

# Private Water Supply

## Physical Contaminants



01422 833121

[www.springhillwaterservices.co.uk](http://www.springhillwaterservices.co.uk)

### Aluminium

Aluminium occurs naturally in many raw waters, particularly those from upland catchments which contain acidic surface water. The UK drinking water quality regulation set the standard for Aluminium as 0.200 mg/l. The aim of the standard is to avoid the aesthetic problems of discolouration and cloudiness rather than being health related. Aluminium, in a small private water supply can be removed by filtration or reverse osmosis.

### Colour

True discolouration is often caused by humic and fulvic materials leaching from peat or other decaying vegetation. This type of discolouration is difficult to remove and filtration on its own will not remove colour.

However, what seems like discolouration is in often suspended matter caused by materials such as iron and manganese or other floating debris.

A simple test for colour is to leave a glass of discoloured water to stand overnight. If in the morning the colour has "dropped out" then the problem is in all probability, caused by suspended solids. This type of discolouration is relatively easy to remove through basic filtration.

### Hardness

The UK water standards do not set a level for hardness (calcium and magnesium). Where the water is very hard (greater than 300 mg/l) scaling of fixtures and fittings and appliances such as kettles will occur. However, even water that is slightly hard (greater than 100 mg/l) some appliances might show signs of scaling.

The most often used method for removing hardness in a private water supply is a base-exchange water softener installed on the mains supply into a property.

### Iron and manganese

Closely related, iron and manganese are twin troublemakers. Even where their concentrations in water are low, they cannot be ignored. Iron presents the greater problem only because it appears more frequently. The presence of iron alone or in combination with manganese leads to staining problems.

Iron is the fourth most abundant element in the earth's crust and after aluminium it is the second most abundant metal. It is the third most abundant constituent of shales after aluminium and silicon and the fifth most common element in sandstones. The average level of iron in soils is 0.5 to 4.3 %.

Where total iron is present at levels below 0.100 mg/l it may be considered negligible for domestic use but if the total iron level is above 0.300 mg/l it can produce a brown or red stains on plumbing fixtures, dishes, cooking ware and any many other surfaces which come into contact with the iron water.

The WHO suggests that iron levels around 2.0 mg/l are acceptable from a health point of view and the United Kingdom Drinking Water Inspectorate suggests that levels up to 2.8 mg/l are even acceptable. However, for aesthetic reasons, the UK standard for iron is 0.200 mg/l.

Iron concentrations of 0.04 mg/l can be detected by taste in pure water whilst in spring water the taste threshold value is 0.120 mg/l.

Although the standard for iron in the United Kingdom is 0.2 milligrams per litre staining in washing machines and pipework will only occur where levels of iron exceed 0.3 milligrams per litre with concentrations below this level causing few problems in a domestic situation. In most cases, filtration will totally remove iron and manganese however; in some instances it is only possible to achieve a "significant reduction".

# Physical Contaminants

## Lead

High levels of lead in a private water supply are usually caused by plumbosolvency, that is, acidic water dissolves lead pipework, tank linings or leaded water fittings. The UK standard for lead is 0.010mg/l to be met by 2013. Water that has been standing in lead pipe for even a short period, for example overnight, should not be consumed. If there are no alternatives, then running the water for 30 to 60 seconds will clear most of the lead from water used for drinking and cooking.

When treating a small private water supply, the best remedy is to remove all of the lead from the distribution system. Reverse Osmosis is also a highly effective treatment method for removing lead from drinking water.

## Nitrates

Discharge effluents from septic tanks containing nitrate are the main contributor to the concentration of nitrate in some surface derived sources. In many areas, agricultural activity is also a source of nitrate that ends up in a private water supply.

Ion exchange nitrate removal filters are often used on a private water supply, however, an under-sink reverse osmosis unit will remove water from a kitchen tap used for drinking water and cooking.

## pH (Hydrogen Ion)

When the pH and the alkalinity of water are low, the water is likely to be acidic in which case the pH should be corrected. Acidic water causes pin-holing of copper pipe and hot water cylinders. This frequently leads to copper leaching into the water causing discolouration (blue tinge / staining) of sanitary ware and blonde coloured hair.

The simplest and most convenient way to raise pH is to run the water through a vessel containing a bed of specially activated limestone. This usually takes the form of a mixture of calcium and magnesium salts. The media gradually dissolves, increasing the pH of the water. This type of unit is called a pH Corrector. The standard for pH in the UK is a minimum of 6.5 and a maximum of 10.

## Taste and odour

Taste and odour in a private water supply often comes from organic compounds that give the water an “earthy” or “musty” taste. High concentrations of iron and manganese can also impart an unpleasant metallic taste.

The drinking water directives do not give a numeric standard for taste and odour; however, they do require that the water is “acceptable to consumers and no abnormal change”.

Taste and odour are most often removed for aesthetic reasons. A basic activated carbon filter can be effective at removing taste and odour, however, where the problem is acute, then a more sophisticated form of treatment may be required.

## Turbidity

Turbidity is caused by the scattering of light by suspended matter such as clay, silt, and finely divided organic and inorganic matter. Turbidity is not associated specifically with faecal contamination but increases in turbidity are often accompanied with increases in pathogen numbers, including cysts or oocysts.

If the water is allowed to stand for a while, the turbidity will often settle out and become sediment. The World Health Organisation have not set a standard for turbidity, however, adverse effects can be expected when water has 5 NTU or above.

Turbidity is important because it affects both the acceptability of water and the selection and efficiency of treatment processes such as ultraviolet disinfection, in which case the turbidity level should be less than 5 NTU

The main problem associated with turbidity is aesthetic. People do not like drinking cloudy water, even if it is safe to drink.

The turbidity of water in a private supply is dependent on the quality of the source and the effectiveness of any treatment or storage. As with many other problems in an inadequately protected small water supply, turbidity is more likely to be present following heavy rain or a snow melt. Turbidity is relatively easy to remove using basic filtration.