



BIOLOGICAL CONSULTING SERVICES
OF NORTH FLORIDA, INC.

January 17, 2018

Joshua Buchholz
Berkey Water

Hurst, TX
(888) 803-4438
josh@berkeywater.com
Client ID: Black Berkey A

BCS ID: 1711146

Project Name: Purifier Filtration Efficacy Testing; Leptospira

Dear Joshua Buchholz,

We have completed the filtration efficacy study on the submitted units as outlined below. The contaminant species, study conditions, and water parameters utilized were based on client's request and adaptation of the guidance documents and protocols listed below:

Validation of Water Purifier Efficacy: Screening of purifier performance as per client requested protocol; BCS SOP-F1 (ISO17025 accredited)

Report Conclusion: Purifier efficacy at the indicated challenge point(s) is provided in the following pages.

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

Sincerely,

George Lukasik, Ph.D.
Laboratory Director

Page 1 of 7

Final Report BCS ID 1711146 Revision #0, 01/16/2018

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BCS LABORATORIES, INC. — GAINESVILLE
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FL DOH #E82924, ISO/IEC 17025:2005 L2422 (L-A-B), PA DEP# 68-03950, EPA# FLO1147
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LABORATORY
ACCREDITATION
BUREAU
a division of A-S-B
ACCREDITED ISO/IEC 17025



Analysis: *Leptospira interrogans* (ATCC 23581) Filtration Efficacy Test Water: General Test Water I

Test Point: Initial Efficacy Following a 1 Gallon GTW1 Flush (Conditioning) **Test Point Conclusion: N/A**

Flow rate: 72.5 mL/min Temp: 21.4 C pH: 7.32 NTU: 0.17 NTU TOC: 0.100 ppm

Influent Conc: 2.70E+04 cfu/mL TDS: 161 ppm Hardness: 135 ppm

Test Notes: None to report.

BCS Sample ID 1: 1711146 Client ID 1: Black Berkey A Pressure(psi) Gravity

Eff Conc 1: 5.36E+01 cfu/mL % Reduct 1: 99.8 Log10 Reduct 1: 2.7

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Analysis: *Leptospira interrogans* (ATCC 23581) Filtration Efficacy Test Water: General Test Water I

Test Point: Efficacy at 5 Gallons

Test Point Conclusion: N/A

Flow rate: 64.6 mL/min Temp: 23.6 C pH: 7.44 NTU: 0.26 NTU TOC: 0.190 ppm

Influent Conc: 2.40E+04 cfu/mL TDS: 186 ppm Hardness: 134 ppm

Test Notes: None to report.

BCS Sample ID 1: 1711146	Client ID 1: Black Berkey A	Pressure(psi)	Gravity
Eff Conc 1: 7.77E+01 cfu/mL	% Reduct 1: 99.7	Log10 Reduct 1:	2.5

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Analysis: *Leptospira interrogans* (ATCC 23581) Filtration Efficacy Test Water: General Test Water I

Test Point: Efficacy at 10 Gallons

Test Point Conclusion: N/A

Flow rate: 63.8 mL/min Temp: 23.1 C pH: 7.55 NTU: 0.34 NTU TOC: 0.202 ppm

Influent Conc: 2.30E+04 cfu/mL TDS: 161 ppm Hardness: 135 ppm

Test Notes: None to report.

BCS Sample ID 1: 1711146	Client ID 1: Black Berkey A	Pressure(psi)	Gravity
Eff Conc 1: 9.47E+01 cfu/mL	% Reduct 1: 99.6	Log10 Reduct 1:	2.4

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Project: Purifier Filtration Efficacy Testing; Leptospira
Date Received: November 13, 2017 10:30 Analyst: David Sekora, M.S.
Test Start Date: November 28, 2017 Test End Date: December 12, 2017 Qualifier: NONE
Report Notes:

The study was conducted as clients request to evaluate the provided Berkey Travel unit's efficacy for the filtration of *Leptospira interrogans* (ATCC 23581) from a water supply. A single unit was evaluated for performance initially and following passage of the indicated volume of clean water. The provided unit was fitted with two filters following their flush as per manufacturer's instructions. Following assembly, the unit was conditioned by adding 1 gallon of General Test Water 1 (GTW1, NSF P231, Dechlorinated municipal tap water) to the upper reservoir and the water was allowed to filter through by gravity. After conditioning, an aliquot of the challenge species was added to GTW1, the water was homogenized, and a sample was removed. Five liters of the challenge water was transferred into the upper reservoir of the filtration unit. The challenge water was allowed to filter by gravity. The entire effluent was collected for analysis. A sample of the influent challenge water was removed prior to and at the end of the challenge. Following, the indicated volume of GTW1 was passed through the unit and the challenge was repeated as described above. Each of the replicate collected samples were analyzed in duplicates (at the minimum) at two dilutions for the microbiological species on *Leptospira* media as per laboratory standard accredited ISO17025:2005 methodology. Turbidity was analyzed as per SM2130B (if needed), pH as per SM4500HB, TOC (if needed) as per SM5310C, Alkalinity as per SM2320B (if needed), TDS as per SM2540, chlorine as per SM4500-Cl G, and hardness as per SM2340C. All analysis was conducted using calibrated and/or validated Instruments to traceable standards (NIST). All method QC was within method acceptance limit. No general environmental conditions are specified in the standard or have been identified that could affect the test results or measurements. End of Report Notes.

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*I certify that I have examined I am familiar with the information submitted herein. The results pertain only to the sample(s) analyzed associated identifier #(s). Based on my inquiry of the individuals responsible for the analysis, I believe the data to be true, accurate, and complete. Unit descriptions and names were obtained from the submitted documents. The analysis was authorized and commissioned by the client or client's representative. The resulting data are representative of the analysis conducted on the collected samples and it's/their condition at the time of analysis. The data provided is strictly representative of the study conducted under laboratory conditions using the material/samples/articles provided by the client (or client's representative) and it's (their) condition at the time of test. The data obtained may not be representative or indicative of a real-life process and/or application. The sample(s) were analyzed in accordance with the appropriate method, however due to the inherent limitations of methods, microorganisms may avoid detection. BCS Laboratories offers no express or implied warranties concerning the quality, safety, and/or purity of any sample, batch, source, or the process they are derived from. Quality assurance controls were performed as outlined in the method and as per Good Laboratory Practices. Analyses were performed in accordance with laboratory practices and procedures set-forth by ISO 17025-2005 and NELAP/TNI accreditation standards unless otherwise noted. BCS makes no express or implied warranty regarding the ownership, merchantability, safety or fitness for a particular purpose of any such property or product.

Signature of Laboratory Director/Authorized Rep.  Date: January 17, 2018

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DATA QUALIFIER CODES	
SYMBOL	MEANING
D	Measurement was made in the field.
I	The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.
J1	The sample matrix interfered with the ability to make any accurate determination.
J2	No Quality Control criteria exist for the component.
^	analysis conducted outside the Laboratory's scope of accreditation
L	Off scale high. Actual value is known to be greater than value given.
O	Sampled, but analysis not performed.
Q	Sample held beyond the accepted holding time.
U	Indicates that the compound was analyzed for but not detected. The reported value is the method detection limit.
V	Analyte was detected in both sample and associated method blank. Data may not be accurate.
Y	The laboratory analysis was from an improperly preserved sample. The data may not be accurate.
Z	Too many colonies present (TNTC); the numeric value given represents the upper end of the value that can be determined based on the volume.
?	Data are rejected and should not be used. QC data did not meet acceptance criteria.
**	Analysis of analyte submitted to an accredited sub-contract laboratory.
!	Data deviate from historically established concentration range.
#	BCS Lab specific qualifier. See laboratory analysis notes.

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