

Bottled Water

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of hot water and balneology. However, the advent of Christianity saw the practice abandoned, mainly because therms had become places of debauchery. It was not until the 16th century in Italy that hydrotherapy became fashionable again.

Public water supplies did not become common until the 19th century and before that any source of wholesome water, usually from underground aquifers, was highly prized. Cures for many ailments were attributed to drinking or bathing in water from these sources. Spa towns developed in the 17th and 18th centuries, where visitors could 'take the waters' and enjoy a holiday. Spa, a town in Belgium, was one of the earliest of these 'watering places'.

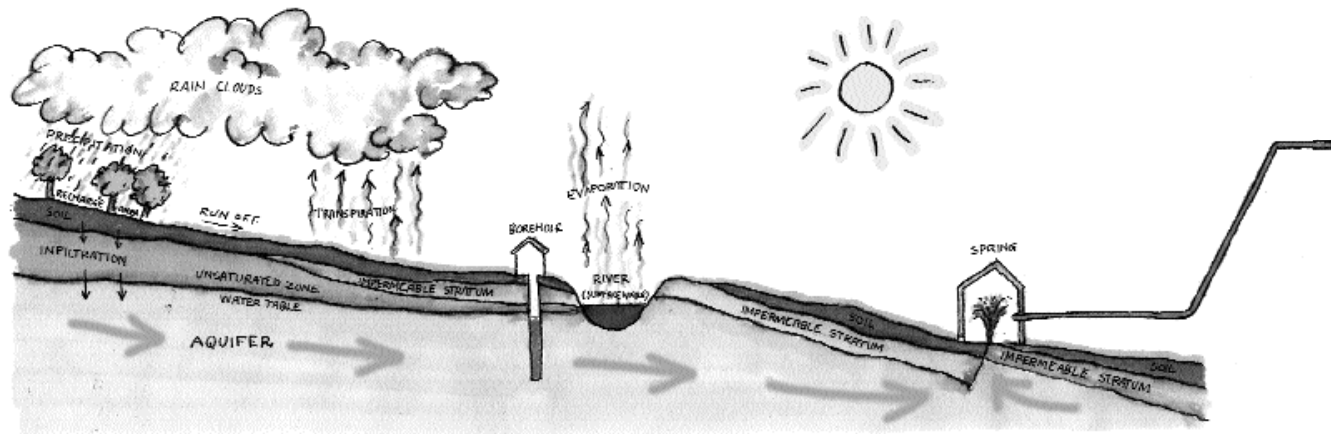
Some of the most popular Bottled Waters today come from elsewhere in Europe, in particular from France and Italy. Evian was discovered in 1789 and was granted the first official bottling authorisation in 1826. However, the UK has a strong history of Bottled Waters dating back to the time of the Romans who discovered the benefits of waters in spa towns such as Bath and Buxton. Mary Queen of Scots was a regular visitor to the baths at Buxton during her captivity between 1570 and 1584. Often tourist industries have grown up around towns with famous spa waters. Another famous watering hole was the town of Malvern which first began bottling water commercially in Tudor times. By 1664, waters from Tunbridge Wells were being bottled and taken to London.

1 HISTORY

Water is one of the first things that astronomers look for in order to try and find life on a faraway planet. Until recently, the Earth was believed to be the only planet that gathers the conditions necessary to allow the formation of water. Because Earth carries water, it carries life.

The Greeks, and later the Romans, learnt to master water, via complicated systems which permitted irrigation and aqueducts which transported water to cities. The Romans also discovered the pleasure

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Over the last century, and particularly the last 20 years, the number of Bottled Waters available in the UK has increased dramatically. Wales and Scotland have seen significant growth, extending the number of Bottled Waters available on the market. Table waters have also returned to prominence having been available for over a century. The name reflects the move to serve Bottled Waters 'at the table'.

2 DEFINITIONS

2.1 Natural Mineral Water

Natural Mineral Water is an official designation which was originally set down in UK law in 1985. New regulations were introduced in June 1999 consolidating the regulations covering Natural Mineral Water, Spring Water and other Bottled Waters. This legislation is derived from a European Directive covering all Natural Mineral Waters and Spring Waters extracted within the European Union. These require the water to meet certain requirements. It must:

- come from a specified underground source which is protected from any kind of pollution
- be stable in its chemical and physical composition
- satisfy microbiological criteria and be free of any harmful bacteria
- receive no treatment other than filtration (to remove items such as sand particles) or carbonation by the addition of carbon dioxide (although some waters are naturally carbonated)
- be bottled at source and fitted with a tamper evident seal
- undergo regular analyses after recognition by an approved laboratory to ensure that these exacting standards are maintained

2.2 Spring Water

Under the new consolidated Natural Mineral Water, Spring Water and Bottled Drinking Water Regulations, Spring Waters are bottled waters that come from a single underground source. These waters are bottled at source but may undergo permitted treatments that do not alter the composition of the water e.g. filtration and carbonation. Spring Water must also comply with the Drinking Water Regulations.

2.3 Table Water

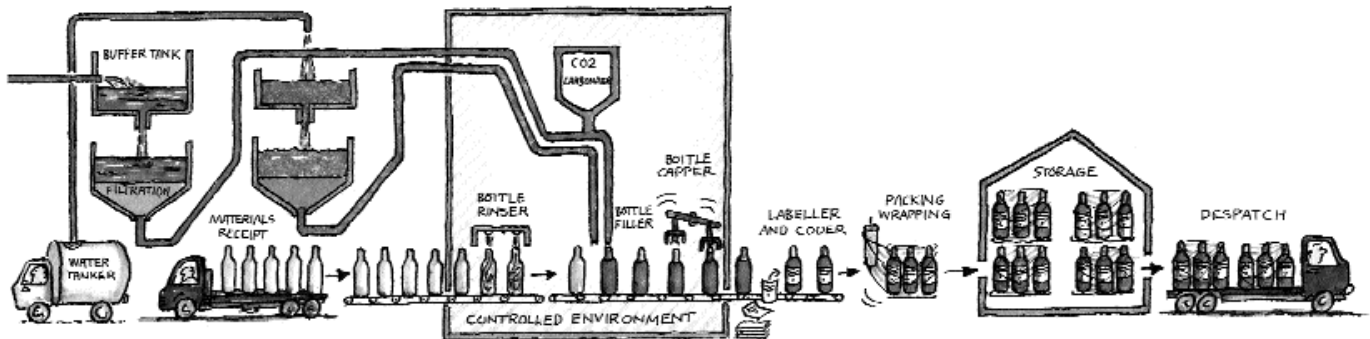
This is the industry description given to other bottled drinking water that may come from more than one source or not from a single underground source. It may include the public water supply or be transported from the source to the bottling plant. Bottling companies may carry out filtration and treatment processes on the water to amend its constituents before the water is distributed for sale. Some companies may also add mineral salts and carbon dioxide to their water.

3 SOURCES OF BOTTLED WATER

Water, which first falls as rain or snow, is both filtered by, and picks up minerals from, the rocks through which it percolates. This can take many years. Some waters are believed to take only three to five years to filter through rocks, whereas others may take hundreds of years to do so.

In the case of Natural Mineral Water, this filtration time helps the water to become stable in its composition, its flow rate and its temperature. The composition of any particular Natural Mineral Water is the same now as it has been for hundreds of years.

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The water collects when it reaches a layer of rock through which it cannot pass (an impermeable layer). The water may emerge as a spring at a natural fault of the rock or it may be brought to the surface through a bore hole or well. It will contain traces of the minerals it has picked up whilst passing through the various rocks during the percolation process.

The composition and quality of water supplies are directly related to the soil structure and geology of the surrounding catchment area, because all fresh water is derived from rain. The rain falling on the ground will pick up and dissolve inorganic salts as well as naturally occurring organic matter. For example, rain falling on chalk will produce a water that is high in dissolved solids, hardness and alkalinity. Water from peaty areas is often pale yellow in colour and contains appreciable amounts of organic matter.

4 EXTRACTION AND BOTTLING

Bottled Water is not manufactured in the sense of general soft drinks production. This is because it has only one ingredient – water.

4.1 Natural Mineral Water

Natural Mineral Water is not processed, it is simply bottled. Water comes in direct from the source through stainless steel pipes. It is bottled using dedicated bottling machines in special bottling rooms in order to protect the water from any contamination. The bottles are immediately sealed, labelled and collected for packing. The packs, cartons and crates are palletised and loaded direct into wagons, trailers or containers for shipment to customers. No chemicals are added, the water is

not tampered with, it is delivered to the customer as pure as it came from the source.

On top of the legal statutory analysis undertaken by the law enforcement officers (Environmental Health and Trading Standards Officers), many different controls take place in the bottling plants:

- The bacteriological controls are undertaken daily, from various points from source to the finished product.
- The physico-chemical controls verify daily the stability of the composition and check that no accidental pollution has taken place.
- The procedural controls of products ensure that specifications on product and materials are met.
- The products are 'positively released' on satisfactory completion of these tests.

The water is subjected to stringent quality checks both as it flows from the spring and at each different stage of the bottling process (filling, before and after capping). At every stage of the bottling process, samples are taken from the piping, the equipment, the air in the bottling area, the empty bottles and the bottle caps in order to maintain perfect conditions of hygiene. These stages are known as critical control points. (See **Liquids Mean Life** and **Legislation and Good Practice**.)

The factory layout should ideally be able to accommodate a continuous process flow. The material receipts and storage should be at one end and finished goods and despatch at the other with the processing stage in order of procedure in between.

Materials storage should be separated into allocated areas for packaging materials, closures and bottles, and, where possible, also different types of bottles (glass, PET, PVC). Packaging materials in particular can generate a lot of dust

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and care must be taken not to contaminate bottles and closures.

It is advisable to allocate a particular area for the critical stage of bottle filling and capping where a controlled environment can be provided. This may simply entail providing physical barriers around this area, but it is best to filter the air and impose positive pressure in this area as well.

4.2 Spring Water

Water comes in direct from the source through stainless steel pipes. It is bottled using a number of bottling machines in special bottling rooms. The bottles are immediately sealed, labelled, and collected for packing. The packs, cartons and crates are palletised and are either loaded direct into wagons, trailers or containers for shipment to customers or stored in warehouses.

Certain treatments such as filtration and aeration are permitted under the regulations. These aim to maintain the integrity of the product or remove unstable elements. Like Natural Mineral Water and other natural products, Spring Waters also contain benign or 'good' bacteria which demonstrate that the water has not been subject to disinfection. By law the water must be free of harmful bacteria.

On top of the legal statutory analysis undertaken by the law enforcement officers (Environmental Health and Trading Standards Officers), many different controls take place in the bottling plants, in total up to 800 a day:

- The bacteriological controls are undertaken daily, from the source to the finished product.
- The physico-chemical controls verify daily the composition and check that no accidental pollution has taken place.
- The mechanical controls of full bottles verify daily their integrity and their capacity to preserve the water's qualities.

Like Natural Mineral Water, the Spring Water is subjected to stringent quality checks both as it flows from the spring and at each different stage of the bottling process.

4.3 Table Water

In the case of Table Water, instead of being taken into the plant via a single pipeline, the water may be delivered by tanker from a number of sources and blended. Because the treatments sometimes remove some or all of the preferred level of minerals, some Table Water producers add mineral salts to replace lost minerals.

The following treatment methods influence the micro-biological contents of the waters, removing any possible harmful bacteria which may have been picked up during the underground percolation process.

a) Filtration

The water is passed through a porous substance such as special paper, charcoal or sand which allows the fluid to pass through but retains suspended solid particles.

b) Ozonation

Ozone, a colourless gas, is passed through the water acting as a cleansing agent or to remove unstable elements such as iron or manganese.

c) UV radiation

The water is treated with ultra-violet light which kills bacteria.

The following treatments aim to influence the chemical composition of the water ensuring that any extreme levels of minerals picked up during the filtration process are reduced.

a) Reverse osmosis

A high pressure is used to force water through the pores of a synthetic membrane which are too small to allow most metal ions and aqueous salt ions to pass through.

b) Ion exchange

The water is passed across the surface of a resin which captures a particular ion from the water and gives up another ion in return. This is particularly useful in dealing with excessive minerals.

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c) *Precipitation*

The water is heated to a temperature which results in the dissolved substance separating from the water as a fine suspension of solids.

The treatments above should not be mistaken for disinfecting systems such as those used to cleanse mains water. Mains water has a number of uses including bathing, washing and drinking. It must be transported over long distances in large pipes before reaching the final consumer. Chlorine is added to general water supplies for safety reasons as part of the cleansing systems. It acts as a residual disinfectant although it can impart a taste which some people may dislike. As Bottled Waters are delivered hygienically direct into sealed bottles, there is no requirement for a residual disinfectant.

5 TYPES AND STYLES

5.1 Types

Hard water contains calcium and magnesium salts. This type of water comes from limestone or chalky sources. Occasionally, hard waters result from sea water mixing with fresh water. Hard waters are believed to be the most beneficial to drink because of their high calcium content.

Soft water is obtained from surface sources consisting of lakes and rivers flowing through rocky terrain. They are also obtained from some underground sources where they are filtered naturally by gravel. These waters contain sodium and potassium salts. Soft water tends to taste slightly soapy.

Brackish water contains a high amount of sodium or potassium chlorides. It occurs when the water is obtained from areas that have quantities of underground salt deposits or from near to the sea. The taste is sometimes salty.

Humic water is obtained from surface sources or boreholes in moorland peat areas. The water is coloured slightly yellow and may taste slightly bitter.

5.2 Styles

There are two styles of Bottled Water: still and sparkling. Traditionally, sparkling water has been viewed as a refreshment beverage whilst still waters are consumed as drinking waters. In the UK, there are no naturally occurring sparkling waters, only still waters. Carbon dioxide is therefore added to produce a sparkling water. In Europe however, there are a number of water sources that are naturally carbonated. These are usually described as naturally sparkling.

Flavoured water is a relatively new product but again finds its origins back in history. As in the case of tonic water and soda water these products contain ingredients other than water and therefore are soft drinks. In the trade they are known as clear soft drinks in order to differentiate them from Bottled Waters.

6 PACKAGING

Water is a good solvent, so the packaging used needs to be chosen carefully so that it does not affect the odour or the taste of the water. There are stringent microbiological standards set for all Bottled Waters which mean that they must also be checked for bacteria and that strict hygiene must be maintained in the factory. The conditions under which Bottled Waters are packaged are some of the most hygienic in the food industry. Materials used for Bottled Water containers must be:

- able to protect the product
- resistant to physical stress
- neutral (no migration, no taste)
- hygienic
- unalterable
- safe

Three materials are commonly used which conform to the above requirements:

- Glass
- PET (polyethylene terephthalate)
- PVC plastic (polyvinyl chloride)

Each material has its own specific properties (See **Wrapping Up**).

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Packaging of bottled waters

Type of Container	Approximate percentage of all bottled water
Plastic – PET	64%
Glass	7%
Plastic – Polycarbonate	21%
Others	8%

Source: Zenith International, 2003

6.1 Materials

Glass bottles are generally supplied by the glass manufacturer as a food container and therefore fit for use having been delivered in a sterile and hygienic condition. They are subject to regular microbiological scrutiny before, during and after the filling process. Returnable glass bottles are washed

at high temperatures. Like the plastic bottles, they are rinsed with pure water before filling. The plastic bottles are usually manufactured on site (although some are delivered pre-blown) using an extrusion-blow moulding technique with a special PVC or PET, approved by the Department of Health. The material is transformed by heating it to 180°C into a bluish continuous fluid tube which is cut into segments, directly enclosed within two half-moulds and applied to the walls of the mould by a high pressure draught of sterile air. In a usually filtered atmosphere, the bottles are then moved towards storage hoppers, set upright and fed onto the automatic bottling lines. They are then filled and capped.

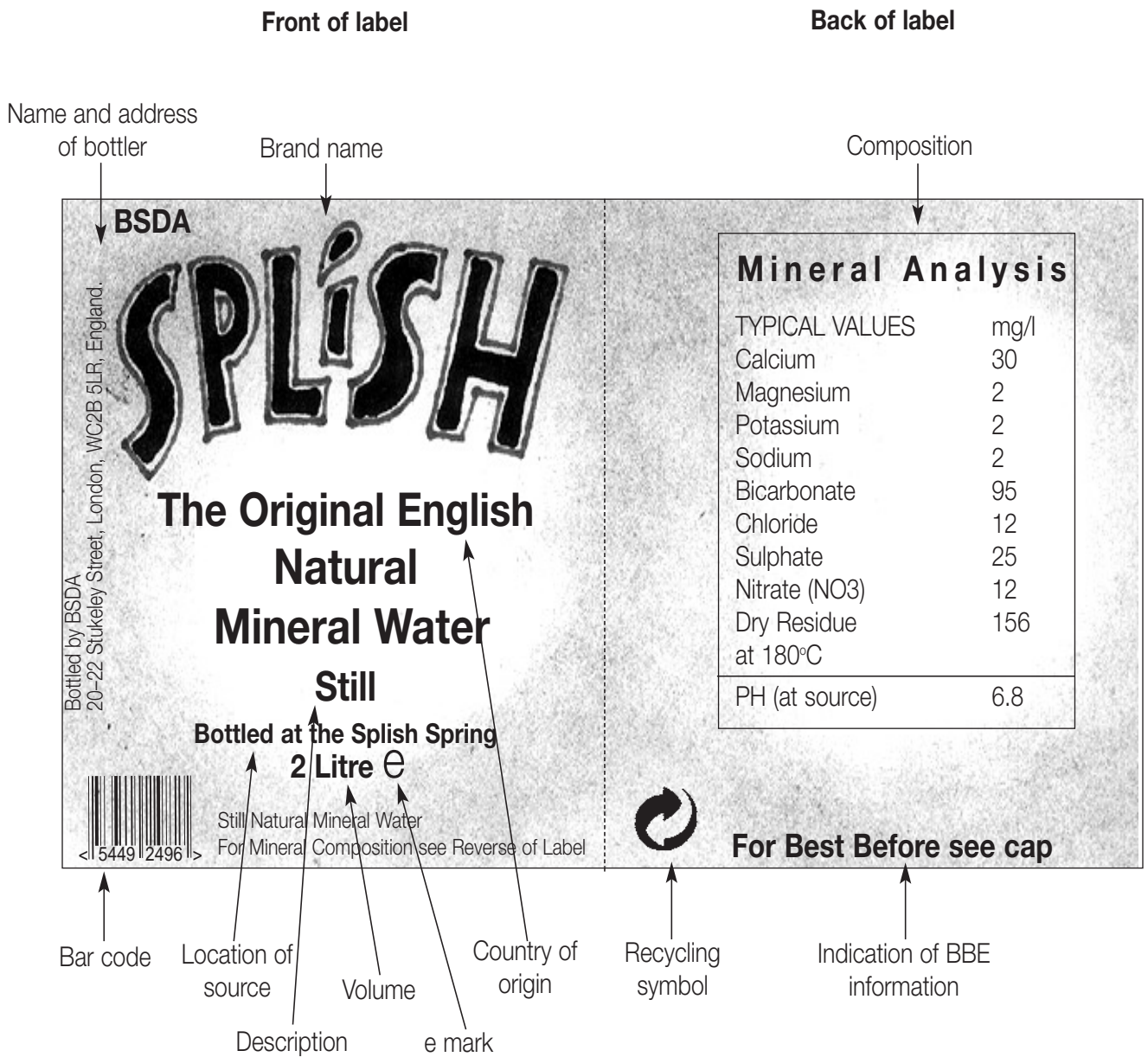
Product is best kept in constant flow from source to bottling. For Bottled Waters, water should not remain in bulk storage for more than 24 hours. All these precautions guarantee the purity and quality of the water.



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6.2 Labelling

Labels on Natural Mineral Water must include:



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Labels on Spring Water must include (the mineral analysis is optional):

<p style="text-align: center;">Mayfield Spring Water</p> <p style="text-align: center;"><i>As captured at source in the hamlet in Bourne, Dorset</i></p> <p style="text-align: center;">2 Litre </p> <div style="display: flex; align-items: center; margin-top: 20px;"> <p style="font-size: small;">Mayfield Water Co. 22 James Street, Bourne, Dorset.</p> </div> <p style="font-size: x-small; margin-top: 5px;">< 5449 2496 > For Mineral Composition see Reverse of Label</p>	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="text-align: center;">Mineral Analysis</th> </tr> </thead> <tbody> <tr> <td style="text-align: left;">TYPICAL VALUES</td> <td style="text-align: right;">mg/l</td> </tr> <tr> <td>Calcium</td> <td style="text-align: right;">30</td> </tr> <tr> <td>Magnesium</td> <td style="text-align: right;">2</td> </tr> <tr> <td>Potassium</td> <td style="text-align: right;">2</td> </tr> <tr> <td>Sodium</td> <td style="text-align: right;">2</td> </tr> <tr> <td>Bicarbonate</td> <td style="text-align: right;">95</td> </tr> <tr> <td>Chloride</td> <td style="text-align: right;">12</td> </tr> <tr> <td>Sulphate</td> <td style="text-align: right;">25</td> </tr> <tr> <td>Nitrate (NO3)</td> <td style="text-align: right;">12</td> </tr> <tr> <td>Dry Residue at 180°C</td> <td style="text-align: right;">156</td> </tr> <tr> <td style="border-top: 1px solid black;">PH (at source)</td> <td style="border-top: 1px solid black; text-align: right;">6.8</td> </tr> </tbody> </table> <p style="text-align: center; margin-top: 20px;">For Best Before see cap</p>	Mineral Analysis		TYPICAL VALUES	mg/l	Calcium	30	Magnesium	2	Potassium	2	Sodium	2	Bicarbonate	95	Chloride	12	Sulphate	25	Nitrate (NO3)	12	Dry Residue at 180°C	156	PH (at source)	6.8
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Labels on Table Water must include:

<p style="text-align: center;">Grey Shields</p> <p style="text-align: center;">Sparkling Table Water</p> <p style="text-align: center;">Produced in Windsor, Berks</p> <p style="text-align: center;">2 Litre </p> <p style="font-size: x-small; margin-top: 20px;">Grey Shields Water Co. 15 Victoria Road, Windsor, Berks.</p>	<p style="text-align: center;">Purified water, created from the chalk water surface of the South Downs Water Co.</p> <p style="text-align: center; margin-top: 20px;">Best Before see cap</p>
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It is recommended that Table Water producers also include the mineral analysis of the water but this is not a legal requirement. Under the new legislation information regarding the treatments undertaken to purify the water must also be included on the label.

6.3 Shelf-life

In order to retain the quality of the bottled water, it is necessary to keep the bottles in a tidy, dry place with a constant temperature, preferably sheltered from the sun. Once opened, the water bottles should be closed securely again, kept in a clean place and, if possible, refrigerated. It is recommended not to drink directly from the bottle.

Pack	Type	Shelf-life
Glass PET	still or carbonated	2 years
	still	12-24 months*
	carbonated 1 litre and over	12 months
	carbonated less than 1 litre	less than 12 months
PVC Cans	still	12-24 months*
	still or carbonated	1 year

*According to manufacturers' experience

The shelf, life of still Spring or Table Water is dependent upon the packaging used. Glass bottles in particular aid in maintaining the integrity of carbonated product.

7 NUTRITION AND THE IMPORTANCE OF FLUID

7.1 The importance of fluid

Water is essential for the functioning of almost all the body's living cells. Human blood is 95% water, bones are 22% water and even 75% of the human brain is water. Without food humans can live for 14 days or more, but without water the body can only survive a few days. Water is the principal constituent of cells and tissues and is the means of transport of essential nutrients around the body. [The digestive system breaks down solid foods into smaller units that the bloodstream can carry to the liver and other organs where they are converted into body substances for use by the cells as building materials. New materials are carried to the cells and waste products are removed by the flow of blood and glandular secretions.] Without water to moisten the lungs there could be no intake of oxygen and no expulsion of carbon dioxide.

Water also plays a vital role in controlling body temperature. Normally maintained at about 37°C, whether the outside temperature be arctic, temperate or tropical, the body temperature is controlled by a process called 'homeostasis', which includes the evaporation of water through the skin. In warm conditions or in a hot dry atmosphere heat loss is increased by perspiration and in extreme conditions can exceed one litre an hour. However, at low temperatures water is transferred from the blood into the tissues, so that less of it is brought to the surface of the skin and heat is conserved. During periods of intense physical effort, body heat also rises and needs to be regulated.

Water is eliminated from the body in a number of ways:

- respiration
- perspiration
- waste product expulsion – indeed, water transports the body's waste products to the external environment.

The body gets its water from three sources:

- water itself or the water in beverages;
- water in solid foods, which contains wide ranging amounts, from 5% or so in biscuits, 60% in steak, to 90% in the juiciest fruits;
- and water produced in the body as a byproduct of chemical changes that convert food into cell material.

We eliminate around 2.5 litres of water per day, through urine, perspiration and respiration. The food we ingest brings in about 1 litre. So 1.5 litres need to be ingested in the form of beverages in order to recover normal water loss.

However, the body's water requirements vary greatly according to the outside temperature, the age and activity levels of an individual, as well as other factors. A normal resting person in a temperature around 23°C and medium humidity loses about 0.65 litres a day from the skin and lungs. It was reported that on one occasion, a football player lost almost ten times that amount of water in an hour and ten minutes.

Babies and children need more water, as do pregnant women to maintain hydration for themselves and the baby, and later for breast feeding. Elderly people should be careful to consume enough water because the sensation of thirst diminishes with age. However, it should be noted that thirst is an indicator that a person is significantly dehydrated.

The two human organs that contain the most water in our body are the brain (75% water) and the skin (70%). They are the first to suffer from the effects of dehydration, such as headaches. The water lost in sweat (during sports for example) should therefore be replaced as soon as possible to avert fatigue, one of the earliest symptoms of water shortage. The aesthetic qualities of the skin are directly linked to its water content.

Dehydration does not just occur in hot climates. The body also loses water in cold, dry weather: a cloud of vapour can be seen when people exhale. Indoor conditions, such as air conditioning or central heating also have a dehydrating effect on the body. Re-circulated air in planes, cars, buses and trains has a drying effect and of course exercise also reduces the amount of water in our bodies.

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7.2 Nutrition and minerals

The need for a sufficient intake of minerals is present throughout life. Minerals are essential to the smooth functioning of the body. They are important components of the body's enzyme and regulatory systems and, in conjunction with bicarbonates and sulphates, contribute to the body's balance.

Natural Mineral Waters will contain different levels of minerals depending upon the rocks through which they have filtered. Hence, each Natural Mineral Water has its own individual taste. For example, waters that have flowed through chalk will contain calcium. Those containing magnesium will have a bitter taste whilst those containing sodium will be salty. Water tasters have a guide for taste which includes the following descriptions:

'fresh', 'soft', 'light', 'heavy', 'sparkling', 'acidic', 'metallic', 'alkaline', 'clean' and 'salty'.

7.2.1 The major minerals

Calcium is required to form healthy teeth and bones, but it is also needed for blood circulation as well as functions of the nervous system and muscles. Deficiency in this mineral can result in stunted growth, rickets, osteoporosis and convulsions.

Magnesium plays an essential role in normalising the metabolism, muscle contraction and bone development. It is also necessary for maximising the benefits of Vitamin D and calcium intake. Deficiency can result in reduced blood pressure and in neuromuscular dysfunction. High intake may cause nausea, vomiting and hypertension.

Potassium contributes to the acid base and body water balance, blood pressure regulation, nerve function and muscle contraction. In particular it contributes to the good functioning of the cardiac muscle. Deficiency can result in muscular weakness. Excess could lead to an irregular heart rate.

Sodium helps maintain proper nerve functions and fixes water in the body, helping the ionic balance of water in the body. Insufficient sodium can affect muscles and cause vertigo, nausea and a reduced appetite.

Chloride is important for the formation of gastric juices. A dietary deficiency is virtually unknown. Excessive levels can lead to vomiting.

Phosphorus helps bone and tooth formation and the body's acid balance. It also intervenes in the conservation and use of energy in enzymatic systems. A deficiency can cause demineralisation of bone and loss of calcium. A high intake may affect the phosphorous:calcium ratio in the body.

7.2.2 The oligo-elements

These are trace elements, which are catalysts in internal reactions, thus participating in the metabolic pathways that ensure and renew life. We need them in very small quantities. They are: copper, iron, fluorine, iodine, manganese, selenium and zinc.

Copper is involved in iron absorption, metabolism and the formation of elastic and connection tissue. A deficiency is rare but can lead to metabolic problems and a reduced resistance to infection.

Iron is a component of haemoglobin and is needed by bone marrow to make new blood cells. A deficiency can produce symptoms such as weakness, breathlessness, apathy and inattentiveness. The most common sign of deficiency is anaemia. High doses of iron can lead to cirrhosis of the liver.

Fluorine (or fluoride) is part of the bone elements and helps prevent dental caries. A rise in tooth decay is one of the first signs of a deficiency. Many mineral waters are a good source of fluoride. Excessive quantities can lead to tooth mottling and skeletal changes.

Iodine is necessary for the normal function of the thyroid gland and hence the metabolic rate. When there is a deficiency of this trace element, there can be thyroid problems. Worldwide about 0.5 billion people are iodine deficient. High amounts of iodine can cause hyperthyroidism.

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Manganese is useful for the growth of bones and tendons and the synthesis of complex carbohydrates and proteins. It also has a complex influence on mental activity. A deficiency is very rare but can result in depression, weakness, irrational behaviour and leg cramps.

Selenium protects cells against oxidative damage. It also stimulates the immune system. Low levels have been linked to muscular weakness. Excessive levels may cause gastrointestinal problems, nerve disorders and nail and hair changes.

Zinc is extremely important in the immune system and plays a major role in enzyme activity. Deficiency will lead to growth failure, skin lesions and impaired immunity. High doses may lead to fever, nausea, vomiting, diarrhoea and blood disorders.

The mineral composition of a Natural Mineral Water comes from the geological structure of the bedrock from which it emerges and the length of time the water circulates in underground formations. Each source therefore produces a distinctive water with unique properties and flavour – a fingerprint. Natural Mineral Water can therefore help to complement the minerals ingested daily through a balanced diet. Bacteria which appear in Natural Mineral Water show that the water is not a ‘sterile’ product, i.e. it has not undergone treatment.

A typical official analysis of a Natural Mineral Water			
	mg/l		mg/l
Calcium	55	Aluminium	0
Magnesium	19	Bicarbonates	248
Sodium	24	Sulphates	23
Potassium	1	Chlorides	42
Iron	0	Nitrates	<0.1
Dry residue at 180°C: 280 mg/l pH=7.4			

Dietary reference values for minerals		
Mineral	Male (11–14 years) 43.1 kg	Female (11–14 years) 43.8 kg
Calcium	1,000 mg/day	800 mg/day
Magnesium	280 mg/day	280 mg/day
Potassium	3,100 mg/day	3,100 mg/day
Sodium	1,600 mg/day	1,600 mg/day
Chloride	2,500 mg/day	2,500 mg/day
Phosphorus	775 mg/day	625 mg/day
Copper	0.8 mg/day	0.8 mg/day
Iron	11.3 mg/day	14.8 mg/day
Fluorine	n/a	n/a
Manganese	1.4 mg/day	1.4 mg/day
Selenium	45 mg/day	45 mg/day
Zinc	9 mg/day	9 mg/day

Source: RHSS 41 Dietary Reference Values for Food Energy and Nutrients for the UK 1991

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A typical official analysis of a Spring Water

	mg/l		mg/l
Ca	38	HCO ₃	243
Mg	22	Cl	1
K	2	SO ₄	17
Na	6	NO ₃	<0.05
Dry residue at 180°C: 200 mg/l			
pH at source 7.6			

A typical official analysis of a Table Water

	mg/l		mg/l
Calcium	19	Aluminium	nil
Magnesium	2.43	Bicarbonates	nil
Sodium	9.81	Sulphates	14.0
Potassium	0.85	Chlorides	17.0
Iron	nil	Nitrates	nil