AQUADIAGNOSTICS
Water Research & Technology Centre
IAPMO

AQUADIAGNOSTICS WATER RESEARCH & TECHNOLOGY CENTRE LIMITED

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

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.com | E: askme@IAPMOAquadiagnostics.org

TEST REPORT

Report No: AWRTCL/PRTR/14523/18-19 **Date: 09.08.2018**

CUSTOMER DETAILS	SAMPLE DETAILS	TEST DETAILS
Name & Address : **IAPMO R & T** **USA**	**Sample received: 17.07.2018**	**Method:** **As agreed between the testing Laboratory and the Customer.** **Protocol: NSFP 231**
	Sample code no:-AWRTCL/14523/18-19	
	Sample Description: 10" Filter cartridge assembly	
	Sample Quantity for Testing: 1 No	
	Submitted by : IAPMO R & T – USA	
	Date of Analysis started : 02.08.2018	
	Date of Analysis Completed : 09.08.2018	
	Subcontract : Not Applicable	
	Sample condition when received : Intact	

EXECUTIVE SUMMARY:

Tested 10" Cartridge Filter assembly at 6.6Lit/min Flow rate that was achieved at working pressure of 60 PSI, performed with ≥3.95 log reduction for E.Coli MTCC 68 test organism throughout the volume of testing for 2270 Liters. As the product flow rate dropped by >75% from the original Flow rate, at 2270 Liters the protocol was slightly modified. One sampling was done at this volume and the product was left for 48 hr stagnation. After stagnation one more sampling was carried out as the last sampling. Spiking of microorganism was done at the time of sampling. GTW#1 test water was used up to 50% of the total Volume targeted (3790Liters). Later part of the testing was done with CTW#03 water. 4^0C water was used at the time of sampling. Higher TOC was maintained in the CTW#3 water throughout testing. Turbidity was raised to ≥30NTU only at the time of sampling. Silver concentration was measured in all the sampling points. Concentration of Silver ranged between 7.69 and 16.93 µg/L (ppb) which is well within the Drinking water specification of 100 ppb.

Dr.S.MURALIDHARA RAO
Managing Director
9th August 2018

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TEST APPARATUS



TEST CARTRIDGE assy.	TEST WATER TANKS

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TEST DATA:

Date	Sampling Point	Influent E.Coli MTCC68 counts Cfu/mL	Effluent E.Coli MTCC68 counts Cfu/100mL	Effluent E.Coli MTCC68 counts Cfu/mL	% Reduction & LRV	Flow rate at the time of Sampling Liters per minute	Silver Concentration in product water as Ag µg/L
02.08.18	10 Liters	6.0×10^5	TNTC	62		6.60	7.99 (average of duplicate samples)
		6.0×10^5	TNTC	58			
		5.0×10^5	TNTC	65			
	Average	5.6×10^5	TNTC	62	99.9889		
	Log Value	5.74		1.79	3.95		
	Duplicate 10 Liters	7.0×10^5	TNTC	60			
		6.0×10^5	TNTC	56			
		6.0×10^5	TNTC	67			
	Average	6.3×10^5	TNTC	61	99.9903		
	Log Value	5.79		1.78	4.01		
02.08.18	10% 380Liters	6.0×10^5	TNTC	36		5.40	7.69
		7.0×10^5	TNTC	32			
		6.0×10^5	TNTC	38			
	Average	6.3×10^5	TNTC	35	99.9944		
	Log Value	5.79		1.54	4.25		
	Duplicate 10% 380Liters	5.0×10^5	TNTC	36			
		6.0×10^5	TNTC	35			
		6.0×10^5	TNTC	31			
	Average	5.6×10^5	TNTC	34	99.9939		
	log Value	5.74		1.53	4.21		
02.08.18	25% 950 Liters	6.0 X 105	TNTC	65		5.36	16.48
		7.0 X 105	TNTC	68			
		7.0 X 105	TNTC	60			
	Average	6.6 X 105	TNTC	64	99.9903		
	Log Value	5.81		1.80	4.01		
02.08.18	Duplicate 25% 950 Liters	7.0 X 105	TNTC	69			
		6.0 X 105	TNTC	62			
		5.0 X 105	TNTC	63			
	Average	6.0 X 105	TNTC	65	99.9891		
	Log Value	5.77		1.81	3.96		

Cfu: Colony forming units, TNTC: Too numerous to count / 100 ml, LRV: Log Reduction Value

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Date	Sampling Point	Influent E.Coli MTCC68 counts Cfu/mL	Effluent E.Coli MTCC68 counts Cfu/100mL	Effluent E.Coli MTCC68 counts Cfu/mL	% Reduction & LRV	Flow rate at the time of Sampling Liters per minute	Silver Concentration in product water as Ag µg/L
03.08.18	50% 1890Litres	6.0×10^5	TNTC	58		5.0	16.65
		7.0×10^5	TNTC	56			
		6.0×10^5	TNTC	53			
	Average	6.3×10^5	TNTC	57	99.9909		
	Log Value	5.79		1.75	4.04		
	Duplicate 50% 1890Litres	5.0×10^5	TNTC	60			
		7.0×10^5	TNTC	58			
		6.0×10^5	TNTC	70			
	Average	6.0×10^5	TNTC	63	99.9895		
	Log Value	5.77		1.79	3.98		
06.08.18	After 48hr stagnation	6.0×10^5	TNTC	46		4.8	14.97
			TNTC	49			
			TNTC	45			
	Average		TNTC	47	99.9921		
	Log Value	5.77		1.67	4.10		
	After 48hr stagnation	6.0×10^5	TNTC	50			
			TNTC	52			
			TNTC	48			
	Average		TNTC	50	99.9916		
	Log Value	5.77		1.69	4.08		
06.08.18	60% 2270 Litres	6.0 X 105	TNTC	58		3.4	16.93
		5.0 X 105	TNTC	60			
		7.0 X 105	TNTC	69			
	Average	6.0 X 105	TNTC	62	99.9896		
	Log Value	5.77		1.79	3.98		
06.08.18	Duplicate 60%2270 Litres	7.0 X 105	TNTC	72			
		7.0 X 105	TNTC	70			
		5.0 X 105	TNTC	68			
	Average	6.3 X 105	TNTC	70	99.9888		
	Log Value	5.79		1.84	3.95		

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Date	Sampling Point	Influent E.Coli MTCC68 counts Cfu/mL	Effluent E.Coli MTCC68 counts Cfu/100mL	Effluent E.Coli MTCC68 counts Cfu/mL	% Reduction & LRV	Flow rate at the time of Sampling Liters per minute	Silver Concentration in product water as Ag µg/L
06.08.18	At ≥75%Flow reduction	7.0×10^5	TNTC	75		1.20 (81.8% Flow Reduction)	16.21
		6.0×10^5	TNTC	70			
		7.0×10^5	TNTC	72			
	Average	6.6×10^5	TNTC	72	99.9890		
	Log Value	5.81		1.85	3.96		
	At ≥75%Flow reduction Duplicate	6.0×10^5	TNTC	78			
		5.0×10^5	TNTC	64			
		6.0×10^5	TNTC	75			
	Average	5.6×10^5	TNTC	72	99.9871		
	Log Value	5.74		1.85	3.89		
08.08.18	After 48hr stagnation	6.1×10^5	TNTC	48		1.0	15.94
			TNTC	50			
			TNTC	42			
	Average		TNTC	47	99.9922		
	Log Value	5.78		1.67	4.11		
	Duplicate After 48hr stagnation	6.1×10^5	TNTC	41			
			TNTC	53			
			TNTC	49			
	Average		TNTC	48	99.9921		
	Log Value	5.78		1.68	4.10		

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CHARACTERISTICS OF WATER : AT THE TIME OF SAMPLING

Parameter	Initial Sampling	10% Volume sampling	25% Volume sampling	50% Volume sampling	After 48 hr stagnation
pH	7.62	7.34	6.98	6.95	6.95
TDS (mg/L)	417	434	428	416	416
Total Hardness mg/L	100.08	111.2	100.08	111.2	111.2
Total Alkalinity mg/L	100	105	105	105	105
TOC(mg/L)	0.3	0.4	0.4	0.4	0.4
Turbidity NTU	0.3	0.3	0.4	0.3	0.3
Temperature ^{o}C	22 ^{0} C	22 ^{0} C	24 ^{0} C	23^{0} C	23^{0} C
Parameter	**60% Volume sampling**	**At ≥75% Flow reduction sampling**	**After 48 hr stagnation**		
pH	9.10	9.10	9.10		
TDS (mg/L)	1486	1486	1486		
Total Hardness mg/L	300.24	300.24	300.24		
Total Alkalinity mg/L	190	190	190		
TOC(mg/L)	11.4	11.4	11.4		
Turbidity NTU	30.8	30.8	30.8		
Temperature ^{o}C	4^{0} C	4^{0} C	22^{0} C		

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MATERIAL USED FOR ADJUSTING CHEMICAL COMPOSITION

Base water : DM water
TDS: NaCl, $CaCl_2.2H_2O$, $MgSO_4.7H_2O$,$NaHCO_3$ for TDS, Hardness and Alkalinity
NaOH 5% solution for raising pH
Sodium Salt of Humic acid for TOC
A4 test dust for Turbidity

ANALYTICAL METHODS:

TDS: Calibrated TDS meter
pH: APHA 23rd edn 4500 H+B
Total Hardness as CaCO3 mg/L :APHA23rd edn 2340C
Total Alkalinity as CaCO3 mg/L: APHA 23rd edn 2320B
Turbidity: APHA 23rd edn 2103B
TOC: HACH DR2800 spectrophotometer
Temperature: Calibrated Thermometer
E.Coli Enumeration: APHA 23rd edn / M Endo agar Membrane filtration technique

Water Running Cycle: 30 min ON / 30 min OFF
Per day water filtration: Four ON cycles

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