

Information note on Regulation 5



Background

There are potentially many products and substances which may come into contact with water from the point of abstraction to the point of consumption – for example, the surfaces of pipes, tanks, treatment chemicals or filter media, point of use devices and other types of water fittings such as components of meters, pumps, and valves. Regulation 5 prevents the use of products or substances known to have a detrimental effect on the safety or quality of drinking water.

Application

The Regulation applies to usage of products and substances after 1 January 2010 (i.e. it is not retrospective). Any new usage of a product or substance in a private supply is covered by Regulation 5(1). For example, many existing spring chambers and reservoirs are not constructed of material which would comply with this Regulation. It is not expected that these need replacing. However, if a reservoir or spring chamber needs new pipework or a repair to a crack in the walls (with cement and waterproof lining/sealant), any material used to repair this must comply with this Regulation. These types of products are usually readily available because they are frequently used by water undertakers. If necessary you can seek further advice from your water company or the Water Regulations Advisory Service (WRAS) (<http://www.wras.co.uk/Directory/>) or the Drinking Water Inspectorate (DWI). Where improvement works are required to a supply, the relevant local authority is advised to make it clear in a notice that any products and substances used in these improvements must comply with this regulation.

How do local authorities check if a product or substance complies with regulation 5(1)?

Local authorities should be satisfied that any product or substance in use in a private supply is documented as part of a risk assessment, any investigation and/or any improvement works. Products or substances meeting one (or more) of the following criteria may be considered as complying with regulation 5(1):

1. Listed in the Secretary of State's list of approved products for use in Public Water Supply in the United Kingdom (current version is available on the DWI website);
2. Listed in the Water Regulations Advisory Service (WRAS) Water Fittings and Materials Directory (available on the WRAS website: www.wras.co.uk) as suitable for use in plumbing systems within buildings;

Information note on Regulation 5



3. The particular usage of the product/substance results in either a minimal surface area exposure or a transient contact time with water and testing using BS6920 methodology has shown that the product/substance does not give rise to an objectionable taste or odour and does not encourage microbial growth (advice and example calculations for this are covered in <http://dwi.defra.gov.uk/drinking-water-products/advice-and-approval/Advicesheet8.pdf1>);
4. Treatment chemicals conforming to a BS:EN standard and dosed in accordance with any national conditions of use (current BS:EN standards and conditions of use are shown in the Secretary of State's list of approved products for use in public water supply in the United Kingdom);
5. To be included by DWI on a list of products permitted under regulation 5, the supplier or operator or local authority will need to provide evidence of usage in at least three different private supplies in the previous 12 months from the date of application. This transitional list will be maintained on the DWI website as part of the regulation 5 list.

Anyone wishing to have a product or substance added to the transitional list should provide the DWI with a description of the product or substance and its conditions of use, together with details of three or more private supply operators where the product or substance has been used without affecting the quality or safety of the water supply.

These details will then be cross-referenced with local authority risk assessments and water quality data to assess whether there are any concerns about the product adversely affecting the water.

If, during a risk assessment or during the exercise of any duties under the Regulations, a local authority becomes aware of a product or substance that meets this 'traditional use' criteria but it is not yet on the transitional list, they should forward details to the DWI and request its addition to the transitional list. The DWI will ask the manufacturers to supply any additional information necessary.

If a local authority becomes aware of a new product or one which has been in use for either less than 12 months or in fewer than three private supplies, the product/substance must conform to at least one of the other criteria (1 to 5 above).

If the DWI becomes aware that a product or substance on the transitional list has adversely affected water quality or safety, the product or substance will be removed from the list. Where a product or substance is being investigated by the DWI for adversely affecting the quality or safety of a supply, this will be shown on the list as 'under review'. The DWI recommends that a new usage of such a product or substance be avoided until the review is complete and the product/substance either approved or rejected as unsuitable.

Information note on Regulation 5



The transitional list will be maintained for ten years until 31 December 2021. Thereafter, suppliers/manufacturers must arrange for their product or substance to be approved under an equivalent scheme (namely one of the systems in 1 to 4 above).

What action should a local authority take if it finds that a product or substance may be affecting the quality or safety of the water supply?

If, as part of an investigation or remedial works, it is suspected that a product has been used which does not satisfy the requirements of regulation 5(1), the local authority should assess whether there is a potential danger to human health. For example, by allowing a product to be used which does not satisfy the requirement of regulation 5, bacterial growth could be encouraged on the surface of the product and pathogenic bacteria could multiply. The contamination of the supply with pathogenic bacteria is likely when the presence of indicators occur such as *E.coli* and coliforms.

If a supply is considered to be a potential danger to human health, a regulation 18 notice must be served advising the relevant person that the use of the product or substance is in breach of regulation 5 and that steps must be taken to remove the product or substance and install an alternative.

A breach of regulation 5 may also cause the water to be unwholesome. If this is the case, and the water is not considered a potential danger to health, a section 80 Notice may be served.

Parameters which do not require analysis but are controlled by the use of approved products

There are certain parameters which are listed in the regulations which are controlled through the use of products which are approved under regulation 5(1), and for which monitoring of drinking water is not required. In all circumstances the risk assessment should be conducted and taken into account when making a decision about the parameters for testing.

Where products containing these parameters are not part of the supply system, there is no need to monitor for these parameters. If products containing these parameters are in use, there is no need to carry out monitoring as long as the products are approved. These products are listed below.

Information note on Regulation 5



Parameter	Circumstances in which likely to be present	Criteria for exclusion from audit monitoring
Acrylamide	Use of polyacrylamides as coagulant aids. Use of polyacrylamide grouts for borehole/well linings.	Approved products should be used.
Epichlorohydrin	Use of polyamines as coagulant aids. Use of epoxy resins (e.g. to line pipes and tanks). Use to make some ion exchange resins.	Approved products should be used.
Vinyl chloride	Used for making PVC. Leaching from unplasticised PVC pipes used in distribution or domestic plumbing.	Approved products should be used.

Regulation 5(2)

Regulation 5(2) of the Regulations states that where disinfection forms part of the preparation or distribution of water, the relevant person must design, operate and maintain the disinfection process so as to keep disinfection by-products as low as possible without compromising the effectiveness of the disinfection.

Disinfection by-products (DBPs) are formed by the reaction of disinfectants with precursor substances. Natural organic matter (usually measured as total organic carbon) and inorganic matter (bromide) are the most significant DBP precursors. All commonly used chemical disinfectants (e.g. chlorine, chlorine dioxide, chloramines and ozone) react with organic matter and/or bromide to varying degrees to form different DBPs. Other types of DBPs which may form include haloacetic acids, haloaldehydes, haloketones, chloral hydrate, haloacetonitriles, halogenated hydroxyfuranone derivatives, nitrosamines, chlorite, chlorate and bromate. The factors which influence DBP formation include:

- type and concentration of disinfectant used;
- concentrations of organic matter and other DBP precursors present in water presented for chemical disinfection;
- temperature;
- pH;
- contact time;
- length of a distribution network.

Information note on Regulation 5



While a wide range of DBPs may be formed, the most commonly encountered DBPs are trihalomethanes. However, the levels of bromate where ozone is used and chlorite/chlorate where chlorine dioxide is used as a disinfectant will need to be closely monitored to ensure that the levels do not exceed the regulatory standards or the WHO provisional guidelines values.

Further factors that can contribute to elevated levels of DBPs include:

- a lack of, or poorly operated or maintained, treatment processes capable of removing organic matter (such as coagulation or filtration);
- operation of treatment processes outside their design criteria (e.g. excessive filtrations);
- accumulation of sediments in tanks/chambers or the distribution network;
- ingress into tanks/chambers or distribution network.

Local authorities should encourage relevant persons to focus their activities to minimise the formation of DBPs on identifying and removing DBP pre-cursors and avoiding conditions that encourage the formation of DBPs (while ensuring disinfection itself is not compromised). The Regulations set a parametric value of 100µg/l for trihalomethanes (i.e. a group of four DBPs, namely chloroform, bromoform, dibromochloromethane and bromodichloromethane) and 10µg/l for bromate. In general there will be a need to control excessive dosing, and to remove or reduce chemicals which may act as precursors in the creation of DBPs. Specific actions that relevant persons can take to minimise the formation of DBPs are listed below. This list is not exhaustive and a significant body of scientific knowledge is available on the reduction of DBPs pre-cursors. Many of the activities below will also have beneficial impacts or should already be underway to ensure the safety and integrity of the water supply:

- ensure the adequacy of the treatment process to remove organic material;
- review of raw water intake management;
- optimisation of any pre-treatment stage including filtration (if present);
- optimise the disinfection process to ensure that the optimum disinfectant dose is used (however, care must be taken that the disinfection process is never compromised);
- assessment and review of disinfection chemicals used (e.g. ozone, chloramination, chlorine dioxide, UV etc);
- flushing and cleaning of distribution mains;
- implementation of a regular programme of cleaning out of any clear water tanks and/or service reservoirs.

Information note on Regulation 5



Relevant persons must ensure at all times that actions taken to minimise DBPs formation do not compromise the effectiveness of the disinfection process. Furthermore they must be able to demonstrate that the disinfection process is not only designed for the challenge present in the raw water, but also that it is operating within the design criteria of the treatment.

Regulation 5(2)(b) requires that the effectiveness of the disinfection process must be maintained and verified. This means that any disinfection process should be fit for purpose, and that the effectiveness of the process is able to be measured and evaluated, as required by regulation 5(2)(c). This may be through the use of online monitoring, regular sampling or other means.