



SEALING & BONDING TECHNOLOGIES AND CONCEPTS FOR JOINT SEALING

BUILDING TRUST





JOINT SEALANTS FOR LONG-LIVING AND TIGHT CONNECTIONS

Sika is a global player based in over 90 countries with many years of experience and top references for all kinds of buildings and civil engineering structures. With our innovative & best in class products and a wide portfolio we can always offer the perfect solution for your building.

Sealants amount to approximately 1% of the construction costs of a typical large building project. In the case of sealant failure, however, the refurbishment costs are many times that of the initial installation. Correct joint design, product selection and application are the prerequisite for a reliable sealing over the whole lifetime of a building or construction. In this brochure concepts for joint sealing are described in detail.

In a globalized market with increasing numbers of construction materials and suppliers, tight budgets and high requirements in energy efficiency and profitability, it is crucial to have a reliable and competent partner. Consult Sika and let us provide you best in class sealants for your building.

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BUILDING AND CIVIL ENGINEERING STRUCTURES ARE FULL OF JOINTS

JOINTS IN BETWEEN construction elements can be found in different parts of a construction, e. g. between precast concrete elements in facades, around windows and doors, between floors and walls, around storage tanks, etc.

Joint sealants have to meet various requirements depending on function and location of the respective joint.

The purpose of joint sealing generally is to:

- Prevent passage of media (air, water, chemicals, smoke etc.)
- Provide thermal and sound insulation
- Enhance the visual appearance of the construction

IN A WORLD FULL OF JOINTS, SELECT THE MOST DURABLE SOLUTION AND TAKE NO RISKS.

WHY ELASTIC SEALING?

Buildings and civil engineering structures consist of individual elements which exhibit relative movements to each other. There are two kinds of such movements:

THERMAL MOVEMENTS

Temperature changes due to climatic, solar and weather effects results in expansion or contraction of the building elements. For the sealants connecting them this leads to permanent movement. In case of increasing temperatures, the elements expand, the joints become smaller and the sealant is compressed. In case of decreasing temperatures, the elements shrink, the joints become larger and the sealant expanded or elongated. In the latter case the adhesion of the sealant to the substrate is crucial. Thermal movements are considerably in case of large elements or when different materials are used for example a brick wall and vinyl window frame.

STRUCTURAL MOVEMENTS

Structural movements can have several reasons. They can originate from settlement of the structure, vibrations or other loads like wind. Structural movements change the initial joint dimensions and consequently can apply considerable stress to the sealing material, often shear stress.

Movement within the joints is a reality and the long-term solution to accommodate them are high-performance elastic joint sealants. These sealants retain their original functionality and good adhesion to the substrate throughout their whole life cycle and provide durable tightness.



Expansion of building elements



Contraction of building elements



Shear movement

JOINT SEALING WITH SIKA SEALANTS IS A PLEASURE

THE APPLICATION PROPERTIES OF sealants have a direct impact on the efficiency, reliability and appearance of the joint sealing job.

DESIGNED FOR EFFICIENT APPLICATION – KEY APPLICATION ADVANTAGES



LOW EXTRUSION FORCE

For efficient application the sealant must be easy to extrude – even at low temperatures.



SHORT CUT-OFF STRING

Avoid unnecessary cleaning. Long cut-off strings will mess up your construction elements and permanently stain them.



NON-SAG BEHAVIOUR

Sealants must stay where they are applied. Non-sag behaviour is essential when the joints are wide and in a vertical or overhead position. The rheology of Sika's facade sealants is designed not to flow or sag after application.*



GOOD "BODY" AND TACK-FREE SURFACE

To achieve a visually attractive finish the sealant must be easy to tool. Sika sealants stand out due to their good body, tack-free surface and sufficient tooling time, even under warm and humid conditions – the prerequisite to perfectly shape and smooth out the sealant surface.



LOW SMELL AND LOW VOC

Being exposed to badly smelling products and volatile organic compounds (VOC) all day will make you feel bad. When creating our products we take care that their smell is not disturbing and the VOC meets the stringent market requirements.

AS PARTNER OF PROFESSIONAL APPLICATORS WE KNOW WHAT COUNTS. SIKA SEALANTS ARE THE FIRST CHOICE OF APPLICATORS WORLD-WIDE!

* For special applications like floor joints the sealants rheology is designed to be self-levelling ensuring perfect and smooth transitions.

SIKA JOINT SEALING SOLUTIONS FOR LONG-LASTING TIGHT JOINTS

Sika provides a full range of elastic joint sealants and accessories for your construction with the following main advantages:

- Long-term elasticity to accommodate joint movements
- Good and durable adhesion to common construction materials to ensure durable tightness
- Perfect handling for efficient, reliable and attractive joint sealant application
- Visual appearance that meets the demands of architects and owners
- Excellent mechanical properties, chemical resistance and weatherability ensuring sustainable performance even under most adverse conditions and loads
- Technical support and training for architects, specifiers and applicators
- Many approvals, external testing and best references
- Global supply chain

Sika offers sealant solutions for a great variety of applications:

- Building envelope joints like precast concrete facades, glass and metal facades, natural stone facades and joints in exterior insulation and finishing systems (EIFS) for wall claddings
- Civil engineering joints in containment bunds of fuel stations, water and sewage treatment plants and swimming pools
- Interior finishing joints in bathrooms and kitchens
- Floor joints
- Roof and flashing joints

As a market leader in construction chemicals Sika offers comprehensive and compatible solutions from “roof to basement” for all types of buildings and civil engineering structures.

Sika has a long history in construction joint sealing. All Sika products are the fruit of many years of experience, outstanding R&D capabilities, continuous adaptation and improvement to modern construction materials and practices and state of the art production sites. As we are globally present, we can respond to your needs and local requirements wherever you are realizing projects.

Using Sika products is a decision for competence, performance, security and a reliable partner. Specify Sika products for all your construction and have one partner, one solution and one guarantee! Incompatibility between the different systems is an unnecessary risk that can be avoided.

Sika sealants makes construction joints sustainably air and water tight. The best performance for your application is the key issue; therefore Sika produces high quality products in all major technologies.

SIKA RECOMMENDS:

- SikaHyflex® and Sikaflex® for building envelope:
 - For non-porous substrates like metal and glass, choose Sika’s innovative silicone range.
 - For porous substrates like concrete, bricks and masonry, choose Sika’s advanced polyurethane sealants.
 - For applications where a wide adhesion range is required like for window installations, the unique silane-modified polymer sealants are best suitable.
- Sikaflex® and Sikasil® for civil engineering
- Sikaflex®, SikaSeal® and Sikacryl® for interior finishing



Additionally, Sika offers complementary products such as primers and cleaning agents to complete the sealants range.

QUALITY, SERVICES AND SUPPORT

SIKA OFFERS SOLUTIONS RATHER than single products. Individualised service and support are key elements to guarantee long-lasting joint sealing solutions that keep their function even under the most difficult and adverse conditions.

SIKA'S SERVICE AND SUPPORT COMPRISES:

- Product selection based on specific requirements
 - Advice regarding joint design and dimensioning
 - Specification templates, method statements, project-specific technical documentation
 - Adhesion, compatibility and performance tests
 - Recommendations for joint details also in connection with compatible Sikafloor®, Sikaplan®, Sikalastic® and Sarnafil® flooring and roofing systems as well as Sikagard® protective coatings
 - Applicator training and on-site support
 - Tailor-made guarantee concepts
 - Project-specific colour matching
- With Sika's local support in more than 90 countries cost effective, reliable and customized solutions for every joint sealing requirement and standard are available.



MOST RELEVANT STANDARDS FOR JOINT SEALANT SPECIFICATION

IN A GLOBALIZED WORLD, standards and regulations become increasingly important. They act as common ground where design and specification sometimes are done far away from the future location of the building or civil engineering structure and where building materials are sourced locally and globally.

There are classification and test standards. Classification standards specify the types and classes of sealants used in building construction according to their application and characteristics. Sealants are characterized according to the performance they achieved in a number of test standards. In general, these tests simulate the conditions under which the sealants will have to perform in your construction e.g. thermal and mechanical cyclic exposure by the Hockman cycle test.

There are a great number of international, regional and local standards covering construction sealants. A selection of important standards is described in more detail below.

ISO 11600

This classification standard, issued by the International Organisation of Standardisation, specifies the types and classes of sealants used in building construction according to their applications and performance characteristics. It also describes the requirements and respective test methods for the different types and classes.

- Area of application of the sealant:
 - Type G for glazing sealants for use in glazing joints
 - Type F for construction sealants for use in building joints others than glazing.
- Movement capability and elastic behaviour of the sealant.

Kind of application	Movement capability	Class	Elastic recovery	Loss of volume
Type G & Type F	± 25%	25 LM	≥ 70%	≤ 10%
		25 HM	≥ 70%	≤ 10%
	± 20%	20 LM	≥ 60%	≤ 10%
		20 HM	≥ 60%	≤ 10%
Type F	± 12.5%	12.5 E	≥ 40%	≤ 25%
		12.5 P	< 40%	≤ 25%
	± 7.5%	7.5 P	< 40%	≤ 25%

The movement capability describes the ability of a joint sealant to expand and contract under load. ISO 11600 defines several tests regarding elongation, compression at different temperatures and environmental conditions. For example class 25 means that the joint sealant was tested for ± 25% movement.

The letters included in the class (e.g. LM) describe the sealants modulus and its elastic behaviour.

- Low modulus (LM) joint sealants stay soft and exert low stress to the sealant/substrate interface also at low temperatures. They are commonly used for facade joints and in regions with cold weather.
- High modulus (HM) sealants are harder and are used for facades in warmer climates and for floor joints.
- Lower performing elastic classes 12.5 and 7.5 are divided into elastic (E) and plastic (P). Plastic meant that the product only has limited capability to reversibly absorb movement.

As all ISO standards, ISO 11600 can be used world-wide, but is mainly used in specifications in Europe, Pacific and the Middle East.

EN 15651

EN 15651 is a mandatory approval for certain sealants sold within the European Union. The test methods are based on ISO 11600 and lead to CE marking.

EN15651 defines requirements for the 5 following groups of sealants:

Scope	Area of application	Movement capability
EN15651-1 F: Sealants for facade elements	EXT = External	Analogue ISO 11600
EN15651-2 G: Sealants for glazing	INT = Internal	
EN15651-3 S: Sealants for sanitary joints	CC = Cold climate	
EN15651-4 P: Sealants for pedestrian walkways		

Out of these classifications the correct denomination unfolds. For example **EN15651-1 F EXT-INT CC 25 LM**, which means:

- EN15651-1 F = Sealant for facade elements
- EXT-INT = Exterior & interior application
- CC = Cold climate application
- 25 = Movement capability of $\pm 25\%$
- LM = Low modulus

ASTM C 920

ASTM C 920 is the most recognized classification standard for joint sealants. It is issued by ASTM International, formerly known as the American Society for Testing and Materials. This standard is not only referred to when writing specifications in North America but also widely in Latin America, Asia, the Middle East and other countries or regions. ASTM C 920 covers the properties of cold-applied elastomeric joint sealants for sealing, caulking, or glazing operations on

buildings, plazas, and decks for vehicular or pedestrian use, and types of construction other than highway and airfield pavements and bridges.

A sealant qualifying under this specification is classified as to type, grade, class, and use. The class is defined after testing the sealants' cohesion and adhesion under cyclic movement according to the so-called "Hockman Cycle" (ASTM C 719).

Class*	Type	Grade	Use
Class 100/50	S = Single component	P = Pourable or self-levelling	NT = Non-traffic areas
Class 50	M = Multi component	NS = Non-sag or gun grade	T = Traffic
Class 35			M = Tested on mortar substrates
Class 25			G = Tested on glass substrates
Class 12.5			A = Tested on aluminium substrates
			O = tested on other substrates
			I = Immersion

*Elongation and compression in % of the joint width

An ASTM classification can look like the following: **ASTM C 920 class 25 Type S Grade NS Use M, A, NT**, which means:

- ASTM C 920 class 25 = $\pm 25\%$ movement capability
- Type S = Single component
- Grade NS = Non-sag, gun applied
- Use M = Mortar substrate
- A = Aluminum substrate
- NT = Not for traffic areas

JIS A 5758 AND OTHER IMPORTANT STANDARDS

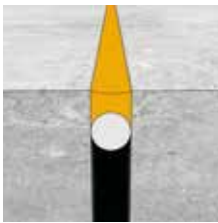
Japanese JIS standard A 5758 for sealing and glazing in buildings is based upon the principles of ISO 11600 and provides a classification of sealants according to their movement

capability and modulus. Contrary to ISO 11600 the JIS standard defines an additional class "30S" (S indicates shearing) for glazing sealants.

JOINT DESIGN FOR LONG-LASTING & TIGHT BUILDING ENVELOPE JOINTS

THE FACADE IS THE FACE of your building. In contemporary architecture the facade is of special interest expressed by large dimensions, unconventional shapes and high material diversity. Joint design is demanding and prone to mistakes. For integral joint specification, following some rough guidelines will result in a long-lasting and tight building envelope.

MOST COMMON MISTAKES



JOINT WIDTH

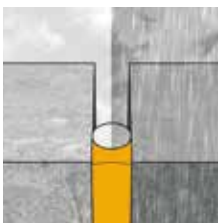
A joint's expected movement can be calculated from the dimensions and thermal expansion coefficients of the facade elements and the maximum and minimum temperature your facade will be exposed to.

The expected movement and the sealant's movement capability leads to a minimum joint width required to withstand the daily and seasonal cyclic movement. To simplify your choice, sealants are classified according to their movement class by several standards. The most common ones are listed on the previous page.



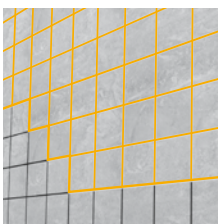
MATERIALS TO BE JOINED

Depending on the design of your facade, it may consist of facade elements of different materials like concrete, glass, metal, brick or stone, just to mention the most common ones. These elements have to be sealed to each other but also to other waterproofing products like membranes or structural glazing elements consisting of glass, spacer and adhesives. The sealant must show good adhesion to the adjacent materials and at the same time must be compatible with all materials to avoid discoloration, loss of adhesion over time or any changes of properties.



ENVIRONMENTAL EXPOSURE

Environmental conditions have an impact on the service life and the performance of the sealant. Expected UV and heat exposure as well as the chemical impact must be considered when choosing the product. Additionally, when sealing between the inside and outside of the building the vapor permeability of the sealant has to be considered to avoid accumulation of water in the walls. The general rule is to use a sealant with lower vapor permeability on the warm side of the wall, as warm air is generally more humid than cold air (or the same vapor permeability but thicker applied on the inside).



APPEARANCE

Ugly joints are like scares on a facade. Therefore, when specifying the joint sealant, the visual appearance and matched color of the joint is important. When sealing natural stone or glass a products staining and streaking must be checked as this would damage the appearance of the whole facade irreversibly. In this case stone and glass must be replaced. By using non-staining and non-streaking products where required money can be saved ultimately.



MECHANICAL EXPOSURE

Floor and some wall joints are exposed to mechanical impact. (Floor: Tyres, heels, tolly, fork lift, cleaning machines (high pressure water, brushes). Wall: People that pick and play with the sealants, especially in zones where they have to wait like bus stations). This impact damages the joint sealants. Therefore choose harder sealants, with high tear propagation resistance and plan recessed floor joints to avoid contact with the wheels.

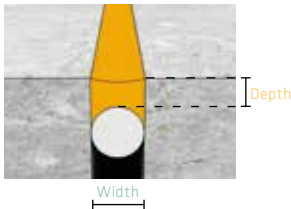
JOINT DIMENSIONING

The design of a sealing system involves more than just the selection of a sealant with suitable physical and chemical resistance. In order to obtain optimal long-term performance the following considerations are essential as well:

- Proper joint design, including correct dimensioning and back-up material selection
- Type and nature of substrates
- Application process and ambient conditions at the time of the installation

GENERAL RULES FOR JOINT DESIGN

Movement capability of the sealant and joint width must fit to the expected movement of the adjacent building elements.



Joint width: Must be designed according to the sealants movement capability

Sealant dimensions: The optimal ratio of sealant width to depth is 2:1 for facade joints and 1:0.8 for floor joints

Joint depth: A joint must have sufficient depth so that backer rod and sealant fit inside.



Spacing between joints: In the following tables an example for joint dimensions for concrete elements and a sealant with 25% movement capability are given:

Facade Joints			Interior Floor Joints			Exterior Floor Joints		
Joint spacing (m)	Minim. joint width (mm)	Sealant depth (mm)	Joint spacing (m)	Minim. joint width (mm)	Sealant depth (mm)	Joint spacing (m)	Minim. joint width (mm)	Sealant depth (mm)
2	15	8	2	10	12	2	12	10
4	20	10	3	10	12	3	12	10
6	25	12	4	10	12	4	15	12
8	30	15	5	10	12	5	18	15
10	35	18	6	10	12	6	20	17
			8	10	12	8	30	25



Cohesive failure



Correct use

The sealant must be capable of extending and contracting along with the building elements to which it is joined. If this is not possible the consequence may be adhesive and/or cohesive failure.

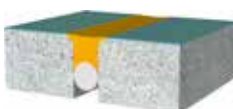
- The sealant depth defines the stress at the sealant/substrate interface. If the sealant depth is too large this will lead to severe stress on the interface at low temperatures and finally adhesion failure.

- 3-side adhesion must be avoided. Any other adhesion than to the joint flanks leads to massive reduction of the elasticity and movement capability of the sealant and consequently to failure of the sealant.

The correct use of backing material can avoid these problems. The backer rod defines the joint depth and avoids 3-side adhesion.



Recessed floor joint



Flush floor joint

FLOOR JOINT DESIGN

Depending on the location and expected loads of a floor joint special design considerations for floor joints are necessary. Generally high modulus sealants are recommended for floor joint applications.

Joints in areas with a lot of car and/or equipment traffic should be recessed to reduce mechanical loads.

Joints in pedestrian areas should be flush with the surface to prevent tripping hazard. The sealant must also have a certain hardness and indentation resistance due to high mechanical impacts from narrow heels.

ENSURING GOOD ADHESION

Primers for all Materials and Applications

SUBSTRATE PRE-TREATMENT – PRIMERS, ACTIVATORS AND CLEANERS

Strong and durable adhesion of the sealant to the substrate is the essence of joint sealing. No adhesion means water ingress. Therefore, we recommend to pre-treat the joints before sealant application. The effort and cost of pre-treatment before the initial sealant application is very small with regard to the gain in durability and service life of the joint.

Primer application does not replace the usual joint preparation. Before the primer and sealant application, the joint must be well cleaned from all processing agents, dirt and dust. In case of concrete, the laitance must be removed by grinding and loose particles, dust etc. must be removed. The substrate surface must be capable to withstand the elastic forces from the sealant movement. If this rule is disobeyed, the substrate will crack near the surface. Therefore a serious substrate preparation is essential.

Good adhesion is achieved by several means on the different substrates:

- For **porous** substrates the primer closes the porosity, improves the wetting of the surface with the sealant, guarantees best possible chemical bonding and prevents water penetration at the substrate-sealant interface. For joints with periodic water immersion, the pre-treatment with a primer is mandatory.

- For **non-porous** substrates the treatment is chosen according to the material:

- **Metals and powder coated metals:** Besides cleaning and removing processing agents from the surface, activators leave adhesion promoters on the surface to ensure good adhesion. Cleaners are special solvents to clean the substrate surface. Primers are used to ensure good wetting of the sealant.
- **Plastics:** Independent of the sealant technology adhesion to plastics often is difficult to achieve. Therefore, activators and primers are used. They change the surface energy to enable durable adhesion.
- **Glass:** Generally, glass only needs to be cleaned before sealant application. As some cleaners may leave visible stains on the glass, special products are used here.

Sika has a wide range of primers, cleaners and activators for the different substrates and the know-how to consult you. Please contact the local sales force for pre-treatment recommendation and testing.

ADHESION IS THE KEY
TO STRONG AND DURABLE
JOINT SEALING.

CHOOSING THE CORRECT PRIMER

Product	Porous	Non porous		
	Concrete, masonry & raw wood	Metals	Plastics & Coatings	Glass
Sika® Primer-3N	X	X	X for coatings	
Sika® Primer-4W	X	(X)		
Sika® Primer-215	X		X	
Sika® Primer-790		X for SIL sealants		
Sika® Aktivator-100		X for PVDF		
Sika® Aktivator-205		X		
Sika® Cleaner P		X		X
Sika® Cleaner G&M		X		X

Generally primers and activators and cleaners are related to the substrate and not to the sealant technology.

APPLICATION OF JOINT SEALANTS

TO CREATE VISUALLY APPEALING AND DURABLE JOINTS, you have to consider several points. A description for the procedure valid for porous substrates such as precast concrete is shown below. In the case of non-porous substrates the surface preparation is usually different, but the other steps are identical application procedure stays the same.

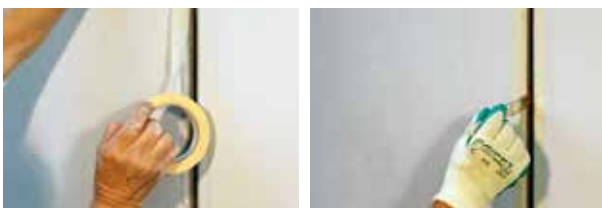
APPLICATION STEPS



- 1 Surface preparation:**
Grind the substrate with a wire brush or other equipment tool, and remove dust and friable particles.



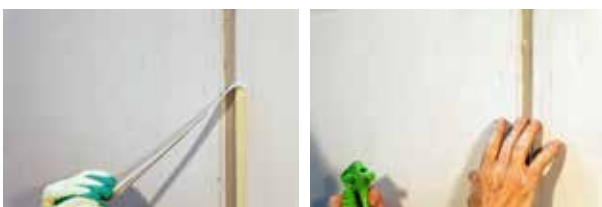
- 2 Backer rod installation:**
Insert a fitting backer rod to the required depth. The diameter of the backing rods should be 20 - 30% larger than the joint width. If using a closed cell polyethylene backer rod pay attention when inserting the rod not to damage it for example by using a sharp tool like a screwdriver. Use a blunt tool to insert the backer rod.



- 3 Masking tape and primer application:**
If sharp and exact joint lines are required place a masking tape. Take care that the tape is well attached to the surface to avoid spread of the primer below the tape. Apply primer in the area where the sealant is supposed to be applied later.



- 4 Sealant application:**
Fill the joint with sealant avoiding air entrapment. Remove excess material.



- 5 Make it look nice:**
Remove the masking tape before skin formation. Smooth the joint sealant with smoothing liquid for a perfect finish.

SOLUTIONS FOR JOINT RENEWAL AND REPAIR



REASONS FOR JOINT REPAIR

A careful visual inspection is usually enough to determine if the joint sealing is improper or worn out and a replacement is needed. Reasons for joint refurbishment may include but are not limited to the following:

- Failures in workmanship
- Use of unsuitable type of sealant
- Wrong joint design
- Underestimated load
- Sealant reached end of its service life
- Compatibility issues with adjacent materials (e. g. gaskets)
- Exposure to aggressive chemicals
- Insufficient surface preparation (loss of adhesion)

RENOVATION AT THE END OF SERVICE LIFE

An old sealant needs to be renovated at the end of its service life or because of maintenance or quality insufficiency reasons.

Following steps should be done:

1. Remove old sealant. Up to 0.5 mm of the old sealant can be left on the surface if the substrate and the adhesion are still in good shape.
2. Make sure that the substrate & joint flanks are still strong. In areas with adhesion loss, mechanical cleaning of the bonding area is mandatory.
3. In order to ensure long-term durability and tightness of the newly sealed joint both the substrate surfaces as well as the old sealant residues should be pre-treated using the primer recommended.
4. Use the same sealant technology as before. Replace polyurethane with polyurethane, silicone with silicone, etc. If the reason for sealant replacement is some kind of incompatibility with the substrate or any adjacent material check with your Sika representative for a compatible solution.

RENOVATION IN CASE OF WRONG JOINT DIMENSIONING

In case of wrong joint dimensioning and no sealant with a movement capability to accommodate the expected loads the joint needs to be re-sealed with a rubber profile or a tape.

Preformed elastic joint tapes are available in various dimensions to suit different joint sizes. One of the major advantages of such tapes is the fact that they can be used regardless of the reason the joint has to be refurbished or the kind of sealant previously used. The tape is bonded to the substrate on either side of the joint.

BACKING MATERIAL



CLOSED-CELL POLYETHYLENE FOAM BACKER ROD (HOLLOW OR SOLID)

Advantage:

- Does not take up water and moisture which is beneficial for the long-term performance of the sealant. We recommend closed cell backer rods for exterior applications and closed-cell solid polyethylene backer rods floor joints

Drawback:

- Limited compressibility, meaning several different sizes needed on the job site
- Avoid damaging the rod during installation due to the release of gas from the foam which may lead to bubble formation within the sealant



OPEN-CELL POLYURETHANE FOAM BACKER ROD

Advantage:

- High compressibility and easy to install
- Economic

Drawback:

- Backer rod will take up water and moisture which may lead to premature failure of the sealant. Therefore this type of backing material is recommended for indoor applications only

WATERPROOFING SOLUTIONS FROM BASEMENT TO ROOF

Sika is one of the very few companies that offers solutions for your building from basement to roof. Specify Sika products from basement to roof and have one partner, one solution and one guarantee! Incompatibility between the different systems is an unnecessary risk that can be avoided.



1

Basement waterproofing with SikaProof® and Sikaplan® membranes or Sikalastic® coatings

2

Facade cladding with Sika TackPanel adhesives

3

Structural glazing with Sikasil® SG adhesives

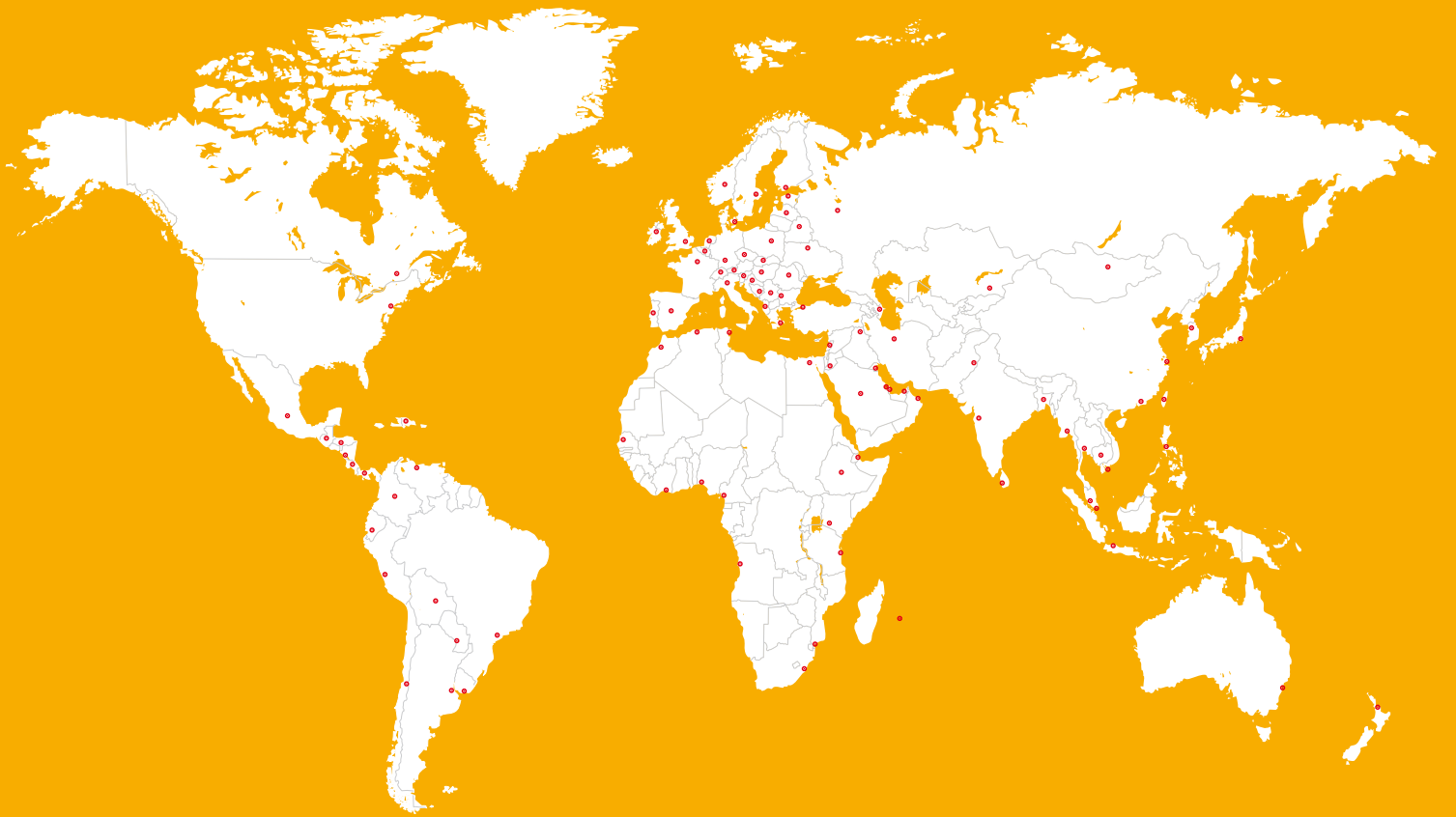
4

Facade impregnation with Sikagard® coatings

5

Roof waterproofing with Sarnafil® and Sikaplan® single-ply or Sikalastic® liquid-applied membranes

GLOBAL BUT LOCAL PARTNERSHIP



FOR MORE SEALING & BONDING INFORMATION:



WE ARE SIKA

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 the motor vehicle industry. Sika's product lines feature concrete admixtures, mortars, sealants and adhesives, structural strengthening systems, industrial flooring as well as roofing and waterproofing systems.

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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