

# ENVIRONMENTAL LABORATORY

The scope of testing services involves physicochemical analysis of water and industrial effluents, physicochemical and bacteriological analysis of drinking water, characterization of ETP sludge, ion exchange resins, activated carbon and sand, monitoring of ambient air and stack gases. The physicochemical analysis of water helps in ascertaining the right quality of water to be used in the textile process house to obtain the desired color, shade and brightness on the fabric using minimum quantity of dyes and auxiliary chemicals. The drinking water must comply with IS 10500: 1991 to ascertain its suitability for human consumption. The quality of treated effluent and ETP sludge must comply with the standards prescribed by Central /State Pollution Control Boards. Analysis of recovered water after the tertiary treatment provides a scope of recycling the same into the process house. Characterization of ion exchange resins, activated carbon and sand helps in trouble shooting of water and effluent treatment plants. Regular monitoring of discharged effluents, ambient air and stack gases is a mandatory requirement.

## I. Water And Industrial Effluents

*(Testing as per Indian/American Standards)*

S.No.	Nature of Test	Test Method	Instrument	Sample Size (ml)	Testing Charges (Rs.)
<b>A. Physical Properties</b>					
1.	Appearance	Visual	Transparent Glass Vessel	500	90.00
2.	Color	Visual Comparison (Pt-/Co Standard)	Nessler Tubes	200	140.00
3.	Odor	At 60° C	Wide Mouthed Jar	500	110.00
4.	Turbidity	Nephelometric	Turbidity meter	200	140.00
5.	pH Value	Electrometric	pH meter	500	140.00
6.	Conductivity	Lab. Method	Conductivity meter	500	140.00
7.	Total Solids (TS)	Gravimetric 103 - 105°C	Hot Air Oven	400	210.00
8.	Total Dissolved Solid (TDS)	Gravimetric, 180°C	Hot Air Oven	400	280.00
9.	Suspended Solids (TSS) with/without TS/TDS	Calculation (TS - TDS = TSS)	Hot Air Oven	1000	490.00
10.	Fixed Solids (FS)	Gravimetric, 550 °C	Muffle Furnace	400	360.00
11.	Volatile Solids (VS) with/without TS/FS	Calculation (TS - FS = VS)	Hot Air Oven, Muffle Furnace	1000	570.00
12.	Settleable Solids	a. By volume b. Gravimetric	- Imhoff Cone - Hot Air Oven	1000 1000	140.00 1060.00
<b>B. Chemical Constituents</b>					
<b>1. Organics</b>					
1.	Biochemical Oxygen Demand (BOD)	Winkler, Titrimetric 3 days, 27° C	BOD Incubator	500	590.00
2.	Chemical Oxygen Demand (COD)	Open Reflux	Reflux Apparatus	200	470.00
3.	Oil and Grease (O/G)	Partition-gravimetric	Oven Separating Funnels	500	370.00
4.	Organic Matter	KMnO <sub>4</sub> , 4 hrs, 27°C	Incubator	1000	470.00

<b>2. Inorganics</b>					
1.	Acidity (Total)	Titrimetric	pH Meter	200	240.00
2.	Acidity (Free Mineral)	Titrimetric	pH Meter	200	240.00
3.	Acidity (Equivalent Mineral)	Titrimetric	pH Meter, Resin Column	1000	460.00
4.	Alkalinity (Phenolphthalein)	Titrimetric	pH Meter	200	240.00
5.	Alkalinity (Total M.O.)	Titrimetric	pH Meter	200	240.00
6.	Ammonical Nitrogen	Titrimetric	Distillation Assembly	200	470.00
7.	Bicarbonates	Titrimetric	pH Meter	200	290.00
8.	Boron	Colorimetric (Curcumine)	UV-Visible Spectrophotometer	200	380.00
9.	Bromide	Colorimetric (Phenol Red)	UV-Visible Spectrophotometer	200	380.00
10.	Carbon Dioxide, Free	Titrimetric	Titration	200	270.00
11.	Carbonates	Titrimetric	pH Meter	200	310.00
12.	Chlorides	Argentometric	Titration	200	240.00
13.	Chlorine, Residual	Iodometric	Titration	500	270.00
14.	Chlorine Demand	Iodometric	Titration	1000	540.00
15.	Dissolved Oxygen	Winkler Titrimetric, Azide modification	Titration	1000	270.00
16.	Fluoride	Colorimetric (SPADNS)	UV-Visible Spectrophotometer	200	380.00
17.	Hardness, Total (TH)	EDTA Titrimetric	Titration	400	240.00
18.	Hardness, Calcium (Ca)	Flame Emission	Flame Photometer	200	380.00
19.	Hardness, Magnesium (Mg) with/without TH/Ca	Calculation (TH-Ca=Mg)	Flame Photometer, Titration	600	620.00
20.	Hardness, Temporary	Calculation from TH and Alkalinity	Titration, pH Meter	600	530.00
21.	Hardness, Permanent	Calculation from TH and 'Alkalinity	Titration, pH Meter	600	530.00
22.	Saturation Index (CaCO <sub>3</sub> Saturation)	Calculation from pH, Alk, Ca, TDS, Temp.	pH Meter, Flame Photometer, Oven	1000	1750.00
23.	Nitrite Nitrogen	Colorimetric (Diazotization)	UV-Visible Spectrophotometer	200	380.00
24.	Nitrite Nitrogen	Colorimetric (Chromotropic A.)	UV-Visible Spectrophotometer	200	380.00
25.	Phosphate	Colorimetric (Stannous Chloride)	UV-Visible Spectrophotometer	200	380.00
26.	Silica	Colorimetric (Molybdosilicate.)	UV-Visible Spectrophotometer	200	380.00
27.	Sulfate	Turbidimetric	UV-Visible Spectrophotometer	200	380.00

28.	Sulfide	Iodometric Titration	Titration	200	270.00
29.	Sulfite	Iodometric Titration	Titration	200	270.00
<b>3. Metals</b>					
1.	Calcium	Flame Emission	Flame Photometer	200	380.00
2.	Chromium (VI)	Colorimetric (Diphenylcarbazid)	UV-Visible Spectrophotometer	200	380.00
3.	Iron, Total (T.Fe)	Colorimetric (Phenanthroline)	UV-Visible Spectrophotometer	200	380.00
4.	Iron, Dissolved (D.Fe)	Colorimetric (Phenanthroline)	UV-Visible Spectrophotometer	200	430.00
5.	Iron, Suspended (S.Fe) with/without T.Fe/D.Fe	Calculation (T.Fe-D.Fe=S.Fe)	UV-Visible Spectrophotometer	200	810.00
6.	Lithium	Flame Emission	Flame Photometer	200	380.00
7.	Magnesium (Mg) with/without TH/Ca	Calculation (TH-Ca=Mg)	Titration, Flame Photometer	600	620.00
8.	Potassium	Flame Emission	Flame Photometer	200	380.00
9.	Sodium	Flame Emission	Flame Photometer	200	380.00
<b>C. Bacteriological Examination</b>					
1.	MPN coliform per 100 ml	Multiple Tube Dilution (Presumptive)	Autoclave, Culture tubes	300	560.00
* Sample collection charges for water and effluent samples are Rs. 750.00 for Ghaziabad, Noida and Delhi. For others TA/DA will be charged extra.					

Sample quantity required for routing analysis : 2 liters for 6 parameters  
4 liters for more than 6 parameters

## II. E.T.P.. Sludge

(Testing as per American Standards)

S.No.	Nature of Test	Test Method	Instrument	Sample Size (ml)	Test Fee (Rs.)
1.	pH Value	1:5 Sludge/Water Suspension	pH Meter	200	240.00
2.	Moisture Content	Gravimetric	Hot Air Oven	200	310.00
3.	Specific Gravity	Weight/Volume	Measuring Cylinder	200	210.00
4.	Total Solid Content (TS)	Gravimetric 103 - 105°C	Hot Air Oven	400	210.00
5.	Fixed Solids (FS)	Gravimetric, 550°C	Muffle Furnace	400	360.00
6.	Volatile Solids (VS) with/without TS/Fs	TS-FS=VS	Hot Air Oven, Muffle Furnace	1000	570.00
7.	Settleable Solids	a. By volume b. Gravimetric	- Imhoff Cone - Hot Air Oven	1000 1000	140.00 1060.00
8.	Settled Sludge Volume	By volume	Settling Vessel	1000	140.00

9.	Sludge Volume Index (SVI)	By volume and gravimetric	Settling Vessel Hot Air Oven	1000	660.00
10.	Calcium Content	Flame Emission	Flame Photometer	200	620.00
11.	Iron Content	Colorimetric (Phenanthroline)	UV-Visible Spectrophotometer	200	620.00
12.	Chromium (IV)	Colorimetric (Diphenylcarbazid)	UV-Visible Spectrophotometer	200	620.00
13.	Silica	Colorimetric (Molybosilicate)	UV-Visible Spectrophotometer	200	620.00
14.	Potassium	Flame Emission	Flame Photometer	200	620.00
15.	Sodium	Flame Emission	Flame Photometer	200	620.00

Sample quantity required for routing analysis : Liquid Sludge : 2 liters in sealed plastic jar  
Semi-solid Sludge : 500 g in sealed polythene bag

### III. ION Exchange Resins

(Testing as per Indian Standards)

S.No.	Nature of Test	Test Method	Instrument	Sample Size (ml)	Test Fee (Rs.)
1.	Iron Fouling a. Qualitative b. Quantitative	- Color observation - Phenanthroline	- Resin Column - UV-Visible Spectrophotometer	100 100	310.00 690.00
2.	Silica Fouling a. Qualitative b. Quantitative	- Color observation - Molybdosilicate	- Resin Column - UV-Visible Spectrophotometer	100 100	310.00 690.00
3.	Organic Fouling (Qualitative)	- Color observation	Resin Column	100	310.00
4.	Cracks	Counting	Microscope	50	360.00
5.	Pieces	Counting	Microscope	50	360.00
6.	Fines	Screening	British Standard Sieves	200	280.00
7.	Coarse	Screening	British Standard Sieves	200	280.00
8.	Effective Size	Screening	British Standard Sieves	500	940.00
9.	Effective Size and Uniformity Coefficient	Screening	British Standard Sieves	500	990.00
10.	Water Regain/ % Moisture	Gravimetric	Sintered Glass Tubes	100	710.00
11.	Total Exchange Capacity	Titrimetric	Resin Columns	100	1460.00
12.	Weight Capacity	Titrimetric	Stoppered Conical Flasks	100	1460.00
13.	Strong Base Capacity	Titrimetric	Resin Columns	100	1810.00

14.	Bulk Density	Weight/Volume	Measuring Cylinders	200	210.00
15.	True Density	Weight/Volume	Measuring Cylinders	200	210.00
16.	% Voids	Weight/Volume	Measuring Cylinders	200	420.00
17.	% Volume Change	Soaking in NaOH	Resin Column	200	410.00
18.	% H <sup>+</sup>	Soaking in HCl	Resin Column	200	830.00

Sample quantity required for routing analysis : 1 liter moist resin in sealed plastic jar.

#### IV. Activated Carbon

(Testing as per Indian Standards)

S.No.	Nature of Test	Test Method	Instrument	Sample Size (ml)	Test Fee (Rs.)
1.	pH Value	1:5 Caron/Water Suspension	pH Meter	25	240.00
2.	Moisture Content	Gravimetric	Hot Air Oven	25	310.00
3.	Ash Content	Ignition	Muffle Furnace	25	440.00
4.	Water Soluble Matter	Gravimetric	Electronic Balance	25	520.00
5.	Acid Soluble Matter	Gravimetric	Electronic Balance	25	600.00
6.	Fines	Screening	British Standard Sieves	200	210.00
7.	Particle Size	Screening	British Standard Sieves	500	670.00
8.	Decolorizing Power	Titrimetric (Methylene Blue)	Titration	25	410.00
9.	Iron Content	Colorimetric (Phenanthroline)	UV-Visible Spectrophotometer	25	620.00
10.	Chloride Content	Argentometric Titration	Titration	25	620.00
11.	Sulfate Content	Turbidimetric	UV-Visible Spectrophotometer	25	620.00
12.	Surface Area	Ethylene Glycol	Hot Air Oven	25	540.00
13.	Acetic Acid Adsorption Capacity	Titrimetric	Glass Columns	50	830.00
14.	Cl <sub>2</sub> /Chloramine Adsorption Capacity	Titrimetric	Glass Columns	50	980.00

Sample quantity required for routing analysis : 1 kg in sealed polythene bag.

## V. Filtering Sand

(Testing as per Indian Standards)

S.No.	Nature of Test	Test Method	Instrument	Sample Size (ml)	Test Fee (Rs.)
1.	pH Value	1:5 Sand/Water Suspension	pH Meter	50	240.00
2.	Specific Gravity	Weight/Volume	Measuring Cylinder	200	210.00
3.	Impurities	Gravimetric	Electronic Balance	50	210.00
4.	Acid Soluble Matter	Gravimetric	Electronic Balance	50	600.00
5.	Loss on Ignition	Gravimetric	Muffle Furnace	50	440.00
6.	Effective Size	Screening	British Standard Sieves	500	670.00
7.	Silica Content	Colorimetric (Molybdosilicate)	UV-Visible Spectrophotometer	50	620.00

Sample quantity required for routing analysis : 1 kg in sealed polythene bag.

## VI. Ambient Air/stack Gases Monitoring

(Testing as per CPCB/EPA Method)

S.No.	Nature of Test	Test Method	Instrument	Sample Size (ml)	Test Fee (Rs.)
1.	Stack Monitoring inclusive of following parameters.				480.00
	- SPM	Gravimetric	Hot Air Oven, Thimbles	N/A	
	- NO <sub>2</sub>	Colorimetric (NEDA)	UV-Visible Spectrophotometer	N/A	
	- SO <sub>2</sub>	Titrimetric	Titration	N/A	
2.	Every Additional Stack Monitoring				2400.00
3.	Ambient Air Monitoring for SPM				4000.00

\* TA/DA and transportation cost will be extra

### Note :

1. A minimum size of sample as given in the schedule is must to ensure reliable and accurate test results.
2. The sample must be random and representative of the bulk. Alternatively, we can send our chemist for sample collection on chargeable basis.
3. For further details contact Officer I/C, Environmental Laboratory.