



## Installation Guide for Base Seal, Labyrinth, and Split Waterstops

Base seal (externally placed), labyrinth, and split waterstops comprise a special class of PVC waterstops and require somewhat different installation techniques. These techniques will be described for each style waterstop. While the installation of these waterstops differs, the splicing and joining requirements are the same as those for traditional, fully embedded waterstops. Please see VWA's "PVC Waterstop Installation Guide" for instructions. Furthermore, the generally non-symmetric cross-section of these waterstops limits the variety of fabricated intersections and changes of direction that are possible. Vertical "Tees" and "Crosses" are examples of non-recommended fabrications. Split waterstops are also limited to primarily straight runs as corner fabrications and intersections are not recommended.

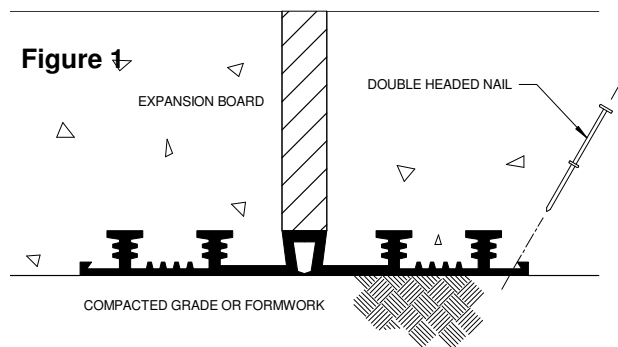
### Base Seal Waterstops

Base seal type waterstops (sometimes referred to as externally placed waterstops) are installed prior to placement of concrete and reside either on compacted grade, mudslabs or vertical formwork. Base seal waterstops are positioned such that only the ribbed side of the waterstop engages the concrete. The design of these waterstops eliminates the need for split forming.

A solid backing is required for proper initial support as well as for proper in service performance. Lack of support can lead to ballooning of the waterstop when exposed to high hydrostatic pressure.

Base seal waterstops are secured in position by nailing or staking the outer edges of the profile to the underlying support as shown in Figure 1. Doubled headed nails should be placed through the outer edges of the waterstop to secure the waterstop to the formwork. Larger nails or spikes should be used in securing the waterstop directly to compacted sub grade. The waterstop should be positioned such that the longitudinal centerline of the waterstop coincides with the protected joint.

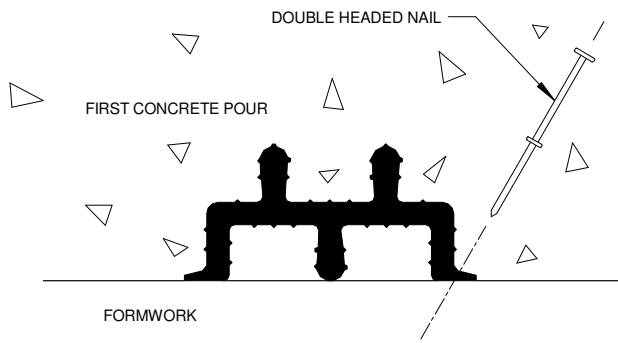
It is imperative that the external side of the waterstop is protected from potential mechanical damage or long-term exposure to ultra-violet light. Care should be taken in the placement of concrete to prevent movement or displacement of the waterstop.



### Labyrinth Waterstops

Installation of labyrinth waterstops is similar to the installation of base seal waterstops with the waterstop residing between two new sections of concrete.

Labyrinth waterstops are attached to formwork prior to the first concrete pour with double-headed nails, as shown in Figure 2. After the first pour, the formwork is stripped, leaving the labyrinth waterstop partially embedded in the first pour. After making the first concrete pour, carefully remove the formwork and clinch or cut flush the nails protruding from the concrete. The second placement of concrete can now be made.



## Split Waterstops

Split style waterstops lend themselves to long, uninterrupted runs. Applications requiring intersections and 90° corners are not recommended. Split waterstops are installed by spreading the split flanges of the waterstop apart and securing each flange to the formwork with small finishing nails as shown in Figure 3.

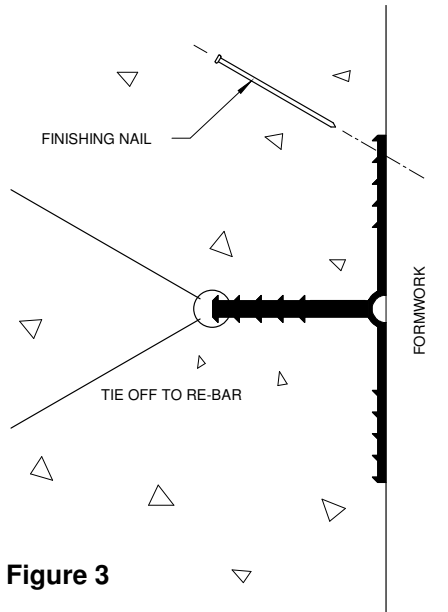


Figure 3

Care must be taken to avoid tearing the waterstop. Precautions should also be taken to keep the waterstop flush against the formwork to prevent concrete from entering any gap between the formwork and waterstop. After making the first concrete placement, carefully remove formwork. Clinch or cut flush the nails protruding from the concrete. Use adhesive to continuously and firmly join split flanges together.

Hog rings and tie wire should be used to secure the now bonded flange to adjacent rebar as shown in Figure 4. The waterstop is now ready for the second (final) concrete pour.

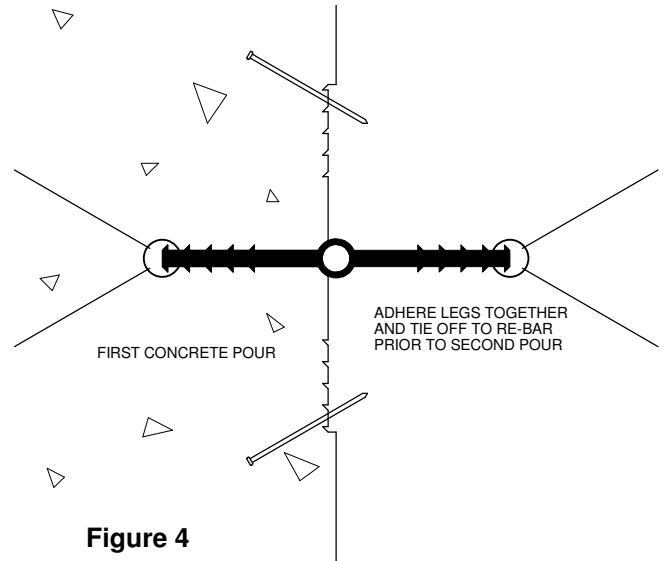


Figure 4

## Splicing Requirements

Splicing guidelines and instructions are detailed in VWA's PVC Waterstop Installation Guide. These guidelines should be followed for all PVC Waterstops. Please refer to this document for specific instructions. It should be noted that not all transitions are possible with nonsymmetrical profiles. Vertical Tees and Crosses are not recommended for nonsymmetrical profiles. Split waterstops are difficult to properly splice at transitions and changes of direction.

**Important Precautions:** Thoroughly consolidate the concrete around the waterstop to prevent voids or honeycombing next to the waterstop. Pay particular attention to the underside of horizontally placed waterstops. Intimate contact of the concrete and waterstop is necessary for full performance of a waterstop. Voids next to the waterstop can significantly reduce its water stopping ability. Furthermore, adequate clearance should be maintained between reinforcing steel and the waterstop. Typical clearance should be twice the maximum aggregate size. Inadequate clearance can promote the formation of voids due to aggregate bridging. It is important to maintain continuity of the entire waterstop system. Splices must be properly completed at all changes of directions, transitions, and butt joints. Any discontinuity in the waterstop system can be a point of leakage. Be sure the PVC waterstop is clean prior to the concrete pour. It is difficult to achieve a quality seal if the waterstop is greasy, dirty, or covered with concrete laitance. Store PVC waterstops under tarps or indoors to avoid direct exposure to sunlight. PVC can suffer UV degradation from the sun. Extended UV exposure will leach plasticizer from the PVC, reducing its physical properties and causing the PVC to become brittle. Protect installed waterstops from UV if the second pour of concrete will be delayed more than 30 days.