Northern Ireland Environment Agency

European and National Drinking Water Quality Standards

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Microbiological Standards

To protect public health there are microbiological standards which have to be met at each treatment works and treated water service reservoir or tower. Microbiological determinations are also undertaken on consumer tap samples. The significance of individual test results for each microbiological parameter at each location varies, and a single positive result does not necessarily mean that water is unsafe to drink. Other information is required to assess water safety and each result is assessed on a case-by-case basis. Each of the standards 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. These organisms are controlled through the disinfection of water.	0 per 100 ml
Escherichia coli (*E. coli*)	*E. coli* 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.	0 per 100 ml
Clostridium perfringens (including spores)	*Clostridium perfringens* is a spore-forming bacterium which is present in the gut of all warm-blooded animals. The spores can survive disinfection. The presence of spores in drinking water indicates a remote or intermittent source of contamination that requires investigation.	0 per 100 ml

Table 1: Microbiological Standards

Parameter	Description	Standard
Coliform bacteria	These 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. Coliform bacteria indicate whether treatment, especially disinfection, is satisfactory. The standard applies as an absolute value at the treatment works and must be met by 95 per cent of samples taken at service reservoirs.	0 per 100 ml
Colony counts	Colony count measurements detect a wide range of micro-organisms; the types and numbers detected depend on the media and temperature used. The test is of little value as a measure of pathogen risk but is a useful operational tool.	No abnormal change

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 localized 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.	0.10 µg/l
Antimony	Antimony is rarely found in drinking water. Trace amounts can be derived from brass tap fittings and solders.	5.0 µgSb/l

Table 2: European Health-Based Chemical Standards

Parameter	Description	Standard
Arsenic	Naturally present at trace levels in a very few groundwater sources. Arsenic, when present, is removed by specialist water treatment processes.	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. Some bottled water and soft drinks which include sodium benzoate as an ingredient have been reported as containing benzene.	1.0 µg/l
Benzo(a)pyrene	One of several compounds known as polycyclic aromatic hydrocarbons (PAHs), see below. Their source in drinking water is as a result of a deterioration of coal tar which many years ago was used to line water pipes. Due to ongoing water mains refurbishment and renewal it is now rare to detect this substance in drinking water. A stringent standard has been set for this individual substance based on its toxicity.	0.010 µg/l
Boron	Boron in water sources comes from industrial discharges or from detergents in treated sewage effluents. The concentrations present in drinking water are not of public health concern.	1.0 mgB/l
Bromate	Bromate can be formed during disinfection of drinking water through a reaction between naturally occurring bromide with strong oxidants (usually ozone). It may be generated in the manufacture of sodium hypochlorite disinfectant. A stringent standard has been set based on toxicity and best water treatment practice.	10 µgBrO$_3$/l
Cadmium	Cadmium is rarely detected in drinking water and trace amounts are usually due to dissolution of impurities from plumbing fittings.	5.0 µgCd/l
Chromium	Not normally present in drinking water.	50 µgCr/l

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Table 2: European Health-Based Chemical Standards

Parameter	Description	Standard
Copper	Copper in drinking water comes mostly from copper pipes and fittings in households. In general, water sources are not aggressive towards copper but problems very occasionally occur on new housing estates. These 'blue water' events can be avoided by good plumbing practices.	2.0 mgCu/l
Cyanide	Cyanide is not normally present in drinking water.	50 µgCN/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 special water treatment.	3.0 µg/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.	0.10 µg/l
Fluoride	Fluoride occurs naturally in many water sources, particularly, in groundwater. It cannot be removed by conventional water treatment so high levels must be reduced by blending with another low fluoride water source.	1.5 mgF/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. If the water supply has a tendency to dissolve lead, then Northern Ireland Water Ltd (NI Water) treats the water to reduce consumer exposure.	25 µgPb/l (10 µgPb/l from 25th December 2013)
Mercury	Mercury is not normally found in sources of drinking water.	1.0 µgHg/l
Nickel	Nickel is not normally found in drinking water sources. Traces can be found in drinking water arising from the protective coatings on taps and other plumbing fittings.	20 µgNi/l
Nitrate	Nitrate occurs naturally in all source waters, although higher concentrations tend to occur where fertilizers are used on the land. Where necessary, nitrate levels are reduced during water treatment (ion exchange or blending with low nitrate water).	50 mgNO$_3$/l

Table 2: European Health-Based Chemical Standards

Parameter	Description	Standard
Nitrite	Nitrite is sometimes produced as a by-product when chloramine is used as the essential residual disinfectant in a water supply. Careful operation of the disinfection process ensures levels of nitrite are kept below the standard.	0.50 mgNO$_2$/l at consumers' taps; 0.10 mgNO$_2$/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 found in drinking water.	0.030 µg/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. Where needed, NI Water has installed water treatment (activated carbon) so that pesticides are removed from drinking water. The standard for each individual pesticide is 0.10 µg/l. NI Water must test for those pesticides used widely in its supply areas.	0.10 µg/l
Pesticides - total	This parameter represents the sum of detectable concentrations of individual pesticides.	0.50 µg/l
Polycyclic aromatic hydrocarbons (PAHs)	PAHs is a group name for several substances present in petroleum based products such as coal tar. PAHs are present in coal tar linings, which were used to protect water mains before 1970. Traces of PAHs may be present in tap water if the original coal tar lining is still present. This parameter represents the sum of the concentrations of four individual PAHs.	0.10 µg/l
Selenium	Selenium is an essential element and a necessary dietary component. Amounts in drinking water are usually well below the standard.	10 µgSe/l
Tetrachloroethene and Trichloroethene	These are solvents that may occur 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.	10 µg/l

Table 2: European Health-Based Chemical Standards

Parameter	Description	Standard
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.	100 µg/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.	0.50 µg/l

National Chemical and Physical Standards

The European Drinking Water Directive recognizes 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	Occurs naturally in some drinking water sources. It is removed from drinking water by conventional water treatment processes (coagulation and filtration). Aluminium sulphate can be used as a water treatment chemical to remove cloudiness, colour and organisms.	200 µgAl/l
Colour	Colour occurs naturally in upland sources. It is removed by conventional water treatment processes (coagulation and filtration).	20 mg/l Pt/Co
Iron	Iron is present naturally in many water sources. It is removed by water treatment. Some iron compounds are used as water treatment chemicals. However, the most common source of iron in drinking water is corrosion of cast-iron water mains.	200 µgFe/l
Manganese	Manganese is present naturally in many water sources and is usually removed during water treatment.	50 µgMn/l
Odour and taste	Odour and taste can arise as a consequence of natural processes in surface water sources, particularly between late spring through to early summer. Water treatment with activated carbon or ozone will remove these natural substances. The standard relates to the evaluations of a panel of people assessing samples in the laboratory, to obtain a semi-quantitative taste and odour value.	Acceptable to consumers and no abnormal change

Table 3: National Chemical and Physical Standards

Parameter	Description	Standard
Sodium	Sodium is a component of common salt. It is present in seawater and brackish groundwater. Some treatment chemicals contain sodium. Concentrations in drinking water are extremely low but some water softeners can add significant amounts to drinking water, where they are installed in homes or factories, if installation is not according to best practice.	200 mgNa/l
Tetrachloromethane	This is a solvent that may occur in ground water in the vicinity of industrial areas. Where necessary, it is removed by specialist water treatment.	3 µg/l
Turbidity	Turbidity is a measure of the cloudiness of water. Levels are controlled by the treatment process. It can also arise from disturbance of sediment in the distribution system. This standard applies at consumers' taps; a tighter indicator turbidity standard triggers investigation at the treatment works (see additional monitoring parameter table below).	4 NTU

Additional Monitoring Parameters

In addition to the drinking water standards, NI Water is required to test for additional indicator parameters to assist it with 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	Ammonium salts are naturally present in trace amounts in most water sources. Their presence might indicate contamination of sanitary significance and they interfere with the operation of the disinfection processes.	0.50 mgNH$_4$/l
Chloride	Chloride is a component of common salt. It may occur in water naturally but it may be present due to local use of de-icing salt and saline intrusion.	250 mgCl/l
Clostridium perfringens (including spores)	Clostridium perfringens is a spore-forming bacterium which is present in the gut of all warm-blooded animals. The spores can survive disinfection. The presence of spores in drinking water indicates a remote or intermittent source of contamination that requires investigation.	0 per 100ml
Coliform bacteria	These 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. Coliform bacteria indicate whether treatment, especially disinfection, is satisfactory. The standard applies as an absolute value at the treatment works and must be met by 95 per cent of samples taken at service reservoirs.	0 per 100ml
Colony counts	Colony count measurements detect a wide range of micro-organisms; the types and numbers detected depend on the media and temperature used. The test is of little value as a measure of pathogen risk but is a useful operational tool.	No abnormal change
Conductivity	Conductivity is a non-specific measure of the amount of natural dissolved inorganic substances in source waters.	2500 µS/cm at 20°C

Table 4: Additional Monitoring Parameters

Parameter	Description	Level or State Above Which Investigation is Required
Hydrogen ion (pH)	pH value or hydrogen ion concentration, gives an indication of the degree of acidity of the water. pH 7 is neutral; values below 7 indicate acidic characteristics and values greater than 7 indicate alkaline characteristics. A low pH may result in pipe corrosion. An alkali may be added before water is supplied so that corrosion is minimized.	pH value 9.5 (maximum)
		pH value 6.5 (minimum)
Sulphate	Sulphate occurs naturally in all waters and cannot be removed by treatment.	250 mgSO$_4$/l
Total indicative dose	Total 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/year
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).	100 Bq/l
Turbidity	Turbidity measurement is an important non-specific water quality control parameter at water treatment works because it can be monitored continuously on line and set to alert operators of deterioration in raw water quality or the need to optimize water treatment.	1 NTU