Water Technology Advisory Note

2020/05

Company: Sydney 905 Filters (Pty) Ltd

Technology: Point of Use Microfiltration (0.1 microns) water filter and a Point of Use Ultrafiltration (0.01 microns) water purifier.

Background

Sydney 905 Filters (Pty) Ltd is based on the South Coast of KwaZulu-Natal, South Africa. The company has designed, developed and supplies two filters, namely, a 0.1 micron hollow fibre Point-of-Use (POU) microfiltration water filter as well as a 0.01 micron hollow fibre POU ultrafiltration water purifier.

Technology Description

Hollow-Fibre Membranes (HFM) offer a simple way to purify water by using a non-chemical, physical barrier to effectively remove microbiological contaminants from the water. Unlike other filtration methods, HFM's do not remove the beneficial minerals from the water, waste a great deal of water during the filtration process or require the holding tanks or pumps commonly used in low pressure applications.

To make the filter cartridge, HFM strands are cut to a specific length, gathered in bundles and folded into a U-shaped loop. This loop shape allows both the exit, and the entrance ends of the membrane "tube" to be bundled next to each other on one end of the filter case. The open-ended portion of the "tube" is potted in a polymer binder/glue, securing it. This binds the bundle together causing it to maintain a uniform shape and seals it into the filter case. The untreated water now enters the filter from the closed end of the looped bundles, passing through the micro pores in the walls of the HFM and exiting through the tubule openings as clean water.

Therefore, HFM's having thousands even millions of tiny holes or pores of a uniform size work through allowing only clean water to pass from the outside of the tube (straw) to the inside of the tube, physically excluding the passage of microbiological contaminants such bacteria, cysts and virus (also referred to as size exclusion). This "outside–in" flow pattern, also increases the membrane filter's surface area, increasing the products permeability, and reducing premature failure caused by excess

debris being trapped on the inside of the membrane. Additionally, this "outside-in" flow design also creates a product that can be "back-flushed" by flushing the filter with clean water via a reverse flow. Back flushing the filter in this way helps clears it of debris and enables the user to reclaim most of the filter's original performance.

Claims

A globally unique fully sustainable water filter that is extremely effective (i.e. it is impossible for any bacteria, protozoa or cysts to pass through the 0.1 microns (absolute) hollow fibre membranes. It has a removal rate of approximately log 7, (i.e. 99.99999%), it is cost-efficient and it actually never needs replacing if it is looked after. There are no chemicals used either and no cartridges that ever need to be replaced. It is about 12 cm length, 4 cm wide and weighs roughly 90 grams. It handles from a mere gravity feed up to 4½ bars pressure and delivers approximately 100 litres per minute at this pressure. It can thread onto any threaded or non-threaded connection, so it is suitable for rural and urban use, indoors or outdoors.

Scientific Opinion

Reviewing the submitted documentation, one could not get information of how the filter cartridge was constructed. Outlined above is the standard method normally utilized to make such filters. If a similar approach is followed in the construction of the filter cartridge, generally all the claims above will hold true. It will be possible to clean the water as claimed, and critically the backwash function which will prolong the useability of the filter. Additionally, the ability of this filter to operate at low pressure levels is an added advantage and increase its applicability.

Having said the above, this solution as presented here does offer a very efficient and cost effective way of providing clean water to communities, especially those who are not in the municipal supply area, but also including those who way want to take charge of the quality of water they use. This solution can effectively deal with water quality uncertainties associated with water tanking. The solution is simple to use, though more information would still need to be provided on effective backwashing.

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The HFM technology is well researched and many papers published on it and is being used in several marketable products. This will include kidney dialysis machines.

Therefore, the one area of this solution that needs to be looked at closely is the quality control process around the construction of the filter cartridge or the filter unit.

Technology Readiness Level

This technology could be placed at TRL 8. The technology appears to be complete and ready for the market. There is mention of ongoing large-scale testing involving user communities. Results from there will add to the critical information about the solution.

Recommendation

The verification of the quality control system used in the manufacturing. Once that is verified and in line with nationally accepted protocols, this technology can easily be recommended for application.

This Advisory Note is not a recommendation letter or an endorsement of the technology. The Advisory is intended to advice on relevance, potential application options and appropriateness for municipal sector largely.