AQUADIAGNOSTICS
Water Research & Technology Centre
IAPMO

AQUADIAGNOSTICS WATER RESEARCH & TECHNOLOGY CENTRE LIMITED
CIN:U73100KA2008PLC045994 | An IAPMO Group – USA Company
Registered Office:
No. 43, PMR Towers, 3rd Floor, Above State Bank of India, Beretena Agrahara,
Near Hosa Road Junction, Hosur Main Road, Bangalore – 560 100
Ph: +080 25743042 | www.aquadiagnostics.org | E: askme@IAPMOAquadiagnostics.org
GSTIN: 29AAHCAO185G1ZP

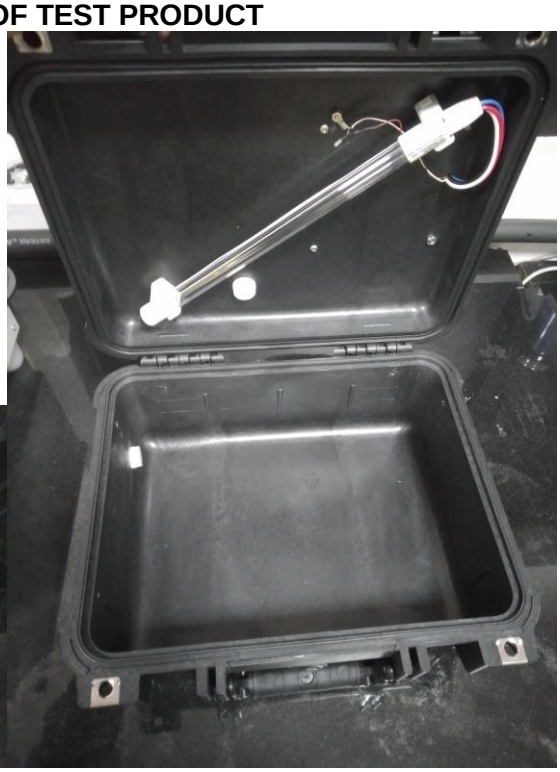
TEST REPORT

Report No: AWRTCL/PRTR/16088/19-20 **Date: 17.07.2019**

CUSTOMER DETAILS	SAMPLE DETAILS	TEST DETAILS
Name & Address : **Kind Attn:** **Mr.David Conklin** **Oregon Freshwater Simulations** **USA**	**Sample received:06.07.2019**	**Protocol:** **As agreed between the testing laboratory and the Customer**
	Sample code no: AWRTCL/16088/19-20	
	Sample Description: UV based Water Purifier – Batch Process system	
	Sample Quantity for Testing: 1No	
	Submitted by: Oregon Fresh Water Simulations – USA	
	Date of Analysis started:15.07.2019	
	Date of Analysis Completed:17.07.2019	
	Subcontract: Not Applicable	
	Sample condition when received: Intact	

EXECUTIVE SUMMARY: One unit of batch process UV based water purifier was tested with very high concentrations of MS2 phage ATCC15597B1 (surrogate Virus) for an UV exposure of 40 sec and 60 seconds separately. The log reduction in various trials was found to be in the range of 4.97 to 5.30. MS2 phage reduction performance by the tested unit exceeds the requirement of 4.0 log reduction (minimum) as per NSF P231 protocol.

PICTURES OF TEST PRODUCT



AQUADIAGNOSTICS
Water Research & Technology Centre
IAPMO
AQUADIAGNOSTICS WATER RESEARCH & TECHNOLOGY CENTRE LIMITED
CIN:U73100KA2008PLC045994 | An IAPMO Group – USA Company
Registered Office:
No. 43, PMR Towers, 3rd Floor, Above State Bank of India, Beretena Agrahara,
Near Hosa Road Junction, Hosur Main Road, Bangalore – 560 100
Ph: +080 25743042 | www.aquadiagnostics.org | E: askme@IAPMOAquadiagnostics.org
GSTIN: 29AAHCAO185G1ZP

PRODUCT OPERATION, SAMPLING AND RESULTS

S.No	Operation performed	MS2 phage ATCC15597B1 Counts	% Reduction
1	Treatment unit was cleaned by filling tap water to overflow level, adding 4 drops of Sodium Hyphochlorite solution (4% -unscented). The contents were allowed to sit for 1 hour. Discarded the chlorinated water and flushed with unchlorinated water.	-- --	--
2	20 Lit of Tap water with added PHBA to reduce UV transmittance by 70% was generated. UVT of Tap water at 254 nm: 99.9% UVT after adding PHBA at 254 nm: 70%	--	--
3	To the above water MS2 phage culture was added @ 180 µL/ 20 Lit to achieve 10^7 pfu/ml (10^{10} pfu /Lit)..	--	--
4	From this water, 5 Lit volume was introduced into the bottom container of the unit. After thorough mixing with a sterile glass rod, samples were taken in duplicates (Lab#1)	**7.5 x 10^7 Pfu/ml** Influent water	-- (7.87 log)
	b). The spiked water was allowed to be held in unit for 10 minutes. Samples were collected from outlet valve in duplicates (Lab #2). This provides a baseline result without any treatment	**7.5 x 10^7pfu /ml** Influent water	-- (7.87 log)
5	Spiked water was discarded and flushed with unchlorinated, MS2-free water.	--	-
6	Treatment unit was filled with 5L of MS2 spiked water. Allowed to stay for 10 minutes and samples were collected in duplicates (Lab#3)	-	-
7	a. Samples were collected in duplicates (Lab #3)	**8.0 x 10^7pfu /ml** Influent water	**99.999%** (5.01log)
	b. Unit was cranked (from the time Green LED glows) for **40 seconds**. and stopped. Samples were collected in duplicates after 10 seconds after stopping. MS2 (Lab #4)	**TNTC/ml 78pfu/0.1ml** Treated water	
8	After flushing and refilling with MS2 spiked water, the unit was cranked again for **40 seconds**. Samples (influent & treated water) were collected (Lab #5 and #6)	**7.5 x 10^7pfu /ml** Influent water **TNTC/ml 80 pfu/0.1 ml** Treated water	**99.9989%** (4.97 log)
9	After flushing and refilling water MS2 spiked water, unit was cranked for **60 seconds**. (Lab #7 and #8)	**7.0 x 10^7pfu /ml** Influent water **TNTC /ml 41pfu/0.1 ml** Treated water	**99.9994%** (5.23 log)
10	After flushing and refilling water MS2 spiked water unit was cranked again for **60 seconds**. (Lab #9 and #10)	**8.0 x 10^7pfu /ml** Influent water **TNTC /ml 42 pfu/0.1 ml** Treated water	**99.9995%** (5.30 log)

Pfu: Plaque forming units, TNTC: Too numerous to count

TEST WATER COMPOSITION: 20 Lit Quantity

Test Water Characteristics	Recommended concentration GTW #1	Concentration maintained by the Laboratory
pH	6.5 to 8.5	7.41
TDS mg/L	50-500	338
TOC mg/L	0.1 – 5.0	<1.0
Turbidity NTU	0.1 to 5.0	<1.0
Temperature ^{0}C	20 ± 5^{0}C	24

ENUMERATION OF MS2 PHAGE COUNTS IN BOTH INFLUENT & EFFLUENT WATERS:

1. Influent water: Serially diluted 1 ml quantum (10^{-6} and 10^{-7}) was plated out on double layer of TSA (Tryptone Soya agar) hard and soft agar.
2. Effluent water was plated out with 1 ml and 0.1 ml without dilution on double layer of TSA (Tryptone Soya agar) hard and soft agar.
3. All the results were expressed pfu/ml (plaque forming units) in case of Influent water after considering the dilution factor.
4. In case of Effluent water, the counts were expressed in pfu/0.1 ml (plaque forming unis).
5. TNTC: Too numerous to count in 1 ml quantity and hence it can't be expressed in terms of pfu/ml. Due to this reason it is mentioned as TNTC / ml.

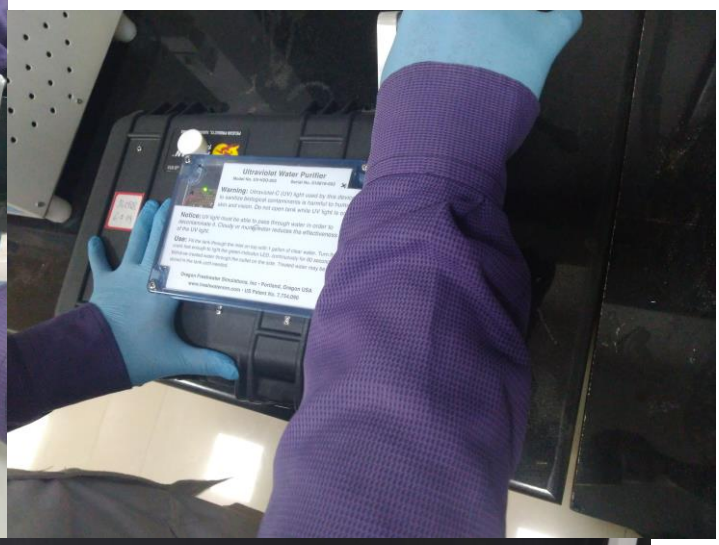
Analysis Methods used:

Test Water Characteristics	Test Method Used
pH	APHA 23rd edn 4500 H+B
TDS mg/L	Calibrated TDS meter
TOC mg/L	HACH DR2800 Spectrophotometer
Turbidity NTU	APHA 23rd edn 2340C
Temperature ^{0}C	Calibrated thermometer
MS2 phage	USEPA / APHA methods
UVT	UV-Vis spectrophotometer

PICTURES OF PRODUCT OPERATION, COLLECTION OF SAMPLES AND ANALYSIS

Influent water Collection

Cranking of Product with MS2 phage Spiked water



Collection of Treated water

AQUADIAGNOSTICS
Water Research & Technology Centre
IAPMO

AQUADIAGNOSTICS WATER RESEARCH & TECHNOLOGY CENTRE LIMITED

CIN:U73100KA2008PLC045994 | **An IAPMO Group – USA Company**

Registered Office:
No. 43, PMR Towers, 3rd Floor, Above State Bank of India, Beretena Agrahara,
Near Hosa Road Junction, Hosur Main Road, Bangalore – 560 100
Ph: +080 25743042 | www.aquadiagnostics.org | E: askme@IAPMOAquadiagnostics.org
GSTIN: 29AAHCAO185G1ZP

Biosafety Cabinet

Plating of MS2 phage samples

Authorized Signatory

Aquadiagnostics Water Research & Technology Centre Limited

Dr.S.Muralidhara Rao
Head – Laboratory

00---End of the Report---00

NABL ACCREDITED LABORATORY | RECOGNIZED BY IAPMO R&T – USA

We under take analytical job for water, food, biocidal resins, detergents & sanitizers and soil. We carry out performance evaluation of drinking water treatment units as per NSF/ANSI specifications. Based on performance we can arrange for certification from IAPMO – USA

Note:
1. The results pertain only to the tested samples and applicable parameters.
2. Samples will be disposed after 15 days from the issue of test certificate unless otherwise specified, in case of bacteriological tests, the samples will be disposed after 7 days itself from the date of issuing the certificate.
3. This report is not to be reproduced either wholly or in parts and cannot be used as evidence in the court of Law and should not be used in any advertising media without prior written permission.
4. In case, any recommendation of contents of this certificate is required please contact our office.