



Overview

Organization

World-class LED manufacturer.

Situation

A new product design required a flame barrier with a UL 94 5VA rating in order to meet UL 8750 polymeric enclosure requirements. The material needed to have excellent flame-retardant and insulating properties and arc resistance. It also needed to be thin and easily die-cut.

3M Solution

3M™ Flame Barrier FRB Series

Features/Benefits

- Eliminates need for glass plate or flame-retardant plastic lens, reducing cost and bulk while improving efficiency.
- UL 94 5VA rated. Enables LED enclosure to meet fire barrier requirements.
- Available in white or black to enhance optical output.
- Easily die-cut and formed to create custom geometries and shapes.

Results

Enabled a narrow-profile, award-winning LED design and reduced cost.

Flame Barrier from 3M Helps Customer Achieve Award-Winning LED Design

The Challenge

A world-class manufacturer of LED luminaires was designing a line of outdoor fixtures for parking lot illumination. The business objective called for a narrow-profile, aesthetically pleasing design that maximized light output and minimized cost. In addition, the fixture needed to comply with the UL 8750 safety standard for LED equipment, including incorporating an approved fire enclosure that meets UL 94 5VA flammability requirements.

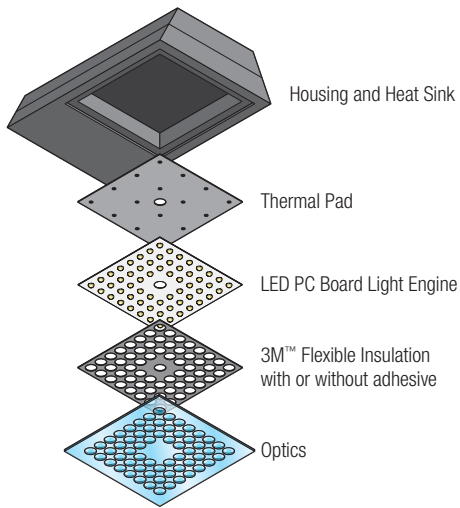
To meet the design, cost and safety goals for the LED product, the manufacturer sought to design-in a thin, flame-retardant material. Layered between the light engine and the optics, a flame-retardant material could help the design meet the UL safety standards while avoiding the extra cost and bulk of a glass plate or flame-retardant plastic lens, which would otherwise be required. The desired flame-retardant material also needed to maximize light output and to be die-cut to let LEDs shine through and cover circuit traces on the light engine.

The Solution

Flame-retardant materials abound on the market. But hone in on products that are both thin (< 0.245 mm) and meet UL 94 5VA flammability requirements, and the field narrows. A limited number of such products are available on the market in the U.S., according to market research conducted by 3M. Most of those products are mica-based materials, which offer excellent flame resistance but often have difficulty standing up to the physical rigors of die-cutting, posing challenges for the LED manufacturer.

3M offers an alternative. 3M™ Flame Barrier FRB Series products have earned the UL 94 5VA flammability rating and can be used to comply with required polymeric fire enclosure requirements specified in UL 8750 Table 6.2. Made of specially engineered inorganic materials, the barrier provides excellent flame resistance to reduce the chance of fire hazard. Moreover, the material's insulating properties help protect installers and maintenance crews against electrical shock, while its arc resistance reduces the risk of shorts and subsequent LED product failures.





3M™ Flame Barrier FRB Series

In addition to its flame-resistance and electrical properties, the 3M flame barrier is very thin, allowing low-profile designs. And, the specially formulated barrier material can be easily die-cut to specifications, enabling a wide array of diode patterns. This is a clear advantage over mica-based flame barriers, which are less easily die-cut because the mica shards can easily break off during the cutting process.

Available in white or black, the 3M flame barrier can enhance optical properties. The white material exhibits a reflectivity of greater than 90 percent, helping to maximize light output. The black material absorbs light for applications where less brightness is needed, helping to reduce light pollution.

The Results

The LED manufacturer selected 3M Flame Barrier FRB material in white. The flame barrier helped the company optimize the design of its outdoor LED luminaire. The thin, inorganic barrier from 3M allowed the LED product to meet enclosure requirements specified in UL 8750 without using a glass plate, a flame-retardant plastic lens or a mica-based material. The white flame barrier's high reflectivity helped improve light output.

The 3M material enabled the following:

- A sleek, narrow-profile fixture that won a design award.
- Reduced cost.
- Maximized light output.

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