PRODUCT OVERVIEW
FOR STRUCTURAL WATER-PROOFING
# Contents

## Product Overview for Structural Waterproofing

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Sika® Tricoflex® bonded sealing system
Easy joint sealing and detailing solutions
Sika® Tricoflex® bonded sealing system
Easy sealing and detailing solutions

Advantages of the Sika® Tricoflex® system
- Ideal solution for watertight sealing between pre-cast elements, double wall joints, light wells and joints separate structures, transitions between different materials e.g. reinforced concrete to concrete blocks, plus for many types of joint and crack repairs etc.
- The specially developed, solvent-free, epoxy resin based, system adhesive is also suitable for use on damp substrates.
- The system adhesive has excellent bond to concrete, steel, brick, wood, various plastics and most other commonly used construction materials.
- A completely homogeneous joint sealing and waterproofing system using highly flexible, next generation Thermoplastic Polyolefin Elastomer (TPE) membrane that combines the best performance characteristics of thermo-plastics (e.g. PVC) and elastomers (e.g. EPDM), resulting in an elongation at break > 400%

Installation
The Sika® Tricoflex® bonded sealing system is extremely easy to use. The substrates must be clean, sound with no loose or friable material, and free from any contaminants. The Tricoflex® system is applied in 5 simple steps, which are shown in the pictures.

1. Mixing the Sika® Tricoflex® FU 60 system adhesive
2. Applying the base layer of adhesive
3. Positioning the membrane strip
4. Jointing membrane strips by heat welding
5. Applying the top layer of adhesive

The Sika® Tricoflex® TPE membrane is available in widths from 100 mm to 2000 mm on request.

Additional system components

System structure: Watertight against water under hydrostatic pressure
- A: Concrete substrate
- B: Base layer of Sika® Tricoflex® FU 60 system adhesive
- C: Sika® Tricoflex® sealing strip
- D: Top layer of Tricoflex® FU 60 system adhesive
- E: For expansion joints: An additional expansion area to accommodate larger joint movement is also possible (e.g. Omega ‘Ω’ loop installation)

System structure: Watertight against water not under pressure (e.g. damp soil, percolating water etc.)
- The complete top surface layer of Sika® Tricoflex® FU 60 adhesive can be omitted and only the end anchoring parts must be covered

For Expansion joints

<table>
<thead>
<tr>
<th>Membrane strip width</th>
<th>Membrane thickness</th>
<th>Height</th>
<th>Adhesive requirement (kg/m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>200</td>
<td>2</td>
<td>20</td>
<td>2.0</td>
</tr>
<tr>
<td>250</td>
<td>2</td>
<td>20</td>
<td>2.4</td>
</tr>
<tr>
<td>300</td>
<td>2</td>
<td>20</td>
<td>2.8</td>
</tr>
</tbody>
</table>

Sika® Tricoflex® TPE sealing strips

For Construction joints

<table>
<thead>
<tr>
<th>Membrane strip width</th>
<th>Membrane thickness</th>
<th>Height</th>
<th>Adhesive requirement (kg/m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>150</td>
<td>1</td>
<td>20</td>
<td>1.4</td>
</tr>
<tr>
<td>200</td>
<td>1</td>
<td>20</td>
<td>2.0</td>
</tr>
<tr>
<td>250</td>
<td>1</td>
<td>20</td>
<td>2.4</td>
</tr>
</tbody>
</table>

For bonding to hardened surfaces to seal movement and construction joints between buildings and/or precast elements, plus can also be cast into site-placed concrete to seal many different types of joints.
Precast basement elements – connection joint waterproofing

Requirement:
Watertight sealing of the base joints, connection joints and service penetrations against water under hydrostatic pressure.

Method:
- For the base floor/wall joints
  - Installation of Sika® Tricoflex® DFT 330/3 KF waterstop profiles prefabricated into DFT 330/3 KI angle sections and bonded with the adhesive in a watertight connection to the existing structure. The free, profiled leg of the waterstop profile was then cast into the new concrete.
- For the vertical wall/wall joints
  - Installation of Sika® Tricoflex® DFT 330/3 KF waterstop profiles prefabricated into DFT 330/3 KI angle sections and bonded with the adhesive in a watertight connection to the existing structure. The free, profiled leg of the waterstop profile was then cast into the new concrete.
- Detailing and sealing
  - Filling the tie-rod holes with adhesive and over-banding where necessary
  - Sealing around pipe penetrations with pre-formed collar strips

Connecting a new building to an existing structure

Requirement:
This new building structure had to be connected at the foundations with a watertight joint to the adjacent existing structure.

Method:
- Sika® Tricoflex® DFT 330/3 KF waterstop profiles were prefabricated into DFT 330/3 KI angle sections and bonded with the adhesive in a watertight connection to the existing structure. The free, profiled leg of the waterstop profile was then cast into the new concrete.

Joint repairs inside a secondary clarifier treatment tank

Requirement:
To replace the deteriorated existing joint sealant, with limited access and angled joint runs, with a system to withstand exposure to aggressive wastewater under hydrostatic pressure and additional mechanical loading from the treatment process.

Method:
- Installation of Sika® Tricoflex® LFT 240 profiles, which are designed for use against higher water pressures and mechanical loading
- The sealed joints were then protected from accidental mechanical damage with a sliding cover plate (fixed one-side).

Waterproofing for typical detailing solutions

Requirement:
Secure watertight detailing solutions around pipe penetrations (e.g. for utility pipe entries and service ducts etc.), plus around clamped seals in flanged waterstops etc.

Method:
- Easy detailing and sealing with Sika® Tricoflex pipe collars and profile systems.

Precast concrete bridge elements – connection joint waterproofing

Requirement:
The foundations were a reinforced concrete raft and base slab cast in situ. The vertical sides were then produced using precast concrete sections and the joints between them had to be made durable watertight.

Method:
- All of the joints between the precast wall sections were easily and simply made watertight with the Sika® Tricoflex® bonded sealing system.

Sports stadium terrace deck – wide joint waterproofing

Requirement:
Waterproofing of joints in the stadium terraces with movement capabilities of up to 5 cm, plus complex joint configurations and difficult runs (e.g. large numbers of edges in different planes).

Method:
- Installation of the Sika® Tricoflex® membrane strip with a pre-formed central loop into the joints (giving the security of additional movement capability in addition to the 400% elongation at break performance of the membrane)
- Covering of the joints in trafficked areas with a sliding cover plate (fixed one-side only)

Expansion joint waterproofing in a shaft

Requirement:
Post-construction waterproofing of the expansion joints in the difficult access and working conditions with restricted space.

Method:
- Prefabrication of Sika® Tricoflex® LFT 330 waterstop profile to suit the structure, then simple butt welding in the shaft to form a reliable watertight seal.

Expansion joint waterproofing on an in-situ poured concrete structure

Requirement:
Very rough concrete surfaces and joints with large movement capabilities of up to 4 cm.

Method:
- Installation of the Sika® Tricoflex® membrane with a top layer of adhesive only on the bonded edges of the strip, not in the central expansion area, so the system can easily accommodate the anticipated movement and more

Waterproofing for typical detailing solutions

Requirement:
Secure watertight detailing solutions around pipe penetrations (e.g. for utility pipe entries and service ducts etc.), plus around clamped seals in flanged waterstops etc.

Method:
- Easy detailing and sealing with Sika® Tricoflex pipe collars and profile systems.
Injection technology
Approved injection systems, proven for many years.
Injection technology

Injection hoses and injection materials

Injection technology

Watertight joint and crack sealing by injection is based on approved, tested and well proven technologies. The basis for any successful injection project is to select the right injection material and equipment, then to carry out the injection process professionally. Injection technology generally works on the principle known as grouting and is now an indispensable part of both structural repair works and planned structural waterproofing.

With the aid of injection packers (ports) and hoses, any voids and other defects in the concrete can be effectively and efficiently grouted, filled and sealed with a wide variety of methods and materials.

SikaFuko® VT injection hoses – when secure watertightness is required

This unique design with an integral valve system guarantees maximum security. In the concreting process the neoprene strips seal the future outlets securely and prevent cement paste entering the hose. In the grouting process these neoprene strips are compressed and the injection material can escape through the preformed slots along the length of the hose. With the right injection material, vacuum pressure cleaning allows grouting to be repeated in the event of future leaks or damage.

SikaFuko® Eco injection hoses – a cost effective solution

An extremely cost effective standard injection hose system that has been approved and widely used for many years. It is most suitable for single and repeat grouting with polyurethane resins, cement suspensions and acrylate gels.

Injection materials

Acrylate resins

- Miscible with water, therefore usable for repeat grouting with suitable injection hoses
- Can be used and react at low temperatures (>5°C)
- Can have additional swelling ability for additional security, e.g. in crack movement
- The reaction time is adjustable to suit the specific problem and project requirements

Polyurethane resins

- Provide excellent edge adhesion on dry, damp and even wet surfaces
- Suitable for grouting water-bearing cracks in combination with waterstopping PU foam
- Cures to a shrinkage-free, permanently elastic, durable polymer
- Suitable for flexible filling and watertight grouting of concrete voids, cracks, defects and construction joints through injection packers and pre-installed hoses

Cement suspensions

- Economic injection materials that are ideal for projects with high volume material demands
- Miscible with water, therefore usable for repeat grouting with suitable injection hoses
- Special additive components give improved grout flow and pressure stability properties

Sika injection materials

| Acrylate resin/gel | Sika® Injection 304 | 3 0,5 - 2 x x x x | x | x | x | x |
| Polyurethane resin/foam | Sika® Injection 201 CE | 70 x x x x | x | x |
| | Sika® Injection 101 RC | 2 | 70 x x x x |
| | Sika® Injection 107 | 2 | 70 x x x x |
| Cement suspension, micro-cement based | Sika® Tricodur® SI | 60 x x x x | x | x |

SikaFuko® VT injection hose

<table>
<thead>
<tr>
<th>Ø Hose diameter</th>
<th>PUR-resin</th>
<th>EP-resin*</th>
<th>Acrylate-resin*</th>
<th>Cement - suspension*</th>
<th>Cement-paste*</th>
</tr>
</thead>
<tbody>
<tr>
<td>SikaFuko® VT 1</td>
<td>6</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SikaFuko® VT 2</td>
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<td>x</td>
<td></td>
<td></td>
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</tbody>
</table>

x For single injection  @ For repeat injection (vacuumbale)  – Not recommended

SikaFuko® Eco injection hose

<table>
<thead>
<tr>
<th>Ø Tube diameter</th>
<th>PUR-resin</th>
<th>EP-resin*</th>
<th>Acrylate-resin*</th>
<th>Cement - suspension*</th>
<th>Cement-paste*</th>
</tr>
</thead>
<tbody>
<tr>
<td>SikaFuko® Eco 1</td>
<td>6</td>
<td>x</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

x For single injection  @ For repeat injection (vacuumbale)  – Not recommended

Accessories for injection hoses

- Assembly
- Installation and Fixing
- Injection Grouting

12 13
SikaSwell® swelling products
Active joint waterproofing systems
SikaSwell® swelling products
Profiles, adhesive sealants and combination systems

SikaSwell® swelling products
Swelling products are also known as active waterproofing systems because they swell and develop pressure in contact with water, which blocks the path and prevents water penetration through the joint. The advantages of these products are their ease of handling and economy. Swelling products are suitable for sealing construction joints and many types of detailing, plus for secondary or back-up sealing systems e.g. in combination with injection hoses and waterbars.

- For construction joints, wall penetrations, connections between different materials
- Reliable, reversible swelling capabilities
- Outstanding chemical resistance
- Easy and fast installation
- Extremely high long term durability

<table>
<thead>
<tr>
<th>Swelling product types</th>
<th>Waterproofing of</th>
</tr>
</thead>
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<tr>
<td>Swelling profiles</td>
<td></td>
</tr>
<tr>
<td>Acrylate based</td>
<td>Shape-maintaining Reversible swelling</td>
</tr>
<tr>
<td>Bentonite based</td>
<td>Long worldwide experience Reversible swelling</td>
</tr>
<tr>
<td>Swelling profile rings and plugs</td>
<td>Acrylate based</td>
</tr>
<tr>
<td>Swelling adhesive sealants</td>
<td>Polyurethane based</td>
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SikaSwell swelling profiles

<table>
<thead>
<tr>
<th>Profile</th>
<th>Height</th>
<th>Width</th>
<th>Swelling in water wt.%</th>
<th>Fixing method</th>
<th>Clips/ mesh</th>
</tr>
</thead>
<tbody>
<tr>
<td>SikaSwell® A 2010</td>
<td>10</td>
<td>20</td>
<td>ca. 10</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>SikaSwell® A 2015</td>
<td>15</td>
<td>20</td>
<td>ca. 10</td>
<td>x</td>
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</tr>
<tr>
<td>SikaSwell® A 2025</td>
<td>25</td>
<td>20</td>
<td>ca. 10</td>
<td>x</td>
<td></td>
</tr>
</tbody>
</table>

- Swelling details are guide values and may vary due to site conditions
- Easy and secure fixing with Sikabond AT-Universal or SikaSwell-S2 adhesive
- Packaging units
  - Typ 2010, 20 mm x 10 mm: 1 box = 60 m / 6 rolls
  - Typ 2015, 20 mm x 15 mm: 1 box = 56 m / 8 rolls
  - Typ 2025, 20 mm x 25 mm: 1 box = 30 m / 6 rolls

SikaSwell adhesive sealant

<table>
<thead>
<tr>
<th>Acrylate based</th>
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<tbody>
<tr>
<td>SikaSwell® swelling paste Type E</td>
</tr>
<tr>
<td>1 Cartridge ca. 250</td>
</tr>
<tr>
<td>24 h</td>
</tr>
</tbody>
</table>

Accessory for SikaSwell® swelling paste Type E:
- Manual cartridge gun

Swelling adhesive sealants

<table>
<thead>
<tr>
<th>Polyurethane based</th>
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</thead>
<tbody>
<tr>
<td>SikaSwell® swelling paste Type E</td>
</tr>
<tr>
<td>1 Cartridge ca. 250</td>
</tr>
<tr>
<td>24 h</td>
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</tbody>
</table>

Sika swelling rings

<table>
<thead>
<tr>
<th>Inside diameter</th>
<th>Waterproofing of</th>
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<tbody>
<tr>
<td>Fibre cement ducts</td>
<td></td>
</tr>
<tr>
<td>Sika swelling ring</td>
<td>43</td>
</tr>
<tr>
<td>Plastic pipes and ducts</td>
<td></td>
</tr>
<tr>
<td>Sika swelling ring</td>
<td>26</td>
</tr>
<tr>
<td>Anchor bars</td>
<td></td>
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<tr>
<td>Sika swelling ring</td>
<td>18</td>
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</table>

Quellstopfen

<table>
<thead>
<tr>
<th>Fibre cement ducts</th>
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</thead>
<tbody>
<tr>
<td>Sika swelling plug</td>
</tr>
<tr>
<td>Plastic pipes</td>
</tr>
<tr>
<td>Sika swelling plug KS</td>
</tr>
</tbody>
</table>
Sika® Waterbars
System solutions for watertight sealing of expansion and construction joints
Sika® Waterbars

System solutions for watertight sealing of expansion and contraction joints

Joint waterproofing has been successfully achieved in watertight concrete structures by using engineered waterstops for many years. In fact these waterbars are now often widely known as ‘waterstops’ in many places. Since the early 1930’s building basements and civil engineering structures have used such waterstops for secure waterproofing systems for structural joints exposed to high stress.

Today these waterbars are available based on different materials and in a wide variety of profiles and cross-sections for the equal diversity of watertight sealing and watertopping functions that are required. In different types of structure there are different types of exposure and stress, with special waterbars also produced for specific exposure requirements, such as extremely high water pressures or where the waterstop system itself must also be in contact with aggressive substances.


Sika® PVC-P Waterbars are manufactured to Sika’s own in-house standards and also meet the form and material requirements of the DBIB (German institute for Civil Engineering) with an abP Certificate for use in construction projects.

The planning and design, joint formation, handling and installation of regulated Tricomer and Elastomer waterbars are governed by DIN 18197. Sealing of joints in concrete with waterbars. The National Technical Approval for Sika PVC-P waterbars also relates to this application standard as regards the products manufacture, design and use, including modifications. German standards and guidelines also exist and apply to specific engineered joint waterproofing applications e.g. for use in bridges, tunnels, locks and dams.

Waterstop solutions produced with all of the above types of waterbar now represent the most proven system solutions for the waterproofing of expansion and contraction joints in watertight concrete structures. These solutions also have the longest track record and are covered by detailed instructions for their manufacture, design and installation to established standards and guidelines. The use of these prefabricated waterstop systems with factory welded joints that minimize the need for site joints, also gives the highest level of watertight joint security and reliability.

Sika® Waterbars

Material descriptions and approvals

PVC-P

- plasticized polyvinyl chloride for Sika PVC-p waterbars

The advantages of this material are its suitability for the watertopping system in many applications, it can be easily heat welded and is relatively low cost. Its tensile strength is 8 MPa minimum and its elongation at break is 275% min. The products are “Not compatible with bitumen” (PVC/NB). They have proved effective over many decades. The waterstops are thoroughly tested and have an individual DBIB Approval Certificate (abP).

Approval/Compliance:
abP Approval Certificate

PVC-P+Q

- PVC-P waterbars with a swelling section for Sika® combination (KAB) waterbars

The material used for KAB construction joint waterbars is a special PVC-P with high Shore hardness, which gives it very good positional stability that is combined with high elongation capability. These waterbars are completed by integrated swelling sections to give dual-action waterproofing functions with a very high sealing effect.

Approval/Compliance:
abP – Approval Certificate

WU Guidelines for Watertight Structures (DafStb)

PVC/NBR

- PVC-P/NBR polymer, bitumen resistant, for Sika® Tricom® waterbars

This special polymer was developed in our own laboratories and consists of very high quality base materials which exceed the requirements of the standards in many aspects. Tricomer® has permanent elasticity similar to elastomer, plus outstanding chemical and ageing resistance. Its elongation at break is over 350% and its tensile strength min. 10 MPa. Tricomer® waterbars are also produced in a “Bitumen compatible” (BV) quality. They can be heat welded and are well proven.

Approval/Compliance:
Meets Standards DIN 18541 and DIN 18197, plus abP Certified for clamped flanged seals

Elastomer

For Sika® Elastomer waterbars

Elastomers are open-pored, cross-linked polymers which become an elastic material by the process of vulcanization. Therefore these profiles must also be joined together by vulcanizing. Elastomers are extremely ductile (elongation at break ≥ 380%) with outstanding elastic recovery. For this reason elastomer waterstops are mainly used for larger joints and joints with larger movement requirements such as with frequent load changes, low temperatures and/or high water pressures.

Approval/Compliance:
Meets Standards DIN 7865 and DIN 18197

Thermoplastic polyolefin (FPO) for Sika® Eco waterbars

This FPO material is fully tested in accordance with German DVGW criteria in worksheet W 270 and the German KTW recommendations and is approved as meeting all of the requirements for plastics to be used in contact with drinking water (potable) or foodstuffs. This FPO material also has outstanding physical properties, including a 350% elongation at break and ≥ 10 MPa tensile strength, plus the waterbars can be joined by heat welding. This means the material is very suitable for the manufacture of waterbars. The light blue colour of this waterbar product range easily distinguishes it from all other materials.

Approval/Compliance:
Drinking water approval in accordance with KTW and DVGW worksheet W 270

PE – Polyethylene

For Sika® Westec® waterbars

This range is approved for use as joint watertopping materials in structures and designs for the storage, filling and handling of substances hazardous to water (LAU in Germany). This also includes installations for the production, processing and use of water-pollutant substances (HBV in Germany). This is due to its very high chemical resistance and in particular, the material is resistant to many hydrocarbons (e.g. fuels and solvents). Its elongation at break is approx. 900% and its tensile strength approx. 28 MPa. The waterbars made from it are comparatively hard and therefore their handling and installation varies considerably from the usual watertop standards.

Approval/Compliance:
Approval ETA-04/0044 in accordance with German Water Management Act (WHG) for use in LAU facilities (storage, filling and handling of substances hazardous to water)

Special polymer

For Sika SP waterbars

This material is also approved for use in LAU and HBV facilities, due to its high chemical resistance; however it is a more flexible material that can therefore accommodate larger movement. These have an elongation at break of approx. 360% and a tensile strength of approx. 12.6 N/mm2.

Approval/Compliance:
WHG approval abP Z 74-5-98
**General information**

1. **Joint width**
   - The design diagrams apply to an initial/nominal joint width \( w_{nom} \) for the internal expansion joint and the joint capping waterbars of 20 – 30 mm and 20 mm for the external expansion joint waterbars.

   \[
   v_r = \text{resulting movement}, \quad v_x = \text{movement in x axis}\]

   \[
   v_y = \text{movement in y axis}, \quad v_z = \text{movement in z axis}
   \]

2. **Position in the component**
   - **Cover depth rule:** Embedment depth \( t \leq \) cover depth \( u \)
   - **Simplified cover depth rule (DIN 18197):**
     \[
     \text{Component thickness} \geq \text{total waterbar width} \ a
     \]

3. **Minimum component thickness for internal waterbars**
   - The component thickness around the waterbar must be at least equal to the waterbar width. A component thickness of 30 cm is adequate for the D 320 waterbar.

4. **Design (water pressure and movement)**
   - **Waterbar**
     - **Shape/type**
     - **Joint width**
   - **Design water level:** The maximum expected groundwater, interlayer water or flood water; for tanks, the filling level.

**DIN 18197** covers the planning principles, installation, jointing and design of the waterbars, allowing for all the principles defined in that DIN.
Sika® Waterbars Tricomer® acc. to DIN 18541
Calculation diagram acc. to DIN 18195

For higher water pressure > 14 m head, e.g. for use in dams, references and experience with waterbars with an even more robust design are available.

D
Internal expansion joint waterbars

DA
External expansion joint waterbars

FA
Capping joint waterbar

A
Internal construction joint waterbars

AA
External construction joint waterbars

Sika® Waterbars Elastomer acc. to DIN 7865
Calculation diagram acc. to DIN 18195

FM
Internal expansion joint waterbars

FMS
Internal expansion joint waterbars with lateral steel plates

AM
External expansion joint waterbars

FAE und FFK
Capping joint waterbars

F
Internal construction joint waterbars

FS
Internal construction joint waterbars with lateral steel plates

For each additional millimetre of waterbars thickness, the allowable water pressure increases by 10%, maximum of 50%. See DIN 18197

Expansion joint waterbars Classification

Expansion joint waterstops | Component thickness [mm] | Construction joint waterstops
--- | --- | ---
D 240 | A 240 | A 240
D 320 | A 320 | A 320
D 500/6~/9 | A 500 | A 500
DA 240 | AA 240 | AA 240
DA 320 | AA 320 | AA 320
DA 500 | AA 500 | AA 500
* Free choice

Expansion joint waterbars Classification

Expansion joint waterstops | Component thickness [mm] | Construction joint waterstops
--- | --- | ---
FM 250 | 250 | F 250
FM 300 | 300 | F 300
FM 350 | 350 | F 350
FM 400 | 400 | F 400
FM 500 | 500 | F 500
FS 250 | 250 | FS 250
FS 300 | 300 | FS 300
FS 400 | 400 | FS 400
FS 500 | 500 | FS 500
FS 1000 | 1000 | FS 1000
AM 250 | * | A 250
AM 300 | * | A 300
AM 500 | * | A 500
* Free choice
### Sika® Waterbars PVC-P for expansion joints

Acc. to Sika in-house standards with abP Approval

<table>
<thead>
<tr>
<th>Sika® PVC-P</th>
<th>Total width</th>
<th>Width of expansion part</th>
<th>Thickness of expansion part</th>
<th>Width of sealing strip</th>
<th>Height of anchoring ribs</th>
</tr>
</thead>
<tbody>
<tr>
<td>DF 24</td>
<td>240</td>
<td>85</td>
<td>4</td>
<td>78</td>
<td>15</td>
</tr>
<tr>
<td>DF 32</td>
<td>320</td>
<td>103</td>
<td>6</td>
<td>105</td>
<td>15</td>
</tr>
</tbody>
</table>

Reinforced expansion joint waterbars with fixing loop

| STF 32 | 320 | 100 | 4.5 | 110 | 15 |

### Installation aids for capping joint waterbars

<table>
<thead>
<tr>
<th>Installation aids</th>
<th>Joint width</th>
<th>Exposed width</th>
<th>Chamfer height</th>
<th>Width of temporal strip</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>TFL 20</td>
<td>10</td>
<td>20</td>
<td>15</td>
<td>60</td>
<td>1000</td>
</tr>
<tr>
<td>TFL 30</td>
<td>20</td>
<td>30</td>
<td>15</td>
<td>80</td>
<td>1000</td>
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<tr>
<td>TFL 40</td>
<td>30</td>
<td>40</td>
<td>15</td>
<td>100</td>
<td>1000</td>
</tr>
<tr>
<td>TFL 50</td>
<td>40</td>
<td>50</td>
<td>15</td>
<td>150</td>
<td>1000</td>
</tr>
</tbody>
</table>

The installation aid is coordinated with the exposed width of the capping joint waterbars.
### Sika® Waterbars Tricomer® for expansion joints

Acc. to DIN 18541

#### DIN 18541

<table>
<thead>
<tr>
<th>Width of expansion part (mm)</th>
<th>Thickness of expansion part (mm)</th>
<th>Width of sealing part (mm)</th>
<th>Height of anchoring ribs (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>D 240</strong></td>
<td>240</td>
<td>95</td>
<td>4.5</td>
</tr>
<tr>
<td><strong>D 320</strong></td>
<td>320</td>
<td>104</td>
<td>5</td>
</tr>
<tr>
<td><strong>D 500</strong></td>
<td>500</td>
<td>155</td>
<td>6.5</td>
</tr>
<tr>
<td><strong>D 250/4</strong></td>
<td>250</td>
<td>120</td>
<td>6</td>
</tr>
<tr>
<td><strong>D 320/4</strong></td>
<td>320</td>
<td>170</td>
<td>6</td>
</tr>
<tr>
<td><strong>D 250/5</strong></td>
<td>250</td>
<td>120</td>
<td>7.5</td>
</tr>
<tr>
<td><strong>D 320/5</strong></td>
<td>320</td>
<td>170</td>
<td>7.5</td>
</tr>
</tbody>
</table>

#### DIN 18541 part 2

<table>
<thead>
<tr>
<th>Width of expansion part (mm)</th>
<th>Thickness of expansion part (mm)</th>
<th>Width of sealing part (mm)</th>
<th>Height of anchoring ribs (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DA 240 angle A</strong></td>
<td>130/105</td>
<td>55/36</td>
<td>4.5</td>
</tr>
<tr>
<td><strong>DA 240 angle W</strong></td>
<td>130/105</td>
<td>55/36</td>
<td>4.5</td>
</tr>
<tr>
<td><strong>DA 320 angle A</strong></td>
<td>176/156</td>
<td>63/43</td>
<td>4.5</td>
</tr>
<tr>
<td><strong>DA 320 angle W</strong></td>
<td>176/156</td>
<td>63/43</td>
<td>4.5</td>
</tr>
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</table>

#### DIN 18541 part 3

<table>
<thead>
<tr>
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<th>Thickness of expansion part (mm)</th>
<th>Width of sealing part (mm)</th>
<th>Height of anchoring ribs (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>FA 50</strong></td>
<td>50</td>
<td>35</td>
<td>30</td>
</tr>
<tr>
<td><strong>FA 50/20/25/50</strong></td>
<td>35</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td><strong>FA 50/20/25/50</strong></td>
<td>35</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td><strong>FA 50/20/25/50</strong></td>
<td>35</td>
<td>30</td>
<td>30</td>
</tr>
</tbody>
</table>

**Very robustly profiled and dimensioned expansion joint waterbars**

- **D 240/25**
- **D 240/35**
- **D 320/25**
- **D 320/35**
- **D 500/35**

### Sika® Waterbars Tricomer® for construction joints

Acc. to DIN 18541

#### DIN 18541

<table>
<thead>
<tr>
<th>Width of expansion part (mm)</th>
<th>Thickness of expansion part (mm)</th>
<th>Width of sealing part (mm)</th>
<th>Height of anchoring ribs (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A 240</strong></td>
<td>240</td>
<td>85</td>
<td>4.5</td>
</tr>
<tr>
<td><strong>A 320</strong></td>
<td>320</td>
<td>100</td>
<td>5</td>
</tr>
<tr>
<td><strong>A 400/110</strong></td>
<td>400</td>
<td>120</td>
<td>7.5</td>
</tr>
</tbody>
</table>

**Very robustly profiled and dimensioned construction joint waterbars**

- **A 240**
- **A 320**
- **A 400/110**

#### DIN 18541 part 2

<table>
<thead>
<tr>
<th>Width of expansion part (mm)</th>
<th>Thickness of expansion part (mm)</th>
<th>Width of sealing part (mm)</th>
<th>Height of anchoring ribs (mm)</th>
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</thead>
<tbody>
<tr>
<td><strong>AA 240 edge A</strong></td>
<td>120/120</td>
<td>45/45</td>
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</tr>
<tr>
<td><strong>AA 320 edge A</strong></td>
<td>165/165</td>
<td>52/52</td>
<td>4.5</td>
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</table>

#### DIN 18541 part 3

<table>
<thead>
<tr>
<th>Width of expansion part (mm)</th>
<th>Thickness of expansion part (mm)</th>
<th>Width of sealing part (mm)</th>
<th>Height of anchoring ribs (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>FA 50/30/35</strong></td>
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<td>30</td>
</tr>
<tr>
<td><strong>FA 50/30/35</strong></td>
<td>35</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td><strong>FA 50/30/35</strong></td>
<td>35</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td><strong>FA 50/30/35</strong></td>
<td>35</td>
<td>30</td>
<td>30</td>
</tr>
</tbody>
</table>

### Sika® Waterbars Tricomer®

**Total Width of Thickness Profile Number**

<table>
<thead>
<tr>
<th>DIN 18541 part 2</th>
<th>Width</th>
<th>Thickness</th>
<th>Profile</th>
<th>Number</th>
<th>Anchoring ribs</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DA 240</strong></td>
<td>240</td>
<td>90</td>
<td>4.5</td>
<td>25</td>
<td>4</td>
</tr>
<tr>
<td><strong>DA 240</strong></td>
<td>240</td>
<td>104</td>
<td>5</td>
<td>35</td>
<td>4</td>
</tr>
<tr>
<td><strong>DA 320</strong></td>
<td>330</td>
<td>104</td>
<td>5</td>
<td>35</td>
<td>6</td>
</tr>
<tr>
<td><strong>DA 320</strong></td>
<td>330</td>
<td>104</td>
<td>5</td>
<td>35</td>
<td>6</td>
</tr>
</tbody>
</table>

**Sika® Waterbars Tricomer®**

- **A = Anchoring ribs external**
- **W = Anchoring ribs either side**

## Waterstop welding

The welded joint connections in the waterstop are made at angles for T-joints, intersections and transitions by factory welded joints. On site, only longitudinal connections in the waterstopping system are made by site welded butt joints. The welding equipment used must enable simultaneous heating, melting and jointing to be carried out across the whole area of the connection. The profile ends must be compressed immediately after heating/melting at an evenly applied jointing pressure. Any joints formed on site must be made only by the waterbar manufacturer's technical personnel or by joint technicians specifically trained by the manufacturer.
Sika® Waterbars Elastomer for expansion joints
Acc. to DIN 7865

Sika® Elastomer
Total Width of Thickness of Width of Height of
DIN 7865 expansion expansion sealing anchoring
part part part ribs

FM 200 200 110 9 45 32
FM 250 250 125 9 63 38
FM 300 300 175 10 63 38
FM 350 300 180 12 85 38
FM 400 400 230 12 85 38
FM 500 500 300 13 100 38

Expansion joint waterbar with encased centre bulb
FM 350 HS 350 180 12 85 38

Sika® Elastomer
Total Width of Thickness of Width of Height of
DIN 7865 expansion expansion sealing anchoring
part part part* ribs

FMS 350 350 120 10 45 32
FMS 400 400 170 11 45 32
FMS 500 500 230 12 65 38

Expansion joint waterbar with lateral steel plates and central hose sheeting
FMS 400 HS 400 170 11 45 32

• The FMS...HS profile range is most suitable for wide joints and joints which do not allow expansion, or for standard expansion joints if large settlement movement is expected.

* Excluding steel plate

Sika® Elastomer
Total Width of Thickness Profile Number
DIN 7865 width expansion height Anchoring ribs
part

FAE 50 50 10 30 2
FAE 100 100 30 30 4
FAE 150 150 30 30 4
FFK 5/2 55 35 20 35 2
FFK 1/2 70 50 20 45 2
FFK 7/4 70 50 40 45 2
FFK 7/5 70 50 40 45 2
FFK 10/4 100 35 20 45 4
FFK 18/3 180 55 30 30 6

Sika® Waterbars Elastomer for construction joints
Acc. to DIN 7865

Sika® Elastomer
Total Width of Thickness of Width of Height of
DIN 7865 expansion expansion sealing anchoring
part part part ribs

FS 270 270 60 7 105 22
FS 310 310 80 8 115 22

Construction joint waterbars with lateral steel plates
FS 270 270 60 7 105 22
FS 310 310 80 8 115 22

Sika® Elastomer
Total Width of Thickness Profile Number
DIN 7865 width expansion height Anchoring ribs
part

AM 250 250 100 6 31 4
AM 350 350 100 6 31 6
AM 500 500 150 6 31 8

Sika® Waterbars Elastomer vulcanization

The only jointing method approved for Sika® Elastomer waterbars is vulcanization. Raw material is
added and the joint is formed by the combined action of heat and pressure.
A heated vulcanizing machine with a matrix matching the shape of the waterbar is used.
Any joints formed on site must be made only by the waterbar manufacturer’s technical personnel
or by jointing technicians specifically trained by the manufacturer.
Special Sika® waterbars

In hydraulic structures

The joint waterproofing systems in hydraulic structures are generally exposed to high stress due to the combination of high water pressure, large movement, and in some cases also to open weathering.

For this reason suitable large-sized Special Sika® Tricomer or Elastomer waterbars are normally used for such complex structures. Specific material types and custom waterproofing systems may be required for these demanding applications. These can also require specific testing approvals and inspection at all stages of their design, production, and installation, meaning there can necessarily be a considerable time lag before their final approval for use.

Typical uses:
- Flood barriers
- Connecting joints in sewers
- Locks
- Dams
- Floating tunnel segments

Special waterproofing solutions geared to the structural and exposure conditions.

### Tricomer®

<table>
<thead>
<tr>
<th>Sika® Expansion joint waterbar, very robust type</th>
<th>Total Width</th>
<th>Thickness of expansion part</th>
<th>Width of bulks</th>
<th>Height of anchoring ribs</th>
</tr>
</thead>
<tbody>
<tr>
<td>OKB 30</td>
<td>300</td>
<td>184</td>
<td>8</td>
<td>156</td>
</tr>
<tr>
<td>OKB 24</td>
<td>240</td>
<td>130</td>
<td>8</td>
<td>96</td>
</tr>
</tbody>
</table>

### Elastomer

<table>
<thead>
<tr>
<th>Sika® Expansion joint waterbar with lateral steel plates</th>
<th>Total Width</th>
<th>Thickness of expansion part</th>
<th>Width of bulks</th>
<th>Height of anchoring ribs</th>
</tr>
</thead>
<tbody>
<tr>
<td>FMS 450 5*</td>
<td>450</td>
<td>186</td>
<td>17/4</td>
<td>32</td>
</tr>
</tbody>
</table>

### Sika® Construction joint waterbar, very robust type

| OKB 30/70 | 320 | 165 | 10 | 26 |

- Waterproofing of black joints in dams
- Waterstops of this design with drinking water approval are also available on request

**Thickness in expansion part, measured at the central hose**

### Sika® Special Waterbars

In bridge construction

Sika® Special Waterbars

In tunnel construction

Sika® Special Waterstops for bridge construction

Detailed specifications for the use of waterbars in bridge construction are given in German Civil Engineering Guidelines ZTV-ING and RZ2-ING, and in German Railways (Bundesbahn) Guideline BBaK 6101.

For Elastomer waterbars in accordance with DIN 7865, external monitoring must be used for quality control of the joint waterproofing.

The longitudinal joint for parapet bridge superstructures is covered around the abutment by a clamped flanged seal with a flat profile as shown in drawing FUG 6. For retractable bridge superstructures the abutment joint is covered by a clamped elastomer strip.

Waterproofing terminations under the edge capping.

### Sika® Elastomer

<table>
<thead>
<tr>
<th>Sika® Elastomer</th>
<th>Total Width</th>
<th>Thickness</th>
<th>Profile Height</th>
<th>Number anchoring ribs</th>
</tr>
</thead>
<tbody>
<tr>
<td>DAB 450</td>
<td>450</td>
<td>4</td>
<td>20</td>
<td>3</td>
</tr>
</tbody>
</table>

- According to DB AG – DBS-BaK 6101 “Railway bridges and other civil engineering structures".
- Waterproofing terminations under the edge capping.

### Sika® Construction joint waterbar, very robust type

| OKB Vario 200 - 1000 | Variable |

- Joint waterproofing systems in hydraulic structures are generally exposed to high stress due to the combination of high water pressure, large movement, and in some cases also to open weathering.

### Sika® Expansion joint waterbar

| OKB Vario 200 - 1000 | Variable |

- Join waterproofing systems in hydraulic structures are generally exposed to high stress due to the combination of high water pressure, large movement, and in some cases also to open weathering.

### Sika® Barol injection channel

- Waterstops in combination with membrane systems: there is full compatibility guaranty through equal material base of waterstop and membrane.

* With injection channel.
Sika® Waterbars for flanging constructions
For connections, transitions and the waterproofing of existing joints bestehender Fugen
Sika® Waterbars for flanging constructions
For connection joints and post-construction waterproofing of joints

Standards of flanging constructions, fields of applications acc. to DIN

- Sika® Tricomer®
  - Up to 10 mm movement
  - Up to 6 m head of water

- Sika® Elastomer
  - Up to 20 mm movement
  - Up to 15 m head of water

- Sika® Omega profiles
  - Up to 50 mm movement
  - Up to 30 m head of water

Unreinforced
Reinforced with nylon fabric

Connections of new to old structures (flanged on one leg)
Existing joints (flanged on both legs)

Type of seal

Loose flanged seal
Loose/fixed flange seal

Sika® Tricomer® flanging profiles
- Flanging with Sika® Tricomer® thermoplastic waterbar, DIN 18541-2
- Certification to abP
- Flanging profiles with permanent elasticity and appropriate elastic recovery
- For waterproofing movement and construction joints and joints not allowing expansion, up to a maximum water pressure of 0.6 bar (6 m head) and resulting movement \( u \) of 10 mm
- Must only be installed by trained and qualified personnel
- Typical uses: connections of new structures to existing, plus waterproofing existing joints

Sika® Elastomer flanging profiles
- Flanging with Sika® Elastomer waterbar, DIN 7865-2
- Robust flanging profiles with high permanent elasticity and elastic recovery
- For waterproofing movement, construction and connection joints up to a maximum water pressure of 1.5 bar (15 m head) and resulting movement \( u \) of 20 mm
- Must only be installed by trained and qualified personnel
- Typical uses: connections of new structures to existing, waterproofing of existing joints; transitions / changes in the waterproofing / waterstopping system

Sika® Omega flanging profile
- Flanging with fabric-reinforced Elastomer Omega waterbar
- Robust cross-sections with high permanent elasticity and elastic recovery
- For waterproofing movement joints up to a water pressure of 3.0 bar (30 m head) and more with appropriate design, movement capability dependent on profile and location etc.
- Must only be installed by trained and qualified personnel
- Typical uses: waterproofing movement joints with originally designed and existing Omega fixed flanges, or for joint transitions according to DIN 18195-9

Technical support
For waterproofing and joint waterstop specifications with high demands or special requirements, please contact us for advice – take advantage and benefit from our 30-year experience. Sika provides:
- Design assistance and support
- CAD documentation
- Complete factory-produced waterstop systems

Sika® accessories for loose flanged seals
Standard types, other dimensions on request
1. Flanging waterbar
2. Raw rubber sealing layer in mm:
   50 x 4, 80 x 4, 100 x 4, 120 x 4
3. Clamped flange, galvanized V4A in mm:
   40 x 6, 80 x 8, 80 x 10, 100 x 10
   Hole spacing \( e = 15 \) cm
   (for clamped flange 40 x 6: \( e = 20 \) cm)
4. Clamped flange angles (internal or external angles) 90°
   Galvanized or V4A in mm: 80 x 10, 100 x 10
   Chemical anchor galvanized or V4A quality
   M 10 x 115 for metal flange 40 x 6
   M 12 x 160 for metal flange 80 x 8
   M 16 x 190 for metal flange 80 x 10, 100 x 10
5. Patching mortars for surface repair and preparation
6. Protection profile Sika® KSP 230
### Sika® Flanging profiles

#### Connections from new to existing structures

<table>
<thead>
<tr>
<th>Sika® Tricomer®</th>
<th>Total width</th>
<th>Width of expansion part</th>
<th>Thickness</th>
<th>Width of sealing part</th>
<th>Width of bulbs</th>
<th>Height of anchoring ribs</th>
</tr>
</thead>
<tbody>
<tr>
<td>FM 350 K</td>
<td>350</td>
<td>12</td>
<td>85</td>
<td>20</td>
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<table>
<thead>
<tr>
<th>Sika® Elastomer</th>
<th>Total width</th>
<th>Thickness</th>
<th>Width of sealing part</th>
<th>Width of anchoring ribs</th>
</tr>
</thead>
<tbody>
<tr>
<td>FM 350 K</td>
<td>350</td>
<td>12</td>
<td>20</td>
<td>31</td>
</tr>
</tbody>
</table>

* Excluding the central hose

---

### Sika® Flanging profiles

#### Waterproofing of existing joints

<table>
<thead>
<tr>
<th>Sika® Tricomer®</th>
<th>Total width</th>
<th>Thickness</th>
<th>Width of expansion part</th>
<th>Width of loop</th>
<th>Height of loop</th>
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<tbody>
<tr>
<td>FM 300</td>
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<table>
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<th>Total width</th>
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<th>Width of expansion part</th>
<th>Width of loop</th>
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<tbody>
<tr>
<td>FM 250</td>
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<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* UV and weather resistant elastomer material

* Other widths on request

---

### Sika® Omega profiles

#### Connections from new to existing structures

<table>
<thead>
<tr>
<th>Sika® Omega profiles</th>
<th>Total width</th>
<th>Thickness</th>
<th>Width of expansion part</th>
<th>Width of loop</th>
<th>Height of loop</th>
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</thead>
<tbody>
<tr>
<td>OK 24</td>
<td>240</td>
<td>130</td>
<td>8</td>
<td>96</td>
<td>68</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Sika® Omega profiles fabric reinforced</th>
<th>Total width</th>
<th>Thickness</th>
<th>Width of expansion part</th>
<th>Width of loop</th>
<th>Height of loop</th>
</tr>
</thead>
<tbody>
<tr>
<td>OKB 24</td>
<td>240</td>
<td>130</td>
<td>8</td>
<td>96</td>
<td>68</td>
</tr>
</tbody>
</table>

* Tilt flanged seal, clamped without piercing the profiles.

---

### Sika® Omega profiles

#### Waterproofing of existing joints

<table>
<thead>
<tr>
<th>Sika® Omega profiles</th>
<th>Total width</th>
<th>Thickness</th>
<th>Width of expansion part</th>
<th>Width of loop</th>
<th>Height of loop</th>
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</thead>
<tbody>
<tr>
<td>DK 24</td>
<td>240</td>
<td>130</td>
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<td>96</td>
<td>68</td>
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</table>

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<thead>
<tr>
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<th>Width of expansion part</th>
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<tbody>
<tr>
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<td>240</td>
<td>130</td>
<td>8</td>
<td>96</td>
<td>68</td>
</tr>
</tbody>
</table>

* Other widths on request

---

### Sika® Tricomer®

<table>
<thead>
<tr>
<th>Total width</th>
<th>Thickness</th>
<th>Width of expansion part</th>
<th>Width of loop</th>
<th>Height of loop</th>
</tr>
</thead>
<tbody>
<tr>
<td>LP 320*</td>
<td>320</td>
<td>On request</td>
<td>20</td>
<td>25</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sika® Omega profiles</th>
<th>Total width</th>
<th>Thickness</th>
<th>Width of expansion part</th>
<th>Width of loop</th>
<th>Height of loop</th>
</tr>
</thead>
<tbody>
<tr>
<td>DK 24</td>
<td>240</td>
<td>130</td>
<td>8</td>
<td>96</td>
<td>68</td>
</tr>
</tbody>
</table>

* Other widths on request
Sika® KAB combination system
The dual action system for secure waterproofing
Sika® KAB combination construction joint waterbars

Waterstops with integrated swelling profiles

Sika® KAB combination construction joint waterbars – the dual action system for secure waterproofing of construction and crack induced joints

The three profile types KAB 125, KAB 175 S and KAB 175 SR are designed specifically to suit their individual applications and therefore combine ease of use on site with the highest levels of watertight protection. These dual action waterbars that incorporate swelling profiles therefore work with a combination of two sealing principles in one product – the labyrinth principle extending the water path, plus contact pressure sealing. One specific additional advantage is that comparable waterproofing effects can be achieved with much narrower profiles.

The KAB waterbars have a rigid inner core and integrated eyelets for fixing, making them easy and secure to install and giving them high stability for wall joint waterproofing.

The watertight jointing method is also by welding, bonding or clamping options, plus as they are supplied in longer 25 m rolls, fewer joints are actually required to be made on site. Vertical angles can also be formed easily by simply bending the waterbar and fixing it in position.

**Uses**

- Floor/wall construction joints with Sika® KAB 125
- Sika® KAB 125 waterbars have a swelling profile in the base which is therefore protected from rain on site and it is fixed to the bottom reinforcement with links. There is no need for a break in the reinforcement or a concrete kicker, unlike with traditional waterbars or metal sheet waterstops. The base is cast in by approximately 4 cm and the profiled leg is fully embedded when the wall is concreted.
- Wall/wall construction joints with Sika® KAB 175 S
- Sika® KAB 175 S waterbars have a swelling profile on both legs and are installed centrally in the face formwork of the wall. The high stability of the profile makes secure positional fixing very easy and in general the free profile leg does not need to be fixed again after striking the first section formwork.
- Crack induced joints formed in site-placed concrete with Sika® KAB 175 SR
- Sika® KAB 175 SR waterbars have all the advantages of the KAB 175 S type, with an additional integrated clip-on strip for the crack inducing elements. These are selected to match the respective wall thickness and are simply clipped on. Sika® KAB 175 SR waterbars are supplied as ready-cut lengths in standard building storey heights. They are fastened with special mounting brackets or fixed to the wall reinforcement with tie wire.
- Crack induced joints in triple wall structures with Sika® KAB 175 SR
- The Sika® KAB 175 SR waterbars are installed in a similar way to the site-placed concrete method above. However, a very useful alternative option is to install the fixing cage between the two forms at the precast plant, then the Sika® KAB 175 SR only needs to be adjusted and fixed on site. Here again the high rigidity of the waterbar has the great advantage of being highly stable yet only needs to be fixed on one side.

**Internal waterproofing of precast basements with the Sika® KAB range**

The Sika® KAB waterproofing system was developed partly for precast concrete basements produced according to the German WZV guidelines. The KAB construction joint waterbar (KAB) has massive advantages over traditional waterproofing systems for this application, because as the waterbar is combined with an integrated swelling membrane, the profiles can be very narrow, which also makes them very suitable for use in filigree structures such as triple walls.

Sika® KAB profiles are reinforced and are extremely stable. They provide significant installation and conserving advantages and can be jointed by welding, bonding or clamping options.

---

**Table: Sika® PVC-P Total Thickness Installation Swelling of membrane insert**

<table>
<thead>
<tr>
<th>Sika® PVC-P</th>
<th>Total Thickness</th>
<th>Installation</th>
<th>Swelling of membrane insert</th>
</tr>
</thead>
<tbody>
<tr>
<td>KAB 125</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>KAB 100</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clips</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clamping plates KS 12 for KAB 125 and KS 15 for KAB 150</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>For connections</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Sika® KAB accessories:**

- 25 m KAB waterstop with 50 clips in the box (0 & 50cm spacing approx. 50 cm)

---

KAB 125, for floor/wall joints

KAB 175 S, wall/wall construction joint

KAB 175 SR, crack induced joint

KAB 175 SR, for crack induced joints

KAB 125 for floor/wall joints

Connection of KAB 125 to KAB 175 SR
Sika® Crack inducing tubes SR
Waterproofing and cross-section weakening for crack induced joints

Installation information
The crack inducing tube is cut on the underside and pulled over the FIX or KAB construction joint waterstop. Clearance from the floor/ceiling concrete approx. 5 cm. At the top of the wall the crack inducing tube is fixed to the formwork with a shear connector (parallel triangular fillets). The shrinkage crack then passes through and between the triangular fillets on both sides of the concrete walls. The bottom of the crack inducing tube must be filled during concreting. Complete filling is essential in some types of structure.

Sika® PVC-P
Total  Diameter Thickness of  Height of
with rigid PVC  width  outer tube anchoring ribs
inner tube a d c f
SR 6  110  64  4  21
SR 9  138  88  4  30
SR 18  235  175  5  35

Standard lengths:
•   SR 6: 2,75 m / 3,30 m
•   SR 9: 2,50 m / 3 m / 4 m
•   SR 18: 3 m / 4 m
•   Non-standard lengths on request

Uses:
•   SR 6: For precast section walls and thin site-placed concrete walls
•   SR 9: For wall thicknesses from ca. 200 mm to ca. 350 mm
•   SR 18: For wall thicknesses from 350 mm to ca. 600 mm

Sika® Metasheet FBV
Waterproofing by bonding to fresh concrete

Bonding to fresh concrete
This unique technology is based on a coating material which fully bonds with fresh concrete. For both surface and joint waterproofing, this technology provides many options for the reliable and cost effective sealing of concrete structures.

Uses
In joint waterproofing the metal sheets are coated with an FBV membrane and can be used for waterproofing horizontal and vertical construction joints. Its outstanding sealing efficiency has been verified by extensive testing and this is also documented in the German abP Approval Certificate. The Sika® Metasheet FBV system also has genuine installation advantages.

Advantages
• Weatherproof material
  Suitable for use in cold, hot, wet and dry conditions, it is robust and ideal for site works
• Easy to use
  No accidental sticking to other surfaces during installation
• Not a dirt trap
  Does not absorb dirt when the protective foil is removed
• Secure butt joints
  Secure due to the adhesive strength and joint clips
• Lightweight
  No heavy materials or high-volume coatings

Sika® Metasheet FBV
Waterproofing by bonding to fresh concrete

Sika® Metasheet FBV with special coating

Sika® Metasheet FBV 120 PB
Fixing clips 120 PB
Joint clips
Clamping plates KS 12

Table:
<table>
<thead>
<tr>
<th>Width</th>
<th>Thickness</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>120</td>
<td>1,50</td>
<td>15</td>
</tr>
</tbody>
</table>

* 50 in a stable wooden box
** 15 m rolls in cardboard boxes, 36 boxes on pallet (also available as a set with the fixing clips in the box)
Sika® compression seals
UV and weather resistant

Sika® Tricomer®*

<table>
<thead>
<tr>
<th>Joint Profile</th>
<th>Profile Thickness</th>
</tr>
</thead>
<tbody>
<tr>
<td>K</td>
<td>B</td>
</tr>
<tr>
<td>KA 22/21</td>
<td>13-17</td>
</tr>
<tr>
<td>KA 30/28</td>
<td>20-25</td>
</tr>
<tr>
<td>KA 40/40</td>
<td>30-35</td>
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</tbody>
</table>

Sika® Elastomer

<table>
<thead>
<tr>
<th>Joint Profile</th>
<th>Profile Thickness</th>
</tr>
</thead>
<tbody>
<tr>
<td>K</td>
<td>B1/B2</td>
</tr>
<tr>
<td>MKN 10</td>
<td>8-13</td>
</tr>
<tr>
<td>MKN 15</td>
<td>13-20</td>
</tr>
<tr>
<td>MKN 20</td>
<td>20-25</td>
</tr>
<tr>
<td>MKN 25</td>
<td>25-30</td>
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<tr>
<td>MKN 30</td>
<td>30-35</td>
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<tr>
<td>MKN 40</td>
<td>35-40</td>
</tr>
<tr>
<td>MKN 50</td>
<td>45-50</td>
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Sika® Tricomer®**

<table>
<thead>
<tr>
<th>Joint Profile</th>
<th>Profile Thickness</th>
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</thead>
<tbody>
<tr>
<td>K</td>
<td>B</td>
</tr>
<tr>
<td>KA 30/28</td>
<td>14/14</td>
</tr>
<tr>
<td>KA 40/40</td>
<td>24/24</td>
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<tr>
<td>KA 50/50</td>
<td>34/34</td>
</tr>
<tr>
<td>KA 60/60</td>
<td>44/44</td>
</tr>
</tbody>
</table>

* Special types and colours on request
** Dependent on requirement: Installation with depth stop or side bonding with Sika MK adhesive or SikaSwell-S2
*** With wide top plate, covers the joint including the chamfers (15 mm each)
**** Multi cavity base

Sika® Elastomer

<table>
<thead>
<tr>
<th>Joint Profile</th>
<th>Profile Thickness</th>
</tr>
</thead>
<tbody>
<tr>
<td>K</td>
<td>B</td>
</tr>
<tr>
<td>FN 20</td>
<td>15-25</td>
</tr>
<tr>
<td>FN 30</td>
<td>25-35</td>
</tr>
<tr>
<td>FN 40</td>
<td>35-40</td>
</tr>
</tbody>
</table>

Sika® Maro pipe waterproofing system
Pipe collars for joint bridging

Functional description
The Sika® Maro pipe collar is manufactured on the basis of the specified outside diameter of the pipe. It is fitted by pressing it over the ends of the pipe and fixing it with the banded clamps. The anchoring ribs are cast in and take over the sealing function on the labyrinth path principle (like external waterstop). The pipe is therefore effectively broken around the expansion joint and this is then bridged and made watertight by the expansion part of the waterstop collar. Variable movement in adjacent components can be absorbed by the expansion part of the collar.

Components/packaging
Waterstop pipe collar:
1. Anchoring rib
2. Expanding hose
3. Banded clamp
4. Pipe
5. Pipe collar
6. Spacer

Waterstop pipe collar:

<table>
<thead>
<tr>
<th>Waterstop pipe collars</th>
<th>Inside Ø cap to</th>
<th>Collar width</th>
<th>Max. anchoring ribs height</th>
</tr>
</thead>
<tbody>
<tr>
<td>Typ 200</td>
<td>299</td>
<td>330</td>
<td>20</td>
</tr>
<tr>
<td>Typ 300</td>
<td>399</td>
<td>330</td>
<td>20</td>
</tr>
<tr>
<td>Typ 400</td>
<td>499</td>
<td>330</td>
<td>35</td>
</tr>
<tr>
<td>Typ 500</td>
<td>599</td>
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<td>Typ 600</td>
<td>699</td>
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<td>Typ 700</td>
<td>799</td>
<td>500</td>
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<td>Typ 800</td>
<td>899</td>
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<tr>
<td>Typ 900</td>
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</tr>
<tr>
<td>Typ 1000</td>
<td>1099</td>
<td>500</td>
<td>35</td>
</tr>
</tbody>
</table>

* Other dimensions from 120 mm on request
* Design basis for the inside diameter of the collar is the pipe outside diameter
Prefabricated Standard Junctions
For Sika® Waterbars

Prefabricated Junctions/Jointing Pieces
A wide range of standard prefabricated junction pieces are available for Sika® Waterbars on request. All have a 50 cm free wing, allowing easy butt-jointing on site. Non standard sections are also available and can be produced, to your engineering drawings giving the exact details and measurements required.

Standard Junctions
- PVC-P and TPO
  - Tricomer® Available Types: 1 – 13
  - Available Types: 1 – 13
- Elastomer
  - Available Types: 1 – 11
  - Symmetric corner, type 12 – off request
  - Angle corner, type 13 – on request
- PE
  - Available Types: 1, 2, 3, 5

Composite Junctions
- PVC-P and TPO
  - Tricomer® Available Types: 14 – 19
  - Available Types: 14 – 19
- Elastomer
  - on request

The types shown (14 - 19) are only a selection of the possible composite types.

Prefabricated Waterbar Systems

Waterbar Systems
One of our special services is the manufacture of prefabricated waterbar systems, possibly combining several different profiles and types of junctions according to the specific site waterproofing requirements. Waterbar sections are prefabricated to such an extent, that it is only necessary to weld or vulcanize a few butt joint connections on site. The total length of such custom made system should generally not exceed more than 10 – 20 m, dependent on the type of the profile and the complexity of its installation.
Introduction

Joints between thermoplastic waterbars are made with a heat welding process. This process is reversible. The principle of welding consists of softening the mating surfaces of both the two parts to be joined by heating them to the melting temperature, quickly pressing them together, and allowing them to cool. Welding is not possible merely by heating and softening one of the two pieces to be welded together. Although the welding of thermoplastic materials is easier and cheaper on site than the vulcanising of Elastomers (artificial rubber based materials), it demands more manual skill and dexterity, as well as ensuring good workmanship and quality control.

Welding Equipment for Sika® Waterbars

<table>
<thead>
<tr>
<th>Semi-Automatic Tools</th>
</tr>
</thead>
<tbody>
<tr>
<td>Welding equipment type SG 320 L</td>
</tr>
<tr>
<td>Semi-automatic Welding equipment with clamping moulds, dependent on profile</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Tools for Manual Welding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Axe-shaped welding tool 200 W</td>
</tr>
<tr>
<td>Welding tip 50 W</td>
</tr>
<tr>
<td>Welding tongue 125 W</td>
</tr>
<tr>
<td>Hot air Shaver:</td>
</tr>
<tr>
<td>- round nozzle, short</td>
</tr>
<tr>
<td>- flat nozzle</td>
</tr>
<tr>
<td>- quick welding nozzle, round</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Welding Accessories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Welding foil</td>
</tr>
<tr>
<td>Welding strip</td>
</tr>
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<table>
<thead>
<tr>
<th>Special tools</th>
</tr>
</thead>
<tbody>
<tr>
<td>Special knife</td>
</tr>
<tr>
<td>Special tongue for waterstop clips</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Accessories for Installation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Waterbar clip type 1</td>
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<tr>
<td>Waterbar round clip</td>
</tr>
<tr>
<td>Clip for Sika® Waterbar</td>
</tr>
<tr>
<td>Clamping Plates:</td>
</tr>
<tr>
<td>- KS 12</td>
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<tr>
<td>- KS 15</td>
</tr>
<tr>
<td>- KS 24</td>
</tr>
<tr>
<td>- KS 32</td>
</tr>
</tbody>
</table>

Welding of Sika® Waterbars Made of PVC-P, TPO and Tricomer®

Measuring, marking, cutting
Axe-shaped welding tool
Welding equipment type SG 320 L
Spark tester
Preparation of overlapping
Overlapping joint with hot air blower
Strengthening with welding foil using hot air gun
Strengthening with welding strip using welding tip
Equipment, Tools and Accessories
For the Vulcanizing of Sika® Waterbars Elastomer

Introduction
Joints of Sika® waterbars Elastomer (rubber) are made in a vulcanizing process. This process is irreversible, i.e. it can be carried out only once and therefore requires careful, consistent and complete execution of all of the working steps. Standard junctions, e.g. flat cross, vertical T, flat edges etc. are all prefabricated in our factory using specialist equipment i.e. autoclaves. Therefore only the butt joints should be made on site.

Vulcanizing Equipment for Sika® Waterbars Elastomer

Vulcanizing of Sika® Waterbars Elastomer

Measuring, marking, cutting
Grinding of the rubber surface
Applying the vulcanizing solution to the rubber surface
Plugging of the centre bulb with a cellular foam plug and inserting a raw rubber plug

Applying the adhesion strip
Jointing the waterstop, tightening with the fixing Clamps
Application of cover strips, pressing home of both cover strips
Powdering of waterstop and inserting into the vulcanizing equipment
**Waterbar Specification**

**Closed Waterproofing System**
Waterbars must create a closed waterproofing system within the reinforced concrete structure. Joint intersections with each other and with penetrations and edges of the structure should be made as square as possible. The clearance from the edges of the structure should generally be 0.5 m minimum. The overall waterbar section system specification and method statement for a project are divided into logical sections. These are linked to the drawings of the system and its components, their factory prefabrication or assembly and for their installation on site. This also provides part of the project documentation and confirmation of the specific waterbar qualities required. The waterbars should conform with the local regulations and specifications.

**Waterbar Width Rule**
The component thickness of around internal waterbars should be at least equivalent to the waterbar width (embedment depth $d$). A component thickness of 30 mm is sufficient for 30 mm wide waterbars according to DIN 18541 (types D and A). The choice of waterbars is based on the load and exposure, e.g. in accordance with DIN 4108-10. Our Product Engineering department will be pleased to assist you in your projects.

**Concrete and Reinforcement Cover**
The clearance between waterbar and reinforcement shall be at least 20 mm.

**Bending Radius**
When there are changes of direction perpendicular to the waterbar level, waterbars may be bent strictly regarding the indicated minimum bending radius $r$. If the required bending radius $r$ cannot be maintained, a factory-made vertical angle should be specified.

**Minimum Joint Width**
For the joints in service, under their intended deformation, the joint width at a nominal width of $W_{nom} = 20$ mm must not be less than 15 mm and at a nominal width of $W_{nom} = 30$ mm, not less than 20 mm. Otherwise a deformation void must be created by forming an encased centre bulb (e.g. waterstop type Tricosal® FMS 500 HS Elastomer – see Contraction Joint above).

**Joint Seal at Open and Below Ground Ends**
To protect joints from contamination, external waterbar should be installed at below ground ends with a suitable joint sealant or capping waterbar at the open air ends.

**Use of External Waterbars**
External waterbars are always fitted on the water contact side. They must not be casted in on the top of horizontal and low angled components (due to the risk of an entrapment and void). External waterbars must be given adequate durable protection against mechanical damage (e.g. by backfilling with soil, sand, similar fillers without angular crushed stones).

**Horizontal Waterbar Installation in Slabs**
Internal waterbars in horizontal base or deck slabs should be installed in a v-shape at an angle of about 15° upwards, to allow the waterbar sides to be embedded without voids and to prevent concrete honeycombing (from grout loss / segregation during concreting).

**Design of Wide Joints**
For expansion joints with a nominal joint width $W_{nom} ≥ 30$ mm and if shear force $V > W_{nom}$ occurs, measures must be taken to prevent any possible damage to the waterstop from the concrete edges (e.g. use encased centre-bulb waterstop type: Tricosal® FMS 500 HS Elastomer).

**Main Waterbar**

**Concrete and Reinforcement Cover**

**Bending Radius**

**Joint Seal at Open and Below Ground Ends**

**Horizontal Waterbar Installation in Slabs**

**Use of External Waterbars**

**Design of Wide Joints**

**Minimum Joint Width**

**Concrete and Reinforcement Cover**

**Bending Radius**

**Joint Seal at Open and Below Ground Ends**

**Horizontal Waterbar Installation in Slabs**

**Use of External Waterbars**

**Design of Wide Joints**

**Minimum Joint Width**

**Concrete and Reinforcement Cover**

**Bending Radius**

**Joint Seal at Open and Below Ground Ends**
Waterbar Handling Guidelines

Storage

Protected Storage
When delivered to site, the waterbar products must be unloaded carefully and inspected immediately for completeness and integrity, including form and dimensions. Before installation the waterbars must be kept in a sheltered place on boards or some other firm base (e.g. pallets, concrete surfaces) and protected from contamination or damage.

Cleanliness and Integrity
Waterbars must not be installed if they have suffered deformation or damage which might impair their function. Waterbars must be installed without creasing or distortion. Deformation in external PCV-P, TPO or Tricomer® waterbars caused during storage or handling (e.g. creasing or distortion of the anchors) should be corrected by stretching on a level base and heat treatment. Waterbars can only be installed at a material temperature of over ±0 °C and in weather conditions not endangering the safe installation of the whole waterproofing system.

Fixed in a Stable Position
Waterbars should be installed in their specified position, symmetrical to the joint axis, and be fixed so that their position can not change or move during the concreting works.

Concrete and Reinforcement Cover
The minimum clearance and concrete cover shall be at least 20 mm.

Waterbar Installation Guidelines

Installation and Fixing

Storage in Summer
Waterbars must be protected from direct sunlight, specially in summer, e.g. by covering. In high outside temperatures waterbars must be taken to the point of installation and laid out under no tension.

Storage in Winter
Waterbars should be kept in covered storage if possible and then be put in heated rooms for at least one full day prior to their installation, to make the handling and installation easier and less prone to damage (thermoplastic material).

Storage in Summer
Waterbars must be protected from direct sunlight, specially in summer, e.g. by covering. In high outside temperatures waterbars must be taken to the point of installation and laid out under no tension.

Fixed in a Stable Position
Waterbars should be installed in their specified position, symmetrical to the joint axis, and be fixed so that their position can not change or move during the concreting works.

Concrete and Reinforcement Cover
The minimum clearance and concrete cover shall be at least 20 mm.
**Waterbar Installation Guidelines on Site**

**During the Waterbar Installation**

- **Fixing Internal Waterbars**
  Internal waterbars are anchored to the reinforcement. The waterbars are fixed to the edge anchors with the special waterbar clip or, in the case of waterbars with steel plates (FMS, FS) to the edge perforation of the steel plates at maximum intervals of 25 cm.

- **Fixing External Waterbars**
  External waterbars for walls are fixed with nails to the formwork at the edges, nailing plates with an embedment depth maximum 1/3 of nail length and bent around approx. 45°. If there is a risk of a stop end anchor snapping (e.g. due to concrete dropping too heavily by mistake), it should be fixed to the reinforcement with waterbar clips every 25 cm, e.g. the top stop end anchors of the waterbar system in the base / wall joints. External waterbars for horizontal installation under bases are fixed directly to the concrete blinding.

- **Horizontal Waterbar Positioning in Slabs**
  To prevent honeycombing or concreting voids, the internal waterbars in basins and decks should be installed in a v-shape at an angle of about 15° upwards.

- **Spacing Between Joints in the Waterbars Themselves**
  The spacing between two joins in the waterbars themselves should be 0.50 m minimum. In every configuration the length of the free waterbar ends should be 1.00 m minimum so that these connection joints can be formed easily and correctly on site.

- **Tight Bulkhead Formwork**
  When installing the waterbar system, ensure that the bulkhead formwork is tight, stable and immovable. The stoppered formwork must be tight against the waterbars. The waterbar must be protected from damage before and during the concreting works.

**Waterstop Installation Guidelines**

**During the Concreting Works**

- **Embedding of External Waterbars**
  Waterbars must be free from contamination and ice when casted in. If necessary they should be cleaned before concreting (e.g. removal of any accumulated site debris such as sawdust, sand, concrete residues, cement laitance, oil, grease, ice etc.). This is particularly important for external waterbars in the base of a structure.

- **Casting Without Honeycombing or Voids**
  The waterbars must be fully enclosed in concrete and the concrete must be free from voids. Make sure that there is a low concrete drop height, good flow without segregation and even distribution.

- **Clearance Between Poker Vibrators and Waterbars**
  The poker vibrators must never touch the waterbar or its fixings (minimum clearance ≥10 cm). It is usually preferable to compact around external waterbars with external vibrators, which will also give better compaction around stop-end anchors.

- **Protection of Exposed Waterbars On Site**
  The waterbars should be protected from damage until they are fully casted in. Examples of suitable protective measures are:
  - For waterbars in walls: cover reinforcement ends with boarding, box in or roll up and suspend the waterbar till later
  - For waterbars to be trafficked: completely cover or bed in sand
  - For waterbar ends to be exposed for some time: box in to fully protect

- **Striking Around External Waterbars**
  Take great care that external waterbars do not come loose during striking of adjacent or attached formwork. Extend the time before striking these areas if necessary.
Sika® Waterproofing Products – Additional information

Quality, support and service

Quality monitoring
All Sika waterproofing products are produced under ISO monitoring standards during production. Our waterbars also undergo regular external monitoring in accordance with DIN Standard requirements in Germany by North Rhine Westphalia Materials Testing Institute (MPA NRW).

Dimensions/Tolerances
Sika waterstop products are subject to the dimensional and tolerance requirements of the relevant German Standards, e.g. DIN 18541 and DIN 7865.

Certification
Test certificates with the materials physical and chemical properties can be supplied by agreement.

Support and service
With Sika’s extensive expertise and experience in the development, production and practical installation of waterproofing systems and products, Sika personnel are well qualified to provide advice and assistance to owners and their professional design and construction teams on the selection of the most suitable waterproofing systems, engineered joint designs and configuration.
Sika provides design guidelines and tools, together with all necessary specifications, technical information, tender documents and on-site support so that the systems used to waterproof your project will perform as required and do their job reliably for the long term.

CAD drawings
CAD drawings are produced and available on request for designers and contractors to use for design, inspection, installation, invoicing and providing documentation on the waterproofing systems and details for specification and as-built drawings etc. as required.

Installation training courses
Sika provides frequent focused technical and practical training courses to ensure the correct and professional installation of our waterproofing systems – from on-site induction to in-house courses over several days at our own training facilities.

Subcontract services
Sika Deutschland GmbH is a product manufacturer and does not provide installation services on site. However, this service is provided by specialist contractor partners that are specifically trained in each of the systems by Sika. For detailed information please contact your local Sika Company.

Disclaimer
All the information in this brochure, and, in particular, the suggestions and examples relating to the application and end-uses of the products, are given in good faith based on our current knowledge and experience of the products when properly stored, handled and applied under normal conditions in accordance with our recommendations. In practice, the differences in materials, substrates and actual site conditions are such that no warranty in respect of merchantability or of fitness for a particular purpose, nor any liability arising out of any legal relationship whatsoever, can be inferred either from this information, or from any written recommendations, or from any other advice offered. The user of the product must test the product’s suitability for the intended application and purpose. Sika reserves the right to change the properties of its products. The proprietary rights of third parties must be observed. All orders are accepted subject to our current terms of sale and delivery. Users must always refer to the most recent issue of the local Product Data Sheet for the product concerned, copies of which will be supplied on request.

Technical information and details
The drawings and details in this brochure are schematic and may vary according to the actual installation situation. The illustrations of the waterstops themselves are intended as graphic representations of the profiles mentioned.

Dimensional information
The dimensions in the tables are in mm (unless otherwise stated) and given as a guide.

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WORLDWIDE SYSTEM SOLUTIONS FOR CONSTRUCTION AND INDUSTRY

As a subsidiary of the multinational Sika AG, Baar, Switzerland, Sika Deutschland GmbH is a global leader for the supply of chemical products and systems for construction and adhesives for industry.