

EMA'S ENGINEERING TODAY

MARCH 2012

Information and Helpful Hints for School Districts and the Architects who serve them.

LED Lighting has many good features:

- Dimmable
- Not susceptible to vibration
- Good lumen maintenance
- Long life expectancy
- Potential to be very energy efficient
- Does not contain mercury
- Does not flicker or buzz

On the downside:

- Currently more expensive than conventional light sources
- Sensitive to heat



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LED Lighting: Workhorse of Not-Too-Distant Future

Today, more and more LED (light emitting diodes) products are becoming replacements and retrofits for conventional lighting sources like incandescent, fluorescent, and HID. LEDs are made from semiconductor materials that convert electricity into light. At one time they were utilized mainly as indicator lights on electronic devices. One day they may well replace most or all of the traditional light sources to which we are accustomed.

The Department of Energy's long-term goals call for efficacies of 160 lumens per watt for commercially available LED products by 2025. This is about 60% more efficient than currently available fluorescent systems.

LEDs rated life is 50,000 hours!

For well-designed LEDs the rated life, the number of operating hours it takes for light output to fall to a designated level, is presently projected at 50,000 hours or more. The current testing standard, IESNA LM-80, defines rated life as the point at which light output reaches 80% of initial levels. Keep in mind that LEDs do not burn out and fail to light; they just get dimmer and dimmer. For comparison, the life of incandescent and fluorescent lamps is the number of operating hours until failure.

Utilize the "Lighting Facts Program" to compare LEDs quality

The quality of LEDs used in fixtures can vary between manufacturers. One enemy of LEDs is heat; therefore, they must have adequate heat removal systems or they will tend to fail prematurely. Additionally, quality control in the LED making process is very important. Lack of control can lead to lack of color consistency of LEDs within the same fixture. To assist consumers, the DOE has introduced the Lighting Facts program. Participating manufacturers agree to test products and report the results according to accepted industry standards. The program includes the Lighting Facts label, which presents data in a standard format so that consumers can more easily compare products.



"While LED lighting is gaining credibility for some school lighting applications, four-foot energy efficient fluorescent fixtures remain the K-12 workhorse. But stay tuned!" said David Fisher, P.E., Estes, McClure & Associates.

LEDs lighting output is different from conventional sources

Light output from LED lamps and fixtures differs from comparable conventional sources. LED replacements for incandescent and compact fluorescent bulbs produce about the same amount of light as the products they are intended to replace. On the other hand, LED T-8 retrofit lamps give off only about one-half as much light as standard T-8 fluorescents. Additionally, to utilize these retrofit lamps, existing fixtures must be re-wired to bypass the ballasts. LED area lights, which can replace HID fixtures in parking lots, etc., have lower light output than their HID counterparts. However, due to their light distribution characteristics, use of the LED fixtures can result in comparable average light levels across an area with fewer hot spots.

Does the cost justify the savings?

LED lighting presently comes at a cost premium. LED modules to replace compact fluorescents cost several times as much as equivalent CFLs. LED replacements for 4-foot, T-8 fluorescent tubes cost \$50 or more, while a standard T-8 fluorescent lamp

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LED Lighting continued

LED Lighting: Workhorse of Not-Too-Distant Future

is about two dollars. Currently the premium for outdoor area LED fixtures ranges from 50% to 300% compared to HID, depending on the fixtures selected.

“At today’s prices a typical elementary classroom with LED lighting would cost 2 ½ to 3 times as much as energy efficient fluorescent and the savings is about \$67 per year,” said David Fisher, P.E. Estes, McClure & Associates.

While LED technology is advancing rapidly, it is not yet completely on par with traditional lighting technologies. At some point in the not-too-distant future, fixtures with LED lamps are likely to outperform those using fluorescent or HID lamps. In the meantime, districts may want to consider obtaining a limited number of LED fixtures to install and monitor on a test basis. However, districts should be wary of inexpensive fixtures from unknown manufacturers that cannot provide verification that their products are made and tested per current industry standards.

To reduce lighting cost and create master planning contact Gary Bristow, P.E. at gbristow@estesmcclure.com or Mike Clendenin, P.E. at mclendenin@estesmcclure.com.

Company Spotlight

**“Happy Birthday EMA!”
38 Years Strong**



Josh Gentry, P.E.

Josh Gentry, P.E. was voted “EMA Engineer of the Year” by EMA employees in celebration of National Engineers Week. Gentry is a graduate of UT-Tyler Engineering program, licensed engineer, LEED Accredited Professional, and ASHRAE Certified Design Professional. He is a project engineer and EMA shareholder. Congratulations Josh!

Mike Clendenin, P.E. and EMA’s President and CEO attended the East Texas National Engineers Week Banquet/Program at LeTourneau University in Longview, TX.

Congratulations to **Tonya Newsom, P.E.** on the birth of her daughter, Victoria Lynn, on February 18th. Tonya has been with EMA for 22 years.

Danny Bennett recently got engaged to Melynda Farrar. Congratulations Danny!



Mike Clendenin, P.E.