BRISTOL WATER

Drinking Water Quality

The standards explained

PEOPLE NOW SHOW MORE INTEREST IN THEIR DRINKING WATER– WE WELCOME THIS.

Drinking water is surprisingly complex and will vary from area to area, usually because of the different rocks it passes through.

All water we supply is treated before being piped to customers' homes. In the Bristol Water area, 75% of the water we use is from surface water sources such as lakes and rivers, while the remainder is from groundwater sources such as wells and springs.

LEGAL REQUIREMENTS

Water Companies must supply wholesome water as defined under the current Water Supply (Water Quality) Regulations, which set out in detail the acceptable standards for drinking water.

Copies of these Regulations can be found on the Drinking Water Inspectorate's (DWI) website – www.dwi.gov.uk

These Regulations include mandatory *indicator* standards as well as health-based standards. In this leaflet, all the standards are shown, but where these are not mandatory this is stated.

"IMPROVEMENT PROGRAMMES"

DWI may authorise a temporary supply of water which does not meet all the requirements of the Regulations. Further information regarding this process can be found on the DWI website together with any current legally binding programmes of work water companies may have.

WATER TESTING

We take samples at water sources; at treatment works; service reservoirs (large covered storage tanks in our supply network, such as water towers); and at customers' taps. Samples taken as required by the Regulations are called *compliance* samples and results can be requested free of charge for your supply area. Reports are also available to download via our website

Approximately 100,000 compliance tests are carried out each year. Over 99.9% of these tests meet the required standards.

Water quality is continuously monitored at the treatment works: these automatically shut down if set limits are exceeded.

WHAT IF A TEST FAILS?

When a sample fails a standard, it does not necessarily mean that the water is unfit to drink. For instance, the odour of water samples is measured by comparing this with a "standard" water, but a difference between the two does not mean that the sample is unsuitable for drinking.

Sample failures can also be caused by the householder's plumbing system, or even a dirty tap. Nonetheless, any failure of the standards is investigated carefully and we take further samples to check if there is an ongoing problem. We inform the DWI of any compliance sample failures, and if any problems are found we act immediately.

UNITS OF MEASUREMENT

The units of measurement we use, for what we detect in the water, are very small.

1 milligram/litre (mg/l) is 1 part in 1,000,000 (one part in a million)

1 microgram/litre (ug/l) is 1 part in 1,000,000,000 (one part in a billion)

1 nanogram/litre (ng/l) is 1 part in 1,000,000,000,000 (one part in a trillion)

Many of the measurements we make are close to the limits of detection, even with the most sophisticated instruments.

Microbiological standards

Coliform bacteria are widely distributed in the environment often as a result of human or animal activity, but some grow on plant matter. We test for these organisms because their presence in the water supply can indicate a problem with the integrity of the water supply system. However, when they are detected, it is often because they can grow within taps in the home. The standard is 0 per 100ml *(indicator standard)*.

Faecal Coliforms (E. *Coli*) and Enterococci are bacteria present in the gut of humans and warm-blooded animals. Their presence in the water supply indicates potential faecal contamination and requires immediate investigation. The standard is 0 per 100ml.

Clostridium perfringens is a spore-forming bacteria that is present in the gut of warm-blooded animals. These spores are resistant to disinfection with chlorine. Their presence in the water supply can indicate historic faecal contamination. The standard is 0 per 100ml *(indicator standard)*

Colony counts at 22°C and 37°C. Small numbers of harmless bacteria are always likely to be present in the water but have no direct health significance. The information is used to monitor the efficiency of the treatment process and water mains' cleanliness. The standard is 'no abnormal change' *(indicator standard)*.

Health-based chemical standards

Health-based standards for chemical parameters are set using a precautionary approach and on the basis of a lifetime's consumption of water taking into account other exposure through routes such as food. Just because a standard has been set for a substance does not mean that it is present in drinking water. Occasionally drinking water may contain low levels of the substance due to local circumstances to the source water or due to internal plumbing systems within the property.

Acrylamide monomer is not normally found in drinking water. It is produced in the manufacture of polyacrylamides, which are sometimes used in water treatment. The levels used are very tightly controlled. The standard is 0.1 µg/l.

Antimony is rarely found in drinking water. Trace amounts can enter the water from brass tap fittings and solders. The standard is 5 µg/l.

Arsenic occurs naturally in some water sources at low levels. Where we have detected this above the drinking water standard we have installed treatment processes to remove it. The standard is 10 µg/l

Benzene is present in fuels such as petrol. It is not found in drinking water, but it can penetrate plastic water pipes if a spill occurs nearby. The standard is 1 µg/l.

Benzo(a)pyrene is one of several compounds known as polycyclic aromatic hydrocarbons (PAHs). They can enter water where coal tar pitch was used in the past to line iron water mains, preventing corrosion. To reduce this risk, water companies have carried out extensive mains renovation programmes. The standard is 10 ng/l.

Boron can be found at low levels in some waters. It can come from industrial discharges and is also used in detergents. The standard is 1 mg/l.

Bromate is not normally found in water sources. It can be formed when ozone is used to treat the water. Treatment processes are tightly controlled to minimise this. The standard is 10 µg/l.

Cadmium can occur naturally at low levels in some waters, although it is rarely detected in drinking water. Trace amounts can enter the water due to dissolution of impurities from plumbing fittings. The standard is 5 µg/l.

Chromium is not normally found in water sources. Its presence in drinking water is normally associated with coatings on some taps and plumbing fittings. The standard is 50 µg/l

Copper in drinking water comes from copper pipes and fittings in households. At high levels it can cause a metallic taste or even a blue discolouration to the water. This can normally be avoided by good plumbing practices. The standard is 2 mg/l.

Cyanide is rarely found in drinking water. Its presence in some surface waters could be associated with heavy industry or a specific contamination incident. The standard is 50 µg/l.

1,2 Dichloroethane is a solvent that is sometimes found in source waters in the vicinity of industrial sites. If found it can be removed by treatment. The standard is 3 µg/l

Epichlorhydrin can be found in trace amounts in polyamine water treatment chemicals. Its presence in drinking water is limited by control of the product specification. The standard is 0.1 µg/l.

Fluoride can occur naturally in some source waters at varying levels. If found at high levels the water needs to be blended with a low fluoride water source. In some areas of the UK fluoride is added to the water to protect against tooth decay. The decision to add fluoride to the water is made by the Local Health Authority. Source waters used by Bristol Water do contain very low levels of fluoride but we have never added fluoride to the water. The standard is 1.5 mg/l.

Lead is occasionally found at low levels in some raw waters as it passes through some rock types. It is normally found in drinking water where lead pipes are present. Many properties built before the mid-1970s had a lead supply pipe or lead plumbing. Bristol Water adds a small amount of phosphate to most of the water supplied to reduce the amount of lead, which dissolves from such pipes. If you have lead pipes and would like to check if they are causing a problem, we can test the water free of charge. The current standard is 10 µg/l.

Mercury is not normally found in drinking water in the UK. The standard is 1 µg/l

Nickel occurs naturally in some groundwaters. More commonly its presence in drinking water is from coatings on modern taps and other plumbing fittings. The standard is 20 µg/l.

Nitrate occurs naturally in all source waters although higher concentrations can occur when the water passes through agricultural land. High nitrate waters can be blended with low nitrate waters to ensure the level is below the standard. Water Companies also work with the Environment Agency and farmers to reduce the amount of nitrate entering the water. The standard is 50 mg/l.

Nitrite can occur in source waters but can also be formed when chloramine is used as the residual disinfectant in the water supply. Bristol Water does not use chloramine. Two standards apply, one for water leaving the treatment works – 0.1 mg/l and one for the water at the consumers' taps – 0.5 mg/l.

Pesticides – organochlorine compounds (aldrin, dieldrin, heptachlor and heptachlor epoxide) are no longer used in the UK because they are persistent in the environment. They are unlikely to be found in drinking water. The standard for each compound is 30 ng/l.

Pesticides – Other. This is a diverse range of products including herbicides, insecticides, fungicides and molluscicides. Many water sources contain small amounts of these compounds particularly waters that pass through agricultural land. The majority of these compounds can be removed during the treatment process and for those that aren't we are working with the farmers to prevent them from entering the water. Pesticides tested will vary from area to area and is determined by pesticide usage in the catchment area of each water source. This information is updated on a regular basis to ensure the correct tests are completed. The standard for each individual substance is 0.1 µg/l and there is a total pesticide standard of 0.5 µg/l for all the pesticides tested for.

Polycyclic aromatic hydrocarbons is a group name for several substances (benzo-b-fluoranthene, benzo-k-fluoranthene, benzo-ghi-perylene, indeno-123-cd-pyrene) found in petroleum based products such as coal tar. The standard for the sum of these compounds (excluding benzo (a)pyrene - please see above for more information) is 0.1 µg/l.

Selenium is an essential element and a necessary dietary component. Amounts in drinking water are usually well below the standard of 10 µg/l.

Tetrachloroethane and Trichloroethene are solvents that may occur in water in the vicinity of industrial sites. They can be removed by treatment. The standard for the sum of both substances is 10 µg/l.

Trihalomethanes are normally formed during the disinfection of water by a reaction between chlorine and naturally occurring organic substances. The disinfection process is operated to minimise their formation. The standard is 100 µg/l.

Vinyl chloride may be present in plastic pipes as a residual of the manufacturing process of polyvinyl chloride (PVC) water pipes. The standard is 0.5 µg/l.

National chemical and physical standards

In addition to the health-based standards specified in the EU directive there are national mandatory standards for a number of parameters. Many of these standards are set on the basis that higher levels may make the water unacceptable to consumers.

Aluminium occurs naturally in some source waters and aluminium compounds can be used at treatment works to remove impurities from the water. The standard is 200 µg/l.

Colour in the source water can be caused by natural organics, which are normally removed during treatment. Sometimes iron from water mains or copper from plumbing systems can give a tint to the water. The standard is 20 mg/l Pt/Co.

Iron can be found in some source waters and iron compounds are sometimes used during the treatment process. However, the most common source of iron in drinking water is old iron water mains. The standard is 200 µg/l.

Odour and Taste can arise as a consequence of natural substances in the source water. However, changes in taste and odour can be caused by internal plumbing systems (more information can be found on our website). The standard is described as 'acceptable to consumers and no abnormal change'.

Sodium is a naturally occurring substance, which can also be increased as an effect of softening the water. The standard is 200 mg/l.

Turbidity is a measure of the cloudiness of water, normally caused by suspended minerals. It is also an important non-specific water quality control parameter at water treatment works. Two standards apply. One for water leaving the treatment works to ensure the treatment process is operating correctly: 1.0 NTU. The other standard applies at the consumers' taps. This standard is 4.0 NTU and is higher because some turbidity may occur from water passing through the water mains and consumers' plumbing.

Additional monitoring parameters

In addition to the drinking water standards, water companies are required to test for additional indicator parameters to assist with good water supply management.

Ammonium is naturally present at low levels in most waters. Its presence may indicate contamination needing further investigation. It is not harmful but can be of concern to Haemodialysis patients. The guide value is 0.5 mg/l.

Conductivity is a measure of the amount of naturally dissolved minerals in the water. The guide value is 2,500 µS/cm.

Hydrogen Ion (pH) is a measure of how acid or alkaline the water is. A pH of 7 is neutral; values below 7 are acidic and values above 7 are alkaline. The water we supply is slightly alkaline. The guide value range is 6.5 and 9.5.

Sulphate occurs naturally in most waters and comes from mineral deposits. The guide value is 250 mg/l.

Total Indicative Dose is a measure of the effective dose of radiation the body will receive from consumption of the water. It is calculated only when screening values for gross alpha or gross beta (radiation) are exceeded. The guide value is 0.10mSv/year.

Total Organic Carbon is a measure of the natural organic material present in the water. It varies from source to source and is monitored to check for any unusual change. The guide value is 'no abnormal change'.

Tritium is a radioactive isotope of hydrogen. Discharges to the environment are strictly controlled and there is a national programme of monitoring surface waters. The guide value for drinking water sources is 100 Bq/l.

Chlorine is an essential part of water treatment and ensures the wholesomeness of the drinking water is maintained as it moves through our mains network to your tap. There is no legal limit or guide value and levels are kept as low as possible whilst ensuring the bacteriological quality of the water.

For further information on water quality
or any other issues regarding your water supply,
please contact

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