



SOLAR SOLUTIONS BONDED MOUNTING TECHNOLOGY

DURABLE BONDING OF PV MODULES TO MOUNTING SYSTEMS WITH Sikasil®

BUILDING TRUST



ADDED VALUE BY BONDING OF MODULES TO MOUNTING SYSTEMS

NOWADAYS PHOTOVOLTAIC MODULES are typically mounted to the subconstruction by clips, frames and screws or other mechanical devices. This system is not only very labour and time consuming in the field but also in terms of small parts handling. In addition to this, the failure rate in wrong or over-tightened fixing can cause glass breakage or damage in the cells. Furthermore, savings in materials can be achieved by moving from frames to a bonded frameless mounting solution. As the industry is currently striving to reduce costs and improve long-term performance, the bonding of modules to structures in production or on-site is the reasonable way forward.

KEY SYSTEM BENEFITS

Reduced costs in production and installation

- Savings in costs of up to 15% compared to common framing and installation systems
- Reduced installation time on-site of up to 40%
- Savings in backrail material of up to 15% compared to tape solutions
- Elimination of electrical grounding
- Minimized material handling compared to clamping
- Value added by mounting integration, new designs for BIPV and architectural appeal

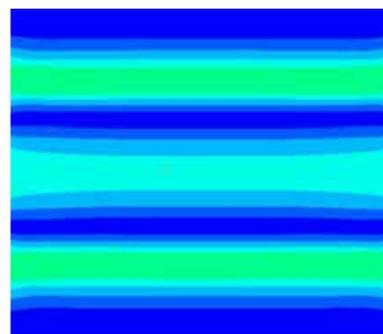
Increased durability and performance

- Reduced glass breakage by elimination of stress peaks
- Minimized micro cracks on cells due to stress distribution imply higher yield over service life
- Elimination of raised edges from frames that trap dirt, snow or water which harm the laminate and reduce the power output
- Structurally bonded with an adhesive technology which meets stringent durability requirements
- Simplified tolerance compensation of bonded components

ELIMINATION OF STRESS PEAKS

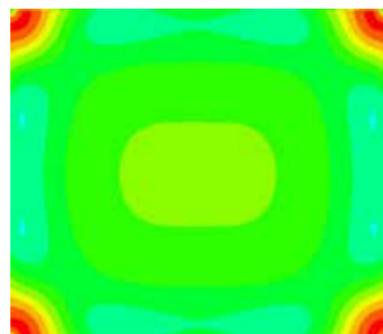
Illustrations show FEM calculation with a load of 1.8 kN/m². Red colour indicates the highest and dark blue the lowest stresses on the module/glass.

Frameless Module
Bonded linear fixation

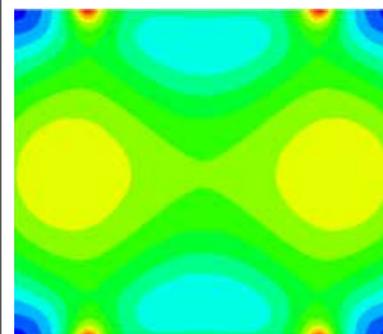


- Homogeneous stress distribution
- Reduced stress by up to 60%
- Minimizes risk of cracks
- Damping of dynamic loads
- Less deflection under load by up to 85%

Framed Module
Fixed with clamps



Frameless Module
Fixed with clamps



SUITABLE IN PRODUCTION AND ON-SITE

SIKA'S PROVEN TECHNOLOGY and comprehensive project support enable to take advantage of the bonding solution in production and on-site. To achieve optimized processes and output in production while bonding the rails to modules, fast curing two-part silicones show clear benefits. For applications in the field, the ease of use in manual application one-part products show their preference. The most beneficial solution to serve your demands is greatest evaluated in trusted cooperation.

BONDING MODULES TO RACKING SYSTEMS ON-SITE

Best recommended Sika products

Sikasil® AS-70	High strength one-part silicone, meets EOTA ETAG 002, UL 94 HB
Sika® Tape FA-22	High performance acrylic tape for pre-fixation

SYSTEM BENEFITS

- Simplified manual application
- From box-to-racking, no module handling in between
- Flexibility in racking systems



RAIL BONDING TO MODULES IN PRODUCTION

Best recommended Sika products

Sikasil® AS-780	Fast curing two-part silicone adhesive with exceptional initial strength, UL 94 HB
Sikasil® AS-785	High strength and fast curing two-part silicone adhesive, meets EOTA ETAG 002, UL 94 V-1

SYSTEM BENEFITS

- Heavy reduction in manual labor
- Simplified in-line bonding feasible with existing cycle times
- Elimination of pre-fixation means or complex curing zones
- Easier quality control in production compared to field
- Minimized climatic impact





CHOOSING THE RIGHT TECHNOLOGY

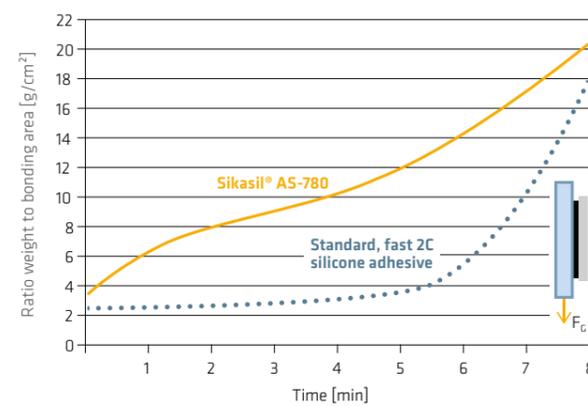
THE OUTSTANDING PERFORMANCE of silicone adhesive technologies in regard to long term durability has proven itself over decades in the facade, insulating glass and other highly demanding industries. Sikasil® AS-780 combines these qualities with process optimized characteristics for fast assembly and handling, which is limited within common silicones. All this makes it the best choice for your bonded module mounting system.

Parameter	Tapes	Organic adhesives (e.g. PU or MS)	Silicones (Sikasil® AS-780)
Surface tolerances	Limited tolerance compensation. Completely leveled, parallel and smooth surface necessary 	Good tolerance compensation 	Good tolerance compensation 
			
Pre-treatment of surface	Cleaning and often priming needed 	Cleaning, possibly grinding and priming necessary 	Mostly only cleaning or activating necessary 
Automated application	Comparatively difficult and high investment costs 	Easily possible 	Easily possible 
Contact pressure	Defined high and well distributed joining pressure necessary 	Low demand on joining pressure and pressure distribution 	Low demand on joining pressure and pressure distribution 
Correction on positioning	Not possible 	Possible during processing time. Except when pre-fixation tapes are used 	Possible during processing time 
Curing (strength build-up)	Immediate tack (100% adhesion build-up after several hours) 	Very fast curing systems available. For in-line processing pre-fixation tapes needed 	Immediate tack. No pre-fixation means needed 
UV resistance	Limited - good 	Limited - moderate 	Excellent 
Temperature influence on properties	High influence. Decrease in mechanical properties under high temperatures 	High influence. Decrease in mechanical properties under high temperatures 	Marginal influence. Only minimal impact of temperatures (service temperature -40°C to 150°C) 
Weathering resistance	Limited 	Limited - moderate 	Excellent 
Flame and fire resistance	Limited 	Limited - moderate 	Excellent 

KEY CHARACTERISTICS OF Sikasil® AS-780

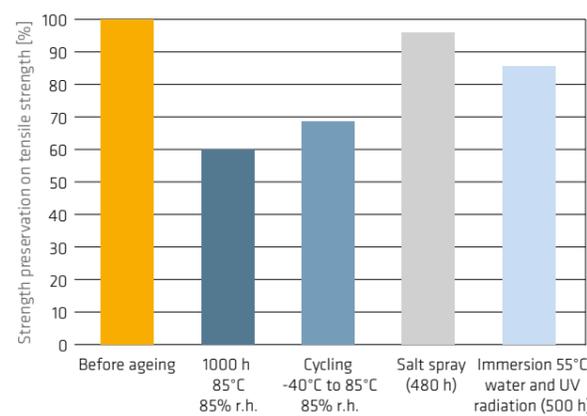
THE INNOVATIVE Sikasil® AS-780 is specifically designed to fit into the common production processes and cycle times of a PV module production. This makes it possible to fully integrate the bonding process into the existing production lines. The high initial green strength of Sikasil® AS-780 allows the assembled modules to be handled within the cycle time for flashing or packaging without any need for pre-fixation. To ensure a durable and structural bonding under harsh environmental impacts, Sikasil® AS-780 has been tested under most severe conditions.

Initial green-strength



Sikasil® AS-780 shows an exceptional initial green-strength for short handling times compared to common fast curing two-component silicones and this even with longer mixer open time and pot life for increased freedom in process.

Strength preservation after exposure



After different test conditions and cycles Sikasil® AS-780 remains at a high level of strength preservation. The failure pattern results in a 100% cohesion failure.

KEY PRODUCT BENEFITS

- Exceptional initial green strength and fast curing product
- Prompt handling and packaging within standard cycle times feasible
- Elimination of any pre-fixation or complex buffer zones
- Simplified automation for in-line processes
- Highly durable and structural yet flexible bonding
- Meets requirements of IEC 61646 and IEC 61730
- UL 94 HB listed

Technical product data of Sikasil® AS-780

Base	2-component silicone
Color	Black
Snap time (CQP 554-1)	10 min approx.
Shore A-hardness (CQP 023-1/ISO 868)	50 approx.
Tensile strength (CQP 036-1/ISO 37)	2.4 N/mm ² approx.
Elongation at break (CQP 036-1/ISO 37)	185% approx.
Initial green-strength	6-7 g/cm ² approx.

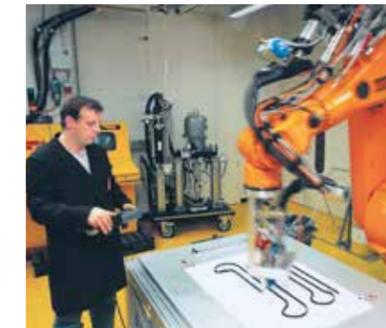
OUR PERFORMANCE – YOUR BENEFITS

Performance	Benefit
Construction consultancy	<ul style="list-style-type: none"> ■ Review and consultancy of existing and new photovoltaic systems with regard to suitability for bonding ■ Advice on system improvements i.e. material choice or dimensioning
Functional testing	<ul style="list-style-type: none"> ■ Support with prototyping ■ Functional tests / test plan of entire system for compatibility, adhesion and function
Application technology	<ul style="list-style-type: none"> ■ Active consulting, including the selection of right application technology ■ Assist in system and equipment engineering for bonding technology ■ Support with application and quality procedures
Applicator training	<ul style="list-style-type: none"> ■ Preparation of operating manuals for bonding in conformity with ISO ■ Factory and on-site training of applicators
External approvals	<ul style="list-style-type: none"> ■ Best practice sample preparation

OUR CORE COMPETENCE – FROM DESIGN TO FIELD



DESIGN AND SYSTEM ENGINEERING



TECHNICAL SERVICE



Sika develops bonding and sealing solutions in close cooperation with its customers in the photovoltaic industry. To Sika, this means not only developing best-in-class technology solutions to match the customer's technical and commercial requirements, but also ensuring appropriate performance throughout the design, prototyping, validation and full production phases. Experts in Sika's R&D, Technical Service and System Engineering specialize in devising unique client-oriented solutions.

Application oriented adhesives and sealants, as well as innovative construction methods are currently in high demand, which calls for design and application support. At Sika Solar Competence Centers, the most suitable solutions are developed in partnership with our customers to achieve the targeted results. Ultimately, this means reduced production costs, greater product reliability, improved aesthetic appeal and faster turn-around times, adding value to the activities of Sika customers.

Sika Technical Service teams are located around the world, and are dedicated to providing best practice selection, validation and application of Sika materials. By being located close to our customers, Sika Technical Service provides fast and reliable tests based on international or local standards and can assure optimum local language communication and understanding throughout the technical application development process to ensure the best possible results.

GLOBAL BUT LOCAL PARTNERSHIP



FOR MORE SOLAR SOLUTION INFORMATION:



www.sika.com/solar

WHO WE ARE

Sika AG, Switzerland, is a globally active specialty chemicals company. Sika supplies the building and construction industry as well as manufacturing industries (automotive, bus, truck, rails, solar, wind power plants and facades). Sika is a leader in processing materials used in sealing, bonding, damping, reinforcing and protecting loadbearing structures. Sika's product lines feature highquality concrete admixtures, specialty mortars, sealants and adhesives, damping and reinforcing materials, structural strengthening systems, industrial flooring as well as roofing and waterproofing systems.

Our most current General Sales Conditions shall apply.
Please consult the Data Sheet prior to any use and processing.



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