

Q&A

LED Materials & Packaging Advancements: With Jeroen Bloemhard, Global Industry Executive Director, Dow Corning

By Heather Krier, Assistant Editor



Dow Corning Corp. is a globally integrated provider of materials, application technology and services, and is focused on providing innovative technology for all segments of the electronics industry. Dow Corning Corp. was formed in 1943 in Midland, Mich. It is equally owned by The Dow Chemical Company and Corning, Inc. More than half of Dow Corning's sales are outside the US.

Dow Corning brand LED Solutions range from optical grades to potting and thermally conductive grades to serve the fully integrated LED market

from packaging to assembly, providing protection from high-temperature conditions, enhanced optical properties, good UV stability, high reliability, lead-free solder processing and optimized heat transfer capability. Typical applications include LED chip protection materials including gels and encapsulants, LED lenses, LED outdoor billboard protection material, LED back-lighting system heat transfer materials and LED light guides.

Jeroen Bloemhard, global industry executive director for Dow Corning Electronics and Advanced Technologies took the time to answer a few questions regarding the current LED materials and packaging industry.

What do you identify as the most important recent advances in LED materials and packaging that will impact the LED industry in 2008?

Recently, HBLEED is being adopted widely for a variety of applications across diverse applications such as LCD backlight units, automotive lighting and general and solid state lighting. These applications make the five-year industry outlook for HBLEED growth highly positive - we've seen growth estimates of approximately 20 percent CAGR.

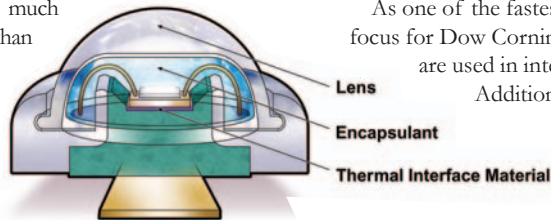
Recent advances allowing HBLEEDs' broader adoption include significantly improved performance and reliability from new materials and packaging designs. Silicone materials have proven to be a key enabler to this broader adoption with their ability to increase light output and minimize heat build-up.

What new or improved materials or packaging techniques do you hope will become widely accepted and successful in the LED industry in 2008?

At Dow Corning, we see great potential for silicon-based encapsulants that not only protect LEDs from environmental hazards, but also help in managing the level of light output and improving long-term reliability at high to low operational temperatures (-40° to 150°C).

Silicone encapsulants can withstand much higher LED operating temperatures than epoxy compounds. Silicone encapsulants also offer high light transmittance, excellent adhesion to a variety of materials, low moisture absorption and are available in a wide range of hardnesses and viscosities.

Of particular importance is light output - a significant technical objective throughout the LED industry. Therefore, we believe higher refractive index silicone encapsulants will be critical in contributing to the broader adoption of LEDs in high-performance applications.



What new products has Dow Corning Electronics released?

In October 2007, Dow Corning launched a series of newly developed high refractive index encapsulants: Dow Corning OE-6665 A and B, Dow Corning OE-6630 A and B, and Dow Corning OE-6635 A and B. All three products are highly transparent with a refractive index of 1.53, compared with 1.4 for other silicone encapsulants currently available.

In addition to these high refractive index silicone encapsulants, we are planning to introduce a portfolio of products and services to help customers meet their manufacturing throughput objectives. We call this the Optimized Manufacturing Process program.

How will these products impact the LED industry?

In addition to achieving throughput objectives, our Optimized Manufacturing Process program is designed to help LED makers reduce overall production costs for new LED products. As the average selling price of new LEDs declines, the challenge for LED makers is to increase manufacturing volume while lowering total production costs. Our Optimized Manufacturing Process program is designed to address this manufacturing conundrum and help our customers remain competitive and profitable through sustainable growth.

In what areas do you feel that Dow Corning Electronics will need to expand in the future to address emerging applications for the LED industry?

In addition to silicone encapsulants, Dow Corning is planning to introduce new silicone products addressing die-attach, thermal management and LED optical fabrication applications.

We are also seeing other LED applications in the automotive and general lighting industries, where silicone's superior performance can meet LED materials needs that current organic materials cannot.

What is Dow Corning Electronics' plan to keep up with the demands of the LED industry for materials and packaging?

Given the importance of the LED industry for Dow Corning, we continue to invest in:

- Research and commercialization of new technologies and products
- Application development through internal testing and data generation
- Alliances with relevant industry partners such as suppliers of substrates and manufacturing equipment
- Increasing manufacturing capabilities

Are there any new developments in LED materials and packaging in regard to automotive applications?

As one of the fastest growing markets, automotive lighting is a strong focus for Dow Corning. Currently, Dow Corning's many LED products are used in interior and exterior automotive lighting applications.

Additionally, headlamp applications still pose a significant technical challenge for the industry, such as thermal management and luminance requirements. Those technical challenges are precisely what Dow Corning's high-performance silicone encapsulants and thermal solutions address.

For more information on LED applications, contact Dow Corning Electronics Solutions, electronics@dowcorning.com.