



Background

Aqua Nu Filtration Systems began life like most great innovations as the unrelenting challenge inside the mind of its original inventor.

In 2006 Patrick Farrelly was convinced of the potential to create an environmentally friendly and highly affordable water filtration system that does not deplete scarce world resources or create chemical or landfill waste. Pat had a vision of a low cost water filter that successfully removes harmful water-based microbes while enabling water to flow through a permeable structure at normal rates.

After considerable time and effort researching and evaluating the functionality and potential of GAC (Granulated Activated Carbon) and its varied different filtration capabilities, Pat realised the solution was elsewhere. His work then led him to consult with pioneers in health and sustainability such as Dr. Robert Verkerk.

Ultra high Flow Rate Ceramics soon became the focus of attention. Over three years of laboratory work undertaken in the sourcing, design, production and testing of ceramic membranes led to Aqua-Nu's unique discovery in safe and clean water filtration with worldwide potential and diverse applications.

Removing Microbes – A New Industry Standard

The quality of drinking-water is a powerful environmental determinant of health. Assurance of drinking-water safety is a foundation for the prevention and control of waterborne diseases.

Poor water quality continues to pose a major threat to human health. Diarrhoeal disease alone amounts to an estimated 4.1 % of the total daily global burden of disease and is responsible for the deaths of 1.8 million people every year (WHO, 2004). It was estimated that 88% of that burden is attributable to unsafe water supply, sanitation and hygiene.

The Aqua-Nu Ultra High Flow Rate ceramic which has an adjustable flow is capable of being manufactured in any shape or size, giving it far reaching commercial, medical and humanitarian potential. Aqua-Nu's ceramic technology is capable of being fitted or retrofitted to new and existing systems.

The company's team of scientists and technologists has spent six years developing and testing unique point-of-use filtration technologies using non-chemical based ultra high flow rate ceramics' and original anti-microbial treatment systems.

It was recognised early in the project that it was not possible to meet the required objectives through the use of activated carbon as the sole filtration medium, the medium utilised in the vast majority of domestic water filters. However, in considering a range of supplementary media, it was decided that the use of a ceramic-based membrane could facilitate the high flow rate and high contaminant removal required to support multiple water filtration applications, including filtered jugs, kettles and as an inline filter on plastic (PET) bottles.

A diatomaceous earth based ceramic was ultimately developed and patented, specifically for use with particular grades of granulated activated carbon (GAC). This ceramic is treated with a bactericidal agent to prevent sporulation of bacteria within the capsule.

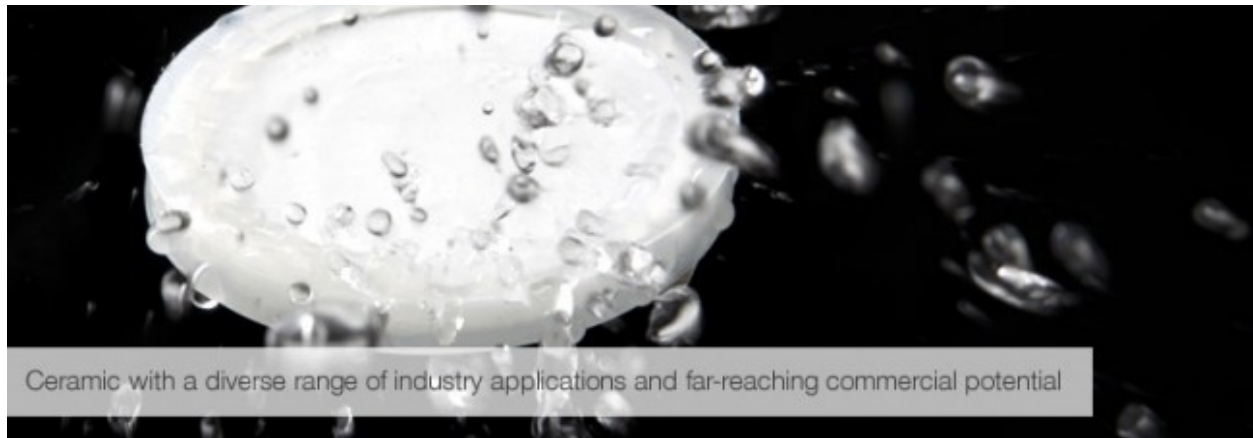
In tests conducted with independent laboratories, notably CAL Ltd in Ireland along with South East Water and Severn Trent Laboratories in the UK, this unique, efficient and flexible water filtration system has performed substantially beyond industry standards and leading market competitors.

The Aqua-Nu Ultra High Flow Rate ceramic performed as follows:

- cryptosporidium > 99.9999%
- giardia > 99.9999%
- legionella > 99.99%

Aqua-Nu ceramic also removes by occlusion/pore value:

1. shistosoma causing shistosomiasis (according to wiki: is the second most socioeconomically devastating parasitic disease after malaria)
2. echinococcus vogeli causes echinococcosis (according to wiki: is a serious disease that not only has a significantly high fatality rate, but also has the potential to become an emerging disease in many countries)
3. dracunculus (guinea worm)
4. trypanosoma (sleeping sickness)
5. fasciola hepatica/liver fluke (causes liver rot)
6. onchocerca volvulus (river blindness)
7. spiroketes (most well known of which is leptospira causes weils disease)
8. threadworm
9. hookworm
10. pinworm (causes enterobiasis in children in developed world)
11. tapeworm
12. roundworm
13. ascaris
14. taenia solium
15. hymenolepsis nana
16. cyclospora cayetanensis (protozoan cysts)



Research into filtration

Aqua-Nu's research centres on the following areas:

- Filtration of micro-organisms responsible for water-borne diseases on par with domestic reverse osmosis filtration systems
- Filtration of chlorine and inorganic contaminants at least on par with market leading brands of domestic jug filters
- Inclusion of anti-microbial activity within the filtration media to prevent blooming of microbes during the life of the patented ULTRA HIGH FLOW RATE CERAMIC
- Inclusion of anti-microbial capacity within the mouthpiece of the PURITYCAP® to prevent growth of any microbes introduced by mouth contact with bottle top filter device (PURITYCAP®)
- Flexibility of design of patented ULTRA HIGH FLOW RATE CERAMIC filter to allow fitment of different sizes of ceramic to a range of devices, including Water Jug Filter, PET Bottle Top Filter (PURITYCAP®) and cold water tap filter (PURITYTAP)
- Low cost and affordability, on par with market leading brands of domestic jug filters and significantly lower cost than competitors' products and similar technologies.

The Intelligent Ceramic

Aqua-Nu has developed a patented unique filtration technology using non-chemical based 'ultra high flow rate' ceramic and advanced anti-microbial treatment systems. This ULTRA HIGH FLOW RATE ceramic is the result of 6 years intensive development, carried out predominantly in-house with input from internationally recognised experts in ceramics.

These flexible and environmentally friendly filtration solutions can be adapted for use in a wide range of domestic drinking water systems, as well as for filtration of bulk water for industrial, medical and humanitarian purposes. Diatomaceous earth, a siliceous talc-like material derived from ancient deposits of marine diatoms (unicellular algae) known for the symmetrical sculpturing of their cell walls, was selected as the base medium for the ceramic on the basis of previous studies demonstrating its efficacy.

In order to improve its flow rate while maximizing retention of micro-organisms within the ceramic, a honeycomb structure was achieved by inclusion of a specific process unique to the company.

Extensive work has been conducted by Aqua-Nu in developing the ceramic so that very high flow rates (more than >1 to 1.2 litres per minute over 11 square centimeters at 100 millibar) are achieved whilst ensuring filtration of pathogenic oocysts such as Cryptosporidium and Giardia and bacteria most notably Legionella meets the target requirements.

Following laboratory development, Aqua-Nu is now scaling up for the production of the ceramic with our advanced manufacturing partners around the world. A number of our technologies are subject to worldwide patents and have applications both in the developed and developing world.

Testing and Certification



Aqua-Nu has conducted rigorous testing on its production quality ceramic with independent laboratories, most notably CAL Laboratories, City Analysts and South East Water in England. A selection of the most pertinent and recent Aqua-Nu Scientific Ceramic Test Results for reference can be found at <http://www.aqua-nu.com/technology/testing-certification/>

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