

## Specification for RETRO-Passive 500

### 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 CSA/UL and the US Department of Energy's Energy Star program.
3. This Retrofit will have a listing of UL1593C and UL8750.
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, or ETL listed.
8. The Retrofit must be made in the USA.

### B. Physical Product

1. The base Retrofit shall weigh no greater than 3.5 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 an aluminum housing free of burrs, chips or other defect that protects and promotes cooling of the driver board and shall protect from radio interference.
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.

### 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 on a non-dimming system.
4. The driver shall have a power factor of .96 or higher.
5. The Retrofit shall have no current draw when in the non-light-emitting state.

## **D. Thermal**

1. Case temperature of the LED Driver shall not reach higher than 40 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 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 come equipped with a device allowing reflectors to be changed out in the field without tools.
3. Standard reflector options shall be as follows.
  - a. 15 Degree (3-1/8" "Tall")
  - b. 23 Degree (3-1/8" "Tall")
  - c. 46 Degree (3-1/8" "Tall")
  - d. 26 Degree (1-9/16" "Short")
  - e. 40 Degree (1-9/16" "Short")
  - f. 59 Degree (1-9/16" "Short")
  - g. 70 Degree (1-9/16" "Short")
4. Other reflector options may be possible for specific situations.

## **F. Light Emitting Diode**

1. The LEDs shall utilize the Chip On Board construction.
2. The LEDs shall produce greater than 5000 Lumens of light in a 22.5mm by 22.5mm chip while not exceeding 49 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. The 80CRI should be considered the standard for the product in most cases.
5. LED chips 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 units 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.

## **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, CSA for example
  - e. Energy Certifications
  - f. Power Rating
  - g. Unit type listing output
  - h. Color temperature
2. Each Retrofit unit shall have a unique serial number on the outside of the product, which is easily recognizable as such.
3. All Retrofits shall be tested after being completely assembled by dimming up and down in a loop for no less than 12 hours. Each fixture will then be evaluated to make sure all parts and diodes are functioning correctly before shipping.
4. All Retrofits will be individually packaged in a way to protect them during shipping.
5. All Retrofits shall have installation instructions included with each shipment.
6. The Retrofit manufacturer shall have a phone number and personnel on hand to talk an installer through any issues that may arise.