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## Marking & Identification of Pipework for Water Reuse Systems

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### 1. Introduction

Water reuse is an accepted method worldwide for reducing water demand. Rainwater and greywater which is treated wastewater from showers, baths and sinks, are increasingly being collected and reused for applications which do not require wholesome water, such as laundry, WC flushing and garden watering. In addition to these, other sources of water such as blackwater (recycled sewage effluent) and industrial water are being considered for reuse.

The purpose of the Water Supply (Water Fittings) Regulations and Scottish Water Byelaws (hereafter referred to as the Regulations) is to prevent waste, misuse, undue consumption, erroneous measurement and most importantly contamination of drinking water. Contamination can occur as a result of backpressure or backsiphonage, both of which can cause contaminants to be drawn back up pipework into the water supply. Reused water, including that which has been treated, is considered to be fluid category 5 (the most dangerous of pollutants posing a serious health hazard) and must not under any circumstances be allowed to come into contact with the wholesome domestic drinking water supplies.

To reduce the risk of cross-connection and contamination of the wholesome water supply it is essential that all reused water pipework is both readily distinguishable from other pipework and instantly recognisable wherever it is located, for example inside a property, beneath the street, or on private land. So that accidental or deliberate operation, that could put the wholesome supply at risk, can be avoided all apparatus such as valves and washouts on systems distributing reused water should be suitably marked and significantly different from those normally used on wholesome water distribution networks.

New British standards, BS 8525-1:2010 'Greywater systems – Part 1: Code of practice' and BS 8515:2009 'Rainwater harvesting systems –

Code of practice' have been developed to both ensure compliance with the requirements of the Regulations and the adoption of best practice.

This information guidance note (IGN) details the colour coding and marking identification required to ensure that internal pipework and external distribution networks conveying reused water satisfy the requirements of the Regulations and comply with the appropriate British Standard. It also provides information regarding signage for storage cisterns and appliances.

In exceptional circumstances local water suppliers may be willing to accept alternatives to the recommendation made in this guidance; however any deviation must be discussed and agreed in advance.

### 2. Reused water systems

Because reused water systems are relatively new to the UK it is important that every effort is made to ensure that all pipework conveying reused water is immediately and easily identifiable to those who come across it. It is therefore essential that, wherever it is located, pipework distributing reused water is both recognisable and distinguishable from that supplying wholesome mains water. The use of contrasting or different pipe materials will make this easier but it will not identify the nature of the contents, and so irrespective of the pipe material used pipes must be marked and labelled to ensure that all pipework conveying unwholesome reused water is distinguishable from other pipework.

### 3. Notification

Water suppliers must be notified in advance and grant consent for the installation of reused water

systems in all new developments supplied with, or intended to be supplied with, mains water.

Unless a reused water system is being installed by an approved contractor the water supplier must also be notified of any proposals to install, extend, alter or modify a reused water system in non-domestic premises.

It is recommended that the water supplier also be notified of the retrofitting, alteration or modification of a reused water system in domestic property.

In Northern Ireland all proposed work to be carried out on reused water systems in any premises is notifiable regardless of whether the installer is an approved contractor or not.

#### 4. Reused water pipework inside buildings

So that anyone can immediately recognise pipework conveying reused water and identify the nature of the contents, in addition to the usual manufacturers' specification or standard markings, reused water pipework should be permanently marked using colour coded banding - this can be done either during manufacture or installation - and labelled. Pipes which are insulated should be marked and labelled irrespective of whether they are surface marked or identified during manufacture.

In accordance with BS 1710:1984 'Identification of pipelines and services' pipework distributing reused water should be colour coded with a green-black-green banding. The basic identification colour, green (BS 4800:1989 12 D 45) identifies the contents as water; the banding should be approximately 150mm wide. The code indicator colour, black (BS 4800:1989 00 E 53) identifies the contents as unwholesome reused water and should be approximately 100mm in width. In domestic properties where the pipework is likely to be smaller the same principles apply, however the overall length of the banding may be reduced proportionally (see Figure 1).

Because there is more than one type of reused water system, as well as colour coding reused water pipelines it is important to be able to differentiate

between pipework conveying reused water of different types, pressures and designated uses. Therefore in addition to colour coding all pipework should also be labelled so as to clearly identify what is being distributed and the direction of flow (see Figure 1). Marking and labels should be located along the length of the pipework at intervals of no more than 0.5 metres as well as at key connection points, where labels to identify each appliance and its water supply should be secured to the pipe. Where pipework is not easily exposed, such as between joists or in floor voids, marking and labels should be applied at least once in every space or void (see Figure 2). Ducting conveying reused water pipework, irrespective of location, does not need to be marked or labelled.

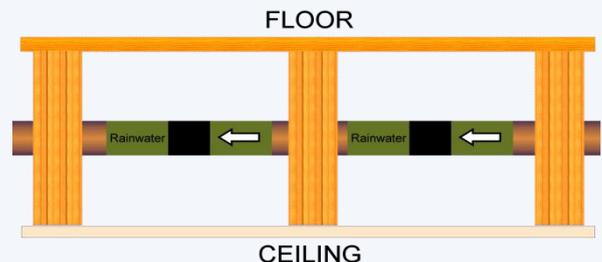


Figure 2: Marking and labelling of pipework in areas not easily exposed

In non-domestic properties labels specifying the nature of the supply should be applied, within 100mm, either side of the colour coding banding. In the case of domestic properties only one label need be applied. The label should identify what type of reused water is being conveyed and include any other relevant information (See Figure 1). Labels should be either self-adhesive, wrap around or mechanically secured to the pipe. (As some adhesives may have a detrimental effect upon plastics it is recommended that the manufacturer's advice is sought before applying self adhesive labels to plastic pipe.)

In accordance with BS 8525-1:2010 and BS 8515:2009 labels should green or edged in green (BS4800:1989, colour 12 D 45) and not less than 100mm in length. The lettering should be black (BS4800:1989 00 E 53) and no less than 5mm in height, in the case of large diameter pipes larger labels and larger size of lettering is recommended.

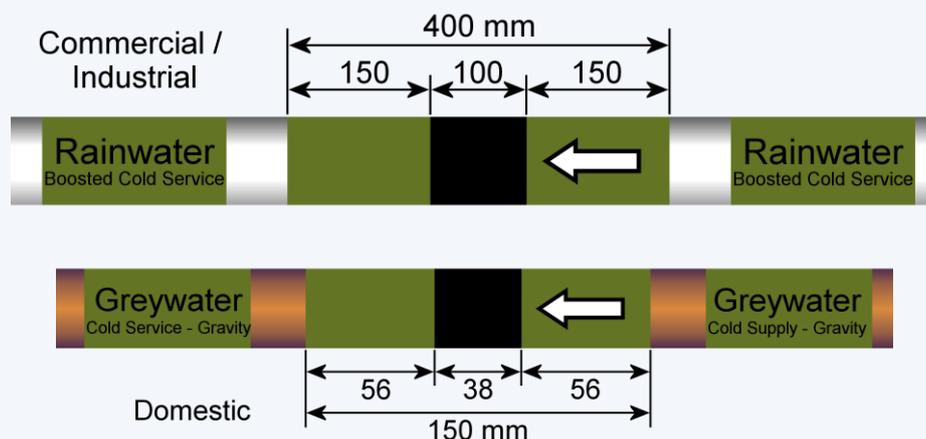


Figure 1: examples of recommended marking and labelling for pipework inside buildings

To further reduce the possibility of any confusion regarding the nature of the supply, it is also recommended that all storage cisterns and point of use appliances supplied by a reused water system be identified by signage which clearly identifies that an unwholesome reused water system is in use (see Figure 3). Where labels are to be applied outdoors they should be robust and waterproof.



Figure 3: examples of labels for storage cisterns and point of use appliances e.g. washing machines, WCs, outside taps etc.

In addition to primary point of use labelling it is also recommended that a label be attached to the incoming stop valve or other key points so that users are aware that a reused water system has been installed (see Figure 4).



Figure 4: examples of labels for use at stop valve and other key connection points

## 5. Reclaimed water pipework outside buildings or below ground

Blue pipe should not be used for external reused water pipework, including any below ground back-up supply, as this is recognised standard pipe colour used in the UK for wholesome water. Instead it is recommended that a black plastic pipe marked with green longitudinal stripes at the four quadrants, in line with NJUG guidelines, as shown in Figure 5, be used for all external pipework conveying reused water.

The green stripes should be:-

- 3 to 9mm wide on pipe up to and including 32mm OD;
- 5 to 12mm on pipe from 32mm up to and including 63mm OD;
- 8 to 18mm on pipe from 63mm up to and including 125mm OD;
- 12 to 24mm on pipe from 125mm up to 355mm OD



Figure 5: example of the colour coding recommended for external reused water pipework

In addition to the usual manufacturers' specification or standard markings the pipe should also be permanently marked so as to identify the type of reused water it is conveying. For example pipework conveying rainwater should be marked 'RAINWATER' (see Figure 6).

**RAINWATER 32mm x 3.0m SDR11 PE 80 PN 12.5 MANUFACTURER**

Figure 6: example of the recommended marking for pipework installed outside buildings or below ground

The marking must be visible and legible. It is recommended that lettering be green or white and not less than 5mm in height. This marking should be repeated along the length of the pipework at intervals of no more than 0.5 metre.

Where the ground conditions mean that standard plastic pipes are unsuitable i.e. contaminated ground, a suitable alternative pipe material marked or labelled may be used instead. Labels should be applied in such a way that they will not be scratched or detached during installation.

To assist with the identification of buried reused water pipework it is also recommended that during installation the pipe is laid with the lettering facing upwards and a marker tape positioned either in the trench directly above the pipeline or alternatively wrapped around the pipe. The marker tape should be green and carry a description, in black lettering, of the supply in the pipeline below for example 'CAUTION RAINWATER PIPE BELOW' (see

Figure 7). Extra care should be taken when there are pipes in close proximity or multiple pipes in a trench.

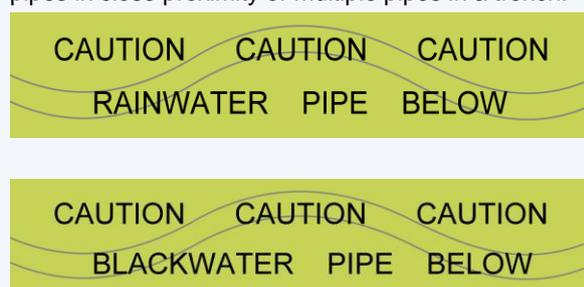


Figure 7: example of the type of marker tape that should be used

Pipes conveying combined reused water should be readily distinguishable from other pipework, including that carrying solely rainwater or greywater. It is recommended that additional labelling or marking, which identifies the precise nature of the contents, be applied to combined reused water pipework e.g. combined rain & greywater.

## 6. Identification of washouts and valves on reused water distribution systems

Marker plates are commonly used on distribution systems to identify the location and type of apparatus such as valves. Where the distribution of reused water warrants the use of such equipment marker plates should similarly be used to identify the contents as well as the valve type and location.

Rather than being prescriptive in terms of the type, style, colour and layout of marker plates it is recommended that reused water pipeline apparatus should be identified on marker plates by use of colour coding and wording (i.e. RAINWATER in black letters on a green background). An example is shown in Figure 8.

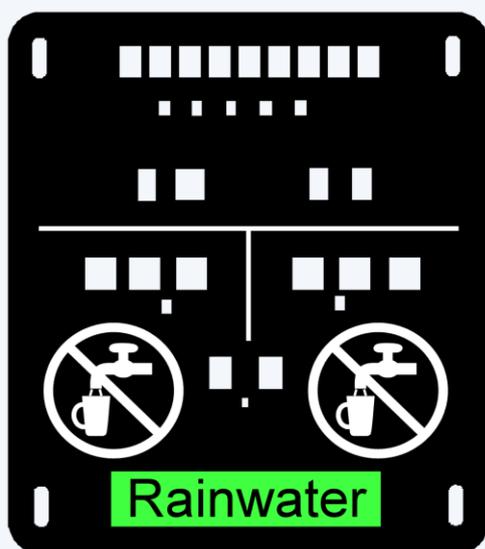


Figure 8: example of a marker plate incorporating an identification plate

To provide additional security it is recommended that a marker plate is fitted on the underside of the lids on chambers housing reused water systems apparatus.

In future, non-standard fittings may be recommended for the wash out and valves for clear distinction and to avoid cross-connection.

## 7. Collection of water for reused water systems

Standard sewer and drainage pipes are normally used for greywater and rainwater collection systems both within and outside of buildings.

Whilst this minimises the risk of cross-connection with the wholesome supply there is still potential for confusion with other pipework including the risk of cross-connection with waste or foul water.

Such cross-connections would not only affect the treatment of, but could also possibly contaminate the reused water. BS 8525-1:2010 specifies that collection pipework for greywater systems, including combined systems, such as rainwater and greywater, should be labelled. Therefore consideration should be given to the use of appropriate labelling and marking using adhesive labels, pipe wraps or mechanically fitted labels for the rainwater and greywater collection pipework. It is recommended that the same labelling be employed for reused water collection as used for reused water distribution.

## References

- BS 8515 (2009) Rainwater harvesting systems – Code of practice
- BS 8525 (2010) Greywater Systems. Part 1. Code of practice
- BS 1710 (1984) British Standard Specification for Identification of pipelines and services
- BS 4800 (1989) Schedule of paint colours for building purposes

Further copies and technical information may be obtained from:

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 30 Fern Close  
 Pen-y-Fan Industrial Estate  
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 Gwent  
 NP11 3EH

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