

**DOC: CPCB/RLB/QM/  
Issue No.: 01  
Date of Issue: 01/05/2020  
Amendment No.: 02  
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# **QUALITY MANUAL**



**REGIONAL LABORATORY  
CENTRAL POLLUTION CONTROL BOARD  
REGIONAL DIRECTORATE  
SHIVANAGAR, BENGALURU - 560079**



**ANNEXURE – 4****RANGE OF LABORATORY ACTIVITIES (TESTING)**

Sl. no	Group of products, materials or items tested	Specific tests or types of tests performed	Specification, standard (method) or technique used	Range of testing/ Limit of detection	Measurement Uncertainty ( $\pm$ )
<b>I ATMOSPHERIC POLLUTION</b>					
1	Ambient Air	Particulate Matter (size less than 10 $\mu\text{m}$ ) or $\text{PM}_{10}$	IS: 5182 (Part 23):2006 RA-2017	5 – 1000 $\mu\text{g}/\text{m}^3$	35.00 $\pm$ 0.67 $\mu\text{g}/\text{m}^3$
		Sulphur Dioxide	IS: 5182 (Part 2): 2001 RA-2017	4 – 1050 $\mu\text{g}/\text{m}^3$	8.23 $\pm$ 0.17 $\mu\text{g}/\text{m}^3$
		Nitrogen Dioxide	IS: 5182 (Part 6): 2006 RA-2017	9 – 750 $\mu\text{g}/\text{m}^3$	10.95 $\pm$ 0.16 $\mu\text{g}/\text{m}^3$
		Ammonia	ISC Method 401, Methods of Air Sampling and Analysis, 3 <sup>rd</sup> Edition, Lewis Publishers, 1988	20 - 700 $\mu\text{g}/\text{m}^3$	25.95 $\pm$ 0.03 $\mu\text{g}/\text{m}^3$
		Arsenic	EPA – IO 3.4: 1999	20 – 1000 $\text{ng}/\text{m}^3$	37.63 $\pm$ 1.2 $\text{ng}/\text{m}^3$
		Cadmium	EPA – IO 3.4: 1999	0.2 – 100 $\mu\text{g}/\text{m}^3$	2 $\pm$ 0.1 $\mu\text{g}/\text{m}^3$
		Nickel	EPA – IO 3.4: 1999	20 – 1000 $\text{ng}/\text{m}^3$	34.15 $\pm$ 1.2 $\text{ng}/\text{m}^3$
		Lead	EPA – IO 3.4: 1999	0.2–100 $\mu\text{g}/\text{m}^3$	2 $\pm$ 0.2 $\mu\text{g}/\text{m}^3$
2	Stack Emission	Particulate Matter or PM	IS 11255 (Part-1):1985 RA-2019 IS 11255 (Part-3):1985 RA-2018 for flow rate	1 – 5000 $\text{mg}/\text{Nm}^3$	25.46 $\pm$ 2.8 $\text{mg}/\text{Nm}^3$
		Sulphur Dioxide	Sampling by IS 11255 (Part 2):1985 RA-2019 and analysis by ISC Method 711, Methods of Air Sampling and Analysis, 3 <sup>rd</sup> Edition, Lewis Publishers, 1988	4–8000 $\text{mg}/\text{Nm}^3$	8.24 $\pm$ 0.03 $\text{mg}/\text{Nm}^3$
<b>II WATER</b>					
1	Stream Water/River Water/Lake Water/Well Water/ Ground Water	pH	APHA (24 <sup>th</sup> Ed.): 2023 4500-H <sup>+</sup> B	1 - 14	7.00 $\pm$ 0.02
		Total Suspended Solids	APHA (24 <sup>th</sup> Ed.): 2023 2540-D	5 – 2000 $\text{mg}/\text{L}$	52 $\pm$ 2 $\text{mg}/\text{L}$
		Total Dissolved Solids	APHA (24 <sup>th</sup> Ed.): 2023 2540-C	2 - 5000 $\text{mg}/\text{L}$	495 $\pm$ 6.41 $\text{mg}/\text{L}$
		Total solids	APHA (24 <sup>th</sup> Ed.): 2023 2540-B	10 - 10,000 $\text{mg}/\text{L}$	110 $\pm$ 1.5 $\text{mg}/\text{L}$
		Turbidity	APHA (24 <sup>th</sup> Ed.): 2023 2130-B	4 - 400 NTU	40.8 $\pm$ 1.26 NTU
		Conductivity	APHA (24 <sup>th</sup> Ed.): 2023 2510-B	5 - 20000 $\mu\text{S}/\text{cm}$	1413 $\pm$ 1.7 $\mu\text{S}/\text{cm}$
		Chemical Oxygen Demand (COD)	IS 3025 (part 58):2006 (RA 2017)	4 - 5000 $\text{mg}/\text{L}$	501 $\pm$ 3.25 $\text{mg}/\text{L}$
		Biochemical Oxygen Demand (BOD) for 3 days at 27 °C	IS: 3025 (Part 44):1993, RA (2014)	2 - 1000 $\text{mg}/\text{L}$	42 $\pm$ 0.8 $\text{mg}/\text{L}$
		Dissolved Oxygen	APHA (24 <sup>th</sup> Ed.): 2023 4500-O, B.	1 - 10 $\text{mg}/\text{L}$	5.4 $\pm$ 0.1 $\text{mg}/\text{L}$
		Nitrate as N	APHA (24 <sup>th</sup> Ed.): 2023 4500-NO <sub>3</sub> -E.	0.02 - 100 $\text{mg}/\text{L}$	1.58 $\pm$ 0.105 $\text{mg}/\text{L}$

**Regional Laboratory, Central Pollution Control Board, Regional Directorate, Bengaluru**

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1	Stream Water/River Water/Lake Water/Well Water/ Ground Water	Nitrite as N	APHA (24 <sup>th</sup> Ed.): 2023 4500-NO <sub>2</sub> -B.	0.02 - 10 mg/L	0.542± 0.052 mg/L
		Ammonical Nitrogen as N	APHA (24 <sup>th</sup> Ed.): 2023 4500-NH <sub>3</sub> , Band F.	1 - 500 mg/L	77.8±0.54 mg/L
		Total Kjeldahl Nitrogen (TKN) as N	APHA (24 <sup>th</sup> Ed.): 2023 4500-Norg-B & 4500-NH <sub>3</sub> B and C	5 – 1000 mg/L	8.75±0.2mg/L
		Phosphate as P	APHA (24 <sup>th</sup> Ed.): 2023 4500-P –D.	0.01 - 200 mg/L	0.822 ± 0.015 mg/L
		Sulphate as SO <sub>4</sub>	APHA (24 <sup>th</sup> Ed.): 2023 4500-SO <sub>4</sub> – E.	4 - 500 mg/L	40±1 mg/L
		Total Alkalinity as CaCO <sub>3</sub>	APHA (24 <sup>th</sup> Ed.): 2023 2320-B.	2 - 1000 mg /L	901 ± 9.91 mg/L
		Fluoride as F	APHA (24 <sup>th</sup> Ed.): 2023 4500-F-D.	0.1 - 100 mg/L	1.12 ± 0.042 mg/L
		Chloride as Cl	APHA (24 <sup>th</sup> Ed.): 2023 4500-Cl-B.	2 -4000 mg/L	526±6.21 mg/L
		Calcium as Ca	APHA (24 <sup>th</sup> Ed.): 2023 3500-Ca -B.	4 – 1000 mg /L	35±0.64 mg/L
		Sodium	APHA (24 <sup>th</sup> Ed.): 2023 3500-Na- B.	1- 2000 mg/L	17±1 mg/L
		Potassium	APHA (24 <sup>th</sup> Ed.): 2023 3500-K –B.	1- 500 mg/L	2.82±0.1 mg /L
		Magnesium as Mg	APHA (24 <sup>th</sup> Ed.): 2023 3500-Mg -B.	2 - 1000 mg /L	15±0.64 mg /L
		Total Hardness as CaCO <sub>3</sub>	APHA (24 <sup>th</sup> Ed.): 2023 2340-C.	5-4000 mg /L	148±2.7 mg /L
		Sodium Absorption Ratio (SAR)	IS 11624:1986 (RA 2009)	0.1 - 30	0.75±0.08
		Percent Sodium	CPCB/RLB/TM/5.4/W-34: 2018	0.5 - 95%	21.27±2.81%
Hexavalent Chromium as Cr <sup>+6</sup>	APHA (24 <sup>th</sup> Ed.): 2023 3500- Cr - B.	0.1 - 100 mg/L	0.20±0.01 mg /L		
Boron	APHA (24 <sup>th</sup> Ed.): 2023 4500-B – B.	0.1 - 100 mg/L	0.50±0.05 mg /L		
<b>III RESIDUES IN WATER</b>					
1	Trace Metal Elements	Copper	APHA (24 <sup>th</sup> Ed.): 2023 3120-B.	0.1 – 100 mg/L	2.00±0.08 mg /L
		Nickel	APHA (24 <sup>th</sup> Ed.): 2023 3120-B.	0.1 – 100 mg/L	1.00±0.19 mg /L
		Lead	APHA (24 <sup>th</sup> Ed.): 2023 3120-B.	0.1 – 100 mg/L	2.00±0.42 mg /L
		Iron	APHA (24 <sup>th</sup> Ed.): 2023 3120-B.	0.1 – 100 mg/L	2.00±0.07 mg /L
		Cadmium	APHA (24 <sup>th</sup> Ed.): 2023 3120-B.	0.1 – 100 mg/L	1.00±0.05 mg /L
		Zinc	APHA (24 <sup>th</sup> Ed.): 2023 3120-B.	0.1 – 100 mg/L	1.00±0.14 mg /L
		Manganese	APHA (24 <sup>th</sup> Ed.): 2023 3120-B.	0.1 – 100 mg/L	1.00±0.08 mg /L
		Chromium (Total)	APHA (24 <sup>th</sup> Ed.): 2023 3120-B.	0.1 – 100 mg/L	2.00±0.07 mg /L
		Cobalt	APHA (24 <sup>th</sup> Ed.): 2023 3120-B.	0.1 – 100 mg/L	1.00±0.19 mg /L

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IV Pollution & Environment					
1.	Waste Water (Effluents & Sewage)	pH	APHA (24 <sup>th</sup> Ed.): 2023 4500-H <sup>+</sup> B	1 - 14	7±0.018
		Total Suspended Solids	APHA (24 <sup>th</sup> Ed.): 2023 2540-D	5 – 2000 mg/L	52±2 mg /L
		Total Dissolved Solids	APHA (24 <sup>th</sup> Ed.): 2023 2540-C	5 - 100000 mg/L	495±6.41 mg /L
		Total solids	APHA (24 <sup>th</sup> Ed.): 2023 2540-B	10 – 100000mg/L	110±1.5 mg /L
		Conductivity	APHA (24 <sup>th</sup> Ed.): 2023 2510-B	5 - 20000 µS/cm	1413±1.7µs/cm
		Chemical Oxygen Demand (COD)	IS 3025 (part 58):2006 (RA 2017)	4 - 150000 mg/L	501±3.25 mg /L
		Biochemical Oxygen Demand (BOD) for 3days at 27 °C	IS: 3025 (Part 44):1993, RA (2014)	2 - 75000 mg/L	42±0.8 mg /L
		Dissolved Oxygen	APHA (24 <sup>th</sup> Ed.): 2023 4500-O, B.	1 – 10 mg/L	5.4 ± 0.1 mg /L
		Nitrate as N	APHA (24 <sup>th</sup> Ed.): 2023 4500-NO <sub>3</sub> -E.	0.02 - 100 mg/L	1.58±0.10 mg/L
		Nitrite as N	APHA (24 <sup>th</sup> Ed.): 2023 4500-NO <sub>2</sub> -B.	0.02 - 10 mg/L	0.542±0.052 mg /L
		Ammonical Nitrogen as N	APHA (24 <sup>th</sup> Ed.): 2023 4500-NH <sub>3</sub> B, and C.	5 - 500 mg/L	77.8±0.54 mg /L
		Total Kjeldahl Nitrogen (TKN) as N	APHA (24 <sup>th</sup> Ed.): 2023 4500-Norg-B & 4500-NH <sub>3</sub> B and C	2 – 1000 mg/L	939±42 mg /L
		Oil and Grease	APHA (24 <sup>th</sup> Ed.): 2023 5520-B.	4 - 5000 mg/L	41±1.5 mg /L
		Phosphate as P	APHA (24 <sup>th</sup> Ed.): 2023 4500-P –D.	0.1 — 200 mg/L	0.822± 0.015 mg /L
		Sulphate as SO <sub>4</sub>	APHA (24 <sup>th</sup> Ed.): 2023 4500-SO <sub>4</sub> – E.	4 - 1000 mg/L	40.42±0.80 mg /L
		Total Alkalinity as CaCO <sub>3</sub>	APHA (24 <sup>th</sup> Ed.): 2023 2320-B.	2 - 2000 mg /L	901 ± 9.91 mg /L
		Fluoride as F	APHA (24 <sup>th</sup> Ed.): 2023 4500-F-D.	0.1-100 mg/L	1.12±0.042 mg /L
		Chloride as Cl	APHA (24 <sup>th</sup> Ed.): 2023 4500-Cl-B.	2 - 10000 mg/L	526±6.21 mg /L
		Calcium as Ca	APHA (24 <sup>th</sup> Ed.): 2023 3500-Ca -B.	4 - 1000mg /L	35±0.64 mg /L
Sodium	APHA (24 <sup>th</sup> Ed.): 2023 3500-Na- B.	1 - 10000 mg/L	16.78±0.08 mg /L		
Potassium	APHA (24 <sup>th</sup> Ed.): 2023 3500-K –B.	1 - 500 mg/L	2.82 ± 0.04 mg /L		
Magnesium as Mg	APHA (24 <sup>th</sup> Ed.): 2023 3500-Mg -B.	2 - 1000 mg /L	15±0.64 mg /L		

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		Total Hardness as CaCO <sub>3</sub>	APHA (24 <sup>th</sup> Ed.): 2023 2340-C.	5 - 4000 mg /L	148±2.7 mg /L
		Sodium Absorption Ratio (SAR)	IS 11624:1986 (RA2009)	0.1 - 30	0.75±0.08
		Percent Sodium	CPCB/RLB/TM/5.4/W-34:2018	0.5 - 95%	21.27±2.81%
		Hexavalent Chromium as Cr <sup>+6</sup>	APHA (24 <sup>th</sup> Ed.): 2023 3500- Cr - B.	0.1 – 500 mg/L	2 ± 0.05 mg /L
		Boron	APHA (24 <sup>th</sup> Ed.): 2023 4500-B – B.	0.1-100 mg/L	34±2 mg /L
		Copper	APHA (24 <sup>th</sup> Ed.): 2023 3120-B.	0.1 – 100 mg/L	2.00±0.08 mg /L
		Nickel	APHA (24 <sup>th</sup> Ed.): 2023 3120-B.	0.1 – 100 mg/L	1.00±0.19 mg /L
		Lead	APHA (24 <sup>th</sup> Ed.): 2023 3120-B.	0.1 – 100 mg/L	2.00±0.42 mg /L
		Iron	APHA (24 <sup>th</sup> Ed.): 2023 3120-B.	0.1 – 100 mg/L	2.00±0.07 mg /L
		Cadmium	APHA (24 <sup>th</sup> Ed.): 2023 3120-B.	0.1 – 100 mg/L	1.00±0.05 mg /L
		Zinc	APHA (24 <sup>th</sup> Ed.): 2023 3120-B.	0.1 – 100 mg/L	1.00±0.14 mg /L
		Manganese	APHA (24 <sup>th</sup> Ed.): 2023 3120-B.	0.1 – 100 mg/L	1.00±0.08 mg /L
		Chromium (Total)	APHA (24 <sup>th</sup> Ed.): 2023 3120-B.	0.1 – 100 mg/L	2.00±0.07 mg /L
		Cobalt	APHA (24 <sup>th</sup> Ed.): 2023 3120-B.	0.1 – 100 mg/L	1.00±0.19 mg /L
2.	Wastes (Liquid / Slurry / Sludge / Solid / Semi – solid)	pH	US EPA 9045D: 2004	1 - 14	4.15±0.06

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