CONCRETE ACCESSORIES
Sika® Westec®
BARRIER TECHNOLOGIES
WATERSTOPS FOR INDUSTRIAL APPLICATIONS
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.

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

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 Vulcanize 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.
**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.

**PHYSICAL PROPERTIES OF FINISHED WATERSTOP**

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

*SS Properties taken from ASTM A240, Table 2

**CHEMICAL EXPOSURE**

<table>
<thead>
<tr>
<th>CHEMICAL EXPOSURE</th>
<th>Temperature</th>
<th>TPE-R</th>
<th>PE</th>
<th>Stainless Steel 316</th>
<th>PVC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ammonia, Anhydrous</td>
<td>23°C (73.4°F)</td>
<td>A</td>
<td>B</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>*Antifreeze (50% Ethylene Glycol/50% Water)</td>
<td>100°C (212°F)</td>
<td>A</td>
<td>B</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>ASTM Oil #2</td>
<td>125°C (257°F)</td>
<td>B</td>
<td>A</td>
<td>A</td>
<td>X</td>
</tr>
<tr>
<td>Benzene</td>
<td>23°C (73.4°F)</td>
<td>B</td>
<td>A</td>
<td>A</td>
<td>X</td>
</tr>
<tr>
<td>Carbon tetrachloride</td>
<td>23°C (73.4°F)</td>
<td>B</td>
<td>A</td>
<td>A</td>
<td>X</td>
</tr>
<tr>
<td>Chlorine (Wet/Dry)</td>
<td>23°C (73.4°F)</td>
<td>A/A</td>
<td>C</td>
<td>A</td>
<td>X/X</td>
</tr>
<tr>
<td>Creosote</td>
<td>23°C (73.4°F)</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>X</td>
</tr>
<tr>
<td>Cyclohexane</td>
<td>23°C (73.4°F)</td>
<td>X</td>
<td>X</td>
<td>A</td>
<td>X</td>
</tr>
<tr>
<td>Diesel Fuel</td>
<td>23°C (73.4°F)</td>
<td>X</td>
<td>X</td>
<td>A</td>
<td>X</td>
</tr>
<tr>
<td>Ethanol</td>
<td>23°C (73.4°F)</td>
<td>B</td>
<td>B</td>
<td>A</td>
<td>X</td>
</tr>
<tr>
<td>Hydraulic Fluid</td>
<td>23°C (73.4°F)</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>X</td>
</tr>
<tr>
<td>Hydrogen Peroxide</td>
<td>23°C (73.4°F)</td>
<td>B</td>
<td>B</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>Isopropyl Alcohols</td>
<td>23°C (73.4°F)</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>Jet Fuel - JP8</td>
<td>23°C (73.4°F)</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>Kerosene</td>
<td>23°C (73.4°F)</td>
<td>B</td>
<td>B</td>
<td>A</td>
<td>A/C</td>
</tr>
<tr>
<td>Methyl Ethyl Ketone</td>
<td>23°C (73.4°F)</td>
<td>B</td>
<td>B</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>Nitric Acid- 70%</td>
<td>23°C (73.4°F)</td>
<td>B</td>
<td>X</td>
<td>A</td>
<td>X</td>
</tr>
<tr>
<td>Oil, Mineral</td>
<td>23°C (73.4°F)</td>
<td>A</td>
<td>B</td>
<td>A</td>
<td>B/C</td>
</tr>
<tr>
<td>Sodium Hydroxide 80% Solution</td>
<td>23°C (73.4°F)</td>
<td>A</td>
<td>C</td>
<td>X</td>
<td>A</td>
</tr>
<tr>
<td>Sodium Hypochlorite</td>
<td>23°C (73.4°F)</td>
<td>A</td>
<td>B</td>
<td>B</td>
<td>A</td>
</tr>
<tr>
<td>Styrene</td>
<td>23°C (73.4°F)</td>
<td>A</td>
<td>B</td>
<td>A</td>
<td>X</td>
</tr>
<tr>
<td>Sulfuric Acid 98%</td>
<td>23°C (73.4°F)</td>
<td>B</td>
<td>C</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Tetrachloroethylene</td>
<td>23°C (73.4°F)</td>
<td>B</td>
<td>A</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Toluenene</td>
<td>23°C (73.4°F)</td>
<td>X</td>
<td>X</td>
<td>A</td>
<td>X</td>
</tr>
<tr>
<td>Di Water pH 11</td>
<td>23°C (73.4°F)</td>
<td>A</td>
<td>B</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>Xylene</td>
<td>23°C (73.4°F)</td>
<td>B</td>
<td>B</td>
<td>A</td>
<td>X</td>
</tr>
</tbody>
</table>
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 designed 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. TPE-R 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.
# ENVIROSTOP® TPE-R PROFILES: STANDARD, RETROFIT AND EB CAP

<table>
<thead>
<tr>
<th>RIBBED CENTERBULB</th>
<th>RETROFIT</th>
<th>EB CAP</th>
</tr>
</thead>
<tbody>
<tr>
<td>618</td>
<td>629</td>
<td>637</td>
</tr>
<tr>
<td><img src="image1" alt="Image" /></td>
<td><img src="image2" alt="Image" /></td>
<td><img src="image3" alt="Image" /></td>
</tr>
<tr>
<td>3/16&quot; &amp; 7/16&quot; OD</td>
<td>3/16&quot;</td>
<td>3/16&quot;</td>
</tr>
<tr>
<td>1/8&quot;</td>
<td>2 9/16&quot;</td>
<td>3/8&quot;</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>RIBBED TEAR WEB</th>
<th>EP CAP RETROFIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>607</td>
<td>691</td>
</tr>
<tr>
<td><img src="image4" alt="Image" /></td>
<td><img src="image5" alt="Image" /></td>
</tr>
<tr>
<td>1 1/16&quot;</td>
<td>5/16&quot;</td>
</tr>
<tr>
<td>6&quot;</td>
<td>3/16&quot;</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>BASE SEAL</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>555</td>
<td>688</td>
</tr>
<tr>
<td><img src="image6" alt="Image" /></td>
<td><img src="image7" alt="Image" /></td>
</tr>
<tr>
<td>9 13/16&quot;</td>
<td>5/16&quot;</td>
</tr>
<tr>
<td>3/16&quot; TEAR WEB</td>
<td>2 7/16&quot;</td>
</tr>
</tbody>
</table>

_Sika® Westec® BARRIER TECHNOLOGIES_  
Concrete Accessories
PE PROFILES: STANDARD, RETROFIT AND EB CAP

SS PROFILES (STAINLESS STEEL): STANDARD AND RETROFIT
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.

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.

**CONSTRUCTION DETAILS FOR SPECIAL RETROFIT DESIGNS**
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

**POLYBOARD**

Westec ¾” 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.
SIKA SOLUTIONS FROM ROOF TO FOUNDATIONS

Roofing Systems

Sarnafil®
Sikaplan®
Sikalastic®

Concrete Production

Sika® ViscoCrete®
Sika® Retarder®
Sika® AER®

Joint Sealing

Sikaflex®
Sikasil®
Sikadur® Combiflex

Grouting and Anchoring

SikaGrout®
Sikadur®
Sika AnchorFix®

Concrete Repair & Protection

Sika® MonoTop®
SikaTop®, SikaRepair®
Sikagard®

Structural Strengthening

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

Floor & Wall Systems

SikaFloor®
Sikagard®
Sikagard® Duroplast

Waterproofing Systems

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

Sika Canada Inc., a member of the Sika Group, is a leader in the field of specialty chemicals for construction and manufacturing industries. Our product lines feature high quality roofing systems, concrete admixtures, mortars and resins, sealants and adhesives, structural strengthening components, industrial and decorative flooring, as well as protective coatings and waterproofing systems. Our expertise is borne out of a global presence and served by strong, local support. Sika has earned the trust of our customers for over 100 years, by delivering the highest standards of commitment and partnership.

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 on the Internet under www.sika.ca.

SIKA CANADA INC.
Head Office
601, avenue Delmar
Pointe-Claire, Quebec
H9R 4A3

Other locations
Toronto
Edmonton
Vancouver

1-800-933-SIKA
www.sika.ca

An ISO 9001 certified company
Pointe-Claire: ISO 14001 certified EMS

BUILDING TRUST
CONSTRUIRE LA CONFIANCE

© Sika Canada Inc./Sika® Westec® Barrier Technologies Inc. 2014