Laboratory	**Coastal Waste Management Project-Laboratory, RD. No. 20/5, JNPC, Parawada Mandal, Visakhapatnam, Andhra 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

CHEMICALTESTING

I.	**POLLUTION AND ENVIRONMENT**			
1.	**Waste Water**	pH	APHA 23rd Ed., 4500 H^+ B (Electrometric Method)	1 to13.0
		Temperature	APHA 23rd Ed.; 2550 –A, B (Glass or Electronic Thermometer method)	0 to 100 °C
		Conductivity	APHA 23rd Ed.; 2510 B (Laboratory Method)	2 µS/cm to100000 µS/cm
		Acidity as $CaCO_3$	APHA 23rd Ed.; 2310 B (Titration Method)	10 mg/L to 10000 mg/L
		Alkalinity as $CaCO_3$	APHA 23rd Ed.; 2320 B (Titration Method)	10 mg/L to 30000 mg/L
		Total Solids	APHA 23rd Ed.; 2540 B (Gravimetric Method)	10 mg/L to 100000 mg/L
		Total Dissolved Solids	APHA 23rd Ed.; 2540 C (Gravimetric Method)	10 mg/L to 100000 mg/L
		Total Suspended Solids	APHA 23rd Ed.; 2540 D (Gravimetric Method)	10 mg/L to 5000 mg/L
		Fixed Solids	APHA 23rd Ed.; 2540 E (Gravimetric Method)	10 mg/L to 50000 mg/L
		Volatile Solids	APHA 23rd Ed.; 2540 E (Gravimetric Method)	10 mg/L to 10000 mg/L
		Chlorides as Cl^-	APHA 23rd Ed.; 4500 Cl^- C (Mercuric Nitrate Method)	10 mg/L to 50000 mg/L
		Sulphates as SO_4^{-2}	APHA 23rd Ed.4500 $SO4^{-2}$ D (Gravimetric Method)	20 mg/L to 10000 mg/L
		Sulphide as H_2S	APHA 23rd Ed.4500 S^2 F (Iodometric Method)	10 mg/L to 5000 mg/L

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Convenor

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Program Director

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		Sulphite as SO_3^{-2}	APHA 23rd Ed.; 4500 $SO3^{-2}$, B (2017) (Iodometric Method)	10 mg/L to 10000 mg/L
		Nitrate Nitrogen as N	APHA 23rd Ed.; 4500 NO_3–E (Spectrophotometric Method)	1 mg/L to 1000 mg/L
		Nitrite Nitrogen as N	APHA 23rd Ed.; 4500 NO_2 – B (UV–Screening Method)	0.2 mg/L to 1000 mg/L
		Ammonical Nitrogen as N	APHA 23rd Ed.; 4500 NH3 B, C (Distillation & Titrimetric Method)	1 mg/L to 1000 mg/L
		Nitrogen (Organic) as N	APHA 23rd Ed.; 4500 N (org) B (Macro–Kjeldahl Method)	1 mg/L to 1000 mg/L
		Fluorides as F^-	APHA 23rd Ed.; 4500 F– D (Spectrophotometric Method)	0.2 mg/L to 1000 mg/L
		Residual Chlorine as Cl	APHA 23rd Ed.; 4500 Cl B (Iodometric Method)	1 mg/L to 100 mg/L
		Cyanides Total as CN^-	APHA 23rd Ed.; 4500 CN– C, E (Spectrophotometric Method)	0.2 mg/L to 1000 mg/L
		Total Hardness as $CaCO_3$	APHA 23rd Ed.; 2340 C (EDTA Titrimetric Method)	10 mg/L to 50000 mg/L
		Phosphorus as P	APHA 23rd Ed.; 4500 P C (Spectrophotometric Method)	1 mg/L to 10000 mg/L
		Dissolved Oxygen	APHA 23rd Ed.; 4500 O C (Azide Modification Method)	1 mg/L to 9 mg/L

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		Oil & Grease	APHA 23rd Ed.;5520 B (Gravimetric Method)	10 mg/L to 10000 mg/L
		Chemical Oxygen Demand	APHA 23rd Ed.; 5220 B (Open reflux Method)	10 mg/L to 100000 mg/L
		Biochemical Oxygen Demand 3 Days at 27°C	IS : 3025 (Part 44) (Titrimetric Method)	4 mg/L to 50000 mg/L
		Calcium as Ca	APHA 23rd Ed.; 3500 Ca B (EDTA Titrimetric Method)	10 mg/L to 30000 mg/L
		Magnesium as Mg	APHA 23rd Ed.; 3500–Mg B (Calculation Method)	10 mg/L to 2000 mg/L
		Sodium as Na	APHA 23rd Ed.;; 3500 Na B (Flame Photometric Method)	1 mg/L to 1000 mg/L
		Potassium as K	APHA 23rd Ed.;; 3500 K B (Flame Photometric Method)	1 mg/L to 1000 mg/L
		Cadmium Cd	APHA 23rd Ed.; 3111 B, AAS	0.1 mg/L to 1000 mg/L
		Total Chromium as Cr	APHA 23rd Ed.; 3111 B, AAS	0.5 mg/L to 1000 mg/L
		Hexavalent Chromium as Cr^{+6}	APHA 23rd Ed.; 3500 Cr B (Spectrophotometric Method)	0.1 mg/L to 100 mg/L
		Iron as Fe	APHA 23rd Ed.; 3111 B, AAS	0.1 mg/L to 1000 mg/L
		Lead as Pb	APHA 23rd Ed.; 3111 B, AAS	0.3 mg/L to 1000 mg/L
		Nickel as Ni	APHA 23rd Ed.; 3111 B, AAS	0.5 mg/L to 1000 mg/L
		Silica as SiO_2	APHA 23rd Ed.; 4500 SiO_2 C (Spectrophotometric Method)	0.5 mg/L to 1000 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
		Zinc as Zn	APHA 23rd Ed.; 3111 B, AAS	0.5 mg/L to 1000 mg/L
		Copper as Cu	APHA 23rd Ed.; 3111 B, AAS	0.3 mg/L to 1000 mg/L
		Turbidity	APHA 23rd Ed.; 2130 B (Nephlometric Method)	0.05 NTU to 100 NTU
		Arsenic	APHA 23rd Ed.; 3500 As B, (Spectrophotometric Method)	0.1 mg/L to 100 mg/L
2.	**Hazardous Waste**	pH	USEPA; 9045 C, (1995) (Electrometric Method)	1 to 13.0
		Bulk Density	ASTM D 5057–10, (Gravimetric Method)	0.2 g/cc to 3 g/cc
		Calorific Value	IS 1350(part–II), (Bomb Calorimeter Method)	200 cal/g to 15000 cal/g
		Flash Point	USEPA;1020 A (Closed cup Method)	Ambient -110 ^{o}C
		Moisture content	IS 2362 (Karl Fisher Titration Method)	0.1 to 92
		Loss on drying at 105^{o}C	APHA 23rd Ed. 2540 G	1 % to 90%
		Loss on ignition at 550^{o}C	APHA 23rd Ed. 2540 G	1 % to 99%
		Paint Filter Liquid Test	USEPA–9095 A (Filtration Method)	Qualitative
		Reactive Cyanide as HCN	USEPA 9010 B (Distillation) APHA 23rd Ed.; 4500 CN– E (Spectrophotometric Method)	1 mg/kg to 1000 mg/kg
		Total Cyanide as CN^{-}	USEPA; 9010 C APHA 23rd Ed; 4500 CN^{-} E (Spectrophotometric Method)	1 mg/kg to 5000 mg/kg

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
		Test for Cyanide	CPCB TSDF Protocol (Extraction) APHA 23rd Ed.; 4500 CN^- K (Spot identification)	Qualitative
		Total Sulfide as H_2S	USEPA 9030B (Distillation) USEPA 9034 (Iodometric Method)	10 mg/kg to 10000 mg/kg
		Reactive Sulfide as H_2S	USEPA 9030B (Distillation) USEPA 9034 (Iodometric Method)	10 mg/kg to 10000 mg/kg
		Test for sulfide	CPCB TSDF Protocol (Extraction) APHA 23rd Ed.;4500 S^{2-}	Qualitative (Spot identification)
		Ammonical Nitrogen as N	APHA 23rd Ed; 4500 NH_3 B, C (Distillation & Titrimetric Method)	1 mg/L to 1000 mg/L
		Extractable organics	USEPA– 3540 C (Soxhlet Extraction Method)	1 % to 95 %
		Water soluble inorganics	APHA 23rd Ed.; 2540 B&E (Gravimetric Method)	1 % to 99 %
		Water soluble organics	APHA 23rd Ed.2540 B&E (Gravimetric Method)	1 % to 99 %
		Cadmium as Cd	USEPA–3050B (Acid Digestion) USEPA7000B, AAS	1 mg/kg to 5000 mg/kg
		Copper as Cu	USEPA–3050B (Acid Digestion) USEPA7000B, AAS	5 mg/kg to 5000 mg/kg

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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
		Hexavalent Chromium as Cr^{+6}	USEPA–3050B (Acid Digestion) USEPA 1998, SW–846; 7196A (Spectrophotometric Method)	5 mg/kg to 5000 mg/kg
		Iron as Fe	USEPA–3050B (Acid Digestion) USEPA7000B, AAS	5 mg/kg to 5000 mg/kg
		Lead as Pb	USEPA–3050B (Acid Digestion) USEPA7000B, AAS	10 mg/kg to 5000 mg/kg
		Nickel as Ni	USEPA–3050B (Acid Digestion) USEPA7000B, AAS	5 mg/kg to 5000 mg/kg
		Zinc as Zn	USEPA–3050B (Acid Digestion) USEPA7000B, AAS	5 mg/kg to 5000 mg/kg
		Arsenic as As	USEPA–3050B APHA– 3500 As B (Spectrophotometric Method)	10 mg/kg to 10000 mg/kg
		Metals in TCLP Leachate		
		Arsenic as As	USEPA 1311 (Extraction) APHA23rd Ed. 3500 As B (Spectrophotometric Method)	0.1 mg/L to 100 mg/L
		Cadmium as Cd	USEPA 1311 (Extraction) USEPA7000B, AAS	0.1 mg/L to 1000 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
		Total Chromium as Cr	USEPA 1311 (Extraction) USEPA7000B , AAS	0.5 mg/L to 1000 mg/L
		Hexavalent Chromium as Cr^{+6}	USEPA 1311 (Extraction) APHA 23rd Ed.; 3500 Cr B, (Spectrophotometric Method)	0.2 mg/L to 100 mg/L
		Iron as Fe	USEPA 1311 (Extraction) USEPA7000B , AAS	1 mg/L to 100 mg/L
		Lead as Pb	USEPA 1311 (Extraction) USEPA7000B, AAS	0.3 mg/L to 100 mg/L
		Nickel as Ni	USEPA 1311 (Extraction) USEPA7000B, AAS	0.5 mg/L to 100 mg/L
		Copper as Cu	USEPA 1311 (Extraction) USEPA7000B, AAS	0.3 mg/L to 100 mg/L
		Zinc as Zn	USEPA 1311 (Extraction) USEPA7000B, AAS	1 mg/L to 100 mg/L
		Metal s in water leachate		
		Arsenic as As	CPCB TSDF Protocol (Extraction) APHA ; 3500 As B, (Spectrophotometric Method)	0.1 mg/L to 100 mg/L
		Cadmium as Cd	CPCB TSDF Protocol (Extraction) USEPA–7000B, AAS	0.1 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
		Total Chromium as Cr	CPCB TSDF Protocol (Extraction) USEPA–7000B, AAS	0.5 mg/L to 1000 mg/L
		Hexavalent Chromium as Cr^{+6}	CPCB TSDF Protocol (Extraction) APHA ; 3500 Cr B, (Spectrophotometric Method)	0.2 mg/L to 100 mg/L
		Iron as Fe	CPCB TSDF Protocol (Extraction) USEPA–7000B, AAS	1 mg/L to 100 mg/L
		Lead as Pb	CPCB TSDF Protocol (Extraction) USEPA–7000B, AAS	0.3 mg/L to 100 mg/L
		Nickel as Ni	CPCB TSDF Protocol (Extraction) USEPA–7000B, AAS	0.5 mg/L to 100 mg/L
		Copper as Cu	CPCB TSDF Protocol (Extraction) USEPA–7000B, AAS	0.3 mg/L to 100 mg/L
		Zinc as Zn	CPCB TSDF Protocol (Extraction) USEPA–7000B, AAS	1 mg/L to 100 mg/L
II.	**WATER**			
1.	**Ground Water**	pH	APHA 23rd Edition 4500 H^+ B (Electrometric Method)	1 to 13.5
		Temperature	APHA 23rd Edition 2550 –A, B (Glass or Electronic Thermometer method)	0 to 100 °C

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		Conductivity	APHA 23rd Ed,; 2510 B (Laboratory Method)	2 µS/cm to 10000 µS/cm
		Acidity as $CaCO_3$	APHA 23rd Ed., 2310 B (Titrimetric Method)	10 mg/L to 1000 mg/L
		Alkalinity as $CaCO_3$	APHA 23rd Ed. 2320 B (Titrimetric Method)	10 mg/L to 3000 mg/L
		Total Solids	APHA 23rd Ed. 2540 B (Gravimetric Method)	10 mg/L to 10000 mg/L
		Total Dissolved Solids	APHA 23rd Ed. 2540 C (Gravimetric Method)	10 mg/L to 10000 mg/L
		Total Suspended Solids	APHA 23rd Ed.; 2540 D (Gravimetric Method)	10 mg/L to 1000 mg/L
		Fixed Solids	APHA 23rd Ed; 2540 E (Gravimetric Method)	10 mg/L to 5000 mg/L
		Volatile Solids	APHA 23rd Ed.; 2540 E (Gravimetric Method)	10 mg/L to 1000 mg/L
		Chlorides as Cl^-	APHA 23rd Ed.; 4500 Cl^- B, (Mercuric Nitrate Method)	10 mg/L to 1000 mg/L
		Sulphates as SO_4^{-2}	APHA 23rd Ed.; 4500 SO_4^{-2} D (Gravimetric Method)	20 mg/L to1000 mg/L
		Sulphide as S^{-2}	APHA 23rd Ed. 4500 S^2 F, (Iodometric Method)	10 mg/L to100 mg/L
		Sulphite as SO_3^{-2}	APHA 23rd Ed. 4500 SO_3^{-2} B, (Iodometric Method)	10 mg/L to100 mg/L
		Nitrate Nitrogen as N	APHA 23rd Ed. 4500 NO_3^-B (Spectrophotometric Method)	1 mg/L to 1000 mg/L
		Nitrite Nitrogen as N	APHA 23rd Ed.; 4500 NO_2 –B (UV–Screening Method)	0.2 mg/L to 1000 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
		Nitrogen (Ammonia) as N	APHA 23rd Ed. 4500 NH_3 B C (Distillation & Titrimetric Method)	1 mg/L to 1000 mg/L
		Nitrogen (Organic) as N	APHA 23rd Ed. 4500 N (org) B, (Macro–Kjeldahl Method)	1 mg/L to 1000 mg/L
		Fluorides as F^-	APHA 23rd Ed; 4500 F^- D (SPADNS Method)	0.2 mg/L to 100 mg/L
		Residual Chlorine as Cl	APHA 23rd Ed. 4500 Cl B (Iodometric Method)	1 mg/L to 100 mg/L
		Cyanides Total as CN^-	APHA 23rd Ed. 4500 CN^- C, E, (Distillation & Spectrophotometric Method)	0.2 mg/L to 100 mg/L
		Total Hardness as $CaCO_3$	APHA 23rd Ed. 2340 C (EDTA Titration Method)	10 mg/L to 5000 mg/L
		Phosphorus as P	APHA 23rd Ed. 4500 P C (Spectrophotometric Method)	1 mg/L to 100 mg/L
		Dissolved Oxygen	APHA 23rd Ed. 4500 O C (Azide Modification Method)	1 mg/L to 9.0 mg/L
		Oil & Grease	APHA 23rd Ed. 5520 B (Gravimetric Method)	10 mg/L to 100 mg/L
		Chemical Oxygen Demand	APHA 23rd Ed.5220 B (Open Reflux Method)	10 mg/L to 5000 mg/L
		Biochemical Oxygen Demand 3 Days at 27°C	IS : 3025 (Part 44) (Titrimetric Method)	4 mg/L to 2000 mg/L
		Calcium as Ca	APHA 23rd Ed.3500 Ca B (EDTA Titrimetric Method)	10 mg/L to 3000 mg/L
		Magnesium as Mg	APHA 23rd Ed.; 3500–Mg B (Calculation Method)	10 mg/L to 2000 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
		Sodium as Na	APHA 23rd Ed.3500 Na B (Flame Photometric Method)	1 mg/L to 1000 mg/L
		Potassium as K	APHA 23rd Ed.; 3500 K B (Flame Photometric Method)	1 mg/L to 1000 mg/L
		Silica as SiO_2	APHA 23rd Ed.4500 SiO_2 C (Spectrophotometric Method)	0.5 mg/L to 100 mg/L
		Turbidity	APHA 23rd Ed.; 2130 B (Nephlometric Method)	0.05 NTU to 100 NTU
III.	**RESIDUES IN WATER**			
1.	**Trace Metal Elements**	Cadmium Cd	APHA 23rd Ed.3111 B, AAS	0.1 mg/L to 100 mg/L
		Total Chromium as Cr	APHA 23rd Ed. 3111 B, AAS	0.5 mg/L to 100 mg/L
		Hexavalent Chromium as Cr^{+6}	APHA 23rd Ed.3500 Cr B (Spectrophotometric Method)	0.1 mg/L to 100 mg/L
		Iron as Fe	APHA 23rd Ed.3111 B, AAS	0.1 mg/L to 100 mg/L
		Lead as Pb	APHA 23rd Ed.3111 B, AAS	0.3 mg/L to 100 mg/L
		Nickel as Ni	APHA 23rd Ed.3111 B, AAS	0.5 mg/L to 100 mg/L
		Zinc as Zn	APHA 23rd Ed.3111 B, AAS	1 mg/L to 100 mg/L
		Copper as Cu	APHA 23rd Ed.3111 B (2017), AAS	0.3 mg/L to 100 mg/L
IV.	**ATMOSPHERIC POLLUTION**			
1	**Ambient Air**	Sulphur Dioxide	IS 5182 (Part 2) (Improved West & Geake Method)	6 µg/m^3 to 1050 µg/m^3
		Oxides of Nitrogen	IS 5182 (Part 6) (Modified Jacob &Hochheiser Method)	6 µg/m^3 to 750 µg/m^3
		Respirable Suspended Particulate Matter (PM_{10})	IS 5182 (Part 23) (Gravimetric Method)	5 µg/m^3 to 1000 µg/m^3