

Guide to Testing Water Efficient Product Labelling Scheme



GUIDE TO TESTING WATER EFFICIENT PRODUCT LABELLING SCHEME

1 GENERAL

Applicants are reminded that:

- Products submitted for approval shall comply with all UK Regulatory requirements applicable to the product – see limitations on testing;

Further information on UK Regulatory requirements can be found at: Water Regulations Advisory Scheme, web site <http://www.wras.co.uk> or telephone number 44 (1)1495 248454 and Kiwa, web site <http://www.kiwa.co.uk> or telephone number 44 (1) 1495 356795

- Devices used to measure distance, flow rate, volume and pressure shall have calibration records that are traceable to National Standards.

2. BATHS

2.1 Procedure

Use any suitable means eg weighing/volume measurement, to establish the volume of water contained when the bath is filled to a point at which water first flows through the overflow fitment.

Baths without provision of an overflow fitment shall be filled to a level 80 mm below their spill over level.

Note: 80 mm is intended to replicate the invert of an overflow fitment should one have been installed at the maximum height permitted by EN 232 ie dimension $H_1 \geq 60$ mm.

By calculation, establish and record the volume.

2.2 Requirement

The volume recorded shall have a capacity of 200 litres or less to be eligible for inclusion on to the Scheme.

Using calculations detailed in BS 6700, the effective capacity (i.e. the water required, allowing for displacement of a person, to take a satisfactory bath) of a bath is 40% of the measured volume:-

Product will be further sub-divided into the following bands allowing for the fixing of the Scheme Enhanced Label to the product. The grey arrow allows for the optional quotation of actual bath capacity to enable consumers to identify where in the band a particular product sits. If this is used then value quoted must be rounded to the nearest whole number.



Actual Bath Capacity (litres)	Effective Capacity (litres)
155 or less	62 or less
170 or less	68 or less
185 or less	74 or less
200 or less	80 or less

3 WC SUITES

3.1 Limitation on testing

It is a prerequisite of the Scheme that WC suites and their internal components shall satisfy all UK Regulatory requirements. Those concerning efficiency of flushing are reflected in Class 2 of BS EN 997: 2003. WC suites must comply with the requirements of Class 2 of BS EN 997 when flushed with the volume(s) declared by the manufacturer. Such compliance must be confirmed in the Declaration of Conformity that accompanies applications for approval.

Applicants shall hold on file copies of test reports verifying compliance with Class 2 of BS EN 997. Such test reports shall detail the principal components that form the suite and critical dimensions necessary for compliance with the standard eg cistern fixing height.

It follows that testing under the Scheme is limited to verifying only that the flush volumes claimed by the manufacturer, comply with the requirements of the Scheme.

Note: When testing to verify compliance with the requirements of Class 2 of BS EN 997: 2003 for the purposes of the Declaration of Conformity, it should be noted that there are 2 significant errors in the Regulators' Specification for the Performance of WC Suites. These were subsequently included in the European Standard. The following should be noted when referencing BS EN 997: 2003:

- Clause 6.17.4.2 – 3rd paragraph: The test in question is intended to be conducted with the water supply isolated. Amend the 8th sentence to read only 'Turn on the power supply' ie delete 'and water supplies'.
- Clause 6.17.4.3 – Formula for the full-flush: The negative value should read '- 1.0 litre' not '- 1.5 litres'.

3.2 Apparatus

The apparatus described in clause 6.17.3.1 of BS EN 997: 2003 shall be used.

3.3 Procedure

The procedures described in clause 6.17.3.2 of BS EN 997: 2003 shall be followed, with the exception that the water trap seal depth need not be measured.

The volume measured after each flushing operation shall be recorded.

3.4 Requirements

The volume of water recorded after each flushing operation shall not exceed:

- The nominal value of any quoted flush volume i.e. for a 6/4 dual flush WC suite, the actual flush volume for a full flush shall be no greater than 6.0 litres and the short flush no greater than 4.0 litres.
- A calculated average of 4.5 litres. In the case of dual flushing – based on a ratio of 1 full-flush to 3 short-flushes.

Product will be further sub-divided into the following nominal average flush capacity bands (based on a 3:1 ratio) allowing for the fixing of the Scheme Enhanced Label to the product. The grey arrow allows for the optional quotation of the nominal average flush volume to enable consumers to identify where in the band a particular product sits. If this is used then the actual value quoted shall be based on the nominal flush volumes and quoted to two decimal places.



Average flush volume ratio 3:1 (litres)
3.5 or less
4.5 or less

4 INDEPENDENT FLUSHING CISTERNS

4.1 Limitation on testing

It is a prerequisite of the Scheme that Independent Flushing Cisterns shall satisfy all UK Regulatory requirements – those concerning efficiency of flushing are reflected in Class 2 of BS EN 14055 (and in Class 2 of BS EN 997: 2003). Compliance must be confirmed in the Declaration of Conformity that accompanies all applications for approval.

Applicants shall hold on file copies of test reports verifying compliance with Class 2 of BS EN 14055.

It follows that testing under the Scheme is limited to verifying only, that the flush volumes claimed by the applicant comply with the requirements of the scheme.

Particular note should be made of clause 6.10.7 in BS EN 14055 – which references clause 6.17.11 of EN 997: 2003. Guidance therein concerns the expectation that the performance requirements included in the standards goes some way towards ensuring that any element offered for sale independently should enable other associated elements to meet the performance characteristics of Class 2 of BS EN 997: 2003 when combined to form a WC suite. The guidance continues, to state that ‘the whosoever selects components to form a WC suite should ensure that they form a compliant suite which satisfies all the test requirements’ of the Regulators’ specification ie of Class 2 of BS EN 997 2003.

4.2 Apparatus

The apparatus described in clause 6.10.3.1 of BS EN 14055 shall be used.

4.3 Procedure

The procedures described in clause 6.10.3.2 of BS EN 14055 shall be used.

The volume of water collected in the measuring vessel after each flushing operation shall be recorded.

4.4 Requirements

The volume of water recorded after each flushing operation shall not exceed:

- The nominal value of any quoted flush volume i.e. for a 6/4 dual flush WC suite, the actual flush volume for a full flush shall be no greater than 6.0 litres and the short flush no greater than 4.0 litres.
- A calculated average of 4.5 litres. In the case of dual flushing – based on a ratio of 1 full-flush to 3 short-flushes.

Product will be further sub-divided into the following nominal average flush capacity bands (based on a 3:1 ratio) allowing for the fixing of the Scheme Enhanced Label to the product. The grey arrow allows for the optional quotation of the nominal average flush volume to enable consumers to identify where in the band a particular product sits. If this is used then the actual value quoted shall be based on the nominal flush volumes and quoted to two decimal places.



Average flush volume ratio 3:1 (litres)	
	3.5 or less
	4.5 or less

5 TAPS AND COMBINATION TAP ASSEMBLIES (Excluding Bath-Shower Mixers and Kitchen Taps)

5.1 Limitation on testing

It is a prerequisite of the Scheme that Taps and Combination Tap Assemblies shall satisfy all UK Regulatory requirements. These are defined in various UK Regulations, some of which – with particular relevance to water and its use, are referenced in the Scheme’s documentation.

It follows that testing under the Scheme is limited to verifying only, that the flow rate(s) claimed by the manufacturer comply with the requirements of the Scheme.

5.2 Apparatus

A suitable supply system capable of delivering cold water at a dynamic pressure of $5 + 0/-0.05$ bar for the duration of the test.

Suitable apparatus is described in clause 10.2.2 of BS EN 200:2008 – with the exceptions that pressure gauges may be substituted for manometers and the cold water supply system shall be capable of delivering the pressure specified above for the duration of the test.

5.3 Procedure

The procedure described in clause 10.2.3 of BS EN 200:2008 shall be followed, with the exceptions that:

- The dynamic pressure applied to each inlet of taps for installation in both Type 1 and Type 2 water supply systems shall be $5 + 0/-0.05$ bar.
- The pressure shall be applied gradually.

The flow rate under stable and continuous flow conditions shall be recorded.

5.4 Requirement

The flow rate shall be recorded as a ‘flow to basin’ expression i.e. for combination tap assemblies the maximum flow rate available and for pillar taps the maximum flow rate available as a calculation of the combined flow from both the cold and hot taps.

The recorded 'flow to basin' rate for each product (or combination thereof) shall not exceed 10.0 litres per minute.

Product will be further sub-divided into the following bands allowing for the fixing of the Scheme Enhanced Label to the product. The grey arrow allows for the optional quotation of actual flow rate to enable consumers to identify where in the band a particular product sits. If this is used then the value quoted must be quoted to one decimal place.



Flow to basin rate (litres per minute)
4.0 litres or less
6.0 litres or less
8.0 litres or less
10.0 litres or less

6 SHOWER CONTROLS (Including Bath-Shower Mixers)

a. MIXER SHOWERS

Mixer Showers are complex products. Manufacturers follow differing philosophies concerning methods of controlling flow rates. Most commonly, these include specifying limitations on the supply pressures, or the incorporation of flow limiting devices which can be located either in the mixer shower itself – or in the shower hose/outlet or handset. As might be expected, manufacturers have differing views concerning which method is most suitable. The Scheme accommodates these differing positions by including alternative methods of test.

6.1 Limitation on testing

It is a prerequisite of the Scheme that Mixer showers shall satisfy all UK Regulatory requirements. These are detailed in various UK Regulations, some of which - with particular reference to water and its use, are referenced in the Scheme' documentation.

It follows, that testing under the Scheme is limited to verifying only, that the flow rate(s) claimed by the manufacturer comply with the requirements of the Scheme.

6.2 Apparatus

Suitable apparatus and criteria e.g. method of temperature measurement, are specified in clauses B.1 to B.2.3.2 of D 08. However, the qualifications described below apply:

6.3 Procedure

6.3.1 Connect the mixing valve to the apparatus specified above:

- In the case of mixer showers not limited to low pressure applications only and with flow limiting devices located in either the inlets or in the outlet, the test is to be conducted with 'open outlet' ie no hose or shower outlet attached. However, the 'outlet pipework' described in clause B.1.2.2 of D 08 shall be connected to simulate the flow restriction of a shower hose and outlet.

- In the case of mixer showers not limited to low pressure applications only and with a flow limiting device located in the shower hose or outlet or handset - or in the case of Electric Showers, the dedicated shower hose and dedicated shower outlet shall be attached.
- In the case of mixer showers for low pressure applications only, the dedicated shower hose(s)/outlet(s) specified by the manufacturer shall be attached and the maximum pressure specified by the manufacturer shall be applied.
- In the case of Bath /Shower combination tap assemblies, in all cases, only the flow rate to shower is measured.

6.3.2 Mixer showers tested with 'open outlet'¹⁾

6.3.2.1 Fully open the flow control of the mixing valve and valve (5) and tap (6) of the 'outlet pipework'.

6.3.2.2 Apply a 5 ± 0.05 bar pressure to both the hot and the cold inlets.

6.3.2.3 Adjust the mixed water temperature to 42 ± 1 °C.

6.3.2.4 Adjust the tap (6) to give a 1 ± 0.05 bar pressure loss (to replicate a shower hose and shower /outlet).

6.3.2.5 Under steady and constant flow conditions measure and record the mixed water flow rate.

6.3.3 Mixer showers tested with dedicated shower hose and outlet²⁾

6.3.1 Fully open the flow control.

6.3.2 For mixer showers that are not limited to low pressure applications only - apply a 5 ± 0.05 bar pressure to both the hot and the cold inlets, alternatively;

in the case of mixer showers that are limited to low pressure applications only – apply the maximum pressure specified by the manufacturer to both the hot and the cold inlets.

6.3.3 Adjust the mixed water temperature to 42 ± 1 °C.

6.3.4 Under steady and constant flow conditions measure and record the mixed water flow rate.

6.4 Requirement

The flow rate recorded shall not exceed a nominal³⁾ 13 l/m.

¹⁾ Mixer showers tested with 'open outlet' will deliver a different flow rate in use with a shower hose & outlet fitted. It is anticipated this difference will be minimal.

²⁾ Testing with a dedicated shower hose and dedicated shower outlet means that in the event of a shower hose or shower outlet having to be replaced, the components must be replaced on a like for like basis. Failure to do so may create a safety hazard with Electric Showers, and for all types so tested, the requirements of the scheme might no longer be satisfied - and approval invalidated. This must be made clear in installation and maintenance instructions.



3) For the purposes of the Scheme 'nominal' is interpreted as being ≤ 13.2 l/m. The value is adopted because commonly available flow limiting devices are subject to a tolerance of $\pm 10\%$. It is assumed that the 'target' flow rate will be 12 l/m, which with a 10% upper tolerance limit equates to a maximum flow of 13.2 l/m.

Product will be further sub-divided into the following bands allowing for the fixing of the Scheme Enhanced Label to the product. The grey arrow allows for the optional quotation of actual flow rate to enable consumers to identify where in the band a particular product sits. If this is used then the value quoted must be quoted to one decimal place. Allowing for tolerance limits of flow limiting devices, the maximum flow quoted will never exceed 13.0 litres per minute.

Flow rate (litres per minute)
6.0 litres or less
8.0 litres or less
10.0 litres or less
13.0 litres or less

b. ELECTRIC SHOWERS

Electric Showers are complex products. However the principles of the design of electric showers across all manufacturers are essentially the same. For the purposes of this Scheme all electric shower controls will comprise of a shower handset, flexible hose and shower (heating) unit.

6.5 Limitation on testing

Electric showers deliver hot water at a flow rate as a function of their design primarily based upon the energy rating of the heating element contained within the shower (heating) unit. The flow rate is further affected by incoming water temperature and the desired set temperature of the outlet water. The relationship of all these factors is identical for all designs of electric showers. Physical testing is therefore not needed to validate the flow rates of these products. A mathematical calculation will therefore be employed for validation of flow rates for all electric showers as part of this Scheme.

6.6 Procedure

Formula for flow rate calculation:-

$$\text{Flow rate l/m} = (60 * (\text{Operating Voltage} / (240 / (\text{Nominal kW rating} / 240) * \text{Operating Voltage})) / 4.18 * (\text{outlet temperature} - \text{inlet temperature}))$$

To further 'commonize' the parameters used for the calculation the inlet temperature and outlet temperature values are selected to be mid-values that essentially cover seasonal variation between winter and summer operation of these products.

For the purposes of this Scheme, the following seasonally adjusted values will be:-

- Outlet set temperature 42°C;
- Inlet supply temperature 15°C;

and in all cases the operating voltage will be 240 volts.



The calculation method validates all existing known electric shower products as 'eco' and therefore as suitable to be placed on this Scheme.

E.g.

7.0 kW nominal rating at 240V will calculate to 3.72 l/m

8.0 kW nominal rating at 240V will calculate to 4.25 l/m

9.0 kW nominal rating at 240V will calculate to 4.78 l/m

7 **SHOWER HANDSETS**

7.1 **Shower Handsets**

Shower handsets are available in various styles from fixed single mode sprays to multi and combination mode spray settings. It is recognised that the shower handset is probably the most often replaced shower accessory. It is worth noting therefore that handsets should only be replaced on a like for like process. Replacing a handset with one that has a differing maximum flow rate can have safety consequences for the end user e.g. affecting the thermal stability of thermostatic mixing valves or potentially causing flow restrictions to electric showers that could result in a serious malfunction of the equipment.

7.2 **Limitation on testing**

It is a prerequisite of the Scheme that Shower handsets shall satisfy all UK Regulatory requirements. These are detailed in various UK Regulations, some of which - with particular reference to water and its use, are referenced in the Scheme' documentation.

It follows, that testing under the Scheme is limited to verifying only, that the flow rate(s) claimed by the manufacturer comply with the requirements of the Scheme.

7.3 **Apparatus**

A suitable supply system capable of delivering cold water at a dynamic pressure of $5 + 0/-0.05$ bar for the duration of the test.

Suitable apparatus is described in clause 11.2.3 of EN 1112: 2008 with the exceptions that the cold water supply system shall be capable of delivering the pressure specified above for the duration of the test.

The datum used shall be appropriate for the type of handset being tested – i.e. for 'deluge' style fixed heads the datum of the spray plate shall be level while for flexible showering handsets (those typically connected via flexible hoses) the datum of the spray plate shall be at 45° to level. In all cases the handset must form a full spray pattern in all available spray modes.

7.4 **Procedure**

- The dynamic pressure shall be applied gradually to the inlet of handset
- The flow rate under stable and continuous flow conditions shall be recorded.

7.5 **Requirement**

The flow rate of the highest flow mode shall be recorded and it shall not exceed a nominal¹⁾ 13 l/m.

¹⁾ For the purposes of the Scheme 'nominal' is interpreted as being ≤ 13.2 l/m. The value is adopted because commonly available flow limiting devices are subject to a tolerance of $\pm 10\%$. It is assumed that the 'target' flow rate will be 12 l/m, which with a 10% upper tolerance limit equates to a maximum flow of 13.2 l/m.

Product will be further sub-divided into the following bands allowing for the fixing of the Scheme Enhanced Label to the product. The grey arrow allows for the optional quotation of actual flow rate to enable consumers to identify where in the band a particular product sits. If this is used then the value quoted must be quoted to one decimal place. Allowing for tolerance limits of flow limiting devices, the maximum flow quoted will never exceed 13.0 litres per minute.



Flow rate (litres per minute)
6.0 litres or less
8.0 litres or less
10.0 litres or less
13.0 litres or less

8 GREY WATER RECYCLING UNITS

Grey water recycling units are considered by their very nature of re-using water to be 'eco' products. The Scheme intends only to cover those products that are permanently installed into the fabric of the building and provide water for internal use e.g WC flushing.

It is a prerequisite of the Scheme that grey water recycling units shall satisfy all UK Regulatory requirements. These are detailed in various UK Regulations, some of which - with particular reference to water and its use, are referenced in the Scheme' documentation.

It follows, that testing under the Scheme is limited to verifying only the capacities claimed by the manufacturer.

9 URINAL CONTROLLERS

9.1 General

Urinal controllers are available in a number of forms from controllers designed to operate a flush to a single urinal bowl, to a controller that controls the flow of water into a cistern, which flushes multiple urinal bowls or a stall designed for multiple persons.

9.2 Limitation on testing

It is a prerequisite of the Scheme that Urinal Controllers shall satisfy all UK Regulatory requirements. These are detailed in various UK Regulations, some of which - with particular reference to water and its use, are referenced in the Scheme's documentation.

It follows, that testing under the Scheme is limited to verifying only, that the flow rate(s) and volumes claimed by the manufacturer comply with the requirements of the Scheme.

9.3 Requirement

There are two types of permitted urinal controllers:

1. A pressure flushing valve kit with no extra parts needed, supplied to meet requirements. Directly connected to a supply or distributing pipe which is designed to flush the urinal either manually or automatically, provided that the flushing arrangement incorporates a DC pipe interrupter backflow prevention arrangement or device appropriate to fluid category 5. Installation should be checked to ensure compliance with requirements. For these products, the maximum flush volume per bowl or position each time the valve is used is 1.5 litres per flush. If manually operated solenoid or equivalent pressure flushing valves are used, the valve must be of the normally closed type or latching (bi-stable).

2. An automatically operated flushing cistern serving urinals, which shall be filled with water at a rate of:-
 - a) 10 l/h per urinal bowl for a cistern serving a single urinal bowl; or
 - b) 7.5 l/h per urinal bowl or position or, as the case might be, for each 700mm width of urinal slab for a cistern serving two or more urinals; or

If sensors are used to control the flush then they shall not be falsely triggered and they should prevent flushing during long periods of non-use (with the exception of a hygiene flush). Hygiene flush periods should be factory set to occur no more frequently than 12 hours or set to default 'off'.

Any sensor should ensure that the urinal is only flushed after use, excluding hygiene flush.

In each case the controller must be designed so that on installation it can be adjusted to deliver water flush cycles that comply with the Water Supply (Water Fittings) Regulations 1999 i.e. less than 1.5 litres per urinal bowl or position each time the device is operated.

As this is typically an installation requirement then this aspect must be verifiable on physical audit of the product and must be suitably documented in the product documentation to ensure that operatives can install and adjust the product to give suitable performance.

Product documentation shall include all necessary details to ensure that the product can be installed in compliance with the Water Supply (Water Fittings) Regulations 1999.

10 REPLACEMENT WC FLUSHING DEVICES

10.1 General

Replacement WC flushing devices are fitted to existing cisterns or WC suites as replacement items when repairs or maintenance may be required. Often they are also replaced as part of water efficiency measures. However the flush volume function is largely a factor of cistern size and must be matched for performance to the performance of the pan and as such replacement flush mechanisms may not deliver water savings.

Two types of replacement WC flushing devices are considered suitable to meet the requirement and qualification for inclusion on the Water Efficient Product Labelling Scheme –

- A. Flushing siphons.
- B. Drop type flush valves.

To deliver water savings replacement flush mechanisms must therefore be of dual flush design.

10.2 Limitation on testing

It is a prerequisite of the Scheme that the replacement WC flushing devices and their internal components shall satisfy all UK Regulatory requirements. These are detailed in various UK Regulations, some of which – with particular reference to water and its use, are referenced in the Scheme's documentation. Those concerning efficiency of flushing are reflected in Class 2 of BS EN 997.

It follows, that testing under the Scheme is limited to verifying only, that the flow rate(s) and volumes claimed by the manufacturer comply with the requirements of the Scheme.

10.3 Requirement

To ensure durability and effectiveness of the flush the replacement device must comply with the appropriate requirements of the Regulator's specification for WC suites.

See below:

For devices designed to replace the existing cistern the device must meet the requirements of:

A – Specification of the water level(s) and the ability to match the original equipment full flush rate to maintain flush efficacy.

B – The flush mechanism shall be dual flush in operation with the part flush volume being no greater than $\frac{2}{3}$ the full flush volume for any given installation.

C – Physical endurance and leakage

D – Chemical endurance

E – Suitable instructions explaining how to operate both full and part flush operations shall be provided for the customer/end user.

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