

Versapor® membrane prevents moisture intrusion and stabilizes temperature in outdoor LED street light and spot light control boxes

Overview

Light-emitting diode (LED) street lights and spot lights are increasingly being deployed in major cities throughout the world. LED lighting in recent years has gained both appeal and acceptance due to its high energy efficiency and low cost compared to conventional incandescent bulbs. Studies show that LED street lights and spot lights are effective at providing light, while reducing the cost of illumination.

The Challenge

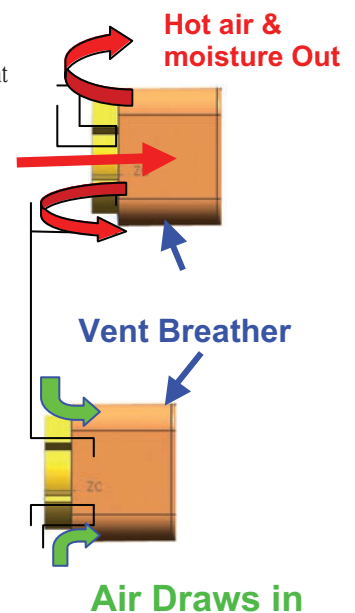
While reduced costs and improved energy efficiency are clear advantages of LED lighting, certain challenges remain. The single biggest challenge to manufacturers is designing a control box that can withstand the outdoor environment in which it is installed. The LED control box must be protected from severe conditions (rain, sun, heat, etc.) in order to function properly and power the LED lights.

A hydrophobic membrane is recommended to prevent moisture from entering the LED-enclosed, thermal controller box and to allow the heat that is generated inside the box to safely dissipate (temperature stabilization).

The challenge is how to increase the life span of the control box so that it lasts as long as the LED lights that it controls.

Pall Malaysia is working closely with Enersave Lighting Sdn. Bhd. to select a suitable hydrophobic membrane with the following benefits:

- Increased control box reliability
- Improved LED light burn rate
- Temperature stabilization
- Effective moisture barrier



The Solution

Pall's Versapor membrane was selected for use in this application for its ability to function as a continuous moisture barrier and temperature stabilizer.

In order to prove the effectiveness of the Versapor membrane, a comparison test was designed (called B vs. C), where results from Test B (with the membrane) were evaluated against Test C (without the membrane). The test was conducted in a live setting with LED spot lights installed outside of a customer's retail shop.

The temperature of the LEDs during operation was recorded at 60°C (140°F) without the membrane vent plugs. The temperature would be used as part of the criteria to determine if the membrane vent plugs were a success. To consider the vent plugs a success, an ambient temperature would need to be achieved.



The following test conditions were followed:

Test B:

The lighting was installed **with** Pall's Versapor membrane vent plugs incorporated into the LED control box.

Test C:

The lighting was installed **without** Pall's Versapor membrane vent plugs.

It was estimated that each 8-LED light would require 10 pieces of the vent breather.

The Results

The square vent plugs in Test B were installed and monitored for 12 months to observe any signs of deterioration or damage. After 12 months, no deterioration was detected. The LED lights and control box were still in good, working condition.

In Test C, where the lighting was installed **without** Pall's Versapor membrane vent plugs, the results were noticeably different. Within weeks of the installation, damage was reported in both the LEDs and the control box. Also, the LED burn rate was high.

The test results confirmed the effectiveness of Pall's Versapor membrane in this application.

Note: currently there are no industry standards for membrane materials used in this type of application. Testing in the actual environment was the best way to verify the material's performance.

The benefits of Pall's Versapor membrane vent plugs include:

- Increased life of the control box
- Reduced burn rate of the LED lights

About Pall Corporation

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The Versapor membrane is sealed inside the vent plug.

The vent plug is water resistant. It functions as a thermal and pressure controller for the LEDs inside the lense cover. As a result, the LEDs life increases.



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