

PRODUCT DATA SHEET

Sika® Waterbars – Elastomer Type

Waterstops for joint sealing in watertight concrete structures according to DIN 7865-1-2

PRODUCT DESCRIPTION

Sika® Waterbars – Elastomer Type are permanently flexible waterstops made from Elastomers, SBR (styrene butadiene rubber) based as standard, for sealing expansion and construction joints in watertight concrete structures.

They are available in a range of different types, profiles and sizes to suit different types of structures and joint sealing applications.

DESIGNATION

Sika® Waterbars – Elastomer Type DIN 7865-1-2 SBR or other elastomers

CHARACTERISTICS / ADVANTAGES

- High tensile strength and elongation
- High permanent flexibility and high resilience
- Suitable for high water pressure and stress
- Resistant to all natural mediums aggressive to concrete
- Resistant to a broad spectrum of chemical agents (testing necessary for any additional specific situations)
- Dimensionally stable in contact with penetration grade bitumen
- Robust sections for handling on site
- Vulcanizable for butt jointing the waterstops on site

PRINCIPLES FOR USE

- Design and installation principles according to DIN 18197
- Jointing systems in accordance with DIN 18197 and DIN 7865

USES

- Joint sealing in concrete structures
- Expansion and construction joint sealing in insitu concrete construction
- For connecting to joints in existing structures use Sika Waterbars - Elastomer Clamped Type profiles in accordance with DIN 7865-2 (see separate Product Data Sheet)
- Typical structures:
 - Commercial building basements, underground car parks
 - Bridges, including bridge trough structures
 - Rail and road tunnels
 - Water treatment plants
 - Locks and weirs
 - Power stations, barrages and dams (Waterbars with hoses for injection / reinjection capabilities)

STANDARDS/ DIRECTIVES	<ul style="list-style-type: none"> - DIN 18197 - DIN 7865-1-2 - WU-Directive DAFStb. - ZTV-ING, RiZ-ING - DS 804.6201 of DB AG - Vulcanizing instructions - Vulcanizing unit instruction manual
----------------------------------	--

TEST CERTIFICATE / APPROVALS	<ul style="list-style-type: none"> - Manufacturer's test certificate, other tests and approvals as required - Certificate of Conformity DIN 7865 - External monitoring by MPA NRW - Standard external monitoring inspection certificates - Specified for joint sealing in civil engineering structures according to ZTV-ING, RiZ-ING and DB AG RiLi 804.6201
---	---

PRODUCT DATA

MATERIALS	<p>- Standard Grades</p> <p>SBR Elastomer based: Styrene Butadiene Rubber For integral and externally fixed waterstops</p> <p>EPDM Elastomer based: Ethylene Propylene Diene Monomer rubber For exposed / finishing waterstops FFK/FAE and flat profiles FPK</p> <p>Non-Standard Grades (integral and externally fixed waterstops)</p> <p>CR Elastomer based: Chloroprene rubber</p> <p>EPDM Elastomer based: Ethylene Propylene Diene Monomer rubber</p>
------------------	--

COLOUR	<ul style="list-style-type: none"> - Black for integral and externally fixed waterstops - Black with grey visible surface for exposed / finishing waterstops FAE/FFK
---------------	--

PACKAGING	<ul style="list-style-type: none"> - Supplied as standard rolls of 20, 25, 35 or 40 m dependent on profile, on Euro or disposable pallets - Fabricated waterstopping systems in coils, on Euro or disposable pallets dependent on size
------------------	--

STORAGE	<p>Stored on the pallets as supplied on a flat base</p> <ul style="list-style-type: none"> ▪ For long-term storage ≥ 6 months in enclosed areas: <ul style="list-style-type: none"> The recommendations of DIN 7716 apply The storage area should be covered, cool, dry, free from dust and moderately ventilated The Elastomer waterstops must be protected from heat sources and strong artificial lights with an high UV content ▪ Short-term storage ≥ 6 weeks and < 6 months in enclosed areas: <ul style="list-style-type: none"> The principles of DIN 7716 apply <p>On construction sites, outdoors:</p> <ul style="list-style-type: none"> - In dry storage, protected by suitable covers from direct sunlight, snow and ice, or any other form of contamination - Store separate from other potentially harmful materials, plant and equipment such as structural steel, reinforcements of fuels etc. - Store away from traffic and site roads <ul style="list-style-type: none"> ▪ Short-term storage ≤ 6 weeks on construction sites, outdoors: <ul style="list-style-type: none"> - Protected from contamination or damage - Protected by suitable covers from strong sunlight, snow or ice etc.
----------------	--

- Vulcanizing materials should be covered and stored in a cool, dry area free from dust and contamination. It is recommended that the stock requirements be coordinated for a maximum storage period of about 6 weeks.

MECHANICAL PROPERTIES

DIN 7865-2, Table 1

SHORE-A HARDNESS	62 ± 5 Shore-A	DIN 53505
ULTIMATE TENSILE STRENGTH	≥ 10 MPa	DIN 53504
ULTIMATE ELONGATION	≥ 380 %	DIN 53504
COMPRESSION SET	168 h / 23 °C ≤ 20 % 24 h / 70 °C ≤ 35 %	DIN ISO 815
TEAR PROPAGATION RESISTANCE	≥ 8 N/mm	DIN ISO34-1: 2004-07
REACTION TO HEAT AGEING	Shore-A-Härte-Änderung ≤ + 8 Reißfestigkeit ≥ 9 MPa Reißdehnung ≥ 300 %	DIN 53508
REACTION TO COLD	≤ 90 Shore A	DIN 7865-2: 2008-02
TENSION SET	≤ 20 %	DIN ISO 2285/DIN 7865
ADHESION TO METAL ¹⁾	≥ 1,50 kN	DIN 7865-2
REACTION TO PENETRATION GRADE BITUMEN	Permanent deformation < 20 % Ultimate tensile strength ≥ 7 MPa Ultimate elongation ≥ 300 %	DIN 7865: 2008-02
REACTION TO OZONE AGEING	No cracks	DIN 53509-1
BOND STRENGTH	Tensile force of the bond ≥ 90% of the tensile force that must be exerted to break the non-jointed waterstop or a structural break in the elastomer outside the joint	DIN 7865-2

¹⁾ FOR WATERSTOPS WITH STEEL PLATES

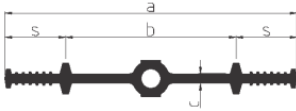
Forms

The limits of water pressure and stress given in the tables below apply to standard uses without specific additional testing.

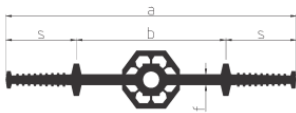
Different values may be used when precise information on all of the relevant stresses and structural requirements is available.

EXPANSION JOINT WATER-STOPPS, INTERNALLY FIXED

Form FM



Form FM 350 HS

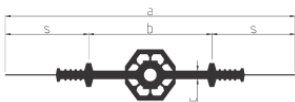


Type	Form	Total width	Width of expansion part	Thickness of expansion part	Width of sealing part	Roll length	Water pressure	Resulting movement
		a	b	c	s			
		[mm]	[mm]	[mm]	[mm]			
Internal	FM 200	200	110	9	45	25	0	25
	FM 250*	250	125	9	62,5	25	0	25
							0,3	20
							0,5	10
	FM 300*	300	175	10	62,5	25	0	35
							0,5	30
							1,2	20
FM 350*	350	180	12	85	25	0	45	
						1,5	30	
						2,0	20	
FM 350 HS	350	180	12	85	20	0	45	
						1,5	30	
						2,0	20	
FM 400	400	230	12	85	25	0	45	
						1,5	30	
						2,0	20	
FM 500	500	300	13	100	25	0	50	
						2,0	30	
						2,5	20	

Form FMS



Form FMS...HS



					s ₁ + s ₂			
Internal with lateral steel plates	FMS 350*	350	120	10	45+70	35	0 0,5 1,2	35 30 20
	FMS 400*	400	170	11	45+70	35	0 1,5 2,0	45 30 20
	FMS 500	500	230	12	65+70	25	0 2,0 2,5	50 30 20
	FMS 400 HS	400	170	11	45+70	20	0 1,5 2,0	45 30 20
	FMS 500 HS	500	230	12	65+70	20	0 2,0 2,5	50 30 20
		Forms FM / FMS ... HS with central hose sheathing are used for compression joints with shear stress or joints with a width w _{nom} > 30 mm.						
	FMS 450 S	450	186	12	62+70	35	0 1,5 2,5	45 30 20
		Form FMS 450 S = FMS 450 RMD is a special elastomer expansion joint waterstop with lateral steel plates and a dumbbell-shaped cross-section and is mainly for use on concrete structures for waterway infrastructure. The form of the central hose is dependent on the nominal joint width - 30, 40, 50 mm.						

* Standard stock product

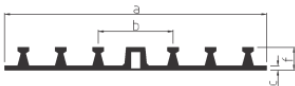
s₁ = Width of Elastomer sealing parts

s₂ = Width of lateral steel plates 70 mm

v_r = Resulting movement (v_x² + v_y² + v_z²)^½

EXPANSION JOINT WATERSTOP, EXTERNALLY FIXED

Form AM



Type	Form	Total width	Width of expansion part	Thickness of expansion part	Stop anchor	Roll length	Water pressure	Resulting movement
		a	b	c	N x f		P	v _r
		[mm]	[mm]	[mm]	[mm]	[m]	[bar]	[mm]
external	AM 250*	250	100	6	4 x 31	25	0 0,3	30 20
	AM 250-2 ***	250	100	5,5	4 x 30	25	0 0,2	30 20
	AM 350*	350	100	6	6 x 31	25	0 0,7	35 20
	AM 500	500	150	6	8 x 31	20	0 1,0	40 20

WATERSTOPS FOR CAPPING JOINTS

Form FAE



Type	Form	Total width	Joint width	Profile thick-ness	Stop anchor	Roll length	Water pres-sure	Resulting movement
		a	w nom	c / d	N x f		P	v _r
		[mm]	[mm]	[mm]	[mm]	[m]	[bar]	[mm]
	FAE 50*	55	20	5	2 x 30	40	0	20
	FAE 100*	105	20	5	4 x 30	40	0,1	20
	FAE 150	155	20	5	6 x 30	20	0,3	20
	FFK 5/2* **	55	10	5	2 x 35	40	0	20
	FFK 7/3* **	70	20	5	2 x 45	40	0	40
	FFK 7/4* **	70	30	5	2 x 45	40	0	40
	FFK 7/5* **	70	40	5	2 x 45	20	0	40
	FFK 10/3* **	100	20	5	4 x 45	40	0,1	20

Installation aid for finishing waterstops: TFL spacer and joint former

CONSTRUCTION JOINT WATERSTOPS

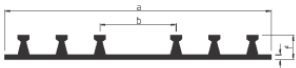
Form F



Form FS



Form A



Type	Form	Total width	Width of expansion part	Thickness of expansion part	Stop anchor	Roll length	Water pres-sure	Resulting movement	
		a	w nom	c / d	N x f		P	v _r	
		[mm]	[mm]	[mm]	[mm]	[m]	[bar]	[mm]	
internal	F 200*	200	75	7	62,5	25	1,2	3	
	F 250*	250	80	8	85	25	2,0		
	F 300*	300	100	8	100	25	2,5		
					s ₁ + s ₂				
	FS 270	270	60	7	35+70	25	1,2		
	FS 310*	310	80	8	45+70	50	2,0		
external					Stop anchor				
					N x f				
	A 250*	250	100	6	4x31	25	0,3	3	
	A 250-2* **	250	100	5,5	4x30	25	0,2		
	A 350*	350	100	6	6x31	25	0,7		
A 500	500	150	6	8x31	30	1,0			

*Standard stock product **Waterstop to DIN 7865-2

s₁ = Width of Elastomer sealing parts

s₂ = Width of lateral steel straps 70 mm

v_r = Resulting movement $(v_x^2 + v_y^2 + v_z^2)^{1/2}$

N No. of stop anchors with AM and FAE/FFK

f Depth of profile (depth of stop anchors including base plate)

WATERSTOP SELECTION

WATER PRESSURE COVER DEPTH STRESS

The data in the tables on water pressures and the resultant strain gives the general application range in which the waterstops can be used without additional testing requirements.

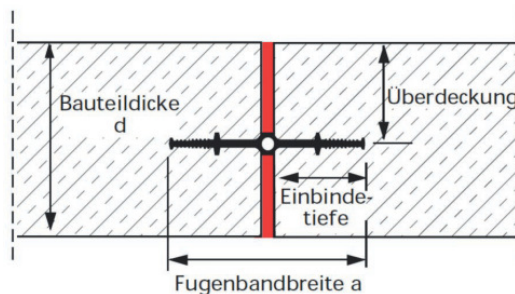
Shear strains in the y direction (transverse longitudinal to the waterstop) are limited to the dimensions of the nominal joint width w_{nom} . If the shear strains are greater, then additional measures are required.

The different forms of waterstops are to be selected as detailed in DIN 18197.

If the water pressure and/or resulting movement value is exceeded, the values applicable to the specific use should be defined on the basis of specific references, calculations or tests, with allowance for all of the actual influences and stresses anticipated.

RULE OF COVER DEPTH

As applicable to integrally fixed waterstops:
 Concrete cover \geq embedment depth or
 Total waterstop width $a \approx$ member thickness



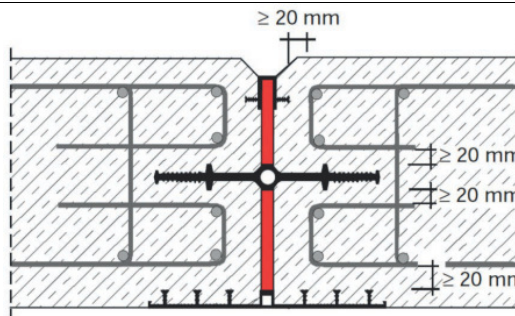
Member thickness Waterbar width a Embedment depth Cover

Externally fixed waterstops and finishing waterstops can be selected without considering the member thickness.

ANCHORAGE DEPTH

The anchorage depth/concrete cover of the anchor ribs or stop anchors must be 30 mm minimum.

REINFORCEMENT CLEARANCE



NOMINAL JOINT WIDTHS

The nominal joint width is:

- Internal expansion waterstops $w_{nom} = 20$ oder 30 mm
- External expansion waterstops $w_{nom} = 20$ mm
- for capping joints waterstops $w_{nom} =$ in accordance with the profile clearance (10, 20, 30, 40 mm)

For a greater nominal joint width or compression joints subject to shear stresses, internal expansion waterstops with central hose sheathing are used.

TEMPERATURE RANGE

The service temperature range (waterstop temperature) is:

- For pressurised water: - 20°C to + 40°C,
 - For non pressurised water: - 20°C to + 60°C.
-

SPECIAL STRESSES AND EXPOSURE**SPECIAL STRESSES AND EXPOSURES**

For special stresses and exposures due to different temperatures and/or chemical mediums outside the substances or situations specifically defined in DIN 4033. Separate tests are always necessary. Where required other materials are available in addition to the standard SBR (styrene butadiene rubber). Elastomer waterstops made from materials other than the standard SBR Grade are produced to order when required. They are not held in stock.

SYSTEM INFORMATION**GENERAL**

Only butt joints should be formed on site with Elastomer waterstops; the other jointing profiles required should all be factory produced.

The factory production of different waterstop systems and profiles reduces the joints required to be formed on site to a minimum.

PREFABRICATED FORMPIECES

Special profiles or waterstopping systems can be factory produced for specific projects.

Standard joint profiles for internal and external waterstops include:



Cross piece flat T-piece flat L-piece Flat Cross piece vertical T-piece vertical L-piece vertical

Standard joint profiles of exposed /finishing waterstops include:



Cross piece vertical T-piece vertical L-piece vertical L cross piece flat L-piece flat, coverslab inside

Production of these profiles is preferably in 90°, or in standard internal or external angles 60° - 175°.

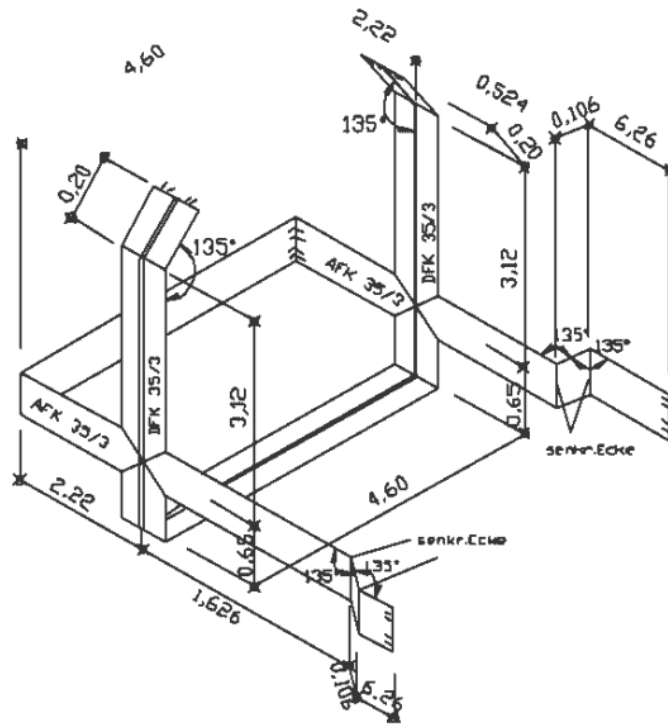
Special joints:

Combined waterstopping systems using combinations of different waterstop forms and profiles can be produced, e.g. form FM with AM, FM/FMS with metal waterstop or AM with FAE.

In the standard approach the joint profiles are built into the joint waterstop systems. The sizes of the system components are dependent on the waterstop forms involved and the type and number of joints required.

The normal maximum total length of waterstopping systems: up to 25 m maximum (total for all separate lengths).

Typical Waterstop system (as example)



DOCUMENTATION

- Manufacturer's test certificate, other test certificates as required
- Certificate of Conformity
- Regular external monitoring test certificates
- System drawings of the system components with dimensions

HANDLING

As specified in DIN 18197

- Careful transport and handling on site
- Installation only at waterstop material temperatures $\geq 0^{\circ}\text{C}$
- Protection is required until the waterstopping system is fully cast in
- Special care to be taken of free waterstop ends
- Waterstops are to be cleaned before casting in

APPLICATION

As specified in DIN 18197

- Internal waterstops are installed within the concrete section and clearance from the edge of the concrete being at least half the total width a of the waterstop
- External waterstops are installed flush with the external face of the concrete. Do not install on the top surface of horizontal or slightly sloping concrete.
- Waterstops for capping joints are installed in the joint, set back by the dimension of any joint chamfer.

Detailed information on installation is given in the relevant Sika method statements and instructions for use. If there are very high stresses or difficult concreting conditions, the waterstops can be supplied with integral or integrated injection hoses to additionally inject/grout the cast-in parts at a later date.

**JOINTING ON SITE /
SITE JOINTS**

The Elastomer waterstops are butt jointed together by vulcanization, i.e. with added Sika rubber wraps and the action of heat and pressure in a site vulcanizing press with moulds dependent on the profile used and longitudinal strain and specified vulcanizing parameters for the specific forms (temperature and time). Jointing with other vulcanizing agents without heat or using adhesives or adhesive tape is not permitted under DIN 18197. Site joints must only be formed as stated in the vulcanizing instructions.

Requirement: Minimum ambient temperature + 5 °C and dry weather conditions. Site joints must be formed only by trained and qualified personnel. Their training completion certificates must not be more than 2 years old. Training courses leading to such operative certification are run by Sika Deutschland GmbH, Structural Joint Sealing Department, Illertissen.

The conditions of DIN 18197 and DIN 7865 apply. The key steps in the vulcanizing for all Sika Elastomer waterstopping forms FM/F, FMS/FS, FMS...HS, AM/A, FAE are fully described in the detailed instructions.

These key steps for site jointing complying with the vulcanizing instructions are:

- Cut the waterstop ends, straight and square
- Roughen the waterstop ends on the front, top and bottom
- Grind the steel plates until smooth, for FMS/FS
- For FMS/FS also apply bonding agent beforehand
- Apply vulcanizing solvent
- Plug the central hose with a foam stopper and elastomer stopper from adhesion foil
- Apply the adhesion foil on the front
- Bring together the waterstop ends and apply the tensioning harness
- Wrap in strip type 0
- Wrap in strip type 1
- Sprinkle the wrapped joint with talcum release agent
- Place the prepared joint in the preheated vulcanizing unit with the moulds for the form
- Vulcanize the butt joint for about 35-45 minutes
- Remove from the vulcanizing unit
- Cool (by ambient temperature - do not use coolant)

After cooling for about min. half an hour, the joint is finished and may be fixed / installed / stressed. Further steps may be necessary dependent on the specific jointing requirements and the waterstop form. The vulcanizing instructions are enclosed with the vulcanizing unit. All vulcanizing work is subject to the relevant local Health and Safety regulations and the Equipment and Materials Safety Information. Formation of these site joints takes about 1 – 2 hours of working time per joint dependent on the specific waterstop form and therefore this time must be scheduled and the work completed properly before the next operations proceed

VULCANIZING UNITS



- Vulcanizing unit VG 450 for waterstops up to 400 mm total width
- Vulcanizing unit VG 600 for waterstops up to 500 mm total width
- Moulds – according to the profiles being used
- Tensioning harness for longitudinal strain application

TOOLS, OTHER SUPPLIES AND PROTECTIVE CLOTHING

Cutting:	Tape measure, metre ruler, set square, marker pen, rubber cutter
Roughening:	Goggles, protective gloves, hand drill, abrasive gel/carbide abrasive wheel with mounting
Removing abrasion dust	Hand brush or paintbrush
Adhesive film:	Scissors, roller 4 mm
Cover tape:	Scissors, roller 4 mm and roller 12 mm
Tensioning the vulcanizing unit:	Screwdriver/ring spanner SW 32 Heat insulated gloves
Demoulding:	Screwdriver
Additionally for the waterstop forms FMS/FS with lateral steel straps:	
Cutting :	Jigsaw with metal blade
Preparation of steel plates:	Angle grinder with steel roughing disc (small unit)
Priming:	Paintbrush/round brush with long bristles
Bonding agent:	Paintbrush/round brush with long bristles
Welding the steel plates:	Thin plate welding jig, gas or solid rod electrodes Welder's protective clothing

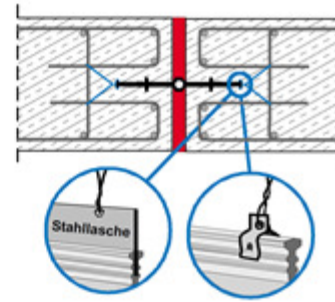
VULCANIZING MATERIALS

Stopper	Profile 1 metre
Vulcanizing solvent	Can ca. 1 kg
Adhesion foil	35 x 0.6 mm, Roll ca. 33 m
Strip type 0	35 x 2 mm, Roll ca. 26 m
Strip type 1	50 x 2.5 mm, Roll ca. 27 m
Talcum	PE bottle ca. 100 g
For waterstops FMS with lateral steel plates:	
Priming	Can ca. 250 g
Bonding agent	Can ca. 250 g

Unless otherwise agreed, one vulcanizing kit is supplied with the first order for vulcanizing materials and is invoiced. Further vulcanizing materials are supplied to order and the quantity stocked should be based on a 6-week usage requirement. Vulcanizing material is non-vulcanized raw rubber and must be stored in a cool, dry, dark area free from dust..



Size 2

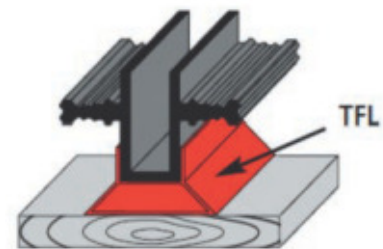
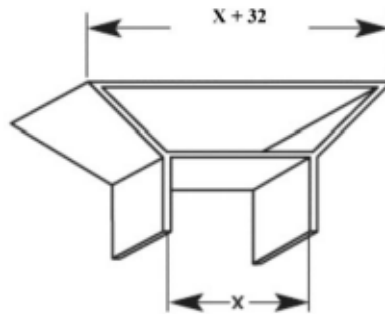


Steel strap

The waterstop fixings should be installed at maximum 25 cm centres. Fixing should be made onto the reinforcement.

TFL spacer and joint former

for the secure installation of exposed / finishing waterstops



Profile	Joint width w_{nom}	Sightline X	Units
	[mm]	[mm]	[m]
TFL 20	10	20	1 m / 2,50 m in Coils of 10
TFL 30	20	30	1 m / 2,50 m in Coils of 10
TFL 40	30	40	1 m
TFL 50	40	50	1 m

Future injection capability

- Injection hose SikaFuko® -VT 1 and 2 or SikaFuko® -Eco 1
- Fast setting binder (for waterstop form FMS/FS)
- Round clamp 16/18 (for SikaFuko® -VT 1 and waterstop form FM/F)
- Round clamp 22 (for SikaFuko® -VT 2 waterstop form FM/F)
- Fixings to be placed every 12.5 cm

Installation and injection of the SikaFuko injection hoses is detailed in their respective Product Data Sheets, Sika Method Statement / Installation guidelines for and relevant local regulations for the specific injection hoses used.

Stoppers

To plug the injectable hoses at free waterstop ends (DIN 18197).
Use profiled cords in metre lengths. On site put in cuts ca. 10 cm, to a depth of approx. 5 cm.

On permanent free ends the projecting part is cut off.

On temporary free ends the stoppers should be removed before forming the connecting butt joint.

Sheet membrane connections

For the connection of sheet membranes to the integral Sika® Elastomer waterbars are factory vulcanized on metal sheets for the waterstop forms FM and F and welded on for the waterstop forms FMS and FS.

Standard metal sheet size: 300 x 200 x 2 mm

IMPORTANT INSTRUCTIONS

HEALTH HAZARDS

For information and advice on the safe handling, storage and disposal of chemical products, users shall refer to the most recent Material Safety Data Sheet containing physical, ecological, toxicological and other safety-related data..

To select an appropriate protective equipment under www.sika.de our info datasheets are available:

"General information on OSH" (Code 7510) and "General information on the wearing of protective gloves" (Code 7511).

VALUE BASE

All technical data stated in the Product Data Sheet are based on laboratory tests. Actual measured data may vary from country to country. Please consult the local Product Data Sheet for the exact description of the application fields.

COUNTRY SPECIFIC SPECIFICATIONS

The information in this product data sheet are valid for the delivered by Sika Germany GmbH product . Please note that details may differ in other countries . Observe the valid abroad Product Data Sheet.

LEGAL NOTES

The above information, in particular the recommendations relating to the application and use of Sika products, are given in good faith based on Sika's current knowledge and experience of the products when properly stored, handled and applied under normal conditions in accordance with Sika's recommendations. In practice, the differences in materials, substrates and actual site conditions are such that no warranty in respect of merchantability or 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 verbal advice or consultation, unless we have acted intentionally or with gross negligence. In such a case, the user must prove that he has provided Sika with all the information, which is necessary for the proper and successful assessment of the case by Sika, in full, in time and in writing. The user of the product shall ensure that the product is suitable 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 and conditions 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 can either be requested from us or downloaded from our website at www.sika.de.

Sika Deutschland GmbH
Flooring / Waterproofing
Kornwestheimer Straße 103-107
70439 Stuttgart
Deutschland

Telefon: 0711/8009-0
Telefax: 0711/8009-321
E-Mail: info@de.sika.com
www.sika.de

Product Data Sheet
Sika Fugenband Elastomer
Gültig ab: 18.08.2015
Kennziffer: E 4006