Considering LED Tubes

As an emerging lighting technology, LED linear tube options are raising questions throughout the industry—it’s important to know the options and which one will work best for you.

Fluorescent lighting is universal; billions of these tubes can be found in warehouses, retail facilities and other large commercial spaces across the globe. Look up, and you’ll likely find these familiar tubes lining the ceilings of many facilities.

But linear fluorescent tubes (LFLs) have largely reached their maximum technological potential. In contrast, LED lighting is rapidly evolving and providing an alternative to LFLs. Building and facility managers are adopting LED lighting for its long life span, energy efficiency and controllability. Now, with Refit Solutions from GE anywhere LFL is today, LED can exist tomorrow.
The Options

Three different types of LED linear tube options have emerged onto the market, as designated by Underwriters Laboratories (UL) under the UL 1598 certification. In order to make the best choice for your facility, it’s important to consider the differences:

**LED Tube with Integrated Driver - Compatible and Operated on Existing LFL Ballast**

**Description**
This UL Type A tube, which will be offered by GE through its LED Tube with integrated Lightech™ driver, is designed with an internal driver that allows the tube to operate directly from the existing linear fluorescent ballast. Most of these products are designed to work with T12, T8 and T5 ballasts.

**Advantages**
UL Type A offers the simplest installation process—retrofitting involves a simple swap of the existing LFL with a UL Type A LED tube. Unlike the other options, no electrical or structural modification of the existing LFL fixture is required.

**Disadvantages**
However, with these benefits come some limitations. The lifetime of a UL Type A solution is dependent not only on the design life of the LED tube, but on the linear fluorescent ballast life, which could result in additional maintenance and costs within the lifetime of the product. Also, compatibility with various linear fluorescent ballasts on the market may vary, depending on different manufacturers and models.

Additionally, a UL Type A tube sacrifices efficiency due to the additional power loss from the existing ballast and is limited in dimming and controllability.

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**LED Tube with Integrated Driver - Wired to Mains**

**Description**
Like the UL Type A, this UL Type B tube operates with an internal driver. However, UL Type B’s internal driver is instead powered directly from the main voltage supplied to the existing LFL fixture, requiring several important and unique considerations.

**Disadvantages**
Installation of a UL Type B involves electrical modification to the existing fixture in order to connect the tube to the power supply. The existing LFL and its corresponding ballast must be removed from the fixture. Sockets may need to be replaced, and a connection is required from the fixture input wires directly to the sockets.

UL Type B is inherently more efficient than UL Type A, with no power loss from the removal of the existing LFL ballast, but it is similarly limited in dimming and control capabilities.

It is important to note that the fixture’s incoming power wires are connected directly to the sockets, meaning installers are potentially exposed to the main’s voltage during installation. For safety reasons, strict adherence to installation instructions is critical when rewiring existing fixtures and utilizing UL Type B tubes. Safe installation can be completed, but total installation time and cost will increase because of high-voltage wiring.

GE does not anticipate that it will offer UL Type B tubes in North America.

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LED Tube with Remote Driver

Description
A UL Type C tube, offered among GE's Refit Solutions as the LED Tube with remote Lightech™ driver, operates with a remote driver that powers the LED linear tube, rather than an integrated driver. Like UL Type B, UL Type C involves electrical modification to the existing fixture, but the low-voltage outputs of the driver are connected to the sockets instead of line voltage.

Advantages
Installation for UL Type C tubes involves removing existing tubes and ballasts, and it may involve replacement of existing sockets. The fixture input wires must be connected to the LED driver, and the driver's low-voltage output wires must then be connected to the sockets before installing the new LED linear tubes. Once installed, this driver can power several LED tubes throughout the fixture. The UL Type C offers the highest system efficacy, best system compatibility and greatest overall performance. It can be integrated with robust dimming and control functionality, helping to offset moderate labor and installation costs with heightened efficiency well into the future.

UL Considerations

If retrofitting an existing fixture that is UL approved with a UL-approved LED tube, the fixture will remain UL approved. If retrofitting an existing fixture that is not UL approved with a UL-approved LED tube, the fixture with the LED tubes would need to be submitted to UL for approval, if UL certification is necessary.

GE's Refit Solutions will keep intact the existing fixture's UL certification because Refit Solutions are certified by UL. GE customers must read the instructions provided with Refit Solutions prior to installation to understand inherent risks involved in altering existing systems.

As a more controllable technology than LFL, LED lighting can be successfully integrated into facilities' energy-efficiency planning. And with new LED tube options, the installation work can be done without as much hassle. GE's Refit Solutions can provide efficient LED lighting anywhere fluorescent tubes currently exist.

To learn more about GE's Refit Solutions or to schedule a professional lighting audit, please visit www.gelighting.com/refitsolutions.