

RENEWABLE ENERGY

Dow materials for photovoltaics

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Powering innovative solutions

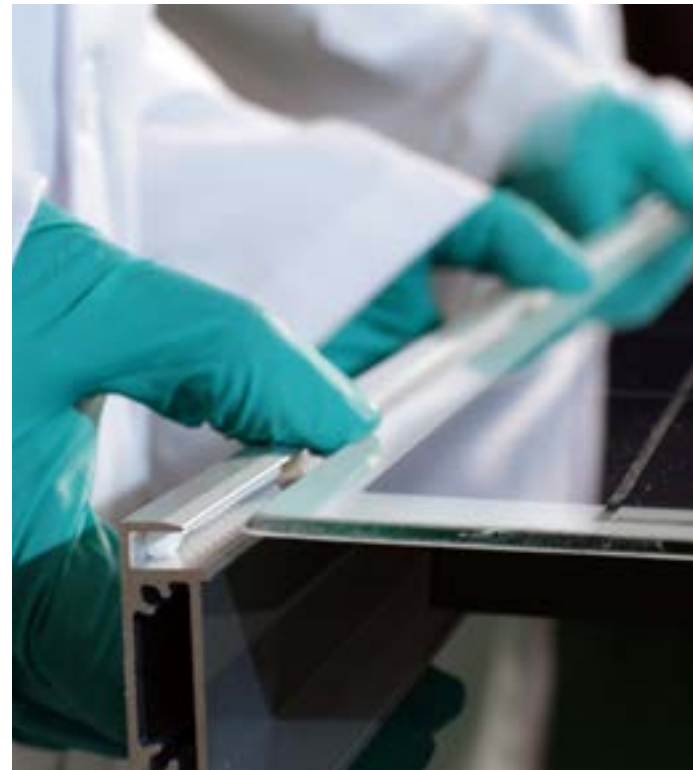
Materials for PV assembly and repair

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 |
|--|-------------------------|
| Solar cell encapsulant | |
| DOWSIL™ PV-6326 Solar Cell Encapsulation Silicone | Liquid |
| ENGAGETM PV 8660 Polyolefin Elastomer | Solid pellet |
| ENGAGETM PV 8669 Polyolefin Elastomer | Solid pellet |
| ENGAGETM PV 8680 Polyolefin Elastomer | Solid pellet |
| ENGAGETM PV 8688 Polyolefin Elastomer | Solid pellet |
| Junction box potting agent | |
| DOWSIL™ PV-7326 Potting Agent | Liquid |
| Junction box adhesives, frame sealing | |
| DOWSIL™ PV-8404 Fast Cure Bonding Adhesive | Paste - no slump |
| DOWSIL™ PV-804 Neutral Sealant | Paste - no slump |
| Rail bonding, junction box bonding, frame sealing | |
| DOWSIL™ PV-8301 Fast Cure Sealant | Paste - no slump |
| DOWSIL™ PV-8303 Ultra Fast Cure Sealant | Paste - no slump |

| 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 |
| | 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 |

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) |
|--|-------------------------|-------------------|
| Thermal management | | |
| DOWSIL™ TC-8225 Thermally Conductive Gap Filler | Paste - no slump | 200000 |
| DOWSIL™ TC-4551 CV Thermally Conductive Gap Filler | Paste - no slump | 250000 |
| DOWSIL™ TC-8335 Thermal Gel | Paste - no slump | 260000 |
| DOWSIL™ TC-5150 Thermally Conductive Gap Filler | Paste - no slump | 2360000 |
| PCB protection coatings | | |
| DOWSIL™ EA-9187 LH Conformal Coating | Liquid | 440 |
| DOWSIL™ EA-9187L UV Conformal Coating | Liquid | 900 |
| DOWSIL™ 1-2577 Conformal Coating | Liquid | 950 |
| Electronics encapsulants | | |
| DOWSIL™ EE-3200 Low Stress Silicone Encapsulant | Liquid | 1700 |
| DOWSIL™ CN-8760 Thermally Conductive Encapsulant | Liquid | 2700 |
| DOWSIL™ TC-6015 Thermally Conductive Encapsulant | Liquid | 4000 |
| Power conversion assembly adhesives and sealants | | |
| DOWSIL™ EA-3838 Fast Adhesive | Paste - no slump | 150000 |
| DOWSIL™ PV-804 Neutral Sealant | Paste - no slump | |
| Electrically conductive adhesive | | |
| DOWSIL™ EC-8425 Electrically Conductive Adhesive | 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 |
|---|--------------|--------------------------|---|----------------------|------------------|-----------------------------|--|
| Thermal management | | | | | | | |
| 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 | |
| PCB protection coatings | | | | | | | |
| 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 |
| Electronics encapsulants | | | | | | | |
| 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 |
| Power conversion assembly adhesives and sealants | | | | | | | |
| 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 |
| Electrically conductive adhesive | | | | | | | |
| 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 or contact your Dow representative.

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