

## Hot Water Systems

The water fittings regulations in [England, Wales](#) and [Northern Ireland, byelaws in Scotland](#) are legal requirements which apply to all premises which have, or will have, a mains water supply, even if it is only a backup supply.

An important item of public health legislation, their purpose is to protect drinking water supplies. Their objective is to prevent contamination, misuse, waste, undue consumption or erroneous measurement of water. They do this by setting legal requirements for the design, installation, operation and maintenance of water fittings, including water-using appliances.

The booklet provides information about the design and installation of hot water systems.

For further information about these requirements please refer to the Water Reg UK website [www.waterregsuk.co.uk](http://www.waterregsuk.co.uk), or contact the local [water undertaker](#).

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## What are the temperatures requirements for hot water storage and distribution?

Good system design, commissioning and maintenance will help to reduce and address the risk of contamination resulting from microbial growth and limit waste due to taps left to run.

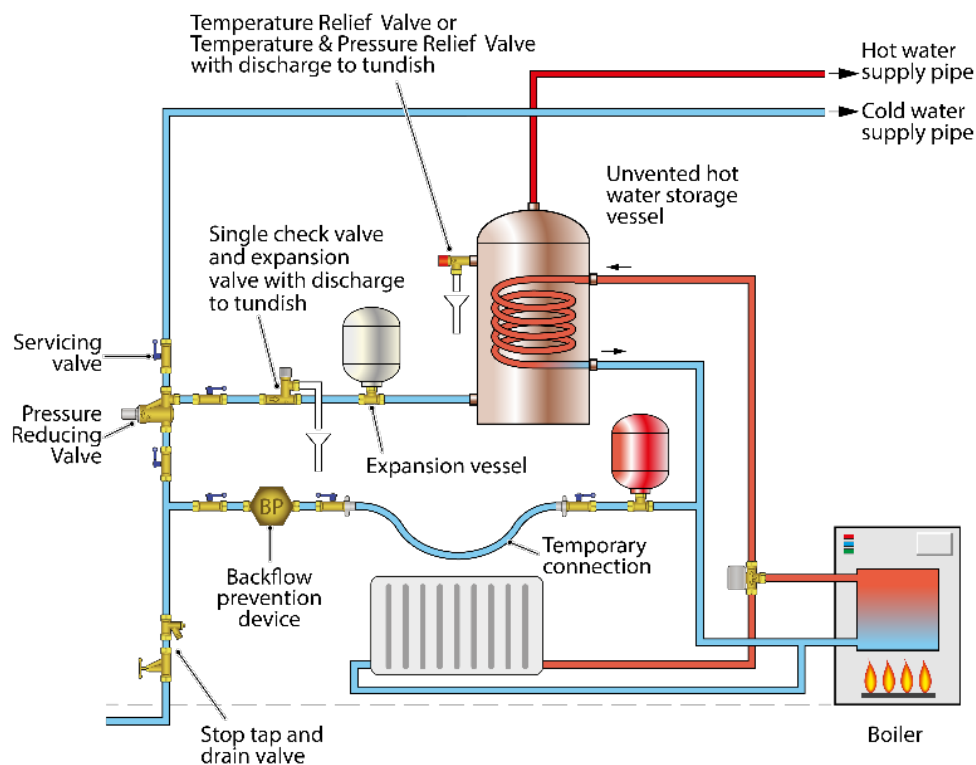
Storage and distribution temperature requirement for domestic hot water systems are set out in other legislation, codes of practice and British Standards.

For further information please refer to Building Regulations, BS EN 806, BS 8558, HSC L8 and CIBSE Commissioning Code M.

## What level of risk are the fluids in a primary (heating) circuit?

The risk is dependent upon the fluid, the dose used and concentration within the system. The volume of fluids and operating pressures will also be considered when assessing the suitability of the backflow protection device or arrangement to be installed.

Please note the final decision rests with the local water undertaker.



## Do drinking water supplies need to be separated from fluids in primary systems and closed circuits?

Yes, appropriate separation is required. Minimising the risk of contaminated fluids coming into contact with water to be used for domestic purposes (drinking, bathing, washing, cooking etc) is a key objective of the water fittings regulations/byelaws.

Mindful of the need to ensure sufficient safeguards are in place to address the possibility of drinking water supplies coming into contact with fluids which are not considered to be wholesome, in determining whether systems making use of heat recovery or exchange are

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compliant with regulation 4(1) the following factors will be taken into consideration. Please note decisions will be taken on a case by case basis.

- The actual fluid categories of the fluids within the system.
- How readily identifiable any potential integrity failure of the system would be.
- Whether the system design meets the requirements for single or double wall separation specified in BS EN 1717.

### When can a filling loop be used?

Where a closed circuit (heating system etc) has been categorised by the water undertaker as a fluid category 3 risk, the installation of a compliant double check valve on the fill point connection to the supply/distribution pipe may be considered as acceptable backflow protection.

Where a fill point connection incorporates a “flexible connection”, when not in use it is good practice for the hose to be completely disconnected and removed. However, a partial disconnection, that is to say only detaching one end of the hose, may be acceptable providing the disconnection is made between the hose and the backflow prevention device on the supply/distribution pipe.

**Please note:** if the water undertaker has concerns about the likelihood of contamination, or the suitability of a double check valve - for example due either to age, operating temperature or pressure fluctuations – under [schedule 2 paragraph 15\(4\)](#) they can require the installation of additional backflow protection. Further information about backflow protection can be found in the Guidance section on the Water Reg UK website.

### What are acceptable safety devices?

Acceptable safety devices include:

- Temperature relief valves
- Temperature control arrangements such as non-self-resetting energy cut outs and cylinder thermostats (interlocked to prevent flow from the primary circuit).
- Combined temperature and pressure relief valves
- Pressure reducing valves
- Expansion vessels installed in combination with expansion relief valves.

For further information, including advice about safety device arrangements for different methods of heating, please refer to the relevant version of the Building Regulations.

### Do safety devices have to comply with regulation 4(1)(a)?

All safety devices must comply with the requirements of regulation 4(1). Examples of appropriate British Standards are given in the guidance to part G of the Building Regulations.

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## Are there any specific suitability requirements (regulation 4(1)(b)) for hot water systems?

All water fittings must be suitable for the circumstances in which they are used. In addition to the normal system operating temperatures and pressures consideration should be given to the suitability of components for use at elevated temperatures likely to be encountered under fault conditions

The safety arrangements installed on a water heater used to heat water for domestic applications should prevent the temperature exceeding 100°C.

The suitability of safety arrangements for other applications, for example industrial processes will be assessed on a case by case basis.

Where the source of heat energy cannot be relied upon in all circumstances to achieve the required minimum temperature to address concerns about microbiological growth an additional heat source should be available.

## How should safety devices discharge?

Any discharge from a hot water system safety device should be safe and conspicuous.

Where a discharge is made via a tundish it should conform to the applicable British Standard or equivalent.

For further information please refer to the relevant version of the Building Regulations.

## What size vent pipes should be installed?

Advice regarding the sizing of hot water system vent pipes can be found in the guidance to part G of the Building Regulations, BS EN 806 and BS 8558.

## How can you accommodate expansion?

All hot water systems must be capable of accommodating expansion. There are various ways to do this including:

### (a) Secondary hot water systems only

The water fittings regulations/byelaws permit accommodation within the secondary hot water system, of thermal expansion from unvented water heaters (with the exception of instantaneous water heaters with a capacity less than 15 litres).

This is however only allowed if:

- The expanded water does not increase the temperature of the water in the supply pipe to in excess of 25°C in England and Wales 20°C in Scotland and Northern Ireland. As this may result in waste or impact on wholesomeness.
- Both the expanded water plus any displacement can be accommodated within the supply pipe. It is not permissible for water displaced as a result of accommodating expansion to backflow into the pipework owned by the local water undertaker.

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### (b) Primary feed and expansion cisterns

To prevent waste the preset water level for expansion cisterns or combined feed and expansion cisterns should accommodate at least 4% of the total volume in the primary (heating) system circuit before discharging through the overflow or warning pipe.

### (c) Expansion vessels

To address contamination concerns associated with stagnation and particulate accumulation it is recommended expansion vessels be installed so as to avoid localised low turnover (stagnation).

Specifically, they be installed securely in the vertical so that the water fitting is:

1. bottom fed and upright
2. the connecting pipework to the fitting
  - rises continuously
  - is kept to a minimum
3. sized correctly for the system
4. designed to ensure an adequate turnover of water within the expansion vessel.

#### Please note:

Where an expansion vessel is used an expansion valve which operates at an appropriate operating pressure must be fitted to ensure water discharges safely and conspicuously in the event of a malfunction. To prevent waste the expansion valve must automatically close after a discharge.

No intervening valves should be installed between the expansion vessel, expansion valve and hot water heater/storage.

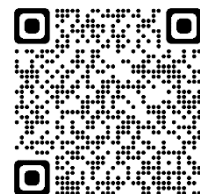
### Who is responsible for enforcing safety?

The purpose of the water fittings regulations/byelaws is to prevent contamination, waste, misuse, undue consumption and erroneous measurement.

There are a number of regulators responsible for enforcement of safety requirements including the Health and Safety Executive, Trading Standards and local authorities. Satisfying the water fittings regulations/byelaws does not guarantee compliance with the regulations these bodies enforce.

### Additional sources of information:

- [Installation Guidance](#)
- [Backflow Protection Guidance](#)
- [Notification Guidance](#)
- [Multifunctional taps leaflet](#) (includes boiling water taps)



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