

Guidance on Contraventions of Drinking Water Quality Standards in Private Water Supplies

July 2019



European and National Drinking Water Quality Standards

Microbiological Standards

Microbiological standards are set to ensure water is wholesome and free from any micro-organism and parasite which would constitute a risk to human health. Each of the standards, including likely source and remedial action(s) to be taken if contravened is listed below.

Table 1: Microbiological Standards

Parameter	Description	Standard
Enterococci	Enterococci are bacteria found in the gut of all warm-blooded animals. They should not be present in drinking water and immediate action is required to identify and remove the source of faecal contamination. It can be an indication of pollution by surface run-off to ground or surface waters. These organisms are controlled through the disinfection of water. You should check: (a) the integrity of the supply source and ensure that there is no possibility of surface contamination; and (b) the disinfection treatment process if present.	0 per 100 ml
<i>Escherichia coli</i> (<i>E. coli</i>)	<i>E. coli</i> is a bacterium present in the gut of all warm-blooded animals. It should not be present in drinking water and immediate action is required to identify and remove the source of faecal contamination. It is controlled through the disinfection of water. You should check: (a) the integrity of the supply source and ensure that there is no possibility of surface contamination; and (b) the disinfection treatment process if present.	0 per 100 ml

European Health-Based Chemical Standards

European health-based standards for chemicals are set with a wide margin of safety on the basis of a lifetime's consumption of water and taking into account the amounts present in food. Just because a standard has been set for a substance does not mean that it is present in drinking water. The vast majority of the regulated chemicals are never found in drinking water in Northern Ireland. Others occur only in very specific or localised circumstances which are described below.

Table 2: European Health-Based Chemical Standards

Parameter	Description	Standard
Acrylamide	Acrylamide monomer is not normally found in drinking water. It is produced in the manufacture of polyacrylamides used in water treatment. Its presence in drinking water is controlled by product specification. The use of acrylamide as a grouting agent can cause the contamination of groundwater and soil. However, acrylamide is not considered to be highly persistent in the environment.	0.10µg/l
Antimony	Antimony is a naturally occurring trace element used in the metal industry and in flame retardant materials. It can also occur naturally from weathering of rocks. Trace amounts can be derived from brass tap fittings and solders.	5.0µgSb/l
Arsenic	Arsenic is naturally present at trace levels in a very few groundwater sources and can be removed by specialist water treatment processes. The standard is set for health reasons and any failure of the standard should be investigated and appropriate corrective action taken.	10 µgAs/l
Benzene	Benzene is an organic chemical present in petrol. It is not normally found in water sources or supplies, though it can migrate through underground plastic water pipes if petrol is spilt in the vicinity. Benzene is carcinogenic to humans and any failures of the standard should be investigated and appropriate corrective action taken.	1.0µg/l
Benzo(a)pyrene	Benzo(a)pyrene is one of several compounds known as polycyclic aromatic hydrocarbons (PAHs), see below. The main cause for detection of this compound in drinking water is leaching from linings of water storage tanks and distribution lines. A stringent standard has been set for this individual substance based on its toxicity.	0.010µg/l
Boron	Naturally occurring boron is present in groundwater primarily as a result of leaching from rocks and soils containing borates and borosilicates. It can also come from industrial discharges or from detergents in treated sewage effluents. Waters with a high boron concentration can be treated by ion-exchange or reverse osmosis.	1.0mgB/l

Table 2: European Health-Based Chemical Standards

Parameter	Description	Standard
Bromate	Bromate is not present in source waters. It may be formed when concentrated hypochlorite solutions are used to disinfect water containing elevated bromide concentrations due to saline intrusion. It may also be generated in the manufacture of sodium hypochlorite disinfectant. A stringent standard has been set based on toxicity and best water treatment practice. Ensure that fresh hypochlorite solution is used when chlorinating pipework and storage systems.	10µg BrO ₃ /l
Cadmium	Cadmium is rarely detected in drinking water and trace amounts are usually due to dissolution of impurities from plumbing fittings.	5.0µgCd/l
Chromium	Chromium is commonly found in the Earth's crust. Although it is not usually found in drinking water, it can leach from some domestic plumbing fittings (e.g. chrome plated plastic taps). The toxicity of chromium depends on the form in which it is found, with hexavalent chromium classified as a human carcinogen.	50µgCr/l
Copper	Copper in drinking water can originate from the corrosion of copper pipework; levels can increase if water is particularly corrosive or sits stagnant in copper pipes for long periods of time, e.g. overnight or weekends. If your supply has elevated levels it is recommended you flush the water supply system regularly particularly in the morning.	2.0mgCu/l
Cyanide	Cyanide is not normally present in drinking water. Its presence in drinking water indicates possible contamination of raw waters from industrial processes.	50µgCN/l
1,2-dichloroethane	1,2-dichloroethane is a solvent that may be found in groundwater in the vicinity of industrial sites. Where necessary, it can be removed by specialist water treatment.	3.0µg/l
Epichlorohydrin	Epichlorohydrin can be found in trace amounts in polyamine water treatment chemicals. Its presence in drinking water is limited by control of the product specification.	0.10µg/l
Fluoride	Fluoride occurs naturally in many water sources, especially groundwater. The regulatory standard is set for health reasons. It cannot be removed by conventional water treatment so high levels must be reduced by blending with another low fluoride water source.	1.5mgF/l
Lead	Lead very occasionally occurs naturally in raw waters but the usual reason for its presence in drinking water is plumbing in older properties. Acidic waters can increase the potential for lead to leach from pipework and fittings. If your supply has elevated levels the source should be identified and removed. Water that has been standing in lead pipes for long periods, for example overnight, should not be drunk. In these circumstances, the tap should be run for 30 to 60 seconds to clear the pipes before taking water for drinking or cooking.	10µgPb/l
Mercury	Mercury is not normally found in drinking water sources.	1.0µgHg/l

Table 2: European Health-Based Chemical Standards

Parameter	Description	Standard
Nickel	Nickel occurs naturally in some groundwater and can be removed with specialist treatment. It may be present in drinking water from water that comes into contact with nickel or chromium plated taps particularly where the water has been stagnant prior to consumption.	20µg Ni/l
Nitrate	Nitrate occurs naturally in all source waters, although higher concentrations tend to occur where fertilizers are used on the land. The standard for nitrate is set to protect bottle fed infants from methaemoglobinaemia, in which the oxygen carrying capacity of the blood is reduced. Where necessary, nitrate levels can be reduced with ion exchange treatment or by blending with low nitrate water. It may also be appropriate to consider controls over agricultural activities in the proximity of the source as a long term means of reducing the leaching of nitrate into water supplies, if these are the source.	50mg NO ₃ /l
Nitrite	Nitrite can be present due to contamination of source waters. The standard for nitrite is set primarily to protect bottle fed babies and infants from methaemoglobinaemia, in which the oxygen carrying capacity of the blood is reduced. Elevated levels are not likely to occur unless chloramination is used as a residual disinfectant or chlorine disinfection is practiced when ammonium ions are present.	0.50mg NO ₂ /l at consumers' taps; 0.10mgNO ₂ /l at water treatment works
Pesticides - organochlorine compounds (aldrin, dieldrin, heptachlor, heptachlor epoxide)	These organochlorine compounds are no longer used in the UK because they are persistent in the environment. A stringent standard has been set on the basis of their toxicity. They are not normally detected in drinking water.	0.030µg/l
Pesticides - other than organochlorine compounds	This is a diverse and large group which includes organic chemicals with a wide range of uses, such as weed-killers, insecticides and fungicides. Water sources may contain traces of pesticide residues as a result of agricultural and non-agricultural use of pesticides on crops, and for weed control. The standard for each individual pesticide is 0.10µg/l. The reason for any failure of the standard should be investigated and measures put in place to address the contamination of the water supply and bring it into compliance with the drinking water quality standards. This may include: flushing of borehole/well and associated water supply system; and review of the use and storage of pesticides in the vicinity of the supply.	0.10µg/l
Pesticides - total	This parameter represents the sum of detectable concentrations of individual pesticides.	0.50µg/l
Polycyclic aromatic hydrocarbons (PAHs)	PAHs is the group name for several substances present in petroleum based products such as coal tar. They originate from many sources including coal-tar coating of drinking water pipes and storage tanks, soot, vehicle emissions and as combustion products of hydrocarbon fuels. This parameter represents the sum of the concentrations of four individual PAHs.	0.10µg/l
Selenium	Selenium is an essential element and a necessary dietary component. Amounts in drinking water are usually well below the standard.	10µgSe/l

Table 2: European Health-Based Chemical Standards

Parameter	Description	Standard
Tetrachloroethene and Trichloroethene	Tetrachloroethene and trichloroethene are synthetic solvents used in the dry-cleaning industry and other various industrial and manufacturing processes as well as being used as a degreaser. These solvents may be detected in groundwater in the vicinity of industrial areas. Where necessary, they are removed by specialist treatment. The standard relates to the sum of the detectable concentrations of the two compounds.	10µg/l
Trihalomethanes (THMs)	THMs are formed during the disinfection process by a reaction between chlorine and naturally occurring organic substances. The use of chlorine in water treatment is a very important health safeguard. Good operational practice of treatment processes minimizes the production of THMs.	100µg/l
Vinyl chloride	Vinyl chloride may be present in plastic pipes as a residual of the manufacturing process of polyvinyl chloride (PVC) water pipes. Its presence in drinking water is controlled by product specification.	0.50µg/l

National Chemical and Physical Standards

The European Drinking Water Directive recognises the importance of maintaining a high quality of drinking water, and for this reason, several standards set in the original 1980 Drinking Water Directive (but not the 1998 Drinking Water Directive) have been continued in the form of national standards. Most of the standards address levels that make the water unacceptable to consumers on the grounds of odour, taste or appearance.

Table 3: National Chemical and Physical Standards

Parameter	Description	Standard
Aluminium	Aluminium occurs naturally in some drinking water sources. It is removed from drinking water by conventional water treatment processes (coagulation and filtration). The regulatory standard is based on its tendency to cause cloudiness and discoloration of the water. A health based standard of 500µg/l applies.	200µgAl/l
Colour	Coloured waters are caused by the presence of organic matter or iron and other metals. The removal of colour from water is necessary not only for aesthetic reasons but also because chlorination of such waters may give rise to high concentrations of by-products and/or reduce the efficiency of UV disinfection.	20mg/lPt/Co
Iron	Iron is present naturally in many water sources. It can be removed by water treatment. The standard for iron is set to avoid discolouration and taste problems. Excess levels can affect the disinfection process for both chlorination and UV. A health based standard of 2000µg/l applies.	200µgFe/l
Manganese	The standard for manganese is set to avoid discolouration and taste problems. Excess levels can affect the disinfection process for both chlorination and UV. A health based standard of 400µg/l applies.	50µgMn/l
Odour and taste	Odour and taste can arise as a consequence of natural processes or contaminants in the water supply. Any changes should be investigated and remedial actions carried out as required.	Acceptable to consumers and no abnormal change
Sodium	Sodium is a component of common salt. It is present in seawater and brackish groundwater. Some treatment chemicals contain sodium. Elevated levels of sodium found in the water supply could be present as a by-product of water softening. Levels above the standards set in the regulations may give rise to taste problems.	200mgNa/l
Tetrachloromethane	This is a solvent that may occur in groundwater in the vicinity of industrial areas. Where necessary, it is removed by specialist water treatment.	3µg/l
Turbidity	The turbidity value is an indication of the amount of colloidal / particulate matter within the water. Levels above 4NTU can be unacceptable to consumers. High turbidity levels can also reduce the effectiveness of disinfection processes.	4NTU

Additional Monitoring Parameters

In addition to the drinking water standards, monitoring of additional indicator parameters assist in good water supply management and control of the drinking water quality.

Table 4: Additional Monitoring Parameters

Parameter	Description	Level or State Above Which Investigation is Required
Ammonium	Ammonia or ammonium compounds are naturally present, in trace amounts, in both ground and surface water sources. However, unexpected levels may indicate that recent pollution has taken place.	0.50mg NH ₄ /l
Chloride	The standards set in the regulations are for aesthetic reasons, as high levels of chloride may give rise to taste problems.	250mg Cl/l
<i>Clostridium perfringens</i> (including spores)	<i>Clostridium perfringens</i> is a spore-forming bacterium which is present in the gut of all warm-blooded animals. The spores are extremely resistant to the water environment and water treatment processes (including chlorination). As a consequence, their presence in the absence of <i>E. coli</i> and enterococci can be taken to indicate a historic pollution event. Their presence would imply that a source is liable to intermittent contamination and you are advised to check the source protection afforded to your private water supply.	0 per 100 ml
Coliform bacteria	Coliform bacteria are widely distributed in the environment, often as a result of human or animal activity, but some grow on plant matter. Their presence in water supplies indicates a need to investigate the source of the contamination and the integrity of the water supply system. You should check: (a) the integrity of the supply source and ensure there is no possibility of surface contamination; and (b) the disinfection treatment process if present.	0 per 100 ml
Colony counts at 22°C	Bacteria recovered in colony counts at 22°C represent those bacteria naturally present in water and have limited public health significance. However, these counts can be a useful assessment of the efficiency of any water treatment and the cleanliness and integrity of your distribution and storage system. You should investigate the reason for raised colony count levels and consider flushing and disinfection of pipe work.	No abnormal change
Conductivity	Conductivity is a non-specific measure of the amount of natural dissolved inorganic substances in source waters.	2500µS/cm at 20°C
Hydrogen ion (pH)	The hydrogen ion value of water is a measure of the acidity (low values) or alkalinity (high values). It should be noted that hydrogen ion levels significantly outside the tolerance values may cause eye and skin irritation. Soft acidic waters can cause corrosion of pipework and the dissolution of metals such as copper, zinc and lead. Hard, alkaline waters can cause problems associated with scale formation.	pH value 9.5 (maximum) pH value 6.5 (minimum)

Table 4: Additional Monitoring Parameters

Parameter	Description	Level or State Above Which Investigation is Required
Indicative Dose (for radioactivity)	Indicative dose is a measure of the effective dose of radiation the body will receive from consumption of water. Its calculation is only required when screening values for gross alpha or gross beta are exceeded.	0.10 mSv
Sulphate	Levels of sulphate above the standard may cause noticeable taste problems.	250mg SO ₄ /l
Radon (for radioactivity)	Radon is a radioactive gas which may be found in some drinking-water supplies, in particular those sourced from groundwater. The health risk from exposure to radon is considered to be primarily from inhalation rather than ingestion. If you are concerned about radon levels at your property or premises it is recommended you carry out radon in air testing to assess the level of risk of exposure to radon. Guidance on Radon in air monitoring can be found on the Public Health England website: https://www.ukradon.org/information/measuringradon	100Bq/l
Total organic carbon (TOC)	TOC represents the total amount of organic matter present in the water.	No abnormal change
Tritium (for radioactivity)	Tritium is a radioactive isotope of hydrogen. Discharges to the environment are strictly controlled in Northern Ireland by the Industrial Pollution and Radiochemical Inspectorate of the Northern Ireland Environment Agency (NIEA).	100Bq/l
Turbidity	Turbidity should be below 1 NTU in treated surface water to ensure the effectiveness of the disinfection process.	1 NTU

For further information:

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