



RAIL
ADVANCED TECHNOLOGIES
DELIVERING PERFORMANCE

BUILDING TRUST



SIKA TRANSPORTATION AT A GLANCE

**35 % OF GLOBAL
RAIL FLEET**

MADE STRONGER AND SAFER
WITH SIKA SOLUTIONS

**80 KG WEIGHT
REDUCTION**

PER VEHICLE WITH Sikaflex® LOW
DENSITY ADHESIVES AND SEALANTS

3,500,000 KG

SIKA PRODUCTS USED EVERY YEAR
TO BUILD TRAINS

150,000 BUSES

PRODUCED EVERY YEAR CONTAIN
SIKA PRODUCTS

25 % NOISE REDUCTION

WITH Sikagard®, SikaBaffle® AND SikaDamp® ACOUSTIC SYSTEMS

**22 MILLION KG
SIKA
PRODUCTS**

SOLD TO THE TRANSPORTATION MARKET
EVERY YEAR

**250,000
TRUCK
CABINES**

PRODUCED WITH SIKA MATERIALS
AND PARTS ANNUALLY

Since decades, Sika is present in the global Transportation industry and supports customers in this dynamic and challenging environment. Owners and operators demand ever-lower vehicle running and repair costs combined with improved reliability and durability. Government legislation is regulating lower vehicle emissions and the use of safer process materials as well as improved passenger and driver safety. Sika, as supplier and partner to the global Transportation industry, provides a range of state of the art technology solutions to assist manufacturers in meeting these challenges.

CONTENT

04	Trends for Passenger Rail Vehicles	
06	Rail Application Overview	
08	Roof and Exterior Component	layar
10	Floor and Interior Component	layar
12	Mask / Front-End Hood	layar
14	Direct Glazing	layar
16	Interior Trim	layar
18	Underbody Coating and Acoustic	layar
20	Fire Protection Coatings	layar
22	Service and Support	
23	Sika Industry Brands	

AUGMENTED REALITY

We'd like to show you animations of the rail-applications.
You can experience the animations live on your mobile device.

For doing so, please follow the instructions below for iOS or Android.



1. Download the free app "Layar" on the App-Store.
2. Open the app and scan the expanded views marked with the "Layar" logo.
3. Enjoy the animations.

TRENDS FOR PASSENGER RAIL VEHICLES

FASTER PROCESSES – SAFER VEHICLES – INCREASED COMFORT

Rail is an important service provider to the global society. It provides with its infrastructure the transportation backbone for a sustainable economy. The rail manufactures must increasingly rely on innovative potential to deliver smart solutions in order to meet the numerous challenges like demographic development, climate change, increased demand for safety and at the same time cope with high cost pressure.

Manufacturers of passenger rail vehicles expect improvements in their processes, highly efficient and easy to use repair solutions and support for innovation in vehicle design. Rail operators have to meet higher safety levels, increased reliability and at the same time reduced operating cost including provisions for comfortable passenger experience.

Sika provides technological solutions that assist rail vehicle manufacturers and operators in meeting their targets.



FASTER PROCESSES



Quality plays a key role in the rail market place but cost is of equal importance to rail vehicle manufacturers. Both factors need to be taken into consideration in order to maintain competitiveness and success. Therefore, focus is on process simplifications that reduce the risks for mistakes. Shorter cycle times increase capacity and can eliminate bottlenecks. Sika provides advice and solutions how to achieve these goals with accelerated or two-component systems, which do not require heat for curing or simply technologies and which do not need many pretreatment steps.

INCREASED COMFORT



Passengers and fleet operators demand for high capacity vehicles providing fast, efficient and comfortable urban transport. Sika solution block out noise and damp vibrations that can create discomfort for rail vehicle passengers. Performance combined with excellent application properties make those products the perfect solution to improve the travelling experience for the occupants.





ENVIRONMENTAL HEALTH & SAFETY



The market is constantly evolving and technology is playing a greater role helping companies ensure compliance, drive profitability, reduce risks, and improve environmental and social concerns. At the same time the new legislations, harsher classification and higher demands on worker safety are challenging topics for everyone in touch with chemical substances. Sika is dedicated to sustainable developments and provides innovative solutions like water based pretreatments, phthalate and tin free sealants and adhesives as well as products that allow reduced consumption and considerable weight savings.

INCREASED LEGISLATION AND SAFETY DEMANDS



Legislation and community demands are increasing year by year. The use of adhesives and sealants in the rail sector has become a genuine alternative to traditional joining techniques such as riveting and welding. The growing material mix led to reduction in vehicle weight, improved space usage, new design opportunities, less corrosion and easier repairs. More than half a ton of adhesive is used for a modern passenger carriage nowadays. However, this positive development showed impact on legislation side. Harsher fire safety requirements, quality control demands and well-educated personnel lead to a significant increased workload for certification, and audit trails.



APPLICATION OVERVIEW

Operators as well as rail manufacturers require and demand reliability and durability in combination with continuous reduction of vehicle production and operating cost. Sika offers customized solutions and develops new systems for the rail market, which help to fulfil these requests for improved quality and reduced production cost.

ROOF AND EXTERIOR COMPONENTS

Large components require long open time adhesives which provide sufficient time for the assembly. At the same time fast-curing speed and strength build up is required to support the manufacturing process. Exterior joints must cope with aggressive rail cleaners. >> **Page 8**

INTERIOR TRIM

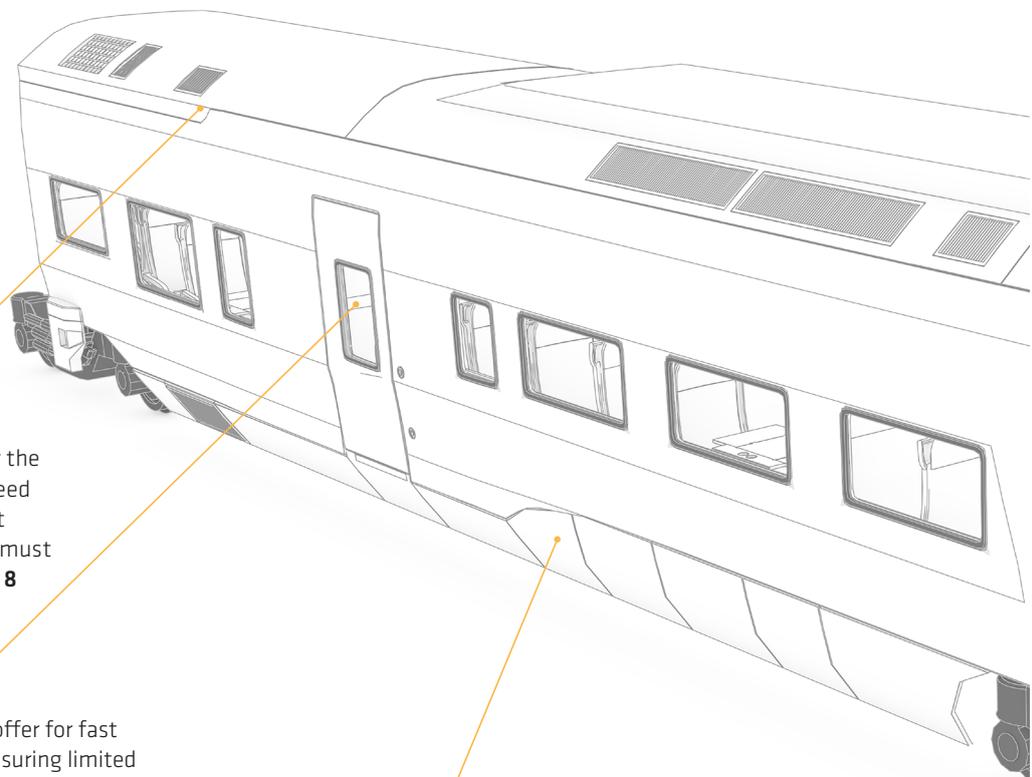
A variety of technologies are at offer for fast assembly and high initial tack ensuring limited interruption of the manufacturing process. >> **Page 16**

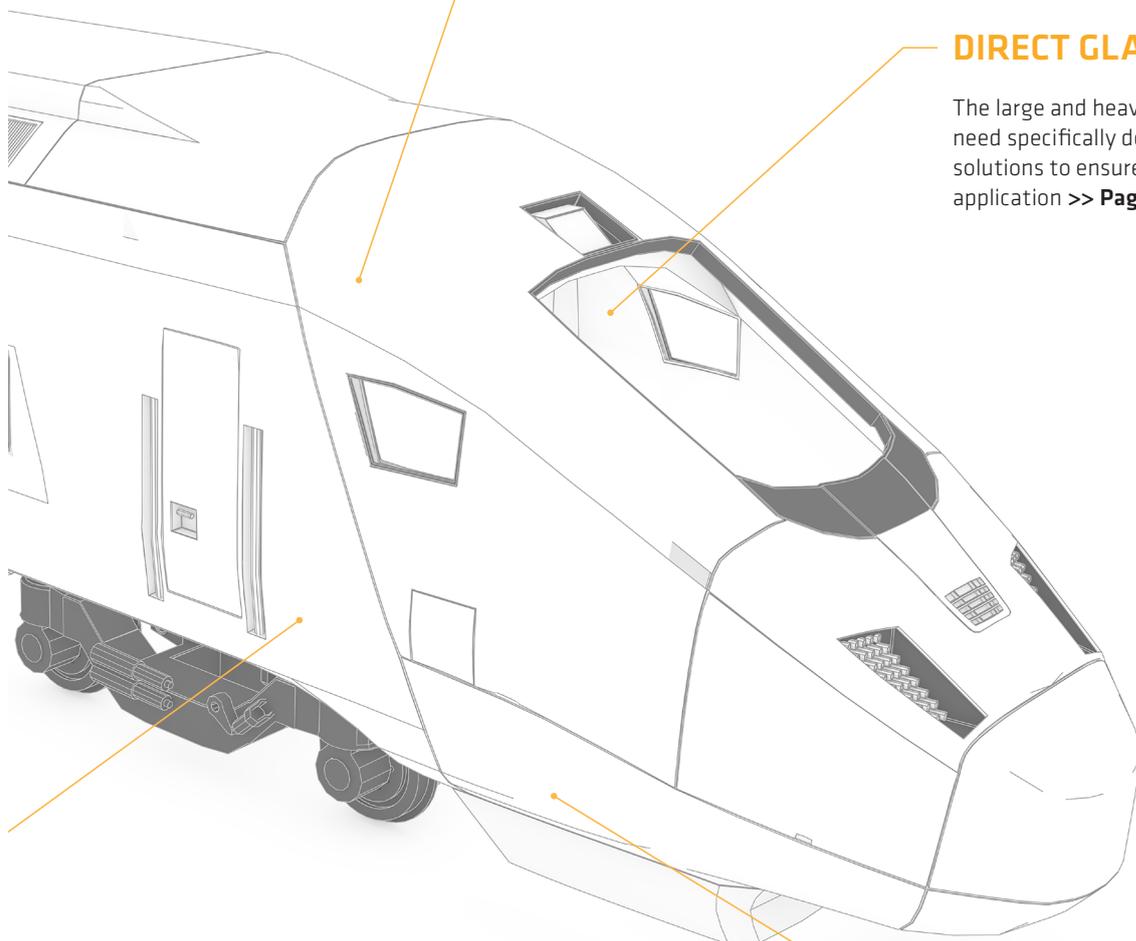
FIRE PROTECTION COATINGS

Superb protective coatings increase the safety and ensure sufficient time for evacuation in case of a fire incident. Systems for all kind of substrates are available. >> **Page 20**

FLOOR AND INTERIOR COMPONENT

Different bonding technologies can be provided to satisfy demands like fast curing speed combined with sufficient working time. Products with limited pretreatment steps are available. >> **Page 10**





MASK / FRONT-END HOOD

The large and heavy masks or cabs need solutions which ensure long working time and based on the large joint geometries fast curing speed. Specifically designed bonding and sealing solutions are available to meet these needs. >> **Page 12**

DIRECT GLAZING

The large and heavy windows and front screens need specifically designed bonding and sealing solutions to ensure fast processes and easy application >> **Page 14**

UNDERBODY COATING AND ACOUSTIC

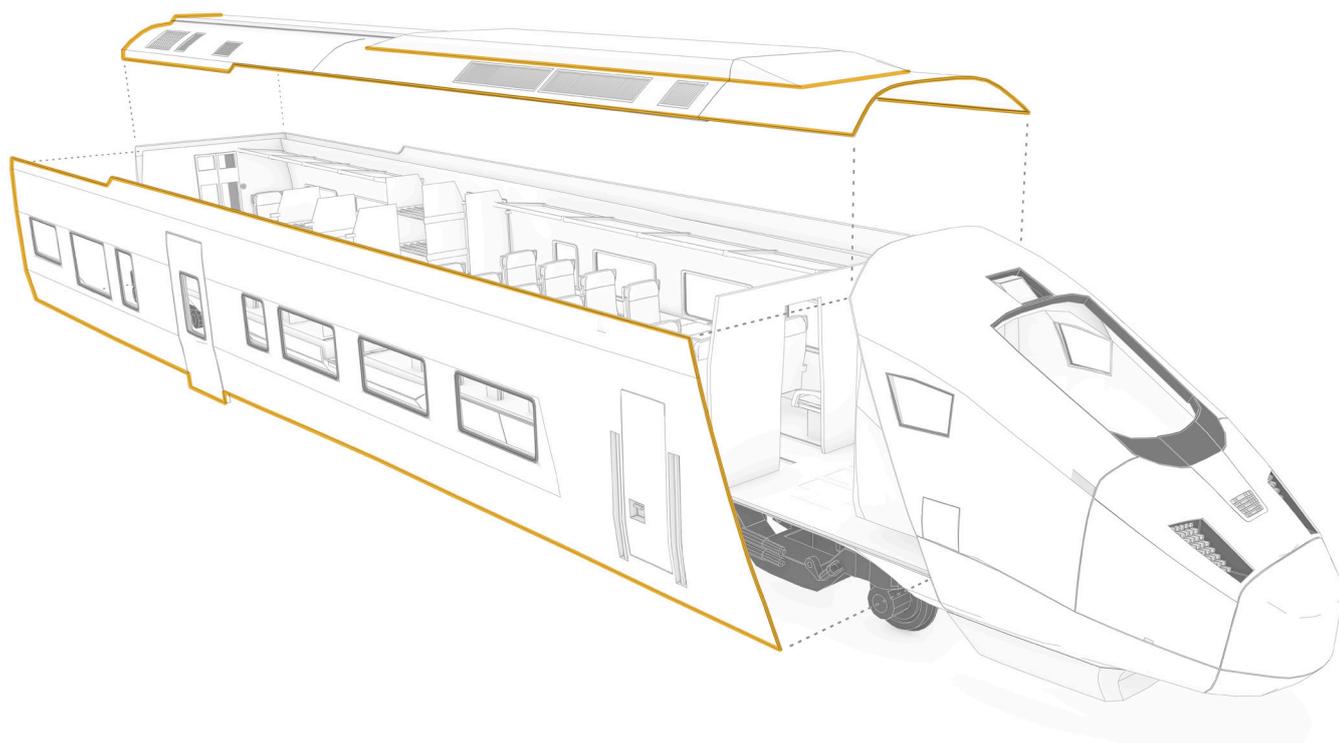
Best in application properties and very high abrasion resistance for long lasting protection as well as excellent noise damping characteristics. >> **Page 18**

ROOF AND EXTERIOR COMPONENTS

Rail vehicle manufacturers face tough and complex challenges in the design and assembly of roofs and other large assembly parts. Various influence factors like avoidance of standing water, sufficient joint designs and heavy components on the roof must be taken in consideration.

Sikaflex® polyurethane adhesive and sealant systems provide high-performance elastic assembly with easy-to-use one-component formulations. Sikaflex® STP technology offers the attributes of Sikaflex® polyurethanes combined with reduced substrate preparation and improved ecology. SikaBooster® and PowerCure technology show rapid curing speed.

Those systems can be used with pump or manual systems from manufacturing to repair. SikaPower® two-component structural epoxy solutions are perfectly suited for the production of large and medium size plastic parts. The products provide long open time combined with sufficient curing speed.



"Longevity and durability against different loads during operation, climatic factors and other influence factors are expected from a modern rail vehicle. High speeds, climatic conditions and structural requirements are all examples for demands on the adhesives and sealants used. Sika solutions fulfill these requirements permanent every day."



BENEFITS

- Enhanced aesthetics via elimination of visible fixings
- Broad substrate compatibility
- Fast production process
- Improved water and moisture leak resistance
- High structural strength and durability



PRODUCTS

Sikaflex®-268

Sikaflex®-268 PowerCure

Sikaflex®-268 + SikaBooster®-20 S

Sikaflex®-558

Sikaflex®-558 PowerCure

Sikaflex®-558 + SikaBooster®-30 STP

Sikaflex®-521 UV

SikaPower®-1200

SikaPower®-1565

PRODUCT DESCRIPTION

All in one adhesive/sealant system with very good ageing and weathering resistance and accelerated sealing capability

All in one isocyanate free, STP based adhesive/sealant system with very good ageing and weathering resistance and accelerated sealing capability

Weathering resistant sealant adhesive for small exposed joints

Two-component, ultra-high toughened epoxy adhesive
With impact strength and wide adhesion range on composite and metals

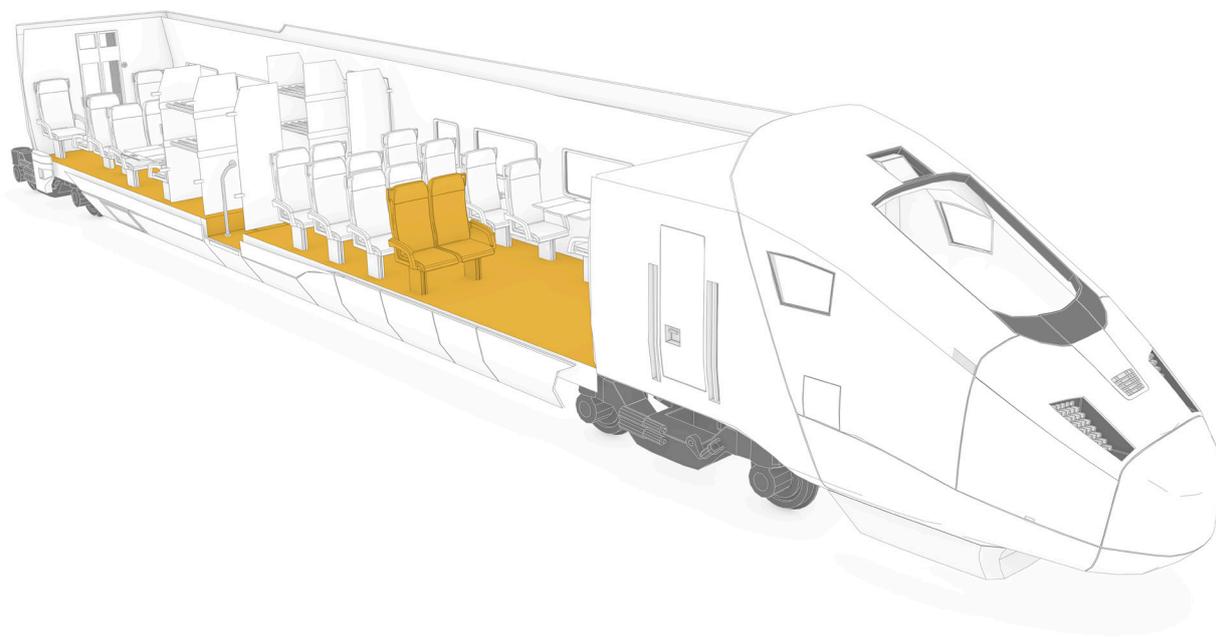
Two-component structural multi-purpose epoxy adhesives with wide adhesion range and excellent mechanical performance to dynamic loads

FLOOR AND INTERIOR COMPONENTS

High performance flooring materials consisting of durable wood floor plates or heatable aluminum panels are used depending on the type of train. Interior components need to be of high quality and long life expectancy in order to meet the day-to-day requirements of transporting people in high numbers. Railway operators need best performance and reliability from their interiors as repairs and breakdowns are costly and disruptive.

Sikaflex® polyurethane adhesives provide high-performance elastic assembly with easy-to-use one-component formulations. Sikaflex® STP technology offers the attributes of Sikaflex® polyurethanes combined with reduced substrate preparation and improved ecology. SikaBooster® and

PowerCure technology show rapid curing speed and SikaFast® two-component acrylic technology offers semi- and structural adhesive solutions for bonding a wide spectrum of substrates from large plastic covers to small cable brackets.



"Elastic bonding solutions from Sika provide long lasting performance, sound and vibration damping as well as resistance against different loads and climatic conditions. Different technologies from Sika are used to ensure highest performance of bond lines and sealing joints."



BENEFITS

- Enhanced aesthetics via elimination of visible fixings
- Broad substrate compatibility
- Fast production process
- Improved water and moisture leak resistance
- Improved sound and vibration damping



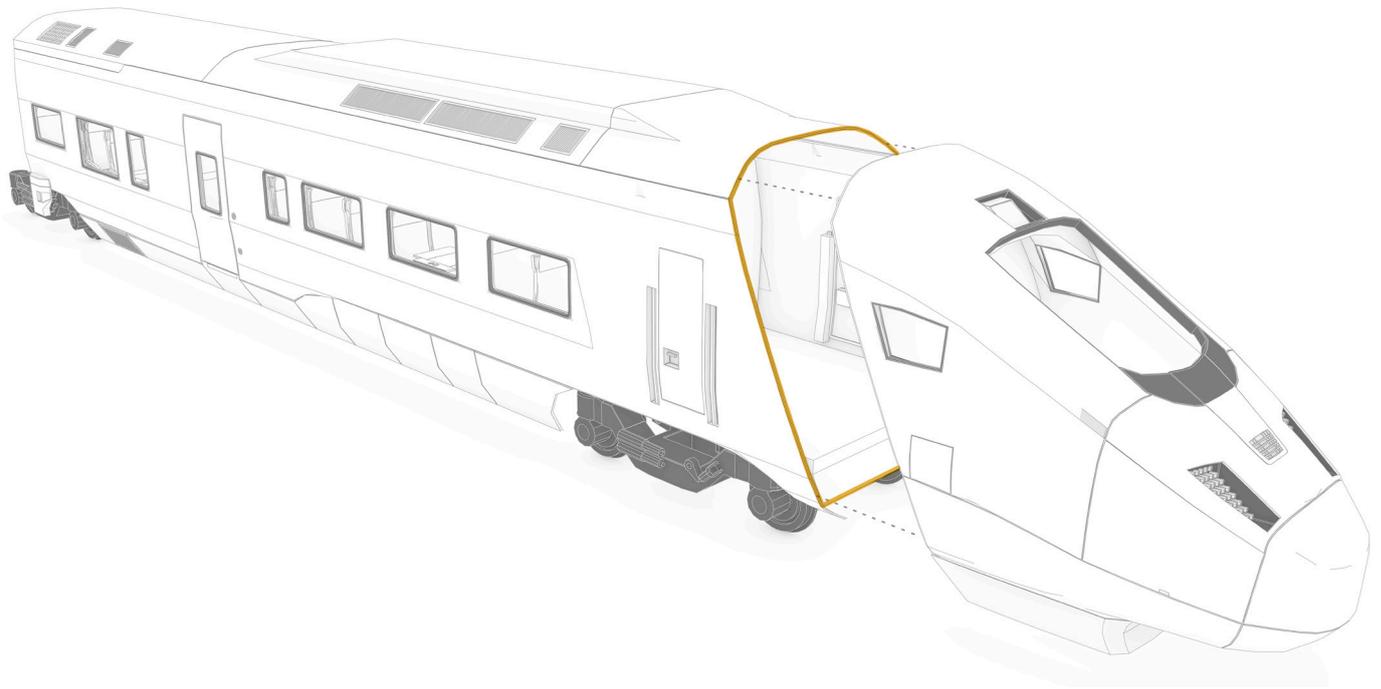
PRODUCTS	PRODUCT DESCRIPTION
Sikaflex®-268	All in one adhesive/sealant system with very good ageing and weathering resistance and accelerated sealing capability
Sikaflex®-268 PowerCure	
Sikaflex®-268 + SikaBooster®-20 S	
Sikaflex®-558	All in one isocyanate free, STP based adhesive/sealant system with very good ageing and weathering resistance and accelerated sealing capability
Sikaflex®-558 PowerCure	
Sikaflex®-558 + SikaBooster®-30 STP	
Sikaflex®-221	Standard adhesive sealant for interior use
Sikaflex®-821 FR	Fire rated sealant in acc. EN 45545-2 for interior applications, meets HL2
Sikaflex®-515	Standard STP sealant for interior use
SikaFast®-3131	Flexible, structural assembly adhesive with short open and medium fixture time
SikaFast®-5215 NT	Fast curing, two-component structural adhesive with low odor
SikaFast®-5560	Two-component acrylate adhesive

MASK / FRONT-END HOOD

Shapes and design of rail vehicles have evolved dramatically with the introduction of thermoset components. This is also most visible at front-end hoods and masks. The production of those components takes place mostly at specialized sub-suppliers. The final product then is mounted at the rail manufacturer. Both, sub-supplier and rail vehicle builders have specific requirements for the production and assembly of the masks and front-end hoods. Various influence factors like avoidance of standing water, sufficient joint designs and heavy components on the roof must be taken in consideration.

Sika offers a versatile spectrum of adhesives for the front-end hood and mask production ranging from highly toughened and structural two-component epoxy technology called SikaPower® over to polyurethane adhesive and sealant systems which provide high-performance elastic assembly with easy-to-use one-component formulations. The same technology is used for the assembly of the masks and

front-end hoods. The portfolio is complemented with Sikaflex® STP technology offering the attributes of Sikaflex® polyurethanes combined with reduced substrate preparation and improved ecology. SikaBooster® and PowerCure technology show rapid curing speed. Those systems can be used with pump or manual systems from manufacturing to repair.



"The use of thermoset plastics for front-end and mask production is well established. It led to improved manufacturing processes and considerable reduction in vehicle weight. Sika bonding and sealing solutions ensure longevity, durability of these parts which are subject to constant dynamic stress."



BENEFITS

- Enhanced aesthetics via elimination of visible fixings
- Broad substrate compatibility
- Fast production process
- Excellent protection against water and moisture ingress
- High structural strength and durability



PRODUCTS

Sikaflex®-268

Sikaflex®-268 PowerCure

Sikaflex®-268 + SikaBooster®-20 S

Sikaflex®-558

Sikaflex®-558 PowerCure

Sikaflex®-558 + SikaBooster®-30 STP

Sikaflex®-521 UV

SikaPower®-1200

SikaPower®-1565

PRODUCT DESCRIPTION

All in one adhesive/sealant system with very good ageing and weathering resistance and accelerated sealing capability

All in one isocyanate free, STP based adhesive/sealant system with very good ageing and weathering resistance and accelerated sealing capability

Weathering resistant sealant adhesive for small exposed joints

Two-component, ultra-high toughened epoxy adhesive
With impact strength and wide adhesion range on composite and metals

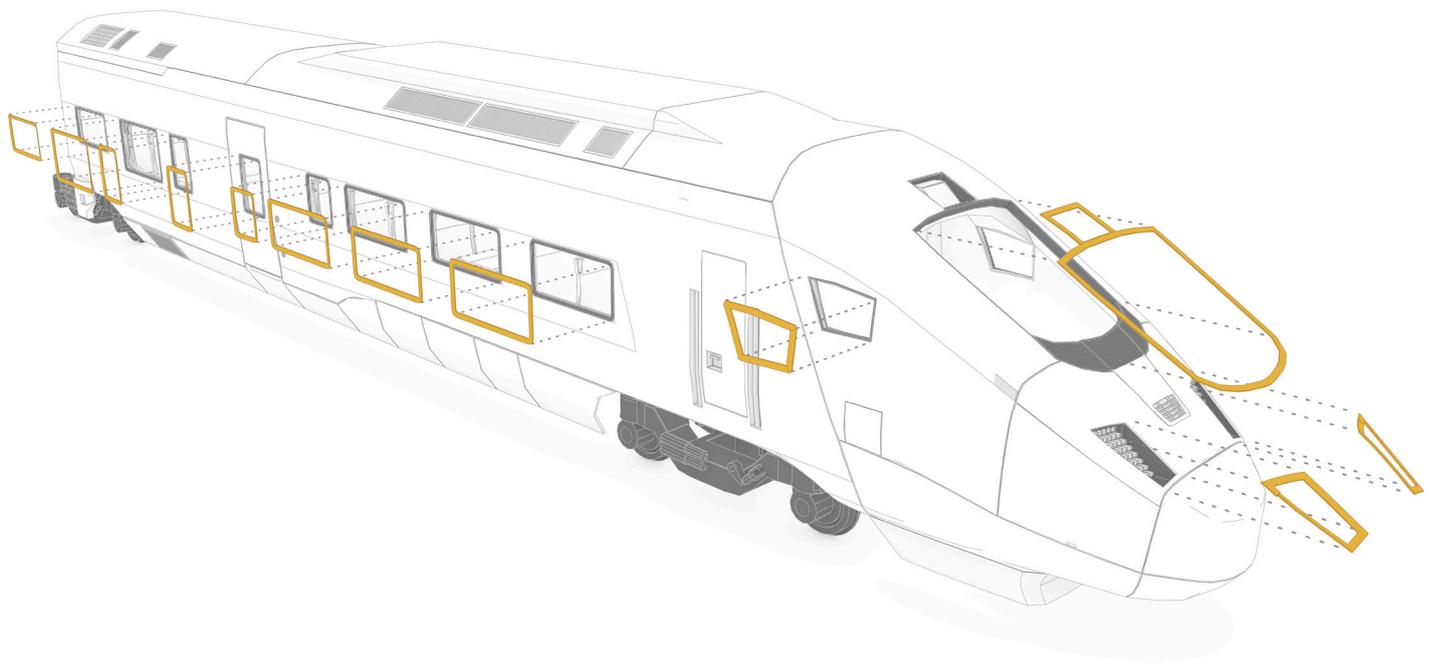
Two-component structural multi-purpose epoxy adhesives with wide adhesion range and excellent mechanical performance to dynamic loads

DIRECT GLAZING

For over 30 years, Sika has been providing the Automotive and Transportation market including rail vehicle manufacturers with adhesives and sealants for direct glazing applications. Innovative systems with excellent workability, fast curing speed and improved ecology are at offer in order to simplify and improve the manufacturing processes.

Sika offers a specifically for the rail market designed adhesive and sealing system for direct glazing applications. It allows easy setting and long open time. Sikaflex®-268 and Sikaflex®-558 systems can be used in combination with dedicated acceleration pastes using pumps or the

highly innovative hand solution called PowerCure. Those systems provide the ultimate key for OEM's seeking excellent mechanical properties with shortest possible full cure time and provide the opportunity to have the same accelerated system from line application to repair.



"Significant reduction and simplification from production to repair can be achieved through the use of unique Sika adhesives and sealant systems together with one-step pretreatment solutions."



BENEFITS

- Very good processing and tooling characteristics
- Hand applied accelerated system available
- Accelerated systems – also for open joints
- Resistant against a wide range of rail cleaning agents
- Excellent weathering stability



PRODUCTS

Sikaflex®-268

Sikaflex®-268 PowerCure

Sikaflex®-268 + SikaBooster®-20 S

Sikaflex®-558

Sikaflex®-558 PowerCure

Sikaflex®-558 + SikaBooster®-30 STP

PRODUCT DESCRIPTION

All in one adhesive/sealant system with very good ageing and weathering resistance and accelerated sealing capability

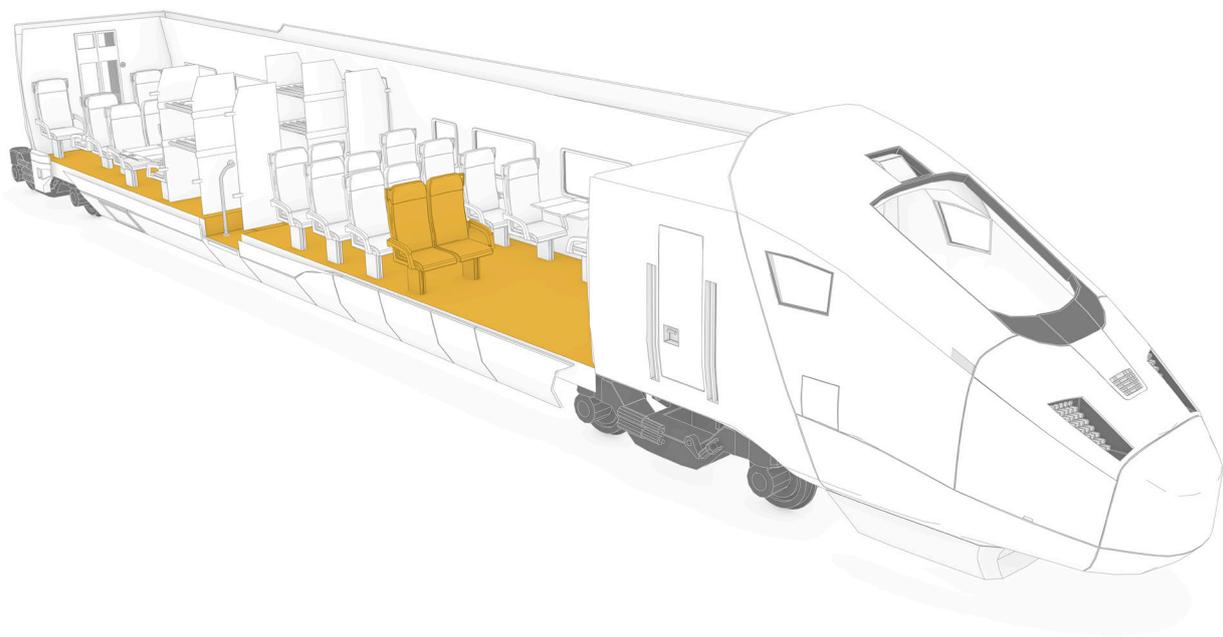
All in one isocyanate free, STP based adhesive/sealant system with very good ageing and weathering resistance and accelerated sealing capability

INTERIOR TRIM

Rail vehicle interiors not only need to have a high quality finish. The floors, seats and other components need to have high durability against wear and therefore long life expectancy in order to meet the day-to-day requirements of transporting people in high numbers. Railway operators want this high performance and reliability from their interiors as repairs and breakdowns are costly and disruptive.

Sika has developed several hotmelt, solvent-based and water-based solutions to ensure strong and durable adhesion to the substrates used. SikaSense® and SikaMelt® technologies provide the required performance for lamination of a variety

of interior applications including carpets, PVC floors, pillar trims and seat assemblies. The fire rated Sikaflex® sealants are used to provide a tight and permanent seal for interior joints thanks to their elastic and durable behavior.



"Various aspects like operational temperature range and ecology in conjunction with low cost and limited cycle times must be considered in the production process of interior trim made of plastics and fabrics for trains and trams."



BENEFITS

- Enhanced aesthetics via elimination of visible fixings
- Broad substrate compatibility
- Fast production process
- Improved water and moisture leak resistance
- Improved sound and vibration damping



PRODUCTS

SikaSense®-4490

SikaSense®-4600

SikaMelt®-9209 HT

SikaMelt®-9600 FS

Sikaflex®-821 FR

Sikaflex®-858 FR

PRODUCT DESCRIPTION

One-component, solvent-free, universal pressure-sensitive dispersion adhesive

One-component, solvent based, fast contact adhesive with high initial strength

All-rounder PSA hot melt with high cohesion and peel strength

Textile lamination PUR hot melt with high final strength and flexibility

Fire rated sealant in acc. EN 45545-2 for interior applications, meets HL2

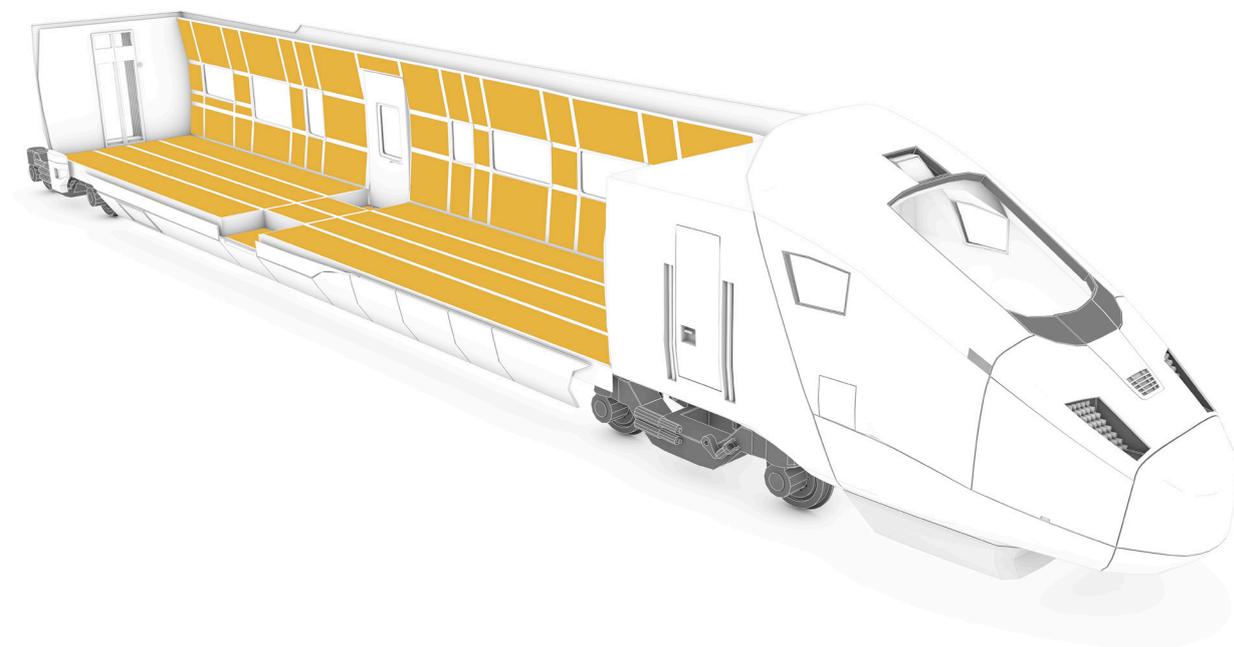
Fire rated STP sealant in acc. EN 45545-2 for interior applications, meets HL3

UNDERBODY COATING AND ACOUSTIC

Public transport operators and government bodies are demanding high standards for interior and exterior vehicle noise. Sika offers high-technology solution to facilitate significant reductions in vehicle noise via absorption of vibration within the vehicle body.

Sika provides with Sikagard®-6682 a product which can be used for interior or exterior noise damping as well as underbody coating. It not only shows excellent sound

deadening behavior but as well best in class stone chip resistance together with phenomenal working characteristics.



"Public transport companies and passengers itself have increasing demands on comfortable journeys. Various solutions from Sika are helping to significantly reduce vibrations, acoustic and impact noise."



BENEFITS

- Excellent sound damping characteristics
- Easy workability and processing
- High resistance to abrasion
- Broad adhesion range
- Can be installed in any area of assembly



PRODUCTS

Sikagard®-6682

PRODUCT DESCRIPTION

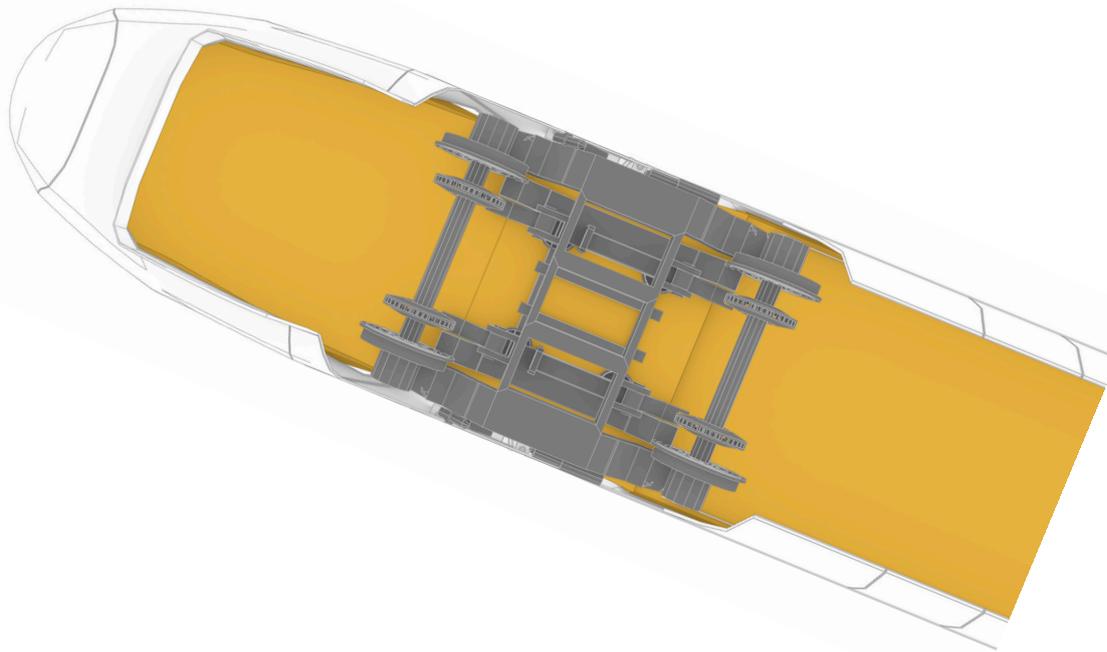
Water based sound deadening and anti chip underbody coating with excellent adhesion on e-coat and paints

FIRE PROTECTION COATINGS

Rail manufacturers and operators as well as governmental bodies treat safety concerns as an absolute number one. Passenger must be transported with a minimal risk and it is not without reason that the rail sector is one of the safest mode of transportation. Many active and passive safety features are built into a train. Sika offers solution to improve the safety of rail vehicles, so once an accident happens passenger can be evacuated with sufficient time.

Sika®Pyroplast® Wood and Sika®Unitherm® Platinum are intumescent fire protection coatings for wood and steel substrates. The systems prevent the fire spreading and build an insulation layer by foaming and forming a carbonic char. Sika®Pyroplast® Wood can be used for wood floors.

The product will prevent the wood from catching fire. Sika®Unitherm® Platinum is dominantly used on metal substrates. In addition to its intumescent function, it provides excellent abrasion resistance and corrosion protection.

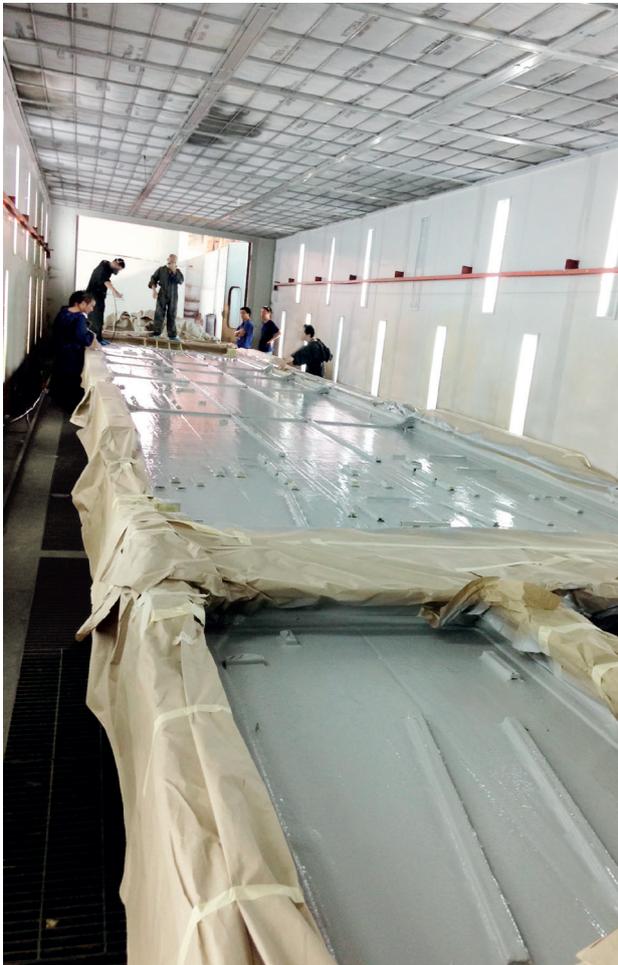


"Rail vehicles and especially metro trains must incorporate a lot of safety features as those trains operate underground and in tunnels. Sika introduced a system of fire protection coatings to stop the fire spreading and provide additional time for evacuation."



BENEFITS

- Prevents the fire to spread
- Makes substrates incombustible
- High mechanical strength
- Fast curing
- Water based formulations



PRODUCTS

Sika® Pyroplast® Wood

Sika® Untherm® Platinum

PRODUCT DESCRIPTION

Easy to use, water based fire protection coating for interior wood substrates

Solvent free, epoxy resin based intumescent fire protection coating for internal and external applications

Other products available. Product/system choice will be defined based on specific customer needs.

SERVICE AND SUPPORT

Sika is dedicated to providing and maintaining the highest quality standards with its products and services. Therefore, local presence with global reach and dedicated sales teams supported by world class technical service and engineering support is of very high importance to Sika.



The global and local organizations are dedicated to provide customers with innovative solutions, experience and knowledge. Our teams help from the idea through to the design stage and until completion of projects with:

- Organization and project-specific material and durability tests performed by qualified laboratories
- Supplying technical documentation to support design, simulation and manufacturing processes in order to achieve high quality
- Helping determine the best fit for production setups by building up similar production processes in-house
- Supporting customers independently with evaluation and setup of equipment such as pumps and dosing units, all the way up to fully automated cells
- Providing tailored customer application trainings, audits and seminars

RESEARCH AND DEVELOPMENT (R&D)

With about 70 patent applications every year, Sika is one of the most innovative companies in Switzerland. 20 global technology centers are the backbone of product development. This footprint offers access to a worldwide network of partners, suppliers and scientist to guarantee customer oriented solutions.

SUSTAINABILITY IMPACT ON TRANSPORTATION BUSINESS

- Energy-saving products
- Reduced material consumption
- Considerable weight savings
- Durable and long lasting systems
- EH&S friendlier solutions

SIKA INDUSTRY BRANDS

BRAND FAMILIES	DESCRIPTION
Sikaflex®	Prepolymer-based flexible adhesives and sealants for glazing, sealing, bonding, bedding and caulking in Automotive and Industry
SikaTack®	1-component or accelerated windshield adhesives (PowerCure)
SikaForce®	1- and 2-component polyurethane adhesives range from flexible to structural strength for industrial application
Sikasil®	Silicone-based sealants and adhesives for industrial applications
SikaMelt®	Reactive and non-reactive hot melt adhesives for industrial applications
SikaReinforcer®	2-component molded epoxy expandable foam with FRP carrier for selective reinforcement in vehicle structures
Biresin®	Casting resins for models, moulds, composites, special applications
SikaBlock®	Tooling boards for model making
SikaFast®	1- and 2-component adhesive systems based on advanced acrylic chemistry
SikaLastomer®	1-component butyl sealant systems
SikaDamp®	Butyl rubber-based products for acoustic damping
SikaPower®	1- and 2-component epoxy and epoxy-hybrid adhesives and sealants for body shop and industrial applications
SikaBaffle®	Thermoplastics or rubber-based products for acoustic insulating and sealing the vehicle cabin against noise, dust and in cavities of Automotive and Truck, granulate for moulding or co-extruded tape
SikaSense®	Water- and solvent-based 1- and 2-component adhesive systems, engineered to create an elastic, strong and durable bond on plastics, wood, synthetic, leather, cotton fibers or wood fibers
Sikagard®	Protective coating

GLOBAL BUT LOCAL PARTNERSHIP



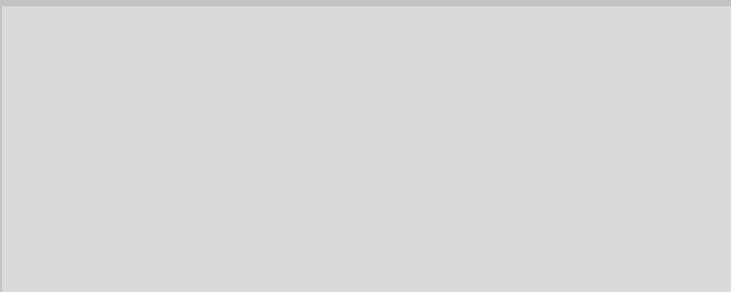
FOR MORE RAIL INFORMATION:



www.sika.com/rail

WHO WE ARE

Sika is a specialty chemicals company with a leading position in the development and production of systems and products for bonding, sealing, damping, reinforcing and protecting in the building sector and automotive industry. Sika has subsidiaries in 97 countries around the world and manufactures in over 190 factories. Its more than 17,000 employees generated annual sales of CHF 5.75 billion in 2016.



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



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BUILDING TRUST

