



Consumer Solutions

# Dow Solutions for Lamp & Luminaire Assembly

**DOWSIL™**

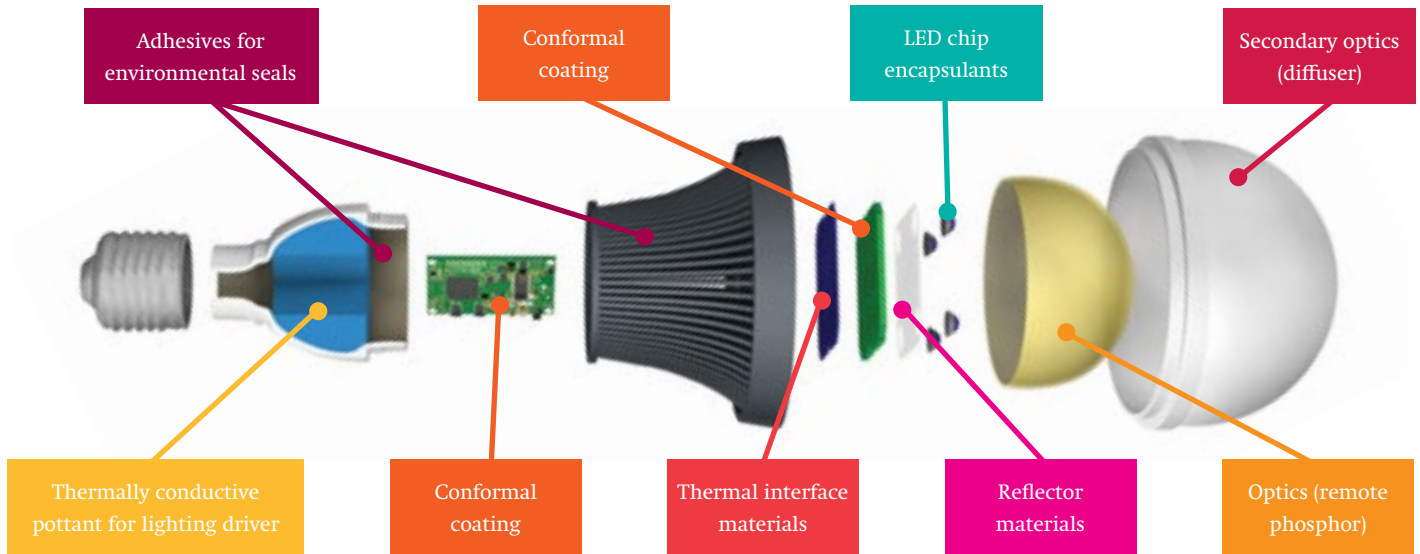


# Dow Solutions for Lighting Assembly

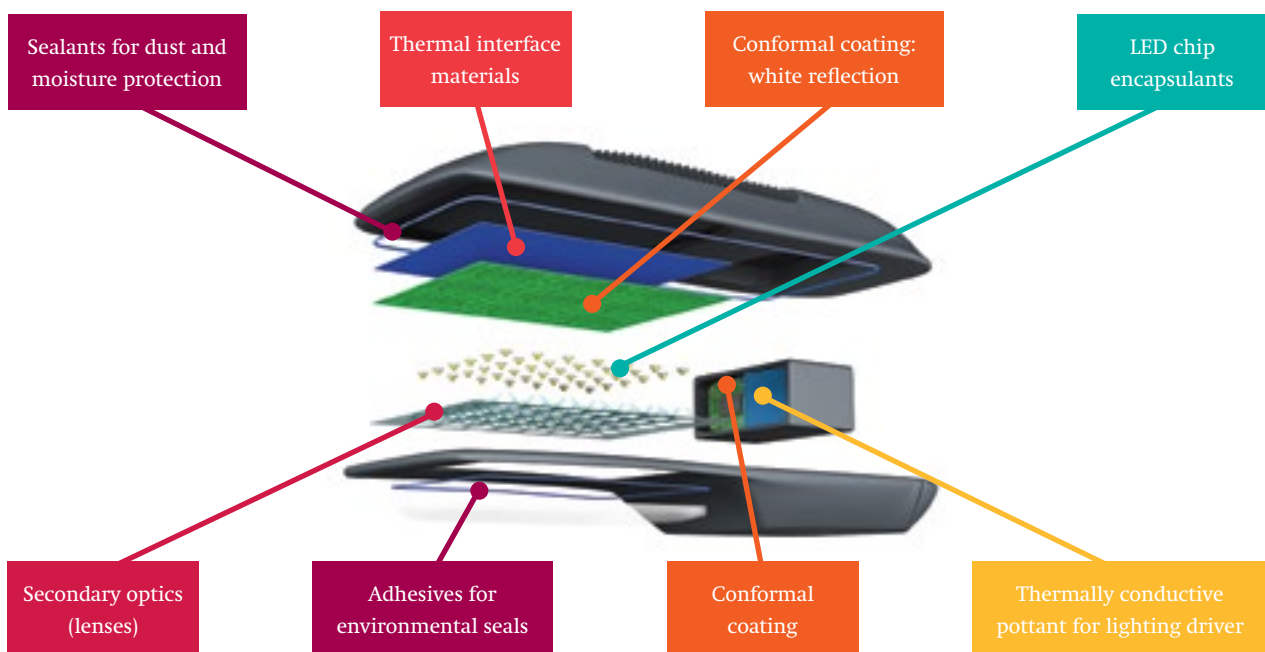
With more than 70 years of experience developing silicone-based solutions for cutting-edge applications, Dow offers today's LED industry unmatched experience and know-how for LED lamp and luminaire assembly. We bring more than just an industry-leading portfolio of assembly materials – such as thermal pottants, thermal interface materials, adhesives and sealants, and conformal

coatings. As a dedicated innovation partner, we also bring proven process and application expertise, a reliable global supply base, and world-class customer service. If your application involves the manufacture, assembly, protection or enhancement of LED lighting devices, you will likely find with Dow a materials or process solution tailored to your needs.

## Dow Silicone Solutions for LED Lamp Assembly



## Dow Silicone Solutions for LED Luminaire Assembly

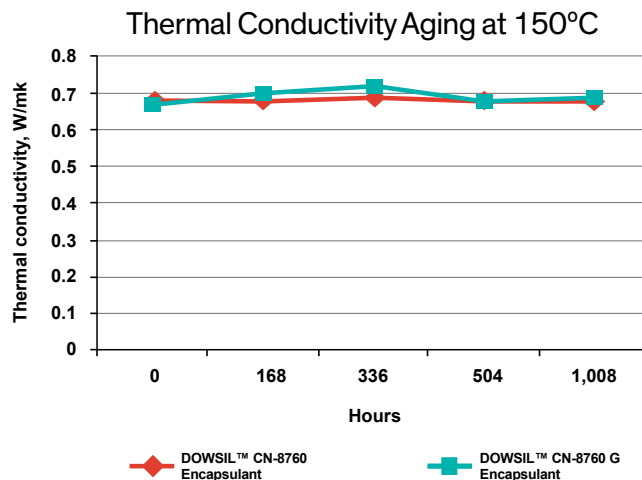


## Thermal Pottants

Our 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 relative thermal indexes 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.



Key Properties	Units	SYLGARD™ 160 Silicone Elastomer	SYLGARD™ 164 Silicone Elastomer	SYLGARD™ 170 Silicone Elastomer	DOWSIL™ CN-8760G Encapsulant	DOWSIL™ CN-8760 Encapsulant
One- or Two-Part		Two	Two	Two	Two	Two
Mix Ratio		1:1	1:1	1:1	1:1	1:1
Color		Dark Gray to Black	Gray	Dark Gray to Black	Gray	Dark Gray
Viscosity (Part A)	cP	8,100	8,925	2,675	2,900	2,825
Viscosity (Part B)	cP	3,950	9,175	1,425	3,200	2,875
Viscosity (Mixed)	cP	6,025	–	2,050	3,200	2,850
Specific Gravity		A: 1.61 B: 1.61	A: 1.58 B: 1.57	A: 1.34 B: 1.37	1.58	1.6
Working Time at 25°C	minutes	20	–	15	100	100
Cure Time		24 hours (25°C) 4 minutes (100°C)	36 minutes (25°C)	24 hours (25°C) 45 minutes (50°C) 10 minutes (100°C)	24 hours (25°C) 30 minutes (60°C)	45 minutes (50°C)
Tensile Strength	MPa	4.2	–	2.9	1.8	2.8
Elongation	%	105	–	165	85	95
Durometer, Shore A		56	61	50	45	49
Dielectric Strength	kV/mm	19	19	18	24	26
Volume Resistivity	ohm*cm	5.6E+14	1.1E+13	2.67E+15	1.00E+16	>1E+16
Dielectric Constant at 100 kHz		3.45	3.28	3.16	2.66	3.713
Dissipation Factor at 100 kHz		0.00118	0.0009	0.00077	0.06	0.0037
Thermal Conductivity	W/mK	0.62	0.64	0.48	0.67	0.65
Agency Listing		UL94 V-0	UL94 V-0	UL94 V-0 Mil Spec	UL94 V-0	UL94 V-0
RTI		105	105	170	150	105

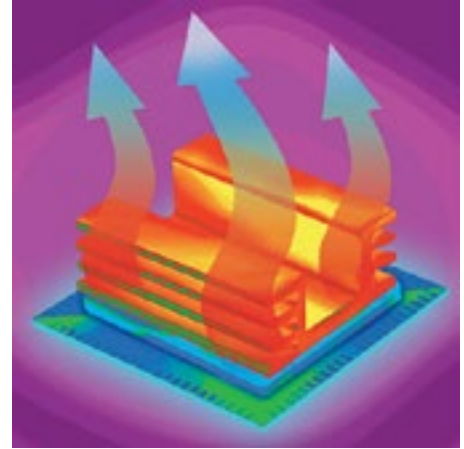


## Thermal Interface Materials

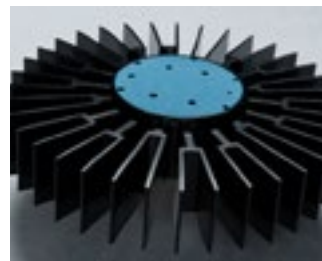
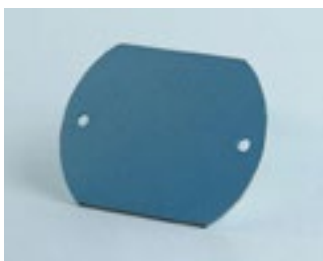
Our broad portfolio of thermal interface materials offers versatile heat management options for virtually every LED lamp and luminaire design.

- **Thermal Adhesives** form strong thermally stable bonds to most LED printed circuit board substrates (e.g., ceramic, MCPCB and FR4) and deliver excellent thermal conductivity. Our materials cure at room temperature, with accelerated heat cure options for flexible processing. Their low volatility means no adverse impact on light output.

- **Thermal Greases** enable very thin bond lines and fill tight gaps to ensure durable thermal management and long-term reliability of LED devices.
- **Dispensable Thermal Pads** enable quick and precise 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. Plus, they may offer longer reliability compared to conventional thermal greases.

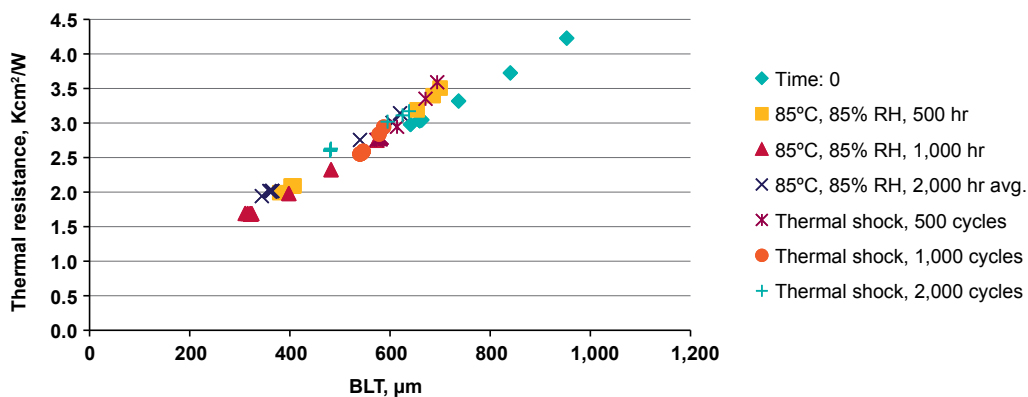


Key Properties	Units	THERMAL ADHESIVES				
		DOWSIL™ SE 4485 Thermally Conductive Adhesive	DOWSIL™ SE 4485 L Thermally Conductive Adhesive	DOWSIL™ SE 4486 Thermally Conductive Adhesive	DOWSIL™ SE 4420 RTV Sealant	DOWSIL™ EA-9189 H White RTV Adhesive
One- or Two-Part		One	One	One	One	One
Color		White	White	White	White	White
Viscosity	cP	230,000	150,000	20,000	108,000	Paste
Tack-Free Time at 25°C	minutes	12	5	4	8	3
Specific Gravity		2.9	2.85	2.59	2.26	1.6
Durometer, Shore A		91	89	80	77	78
Tensile Strength	MPa	3.7	5.1	4.1	4.4	5.6
Elongation	%	–	20	45	75	40
Unprimed Adhesion – Lap Shear	MPa	2 (Glass)	2.7 (Glass)	2.4 (Glass)	2.7 (AL)	2.5 (AL) 3 (FR4) 1.2 (PC) 1.7 (Copper)
Thermal Conductivity	W/mK	2.8	2.2	1.59	0.92	0.88
Dielectric Strength	kV/mm	19	38	20	28	24
Dielectric Constant at 1 MHz		5.6	4.4	4.8	4.1	2.91
Dissipation Factor at 1 MHz		5.00E-03	2.00E-03	3.00E-03	2.00E-03	0.0082
Volume Resistivity	ohm*cm	8.00E+14	1.00E+14	2.00E+14	1.00E+15	1.93E+16
Content of Low-Molecular Siloxane (D4-D10)	ppm	10	10	10	N/A	N/A
Agency Listing		UL94 V-0	N/A	N/A	N/A	UL94 V-0



Key Properties	Units	THERMAL GREASES			DISPENSABLE THERMAL PADS			
		DOWSIL™ TC-5625 Thermally Conductive Compound	DOWSIL™ TC-5080 Thermal Grease	DOWSIL™ SC 102 Compound	DOWSIL™ TC-4025 Dispensable Thermal Pad	DOWSIL™ TC-4026 Dispensable Thermal Pad	DOWSIL™ TC-4015 Dispensable Thermal Pad	DOWSIL™ TC-4016 Dispensable Thermal Pad
One- or Two-Part		One	One	One	Two	Two	Two	Two
Mix Ratio		N/A	N/A	N/A	1:1	1:1	1:1	1:1
Viscosity	cP	102,125	836,000	29,000	A: 73,000 B: 74,000	A: 73,000 B: 74,000	A: 104,000 B: 124,000	A: 104,000 B: 124,000
Mixed Viscosity	cP	N/A	N/A	N/A	70,000	70,000	103,000	103,000
Color		Gray	White	White	Blue	Blue	Blue	Blue
Bleed	%	–	<0.01	0.14	N/A	N/A	N/A	N/A
Specific Gravity		4.2	2.16	2.4	2.83	2.83	2.6063	2.6063
Working Time at 25°C	hours	N/A	N/A	N/A	>3	>3	4	4
Cure Time at 25°C	hours	N/A	N/A	N/A	24	24	24	24
Heat Cure Time	minutes	N/A	N/A	N/A	40 @ 75°C 15 @ 100°C 10 @ 120°C	40 @ 75°C 15 @ 100°C 10 @ 120°C	48 @ 75°C 16 @ 100°C 10 @ 120°C	48 @ 75°C 16 @ 100°C 10 @ 120°C
Durometer, Shore 00		N/A	N/A	N/A	50	50	50	50
Elongation	%	N/A	N/A	N/A	209	209	262	262
Thermal Conductivity	W/mK	2.5	1	0.9	2.5	2.5	1.71	1.71
Thermal Resistance at 40 psi	°C*cm²/W	0.1	0.25	0.62	N/A	N/A	N/A	N/A
Dielectric Strength	kV/mm	3	9	2	18	18	18	18
Dielectric Constant		19.61 (1 kHz)	–	4 (50 Hz)	6.4 (100 kHz)	6.4 (100 kHz)	5.78	5.78
Dissipation Factor		0.0415 (1 kHz)	–	0.02 (50 Hz)	0.001 (100 kHz)	0.001 (100 kHz)	0.002 (100 kHz)	0.002 (100 kHz)
Volume Resistivity	ohm*cm	1.22E+12	2.89E+15	2.00E+16	3.90E+12	3.90E+12	5.18E+12	5.18E+12
Agency Listing		N/A	UL94 V-0	N/A	UL94 V-0	UL94 V-0	UL94 V-0	UL94 V-0

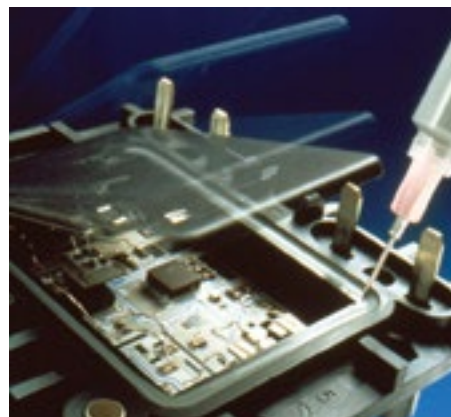
Reliability Test of DOWSIL™ TC-4025 Dispensable Thermal Pad



Compared with Time: 0 testing at any BLT condition, thermal resistance of DOWSIL™ TC-4025 Dispensable Thermal Pad remains stable after reliability testing (500, 1,000 and 2,000 hours at 85°C/85% RH and 500, 1,000 and 2,000 cycles of thermal shock at -40 to ~125°C).

## Adhesives & Sealants

Thermal silicone adhesives and sealants from Dow 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.



Key Properties	Units	DOWSIL™ EA-9189 H White RTV Adhesive	DOWSIL™ EA-4900 White RTV Adhesive	DOWSIL™ 3-1944 RTV Coating
One- or Two-Part		One	One	One
Color		White	White	Translucent
Viscosity	cP	Paste	Paste	63,775
Tack-Free Time at 25°C	minutes	3	6	14
Specific Gravity		1.6	1.65	1.03
Durometer, Shore A		78	81	36
Tensile Strength	MPa	5.6	4.1	2.2
Elongation	%	40	33	145
Unprimed Adhesion – Lap Shear	MPa	2.5 (AL) 3 (FR4) 1.2 (PC) 1.7 (Copper)	1.1 (AL) 2 (FR4) 0.9 (PC) 1.6 (Copper)	3 (N/cm) 180° Peel Strength
Thermal Conductivity	W/mK	0.88	N/A	N/A
Dielectric Strength	kV/mm	24	25	21
Dielectric Constant at 100 kHz		2.91	3.93	2.73
Dissipation Factor at 100 kHz		0.0082	0.007	<0.0002
Volume Resistivity	ohm*cm	1.93E+16	1.03E+15	1.6E+15
Content of Low-Molecular Siloxane (D4-D10)	ppm	N/A	<300	N/A
Agency Listing		UL94 V-0	UL94 V-0	UL94 V-0 Mil I-46058C

## Conformal Coatings

Our silicone conformal coatings protect delicate LED electronics from humidity, moisture and thermal stress, and they deliver excellent insulation against high voltages and short circuits. Free of solvents, these environmentally friendly materials minimize processing costs by eliminating the need for special storage, handling and ventilation. Available in a variety of viscosities and cure chemistries, they provide excellent unprimed adhesion to many common LED materials.



Key Properties	Units	DOWSIL™ 1-2577 Low VOC Conformal Coating	DOWSIL™ 1-2620 Low VOC Conformal Coating	DOWSIL™ 1-4105 Conformal Coating	DOWSIL™ 3-1953 Conformal Coating
One- or Two-Part		One	One	One	One
Color		Transparent	Transparent	Clear	Translucent
Viscosity	cP	1,050	350	450	350
NVC (Nonvolatile Content)	%	33.6	33.6	98	99.4
Specific Gravity		1.12	1.12	0.97	0.99
Tack-Free Time at 25°C	minutes	6	5	N/A	8
Tack-Free Time at 60°C/15% RH	minutes	1.5	1	N/A	0.5
Heat Cure Time at 100°C	minutes	N/A	N/A	5	N/A
Durometer		25 (Shore D)	25 (Shore D)	64 (Shore 00)	34 (Shore A)
Dielectric Strength	kV/mm	13	16	20	17
Volume Resistivity	ohm*cm	1.90E+14	1.05E+15	2.7E+13	5.5E+15
Dielectric Constant at 100 kHz		2.33	2.48	2.63	—
Dissipation Factor at 100 kHz		0.0003	0.004	<0.0002	<0.0002
Agency Listing		IPC-CC-830B, UL 746E	IPC-CC-830B, UL746E	UL746E	IPC-CC-830B, UL746E
UL Flammability Classification		UL94 V-0	UL94 V-0	UL94 V-1	UL94 V-0
Mil Specification		46058C Amend. 7	46058C Amend. 7	N/A	46058C Amend. 7

## How can we help you today?

Tell us about your performance, design and manufacturing challenges. Let us put our silicon-based materials expertise, application knowledge and processing experience to work for you.

Dow has customer service teams, science and technology centers, application support teams, sales offices, and manufacturing sites around the globe. For more information about our materials and capabilities, visit [consumer.dow.com](http://consumer.dow.com).

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