



RapidPure Intrepid Water Bottle Filter Reuse Study

Introduction

A general recommendation for use of RapidPure Intrepid water bottles is to remove the RapidPure Intrepid filter and allow to air dry between uses. This is recommended in order to prevent any biological contaminants trapped in the media from proliferating and shortening the life of the filter. This study was conducted in order to show that the RapidPure Intrepid filters could be air dried between uses without diminishing the performance of the media.

Materials and Methods

- UltraCeram (Carbon Heat Sealed with Silver)
- Testing was carried out at Biological Consulting Services, Inc. in Gainesville, Florida.

The goal was to test the RapidPure UltraCeram using water that would mimic the “real world” concentration of biological contaminants that might be found in a river or stream. However, it is difficult to evaluate the performance of the media to the current specification for removal while using low challenge concentrations. It was recommended by BCS that higher concentrations of bacteria and virus be used across a smaller volume of water.

One liter of challenge solution was filtered through 90mm discs of RapidPure UltraCeram and effluent samples were taken. Then the RapidPure media was removed from the holders and allowed to dry completely. The samples were then placed back into the holders and challenged again for one liter with samples taken at the beginning and end of the test. This procedure was repeated for five days. All effluent samples were evaluated for the presence of *Raoultella terrigena* (bacteria) and MS2 bacteriophage (virus).

Procedure as stated by BCS:

The study was commissioned and conducted with RapidPure UltraCeram grade paper in duplicates, filter A and filter B. During Day 1 of study, 1 liter of challenge water was passed through each filter. The tail end effluent sample (950ml-1000ml) of Day 1 was collected and analyzed as was the influent. The filter holders were then opened to expose and allow the filter media to dry overnight.

On Day 2 of the study, the filter holders were sealed and another 1 liter of freshly prepared challenge water was passed through each filter. The effluent of filters was sampled for the first 50 ml fraction and the final 50 ml fraction. The “Effluent 1” sample was collected immediately following flow through the filter. “Effluent 2” sample was collected from the filter’s effluent stream at the tail end of the 1 liter challenge and represented effluent volume fraction 950-1000 ml. Effluent and influent samples were analyzed for bacterial and viral species as per standard lab SOP (SOP F-1). After the “Effluent 2” samples were taken, the flow was stopped, the filter holders were drained from excess fluid, and were once again opened to expose the filter media and allow to dry overnight. The challenge process was repeated for Day 3-5 of the study. Flow rate throughout the experiment was maintained at 130ml/min.”

[See reverse side for Data and Discussion sections.](#)

Data

	Influent RT	Percentage Removal	Influent MS2	Percentage Removal
Day 1 Filter A Effluent 1	3.4×10^4	>99.9998%	3.3×10^4	>99.999%
Day 1 Filter B Effluent 1	3.4×10^4	>99.9998%	3.3×10^4	>99.999%
Day 2 Filter A Effluent 1	4.8×10^4	>99.9998%	3.1×10^4	>99.999%
Day 2 Filter B Effluent 1	4.8×10^4	>99.9998%	3.1×10^4	>99.999%
Day 2 Filter A Effluent 2	4.8×10^4	>99.9998%	3.1×10^4	>99.999%
Day 2 Filter B Effluent 2	4.8×10^4	>99.9998%	3.1×10^4	>99.999%
Day 3 Filter A Effluent 1	3.0×10^4	>99.9998%	3.8×10^4	>99.999%
Day 3 Filter B Effluent 1	3.0×10^4	>99.9998%	3.8×10^4	>99.999%
Day 3 Filter A Effluent 2	3.0×10^4	>99.9998%	3.8×10^4	>99.999%
Day 3 Filter B Effluent 2	3.0×10^4	>99.9998%	3.8×10^4	>99.999%
Day 4 Filter A Effluent 1	3.3×10^4	>99.9998%	3.9×10^4	>99.999%
Day 4 Filter B Effluent 1	3.3×10^4	>99.9998%	3.9×10^4	>99.999%
Day 4 Filter A Effluent 2	3.3×10^4	>99.9998%	3.9×10^4	>99.999%
Day 4 Filter B Effluent 2	3.3×10^4	>99.9998%	3.9×10^4	>99.999%
Day 5 Filter A Effluent 1	2.7×10^4	>99.9998%	2.2×10^5	>99.998%
Day 5 Filter B Effluent 1	2.7×10^4	>99.9998%	2.2×10^5	>99.998%
Day 5 Filter A Effluent 2	2.7×10^4	>99.9998%	2.2×10^5	>99.998%
Day 5 Filter B Effluent 2	2.7×10^4	>99.9998%	2.2×10^5	>99.998%

Figure 1. Percent removal of RT and MS2 for all effluent samples taken.

Discussion

The performance of the RapidPure UltraCeram filter media did not decline throughout the testing. This data shows that drying of Intrepid water bottle filters between uses should not affect the performance during subsequent uses.

How does RapidPure UltraCeram work?

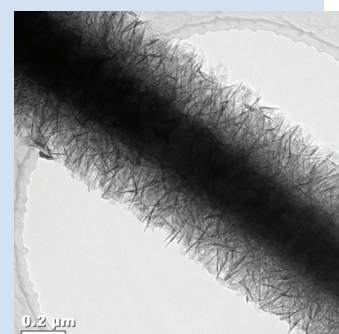
Waterborne pathogenic microorganisms are a major source of disease worldwide. Pathogens and water system deficiencies that are identified in outbreaks may also be important causes of endemic waterborne illnesses.

Of increased importance, however, are outbreaks caused by the microbial contamination of water distribution systems. In light of the growing evidence showing the resistance of certain microorganisms to standard disinfection methods (including chlorination and UV radiation) mechanical removal of these contaminants is often the most reliable choice.

When used in multiple layers, RapidPure UltraCeram filter media is capable of retaining 99.9999% of microorganisms (such as viruses, bacteria & protozoa which can include Cryptosporidium, Giardia Intestinals, Legionella, Pseudomonas, Salmonella, E-coli, Mycobacteria, Aspergillus), Endotoxins & DNA - all at flow rates

hundreds of times greater than virus-rated ultraporous filters. The turbidity of the water coming through the RapidPure UltraCeram media typically remains below 0.01 NTU (even when tested at 250 NTU) until the filter is exhausted.

RapidPure UltraCeram filters utilize a non-woven filter media containing a thermally-bonded blend of microglass fibers and cellulose infused with nanoalumina fibers. The microglass and cellulose act as the scaffold upon which the active component of these filters (the nanoalumina fibers) is permanently affixed.



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Patent pending.

*The level of turbidity in the water influences filter life.