

## Specification for RETRO-Passive® 2.0 150 Watt Equivalent LED RETROFIT Kit 120V

### A. General

1. This Retrofit is intended to upgrade an existing incandescent fixture to an LED fixture while utilizing the existing housing and electrical connection while retaining the output levels and dimming capabilities.
2. This Retrofit will meet or exceed energy efficiency standards for the US Department of Energy's Energy Star program and DLC.
3. This Retrofit will be manufactured in accordance to UL1593C and UL8750 standards.
4. This Retrofit will work with SCR, forward and reverse phase dimming, two-wire dimmers, IGBT, TRIAC, and Sine Wave dimmers.
5. This Retrofit shall have no greater droop than 3% in a plenum ambient room temperature of 40 degrees Celsius.
6. This Retrofit shall dim completely from full on to no light being emitted without flicker, strobing, or other visual distraction.
7. The entire Retrofit assembly shall be UL, CSA, ETL or TUV-SUD listed.
8. The Retrofit must be made in the USA.

### B. Physical Product

1. The base Retrofit shall weigh no greater than 2.5 pounds.
2. The Retrofit shall come equipped with an electrical connection such as a screw connector or bare wires to attach to the existing product.
3. The Retrofit shall have a driver chamber utilizing a UL 94 v0 plastic clamshell intended for the custom driver and heat sink attachment.
4. The Retrofit shall have a single solid heat sink that dissipates heat from the LED Chip on Board (COB).
5. The Retrofit shall have a single COB emitter of LEDs. Multiple chips or individual LEDs are not permissible.
6. The Retrofit shall use an interchangeable reflector system that requires no tools to change or replace reflectors for any reason during or after installation.
7. The Retrofit shall not have a fan, so there is no noise.

### C. Electrical

1. The Retrofit shall operate on 110 to 120 volts alternating current.
2. The Retrofit shall dim smoothly on forward and reverse phase dimming, two-wire dimmers, IGBT, TRIAC, and Sine Wave dimmers.
3. The Retrofit shall function as a constant on product, when utilized on a non-dimming system.
4. The driver shall have a power factor of .96 or higher.
5. The Retrofit shall have no (vampire load) current draw when off.

## **D. Thermal**

1. Case temperature of the LED Driver shall not reach higher than 30 degrees Celsius in an ambient room temperature of 25 degrees Celsius.
2. LED Driver case shall be constructed with a thermistor to provide overtemp protection.
  - a. In the event of overheating, the LED Electronics shall reduce current to LED to protect the LED chip.
  - b. In extreme cases, the fixture will shut off altogether until the product cools to an acceptable temperature.

## **E. Optical**

1. The Retrofit shall produce a nominal 120-degree cone of light.
2. The Retrofit shall be manufactured allowing reflectors to be changed in the field without tools.
3. Standard reflector options shall be as follows:
  - a. 11 Degree (3-1/8" "Tall")
  - b. 20 Degree (3-1/8" "Tall")
  - c. 47 Degree (3-1/8" "Tall")
  - d. 15 Degree (1-9/16" "Short")
  - e. 28 Degree (1-9/16" "Short")
  - f. 56 Degree (1-9/16" "Short")
  - g. 74 Degree (1-9/16" "Short")
4. Other reflector options are available for specific applications.

## **F. Light Emitting Diode**

1. The LEDs shall utilize the Chip on Board (COB) construction.
2. The LEDs shall produce greater than 2100 Lumens of light in a 14.5mm x 14.5mm array while not exceeding 18.5 watts at 2,700 Kelvin greater than 80 CRI.
3. The LEDs shall have the following options of color temperatures and Color Rendering Index (CRI).
  - a. 2,700K 80CRI, 90CRI, 97CRI
  - b. 3,000K 80CRI, 90CRI, 97CRI
  - c. 3,500K 80CRI, 90CRI
  - d. 4,000K 80CRI, 90CRI, 97CRI
  - e. 5,000K 80CRI, 90CRI
4. 80CRI is the standard for this product unless otherwise specified.
5. LED Cobs are to be sorted using the 3 Step MacAdam System.

## **G. Dimming Performance**

1. The Retrofit shall dim in a smooth, even manner without pops, flicker, or strobing across all fixtures while dimming.
2. The Retrofit shall use Constant Current Reduction (CCR) for the method of dimming.
3. Pulse Width Modulation (PWM) is not an acceptable alternative to dimming the LED.

## **H. Quality Assurance**

1. All Retrofits shall bear the manufacturer's label which shall include the following.
  - a. Manufacturer's name and address
  - b. Manufacturer's 1-888 telephone number
  - c. Manufacturer's website
  - d. Product listings, TUV-SUD for example
  - e. Energy Certifications
  - f. Power Rating
  - g. Unit type listing output
  - h. Color temperature
  - i. Project specific naming
2. Each Retrofit unit shall have a unique serial number on the outside of the product, which is easily recognizable.
3. All Retrofits shall be tested after being completely assembled by dimming up and down in a loop for no less than 96 hours. Each fixture will then be evaluated to make sure all parts and diodes are functioning correctly before shipping.
4. All Retrofits will be packaged in foam in such a way to protect them during shipping.
5. All Retrofits shall have installation instructions included with each shipment.
6. The Retrofit manufacturer shall have phone number and personnel on hand to talk an installer through any issues that may arise.