

# TEST REPORT

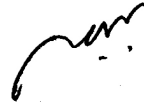
Report No: AWRCL/PRTR/14523/18-19

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:-AWRCL/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  $\geq 3.95$  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°C water was used at the time of sampling. Higher TOC was maintained in the CTW#3 water throughout testing. Turbidity was raised to  $\geq 30$ NTU 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  
9<sup>th</sup> August 2018

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## TEST APPARATUS



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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 X 10 <sup>5</sup>	TNTC	62	99.9889 3.95	6.60	7.99 (average of duplicate samples)
		6.0 X 10 <sup>5</sup>	TNTC	58			
		5.0 X 10 <sup>5</sup>	TNTC	65			
	Average	5.6 X 10 <sup>5</sup>	TNTC	62			
	Log Value	5.74		1.79			
	Duplicate 10 Liters	7.0 X 10 <sup>5</sup>	TNTC	60			
		6.0 X 10 <sup>5</sup>	TNTC	56			
		6.0 X 10 <sup>5</sup>	TNTC	67			
Average	6.3 X 10 <sup>5</sup>	TNTC	61	99.9903			
Log Value	5.79		1.78	4.01			
02.08.18	10% 380Liters	6.0 X 10 <sup>5</sup>	TNTC	36	99.9944 4.25	5.40	7.69
		7.0 X 10 <sup>5</sup>	TNTC	32			
		6.0 X 10 <sup>5</sup>	TNTC	38			
	Average	6.3 X 10 <sup>5</sup>	TNTC	35			
	Log Value	5.79		1.54			
	Duplicate 10% 380Liters	5.0 X 10 <sup>5</sup>	TNTC	36			
		6.0 X 10 <sup>5</sup>	TNTC	35			
		6.0 X 10 <sup>5</sup>	TNTC	31			
Average	5.6 X 10 <sup>5</sup>	TNTC	34	99.9939			
log Value	5.74		1.53	4.21			
02.08.18	25% 950 Liters	6.0 X 10 <sup>5</sup>	TNTC	65	99.9903 4.01	5.36	16.48
		7.0 X 10 <sup>5</sup>	TNTC	68			
	7.0 X 10 <sup>5</sup>	TNTC	60				
	Average	6.6 X 10 <sup>5</sup>	TNTC	64			
	Log Value	5.81		1.80			
02.08.18	Duplicate 25% 950 Liters	7.0 X 10 <sup>5</sup>	TNTC	69	99.9891 3.96		
		6.0 X 10 <sup>5</sup>	TNTC	62			
	5.0 X 10 <sup>5</sup>	TNTC	63				
	Average	6.0 X 10 <sup>5</sup>	TNTC	65			
	Log Value	5.77		1.81			

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 X 10 <sup>5</sup>	TNTC	58		5.0	16.65	
		7.0 X 10 <sup>5</sup>	TNTC	56				
		6.0 X 10 <sup>5</sup>	TNTC	53				
	Average	6.3 X 10 <sup>5</sup>	TNTC	57	99.9909			
	Log Value	5.79		1.75	4.04			
	Duplicate 50% 1890Litres	5.0 X 10 <sup>5</sup>	TNTC	60				
		7.0 X 10 <sup>5</sup>	TNTC	58				
		6.0 X 10 <sup>5</sup>	TNTC	70				
		Average	6.0 X 10 <sup>5</sup>	TNTC	63			99.9895
	Log Value	5.77		1.79	3.98			
06.08.18	After 48hr stagnation	6.0 X 10 <sup>5</sup>	TNTC	46		4.8	14.97	
			TNTC	49				
			TNTC	45				
			TNTC	47	99.9921			
	Log Value	5.77		1.67	4.10			
	After 48hr stagnation	6.0 X 10 <sup>5</sup>	TNTC	50				
			TNTC	52				
			TNTC	48				
			TNTC	50	99.9916			
	Log Value	5.77		1.69	4.08			
06.08.18	60% 2270 Litres	6.0 X 10 <sup>5</sup>	TNTC	58		3.4	16.93	
		5.0 X 10 <sup>5</sup>	TNTC	60				
		7.0 X 10 <sup>5</sup>	TNTC	69				
		Average	6.0 X 10 <sup>5</sup>	TNTC	62			99.9896
		Log Value	5.77		1.79			3.98
06.08.18	Duplicate 60%2270 Litres	7.0 X 10 <sup>5</sup>	TNTC	72				
		7.0 X 10 <sup>5</sup>	TNTC	70				
		5.0 X 10 <sup>5</sup>	TNTC	68				
		Average	6.3 X 10 <sup>5</sup>	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 X 10 <sup>5</sup>	TNTC	75		1.20 (81.8% Flow Reduction)	16.21
		6.0 X 10 <sup>5</sup>	TNTC	70			
		7.0 X 10 <sup>5</sup>	TNTC	72			
	Average	6.6 X 10 <sup>5</sup>	TNTC	72	99.9890		
	Log Value	5.81		1.85	3.96		
	At ≥75%Flow reduction Duplicate	6.0 X 10 <sup>5</sup>	TNTC	78			
		5.0 X 10 <sup>5</sup>	TNTC	64			
		6.0 X 10 <sup>5</sup>	TNTC	75			
	Average	5.6 X 10 <sup>5</sup>	TNTC	72	99.9871		
	Log Value	5.74		1.85	3.89		
08.08.18	After 48hr stagnation	6.1 X 10 <sup>5</sup>	TNTC	48		1.0	15.94
			TNTC	50			
			TNTC	42			
			TNTC	47	99.9922		
	Average	5.78		1.67	4.11		
	Duplicate After 48hr stagnation	6.1 X 10 <sup>5</sup>	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 °C	22 ° C	22 ° C	24 ° C	23° C	23° 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 °C	4° C	4° C	22° C		

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## MATERIAL USED FOR ADJUSTING CHEMICAL COMPOSITION

Base water : DM water

TDS: NaCl, CaCl<sub>2</sub>.2H<sub>2</sub>O, MgSO<sub>4</sub>.7H<sub>2</sub>O, NaHCO<sub>3</sub> 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 23<sup>rd</sup> edn 4500 H+B

Total Hardness as CaCO<sub>3</sub> mg/L :APHA23<sup>rd</sup> edn 2340C

Total Alkalinity as CaCO<sub>3</sub> mg/L: APHA 23<sup>rd</sup> edn 2320B

Turbidity: APHA 23<sup>rd</sup> edn 2103B

TOC: HACH DR2800 spectrophotometer

Temperature: Calibrated Thermometer

E.Coli Enumeration: APHA 23<sup>rd</sup> 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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