

**Hep_vO® Self-Sealing
Waste Valve**

**Product & Installation
Guide**



Introduction to Hep_vO®

Hep_vO® is a unique self-sealing waste valve that prevents the escape of foul sewer air from waste discharge systems, and actively maintains the pressure equilibrium in soil and waste installations. As a dry sealing valve, Hep_vO® utilises a purpose designed membrane to create an airtight seal between the living space and the drainage system. The self-sealing valve opens under the water pressure of an appliance emptying, and closes to form a tight seal after the appliance has discharged under normal atmospheric conditions.

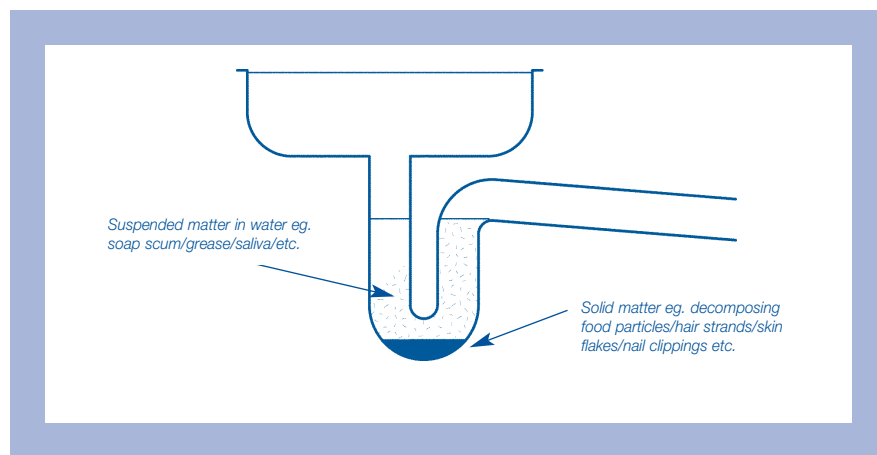


Benefits

The Hep_vO® dry self-sealing valve offers a number of benefits for both the professional installer and end user of the product. In addition, Hep_vO® offers considerable benefits for the system designer. See the System Design section of this document for further information.

- Hep_vO® actively eliminates negative pressure within the waste system by opening and allowing in fresh air until a state of equilibrium with atmosphere is reached. It subsequently closes to reseal the waste system and prevent foul air release. This means that the venting of the waste system, or the inclusion of an air admittance valve in the waste system, is no longer necessary.
- The Hep_vO® valve results in enhanced plumbing design and system efficiency. Unlike water seal traps, Hep_vO® is not affected by siphonage and will therefore not allow the escape of foul air into the living space from drain or sewer.
- Hep_vO® allows discharge water to pass easily through, regardless of the volume.
- Hep_vO® allows the placement of a greater number of appliances together on fewer discharge pipes without compromising the performance of the sanitary discharge system.
- Hep_vO® operates silently and is not subject to “gurgling” noises typically associated with siphonage and indicative of a breach in the water seal barrier. Independent tests confirm that Hep_vO® performs silently when subjected to a range of abnormal pressures.
- The Hep_vO® valve promotes hygiene, particularly where an appliance is infrequently used. Hep_vO® differs from conventional traps, which can dry out or hold water which can become stagnant causing the emission of smells and enhancing bacterial growth – see Figure 1 below.
- Even when hot or cold fats are released into it, a Hep_vO® valve continues to perform. In comparative tests with conventional traps, a solid plug of fat forms within the trap as the fat comes into contact with the cold water held in the trap.
- The Hep_vO® valve will perform under back pressures which are 10 times greater than those experienced in a typical soil and waste system.
- The flexibility of the Hep_vO® valve seal prevents the accumulation of limescale.

Figure 1. Water held in conventional traps can become stagnant



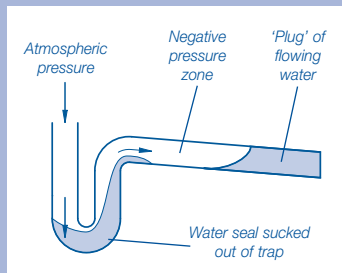
Benefits

Water seal weaknesses

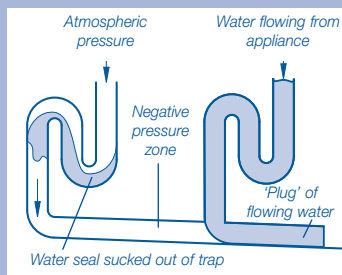
In summary, Hep_vO® will not fail under any of the conditions shown below in Figure 2.

Figure 2. Ten potential reasons for trap failure

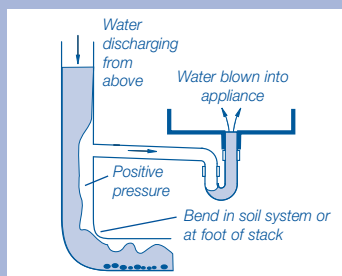
a. Self siphonage



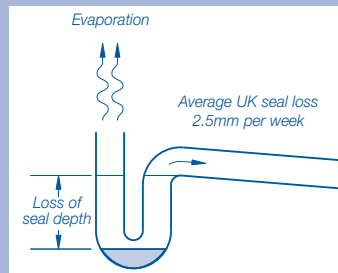
b. Induced siphonage



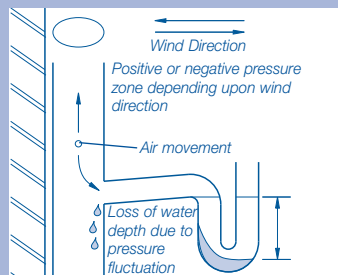
c. Compression



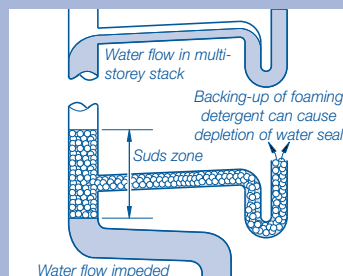
d. Evaporation



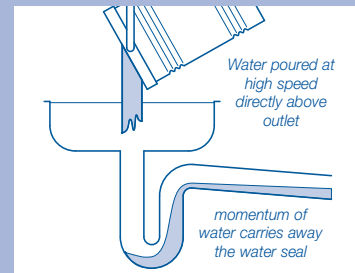
e. Wind effect (wavering out)



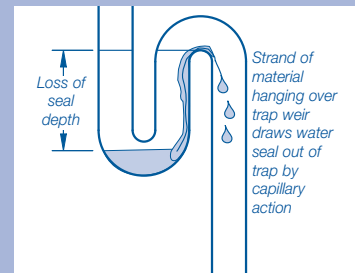
f. Foaming



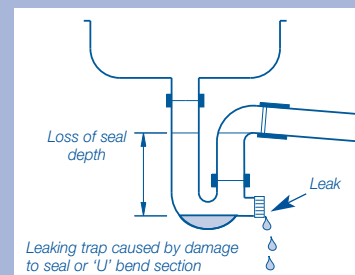
g. Momentum



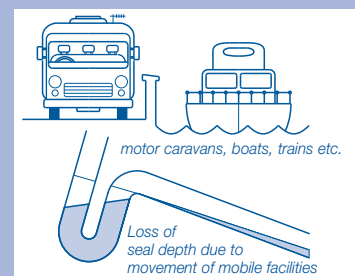
h. Capillary action



i. Leakage



j. Movement



Applications

Hep_vO® can be used more effectively than a conventional trap in domestic situations, including marine and mobile home installations (see Figure 2j).

A self-sealing waste valve is a suitable alternative for traditional waste traps on any waste appliance and on all types of sanitary systems such as primary ventilated systems (formerly known as “single stack”) and secondary ventilated systems, stub stacks, and where appliances connect to a gully. In addition, Hep_vO® can be used in a number of other applications:

- In conjunction with HepFlex® Waste flexible waste pipes and connectors, as well as with traditional rigid waste systems.
- Acts as an air admittance valve, allowing air into the drainage system when negative pressure occurs.

Once a state of equilibrium is met the valve closes. Using the valve as an air admittance tool provides cost savings, as it eliminates the need for a traditional open vent pipe or an air admittance valve to be positioned on the stack in certain circumstances.

- With an unvented hot water storage system to connect a tundish outlet pipe to a drainage stack. This stops the omission of foul air from drainage systems into premises. Using the Hep_vO® tundish adaptor kit, the connection from unvented hot water discharge appliances to soil stacks is simplified in systems with a temperature/pressure valve of no more than DN20. The kit reduces the number of fittings required, eliminating the need for a running adaptor. This application is not recommended for combi or sealed boiler systems.



System design

It is a mandatory requirement of the Building Regulations Document H that a drainage system does not allow foul air from the drainage system to enter the building under working conditions.

Primary ventilated soil and waste discharge systems, as described in BS EN 12056 Part 2: Code of Practice for Sanitary Pipework, will be subject to negative and positive pressures as water is discharged from associated sanitary appliances. These pressure fluctuations may result in self siphonage, induced siphonage or compression (see Figure 2 a,b,c).

If the primary ventilated system is designed strictly in accordance to the guidance in BS EN 12056 Part 2, then these positive and negative pressure fluctuations can cause water trap seal reduction, for example, reducing a wash hand basin trap from 75mm to 25mm. Systems which deviate from the regulations will be subject to greater pressure fluctuations which commonly

result in water displacement out of the trap allowing foul air to enter the building.

Foul sewer air is undesirable and must not be tolerated. A water seal trap which is not protecting people from the entry of sewer air can be identified by either a Gurgling Noise and/or a Foul Drain Smell.

The performance of the valve in excluding foul air is unaffected by those pressures normally found in domestic and commercial soil and waste systems. Hep_vO® removes the risk of the escape of foul sewer air that exists when using conventional traps.

Excessive positive pressures will be relieved by air bubbles escaping through any WC water seal within the system. However, should abnormally excessive internal pressures exceed 500mm water gauge (0.5 bar), then the valve element of Hep_vO® will invert, indicating high pressures exist within the soil and waste system. Another indicator is that water will backfill the appliance, thereby giving

an important safety warning that there is a problem within the system, and investigation is required. Hep_vO® allows the designer to place a greater number of appliances together on fewer discharge pipes without compromising the performance of the sanitary discharge system.

Design freedom and economic benefits

Current regulations for waste system design set limits on length and gradient of pipes and the number of appliances which can be connected to a waste pipe in order to keep pressure fluctuations to a minimum. This may be rectified by the incorporation of vent pipes at appropriate design locations.

The incorporation of Hep_vO® increases the designers' scope for the reasons listed opposite, whilst providing a good sanitary system offering a minimum resistance to flow, as stated in BS EN 12056: Part 2.

System design (continued)

- 1 Full bore flow can be a benefit where Hep_vO® is fitted to all appliances – see Figure 3. Full bore flow provides better self-cleansing, which means that smaller diameter waste pipe branches can be considered without fear of siphonage from traditional water-filled traps. This can also save space and cost.
- 2 Anti-siphon piping and valves are not required for waste appliances.
- 3 Auxiliary venting is not required for ranges of waste appliances.
- 4 There is no maximum limit on waste pipe slopes.
- 5 Branches connecting waste appliances to a common pipe do not need to be swept at 45 degrees.
- 6 Where necessary, tight radius bends can be used without fear of siphonage or compression.

Time saving

Hep_vO® allows for simpler systems with less pipework & straight runs – see Figure 3.

On completion of the installation, there is no need to perform self siphonage and induced siphonage tests for branch discharge pipes from waste appliances.

Figure 3. Schematic view for three basins

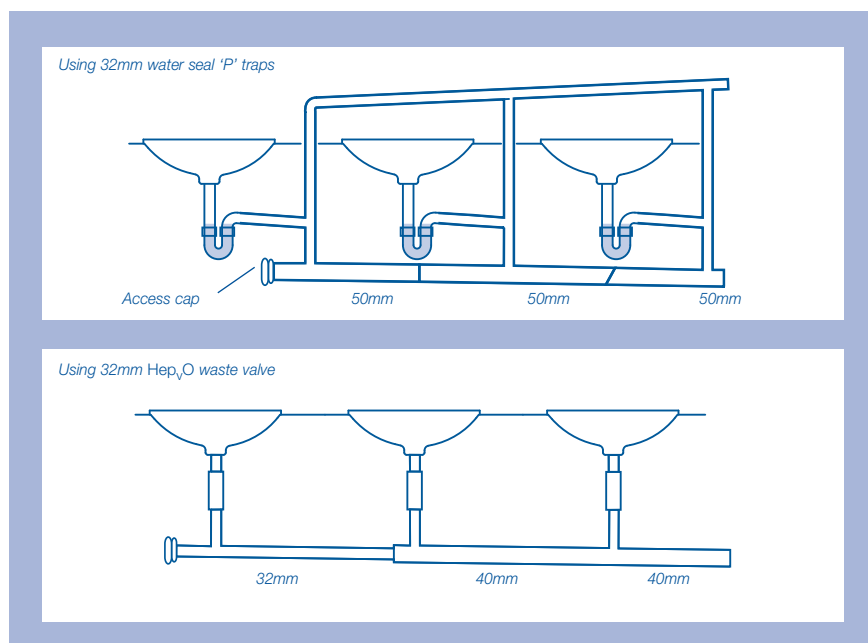


Figure 5. Space saving capabilities under a kitchen sink

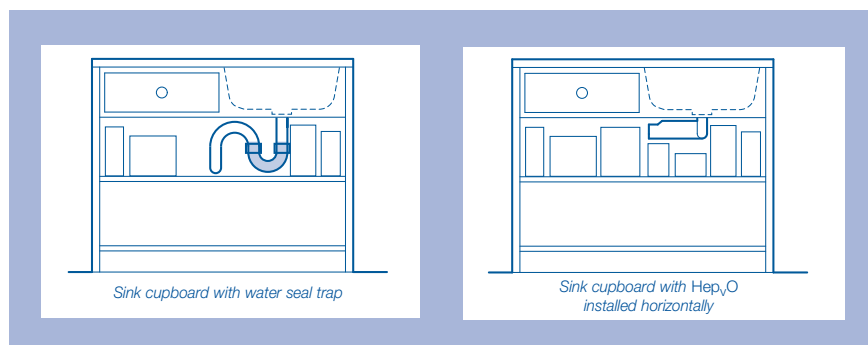
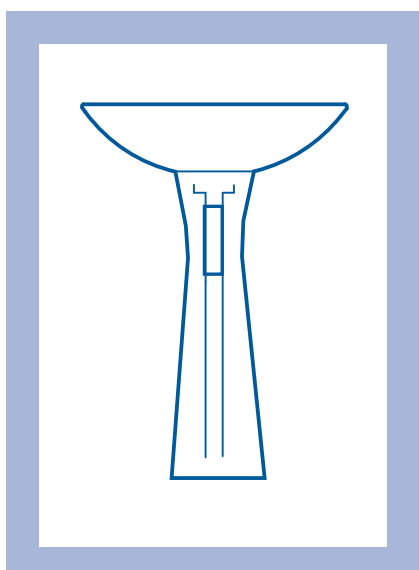


Figure 4. Hep_vO in a slimline pedestal



Space saving

Where required, the waste pipe can drop in a straight line from the appliance outlet which means that installation access for slimline pedestals is significantly enhanced – see Figure 4. For kitchen sinks, Hep_vO® can be offset to the back wall after a short run of waste pipe from the appliance outlet

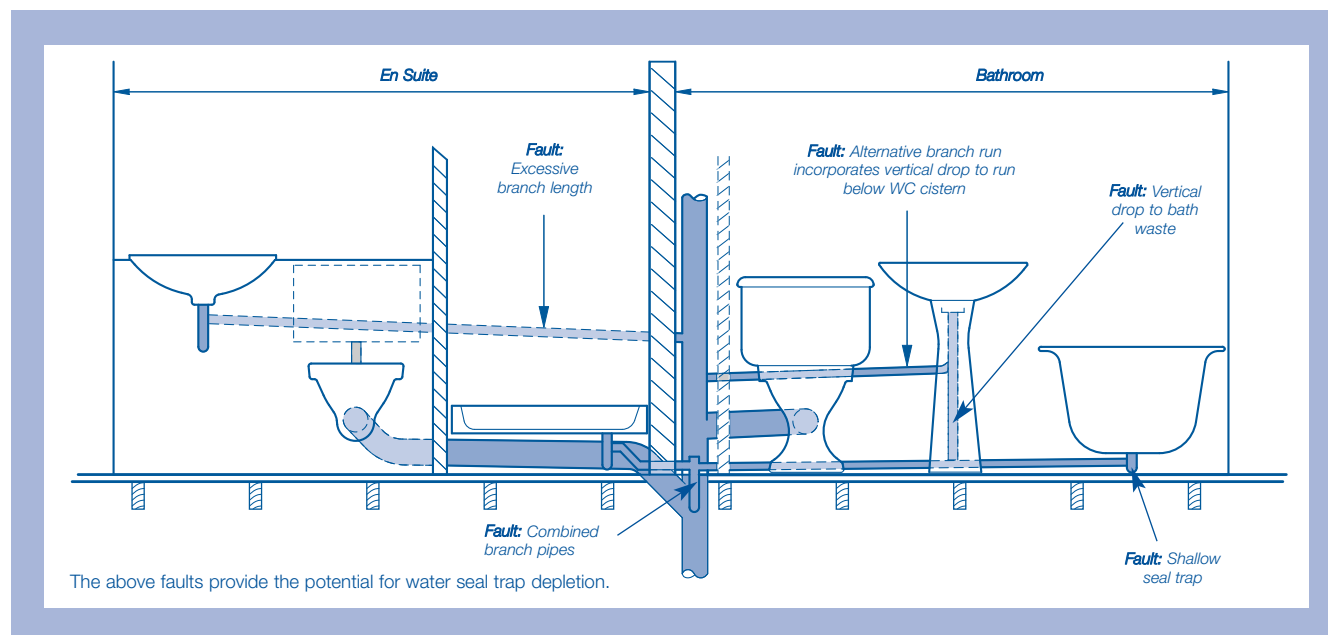
which opens up the cupboard space below the sink – see Figure 5.

Hep_vO® can be installed horizontally by using the 90° adaptor, which avoids cutting the floor under baths and showers to accommodate the 'U' bend of a trap – see Figures 10 & 11. If installed horizontally a fall of at least 10° is recommended.



System design (continued)

Figure 6. Problems leading to trap failure within a typical bathroom and en-suite arrangement Installation requirements often dictate pipework is outside the design limitations of BS EN 12056 Part 2



As house designs become more creative and complex, they create greater potential within the system for pressure fluctuations and trap failure.

Example: Adjacent bathroom and en-suite.

In Figure 6, a conventional water seal trap would be liable to failure as a result of pressure fluctuations. Use of the HEP_vO® valve in this design would relieve negative pressure changes and maintain an effective seal between each waste appliance and the drainage system.

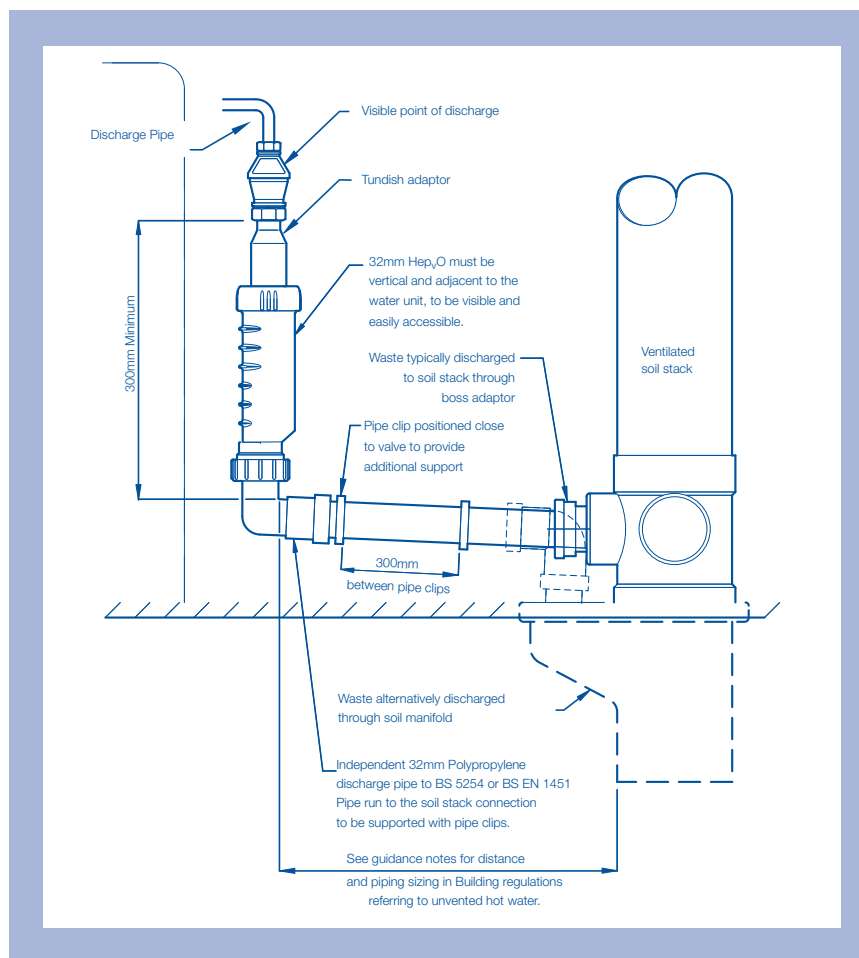
Example: An unvented hot water storage system.

In Figure 7, the HEP_vO® valve is used in conjunction with a combined temperature and pressure relief valve. The hot water is discharged through the HEP_vO® valve. In this application, the discharge pipe should only be of either polypropylene to BS EN 1451 Part 1 or copper.

Ventilation

Care should be taken to ensure that the underground drainage system is not completely sealed. Natural open ventilation is required at the head of each main drain run and/or at every tenth dwelling.

Figure 7. Self-sealing valve when used with a combined temperature and pressure relief valve for unvented hot water storage system



Installation

Hep_vO® should be installed in accordance with the instructions given here.

Orientation

When fixed horizontally to an appliance outlet or to a sloping pipe Hep_vO® must be installed with the ribs underneath – see Figure 8. This prevents standing water and provides a continuous fall.

Hep_vO® inlet

The inlet is provided with a screwed cap and sealing ring, designed to connect to waste fittings conforming to BS EN 274, or to a Hep_vO® inlet adaptor.

Jointing

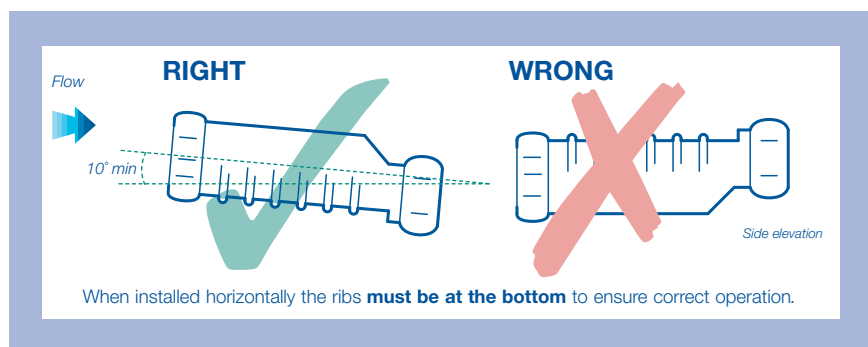
Offer up the Hep_vO® inlet to the threaded tail of the appliance waste outlet or Hep_vO® knuckle or running adaptor, and tighten the threaded cap sufficiently hand-tight to provide a water-tight seal (check that the cap screws on square and does not ‘cross-thread’). When the screwed cap is tight, the Hep_vO® body is secure.

Hep_vO® outlet

The outlet is provided with a universal compression connection which is designed for use with BS EN 1451 Part 1 (formerly BS 5254) polypropylene pipe, BS EN 1455 Part 1 ABS, MUPVC or polypropylene pipe, BS EN 1057 copper pipe, or equivalent imperial size copper pipe to BS 659.



Figure 8. Hep_vO® orientation when installed horizontally

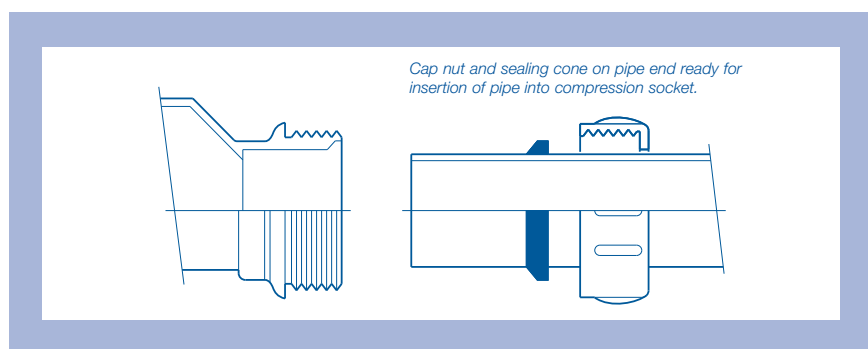


Jointing

- 1 Cut the pipe to length, allowing for the full compression socket depth (using an appropriate pipe cutter, such as a Hepworth ratchet pipe cutter).
- 2 Remove any ‘swarf’ from the end of the plastic pipe. Ream the copper pipe end to remove any ‘burr’, and file if necessary to remove any external sharp edges. Mark the socket depth on the pipe, and check that the pipe section to be jointed is free of any surface damage which may affect the joint seal.
- 3 Unscrew the cap from the Hep_vO® outlet, and slide the cap and rubber seal onto the pipe – see Figure 9.
- 4 Insert the pipe end fully into the socket.
- 5 Slide the rubber seal and screwed cap up against the face of the socket, and tighten the cap sufficiently hand-tight (check that the cap is square to the body and does not ‘cross-thread’).

NOTE: Do not use any jointing compound or sealant on the Hep_vO® inlet or outlet connections.

Figure 9. Hep_vO® outlet connection



Installation (continued)

Hep_VO® can be used on any waste appliance. The installation arrangement will depend on the dimensional design of the appliance and site constraints. Figure 10 shows some of the mounting options for Hep_VO®.

Hep_VO® can be fixed directly to the waste outlet of an appliance. By using the appropriate adaptor it can also be mounted in the horizontal position either at the appliance or on the pipe.

Hep_VO® should ideally be fitted vertically. If a Hep_VO® valve is fitted horizontally, then a significant fall of around 10° is recommended so that waste water does not lie in the valve – see Figure 8.

Waste piping

Waste pipes should have sufficient slope to convey the likely flow, but should not be less than 18mm/metre in accordance with BS EN 12056 Part 2. When using Hep_VO® there is no maximum slope limitation – often a restriction applicable to single stack waste systems.

As Hep_VO® is unaffected by siphonage or compression, combined waste piping can be used to connect more than one appliance to the stack. Figure 11 shows how Hep_VO® can be used to simplify the plumbing to a typical bathroom.

Any branch discharge pipes serving appliances not fitted with Hep_VO® (eg. a range of WC's) should be designed and installed in accordance with BS EN 12056 Part 2. Discharge stacks should continue to be sized, and vented where appropriate, in accordance with BS EN 12056 Part 2.

NOTE: Care should be taken to ensure that the underground drainage system is not completely sealed. Natural open ventilation is required at the head of each main drain run and/or at every tenth dwelling.

Figure 10. Hep_VO® mounting options

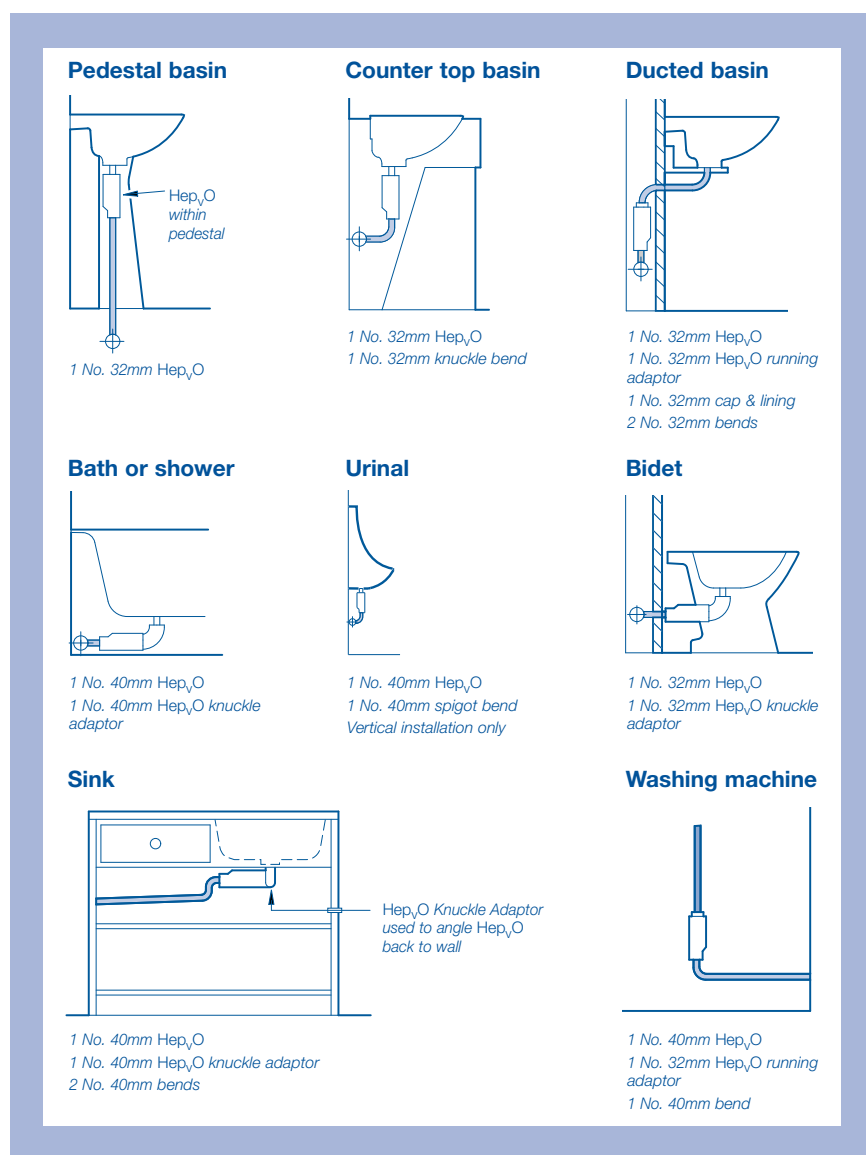
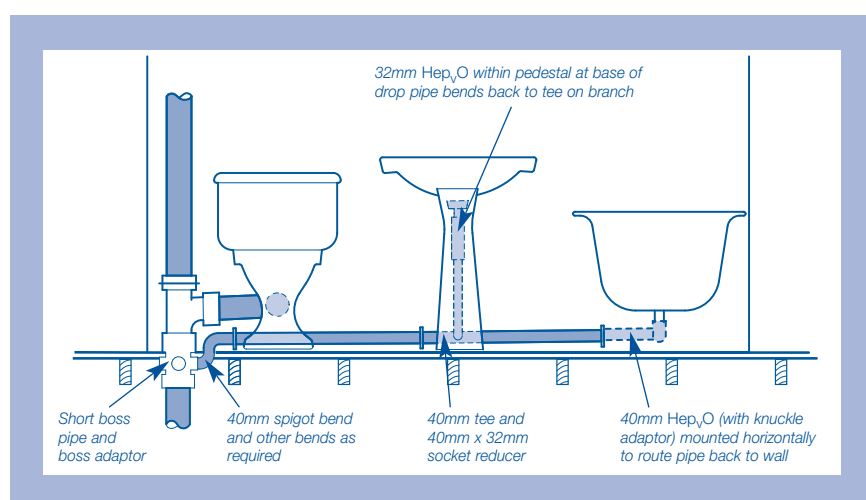


Figure 11. Hep_VO® installation in a typical bathroom



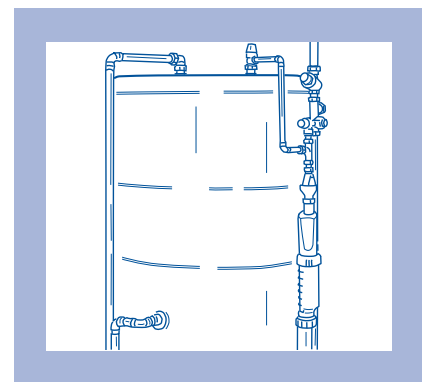
Installation (continued)

Hep_VO® tundish adaptor kit

The Hep_VO® tundish adaptor kit should be installed as described below. Unvented hot water systems must be installed by certified and qualified installers.

1. Connect and correctly tighten the tundish adaptor spigot into the compression fitting outlet of the tundish (supplied by the manufacturer of the unvented hot water storage system).
2. Hand-tighten the screw thread connection of the tundish adaptor to the rotating captive inlet thread of the Hep_VO®.
3. Connect and hand-tighten the Hep_VO® outlet connection to the waste pipe.

Figure 12. Tundish adaptor kit installation on an unvented hot water storage system



Testing and maintenance

Hep_VO® operates as illustrated in Figure 13 below.

The following tests are relevant to any sanitary installation, not just to installations where Hep_VO® is incorporated.

Air tests

Sanitary installations should be air tested to 38mm water gauge for at least 3 minutes, in accordance with Building Regulations Approved Document H. Installations which incorporate Hep_VO® can be tested in the normal manner, using

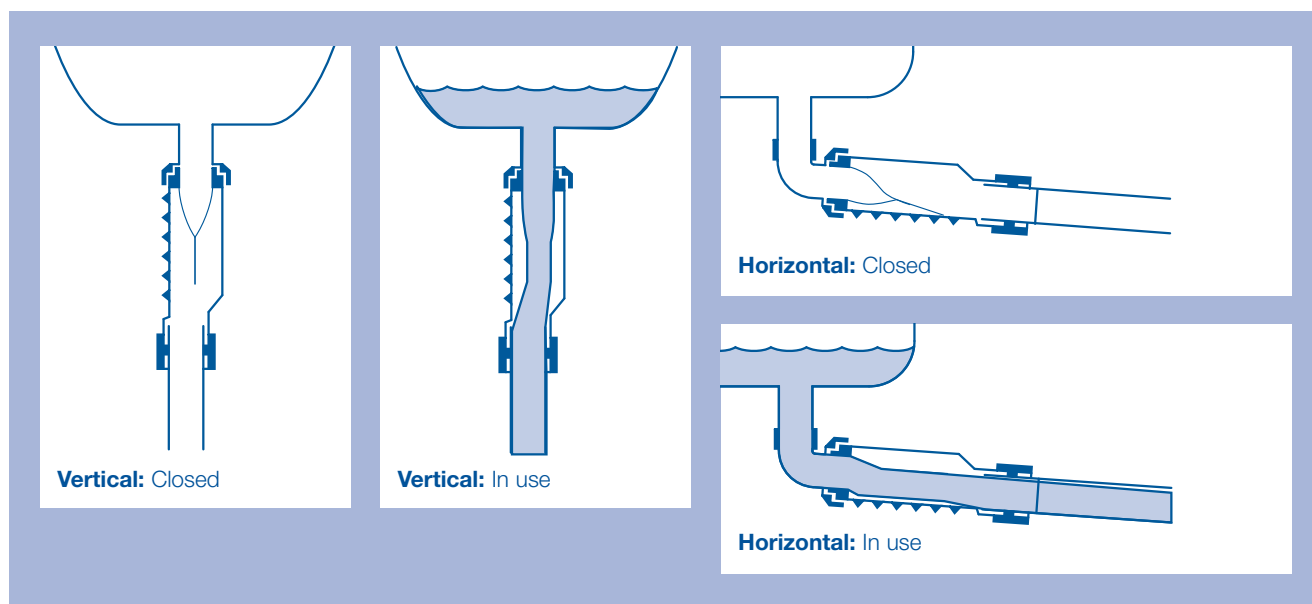
standard test equipment, as shown in Figure 14. Various sizes of expanding pipe stoppers (100mm or larger) are available from the Hepworth drainage range. Smoke producing equipment should **not** be used when testing plastics pipework.

Water tests

Water testing the base of a discharge stack is recommended, especially where there are no appliances on the bottom storey, and where the stack is to be concealed. Testing is normally achieved

by fixing a temporary expanding pipe stopper to the drain at the base of the stack, and filling the stack with water up to the flood level of the lowest sanitary appliance (providing that the test pressure does not exceed 6 meters water gauge for soil and waste products and 4 meters water gauge for drainage products). When performing a water test, it is recommended that the expanding pipe stopper is provided with a temporary strut (to prevent blow-out), and fitted with a drain valve.

Figure 13. Operation of Hep_VO®



Testing and maintenance

Performance tests

Sanitary installations should be tested at simultaneous design flow conditions in accordance with BS EN 12056 Part 2. Tests for self-siphonage and induced siphonage in branch discharge pipes where HEP_vO[®] is fitted to each appliance are unnecessary.

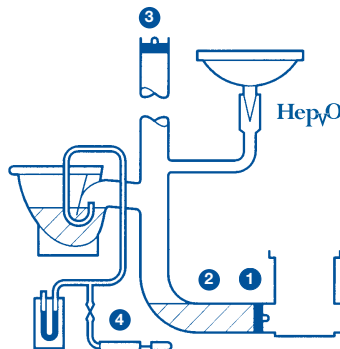
Other branch pipes and discharge stacks should be tested in accordance with BS EN 12056 Part 2.

Blockages

If a pipe blockage occurs downstream of HEP_vO[®] we recommend temporarily removing the HEP_vO[®] valve before rodding the pipeline. If the HEP_vO[®] is rodded there is the possibility that damage to the internal components will occur.

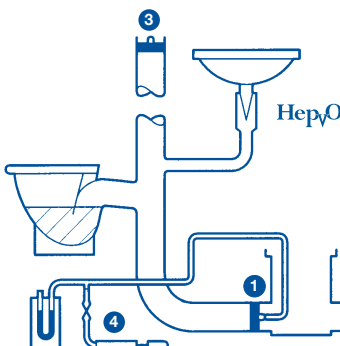
Figure 14. Test methods

Method 1



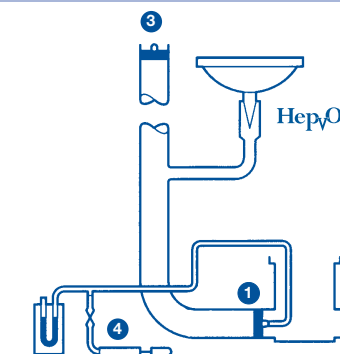
Waste appliances fitted with HEP_vO, all other traps full of water.
Test hose connected via trap seal.

Method 2



Waste appliances fitted with HEP_vO, all other traps full of water.
Test hose connected to base of stack.

Method 3



Waste appliances fitted with HEP_vO, no water seal traps installed.
Test hose connected to base of stack.

Key

- 1 Temporary expanding pipe stopper in drain at the base of the stack.
- 2 Water filled behind stopper to confirm effective seal (optional).
- 3 Temporary expanding pipe stopper in discharge stack (not necessary where air admittance valve is installed).
- 4 Standard air testing kit comprising of air pump, test cock, 'U' gauge, test hose and hose tee piece.

Notes

- a An inflatable bag type pipe stopper may be used instead of an expanding pipe stopper at 1, where appropriate.
- b On multi-storey buildings it may be more convenient to test the stack in stages.

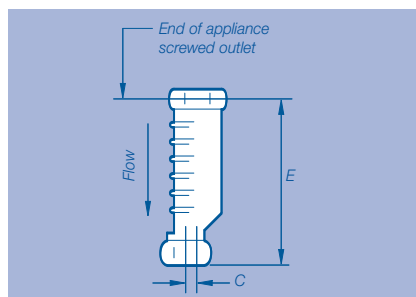
Product detail

The Hep_VO® valve and knuckle adaptors are available in sizes 32mm and 40mm. The Hep_VO® tundish adaptor kit comprises a 32mm Hep_VO® valve and tundish adaptor. A 87.5° knuckle adaptor should be used with the Hep_VO® valve for horizontal applications, and a running adaptor when installed the Hep_VO® in a pipe run. All items are manufactured from white polypropylene and are covered by BRE certificate no 042/97. Dimensional data for the Hep_VO® is shown in Figure 15 below.

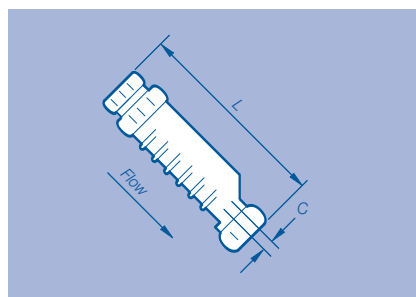
Hep_VO® dimensional data

Figure 15. Principle dimensions (mm)

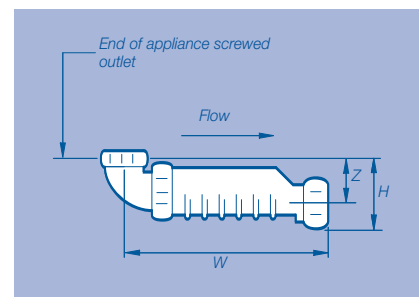
SIZE	C	E	L	W	Z	H
32mm	8	171	208	211	40	70
40mm	5	171	208	213	40	73



a) Fixed vertically directly to appliance outlet



b) Fixed on a pipe at any sloping angle using running adaptor (available separately)



c) Fixed horizontally to appliance outlet using knuckle adaptor (available separately)

Notes:

- 1 Dimensions are nominal and may vary slightly due to compression of the rubber seals.
- 2 When fixed to a pipe, it is recommended that Hep_VO® should remain accessible.

Quality, standards and approvals

All Hepworth branded products are manufactured under a quality management system which is approved to BS EN ISO 9001.

All Wavin manufacturing sites operate Environmental Management Systems which comply with the requirements of, and are certified to, BS EN ISO 14001.

The use of Hep_VO®, when installed in accordance with manufacturers recommendations, will ensure that

installations comply with the requirements of BS EN 12056 Part 2 Code of Practice for Sanitary Pipework, and Document H of the Building Regulations 2002 'Drainage and Waste Disposal', with respect to seal integrity.

Hep_VO® functions without the use of water and complies with all other relevant functional requirements of BS EN 274: Specification for Plastics Waste Traps.

Hep_VO® is certified by BRE, certificate number 042/97, as a satisfactory means of excluding foul air from a building within a single stack drainage system.

Hep_VO® also complies with BS EN 15749-1 2004 Ships and Marine Technology – drainage systems on ships and marine structures.

Test results indicate that the Hep_VO® valve has a life expectancy at least equivalent to current water sealed traps.

Customer service

Wavin operates a Technical Advisory Service to answer any technical enquiries you may have about the Hep_VO® range or any other Hepworth product.

Products can be ordered through your builders or plumbing merchant.

Wavin Online

All literature can be downloaded via the searchable PDF library at:
www.wavinpdfs.co.uk

Literature Requests

To request a copy of any item(s) of current literature, please contact:

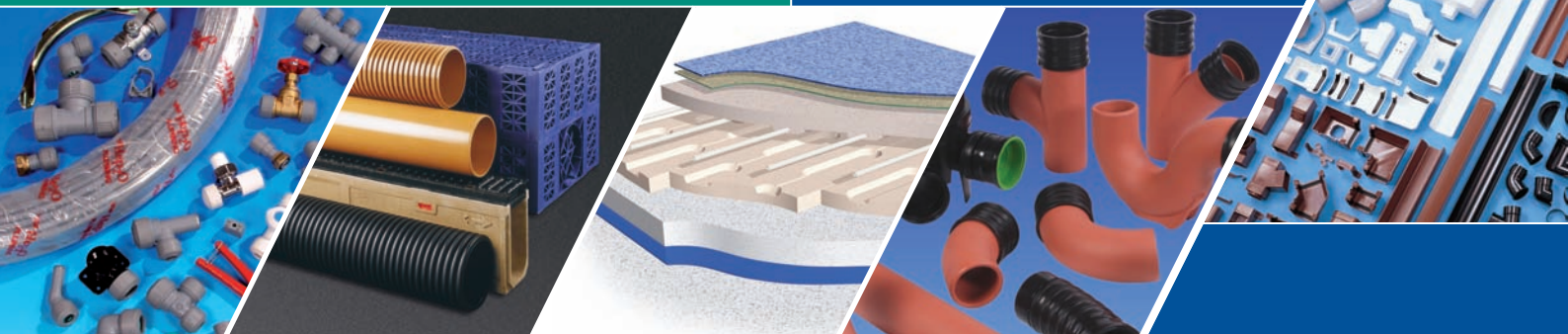
Tel: 01249 766333

Fax: 01249 766332

Email: literature@wavin.co.uk

Hep_vO® Self-Sealing Waste Valve

Product & Installation Guide



Meeting your needs

Wavin offers a comprehensive range of plastic, clay and terracotta systems under the OSMA, Hepworth and Hep₂O® brands that provide intelligent solutions for all Building & Installation, Civils & Infrastructure and Surface Heating & Cooling applications.

All OSMA and Hepworth systems are backed by full technical literature and project support.



ISO 9001:2000

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