

## 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, fine surface features and integrated mechanical features not possible with traditional plastics
- Outstanding physical and optical performance in demanding environments, including high heat, high humidity and UV exposure
- Excellent optical properties with non-yellowing performance
- Proven processing performance enables high throughput and less downtime with 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, and other optical components.

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.

## 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.

The long-term stability of optics made from SILASTIC™ Moldable Optical Silicones has been proven in accelerated aging tests up to 6,000 hours at 150°C, as well as artificial sunlight (UV-A and -B) combined with heat (65°C).



# SILASTIC™

silicone elastomers by 

Table 1: SILASTIC™ Moldable Optical Silicones versus other optical materials

	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

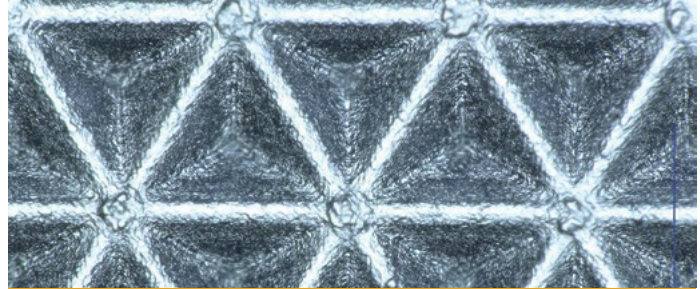
### Molding characteristics

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-0002 Moldable Silicone	SILASTIC™ MS-1003 Moldable Silicone	SILASTIC™ MS-1002 Moldable Silicone	SILASTIC™ MS-4007 Moldable Silicone	SILASTIC™ MS-4002 Moldable Silicone	SILASTIC™ MS-4022 Moldable Silicone	SILASTIC™ MS-2002 Moldable Silicone	SILASTIC™ MS-1001 Moldable Silicone**
<b>Color</b>	Translucent	Optically clear	Optically clear	Optically clear	Optically clear	Optically clear	White reflecting	Optically clear
<b>Viscosity (part A), cP</b>	148,000	52,000	40,000	28,000	50,000	46,000	695,000	20,000
<b>Viscosity (part B), cP</b>	145,000	37,500	18,000	9,500	21,000	16,000	565,000	9,000
<b>Viscosity (mixed*), cP</b>	—	42,300	26,250	10,500	25,000	19,000	—	14,000
<b>Working time at 25°C (pot life), hours</b>	48	48	48	48	48	48	48	30
<b>Specific gravity, kg/l</b>	—	1.05	1.07	1.08	1.08	1.08	—	—
<b>Durometer, shore A</b>	65	51	72	70	84	85	84	87
<b>(psi)</b>	1,300	800	1,625	1,700	1,700	1,600	1,250	1,740
<b>(MPa)</b>	—	5.5	11.2	11.7	11.7	11.0	—	12.0
<b>Elongation, %</b>	270	325	80	100	60	52	65	50
<b>Linear CTE, ppm/°C</b>	280	325	275	270	250	245	210	250
<b>Transmission, 3.2 mm thickness</b>	75% at 450 nm 89% at 760 nm	91% at 380 nm 92% at 450 nm 93% at 760 nm	89% at 380 nm 91% at 450 nm 94% at 760 nm	91% at 380 nm 93% at 450 nm 94% at 760 nm	89% at 380 nm 92% at 450 nm 93% at 760 nm	87% at 380 nm 90% at 450 nm 93% at 760 nm	N/A	92% at 380 nm 93% at 450 nm 94% at 760 nm
<b>Refractive index (633 nm), %</b>	—	1.41	1.41	1.41	1.42	1.42	N/A	1.41
<b>Abbe number, a.i.</b>	—	50	50	48	52	52	—	—
<b>Reflectance</b>	N/A	N/A	N/A	N/A	N/A	N/A	97% at 450 nm 98% at 555 nm 99% at 630 nm	N/A
<b>Dielectric strength (volts/mil)</b>	500	508	584	650	711	660	525	736
<b>Dielectric strength (kV/mm)</b>	19.7	20	23	25.6	28	26	20.7	29
<b>Volume resistivity, ohm·cm</b>	—	1.00E+16	1.00E+18	1.00E+14	1.00E+14	1.00E+16	3.00E+15	—
<b>Agency listing</b>	UL 94 UL 746	UL 94 UL 746A UL 746C(f1)	UL 94 UL 746A UL 746C(f1)	UL 94 UL 746A UL 746C(f1)	UL 94 UL 746A UL 746C(f1)	UL 94 UL 746A UL 746C(f1)	UL 94 UL 746A UL 746C(f1)	UL 94 UL 746

\* Mix ratio of 1:1

\*\* CV grade



## 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 [consumer.dow.com/lighting](https://consumer.dow.com/lighting).



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### 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.

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