



## ***LED Tubular Lamp / Kit Guide***

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LED lighting products have great potential to replace existing fluorescent lighting, reduce energy use and improve lighting quality in many indoor commercial applications. It can be difficult to decide which one is best to use for your space. This decision is important because these technologies will remain in your building for a long time, and we hope this guide will help you make the best decision possible.

There are three main categories of LED products available to retrofit existing linear fluorescent fixtures.

### **#1 - T8 Replacement Tubular LED Lamps (TLED):**

Tubular LED lamps are designed to fit into existing fluorescent lamp/sockets/fixtures and work without any form of mechanical modifications or electrical rewiring. Typically these are used in recessed or surface mounted direct fixtures. Use in recessed indirect (diminished light levels) or parabolic louvered (increases glare) troffers is not recommended.

#### Benefits:

- Possible energy savings
- Simple drop-in lamp replacements (no rewiring)
- May be more cost effective than other LED retrofit options (if ballasts are not more than 5 years old)

#### What to consider before purchasing:

- Manufacturer spec sheets may be vague, LED lamp and existing ballast must be compatible, must be UL Listed
- If existing ballasts are more than 5 years old, using a kit that does not utilize the existing ballast may be a better option to gain maintenance savings. When the old ballast fails, it will still have to be replaced even if retrofitted to LED lamps
- Verify condition of existing lens/louver. If in poor condition, new LED lamps will not correct the problem, a new fixture may be a better solution
- Verify light distribution, light output, and quality of light prior to purchasing in volume. Try a few first and see how they perform in your space
- Compare cost and life to the cost and life of a fluorescent T8. TLED may not be the best solution
- Products must be on the DLC or LDL Qualified product lists

## #2 - LED Retrofit Kits –Lamp Style:

Lamp style LED retrofit kits are designed to replace existing linear fluorescent lamps and require some form of electrical rewiring (bypass or replace the fluorescent ballasts). The LED lamps are designed to fit into fluorescent lamp sockets and may use either internal or external LED drivers. Typically these are used in direct fixtures when you want to keep the luminaire housing.

### Internal LED Drivers:

Single ended power TLED's use one lamp socket for power and the other to only support the lamp. Lamps with double ended power inputs use both lamp sockets for power and mechanical support. The power is typically 120-277VAC for both formats and requires bypassing the fluorescent ballast and re-wiring the lamp sockets.

### External LED Drivers:

Do not use the lamp sockets for power, but for mechanical support. Products that use the lamp sockets are often wired similarly to fluorescent lamps with instant start ballasts, except they use low voltage wiring. Or in some products, the LED driver is connected to the LED lamps via low voltage cables with a plug in connector. Lamps may also be daisy chained together with these cables.

**Regardless of the lamp type, it is recommended that the lamp sockets be replaced during installation.**

### Benefits:

- Possible energy savings
- Potential maintenance savings
- May be more cost effective than new LED fixtures or retrofit options
- Retain appearance of original light fixtures

### What to consider before purchasing:

- Must be installed only by a qualified electrician
- Existing ballast should be removed and disposed of properly
- An electrical disconnect should be installed on the incoming power leads (as required in NEC Section 410.73(G) for fluorescent fixtures)
- Labor for installing some kits may cost more than installing new fixtures
- Verify condition of existing lens/louver. If in poor condition, new LED lamps will not correct the problem, a new fixture may be a better solution
- Verify light distribution, light output, and quality of light prior to purchasing in volume. *Try a few first and see how they perform in your space*
- Use higher efficacy products (70+ LPW) that are UL Classified and DLC or DLC listed
- If dimming is desired, a system using an external driver may be easier to dim, as are available with common control communication formats (0-10v, DALI)
- Must be installed with manufacturer provided labels to inform future maintenance staff about the conversion to LED

## **LED Retrofit Kits – Light Bars:**

LED light bar retrofit kits are designed to fit into existing fluorescent fixtures and require some form of electrical rewiring. They are mounted directly to the luminaire using screws, tape, magnets, etc. and do not use the lamp sockets. They can use either internal or external LED drivers. Typically these are used in lensed or volumetric fixtures

### Benefits:

- Possible energy savings
- Potential maintenance savings
- Less expensive than new LED luminaires or troffer retrofit kits
- Does not use lamp sockets for support
- Retain appearance of original fixtures
- May provide additional up lighting due to their configuration and flexibility within the fixture

### What to consider before purchasing:

- Must be installed only by a qualified electrician
- Existing ballasts and lamp sockets should be removed and disposed of properly
- An electrical disconnect must be installed on the incoming power leads (as required in NEC Section 410.73(G) for fluorescent fixtures)
- Verify condition of existing lens/louder. If in poor condition, new LED lamps will not correct the problem, a new fixture may be a better solution
- Verify light distribution, light output, and quality of light prior to purchasing in volume. Try a few first and see how they perform in your space
- Use higher efficacy products (70+ LPW) that are UL Classified
- Choose diffuse/wide lamp beam angle option
- If dimming is desired, a system using an external driver may be easier to dim, as are available with common control communication formats (0-10v, DALI)
- Products must be on the DLC or LDL Qualified product lists





### **LED Retrofit Kits - Troffers:**

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LED troffer retrofit kits are designed to replace fluorescent lamps, sockets and ballasts within existing troffers, and require some form of electrical rewiring. Kits must include a new optical assembly specifically designed for LED's.

#### Benefits:

- Likely energy savings
- Maintenance savings
- May be easier to install, and less expensive than new LED luminaire
- Kits optical assembly is specifically designed for LEDs
- Can update appearance of original fixtures
- Dimming an available option on many models
- Do not need to enter ceilings with asbestos or insulation above / around existing fixtures

#### What to consider before purchasing:

- Must be installed only by a qualified electrician
- Existing ballasts and lamp sockets must be removed and disposed of properly
- Check seismic code requirements
- Physical fit, light distribution, light output, and quality of light should be verified prior to purchasing in volume. Try a few first and see how they perform in your space
- Use higher efficacy products (90+ LPW) that are UL Classified
- Products must be on the DLC or LDL Qualified product lists



### **#3 - LED Troffers:**

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LED troffers are designed to replace fluorescent troffers.

#### Benefits:

- Energy savings, most efficient compared to HP T8's
- Maintenance savings
- Full warranty (may be up to 10 years on some products)
- May dramatically improve lighting quality
- Update appearance / provide a new look in the space
- Dimming is an available option on most models
- Can relocate fixtures to redesign over lit or improperly lit spaces

#### What to consider before purchasing:

- Must be installed only by a qualified electrician
- Check seismic code requirements
- May be the best and most expensive option
- May produce glare, select a dimming option to reduce possible glare and provide additional energy savings
- Use higher efficacy products (90+ LPW) that are UL Listed
- Products must be on the DLC Qualified product lists



### **Fluorescent is still an option!**

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New generation fluorescent T8 lamp/ballasts have advanced greatly and may be the most cost effective option when retrofitting, don't rule them out.

Benefits:

- Efficacy of over 100 lumens per watt
- Rated life up to 84,000 hours (based on 12 hour start)
- Color rendering in the 90s CRI
- 25, 28 & 32 watt versions available
- Low cost
- Mature technology
- Existing fixtures were designed to use linear fluorescent technology, no performance considerations
- Dimmable (with compatible ballast/dimmer combination)

What to consider before purchasing:

- All fluorescent lamps contain mercury, are considered universal waste, which is a category of hazardous waste, and must be disposed of properly
- If existing space is over lit, using a low ballast factor, reduced lamp wattage fluorescent combination, or de-lamping is the most inexpensive option.