The Golden Question

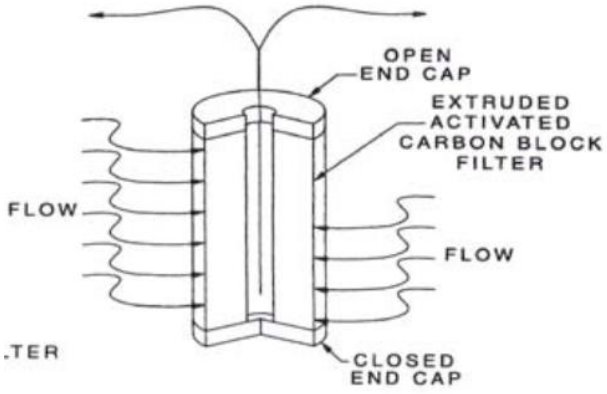
“How long will the filters last?”

Almost anyone that is in the process of purchasing a water purification system, no matter what the system is, will inevitably ask the question; “how long will the filters last?” In response, whoever the manufacturer is, the answer would likely be a rhetorical one; “How long is a piece of string Sir?”

This sounds like an incredibly ignorant and deflected answer. However, there is very good reason to this.

For our explanation as to why, we shall stick with our Séon mobile water purifiers. Séon has been designed to for ease of transportation and to purify water from any available water source. The water quality at these sources will likely be untested for a thorough break down of contaminants; probably just known to be salty or not, how dirty or turbid it looks to the eye and does it smell a bit funky.

Séon UV uses a 10”, 5µm, carbon activated cartridge filter as the first line of filtration. This cartridge is designed to remove particulate contaminant from the water and to absorb Volatile Organic Compounds (VOC`s) and some chemicals; core of this purpose is to remove taint, taste and odour.



1.0

A cross section of a Carbon Activated Filter Cartridge

Whilst having superb performance these cartridges have a finite life and thus disposable. The cartridge traps suspended particles preventing them passing through whilst the carbon within absorbs the VOC`s and chemicals. Eventually the cartridge will become saturated with the contaminants and water flow through will drop off. `*The life of the cartridge is completely dependent upon the volume and the quality of the water that passes through it*`.

Now, without knowing exactly the manor of the contamination in the water it is almost impossible to predict how long the cartridge will last. The picture below shows a number of water samples taken from a very small section of the Orange River in South Africa. The samples highlight widely varying levels of turbidity depending on when and where they were in this section of river; fast flowing centre, slow sides, tributaries, rainy season, dry season.

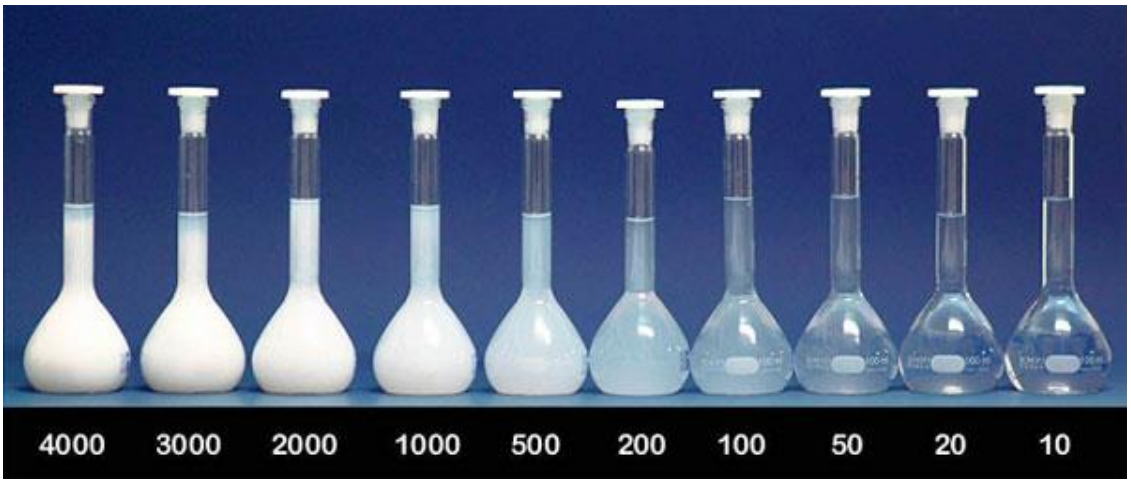
2.0

A selection of water turbidity samples from Orange River

What we can't see in the image is exactly what is in the water; i.e. the dissolved and undissolved solids.

Water turbidity can be measured. Measurements are commonly taken using the Nephelometric Turbidity Unit (NTU). The turbidity of water is based on the amount of light scattered by particles in the water. The more particles that are present, the more light that will be scattered. The particles are undissolved solids suspended in the water. *It should be noted that any dissolved solids in water actually absorb light rather than deflect* it. Another standard measurement is to weigh the undissolved or Total Suspended Solids (TSS) in the water by trapping them and then drying them; though this is more of a laboratory test. You can commonly see these two measurements in water and filter descriptions displayed as NTU, mg/l or %.

However, as mentioned above, dissolved solids absorb light rather than scatter it which can affect true readings. Salt water, will cause suspended solids to clump and sink which is why seawater will regularly look clearer than fresh water. Carbon is excellent at removing chlorine from water, however, being a dissolved solid this will require another form of water testing to understand how much is present in the water and thus how many litres the cartridge would be able to absorb before saturation.



3.0

Nephelometric Turbidity Units - NTU

As you can appreciate, water quality variables are infinite, couple this with an unknown volume of water to pass through the cartridge and you can begin to understand how difficult it is to predict exact life of a filter cartridge.

However, for a rule of thumb; the clearer the water, the longer the life of a filter cartridge. A clear, untrusted water source may allow a cartridge to filter hundreds of thousands of litres of water before saturation, try processing water from a thick, muddy puddle and it is likely to clog in minutes.

If you would like to discuss your water purification needs with a specialist at Wananchi please contact us today!

References

1.0 – Matrikx – Technical Data Bulletin - #KX001-11-18-2008
2.0 – Senqu2sea – The Bright Lights – 24/01/2013
3.0 – ISA - What does Turbidity look like? – John Daley - 2007