

CONCRETE ACCESSORIES

Sika® Westec®

BARRIER TECHNOLOGIES

WATERSTOPS FOR INDUSTRIAL APPLICATIONS

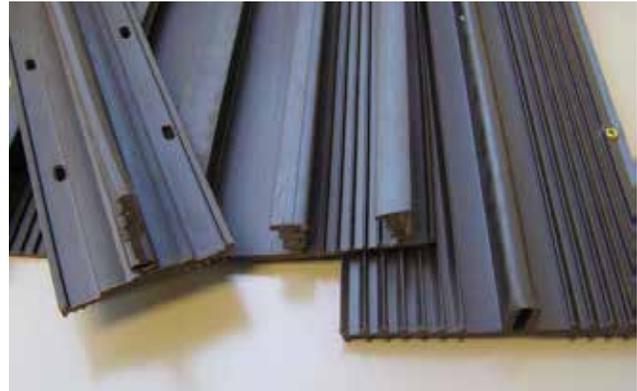
BUILDING TRUST
CONSTRUIRE LA CONFIANCE





QUALITY PRODUCTS FOR SECONDARY CONTAINMENT

Industrial applications have special requirements for containment structure design and construction. The standard flexible PVC waterstop material may not be suitable for the harsh chemical environments. Sika's Westec® Barrier Technologies specialise in waterstop applications for these unique industrial environments. In addition to the traditional waterstop profiles, Sika has several profiles specifically designed for industrial applications, particularly retrofit profiles for expanding and updating existing facilities.



WATERSTOPS

APPLICATION AREAS

- Ethanol/Biodiesel Plants
- Petrochemical Manufacturing
- Refineries
- Pulp and Paper Mills
- Land, Air and Seaports
- Fuel Storage / Tank Farms
- Pipelines
- Pharmaceutical Plants

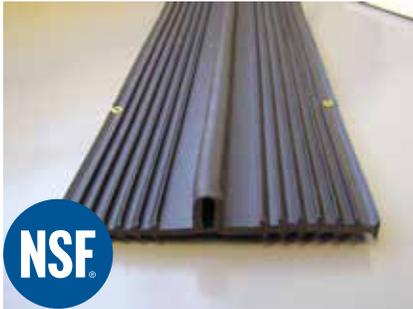


THE ORIGINAL EB CAP SYSTEM
FOR CONCRETE JOINTS
PATENT NO.5,375,386

SUPERIOR SERVICE

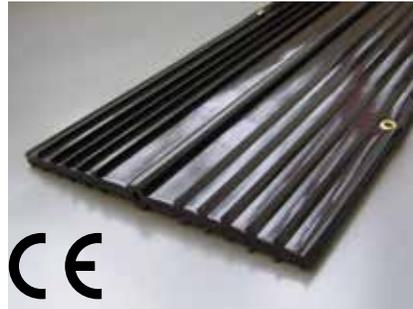
Sika technical engineers are available for design review, chemical test data, material takeoff and shop drawing assistance.

MATERIAL CHOICES FOR OPTIMUM PERFORMANCE



Envirostop® TPE-R

Thermoplastic Elastomeric Rubber is a fully vulcanized blend of EPDM and Polypropylene, also called a Thermoplastic Vulcanizate or TPV. This gives the waterstop the flexibility and sealing properties of a rubber seal, but allows for heat welding and processing like a plastic. In addition to the favourable physical properties, TPE-R also offers an excellent resistance to a wide range of chemicals. ASTM tests (D-471) show good resistance to oils, fuels, acids, bases and numerous solvents.



PE Polyethylene

Polyethylene (VLDPE) is more plastic-like, having increased elastic modulus and hardness than TPE-R. PE also has greater resistance in some applications, and is particularly effective for hydrocarbons such as Benzene, Toluene and Xylene. After exposure (1-4 weeks) to such and subsequent drying, PE waterstop was found to return nearly to its original physical properties.



SS (Stainless Steel)

Stainless steel is for high temperature environments that exceed 121°C (250°F) or the most severe chemical applications. Sika offers 316 low carbon stainless steel waterstops. However, many applications that have traditionally used SS waterstop can be served with TPE-R, including ozone contact structures.



Grommets

TPE-R and PE 6" and 9" waterstops are pre-punched in the outermost rib with brass grommets providing convenient points on 12" centers to wire the waterstop to reinforcement. Properly securing the waterstop is critical to ensure good consolidation around the ribs and a liquid -tight seal.



Splicing and Fabrications

Sika® Greenstreak® PVC welding equipment and techniques can be used for Westec® TPE-R and PE waterstops, requiring only a higher temperature set at 210°C (410°F). Sika recommends factory-fabricated joints at all intersections and direction changes. They offer a quick and economical alternative to cutting and splicing these critical junctions in the field. Contact a Sika Technical Sales Representative to arrange for a material takeoff and custom shop drawings. Fabrications are available for TPE-R, PE and SS.



Envirostop® TPE-R

Westec® Envirostop® TPE-R waterstop is certified to NSF/ANSI Standard 61 for drinking water applications.

The standard establishes minimum health effects requirements for the chemical contaminants and impurities that may be indirectly imparted to drinking water. Although more commonly known for its use in chemical containment applications, TPE-R waterstop is now widely used for ozone contact structures in the water treatment industry. Envirostop® TPE-R waterstop can be specified for any drinking water containment structure where this certification is required for joint sealing materials.



Westec® PE 050 and 631 waterstop profiles are the first to receive the European Technical

Approval for watersealing bands and have been approved for CE marking in the European Union, ETA-04/0044.

PHYSICAL PROPERTIES OF FINISHED WATERSTOP

PROPERTY	TEST METHOD	TPE-R	PE	*SS (STAINLESS STEEL)
Tensile Strength	ASTM D 638	2000 psi	2000 psi	75 000 psi
Elongation	ASTM D 638	450%	800%	40%
100% Modulus	ASTM D 638	1000 psi	4200 psi	
Brittle Temperature	ASTM D 746	-56°C (-70°F)		
Hardness	ASTM D 2240	85 Shore A	40 Shore D	95 max. Rockwell B
Yield Strength				25 000 psi

*SS Properties taken from ASTM A240, Table 2

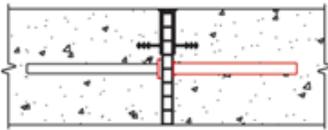
CHEMICAL RESISTANCE: GENERAL GUIDELINES

Chemical resistance recommendations are based on short term, secondary containment applications. Typical testing is performed according to ASTM D-471 "Standard Test Method for Rubber Property-Effect of Liquids" with 166-hour (7 day) immersion. Performance data has been collected from a variety of sources including industry reference data, third-party and in-house testing. Consult a Sika Technical Sales Representative for application specific chemical data or further testing.

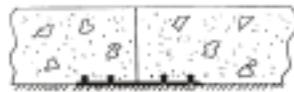
CHEMICAL EXPOSURE	Temperature	TPE-R	PE	Stainless Steel 316	PVC
Rating Key: A = Excellent B = Good C = Conditional X = Do not use					
Ammonia, Anhydrous	23°C (73.4°F)	A	B	A	A
*Antifreeze (50% Ethylene Glycol/50% Water)	100°C (212°F)	A	B	A	A
ASTM Oil #2	125°C (257°F)	B		A	X
Benzene	100°C (212°F)	B	B	A	X
Carbontetrachloride	23°C (73.4°F)	X	X	B	X
Chlorine (Wet/Dry)	23°C (73.4°F)	A/A	C3C	A/X	X/X
Creosote	23°C (73.4°F)	A		A	X
Cyclohexane	23°C (73.4°F)	X	X	A	X
Diesel Fuel	23°C (73.4°F)	B	B	A	X
Ethanol	23°C (73.4°F)	A	A	A	X
Hydraulic Fluid	23°C (73.4°F)	A	B	A	X
Hydrogen Peroxide	23°C (73.4°F)	A	B	B	A
Isopropyl Alcohols	23°C (73.4°F)	A	A	A	A
Jet Fuel - JP8	23°C (73.4°F)	B	B	A	C
Kerosene	23°C (73.4°F)	B	C	A	C
Methyl Ethyl Ketone	23°C (73.4°F)	B	B	A	X
Nitric Acid- 70%	23°C (73.4°F)	B	X	A	X
Oil, Mineral	23°C (73.4°F)	A	B	A	B/C
Sodium Hydroxide 80% Solution	23°C (73.4°F)	A	C	X	A
Sodium Hypochlorite	23°C (73.4°F)	A	B	B	A
Styrene	23°C (73.4°F)	B	B	A	X
Sulfuric Acid 98%	23°C (73.4°F)	B	C	X	X
Tetrahydrofuran	23°C (73.4°F)	B	X	A	X
Toluene	23°C (73.4°F)	B	B	A	X
Trichloroethylene	23°C (73.4°F)	X	X	A	X
DI Water pH 11	23°C (73.4°F)	A	B	A	A
Xylene	23°C (73.4°F)	B	B	A	X

SELECTING THE RIGHT PROFILE

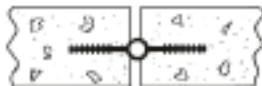
TPE-R and PE waterstops are available in a variety of sizes and profiles to meet the needs of various structures and applications.



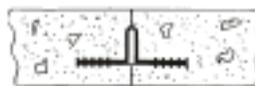
EB Cap - The patented Expansion Board Cap Seal system was design to serve as both a waterstop and joint sealant. This unique design allows for one-step placement of your joint sealant and waterstop. No stripping, sawcutting or sealing is required. The result is an easy-to-install, maintenance-free joint. TPER and PE profiles are available.



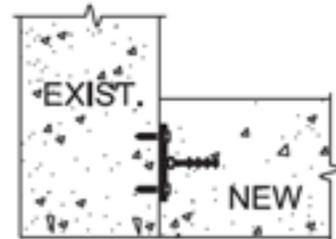
Base Seal is designed for slab on grade joints or backfilled walls and eliminates difficult split forming details. This profile is difficult to join to other waterstops so may not be suitable for containment areas with standard waterstops in other joints. This profile is available only as TPE-R.



Ribbed with Centerbulb is a very versatile waterstop and a standard for the concrete industry. The centerbulb of the waterstop accommodates vertical and horizontal movement equal to the inside diameter of the centerbulb. This waterstop can be used in control joints and expansion joints, vertical and horizontal applications. TPE-R and PE profiles are available.



Ribbed with Tear Web is designed for larger joint movements. The thin web in the U-shaped centerbulb will tear during joint movement and allow for additional expansion or differential settlements. Some fabrications are limited. TPE-R and PE profiles are available.



Retrofit - modern chemical plants and manufacturing facilities are constantly expanding, modifying existing areas for new technologies and products. Structural changes to the concrete areas create the potential for leaks between the new and existing concrete. Traditionally, adding a waterstop to these joints required saw cutting a groove several inches into the existing concrete and grouting in a waterstop. This method is time-consuming, labour-intensive and often requires cutting through the top layer of rebar in the existing concrete. Westec offers multiple profiles for a variety of situations and applications. TPE-R, PE and SS Retrofit profiles are available.

WHAT ABOUT SPLIT WATERSTOPS?

Split waterstops have a split flange that opens and is attached to one side of the bulkhead. Following the first pour, the bulkhead is removed and the flange is closed and secured to adjacent reinforcing steel prior to the succeeding pour. These waterstops typically cannot be joined to other waterstops and cannot accommodate directional changes or intersections. The applications for split waterstops are limited and not suitable for chemical containment.

WHAT ABOUT DUMBBELL WATERSTOPS?

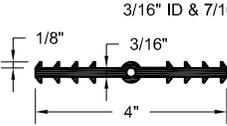
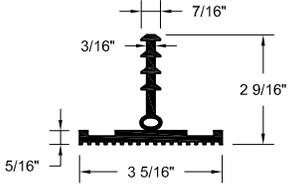
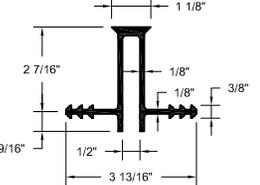
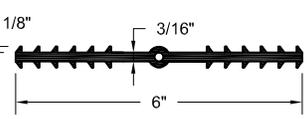
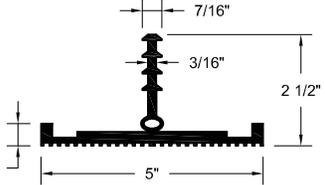
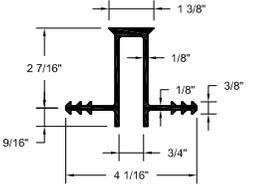
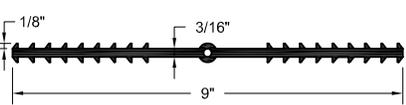
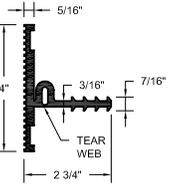
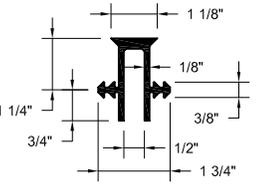
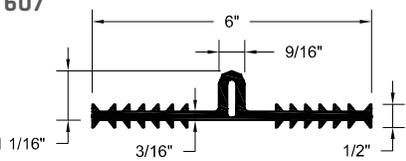
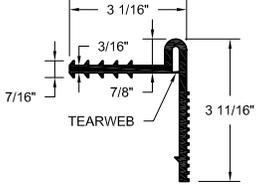
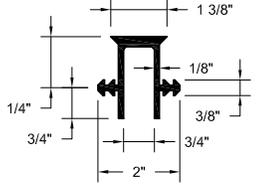
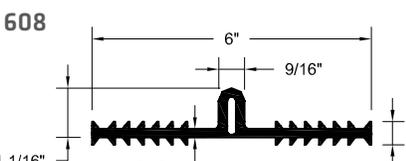
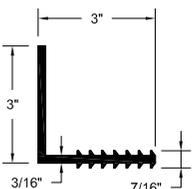
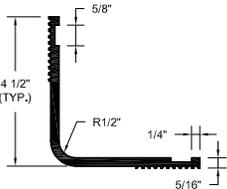
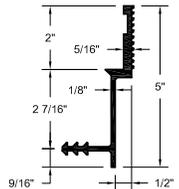
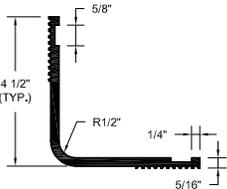
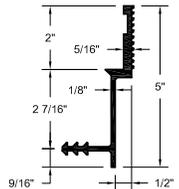
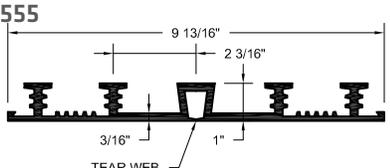
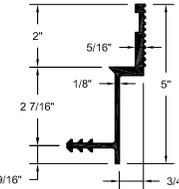
Generally, any situation suited for dumbbell waterstops can be better served with a ribbed profile. The multi-rib configuration disperses stress to the waterstop more effectively than a single dumbbell and creates a more circuitous path for liquid migration.

WHAT ABOUT HYDROPHILIC (SWELLING) WATERSTOPS?

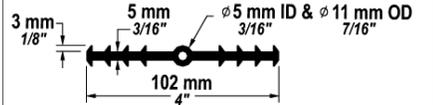
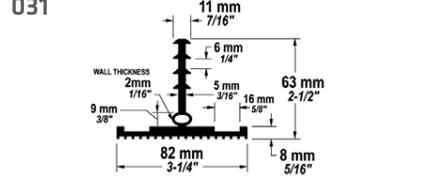
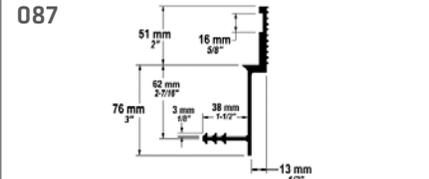
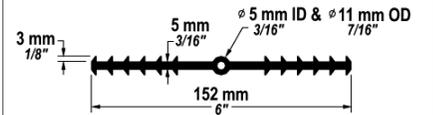
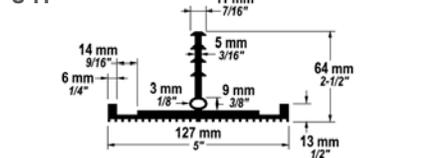
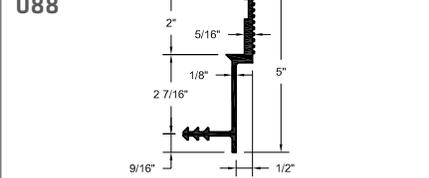
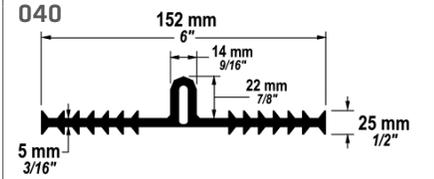
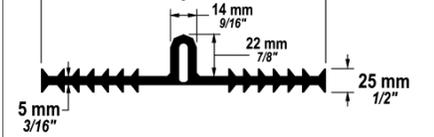
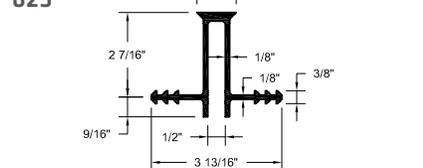
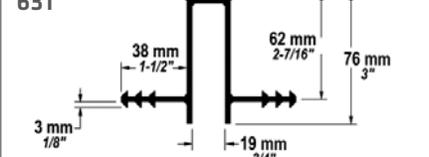
Hydrophilic strip-applied waterstops, are easy to install and effective in a variety of applications. However they have some limitations and should be used with caution in secondary chemical containment installations. Designers should consider not only the chemical resistance of hydrophilic materials, but the degree and rate of swell of the waterstops during exposure to a medium other than water. Embedded waterstops generally provide a more reliable seal against infrequent but sudden exposure to aggressive liquids.

PROFILES

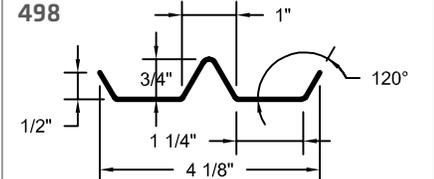
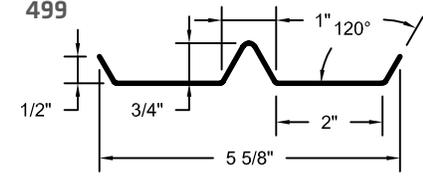
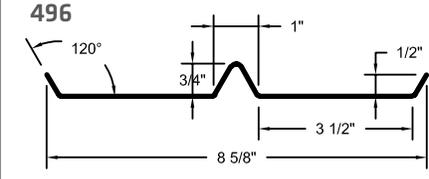
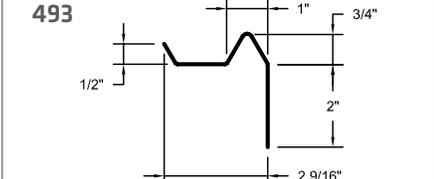
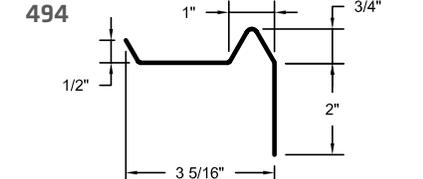
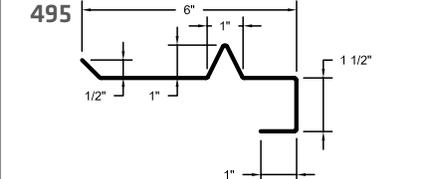
ENVIROSTOP® TPE-R PROFILES: STANDARD, RETROFIT AND EB CAP

RIBBED CENTERBULB	RETROFIT	EB CAP	
<p>618</p> <p>3/16" ID & 7/16" OD</p> 	<p>629</p> 	<p>637</p> 	
<p>619</p> <p>3/16" ID & 7/16" OD</p> 	<p>630</p> 	<p>638</p> 	
<p>620</p> <p>3/16" ID & 7/16" OD</p> 	<p>686</p> 	<p>634</p> 	
RIBBED TEAR WEB			
<p>607</p> 	<p>697</p> 	<p>639</p> 	
<p>608</p> 	<p>694</p> 	EP CAP RETROFIT	
<th colspan="1">BASE SEAL</th> <td> <p>691</p>  </td> <td> <p>687</p>  </td>	BASE SEAL	<p>691</p> 	<p>687</p> 
<p>555</p> 	<p>688</p> 		

PE PROFILES: STANDARD, RETROFIT AND EB CAP

<p>039</p>  <p>3 mm 1/8"</p> <p>5 mm 3/16"</p> <p>102 mm 4"</p> <p>∅ 5 mm ID & ∅ 11 mm OD 3/16" 7/16"</p>	<p>031</p>  <p>11 mm 7/16"</p> <p>6 mm 1/4"</p> <p>2 mm 1/16"</p> <p>82 mm 3-1/4"</p> <p>WALL THICKNESS</p> <p>9 mm 3/8"</p> <p>3 mm 1/8"</p> <p>5 mm 3/16"</p> <p>16 mm 5/8"</p> <p>63 mm 2-1/2"</p> <p>8 mm 5/16"</p>	<p>EB CAP RETROFIT</p> <p>087</p>  <p>51 mm 2"</p> <p>16 mm 5/8"</p> <p>76 mm 3"</p> <p>62 mm 2-5/16"</p> <p>3 mm 1/8"</p> <p>38 mm 1-5/16"</p> <p>13 mm 1/2"</p>
<p>050</p>  <p>3 mm 1/8"</p> <p>5 mm 3/16"</p> <p>152 mm 6"</p> <p>∅ 5 mm ID & ∅ 11 mm OD 3/16" 7/16"</p>	<p>041</p>  <p>11 mm 7/16"</p> <p>5 mm 3/16"</p> <p>14 mm 9/16"</p> <p>6 mm 1/4"</p> <p>3 mm 1/8"</p> <p>9 mm 3/8"</p> <p>127 mm 5"</p> <p>64 mm 2-1/2"</p> <p>13 mm 1/2"</p>	<p>088</p>  <p>2"</p> <p>5/16"</p> <p>5"</p> <p>16 mm 5/8"</p> <p>1/8"</p> <p>2 7/16"</p> <p>9/16"</p> <p>1/2"</p>
<p>040</p>  <p>5 mm 3/16"</p> <p>152 mm 6"</p> <p>14 mm 9/16"</p> <p>22 mm 7/8"</p> <p>25 mm 1 1/2"</p>	<p>EP CAP</p>	
<p>040</p>  <p>5 mm 3/16"</p> <p>152 mm 6"</p> <p>14 mm 9/16"</p> <p>22 mm 7/8"</p> <p>25 mm 1 1/2"</p>	<p>625</p>  <p>1 1/8"</p> <p>2 7/16"</p> <p>1/8"</p> <p>1/8"</p> <p>3/8"</p> <p>9/16"</p> <p>1/2"</p> <p>3 13/16"</p>	<p>631</p>  <p>3 mm 1/8"</p> <p>38 mm 1-1/2"</p> <p>62 mm 2-7/16"</p> <p>76 mm 3"</p> <p>19 mm 3/4"</p>

SS PROFILES (STAINLESS STEEL): STANDARD AND RETROFIT

<p>498</p>  <p>1/2"</p> <p>3/4"</p> <p>1 1/4"</p> <p>4 1/8"</p> <p>120°</p>	<p>499</p>  <p>1/2"</p> <p>3/4"</p> <p>5 5/8"</p> <p>2"</p> <p>120°</p>	<p>496</p>  <p>1/2"</p> <p>3/4"</p> <p>8 5/8"</p> <p>3 1/2"</p> <p>120°</p>
<p>493</p>  <p>1/2"</p> <p>3/4"</p> <p>2 9/16"</p>	<p>494</p>  <p>1/2"</p> <p>3/4"</p> <p>3 5/16"</p>	<p>495</p>  <p>1/2"</p> <p>3/4"</p> <p>1 1/2"</p>

INSTALLING RETROFIT WATERSTOPS



Retrofit Waterstop

Sika has a variety of Westec® retrofit profiles for varying applications. The general principle is to secure a waterstop profile to existing concrete by bolting a profile into a bed of epoxy. This eliminates any requirement for saw-cutting into the existing concrete. Stainless steel batten bars, concrete fasteners and Novolac Gel Epoxy are supplied with each profile.

This 4-part system eliminates the saw-cut requirement and creates a fluid-tight joint at the new-to-existing concrete junction.

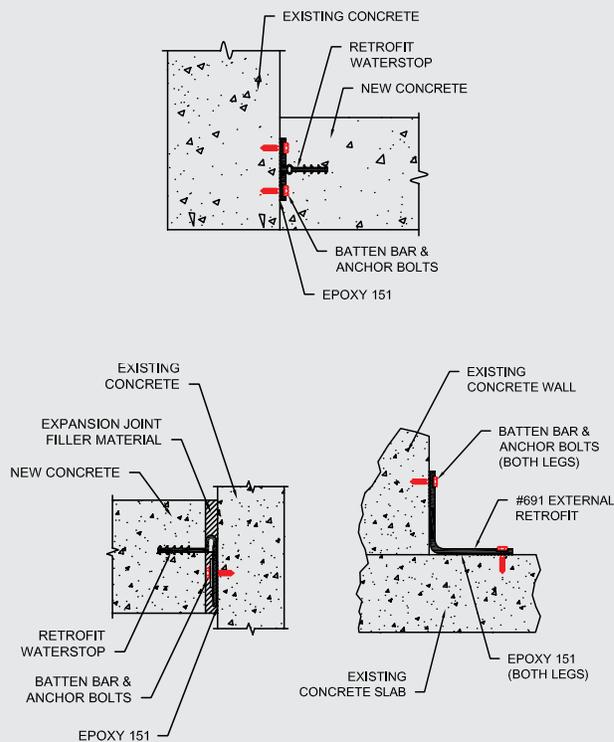
1. EPOXY BED: A bed of epoxy (about 1/8") is applied to the existing concrete. The gel epoxy serves as a gasket, ensuring a liquid-tight seal between the profile and existing concrete. Concrete should be clean, dry and free of loose material.

2. WATERSTOP PROFILE: Next the waterstop profile is pressed into the epoxy bed. Sika Westec offers numerous configurations for a variety of applications (large movements, expansion joints, external joints, etc.) but all have the same basic components. TPE-R and PE profiles feature series of small ridges for the epoxy bed and a larger web for embedment into the new concrete, similar to a standard ribbed waterstop.

3. BATTEN BAR: A stainless steel batten bar (sometimes two) runs the length of the waterstop to maintain even pressure on the waterstop and distribute shear forces due to differential slab settlements. Batten bars come in multiple sizes, depending on the profile, but all are predrilled for concrete fasteners every 6".

4. CONCRETE FASTENERS: Retrofit systems are supplied with stainless steel concrete anchors/screws. These bolt through the batten bar, profile and epoxy and secure everything to the existing concrete. While the epoxy does have some adhesive properties, batten bars and fasteners are required to maintain a fluid-tight seal and support any concrete movement.

CONSTRUCTION DETAILS FOR SPECIAL RETROFIT DESIGNS



PATENTED EXPANSION BOARD CAP SEAL SYSTEM



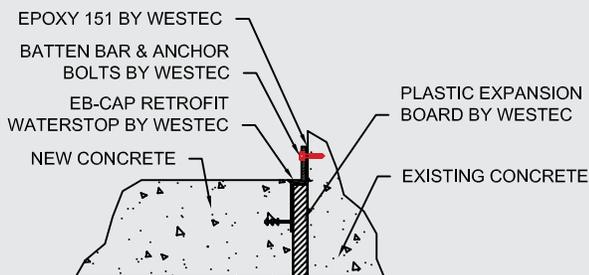
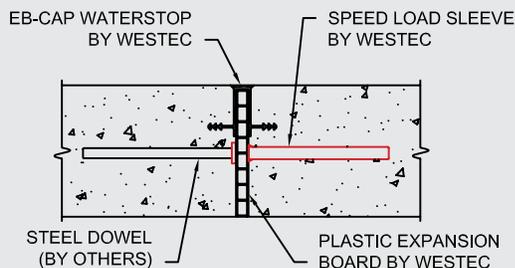
The EB Cap seal system is a complete concrete joint system designed and patented by Westec. Easy to install, the EB Cap integrates the waterstop, forming system, expansion board, joint seal and load transfer units into a single structure. Just stake down the board, set your screed elevation and that's it. No stripping forms, no messy sealants, no problems!

INSTALLATION BENEFITS:

- No split formwork
- Fewer installation steps
- No poured-in-place sealant required
- No remobilization for saw cutting or sealant
- Convenient strip pouring possible with Speed Loads
- Lower labour and installation costs
- No joint finishing required

Patent # for EB Cap is 5,378,386

CONSTRUCTION DETAILS FOR SPECIAL EB CAP DESIGNS



POLYBOARD

Westec 3/4" HDPE Polyboard is available for 6" and 8" paving applications. The polyboard is designed to work with the EB cap and EB Cap retrofit profiles and serves as both expansion material and a forming system.

SPEED LOAD

Speed Load sleeves are an excellent addition to the Expansion Board cap seal and Polyboard. Speed load sleeves align the steel load transfer dowels and are designed specifically for leave-in-place forming systems like the EB Cap System.

Please consult a Sika Technical Sales Representative for your specific project needs.

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Sikaplan®
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Concrete Production



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Sika® AER^{CA}

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Sikaflex®
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Grouting and Anchoring



SikaGrout®
Sikadur®
Sika AnchorFix®

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Sika® MonoTop®
SikaTop®, SikaRepair®
Sikagard®

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Sikadur®, Sika® CarboDur®
SikaWrap®
Sika® CarboShear

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Sikagard® Duroplast

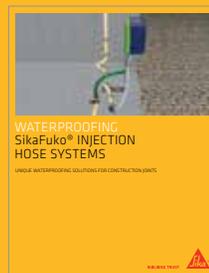
Waterproofing Systems



SikaProof®, SikaFuko®
Sika® Greenstreak®
SikaSwell®, SikaFix®

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Also Available:



The information, and in particular, the recommendations relating to the application and end-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, within their shelf life. 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 recommendations, or from any other advice offered. The proprietary rights of third parties must be observed. All orders are accepted subject to our current terms of sale and delivery. Users should always refer to the most recent issue of the Product Data Sheet for the product concerned, copies of which will be supplied on request or can be accessed in the Internet under www.sika.ca.

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