

# Water quality standards explained



**Scottish Water**  
Trusted to serve Scotland



**At Scottish Water, it is our duty to ensure that there is a clear and fresh supply of high quality water for everyone to use.**

Essentially, all of our drinking water comes from rain. When it rains, water flows into streams, rivers, lochs and reservoirs. The vast majority of water supplied in Scotland comes from these sources.

Water that seeps through the ground until it reaches rocks which it cannot pass through, and then forms pools, is called groundwater. This is often very pure: as the rain seeps through the ground, pollutants are often filtered out naturally.

**This factsheet provides you with information on:**

- Where the water quality standards come from
- Where we sample
- What happens if a test fails
- Units of measurement
- Individual parameters/substances
- Sample results
- How to contact us

## 1 Where the water quality standards come from

In Scotland, The Public Water Supplies (Scotland) Regulations 2014 ensures the production of an adequate and high quality supply of water. These regulations detail the acceptable levels of certain characteristics, elements and substances allowed in drinking water. Usually this is a maximum level but occasionally a minimum is also set (e.g. pH). This permissible level is known as the Prescribed Concentration or Value (PCV).

## 2 Where we sample

Water is sampled regularly at our treatment works, service reservoirs and at our customers' taps to monitor the quality of the drinking water. In addition to this, some water quality parameters are continuously monitored at major treatment works. Across Scotland laboratory tests are carried out on water samples each year for regulatory purposes. Many more samples are taken by staff for operational reasons (e.g. bursts, new mains, complaints). The percentage of all regulatory samples complying with the relevant standards in Scotland is over 99%.





### 3 What happens if a test fails

If a sample test fails, this does not necessarily mean the water is unsafe to drink. The maximum permissible limits (PCV) for water quality tests are generally set at a value significantly below any risk to public health. All water sample failures are taken very seriously and are dealt with promptly. These are investigated and appropriate remedial actions are taken to restore water quality. All PCV failures are reported externally to the Drinking Water Quality Regulator (DWQR), respective area health boards, environmental health departments and Health Protection Scotland. In the unlikely event any failed test should give cause for concern regarding a risk to public health, Scottish Water will urgently take appropriate remedial action to restore water quality.

### 4 Units of measurement

The units of measurement used in this factsheet are as follows:

- 1 milligram per litre (mg/l) is one part per million
- 1 microgram per litre (ug/l) is 1 part per billion or thousand million
- 1 nanogram per litre (ng/l) is 1 part per million million
- NTU – Nephelometric turbidity units (for turbidity measurement)
- mg/l Pt/Co – Milligram per litre (mg/l)
- Pt/Co – Platinum-cobalt units Standard (for colour measurement)
- uS/cm – micro siemens/centimetre (for conductivity measurement)
- E-Coli or Enterococci – 0 per 100 ml

### 5 Individual parameters/substances

#### pH

This is a scientific term used to describe the acidity or alkalinity of a fluid. We need to control the pH of water because:

- if water is too acidic then it may corrode metal pipes in the distribution system

- if water is too alkaline it may cause deposits to form in the pipes

The standard is to keep water pH levels in the 6.5-9.5 range.

#### Colour

The colour of drinking water is usually dependent on the presence of naturally occurring dissolved organic matter. For example, the higher the peat content of a catchment, the higher the colour. However, colour may also be due to the presence of iron contributed by old cast iron mains. For more information please see **Scottish Water Factsheet 4 Colour, taste and odour explained**.

- PCV for colour is 20 mg/l Pt/Co.

Sometimes the water coming out of the tap has a milky or cloudy appearance, which is usually caused by excess air dissolved in the water. This is not harmful and if the water is left to stand for a few minutes it will clear from the bottom upwards.

#### Turbidity

Turbidity is caused by very fine insoluble materials that may be present in water. Levels are closely monitored during the treatment processes.

- PCV at the customer's tap is 4.0 NTU

#### Odour and taste

Customer concerns quite often relate to taste and odour. Quality control tests are carried out to measure the level of taste and odour and are performed by a specialist testing panel.

For more information please see **Scottish Water Factsheet 4 Colour, taste and odour**.

#### Conductivity

Conductivity is proportional to the dissolved solids content of the water and is often used as an indication of the presence of dissolved minerals, such as calcium, magnesium and sodium.

- PCV is 2500 uS/cm at 20°C

For more information please see **Scottish Water Factsheet 12 Hardness in drinking water**.



### Hardness

Hardness is normally caused by rocks through which the water has passed. In Scotland most of our water is soft. Hardness is a measure of the calcium and magnesium concentrations in water. Hardness means you may have to use more soap when washing as hard water lathers less than soft water. It has no adverse effects on health and is safe to drink.

There is no standard specified in the regulations. For more information please see Scottish Water Factsheet 12 Hardness in drinking water.

### Chlorine (Cl)

Chlorine is added to water to ensure water is free from bacteria. When chlorine is added not all of it is used up in the process. Some remains as 'free chlorine' to make sure the water remains safe as it passes through the distribution system. For more information please see Scottish Water Factsheet 5 Chlorine explained, and Factsheet 6 Chloramination explained.

No PCV is prescribed for chlorine in the regulations and these levels are set to ensure that a small concentration remains at the end of the distribution system.

### E-coli and enterococci

If present, these indicate a possible breach in the integrity of the water supply system. An effective treatment process will kill any organisms present.

PCV standards are:

- 0 per 100 ml for E-Coli
- 0 per 100 ml for Enterococci

### Coliforms

These are naturally present in the environment. Their presence may indicate a possible breach in the integrity of the supply system or contamination from the kitchen sink or taps.

### Nitrite and nitrate (NO<sub>2</sub> and NO<sub>3</sub>)

Normally only trace amounts of these compounds are found in water.

- PCV for nitrite = 0.5 mg NO<sub>2</sub>/l
- PCV for nitrate = 50 mg NO<sub>3</sub>/l

### Chloride (Cl)

Chloride in water originates from natural sources such as mineral deposits. It can contribute to taste which may be unacceptable to customers if the standard is exceeded.

- PCV = 250 mg Cl/l

### Fluoride (F)

Scottish Water does not add fluoride to any water supply in Scotland. Fluoride can be found naturally in some raw water supplies at low levels.

- PCV = 1.5 mg F/l

### Sulphate (SO<sub>4</sub>)

Sulphate occurs naturally in water and originates from mineral deposits. High concentrations may give rise to taste problems and in the long term, damage pipe work.

- PCV = 250 mg SO<sub>4</sub>/l

If a sample fails, this does not necessarily mean the water is unsafe to drink.



### Copper (Cu)

Copper can occur naturally in some water sources, and is normally found in low concentrations in drinking water.

- PCV = 2 mg Cu/l

### Iron (Fe)

This is one of the most abundant metals found naturally in surface and ground waters. After treatment it is normally reduced to trace concentrations in drinking water. Increased levels can occur due to the corrosion of old cast iron water mains.

- PCV = 200 ug Fe/l

### Manganese (Mn)

Manganese occurs naturally in water. High concentrations of manganese in tap water may cause discolouration.

- PCV = 50 ug Mn/l



### Aluminium (Al)

Aluminium can occur naturally in water within certain catchments. However, aluminium compounds are used in the treatment process to help remove impurities. Any aluminium compounds added during the treatment process are removed before the final treated water leaves the treatment works.

- PCV = 200 ug Al/l

### Sodium (Na)

Sodium occurs naturally in trace amounts in water. High concentrations may impart a level of taste that is unacceptable to customers.

- PCV = 200 mg Na/l

### Lead (Pb)

Lead is not normally present in water sources, but significant concentrations may be present at customers' taps if lead or copper pipes with lead joints have been used in the plumbing system. For more information please see **Scottish Water Factsheet 7 Lead explained**.

- PCV = 10 ug/l

### Trihalomethanes (THMs)

THMs occur in drinking water as by-products of the reaction of chlorine with naturally occurring dissolved organic materials. In drinking water only four compounds out of the group of THMs have health significance, the most common of which is chloroform. The PCV is based on the sum of the concentrations of all four constituents.

- PCV = 100 ug/l

### Other substances

In addition to those listed and explained above, we also test for substances such as hydrocarbons, pesticides and herbicides, phenols and organic carbon. We also carry out extensive monitoring of our supplies for cryptosporidium through sampling of raw and final treated water.

## 6 Sample results

If a field customer representative has taken a range of samples they will then be delivered to our laboratories for further analysis.

Within 10-14 days of the samples being taken a scientist in our public health team will send you a detailed letter explaining the results of the samples taken.

## We want to make it easy to contact us – here's how:

We always have someone here to take your call, you can write to us or alternatively you can contact us through our website.

Alternative formats of this leaflet can be made available free of charge. For information on Braille, large print, audio and a variety of languages, please contact us.

If you have a disability, medical condition or other reason where you will need additional assistance from Scottish Water then please contact us and we can add your name, address and requirements to our confidential Priority Services Register.

We record all calls for quality and training purposes.



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