

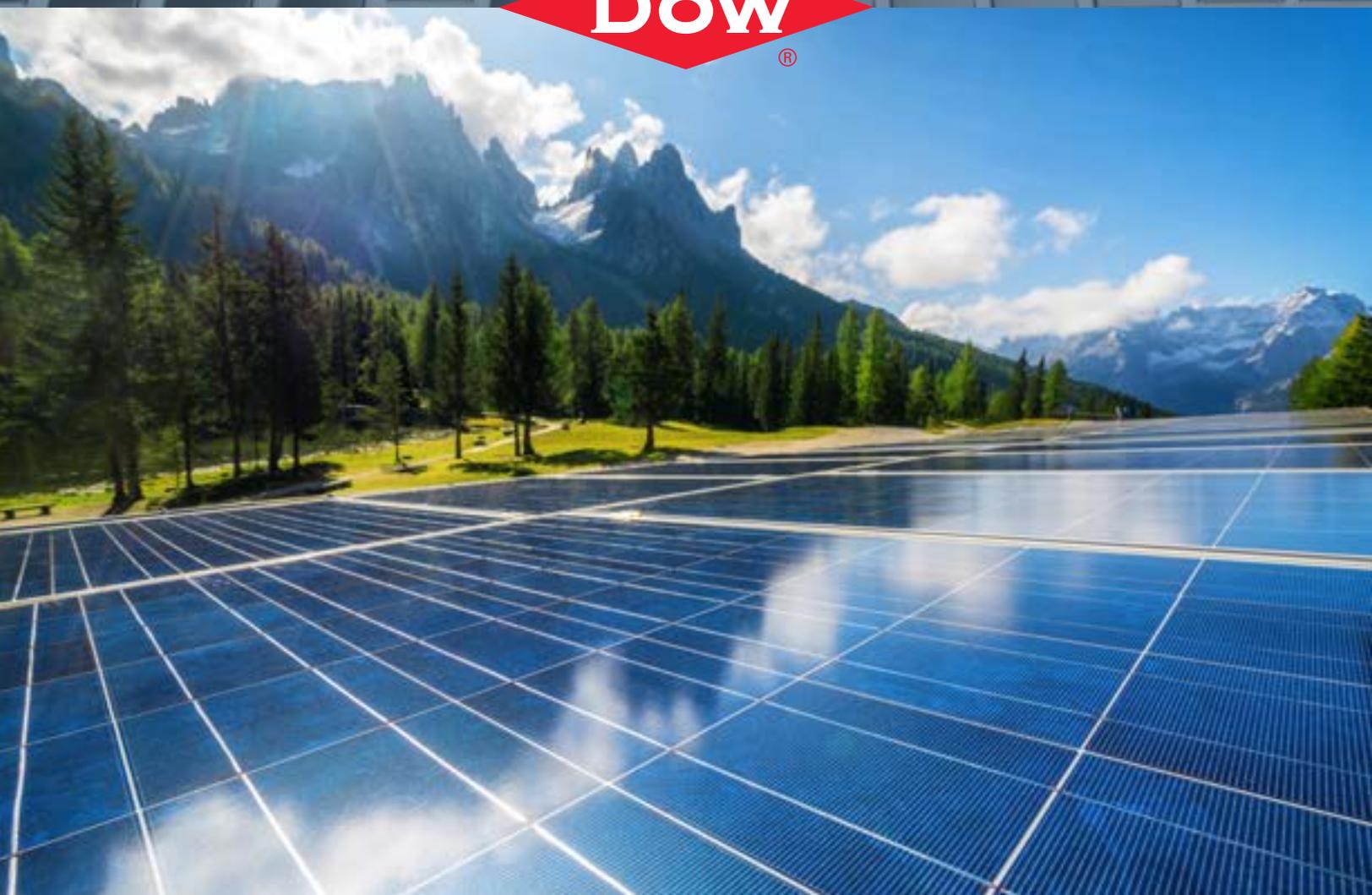
RENEWABLE ENERGY

# Dow materials for photovoltaics

The Dow logo is a red diamond shape with the word "DOW" in white, bold, sans-serif capital letters. A small registered trademark symbol (®) is located to the right of the diamond.

**DOW**

®



# Powering innovative solutions

## Materials for PV assembly and repair

As the global photovoltaic (PV) market continues to grow, the demand for durable, reliable and better performing solar modules is critical. Dow delivers a wide base of chemistries and technologies in high-performance materials – tested to meet the specific requirements of the solar industry – that help to create more reliable solar modules.

Built on more than 50 years of expertise, we are collaborating with leading solar companies to improve durability, longevity, and performance of photovoltaic systems. We understand that materials drive innovation and are helping to solve the challenges in module manufacturing by leveraging our silicone, polyolefin, and polyurethane chemistries. Our successful material technologies are enabling PV module manufacturers to explore novel and more efficient designs. The designs for tomorrow's renewable energy needs.

Offering encapsulants and potting for your electronic components, rail bonding, frame sealing and junction box adhesives, repair and protective coatings, and materials for optics, we can help to make your applications more efficient, and more reliable.

Let us help you create modules with longer service life and better reliability. Contact one of our solar materials experts, and let's work together to make the global expansion of solar needed for the world's energy transition a reality.



Product	Consistency as supplied
<b>Solar cell encapsulant</b>	
DOWSIL™ PV-6326 Solar Cell Encapsulation Silicone	Liquid
<a href="#">ENGAGE™ PV 8660 Polyolefin Elastomer</a>	Solid pellet
<a href="#">ENGAGE™ PV 8669 Polyolefin Elastomer</a>	Solid pellet
ENGAGE™ PV 8680 Polyolefin Elastomer	Solid pellet
ENGAGE™ PV 8688 Polyolefin Elastomer	Solid pellet

<b>Junction box potting agent</b>	
<a href="#">DOWSIL™ PV-7326 Potting Agent</a>	Liquid

<b>Junction box adhesives, frame sealing</b>	
DOWSIL™ PV-8404 Fast Cure Bonding Adhesive	Paste - no slump
<a href="#">DOWSIL™ PV-804 Neutral Sealant</a>	Paste - no slump

<b>Rail bonding, junction box bonding, frame sealing</b>	
<a href="#">DOWSIL™ PV-8301 Fast Cure Sealant</a>	Paste - no slump
DOWSIL™ PV-8303 Ultra Fast Cure Sealant	Paste - no slump

<b>BIPV Structural glazing</b>	
<a href="#">DOWSIL™ 993N Structural Glazing Sealant</a>	Paste - no slump
<a href="#">DOWSIL™ 993 Structural Glazing Sealant</a>	Paste - no slump
<a href="#">DOWSIL™ 994 Ultra Fast Bonding Sealant</a>	Paste - no slump
<a href="#">DOWSIL™ 983 Structural Glazing Sealant</a>	Paste - no slump

<b>Backsheet repair coating</b>	
<a href="#">DOWSIL™ 7094 Flowable Sealant</a>	Viscous liquid

Product	Solvent
<b>Backsheet lamination adhesives</b>	
ADCOTE™ A 3302-E Solvent-Borne Adhesive	MEK
ADCOTE™ A 3302E EA Solvent-Borne Adhesive	Ethyl acetate
ADCOTE™ 503R Solvent-Borne Adhesive	MEK

Silicone	Polyolefin	Polyurethane	Curing Agent
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These are typical properties, not to be construed as specifications.

Viscosity or melt index	1- or 2-part	Cure system	Relative density (mixed)	Cure time/temperature	Color or transparent	Hardness Shore A (*Shore 00)	UL ratings
2800 mPa·s	2	Condensation	0.97	Gel time 9 hours at 23°C	Transparent	10	UL 94: HB UL 746B: RTI 105 UL 746C: Outdoor UV/H20 f2
5 dg/min	N/A	Peroxide	0.872		Transparent	66	
14 dg/min	N/A	Peroxide	0.873		Transparent	68	
5 dg/min	N/A	Peroxide	0.872		Transparent	66	
14 dg/min	N/A	Peroxide	0.873		Transparent	68	

3300 mPa·s	2	Condensation	1.42	Working time 7.6 min at 25°C Full cure time 75 hours at 25°C	White	37	UL 94: V0 UL 746A: HWI PLC2, HAI PLC0, CTI PLC0, UL746B: RTI 105
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	2	Condensation	1.34	Snap time 5 min at 25°C Tack-free time 16 min at 25°C	Black	40	UL94: HB (1mm), V-1 (5mm) UL746A: CTI PLC0 UL746B: RTI 105
	1	Condensation	1.4	Tack-free time 30 min at 23°C 24 hours for each 2mm at 23°C	Black or White	39	UL 94: HB UL746A: HWI (5mm) PLC2, HAI (5mm) PLC0, CTI PLC1 UL 746B: RTI Elec 140, RTI Imp 105, RTI Str 115; UL 746C Outdoor UV/H20 f2

76000 mPa·s	2	Addition	1.31	Snap time 20-25 min at 25°C Full cure 8 hours at 25°C	Black	38-44	UL 94: HB UL 746A: HWI PLC3, HAI PLC0, CTI PLC0; UL 746B: RTI 105 UL 746C: Outdoor UV/H20 f2
350000 mPa·s	2	Addition	1.31	Snap time 8-10 min at 25°C Full cure 2.5 hours at 25°C	Black	38-44	UL 94: HB UL746A: HWI PLC2, HAI PLC3, CTI PLC0 UL746B: RTI 105

40000 mPa·s	2	Condensation	1.34	Snap time 20-60 min at 25°C	Black	39	
40000 mPa·s	2	Condensation	1.30	Working time 10-30 min Tack-free time 80-100 min at 25°C	Black	40	UL94: HB UL746A: HWI PLC2, HAI PLC0, CTI PLC0 UL746B: RTI 105
	2	Condensation	1.30	Tack-free time 5-18 min	Black	45	
40000 mPa·s	2	Condensation	1.30	Working time 10-25 min	Black	35-45	

28000 mPa·s	1	Condensation	1.30	Tack-free time 50 min at 23°C	White	19	UL94: HB UL746B: RTI 105
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Viscosity at 25°C (mPa·s)	Solid Content (%)	Curing Agent Name	Solvent	Viscosity at 25°C (mPa·s)	Solid Content (%)	Mix Ratio <sup>3</sup>	Suggested Curing Conditions
500	45	DOW™ CR 865 <sup>1</sup>	Ethyl acetate	400	75	100:10	6 days at 35°C <sup>1</sup>
900							
2400	51	DOW™ CR 865B <sup>2</sup>				100:20	3 days at 35°C <sup>2</sup>

<sup>1</sup> When DOW™ CR 865 is used as a curing agent, the suggested curing condition is 6 days at 35°C

<sup>2</sup> When DOW™ CR 865B is used as a curing agent, the suggested curing condition is 3 days at 35°C

<sup>3</sup> Mixing ratios of 100:10 apply only to ADCOTE™ A 3302-E and ADCOTE™ A 3302E EA. Mixing ratio of 100:20 only applies to ADCOTE™ 503R.

## Maximize reliable power conversion

From the solar panel's DC output a solar energy system requires high-performance, dependable components to reliably optimize and convert the energy to be used or stored. Advanced silicone materials allow enhanced warranties for the industry, based on their excellent aging resistance, under a wide range of harsh environments that outdoor devices can be exposed to during their lifetime. Our advanced adhesive, protective encapsulant and thermal management options protect outdoor electronics from environmental impacts, remove heat to raise performance efficiency, and offer long lifetime for solar power systems.

Solar power inverters used on strings of PV modules allow the energy harnessed to be converted into a useful form in order to return to the grid, be stored in a battery, or be used by the consumer.

Power optimizers and microinverters increase efficiency by mitigating power loss as a result of modules mismatch and allow more flexibility in solar installations.

Dow has multiple approved and demonstrated technologies to protect these important conversion devices, including thermal and gasketing options.



Product	Consistency as supplied	Viscosity (mPa.s)
<b>Thermal management</b>		
<a href="#">DOWSIL™ TC-8225 Thermally Conductive Gap Filler</a>	Paste - no slump	200000
<a href="#">DOWSIL™ TC-4551 CV Thermally Conductive Gap Filler</a>	Paste - no slump	250000
DOWSIL™ TC-8335 Thermal Gel	Paste - no slump	260000
<a href="#">DOWSIL™ TC-5150 Thermally Conductive Gap Filler</a>	Paste - no slump	2360000
<b>PCB protection coatings</b>		
DOWSIL™ EA-9187 LH Conformal Coating	Liquid	440
<a href="#">DOWSIL™ EA-9187L UV Conformal Coating</a>	Liquid	900
<a href="#">DOWSIL™ 1-2577 Conformal Coating</a>	Liquid	950
<b>Electronics encapsulants</b>		
<a href="#">DOWSIL™ EE-3200 Low Stress Silicone Encapsulant</a>	Liquid	1700
<a href="#">DOWSIL™ CN-8760 Thermally Conductive Encapsulant</a>	Liquid	2700
<a href="#">DOWSIL™ TC-6015 Thermally Conductive Encapsulant</a>	Liquid	4000
<b>Power conversion assembly adhesives and sealants</b>		
<a href="#">DOWSIL™ EA-3838 Fast Adhesive</a>	Paste - no slump	150000
<a href="#">DOWSIL™ PV-804 Neutral Sealant</a>	Paste - no slump	
<b>Electrically conductive adhesive</b>		
<a href="#">DOWSIL™ EC-8425 Electrically Conductive Adhesive</a>	Paste - no slump	400000



1- or 2-part	Cure system	Relative density (mixed)	Cure time/ temperature	Color or transparent	Hardness Shore A	Thermal conductivity (W/mK)	UL ratings
<b>Thermal management</b>							
2	Addition	2.9	2 hours at 25°C 10 min at 80°C	Blue	55 (shore 00)	2.7	UL 94: V0 UL746A: HWI PLC1, HAI PLC1, CTI PLC0 UL746B: RTI 150
2	Addition	3.3	2 hours at 25°C 15 min at 80°C	Blue	54 (shore 00)	5.2	UL 94: V0 UL746B: RTI 150
1	Addition	3.2	60 min at 60°C 10 min at 120°C	Pink	75 (shore 00)	4	
1	Non curing	3.47	NA	Blue	NA	5	
<b>PCB protection coatings</b>							
1	Condensation	0.98	Skin over time 7 min at 25°C	Clear	21		UL94: V0 (1.5mm laminate) UL746E indoor certified, RTI 130
1	Condensation	0.98	Skin over time 9 min at 25°C	Translucent	17		UL94: V0 (1.5mm laminate) UL746E indoor & outdoor certified, RTI 105
1	Condensation	1.11	Tack-free time 7 min at 25°C	Translucent	80		UL94: V0, 5VA UL746B: RTI 105 UL746E indoor & outdoor certified, RTI 130
<b>Electronics encapsulants</b>							
2	Addition	1.47	3 hours at 25°C 20 min at 50°C	Dark Grey	43 (shore 00)		UL94: V-0 UL746A: HWI PLC4, HAI PLC1, CTI PLC0 UL746B: RTI 150
2	Addition	1.6	40 min at 50°C	Dark Grey	55		UL94: V-0 UL746A: HWI PLC0, HAI PLC0, CTI PLC0 UL746B: RTI 150
2	Addition	2.25	3 hours at 25°C 30 min at 70°C	Grey	40		UL94: V-0 UL746A: HWI (1.5mm) PLC2, (3mm) PLC0, HAI PLC0, CTI PLC0 UL746B: RTI 150
<b>Power conversion assembly adhesives and sealants</b>							
2	Condensation	1.4	Tack-free time 5-8 min at 25°C (2:1 ratio) >0.5Mpa in 15 min	Black	40		UL94: V-1 (5mm) UL746A: CTI PLC0 UL746B: RTI 105
1	Condensation	1.4	Tack-free time 30 min at 23°C 24 hours for each 2mm at 23°C	Black or White	39		UL 94: HB UL746A: HWI (5mm) PLC2, HAI (5mm) PLC0, CTI PLC1 UL 746B: RTI Elec 140, RTI Imp 105, RTI Str 115 UL 746C: Outdoor UV/H20 f2
<b>Electrically conductive adhesive</b>							
1	Addition	2.2	90 min at 90°C 10 min at 150°C	Tan	40 (shore D)		

These are typical properties, not to be construed as specifications.





## Learn more

We bring more than just an industry-leading portfolio of advanced organic and 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 help to support your applications, visit [dow.com/solar](https://www.dow.com/solar) or contact your Dow representative.

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