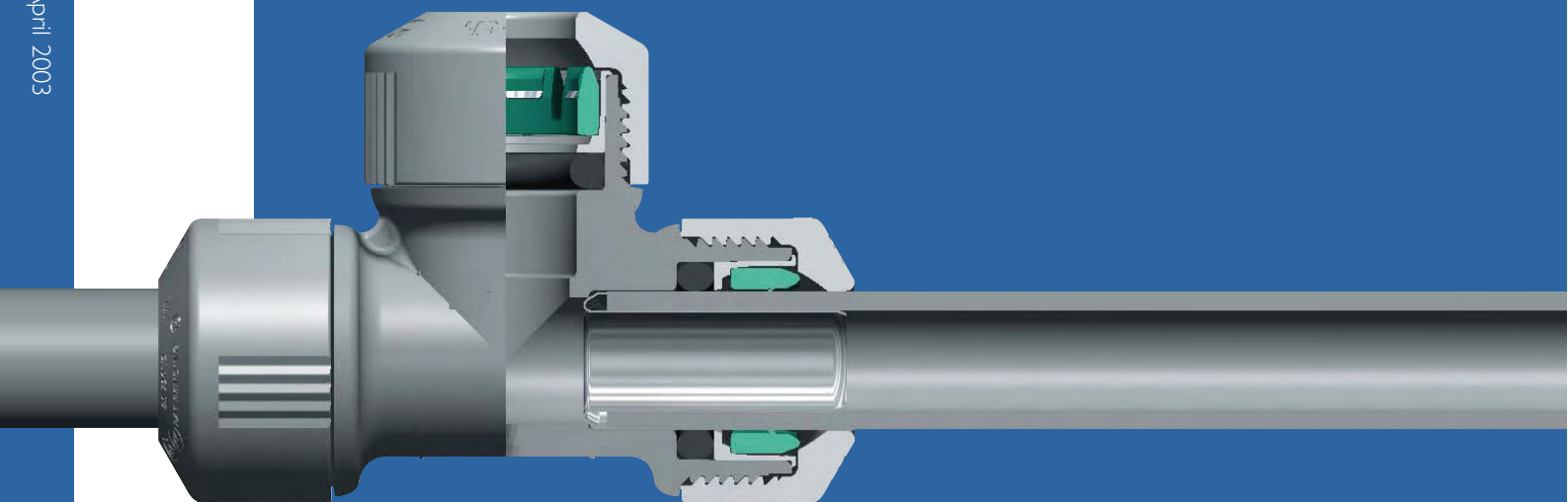




Hep2O[®]

The Flexible
Push-fit
Plumbing System

Technical Handbook





Making Connections

Delivering Results



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Introduction to Hepworth

The Company

Hepworth Building Products is a global company with the vision to provide solutions that assist water cycle management across the world. Here in the UK, we face ever-increasing challenges – from dealing with devastating flooding, to taking responsibility for our environment by using sustainable materials in new and refurbished developments.

Hepworth's three divisions:

- Hepworth Plumbing Products
- Hepworth Drainage
- Hepworth Concrete

manufacture and supply products and services to meet modern challenges and turn vision into reality. All Hepworth products play a key role in realising this vision.

Quality System Standards

The quality of **Hep₂O®** plumbing components and materials is assured by the application of the Hepworth Building Products' Quality Management Programme.

This has been assessed and approved, and is regularly monitored by the British Standards Institution and complies with BS EN ISO 9001.



Expertise and Experience

Hepworth Building Products are the most integrated multi-material supplier of products and services, with the knowledge and capability to meet the burgeoning demands of modern day water management. Advice and technical assistance is available to all professional users of the **Hep₂O®** flexible, push-fit plumbing system to help design efficient and cost-effective services layouts.

Continuing Research and Development

The innovative **Hep₂O®** plumbing solutions are underpinned by a rigorous and continuing research and development programme. This, in turn, is augmented by feedback from customers.

Working with Others

To further consolidate our continuing product development, and ensure current and future building requirements are met, Hepworth Plumbing Products has industrial affiliation with the Institute of Plumbing, the Scottish & Northern Ireland Plumbing Employer's Federation (SNIPEF), and the National Association of Plumbing, Heating & Mechanical Services Contractors (APHC).

Environmental Policy

Hepworth Building Products is committed not only to compliance with environmental laws and the adoption of acceptable standards, but also to the introduction of measures to limit the adverse effects of its operations on the environment.

As a major extractor of raw materials and user of energy, we therefore operate an environmental policy that is fully integrated with all aspects of company activities, to substantially reduce our impact on the environment.

The environmental policy sets the standards for site emissions, noise levels and overall good housekeeping, within a continuous improvement regime using the Best Available Techniques Not Entailing Excessive Costs (BATNEEC) guidelines from the 1990 Environmental Protection Act.

New processes and procedures for both manufacturing and services are systematically assessed to ensure that efficiencies are optimised without sacrificing environmental benefits.





Introduction

Hep2O® is an innovative, flexible, push-fit plumbing system especially developed for use by architects, designers and professional installers.

The **Hep2O®** system is particularly suitable for domestic hot and cold water supply, including potable water, and central heating.

The system comprises flexible 'straight coil' polybutylene pipework connected to polybutylene fittings that incorporate an integral push-fit mechanism. Unlike other forms of coiled plastics pipes, **Hep2O®** pipes utilising 'straight coil' technology do not return to their coiled state when uncoiled from their convenient **SmartPack™** dispensers but instead remain straight with no loss of flexibility. These characteristics provide a significantly faster, safer and more cost effective installation when compared to rigid pipe systems.

With rigid pipe systems, joists must be notched and the pipes installed prior to the laying of flooring boards. This has a number of disadvantages:

- a) the plumber must work on open joists increasing the risk of injury
- b) the plumber must return after floors are laid, to connect radiators and other fixtures
- c) the plumber often finds that the tails originally installed, have been moved by other tradesmen, and must therefore be reinstated.



Flexibility and Adaptability

Flexible pipe on the other hand, can be fixed below previously installed flooring boards because it is easily cabled *through* joists into the correct location, avoiding the awkward manoeuvring associated with the installation of rigid straight lengths. This allows for safer working and for the exact positioning of tails through the floor. There is also less risk of puncturing the pipe with nails used for fixing the flooring boards and therefore no need to use protective devices such as 'joist clips'.

Specially prepared lengths of pipe to form straight and offset connections usually associated with rigid systems are unnecessary as the natural flexibility of the **Hep2O®** polybutylene pipe is used to overcome the likelihood of misalignment, thereby also eliminating dry runs. This flexibility, in conjunction with long coil lengths and guaranteed joint performance, enables installations to be completed with fewer joints, minimising the drop in operational flow rates and potential weak points in the system.

Without the use of flux and solder (and therefore no naked flames or exposure to noxious fumes when working in confined spaces), effective, high performance joints are assured with the unique **Hep2O®** push-fit fittings. Each fitting consists of a high integrity grab wedge and robust pre-lubricated 'O' ring, allowing joints to be formed by the insertion of pipes into fittings using only hand pressure. Available in both Demountable and SlimLine form, the wide variety of fittings is complemented by a comprehensive range of auxiliary and ancillary products. **Hep2O®** fittings are also designed to accept copper as well as **Hep2O®** pipe, enabling rigid and flexible systems to be mixed if required.

The **Hep2O®** System incorporates a comprehensive range of spigot tees and spigot manifold fittings, offering 360° rotation, that can be used individually or in groups to enhance systems based on conventional UK design.

The adaptability of the **Hep2O®** system is further extended with a choice of **Standard Pipe** or **Barrier Pipe**. Barrier pipe incorporates an oxygen barrier within the pipe wall thickness to inhibit oxygen permeation when used for central heating systems. **Hep2O® Underfloor Heating Pipe**, also incorporating an oxygen diffusion barrier, is specially designed for underfloor central heating systems.

Also available is the **Conduit System** that allows access to fittings in walls and floors, and for **Hep2O®** pipes to be withdrawn for inspection. A time and labour saving variation is the **Hep2O® Pipe in Pipe System** that incorporates **Hep2O®** Barrier Pipe in a pre-sheathed conduit ready for underscreed installation.

In addition, straight lengths of **Hep2O®** pipe (as flexible as coiled pipes) are also available mostly for exposed pipework where neatness is important or where only short lengths are required.

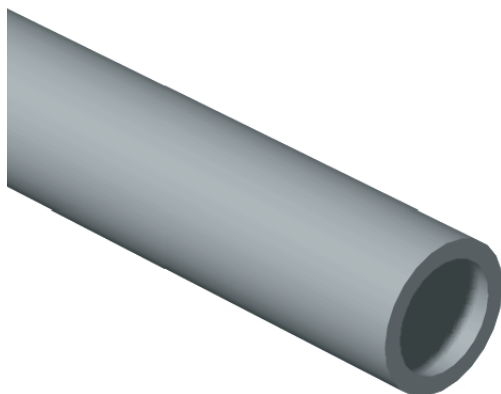
Appearance

Hep2O® pipe, and most of the plastics fittings, are light grey in colour. Other plastics fittings within the range are white. Brass fittings are natural in colour. Radiator and ball valves have chromed or nickel plated brass bodies.

The Handbook

This handbook describes the technical characteristics and uses of the **Hep2O®** system, and its proven advantages over rigid pipe systems.

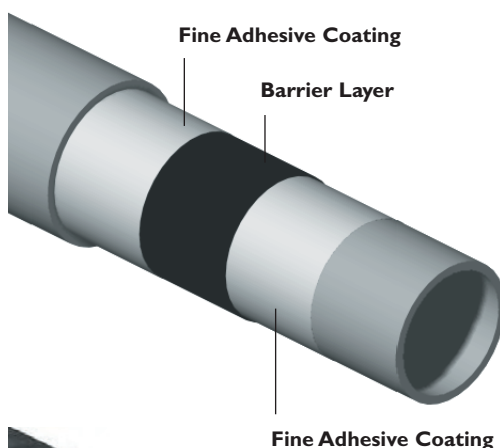




Standard Pipe

Hep₂O[®] Standard Pipe is made from polybutylene in straight coiled or cut lengths, and manufactured to BS 7291: Parts 1 and 2, Class S.

Hep₂O[®] Standard Pipe allows a very small amount of oxygen (not air) to enter the system but is negligible compared with that which can enter via header tanks, valve glands and pumps.



Demountable Fittings

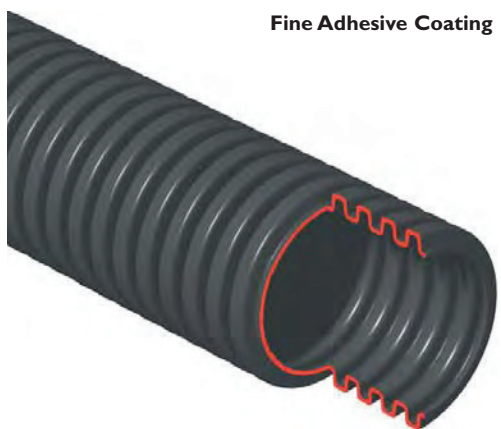
Hep₂O[®] Demountable fittings are made predominantly from polybutylene.

3 precision-made internal components ensure that the push-fitted joint is robust and watertight yet remains rotatable and, if required, easily dismantled.

Barrier Pipe

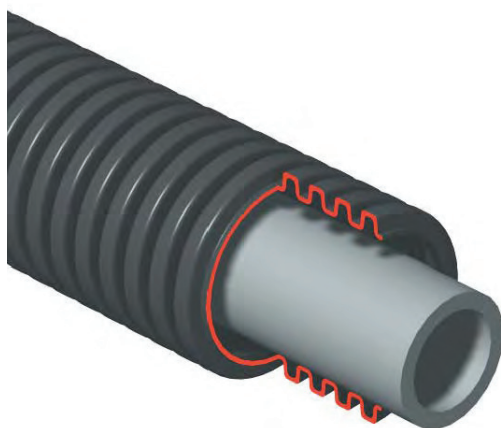
Hep₂O[®] Barrier Pipe has a layer of ethylene vinyl alcohol that prevents the diffusion of oxygen through the pipe wall. The barrier layer also has a fine adhesive coating on each side thus making 5 layers in total.

Hep₂O[®] Barrier Pipe, available in straight coiled or cut lengths, is covered by Agrément Certificate 92/2823 and manufactured to BS 7291: Parts 1 and 2, Class S.



Conduit Pipe

Hep₂O[®] Conduit Pipe is made from flexible polypropylene. It forms part of the **Hep₂O[®]** Conduit System that allows pipes to be withdrawn for inspection.



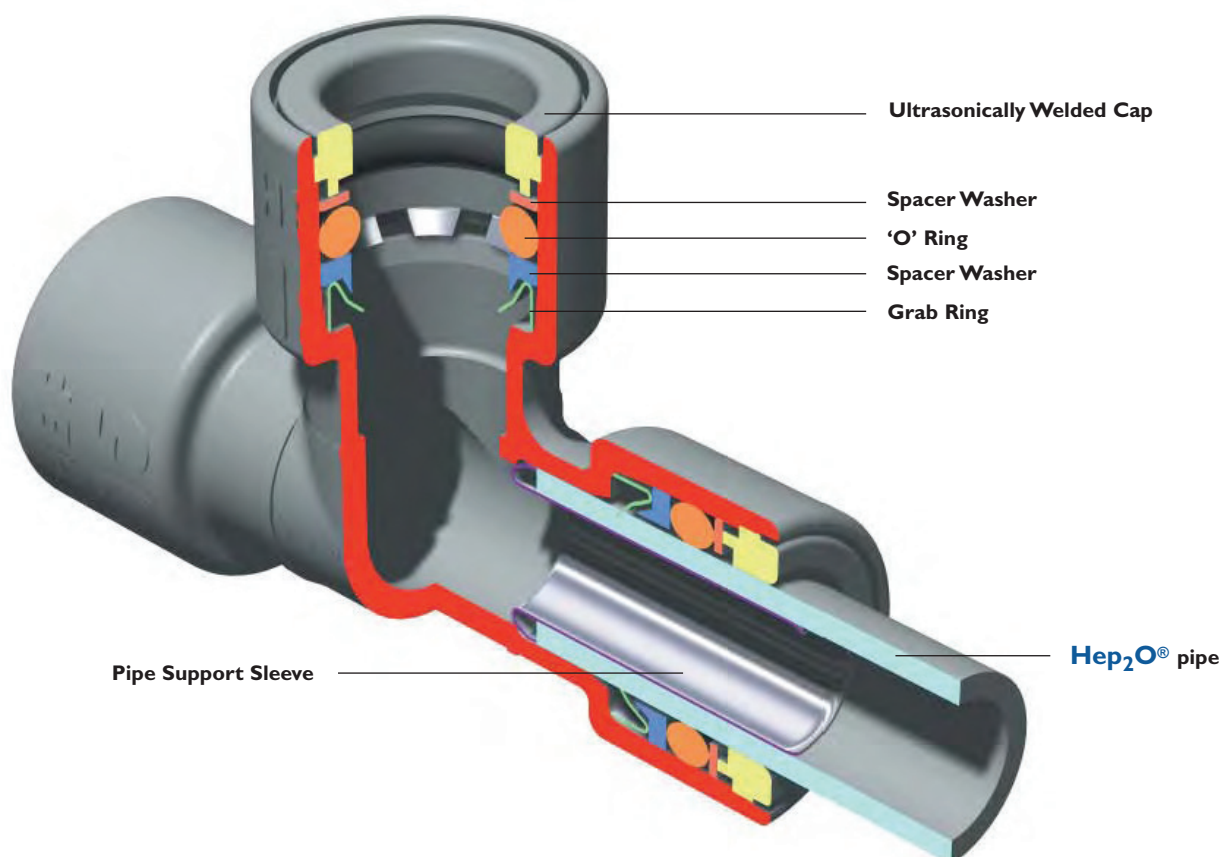
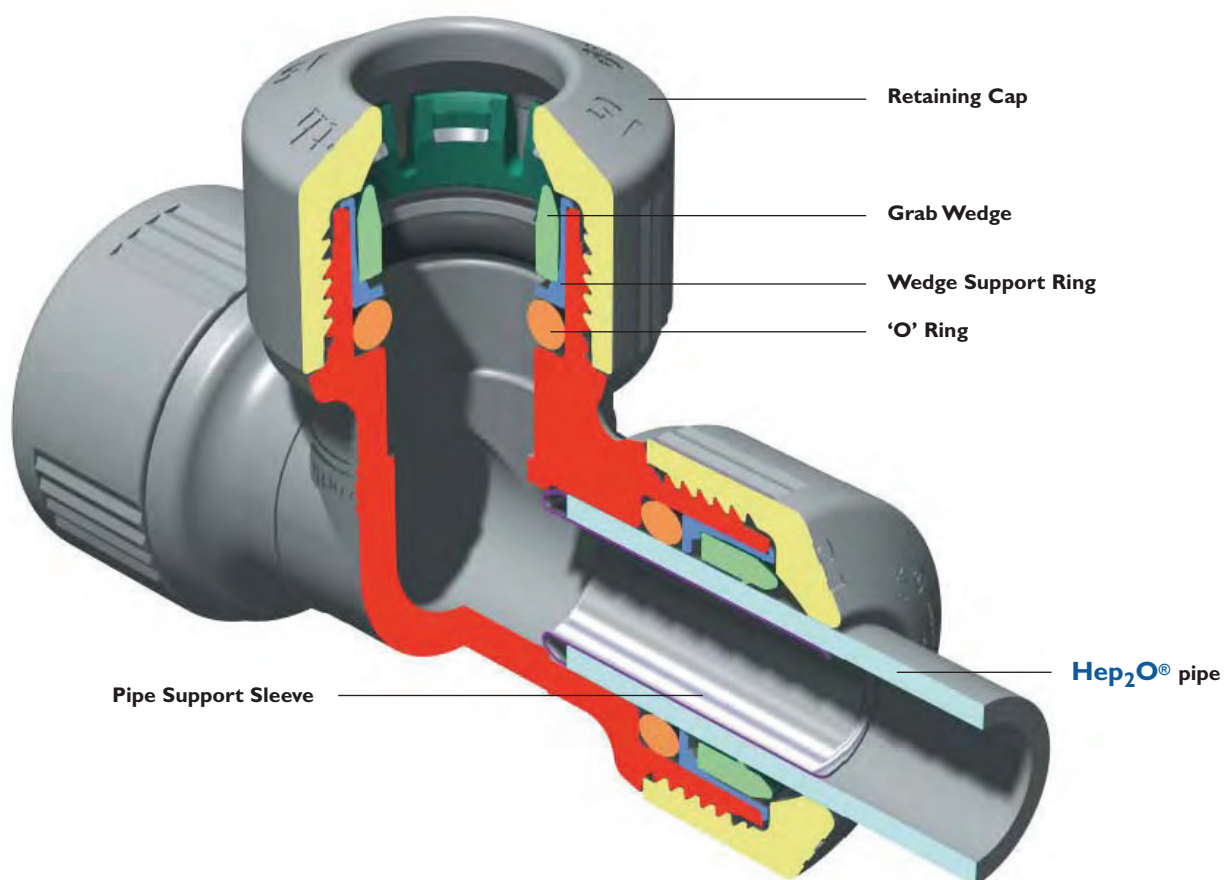
SlimLine Fittings

Hep₂O[®] SlimLine fittings are made predominantly from PVDF.

4 precision-made internal components ensure that the push-fit joint is robust and watertight yet remains rotatable but cannot be dismantled.

Pipe in Pipe System

Hep₂O[®] Pipe in Pipe system incorporates **Hep₂O[®]** 15mm Barrier Pipe in a pre-sheathed plastics Conduit ready for underscreed installation, saving time and effort.



The Basics of Cutting and Joining



Stage 1

Use only **Hep₂O®** Pipe Cutters (types HD74, HD75, HD77 or HD78) to cut the pipe. Never use a hacksaw.

Wherever possible, cut the pipe at the 'V' marks provided.

To ensure a clean, square cut, rotate the pipe whilst maintaining pressure on the cutter until the pipe is severed.



Stage 2

Ensure the pipe end is clean, and free from burrs and surface damage.

Insert a **Hep₂O®** Support Sleeve (HX60) into the pipe end.



Stage 3

Push the pipe firmly into the pre-lubricated fitting.

A secure joint has been made when the end of the retaining cap has reached the next 'V' mark on the pipe.

Never knock the fitting onto the pipe, or slacken the retaining cap prior to pipe insertion as these actions will not ease jointing.



Stage 4

Tug back on the pipe to ensure the grab wedge engages correctly.

Do not undo the retaining cap after pipe insertion.

Typical Plumbing Connections



Wash hand basin 10mm



Bath



Wash hand basin 15mm



Washing machine/dishwasher



Sink



Cylinder cupboard



W.C.



Boiler



Cylinder cupboard

The Benefits of Hep2O®

Installation Benefits

Cabling Ability

The flexibility of **Hep2O®** enables pipework to be threaded or 'cabled' through holes in the centre of joists without the need for top notching. As a result:

- flooring boards can be laid before pipes are installed.
- balancing on open joists is no longer necessary.
- the risk of pipes being damaged by nails during or after construction is eliminated.
- other trades can progress more quickly and safely.
- there will be less contact noise from expanding heating pipes because a hole drilled through the centre of a joist can be twice the size allowed for a notch.



Straight Coil Technology

Straight coiled **Hep2O®** pipes are dispensed from their packaging in a controlled manner, only releasing the amount of pipe required.

Less Jointing

Supplied in 25, 50 and 100 metre coils, **Hep2O®** pipework can be cabled in long continuous runs, therefore:

- fewer straight connectors and 90° bends are needed, as the pipe is flexible.
- less risk of installer error.
- minimises potential reduction in operational water flow rates.
- fewer weak points in the system.

Low Wastage

Supplied in lengths of 25, 50 and 100 metres, fewer short ends of **Hep2O®** pipe are created when pipes are cut to length.

Measured and Cut In-Situ

During installation, **Hep2O®** pipe can be held alongside a fitting, cut at the insertion depth, and then inserted into the fitting. This:

- reduces installation time, especially where bends are required.
- eliminates setting up of 'dry runs' usually required for rigid systems.



High Impact Resistance

Hep2O® pipes resist impact by momentarily deforming and then returning to shape.

Rotatable Fittings

Hep2O® fittings will rotate even under pressure, allowing for flexible installation practices, and includes:

- folding back valves when not in use to create more space in cylinder cupboards.
- designing pumps to swing out of inaccessible positions without being disconnected.



Easily Handled

Supplied in coils and about one quarter the weight of lengths of rigid copper pipe, **Hep2O®** is:

- easier to carry and manoeuvre on site and requires 40% less space for storage.
- lighter and easier to manoeuvre when installing long runs of pipe.



'Less Risk' Jointing

Hep2O® fittings do not require soldered joints. As a result:

- no naked flame to potentially harm people or damage property.
- no build-up of noxious fumes within confined spaces.
- **Hep2O®** is a clean installation as no flux is needed, keeping hands free of dirt and reducing contamination of other fittings.



Joining Compatibility

Hep2O® pipe and fittings are designed to be compatible with traditional pipe materials and joining techniques.

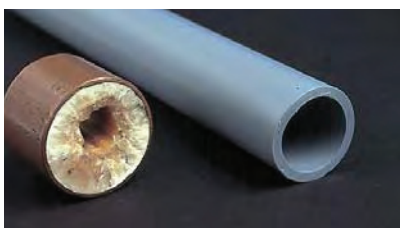


Performance Benefits

No Scale Build-Up

The smooth bore of **Hep2O**® pipes, and also their tendency to expand, prevents accumulations of lime scale when used in hard water areas. Therefore:

- the pipes will retain their bore throughout their life.
- maintenance costs are reduced.
- fuel costs are reduced.



Corrosion Free

In soft water areas **Hep2O**® pipes will remain corrosion free.



No Burst Pipes

Hep2O® pipe will accommodate the increase in volume that happens when water changes to ice, and then return to its original shape during a thaw, ready again to accommodate further freezing.



Suitable for Potable Water

Hep2O® polybutylene pipe and fittings do not taint or reduce the quality of potable water.

Quieter in Use

The flexible nature of polybutylene results in **Hep2O**® installations being almost silent. This is due to:

- the use of bends as an integral part of the pipe length, instead of 90° elbows, which creates less turbulence in the system again reducing noise levels. (1)
- less contact noise between expanding heating pipes and adjacent construction because of generous sized cabling holes. (2) See also 'Cabling Ability'.
- the drastic reduction of noise problems associated with 'water hammer'.



Cooler to the Touch

The lower diffusivity of polybutylene relative to that of copper results in pipework being cooler to the touch.

This property also reduces the risk of condensation on cold pipes.



Solder Free

The robust push-fit mechanism requires no need for solder, thereby ensuring that a **Hep2O**® installation conforms to the requirements of the Water Regulations.



Easily Modified

A cold or hot water system can be easily extended when using **Hep2O**® push-fit plumbing, thereby affording considerable flexibility in design.

Hep2O® Demountable or SlimLine pipe fittings can also be easily blanked off temporarily during installation for later connection of services equipment. (1 and 2)

Last-minute alterations can be made to joints using Demountable fittings, with the aid of the Wedge Removal Tool (HX79) obtainable from Hepworth. (3)



Hep₂O[®] Product Selector

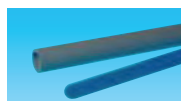
Pipes



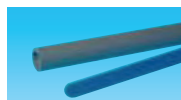
Straight Coiled Pipe Standard
(p.12)



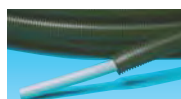
Straight Coiled Pipe Barrier
(p.12)



Cut Length Standard
(p.13)



Cut Length Barrier
(p.13)



Pipe in Pipe System
(p.13)

Demountable Fittings



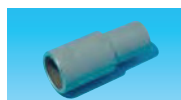
Straight Connector
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Socket Reducer
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Adaptor
(p.14)



Double Spigot Reducer
(p.15)



Elbow 90°
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Elbow 90° Single Socket
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Bend 135° Single Socket
(p.16)



Equal Tee
(p.16)



End Reduced Tee
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Branch Reduced Tee
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Branch & One End Reduced Tee
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Branch Reduced Tee - Spigot
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Tank Connector
for cold water use only
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Straight Tap Connector
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Bent Tap Connector
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SlimLine Fittings



Straight Connector
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Socket Reducer
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Elbow 90°
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Elbow 90° Single Socket
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Equal Tee
(p.20)



End Reduced Tee
(p.20)



Branch Reduced Tee
(p.21)



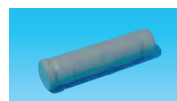
Branch & One End Reduced Tee
(p.21)



Straight Tap Connector
(p.21)



Bent Tap Connector
(p.22)



Blanking Plug
(p.22)

Auxiliary Fittings



Adaptor - Male BSP/Hep₂O[®]
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Adaptor - Female BSP/Hep₂O[®]
(p.23)



Adaptor - Male BSP/Hep₂O[®]
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Adaptor - Female BSP/Hep₂O[®]
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Draincock
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Adaptor - Tap Connector
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Gate Valve - Hot/Cold
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Stopcock - Cold Water, Hep₂O[®]/Hep₂O[®]
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Stopcock - Cold Water, Hep2O®/MDPE
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Lever Ball Valve
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Shut-off Valve - Hot/Cold, Not For Central Heating
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Appliance Valve - Hot/Cold, Not For Central Heating
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Radiator or Lockshield Valve
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Radiator Draincock
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Double-Check Valve
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Two Port Manifold - Closed Spigot
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Two Port Manifold - All Socket
(p.29)



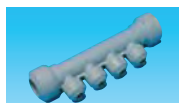
Four Port Manifold - Closed Spigot
(p.29)



Four Port Manifold - All Socket
(p.30)



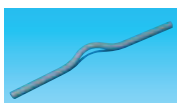
Four Port Manifold - Closed Spigot, Ports One Side
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Four Port Manifold - All Socket, Ports One Side
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Radiator Connectors & Escutcheon Plates
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Pipe Step Over
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Ancillary Items



Pipe Support Sleeve
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Pipe Clip - Screw Type
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Pipe Clip Spacer
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Pipe Clip - Cable Type
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Fitting Clip
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Conical Tap Connector Washer
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Flat Tap Connector Washer
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Blanking Peg - Demountable Fittings
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Wedge Removal Tool - Demountable Fittings
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Copper Pipe Cut End Protector
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'O' Ring Seal
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Grab Wedge
(p.35)

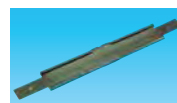
Conduit System



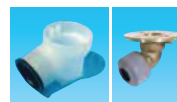
Conduit Pipe
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Conduit Junction Box
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Terminal Back Plate
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Conduit Terminal
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Accessories



Cold Forming Bend Fixture
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Pipe Cutters
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Hep2O® Central Heating & Water Services Calculator
(p.39)



Hep2O® Joint Test Kit
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Routabout System



Spacer Ring
(p.40)



Cutter
(p.40)



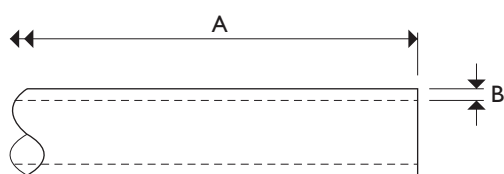
Template
(p.40)

All product dimensions on the following Product Range pages, are in mm unless otherwise stated

Hep₂O[®] Product Range

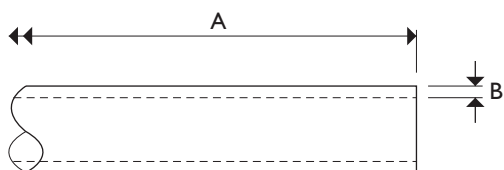
Hep₂O[®] Pipes

Straight Coiled Pipe - Standard



Code	Nominal Diameter	A	B
HXP50/10	10	50m	1.65
HXP100/10	10	100m	1.65
HXP25/15	15	25m	1.85
HXP50/15	15	50m	1.85
HXP100/15	15	100m	1.85
HXP25/22	22	25m	2.15
HXP50/22	22	50m	2.15

Straight Coiled Pipe - Barrier

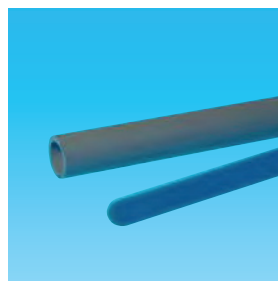
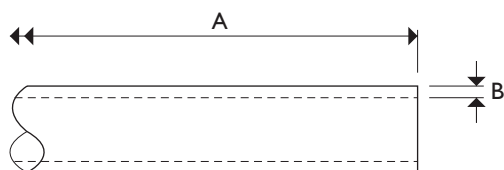


Code	Nominal Diameter	A	B
HXX50/10	10	50m	1.65
HXX100/10	10	100m	1.65
HXX25/15	15	25m	1.85
HXX50/15	15	50m	1.85
HXX100/15	15	100m	1.85
HXX25/22	22	25m	2.15
HXX50/22	22	50m	2.15
HXX25/28	28	25m	2.75
HXX50/28	28	50m	2.75



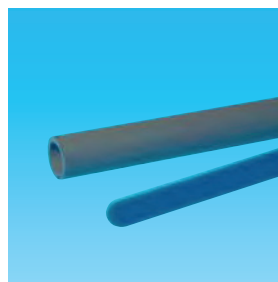
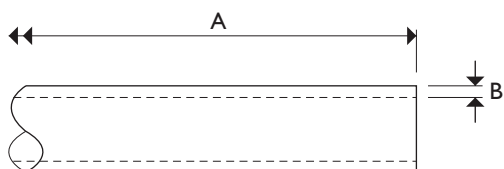
Hep₂O® Pipes

Cut Lengths - Standard



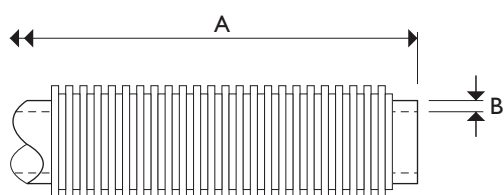
Code	Nominal Diameter	A	B
HXP03/15	15	3m	1.85
HXP06/15	15	6m	1.85
HXP03/22	22	3m	2.15
HXP06/22	22	6m	2.15
HXP03/28	28	3m	2.75
HXP06/28	28	6m	2.75

Cut Lengths - Barrier



Code	Nominal Diameter	A	B
HXX03/15	15	3m	1.85
HXX06/15	15	6m	1.85
HXX03/22	22	3m	2.15
HXX06/22	22	6m	2.15
HXX03/28	28	3m	2.75
HXX06/28	28	6m	2.75

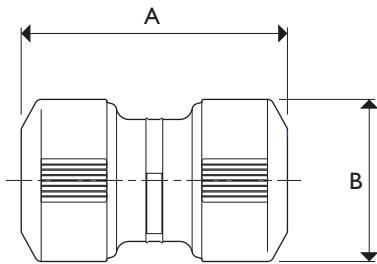
Pipe in Pipe System



Code	Nominal Diameter	A	B
HXXC2515	15	25m	1.85
HXXC5015	15	50m	1.85

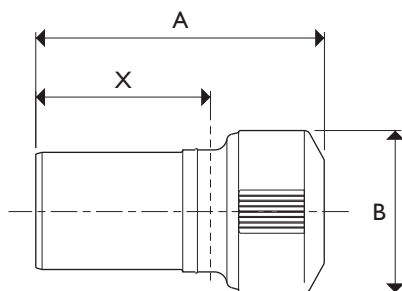
Hep₂O[®] Demountable Fittings

Straight Connector



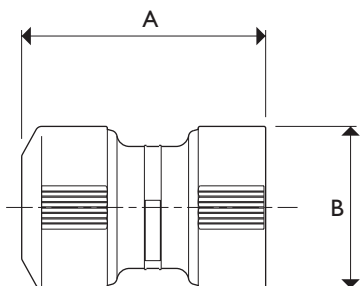
Code	Nominal Diameter	A	B
HD1/10	10	57	24
HD1/15	15	62	31
HD1/22	22	65	39
HD1/28	28	76	48

Socket Reducer



Code	Nominal Diameter	A	B	X
HD2/15	15	53	24	28
HD2/22	22	63	31	31
HD2/28	28	70	39	38

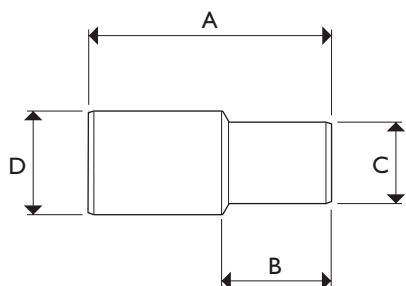
Adaptor



Code	Nominal Diameter	A	B
HD3A/22	22	61	39

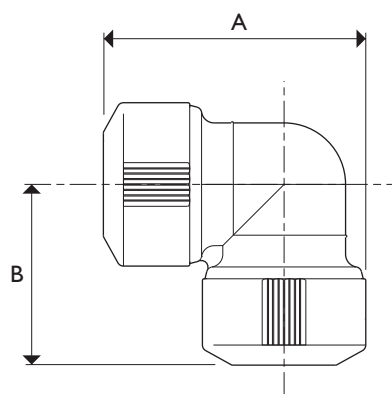
Hep₂O® Demountable Fittings

Double Spigot Reducer



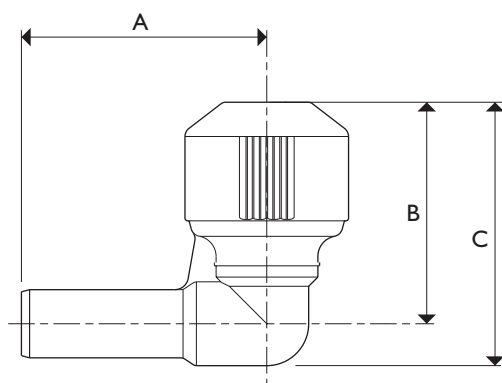
Code	Nominal Diameter	A	B	C	D
HX310/15 (Plastics)	15	51	23	10	15
HX42/10 (Brass)	10	40	19	8	10
HX42/28 (Plastics)	28	67	30	22	28

Elbow 90°



Code	Nominal Diameter	A	B
HD5/10	10	43	31
HD5/15	15	53	37
HD5/22	22	66	43
HD5/28	28	75	52

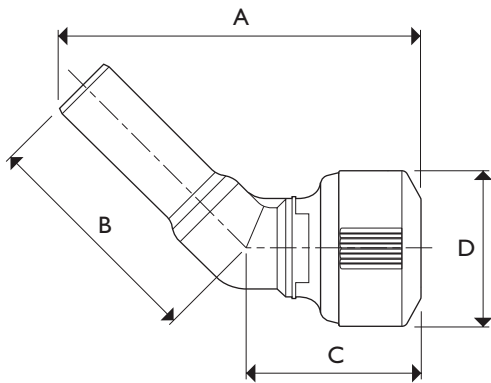
Elbow 90° Single Socket



Code	Nominal Diameter	A	B	C
HD4/10	10	37	28	34

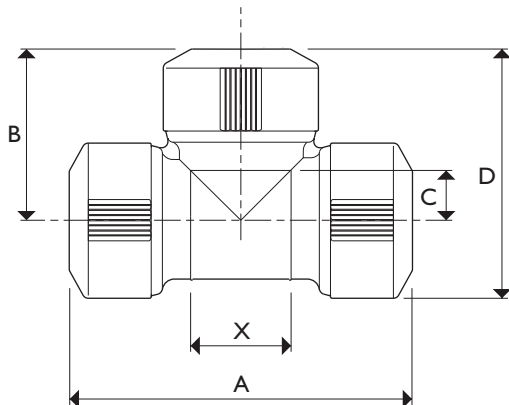
Hep₂O[®] Demountable Fittings

Bend 135° Single Socket



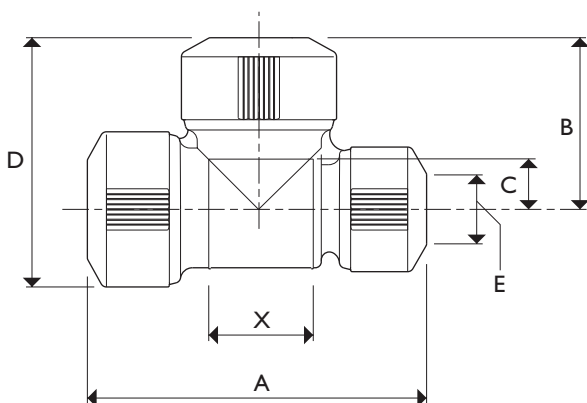
Code	Nominal Diameter	A	B	C	D
HD8/10	10	51.3	35	23	24
HD8/15	15	64.8	41	30.5	31
HD8/22	22	73.6	45	34	39

Equal Tee



Code	Nominal Diameter	A	B	C	D	X
HD10/10	10	63	31	7	43	15
HD10/15	15	75	38	9	54	19
HD10/22	22	85	42	12	61	25
HD10/28	28	105	53	16	75	30

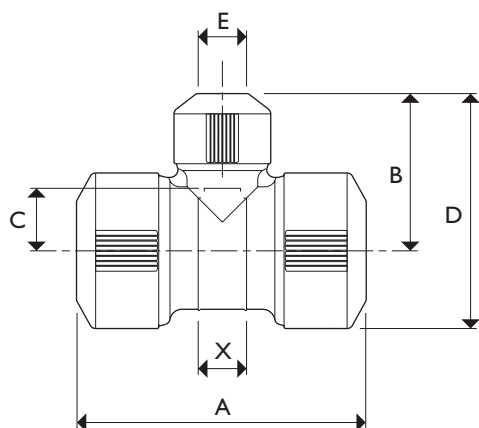
End Reduced Tee



Code	Nominal Diameter	A	B	C	D	E	X
HD12/22	22	84	42	12	62	15	26
HD12/28	28	96	53	16	76	22	31

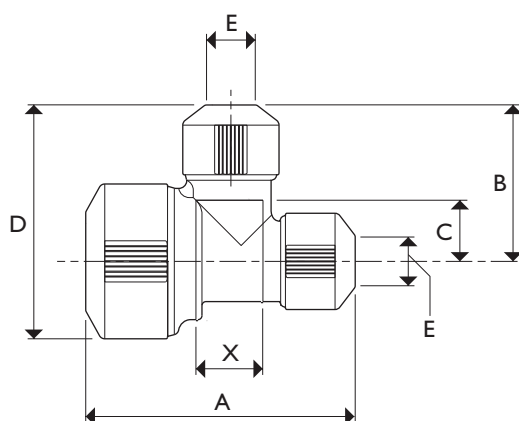
Hep₂O® Demountable Fittings

Branch Reduced Tee



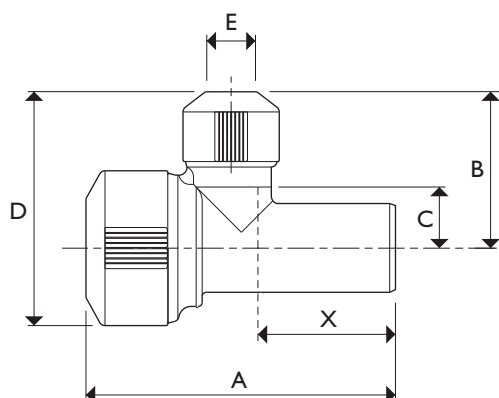
Code	Nominal Diameter	A	B	C	D	E	X
HD13/15	15	64	30	11	45	10	14
HD13/22	22	77	40	13	60	15	17
HD13A/22	22	73	40	16	58	10	12
HD13/28	28	98	45	18	77	22	23
HD13A/28	28	96	46	18	71	15	16

Branch & One End Reduced Tee



Code	Nominal Diameter	A	B	C	D	E	X
HD14/15	15	65	36	12	51	10	12
HD14/22	22	76	40	12	60	15	18
HD14A/22	22	68	40	16	59	10	13
HD14/28	28	89	45	17	67	22	25

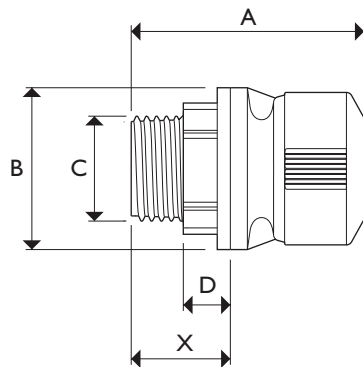
Branch Reduced Tee - Spigot



Code	Nominal Diameter	A	B	C	D	E	X
HD15/15	15	71	30	11	46	10	41
HD15/22	22	81	33	9	56	15	54

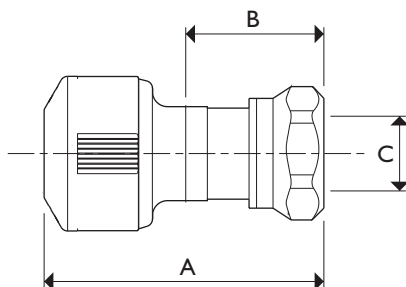
Hep₂O[®] Demountable Fittings

Tank Connector



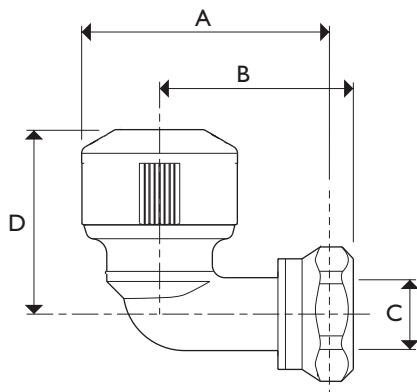
Code	Nominal Diameter	A	B	C	D	X
HX20/15	15	55	34	$\frac{3}{4}$ " BSP	13	22
HX20/22	22	57	41	1" BSP	12	24

Straight Tap Connector



Code	Nominal Diameter	A	B	C
HD25A/15	15	56	29	$\frac{1}{2}$ " BSP
HD25B/15	15	56	29	$\frac{3}{4}$ " BSP
HD25B/22	22	58	30	$\frac{3}{4}$ " BSP

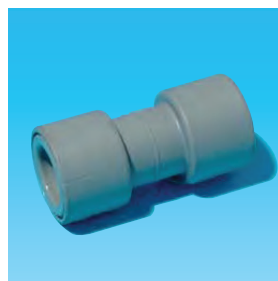
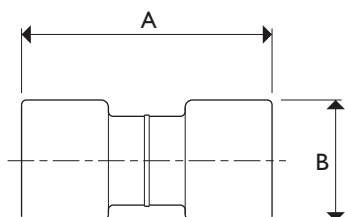
Bent Tap Connector



Code	Nominal Diameter	A	B	C	D
HD27/15	15	52	48	$\frac{1}{2}$ " BSP	37

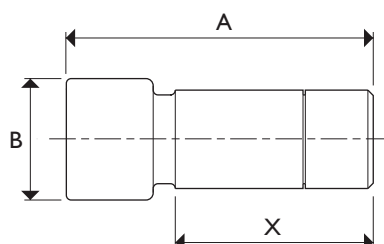
Hep₂O® SlimLine Fittings

Straight Connector



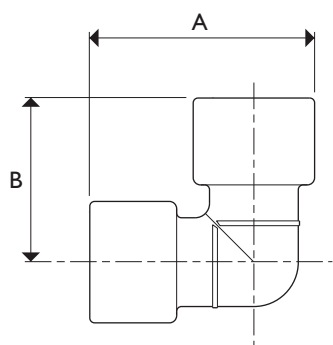
Code	Nominal Diameter	A	B
HX1/10	10	43	19
HX1/15	15	52	25
HX1/22	22	54	32

Socket Reducer



Code	Nominal Diameter	A	B	X
HX2/15	15	47	19	24
HX2/22	22	52	25	24

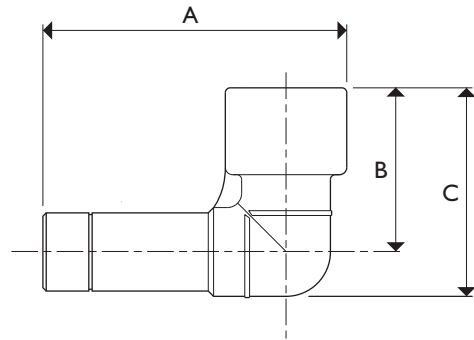
Elbow 90°



Code	Nominal Diameter	A	B
HX5/10	10	37	27
HX5/15	15	47	34
HX5/22	22	55	39

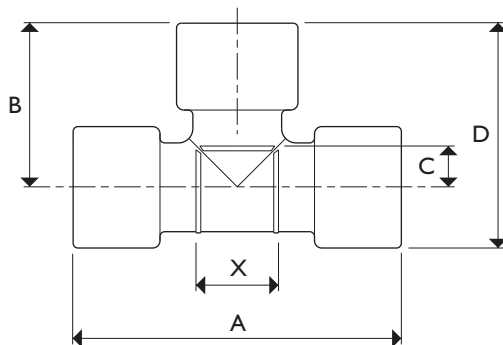
Hep₂O[®] SlimLine Fittings

Elbow 90° Single Socket



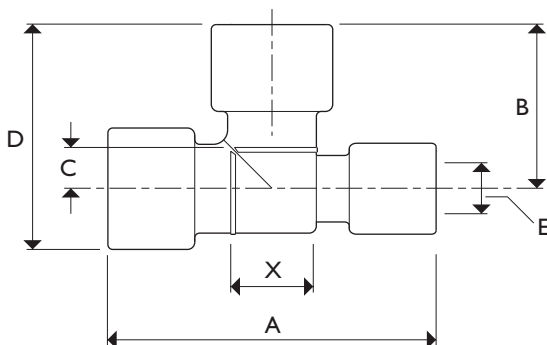
Code	Nominal Diameter	A	B	C
HX4/10	10	37	27	33
HX4/15	15	57	36	45
HX4/22	22	64	39	51

Equal Tee



Code	Nominal Diameter	A	B	C	D	X
HX10/10	10	55	27	7	37	14
HX10/15	15	68	34	9	47	17
HX10/22	22	77	39	12	55	24

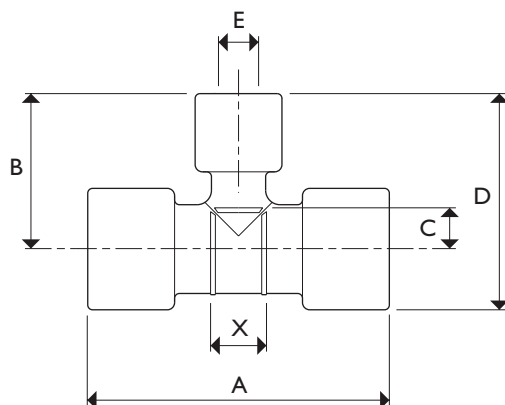
End Reduced Tee



Code	Nominal Diameter	A	B	C	D	E	X
HX12/22	22	77	39	12	55	15	25

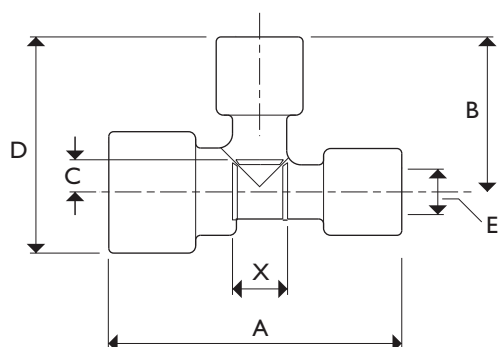
Hep₂O® SlimLine Fittings

Branch Reduced Tee



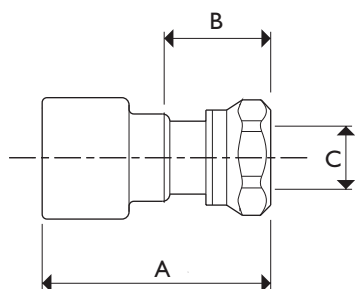
Code	Nominal Diameter	A	B	C	D	E	X
HX13/15	15	63	29	9	42	10	12
HX13/22	22	70	35	12	54	15	17

Branch & One End Reduced Tee



Code	Nominal Diameter	A	B	C	D	E	X
HX14/22	22	70	38	12	54	15	17

Straight Tap Connector

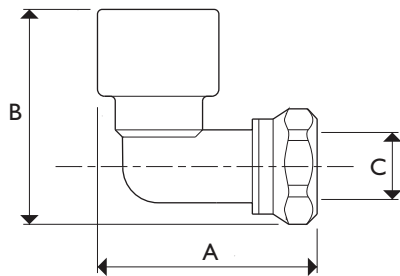


Code	Nominal Diameter	A	B	C
HX25A/15	15	53	18	1/2" BSP
HX25B/15	15	45	24	3/4" BSP

Hep₂O[®] Product Range

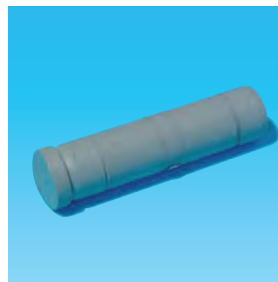
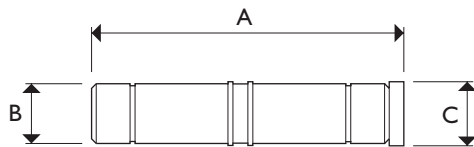
Hep₂O[®] SlimLine Fittings

Bent Tap Connector



Code	Nominal Diameter	A	B	C
HX27/I5	15	49	46	1/2" BSP

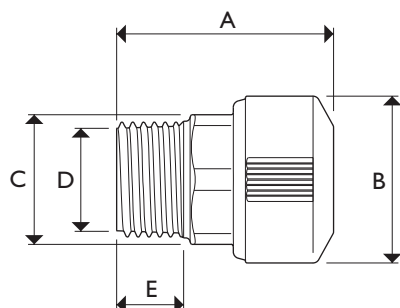
Blanking Plug



Code	Nominal Diameter	A	B	C
HX41/I5	15	63	15	16
HX41/22	22	66	22	24

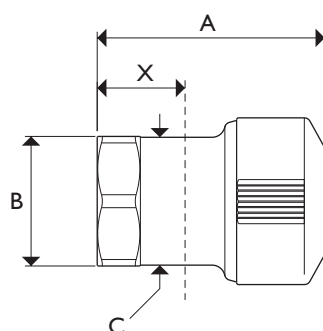
Hep₂O® Auxiliary Fittings

Adaptor - Male BSP/Hep₂O® Socket



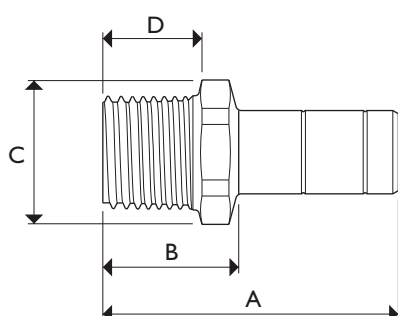
Code	Nominal Diameter	A	B	C	D	E
HX29/15	15	47	31	26	1/2" BSP	15
HX29/22	22	51	39	30	3/4" BSP	17
HX29/28	28	57	48	36	1" BSP	20

Adaptor - Female BSP/Hep₂O® Socket



Code	Nominal Diameter	A	B	C	X
HX28/15	15	50	26	25	18
HX24/15	15	49	30	30	19
HX28/22	22	53	30	30	19
HX28/28	28	63	36	36	24

Adaptor - Male BSP/Hep₂O® Spigot

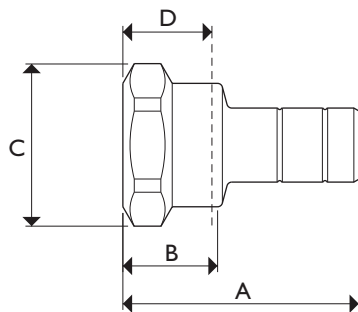


Code	Nominal Diameter	A	B	C	D
HX31/15	15	50	23	23	16
HX31/22	22	53	25	30	28
HX31/28	28	68	31	36	39

Hep₂O[®] Product Range

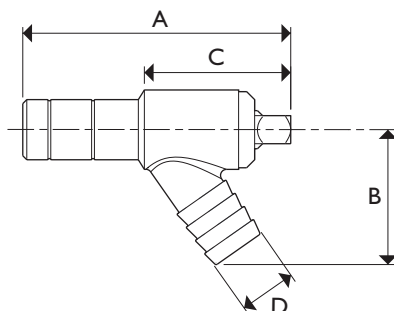
Hep₂O[®] Auxiliary Fittings

Adaptor - Female BSP/Hep₂O[®] Spigot



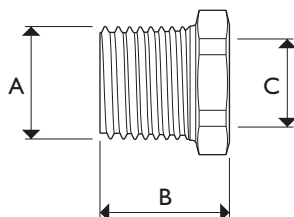
Code	Nominal Diameter	A	B	C	D
HX30/15	15	48	21	25	18
HX30/22	22	50	21	30	19
HX30/28	28	63	26	36	23

Draincock



Code	Nominal Diameter	A	B	C	D
HX32/15	15	65	34	38	14

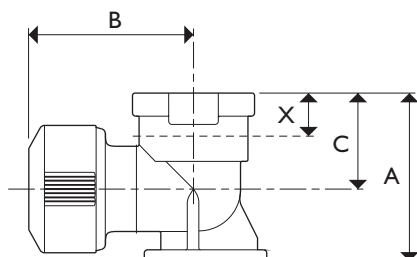
Adaptor - Tap Connector



Code	Nominal Diameter	A	B	C
HX39/15	15	1/2" BSP	18	3/8" BSP

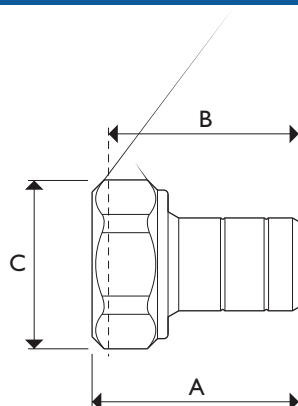
Hep₂O® Auxiliary Fittings

Wall Plate Elbow



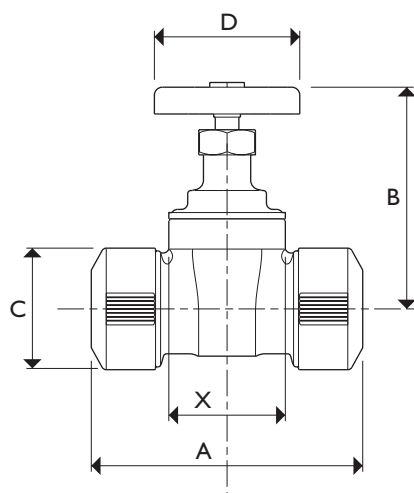
Code	Nominal Diameter	A	B	C	X
HX6/15	15	42	37	25	15
HX6/22	22	51	40	29	17

Cylinder Connector



Code	Nominal Diameter	A	B	C
HX34/22	22	49	46	36

Gate Valve - Hot/Cold

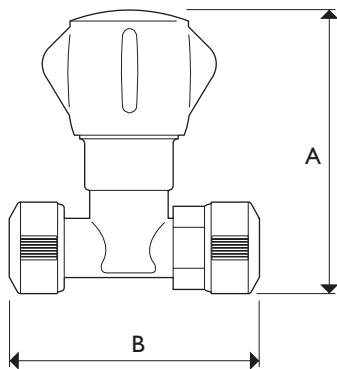


Code	Nominal Diameter	A	B	C	D	X
HX35/15	15	75	65	31	50	29
HX35/22	22	86	76	39	50	36

- This product is suitable for central heating

Hep₂O[®] Auxiliary Fittings

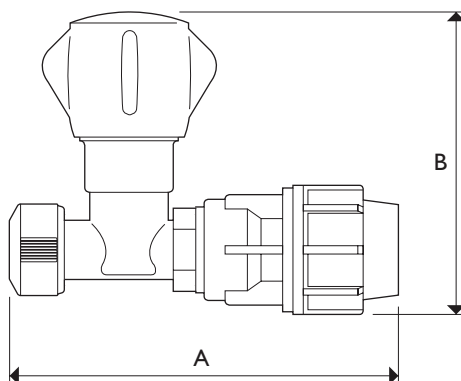
Stopcock - Hep₂O[®]/Hep₂O[®]



Code	Nominal Diameter	A	B
HX36/15	15	93	81
HX36/22	22	102	91

- This product is for cold water use only

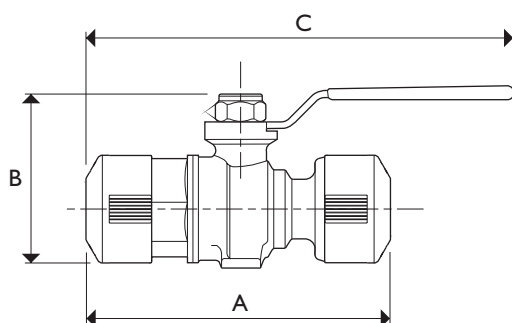
Stopcock - Hep₂O[®]/MDPE



Code	Nominal Diameter	A	B
HX43/22	22	168	125

- This product is for cold water use only

Lever Ball Valve

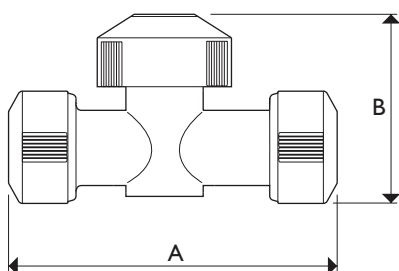


Code	Nominal Diameter	A	B	C
HX22/15	15	85	50	120
HX22/22	22	96	60	142

- This product is suitable for central heating

Hep₂O® Auxiliary Fittings

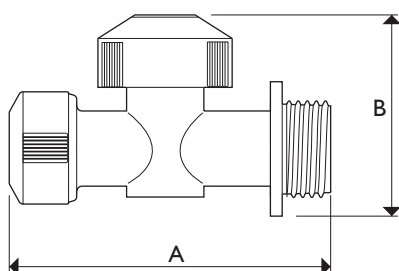
Shut-off Valves - Hot/Cold



Code	Nominal Diameter	A	B
HX37H/15	15	94	50
HX37C/15	15	94	50

- This product is not for use with central heating
- Indicator disc is reversible to denote hot or cold water

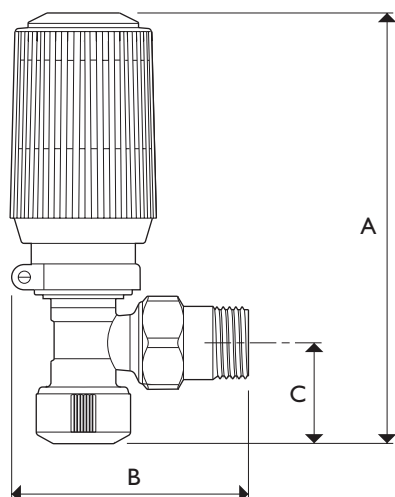
Appliance Valves - Hot/Cold



Code	Nominal Diameter	A	B
HX38H/15	15	89	53
HX38C/15	15	89	53

- This product is not for use with central heating
- Indicator disc is reversible to denote hot or cold water

Thermostatic Radiator Valve

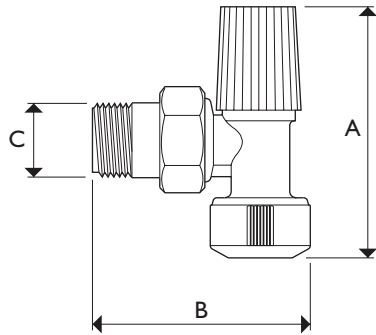


Code	Nominal Diameter	A	B	C
HX71/10	10	130	77	29
HX71/15	15	132	77	35

All dimensions are in mm unless otherwise stated

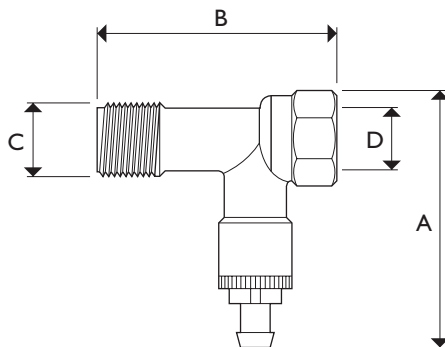
Hep₂O[®] Auxiliary Fittings

Radiator or Lockshield Valve



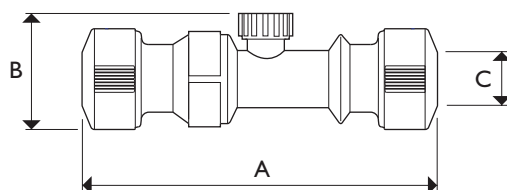
Code	Nominal Diameter	A	B	C
HX73/10	10	68	39	1/2" BSP
HX73/15	15	78	49	1/2" BSP

Radiator Draincock



Code	Nominal Diameter	A	B	C	D
HX23/15	15	64	59	1/2" BSP	1/2" BSP

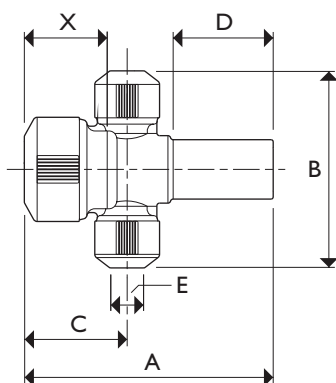
Double-Check Valve



Code	Nominal Diameter	A	B	C
HX72/10 (Brass)	10	103	26	10
HX72/15 (Plastics)	15	112	37	15
HX72/22 (Brass)	22	133	41	22

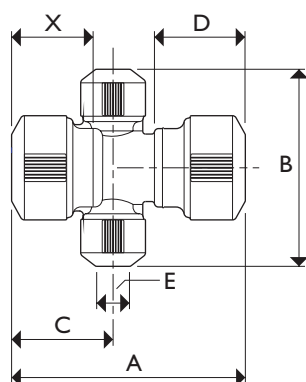
Hep₂O® Auxiliary Fittings

Two Port Manifold - Closed Spigot



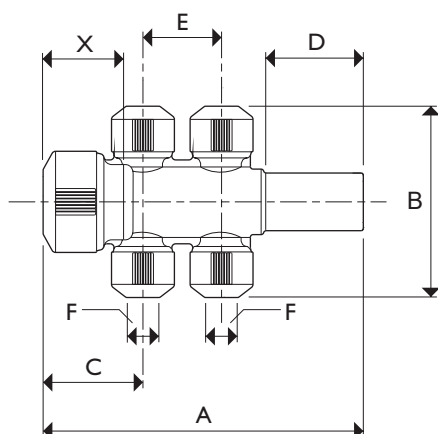
Code	Nominal Diameter	A	B	C	D	E	X
HX92/22	22	92	74	37	39	10	31

Two Port Manifold - All Socket



Code	Nominal Diameter	A	B	C	D	E	X
HX92B/22	22	87	74	37	31	10	31

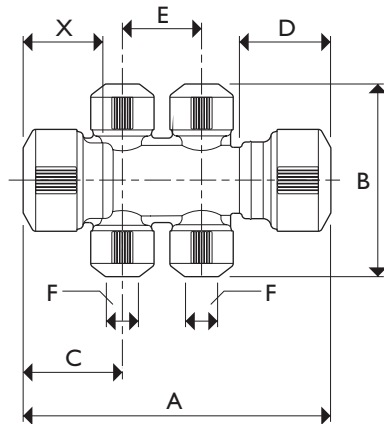
Four Port Manifold - Closed Spigot



Code	Nominal Dia	A	B	C	D	E	F	X
HX94/22	22	123	74	39	40	30	10	31

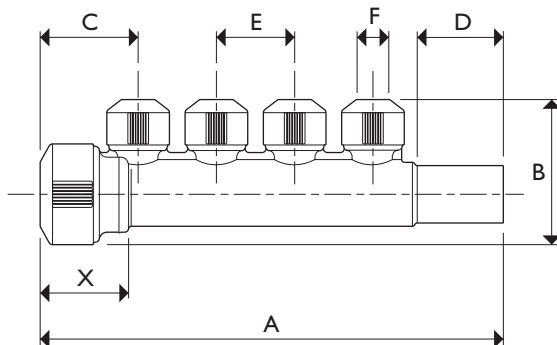
Hep₂O[®] Auxiliary Fittings

Four Port Manifold - All Socket



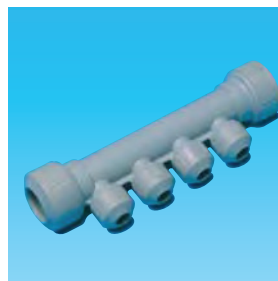
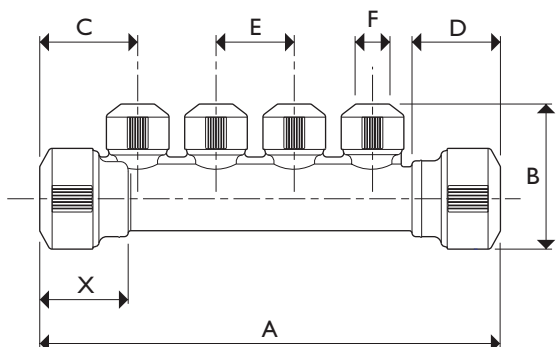
Code	Nominal Dia	A	B	C	D	E	F	X
HX94B/22	22	118	74	38	31	30	10	31

Four Port Manifold - Closed Spigot, Ports One Side



Code	Nominal Dia	A	B	C	D	E	F	X
HX96/22	22	184	56	38	38	30	10	31

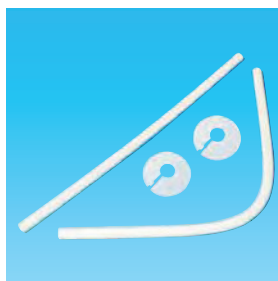
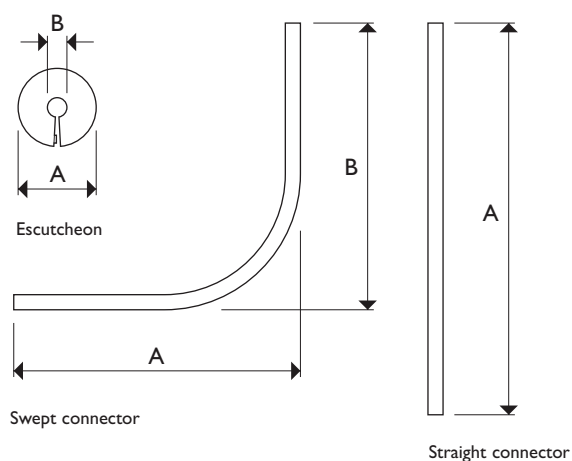
Four Port Manifold - All Socket, Ports One Side



Code	Nominal Dia	A	B	C	D	E	F	X
HX96B/22	22	178	56	38	31	30	10	31

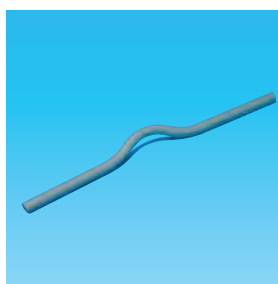
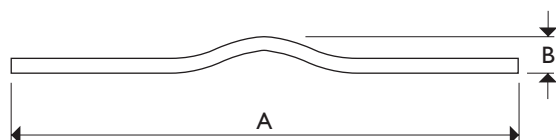
Hep₂O® Auxiliary Fittings

Radiator Connectors & Escutcheon Plates



Code	Nominal Dia	A	B
HX77/10 (straight connector)	10	300	–
HX78/10 (swept connector)	10	200	200
HX83/10 (escutcheon plate)	10	50	10
HX83/15 (escutcheon plate)	15	55	15

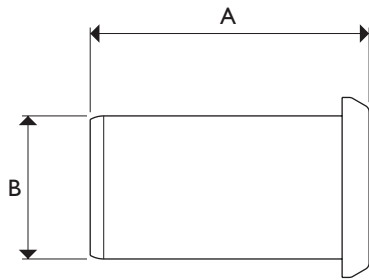
Pipe Step Over



Code	Nominal Diameter	A	B
HX82/15	15	460	45
HX82/22	22	475	55

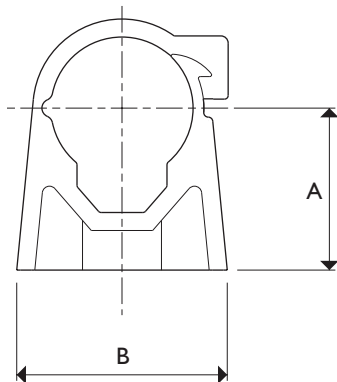
Hep₂O[®] Ancillary Items

Pipe Support Sleeve



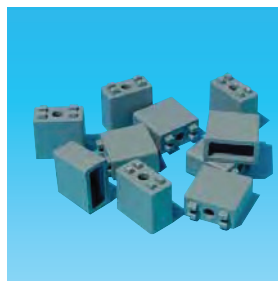
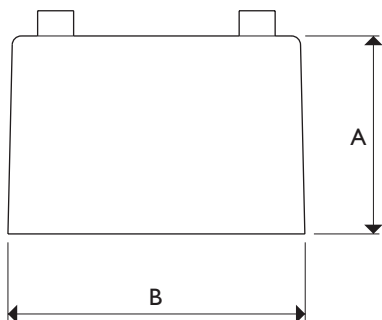
Code	Nominal Diameter	A	B
HX60/10	10	26	10
HX60/15	15	29	15
HX60/22	22	31	22
HX60/28	28	35	28

Pipe Clip - Screw Type



Code	Nominal Diameter	A	B
HX85/15	15	18	23
HX85/22	22	22	32
HX85/28	28	25	32

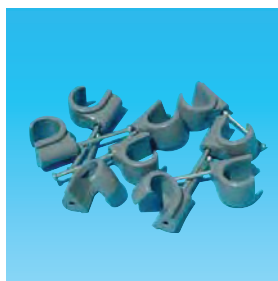
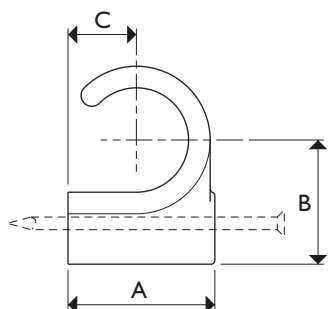
Pipe Clip Spacer



Code	Nominal Diameter	A	B
HX86/15	15	22	24
HX86/22	22	22	32

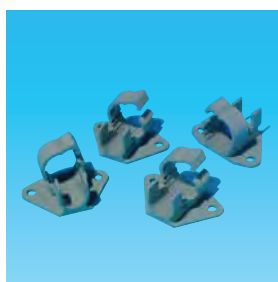
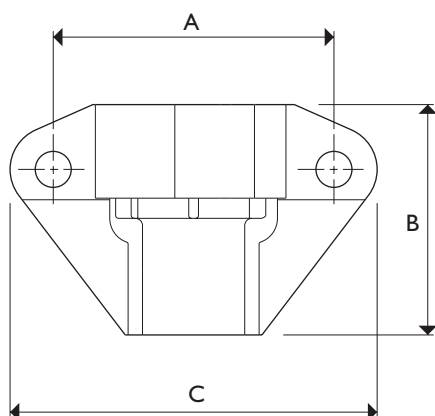
Hep₂O® Ancillary Items

Pipe Clip - Cable Type



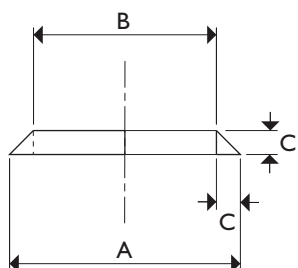
Code	Nominal Diameter	A	B	C
HX65/10	10	26	18	7
HX65/15	15	20	17	9.5
HX65/22	22	27	21	13
HX65/28	28	29	23	15

Fitting Clip



Code	Nominal Diameter	A	B	C
HX84/10	10	39	32	51

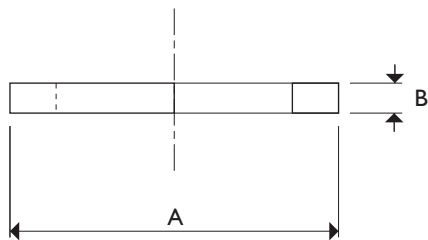
Conical Tap Connector Washer



Code	Nominal Diameter	A	B	C
HX57/15	15	18	14	3
HX57/22	22	23	19	3

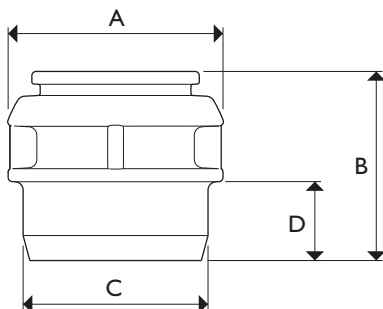
Hep₂O[®] Ancillary Items

Flat Tap Connector Washer



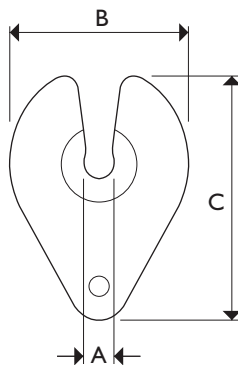
Code	Nominal Diameter	A	B
HX58/15	15	11	2
HX58/22	22	18	2

Blanking Peg - Demountable Fittings



Code	Nominal Diameter	A	B	C	D
HX44/10	10	14	19	10	7
HX44/15	15	20	22	15	9
HX44/22	22	26	23	22	10
HX44/28	28	32	30	28	11

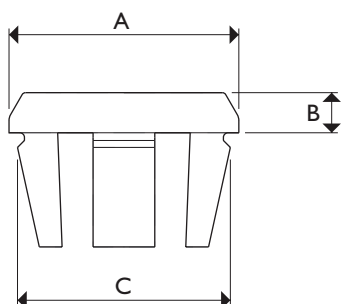
Wedge Removal Tool - Demountable Fittings



Code	Nominal Diameter	A	B	C
HX79/10	10	10	60	77
HX79/15	15	15	60	75
HX79/22	22	22	60	73
HX79/28	28	28	60	71

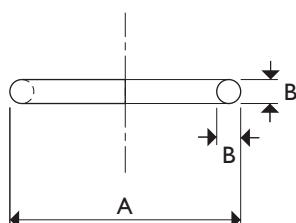
Hep₂O® Ancillary Items

Copper Pipe Cut End Protector



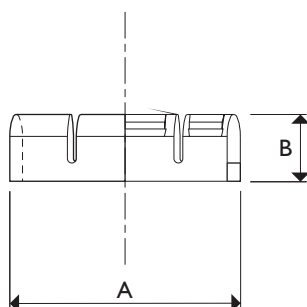
Code	Nominal Diameter	A	B	C
HX61/15	15	15	3	14
HX61/22	22	22	4	20

'O' Ring Seal



Code	Nominal Diameter	A	B
HX51/10	10	9	3
HX51/15	15	14	4
HX51/22	22	21	3
HX51/28	28	27	3

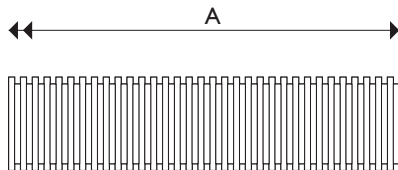
Grab Wedge



Code	Nominal Diameter	A	B
HX46/10	10	14	5
HX46/15	15	20	7
HX46/22	22	26	8
HX46/28	28	32	13

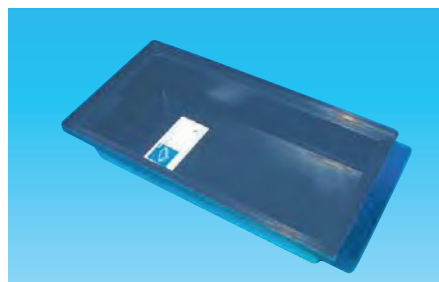
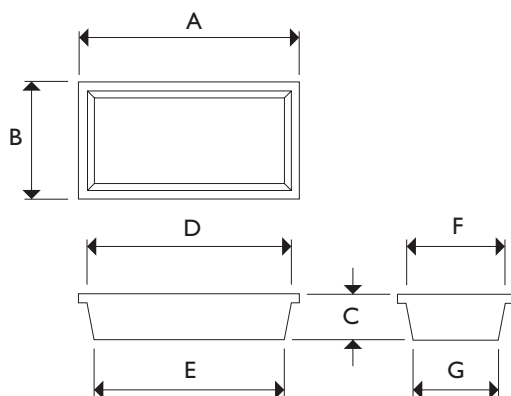
Hep₂O[®] Conduit System

Conduit Pipe



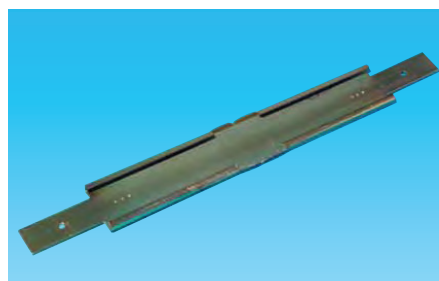
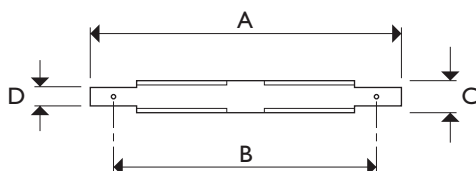
Code	Nominal Diameter	A
HXC25/15	15	25m
HXC50/15	15	50m
HXC25/22	22	25m
HXC50/22	22	50m

Conduit Junction Box & Lid



Code	A	B	C	D	E	F	G
HX100 (box)	377	202	75	340	322	165	150
HX104 (lid)	372	197	—	—	—	—	—

Terminal Back Plate

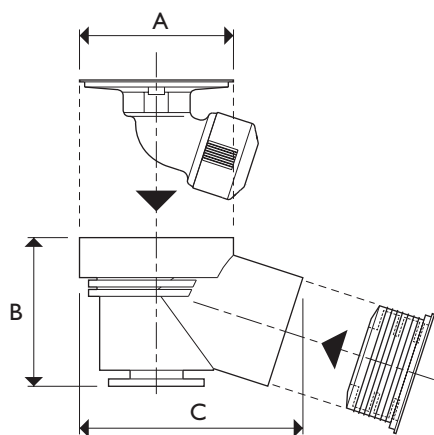


Code	A	B	C	D
HX103	360	280	46	20

- This product is for use with HX6/15, HX6/22 and HX101/15

Hep₂O® Conduit System

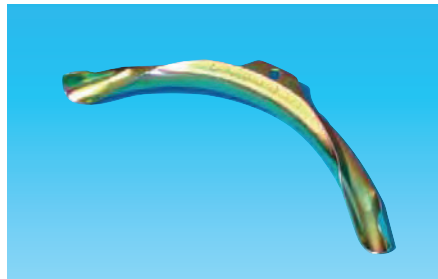
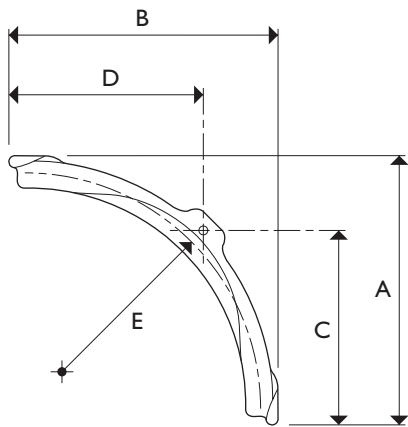
Conduit Terminal



Code	Nominal Diameter	A	B	C
HX101/15	15	58	58	86

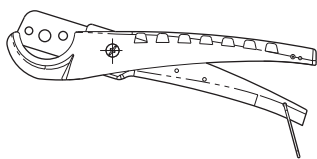
Hep₂O[®] Accessories

Cold Forming Bend Fixture

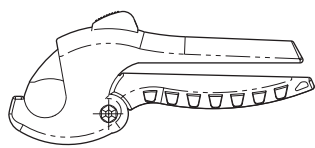


Code	Nominal Diameter	A	B	C	D	E
HX75/15	15	160	160	126	126	120
HX75/22	22	258	258	206	206	176

Pipe Cutters



Standard cutter HD74 (metal)



Procutter HD75 (plastic)



Ratchet cutter HD78

Code	Type	For Pipe Diameter
HD74	Standard	28 max
HD75	Procutter	28 max
HD77	Ratchet	42 max
HD78	Ratchet	28 max

Hep₂O® Accessories

Hep₂O® Central Heating & Water Services Calculator



Code	Description
HX80	Complete with protective case

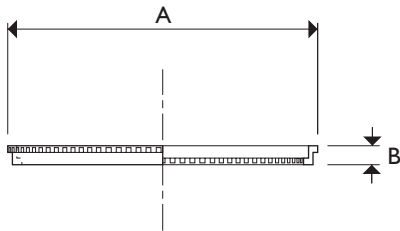
Hep₂O® Joint Test Kit



Code	Description
HX81	Robust metal construction
HX81A	Replacement seals

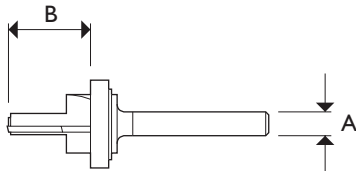
Hep₂O[®] Routabout System

Routabout Spacer Ring



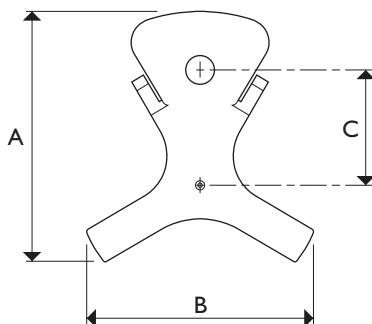
Code	A	B
HX404	250	18
HX405	250	22

Routabout Cutter



Code	A	B
HX406	1/4"	18
HX407	1/2"	18
HX408	1/4"	22
HX409	1/2"	22

Routabout Rotating Template



Code	A	B	C
HX410	266	244	122



Strength and Durability

Pull-out resistance

BS 7291: Part 2: 2001 provides a test procedure for assessing the pull-out strengths of pipes from fittings.

Hep₂O[®] pipes and fittings have been tested and offer resistances in excess of these requirements.

The levels required by BS 7291: 2001 are shown in Table 1.

Hydrostatic pressure resistance and life expectancy

The ability of a pipe to resist water pressure depends upon the tensile strength of the material, which varies with temperature.

Hep₂O[®] pipe has been tested to resist various pressures at various temperatures representing normal operating life cycles. Refer to Table 2.

Hep₂O[®] pipes and fittings conform to the long term hydrostatic strength tests as detailed in BS 7291: Part 1: 2001, Clause 6.3.

A life expectancy of not less than 50 years can be extrapolated from this data, and is based on the range of intermittent flow temperatures that these systems would normally experience, ranging between 12 bar 20°C and 6 bar 90°C.

Short exposure to temperatures up to 100°C resulting from thermostat/system malfunction will not cause failure, but may shorten the long term design life of the system.

Thermal cycling

Thermal cycling - the rise and fall in water temperature during normal operation - also induces different and additional stresses on pipes and joints.

Hep₂O[®] conforms to the requirements of a thermal cycling test schedule, to prove the strengths of a plumbing system, as detailed in BS 7291: Part 1: 2001. The schedule is set out in Table 3.

Effects of Fire

Flammability and burning

In common with most other organic polymers and materials used in the manufacturing and construction industries, polybutylene will burn. It is difficult to ignite, however, and is defined as combustible but not highly flammable.

Fire protection

Polybutylene pipe, less than 50mm in diameter, does not need to be sleeved in intumescent material when passing through a fire resistant wall.

Table 1 BS 7291: 2001 Pull-Out Force Requirements

Nominal outside pipe diameter	BS safe maximum pull-out force
10mm	380N *
15mm	705N *
22mm	1190N *
28mm	1960N *

*From BS 7291: Part 2: 2001, Table C1

Table 2 Operating Temperatures and Pressures

Safe pressures	Peak life cycle operating temperatures								Short malfunction at 100°C
	20°C	30°C	40°C	50°C	60°C	70°C	80°C	90°C	
Bar	12	11.5	11	10.5	9	8	7	6	3.5
psi	174	167	160	152	131	116	102	87	51
Head of water (m)	120	115	110	105	90	80	70	60	35

Table 3 Thermal Cycling

Hot water		Cold water		Min pressure			No. of cycles
Inlet temp	Duration	Inlet temp	Duration	Bar	psi	m/head	
83 ± 2°C	20 mins	15 ± 5°C	10 mins	3.5	88.2	60	5000
114 ± 2°C	20 mins	15 ± 5°C	10 mins	6	88.2	60	1000
105 ± 2°C	20 mins	15 ± 5°C	10 mins	3.5	88.2	60	5000

Flexibility

Modulus of elasticity

Modulus of elasticity is a measure of the ability of a material to cope with stresses.

The modulus of elasticity of polybutylene is 400-450N/mm². Compared to other materials, including other plastics, this value is very low. For example, for PVC it is 2410N/mm² and for copper 129800N/mm².

This means that polybutylene is not difficult to bend and expansion stresses are low. However, polybutylene is unusual in combining flexibility with toughness even at elevated temperatures and pressures, ensuring that Hep₂O[®] meets the demands of modern heating installations.

Manipulation of pipework

Hep₂O[®] pipe can be bent manually without heating for unsupported bends to a minimum radius of eight times the pipe's outside diameter. This removes the need to insert a 90° elbow fitting and results in a reduction in loss of head (i.e. a 15mm elbow equates to an extra 0.5m on the pipe run).

The durability of Hep₂O[®] pipe and its ability to stretch without damage, allows the minimum bend to be made cold, without causing 'kinking' on the inside, nor collapse on the outside of a bend. A reduction of the bore is thereby minimised. Refer to Figure 1 and Table 4.

Where support bends are needed for 15mm and 22mm outside diameter pipes, the use of a Cold Forming Bend Fixture (HX75) will give a radius of eight times the pipe diameter, again minimising the loss of head in a system. Refer to Figure 2 and Table 5.

Dependent on its diameter, pipe is available in coils of up to 100 metres (see Product Range section, page 12), which facilitates handling and transportation.

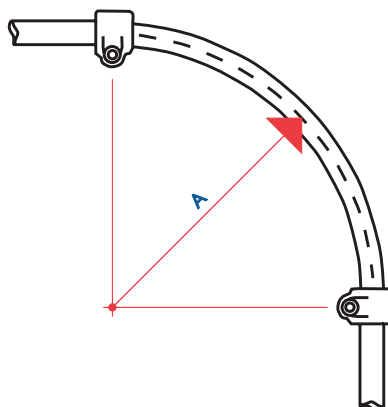


Figure 1
Minimum unsupported cold-bend radii

Table 4 Minimum Unsupported Cold-Bend Radii

Nominal dia (mm)	10	15	22	28
A (mm)	80	120	176	224

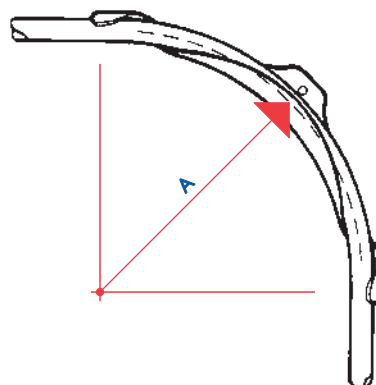


Figure 2
Cold form bend radii

Table 5 Cold Form Bend Radii

Nominal dia (mm)	15	22
A (mm)	120	176

Site handling is also made easier as this flexibility enables the pipe to be bent around corners and within confined spaces.

Hep₂O[®] pipes will not suffer fatigue stress damage through normal vibration.

Weight

Hep₂O[®] pipe is approximately 1/4 the weight of copper pipe per metre as indicated in Table 6.

Table 6 Hep₂O[®] and Copper Pipe Weight Comparison

Nominal dia (mm)	10	15	22	28
	Weight (g/m)			
Hep ₂ O	41	75	126	210
Copper	183	281	534	683

Thermal expansion

Hep₂O[®] pipes expand when the temperature is raised.

The flexibility of the pipe means that the expansion is spread evenly along a pipe run eliminating damaging movement at a critical fixed point in the system.

When hot, the pipe's expansion creates undulations, though its former length is resumed after the temperature has dropped.

Exposed pipe runs should therefore be boxed in to avoid unsightly temporary distortion.

The coefficient of thermal expansion of polybutylene is $1.3 \times 10^{-4}/m/^{\circ}C$. This means that the pipe expands by 1.3mm per metre of pipe for every 10°C temperature rise.

Example:

Calculate the amount of expansion of a 2.4 metre pipe installed at 20°C when running at 80°C.

$$0.00013 \times 2400 \times 60 = 18.72\text{mm}$$

Where the pipe is totally restrained in a concrete floor (e.g. as underfloor heating), the stresses are so low that they are absorbed by the material.



Thermal Characteristics

Thermal conductivity

The thermal conductivity (k) of polybutylene is 0.22W/mK which is low relative to copper. This property, coupled with the approximately 2mm thick pipe walls of **Hep2O®**, means that:

- the pipe is safe to touch even when conveying water at 60°C.
- the pipe does not radiate heat quickly, and so will not cool quickly, thereby delivering hot water.

Melting point

The melting point of polybutylene is 125°C, and as a result, blow lamps must never be played on **Hep2O®** pipes and fittings.

However, the Vicat softening point, at 116-117°C, is well above the boiling point of water and is also greater than the overheat control of gas and oil boilers (approximately 95°C).

Connections to boilers

Where boilers incorporate a copper heat exchanger and the connections are made outside the casing, **Hep2O®** can be connected directly to the boiler via the compression nut, if this is located more than 350mm from the heat source. Typically, these boilers contain high limit cut-out thermostats and generally have a low water content. See page 51.

Special installation procedures only apply for solid fuel boilers, other cast iron heat exchange boilers, or where the first connection is made inside the boiler casing. In these instances, where the heat output may be uncontrolled, a 1 metre run of copper pipe should be used between the boiler and the start of the **Hep2O®** system. See page 51.

All boiler connections should be made in accordance with the requirements of BS 5955: Part 8.

Solder joints

When soldering HX42/10 (a brass double spigot reducer in the Demountable range), ensure that the solder joint is completed first and has fully cooled before making the push-fit connection.

Freezing temperatures

Hep2O® maintains its flexibility in temperatures down to -15°C. This property significantly reduces the likelihood of bursts, even at sub-zero temperatures, when the pipework has frozen and the water has expanded in volume by becoming ice.

Hep2O® pipe accepts this expansion without fracturing, and resumes its original size after a thaw.

Thermal Insulation

Thermal diffusivity

Thermal diffusivity is the rate of heat diffusion throughout a material. The greater the value the greater the heat diffusion. The thermal diffusivity of a material depends on its thermal conductivity, density and specific heat.

Although **Hep2O®** has a lower diffusivity than copper, its insulation requirements are the same as those of copper and should comply with BS 6700, BS 5422 and the Water Regulations.

Table 7 Frost Protection

Pipe diameter (mm)	Indoor (k)			Outdoor (k)		
	0.035	0.04	0.055	0.035	0.04	0.055
	Insulation (mm)			Insulation (mm)		
15	22	32	50	27	38	63
22	22	32	50	27	38	63
28	22	32	50	27	38	63

Table 8 Central Heating Installations Insulation Thicknesses

Pipe diameter (mm)	0.04 (k)	0.55 (k)	0.07 (k)
	Insulation (mm)		
15	19	25	25
22	25	25	25
28	25	25	25

Frost protection

The minimum thicknesses of insulation to delay freezing are given in Table 7.

Pipework that is potentially exposed to freezing conditions and therefore requires insulation would typically be found in the following areas:

- unheated roof spaces.
- unheated cellars.
- unheated outbuildings.
- near windows, airbricks, ventilators, etc.
- in chases or ducts formed in outside walls.

Central heating installations

Minimum thicknesses of insulation for central heating installations are given in Table 8. The figures are based on the temperature differential of 75°C hot face to 20°C ambient air.

Gas and oil fired domestic hot water installations

The recommended minimum thicknesses of insulation for domestic hot water pipework is given in Table 9. The figures are based on the temperature differential of 60°C hot face to 20°C ambient air.

Table 9 Gas & Oil Fired Domestic Hot Water Installations Insulation Thicknesses

Pipe diameter (mm)	0.04 (k)	0.55 (k)	0.07 (k)
	Insulation (mm)		
15	25	32	32
22	25	32	32
28	25	32	32

Corrosion and Chemical Effects

Corrosion and oxygen diffusion

Corrosion of metals is a hazard in installations, therefore it is essential that the water oxygen content is kept to an absolute minimum.

Oxygen will almost always be present in any system as it can enter through a variety of points, such as open header tanks, threaded joints, valves and pumps. However, Hep₂O[®] Barrier Pipe will ensure that oxygen ingress through the pipe wall is kept to a minimum.

All heating circuits, whatever the type of pipe used, should be protected by an inhibitor, and then any oxygen entering the system will have no adverse effects.

Hep₂O[®] pipe is unaffected by both acidic (soft) water or alkaline (hard) water, the most common reasons for copper pipe corrosion in all-metal pipework.

Contact with chemicals

Hep₂O[®] is not damaged by *short term* contact with other chemicals commonly found in a domestic environment. These chemicals include: paraffin, diesel oil, carbon tetrachloride, bleaches, detergents, turpentine, linseed oil, white spirit, water purification softeners, common adhesives, paints, varnishes, sealers, cement, quick lime.

High sustained concentrations of chlorine will have an adverse effect on all plastics pipe. However, such concentrations are not usually experienced within the UK water supply which are very low (less than 0.5 ppm). At these levels, under normal operating conditions there will be no adverse effect on the life expectancy of the Hep₂O[®] system. Short term chlorination for disinfection will not have an adverse effect on the system.

However, Hep₂O[®] should not be used in installations where sustained above average chlorine levels can be anticipated such as swimming pools.

If long term contact is suspected, the Hepworth Plumbing Products Technical Advisory Service should be consulted on 01709 856406.

Scale resistance

Hep₂O[®] pipe is unaffected by both acidic (soft) water or alkaline (hard) water, the most common reasons for copper pipe scale build-up in all-metal pipework.

In hard water areas, scale or fur build-up inside Hep₂O[®] pipes is resisted by the exceptionally smooth finish and cleanly abutting surfaces within joints. The bore of the pipework will therefore be maintained almost indefinitely, as the scale will not adhere to it.

Hep₂O[®] pipe and fittings have been tested by the Water Research Centre and have been found to comply with the requirements of the Water Regulations. The pipes and fittings will not waste nor impart taint, taste or odour to water.

Biological

Organic growth

Hep₂O[®] does not encourage the growth of micro-organisms, as listed in the Water Fittings and Materials Directory 0112066. Polybutylene satisfies the requirements of BS 6920.

Rodent attack

Hep₂O[®] does not specifically attract rodents. However, if the installation is in an area where there is a high risk of rodent attack, Hep₂O[®] like other piping and electrical cables should be ducted to ensure no damage can be caused.

Ultra-violet Light

External Hep₂O[®] installations must be adequately covered to avoid long exposure to sunlight.

Hep₂O[®] pipe is delivered in SmartPack[™] protective wrapping that should not be opened until the pipe is ready for installation.

Opacity

Hep₂O[®] materials conform with the opacity requirements of BS 7291: Part 1: 2001, Clause 6.7, ensuring that insufficient light passes through the pipe walls to allow the growth of algae.

Acoustic

Problems with noise are frequently experienced with systems incorporating rigid pipes. Hep₂O[®] pipe does not transmit noise and with careful installation to reduce the source of noise to a minimum, Hep₂O[®] can be installed to run almost silently. For example:

- the flexible nature of Hep₂O[®] pipe prevents high contact forces between pipes and supports, significantly reducing the 'creaking' commonly associated with the thermal expansion of rigid pipes.
- noise can be caused by pipes knocking together or knocking on hard surfaces in close proximity. Unlike rigid pipes, the inherent elasticity of Hep₂O[®] cushions the impact causing less impact noise and absorbing vibrations, preventing the transmission of any sound along the pipes.
- similarly, noise from 'water hammer' resulting from abrupt stoppage of water flow (typically by closure of quarter turn valves, solenoids and reverberating ball valves) is normally absorbed by Hep₂O[®] and not transmitted along the pipes.
- noise generated by central heating pumps is rapidly absorbed by Hep₂O[®] pipes and can be significantly reduced when compared with rigid systems.

Electrical Safety

Hep₂O® piping does not conduct electricity.

However, if **Hep₂O®** forms a break in the continuity of metal pipework that is being used for earthing or bonding, then the break should be re-bonded to both sections of the existing pipe when cutting and after installation.

Main, supplementary and equipotential bonding

Installers should be aware of the main and supplementary bonding of electrical installations where plumbing is carried out with plastics piping.

1. This guidance is given on the basis that the following conditions apply. If they do not then the installation must be considered on an individual basis:

- the gas pipe to the boiler is metallic.
- the hot and cold water services are carried out in **Hep₂O®**.
- the central heating pipes are **Hep₂O®**.
- the waste pipes from the bath, hand basin, WC, bidet and kitchen sink are plastics.

2. There is no requirement to supplementary bond the following:

- the bath even if it is metal.
- the kitchen sink.
- central heating radiators.
- bathroom radiators and towel rails heated by a wet central heating system unless there is less than a 2 metre run of plastics pipe between them and the boiler, or between them and any metallic pipe from the boiler to which the radiator plastics pipe is connected.

3. There is no requirement in the above circumstances to bond a steel sink but it is not incorrect to bond a steel sink to the earth terminal of an adjacent socket.

4. If all the conditions in 1 apply then the following precautions must be undertaken.

Items to be mainbonded:

- the consumer's gas pipe at the service entry.
- any other services that are metallic, e.g. heating oil pipes.
- structural steel should be bonded to the main earth terminal.

Items to be supplementary bonded (in the bathroom):

- the earth terminal of the lighting point (rose, luminaire support coupling, luminaire).
- the earth terminal of the electric radiant heater (if any).
- the earth terminal of the electric shower water heater (if any).
- the earth terminal of any other appliance.

There is no need to connect the supplementary bonding conductor to the main earth bar.

Supplementary bonding in a bathroom when **Hep₂O®** and plastics soil and waste pipes have been installed

(Refer to Figure 3)

There is no requirement to supplementary bond:

- **Hep₂O®** pipes.
- plastic soil and waste pipes.
- visible copper pipes less than 0.5m long.
- metal taps.
- metal baths not connected to extraneous conductive parts (i.e. structural steelwork).

However, metal (Class I) items of equipment in a bathroom or shower room (e.g. electric heaters, showers and luminaires) will require supplementary bonding if simultaneously accessible.

Supplementary bonds must be connected to the protective conductors of each circuit at the accessory point.

Supplementary bonding in a bathroom when metallic service pipes, soil pipes and waste pipes have been installed

(Refer to Figure 4)

Supplementary bonding will be a requirement for:

- all simultaneously accessible metal (Class I) equipment (e.g. electric heaters and showers).
- central heating pipes.
- hot and cold water pipes.
- waste and soil pipes.

Pipe connections should be made with BS 951 clamps, complete with a 'safety electrical connection' label.

However, metal baths not connected to a metal building structure do not require supplementary bonding if all metal pipes connected to them have been bonded.

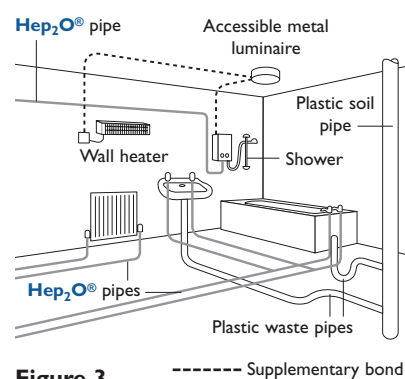


Figure 3

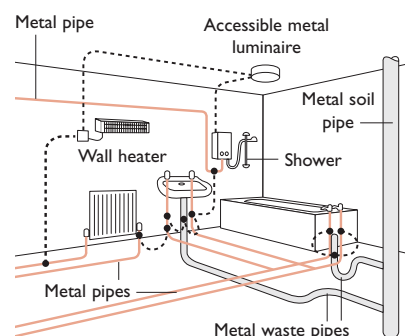


Figure 4

Connection to Metric Copper Pipe

Hep₂O® fittings have been designed to form reliable joints with metric copper tube which conforms to BS EN 1057 - R520. Copper pipes should be cut with a wheel cutter. Before jointing, copper pipe ends should be inspected to ensure they are free from burrs or swarf (which could damage the 'O' ring).

It is also possible to connect 10mm BS EN 1057 - R220 copper tube into **Hep₂O®** fittings providing the tube end is carefully prepared. R220 copper tube is 'soft' and therefore susceptible to becoming mis-shaped or dented if it is not handled with care on site. Therefore the R220 tube end should be inspected for any signs of damage prior to jointing, as deformity of the tube could damage the 'O' ring whilst jointing, or otherwise affect the joint seal.

R220 tube should be cut with a mini wheel cutter, and then a chamfer should be filed on the pipe. Rinse away the remainder of any copper filings and dry off.

Connection to Imperial Copper Pipe

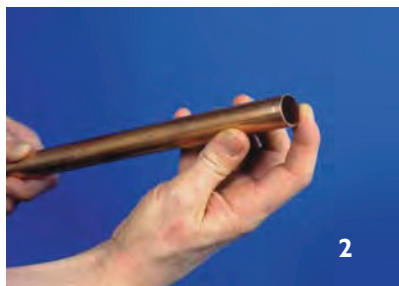
When connecting to 3/4" imperial copper **Hep₂O®** offers a special Straight Adaptor (HX3A/22) which accepts 22mm pipe at one end and 3/4" imperial at the other end.

See also fitting detachment procedure in System Modification & Maintenance (page 52).

Standard **Hep₂O®** fittings can be used to connect 3/8", 1/2" and 1" imperial pipes.



Cut copper pipe using a wheel cutter



Inspect ends to ensure they are free from burrs or swarf



Straight Adaptor HX3A/22



Insert copper end protector (HX61)



Mark joint depth on copper pipe before jointing



Push pipe firmly into fitting



Tug back on the pipe to ensure grab wedge engages properly

Connection to Compression Fittings

Hep₂O[®] pipe is suitable for connecting to compression fittings complying with BS EN 1254.

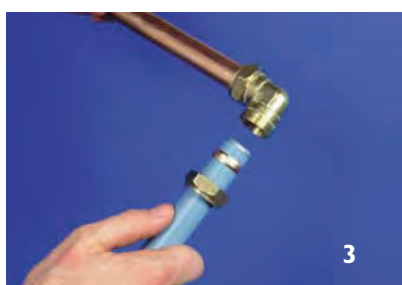
Cut the **Hep₂O[®]** pipe with the recommended cutters and proceed as shown below.



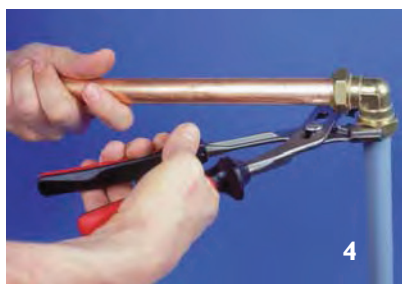
Insert support sleeve into pipe



Apply PTFE if required



Ensure pipe is fully inserted



Tightening nut

Connections Adjacent to Capillary Joints

When using **Hep₂O[®]** pipe or fittings adjacent to capillary joints it is preferable to carry out the soldering work before the **Hep₂O[®]** is installed.

If it is not possible to undertake the work in this sequence then the following precautions should be observed:

- do keep flame or soldering irons away from **Hep₂O[®]**.
- do not allow flux to run onto **Hep₂O[®]**. Flux runs inside pipe may occur during soldering. This effect can be reduced by not using excessive amounts of flux and by applying flux to copper tube end only.
- do not allow hot solder to come into contact with **Hep₂O[®]**.
- to prevent overheating of **Hep₂O[®]** by conduction of heat along copper pipe, where necessary, wrap a damp cloth around copper pipe to minimise this effect.
- systems should be flushed with water to remove any internal flux residues.

Connection to Chrome Plated Copper or Stainless Steel Pipe

Hep₂O[®] fittings cannot be connected directly to chrome plated copper or stainless steel, because of the relative surface hardness of these materials. Therefore compression fittings should be used.

Connection to Brass Spigots

The only brass spigots which are suitable for jointing into **Hep₂O[®]** fittings are those within the **Hep₂O[®]** range. Brass spigots designed for compression or capillary joints do not have the necessary joint grooves and are too short.

Connection to Acorn[®]

Hep₂O[®] is fully compatible with its predecessor, **Acorn[®]** system previously manufactured by **Bartol**, a Hepworth company.

Pre-1984 **Acorn[®]** 22mm pipe was manufactured with a thicker wall and requires a different support sleeve. If carrying out remedial work on such an **Acorn[®]** system please contact our Technical Advisory Service.

Internal components of current **Hep₂O[®]** fittings (Cap, BiTite Grab Wedge, Wedge Support Ring and 'O' Ring) are not in any way compatible with original **Hep₂O[®]** fitting components (Cap, 'O' Ring, Spacer Washer and Grab Ring) and therefore bodies and components must **not** be mixed.

However, **Hep₂O[®]** Pipe (Standard or Barrier) is fully compatible with **all** versions of **Hep₂O[®]** fittings.

For further advice and information contact Hepworth Plumbing Products' Technical Advisory Service.

Connection to Plastic Pipes

Hep₂O[®] should not be used in conjunction with other manufacturers' plastics pipe and fittings as dimensional tolerances and quality control cannot be guaranteed by Hepworth Plumbing Products.

Connection to Incoming Service Pipes

Water may enter a property through a variety of pipe materials. In recently developed properties the water is typically brought to a residence in blue MDPE (medium density polyethylene) pipe. However, in renovation of older properties this pipe may well be made of one of a number of metals. The method of converting from the service pipe to Hep₂O® differs depending on the material of the service pipe.

The following guidance is applicable to blue MDPE pipe to BS 6572.

For 20mm MDPE use:

- a polyethylene 20 x 1/2" BSP male adaptor (code 20PEAM05).
- a MDPE pipe liner (code 20PELIN).
- Hep₂O® female adaptor (code HX30/15).
- Hep₂O® stopcock (code HX36/15).

Refer to Figure 5.

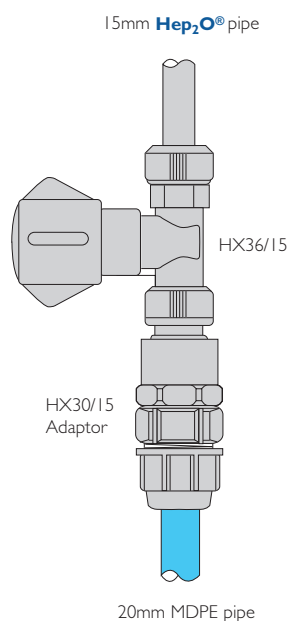


Figure 5
Rotatable stopcock

For 25mm MDPE use:

- a Hep₂O® x MDPE stopcock (code HX43/22).
- a MDPE pipe liner (code 25PELIN).

Refer to Figure 6.

Alternatively if you wish to take advantage of the rotatability of Hep₂O® joints by turning the stopcock towards the wall when not in use, then use:

- a polyethylene 25 x 3/4" BSP male adaptor (code 25PEAM07).
- a MDPE pipe liner (code 25PELIN).
- Hep₂O® female adaptor (code HX30/22).
- Hep₂O® stopcock (code HX36/22).

Refer to Figure 7.

Details of MDPE pipe, fittings and jointing instructions are contained in separate literature which can be obtained by contacting our Literature Service Hotline Tel: 01709 856408 Fax: 01709 856409.

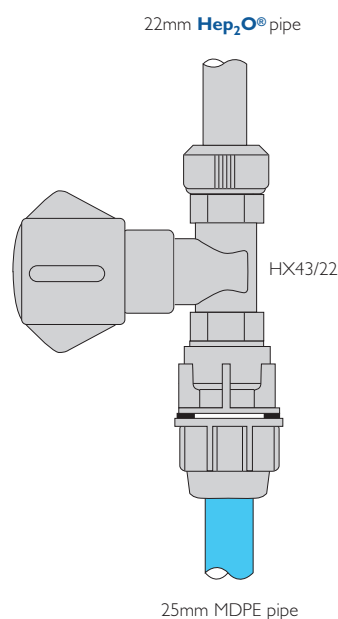


Figure 6
Non-rotatable stopcock

Consideration should also be made of the following:

- where a common supply pipe serves two or more dwellings a double check valve (code HX72) is required directly after the stopcock in each dwelling to comply with Water Byelaws.
- a drain-cock (code HX32) should be fitted immediately after the stopcock or after a double check valve where provided to comply with Water Regulations.
- for sealing screwed joints on adaptors apply PTFE to threads.

Alternatively a PE (polyethylene) to copper compression stopcock can be used. The information on using compression fittings on Hep₂O® pipe should be carefully noted. See page 47.

For metal pipes an appropriate stopcock should be used with a compression outlet to 15 or 22mm copper. Hep₂O® can then be fitted directly to these outlets carefully noting details in Connection to Compression Fittings. See page 47.

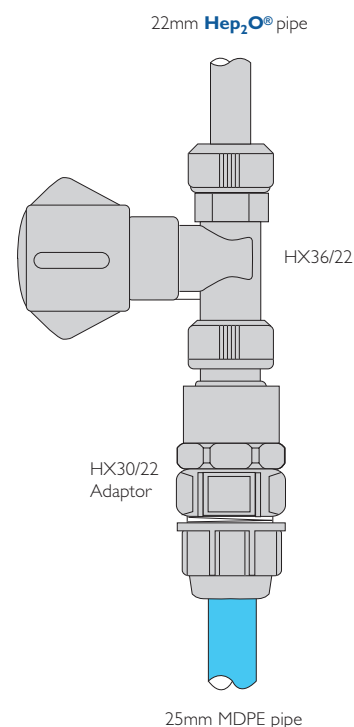


Figure 7
Rotatable stopcock

Connection to Steel Pipes and Threaded Bosses

In order to facilitate connection to male and female iron threads, four adaptors (HX28/HX29 Socket Adaptors, HX31/HX30 Spigot Adaptors) are available in the **Hep₂O®** range. This enables connection to a wide range of different materials.



HX28



HX29



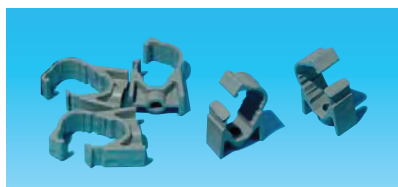
HX30



HX31

Connection to Appliances

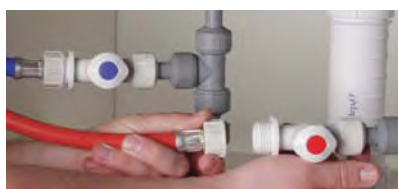
When connecting to appliances and dishwashers always use **Hep₂O®** appliance valves (HX38C/I5, HX38H/I5). The **Hep₂O®** pipework used to service these appliances should be clipped in accordance with the recommended clipping distances using screw-type clips (HX85). Refer to page 66.



Pipe Clip - Screw type HX85



Appliance valve HX38 (Cold or Hot)



Connecting appliance valves

Connection to Draw-off Taps

When connecting to draw-off taps having a male threaded 'tail' use either the Demountable or SlimLine **Hep₂O®** tap connector. Do not use any jointing compound on the jointing shoulder, use only the washer provided. When using the wall plate elbow or the '1/2" x 3/8" BSP adaptor the threads should be sealed by applying PTFE tape to the male threads.



Demountable fitting HD25



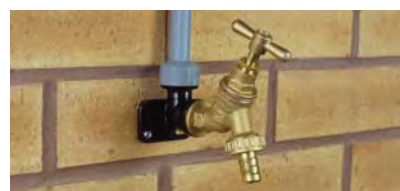
Demountable fitting HD27



SlimLine fitting HX25



SlimLine fitting HX27



Wall Plate Elbow (auxiliary fitting HX6)
(tap not supplied)

Connection to Ancillaries (Pumps, Valves, etc.)

When connecting Hep2O® to ancillaries it is important to follow the guidance in the section 'Connection to Compression Fittings' (Page 47). Due to the flexibility of Hep2O® the pipework must be clipped adjacent to the outlets of the pumps and valves using Hep2O® screw pipe clips (code HX85). This ensures adequate support and reduces vibration in the majority of cases.

Where it is felt that the weight of the pump merits extra support, metal brackets should be used.

Where the size of the pump and/or valve requires fixing at a greater distance from the wall than can be accommodated by the pipe clip alone, then this can be augmented with a pipe spacer (code HX86), which will allow a greater 'stand-off' distance whilst maintaining security.



Connection to pump

Connection to Storage Vessels and Radiators

When connecting Hep2O® pipe to cylinders, radiators etc., it is always recommended that Hep2O® fittings are used wherever possible.

The Hep2O® range of fittings includes thermostatic, wheel head and lockshield radiator valves, tank connectors, gate valves, stopcocks and cylinder connectors.

If the use of compression fittings is unavoidable then the jointing instructions outlined in the section, 'Connection to Compression Fittings' (page 47) should be carefully followed.

Do not use jointing compound on the jointing shoulder of the cylinder connector; use only PTFE tape.

Do not use any jointing compound when fitting tank connectors, use only sealing washers (not provided).

Refer to 'Design Considerations', page 70, for information on cylinder cupboard requirements.



Tank connector



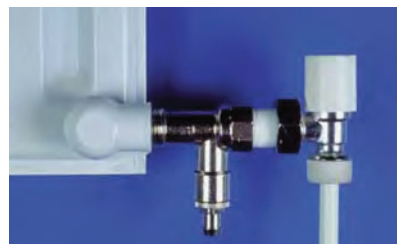
Cylinder connector



Radiator or Lockshield Valve (HX73)



Thermostatic Radiator Valve (HX71)



Radiator or Lockshield Valve (HX73)
+
Straight Radiator Connector (HX77)
+
Radiator Draincock (HX23)