Waterstops play a critical role in the integrity of concrete structures. They provide a fluid-tight diaphragm when embedded in, and running through concrete joints.

Earth Shield® Thermoplastic Vulcanizate Waterstop (TPV), by JP Specialties, Inc., greatly expands the scope of conventional waterstop by offering unmatched chemical resistance to a broad spectrum of aggressive chemicals, solvents, and hot petroleum oils. Manufactured NSF certified, EPA-compliant waterstop profiles are available for new construction and retrofit, as well as the tools and accessories for proper field installation.

JP Specialties has been the respected innovator in the waterstop industry since 1954. We are known worldwide for our high-quality waterstop, and we hold the patent on the ST-10® In Line Waterstop Splicing Table and the XLT2000 Waterstop Fabrication — the equipment used to mechanically weld thermoplastic waterstops.

See page 4 for more info

Earth Shield® Retrofit Column and Pipe Fitting (part number JP320LC1.XX* [*XX is diameter in inches]) is manufactured with a flexible, chemical-resistant polymer and includes all stainless steel anchoring hardware.

See page 7 for more info
Thermoplastic Vulcanizate (TPV / TPER) Waterstop Basic Use

Earth Shield® Thermoplastic Vulcanizate Waterstop is used as a fluid-tight diaphragm, embedded in concrete, across and along the joint, for primary and secondary containment structures. Earth Shield® Chemical Resistant Waterstops are resistant to a wide range of oils, solvents, and aggressive chemicals. Alcohol, ketones, glycols, esters, and aqueous solutions of acids, salts, and bases have little effect on Earth Shield® Thermoplastic Vulcanizate Waterstop.

Unlike polyvinyl chloride (PVC) waterstop, Earth Shield® waterstop contains no plasticizer, stabilizer, or filler to leech out when exposed to chemicals, fuels, and aggressive industrial fluids. Also, unlike PVC waterstop, Earth Shield® can withstand prolonged exposure to high and low temperatures (-78°F to 275°F long term) without detrimental effect.

Earth Shield® TPV Waterstop is NSF Standard 61 Certified for use in drinking water and is made of a recyclable polymer, so it’s good for health and the environment. www.earthshield.com/nsf_certified_waterstop.html

The superior chemical resistance of Earth Shield® Thermoplastic Vulcanizate Waterstop is enhanced by the use of a ribbed centerbulb configuration, which is available in a 4, 6, and 9-inch width. This provides for greater mechanical bonding with the concrete and a barrier against migration of liquid flow around the waterstop. The ribbed centerbulb style also allows for joint movement and may be used in above or below grade applications. Additional shapes are available for retrofit, extreme expansion, stainless steel and base seal applications.

Different varieties and grades of thermoplastic elastomers (TPE) are commercially available. On the low-end there is thermoplastic polyolefin (TPO), which has a rubber phase that is not cross-linked. On the high-end there is thermoplastic vulcanizate (TPV)... Earth Shield® has chosen a fully cross-linked TPV as our standard elastomer compound, which provides superior mechanical properties, retention, and chemical resistance. In fact, when compared side-by-side, no competitive product is even close to achieving the physical properties of Earth Shield®.

Typical Applications
- Primary and secondary containment
- Waste water treatment plants
- Refineries
- Ozone contactor structures
- Mining facilities
- Fueling areas
- Chemical factories
- Manure pits

Earth Shield® Advantages
- Outstanding fluid resistance to a wide range of aqueous-based fluids, oils, and hydrocarbons
- Excellent retention of physical properties at elevated temperatures
- Superior ozone and weather resistance

Installation
Install Earth Shield® TPV Waterstop in all concrete joints. Waterstop should be centered in, and run the extent of the joint. All changes of directions should be prefabricated (see Shop Made Fittings), leaving only butt-welding for the field. If
installing in an expansion joint, keep center bulb unembedded to allow it to accommodate movement as designed. Use #3 hog rings and tie wire to secure waterstop to reinforcing steel to avoid displacement during the concrete pour. Splice straight lengths of waterstop, and Shop Made Fittings to straight lengths, with an ST-10® In Line Waterstop Splicer with the iron temperature set to 410°F to 430°F.

More detailed installation instructions can be found in our Standard 3-part Specifications.

Technical Assistance
Qualified technical assistance is available during any phase of your construction project.

Specifications
Standard 3-part Specifications are available at our website in Microsoft® Word and Adobe® PDF format, and upon request in printed and a variety of computer word processor formats. Call our Technical Sales Staff for additional help with your specification.

www.earthshield.com/specifications.html

Suggested Proprietary Short Form Guide
Specification Section 03150
(Master Format 2004 — 03 15 13)
TPV Chemical Resistant Waterstop
Waterstop indicated in drawings and specifications for contraction (control), expansion and construction joints to be Earth Shield® TPV Chemical Resistant Waterstop Part No. #### [Designer insert appropriate part number here] as manufactured by JP Specialties, Inc.; 551 Birch Street, Lake Elsinore, CA 92530; Phone 951-674-6869

1. Thermoplastic Vulcanizate (TPV) Waterstop shall conform to EPA Title 40 CFR Section 265.193. The suitability of the waterstop for a specific application should be determined by specific testing for that particular requirement per ASTM D471. Project-specific certification to be provided by the manufacturer.

2. Thermoplastic Vulcanizate (TPV) Waterstop shall be independently certified for use in potable water per NSF/ANSI Standard 61. Third-party certified documentation to be provided by the manufacturer.

3. No equals or substitutions allowed.

<table>
<thead>
<tr>
<th>Property</th>
<th>Test Method</th>
<th>Required Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specific Gravity</td>
<td>ASTM D792</td>
<td>.96</td>
</tr>
<tr>
<td>Shore A Hardness (5 sec.)</td>
<td>ASTM D2240</td>
<td>90±3 at 77°F</td>
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<tr>
<td>Tensile Strength</td>
<td>ASTM D412</td>
<td>2,300 psi</td>
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<td>Ultimate Elongation</td>
<td>ASTM D412</td>
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<td>100% Modulus</td>
<td>ASTM D746</td>
<td>1,000 psi</td>
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<tr>
<td>Tear Strength</td>
<td>ASTM D624</td>
<td>278 pli at 77°F</td>
</tr>
<tr>
<td>Compression Set</td>
<td>ASTM D395</td>
<td>29% at 77°F</td>
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<tr>
<td>Brittle Point</td>
<td>ASTM D746</td>
<td>-78°F</td>
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<tr>
<td>Drinking Water Safe</td>
<td>NSF/ANSI 61</td>
<td>Waterstop certified by NSF for use in potable water</td>
</tr>
<tr>
<td>Ozone Resistance</td>
<td>ASTM D1171</td>
<td>Passed, no cracking at 450 pphm</td>
</tr>
<tr>
<td>Chemical Resistance</td>
<td>ASTM D471</td>
<td>Meet or exceed specific testing standards for contained fluids as required by Owner and certified by Manufacturer</td>
</tr>
<tr>
<td>Green Certification</td>
<td>GreenSpec</td>
<td>Approved</td>
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</table>
Ribbed Centerbulb
www.earthshield.com/ribbedcenterbulb.html

Ribbed centerbulb is the most versatile type of waterstop available. The centerbulb accommodates lateral, transverse, and shear movement. Ribbed centerbulb can be used in expansion, construction, and control joints.

Ribbed centerbulb waterstops provide superior anchoring abilities and a long fluid-flow path because of the multiple ribs on the exterior flanges. Under stress, the multiple ribs will distort less than a dumbbell type waterstop. This is because the stress is first applied to the inward-most anchoring rib, and decreases to the subsequent ribs.

The centerbulb allows for joint movement beyond the ultimate elongation of the material (530%), without causing distortion to anchoring ribs. All of our ribbed centerbulb waterstops are manufactured with a 9/16'' outer diameter centerbulb, which is the largest in the industry. This centerbulb, coupled with the outstanding mechanical properties of our proprietary TPV elastomer (ultimate elongation, tensile strength, etc.), provides for unsurpassed joint movement and sealing abilities.

Like all our thermoplastic vulcanizate waterstops, ribbed centerbulb can be heat-welded using a standard waterstop splicing iron. This allows for easy field fabrications, and allows the waterstop to function as a continuous, homogeneous, fluid-tight diaphragm. Waterstop change of directions (fittings) can be purchased along with straight roll stock, and custom, fit-to-print waterstop modules are produced to order.
**Standard Fabrications**

- **JP436L1 Flat Ell**
- **JP636L1 Flat Ell**
- **JP936L1 Flat Ell**

- **JP436T1 Flat Tee**
- **JP636T1 Flat Tee**
- **JP936T1 Flat Tee**

- **JP436L2 Vert Ell**
- **JP636L2 Vert Ell**
- **JP936L2 Vert Ell**

- **JP436T2 Vert Tee**
- **JP636T2 Vert Tee**
- **JP936T2 Vert Tee**

- **JP436X1 Flat Cross**
- **JP636X1 Flat Cross**
- **JP936X1 Flat Cross**

- **JP436X2 Vert Cross**
- **JP636X2 Vert Cross**
- **JP936X2 Vert Cross**
Retrofit waterstop is designed to provide a fluid-tight seal between existing and new concrete construction, without resorting to the labor-intensive and structurally destructive saw-cut-and-grout method. It is ideal for constructing a new containment curb or wall to an existing slab, or joining a new slab to an existing wall. Special profile fabrications are available for columns and pipe penetrations.

All of our retrofit waterstops are sold as a system, and include all the necessary stainless steel bars and bolts. We also offer a high-quality chemical resistant novolac epoxy — VEN 1000. Earth Shield® retrofit waterstops are manufactured with our proprietary thermoplastic vulcanizate compound, which provides for unsurpassed chemical resistance.

Like all our thermoplastic vulcanizate waterstops, Earth Shield® retrofit can be heat-welded using a standard waterstop splicing iron. This allows for easy field fabrications, and allows the waterstop to function as a continuous, homogeneous, fluid-tight diaphragm. Waterstop change of directions can be purchased along with straight roll stock, and custom, fit-to-print waterstop modules are produced to order. Prefabricated ells, tees, tank pads, column fittings, and many others are in stock and ready to ship.
Earth Shield® has solved a long-standing problem for engineered concrete structures with circular protrusions, such as columns, pipes, piers, and pilasters. The problem: how to permanently seal the concrete joint when cast-in-place concrete is formed against an existing circular member. The solution: Earth Shield® Column & Pipe Fitting (part no. JP320LC1.XX* [*XX is the diameter in inches]) manufactured with a flexible, chemical-resistant polymer and stainless steel anchoring hardware. A single laborer on the job site can quickly install the column fitting and its associated hardware. Simply apply an epoxy gel bed to the existing surface; place the polymer ring into the epoxy gel bed; heat weld the single opening on the polymer ring using a waterstop splicing iron; and finally, complete the system with the stainless steel closure ring.

The Earth Shield® system functions as an internal dam, centrally located within the cast concrete, to stop aggressive chemicals, solvents and hot petroleum oils from penetrating the joint. By preventing the passage of hazardous liquids the Earth Shield® Column Fitting provides facility owners, engineers, and contractors with the necessary EPA-mandated containment compliance (EPA Title 40 CFR 265.193). Of course, the system prevents the passage of water as well. The mechanical properties of the polymer, plus the tear-web design of the JP320L profile, enable the column fitting to function equally well in expansion (isolation) joints and construction joints.
Integrated Cap Systems
www.earthshield.com/capsystems.html

Integrated expansion board cap waterstop systems are designed to replace post-applied joint sealant, and provide a fluid-tight internal seal like a traditional waterstop with a one-step, integrated unit.

Earth Shield® expansion board cap waterstop is installed on top of conventional expansion board filler. The expansion board acts as the form; therefore, no form splitting is necessary. This greatly accelerates the project schedule and provides a long lasting, attractive finished concrete joint.

Earth Shield® screed key cap slides over the top of metal screed key, eliminating the need for sealant.

- No split forms
- Accelerated installation
- No sawcutting or sealant
- No joint finishing
- Long life
- UV and abrasion resistant

Typical Joint Detail
Typical Joint Detail

Standard Fabrications

- JPEB350X1 Flat Cross
- JPEB375X1 Flat Cross
- JPEB350T1 Flat Tee
- JPEB375T1 Flat Tee
- JPEB375RL1 Outside Corner
  (Includes all batten bars and anchors)
- JPEB350L2 Inside Corner
- JPEB375L2 Inside Corner
- JPEB350L3 Outside Corner
- JPEB375L3 Outside Corner
- JPEB375RL2 Inside Corner
  (Includes all batten bars and anchors)
- JPEB350L1 Flat Ell
- JPEB375L1 Flat Ell
Special Shapes
www.earthshield.com/specialshapes.html

Earth Shield® tear web waterstops are designed for large joint movements such as tank foundations. Tear web is suitable for expansion joints. For construction and contraction (control) joints, ribbed centerbulb should be used instead.

Base Seal
www.earthshield.com/baseseal.html

Base seal waterstop is ideal for flat pavement jobs such as runways, large containment slabs, etc. Base seal waterstop is by far the easiest waterstop to install... Simply lay the waterstop directly on the compacted subgrade, place and finish concrete, and create control joint using saw cut or other method. The base seal provides a permanent, life-of-structure seal at the bottom of the joint.

Base seal is suitable for construction, contraction (control), and expansion joints. Base seal should not be used on jobs that make interior wall transitions as the part is non-symmetrical and therefore cannot function correctly. For large hydrostatic head pressures (>50 foot) ribbed centerbulb should be used instead.
Dumbbell
www.earthshield.com/dumbbell.html

Dumbbell waterstop is usually used in below grade applications, where limited movement is expected. Dumbbell waterstop can be installed in construction and contraction (control) joints; whereas, dumbbell centerbulb can be installed in construction, control, and expansion joints.

The large centerbulb (1-1/2" outer diameter) on the JP949 (and JP1149) waterstop profile, coupled with the outstanding mechanical properties of our thermoplastic vulcanizate and large endbulb anchors, enable the product to withstand large -scale joint movement (seismic, settlement, etc.). JP648, JP948, JP949 and JP1149 are all 3/8” thick...The largest and thickest profiles available in the industry!
Testing has shown that the majority of waterstop failures are caused when the waterstop must make directional changes. This is because directional changes, or fittings as they are commonly known, require special tools and skills that are not generally required for welding the straight edges of waterstops. Consequently, the fittings are either made wrong (edge welding); there is no tensile strength in the welds; the material is charred, burnt or otherwise contaminated; or the worker’s lack of experience causes unreliable welds. Shop Made Fittings are machine welded using an XLT-2000 Waterstop Splicing Table. JP Specialties invented the XLT-2000 and retains the patent on the technology. The XLT-2000 applies force evenly, creating monolithic, homogeneous and contaminant-free welds.

Shop Made Fittings are recognized and specified worldwide by major engineering firms. The U.S. Army Corps of Engineers also specified Shop Made Fittings in the July, 1995 revision of CEGS Section 03250. Shop Made Fittings are specified because they work. Edge welding waterstop seriously compromises the integrity of any project. Even the limited movement of concrete during the coefficient of expansion and contraction can be too much for edge welded waterstop. The edge welded waterstop lacks the proper tensile strength and does not maintain the characteristics of the parent material (bulb or rib continuity). Consequently, the waterstop often tears at the most critical junction: the change of direction. Since all waterstops are designed to act as a continuous, fluid-tight diaphragm which fluids (generally water) traverse, the structure that uses edge welded waterstop will naturally leak, as fluids migrate to any tears in the weld and pass through to the other side of the joint.

Structures that use Shop Made Fittings will significantly reduce these waterstop failures. The tensile strength of the weld will be at least 80% of the parent material. Continuity of the bulbs and ribs shall be maintained across the weld. In other words, the waterstop will perform as intended and last the life of the structure.
NSF/ANSI Standard 61 was developed to establish minimum requirements for the chemical contaminants and impurities that are indirectly imparted to drinking water from products, components, and materials used in drinking water systems.

Standard 61 is intended to cover specific materials or products that come into contact with drinking water, drinking water treatment chemicals, or both. The focus of Standard 61 is evaluation of contaminants or impurities imparted indirectly to drinking water.

In the U.S., 47 of 50 states have legislation that requires compliance with NSF/ANSI Standard 61. Products that are NSF Certified against NSF/ANSI Standard 61 demonstrate compliance with both Canadian and U.S. Plumbing Codes. NSF Certification and Testing is widely accepted. NSF data is recognized by ASSE, BOCA, IAPMO, ICBO-ES, SBCCI, City of Los Angeles and many others.

Trust Your Critical Water Projects to Earth Shield® — NSF Standard 61 Certified, EPA Compliant Waterstop

Water is arguably the most valuable resource in the world. Today’s water treatment, distribution, and storage projects are under ever-increasing layers of regulations and requirements, one of the foremost being that components and materials that contact potable water not have potential adverse human effects.

Earth Shield® TPV Waterstop, with NSF 61 certification, is the perfect choice for today’s critical water projects, and in particular drinking water projects.

NSF Certified Waterstop

www.earthshield.com/nsf_certified_waterstop.html
Type 20 & 23 Hydrophilic Butyl Rubber Waterstops

Earth Shield® Type 20 & Type 23 Hydrophilic Butyl Rubber Waterstops are engineered to absorb water, expand, and maintain a 100% full expansion, making them ideal for use in non-moving joints. Type 20 is certified for use in Federal Specification SS-S-210A. Earth Shield® Type 23 is certified for use in Federal Specifications SS-S-210A, SS-S-211A, and SS-S-212A.

**Applications:**
- **Concrete Construction:** Non-moving joints in concrete construction.
- **Manholes:** For use in manholes and similar applications.
- **Concrete Slabs:** For use in concrete slabs and walls.
- **Concrete Vaults:** For use in concrete vaults.
- **Storage Tanks:** For use in storage tanks.
- **Tunnels:** For use in tunnel construction.

**Installation Instructions:**
1. Cut Type 20 primer to the required length.
2. Apply Type 20 primer to the concrete surface, ensuring a uniform coat.
3. Stick Type 20 primer to the concrete surface, ensuring a uniform coat.
4. Overlap ends (1" minimum) and join with a kneading action, ensuring no separation or air pockets.
5. Allow primer to cure (per directions on can).

**Technical Specifications:**
- **Density:** 0.75 to 0.80 kg/L.
- **Color:** Black, gray, or white.
- **Temperature Range:** -40°F to 230°F.
- **Diameter:** 1" (25.4 mm) or 3/4" (19.05 mm).
- **Elongation:** 150%.
- **Tensile Strength:** 630 psi.
- **Yield Strength:** 49,741 psi.
- **Weight:** 560 lbs. per 1000 ft.

**Quality Assurance:**
- Earth Shield® Type 20 and Type 23 are manufactured by JP Specialties, Inc. and are certified to Federal Specifications SS-S-210A and SS-S-212A.
- Earth Shield® Type 20 and Type 23 are available in a variety of sizes and thicknesses, ensuring compatibility with a wide range of applications.

**Contact Information:**
- **JP Specialties, Inc.**
  - P.O. Box 1507, Lake Elsinore, CA 92531
  - Phone: (951) 674-1315
  - Fax: (951) 674-1315
  - Web: www.jpspecialties.com
  - E-mail: jpspec@jpspecialties.com

Earth Shield® Type 20 & Type 23 Hydrophilic Butyl Rubber Waterstops are designed to provide a cost-effective and reliable solution for concrete construction joints and other applications requiring a hydrophilic waterstop.
Earth Shield® Type 10 is a high-quality, self-sealing mastic waterstop concrete construction which prevents water from penetrating non-moving joints in J P Specialties, Inc.

- Retaining Walls • Foundations
- Burial Vaults • Slabs-on-grade
- Utility Vaults • Box Culverts
- Tunnels

The Type 10 Advantage
- Provides permanently flexible watertight joints.
- Rugged service temperature: -30° C to 93° C.
- Pressure resistance: 20 psi.

1. Brush and remove loose dirt and particles from the surface.
2. Brush one coat of Type 10 Primer Adhesive on to the clean, concrete surface. Type 10 Primer Adhesive is available in one gallon cans.
3. Place all of part “B” into a mixing container.
4. Press Type 10 firmly onto the primed surface.
5. Overlap ends (1” minimum), and join with a kneading action, trying to keep the epoxy from curing too quickly.
6. Apply continuous bed of nylon住epoxy putty left in the container will harden too quickly. Do not keep the epoxy past its 30 minute pot life.
7. You are now ready for your second pour.

Type 10 Waterstop is not intended for use in expansive joints. It should be used in non-moving joints only. JP Specialties, Inc.

- 551 Birch Street, Lake Elsinore, CA 92530
- Phone: 800-821-3859; International 951-674-6869; Fax 951-674-1315
- E-mail: jpspec@jpspecialties.com
- P.O. Box 1507, Lake Elsinore, CA 92531

JP Specialties, Inc. has been a leader since 1954 in Prefabricated Waterstop Modules and Shop Made Fittings.

Additional JP Specialties Products

www.earthshield.com/product.html
Earth Shield® Chemical Resistant Waterstop is readily available from a variety of sources:

- **Preferred Regional Stocking Partners** — We are partnered with some of the very best Concrete Accessories Distributors in the world. All our preferred partners have large stocking inventories and are factory trained to provide the utmost in on-site assistance.

- **Distributor Sales** — Earth Shield® can be special ordered from many distributor sales channels throughout the world.

- **Factory Direct** — Earth Shield® may be contacted directly for project quotation and product purchase (call 888-836-5778).

**Earth Shield® Thermoplastic Vulcanizate (TPV / TPER) Waterstop Limited Warranty**

JP Specialties, Inc. warrants to the Buyer that this product is new and will be free from defects and will perform as represented in writing subject to the two (2) following conditions: First, the application of the product and the concrete construction practices used in the application are in accordance with JP Specialties, Inc. recommendations; and, Second, the Buyer has selected the proper product for the specific application required.

Any information supplied in good faith by JP Specialties, Inc. with respect to its products is believed to be correct. JP Specialties, Inc. makes no representation or warranties, expressed or implied, as to the accuracy or completeness of such information. The exclusive remedies of the Buyer and the limit of the liability of JP Specialties, Inc. from any and all losses or damages resulting from the use of this product shall be either full refund of the purchase price to the Buyer of this product or the replacement of the quantity of product purchased by the Buyer at the discretion of JP Specialties, Inc.

All supplied testing data has been performed by independent testing laboratories. JP Specialties, Inc. has performed no tests.