

# Expanbar\* PVC

**Centrally and externally placed PVC waterstops.**

## Uses

The Expanbar\* range of PVC waterstops is designed to provide an integral sealing system for movement and construction joints in concrete cast in-situ. These joints typically occur in the following types of structure:

### Water retaining

- Reservoirs, water towers and sewage tanks
- Dams, culverts, canals and spillways
- Swimming pools
- Bunded areas surrounding liquid retaining tanks

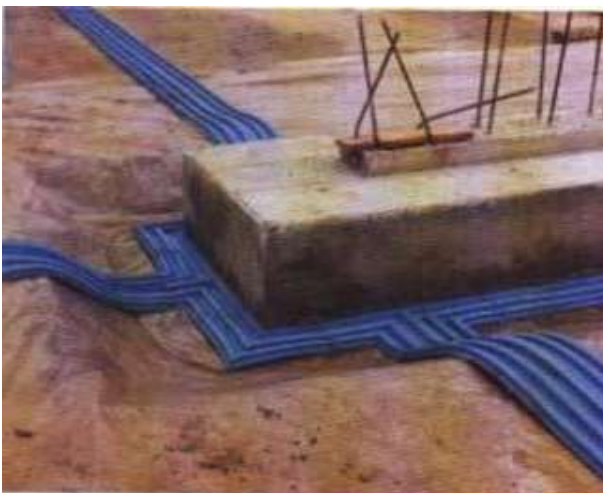
### Water excluding

- Basements and underground car parks
- Tunnels and subways
- Abutments and retaining walls
- Roof decks and podium areas

### Advantages

- Range of profiles to suit every need
- Fully continuous 4 bulbed network
- Reinforced eyeletted edge flanges for positive fixing
- Simple on-site jointing
- Full range of moulded and fabricated intersection pieces
- Approval for use in contact with potable water

The range consists of centrally placed profiles; Expanbar\* Hydrofoil, Expanbar\* Watafoil, Expanbar\* XHD Hydrofoil and Expanbar\* XHD Watafoil; and externally placed profiles; Expanbar\* Rearguard S, Expanbar\* Rearguard R, Expanbar\* Rearguard Kicker and Expanbar\* Angleguard.



## Standards compliance

Expanbar\* PVC waterstops are suitable for use in contact with potable water.

## Description

Expanbar\* waterstops are extruded from a high grade PVC compound which has been formulated to give excellent flexibility and longevity characteristics. They are available as straight lengths and factory produced intersections or as a factory prefabricated segment of a network to minimise site jointing.

## Principles of waterstop function

Expanbar\* waterstops work because of two specific aspects of their design.

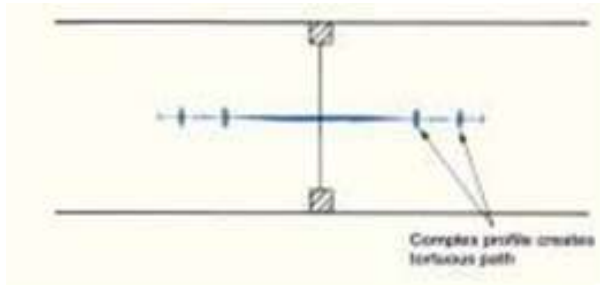
### a) Valve principle

Simple waterstop profiles based on dumbbells are cast into the edges of adjacent concrete panels which act as baffles. In the event of joints opening as drying shrinkage or other movement occurs, the edge bulbs of the profile act as anchors. These induce tensions across the waterstop resulting in a sealing effect at the inner faces of the edge bulbs.

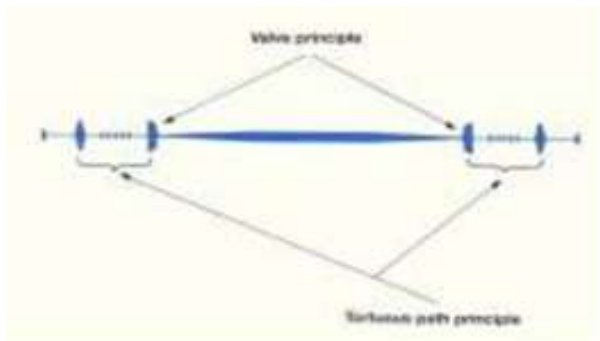


### b) Tortuous path principle

Profiles with a more complex cross section have a much greater surface area. They present a much greater resistance and more difficult path for water to seep around the section.



The Expanbar\* range incorporates both of these principles. The products offer a fully continuous 4 bulbed design maintaining both the valve and tortuous path principles. These principles are maintained in the transition from Rearguard profiles in floors to centrally placed profiles in walls.



### Expanbar\* Hydrofoil sections

Centre bulb sections are used in expansion, contraction and construction joints. The centre bulb allows for movements in a structure to be accommodated whilst its hexagonal design provides a flat surface. This allows shuttering and joint fillers to fit snugly.

The 330 mm profile is specially designed for use in roof slabs where a greater degree of movement may occur particularly during construction.

### Hydrofoil sections

#### Expanbar\* Watafoil sections

Plain web sections are used in construction and contraction joints.

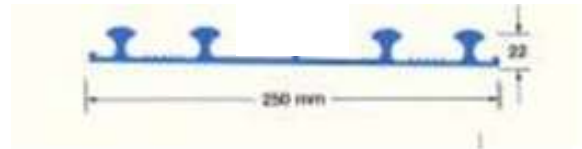
### Watafoil sections



All centrally placed Expanbar\* waterstops incorporate an eyeletted, reinforced edge flange. This enables them to be easily positioned by wiring to surrounding reinforcement.

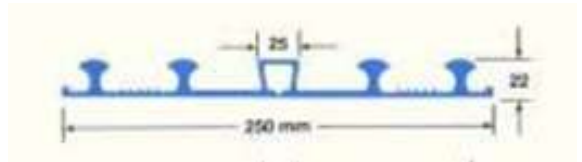
### Expanbar\* Rearguard R

Plain web sections which are placed externally for use in contraction and construction joints. They incorporate a central fin to assist setting out shutter location.



### Expanbar\* Rearguard S

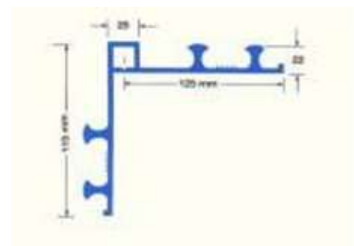
Sections incorporate a flat top centre box which allows movement to be accommodated in expansion joints. The box also provides a seating to support joint fillers.



All Rearguard sections incorporate a nailing flange with a reinforced edge to provide a secure fixing that will resist tearing.

### Expanbar\* Angleguard

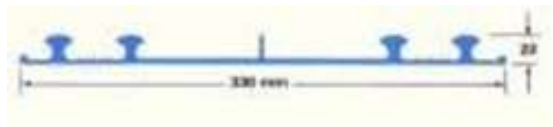
An externally placed waterstop for use where the joint line coincides with a change in level of the slab soffit. The profile is designed to co-ordinate with the 250 mm Rearguard S profile.





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## Expanbar\* Rearguard Kicker



An extra wide version of Rearguard R profile which is used to seal wall/kicker joints where the concrete kicker is being cast after the slab rather than monolithically with the slab. The extra width enables the waterstop to span both the joint between kicker and slab as well as the joint between kicker and wall.

Dimensions are approximate and subject to manufacturing tolerances.

### Technical support

Expanchem Fospak offers a comprehensive range of high performance, high quality, construction products all backed by BS 5750 certification. Expanchem Fospak offers a technical support package to specifiers and contractors which includes computer-aided design (CAD), standard details and technical advice from staff with unrivalled experience in the industry.

### Design criteria

The choice of the width and thickness of waterstop is largely governed by concrete thickness, the position of the reinforcement, aggregate size and complexity of the pour.

In general the 250 mm width of waterstop is suited to wall thicknesses of 250 mm and over. For concrete less than 250 mm thick, the use of a narrower waterstop approximating to the wall thickness will be appropriate. 150mm and 200mm profiles are available for this purpose.

### Centrally placed waterstop

These waterstops are positioned within the thickness of the concrete components and as a result are supported by concrete on both sides. They are therefore able to withstand water pressure from either side. This makes them suitable for use in water retaining structures. They will prevent loss of water from within the tank and will prevent ingress of ground water when the tank is drained down.

## Externally placed waterstop

These waterstops are designed for use in basement, foundation and floor slab construction in vertical and horizontal joints in both water retaining and water excluding structures.

When used in walls, externally placed waterstops will only resist water pressure from the face to which they are fixed. When used below floor slabs, where the waterstop is supported by the blinding concrete or when placed in vertical situations against permanent concrete shuttering, externally placed waterstops will resist water pressure from either face.

### Properties

#### Profiles

**Form** : Extruded thermoplastic sections

**Colour** : Blue

#### Hydrostatic head

**250 mm profile** : Up to 100 m

**200 mm profile** : Up to 50 m

**Joint movement** : Up to 10 mm

#### Compound

**Typical figures** : To BS 2782 at 25°C

**Tensile strength** : 12 - 14 MN/m<sup>2</sup>

**Elongation at break** : 300 - 350%

**Hardness** : Shore 'A' 70-90

### Specification clauses

#### 1. Supplier specification

Where indicated on the drawings, PVC waterstops shall be Expanbar\* Waterstops obtained from Expanchem Fospak (address as shown). All wall/floor waterstop connections shall be made using Expanbar\* injection moulded transition pieces to ensure continuity of the four bulb profiles.

#### 2. Performance specification

Where indicated on the drawings, PVC waterstops shall be made from extruded plasticized PVC compound. The compound used shall meet the US Corps of Engineers specification CRD-C 572-74. It shall have a tensile strength in excess of 14MN/m<sup>2</sup>, an elongation at break in excess of 300% and be capable of withstanding hydrostatic loading upto 100m.



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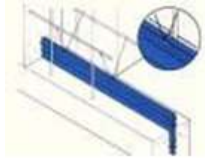
## Installation instructions

### Expanbar\* Hydrofoil and Watafoil

Waterstops must be installed so that they are securely held in their correct position while the concrete is being placed. Concrete must be fully compacted around the waterstops to ensure that no voids or porous areas remain. Where reinforcement is present, an adequate clearance must be left to permit proper compaction.

The brass eyelets used for securing the waterstop are located outside the edge bulbs so as not to create water paths around the profile.

Example of a kicker joint

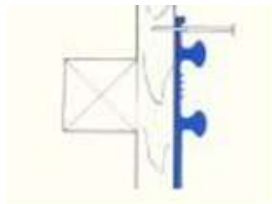


### Expanbar\* Rearguard

When used on ground slabs where the waterstop is supported on blinding, Rearguard profiles usually require no fixing. Lay the waterstop centrally over the line of the joint to be formed.

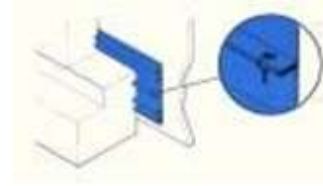
Fixing to vertical shuttering is done by nailing through the outer nailing flanges leaving the head of the nail proud so that it is held in the cured concrete. This prevents the waterstop being displaced when the shuttering is struck.

Fixing to vertical shutter



### Expanbar\* Rearguard Kicker

In addition to nailing to the external shutter, the 330mm Kicker profile is equipped with brass eyelets in the central rib. Twist short lengths of tying wire through these eyelets so that when the kicker is cast they act as anchors, holding the centre of the waterstop tight against the face of the concrete. This prevents the build-up of debris between the waterstop and the kicker prior to the wall being poured.



### Expanbar\* Angleguard

Fixing in position is done in a similar manner to Expanbar\* Rearguard.

### Site jointing instructions

Jointing of Expanbar\* waterstops is carried out using Expanchem Heat Welding Equipment. The ends to be joined are cut square and held in alignment in a special jig. The ends are then pressed either side of a special heated blade, until an even, molten bead of PVC appears around the section. The heated blade is then removed and the molten ends pressed fully together. The PVC cools to form a strong fusion welded joint. Full instructions are available from Expanchem Fospak.

### Expanchem PVC heat welding equipment



### Equipment

Jointing jigs are available for all profiles and sizes.

### Heater blades

110v and 220v blades are available.

**Warning:** Ensure that heater blades are earthed.

### Precautions

### Health and safety

Hot weld site jointing of PVC waterstops results in the liberation of hydrogen chloride mist and vapour. The OEL (operational exposure limit) of 5 ppm can be exceeded in still air confined spaces, therefore forced ventilation must be provided or a suitable respirator used.



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\* Denotes the trademark registered.

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