Seychelle Filter Tests

UK Govt Environment Agency June-August 2005
National Laboratory Service UKAS Testing 0745 Group

Starcross

Devon UK

Over 150 separate laboratory tests conducted
June – August 2005

Tested at 100/200/300 Litres
Tested at 100/200/300 Litres Metals and 400/500/600 Litres Live Bacillus Globefii (Anthrax)

The filter is to function both as a means of disinfection against bacteria and viruses and as a filter to remove parasites, water borne pathogens and other waterborne contaminants. It is to effective against the following challenges:

Bacteria: E Coli b Cholera Salmonella Hepatitis
Viruses: Polio Norwark Meningitis Anthrax
Parasites: Giadiosis Cryptosporidium Bilharzia Leptospirosis/Weils Disease
Metals: Lead Copper Aluminum Mercury Radon 22 Cadmium
Chemicals: Nitrates PCBs Benzines DDT

Ultimately the filter should remove the chlorine and or Iodine that can been used in the disinfection process leaving the service person with clean, safe, odor free, taste free water.

All contaminants cumulatively added at 1/100/200 liters
Tested at 100/200/300 Liters

ONLY Live Microbiological Tested:

Live Cryptosporidium cysts
Live E-Coli
Live E Faecalis
Live F+RNA Phage (waterborne virals)
Live Bacillus Globegii (Surrogate Non Invasive-Anthrax)

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NATIONAL LABORATORY SERVICE

FILTER EVALUATION

Seychelle Environmental Technologies for
UK Agent (Seychelle): PGS Butler-(Drinksafe-systems) UK

Issued date: 5th September 2005

To Illustrate our approach to evaluating the filters submitted please see the summary below:

Our testing procedures were designed to comply with the Cardinal Points specification supplied by the MoD ref. DC/CPS/6015 Issue 1 and to challenge the filter in a way that gives an accurate representation of its use in the field.

Over 150 separate laboratory tests were carried out between 13th June and 10th August 2005 at the Environment Agency's National Laboratory Service Laboratory based at Starcross, Devon, UK.

Method tests and validation to cover all five main areas of source water contamination (Organic, Metal, Inorganic, Microbiological and Aesthetics) were implemented and the filter's efficacy to reduce levels of contaminants present were tested.

Each filter tested was challenged with 300 litres of water cumulatively seeded with a combination of Organic, Metal, Inorganic and Microbiological contaminants to represent potential field operational conditions. To demonstrate the filter's ability to demonstrate the filter's ability to 'trap and retain' contaminates, post-filter samples were taken for analysis at intervals of 100,200 and 300 litres.

All of the above waterborne viruses and pathogens were tested for in this manner over 300 litres with either F+RNA Phage (Waterborne Virus), E—Coli, and E-Faecalis and live cryptosporidium cysts, (Crytosporidium and Giardia). This also included testing for Anthrax with Bacillus Globegii.

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Method and validation:

Many water quality tests are tested by passing 1 litre of contaminated source water and measuring the results by actual and (%) reduction. Some microbiological tests do not use live microorganisms. Our method procedures however have demonstrated the filter's ability to 'trap and retain' Organic, Metal inorganic, Microorganisms and Aesthetics over the specified 300 litres.

The Environment Agency also holds certification to ISO 9001:2000, ISO 14001:1996 and is registered to the Eco-Management and Audit Scheme (EMAS). The latter two standards are both internationally recognized as a foundation for sound environmental management, improvements in performance and ensure compliance with environmental legislation.

The laboratory invites enquires detailing test6ing method and validation, and welcomes on-site visits for further discussion and tour of laboratory facilities. Alternatively, scientific advisors can visit off-site to discuss method and validation regarding these and any other tests.

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REDUCTION VALUE

COMPOUND	100L 100% Reduction	200L 100% Reduction	300L 100% Reduction
Endrin	96.7	95	94.4
4,4-DDD (TDE-pp)	>96.7	>96.7	>96.7
4,4-DDT	>96.7	>96.7	>96.7
Lindane	>93.3	93.3	93.3
Heptachlor	>96.7	>96.7	>96.7
PCB 28	>96.7	>96.7	>96.7
PCB 52	>96.7	>96.7	>96.7
PCB 101	>96.7	>96.7	>96.7
PCB138	>96.7	>96.7	>96.7
PCB 153	>96.7	>96.7	>96.7
PCB 180	>96.7	>96.7	>96.7
Altrazine	90	86.7	86.7
Simazine	96.7	93.3	93.3
Nitrite	8.9	11	11.3
Bromodichloromethane	94.9	90.2	88.1
Bromoform	>91.2	>91.2	>91.2
Benzene	>88	>88	>88
Dibromochloromethae	>94.6	>94.6	>94.2
Carbon Tetrachloride	>88	>88	>88
Ethyl Benzene	>88	>88	>88
Methyl tert Butyl Ether	25.3	12.7	-4
1,1,1-Trichloroethane	>88	>88	>88
1,1,2-Trichloroethane	>88	>88	>88
Trichloroethene	>88	>88	>88
Toluene	86.7	87.3	>87.6
Total Xylene	>88	>88	>88
Crytosporidium	99.90	99.89	99.92
E.Coli	>99.9999	>99.9999	>99.9999
E.faecalis	>99.9988	99.9988	>99.9991
F+RNA	>99.9999	99.9999	99.9999

Greater than (>) are quoted when a result(s) is below the methods minimum reporting value (MRV), therefore value taken as a positive result i.e. MRV of <10 is taken as 10.

REDUCTION VALUES CONTINUED

METAL COMPOUNDS	100L 100% Reduction	200L 100% Reduction	300L 100% Reduction
Aluminum	>75	>75	70
Arsenic	28	27.8	28.8
Cadmium	>97.5	96.5	94.8
Copper	>75	>75	>75
Lead	>75	>75	>75
Mercury	85	79.4	77.1

CHLORINE

Test Results

COMPOUND	MRV (mg/l)	Total Pre-filtered amount (mg)	Post-filtered amount (mg)	Reduction
Chlorine	0.01	240	<1	>99.58

IODINE

Test Results

COMPOUND	MRV (mg/l)	Total Pre-filtered amount (mg)	Post-filtered amount (mg)	Reduction
Iodine	0.02	24	<2	>91.67