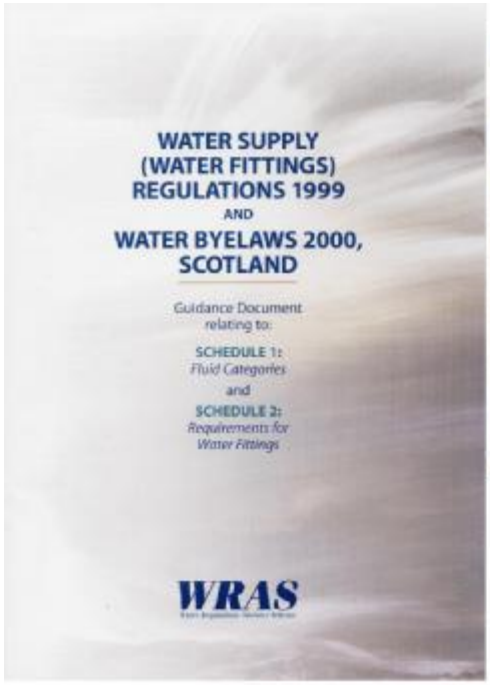
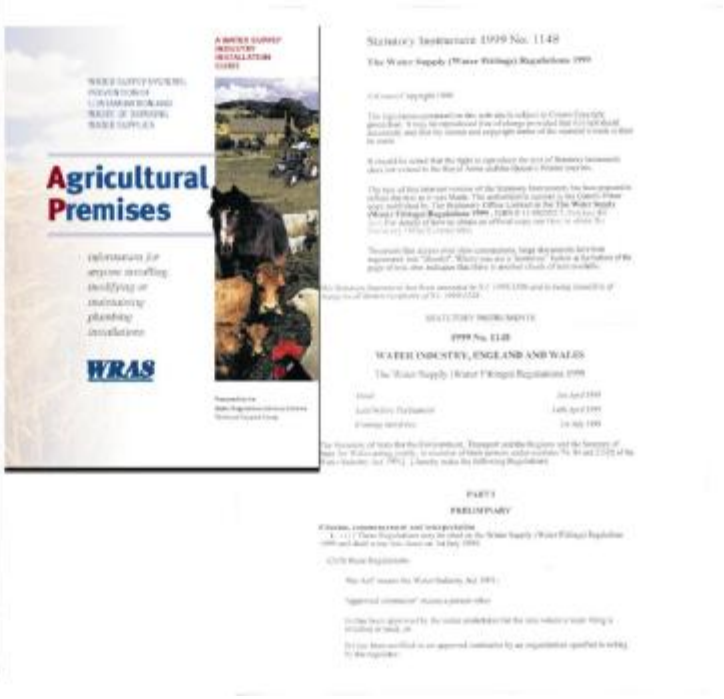
Information

Horticultural Consultants
Weggs Farm
Common Road
Dickleburgh, DISS
Norfolk IP21 4PJ
Tel: 01379 741200
Fax: 01379 741800
Email: info@dovebugs.co.uk
www.dovebugs.co.uk

Mains Water System Regulations

All nurseries and garden centres that use mains water for hosepipes and irrigation systems need to make sure that their equipment complies with recent regulations passed in England, Scotland, Northern Ireland and Wales. These regulations are called the Water Supply (Water Fittings) Regulations 1999 or (in Scotland) Water By-laws 2000. www.hmso.gov.uk/si/si1999/99114802.htm & http://www.hmso.gov.uk/si/si1999/19991148.htm. Booklets giving guidance notes to the various regulations are available from the Water Regulations Advisory Scheme (WRAS). Copies can be obtained from WRAS, Fern Close, Pen-y-fan Industrial Estate, Oakdale, Gwent NP11 3EH Tel: 01495 248454 or http://www.wras.co.uk. They also produce a booklet on the use of mains water on agricultural premises.





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The Government has placed quite high penalties on the water supply industry if they supply contaminated water; therefore they are taking quite seriously any businesses that could cause co ntamination in the event of back syphonage into the mains. Nurseries and garden centres are considered one of the high risk sites due to the use of liquid feed, pesticides and the water that remains trapped in pipes for lengthy periods of time. Most of the water suppliers in the UK are now making appointments to inspect premises to check for their compliance to these regulations and this is sometimes done on a geographical postcode basis.

Contamination

Inspectors are looking for three conditions would cause the water to fall below the EU Drinking Water Standards.

- Contamination is where a change takes place with the quality of the water or there is a deterioration of the quality supplied by the water supplier.
- Back flow is defined as flow in a direction contrary to the intended normal direction of flow.
- Cross connections is where there are any connections between the mains water supply and any other water supply that may or may not be classified as drinking quality.

Contamination can be caused by many situations on a nursery or garden centre.

- Tanks used for capillary watering systems that may have the outlet of the ball valve below ground level are subject to flooding.
- Water supplies that are used for preparation of pesticides again should have no co nnection to any tank or sprayer during the filling process. This is usually achieved with the use of an air gap in the system.
- Pipe or fitting that contains water that is not wholesome must not be connected to pipes that contain mains water unless there is adequate backflow prevention in the pipeline.
- All underground pipes should be at a minimum depth of 750mm, unless you have permission from the water undertaker for technical reasons. Pipes can be lagged or put into a duct to increase the insulation. Pipes that are placed shallower are subject to frost damage and splitting, which, again, can allow dirty water into the pipeline.
- Float operated valves must have an isolating valve in the pipeline to them to turn them off in the event of leakage.
- Spray lines, which may not completely drain at the end of each irrigation run, may have water sitting in them for several days, which can create a hazard with regards to water quality in the event of a backflow condition.
- Spray lines and hoses that are used for liquid feed applications should never have a diluter connected to them straight onto the mains. There is a risk that the fertiliser could be sucked back during low-pressure conditions.

System modifications

Within the regulations you should also contact your water undertaker and seek their approval before any work is carried out on your water system, where it is fed from the mains. Work that is not a direct connection, such as an irrigation system with a tank and pump, is actually subject to these cond itions if the water source is from the mains. Water abstracted by you from a borehole, reservoir etc is not relevent to these regulations. You need water undertakers' approval for the following extracts of the regulation that are related to horticulture:

- Extension or alteration of a water system on any premises other than a house.
- The installation of any water system laid outside a building and either less than 750mm or more than 1350mm below ground level.
- Nursery watering systems unless they are designed to be operated by hand.
- A pump or booster drawing more than 12 litre/minute.
- Where a water fitting is installed, altered by an approved contractor, the contractor shall provide a signed certificate stating that the system complies with all relevant regula tions.

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Enforcement
The water undertaker can serve an enforcement notice on a business with a time limit for completion of the improvement. In such situations you can discuss the work with the water undertaker and the practical time scale for the remedial work. An enforcement notice is most likely related to contamination or leakage issues. In such a situation you should ensure that the work is carried out by or under the direction of an approved contractor.

Water quality categories
The contamination is classified into various categories according to the seriousness of contamination:

Fluid category **1**
Water supplied by a water company and meeting the quality requirements for drinking water.

Fluid category **2**
Water in fluid category 1 whose quality is impaired owing to a change in its temperature or the presence of substances causing a change in its taste, smell or appearance.

Fluid category **3**
Water which represents a slight health hazard because of the concentration of substances of low toxicity, including any water which contains chlorine, antifreeze or copper sulphate.

Fluid category **4**
Water that represents a significant health hazard because of the concentration of toxic substances including any fluid that contains pesticides, herbicides,fungicides or environmental organisms of potential health significance.

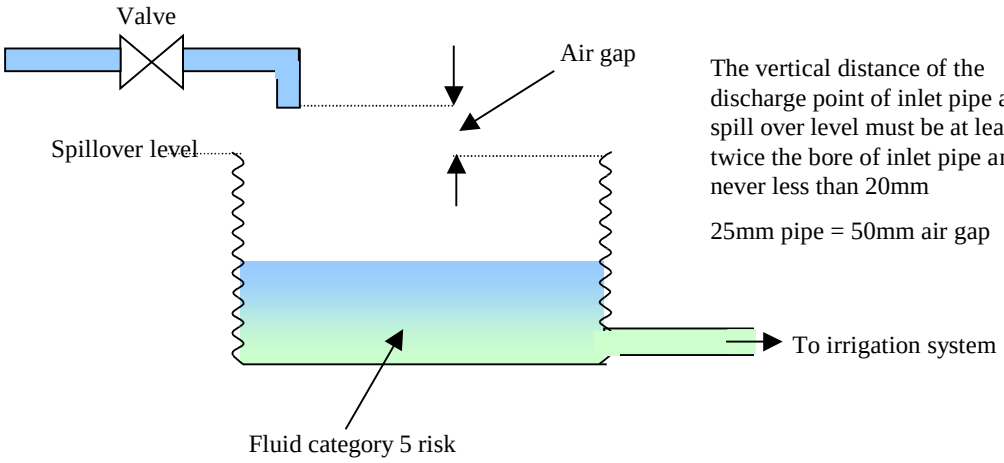
Fluid category **5**
Fluid representing a serious health hazard because of the concentration of pathogenic organisms, radioactive or very toxic substances, including any fluid which contains human waste, animal waste or pathogens from any other source.

Backflow prevention systems
There are several methods of preventing water backflow. There is no one backflow prevention system that is suitable for all situations and the appropriate one must be chosen after consultation with your water undertaker.

Backflow prevention systems may involve the incorporation of an air gap in the supply pipe from the mains, installation of double check valves or air vacuum breakers in the incoming mains. The choice for the most appropriate system needs to be made on site as it is relative to the type of incoming mains installation. In the majority of cases the provision of a water storage tank with an incoming mains operated by a ball valve is sufficient to completely isolate the irrigation system from the mains, however there may be some situations where that is not possible. In these circumstances further measures must be taken to protect the incoming mains supply. This may require the splitting up of the incoming mains into sections and treating each section separately. Providing double check valve arrangements on different branches of the pipeline may be sufficient or the fitting of double check valves on water outlets. Check with your water undertaker as to the required system of backflow prevention. The following section outlines the various backflow prevention systems available, categorising them according to the DETR guidance notes as previously mentioned.

Air gap arrangements
An air gap relates to a visible, unobstructed and complete physical air break between the lowest point of the water outlet discharge and the level of potentially contaminated fluid within a tank fitting or appliance. The distance should never be less than 20mm or twice the internal diameter of the inlet pipe whichever is greater. Water should also discharge at not more than 15° from the vertical centre line of the water stream.

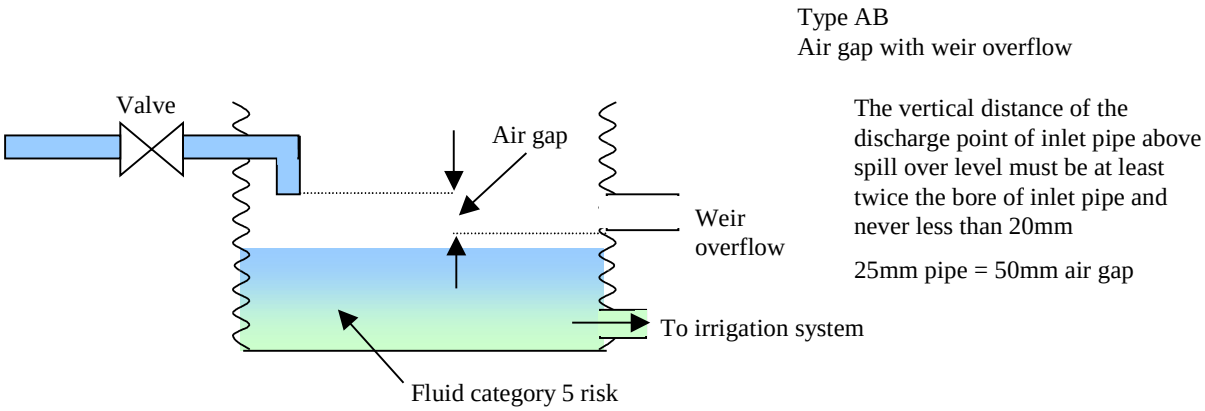
Type AA – Air gap with unrestricted discharge. A non-mechanical backflow prevention arrangement of water fittings where water is discharged through an air gap into a receptacle which has at all times an unrestricted spill over to the atmosphere. This is a typical ball valve into an open topped tank with the discharge point located above the spillover level.



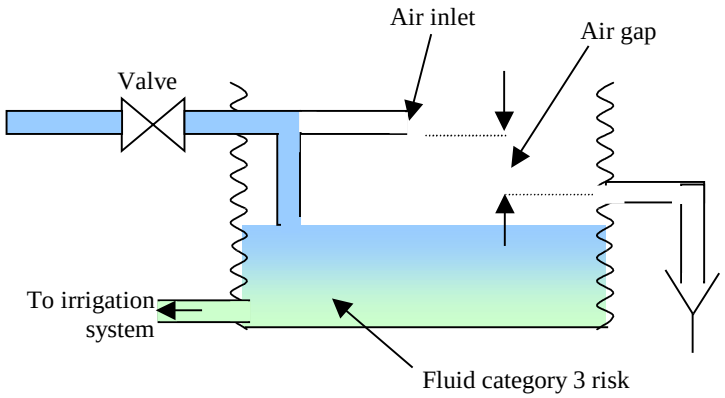
Type AB – Air gap with weir overflow. A non-mechanical backflow prevention arrangement of water fittings complying with Type AA, except that the air gap is the vertical distance from the lowest point of the discharge orifice which discharges into the receptacle, to the critical level of the rectangular weir overflow. This is for example where a ball valve discharges into a reservoir with overflow weir.

Critical level = level of fluid is the receptacle 2 seconds after closing the inlet, starting from the maximum fluid level.

The discharge point can be below the top of the receptacle in this arrangement.



Type AC – Air gap with vented submerged inlet and piped overflow. A non-mechanical backflow prevention arrangement of water fittings with a vented, but submerged, inlet; the air gap being measured vertically downwards from the lowest point of the air inlet to the critical level. This arrangement would be that used in a capillary sand bed with tank and drain. This only provides protection against backflow to fluid category 3 risks.



Type AC
Air gap with submerged inlet and circular overflow

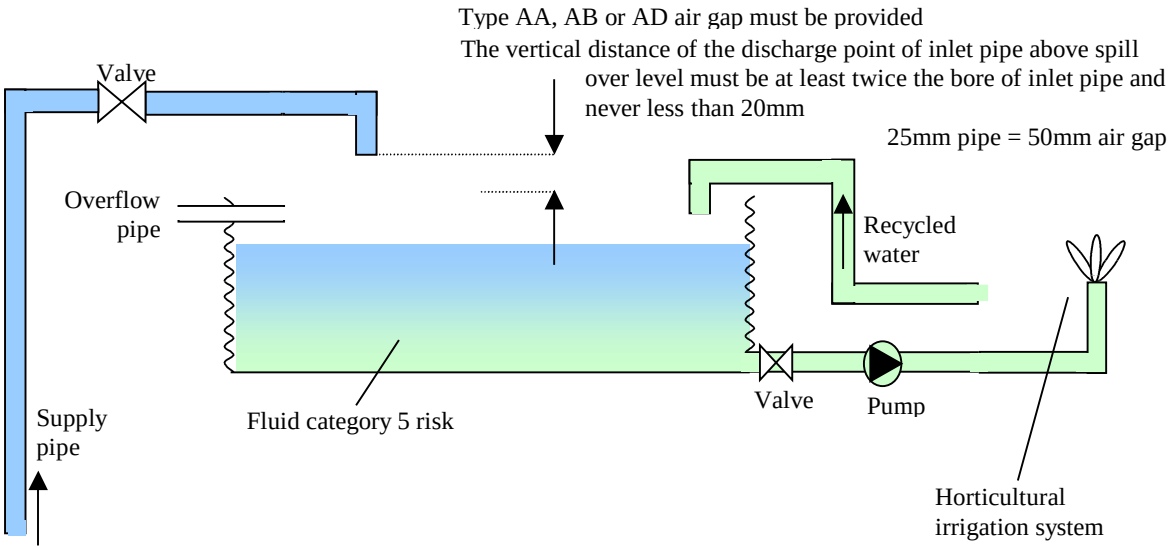
Air gap with vented submerged inlet, the air gap being measured vertically downwards from the lowest point of the air inlet pipe to the critical water level

The vertical distance of the discharge point of inlet pipe above spill over level must be at least twice the bore of inlet pipe and never less than 20mm

25mm pipe = 50mm air gap

Type AF – Air gap with piped overflow. A non-mechanical backflow prevention arrangement of water fittings with an air gap measured downwards from the lowest point of the discharge orifice, which discharges into a tank, to the critical level. This arrangement relates to tanks with an overflow pipe such as might be used in a small mist system. It only provides protection up to fluid category 5 risks.

Separation of water in a supply pipe from water that has been used



Non-mechanical backflow prevention arrangements and applicable fluid category			
Type	Description of backflow prevention arrangements	Suitable for protection against fluid category	
		Backpressure	Back siphonage
AA	Air gap with unrestricted discharge above spill over level	5	5
AB	Air gap with weir overflow	5	5
AC	Air gap with vented submerged inlet	3	3
AD	Air gap with injector	5	5
AF	Air gap with circular overflow	4	4
AG	Air gap with minimum size circular overflow determined by measure or vacuum test	3	3
AUK1	Air gap with interposed cistern (For example, a WC suite)	3	5
AUK2	Air gaps for taps and combination fittings (tap gaps) discharging over domestic sanitary appliances, such as a washbasin, bidet, bath or shower tray shall not be less than the following: Size of tap or combination fitting — Vertical distance of bottom of tap outlet above spill-over level of receiving appliance Not exceeding G½" — 20mm Exceeding G½" but not exceeding G¾" — 25mm Exceeding G¾" — 70mm	X	3
AUK3	Air gaps for taps or combination fittings (tap gaps) discharging over any higher risk domestic sanitary appliances where a fluid category 4 or 5 is present, such as: a.any domestic or non-domestic sink or other appliance; or b. any appliance in premises where a higher level of protection is required, such as some appliances in hospitals or other health care premises, shall not less than 20mm or twice the diameter of the inlet pipe to the fitting, whichever is the greater.	X	5
DC	Pipe interrupter with permanent atmospheric vent	X	5

Notes:

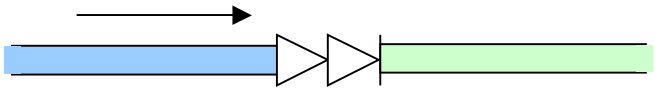
1. X indicates that the backflow prevention arrangement or device is not applicable or not acceptable for protection against backpressure for any fluid category within water installations in the UK.
2. Arrangements incorporating Type DC devices shall have no control values on the outlet of the device; they shall be fitted not less than 300mm above the spill over level of a WC pan, or 150mm above the sparge pipe outlet of a urinal, and discharge vertically downwards.
3. Overflows and warning pipes shall discharge through, or terminate with an air gap, the dimension of which should satisfy a Type AA air gap.

Backflow prevention arrangements

Type BA – Verifiable backflow preventer with reduced pressure zone. A mechanical backflow prevent ion device consisting of three pressure zones with differential non-return valves that will operate when potential backflow conditions occur or there is a malfunction of the valve. Provides protection up to fluid category 4. Information and guidance on use and installation is available from WRAS (see website www.wras.co.uk).

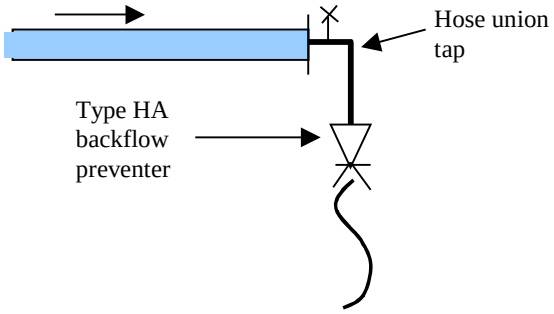
Type DA – Anti-vacuum valve (or vacuum breaker). A mechanical backflow prevention device with an air inlet which is closed when water within the device is at or above atmospheric pressure but which opens to admit air if a vacuum occurs at the inlet. Provides protection up to fluid category 3.

Type ED – Non-verifiable double check valve. This is a mechanical backflow prevention device consisting of two single check valves in series, which will permit water to flow from upstream to downstream but not in the reverse direction. Provides protection up to fluid category 3.



Type ED
Non-variable double check valve

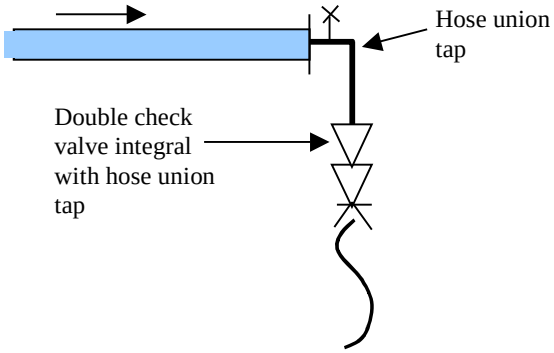
Type HA – Hose union backflow preventer. This is usually a portable device which is a mechanical backflow prevention device fitted to the outlet of a hose union tap and consisting of a single check valve with air inlets that open if the flow of water ceases.



Type HA
Hose union backflow preventer

Not to be used in new installations. Only permitted outside for fitting to existing hose union taps that do not incorporate any backflow prevention device.

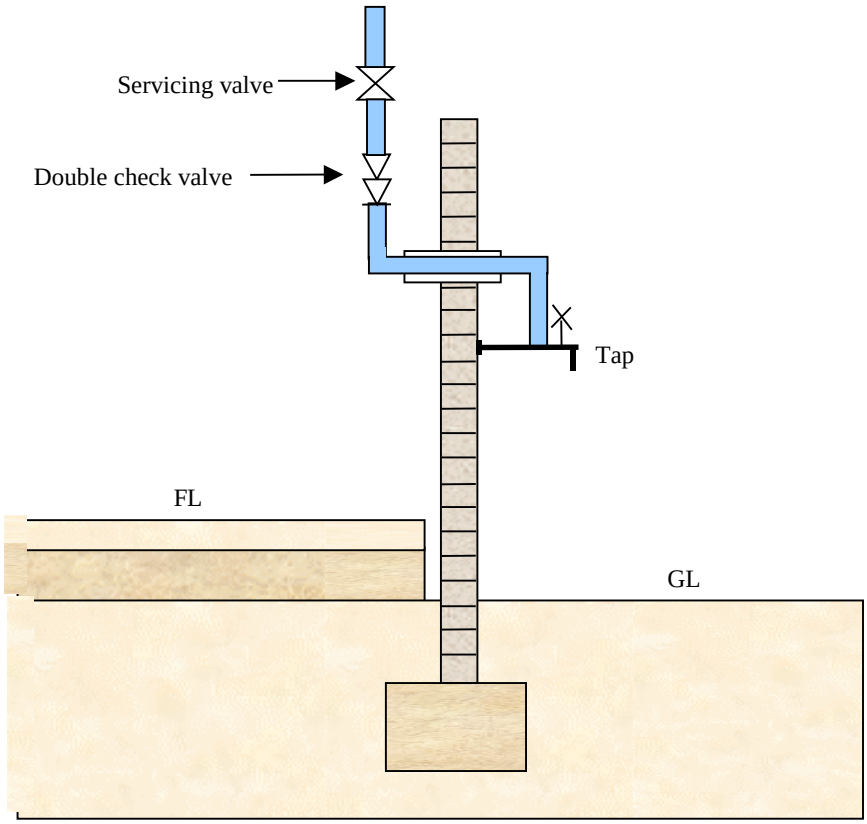
This is vulnerable to damage by freezing and needs to be protected or drained in winter.



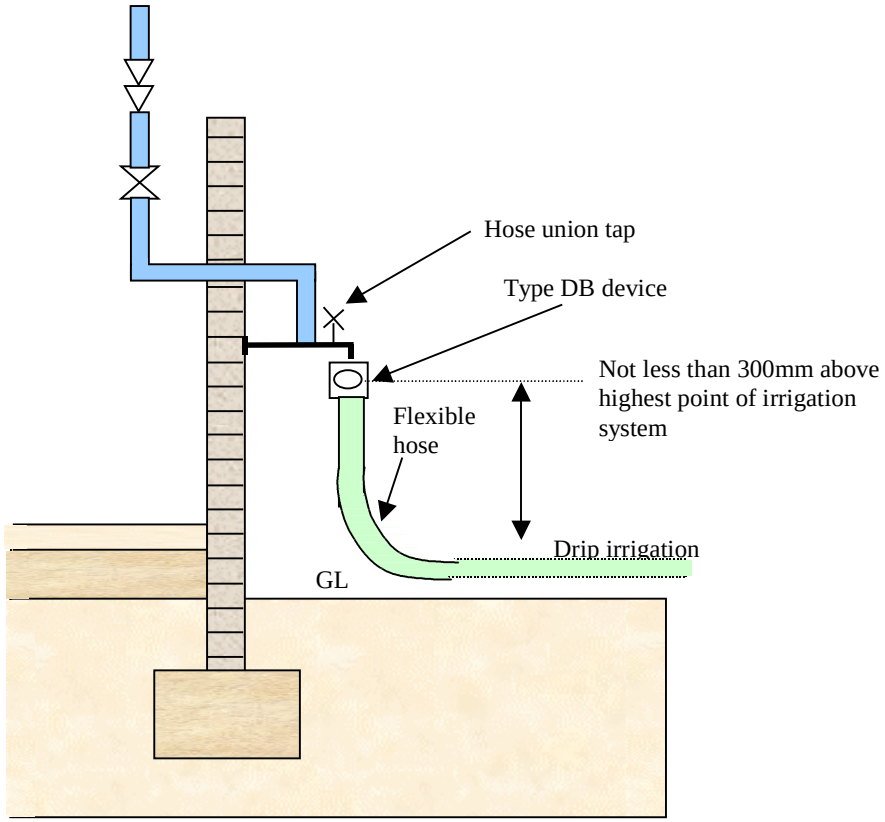
Type HUK 1
Hose union tap incorporating verifiable double check valve

*Not to be used in new installations. Only permitted outside for replacement of **existing** hose union taps that do not incorporate any backflow prevention device.*

This is vulnerable to damage by freezing and needs to be protected or drained in winter.



Backflow protection to external hose taps. Note that these systems may need approval from Water authorities in commercial situations



Drip irrigation where ground is level or sloping away from building

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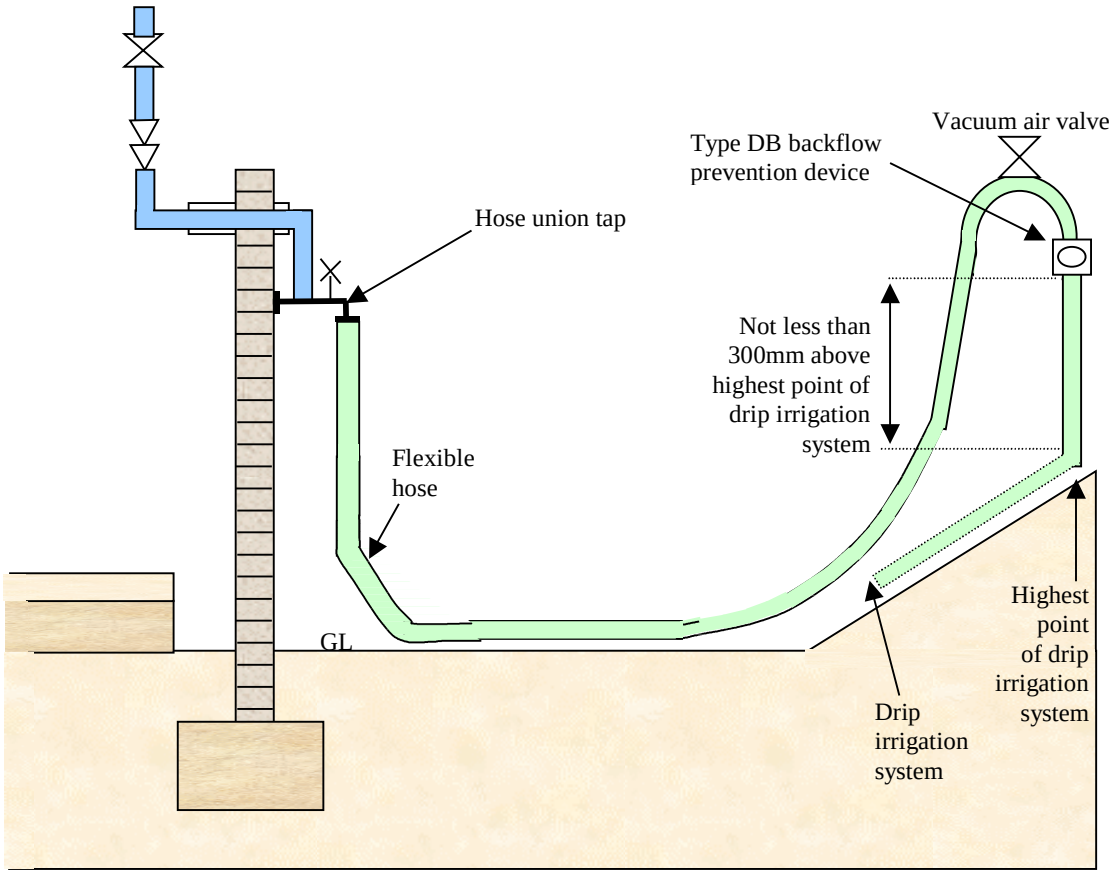

Drip irrigation with ground rising away from the tap

Type HUK1 – Hose union tap incorporating a double check valve. A hose union tap in which a double check valve has been incorporated into either the inlet or outlet of the tap.

The Water suppliers have agreed to accept these arrangements shown here and on the previous pages for domestic situations. A risk assessment may show a higher risk on your nursery in which case they may not be acceptable. Depending on the level of risk a type BA device (RP2 valve) or an air gap/booster pump may be needed. For example pesticide filling or fertilizer dilution may increase the risk of these arrangements, or outlets below ground level after the tap.