Water Facts

2. Water Quality

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Water Quality

How can I be confident in the quality of the water I receive?

Drinking water quality in England is regulated by the Drinking Water Inspectorate (DWI). The DWI assesses the performance of water companies' compliance with the requirements of The Water Supply (Water Quality) Regulations (as amended), which are the national regulations that set the standards that ensure drinking water is safe to drink and acceptable to consumers.

The Regulations require water companies to evaluate the level of risk to water quality associated with the drinking water supply process from catchment through to the customer tap. Any risk levels that are identified as being too high require the water company to introduce control measures such as introducing a new treatment process to bring them down to an acceptable level of risk. This risk-based approach for managing water supplies is known as water safety planning.

Water companies monitor the quality of the water at several stages of the water supply process, including at abstraction, after treatment, after storage in the network and at customers taps. This is done in accordance with the monitoring schedules described in The Water Supply (Water Quality) Regulations (as amended). This programme of monitoring is used to demonstrate the quality of water and verify the effectiveness of the water safety planning process.

The Water Supply (Water Quality) Regulations set down the standards required for each of the parameters in the monitoring programme. They explain, in detail, the levels of certain characteristics, elements and substances that are allowed in drinking water. Each substance has a limit as to how much or how little should be in the water supply. Usually, the limit is a maximum level but occasionally a minimum value is also set (for example, the pH, or acidity levels). This permissible level is known as the Prescribed Concentration or Value (PCV).

Which parameters are monitored and what do they show?

Water companies monitor a range of parameters at customers taps. More information on some of the parameters monitored and the prescribed concentration and values are provided in Table 1.

To help understand the information, the common units of measurement referred to are:

- 1 milligram per litre (mg/l) is one part per million.
- 1 microgram per litre (ug/l) is one part per billion or thousand million.
- 1 nanogram per litre (ng/l) is one part in a million million.
- NTU = Nephelometric Turbidity Units (for measuring turbidity which is the level of cloudiness caused by particles in water)
- oH = Degree Hazen (for colour measurement)
- uS/cm – microSiemens/centimetre (for conductivity measurement)
- *E. coli* or enterococci = number per 100 ml

Table 1. Water Quality parameters monitored at customer taps.

Parameter	Reason for monitoring	Prescribed concentration or value
Aluminium	Aluminium can occur naturally in water. Aluminium compounds are used in the water treatment process to help remove impurities. Any aluminium salts added in controlled amounts during the treatment process and removed through clarification and filtration processes.	The PCV for Aluminium is 200ugAl/l
Antimony	Antimony isn't normally found in great quantities in natural water. It is however used to form alloys with copper, lead and tin and can be found in solders as a replacement for lead.	The PCV for Antimony is 5ugSb/l
Arsenic	Arsenic is found widely in rock and groundwater in certain areas. There are several treatment methods available to water companies to reduce the concentration of arsenic to acceptable levels.	The PCV for Arsenic is 10ugAS/l
Benzene	Benzene is found in petrol and is used in the production of many organic chemicals. It is most commonly introduced to water via industrial contamination, and localised spillages of petrol where there is permeation through to the underground pipes.	The PCV for Benzene is 1 ug/l
Benzo(a)pryrene	Benzo(a)pyrene is a polycyclic aromatic hydrocarbon (PAH) that occurs in the environment, as a consequence of incomplete combustion of oil, waste or hydrocarbons. Elevated levels can occasionally be detected in drinking water as a result of contact with coal tar pitch pipe linings.	The PCV for Benzo(a)pyrene is 0.01 ug/l
Boron	Boron is used in the manufacture of glass, soaps, detergents, and flame retardants. It is naturally occurring in rock and soil from which it is leached into ground and surface waters. Discharges from wastewater into the environment can increase the concentration of boron in the receiving water.	The PCV for Boron is 1ugB/l
Bromate	Bromate is not normally found in water but can occur where there is pollution from industrial sources sometimes associated with contaminated land. It can also be present where the water company uses ozonation for treatment causing bromate to form as a by-product where bromide is present, or it can be formed as a by-product of the electrolysis process used to generate sodium hypochlorite.	The PCV for Bromate is 10ugBr/l.

Cadmium	Cadmium is used in the manufacture of steel, plastics, and batteries. It can be present in the environment due to wastewater discharges and diffuse pollution from fertilizers. The presence of cadmium as contaminant in drinking water can also be due to the presence as an impurity in galvanized pipes, solders and plumbing fittings.	The PCV for Cadmium is 5ugCd/l
Chloride	Chloride in drinking water originates from natural sources such as mineral deposits, and from tidal mixing of river and groundwater. It contributes to taste which may be unacceptable to consumers if the standard is exceeded.	The PCV for Chloride is 250mgCl/l.
Chlorine	Chlorine is added during treatment to disinfect water and make sure it's free from harmful bacteria. When we add chlorine in strictly controlled amounts, not all of it is used up in the process. Some remains as 'free chlorine' to maintain microbiological quality as it passes through the distribution pipes.	There is no PCV for Chlorine.
Chromium	Chromium is steely-grey, hard metal that is found in the environment. Chromium occurs in a variety of valence states with trivalent (chromium (III)) and hexavalent (chromium (VI)) being the most stable and biologically relevant oxidation states. Chromium is used widely to make stainless steel, for electroplating other metals, for making refractory bricks in high temperature ovens, catalysts, pigments and paints, pesticides and fungicides, ceramics and glass, laboratory reagents and in photography.	The PCV for Chromium is 50ugCr/l.
Colour	The colour of drinking water is usually due to the presence of naturally occurring dissolved organic matter. However, colour may also be due to the presence of iron sediment caused by old cast iron mains in the water distribution network. In some circumstances, the appearance of high colour may make water unacceptable for customers to use.	The PCV for Colour is 20 degrees Hazen (oH).
Conductivity	Conductivity is a measure of the dissolved solids content of water and is often used as an indication of the presence of trace levels of dissolved mineral salts of calcium, magnesium and sodium.	The PCV for Conductivity is 2500 uS/cm at 20oC.
Copper	Copper occurs naturally and is normally found in low concentrations in drinking water. Issues with high levels of copper can be caused by domestic plumbing and fittings.	The PCV for Copper is 2mgCu/l.

Cyanide	Cyanide can be found in source waters at very low levels. However, there is the potential for the accidental release of cyanide by industry into the environment and for cyanide to be present in drinking water when there is problem with the chloramination process which can be used for disinfection of water supplies.	The PCV for Cyanide is 50ugCN/l
1,2 Dichloroethane	1,2 dichloroethane is used as an intermediate in the production of vinyl chloride, as a solvent and as a scavenger in gasoline. It may be present in surface and groundwaters following disposal in waste sites and discharge of effluents from industries using it.	The PCV for 1,2 Dichloroethane is 3ug/l.
E. coli and Enterococci	If present, these bacteria suggest a possible breach in the water supply system. An efficient treatment process will remove and kill any organisms present. As bacteria can flourish in taps, be careful not to contaminate your drinking water tap by, for example, hanging a dishcloth over it. Be especially careful when washing food as bacteria can easily splash back on to the tap.	The PCV standards are: 0 per 100 ml for E.coli. 0 per 100 ml for Enterococci.
Fluoride	Fluoride can be found naturally in raw water supplies at low levels. In some areas the local health authorities have decided that for health reasons there is a need to add fluoride to the water supply.	The PCV for Fluoride is 1.5mgF/l.
Hardness	The mineral content of drinking water varies widely but all water contains naturally occurring mineral salts which contribute to the taste and natural characteristics of drinking water. Hardness is a measure of the calcium and magnesium concentrations in water and is usually caused by the rocks through which the water has passed. In hard water areas you may have to use more soap when washing as hard water lathers less than soft water. It has no adverse effects on health.	There is no standard specification in the regulations for the level of hardness in water.
Hydrogen ion concentration or pH	pH is a scientific term used to describe the degree of acidity or alkalinity. We need to control the pH of water because: • If it is too acidic then it may corrode metal pipes in the distribution system. • If it is too alkaline it may form deposits in pipes and cause taste problems.	Regulations require the pH of drinking water to be in the range of pH 6.5 to 9.5.
Iron	Iron is one of the most abundant metals on earth and is found naturally in surface and groundwater. After treatment it's normally reduced to trace concentrations in drinking water. Increased levels can occur due to corrosion in old cast iron water mains sediment. Normally there's no health risk associated with higher levels of iron except in the case of some specific medical conditions. However, iron can cause staining on domestic fittings and the water may look unacceptable to some people.	The PCV for Iron is 200ugFe/l.

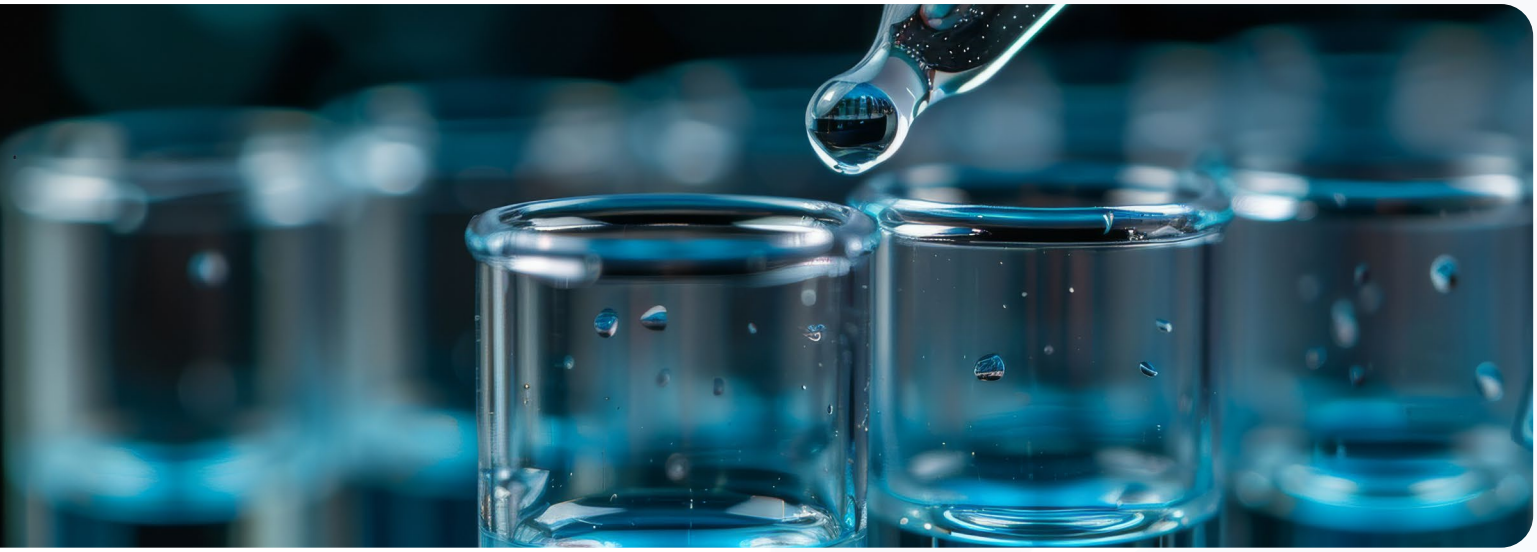
Lead	Lead isn't normally present in water sources, but significant concentrations can be found in drinking water if lead pipes, or copper pipes with lead joints have been used in the domestic plumbing system.	The PCV for Lead is 10ugPb/l.
Manganese	Manganese occurs naturally in water. High concentrations of Manganese are unacceptable in drinking water on aesthetic grounds and can be seen as purple or black spots on laundry.	The PCV for Manganese is 50ugMn/l.
Mercury	Mercury is found at low levels in surface and groundwaters. Mercury is used in electrical appliances, dental amalgams, as the raw component of Mercury compounds and in the production of chlorine. It is therefore common in the environment.	The PCV for Mercury is 1ugHg/l
Nickel	Nickel is mainly used in the production of stainless steel and nickel alloys. Levels of Nickel in drinking water can be significant where water has come into contact with kettles and/or nickel and chromium plated taps that are breaking down.	The PCV for Nickel is 20ugNi/l
Nitrate and Nitrite	Nitrites and nitrates are two different molecules that are made up of both nitrogen and oxygen. The chemical difference between nitrites and nitrates is how many oxygen atoms each compound contains. Normally only traces of these compounds are found in drinking water. However, mainly because of agricultural activity, nitrate levels can increase in raw untreated water. Where this happens, Southern Water treats the water to remove nitrates. Nitrate is used mainly in inorganic fertilizers but is also used in the production of explosives and glassmaking. Nitrate occurs naturally in plants and is a key nutrient that helps them grow. Sodium nitrite is used as a food preservative, especially in processed meats. Nitrite can form in drinking water distribution pipes due to the action of bacteria, where stagnation of nitrate-containing and oxygen-poor drinking water occurs.	The PCV for Nitrite is 0.5 mg NO2/l The PCV for Nitrate is 50 mg NO3/l.
Pesticides	Pesticides are chemicals that are used as weed killers, insecticides, fungicides and other similar purposes. They are found in rivers and ground waters because of both agricultural and non-agricultural use on the land. The concentration of pesticides found in drinking water is controlled by water companies by the use of catchment management where water companies encourage pesticide users to limit the use of pesticides and advanced water treatment processes including ozonation and activated carbon.	There are several PCV's associated with pesticides they are: • Total (the sum of) pesticides is 0.5ug/l • Aldrin 0.03ug/l • Dieldrin 0.03ug/l • Heptachlor 0.03ug/l • Heptachlor epoxide 0.03ug/l • Any other individual pesticide 0.1ug/l

Polycyclic aromatic hydrocarbons (PAHs)	Poly aromatic hydrocarbons are commonly found in drinking water where the internal lining of old ductile iron coal tar lined pipes have broken down.	The PCV for the sum of PAH's is 0.1ug/l. This includes the following compounds: • Benzo(b)fluoranthen • Benzo(k)fluoranthene • Benzo(ghi)perylene • Indeno(1,2,3-cd) pyrene
Sodium	Sodium occurs naturally in trace amounts in water. High concentrations may affect the taste of water and be unacceptable to consumers. Higher concentrations of sodium in drinking water should not be used for making up baby feeds or bottles.	The PCV for Sodium is 200mgNa/l.
Sulphate	Sulphate occurs naturally in water and originates from mineral deposits. High concentrations may affect taste and can degrade pipes.	The PCV for Sulphate is 250 mgSO4/l.
Taste and Odour	Occasionally customers complain to us about the taste and smell of their water. Quality control tests to measure the level of taste and odour are performed by a specialist panel.	The PCV for Taste and for Odour is dilution number 1 at 25oC.
Tetrachoroethene & Trichloroethene	Tetrachoroethene and Trichloroethene are used as a solvent in dry cleaning and as a metal degreasing solvent. Poor disposal of these products can result in contamination of groundwater.	The PCV for Tetrachloroethene and Trichloroethene is 10ug/l.
Total coliform bacteria	Total coiforms include a wide range of bacteria, some of which can grow and survive in water. They are found in a range of environments. As they can grow and survive within the water distribution system total coliforms are used as an indicator of the cleanliness of the piped distribution system and the presence of biofilms. Most total coliforms will be killed almost immediately after disinfection with a chlorine-based disinfectant.	The PCV standard is: 0 per 100ml for total Coliforms.
Trihalomethanes (THMs)	THMs occur in drinking water principally as trace by-products of the reaction of chlorine with naturally occurring dissolved organic materials. For drinking water, it is the sum of several compounds classed as THMs that are significant, the most common of which is chloroform.	The PCV for THMs is 100ug/l (sum of all compounds measured).
Turbidity	Turbidity is caused by very fine particles suspended in water. Turbidity is closely monitored during the treatment process. Sometimes, water coming out of the tap has a milky / white appearance. This is usually caused by excess air dissolving in the water (similar to opening a bottle of fizzy drink). It isn't harmful and if water is left to stand for a few minutes, it will clear from the bottom up.	The PCV for Turbidity at customers' taps is 4.0 NTU.

What happens if a test fails?

If a sample fails a test, it doesn't necessarily mean that the water entering your home or business is unsuitable to drink. Sometimes the water in mains or pipes and in neighbouring properties meets all the required standards, but there is an issue with the householder's plumbing system. In this case, we let the customer know and advise them about what action they should take next to prevent any further contamination from the plumbing system. Water quality failures are swiftly recorded, investigated, and acted on to make sure any problems are resolved as soon as possible. We also report failures to the Drinking Water Inspectorate, health professionals (United Kingdom Health Security Agency) and the local environmental health services.

When there is a parameter failure from a sample taken from your home or business we will investigate. The investigation will include us taking more samples from the tap that was originally sampled and if required samples from your neighbours. We will also undertake an inspection of your plumbing to see if it complies with the regulations and whether it may have contributed to the failure. We will try to identify the cause of the failure but sometimes this isn't always possible. In any case, we will write to you informing you of the findings of our investigations and where we are able any actions that will help to prevent any further failures.



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