



British Standard 8515:2009 Explained

# BS 8515:2009 Rainwater Harvesting Systems - Code of Practice

This code of practice protects the public by ensuring consistency of quality, installation, testing and maintenance of Rainwater Harvesting systems for non-potable (non-drinkable) water applications in the UK.

The introduction of BS 8515:2009 means there is for the first time, clear guidance on what are the minimum acceptable standards Rainwater Harvesting companies and the people specifying their systems have to meet. By ensuring conformity across the industry, the standard will further strengthen the industry's reputation for producing high quality, reliable and efficient systems.

## What does the British Standard cover?

BS 8515:2009 covers the design, installation, water quality, maintenance, and risk management of Rainwater Harvesting systems. The use of water butts and the design of system components are not covered but it does apply equally to new build and retrofit projects.

## Why harvest rainwater?

Rising utility bills, reduction of running costs and environmental implications are just three reasons for investing in a Rainwater Harvesting system. 50% of domestic and up to 85% of non-domestic mains water can be replaced in this way. Rainwater Harvesting is a key component to reach compliance within the Code for Sustainable Homes to reduce overall water consumption. Additionally, rainwater re-use scores high accreditation in the Water Efficiency sector of the BREEAM schemes and can help with gaining planning permission by meeting site drainage requirements (ref Building Regulations Part H) as part of a sustainable drainage (SuDS) scheme.

## What types of system are there?

Rainwater Harvesting systems fall into three main categories:

- Non-pressurised: where rainwater is gravity fed, via a header tank, to its point of use.
- Pressurised: where the water is pumped directly from the storage tank to the point of use.
- Combination: which combines elements of both direct pressure and gravity fed systems by using an internal control unit to supply boosted water on demand to points of use. The unit integrates a WRAS compliant means of safely topping up with mains water.

## What design aspects need to be considered in order to comply?

The amount and intensity of rainfall; the size and type of roof or collection surface; and the

number and type of intended applications, both present and future, will all be considered as part of adhering to BS 8515:2009.

The size of the storage tank, which can be located underground or above ground, will also be calculated based on the formula in BS 8515:2009. The system designer should also take into consideration the client's requirements and site restrictions, such as shallow drainage, giving a more 'detailed approach'. The collection surface has a significant impact.

For example, a green roof absorbs water, resulting in less run off and more discolouration than other roof types. The use of syphonic drainage can be an effective method of collecting the maximum amount of available rainwater, but will affect the system design due to the high flow rates. Care needs to be taken to ensure the water cannot stagnate, so the system, including the roof, guttering and pipework should be free draining and prevent contaminated water entering the system.

To comply with the British Standard the system has to feature filtration before the rainwater enters the "main body of stored water".

The filter system needs to meet strict criteria: covering its weather resistance, accessibility and efficiency. Water should also enter via a calmed inlet.

## UV Disinfection

Most non-potable water use, such as flushing WCs and laundry, will not require the use of ultraviolet disinfection. The standard advises that when there is the potential for greater human exposure or in 'high-care' environments, UV treatment may be beneficial. Systems with a third stage of fine filtration are key to ensuring that the UV disinfection system remains clean and therefore most effective.

## Is the storage tank covered by BS 8515:2009?

Storage tanks, whether below or above ground, are covered by the standard. They need to be watertight, discourage microbial growth, avoid stagnation and be sited so not to allow conditions suitable for Legionella to develop. Underground tanks should be designed to suit traffic loadings and resist flotation. Above ground tanks should be sufficiently insulated to prevent the water from either freezing or warming.

## How do I stop the recovered rainfall entering the public mains water supply?

BS 8515:2009 stipulates, that backflow prevention, providing category 5 protection, should be fitted upstream of or at the point where the two systems meet. This should be in the form of a Type AA or AB Airgap conforming to BS EN 13076 and BS EN 13077 respectively.

## Do Rainwater Harvesting tanks need an overflow?

Yes, so that in time of really heavy rain, the excess water can drain away. The overflow should be designed to prevent backflow and stop vermin entering the system. The flow capacity of the outlet pipe on the overflow should be equal or larger than the inlet pipe's capacity.

A good design will allow the main storage tank to overflow at least twice a year to remove build up of floating sediment on the top of the stored water and maintain good water quality.

## Why is a control unit necessary?

Basically, the control unit makes the user aware if the system is functioning effectively or not. The unit controls the pump(s), automatically activates the back-up water supply and provides a volt free outlet for linking to a building management system (BMS), where necessary.

## Is the pipework for rainwater different to mains water?

All pipework used in the Rainwater Harvesting system should be in a contrasting colour, or material, to mains pipework and labelled in accordance with Annex C of BS 8515:2009. Pipework should not be blue, but green or black and green, and robust enough to withstand the pressure of the system and sized to provide the specified flow rates.

## Who can install a Rainwater Harvesting system?

Installation of the system should be in accordance with the manufacturer's instructions and carried out by qualified personnel with regard to location and access to components for future maintenance and/or replacement.

## Who can commission a Rainwater Harvesting system?

Only qualified people, authorised by the manufacturer, should commission a system. The system needs to be flushed and tested prior to handover. There should be no cross-connections in accordance with BS 6700 and all pipework and fittings need to meet BS 6700:2006, 6.1.12.3. Electrical wiring needs to comply with BS 7671.

## Does the system require regular maintenance?

Routine and ongoing maintenance, in line with manufacturer's recommendations is the best way to ensure a system is reliable and effective.

## What steps are taken to ensure safety of the system?

A risk assessment should be undertaken when the system is being designed and follow a recognised process, as detailed in BS 31100 for example. The design, installation, testing, commissioning, operation and maintenance of the system all need to be considered within the risk assessment along with water quality, electrics and access. The manufacturers and/or supplier's reputation, experience, knowledge and compliance with BS 8515:2009 should also offer reassurance.