LIGHTING

PRODUCT INFORMATION GUIDE

Imagine a brighter future with the unprecedented design freedom offered by silicones

SILASTIC™ Moldable Optical Silicones provide greater design freedom and performance

- Material flexibility and mold replication enable complex optical shapes
- Enables fine surface and integrated mechanical features not possible with traditional plastics
- Outstanding physical and optical performance in demanding environments - high heat, high humidity, and UV exposure (UL746C(f1))
- Excellent optical properties with non-yellowing performance
- Proven processing performance enables high throughput, less downtime, and low stress on mold tools
- Resistant to scratches, cracks, vibrations, and other damage that may limit traditional materials
- Lighter than glass and other optical materials to enable light-weighting

High performance injection-molded optical silicones for lamp and luminaire applications

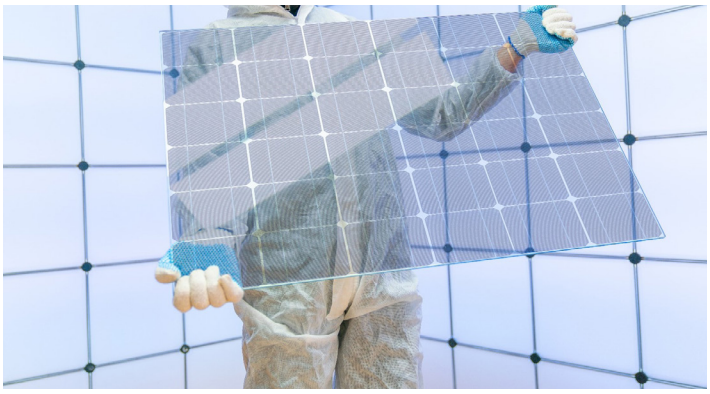
Imagine your LED lighting options when the limitations of traditional plastics and glass are removed. With the unmatched characteristics and performance of SILASTIC™ Moldable Optical Silicones, you can imagine — and create — the newest, brightest LED lighting innovations.

Innovative designs, not currently feasible with optical plastics and glass, are now possible. Moldable silicones are suitable for a wide range of applications, including:

- Secondary lenses
- Freeform collimators
- Micro-lens arrays
- Light pipes
- Light guides
- Other optical components

Optical performance

SILASTIC™ Moldable Optical Silicones can deliver refraction, reflection, and diffusion in many forms. Excellent optical clarity and light transmission are combined with resistance to heat, UV and environmental degradation — allowing these silicones to deliver higher lumen density, low haze and scatter and long-term performance.



SILASTIC™
silicone elastomers by DOW

SILASTIC™ Moldable Optical Silicones versus other optical materials

Moldable optical silicones from Dow provide good resistance to ultraviolet (UV) exposure, optical yellowing, and scratching — especially compared with polycarbonate (PC) and polymethyl methacrylate (PMMA) plastics. The chemical backbone of silicones makes them heat resistant and particularly well-suited to manage the increasingly high temperatures of new high-power LED lighting systems.

The long-term stability of optics made from SILASTIC™ Moldable Optical Silicones has been proven in accelerated aging tests up to 12,000 hours at 150°C, as well as artificial sunlight (UV-A and -B) combined with heat (65°C).

Table 1

	SILASTIC™ Moldable Silicone	PC	PMMA	Glass
Light transmission	94%	88-90%	93%	95%
Refractive index	1.42	1.58	1.49	1.52
UV resistance	High	Low	Medium	High
Chemical resistance	Medium	Medium	Low	High
Service temperature maximum (°C)	>150	120	90	>200
Yellowing*	Low	High	High	Low
Micro detail replication	High	Low	Medium	Low
Ability to mold large and thick parts	High	Low	Low	Medium
Minimum thickness**	<0.5 mm	2 mm	2 mm	—
Draft angle (manufacturing)**	<0°	1 to 2°	1 to 2°	—
Weight	Low	Medium	Medium	High
Flexible material — integration	High	Low	Low	Low

* Yellowing due to high temperature, high lumen density, or UV exposure
** Injection molding process

Molding characteristics

Highly versatile and moldable, these two-part silicone materials allow you to explore more-complex designs — while potentially simplifying the manufacturing process and reducing costs.

With a low viscosity before cure, optical silicones from Dow make the injection molding of complex shapes easier than with organic polymers or glass. The silicones require very low injection pressures compared to thermoplastics.

Based on your application's needs, these silicones can produce components that are soft and pliable or firm and tough. The flexible material can support easy demolding — even with complex shapes and undercuts.

Fine details, surface finishes, and micro-scale optical structures can be molded, and no secondary polishing of the molded optics is required.

Outstanding mold surface wetting allows moldable optical silicones from Dow to replicate fine surface features. In this 50X magnification image, SILASTIC™ MS-1002 Silicone has replicated micrometer size optical features designed by Tenibac-Graphion, Inc.

Table 2: Key properties of SILASTIC™ Moldable Optical Silicones

	SILASTIC™ MS-1001 Moldable Silicone**	SILASTIC™ MS-1002 Moldable Silicone	SILASTIC™ MS-1003 Moldable Silicone
Color	Optically clear	Optically clear	Optically clear
Viscosity (part A), cP	20,000	40,000	52,000
Viscosity (part B), cP	9,000	18,000	37,500
Viscosity (mixed*), cP	14,000	26,250	42,300
Working time at 25°C (pot life), hours	30	48	48
Specific gravity, (g/cm^3)	1.05	1.07	1.05
Durometer, shore A	87	72	51
Tensile Strength (psi)	1,740	1,625	800
Tensile Strength (MPa)	12	11	6
Tensile Elongation, %	50	80	325
Linear CTE, ppm/°C	250	275	325
Luminous transmittance at 3nm* **	93%	93%	93%
Luminous transmittance at 10nm* **	92%	90%	92%
Refractive index (nD, 589.3 nm)	1,418	1,413	1,409
Abbe number, a.i.	48	52	51
Dielectric strength (volts/mil)	736	584	508
Dielectric strength (kV/mm)	29	23	20
Volume resistivity, ohm•cm	--	1.00E+18	1.00E+16
Agency listing	UL 94 UL 746A AMECA	UL 94 UL 746A UL 746C(f1)(f8)AMECA	UL 94 UL 746A UL 746C(f1)(f8)

* Mix ratio 1:1
**CV grade
*** Weighted total transmittance between 360 and 780 nm according to CIE Colorimetry 15:2004

Learn more

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

To find out how we can support your applications, visit **www.dow.com/lighting.**

DOW®

Want to see how moldable optical silicones will work in your application?

Let the pioneers of optical silicones help you. When you pair the unique benefits of these materials with Dow's expertise, you will find new ways to help enhance the performance, durability and total cost of ownership of your design.

The earlier in the design process you work with Dow Lighting experts, the more we can do — together — to enhance value and performance. We'll help you imagine new and innovative ways to control light.

Numerous **case studies** have been published, that illustrate the benefits and performances of DOW SILASTIC Moldable Silicones in a wide variety of applications, such as, e.g., Adaptive Driving Beam (ADB) auto LED headlamps, outdoor street and stadium LED lighting fixtures, down-light and retail spots LED fixtures, water disinfection devices using UV-C LED and concentrated photo-voltaic panels. More details on these case studies can be found on our web site on **www.dow.com/lighting**.

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