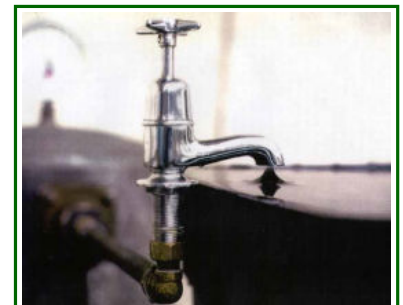


Water Regulations Tutorial # 4 Clothes & Dishwashing

Updated October 2022

Most water fittings have “appropriate” backflow protection either built-in or inherent in their design. Schedule 2, Paragraph 15, which is law, requires **point of use protection**. It states ...“every water system shall contain an adequate device or devices for preventing backflow of fluid from any appliance, fitting or process from occurring”. Non-mechanical backflow prevention methods are described in table S15.2 as “arrangements” rather than “devices” and it is understood that the Schedule is meant to include these too.

Most taps have point of use protection by virtue of the air gap created between the tap and spill-over level (rim) of that vessel. The overflow pipe is ignored, and provided there is sufficient vertical height between the tap outlet and rim, a backflow arrangement has been created. WC cisterns similarly have built-in protection by virtue of the float valve air gap (Type AG, creating AUK1).



This tap is sucking up potentially contaminated fluid because there is insufficient air gap

WASHING MACHINES

Most “domestic” – meaning intended for use in a house – clothes and dish washing machines are manufactured with a built-in backflow prevention device or arrangement suitable for Fluid Category 3. Since house applications are defined as Fluid Category 3 (table G6.1C), no additional backflow measures are required.

FLUID CATEGORIES

The Fluid Category identifies the level of risk, with Category 3 identifying a **slight** health risk, Category 4 a **significant** risk and Category 5 a **serious** health risk. It follows that the risk is not the appliance per se. In other words it is not normally the washing machine that contaminates but the soiled items inside.

Previous UK Classification	European/New UK Classification	Backflow Prevention Examples (Used in Building Services)
Class 1 Schedule A Risk	Fluid Category 5	Air Gap – AA AB Pipe Interrupter – DC
	Fluid Category 4	RPZ – BA
Class 2 Schedule B Risk	Fluid Category 3	Double Check – EC ED
	Fluid Category 2	Single Check – EA EB
Class 3 Schedule C Risk	Fluid Category 2	Single Check – EA EB
Wholesome Water	Fluid Category 1	No Protection Required

“Clothes” washing clearly contaminates the water supplied to that machine to create a “Fluid”. Soap powders and other chemicals are sufficient for the Fluid Category to be 3. In a house situation, the volumes, frequency of use and “dirtiness” of clothes mean the overall risk is Category 3. Admittedly soiled nappies are sometimes washed in a home machine but the use is probably infrequent.

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If the same washing machine as used in a house, is installed in a non-house situation, the Fluid Category in many cases is 4. If the same machine is installed in a nursing home, where there may be incontinent residents and hence soiled sheets, the risk may be Fluid Category 5. So it is the **use** - and not the appliance - that determines the Fluid Category and therefore the backflow prevention required.

WRAS has published an Information and Guidance Note No. 9-04-01 "Water Supplies to Washing Machines and Dishwashers", this provides Fluid Category examples. It states washing machines and dishwashers used in the following environments are deemed to be in the given fluid categories –

Fluid Category 4: *Hotels, restaurants, public houses, canteens and other premises where the items to be washed are for catering use, but excluding catering for healthcare premises (see below); high street laundrettes used by the public at large; commercial laundry businesses where no medical or other high risk items are likely to be processed.*

Fluid Category 5: *All residential or day care establishments where health care is provided for the residents or visitors; laboratories, mortuaries and premises where laundry or equipment might be contaminated with toxic chemicals or with animal wastes or body fluids by other than normal domestic activities, e.g. slaughter houses, meat processing or butchery premises and veterinary practices.*

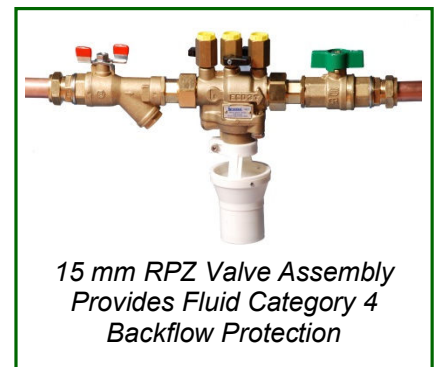
The above definitions apply whether the machines are manually or coin operated. All applications should be assessed for any higher risks beyond the 'norm' and where these exist the relevant risk category should be applied regardless of the above definitions."

Once again the Fluid Category diagram on page one is helpful. Clearly an appliance with Category 3 protection is unsuitable for Category 4 and 5 applications.

FLUID CATEGORY 4 PROTECTION

The only suitable Fluid Category 4 device that is acceptable is a BA device (Reduced Pressure Zone – RPZ Valve).

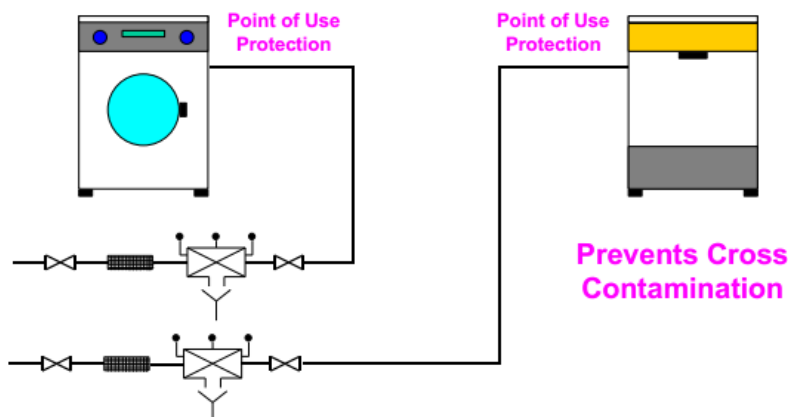
Many Consultants consider running a non-drinking water circuit round a building with the intention of using this for a number of appliances. Whilst it may have backflow protection at its source, e.g. a Break Tank with Type AB air gap, this does not meet the requirement of the Water Regulations, which requires **point of use protection**. (Schedule 2, Paragraph 15). Point of use protection prevents cross contamination. The water supplier has the legal right to enter buildings they supply water to in order to check for compliance with the regulations.



A clothes washing machine and dishwasher may both be Fluid Category 4 in a non-house situation. So can a single BA device be used to supply both? The answer generally is no. Suppose the dishwasher was on its final rinse, whilst the clothes washer was full of significantly harmful substances when a negative pressure caused backflow to occur. The fluid in the clothes washer could contaminate the culinary items in the dishwasher. Separate BA devices would prevent cross contamination.

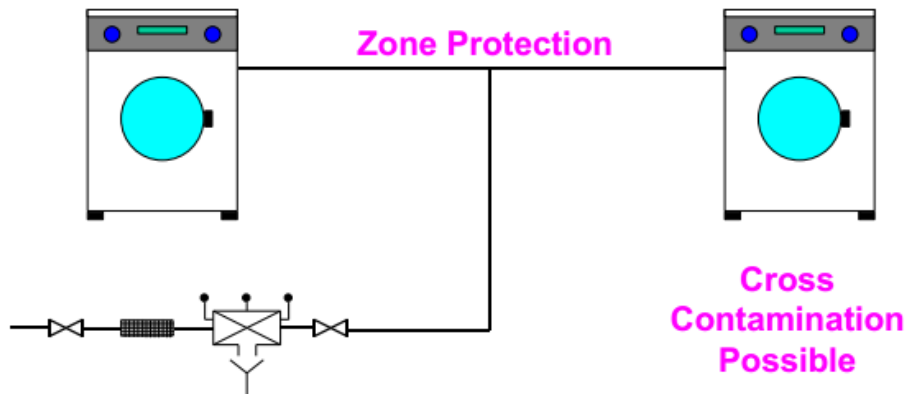
POINT OF USE PROTECTION OF A WASHING MACHINE AND A DISHWASHER

Note – The symbol illustrates an RPZ valve assembly, with an upstream servicing valve, strainer, BA device with 3 test points and tundish and finally another servicing valve



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Clearly a single BA device supplying two clothes washing machines does not present the same level of risk if cross contamination should occur. This is generally described as “zone” protection - although some still consider this “point of use”. Many laundry rooms have just one large BA device for all the machines. *(Note supply to heater/boiler taken off downstream of BA device).*



BA DISCHARGE

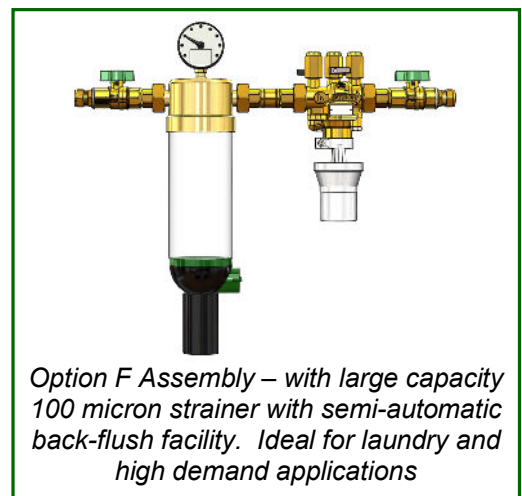
BA devices have a relief valve between the two check valves, which is designed to open rather than allow backflow conditions to be created. The discharge quantity is normally small and infrequent and there is risk of the water in a conventional S bend trap evaporating. The solution is to use a Waterless Trap, which is ideal for washing machines and dishwashers because there is already a foul water pipe nearby.

BA REQUIREMENTS

WRAS Information & Guidance note AIM 08-01 Issue 2 deals with RPZ Valve (BA device) issues. BA devices require resilient seat isolating valves, an appropriate strainer and correct installation clearances. Also the assembly should be in a tamperproof environment or installed in a cabinet. To assist with these requirements, 15 mm and 22 mm BA devices can be supplied by Arrow Valves in a small cabinet complete with valves, strainer, tundish and clear instructions. Arrow Valves have regional accredited testers throughout the UK mainland and can offer commissioning and testing (an annual requirement) of BA devices.

STRAINER

Zone devices in particular, where the annual water throughput is high, should be supplied through a large capacity strainer with a semi or fully automatic back-flush facility – Arrow Valves Option F assembly. Conventional Y strainers often have a coarse mesh, which does not protect the BA device.



HOT WATER BACKFLOW PROTECTION

Hot water should be maintained to Fluid Category 2 standards in order for it to be safe for “domestic purposes” such as personal washing. Imagine washing one’s face at a basin with Fluid Category 4 chemicals that have backflowed from an appliance with chemicals!

Some dishwashers have a hot fill connection only. Clothes washing machines often have hot and cold supplies. Modern plumbing systems tend to be sealed and supplied at mains pressure. A BA device provides the necessary protection for Fluid Categories 1 - 4. It is important to check the suitability of the BA valve for hot water. The manufacturer’s specification should be consulted. Where possible, BA devices should be used for cold water in order to avoid scalding any person testing or maintaining the valve. However it is perfectly possible to safely test with hot water if one uses some initiative.

All BA devices require about 0.6 Bar (6 m head) before they will open at all. Gravity systems – quite common for hot water services in older buildings – are unlikely to have the 10 m minimum head to open a BA device. Where the hot water is supplied by gravity and the cold from mains, it is generally more cost effective to fill the machines with cold water only through one valve. The suitability should be

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checked against the appliance specification. The cycle time may be longer because the machine's electrical heaters have to heat the water. In actual fact, often the volume of water in the pipes between the hot tank and appliance - "dead leg" - may be as much as that required by the appliance – so the machine is full before the "hot water" comes through.

If the heating plant is for non-domestic purposes, i.e. serving the clothes washing machines only, there is no problem using one BA device for the cold zone serving the clothes washing machines and the cold supply to the heating plant.

FLUID CATEGORY 5 PROTECTION

For health care and other applications that have been identified as Fluid Category 5, external backflow protection should be through a Break Tank with a type AB air gap. The industry often refers to "Family A" devices or arrangements, which is the prefix letter. This term is misleading because an AG air gap is only suitable for Fluid Category 3 protection. An interposed cistern (AUK1) requires two cisterns and is often impractical. Similarly a DC device could not be used because there is no spillover level. Unless the machine can be supplied from a dedicated distributing pipe from a cistern with type AB air gap, a pump will be necessary to restore the pressure. Arrow Valves break tank and pump assembly "Midi-Break®" model BTMIDI is ideal since it is compact, uses solid-state filling technology and incorporates a Type AB air gap.



ACCEPTABLE APPLIANCES WITHOUT ADDITIONAL BACKFLOW PROTECTION

There are now some machines manufactured with Fluid Category 5 protection. The WRAS Water Fittings and Materials Directory lists the approved fittings as tested by the NSF-WRc or Kiwa UK laboratories.

These machines are often large and of a commercial nature – as used in many laundrettes – so may not fit below a work surface. It is advisable to check the dimensions and cost before committing to this method. The list of approved machines is growing, so it is wise to use the latest directory.



GLASS WASHERS

Public Houses often have a glass washer with a flexible spray hose, which can be submerged in the rinsing fluid. This is Fluid Category 4 and appropriate backflow protection is required. An air gap with type AA or AB air gap would provide the necessary protection but a pump would be required to restore the pressure. BA devices provide Fluid Category 4 protection and provide a reasonable spray utilising mains pressure. Zone protection is normally acceptable, with one BA device serving the glass washer and dishwasher. The Arrow Valves Option B in a 300 mm square cabinet is ideal for this application.

CONNECTING HOSES

Flexible hoses connecting appliances to the water supply system are a frequent cause of unacceptable taste in drinking water, due to water in the hose becoming contaminated by organic chemicals leached from it. Water can move from the hose into the pipe supplying the drinking water tap as a result of pressure fluctuation or diffusion. Connection hoses approved by WRAS from October 2001 should not give rise to this problem. When using a machine approved for Fluid Category 4 or 5 connected to a supply pipe, approved hoses should be used. If using non-approved hoses, both hot and cold water pipes must be protected with a Single Check Valve (EB device) e.g. Arrow Valves model EB235 at the point of connection to the supplying pipework. Note – this taste problem cannot occur when supplying the machine through a BA device because the BA device is upstream of the hoses.



FLOOD PROTECTION

A rupture to the flexible hose connecting a domestic appliance to the water system can result in a major leak. Washing machines and dishwashers require a regular water supply of approximately 0.2 litres per second, a leak fed at this flow rate can cause serious flood damage to a domestic property.



An effective way of protecting the appliance from causing a leak is to fit an Automatic Waterstop Valve upstream of the flexible hose. The device automatically shuts off the water supply to the appliance when it detects an excess flow of at least 0.3 litres per second.

WATER CONSUMPTION

Clothes and dish washing machines installed after 1 July 1999, must comply with Schedule 2, paragraph 29 which states the maximum consumption per Kilogram of washload / place setting.

SUMMARY

1. Establish the intended use - and hence Fluid Category - for the washing machine or dishwasher. If in doubt, check with the water supplier.
2. For new installations, specify a machine with suitable integral backflow protection (e.g. Fluid Category 5).
3. When upgrading a system, check the level of protection required and provided. Where necessary specify backflow protection.
4. Specify an appropriate backflow prevention device or arrangement. (Copy specification clauses from our web site).
5. Notify the water company.

Thank you for your interest