

QuickFacts

October 2015 | Issue 302

BLUESTONE & HOCKLEY

REAL ESTATE SERVICES

Transitioning from T12 to T8, T5 or LED Lighting for Commercial Buildings

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Electric lighting is responsible for over one quarter of the energy used in commercial buildings in the USA. One reason why it continues to be a major contributor to operating costs is because many commercial buildings are still equipped with T12 light bulbs.

As of July 14, 2012, the U.S. no longer manufactures or imports most T12 lamps. These include most standard four foot T12 lamps, eight foot T12 lamps, and two foot T12 U lamps used in commercial buildings. The EPA recommends retrofitting all T12 fixtures in an effort to reduce the use of mercury and fossil-based fuel, and to support this effort, utility districts have created incentive programs to encourage property owners to upgrade their lighting. T12 light bulbs can be easily retrofitted to T8 light bulbs which are smaller, use less energy, and have less mercury in them than T12 bulbs. The other alternative, not as easily retrofitted, are LED bulbs that have no mercury in them at all.

Definition of lamp types

Fluorescent lights are tube shaped lamps with a chemical phosphor coating on the inside of the tube. They have small pins on each end that fit into the ballasts located in light fixtures.

T12 lamps have a diameter of 1 ½ inches (or 12/8th of an inch.)

T8 lamps are fluorescent lights one inch (or 8/8ths) in diameter.

T5 lamps are 5/8th in diameter.

LED lights use light emitting diodes to produce light very efficiently. An electrical current passes through semiconductor material, which illuminates the tiny light sources we call LEDs. LEDs do not contain mercury.

Efficiency

The smaller the lamps the more energy efficient they are. T8 bulbs use about 35% less electricity to produce the same amount of light as a T12. T5 bulbs use about 45% less energy than T12s. For some applications, one T5 bulb can replace two T12 bulbs, providing even greater energy savings (a process called “de-lamping.”)

The process, however, can be more complex than plugging in a new bulb. Older bulbs, like T12s, used magnetic ballasts while newer, more efficient T8s and T5s use electronic ballasts. T8s can be retrofitted into T12 fixtures. In some cases, changing to T5s requires replacing or rewiring the whole light fixture, adding significant cost and complexity in the interest of improved efficiency.

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LED lighting

The typical T12 four-lamp fixture uses 172 watts of power between the lamps and ballast. LED equivalents typically use only 50 watts, 71% less energy per fixture. Not only are they brighter per watt, they also last longer than even the preferred florescent bulbs. T8 and T5 bulbs can last up to 4 years maximum, which sounds good until you learn that LED bulbs can last up to 10 years in a new fixture. With replacement lights, there is almost no price differential between LEDs and T5s. With the energy savings being so great the no-brainer is to go with LEDs.

In a 2013 article, Michigan-based Hovey Lighting, an energy efficient commercial lighting provider, argued the advantages of retrofitting with direct replacement LEDs (where you don't need to replace the ballast) over T8s. Here are some of their reasons:

“LED Replacement Bulbs are 30% More Efficient

So not only do you get more light from a LED replacement bulb, they use less wattage. LED replacement bulbs only use 22 watts vs 28-32 watts with T8 making the LED 30% more efficient.

LED Still Give Off Light At End-of-Life

A fluorescent bulb at the end of its life is very simple to spot, because it is DEAD, nothing left. A T8 bulb is considered end-of-life at 60% of its light output, which equates to roughly 14,400 hours.

LED replacement bulbs on the other hand, calculate the end of life at 70% which is approximately 50,000 hours.

In order to keep up with LED, you will have to replace the T8 bulbs 3.5 times.

LED Replacement Bulbs Have No Mercury

One of the most important differences lies in the fact that there is no Mercury or Glass Content with LED lighting.

In the State of Washington alone, over 10 Million lamps are disposed of in landfills each year. Those 10 Million lamps hold roughly 400 lbs of toxic Mercury waste that gets



(photo by Christian Taube)

deposited each year.

Washington State estimates that only 2 out of 10 bulbs are effectively recycled.

LED Does Not Give Off UV

LED replacement bulbs do not emit any light in the non-visible light spectrum (UV). UV/IR light causes colors to fade in fabrics, signage, while also being the leading cause for eye strain and eye fatigue. Fluorescent T8 bulbs emit UV/IR light.

LED Makes Air Conditioning More Efficient

LED fixtures contribute little to

none in regards to heat gain in a room or air conditioned space. The LED generates less heat. Less heat means that the Air Conditioning system does not have to work as hard.

This is vitally important if you are doing a new build or upgrade as you may be able to utilize smaller A/C systems to heat the same area.

LED Provides 70% More Light

The beam angle of the LED replacement bulb is 110 degrees. This means that all of the light generated by the LED bulb is focused in the 110 degree area.

The T8 bulb on the other has a beam angle of 360 degrees. That means the majority of the light generated by the T8 bulb is going out the sides and top of the bulb, which does not benefit the intended target.”

This may lead you to consider retrofitting your commercial building to save energy. But is the initial investment worth it? In our office building the owner sends a technician to replace burnt out light bulbs monthly. At the very least, the longevity of LEDs would save this labor cost.

Retrofitting

The decision to retrofit a building can be a difficult and potentially expensive one, but many resources are available to help. In the Portland, Oregon / Vancouver, Washington metro area companies like Pacific Lamp Wholesale, Phoenix Electric and Pacific Energy Concepts lead the way in energy retrofits. They conduct a

lighting retrofit analysis, draft an implementation plan and introduce owners to the applicable cash incentive programs offered by the Energy Trust of Oregon (or the local electricity supplier / utility district). These programs change all of the time and need to be reviewed at the time that you are ready to make a retrofit decision. There are currently no federal or state tax credits available for commercial building retrofits.

Recycling old lamps

As previously mentioned, all fluorescent lights contain mercury, and the ballasts for old long-tube lights contain PCBs, so when you do decide to discard your old fluorescents, remember to recycle rather than tossing them in the trash. For large retrofits, the company you contract with will most likely dispose of the old lamps, but for smaller jobs, many local governments and commercial retailers offer no cost recycling drop-offs. Among the larger retailers, Home Depot, IKEA, and Orchards Supply Hardware offer fluorescent recycling. Another option is your city's hazardous waste facility.

It makes total sense to retrofit buildings and even portions of buildings when you are leasing to a new tenant so you can include it in a tenant improvement plan. Retrofitting the lighting in commercial buildings is a logical step since it saves you money on your electrical bill while improving the lighting. You use less electricity

and it makes your building more attractive to lease and easier to work within. So consider retrofitting your lighting as you make decisions to update your commercial building, especially when you are moving in new tenants. Tie the cost to your tenant improvement package.

Resources

<http://www.foodservicewarehouse.com/blog/fluorescent-lighting-t8-vs-t12-bulbs/>

<http://greensavingsco.com/2009/12/changing-from-t12-to-t5/>

<http://www.ledsource.com/blog/switch-your-t12-fluorescents-to-leds-before-its-too-late-2/>

<http://www.hoveyelectric.com/hovey-electric-power-blog/bid/99038/8-Reasons-To-Consider-LED-Replacement-Bulbs-vs-T8-Fluorescent-Bulbs>

<http://paclamp.com/lighting/financing-energy-saving-options>

http://energytrust.org/library/forms/BE_PI0190L.pdf

Clifford A. Hockley is President of Bluestone & Hockley Real Estate Services, greater Portland's full service real estate brokerage and property management company. **Founded in 1972**, Bluestone & Hockley's staff totals nearly 110 employees, including 20 licensed brokers. The company's property management division serves commercial buildings, apartments, condominium associations and houses in the Portland / Vancouver metro area, while the brokerage division facilitates both leasing and sales of investment properties throughout Oregon and Washington.

Cliff earned a degree in Political Science from Claremont McKenna College and holds an MBA from Willamette University. He is a Certified Property Manager and has achieved his Certified Commercial Investment Member designation (CCIM). Bluestone & Hockley Real Estate Services is an Accredited Management Organization (AMO) by the Institute of Real Estate Management (IREM). Cliff is a member of the Institute of Real Estate Management and was named Certified Property Manager of the year in 2001 and 2003. Cliff is a frequent contributor to industry newsletters.

Bluestone & Hockley offers **customized brokerage, property and asset management, as well as maintenance services** to property owners and investors throughout the Portland/Vancouver metro area. The company's full-service approach benefits busy property owners and investors, who know they can count on Bluestone & Hockley for high quality real estate services start to finish.

