



LED Replacement: Tubes and Drivers

LIGHTING RETROFIT APPROACHES

Fluorescent tubes are the most common light source for general ambient lighting in the commercial sector (estimated at 80% of installed lamps). They are commonly found in offices, retail stores, classrooms, medical facilities, warehouses, manufacturing floors, storage rooms, signage and more.

However, the days of this workhorse are numbered. It was predicted by the U.S. Department of Energy in their *2016 Energy*

Savings Forecast of Solid-State Lighting in General Illumination Applications report, that approximately 36% of existing commercial buildings will use LED lighting by 2020. This transformation from fluorescent lighting is driven primarily by improvements in manufacturing costs and luminaire efficiency; tighter energy conservation requirements, accelerated by utility company rebates; and the adoption of LED lighting by facility maintenance departments, tenants and occupants because of increased efficiency, color quality, long lifetime/low maintenance and controllability.

Fundamentally, there are three approaches to retrofitting a facility for LED:

- 1 **Replace with tubular LED lamps (i.e. LED T8 Tubes, or Tubes + Ballast)**
- 2 **Replace the light engine (LED Tubes + Drivers, or LED Retrofit Kits)**
- 3 **Replace with a full LED luminaire (LED Luminaires)**

Tubular LED Lamp Options

Not all LED lamps are the same. Here's how you can compare:

Tube Types

LED retrofit tubes look the same as the fluorescents they replace, but integrated electronics change how they are installed. There are three LED tube types defined by Underwriters Labs (UL). Type A / Type B / Type C.

Type A – Easiest LED Installation



Uses the existing fluorescent ballast

Type A LED tubes are powered by the existing fluorescent ballast. Electronics within the endcap of the LED tube convert power supplied by the ballast to a constant current at the proper voltage for the LEDs. They are compatible with a broad range of common ballasts making them plug-and-play. Light output from the LED tubes will vary depending upon the ballast factor of the installed ballast, the same as fluorescent lamps do. Specification sheets provide information on performance with different ballast factors. These LED tubes install as simply as changing the fluorescent tubes. There's no rewiring to the fixture, making this family of tubes an ideal choice for a maintenance department DIY project. Check for compatibility with the installed ballasts first and then schedule the replacement maintenance.

Using Type A tubes is the fastest, least expensive approach to a facility retrofit. However, since they are powered by the ballast, there will be downstream ballast replacement maintenance, so considering the age of the existing ballasts is suggested before using this approach.

Type B – Simplest LED Lighting System



Integrated Driver: Connects directly to the power line

Type B LED tubes are powered directly by the buildings 120V-277V AC power. The luminaire is wired to bypass or remove the ballast. The lampholders, which can be shunted or unshunted, are rewired to have power supplied to each end of the tube. This dual-ended power connection is a safety feature.

Using a Type B tube is the lowest power option for a re-lamping project because there is neither a ballast nor an LED Driver in the LED tube's endcap that converts power from the utility company to the constant current and voltage needed by the LEDs. It's already matched for efficiency. This approach will require a licensed electrician to rewire the fixture. However, the return on investment is excellent as it lowers the energy use, eliminates future ballast replacement maintenance and reduces the frequency of tube replacements because of the long life of the LED tubes. Furthermore, because the fixture has been altered for line-driven tubes, thus eliminating the possibility of switching back to fluorescent tubes, retrofit rebates from utility companies may be greater.

Type C – Best LED Performance



Uses a separate LED Dimmable Driver

Type C solutions include LED tubes designed to operate with a matched, dimmable LED Driver. This replaces both the fluorescent ballast with an LED Driver and fluorescent tubes with LED tubes. It's a favorite of utility companies for rebates because the fixture has been converted from fluorescent to energy efficient LED, and like the Type B tubes, it eliminates downstream ballast maintenance.

This type of retrofit is also attractive in certain applications like schools because the voltage in the luminaire is low voltage, less than 60VDC making it safer for peace of mind. A licensed electrician will need to remove the ballast, install the LED Driver, similar to a ballast replacement. Lampholders should be checked while wiring in the new driver. Because Type C has an external driver, they offer the longest life and feature dimming options for added control.

Regardless of the type of LED retrofit approach you choose, Universal has the resources to help plan a successful retrofit.

- Calculate your own local utility rebate savings with Universal's DLC® QPL Listed products.
- Use the [online ROI calculator](#) to design your own custom lighting proposal.
- [Find a Local Energy Partner](#) to help you plan your retrofit project.
- Contact Universal Lighting Technologies Technical Support at tes@unvlt.com or 1-800-255-5278
- Get your team educated at [Universal University](#) or request on-site local training.



Which option should you choose?

Here are some tips to help you choose which retrofit option is right for your facility.

When to use T8 LED Tubes:

- When you need simple and/or clean installation.
- When you need affordability and/or an entry level stepping stone.
- Easiest way to retrofit. No electrical modification to luminaire.
- Goes right into the existing socket with most ballasts.
- Good way to save energy with up to a 20W saving in a 2-lamp fixture.
- 210° distribution of light makes it more efficient than older 360°(wasted) fluorescent lamps.

When to use T8 LED Tubes paired with LED Ready® Ballasts:

- System life will depend on the remaining life of existing T8 electronic ballast, so consider pairing.
- When you need the six-year warranty, then pair our ballasts and our tubes.
- LED Ready® ballasts are engineer tested to be compatible.

When to use T8 LED Tubes paired with LED Drivers:

- When you need dimming options.
- Qualifies for utility rebates, where Tubes alone may not qualify, because the driver is permanently mounted.
- When you want a permanent solution that cannot revert to fluorescent.

When to use LED Retrofit Kits:

- When you have applications where energy and maintenance costs are high.
- When T8 Tubes don't fit, such as T5s.
- When you have hard to reach places that require a long product lifetime to reduce maintenance.
- Retrofits T8, T12, or T5 in almost any type of fixture.
- Two foot and four foot light bars can retrofit 2', 4' or 8' fixtures.
- Greatest energy efficiency is achieved by retrofitting existing fixtures with Universal's "matched" LED Drivers and Modules.
- Clean install (e.g. good for hospitals where it is important to have minimum ceiling disruption). No mercury content or UV output.
- Available in two lamp and three lamp.
- The three lamp is perfect for parabolic or offset channel light fixture retrofits (a growing market).
- Drivers have 0-10V dimming for even more control and energy savings.
- LED Retrofit Kit has almost a 3x longer lumen life than the LED tube.
- For Canada – fits right into a metric fixture.
- 7-year warranty.

Universal makes it easy for you to choose the right replacement driver for your facility.

Learn about LED Tube & Driver Options:

- Read more [Drivers Educational Articles](#)
- Read [LED case studies](#)
- Request LED Driver Replacement Training for your team at your facility
- Sign up for LED Driver courses at the [Universal University](#)

Find a Universal Replacement LED Driver:

- [Find a local LED "Touch to Tune" Location Near You](#)
- [Learn more about the "Touch to Tune" Driver Tuning App](#)
- [Watch the "Touch to Tune" Video](#)

Need help? Contact an expert:

- Contact the Universal Lighting Technologies Technical Support Team (TES) for assistance at tes@unvlt.com or 1-800-225-5278
- Find a [local ENERGY Select partner](#) to help you with your plan retrofit project and select materials