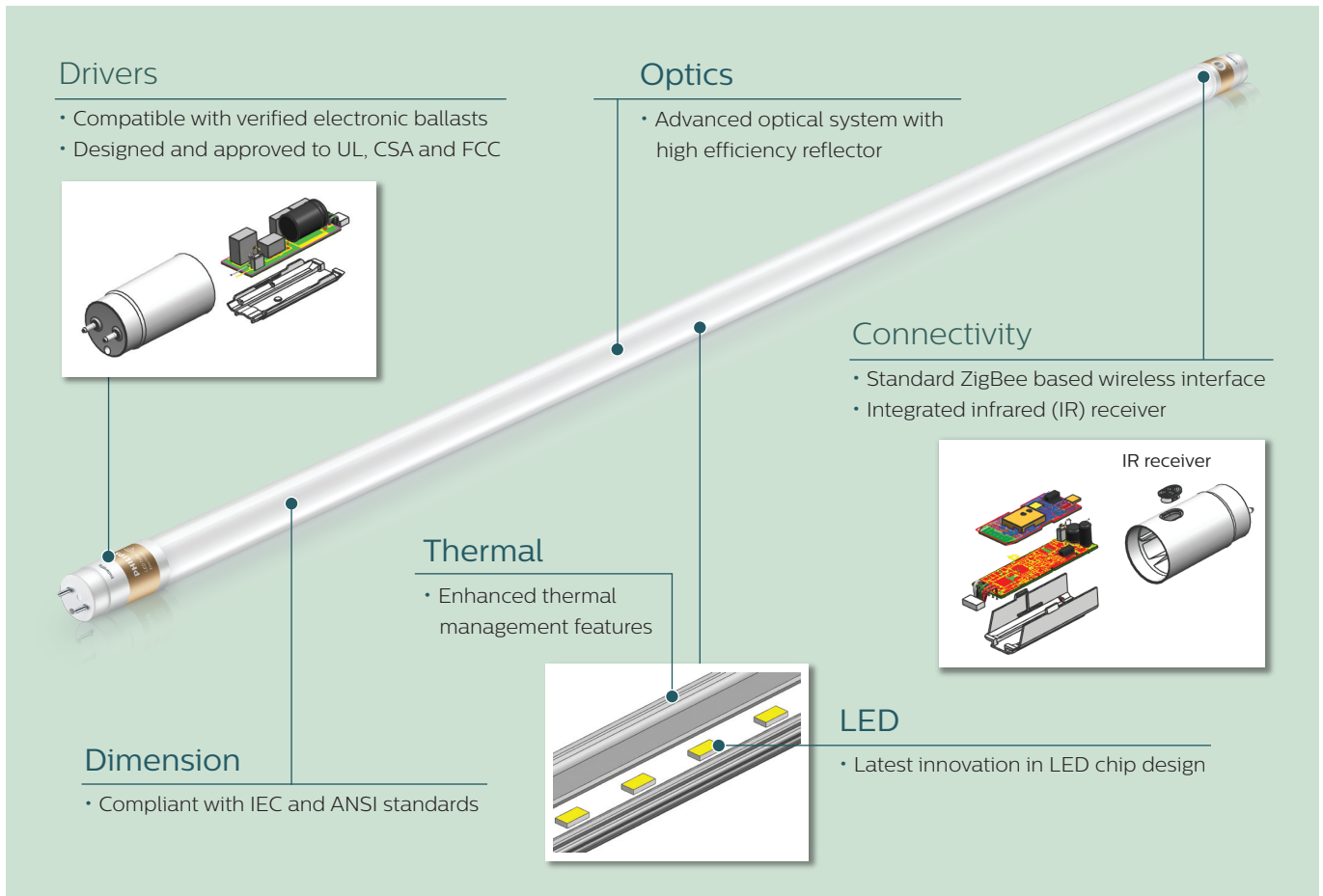


# Technical Application Guide

Philips is now introducing a new line of connected LED lighting products with EasySmart technology. Philips InstantFit LED T8 with EasySmart technology is compatible with verified<sup>1</sup> electronic ballasts. It is the easiest way to replace fluorescent lamps with connected LED lamps without rewiring the fixture. It is true plug and play. The lamp offers standard ZigBee based connectivity that easily interoperates with various control devices. Compared with a non-connected LED solution, EasySmart technology realizes more energy savings by enabling advanced control options.





## Product Features

### Ballast Compatibility

- Innovative driver design that enables a “plug-and-play” LED solution.
- Compatible with verified<sup>1</sup> electronic ballast.
- Quick and easy installation.

### Connectivity

- ZigBee based wireless interface.
- Reliable and secure wireless communication, nominal range 40 feet.
- Up to 50 lamps in one network.
- Easy commissioning and (re-)configuration from the floor.

### Control Functionality

- Automatic on/off and dimming based on occupancy detection and daylight variation.
- Personal dimming and scene setting with ZigBee wireless switch.
- High-end trimming to help save energy and extend lamp life.

### Energy Savings

- Energy savings of 50% or more\* when used with advanced control such as dimming, occupancy sensing and daylight harvesting.
- DLC listed.

### User comfort

- Uniform light output with advanced optical design.
- Personal light setting to enhance user comfort and productivity.
- Typical CRI 82.

### Reliability

- Reliable operation between -20°C and +45°C ambient temperature.
- Tested to B50 L70 requirement. Lamps are rated for 50,000 hours.
- 200,000 switching cycles.

### Safety

- Over voltage and over temperature protection.
- Complies with relevant UL and CSA safety requirements.
- Shatterproof polycarbonate (PC) material.

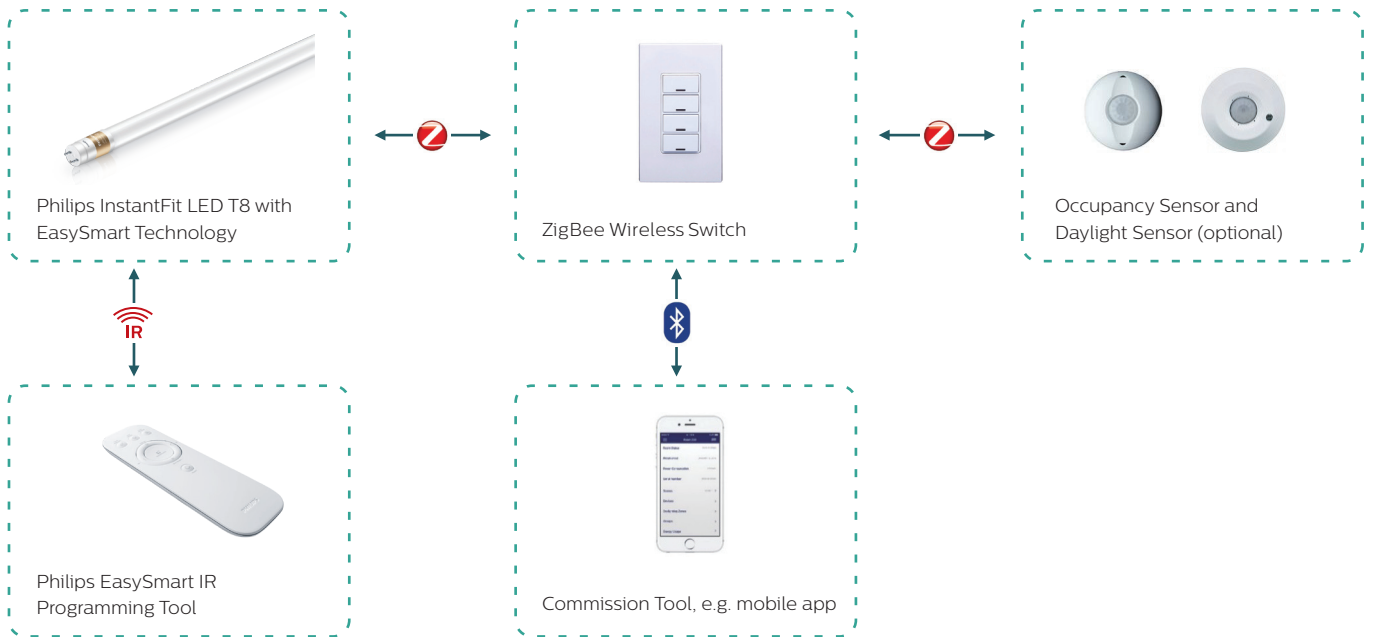
### Environment

- No Mercury.
- Low Carbon Footprint.

\* 50% energy savings compared to an F32T8 when dimmed at least 30% for 10% of the time product is on.

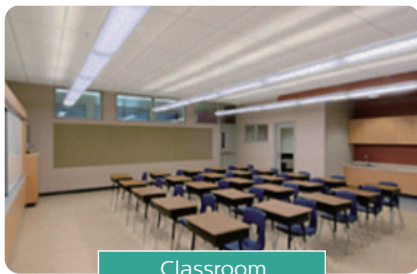
## System Overview

Communication between lamps, switches and sensors is ZigBee based. To facilitate the installation, Philips provides an IR programming tool as accessory. Your control device manufacturer will provide a tool (ie: mobile app), to commission the sensor and switch.



- \* Philips InstantFit LED T8 with EasySmart technology uses ZigBee protocol to communicate with each other and control devices.
- \* EasySmart IR programming tool communicates with individual lamp via infrared.

## Applications



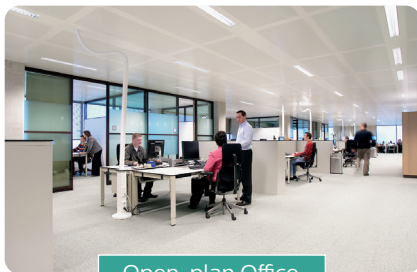
Classroom



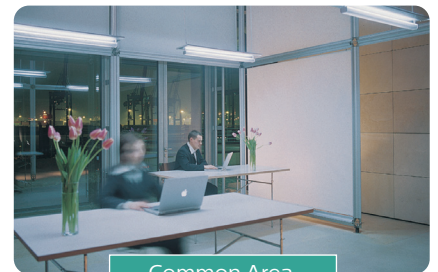
Conference Room



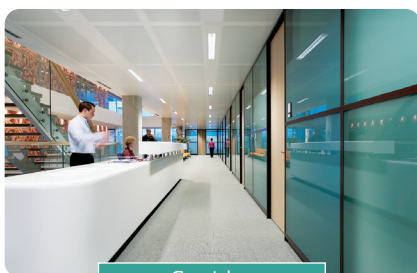
Private Office



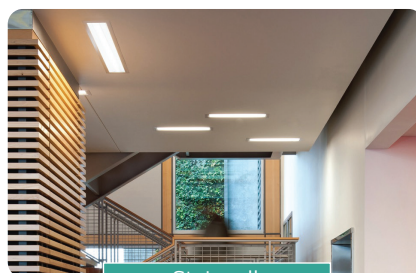
Open-plan Office



Common Area



Corridor

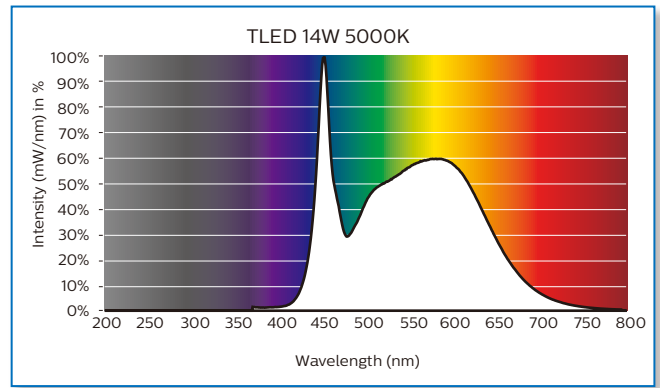
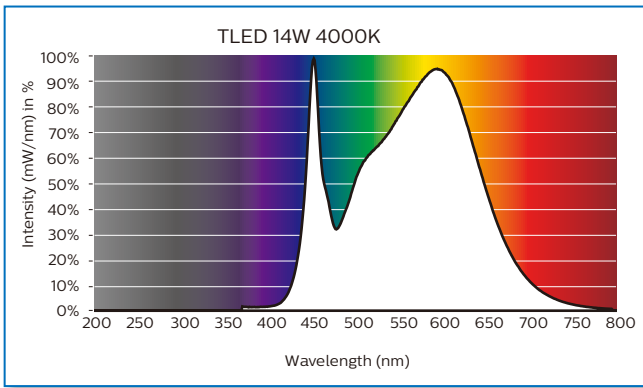
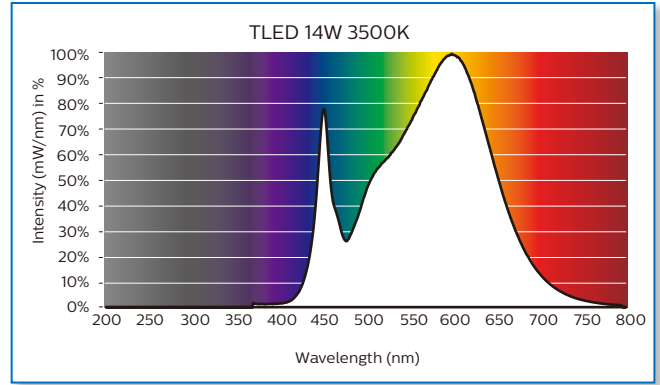
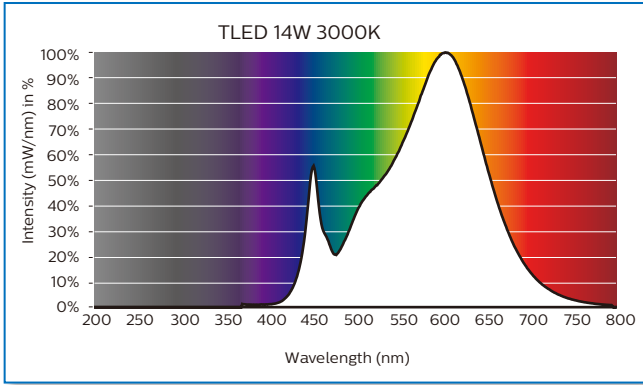


Stairwell



Restroom

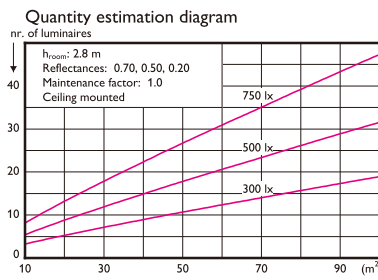
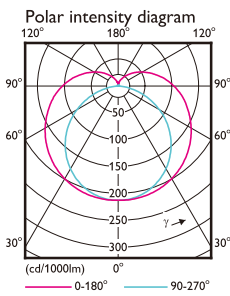
# Spectral Power Distribution



# Photometric Diagrams

1 x TLED 14W 3000K 160D 9290012811

1 x 2000 lm



Utilisation factor table

| Room Index k | Reflectances (%) for ceiling, walls and working plane (CIE) |      |      |      |      |      |      |      |      |      |      |      |
|--------------|---|------|------|------|------|------|------|------|------|------|------|------|
|              | 0.80  | 0.80 | 0.70 | 0.70 | 0.70 | 0.70 | 0.50 | 0.50 | 0.30 | 0.30 | 0.10 | 0.00 |
| 0.60         | 0.41  | 0.39 | 0.40 | 0.39 | 0.38 | 0.30 | 0.29 | 0.24 | 0.27 | 0.23 | 0.19 |      |
| 0.80         | 0.51  | 0.48 | 0.49 | 0.47 | 0.46 | 0.38 | 0.36 | 0.31 | 0.34 | 0.29 | 0.25 |      |
| 1.00         | 0.59  | 0.55 | 0.56 | 0.54 | 0.53 | 0.45 | 0.42 | 0.37 | 0.39 | 0.35 | 0.30 |      |
| 1.25         | 0.67  | 0.61 | 0.64 | 0.61 | 0.59 | 0.51 | 0.48 | 0.43 | 0.45 | 0.41 | 0.36 |      |
| 1.50         | 0.73  | 0.66 | 0.70 | 0.67 | 0.64 | 0.57 | 0.53 | 0.48 | 0.50 | 0.45 | 0.40 |      |
| 2.00         | 0.82  | 0.74 | 0.78 | 0.75 | 0.71 | 0.65 | 0.61 | 0.56 | 0.57 | 0.53 | 0.47 |      |
| 2.50         | 0.89  | 0.79 | 0.85 | 0.80 | 0.76 | 0.70 | 0.66 | 0.61 | 0.61 | 0.58 | 0.52 |      |
| 3.00         | 0.94  | 0.82 | 0.89 | 0.84 | 0.79 | 0.74 | 0.69 | 0.66 | 0.65 | 0.62 | 0.55 |      |
| 4.00         | 1.00  | 0.87 | 0.95 | 0.89 | 0.84 | 0.79 | 0.74 | 0.71 | 0.70 | 0.67 | 0.60 |      |
| 5.00         | 1.04  | 0.90 | 0.99 | 0.92 | 0.87 | 0.83 | 0.78 | 0.75 | 0.73 | 0.70 | 0.63 |      |

Ceiling mounted

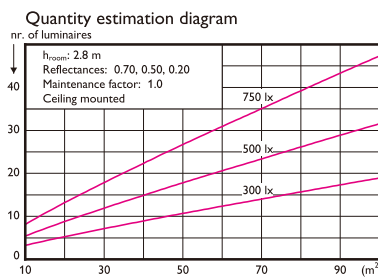
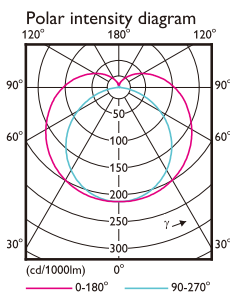
Luminaire Table

| Plane Conc. | 0.0  | 15.0 | 30.0 | 45.0 | 60.0 | 75.0 | 90.0  |
|-------------|------|------|------|------|------|------|-------|
| 45.0        | 7599 | 7581 | 7657 | 7880 | 8359 | 9339 | 11372 |
| 50.0        | 7316 | 7283 | 7328 | 7506 | 7914 | 8849 | 11068 |
| 55.0        | 7056 | 7012 | 7030 | 7135 | 7458 | 8302 | 10681 |
| 60.0        | 6826 | 6790 | 6753 | 6805 | 7004 | 7704 | 10184 |
| 65.0        | 6622 | 6585 | 6507 | 6485 | 6561 | 7049 | 9537  |
| 70.0        | 6455 | 6399 | 6303 | 6220 | 6150 | 6331 | 8693  |
| 75.0        | 6347 | 6265 | 6162 | 6010 | 5782 | 5564 | 7521  |
| 80.0        | 6269 | 6195 | 6058 | 5826 | 5463 | 4761 | 5812  |
| 85.0        | 6200 | 6119 | 5959 | 5694 | 5216 | 4050 | 3289  |
| 90.0        | 6158 | 6060 | 5890 | 5602 | 5052 | 3628 | 1531  |

(cd/m²)

1 x TLED 14W 3500K 160D 9290012812

1 x 2000 lm



Utilisation factor table

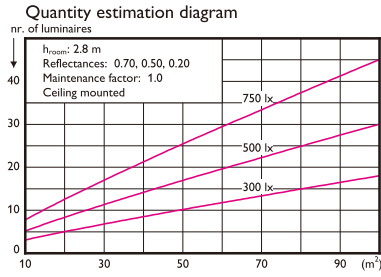
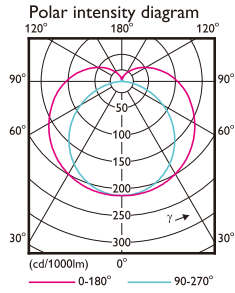
| Room Index k | Reflectances (%) for ceiling, walls and working plane (CIE) |      |      |      |      |      |      |      |      |      |      |      |
|--------------|---|------|------|------|------|------|------|------|------|------|------|------|
|              | 0.80  | 0.80 | 0.70 | 0.70 | 0.70 | 0.70 | 0.50 | 0.50 | 0.30 | 0.30 | 0.10 | 0.00 |
| 0.60         | 0.41  | 0.39 | 0.40 | 0.39 | 0.38 | 0.30 | 0.29 | 0.24 | 0.27 | 0.23 | 0.19 |      |
| 0.80         | 0.51  | 0.48 | 0.49 | 0.47 | 0.46 | 0.38 | 0.36 | 0.31 | 0.34 | 0.29 | 0.25 |      |
| 1.00         | 0.59  | 0.55 | 0.56 | 0.54 | 0.53 | 0.45 | 0.42 | 0.37 | 0.39 | 0.35 | 0.30 |      |
| 1.25         | 0.67  | 0.61 | 0.64 | 0.61 | 0.59 | 0.51 | 0.48 | 0.43 | 0.45 | 0.41 | 0.36 |      |
| 1.50         | 0.73  | 0.66 | 0.70 | 0.67 | 0.64 | 0.57 | 0.53 | 0.48 | 0.50 | 0.45 | 0.40 |      |
| 2.00         | 0.82  | 0.74 | 0.78 | 0.75 | 0.71 | 0.65 | 0.61 | 0.56 | 0.57 | 0.53 | 0.47 |      |
| 2.50         | 0.89  | 0.79 | 0.85 | 0.80 | 0.76 | 0.70 | 0.66 | 0.61 | 0.61 | 0.58 | 0.52 |      |
| 3.00         | 0.94  | 0.82 | 0.89 | 0.84 | 0.79 | 0.74 | 0.69 | 0.66 | 0.65 | 0.62 | 0.55 |      |
| 4.00         | 1.00  | 0.87 | 0.95 | 0.89 | 0.84 | 0.79 | 0.74 | 0.71 | 0.70 | 0.67 | 0.60 |      |
| 5.00         | 1.04  | 0.90 | 0.99 | 0.92 | 0.87 | 0.83 | 0.78 | 0.75 | 0.73 | 0.70 | 0.63 |      |

Ceiling mounted

Luminaire Table

| Plane Conc. | 0.0  | 15.0 | 30.0 | 45.0 | 60.0 | 75.0 | 90.0  |
|-------------|------|------|------|------|------|------|-------|
| 45.0        | 7599 | 7581 | 7657 | 7880 | 8359 | 9339 | 11372 |
| 50.0        | 7316 | 7283 | 7328 | 7506 | 7914 | 8849 | 11068 |
| 55.0        | 7056 | 7012 | 7030 | 7135 | 7458 | 8302 | 10681 |
| 60.0        | 6826 | 6790 | 6753 | 6805 | 7004 | 7704 | 10184 |
| 65.0        | 6622 | 6585 | 6507 | 6485 | 6561 | 7049 | 9537  |
| 70.0        | 6455 | 6399 | 6303 | 6220 | 6150 | 6331 | 8693  |
| 75.0        | 6347 | 6265 | 6162 | 6010 | 5782 | 5564 | 7521  |
| 80.0        | 6269 | 6195 | 6058 | 5826 | 5463 | 4761 | 5812  |
| 85.0        | 6200 | 6119 | 5959 | 5694 | 5216 | 4050 | 3289  |
| 90.0        | 6158 | 6060 | 5890 | 5602 | 5052 | 3628 | 1531  |

(cd/m²)

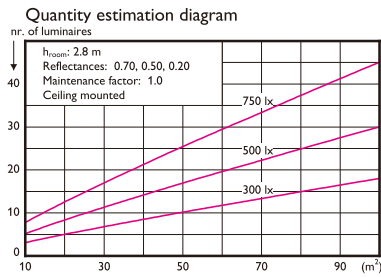
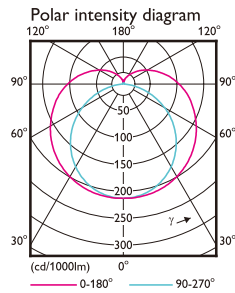


Utilisation factor table

| Room Index k | Reflectances (%) for ceiling, walls and working plane (CIE) |      |      |      |      |      |      |      |      |      |      |
|--------------|---|------|------|------|------|------|------|------|------|------|------|
|              | 0.80  | 0.80 | 0.70 | 0.70 | 0.70 | 0.70 | 0.50 | 0.50 | 0.30 | 0.30 | 0.00 |
| 0.60         | 0.41  | 0.39 | 0.40 | 0.39 | 0.38 | 0.30 | 0.29 | 0.24 | 0.27 | 0.23 | 0.19 |
| 0.80         | 0.51  | 0.48 | 0.49 | 0.47 | 0.46 | 0.38 | 0.36 | 0.31 | 0.34 | 0.29 | 0.25 |
| 1.00         | 0.59  | 0.55 | 0.56 | 0.54 | 0.53 | 0.45 | 0.42 | 0.37 | 0.39 | 0.35 | 0.30 |
| 1.25         | 0.67  | 0.61 | 0.64 | 0.61 | 0.59 | 0.51 | 0.48 | 0.43 | 0.45 | 0.41 | 0.36 |
| 1.50         | 0.73  | 0.66 | 0.70 | 0.67 | 0.64 | 0.57 | 0.53 | 0.48 | 0.50 | 0.45 | 0.40 |
| 2.00         | 0.82  | 0.74 | 0.78 | 0.75 | 0.71 | 0.65 | 0.61 | 0.56 | 0.57 | 0.53 | 0.47 |
| 2.50         | 0.89  | 0.79 | 0.85 | 0.80 | 0.76 | 0.70 | 0.66 | 0.61 | 0.61 | 0.58 | 0.52 |
| 3.00         | 0.94  | 0.82 | 0.89 | 0.84 | 0.79 | 0.74 | 0.69 | 0.66 | 0.65 | 0.62 | 0.55 |
| 4.00         | 1.00  | 0.87 | 0.95 | 0.89 | 0.84 | 0.79 | 0.74 | 0.71 | 0.70 | 0.67 | 0.60 |
| 5.00         | 1.04  | 0.90 | 0.99 | 0.92 | 0.87 | 0.83 | 0.78 | 0.75 | 0.73 | 0.70 | 0.63 |

Luminance Table

| Plane Cct | 0.0  | 15.0 | 30.0 | 45.0 | 60.0 | 75.0 | 90.0  |
|-----------|------|------|------|------|------|------|-------|
| 45.0      | 7978 | 7959 | 8040 | 8273 | 8777 | 9805 | 11940 |
| 50.0      | 7681 | 7646 | 7694 | 7881 | 8309 | 9293 | 11623 |
| 55.0      | 7409 | 7361 | 7382 | 7492 | 7833 | 8717 | 11148 |
| 60.0      | 7166 | 7129 | 7090 | 7143 | 7355 | 8092 | 10693 |
| 65.0      | 6954 | 6914 | 6832 | 6811 | 6891 | 7401 | 10013 |
| 70.0      | 6778 | 6719 | 6617 | 6529 | 6458 | 6645 | 9126  |
| 75.0      | 6666 | 6578 | 6468 | 6311 | 6071 | 5845 | 7902  |
| 80.0      | 6582 | 6503 | 6359 | 6115 | 5736 | 5005 | 6100  |
| 85.0      | 6511 | 6427 | 6259 | 5978 | 5477 | 4352 | 3451  |
| 90.0      | 6464 | 6363 | 6185 | 5886 | 5304 | 3819 | 1531  |



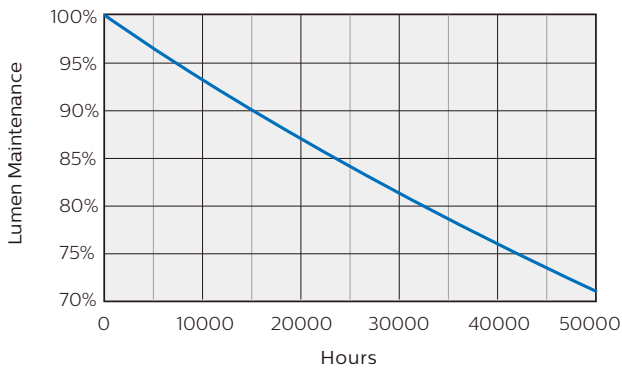
Utilisation factor table

| Room Index k | Reflectances (%) for ceiling, walls and working plane (CIE) |      |      |      |      |      |      |      |      |      |      |
|--------------|---|------|------|------|------|------|------|------|------|------|------|
|              | 0.80  | 0.80 | 0.70 | 0.70 | 0.70 | 0.70 | 0.50 | 0.50 | 0.30 | 0.30 | 0.00 |
| 0.60         | 0.41  | 0.39 | 0.40 | 0.39 | 0.38 | 0.30 | 0.29 | 0.24 | 0.27 | 0.23 | 0.19 |
| 0.80         | 0.51  | 0.48 | 0.49 | 0.47 | 0.46 | 0.38 | 0.36 | 0.31 | 0.34 | 0.29 | 0.25 |
| 1.00         | 0.59  | 0.55 | 0.56 | 0.54 | 0.53 | 0.45 | 0.42 | 0.37 | 0.39 | 0.35 | 0.30 |
| 1.25         | 0.67  | 0.61 | 0.64 | 0.61 | 0.59 | 0.51 | 0.48 | 0.43 | 0.45 | 0.41 | 0.36 |
| 1.50         | 0.73  | 0.66 | 0.70 | 0.67 | 0.64 | 0.57 | 0.53 | 0.48 | 0.50 | 0.45 | 0.40 |
| 2.00         | 0.82  | 0.74 | 0.78 | 0.75 | 0.71 | 0.65 | 0.61 | 0.56 | 0.57 | 0.53 | 0.47 |
| 2.50         | 0.89  | 0.79 | 0.85 | 0.80 | 0.76 | 0.70 | 0.66 | 0.61 | 0.61 | 0.58 | 0.52 |
| 3.00         | 0.94  | 0.82 | 0.89 | 0.84 | 0.79 | 0.74 | 0.69 | 0.66 | 0.65 | 0.62 | 0.55 |
| 4.00         | 1.00  | 0.87 | 0.95 | 0.89 | 0.84 | 0.79 | 0.74 | 0.71 | 0.70 | 0.67 | 0.60 |
| 5.00         | 1.04  | 0.90 | 0.99 | 0.92 | 0.87 | 0.83 | 0.78 | 0.75 | 0.73 | 0.70 | 0.63 |

Luminance Table

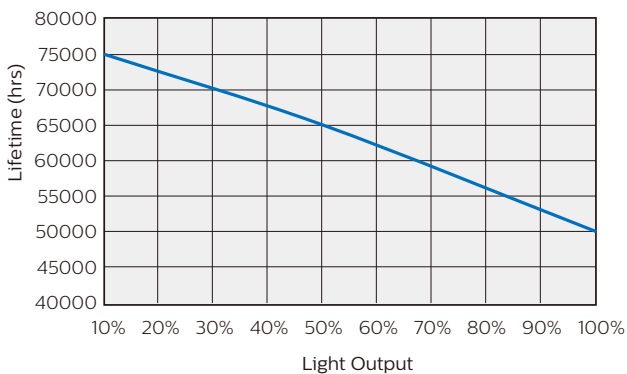
| Plane Cct | 0.0  | 15.0 | 30.0 | 45.0 | 60.0 | 75.0 | 90.0  |
|-----------|------|------|------|------|------|------|-------|
| 45.0      | 7978 | 7959 | 8040 | 8273 | 8777 | 9805 | 11940 |
| 50.0      | 7681 | 7646 | 7694 | 7881 | 8309 | 9293 | 11623 |
| 55.0      | 7409 | 7361 | 7382 | 7492 | 7833 | 8717 | 11148 |
| 60.0      | 7166 | 7129 | 7090 | 7143 | 7355 | 8092 | 10693 |
| 65.0      | 6954 | 6914 | 6832 | 6811 | 6891 | 7401 | 10013 |
| 70.0      | 6778 | 6719 | 6617 | 6529 | 6458 | 6645 | 9126  |
| 75.0      | 6666 | 6578 | 6468 | 6311 | 6071 | 5845 | 7902  |
| 80.0      | 6582 | 6503 | 6359 | 6115 | 5736 | 5005 | 6100  |
| 85.0      | 6511 | 6427 | 6259 | 5978 | 5477 | 4352 | 3451  |
| 90.0      | 6464 | 6363 | 6185 | 5886 | 5304 | 3819 | 1531  |

### Lifetime and Lumen Maintenance



Philips InstantFit LED T8 with EasySmart technology has a lifetime of 50,000 hours. This is defined as the number of hours when 50% of a large group of identical lamps drop below 70% of its initial lumen.

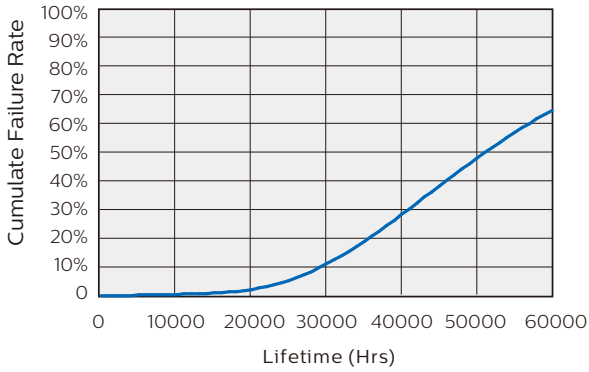
### Lifetime and Dimming



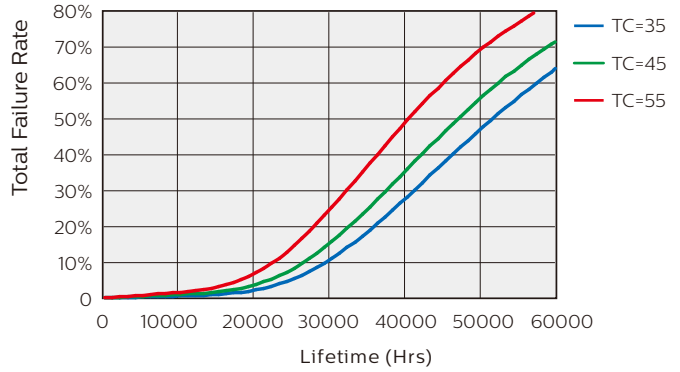
Dimming can help extend lifetime (ie: dimming 30% can extend lifetime by 9,000hrs)

# Lifetime and Failure Rate

Lifetime vs. Failure rate @Ta 25°C

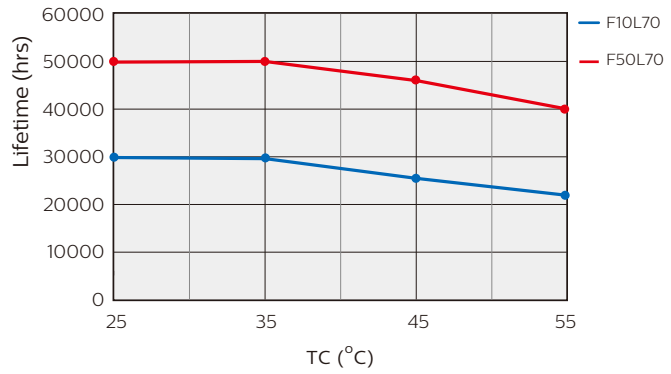
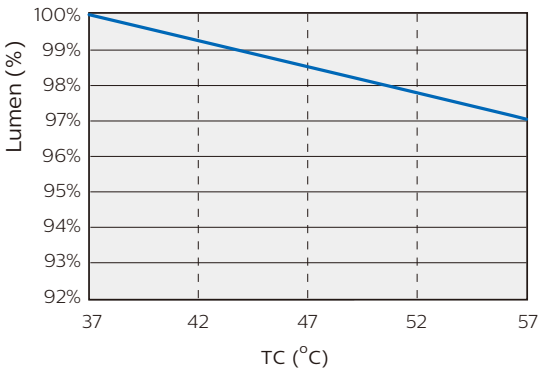


Lifetime vs. Failure Rate vs. Tcase

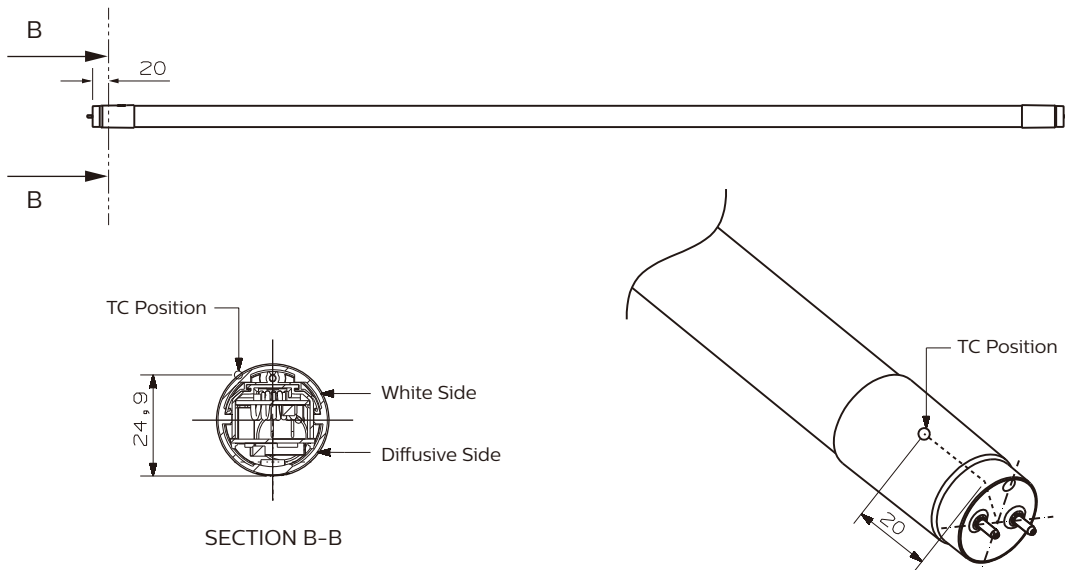


# Temperature

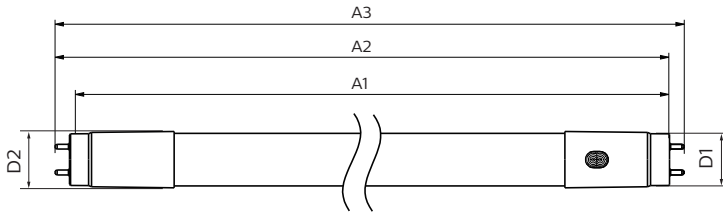
|  |             |           |           |
|--|-------------|-----------|-----------|
| Operating temperature                          | T operating | min -20°C | max +45°C |
| Storage temperature                            | T storage   | min -40°C | max +65°C |
| Maximum case temperature of tube at Tamb.=25°C | T case      |           | +37°C     |



# Dimensions







### Dimensions (mm)

| Product | A1     | A2     | A3     | D1   | D2   |
|---------|--------|--------|--------|------|------|
| 14T8/48 | 1198.1 | 1205.2 | 1212.3 | 25.6 | 27.8 |

## Technical Specification

| Product Description            | Bare Lamp Watts* | Average System Watts* | Standby Power* | Initial Lumens | Lifetime | Cap Base | Length | Bulb Type | CCT   | RF Range | Product number |
|--------------------------------|------------------|-----------------------|----------------|----------------|----------|----------|--------|-----------|-------|----------|----------------|
|                                | ( W )            | ( W )                 | ( W )          | ( lm )         | ( hrs )  |          | ( lm ) |           | ( K ) | ( ft )   |                |
| 14T8/48-3000 IF 10/1 EasySmart | 14               | 17                    | ≤0.5           | 2000           | 50,000   | G13      | 48     | T8        | 3000  | 40       | 929001281104   |
| 14T8/48-3500 IF 10/1 EasySmart | 14               | 17                    | ≤0.5           | 2000           | 50,000   | G13      | 48     | T8        | 3500  | 40       | 929001281204   |
| 14T8/48-4000 IF 10/1 EasySmart | 14               | 17                    | ≤0.5           | 2100           | 50,000   | G13      | 48     | T8        | 4000  | 40       | 929001281304   |
| 14T8/48-5000 IF 10/1 EasySmart | 14               | 17                    | ≤0.5           | 2100           | 50,000   | G13      | 48     | T8        | 5000  | 40       | 929001281404   |

\* Test based on reference instant-start ballast

Please visit [www.philips.com/EasySmart](http://www.philips.com/EasySmart) for latest information on ballast compatibility.

## Accessory

| Ordering Code | Product Number | Product Description                |
|---------------|----------------|------------------------------------|
| 473504        | 929001390604   | EasySmart IR Programming Tool 10/1 |

## Control Compatibility

Philips InstantFit LED T8 with EasySmart technology now work with:

| Brand   | Model ID/Order Code | Product Description   |
|---------|---------------------|---|
| Leviton | DLDNK-01W           | Intellect Decora Lumina RF 1-Button multi-function BLE keypad with room controller and LED feedback functionality, 120-277VAC, 50/60Hz, White |
| Leviton | DLDNK-02W           | Intellect Decora Lumina RF 2-Button multi-function BLE keypad with room controller and LED feedback functionality, 120-277VAC, 50/60Hz, White |
| Leviton | DLDNK-04W           | Intellect Decora Lumina RF 4-Button multi-function BLE keypad with room controller and LED feedback functionality, 120-277VAC, 50/60Hz, White |
| Leviton | DLDNK-08W           | Intellect Decora Lumina RF 8-Button multi-function BLE keypad with room controller and LED feedback functionality, 120-277VAC, 50/60Hz, White |
| Leviton | ZSC04-1xW           | Lumina RF PIR Occupancy Sensor, 450 sq ft   |
| Leviton | ZSC15-1xW           | Lumina RF PIR Occupancy Sensor, 1,500 sq ft   |
| Leviton | LURPC-00W           | Lumina RF Wireless Photocell  |
| Leviton | FREE                | Neuron App  |

Product must be used with compatible control devices. Please visit [www.philips.com/EasySmart](http://www.philips.com/EasySmart) for latest information on control compatibility.

## Approbation & Certificates

Philips InstantFit LED T8 with EasySmart technology strictly follows applicable legislation and standard. The product complies with **UL**, **CSA**, **NSF** and **RoHS**.



Product is **DLC** qualified.



Philips is a member of ZigBee Alliance. Product is **ZigBee** certified.



## Application Notes

- Product is dimmable by wireless control
- Suitable for damp locations
- Reliable operation between -20°C to + 45°C ambient temperature
- Suitable to replace T8 fluorescent lamps that operate on instant-start ballasts  
Please refer to [www.philips.com/EasySmart](http://www.philips.com/EasySmart) for latest ballast compatibility list
- Require use of shunted lamp holders
- Not intended for use in emergency luminaires
- Not compatible with luminaires that use a remote starter
- Modifications to the product void the limited warranty.  
For warranty information, please see [www.philips.com/warranties](http://www.philips.com/warranties)
- You are required to read and understand the Quick Installation Guide and all warnings, cautions and other materials related to installation published at:  
[www.philips.com/EasySmart](http://www.philips.com/EasySmart) before commencing installation work.

## Footnotes

<sup>1</sup>Verified as compatible by Philips. Visit [www.philips.com/EasySmart](http://www.philips.com/EasySmart) for latest ballast compatibility guide.

