

LUMENFLOW CASE STUDY

LumenFlow's Surface Mount Optics enabled by SILASTIC™ Moldable Silicone offer more accurate and efficient optical assembly

The challenge

LED lighting has primarily used secondary optics as a way to get more light on target. These secondary optics are mounted above LEDs on printed circuit boards (PCB) in order to gather and control wide-angle LED light and increase overall system efficiency. Traditionally, these optics were made from polycarbonate (PC) or acrylic (PMMA) and require secondary components or fixtures to mount to the PCB. They can also be directly applied to circuit boards using liquid adhesives, die-cut adhesives, cold stakes, or other mechanical mounting methods. These solutions require additional labor and/or specialized equipment once the PCB assembly (PCBA) has been processed to attach these optics: increasing labor costs, part costs and program investment.

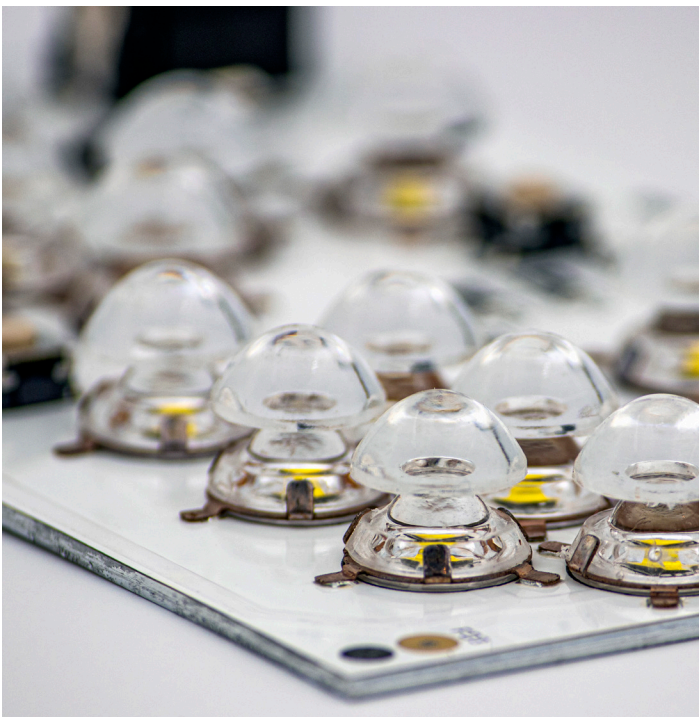
The solution

Working with the silicone experts at Dow, LumenFlow has developed Surface Mount Optic (SMO) Technology. Created with SILASTIC™ MS-1002 Moldable Silicone, they have designed a secondary optic with an integrated solder reflow clip. By integrating this reflow clip and leveraging the thermal stability properties of SILASTIC™ Moldable Silicones, secondary optics can now be loaded in tape and reel and placed on the PCB using standard Surface Mount Technology (SMT) equipment.

Due to the properties of SILASTIC™ Moldable Silicones, the SMOs can be placed directly on top of LEDs and can be reflow-soldered in place in one pass. This eliminates the need for costly second passes through the SMT process. In addition, the secondary optic is now placed by highly accurate SMT equipment, and alignment to the LED is improved – increasing system output.

LumenFlow selected SILASTIC™ Moldable Silicones because of their unique properties that help in enabling this SMO technology. Some of those properties include:

- The thermal stability characteristics of SILASTIC™ Moldable Silicones – the optic will not yellow, sag, or lose optical function during the solder reflow process. Traditional thermoplastics cannot withstand the temperatures of a standard solder reflow process.
- Superior optical transmission when compared to traditional PC and PMMA optics including UVA, UVB and IR spectrums. Additionally, the materials are robust in thermal and photothermal aging performance.



The properties of SILASTIC™ Moldable Silicones provide design freedom, allowing for unique geometries and other functional aspects not possible in traditional thermoplastic optical designs. A variety of lenses can be added to one PCBA in the SMT process as different optics can be loaded and switched (as automation allows), reducing mistakes.

The success

SILASTIC™ Moldable Silicone optics help eliminate costly secondary operations of placing optics over LEDs. These surface mount optics improve placement accuracy and repeatability vs. more traditional methods. A single pass on an SMT line is all that is needed to both solder the PCBA and optics in place, drastically reducing handling. Furthermore, making SMO from SILASTIC™ Moldable Silicones allows for designs that put more low angle LED light on target for improved optical system efficiency.



SMO DFL10d

SMO DFL30d

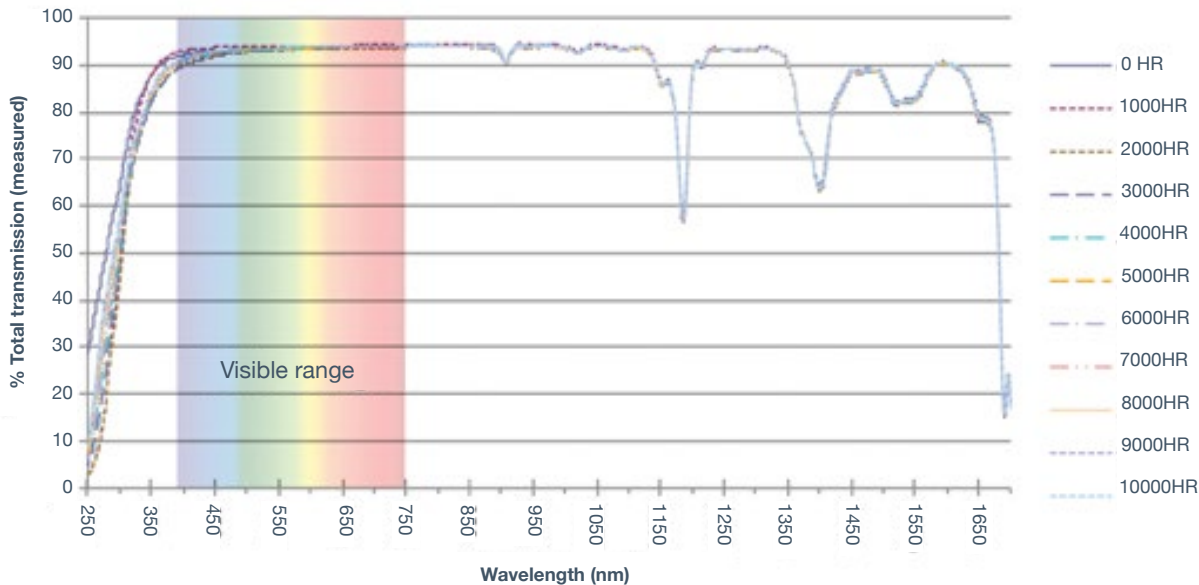


SMO DFL60d

About LumenFlow

With LumenFlow’s in-house design and manufacturing capabilities, new SMOs can be designed to meet customer specific performance targets and optimized for customer desired sources.

SILASTIC™ MS-1002 Moldable Silicone thermally aged transmission @ 150°C



Learn More

We bring more than just an industry-leading portfolio of optics materials. As your dedicated innovation leader, we bring proven process and application expertise, a network of molding and optical experts, a reliable global supply base, and world-class customer service.

To find out how Dow can support your lighting applications, visit dow.com/lighting.

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