Backflow prevention guidance: coastal & inland waterways





1. Scope

This information and guidance note (IGN) provides advice to assist those responsible for operating and managing ports, harbours, marinas and inland waterways to comply with their legal obligations in relation to water supplies.

The advice given is intended to help prevent contamination of drinking water supplies, including by backflow or cross connection with other sources of water. Alternative water sources, such as seawater, river water and canal water, are categorised as a fluid category 5 risk (see glossary).

For the purposes of this document the 'Regulations' refer to the:

- Water Supply (Water Fittings) Regulations 1999,
- Water Supply (Water Fittings) (Scotland) Byelaws 2014,
- Water Supply (Water Fittings) Regulations (Northern Ireland) 2009.

There have been many instances of significant contamination of water supplies as a result of failure to comply with these regulations.

The obligation to comply with the regulations is not affected by retail competition (retail competition does not apply in Northern Ireland).

The advice given in this document supersedes any existing guidance published by, or on behalf of, water undertakers prior to its publication. Existing local agreements with water undertakers may need revision in line with the advice given in this IGN.

2. Background

The regulations are national requirements applying to all water fittings and appliances which use, or can use, water supplied by a water undertaker. Their purpose is to safeguard public health and conserve water through the prevention of contamination, waste, misuse, undue consumption and erroneous measurement of water supplies.

Owners and occupiers of ports, harbours, marinas and inland waterways have a legal duty to comply with the regulations. This includes a responsibility to notify (regulation 5) the local water undertaker of proposed plumbing work and ensure that water fittings are installed, maintained and used correctly in compliance with the regulations. Failure to comply with the regulations is a criminal offence which may result in both enforcement and legal action being taken.

Water undertakers, as regulators, have a range of powers at their disposal. These include the power to disconnect water supplies where there is a serious risk of contamination.

3. Notification and Approved Contractors (regulations 5 & 6)

Regulation 5 makes it a legal requirement to notify, and obtain prior consent, from the local water undertaker for plumbing work carried out in non-household premises. Notification must include drawings showing the location and layout of proposed plumbing work. A schedule of the water fittings to be used will also be required. Consent may be subject to terms and conditions. Any conditions applied by the water undertaker must be adhered to, as this will help ensure compliance is achieved.

Consent must be requested at least 10 working days before any proposed plumbing work is due to begin. Failure to notify under regulation 5 is a criminal offence. Please refer to the notification leaflet published by WaterRegsUK or contact the local water undertaker for further information.

Members of WaterSafe, an approved contractors' scheme recognised by water undertakers, are able to carry out some types of work without prior notification; they can also certify their work as complying with the regulations. A certificate of compliance issued by an approved contractor can be used by their customers as a defense in the event of enforcement action involving the certified work. For further information regarding approved contractors refer to www.watersafe.org.uk or contact the local water undertaker.

4. Contamination (by materials and substances)

The potential for drinking water supplies to become contaminated is a recognised risk to public health. Owners and occupiers of ports, harbours, marinas and inland waterways are legally responsible for ensuring plumbing systems are installed and used in a way that will not cause, or be likely to cause, contamination.

The regulations (schedule 1) categorises contamination hazards according to their risk to public health. Sea, river and canal water are classified as being a fluid category 5 risk. Fluid category 5 fluids are the highest contamination risk posing a serious hazard to health.

Plumbing systems and appliances which are exposed to a fluid risk category 5 pose a significant risk of contamination through backflow or back siphonage.

High risks of exposure to fluid category 5 may include, but are not limited to:

- Filling on board water systems,
- Water used in connection with sewage disposal,
- Industrial processes,
- Pressurised systems,
- Sea water fire-fighting systems,
- Pipework and connection points likely to become submerged.

Water fittings which are exposed to fluid risk category 5 should incorporate a backflow prevention device which provides protection against fluid category 5 (see section 5 of this IGN). However, under the Regulations, it is ultimately for water undertakers to determine whether protection against fluid risk category 5 is required in any case.

5. Backflow prevention

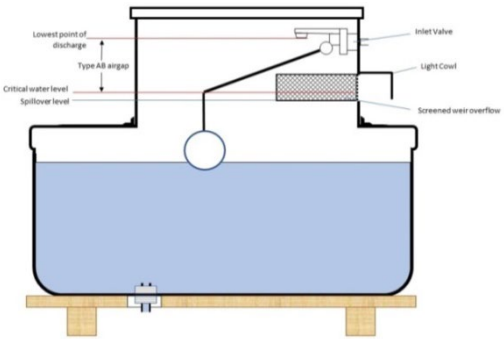

Figure 1: illustration of a Type AB air gap arrangement

The regulations require every system to be protected by an appropriate and adequate form of backflow protection.

Backflow prevention arrangements and devices, together with the level of protection they provide against back siphonage and back pressure against the relevant categories, are set out in the Regulators' Specification for backflow prevention arrangements and devices. As noted in section 4 of this IGN, under the Regulations, it is ultimately for water undertakers to determine whether protection against fluid risk category 5 is required in any case.

There are several different forms of backflow protection. However, only three of these - a type AA, AB and AD air gap arrangement - offer fluid category 5 protection against back pressure and back siphonage. Where water is required to be wholesome only a type AB and AD air gap will be suitable for use.

A type DC arrangement provides fluid category 5 backflow protection against back siphonage only. Due to installation and operational restrictions, including the size of supply, use of a type DC arrangement is limited and unlikely to be suitable for use at a port. For further information please refer to the water fittings department of the local water undertaker.

6. Whole-site and zone backflow protection

Whole-site or zone backflow protection maybe required in addition to point of use protection installed to protect against backflow from a system. The decision to require the installation of additional backflow protection, and the level of protection required, will be determined by the local water undertaker.

For further information on whole-site and zone backflow protection please contact the local water undertaker.

7. Examples of high risks

Environmental hazards

The regulations require that all water fittings must be of an appropriate quality and standard, and be suitable for the circumstances in which they will be used.

Some examples of environmental hazards that are known to affect the suitability of water fittings include:

- Permeation of plastic pipes and fittings by hydrocarbons,
- Damage through contact with salt water,
- Exposure to sunlight.

Cross connection

Mains or stored water for domestic use is at risk of contamination by backflow of fluids already stored on board: cross connections with pipelines carrying other fluids, such as seawater (category 5 fluid) have resulted in contamination of the drinking water supplies.

The range of contaminants at ports, harbours, marinas and inland waterways is likely to include, but is not limited to, onboard stored water, sewage, seawater lines, fuels or the water the vessel is floating on.

When supplying water to a vessel, it is essential that contaminants are prevented from entering the drinking water supply pipework.



Figure 2: An example of high risk hose connections typically found on board ships

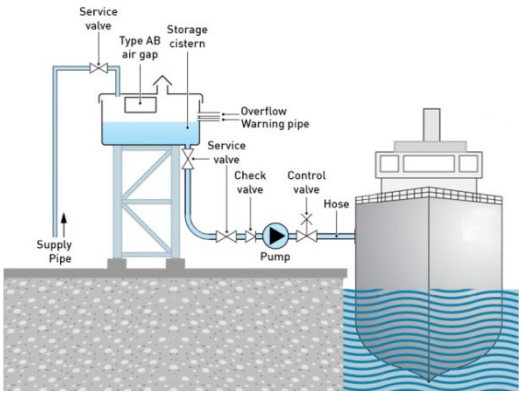

Figure 3: example of fluid category 5 backflow protection in use

Hoses used to make a temporary connection to supply water to vessels are a known route by which backflow and contamination of mains or stored water can occur.

A suitable method to feed water to a vessel via a dedicated storage cistern incorporating an appropriate air gap.

Fire hydrants

Mains fed fire hydrants must **not** be used for any purpose other than firefighting, and should be readily distinguishable from hydrants used for any other purposes (i.e. bunkering of ships).

8. Identification

To minimise the risk of contamination as a result of cross connection, the regulations require all water systems be readily identifiable. To comply with this requirement, all pipelines and services must be marked in accordance with BS 1710: 2014 or as agreed with the local water undertaker.

9. Powers of water undertaker

Water undertakers have the duty to enforce the regulations, making use of a number of enforcement options when dealing with any contraventions found.

Where contraventions are identified, water undertakers may serve notice on owners or occupiers requiring them to carry out specified rectification work within set timescales.

Water undertakers also have powers, under relevant legislation, to disconnect the water supply where they perceive there to be a serious hazard to public health.

10. Further advice

For England and Wales, the Water Supply (Water Fittings) Regulations 1999 and their Schedules are Statutory Instruments (1999 No 1148 and No 1506) available from http://www.legislation.gov.uk/uksi/1999/1148/contents/made.

Copies of the Water Supply (Water Fittings) (Scotland) Byelaws 2014 are available from Scottish Water or via http://www.legislation.gov.uk/ssi/2014/364/pdfs/ssi_20140364_en.pdf

The Water Supply (Water Fittings) Regulations (Northern Ireland) 2009 are available from NI Water. http://www.niwater.com/water-fittings-regulations/ or via http://www.legislation.gov.uk/nisr/2009/255/contents/made

In addition to individual company websites, contact details for water fittings regulations departments, can be obtained from the Water Regs UK website www.waterregsuk.co.uk Tel: 0333 207 9030

WaterSafe: Tel: 0333 207 9030 website: www.watersafe.org.uk

11. Glossary

Backflow: the flow of water in an opposite direction to the intended normal direction which can occur either by backpressure or back siphonage.

Backflow protection: to prevent plumbing systems within premises, or the water mains, from becoming contaminated by backflow, the regulations require adequate and appropriate backflow protection to be installed.

Contamination: after it has been supplied, water can become contaminated by being in contact with unsuitable materials, ingress of contaminants or by backflow of contaminated fluid from fittings or appliances. This is particularly relevant when initially filling or replenishing onboard water systems. Backflow in these circumstances could contaminate drinking water supplies on board, elsewhere in the immediate vicinity or in the surrounding neighbourhood.

Point of use backflow protection: protection against backflow via a terminal water fitting i.e. an individual water fitting or, where permitted by the water undertaker, multiple water fittings.

Regulators Specification: the regulations identify five fluid categories, which reflect the impact of downstream fluids and the associated risk to public health should fluids contaminate wholesome water. The Regulators' Specification for backflow prevention arrangements and devices is guidance issued by Defra to accompany the Water Supply (Water Fittings) Regulations. The backflow prevention specification equates each fluid category to a range of suitable backflow prevention devices.

Water undertaker (wholesaler): water companies operating the public water networks hold appointments as water undertakers. Water undertakers are responsible for enforcing the Water Supply (Water Fittings) Regulations, Byelaws in Scotland, in their area of supply.

Whole-site backflow protection: whole-site protection is an additional safeguard installed where a water undertaker is concerned the risk to public health, posed by potential backflow is significant. This provides security in addition to point of use and any zone backflow protection. The type of backflow protection required will be determined by the water undertaker, it must be installed on the supply pipe as close to the boundary of the site as possible.

Zone backflow protection: zone protection is required where a water undertaker is concerned there is a significant risk of contamination by backflow occurring within a site. Whereas whole site backflow protection provides an additional layer of backflow protection to the mains water supply to a site, zone protection as the name suggests, provides and additional layer of backflow protection to a defined area or zone within a site. It must be installed on the supply or distributing pipe as close to the boundary of the zone as possible.

Extract from Schedule 1: fluid categories
Fluid category 5
Fluid representing a serious health hazard because of the concentration of pathogenic organisms, radioactive or very toxic substances, including any fluid which contains–

(a)faecal material or other human waste;

(b)butchery or other animal waste; or

(c)pathogens from any other source.

http://www.legislation.gov.uk/uksi/1999/1148/schedule/1/made

This document has been developed by those water undertakers which subscribe to Water Regs UK. Further copies can be obtained from the Water Regs UK website www.waterregs.co.uk

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