industrial products listed with LED Lighting Facts have a luminous efficacy greater than 130 lm/W, with 5% exceeding 150 lm/W and 1% exceeding 175 lm/W. These values are substantially higher than the average efficacy of metal halide and fluorescent fixtures, which typically fall between 70 and 90 lm/W.

In the aggregate, the output of industrial products listed by LED Lighting Facts is more than sufficient to match that of conventional fixtures. While 50% of the listed industrial luminaires emit between 11,000 and 22,000 lumens, the mean light output is over 18,000 lumens, due to more than 150 products that exceed 50,000 lumens. This can match the output of conventional fixtures that use 1000W metal halide or an array of 16 high-output T5 lamps. Because of higher mounting heights, glare in industrial applications is less of an issue than in classroom and office applications, for example.

In terms of color quality and power quality, LED industrial fixtures almost all offer the same performance as their metal halide and fluorescent counterparts. About 65% of the listed industrial luminaires have a CRI in the 80s, whereas the majority had a CRI in the 70s back in 2014. These CRI values are likely adequate for most industrial applications. About half of the listed industrial products have a nominal CCT of 5000K or greater, which, although not uncommon, is higher than what's typically found in conventional industrial lamps. These higher-CCT products likely contribute to the higher efficacy seen in industrial fixtures, compared to other types listed by LED Lighting Facts. There are still plenty of options at lower CCTs, however.

In 2015, industrial luminaires represented 15% of all lighting energy use, the second-highest energy consumption of all evaluated categories. Although the number of installed industrial fixtures is not as high as the number of installed products in other categories, such as A-lamps, industrial fixtures operate for significantly longer periods (at least 12 hours a day) and thus, as a category, have the potential to bring similar aggregate energy savings. While LED products only comprised 6% of all industrial luminaire installations in 2015, DOE projects market penetration to grow to 86% by 2035.

In terms of the data captured by LED Lighting Facts and reported in the new Snapshot, LED industrial products offer a compelling alternative to incumbent products. While the report focuses on basic photometric characteristics, choosing a product for a specific installation requires a more comprehensive analysis, including light distribution, projected lifetime, lumen maintenance, and cost.

For the complete findings, download the [full report](#).

Best regards,
Jim Brodrick

As always, if you have questions or comments, you can reach us at postings@akoyaonline.com.