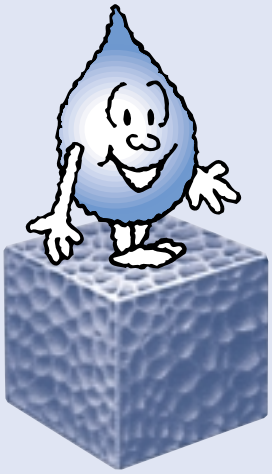
ACTIVATED CARBON... AMAZING CARBON?



Activated carbon is an amazing substance.

Why?

Because it's got a large surface area.

Why is that important?

Well, it's got a very big surface area, per unit volume.

Sounds complicated, explain...

Well, put it like this. Take a 1 centimetre cube of charcoal, and flatten it until it is just a millimetre thick and about 3 centimetres square. The volume of carbon has remained the same, but the surface area is much bigger...in actual fact about three and a half times bigger than the original cube.

So why is this important?

It proves that something can have a very big surface area even though the amount of material you're using might be fairly small. Activated carbon is special because it's so full of little cracks and holes (which we call pores) that a single gramme can have a surface area of up to one thousand square metres!

Impressive, but how does this make it useful?

Well, the little cracks and holes are just the right size for certain molecules to get trapped in. The kind of molecules we want to remove from the water.

Such as?

The molecules which cause taste and odour, the molecules which cause colour in the water, and any tiny residues of pesticides there may be in water.

But don't these pores get filled up after a while?

Yes. Which is why we have to regenerate the carbon. We heat it up to about 800°C in a special furnace, which drives off the trapped molecules and turns it all back into fresh charcoal. To stop it from catching fire, we pump steam into the furnace, which also helps to make sure all the trapped molecules come back out, and keeps those pores open!

Perhaps it is pretty amazing!

Testing Quality

To ensure that all the treatment we do is working correctly we take samples of water from reservoirs and treatment works as well as your tap so we can test it back at our laboratory. In total we do over 50,000 tests every year and each test is measured against a legal requirement...a set of standards.

There are over 56 standards set down in law which give a maximum level allowed for each one. Not all the standards reflect a health risk if the levels are breached but nonetheless all the standards are taken seriously.
The list includes:
Nitrate, Ammonia, Iron, Aluminium, lead and pesticides.

The water quality regulations in Britain are some of the toughest in the world and call for the use of some very sophisticated equipment capable of doing scientific measurement using very small units.

To help you understand just how small the amounts we are searching for are have a look at these three examples.

Parts per million

*Take **two 1 Kilo** bags of sugar and pour them into an Olympic sized swimming pool and allow it to mix. The pool now contains **1 part per million of sugar** which can be expressed as milligrammes per litre (mg/l).*
For example: Nitrate can often be found in water that has passed over and through agricultural land. It is an important part of many fertilisers. The limit in drinking water is 50 mg/l (or 100 x 1 kilo bags in our pool).

Parts per billion

*Now, instead of two bags, this time all you pour into the pool is half a teaspoon of sugar. The pool now contains **1 part per billion of sugar**. This can be expressed as microgrammes per litre - ug/l.*

For example: Iron is found naturally in some underground sources and it also finds its way into water from iron pipes. Whilst it is not a health hazard, it can make the water look discoloured. The limit for Iron in the water is 200 ug/l. (or 100 teaspoons in our pool).

Part per trillion

*Lastly, you take 1 grain of sugar and drop it into the pool, once fully mixed the pool will contain **1 part per trillion** of sugar. Parts per trillion can be expressed as nanogrammes per litre, ng/l.*

For example:
Pesticides are widely used in agriculture and can eventually find their way into water sources. The level allowed is 0.1 ug/l. To liken it to our examples 1 teaspoonful would put the pool 20 times over the limit.