

Laboratory **Life Shell Labs India Private Ltd., No. 20, Nehru Street, Maruthi Nagar, Phase-1, Iyyappanthangal, Chennai, Tamil Nadu**

Accreditation Standard **ISO/IEC 17025: 2005**

Certificate Number **TC-7602**

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Validity **25.07.2018 to 24.07.2020**

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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
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BIOLOGICAL TESTING

I.	WATER			
1.	Drinking Water	Total Viable Colony Count @ 37°C for 24 hrs	IS 5402	≥ 1 CFU/ml
		Total Viable Colony Count @ 22°C for 72 hrs	IS 5402	≥ 1 CFU/ml
		Yeast & Mould Count	IS 5403	Qualitative Present/Absent/250ml
		Coliforms	IS 15185; IS 5401	Qualitative Present/Absent/250ml
		E. coli (Thermotolerant Bacteria)	IS 15185; IS 5887(Part 1)	Qualitative Present/Absent/250ml
		Staphylococcus aureus	IS 5887 (Part 2)	Qualitative Present/Absent/250ml
2.	Drinking Water and Ground Water	Total Coliforms	IS 1622; APHA	2 to 1600 MPN /100ml 1.8 to 1600 MPN /100ml
		Fecal Coliforms	IS 1622; APHA	2 to 1600 MPN /100ml 1.8 to 1600MPN /100ml
		E. coli	IS 1622; APHA	2 to 1600 MPN /100ml 1.8 to 1600MPN /100ml
3.	Water for Processed food Industry	Standard Plate Count	IS 1622	≥ 1 CFU/ml
		Total Coliforms	IS 1622	2 to 1600 MPN /100ml
		Proteolytic & Lipolytic Bacterial Count	IS 4251	≥ 1 CFU/ml
4.	Water for Swimming Pools	Standard Plate Count	IS 3328 Annex A	≥ 1 CFU/ml
		Coliforms	IS 1622	2 to 1600 MPN /100ml
II.	POLLUTION AND ENVIRONMENT			
1.	Effluent Water and Sewage Water	Heterotrophic plate Count	APHA	≥1 CFU/ml
		Coliforms	APHA	1.8 to 1600 MPN /100ml
		Fecal Coliforms	APHA	1.8 to 1600 MPN /100ml

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		E. coli	APHA	1.8 to 1600 MPN /100ml
		Fecal streptococci	APHA	1.8 to 1600 MPN /100ml
2.	Microbiological Monitoring of Environmental Samples			
A.	Swab Method	Total Plate Count	APHA	≥10 CFU/25 cm ²
		Yeast & Mold		≥10 CFU/25 cm ²
		Coliforms		Absent/Present /25cm ²
		Staphylococcus aureus		Absent/Present /25cm ²
B.	Plate Exposure Method	Total Plate Count	APHA	≥10 CFU/25 cm ²
		Yeast & Mould		≥10 CFU/25 cm ²
		Total Coliforms		Absent/Present / plate
		Staphylococcus aureus		Absent/Present / plate

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CHEMICAL TESTING

I.	WATER			
1.	Surface Water, Ground Water and Irrigation Water	Colour	IS 3025 (Part 4)	1 to 100 Hazen Unit
		pH @ 25°C	IS 3025 (Part 11)	2 to 13
		Electrical Conductivity	IS 3025 (Part 14)	1 µmhos/cm to 15000 µmhos/cm
		Turbidity	IS 3025 (Part 10)	0.5 NTU to 200 NTU
		Oil and Grease	IS 3025 (Part 39); APHA	2 mg/L to 500 mg/L
		Total Suspended Solids (TSS)	IS 3025 (Part 17)	1 mg/L to 600 mg/L
		Total Dissolved Solids (TDS)	IS 3025 (Part 16)	1 mg/L to 10000 mg/L
		Total Hardness as CaCO ₃	IS 3025 (Part 21)	1 mg/L to 2000 mg/L
		Total Alkalinity as CaCO ₃	IS 3025 (Part 23)	1 mg/L to 3000 mg/L
		Acidity as CaCO ₃	IS 3025 (Part 22)	1 mg/L to 500 mg/L
		Chloride as Cl ⁻	IS 3025 (Part 32)	1 mg/L to 2000 mg/L
		Sulphate as SO ₄ ²⁻	APHA	1 mg/L to 1000 mg/L
		Chlorine Residual	IS 3025 (Part 26)	0.2 mg/L to 100 mg/L
		Total Phosphorous as PO ₄	IS 3025 (Part 31)	0.1 mg/L to 20 mg/L
		Reactive Silica	IS 3025 (Part 35)	0.04 mg/L to 200 mg/L
		Fluoride as F ⁻	APHA	0.1 mg/L to 10 mg/L
		Total Kjeldahl Nitrogen as N	IS 3025 (Part 34)	1 mg/L to 100 mg/L
		Ammonical Nitrogen as NH ₄ - N ⁺	IS 3025 (Part 34)	1 mg/L to 50 mg/L
		Ammonia as NH ₃	IS 3025 (Part 34); APHA	0.1 mg/L to 20 mg/L
		Nitrate as NO ₃ ²⁻	APHA	0.5 mg/L to 100 mg/L
Nitrite as NO ₂ ⁻	IS 3025 (Part 34)	0.01 mg/L to 10 mg/L		
Sulphide as S ²⁻	IS 3025 (Part 29)	0.5 mg/L to 20 mg/L		
Dissolved Oxygen	IS 3025 (Part 38)	0.2 mg/L to 10 mg/L		

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		Chemical Oxygen Demand (COD)	IS 3025 (Part 58); APHA	4 mg/L to 2000 mg/L
		Bio Chemical Oxygen Demand (BOD) - 3 days @ 27°C	IS 3025 (Part 44)	2 mg/L to 200 mg/L
		Sodium as Na ⁺	IS 3025 (Part 45)	1 mg/L to 300 mg/L
		Potassium as K ⁺	IS 3025 (Part 45)	1 mg/L to 100 mg/L
2.	Water for Construction Purpose	pH @ 25°C	IS 3025 (Part 11)	2 to 13
		Chloride as Cl ⁻	IS 3025 (Part 32)	1 mg/L to 2000 mg/L
		Sulphate as SO ₄ ²⁻	APHA	1 mg/L to 1000 mg/L
		Suspended Matter	IS 3025 (Part 17)	1 mg/L to 3000 mg/L
		Acidity- To neutralize 100ml sample of water using phenolphthalein indicator with 0.02 N NaOH	IS 3025 (Part 22)	1ml to 25 ml
		Alkalinity- To neutralize 100 ml sample of water using mixed indicator with 0.02 N. H ₂ SO ₄	IS 3025 (Part 23)	1 ml to 100 ml
		Organic Solids	IS 3025 (Part 18)	2 mg/L to 1000 mg/L
		Inorganic Solids	IS 3025 (Part 18)	2 mg/L to 10000 mg/L
3.	Water for Swimming Pools	Colour	IS 3025 (Part 4)	1 to 100 Hazen Unit
		pH @ 25°C	IS 3025 (Part 11)	2 to 13
		Turbidity	IS 3025 (Part 10)	0.5 NTU to 200 NTU
		Total Dissolved Solids (TDS)	IS 3025 (Part 16)	1 mg/L to 5000 mg/L
		Total Alkalinity as CaCO ₃	IS 3025 (Part 23)	1 mg/L to 1000 mg/L
		Chloride as Cl ⁻	IS 3025 (Part 32)	1 mg/L to 1000 mg/L
		Chlorine Residual	IS 3025 (Part 26)	0.5 mg/L to 100 mg/L
		Oxygen Observed in 4 hrs	IS 3025 (Part 63)	0.2 mg/L to 10 mg/L
4.	Drinking Water	Colour	IS 3025 (Part 4)	1 to 100 Hazen Unit
		pH @ 25°C	IS 3025 (Part 11)	2 to 13
		Turbidity	IS 3025 (Part 10)	0.5 NTU to 200 NTU
		Electrical Conductivity	IS 3025 (Part 14)	1 to 30000 µmhos/cm

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		Total Dissolved Solids (TDS)	IS 3025 (Part 16)	1 mg/L to 2500 mg/L
		Total Hardness as CaCO ₃	IS 3025 (Part 21)	1 mg/L to 2000 mg/L
		Total Alkalinity as CaCO ₃	IS 3025 (Part 23)	1 mg/L to 3000 mg/L
		Chloride as Cl ⁻	IS 3025 (Part 32)	1 mg/L to 2000 mg/L
		Sulphate as SO ₄ ²⁻	APHA	1 mg/L to 1000 mg/L
		Chlorine Residual	IS 3025 (Part 26)	0.1 mg/L to 2.0 mg/L
		Sulphide as S ²⁻	IS 3025 (Part 29)	0.1 mg/L to 1.0 mg/L
		Fluoride as F ⁻	IS 3025 (Part 60); APHA	0.1 mg/L to 5 mg/L
		Ammoniacal Nitrogen as NH ₃ -N ⁺	IS 3025 (Part 34); APHA	0.1 mg/L to 20 mg/L
		Nitrate as NO ₃ ⁻	APHA	0.5 mg/L to 100 mg/L
		Reactive Silica	IS 3025 (Part 35)	0.04 mg/L to 100 mg/L
II.	RESIDUE IN WATER			
1.	Drinking Water, Ground Water, Swimming Pool Water, Wastewater	Magnesium as Mg	IS 3025 (Part 46)	0.20 mg/L to 1000 mg/L
		Iron as Fe	IS 3025 (Part 53)	0.01 mg/L to 20 mg/L
		Boron as B	IS 3025 (Part 57)	0.1 mg/L to 5.0 mg/L
		Hexavalent Chromium Cr ⁶⁺	IS 3025 (Part 52)	0.1 mg/L to 20 mg/L
		Aluminum as Al	IS 3025 (Part 55)	0.02 mg/L to 2.0 mg/L
		Manganese as Mn	IS 3025 (Part 59)	0.5 mg/L to 20 mg/L
III.	POLLUTION & ENVIRONMENT			
1.	Waste Water (Sewage/ Effluent)	Colour	IS 3025 (Part 4)	2 to 100 Hazen unit
		Turbidity	IS 3025 (Part 10)	2 NTU to 400 NTU
		pH @ 25°C	IS 3025 (Part 11)	2 to 13
		Electrical Conductivity	IS 3025 (Part 14)	1 to 90,000 µmhos/cm
		Total Suspended Solids (TSS)	IS 3025 (Part 17); APHA	2 mg/L to 5000 mg/L
		Total Dissolved Solids	IS 3025 (Part 16); APHA	2 mg/L to 50000 mg/L

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		(TDS)		
		Total Solids (TS)	IS 3025 (Part 15)	2 mg/L to 50000 mg/L
		Fixed Solids	IS 3025 (Part 18)	2 mg/L to 5000 mg/L
		Volatile Solids	IS 3025 (Part 18)	2 mg/L to 50000 mg/L
		Total Hardness as CaCO ₃	IS 3025 (Part 21)	1 mg/L to 5000 mg/L
		Acidity as CaCO ₃	IS 3025 (Part 22)	1 mg/L to 1000 mg/L
		Alkalinity as CaCO ₃	IS 3025 (Part 23)	1 mg/L to 1000 mg/L
		Oil and Grease	IS 3025 (Part 39); APHA	2 mg/L to 5000 mg/L
		Bio Chemical Oxygen Demand BOD-3 days @ 27°C	IS 3025 (Part 44)	2 mg/L to 10000 mg/L
		Chemical Oxygen Demand (COD)	IS 3025 (Part 58); APHA	4 mg/L to 50000 mg/L
		Dissolved Oxygen	IS 3025 (Part 38)	0.2 mg/L to 10 mg/L
		Chloride as Cl ⁻	IS 3025 (Part 32)	1 mg/L to 10000 mg/L
		Sulphate as SO ₄ ²⁻	APHA	1 mg/L to 8000 mg/L
		Sulphites SO ₃ ²⁻	APHA	1 mg/L to 100 mg/L
		Sulphide S ²⁻	IS 3025 (Part 29)	2 mg/L to 200 mg/L
		Total Kjeldahl Nitrogen as N	IS 3025 (Part 34)	1 mg/L to 500 mg/L
		Ammoniacal Nitrogen as NH ₃ - N ⁺	IS 3025 (Part 34)	1 mg/L to 200 mg/L
		Fluoride as F ⁻	APHA	0.1 mg/L to 5.0 mg/L
		Dissolved Phosphorous as PO ₄	IS 3025 (Part 31)	0.1 mg/L to 20 mg/L
		Nitrate Nitrogen as NO ₃	APHA	0.5 mg/L to 100 mg/L
		Nitrite Nitrogen as NO ₂	APHA	0.02 mg/L to 100 mg/L
		Sodium as Na ⁺	IS 3025 (Part 45)	1 mg/L to 1000 mg/L
		Sodium absorption Ratio	IS 11624	0.1 meq/L to 20 meq/L
		Residual Sodium Carbonate	IS 11624	(-)5 meq/L to (+)10 meq/L
		Chlorine Residual	IS 3025 (Part 26)	0.1 mg/L to 2.0 mg/L
		Calcium as Ca ²⁺	IS 3025 (Part 40)	0.4 mg/L to 1000 mg/L
		Bi Carbonate as HCO ₃	IS 3025 (Part 51)	2 mg/L to 1000 mg/L

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2.	Soil/Sediments	pH Value	IS 2720 (Part 26)	2 to 12
		Electrical Conductivity	IS 14767 (2000)	1 to 10000 μ mhos/cm
		Water Content	IS 2720 (Part 2)	1 % to 50 %
		Organic Matter	IS 2720 (Part 22)	0.02 % to 20 %
		Total Soluble Sulphate as SO_4^{2-}	IS 2720 (Part 27)	1 % to 50 %
		Chloride as Cl^-	Method of analysis for soils of arid and semi-arid Regions, FAO	0.5 meq/L to 500 meq/L
		Total Kjeldahl Nitrogen as N	IS 14684	0.02 % to 20 %
		Total Phosphorus as P^+	IS 10158	0.1 % to 20 %
		Soluble Potassium as K^+	Method of analysis for soils of arid and semi-arid Regions, FAO	0.05 to 500 meq /100g
		Calcium Carbonate as $CaCO_3$	Method of analysis for soils of arid and semi-arid Regions, FAO	1 % to 50 %
		Soluble Sodium as Na^{2+}	Method of analysis for soils of arid and semi-arid Regions, FAO	0.05 to 500 meq/100g
		Soluble Calcium as Ca^{2+}	Method of analysis for soils of arid and semi-arid Regions, FAO	0.2 meq/L to 500 meq/L
Soluble Magnesium as Mg	Method of analysis for soils of arid and semi-arid Regions, FAO	0.2 meq/L to 500 meq/L		
Soluble Chromium as Cr	Method of analysis for soils of arid and semi-arid Regions, FAO	0.05 % to 20 %		
IV.	ATMOSPHERIC POLLUTION			

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1.	Ambient Air	PM ₁₀	IS 5182 (Part 23)	5 µg/m ³ to 500 µg/m ³
		PM _{2.5}	LSL/SOP/CHE/002 Issue No. 1, Issue Date: 28-07-2017	14 µg/m ³ to 400 µg/m ³
		Sulphur Dioxide as SO ₂	IS 5182 (Part 2)	3 µg/m ³ to 250 µg/m ³
		Nitrogen dioxide as NO ₂	IS 5182 (Part 6)	3 µg/m ³ to 350µg/m ³
		Ozone (O ₃)	IS 5182 (Part 9)	5 µg/m ³ to 400 µg/m ³
		Ammonia as NH ₃	CPCB Manual NAAQMS/36 Page No:35-38	5 µg/m ³ to 500 µg/ m ³
2.	Stack Emission	Particulate Matter (PM)	IS 11255 (Part 1)	5 mg/Nm ³ to 500 mg/Nm ³
		Sulphur dioxide as SO ₂	IS 11255 (Part 2)	3 mg/Nm ³ to 200 mg/ Nm ³
		Oxides of Nitrogen as NO _x	IS 11255 (Part 7)	2 mg/Nm ³ to 200 mg/ Nm ³
		CO ₂	IS 13270	0.2 % to 12 %
		CO	IS 13270	0.2 % to 3 %
		O ₂	IS 13270	1 % to 22 %
3.	Ambient Noise Level (Excluding Vibration)	L Min, L Max, L. eq.	IS 9989	34 dB(A) to 110 dB(A)
4.	Source Noise Level (Excluding Vibration) Industrial area, Work Zone and Machineries	Source Noise Level L Min, L Max	IS 9989	60 dB(A) to 110 dB(A)