

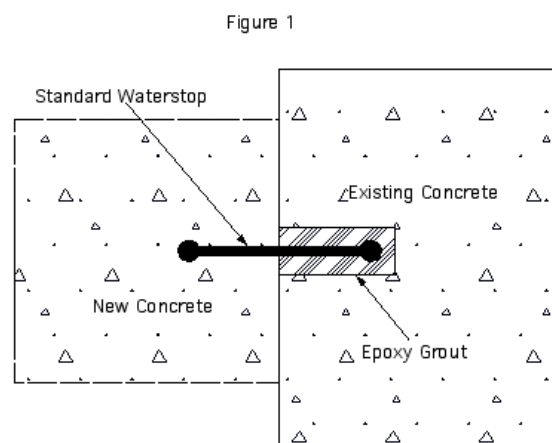


Tech Tips 002

Earth Shield® Retrofit Systems

By David R. Poole, CSI

Joining new concrete to existing concrete requires the use of a waterstop if the joint is to be fluid-proof. However, this formed joint has always been problematic for Engineers and Contractors, as properly installing a standard waterstop across a preformed joint is difficult, expensive, and usually a compromise. Traditionally, Engineers have accomplished the task by specifying the use of a standard embedded waterstop within a sawcut and epoxy-grout filled channel (see figure 1).



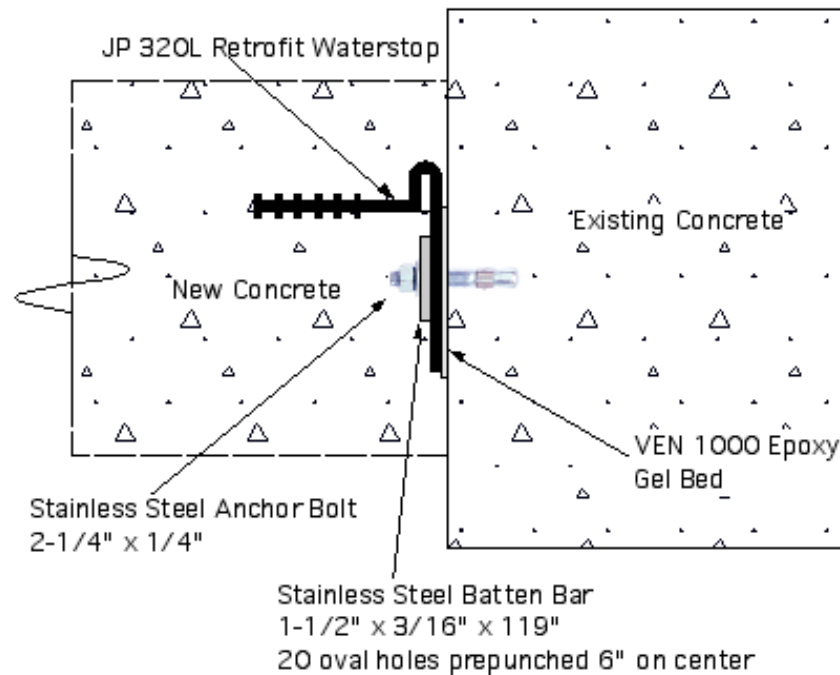
This labor-intensive and costly method has often produced questionable results due to the potential cold joint formed between the epoxy and the existing concrete surface from shrinkage. Furthermore, by sawcutting the existing concrete, the Contractor may be inadvertently destroying the reinforcing steel within the concrete.

Earth Shield currently manufactures six polymer retrofit systems that offer Engineers, Owners, and Contractors real solutions for retrofitting applications. All of the systems are non-destructive — there is no sawcutting of the existing concrete, and therefore no destruction of the internal reinforcing steel. All of the systems feature chemical bond ([epoxy](#)), as well as mechanical anchor system (stainless steel batten bar and bolts). (See figure 2.) And all of the systems are manufactured from a fully cross-linked thermoplastic vulcanizate (TPV), which provides broad-spectrum resistance to a variety of aggressive chemicals, long life span (entire lifecycle of structure), and excellent physical properties (tensile strength, elongation, etc.).

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Figure 2

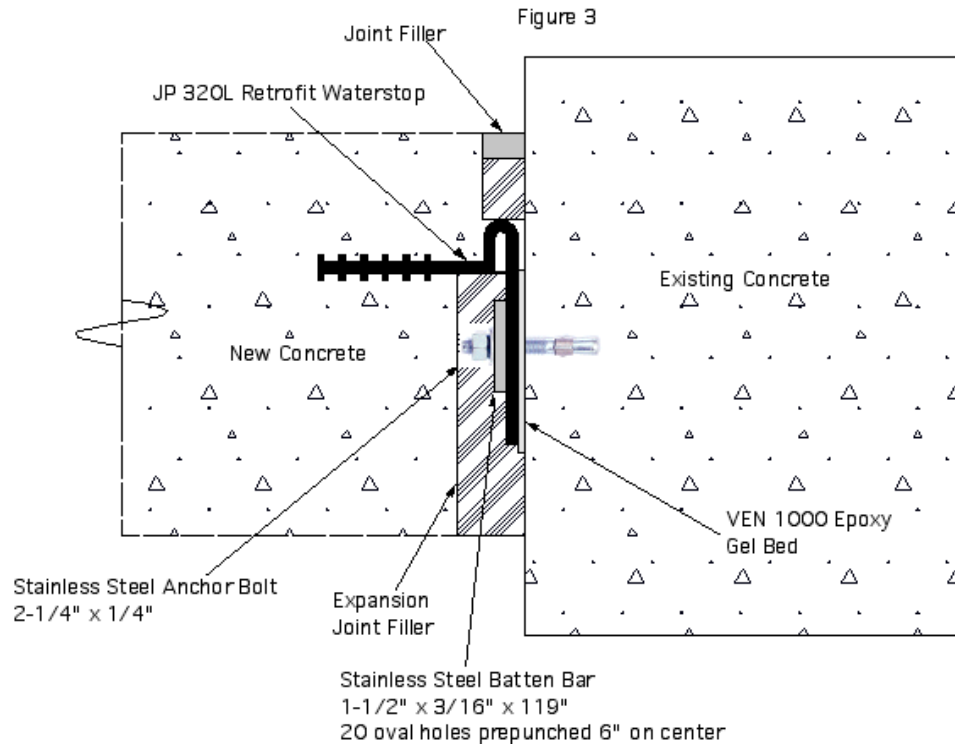


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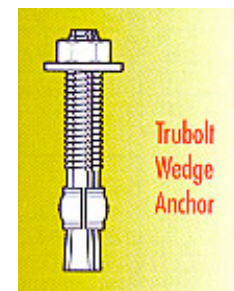
All six Earth Shield retrofit waterstops systems can be installed either vertically or horizontally. Therefore, they are equally suited for joining slab to wall or wall to slab. A frequent application is for the Contractor to pour the slab monolithically; apply an Earth Shield retrofit waterstop system to the cured slab (green concrete is perfectly acceptable); and cast containment walls (curbs) on top of the waterstop. All of our retrofit waterstop systems can be factory fabricated to fit-to-print dimensions, leaving little to no welding for the Contractor in the field.



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Earth Shield JP320L Retrofit System — JP320L is the workhorse of all the retrofit systems. It is designed for large shear, transverse, or lateral movements (expansion or isolation joints), as well as non-moving construction joints. Therefore, it is perfectly suited for tank settlement, vehicular traffic, seismic, etc. The large “U-shaped” bulb on the top of the waterstop, when kept unembedded through the use of expansion joint filler (*see figure 3*), allows for movement beyond the 530 % ultimate elongation of the parent material. Of all the retrofit waterstop systems Earth Shield manufactures, JP320L is designed to accommodate the most movement.



The anchoring hardware on JP320L and JP336L is the most robust and effective. Both systems utilize a large, pre-punched (6" on-center) stainless steel batten bar with large stainless steel [Trubolt Wedge Anchor](#) bolts. The backside of the waterstops' anchoring legs are serrated for the epoxy to tightly bond to.



JP Specialties, Inc. / Earth Shield® Waterstop

JP320L Tear Web Retrofit Waterstop

- ☑ One (1) 10 lft length of “L” Shaped TPE Waterstop with Tear Web
- ☑ One (1) 10 lft length of 3/16” x 1-1/2” Stainless Steel Batten Bar
- ☑ Twenty (20) Stainless Steel Anchor Bolts (size: 2-1/4” x 1/4”)

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Earth Shield JP336L Retrofit System — JP336L is designed primarily for non-moving construction joints, although it can handle limited joint movement due to the mechanical properties of the parent material. A primary advantage of JP336L is that the fastening leg on the waterstop can be field-trimmed to 1-1/2” — the size of the stainless steel batten bar. Therefore, JP336L takes up very little room within a joint making it perfect for retrofitting thin slabs.

JP336L Retrofit Waterstop

- ☑ One (1) 10 lft length of “L” Shaped TPE Waterstop
- ☑ One (1) 10 lft length of 3/16” x 1-1/2” Stainless Steel Batten Bar
- ☑ Twenty (20) Stainless Steel Anchor Bolts (size: 2-1/4” x 1/4”)

Earth Shield JP325T & JP450T Centerbulb Retrofit Systems

— JP325T and JP450T are “T”-shaped retrofit systems utilizing a double batten bar system — one batten bar on the top, and another on the bottom. The batten bar and fastening system on JP325T & JP450T is not as robust as that on the “L”-shaped retrofit products. The “T”-shaped systems use [Tapcons](#) instead of wedge anchors, and two smaller, thinner batten bars, as opposed to the one heavy-duty batten bar on the “L”-shaped systems. The backside of the waterstops’ anchoring legs are serrated for the epoxy to tightly bond to.

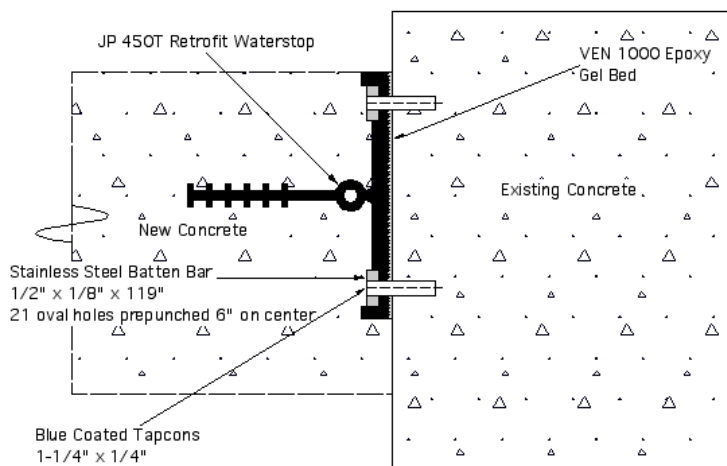


JP450T can be installed at the top of the concrete joint, replacing the joint sealant (*see figure 4*). Additionally, JP450T is designed to interface with our expansion board cap waterstops ([JPEB350](#) and [JPEB375](#)).



JP Specialties, Inc. / Earth Shield® Waterstop

Figure 4



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JP325T Centerbulb Retrofit Waterstop

- One (1) 10 lft length of "T" Shaped TPE Waterstop
- Two (2) 10 lft length of 1/8" x 1/2" Stainless Steel Batten Bar
- Forty-two (42) Blue Coated Tapcons (1-1/4" x 1/4")

JP450T Centerbulb Retrofit Waterstop

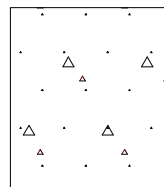
- One (1) 10 lft length of "T" Shaped TPE Waterstop
- Two (2) 10 lft length of 1/8" x 1/2" Stainless Steel Batten Bar
- Forty-two (42) Blue Coated Tapcons (1-1/4" x 1/4")

Earth Shield JPEB375R Retrofit System — JPEB375R is specifically designed to interface with our expansion board cap waterstops ([JPEB350](#) and [JPEB375](#)). 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 or Earth

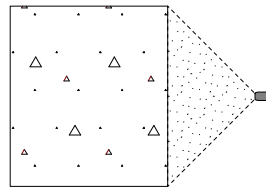


Shield's own chemical resistant, [plastic expansion board](#). The expansion board acts as the form; therefore, no form splitting is necessary. This greatly accelerates the project schedule and provides a long lasting, attractive finished concrete joint.

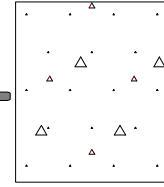
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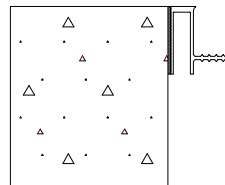
1) Existing Concrete — Prepare existing concrete by grinding away any irregularities.



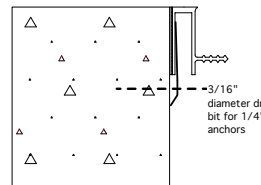
2) Thoroughly clean existing concrete using:
A. Wire brush or needle gun
B. High pressure water blast
C. Sand blast



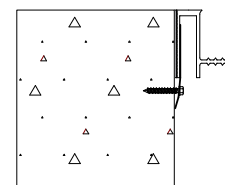
3) Place epoxy strip 1/8" thick by 3" wide on concrete surface.



4) Embed prefabricated retrofit waterstop into strip of uncured epoxy.



5) Drill fastener holes into concrete to appropriate depth, using stainless steel batten bar against retrofit waterstop as a template. Anchor holes should be drilled through every batten bar hole.



6) Apply fasteners through predrilled pilot holes in batten bar and tighten as required. (20 fasteners per 10 lft length of waterstop total.)

7) Allow installed system to cure 24 hours before placing new concrete.

JPEB375R Retrofit Installation
Scale: 3" = 1'-0"

JPEB375R Retrofit Waterstop

- One (1) 10 lft length of 3/4" EB Cap TPE Waterstop
- One (1) 10 lft length of Stainless Steel Batten Bar
- Twenty (20) Stainless Steel Anchor Tapcons (size: 1-3/4" x 1/4")

Earth Shield JP621L Retrofit System — JPEB375R is specifically designed to accommodate large shear movements, such as tank ring foundations subjected to settlement. The embedded waterstop leg has two large polymer dams which are designed to create a torturous fluid path and simultaneously perform as anchor points for the new concrete to bond to. The JP621L profile has a large, tear-web center-



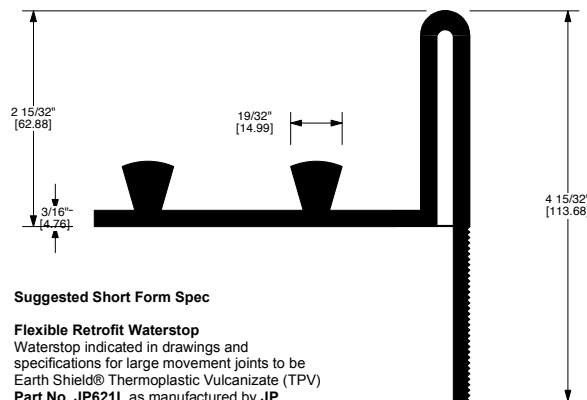
JP Specialties, Inc. / Earth Shield® Waterstop

bulb that can move greater than five inches without deformation of the waterstops main body. (The thin diaphragm, or "tear-web", ruptures under shear stress, allowing the "U-bulb" to move freely for its entire length when installed in an open joint.) JP621L Retrofit Waterstop can be heat welded to a continuous, fluid-tight barrier, like all our Earth Shield waterstop profiles, and can be joined to our base seal (or rearguard) profiles for intersecting joints.

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JP621L Tear Web Retrofit Waterstop

- One (1) 10 lft length of "L" Shaped TPE Waterstop with Large Bulb Tear Web
- One (1) 10 lft length of 3/16" x 1-1/2" Stainless Steel Batten Bar
- Twenty (20) Stainless Steel Anchor Bolts (size: 2-1/4" x 1/4")



Suggested Short Form Spec

Flexible Retrofit Waterstop
 Waterstop indicated in drawings and specifications for large movement joints to be Earth Shield® Thermoplastic Vulcanizate (TPV)
Part No. JP621L as manufactured by JP Specialties, Inc. - 551 Birch Street, Lake Elsinore, CA 92530 - Phone 888-836-5778; International 951-674-6869; Fax 951-674-1315; Web www.earthshield.com; E-mail davidp@earthshield.com

1. All components — stainless steel batten bar, stainless steel anchor bolts, and chemical resistant novolac epoxy — to be supplied by manufacturer.
2. No equals or substitutions allowed.
3. Install per manufacturer's recommendations.

Included components:

- 20 each (per 10 lft waterstop length) — 2-1/4" x 1/4" stainless steel wedge anchor.
- 1 each (per 10 lft waterstop length) — 3/16" x 1-1/2" x 119.5" stainless steel batten bar (pre-punched 6" on-center to accommodate anchors).

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TITLE		
Retrofit Expansion Joint System		
PART NUMBER	DRAWN BY	DATE
JP621L	DRP	11/08
CAD FILE NAME	APPROVALS	SIZE
JP621L		A