

Cold water services: storage cisterns - general design & installation requirements:



For cold water services storage cisterns to comply with the requirements of the Water Supply (Water Fittings) Regulations & Scottish Water Byelaws the complete installation must be designed and installed so that:-

It is of an appropriate quality and standard

- All components making up a cold water storage cistern, including the inlet, outlet and servicing valves, must conform to the requirements of Regulation 4.

The risk of contamination is minimised:

In a cold water cistern storing water that is required to remain wholesome, to minimise the risk of contamination it is essential that:

- There is a regular turnover of water, this can be achieved by:-
 - Sizing the cistern to ensure that water is stored for as short a time as possible. Suggestions for storage capacity are given in BS EN 806-2: 2005, however the local water supplier should always be consulted before finalising designs; and
 - Arranging the inlet and outlet connections so as to encourage mixing throughout and prevent areas of stagnation or 'short circuiting' within the cistern. For example positioning inlets and outlets on opposite sides, connecting cisterns in parallel and/or the use of delayed action float valves may help minimise the risk of stagnation.
- The cistern is fitted with a rigid close fitting and securely fixed lid or cover. Cisterns, and their lids, should be made of materials which do not shatter or fragment when broken. All non-metallic materials in contact with the contents, including any surface where condensate forms, must comply with the requirements of BS 6920.

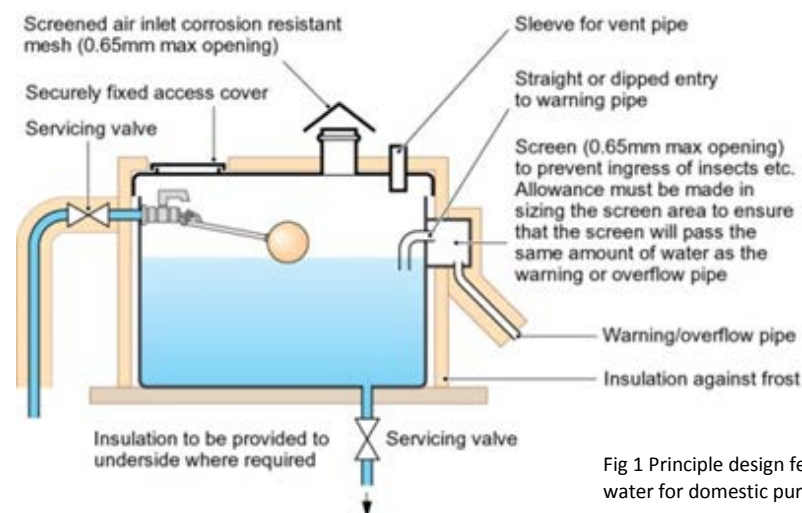


Fig 1 Principle design features for a cistern storing water for domestic purposes

Incorporates essential design features:

Inlet arrangements:

- The supply pipe feeding a storage cistern should be fitted with an inlet valve capable of shutting off the flow at a set level. If a floated operated valve is used, to ensure that it closes at the correct level the valve should not only be adjustable but also securely and rigidly attached to the cistern.

- If the cistern is fitted with a warning pipe the inlet valves must close when the level of water is not less than 25mm below the warning pipe overflow level. If an alternative to a warning pipe is being used the inlet valve must close at not less than 50mm below the overflow level.
- The supply feeding a storage cistern must be protected against backflow by one of the backflow prevention arrangements or devices listed in the Regulators' Backflow Specification*. This should have a fluid category rating that is equal to or exceeds the fluid level of risk categorisation for the cistern. The usual form of backflow protection for cisterns storing water for domestic use (i.e. drinking, bathing cooking, washing etc) is a Type AG air gap at the inlet, but alternative suitable backflow protection such as a single check valve on the supply to the inlet is equally acceptable**.
- To facilitate maintenance servicing valves should be installed on the inlet pipes adjacent to the storage cistern.

Outlet arrangements:

- Where practicable all outlets from a storage cistern should be located at the bottom of the cistern.
- All outlets from storage cisterns, except vent pipes, supplies to primary (heating) circuits, overflow pipes and warning pipes, should be fitted with a servicing valve as close to the cistern as is reasonably practicable.

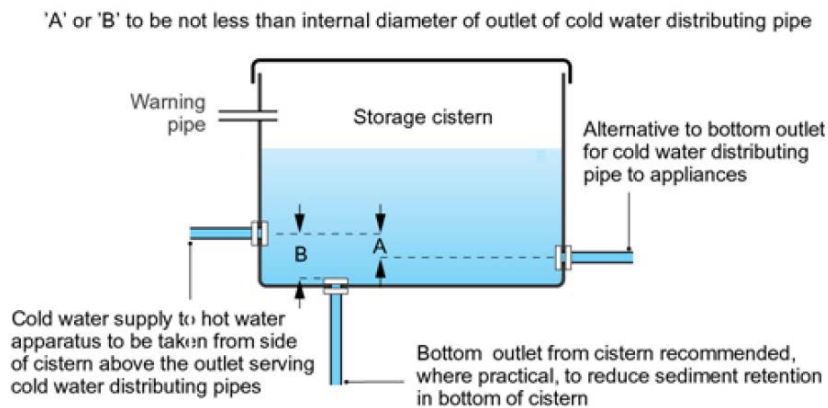


Fig 2 Example of the positioning of outlets from a cistern.

Overflow & warning pipe provision:

- Every storage cistern should be fitted with an overflow pipe plus a suitable means of warning of an impending overflow. A warning pipe is commonly used for this purpose, but alternatives such as visible or audible alarms may also be fitted. Although usually separate a combined overflow/warning pipe may be accepted on cisterns with a capacity of 1,000 litres or less.

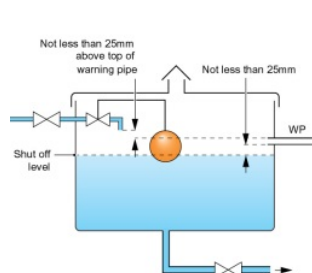


Fig 3 Cistern 1,000 litres or less capacity with combined warning /overflow pipe

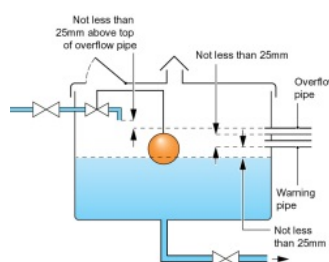


Fig4 Cistern 1,000 litres or more capacity with separate warning and overflow pipes

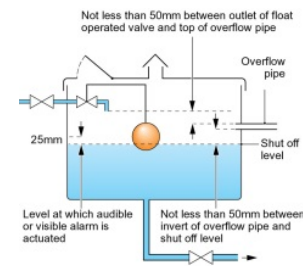


Fig 5 Cistern with an effective alternative to a warning pipe

- Overflow and warning pipes should be positioned so as to exclude light and screened to prevent the ingress of insects and other foreign bodies. Screen mesh size should not exceed 0.65mm (opening).
- Overflow and warning pipes should be installed on a downward inclined plane and not discharge into any other cistern.

* For further information on backflow prevention please refer to section 6 of the 'Defra guidance to the Regulations' document <http://archive.defra.gov.uk/environment/quality/water/industry/wsregs99/documents/waterregs99-guidance.pdf>

** Refer to WRAS Interpretation B42 for further information https://www.wras.co.uk/consumers/resources/interpretations_and_advice/backflow_prevention/b42/

- The discharge from the overflow/warning pipe must be conspicuous. If discharging to drain a visible air break, giving fluid category 5 backflow protection, in the form of an air break to drain conforming to the design specification given in EN 1717 or a type AA air gap must be installed.
- If a common warning pipe is used the location of the cistern overflowing must be readily identifiable.
- A warning/overflow pipe must be at least 19mm (internal diameter) and capable of accommodating all possible flow rates i.e. the maximum inflow under fault conditions. The effect of any screen on the nominal flow capacity must be taken into account when determining the size of an overflow.

Correctly installed:

- To minimise undue warming and the risk of freezing all cold water storage cisterns should be insulated.
- Every cold water storage cistern should be adequately supported to avoid distortion or damage. Refer to Part G of the Building Regulations provide further information and advice.
- Every storage cistern must be constructed and installed so that they can be easily inspected (both externally and internally) and cleansed. For ease of installation, maintenance and replacement float operated valves and other controls must be readily accessible, the minimum unobstructed clearance above a cistern is 350mm. Cisterns with a capacity greater than 1,000 litres should be capable of being inspected and cleansed without having to be wholly uncovered.

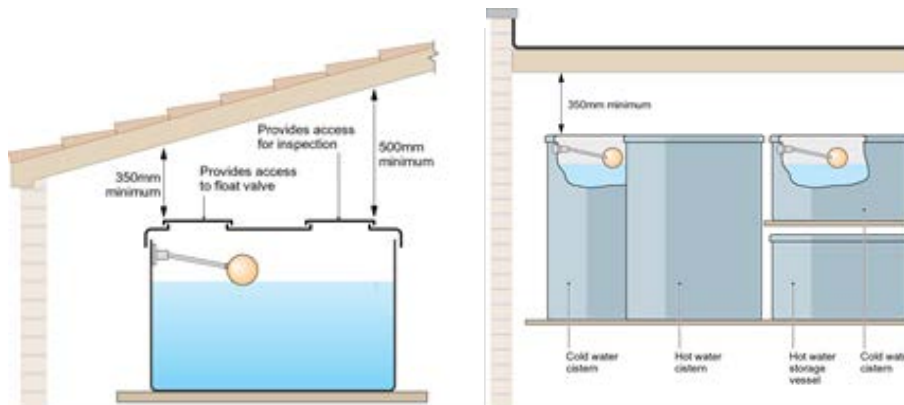


Fig 6 Minimum unobstructed clearance above a cistern 350mm

Connecting storage cisterns:

- The installation of inter-linked storage cisterns should be avoided wherever possible. Where it is unavoidable, the number of inter-linked cisterns should be kept to a minimum. To avoid stagnation storage cisterns should be connected so that flow throughout each cistern is encouraged.

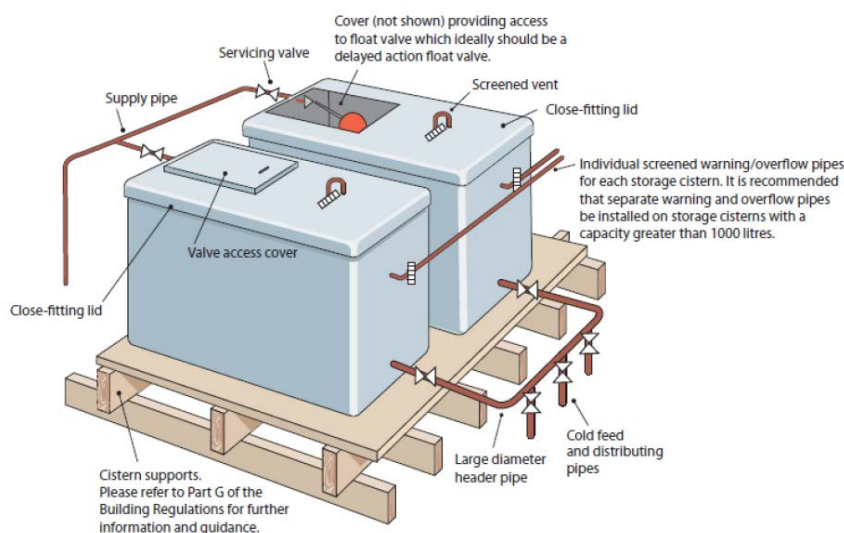


Fig 7 Example of how to connect storage cisterns