



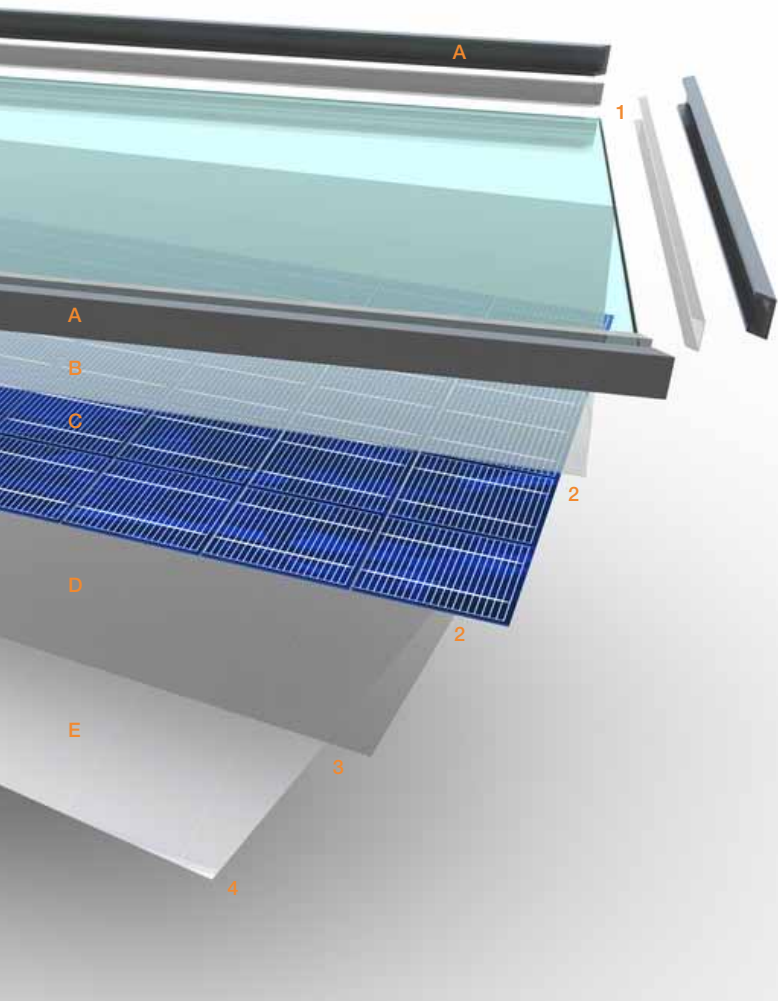
WACKER

CREATING TOMORROW'S SOLUTIONS

RENEWABLE ENERGIES | SOLAR

BEFORE THERE IS A SOLAR
PANEL – **THERE IS WACKER!**

Silicone – the Optimum Material
for a Solar Age



- A Aluminum frame
- B Glass
- C Solar-cell strings
- D Backsheet
- E Junction box with bypass diodes

- 1 Bonding of the system components (glass, lamination, solar cell and backsheet within the frame with ELASTOSIL® Solar)
- 2 Lamination of solar cells with TECTOSIL® encapsulation material or ELASTOSIL® Solar
- 3 ELASTOSIL® Solar for bonding
- 4 ELASTOSIL® Solar for potting

BONDING, ENCAPSULATING, MAKING PROGRESS POSSIBLE

The world needs energy. And the sun generates a plentiful supply of it free of charge. In an age of eco-friendly energy, photovoltaics (PV) therefore plays an increasingly important role. WACKER supports the globally expanding PV market by supplying high-quality and innovative silicone rubber grades.

Specifically developed for bonding and encapsulating solar cells, our silicone grades feature tailored properties. Exhibiting excellent weathering and radiation resistance, silicones are innovative products that meet the solar industry's every requirement. WACKER easily satisfies global demand, as well. After all, our silicones are available anytime around the world and can be easily customized to individual needs.

We Put Silicones in the Right Light

- Bonding solar assemblies into their frame
- Affixing junction boxes and other components
- Production of molded articles for optical applications
- Fixing solar cells to support structures
- Bonding cover glass to solar cells
- Ablative bonding for grounding of electrostatic charge
- Encapsulation of all kinds of electronic components with liquid silicones for their protection and insulation
- Encapsulation of PV cells with film material

Our "SILICONE RUBBER ADHESIVES FOR OUTER SPACE" brochure provides further information on possible uses of our adhesives in the satellite-construction and aerospace sectors. Discover the potential of our ELASTOSIL® S product line. Just contact us!

ELASTOSIL®, SEMICOSIL® and TECTOSIL® are registered trademarks of Wacker Chemie AG. Wacker Chemie AG is certified to ISO 9001 and ISO 14001.



APPROACH BONDING WITH THE RIGHT FRAME OF MIND

Fixing with ELASTOSIL® Solar

You won't find a better material to reliably bond photovoltaic components than ELASTOSIL® Solar. Our silicone rubber grades are ideal for bonding solar-cell laminates into an aluminum frame. High-performance silicones also come into their own whenever components such as junction boxes need to be fixed to a backing.

Effective Properties That Last

- Adhesion to typical substrates (glass, aluminum, Tedlar®, EVA etc.)
- Neutral crosslinking
- Long-term resistance to weathering and UV
- Easy processing

Product Solutions

- ELASTOSIL® Solar 1101
- ELASTOSIL® Solar 1105
- ELASTOSIL® Solar 1109
- ELASTOSIL® Solar 1200 with WACKER® Catalyst T77 or WACKER® Catalyst T78
- Further customized products on request

POTTING OF JUNCTION BOXES

Perfect Potting

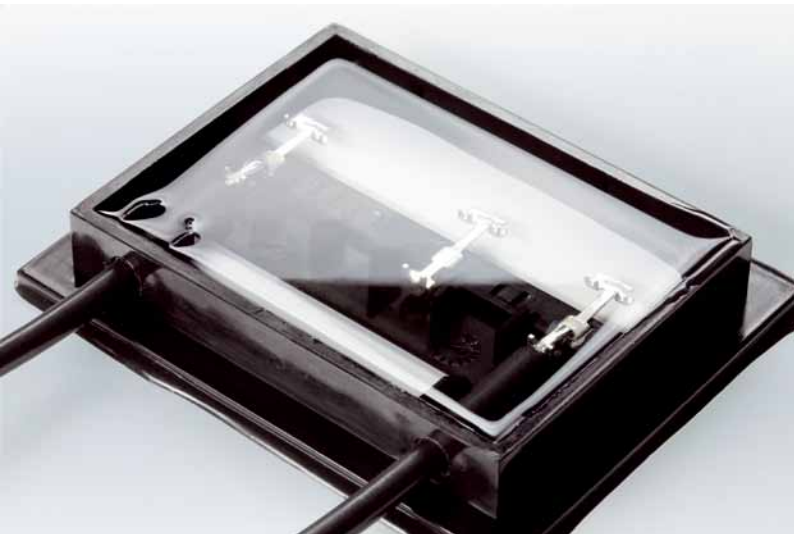
The potting of junction boxes housing electronic and electrical components requires reliable materials. You need look no further than ELASTOSIL® Solar, which exhibits low viscosity and rapid curing.

Properties for Potting

- Low viscosity
- Rapid curing
- Low modulus for reducing thermomechanical stress
- Protection of bypass diodes against moisture penetration

Product Solutions

- ELASTOSIL® Solar 2208, with WACKER® Catalyst T80
- ELASTOSIL® Solar 2209, with WACKER® Catalyst T80
- Further customized products on request



LONG-LASTING ENCAPSULATION WITH ELASTOSIL® LIQUID SILICONE

Transparent, Stable and Effective

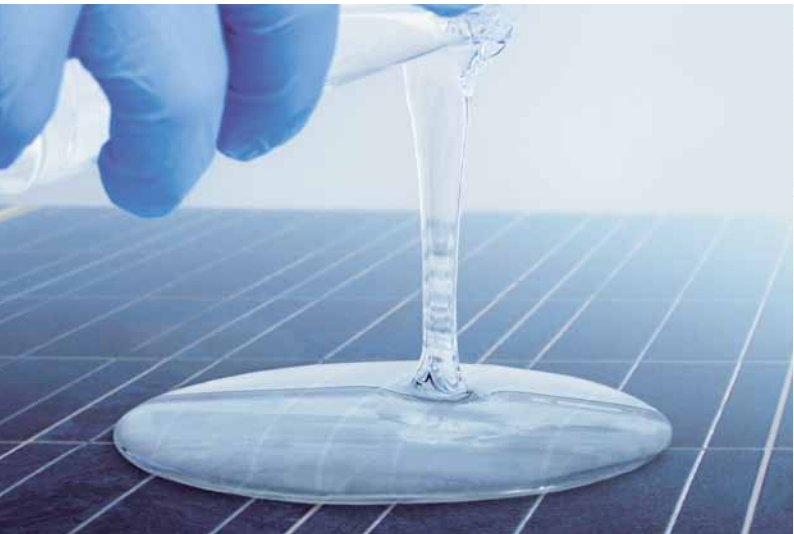
There are plenty of advantages to be had when using WACKER's silicones to encapsulate flexible and rigid solar modules. The main benefits include protection against weathering and UV radiation, as well as the silicones' high level of transparency.

A Host of Benefits

- Adhesion to typical substrates
- Very high transparency
- Rapid curing
- Long-term resistance to weathering and UV
- No yellowing

Product Solutions

- ELASTOSIL® Solar 2200
- ELASTOSIL® Solar 2202, ELASTOSIL® Solar 2203 with ELASTOSIL® CAT PT, CAT PT-F or Catalyst UV
- Further customized products on request



LONG-LASTING ENCAPSULATION WITH TECTOSIL® FILM

A Competitive Solution

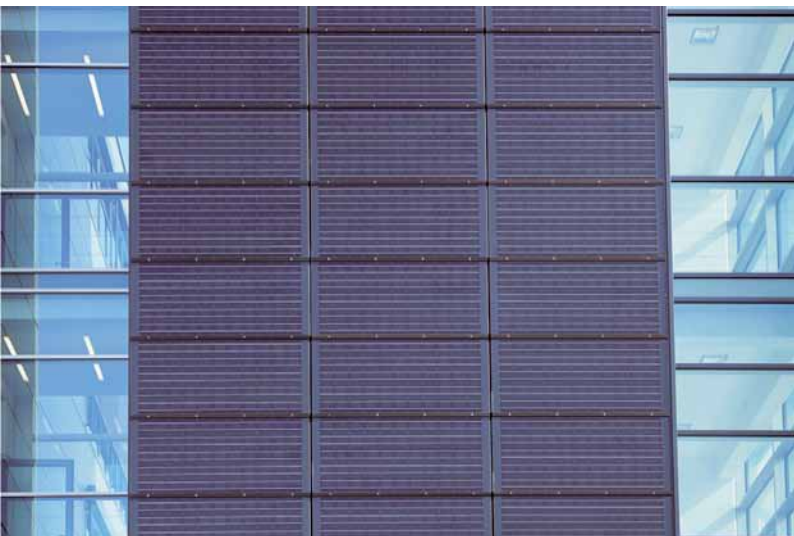
The best prerequisites for competing in the growing market for photovoltaics are improved module quality together with reduced processing costs. With TECTOSIL®, WACKER has developed an encapsulant that meets these requirements. TECTOSIL® ensures improved properties in all application areas.

Optimum Qualities

- Highly transparent
- Electrically insulating
- Low corrosive potential
- High module quality
- Optimized manufacturing process
- Non-chemical crosslinking permits module recycling
- Highly flexible material
- No yellowing

WACKER's Film Encapsulant

- TECTOSIL®





LENSES UNDER THE SPOTLIGHT

Efficient Innovations

Silicones from WACKER are innovative; a clear example of this is the the manufacture of SOG (silicone-on-glass) Fresnel lens systems. Silicone-based optical systems concentrate the light, thereby increasing efficiency.

An Overview of Specialty Applications

- Manufacture of primary (Fresnel) and secondary lenses in concentrator modules
- Injection-molded lenses and optical waveguides for optical coupling to reduce scattering losses

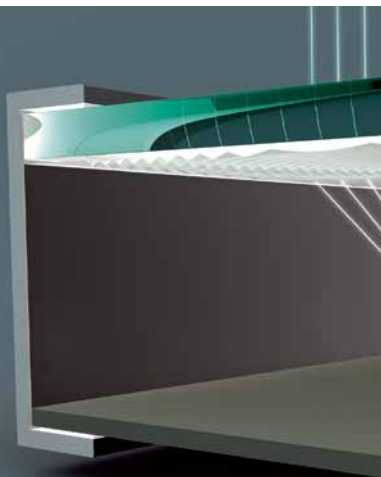
Properties That Endure

- Highly transparent
- Outstanding heat resistance
- Long-term stability to UV-A and UV-B
- No yellowing
- Rapid curing and fast demoldability
- Excellent fidelity of reproduction
- Lighter than glass

Product Solutions

- ELASTOSIL® Solar 3210
- ELASTOSIL® Solar 3201 with ELASTOSIL® CAT PT, ELASTOSIL® CAT PT-F or ELASTOSIL® CAT UV

- A Glass
- B Silicone fresnel lens
- C Secondary optical element
- D Solar cell



EFFICIENCY IN FOCUS

There is Much More Beyond Lense Replication

ELASTOSIL® Solar silicone elastomers make CPV module production efficient and reliable. This includes bonding applications for the module assembly and the secondary optical unit as well as an effective heat management of solar cells.

Specialty Applications

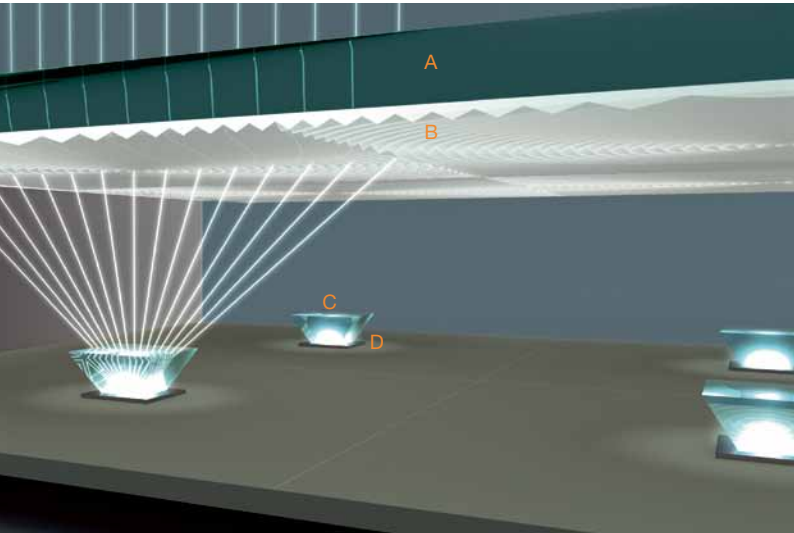
- Fixing the whole CPV assembly with its frame
- Bonding the secondary optical units to the solar cells
- Bonding high-efficiency (multiple junction) solar cells with their heat sink by means of thermally conductive glues

Properties

- Excellent adhesion to typical substrates (glass, aluminum, multiple junction cells etc.)
- Neutral crosslinking
- Long-term resistance to weathering and UV
- No yellowing
- Easy processing and rapid curing
- Outstanding heat resistance

Product Solutions

- ELASTOSIL® Solar 1200 with WACKER® Catalyst T77 or WACKER® Catalyst T78
- SEMICOSIL® 988/1K
- Customized thermally conductive products on request



FOCUS ON FACTS AND FIGURES

Product	Applications
ELASTOSIL® Solar 1101	General-purpose adhesive for frame bonding and fixing junction boxes
ELASTOSIL® Solar 1105	General-purpose adhesive for frame bonding and fixing junction boxes
ELASTOSIL® Solar 1109	General-purpose adhesive for frame bonding and fixing junction boxes
ELASTOSIL® Solar 1200	General-purpose adhesive for frame bonding and fixing junction boxes
ELASTOSIL® Solar 2200	Liquid silicone for roll-to-roll lamination of flexible solar modules
ELASTOSIL® Solar 2202	Liquid silicones for encapsulation of PV cells
ELASTOSIL® Solar 2203	Liquid silicones for encapsulation of PV cells
ELASTOSIL® Solar 2208	Potting of junction boxes
ELASTOSIL® Solar 2209	Potting of junction boxes
ELASTOSIL® Solar 3201	Encapsulant for producing optical molded parts
ELASTOSIL® Solar 3210	Encapsulant for producing optical molded parts
SEMICOSIL® 988/1K	Bonding of secondary optical unit
TECTOSIL® 177	Thermoplastic silicone sheet for encapsulation of PV cells

Please refer to our technical product data sheets for further details.

Grade	Brief Description
1-part silicone rubber; non-sag; room-temperature curing	Alkoxy-based neutral curing; self-adhesive; resistant to weathering and UV radiation; excellent reversion stability; electrically insulating; translucent
1-part silicone rubber; non-sag; room-temperature curing	Oxime-based curing; self-adhesive; resistant to weathering and UV radiation; excellent reversion stability; electrically insulating and flame-retardant; off-white
1-part silicone rubber; non-sag; room-temperature curing	Alkoxy-based neutral curing; tin-free; self-adhesive; resistant to weathering and UV radiation; excellent reversion stability; electrically insulating and flame-retardant; black and white
Condensation-curing 2-part silicone rubber; non-sag; room-temperature curing	Alkoxy-based, fast, neutral curing; self-adhesive with WACKER® Catalyst T77 or WACKER® Catalyst T78; resistant to weathering and UV radiation; excellent reversion stability; electrically insulating; black (white on request)
Flowable 2-part silicone rubber; fast cure at elevated temperature	Addition-curing; self-adhesive; resistant to weathering and UV radiation; electrically insulating; slightly opaque
Pourable 2-part silicone gel; room-temperature curing	Addition-curing; for crystal-clear, gelatinous cured products with very high transmission; excellent adhesion; resistant to weathering and UV radiation; electrically insulating
Pourable 2-part silicone gel; room-temperature curing	Addition-curing; for crystal-clear, gelatinous cured products with very high transmission; excellent adhesion with ELASTOSIL® CAT PT or ELASTOSIL® CAT PT-F; resistant to weathering and UV radiation; electrically insulating
Pourable 2-part silicone rubber; room-temperature curing	Alkoxy-based, filled, fast, neutral curing; self-adhesive with WACKER® Catalyst T78 or WACKER® Catalyst T80; resistant to weathering and UV radiation; electrically insulating
Pourable 2-part silicone rubber; room-temperature curing	Alkoxy-based, unfilled, fast, neutral curing; self-adhesive with WACKER® Catalyst T78 or WACKER® Catalyst T80; resistant to weathering and UV radiation; electrically insulating
Pourable 2-part silicone rubber; room-temperature curing	Addition-curing; self-adhesive on glass with ELASTOSIL® CAT PT, ELASTOSIL® CAT PT-F or ELASTOSIL® CAT UV; for crystal-clear cured products with very high transmission; medium Shore hardness; resistant to weathering and UV radiation; electrically insulating
Pourable 2-part silicone rubber; room-temperature curing	Addition-curing; for crystal-clear cured products with very high transmission; medium shore hardness; resistant to weathering and UV radiation; electrically insulating
1-part silicone rubber; non-sag; heat-curing	Addition-curing; self-adhesive; resistant to weathering and UV radiation; electrically insulating; slightly opaque
Thermoplastic silicone; non-curing	Thermoplastic sheet, non-curing; for crystal-clear products with very high transmission; excellent adhesion; resistant to weathering and UV radiation; electrically highly insulating, recyclable



WACKER

Wacker Chemie AG
Hanns-Seidel-Platz 4
81737 München, Germany
Tel. +49 89 6279-0
info@wacker.com

www.wacker.com/renewable

The data presented in this brochure are in accordance with the present state of our knowledge but do not absolve the user from carefully checking all supplies immediately on receipt. We reserve the right to alter product constants within the scope of technical progress or new developments. The recommendations made in this brochure should be checked by preliminary trials because of conditions during processing over which we have no control, especially where other companies' raw materials are also being used. The information provided by us does not absolve the user from the obligation of investigating the possibility of infringement of third parties' rights and, if necessary, clarifying the position. Recommendations for use do not constitute a warranty, either express or implied, of the fitness or suitability of the product for a particular purpose.