

## Conservation of Water

### An IGN for Architects, Designers, Installers and Occupiers of Premises

#### 1. Introduction – Why conservation?

- 1.1 The Water Supply Industry has a duty to ensure that water is used wisely by its customers. Many Water Suppliers have their own local leaflets encouraging water saving. However, this IGN is aimed at architects, designers and installers, who are encouraged to pass on the following advice to their clients and the Water Supply Industry's customers. The IGN presents a national view of the Industry's requirements and summarises those measures that may be undertaken to enable the Industry's customers to conserve water and at the same time conserve energy in relation to treatment processes, water supply and efficient water waste disposal.
- 1.2 Much is written on the topic of water conservation. What follows is an overview of those publications. Suggestions for further reading are set out on page 4.
- 1.3 There is an ever increasing demand for water in certain parts of the country. Climatic changes may be affecting rainfall and at times, the rainfall fails to replenish ground water sources and aquifers, hence the growing need to conserve water. Drinking water requires energy both for its treatment and to pump it to its destination. Reducing water consumption therefore also reduces energy consumption.
- 1.4 Indirect benefits arising from water conservation lead to energy savings related to supply, treatment and process costs and reduced disposal costs, trade effluents etc. Industrial customers and domestic customers with metered supplies already have every incentive to economise on water use.
- 1.5 A national water grid is not currently considered economically feasible because of the energy demands that are required to pump water – a heavy product – around a national circuit. There are also ecological and water quality problems inherent in common carriage.
- 1.6 Reference to Water Regulations in this IGN is deemed to include reference to the Water Supply (Water Fittings) Regulations 1999 in England and Wales, the Scottish Water Byelaws 2004 and Water Regulations, Northern Ireland.

THERE ARE NUMBERS OF WAYS THAT CONSERVATION OF WATER MAY BE ACHIEVED. THESE INCLUDE:-

#### 2. Water meters

Water meters should be located in places where readings may be taken with ease and their visibility can act as a reminder to the customer to be prudent in the use of water. The presence of a water meter is an incentive to use water efficiently.

Checking meter readings regularly can indicate leaks or other faults in a plumbing system – which may not otherwise be obvious.

#### 3. WC flushing cisterns

The Water Regulations permit the re-introduction of dual-flush WC flushing cisterns. Installed and used correctly they can achieve considerable water savings. The Regulations require a reduced maximum volume of water flushed in newly installed WC cisterns – from seven and a half litres down to six litres. There is no prescribed lower limit.

Only those flushing devices which meet the stringent specification approved by the Regulator will be allowed. These include drop valves. Mains pressure flushing valves and pressure flushing cisterns which are permitted in certain non-domestic premises.

The Water Supply Industry encourages the use of displacement devices in existing flushing cisterns provided they do not lead, by repeated flushing, to a greater water use. There are proprietary devices available as alternatives to 'the brick in the WC cistern' but they must be used judiciously. Their installation must not result in additional flushing to remove faecal material nor must the displacement device impede the action of the float operated valve.

The Regulator has modified the Regulations by means of a relaxation to permit the retro-fitting of dual and interruptible flushing devices to WC cisterns

which were installed before 1 July 1999. These 'Byelaws' cisterns use 7½ litres or more per flush and savings of 25% in water use have been shown in trials where dual flush was introduced. Retro-fit devices must not alter the available full flush volume and must meet the relevant parts of the current Regulators' WC performance specification. There must be clearly a discernable method of operating the different flush volumes and clear operating instructions must be displayed on the cistern or nearby.

The efficient operation of flushing mechanisms should be routinely checked.

**4. Urinal flushing controls**

Regulations require automatic controls on urinal flushing cisterns. Automatic and proximity controls allow great water savings. These also provide period flushing when there has been little or no use, ie. no flushing in silent hours and at weekends.

Water-less urinals are now available. However it is necessary to evaluate the cost of cleaning chemicals and manpower against the savings from fewer water fittings and the use of water.

**5. Proximity fittings**

Infra-red or ultrasound sensors (proximity switches) can be provided to control the flushing of urinals and supplies to basin taps. Such sensors, in providing supplies precisely when required, save water.


**6. Self-closing and spray taps**

Properly adjusted for length of time and flow and well maintained, self-closing taps at basins and as controls for showers in schools and municipal buildings effect significant water savings. Taps, with spray outlets, either self-closing or of the manually closing type, can also reduce water consumption and may also be used with basins without plugs in certain circumstances – where spray taps discharge less than 3.6 L per minute. Otherwise, basins shall always have plugs.

The spray outlets of taps and the roses of shower outlets accumulate scale in certain water supply areas. Outlets should be cleaned regularly in order to provide a full, directional flow thereby discouraging repeated tap-opening actions leading to excessive water use. In areas of high mains pressures, flow restrictors in connections to taps will save water.


Dripping taps should always be adjusted or the washer (or the ceramic disc) replaced.

Water loss which may arise from a conventional tap is illustrated in Fig.1 on the right.



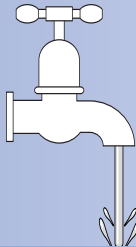
**Two drops/second**

1 minute loss	18ml
Annual loss	9.5m <sup>3</sup>
Annual water only cost	£5–£15
Annual water and effluent cost	£10–£36




**Drops breaking into a stream**

1 minute loss	59ml
Annual loss	31m <sup>3</sup>
Annual water only cost	£17–£51
Annual water and effluent cost	£33–£117




**2mm stream**

1 minute loss	277ml
Annual loss	146m <sup>3</sup>
Annual water only cost	£82–£239
Annual water and effluent cost	£156–£553



**3mm stream**

1 minute loss	638ml
Annual loss	336m <sup>3</sup>
Annual water only cost	£189–£552
Annual water and effluent cost	£360–£1,273



**5mm stream**

1 minute loss	1 litre
Annual loss	528m <sup>3</sup>
Annual water only cost	£297–£867
Annual water and effluent cost	£566–£2,000

Fig. 1. Potential water loss versus costs.

## 7. Pipes

Careful attention to pipe-work design can reduce the amount of cold water that runs to waste before 'the hot water arrives'. Care should be taken to route or lag pipes carrying water intended for drinking in order that it will not be warmed. Pipes carrying hot water should also be lagged to prevent heat loss and thereby reducing draw-off of tepid water.

The smaller the bore of the hot water pipes, the less water is drawn off when hot water is required at the tap.

## 8. Appliances

Washing and dishwashing machines and other water using appliances that use the minimum amount of water or have the ecolabel should be specified. The manufacturer's instructions supplied with an appliance will indicate the volume of water use.

## 9. Cisterns – WC, cold water storage, feed and expansion

Warning pipes should be checked for discharge and remedial action taken to adjust or replace the washers of associated float operated valves.

The floats of all float operated valves should be checked from time to time to ensure that they do not contain water, thereby sitting lower in the water and allowing the water level to rise above the correct water line.

Lagging cisterns prevents undesirable tepid draw-off water temperatures in summer and freezing of water in winter.

## 10. Heaters

Point of use heaters eliminate cold water run-off.

Heat sources and hot water storage vessels should be situated as close as possible to hot water outlet taps, to reduce cold water run-off.

## 11. Showers

Power showers (pump-driven) use more water than showers that are not pump-driven.

Instantaneous showers (having a point of use heater) may use less cold water at initial draw off, than a shower connected to a hot water system.

Low-flow shower heads can provide an effective shower.

## 12. Water softeners

Older types of water softeners back-wash indiscriminately, irrespective of the amount of water that passes through them for use. Newer types have controls that restrict the frequency of backwashing and hence are more economic in their use of water.

The necessity to increase customers' awareness of the water-using potential of water softeners has led to the Water Regulations requiring notification of their installation and also the Water Supply Industry may require that the supply to them be metered.

## 13. Volumes of stored water

Careful attention to predicting requirements can reduce the volume of water which is to be stored in cisterns. This can reduce the amount of water that is stored but remains unused.

## 14. Gardens

Clients should be advised that the Water Supplier should be informed of any irrigation system supplied with mains water that is intended to operate while unattended.

## 15. Swimming pools

Swimming pools supplied with water from the mains should be covered when not in use in order to reduce evaporation. Water Regulations require that the Water Supplier is notified of the construction of pools containing in excess of 10,000 litres.

Pools should be checked from time to time to ensure that they remain watertight.

## 16. Pressure reducing valves

In areas of high mains water pressure, pressure reducing valves can reduce water wastage.

## 17. Car and vehicle wash plant

Car and vehicle wash plants should be installed that incorporate water recirculation facilities.

## 18. Greywater

Greywater recycling systems for WC flushing and garden watering must only be connected to the mains water system via an air gap providing fluid category 5 backflow prevention (e.g. Type AA or AB air gap).

## 19. Approved fittings and materials

**ALWAYS USE FITTINGS AND MATERIALS LISTED IN THE WATER REGULATIONS ADVISORY SCHEME 'WATER FITTINGS AND MATERIALS DIRECTORY'**

Additional points to pass on to clients, i.e. customers of Water Suppliers:-

### **GARDENS**

Lawn sprinklers are to be discouraged and must never be left on over-night. Watering gardens and hanging baskets by a hand-held watering can will

use less water than the use of a hose. Garden hoses should be fitted with self-closing flow controls at the outlet end. Where hoses are used without being hand held, some Water Suppliers may require the water supply to the premises to be metered.

Certain plants require less water than others. Advice about such plants may be gained from Garden Centres.

#### **WATER BUTTS**

Water butts at rainwater downpipe outlets should be used for retaining rainwater for garden watering. There are systems available which will allow the use of rainwater for toilet flushing. However, there must be no physical connection between the public drinking water supply system and the rainwater system or any system where used water i.e. bath water, is used for flushing toilets or garden watering.

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### **Further reading**

*'Water Fittings and Materials Directory'* available at the address below or via the WRAS website [www.wras.co.uk](http://www.wras.co.uk)

#### **Environmental Technology Best Practice Programme:-**

**Guide GG26:-** *'Saving money through waste minimisation: Reducing water use'*

**Guide GG67:-** *'Cost effective water saving devices and practices'*

**Building Services Research and Information Association (BSRIA)** *'Water Conservation in Buildings'*. ISBN 0 86022 263 2

**Department for Environment, Food and Rural Affairs (DEFRA)** Water conservation website, [www.defra.gov.uk/environment/water/conserve](http://www.defra.gov.uk/environment/water/conserve)

**Confederation of British Industries (CBI)** *'Efficient Water Management: Guidelines for Business'*. ISBN 0 85201 317 5

**Environmental Technology Best Practice Programme's** *'Funding, 1-Hidden Profit, 200 tips for reducing waste'* (ET30).

**Building Research Establishment (BRE).** *'The Office Toolkit'*.

**Environmental Agency,** *Conserving water in Buildings* – a series of fact cards, other leaflets and advice. [www.environment-agency.gov.uk/subjects/waterres/286587](http://www.environment-agency.gov.uk/subjects/waterres/286587)

Advisory leaflets from the local Water Supplier.

Further copies and technical information may be obtained from:

Water Regulations Advisory Scheme,  
30 Fern Close,  
Pen-y-Fan Industrial Estate,  
Oakdale,  
Gwent NP11 3EH.

Tel: +44 (0)1495 248454.

Fax: +44 (0)1495 249234

E-mail: [info@wras.co.uk](mailto:info@wras.co.uk)

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