Requirements for cold water storage cisterns

The cold-water cistern is one of the most important parts of a cold water system. The following diagram is based on the Water Regulations requirements for cold-water storage cisterns.

Try to remember the following key points.

**Cisterns should be:**
- Fitted with an effective inlet control device to maintain the correct water level
- Fitted with service valves on inlet and outlet pipes
- Fitted with screened warning/overflow pipes to warn of overflow
- Covered to exclude light or insects
- Insulated to prevent heat loss and undue warming
- Installed so that risk of contamination is minimized
- Arranged so that water can circulate preventing stagnation
- Supported to avoid distortion or damage leading to leaks
- Readily accessible for maintenance and cleaning
Materials used for cisterns

In the past galvanized low carbon steel was the main material used to make cold-water storage cisterns. You might still come across these on maintenance jobs, but most new installations use cisterns made from plastic such as:

- Polyethylene
- Polypropylene
- Polyvinyl chloride

Cisterns made from these materials are:

- Light
- Strong
- Hygienic
- Resistant to corrosion
- Flexible, and can be maneuvered through small openings

The cisterns are available in square, rectangular or circular shapes, and are produced in black to prevent algae growth.

Because of their flexible material the base of the cistern should be fully supported.
Materials used for cisterns

Holes for pipe connections should be cut using a hole saw. The joint between cistern wall and fitting should be made using plastic washers. Oil-based paste of any description should not be used as this causes the plastic material to breakdown.

Connections to cisterns and control valves

Inlet controls

The Water Regulations require that a pipe supplying water to a storage cistern be fitted with an effective adjustable shut-off device. This device will close when the water reaches its required level. It must also be adjustable.

For most domestic applications, a float-operated valve is used. These must comply with the relevant British Standard (in this case BS1212), and are as follows:

- Portsmouth type
- Diaphragm valve made of brass
- Diaphragm valve made of plastic

The Portsmouth valve is not widely used on new installations as it does not provide an effective air gap between the water level and the point at which the valve discharges. You will more than likely see this valve on existing installations.

The brass or plastic diaphragm float valves can be used in any situation.
Diaphragm equilibrium float valves to BS1212 part 4 are designed primarily for use in a WC flushing cistern.

**Servicing Valves**

Inlet pipes to cisterns must have a servicing valve fitted immediately before connection to the cistern, in order to enable any maintenance to be carried out on the cistern without turning off all the water supply. This also applies to WC cisterns. The valve usually installed is a spherical type plug valve – more on this later.

Outlet pipes such as **cold feed** and **distribution pipes** from cisterns should also be fitted with servicing valves, and these should be located as near to the point of connection to the system as possible. Here the valve type will usually be a wheelhead gate valve.

The outlet pipes should also be connected as **low in the cistern as possible** – there is a move in the new Water regulations to **preferred connections in the bottom** of the cistern rather than the side.
Overflow pipes and warning pipes

It’s worth mentioning here, to avoid confusion, what is meant by overflow pipes and warning pipes. When water in a cistern rises above a pre-set level, usually due to a faulty float operated valve, the water is allowed to flow through a pipe from a cistern.

An **Overflow pipe** is used to discharge water where it will not **cause damage** to the building.

A **Warning Pipe** is an overflow pipe used to give warning to the occupiers of a building that a cistern is overflowing and **needs attention**.

For **small cisterns** of up to 1000 litres (that’s us!) they must be fitted with a warning pipe and no other overflow pipe.

In larger cisterns, (between 1000 and 5000 litres) they are fitted with both.

Location of warning pipe in a small cistern:

![Diagram showing the location of a warning pipe in a small cistern]

A few other pointers about warning pipes

- If the float operated valve becomes defective the warning pipe should be capable of removing excess water without becoming submerged
- The warning pipe should fall continuously from the cistern to the point of discharge
- Warning pipes should discharge where the water will be noticed, usually outside the building
- Warning pipes should be fitted with a screen or filter to exclude insects
Pipes and fittings used in cold water systems

Quick recap, in the common processes section we looked at the various types of fittings and methods used for jointing a range of pipe materials. We also looked at the installation requirements in terms of access to pipes and fittings, methods of fixing, and pipe locations in buildings.

Here, we’ll cover pipe sizes used in cold water systems and carry out a short exercise on pipe work fittings.

You’ll cover pipe sizing in much greater detail at level 3. Generally speaking, in most domestic installations the pipe sizes used are **15 to 22mm**, in larger domestic premises the cold-water distribution pipe could be **28mm**.

The diagram below shows a typical installation for a domestic dwelling. The maximum pipe size is 22 mm.
Close fitting bolted or screwed down cover

Breather (b)

Push in vent connection (a)

Vent pipe from hot water system

Detail (a)

Steel backing plate prevents flexing of cistern because of upward pressure exerted by float

High density polythene water storage vessel

(i) Wire mesh

(ii) Wire mesh

Shroud

Connection made to cistern cover with standard 22 mm tank connector

Dip pipe

Pull out wire mesh screen

Screened warning pipe assembly

Snap on cap with sealing washer

Connection to overflow pipe

Plan view of pull out strainer

Alternative cistern vent

The cistern shown may be obtained as a complete kit including all details shown to comply with the Water Regulations requirements relating to screening with wire mesh any openings such as overflows through which vermin (insects, etc.) might obtain access to the stored water.

Note that each of the bearers 'B' must be doubled if timbers having the smaller cross-sectional area are used, so that in effect four lengths of timber will be necessary for each cistern support.

<table>
<thead>
<tr>
<th>Truss span (m)</th>
<th>300 litres actual capacity</th>
<th>230 litres actual capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.5</td>
<td>Two 38 × 100 mm or One 50 × 75 mm</td>
<td>One 50 × 100 mm</td>
</tr>
<tr>
<td>9.0</td>
<td>Two 38 × 100 mm or One 50 × 150 mm</td>
<td>Two 38 × 100 mm or One 50 × 125 mm</td>
</tr>
<tr>
<td>12.0</td>
<td>Two 38 × 150 mm</td>
<td>Two 38 × 125 mm or One 50 × 150 mm</td>
</tr>
</tbody>
</table>

*This indicates that two lengths of timber must be laid for each bearer
Recommendations of Building Research Establishment for supporting storage cisterns on roof trusses. Cisterns of 300 litres capacity must be carried on not less than four trusses. Those of 230 litres may be supported on three as shown. Bearers “A” must be fixed as close as possible to the “node” points. Bearers “A” and “C” should be constructed of timber not less than 50 x 75mm. The trussed rafter designer should be informed of the cistern capacity and its location in the roof space.