



METAL ADHESIVES WELD SHOP SOLUTIONS

BUILDING TRUST



ADHESIVE BONDING - ALTERNATIVE TO MECHANICAL FASTENING

METAL FABRICATORS ARE FACING SUBSTANTIAL CHALLENGES DAILY, which is why they increasingly consider adhesive bonding for their assembly. Driven by the shortage of skilled labor, evolving market requirements, and overall increased quality perception of finished goods, incorporating adhesive bonding into your weld shop will have a lasting positive effect.

CUSTOMER CHALLENGES

<p>Lack of trained welders</p> <p>It is becoming increasingly difficult to find skilled and trained welders who can do the job.</p>	<p>Limitations in multi-material design</p> <p>Welding a multi-material mix is not possible. Light-weight designs mostly require adhesive bonding.</p>	<p>Overall processing times and costs</p> <p>High market demands require a faster throughput to produce more goods.</p>	<p>Long-term durability</p> <p>In highly dynamic environments weld lines tend to crack shortening service life of vehicles.</p>
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"WE HELP YOU CREATE INSTANT TIME AND COST SAVINGS. OUR WELD-SHOP SOLUTIONS PROVIDE IMPROVEMENTS ALONG THE ENTIRE VALUE CHAIN."

 <p>TRAINED WORKFORCE</p> <p>Adhesive bonding helps overcome welder shortages.</p>	 <p>MULTI-MATERIAL BONDING</p> <p>Adhesive bonding allow for the joining of dissimilar materials.</p>	 <p>HIGHER THROUGHPUT</p> <p>Increase your output by incorporating adhesive bonding.</p>	 <p>LONG-TERM DURABILITY</p> <p>Adhesives outperform mechanical fasteners due to better load distribution.</p>
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WHY BONDING?

Using structural adhesives helps achieve a more even stress distribution; they also enable users to make significant gains in productivity. Secondary process steps, such as punching holes for screws or sanding and polishing processes after welding, can be reduced. Using structural adhesives is also faster than most welding techniques, and by combining both methods, maximum process cost improvements can be achieved.

COMPARISON OF JOINING TECHNIQUES

	Cost factors	Screws	Welds	Rivets	Rigid bonding	Elastic bonding
Joining dissimilar materials	Most economical use of materials	+	-	+	++	++
Calculability of joint, dependency of strength on temperature	Development cost	++	++	+	0	+
Thermal distortion	Additional process steps	++	-	+	++	++
Sealing of joint	Additional work and expense of sealing	-	+	-	++	++
Waiting time between assembly and adequate strength attainment	Integration into the production cycle	++	++	++	+/0	+/0
Temperature resistance	Limitations in use case	++	++	++	+	0



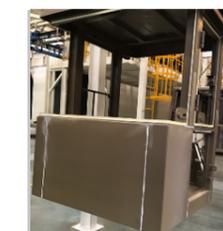
WHY SEALING?

Sealing joints or protecting vulnerable areas is essential for long-lasting vehicles; they prevent leaks, cover edges, prevent corrosion, and improve aesthetics.

Sika's sealing offering includes solutions that can be used in the body or paint shop, are paintable, and are resistant to the heat of the paint baking process.

KEY TECHNOLOGIES

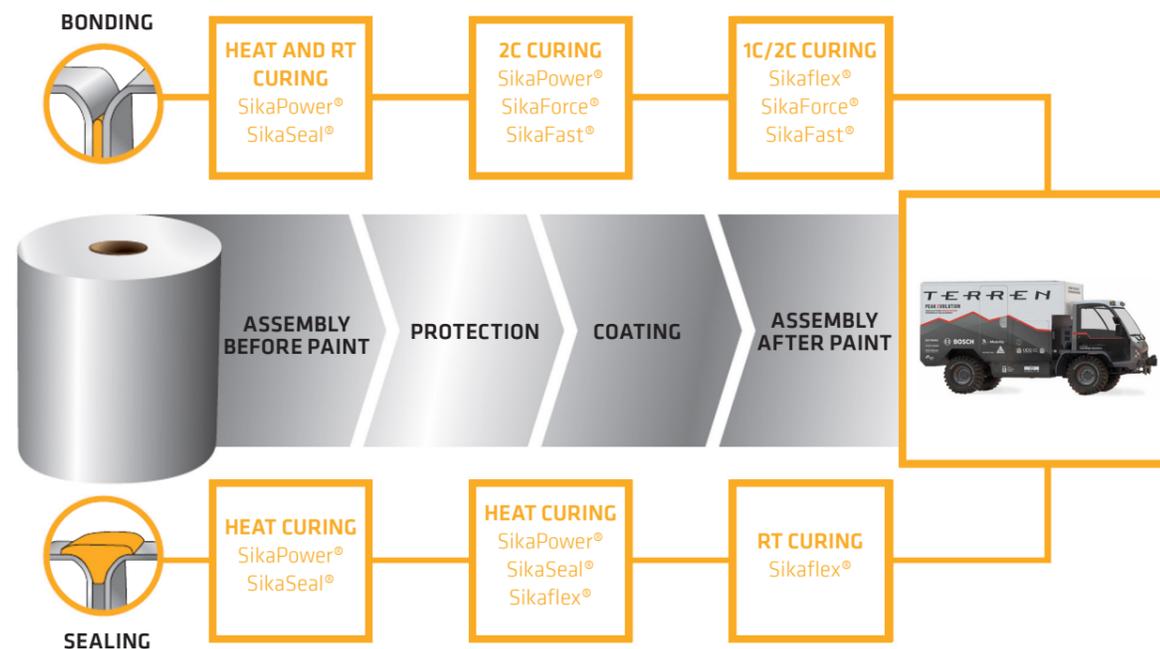
- SikaSeal®** Impressive workability in manual and robotic applications
- SikaPower®** Excellent versatility in pre-and-post coating processes
- Sikaflex®** Reliable performance across of broad range of applications



YOUR PARTNER FROM ENGINEERING TO PRODUCTION

SIKA SUPPORTS CUSTOMERS FROM ENGINEERING TO INTEGRATION IN PRODUCTION.

Engineers developing commercial vehicles and off-highway machinery are improving their productivity, vehicle durability, and efficiency by using adhesive bonding in their vehicle design. Our experts help you reduce manufacturing costs by optimizing your production process with adhesive bonding and sealing.

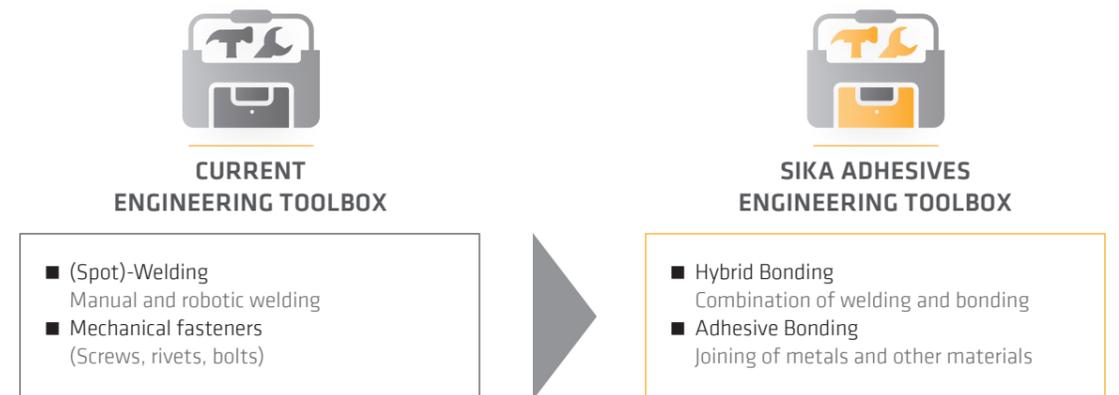


ADHESIVE BONDING ENGINEERING CALCULATION AND SIMULATION

EXPERT DESIGN AND LAB TESTING SERVICES TO ENSURE HIGH-QUALITY PRODUCTION RESULTS

We understand that choosing a suitable adhesive is not all it takes to get your job done. We help you **identify design problems** or inefficiencies in your production processes to find new ways to benefit from a wide range of solutions we offer.

We believe in **collaboration as innovation** is rarely accomplished alone. It requires a team with expertise and passion for achieving set goals. At Sika, we are part of your team. We work alongside innovators to solve **complex challenges** in every industry. We lead with our weld shop solutions that **make the impossible seem possible**. When tackling your next challenge, we can provide the product and expertise to help you get there.



The engineering needs of manufacturers are diverse. From lab and analytical testing to design competency and FEA Molding insights, engineering services help manufacturers improve their product designs and achieve better manufacturing results. Utilizing Sika's engineering services can help you get the most out of your production processes.

"OVER THE LAST 40 YEARS, SIKA HAS BUILT PROFOUND EXPERTISE TO GUIDE CUSTOMERS IN IMPLEMENTING ADHESIVES TO THEIR DESIGNS AND MANUFACTURING."



SIKA HAS GOT YOU COVERED

No matter where in the process you find yourself, our comprehensive bonding and sealing solutions can be used under various circumstances tailor-made to your needs:

- Heat curing adhesive and sealing solutions with adhesion to oily surfaces, high temperature capability and excellent e-coat wash-out resistance
- Single or multi-component adhesives with adhesion to e-coated or primed metal providing high temperature resistance for subsequent powder-coating process
- Innovative 1C/2C adhesives to optimize your assembly after the paint

SIKA ADDED VALUE

Going beyond the supply of materials and products

Sika is dedicated to providing and maintaining the highest quality and standards with its products and services. All Sika solutions are designed with the customer's success in mind and to establish long-lasting and mutually-beneficial relationships.

Sika Industry's well-proven solutions are equally complemented with an unmatched level of customer service and technical support. We aim to help our customers produce a better vehicle, improve processes, minimize emissions and support the reduction of overall vehicle manufacturing cost.

For decades, Sika has been a presence in the global transportation industry, supporting customers with solutions for sealing, assembly bonding and coatings, as well as reinforcement and acoustic solutions. Owners and operators demand ever-lower vehicle running and repair costs combined with improved reliability and durability. Newly developed structural adhesives help to meet these requirements. Government legislation is pushing for lower vehicle emissions. Sika, as a supplier and partner to the global transportation industry, provides a range of state-of-the-art technology solutions to help manufacturers meet these challenges as well.



When using high-quality adhesive solutions from Sika, it is essential to plan your processes and product designs around sound principles and ideas. Sika's engineering service's team is ready to help with a wide range of design and analytical tasks. Our team of experts provide a range of services that can help you improve your product design.

We work closely with our industrial customers to create tailor-made and integrated solutions designed to meet their challenges, particularly in relation to cost efficiency and suitability for volume production. How you can benefit from this:

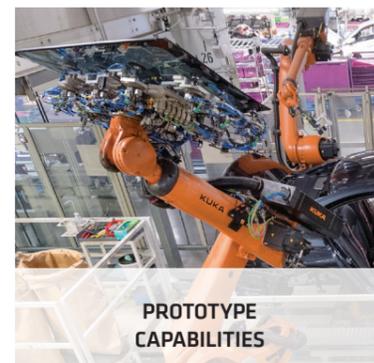
- We partner with you right from the point of concept.
- We anticipate the needs of your designers and engineers because we have in-depth knowledge of your industry.
- We can facilitate your prototyping initiative with a custom performance evaluation in a simulated or actual production environment.
- No matter the industry, we can provide a comprehensive analysis of your manufacturing process to identify both problem points and improvement recommendations.



DESIGN
COMPETENCY



LAB TESTING AND
ANALYTICAL SERVICES



PROTOTYPE
CAPABILITIES

100+ COUNTRIES

WITH LOCAL SUPPORT TEAM

OVER

50 TECHNICAL SERVICE LABS

WITH ADHESIVE AND
APPLICATION EXPERTS

> 40 YEARS

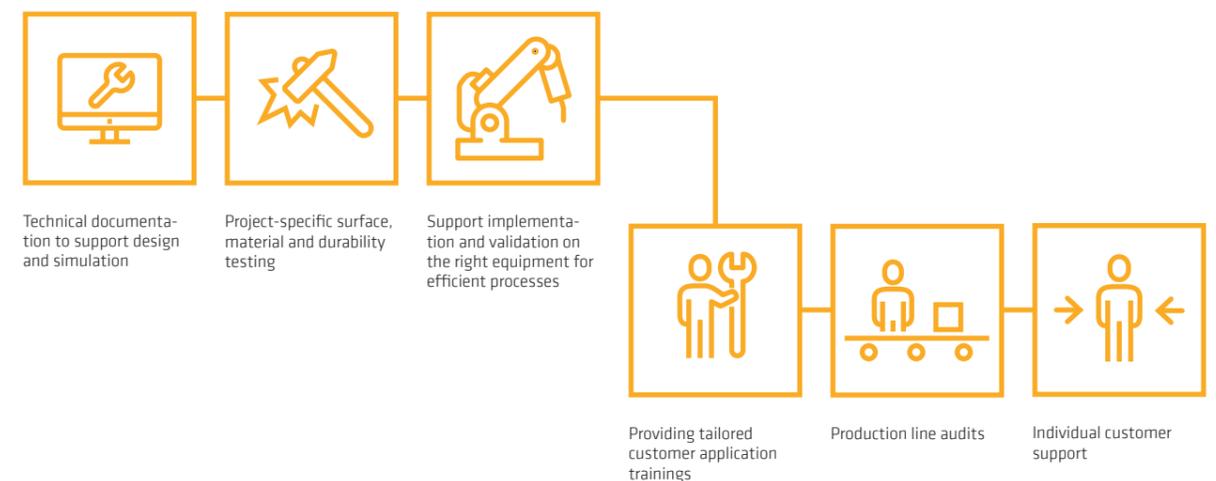
EXPERIENCE AS SUPPLIER AND TECHNOLOGY
PARTNER IN AUTOMOTIVE AND COMMERCIAL
TRANSPORTATION

AUTOMATION AND PROCESS

EXPERTISE THROUGH A GLOBAL NETWORK OF EXPERTS AND PARTNERSHIPS WITH LEADING
EQUIPMENT MANUFACTURERS

"SIKA OFFERS ADDED VALUE SOLUTIONS THAT INCREASE YOUR PRODUCTIVITY, REDUCE YOUR COSTS, AND RESULT IN DIFFERENTIATED END PRODUCTS FOR YOUR CUSTOMER."

Our teams help from the idea through to the design stage and until the completion of a project with:



METAL ADHESIVES

Sika's metal bonding solutions range from joining bare metal in a weld shop, e.g., as a replacement of welded structures; to the combination of different materials. Sika's metal bonding solutions integrate well into your current processes, and our technical service supports you in identifying the best solution for each challenge. **RELY ON PROVEN AUTOMOTIVE PERFORMANCE.**

Your Process	Bonding in the Weld Shop or Paint Shop (160-200°C)			Bonding in the Paint Shop or Assembly Line		
	E-coating or Powdercoat Process at 160-200°C			Cold Curing Process		
	Bonding of Bare Metal (appropriate corrosion protection measures to be considered)					
	Mixed Material Bonding					
	Ultimate Fatigue and Crash Performance	High Wash-out Resistance	Ultimate Fatigue - Cold Cure	Fast Curing	Semistructural and Elastic Curing	Elastic and Very Fast Curing
Sika Solution^A	SikaPower [®] -498/3	SikaPower [®] -492 G	SikaPower [®] -1277	SikaFast [®] -555 L3 / L5 / L10	SikaForce [®] -420 L20 / L45 / L105	SikaForce [®] -840
Chemistry	Heat Cure Epoxy	Heat Cure Epoxy	2C Epoxy	2C Acrylic	2C PUR	2C PUR
Color	Gray	Black	Red	Gray	White	Black
Mix Ratio	–	–	2:1	10:1	4:1	1:1
Application Temperature	50-60°C (nozzle)	50-60°C (nozzle)	15-35°C	15-40°C	15-35°C	15-35°C
Wash Out Resistance	+++	++	After curing	–	–	–
Open Time	–	–	1 hour	L10: 10min	L20: 20min	L7: 7min
Curing Speed	20min/175°C	20min /175°C	1MPa = 11 hours	L10: 25min/80%	L20: 60min	L7: 1MPa = 20min
Lap Shear Strength	30MPa (steel 1.5mm / 0.3mm)	30MPa (steel 1.5mm / 0.3mm)	28MPa	12 Mpa	Data	15 Mpa
Impact Peel	40 N/mm	30 N/mm	30 N/mm	–	–	–
Glass Transition	100°C	105°C	67°C	55°C	–	-45°C
Heat Resistance	≤1hr 210°C	≤1hr 210°C	≤1hr 220°C	Check		
Suitable for^B						
- Steel ^C	■■■■	■■■■	■■■■	■■■■	■□□	NR
- Aluminum ^C	■■□	■□□	■■■	■■■	■□□	NR
- Primed Metal	■■□	■■□	■■■	■■■	■□□	■□□
- Painted Metal	NR	NR	NR	■■■	■□□	■■■
- Mixed Material	NR	NR	■■□	■■■	■□□	■■□
Product Description	SikaPower [®] -498/3 is the ultimate fatigue and crash resistant body shop adhesive. It can be used as complete or partial replacement of welding. It bonds to oily metals.	SikaPower [®] -492 G is suitable for high structural bonding of different types of metal.	SikaPower [®] -1277 is made for high strength and impact-resistant bonding of metallic substrates, like steel and aluminum, as well as of composite substrates, like GFRP and CFRP laminates.	SikaFast [®] -555 is a fast curing, flexibilized structural, 2-component adhesive. It provides very good adhesion on various substrates such as metals, plastics, glass and wood.	SikaForce [®] -420 is a fast curing, rigid 2-component adhesive. It bonds without pre-treatment to a wide range of substrates such as GRP, metal and wood.	SikaForce [®] -840 L07 is designed for bonding composite or coated metal components. The adhesive is characterized by fast curing and strength build-up.

A Always consult the most current local Product Datasheet. Check with your local Sika company about product availability or alternative solutions.
B Suitability needs to be checked for each project. Thermal expansion of components, corrosion resistance, process requirements and adhesion are critical parameters for product selection. **C** Metals need appropriate corrosion protection measures.

SEALING SOLUTIONS

SIKA PROVIDES PEACE OF MIND SEALING SOLUTIONS that integrate well into your weld shop and paint process. With our vast experience in automotive, transportation, and industrial manufacturing, Sika's technical experts support you in solving your sealing challenge anywhere in your process chain.

Your Process	Sealing in the Weld or Paint Shop			Bonding in the Paint Shop or Assembly Line		Bonding in the Paint Shop or Assembly Line		
	E-coating or Powdercoat Process at 160-200°C			Moisture Curing Solutions				
	Painting before curing							
								Painting after curing
	Powdercoat Sealant	High Wash-out Resistance	Anti-flutter	Spray Sealer	Brushable Low Bake Paint Sealant	Sealing and Bonding	Exterior Sealant	
Sika Solution^A	SikaPower [®] -4508	SikaPower [®] -415 P1	SikaSeal [®] -710 LS-2	Sikaflex [®] -529 Evolution	Sikaflex [®] -215	Sikaflex [®] -221	Sikaflex [®] -521 UV	
Chemistry	Heat Cure Epoxy	Heat Cure Epoxy	Rubber-based	1C STP	1C PUR	1C PUR	1C STP	
Color	White	Black	Gray	Ochre, Black	White	White, Black, Gray	White, Black, Gray	
Mix Ratio	–	–	–	–	–	–	–	
Application Temperature	20-50°C	15-35°C	15-35°C	5-40°C	5-40°C	5-40°C	5-40°C	
Wash Out Resistance	After pre-curing	After skinning	High	–	–	–	–	
Open Time	–	3-4 hrs / 5 min 160°C	–	15 min	20 min	45 min	30 min	
Curing Speed	25 min 180°C	25 min 180°C	20 min 180°C	3 mm/day	4 mm/day	4 mm/day	4 mm/day	
Tensile Strength			–	2.0 Mpa	1.3 Mpa	1.8 Mpa	1.8 Mpa	
Elongation at break	40%	100%	–	150%	150%	500%	400%	
Expansion	–	–	40-70%	–	–	–	–	
Heat Resistance^D	1h / 210 °C	10 min / 220°C	10 min / 210°C	After curing: 1h 140°C	120°C / 30 min	After curing: 1h 140°C	After curing: 1h 140°C	
Suitable for^B								
- Steel ^C	■■■	■■■	■■■	NR	NR	NR	NR	
- Aluminum ^C	■■■	■■■	■■■	NR	NR	NR	NR	
- Primed Metal	■■■	■■■	■■■	■■■	■■■	■■■	■■■	
- E-coated Metal	■■■	■■■	■■■	■■■	■■■	■■■	■■■	
- Painted Metal	NR	NR	NR	■■■	■■■	■■■	■■■	
- Mixed Material	NR	NR	NR	■■■	■■■	■■■	■■■	
Product Description	SikaPower [®] -4508 is a heat-curing sealant. It is especially designed for sealing on E-coated surfaces prior to a paint or powder-coating process. It adheres to most e-coated or oily bare metals.	SikaPower [®] -415 P1 is designed for sealing of seams or joints for sheet metal assembly work and is cured with heat, e.g. in the electrocoat oven. It forms a skin for increased wash-out resistance at exposure to humidity.	SikaSeal [®] -710 LS-2 is a universal, PVC free anti-flutter adhesive. It has a good wash-out resistance.	Sikaflex [®] -529 Evolution is a moisture curing, sprayable sealant. It can be painted over with most 1C and 2C paints.	Sikaflex [®] -215 is a brushable, non-bubbling PUR sealant. It is designed to be used on e-coated surfaces. Sikaflex [®] -215 can be painted and withstand common industrial paint oven conditions before curing.	Sikaflex [®] -221 is a multi-purpose adhesive / sealant that bonds well to a wide variety of substrates like metals, metal primers and paint coatings (2-component systems), ceramic materials and plastics.	Sikaflex [®] -521 UV is a weathering-resistant 1C adhesive / sealant that bonds well to a wide variety of bonding surfaces such as metals, ABS, PC, FRP and wood with usually no need for special treatment.	

A Always consult the most current local Product Datasheet. Check with your local Sika company about product availability or alternative solutions.
B Suitability needs to be checked for each project. Thermal expansion of components, corrosion resistance, process requirements and adhesion are critical parameters for product selection. **C** Metals need appropriate corrosion protection measures. **D** Heat resistance related to the painting process.

GLOBAL BUT LOCAL PARTNERSHIP



FOR MORE TRANSPORTATION INFORMATION



www.sika.com/transportation

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, rail, solar and wind power plants, facades). Sika is a leader in processing materials used in sealing, bonding, damping, reinforcing, and protecting loadbearing structures. Sika's product lines feature high-quality 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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