



INNOVATIVE SOLUTIONS FOR LED LIGHTING





Who We Are

Distributors Group Europe (DGE) was established in 1996 by several European based specialty chemical distributors. Our market is Europe. For our members we provide central marketing and sales support for the introduction of new products while also functioning as a knowledge reference center for the group. For our suppliers, we provide a single platform whereby suppliers can market their products through a network of dedicated specialty chemical distributors.

DGE's members are independently owned technically oriented distributors. Each local member is focused on making specialty chemical products simple to use and understood in their home market while meeting their customer's, ever changing product performance needs. On average our members have been addressing their customer's needs for more than 50 years.



Our support

Due to the broad range of technologies each DGE member has in house our specialists can offer the optimal solution for your LED fixtures. These technologies are accompanied with solutions for the optimal manufacturing process and equipment. Our specialists can support in finding the right equipment for manufacturing making the transfer of your design from R&D to production as easy as possible.

With the experience our specialists have in the lighting market they can recommend solutions which are compatible with LEDs. With the support our specialists can offer we can shorten your development time. Our specialists are continuously trained by our suppliers and therefore always up to date with the state of the art technology and information on new products. Also due to their extensive network within DGE our specialists are up to date with latest knowledge in the lighting market, since they exchange experiences on applications and technologies. In this way DGE is always able to find the right solution for the lighting customer.



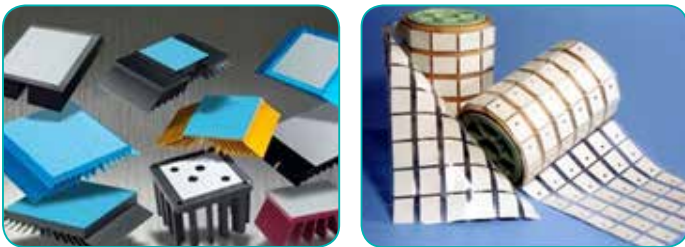
Challenges in LED lighting design

Lighting designers need to shape their light, cool for long lifetime, protect from stringent environmental conditions for high reliability and at the same time make creative designs which are easy to manufacture. With the various technologies DGE can offer, all these requirements can be fulfilled. DGE offers a wide range of specialty chemicals and components which can be used in LED lighting.



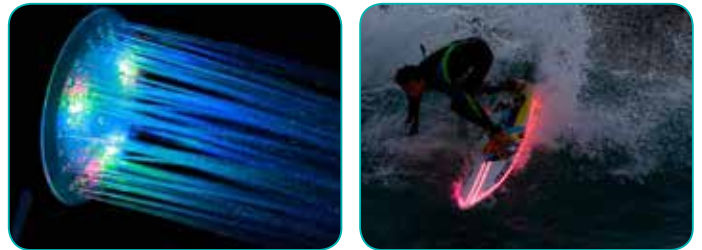
Cool for life

DGE offers a range of products to cool your LEDs and electronic components to provide a long lifetime of the lamp or luminaire. Depending if you want to seal your LED strip for life or be able to replace the LED strip thermal interface materials can be offered, ranging from greases, thermal pads, screen printable thermal pads and thermal adhesives.



Protect for high reliability

A broad range of technologies can be offered to seal your luminaires and protect the LEDs and electronic components from dust and moisture. Depending if you want to seal your luminaire for life or be able to replace the LED strip DGE can offer various solutions from pre-formed gaskets to adhesives. Alternatively the individual LEDs and electronic components can be protected with conformal coatings, encapsulants or pottants. All depending on the required IP rating of the LED lamp or luminaire as well as the type of LED, i.e. low power, mid power or high power used in the luminaire.



Shape your light

To shape the light of your LEDs in your lamp or luminaire we offer a new breakthrough technology which can lead to innovative designs which were not possible before.

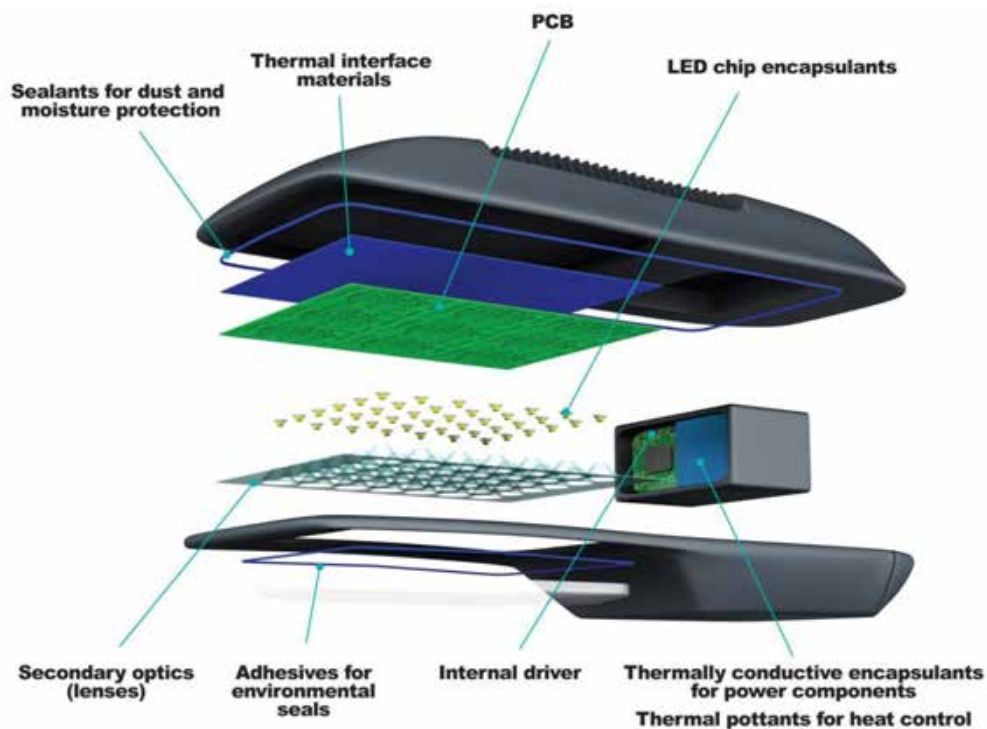


Advanced silicone and silicon-based materials for next-generation LED lighting

As a premier global supplier of silicones and a world leader in silicon-based technology, Dow Corning solutions span the entire lighting value chain - from wafer and chip-level applications to LED packaging to lamp and luminaire design and lamp assembly. Dow

Corning materials add proven reliability and efficiency for sealing, protecting, adhering, cooling and shaping light across all lighting applications. The future is looking bright for LED lighting designers and manufacturers. From offices to

street lamps to automotive to architectural installations, when using silicones for next-generation LED designs this brings new possibilities in efficiency, light output, energy savings, and expressive design while giving customers an entirely new experience.



Silicone benefits for the entire LED lighting value chain include:

- Greater photo stability allowing for higher lumen density for optical materials
- Improved thermal stability maintaining lumen and color quality over the lifetime of the LED
- Expanded design latitudes allowing detailed features and challenging designs such as undercuts
- Enhanced UV stability boosting reliability over time for outdoor applications
- High transparency enabling higher efficiency
- Easy processability lowering total cost of ownership
- Powerful thermal and moisture resistance enhancing reliability and protection of sensitive electronic components



► LED Solution Provider

Chemical Compatibility to LEDs

The challenge for lighting designers is to design unique luminaires and at the same time to avoid failure or degradation of LEDs when using chemical components in the system. Most often LED failure or degradation can occur when components are used which are chemical incompatible with the LED.

Dow Corning's unique advantage is the expertise in developing silicone solutions for the complete LED lighting value chain, from the packaging materials for the manufacturing of LEDs, moldable optical silicones for secondary optics applications, to the final assembly and protection of LED Lighting. Cree has recognized the quality, performance and innovation of these materials through all of these stages.

As a result Dow Corning is now part of the Cree® Solution Provider Program. The Cree Solution



Provider Program (CSP) helps lighting manufacturers to find complementary components from third-party manufacturers who work with Cree LED products. This helps lighting manufacturers with their LED lighting needs and enables a shorter design cycle to get products to market faster.

In this brochure materials that are already tested with Cree LEDs and which can be found on the Cree chemical compatibility list are marked. This can help lighting designers in making the right choice for the material used and shorten development time, leading to a faster time to market.





Dow Corning™ silicone conformal coatings protect delicate LEDs and electronics from humidity, moisture and thermal stress, and deliver excellent insulation against high voltages and short circuits.

Dow Corning™ conformal coatings are available in a variety of viscosities and cure chemistries. They provide excellent unprimed adhesion to many common LED materials.

All Dow Corning™ conformal coatings contain an UV indicator for inspection under black light.

Conformal Coatings

Materials	Properties	Viscosity (mPa.s)	Durometer	Tack free time	Polymerization	Dielectric strength (kV/mm)	Packaging
RTV Elastoplastic							
Dow Corning® CC-2571	1 part • without UV dye UL 94 V-0 Diluent OS-20 fluid	75	80 Shore A	15 min	RTV	40.1	Pail : 3.6 kg • 18.1 kg
Dow Corning® 1-2620	Silicone • 1 part • UL 94 V-0 • Mil Spec • Diluent OS-20 fluid	150	80 Shore A	5 min	RTV	22	Bot : 454 g Pail : 3.6 kg • 18.1 kg Drum 199.5 kg
Dow Corning® 1-2620 Low VOC	Silicone • 1 part • UL 94 V-0 • Mil Spec Diluent OS-20 fluid	350	80 Shore A	5 min	RTV	16	Pail : 3.6 kg • 15 kg Drum 181.4 kg
Dow Corning® 1-2577*	Silicone • 1 part • UL 94 V-0 • Mil Spec Diluent OS-20 fluid	950	80 Shore A	7 min	RTV	16	Bot : 500 g Pail : 5 kg • 20 kg Drum 199.5 kg
Dow Corning® CC-2570	1 part • without UV dye UL 94 V-0 Diluent OS-20 fluid	1 000	76 Shore A	7 min	RTV	27.7	Pail : 3.6 kg • 18.1 kg
Dow Corning® 1-2577 Low VOC*	Silicone • 1 part • UL 94 V-0 • Mil Spec Diluent OS-20 fluid	1050	25 Shore D	6 min	RTV	13	Bot : 500 g Pail : 5 kg • 15 kg Drum 181.4 kg
RTV Elastomeric							
Dow Corning® 3-1965	Silicone • 1 part • UL 94 V-0 • Mil Spec	115	33 Shore A	6 min	RTV	17	CRT: 175 ml Pail : 3.6 kg • 18.1 kg
Dow Corning® 3-1953*	Silicone • 1 part • UL 94 V-0 • Mil Spec	350	34 Shore A	8 min	RTV	17	Pail : 5 kg • 18.1 kg • 20 kg
Dow Corning® 3140	Silicone • 1 part • UL 94 V-1 • Mil Spec	34400	34 Shore A	116 min	RTV	15	Tube: 90 ml CRT: 310 ml Pail : 20 l
Dow Corning® 3-1944*	Silicone • 1 part • UL 94 V-0 • Mil Spec	63775	36 Shore A	14 min	RTV	21	CRT: 305 ml Pail : 18.1 kg
Heat cure							
Dow Corning® 1-4105*	Silicone • 1 part • UL 94 V-1	450	64 Shore OO	-	10 min @105°C	20	Pail : 18.1 kg • 20 kg Drum : 199.5 kg

*Product is part of CREE® chemical compatibility list.

Dow Corning's high-flow thermal silicone pottants protect LED drivers from moisture and dust, while dissipating damaging heat and absorbing component noise. With high thermal conductivity and RTI

reaching as high as 150°C, these materials help ensure long-term reliability and lower lifetime costs for your LED lamp and Luminaire design. Their room-temperature cure process

can be accelerated with mild heat to expand manufacturing flexibility and reduce processing cost.



Thermal Pottants

Materials	Properties	Color	Viscosity (mPa.s)	Durometer	Thermal conductivity (W/m.K)	Working Time/ pot life	Cure time	Dielectric strength (kV/mm)	Elongation (%)	Packaging
Room temperature & Heat accelerable cure										
Dow Corning® CN-8760 G	2-Part, 1:1, UL 94 V-0	Gray	3200	45 Shore A	0.67	100 min	24h @25°C	24	85	Kits : 30 kg 50 kg
Dow Corning® CN 8760	2-Part, 1:1, UL 94 V-0	Dark gray	2850	52 Shore A	0.66	120 min	40 min @50°C	33	95	Kits : 30 kg 50 kg
Dow Corning® Sylgard 164	2-Part, 1:1, UL 94 V-0	Gray	12000	61 Shore A	0.64	14 min	0,6h @25°C	19	105	Kits : 210 ml 49.8 kg 453.4 kg
Dow Corning® Sylgard 160	2-Part, 1:1, UL 94 V-0	Dark gray	4865	56 Shore A	0.62	20 min	24h @25°C 4 min @100°C	19	105	Kits : 210 ml 10.8 kg 49.8 kg 453.4 kg
Dow Corning® Sylgard 170	2-Part, 1:1, UL 94 V-0, Mil Spec	Dark gray	2135	50 Shore A	0.48	15 min	24h @25°C 25 min @ 70C 10 min @100°C	18	165	Kits: 210 ml 2 kg 10 kg 40 kg 400 kg
Dow Corning® Sylgard 170 FastCure	2-Part, 1:1, UL 94 V-0	Black	2361	43 Shore A	0.40	4 min	12 min @25°C	14	125	Kits: 210 ml 40 kg 400 kg
Dow Corning® Sylgard 186	2-Part, 10:1, UL 94 V-1	Translucent	66700	24 Shore A	-	1.65h	48h @ 25°C 25 min @ 100°C 15 min @150°C	17.7	255	Kits: 0.5 kg 1.1 kg 5.5 kg 224.5 kg
Heat cure only										
Dow Corning® Q3-3600	2-Part, 1:1, UL 94 V-1, Mil Spec Primerless	Gray	3200	89 Shore A	0.8	24h	60 min @150°C	26	55	Kits : 4 kg 20 kg
Dow Corning® Sylgard 567	2-Part, 1:1, UL 94 V-0, Mil Spec Primerless	Black	1500	40 Shore A	0.29	-	180 min @70°C 120 min @100°C	16	95	Kits: 210 ml 2 kg 10 kg 40 kg

Primer

Materials	Color	Solvent	Flash point (°C)	VOC (g/l)	Compatible Silicones
Dow Corning® 92-023	clear	Heptane	-13	681	Non-pigmented two-part addition-cure silicones
Dow Corning® 1200OS	clear/red	Volatile siloxane	27	76	All
Dow Corning® PR-1200	clear/red	Naphta	13	719	All

Thermal Interface Materials

Dow Corning's broad portfolio of thermal interface materials offers versatile heat management options for virtually every LED lamp and Luminaire design.

The material is applied between heat source, for example PCB or Chip On Board LED, and heat sink to dissipate the heat from the lighting source and reduce junction temperature.

Depending if the LED printed circuit board or Chip On Board LED needs to

be sealed or able to be replaced, silicone technology is able to offer both type of solutions and at the same time offering a very low thermal resistance between LED PCB or COB LED and heatsink.

Thermal management

Dispensable Thermal Pads enable quick and precise screen printing of thermally conductive silicone pads in controllable

thicknesses on complex substrate shapes. They can enhance thermal performance, accelerate production and reduce system costs compared to fabricated pads.

Thermal Greases, compounds, enable very thin bond lines and fill tight gaps to ensure durable thermal management and long-term reliability of LED devices.

Printable Pads

Materials	Properties	Thermal conductivity (W/m.K)	Viscosity (mPa.s)	Durometer	Cure time	Dielectric strength (kV/mm)	Packaging
Dow Corning® TC-4026	Silicone • 2-Part • 1:1 • Blue • UL 94 V-0 • Glass beads*	2.5	70,000	50 Shore OO	24h @25°C 48 min @75°C 16 min @100°C	18	Kits : 2 kg 10 kg 40 kg
Dow Corning® TC-4025**	Silicone, 2-Part • 1:1 • Blue • UL 94 V-0	2.5	70,000	50 Shore OO	24h @25°C 48 min @75°C 16 min @100°C"	18	Kits : 2 kg 10 kg 40 kg
Dow Corning® TC-4016	Silicone • 2-Part • 1:1 • Blue • UL 94 V-0 Glass beads*	1.7	103,000	50 Shore OO	24h @25°C 48 min @75°C 16 min @100°C	18	Kits : 2 kg 10 kg 40 kg
Dow Corning® TC-4015**	Silicone • 2-Part • 1:1 • Blue • UL 94 V-0	1.7	103,000	50 Shore OO	24h @25°C 40 min @75°C 15 min @100°C	18	Kits : 2 kg 10 kg 40 kg

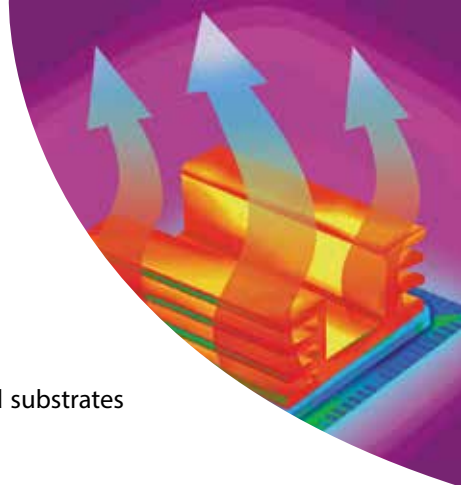
*Glass beads : Added to help control the thickness

**Product is part of CREE® chemical compatibility list.

Compounds

Materials	Properties	Thermal conductivity (W/m.K)	Thermal Resistance at 40psi (°C.cm ² /W)	Viscosity (mPa.s)	Dielectric strength (kV/mm)	Packaging
Dow Corning® TC-5351	Silicone • gray • grease	3.3	0.25	300,000	6.3	CRT 1 kg Pail : 20 kg
Dow Corning® TC-5121C**	Silicone • greenish-yellow • grease	2.8	0.09	79,000	1.9	Pail : 1 kg
Dow Corning® SE 4490CV	Silicone • white • grease	1.9	0.77	52,000	35	Pail : 1 kg
Dow Corning® TC-5080	Silicone • white • grease	1	0.2	836,000	8.7	Pail : 1 kg Drum: 250 kg
Dow Corning® SC102	Silicone • white • grease	0.9	0.62	29,000	2	Pail : 1 kg Pail: 20 kg
Dow Corning® 340	Silicone • white • grease	0.68	0.16	542,000	8	Tub : 100 g Pail : 10 kg • 60 kg

**Product is part of CREE® chemical compatibility list.



Thermal management and fixation

Thermally conductive adhesives form strong stable bonds to most LED printed circuit board substrates (e.g. Ceramic, MCPCB and FR4), and deliver excellent thermal conductivity.

The materials cure at room temperature or at elevated temperature. Their low volatility means no adverse impact to light output.

Thermally Conductive Adhesive

Materials	Properties	Thermal conductivity (W/m.K)	Tensile strength (Mpa)	Viscosity (mPa.s)	Durometer	Elongation	Cure time	Dielectric strength (kV/mm)	Packaging
RTV									
Dow Corning® SE 4485	Silicone • 1 Part • White • UL 94 V-0	2,8	3,4	230 000	90 Shore A	99,2	RTV	19	CRT : 330 ml
Dow Corning® SE 4485 L	Silicone • 1 Part • White	2,2	5,1	100 000	90 Shore A	20	RTV	38	CRT : 330 ml
Dow Corning® SE 4486*	Silicone • 1 Part • White	1,59	3,8	20 000	80 Shore A	45	RTV	13	Tube : 250 g CRT : 330 ml
Dow Corning® SE 4420	Silicone • 1 Part • White	0,9	4,4	108 000	77 Shore A	65	RTV	14,6	Tube : 200 g CRT : 330 ml
Dow Corning® EA 9189 H	Silicone • 1 Part • White • UL 94 V-0	0,88	3,9	-	80 Shore A	32	RTV	28	CRT : 330 ml 2.6 l
Heat cure									
Dow Corning® TC-2035	Silicone • 2-Part • 1:1 • red	3,3	3,6	130 000	95 Shore A	43	30 min @125°C 10 min @150°C	21	Kit: 2x450 g 2 kg 3.2 kg 50 kg
Dow Corning® TC-2030	Silicone • 2-Part • 1:1 • Gray	2,7	4,7	220 000	92 Shore A	50	60 min @130°C	21	Kit: 2x610 ml 2 kg 50 kg
Dow Corning® SE 4450	Silicone • 1 Part • Gray	1,92	7,3	66,000	94 Shore A	45	30 min @150°C	22	Pail : 1 kg 20 kg
Dow Corning® 1-4173	Silicone • 1 Part • Gray • UL 94 V-0	1,78	6,2	61,000	92 Shore A	20	90 min @100°C	16,7	CRT : 75 ml 1.5 kg Pail : 10 kg

*Product is part of CREE® chemical compatibility list.



Silicone adhesives & sealants from Dow Corning form excellent bonds and seals with a variety of common LED lamp and Luminaire materials, and ensure reliable long-term performance at temperatures exceeding 120°C. These solventless

materials cure at room temperature to greatly simplify processing, and their low volatility (<300 ppm) helps maintain lumen output over the lifetime of your device.

The adhesives and sealants can be

used to seal PC/PMMA covers to the heatsink. Also the sealants are excellent for gluing PC/PMMA and silicone lenses to PCBs.



Adhesives & Sealants

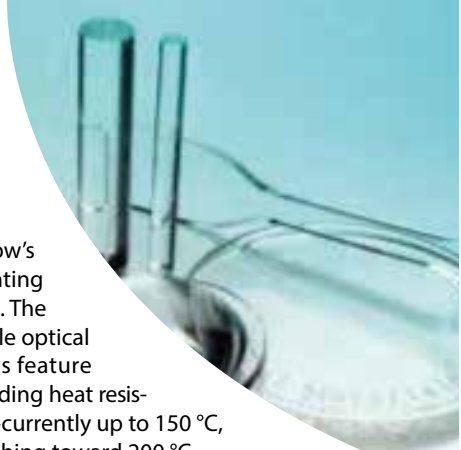
Materials	Properties	Color	Tack free time (min)	Durometer	Elongation (%)	Tensile strength (Mpa)	Dielectric strength (kV/mm)	Packaging
RTV								
Dow Corning® 3145*	Silicone • RTV • 1 Part • MIL-A-46146	Gray • Clear	78	51 Shore A	650	7,1	20	Tube 90 ml CRT 310 ml Pail 19 kg
Dow Corning® 3140	Silicone • RTV • 1 Part • Flowable (34,400 mPa.s) •UL 94-HB, Mil Spec	Clear	105	34 Shore A	425	3	17.5	Tube 90 ml CRT 310 ml Pail 20 l
Dow Corning® 744	Silicone • RTV • 1 Part • UL 94-HB	White	55	37 Shore A	590	2,7	16	Tube 90 ml CRT 310 ml Pail 20 l
Dow Corning® 7091*	Silicone • RTV • 1 Part	White • Gray • Black	28	37 Shore A	680	2,5	DK	CRT 310 ml Pail 20 l
Dow Corning® SE 9186	Silicone • RTV • 1 Part	White • Clear	9	19 Shore A	555	2,3	23	Tube 100 g CRT 330 ml Pail 18 kg
Dow Corning® EA 2900	Silicone • RTV • 1 Part • UL 94 V-1	White	20	50 Shore A	400	2,1	17.1	CRT 310 ml Pail 20 l
Dow Corning® SE 9120	Silicone • RTV • 1 Part • Flowable (8 125 mPa.s)	Clear • White	9	24 Shore A	375	1,5	23	Tube 95 g CRT 330 ml
Dow Corning® AS7096N*	Silicone • RTV • 1 Part	Clear	15 - 30	13 Shore A	500	1	DK	CRT 310 ml Pail 20 l
Dow Corning® 3165	Silicone • RTV • 1 Part • UL 94 V-0	Gray	5	35 Shore A	185	0,9	DK	CRT 310 ml Pail 21.9 kg
Dow Corning® SE 9187 L	Silicone • RTV • 1 Part • UL94-HB (Black only)	White • Clear • Black	8	18 Shore A	155	0,5	20	Tube 95 g CRT 330 ml Pail 18 kg
Heat cure								
Dow Corning® SE 1700	Silicone, Heat Cure (30min 150°C) • 2-Part, non- flowing (542 000 mPa.s) • ratio 10:1	White • Clear	-	48 Shore A	355	6,8	22	Kit 1.1 kg kit 22 kg
Hotmelt								
Dow Corning® EA-4600 HM	Hot melt silicone • 1 Part	Black	15	56 Shore A	1 000	4,6	20	CRT 30 ml • 330 ml
Dow Corning® HM-2510	Hot melt silicone • 1 Part	Clear	15	47 Shore A	760	2,7	DK	Pail 22 kg

*Product is part of CREE® chemical compatibility list.

Moldable silicones are suitable for a range of applications, such as secondary lenses, light pipes, light guides and other optical components. These transparent, lighter-than-glass materials are soft enough to allow your innovative design combined with integrated functionality of the optical parts. They deliver good ultraviolet (UV) resistance, minimize yellowing and resist scratching, especially in comparison to PC and PMMA plastics. They also mix easily with additives to meet your specific design needs and performance goal. A low viscosity before cure makes injection molding into complex shapes easier than

with either organic polymers or glass. This may help reduce manufacturing costs and cycle times in injection molding and potentially reduce system costs for LED-illuminated lamps and luminaires. Innovative designs, not currently feasible with other known commercial products, are now possible. Meaning that optical and mechanical designers can be more creative than ever. Compared to many organic materials, the chemical backbone of silicones makes them particularly well-suited to manage the increasingly high temperatures of today's and

tomorrow's LED lighting systems. The moldable optical silicones feature outstanding heat resistance—currently up to 150 °C, and pushing toward 200 °C. The highly transparent potting material can be used to encapsulate LEDs and protect them from moisture and dust. The elasticity of the material can absorb mechanical stresses to ensure a long lifetime of the LEDs.



Transparent secondary optics

Materials	Properties	Refractive index	Transmission (% @450nm, 3.2mm)	CTE (ppm/°C)	Viscosity	Durometer	Dielectric strength (kV/mm)	Tensile strength (Mpa)	Elongation (%)	Packaging
Dow Corning® MS-1001	Silicone • 2-Part • 1:1 • transparent	1.41	93	250	14,000	87 Shore A	29	12	50	Kits : 1 kg • 36 kg
Dow Corning® MS-1002	Silicone • 2-Part • 1:1 • transparent	1.41	91	275	26,250	74 Shore A	19	11.2	80	Kits : 1 kg • 36 kg
Dow Corning® MS-1003	Silicone • 2-Part • 1:1 • transparent	1.41	92	325	42,250	52 Shore A	20	5.5	325	Kits : 1 kg • 36 kg

Translucent secondary optics

Materials	Properties	Refractive index	Transmission (% @450nm, 3.2mm)	CTE (ppm/°C)	Viscosity	Durometer	Dielectric strength (kV/mm)	Tensile strength (Mpa)	Elongation (%)	Packaging
Dow Corning® MS-0002	Silicone • 2-Part • 1:1 • translucent	1.41	75,1	280	147,000	65 Shore A	19,7	9,03	270	Kits : 40 kg • 410 kg

Reflector

Materials	Properties	Reflectance (% @450nm)	CTE (ppm/°C)	Viscosity	Durometer	Dielectric strength (kV/mm)	Tensile strength (Mpa)	Elongation (%)	Packaging
Dow Corning® MS-2002	Silicone • 2-Part • 1:1 • White Reflector	97	210	650,000	84 Shore A	20.7	8.6	65	Kits : 1 kg • 44 kg

White reflective coating

Materials	Properties	Reflectance (% @127µm)	Viscosity	Durometer	Tack free time	Polymerization	Dielectric strength (kV/mm)	Temperature Range	Packaging
Dow Corning® CI-2001	Silicone • 1 part • UL 94 V-0	96	1 500	80 Shore A	10 min	RTV	25	-45 to +200°C	Can : 0.5 kg Pails : 3.4 kg • 15 kg

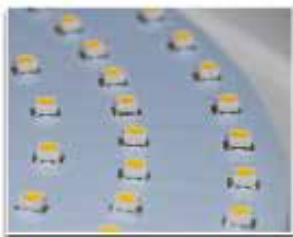
Encapsulants

Materials	Properties	Color	Viscosity (mPa.s)	Durometer	Refractive index @ 633 nm	Working Time/ pot life	Cure time	Dielectric strength (kV/mm)	Elongation (%)	Packaging
Dow Corning® EI-1184	Silicone • 2-Part • 1:1 • UL 94-V1 • Mil Spec • RTI150	Transparent	5 300	61 Shore A	1.42	24 min	4 h @25°C 70 min @50°C < 5 min @100°C	19	55	Kits : 1 kg • 36 kg • 360 kg
Dow Corning® Sylgard 182	Silicone • 2-Part • 10:1 • UL 94 V-1 • RTI150	Transparent	4 575	51 Shore A	1.41	8h	336h @25°C 75 min @100°C 20 min @150°C	19	105	Kits: 0.5 kg • 1.1 kg • 5.5 kg • 19.9 kg • 204.1 kg
Dow Corning® Sylgard 184	Silicone • 2-Part • 10:1 • UL94V-0 • Mil Spec • RTI150	Transparent	3 500	43 Shore A	1.42	1.5h	48h @25°C 35 min @100°C 10 min @150°C	19	120	Kits: 0.5 kg • 1.1 kg • 5.5 kg • 22 kg • 224.5 kg



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