

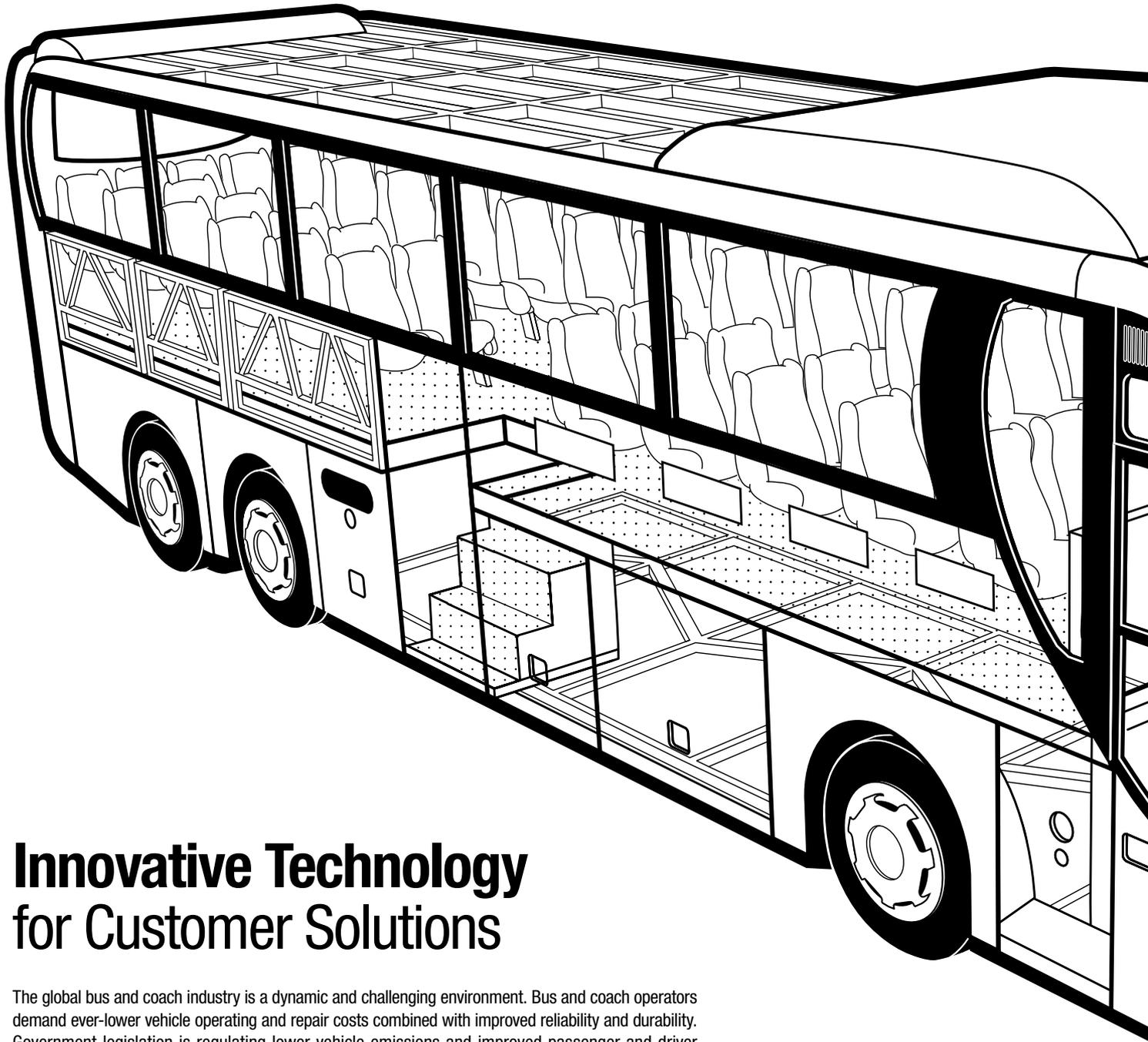
Industry



Bus & Coach

Innovative Technology for Customer Solutions

Sika®

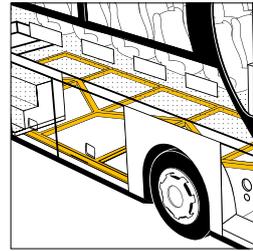
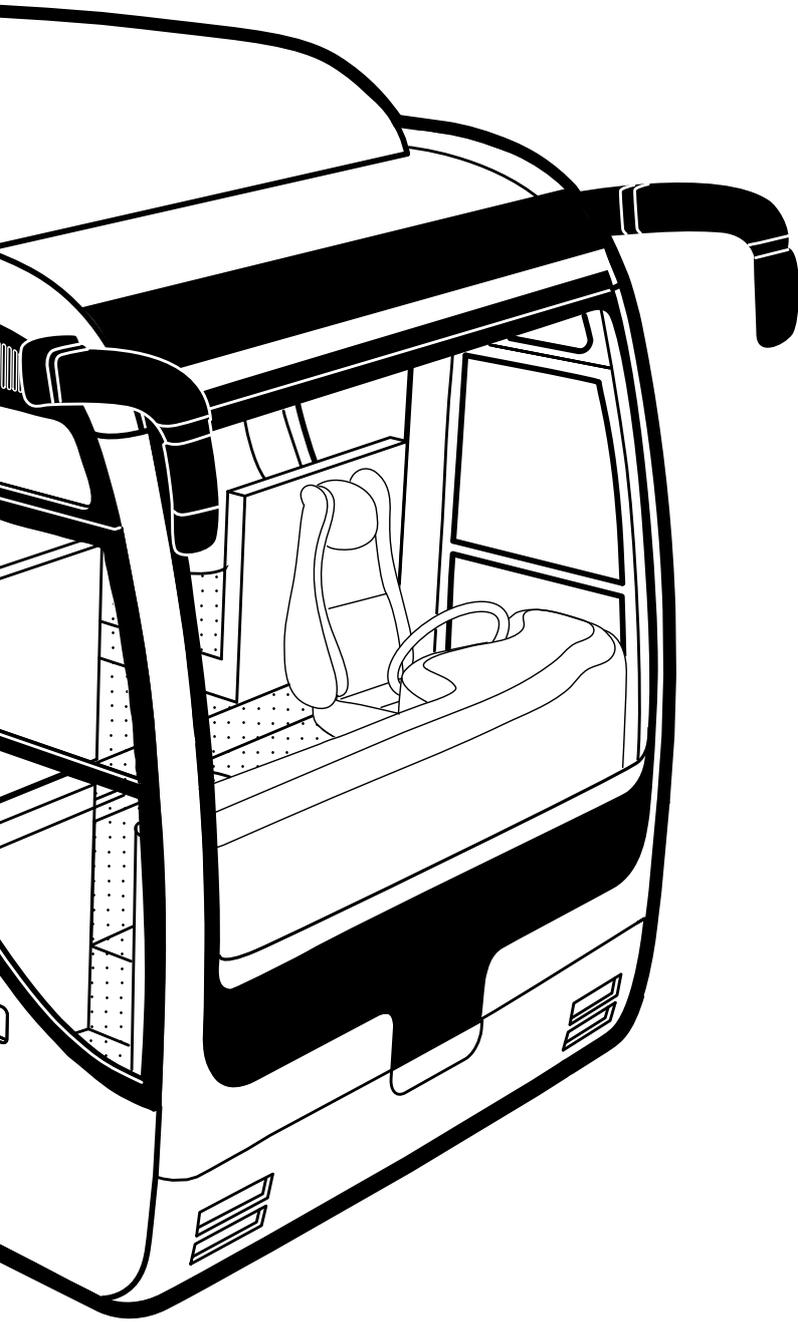


Innovative Technology for Customer Solutions

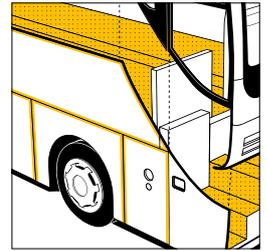
The global bus and coach industry is a dynamic and challenging environment. Bus and coach operators demand ever-lower vehicle operating and repair costs combined with improved reliability and durability. Government legislation is regulating lower vehicle emissions and improved passenger and driver safety. Sika, as supplier and partner to the global bus and coach industry, provides a range of state-of-the-art technology solutions to assist manufacturers in meeting these challenges. As a speciality company for chemical products, we concentrate on our core competencies: bonding, sealing, damping and reinforcing.

As a globally operating company, we are partner to our customers worldwide. Sika is represented with its own subsidiaries in all bus and coach producing countries, thus ensuring first-class order handling and delivery, as well as application, technical and commercial support.

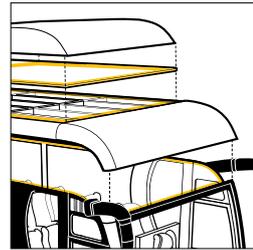
Content



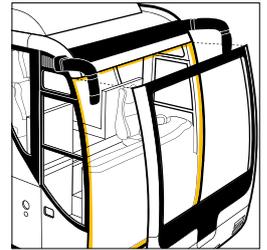
Body Structure_4



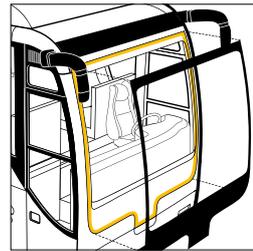
Floor, Side Panels & Luggage Doors_6



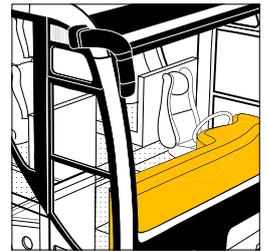
Roof Bonding_8



Front and Rear Module_10



Direct Glazing_12

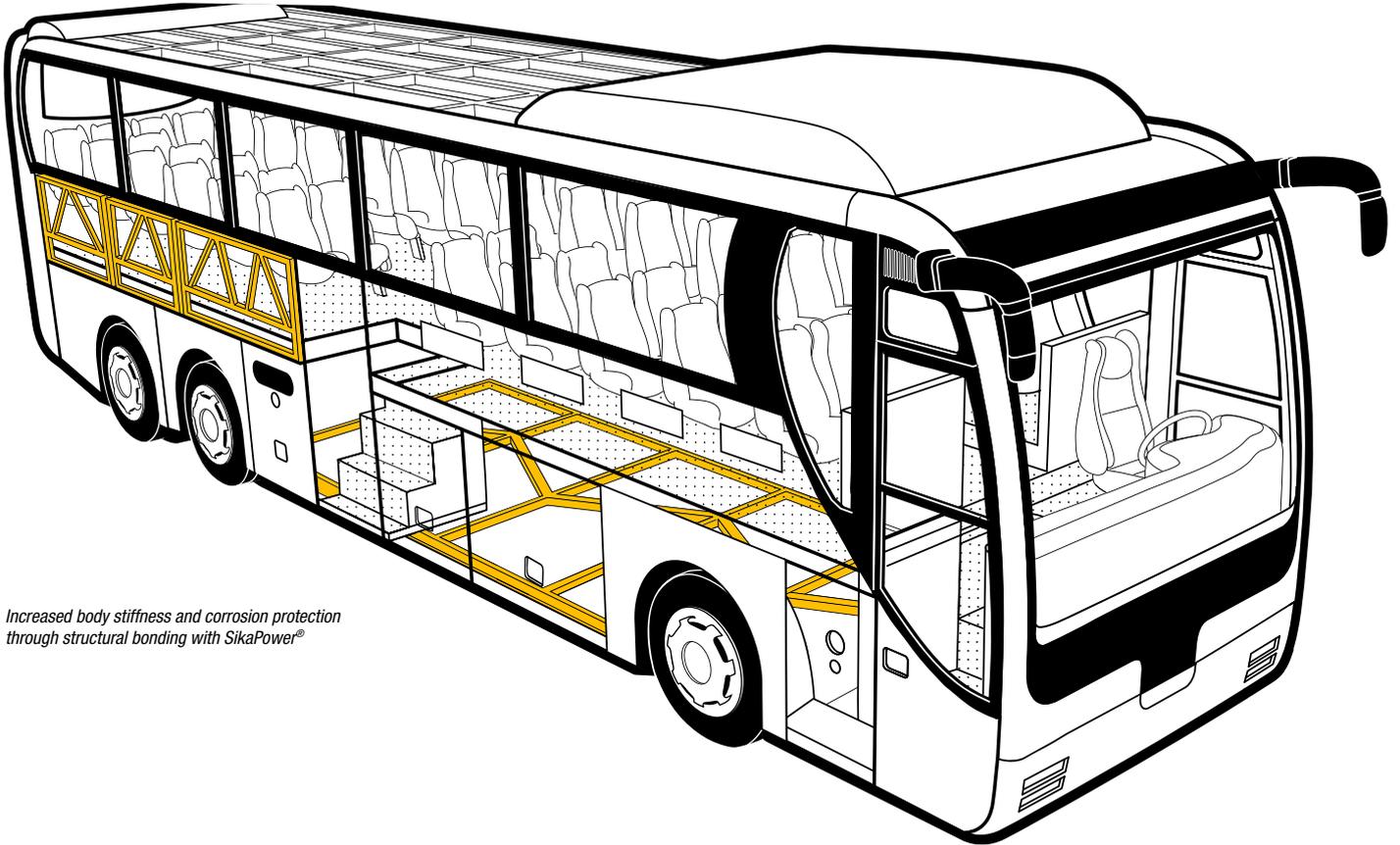


Interior Trim_14



Acoustic Management_16

Body Structure



Increased body stiffness and corrosion protection through structural bonding with SikaPower®

Bus and coach manufacturers utilise a wide range of materials and processes in the assembly of the body structure. Sika provides a range of material technologies ideally suited to these challenging and diverse environments. SikaPower® structural adhesives are easy to combine with other joining technologies. Flexibility, durability and a reduction in the number of spot welding points are just some of the advantages provided by this sealing and bonding technology.

SikaPower® body shop adhesives and sealants are heat-curing products based on one- and two-component PUR-epoxy hybrid technology. SikaPower® products are available with a wide range of mechanical properties to suit the requirements of applications as diverse as anti-flutter, hem flange, stiff structural bonding and crash-resistant spot weld applications.

Bonded aluminium bus structure



Why Use Structural Adhesives?

- Enhances component stiffness to facilitate weight reduction and improvements in fuel economy
- Improves component crash resistance to enable improved vehicle safety
- Minimises risk of water leakage
- Reduces noise, vibration and harshness
- Enables use of optimum substrate for each application via elimination of the requirements of weld compatibility

Technological Benefits

- Adhesion to oiled metals without pre-treatment or degreasing
- Excellent ageing and long-term durability
- Superb wash-out resistance
- Low bake curing to improve object temperature variations
- Solvent and PVC free
- One- and two-component systems to suit OEM¹⁾ process requirements

Future Trends for Body Structure

- Increased use of automotive OEM E-coat/KTL process for bus and coach manufacturers
- Use of advanced composites for structural applications
- Lower temperature bake conditions for corrosion protection oven for low to medium volume manufacturers

1) Original Equipment Manufacturer

Best Recommended Sika Products

Features & Benefits

SikaPower®-415 P1

Excellent adhesion on oily substrates; heat cured; excellent seam sealing properties

SikaPower®-460 C1

Excellent dimensional bead stability with broad tolerance range; optimum read through resistance; pre-curing not required; high-performance corrosion protection; excellent mechanical properties

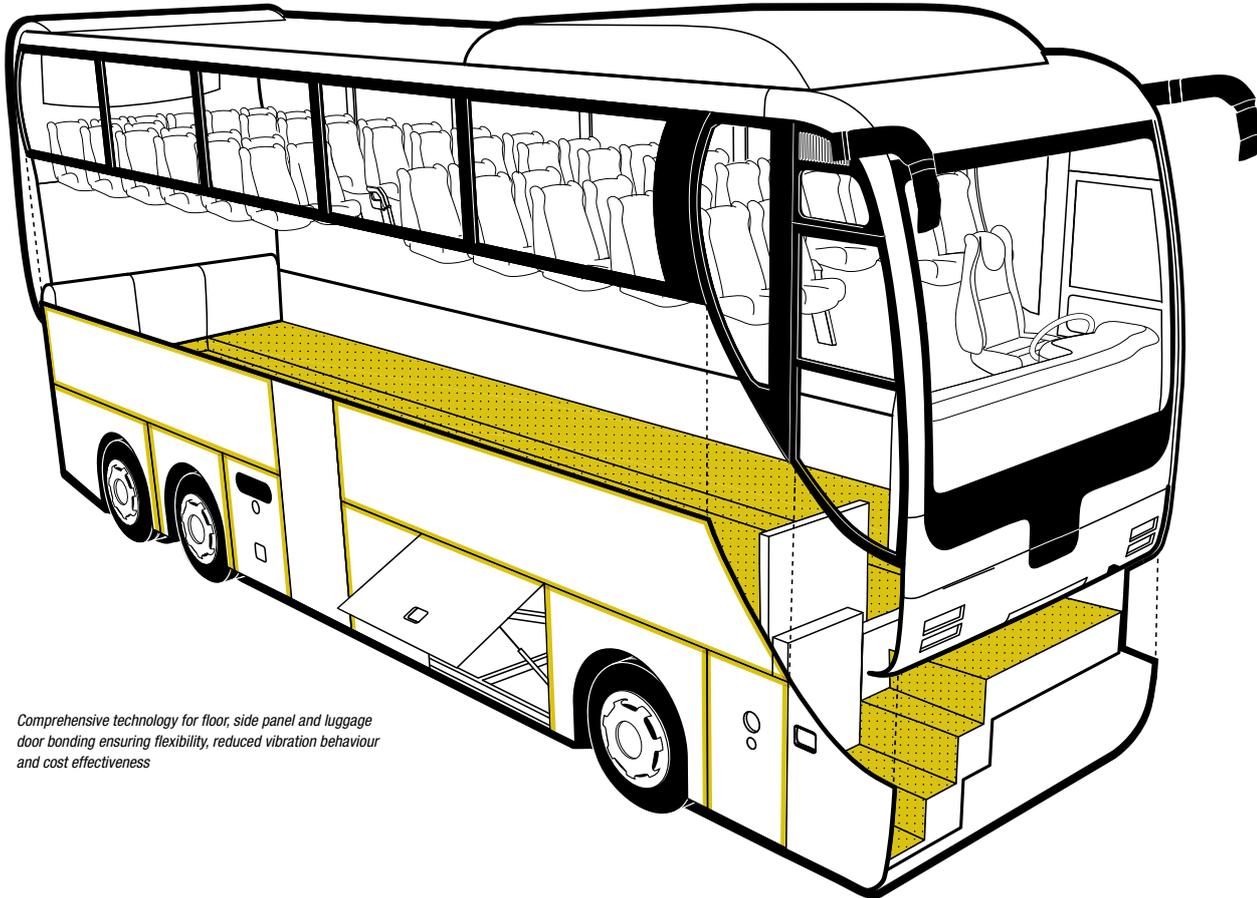
SikaPower®-496

Excellent adhesion on oily substrates; high-performance structural adhesive; heat cured; crash/impact-resistant system

SikaFast®-3000 Series

High tensile properties, elasticity and impact resistance; excellent adhesion profile; gap-filling capability

Floor, Side Panels & Luggage Doors



Comprehensive technology for floor, side panel and luggage door bonding ensuring flexibility, reduced vibration behaviour and cost effectiveness

Bus and coach operators expect high levels of durability from their vehicles. Resistance to impact, extreme temperature conditions and round the clock operation make extreme demands on all areas of the vehicle. Sika has formulated a range of elastic bonding solutions for floor and side panel assembly to enable vehicle manufacturers to satisfy these challenging demands.

Sikaflex® provides high-performance elastic assembly within an easy-to-use one-component formulation. Sikaflex® hybrid technology provides the high performance of Sikaflex® polyurethane systems combined with reduced substrate preparation and improved ecological benefits. Sikaflex®-254 Booster provides the high-performance attributes of Sikaflex®, combined with rapid full cure due to the combination with Sika's proprietary Booster system. SikaForce® two-component polyurethane combines high strength with good flexibility. SikaFast® two-component methyl methacrylate and ADP (Acrylic Double Performance) structural adhesives provide high strength and excellent impact resistance with low surface preparation. SikaPower® body shop structural adhesives and sealants are heat-curing products based on one- and two-component PUR-epoxy hybrid technology.

Why Use Adhesives?

- Bonded assemblies are better able to withstand shock and impact, minimising repair costs and frequency
- Use of adhesives and sealants does not damage the vehicle corrosion protection layer, therefore reducing the likelihood of repair
- Adhesive systems absorb vibration, improving interior and exterior vehicle noise levels
- Bonding shows aesthetic and process advantages against mechanical fixing methods

Technological Benefits

- Improved impact resistance
- Enhanced aesthetics and aerodynamics via elimination of visible fixings
- No damage to corrosion protection system
- Excellent resistance to harsh climatic conditions
- Improved water and moisture leak resistance
- Improved sound and vibration damping

Future Trends for Floor & Side Panels

- Increased use of advanced composites
- Use of more environment-friendly paint systems
- Possible implementation of challenging side impact safety legislation

Best Recommended Sika Products

Features & Benefits

Sikaflex®-221

High-quality multi-purpose sealant, suitable for making permanent elastic seals of high strength

Sikaflex®-252

Structural assembly adhesive for flexible joints subjected to dynamic stresses

Sikaflex®-254

Extremely easy to use; long open time with fast curing time; multi-purpose system; widely OEM approved

Sikaflex®-254 Booster

Fast curing; 'failsafe' systems cures even in the absence of Booster Paste; good mechanical properties and adhesion

Sikaflex®-552

Excellent adhesion properties (especially galvanised steel); ecology friendly; bonds and seals; suitable for exterior joints

SikaFast®-3000 Series

High tensile properties, elasticity and impact resistance; excellent adhesion profile; gap-filling capability

SikaFast®-5000 Series

High mechanical properties; fast curing with long open times; excellent adhesion profile; low odour

SikaForce®-7752 L09

Fast curing; high stiffness; excellent adhesion profile; good tooling behaviour; gap-filling capability

SikaPower®-460 C1

Excellent dimensional bead stability with broad tolerance range; optimum read through resistance; pre-curing not required; high-performance corrosion protection; excellent mechanical properties

SikaLastomer®-710

Excellent sound damping

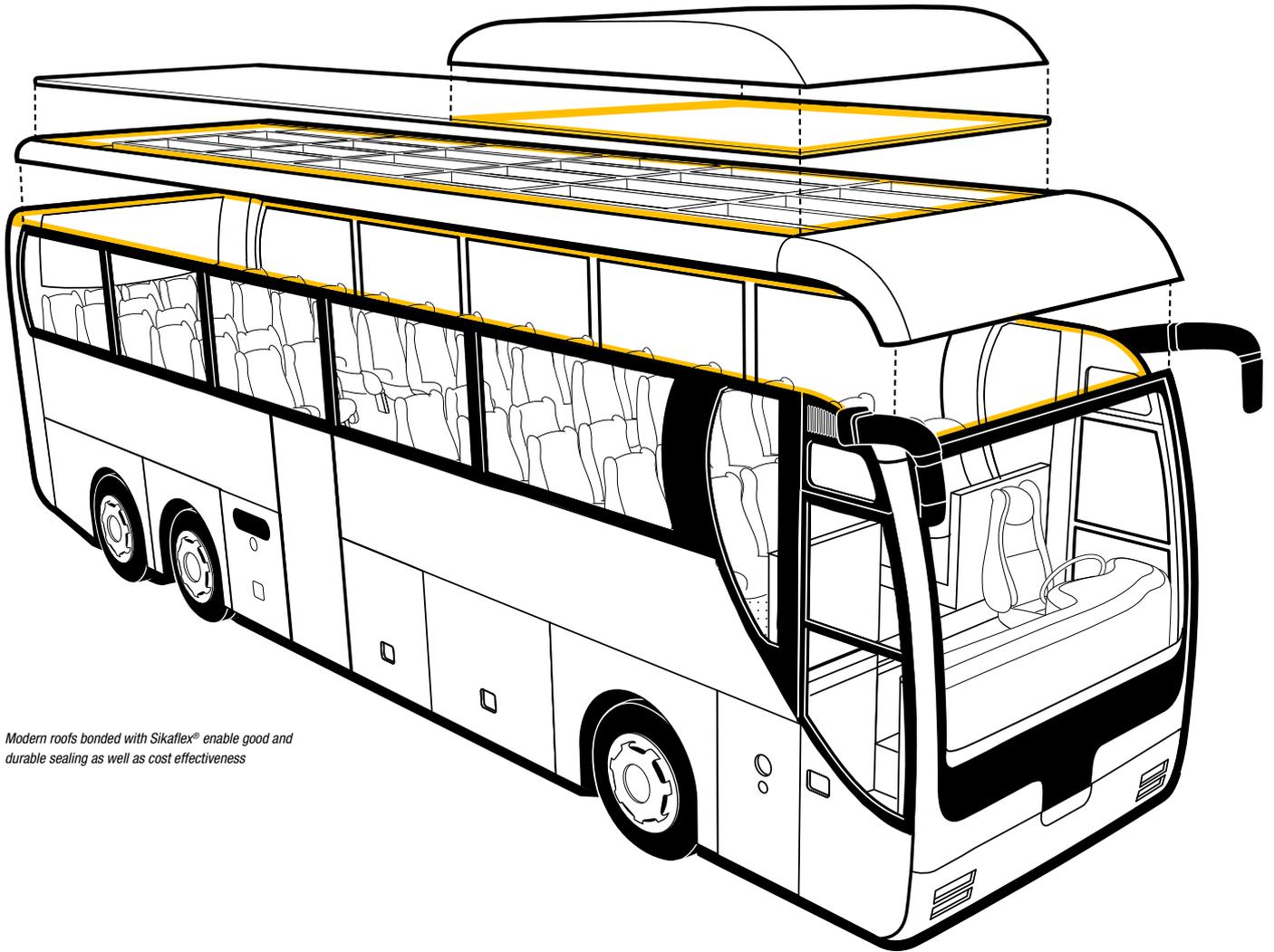


Bonded wooden floor



Bonded aluminium side panel

Roof Bonding



Modern roofs bonded with Sikaflex® enable good and durable sealing as well as cost effectiveness

Bus and coach manufacturers face particularly tough challenges for construction of roof assemblies for modern bus and coach vehicles. Apart from obvious requirements for long-term durability and resistance to harsh climates, additional requirements include lowest possible weight (vehicle handling and fuel economy), highest possible strength (roll-over resistance for occupant safety) and increased functional complexity (air conditioning units, sunroof apertures). Sika has developed a range of speciality formulations with ideal characteristics to enable vehicle OEM's to meet these requirements with optimum quality, consistency and cost.

Sikaflex® provides high-performance elastic assembly within an easy-to-use one-component formulation. SikaForce® two-component provides the high performance of polyurethane systems combined with long open time and process advantages. SikaPower® structural adhesives and sealants are heat-curing products for metal bonding applications based on one- and two-component PUR-epoxy hybrid technology.

Why Use Bonded Roof Panels?

- Bonded assemblies enable weight reduction versus mechanically fastened systems at the top of the vehicle, enabling weight reduction (better fuel economy and emissions) and optimising vehicle driving characteristics and active safety
- Use of adhesives and sealants does not damage the vehicle corrosion protection layer, therefore reducing the likelihood of repair
- Adhesive systems absorb vibration, improving interior and exterior vehicle noise levels
- Bonded and sealed systems provide enhanced water leakage resistance to minimise vehicle repair frequency and time

Technological Benefits

- Enhanced aesthetics and aerodynamics via elimination of visible fixings
- No damage to corrosion protection system
- Excellent resistance to harsh climatic conditions
- Reduced weight versus mechanical fastener based systems
- Improved water and moisture leak resistance
- Improved sound and vibration damping

Future Trends for Roof Panels

- Increased use of advanced composites
- Use of more environment-friendly paint systems
- Increased requirements for vehicle roll-over protection

Best Recommended Sika Products

Features & Benefits

Sikaflex®-221

High-quality multi-purpose sealant, suitable for making permanent elastic seals of high strength

Sikaflex®-254

Extremely easy to use; long open time with fast curing time; multi-purpose system; widely OEM approved

Sikaflex®-521 UV

Joint sealant with excellent UV, ageing and weather resistance, reduced substrate surface preparation needed. Solvent and VOC-free.

Sikaflex®-552

UV-stable assembly adhesive for sealing and bonding, excellent adhesion properties, ecology-friendly; suitable also for exterior joints

SikaForce®-7550

Joining of similar/dissimilar substrates; high stiffness; no thermal distortion or deformation; good tooling behaviour; good gap-filling capability

SikaPower®-460 C1

Excellent dimensional bead stability with broad tolerance range; optimum read through resistance; pre-curing not required; high-performance corrosion protection; excellent mechanical properties

SikaPower®-496

Excellent adhesion on oily substrates; high-performance structural adhesive; heat cured; crash/impact-resistant system



Bonding of aluminium roof onto aluminium frame

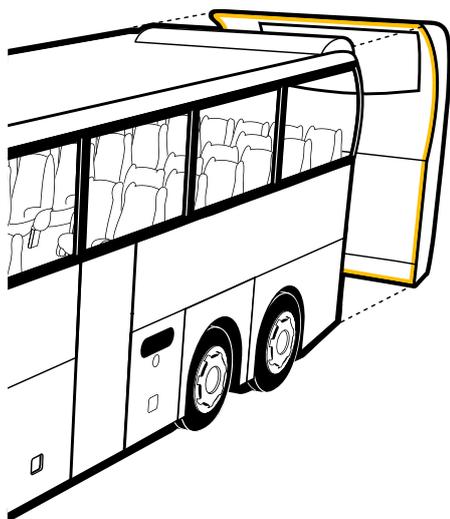
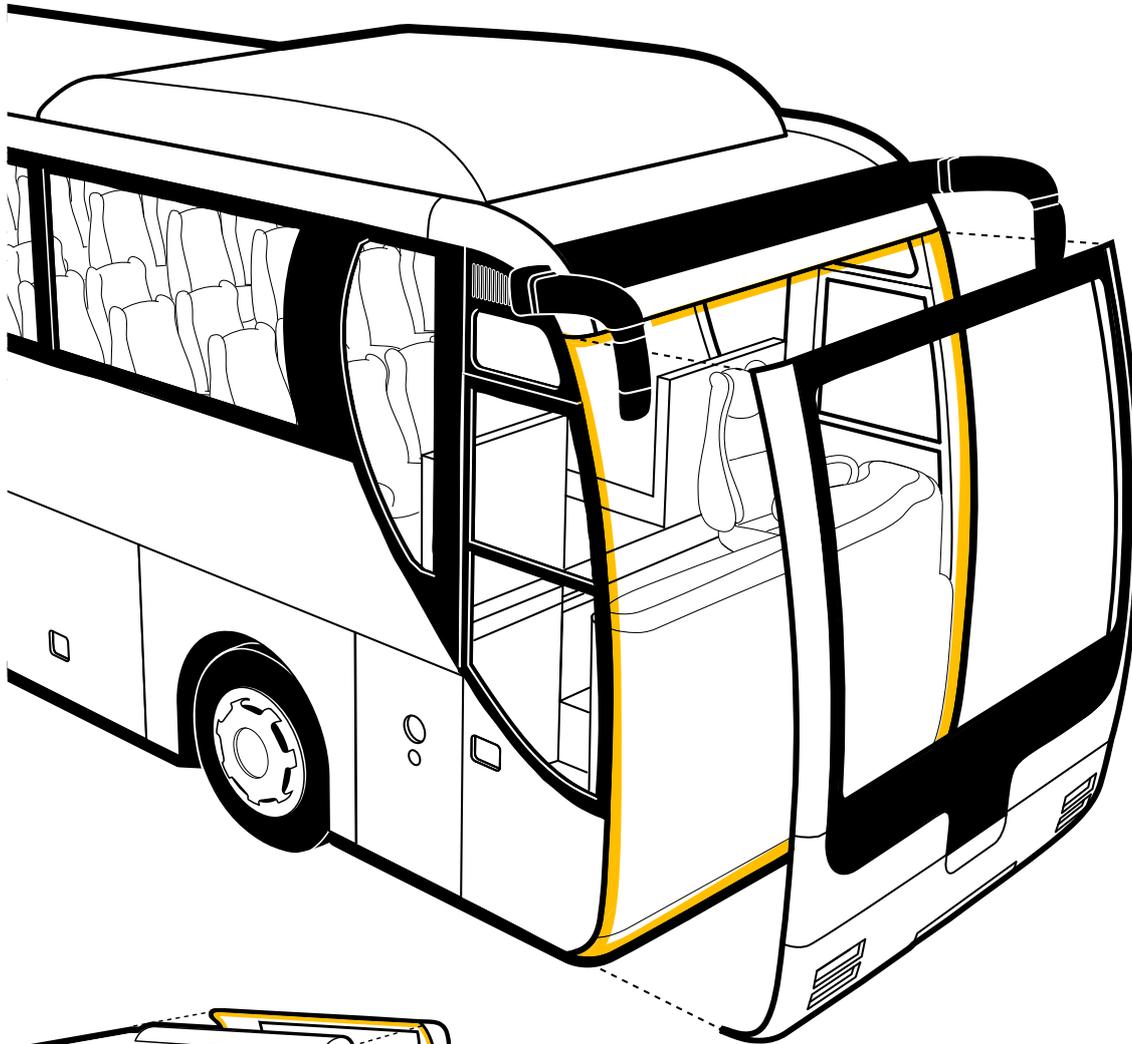


Bonded air conditioning device on roof



Bonded aluminium roof

Front & Rear Module



Bonding of glass fibre reinforced plastic (GRP) masks provides tremendous benefits compared to other fixation methods

The last ten years have seen a dramatic improvement in the aerodynamics and styling of bus and coach vehicles. The front and rear modules of modern vehicles are two of the most visible indicators of such changes. The use of thermoset composites is now common for such applications, and has enabled dramatic changes in vehicle styling and aerodynamic behaviour to be achieved. In addition to these changes, such applications must comply with ever-tougher durability, impact and ease-of-assembly requirements. Sika has formulated a range of materials to exceed customer requirements for this challenging application.

Sikaflex® provides high-performance elastic assembly within an easy-to-use one-component formulation. Sikaflex® hybrid technology provides the high performance of Sikaflex® polyurethane systems combined with reduced substrate preparation and improved ecological benefits. Sikaflex®-254 Booster provides the high-performance attributes of Sikaflex®, combined with rapid full cure due to the combination with Sika's proprietary Booster system. SikaFast® two-component methyl methacrylate structural adhesives provide high strength and excellent impact resistance with low surface preparation.

Multiple bonded plastic parts at bus front



Assembly of GRP rear module onto aluminium structure



Why Bond Front & Rear Mask Applications?

- Bonded assemblies enable weight reduction versus mechanically fastened systems enabling better fuel economy and emissions
- Use of adhesives and sealants does not damage the vehicle corrosion protection layer, therefore reducing the likelihood of repair
- Adhesive systems absorb vibration, improving interior and exterior vehicle noise levels
- Bonded and sealed systems provide enhanced water leakage resistance to minimise vehicle repair frequency and time

Technological Benefits

- Improved moisture and water sealing
- Enhanced sound and vibration damping
- Rapid assembly
- High-performance adhesion
- Excellent impact resistance
- Ability to withstand different CLTE (Coefficient of Linear Thermal Expansion) between thermoset composites and metals

Future Trends for Front & Rear Mask Applications

- Greater use of advanced composites
- Possible use of thermoplastic composites such as GMT (Glass mat reinforced Thermoplastic Composite) and LFI (Long Fibre Injection)

Best Recommended Sika Products

Features & Benefits

Sikaflex®-254

Extremely easy to use; long open time with fast curing time; multi-purpose system; widely OEM approved

Sikaflex®-254 Booster

Fast curing; 'failsafe' systems cures even in the absence of Booster paste; good mechanical properties and adhesion

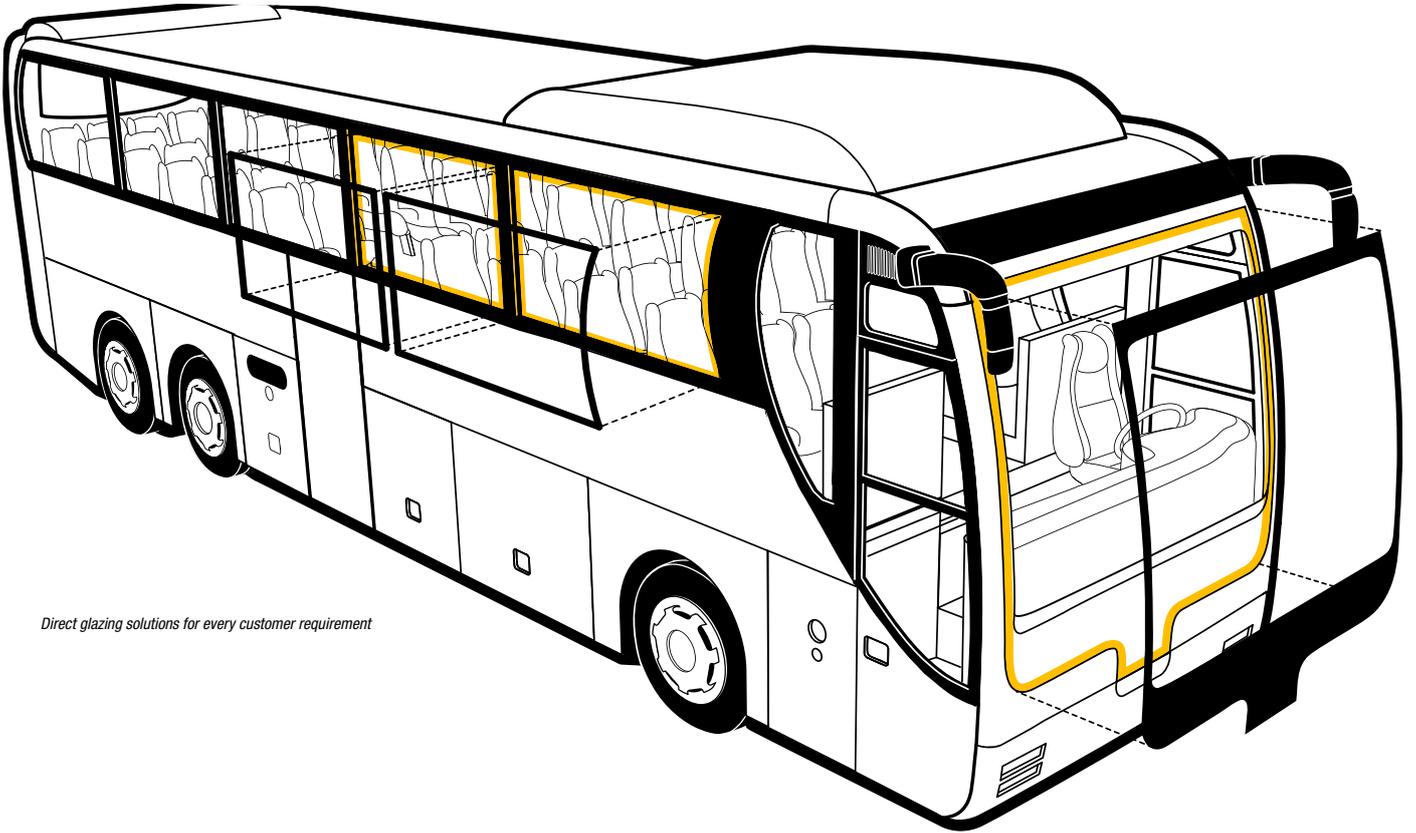
Sikaflex®-552

UV-stable assembly adhesive for sealing and bonding, excellent adhesion properties, ecology-friendly; suitable also for exterior joints

SikaFast®-3000 Series

High tensile properties, elasticity and impact resistance; excellent adhesion profile; gap-filling capability

Direct Glazing



Direct glazing solutions for every customer requirement

For over 20 years, Sika has been providing bus & coach, automotive, truck and rail OEM assembly lines with adhesive and sealant solutions for sealing, bonding and direct glazing. Primerless, manual and automated pre-treatment options are available to fit the needs of a variety of OEM application processes in order to create significant cost savings and manufacturing process simplification.

Sika offers a wide range of adhesive technologies to suit all direct glazing applications. Specific Sikaflex® solutions are available to suit cold, warm and hot application processes. Proprietary Sikaflex® materials are capable of retaining the glass in position following installation, allowing for elimination of secondary clips, fixings and tape. Sikaflex® materials can also provide low electrically conductive properties for elimination of galvanic corrosion/antenna signal loss. The SikaTack® Plus Booster range provides the ultimate solution for OEM's seeking excellent mechanical properties with the shortest possible full cure time. Unlike traditional two-component systems, this boosted one-component system has the significant benefit of full material cure irrespective of the presence of the accelerator paste, providing enhanced process/quality consistency and security.

Why Direct Glaze?

- Increased body stiffness for enhanced roll-over strength and improved occupant impact protection
- Enhanced aerodynamics versus gasket glazed systems to improve fuel economy and vehicle emissions
- Higher body stiffness to reduce noise, vibration and harshness within the vehicle body

Technological Benefits

- Sika's tried and tested primerless to glass technology
- Primerless to paint
- Accelerated with Sika® Booster for rapid full cure
- Low conductivity
- High initial green strength
- Hot applied systems to eliminate secondary clips, fixings and tape

Future Trends for Direct Glazing

- Increased use of thermoplastic side glazing systems for enhancements in weight reduction and crash resistance
- Elimination of primers and surface pre-treatments

Best Recommended Sika Products

Features & Benefits

Sikaflex®-222 UV

Ideal for use with organic glass; easy application; suitable for bonding & sealing; compatible with PC (Polycarbonate) and PMMA (Polymethylmetacrylate) with proprietary Sika surface preparation system; high elasticity and low modulus

Sikaflex®-250 PC

Warm applied system; high green strength enables reduction in clips, fixings and tape; good tooling behaviour; widely OEM approved; excellent adhesion characteristics

Sikaflex®-265

Extremely easy to use; suitable for bonding & sealing; large gap-filling capabilities; excellent aesthetics with a smooth surface finish; long open time; the bus/coach industry standard for direct glazing!

SikaTack® Plus Booster

Fast curing; 'failsafe' systems cures even in the absence of Booster paste; good mechanical properties and adhesion



Gap-filling of windscreen



Finished glass installation including gap-filling

Interior Trim



Substantial technology for lamination and assembly bonding of interior

Vehicle owner operators have driven a significant increase in interior comfort and functionality in recent years, requiring the use of an increasingly diverse mix of interior plastics and fabrics. Performance requirements for interior components have increased, with higher operational temperature requirements, improved emissions/environmental performance needs and reduced component cost/cycle time in production. Sika has developed several hot melt, solvent-based and water-based solutions to create strong adhesion to many substrates. SikaMelt[®], SikaTherm[®] and SikaSense[®] technologies are used in the lamination and bonding of a variety of interior applications including instrument panels, interior door trims, carpets, pillar trims, headliners, centre consoles, stowage bins and seat assemblies.

SikaMelt[®] offers customers a range of formulations to meet a variety of substrate and process requirements. SikaMelt[®] provides good initial green strength without pre-treatment, and is ideal for high-speed assembly operations.

SikaTherm[®] water-based adhesives are high-performance single and dual component polyurethane dispersion systems suitable for manual or automated application. SikaTherm[®] formulations are suitable for pressure and vacuum lamination, and are capable of meeting the highest durability and long-term ageing standards.

SikaSense[®] are solvent- and water-based adhesives used for floor covering applications and sound damping applications.



Bonded PVC floor



Bonded carpet

Why Use Sika Interior Trim Adhesives?

- No visible fixings
- Improved impact resistance and occupant safety
- Broad substrate compatibility allows for use of low cost materials in non-visible applications, thereby reducing overall component cost
- Lower vehicle weight via use of load distributing adhesive systems
- Reduced interior noise and vibration

Technological Benefits – SikaMelt®

- Low application weights
- Low reactivation temperatures
- High strength
- Good heat resistance
- Low fogging and carbon emission values
- Dry-cleaning resistant
- Fast tack development times
- Good adhesion to polypropylene

Technological Benefits – SikaTherm®

- One- and dual-sided adhesive application
- Low reactivation temperatures
- High strength
- Good heat resistance
- Low fogging and carbon emission values
- Short flash off times
- Good weather resistance
- Fast tack development times
- Broad substrate compatibility

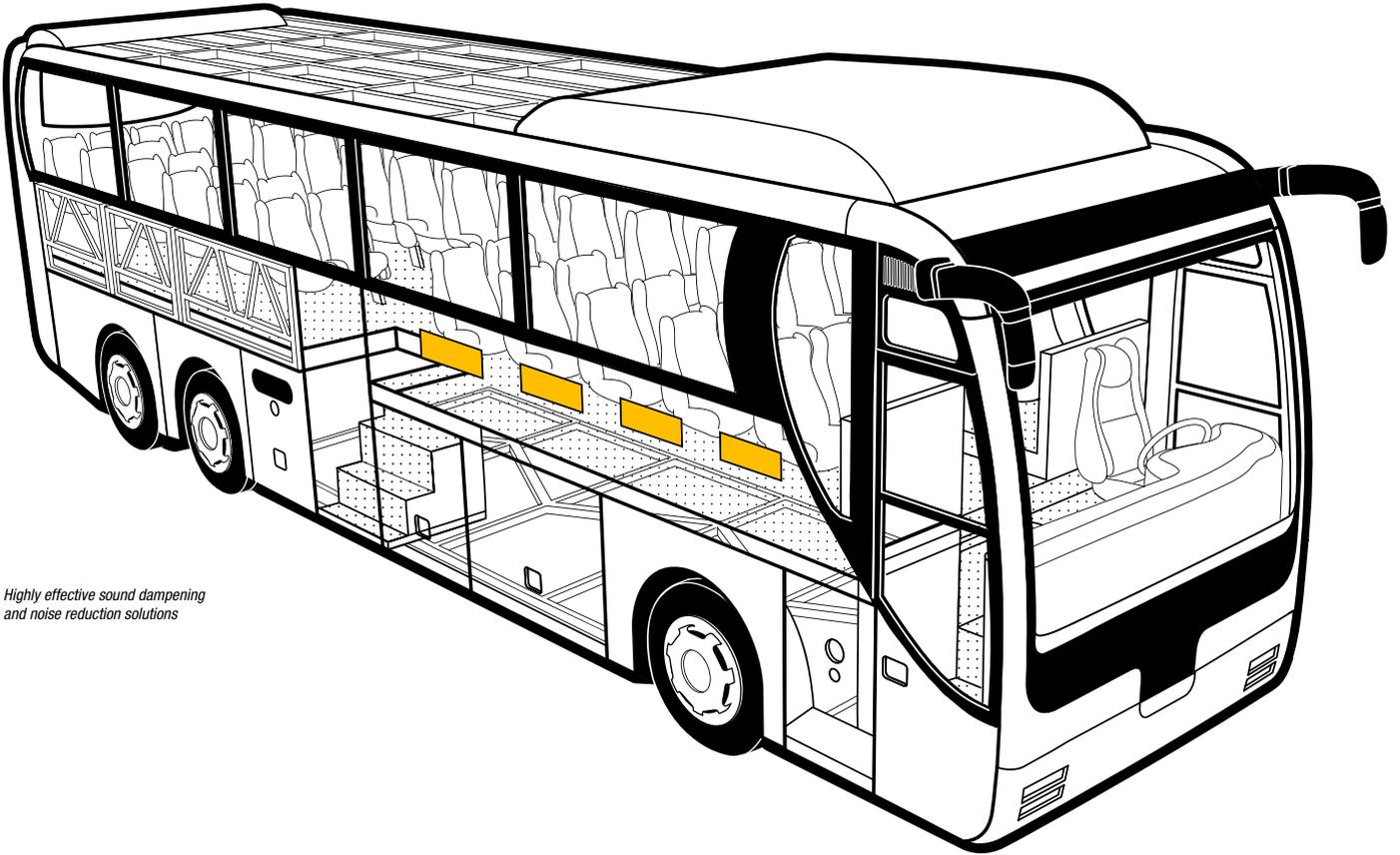
Technological Benefits – SikaSense®

- Excellent heat and ageing resistance
- Flexible characteristics
- Strong adhesion
- Broad substrate compatibility
- Wide range of open times

Future Trends for Interior Trim

- Increased use of polypropylene composites (talc, glass, wollastonite, etc.)
- Higher occupant impact protection standards
- Greater restrictions on the use of materials containing solvents and volatile organic compounds
- Enhanced recycling requirements for end-of-life vehicles
- Reduced interior noise and vibration

Acoustic Management



Highly effective sound dampening and noise reduction solutions

Bus & coach operators and government bodies are demanding ever-lower standards of interior and exterior vehicle noise. Sika has formulated a high-technology solution to facilitate significant reductions in vehicle noise via absorption of vibration within the vehicle body.

SikaDamp® spray-on technology is a unique, spray-applied damping solution designed to minimise interior noise through a flexible one-layer application. The spray-on material adheres to the electrode position coating to ensure maximum corrosion protection. The applied spray-on damper is heat cured and can be used prior to application of under body coating or exposure to paint bake ovens.



Why Use NVH (Noise, Vibration and Harshness) Solutions?

- Improved vehicle user comfort
- Enhanced compliance to vehicle noise regulations
- Improved fuel economy through weight reduction

Technological Benefits

- Reduction in noise and vibration
- Reduction in vehicle weight
- Clean, accurate and consistent application
- Excellent corrosion protection
- Flexible and adjustable application properties

Future Trends for Bus/Coach NVH Solutions

- More stringent requirements for lower exterior vehicle noise
- Greater operator demands for lower interior noise and vibration

Focusing on the Customer



Sika develops bonding, sealing, damping and reinforcing solutions in close co-operation with our customers in the bus industry. To Sika, this means not only developing best-in-class technology solutions to match our customers technical and commercial requirements, but also ensuring appropriate performance throughout the design, prototyping, validation and full production phases. Specialists in Sika's R&D (Research & Development), Technical Service, Systems Engineering and Application Technology concentrate on devising Research & Development appropriate client-oriented solutions.

Technology Centres

Sika Technology Centres are focused on the development of new materials. This allows Sika to actively promote technology development within the bus market, and to add value to the activities of our customers.

Technical Service

Sika Technical Service teams are located around the world, and are dedicated to provide best practice selection, validation and application of Sika materials. By being located close to our customers, Sika Technical Service can ensure optimum local language communication and understanding throughout the technical application development process to ensure best possible results for our customers.



CAD/CAE Supported Development

Sika concentrates on Computer Aided Design and Engineering of structurally reinforcing process materials. As our customers increasingly use static and dynamic simulation tools to design, develop and validate new vehicle structures, Sika has the expertise and competence to support vehicle development programmes in the appropriate software coding utilised by our customers.

System Engineering

Application Technology is a key success factor in the use of adhesives and sealants. Sika's System Engineering Competence Centre focuses on this important task and develops application parameters and systems aimed at holistic solutions for our clients. This includes pumping and application systems as well as automated robotic equipment specifically designed to meet individual customer needs.

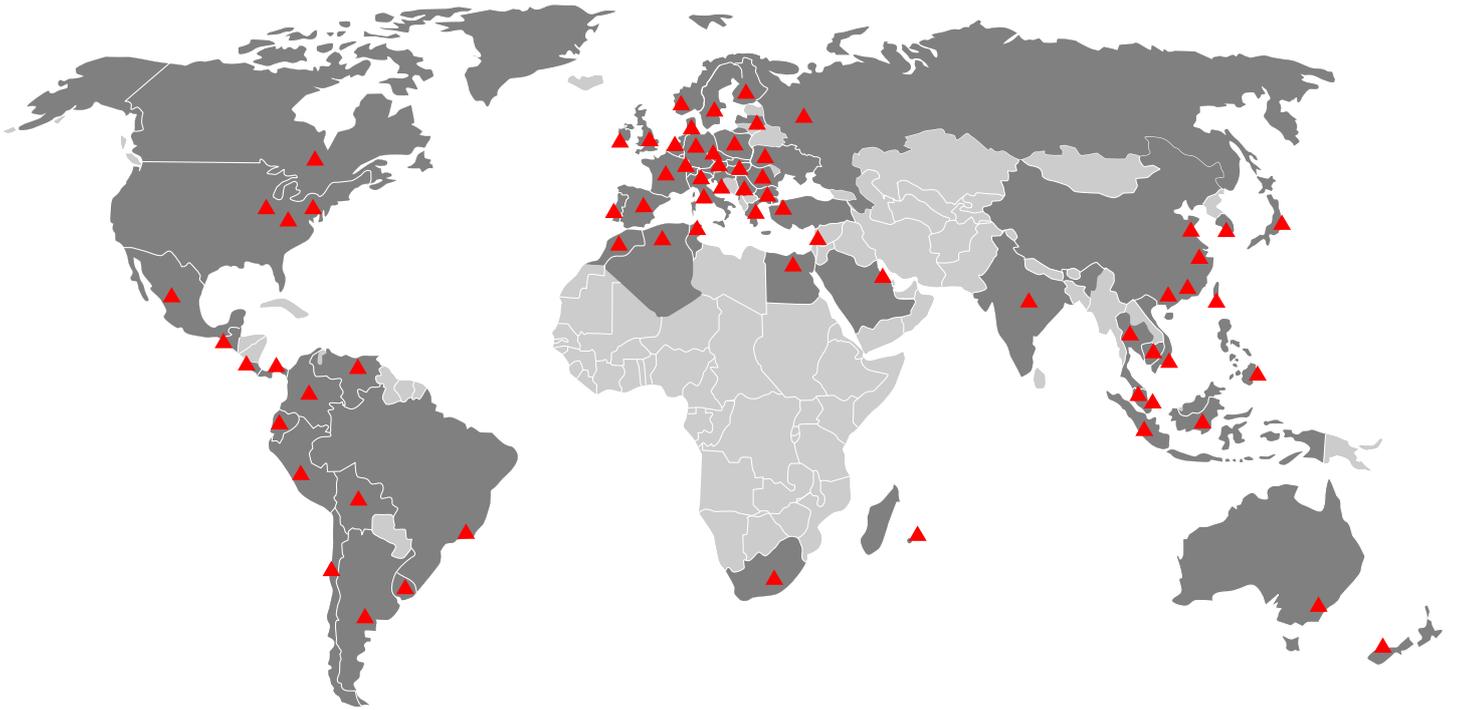
Acoustic Test Centre

In our Acoustic Test Centre we are able to evaluate and optimise the acoustic performance of our products. The ability of this facility to house very large vehicle structures, combined with sophisticated equipment such as a chassis dynamometer, wind testing rig and E-coat/KTL oven, provides our customers with ideal support to achieve dependable and accurate results in vehicle development programmes.

Local Service & Support

With major sales, service and logistics operations around the globe, Sika provides customers with world scale customer service, sales and logistics support via local dedicated teams in local languages.

Sika Worldwide



Sika ensures high quality for its products and services. In each production process, for each workplace and for each employee, the guiding aim is to uphold quality at the highest level. Sika is certified according to the international standards ISO 9001, ISO 14001 and QS 9000.



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

www.sika.com

