

BSRIA

TECHNICAL NOTE TN 6/2002

# Water Reclamation Guidance

## Design and construction of systems using grey water

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This guidance has been prepared for the benefit of manufacturers, specifiers, installers and end users of water reclamation systems using grey water. It takes account of information produced during the *Buildings that save water (BTSW) project*<sup>1</sup>, the *WRAS Guidance*<sup>2</sup> concerning the use of reclaimed water for toilet flushing, irrigation and vehicle washing purposes in the UK.

The purpose of the guidance is to highlight specific issues of concern affecting the design, construction and installation of packaged water reclamation systems using grey water. Such systems should conform to the requirement contained within the BSRIA Technical Note, TN 7/2002: *Water reclamation standard - laboratory testing of systems using grey water*<sup>3</sup>.

Systems which comply with the standard are expected to function safely and achieve the required reclaimed water quality in the circumstances specified by the manufacturer in the product literature. The performance of each installed system must, however, be verified during the commissioning process before reclaimed water is returned from use and verified thereafter through periodic testing.

### Scope

This guidance applies to systems which provide reclaimed water for toilet flushing and irrigation purposes. It does not apply to:

- systems intended to provide treated water to drinking water standards
- systems intended for the treatment of industrial effluents
- sources intentionally containing raw sewage or WC waste
- rainwater collection and treatment systems.

This guidance should be read in conjunction with the BSRIA Technical Note, TN 7/2002: *Water reclamation standard - laboratory testing of systems using grey water*<sup>3</sup> which covers systems in single houses and larger systems with a maximum continuous throughput not exceeding 10 m<sup>3</sup>/day. This standard makes no assumption regarding treatment process.

This document is not intended to be an overall guide to the design and installation of water reclamation systems nor does it cover issues such as assessing site suitability and system sizing. Such information is contained in the reports of the BTSW project<sup>1</sup>.

### Treatment principles

The standard does not assume any particular treatment process as technologies available for water reclamation systems are rapidly evolving. Biological, chemical or physical treatment processes, or a combination of these, may be used to achieve the performance requirements of the standard. Some current systems and treatment processes are described in reference 1.

**Design features specified in the standard**

The standard is mainly performance-based. Only those essential control and safety features which apply to all water reclamation systems using grey water, independent of the treatment process, are specified as particular technical requirements. These are:

- Fail safe requirements for loss of power and loss of disinfection
- Detection and prevention of sewer backflow
- Automatic dumping of stagnant water
- System status indicators.

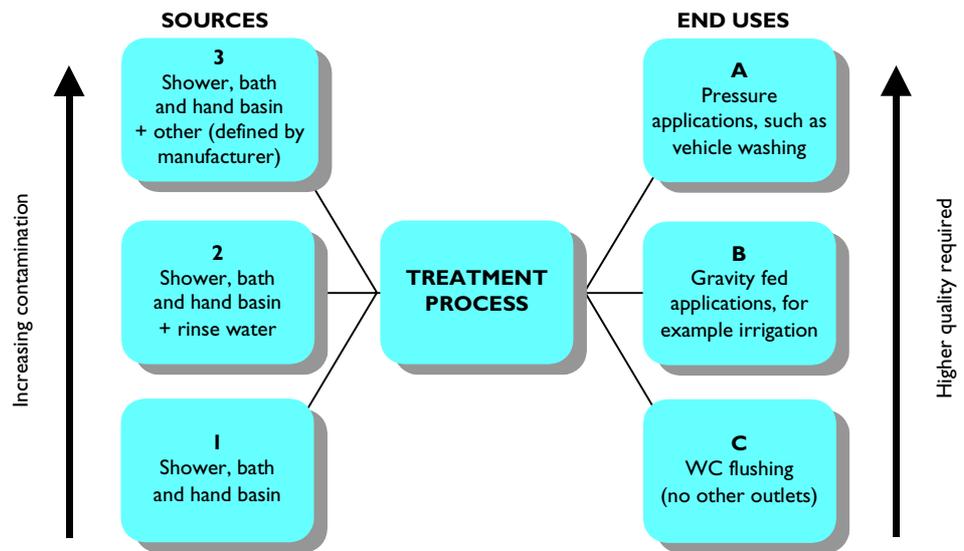
**I.1 DEFINITIONS**

**Table I:** List of definitions.

<b>Grey water</b>	Water originally supplied as wholesome water that has already been used for bathing, washing, laundry or washing dishes.
<b>Black water</b>	Effluent discharged as sewage (whether foul, surface or combined).
<b>Reclaimed water</b>	Water which has been treated so that its quality is suitable for particular specified purposes such as irrigation, and toilet flushing.
<b>Green water</b>	Reclaimed water which has been treated to a relatively high standard, suitable for general use as non-wholesome water. It may be identified through inclusion of a green dye and supplied through green pipes.
<b>Wholesome water</b>	Water fit to drink and complying with the requirements of regulations made under Section 67 of the <i>Water Industries Act 1991</i> . Fluid category 1 of the <i>Water Supply (Water Fittings) Regulations 1999</i> .

Systems conforming to the BSRIA Technical Note, TN 7/2002: *Water reclamation standard - laboratory testing of systems using grey water*<sup>3</sup> are to be classified with a number and a letter according to the source of grey water, and the end use of the treated water as shown in Figure 1. This classification system should be followed in manufacturers literature and any relevant test certificate.

**Figure 1:** Classification of water reclamation systems using grey water.



**Notes**

*Under Source 3, other could include, for example, borehole water as part of the supply.  
 Rinse water refers to secondary rinse water from laundry and dishwashing machines.  
 Pressure applications are considered to pose a greater risk of exposure and ingestion due to the formation of spray and aerosol.*

The acceptable inputs to any grey water system will be defined by the manufacturer. Some systems are potentially capable of treating highly contaminated water, even black water. Other systems are limited to a subset of what may normally be considered grey water, for example only bath and shower water.

The acceptable output from the system is defined by the end use. Figure 1 provides three basic categories of end use which are covered by the standard. Specifiers may specify aesthetic criteria for the reclaimed water, over and above the basic quality criteria included in the standard, in order to meet the requirements of particular users. Specifiers should bear in mind the potential problems of independently verifying that these criteria are achieved.

The scale of the system and consequent risk assessment will influence the level of routine monitoring recommended for the system. It is recommended that even the smallest household systems have at least an annual check on output water quality including total coliforms and disinfectant residual (if relevant). This can be included as part of a routine maintenance contract. Multi-user systems will require more frequent checks to verify effective and safe operation. In the most critical applications, continuous on-line monitoring of one or more parameters, such as residual disinfectant concentration, may need to be considered.