

PROFORMA

Laboratory Recognition under Environment (Protection) Act, 1986

(To be filled in by existing laboratories interested to be considered for recognition as Environmental Laboratories under the Environment Protection Act, 1986)

1. General

(i) Name of the Laboratory : _____

(ii) Year of Establishment : _____

(iii) Name of the Organisation : _____

(iv) Address:

a) Postal : _____

b) Telephone : _____

c) Telegram : _____

d) Telex/fax : _____

(v) Objectives and scope of the Organisation: *

*(Please indicate, among others, whether it includes specialized testing, measurement, services)

(vi) Head of the Organisation:

a) Name : _____

b) Designation : _____

c) Address : _____

d) Telephone No. : _____ Fax No. : _____

(vii) Laboratory Incharge, if different than (vii) above:

a) Name : _____

b) Designation : _____

c) Address : _____

d) Telephone No. : _____ Fax No. : _____

2. **Infrastructure and details of Laboratory:** (please enclose brief layout plan map of laboratory)

(i) Area of specialisation pertaining to Environment:

a) _____

b) _____

c) _____

d) _____

e) _____

(ii) Type of tests which are offered to be conducted:
(Please enclose separate sheet, if space is inadequate)

S.No.	Nature of tests / analysis performed	Minimum required time for the test / analysis	Charges

(iii) Which of the following type of analytical tests are being carried out in the laboratory:

a) Physical

b) Chemical

- c) Radioactive
 - d) Microbiological
 - e) Toxicological
 - f) Any other (please specify)
- (iv) a) Mark the parameters given in Appendix 'A ' which can be analysed in the laboratory
- b) Mark the equipment given in Appendix '8' which are available in the laboratory
- c) Mark the Instruments given in Appendix 'C' which are available in the laboratory
- d) Mark the methodology employed for analysis in Appendix 'D'
- e) Mark the Air Quality Parameters, which can be analysed in the laboratory in Appendix 'E'
- (v) Name, designation and qualifications of staff/officers (with expertise in environmental analysis/testing):
(please enclose separate sheet, if space is inadequate)

S.No.	Name	Qualification	Experience

Note: Please indicate the name/s of personnel (maximum three) to be considered for nomination as Govt. Analysts. Brief bio-data of these persons should be enclosed.

S.No.	Name	Qualification	Experience

Signature (Head of organization)

(Head of laboratory)

Full name : _____
(In capital letters)

Full name: _____
(In capital letters)

List of Parameters to be Analysed

(a) Physical Tests: [Please mark Yes (•) / No (x)]

1. Colour
2. Conductivity
3. pH
4. Suspended solids
5. Settleable solids
6. Sludge Volume Index
7. Total solids
8. Temperature
9. Turbidity
10. Velocity of flow

(b) Chemical Tests

1. Acidity
2. Alkalinity
3. Aluminium
4. Ammonical Nitrogen
5. Arsenic
6. Barium
7. Beryllium
8. Boron
9. Bromide
10. Carbon dioxide
11. Cadmium
12. Chemical Oxygen Demand (COD)
13. Bio-chemical Oxygen Demand (BOD)
14. Chloride
15. Residual Chlorine
16. Calcium (Titrimetric)
17. Chromium (Colorimetric)
18. Copper
19. Cyanide
20. Dissolved Oxygen
21. Fluoride (Colorimetric without distillation)
22. Hardness (Titrimetric)
23. Iodine
24. Iron (Colorimetric)
25. Lead (Colorimetric)
26. Manganese
27. Magnesium
28. Mercury
29. Nickel
30. Nitrite -Nitrogen
31. Nitrate -Nitrogen

32. Oil and Grease (Simple extraction)
33. Pesticides and Insecticides
34. Phosphate
35. Phenols
36. Potassium
37. Selenium
38. Silica
39. Silver
40. Sodium
41. Strontium
42. Sulfite
43. Sulphate (Turbidimetric)
44. Tannin and Lignin
45. Tin
46. Urea Nitrogen
47. Zinc (Colorimetric)
48. Any other (Please specify)

(c) Radioactive Tests

1. Gross Alpha and Gross Beta radioactivity

(d) Microbiological Tests

1. Faecal Coliform
2. Total Coliform
3. Faecal Streptococci
4. E. Coli
5. Total plate count
6. Cell Count (Plankton)
7. Benthos (Mud organisms)
8. Chlorophyll

(e) Toxicological Tests

1. Pathways into the Environment
2. Concentrations:
 - Loss/Persistence
 - Concentrations
 - Human Intake
3. Environmental Fate Tests:
 - Biodegradation / Biotransformation
 - Photodegradation
 - Hydrolysis
 - Sorption
 - Evaporation
 - Oxidation
 - Model Ecosystem studies
4. Environmental Fate
5. Chemobiokinetics

- Absorption
 - Distribution
 - Bioconcentration Factor
 - Metabolism
 - Extraction
6. Mammalian Toxicity
 7. Special Toxicity Studies
 - Biochemical Interactions
 - Carcinogenicity
 - Mutagenicity
 - Neurotoxicity
 - Behaviour
 - Sensitization
 - Interacting Agents
 - Primary Irritation
 - Innunotoxicity
 - Reproduction
 - Teratogenicity
 8. Effects on Organisms in the Environment
 - Aquatic Toxicity
 - Terrestrial Toxicity

APPENDIX 'B'

(LIST OF EQUIPMENTS)

[Note : Please mark mark Yes (√) / No (x)]

1. Autoclave
2. Aquarium for bioassay & aerators
3. Ammonia distillation assembly
4. Arsenic estimation assembly (Gutzeit generator)
5. Balance (one weighing upto 10 mg & other weighing upto 0.01 mg)
6. BOD Incubator
7. Bacteriological Incubator
8. Bottom sampler
9. Centrifuge
10. Colony Counter (Electronic)
11. Colour Comparator
12. Current Meter
13. COD Digestion Assembly
14. Cyanide distillation Assembly
15. Deep Freezer

16. Depth Sampler
17. Electronic Colony Counter
18. Filtration Pumps (Vaccum)
19. Fluoride distillation assembly
20. Flocculator (Jar testing apparatus)
21. Flow meter (air, water)
22. Flask shaker
23. Fuming chamber
24. Gas Analysis apparatus
25. Heating Mantle
26. Hot Plate (different sizes)
27. Inoculation chamber
28. Inoculation hood
29. Kjeldahl Nitrogen Assembly
30. Magnetic Stirrer with hot plate
31. Millipore filtration assembly
32. Muffle furnace
33. Oven (hot air)
34. Refrigerator (big size)
35. Rotary shaker
36. Semi-micro nitrogen assembly
37. Stop watch
38. Thermometer (different ranges)
39. Soxhlet extraction assembly
40. Vaccum filtration pump
41. Water current meter
42. Water deionizer
43. Water distillation assembly (nano pure system)
44. Water distillation assembly (ordinary)
45. Water bath
46. Microscope (ordinary)
47. Microscope (Research)
48. Microscope (Planktonic inverted)
49. Any other (Please specify)

LIST OF INSTRUMENTS

[Note : Please mark mark Yes (√) / No (x)]

1. Analytical Balance
2. Atomic Absorption Spectrophotometer with the following cathode lamps:

Aluminium	Antimony	Arsenic	Barium	Boron
Chromium	Calcium	Cobalt	Copper	Iron
Lead	Magnesium	Manganese	Nickel	Potassium
Silver	Sodium	Tin	Vanadium	Zinc
3. Binocular Microscope
4. Conductivity Meter
5. Colorimeter
6. Dissection Microscope
7. Dissolved Oxygen Meter
8. Flame Photometer
9. Gas Liquid Chromatograph
10. Mercury Analyzer
11. Micro Analytical Balance
12. Portable Water Analysis Kit (for DO, Temperature, Conductivity, Redox potential etc.)
13. pH Meter with combined glass-calomel electrode (Portable and Table models)
14. Polarograph
15. Spectrocolorimeter
16. Spectrophotometer (Ultra-Violet, Visible & Infra-red)
17. Specific Ion Meter with Micro-processor with the following ion selective electrode:

Ammonia	Iodide	Sulphate
Cyanide	Nitrate	
Fluoride	Redox	
18. Specific Ion Meter (Ordinary)
19. Stereoscopic Microscope
20. Total Organic Carbon Analyzer
21. Turbidity Meter
22. UV -visible Spectrophotometer
23. BOD-Respirometer
24. Any other, please specify or attach the list.

METHODOLOGY EMPLOYED FOR ANALYSIS

(A) PHYSICAL PARAMETERS

S.No.	PARAMETER	METHOD
1.	Colour	a. Visible Comparison Method (only potable waters) b. Spectrophotometric Method (All)
2.	Conductivity	Conductivity Meter
3.	pH Value	pH Meter
4.	Suspended Solids (Total Number filterable)	a. Membrane filter apparatus (Millipore vacuum filtration apparatus) b. Gooch Crucible
5.	Settleable solids	Imhoff concentration: a. By Volume (mg/L) b. By Weight (mg/L)
6.	Sludge Volume Index	Imhoff conc. membrane filter apparatus or Gooch crucible
7.	Total Solids	Gravimetric
8.	Temperature	Thermometer/Thermistor/ Thermophone
9.	Turbidity	Nephelometric
10.	Velocity of flow	a. Cross-Section-velocity Method b. Weirs (Rectangular or V Notch or U-Notch) c. Chemical Methods

(B) CHEMICAL PARAMETERS

S.No.	PARAMETER	METHOD
1	Acidity	a. Electrometric/Potentiometric titration b. Color Indicator titration
2	Alkalinity	a. Electrometric/Potentiometric titration b. Color Indicator titration
3.	Aluminium	a. Atomic Absorption Spectrophotometer b. Colorimetric (Eriochrome Cyaniner)
4.	Ammonical Nitrogen	a. Distillation followed by colorimetric method (Nesslerization or phenate) b. Distillation followed by titrimetric method c. Distillation followed by ion Selective electrode method
5.	Arsenic	a. Atomic Absorption spectrophotometer b. Silver Diethyl dithiocarbonate
6.	Barium	Atomic Absorption Spectrophotometer
7.	Beryllium	a. Atomic Absorption Spectrophotometer b. Colorimetric (Aluminion)
8.	Boron	Colorimetric (Curcumin or Carmine)
9.	Bromide	Colorimetric (Chloramine -T)
10.	Carbon Dioxide	a. Titrimetric b. Nomographic
11.	Cadmium	a. Atomic Absorption Spectrophotometer b. Colorimetric (Dithiozone)
12.	Chemical Oxygen Demand	Dichromate Reflux
13.	Biochemical Oxygen Demand	a. Five day BOD at 20 degree celsius b. Three day BOD at 27 degree celsius
14.	Chloride	Titrimetric (Argentometric or Mercuric Nitrate)
15.	Chlorine Residual	Titrimetric
16.	Calcium	a. Atomic Absorption Spectrophotometer b. Titrimetric (EDTA)
17.	Chromium	a. Atomic Absorption Spectrophotometer (For Total) b. Colorimetric (Diphenylcarbazide) (For hexavalent,

		trivalent and total)
18.	Copper	a. Atomic Absorption Spectrophotometer b. Colorimetric (Neocuproin and Bethno-cuproine)
19.	Cyanide	a. Distillation followed by Titrimetric (P-dimethyl-amino-benzalrhodenino indicator) b. Distillation followed by Colorimetric (pyridine -Barbituric acid) c. Distillation followed by Cyanide-Selective Electrode
20.	Dissolved Oxygen	Winkler titrimetric-azide modification (Iodometric)
21.	Fluoride	a. Distillation followed by Colorimetric (SPADNS or Alizarin Red) b. Distillation followed by Fluoride selective electrode
22.	Hardness Total	Titrimetric (EDTA)
23.	Iodine	Colorimetric (Leuce Crystal violet of Catalytic reduction)
24.	Iron	a. Atomic Absorption Spectrophotometer b. Colorimetric (Phenanthraline)
25.	Lead	a. Atomic Absorption Spectrophotometer b. Colorimetric (Dithiozone)
26.	Manganese	a. Atomic Absorption Spectrophotometer (Total) b. Colorimetric (Persulfate)
27.	Magnesium	a. Atomic Absorption Spectrophotometer b. By difference (between total hardness and calcium determined titri-metrically)
28.	Mercury	a. Flareless (cold vapour) Atomic Absorption (Mercury Analyzer) b. Colorimetric (Dithiozoncer)
29.	Nickel	a. Atomic Absorption Spectrophotometer b. Colorimetric (Heptaxime or Dimethyl-glyoxime)
30.	Nitrite Nitrogen	Colorimetric (Diazotization)
31.	Nitrate Nitrogen	a. Colorimetric (Chromotropic Acid) b. Cadmium reduction followed by Colorimetric for Nitrite (Diazotization) c. Ultra-violet Spectrophotometric (For unpolluted water only)

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|-----|--------------------------------|--|
| 32. | Oil and Grease | a. Gravimetric (Simple extraction)
b. Soxhlet extraction |
| 33. | Pesticides and
Insecticides | a. Organochlorine -Gas Chromatograph
b. Organophosphorus -Gas Chromatograph |
| 34 | Phosphate | a. Orthophosphate-Pretreatment followed by
Colorimetric (Stannous -chloride or Vanadinrn
molybdate)
b. Polyphosphate - -do-
c. Total -do - |
| 35. | Phenols | a. Distillation followed by Colorimetric
(4-Aminoantipyrine or Chloroform extraction)
b. Gas Liquid Chromatograph |
| 36. | Potassium | a. Atomic Absorption Spectrophotometer
b. Flame photometer |
| 37. | Selenium | a. Atomic Absorption spectrophotometer
b. Distillation followed by colorimetric
(Diaminobenzidine) |
| 38. | Silica | a. Atomic Absorption Spectrophotometer
b. Colorimetric (Heteropoly blue or Molybdosilicate) |
| 39. | Siliver | a. Atomic Absorption Spectrophotometer
b. Colorimetric (Dithiozone) |
| 40. | Sodium | a. Atomic Absorption Spectrophotometer
b. Flame photometer |
| 41. | Strontium | a. Atomic Absorption Spectrophotometer
b. Flame photometer |
| 42. | Sulphite | Titrimetric (Iodometric) |
| 43. | Sulphate | Turbidimetric |
| 44. | Tannin and Lignin | Colorimetric |
| 45. | Tin | Atomic Absorption Spectrophotometer |
| 46. | Urea Nitrogen | a. Colorimetric
b. Titrimetric |
| 47. | Zinc | a. Atomic Absorption Spectrophotometer
b. Colorimetric (Dithiozone or Zincon) |

AIR PARAMETERS

Mark the air quality parameters given below which can be analysed in your laboratory , {Please mark Yes (√), No (x)}. For yes marked parameters give details such as method of analysis, instrument used for sampling and analysis, range of sensitivity etc. Enclose separate sheet.

Parameters	Ambient air/Fugitive Emissions	Method	Stack gases/Source emission	Method
Nox				
SPM				
SO ₂				
NO				
CO				
Hydro Carbon				
NH ₃				
O ₃				
Velocity				
Flow				
Acid mist				
SO ₃				
HF				
Total Fluoride				
Particulate Fluoride				
Gaseous Fluoride				

AIR PARAMETERS (Contd.)

Micro meteorological	Yes/No	Method
1. Wind Speed		
2. Wind Direction		
3. Temperature		
4. Mixing depth Inversion height		

Vehicular Emission	Yes/No	Method
1. Smoke		
2. Carbon monoxide		
3. Oxides of Nitrogen		
4. Hydrocarbon		

Toxic And Hazardous Gases

Provide a list of toxic and hazardous gaseous parameters, which could be analysed in your laboratory:

List of Instruments / Equipments for Air Analysis

Mention the names of the instruments / equipment which are available in the laboratory for sampling and analysis of each of the following group of tests. Also mention sensitivity and range of each instrument / equipment.

Instrument	Make	Range	Sensitivity
1. Ambient Air/Gigitive Emission			
2. Micro-meteorological			
3. Source Emission			
4. Vehicular Emission			

5. Toxic and Hazardous Gases

6. Does the facilities for calibration of various flow measuring devices (e.g. Rotameter, dry gas flow meter), Blower or high volume sampler, Pilot tube etc., exist in your lab. If yes, then please provide the details of calibration system. (Use separate sheet if required).

Rules of Environment (Protection) Act – 1986

(The Gazette of India, Extra – ordinary) Part – II, Section – 3, Sub – Section II)

Rule 9 Functions of Environmental Laboratories

The following shall be the functions of environmental laboratories:

1. to evolve standardised methods for sampling and analysis of various types of environmental pollutants
2. to analyse samples sent by the Central Government or the officers empowered under Sub-Section (I) of Section II.
3. to carry out such investigations as may be directed by the Central Government to lay down standards for the quality of environment and discharge of environmental pollutants, to monitor and to enforce the standards laid down.
4. to send periodical reports regarding its activities to the Central Government.
