Laboratory	**Laboratory, Creative Enviro Services, 42, Doorsanchar Nagar, E-8, Arera Colony, Bhopal, Madhya Pradesh**		
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Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection

CHEMICAL TESTING

I.	**WATER**			
1.	**Surface Water Ground Water Drinking Water Packaged Drinking Water**	pH	APHA (23rd Edition) 4500-H^+B: 2017 Electrometric Method	2 to 12
		Total Solids	APHA, (23rd Edition), 2540B: 2017, Gravimetric Method	2 mg/l to 10000 mg/l
		Total Dissolved Solids	APHA, (23rd Edition), 2540C: 2017, Gravimetric Method	2 mg/l to 10000 mg/l
		Total Suspended Solids	APHA, (23rd Edition), 2540D 2017, Gravimetric Method	2 mg/l to 1000 mg/l
		Electrical conductivity	APHA, (23rd Edition), 2510 B: 2017, by Conductivity meter	0.1 µS/cm to 2000 µS/cm
		Turbidity	APHA, (23rd Edition), 2130 B: 2017, Nephelometric Method,	0.1 NTU to 100 NTU
		Total alkalinity (as $CaCO_3$)	APHA, (23rd Edition), 2320 B: 2017, Titrimetric Method	2 mg/l to 1000 mg/l
		Total hardness (as $CaCO_3$)	APHA, (23rd Edition), 2340 C, 2017, EDTA Titrimetraic Method	2 mg/l to 1000 mg/l
		Calcium hardness (as $CaCO_3$)	APHA, (23rd Edition), 3500 CaB: 2017, EDTA Titrimetric Method	2 mg/l to 1000 mg/l
		Magnesium hardness (as $CaCO_3$)	APHA, (23rd Edition), 2340 B, 2017, Calculation Method	2 mg/l to 1000 mg/l

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
		Chloride (as Cl)	APHA, (23rd Edition), 4500-Cl^- B, 2017, Argentometric Method	1 mg/l to 5000 mg/l
		Sulphate (as SO_4)	APHA, (23rd Edition), 4500E, 2017, Turbidimetric Method	1 mg/l to 200 mg/l
		Residual Chlorine	APHA, (23rd Edition), 4500 Cl B, 2017, Iodometric Method,	1 mg/l to 100 mg/l
		Phosphate (as P)	APHA, (23rd Edition), 4500-PD, 2017, Stannous Chloride Method	0.01 mg/l to 50 mg/l
		Ammonical Nitrogen (as NH_3)	APHA (23rd Edition), 4500-NH_3F, 2017, Phenate Method	0.05 mg/l to 10 mg/l
		Nitrogen Nitrate (as NO_3)	APHA, (23rd Edition), 4500-NO_3B, 2017, UV Spectrophotometeric Method	0.01 mg/l to 25 mg/l
		Nitrogen Nitrite (as NO_2)	APHA, (23rd Edition), 4500-NO_2 B 2017, Colorimetric Method	0.01 mg/l to 25 mg/l
		Iron (as Fe)	APHA, (23rd Edition), 3500 - B, 2017, o-phenanthroline Method	0.05 mg/l to 5 mg/l
		Fluoride (as F)	APHA, (23rd Edition), 4500-F^- D, 2017, SPANDS Method	0.1 mg/l to 10 mg/l
		Dissolved Oxygen	APHA, (23rd Edition), 4500 – OB, 2017, Azide Modification,	0.1 mg/l to 10 mg/l
		Sodium (as Na)	APHA, (23rd Edition), 2017, Flame-photometer Method 3500 Na B	1 mg/l to 500 mg/l

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Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
		Potassium (as K)	APHA, (23rd Edition), 3500 K B, 2017, Flame - Photometer Method	1 mg/l to 500 mg/l
		BOD at 27° C- 3 days	IS 3025, (Part-44): 1993,	2 mg/l to 500 mg/l
		COD	APHA, (23rd Edition), 5220 B, 2017, Open Reflux Method,	4 mg/l to 4000 mg/l
		Oil & Grease	APHA, (23rd Edition), 5520B, 2017, Gravimetric Method	2 mg/l to 1000 mg/l
		Total Kjeldahl Nitrogen	APHA, (23rd Edition), 4500-Norg-B, 2017	5 mg/l to 100 mg/l
		Acidity as $CaCO_3$	APHA (23rd Edition), 2310 B, 2017, Titrimetric Method	2 mg/l to 1000 mg/l
		Copper as Cu	APHA, (23rd Edition), 3500-B, 2017, Neocuproine Method	0.03 mg/l to 5 mg/l
		Chromium as Cr^{+6}	APHA, (23rd Edition), 3500-B, 2017, Colorimetric Method	0.01 mg/l to 1 mg/l
		Manganese	APHA, (23rd Edition), 3500-B, 2017, Persulphate method	0.2 mg/l to 5 mg/l
		Temperature	APHA, (23rd Edition), 2550-B, 2017,	1.0 °C to 100 °C
		Arsenic as As	APHA, (23rd Edition), 3114-B, 2017, Hydride generation/AAS method	0.05 mg/L to 10 mg/L
		Mercury as Hg	APHA, (23rd Edition), 3112 - B, 2017, Cold Vapour/AAS method	0.01 mg/L to 1.0 mg/L
		Lead	APHA, (23rd Edition), 3111-B, 2017, Direct Air Acetylene flame method	0.05 mg/L to 5.0 mg/L

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
		Cadmium	APHA, (23rd Edition), Year 2012, 3111-B, Direct Air Acetylene flame method	0.05 mg/L to 5.0 mg/L
		Zinc	APHA, (23rd Edition), 3111-B, 2017, Direct Air Acetylene flame method	0.05 mg/L to 5.0 mg/L
		Selenium	APHA, (23rd Edition), 3114-C , 2017, continuous Hydride generation/AAS method	0.05 mg/L to 5.0 mg/L
		Nickel	APHA, (23rd Edition), 3111-B, 2017, Direct Air Acetylene flame method	0.05 mg/L to 5.0 mg/L
		Boron	APHA, (23rd Edition), 4500B-C, 2017, Carmine method	0.1 mg/L to 5.0 mg/L
		Total Chromium as Cr	APHA, (23rd Edition), 3111-B, 2017, Direct Air Acetylene flame method	0.05 mg/L to 5.0 mg/L
		Barium	APHA (23rd Edition), 3111-D, 2017, Direct N_2O Acetylene flame method	1 mg/L to 50 mg/L
		Sulphide (as H_2S)	APHA, (23rd Edition), 4500-S^2-F, 2017, Iodometric method	0.1 mg/L to 5.0 mg/L
		Sodium Absorption Ratio	IS 11624-1986	1 meq/l to 25 meq/l
II.	**POLLUTION AND ENVIRONMENT**			
1.	**Waste Water (Effluent/ Sewage)**	pH	APHA (23rd Edition) 4500-H^+B: 2017 Electrometric Method	2 to 12

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
		Total Solids	APHA, (23rd Edition), 2540B: 2017, Gravimetric Method	2 mg/l to 10000 mg/l
		Total Dissolved Solids	APHA, (23rd Edition), 2540C: 2017, Gravimetric Method	2 mg/l to 10000 mg/l
		Total Suspended Solids	APHA, (23rd Edition), 2540D 2017, Gravimetric Method	2 mg/l to 1000 mg/l
		Electrical conductivity	APHA, (23rd Edition), 2510 B: 2017, by Conductivity meter	0.1 µS/cm to 2000 µS/cm
		Turbidity	APHA, (23rd Edition), 2130 B: 2017, Nephelometric Method	0.1 NTU to 100 NTU
		Total alkalinity (as $CaCO_3$)	APHA, (23rd Edition), 2320 B: 2017, Titrimetric Method	2 mg/l to 1000 mg/l
		Total hardness (as $CaCO_3$)	APHA, (23rd Edition), 2340 C, 2017, EDTA Titrimetraic Method	2 mg/l to 1000 mg/l
		Calcium hardness (as $CaCO_3$)	APHA, (23rd Edition), 3500 CaB: 2017, EDTA Titrimetric Method	2 mg/l to 1000 mg/l
		Magnesium hardness (as $CaCO_3$)	APHA, (23rd Edition), 2340 B, 2017, Calculation Method	2 mg/l to 1000 mg/l
		Chloride (as Cl)	APHA, (23rd Edition), 4500-Cl^- B, 2017, Argentometric Method	1 mg/l to 5000 mg/l
		Sulphate (as SO_4)	APHA, (23rd Edition), 4500E, 2017, Turbidimetric Method	1 mg/l to 200 mg/l

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Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
		Residual Chlorine	APHA, (23rd Edition), 4500 Cl B, 2017, Iodometric Method,	1 mg/l to 100 mg/l
		Phosphate (as P)	APHA, (23rd Edition), 4500-PD, 2017, Stannous Chloride Method	0.01 mg/l to 50 mg/l
		Ammonical Nitrogen (as NH_3)	APHA (23rd Edition), 4500-NH_3F, 2017, Phenate Method	0.05 mg/l to 10 mg/l
		Nitrogen Nitrate (as NO_3)	APHA, (23rd Edition), 4500-NO_3B, 2017, UV Spectrophotometeric Method	0.01 mg/l to 25 mg/l
		Nitrogen Nitrite (as NO_2)	APHA, (23rd Edition), 4500-NO_2 B 2017, Colorimetric Method	0.01 mg/l to 25 mg/l
		Iron (as Fe)	APHA, (23rd Edition), 3500 - B, 2017, o-phenanthroline Method	0.05 mg/l to 5 mg/l
		Fluoride (as F)	APHA, (23rd Edition), 4500-F^- D, 2017, SPANDS Method	0.1 to 10 mg/l
		Dissolved Oxygen	APHA, (23rd Edition), 4500 – OB, 2017, Azide Modification	0.1 mg/l to 10 mg/l
		Sodium (as Na)	APHA, (23rd Edition), 2017, Flame-photometer Method 3500 Na B	1 mg/l to 500 mg/l
		Potassium (as K)	APHA, (23rd Edition), 3500 K B, 2017, Flame – photometer Method	1 mg/l to 500 mg/l
		BOD at 27° C- 3 days	IS 3025, (Part-44): 1993,	2 mg/l to 500 mg/l

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Convenor

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Program Director

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
		COD	APHA, (23rd Edition), 5220 B, 2017, Open Reflux Method	4 mg/l to 4000 mg/l
		Oil & Grease	APHA, (23rd Edition), 5520B, 2017, Gravimetric Method	2 mg/l to 1000 mg/l
		Total Kjeldahl Nitrogen	APHA, (23rd Edition), 4500-Norg-B, 2017	5 mg/l to 100 mg/l
		Acidity as $CaCO_3$	APHA (23rd Edition), 2310 B, 2017, Titrimetric Method	2 mg/l to 1000 mg/l
		Copper as Cu	APHA, (23rd Edition), 3500-B, 2017, Neocuproine Method	0.03 mg/l to 5 mg/l
		Chromium as Cr^{+6}	APHA, (23rd Edition), 3500-B, 2017, Colorimetric Method	0.01 mg/l to 1 mg/l
		Manganese	APHA, (23rd Edition), 3500-B, 2017, Persulphate method	0.2 mg/l to 5 mg/l
		Temperature	APHA, (23rd Edition), 2550-B, 2017,	1.0 °C to 100 °C
		Arsenic as As	APHA, (23rd Edition), 3114-B, 2017, Hydride generation/AAS method	0.05 mg/L to 10 mg/L
		Mercury as Hg	APHA, (23rd Edition), 3112 - B , 2017, Cold Vapour/AAS method	0.01 mg/L to 1.0 mg/L
		Lead	APHA, (23rd Edition), 3111-B, 2017, Direct Air Acetylene flame method	0.05 mg/L to 5.0 mg/L
		Cadmium	APHA, (23rd Edition), Year 2012, 3111-B, Direct Air Acetylene flame method	0.05 mg/L to 5.0 mg/L

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
		Zinc	APHA, (23rd Edition), 3111-B, 2017, Direct Air Acetylene flame method	0.05 mg/L to 5.0 mg/L
		Selenium	APHA, (23rd Edition), 3114-C , 2017, continuous Hydride generation/AAS method	0.05 mg/L to 5.0 mg/L
		Nickel	APHA, (23rd Edition), 3111-B, 2017, Direct Air Acetylene flame method	0.05 mg/L to 5.0 mg/L
		Boron	APHA, (23rd Edition), 4500B-C, 2017, Carmine method	0.1 mg/L to 5.0 mg/L
		Total Chromium as Cr	APHA, (23rd Edition), 3111-B, 2017, Direct Air Acetylene flame method	0.05 mg/L to 5.0 mg/L
		Barium	APHA (23rd Edition), 3111-D, 2017, Direct N_2O Acetylene flame method	1 mg/L to 50 mg/L
		Sulphide (as H_2S)	APHA, (23rd Edition), 4500-S^2-F, 2017, Iodometric method	0.1 mg/L to 5.0 mg/L
		Sodium Absorption Ratio	IS 11624-1986	1 meq/l to 25 meq/l
2.	**Hazardous Wastes (Liquid/ Slurry/ Sludge)**	Calorific Value	CES/LAB/ SOP/07 (11), Bomb Calorimeter method	100 cal/g to 10000 cal/g
3.	**Hazardous Wastes (Liquid/ Slurry/ Sludge) TCLP extract (as per USEPA 1311)**	Arsenic as As	APHA, (23rd Edition), 3114-B, 2017, Hydride generation/AAS method	0.05 mg/L to 10 mg/L
		Mercury as Hg	APHA, (23rd Edition), 3112 - B, 2017, Cold Vapour/AAS method	0.01 mg/L to 1.0 mg/L

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
		Lead	APHA, (23rd Edition), 3111-B, 2017, Direct Air Acetylene flame method	0.05 mg/L to 5.0 mg/L
		Cadmium	APHA, (23rd Edition), Year 2012, 3111-B, Direct Air Acetylene flame method	0.05 mg/L to 5.0 mg/L
		Zinc	APHA, (23rd Edition), 3111-B, 2017, Direct Air Acetylene flame method	0.05 mg/L to 5.0 mg/L
		Selenium	APHA, (23rd Edition), 3114-C, 2017, continuous Hydride generation/AAS method	0.05 mg/L to 5.0 mg/L
		Nickel	APHA, (23rd Edition), 3111-B, 2017, Direct Air Acetylene flame method	0.05 mg/L to 5.0 mg/L
		Boron	APHA, (23rd Edition), 4500B-C, 2017, Carmine method	0.1 mg/L to 5.0 mg/L
		Total Chromium as Cr	APHA, (23rd Edition), 3111-B, 2017, Direct Air Acetylene flame method	0.05 mg/L to 5.0 mg/L
		Barium	APHA (23rd Edition), 3111-D, 2017, Direct N_2O Acetylene flame method	1 mg/L to 50 mg/L
4.	**Used/ Waste Oil**	Calorific Value	IS 1448 (Part 6): 1984	100 cal/g to 3000 cal/g
		Ash Content	IS 1448 (Part 4): 1984	0.1 % to 5 %
5.	**Soil**	pH	IS 2720 (Part 26): 1987 Electronic method	2.0 to 14
		Electrical Conductivity	IS 14767:2000	10 µmhos/cm to 3000 µmhos/cm
		Grain Size Analysis (2 mm, 710 µ & 425 µ)	IS 2720 (Part 4): 1985	1 % to 100 %
		Water Content	IS 2720 (Part 2): 1973	1 % to 50 %

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
		Calcium carbonate as (CaC03)	IS 2720 (Part 23): 1976	1 % to 50 %
		Total Soluble Sulphate	IS 2720 (Part 27): 1977 Colorimetric method	0.1 % to 15 %
		Organic Carbon	IS 2720 (Part 22): 1972	0.1 % to 5.0 %
		Available Phosphorus	CES/LAB/SOP/05 (13) Based on method manual soil testing in India (Department of Agricultural & Cooperation, GOI)	10 kg/ha to 300 kg/ha
		Available Potassium as K	CES/LAB/ SOP/05 (14) Based on method manual soil testing in India (Department of Agricultural & Cooperation, GOI)	10 kg/ha to 300 kg/ha
		Available Nitrogen as N	IS- 14684:1999 (RA2014)	10 kg/ha to 300 kg/ha
		Water Holding Capacity	CES/LAB/ SOP/05 (15) Based on method manual soil testing in India (Department of Agricultural & Cooperation, GOI)	1 % to 50 %
		Organic Matter	IS 2720 (Part 22): 1972	0.1 % to 5 %
		Total Soluble Solid	IS 2720 (Part 21): 1977 (RA 2016)	0.1 % to 5 %
6.	**Treated Effluent**	Survival of fish after 96 hours in 100 percent treated effluent	APHA edition 23rd 2012, 8010- D	1.0 % to 100 %
III.	**ATMOSPHERIC POLLUTION**			
1.	**Ambient Air**	PM_{10}	IS 5182 (Part 23): 2006	4 g/m^3 to 1000 g/m^3
		$PM_{2.5}$	CES/LAB/SOP/ 03 (air) (02) based on Guidelines for the measurement of	2 g/m^3 to 250 g/m^3

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Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
			Ambient Air Pollutants volume –I	
		SO_2	IS 5182 (Part 2): 2001	4 $g/m^3$to 200 g/m^3
		NO_2	IS 5182 (Part 6): 2006 Colorimetric Method	5 g/m^3 to 740 g/m^3
		Ozone	IS: 5182 (part 9) 2014	5.0 ug/m^3 to 100 ug/m^3
		Ammonia	CES/LAB/ SOP/03 (air) (11) Indophenol method (Method 401, method of Air Sampling and Analysis, 3rd Edition) reprint 2016	5 ug/m^3 to 100 ug/m^3
		Lead	IS 5182 (Part 22): 2004	0. 05 ug/m^3 to 5.0 ug/m^3
		Total Volatile organic Compounds (as Isobutylene)	CES/LAB/ SOP/ 03 (12) (Air) using VOC monitor instrument	1 ug/m^3 to 1000 ug/m^3
		Carbon monoxide	IS 5182 (Part 10): 1999 (Indicator tube method)	1 mg/m^3 to 30 mg/m^3
2.	**Stack Emission (Process/ Vent / DG)**	Particulate Matter	IS 11255 (Part 1): 1985 (RA 2003)	4 mg/Nm^3 to 1000 mg/Nm^3
		Sulphur Di oxide	IS 11255 (Part 2): 1985 (RA 2003) Titration method	1 mg/Nm^3 to 250 mg/Nm^3
		Oxides of Nitrogen	IS 11255 (Part 7): 2005 Colorimetric Method	2 mg/Nm^3 to 400 mg/Nm^3
3.	**Ambient Noise Level (excluding vibration)**	L_{eq} (equivalent noise level)	CES/LAB/SOP/ 04	30 to 130 dB(A)
4.	**Source (DG/ Traffic/ Machine) Noise Level (Excluding Vibration)**	Sound pressure level	CES/LAB/SOP/ 04	30 to 130 dB(A)

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