

UNIPRO

SECTION A

CONCRETE WORK SUPPLIES

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PVC WATERSTOP FOR CONCRETE

- 1 - CENTERSTOP PROFILE
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- 3 - INTERSECTIONS

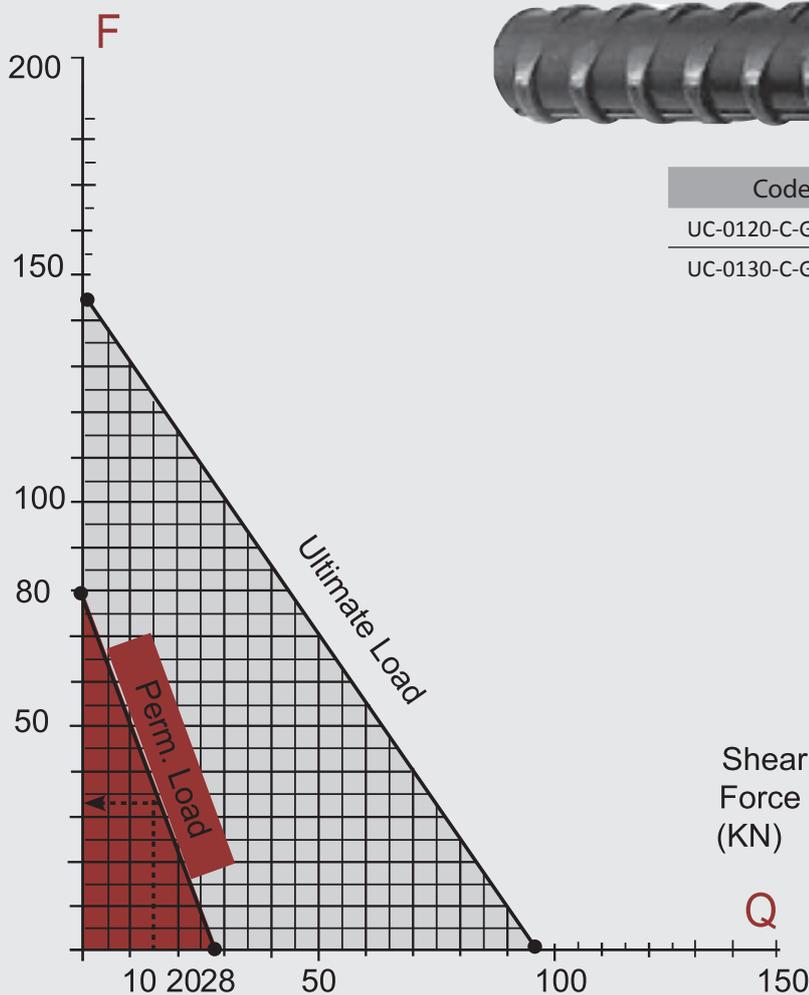
TIE BAR SYSTEM

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TIE RODS

- Form tie rods DG 15/17 made from mild steel and steel EN 8 are threaded along their entire length. Natural finish with anti rust coating.
- Core diameter = 15mm (outer diameter= 17mm).
- Weight 1.44 Kg/m
- Permissible load (breaking and working load) as per DIN 18216 | $F_{perm.} = 80-90$ KN
- Permissible shear load (breaking and working load) | $Q_{perm.} = 28$ KN
- Ultimate tensile load (breaking and working load) | $F_{ult.} = 146$ KN
- Yield force $F_{yield} = 121$ KN
- Rupture elongation $E_{rup} = 15\%$
- Safety regulation: Do not weld and heat tie rods because there will be danger of cracking!

Tensile Force (KN)



Code	Size
UC-0120-C-GSTRD3	DG 15/17 x 3 LM
UC-0130-C-GSTRD6	DG 15/17 x 6 LM

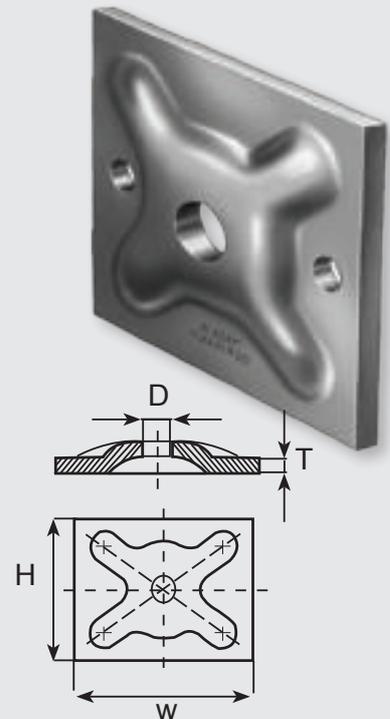
FORMWORK ACCESSORIES

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GALVANIZED WALER PLATES

Plates are made from steel ST 37 to accommodate tie rods DG 15/17.
To be used with wing nuts or hexagon nuts.
For use in both timber and steel formwork.
Zinc plated.
 $\varnothing D = 20 \text{ mm}$.

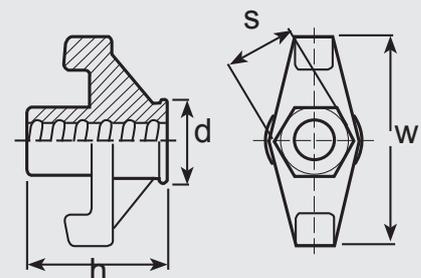
Code	Size (W x H x T)	Permissible load (KN)
UC-0160-C-GPRWR6	120 x 120 x 6 mm	80
UC-0170-C-GPRWR8	120 x 120 x 8 mm	90



GALVANIZED WING NUTS / SW 27

Wing nuts are made of cast iron to be used in conjunction with waler plates for securing tie rods in formwork applications.
For use in both timber and steel formwork.
Zinc plated.
 $h = 60 \text{ mm}$, $d = 33 \text{ mm}$, $w = 90 \text{ mm}$, $s = 27 \text{ mm}$.

Code	Permissible Load (KN)
UC-0140-C-GWNT35	80 KN



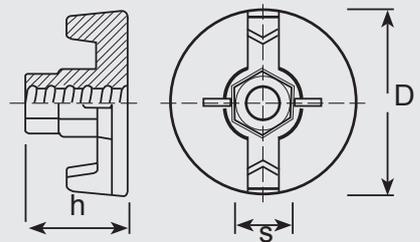
FORMWORK ACCESSORIES

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GALVANIZED WALER NUTS / SW 27

Waler nuts are made from cast iron to accommodate tie rods DG 15/17.
For use without waler or counter plates in both timber and steel formwork.
Zinc plated.
h= 55 mm, s= 27 mm.

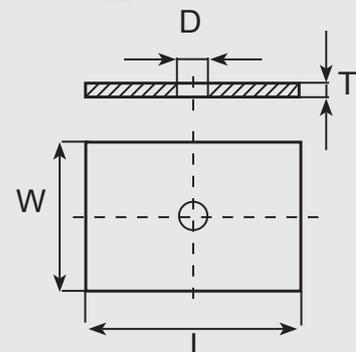
Code	Base Diameter D (mm)
UC-0175-C-GAN30	70 mm
UC-0176-C-GAN50	100 mm



GALVANIZED COUNTER PLATES / PLAIN

Counter plates made from steel ST 37.
To accommodate tie rods DG 15/17.
To be used in both timber and steel formwork with wing or hexagon nuts.
Hot-dip galvanized.
Ø D= 20mm.

Code	Size (L x W x T)
UC-0145-C-GCP	140 x 70 mm x 8 mm



FORMWORK ACCESSORIES

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HEXAGON NUTS / SW 30

For use with tie rods DG 15/17 in both timber and steel formwork with waler or counter plate.

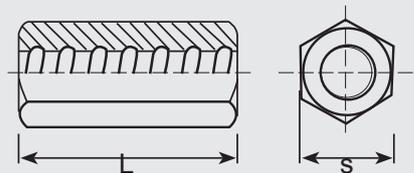
50 mm length to be used also as bar connector.

To be operated by means of a spanner.

Zinc plated.

Hex size $s = 30$ mm

Code	Size
UC-0150-C-GJCP30	DG15/17 x 30 mm
UC-0155-C-GJCP50	DG15/17 x 50 mm



CHAMFERS AND BARRIERS

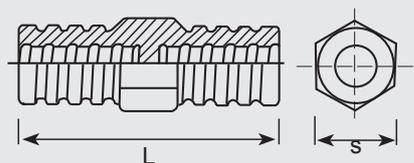
WATER STOPPERS OR BARRIERS / SW 36

This malleable cast iron - Grade BM 30- 06 Grey iron part is used together with tie rods DG 15/17 for the construction of watertight concrete walls. It is very often the case that customers demand the tie rods to be connected up to a so-called waterstop in the middle of the wall.

Zinc plated.

Hex size $s = 36$ mm.

Code	Size L x S	Permissible Load (KN)
UC-0180-C-SWB116	DG15/17 x 116 mm	80-90 KN



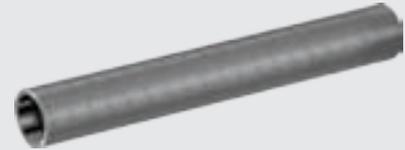
These systems are used for basement walls or tanks where a watertight structure is required. After the concrete has cured the bars are unscrewed from the watertight coupling, formwork cones removed and the holes are then grouted with mortar or injected with polyester resin.

CHAMFERS AND BARRIERS

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PVC TUBES - THRUTY SLEEVES

Rigid PVC tube, supplied in length of 2 m, which can be easily cut to size on site. To be used as an expandable sleeve over tie-rods, facilitating their removal and also acting as a spacer to give correct shutter position. Tubes allow the recovery of the tie rods by preventing contact with the concrete. Length to be cut depends on wall thickness.
(length= wall thickness minus 2 cm)

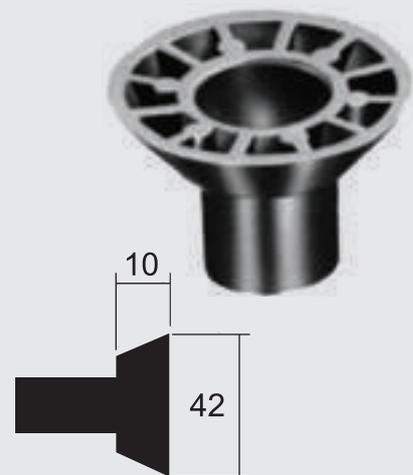
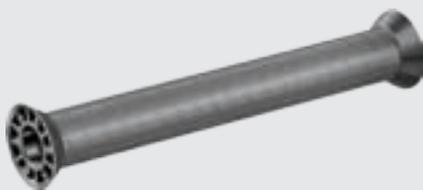


Code	Inner Diameter (mm)	Outer Diameter (mm)	Length (mm)
UC-200-C-PVT222	22	26	2000

PVC THRUTY CONES

Thru cones used at the ends of thru sleeves and can be easily extracted after removal of the formwork, to form a chamfered recess for subsequent grouting.

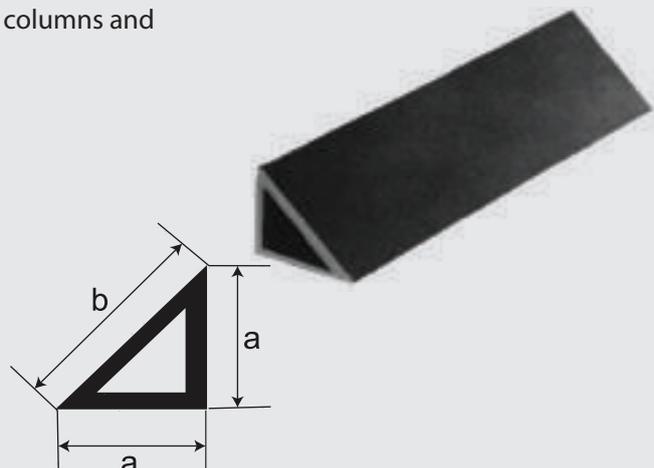
Code	For Sleeve Inner (mm)	Recess Depth (mm)
UC-0190-C-PVCN22	22	10



PVC CHAMFER STRIPS

PVC profiles suitable for forming chamfered corners to columns and beams. Chamfers are re-usable.

Code	Dimension A x Length
UC-0020-C-PCH102	10 mm x 2 LM
UC-0030-C-PCH152	15 mm x 2 LM
UC-0040-C-PCH202	20 mm x 2 LM
UC-0050-C-PCH252	25 mm x 2 LM
UC-0060-C-PCH302	30 mm x 2 LM



CHAMFERS AND BARRIERS

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PVC CHAIR SPACER

This spacer is the most popular spacer for horizontal placed reinforcement in slabs and beams. It has good stability and can be used with various bar diameters due to its concave seat. Designed for light reinforcement in slabs and beams.

Code	Size
UC-0510-C-PCHS25	25 mm
UC-0520-C-PCHS30	30 mm
UC-0530-C-PCHS40	40 mm
UC-0540-C-PCHS50	50 mm



PVC CHAIR SPACER

Code	Size
UC-0610-C-PCLS25	25 mm
UC-0620-C-PCLS30	30 mm
UC-0630-C-PCLS40	40 mm
UC-0640-C-PCLS50	50 mm
UC-0650-C-PLSS75	75 mm



PVC WHEEL SPACER

Wheel spacers for universal use. Clamping retention lugs for different steel diameters. Extra-wide support area reduces possibility of tipping over. Open style design does not interrupt concrete flow. External ribs for minimal formwork contact.

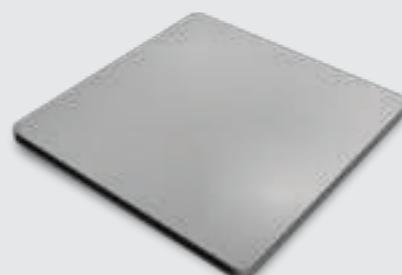
Code	Size
UC-0610-C-PWLS20	20 mm
UC-0620-C-PWLS25	25 mm
UC-0630-C-PWLS30	30 mm
UC-0640-C-PWLS40	40 mm
UC-0640-C-PWLS50	50 mm
UC-0660-C-PWLS75	75 mm



SHIM PAD

For assembling precast concrete parts and facade elements.

Code	Thickness	Size
UC-0330-C-PSHM02	2 mm	70 x 70 x 2 mm
UC-0340-C-PSHM03	3 mm	70 x 70 x 3 mm
UC-0350-C-PSHM04	5 mm	70 x 70 x 5 mm
UC-0370-C-PSHM10	10 mm	70 x 70 x 10 mm



PVC WATER STOP

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COMPOSITION AND MATERIALS

UNIPRO WaterStop is a specially formulated Polyvinyl Chloride (PVC) compound. Flexible, resilient, tough, chemically inert, is not affected by weathering, low temperatures, or constant immersion in water. It will withstand rough treatment during installation, yet is relatively easy to install and splice. Unitech WaterStop is unaffected by concrete additives and most water solutions of organic chemicals. It has the ability to accommodate joint movements and at the same time prevent water passage through the joints.

USAGE

UNIPRO WaterStop is designed for use in any concrete structure which contains joints and is subjected to a hydrostatic load on one face of the structure. It prevents water movement through concrete joints in water reservoirs, canals, dams, sewage treatment plants, bridges, stadiums, basements, floor slabs, parking garages, and similar structures.

PROPERTIES

UNITECH WaterStop is unaffected by alkalis, acids, hydrocarbons, oxidation, sewerage, and most water solutions of organic chemicals. It is extremely resistant to abrasion, corrosion, and aging. For physical properties see Table 1.

PHYSICAL PROPERTIES

PROPERTIES	TEST METHOD	NOMINAL VALUES
Specific Gravity	ASTM D 792	1.4±0.1 g/cc
Tensile Strength	ASTM D 638 DIN 53455	13.7±1 MPa 13.7 N/mm ²
Ultimate Elongation	ASTM D 638 DIN 53455	300% 300%
Hardness-Shore - A	ASTM D 2240 DIN 53505	75±5 75±5
Stiffness in Flexure	ASTM D 747	4.14 MPa 4.14 N/mm ²
Tear Resistance	ASTM D 624	285 lb/in.min 50KN/m
Water Absorption - 24 hours - 48 hours	ASTM 570 ASTM 570	0.82% 0.320%
Resistance to Chemicals Density	ASTM 570	Excellent to inorganic solutions: salts, hydrocarbons, acids, and alkalis



AREAS OF APPLICATION

WATER RETAINING

- Sewage treatment plants
- Water treatment plants
- Swimming pools
- Reservoirs
- Dams and Spillways
- Bund walls

WATER EXCLUDING

- Basement areas
- Underground car parks
- Tunnels
- Retaining walls
- Suspended slabs
- Pits
- Roof slabs

STRUCTURAL ENGINEERING

- Bridges
- Industrial buildings
- Power stations



Two main types of profiles are available. Centerstop for centrally placed applications and Outerstop for externally placed applications. These profiles are available in rolls with separate intersections supplied to simplify and minimise on-site fabrication.

PVC WATER STOP

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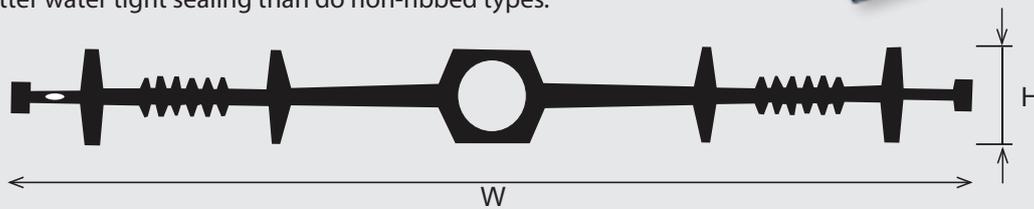
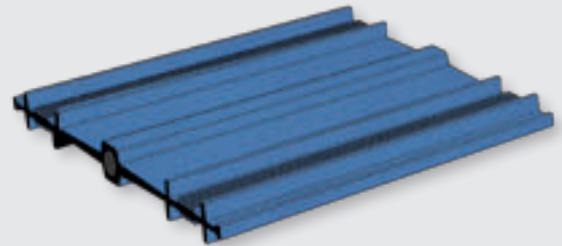
CENTERSTOP PROFILES

Two subtypes are available:

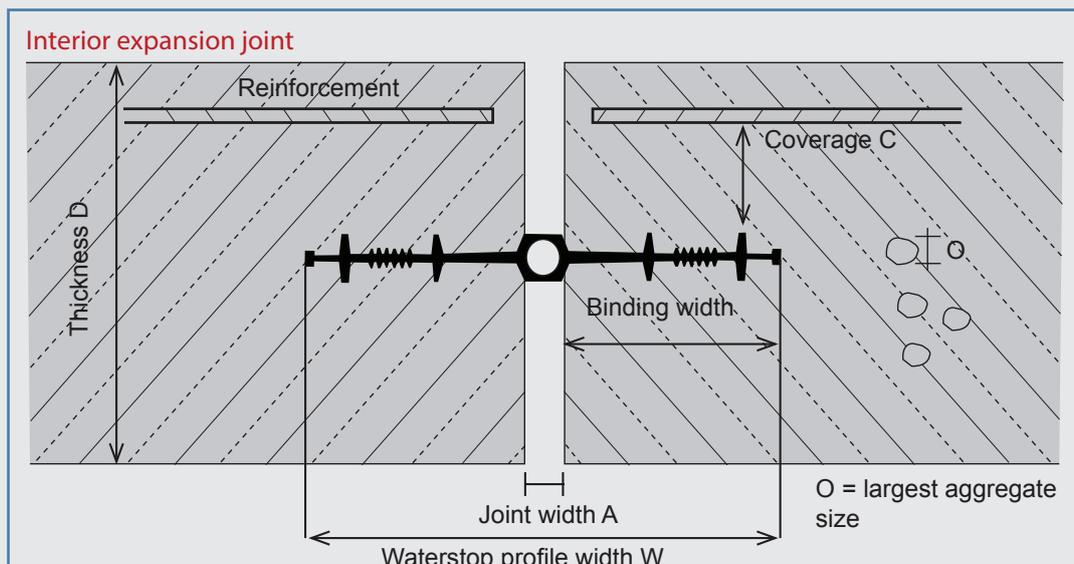
- 1- Center ribbed type with center bulb IX-xxx
- 2- Center ribbed type without center bulb IC-xxx

1- Center ribbed type with center bulb:

Center ribbed type with center bulb waterstop profiles are fixed generally on the middle of the slab or wall joint of the concrete structure. This profile provides a barrier to water trying either to enter or leave the structure. The central bulb enables it to be used in joints where movement may occur. It can be used in horizontal and vertical applications for expansion, construction joints. The bulb works with both lateral and transverse movement, and the ribs provide better water tight sealing than do non-ribbed types.



Code	Description	W x H x L
WS-0200-C-EIJ150	PVC Waterstops IX-150	150 x 20 mm x 15 LM
WS-0203-C-EIJ200	PVC Waterstops IX-200	200 x 20 mm x 15 LM
WS-0210-C-EIJ250	PVC Waterstops IX-250	250 x 25 mm x 15 LM



W shall not be greater than D
W shall not be lesser than $(6 \times O) + A$
C should be equal to or more than $2 \times O$

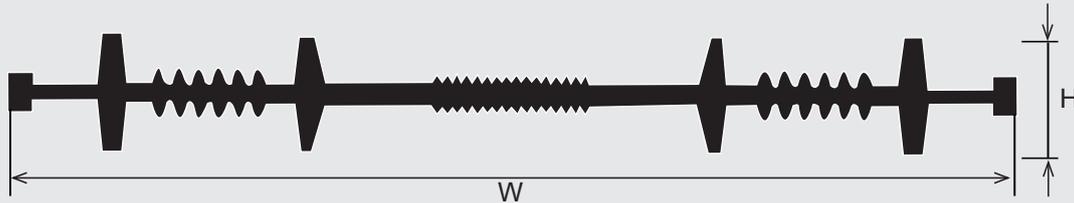
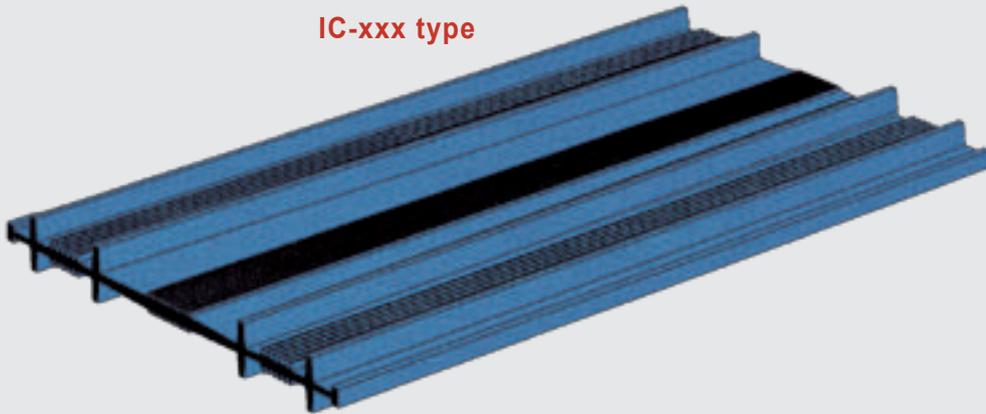
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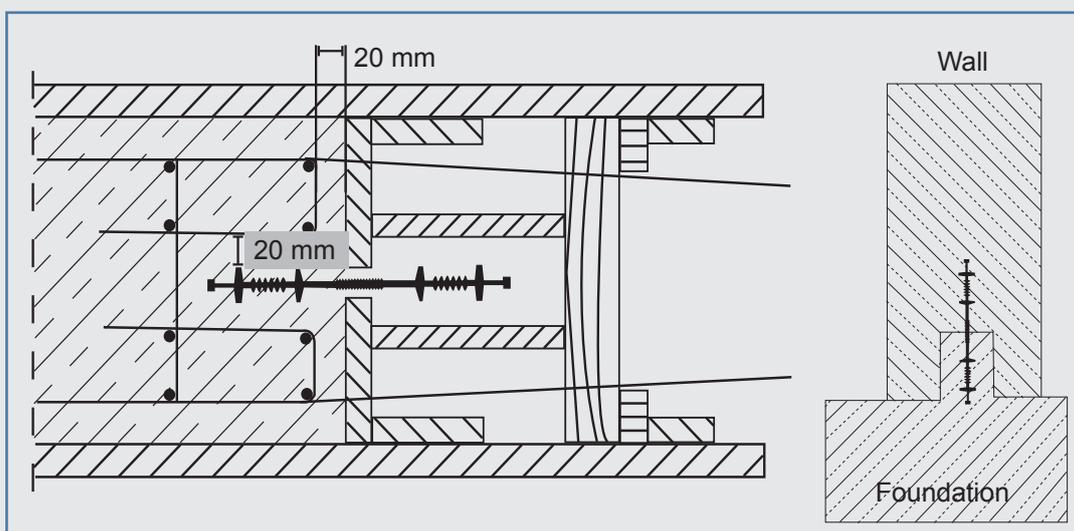
2- Center Ribbed type without center bulb :

This type is designed for horizontal and vertical construction joints where an economical and easy to install product is required.

IC-xxx type



Code	Description	W x H x L
WS-0230-C-CIJ150	PVC Waterstops IC-150	150 x 20 mm x 15 LM
WS-0235-C-CIJ200	PVC Waterstops IC-200	200 x 20 mm x 15 LM
WS-0240-C-CIJ250	PVC Waterstops IC-250	250 x 25 mm x 15 LM



PVC WATER STOP

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OUTERSTOP PROFILES

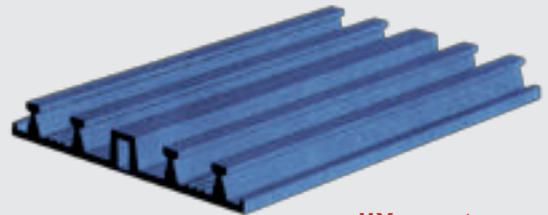
Externally placed profiles are designed for use in floor and basement areas in horizontal and vertical joints. UBI Outerstop profiles are located on the external face to the concrete. The specially designed keys enable compaction to be obtained around the waterstop, bonding the concrete and waterstop together forming a positive water barrier.

Two subtypes are available:

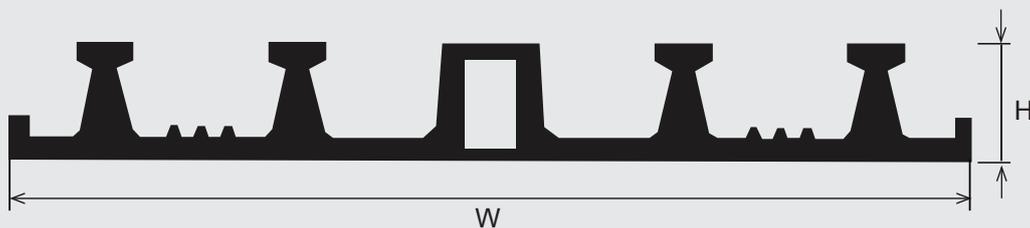
- 1- Outer ribbed type with V- bulb IIX- xxx
- 2- Outer ribbed type without V- bulb IIC-xxx

1- Outer Ribbed type with v-bulb :

For use in expansion, construction and contraction joints, the flat top bulb section allows support for any joint filler and allows for any movement in the structure. The bottom of the bulb has a "V" shaped notch so that should the joint open beyond the capacity of the PVC bulb, the bottom of it will tear along the notch and permit the bulb to open whilst still maintaining the water barrier.

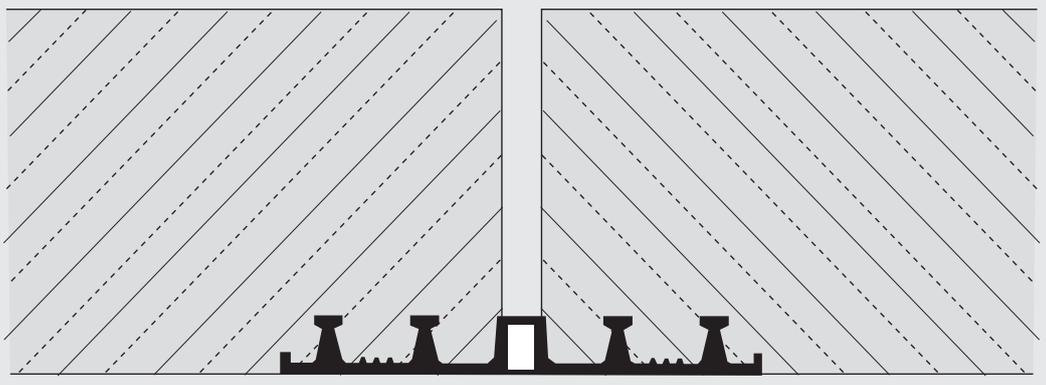


IIX-xxx type



Code	Description	W x H x L
WS-0215-C-EEJ150	PVC Waterstops IIX-150	150 x 15 mm x 15 LM
WS-0220-C-EEJ200	PVC Waterstops IIX-200	200 x 20 mm x 15 LM
WS-0210-C-EEJ250	PVC Waterstops IIX-250	250 x 22 mm x 15 LM

Exterior expansion joint

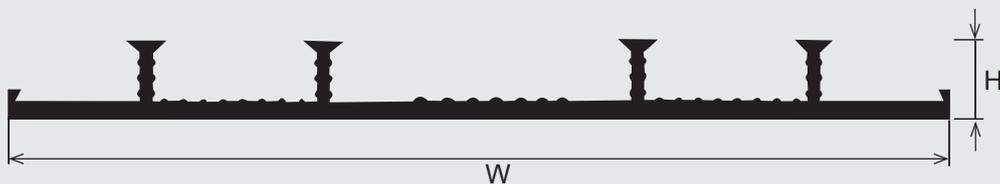


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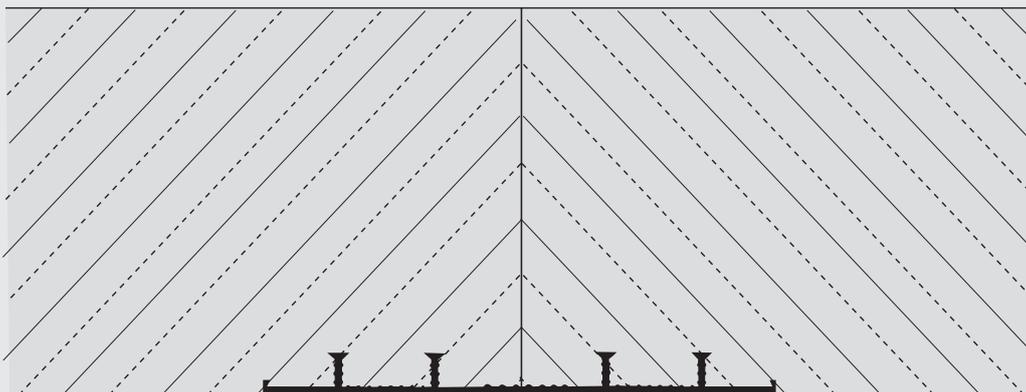
2- Outer Ribbed type without V-bulb:

It is important that all waterstops are held securely during the concrete pour and that the concrete is properly compacted to remove voids and porous areas. For horizontal applications where an already stable support exists, UNITECH outerstop profiles generally require no fixing as they are laid centrally along the joint being formed. For use in construction and contraction joints, where no movement is expected



Code	Description	W x H x L
WS-0245-C-CEJ150	PVC Waterstops IIC-150	150 x 15 mm x 15 LM
WS-0250-C-CEJ200	PVC Waterstops IIC-200	200 x 20 mm x 15 LM
WS-0255-C-CEJ250	PVC Waterstops IIC-250	250 x 22 mm x 15 LM

Exterior construction joint



PVC WATER STOP

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INTERSECTIONS

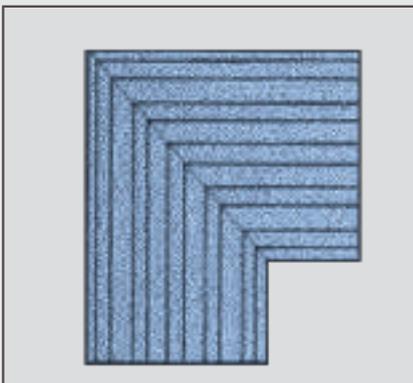
A range or prefabricated intersections, both standard and specials are available for each UBI profile.

These are factory made and are usually very difficult to make in the field. By using factory-made intersections, the contractor has to only make straight joining welds on site.

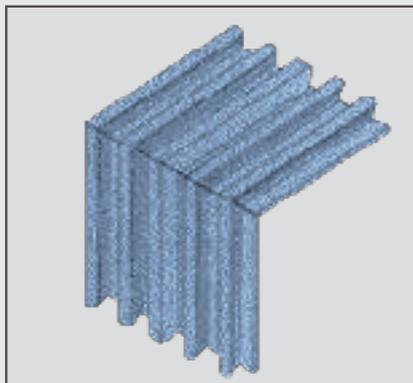
The standard leg length is 250mm. Factory welded units to suit lift pits, etc. are also available.

Intersection pieces

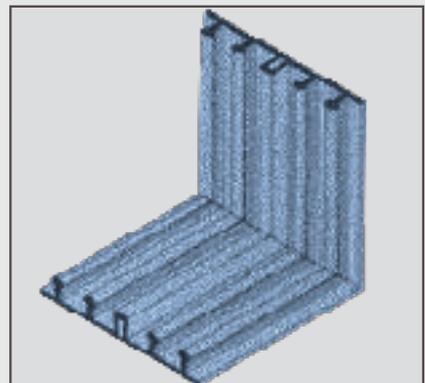
A range of intersection pieces is available for each profile. The standard leg is 250mm.



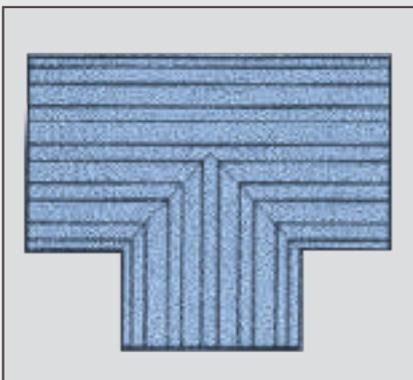
Two way flat



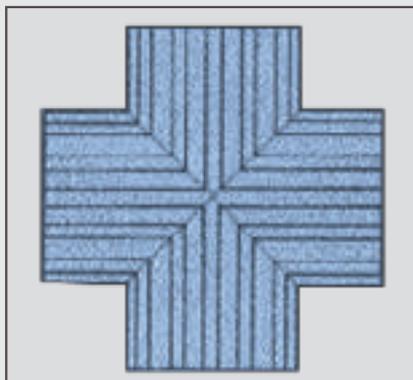
Two way vertical outside profile



Two way vertical inside profile



Three way flat



Four way flat

PVC WATER STOP

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WELDING EQUIPMENT

Following is the procedure, for field splicing PVC waterstops. On-site welding is a relatively simple exercise using heat welding equipment comprising of an adjustable welding jig and heating blade.

- 1- The number of joins in the waterstop shall be the minimum practical. Straight splices maybe carried out in the field but all intersections should be factory produced.
- 2- Preheat welding blade.
- 3- Place the ends of the waterstop through the adjustable jig and clamp down using assembly screws, cut both ends off square with a sharp knife or fine tooth saw. (Refer fig.1)
- 4- Loosen the clamps and slide back allowing approximately 10-15mm of waterstop to protrude from both ends, then clamp the jigs tightly in position. At this stage when the jig slides together the ends should meet squarely and the profiles are to match up. If the waterstop is not square to each other or the profiles do not meet up, loosen the clamps on the jig and Adjust the waterstop until ends meet up perfectly, tighten up the clamps ready for welding. (Refer Fig. 2)
- 5- Slide the two halves of the jig apart and position the preheated welding blade on the bars between the waterstop

- profiles. Slide the two sections back together until they press against the sides of the heating blade and maintain pressure against the blade in this position until a bead of molten PVC approximately 3mm thick appears along the length of the blade. The PVC should melt without charring or burning. (Refer Fig. 3)
- 6- Slide the jig apart, remove the heating blade vertically and then slide the two halves of the profile back together holding under pressure for approximately 1 minute allowing the molten PVC to fuse together. (Refer Fig. 3)
- 7- Unclamp the jigs and carefully remove the joined waterstop taking care not to flex joint until it is cool. Welding should only be carried out in areas with adequate ventilation, if welding in confined locations, it is considered necessary to provide forced ventilation or a suitable respirator. Care shall be taken not to heat the PVC to the point of charring as harmful fumes may be released.

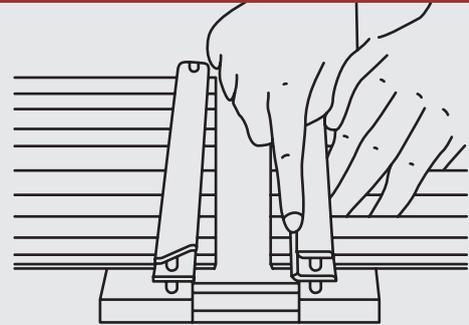


Fig.1

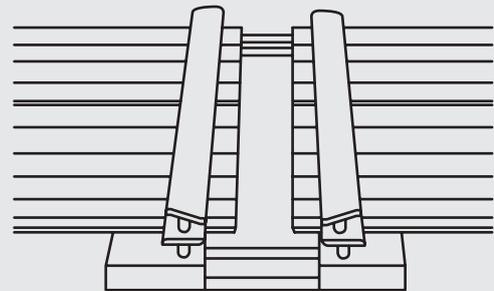


Fig.2

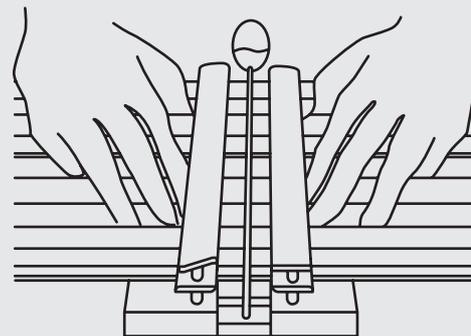


Fig.3

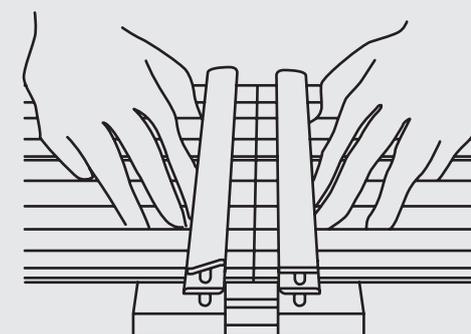


Fig.4