

# WATER FILTER EFFICIENCY STUDY

## STUDY DONE FOR

**M/s Newco Pro India (Pvt) Ltd**

<b>Report Number</b>	EQNX:001:LAB:W:24:04:20298 - 20317
<b>Sample Description</b>	Sydney 905 Water Filter
<b>Analysis Date</b>	04/05/2024 – 24/05/2024
<b>Done By</b>	Mr. Chetan , Mrs. Supriya , Mr. Santosh, Mrs. Radhika
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# Sydney 905 WATER FILTER EFFICIENCY STUDY

## 1. SCOPE –

- To determine the efficiency of the Sydney 905 water filter to reduce the chemical and microbial contaminants from the water.

## 2. PARAMETERS TO BE TESTED –

### ➤ Chemical parameters

1. Chlorine
2. pH
3. TOC
4. Turbidity
5. Temperature
6. TSS
7. Electrical conductivity
8. TDS
9. Alkalinity
10. Total Hardness
11. Calcium Hardness
12. Ammonia
13. Sulphates
14. Nitrates
15. Nitrites
16. Total phosphates
17. Fluorides

### ➤ Heavy metals

1. Sodium
2. Manganese
3. Iron
4. Magnesium
5. Calcium
6. Potassium

➤ **Biological contaminants**

1. E.coli
2. Fecal Coliform
3. Total Coliform

### **3. Method of analysis**

#### **3.1 Testing Method**

- 3 filters were supplied for testing and the tests were run on all 3 filters to obtain an average result for each parameter tested.
- Unwrap the Sydney 905 water filter and clean the outer casing with sterile water.
- Flush all the three filters with 4-5 liters of sterile water prior to testing.
- Prepare the feed water (both GTW and CTW) as specified above.
- Subject the feed water (both GTW and CTW) to the analysis of the above mentioned parameters (consider the samples as pre-treatment water samples).
- Pass the feed water – GTW from the Sydney 905 water filter at the flow rate of 1 lit/min
- Examine the filtered water (passed through the filters) for all the above mentioned parameters (consider the sample as post-treatment water sample).
- Repeat the above steps for two more times for all the Sydney 905 water filters, so that results will be obtained in triplicates.
- Repeat the steps 5, 6 and 7 using CTW for all the three Sydney 905 water filters.
- Compare the results of pre and post treatment water samples.
- Calculate the % reduction for applicable parameters.
- Conclude on the efficacy of the water filter basis on the obtained results.

**Note : -**

**The protocol has been designed by referring to the WHO protocol shared by the Newco Pro India (Pvt) Ltd Team.**

**The backwashing/cleaning is to be followed as specified by the Newco Pro India (Pvt) Ltd Team.**

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### 3.2 Preparation of feed water as per below table

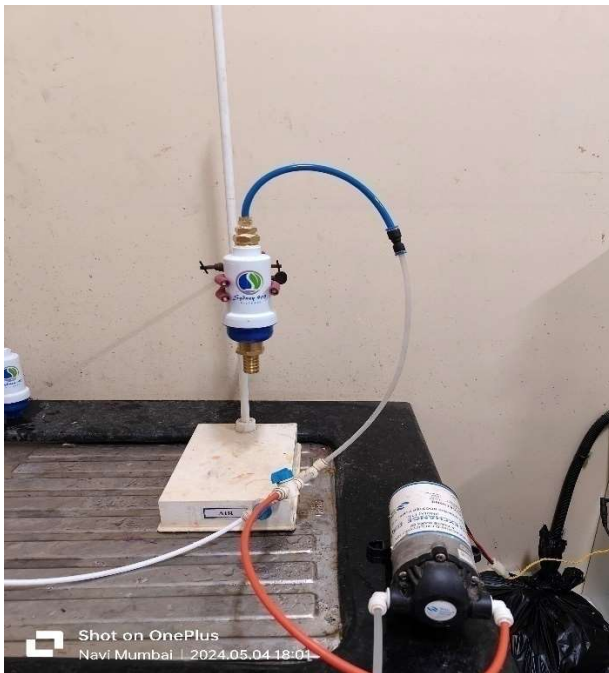
General Test Water (GTW)			Challenge Test Water (CTW)		
Parameter	Specification	Unit	Parameter	Specification	Unit
Chlorine	< 0.05	mg/L	Chlorine	< 0.05	mg/L
pH	7.0 ± 0.5	-	pH	9.0 ± 0.5	-
TOC	1.05 ± 0.95	mg/L	TOC	15 ± 5	mg/L
Turbidity	< 1	NTU	Turbidity	40 ± 10	NTU
TSS	50 ± 15	mg/L	TSS	50 ± 15	mg/L
Electrical Conductivity	250 ± 15	µs/cm	Electrical Conductivity	100 ± 15	µs/cm
Temperature	20 ± 3°C	°C	Temperature	4 ± 1°C	°C
TDS	275 ± 225	mg/L	TDS	1500 ± 150	mg/L
Alkalinity	100 ± 20	mg/L as CaCO <sub>3</sub>	Alkalinity	100 ± 20	mg/L as CaCO <sub>3</sub>
Total Hardness	200	mg/L	Total Hardness	200	mg/L
Calcium Hardness	80	mg/L	Calcium Hardness	80	mg/L
Iron	0.1	mg/L	Iron	0.1	mg/L
Ammonia	0.5	mg/L	Ammonia	0.5	mg/L
Sulphates	100	mg/L	Sulphates	100	mg/L
Nitrates	5	mg/L	Nitrates	5	mg/L
Nitrites	0.01	mg/L	Nitrites	0.01	mg/L
Total phosphates	0.5	mg/L	Total phosphates	0.5	mg/L
Magnesium	30	mg/L	Magnesium	30	mg/L
Calcium	80	mg/L	Calcium	80	mg/L
Fluorides	0.5	mg/L	Fluorides	0.5	mg/L
Potassium	10	mg/L	Potassium	10	mg/L
Sodium	1	mg/L	Sodium	1	mg/L
Manganese	0.01	mg/L	Manganese	0.01	mg/L
E. coli	10 <sup>6</sup>	per/100 ml	E. coli	10 <sup>6</sup>	per/100 ml
Fecal Coliform	10 <sup>6</sup>	per/100 ml	Fecal Coliform	10 <sup>6</sup>	per/100 ml
Total Coliform	10 <sup>6</sup>	per/100 ml	Total Coliform	10 <sup>6</sup>	per/100 ml

## 4. Photos

### Sample Photos



### Sample Analysis Setup



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## 5. Observation :-

### A) Sample – A - General Test Water (GTW)

Parameter	Unit	Initial	Final			Average	% Reduction
			Sample – A1	Sample – A2	Sample – A3		
Chlorine	mg/L	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	NA
pH	-	7.02	6.99	7.01	6.93	6.98	0.62
TOC	mg/L	1.604	1.594	1.601	1.599	1.598	0.37
Turbidity	NTU	< 1	< 0.5	< 0.5	< 0.5	< 0.5	99.99
TSS	mg/L	48	< 1.0	< 1.0	< 1.0	< 1.0	99.99
Electrical Conductivity	µs/cm	238.4	218.4	211.3	197.3	209.00	12.33
Temperature	°C	22.3	22.3	22.4	22.3	22.33	NA
TDS	mg/L	412	387	377	361	375.00	8.98
Alkalinity	mg/L	100	93.4	73.1	85.3	83.93	16.07
Total Hardness	mg/L	200	173.4	175.4	167.3	172.03	13.98
Calcium Hardness	mg/L	80	72.87	69.96	64.13	68.99	13.77
Iron	mg/L	0.1	< 0.01	< 0.01	< 0.01	< 0.01	99.99
Ammonia	mg/L	0.5	< 0.1	< 0.1	< 0.1	< 0.1	99.99
Sulphates	mg/L	100	8.2	7.9	8.7	8.27	91.73
Nitrates	mg/L	5	< 0.1	< 0.1	< 0.1	< 0.1	99.99
Nitrites	mg/L	0.01	< 0.005	< 0.005	< 0.005	< 0.005	99.99
Total phosphates	mg/L	0.48	< 0.05	< 0.05	< 0.05	< 0.05	99.99
Magnesium	mg/L	34.3	31.4	33.5	34.3	33.07	3.60
Calcium	mg/L	71.4	66.2	70.5	70.8	69.17	3.13
Fluorides	mg/L	0.5	< 0.05	< 0.05	< 0.05	< 0.05	99.99
Potassium	mg/L	10.5	9.3	10	10.2	9.83	6.35
Sodium	mg/L	0.7	0.62	0.67	0.68	0.66	6.19
Manganese	mg/L	0.02	0.018	0.017	0.018	0.02	11.67
E. coli	per/100 ml	1.7 X 10 <sup>6</sup>	Not Detected	Not Detected	Not Detected	Not Detected	100
Fecal Coliform	per/100 ml	1.7 X 10 <sup>6</sup>	< 1.0	< 1.0	< 1.0	< 1.0	100
Total Coliform	per/100 ml	1.7 X 10 <sup>6</sup>	Not Detected	Not Detected	Not Detected	Not Detected	100

## B) Sample – B - General Test Water (GTW)

Parameter	Unit	Initial	Final			Average	% Reduction
			Sample – B1	Sample – B2	Sample – B3		
Chlorine	mg/L	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	NA
pH	-	7.02	6.95	6.98	6.96	6.96	0.81
TOC	mg/L	1.604	1.587	1.599	1.571	1.59	1.14
Turbidity	NTU	< 1	< 0.5	< 0.5	< 0.5	< 0.5	99.99
TSS	mg/L	48	< 1.0	< 1.0	< 1.0	< 1.0	99.99
Electrical Conductivity	µs/cm	238.4	194.7	193.3	201.6	196.53	17.56
Temperature	°C	22.4	22.5	22.3	22.4	22.40	NA
TDS	mg/L	412	355	341	374	356.67	13.43
Alkalinity	mg/L	100	89.3	93.4	91.4	91.37	8.63
Total Hardness	mg/L	200	169.3	173.4	174.4	172.37	13.82
Calcium Hardness	mg/L	80	71.62	77.45	74.53	74.53	6.83
Iron	mg/L	0.1	< 0.01	< 0.01	< 0.01	< 0.01	99.99
Ammonia	mg/L	0.5	< 0.1	< 0.1	< 0.1	< 0.1	99.99
Sulphates	mg/L	100	7.3	7.8	8.3	7.80	92.20
Nitrates	mg/L	5	< 0.1	< 0.1	< 0.1	< 0.1	99.99
Nitrites	mg/L	0.01	< 0.005	< 0.005	< 0.005	< 0.005	99.99
Total phosphates	mg/L	0.48	< 0.05	< 0.05	< 0.05	< 0.05	99.99
Magnesium	mg/L	34.3	33.2	34	34.2	33.80	1.46
Calcium	mg/L	71.4	68.5	69.7	70.2	69.47	2.71
Fluorides	mg/L	0.5	< 0.05	< 0.05	< 0.05	< 0.05	99.99
Potassium	mg/L	10.5	9.9	10.2	10.2	10.10	3.81
Sodium	mg/L	0.7	0.66	0.67	0.68	0.67	4.29
Manganese	mg/L	0.02	0.015	0.015	0.014	0.01	26.67
E. coli	per/100 ml	1.7 X 10 <sup>6</sup>	Not Detected	Not Detected	Not Detected	Not Detected	100
Fecal Coliform	per/100 ml	1.7 X 10 <sup>6</sup>	< 1.0	< 1.0	< 1.0	< 1.0	100
Total Coliform	per/100 ml	1.7 X 10 <sup>6</sup>	Not Detected	Not Detected	Not Detected	Not Detected	100

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### C) Sample – C - General Test Water (GTW)

Parameter	Unit	Initial	Final			Average	% Reduction
			Sample – C1	Sample – C2	Sample – C3		
Chlorine	mg/L	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	NA
pH	-	7.02	6.95	6.93	6.99	6.96	0.90
TOC	mg/L	1.604	1.498	1.523	1.573	1.53	4.53
Turbidity	NTU	< 1	< 0.5	< 0.5	< 0.5	< 0.5	99.99
TSS	mg/L	48	< 1.0	< 1.0	< 1.0	< 1.0	99.99
Electrical Conductivity	µs/cm	238.4	205.2	203.6	201.2	203.33	14.71
Temperature	°C	22.3	22.4	22.4	22.3	22.37	NA
TDS	mg/L	412	320	384	352	352.00	14.56
Alkalinity	mg/L	100	89.3	95.4	91.4	92.03	7.97
Total Hardness	mg/L	200	175.4	171.4	170.3	172.37	13.82
Calcium Hardness	mg/L	80	65.59	75.79	69.96	70.44	11.95
Iron	mg/L	0.1	< 0.01	< 0.01	< 0.01	< 0.01	99.99
Ammonia	mg/L	0.5	< 0.1	< 0.1	< 0.1	< 0.1	99.99
Sulphates	mg/L	100	8.4	8.5	8.3	8.40	91.60
Nitrates	mg/L	5	< 0.1	< 0.1	< 0.1	< 0.1	99.99
Nitrites	mg/L	0.01	< 0.005	< 0.005	< 0.005	< 0.005	99.99
Total phosphates	mg/L	0.48	< 0.05	< 0.05	< 0.05	< 0.05	99.99
Magnesium	mg/L	34.3	33.1	34.1	34	33.73	1.65
Calcium	mg/L	71.4	69.5	72.3	70.9	70.90	0.70
Fluorides	mg/L	0.5	< 0.05	< 0.05	< 0.05	< 0.05	99.99
Potassium	mg/L	10.5	9.8	10.1	10.2	10.03	4.44
Sodium	mg/L	0.7	0.66	0.68	0.67	0.67	4.29
Manganese	mg/L	0.02	0.019	0.021	0.017	0.02	5.00
E. coli	per/100 ml	1.7 X 10 <sup>6</sup>	Not Detected	Not Detected	Not Detected	Not Detected	100
Fecal Coliform	per/100 ml	1.7 X 10 <sup>6</sup>	< 1.0	< 1.0	< 1.0	< 1.0	100
Total Coliform	per/100 ml	1.7 X 10 <sup>6</sup>	Not Detected	Not Detected	Not Detected	Not Detected	100

### A) Sample – A - Challenge Test Water (CTW)

Parameter	Unit	Initial	Final			Average	% Reduction
			Sample – A1	Sample – A2	Sample – A3		
Chlorine	mg/L	< 0.05	< 0.05	< 0.05	< 0.05	< 0.5	NA
pH	-	8.7	8.63	8.67	8.69	8.66	0.42
TOC	mg/L	18.403	17.216	17.658	17.903	17.59	4.41
Turbidity	NTU	37	2.7	2.6	2.7	2.67	92.79
TSS	mg/L	62	< 1.0	< 1.0	< 1.0	< 1.0	99.99
Electrical Conductivity	µs/cm	113.5	93.75	94.15	94.11	94.00	17.18
Temperature	°C	4.2	4.2	4.1	4.1	4.13	NA
TDS	mg/L	1568	1216	1297	1384	1299.00	17.16
Alkalinity	mg/L	123	88.9	78.5	81.6	83.00	32.52
Total Hardness	mg/L	217	175.6	170.3	169.5	171.80	20.83
Calcium Hardness	mg/L	80	75.10	70.60	65.33	70.34	12.07
Iron	mg/L	0.1	< 0.01	< 0.01	< 0.01	< 0.01	99.99
Ammonia	mg/L	0.5	< 0.1	< 0.1	< 0.1	< 0.1	99.99
Sulphates	mg/L	100	9.9	8.3	8.1	8.77	91.23
Nitrates	mg/L	5	< 0.1	< 0.1	< 0.1	< 0.1	99.99
Nitrites	mg/L	0.01	< 0.005	< 0.005	< 0.005	< 0.005	99.99
Total phosphates	mg/L	0.48	< 0.05	< 0.05	< 0.05	< 0.05	99.99
Magnesium	mg/L	37.6	32.3	31.7	33.3	32.43	13.74
Calcium	mg/L	74.5	67.1	70.9	68.6	68.87	7.56
Fluorides	mg/L	0.5	< 0.05	< 0.05	< 0.05	< 0.05	99.99
Potassium	mg/L	10.5	9.7	9.4	9.8	9.63	8.25
Sodium	mg/L	0.7	0.61	0.64	0.63	0.63	10.48
Manganese	mg/L	0.02	0.016	0.018	0.019	0.02	11.67
E. coli	per/100 ml	1.7 X 10 <sup>6</sup>	Not Detected	Not Detected	Not Detected	Not Detected	100
Fecal Coliform	per/100 ml	1.7 X 10 <sup>6</sup>	< 1.0	< 1.0	< 1.0	< 1.0	100
Total Coliform	per/100 ml	1.7 X 10 <sup>6</sup>	Not Detected	Not Detected	Not Detected	Not Detected	100

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### B) Sample – B - Challenge Test Water (CTW)

Parameter	Unit	Initial	Final			Average	% Reduction
			Sample – B1	Sample – B2	Sample – B3		
Chlorine	mg/L	< 0.05	< 0.05	< 0.05	< 0.05	< 0.5	NA
pH	-	8.7	8.62	8.66	8.69	8.66	0.50
TOC	mg/L	18.403	17.115	17.627	17.568	17.44	5.25
Turbidity	NTU	37	2.9	3.1	3.2	3.07	91.71
TSS	mg/L	62	< 1.0	< 1.0	< 1.0	< 1.0	99.99
Electrical Conductivity	µs/cm	113.5	95.55	96.85	94.12	95.51	15.85
Temperature	°C	4.2	4.1	4	4.1	4.07	NA
TDS	mg/L	1568	1228	1294	1245	1255.67	19.92
Alkalinity	mg/L	123	90.4	91.7	89.5	90.53	26.40
Total Hardness	mg/L	217	172.8	170.9	172.6	172.10	20.69
Calcium Hardness	mg/L	80	72.81	74.35	71.67	72.94	8.82
Iron	mg/L	0.1	< 0.01	< 0.01	< 0.01	< 0.01	99.99
Ammonia	mg/L	0.5	< 0.1	< 0.1	< 0.1	< 0.1	99.99
Sulphates	mg/L	100	8.1	8.4	8	8.17	91.83
Nitrates	mg/L	5	< 0.1	< 0.1	< 0.1	< 0.1	99.99
Nitrites	mg/L	0.01	< 0.005	< 0.005	< 0.005	< 0.005	99.99
Total phosphates	mg/L	0.48	< 0.05	< 0.05	< 0.05	< 0.05	99.99
Magnesium	mg/L	37.6	34.1	33.8	33.9	33.93	9.75
Calcium	mg/L	74.5	68.9	70.6	70.5	70.00	6.04
Fluorides	mg/L	0.5	< 0.05	< 0.05	< 0.05	< 0.05	99.99
Potassium	mg/L	10.5	9.8	9.3	9.5	9.53	9.21
Sodium	mg/L	0.7	0.64	0.66	0.64	0.65	7.62
Manganese	mg/L	0.02	0.017	0.016	0.015	0.02	20.00
E. coli	per/100 ml	1.7 X 10 <sup>6</sup>	Not Detected	Not Detected	Not Detected	Not Detected	100
Fecal Coliform	per/100 ml	1.7 X 10 <sup>6</sup>	< 1.0	< 1.0	< 1.0	< 1.0	100
Total Coliform	per/100 ml	1.7 X 10 <sup>6</sup>	Not Detected	Not Detected	Not Detected	Not Detected	100

### C) Sample – C - Challenge Test Water (CTW)

Parameter	Unit	Initial	Final			Average	% Reduction
			Sample – C1	Sample – C2	Sample – C3		
Chlorine	mg/L	< 0.05	< 0.05	< 0.05	< 0.05	< 0.5	NA
pH	-	8.7	8.63	8.67	8.61	8.64	0.73
TOC	mg/L	18.403	17.922	18.103	17.497	17.84	3.06
Turbidity	NTU	37	3.2	3.5	3	3.23	91.26
TSS	mg/L	62	< 1.0	< 1.0	< 1.0	< 1.0	100
Electrical Conductivity	µs/cm	113.5	98.8	94.7	97.5	97.00	14.54
Temperature	°C	4.2	4.2	4.3	4.2	4.23	NA
TDS	mg/L	1568	1072	1124	1097	1097.67	30.00
Alkalinity	mg/L	123	91.7	93.5	92.2	92.47	24.82
Total Hardness	mg/L	217	170.9	174.3	173.4	172.87	20.34
Calcium Hardness	mg/L	80	69.47	71.46	70.29	70.41	11.99
Iron	mg/L	0.1	< 0.01	< 0.01	< 0.01	< 0.01	99.99
Ammonia	mg/L	0.5	< 0.1	< 0.1	< 0.1	< 0.1	99.99
Sulphates	mg/L	100	8.2	8.7	8.3	8.40	91.60
Nitrates	mg/L	5	< 0.1	< 0.1	< 0.1	< 0.1	99.99
Nitrites	mg/L	0.01	< 0.005	< 0.005	< 0.005	< 0.005	99.99
Total phosphates	mg/L	0.48	< 0.05	< 0.05	< 0.05	< 0.05	99.99
Magnesium	mg/L	37.6	32.5	31.3	33.4	32.40	13.83
Calcium	mg/L	74.5	68.5	70.6	33	57.37	23.00
Fluorides	mg/L	0.5	< 0.05	< 0.05	< 0.05	< 0.05	99.99
Potassium	mg/L	10.5	9.4	9.8	9.7	9.63	8.25
Sodium	mg/L	0.7	0.67	0.62	0.64	0.64	8.10
Manganese	mg/L	0.02	0.019	0.018	0.015	0.02	13.33
E. coli	per/100 ml	1.7 X 10 <sup>6</sup>	Not Detected	Not Detected	Not Detected	Not Detected	100
Fecal Coliform	per/100 ml	1.7 X 10 <sup>6</sup>	< 1.0	< 1.0	< 1.0	< 1.0	100
Total Coliform	per/100 ml	1.7 X 10 <sup>6</sup>	Not Detected	Not Detected	Not Detected	Not Detected	100

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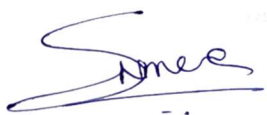
## 6. Conclusion : -

### A)-GENERAL TEST WATER -

- The Sydney 905 water filter effectively improves the water quality by significantly reducing contaminants to non-detectable.
- Parameters such as turbidity, TSS, iron, and ammonia show nearly complete removal.
- The overall conclusion is that the water treatment method employed is effective in improving water quality by significantly reducing contaminants and ensuring safety and clarity of the water.
- The Sydney 905 water filters are highly effective against tested biological contaminants such as E. coli, Fecal coliform, Total Coliform showing 100% filtration efficiency.

### B)-CHALLENGE TEST WATER –

- The Sydney 905 water filter effectively improves water quality by significantly reducing contaminants to non-detectable.
- Parameters such as turbidity, TSS, iron, and ammonia show nearly complete removal.
- The Sydney 905 water filters are highly effective in improving water quality by significantly reducing contaminants and ensuring safety and clarity of the water. The slight variations in some parameters across different samples indicate consistency and reliability of the treatment process.
- The Sydney 905 water filters are highly effective against tested biological contaminants such as E. coli, Fecal coliform, Total Coliform showing 100% filtration efficiency.



**Done By**




**Verified By**

**Note :**

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