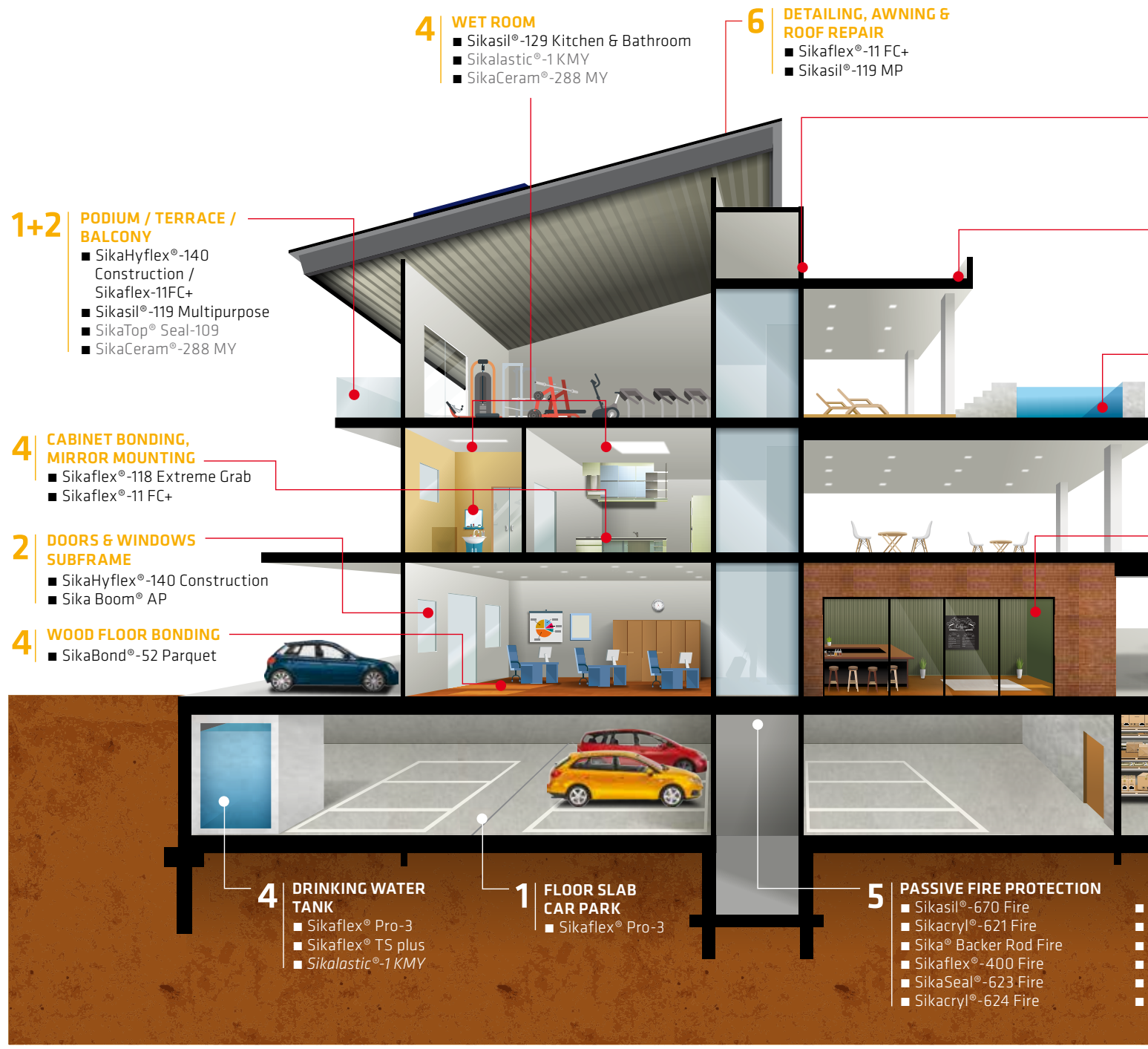
# SEALING & BONDING
# JOINT SEALANTS FOR YOUR BUILDING

BUILDING TRUST

# CONTENT

# WHERE ARE BUILDINGS MOST VULNERABLE TO WATER INGRESS? AT THE JOINTS!

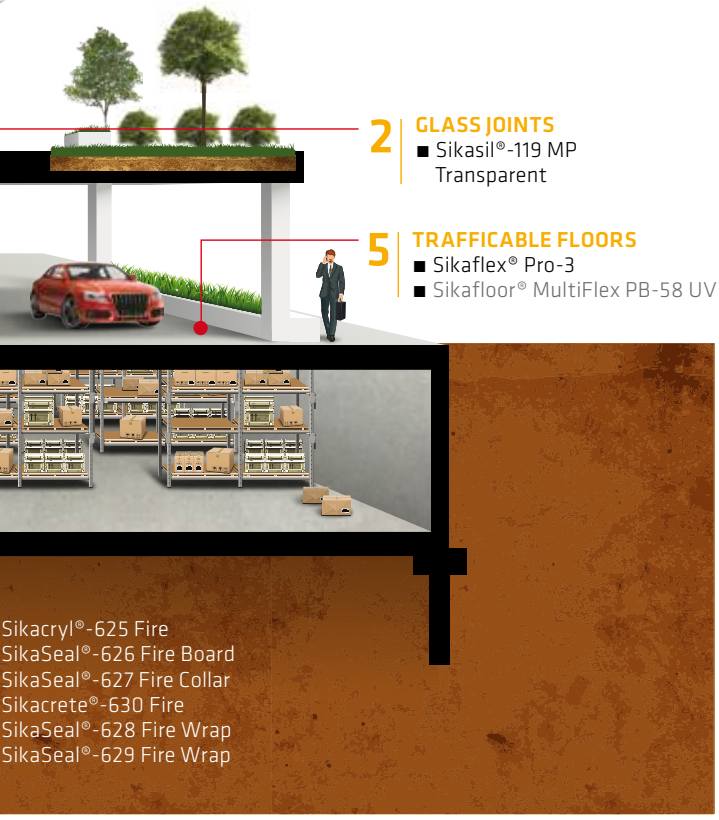



To reduce risk and gain performance certainty, construction waterproofing needs to be considered early, and specified as a complete and compatible system from basement to roof.

1 **PRECAST JOINTS**
- SikaHyflex®-140 Construction

6 **TERMINATION JOINTS**
- Sikaflex®-11 FC+
- Sarnafil®-G 410-15 L Felt

2 **SWIMMING POOL**
- Sikasil® Pool
- Sikalastic®-1 KMY




# AT THE JOINT THE DIFFERENT BUILDING ELEMENTS, MATERIALS AND TRADES MEET. WHEN THINKING OF WATER-PROOFING, THINK ABOUT THE JOINT SOLUTION FIRST!

**THE BUILDING BLOCKS OF** your construction, like the concrete slab, the glass facade element, the roofing membrane, the metal cover, etc., generally do not let water enter the building. It is at the joints where your building is weakest to leakage. Only correctly specified and professionally applied high quality joint sealants will manage to keep your building sustainably tight during its entire lifespan.

**1**

**Concrete joints**

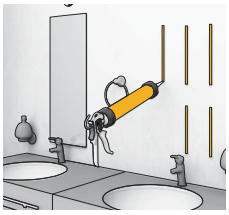
**2**

**Connection & Glass joints**

**3**

**Interior & Sanitary joints**

**4**



**Bonding & Mounting**

**5**

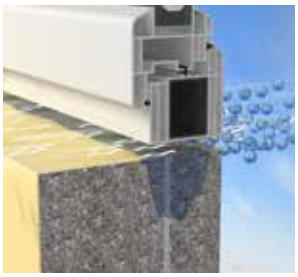
**Passive Fire Protection**

**6**

**Roof & Awning Joints**

# 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 Sealing provides completes a building by providing:

- Waterproofing
- Air tightess
- Thermal Insulation
- Sound insulation
- Visual aspect
- Fire resistance

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. Every material type behaves differently. This leads to permanent movement on the joints connecting them. Without joints building elements may build up stress and fail.

**STRUCTURAL MOVEMENTS**
Structural movements change the initial joint dimensions and consequently can apply stress to the sealing material, often shear stress. Reason include:

- Ground settlement
- Wind sway or Seismic activity
- Static-load deflection (eg, gross beam load)
- Live-load deflection (eg, warehouse floor)
- Dynamic crowd deflection (eg, Stadium)

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

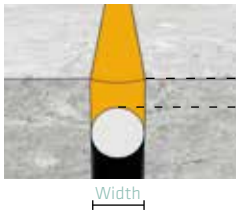
# JOINT DIMENSIONING

**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:

**Exterior Wall**
**SikaHyflex®-140, +-25% movement**

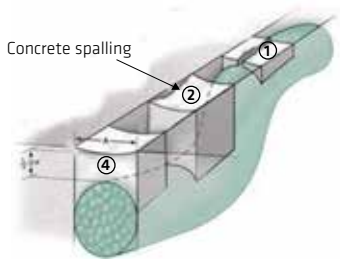
| Joint distance (m) | Min. joint width (mm) | Min. joint depth (mm) |
|---|---|---|
| 2 | 15 | 10 |
| 4 | 20 | 10 |
| 6 | 25 | 12 |
| 8 | 30 | 15 |
| 10 | 35 | 18 |

**Exterior Floor**
**PRO-3, +-35% movement**

| Joint distance (m) | Min. joint width (mm) | Min. joint depth (mm) |
|---|---|---|
| 2 | 10 | 10 |
| 4 | 15 | 12 |
| 6 | 20 | 17 |
| 8 | 28 | 22 |
| 10 | 35 | 28 |

**Interior**
**Sikasil® or Sikaflex®, 25% Movement**
Typical joint widths for joints between concrete elements for interior applications

| Joint distance (m) | Min. joint width (mm) | Min. joint depth (mm) |
|---|---|---|
| 2 | 10 | 10 |
| 4 | 10 | 10 |
| 6 | 10 | 10 |
| 8 | 15 | 12 |
| 10 | 18 | 15 |

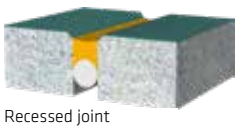


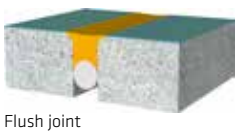

### JOINT DEPTH AND BACKING

① X Too shallow : Sealant easily fails under stress
② X Too deep : Substrate failure like spalling due to high level of stress
③ X 3-sided bond : Sealant loses it's flexibility
④ ✓ Install **a suitable Backing Material,** normally PE backing rod or tape, **at the correct depths**

Cohesive failure

Correct use


Recessed joint


Flush joint

### BASIC FACADE & FLOOR JOINT DESIGN

**FLUSH JOINT**
X exposed to mechanical impact
X Irregularities easily visible
X Susceptible to concrete spalling
✓ "Hidden" look from distance if painted

**RECESSED JOINT**
X Extra substrate preparation
✓ Aesthetic element
✓ Longer lasting substrate & sealant

# 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.

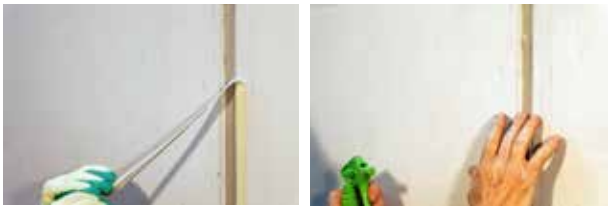
## APPLICATION STEPS

**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 primerin the area where the sealant is supposed to be apllied later.

**4 Sealant appliaction:**
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.

# 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 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 facade e.g. thermal and mechanical cyclic testing by the Hockman cycle.

In the following overview, classification of construction sealants according to the 3 most relevant classification standards is described.

**MOST RELEVANT SEALANT CLASSIFICATION STANDARDS AT A GLANCE**

| Classification standards | ASTM C 920 | ISO 11600 | EN 15651 |
|---|---|---|---|
| Region of use | United States, Canada, Latin America, Middle East, Asia | Europe, Pacific, Middle East | Europe |
| Legally | Voluntary | Voluntary | Mandatory in EU for CE marking |
| Classification | **Type**<br>S = Single component<br>M = Multi component<br>**Grade**<br>P = Pourable or self levelling<br>NS = Non-sag or gunnable | **Glazing sealants: G**<br>Class 25: 25 LM / 25 HM<br>Class 20: 20 LM / 20 HM | **Type**<br>EN15651-1 F = Facade elements<br>EN15651-2 G = Glazing<br>EN15651-3 S = Sanitary joints<br>EN15651-4 P = Pedestrian walkways |
| | **Class**<br>Class 100/50 = 100% elongation & 50% compression<br>Class 50; 35; 25; 12.5 = % elongation & compression | **Construction sealants: F**<br>Class 25: 25 LM / 25 HM<br>Class 20: 20 LM / 20 HM<br>Class 12.5: 12.5 E / 12.5 P<br>Class 7.5 P | **Application**<br>EXT = External<br>INT = Internal<br>CC = Cold climate |
| | **Use**<br>NT = Non-traffic areas<br>M = Tested on mortar substrates<br>G = Tested on glass substrates<br>A = Tested on aluminium substrates<br>O = Tested on other substrates | **Use**<br>LM = Low modulus<br>HM = High modulus<br>E = Elastic<br>P = Plastic | **Movement capability**<br>Analogue ISO 11600 |
| Explanations & examples | **ASTM C920 class 25 Type S Grade NS Use M. A. NT**<br>ASTM C920 class 25 = ± 25% movement capability<br>Type S = Single component<br>Grade NS = Non-sag, gun applied<br>Use M = Mortar substrate<br>A = Aluminum substrate<br>NT = Not for traffic areas | **EN15651-1 F EXT-INT CC 25 LM**<br>EN15651-1 F = Sealant for facade elements<br>EXT-INT = Exterior & interior application<br>CC = Cold climate application<br>25 = Movement capability of ± 25%<br>LM = Low modulus | **ASTM C920 class 25 Type S Grade NS Use M. A. NT**<br>ASTM C920 class 25 = ± 25% movement capability<br>Type S = Single component<br>Grade NS = Non-sag, gun applied<br>Use M = Mortar substrate<br>A = Aluminum substrate<br>NT = Not for traffic areas |

- The different movement classes of the different standards cannot be compared with each other as the testing procedures are different.
- Staining behaviour of sealants on natural stone and other porous substrates is evaluated according to ASTM C 1248 and ISO 16938-1.
- Sika joint sealants have all major approvals and can be specified and applied globally.
- Sika sealants are produced at different sites world wide and are internally and externally tested and monitored. This is how Sika can assure best quality & logistics for your project.

# SEALANTS FOR CONCRETE AND MASONRY FACADE JOINTS

| Type | SikaHyflex®-140 Construction |
|---|---|
| Chemical Base | 1-component *i*-cure Technology Polyurethane |
| Movement Capability | ASTM C920 class 25<br>ISO 11600 class 25 HM* |
| Benefits | Good adhesion to porous substrates |
| Typical Application | Designed for movement and connection joints in concrete facades as well as other construction sealing applications |
| Technical approvals | ASTM C 920 |
| Color | Concrete grey |
| Packaging | 600 ml/sausage<br>(20 pieces per box) |

**...CURE BUBBLE-FREE EVEN UNDER EXTREME CONDITIONS**

**NO EXTRA COST FOR REPAIR!**

**... ADHERE TO DAMP CONCRETE**

**NO WAITING TIME AFTER RAIN!**

**... CAN BE OVER-PAINTED**

**FREEDOM OF COLOR CHOICE EVEN AFTER YEARS!**

**... ARE PERMANENTLY FLEXIBLE**

**NO JOINT DEFORMATION AFTER MOVEMENT!**

**... DO NOT RELEASE TOXIC METHANOL**

**MORE SAFETY FOR YOUR LABOUR!**

# SEALANTS FOR CONCRETE AND MASONRY FACADE JOINTS

| Type | SikaHyflex®-160 Construction | SikaHyflex®-250 Facade |
|---|---|---|
| |  |  |
| Chemical Base | 1-component *i*-cure Technology Polyurethane | 1-component *i*-cure Technology Polyurethane |
| Movement Capability | ±35 % (ASTM C719) | +100 / -50 % (ASTM C 719) |
| Benefits | ■ High movement capability<br>■ Bubble-free curing<br>■ Can be overpainted (over paintability test must be conducted)<br>■ Good adhesion to many substrates<br>■ Solvent-free<br>■ Very low emissions | ■ Very good weathering resistance<br>■ Bubble-free curing<br>■ Low stress to the substrate<br>■ Very good extrusion and workability<br>■ Good adhesion to many different substrates<br>■ Solvent-free<br>■ Very low emissions |
| Typical Application | Designed for movement and connection joints in concrete and masonry facade | Designed for the elastic joint sealing and waterproofing of movement and connection joints in building envelopes. Suitable for EIFS facades |
| Technical approvals | ■ EN 15651-1<br>■ ISO 11600<br>■ ASTM C 920 class 35 | ■ EN 15651-1 F EXT-INT CC 25 LM<br>■ ISO 11600 F 25 LM<br>■ DIN 18540 F<br>■ ASTM C 920, class 100/50 |
| Color | Concrete grey | Concrete grey |
| Packaging | 600 ml/sausage<br>(20 pieces per box) | 600 ml/sausage<br>(20 pieces per box) |

Sika polyurethane *i*-Cure technology has several advantages compared to MS, silicone and conventional polyurethane sealant technology:

- Better adhesion to porous substrates
- Superior tear propagation
- Suitable for use on damp substrates, for example, after rainfall

*i*-Cure is Sika's innovative solution for bubble free curing sealants.

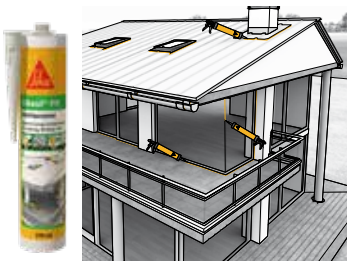
# SEALANTS RELATED TO TRAFFICABLE & SPECIALITY JOINT

| Type | Sikaflex® PRO-3 | Sikaflex®-406 KC | Sikasil®-670 Fire |
|---|---|---|---|
| |  |  |  |
| **Chemical Base** | 1-component *i*-cure Technology Polyurethane | *i*-Cure® Technology polyurethane accelerated with Sika® Booster-Technology | 1-component neutral cure silicone |
| **Movement Capability** | ± 35 % (ASTM C 719) | ±25 % | ±35 % (ASTM C 719) |
| **Benefits** | ■ High movement capability<br>■ Very high mechanical and chemical resistance<br>■ Bubble-free curing<br>■ Water resistant<br>■ Diesel and jet fuel resistant<br>■ Solvent-free and odorless | ■ Low stress on joint edges<br>■ Very high mechanical and chemical resistance e.g. to diesel and jet fuel<br>■ Recessed and broadcasted joints can be opened to traffic after 3 hours | ■ Up to 4 hours fire resistance according to EN 1366-4<br>■ Very good resistance to weathering<br>■ Easy to smooth and very good workability<br>■ Good adhesion to many different substrates<br>■ Neutral curing |
| **Typical Application** | Designed for movement and connec-tion joints in floors, pedestrian and traffic areas (e.g.parking decks, car parks), warehouses and productionareas, applications in the food industry, sewage treat-ment plants, tunnel construction and in cleanrooms. | ■ Connection joints between steel, defined asphalt types, concrete, granite, rails in track superstructure, roads and floors<br>■ Movement joints in road and airport pavements, pedestrian and traffic areas and other situations where early exposure to traffic is required | Designed for fire rated movement and connection joints on porous and non-porous sub-strates |
| **Technical approvals** | ■ EN 15651-4 PW EXT-INT CC 25 HM<br>■ ISO 11600 F 25 HM<br>■ ASTM C 920, class 35<br>■ ISEGA Certificate for food stuff area usage<br>■ BS 6920 (drinking water contact)<br>■ ASTM C 1248 non-staining on marble<br>■ ISO 16938-1 non-staining on marble<br>■ CSM TVOC tested (ISO-6.8)<br>■ CSM biological resistant: very good<br>■ Tested according principals of DIBt for Waste Water Exposure<br>■ Resistance against Diesel and Jet Fuel according tothe DIBt guidelines | ■ CE Marking and Declaration of Performance to EN 15651-4 -Sealants for non-structural use in joints in buildings - Sealants for pedestrian walkways<br>■ CE Marking and Declaration of Performance to EN 14188-2-- Joint fillers and sealants – Part 2: Specifica-tions for cold applied sealants<br>■ Performance Test DIN EN 15651-4:2012-09, Sikaflex®-406 KC, SKZ, Test report No. 131282/18-II<br>■ Testing of Properties DIN EN 14188-2:2005-03, Sikaflex®-406 KC, SKZ, Test report No. 131282/18-I | ■ EN 15651-1 F EXT-INT CC 25 LM<br>■ EN 15651-4 PW INT<br>■ ISO 11600 F 25 LM & G 25 LM<br>■ ASTM C 920, class 35<br>■ EN 1366-4 assessment report<br>■ ETA (ETAG 026)<br>■ UL listing (UL 2079)<br>■ EN 13501-2 classification report<br>■ EN 140-3 |
| **Color** | Concrete grey | Black | White, grey and black |
| **Packaging** | 600 ml/sausage<br>(20 pieces per box) | ■ Sikaflex®-406 KC Container: 10 l<br>■ Sikaflex®-406 KC Booster 150 ml foil pack 45 foil packs per box | 600 ml/sausage<br>(20 pieces per box) |

# BONDING ADHESIVES & TAPES

| Type | Sikaflex®-11 FC+ | Sikaflex®-118 Extreme Grab | Sika® MultiSeal® AP |
|---|---|---|---|
| |   |   |  |
| **Chemical Base** | 1-component *i*-cure Technology Polyurethane | Silane terminated polymer | Rubber modified bituminous tape |
| **Movement Capability** | ±35 % (ASTM C 719) | ±35 % (ASTM C 719) | |
| **Benefits** | ■ Silicone-free<br>■ Very good adhesion to most construction materials<br>■ No need to grout the bonded areas<br>■ Good mechanical resistance<br>■ Good resistance to weathering<br>■ Impact and vibration absorbing<br>■ Very low emissions | ■ Fixing of heavy objects without temporary fixation<br>■ Good workability<br>■ Very low emissions<br>■ Adhesive-sealant with CE marking | ■ Very easy to apply<br>■ Good adhesion to many substrates<br>■ Weather proof<br>■ Self-adhering<br>■ Compatible with bituminous substrates<br>■ Can be over-painted<br>■ Can be applied at low temperatures |
| **Typical Application** | Designed as a joint sealant for vertical and horizontal joints, soundproofing of pipes between concrete and sheathing, caulking between partitions, seam sealing, sealing in metal and wood construction and for ventilation construction | An adhesive to bond most construction components and materials such as:<br>■ Concrete<br>■ Masonry<br>■ Most stones<br>■ Ceramic<br>■ Wood<br>■ Metals<br>■ Glass<br>■ Mirrors | ■ Designed for sealing and repairing applications against water ingress on roofs and any other building element |
| **Technical approvals** | ■ EN 15651-1 F EXT-INT CC 25HM<br>■ EN 15651-4 PW EXT-INT CC 25HM<br>■ ASTM C920-11 class 35, ISEGA, Certificate No 43792 U 16 | ■ CE Marking and Declaration of Performance to EN 15651-1 - Sealants for non-structural use in joints in buildings - Facade elements: Class F EXT-INT CC 20HM | |
| **Color** | Concrete grey | White, concrete grey and black | Matt Grey |
| **Packaging** | 600 ml/sausage<br>(20 pieces per box) | 290 ml/cartridge<br>(20 cartridge per box) | 3 m x 100 mm<br>3 m x 250 mm |

# SILICONES FOR INTERIOR AND EXTERIOR

| Type | Sikasil®-119 MP | Sikasil®-129 Kitchen & Bathroom |
|---|---|---|
| |  |  |
| **Chemical Base** | 1-component neutral (oxime) curing silicone | 1-component neutral (oxime) curing silicone |
| **Movement Capability** | Black, white and grey:<br>±25 % (ASTM C719)<br>Transparent:<br>+-20 % (ASTM C719) | Black, white and grey<br>±25 % (ASTM C719)<br>Transparent:<br>+-20 % (ASTM C719) |
| **Benefits** | ■ Good adhesion to most construction materials<br>■ Adhesion to glass<br>■ Fast curing<br>■ UV resistance | ■ Good adhesion to most construction materials<br>■ Adhesion to glass<br>■ Fast curing<br>■ Anti-fungal resistance |
| **Typical Application** | ■ Window & glass sealing (non-structural)<br>■ Roof and gutter<br>■ Awning<br>■ Tile and perimeter joints | ■ Tiles glass and appliance sealing in all interior wet areas |
| **Color** | Transparent, white, black and grey | Transparent and white |
| **Packaging** | 270 ml/cartridge<br>(12 pieces per box) | 270 ml/cartridge<br>(12 pieces per box) |

# TOOLS AND ACCESSORIES

| Type | Sika® Primer 3N |
|---|---|
| |  |
| Chemical Base | Solvent-based epoxy resin compound |
| Benefits | ■ Easy to apply<br>■ Water repellent<br>■ Short flash-off time |
| Typical Application | Designed for Sikaflex®, SikaHyflex, and Sikasil® products used on porous substrates (e.g. concrete) and metals |
| Color | Transparent |
| Packaging | 1 Liter bottle<br>(4 pieces per box) |

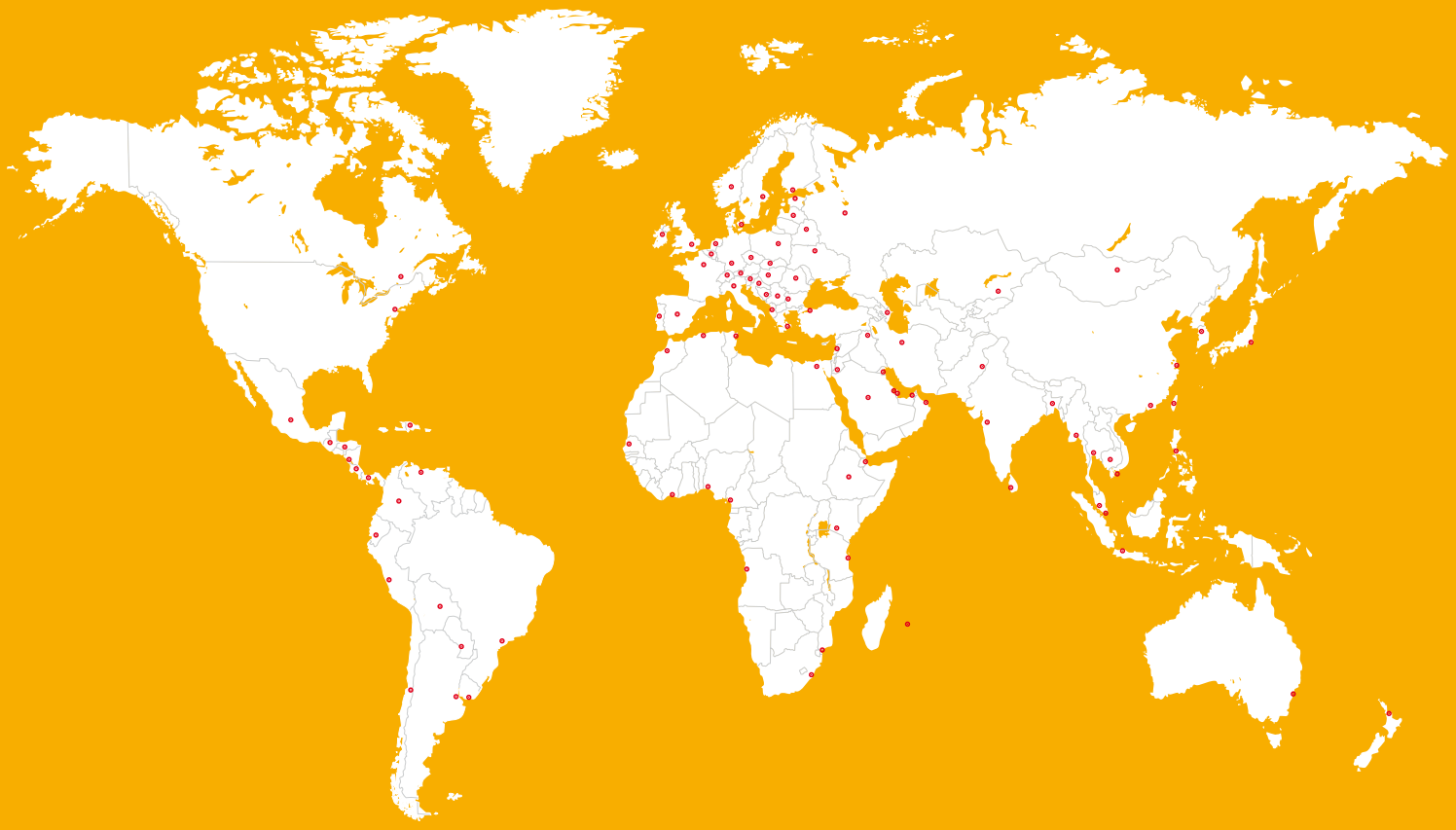
## CHOOSING THE CORRECT PRIMER

| Product | Chemistry | Porous | Non porous | |
|---|---|---|---|---|
| | | Concrete, masonry & raw wood | Metals | Plastics & Coatings |
| Sika® Primer-3N | Solvent based Epoxy | X | X | X for coatings |
| Sika® Primer-215 | Solvent based PU | | X | X |
| Sika®Aktivator-100 | Solvent Based | | X for PVDF | |
| Sika® Aktivator-205 | Solvent based | | X | |

Generally primers and activators and cleaners are related to the substrate and not to the sealant technology. All our sealants are compatible with our primers.

| Type | Sika® Backer Rod | Sika® Heavy Duty Gun |
|---|---|---|
| |  |  |
| Chemical Base | Extruded Polyethylene Foam | - |
| Benefits | - | For easy sealant application |
| Typical Application | Backing material before sealant application | - |
| Color | White | - |
| Packaging | 200 pieces per pack | 1 piece per pack |
| Size | ■ 8 mm x 3.5 m<br>■ 12 mm x 3.5 m<br>■ 15 mm x 3.5 m<br>■ 20 mm x 3.5 m<br>■ 25 mm x 3.5 m<br>■ 30 mm x 3.5 m | Use for 600 ml sausage sealant |

# GLOBAL BUT LOCAL PARTNERSHIP



**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.





**SIKA KIMIA SDN BHD**
No. 9, Jalan Timur
46000 Petaling Jaya
Selangor Darul Ehsan Malaysia

**Contact**
Phone +603 7957 0111
Fax +603 7956 7291
www.sika.com.my

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