

APPENDIX 2

Filtration results for Chlorine, Fluoride and Lead

| Challenge species | BCS Identification Number | Filter influent average concentration | Concentration of the challenge species in the filter effluent | | | |
|------------------------------|---------------------------|---------------------------------------|---|-------------------|----------------------|---------------------|
| | | | Species | CHCl ₃ | CHCl ₂ Br | CHClBr ₂ |
| Trihalomethanes ¹ | 1306090 | 1863.28 µg / L | 6.85 | 4.12 | 2.85 | 2.86 |
| | 1306091 | | 12.16 | 6.58 | 4.14 | 3.62 |
| Chlorine ² | 1306090 | 18 mg / L | None Detected < 1.0 mg/L* | | | |
| | 1306091 | | None Detected < 1.0 mg/L* | | | |
| Fluoride ² | 1306090 | 0.79 mg / L | None Detected < 0.025 mg/L* | | | |
| | 1306091 | | None Detected < 0.025 mg/L* | | | |
| Lead ² | 1306090 | 0.37 mg / L | None Detected < 0.002 mg/L* | | | |
| | 1306091 | | None Detected < 0.002 mg/L* | | | |

Filtration results for Chlorine, Fluoride and Lead

| Challenge species | BCS Identification Number | Filter influent average concentration | Percent removal of the challenge species following the passage of the indicated volume of water** | | | | |
|--|---------------------------|---------------------------------------|---|---------------|---------------|---------------|---------------|
| | | | 0.5 gallon*** | 10 gallons*** | 20 gallons*** | 30 gallons*** | 40 gallons*** |
| Fluorescent microspheres ¹ | 1306004 | 1.1 x 10 ⁵ particles / ml | >99.999%* | >99.999%* | >99.999%* | >99.999%* | >99.999%* |
| | 1306007 | | >99.999%* | >99.999%* | >99.999%* | >99.999%* | >99.999%* |
| <i>Raoultella terrigena</i> ² | 1306004 | 1.7 x 10 ⁵ cfu / ml | >99.9997%* | >99.9997%* | >99.9997%* | >99.9997%* | >99.9997%* |
| | 1306007 | | >99.9997%* | >99.9997%* | >99.9997%* | >99.9997%* | >99.9997%* |
| MS-2 Bacteriophage ³ | 1306004 | 9.6 x 10 ⁵ pfu / ml | >99.99995%* | >99.99994%* | >99.99994%* | >99.99994%* | >99.99994%* |
| | 1306007 | | >99.99994%* | >99.99994%* | >99.99994%* | >99.99994%* | >99.99994%* |

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Test reports

LONDON SCHOOL OF HYGIENE & TROPICAL MEDICINE

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Peter Donachie BSc
Principal Scientific Officer (Medical Microbiology)
Faculty of Infectious and Tropical Diseases

8 May 2013

REPORT ON MICROBIOLOGICAL TESTS CARRIED OUT ON THE BEHALF OF WATER-TO-GO LTD. ON TWO WATER FILTRATION BOTTLES BY THE LONDON SCHOOL OF HYGIENE AND TROPICAL MEDICINE.

Test Items

The bottles manufactured by Water-to-go Ltd.

The bottles were delivered to the laboratory new and unused. Before testing each bottle was examined for mechanical defect or leaks and was primed using deionised water according to the manufacturer's instructions.

Test organisms

Poliovirus type 1 (Sabin vaccine strain) at a concentration of 24.50×10^6 PFU (plaque forming units) per millilitre.

Escherichia coli ATCC 22952 at a concentration of 26.00×10^8 CFU (colony forming units) per millilitre.
Fluorescent beads. The size of the beads was chosen to mimic Cryptosporidium oocysts at a concentration of 10.85×10^3 beads per millilitre.

Test Water

Autoclaved Distilled Water.

Test procedure

1. Bottles were primed according to user instructions and then washed several times with deionised water before challenge.
2. 100ml of poliovirus suspension was added to 1500ml of challenge water and mixed thoroughly. The seeded test water was sucked through the bottle and collected in sterile containers for assay. For the bacteriological challenge 50ml of an overnight culture of Escherichia coli suspension was added to 1000ml of challenge water.
3. Prior to filtration, a sample of the seeded test water was taken and the number of virus particles and bacteria determined in parallel with the filtered samples.

Microbiological assay

1. For virus assay, 9ml volumes of water (filtered and unfiltered) were added to 1ml of $\times 10$ cell culture medium and diluted 10-fold steps in single strength medium. Four replicates of each dilution were added to VERO cell monolayers and a plaque assay performed and incubated for 2 days before examination for plaque formation. The amount of virus in the filtered sample when compared to the unfiltered sample was measured and the log reduction calculated.

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Test reports

2. For bacteria, 1ml samples were assayed for *Escherichia coli* by spread plate and Miles & Misra techniques. The tests were performed in triplicate.
3. For fluorescent beads the water was filtered through filter paper membranes known to have pores smaller than the beads and the membrane viewed under an ultra violet microscope.
4. For the reduction of chlorine, 10ml water samples were treated with N,N,-diethyl-p-phenylenediamine which reacts with free chlorine and produces a red complex and the intensity of the colour was measured by eye compared to known standards using a Lovibond comparator.
5. Suitable controls, positive and negative were included in all assays.

Test results

Table 1- Summary of Assay results of all samples

| bottle | Test organism | Inflowing (log ₁₀) | outflowing (log ₁₀) | % reduction (log ₁₀ reduction) |
|--------|-------------------------|------------------------------------|------------------------------------|---|
| 1 | Poliovirus | 2.48×10 ⁵ PFU/ml (5.39) | 156.8 PFU/ml (2.20) | 99.982% (3.73) |
| 2 | | | 45.60 PFU/ml (1.66) | 99.937% (3.20) |
| 1 | <i>Escherichia coli</i> | 2.60×10 ⁷ CFU/ml (7.41) | 2.10×10 ² CFU/ml (2.32) | 99.9992% (5.09) |
| 2 | | | 4.25×10 ³ CFU/ml (3.63) | 99.9837% (3.79) |
| 1 | Beads | 1.09×10 ⁴ /ml (4.04) | ≤168/ml (≤2.27) | ≥99.982906% (≥3.77) |
| 2 | | | ≤168/ml (≤2.27) | ≥99.982906% (≥3.77) |
| 1 | Free Chlorine | 60ppm | <0.4ppm | |
| 2 | | | <0.4ppm | |

The reduced Chlorine reading was between 0 and 0.4ppm as 0.4ppm represented the lowest comparator disc.

Summary

Under the conditions of testing in the laboratory of the London School of Hygiene and Tropical Medicine as shown in this report, these results show that the Water-to-go Ltd bottle removed more than 99.9% of bacteria, viruses and *Cryptosporidium oocyst* from contaminated water.

There was also a significant or total reduction in free chlorine by the filter.

Signed on 8th May 2013



Peter Donachie BSc (Hons.)
Principal Scientific Officer (Medical Microbiology)
London School of Hygiene & Tropical Medicine

APPENDIX I - 3 of 8

Test reports



Biological Consulting Services
of North Florida, Inc.

May 23, 2013

Thomas Robbins
Sun Hong Kong

Re: Bacterial, viral, and protozoan parasite filtration efficacy testing of the provided water bottle filters: BCS ID 1305210, 1305212, 1305215, and 1305220. "Water-To-Go" filters.

Dear Mr. Robbins;

We have conducted the requested filtration efficacy study on the provided water bottle filters received on May 14, 2013. The experimental set up and challenge of the water filter was designed to evaluate the filter's initial microbiological contaminant removal efficacy. It is intended to demonstrate its efficacy following light use on the removal of bacterial, viral, and parasitic waterborne contaminants. The contaminant species and water condition parameters selected were based on NSF water purifier testing protocols.

Following, you will find our report on the results of the challenge study. Should you have any questions, please do not hesitate to contact me.

Sincerely,

George Lukasik, Ph.D.
Laboratory Director

thebearrules@hotmail.com

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FL DOH LABORATORY #E82924, EPA# FL01147

THIS REPORT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN CONSENT OF BCS LABORATORIES.

FILE: SUN HONGKONG WATER-TO- GO FILTERS MICROBIAL REMOVAL EFFICACY STUDY REPORT 05 15 2013.DOC



APPENDIX I - 4 of 8

Test reports

Samples: Sun Hong Kong Provided Pleated "Water-To-Go" Filters
Test: Filtration Efficacy / Vacuum*
Test Parameter: *Raoultella terrigena*, MS-2 Bacteriophage (virus), and 3.0 µM Fluorescent Microspheres as *Cryptosporidium parvum* Oocyst Surrogate
Performed and Analyzed by: George Lukasik, Ph.D. & Alison Stargel, MPH; May 15, 2013

| Water Sample | Percent Removal of Challenge Species* | | |
|--|--|--|---|
| | Three Micron Fluorescent microspheres ¹ (Parasitic Contaminants Surrogate Percent Removal) | <i>Raoultella terrigena</i> ² (Bacterial Contaminants Percent Removal) | MS-2 Bacteriophage ³ (Viral Contaminants Percent Removal) |
| Filter Influent Water** | 1.4 x 10 ⁴ beads/ 0.1 ml | 4.6 x 10 ⁵ cfu/ml | 4.4 x 10 ⁵ pfu/ml |
| 12 Pleat Filter #1 Effluent Water** BCS 1205212 | >99.99%*** | >99.9999%*** | 99.9998% |
| 12 Pleat Filter #2 Effluent Water** BCS 1205220 | >99.99%*** | >99.9999%*** | >99.9999%*** |
| 24 Pleat Filter #1 Effluent Water** BCS 1205210 | >99.99%*** | >99.9999%*** | >99.9999%*** |
| 24 Pleat Filter #2 Effluent Water** BCS 1205215 | >99.99%*** | >99.9999%*** | >99.9999%*** |

¹ Three micron green fluorescent latex microspheres (Fluoresbrite® YG Microspheres 3.00µm, PolySciences Inc. PA, USA) were used as surrogates for *Cryptosporidium* oocysts. It is used to determine filter's parasitic removal efficacy. The microspheres were enumerated by fixing onto SingleSpot Slides (IDEXX, USA) and viewing by UV fluorescence microscopy.

² *Raoultella terrigena* (ATCC 33257) was obtained from ATCC and propagated on Tryptic Soy Agar (TSA, Becton Dickinson, USA). It is used as a bacterial model to evaluate filters for bacterial removal efficacy. The bacteria were enumerated as colony forming units (cfu) following incubation at 36.5°C for 24 hours.

³ Bacteriophage MS-2 (ATCC 15597-B1) was used as a model for human viruses. It is of similar shape and size to human enteroviruses and thus is used to determine filter's viral capture efficacy. It was enumerated using *E. coli* C3000 (ATCC 15597) as a host using the single layer plaque assay agar procedure as per EPA 1601.

** Filter effluent samples were analyzed in duplicates following collection.

*** No species were detected in the filter effluent for the duplicate samples analyzed.

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APPENDIX I - 5 of 8

Test reports

Samples: Sun Hong Kong Provided Pleated "Water-To-Go" Filters
Test: Filtration Efficacy / vacuum
Test Parameter: *Raoultella terrigena*, MS-2 Bacteriophage (virus), and 3.0 µM Fluorescent Microspheres as *Cryptosporidium parvum* Oocyst Surrogate
Performed and Analyzed by: George Lukasik, Ph.D. & Alison Stargel, MPH; May 15, 2013

*Challenge Study Description: 1 liter of laboratory grade reagent water was passed through each filter using 3.6 inHg vacuum provided by a diaphragm pressure/vacuum pump (Schuco-Vac Pump). Reagent water was then seeded with *Raoultella terrigena*, bacteriophage MS-2, and latex microspheres. This solution was stirred till homogenous and 500 ml was aspirated through each filter using vacuum. The filter effluent was collected in a trap bottle. The flow rate was measured at 10ml/sec. The effluent was assayed for the respective species. A sample of the influent was removed prior to the beginning of the challenge study and at the end. The number of microorganisms and microspheres was determined and is reported as the "Filter Influent Water" and "Filter Effluent Water". The flow rate was calculated using a NIST traceable timer.

Study data are summarized in the provided table(s). The results presented pertain only to the study conducted on the test articles/samples provided by the client (or client representative). The study was authorized and commissioned by the client. The results presented pertain only to the samples analyzed and identifier number(s) indicated. The data provided is strictly representative of the study conducted using the material/samples/articles provided by the client (or client's representative) and its (their) condition at the time of test. The study and data are obtained under laboratory conditions and may not be representative or indicative of a real-life process and/or application. Positive, negative, and neutralization controls were performed as outlined in the method and as per Good Laboratory Practices. All analyses were performed in accordance to laboratory practices and procedures set-forth by our NELAP/TNI accreditation standards (ISO 17025) unless otherwise noted. BCS makes no claims with regards to the express or implied warranty regarding the ownership, merchantability, safety or fitness for a particular purpose of any such property or product.



May 23, 2013

Signature of Laboratory Director/Authorized Rep. _____ Date: _____

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FILE: SUN HONGKONG WATER-TO- GO FILTERS MICROBIAL REMOVAL EFFICACY STUDY REPORT 05 15 2013.DOC



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Test reports

Format No. BTH/QF/105

BANGALORE TEST HOUSE

65, 20th Main, Marenahalli, Vijayanagar, Bangalore - 560 040.
Ph.: 23356415, 23151665, Fax: 080-23385979
e-mail: testhouse@satyam.net.in website: www.bthindia.com

TEST CERTIFICATE


1 of 3


Mr. Jitendra Pratap Singh
Old Airport Road,
BANGALORE - 560 008

Report No : ED/2012/11/0466
Date of report : 22.11.2012
Reference No : RFA
Date : 13.11.2012
Date of receipt : 15.11.2012
Job Order No : ED/2012/11/0466

Sample Particulars: One sample of Treated Water was received.

| TESTS | RESULTS | MAXIMUM ACCEPTABLE LIMITS AS PER IS: 10500 -1991 (Amd.3) | MAXIMUM PERMISSIBLE LIMITS IN THE ABSENCE OF ALTERNATE SOURCE AS PER IS: 10500-1991 (Amd.3) | PROTOCOL |
|---|-------------------|---|--|-----------------------|
| 1. Colour, True colour units | : < 2 | : 5 | : 25 | : IS: 3025 (P 4) |
| 2. Odour | : Unobjectionable | : Unobjectionable | : - | : IS: 3025 (P 5) |
| 3. Turbidity, NTU | : 1.8 | : 5 | : 10 | : IS: 3025 (P 10) |
| 4. pH | : 7.62 | : 6.50 to 8.50 | : No relaxation | : IS: 3025 (P 11) |
| 5. Chlorides, as Cl, mg/L | : 65.9 | : 250 | : 1000 | : IS: 3025 (P 32) |
| 6. Total Hardness as CaCO ₃ , mg/L | : 279.4 | : 300 | : 600 | : IS: 3025 (P 21) |
| 7. Calcium, as Ca, mg/L | : 68.4 | : 75 | : 200 | : IS: 3025 (P 40) |
| 8. Magnesium, as Mg, mg/L | : 26.4 | : 30 | : 100 | : IS: 3025 (P 46) |
| 9. Total Dissolved solids, mg/L | : 546.0 | : 500 | : 2000 | : IS: 3025 (P 16) |
| 10. Sulphates, as SO ₄ , mg/L | : 43.4 | : 200 | : 400 | : IS: 3025 (P 24) |
| 11. Copper, as Cu, mg/L | : < 0.05 | : 0.05 | : 1.5 | : IS: 3025 (P 42) |
| 12. Iron, as Fe, mg/L | : 0.08 | : 0.30 | : 1.0 | : IS: 3025 (P 53) |
| 13. Manganese, as Mn, mg/L | : < 0.1 | : 0.1 | : 0.3 | : IS: 3025 (P 59) |
| 14. Nitrates, as NO ₃ , mg/L | : 14.9 | : 45 | : No relaxation | : IS: 3025 (P 34) |
| 15. Fluorides, as F, mg/L | : 0.30 | : 1.0 | : 1.5 | : IS: 3025 (P 60) |
| 16. Phenolic Compounds, as C ₆ H ₅ OH, mg/L | : Absent | : 0.001 | : 0.002 | : IS: 3025 (P 43) |
| 17. Mercury, as Hg, mg/L | : < 0.001 | : 0.001 | : No relaxation | : IS: 3025 (P 48) |
| 18. Cadmium, as Cd, mg/L | : < 0.01 | : 0.01 | : No relaxation | : IS: 3025 (P 41) |
| 19. Selenium, as Se, mg/L | : < 0.01 | : 0.01 | : No relaxation | : IS: 3025 (P 56) |
| 20. Arsenic, as As, mg/L | : 0.065 | : 0.01 | : No relaxation | : IS: 3025 (P 37) |
| 21. Cyanide, as CN, mg/L | : Absent | : 0.05 | : No relaxation | : APHA |
| 22. Lead, as Pb, mg/L | : < 0.01 | : 0.05 | : No relaxation | : IS: 3025 (P 47) |
| 23. Zinc, as Zn, mg/L | : 0.01 | : 5 | : 15 | : IS: 3025 (P 49) |
| 24. Anionic Detergents as MBAS, mg/L | : < 0.2 | : 0.20 | : 1.0 | : Annex K of IS:13428 |
| 25. Chromium, as Cr ⁶⁺ , mg/L | : < 0.01 | : 0.05 | : No relaxation | : IS: 3025 (P 52) |
| 26. Residual Free Chlorine, mg/L | : < 0.05 | : Min 0.20 | : - | : IS: 3025 (P 26) |
| 27. Alkalinity, as CaCO ₃ , mg/L | : 295.4 | : 200 | : 600 | : IS: 3025 (P 23) |
| 28. Aluminium, as Al, mg/L | : < 0.01 | : 0.03 | : 0.2 | : IS: 3025 (P 55) |
| 29. Boron, as B, mg/L | : < 0.1 | : 1.00 | : 5.0 | : APHA |


ANALYST


AUTHORISED SIGNATORY

NOTE 1. The result listed refer only to the listed samples & applicable parameters. Enforcement of products is neither inferred nor implied. 2. Samples will be destroyed after 15 days from the date of issue of test certificate unless otherwise specified. 3. This report is not to be reproduced wholly or in part & cannot be used as an evidence in the Court of law & should not be used in any advertising media without our special permission in writing. 4. Samples not drawn by us unless otherwise stated. 5. Total liability of our laboratory is limited to the invoice amount. Any dispute arising out of this report is subject to Bangalore Jurisdiction only.

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Test reports

Format No. BTH/QF/106

| | | | | |
|---|---|--|---|---|
|  |  | BANGALORE TEST HOUSE 65, 20th Main, Marenahalli, Vijayanagar, Bangalore - 560 040. Ph: 23356415, 23151665, Fax: 080-23385979 e-mail: testhouse@satyam.net.in website: www.bthindia.com |  |  |
|---|---|--|---|---|

TEST CERTIFICATE

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| | |
|---|---|
| Mr. Jitendra Pratap Singh Old Airport Road, BANGALORE - 560 008 | Report No : ED/2012/11/0466 Date of report : 22.11.2012 Reference No : RFA Date : 13.11.2012 Date of receipt : 15.11.2012 Job Order No : ED/2012/11/0466 |
|---|---|

Sample Particulars: One sample of Treated Water was received.

| <u>TESTS</u> | <u>RESULTS</u> | <u>ACCEPTABLE LIMITS AS PER IS: 10500 - 1991</u> | <u>ROTOCOL</u> |
|---------------------------------------|---|--|----------------|
| Description | : Colourless and clear transparent liquid filled in a PET bottle. | | |
| <u>MICROBIOLOGICAL TESTS :</u> | | | |
| 30. Coliform Organisms /100 ml | : Less than 1 | : Less than 1 | : IS:1622-1981 |
| 31. E. coli Bacteria/100ml | : Absent | : Absent | : IS:1622-1981 |

Remarks : The sample conforms to IS:10500-1991 for drinking water with respect to Chemical & Microbiological Requirements.





| | |
|---|--|
| ANALYST  | AUTHORISED SIGNATORY  |
|---|--|

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Test reports

Format No. BTH/QF/106

| | | | | |
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|---|---|---|---|---|

TEST CERTIFICATE

3 of 3



| | |
|---|---|
| Mr. Jitendra Pratap Singh Old Airport Road, BANGALORE - 560 008 | Report No : ED/2012/11/0466 Date of report : 22.11.2012 Reference No : RFA Date : 13.11.2012 Date of receipt : 15.11.2012 Job Order No : ED/2012/11/0466 |
|---|---|

Sample Particulars: One sample of Treated Water was received.

PESTICIDE RESIDUES :

| Tests | Results mg/L | Test Method | Method Detection mg/L |
|-------------------------|--------------|-------------|-----------------------|
| 32. o,p- DDT | BDL | USEPA 508 | 0.000025 |
| 33. Alpha HCH | 0.1 µg/L | USEPA 508 | 0.000025 |
| 34. Endosulfan sulphate | BDL | USEPA 508 | 0.000025 |
| 35. Chlorpyrifos | BDL | USEPA 525.2 | 0.000025 |

BDL : Below Detection Level

| | |
|---|--|
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