

PREVENTION OF THE RISK OF BACKFLOW IN THE DESIGN OF DOMESTIC BATHROOMS



INFORMATION ON THE DESIGN OF COMPACT DOMESTIC BATHROOMS TO COMPLY WITH THE BACKFLOW PREVENTION REQUIREMENTS OF THE WATER SUPPLY (WATER FITTINGS) REGULATIONS 1999

Risk of drinking water contamination

Compact bathroom design is proving popular with designers & house builders as it makes economical use of the available floor space. The compact bathroom design typically places a bath combination tap with shower attachment in close proximity to the WC. The shower attachment frequently does not include a means of being attached to a slider or rail system and so the hose is usually unrestrained. This allows the hose outlet to be placed below the rim of the WC pan (Fig. 1). If the water supply failed, backflow could allow contaminated water from the WC to enter the plumbing system and be drawn off from a tap for drinking or cooking use within the home and or in neighbouring homes.

The same risk arises from flexible shower hoses installed adjacent to WCs for personal cleansing in place of toilet paper.



Figure 1a: Bath shower hose which is long enough to reach the WC



Figure 1b: Shower hose provided for personal cleansing

The Water Fittings Regulations

In England and Wales, the Water Supply (Water Fittings) Regulations 1999 (and equivalent byelaws and regulations in Scotland and Northern Ireland) specify that there must be adequate devices at outlets to prevent backflow. The risk from backflow at any particular outlet is assessed in terms of fluid categories – the least serious being fluid category one (FC1) which is drinking water as supplied by Water Suppliers, and the worst being fluid category five (FC5) - fluids containing faecal micro-organisms as would occur in WCs. Backflow must be prevented by use of a suitably-rated device. Lists of devices and the backflow protection they give are included in the Regulations.

The occupants of the homes and the plumbers who install the water fittings are both responsible for complying with the Water Fittings Regulations and both can be prosecuted for a criminal offence if they contravene the Regulations. More importantly, ignoring the Regulations puts at risk the health of those using the drinking water in the home and in the neighbourhood.

Protecting against backflow risk

The Government's Guidance to the Regulations and the WRAS Water Regulations Guide explain the backflow risk of shower hoses and WCs and the means of protecting against it. If the WC is within the zone of backflow risk of the shower hose, (see Figure 2), the hot and cold water supplies to the shower combination tap must be protected by a **fluid category five** backflow device. This requires a suitable **air gap**, which is incorporated into

the water storage cistern which feeds the water to the bath tap, via pipes which must serve no other outlets at a lower level than the bath.

The predominance of unvented water heating systems in modern homes means it unusual to find this arrangement. Even where a 'roof tank' (storage cistern) exists, the air gap usually used does not give FC5 protection and hot water is usually fed through a pipe which serves other outlets lower than the bath combination tap, so the system does not comply.

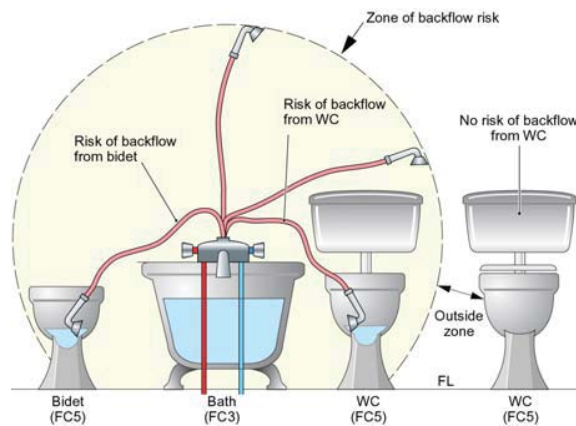


Figure 2: Zone of backflow risk for a shower hose outlet

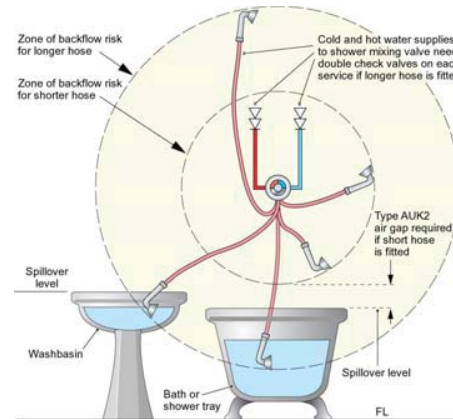


Figure 3: FC3 backflow protection by shortening the hose or providing check valves

Alternative Backflow Protection

There are several other ways to achieve adequate backflow protection, in addition to the use of a storage cistern with air gap as described above.

Designing the bathroom so that the bath taps are at the opposite end of the bath from the WC allows a long hose for the convenience of users but prevents it reaching the WC.

With existing layouts there are simple and cost effective methods to prevent the hose outlet reaching the WC:

- (i) Fit a shorter hose so that it doesn't reach the WC pan.
- (ii) Fit a shower screen between the bath and WC, so the hose isn't long enough to reach round to the WC.
- (iii) Use a restraining ring or clip to fasten the hose to a shower rail or wall so that it cannot reach the WC. The restraining ring or clip should be designed and fitted so that it is robust enough not to be easily broken or have the hose removed from it.

Note on backflow from the bath or hand-basin

Baths and hand-basins in premises where healthcare is provided (e.g. hospitals, nursing homes) or for use in connection with medical, dental or veterinary purposes, require fluid category five backflow protection.

In domestic premises, if the shower hose cannot reach the WC but can be left below the rim of the bath or wash hand basin, the bath combination tap (Figure 3) must be protected to fluid category three by:

- (i) restraining the hose so the outlet maintains a type AUK2 air gap* above the bath rim, or
- (ii) fitting a bath combination tap with a **self cancelling flow diverter** (which creates an air gap by automatically changing the water flow back to the tap outlet if the flow stops), or
- (iii) fitting a double check valve (non-return valve) to the hot and cold water supplies to the tap.

* For domestic baths and basins, the size of the type AUK2 air gap depends upon the size of the tap or fitting.

Tap size	Size of air gap
Up to G½"	20 mm
From G½" to G¾"	25 mm
Greater than G¾"	70 mm

(The term G½" etc. is a standard measure of the diameter of the tap connection)

For further information, logon to the WRAS website, www.wras.co.uk, or contact WRAS at 0333 207 9030 or by email at info@wras.co.uk.