



LED retrofits!

Retrofit your existing
Fluorescent Lights in
Seconds

No Electrician Needed!

With the highest safety rating available, **UL Listed**, these LED T8 Tubes replace fluorescent tube lights without any changes to your existing fixture or ballast. Retrofits in seconds and produces 60% in energy savings.

4' T8 Specification Guide



LED T8 Retrofit Product Description

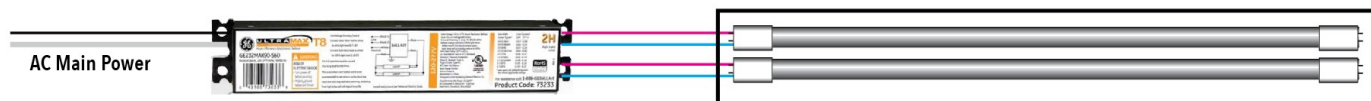
Illumination Performance: With a 320° illumination angle, the design allows more up light, providing a more uniform light output. This lamp delivers lumens of full spectrum LED light at 80 CRI while achieving 135 lumens per watt in average at the fixture level.

Color Availability: The Pure Bright T8 LED tube lights are available in three color temperatures: 3000K, 4000K, and 5000K.

UL testing: Our tube lights have passed the most rigorous testing procedures at Underwriters Laboratories and have archived the UL Listed category.

Ballast Compatibility: Our tube light work with all electronic T8 ballasts, rapid-start, programmed-start and instant-start ballasts.

Dimming: Dim with dimming ballasts (Triac and 0-10 VDC), enabling daylight harvesting and profile dimming based on controls. California Title 24 ready.



The existing T8 electronic ballast stays in place. To retrofit, replace the fluorescent bulb with the Pure Bright LED tubes. Your existing ballast acts as the driver.

Pure Bright Performance Table

| |
|---|
| Retrofits existing 32W T8 fluorescent tube lights. No electrical alterations needed. |
| Efficacy: 125.85 LPW in average to all color temperature |
| Lamp Delivered Light Output: 2,068 lumens per 4' LED tube light |
| Target System Delivered Light Output: 2,068 lumens |
| Input Power: 13.0 Watts @ 1.0 ballast factor / 14.6 Watts @ 0.88 ballast factor / 16.6 Watts @ 0.78 ballast factor |
| CRI: 80 Down Flux of Lamp: 78.3% Up Flux of Lamp: 21.71% Output Flux Ratio: in \square Solid Angle : 50.21% |
| Installation: Installs into existing linear fluorescent luminaire and operates on existing ballast. Ballasts serves as LED driver. |
| CIE Type: Semi-direct lighting. 78/22 flux direction designed to fill luminaire with illumination to provide even lighting. |
| CCT: 3000K, 4000K, and 5000K |
| Input Voltage: 120-277 VAC: determined by existing fluorescent ballast |
| Lifetime: In-Situ Temperature Measurement Test 70,000 hours |
| Warranty: 10 years |
| Location: Suitable for damp or dry locations. Mounting: Linear fluorescent fixtures |
| Controls: Dimmable (ballast dependent) enabling daylight harvesting and profiling. |

Ordering Information

Example: PBT8-DL5004EFX-U

| PBT8 | DL50 | 04 | EF | 4 | U |
|--------------------|--|---|---|--|------------------------------|
| Product | Color Temperature | Length | T8 Ballast Type | Control | Options |
| Pure Bright LED T8 | DL50: 5000K (Day Light) NW40: 4000K (Neutral White) WW30: 3000K (Warm White) | 02: 2-Ft 03: 3-Ft 04: 4-Ft UB: 4-Ft U-Bend Other lengths available on request | EF: Electronic Fluorescent Nearly all 120-277V T8 electronic ballasts including Instant-Start, Rapid-Start and Programmed-Start versions | 2- or 4-wires input Dimmable based on ballast | U: Universal Frosted lens |

Pure Bright T8 LED Tube Dimensions

| | |
|---------------------------|------------------|
| Overall Length | 47.27" (1212 mm) |
| Tube Length (without pin) | 46.72" (1198 mm) |
| Tube Diameter | 1.0" (26 mm) |
| Pin Distance | 0.5" (13 mm) |
| Pin Diameter | 0.096" (2.3 mm) |
| Pin Height | 0.29" (7.0 mm) |

Ballast Driver Electronic Characteristics

| | |
|---------------------------|-------------------------------------|
| AC Input Range | 120 to 277VAC; 347VAC for Canada |
| Power Factor | Determined by Ballast |
| Total Harmonic Distortion | <20%, determined by ballast |
| Efficiency | 0.99 @ 1.0BF = 125.85 LPW |
| Operation Temperature | -20°C to +50°C, Tc: 58.3°C |
| Storage Temperature | -20°C to +85°C |

Smart Driver Technology: Works With All T8 Ballast Types

The Pure Bright unique patented design Smart Driver Technology has been in development for over five years. With UL Listed approval-the most rigorous NRTL requirements-there is no requirement to first compare ballast models for in-field installations. Lower testing approvals require installers to open ballast compartments, and to replace ballasts with those listed on UL-required installation instructions.

Construction and Materials

The lightweight aluminum heat sink efficiently draws heat away from the LED diodes. Lens materials are recognized and certified by Underwriters Laboratories (UL) to flammability specification UL-94 V-0. Pure Bright has been successfully tested on active oil tankers running 24/7 for over 50,000 hours (references available) under severe vibration conditions, with units installed in the boiler rooms operational at an average temperature of 117°F without failure.

Optical System

320° wrap-around lens design places 22% of the illumination above the horizontal plane, and 78% below. This semi-direct designation enables full illumination of the fixture and ensures optimal lighting distribution.

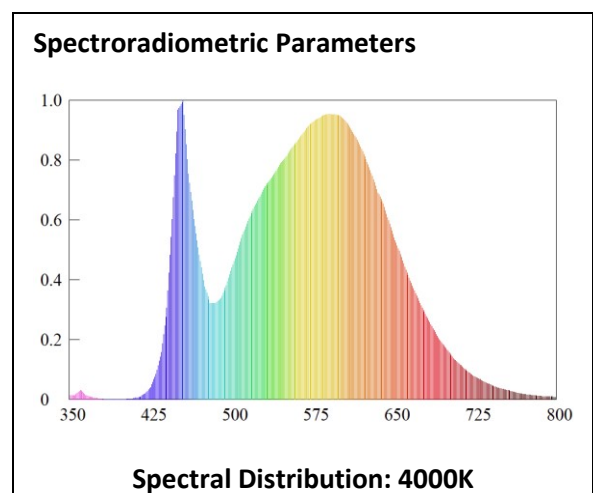
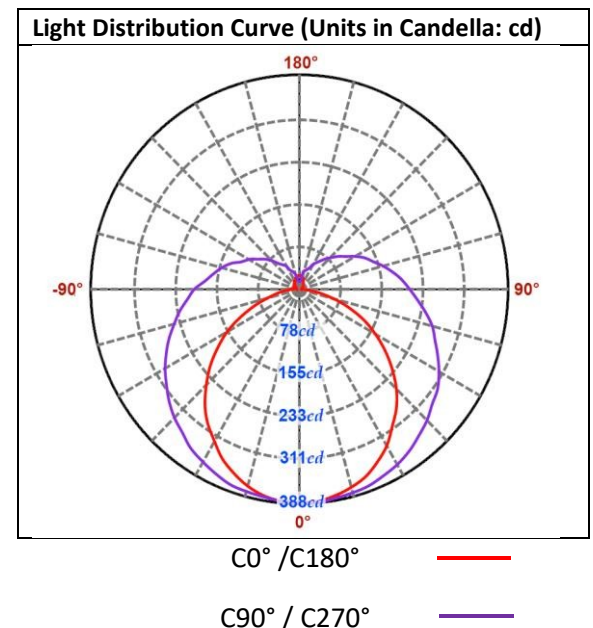
Spectral Performance

Pure Bright LED Tubes provide significant improvements of illumination quality over fluorescent tubes. Shown at right is the distribution of 4000K bulbs.

Controls




Full dimmable (ballast dependent).

| C90 Zonal Lumen Distribution | | |
|-----------------------------------|--------------|---------------|
| Zone | Lumens | % Lamp |
| 0-30° | 307 | 16.0% |
| 0-40° | 512 | 26.6% |
| 0-60° | 966 | 50.2% |
| 0-90° | 1,507 | 78.3% |
| 90-120° | 285 | 14.8% |
| 90-130° | 337 | 17.5% |
| 90-150° | 395 | 20.5% |
| 90-180° | 417 | 21.7% |
| 0-180° | 1,925 | 100.0% |
| Up/Down flux rate= 21.7% : 78.3% | | |
| CIE Type: Semi-direct Lamp | | |



Pure Bright Safety Ratings: UL Listed- A clear choice for your next project

Pure Bright LED T8 tubes have passed the most rigorous testing procedures at Underwriters Laboratories and have received **UL Listed** approval. When you are considering ballast-compatible LED products, the NTL safety rating significantly impacts how you are to use the products. When manufacturers’ products claim “Plug and Play”, but have only achieved **UL Classified**, you must first check the ballast model number to ensure it matches approved ballasts on the UL-approved installation instructions (must be supplied with tubes); failure to check ballast compatibility may affect commercial property insurance claims). National, State and Local Electric Codes determine when an electrician is required to change ballasts. **UL Component** rated lamps are not field installable.

| UL Mark | UL Mark Description* | Field Implications | Installation Implications |
|---|---|---|--|
|  | The UL Listed mark appears on end products suitable for field installation. Products are covered by UL’s Follow-Up Services program to verify that the end products continue to be manufactured in compliance with UL’s safety requirements. | UL Listed Marks appears on end products suitable for field installation. Facility liability insurance policies recognize this mark. | Works with all T8 ballasts. No electrician needed. |
|  | The UL Classified mark appears on products that UL has evaluated but only with respect to specific properties, a limited range of hazards, or suitability for use under limited or special conditions. | UL Classified products are limited to specific ballast model numbers in UL-approved installation instructions. Facility liability insurance policies may be voided where inconsistencies exist. | Electrician required where existing ballast is not included on UL-approved installation instructions list. |
|  | The UL Component mark is specifically used on parts are part of a larger product or system. These components have restrictions on their performance or may be incomplete in construction. | UL Component products in this category are intended to be installed in another end product, and are intended to be installed at the factory, not in the field. | Field installations in no approved. |
| *Reference: http://ul.com/corporate/marks/ul-listing-and-classification-marks/appearance-and-significance/marks-for-north-america/ | | | |

As Local Building Codes: Pure Bright Plastics Fire Safety Rating: UL 94-V-0

Fire codes, life safety and model building codes include numerous requirements that products and materials meet specified minimum flammability ratings. By ensuring that building materials meet hourly fire resistance ratings and don’t exceed flame spread and smoke developed ratings, occupant safety is optimized. Failure to meet these minimum standards increases the chance of fire and smoke spread, and increased dangers for building occupants.

The Pure Bright T8 LED tube lens materials are recognized and certified by Underwriters Laboratories to flammability specification UL 94 V-0 under yellow card listing. The UL 94 Standard provides a method for rating the ignition characteristics of plastic materials. The UL 94 “V” indicates a vertical burn test that is used widely for plastic materials that are used mostly in electrical devices. In this test-five vertically mounted samples are exposed to two successive ten-second bottom ignitions for a 3/4” 50W Terrel burner flame ignition source. Flame resistance is then classified according to:

- 1) The time for the flame to self-extinguish, and
- 2) The duration of the afterglow

To achieve a V rating (e.g. V-2, V-1, or V-0) the test samples, placed vertically with the test flame impinging on the bottom of the sample, must extinguish within specified times, not burning to the top clamp or dripping molten material which ignites a cotton indicator.

The V-0 rating of our lens polymer is the highest rating under the UL 94-V test which means that:

- a) The extinguishment time (for each samples) was 0-10 seconds
- b) The afterglow time was 0-30 seconds per sample
- c) There are no flaming drips