



● AAQ

● Ground water

● Surface water

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Foreword

The Section 17 of the Water (Prevention and Control of Pollution) Act, 1974 & Section 17 of the Air (Prevention and Control of Pollution) Act, 1981 stipulates PCB to Plan Comprehensive Programmes for the Prevention, Control Or Abatement of Pollution.

The Section 16 (2) (c) of the Water (Prevention & Control of Pollution) Act, 1974 & under Section 16 (2) (d) of the Air (Prevention & Control of Pollution) Act, 1981 Stipulates CPCB to provide Technical Assistance and Guidance to CPCB.

CPCB had carried out Environment Quality Monitoring through EPA recognized labs in 88 Industrial Cluster during 2009, 2011 & 2013, and have rated them based on *Comprehensive Environmental Pollution Index (CEPI)*.

This Present Environmental Quality Monitoring Report is for the Postmonsoon Period of 2017 at Critically Polluted Areas in Tamil Nadu viz., *Manali, Ranipet, Cuddalore & Coimbatore*.

This report contains present status of Environment Quality pertaining to Ambient Air Quality, Surface Water & Ground Water with respect to these Critically Polluted Area.

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1.0 GENERAL SCOPE OF WORK

The General Scope pertains to "Environmental Quality Monitoring in 4-Critically Polluted Areas" viz., Manali, Coimbatore-Kurichi, Cuddalore-SIPCOT & Ranipet.

Tamil Nadu Pollution Control Board (TNPCB) is the Project Awarding Agency, and had awarded the said project work to Chennai Testing Laboratory Private Limited as the Project Executing Agency to carry out Monitoring, Sampling, Analysis of Ambient Air Quality, Surface Water and Ground Water Testing in the above said Critically Polluted Areas during Pre Monsoon Season and Post Monsoon Season.

2.0 SPECIFIC SCOPE OF WORK.

The Specific Scope involved, Ambient Air Quality Monitoring, Sampling and Analysis, Sampling and Analysis of Surface Water and Ground Water.

2.1 Ambient Air Quality.

- Ambient Air Quality was carried out at each location for 3-days with a gap of 1-day between each day of monitoring.
- Samples at each location were collected for analysis of flowing parameters in Ambient Air.
 - o SO₂, NO₂, PM₁₀, PM_{2.5}, Lead, Ammonia, Benzene, Benzo(a)Pyrene, Arsenic, Nickel – Frequency for 24 hourly average monitoring values and O₃, CO – Frequency for 1 Hourly average and 8 hourly average values.

2.2 Surface Water Quality.

- Surface water samples were collected as per norms stipulated in IS 3025 (Part 1)- 1987 (RA.2003)
- Sanitary Survey, General Appearance, Color, Smell, Transparency, Ecological (Presence of Animals like fish, insects etc),
- pH, Oil & Grease, Suspended Solids, DO (%Saturation), COD, BOD, Electrical Conductivity, Total Dissolved Solids, Nitrate-Nitrogen, Nitrite-Nitrogen, Total Nitrogen, Free Ammonia, Total Residual Chlorine, Cyanide, Fluoride, Chloride, Sulphate, Sulphides, Total Hardness, Dissolved Phosphates, SAR, Total Coliforms, Fecal Coli form.
- Total Phosphorous, TKN, Total Ammonia, Nitrogen, Phenols, Surface Active Agents, Anionic Detergents, Organo Chlorine Pesticides, PAH, PCB, PCT, Zinc, Nickel, Copper, Hexavalent Chromium, Chromium Total, Arsenic, Lead, Cadmium, Mercury, Manganese, Iron, Vanadium, Selenium, Boron.
- Bio-Assay (Zebra Fish) Test.

2.3 Ground Water Quality.

- Ground Water were collected as per norms stipulated in IS 3025 (Part 1)- 1987 (RA.2003)
- Sanitary Survey, General Appearance, Color, Smell, Transparency, Ecological (Presence of Animals like fish, insects etc),
- pH, Oil & Grease, Suspended Solids, COD, BOD, Electrical Conductivity, Total Dissolved Solids, Nitrate-Nitrogen, Nitrite-Nitrogen, Total Nitrogen, Free Ammonia, Total Residual Chlorine, Cyanide, Fluoride, Chloride, Sulphate, Sulphides, Total Hardness, Dissolved Phosphates, SAR, Total Coliforms, Fecal Coli form.

- Total Phosphorous, TKN, Total Ammonia, Nitrogen, Phenols, Surface Active Agents, Anionic Detergents, Organo Chlorine Pesticides, PAH, PCB, PCT, Zinc, Nickel, Copper, Hexavalent Chromium, Chromium Total, Arsenic, Lead, Cadmium, Mercury, Manganese, Iron, Vanadium, Selenium, Boron.

3.0 About Chennai Testing Laboratory

Chennai Testing Laboratory Private Limited is an NABL Accredited and MoEF & CC Recognized Laboratory.

NABL ACCREDITATION CERTIFICATE



MoEF&CC RECOGNIZATI ON – GAZETTE NOTIFICATI ON





The Scope of NABL is enclosed in Annexure – II .

4.0 Standard Methods & Procedure

4.1 Sampling of Ambient Air

Preparing the filter: The respirable dust concentration will be determined by a gravimetric analysis, requiring an accurate estimation of the change in weight of the filter paper on account of the dust deposited it. Handling of the filter paper is minimized and care is taken that the paper does not get sheared or damaged during handling. It is required to dry of the filters papers in dessicator prior to weightment.

Check points: inspect the filter against a bright lamp or light for pinholes and micro-cracks. Put indication numbers on the corner of the underside of each filter. Place the filter papers in desiccators for at least 16 hours to remove traces of moisture. Weigh the papers after they are taken from desiccator. Store the paper without folding the paper in a clean flat box.

Preparing the dust collection bottles: Dry and clean the dust collection bottles for weighing. Mark number for bottles.

Preparing the absorbing solution: For Sulphur dioxide: prepare potassium tetrachloro mercurate solution. For oxides of nitrogen: Prepare sodium hydroxide (0.1N).

Installing the filter on the sampler: Loosen the four wings nut and open the top cover. Check that the filter clamping gasket and backing screen are clean.

Place the filter sheet on the backing screen taking care to ensure that it is centralized. Place the top cover on the filter paper and uniformly tighten the wing nuts maintaining almost equal pressure on all side.

Installing the dust collection bottles at the bottom of cyclone and push it upwards until it rests firmly against the bottom seal ring.

Installing the gaseous sampling attachment: Attach the gaseous kit in side of the high-volume sampler. Place the impingers with absorbing solution in ice tray. Place the ice tray containing the impingers in the enclosure and connect individual impingers to the respective nozzles of the gas manifold.

Feed the real program of sampling in the digital timer after setting real time and day, record initial time tantalizer reading.

Provide the power connection, and switch on the blower. The manometer fluid will rise. Let the water level stabilize and record initial manometer reading after 5 mins of operation. Use rotameter to set air volume pas through the impingers. Note initial and final rotameter reading. Run the instrument for 8 hours or 24 hours. Before the sampling end note, record the final reading of manometer and rotameter, and note the final reading of timer.

The absorbing reagents are recovered from the impingers, and transferred to container and labelled properly, and analyzed in the laboratory. After sampling, filter paper is removed carefully, and kept in air tight plastic covers, and reweighed, in laboratory.

4.2 Sampling of Water

4.2.1 Sampling of Water for Microbiological analysis

Before sampling ensure that sampling kit is available as per the details mentioned.

Samples for Microbiological analysis should be collected in a pre-sterilized screw cap bottle/ sterile container.

For sampling of Treated Raw water (may contain chlorine), add 0.1ml of 5% sodium thio-sulphate solution in the bottle before sterilization.

Wear the sterile gloves and remove the cap of the bottle just prior to collecting the sample.

The sample side of the cap should not come in contact with any surface, including fingers or hands of individual collecting the sample. The cap may be kept on the top of a clean surface, topside against the surface.

Open the sampling/user point valve until there is a steady stream of water flows.

Drain approximately for 1 minute, collect water in sampling bottle.

Do not allow the 'bottle' or the 'water in the bottle' to come in contact with the valve.

Fill the bottle without overflowing the bottle.

Remove the container from the sample stream, and place the cap on the bottle as quickly as possible.

Tighten the cap, and secure the valve.

Fill the information on the face of the bottle such as location of sampling, date of sampling and signature.

The initial time limit for starting analysis should be 1 hour but not more than 6 hours after collection of water samples. Under exceptional circumstances the analysis should be commenced at least within 30 hours, and sample should be kept in dark at 1-4°C.

4.2.2 Sampling of Water for Chemical analysis

Samples for chemical analysis is collected in a clean and dried bottle.

Remove the cap from the bottle just prior to collect the sample.

The sample side of the cap should not come in contact with any surface, including fingers or hands of individual collecting the sample. The cap may be kept on the top of a clean surface, topside against the surface.

Open the sampling/user point valve until there is a steady stream of water flows.

Drain approximately for 1 minute, collect water in sampling bottle.

Rinse the bottle with the water to be sampled at least three times.

Do not allow the 'bottle' or the 'water in the bottle' to come in contact with the valve.

Remove the container from the sample stream and place the cap on the bottle as quickly as possible and ensure that no air bubble is entrapped.

Tighten the cap and secure the valve.

Fill the information on the face of the bottle such as location of sampling, date of sampling and signature.

Analysis is in any case initiated within 24hrs after sampling.

4.2.3 Rivers, Streams, Canals:

Samples are collected, as far as possible, from mid-stream at mid depths. Samplings too near the bank provide fictitious results. Site is selected preferably where marked quality changes occur, and where there is important river uses such as confluences, major river discharges or abstractions.

Sampling locations can be fixed by reference to significant features. In this connection use of reference maps may be helpful. Taking samples from over the bridges is appropriate.

Samples are taken using boats where feasible in rivers and lakes. Unsafe banks are avoided. Wherever necessary, sampling is made by taking safety measures.

When it is intended to monitor the effects of a discharge, both upstream and downstream sampling is necessary. Mixing of discharge with receiving water is important.

A sample from 100 meters downstream of the discharge point is considered representative in case of small streams. In case of long rivers there should be three fixed sampling locations in a cross-section (left, middle, right) the left and right one should be far enough from the bank.

Sampling extends to an appropriate distance downstream to assess effects on the river. Ideally, sample is taken from a turbulent point. The general considerations for rivers and streams also apply to canals.

4.2.4 Samples for general chemical analyses:

For analyses of trace quantities of chemical constituents of surface water, it is usual to clean new containers thoroughly in order to minimize possible contamination of the sample; the type of cleaners used and container material vary according to the constituents to be analyzed.

For general purposes, new glass containers are cleaned with water and detergents to remove dust and packaging material. They are then be cleaned with chromic-sulphuric acid mixture before being thoroughly rinsed with distilled water.

It is noted that detergents, possibly containing phosphates, cannot be used if phosphates or surface-active agents are to be determined, nor can chromic acid-sulphuric acid mixture be used if trace quantities of sulphate and chromium are to be determined.

Polyethylene containers, in general, are cleaned by filling with 1 mol/l nitric acid or hydrochloric acid, leaving for 1 to 2 days, followed by thorough rinsing with distilled or de-ionized water.

4.2.5 Samples for determination of pesticides, herbicides and their residues:

In general brown glass are used, because plastics, except polytetrafluorethylene (PTFE), may introduce interferences which can be significant if trace analyses are to be performed.

The containers are cleaned with water and detergent, followed by thorough rinsing with distilled water, then oven dried and cooled before being rinsed with hexane or petroleum ether. Finally, they are dried with a stream of carefully purified air or nitrogen.

A continuous extraction with acetone for 12 h, followed by a hexane rinse and drying as described above, are also used.

4.2.6 Samples for microbiological analysis:

The containers shall withstand a 160°C sterilization and shall not produce or release at this temperature any chemicals which would either inhibit biological activity, induce mortality or encourage growth. Or commercial available sterile sample container is also used.

When lower sterilization temperatures are used, polycarbonate and heat resistant polypropylene containers are used. Caps or other stoppers withstand the same sterilization temperatures as the containers.

Glass containers are cleaned with water and detergent, followed by thorough rinsing with distilled water. Then they are rinsed with nitric acid (HNO₃) followed by thorough rinsing with distilled water in order to remove heavy metals or chromate residues.

A total of 0.1 ml of a 10 percent (m/m) solution of sodium thiosulphate (Na₂S₂O₃) is added, for every 125 ml of container capacity. before sterilization. This is to eliminate inhibition of bacteria by chlorine.

4.2.7 Sample Volume

A two-litre sample is normally sufficient for most physical and chemical analysis. However, the quantity may be varied depending upon the type of analysis, methods used etc.

Samples from the same container, are ensured not to be used for multiple testing requirements (e.g., Organic, Inorganic, Radiological, Bacteriological, and microscopic examination) because methods of collecting and handling are different for each type of test. Always enough sample volume in the appropriate container is collected in order to comply with sample handling, storage, preservation requirements.

For Microbiological analysis, the volume of sample will be ensured to be sufficient to carry out all tests required. For potable water samples a minimum of 100 ± 2.5 ml is collected. Larger volumes are need for bacterial pathogen. For packaged drinking water, 20 L sample required for determination of all bacterial pathogens.

4.2.8 Sample Preservation

Waste waters usually decompose rapidly at room temperature, therefore, certain tests, namely, dissolved oxygen, Sulphide, residual chlorine, nitrite, pH, etc., fixed at site. For certain other tests; preservatives are added immediately to individual samples of the same water or wastewater in different sampling bottles for each test.

For Microbiological analysis: The initial time limit for starting analysis is 1 hour but not more than 6 hours after collection of water samples. Under exceptional circumstances the analysis is commenced at least within 30 hours, and sample is kept in dark at $1-4^{\circ}\text{C}$.

4.3 METHOD OF ANALYSIS

4.3.1 AMBIENT AIR QUALITY ANALYSIS

4.3.1.1 PARTICULATE MATTER (PM_{2.5})

APPARATUS

- Sampler – Fine particulate sampler – Envirotech APM 550
- Volume flow controllers
- Analytical balance
- Elapsed timer
- Flow meter Device
- Psychomotor
- Filter media - PTFE, 47 mm dia. and GF /A 37 mm dia.

PROCEDURE

Conditioning the Membrane Filter prior to use:

As the total mass of fine particles likely to be deposited is very small, while handling the filters for use in PM_{2.5} particulate sampling, care should be taken to avoid contaminating the filter in any manner. To minimize errors follow the precautions mentioned below:

1. Minimize exposure of the filter to open air. Keep them covered inside the filter carriers provided with the instrument.
2. The membrane is a fine and fragile material; take care to handle the filter only by the support ring on its edge using non – serrated forceps.
3. To equilibrate the filters keep them in a controlled environment (such as desiccators) at 25 degrees C and RH less than 35% for at least 16 Hrs.
4. Weigh the filters on a microbalance with a resolution of at least 0.01 mg. for best result it is advisable to re weigh the filters a few times and confirm repeatability of the weight.

Filter Identification

Number and record the initial weight (W₁) of the filters. As identification number cannot be marked on the filter a suitable identification code should be written on the filter carrier

Record the initial dry gas meter reading before on the instrument and switch on the instrument after end of desired sampling period, switch off the pump unit and record final dry gas meter reading. The difference of final DGM and initial reading will give you the volume of air sampled in cubic meters. Carefully remove the filter cassette from the filter holder and immediately place it in the covered filter carrier provided. Before taking the weight of the filter equilibrate it for 16 Hrs and take the final Weight of the filter paper (W₂).

CALCULATION

Calculation of volume of air sampled:

$$V = (\text{Final reading of DGM} - \text{Initial reading of DGM})$$

Where,

$$V = \text{Volume of air sample in m}^3$$

Calculation for PM_{2.5} in ambient air

$$\text{PM}_{2.5} (\text{as } \mu\text{g}/\text{m}^3) = \frac{(W_2 - W_1) * 10^6}{V}$$

Where,

$PM_{2.5}$ = mass concentration of particulate matter less than 2.5 micron diameter, in $\mu\text{g}/\text{m}^3$

4.3.1.2 PARTICULATE MATTER (PM10)

APPARATUS

1. Sampler – Respirable Dust sampler
2. Cyclonic size selective inlet for PM 10 sampling
3. Volume flow controllers
4. Analytical balance
5. Elapsed timer
6. Flow meter Device
7. Equilibration rack
8. Numbering machine
9. Psychrometer
10. Filter media - A 20.3 x 25.4 cm glass fibre filter

PROCEDURE

Filter inspection

Clean the light tables surfaces. Filter should be handled with clean hands to prevent contamination. Clean lands each filter on the light table and examine it for pinholes, loose particles, tears, creases, limps or other defects. Loose particles may be removed with soft brush.

Filters not meeting the above visual criteria shall not be used.

Filter Identification

Apply an ID numbers to upper right hand corner on the smoothest side of each filter with the incrementing number machine.

Filter Equilibration

Place blank or exposed filter in air tight desiccators having active desiccant in the control temperature 15 to 27^o C and to 0 to 50 % RH environment for 24 hrs prior to weighing.

Filter weighing

Weigh filters in - group of 10 to 50. Use clean hands for all filters handling. Stack filter jackets with data forms printed on them in the same order as the order of filters in the equilibration rack. Adjust the balance tare to read zero with nothing in the weighing chamber and adjust the span to read 3.0000 g + / - 0.0003 g with the g standard weight on the weighing pan. Record the weight on the data from in the blank or exposed filter column.

Field sampling

Remove the filter from its jackets and center it on the support screen with the rough side of the filter facing upwards. Replace the face plate and tightening the wing – nut to secure the rubber gasket against the filter edge. Gently lower the inlet, inertial jet and cyclonic inlets must have their seals in contact with the top of the faceplate. For automatically flow controlled unites, record the designed flow rate on the data sheet. Record the reading on the elapsed time meter. The specified length of the sampling is commonly 8 hr or 24 hrs. During this period reading of flow rate should be taken.

After sampling is complete, record the final flow rate and the elapsed time in the same manner. Subtract the initial elapsed time from the final elapsed to determine the sample duration. Remove the face plate by removing wing nut. Fold the filter in half lengthwise by handling it along its edge with the exposed side inward. Insert the filter in its jackets. Note the presence of insects on the deposit, loose particles, non – centered deposit,

evidence of leaks and unusual meteorological condition on the data sheet. Mark the flow recorder chart, if any, and return it with the data sheet.

CALCULATION

Calculation of volume of air sampled:

$$V = Qt$$

Where,

V = Volume of air sampled in m³

Q= Average flow rates, in m³ in min

T = total sampling time, in min

Calculation for PM₁₀ in ambient air

$$\text{PM}_{10} \text{ (as } \mu\text{g/ m}^3\text{)} = \frac{(W_2 - W_1) 10^6}{V}$$

Where,

PM₁₀ = mass concentration of particulate matter less than 10 micron diameter, in $\mu\text{g/ m}^3$.

4.3.1.3 SULPHUR DIOXIDE (SO₂)

APPARATUS

1. Glass Impinger having tube of 60 mm outer diameter and 15 mm length.
2. Poly p

REAGENTS

Absorbing Solution (0.1M sodium tetrachloromercurate): Dissolve 10.86gm mercuric chloride, 0.66gm EDTA, and 6gm Potassium Chloride in 1 litre of distilled water. (CAUTION: Highly poisonous; if spilled on skin, flush off with water immediately). This solution may be stored at room temperature for several months.

Sulphamic acid (0.6%)

Formaldehyde----0.2%

Stock Iodine solution----0.1N

Iodine solution---0.01N: Dilute 50 ml stock solution in 500 ml with distilled water.

Starch indicator solution: Triturate 0.4gm soluble starch and 0.002gm of mercuric iodide preservative with a little water and the paste. Slowly to 200 ml boiling water. Continue boiling until the solution is clear, cool and transfer to bottle.

Stock Sodium thio sulphate---0.1N: 25gm of Sodium thio Sulphate pentahydrate in a beaker, add 0.1gm of Sodium carbonate, dissolve and make to 1 litre with distilled water.

Sodium thio sulphate---0.01N: Dilute 100 ml of std. Sodium thio sulphate solution to 1 litre.

Standardized Sulphite solution for preparation of working Sulphite--- TCM solution. Dissolve 0.3gm of Sodium metabisulphite or 0.4gm of Sodium sulphite in 500 ml of freshly boiled and cooled distilled water. Sulphite solution in 500 ml of freshly boiled and cooled distilled water. Sulphite solution is unstable: it is therefore important to use purity water. This solution contains the equivalent of 320-400 $\mu\text{g/ml}$ of SO₂. The actual concentration of sulphite solution is determined

by following. Pipette 50ml of the 0.01N Iodine solution to each of two 500 ml iodine. Flasks A (blank) and B (sample). To flask A add 25 ml of distilled water and flask B add 25ml of sulphite solution. Stopper the flask and allow reacting for 5 min. Titrate with 0.01N thio using starch indicator.

Calculation:

$$C = (V_1 - V_2) \times N \times 32000 / 25$$

Where,

C = Conc. of SO₂ solution in µg/ml

V₁ = Volume of thio used for blank

V₂ = Volume of thio used for sample

N = Normality of thio

3200 = Mill equivalent weight of SO₂, µg

25 = Volume of std. Sulphite solution

Stock Para Rosaniline: Dissolve 0.5gm of p- Rosaniline in 100ml of distilled water. Keep it for 2 days and filter the solution. The filtrate solution is stable for 3 months, if stored in the refrigerator.

Working p- Rosaniline solution: Add 15 ml of conc. HCL acid to 10 ml of stock p-rosaniline and dilute to 250 ml of distilled water.

PROCEDURE:

1 Sample preparation:

After collection of the sample if a precipitate is observed in the sample, removes it through centrifuging.

2 Determination:

Dilute the entire the sample to initial volume with absorbing solution. Take 10 ml sample into 25 ml of smf. Delay the analysis of 20 min to allow any ozone decompose. for each set of determinations prepare a reagent blank by adding 10 ml of unexposed TCM solution to a 25 ml smf. Bring the each flask add 1 ml of 0.6% sulphamic acid and allow reacting for the 10 min. for destroy the nitrite resulting from oxides of Nitrogen. Add 2 ml of 0.2% formaldehyde and 5ml of working para rosaniline solution. Bring all flask to volume with freshly boiled and cooled distilled water with in 30 to 60 min. determine the absorbance of the sample, reagent blank, and control solution at 560 nm.

3 Calibration curve- procedure with Sulphite solution. Measure by graduated pipette amount of working sulphite tetra chloro mercurate solution into a series 25 ml smf (such as 0, 1, 2, 3, 4, 5) Bring the Volume to 10 ml with absorbing solution then adds the remaining as 2.

DATA ANALYSIS

Volume of air sampled: The average flow rate at which the sample collected is calculated by taking the arithmetic average of the hourly flow rate readings. The total volume of sample collection

(Q) s estimated as follows:

Total volume of air sample Q, M³ = Avg. flow rate X time in min/10³

CONCENTRATION OF SULPHUR DIOXIDES:

$$\text{Mass of sulphur dioxides in } \mu\text{g/ m}^3 = \frac{(A - A_0) \times B \times 30}{Q \times 10}$$

A = Sample absorbance

A₀ = reagent blank basorbance



B = calibration factor
Q = Volume of air sample in m³

4.3.1.4 OXIDES OF NITROGEN (NO_x)

APPARATUS

Sampler – Respirable Dust sampler with gaseous kit
Spectrophotometer

Analytical glass ware

Volumetric Flasks – 50 ml , 100 ml , 250 ml , 500 ml and 1000 ml

Pipettes - 10 ml, 2 ml, 10 ml, and 50 ml: Volumetric pipettes of 2 ml and 1 ml shall be graduated in 1/10 ml.

REAGENTS

1 General

Unless specified otherwise, pure chemicals and reagents grade water (See 1070) shall be used in the tests.

2 Absorbing Reagents – Dissolve 4.0 gm of Sodium Hydroxide in distilled water, add 1.0 gm of Sodium arsenite and dilute to 1000 ml with distilled water

3 Hydrogen peroxide – 30 %

4 Hydropergen per oxide solution – Dilute 0.2 ml of 30 percent hydrogen peroxide to 250 ml with distilled water. Keep in refrigerator and protect from light.

5 NEDA – Dissolve 0.5 g of NEDA in 500 ml of distilled water. Keep in refrigerator and protect from light.

6 Sodium Arsenite

7 Sodium Hydroxide

8 Sodium Nitrite - Assay of 97 % NaNO₂ or greater

9 Sodium Nitrite Stock solution (1000 µg NO₂ / ml).

Dissolve 1.5 g of desiccated sodium nitrite in distilled water and dilute to 1000 ml such that solution containing 1000 µg NO₂ / ml is obtained.

The amount of NaNO₂ to be used if the assay percent is less than 100 % is calculated as follows:

$$G = 1.500 / A$$

Where,

G = amount of NaNO₂ in gm

1.500 = gravimetric conversion factor

A = Assay, percent

9.1 Sodium Nitrite solution (10 µg NO₂ / ml)

Pipette 5.0 ml of the stock solution in to 500 ml volumetric flask and dilute to volume with distilled water.

9.2 Sodium Nitrite (1 µg NO₂ / ml) – Pipette 25 ml of the solution (see 9.11.1) in to a 250 ml volumetric flask and dilute to volume with absorbing solution . Prepare fresh daily.

9.3 Sulphanilamide solution - Dissolve 20.0 gm of sulphailamide in 700 ml of distilled water Add with mixing 50 ml of the 85 % Phosphoric acid and dilute to 1000 ml.

PROCEDURE

1 Sample collection

1.1 Four hourly sampling



1.1.1 Assemble the sampling apparatus at the sampling site. Component upstream from the absorber may be connected where required with Teflon / silicon tubing: glass tubing with dry ball joints: or glass tubing with butt – to – butt joints with Teflon or polypropylene. Add exactly 30 ml of absorbing reagents to the calibrated absorber. Disconnect the funnel. Connect the calibrate flow meter. Measure the flow rate before sampling and record as F_1 / Start sampling only after obtaining initial flow rate of 1 liter / min. Ensure packing of ice pack around the absorber for low temperature for improve absorption efficiency. $10 - 15^{\circ} \text{C}$ should be used for better absorption efficiency.

1.2 8 or 24 hourly sampling

1.2.1 Assemble the sampling apparatus at the sampling site. Component upstream from the absorber may be connected where required with Teflon / silicon tubing: glass tubing with dry ball joints: or glass tubing with butt – to – butt joints with Teflon or polypropylene. Add exactly 30 ml of absorbing reagents to the calibrated absorber. Disconnect the funnel. Connect the calibrate flow meter. Measure the flow rate before sampling and record as F_1 / Start sampling only after obtaining initial flow rate of 0.5 liter / min. Ensure packing of ice pack around the absorber for low temperature for improve absorption efficiency. $10 - 15^{\circ} \text{C}$ should be used for better absorption efficiency.

1.2.1.1 Samples for 8 or 24 hrs.

Record the exact sampling time in minutes by recording initial (t_1) and final (t_2) time of the sampling. Measure and record the flow rate before and final sampling as f_1 and f_2 . Seal the collect the samples after making it up to 30 ml using distilled water and transport to the laboratory for analysis.

Analysis

Pipette 10 ml of the collected sample into 50 ml volumetric flask. Now add 1 ml of hydrogen peroxide solution, 10 ml of sulphanilamide solution, and 1.4 ml of NEDA solution using pipette, with through mixing after the addition of each reagent and make up to 50 ml with distilled water.

Prepare a blank in the same manner using 10 ml of un – exposed absorbing reagent. After a 10 min color development interval, Measure and record this absorbance at 540 mm against the prepared reagent blank. Determine NO_2 from the calibration curve. Samples with an absorbance greater than 1.0 must be reanalyzed after diluting an aliquot of the collected samples with an aliquot of the collected samples with an equal quantity of un exposed absorbing reagents.

Calibration graph:

Prepare calibration curve using $1 \mu\text{g} / \text{ml}$ working standard in accordance with the analytical procedure. measure and record the absorbance for each calibration standards (0,1,2,3,4,5,6,7,8,9,10,12,15,20 $\mu\text{g} \text{NO}_2$).

Plot absorbance (y-axis) versus the corresponding concentration in $\mu\text{g} \text{NO}_2 / 50 \text{ ml}$ solution (x-axis).draw compute the straight line best fitting the data obtain the calibration curve.

Calculations

Air volume

Calculate the volume of air drawn for sample as follows:

$$V = \frac{f_1 + f_2}{2} \times (t_f - t_i) \times 60 \times 10^{-3}$$

Where,

V_a = Volume of air sample, m^3
 f_1 = air flow rate before sampling, lit/min
 f_2 = air flow rate after sampling, lit/min
 t_1 = initial time in hours
 t_2 = Final time hours
 10^{-3} = conversion of liter to m^3
 60 = Conversion of hours to min.

NO_2 Concentration in analyzed sample
 Determine $\mu g NO_2 / ml$ graphically from the calibration curve or compute from the slope and intercept values.

NO_2 Concentration in analyzed sample
 Calculate NO_2 as μg per cubic metre of air as follows:

$$NO_2 \mu g / m^3 = \frac{NO_2 \times D \times 30}{V_a \times 0.82 \times 10}$$

Where,

NO_2 = NO_2 concentration in analyzed sample, μg

D = dilution factor (D = 1 for no dilution; D = 2 for 1:1 dilution)

V_a = volume of air sample, m^3 .

4.3.1.5 LEAD, NICKEL & ARSENIC

APPARATUS

Respirable Dust Sampler
 Hot Plate (Thermostatically Controlled)
 EPM 2000 Filter paper
 Atomic Absorption Spectrometer
 MHS

REAGENTS:

Distilled or Deionized Water:

Nitric Acid (HNO_3), Concentrate (Metal free):

Nitric Acid, Dilute:

Approximately 0.1 mole/litre. Add 10 ml of concentrated nitric acid to 500 ml of water and dilute to 1 litre with water.

Hydrogen Peroxide (30 %)

Metal Standard Solutions (Certified standard)

Sodium borohydride (GR/AR grade).

Potassium iodide (GR/AR grade)

Standard preparation procedure:

Prepare a series of standard solution in the optimum concentration ranges by appropriate dilution of stock solution with 2% conc.HNO₃ solution as follows

Required concentration (ppm)	Stock solution taken (ppm)	Volume taken from stock solution (mL)	Volume made-up (mL)	Final concentration (ppm)
20	100	20	100	20
10	100	10	100	10
5	100	5	100	5
2	10	20	100	2
1	10	10	100	1
0.5	10	5	100	0.5
0.3	2	15	100	0.3
0.2	2	10	100	0.2
0.1	1	10	100	0.1
0.05	0.5	10	100	0.05
0.02	0.2	10	100	0.02
0.01	0.1	10	100	0.01
Required concentration (ppb)	Stock solution taken (ppb)	Volume taken from stock solution (mL)	Volume made-up (mL)	Final concentration (ppb)
150	1000	15	100	150
100	1000	10	100	100
50.0	1000	5	100	50
40.0	1000	4	100	40
30.0	100	30	100	30
20.0	100	20	100	20
10.0	100	10	100	10
5.0	50	10	100	5
2.0	20	10	100	2
1.0	10	10	100	1

Element	Working range Concentration in ppm						
	1	2	3	5	10	15	20
Lead	0.01	0.02	0.05	0.1	0.2	0.5	1.0
Nickel	0.005	0.01	0.02	0.03	0.04	0.05	0.1
Arsenic							

Instrumentation conditions for determining metals by FAAS:

Metals	Wave length (nm)	Slit width (nm)	Mode of operation
Pb	217.0	2.7/1.35	Air acetylene
Ni	232.0	1.8/1.35	Air acetylene
As	193.7	2.7/2.3	MHS with flame

PROCEDURE

Digestion Procedure for Filters:

The exposed glass filters are cut into pieces by means of clean stainless steel scissors and transferred into a 250 ml beaker. To the beaker is added 6 ml of concentrated nitric acid, 4 ml of hydrogen peroxide (30 %) and 50 ml of distilled water. Place beaker on the hot plate, contained in a fume hood, and reflux gently while covered with a watch glass for 30 min. Do not allow sample to dry. Repeat this addition of nitric acid, hydrogen peroxide and distilled water followed by evaporation, at least twice. Then continue to heat until the residue is barely dry and a white ash appears. Do not bake the residue. If the residue ignites, discard the sample, as Lead, Chromium, and Nickel would have been lost. Dissolve the residue in 5 ml of concentrated nitric acid. Filter the digest, with repeated small washings of nitric acid into a 50 ml volumetric flask and make up to mark with dilute nitric acid.

Blank Factor:

Analyze at least one unexposed filter with each batch of exposed test filters.

Determination of Lead, Nickel & Arsenic by AAS:

FAAS Measurement:

Set the atomic absorption spectrophotometer for the standard condition as follows:

Choose the correct hollow cathode lamp, align the instrument, position the Monochromator at the value recommended by the manufacturer, select the proper monochromator slit width, set the light source current, ignite the flame, regulate the flow of fuel and oxidant, adjust the burner for maximum absorption and stability and balance the meter. Run a series of standards of the metal of interest and construct a calibration curve. Aspirate the blanks and samples. Dilute samples that exceed the calibration range. For Lead (Pb) and Nickel (Ni), the wavelength required for analysis is 217nm and 232nm respectively.

Analysis with Mercury hydride system (MHS15) for Arsenic,

Install air-acetylene burner and install 'T' shape quartz cell on top of the burner. Attach the Mercury hydride system to the atomic absorption spectrometer. Connect the Quartz cell and VG assembly with provided tube. Take the. NaBH₄ (3%) and NaOH (1%) solution in the reluctant container. Then Take 10 ml of sample add 1 ml of KI solution for

pre reduction place the sample in sample container wavelength required for analysis is 193.7nm.

CALCULATION

Metal Concentration:

$$C = (M_s - M_b) \times V_s \times F_a/V \times F_t$$

Where,

C = concentration, $\mu\text{g metal/m}^3$.

M_s = metal concentration $\mu\text{g/mL}$

M_b = blank concentration $\mu\text{g/mL}$

V_s = total volume of extraction in mL

F_a = total area of exposed filter in cm^2

V = Volume of air sampled in m^3

F_t = Area of filter taken for digestion in cm^2

4.3.1.6 AMMONIA

Apparatus

Respirable dust sampler

Spectrophotometer

Reagents

Absorbing solution – Dilute 3 ml of conc. H_2SO_4 to 1 liter with water to obtain 0.1 N H_2SO_4 .

Sodium nitroprusside (sodium nitrosylpentacyanoferrate III) - Dissolve 2 g sodium nitroprusside in 100 ml of water and keep it refrigerated.

6.75 N sodium hydroxide – Dissolve 270 g NaOH in about 1 lit of DW. Boil to 600 ml in order to volatilize the ammonia contained in the reagent. Cool and fill to 1 liter. Store in polyethylene bottle. This solution is extremely caustic. Prevent contact with skin or eyes.

Sodium hypochlorite solution – Dilute 5-6% sodium hypochlorite with DW to give 0.1 N solution (3.7%). Strength is determined before dilution by iodimetric titration after appropriate dilution. The solution keeps well for two months in refrigerator.

Phenol solution 45% v/v – Melt phenol by immersing a bottle containing the material in a water bath at 60°C . Pour 45 ml (50 g) into a 100 ml warmed cylinder and fill to mark with methanol.

Buffer – Dissolve 50 g of $\text{Na}_3\text{PO}_4 \cdot 2\text{H}_2\text{O}$ and 74 ml of 6.75 N NaOH in 1 liter of DW.

Working hypochlorite solution – Mix 30 ml of 0.1 N sodium hypochlorite and 30 ml 6.75 N sodium hydroxide and dilute to 100 ml.

Working phenol solution – Mix 20 ml of the 45 % phenol solution with 1 ml of 2% sodium nitroprusside and dilute to 100 ml. Prepare fresh every 4 hours.

Ammonia standard solution – Dissolve 3.18 g of NH_4Cl , a 3.88 g of NH_4 twice SO_4 in 1 lit of DW. Add a drop of CHCl_3 for preservation. Dilute 10 ml of the stock solution to 1 lit with absorbing solution.

Procedure

For sampling, place 10 ml of absorbing solution in each bubbler for samples and field blanks. Sample at the rate of 1 L per minute for a sufficient time to obtain an adequate sample usually 1 hour.

Transfer contents to 25 ml glass stoppered graduated cylinder. Maintain at 25°C. Add 2 ml buffer and 5 ml of working phenol solution, mix fill to about 22 ml, then add 2.5 ml of working hypochloride solution and rapidly mix. Dilute to 25 ml, mix and store in dark at 25°C for 30 minute to develop colour. Measure absorbance at 630 nm. Use field blanks.

Calibration

Pipette 0.5, 1, 1.5 ml of working standard solution into 25 ml glass stoppered graduated cylinders. These correspond to 5, 10 and 15 µg of ammonia per 25 ml of solution. Fill to 10 ml mark with absorbing solution. A reagent blank with 10 ml of absorbing solution is also prepared. Add reagents to each cylinder as in the procedure for analysis. Read absorbance of each standard against reagent blank. Plot the calibration curve.

Calculation

$$\text{Ammonia } \mu\text{g}/\text{m}^3 = \frac{W}{VO}$$

Where

W = µg ammonia in 25 ml from standard curve

VO = volume of air sampled in m³ at 25°C and 101.3 kPa

$$VO = \frac{F}{1000} \times T \times \frac{P_s}{101.3} \times \frac{298}{273 + T_s}$$

Where

F = flow rate l/min

t = Elapsed sampling time in minutes

P_s = atmospheric pressure in kPa at sampling point

T_s = temperature in °C at sampling point

4.3.1.7 OZONE

REAGENTS

Absorbent:

Dissolve 13.6 g of potassium dihydrogen phosphate (KH_2PO_4), 14.20 g of disodium hydrogen phosphate (Na_2HPO_4) and 10 g potassium iodide and dilute to 1L distilled water.

Standard Iodine Solution:

Stock Solution 0.025m I_2 (0.05N)

Dissolve 16 g of potassium iodide and 3.173 g of iodine successively and dilute the mixture with distilled water to exactly 500 ml to make a 0.05 N solution.

0.001m I_2 (0.002 N)

Pipet exactly 4 ml of the 0.025 M stock solution into a 100 ml low actinic volumetric flask and dilute to the mark with absorbing solution. protect from strong light. discard after use.

Calibration iodine solution:

For calibration purposes exactly 5.11 ml of the 0.001m I_2 is diluted with absorbing solution just before use to 100 ml to make the final concentration 1 μL of O_3/ml .

SAMPLING

Pipette exactly 10 ml of the absorbing solution into the bubbler and sample at a rate of 1 litres/min for up to 60 minutes. The flow rate and time of sampling should be adjusted to obtain a sufficiently large concentration of oxidant in the absorbing solution. Approximately 2 μg of ozone may be obtained in the absorbing solution at an atmospheric concentration of 0.01 ppm by sampling for 30 minutes at 3 litres / min.

The total volume of the air sample collected should be corrected to standard conditions of 25°C and 760 mmHg if temperature and pressure deviate appreciably from these conditions. Do not expose the absorbing solution to sunlight.

Calibration

Obtain a range of calibration points containing from 1 μL to 10 μL of ozone per 10 ml of solution. prepare by individually adding 1.0, 2.0, 4.0, 6.0, 8.0 and 10.0 ml of the calibrating iodine solution to 10ml volumetric flask. bring each to the calibration mark with absorbing reagent.

Plot the absorbance of the obtained colors against the concentration of O₃ in μL/10ml absorbing reagent . the plot follows beers law.draw the straight line through the origina giving the best fit,or fit by least squares. Do not extrapolate beyond the highest concentration.

PROCEDURE

measurement of color

If significant evaporation of solution occurs, add distilled water to bring the liquid volume to 10 ml. Read the absorbance at 352 nm.

Blank correction:

Measure the absorbance of the unexposed reagent and subtract the value from the absorbance of the sample.

CALCULATION

The total μL of O₃/10ml of reagent read from the calibration curve.the concentration of O₃ in the gas phase in μL/L or PPM is given by:

$$O_3 \text{ ppm} = \frac{\text{total } \mu\text{Lozone per 10 ml}}{\text{Volume of air sample,L}}$$

The concentration of O₃ in terms of μg/m³ is obtained when desired from the value of μL/L

$$\text{Oxidant (as O}_3\text{), } \mu\text{g/m}^3 = \text{ppm} \times 48 \times 1000 / 24.47.$$

4.3.1.8 CARBON MONOXIDE

Instrument

Gas Alert micro 5 PID Analyser (BW Technologies S.No 312-007301)

Procedure

Press on/off button on the meter. Audible/visual/vibrator alarm activates. And instrument show the current date & time.

The Current TWA, STEL, low and high alarm set points display and self test performs during start up.

LEL sensor correction done with methane. VOC sensor correction done with isobutylene.

Automatically instrument corrects the pump test & blocks the instrument inlet 3 seconds.

Automatically instrument calibrating with O₂.

Finally instrument show the readings PID CO in ppm,

Press and Hold off button until countdown is complete.

4.3.1.9 BENZENE

APPARATUS

Low Volume Pump

Sampling Sorbent (Sample) Tubes

Gas Chromatograph Mass Spectroscopy

REAGENTS

Suitable Adsorbent – Chromatographic grade activated charcoal (coconut shell) or other suitable adsorbent, that is, Chromosorb 106 or other suitable adsorbent having particle size in the range 60 to 80 mesh.

Methanol (CH₃OH) – Ms grade, Purity > 99.9 percent (GLC),

Benzene, Toluene, Xylene – Certified reference standards, BTEX 2000 µg/ml each,

Carrier Gas – Helium of purity > 99.995 percent,

PROCEDURE:

Sampling:

Prepare a gas sampling tube filled with an activated charcoal. Open a tube at two ends and connect it to a sample pump and pulling air through the tube with the pump. Thus

airborne chemicals will be trapped onto the surface of the sorbent. Keep the tubes in vertical position to prevent the possibility of channeling that can lead to under sampling. The sampling flow rate could be in the range of 20 - 500ml/min for ambient air. A Sample component may breakthrough from the back end of tube, if excessive flow rates are used. Sample is to be discarded, if the breakthrough is observed more than 10 percent. If analyzed concentration in backup section is more than 10 percent of front section, sample needs to be discarded. The tube is then sealed with push-on cap and sent to a laboratory for analysis. Store the tubes properly wrapped in aluminum foil.

Calibration:

Prepare a primary stock standard solution of 2000 µg/ml of benzene, toluene and xylene each gravimetrically using a pipette in methanol. Keep 20 ppm of standard dilution as intermediate stock, store in proper condition. Prepare further diluted solutions of working concentration range of 0.2, 0.5, 1.0, 2.0 µg/ml with Methanol from stock standard in a clean vial. Introduce immediately 1 µl standard solution into the injector of GCMS directly and plot the curve between the concentration and response (peak area). Prepare fresh standard solutions with each batch of samples. A typical chromatogram of standard mixture.

Analytical Procedure:

Samples collected through active sampling (sorbent tubes) are extracted or desorbed by conventional solvent (generally 1-5 ml of Methanol) using ultrasonication for 15 min to remove analyte from the sorbent material. Desorbed samples are analyzed using Gas Chromatograph (GCMS) fitted with capillary column .A single tube may provide enough samples to permit several analyses.

Instrument Conditions for GC/MS:

Column : DB-5 MS 30 mts x 0.25 mm x 0.25µm;

Split less; Ion source : 200°C

Oven temp.program

Rate	Temperature.(°C)	Hold time (min)
----	35.0	2.00
5.0	50.0	3.00
10.0	140.0	1.00
20.0	240.0	1.00

Table 1 : BTX –GC-MS Target Reference Ions

Compound Name	Target Ion	Reference Ions	
		I	II
Benzene	78	77	52

CALCULATION:

Amount of analyte compound found on tube can be converted into µg/m³, by using the formula:

$$\text{Volume of air (m}^3\text{) (sucked through the adsorption tube)} = \frac{S \times t}{10^6}$$

where

S = sampling rate, in ml/min; and



$$t = \text{sampling time, in min}$$

$$\text{Concentration } (\mu\text{g}/\text{m}^3) \text{ (at ambient condition)} = \frac{\text{Conc. in } \mu\text{g}/\text{ml} \times V_1}{V_2}$$

Or

$$\frac{\text{Area} \times V_1}{\text{Slope factor} \times V_2}$$

where

V_1 = total volume of the sample extracted in ml;

V_2 = volume of air sucked through the tube, in m^3 .

Blank value is to be subtracted from the amount of compound found in the sample.

4.3.1.10 BENZO (A) PYRENE

Apparatus

Ultra Sonicator

Nitrogen Concentrator

GC MS

Capillary column DB 5 MS capillary column 30 m x 0.25 mm x 0.25 μ

Micro pipettes

Volumetric flasks and Beakers.

RDS sampler

Reagents

Toluene

Cyclohexane

Tri-phenyl benzene

PAH mix standard

Activated silica gel (60- 100 meshes) Chromatography grade.

Sampling

Collect sample through RDS sampler using glass fibre using (EPM – 2000) filter paper preferably whatman or equivalent at the flow rate of ($\sim 1.2 \text{ m}^3/\text{min}$) over an extended period of time usually 8 hr for ambient air.

Sample Filter Storage:

After sampling, filters are kept in the controlled laboratory conditions ($20\text{-}25^\circ\text{C}$) in an envelope marked with necessary identification information if processed immediately, otherwise wrap the filters in Aluminium foil & kept it in refrigerator at 4°C in dark to avoid photo oxidation of PAHs.

Sample Processing:

Extraction:

Filter papers (half of all the filters papers collected in a day) are cut into strips using scissors and transfer to 250 ml beaker. Add ~ 25 ml. of Toluene (HPLC grade). These samples are extracted with toluene using ultra sonic bath for about 30 minutes. Repeat the procedure twice (25ml x 2 times) for complete extraction.

Filtration:

Filter the extracted samples with Whatman filter paper no.41 containing 2 gm of Anhydrous Sodium Sulphate (to remove moisture).

Concentration:

After filtration, the filtrate is concentrated using Concentrator to 2ml final volume.

Clean-up with silica Gel

To clean up the impurities, pass 2 ml of concentrated sample through silica gel column (pre conditioned, 60-80 mesh, and 200-250mm×10 mm with Teflon stopcock). After cleaning add 5ml cyclohexane and collect the elute in 25 ml beaker. Repeat the process for at least 3 times and collect it in the same beaker.

Re-concentration with Concentrator.

The Cleaned up extract/filtrate (approximately 17 ml) is further concentrated and it is evaporated to nearly dryness with Nitrogen.

Final Sample volume

The dried sample is re-dissolved in 1ml of toluene and transfer into 2 ml vials final analysis.

Extracted Sample Storage:

Cover/Cap the sample vials /tubes and mark with necessary identification. Keep it in refrigerator at 4°C prior to the analysis.

Analysis/ Instrument Set-Up

GC Conditions:

Injector: 260°C

MS Temp: 280°C

Column: Capillary column DB 5 ms 30 x 250 µm x 0.25 µm

Oven Programme : 50°C (hold for 1 min), ramp 1 @ 15°C / min to 130°C (2 min) ramp 2 @ 2°C/min to 205 (0 min), ramp 3 @ 8°C/min to 230 (5 min) ramp 4@ 5°C/min to 300 (8 min)

Run Time: 46.792 minutes

Carrier gas flow (He): 1.2211 ml/min

Preparation of Standard Calibration Mixture

Stock Standard Solution PAH mix standard solution of 16 Compounds including B(a)P (Supelco, USA make PAH mix 16 compounds) of concentration 2000 µg/ml in ethylene chloride. Keep 20 ppm of standard solutions as intermediate stock.

Working Standard Solution Working Standard Solutions (0.025, 0.05, 0.1, 0.25, 0.5 ng/µl concentrations) are prepared from stock solution with toluene.

Sample injection:

Take 1µl of sample from the vial using standard gas tight syringe and inject in the Capillary GC-MS instrument for analysis. Record the resulting concentration of each PAH compound including B(a)P. PAH standards are to be injected in GC-MS instrument with every batch of samples.

Instrument Conditions for GC/MS:

Column : DB-5 MS 30 mts x 0.25 mm x 0.25µm;

Split less; Ion source : 200°C



Oven temp.program

Rate	Temperature.(°C)	Hold time (min)
----	50.0	1.00
15.00	130.0	2.0
12.00	200.0	0.00
2.00	205.0	0.00
8.00	230.0	5.00
5.00	300.0	8.00

Table 1 : PAH'S –GC-MS Target Reference Ions

Compound Name	Target Ion	Reference Ions	
		I	II
Naphthalene	128	127	129
Acenaphthylene	152	151	150
2-Bromo-Naphthalene	127	206	208
Acenaphthene	153	154	152
Fluorene	166	165	163
Phenanthrene	178	176	179
Anthracene	178	176	179
Pyrene	202	200	203
Fluoranthene	202	200	201
Chrysene	228	226	229
Benz[a]anthracene	228	226	229
Benzo[a]pyrene	252	250	253
Benzo[b]fluoranthene	252	250	253
Benzo[ghi]perylene	276	250	253
Dibenz[a,h]anthracene	278	250	253
Indeno[1,2,3-cd]pyrene	276	277	274

Calculations

Calculate the air volume from the periodic flow reading taken during sampling using the following equation:

$$V = Q \times T$$

Where,

Q =Average flow rate of sampling m³/min

T = sampling time, in min.

V = total sample volume at ambient conditions in m³

Concentration of analyte i.e B(a)P:

The concentration of PAH compound or Benzo (a)pyrene in ng /m³ in the air Sampled is given by:

$$C \text{ (ng /m}^3\text{)} = C_s \times V_e / V_i \times V_s$$

Where,

C_s: Concentration of Benzo (a) pyrene in ng / μl in the sample extract recorded

By GCMS.

V_e: Final volume of extract in μl (i.e. 1000)

V_i: Injection Volume (i.e. 1μl)

V_s: Volume of air sample in m³

4.3.2 WATER QUALITY ANALYSIS

4.3.2.1 pH

APPARATUS

a. pH meter consisting of potentiometer, a glass electrode, a reference electrode, and a temperature-compensating device.

b. Beakers

REAGENT

a. Standard pH Buffer solutions: NIST traceable Buffer solutions of pH 4.01 (Potassium hydrogen phthalate), 7.00 (Potassium di hydrogen Phosphate/ di-sodium hydrogen phosphate) and 9.00 Boric acid/ Potassium chloride/ Sodium hydroxide).

NOTE:

a. KCl solution should have a conductivity of less than 2 $\mu\text{S}/\text{cm}$.

b. Discard the buffer solution if there is any mold growth or contamination

PROCEDURE

a. Bring buffer solution and the samples to the room temperature.

b. Warm up the instrument for 15-30 minutes.

c. Check the level of the electrolyte in the reference electrode.

d. Rinse the electrode with the distilled water and air dry.

e. Standardise the instrument using different buffer solutions.

f. Rinse the electrode with the distilled water and air dry or wipe with tissue paper, dip the electrode in the beaker containing sample and measure the pH value at given temperature.

g. Take the reading, when it becomes stable.

4.3.2.2 Turbidity

APPARATUS

- a. Turbidity meter
 - Light source: Tungsten –filament lamp operated at a color temperature between 2200 and 3000^o K.
 - Distance traversed by incident light and scattered light should not exceed 10 cm.
 - Angle of light acceptance by detector should not exceed $\pm 30^{\circ}$
- b. Sample tubes of clear, colorless glass or plastic.

REAGENT

- a. Dilution water: The turbidity of the distilled water used for preparation of the reagent should be as low as 0.02 NTU. Pass distilled water through a membrane filter having pore size of 0.2 μ M. Rinse the collecting flask at least twice with filtered water. Discard first 200 ml
- b. Stock turbidity suspension:
 - (i) Solution I: Dissolved 1.00 gm of Hydrazine sulphate, (NH₂)₂.H₂SO₄ in distilled water and dilute to 100ml
 - (ii) Solution II: Dissolved 10.0 gm of hexamethylene tetramine, (CH₂)₆N₄ in distilled water and dilute to 100ml
 - (iii) In a 100ml volumetric flask, mix 5.0 ml solution I and 5.0 ml solution II. Let stand for 24 hours at 25^oC. Dilute to 100 ml. The turbidity of this suspension is 400 NTU
- c. Standard turbidity suspension to 100 ml with distilled water. The turbidity of this suspension is 40 NTU . Prepare daily.
- d. Dilute turbidity Standards: Dilute portion of standard turbidity suspension as required.

Note. Prepare solution and suspensions monthly.

PROCEDURE

- a. For less than 40 NTU:
 1. Warm up the instrument for few minutes.
 2. Calibrate the instrument for each range, otherwise run at least one standard in the range to be used.
 3. Thoroughly shake the sample and set aside for few minutes till air bubbles disappear.
 4. Pour sample into the tube and allow sufficient time for air bubbles to escape
 5. Insert the tube into the sample holder
 6. Set the instrument at appropriate range and read turbidity directly.

- b. For Greater than 40 NTU
1. Dilute the sample until the turbidity falls between 30 -40 NTU.
 2. Measure the actual turbidity as per the procedure given above (a) 1 through 6

CALCULATION

Compute turbidity of the diluted sample from turbidity value of diluted sample and dilution factors as follows:

$$\text{Turbidity (NTU)} = \frac{A \times (B + C)}{C}$$

Where,

- A- NTU found in diluted sample
- B- Volume of dilution water in ml and
- C- Sample volume taken for dilution

4.3.2.3 Total Dissolved Solids (TDS)

APPARATUS

1. Filtration assembly with suction flask and pump.
2. Whatman filter paper GF/C grade.
3. Drying Oven, for operation at 180^oC
4. Analytical balance capable of weighing 0.1 mg.
5. Desiccator, provided with a desiccant
6. Forceps
7. Evaporating dishes of 100 ml capacity made of porcelain or high silica glass

PROCEDURE

1. Dry the well clean dish in an oven at 180^oC for 1 hour
2. Cool, desiccate and take the initial weight of the dish
3. Repeat the above step (2) until a constant weight is obtained
4. Transfer a known volume of filtered homogenous sample into the dish.
5. Evaporate to dryness on a steam bath
6. Dry the evaporated sample in an oven at 180^oC for 1 hour
7. Cool in a desiccator and weigh
8. Repeat the steps 6 and 7 until a constant weight is obtained

CALCULATION

$$\text{Total Dissolved Solids, mg/l} = \frac{(A-B) \times 1000}{V}$$

Where,

A= weight of the dish residue, mg

B= Weight of the dish, mg

V= Volume of sample, ml

4.3.2.4 Conductivity

APPARATUS

- a. Conductivity meter consisting of Conductivity cell - Platinum electrode type and a temperature-compensating device.
- b. Beakers

REAGENTS

- a. Conductivity water – Distilled water used for the preparation of standard solution should have very low conductivity and free from carbon dioxide. Before using the distilled water, boil to expel carbon dioxide and allow cooling.
- b. Standard Potassium Chloride Solution: NIST traceability Potassium Chloride solutions of 0.147mS/cm. Store the solution in a borosilicate glass bottle.

PROCEDURE

- a. Bring standard KCl solution and the samples to the room temperature.
- b. Warm up the instrument for 15-30 minutes.
- c. Rinse the electrode with the distilled water and air dry.
- d. Standardise the instrument using different KCL concentration
- e. Rinse the electrode with the distilled water and air dry or wipe with tissue paper, dip the electrode in the beaker containing sample and measure the Conductivity value at given temperature.
- f. Take the reading, when it becomes stab

PRECISION AND BIAS

The precision and accuracy of measurement depends upon the type of the instrument used, however the precision and accuracy of above $\pm 5\%$ can be achieved.

EXPRESSION OF RESULTS

Express the results in $\mu\text{S}/\text{cm}$. Round off the results as whole number.

4.3.2.5 Nitrite Nitrogen

APPARATUS

- a. Spectrophotometer for use at 543 nm, providing a light path of 1 cm or longer

REAGENTS

- a. Nitrite free water
- b. Colour reagent: To 800 ml water add 100 ml 85% phosphoric acid and 10 g sulfanilamide. After dissolving sulfanilamide completely, add 1 g N- (1-naphthyl)-ethylenediamine dihydrochloride. Mix to dissolve, then dilute to 1 L with water. This solution is stable for about a month when stored in a dark bottle in refrigerator.
- c. Stock Nitrite Solution: Dissolve 1.232 g NaNO_2 in water and dilute to 1000 ml, 1.00 ml = 250 μg N. Preserve with 1 ml CHCl_3
- d. Intermediate Nitrite Solution: Dilute 50 ml of stock nitrite solution to 250 ml, 1.0 ml = 50 μg N. Prepare freshly daily.
- e. Standard Nitrite Solution: Dilute 10.0 ml intermediate NO_2 solution to 1000 ml with water, 1.0 ml = 0.500 μg N. Prepare daily.

PROCEDURE

If sample contains suspended solids, filter through a 0.45 μm pore size membrane filter. If the sample pH is not between 5 and 9 adjust to that range with 1N HCl or NH_4OH as required. To 50.0 ml, add 2ml color reagent and mix. Between 10 min and 2 hour after adding reagents to samples and standards measure absorbance at 543 nm.

CALCULATION

Prepare a standard curve by plotting absorbance of standard against $\text{NO}_2\text{-N}$ concentration. Compute sample concentration directly from curve.

4.3.2.6 Nitrate Nitrogen

APPARATUS

- a. Reduction Column – Purchase or construct the column
- b. Spectrophotometer 543 nm, providing a light path of 1 cm or longer.

REAGENT

- a. Nitrate free water
- b. Copper – Cadmium granules: Wash 25 g new or used 20 to 100 mesh Cd granules with 6 N HCl and rinse with water. Swirl Cd with 100 ml 2 % CuSO₄ solution for 5 min. or until blue colour partially fades. Decant and repeat with fresh CuSO₄ until a brown colloidal precipitate begins to develop. Gently flush with water to remove all precipitated Cu.
- c. Colour Reagent : To 800 ml water add 100 ml 85 % phosphoric acid and 10 g sulphanilamide. After dissolving sulphanilamide completely, add 1g N (1- naphthyl) ethylenediamine dihydrochloride. Mix to dissolved then dilute to 1 L with water. Solution is stable for about a month when stored in a dark bottle in Refrigerate.
- d. Ammonium Chloride –EDTA solution: Dissolve 13 g NH₄Cl and 1.7 disodium ethylenediamine tetra acetate in 900 ml water. Adjust the pH to 8.5 with conc. NH₄OH and dilute to 1 L.
- e. Dilute Ammonium Chloride – EDTA solution: Dilute 300 ml NH₄Cl –EDTA solution to 500 ml with water.
- f. Hydrochloric Acid, HCl 6N
- g. Copper Sulphate Solution 2 % : Dissolved 20 g CuSO₄.5H₂O in 500 ml water and dilute to 1 L
- h. Stock Nitrate Solution – Dry Potassium Nitrate (KNO₃) in an oven at 105^oC for 24 hours. Dissolve 0.7218 g in water and dilute to 1000ml: 1.00 ml = 100 µg NO₃⁻- N. Preserve with 2 ml CHCl₃/l. This solution is stable for at least 6 months.
- i. Intermediate Nitrate Solution: Dilute 100 ml stock nitrate solution to 100 ml with water 1.0 ml = 10.0 µg NO₃⁻-N. Preserve with 2 ml CHCl₃/l . This solution is stable for 6 months.
- k. Stock Nitrite Solution: Preparation of stock solution – Dissolved 1.232 g Na₂NO₃ in water and dilute to 1000 ml. 1.0 ml = 250 µg N preserve with 1 ml CHCl₃.
- l. Intermediate Nitrite Solution : Dilute 50.0 ml intermediate nitrite solution to 250 ml 1.0 ml = 50 µg NO₃⁻-

Working nitrite solution: Dilute 50.0 ml intermediate nitrite solution to 500 ml with nitrite free water : 1ml = 5 µg NO₂⁻N

PROCEDURE

- a. Preparation of reduction column – Insert a glass wool plug into bottom of reduction column and fill with water, add sufficient Cu – Cd granules to produce a column 18.5 cm long. Maintain water level above Cu – Cd granules to prevent entrapment of air. Wash the column with 200 ml dilute NH₄Cl –EDTA solution. Activate Column by passing through it, at 7 to 10 ml/min at least 100 ml of a solution composed of 25 % 1.0 mg NO₃ N/l standard and 75 % NH₄Cl- EDTA solution.

b. Treatment of samples

1. Remove Turbidity – Filter turbid samples through 0.45 μm – pore diameter membrane filter.
2. pH adjustment – Adjust pH to between 7 and 9, as necessary, using a pH meter and dilute HCl or NaOH. This insures a pH of 8.5 after adding NH_4Cl -EDTA solution.

Sampler Reduction

To 25.0 ml sample or a portion diluted to 25.0 ml add 75 ml NH_4Cl –EDTA solution and mix. Pour mixed sample into column and collect at a rate of 7 to 10 ml/ minute. Discard first 25 ml. Collect the rest in original sample flask. There is no need to wash columns between samples, but if columns are not to be reused for several hours or longer , pour 50 ml, dilute NH_4Cl –EDTA solution on the top and let it pass through the system. Store Cu –Cd column in this solution and never let it dry.

Colour Development and Measurement:

As soon as possible and not more than 15 min. after reduction, add 2.0 ml colour reagent to 50 ml sample and mix . Between 10 min. and 2 h afterward, measure absorbance at 543 nm against a distilled water reagent blank.

STANDARDS

Using the intermediate $\text{NO}_3\text{-N}$ solution prepare standard in the range 0.05 to 1.0mg $\text{NO}_3\text{-N/l}$ by diluting the following volumes to 100 ml in volumetric flask 0.5, 1.0, 2.0, 5.0 and 10.0 ml .Carry out reduction of standards exactly as described for samples.

CALCULATION

Obtain a standard curve by plotting absorbance of standards against $\text{NO}_3\text{-N}$ concentration. Compute sample concentration directly from standards curve, report a milligrams oxidized N per liter (the sum of $\text{NO}_3\text{-N}$ + $\text{NO}_2\text{-N}$) unless the concentration of $\text{NO}_2\text{-N}$ is separately determined and subtracted.

4.3.2.7 CHLORIDE

APPARATUS

- i. Erlenmeyer flask, 250 ml
- ii. Burette, 50 ml
- iii. Stirrer
- iv. pH meter

REAGENTS

- i. Potassium Chromate (K_2CrO_4) solution – Dissolve 50 g K_2CrO_4 in distilled water. Add AgNO_3 Let stand for 12 hours, then filter if required and dilute to 1 lit. with distilled water.
- ii. Standard Sodium Chloride, 0.0141 M (0.0141 N) – Dissolved 824.0 mg/ NaCl (dried at 140°C) and dilute to 1 lit., 1 ml 0.0141 (N) NaCl = 0.5 mg Cl^- (1.00 ml = 500 $\mu\text{g Cl}^-$)

- iii. Standard Silver Nitrate (AgNO_3) 0.0141 N – Dissolved 2.395 g AgNO_3 in distilled water and dilute to 1 lit.
- iv. Aluminum Hydroxide Suspension – Dissolved 125 g Aluminum potassium sulphate, A & K (SO_4)₂ 12 H_2O or Aluminum ammonium sulphate $\text{AlNH}_4(\text{SO}_4)_2 12\text{H}_2\text{O}$ in 1 lit. distilled water, warm to 60°C and add 55 ml Ammonium Hydroxide (NH_4OH) with stirring, allow it stand for 1 hr and transfer to large bottle.
- v. Sodium Hydroxide (NaOH) 1N – Dissolved 40 g NaOH in distilled water and dilute to 1 lit.
- vi. Sulfuric Acid (H_2SO_4) 1N – Prepare 1: 3 conc. H_2SO_4 .

PROCEDURE

- i. Take 100 ml well mixed, pH adjusted (7.0-10.0) sample in erlenmeyer flask and add 1 ml K_2CrO_4
- ii. Titrate with standard AgNO_3 solution until it turns yellow to brick red which persists for few seconds
- iii. Run a blank taking 100 ml distilled water. Usually 0.2 to 0.3 ml of AgNO_3 is consumed in blank samples.
- iv. Standardize AgNO_3 against 0.0141 N NaCl solution.
- v. Pipette 10 ml NaCl (0.0141) and add 40 ml distilled water to it. Add 1 ml indicator and titrate with AgNO_3 .

CALCULATION

For Standardization

$$\text{AgNO}_3 \text{ (N)} = \frac{10 \times 0.0141}{\text{Volume of AgNO}_3 \text{ Consumed}} \quad (\text{N})$$

Concentration of Chloride:

$$\text{Cl mg/l} = \frac{(A-B) \times N \times 35.45 \times 1000}{\text{Sample volume (ml)}} \quad \text{mg/l}$$

Where

A = ml AgNO_3 consumed for sample

B = ml AgNO_3 consumed for blank

N = Normality of AgNO_3 solution

35.45 = Atomic weight of Chlorine

4.3.2.8 Sulphate

APPARATUS

- i. Magnetic stirrer with stirring bars
- ii. Spectrophotometer for use at 420 nm providing a light path of 2.5 to 10 cm.
- iii. Stopwatch or electric timer.
- iv. Measuring spoon, capacity 0.2 to 0.3 ml.

REAGENTS

- i. Buffer Solution A : Dissolve 30 g Magnesium chloride $\text{MgCl}_2 \cdot 6\text{H}_2\text{O}$, 5 g sodium acetate, $\text{CH}_3\text{COONa} \cdot 3\text{H}_2\text{O}$, 1.0 g potassium nitrate, KNO_3 and 20 ml acetic acid, CH_3COOH (99%) , in 500 ml distilled water and make up to 1 lit.
Buffer Solution B : (required when the sample SO_4^{2-} conc. is less than 10 mg/l): Dissolve 30 g $\text{MgCl}_2 \cdot 6\text{H}_2\text{O}$, 5.0 g $\text{CH}_3\text{COONa} \cdot 3\text{H}_2\text{O}$, 1.0 g KNO_3 , 0.11g sodium sulfate, Na_2SO_4 and 20 ml acetic acid (99%) in 500 ml distilled water and make up to 1 lit.
- ii. Barium Chloride: Crystal 20 -30 mesh.
- iii. Stock Sulphates Solution: Dissolved 0.1479 g anhydrous Na_2SO_4 in distilled water and dilute to 1 lit. 1 ml = 100 μg SO_4^{2-} .
- iv. Standard Sulphate Solution : Dilute 10.0 ml of stock solution to 100 ml with distilled water, 1 ml = 0.1 μg SO_4^{2-} .

PROCEDURE

Calibration Curve:

- a. Measure in 250 ml conical flask 10.0, 20.0, 30.0, 40.0, 50.0 ml of standard sulphate solution and dilution to 100 ml.
- b. Add 20.0 ml Buffer soln. A and mix well using magnetic stirrer. The speed of stirring should be the same for both standards and samples.
- c. While stirring add about spoonful of BaCl_2 crystals and continue to stir exactly one minute.
- d. Immediately after one minute, pour some of the solution into the absorption cell and measure the optical density at 420 nm at 30 seconds intervals for four minutes taking the maximum turbidity which will normally be after a period of 2 minutes after completion of stirring.
- e. Carry out reagent blank using distilled water.
- f. Prepare a calibration curve for sulphate concentration v/s absorbance.

Sample Measurement

- i. Measure in a 250 ml conical flask, measure 100ml sample or suitable quantity of the sample and dilute to 100 ml and proceed from step (b) to (e) as for standards.
- ii. From the calibration graph read the mg/l sulphate concentration equivalent to absorbance.

CALCULATIONS

mg/l SO_4^{2-} = Concentration of mg/l, obtained after comparison with calibration curve \times D

Where,

D = dilution factor.

4.3.2.9 Hardness

APPARATUS

- i. Conical flask 250 ml
- ii. Burette 50 ml
- iii. Beakers 250 ml

- iv. Pipettes 10 ml, 5 ml, 1.0 ml
- v. pH meter

REAGENTS

i. Buffer Solution – Dissolved 16.9 g ammonium chloride, NH_4Cl in 143 ml liquor ammonia, NH_4OH . Add 1.25 g magnesium salt of EDTA and dilute to 250 ml with distilled water.

If magnesium salt of EDTA is not available, dissolve 1.179 g di-sodium salt of EDTA (AR grade) and 780 mg $\text{SO}_4 \cdot 7\text{H}_2\text{O}$ or 644 mg $\text{MgCl}_2 \cdot 6\text{H}_2\text{O}$ in 50 ml distilled water. Add this solution to $\text{NH}_4\text{Cl} + \text{NH}_4\text{OH}$ solution and dilute to 250 ml.

ii. Standard EDTA solution (0.01 M) – Dissolve 3.723 g AR grade disodium ethylene diamine tetra acetate dehydrate, also called (ethylenedinitrilo)tetraacetic acid disodium salt (EDTA) $\text{Na}_2\text{C}_{10}\text{H}_{12}\text{O}_8\text{N}_2 \cdot 2\text{H}_2\text{O}$ in distilled water and dilute to 1 lit. Standardize it against standard calcium solution. Standard of EDTA titration 0.01 M is equivalent to 400.8 μg calcium /ml

iii. Indicator- Eriochrome Black T: Sodium salt of 1-(1-hydroxy-2-naphthylazo)-5-nitro-2-naphthol-4-sulfonic acid, **Dissolve 0.5 g dye in 100 g 2,2',2''** -nitrilotriethanol (also called triethanolamine) or 2- methoxymethanol (also called ethylene glycol monomethyl ether). Add 2 drops per 50 ml solution to be titrated.

iv. Standard Calcium Solution – Weigh 1.0 g anhydrous CaCO_3 (Calcium Carbonate) powder (primary standard) with low heavy metals, alkalis and magnesium into a 500 ml Erlenmeyer flask. Place a funnel in the neck and add a little at a time (1+1) HCl until the CaCO_3 dissolves. Add 200 ml distilled water and boil for few minutes to expel CO_2 . Cool and add few drops of methyl red indicator, adjust the colour to intermediate orange colour by adding 3N NH_4OH or 1+1 HCl as required. Transfer the solution to volumetric flask and dilute 101 lit. Discard the solution if any precipitate or growth is found. 1ml CaCO_3 solution is equivalent to 1 mg CaCO_3

v. Pretreatment of Polluted Water and Water Samples

Use nitric acid- sulfuric acid or nitric – perchloric acid digestion

PROCEDURE

- i. Take 50 ml sample or a portion diluted to 50 ml.
- ii. Add 1 ml buffer solution or a volume sufficient to produce pH 10.0 – 10.1, check the pH rapidly with paper strip/pH meter.
- iii. Add 1 to 2 drops of indicator
- iv. Titrate with standards EDTA slowly, with continuous stirring to the proper end point. Complete titration within 5 minutes.
- v. Standardize EDTA with standard CaCO_3 solution.

CALCULATION

Determination of strength of EDTA

10 ml CaCO_3 solution is equivalent is 10 mg CaCO_3

V is the volume of EDTA consumed to titrate 10 ml CaCO_3

Hence, mg equivalent of CaCO_3 per ml of EDTA is = $\frac{10 \text{ mg}}{V \text{ ml}}$ N mg/ml

Hardness as CaCO_3 (mg/l) = $\frac{A \times B \times 1000}{\text{ml of sample}}$

Where,

A = ml titrant for sample

B = mg, CaCO_3 equivalent to 1.0 ml EDTA titrant.

4.3.2.10 CALCIUM

APPARATUS

- i. Conical flask 250 ml
- ii. Burette 50 ml
- iii. Beakers 250 ml
- iv. Pipettes 10 ml, 5 ml, 1.0 ml
- v. pH meter

REAGENTS

i. Standard EDTA solution (0.01 M) – Dissolve 3.723 g AR grade disodium ethylenediaminetetraacetate dehydrate, also called (ethylenedinitrilo) tetraacetic acid disodium salt (EDTA) $\text{Na}_2\text{C}_{10}\text{H}_{12}\text{O}_8\text{N}_2 \cdot 2\text{H}_2\text{O}$ in distilled water and dilute to 1 lit. Standardize it against standard calcium solution. Standard of EDTA titration 0.01 M is equivalent to 400.8 μg calcium /ml.

ii. Sodium Hydroxide NaOH (1N)

iii. Indicators

a. Murexide (Ammonium Purpurate) – Changes from pink to purple at the end point . Prepare by mixing 200 g dye in 100 g solid Sodium chloride, NaCl grind it to 40-50 mesh. This indicator is unstable in alkaline condition.

b. Eriochrome Blue Black RC – Mix 200 mg dye with 100 g NaCl and grind it to 40 -50 mesh , 0.2 to 0.4 g of the mixture is the required for each titration. During the course of titration, the colour changes from red through purple bluish purple to a pure blue without any trace of reddish or purple tinge. pH of the sample may be raised to 14 by adding 8 N NaOH in order to get a sharper colour change.

iv. Standard Calcium Solution – Weigh 1.0 g anhydrous CaCO_3 (Calcium Carbonate) powder (primary standard) with low heavy metals, alkalis and magnesium into a 500 ml Erlenmeyer flask. Place a funnel in the neck and add a little at a time (1+1) HCl until the CaCO_3 dissolves. Add 200 ml distilled water and boil for few minutes to expel CO_2 . Cool and add few drops of methyl red indicator, adjust the colour to intermediate orange colour by adding 3N NH_4OH or 1+1 HCl as required. Transfer the solution to volumetric flask and dilute 101 lit. Discard the solution if any precipitate or growth is found.

1ml CaCO_3 solution is equivalent to 1 mg CaCO_3

v. Pretreatment of Polluted Water and Water Samples

Mix the sample and transfer a suitable volume (50 -100 ml) to a 125 ml conical flask .Add 4 ml conc. HNO₃ and few boiling chips or glass beads. Boil slowly on an evaporate on a hot plate (to about 10-20 ml) before precipitation occurs. Continue heating and addition of conc HNO₃ as necessary until digestion is complete, as shown by a light coloured clear solution. Do not let the sample dry during digestion. Wash the flask or beaker walls with water and than filter if necessary. Transfer the filtrate to 100 ml volumetric flask and dilute to mark. Ensure that all the dige3sted trace of sample is transferred. Generally fresh water or ground water samples do not require any pretreatment.

PROCEDURE

- i. Take 50 ml sample or a portion diluted to 50 ml
- ii. If, the alkalinity of the sample is more than 300 mg/l, neutralize it with acid boiling for 1 minutes and cooling it, then titrate.
- iii. Add 2 ml NaOH (1N) solution or a volume sufficient to produce pH 12 -13, check the pH rapidly with paper strip.
- iv. Add 0.1 to 0.2 g indicator
- v. Titrate with standards EDTA slowly, with continuous stirring to the proper end point. Complete titration within 5 minutes.
- vi. Standardize EDTA with standard CaCO₃ solution.

CALCULATION

- a. Determination of strength of EDTA
- b. 10 ml CaCO₃ solution is equivalent is 10 mg CaCO₃
- c. V is the volume of EDTA consumed to titrate 10 ml CaCO₃
- d. Hence, mg equivalent of CaCO₃ per ml of EDTA = $\frac{10 \text{ mg}}{V \text{ ml}}$ N mg/ml

$$\text{Ca mg/l} = \frac{A \times B \times 400.8}{\text{ml of sample}}$$

$$\text{Calcium as CaCO}_3 \text{ (mg/l)} = \frac{A \times B \times 1000}{\text{ml of sample}}$$

Where,

A = ml titrant for sample

B = mg, CaCO₃ equivalent to 1.0 ml EDTA titrant at the calcium indicator end Point

4.3.2.11 MAGNESIUM

APPARATUS

- i. Conical flask 250 ml
- ii. Burette 50 ml
- iii. Beakers 250 ml
- iv. Pipettes 10 ml , 5ml 25 ml 1.0 ml
- v. pH meter

REAGENTS

I. Total Hardness as CaCO_3

i. Buffer Solution – Dissolved 16.9 g ammonium chloride, NH_4Cl in 143 ml liquor ammonia, NH_4OH . Add 1.25 g magnesium salt of EDTA and dilute to 250 ml with distilled water. If magnesium salt of EDTA is not available, dissolve 1.179 g di-sodium salt of EDTA (AR grade) and 780 mg $\text{SO}_4 \cdot 7\text{H}_2\text{O}$ or 644 mg $\text{MgCl}_2 \cdot 6\text{H}_2\text{O}$ in 50 ml distilled water. Add this solution to $\text{NH}_4\text{Cl} + \text{NH}_4\text{OH}$ solution and dilute to 250 ml.

ii. Standard EDTA 0.01 (M) – Dissolved 3.723 g sodium salt of EDTA and dilute to 1000 ml.

iii. Standard Calcium solution – Weigh 1.0 g anhydrous CaCO_3 (Calcium carbonate) powder (primary standard) with low heavy metals, alkalis and magnesium) into a 500ml Erlenmeyer flask. Place a funnel in neck of the flask and add a little at a time 1+1 HCl until the CaCO_3 dissolves. Add 200 ml distilled water and boil for few minutes to expel CO_2 . Cool and add few drops of methyl red indicator adjust the colour to intermediate orange colour by adding NH_4OH (3N) or 1+ 1 HCl as required. Transfer the solution to volumetric flask and dilute to 1000 ml. Discard the solution if any precipitate or growth is found.

1ml CaCO_3 solution is equivalent to 1 mg CaCO_3

iv. Indicator

- a. Erichrome Black -T (EBT) – Sodium salt of 1 (1- hydroxyl, 2 naphthylazo) 6- nitro – 2 naphthol -4 sulphonate is a dye having 203 no. in the colour index. EBT is used in powder form with sodium chloride, NaCl. Mix 0.5 g EBT with 100 g of NaCl , grind together in mortar to obtain homogenous mixture of 40- 50 mesh size. Use 0.2 to 0.4 g per 100 ml sample for each titration.
- a. Calmagite – 1-(1- hydroxyl -4 methyl, -2 phenylazo) 2 naphthol -4 sulphonic acid is a dye produce same colour change as EBT when titrated for hardness estimation. It has a more sharp end point. Dissolve 0.1 g calmagite in 100 ml distilled water. Use 1 ml indicator per 100 ml sample to be titrated.

II. Calcium Hardness as CaCO_3

i. Standard EDTA solution (0.01 M) – Dissolved 3.723 g AR grade Ethylene diamine tetra acetic acid (EDTA) di-sodium salt $\text{NaCl10H12O}_8\text{N}_2 \cdot 2\text{H}_2\text{O}$ in distilled water and dilute to 1 lit. Standardize it against standard calcium solution. Standard EDTA titration 0.01 (M) is equivalent to 400.8 μg calcium/ml.

ii. Sodium Hydroxide NaOH (1N)

iii. Indicators

- a. Murexide (Ammonium Purpurate) – Changes from pink to purple at the end point. Prepare by mixing 200 g dye in 100 g solid Sodium chloride, NaCl grind it to 40-50 mesh. This indicator is unstable in alkaline condition.
- b. Eriochrome Blue Black RC – Mix 200 mg dye with 100 g NaCl and grind it to 40 -50 mesh , 0.2 to 0.4 g of the mixture is the required for each titration. During the course of titration, the colour changes from red through purple bluish purple to a pure blue without any trace of reddish or purple tinge. pH of the sample may be raised to 14 by adding 8 N NaOH in order to get a sharper colour change

iv. Standard Calcium Solution – Weigh 1.0 g anhydrous CaCO₃ (Calcium Carbonate) powder (primary standard) with low heavy metals, alkalis and magnesium into a 500 ml Erlenmeyer flask. Place a funnel in the neck and add a little at a time (1+1) HCl until the CaCO₃ dissolves. Add 200 ml distilled water and boil for few minutes to expel CO₂. Cool and add few drops of methyl red indicator, adjust the colour to intermediate orange colour by adding 3N NH₄OH or 1+1 HCl as required. Transfer the solution to volumetric flask and dilute 101 lit. Discard the solution if any precipitate or growth is found.

1ml CaCO₃ solution is equivalent to 1 mg CaCO₃

III. Pretreatment of Polluted Water and Water Samples

Mix the sample and transfer a suitable volume (50 -100 ml) to a 125 ml conical flask .Add 4 ml conc. HNO₃ and few boiling chips or glass beads. Boil slowly on

a evaporate on a hot plate (to about 10-20 ml) before precipitation occurs. Continue heating and addition of conc HNO₃ as necessary until digestion is complete, as shown by a light coloured clear solution. Do not let the sample dry during digestion. Wash the flask or beaker walls with water and then filter if necessary. Transfer the filtrate to 100 ml volumetric flask and dilute to mark. Ensure that all the digested trace of sample is transferred. Generally fresh water or ground water samples do not require any pretreatment.

PROCEDURE

I. Total Hardness as CaCO₃ is determined as follows:

Take 50 ml sample in a conical flask. Add 2 ml ammonia buffer solution and a pinch of EBT indicator. Titrate with standard EDTA solution slowly with continuous stirring, until wine red colour change to blue end point.

II. Calcium hardness as CaCO₃ is determined as follows:

Take 50 ml sample in a conical flask add 2 ml of NaOH solution and pinch of calcium indicator. Titrate with standard EDTA solution, slow with continuous stirring until colour changes to blue end point.

CALCULATION

Magnesium as equivalent CaCO_3 may easily be estimated as the difference between total hardness and calcium hardness as CaCO_3 :

Magnesium as mg/l =

$(\text{Total Hardness as mg CaCO}_3/\text{l} - \text{Calcium Hardness as mg CaCO}_3/\text{l}) \times 0.243.$

4.3.2.12 TOTAL SUSPENDED SOLIDS

APPARATUS

1. Filtration assembly with suction flask and pump.
2. Whatman filter paper GF/C grade
3. Drying Oven, for operation at $103 - 105^\circ\text{C}$
4. Analytical balance capable of weighing 0.1 mg.
5. Desiccator, provided with a desiccant
6. Forceps

PROCEDURE

1. Assemble the filtration assembly and place the dried and pre-weighed filter paper.
2. Wet the filter paper with small volume of distilled water.
3. Select appropriate volume of homogenous sample.
4. Apply suction and transfer the sample to the filtration
5. Wash with three successive 10 ml volume of distilled water.
6. Continue suction for about 3 min after filtration is complete.
7. Remove the filter paper using forceps and transfer to the Petri dish.
8. Dry for at least 1 hr at $103 - 105^\circ\text{C}$. Prolong drying if, the sample is not covered for at least 6-12 hours
9. Cool in a desiccator and weigh.
10. Repeat the cycle of drying, cooling and weighing until a constant weight is obtained.

CALCULATION

Total Suspended Solids, mg/l = $\frac{(A - B)}{V} \times 106$

V

Where,

A = weight of the filter paper + dried residue, gm

B = weight of the filter paper, gm

V = Volume of sample, ml.

4.3.2.13 OIL & GREASE

APPARATUS

- a. Separating funnel, @-L, with TEF* stopcock.
- b. Distillation flask, of 125 ml capacity
- c. Liquid funnel, glass
- d. Filter paper, 11 –cm diameter
- e. Centrifuge, capable of spinning at least four 100 – ml glass centrifuge tubes at 2400 rpm or more.
- f. Centrifuge tubes, 100 –ml glass.
- g. Water bath, capable of maintaining 85^o C.
- h. Vaccum pump or other source of vaccum.
- i. Distilling adapter with drip tip. Setup of distillate recovery apparatus.
- j. Ice bath.
- k. Waste receptacle, for used solvent
- l. Desiccator.
- m. Balance

REAGENTS

- a. Hydrochloric acid or Sulfuric acid, 1:1: Mix equal volume of either acid and reagent water.
- b. n- Hexane, 85% minimum purity.
- c. Sodium sulfate, Na₂SO₄, anhydrous crystal. Dry at 200^o – 250^o C for 24 h

PROCEDURE

- a. Place 1 lit. or appropriate volume of the sample in a suitable separating funnel
- b. Add 5 ml HCl (1:1) or 1:1 H₂SO₄ per litre to bring down the pH 2 or lower
- c. Rinse the sample bottle with 30 ml solvent and the washing to the separatory funnel and shake vigorously for 2 minutes.
- d. After separation of two layers, draw the aqueous phase into a clear container and transfer the solvent layer through a filter paper and 10 g Na₂

SO₄, both of which have been solvent- rinsed, into a clean, tared distilling flask containing boiling chips, previously weighed distillation flask.

e. Continue the extraction twice and add the solvent extract to the distillation flask wash the container every time with solvent and add to the separatory funnel.

f. Wash the filter paper with an additional 10 to 20 ml of solvent.

g. Distill solvent from flask in a water bath at 85°C. To maximize the solvent recovery, fit distillation flask with a distillation adapter equipped with a drip tip and collect solvent in an ice-bath cooled receiver.

h. When visible solvent condensation stops, replaced bent distillation apparatus with vacuum/air adapter connected to vacuum source. Immediately draw air through flask with an applied vacuum for the final 1 min.

i. Remove the flask from the water bath and cool in desiccator until constant weight is obtained.

CALCULATION

If the organic solvent is free of turbidity, the gain in weight of the distilling flask is mainly due to oil & grease.

$$\text{Oil \& Grease (mg/l)} = \frac{(A - B) \times 1000 \times 1000}{\text{Volume of sample in ml}}$$

Where,

A = Total weight in g. (flask + Oil & grease)

B = Weight of empty flask in g

Express the result in mg/l

4.3.2.14 DISSOLVED OXYGEN

APPARATUS

The bottle used should be of good quality having 300 ml capacity with narrow well fitting ground –glass stopper. It is convenient to have number on bottles stoppers

REAGENTS

1. Manganous sulfate Solution – Dissolve 480 g MnSO₄. 4H₂O, 400 g MnSO₄. H₂O or 364 g MnSO₄ in distilled water. Filter and dilute to 1 litre. This manganese solution should not give a color with starch when added to an acidified to potassium iodide.

2. Alkali iodide azide solution:

a) Dissolve 500 g of NaOH or (700 g of KOH) and 150 g of KI in distilled water to make 1 litre of solution. Add 10 g NaN₃ dissolved in 40 ml distilled water. Potassium and sodium salts may be used interchanged reagent should not give color with starch solution when diluted and acidified.

3. Sulfuric acid conc.

4. Starch Indicator – Make a smooth paste of 5 g soluble starch in cold water and pour this into 1 litre boiling water with constant stirring. Boil for one minute

and allow to cool before use. Use clear supernatant. Preserve with 1.25 g salicylic acid or by adding a few of toluene.

5. Sodium Thiosulphate stock solution- Dissolve 6.205 g sodium thiosulfate pentahydrate, (Na₂S₂O₃ · 5H₂O) in 1 lit. Add 1.5 ml 6N NaOH or 0.4 g solid NaOH and dilute to 1000 ml. Standardize with bi-iodate solution

6. Standard Potassium bi-iodate solution, 0.0021M – Dissolve 812.4 mg KH(IO₃)₂ in distilled water and dilute to 1 lit. The solution is stable for a long period if stored in dark glass stoppered bottle.

7. Standardisation – Dissolve approximately 2 g KI, free from iodate, in an Erlenmeyer flask with 100 to 150 ml distilled water. Add 1 ml 6N H₂SO₄ or a few drops of conc. H₂SO₄ and 20.0 ml standard bi-iodate solution. Dilute to 200 ml and titrate liberated iodine with thiosulfate titrant, adding starch towards end of titration, when a pale straw color is reached. When the solution is equal strength, 20.0 ml 0.025 M Na₂S₂O₃ should be required. If not, adjust the Na₂S₂O₃ solution to 0.025M

POROCEDURE

1. Fill the bottle without turbulently exposing the sample to the air.
2. Add 1 ml MnSO₄ solution, followed by 1 ml alkali-iodide azide reagent.
3. Stopper carefully to exclude air bubbles and mix by inverting bottle a few times
4. Let the precipitate has settled sufficiently (approximately half the bottle volume) to leave clear supernate above the manganese hydroxide floc, add 1.0 ml conc. H₂SO₄
5. Restopper and mix by inveting several times until dissolution is complete.
6. Titrate a volume corresponding to 200 ml original sample after correction for sample loss by displacement with reagent. { for a total of 2 ml (1 ml each) of MnSO₄ and alkali –iodide- azide reagents in a 300 ml bottle, titrate 200 x $300/(300 - 2) = 201 \text{ ml}$ }

7. Titrate with 0.025 M Na₂S₂O₃ solution to a pale straw color.
8. Add a few drops of starch solution and continue titration upto first disappearance of blue color.

CALCULATION

For titration of 200 ml sample, 1 ml 0.025M Na₂S₂O₃ = 1 mg DO/L

4.3.2.15 BIOCHEMICAL OXYGEN DEMAND (BOD)

APPARATUS

- a. Incubation Bottles: 300 ml capacity narrow neck special BOD bottles with planed mouth with ground glass stoppers. New bottles should be cleaned with 6 N Hydrochloric acid or sulphuric acid followed by rinsing with distilled water. In normal use, bottles incase used for Wrinklers procedure (estimation of Dissolved Oxygen) shall only be rinsed with tap water followed by distilled water.
- b. Air Incubators: air incubation with thermostatically controlled 27°C ± 1°C . Avoid light to prevent possibility of photosynthetic production of oxygen.

REAGENTS

- a. Phosphate Buffer Solution: Dissolve 8.5 g potassium dihydrogen phosphate (KH₂PO₄), 21.75 g potassium hydrogen phosphate (K₂HPO₄) 3.4 g disodium hydrogen phosphate (Na₂HPO₄.7H₂O) and 1.7 g ammonium chloride (NH₄Cl) in about 500 ml distilled water and dilute to 1 lit. The pH of the solution should be around 7.2 ± 0.1 when measured by pH meter without any further adjustment.
- b. Magnesium Sulphate Solution : Dissolve 22.5 g magnesium sulphate (MgSO₄.7H₂O) is distilled water and dilute to 1 lit.
- c. Calcium Chloride solution : Dissolve 27.5 g calcium chloride (CaCl₂) in distilled water and dilute to 1 lit.
- d. Ferric Chloride solution : Dissolve 0.25 g hydrated ferric chloride (FeCl₃.6H₂O) in distilled water.
- e. Acid and Alkali solution:
 1. 1 N Sodium Hydroxide : Dissolve 40 g sodium hydroxide (NaOH) in distilled water and dilute to 1 lit.
 2. 1 N Sulphuric acid : slowly and while stirring, add 28 ml of concentration sulphuric acid (H₂SO₄) to distilled water.
- f. Sodium Sulphite solution: Dissolve 1.575 g sodium sulphite (Na₃SO₃) in 1000 ml distilled water. This solution is not stable prepare freshly before use
- g. Glucose – Glutamic acid solution: Dry reagent grade glucose and reagent grade glutamic acid at 103°C for 1 hr. Add 150 mg of glucose and 150 mg of glutamic acid to distilled water and dilute to 1 lit. Prepare fresh immediately before use.

NOTE: Any of the above solution showing any sign of biological growth should be discarded.

PROCEDURE

- a. Preparation of dilution water : Aerate the required volume of distilled water in a container by bubbling compressed air for 8 to 12 hours to attain dissolved oxygen saturation. Let it stabilize for 4 hr at room temperature (around 27⁰C). At the time of use, add 1lit each of phosphate buffer, magnesium sulphate , calcium chloride and ferric chloride for each litre of dilution water.
- b. Seeding : Add 2 to 5 ml of treated waste (obtained either from biological treatment system or from domestic sewage) per litre of dilution water for the samples like untreated industrial wastes. Disinfected waste, high temperature waste, waste with extreme pH values for seeding purpose.
In case of sample like domestic wastewater, unchlorinated or otherwise undisinfected effluent from biological waste treatment plants and surface waters receiving wastewater discharges contain satisfactory microbial population, seeding is not required since these types of samples contain sufficient microorganisms for degradation purpose.
- c. Sample pre-treatment:
 1. Neutralize samples containing alkalinity or acidity to pH 6.5 to 7.5 using alkali or acid of such strength that the quantity of reagents does not alter the sample by more than 0.5%
 2. If samples containing residual chlorine compounds, dechlorinated sample, Sodium thiosulphate (Na₂SO₃) solution as per the procedure given below
Take 50 ml of sample and acidify with addition of 10 ml of 1:1 HCl. Add about 1 g Potassium Iodide (KI). Titrate with 0.025 N Sodium Thiosulphate (Na₂S₂O₃. 5H₂O) using starch indicator. Calculate the

volume of Na₂S₂O₃.5H₂O required per ml of sample and dilute accordingly to the sample to be tested for BOD test.
 3. Sample temperature adjustment: Bring the sample to 27⁰C ±1⁰C before making dilution
- d. Sample volume and dilution Techniques: On the basis of chemical Oxygen demand (COD), determine expected BOD (normally 40 to 60 % of COD may be considered as expected BOD depending upon the strength of waste). Use the following formula for calculating sample volume.

$$\text{Sample volume required in ml per litre of dilution water} = \frac{X}{\text{expected BOD}} \times 1000$$

For keeping 2 dilution, take $X = 2.5$ and 4.0

For keeping single dilution, take $X = 3.0$ or 3.5

Round off to nearest convenient volume fraction.

The following dilutions are suggested:

Types of wastewater	% of dilution suggested
Strong trade waste	0.1 to 1.0%
Raw or settled sewage	1.0 to 5.0 %

Biological treated effluent	-	5.0 to 25.0%
Polluted river water	-	25.0 to 100.05

Note: 1. In case of high BOD sample of 500 and above. Prepare primary dilution with distilled water and the final dilution.

2. Samples of natural surface water bodies like river Lake and marine generally do not require dilution due to low BOD values. For such sample the dilution can be kept 25 to 100 % depending upon the expected BOD.

e. Take require quantity of sample under test in one litre volumetric flask. Dilute to the mark with the dilution water by siphoning from the container. Mix well. Rinse three BOD bottles with the diluted sample and fill up these bottles with the diluted sample. Stopper the bottles immediately after removing the air bubbles.

a. Determination of initial Dissolved Oxygen (DO): Determine initial Dissolved Oxygen (DO) for one bottle and keep two bottles for incubation at 27°C for 72 h (3 days). Prepare six blanks by siphoning out dilution water directly into the bottles. Determine initial DO in two bottles and incubate remaining bottles at 27°C ± 1°C for 72 h (3 days)

During incubation, to ensure proper sealing, add water to the mouth of the bottle

CALCULATION

a) When sample is undiluted

$$\text{BOD}_3, \text{ mg/l} = D1 - D2$$

b) When dilution water, is not seeded

$$\text{BOD}_3, \text{ mg/l} = \frac{D1 - D2}{P} \times 100$$

c) When dilution water is seeded

$$\text{BOD}_3, \text{ mg/l} = \frac{(D1 - D2) - (B1 - B2) f}{P} \times 100$$

Where:

D1 = Initial DO of sample in mg/l

D2 = DO of sample after incubation in mg/l

B1 = DO of seed control before incubation in mg/l

B2 = DO of seed control after incubation in mg/l

P = Percentage dilution of sample (sample volume in ml/10)

f = ratio of seed in diluted sample to seed in control; (percent seed in diluted sample): (percent seed in seed control)

4.3.2.16 CHEMICAL OXYGEN DEMAND (COD)

APPARATUS

Reflux Apparatus: Consisting of a flat bottom, 150 to 250 ml capacity tube with conical glass joint and long air condensers.

Burner or Hot Plate: It is convenient to have a digester block on which series of refluxing sets are connected to have uniform heating to all the tubes. This eliminates the botheration of having separated blank for each sample.

REAGENTS

Standard Potassium Dichromate (0.25 N) : Dissolve 12.259 g. potassium dichromate previously dried at 103°C for 24 hours in distilled water and dilute to 1000ml. This reagent undergoes a six- electron reduction reaction; the equivalent conc. is 6×0.04167 or 0.25 N.

Sulphuric Acid: Add Ag_2SO_4 , reagent or technical grade, crystals or power, to conc. H_2SO_4 at the rate of 5.5 g Ag_2SO_4 /kg H_2SO_4 . let stand 1 to 2 d to dissolve Mix.

Standard Ferrous Ammonium Sulphate (0.25 M) : Dissolve 98 g of $\text{Fe}(\text{NH}_4)_2(\text{SO}_4)_2 \cdot 6\text{H}_2\text{O}$ in distilled water. Add 20 ml conc. H_2SO_4 and cool and dilute to 1 litre. Standard this solution daily against the standard $\text{K}_2\text{Cr}_2\text{O}_7$.

PROCEDURE

Standardization: Dilute 25 ml standard $\text{K}_2\text{Cr}_2\text{O}_7$ solution to about 100 ml distilled water. Add 30 ml conc. H_2SO_4 and cool. Add 3-4 drops of ferroin indicators and titrate with ferrous ammonium sulphate till the colour change to wine red.

Normality of Ferrous ammonium sulphate = $25 \times 0.25/\text{ml Fe}(\text{NH}_4)_2(\text{SO}_4)_2$

Ferroin Indicators: Dissolve 1.485 g 1.10 phenanthroline monohydrate and 695 mg $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$ in water and dilute to 100 ml . This indicator solution could be purchased already prepared.

Mercuric Sulphate: HgSO_4 crystal

Place 0.4 HgSO_4 in a reflux tube. Add 20 ml of sample or an aliquote of sample diluted to 20 ml with distilled water. Mix well, so that chloride are converted into poorly ionized mercuric chloride. Add 10 ml standard $\text{K}_2\text{Cr}_2\text{O}_7$ followed by slowly 30 ml sulphuric acid which already contains silver sulphate. This slow addition along with swirling prevents loss of volatile materials such as fatty acid, in the sample. Mix well if the colour turns green, either take fresh sample with smaller aliquot or add more dichromate and acid. Final conc. Of conc. Sulphuric acid should be always 50%.

Connect the tube to condenser and reflux for 2 hrs. Cool and wash down the condensers with small quantity of distilled water. Remove the flask and add about 80 ml distilled

water. Cool and titrate against standard ferrous ammonium sulfate using ferrion as indicator. Colour changes sharply from green to wine red.

Reflux a reagent blank under identical conditions, preferably simultaneously with the sample.

ALTERNATE PROCEDURE FOR LOW –COD SAMPLES (BELOW 50 mg/l)

The method is same as for the high –COD sample except in this case the concentration of K₂Cr₂O₄ and ferrous ammonium sulfate 0.025N. Exercise extreme care with this procedure because even a trace of organic matter in the glassware of the atmosphere may cause a gross error. COD values upto 160 mg/l can be estimated by this procedure

CALCULATION

$$\text{COD as mg O}_2\text{/L} = \frac{(a-b) N \times 8000}{\text{ml of sample}}$$

Where,

a – is the ml Fe (NH₄)₂(SO₄) required for blank

b – is the ml Fe(NH₄)₂(SO₄) required for sample

N- is the normality of Fe(NH₄)₂(SO₄)

4.3.2.17 IRON (Fe)

APPARATUS

1. Spectrophotometer: For use at 510 nm, providing a light path of 1 cm or longer.
2. Acid-washed Standard Volumetric Glassware.

REAGENTS

1. Hydrochloric Acid: Concentrated (11 N) containing less than 0.00005 percent iron.
2. Hydroxylamine Solution: Dissolve 10 g of NH₂OH.HCl in 100 ml water. This solution is stable for at least one week.
3. Ammonium Acetate Buffer Solution: Dissolve 250 g NH₄C₂H₃O₂ in 150 ml water. Add 700 ml glacial acetic acid. Prepare new reference standards with each buffer preparation.
4. 1,10 Phenanthroline Solution: Dissolve 100 mg 1,10 phenanthroline monohydrate, C₁₂H₈N₂.H₂O, in 100 ml water, by stirring and heating to 80°C. Do not boil. Discard the solution, if it darkens. Heating is not necessary if 2 drops conc HCl are added to the water. This solution is stable for at least one week.
5. Stock Iron Solution: Add carefully and with constant stirring 20 ml conc. H₂SO₄ to 50 ml water contained in 250 ml beaker and dissolve 1.404 g Fe (NH₄)₂(SO₄)₂.6H₂O.

Add 0.1 N potassium permanganate drop wise until a faint pink color persists. Transfer quantitatively to a 1000 ml volumetric flask and make up to the mark with water and mix (1.0 ml = 200 µg of Fe).

6. Standard Iron Solutions: Pipette out 50.0 ml stock solution into a 1000 ml volumetric flask and make up to the mark with water and mix well (1.0 ml = 10.0 µg of Fe).

Pipette 5.0 ml stock solution into a 1000 ml volumetric flask and make up to the mark with water and mix well (1.0 = 1.0 µg of Fe)

Note: Prepare standard iron solutions daily for use.

PROCEDURE

Calibration Curve: Pipette out appropriate portions of standard iron solution into 125 ml conical flasks to contain from 10 to 100 µg of Fe. For the reagent blank, pipette out 10 ml of water to a separate conical flask. Dilute the contents of each conical flask to about 50 ml by adding water. To each flask, add 1 ml $\text{NH}_2\text{OH}\cdot\text{HCl}$ solution and 2 ml conc. HCl. Add a few boiling chips and boil acetate buffer solution first and add 10 ml 1,10 phenanthroline solution to each flask. Dilute to 100 ml with water and mix thoroughly and allow to stand for 10 to 15 min. Measure the absorbance of the blank. Construct a calibration curve by plotting absorbance values against micrograms of iron in 100 ml of the final solution.

Determination of Total Iron: If the sample contains an excessive amount of organic matter, then sample is digested with HNO_3 and H_2SO_4 (by adding 5 ml of Con. HNO_3 and 10 ml Con. H_2SO_4 heat until a clear results. Cool transfer quantitatively to a 100 ml volumetric flask. Dilute up to the mark with water, and mix well) and the iron present is separated by extraction.

Color Development and Measurement:

Soluble iron (for filtered sample direct determination): Pipette out a portion of filtered sample containing 50-60 µg of iron in 150 ml conical flask. Dilute the contents of conical flask to about 50 ml by adding water. Add 1 ml $\text{NH}_2\text{OH}\cdot\text{HCl}$ solution and 2 ml conc HCl. Add a few boiling chips and boil the solution until the volume is reduced to about 20 ml. Cool to room temperature and quantitatively transfer to 100 ml volumetric flasks. Add 10 ml ammonium acetate buffer solution first and add 10 ml 1, 10 phenanthroline solution to each flask. Dilute to 100 ml with water and mix thoroughly and allow to stand for 10 to 15 min. Measure the absorbance of the iron complexes at 510 nm against the reagent blank.

For Samples after digestion and extraction: Add 1 ml of $\text{NH}_2\text{OH}\cdot\text{HCl}$ solution, add 10 ml ammonium acetate buffer solution and then add 10 ml 1, 10 phenanthroline solution to each flask. Ten ml of phenanthroline solution in to the volumetric flasks containing extracted iron. Dilute to 100 ml with water, mix thoroughly and allow to stand for 10 min. Measure the absorbance of the iron-complex at 510 nm against the reagent blank prepared in an identical manner (using water instead of the sample solution). Determine micrograms of iron in the solution from the absorbance reading, by referring to the calibration curve.

CALCULATION

Soluble Iron (Direct determination without the Digestion Step):

$$\text{mg of Fe/l} = \frac{\mu\text{g of Fe (in 100 ml of the final solution)}}{V}$$

Where,

V = Volume in ml of the sample used.

Total Iron (When the Digestion is carried out)

$$\text{mg of Fe/l} = \frac{\mu\text{g of Fe (in 100 ml of the final solution)}}{V_1 \times V_2} \times 100$$

Where,

V₁ = volume in ml of the sample used, and

V₂ = total volume in ml of digested solution used for Fe determination.

4.3.2.18 FLUORIDE (F)

APPARATUS

Spectrophotometer, for use at 570 nm, providing a light path of at least 1 cm.

REAGENTS

1. Stock Fluoride Solution: Dissolve 221.0 mg anhydrous sodium fluoride, NaF, in distilled water and dilute to 1000 ml; **1.00 ml = 100 µg F⁻**.
2. Standard Fluoride Solution: Dilute 100 ml stock fluoride solution to 1000 ml with **distilled water; 1.00 ml = 10.0 µg F⁻**.
3. SPADNS Solution: Dissolve 958 mg SPADNS, sodium 2-(parasulfophenylazo)-1,8-dihydroxy-3,6-naphthalene disulfonate, also called 4,5-dihydroxy-3-(parasulfophenylazo)-2,7-naphthalenedisulfonic acid trisodium salt, in distilled water and dilute to 500 ml. This solution is stable for at least 1 year if protected from direct sunlight.
4. Zirconyl-acid Reagent: Dissolve 133 mg zirconyl chloride octahydrate, ZrOCl₂.8H₂O, in about 25 ml distilled water. Add 350 ml conc HCl and dilute to 500 ml with distilled water.
5. Acid Zirconyl-SPADNS Reagent: Mix equal volumes of SPADNS solution and Zirconyl -acid reagent .The combined reagent is stable for atleast 2 years.
6. Reference solution: Add 10 ml SPADNS solution to 100 ml distilled water .Dilute 7 ml conc Hcl to 10 ml and add to the diluted SPADNS solution .The resulting solution ,used for setting the instrument reference point (zero) ,is stable for at least 1 year . Alternatively, use a prepared standard Of 0 mg F⁻ /L as a reference.

7. Sodium Arsenite Solution: Dissolve 5.0 g NaAsO₂ and dilute to 1 L with distilled water. (Caution: Toxic-avoid ingestion.)

PROCEDURE

1. Preparation of Standard Curve: Prepare fluoride standards in the range of 0 to **1.40 mg F⁻/L** by diluting appropriate quantities of standard fluoride solution to 50 ml with distilled water. Pipet 5.00 ml each of SPADNS solution and zirconyl-acid reagent, or 10.00 ml mixed acid-zirconyl-SPADNS reagent, to each standard and mix well. Avoid contamination. Set photometer to zero absorbance with the reference solution and obtain absorbance readings of standards. Plot a curve of the milligrams fluoride-absorbance relationship. Prepare a new standard curve whenever a fresh reagent is made or a different standard temperature is desired. As an alternative to using a reference, set photometer at some convenient point (0.300 or 0.500 absorbance) with **the prepared 0 mg F⁻/L standard.**

2. Sample Pretreatment: If the sample contains residual chlorine, remove it by adding 1 drop (0.05 ml) NaAsO₂ solution/0.1 mg residual chlorine and mix. (Sodium arsenite concentrations of 1300 mg/L produce an error of 0.1 mg/L at 1.0 mg F⁻/L.)

3. Color Development: Use a 50.0 ml sample or a portion diluted to 50 ml with distilled water. Adjust sample temperature to that used for the standard curve. Add 5.00 ml each of SPADNS solution and zirconyl-acid reagent, or 10.00 ml acid-zirconyl-SPADNS reagent; mix well and read absorbance, first setting the reference point of the photometer as above. If the absorbance falls beyond the range of the standard curve, repeat using a diluted sample.

CALCULATION

$$\text{mg F}^{-}/\text{L} = \frac{A}{\text{ml sample}} \times \frac{B}{C}$$

Where,

A = $\mu\text{g F}^{-}$ determined from plotted curve,

B = final volume of diluted sample, ml, and

C = volume of diluted sample used for color development ml.

When the prepared 0 mg F⁻/L standard is used to set the photometer, alternatively calculate fluoride concentration as follows;

$$\text{mg F}^{-}/\text{L} = \frac{A_0 - A_x}{A_0 - A_1}$$

Where,

A₀ = absorbance of the prepared 0 mg F⁻/L standard,

A₁ = absorbance of the prepared 1.0 mg F⁻/L standard,

A_x = absorbance of the prepared sample.

4.3.2.19 COLOR

APPARATUS

1. Nessler cylinders: 50 ml capacity.
2. Centrifuge or filter assembly: With glass fibre filters or membrane filters with functional pore sizes of approximately 0.45 µm.

REAGENT

1. Standard Chloroplatinate Solution: Dissolve 1.246 g potassium chloroplatinate (equivalent to 500 mg metallic platinum) and 1.00 g crystalline cobaltous chloride (equivalent to 250 mg metallic cobalt) in distilled water containing 100 ml of concentrated hydrochloric acid. Dilute to 1000 ml with distilled water. This standard solution is equivalent to 500 color units.

2. PREPARATION OF STANDARDS:

Prepare standards having color units of 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 60 and 70 by diluting 0.5, 1.0, 1.5, 2.0, 2.5, 3.0, 3.5, 4.0, 4.5, 5.0, 6.0 and 7.0 ml standard chloroplatinate solution with distilled water to 50 ml. Use distilled water as 0 unit standard.

Protect these standards against evaporation and contamination by use of clean inert stoppers. The standards should also be protected against absorption of ammonia, which causes increase in color.

PROCEDURE

Apparent Color: Observe the color of the sample by filling a matched Nessler cylinder to the 50 ml mark with water and compare with standards. Compare by looking vertically downward through the cylinders towards a white surface placed at such an angle that light is reflected upwards through the column of liquid. If turbidity has not been removed, report the colour as '**apparent color**'. **If the color exceeds 70 units, dilute the sample with distilled water until the color is in the range of the standards.**

True Color: Remove turbidity by centrifuging or filtering sample until the supernatant liquid is clear. Compare the centrifuged or filtered sample with distilled water to ensure that turbidity has been removed. If the sample is clear, then compare with the standards as given in above procedure.

CALCULATION

$$\text{Color units} = \frac{50A}{V}$$

Where,

A = estimated color of diluted sample, and
V = volume in ml of sample taken for dilution.

4.3.2.20 ODOUR

PREPARATION OF APPARATUS

Thoroughly clean the required number of wide-mouth glass-stoppered bottles of about one litre capacity. Rinse them with hydrochloric acid and render them completely odourless by repeated washing with odour-free distilled water, which can be prepared by passing distilled water through a column of granulated activated carbon.

PROCEDURE

1. As soon as possible after collection of sample, fill the bottle half-full of sample, insert the stopper, shake vigorously two to three seconds and then quickly observe the odour. The sample taken for observation of odour shall be at room temperature .
2. When it is desired to record the odour at an elevated temperature, make the observation after warming the sample in a clean stoppered bottle to about 60°C.

REPORT

Report the true odour of the sample at the mouth of the bottle as rotten egg, burnt sugar, soapy, fishy, septic, aromatic, chlorinous, alcoholic odour, or any other specific odour. In case it is not possible to specify the exact nature of odour, report as agreeable or disagreeable.

4.3.2.21 CHLORINE RESIDUAL

APARATUS

- i Erlenmeyer flask-500ml
- ii burette-50ml
- iii pipettes-50ml, 25ml

REAGENTS

- i Acetic acid glacial
- ii Potassium iodide-crystals
- iii Standard sodium thiosulphate-0.01 N
- iv Standard potassium dichromate-0.1N
- v Starch indicator solution

PROCEDURE

Select sample volume which will require not more than 20 ml of 0.01N sodium thiosulphate. Thus for residual chlorine concentration of 1 mg/l or less, take 1000ml of sample, for range of 1 to 10 mg/l, a 500 ml of sample and above 10 mg/l proportionately less sample.

Take appropriate volume of the sample and add acetic acid to bring down the pH to 3 to 4 in the flask. Add about 1.0 g of potassium iodide crystals and mix with a glass rod.

Titrate with 0.01N sodium thiosulphate until yellow colour of the liberated iodine is almost discharged. Add 1.0 ml of starch indicator and titrate until the yellow colour is discharged.

CALCULATION

Residual chlorine, mg/l = Vol. of thio used x strength of thio x 35450 / Vol. of sample taken.

4.3.2.22 PHENOLS (as C₆H₅OH)

APPARATUS

- i Spectrophotometer- For use at 460 nm and equipped with 1 cm cells
- ii Buchner type with fritted disc.
- iii Filter paper
- iv pH meter
- v Separating funnel-1000 ml capacity

REAGENTS

All reagents should be prepared with distilled free from phenols and chlorine.

i Phenol stock solution-Dissolve 1.0 g phenol in freshly boiled and cooled distilled water and dilute to 1000 ml.

ii Intermediate phenol solution-Dilute 10.0 ml of stock phenol solution in freshly boiled and cooled distilled water to 1 litre. Prepare daily.

$$1\text{ml} = 100\ \mu\text{g of phenol}$$

iii Standard phenol solution- Dilute 50.0 ml of in intermediate phenol solution to 500ml with freshly, boiled cooled distilled water.

$$1\text{ml} = 1\ \mu\text{g of phenol}$$

iv Ammonium hydroxide- 0.5 N dilute 35 ml of fresh concentrated ammonium hydroxide to 1000 l with distilled water.

v Phosphate buffer solution-Dissolve 104.5 g of potassium hydrogen phosphate and 72.3 g of potassium dihydrogen phosphate in distilled water and dilute to 1 litre. The pH of the resulting solution should be 6.8

vi 4-amino antipyrine solution-Dissolve 2.0 g of 4-aminoantipyrine in distilled water and dilute to 100 ml. Prepare daily.

vii Potassium ferricyanide solution- Dissolve 8.0 g of material in water and dilute to 100 ml. Prepare fresh weekly.

viii Chloroform

ix Sodium sulphate-Anhydrous

PROCEDURE

Preliminary step or steam distillation

Measure 500 ml of sample into a beaker. Lower the pH to approximately 4.0 with 8.5 % phosphoric acid.

Transfer to the distillation apparatus made up of glass, consisting of a 1 litre borosilicate glass distilling apparatus with graham condenser.

Distill 450 ml of sample and stop the distillation. When boiling ceases, add 50 ml of warm distilled water to the distilling flask and resume distillation until 500 ml have been collected.

Extraction and colorimetric detection

Place 500 ml of distillate in a 1 litre beaker, add 12.0 ml of 0.5N ammonium hydroxide and adjust pH to 7.9 ± 0.1 with phosphate buffer.

Transfer to a 1 litre separating funnel, add 30. ml of aminoantipyrine solution, mix well and add 3.0 ml of potassium ferricyanide and let colour develop for 3 minutes.

Extract immediately with chloroform using 25 ml. Let chloroform settle, shake again for 10 minutes and let the chloroform settle again.

Filter each chloroform extract through filter paper containing a 5 g of layer of anhydrous sodium sulphate. Make up the volume to 25 ml.

Read absorbance of sample and standards against the blank at 460nm.

Prepare a standard curve by plotting the absorbance values of standards versus corresponding phenol concentrations.

CALCULATION

Concentration of phenol, $\mu\text{g/l} = \frac{C}{V} \times 1000$

Where,

C=Concentration of phenol in μg in sample from the calibration curve

V=Volume in ml of original sample

4.3.2.23 CYANIDE (as CN)

APPARATUS

Boiling flask-1 litre, with inlet tube and provision for water cooled condensers.

Heating Mantle

Gas absorber-with gas dispersion tube equipped with medium porosity fritted outlet.

Ground glass ST joints-TFE sleeved or with an appropriate lubricant for the boiling flask and condenser. Neoprene stopper and plastic threaded joints may also be used.

Spectrophotometer-for use at 620 nm, providing a light path of 1 cm.

REAGENTS

Sodium hydroxide solution-Dissolve 50 g sodium hydroxide in 1 litre distilled water.

Lead carbonate-Powdered

Sulphamic acid ($\text{NH}_2\text{SO}_3\text{H}$).

Magnesium chloride solution-Dissolve 51 g magnesium chloride ($\text{MgCl}_2 \cdot 6\text{H}_2\text{O}$) in 100 ml distilled water.

Sulphuric acid concentrated

Sodium hydroxide solution (0.2N)-Dissolve 8.0 g sodium hydroxide in 1 litre distilled water.

Acetic acid-Make by diluting 1 part of glacial acid with 4 parts of water.

Stock cyanide solution-Dissolve 2.51 g potassium cyanide in 1 litre water; standardize this solution with 0.0192N silver nitrate solution. The solution loses strength gradually and must be rechecked every week.

1 ml of this solution = 1 mg CN

Standard cyanide solution- Dilute 10 ml stock cyanide solution (6.8) to 1 litre with distilled water, mix and make a second dilution of 10 ml to 100 ml.

1 ml = 1 μg CN

Chloramine T- Dissolve 1 g of chloramine T in 100 ml of distilled water.

Pyridine

1-Phenyl 3-methyl 5-pyrazolone solution- Prepare a saturated aqueous solution (approximately 0.5 g/100 ml) by adding the pyrazolone to water at 75°C. agitate occasionally as the solution cools to room temperature.

Bis-pyrazolone (3, 3'-dimethyl 1-diphenyl) (4, 4'-bis-2-pyrazolone) (5, 5' dione).

Mixed pyridine pyrazolone reagent- Mix 125 ml of the filtered saturated aqueous solution of pyrazolone with a filtered solution containing 0.025 g bis-pyrazolone dissolve in 25 ml pyridine. Several minutes of mixing is usually necessary to dissolve the bis-pyrazolone in pyridine.

Standard silver nitrate solution- Dissolve 3.27 g of silver nitrate in 1 litre of distilled water.

1 ml of this solution = 1.00 mg CN

PROCEDURE

Distillation

Add 500 ml sample to the boiling flask. Add 10 ml sodium hydroxide solution to gas scrubber and dilute if necessary with distilled water to obtain an adequate liquid depth in the absorber. Do not use more than 225 ml total volume of absorber solution.

When sulphide generation from the distilling flask is anticipated, add 50 or more mg powdered lead carbonate to the absorber solution to precipitate sulphide. Connect the train, consisting of boiling flask air inlet, flask condenser, gas washer, suction flask trap and aspirator. Adjust suction so that approximately 1 air bubble per second enters the boiling flask. This air rate will carry hydrogen cyanide gas through the air inlet. If this air rate does not prevent sample backup in the delivery tube, increase airflow rate to 2 air bubbles per second. Observe air purge rate in the absorber where the liquid level should be raised not more than 6.5 to 10 m.

Maintain airflow through the reaction

Add 2 g of sulphamic acid through the air inlet tube and wash down with distilled water. Add 50 ml of concentrated sulphuric acid through the air inlet tube with distilled water and let air mix flask content for 3 minutes. Add 20 ml of magnesium chloride reagent through air inlet and wash down with stream of water. A precipitate that may form redissolves on heating.

Heat with rapid boiling, but do not flood condenser inlet or permit vapours to rise more than halfway into condenser. Adequate refluxing is indicated by reflux rate of 4 to 5 drops/min from the condenser lip. Reflux for at least 1 hour. Discontinue heating but continue airflow. Cool for 15 minutes and drain gas washer contents into separate container. Rinse connecting tube between condenser and gas washer with distilled water, and rinse water to drained liquid, and make up to 250 ml in a volumetric flask.

Procedure for colorimetric measurement

Transfer 15 ml of distillate to a 50 ml beaker.

To prepare standard solutions for the calibration curve use cyanide

Standard 1 ml = 1 mg CN. Pipette 0 (blank), 0.2, 0.5, 0.8 and 1.0 ml into 50 ml beaker and make up to 15 ml with 0.2N sodium hydroxide solution. Proceed samples and standards in the same manner.

Adjust pH at 6-7 with acetic acid. Transfer to 25 ml volumetric flask.

Add 0.2 ml chloramine T solution and mix. Allow 2 minutes for the reaction

Add 5.0 ml mixed pyridine-pyrazolone reagent and make up to the mark, ml. allow 20 minutes for colour development. 7.3.6 Read absorbance at 620 nm in a 1 cm cell.

As a check on the distillation step, periodically process cyanide standard solutions through the complete procedure.

CALCULATION

Prepare a calibration curve derived by plotting concentration versus absorbance.

Determine the micrograms of cyanide in the sample by comparing on calibration curve.

Calculate the cyanide concentration as follows:

$$\text{mg/L, CN} = \frac{A \times B}{C \times D}$$

Where,

A = cyanide determined in mg by calibration graph.

B = diluted absorbing solution

C = original sample in ml, and

D = sample taken for colorimetric measurement in ml.

4.3.2.24 HEXAVALENT CHROMIUM (as Cr⁶⁺)

APPARATUS

Spectrophotometer for use at 540nm.

pH meter.

REAGENTS

Stock chromium solution- Dissolve 141.4 mg of K₂Cr₂O₇ in water and dilute to 100 ml.
(1ml = 500µg of Cr)

Standard chromium solution- Dilute 1 ml of stock chromium solution to 100 ml
1ml = 5.0 µg of Cr

Conc. Nitric acid

Phosphoric acid

Acetone

Conc. Ammonium hydroxide

Conc. Sulphuric acid, 1:1 and 6N, 0.2N

Methyl orange indicator solution- Dissolve 50 mg methyl orange in 100 ml water.

Potassium permanganate solution- Dissolve 4 g KMnO₄ in 100ml water

Sodium azide solution- Dissolve 0.5 g of sodium azide in 100ml water.

Diphenylcarbazide solution- Dissolve 250 mg of 1 5-diphenylcarbazide in 50 ml acetone.

PROCEDURE

Preparation of calibration curve

Pipette measured volumes of standard chromium ranging from 2 to 20 ml into 100ml beakers. Make up the volume to about 50 ml with water. Use 0.2N H₂SO₄ and pH meter to adjust the pH of each solution to 1.0±3.0.

Transfer quantitatively each of these solutions into 100ml volumetric flasks and add 2.0 ml of diphenylcarbazide solution. Dilute 100 ml with water, mix and let these stand for 5 to 10 minutes for full colour development. Meanwhile, prepare a reagent blank in an identical manner using 10 ml of water.

Measure the absorbance of the standard solutions at 540 nm, using reagent blank as reference solution.

Construct a calibration curve by plotting absorbance values against micrograms of chromium in 100 ml of the final solution.

Determination of hexavalent chromium (Cr⁶⁺)

Pipette a portion of filtered sample containing 10 to 100 µg of Cr into 100 ml beaker. Make up the volume to about 50 ml with water.

Adjust pH of this solution to 1.0±3.0 using 0.2N H₂SO₄ and pH meter.

Transfer quantitatively into a 100 ml volumetric flask; add 2.0ml of diphenylcarbazide solution. Dilute to 100 ml with water, mix well and allow standing for 5 to 10 min.

Measure absorbance at 540 nm, using reagent blank as reference solution. From the absorbance data determine the micrograms of Cr present in 100 ml of final solution using calibration curve.

CALCULATION

Hexavalent chromium mg Cr/l = $\frac{\mu\text{g of Cr (in 100 ml of the final solution)}}{V}$

Where,

V = Volume in ml, of the sample used.

4.3.2.25 AMMONICAL NITROGEN (as N)

APPARATUS

Distillation assembly-Kjeldahl assembly is suitable.

Measuring scoop-**To contain 1 g of Devarda's alloy.**

Spectrophotometer, for use at 400-425 nm.

pH meter.

Nessler tubes.

REAGENTS

Ammonia free water.

Borate buffer solution-Add 88 ml of 0.1N sodium hydroxide to 500 ml of 0.025M sodium tetraborate and make up to 1 litre.

Sodium hydroxide 6N

Devarda's alloy (An alloy of 50% Cu, 45% Al, and 5% Zn)

Reagent for acidimetric titration-Mixed indicator solution- Dissolve 200 mg of methyl red indicator in 100ml of 95% ethylalcohol. Dissolve 100 mg of methylene blue in 50 ml of 95% ethyl alcohol. Combine these two.

Indicating boric acid solution- Dissolve 20 g of hydrochloric acid in ammonia free water, add 10 ml of mixed indicator solution and dilute to 1 litre.

Standard sulphuric acid titrant (0.02N)

Reagent for calorimetric estimation-**Nessler's reagent**- Dissolve 100 g of mercuric iodide and 70 g of potassium iodide in a small quantity of water and add this mixture slowly, with rinsing, to a cool solution of 160 g of sodium hydroxide dissolved in 500 ml of water. Dilute to 1 litre.

Stock ammonia solution- Dissolve 3.819 g of anhydrous ammonium chloride in water and dilute in 1 litre.

Standard ammonia solution- Dilute 10 ml of stock ammonia solution with 1000 ml water.



PROCEDURE

If ammonia has not been determined by a method involving preliminary distillation; dilute a portion of the sample to 500 ml with ammonia free water.

Add 25 ml of borate buffer and adjust to pH 9.5 with 6N sodium hydroxide using a pH meter. Distill 25 to 300 ml into a dry receiving flask and discard. Make sure that the last part of the distillation is conducted with condenser tip out of the liquid in receiving flask.

To the residue after removing ammonia, **add 1 g of Devarda's alloy and sufficient** ammonia free distilled water to bring total volume to 350 ml.

Place in a receiving flask 50 ml boric acid absorbent for each milligram of nitrate nitrogen in the sample.

Immerse the end of condenser in the absorbent. Heat distillation flask until boiling or vigorous bubbling occurs. Reduce heat and distill at the rate of 5 to 10 ml/minute until at least 150 ml distillate has been collected.

Lower receiver so the liquid is below the end of the condenser and continue distillation for 1 to 2 minutes to cleanse condenser.

Determine Ammonical nitrogen either by nesslerization or titration with standard strong acid.

Final ammonia measurement.

Reagent- Mixed indicator solution- Dissolve 200 mg of methyl red indicator in 100 ml of 95% isopropyl alcohol or ethane. Dissolve 100 mg of methylene blue in 50 ml of 95% ethanol. Combine these two. Prepare monthly.

Indicating boric acid solution- Dissolve 20 g of hydroboric acid in ammonia free water, add 10 ml of mixed indicator solution and dilute to 1 litre.

Standard sulphuric acid titrant- 0.02 N (1 ml = 280 µg of nitrogen).

Titration

Titrate ammonia in distillate against standard sulphuric acid until indicator turns pale lavender.

Carry blank through all steps of the process and apply the necessary correction to the results.

Final Ammonia measurement by using spectrophotometer.

Colour development

Use 50 ml of sample or portion dilute to 50 ml of distillate.

Add 1 ml Nessler's reagent, colour develops.

Measure the absorbance at 410 nm.



CALCULATION

Titrimetric method

$$\text{Ammonical nitrogen (NH}_3\text{-N), mg/l} = \frac{(A-B) \times 280}{V}$$

Where,

A= Volume in ml of sulphuric acid titrated for sample

B= Volume in ml of sulphuric acid titrated for blank

V= Volume in ml of sample taken for test

Spectrophotometric method

$$\text{Ammonical Nitrogen (NH}_3\text{-N), mg/l} = A \times \frac{B}{V} \times C$$

Where,

A= μg of ammonical nitrogen in 51 ml of final volume

B= Total volume of distillate collected in ml including acid absorbents

V= Volume in ml sample taken for test

C= Volume in ml of total distillate take for nesslerization.

4.3.2.26 PHOSPHOROUS (as P)

APPARATUS

Spectrophotometer and its accessories

Whattman No.42

Glasswares.

REAGENTS

Phenolphthalein solution

Hydrochloric acid-1:1

Activated carbon

Vanadate-molybdate reagent

Solution A- Dissolve 25 g of ammonium molybdate in 300 ml of distilled water.

Solution B- Dissolve 1.25 g of ammonium metavanadate by heating to boiling in 300 ml of distilled water. Cool and add 300 ml of conc. hydrochloric acid. Cool to room temperature. Pour solution A and B mix and dilute to 1 litre.

Standard phosphate solution- Dissolve 219.5 mg of anhydrous potassium dihydrogen phosphate in distilled water and dilute to 1000ml.

PROCEDURE

If the sample pH is greater than 10, add 0.05 ml of phenolphthalein indicator to 50 ml of sample and discharge the pink colour with 1:1 hydrochloric acid before diluting to 100 ml.

Remove excessive colour in sample by shaking about 50 ml with 200 mg of activated carbon in an Erlenmeyer flask for 5 minutes and filter to remove carbon.

Place 35 ml sample containing 0.05 to 1.0 mg of phosphorous in a 50 ml volumetric flask. Add 10 ml vanadate-molybdate reagent and dilute to the mark with distilled water.

Prepare blank in which 35 ml of distilled water is substituted for the sample. After 10 minutes or more, measure absorbance of sample versus blank at a wavelength of 470 nm.

Prepare a calibration curve by using suitable volumes of standard phosphate solution and proceeding as given above. Read the concentration of the sample from the calibration curve for the given absorbance.

CALCULATION

$$\text{Phosphorous (P), mg/l} = m \times \frac{1000}{V}$$

Where,

m = mg of phosphorous (in 50 ml of sample)

V = Volume in ml of sample.

4.3.2.27 TOTAL KJELDHAL NITROGEN APPARATUS

Digestion apparatus- Kjeldhal flask with a total capacity of 800 ml yield the best results. The heating device meeting this specification should provide the temperature range of 365°C to 370°C for effective digestion.

Distillation apparatus

Apparatus for ammonia determination

Spectrophotometer

REAGENTS

Zinc sulphate solution

EDTA reagent

Rochelle salt solution

Nessler reagent

Stock ammonium solution 6.6 Standard ammonium solution

Potassium chloroplatinate solution

Cobalt chloride solution

Mercuric sulphate solution

Digestion reagent- Dissolve 134 g of potassium sulphate in 650 ml of water and 200 ml Conc. sulphuric acid. Add with stirring, 25 ml of mercuric sulphate solution. Dilute the combined solution to 1 litre with water. Keep at a temperature to 20°C to prevent crystallization.

Sodium hydroxide- Sodium thiosulphate

Borate buffer solution- Add 88 ml of 0.1 N sodium hydroxide solution to 500 ml of approximately 0.025 M sodium tetraborate solutions and dilute to 1 litre.

Sodium hydroxide 6 N

PROCEDURE

Selection of sample volume and sample preparation.

Place a measured volume of sample in 800 ml Kjeldhal flask. Select sample size from the following table.

Org. N in sample, mg/l	Sample size, in ml
0-1	500
1-10	250
10-20	100
20-50	50
50-100	25

Ammonia removal

Add 25 ml borate buffer and add 6 N sodium hydroxide until pH 9.5 is reached.

If desired, distill this fraction and determine Ammonical nitrogen. Alternatively, if ammonia has been determined by the distillation method, use residue in distilling flasks for organic nitrogen determination.

Digestion

Cool and add carefully 50 ml of digestion reagent to distillation flask. Add a few glass beads and after mixing, heating under hood or with suitable ejection equipment to remove acid fumes.

Boil briskly until the volume is greatly reduced and copious white fumes are observed. Then continue digestion for additional 30 minutes. As digestion continues, coloured or turbid samples will turn clear or straw coloured.

After digestion, let flask and contents cool, dilute to 300 ml with water and mix. Tilt flasks and carefully add 50 ml of hydroxide thiosulphate to form an alkaline layer at flask bottom.

Connect flask to steamed out distillation apparatus and shake flasks to ensure complete mixing. A blank precipitate of mercuric sulphide will form and the pH should exceed 11.

Distillation

Distill and collect 200 ml of distillate below surface of 50 ml absorbent solution. Use plain boric acid solution when ammonia is to be determined by nesslerization and use indication boric acid for titrimetric finish.

Use 50 ml of 0.04 N sulphuric acid for collecting distillate of absorbent solution and do not let temperature in condenser rise above 29°C. Lower collected distillate free of contact with delivery tube and continuing during last 1-2 minutes to cleanse condenser.

Final ammonia measurement- Use the titration method.

Reagent- Mixed indicator solution- Dissolve 200 mg of methyl red indicator in 100 ml of 95% isopropyl alcohol or ethane. Dissolve 100 mg of methylene blue in 50 ml of 95% ethanol. Combine these two. Prepare monthly.

Indicating boric acid solution- Dissolve 20 g of hydroboric acid in ammonia free water, add 10 ml of mixed indicator solution and dilute to 1 litre.

Standard sulphuric acid titrant- 0.02 N (1 ml = 280 µg of nitrogen).

Titration

Titrate ammonia in distillate against standard sulphuric acid until indicator turns pale lavender. Carry blank through all steps of the process and apply the necessary correction to the results.

CALCULATION

Titrimetric method

$$\text{Ammoniacal nitrogen (NH}_3\text{-N), mg/l} = \frac{(A-B) \times 280}{V}$$

Where,

A= Volume in ml of sulphuric acid titrated for sample

B= Volume in ml of sulphuric acid titrated for blank

V= Volume in ml of sample taken for test

4.3.2.28 AMMONIA (as NH³)

APPARATUS

Spectrophotometer for use at 640 nm with a light path of 1 cm

REAGENTS

Phenol solution- Mix 11.1 ml liquefied phenol (≥89%) with 95% v/v ethyl alcohol to a final volume of 100 ml. Prepare weekly.

Sodium nitroprusside, 0.5% w/v- Dissolve 0.5 g sodium nitroprusside in 100 ml deionized water. Store in amber bottle for up to 1 month.

Alkaline citrate- Dissolve 200 gm trisodium citrate and 10 g sodium hydroxide in deionized water. Dilute to 100 ml.

Sodium hypochlorite, commercial solution about 5%- This solution slowly decomposes once the seal on the bottle cap is broken. Replace about every 2 months.

Oxidizing solution- Mix 100 ml alkaline citrate solution with 25 ml sodium hypochlorite. Prepare fresh daily.

Stock ammonium solution- Dissolve 3.819 g of anhydrous ammonium chloride (dried at 100°C) in water, and dilute to 1000 ml.

1.00 ml = 1.00 mg N = 1.22 mg NH₃

Standard ammonium solution- Use stock ammonium solution and water to prepare a calibration curve in a range appropriate for the concentrations of the samples.

PROCEDURE

To a 25 ml sample in a 50 ml Erlenmeyer flask add with thorough mixing after each addition, 1 ml phenol solution, 1 ml sodium nitroprusside solution, and 2.5 ml oxidizing solution.

Cover samples with plastic wrap or paraffin wrapper film. Let colour develop at room temperature (22 to 27°C) in subdued light for at least 1 hr.

Colour is stable for 24 hrs. Measure absorbance at 640 nm.

Prepare a blank and at least two other standards by diluting stock ammonia solution into the sample concentration range. Treat standards the same as samples.

CALCULATIONS

Prepare a standard curve by plotting absorbance readings of standards against ammonia concentrations of standards. Compute sample concentration by comparing sample absorbance with the standard curve.

$$\text{Free ammonia (as NH}_3\text{), mg/l} = \frac{A \times B \times C}{V}$$

Where,

A = μg of ammoniacal nitrogen in 51 ml of final volume

B = total volume distillate collected in ml including acid absorbents

V = volume in ml sample taken for test

C = volume in ml of total distillate taken for nesslerization

4.3.2.29 SULPHIDE

APPARATUS

Reaction flask- Wide mouth bottle of 1 litre capacity, with a 2 hole stopper, fitted with a fritted gas diffusion tube (plastic, ceramic or glass and a gas outlet tube).

Absorption flasks- Two 250 ml capacity long necked flask with 2 hole stoppers fitted with glass tubes and suitable connections to pass gas through in series.

REAGENTS

Zinc acetate solution (2N) - Dissolve 110 g Zn (C₂H₃O₂)₂ · 2H₂O in 400 ml distilled water and finally make up to 1 litre.

Nitrogen gas.

Sulphuric acid concentrated

Standard iodine solution (0.25N) - Dissolve 25 g potassium iodide (KI) to little water and add 3.175 g of iodine. After iodine has dissolved, dilute to 1 litre with distilled water, standardize this solution against 0.025 N sodium thiosulphate using starch indicator.

Hydrochloric acid concentrated

Standard thiosulphate solution (0.025 N) - Dissolve 6.205 g Na₂S₂O₃ · 5H₂O in 800 ml boiled and cooled distilled water. Add 0.4 g of NaOH or 5 ml chloroform as a preservative and finally make up to 1 litre. .7 Starch indicator solution- Add 5 g of starch to 800 ml boiling distilled water and stir. Dilute to 1 litre and boil for few minutes and let settle overnight. Use the clear supernatant.

Aluminium chloride solution (6N) - Take 100g or AlCl₃ · 6H₂O from the reagent bottle and dissolve in 144 ml distilled water.

Sodium hydroxide (6N) - Dissolve 240 g NaOH in distilled water and dilute to 1 litre.

PROCEDURE

Total sulphide

Take 5 ml zinc acetate solution and 95 ml distilled water into each of the two absorption flasks.

Connect the reaction flask and two absorption flasks in series and purge the system with N₂ for 2 minutes. Measure 500 ml well mixed sample into the reaction flask.

Acidify the sample with 10 ml concentrated H₂SO₄ and replace the prepared 2 holes stopper tightly, pass N₂ or CO₂ (not air or oxygen) through the sample for 1 hour or until the experiments show no more sulphide coming over.

To each of the absorption flasks, then add iodine solution well in excess of the amount necessary to react with collected sulphide.

Add 2.5 ml concentrated HCl acid to each flask, stopper and shake to mix thoroughly.

Transfer contents of both flasks and back titrate with 0.025 N sodium thiosulphate solution using starch solution indicator. Run a blank parallel for accurate results.

Dissolved sulphide

Fill 1 litre bottle with following sample in such a way that the sample, which has had the least possible contact with air. Add 2 ml aluminium chloride solution and 2 ml NaOH solution and stopper with no air bubbles under the stopper.

Rotate to and froth about a transverse axis as vigorously as possible for at least 1 minute in order to flocculate the contents thoroughly.

Note: - The volume of these chemicals may be varied according to experience, the idea being to get good clarification without using excessively large amounts. 6.2.3 Allow to settle for 15 minutes or until supernatant liquid is reasonably clear. Alternatively remove suspended matter by centrifugation.

Proceed as for total sulphide after taking 500 ml sample into the reaction flask.

CALCULATION

$$\text{mg/l sulphide} = \frac{(V_1 - V_2) \times 400}{V}$$

Where,

V_1 = volume in ml of standard iodine solution added

V_2 = volume in ml of standard thiosulphate solution used

V = volume in ml of sample taken.

4.3.2.30 ANIONIC SURFACTANTS

APPARATUS:

Spectrophotometer, use at 652nm.

Separator funnels: 500ml, preferably with inert TFE stopcocks and stoppers

CHEMICALS AND REAGENTS:

Stock LAS solution: Weigh an amount of the reference material equal to 1.00g LAS in a 100% active basis. Dissolve in water and dilute to 1000ml. (1.00 ml = 1.00mg LAS)

Standard LAS solution: Dilute 10.00ml stock LAS solution to 1000ml with water. (1.00ml = 10.0 µg LAS).

Phenolphthalein indicator solution- 0.5 g of phenolphthalein in 100 ml 95% alcohol.

Sulfuric acid 1N, 6N.

Sodium hydroxide 1N.

Chloroform.

Methylene blue reagent: Dissolve 100mg methylene blue in 100ml water. Transfer 30ml to a 1000ml flask. Add 500 ml water, 41ml 6NH₂SO₄ and 50g sodium phosphate, monobasic, monohydrate, NaH₂PO₄.H₂O. Shake until dissolved. Dilute to 1000ml.

Wash solution: Add 41ml 6N sulfuric acid to 500ml water in a 1000ml flask. Add 50g NaH₂PO₄.H₂O and shake until dissolved. Dilute to 1000ml.

Methanol.

Hydrogen peroxide 30%.

PROCEDURE:

Preparation of calibration curve:

Prepare an initial calibration curve consisting of at least five ranges of standards. Provided that linearity is demonstrated over the range of interest run daily check standards at the reporting limit and a concentration above the expected samples concentration.

Prepare a series of separating funnels for reagent blank and selected standards. Pipette portions of standard LAS solution into funnels.

Add sufficient water to make the total volume 100ml in each separating funnel. Treat each standard as described in bellow and plot a calibration curve of absorbance vs µg LAS taken, specifying the molecular weight of the LAS used.

Sample size:

For direct analysis of water and wastewater follow the table.

Expected MBAS concentration mg/L	Sample taken ml
0.025-0.080	400
0.08-0.40	250
0.40-2.0	100

If expected MBAS concentration is above 2mg/L, dilute sample containing 40 to 200 µg MBAS to 100ml with water.

For analysis of sample purified by sublation, dissolve sublimate residue in 10 to 20ml methanol, quantitatively transfer the entire amount to 25 – 50ml water, evaporate without boiling until methanol is gone, adding water as necessary to avoid going to dryness, and dilute to about 100ml with water.

Peroxide treatment: If necessary avoid decolorization of methylene blue by sulfides, add a few drops of 30% H₂O₂.

Ion Pairing and extraction:

Add sample to a separating funnel. Make alkaline by drop wise addition of 1N NaOH, using phenolphthalein indicator. Discharge pink color by drop wise addition of 1N sulfuric acid.

Add 10ml CHCl₃ and 25ml methylene blue reagent. Rock funnel vigorously for 30 s and let phases separate. If emulsion forms add < 10 ml of isopropyl alcohol, Add same volume of isopropyl alcohol to all standards. Before draining CHCl₃ layer, swirl gently then let settle.

Draw off CHCl₃ layer into a second separating funnel. Rinse delivery tube of first separating funnel with a small amount of CHCl₃. Repeat extraction two additional times, using 10ml CHCl₃ each time. If blue color in water phase becomes faint, discard and repeat, using a smaller sample.

Combine all CHCl₃ extracts in the second separating funnel. Add 50ml wash solution and shake vigorously for 30 s. Emulsion do not form at this stage. Let settle, swirl, and draw off CHCl₃ layer through a funnel containing a plug of glass wool into a 100 ml volumetric flask; filtrate must be clear. Extract wash solution twice with 10ml CHCl₃ each and add to flask through the glass wool. Rinse glass wool and funnel with CHCl₃. Collect washings in volumetric flask, dilute to mark with CHCl₃, and mix well. Measurement: Determine absorbance at 652 nm against a blank of CHCl₃.

CALCULATION:

From the calibration curve read μg of apparent LAS corresponding to the measured absorbance.

$$\text{mg MBAS/L} = \frac{\mu\text{g apparent LAS}}{\text{ml original sample}}$$

Report as 'MBAS' calculated as LAS mol wt.

4.3.2.31 APPEARANCE

PROCEDURE:

To record the general physical appearance of a sample, use any terms that briefly describe its visible characteristics. These terms may state the presence of color, turbidity, suspended solids, organisms and their immature forms, sediment, floating material, similar particular matter detectable by the unaided eye. Use numerical values when they are available as for color, turbidity and suspended solids.

4.3.2.32 BORON

APPARTUS:

UV VIS Spectrophotometer
Standard Flasks
Evaporating dishes
Water bath set at $55 \pm 2^\circ\text{C}$.

REAGENTS:

Store all reagents in polyethylene or boron free containers.

Stock boron solution: Dissolve 571.6 mg anhydrous boric acid, H_3BO_3 , in distilled water and dilute to 1000ml. 1.00 ml = 100 μg B. Because H_3BO_3 loses weight on drying at 105°C , use high purity analytical reagent quality and keep the bottle tightly stoppered to prevent atmospheric moisture.

Standard boron Solution: Dilute 10.00 ml stock boron solution to 1000ml with distilled water; 1.00ml = 1.00 μg B.

Curcumin Reagent: Dissolve 40 mg finely ground cur cumin and 5.0 g oxalic acid in 80 ml 95%, isopropyl alcohol. Add 4.2 ml Conc. HCl, make up to 100ml with IPA in a 100ml volumetric flask, and filter if reagent is turbid. This reagent is stable for several days if stored in a refrigerator.

SAMPLE TREATMENT:

For waters containing 0.10 to 1.00 mg B/L, use 1.00 ml sample. For water containing more than 1.00 mg B/L make an appropriate dilution with boron free distilled water.

PROCEDURE:

Preparation of calibration curve: Pipette 0 (Blank), 0.25, 0.50, 0.75 and 1.00 μg boron into evaporating dishes of the same type, shape and size. Add distilled water to each standard to bring total volume to 1.0 ml. Add 4.0 ml Curcumin reagent to each and swirl gently to mix contents thoroughly. Float dishes on a water bath set at $55 \pm 2^\circ\text{C}$ and let them remain for 80 minutes, which is usually sufficient for complete drying and removal of HCl. Keep drying time constant for standards and samples. After cooling to room temperature, add 10ml 95% isopropyl alcohol to each dish and stir gently with a polyethylene rod to insure complete dissolution of the red coloured product. Wash contents of dish into a 25 ml volumetric flask, using 95% isopropyl alcohol. Make up to mark with 95% isopropyl alcohol and mix thoroughly by inverting. Read absorbance of standards and samples at a wavelength of 540 nm after setting reagent blank at 0 absorbance. The calibration curve is linear form 0 to 1.00 μg Boron. Make Photometric readings within 1 hour of drying samples.

CALCULATION:

mg Boron/L = Sample Abs x Slope x 1000 / Volume of ml taken

4.3.2.33 MANGANESE

APPARATUS

Spectrophotometer.

Hot Plate

Beakers & Conical Flasks

REAGENTS

Manganese Stock Solution:

Dissolve 288 mg potassium permanganate in 100 ml distilled water. Add 25 ml dilute sulphuric acid (20%). Reduce the permanganic acid by drop wise addition of hydrogen peroxide until it becomes colorless. Transfer to a 1000 ml volumetric flask and make it up to the mark with distilled water.

1 ml = 0.1 mg Mn

Manganese Working Standard Solution:

Pipette 10 ml of stock solution in to a 100 ml volumetric flask and make it up to the mark with distilled water.

1 ml 0.01 mg Mn

Special Reagent:

Add 400 ml conc. Nitric acid to 200 ml distilled water in a 2000 ml beaker. Dissolve 75g mercuric Sulphate in it. Add 200 ml 85% phosphoric acid and 35 mg silver nitrate and dilute the cooled solution to 1000ml.

Ammonium per Sulphate.

PROCEDURE

Digestion for sample containing suspended matter, turbidity and organic matter.

Take a suitable amount of sample in a evaporating dish.

Add 5 ml conc. HCl and evaporate to about 25 ml.

Cool it and add 5 ml conc. Sulphuric Acid

Add 10 ml conc nitric acid.

Mix thoroughly and evaporate until white dense fumes of sulphur tri oxide.

Add a further 10 ml of conc. Nitric acid and evaporate to white dense fumes.

Cool it and add 40 ml distilled water.

Warm and filter it and make it up to 100 ml with distilled water.

Take suitable amount of the sample and make it up to 100 ml.

If the sample is clear no need digestion

Add 5 ml special reagent and mix.

Heat the beakers on a hot plate up to the contents are reduced to 40 ml.

Add 1gm ammonium per Sulphate while boiling.

Continue the boiling for one minute.

Cool the beaker under tap water.

Read absorbance of samples against reagent blank using distilled water at 545 nm.

CALCULATION

Manganese as Mn^{2+} = Optical Density * Slope * 1000/ Sample volume

4.3.2.34 SODIUM ABSORPTION RATIO

CALCULATION

$$SAR = \frac{Na^+}{\sqrt{(Ca^{2+} + Mg^{2+}) / 2}}$$

4.3.2.35 Polycyclic Aromatic Hydrocarbons (PAH)

APPARATUS

Separating funnel, Beaker,

SPE centrifuge, Drying Column,

Syringe & Syringe filter.

Instruments QP-2010-Gas Chromatograph mass Spectrometer (Shimadzu GC/MS).

CHEMICALS & REAGENTS

Methylene chloride, Hexane,

Millipore water,

Instrument Conditions for GC/MS:

Column : DB-5 MS 30 mtsx 0.25 mm x 0.25 μ ;

Split less; Ion source : 200°C

Oven temperature program

Rate	Temperature.(°C)	Hold time (min)
----	50.0	1.00
15.00	130.0	2.0
12.00	200.0	0.00
2.00	205.0	0.00
8.00	230.0	5.00
5.00	300.0	8.00

PROCEDURE

Extraction procedure for polycyclic Aromatic Hydrocarbons (PAH):

Water samples are extracted for PAH at neutral pH.

Transfer 1ltr of water sample to a separating funnel.

Use 60 ml of methylene chloride to rinse the measuring cylinder and transfer the rinse to the separating funnel.

Shake vigorously for 1-2 minutes with periodic venting to release excess pressure.

Note: Methylene chloride creates excessive pressure very rapidly. Therefore, initial venting should be done immediately after the separating funnel is closed and shaken once.

Allow the organic layer to separate from water phase for a minimum of 10 minutes. If the emulsion interface between layers is more than 1/3rd of the size of the solvent layer, mechanical techniques should be employed to complete phase separation.

The mechanical techniques may include stirring, filtration of emulsion through glass wool, centrifugation or other physical methods.

Collect the solvent extracts and transfer to the evaporating tube.

Evaporate the solvent layer under a stream of nitrogen. Reconstitute the residue to 1 ml with hexane and inject into GC-MS.

CALCULATION

Any positive response can be calculated with the corresponding standard.

Sample Area x Std. conc. X Volume made up

Results expressed in ppm = Std. Area x Sample Volume

Table 1: Polycyclic Aromatic Hydrocarbons (PAH)–GCMS Target & Qualifier Ions.

Compound Name	Target Ion	Reference Ions	
		I	II
Naphthalene	128	127	129
Acenaphthylene	152	151	150
Acenaphthene	153	154	152
Fluorene	166	165	82
Phenanthrene	178	176	179
Anthracene	178	176	179
Fluoranthene	202	200	101
Pyrene	202	101	200
Benz(a)anthracene	228	226	229
Chrysene	228	226	229
Benzo(b)floranthene	252	250	253
Benzo(k)floranthene	252	253	250
Benzo(a)pyrene	252	250	253
Indenol(1,2,3-cd)pyrene	276	138	277
Dibenz(a,h)anthracene	278	279	276
Benzo(g,h,i)perylene	276	138	277

4.3.2.36 PolyChloro Biphenyls (PCB)

APPARATUS

Separating funnel (1 Liter), Beaker,

SPE centrifuge, Drying Column,

Syringe & Syringe filter.

Instruments QP-2010-Gas Chromatograph mass Spectrometer (Shimadzu (GC/MS)).

CHEMICALS & REAGENTS

Methylene chloride, Acetone, methanol,

Millipore water,

Sodium sulfate and sodium sulfite or sodium arsenite.

Instrument condition for PCBs & Pesticide Residues byGC/MS:

Column : DB-5 MS mtsx0.25 mmx 0.25 μ.

Splitless; Ion sources : P 200 C

Oven Temp Program

Rate	Temperature.()	Hold time (min)
----	50.0	1.00
15.00	130.0	2.0
12.0	200	0.00
2	205	0.00
12	300	2.0

Injector : 260° C
 Detector : 280° C

PROCEDURE:

Cartridge Extraction for Pesticide Residue and Polychlorobiphenyl Residues:

Take 1 Liter of water sample into the 1L separation funnel with the stopcock closed, Add 5 ml methanol, and mix well. Residual chlorine should not be present as a reducing agent should have been added at the time of sampling (pinch amount of sodium sulfate or sodium arsenite). Also the pH of the sample should be about 2. If residual chlorine is present and/or the pH is >2, the sample may be invalid. Flush each SPE cartridge with two 10 mL aliquots of methylene chloride, followed by two 10 ml aliquots of methanol, letting the cartridge drain dry each flush. Add 10 ml of Millipore water in the SPE cartridge. Periodically open the stopcock and drain a portion of the sample water into the cartridge, and from the exit into the suction flask. Maintain the packing material in the cartridge immersed in water at all times. After all of the sample has passed through the SPE cartridge, wash the separatory funnel and cartridge with 10 ml of Millipore water, and draw air through the cartridge for 10 minutes. Elute the SPE cartridge with 5 ml of methylene chloride. Small amounts of residual water from the SPE cartridge will form an immiscible layer with methylene chloride; allow the methylene chloride to pass through drying anhydrous sodium sulfate and into the collection vial. Do not allow the water layer to enter anhydrous sodium sulfate. Evaporate the methylene chloride elute to dryness under nitrogen, the dried extracts are reconstituted into 1 ml of Acetone and filter through 0.2 µm membrane and injected into the GC/MS.

CALCULATION

Any positive response can be calculated with the corresponding standard.

$$\text{Results expressed in ppm} = \frac{\text{Sample AREA} \times \text{Std .Conc} \times \text{Volume made up}}{\text{Std .Area} \times \text{Sample Volume}}$$

Table 1 : Pesticide –GC-MS Target Reference Ions

Compound Name	Target Ion	REFERENCE Ions	
		I	II
O,p' -DDT	352.00	235.00	165
p,p' -DDT	352.00	235.00	237
O,p' -DDE	316.00	246.00	176
p,p' -DDE	318.00	246.00	248
pp' -DDD	318.00	235.00	237
α- BHC	288.00	181.00	183
β BHC	288.00	109.00	111
Lindane	288.00	181.0	183
Aldrin	362.00	66.00	91
Dieldrin	378.00	79.00	82
Endosulfan -I	404.00	195.00	159
Endosulfan -II	404.00	195.00	159
Heptachlor	370.00	100.00	272.00
Heptachlor epoxide B	386.00	353.00	355.00
Heptachlor epoxide A	386.00	183	185
Methoxychlor	344.00	227.00	228.00
Endrin	378.00	263.00	315.00
Endosulfan -Sulphate	420.00	272	274
Butachlor	311	176	160
Alachlor	269	188	160

Table 2: Polychloro Biphenyls –GC-MS Target & Qualifier Ions

Compound Name	Target Ion	REFERENCE Ions	
		I	II
2,4,4-Trichlorobiphenyl	256	258	186
2,2,5,5,-Tetrachlorobiphenyl	292	220	290
2,2,4,5,5 - Pentachlorobiphenyl	326	328	324
2,2,3,4,4,5 - Hexachlorobiphenyl	360	362	290
2,2,4,4,5,5 - Hexachlorobiphenyl	360	362	290
2,2,3,4,4,5,5- Heptachlorobiphenyl	394	396	324

5.0 Sampling Locations

5.1 Methodology

The Sampling Locations were selected based on the location in which sampling was carried out for each of the attribute in 2013. As per the guidelines of CEPI 2016, the existing sampling locations where monitoring was undertaken in 2013 are to be retained, and additional monitoring locations, if any required, can be included in the monitoring programme in consultation with the concerned zonal offices of CPCB and (or) Head Office, CPCB.

That the SPCB/PCC shall ensure that the sampling stations are provided at strategic locations across the industrial clusters so as to obtain a truly representative environmental quality of the critically polluted area. Moreover, the concerned SPCBs/PCC shall ensure that there is at least one Ambient Air Quality Monitoring Station each in the predominant upwind and downwind directions at each of the CPA.

That the SPCBs/PCC shall collect 3 samples with a gap of one or two days at each location during each round of monitoring in all the CPAs.

That at each of the CPA, 24 hourly ambient air quality monitoring shall be carried out for parameters as detailed in Annexure-III. Also, representative samples for surface water quality and ground water quality shall be collected from prominent surface and ground water bodies location in and around the CPAs. List of water quality parameters is presented in Annexure-III.

Based on the above, the sampling location for each of attribute was fixed, and have been elucidated below.

5.2 Location of Sampling - Manali

5.2.1 Ambient Air Quality

No	Location Name	Latitude	Longitude
1.	SRF Polymers Limited	13°10'26.34"N	80°15'34.16"E
2.	Natco Organics Limited	13°11'13.39"N	80°15'15.57"E
3.	Chennai Petroleum Corporation Limited (CPCL)	13°08'54.37"N	80°16'33.98"E
4.	Indian Additives Limited	13°10'28.43"N	80°17'01.07"E

5.2.2 Surface Water

No.	Location	Latitude	Longitude
1	Buckingham Canal Up Stream	13°09'15.21"N	80°17'04.12"E
2	Buckingham Canal Down Stream	13°10'31.74"N	80°17'28.38"E
3	Amullavai Canal Down Stream	13°10'49.81"N	80°16'11.55"E
4	Amullavai Canal Up Stream	13°10'49.38"N	80°15'19.00"E

5.2.3 Ground Water

No.	Location	Latitude	Longitude
1	Chinna Mathur	13°10'18.64"N	80°15'20.30"E
2	Chinna Sekkadu	13°10'11.40"N	80°15'31.55"E
3	Manali Town - CPCB'S CAAQMS Station.	13°09'57.18"N	80°15'46.45"E
4	Chennai Petroleum Corporation Limited (CPCL)	13°09'12.05"N	80°16'40.98"E

The pictorial representation of sampling locations for Manali Area are given in the Fig 1.0 and Photographs of Sampling are shown in Point No.5.3. Results of Ambient Air Quality, Surface Water Quality and Ground Water Quality are tabulated in Point No. 5.4.

Fig 1.0 Sampling Location Map - Manali



5.3 Sampling in Manali Area

5.3.1 Ambient Air Quality

Indian Additives Limited



13°10'28.43"N
80°17'01.07"E

SRF Polymers Limited



13°10'26.34"N
80°15'34.16"E

NATCO Pharma



13°11'13.39"N
80°15'15.57"E

Chennai Petroleum Corporation Limited (CPCL)



13°08'54.37"N
80°16'33.98"E

5.3.2 Surface Water

BUCKINGHAM CANAL UPSTREAM



13°09'15.21"N
80°17'04.12"E

BUCKINGHAM CANAL DOWNSTREAM



13°10'31.74"N
80°17'28.38"E

AMULLAI VOYAL CANAL UPSTREAM



13°10'49.38"N
80°15'19.00"E

AMULLAI VOYAL CANAL DOWNSTREAM



13°10'49.81"N
80°16'11.55"E

5.3.3 Ground Water

Chinna Mathur



13°10'18.64"N
80°15'20.50"E

Chinna Sekkadu



13°10'11.40"N
80°15'31.55"E

Manali Town



13°09'57.18"N
80°15'46.45"E

Chennai Petroleum Corporation Limited (CPCL)



13°09'12.05"N
80°16'40.98"E

5.4 Monitoring / Analysis Results - Manali
5.4.1 Ambient Air Quality

Parameters	SRF Limited			Indian Additives Limited			CPCL			NATCO Pharma Ltd			NAAQS*	Units
	09.10.17 to 10.10.17	11.10.17 to 12.10.17	13.10.17 to 14.10.17											
Particulate Matter (PM2.5)	26.2	36.8	35.5	34.0	33.0	32.5	24.5	29.0	35.7	30.1	32.0	41.1	60	µg/m ³
Particulate Matter (PM10)	57.0	76.0	74.5	76.1	74.3	71.3	55.2	66.0	78.6	61.5	67.5	84.8	100	µg/m ³
Sulphur Dioxide (SO ₂)	9.4	7.0	11.7	8.6	10.5	13.6	7.8	6.2	8.6	13.6	15.6	18.7	80	µg/m ³
Oxides of Nitrogen (NO _x)	15.5	18.3	22.3	21.6	23.9	23.4	12.2	15.7	21.1	29.3	27.6	32.1	80	µg/m ³
Ozone(O ₃)	44.6	36.0	51.5	46.9	42.3	50.9	29.4	35.7	37.6	20.8	18.8	13.5	180	µg/m ³
Lead(Pb)	BDL(D.L -0.1)	1	µg/m ³											
Carbon Monoxide (CO)	BDL(D.L -1.15)	4	mg/m ³											
Ammonia (NH ₃)	60.3	40.7	46.3	35.2	28.9	34.0	42.6	50.7	30.7	13.0	16.7	23.7	400	µg/m ³
Arsenic(As)	BDL(D.L -1.0)	6	ng/m ³											
Nickel (Ni)	BDL(D.L - 5.0)	8.8	10.4	9.4	7.5	7.1	BDL(D.L - 5.0)	BDL(D.L - 5.0)	5.4	6.9	10	17.1	20	ng/m ³
Benzene (C ₆ H ₆)	BDL(D.L - 1.0)	5	µg/m ³											
Benzo(a) Pyrene	BDL(D.L - 0.5)	1	ng/m ³											

*National Ambient Air Quality Standards – CPCB



5.4.2 Surface Water Quality - Manali

Sampling location			Buckingham Canal Upstream	Buckingham Canal Downstream	Amullavoiyal Canal Upstream	Amullavoiyal Canal Downstream
S.NO	PARAMETERS	UNI TS	RESULTS			
1	Appearance	-	Turbid Liquid	Turbid Liquid	Turbid Liquid	Turbid Liquid
2	Colour	HU	10	10	10	10
3	pH @ 25°C	-	7.4	7.0	7.3	7.4
4	Odour	-	Objectionable	Unobjectionable	Unobjectionable	Objectionable
5	Ecological (Presence of Animals like Fish, Insects Etc)	-	Present	Present	Present	Present
6	Oil & Grease	mg/l	< 2	< 2	< 2	< 2
7	Total Suspended Solids	mg/l	54	24	35	52
8	Dissolved Oxygen	mg/l	4.1	6.0	5.9	3.9
9	Biochemical Oxygen Demand (BOD) 3 days at 27°C	mg/l	24	4	< 2	24
10	Chemical Oxygen Demand (COD)	mg/l	94	26	20	96
11	Conductivity	µs/cm	3636	2082	972	3542
12	Total Dissolved Solids	mg/l	2186	1254	582	2126
13	Nitrate – Nitrogen	mg/l	8.54	40.2	BDL (DL: 0.1)	7.2
14	Nitrite – Nitrogen	mg/l	0.03	56.6	BDL (DL: 0.01)	0.14
15	Free Ammonia as NH ₃	mg/l	7.2	1.7	BDL (DL: 0.1)	7.3
16	Total Residual Chlorine	mg/l	BDL (DL: 0.1)	BDL (DL: 0.1)	BDL (DL: 0.1)	BDL (DL: 0.1)
17	Cyanide as CN	mg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)
18	Fluoride as F	mg/l	0.36	0.29	0.24	0.35
19	Sulphate as SO ₄	mg/l	243	160	20.7	254
20	Sulphide as H ₂ S	mg/l	3.2	BDL (DL: 0.01)	BDL (DL: 0.01)	2.8
21	Total Hardness as CaCO ₃	mg/l	756	273	212	672
22	Dissolved Phosphate as P	mg/l	4.4	2	1.6	4.3

23	Sodium Absorption Ratio	-	7.1	7	3.58	6.9
24	Total Phosphorous as P	mg/l	4.8	2.1	1.6	4.8
25	Total Kjeldahl Nitrogen as N	mg/l	22.6	4.9	BDL (DL: 0.1)	22.4
26	Total Ammonia	mg/l	16.4	4.6	BDL (DL: 0.1)	16.7
27	Phenols	mg/l	BDL (DL: 0.001)	BDL (DL: 0.001)	BDL (DL: 0.001)	BDL (DL: 0.001)
28	Surface Active Agents	mg/l	BDL (DL: 0.1)	BDL (DL: 0.1)	BDL (DL: 0.1)	BDL (DL: 0.1)
29	Anionic detergent as MBAS	mg/l	BDL (DL: 0.1)	BDL (DL: 0.1)	BDL (DL: 0.1)	BDL (DL: 0.1)
30	Hexavalent Chromium as Cr ⁶⁺	mg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)
31	Iron as Fe	mg/l	1.43	0.66	0.83	2.4
32	Boron as B	mg/l	0.74	BDL (DL: 0.1)	BDL (DL: 0.1)	0.64
33	Total Nitrogen	mg/l	384	103.4	BDL (DL: 0.1)	39
34	Chloride	mg/l	771	352	189	776
35	Bio – Assay (Zebra Fish) Test	-	T _f = 2	T _f = 1	T _f = 1	T _f = 2
36	Copper as Cu	mg/l	0.05	BDL (DL: 0.02)	BDL (DL: 0.02)	BDL (DL: 0.02)
37	Manganese as Mn	mg/l	0.44	0.14	0.21	0.38
38	Mercury as Hg	mg/l	BDL (DL: 0.001)	BDL (DL: 0.001)	BDL (DL: 0.001)	BDL (DL: 0.001)
39	Cadmium as Cd	mg/l	BDL (DL: 0.002)	BDL (DL: 0.002)	BDL (DL: 0.002)	BDL (DL: 0.002)
40	Selenium as Se	mg/l	BDL (DL: 0.005)	BDL (DL: 0.005)	BDL (DL: 0.005)	BDL (DL: 0.005)
41	Total Arsenic as As	mg/l	BDL (DL: 0.001)	BDL (DL: 0.001)	BDL (DL: 0.001)	BDL (DL: 0.001)
42	Lead as Pb	mg/l	BDL (DL: 0.005)	BDL (DL: 0.005)	BDL (DL: 0.005)	BDL (DL: 0.005)
43	Zinc as Zn	mg/l	BDL (DL: 0.08)	BDL (DL: 0.08)	BDL (DL: 0.08)	BDL (DL: 0.08)
44	Total Chromium as Cr	mg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)
45	Nickel as Ni	mg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)
46	Vanadium as V	mg/l	BDL (DL: 2.0)	BDL (DL: 2.0)	BDL (DL: 2.0)	BDL (DL: 2.0)
47	Organo chlorine Pesticides (OCP):					
	Aldrin	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)
	Dieldrin	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)

	Endosulfan alpha	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)
	Endosulfan Beta	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)
	Endosulfan Sulfate	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)
	o,p' -DDT	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)
	p,p' -DDT	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)
	p,p' -DDE	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)
	o,p' -DDE	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)
	o,p' -DDD	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)
	p,p' -DDD	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)
	Alpha HCH	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)
	Beta HCH	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)
	Gamma HCH (Lindane)	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)
	Delta HCH	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)
48	Poly Chlorinated Terphenyls (as PCT):					
		o-Terphenyl	µg/l	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)
		m-Terphenyl	µg/l	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)
		p-Terphenyl	µg/l	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)
		Tetradecachloro-o-terphenyl	µg/l	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)
		Tetradecachloro-m-terphenyl	µg/l	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)
		Tetradecachloro-p-terphenyl	µg/l	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)
		4-Chloro-o-terphenyl	µg/l	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)
		4-Chloro-p-terphenyl	µg/l	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)
		2,4-Dichloro-p-terphenyl	µg/l	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)
		2,5-Dichloro-o-terphenyl	µg/l	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)
		2,5-Dichloro-m-terphenyl	µg/l	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)
		2,5-Dichloro-p-terphenyl	µg/l	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)
		2,4,6-Trichloro-p-terphenyl	µg/l	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)

	2,3,5,6-Tetrachloro-p-terphenyl	µg/l	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)
	2,4,4",6-Tetrachloro-p-terphenyl	µg/l	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)
	2,3,4,5,6-Pentachloro-p-terphenyl	µg/l	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)
49	Poly Nuclear Aromatic Hydrocarbons (as PAH):					
	Naphthalene	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)
	Acenaphthylene	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)
	2-Bromo-Naphthalene	µg/l	BDL (DL: 0.02)	BDL (DL: 0.02)	BDL (DL: 0.02)	BDL (DL: 0.02)
	Acenaphthene	µg/l	BDL (DL: 0.02)	BDL (DL: 0.02)	BDL (DL: 0.02)	BDL (DL: 0.02)
	Fluorene	µg/l	BDL (DL: 0.02)	BDL (DL: 0.02)	BDL (DL: 0.02)	BDL (DL: 0.02)
	Phenanthrene	µg/l	BDL (DL: 0.02)	BDL (DL: 0.02)	BDL (DL: 0.02)	BDL (DL: 0.02)
	Anthracene	µg/l	BDL (DL: 0.02)	BDL (DL: 0.02)	BDL (DL: 0.02)	BDL (DL: 0.02)
	Pyrene	µg/l	BDL (DL: 0.02)	BDL (DL: 0.02)	BDL (DL: 0.02)	BDL (DL: 0.02)
	Fluoranthene	µg/l	BDL (DL: 0.02)	BDL (DL: 0.02)	BDL (DL: 0.02)	BDL (DL: 0.02)
	Chrysene	µg/l	BDL (DL: 0.02)	BDL (DL: 0.02)	BDL (DL: 0.02)	BDL (DL: 0.02)
	Benz[a]anthracene	µg/l	BDL (DL: 0.02)	BDL (DL: 0.02)	BDL (DL: 0.02)	BDL (DL: 0.02)
	Benzo[a]pyrene	µg/l	BDL (DL: 0.02)	BDL (DL: 0.02)	BDL (DL: 0.02)	BDL (DL: 0.02)
	Benzo[b]fluoranthene	µg/l	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)
	Benzo[ghi]perylene	µg/l	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)
	Dibenz[a,h]anthracene	µg/l	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)
Indeno[1,2,3-cd]pyrene	µg/l	BDL (DL: 0.04)	BDL (DL: 0.04)	BDL (DL: 0.04)	BDL (DL: 0.04)	
50	Poly Chlorinated Biphenyls (as PCB):					
	2-Chlorobiphenyl	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)
	2,3-dichlorobiphenyl	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)
	2,5,4'-Trichlorobiphenyl	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)
	2,2',4,4'-tetrachlorobiphenyl	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)
	2,2',3,4',6'-Pentachlorobiphenyl	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)
	2,2',4,4',5',6'-Hexachlorobiphenyl	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)
	2,2',3,3',4,4',6'-Heptachlorobiphenyl	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)

	2,2',3,3',4,5,6,6'-Octachlorobiphenyl	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)
51	Total Coliform	MPN/100 ml	500	220	90	900
52	Faecal Coliform	MPN/100 ml	110	50	13	140

5.4.3 Ground Water Quality - Manali

Sampling location			Chinna Mathur	Chinna Chekadu	Manali Town	Chennai Petroleum Corporation Limited
S.NO	PARAMETERS	UNITS	RESULT			
1	Appearance	-	Clear Liquid	Slightly Turbid Liquid	Clear Liquid	Turbid Liquid
2	Colour	HU	2	2	2	500
3	pH @ 25°C	-	7.8	7.1	7.3	6.5
4	Odour	-	Unobjectionable	Unobjectionable	Unobjectionable	Unobjectionable
5	Ecological (Presence of Animals like Fish, Insects Etc)	-	Present	Present	Present	Absent
6	Oil & Grease	mg/l	< 2	< 2	< 2	< 2
7	Total Suspended Solids	mg/l	< 2	8	< 2	690
8	Dissolved Oxygen	mg/l	6.6	6.5	6.6	5.9
9	Biochemical Oxygen Demand (BOD) 3 days at 27°C	mg/l	< 2	< 2	< 2	< 2
10	Chemical Oxygen Demand (COD)	mg/l	< 4	< 4	< 4	24
11	Conductivity	µs/cm	2228	1654	1372	78194
12	Total Dissolved Solids	mg/l	1336	994	824	46924
13	Nitrate - Nitrogen	mg/l	41.5	23.5	33.8	6.2
14	Nitrite - Nitrogen	mg/l	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	0.15
15	Free Ammonia as NH ₃	mg/l	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)
16	Total Residual Chlorine	mg/l	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)
17	Cyanide as CN	mg/l	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)
18	Fluoride as F	mg/l	0.21	0.24	0.14	0.31
19	Sulphate as SO ₄	mg/l	214	75.8	40	7217
20	Sulphide as H ₂ S	mg/l	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)
21	Total Hardness as CaCO ₃	mg/l	465	364	192	12390



22	Dissolved Phosphate as P	mg/l	1.2	3.6	1.2	0.52
23	Sodium Absorption Ratio	-	5.88	4.62	5.3	47.4
24	Total Phosphorous as P	mg/l	1.2	3.6	1.2	0.55
25	Total Kjeldahl Nitrogen as N	mg/l	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)
26	Total Ammonia	mg/l	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)
27	Phenols	mg/l	BDL (DL:0.001)	BDL (DL:0.001)	BDL (DL:0.001)	BDL (DL:0.001)
28	Surface Active Agents	mg/l	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)
29	Anionic detergent as MBAS	mg/l	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)
30	Hexavalent Chromium as Cr ⁶⁺	mg/l	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)
31	Iron as Fe	mg/l	0.09	0.23	0.05	44.1
32	Boron as B	mg/l	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	0.54
33	Total Nitrogen	mg/l	42.5	23.9	34.2	6.4
34	Chloride	mg/l	364	311	301	23383
35	Bio – Assay (Zebra Fish) Test	-	T _f = 1			
36	Copper as Cu	mg/l	BDL (DL:0.02)	BDL (DL:0.02)	BDL (DL:0.02)	0.13
37	Manganese as Mn	mg/l	0.41	0.08	0.08	22.12
38	Mercury as Hg	mg/l	BDL (DL:0.001)	BDL (DL:0.001)	BDL (DL:0.001)	BDL (DL:0.001)
39	Cadmium as Cd	mg/l	BDL (DL:0.002)	BDL (DL:0.002)	BDL (DL:0.002)	BDL (DL:0.002)
40	Selenium as Se	mg/l	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)
41	Total Arsenic as As	mg/l	BDL (DL:0.001)	BDL (DL:0.001)	BDL (DL:0.001)	BDL (DL:0.001)
42	Lead as Pb	mg/l	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)
43	Zinc as Zn	mg/l	BDL (DL:0.08)	BDL (DL:0.08)	BDL (DL:0.08)	BDL (DL:0.08)
44	Total Chromium as Cr	mg/l	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)
45	Nickel as Ni	mg/l	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)
46	Vanadium as V	mg/l	BDL (DL:2.0)	BDL (DL:2.0)	BDL (DL:2.0)	BDL (DL:2.0)
47	Organo chlorine Pesticides (OCP):					
	Aldrin	µg/l	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)
	Dieldrin	µg/l	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)

	Endosulfan alpha	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)
	Endosulfan Beta	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)
	Endosulfan Sulfate	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)
	o,p' -DDT	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)
	p,p' -DDT	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)
	p,p' -DDE	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)
	o,p' -DDE	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)
	o,p' -DDD	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)
	p,p' -DDD	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)
	Alpha HCH	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)
	Beta HCH	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)
	Gamma HCH (Lindane)	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)
	Delta HCH	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)
48	Poly Chlorinated Terphenyls (as PCT):					
		o-Terphenyl	µg/l	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)
		m-Terphenyl	µg/l	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)
		p-Terphenyl	µg/l	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)
		Tetradecachloro-o-terphenyl	µg/l	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)
		Tetradecachloro-m-terphenyl	µg/l	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)
		Tetradecachloro-p-terphenyl	µg/l	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)
		4-Chloro-o-terphenyl	µg/l	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)
		4-Chloro-p-terphenyl	µg/l	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)
		2,4-Dichloro-p-terphenyl	µg/l	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)
		2,5-Dichloro-o-terphenyl	µg/l	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)
		2,5-Dichloro-m-terphenyl	µg/l	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)
		2,5-Dichloro-p-terphenyl	µg/l	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)
		2,4,6-Trichloro-p-terphenyl	µg/l	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)
	2,3,5,6-Tetrachloro-p-terphenyl	µg/l	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)	

	2,4,4",6-Tetrachloro-p-terphenyl	µg/l	BDL (DL: 0.03)	BDL (DL:0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)
	2,3,4,5,6-Pentachloro-p-terphenyl	µg/l	BDL (DL: 0.03)	BDL (DL:0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)
49	Poly Nuclear Aromatic Hydrocarbons (as PAH):					
	Naphthalene	µg/l	BDL (DL: 0.01)	BDL (DL:0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)
	Acenaphthylene	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)
	2-Bromo-Naphthalene	µg/l	BDL (DL: 0.02)	BDL (DL: 0.02)	BDL (DL: 0.02)	BDL (DL: 0.02)
	Acenaphthene	µg/l	BDL (DL: 0.02)	BDL (DL: 0.02)	BDL (DL: 0.02)	BDL (DL: 0.02)
	Fluorene	µg/l	BDL (DL: 0.02)	BDL (DL: 0.02)	BDL (DL: 0.02)	BDL (DL: 0.02)
	Phenanthrene	µg/l	BDL (DL: 0.02)	BDL (DL: 0.02)	BDL (DL: 0.02)	BDL (DL: 0.02)
	Anthracene	µg/l	BDL (DL: 0.02)	BDL (DL: 0.02)	BDL (DL: 0.02)	BDL (DL: 0.02)
	Pyrene	µg/l	BDL (DL: 0.02)	BDL (DL: 0.02)	BDL (DL: 0.02)	BDL (DL: 0.02)
	Fluoranthene	µg/l	BDL (DL: 0.02)	BDL (DL: 0.02)	BDL (DL: 0.02)	BDL (DL: 0.02)
	Chrysene	µg/l	BDL (DL: 0.02)	BDL (DL: 0.02)	BDL (DL: 0.02)	BDL (DL: 0.02)
	Benz[a]anthracene	µg/l	BDL (DL: 0.02)	BDL (DL: 0.02)	BDL (DL: 0.02)	BDL (DL: 0.02)
	Benzo[a]pyrene	µg/l	BDL (DL: 0.02)	BDL (DL: 0.02)	BDL (DL: 0.02)	BDL (DL: 0.02)
	Benzo[b]fluoranthene	µg/l	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)
	Benzo[ghi]perylene	µg/l	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)
	Dibenz[a,h]anthracene	µg/l	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)
Indeno[1,2,3-cd]pyrene	µg/l	BDL (DL: 0.04)	BDL (DL: 0.04)	BDL (DL: 0.04)	BDL (DL: 0.04)	
50	Poly Chlorinated Biphenyls (as PCB):					
	2-Chlorobiphenyl	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)
	2,3-dichlorobiphenyl	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)
	2,5,4'-Trichlorobiphenyl	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)
	2,2',4,4'-tetrachlorobiphenyl	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)
	2,2',3,4',6'-Pentachlorobiphenyl	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)
	2,2',4,4',5',6'-Hexachlorobiphenyl	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)
	2,2',3,3',4,4',6'-Heptachlorobiphenyl	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)
2,2',3,3',4,5,6,6'-Octachlorobiphenyl	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	

51	Total Coliform	MPN/100 ml	< 2	11	21	< 2
52	Faecal Coliform	MPN/100 ml	< 2	< 2	< 2	< 2

5.5 Location of Sampling - Ranipet

5.5.1 Ambient Air Quality

No	Location Name	Latitude	Longitude
1	Malladi drugs & Pharmaceuticals Ltd unit - I	12° 57'01.93"N	79°19'10.96"E
2	Malladi drugs & Pharmaceuticals Ltd unit - III	12° 57'17.92"N	79°19'10.39"E
3	Svis labs (P) Ltd	12° 57'59.09"N	79°17'47.14"E
4	Greaves Cotton Ltd	12° 58'16.16"N	79°17'50.56"E

5.5.2 Surface Water

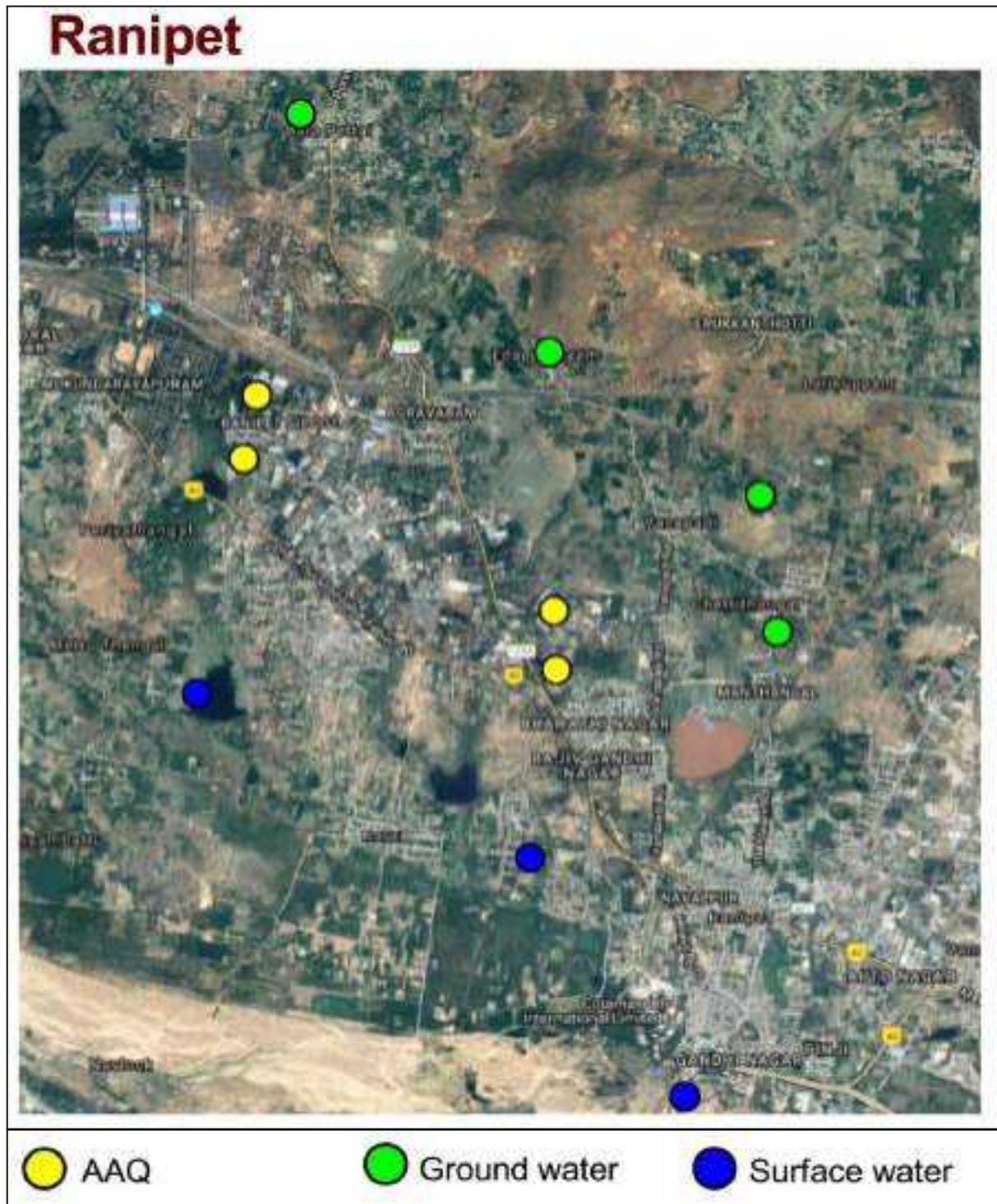
No	Location Names	Latitude	Longitude
1	Palar River	12°55'06.30"N	79°19'45.47"E
2	Karai Lake	12°56'11.01"N	79°19'03.91"E
3	Puliyagannu Village	12°56'55.45"N	79°17'34.64"E

5.5.3 Ground Water

No	Location Names	Latitude	Longitude
1	Ammor - Lalapet Road [Near Venketeswara Leather Metals (P) Ltd]	12°57'49.07"N	79°20'05.72"E
2	Chettithangal Village	12°57'12.35"N	79°20'10.18"E
3	EdappalayamVillage	12°58'27.91"N	79°19'09.04"E
4	Narasinghapuram Village	12°58'40.41"N	79°16'46.31"E
5	Lalapet Village	12°59'32.59"N	79°18'02.39"E

The pictorial representation of sampling locations for Ranipet Area are given in the Fig 2.0 and Photographs of Sampling are shown in Point No.5.6. Results of Ambient Air Quality, Surface Water Quality and Ground Water Quality are tabulated in Point No. 5.7.

Fig 2.0 Sampling Location Map - Ranipet



5.6 Sampling in Ranipet Area

5.6.1 Ambient Air Quality

Malladi Drugs &
Pharmaceuticals Ltd
Unit - I



12°57'01.93"N
79°19'10.96"E

Malladi Drugs &
Pharmaceuticals Ltd
Unit - III



12°57'17.92"N
79°19'10.39"E

Svis Labs (P) Ltd



12°57'59.09"N
79°17'47.14"E

Greaves Cotton Ltd



12°58'16.16"N
79°17'50.56"E

5.6.2 Surface Water – Ranipet Area

Palar River



12°55'06.30"N
79°19'45.47"E

Karai Lake



12°56'11.01"N
79°19'03.91"E

Puliyankannu Lake



12°56'55.45"N
79°17'34.64"E

5.6.3 Ground Water – Ranipet Area

Ammor - Lalpet Road
Near Venketswarea
Leather Metals



12°57'49.07"N
79°20'05.72"E

Chettithangal Village



12°57'12.35"N
79°20'10.18"E

Edappalayam Village



12°58'27.91"N
79°19'09.04"E

Narasingapuram
Village



12°58'40.41"N
79°16'46.31"E

Lalapet Village



12°59'32.59"N
79°18'02.39"E

5.7 Monitoring / Analysis Results - Ranipet
5.7.1 Ambient Air Quality

Parameters	Malladi Drugs – Unit I			Malladi Drugs – Unit III			Svis Labs (P) Ltd			Greaves Cotton Ltd			NAAQS*	Units
	04.10.17 to 05.10.17	06.10.17 to 07.10.17	08.10.17 to 09.10.17											
Particulate Matter (PM _{2.5})	24.2	28.5	32.0	34.0	35.6	32.1	23.0	29.8	26.1	31.2	41.5	36.8	60	µg/m ³
Particulate Matter (PM ₁₀)	55.8	59.2	66.7	71.0	74.5	68.2	52.1	60.1	57.5	67.0	82.1	75.8	100	µg/m ³
Sulphur Dioxide (SO ₂)	9.7	7.0	11.7	8.2	13.2	12.5	5.5	9.0	6.2	7.8	10.5	9.0	80	µg/m ³
Oxides of Nitrogen (NO _x)	22.3	15.9	23.2	18.3	29.3	28.1	17.3	24.6	23.0	18.0	26.5	24.1	80	µg/m ³
Ozone(O ₃)	30.0	24.4	28.1	21.5	23.4	25.8	18.8	31.0	26.4	20.8	16.8	23.8	180	µg/m ³
Lead(Pb)	BDL (D.L -0.1)	0.123	BDL (D.L -0.1)	1	µg/m ³									
Carbon Monoxide (CO)	BDL (D.L -1.15)	4	mg/m ³											
Ammonia (NH ₃)	58.5	64.8	54.8	66.2	55.5	31.5	23.3	17.8	28.5	24.8	33.3	30.3	400	µg/m ³
Arsenic(As)	BDL (D.L -1.0)	6	ng/m ³											
Nickel (Ni)	BDL (D.L - 5.0)	BDL (D.L - 5.0)	BDL (D.L - 5.0)	17.4	8.4	12.7	BDL (D.L - 5.0)	5.1	BDL (D.L - 5.0)	13.2	13.6	10.7	20	ng/m ³
Benzene (C ₆ H ₆)	BDL (D.L - 1.0)	5	µg/m ³											
Benzo(a) Pyrene	BDL (D.L - 0.5)	1	ng/m ³											

*National Ambient Air Quality Standards – CPCB

5.7.2 Surface Water Quality - Ranipet

Sampling location			Palar River	Karai Lake	Puliyagannu Lake
S.NO	PARAMETERS	UNIT S	RESULTS		
1	Appearance	-	Slightly Turbid Liquid	Turbid Liquid	Turbid Liquid
2	Colour	HU	10	10	10
3	pH @ 25°C	-	7.2	7.1	7.1
4	Odour	-	Unobjectionable	Unobjectionable	Unobjectionable
5	Ecological (Presence of Animals like Fish, Insects Etc)	-	Present	Present	Present
6	Oil & Grease	mg/l	< 2	< 2	< 2
7	Total Suspended Solids	mg/l	4	29	19
8	Dissolved Oxygen	mg/l	6.8	6.4	6.3
9	Biochemical Oxygen Demand (BOD) 3 days at 27°C	mg/l	< 2	< 2	< 2
10	Chemical Oxygen Demand (COD)	mg/l	< 4	8	12
11	Conductivity	µs/cm	1130	824	1042
12	Total Dissolved Solids	mg/l	680	496	624
13	Nitrate – Nitrogen	mg/l	3.9	BDL (DL: 0.1)	0.74
14	Nitrite – Nitrogen	mg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)
15	Free Ammonia as NH ₃	mg/l	BDL (DL: 0.1)	BDL (DL: 0.1)	BDL (DL: 0.1)
16	Total Residual Chlorine	mg/l	BDL (DL: 0.1)	BDL (DL: 0.1)	BDL (DL: 0.1)
17	Cyanide as CN	mg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)
18	Fluoride as F	mg/l	0.14	0.16	0.24
19	Sulphate as SO ₄	mg/l	94.3	35.5	93.2
20	Sulphide as H ₂ S	mg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)
21	Total Hardness as CaCO ₃	mg/l	222	182	273
22	Dissolved Phosphate as P	mg/l	1.4	2.0	1.5

23	Sodium Absorption Ratio	-	4.22	2.54	2.51
24	Total Phosphorous as P	mg/l	1.4	2.0	1.5
25	Total Kjeldahl Nitrogen as N	mg/l	BDL (DL: 0.1)	BDL (DL: 0.1)	BDL (DL: 0.1)
26	Total Ammonia	mg/l	BDL (DL: 0.1)	BDL (DL: 0.1)	BDL (DL: 0.1)
27	Phenols	mg/l	BDL (DL: 0.001)	BDL (DL: 0.001)	BDL (DL: 0.001)
28	Surface Active Agents	mg/l	BDL (DL: 0.1)	BDL (DL: 0.1)	BDL (DL: 0.1)
29	Anionic detergent as MBAS	mg/l	BDL (DL: 0.1)	BDL (DL: 0.1)	BDL (DL: 0.1)
30	Hexavalent Chromium as Cr ⁶⁺	mg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)
31	Iron as Fe	mg/l	0.42	0.5	0.48
32	Boron as B	mg/l	BDL (DL: 0.1)	BDL (DL: 0.1)	BDL (DL: 0.1)
33	Total Nitrogen	mg/l	4.1	BDL (DL: 0.1)	0.94
34	Chloride	mg/l	185	159	175
35	Bio – Assay (Zebra Fish) Test	-	Tf = 1	Tf = 1	Tf = 1
36	Copper as Cu	mg/l	BDL (DL: 0.02)	BDL (DL: 0.02)	BDL (DL: 0.02)
37	Manganese as Mn	mg/l	0.10	0.22	0.11
38	Mercury as Hg	mg/l	BDL (DL: 0.001)	BDL (DL: 0.001)	BDL (DL: 0.001)
39	Cadmium as Cd	mg/l	BDL (DL: 0.002)	BDL (DL: 0.002)	BDL (DL: 0.002)
40	Selenium as Se	mg/l	BDL (DL: 0.005)	BDL (DL: 0.005)	BDL (DL: 0.005)
41	Total Arsenic as As	mg/l	BDL (DL: 0.001)	BDL (DL: 0.001)	BDL (DL: 0.001)
42	Lead as Pb	mg/l	BDL (DL: 0.005)	BDL (DL: 0.005)	BDL (DL: 0.005)
43	Zinc as Zn	mg/l	BDL (DL: 0.08)	BDL (DL: 0.08)	BDL (DL: 0.08)
44	Total Chromium as Cr	mg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)
45	Nickel as Ni	mg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)
46	Vanadium as V	mg/l	BDL (DL: 2.0)	BDL (DL: 2.0)	BDL (DL: 2.0)
47	Organo chlorine Pesticides (OCP):				
	Aldrin	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)
	Dieldrin	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)
	Endosulfan alpha	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)

	Endosulfan Beta	µg/l	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	
	Endosulfan Sulfate	µg/l	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	
	o,p' -DDT	µg/l	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	
	p,p' -DDT	µg/l	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	
	p,p' -DDE	µg/l	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	
	o,p' -DDE	µg/l	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	
	o,p' -DDD	µg/l	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	
	p,p' -DDD	µg/l	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	
	Alpha HCH	µg/l	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	
	Beta HCH	µg/l	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	
	Gamma HCH (Lindane)	µg/l	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	
	Delta HCH	µg/l	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	
48	Poly Chlorinated Terphenyls (as PCT):					
		o-Terphenyl	µg/l	BDL (DL:0.03)	BDL (DL:0.03)	BDL (DL:0.03)
		m-Terphenyl	µg/l	BDL (DL:0.03)	BDL (DL:0.03)	BDL (DL:0.03)
		p-Terphenyl	µg/l	BDL (DL:0.03)	BDL (DL:0.03)	BDL (DL:0.03)
		Tetradecachloro-o-terphenyl	µg/l	BDL (DL:0.03)	BDL (DL:0.03)	BDL (DL:0.03)
		Tetradecachloro-m-terphenyl	µg/l	BDL (DL:0.03)	BDL (DL:0.03)	BDL (DL:0.03)
		Tetradecachloro-p-terphenyl	µg/l	BDL (DL:0.03)	BDL (DL:0.03)	BDL (DL:0.03)
		4-Chloro-o-terphenyl	µg/l	BDL (DL:0.03)	BDL (DL:0.03)	BDL (DL:0.03)
		4-Chloro-p-terphenyl	µg/l	BDL (DL:0.03)	BDL (DL:0.03)	BDL (DL:0.03)
		2,4-Dichloro-p-terphenyl	µg/l	BDL (DL:0.03)	BDL (DL:0.03)	BDL (DL:0.03)
		2,5-Dichloro-o-terphenyl	µg/l	BDL (DL:0.03)	BDL (DL:0.03)	BDL (DL:0.03)
		2,5-Dichloro-m-terphenyl	µg/l	BDL (DL:0.03)	BDL (DL:0.03)	BDL (DL:0.03)
		2,5-Dichloro-p-terphenyl	µg/l	BDL (DL:0.03)	BDL (DL:0.03)	BDL (DL:0.03)
		2,4,6-Trichloro-p-terphenyl	µg/l	BDL (DL:0.03)	BDL (DL:0.03)	BDL (DL:0.03)
		2,3,5,6-Tetrachloro-p-terphenyl	µg/l	BDL (DL:0.03)	BDL (DL:0.03)	BDL (DL:0.03)
		2,4,4",6-Tetrachloro-p-terphenyl	µg/l	BDL (DL:0.03)	BDL (DL:0.03)	BDL (DL:0.03)

	2,3,4,5,6-Pentachloro-p-terphenyl	µg/l	BDL (DL:0.03)	BDL (DL:0.03)	BDL (DL:0.03)
49	Poly Nuclear Aromatic Hydrocarbons (as PAH):				
	Naphthalene	µg/l	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)
	Acenaphthylene	µg/l	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)
	2-Bromo-Naphthalene	µg/l	BDL (DL:0.02)	BDL (DL:0.02)	BDL (DL:0.02)
	Acenaphthene	µg/l	BDL (DL:0.02)	BDL (DL:0.02)	BDL (DL:0.02)
	Fluorene	µg/l	BDL (DL:0.02)	BDL (DL:0.02)	BDL (DL:0.02)
	Phenanthrene	µg/l	BDL (DL:0.02)	BDL (DL:0.02)	BDL (DL:0.02)
	Anthracene	µg/l	BDL (DL:0.02)	BDL (DL:0.02)	BDL (DL:0.02)
	Pyrene	µg/l	BDL (DL:0.02)	BDL (DL:0.02)	BDL (DL:0.02)
	Fluoranthene	µg/l	BDL (DL:0.02)	BDL (DL:0.02)	BDL (DL:0.02)
	Chrysene	µg/l	BDL (DL:0.02)	BDL (DL:0.02)	BDL (DL:0.02)
	Benz[a]anthracene	µg/l	BDL (DL:0.02)	BDL (DL:0.02)	BDL (DL:0.02)
	Benzo[a]pyrene	µg/l	BDL (DL:0.02)	BDL (DL:0.02)	BDL (DL:0.02)
	Benzo[b]fluoranthene	µg/l	BDL (DL:0.03)	BDL (DL:0.03)	BDL (DL:0.03)
	Benzo[ghi]perylene	µg/l	BDL (DL:0.03)	BDL (DL:0.03)	BDL (DL:0.03)
	Dibenz[a,h]anthracene	µg/l	BDL (DL:0.03)	BDL (DL:0.03)	BDL (DL:0.03)
Indeno[1,2,3-cd]pyrene	µg/l	BDL (DL:0.04)	BDL (DL:0.04)	BDL (DL:0.04)	
50	Poly Chlorinated Biphenyls (as PCB):				
	2-Chlorobiphenyl	µg/l	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)
	2,3-dichlorobiphenyl	µg/l	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)
	2,5,4'-Trichlorobiphenyl	µg/l	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)
	2,2',4,4'-tetrachlorobiphenyl	µg/l	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)
	2,2',3,4',6'-Pentachlorobiphenyl	µg/l	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)
	2,2',4,4',5',6'-Hexachlorobiphenyl	µg/l	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)
	2,2',3,3',4,4',6'-Heptachlorobiphenyl	µg/l	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)
	2,2',3,3',4,5,6,6'-Octachlorobiphenyl	µg/l	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)

51	Total Coliform	MPN/100 ml	11	50	23
52	Faecal Coliform	MPN/100 ml	< 2	< 2	< 2

5.7.3 Ground Water Quality - Ranipet

Sampling location			Ammor - Lalapet Road (Near Venkateswara Leather Metals (P) Ltd.)	Chettithangal Village	Edappalayam Village	Narasinghapu ram Village	Lalapet Village
S.NO	PARAMETERS	UNITS	RESULTS				
1	Appearance	-	Clear Liquid	Turbid Liquid	Clear Liquid	Slightly Turbid Liquid	Turbid Liquid
2	Colour	HU	2	2	2	5	5
3	pH @ 25°C	-	7.1	7.0	7.3	7.3	7.8
4	Odour	-	Unobjectionable	Unobjectionable	Unobjectionable	Unobjectionable	Unobjectionable
5	Ecological (Presence of Animals like Fish, Insects Etc)	-	Present	Present	Present	Present	Present
6	Oil & Grease	mg/l	< 2	< 2	< 2	< 2	< 2
7	Total Suspended Solids	mg/l	2	26	< 2	11	41
8	Dissolved Oxygen	mg/l	6.6	6.2	6.8	6.7	6.2
9	Biochemical Oxygen Demand (BOD) 3 days at 27°C	mg/l	< 2	< 2	< 2	< 2	< 2
10	Chemical Oxygen Demand (COD)	mg/l	< 4	8	< 4	< 4	12
11	Conductivity	µs/cm	491	2414	814	747	2084
12	Total Dissolved Solids	mg/l	290	1446	486	448	1248
13	Nitrate – Nitrogen	mg/l	BDL (DL: 0.1)	40.9	10.4	8.40	6.17
14	Nitrite – Nitrogen	mg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)
15	Free Ammonia as NH ₃	mg/l	BDL (DL: 0.1)	BDL (DL: 0.1)	BDL (DL: 0.1)	BDL (DL: 0.1)	BDL (DL: 0.1)
16	Total Residual Chlorine	mg/l	BDL (DL: 0.1)	BDL (DL: 0.1)	BDL (DL: 0.1)	BDL (DL: 0.1)	BDL (DL: 0.1)
17	Cyanide as CN	mg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)
18	Fluoride as F	mg/l	0.14	0.18	0.16	0.21	0.24

19	Sulphate as SO ₄	mg/l	43.9	208	64.7	32.1	139
20	Sulphide as H ₂ S	mg/l	BDL (DL:0.01)				
21	Total Hardness as CaCO ₃	mg/l	113	667	364	293	545
22	Dissolved Phosphate as P	mg/l	0.17	1.0	0.21	0.76	0.54
23	Sodium Absorption Ratio	-	1.74	5.05	1.87	2.20	6.0
24	Total Phosphorous as P	mg/l	0.17	1.0	0.21	0.76	0.54
25	Total Kjeldahl Nitrogen as N	mg/l	BDL (DL:0.1)				
26	Total Ammonia	mg/l	BDL (DL:0.1)				
27	Phenols	mg/l	BDL (DL:0.001)				
28	Surface Active Agents	mg/l	BDL (DL:0.1)				
29	Anionic detergent as MBAS	mg/l	BDL (DL:0.1)				
30	Hexavalent Chromium as Cr ⁶⁺	mg/l	BDL (DL:0.01)				
31	Iron as Fe	mg/l	0.57	0.49	0.03	0.57	0.59
32	Boron as B	mg/l	BDL (DL:0.1)				
33	Total Nitrogen	mg/l	BDL (DL:0.1)	41.5	10.9	8.7	7.02
34	Chloride	mg/l	78	486	87	83	364
35	Bio - Assay (Zebra Fish) Test	-	Tf = 1				
36	Copper as Cu	mg/l	BDL (DL:0.02)				
37	Manganese as Mn	mg/l	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	0.31
38	Mercury as Hg	mg/l	BDL (DL:0.001)				
39	Cadmium as Cd	mg/l	BDL (DL:0.002)				
40	Selenium as Se	mg/l	BDL (DL:0.005)				
41	Total Arsenic as As	mg/l	BDL (DL:0.001)				
42	Lead as Pb	mg/l	BDL (DL:0.005)				
43	Zinc as Zn	mg/l	BDL (DL:0.08)	BDL (DL:0.08)	0.10	0.09	BDL (DL:0.08)
44	Total Chromium as Cr	mg/l	BDL (DL:0.01)				
45	Nickel as Ni	mg/l	BDL (DL:0.01)				
46	Vanadium as V	mg/l	BDL (DL:2.0)				

47	Organo chlorine Pesticides (OCP):						
	Aldrin	µg/l	BDL (DL:0.01)				
	Dieldrin	µg/l	BDL (DL:0.01)				
	Endosulfan alpha	µg/l	BDL (DL:0.01)				
	Endosulfan Beta	µg/l	BDL (DL:0.01)				
	Endosulfan Sulfate	µg/l	BDL (DL:0.01)				
	o,p' -DDT	µg/l	BDL (DL:0.01)				
	p,p' -DDT	µg/l	BDL (DL:0.01)				
	p,p' -DDE	µg/l	BDL (DL:0.01)				
	o,p' -DDE	µg/l	BDL (DL:0.01)				
	o,p' -DDD	µg/l	BDL (DL:0.01)				
	p,p' -DDD	µg/l	BDL (DL:0.01)				
	Alpha HCH	µg/l	BDL (DL:0.01)				
	Beta HCH	µg/l	BDL (DL:0.01)				
Gamma HCH (Lindane)	µg/l	BDL (DL:0.01)					
Delta HCH	µg/l	BDL (DL:0.01)					
48	Poly Chlorinated Terphenyls (as PCT):						
	o-Terphenyl	µg/l	BDL (DL:0.03)				
	m-Terphenyl	µg/l	BDL (DL:0.03)				
	p-Terphenyl	µg/l	BDL (DL:0.03)				
	Tetradecachloro-o-terphenyl	µg/l	BDL (DL:0.03)				
	Tetradecachloro-m-terphenyl	µg/l	BDL (DL:0.03)				
	Tetradecachloro-p-terphenyl	µg/l	BDL (DL:0.03)				
	4-Chloro-o-terphenyl	µg/l	BDL (DL:0.03)				
	4-Chloro-p-terphenyl	µg/l	BDL (DL:0.03)				
	2,4-Dichloro-p-terphenyl	µg/l	BDL (DL:0.03)				
	2,5-Dichloro-o-terphenyl	µg/l	BDL (DL:0.03)				
2,5-Dichloro-m-terphenyl	µg/l	BDL (DL:0.03)					

	2,5-Dichloro-p-terphenyl	µg/l	BDL (DL:0.03)				
	2,4,6-Trichloro-p-terphenyl	µg/l	BDL (DL:0.03)				
	2,3,5,6-Tetrachloro-p-terphenyl	µg/l	BDL (DL:0.03)				
	2,4,4",6-Tetrachloro-p-terphenyl	µg/l	BDL (DL:0.03)				
	2,3,4,5,6-Pentachloro-p-terphenyl	µg/l	BDL (DL:0.03)				
49	Poly Nuclear Aromatic Hydrocarbons (as PAH):						
	Naphthalene	µg/l	BDL (DL:0.01)				
	Acenaphthylene	µg/l	BDL (DL:0.01)				
	2-Bromo-Naphthalene	µg/l	BDL (DL:0.02)				
	Acenaphthene	µg/l	BDL (DL:0.02)				
	Fluorene	µg/l	BDL (DL:0.02)				
	Phenanthrene	µg/l	BDL (DL:0.02)				
	Anthracene	µg/l	BDL (DL:0.02)				
	Pyrene	µg/l	BDL (DL:0.02)				
	Fluoranthene	µg/l	BDL (DL:0.02)				
	Chrysene	µg/l	BDL (DL:0.02)				
	Benz[a]anthracene	µg/l	BDL (DL:0.02)				
	Benzo[a]pyrene	µg/l	BDL (DL:0.02)				
	Benzo[b]fluoranthene	µg/l	BDL (DL:0.03)				
	Benzo[ghi]perylene	µg/l	BDL (DL:0.03)				
Dibenz[a,h]anthracene	µg/l	BDL (DL:0.03)					
Indeno[1,2,3-cd]pyrene	µg/l	BDL (DL:0.04)					
50	Poly Chlorinated Biphenyls (as PCB):						
	2-Chlorobiphenyl	µg/l	BDL (DL:0.01)				
	2,3-dichlorobiphenyl	µg/l	BDL (DL:0.01)				
	2,5,4'-Trichlorobiphenyl	µg/l	BDL (DL:0.01)				
	2,2',4,4'-tetrachlorobiphenyl	µg/l	BDL (DL:0.01)				
	2,2',3,4',6'-Pentachlorobiphenyl	µg/l	BDL (DL:0.01)				
	2,2',4,4',5',6'-Hexachlorobiphenyl	µg/l	BDL (DL:0.01)				

	2,2',3,3',4,4',6-Heptachlorobiphenyl	µg/l	BDL (DL:0.01)				
	2,2',3,3',4,5,6,6'-Octachlorobiphenyl	µg/l	BDL (DL:0.01)				
51	Total Coliform	MPN/100 ml	13	13	< 2	4	50
52	Faecal Coliform	MPN/100 ml	< 2	< 2	< 2	< 2	< 2

5.8 Location of Sampling - Cuddalore

5.8.1 Ambient Air Quality

No	Location Name	Latitude	Longitude
1	Center of SIPCOT Phase I & II (SIPCOT Office)	11 ^o 40'24.41"N	79 ^o 44'59.71"E
2	South side of SIPCOT Phase I & II (Semmankuppam Village)	11 ^o 39'05.96"N	79 ^o 44'09.10"E
3	West Side SIPCOT Phase I & II (Karaikadu Village)	11 ^o 40'40.34"N	79 ^o 44'53.48"E
4	Splendid Udyog Pvt Ltd	11 ^o 41'43.00"N	79 ^o 45'39.92"E

5.8.2 Surface Water

No	Location Name	Latitude	Longitude
1	Pondiankuppam Village Upstream of Uppanar River	11 ^o 37'43.97"N	79 ^o 43'57.55"E
2	Nochikadu Village Upstream of Uppanaar River	11 ^o 39'09.07"N	79 ^o 44'36.32"E
3	Behind Kudikadu Village	11 ^o 40'57.39"N	79 ^o 45'47.27"E
4	Thikal Thonithy Village Downstream of SIPCOT	11 ^o 41'31.38"N	79 ^o 46'01.75"E

5.8.3 Ground Water

No	Location Name	Latitude	Longitude
1	Inside of SIPCOT Office	11 ^o 40'24.80"N	79 ^o 45'00.19"E
2	Inside of Chemplast Sanmar Ltd	11 ^o 38'45.54"N	79 ^o 44'26,45"E
3	Kudikadu village- Over Head Tank	11 ^o 40'59.92"N	79 ^o 45'25.44"E
4	Pachangappaam (Opp. to J.K Pharma)	11 ^o 41'44.90"N	79 ^o 45'47.84"E

The pictorial representation of sampling locations for Cuddalore Area are given in the Fig 3.0 and Photographs of Sampling are shown in Point No.5.9. Results of Ambient Air Quality, Surface Water Quality and Ground Water Quality are tabulated in Point No. 5.10.

Fig 3.0 Sampling Location Map - Cuddalore



5.9 Sampling in Cuddalore Area

5.9.1 Ambient Air Quality

Top of SI PCOT Office



11°40'24.41"N
79°44'59.71"E

Semmankuppam



11°39'05.96"N
79°44'09.10"E

Karaikadu



11°40'40.34"N
79°44'53.48"E

Splendid Udyog Limited



11°41'43.00"N
79°45'39.92"E

5.9.2 Surface Water

PANDI YAN KUPPAM
VILLAGE- UPPERSIDE
OF UPPANAR RIVER



11°37'43.97"N
79°43'57.55"E

NOCHI KADU
VILLAGE- UPPER
SIDE OF UPPANAR
RIVER



11°39'09.07"N
79°44'36.32"E

BETWEEN KUDI KADU
VILLAGE



11°40'57.39"N
79°45'47.27"E

THI KAL THONITHY
VILLAGE- D/S OF
SI PCOT



11°41'31.38"N
79°46'01.75"E

5.9.3 Ground Water – Cuddalore Area

Inside of SI PCOT Office



11°40'24.80"N
79°45'00.19"E

Inside Of Chemplast
Sunmar Ltd



11°38'45.54"N
79°44'26.45"E

Kudikadu Village-
Overhead Tank



11°40'59.92"N
79°45'25.44"E

Pachankappam-
Opposite to JK
Pharma



11°41'44.90"N
79°45'47.84"E

5.10 Monitoring / Analysis Results - Cuddalore
5.10.1 Ambient Air Quality

Parameters	SI PCOT Office			Semmankuppam Village			Karaikadu Village			Splendid Udyog Ltd			NAAQS*	Units
	26.09.17 to 27.09.17	28.09.17 to 29.09.17	30.09.17 to 01.10.17											
Particulate Matter (PM2.5)	22.5	30.4	28.5	21.6	31.0	24.0	22.3	21.8	20.5	25.6	32.5	24.4	60	µg/m ³
Particulate Matter (PM10)	53.8	61.2	60.8	48.1	63.8	53.8	50.6	52.4	49.5	56.6	68.6	55.6	100	µg/m ³
Sulphur Dioxide (SO ₂)	9.0	13.6	11.7	12.5	7.4	9.7	3.5	8.6	4.3	10.5	6.6	8.2	80	µg/m ³
Oxides of Nitrogen (NO _x)	18.3	22.3	19.7	23.0	21.1	18.5	11.2	19.7	12.4	21.8	15.7	17.3	80	µg/m ³
Ozone(O ₃)	11.6	15.8	13.9	25.8	20.5	16.2	10.2	8.6	12.5	13.2	16.8	10.9	180	µg/m ³
Lead(Pb)	BDL (D.L -0.1)	1	µg/m ³											
Carbon Monoxide (CO)	BDL (D.L -1.15)	4	mg/m ³											
Ammonia (NH ₃)	27.4	31.5	36.3	21.5	22.6	25.9	37.7	24.1	22.2	34.4	14.1	21.5	400	µg/m ³
Arsenic(As)	BDL (D.L -1.0)	6	ng/m ³											
Nickel (Ni)	BDL (D.L - 5.0)	BDL (D.L - 5.0)	BDL (D.L - 5.0)	BDL (D.L - 5.0)	6.4	5.2	5.5	7.0	BDL (D.L - 5.0)	6.3	8.2	BDL (D.L - 5.0)	20	ng/m ³
Benzene (C ₆ H ₆)	BDL (D.L - 1.0)	5	µg/m ³											
Benzo(a) Pyrene	BDL (D.L - 0.5)	1	ng/m ³											

*National Ambient Air Quality Standards – CPCB

5.10.2 Surface Water Quality - Cuddalore

Sampling location			Pondiankuppam Village Upstream of Uppanar River	Nochikadu Village Upstream of Uppanar River	Behind Kudikadu Village	Thikal Thonithy Village Downstream of Sipcot
S.NO	PARAMETERS	UNITS	RESULTS			
1	Appearance	-	Slightly Turbid Liquid	Slightly turbid liquid	Slightly turbid liquid	Slightly turbid liquid
2	Colour	HU	2	2	2	2
3	pH @ 25°C	-	7.1	7.2	7.2	7.2
4	Odour	-	Unobjectionable	Unobjectionable	Unobjectionable	Unobjectionable
5	Ecological (Presence of Animals like Fish, Insects Etc)	-	Present	Present	Present	Present
6	Oil & Grease	mg/l	< 2	< 2	< 2	< 2
7	Total Suspended Solids	mg/l	25	30	26	38
8	Dissolved Oxygen	mg/l	6.3	6.5	6.6	6.6
9	Biochemical Oxygen Demand (BOD) 3 days at 27°C	mg/l	< 2	< 2	< 2	< 2
10	Chemical Oxygen Demand (COD)	mg/l	< 4	< 4	< 4	< 4
11	Conductivity	µs/cm	2758	2963	12890	13730
12	Total Dissolved Solids	mg/l	1650	1772	7726	9430
13	Nitrate – Nitrogen	mg/l	1.6	1.7	2.2	1.7
14	Nitrite – Nitrogen	mg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)
15	Free Ammonia as NH ₃	mg/l	BDL (DL: 0.1)	BDL (DL: 0.1)	BDL (DL: 0.1)	BDL (DL: 0.1)
16	Total Residual Chlorine	mg/l	BDL (DL: 0.1)	BDL (DL: 0.1)	BDL (DL: 0.1)	BDL (DL: 0.1)
17	Cyanide as CN	mg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)
18	Fluoride as F	mg/l	0.18	0.26	0.26	0.26

19	Sulphate as SO ₄	mg/l	344	336	752	843
20	Sulphide as H ₂ S	mg/l	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)
21	Total Hardness as CaCO ₃	mg/l	455	455	1374	1576
22	Dissolved Phosphate as P	mg/l	0.2	0.58	BDL (DL:0.1)	0.83
23	Sodium Absorption Ratio	-	6.9	7.1	20.2	22.5
24	Total Phosphorous as P	mg/l	0.2	0.58	BDL (DL:0.1)	0.83
25	Total Kjeldahl Nitrogen as N	mg/l	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)
26	Total Ammonia	mg/l	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)
27	Phenols	mg/l	BDL (DL:0.001)	BDL (DL:0.001)	BDL (DL:0.001)	BDL (DL:0.001)
28	Surface Active Agents	mg/l	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)
29	Anionic detergent as MBAS	mg/l	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)
30	Hexavalent Chromium as Cr ⁶⁺	mg/l	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)
31	Iron as Fe	mg/l	0.63	0.51	0.46	0.41
32	Boron as B	mg/l	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)
33	Total Nitrogen	mg/l	1.6	1.7	2.2	1.7
34	Chloride	mg/l	544	583	3186	3992
35	Bio – Assay (Zebra Fish) Test	-	Tf = 1	Tf = 1	Tf = 1	Tf = 1
36	Copper as Cu	mg/l	1.29	1.25	BDL (DL:0.02)	BDL (DL:0.02)
37	Manganese as Mn	mg/l	0.09	0.07	BDL (DL:0.01)	BDL (DL:0.01)
38	Mercury as Hg	mg/l	BDL (DL:0.001)	BDL (DL:0.001)	BDL (DL:0.001)	BDL (DL:0.001)
39	Cadmium as Cd	mg/l	BDL (DL:0.002)	BDL (DL:0.002)	BDL (DL:0.002)	BDL (DL:0.002)
40	Selenium as Se	mg/l	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)
41	Total Arsenic as As	mg/l	BDL (DL:0.001)	BDL (DL:0.001)	BDL (DL:0.001)	BDL (DL:0.001)
42	Lead as Pb	mg/l	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)
43	Zinc as Zn	mg/l	0.25	0.27	BDL (DL:0.08)	BDL (DL:0.08)
44	Total Chromium as Cr	mg/l	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)
45	Nickel as Ni	mg/l	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)

46	Vanadium as V	mg/l	BDL (DL: 2.0)	BDL (DL: 2.0)	BDL (DL: 2.0)	BDL (DL: 2.0)
47	Organo chlorine Pesticides (OCP):					
	Aldrin	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)
	Dieldrin	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)
	Endosulfan alpha	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)
	Endosulfan Beta	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)
	Endosulfan Sulfate	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)
	<i>o,p'</i> -DDT	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)
	<i>p,p'</i> -DDT	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)
	<i>p,p'</i> -DDE	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)
	<i>o,p'</i> -DDE	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)
	<i>o,p'</i> -DDD	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)
	<i>p,p'</i> -DDD	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)
	Alpha HCH	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)
	Beta HCH	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)
	Gamma HCH (Lindane)	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)
Delta HCH	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	
48	Poly Chlorinated Terphenyls (as PCT):					
	<i>o</i> -Terphenyl	µg/l	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)
	<i>m</i> -Terphenyl	µg/l	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)
	<i>p</i> -Terphenyl	µg/l	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)
	Tetradecachloro- <i>o</i> -terphenyl	µg/l	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)
	Tetradecachloro- <i>m</i> -terphenyl	µg/l	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)
	Tetradecachloro- <i>p</i> -terphenyl	µg/l	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)
	4-Chloro- <i>o</i> -terphenyl	µg/l	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)
	4-Chloro- <i>p</i> -terphenyl	µg/l	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)
	2,4-Dichloro- <i>p</i> -terphenyl	µg/l	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)
2,5-Dichloro- <i>o</i> -terphenyl	µg/l	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)	

	2,5-Dichloro-m-terphenyl	µg/l	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)	
	2,5-Dichloro-p-terphenyl	µg/l	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)	
	2,4,6-Trichloro-p-terphenyl	µg/l	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)	
	2,3,5,6-Tetrachloro-p-terphenyl	µg/l	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)	
	2,4,4",6-Tetrachloro-p-terphenyl	µg/l	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)	
	2,3,4,5,6-Pentachloro-p-terphenyl	µg/l	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)	
49	Poly Nuclear Aromatic Hydrocarbons (as PAH):						
		Naphthalene	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)
		Acenaphthylene	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)
		2-Bromo-Naphthalene	µg/l	BDL (DL: 0.02)	BDL (DL: 0.02)	BDL (DL: 0.02)	BDL (DL: 0.02)
		Acenaphthene	µg/l	BDL (DL: 0.02)	BDL (DL: 0.02)	BDL (DL: 0.02)	BDL (DL: 0.02)
		Fluorene	µg/l	BDL (DL: 0.02)	BDL (DL: 0.02)	BDL (DL: 0.02)	BDL (DL: 0.02)
		Phenanthrene	µg/l	BDL (DL: 0.02)	BDL (DL: 0.02)	BDL (DL: 0.02)	BDL (DL: 0.02)
		Anthracene	µg/l	BDL (DL: 0.02)	BDL (DL: 0.02)	BDL (DL: 0.02)	BDL (DL: 0.02)
		Pyrene	µg/l	BDL (DL: 0.02)	BDL (DL: 0.02)	BDL (DL: 0.02)	BDL (DL: 0.02)
		Fluoranthene	µg/l	BDL (DL: 0.02)	BDL (DL: 0.02)	BDL (DL: 0.02)	BDL (DL: 0.02)
		Chrysene	µg/l	BDL (DL: 0.02)	BDL (DL: 0.02)	BDL (DL: 0.02)	BDL (DL: 0.02)
		Benz[a]anthracene	µg/l	BDL (DL: 0.02)	BDL (DL: 0.02)	BDL (DL: 0.02)	BDL (DL: 0.02)
		Benzo[a]pyrene	µg/l	BDL (DL: 0.02)	BDL (DL: 0.02)	BDL (DL: 0.02)	BDL (DL: 0.02)
		Benzo[b]fluoranthene	µg/l	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)
		Benzo[ghi]perylene	µg/l	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)
		Dibenz[a,h]anthracene	µg/l	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)
	Indeno[1,2,3-cd]pyrene	µg/l	BDL (DL: 0.04)	BDL (DL: 0.04)	BDL (DL: 0.04)	BDL (DL: 0.04)	
50	Poly Chlorinated Biphenyls (as PCB):						
		2-Chlorobiphenyl	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)
		2,3-dichlorobiphenyl	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)
		2,5,4'-Trichlorobiphenyl	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)
		2,2',4,4'-tetrachlorobiphenyl	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)

	2,2',3,4',6'-Pentachlorobiphenyl	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)
	2,2',4,4',5',6-Hexachlorobiphenyl	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)
	2,2',3,3',4,4',6-Heptachlorobiphenyl	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)
	2,2',3,3',4,5,6,6'-Octachlorobiphenyl	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)
51	Total Coliform	MPN/100 ml	< 2	< 2	< 2	< 2
52	Faecal Coliform	MPN/100 ml	< 2	< 2	< 2	< 2

5.10.3 Ground Water Quality

Sampling location			Inside of Sipcot Office	Inside of Chemplast Sanmark Ltd.	Kudikadu Village - Over Head Tank	Pachangappaam (Opp.to J.K.Pharma)
S.NO	PARAMETERS	UNITS	RESULTS			
1	Appearance	-	Clear Liquid	Clear Liquid with Suspended Particles	Clear Liquid	Slightly turbid liquid
2	Colour	HU	2	5	2	5
3	pH @ 25°C	-	7.5	7.4	7.2	7.0
4	Odour	-	Unobjectionable	Unobjectionable	Unobjectionable	Unobjectionable
5	Ecological (Presence of Animals like Fish, Insects etc)	-	Absent	Absent	Absent	Absent
6	Oil & Grease	mg/l	< 2	< 2	< 2	< 2
7	Total Suspended Solids	mg/l	< 2	40	8	3
8	Dissolved Oxygen	mg/l	6.7	6.5	6.6	6.4
9	Biochemical Oxygen Demand (BOD) 3 days at 27°C	mg/l	< 2	< 2	< 2	< 2
10	Chemical Oxygen Demand (COD)	mg/l	< 4	< 4	< 4	< 4
11	Conductivity	µs/cm	998	678	574	711
12	Total Dissolved Solids	mg/l	596	402	340	422
13	Nitrate - Nitrogen	mg/l	0.80	0.52	0.58	1.2
14	Nitrite - Nitrogen	mg/l	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)
15	Free Ammonia as NH ₃	mg/l	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)
16	Total Residual Chlorine	mg/l	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)
17	Cyanide as CN	mg/l	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)
18	Fluoride as F	mg/l	0.16	0.16	0.24	0.24
19	Sulphate as SO ₄	mg/l	18.7	8.5	18.4	26.3

20	Sulphide as H ₂ S	mg/l	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)
21	Total Hardness as CaCO ₃	mg/l	246	61	149	214
22	Dissolved Phosphate as P	mg/l	0.94	0.25	0.32	0.32
23	Sodium Absorption Ratio	-	2.27	4.63	1.52	1.0
24	Total Phosphorous as P	mg/l	0.94	0.25	0.32	0.32
25	Total Kjeldahl Nitrogen as N	mg/l	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)
26	Total Ammonia	mg/l	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)
27	Phenols	mg/l	BDL (DL:0.001)	BDL (DL:0.001)	BDL (DL:0.001)	BDL (DL:0.001)
28	Surface Active Agents	mg/l	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)
29	Anionic detergent as MBAS	mg/l	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)
30	Hexavalent Chromium as Cr ⁶⁺	mg/l	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)
31	Iron as Fe	mg/l	0.08	4.81	0.14	1.82
32	Boron as B	mg/l	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)
33	Total Nitrogen	mg/l	0.8	0.52	0.58	1.2
34	Chloride	mg/l	136	150	48	74
35	Bio – Assay (Zebra Fish) Test	-	Tf = 1	Tf = 1	Tf = 1	Tf = 1
36	Copper as Cu	mg/l	BDL (DL:0.02)	BDL (DL:0.02)	BDL (DL:0.02)	BDL (DL:0.02)
37	Manganese as Mn	mg/l	BDL (DL:0.01)	0.17	0.06	0.82
38	Mercury as Hg	mg/l	BDL (DL:0.001)	BDL (DL:0.001)	BDL (DL:0.001)	BDL (DL:0.001)
39	Cadmium as Cd	mg/l	BDL (DL:0.002)	BDL (DL:0.002)	BDL (DL:0.002)	BDL (DL:0.002)
40	Selenium as Se	mg/l	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)
41	Total Arsenic as As	mg/l	BDL (DL:0.001)	BDL (DL:0.001)	BDL (DL:0.001)	BDL (DL:0.001)
42	Lead as Pb	mg/l	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)
43	Zinc as Zn	mg/l	BDL (DL:0.08)	BDL (DL:0.08)	BDL (DL:0.08)	BDL (DL:0.08)
44	Total Chromium as Cr	mg/l	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)
45	Nickel as Ni	mg/l	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)
46	Vanadium as V	mg/l	BDL (DL:2.0)	BDL (DL:2.0)	BDL (DL:2.0)	BDL (DL:2.0)

47	Organo chlorine Pesticides (OCP):					
	Aldrin	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)
	Dieldrin	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)
	Endosulfan alpha	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)
	Endosulfan Beta	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)
	Endosulfan Sulfate	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)
	o,p' -DDT	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)
	p,p' -DDT	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)
	p,p' -DDE	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)
	o,p' -DDE	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)
	o,p' -DDD	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)
	p,p' -DDD	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)
	Alpha HCH	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)
	Beta HCH	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)
	Gamma HCH (Lindane)	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)
Delta HCH	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	
48	Poly Chlorinated Terphenyls (as PCT):					
	o-Terphenyl	µg/l	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)
	m-Terphenyl	µg/l	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)
	p-Terphenyl	µg/l	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)
	Tetradecachloro-o-terphenyl	µg/l	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)
	Tetradecachloro-m-terphenyl	µg/l	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)
	Tetradecachloro-p-terphenyl	µg/l	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)
	4-Chloro-o-terphenyl	µg/l	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)
	4-Chloro-p-terphenyl	µg/l	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)
	2,4-Dichloro-p-terphenyl	µg/l	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)
	2,5-Dichloro-o-terphenyl	µg/l	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)
	2,5-Dichloro-m-terphenyl	µg/l	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)

	2,5-Dichloro-p-terphenyl	µg/l	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)
	2,4,6-Trichloro-p-terphenyl	µg/l	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)
	2,3,5,6-Tetrachloro-p-terphenyl	µg/l	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)
	2,4,4",6-Tetrachloro-p-terphenyl	µg/l	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)
	2,3,4,5,6-Pentachloro-p-terphenyl	µg/l	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)
49	Poly Nuclear Aromatic Hydrocarbons (as PAH):					
	Naphthalene	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)
	Acenaphthylene	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)
	2-Bromo-Naphthalene	µg/l	BDL (DL: 0.02)	BDL (DL: 0.02)	BDL (DL: 0.02)	BDL (DL: 0.02)
	Acenaphthene	µg/l	BDL (DL: 0.02)	BDL (DL: 0.02)	BDL (DL: 0.02)	BDL (DL: 0.02)
	Fluorene	µg/l	BDL (DL: 0.02)	BDL (DL: 0.02)	BDL (DL: 0.02)	BDL (DL: 0.02)
	Phenanthrene	µg/l	BDL (DL: 0.02)	BDL (DL: 0.02)	BDL (DL: 0.02)	BDL (DL: 0.02)
	Anthracene	µg/l	BDL (DL: 0.02)	BDL (DL: 0.02)	BDL (DL: 0.02)	BDL (DL: 0.02)
	Pyrene	µg/l	BDL (DL: 0.02)	BDL (DL: 0.02)	BDL (DL: 0.02)	BDL (DL: 0.02)
	Fluoranthene	µg/l	BDL (DL: 0.02)	BDL (DL: 0.02)	BDL (DL: 0.02)	BDL (DL: 0.02)
	Chrysene	µg/l	BDL (DL: 0.02)	BDL (DL: 0.02)	BDL (DL: 0.02)	BDL (DL: 0.02)
	Benz[a]anthracene	µg/l	BDL (DL: 0.02)	BDL (DL: 0.02)	BDL (DL: 0.02)	BDL (DL: 0.02)
	Benzo[a]pyrene	µg/l	BDL (DL: 0.02)	BDL (DL: 0.02)	BDL (DL: 0.02)	BDL (DL: 0.02)
	Benzo[b]fluoranthene	µg/l	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)
	Benzo[ghi]perylene	µg/l	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)
Dibenz[a,h]anthracene	µg/l	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)	BDL (DL: 0.03)	
Indeno[1,2,3-cd]pyrene	µg/l	BDL (DL: 0.04)	BDL (DL: 0.04)	BDL (DL: 0.04)	BDL (DL: 0.04)	
50	Poly Chlorinated Biphenyls (as PCB):					
	2-Chlorobiphenyl	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)
	2,3-dichlorobiphenyl	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)
	2,5,4'-Trichlorobiphenyl	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)
	2,2',4,4'-tetrachlorobiphenyl	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)
	2,2',3,4',6'-Pentachlorobiphenyl	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)

	2,2',4,4',5',6-Hexachlorobiphenyl	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)
	2,2',3,3',4,4',6-Heptachlorobiphenyl	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)
	2,2',3,3',4,5,6,6'-Octachlorobiphenyl	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)	BDL (DL: 0.01)
51	Total Coliform	MPN/100 ml	< 2	< 2	< 2	< 2
52	Faecal Coliform	MPN/100 ml	< 2	< 2	< 2	< 2

5.11 Location of Sampling - Coimbatore

5.11.1 Ambient Air Quality

No	Location Name	Latitude	Longitude
1	Indo Shell Mould Ltd (Unit- II)	10°56'01.99"N	76°58'31.48"E
2	Top of the SIPCOT Office Building	10°56'33.18"N	76°58'44.13"E

5.11.2 Surface Water

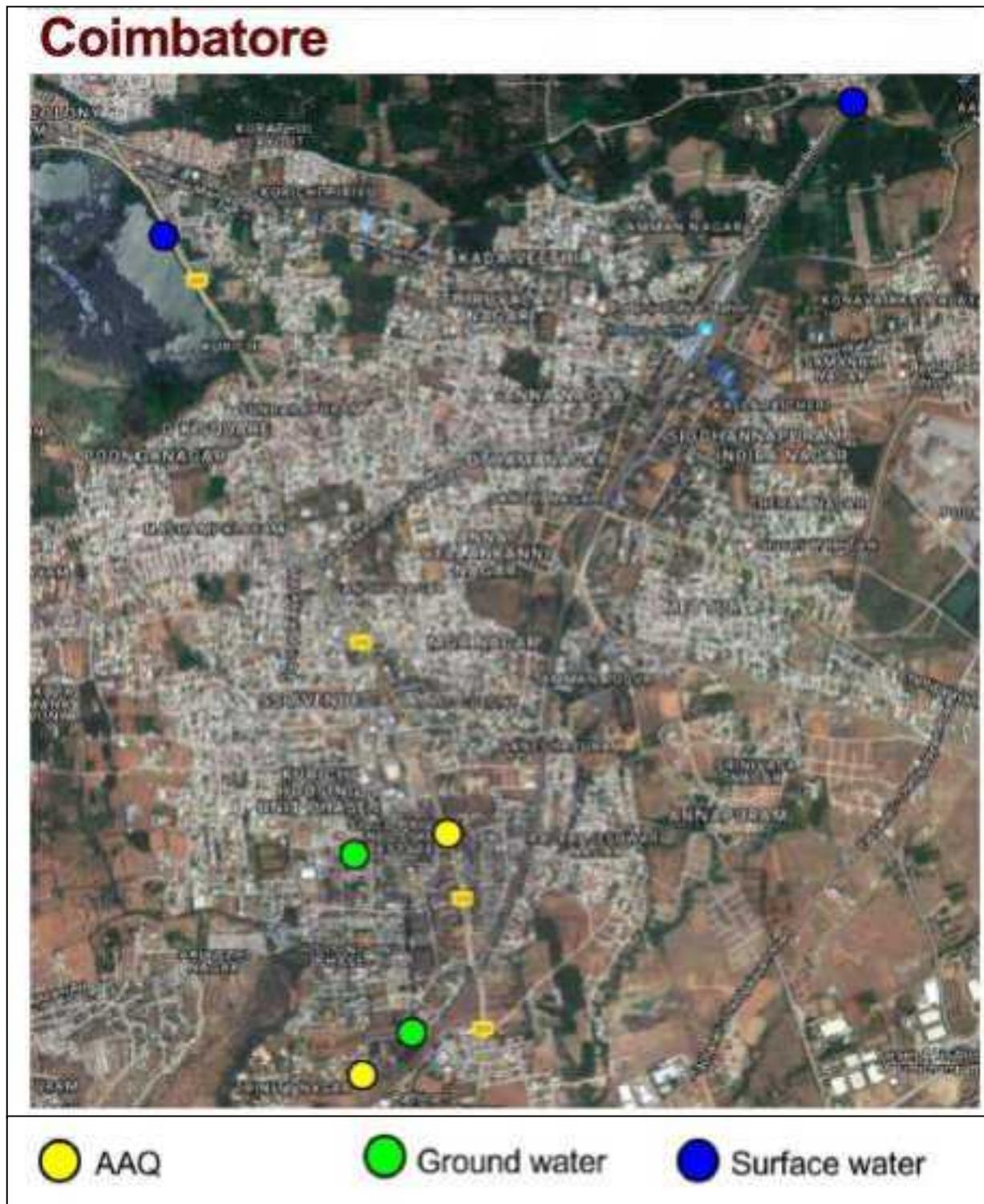
No	Location Name	Latitude	Longitude
1	Noyyar River	10°58'27.56"N	76°59'44.47"E
2	Kurichikulam	10°58'07.62"N	76°58'01.99"E

5.11.3 Ground Water

No	Location Name	Latitude	Longitude
1	Indo Shell Mould Ltd (Unit- II)	10°56'08.36"N	76°58'38.87"E
2	Surya Industries	10°56'35.01"N	76°58'30.30"E

The pictorial representation of sampling locations for Coimbatore Area are given in the Fig 4.0 and Photographs of Sampling are shown in Point No.5.12. Results of Ambient Air Quality, Surface Water Quality and Ground Water Quality are tabulated in Point No. 5.13.

Fig 4.0 Sampling Location Map - Coimbatore



5.12 Sampling in Coimbatore Area

5.12.1 Ambient Air Quality

Indo Shell Mould Unit - II



10°56'01.99"N
76°58'31.48"E

Top of SI PCOT Office



10°56'38.18"N
76°58'44.18"E

5.12.2 Surface Water

Kurichi Lake



10°58'07.62"N
76°58'01.99"E

Noyyal River



10°58'27.56"N
76°59'44.47"E

5.12.3 Ground Water - Coimbatore

Surya Industries



10°56'35.01"N
76°58'30.30"E

Indo Shell Mould Ltd – Unit II



10°56'08.36"N
76°58'38.87"E

5.13 Monitoring / Analysis Results - Coimbatore
5.13.1 Ambient Air Quality

Parameters	Indo Shell Mould Ltd - Unit II			SI PCOT			NAAQS*	Units
	15.09.2017 to 16.09.2017	17.09.2017 to 18.09.2017	19.09.2017 to 20.09.2017	15.09.2017 to 16.09.2017	17.09.2017 to 18.09.2017	19.09.2017 to 20.09.2017		
Particulate Matter (PM2.5)	34.3	42.2	33.5	30.4	32.5	25.1	60	µg/m ³
Particulate Matter (PM10)	74.8	83.6	70.5	64.3	67.4	57.6	100	µg/m ³
Sulphur Dioxide (SO ₂)	13.6	17.1	11.7	8.6	10.1	8.2	80	µg/m ³
Oxides of Nitrogen (NO _x)	23.7	26.5	22.3	17.8	15.2	14.3	80	µg/m ³
Ozone(O ₃)	18.2	20.5	21.1	14.2	13.2	10.6	180	µg/m ³
Lead(Pb)	BDL(D.L -0.1)	BDL(D.L -0.1)	BDL(D.L -0.1)	BDL(D.L -0.1)	BDL(D.L -0.1)	BDL(D.L -0.1)	1	µg/m ³
Carbon Monoxide (CO)	BDL(D.L -1.15)	BDL(D.L -1.15)	BDL(D.L -1.15)	BDL(D.L -1.15)	BDL(D.L -1.15)	BDL(D.L -1.15)	4	mg/m ³
Ammonia (NH ₃)	26.3	27.0	44.8	33.3	25.2	19.2	400	µg/m ³
Arsenic(As)	BDL(D.L -1.0)	BDL(D.L -1.0)	BDL(D.L -1.0)	BDL(D.L -1.0)	BDL(D.L -1.0)	BDL(D.L -1.0)	6	ng/m ³
Nickel (Ni)	5.6	7.1	13.1	BDL(D.L - 5.0)	9.2	6.1	20	ng/m ³
Benzene (C ₆ H ₆)	BDL(D.L - 1.0)	BDL(D.L - 1.0)	BDL(D.L - 1.0)	BDL(D.L - 1.0)	BDL(D.L - 1.0)	BDL(D.L - 1.0)	5	µg/m ³
Benzo(a) Pyrene	BDL(D.L - 0.5)	BDL(D.L - 0.5)	BDL(D.L - 0.5)	BDL(D.L - 0.5)	BDL(D.L - 0.5)	BDL(D.L - 0.5)	1	ng/m ³

*National Ambient Air Quality Standards – CPCB

5.13.2 Surface Water Quality - Coimbatore

Sampling location			Noyyar River	Kurichikulam
S.NO	PARAMETERS	UNITS	RESULTS	
1	Appearance	-	Clear liquid with suspended particles	Slightly turbid liquid
2	Colour	HU	5	10
3	pH @ 25°C	-	7.3	7.4
4	Odour	-	Unobjectionable	Unobjectionable
5	Ecological (Presence of Animals like Fish, Insects Etc)	-	Present	Present
6	Oil & Grease	mg/l	< 2	< 2
7	Total Suspended Solids	mg/l	10	150
8	Dissolved Oxygen	mg/l	6.8	5.8
9	Biochemical Oxygen Demand (BOD) 3 days at 27°C	mg/l	< 2	8
10	Chemical Oxygen Demand (COD)	mg/l	11	54
11	Conductivity	µs/cm	4438	1254
12	Total Dissolved Solids	mg/l	2664	748
13	Nitrate – Nitrogen	mg/l	68.4	20.4
14	Nitrite – Nitrogen	mg/l	BDL (DL:0.01)	BDL (DL:0.01)
15	Free Ammonia as NH ₃	mg/l	0.12	0.54
16	Total Residual Chlorine	mg/l	BDL (DL:0.1)	BDL (DL:0.1)
17	Cyanide as CN	mg/l	BDL (DL:0.01)	BDL (DL:0.01)
18	Fluoride as F	mg/l	0.24	0.26
19	Sulphate as SO ₄	mg/l	215	23.3
20	Sulphide as H ₂ S	mg/l	BDL (DL:0.01)	BDL (DL:0.01)
21	Total Hardness as CaCO ₃	mg/l	1183	254
22	Dissolved Phosphate as P	mg/l	0.14	0.26
23	Sodium Absorption Ratio	-	4.95	3.21
24	Total Phosphorous as P	mg/l	0.16	0.36
25	Total Kjeldahl Nitrogen as N	mg/l	0.36	2.1
26	Total Ammonia	mg/l	0.31	1.4
27	Phenols	mg/l	BDL (DL:0.001)	BDL (DL:0.001)
28	Surface Active Agents	mg/l	BDL (DL:0.1)	BDL (DL:0.1)
29	Anionic detergent as MBAS	mg/l	BDL (DL:0.1)	BDL (DL:0.1)
30	Hexavalent Chromium as Cr ⁶⁺	mg/l	BDL (DL:0.01)	BDL (DL:0.01)
31	Iron as Fe	mg/l	0.3	4.6
32	Boron as B	mg/l	BDL (DL:0.1)	BDL (DL:0.1)
33	Total Nitrogen	mg/l	69.2	24.4
34	Chloride	mg/l	927	243
35	Bio – Assay (Zebra Fish) Test	-	Tf = 1	Tf = 1
36	Copper as Cu	mg/l	BDL(DL:0.02)	0.53

37	Manganese as Mn	mg/l	0.28	0.13
38	Mercury as Hg	mg/l	BDL (DL: 0.001)	BDL (DL: 0.001)
39	Cadmium as Cd	mg/l	BDL (DL: 0.002)	BDL (DL: 0.002)
40	Selenium as Se	mg/l	BDL (DL: 0.005)	BDL (DL: 0.005)
41	Total Arsenic as As	mg/l	BDL (DL: 0.001)	BDL (DL: 0.001)
42	Lead as Pb	mg/l	BDL (DL: 0.005)	BDL (DL: 0.005)
43	Zinc as Zn	mg/l	BDL (DL: 0.08)	0.29
44	Total Chromium as Cr	mg/l	BDL (DL: 0.01)	BDL (DL: 0.01)
45	Nickel as Ni	mg/l	BDL (DL: 0.01)	BDL (DL: 0.01)
46	Vanadium as V	mg/l	BDL (DL: 2.0)	BDL (DL: 2.0)
47	Organo chlorine Pesticides (OCP):			
	Aldrin	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)
	Dieldrin	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)
	Endosulfan alpha	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)
	Endosulfan Beta	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)
	Endosulfan Sulfate	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)
	o,p' -DDT	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)
	p,p' -DDT	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)
	p,p' -DDE	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)
	o,p' -DDE	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)
	o,p' -DDD	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)
	p,p' -DDD	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)
	Alpha HCH	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)
	Beta HCH	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)
	Gamma HCH (Lindane)	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)
Delta HCH	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	
48	Poly Chlorinated Terphenyls (as PCT):			
	o-Terphenyl	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)
	m-Terphenyl	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)
	p-Terphenyl	µg/l	BDL (DL: 0.02)	BDL (DL: 0.02)
	Tetradecachloro-o-terphenyl	µg/l	BDL (DL: 0.02)	BDL (DL: 0.02)
	Tetradecachloro-m-terphenyl	µg/l	BDL (DL: 0.02)	BDL (DL: 0.02)
	Tetradecachloro-p-terphenyl	µg/l	BDL (DL: 0.02)	BDL (DL: 0.02)
	4-Chloro-o-terphenyl	µg/l	BDL (DL: 0.02)	BDL (DL: 0.02)
	4-Chloro-p-terphenyl	µg/l	BDL (DL: 0.02)	BDL (DL: 0.02)
	2,4-Dichloro-p-terphenyl	µg/l	BDL (DL: 0.02)	BDL (DL: 0.02)
	2,5-Dichloro-o-terphenyl	µg/l	BDL (DL: 0.02)	BDL (DL: 0.02)
	2,5-Dichloro-m-terphenyl	µg/l	BDL (DL: 0.02)	BDL (DL: 0.02)
	2,5-Dichloro-p-terphenyl	µg/l	BDL (DL: 0.02)	BDL (DL: 0.02)
	2,4,6-Trichloro-p-terphenyl	µg/l	BDL (DL: 0.03)	BDL (DL: 0.03)
	2,3,5,6-Tetrachloro-p-terphenyl	µg/l	BDL (DL: 0.03)	BDL (DL: 0.03)
2,4,4",6-Tetrachloro-p-terphenyl	µg/l	BDL (DL: 0.03)	BDL (DL: 0.03)	
2,3,4,5,6-Pentachloro-p-terphenyl	µg/l	BDL (DL: 0.04)	BDL (DL: 0.04)	
49	Poly Nuclear Aromatic Hydrocarbons (as PAH):			
	Naphthalene	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)
	Acenaphthylene	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)
	2-Bromo-Naphthalene	µg/l	BDL (DL: 0.02)	BDL (DL: 0.02)
	Acenaphthene	µg/l	BDL (DL: 0.02)	BDL (DL: 0.02)
	Fluorene	µg/l	BDL (DL: 0.02)	BDL (DL: 0.02)
	Phenanthrene	µg/l	BDL (DL: 0.02)	BDL (DL: 0.02)
	Anthracene	µg/l	BDL (DL: 0.02)	BDL (DL: 0.02)
	Pyrene	µg/l	BDL (DL: 0.02)	BDL (DL: 0.02)
	Fluoranthene	µg/l	BDL (DL: 0.02)	BDL (DL: 0.02)

	Chrysene	µg/l	BDL (DL: 0.02)	BDL (DL: 0.02)
	Benz[a]anthracene	µg/l	BDL (DL: 0.02)	BDL (DL: 0.02)
	Benzo[a]pyrene	µg/l	BDL (DL: 0.02)	BDL (DL: 0.02)
	Benzo[b]fluoranthene	µg/l	BDL (DL: 0.03)	BDL (DL: 0.03)
	Benzo[ghi]perylene	µg/l	BDL (DL: 0.03)	BDL (DL: 0.03)
	Dibenz[a,h]anthracene	µg/l	BDL (DL: 0.03)	BDL (DL: 0.03)
	Indeno[1,2,3-cd]pyrene	µg/l	BDL (DL: 0.04)	BDL (DL: 0.04)
	Poly Chlorinated Biphenyls (as PCB):			
	2-Chlorobiphenyl	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)
	2,3-dichlorobiphenyl	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)
	2,5,4'-Trichlorobiphenyl	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)
50	2,2',4,4'-tetrachlorobiphenyl	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)
	2,2',3,4',6'-Pentachlorobiphenyl	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)
	2,2',4,4',5',6'-Hexachlorobiphenyl	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)
	2,2',3,3',4,4',6'-Heptachlorobiphenyl	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)
	2,2',3,3',4,5,6,6'-Octachlorobiphenyl	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)
51	Total Coliform	MPN/100 ml	50	110
52	Faecal Coliform	MPN/100 ml	4	23

5.13.3 Ground Water Quality - Coimbatore

Sampling location			Surya Industrials	Indo Shell Mould Ltd. (Unit - II)
S.NO	PARAMETERS	UNITS	RESULTS	
1	Appearance	-	Clear Liquid	Clear Liquid
2	Colour	HU	2	2
3	pH @ 25°C	-	7.1	7.5
4	Odour	-	Unobjectionable	Unobjectionable
5	Ecological (Presence of Animals like Fish, Insects Etc)	-	Absent	Absent
6	Oil & Grease	mg/l	< 2	< 2
7	Total Suspended Solids	mg/l	< 2	< 2
8	Dissolved Oxygen	mg/l	7.4	6.9
9	Biochemical Oxygen Demand (BOD) 3 days at 27°C	mg/l	< 2	< 2
10	Chemical Oxygen Demand (COD)	mg/l	< 4	< 4
11	Conductivity	µs/cm	2872	1849
12	Total Dissolved Solids	mg/l	1722	1106
13	Nitrate - Nitrogen	mg/l	38.4	21.4
14	Nitrite - Nitrogen	mg/l	BDL (DL:0.01)	BDL (DL:0.01)
15	Free Ammonia as NH ₃	mg/l	BDL (DL:0.1)	BDL (DL:0.1)
16	Total Residual Chlorine	mg/l	BDL (DL:0.1)	BDL (DL:0.1)
17	Cyanide as CN	mg/l	BDL (DL:0.01)	BDL (DL:0.01)
18	Fluoride as F	mg/l	0.14	0.16
19	Sulphate as SO ₄	mg/l	95.7	83.1
20	Sulphide as H ₂ S	mg/l	BDL (DL:0.01)	BDL (DL:0.01)
21	Total Hardness as CaCO ₃	mg/l	828	572
22	Dissolved Phosphate as P	mg/l	BDL (DL:0.1)	BDL (DL:0.1)
23	Sodium Absorption Ratio	-	3.68	2.75
24	Total Phosphorous as P	mg/l	BDL (DL:0.1)	BDL (DL:0.1)
25	Total Kjeldahl Nitrogen as N	mg/l	BDL (DL:0.1)	BDL (DL:0.1)
26	Total Ammonia	mg/l	BDL (DL:0.1)	BDL (DL:0.1)
27	Phenols	mg/l	BDL (DL:0.001)	BDL (DL:0.001)
28	Surface Active Agents	mg/l	BDL (DL:0.1)	BDL (DL:0.1)
29	Anionic detergent as MBAS	mg/l	BDL (DL:0.1)	BDL (DL:0.1)
30	Hexavalent Chromium as Cr ⁶⁺	mg/l	BDL (DL:0.01)	BDL (DL:0.01)
31	Iron as Fe	mg/l	0.02	0.04
32	Boron as B	mg/l	BDL (DL:0.1)	BDL (DL:0.1)
33	Total Nitrogen	mg/l	38.4	21.4
34	Chloride	mg/l	500	209
35	Bio - Assay (Zebra Fish) Test	-	Tf = 1	Tf = 1
36	Copper as Cu	mg/l	0.03	0.03
37	Manganese as Mn	mg/l	0.02	BDL (DL:0.01)

38	Mercury as Hg	mg/l	BDL (DL: 0.001)	BDL (DL: 0.001)
39	Cadmium as Cd	mg/l	BDL (DL: 0.002)	BDL (DL: 0.002)
40	Selenium as Se	mg/l	BDL (DL: 0.005)	BDL (DL: 0.005)
41	Total Arsenic as As	mg/l	BDL (DL: 0.001)	BDL (DL: 0.001)
42	Lead as Pb	mg/l	BDL (DL: 0.005)	BDL (DL: 0.005)
43	Zinc as Zn	mg/l	BDL (DL: 0.08)	0.21
44	Total Chromium as Cr	mg/l	BDL (DL: 0.01)	BDL (DL: 0.01)
45	Nickel as Ni	mg/l	BDL (DL: 0.01)	BDL (DL: 0.01)
46	Vanadium as V	mg/l	BDL (DL: 2.0)	BDL (DL: 2.0)
47	Organo chlorine Pesticides (OCP):			
	Aldrin	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)
	Dieldrin	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)
	Endosulfan alpha	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)
	Endosulfan Beta	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)
	Endosulfan Sulfate	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)
	o,p'-DDT	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)
	p,p'-DDT	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)
	p,p'-DDE	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)
	o,p'-DDE	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)
	o,p'-DDD	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)
	p,p'-DDD	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)
	Alpha HCH	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)
	Beta HCH	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)
Gamma HCH (Lindane)	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	
Delta HCH	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)	
48	Poly Chlorinated Terphenyls (as PCT):			
	o-Terphenyl	µg/l	BDL (DL: 0.03)	BDL (DL: 0.03)
	m-Terphenyl	µg/l	BDL (DL: 0.03)	BDL (DL: 0.03)
	p-Terphenyl	µg/l	BDL (DL: 0.03)	BDL (DL: 0.03)
	Tetradecachloro-o-terphenyl	µg/l	BDL (DL: 0.03)	BDL (DL: 0.03)
	Tetradecachloro-m-terphenyl	µg/l	BDL (DL: 0.03)	BDL (DL: 0.03)
	Tetradecachloro-p-terphenyl	µg/l	BDL (DL: 0.03)	BDL (DL: 0.03)
	4-Chloro-o-terphenyl	µg/l	BDL (DL: 0.03)	BDL (DL: 0.03)
	4-Chloro-p-terphenyl	µg/l	BDL (DL: 0.03)	BDL (DL: 0.03)
	2,4-Dichloro-p-terphenyl	µg/l	BDL (DL: 0.03)	BDL (DL: 0.03)
	2,5-Dichloro-o-terphenyl	µg/l	BDL (DL: 0.03)	BDL (DL: 0.03)
	2,5-Dichloro-m-terphenyl	µg/l	BDL (DL: 0.03)	BDL (DL: 0.03)
	2,5-Dichloro-p-terphenyl	µg/l	BDL (DL: 0.03)	BDL (DL: 0.03)
	2,4,6-Trichloro-p-terphenyl	µg/l	BDL (DL: 0.03)	BDL (DL: 0.03)
	2,3,5,6-Tetrachloro-p-terphenyl	µg/l	BDL (DL: 0.03)	BDL (DL: 0.03)
	2,4,4",6-Tetrachloro-p-terphenyl	µg/l	BDL (DL: 0.03)	BDL (DL: 0.03)
2,3,4,5,6-Pentachloro-p-terphenyl	µg/l	BDL (DL: 0.03)	BDL (DL: 0.03)	
49	Poly Nuclear Aromatic Hydrocarbons (as PAH):			
	Naphthalene	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)
	Acenaphthylene	µg/l	BDL (DL: 0.01)	BDL (DL: 0.01)
	2-Bromo-Naphthalene	µg/l	BDL (DL: 0.02)	BDL (DL: 0.02)
	Acenaphthene	µg/l	BDL (DL: 0.02)	BDL (DL: 0.02)
	Fluorene	µg/l	BDL (DL: 0.02)	BDL (DL: 0.02)
	Phenanthrene	µg/l	BDL (DL: 0.02)	BDL (DL: 0.02)
	Anthracene	µg/l	BDL (DL: 0.02)	BDL (DL: 0.02)
	Pyrene	µg/l	BDL (DL: 0.02)	BDL (DL: 0.02)
	Fluoranthene	µg/l	BDL (DL: 0.02)	BDL (DL: 0.02)
	Chrysene	µg/l	BDL (DL: 0.02)	BDL (DL: 0.02)
	Benz[a]anthracene	µg/l	BDL (DL: 0.02)	BDL (DL: 0.02)
	Benzo[a]pyrene	µg/l	BDL (DL: 0.02)	BDL (DL: 0.02)
	Benzo[b]fluoranthene	µg/l	BDL (DL: 0.03)	BDL (DL: 0.03)
Benzo[ghi]perylene	µg/l	BDL (DL: 0.03)	BDL (DL: 0.03)	

	Dibenz[a,h]anthracene	µg/l	BDL (DL:0.03)	BDL (DL:0.03)
	Indeno[1,2,3-cd]pyrene	µg/l	BDL (DL:0.04)	BDL (DL:0.04)
50	Poly Chlorinated Biphenyls (as PCB):			
	2-Chlorobiphenyl	µg/l	BDL (DL:0.01)	BDL (DL:0.01)
	2,3-dichlorobiphenyl	µg/l	BDL (DL:0.01)	BDL (DL:0.01)
	2,5,4'-Trichlorobiphenyl	µg/l	BDL (DL:0.01)	BDL (DL:0.01)
	2,2',4,4'-tetrachlorobiphenyl	µg/l	BDL (DL:0.01)	BDL (DL:0.01)
	2,2',3,4',6'-Pentachlorobiphenyl	µg/l	BDL (DL:0.01)	BDL (DL:0.01)
	2,2',4,4',5',6-Hexachlorobiphenyl	µg/l	BDL (DL:0.01)	BDL (DL:0.01)
	2,2',3,3',4,4',6-Heptachlorobiphenyl	µg/l	BDL (DL:0.01)	BDL (DL:0.01)
	2,2',3,3',4,5,6,6'-Octachlorobiphenyl	µg/l	BDL (DL:0.01)	BDL (DL:0.01)
51	Total Coliform	MPN/100 ml	12	< 2
52	Faecal Coliform	MPN/100 ml	< 2	< 2

6.0 Conclusion

6.1 Ambient Air Quality

The Overall Ambient Air Quality Results are tabulated in Point No. 6.1.1. and Area-wise detailed are as follows.

A) MANALI AREA

PM₁₀: The maximum and minimum concentrations for PM₁₀ was 84.8- $\mu\text{g}/\text{m}^3$ and 55.2- $\mu\text{g}/\text{m}^3$ respectively. The maximum concentration was recorded at NATCO Pharma Ltd, and the minimum concentration was recorded at CPCL, Manali. All the results are within the limit prescribed by CPCB.

PM_{2.5}: The maximum and minimum concentrations for PM_{2.5} were recorded as 41.1- $\mu\text{g}/\text{m}^3$ and 24.5- $\mu\text{g}/\text{m}^3$ respectively. The maximum concentration was recorded at NATCO Pharma Ltd, and the minimum concentration was recorded at CPCL, Manali. All the results are within the limit prescribed by CPCB.

SO₂: The maximum and minimum concentrations of SO₂ were recorded as 18.7 $\mu\text{g}/\text{m}^3$ and 6.2 $\mu\text{g}/\text{m}^3$. The maximum concentration was recorded at NATCO Pharma Limited, and the minimum concentration was recorded at CPCL, Manali. All the results are within the limit prescribed by CPCB.

NO₂: The maximum concentration of 32.1 $\mu\text{g}/\text{m}^3$ for NO₂ was recorded at NATCO Pharma Limited, and minimum of 12.2 $\mu\text{g}/\text{m}^3$ observed at CPCL, Manali. All the results are within the limit prescribed by CPCB.

O₃

The concentrations of Ozone were observed between 13.5-51.5 $\mu\text{g}/\text{m}^3$ and under the limits of 180 $\mu\text{g}/\text{m}^3$ as specified by CPCB standards.

Ammonia

The concentrations of Ammonia were observed between 13.0 – 60.3 $\mu\text{g}/\text{m}^3$ and under the limits of 400 $\mu\text{g}/\text{m}^3$ as specified by CPCB standards.

CO, Benzene, Benzo (o) Pyrene,

The concentrations of CO, Benzene, Benzo (o) Pyrene (BaP), were below the detectable limits in all the locations during the study period.

Lead, Arsenic

The concentrations of Lead, Arsenic, in all locations were below detectable limits during study period.

Nickel

The concentrations of Ammonia were observed between BDL – 17.1 ng/m^3 and under the limits of 20 ng/m^3 as specified by CPCB standards.

B) RANIPET AREA

PM₁₀: The maximum and minimum concentrations for PM₁₀ were recorded as 82.1- $\mu\text{g}/\text{m}^3$ and 52.1- $\mu\text{g}/\text{m}^3$ respectively. The maximum concentrations were recorded at Greaves Cotton Ltd and the minimum concentrations were recorded at Svis Labs Pvt Ltd. All the results are within the limit prescribed by CPCB.

PM_{2.5}: The maximum and minimum concentrations for PM_{2.5} were recorded as 41.5- $\mu\text{g}/\text{m}^3$ and 23.0- $\mu\text{g}/\text{m}^3$ respectively. The maximum concentration was recorded at Malladi Drugs & Pharmaceutical Ltd-Unit III, and the minimum concentration was recorded at Svis Labs Pvt Ltd. All the results are within the limit prescribed by CPCB.

SO₂: The maximum and minimum concentrations of SO₂ were recorded as 13.2 $\mu\text{g}/\text{m}^3$ and 5.5 $\mu\text{g}/\text{m}^3$. The maximum concentration was recorded at Malladi Drugs & Pharmaceutical Ltd-Unit III, and the minimum concentration was recorded at Svis Labs Pvt Ltd.

NO₂: The maximum concentration of 29.3 $\mu\text{g}/\text{m}^3$ for NO₂ was recorded at Malladi Drugs & Pharmaceutical Ltd, Unit III, and minimum of 15.9 $\mu\text{g}/\text{m}^3$ observed at Greaves Malladi Drugs & Pharmaceutical Ltd, Unit I.

O₃

The concentrations of Ozone were observed between 16.8-31.0 $\mu\text{g}/\text{m}^3$ and under the limits of 180 $\mu\text{g}/\text{m}^3$ as specified by CPCB standards.

Ammonia

The concentrations of Ammonia were observed between 17.8 – 66.2 $\mu\text{g}/\text{m}^3$ and under the limits of 400 $\mu\text{g}/\text{m}^3$ as specified by CPCB standards.

CO, Benzene, Benzo (o) Pyrene,

The concentrations of CO, Benzene, Benzo (o) Pyrene (BaP), were below the detectable limits in all the locations during the study period.

Arsenic

The concentrations of Arsenic, in all locations were below detectable limits during study period.

Lead

The concentrations of Ammonia were observed between DBL – 0.123 $\mu\text{g}/\text{m}^3$ and under the limits of 20 ng/m³ as specified by CPCB standards.

Nickel

The concentrations of Ammonia were observed between DBL – 17.4 ng/m³ and under the limits of 20 ng/m³ as specified by CPCB standards.

C) CUDDALORE AREA

PM₁₀: The maximum and minimum concentrations for PM₁₀ were recorded as 68.6- $\mu\text{g}/\text{m}^3$ and 48.1- $\mu\text{g}/\text{m}^3$ respectively. The maximum concentration was recorded at Splendid Udyog Ltd and the minimum concentration was recorded at Semmankuppam Village. All the results are within the limit prescribed by CPCB.

PM_{2.5}: The maximum and minimum concentrations for PM_{2.5} were recorded as 32.5- $\mu\text{g}/\text{m}^3$ and 20.5- $\mu\text{g}/\text{m}^3$ respectively. The maximum concentration was recorded at Splendid Udyog Ltd and the minimum concentration was recorded at Karaikadu Village. All the results are within the limit prescribed by CPCB.

SO₂: The maximum and minimum concentrations of SO₂ were recorded as 13.6 $\mu\text{g}/\text{m}^3$ and 3.5 $\mu\text{g}/\text{m}^3$. The maximum concentration was recorded at SIPCOT Office, Cuddalore and the minimum concentration was recorded at Karaikadu Village.

NO₂: The maximum concentration of 23.0 $\mu\text{g}/\text{m}^3$ for NO₂ was recorded at Semmankuppam Village and minimum of 11.2 $\mu\text{g}/\text{m}^3$ observed at Karaikadu Village.

O₃

The concentrations of Ozone were observed between 8.6-25.8 $\mu\text{g}/\text{m}^3$ and under the limits of 180 $\mu\text{g}/\text{m}^3$ as specified by CPCB standards.

Ammonia

The concentrations of Ammonia were observed between 14.1 – 37.7 $\mu\text{g}/\text{m}^3$ and under the limits of 400 $\mu\text{g}/\text{m}^3$ as specified by CPCB standards.

CO, Benzene, Benzo (o) Pyrene,

The concentrations of CO, Benzene, Benzo (o) Pyrene (BaP), were below the detectable limits in all the locations during the study period.

Lead, Arsenic

The concentrations of Lead, Arsenic, in all locations were below detectable limits during study period.

Nickel

The concentrations of Ammonia were observed between DBL – 8.2 ng/m³ and under the limits of 20 ng/m³ as specified by CPCB standards.

D) COIMATORE AREA

PM₁₀: The maximum and minimum concentrations for PM₁₀ were recorded as 83.6- $\mu\text{g}/\text{m}^3$ and 57.6- $\mu\text{g}/\text{m}^3$ respectively. The maximum concentration was recorded at Indo Shell Mould Ltd – Unit II, and the minimum concentration was recorded at SIPCOT Office. All the results are within the limit prescribed by CPCB.

PM_{2.5}: The maximum and minimum concentrations for PM_{2.5} were recorded as 42.2- $\mu\text{g}/\text{m}^3$ and 25.1- $\mu\text{g}/\text{m}^3$ respectively. The maximum concentration was recorded at Indo Shell Mould Ltd – Unit II, and the minimum concentration was recorded at SIPCOT Office. All the results are within the limit prescribed by CPCB.

SO₂: The maximum and minimum concentrations of SO₂ were recorded as 17.1 $\mu\text{g}/\text{m}^3$ and 8.2 $\mu\text{g}/\text{m}^3$. The maximum concentration was recorded at Indo Shell Mould Ltd – Unit II and the minimum concentration was recorded at SIPCOT Office.

NO₂: The maximum concentration of 26.5 $\mu\text{g}/\text{m}^3$ for NO₂ was recorded at Indo Shell Mould Ltd – Unit II and minimum of 14.3 $\mu\text{g}/\text{m}^3$ observed at SIPCOT Office.

O₃

The concentrations of Ozone were observed between 10.6-21.1 $\mu\text{g}/\text{m}^3$ and under the limits of 180 $\mu\text{g}/\text{m}^3$ as specified by CPCB standards.

Ammonia

The concentrations of Ammonia were observed between 19.2 – 44.8 $\mu\text{g}/\text{m}^3$ and under the limits of 400 $\mu\text{g}/\text{m}^3$ as specified by CPCB standards.

CO, Benzene, Benzo (o) Pyrene,

The concentrations of CO, Benzene, Benzo (o) Pyrene (BaP), were below the detectable limits in all the locations during the study period.

Lead, Arsenic

The concentrations of Lead, Arsenic, in all locations were below detectable limits during study period.

Nickel

The concentrations of Nickel were observed between 5.6 – 13.1 ng/m^3 and under the limits of 20 ng/m^3 as specified by CPCB standards.

6.1.1 Ambient Air Quality – Overall Result

Parameters	MANALI	RANIPET	CUDDALORE	COIMBATORE	NAAQS*	Units
Particulate Matter (PM2.5)	24.5 – 41.1	23.0 – 41.5	20.5 – 32.5	25.1 – 42.2	60	µg/m ³
Particulate Matter (PM10)	55.2 – 84.8	52.1 – 82.1	48.1 – 68.6	57.6 – 83.6	100	µg/m ³
Sulphur Dioxide (SO ₂)	6.2 – 18.7	5.5 – 13.2	3.5 – 13.6	8.2 – 17.1	80	µg/m ³
Oxides of Nitrogen (NO _x)	12.2 – 32.1	15.9 – 29.3	11.2 – 23.0	14.3 – 26.5	80	µg/m ³
Ozone(O ₃)	13.5 – 51.5	16.8 – 31.0	8.6 – 25.8	10.6 – 21.1	180	µg/m ³
Lead(Pb)	BDL	BDL – 0.123	BDL	BDL	1	µg/m ³
Carbon Monoxide (CO)	BDL	BDL	BDL	BDL	4	mg/m ³
Ammonia (NH ₃)	13.0 – 60.3	17.8 – 66.2	14.1 – 37.7	19.2 – 44.8	400	µg/m ³
Arsenic(As)	BDL	BDL	BDL	BDL	6	ng/m ³
Nickel (Ni)	BDL – 17.1	BDL – 17.4	BDL – 8.2	5.6 – 13.1	20	ng/m ³
Benzene (C ₆ H ₆)	BDL	BDL	BDL	BDL	5	µg/m ³
Benzo(a) Pyrene	BDL	BDL	BDL	BDL	1	ng/m ³

*National Ambient Air Quality Standards – CPCB

6.2 Surface Water Quality

A) Manali

Selected water quality parameters of Surface Water resources within the study area of Manali has been studied for assessing the Water Environment.

4 Locations were identified and samples have been collected in Manali area.

For Surface Water Quality, permissible limits considered as per IS10500, Drinking Water Standards.

Collected surface water samples have been analysed at Lab and the results are tabulated in the corresponding section of each Area. The overall minimum and maximum of results for few parameters at Manali area are as follows

The analysis results indicate that the pH ranges in between 7.0 to 7.4, which is well within the specified standard of 6.5 to 8.5. Total hardness was observed to be ranging from 212 to 756 mg/l. The maximum hardness (756 mg/l) was recorded at Buckingham Canal Upstream Water and the minimum of 212 mg/l was recorded at Amullavoyil Canal Upstream Water.

Chlorides at all the locations were ranging in between 189 and 776 mg/l. Fluorides are ranging in 0.24 and 0.36 mg/l and are found to be within the permissible limit. Nitrates were found to be in the range of from BDL – 40.2 mg/l. The Total Dissolved Solids (TDS) concentrations were found to be ranging in between 582 to 2186 mg/l.

Dissolved Oxygen was ranging in between 3.9 and 6.0 mg/l. Arsenic, Lead and Mercury were found Below Deductable Limits. Iron was ranging in between 0.66 and 2.4 mg/l. Microbial contamination ie Total Coliform found in between 90 and 900 MPN/100 ml and Faecal Coliform found in between 13 and 140 MPN/100 ml.

B) Ranipet

Selected water quality parameters of Surface Water resources within the study area of Ranipet has been studied for assessing the Water Environment.

3 Locations were identified and samples have been collected in Ranipet Area.

For Surface Water Quality, permissible limits considered as per IS10500, Drinking Water Standards.

Collected surface water samples have been analysed at Lab and the results are tabulated in the corresponding section of each Area. The overall minimum and maximum of results for few parameters at Ranipet area are as follows

The analysis results indicate that the pH ranges in between 7.1 to 7.2, which is well within the specified standard of 6.5 to 8.5. Total hardness was observed to be ranging from 182 to 273 mg/l. The maximum hardness (273 mg/l) was recorded at Puliyanakannu Lake Water and the minimum of 182 mg/l was recorded at Palar River Water.

Chlorides at all the locations were ranging in between 159 and 185 mg/l. Fluorides are ranging in 0.14 and 0.24 mg/l and are found to be within the permissible limit. Nitrates were found to be in the range of from BDL – 3.9 mg/l. The Total Dissolved Solids (TDS) concentrations were found to be ranging in between 496 to 680 mg/l.

6.2 Surface Water Quality (Contd....)

Dissolved Oxygen was ranging in between 6.3 and 6.8 mg/l. Arsenic, Lead and Mercury were found Below Deductable Limits. Iron was ranging in between 0.42 and 0.5 mg/l. Microbial contamination ie Total Coliform found in between 11 and 50 MPN/100 ml and Faecal Coliform found in the range of < 2 MPN/100 ml.

C) Cuddalore

Selected water quality parameters of Surface Water resources within the study area of Cuddalore has been studied for assessing the Water Environment.

4 Locations were identified and samples have been collected in Cuddalore Area.

For Surface Water Quality, permissible limits considered as per IS10500, Drinking Water Standards.

Collected surface water samples have been analysed at Lab and the results are tabulated in the corresponding section of each Area. The overall minimum and maximum of results for few parameters at Cuddalore area are as follows

The analysis results indicate that the pH ranges in between 7.1 to 7.2, which is well within the specified standard of 6.5 to 8.5. Total hardness was observed to be ranging from 455 to 1576 mg/l. The maximum hardness (1576 mg/l) was recorded at Thikal Thonithy Village Downstream of Sipcot, Cuddalore Surface Water and the minimum of 455 mg/l was recorded at Upanar Upstream, Pondiyankuppam & Nochikkadu Villages.

Chlorides at all the locations were ranging in between 544 and 3992 mg/l. Fluorides are ranging in 0.18 and 0.26 mg/l and are found to be within the permissible limit. Nitrates were found to be in the range of from 1.6 – 2.2 mg/l. The Total Dissolved Solids (TDS) concentrations were found to be ranging in between 1650 to 9430 mg/l.

Dissolved Oxygen was ranging in between 6.3 and 6.6 mg/l. Arsenic, Lead and Mercury were found Below Deductable Limits. Iron was ranging in between 0.41 and 0.63 mg/l. Microbial contamination ie Total Coliform was found in the range of <2 MPN/100 ml and Faecal Coliform was also found in the range of <2 MPN/100 ml.

D) Coimbatore

Selected water quality parameters of Surface Water resources within the study area of Coimbatore has been studied for assessing the Water Environment.

2 Locations were identified and samples have been collected in Coimbatore Area.

For Surface Water Quality, permissible limits considered as per IS10500, Drinking Water Standards.

Collected surface water samples have been analysed at Lab and the results are tabulated in the corresponding section of each Area. The overall minimum and maximum of results for few parameters at Coimbatore area are as follows

The analysis results indicate that the pH ranges in between 7.3 and 7.4, which is well within the specified standard of 6.5 to 8.5. Total hardness was observed to be ranging from 254 to 1183 mg/l. The maximum hardness (1183 mg/l) was recorded at Noyal River Water and the minimum of 254 mg/l was recorded at Kurichikulam water sample.

6.2 Surface Water Quality (Contd....)

Chlorides at all the locations were ranging in between 243 and 927 mg/l. Fluorides are ranging in 0.24 and 0.26 mg/l and are found to be within the permissible limit. Nitrates were found to be in the range of from 20.4 – 68.4 mg/l. The Total Dissolved Solids (TDS) concentrations were found to be ranging in between 748 to 2664 mg/l.

Dissolved Oxygen was ranging in between 5.8 and 6.8 mg/l. Arsenic, Lead and Mercury were found Below Deductable Limits. Iron was ranging in between 0.3 and 4.6 mg/l. Microbial contamination ie Total Coliform found in between 50 and 110 MPN/100 ml and Faecal Coliform found in between 4 and 23 MPN/100 ml.

6.3 Ground Water Quality

A) Manali

Selected water quality parameters of ground water resources within study area of Manali has been studied for assessing the Water Environment.

4 Locations were identified and samples have been collected in Manali area.

For Ground Water Quality, permissible limits considered as per IS10500, Drinking Water Standards.

Collected ground water samples have been analysed at Lab and the results are tabulated in the corresponding section of each Area. The overall minimum and maximum of results for few parameters at Manali Area are as follows

The analysis results indicate that the pH ranges in between 6.5 to 7.8, which is well within the specified standard of 6.5 to 8.5. Total hardness was observed to be ranging from 192 to 12390 mg/l.

Chlorides at all the locations were ranging in between 301 and 23383 mg/l. Fluorides are ranging in 0.14 and 0.31 mg/l and are found to be within the permissible limit. Nitrates were found to be in the range of from 6.2 – 41.5 mg/l. The Total Dissolved Solids (TDS) concentrations were found to be ranging in between 824 to 46924 mg/l.

Dissolved Oxygen was ranging in between 5.9 and 6.6 mg/l. Arsenic, Lead and Mercury were found Below Deductable Limits. Iron was ranging in between 0.05 and 44.1 mg/l. Microbial contamination ie Total Coliform found in between <2 and 21 MPN/100 ml and Faecal Coliform found in the range of <2 MPN/100 ml.

B) Ranipet

Selected water quality parameters of ground water resources within study area of Ranipet has been studied for assessing the Water Environment.

5 Locations were identified and samples have been collected in Ranipet Area.

For Ground Water Quality, permissible limits considered as per IS10500, Drinking Water Standards.

6.3 Ground Water Quality (Contd...)

Collected ground water samples have been analysed at Lab and the results are tabulated in the corresponding section of each Area. The overall minimum and maximum of results for few parameters at Ranipet Area are as follows

The analysis results indicate that the pH ranges in between 7.0 to 7.8, which is well within the specified standard of 6.5 to 8.5. Total hardness was observed to be ranging from 113 to 667 mg/l.

Chlorides at all the locations were ranging in between 78 and 486 mg/l. Fluorides are ranging in 0.14 and 0.24 mg/l and are found to be within the permissible limit. Nitrates were found to be in the range of from BDL – 40.9 mg/l. The Total Dissolved Solids (TDS) concentrations were found to be ranging in between 290 to 1446 mg/l.

Dissolved Oxygen was ranging in between 6.2 and 6.8 mg/l. Arsenic, Lead and Mercury were found Below Deductable Limits. Iron was ranging in between 0.03 and 0.59 mg/l. Microbial contamination ie Total Coliform found in between <2 and 50 MPN/100 ml and Faecal Coliform found in the range of <2 MPN/100 ml.

C) Cuddalore

Selected water quality parameters of ground water resources within study area of Cuddalore has been studied for assessing the Water Environment.

4 Locations were identified and samples have been collected in Cuddalore Area.

For Ground Water Quality, permissible limits considered as per IS10500, Drinking Water Standards.

Collected ground water samples have been analysed at Lab and the results are tabulated in the corresponding section of each Area. The overall minimum and maximum of results for few parameters at Cuddalore Area are as follows

The analysis results indicate that the pH ranges in between 7.0 to 7.5, which is well within the specified standard of 6.5 to 8.5. Total hardness was observed to be ranging from 61 to 246 mg/l.

Chlorides at all the locations were ranging in between 48 and 150 mg/l. Fluorides are ranging in 0.16 and 0.24 mg/l and are found to be within the permissible limit. Nitrates were found to be in the range of from 0.52 – 1.2 mg/l. The Total Dissolved Solids (TDS) concentrations were found to be ranging in between 340 to 596 mg/l.

Dissolved Oxygen was ranging in between 6.4 and 6.7 mg/l. Arsenic, Lead and Mercury were found Below Deductable Limits. Iron was ranging in between 0.08 and 4.81 mg/l. Microbial contamination ie Total Coliform found in the range of <2 MPN/100 ml and Faecal Coliform was also found in the range of <2 MPN/100 ml.

D) Coimbatore

Selected water quality parameters of ground water resources within study area of Coimbatore has been studied for assessing the Water Environment.

2 Locations were identified and samples have been collected in Coimbatore Area.

6.3 Ground Water Quality (Contd...)

For Ground Water Quality, permissible limits considered as per IS10500, Drinking Water Standards.

Collected ground water samples have been analysed at Lab and the results are tabulated in the corresponding section of each Area. The overall minimum and maximum of results for few parameters at Coimbatore Area are as follows

The analysis results indicate that the pH ranges in between 7.1 to 7.5, which is well within the specified standard of 6.5 to 8.5. Total hardness was observed to be ranging from 572 to 828 mg/l.

Chlorides at all the locations were ranging in between 209 and 500 mg/l. Fluorides are ranging in 0.14 and 0.16 mg/l and are found to be within the permissible limit. Nitrates were found to be in the range of from 21.4 – 38.4 mg/l. The Total Dissolved Solids (TDS) concentrations were found to be ranging in between 1106 to 1722 mg/l.

Dissolved Oxygen was ranging in between 6.9 and 7.4 mg/l. Arsenic, Lead and Mercury were found Below Deductable Limits. Iron was ranging in between 0.02 and 0.04 mg/l. Microbial contamination ie Total Coliform found in between <2 and 12 MPN/100 ml and Faecal Coliform found in the range of <2 MPN/100 ml.

Annexure – I

COPY OF REPORT

Ambient Air Quality Reusts - Manali



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TEST REPORT

Report Number and date	CTL/CH/N-6012/2017-18 & 24.10.2017		
Sample Number	N-6012/17-18		
Customer Name & Address	M/s. Tamil Nadu Pollution Control Board, 76, Mount Salai, Guindy, Chennai - 600 032.		
Project At	Manali Industrial Area		
SAMPLE DETAILS			
Sample Description	Ambient Air Quality		
GPS Reading	13°10' 26.34" N 080° 15' 34.16" E		
Sampling Location	M/L.SRF LIMITED - SRF Stadium		
Sampling Date & Time	09.10.2017 & 10.10 to 10.10.2017 @ 10.10		
Sampled By	Chennai Testing Laboratory Pvt. Ltd.	Sampling Method	IS 5182 (Part V) and (Part XIV)
Date of Receipt	10.10.2017	Sample Condition	Good
Analysis Starting Date	11.10.2017	Analysis Completion Date	23.10.2017

ENVIRONMENTAL CONDITION:

RELATIVE HUMIDITY 80%
AMBIENT TEMPERATURE 34°C
WIND DIRECTION SSE
WEATHER CONDITION Clear Sky

SL.NO	PARAMETERS	METHODS	UNITS	RESULTS	NAAQS*
1	PARTICULATE MATTER (PM ₁₀)	CTL/SOP/AIR/03 - 2014	µg/m ³	26.2	80
2	PARTICULATE MATTER (PM _{2.5})	IS 5182 Part 23 - 2006	µg/m ³	57.8	100
3	SULPHUR DIOXIDE (SO ₂)	IS 5182 Part 2 - 2001	µg/m ³	9.4	80
4	OXIDES OF NITROGEN (NO ₂)	IS 5182 Part 6 - 2006	µg/m ³	15.5	80
5	OZONE (O ₃)	CTL/SOP/AIR/08 - 2014	µg/m ³	44.6	180
6	LEAD (Pb)	IS 5182 PART 22 - 2004	µg/m ³	BDL (D.L - 0.1)	1
7	CARBON MONOXIDE (CO)	CTL/SOP/AIR/23 - 2014	mg/m ³	BDL (D.L - 1.15)	4
8	AMMONIA (NH ₃)	CTL/SOP/AIR/07- 2014 (INDOPHENOL METHOD)	µg/m ³	60.3	400
9	ARSENIC (As)	CTL/SOP/AIR/06 - 2014	ng/m ³	BDL (D.L - 1.0)	6
10	NICKEL (Ni)	CTL/SOP/AIR/06 - 2014	ng/m ³	BDL (D.L - 5.0)	20
11	BENZENE (C ₆ H ₆)	IS 5182 PART 11 - 2006	µg/m ³	BDL (D.L - 1.0)	5
12	BENZO(a)PYRENE	IS 5182 PART 12 - 2004	ng/m ³	BDL (D.L - 0.5)	1

*National Ambient Air Quality Standards - CPCB
BDL - Below Detection Limit(D.L - Detection Limit)

END OF REPORT

For Chennai Testing Laboratory Pvt Ltd

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Page 1 of 1

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Chennai - 600 032 | Tamil Nadu | India | Telefax : +91-44-2250 1757



TEST REPORT

Report Number and date	CTL/CH/N-6013/2017-18 & 24.10.2017		
Sample Number	N-6013/17-18		
Customer Name & Address	M/s. Tamil Nadu Pollution Control Board, 75, Mount Salai, Guindy, Chennai - 600 032.		
Project At	Manali Industrial Area		
SAMPLE DETAILS			
Sample Description	Ambient Air Quality		
GPS Reading	13°10' 26.34" N 80° 15' 34.16" E		
Sampling Location	M/s-SRF LIMITED - SRF Stadium		
Sampling Date & Time	11.10.2017 & 10.30 to 12.10.2017 & 10.30		
Sampled By	Chennai Testing Laboratory Pvt. Ltd.	Sampling Method	IS 5182 (Part V) and (Part XIV)
Date of Receipt	12.10.2017	Sample Condition	Good
Analysis Starting Date	13.10.2017	Analysis Completion Date	23.10.2017

ENVIRONMENTAL CONDITION:

RELATIVE HUMIDITY 63%
AMBIENT TEMPERATURE 32°C
WIND DIRECTION S
WEATHER CONDITION Clear Sky

SL.NO	PARAMETERS	METHODS	UNITS	RESULTS	NAAQS*
1	PARTICULATE MATTER (PM ₁₀)	CTL/SOP/AGR/03 - 2014	µg/m ³	36.8	60
2	PARTICULATE MATTER (PM _{2.5})	IS 5182 Part 23 - 2006	µg/m ³	76.0	100
3	SULPHUR DIOXIDE (SO ₂)	IS 5182 Part 2 - 2001	µg/m ³	7.6	80
4	OXIDES OF NITROGEN (NO _x)	IS 5182 Part 6 - 2006	µg/m ³	18.3	80
5	OZONE (O ₃)	CTL/SOP/AGR/08 - 2014	µg/m ³	36.0	180
6	LEAD (Pb)	IS 5182 PART 22 - 2004	µg/m ³	BDL (D.L - 0.1)	1
7	CARBON MONOXIDE (CO)	CTL/SOP/AIR/23 - 2014	mg/m ³	BDL (D.L - 1.15)	4
8	AMMONIA (NH ₃)	CTL/SOP/AGR/07 - 2014 (INDOPHENOL METHOD)	µg/m ³	49.7	400
9	ARSENIC (As)	CTL/SOP/AIR/06 - 2014	ng/m ³	BDL (D.L - 1.8)	6
10	NICKEL (Ni)	CTL/SOP/AIR/06 - 2014	ng/m ³	8.8	28
11	BENZENE (C ₆ H ₆)	IS 5182 PART 11 - 2006	µg/m ³	BDL (D.L - 1.0)	5
12	BENZO(a)PYRENE	IS 5182 PART 12 - 2004	µg/m ³	BDL (D.L - 0.5)	1

*National Ambient Air Quality Standards - CPCB
BDL - Below Detection Limit (D.L - Detection Limit)

END OF REPORT

For Chennai Testing Laboratory Pvt Ltd

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TEST REPORT

Report Number and date	CTL/CH/N-6014/2017-18 & 24.10.2017		
Sample Number	N-6014/17-18		
Customer Name & Address	M/s. Tamil Nadu Pollution Control Board, 76, Mount Salai, Guindy, Chennai - 600 032.		
Project At	Manali Industrial Area		
SAMPLE DETAILS			
Sample Description	Ambient Air Quality		
GPS Reading	13°10' 26.34" N 80° 15' 34.16" E		
Sampling Location	M/s.SRF LIMITED - SRF Stadium		
Sampling Date & Time	13.10.2017 @ 10.45 to 14.10.2017 @ 10.45		
Sampled By	Chennai Testing Laboratory Pvt. Ltd.	Sampling Method	IS 5182 (Part V) and (Part XIV)
Date of Receipt	14.10.2017	Sample Condition	Good
Analysis Starting Date	16.10.2017	Analysis Completion Date	23.10.2017

ENVIRONMENTAL CONDITION:

RELATIVE HUMIDITY	65%
AMBIENT TEMPERATURE	31°C
WIND DIRECTION	SW
WEATHER CONDITION	Clear Sky

SL.NO	PARAMETERS	METHODS	UNITS	RESULTS	NAAQS*
1	PARTICULATE MATTER (PM ₁₀)	CTL/SOP/AIR/01 - 2014	µg/m ³	35.5	60
2	PARTICULATE MATTER (PM _{2.5})	IS 5182 Part 23 - 2006	µg/m ³	74.5	100
3	SULPHUR DIOXIDE (SO ₂)	IS 5182 Part 2 - 2001	µg/m ³	11.7	80
4	OXIDES OF NITROGEN (NO _x)	IS 5182 Part 6 - 2006	µg/m ³	22.1	80
5	OZONE (O ₃)	CTL/SOP/AIR/08 - 2014	µg/m ³	51.5	180
6	LEAD (Pb)	IS 5182 PART 22 - 2004	µg/m ³	BDL (D.L - 0.1)	1
7	CARBON MONOXIDE (CO)	CTL/SOP/AIR/23 - 2014	mg/m ³	BDL (D.L - 1.15)	4
8	AMMONIA (NH ₃)	CTL/SOP/AIR/07 - 2014 (INDOPHENOL METHOD)	µg/m ³	46.3	400
9	ARSENIC (As)	CTL/SOP/AIR/06 - 2014	ng/m ³	BDL (D.L - 1.0)	6
10	NICKEL (Ni)	CTL/SOP/AIR/06 - 2014	ng/m ³	10.4	20
11	BENZENE (C ₆ H ₆)	IS 5182 PART 11 - 2006	µg/m ³	BDL (D.L - 1.0)	5
12	BENZ(a)PYRENE	IS 5182 PART 11 - 2004	ng/m ³	BDL (D.L - 0.5)	1

*National Ambient Air Quality Standards - CPCB
BDL - Below Detection Limit(D.L - Detection Limit)

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TEST REPORT

Report Number and date	CTL/CH/N-6015/2017-18 & 24.10.2017		
Sample Number	N-6015/17-18		
Customer Name & Address	M/s. Tamil Nadu Pollution Control Board, 76, Mount Salai, Guindy, Chennai - 600 032.		
Project At	Masali Industrial Area		
SAMPLE DETAILS			
Sample Description	Ambient Air Quality		
GPS Reading	13°10' 28.43" N 080° 17' 01.07"E		
Sampling Location	M/s.Indian Additives Limited - Top of the Carbeen		
Sampling Date & Time	09.10.2017 & 11.00 to 10.10.2017 & 11.00		
Sampled By	Chennai Testing Laboratory Pvt. Ltd.	Sampling Method	IS 5182 (Part V) and (Part IV)
Date of Receipt	10.10.2017	Sample Condition	Good
Analysis Starting Date	11.10.2017	Analysis Completion Date	23.10.2017

ENVIRONMENTAL CONDITION:

RELATIVE HUMIDITY	40%
AMBIENT TEMPERATURE	34°C
WIND DIRECTION	SSE
WEATHER CONDITION	Clear Sky

SL.NO	PARAMETERS	METHODS	UNITS	RESULTS	MAAQ5*
1	PARTICULATE MATTER (PM ₁₀)	CTL/SOP/AIR/03 - 2014	µg/m ³	34.0	60
2	PARTICULATE MATTER (PM _{2.5})	IS 5182 Part 23 - 2006	µg/m ³	76.1	100
3	SULPHUR DIOXIDE (SO ₂)	IS 5182 Part 2 - 2001	µg/m ³	0.4	80
4	OXIDES OF NITROGEN (NO ₂)	IS 5182 Part 6 - 2006	µg/m ³	21.6	80
5	OZONE (O ₃)	CTL/SOP/AIR/08 - 2014	µg/m ³	46.5	180
6	LEAD (Pb)	IS 5182 PART 22 - 2004	µg/m ³	BDL (D.L - 0.1)	1
7	CARBON MONOXIDE (CO)	CTL/SOP/AIR/23 - 2014	mg/m ³	BDL (D.L - 1.15)	4
8	AMMONIA (NH ₃)	CTL/SOP/AIR/07 - 2014 (INDOPHENOL METHOD)	µg/m ³	35.2	400
9	ARSENIC (As)	CTL/SOP/AIR/04 - 2014	ng/m ³	BDL (D.L - 1.0)	6
10	NICKEL (Ni)	CTL/SOP/AIR/06 - 2014	ng/m ³	9.4	20
11	BENZENE (C ₆ H ₆)	IS 5182 PART 11 - 2006	µg/m ³	BDL (D.L - 1.0)	5
12	BENZO(a)PYRENE	IS 5182 PART 12 - 2004	ng/m ³	BDL (D.L - 0.0)	1

*National Ambient Air Quality Standards - CPCB
BDL - Below Detection Limit (D.L - Detection Limit)

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TEST REPORT

Report Number and date	CTL/CH/N-6016/2017-18 & 24.10.2017		
Sample Number	N-6016/17-18		
Customer Name & Address	M/s. Tamil Nadu Pollution Control Board, 76, Mount Sula, Guindy, Chennai - 600 032.		
Project At	Manali Industrial Area		
SAMPLE DETAILS			
Sample Description	Ambient Air Quality		
GPS Reading	13°10' 28.43" N 080° 17' 01.07"E		
Sampling Location	M/s.Indian Additives Limited - Top of the Canteen.		
Sampling Date & Time	11.10.2017 & 12.10 to 13.10.2017 & 13.10		
Sampled By	Chennai Testing Laboratory Pvt. Ltd.	Sampling Method	IS 5182 (Part V) and (Part XIV)
Date of Receipt	12.10.2017	Sample Condition	Good
Analysis Starting Date	13.10.2017	Analysis Completion Date	23.10.2017

ENVIRONMENTAL CONDITION:

RELATIVE HUMIDITY	63%
AMBIENT TEMPERATURE	32°C
WIND DIRECTION	S
WEATHER CONDITION	Clear Sky

SL.NO	PARAMETERS	METHODS	UNITS	RESULTS	NAAQS*
1	PARTICULATE MATTER (PM ₁₀)	CTL/SOP/AIR/01 - 2014	µg/m ³	33.0	60
2	PARTICULATE MATTER (PM _{2.5})	IS 5182 Part 23 - 2006	µg/m ³	74.3	100
3	SULPHUR DIOXIDE (SO ₂)	IS 5182 Part 2 - 2001	µg/m ³	16.1	80
4	OXIDES OF NITROGEN (NO _x)	IS 5182 Part 6 - 2006	µg/m ³	23.8	80
5	OZONE (O ₃)	CTL/SOP/AIR/08 - 2014	µg/m ³	42.3	180
6	LEAD (Pb)	IS 5182 PART 22 - 2004	µg/m ³	BDL (D.L - 0.1)	1
7	CARBON MONOXIDE (CO)	CTL/SOP/AIR/23 - 2014	mg/m ³	BDL (D.L - 1.15)	4
8	AMMONIA (NH ₃)	CTL/SOP/AIR/07- 2014 (INDOENGL METHOD)	µg/m ³	28.9	400
9	ARSENIC (As)	CTL/SOP/AIR/06 - 2014	ng/m ³	BDL (D.L - 1.0)	6
10	NICKEL (Ni)	CTL/SOP/AIR/06 - 2014	ng/m ³	7.5	20
11	BENZENE (C ₆ H ₆)	IS 5182 PART 11 - 2006	µg/m ³	BDL (D.L - 1.0)	5
12	BENZO(A)PYRENE	IS 5182 PART 12 - 2004	ng/m ³	BDL (D.L - 0.5)	1

*National Ambient Air Quality Standards - CPCB
BDL - Below Detection Limit(D.L - Detection Limit)

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TEST REPORT

Report Number and date	CTL/CH/N-6017/2017-18 & 24.10.2017		
Sample Number	N-6017/17-18		
Customer Name & Address	M/s. Tamil Nadu Pollution Control Board, 76, Mount Salee, Guindy, Chennai - 600 032.		
Project At	Manali Industrial Area		
SAMPLE DETAILS			
Sample Description	Ambient Air Quality		
GPS Reading	13°10' 28.43" N 080° 17' 01.07"E		
Sampling Location	M/s.Indian Additives Limited - Top of the Canteen		
Sampling Date & Time	13.10.2017 & 12.40 to 14.10.2017 & 12.40		
Sampled By	Chennai Testing Laboratory Pvt. Ltd.	Sampling Method	IS 5182 (Part V) and (Part XIV)
Date of Receipt	14.10.2017	Sample Condition	Good
Analysis Starting Date	16.10.2017	Analysis Completion Date	23.10.2017

ENVIRONMENTAL CONDITION:

RELATIVE HUMIDITY 85%
 AMBIENT TEMPERATURE 31°C
 WIND DIRECTION SW
 WEATHER CONDITION Clear Sky

SL.NO	PARAMETERS	METHODS	UNITS	RESULTS	NAAQS*
1	PARTICULATE MATTER (PM ₁₀)	CTL/SOP/AIR/03 - 2014	µg/m ³	32.5	60
2	PARTICULATE MATTER (PM _{2.5})	IS 5182 Part 22 - 2006	µg/m ³	71.3	100
3	SULPHUR DIOXIDE (SO ₂)	IS 5182 Part 2 - 2006	µg/m ³	13.6	80
4	OXIDES OF NITROGEN (NO _x)	IS 5182 Part 6 - 2006	µg/m ³	23.4	80
5	OZONE (O ₃)	CTL/SOP/AIR/06 - 2014	µg/m ³	50.9	180
6	LEAD (Pb)	IS 5182 PART 22 - 2004	µg/m ³	BDL (D.L - 0.1)	1
7	CARBON MONOXIDE (CO)	CTL/SOP/AIR/23 - 2014	mg/m ³	BDL (D.L - 1.15)	4
8	AMMONIA (NH ₃)	CTL/SOP/AIR/07- 2014 (INDOPHENOL METHOD)	µg/m ³	34.0	400
9	ARSENIC (As)	CTL/SOP/AIR/06 - 2014	ng/m ³	BDL (D.L - 1.0)	6
10	NICKEL (Ni)	CTL/SOP/AIR/06 - 2014	ng/m ³	7.1	20
11	BENZENE (C ₆ H ₆)	IS 5182 PART 11 - 2006	µg/m ³	BDL (D.L - 1.0)	5
12	BENZO(a)PYRENE	IS 5182 PART 12 - 2004	ng/m ³	BDL (D.L - 0.5)	1

*National Ambient Air Quality Standards - CPCB
 BDL - Below Detection Limit(D.L - Detection Limit)

END OF REPORT

For Chennai Testing Laboratory Pvt Ltd

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TEST REPORT

Report Number and date	CTL/CH/N-6057/2017-18 & 24.10.2017		
Sample Number	N-6057/17-18		
Customer Name & Address	M/s. Tamil Nadu Pollution Control Board, 76, Mount Salai, Guindy, Chennai - 600 032.		
Project At	Manali Industrial Area		
SAMPLE DETAILS			
Sample Description	Ambient Air Quality		
GPS Reading	13°00' 54.37" N 80°0' 16' 33.96"E		
Sampling Location	M/s.CPCL - Top of the TTP RD Plant Building		
Sampling Date & Time	09.10.2017 & 12.15 to 10.10.2017 & 12.15		
Sampled By	Chennai Testing Laboratory Pvt. Ltd.	Sampling Method	IS 5182 (Part V) and (Part XIV)
Date of Receipt	10.10.2017	Sample Condition	Good
Analysis Starting Date	11.10.2017	Analysis Completion Date	23.10.2017

ENVIRONMENTAL CONDITION:

RELATIVE HUMIDITY	60%
AMBIENT TEMPERATURE	34°C
WIND DIRECTION	SSE
WEATHER CONDITION	Clear Sky

SL.NO	PARAMETERS	METHODS	UNITS	RESULTS	NAAQS*
1	PARTICULATE MATTER (PM ₁₀)	CTL/SOP/AIR/03 - 2014	µg/m ³	24.5	60
2	PARTICULATE MATTER (PM _{2.5})	IS 5182 Part 21 - 2006	µg/m ³	55.2	100
3	SULPHUR DIOXIDE (SO ₂)	IS 5182 Part 2 - 2001	µg/m ³	7.8	80
4	OXIDES OF NITROGEN (NO _x)	IS 5182 Part 6 - 2006	µg/m ³	12.2	80
5	OZONE (O ₃)	CTL/SOP/AIR/06 - 2014	µg/m ³	19.4	180
6	LEAD (Pb)	IS 5182 PART 22 - 2004	µg/m ³	BDL (D.L - 0.1)	1
7	CARBON MONOXIDE (CO)	CTL/SOP/ASR/23 - 2014	mg/m ³	BDL (D.L - 1.15)	4
8	AMMONIA (NH ₃)	CTL/SOP/ASR/07 - 2014 (INDOPHENOL METHOD)	µg/m ³	42.6	400
9	ARSENIC (As)	CTL/SOP/ASR/06 - 2014	ng/m ³	BDL (D.L - 1.0)	6
10	NICKEL (Ni)	CTL/SOP/ASR/06 - 2014	ng/m ³	BDL (D.L - 5.0)	20
11	BENZENE (C ₆ H ₆)	IS 5182 PART 11 - 2006	µg/m ³	BDL (D.L - 1.0)	1
12	BENZO(a)PYRENE	IS 5182 PART 12 - 2004	ng/m ³	BDL (D.L - 0.5)	1

*National Ambient Air Quality Standards - CPCB
BDL - Below Detection Limit(D.L - Detection Limit)

*** END OF REPORT ***

For Chennai Testing Laboratory Pvt Ltd

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TEST REPORT

Report Number and date	CTL/CH/N-6058/2017-18 & 24.10.2017		
Sample Number	N-6058/17-18		
Customer Name & Address	M/s, Tamil Nadu Pollution Control Board, 76, Mount Sale, Guindy, Chennai - 600 032.		
Project At	Manali Industrial Area		
SAMPLE DETAILS			
Sample Description	Ambient Air Quality		
GPS Reading	13°08' 54.37" N 080° 16' 33.98" E		
Sampling Location	M/s.CPCL - Top of the TTP RD Plant Building		
Sampling Date & Time	11.10.2017 & 12.30 to 12.10.2017 & 12.30		
Sampled By	Chemai Testing Laboratory Pvt. Ltd.	Sampling Method	IS 5182 (Part V) and (Part XIV)
Date of Receipt	12.10.2017	Sample Condition	Good
Analysis Starting Date	13.10.2017	Analysis Completion Date	23.10.2017

ENVIRONMENTAL CONDITION:

RELATIVE HUMIDITY	63%
AMBIENT TEMPERATURE	32°C
WIND DIRECTION	S
WEATHER CONDITION	Clear Sky

SL.NO	PARAMETERS	METHODS	UNITS	RESULTS	NAAQS*
1	PARTICULATE MATTER (PM ₁₀)	CTL/SOP/AIR/01 - 2014	µg/m ³	29.0	60
2	PARTICULATE MATTER (PM _{2.5})	IS 5182 Part 23 - 2006	µg/m ³	66.0	100
3	SULPHUR DIOXIDE (SO ₂)	IS 5182 Part 2 - 2001	µg/m ³	6.2	80
4	OXIDES OF NITROGEN (NO _x)	IS 5182 Part 6 - 2006	µg/m ³	19.7	80
5	OZONE (O ₃)	CTL/SOP/AIR/08 - 2014	µg/m ³	35.7	180
6	LEAD (Pb)	IS 5182 PART 22 - 2004	µg/m ³	BDL (D.L -0.1)	1
7	CARBON MONOXIDE (CO)	CTL/SOP/AIR/23 - 2014	ng/m ³	BDL (D.L -1.15)	4
8	AMMONIA (NH ₃)	CTL/SOP/AIR/07- 2014 (INDORHENOL METHOD)	µg/m ³	59.7	400
9	ARSENIC (As)	CTL/SOP/AIR/06 - 2014	ng/m ³	BDL (D.L -1.8)	6
10	NICKEL (Ni)	CTL/SOP/AIR/06 - 2014	ng/m ³	BDL (D.L - 0.8)	20
11	BENZENE (C ₆ H ₆)	IS 5182 PART 11 - 2006	µg/m ³	BDL (D.L - 1.8)	5
12	BENZO(a)PYRENE	IS 5182 PART 12 - 2004	ng/m ³	BDL (D.L - 0.5)	1

*National Ambient Air Quality Standards - CPCB
BDL - Below Detection Limit(D.L - Detection Limit)

END OF REPORT

For Chemai Testing Laboratory Pvt Ltd

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TEST REPORT

Report Number and date	CTL/CH/N-6055/2017-18 & 24.10.2017		
Sample Number	N-6055/17-18		
Customer Name & Address	M/c. Tamil Nadu Pollution Control Board, 76, Mount Salai, Guindy, Chennai - 600 032.		
Project At	Manali Industrial Area		
SAMPLE DETAILS			
Sample Description	Ambient Air Quality		
GPS Reading	13°08' 54.37" N 080° 16' 33.98"E		
Sampling Location	M/c.CPCL - Top of the TTP RO Plant Building		
Sampling Date & Time	13.10.2017 & 13.50 to 14.10.2017 @ 13.50		
Sampled By	Chennai Testing Laboratory Pvt. Ltd.	Sampling Method	IS 5182 (Part V) and (Part IV)
Date of Receipt	14.10.2017	Sample Condition	Good
Analysis Starting Date	16.10.2017	Analysis Completion Date	23.10.2017

ENVIRONMENTAL CONDITION:

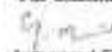
RELATIVE HUMIDITY	65%
AMBIENT TEMPERATURE	31°C
WIND DIRECTION	SW
WEATHER CONDITION	Clear Sky

SL.NO	PARAMETERS	METHODS	UNITS	RESULTS	NAAQS*
1	PARTICULATE MATTER (PM ₁₀)	CTL/SOP/AIR/02 - 2014	µg/m ³	35.7	60
2	PARTICULATE MATTER (PM _{2.5})	IS 5182 Part 22 - 2006	µg/m ³	70.6	100
3	SULPHUR DIOXIDE (SO ₂)	IS 5182 Part 2 - 2001	µg/m ³	8.6	80
4	OXIDES OF NITROGEN (NO _x)	IS 5182 Part 6 - 2006	µg/m ³	21.1	80
5	OZONE (O ₃)	CTL/SOP/AIR/08 - 2014	µg/m ³	37.4	100
6	LEAD (Pb)	IS 5182 PART 22 - 2004	µg/m ³	BDL (D.L - 0.1)	1
7	CARBON MONOXIDE (CO)	CTL/SOP/ADR/23 - 2014	ng/m ³	BDL (D.L - 1.15)	4
8	AMMONIA (NH ₃)	CTL/SOP/AIR/07- 2014 (INDOPHENOL METHOD)	µg/m ³	30.7	400
9	ARSENIC (As)	CTL/SOP/ADR/06 - 2014	ng/m ³	BDL (D.L - 1.0)	6
10	NICKEL (Ni)	CTL/SOP/ADR/06 - 2014	ng/m ³	5.4	20
11	BENZENE (C ₆ H ₆)	IS 5182 PART 11 - 2006	µg/m ³	BDL (D.L - 1.0)	3
12	BENZ(a)PYRENE	IS 5182 PART 12 - 2004	ng/m ³	BDL (D.L - 0.5)	1

*National Ambient Air Quality Standards - CPCB
BDL - Below Detection Limit (D.L - Detection Limit)

END OF REPORT

For Chennai Testing Laboratory Pvt Ltd


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TEST REPORT

Report Number and date	CTL/CH/N-6009/2017-18 & 24.10.2017		
Sample Number	N-6009/17-18		
Customer Name & Address	M/s. Tamil Nadu Pollution Control Board, 76, Mount Sale, Guindy, Chennai - 600 032.		
Project At	Manali Industrial Area		
SAMPLE DETAILS			
Sample Description	Ambient Air Quality		
GPS Reading	13°11' 13.35" N 080° 15' 57.73"E		
Sampling Location	M/s.NATCO Pharma Limited - Top of the ETP LAB		
Sampling Date & Time	09.10.2017 & 13.30 to 10.10.2017 & 13.30		
Sampled By	Chennai Testing Laboratory Pvt. Ltd.	Sampling Method	IS 5182 (Part V) and (Part XIV)
Date of Receipt	10.10.2017	Sample Condition	Good
Analysis Starting Date	11.10.2017	Analysis Completion Date	23.10.2017

ENVIRONMENTAL CONDITION:

RELATIVE HUMIDITY 60%
 AMBIENT TEMPERATURE 34°C
 WIND DIRECTION SSE
 WEATHER CONDITION Clear Sky

SL.NO	PARAMETERS	METHODS	UNITS	RESULTS	NAAQS*
1	PARTICULATE MATTER (PM ₁₀)	CTL/SOP/AIR/03 - 2014	µg/m ³	30.1	60
2	PARTICULATE MATTER (PM _{2.5})	IS 5182 Part 23 - 2006	µg/m ³	61.5	100
3	SULPHUR DIOXIDE (SO ₂)	IS 5182 Part 2 - 2001	µg/m ³	13.6	80
4	OXIDES OF NITROGEN (NO _x)	IS 5182 Part 6 - 2006	µg/m ³	29.3	80
5	OZONE (O ₃)	CTL/SOP/AIR/08 - 2014	µg/m ³	29.8	180
6	LEAD (Pb)	IS 5182 PART 22 - 2004	µg/m ³	BDL (D.L - 0.1)	1
7	CARBON MONOXIDE (CO)	CTL/SOP/AIR/23 - 2014	mg/m ³	BDL (D.L - 1.15)	4
8	AMMONIA (NH ₃)	CTL/SOP/AIR/07 - 2014 (ENDORHEVOL METHOD)	µg/m ³	13.0	400
9	ARSENIC (As)	CTL/SOP/AIR/06 - 2014	ng/m ³	BDL (D.L - 1.0)	5
10	NICKEL (Ni)	CTL/SOP/AIR/06 - 2014	ng/m ³	6.8	20
11	BENZENE (C ₆ H ₆)	IS 5182 PART 11 - 2006	µg/m ³	BDL (D.L - 1.0)	5
12	BENZO(a)PYRENE	IS 5182 PART 12 - 2006	ng/m ³	BDL (D.L - 0.5)	1

*National Ambient Air Quality Standards - CPCB
 BDL - Below Detection Limit(D.L - Detection Limit)

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For Chennai Testing Laboratory Pvt Ltd

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TEST REPORT

Report Number and date	CTL/CH/N-6010/2017-18 & 24.10.2017		
Sample Number	N-6010/17-18		
Customer Name & Address	M/s. Tamil Nadu Pollution Control Board, 75, Mount Salai, Guindy, Chennai - 600 032.		
Project At	Manali Industrial Area		
SAMPLE DETAILS			
Sample Description	Ambient Air Quality		
GPS Reading	13°11' 13.39" N 80° 15' 57.73"E		
Sampling Location	M/s.MATCO Phanna Limited - Top of the ETP LAB		
Sampling Date & Time	11.10.2017 & 15.00 to 12.10.2017 & 15.00		
Sampled By	Chennai Testing Laboratory Pvt. Ltd.	Sampling Method	IS 5182 (Part V) and (Part IV)
Date of Receipt	12.10.2017	Sample Condition	Good
Analysis Starting Date	13.10.2017	Analysis Completion Date	23.10.2017

ENVIRONMENTAL CONDITION:

RELATIVE HUMIDITY 63%
AMBIENT TEMPERATURE 32°C
WIND DIRECTION S
WEATHER CONDITION Clear Sky

SL.NO	PARAMETERS	METHODS	UNITS	RESULTS	NAAQS*
1	PARTICULATE MATTER (PM ₁₀)	CTL/SOP/AIR/02 - 2014	µg/m ³	32.0	60
2	PARTICULATE MATTER (PM _{2.5})	IS 5182 Part 23 - 2006	µg/m ³	67.5	100
3	SULPHUR DIOXIDE (SO ₂)	IS 5182 Part 2 - 2001	µg/m ³	15.6	80
4	OXIDES OF NITROGEN (NO ₂)	IS 5182 Part 6 - 2006	µg/m ³	27.6	80
5	OZONE (O ₃)	CTL/SOP/AIR/08 - 2014	µg/m ³	18.8	180
6	LEAD (Pb)	IS 5182 PART 22 - 2004	µg/m ³	BDL (D.L - 0.1)	1
7	CARBON MONOXIDE (CO)	CTL/SOP/AIR/23 - 2014	ng/m ³	BDL (D.L - 1.15)	4
8	AMMONIA (NH ₃)	CTL/SOP/AIR/07- 2014 (ENDORSENG METHOD)	µg/m ³	16.7	400
9	ARSENIC (As)	CTL/SOP/AIR/06 - 2014	ng/m ³	BDL (D.L - 1.0)	6
10	NICKEL (Ni)	CTL/SOP/AIR/06 - 2014	ng/m ³	10	20
11	BENZENE (C ₆ H ₆)	IS 5182 PART 11 - 2006	µg/m ³	BDL (D.L - 1.0)	5
12	BENZO(a)PYRENE	IS 5182 PART 12 - 2004	ng/m ³	BDL (D.L - 0.5)	1

*National Ambient Air Quality Standards - CPCB
BDL - Below Detection Limit(D.L - Detection Limit)

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TEST REPORT

Report Number and date	CTL/CH/N-6011/2017-18 & 24.10.2017		
Sample Number	N-6011/17-18		
Customer Name & Address	M/s. Tamil Nadu Pollution Control Board, 76, Mount Salai, Guindy, Chennai - 600 032.		
Project At	Manali Industrial Area		
SAMPLE DETAILS			
Sample Description	Ambient Air Quality		
GPS Reading	13°11' 13.39" N 080° 15' 57.73"E		
Sampling Location	M/s.NATCO Pharma Limited - Top of the ETP LAB		
Sampling Date & Time	13.10.2017 & 14.50 to 14.10.2017 & 14.50		
Sampled By	Chennai Testing Laboratory Pvt. Ltd.,	Sampling Method	IS 5182 (Part V) and (Part XIV)
Date of Receipt	14.10.2017	Sample Condition	Good
Analysis Starting Date	16.10.2017	Analysis Completion Date	23.10.2017

ENVIRONMENTAL CONDITION:

RELATIVE HUMIDITY 65%
 AMBIENT TEMPERATURE 31°C
 WIND DIRECTION SW
 WEATHER CONDITION Clear Sky

SL.NO	PARAMETERS	METHODS	UNITS	RESULTS	NAAQS*
1	PARTICULATE MATTER (PM ₁₀)	CTL/SOP/AIR/03 - 2014	µg/m ³	41.1	60
2	PARTICULATE MATTER (PM _{2.5})	IS 5182 Part 23 - 2006	µg/m ³	64.6	100
3	SULPHUR DIOXIDE (SO ₂)	IS 5182 Part 2 - 2001	µg/m ³	18.7	80
4	OXIDES OF NITROGEN (NO ₂)	IS 5182 Part 4 - 2006	µg/m ³	32.1	80
5	OZONE (O ₃)	CTL/SOP/AIR/08 - 2014	µg/m ³	13.5	180
6	LEAD (Pb)	IS 5182 PART 22 - 2004	µg/m ³	BDL (D.L - 0.1)	1
7	CARBON MONOXIDE (CO)	CTL/SOP/AIR/23 - 2014	mg/m ³	BDL (D.L - 1.15)	4
8	AMMONIA (NH ₃)	CTL/SOP/AIR/07- 2014 (INDOPHENOL METHOD)	µg/m ³	23.7	400
9	ARSENIC (As)	CTL/SOP/AIR/06 - 2014	ng/m ³	BDL (D.L - 1.0)	5
10	NICKEL (Ni)	CTL/SOP/AIR/06 - 2014	ng/m ³	17.1	20
11	BENZENE (C ₆ H ₆)	IS 5182 PART 11 - 2006	µg/m ³	BDL (D.L - 1.0)	5
12	BENZO(a)PYRENE	IS 5182 PART 12 - 2004	ng/m ³	BDL (D.L - 0.5)	1

*National Ambient Air Quality Standards - CPCB
 BDL - Below Detection Limit(D.L - Detection Limit)

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Ambient Air Quality Result - Ranipet



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TEST REPORT

Report Number and date	CTL/CH/N-5863/2017-18 & 16.10.2017		
Sample Number	N-5863/17-18		
Customer Name & Address	M/s. Tamil Nadu Pollution Control Board, 76, Mount Saeef, Guindy, Chennai - 600 032.		
Project At	Ranipet Sipcot Area - Vellore		
SAMPLE DETAILS			
Sample Description	Ambient Air Quality		
GPS Reading	12°57' 01.93" N 079° 15'10.96"E		
Sampling Location	M/s. Malladi drugs & Pharmaceuticals Rd unit - 1 - Near Sludge Drying Bed		
Sampling Date & Time	04.10.2017 & 11.40 to 05.10.2017 & 11.40		
Sampled By	Chennai Testing Laboratory Pvt. Ltd.	Sampling Method	IS 5182 (Part V) and (Part XIV)
Date of Receipt	06.10.2017	Sample Condition	Good
Analysis Starting Date	06.10.2017	Analysis Completion Date	14.10.2017

ENVIRONMENTAL CONDITION:

RELATIVE HUMIDITY: 64%
 AMBIENT TEMPERATURE: 33°C
 WIND DIRECTION: SW
 WEATHER CONDITION: Clear Sky

SL.NO	PARAMETERS	METHODS	UNITS	RESULTS	NAAQS*
1	PARTICULATE MATTER (PM ₁₀)	CTL/SOP/ADR/02 - 2014	µg/m ³	24.2	60
2	PARTICULATE MATTER (PM _{2.5})	IS 5182 Part 23 - 2006	µg/m ³	15.8	100
3	SULPHUR DIOXIDE (SO ₂)	IS 5182 Part 2 - 2001	µg/m ³	9.7	80
4	OXIDES OF NITROGEN (NO _x)	IS 5182 Part 8 - 2006	µg/m ³	22.3	80
5	OZONE (O ₃)	CTL/SOP/ADR/08 - 2014	µg/m ³	30.0	180
6	LEAD (Pb)	IS 5182 PART 22 - 2004	µg/m ³	BDL (D.L - 0.1)	1
7	CARBON MONOXIDE (CO)	CTL/SOP/ADR/23 - 2014	mg/m ³	BDL (D.L - 1.15)	4
8	AMMONIA (NH ₃)	CTL/SOP/ADR/07- 2014 (INDOPHENOL METHOD)	µg/m ³	58.5	400
9	ARSENIC (As)	CTL/SOP/ADR/06 - 2014	ng/m ³	BDL (D.L - 1.0)	8
10	NICKEL (Ni)	CTL/SOP/ADR/06 - 2014	ng/m ³	BDL (D.L - 1.0)	20
11	BENZENE (C ₆ H ₆)	IS 5182 PART 11 - 2006	µg/m ³	BDL (D.L - 1.0)	5
12	BENZO(a)PYRENE	IS 5182 PART 12 - 2004	ng/m ³	BDL (D.L - 0.5)	1

*National Ambient Air Quality Standards - CPCB
 BDL - Below Detection Limit(D.L - Detection Limit)

END OF REPORT

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 Chennai - 600 032 | Tamil Nadu | India | Telefax : +91-44-2250 1757



TEST REPORT

Report Number and date	CTL/CH/N-5664/2017-18 & 16.10.2017		
Sample Number	N-5664/17-18		
Customer Name & Address	M/s. Tamil Nadu Pollution Control Board, 76, Mount Salek, Omdy, Chennai - 600 032.		
Project At	Ranipet Sigat Area - Vellore		
SAMPLE DETAILS			
Sample Description	Ambient Air Quality		
GPS Reading	12°57' 01.93" N 87°5' 15" 10.96"E		
Sampling Location	M/s. Malladi drugs & Pharmaceuticals Rd unit - 1 - Near Sludge Drying Bed		
Sampling Date & Time	06.10.2017 & 12-10 to 07.10.2017 & 12-10		
Sampled By	Chennai Testing Laboratory Pvt. Ltd.,	Sampling Method	IS 5182 (Part V) and (Part XIV)
Date of Receipt	07.10.2017	Sample Condition	Good
Analysis Starting Date	09.10.2017	Analysis Completion Date	14.10.2017

ENVIRONMENTAL CONDITION:

RELATIVE HUMIDITY	68%
AMBIENT TEMPERATURE	31°C
WIND DIRECTION	W
WEATHER CONDITION	Partly Cloudy

SL.NO	PARAMETERS	METHODS	UNITS	RESULTS	NAAQS*
1	PARTICULATE MATTER (PM ₁₀)	CTL/SOP/AIR/03 - 2014	µg/m ³	28.5	60
2	PARTICULATE MATTER (PM _{2.5})	IS 5182 Part 23 - 2006	µg/m ³	39.2	100
3	SULPHUR DIOXIDE (SO ₂)	IS 5182 Part 2 - 2001	µg/m ³	7.0	80
4	OXIDES OF NITROGEN (NO _x)	IS 5182 Part 6 - 2006	µg/m ³	15.9	80
5	ODORE (O ₃)	CTL/SOP/AIR/08 - 2014	µg/m ³	24.4	180
6	LEAD (Pb)	IS 5182 PART 22 - 2004	µg/m ³	BDL (D.L - 0.1)	1
7	CARBON MONOXIDE (CO)	CTL/SOP/AIR/23 - 2014	mg/m ³	BDL (D.L - 1.15)	4
8	AMMONIA (NH ₃)	CTL/SOP/AIR/07- 2014 (INDONESIAN METHOD)	µg/m ³	64.8	400
9	ARSENIC (As)	CTL/SOP/AIR/06 - 2014	ng/m ³	BDL (D.L - 1.0)	6
10	NICKEL (Ni)	CTL/SOP/AIR/06 - 2014	ng/m ³	BDL (D.L - 5.0)	20
11	BENZENE (C ₆ H ₆)	IS 5182 PART 11 - 2006	µg/m ³	BDL (D.L - 1.0)	5
12	BENZO(a)PYRENE	IS 5182 PART 12 - 2004	ng/m ³	BDL (D.L - 0.1)	1

*National Ambient Air Quality Standards - CPCB
BDL - Below Detection Limit(D.L - Detection Limit)

END OF REPORT

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TEST REPORT

Report Number and date	CTL/CH/N-5865/2017-18 & 16.10.2017		
Sample Number	N-5865/17-18		
Customer Name & Address	M/s. Tamil Nadu Pollution Control Board, 76, Mount Salai, Gundy, Chennai - 600 032.		
Project At	Ranipet Sigcot Area - Vellore		
SAMPLE DETAILS			
Sample Description	Ambient Air Quality		
GPS Reading	12°57' 01.93" N 079° 19'10.96"E		
Sampling Location	M/s. Malladi drugs & Pharmaceuticals Ltd unit - 1 - Near Sludge Drying Bed		
Sampling Date & Time	05.10.2017 & 12.30 to 05.10.2017 @ 12.30		
Sampled By	Chennai Testing Laboratory Pvt. Ltd.	Sampling Method	IS 5182 (Part V) and (Part XIV)
Date of Receipt	10.10.2017	Sample Condition	Good
Analysis Starting Date	10.10.2017	Analysis Completion Date	14.10.2017

ENVIRONMENTAL CONDITION:

RELATIVE HUMIDITY	65%
AMBIENT TEMPERATURE	32.5°C
WIND DIRECTION	S
WEATHER CONDITION	Partly Cloudy

SL.NO	PARAMETERS	METHODS	UNITS	RESULTS	NAAQS*
1	PARTICULATE MATTER (PM ₁₀)	CTL/SOP/AIR/03 - 2014	µg/m ³	32.0	60
2	PARTICULATE MATTER (PM _{2.5})	IS 5182 Part 22 - 2006	µg/m ³	66.7	100
3	SULPHUR DIOXIDE (SO ₂)	IS 5182 Part 2 - 2001	µg/m ³	11.7	80
4	OXIDES OF NITROGEN (NO _x)	IS 5182 Part 6 - 2006	µg/m ³	23.2	80
5	OZONE (O ₃)	CTL/SOP/AIR/08 - 2014	µg/m ³	28.1	160
6	LEAD (Pb)	IS 5182 PART 22 - 2004	µg/m ³	BDL (D.L - 0.1)	1
7	CARBON MONOXIDE (CO)	CTL/SOP/AIR/23 - 2014	ng/m ³	BDL (D.L - 0.25)	4
8	AMMONIA (NH ₃)	CTL/SOP/AIR/07- 2014 (INDOPHENOL METHOD)	µg/m ³	54.8	400
9	ARSENIC (As)	CTL/SOP/AIR/06 - 2014	ng/m ³	BDL (D.L - 1.0)	8
10	NICKEL (Ni)	CTL/SOP/AIR/06 - 2014	ng/m ³	BDL (D.L - 5.0)	20
11	BENZENE (C ₆ H ₆)	IS 5182 PART 11 - 2006	µg/m ³	BDL (D.L - 1.0)	5
12	BENZO(a)PYRENE	IS 5182 PART 12 - 2004	ng/m ³	BDL (D.L - 0.5)	1

*National Ambient Air Quality Standards - CPCB
BDL - Below Detection Limit(D.L - Detection Limit)

END OF REPORT

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TEST REPORT

Report Number and date	CTL/CH/N-5857/2017-18 & 16.10.2017		
Sample Number	N-5857/17-18		
Customer Name & Address	M/s. Tamil Nadu Pollution Control Board, 76, Mount Satal, Guindy, Chennai - 600 032.		
Project At	Ranipet Sigoot Area - Vellore		
SAMPLE DETAILS			
Sample Description	Ambient Air Quality		
GPS Reading	12°57' 17.92" N 079° 19'10.39"E		
Sampling Location	M/s. Malladi drugs & Pharmaceuticals ltd unit - III - Near SCRAP YARD		
Sampling Date & Time	04.10.2017 & 12.40 to 05.10.2017 & 12.40		
Sampled By	Chennai Testing Laboratory Pvt. Ltd.	Sampling Method	IS 5182 (Part V) and (Part XIV)
Date of Receipt	06.10.2017	Sample Condition	Good
Analysis Starting Date	06.10.2017	Analysis Completion Date	14.10.2017

ENVIRONMENTAL CONDITION:

RELATIVE HUMIDITY	64%
AMBIENT TEMPERATURE	33°C
WIND DIRECTION	SW
WEATHER CONDITION	Clear Sky

SL.NO	PARAMETERS	METHODS	UNITS	RESULTS	NAAQS*
1	PARTICULATE MATTER (PM ₁₀)	CTL/SOP/AIR/03 - 2014	ug/m ³	34.0	60
2	PARTICULATE MATTER (PM _{2.5})	IS 5182 Part 22 - 2006	ug/m ³	71.0	100
3	SULPHUR DIOXIDE (SO ₂)	IS 5182 Part 2 - 2001	ug/m ³	8.2	60
4	OXIDES OF NITROGEN (NO _x)	IS 5182 Part 6 - 2006	ug/m ³	18.3	60
5	OZONE (O ₃)	CTL/SOP/AIR/08 - 2014	ug/m ³	21.5	180
6	LEAD (Pb)	IS 5182 PART 22 - 2004	ug/m ³	BDL (D.L - 0.1)	1
7	CARBON MONOXIDE (CO)	CTL/SOP/AIR/23 - 2014	ug/m ³	BDL (D.L - 1.15)	4
8	AMMONIA (NH ₃)	CTL/SOP/AIR/07- 2014 (INDOPHENDL METHOD)	ug/m ³	66.2	400
9	ARSENIC (As)	CTL/SOP/AIR/06 - 2014	ng/m ³	BDL (D.L - 1.0)	6
10	NICKEL (Ni)	CTL/SOP/AIR/06 - 2014	ng/m ³	17.4	20
11	BENZENE (C ₆ H ₆)	IS 5182 PART 11 - 2006	ug/m ³	BDL (D.L - 1.0)	5
12	BENZO(a)PYRENE	IS 5182 PART 12 - 2004	ng/m ³	BDL (D.L - 0.5)	1

*National Ambient Air Quality Standards - CPCB
BDL - Below Detection Limit(D.L - Detection Limit)

END OF REPORT

For Chennai Testing Laboratory Pvt Ltd


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TEST REPORT

Report Number and date	CTL/CH/N-5858/2017-18 & 16.10.2017		
Sample Number	N-5858/17-18		
Customer Name & Address	M/s. Tamil Nadu Pollution Control Board, 78, Mount Sale, Guindy, Chennai - 600 032.		
Project At	Ranipet Sigoot Area - Vellore		
SAMPLE DETAILS			
Sample Description	Ambient Air Quality		
GPS Reading	12°57' 17.92" N 87°9' 19'10.39"E		
Sampling Location	M/s. Malladi drugs & Pharmaceuticals Rd unit - III - Near SCRAP YARD		
Sampling Date & Time	06.10.2017 & 13.05 to 07.10.2017 & 13.05		
Sampled By	Chennai Testing Laboratory Pvt. Ltd.	Sampling Method	IS 5182 (Part V) and (Part XIV)
Date of Receipt	07.10.2017	Sample Condition	Good
Analysis Starting Date	09.10.2017	Analysis Completion Date	14.10.2017

ENVIRONMENTAL CONDITION:

RELATIVE HUMIDITY	60%
AMBIENT TEMPERATURE	31°C
WIND DIRECTION	W
WEATHER CONDITION	Partly Cloudy

SL.NO	PARAMETERS	METHODS	UNITS	RESULTS	NAAQS*
1	PARTICULATE MATTER (PM ₁₀)	CTL/SOP/AIR/03 - 2014	µg/m ³	35.6	60
2	PARTICULATE MATTER (PM _{2.5})	IS 5182 Part 21 - 2006	µg/m ³	74.5	100
3	SULPHUR DIOXIDE (SO ₂)	IS 5182 Part 2 - 2001	µg/m ³	13.2	80
4	OXIDES OF NITROGEN (NO _x)	IS 5182 Part 6 - 2006	µg/m ³	29.7	80
5	OZONE (O ₃)	CTL/SOP/AIR/08 - 2014	µg/m ³	23.4	180
6	LEAD (Pb)	IS 5182 PART 22 - 2004	µg/m ³	BDL (D.L - 0.1)	1
7	CARBON MONOXIDE (CO)	CTL/SOP/ADR/23 - 2014	mg/m ³	BDL (D.L - 1.15)	4
8	AMMONIA (NH ₃)	CTL/SOP/ADR/07 - 2014 (INDOPHENOL METHOD)	µg/m ³	55.5	400
9	ARSENIC (As)	CTL/SOP/ADR/06 - 2014	ng/m ³	BDL (D.L - 1.0)	6
10	NICKEL (Ni)	CTL/SOP/ADR/06 - 2014	ng/m ³	8.4	20
11	BENZENE (C ₆ H ₆)	IS 5182 PART 11 - 2006	µg/m ³	BDL (D.L - 1.0)	5
12	BENZD(A)PYRENE	IS 5182 PART 12 - 2004	ng/m ³	BDL (D.L - 0.5)	1

*National Ambient Air Quality Standards - CPCB
BDL - Below Detection Limit(D.L - Detection Limit)

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TEST REPORT

Report Number and date	CTL/CH/N-5859/2017-18 & 16.10.2017		
Sample Number	N-5859/17-18		
Customer Name & Address	M/s. Tamil Nadu Pollution Control Board, 76, Mount Salai, Guindy, Chennai - 600 032.		
Project Ref	Ranipet Sipcot Area - Vellore		
SAMPLE DETAILS			
Sample Description	Ambient Air Quality		
GPS Reading	12°57' 17.92" N 87°9' 19"10.39"E		
Sampling Location	M/s. Malladi drugs & Pharmaceuticals Ref unit - III - Near SCRAP YARD		
Sampling Date & Time	08.10.2017 & 13.30 to 09.10.2017 & 13.30		
Sampled By	Chennai Testing Laboratory Pvt. Ltd.	Sampling Method	IS 5182 (Part V) and (Part XIV)
Date of Receipt	10.10.2017	Sample Condition	Good
Analysis Starting Date	10.10.2017	Analysis Completion Date	14.10.2017

ENVIRONMENTAL CONDITION:

RELATIVE HUMIDITY	65%
AMBIENT TEMPERATURE	32.8°C
WIND DIRECTION	S
WEATHER CONDITION	Partly Cloudy

SL.NO	PARAMETERS	METHODS	UNITS	RESULTS	NAAQS*
1	PARTICULATE MATTER (PM ₁₀)	CTL/SOP/AIR/03 - 2014	µg/m ³	32.1	60
2	PARTICULATE MATTER (PM _{2.5})	IS 5182 Part 23 - 2006	µg/m ³	68.2	100
3	SULPHUR DIOXIDE (SO ₂)	IS 5182 Part 2 - 2001	µg/m ³	12.5	80
4	OXIDES OF NITROGEN (NO _x)	IS 5182 Part 6 - 2006	µg/m ³	39.1	80
5	OZONE (O ₃)	CTL/SOP/AIR/08 - 2014	µg/m ³	25.8	180
6	LEAD (Pb)	IS 5182 PART 22 - 2004	µg/m ³	BDL (D.L - 0.1)	1
7	CARBON MONOXIDE (CO)	CTL/SOP/AIR/23 - 2014	mg/m ³	BDL (D.L - 1.15)	4
8	AMMONIA (NH ₃)	CTL/SOP/AIR/07 - 2014 (INDOPHENOL METHOD)	µg/m ³	31.8	400
9	ARSENIC (As)	CTL/SOP/AIR/06 - 2014	ng/m ³	BDL (D.L - 1.0)	5
10	NICKEL (Ni)	CTL/SOP/AIR/06 - 2014	ng/m ³	12.7	30
11	BENZENE (C ₆ H ₆)	IS 5182 PART 11 - 2006	µg/m ³	BDL (D.L - 1.0)	5
12	BENZ(a)PHTHENE	IS 5182 PART 12 - 2004	ng/m ³	BDL (D.L - 0.5)	1

*National Ambient Air Quality Standards - CPCB
BDL - Below Detection Limit(D.L - Detection Limit)

*** END OF REPORT ***

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TEST REPORT

Report Number and date	CTL/CH/N-5854/2017-18 & 16.10.2017		
Sample Number	N-5854/17-18		
Customer Name & Address	M/s. Tamil Nadu Pollution Control Board, 76, Mount Salai, Guindy, Chennai - 600 032.		
Project At	Ranipet Sipcot Area - Vellore		
SAMPLE DETAILS			
Sample Description	Ambient Air Quality		
GPS Reading	12°57' 59.09" N 079° 17'47.14"E		
Sampling Location	M/s. Svis labs (P) Ltd - Top of the Security Room.		
Sampling Date & Time	04.10.2017 & 15.05 to 05.10.2017 & 15.05		
Sampled By	Chennai Testing Laboratory Pvt. Ltd.	Sampling Method	IS 5182 (Part V) and (Part XIV)
Date of Receipt	08.10.2017	Sample Condition	Good
Analysis Starting Date	05.10.2017	Analysis Completion Date	14.10.2017

ENVIRONMENTAL CONDITION:

RELATIVE HUMIDITY	64%
AMBIENT TEMPERATURE	33°C
WIND DIRECTION	SW
WEATHER CONDITION	Clear Sky

SL.NO	PARAMETERS	METHODS	UNITS	RESULTS	NAAQS*
1	PARTICULATE MATTER (PM ₁₀)	CTL/SOP/AIR/03 - 2014	µg/m ³	21.0	80
2	PARTICULATE MATTER (PM _{2.5})	IS 5182 Part 23 - 2006	µg/m ³	52.1	100
3	SULPHUR DIOXIDE (SO ₂)	IS 5182 Part 2 - 2001	µg/m ³	5.5	80
4	OXIDES OF NITROGEN (NO _x)	IS 5182 Part 6 - 2006	µg/m ³	17.3	80
5	OZONE (O ₃)	CTL/SOP/AIR/08 - 2014	µg/m ³	18.0	100
6	LEAD (Pb)	IS 5182 PART 22 - 2004	µg/m ³	BDL (D.L - 0.1)	1
7	CARBON MONOXIDE (CO)	CTL/SOP/ASR/23 - 2014	mg/m ³	BDL (D.L - 1.15)	4
8	AMMONIA (NH ₃)	CTL/SOP/ASR/07- 2014 (INDOPHENOL METHOD)	µg/m ³	23.3	400
9	ARSENIC (As)	CTL/SOP/ASR/06 - 2014	ng/m ³	BDL (D.L - 1.0)	6
10	NICKEL (Ni)	CTL/SOP/ASR/06 - 2014	ng/m ³	BDL (D.L - 5.0)	20
11	BENZENE (C ₆ H ₆)	IS 5182 PART 11 - 2006	µg/m ³	BDL (D.L - 1.0)	5
12	BENZO(a)PYRENE	IS 5182 PART 12 - 2004	ng/m ³	BDL (D.L - 0.5)	1

*National Ambient Air Quality Standards - CPCB
BDL - Below Detection Limit(D.L - Detection Limit)

END OF REPORT

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TEST REPORT

Report Number and date	CTL/CH/N-5855/2017-18 & 16.10.2017		
Sample Number	N-5855/17-18		
Customer Name & Address	M/s. Tamil Nadu Pollution Control Board, 76, Mount Salai, Gundy, Chennai - 600 032.		
Project At	Ramipet Sipcot Area - Vellore		
SAMPLE DETAILS			
Sample Description	Ambient Air Quality		
GPS Reading	12°57' 59.09" N 82°9' 17'47.14"E		
Sampling Location	M/s. Svis labs (P) Ltd - Top of the Security Room		
Sampling Date & Time	06.10.2017 & 15:20 to 07.10.2017 & 15:20		
Sampled By	Chennai Testing Laboratory Pvt. Ltd.	Sampling Method	IS 5182 (Part V) and (Part XIV)
Date of Receipt	07.10.2017	Sample Condition	Good
Analysis Starting Date	09.10.2017	Analysis Completion Date	14.10.2017

ENVIRONMENTAL CONDITION:

RELATIVE HUMIDITY - 48%

AMBIENT TEMPERATURE - 31°C

WIND DIRECTION - W

WEATHER CONDITION - Partly Cloudy

SL.NO	PARAMETERS	METHODS	UNITS	RESULTS	NAAQS*
1	PARTICULATE MATTER (PM ₁₀)	CTL/SOP/AIR/03 - 2014	µg/m ³	29.0	60
2	PARTICULATE MATTER (PM _{2.5})	IS 5182 Part 21 - 2006	µg/m ³	40.1	100
3	SULPHUR DIOXIDE (SO ₂)	IS 5182 Part 2 - 2001	µg/m ³	9.0	80
4	OXIDES OF NITROGEN (NO _x)	IS 5182 Part 6 - 2006	µg/m ³	24.6	80
5	OZONE (O ₃)	CTL/SOP/AIR/08 - 2014	µg/m ³	31.0	180
6	LEAD (Pb)	IS 5182 PART 22 - 2004	µg/m ³	BDL (D.L - 0.1)	1
7	CARBON MONOXIDE (CO)	CTL/SOP/AIR/23 - 2014	ng/m ³	BDL (D.L - 1.15)	4
8	AMMONIA (NH ₃)	CTL/SOP/AIR/07 - 2014 (INDOPHENOL METHOD)	µg/m ³	17.8	400
9	ARGENIC (Ag)	CTL/SOP/AIR/06 - 2014	ng/m ³	BDL (D.L - 1.0)	6
10	NICKEL (Ni)	CTL/SOP/AIR/08 - 2014	ng/m ³	5.1	20
11	BENZENE (C ₆ H ₆)	IS 5182 PART 11 - 2006	µg/m ³	BDL (D.L - 1.0)	5
12	BENZO(a)PYRENE	IS 5182 PART 12 - 2004	ng/m ³	BDL (D.L - 0.5)	1

*National Ambient Air Quality Standards - CPCB
BDL - Below Detection Limit(D.L - Detection Limit)

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TEST REPORT

Report Number and date	CTL/CH/N-5856/2017-18 & 16.10.2017		
Sample Number	N-5856/17-18		
Customer Name & Address	M/s. Tamil Nadu Pollution Control Board, 75, Mount Salai, Guindy, Chennai - 600 032.		
Project At	Ranipet Sipcot Area - Vellore		
SAMPLE DETAILS			
Sample Description	Ambient Air Quality		
GPS Reading	12°57' 59.89" N 87° 17' 47.14" E		
Sampling Location	M/s. Svts labs (P) Ltd - Top of the Security Room		
Sampling Date & Time	08.10.2017 & 15.45 to 09.10.2017 & 15.45		
Sampled By	Chennai Testing Laboratory Pvt. Ltd.	Sampling Method	IS 5182 (Part V) and (Part XIV)
Date of Receipt	10.10.2017	Sample Condition	Good
Analysis Starting Date	10.10.2017	Analysis Completion Date	14.10.2017

ENVIRONMENTAL CONDITION:

RELATIVE HUMIDITY 65%
 AMBIENT TEMPERATURE 32.5°C
 WIND DIRECTION S
 WEATHER CONDITION Partly Cloudy

SL.NO	PARAMETERS	METHODS	UNITS	RESULTS	NAAQS*
1	PARTICULATE MATTER (PM ₁₀)	CTL/SOP/ADR/02 - 2014	µg/m ³	26.1	60
2	PARTICULATE MATTER (PM _{2.5})	IS 5182 Part 23 - 2006	µg/m ³	57.5	100
3	SULPHUR DIOXIDE (SO ₂)	IS 5182 Part 2 - 2001	µg/m ³	6.2	80
4	OXIDES OF NITROGEN (NO _x)	IS 5182 Part 6 - 2006	µg/m ³	23.0	80
5	OZONE (O ₃)	CTL/SOP/ADR/08 - 2014	µg/m ³	26.4	180
6	LEAD (Pb)	IS 5182 PART 22 - 2004	µg/m ³	BDL (D.L - 0.1)	1
7	CARBON MONOXIDE (CO)	CTL/SOP/ADR/23 - 2014	ng/m ³	BDL (D.L - 1.15)	4
8	AMMONIA (NH ₃)	CTL/SOP/ADR/07 - 2014 (INDOPHENOL METHOD)	µg/m ³	28.5	400
9	ARSENIC (As)	CTL/SOP/ADR/06 - 2014	ng/m ³	BDL (D.L - 1.0)	6
10	NICKEL (Ni)	CTL/SOP/ADR/04 - 2014	ng/m ³	BDL (D.L - 5.0)	20
11	BENZENE (C ₆ H ₆)	IS 5182 PART 11 - 2006	µg/m ³	BDL (D.L - 1.0)	5
12	BENZO(a)PYRENE	IS 5182 PART 12 - 2004	ng/m ³	BDL (D.L - 0.5)	1

*National Ambient Air Quality Standards - CPCB
 BDL - Below Detection Limit(D.L. - Detection Limit)

END OF REPORT

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TEST REPORT

Report Number and date	CTL/CH/N-5860/2017-18 & 16-10.2017		
Sample Number	N-5860/17-18		
Customer Name & Address	M/s. Tamil Nadu Pollution Control Board, 76, Mount Salai, Guindy, Chennai - 600 032.		
Project At	Ranipet Sigcot Area - Vellore		
SAMPLE DETAILS			
Sample Description	Ambient Air Quality		
GPS Reading	12°58' 16.16" N 079° 17'50.56"E		
Sampling Location	M/s. Greaves Cotton Ltd - Top of the Canteen Building		
Sampling Date & Time	04.10.2017 & 14.10 to 05.10.2017 & 14.10		
Sampled By	Chennai Testing Laboratory Pvt. Ltd.	Sampling Method	IS 5182 (Part V) and (Part XIV)
Date of Receipt	06.10.2017	Sample Condition	Good
Analytic Starting Date	06.10.2017	Analysis Completion Date	14.10.2017

ENVIRONMENTAL CONDITION:

RELATIVE HUMIDITY 64%
 AMBIENT TEMPERATURE 32°C
 WIND DIRECTION SW
 WEATHER CONDITION Clear Sky

SL.NO	PARAMETERS	METHODS	UNITS	RESULTS	NAAQS*
1	PARTICULATE MATTER (PM ₁₀)	CTL/SOP/AIR/03 - 2014	µg/m ³	31.2	60
2	PARTICULATE MATTER (PM _{2.5})	IS 5182 Part 23 - 2006	µg/m ³	67.0	100
3	SULPHUR DIOXIDE (SO ₂)	IS 5182 Part 2 - 2001	µg/m ³	7.6	80
4	OXIDES OF NITROGEN (NO _x)	IS 5182 Part 6 - 2006	µg/m ³	18.0	80
5	OZONE (O ₃)	CTL/SOP/AIR/08 - 2014	µg/m ³	39.8	100
6	LEAD (Pb)	IS 5182 PART 22 - 2004	µg/m ³	BDL (D.L - 0.1)	1
7	CARBON MONOXIDE (CO)	CTL/SOP/ASR/23 - 2014	ng/m ³	BDL (D.L - 1.15)	4
8	AMMONIA (NH ₃)	CTL/SOP/AIR/07- 2014 (ENDOPHENOL METHOD)	µg/m ³	24.8	400
9	ARSENIC (As)	CTL/SOP/ASR/06 - 2014	ng/m ³	BDL (D.L - 1.0)	6
10	NICKEL (Ni)	CTL/SOP/ASR/06 - 2014	ng/m ³	13.2	20
11	BENZENE (C ₆ H ₆)	IS 5182 PART 11 - 2006	µg/m ³	BDL (D.L - 1.0)	5
12	BENZO(a)PYRENE	IS 5182 PART 12 - 2004	ng/m ³	BDL (D.L - 0.5)	1

*National Ambient Air Quality Standards - CPCB
 BDL - Below Detection Limit(D.L - Detection Limit)

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TEST REPORT

Report Number and date	CTL/CH/N-5861/2017-18 & 16.10.2017		
Sample Number	N-5861/17-18		
Customer Name & Address	M/s. Tamil Nadu Pollution Control Board, 75, Mount Salai, Guindy, Chennai - 600 032.		
Project At	Ranipet Sipcot Area - Vellore		
SAMPLE DETAILS			
Sample Description	Ambient Air Quality		
GPS Reading	12°58' 16.16" N 079° 17'50.56"E		
Sampling Location	M/s. Greaves Cotton Ltd - Top of the Canteen Building		
Sampling Date & Time	06.10.2017 @ 14.30 to 07.10.2017 @ 14.30		
Sampled By	Chennai Testing Laboratory Pvt. Ltd.	Sampling Method	IS 5182 (Part V) and (Part XIV)
Date of Receipt	07.10.2017	Sample Condition	Good
Analysis Starting Date	09.10.2017	Analysis Completion Date	14.10.2017

ENVIRONMENTAL CONDITION:

RELATIVE HUMIDITY: 68%
 AMBIENT TEMPERATURE: 31°C
 WIND DIRECTION: W
 WEATHER CONDITION: Partly Cloudy

SL.NO	PARAMETERS	METHODS	UNITS	RESULTS	NAAQS*
1	PARTICULATE MATTER (PM ₁₀)	CTL/SOP/ABU/03 - 2014	µg/m ³	41.5	60
2	PARTICULATE MATTER (PM _{2.5})	IS 5182 Part 23 - 2006	µg/m ³	82.1	100
3	SULPHUR DIOXIDE (SO ₂)	IS 5182 Part 2 - 2001	µg/m ³	10.5	80
4	OXIDES OF NITROGEN (NO _x)	IS 5182 Part 6 - 2006	µg/m ³	26.5	80
5	OZONE (O ₃)	CTL/SOP/ABU/00 - 2014	µg/m ³	16.8	180
6	LEAD (Pb)	IS 5182 PART 22 - 2004	µg/m ³	0.123	1
7	CARBON MONOXIDE (CO)	CTL/SOP/AIR/23 - 2014	mg/m ³	BDL (D.L - 1.15)	4
8	AMMONIA (NH ₃)	CTL/SOP/ABU/07 - 2014 (INDOPHENOL METHOD)	µg/m ³	33.3	400
9	ARSENIC (As)	CTL/SOP/AIR/06 - 2014	ng/m ³	BDL (D.L - 1.0)	6
10	NICKEL (Ni)	CTL/SOP/AIR/06 - 2014	ng/m ³	13.6	28
11	BENZENE (C ₆ H ₆)	IS 5182 PART 11 - 2006	µg/m ³	BDL (D.L - 1.0)	5
12	BENZO(a)PYRENE	IS 5182 PART 12 - 2004	ng/m ³	BDL (D.L - 0.5)	1

*National Ambient Air Quality Standards - CPCB
 BDL - Below Detection Limit(D.L - Detection Limit)

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TEST REPORT

Report Number and date	CTL/CH/N-5862/2017-18 & 16.10.2017		
Sample Number	N-5862/17-18		
Customer Name & Address	M/s. Tamil Nadu Pollution Control Board, 76, Mount Salei, Guindy, Chennai - 600 032.		
Project At	Ranipet Sippcot Area - Vellore		
SAMPLE DETAILS			
Sample Description	Ambient Air Quality		
GPS Reading	12°58' 16.16" N 075° 17'50.96"E		
Sampling Location	M/s. Greaves Cotton Ltd - Top of the Canteen Building		
Sampling Date & Time	06.10.2017 & 14.50 to 09.10.2017 & 14.50		
Sampled By	Chennai Testing Laboratory Pvt. Ltd.	Sampling Method	IS 5182 (Part V) and (Part XV)
Date of Receipt	10.10.2017	Sample Condition	Good
Analysis Starting Date	10.10.2017	Analysis Completion Date	14.10.2017

ENVIRONMENTAL CONDITION:

RELATIVE HUMIDITY	65%
AMBIENT TEMPERATURE	32.5°C
WIND DIRECTION	S
WEATHER CONDITION	Partly Cloudy

SL.NO	PARAMETERS	METHODS	UNITS	RESULTS	NAAQS*
1	PARTICULATE MATTER (PM ₁₀)	CTL/SOP/AIR/03 - 2014	µg/m ³	36.8	60
2	PARTICULATE MATTER (PM _{2.5})	IS 5182 Part 23 - 2006	µg/m ³	75.8	100
3	SULPHUR DIOXIDE (SO ₂)	IS 5182 Part 2 - 2005	µg/m ³	9.0	80
4	OXIDES OF NITROGEN (NO _x)	IS 5182 Part 6 - 2006	µg/m ³	24.1	80
5	OZONE (O ₃)	CTL/SOP/AIR/08 - 2014	µg/m ³	21.8	180
6	LEAD (Pb)	IS 5182 PART 22 - 2004	µg/m ³	BDL (D.L - 0.1)	1
7	CARBON MONOXIDE (CO)	CTL/SOP/AIR/23 - 2014	mg/m ³	BDL (D.L - 1.15)	4
8	AMMONIA (NH ₃)	CTL/SOP/AIR/07 - 2014 (INDOPHENOL METHOD)	µg/m ³	30.3	400
9	ARSENIC (As)	CTL/SOP/AIR/06 - 2014	ng/m ³	BDL (D.L - 1.0)	8
10	NICKEL (Ni)	CTL/SOP/AIR/06 - 2014	ng/m ³	18.7	20
11	BENZENE (C ₆ H ₆)	IS 5182 PART 11 - 2006	µg/m ³	BDL (D.L - 1.0)	8
12	BENZO(a)PYRENE	IS 5182 PART 12 - 2004	ng/m ³	BDL (D.L - 0.5)	1

*National Ambient Air Quality Standards - CPCB
BDL - Below Detection Limit (D.L - Detection Limit)

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Ambient Air Quality Result - Cuddalore



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TEST REPORT

Report Number and date	CTL/CH/N-5639/2017-18 & 10.10.2017		
Sample Number	N-5639/17-18		
Customer Name & Address	M/s. Tamil Nadu Pollution Control Board, 76, Mount Salai, Guindy, Chennai - 600 032.		
Project At	Cuddalore - Sipcot Complex		
SAMPLE DETAILS			
Sample Description	Ambient Air Quality		
GPS Reading	11°40' 24.41" N 079° 44' 59.71"E		
Sampling Location	Center of Sipcot Phase I&II - Top of the Sipcot Office		
Sampling Date & Time	26.09.2017 & 10.10 to 27.09.2017 & 10.10		
Sampled By	Chennai Testing Laboratory Pvt. Ltd.	Sampling Method	IS 5182 (Part V) and (Part IV)
Date of Receipt	28.09.2017	Sample Condition	Good
Analysis Starting Date	26.09.2017	Analysis Completion Date	09.10.2017

ENVIRONMENTAL CONDITION:

RELATIVE HUMIDITY 56%
AMBIENT TEMPERATURE 34°C
WIND DIRECTION WSW
WEATHER CONDITION Clear Sky

SL.NO	PARAMETERS	METHODS	UNITS	RESULTS	NAAQS*
1	PARTICULATE MATTER (PM ₁₀)	CTL/SOP/ATR/03 - 2014	µg/m ³	22.5	60
2	PARTICULATE MATTER (PM _{2.5})	IS 5182 Part 23 - 2006	µg/m ³	53.8	100
3	SULPHUR DIOXIDE (SO ₂)	IS 5182 Part 2 - 2001	µg/m ³	9.8	80
4	OXIDES OF NITROGEN (NO _x)	IS 5182 Part 6 - 2006	µg/m ³	18.3	80
5	OZONE (O ₃)	CTL/SOP/AIR/08 - 2014	µg/m ³	11.8	180
6	LEAD (Pb)	IS 5182 PART 22 - 2004	µg/m ³	BDL (D.L - 0.1)	1
7	CARBON MONOXIDE (CO)	CTL/SOP/AM/23 - 2014	ng/m ³	BDL (D.L - 1.15)	4
8	AMMONIA (NH ₃)	CTL/SOP/AB/07- 2014 (INDROMENOL METHOD)	µg/m ³	27.8	400
9	ARSENIC (As)	CTL/SOP/AM/06 - 2014	ng/m ³	BDL (D.L - 1.0)	8
10	NICKEL (Ni)	CTL/SOP/AM/06 - 2014	ng/m ³	BDL (D.L - 5.0)	20
11	BENZENE (C ₆ H ₆)	IS 5182 PART 11 - 2006	µg/m ³	BDL (D.L - 1.0)	5
12	BENZO(a)PYRENE	IS 5182 PART 12 - 2004	ng/m ³	BDL (D.L - 0.5)	1

*National Ambient Air Quality Standards - CPCB
BDL - Below Detection Limit(D.L - Detection Limit)

END OF REPORT

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TEST REPORT

Report Number and date	CTL/CH/N-5643/2017-18 & 10.10.2017		
Sample Number	N-5643/17-18		
Customer Name & Address	M/s. Tamil Nadu Pollution Control Board, 76, Mount Selay, Guindy, Chennai - 600 032.		
Project At	Cuddalore - Sipcot Complex		
SAMPLE DETAILS			
Sample Description	Ambient Air Quality		
GPS Reading	11°40' 24.41" N 079° 44' 59.71" E		
Sampling Location	Center of Sipcot Phase I&II - Top of the Sipcot Office		
Sampling Date & Time	28.09.2017 & 09.10 to 29.09.2017 & 09.30		
Sampled By	Chennai Testing Laboratory Pvt. Ltd.	Sampling Method	IS 5182 (Part V) and (Part XIV)
Date of Receipt	30.09.2017	Sample Condition	Good
Analysis Starting Date	30.09.2017	Analysis Completion Date	09.10.2017

ENVIRONMENTAL CONDITION:

RELATIVE HUMIDITY: 53%
 AMBIENT TEMPERATURE: 32°C
 WIND DIRECTION: W
 WEATHER CONDITION: Clear Sky

SL.NO	PARAMETERS	METHODS	UNITS	RESULTS	NAAQS*
1	PARTICULATE MATTER (PM ₁₀)	CTL/SOP/AIR/03 - 2014	µg/m ³	30.4	60
2	PARTICULATE MATTER (PM _{2.5})	IS 5182 Part 23 - 2006	µg/m ³	61.2	100
3	SULPHUR DIOXIDE (SO ₂)	IS 5182 Part 2 - 2001	µg/m ³	13.6	80
4	OXIDES OF NITROGEN (NO ₂)	IS 5182 Part 6 - 2006	µg/m ³	22.3	80
5	OZONE (O ₃)	CTL/SOP/AIR/08 - 2014	µg/m ³	15.8	180
6	LEAD (Pb)	IS 5182 PART 22 - 2004	µg/m ³	BDL (D.L - 0.1)	1
7	CARBON MONOXIDE (CO)	CTL/SOP/AIR/23 - 2014	mg/m ³	BDL (D.L - 1.15)	4
8	AMMONIA (NH ₃)	CTL/SOP/AIR/07- 2014 (INDOPHENOL METHOD)	µg/m ³	21.5	400
9	ARSENIC (As)	CTL/SOP/AIR/06 - 2014	ng/m ³	BDL (D.L - 1.0)	5
10	NICKEL (Ni)	CTL/SOP/AIR/06 - 2014	ng/m ³	BDL (D.L - 5.0)	20
11	BENZENE (C ₆ H ₆)	IS 5182 PART 11 - 2006	µg/m ³	BDL (D.L - 1.0)	5
12	BENZO(a)PYRENE	IS 5182 PART 12 - 2004	ng/m ³	BDL (D.L - 0.5)	1

*National Ambient Air Quality Standards - CPCB
 BDL - Below Detection Limit(D.L - Detection Limit)

END OF REPORT

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TEST REPORT

Report Number and date	CTL/CH/N-5647/2017-18 & 10.10.2017		
Sample Number	N-5647/17-18		
Customer Name & Address	M/s. Tamil Nadu Pollution Control Board, 76, Mount Salai, Guindy, Chennai - 600 032.		
Project At	Cuddalore - Sipcot Complex		
SAMPLE DETAILS			
Sample Description	Ambient Air Quality		
GPS Reading	11°40' 24.41" N 075° 44' 59.71"E		
Sampling Location	Center of Sipcot Phase 1&II - Top of the Sipcot Office		
Sampling Date & Time	30.09.2017 & 10.10 to 03.10.2017 & 10.10		
Sampled By	Chennai Testing Laboratory Pvt. Ltd.	Sampling Method	IS 5182 (Part V) and (Part XIV)
Date of Receipt	01.10.2017	Sample Condition	Good
Analysis Starting Date	03.10.2017	Analysis Completion Date	09.10.2017

ENVIRONMENTAL CONDITION:

RELATIVE HUMIDITY	62%
AMBIENT TEMPERATURE	32°C
WIND DIRECTION	SW
WEATHER CONDITION	Clear Sky

SL.NO	PARAMETERS	METHODS	UNITS	RESULTS	NAAQS*
1	PARTICULATE MATTER (PM ₁₀)	CTL/SOP/AIR/03 - 2014	µg/m ³	28.3	60
2	PARTICULATE MATTER (PM _{2.5})	IS 5182 Part 23 - 2006	µg/m ³	60.8	100
3	SULPHUR DIOXIDE (SO ₂)	IS 5182 Part 2 - 2001	µg/m ³	11.7	80
4	OXIDES OF NITROGEN (NO _x)	IS 5182 Part 6 - 2006	µg/m ³	19.7	80
5	OZONE (O ₃)	CTL/SOP/AIR/08 - 2014	µg/m ³	13.9	180
6	LEAD (Pb)	IS 5182 PART 22 - 2004	µg/m ³	BDL (D.L - 0.1)	1
7	CARBON MONOXIDE (CO)	CTL/SOP/AIR/23 - 2014	mg/m ³	BDL (D.L - 1.1E)	4
8	AMMONIA (NH ₃)	CTL/SOP/AIR/07- 2014 (INDOPHENOL METHOD)	µg/m ³	36.3	400
9	ARSENIC (As)	CTL/SOP/AIR/06 - 2014	ng/m ³	BDL (D.L - 1.0)	5
10	NICKEL (Ni)	CTL/SOP/AIR/06 - 2014	ng/m ³	BDL (D.L - 5.0)	20
11	BENZENE (C ₆ H ₆)	IS 5182 PART 11 - 2006	µg/m ³	BDL (D.L - 1.0)	5
12	BENZO(a)PYRENE	IS 5182 PART 12 - 2004	ng/m ³	BDL (D.L - 0.5)	1

*National Ambient Air Quality Standards - CPCB
BDL - Below Detection Limit (D.L - Detection Limit)

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TEST REPORT

Report Number and date	CTL/CH/N-5640/2017-18 & 10.10.2017		
Sample Number	N-5640/17-18		
Customer Name & Address	M/s. Tamil Nadu Pollution Control Board, 76, Mount Sale, Guindy, Chennai - 600 032.		
Project At	Cuddalore -Sipcot Complex		
SAMPLE DETAILS			
Sample Description	Ambient Air Quality		
GPS Reading	11°39' 05.96" N 079° 44' 09.10"E		
Sampling Location	South Side of Sipcot Phase 1&II - Semmankuppam Village		
Sampling Date & Time	26.09.2017 & 10.50 to 27.09.2017 & 10.50		
Sampled By	Chennai Testing Laboratory Pvt. Ltd.	Sampling Method	IS 1132 (Part V) and (Part XIV)
Date of Receipt	28.09.2017	Sample Condition	Good
Analysis Starting Date	28.09.2017	Analysis Completion Date	09.10.2017

ENVIRONMENTAL CONDITION:

RELATIVE HUMIDITY	56%
AMBIENT TEMPERATURE	34°C
WIND DIRECTION	WSW
WEATHER CONDITION	Clear Sky

SL.NO	PARAMETERS	METHODS	UNITS	RESULTS	NAAQS*
1	PARTICULATE MATTER (PM ₁₀)	CTL/SOP/AIR/03 - 2014	µg/m ³	21.6	60
2	PARTICULATE MATTER (PM _{2.5})	IS 5182 Part 23 - 2006	µg/m ³	48.1	100
3	SULPHUR DIOXIDE (SO ₂)	IS 5182 Part 2 - 2001	µg/m ³	12.5	80
4	OXIDES OF NITROGEN (NO _x)	IS 5182 Part 6 - 2006	µg/m ³	23.0	80
5	OZONE (O ₃)	CTL/SOP/AIR/08 - 2014	µg/m ³	25.8	180
6	LEAD (Pb)	IS 5182 PART 22 - 2004	µg/m ³	BDL (D.L -0.1)	1
7	CARBON MONOXIDE (CO)	CTL/SOP/AIR/23 - 2014	ng/m ³	BDL (D.L -1.15)	4
8	AMMONIA (NH ₃)	CTL/SOP/AIR/07- 2014 (INDUSTRINDL METHOD)	µg/m ³	21.5	400
9	ARSENIC (As)	CTL/SOP/AIR/04 - 2014	ng/m ³	BDL (D.L -1.0)	6
10	NICKEL (Ni)	CTL/SOP/AIR/06 - 2014	ng/m ³	BDL (D.L - 5.0)	20
11	BENZENE (C ₆ H ₆)	IS 5182 PART 11 - 2006	µg/m ³	BDL (D.L - 1.0)	5
12	BENZO(a)PYRENE	IS 5182 PART 13 - 2004	ng/m ³	BDL (D.L - 0.5)	1

*National Ambient Air Quality Standards - CPCB
BDL - Below Detection Limit(D.L - Detection Limit)

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TEST REPORT

Report Number and date	CTL/CH/N-5644/2017-16 & 10.10.2017		
Sample Number	N-5644/17-10		
Customer Name & Address	M/s. Tamil Nadu Pollution Control Board, 76, Mount Salai, Guindy, Chennai - 600 032.		
Project At	Cuddalore - Sipcot Complex		
SAMPLE DETAILS			
Sample Description	Ambient Air Quality		
GPS Reading	11°39' 05.96" N 079° 44' 09.10" E		
Sampling Location	South Side of Sipcot Phase 1&11 - Semmankuppam Village		
Sampling Date & Time	28.09.2017 & 10.00 to 29.09.2017 & 10.00		
Sampled By	Chennai Testing Laboratory Pvt. Ltd.	Sampling Method	IS 1182 (Part V) and (Part XIV)
Date of Receipt	30.09.2017	Sample Condition	Good
Analysis Starting Date	30.09.2017	Analysis Completion Date	09.10.2017

ENVIRONMENTAL CONDITION:

RELATIVE HUMIDITY 58%
 AMBIENT TEMPERATURE 32°C
 WIND DIRECTION W
 WEATHER CONDITION Clear Sky

SL.NO	PARAMETERS	METHODS	UNITS	RESULTS	NAAQS*
1	PARTICULATE MATTER (PM ₁₀)	CTL/SOP/ADR/03 - 2014	µg/m ³	31.0	80
2	PARTICULATE MATTER (PM _{2.5})	IS 5182 Part 22 - 2006	µg/m ³	63.8	100
3	SULPHUR DIOXIDE (SO ₂)	IS 5182 Part 2 - 2001	µg/m ³	7.4	80
4	OXIDES OF NITROGEN (NO _x)	IS 5182 Part 6 - 2006	µg/m ³	21.1	80
5	OZONE (O ₃)	CTL/SOP/ADR/08 - 2014	µg/m ³	20.5	180
6	LEAD (Pb)	IS 5182 PART 22 - 2004	µg/m ³	BDL (D.L - 0.1)	1
7	CARBON MONOXIDE (CO)	CTL/SOP/AIR/23 - 2014	mg/m ³	BDL (D.L - 1.15)	4
8	AMMONIA (NH ₃)	CTL/SOP/AIR/07 - 2014 (INDOPHENOL METHOD)	µg/m ³	22.6	400
9	ARSENIC (As)	CTL/SOP/AIR/06 - 2014	ng/m ³	BDL (D.L - 1.0)	6
10	NICKEL (Ni)	CTL/SOP/AIR/06 - 2014	ng/m ³	6.4	20
11	BENZENE (C ₆ H ₆)	IS 5182 PART 11 - 2006	µg/m ³	BDL (D.L - 1.0)	5
12	BENZO(a)PYRENE	IS 5182 PART 12 - 2004	ng/m ³	BDL (D.L - 0.5)	1

*National Ambient Air Quality Standards - CPCB
 BDL - Below Detection Limit(D.L - Detection Limit)

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TEST REPORT

Report Number and date	CTL/CH/N-5648/2017-18 & 10.10.2017		
Sample Number	N-5648/17-18		
Customer Name & Address	M/s. Tamil Nadu Pollution Control Board, 76, Mount Salai, Gandy, Chennai - 600 032.		
Project At	Cuddalore -Sipcot Complex		
SAMPLE DETAILS			
Sample Description	Ambient Air Quality		
GPS Reading	11°39' 05.96" N 079° 44' 09.10"E		
Sampling Location	South Side of Sipcot Phase I&II - Semmankuppam Village		
Sampling Date & Time	30.09.2017 & 10.30 to 01.10.2017 & 10.30		
Sampled By	Chennai Testing Laboratory Pvt. Ltd.	Sampling Method	IS 5182 (Part V) and (Part XIV)
Date of Receipt	01.10.2017	Sample Condition	Good
Analysis Starting Date	03.10.2017	Analysis Completion Date	09.10.2017

ENVIRONMENTAL CONDITION:

RELATIVE HUMIDITY	62%
AMBIENT TEMPERATURE	32°C
WIND DIRECTION	SW
WEATHER CONDITION	Clear Sky

SL.NO	PARAMETERS	METHODS	UNITS	RESULTS	NAAQS*
1	PARTICULATE MATTER (PM ₁₀)	CTL/SOP/AIR/01 - 2014	µg/m ³	34.0	60
2	PARTICULATE MATTER (PM _{2.5})	IS 5182 Part 23 - 2006	µg/m ³	53.8	100
3	SULPHUR DIOXIDE (SO ₂)	IS 5182 Part 2 - 2001	µg/m ³	9.7	80
4	OXIDES OF NITROGEN (NO _x)	IS 5182 Part 6 - 2006	µg/m ³	18.5	80
5	OZONE (O ₃)	CTL/SOP/AIR/06 - 2014	µg/m ³	16.2	180
6	LEAD (Pb)	IS 5182 PART 22 - 2004	µg/m ³	BDL (D.L - 0.1)	1
7	CARBON MONOXIDE (CO)	CTL/SOP/AIR/23 - 2014	mg/m ³	BDL (D.L - 1.15)	4
8	AMMONIA (NH ₃)	CTL/SOP/AIR/07- 2014 (INDOPHENOL METHOD)	µg/m ³	29.9	400
9	ARSENIC (As)	CTL/SOP/AIR/06 - 2014	ng/m ³	BDL (D.L - 1.0)	5
10	NICKEL (Ni)	CTL/SOP/AIR/06 - 2014	ng/m ³	9.2	20
11	BENZENE (C ₆ H ₆)	IS 5182 PART 11 - 2006	µg/m ³	BDL (D.L - 1.0)	5
12	BENZO(a)PYRENE	IS 5182 PART 12 - 2004	ng/m ³	BDL (D.L - 0.5)	1

*National Ambient Air Quality Standards - CPCB
BDL - Below Detection Limit(D.L - Detection Limit)

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For Chennai Testing Laboratory Pvt Ltd

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TEST REPORT

Report Number and date	CTL/CH/N-5641/2017-18 & 10.10.2017		
Sample Number	N-5641/17-18		
Customer Name & Address	M/s. Tamil Nadu Pollution Control Board, 76, Mount Sale, Guindy, Chennai - 600 032.		
Project At	Cuddalore - Sipcot Complex		
SAMPLE DETAILS			
Sample Description	Ambient Air Quality		
GPS Reading	11°40' 40.34" N 079° 44' 53.48" E		
Sampling Location	West Side of Sipcot Phase I&II - Karakadu Village		
Sampling Date & Time	26.09.2017 & 11.20 to 27.09.2017 & 11.20		
Sampled By	Chennai Testing Laboratory Pvt. Ltd.	Sampling Method	IS 5182 (Part V) and (Part XIV)
Date of Receipt	28.09.2017	Sample Condition	Good
Analysis Starting Date	28.09.2017	Analysis Completion Date	09.10.2017

ENVIRONMENTAL CONDITION:

RELATIVE HUMIDITY	56%
AMBIENT TEMPERATURE	34°C
WIND DIRECTION	WSW
WEATHER CONDITION	Clear Sky

SL.NO	PARAMETERS	METHODS	UNITS	RESULTS	NAAQS*
1	PARTICULATE MATTER (PM ₁₀)	CTL/SOP/AIR/01 - 2014	µg/m ³	22.3	80
2	PARTICULATE MATTER (PM _{2.5})	IS 5182 Part 23 - 2006	µg/m ³	59.6	100
3	SULPHUR DIOXIDE (SO ₂)	IS 5182 Part 2 - 2001	µg/m ³	3.5	80
4	OXIDES OF NITROGEN (NO _x)	IS 5182 Part 6 - 2006	µg/m ³	11.2	80
5	OZONE (O ₃)	CTL/SOP/AIR/08 - 2014	µg/m ³	19.2	100
6	LEAD (Pb)	IS 5182 PART 23 - 2006	µg/m ³	BDL (D.L - 0.1)	1
7	CARBON MONOXIDE (CO)	CTL/SOP/AIR/23 - 2014	ng/m ³	BDL (D.L - 1.15)	4
8	AMMONIA (NH ₃)	CTL/SOP/AIR/07- 2014 (INDORHENOL METHOD)	µg/m ³	37.7	400
9	ARSENIC (As)	CTL/SOP/AIR/06 - 2014	ng/m ³	BDL (D.L - 1.0)	6
10	NICKEL (Ni)	CTL/SOP/AIR/06 - 2014	ng/m ³	5.5	30
11	BENZENE (C ₆ H ₆)	IS 5182 PART 11 - 2006	µg/m ³	BDL (D.L - 1.0)	3
12	BENZO(a)PYRENE	IS 5182 PART 12 - 2004	ng/m ³	BDL (D.L - 0.5)	1

*National Ambient Air Quality Standards - CPCB
BDL - Below Detection Limit (D.L - Detection Limit)

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TEST REPORT

Report Number and date	CTL/CH/N-5645/2017-18 & 10.10.2017		
Sample Number	N-5645/17-18		
Customer Name & Address	M/s. Tamil Nadu Pollution Control Board, 76, Mount Salai, Guindy, Chennai - 600 032.		
Project At	Cuddalore -Sipcot Complex		
SAMPLE DETAILS			
Sample Description	Ambient Air Quality		
GPS Reading	11°40' 40.38" N 079° 44' 53.48"E		
Sampling Location	West Side of Sipcot Phase I&II - Karakadu Village		
Sampling Date & Time	28.09.2017 & 10.40 to 29.09.2017 & 10.40		
Sampled By	Chennai Testing Laboratory Pvt. Ltd.	Sampling Method	IS 5182 (Part V) and (Part XIV)
Date of Receipt	30.09.2017	Sample Condition	Good.
Analysis Starting Date	30.09.2017	Analysis Completion Date	09.10.2017

ENVIRONMENTAL CONDITION:

RELATIVE HUMIDITY	58%
AMBIENT TEMPERATURE	33°C
WIND DIRECTION	W
WEATHER CONDITION	Clear Sky

SL.NO	PARAMETERS	METHODS	UNITS	RESULTS	NAAQS*
1	PARTICULATE MATTER (PM ₁₀)	CTL/SOR/AIR/01 - 2014	µg/m ³	21.8	80
2	PARTICULATE MATTER (PM _{2.5})	IS 5182 Part 23 - 2006	µg/m ³	52.4	100
3	SULPHUR DIOXIDE (SO ₂)	IS 5182 Part 7 - 2001	µg/m ³	8.6	80
4	OXIDES OF NITROGEN (NO _x)	IS 5182 Part 6 - 2006	µg/m ³	15.7	80
5	OZONE (O ₃)	CTL/SOR/AIR/08 - 2014	µg/m ³	8.6	180
6	LEAD (Pb)	IS 5182 PART 22 - 2004	µg/m ³	BDL (D.L -0.1)	1
7	CARBON MONOXIDE (CO)	CTL/SOR/AIR/23 - 2014	mg/m ³	BDL (D.L -1.15)	4
8	AMMONIA (NH ₃)	CTL/SOR/AIR/07- 2014 (INDOPHENOL METHOD)	µg/m ³	24.1	400
9	ARSENIC (As)	CTL/SOR/AIR/06 - 2014	ng/m ³	BDL (D.L -1.0)	6
10	NICKEL (Ni)	CTL/SOR/AIR/06 - 2014	ng/m ³	7.0	20
11	BENZENE (C ₆ H ₆)	IS 5182 PART 11 - 2006	µg/m ³	BDL (D.L - 1.0)	3
12	BENZO(a)PYRENE	IS 5182 PART 12 - 2004	ng/m ³	BDL (D.L - 0.5)	1

*National Ambient Air Quality Standards - CPCB
BDL - Below Detection Limit(D.L - Detection Limit)

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TEST REPORT

Report Number and date	CTL/CH/N-5649/2017-18 & 10.10.2017		
Sample Number	N-5649/17-18		
Customer Name & Address	M/s. Tamil Nadu Pollution Control Board, 76, Mount Salai, Guindy, Chennai - 600 032.		
Project At	Cuddalore - Sipcot Complex		
SAMPLE DETAILS			
Sample Description	Ambient Air Quality		
GPS Reading	11°40' 40.34" N 82°5' 44' 53.48"E		
Sampling Location	West Side of Sipcot Phase I&II - Karaikadu Village		
Sampling Date & Time	30.09.2017 & 11.00 to 01.10.2017 & 11.00		
Sampled By	Chennai Testing Laboratory Pvt. Ltd.	Sampling Method	IS 5182 (Part V) and (Part XIV)
Date of Receipt	01.10.2017	Sample Condition	Good
Analysis Starting Date	03.10.2017	Analysis Completion Date	09.10.2017

ENVIRONMENTAL CONDITION:

RELATIVE HUMIDITY	62%
AMBIENT TEMPERATURE	32°C
WIND DIRECTION	SW
WEATHER CONDITION	Clear Sky

SL.NO	PARAMETERS	METHODS	UNITS	RESULTS	NAAQS*
1	PARTICULATE MATTER (PM ₁₀)	CTL/SOP/AIR/03 - 2014	µg/m ³	20.5	60
2	PARTICULATE MATTER (PM _{2.5})	IS 5182 Part 23 - 2006	µg/m ³	49.5	100
3	SULPHUR DIOXIDE (SO ₂)	IS 5182 Part 2 - 2001	µg/m ³	4.3	80
4	OXIDES OF NITROGEN (NO _x)	IS 5182 Part 6 - 2006	µg/m ³	12.4	80
5	OZONE (O ₃)	CTL/SOP/AIR/08 - 2014	µg/m ³	12.5	180
6	LEAD (Pb)	IS 5182 PART 22 - 2004	µg/m ³	BDL (D.L - 0.1)	1
7	CARBON MONOXIDE (CO)	CTL/SOP/ADR/23 - 2014	mg/m ³	BDL (D.L - 1.15)	4
8	AMMONIA (NH ₃)	CTL/SOP/ADR/07- 2014 (INDOPHENOL METHOD)	µg/m ³	22.2	400
9	ARSENIC (As)	CTL/SOP/ADR/06 - 2014	ng/m ³	BDL (D.L - 1.0)	6
10	NICKEL (Ni)	CTL/SOP/ADR/06 - 2014	ng/m ³	BDL (D.L - 5.0)	20
11	BENZENE (C ₆ H ₆)	IS 5182 PART 11 - 2006	µg/m ³	BDL (D.L - 1.0)	5
12	BENZO(a)PYRENE	IS 5182 PART 17 - 2004	ng/m ³	BDL (D.L - 0.5)	1

*National Ambient Air Quality Standards - CPCB
BDL - Below Detection Limit(D.L - Detection Limit)

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TEST REPORT

Report Number and date	CTL/CH/N-5642/2017-18 & 10.10.2017		
Sample Number	N-5642/17-18		
Customer Name & Address	M/s. Tamil Nadu Pollution Control Board, 76, Mount Salai, Guindy, Chennai - 600 032.		
Project At	Cuddalore - Sipcot Complex		
SAMPLE DETAILS			
Sample Description	Ambient Air Quality		
GPS Reading	11°41' 43.00" N 079° 44' 39.92"E		
Sampling Location	North Side of Sipcot Phase I&II - Speeded Udyog Ltd		
Sampling Date & Time	26.09.2017 @ 11.35 to 27.09.2017 @ 11.35		
Sampled By	Chennai Testing Laboratory Pvt. Ltd.	Sampling Method	IS 5182 (Part V) and (Part XIV)
Date of Receipt	20.09.2017	Sample Condition	Good
Analysis Starting Date	20.09.2017	Analysis Completion Date	09.10.2017

ENVIRONMENTAL CONDITION:

RELATIVE HUMIDITY: 56%
 AMBIENT TEMPERATURE: 34°C
 WIND DIRECTION: WSW
 WEATHER CONDITION: Clear Sky

SL.NO	PARAMETERS	METHODS	UNITS	RESULTS	NAAQS*
1	PARTICULATE MATTER (PM ₁₀)	CTL/SOP/AIR/03 - 2014	µg/m ³	25.8	60
2	PARTICULATE MATTER (PM _{2.5})	IS 5182 Part 23 - 2006	µg/m ³	56.6	100
3	SULPHUR DIOXIDE (SO ₂)	IS 5182 Part 2 - 2001	µg/m ³	10.5	60
4	OXIDES OF NITROGEN (NO _x)	IS 5182 Part 6 - 2006	µg/m ³	21.8	60
5	OZONE (O ₃)	CTL/SOP/AIR/08 - 2014	µg/m ³	13.2	180
6	LEAD (Pb)	IS 5182 PART 22 - 2004	µg/m ³	BDL (D.L - 0.1)	1
7	CARBON MONOXIDE (CO)	CTL/SOP/AIR/21 - 2014	ng/m ³	BDL (D.L - 1.15)	4
8	AMMONIA (NH ₃)	CTL/SOP/AIR/07 - 2014 (INDOPHENOL METHOD)	µg/m ³	34.4	400
9	ARSENIC (As)	CTL/SOP/AIR/06 - 2014	ng/m ³	BDL (D.L - 1.0)	6
10	NICKEL (Ni)	CTL/SOP/AIR/06 - 2014	ng/m ³	6.3	20
11	BENZENE (C ₆ H ₆)	IS 5182 PART 11 - 2006	µg/m ³	BDL (D.L - 1.0)	5
12	BENZO(a)PYRENE	IS 5182 PART 12 - 2004	ng/m ³	BDL (D.L - 0.5)	1

*National Ambient Air Quality Standards - CPCB
 BDL - Below Detection Limit(D.L - Detection Limit)

END OF REPORT

For Chennai Testing Laboratory Pvt Ltd

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TEST REPORT

Report Number and date	CTL/CH/N-5646/2017-18 & 10.10.2017		
Sample Number	N-5646/17-18		
Customer Name & Address	M/s. Tamil Nadu Pollution Control Board, 78, Mount Salai, Gundy, Chennai - 600 032.		
Project At	Cuddalore -Sipcot Complex		
SAMPLE DETAILS			
Sample Description	Ambient Air Quality		
GPS Reading	11°41' 43.00" N 87°5' 44' 39.92"E		
Sampling Location	North Side of Sipcot Phase I&II - Spended Udyog Ltd		
Sampling Date & Time	28.09.2017 & 11.00 to 29.09.2017 & 11.00		
Sampled By	Chennai Testing Laboratory Pvt. Ltd.	Sampling Method	IS 5182 (Part V) and (Part XIV)
Date of Receipt	30.09.2017	Sample Condition	Good
Analysis Starting Date	30.09.2017	Analysis Completion Date	09.10.2017

ENVIRONMENTAL CONDITION:

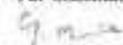
RELATIVE HUMIDITY 58%
AMBIENT TEMPERATURE 32°C
WIND DIRECTION W
WEATHER CONDITION Clear Sky

SL_NO	PARAMETERS	METHODS	UNITS	RESULTS	NAAQS*
1	PARTICULATE MATTER (PM ₁₀)	CTL/SOP/AIR/03 - 2014	µg/m ³	32.5	60
2	PARTICULATE MATTER (PM _{2.5})	IS 5182 Part 23 - 2006	µg/m ³	60.6	100
3	SULPHUR DIOXIDE (SO ₂)	IS 5182 Part 2 - 2001	µg/m ³	6.4	80
4	DIOXIDES OF NITROGEN (NO ₂)	IS 5182 Part 6 - 2006	µg/m ³	15.7	80
5	OZONE (O ₃)	CTL/SOP/AIR/08 - 2014	µg/m ³	16.0	190
6	LEAD (Pb)	IS 5182 PART 22 - 2004	µg/m ³	BDL (D.L - 0.1)	1
7	CARBON MONOXIDE (CO)	CTL/SOP/AIR/23 - 2014	mg/m ³	BDL (D.L - 1.15)	4
8	AMMONIA (NH ₃)	CTL/SOP/AIR/07 - 2014 (ENDORHEMOL METHOD)	µg/m ³	14.1	400
9	ARSENIC (As)	CTL/SOP/AIR/06 - 2014	ng/m ³	BDL (D.L - 1.0)	5
10	NICKEL (Ni)	CTL/SOP/AIR/06 - 2014	ng/m ³	8.2	20
11	BENZENE (C ₆ H ₆)	IS 5182 PART 11 - 2006	µg/m ³	BDL (D.L - 1.0)	1
12	BENZO(a)PYRENE	IS 5182 PART 12 - 2004	ng/m ³	BDL (D.L - 0.5)	1

*National Ambient Air Quality Standards - CPCB
BDL - Below Detection Limit(D.L - Detection Limit)

END OF REPORT

For Chennai Testing Laboratory Pvt Ltd


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TEST REPORT

Report Number and date	CTL/CH/N-5650/2017-18 & 10.10.2017		
Sample Number	N-5650/17-18		
Customer Name & Address	M/s. Tamil Nadu Pollution Control Board, 76, Mount Salai, Gundy, Chennai - 600 032.		
Project At	Cuddalore -Sipcot Complex		
SAMPLE DETAILS			
Sample Description	Ambient Air Quality		
GPS Reading	11°41' 43.00" N 079° 44' 39.92"E		
Sampling Location	North Side of Sipcot Phase I&II - Spended Udyog Ltd		
Sampling Date & Time	30.09.2017 & 11.30 to 01.10.2017 & 11.30		
Sampled By	Chennai Testing Laboratory Pvt. Ltd.	Sampling Method	IS 5182 (Part V) and (Part XIV)
Date of Receipt	01.10.2017	Sample Condition	Good
Analysis Starting Date	01.10.2017	Analysis Completion Date	09.10.2017

ENVIRONMENTAL CONDITION:

RELATIVE HUMIDITY	62%
AMBIENT TEMPERATURE	32°C
WIND DIRECTION	SW
WEATHER CONDITION	Clear Sky

SL.NO	PARAMETERS	METHODS	UNITS	RESULTS	NAAQS*
1	PARTICULATE MATTER (PM ₁₀)	CTL/SOP/ADR/03 - 2014	µg/m ³	24.4	60
2	PARTICULATE MATTER (PM _{2.5})	IS 5182 Part 21 - 2006	µg/m ³	33.8	100
3	SULPHUR DIOXIDE (SO ₂)	IS 5182 Part 2 - 2001	µg/m ³	8.2	80
4	OXIDES OF NITROGEN (NO _x)	IS 5182 Part 6 - 2006	µg/m ³	17.3	80
5	OZONE (O ₃)	CTL/SOP/ADR/08 - 2014	µg/m ³	18.9	180
6	LEAD (Pb)	IS 5182 PART 22 - 2004	µg/m ³	BDL (D.L -0.1)	1
7	CARBON MONOXIDE (CO)	CTL/SOP/ADR/23 - 2014	ng/m ³	BDL (D.L -1.15)	4
8	AMMONIA (NH ₃)	CTL/SOP/ADR/07- 2014 (INDOPHENOL METHOD)	µg/m ³	21.5	400
9	ARSENIC (As)	CTL/SOP/ADR/06 - 2014	ng/m ³	BDL (D.L -1.0)	6
10	NICKEL (Ni)	CTL/SOP/ADR/06 - 2014	ng/m ³	BDL (D.L - 5.0)	20
11	BENZENE (C ₆ H ₆)	IS 5182 PART 11 - 2006	µg/m ³	BDL (D.L - 1.0)	5
12	BENZO(a)PYRENE	IS 5182 PART 12 - 2004	ng/m ³	BDL (D.L - 0.5)	1

*National Ambient Air Quality Standards - CPCB
BDL - Below Detection Limit(D.L - Detection Limit)

END OF REPORT

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Ambient Air Quality Result - Coimbatore



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TEST REPORT

Report Number and date	CTL/CH/N-5102/2017-18 & 30.09.2017		
Sample Number	N-5102/17-18		
Customer Name & Address	M/s. Tamil Nadu Pollution Control Board, 76, Mount Sale, Guindy, Chennai - 600 032.		
Project At	Coimbatore - Kurichi		
SAMPLE DETAILS			
Sample Description	Ambient Air Quality		
GPS Reading	10°56' 01.55" N 076° 56' 31.48"E		
Sampling Location	M/s. INDO SHELL MOULD LIMITED UNIT -II - Near Shell Moulding Area		
Sampling Date & Time	15.09.2017 & 10.30 to 16.09.2017 & 10.30		
Sampled By	Chennai Testing Laboratory Pvt. Ltd.	Sampling Method	IS 5182 (Part V) and (Part XIV)
Date of Receipt	17.09.2017	Sample Condition	Good
Analysis Starting Date	18.09.2017	Analysis Completion Date	20.09.2017

ENVIRONMENTAL CONDITION:

RELATIVE HUMIDITY 84%
AMBIENT TEMPERATURE 32°C
WIND DIRECTION WSW
WEATHER CONDITION Clear Sky

SL.NO	PARAMETERS	METHODS	UNITS	RESULTS	NAAQIS*
1	PARTICULATE MATTER (PM ₁₀)	CTL/SOP/AIR/03 - 2014	µg/m ³	34.2	80
2	PARTICULATE MATTER (PM _{2.5})	IS 5182 Part 23 - 2006	µg/m ³	74.8	100
3	SULPHUR DIOXIDE (SO ₂)	IS 5182 Part 2 - 2006	µg/m ³	13.8	80
4	OXIDES OF NITROGEN (NO _x)	IS 5182 Part 6 - 2006	µg/m ³	23.7	80
5	OZONE (O ₃)	CTL/SOP/AIR/08 - 2014	µg/m ³	16.2	100
6	LEAD (Pb)	IS 5182 PART 22 - 2004	µg/m ³	BDL (D.L - 0.1)	1
7	CARBON MONOXIDE (CO)	CTL/SOP/AIR/23 - 2014	mg/m ³	BDL (D.L - 1.15)	4
8	AMMONIA (NH ₃)	CTL/SOP/AIR/07- 2014 (INDOPHENOL METHOD)	µg/m ³	26.3	400
9	ARSENIC (As)	CTL/SOP/AIR/06 - 2014	ng/m ³	BDL (D.L - 1.0)	6
10	NICKEL (Ni)	CTL/SOP/AIR/09 - 2014	ng/m ³	3.6	20
11	BENZENE (C ₆ H ₆)	IS 5182 PART 11 - 2006	µg/m ³	BDL (D.L - 1.8)	5
12	BENZO(a)PYRENE	IS 5182 PART 12 - 2004	ng/m ³	BDL (D.L - 0.5)	1

*National Ambient Air Quality Standards - CPCB
BDL - Below Detection Limit(D.L - Detection Limit)

END OF REPORT

For Chennai Testing Laboratory Pvt Ltd

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Chennai - 600 032 | Tamil Nadu | India | Telefax : +91-44-2250 1757



TEST REPORT

Report Number and date	CTL/CH/N-5103/2017-18 & 30.09.2017		
Sample Number	N-5103/17-18		
Customer Name & Address	M/s. Tamil Nadu Pollution Control Board, 76, Mount Salai, Guindy, Chennai - 600 032.		
Project At	Coimbatore - Kurichi		
SAMPLE DETAILS			
Sample Description	Ambient Air Quality		
GPS Reading	10°56' 01.99" N 076° 58' 31.48" E		
Sampling Location	M/s. INDO SHELL MOULD LIMITED UNIT -II - Near Shell Moulding Area		
Sampling Date & Time	17.09.2017 & 10.45 to 18.09.2017 & 10.45		
Sampled By	Chennai Testing Laboratory Pvt. Ltd.	Sampling Method	IS 5182 (Part V) and (Part XIV)
Date of Receipt	19.09.2017	Sample Condition	Good
Analysis Starting Date	19.09.2017	Analysis Completion Date	20.09.2017

ENVIRONMENTAL CONDITION:

RELATIVE HUMIDITY 68%
AMBIENT TEMPERATURE 31°C
WIND DIRECTION SW
WEATHER CONDITION Partly Cloudy

SL.NO	PARAMETERS	METHODS	UNITS	RESULTS	NAAQS*
1	PARTICULATE MATTER (PM ₁₀)	CTL/SOP/AIR/03 - 2014	µg/m ³	42.2	60
2	PARTICULATE MATTER (PM _{2.5})	IS 5182 Part 23 - 2006	µg/m ³	83.6	100
3	SULPHUR DIOXIDE (SO ₂)	IS 5182 Part 2 - 2001	µg/m ³	17.3	80
4	OXIDES OF NITROGEN (NO _x)	IS 5182 Part 6 - 2006	µg/m ³	26.3	80
5	OZONE (O ₃)	CTL/SOP/AIR/08 - 2014	µg/m ³	20.5	180
6	LEAD (Pb)	IS 5182 PART 22 - 2004	µg/m ³	BDL (D.L - 0.1)	1
7	CARBON MONOXIDE (CO)	CTL/SOP/AIR/23 - 2014	mg/m ³	BDL (D.L - 1.15)	4
8	AMMONIA (NH ₃)	CTL/SOP/AIR/07 - 2014 (INDOPHENOL METHOD)	µg/m ³	27.0	400
9	ARSENIC (As)	CTL/SOP/AIR/06 - 2014	mg/m ³	BDL (D.L - 1.0)	6
10	NICKEL (Ni)	CTL/SOP/AIR/06 - 2014	mg/m ³	7.1	20
11	BENZENE (C ₆ H ₆)	IS 5182 PART 11 - 2006	µg/m ³	BDL (D.L - 1.0)	5
12	BENZO(a)PYRENE	IS 5182 PART 12 - 2004	ng/m ³	BDL (D.L - 0.5)	1

*National Ambient Air Quality Standards - CPCB
BDL - Below Detection Limit/D.L - Detection Limit

END OF REPORT

For Chennai Testing Laboratory Pvt Ltd

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TEST REPORT

Report Number and date	CTL/CH/N-5104/2017-18 & 30.09.2017		
Sample Number	N-5104/17-18		
Customer Name & Address	M/s, Tamil Nadu Pollution Control Board, 76, Mount Sale, Guindy, Chennai - 600 032.		
Project At	Coimbatore - Kurichi		
SAMPLE DETAILS			
Sample Description	Ambient Air Quality		
GPS Reading	10°56' 01.99" N 076° 58' 31.48" E		
Sampling Location	M/s, INDO SHELL MOULD LIMITED UNIT -11 - Near Shell Moulding Area		
Sampling Date & Time	15.09.2017 & 11.00 to 20.09.2017 & 11.00		
Sampled By	Chennai Testing Laboratory Pvt. Ltd.	Sampling Method	IS 5182 (Part V) and (Part XIV)
Date of Receipt	21.09.2017	Sample Condition	Good
Analysis Starting Date	21.09.2017	Analysis Completion Date	28.09.2017

ENVIRONMENTAL CONDITION:

RELATIVE HUMIDITY 65%
 AMBIENT TEMPERATURE 32.5°C
 WIND DIRECTION SW
 WEATHER CONDITION Partly Cloudy

SL.NO	PARAMETERS	METHODS	UNITS	RESULTS	NAAQS*
1	PARTICULATE MATTER (PM ₁₀)	CTL/SOP/ADR/03 - 2014	µg/m ³	33.5	60
2	PARTICULATE MATTER (PM ₁₀)	IS 5182 Part 23 - 2006	µg/m ³	70.5	100
3	SULPHUR DIOXIDE (SO ₂)	IS 5182 Part 2 - 2001	µg/m ³	11.7	60
4	OXIDES OF NITROGEN (NO _x)	IS 5182 Part 6 - 2006	µg/m ³	22.3	60
5	OZONE (O ₃)	CTL/SOP/ADR/08 - 2014	µg/m ³	21.1	180
6	LEAD (Pb)	IS 5182 PART 22 - 2004	µg/m ³	BDL (D.L - 0.1)	1
7	CARBON MONOXIDE (CO)	CTL/SOP/ADR/23 - 2014	ng/m ³	BDL (D.L - 1.15)	4
8	AMMONIA (NH ₃)	CTL/SOP/ADR/07- 2014 (INDOPHENDL METHOD)	µg/m ³	44.8	400
9	ARSENIC (As)	CTL/SOP/ADR/06 - 2014	ng/m ³	BDL (D.L - 1.0)	6
10	NICKEL (Ni)	CTL/SOP/ADR/06 - 2014	ng/m ³	13.1	20
11	BENZENE (C ₆ H ₆)	IS 5182 PART 11 - 2006	µg/m ³	BDL (D.L - 1.0)	5
12	BENZO(a)PYRENE	IS 5182 PART 12 - 2004	ng/m ³	BDL (D.L - 0.5)	1

*National Ambient Air Quality Standards - CPCB
 BDL - Below Detection Limit(D.L - Detection Limit)

END OF REPORT

For Chennai Testing Laboratory Pvt Ltd

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TEST REPORT

Report Number and date	CTL/CH/N-5106/2017-18 & 30.09.2017		
Sample Number	N-5106/17-18		
Customer Name & Address	M/s. Tamil Nadu Pollution Control Board, 76, Mount Salee, Guindy, Chennai - 600 032.		
Project At	Coimbatore - Kurichi		
SAMPLE DETAILS			
Sample Description	Ambient Air Quality		
GPS Reading	10°56' 33.18" N 076° 58' 44.13" E		
Sampling Location	TOP OF THE SIPCOT OFFICE BUILDING		
Sampling Date & Time	15-09-2017 & 11.00 to 16-09-2017 & 11.00		
Sampled By	Chemical Testing Laboratory Pvt. Ltd.	Sampling Method	IS 5182 (Part V) and (Part XIV)
Date of Receipt	17.09.2017	Sample Condition	Good
Analysis Starting Date	18-09-2017	Analysis Completion Date	26-09-2017

ENVIRONMENTAL CONDITION :

RELATIVE HUMIDITY	64%
AMBIENT TEMPERATURE	33°C
WIND DIRECTION	WSW
WEATHER CONDITION	Clear Sky

SL.NO	PARAMETERS	METHODS	UNITS	RESULTS	NAAQS*
1	PARTICULATE MATTER (PM ₁₀)	CTL/SOP/AIR/03 - 2014	µg/m ³	39.4	60
2	PARTICULATE MATTER (PM _{2.5})	IS 5182 Part 23 - 2006	µg/m ³	64.7	100
3	SULPHUR DIOXIDE (SO ₂)	IS 5182 Part 2 - 2001	µg/m ³	8.8	80
4	OXIDES OF NITROGEN (NO _x)	IS 5182 Part 6 - 2006	µg/m ³	17.8	80
5	OZONE (O ₃)	CTL/SOP/AIR/08 - 2014	µg/m ³	14.2	180
6	LEAD (Pb)	IS 5182 PART 22 - 2004	µg/m ³	BDL (D.L - 0.3)	1
7	CARBON MONOXIDE (CO)	CTL/SOP/AIR/23 - 2014	mg/m ³	BDL (D.L - 1.15)	4
8	AMMONIA (NH ₃)	CTL/SOP/AIR/07- 2014 (INDOPHENOL METHOD)	µg/m ³	33.3	400
9	ARSENIC (As)	CTL/SOP/AIR/06 - 2014	ng/m ³	BDL (D.L - 1.0)	6
10	NICKEL (Ni)	CTL/SOP/AIR/06 - 2014	ng/m ³	BDL (D.L - 5.0)	20
11	BENZENE (C ₆ H ₆)	IS 5182 PART 11 - 2006	µg/m ³	BDL (D.L - 1.0)	1
12	BENZO(a)PYRENE	IS 5182 PART 12 - 2004	ng/m ³	BDL (D.L - 0.5)	1

*National Ambient Air Quality Standards - CPCB
BDL - Below Detection Limit(D.L - Detection Limit)

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TEST REPORT

Report Number and date	CTL/CH/N-5107/2017-18 & 30.09.2017		
Sample Number	N-5107/17-18		
Customer Name & Address	M/s. Tamil Nadu Pollution Control Board, 76, Mount Salai, Guindy, Chennai - 600 032.		
Project At	Coimbatore - Korchi		
SAMPLE DETAILS			
Sample Description	Ambient Air Quality		
GPS Reading	10°56' 33.18" N 87°58' 44.13" E		
Sampling Location	TOP OF THE SIPCOT OFFICE BUILDING		
Sampling Date & Time	17.09.2017 & 11.15 to 18.09.2017 @ 11.15		
Sampled By	Chennai Testing Laboratory Pvt. Ltd.	Sampling Method	IS 5182 (Part V) and (Part XIV)
Date of Receipt	15.09.2017	Sample Condition	Good
Analysis Starting Date	19.09.2017	Analysis Completion Date	20.09.2017

ENVIRONMENTAL CONDITION:

RELATIVE HUMIDITY	68%
AMBIENT TEMPERATURE	31°C
WIND DIRECTION	SW
WEATHER CONDITION	Partly Cloudy

SL.NO	PARAMETERS	METHODS	UNITS	RESULTS	NAAQS*
1	PARTICULATE MATTER (PM ₁₀)	CTL/SOP/AIR/03 - 2014	µg/m ³	32.5	60
2	PARTICULATE MATTER (PM _{2.5})	IS 5182 Part 22 - 2006	µg/m ³	8.4	100
3	SULPHUR DIOXIDE (SO ₂)	IS 5182 Part 2 - 2001	µg/m ³	10.1	80
4	DIOXIDES OF NITROGEN (NO ₂)	IS 5182 Part 6 - 2006	µg/m ³	15.2	80
5	OZONE (O ₃)	CTL/SOP/AIR/08 - 2014	µg/m ³	13.2	180
6	LEAD (Pb)	IS 5182 PART 22 - 2004	µg/m ³	BDL (D.L - 0.1)	1
7	CARBON MONOXIDE (CO)	CTL/SOP/AIR/23 - 2014	ng/m ³	BDL (D.L - 1.15)	4
8	AMMONIA (NH ₃)	CTL/SOP/AIR/07- 2014 (INDOPHENO, METHOD)	µg/m ³	15.2	400
9	ARSENIC (As)	CTL/SOP/AIR/06 - 2014	ng/m ³	BDL (D.L - 1.0)	6
10	NICKEL (Ni)	CTL/SOP/AIR/06 - 2014	ng/m ³	9.2	20
11	BENZENE (C ₆ H ₆)	IS 5182 PART 11 - 2006	µg/m ³	BDL (D.L - 1.0)	5
12	BENZO(a)PYRENE	IS 5182 PART 12 - 2004	ng/m ³	BDL (D.L - 0.5)	1

*National Ambient Air Quality Standards - CPCB
BDL - Below Detection Limit (D.L - Detection Limit)

END OF REPORT

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TEST REPORT

Report Number and date	CTL/CH/N-5108/2017-18 & 30.09.2017		
Sample Number	N-5108/17-18		
Customer Name & Address	M/s. Tamil Nadu Pollution Control Board, 76, Mount Salai, Guindy, Chennai - 600 032.		
Project At	Coimbatore - Kurichi		
SAMPLE DETAILS			
Sample Description	Ambient Air Quality		
GPS Reading	10°56' 33.18" N 076° 56'44.13"E		
Sampling Location	TOP OF THE SIPCOT OFFICE BUILDING		
Sampling Date & Time	19.09.2017 & 11.30 to 20.09.2017 & 11.30		
Sampled By	Chennai Testing Laboratory Pvt. Ltd.	Sampling Method	IS 5182 (Part V) and (Part XIV)
Date of Receipt	21.09.2017	Sample Condition	Good.
Analysis Starting Date	21.09.2017	Analysis Completion Date	28.09.2017

ENVIRONMENTAL CONDITION:

RELATIVE HUMIDITY 85%
 AMBIENT TEMPERATURE 32.5°C
 WIND DIRECTION SW
 WEATHER CONDITION Partly Cloudy

SL.NO	PARAMETERS	METHODS	UNITS	RESULTS	NAAQS*
1	PARTICULATE MATTER (PM ₁₀)	CTL/SOP/AIR/01 - 2014	µg/m ³	25.1	80
2	PARTICULATE MATTER (PM _{2.5})	IS 5182 Part 23 - 2006	µg/m ³	57.6	100
3	SULPHUR DIOXIDE (SO ₂)	IS 5182 Part 2 - 2005	µg/m ³	8.2	80
4	OXIDES OF NITROGEN (NO _x)	IS 5182 Part 6 - 2004	µg/m ³	14.3	80
5	OZONE (O ₃)	CTL/SOP/AIR/08 - 2014	µg/m ³	19.8	180
6	LEAD (Pb)	IS 5182 PART 22 - 2004	µg/m ³	BDL (D.L - 0.1)	1
7	CARBON MONOXIDE (CO)	CTL/SOP/AIR/23 - 2014	mg/m ³	BDL (D.L - 1.15)	4
8	AMMONIA (NH ₃)	CTL/SOP/AIR/07- 2014 (INDORHENOL METHOD)	µg/m ³	19.2	400
9	ARSENIC (As)	CTL/SOP/AIR/06 - 2014	ng/m ³	BDL (D.L - 1.0)	6
10	NICKEL (Ni)	CTL/SOP/AIR/06 - 2014	ng/m ³	6.1	20
11	BENZENE (C ₆ H ₆)	IS 5182 PART 11 - 2006	µg/m ³	BDL (D.L - 1.0)	3
12	BENZ(a)PYRENE	IS 5182 PART 12 - 2004	ng/m ³	BDL (D.L - 0.5)	1

*National Ambient Air Quality Standards - CPCB
 BDL - Below Detection Limit (D.L - Detection Limit)

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Surface Water Analysis - Manali



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CIN : U74999TN2008PTC067568

TEST REPORT

Report Number and date	CTL/CH/N-5916/2017-18 & 16.10.2017		
Sample Number	N-5916/17-18		
Customer Name & Address	M/s. Tamil Nadu Pollution Control Board, 76, Mount Salai, Guindy, Chennai - 600 032.		
Project At	Manali Industrial Area		
SAMPLE DETAILS			
Sample Description By Customer	Surface Water		
Sampling Location	Amdlavoyal Canal Upstream		
GPS Reading	13°10' 49.38" N 86° 15' 19.00" E		
Sampling Date	09.10.2017	Sampled By	Chennai Testing Laboratory Pvt. Ltd.
Quantity Received	5 Litres	Sampling Method	CTL/MSP/5.7/001
Date of Receipt	09.10.2017	Sample Condition	Good & Received in Plastic Container
Analysis Starting Date	10.10.2017	Analysis Completion Date	16.10.2017

Test Results:

The above sample tested as received, and results are as follows:

S.NO	PARAMETERS	METHOD	UNITS	RESULTS
Sanitary Survey:				
1	Appearance	Physical Observation	-	Turbid Liquid
2	Colour	IS 3025 (Part 4)-1983 (R.2006)	HTU	10
3	pH @ 25°C	IS 3025 (Part 11)-1983 (R.2006)	-	7.3
4	Odour	IS 3025 (Part 5)-1983 (R.2006)	-	Unobjectionable
5	Ecological (Presence of Animals like Fish, Insects Etc)	Physical Observation	-	Present
6	Oil & Grease	5520-O&G-B-APHA 22 nd Ed. 2012 (Partition Gravimetric Method)	mg/l	< 2
7	Total Suspended Solids	2540-D-APHA 22 nd Ed.2012	mg/l	35
8	Dissolved Oxygen	4500-O-C-APHA 22 nd Ed.2012	mg/l	5.9
9	Biochemical Oxygen Demand (BOD) 3 days at 27°C	5210-B-APHA 22 nd Ed.2012	mg/l	< 2
10	Chemical Oxygen Demand (COD)	5220-B-APHA 22 nd Ed.2012	mg/l	20
11	Conductivity	IS 3025 (Part 14)-1984 (R.2006)	µs/cm	972
12	Total Dissolved Solids	2540-C-APHA 22 nd Ed.2012	mg/l	582
13	Nitrate - Nitrogen	4500-NO ₂ -B-APHA 22 nd Ed.2012	mg/l	BDL (DL:0.1)
14	Nitrite - Nitrogen	4500-NO ₂ -B-APHA 22 nd Ed.2012	mg/l	BDL (DL:0.01)

For Chennai Testing Laboratory Pvt Ltd

A. Rajan
Authorized Signatory

Page 1 of 5

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TEST REPORT

Report Number and date	CTL/CH/N-5916/2017-18 & 16.10.2017
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S.NO	PARAMETERS	METHOD	UNITS	RESULTS
15	Free Ammonia as NH ₃	4500-NH ₃ - B,C-APHA 22 nd Ed. 2012	mg/l	BDL (DL:0.1)
16	Total Residual Chlorine	IS 3025 (Part 26)-1984	mg/l	BDL (DL:0.1)
17	Cyanide as CN	IS 3025 (Part 27)-1986 (R.2009)	mg/l	BDL (DL:0.01)
18	Fluoride as F	IS 3025 (Part 60)-2008	mg/l	0.24
19	Sulphate as SO ₄	IS 3025 (Part 24)-1986 (R.2009)	mg/l	20.7
20	Sulphide as H ₂ S	IS 3025 (Part 29) (R.2009)	mg/l	BDL (DL:0.01)
21	Total Hardness as CaCO ₃	IS 3025 (Part 21)-1983 (R.2006)	mg/l	212
22	Dissolved Phosphate as P	4500-P-D- APHA 22 nd Ed.2012	mg/l	1.6
23	Sodium Absorption Ratio	IS 11624-1986 (R.2001)	-	3.58
24	Total Phosphorous as P	4500-P-B-D-APHA 22 nd Ed.2012	mg/l	1.6
25	Total Kjeldahl Nitrogen as N	4500-N-B,C-APHA 22 nd Ed.2012	mg/l	BDL (DL:0.1)
26	Total Ammonia	4500-Na ₂ -B,C-APHA 22 nd Ed.2012	mg/l	BDL (DL:0.1)
27	Phenols	5530-C-APHA 22 nd Ed.2012	mg/l	BDL (DL:0.001)
28	Surface Active Agents	IS 13428 - 2005 (Annex K)	mg/l	BDL (DL:0.1)
29	Anionic detergent as MBAS	IS 13428 - 2005 (Annex K)	mg/l	BDL (DL:0.1)
30	Hexavalent Chromium as Cr ⁶⁺	3500-Cr-B-APHA 22 nd Ed. 2012	mg/l	BDL (DL:0.01)
31	Iron as Fe	IS 3025 (Part 53)-2009	mg/l	0.83
32	Boron as B	IS 3025 (Part 57)-2005	mg/l	BDL (DL:0.1)
33	Total Nitrogen	4500-N-B,C-APHA 22 nd Ed.2012	mg/l	BDL (DL:0.1)
34	Chloride	4500-Cl-B-APHA 22 nd Ed. 2012	mg/l	189
35	Bio - Assay (Zebra Fish) Test	IS 6582 (Part 2)- 2001	-	T ₁ = 1
36	Copper as Cu	IS 3025 (Part 42)-1992 (R.2009)	mg/l	BDL (DL:0.02)
37	Manganese as Mn	3111 B APHA 22 nd Edition 2012	mg/l	0.21
38	Mercury as Hg	IS 3025 (Part 40)-1994 (R.2009)	mg/l	BDL (DL:0.001)
39	Cadmium as Cd	IS 3025 (Part 41)-1992 (R.2009)	mg/l	BDL (DL:0.002)
40	Selenium as Se	IS 3025 (Part 56)-2003(R.2009)	mg/l	BDL (DL:0.005)
41	Total Arsenic as As	IS 3025 (Part 37)-1988 (R.2009)	mg/l	BDL (DL:0.001)
42	Lead as Pb	IS 3025 (Part 47)-1994 (R.2009)	mg/l	BDL (DL:0.005)
43	Zinc as Zn	IS 3025 (Part 49)-1994 (R.2009)	mg/l	BDL (DL:0.08)
44	Total Chromium as Cr	IS 3025(Part 52)-2003	mg/l	BDL (DL:0.01)
45	Nickel as Ni	IS 3025 (Part 54)	mg/l	BDL (DL:0.01)
46	Vanadium as V	3111-B-APHA 22 nd Ed.2012	mg/l	BDL (DL:2.0)

T₁ = Toxicity Factor

Note: T₁ = 16, it shows that all or some of the fish die in the test solution for a T value less than 16 (1 part of waste water + 15 part of dilution water) and all are alive in test solution for a T value of 16 and above, after 48 hrs.

For Chennai Testing Laboratory Pvt Ltd

A. Rajan
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TEST REPORT

Report Number and date	CTL/CH/N-5916/2017-18 & 16.10.2017
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S.NO	PARAMETERS	METHOD	UNITS	RESULTS
47	Organo chlorine Pesticides (OCP):			
	Aldrin	CTL/SOP/WATER/101-2012 APHA 22 nd Edition 2012-6630 B	µg/l	BDL (DL:0.01)
	Dieldrin		µg/l	BDL (DL:0.01)
	Endosulfan alpha		µg/l	BDL (DL:0.01)
	Endosulfan Beta		µg/l	BDL (DL:0.01)
	Endosulfan Sulfate		µg/l	BDL (DL:0.01)
	o,p'-DDT		µg/l	BDL (DL:0.01)
	p,p'-DDT		µg/l	BDL (DL:0.01)
	p,p'-DDE		µg/l	BDL (DL:0.01)
	o,p'-DDE		µg/l	BDL (DL:0.01)
	o,p'-DDD		µg/l	BDL (DL:0.01)
	p,p'-DDD		µg/l	BDL (DL:0.01)
	Alpha HCH		µg/l	BDL (DL:0.01)
	Beta HCH		µg/l	BDL (DL:0.01)
	Gamma HCH (Lindane)		µg/l	BDL (DL:0.01)
Delta HCH	µg/l		BDL (DL:0.01)	
48	Poly Chlorinated Terphenyls (as PCT):			
	o-Terphenyl	CTL/SOP/WATER/159-2017	µg/l	BDL (DL:0.03)
	m-Terphenyl		µg/l	BDL (DL:0.03)
	p-Terphenyl		µg/l	BDL (DL:0.03)
	Tetradecachloro-o-terphenyl		µg/l	BDL (DL:0.03)
	Tetradecachloro-m-terphenyl		µg/l	BDL (DL:0.03)
	Tetradecachloro-p-terphenyl		µg/l	BDL (DL:0.03)
	4-Chloro-o-terphenyl		µg/l	BDL (DL:0.03)
	4-Chloro-p-terphenyl		µg/l	BDL (DL:0.03)
	2,4-Dichloro-p-terphenyl		µg/l	BDL (DL:0.03)
	2,5-Dichloro-o-terphenyl		µg/l	BDL (DL:0.03)
	2,5-Dichloro-m-terphenyl		µg/l	BDL (DL:0.03)
	2,5-Dichloro-p-terphenyl		µg/l	BDL (DL:0.03)
	2,4,6-Trichloro-p-terphenyl		µg/l	BDL (DL:0.03)
	2,3,5,6-Tetrachloro-p-terphenyl		µg/l	BDL (DL:0.03)
2,4,4',6'-Tetrachloro-p-terphenyl	µg/l		BDL (DL:0.03)	
2,3,4,5,6-Pentachloro-p-terphenyl	µg/l	BDL (DL:0.03)		

For Chennai Testing Laboratory Pvt Ltd

A. Raju
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TEST REPORT

Report Number and date	CTL/CH/N-5916/2017-18 & 16.10.2017
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S.NO	PARAMETERS	METHOD	UNITS	RESULTS
49	Poly Nuclear Aromatic Hydrocarbons (as PAH):			
	Naphthalene	APHA 22 nd Edition 6440 C CTL/SOP/WATER/102-2012	µg/l	BDL (DL:0.01)
	Acenaphthylene		µg/l	BDL (DL:0.01)
	2-Bromo-Naphthalene		µg/l	BDL (DL:0.02)
	Acenaphthene		µg/l	BDL (DL:0.02)
	Fluorene		µg/l	BDL (DL:0.02)
	Phenanthrene		µg/l	BDL (DL:0.02)
	Anthracene		µg/l	BDL (DL:0.02)
	Pyrene		µg/l	BDL (DL:0.02)
	Fluoranthene		µg/l	BDL (DL:0.02)
	Chrysene		µg/l	BDL (DL:0.02)
	Benz[a]anthracene		µg/l	BDL (DL:0.02)
	Benzo[a]pyrene		µg/l	BDL (DL:0.02)
	Benzo[b]fluoranthene		µg/l	BDL (DL:0.03)
	Benzo[ghi]perylene		µg/l	BDL (DL:0.03)
Dibenz[a,h]anthracene	µg/l		BDL (DL:0.03)	
Indeno[1,2,3-cd]pyrene	µg/l	BDL (DL:0.04)		
50	Poly Chlorinated Biphenyls (as PCB):			
	2-Chlorobiphenyl	Annex M of IS 13428-1998	µg/l	BDL (DL:0.01)
	2,3-dichlorobiphenyl		µg/l	BDL (DL:0.01)
	2,5,4'-Trichlorobiphenyl		µg/l	BDL (DL:0.01)
	2,2',4,4'-tetrachlorobiphenyl		µg/l	BDL (DL:0.01)
	2,2',3,4,6'-Pentachlorobiphenyl		µg/l	BDL (DL:0.01)
	2,2',4,4',5',6'-Hexachlorobiphenyl		µg/l	BDL (DL:0.01)
	2,2',3,3',4,4',6'-Heptachlorobiphenyl		µg/l	BDL (DL:0.01)
2,2',3,3',4,5,6,6'-Octachlorobiphenyl	µg/l		BDL (DL:0.01)	

For Chennai Testing Laboratory Pvt Ltd

A. Rajan
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TEST REPORT

Report Number and date	CTL/CH/N-5916/2017-18 & 16.10.2017		
Sample Number	N-5916/17-18		
Customer Name & Address	M/s. Tamil Nadu Pollution Control Board, 76, Mount Salai, Guindy, Chennai - 600 032.		
Project At	Manali Industrial Area		
SAMPLE DETAILS			
Sample Description By Customer	Surface Water		
Sampling Location	Amullavotyal Canal Upstream		
GPS Reading	13° 10' 49.30" N 000° 15' 19.00" E		
Sampling Date	09.10.2017	Sampled By	Chennai Testing Laboratory Pvt. Ltd.,
Quantity Received	100ml	Sampling Method	CTL/MSP/S.7/001
Date of Receipt	09.10.2017	Sample Condition	Good & Received in Sterile Container
Analysis Starting Date	10.10.2017	Analysis Completion Date	16.10.2017

Test Results:

The above sample tested as received, and results are as follows:

S.NO	PARAMETERS	METHOD	UNITS	RESULTS
1	Total Coliform	IS 1622 : 1981 (R.2009)	MPN/100 ml	90
2	Faecal Coliform		MPN/100 ml	13

END OF REPORT

For Chennai Testing Laboratory Pvt Ltd



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TEST REPORT

Report Number and date	CTL/CH/N-5938/2017-18 & 23.10.2017		
Sample Number	N-5938/17-18		
Customer Name & Address	M/s. Tamil Nadu Pollution Control Board, 76, Mount Salai, Guindy, Chennai - 600 032.		
Project At	Manali Industrial Area		
SAMPLE DETAILS			
Sample Description By Customer	Surface Water (SW1)		
Sampling Location	Buckingham Canal Upstream		
GPS Reading	13°09'15.21"N 080°17'04.12"E		
Sampling Date	10.10.2017	Sampled By	Chennai Testing Laboratory Pvt. Ltd.
Quantity Received	5 Litres	Sampling Method	CTL/MSP/5.7/001
Date of Receipt	10.10.2017	Sample Condition	Good & Received in Plastic Container
Analysis Starting Date	11.10.2017	Analysis Completion Date	23.10.2017

Test Results:

The above sample tested as received, and results are as follows:

S.NO	PARAMETERS	METHOD	UNITS	RESULTS
Sanitary Survey:				
1	Appearance	Physical Observation	-	Turbid Liquid
2	Colour	IS 3025 (Part 4)-1983 (R.2006)	HTU	10
3	pH @ 25°C	IS 3025 (Part 11)-1983 (R.2006)	-	7.4
4	Odour	IS 3025 (Part 5)-1983 (R.2006)	-	Objectionable
5	Ecological (Presence of Animals like Fish, Insects Etc)	Physical Observation	-	Present.
6	Oil & Grease	5520-O&G-B APHA 22 nd Ed.2012 (Partition Gravimetric Method)	mg/l	< 2
7	Total Suspended Solids	2540-D- APHA 22 nd Ed.2012	mg/l	54
8	Dissolved Oxygen	4500-O-C- APHA 22 nd Ed.2012	mg/l	4.1
9	Biochemical Oxygen Demand (BOD) 5 days at 27°C	5210-B-APHA 22 nd Ed.2012	mg/l	24
10	Chemical Oxygen Demand (COD)	5220-B- APHA 22 nd Ed.2012	mg/l	94
11	Conductivity	IS 3025 (Part 14)-1984 (R.2006)	µs/cm	3636
12	Total Dissolved Solids	2540-C-APHA 22 nd Ed.2012	mg/l	2186
13	Nitrate - Nitrogen	4500-NO ₃ -B-APHA 22 nd Ed.2012	mg/l	8.54
14	Nitrite - Nitrogen	4500-NO ₂ -B-APHA 22 nd Ed.2012	mg/l	0.03

For Chennai Testing Laboratory Pvt Ltd

A. Rajan
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TEST REPORT

Report Number and date	CTL/CH/N-5938/2017-18 & 23.10.2017
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S.NO	PARAMETERS	METHOD	UNITS	RESULTS
15	Free Ammonia as NH ₃	4500-NH ₃ -B,C-APHA 22 nd Ed.2012	mg/l	7.2
16	Total Residual Chlorine	IS 3025 (Part 26)-1984	mg/l	BDL (DL:0.1)
17	Cyanide as CN	IS 3025 (Part 27)-1986 (R.2009)	mg/l	BDL (DL:0.01)
18	Fluoride as F	IS 3025 (Part 60)-2008	mg/l	0.36
19	Sulphate as SO ₄	IS 3025 (Part 24)-1986 (R.2009)	mg/l	243
20	Sulphide as H ₂ S	IS 3025 (Part 29) (R.2009)	mg/l	3.2
21	Total Hardness as CaCO ₃	IS 3025 (Part 21)-1983 (R.2006)	mg/l	756
22	Dissolved Phosphate as P	4500-P-D-APHA 22 nd Ed.2012	mg/l	4.4
23	Sodium Absorption Ratio	IS 11624-1986 (R.2001)	-	7.1
24	Total Phosphorous as P	4500-P-B-D-APHA 22 nd Ed.2012	mg/l	4.8
25	Total Kjeldahl Nitrogen as N	4500-N-B,C-APHA 22 nd Ed.2012	mg/l	22.6
26	Total Ammonia	4500-Na ₂ -B,C-APHA 22 nd Ed.2012	mg/l	16.4
27	Phenols	5530-C-APHA 22 nd Ed.2012	mg/l	BDL (DL:0.001)
28	Surface Active Agents	IS 13428-2005 (Annex K)	mg/l	BDL (DL:0.1)
29	Anionic detergent as MBAS	IS 13428-2005 (Annex K)	mg/l	BDL (DL:0.1)
30	Hexavalent Chromium as Cr ⁶⁺	3500-Cr-B-APHA 22 nd Ed. 2012	mg/l	BDL (DL:0.01)
31	Iron as Fe	IS 3025 (Part 53)-2009	mg/l	1.43
32	Boron as B	IS 3025 (Part 57)-2005	mg/l	0.74
33	Total Nitrogen	4500-N-B,C-APHA 22 nd Ed.2012	mg/l	384
34	Chloride	4500-Cl-B-APHA 22 nd Ed. 2012	mg/l	771
35	Bio - Assay (Zebra Fish) Test	IS 6582 (Part 2): 2001	-	T ₁ = 2
36	Copper as Cu	IS 3025 (Part 42)-1992 (R.2009)	mg/l	0.05
37	Manganese as Mn	3111 B APHA 22 nd Edition 2012	mg/l	0.44
38	Mercury as Hg	IS 3025 (Part 48)-1994 (R.2009)	mg/l	BDL (DL:0.001)
39	Cadmium as Cd	IS 3025 (Part 41)-1992 (R.2009)	mg/l	BDL (DL:0.002)
40	Selenium as Se	IS 3025 (Part 56)-2003(R.2009)	mg/l	BDL (DL:0.005)
41	Total Arsenic as As	IS 3025 (Part 37)-1988 (R.2009)	mg/l	BDL (DL:0.001)
42	Lead as Pb	IS 3025 (Part 47)-1994 (R.2009)	mg/l	BDL (DL:0.005)
43	Zinc as Zn	IS 3025 (Part 49)-1994 (R.2009)	mg/l	BDL (DL:0.08)
44	Total Chromium as Cr	IS 3025 (Part 52)-2003	mg/l	BDL (DL:0.01)
45	Nickel as Ni	IS 3025 (Part 54)	mg/l	BDL (DL:0.01)
46	Vanadium as V	3111-B-APHA 22 nd Ed.2012	mg/l	BDL (DL:2.0)

T₁ = Toxicity Factor

Note: T₁ = 16, it shows that all or some of the fish die in the test solution for a T value, less than 16 (1 part of waste water + 15 part of dilution water) and all are alive in test solutions for a T value of 16 and above, after 48 hrs.

For Chennai Testing Laboratory Pvt Ltd

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TEST REPORT

Report Number and date	CTL/CH/N-5938/2017-18 & 23.10.2017
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S. NO	PARAMETERS	METHOD	UNITS	RESULTS
47	Organo chlorine Pesticides (OCP):			
	Aldrin	CTL/SOP/WATER/101-2012 APHA 22 nd Edition 2012-6630 B	ug/l	BDL (DL:0.01)
	Dieldrin		ug/l	BDL (DL:0.01)
	Endosulfan alpha		ug/l	BDL (DL:0.01)
	Endosulfan Beta		ug/l	BDL (DL:0.01)
	Endosulfan Sulfate		ug/l	BDL (DL:0.01)
	o,p'-DDT		ug/l	BDL (DL:0.01)
	p,p'-DDT		ug/l	BDL (DL:0.01)
	p,p'-DDE		ug/l	BDL (DL:0.01)
	o,p'-DDE		ug/l	BDL (DL:0.01)
	o,p'-DDD		ug/l	BDL (DL:0.01)
	p,p'-DDD		ug/l	BDL (DL:0.01)
	Alpha HCH		ug/l	BDL (DL:0.01)
	Beta HCH		ug/l	BDL (DL:0.01)
Gamma HCH (Lindane)	ug/l		BDL (DL:0.01)	
Delta HCH	ug/l	BDL (DL:0.01)		
48	Poly Chlorinated Terphenyls (as PCT):			
	o-Terphenyl	CTL/SOP/WATER/159-2017	ug/l	BDL (DL:0.03)
	m-Terphenyl		ug/l	BDL (DL:0.03)
	p-Terphenyl		ug/l	BDL (DL:0.03)
	Tetradecachloro-o-terphenyl		ug/l	BDL (DL:0.03)
	Tetradecachloro-m-terphenyl		ug/l	BDL (DL:0.03)
	Tetradecachloro-p-terphenyl		ug/l	BDL (DL:0.03)
	4-Chloro-o-terphenyl		ug/l	BDL (DL:0.03)
	4-Chloro-p-terphenyl		ug/l	BDL (DL:0.03)
	2,4-Dichloro-p-terphenyl		ug/l	BDL (DL:0.03)
	2,5-Dichloro-o-terphenyl		ug/l	BDL (DL:0.03)
	2,5-Dichloro-m-terphenyl		ug/l	BDL (DL:0.03)
	2,5-Dichloro-p-terphenyl		ug/l	BDL (DL:0.03)
	2,4,6-Trichloro-p-terphenyl		ug/l	BDL (DL:0.03)
	2,3,5,6-Tetrachloro-p-terphenyl		ug/l	BDL (DL:0.03)
	2,4,4',6-Tetrachloro-p-terphenyl		ug/l	BDL (DL:0.03)
2,3,4,5,6-Pentachloro-p-terphenyl	ug/l		BDL (DL:0.03)	

For Chennai Testing Laboratory Pvt Ltd

A. Raju

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TEST REPORT

Report Number and date	CTL/CH/N-5938/2017-18 & 23.10.2017
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S.NO	PARAMETERS	METHOD	UNITS	RESULTS
49	Poly Nuclear Aromatic Hydrocarbons (as PAH):			
	Naphthalene	APHA 22 nd Edition 6440 C CTL/SOP/WATER/102-2012	µg/l	BDL (DL:0.01)
	Acenaphthylene		µg/l	BDL (DL:0.01)
	2-Bromo-Naphthalene		µg/l	BDL (DL:0.02)
	Acenaphthene		µg/l	BDL (DL:0.02)
	Fluorene		µg/l	BDL (DL:0.02)
	Phenanthrene		µg/l	BDL (DL:0.02)
	Anthracene		µg/l	BDL (DL:0.02)
	Pyrene		µg/l	BDL (DL:0.02)
	Fluoranthene		µg/l	BDL (DL:0.02)
	Chrysene		µg/l	BDL (DL:0.02)
	Benz[a]anthracene		µg/l	BDL (DL:0.02)
	Benzo[a]pyrene		µg/l	BDL (DL:0.02)
	Benzo[b]fluoranthene		µg/l	BDL (DL:0.03)
	Benzo[ghi]perylene		µg/l	BDL (DL:0.03)
Dibenz[a,h]anthracene	µg/l		BDL (DL:0.03)	
Indeno[1,2,3-cd]pyrene	µg/l	BDL (DL:0.04)		
50	Poly Chlorinated Biphenyls (as PCB):			
	2-Chlorobiphenyl	Annex M of IS 13428-1998	µg/l	BDL (DL:0.01)
	2,3-dichlorobiphenyl		µg/l	BDL (DL:0.01)
	2,5,4'-Trichlorobiphenyl		µg/l	BDL (DL:0.01)
	2,2',4,4'-tetrachlorobiphenyl		µg/l	BDL (DL:0.01)
	2,2',3,4,6'-Pentachlorobiphenyl		µg/l	BDL (DL:0.01)
	2,2',4,4',5,6'-Hexachlorobiphenyl		µg/l	BDL (DL:0.01)
	2,2',3,3',4,4',6'-Heptachlorobiphenyl		µg/l	BDL (DL:0.01)
	2,2',3,3',4,5,6,6'-Octachlorobiphenyl		µg/l	BDL (DL:0.01)

For Chennai Testing Laboratory Pvt Ltd

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TEST REPORT

Report Number and date	CTL/CH/N-5938/2017-18 & 23.10.2017		
Sample Number	N-5938/17-18		
Customer Name & Address	M/s. Tamil Nadu Pollution Control Board, 76, Mount Salai, Guindy, Chennai - 600 032.		
Project At	Manali Industrial Area		
SAMPLE DETAILS			
Sample Description By Customer	Surface Water (SW1)		
Sampling Location	Buckingham Canal Upstream		
GPS Reading	13°09'15.21"N 080°17'04.12"E		
Sampling Date	10.10.2017	Sampled By	Chennai Testing Laboratory Pvt. Ltd.
Quantity Received	100ml	Sampling Method	CTL/MSP/5.7/001
Date of Receipt	10.10.2017	Sample Condition	Good & Received in Sterile Container
Analysis Starting Date	11.10.2017	Analysis Completion Date	21.10.2017

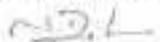
Test Results:

The above sample tested as received, and results are as follows:

S.NO	PARAMETERS	METHOD	UNITS	RESULTS
1	Total Coliform	IS 1622 : 1981 (R2009)	MPN/100 ml	500
2	Faecal Coliform		MPN/100 ml	110

END OF REPORT

For Chennai Testing Laboratory Pvt Ltd


Authorised Signatory

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CIN : U74999TN2008PTC067568

TEST REPORT

Report Number and date	CTL/CH/N-5939/2017-18 & 23.10.2017		
Sample Number	N-5939/17-18		
Customer Name & Address	M/s. Tamil Nadu Pollution Control Board, 76, Mount Salai, Guindy, Chennai - 600 032		
Project At	Manali Industrial Area		
SAMPLE DETAILS			
Sample Description By Customer	Surface Water (SW2)		
Sampling Location	Buckingham Canal Downstream		
GPS Reading	13° 10' 31.74" N 080° 17' 20.38" E		
Sampling Date	10.10.2017	Sampled By	Chennai Testing Laboratory Pvt. Ltd.,
Quantity Received	5 Litres	Sampling Method	CTL/MSP/5.7/001
Date of Receipt	10.10.2017	Sample Condition	Good & Received in Plastic Container
Analysis Starting Date	11.10.2017	Analysis Completion Date	23.10.2017

Test Results:

The above sample tested as received, and results are as follows:

S.NO	PARAMETERS	METHOD	UNITS	RESULTS
Sanitary Survey:				
1	Appearance	Physical Observation	-	Turbid Liquid
2	Colour	IS 3025 (Part 4)-1983 (R.2006)	HU	10
3	pH @ 25°C	IS 3025 (Part 11)-1983 (R.2006)	-	7.0
4	Odour	IS 3025 (Part 5)-1983 (R.2006)	-	Unobjectionable
5	Ecological (Presence of Animals like Fish, Insects Etc)	Physical Observation	-	Present
6	Oil & Grease	5520-OMG-B-APHA 22 nd Ed. 2012 (Partition Gravimetric Method)	mg/l	< 2
7	Total Suspended Solids	2540-D-APHA 22 nd Ed. 2012	mg/l	24
8	Dissolved Oxygen	4500-O-C-APHA 22 nd Ed. 2012	mg/l	6.0
9	Biochemical Oxygen Demand (BOD) 3 days at 27°C	5210-B-APHA 22 nd Ed. 2012	mg/l	4
10	Chemical Oxygen Demand (COD)	5220-B-APHA 22 nd Ed. 2012	mg/l	26
11	Conductivity	IS 3025 (Part 14)-1984 (R.2006)	µs/cm	2082
12	Total Dissolved Solids	2540-C-APHA 22 nd Ed. 2012	mg/l	1254
13	Nitrate - Nitrogen	4500-NO ₃ -B-APHA 22 nd Ed. 2012	mg/l	40.2
14	Nitrite - Nitrogen	4500-NO ₂ -B-APHA 22 nd Ed. 2012	mg/l	56.6

For Chennai Testing Laboratory Pvt Ltd

A. Rajan

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Page 1 of 2

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TEST REPORT

Report Number and date	CTL/CH/N-5939/2017-18 & 23.10.2017
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S.NO	PARAMETERS	METHOD	UNITS	RESULTS
15	Free Ammonia as NH ₃	4500-NH ₃ -B.C.-APHA 22 nd Ed. 2012	mg/l	1.7
16	Total Residual Chlorine	IS 3025 (Part 26)-1984	mg/l	BDL (DL:0.1)
17	Cyanide as CN	IS 3025 (Part 27)-1986 (R.2009)	mg/l	BDL (DL:0.01)
18	Fluoride as F	IS 3025 (Part 60)-2008	mg/l	0.29
19	Sulphate as SO ₄	IS 3025 (Part 24)-1986 (R.2009)	mg/l	160
20	Sulphide as H ₂ S	IS 3025 (Part 29) (R.2009)	mg/l	BDL (DL:0.01)
21	Total Hardness as CaCO ₃	IS 3025 (Part 21)-1983 (R.2006)	mg/l	273
22	Dissolved Phosphate as P	4500-P-D-APHA 22 nd Ed.2012	mg/l	2
23	Sodium Absorption Ratio	IS 11624-1986 (R.2001)	-	7
24	Total Phosphorous as P	4500-P-B-D-APHA 22 nd Ed.2012	mg/l	2.1
25	Total Kjeldahl Nitrogen as N	4500-N-B.C.-APHA 22 nd Ed.2012	mg/l	4.9
26	Total Ammonia	4500-Na ₂ -B.C.-APHA 22 nd Ed.2012	mg/l	4.6
27	Phenols	5530-C-APHA 22 nd Ed.2012	mg/l	BDL (DL:0.001)
28	Surface Active Agents	IS 13428 -2005 (Annex K)	mg/l	BDL (DL:0.1)
29	Anionic detergent as MBAS	IS 13428 -2005 (Annex K)	mg/l	BDL (DL:0.1)
30	Hexavalent Chromium as Cr ^{VI}	3500-Cr-B-APHA 22 nd Ed. 2012	mg/l	BDL (DL:0.01)
31	Iron as Fe	IS 3025 (Part 53)-2009	mg/l	0.66
32	Born as B	IS 3025 (Part 57)-2005	mg/l	BDL (DL:0.1)
33	Total Nitrogen	4500-N-B.C.-APHA 22 nd Ed.2012	mg/l	103.4
34	Chloride	4500-Cl-B-APHA 22 nd Ed. 2012	mg/l	352
35	Bio - Assay (Zebra Fish) Test	IS 6502 (Part 2): 2001	-	T ₁ = 1
36	Copper as Cu	IS 3025 (Part 42)-1992 (R.2009)	mg/l	BDL (DL:0.02)
37	Manganese as Mn	3111 B APHA 22 nd Edition 2012	mg/l	0.14
38	Mercury as Hg	IS 3025 (Part 48)-1994 (R.2009)	mg/l	BDL (DL:0.001)
39	Cadmium as Cd	IS 3025 (Part 41)-1992 (R.2009)	mg/l	BDL (DL:0.002)
40	Selenium as Se	IS 3025 (Part 56)-2003(R.2009)	mg/l	BDL (DL:0.005)
41	Total Arsenic as As	IS 3025 (Part 37)-1988 (R.2009)	mg/l	BDL (DL:0.001)
42	Lead as Pb	IS 3025 (Part 47)-1994 (R.2009)	mg/l	BDL (DL:0.005)
43	Zinc as Zn	IS 3025 (Part 49)-1994 (R.2009)	mg/l	BDL (DL:0.08)
44	Total Chromium as Cr	IS 3025(Part 52)-2003	mg/l	BDL (DL:0.01)
45	Nickel as Ni	IS 3025 (Part 54)	mg/l	BDL (DL:0.01)
46	Vanadium as V	3111-B-APHA 22 nd Ed.2012	mg/l	BDL (DL:2.0)

T₁ = Toxicity Factor

Note: T₁ = 16, it shows that all or some of the fish die in the test solution for a T value, less than 16 (1 part of waste water + 15 part of dilution water) and all are alive in test solutions for a T value of 16 and above, after 48 hrs.

For Chennai Testing Laboratory Pvt Ltd

A. Rajalingam
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Page 2 of 5

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TEST REPORT

Report Number and date	CTL/CH/N-5919/2017-18 & 23.10.2017
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S. NO	PARAMETERS	METHOD	UNITS	RESULTS
Organo chlorine Pesticides (OCP):				
47	Aldrin	CTL/SOP/WATER/101-2012 APHA 22 nd Edition 2012-6630 B	µg/l	BDL (DL:0.01)
	Dieldrin		µg/l	BDL (DL:0.01)
	Endosulfan alpha		µg/l	BDL (DL:0.01)
	Endosulfan Beta		µg/l	BDL (DL:0.01)
	Endosulfan Sulfate		µg/l	BDL (DL:0.01)
	o,p'-DDT		µg/l	BDL (DL:0.01)
	p,p'-DDT		µg/l	BDL (DL:0.01)
	p,p'-DDE		µg/l	BDL (DL:0.01)
	o,p'-DDE		µg/l	BDL (DL:0.01)
	o,p'-DDD		µg/l	BDL (DL:0.01)
	p,p'-DDD		µg/l	BDL (DL:0.01)
	Alpha HCH		µg/l	BDL (DL:0.01)
	Beta HCH		µg/l	BDL (DL:0.01)
	Gamma HCH (Lindane)		µg/l	BDL (DL:0.01)
Delta HCH	µg/l	BDL (DL:0.01)		
Poly Chlorinated Terphenyls (as PCT):				
48	o-Terphenyl	CTL/SOP/WATER/159-2017	µg/l	BDL (DL:0.03)
	m-Terphenyl		µg/l	BDL (DL:0.03)
	p-Terphenyl		µg/l	BDL (DL:0.03)
	Tetradecachloro-o-terphenyl		µg/l	BDL (DL:0.03)
	Tetradecachloro-m-terphenyl		µg/l	BDL (DL:0.03)
	Tetradecachloro-p-terphenyl		µg/l	BDL (DL:0.03)
	4-Chloro-o-terphenyl		µg/l	BDL (DL:0.03)
	4-Chloro-p-terphenyl		µg/l	BDL (DL:0.03)
	2,4-Dichloro-p-terphenyl		µg/l	BDL (DL:0.03)
	2,5-Dichloro-o-terphenyl		µg/l	BDL (DL:0.03)
	2,5-Dichloro-m-terphenyl		µg/l	BDL (DL:0.03)
	2,5-Dichloro-p-terphenyl		µg/l	BDL (DL:0.03)
	2,4,6-Trichloro-p-terphenyl		µg/l	BDL (DL:0.03)
	2,3,5-Tetrachloro-p-terphenyl		µg/l	BDL (DL:0.03)
	2,4,4',6-Tetrachloro-p-terphenyl		µg/l	BDL (DL:0.03)
	2,3,4,5,6-Pentachloro-p-terphenyl		µg/l	BDL (DL:0.03)

For Chennai Testing Laboratory Pvt Ltd

A. Rajan
Authorized Signatory

Page 2 of 2

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The Report is issued only for the use of the address to provide the report.

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TEST REPORT

Report Number and date	CTL/CH/N-5939/2017-18 & 23.10.2017
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S. NO	PARAMETERS	METHOD	UNITS	RESULTS	
49	Poly Nuclear Aromatic Hydrocarbons (as PAH):				
		Naphthalene	APHA 22 nd Edition 6440 C CTL/SOP/WATER/102-2012	µg/l	BDL (DL:0.01)
		Acenaphthylene		µg/l	BDL (DL:0.01)
		2-Brmo-Naphthalene		µg/l	BDL (DL:0.02)
		Acenaphthene		µg/l	BDL (DL:0.02)
		Fluorene		µg/l	BDL (DL:0.02)
		Fluoranthrene		µg/l	BDL (DL:0.02)
		Anthracene		µg/l	BDL (DL:0.02)
		Pyrene		µg/l	BDL (DL:0.02)
		Fluoranthene		µg/l	BDL (DL:0.02)
		Chrysene		µg/l	BDL (DL:0.02)
		Benz[a]anthracene		µg/l	BDL (DL:0.02)
		Benzo[a]pyrene		µg/l	BDL (DL:0.02)
		Benzo[b]fluoranthene		µg/l	BDL (DL:0.03)
	Benzo[ghi]perylene	µg/l		BDL (DL:0.03)	
	Dibenz[a,h]anthracene	µg/l	BDL (DL:0.03)		
	Indeno[1,2,3-cd]pyrene	µg/l	BDL (DL:0.04)		
50	Poly Chlorinated Biphenyls (as PCB):				
		2-Chlorobiphenyl	Annes M of IS 13428-1998	µg/l	BDL (DL:0.01)
		2,3-Dichlorobiphenyl		µg/l	BDL (DL:0.01)
		2,5,4'-Trichlorobiphenyl		µg/l	BDL (DL:0.01)
		2,2',4,4'-tetrachlorobiphenyl		µg/l	BDL (DL:0.01)
		2,2',3,4',6'-Pentachlorobiphenyl		µg/l	BDL (DL:0.01)
		2,2',4,4',5,6'-Hexachlorobiphenyl		µg/l	BDL (DL:0.01)
		2,2',3,3',4,4',6'-Heptachlorobiphenyl		µg/l	BDL (DL:0.01)
	2,2',3,3',4,5,6,6'-Octachlorobiphenyl	µg/l		BDL (DL:0.01)	

For Chennai Testing Laboratory Pvt Ltd

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TEST REPORT

Report Number and date	CTL/CH/N-5939/2017-18 & 23.10.2017		
Sample Number	N-5939/17-18		
Customer Name & Address	M/s. Tamil Nadu Pollution Control Board, 76, Mount Salai, Guindy, Chennai - 600 032.		
Project At	Manali Industrial Area		
SAMPLE DETAILS			
Sample Description By Customer	Surface Water (SW2)		
Sampling Location	Buckingham Canal Downstream		
GPS Reading	13°10'31.74"N 000°17'28.38"E		
Sampling Date	10.10.2017	Sampled By	Chennai Testing Laboratory Pvt. Ltd.
Quantity Received	100ml	Sampling Method	CTL/MSP/5.7/001
Date of Receipt	10.10.2017	Sample Condition	Good & Received in Sterile Container
Analysis Starting Date	11.10.2017	Analysis Completion Date	23.10.2017

Test Results:

The above sample tested as received, and results are as follows:

S.NO	PARAMETERS	METHOD	UNITS	RESULTS
1	Total Coliform	IS 1622 : 1981 (R.2009)	MPN/100 ml	220
2	Faecal Coliform		MPN/100 ml	50

END OF REPORT

For Chennai Testing Laboratory Pvt Ltd


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Page 5 of 5

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TEST REPORT

Report Number and date	CTL/CH/N-5940/2017-18 & 23.10.2017		
Sample Number	N-5940/17-18		
Customer Name & Address	M/s. Tamil Nadu Pollution Control Board, 76, Mount Salai, Guindy, Chennai - 600 032.		
Project At	Manali Industrial Area		
SAMPLE DETAILS			
Sample Description By Customer	Surface Water (SW4)		
Sampling Location	Amullavaiyal Canal Downstream		
GPS Reading	13°10'49.81" N 080°16'11.55" E		
Sampling Date	10.10.2017	Sampled By	Chennai Testing Laboratory Pvt. Ltd.
Quantity Received	5 Litres	Sampling Method	CTL/MSP/5.7/001
Date of Receipt	10.10.2017	Sample Condition	Good & Received in Plastic Container
Analysis Starting Date	11.10.2017	Analysis Completion Date	23.10.2017

Test Results:

The above sample tested as received, and results are as follows:

S.NO	PARAMETERS	METHOD	UNITS	RESULTS
Sanitary Survey:				
1	Appearance	Physical Observation	-	Turbid Liquid
2	Colour	IS 3025 (Part 4)-1983 (R.2006)	HU	10
3	pH @ 25°C	IS 3025 (Part 11)-1983 (R.2006)	-	7.4
4	Odour	IS 3025 (Part 5)-1983 (R.2006)	-	Objectionable
5	Ecological (Presence of Animals like Fish, Insects Etc)	Physical Observation	-	Present
6	Oil & Grease	5520-O&G-B-APHA 22 nd Ed. 2012 (Partition Gravimetric Method)	mg/l	< 2
7	Total Suspended Solids	2540-D-APHA 22 nd Ed. 2012	mg/l	52
8	Dissolved Oxygen	4500-O-C-APHA 22 nd Ed. 2012	mg/l	3.9
9	Biochemical Oxygen Demand (BOD) 3 days at 27°C	5210-B-APHA 22 nd Ed. 2012	mg/l	24
10	Chemical Oxygen Demand (COD)	5220-B-APHA 22 nd Ed. 2012	mg/l	96
11	Conductivity	IS 3025 (Part 14)-1984 (R.2006)	µs/cm	3542
12	Total Dissolved Solids	2540-C-APHA 22 nd Ed. 2012	mg/l	2126
13	Nitrate - Nitrogen	4500-NO ₃ -B-APHA 22 nd Ed. 2012	mg/l	7.2
14	Nitrite - Nitrogen	4500-NO ₂ -B-APHA 22 nd Ed. 2012	mg/l	0.14

For Chennai Testing Laboratory Pvt Ltd

A. Rajan
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Page 1 of 5

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TEST REPORT

Report Number and date	CTL/CH/N-5940/2017-18 & 23.10.2017
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S.NO	PARAMETERS	METHOD	UNITS	RESULTS
15	Free Ammonia as NH ₃	4500-NH ₃ -B.C-APHA 22 nd Ed. 2012	mg/l	7.3
16	Total Residual Chlorine	IS 3025 (Part 26)-1984	mg/l	BDL (DL:0.1)
17	Cyanide as CN	IS 3025 (Part 27)-1986 (R.2009)	mg/l	BDL (DL:0.01)
18	Fluoride as F	IS 3025 (Part 60)-2008	mg/l	0.35
19	Sulphate as SO ₄	IS 3025 (Part 24)-1986 (R.2009)	mg/l	254
20	Sulphide as H ₂ S	IS 3025 (Part 29) (R.2009)	mg/l	2.8
21	Total Hardness as CaCO ₃	IS 3025 (Part 21)-1983 (R.2006)	mg/l	672
22	Dissolved Phosphate as P	4500-P-D-APHA 22 nd Ed.2012	mg/l	4.3
23	Sodium Absorption Ratio	IS 11624-1986 (R.2001)	-	6.9
24	Total Phosphorous as P	4500-P-B-D-APHA 22 nd Ed.2012	mg/l	4.8
25	Total Kjeldahl Nitrogen as N	4500-N-B-C-APHA 22 nd Ed.2012	mg/l	22.4
26	Total Ammonia	4500-Na ₃ -B.C-APHA 22 nd Ed.2012	mg/l	16.7
27	Phenols	5530-C-APHA 22 nd Ed.2012	mg/l	BDL (DL:0.001)
28	Surface Active Agents	IS 13428 -2005 (Annex K)	mg/l	BDL (DL:0.1)
29	Anionic detergent as MBAS	IS 13428 -2005 (Annex K)	mg/l	BDL (DL:0.1)
30	Hexavalent Chromium as Cr ^{VI}	3500-Cr-B-APHA 22 nd Ed. 2012	mg/l	BDL (DL:0.01)
31	Iron as Fe	IS 3025 (Part 53)-2009	mg/l	2.4
32	Boron as B	IS 3025 (Part 57)-2005	mg/l	0.64
33	Total Nitrogen	4500-N-B-C-APHA 22 nd Ed.2012	mg/l	39
34	Chloride	4500-Cl-B-APHA 22 nd Ed. 2012	mg/l	776
35	Bio - Assay (Zebra Fish) Test	IS 6582 (Part 2): 2001	-	T ₁ = 2
36	Copper as Cu	IS 3025 (Part 42)-1992 (R.2009)	mg/l	BDL (DL:0.02)
37	Manganese as Mn	3111 B APHA 22 nd Edition 2012	mg/l	0.38
38	Mercury as Hg	IS 3025 (Part 48)-1994 (R.2009)	mg/l	BDL (DL:0.001)
39	Cadmium as Cd	IS 3025 (Part 41)-1992 (R.2009)	mg/l	BDL (DL:0.002)
40	Selenium as Se	IS 3025 (Part 56)-2003(R.2009)	mg/l	BDL (DL:0.005)
41	Total Arsenic as As	IS 3025 (Part 37)-1988 (R.2009)	mg/l	BDL (DL:0.001)
42	Lead as Pb	IS 3025 (Part 47)-1994 (R.2009)	mg/l	BDL (DL:0.005)
43	Zinc as Zn	IS 3025 (Part 49)-1994 (R.2009)	mg/l	BDL (DL:0.08)
44	Total Chromium as Cr	IS 3025(Part 52)-2003	mg/l	BDL (DL:0.01)
45	Nickel as Ni	IS 3025 (Part 54)	mg/l	BDL (DL:0.01)
46	Vanadium as V	3111-B-APHA 22 nd Ed.2012	mg/l	BDL (DL:2.0)

T₁ = Toxicity Factor

Note: T₁ = 16, it shows that all or some of the fish die in the test solution for a T value, less than 16 (1 part of waste water + 15 part of dilution water) and all are alive in test solutions for a T value of 16 and above, after 48 hrs.

For Chennai Testing Laboratory Pvt Ltd

A. Rajan
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Page 2 of 3

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TEST REPORT

Report Number and date	CTL/CR/N-5940/2017-18 & 23.10.2017
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S. NO	PARAMETERS	METHOD	UNITS	RESULTS
47	Organo chlorine Pesticides (OCP):			
	Aldrin	CTL/SOP/WATER/101-2012 APHA 22 nd Edition 2012-6630 B	µg/l	BDL (DL:0.01)
	Dieldrin		µg/l	BDL (DL:0.01)
	Endosulfan alpha		µg/l	BDL (DL:0.01)
	Endosulfan Beta		µg/l	BDL (DL:0.01)
	Endosulfan Sulfate		µg/l	BDL (DL:0.01)
	o,p'-DDT		µg/l	BDL (DL:0.01)
	p,p'-DDT		µg/l	BDL (DL:0.01)
	p,p'-DDE		µg/l	BDL (DL:0.01)
	o,p'-DDE		µg/l	BDL (DL:0.01)
	o,p'-DDD		µg/l	BDL (DL:0.01)
	p,p'-DDD		µg/l	BDL (DL:0.01)
	Alpha HCH		µg/l	BDL (DL:0.01)
	Beta HCH		µg/l	BDL (DL:0.01)
Gamma HCH (Lindane)	µg/l		BDL (DL:0.01)	
Delta HCH	µg/l	BDL (DL:0.01)		
48	Poly Chlorinated Terphenyls (as PCT):			
	o-Terphenyl	CTL/SOP/WATER/159-2017	µg/l	BDL (DL:0.03)
	m-Terphenyl		µg/l	BDL (DL:0.03)
	p-Terphenyl		µg/l	BDL (DL:0.03)
	Tetradecachloro-o-terphenyl		µg/l	BDL (DL:0.03)
	Tetradecachloro-m-terphenyl		µg/l	BDL (DL:0.03)
	Tetradecachloro-p-terphenyl		µg/l	BDL (DL:0.03)
	4-Chloro-o-terphenyl		µg/l	BDL (DL:0.03)
	4-Chloro-p-terphenyl		µg/l	BDL (DL:0.03)
	2,4-Dichloro-p-terphenyl		µg/l	BDL (DL:0.03)
	2,5-Dichloro-o-terphenyl		µg/l	BDL (DL:0.03)
	2,5-Dichloro-m-terphenyl		µg/l	BDL (DL:0.03)
	2,5-Dichloro-p-terphenyl		µg/l	BDL (DL:0.03)
	2,4,6-Trichloro-p-terphenyl		µg/l	BDL (DL:0.03)
	2,3,5,6-Tetrachloro-p-terphenyl		µg/l	BDL (DL:0.03)
2,4,4',6-Tetrachloro-p-terphenyl	µg/l		BDL (DL:0.03)	
2,3,4,5,6-Pentachloro-p-terphenyl	µg/l	BDL (DL:0.03)		

For Chennai Testing Laboratory Pvt Ltd

A. Raju
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Page 3 of 5

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TEST REPORT

Report Number and date	CTL/CH/N-5940/2017-18 & 23.10.2017
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S. NO	PARAMETERS	METHOD	UNITS	RESULTS
49	Poly Nuclear Aromatic Hydrocarbons (as PAH):			
	Naphthalene	APHA 22 nd Edition 6440 C CTL/SOP/WATER/102-2012	µg/l	BDL (DL:0.01)
	Acenaphthylene		µg/l	BDL (DL:0.01)
	2-Bromo-Naphthalene		µg/l	BDL (DL:0.02)
	Acenaphthene		µg/l	BDL (DL:0.02)
	Fluorene		µg/l	BDL (DL:0.02)
	Phenanthrene		µg/l	BDL (DL:0.02)
	Anthracene		µg/l	BDL (DL:0.02)
	Pyrene		µg/l	BDL (DL:0.02)
	Fluoranthene		µg/l	BDL (DL:0.02)
	Chrysene		µg/l	BDL (DL:0.02)
	Benzo[a]anthracene		µg/l	BDL (DL:0.02)
	Benzo[a]pyrene		µg/l	BDL (DL:0.02)
	Benzo[b]fluoranthene		µg/l	BDL (DL:0.03)
	Benzo[ghi]perylene		µg/l	BDL (DL:0.03)
Dibenz[a,h]anthracene	µg/l		BDL (DL:0.03)	
Indeno[1,2,3-cd]pyrene	µg/l	BDL (DL:0.04)		
50	Poly Chlorinated Biphenyls (as PCB):			
	2-Chlorobiphenyl	Annex M of IS 13428-1998	µg/l	BDL (DL:0.01)
	2,3-dichlorobiphenyl		µg/l	BDL (DL:0.01)
	2,5,4'-Trichlorobiphenyl		µg/l	BDL (DL:0.01)
	2,2',4,4'-tetrachlorobiphenyl		µg/l	BDL (DL:0.01)
	2,2',3,4',6'-Pentachlorobiphenyl		µg/l	BDL (DL:0.01)
	2,2',4,4',5',6'-Hexachlorobiphenyl		µg/l	BDL (DL:0.01)
	2,2',3,3',4,4',6'-Heptachlorobiphenyl		µg/l	BDL (DL:0.01)
	2,2',3,3',4,5,6,6'-Octachlorobiphenyl		µg/l	BDL (DL:0.01)

For Chennai Testing Laboratory Pvt Ltd

A. Rajan
Authorised Signatory

TEST REPORT

Report Number and date	CTL/CH/N-5940/2017-18 & 23.10.2017		
Sample Number	N-5940/17-18		
Customer Name & Address	M/s. Tamil Nadu Pollution Control Board,		
	76, Mount Salai, Guindy, Chennai - 600 032.		
Project At	Manali Industrial Area		
SAMPLE DETAILS			
Sample Description By Customer	Surface Water (SW4)		
Sampling Location	Amulavoyal Canal Downstream		
GPS Reading	13°10'49.81" N 080°16'11.55"E		
Sampling Date	10.10.2017	Sampled By	Chennai Testing Laboratory Pvt. Ltd.,
Quantity Received	100ml	Sampling Method	CTL/MSP/5.7/001
Date of Receipt	10.10.2017	Sample Condition	Good & Received in Sterile Container
Analysis Starting Date	11.10.2017	Analysis Completion Date	23.10.2017

Test Results:

The above sample tested as received, and results are as follows:

S.NO	PARAMETERS	METHOD	UNITS	RESULTS
1	Total Coliform	IS 1622 : 1981 (IL2009)	MPN/100 ml	900
2	Faecal Coliform		MPN/100 ml	140

END OF REPORT

For Chennai Testing Laboratory Pvt Ltd


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Surface Water Analysis Result - Ranipet



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TEST REPORT

Report Number and date	CTL/CH/N-5851/2017-18 & 16.10.2017		
Sample Number	N-5851/17-18		
Customer Name & Address	M/s. Tamil Nadu Pollution Control Board, 76, Mount Salai, Guindy, Chennai - 600 032.		
Project At	Ranipet Sipcot Area, Vellore		
SAMPLE DETAILS			
Sample Description By Customer	Surface Water		
Sampling Location	Palae River		
GPS Reading	12°55' 06.30"N 079° 19' 45.47"E		
Sampling Date	06.10.2017	Sampled By	Chennai Testing Laboratory Pvt. Ltd.
Quantity Received	5 Litres	Sampling Method	CTL/MSP/5.7/001
Date of Receipt	07.10.2017	Sample Condition	Good & Received in Plastic Container
Analysis Starting Date	07.10.2017	Analysis Completion Date	14.10.2017

Test Results:

The above sample tested as received, and results are as follows:

S.NO	PARAMETERS	METHOD	UNITS	RESULTS
Sanitary Survey:				
1	Appearance	Physical Observation	-	Slightly Turbid Liquid
2	Colour	IS 3025 (Part 4)-1983 (R.2006)	HU	10
3	pH @ 25°C	IS 3025 (Part 11)-1983 (R.2006)	-	7.2
4	Odour	IS 3025 (Part 5)-1983 (R.2006)	-	Unobjectionable
5	Ecological (Presence of Animals like Fish, Insects Etc)	Physical Observation	-	Present
6	Oil & Grease	5520-O&G-B APHA 22 nd Ed. 2012 (Partition Gravimetric Method)	mg/l	< 2
7	Total Suspended Solids	2540-D- APHA 22 nd Ed.2012	mg/l	4
8	Dissolved Oxygen	4500-O-C- APHA 22 nd Ed.2012	mg/l	6.8
9	Biochemical Oxygen Demand (BOD) 3 days at 27°C	5210-B-APHA 22 nd Ed.2012	mg/l	< 2
10	Chemical Oxygen Demand (COD)	5220-B- APHA 22 nd Ed.2012	mg/l	< 4
11	Conductivity	IS 3025 (Part 14)-1984 (R.2006)	µs/cm	1130
12	Total Dissolved Solids	2540-C-APHA 22 nd Ed.2012	mg/l	600
13	Nitrate - Nitrogen	4500-NO ₃ -B-APHA 22 nd Ed.2012	mg/l	3.9
14	Nitrite - Nitrogen	4500-NO ₂ -B-APHA 22 nd Ed.2012	mg/l	BDL (DL:0.01)

For Chennai Testing Laboratory Pvt Ltd

A. Rajamani
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Page 1 of 5

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TEST REPORT

Report Number and date	CTL/CH/N-5851/2017-18 & 16.10.2017
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S.NO	PARAMETERS	METHOD	UNITS	RESULTS
15	Free Ammonia as NH ₃	4500-NH ₃ -B.C-APHA 22 nd Ed.	mg/l	BDL (DL:0.1)
16	Total Residual Chlorine	IS 3025 (Part 26)-1984	mg/l	BDL (DL:0.1)
17	Cyanide as CN	IS 3025 (Part 27)-1986 (R.2009)	mg/l	BDL (DL:0.01)
18	Fluoride as F	IS 3025 (Part 60)-2008	mg/l	0.14
19	Sulphate as SO ₄	IS 3025 (Part 24)-1986 (R.2009)	mg/l	94.3
20	Sulphide as H ₂ S	IS 3025 (Part 29) (R.2009)	mg/l	BDL (DL:0.01)
21	Total Hardness as CaCO ₃	IS 3025 (Part 21)-1983 (R.2006)	mg/l	222
22	Dissolved Phosphate as P	4500-P-D- APHA 22 nd Ed.2012	mg/l	1.4
23	Sodium Absorption Ratio	IS 11624-1986 (R.2001)	-	4.22
24	Total Phosphorous as P	4500-P-B-D-APHA 22 nd Ed.2012	mg/l	1.4
25	Total Kjeldahl Nitrogen as N	4500-N-B-C-APHA 22 nd Ed.2012	mg/l	BDL (DL:0.1)
26	Total Ammonia	4500-Na ₃ -B.C-APHA 22 nd Ed.2012	mg/l	BDL (DL:0.1)
27	Phenols	5530-C-APHA 22 nd Ed.2012	mg/l	BDL (DL:0.001)
28	Surface Active Agents	IS 1342B - 2005 (Annex K)	mg/l	BDL (DL:0.1)
29	Anionic detergent as MBAS	IS 1342B - 2005 (Annex K)	mg/l	BDL (DL:0.1)
30	Hexavalent Chromium as Cr ^{VI}	3500-Cr-B-APHA 22 nd Ed. 2012	mg/l	BDL (DL:0.01)
31	Iron as Fe	IS 3025 (Part 53)-2009	mg/l	0.42
32	Boron as B	IS 3025 (Part 57)-2005	mg/l	BDL (DL:0.1)
33	Total Nitrogen	4500-N-B-C-APHA 22 nd Ed.2012	mg/l	4.1
34	Chloride	4500-Cl-B-APHA 22 nd Ed. 2012	mg/l	185
35	Bio - Assay (Zebra Fish) Test	IS 6582 (Part 2): 2001	-	T ₇ = 1
36	Copper as Cu	IS 3025 (Part 42)-1992 (R.2009)	mg/l	BDL (DL:0.02)
37	Manganese as Mn	3111-B-APHA 22 nd Edition 2012	mg/l	0.10
38	Mercury as Hg	IS 3025 (Part 46)-1994 (R.2009)	mg/l	EDL (DL:0.001)
39	Cadmium as Cd	IS 3025 (Part 41)-1992 (R.2009)	mg/l	BDL (DL:0.002)
40	Selenium as Se	IS 3025 (Part 56)-2003(R.2009)	mg/l	EDL (DL:0.005)
41	Total Arsenic as As	IS 3025 (Part 37)-1988 (R.2009)	mg/l	EDL (DL:0.001)
42	Lead as Pb	IS 3025 (Part 47)-1994 (R.2009)	mg/l	EDL (DL:0.005)
43	Zinc as Zn	IS 3025 (Part 49)-1994 (R.2009)	mg/l	BDL (DL:0.08)
44	Total Chromium as Cr	IS 3025(Part 52)-2003	mg/l	BDL (DL:0.01)
45	Nickel as Ni	IS 3025 (Part 54)	mg/l	BDL (DL:0.01)
46	Vanadium as V	3111-B-APHA 22 nd Ed.2012	mg/l	BDL (DL:2.0)

T₇ = Toxicity Factor

Note: T₇ = 16, it shows that all or some of the fish die in the test solution for a T value less than 16 (1 part of waste water + 15 part of dilution water) and all are alive in test solution for a T value of 16 and above, after 96 hrs.

For Chennai Testing Laboratory Pvt Ltd

A. Rajmuni
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Page 2 of 5

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TEST REPORT

Report Number and date	CTL/CH/N-5851/2017-18 & 16.10.2017
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S. NO	PARAMETERS	METHOD	UNITS	RESULTS
47	Organo chlorine Pesticides (OCP):			
	Aldrin	CTL/SOP/WATER/101-2012 APHA 22 nd Edition 2012-6630 B	µg/l	BDL (DL-0.01)
	Dieldrin		µg/l	BDL (DL-0.01)
	Endosulfan alpha		µg/l	BDL (DL-0.01)
	Endosulfan Beta		µg/l	BDL (DL-0.01)
	Endosulfan Sulfate		µg/l	BDL (DL-0.01)
	o,p'-DDT		µg/l	BDL (DL-0.01)
	p,p'-DDT		µg/l	BDL (DL-0.01)
	p,p'-DDE		µg/l	BDL (DL-0.01)
	o,p'-DDE		µg/l	BDL (DL-0.01)
	o,p'-DDD		µg/l	BDL (DL-0.01)
	p,p'-DDD		µg/l	BDL (DL-0.01)
	Alpha HCH		µg/l	BDL (DL-0.01)
	Beta HCH		µg/l	BDL (DL-0.01)
	Gamma HCH (Lindane)		µg/l	BDL (DL-0.01)
Delta HCH	µg/l		BDL (DL-0.01)	
48	Poly Chlorinated Terphenyls (as PCT):			
	o-Terphenyl	CTL/SOP/WATER/159-2017	µg/l	BDL (DL-0.03)
	m-Terphenyl		µg/l	BDL (DL-0.03)
	p-Terphenyl		µg/l	BDL (DL-0.03)
	Tetradecachloro-o-terphenyl		µg/l	BDL (DL-0.03)
	Tetradecachloro-m-terphenyl		µg/l	BDL (DL-0.03)
	Tetradecachloro-p-terphenyl		µg/l	BDL (DL-0.03)
	4-Chloro-o-terphenyl		µg/l	BDL (DL-0.03)
	4-Chloro-p-terphenyl		µg/l	BDL (DL-0.03)
	2,4-Dichloro-p-terphenyl		µg/l	BDL (DL-0.03)
	2,5-Dichloro-o-terphenyl		µg/l	BDL (DL-0.03)
	2,5-Dichloro-m-terphenyl		µg/l	BDL (DL-0.03)
	2,5-Dichloro-p-terphenyl		µg/l	BDL (DL-0.03)
	2,4,6-Trichloro-p-terphenyl		µg/l	BDL (DL-0.03)
	2,3,5,6-Tetrachloro-p-terphenyl		µg/l	BDL (DL-0.03)
2,4,4',6-Tetrachloro-p-terphenyl	µg/l		BDL (DL-0.03)	
2,3,4,5,6-Pentachloro-p-terphenyl	µg/l	BDL (DL-0.03)		

For Chennai Testing Laboratory Pvt Ltd

A. Rajan
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Page 3 of 5

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TEST REPORT

Report Number and date	CTL/CH/N-5851/2017-18 & 16.10.2017
------------------------	------------------------------------

S.NO	PARAMETERS	METHOD	UNITS	RESULTS
49	Poly Nuclear Aromatic Hydrocarbons (as PAH):			
	Naphthalene	APHA 22 nd Edition 6440 C CTL/SOP/WATER/102-2012	µg/l	BDL (DL:0.01)
	Acenaphthylene		µg/l	BDL (DL:0.01)
	2-Bromo-Naphthalene		µg/l	BDL (DL:0.02)
	Acenaphthene		µg/l	BDL (DL:0.02)
	Fluorene		µg/l	BDL (DL:0.02)
	Phenanthrene		µg/l	BDL (DL:0.02)
	Anthracene		µg/l	BDL (DL:0.02)
	Pyrene		µg/l	BDL (DL:0.02)
	Fluoranthene		µg/l	BDL (DL:0.02)
	Chrysene		µg/l	BDL (DL:0.02)
	Benzo[a]anthracene		µg/l	BDL (DL:0.02)
	Benzo[a]pyrene		µg/l	BDL (DL:0.02)
	Benzo[h]fluoranthene		µg/l	BDL (DL:0.03)
	Benzo[ghi]perylene		µg/l	BDL (DL:0.03)
	Dibenz[ah]anthracene		µg/l	BDL (DL:0.03)
Indeno[1,2,3-cd]pyrene	µg/l		BDL (DL:0.04)	
50	Poly Chlorinated Biphenyls (as PCB):			
	2-Chlorobiphenyl	Annex M of IS 13428-1990	µg/l	BDL (DL:0.01)
	2,3-dichlorobiphenyl		µg/l	BDL (DL:0.01)
	2,5,4'-Trichlorobiphenyl		µg/l	BDL (DL:0.01)
	2,2',4,4'-tetrachlorobiphenyl		µg/l	BDL (DL:0.01)
	2,2',3,4,6'-Pentachlorobiphenyl		µg/l	BDL (DL:0.01)
	2,2',4,4',5,6'-Hexachlorobiphenyl		µg/l	BDL (DL:0.01)
	2,2',3,3',4,4',6'-Heptachlorobiphenyl		µg/l	BDL (DL:0.01)
2,2',3,3',4,5,6,6'-Octachlorobiphenyl	µg/l		BDL (DL:0.01)	

For Chennai Testing Laboratory Pvt Ltd

A. Rajan
Authorised Signatory

Page 4 of 5

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TEST REPORT

Report Number and date	CTL/CH/N-5851/2017-18 & 16.10.2017		
Sample Number	N-5851/17-18		
Customer Name & Address	M/s. Tamil Nadu Pollution Control Board,		
	76, Mount Salai, Guindy, Chennai - 600 032.		
Project At	Banipet Sipcot Area, Vellore		
SAMPLE DETAILS			
Sample Description By Customer	Surface Water		
Sampling Location	Palar River		
GPS Reading	12°55' 06.30"N 079° 19' 45.47"E		
Sampling Date	06.10.2017	Sampled By	Chennai Testing Laboratory Pvt. Ltd.
Quantity Received	100ml	Sampling Method	CTL/MSP /5.7/001
Date of Receipt	07.10.2017	Sample Condition	Good & Received in Sterile Container
Analysis Starting Date	07.10.2017	Analysis Completion Date	14.10.2017

Test Results:

The above sample tested as received, and results are as follows:

S.NO	PARAMETERS	METHOD	UNITS	RESULTS
1	Total Coliform	IS 1622 : 1981 (R,2009)	MPN/100 ml	11
2	Faecal Coliform		MPN/100 ml	<2

Note: < 2 can be considered as Absent

END OF REPORT

For Chennai Testing Laboratory Pvt Ltd


Authorised Signatory

Page 5 of 5

TEST REPORT

Report Number and date	CTL/CH/N-5852/2017-18 & 16.10.2017		
Sample Number	N-5852/17-18		
Customer Name & Address	M/s. Tamil Nadu Pollution Control Board, 76, Mount Sabai, Guindy, Chennai - 600 032.		
Project At	Ranipet SIPCOT Area, Vellore		
SAMPLE DETAILS			
Sample Description By Customer	Surface Water		
Sampling Location	Ezral Lake		
GPS Reading	12°56' 11.01"N 079° 19' 03.91"E		
Sampling Date	06.10.2017	Sampled By	Chennai Testing Laboratory Pvt. Ltd.
Quantity Received	5 Litres	Sampling Method	CTL/MSP/5.7/001
Date of Receipt	07.10.2017	Sample Condition	Good & Received in Plastic Container
Analysis Starting Date	07.10.2017	Analysis Completion Date	14.10.2017

Test Results

The above sample tested as received, and results are as follows:

S.NO	PARAMETERS	METHOD	UNITS	RESULTS
Sanitary Survey:				
1	Appearance	Physical Observation	-	Turbid Liquid
2	Colour	IS 3025 (Part 4)-1983 (R.2006)	HU	10
3	pH @ 25°C	IS 3025 (Part 11)-1983 (R.2006)	-	7.1
4	Odour	IS 3025 (Part 5)-1983 (R.2006)	-	Unobjectionable
5	Ecological (Presence of Animals like Fish, Insects Etc)	Physical Observation	-	Present
6	Oil & Grease	5520-O&G-B-APHA 22 nd Ed. 2012 (Partition Gravimetric Method)	mg/l	< 2
7	Total Suspended Solids	2540-D-APHA 22 nd Ed.2012	mg/l	29
8	Dissolved Oxygen	4500-O-C-APHA 22 nd Ed.2012	mg/l	6.4
9	Biochemical Oxygen Demand (BOD) 3 days at 27°C	5210-B-APHA 22 nd Ed.2012	mg/l	< 2
10	Chemical Oxygen Demand (COD)	5220-B-APHA 22 nd Ed.2012	mg/l	8
11	Conductivity	IS 3025 (Part 14)-1984 (R.2006)	µs/cm	824
12	Total Dissolved Solids	2540-C-APHA 22 nd Ed.2012	mg/l	496
13	Nitrate - Nitrogen	4500-NO ₃ -B-APHA 22 nd Ed.2012	mg/l	BDL (DL:0.1)
14	Nitrite - Nitrogen	4500-NO ₂ -B-APHA 22 nd Ed.2012	mg/l	BDL (DL:0.01)

For Chennai Testing Laboratory Pvt Ltd

A. Rajan
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TEST REPORT

Report Number and date	CTL/CH/N-5852/2017-18 & 16.10.2017
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S.NO	PARAMETERS	METHOD	UNITS	RESULTS
15	Free Ammonia as NH ₃	4500-NH ₃ -B.C-APHA 22 nd Ed.	mg/l	BDL (DL-0.1)
16	Total Residual Chlorine	15 3025 (Part 26)-1984	mg/l	BDL (DL-0.1)
17	Cyanide as CN	15 3025 (Part 27)-1986 (R.2009)	mg/l	BDL (DL-0.01)
18	Fluoride as F	15 3025 (Part 60)-2008	mg/l	0.16
19	Sulphate as SO ₄	15 3025 (Part 24)-1986 (R.2009)	mg/l	35.5
20	Sulphide as H ₂ S	15 3025 (Part 29) (R.2009)	mg/l	BDL (DL-0.01)
21	Total Hardness as CaCO ₃	15 3025 (Part 21)-1983 (R.2006)	mg/l	182
22	Dissolved Phosphate as P	4500-P-D-APHA 22 nd Ed.2012	mg/l	2.0
23	Sodium Absorption Ratio	15 11624-1986 (R.2001)	-	2.54
24	Total Phosphorous as P	4500-P-B-D-APHA 22 nd Ed.2012	mg/l	2.0
25	Total Kjeldahl Nitrogen as N	4500-N-B.C-APHA 22 nd Ed.2012	mg/l	BDL (DL-0.1)
26	Total Ammonia	4500-Na ₂ -B.C-APHA 22 nd Ed.2012	mg/l	BDL (DL-0.1)
27	Phenols	5530-C-APHA 22 nd Ed.2012	mg/l	BDL (DL-0.001)
28	Surface Active Agents	15 13428 -2005 (Annex K)	mg/l	BDL (DL-0.1)
29	Anionic detergent as MBAS	15 13428 -2005 (Annex K)	mg/l	BDL (DL-0.1)
30	Hexavalent Chromium as Cr ⁶⁺	3500-Cr-B-APHA 22 nd Ed. 2012	mg/l	BDL (DL-0.01)
31	Iron as Fe	15 3025 (Part 53)-2009	mg/l	0.5
32	Boron as B	15 3025 (Part 57)-2005	mg/l	BDL (DL-0.1)
33	Total Nitrogen	4500-N-B.C-APHA 22 nd Ed.2012	mg/l	BDL (DL-0.1)
34	Chloride	4500-Cl-B-APHA 22 nd Ed. 2012	mg/l	159
35	Bio - Assay (Zebra Fish) Test	15 6582 (Part 2): 2001	-	T _f = 1
36	Copper as Cu	15 3025 (Part 42)-1992 (R.2009)	mg/l	BDL (DL-0.02)
37	Manganese as Mn	3111-B-APHA 22 nd Edition 2012	mg/l	0.22
38	Mercury as Hg	15 3025 (Part 46)-1994 (R.2009)	mg/l	BDL (DL-0.001)
39	Cadmium as Cd	15 3025 (Part 41)-1992 (R.2009)	mg/l	BDL (DL-0.002)
40	Selenium as Se	15 3025 (Part 56)-2003(R.2009)	mg/l	BDL (DL-0.005)
41	Total Arsenic as As	15 3025 (Part 37)-1988 (R.2009)	mg/l	BDL (DL-0.001)
42	Lead as Pb	15 3025 (Part 47)-1994 (R.2009)	mg/l	BDL (DL-0.005)
43	Zinc as Zn	15 3025 (Part 49)-1994 (R.2009)	mg/l	BDL (DL-0.08)
44	Total Chromium as Cr	15 3025(Part 52)-2003	mg/l	BDL (DL-0.01)
45	Nickel as Ni	15 3025 (Part 54)	mg/l	BDL (DL-0.01)
46	Vanadium as V	3111-B-APHA 22 nd Ed.2012	mg/l	BDL (DL-2.0)

T_f = Toxicity Factor

Note: T_f = 16, it shows that all or some of the fish die in the test solution for a T value less than 16 (1 part of waste water + 15 part of dilution water) and all are alive in test solution for a T value of 16 and above, after 48 hrs.

For Chennai Testing Laboratory Pvt Ltd

A. Rajan
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Page 2 of 3

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TEST REPORT

Report Number and date	CTL/CH/N-5852/2017-18 & 16.10.2017
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S.NO	PARAMETERS	METHOD	UNITS	RESULTS
47	Organic Chlorine Pesticides (OCP):			
	Aldrin	CTL/SOP/WATER/101-2012 APHA 22 nd Edition 2012-6630 B	ug/l	BDL (DL:0.01)
	Dieldrin		ug/l	BDL (DL:0.01)
	Endosulfan alpha		ug/l	BDL (DL:0.01)
	Endosulfan Beta		ug/l	BDL (DL:0.01)
	Endosulfan Sulfate		ug/l	BDL (DL:0.01)
	o,p'-DDT		ug/l	BDL (DL:0.01)
	p,p'-DDT		ug/l	BDL (DL:0.01)
	p,p'-DDE		ug/l	BDL (DL:0.01)
	o,p'-DDE		ug/l	BDL (DL:0.01)
	o,p'-DDD		ug/l	BDL (DL:0.01)
	p,p'-DDD		ug/l	BDL (DL:0.01)
	Alpha HCH		ug/l	BDL (DL:0.01)
	Beta HCH		ug/l	BDL (DL:0.01)
Gamma HCH (Lindane)	ug/l		BDL (DL:0.01)	
Delta HCH	ug/l	BDL (DL:0.01)		
48	Poly Chlorinated Terphenyls (as PCT):			
	o-Terphenyl	CTL/SOP/WATER/159-2017	ug/l	BDL (DL:0.03)
	m-Terphenyl		ug/l	BDL (DL:0.03)
	p-Terphenyl		ug/l	BDL (DL:0.03)
	Tetradecachloro-o-terphenyl		ug/l	BDL (DL:0.03)
	Tetradecachloro-m-terphenyl		ug/l	BDL (DL:0.03)
	Tetradecachloro-p-terphenyl		ug/l	BDL (DL:0.03)
	4-Chloro-o-terphenyl		ug/l	BDL (DL:0.03)
	4-Chloro-p-terphenyl		ug/l	BDL (DL:0.03)
	2,4-Dichloro-p-terphenyl		ug/l	BDL (DL:0.03)
	2,5-Dichloro-o-terphenyl		ug/l	BDL (DL:0.03)
	2,5-Dichloro-m-terphenyl		ug/l	BDL (DL:0.03)
	2,5-Dichloro-p-terphenyl		ug/l	BDL (DL:0.03)
	2,4,6-Trichloro-p-terphenyl		ug/l	BDL (DL:0.03)
	2,3,5,6-Tetrachloro-p-terphenyl		ug/l	BDL (DL:0.03)
2,4,4',6-Tetrachloro-p-terphenyl	ug/l		BDL (DL:0.03)	
2,3,4,5,6-Pentachloro-p-terphenyl	ug/l	BDL (DL:0.03)		

For Chennai Testing Laboratory Pvt Ltd

A. Rajan
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Page 2 of 3

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TEST REPORT

Report Number and date	CTL/CH/N-5852/2017-1B & 16.10.2017
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S. NO	PARAMETERS	METHOD	UNITS	RESULTS
49	Poly Nuclear Aromatic Hydrocarbons (as PAH):			
	Naphthalene	APHA 22 nd Edition 6440 C CTL/SOP/WATER/102-2012	µg/l	BDL (DL:0.01)
	Acenaphthylene		µg/l	BDL (DL:0.01)
	2-Bromo-Naphthalene		µg/l	BDL (DL:0.02)
	Acenaphthene		µg/l	BDL (DL:0.02)
	Fluorene		µg/l	BDL (DL:0.02)
	Phenanthrene		µg/l	BDL (DL:0.02)
	Anthracene		µg/l	BDL (DL:0.02)
	Pyrene		µg/l	BDL (DL:0.02)
	Fluoranthene		µg/l	BDL (DL:0.02)
	Chrysene		µg/l	BDL (DL:0.02)
	Benzo[a]anthracene		µg/l	BDL (DL:0.02)
	Benzo[a]pyrene		µg/l	BDL (DL:0.02)
	Benzo[b]fluoranthene		µg/l	BDL (DL:0.03)
	Benzo[ghi]perylene		µg/l	BDL (DL:0.03)
	Dibenzo[ah]anthracene		µg/l	BDL (DL:0.03)
Indeno[1,2,3-cd]pyrene	µg/l		BDL (DL:0.04)	
50	Poly Chlorinated Biphenyls (as PCB):			
	2-Chlorobiphenyl	Annex M of IS 13428-1998	µg/l	BDL (DL:0.01)
	2,3-dichlorobiphenyl		µg/l	BDL (DL:0.01)
	2,5,4'-Trichlorobiphenyl		µg/l	BDL (DL:0.01)
	2,2',4,4'-tetrachlorobiphenyl		µg/l	BDL (DL:0.01)
	2,2',3,4',6'-Pentachlorobiphenyl		µg/l	BDL (DL:0.01)
	2,2',4,4',5',6'-Hexachlorobiphenyl		µg/l	BDL (DL:0.01)
	2,2',3,3',4,4',6'-Heptachlorobiphenyl		µg/l	BDL (DL:0.01)
	2,2',3,3',4,5,6,6'-Octachlorobiphenyl		µg/l	BDL (DL:0.01)

For Chennai Testing Laboratory Pvt Ltd

A. Rajan
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Page 4 of 5

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TEST REPORT

Report Number and date	CTL/CH/N-5852/2017-18 & 16.10.2017		
Sample Number	N-5852/17-18		
Customer Name & Address	M/s. Tamil Nadu Pollution Control Board, 76, Mount Salai, Guindy, Chennai - 600 032.		
Project At	Ranipet Sipcot Area, Vellore		
SAMPLE DETAILS			
Sample Description By Customer	Surface Water		
Sampling Location	Kurai Lake		
GPS Reading	12°56' 11.01"N 079° 19' 03.91"E		
Sampling Date	06.10.2017	Sampled By	Chennai Testing Laboratory Pvt. Ltd.
Quantity Received	100ml	Sampling Method	CTL/MSR/5.7/001
Date of Receipt	07.10.2017	Sample Condition	Good & Received in Sterile Container
Analysis Starting Date	07.10.2017	Analysis Completion Date	14.10.2017

Test Results:

The above sample tested as received, and results are as follows:

S.NO	PARAMETERS	METHOD	UNITS	RESULTS
1	Total Coliform	IS 1622: 1981 (R2009)	MPN/100 ml	50
2	Faecal Coliform		MPN/100 ml	<2

Note: < 2 can be considered as Absent

END OF REPORT

For Chennai Testing Laboratory Pvt Ltd


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TEST REPORT

Report Number and date	CTL/CH/N-5853/2017-18 & 16.10.2017		
Sample Number	N-5853/17-18		
Customer Name & Address	M/s. Tamil Nadu Pollution Control Board, 76, Mount Salai, Gaiindy, Chennai - 600 032.		
Project At	Ramipet Sipcot Area, Vellore		
SAMPLE DETAILS			
Sample Description By Customer	Surface Water		
Sampling Location	Puliyagattu Village		
GPS Reading	12°56' 55.45"N 079° 17' 34.64"E		
Sampling Date	06.10.2017	Sampled By	Chennai Testing Laboratory Pvt. Ltd.
Quantity Received	5 Litres	Sampling Method	CTL/MSP/5.7/001
Date of Receipt	07.10.2017	Sample Condition	Good & Received in Plastic Container
Analysis Starting Date	07.10.2017	Analysis Completion Date	14.10.2017

Test Results

The above sample tested as received, and results are as follows:

S.NO	PARAMETERS	METHOD	UNITS	RESULTS
Sanitary Survey:				
1	Appearance	Physical Observation	-	Turbid Liquid
2	Colour	IS 3025 (Part 4)-1983 (R.2006)	HU	10
3	pH @ 25°C	IS 3025 (Part 11)-1983 (R.2006)	-	7.1
4	Odour	IS 3025 (Part 5)-1983 (R.2006)	-	Unobjectionable
5	Ecological (Presence of Animals like Fish, Insects Etc)	Physical Observation	-	Present
6	Oil & Grease	5520-O&G-B APHA 22 nd Ed. 2012 (Partition Gravimetric Method)	mg/l	< 2
7	Total Suspended Solids	2540-D- APHA 22 nd Ed.2012	mg/l	19
8	Dissolved Oxygen	4500-O-C- APHA 22 nd Ed.2012	mg/l	6.3
9	Biochemical Oxygen Demand (BOD) 3 days at 27°C	5210-B-APHA 22 nd Ed.2012	mg/l	< 2
10	Chemical Oxygen Demand (COD)	5220-B- APHA 22 nd Ed.2012	mg/l	12
11	Conductivity	IS 3025 (Part 14)-1984 (R.2006)	µs/cm	1042
12	Total Dissolved Solids	2540-C-APHA 22 nd Ed.2012	mg/l	624
13	Nitrate - Nitrogen	4500-NO ₃ -B-APHA 22 nd Ed.2012	mg/l	0.74
14	Nitrite - Nitrogen	4500-NO ₂ -B-APHA 22 nd Ed.2012	mg/l	BDL (DL-0.01)

For Chennai Testing Laboratory Pvt Ltd

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TEST REPORT

Report Number and date	CTL/CH/N-5053/2017-10 & 16.10.2017
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S.NO	PARAMETERS	METHOD	UNITS	RESULTS
15	Free Ammonia as NH ₃	4500-NH ₃ - B.C-APHA 22 nd Ed.	mg/l	BDL (DL:0.1)
16	Total Residual Chlorine	IS 3025 (Part 26)-1984	mg/l	BDL (DL:0.1)
17	Cyanide as CN	IS 3025 (Part 27)-1986 (R.2009)	mg/l	BDL (DL:0.01)
18	Fluoride as F	IS 3025 (Part 60)-2008	mg/l	0.24
19	Sulphate as SO ₄	IS 3025 (Part 24)-1986 (R.2009)	mg/l	93.2
20	Sulphide as H ₂ S	IS 3025 (Part 29) (R.2009)	mg/l	BDL (DL:0.01)
21	Total Hardness as CaCO ₃	IS 3025 (Part 21)-1983 (R.2006)	mg/l	273
22	Dissolved Phosphate as P	4500-P-D-APHA 22 nd Ed.2012	mg/l	1.5
23	Sodium Absorption Ratio	IS 11624-1986 (R.2001)	-	2.51
24	Total Phosphorous as P	4500-P-B-D-APHA 22 nd Ed.2012	mg/l	1.5
25	Total Kjeldahl Nitrogen as N	4500-N-B.C-APHA 22 nd Ed.2012	mg/l	BDL (DL:0.1)
26	Total Ammonia	4500-Na ₂ -B.C-APHA 22 nd Ed.2012	mg/l	BDL (DL:0.1)
27	Phenols	5530-C-APHA 22 nd Ed.2012	mg/l	BDL (DL:0.001)
28	Surface Active Agents	IS 13428-2005 (Annex K)	mg/l	BDL (DL:0.1)
29	Anionic detergent as MBAS	IS 13428-2005 (Annex K)	mg/l	BDL (DL:0.1)
30	Hexavalent Chromium as Cr ⁶⁺	3500-Cr-B-APHA 22 nd Ed. 2012	mg/l	BDL (DL:0.01)
31	Iron as Fe	IS 3025 (Part 53)-2009	mg/l	0.40
32	Boron as B	IS 3025 (Part 57)-2005	mg/l	BDL (DL:0.1)
33	Total Nitrogen	4500-N-B.C-APHA 22 nd Ed.2012	mg/l	0.94
34	Chloride	4500-C-B-APHA 22 nd Ed. 2012	mg/l	175
35	Bla - Assay (Zebra Fish) Test	IS 6582 (Part 2): 2001	-	T ₁ = 1
36	Copper as Cu	IS 3025 (Part 42)-1992 (R.2009)	mg/l	BDL (DL:0.02)
37	Manganese as Mn	3111-B-APHA 22 nd Edition 2012	mg/l	0.11
38	Mercury as Hg	IS 3025 (Part 48)-1994 (R.2009)	mg/l	BDL (DL:0.001)
39	Cadmium as Cd	IS 3025 (Part 41)-1992 (R.2009)	mg/l	BDL (DL:0.002)
40	Selenium as Se	IS 3025 (Part 56)-2003(R.2009)	mg/l	BDL (DL:0.005)
41	Total Arsenic as As	IS 3025 (Part 37)-1988 (R.2009)	mg/l	BDL (DL:0.001)
42	Lead as Pb	IS 3025 (Part 47)-1994 (R.2009)	mg/l	BDL (DL:0.005)
43	Zinc as Zn	IS 3025 (Part 49)-1994 (R.2009)	mg/l	BDL (DL:0.08)
44	Total Chromium as Cr	IS 3025(Part 52)-2003	mg/l	BDL (DL:0.01)
45	Nickel as Ni	IS 3025 (Part 54)	mg/l	BDL (DL:0.01)
46	Vanadium as V	3111-B-APHA 22 nd Ed.2012	mg/l	BDL (DL:2.0)

T₁ = Toxicity Factor

Note: T₁ = 16, it shows that all or some of the fish die in the test solution for a T value, less than 16 (1 part of waste water + 15 part of dilution water) and all are alive in test solutions for a T value of 16 and above, after 48 hrs.

For Chennai Testing Laboratory Pvt Ltd

A. Rajan
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Page 2 of 5

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TEST REPORT

Report Number and date	CTL/CH/N-5853/2017-18 & 16.10.2017
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S.NO	PARAMETERS	METHOD	UNITS	RESULTS
	Organo chlorine Pesticides (OCP):			
47	Aldrin	CTL/SOP/WATER/101-2012 APHA 22 nd Edition 2012-6630 B	µg/l	BDL (DL-0.01)
	Dieldrin		µg/l	BDL (DL-0.01)
	Endosulfan alpha		µg/l	BDL (DL-0.01)
	Endosulfan Beta		µg/l	BDL (DL-0.01)
	Endosulfan Sulfate		µg/l	BDL (DL-0.01)
	o,p'-DDT		µg/l	BDL (DL-0.01)
	p,p'-DDT		µg/l	BDL (DL-0.01)
	p,p'-DDE		µg/l	BDL (DL-0.01)
	o,p'-DDE		µg/l	BDL (DL-0.01)
	o,p'-DDD		µg/l	BDL (DL-0.01)
	p,p'-DDD		µg/l	BDL (DL-0.01)
	Alpha HCH		µg/l	BDL (DL-0.01)
	Beta HCH		µg/l	BDL (DL-0.01)
	Gamma HCH (Lindane)		µg/l	BDL (DL-0.01)
Delta HCH	µg/l	BDL (DL-0.01)		
	Poly Chlorinated Terphenyls (as PCT):			
48	o-Terphenyl	CTL/SOP/WATER/159-2017	µg/l	BDL (DL-0.03)
	m-Terphenyl		µg/l	BDL (DL-0.03)
	p-Terphenyl		µg/l	BDL (DL-0.03)
	Tetradecachloro-o-terphenyl		µg/l	BDL (DL-0.03)
	Tetradecachloro-m-terphenyl		µg/l	BDL (DL-0.03)
	Tetradecachloro-p-terphenyl		µg/l	BDL (DL-0.03)
	4-Chloro-o-terphenyl		µg/l	BDL (DL-0.03)
	4-Chloro-p-terphenyl		µg/l	BDL (DL-0.03)
	2,4-Dichloro-p-terphenyl		µg/l	BDL (DL-0.03)
	2,5-Dichloro-o-terphenyl		µg/l	BDL (DL-0.03)
	2,5-Dichloro-m-terphenyl		µg/l	BDL (DL-0.03)
	2,5-Dichloro-p-terphenyl		µg/l	BDL (DL-0.03)
	2,4,6-Trichloro-p-terphenyl		µg/l	BDL (DL-0.03)
	2,3,5,6-Tetrachloro-p-terphenyl		µg/l	BDL (DL-0.03)
	2,4,4',6-Tetrachloro-p-terphenyl		µg/l	BDL (DL-0.03)
2,3,4,5,6-Pentachloro-p-terphenyl	µg/l	BDL (DL-0.03)		

For Chennai Testing Laboratory Pvt Ltd

A. Rajan
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Page 3 of 5

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TEST REPORT

Report Number and date	CTL/CH/N-5853/2017-18 & 16.10.2017
------------------------	------------------------------------

S.NO	PARAMETERS	METHOD	UNITS	RESULTS	
49	Poly Nuclear Aromatic Hydrocarbons (as PAH):				
		Naphthalene	APHA 22 nd Edition 6440 C. CTL/SOP/WATER/102-2012	µg/l	BDL (DL:0.01)
		Acenaphthylene		µg/l	BDL (DL:0.01)
		2-Bromo-Naphthalene		µg/l	BDL (DL:0.02)
		Acenaphthene		µg/l	BDL (DL:0.02)
		Fluorene		µg/l	BDL (DL:0.02)
		Phenanthrene		µg/l	BDL (DL:0.02)
		Anthracene		µg/l	BDL (DL:0.02)
		Pyrene		µg/l	BDL (DL:0.02)
		Fluoranthene		µg/l	BDL (DL:0.02)
		Chrysene		µg/l	BDL (DL:0.02)
		Benzo[a]anthracene		µg/l	BDL (DL:0.02)
		Benzo[a]pyrene		µg/l	BDL (DL:0.02)
		Benzo[b]fluoranthene		µg/l	BDL (DL:0.03)
		Benzo[ghi]perylene		µg/l	BDL (DL:0.03)
		Dibenz[a,h]anthracene		µg/l	BDL (DL:0.03)
	Indeno[1,2,3-cd]pyrene	µg/l		BDL (DL:0.04)	
50	Poly Chlorinated Biphenyls (as PCB):				
		2-Chlorobiphenyl	Annex M of IS 13428-1998	µg/l	BDL (DL:0.01)
		2,3-dichlorobiphenyl		µg/l	BDL (DL:0.01)
		2,5,4-Trichlorobiphenyl		µg/l	BDL (DL:0.01)
		2,2',4,4'-tetrachlorobiphenyl		µg/l	BDL (DL:0.01)
		2,2',3,4',6'-Pentachlorobiphenyl		µg/l	BDL (DL:0.01)
		2,2',4,4',5',6'-Hexachlorobiphenyl		µg/l	BDL (DL:0.01)
		2,2',3,3',4,4',6'-Heptachlorobiphenyl		µg/l	BDL (DL:0.01)
	2,2',3,3',4,5,6,6'-Octachlorobiphenyl	µg/l		BDL (DL:0.01)	

For Chennai Testing Laboratory Pvt Ltd

A. Rajan
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Page 4 of 5

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TEST REPORT

Report Number and date	CTL/CH/N-5853/2017-18 & 16.10.2017		
Sample Number	N-5853/17-18		
Customer Name & Address	M/s. Tamil Nadu Pollution Control Board,		
	76, Mount Salai, Guindy, Chennai - 600 032.		
Project At	Ranipet Sipcot Area , Vellore		
SAMPLE DETAILS			
Sample Description By Customer	Surface Water		
Sampling Location	Puliyaganu Village		
GPS Reading	12°56' 55.45"N 079° 17' 34.64"E		
Sampling Date	06.10.2017	Sampled By	Chennai Testing Laboratory Pvt. Ltd.
Quantity Received	100ml	Sampling Method	CTL/MSP/5.7/001
Date of Receipt	07.10.2017	Sample Condition	Good & Received in Sterile Container
Analysis Starting Date	07.10.2017	Analysis Completion Date	14.10.2017

Test Results:

The above sample tested as received, and results are as follows:

S.NO	PARAMETERS	METHOD	UNITS	RESULTS
1	Total Coliform	IS 1622 : 1981 (R2009)	MPN/100 ml	23
2	Faecal Coliform		MPN/100 ml	< 2

Note: < 2 can be considered as Absent

END OF REPORT

For Chennai Testing Laboratory Pvt Ltd



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Page 5 of 5

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Surface Water Analysis Result - Cuddalore



CIN : U74999TN2008PTC007568

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TEST REPORT

Report Number and date:	CTL/CH/N-5655/2017-18 & 12.10.2017		
Sample Number	N-5655/18-17		
Customer Name & Address	M/s. Tamil Nadu Pollution Control Board, 76, Mount Salai, Guindy, Chennai - 600 032.		
Project At	Cuddalore - SIPCOT Complex		
SAMPLE DETAILS			
Sample Description By Customer	Surface Water		
Sampling Location	Pondankuppam Village Upstream of Uppamar River		
GPS Reading	11°37' 43.97"N 079° 43' 57.55"E		
Sampling Date	29.09.2017	Sampled By	Chennai Testing Laboratory Pvt. Ltd.
Quantity Received	5 Litres	Sampling Method	CTL/MSP/5.7/001
Date of Receipt	30.09.2017	Sample Condition	Good & Received in Plastic Container
Analysis Starting Date	30.09.2017	Analysis Completion Date	11.10.2017

Test Results:

The above sample tested as received, and results are as follows:

S.NO	PARAMETERS	METHOD	UNITS	RESULTS
Sanitary Survey:				
1	Appearance	Physical Observation	-	Slightly Turbid Liquid
2	Colour	IS 3025 (Part 4)-1983 (R.2006)	HU	2
3	pH @ 25°C	IS 3025 (Part 11)-1983 (R.2006)	-	7.1
4	Odour	IS 3025 (Part 5)-1983 (R.2006)	-	Unobjectionable
5	Ecological (Presence of Animals like Fish, Insects Etc)	Physical Observation	-	Present
6	Oil & Grease	5520-O&G-B APHA 22 nd Ed. 2012 (Partition Gravimetric Method)	mg/l	<2
7	Total Suspended Solids	2540-D- APHA 22 nd Ed.2012	mg/l	25
8	Dissolved Oxygen	4500-D-C- APHA 22 nd Ed.2012	mg/l	6.3
9	Biochemical Oxygen Demand (BOD) 3 days at 27°C	5210-B-APHA 22 nd Ed.2012	mg/l	<2
10	Chemical Oxygen Demand (COD)	5220-B- APHA 22 nd Ed.2012	mg/l	<4
11	Conductivity	IS 3025 (Part 14)-1984 (R.2006)	µs/cm	2758
12	Total Dissolved Solids	2540-C-APHA 22 nd Ed.2012	mg/l	1650
13	Nitrate - Nitrogen	4500-NO ₃ -B-APHA 22 nd Ed.2012	mg/l	1.0
14	Nitrite - Nitrogen	4500-NO ₂ -B-APHA 22 nd Ed.2012	mg/l	BDL (DL:0.01)

For Chennai Testing Laboratory Pvt Ltd

A. D. J. [Signature]
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TEST REPORT

Report Number and date	CTL/CH/N-5655/2017-18 & 12.10.2017
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S.NO	PARAMETERS	METHOD	UNITS	RESULTS
15	Free Ammonia as NH ₃	4500-NH ₃ - B.C-APHA 22 nd Ed.	mg/l	BDL (DL:0.1)
16	Total Residual Chlorine	IS 3025 (Part 26)-1984	mg/l	BDL (DL:0.1)
17	Cyanide as CN	IS 3025 (Part 27)-1986 (R.2009)	mg/l	BDL (DL:0.01)
18	Fluoride as F	IS 3025 (Part 60)-2008	mg/l	0.18
19	Sulphate as SO ₄	IS 3025 (Part 24)-1986 (R.2009)	mg/l	344
20	Sulphide as H ₂ S	IS 3025 (Part 29) (R.2009)	mg/l	BDL (DL:0.01)
21	Total Hardness as CaCO ₃	IS 3025 (Part 31)-1983 (R.2006)	mg/l	455
22	Dissolved Phosphate as P	4500-P-D- APHA 22 nd Ed.2012	mg/l	0.2
23	Sodium Absorption Ratio	IS 11624-1986 (R.2001)	-	6.9
24	Total Phosphorous as P	4500-P-B-D-APHA 22 nd Ed.2012	mg/l	0.2
25	Total Kjeldahl Nitrogen as N	4500-N-B-C-APHA 22 nd Ed.2012	mg/l	BDL (DL:0.1)
26	Total Ammonia	4500-Na ₃ -B-C-APHA 22 nd Ed.2012	mg/l	BDL (DL:0.1)
27	Phenols	5530-C-APHA 22 nd Ed.2012	mg/l	BDL (DL:0.001)
28	Surface Active Agents	IS 13428 - 2005 (Annex K)	mg/l	BDL (DL:0.1)
29	Anionic detergent as MBAS	IS 13428 - 2005 (Annex K)	mg/l	BDL (DL:0.1)
30	Hexavalent Chromium as Cr ⁶⁺	3500-Cr-B-APHA 22 nd Ed. 2012	mg/l	BDL (DL:0.01)
31	Iron as Fe	IS 3025 (Part 53)-2009	mg/l	0.63
32	Boron as B	IS 3025 (Part 57)-2005	mg/l	BDL (DL:0.1)
33	Total Nitrogen	4500-N-B-C-APHA 22 nd Ed.2012	mg/l	1.6
34	Chloride	4500-Cl-B-APHA 22 nd Ed. 2012	mg/l	544
35	Bio - Assay (Zebra Fish) Test	IS 6582 (Part 2): 2001	-	T ₁ = 1
36	Copper as Cu	IS 3025 (Part 42)-1992 (R.2009)	mg/l	1.29
37	Manganese as Mn	3111-B-APHA 22 nd Edition 2012	mg/l	0.09
38	Mercury as Hg	IS 3025 (Part 48)-1994 (R.2009)	mg/l	BDL (DL:0.001)
39	Cadmium as Cd	IS 3025 (Part 41)-1992 (R.2009)	mg/l	BDL (DL:0.002)
40	Selenium as Se	IS 3025 (Part 56)-2003(R.2009)	mg/l	BDL (DL:0.005)
41	Total Arsenic as As	IS 3025 (Part 37)-1988 (R.2009)	mg/l	BDL (DL:0.001)
42	Lead as Pb	IS 3025 (Part 47)-1994 (R.2009)	mg/l	BDL (DL:0.005)
43	Zinc as Zn	IS 3025 (Part 49)-1994 (R.2009)	mg/l	0.25
44	Total Chromium as Cr	IS 3025(Part 52)-2003	mg/l	BDL (DL:0.01)
45	Nickel as Ni	IS 3025 (Part 54)	mg/l	BDL (DL:0.01)
46	Vanadium as V	3111-B-APHA 22 nd Ed.2012	mg/l	BDL (DL:2.0)

T₁ = Toxicity Factor

Note: T₁ = 10, it shows that all or some of the fish die in the test solution for a T value less than 10 (1 part of waste water + 15 part of dilution water) and all are alive in test solutions for a T value of 10 and above, after 48 hrs.

For Chennai Testing Laboratory Pvt Ltd

A. Rajan
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TEST REPORT

Report Number and date	CTL/CH/N-5655/2017-18 & 12.10.2017
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S.NO	PARAMETERS	METHOD	UNITS	RESULTS
	Organo chlorine Pesticides (OCP):			
47	Aldrin	CTL/SOP/WATER/101-2012 APHA 22 nd Edition 2012-6630 B	µg/l	BDL (DL:0.01)
	Dieldrin		µg/l	BDL (DL:0.01)
	Endosulfan alpha		µg/l	BDL (DL:0.01)
	Endosulfan Beta		µg/l	BDL (DL:0.01)
	Endosulfan Sulfate		µg/l	BDL (DL:0.01)
	o,p'-DDT		µg/l	BDL (DL:0.01)
	p,p'-DDT		µg/l	BDL (DL:0.01)
	p,p'-DDE		µg/l	BDL (DL:0.01)
	o,p'-DDE		µg/l	BDL (DL:0.01)
	o,p'-DDD		µg/l	BDL (DL:0.01)
	p,p'-DDD		µg/l	BDL (DL:0.01)
	Alpha HCH		µg/l	BDL (DL:0.01)
	Beta HCH		µg/l	BDL (DL:0.01)
	Gamma HCH (Lindane)		µg/l	BDL (DL:0.01)
Delta HCH	µg/l	BDL (DL:0.01)		
	Poly Chlorinated Terphenyls (as PCT):			
48	o-Terphenyl	CTL/SOP/WATER/159-2017	µg/l	BDL (DL:0.03)
	m-Terphenyl		µg/l	BDL (DL:0.03)
	p-Terphenyl		µg/l	BDL (DL:0.03)
	Tetradecachloro-o-terphenyl		µg/l	BDL (DL:0.03)
	Tetradecachloro-m-terphenyl		µg/l	BDL (DL:0.03)
	Tetradecachloro-p-terphenyl		µg/l	BDL (DL:0.03)
	4-Chloro-o-terphenyl		µg/l	BDL (DL:0.03)
	4-Chloro-p-terphenyl		µg/l	BDL (DL:0.03)
	2,4-Dichloro-p-terphenyl		µg/l	BDL (DL:0.03)
	2,5-Dichloro-o-terphenyl		µg/l	BDL (DL:0.03)
	2,5-Dichloro-m-terphenyl		µg/l	BDL (DL:0.03)
	2,5-Dichloro-p-terphenyl		µg/l	BDL (DL:0.03)
	2,4,6-Trichloro-p-terphenyl		µg/l	BDL (DL:0.03)
	2,3,5,6-Tetrachloro-p-terphenyl		µg/l	BDL (DL:0.03)
	2,4,4',6-Tetrachloro-p-terphenyl		µg/l	BDL (DL:0.03)
	2,3,4,5,6-Pentachloro-p-terphenyl		µg/l	BDL (DL:0.03)

For Chennai Testing Laboratory Pvt Ltd

A. Rajan
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TEST REPORT

Report Number and date	CTL/CH/N-5655/2017-18 & 12.10.2017
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S.NO	PARAMETERS	METHOD	UNITS	RESULTS
49	Poly Nuclear Aromatic Hydrocarbons (as PAH):			
	Naphthalene	APHA 22 nd Edition 6440 C CTL/SOP/WATER/102-2012	µg/l	BDL (DL:0.01)
	Acenaphthylene		µg/l	BDL (DL:0.01)
	2-Bromo-Naphthalene		µg/l	BDL (DL:0.02)
	Acenaphthene		µg/l	BDL (DL:0.02)
	Fluorene		µg/l	BDL (DL:0.02)
	Phenanthrene		µg/l	BDL (DL:0.02)
	Anthracene		µg/l	BDL (DL:0.02)
	Pyrene		µg/l	BDL (DL:0.02)
	Fluoranthene		µg/l	BDL (DL:0.02)
	Chrysene		µg/l	BDL (DL:0.02)
	Benzo[a]anthracene		µg/l	BDL (DL:0.02)
	Benzo[a]pyrene		µg/l	BDL (DL:0.02)
	Benzo[b]fluoranthene		µg/l	BDL (DL:0.03)
	Benzo[ghi]perylene		µg/l	BDL (DL:0.03)
	Dibenz[a,h]anthracene		µg/l	BDL (DL:0.03)
Indeno[1,2,3-cd]pyrene	µg/l		BDL (DL:0.04)	
50	Poly Chlorinated Biphenyls (as PCB):			
	2-Chlorobiphenyl	Ames M of IS 13428-1998	µg/l	BDL (DL:0.01)
	2,3-dichlorobiphenyl		µg/l	BDL (DL:0.01)
	2,5,4'-Trichlorobiphenyl		µg/l	BDL (DL:0.01)
	2,2',4,4'-tetrachlorobiphenyl		µg/l	BDL (DL:0.01)
	2,2',3,4',6'-Pentachlorobiphenyl		µg/l	BDL (DL:0.01)
	2,2',4,4',5',6'-Hexachlorobiphenyl		µg/l	BDL (DL:0.01)
	2,2',3,3',4,4',6'-Heptachlorobiphenyl		µg/l	BDL (DL:0.01)
	2,2',3,3',4,5,6,6'-Octachlorobiphenyl		µg/l	BDL (DL:0.01)

For Chennai Testing Laboratory Pvt Ltd

A. Rajan
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Page 4 of 5

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TEST REPORT

Report Number and date:	CTL/CH/N-5655/2017-18 & 12.10.2017		
Sample Number	N-5655/16-17		
Customer Name & Address	M/s. Tamil Nadu Pollution Control Board,		
	76, Mount Salai, Guindy, Chennai - 600 032.		
Project At	Cuddalore - SIPCOT Complex		
SAMPLE DETAILS			
Sample Description By Customer	Surface Water		
Sampling Location	Pondiakuppam Village Upstream of Uppanar River		
GPS Reading	11°37' 43.97"N 079° 43' 57.55"E		
Sampling Date	29.09.2017	Sampled By	Chennai Testing Laboratory Pvt. Ltd.,
Quantity Received	100ml	Sampling Method	CTL/MSP/5.7/001
Date of Receipt	30.09.2017	Sample Condition	Good & Received in Sterile Container
Analysis Starting Date	30.09.2017	Analysis Completion Date	11.10.2017

Test Results:

The above sample tested as received, and results are as follows:

SNO	PARAMETERS	METHOD	UNITS	RESULTS
1	Total Coliform	IS 1622 : 1981 (R.2009)	MPN/100 ml	<2
2	Faecal Coliform		MPN/100 ml	<2

Note: < 2 can be considered as Absent

END OF REPORT

For Chennai Testing Laboratory Pvt Ltd


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TEST REPORT

Report Number and date	CTL/CH/N-5656/2017-10 & 12.10.2017		
Sample Number	N-5656/16-17		
Customer Name & Address	M/s. Tamil Nadu Pollution Control Board, 76, Mount Salai, Guindy, Chennai - 600 032.		
Project At	Cuddalore - SIPCOT Complex		
SAMPLE DETAILS			
Sample Description By Customer	Surface Water		
Sampling Location	Nochkadu Village Upstream of Uppanar River		
GPS Reading	11°30' 09.07"N 079° 44' 36.32"E		
Sampling Date	29.09.2017	Sampled By	Chennai Testing Laboratory Pvt. Ltd.
Quantity Received	5 Litres	Sampling Method	CTL/MSP/5.7/001
Date of Receipt	30.09.2017	Sample Condition	Good & Received in Plastic Container
Analysis Starting Date	30.09.2017	Analysis Completion Date	11.10.2017

Test Results:

The above sample tested as received, and results are as follows:

S.NO	PARAMETERS	METHOD	UNITS	RESULTS
Sanitary Survey:				
1	Appearance	Physical Observation	-	Slightly turbid liquid
2	Colour	IS 3025 (Part 4)-1983 (R.2006)	BU	2
3	pH @ 25°C	IS 3025 (Part 11)-1983 (R.2006)	-	7.2
4	Odour	IS 3025 (Part 5)-1983 (R.2006)	-	Unobjectionable
5	Ecological (Presence of Animals like Fish, Insects Etc)	Physical Observation	-	Present
6	Oil & Grease	5520-O&G-B-APHA 22 nd Ed. 2012 (Partition Gravimetric Method)	mg/l	< 2
7	Total Suspended Solids	2540-D-APHA 22 nd Ed.2012	mg/l	30
8	Dissolved Oxygen	4500-O-C-APHA 22 nd Ed.2012	mg/l	6.5
9	Biochemical Oxygen Demand (BOD) 3 days at 27°C	5210-B-APHA 22 nd Ed.2012	mg/l	<2
10	Chemical Oxygen Demand (COD)	5220-B-APHA 22 nd Ed.2012	mg/l	<4
11	Conductivity	IS 3025 (Part 14)-1984 (R.2006)	µs/cm	2963
12	Total Dissolved Solids	2540-C-APHA 22 nd Ed.2012	mg/l	1772
13	Nitrate - Nitrogen	4500-NO ₃ -B-APHA 22 nd Ed.2012	mg/l	1.7
14	Nitrite - Nitrogen	4500-NO ₂ -B-APHA 22 nd Ed.2012	mg/l	BDL (DL:0.01)

For Chennai Testing Laboratory Pvt Ltd

A. Rajan
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TEST REPORT

Report Number and date	CTL/CH/N-5656/2017-18 & 12.10.2017
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S.NO	PARAMETERS	METHOD	UNITS	RESULTS
15	Free Ammonia as NH ₃	4500-NH ₃ -B.C-APHA 22 nd Ed.	mg/l	BDL (DL-0.1)
16	Total Residual Chlorine	IS 3025 (Part 26)-1984	mg/l	BDL (DL-0.1)
17	Cyanide as CN	IS 3025 (Part 27)-1986 (R.2009)	mg/l	BDL (DL-0.01)
18	Fluoride as F	IS 3025 (Part 60)-2008	mg/l	0.26
19	Sulphate as SO ₄	IS 3025 (Part 24)-1986 (R.2009)	mg/l	336
20	Sulphide as H ₂ S	IS 3025 (Part 29) (R.2009)	mg/l	BDL (DL-0.01)
21	Total Hardness as CaCO ₃	IS 3025 (Part 21)-1983 (R.2006)	mg/l	455
22	Dissolved Phosphate as P	4500-P-D- APHA 22 nd Ed.2012	mg/l	0.58
23	Sodium Absorption Ratio	IS 11624-1986 (R.2001)	-	7.1
24	Total Phosphorous as P	4500-P-B-D-APHA 22 nd Ed.2012	mg/l	0.58
25	Total Kjeldahl Nitrogen as N	4500-N-B-C-APHA 22 nd Ed.2012	mg/l	BDL (DL-0.1)
26	Total Ammonia	4500-Na ₂ -B.C-APHA 22 nd Ed.2012	mg/l	BDL (DL-0.1)
27	Phenols	5530-C-APHA 22 nd Ed.2012	mg/l	BDL (DL-0.001)
28	Surface Active Agents	IS 13428 - 2005 (Annex K)	mg/l	BDL (DL-0.1)
29	Auxoic detergent as MBAS	IS 13428 - 2005 (Annex K)	mg/l	BDL (DL-0.1)
30	Hexavalent Chromium as Cr ⁶⁺	3500-Cr-B-APHA 22 nd Ed. 2012	mg/l	BDL (DL-0.01)
31	Iron as Fe	IS 3025 (Part 53)-2009	mg/l	0.51
32	Boron as B	IS 3025 (Part 57)-2005	mg/l	BDL (DL-0.1)
33	Total Nitrogen	4500-N-B-C-APHA 22 nd Ed.2012	mg/l	1.7
34	Chloride	4500-Cl-B-APHA 22 nd Ed. 2012	mg/l	583
35	Bio - Assay (Zebra Fish) Test	IS 6582 (Part 2), 2001	-	T ₁ = 1
36	Copper as Cu	IS 3025 (Part 42)-1992 (R.2009)	mg/l	1.25
37	Manganese as Mn	3111 B APHA 22 nd Edition 2012	mg/l	0.07
38	Mercury as Hg	IS 3025 (Part 48)-1994 (R.2009)	mg/l	BDL (DL-0.001)
39	Cadmium as Cd	IS 3025 (Part 41)-1992 (R.2009)	mg/l	BDL (DL-0.002)
40	Selenium as Se	IS 3025 (Part 56)-2003(R.2009)	mg/l	BDL (DL-0.005)
41	Total Arsenic as As	IS 3025 (Part 37)-1988 (R.2009)	mg/l	BDL (DL-0.001)
42	Lead as Pb	IS 3025 (Part 47)-1994 (R.2009)	mg/l	BDL (DL-0.005)
43	Zinc as Zn	IS 3025 (Part 49)-1994 (R.2009)	mg/l	0.27
44	Total Chromium as Cr	IS 3025(Part 52)-2003	mg/l	BDL (DL-0.01)
45	Nickel as Ni	IS 3025 (Part 54)	mg/l	BDL (DL-0.01)
46	Vanadium as V	3111-B-APHA 22 nd Ed.2012	mg/l	BDL (DL-2.0)

T₁ = Toxicity Factor

Note: T₁ = 16, it shows that all or some of the fish die in the test solution for a T value, less than 16 (1 part of waste water + 15 part of dilution water) and all are alive in test solutions for a T value of 16 and above, after 48 hrs.

For Chennai Testing Laboratory Pvt Ltd

A. Rajan
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Page 2 of 5

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TEST REPORT

Report Number and date	CTL/CH/N-5656/2017-18 & 12.10.2017
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S. NO	PARAMETERS	METHOD	UNITS	RESULTS
47	Organo chlorine Pesticides (OCP):			
	Aldrin	CTL/SOP/WATER/101-2012 APHA 22 nd Edition 2012-0630 B	µg/l	BDL (DL:0.01)
	Dieldrin		µg/l	BDL (DL:0.01)
	Endosulfan alpha		µg/l	BDL (DL:0.01)
	Endosulfan Beta		µg/l	BDL (DL:0.01)
	Endosulfan Sulfate		µg/l	BDL (DL:0.01)
	o,p'-DDT		µg/l	BDL (DL:0.01)
	p,p'-DDT		µg/l	BDL (DL:0.01)
	p,p'-DDE		µg/l	BDL (DL:0.01)
	o,p'-DDE		µg/l	BDL (DL:0.01)
	o,p'-DDD		µg/l	BDL (DL:0.01)
	p,p'-DDD		µg/l	BDL (DL:0.01)
	Alpha HCH		µg/l	BDL (DL:0.01)
	Beta HCH		µg/l	BDL (DL:0.01)
Gamma HCH (Lindane)	µg/l		BDL (DL:0.01)	
Delta HCH	µg/l	BDL (DL:0.01)		
48	Poly Chlorinated Terphenyls (as PCT):			
	o-Terphenyl	CTL/SOP/WATER/159-2017	µg/l	BDL (DL:0.03)
	m-Terphenyl		µg/l	BDL (DL:0.03)
	p-Terphenyl		µg/l	BDL (DL:0.03)
	Tetradecachloro-o-terphenyl		µg/l	BDL (DL:0.03)
	Tetradecachloro-m-terphenyl		µg/l	BDL (DL:0.03)
	Tetradecachloro-p-terphenyl		µg/l	BDL (DL:0.03)
	4-Chloro-o-terphenyl		µg/l	BDL (DL:0.03)
	4-Chloro-p-terphenyl		µg/l	BDL (DL:0.03)
	2,4-Dichloro-p-terphenyl		µg/l	BDL (DL:0.03)
	2,5-Dichloro-o-terphenyl		µg/l	BDL (DL:0.03)
	2,5-Dichloro-m-terphenyl		µg/l	BDL (DL:0.03)
	2,5-Dichloro-p-terphenyl		µg/l	BDL (DL:0.03)
	2,4,6-Trichloro-p-terphenyl		µg/l	BDL (DL:0.03)
	2,3,5,6-Tetrachloro-p-terphenyl		µg/l	BDL (DL:0.03)
2,4,4',6-Tetrachloro-p-terphenyl	µg/l		BDL (DL:0.03)	
2,3,4,5,6-Pentachloro-p-terphenyl	µg/l	BDL (DL:0.03)		

For Chennai Testing Laboratory Pvt Ltd

A. Rajan
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Page 2 of 5

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TEST REPORT

Report Number and date	CTL/CH/N-5656/2017-18 & 12.10.2017
------------------------	------------------------------------

S.NO	PARAMETERS	METHOD	UNITS	RESULTS
49	Poly Nuclear Aromatic Hydrocarbons (as PAH):			
	Naphthalene	APHA 22 nd Edition 6440 C CTL/SOP/WATER/102-2012	µg/l	BDL (DL:0.01)
	Acenaphthylene		µg/l	BDL (DL:0.01)
	2-Bromo-Naphthalene		µg/l	BDL (DL:0.02)
	Acenaphthene		µg/l	BDL (DL:0.02)
	Fluorene		µg/l	BDL (DL:0.02)
	Phenanthrene		µg/l	BDL (DL:0.02)
	Anthracene		µg/l	BDL (DL:0.02)
	Pyrene		µg/l	BDL (DL:0.02)
	Fluoranthene		µg/l	BDL (DL:0.02)
	Chrysene		µg/l	BDL (DL:0.02)
	Benzo[a]anthracene		µg/l	BDL (DL:0.02)
	Benzo[a]pyrene		µg/l	BDL (DL:0.02)
	Benzo[b]fluoranthene		µg/l	BDL (DL:0.03)
	Benzo[ghi]perylene		µg/l	BDL (DL:0.03)
	Dibenz[a,h]anthracene		µg/l	BDL (DL:0.03)
Indeno[1,2,3-cd]pyrene	µg/l		BDL (DL:0.04)	
50	Poly Chlorinated Biphenyls (as PCB):			
	2-Chlorobiphenyl	Annex M of IS 13428-1998	µg/l	BDL (DL:0.01)
	2,3-dichlorobiphenyl		µg/l	BDL (DL:0.01)
	2,5,4'-Trichlorobiphenyl		µg/l	BDL (DL:0.01)
	2,2',4,4'-tetrachlorobiphenyl		µg/l	BDL (DL:0.01)
	2,2',3,4',6'-Pentachlorobiphenyl		µg/l	BDL (DL:0.01)
	2,2',4,4',5,6'-Hexachlorobiphenyl		µg/l	BDL (DL:0.01)
	2,2',3,3',4,4',6'-Heptachlorobiphenyl		µg/l	BDL (DL:0.01)
2,2',3,3',4,5,6,6'-Octachlorobiphenyl	µg/l		BDL (DL:0.01)	

For Chennai Testing Laboratory Pvt Ltd

A. Rajan
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Page 4 of 5

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TEST REPORT

Report Number and date	CTL/CH/N-5656/2017-10 & 12.10.2017		
Sample Number	N-5656/16-17		
Customer Name & Address	M/s. Tamil Nadu Pollution Control Board,		
	76, Mount Salai, Guindy, Chennai - 600 032.		
Project At	Cuddalore - SIPCOT Complex		
SAMPLE DETAILS			
Sample Description By Customer	Surface Water		
Sampling Location	Nochikadu Village Upstream of Uppanar River		
GPS Reading	11°39' 09.07"N 079° 44' 36.32"E		
Sampling Date	29.09.2017	Sampled By	Chennai Testing Laboratory Pvt. Ltd.,
Quantity Received	100ml	Sampling Method	CTL/MSP/5.7/001
Date of Receipt	30.09.2017	Sample Condition	Good & Received in Sterile Container
Analysis Starting Date	30.09.2017	Analysis Completion Date	11.10.2017

Test Results:

The above sample tested as received, and results are as follows:

S.NO	PARAMETERS	METHOD	UNITS	RESULTS
1	Total Coliform	IS 1622 : 1981 (IL2009)	MPN/100 ml	<2
2	Faecal Coliform		MPN/100 ml	<2

Note: < 2 can be considered as Absent

END OF REPORT

For Chennai Testing Laboratory Pvt Ltd


Authorised Signatory

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TEST REPORT

Report Number and date	CTL/CH/N-5657/2017-18 & 12.10.2017		
Sample Number	N-5657/16-17		
Customer Name & Address	M/s. Tamil Nadu Pollution Control Board, 76, Mount Salai, Guindy, Chennai - 600 032.		
Project At	Cuddalore - SIPCOT Complex		
SAMPLE DETAILS			
Sample Description By Customer	Surface Water		
Sampling Location	Behind Kallikadu Village		
GPS Reading	11°40' 57.39"N 079° 45' 47.27"E		
Sampling Date	29.09.2017	Sampled By	Chennai Testing Laboratory Pvt. Ltd.
Quantity Received	5 Litres	Sampling Method	CTL/MSP/5,7/001
Date of Receipt	30.09.2017	Sample Condition	Good & Received in Plastic Container
Analysis Starting Date	30.09.2017	Analysis Completion Date	11.10.2017

Test Results:

The above sample tested as received, and results are as follows:

S.NO	PARAMETERS	METHOD	UNITS	RESULTS
Sanitary Survey:				
1	Appearance	Physical Observation	-	Slightly turbid liquid
2	Colour	IS 3025 (Part 4)-1983 (R.2006)	HU	2
3	pH @ 25°C	IS 3025 (Part 11)-1983 (R.2006)	-	7.2
4	Odour	IS 3025 (Part 5)-1983 (R.2006)	-	Unobjectionable
5	Ecological (Presence of Animals like Fish, Insects Etc)	Physical Observation	-	Present
6	Oil & Grease	5520-O&G-B APHA 22 nd Ed. 2012 (Partition Gravimetric Method)	mg/l	< 2
7	Total Suspended Solids	2540-D- APHA 22 nd Ed.2012	mg/l	26
8	Dissolved Oxygen	4500-O-C- APHA 22 nd Ed.2012	mg/l	6.6
9	Biochemical Oxygen Demand (BOD) 3 days at 27°C	5210-B-APHA 22 nd Ed.2012	mg/l	< 2
10	Chemical Oxygen Demand (COD)	5220-B- APHA 22 nd Ed.2012	mg/l	< 4
11	Conductivity	IS 3025 (Part 14)-1984 (R.2006)	µs/cm	12690
12	Total Dissolved Solids	2540-C-APHA 22 nd Ed.2012	mg/l	7726
13	Nitrate - Nitrogen	4500-NO ₃ -B-APHA 22 nd Ed.2012	mg/l	2.2
14	Nitrite - Nitrogen	4500-NO ₂ -B-APHA 22 nd Ed.2012	mg/l	BDL (DL:0.01)

For Chennai Testing Laboratory Pvt Ltd.

A. Rajan
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TEST REPORT

Report Number and date	CTL/CH/N-5657/2017-18 & 12.10.2017
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S.NO	PARAMETERS	METHOD	UNITS	RESULTS
15	Free Ammonia as NH ₃	4500-NH ₃ - B.C-APHA 22 nd Ed.	mg/l	BDL (DL-0.1)
16	Total Residual Chlorine	IS 3025 (Part 26)-1984	mg/l	BDL (DL-0.1)
17	Cyanide as CN	IS 3025 (Part 27)-1986 (R.2009)	mg/l	BDL (DL-0.01)
18	Fluoride as F	IS 3025 (Part 60)-2008	mg/l	0.26
19	Sulphate as SO ₄	IS 3025 (Part 24)-1986 (R.2009)	mg/l	752
20	Sulphide as H ₂ S	IS 3025 (Part 29) (R.2009)	mg/l	BDL (DL-0.01)
21	Total Hardness as CaCO ₃	IS 3025 (Part 21)-1983 (R.2006)	mg/l	1374
22	Dissolved Phosphate as P	4500-P-D- APHA 22 nd Ed.2012	mg/l	BDL (DL-0.1)
23	Sodium Absorption Ratio	IS 11624-1986 (R.2001)	-	20.2
24	Total Phosphorous as P	4500-P-B-D-APHA 22 nd Ed.2012	mg/l	BDL (DL-0.1)
25	Total Kjeldahl Nitrogen as N	4500-N-B-C-APHA 22 nd Ed.2012	mg/l	BDL (DL-0.1)
26	Total Ammonia	4500-Na ₂ -B.C-APHA 22 nd Ed.2012	mg/l	BDL (DL-0.1)
27	Phenols	5530-C-APHA 22 nd Ed.2012	mg/l	BDL (DL-0.001)
28	Surface Active Agents	IS 13428 - 2005 (Annex K)	mg/l	BDL (DL-0.1)
29	Anionic detergent as MBAS	IS 13428 - 2005 (Annex K)	mg/l	BDL (DL-0.1)
30	Hexavalent Chromium as Cr ^{VI}	3500-Cr-B-APHA 22 nd Ed. 2012	mg/l	BDL (DL-0.01)
31	Iron as Fe	IS 3025 (Part 53)-2009	mg/l	0.46
32	Boron as B	IS 3025 (Part 57)-2005	mg/l	BDL (DL-0.1)
33	Total Nitrogen	4500-N-B-C-APHA 22 nd Ed.2012	mg/l	2.2
34	Chloride	4500-Cl-B-APHA 22 nd Ed. 2012	mg/l	3186
35	Bio - Assay (Zebra Fish) Test	IS 6582 (Part 2): 2001	-	T ₁ = 1
36	Copper as Cu	IS 3025 (Part 42)-1992 (R.2009)	mg/l	BDL (DL-0.02)
37	Manganese as Mn	3111 B APHA 22 nd Edition 2012	mg/l	BDL (DL-0.01)
38	Mercury as Hg	IS 3025 (Part 48)-1994 (R.2009)	mg/l	BDL (DL-0.001)
39	Cadmium as Cd	IS 3025 (Part 41)-1992 (R.2009)	mg/l	BDL (DL-0.002)
40	Selenium as Se	IS 3025 (Part 56)-2003(R.2009)	mg/l	BDL (DL-0.005)
41	Total Arsenic as As	IS 3025 (Part 37)-1988 (R.2009)	mg/l	BDL (DL-0.001)
42	Lead as Pb	IS 3025 (Part 47)-1994 (R.2009)	mg/l	BDL (DL-0.005)
43	Zinc as Zn	IS 3025 (Part 49)-1994 (R.2009)	mg/l	BDL (DL-0.08)
44	Total Chromium as Cr	IS 3025(Part 52)-2003	mg/l	BDL (DL-0.01)
45	Nickel as Ni	IS 3025 (Part 54)	mg/l	BDL (DL-0.01)
46	Vanadium as V	3111-B-APHA 22 nd Ed.2012	mg/l	BDL (DL-2.0)

T₁ = Toxicity Factor

Note: T₁ = 16. It shows that all or some of the fish die in the test solution for a T value less than 16 (1 part of waste water + 15 part of dilution water) and all are alive in test solution for a T value of 16 and above, after 48 hrs.

For Chennai Testing Laboratory Pvt Ltd

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TEST REPORT

Report Number and date		CTL/CH/N-5657/2017-18 & 12.10.2017		
S.NO	PARAMETERS	METHOD	UNITS	RESULTS
47	Organo chlorine Pesticides (OCP):			
	Aldrin	CTL/SOP/WATER/101-2012 APHA 22 nd Edition 2012-6630 B	µg/l	BDL (DL:0.01)
	Dieldrin		µg/l	BDL (DL:0.01)
	Endosulfan alpha		µg/l	BDL (DL:0.01)
	Endosulfan Beta		µg/l	BDL (DL:0.01)
	Endosulfan Sulfate		µg/l	BDL (DL:0.01)
	o,p'-DDT		µg/l	BDL (DL:0.01)
	p,p'-DDT		µg/l	BDL (DL:0.01)
	p,p'-DDE		µg/l	BDL (DL:0.01)
	o,p'-DDE		µg/l	BDL (DL:0.01)
	o,p'-DDD		µg/l	BDL (DL:0.01)
	p,p'-DDD		µg/l	BDL (DL:0.01)
	Alpha HCH		µg/l	BDL (DL:0.01)
	Beta HCH		µg/l	BDL (DL:0.01)
Gamma HCH (Lindane)	µg/l		BDL (DL:0.01)	
Delta HCH	µg/l	BDL (DL:0.01)		
48	Poly Chlorinated Terphenyls (as PCT):			
	o-Terphenyl	CTL/SOP/WATER/159-2017	µg/l	BDL (DL:0.03)
	m-Terphenyl		µg/l	BDL (DL:0.03)
	p-Terphenyl		µg/l	BDL (DL:0.03)
	Tetradecachloro-o-terphenyl		µg/l	BDL (DL:0.03)
	Tetradecachloro-m-terphenyl		µg/l	BDL (DL:0.03)
	Tetradecachloro-p-terphenyl		µg/l	BDL (DL:0.03)
	4-Chloro-o-terphenyl		µg/l	BDL (DL:0.03)
	4-Chloro-p-terphenyl		µg/l	BDL (DL:0.03)
	2,4-Dichloro-p-terphenyl		µg/l	BDL (DL:0.03)
	2,5-Dichloro-o-terphenyl		µg/l	BDL (DL:0.03)
	2,5-Dichloro-m-terphenyl		µg/l	BDL (DL:0.03)
	2,5-Dichloro-p-terphenyl		µg/l	BDL (DL:0.03)
	2,4,6-Trichloro-p-terphenyl		µg/l	BDL (DL:0.03)
	2,3,5,6-Tetrachloro-p-terphenyl		µg/l	BDL (DL:0.03)
2,4,4',6-Tetrachloro-p-terphenyl	µg/l		BDL (DL:0.03)	
2,3,4,5,6-Pentachloro-p-terphenyl	µg/l	BDL (DL:0.03)		

For Chennai Testing Laboratory Pvt Ltd

A. Raj
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TEST REPORT

Report Number and date	CTL/CH/N-5657/2017-18 & 12.10.2017
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S.NO	PARAMETERS	METHOD	UNITS	RESULTS
49	Poly Nuclear Aromatic Hydrocarbons (as PAH):			
	Naphthalene	APHA 22 nd Edition 6440 C CTL/SOP/WATER/102-2012	µg/l	BDL (DL:0.01)
	Acenaphthylene		µg/l	BDL (DL:0.01)
	2-Bromo-Naphthalene		µg/l	BDL (DL:0.02)
	Acenaphthene		µg/l	BDL (DL:0.02)
	Fluorene		µg/l	BDL (DL:0.02)
	Phenanthrene		µg/l	BDL (DL:0.02)
	Anthracene		µg/l	BDL (DL:0.02)
	Pyrene		µg/l	BDL (DL:0.02)
	Fluoranthene		µg/l	BDL (DL:0.02)
	Chrysene		µg/l	BDL (DL:0.02)
	Benzo[a]anthracene		µg/l	BDL (DL:0.02)
	Benzo[a]pyrene		µg/l	BDL (DL:0.02)
	Benzo[b]fluoranthene		µg/l	BDL (DL:0.03)
	Benzo[ghi]perylene		µg/l	BDL (DL:0.03)
Dibenz[ah]anthracene	µg/l		BDL (DL:0.03)	
Indeno[1,2,3-cd]pyrene	µg/l	BDL (DL:0.04)		
50	Poly Chlorinated Biphenyls (as PCB):			
	2-Chlorobiphenyl	Annex M of IS 13420-1998	µg/l	BDL (DL:0.01)
	2,3-dichlorobiphenyl		µg/l	BDL (DL:0.01)
	2,5,4'-Trichlorobiphenyl		µg/l	BDL (DL:0.01)
	2,2',4,4'-tetrachlorobiphenyl		µg/l	BDL (DL:0.01)
	2,2',3,4,6'-Pentachlorobiphenyl		µg/l	BDL (DL:0.01)
	2,2',4,4',5,6-Hexachlorobiphenyl		µg/l	BDL (DL:0.01)
	2,2',3,3',4,4',6-Heptachlorobiphenyl		µg/l	BDL (DL:0.01)
2,2',3,3',4,5,6,6'-Octachlorobiphenyl	µg/l		BDL (DL:0.01)	

For Chennai Testing Laboratory Pvt Ltd

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TEST REPORT

Report Number and date:	CTL/CH/N-5657/2017-18 & 12.10.2017		
Sample Number	N-5657/16-17		
Customer Name & Address:	M/s. Tamil Nadu Pollution Control Board, 76, Mount Salai, Guindy, Chennai - 600 032.		
Project At	Cuddalore - SIPCOT Complex		
SAMPLE DETAILS			
Sample Description By Customer	Surface Water		
Sampling Location	Behind Kudikadu Village		
GPS Reading	11°40' 57.39"N 079° 45' 47.27"E		
Sampling Date	29.09.2017	Sampled By	Chennai Testing Laboratory Pvt. Ltd.
Quantity Received	100ml	Sampling Method	CTL/MSP/S.7/001
Date of Receipt	30.09.2017	Sample Condition	Good & Received in Sterile Container
Analysis Starting Date	30.09.2017	Analysis Completion Date	11.10.2017

Test Results:

The above sample tested as received, and results are as follows:

S.NO	PARAMETERS	METHOD	UNITS	RESULTS
1	Total Coliform	IS 1622: 1981 (R.2009)	MPN/100 ml	<2
2	Faecal Coliform		MPN/100 ml	<2

Note: < 2 can be considered as Absent

END OF REPORT

For Chennai Testing Laboratory Pvt Ltd


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TEST REPORT

Report Number and date	CTL/CH/N-5658/2017-19 & 12.10.2017		
Sample Number	N-5658/16-17		
Customer Name & Address	M/s. Tamil Nadu Pollution Control Board, 76, Mount Sakal, Guindy, Chennai - 600 032.		
Project At	Cuddalore - SIPCOT Complex		
SAMPLE DETAILS			
Sample Description By Customer	Surface Water		
Sampling Location	Thikal Thonithy Village Downstream of Sipcot		
GPS Reading	11°41' 31.38"N 079° 46' 01.75"E		
Sampling Date	29.09.2017	Sampled By	Chennai Testing Laboratory Pvt. Ltd.
Quantity Received	5 Litres	Sampling Method	CTL/MSP/5.7/001
Date of Receipt	30.09.2017	Sample Condition	Good & Received in Plastic Container
Analysis Starting Date	30.09.2017	Analysis Completion Date	11.10.2017

Test Results:

The above sample tested as received, and results are as follows:

S.NO	PARAMETERS	METHOD	UNITS	RESULTS
Sanitary Survey:				
1	Appearance	Physical Observation	-	Slightly turbid liquid
2	Colour	IS 3025 (Part 4)-1983 (R.2006)	HU	2
3	pH @ 25°C	IS 3025 (Part 11)-1983 (R.2006)	-	7.2
4	Odour	IS 3025 (Part 5)-1983 (R.2006)	-	Unobjectionable
5	Ecological (Presence of Animals like Fish, Insects Etc)	Physical Observation	-	Present
6	Oil & Grease	5520-D&G-B-APHA 22 nd Ed.2012 (Partition Gravimetric Method)	mg/l	< 2
7	Total Suspended Solids	2540-D- APHA 22 nd Ed.2012	mg/l	38
8	Dissolved Oxygen	4500-O-C- APHA 22 nd Ed.2012	mg/l	6.6
9	Biochemical Oxygen Demand (BOD) 3 days at 27°C	5210-B-APHA 22 nd Ed.2012	mg/l	< 2
10	Chemical Oxygen Demand (COD)	5220-B- APHA 22 nd Ed.2012	mg/l	< 4
11	Conductivity	IS 3025 (Part 14)-1984 (R.2006)	µs/cm	13730
12	Total Dissolved Solids	2540-C-APHA 22 nd Ed.2012	mg/l	9430
13	Nitrate - Nitrogen	4500-NO ₃ -B-APHA 22 nd Ed.2012	mg/l	1.7
14	Nitrite - Nitrogen	4500-NO ₂ -B-APHA 22 nd Ed.2012	mg/l	BDL (DL:0.01)

For Chennai Testing Laboratory Pvt Ltd

A. Rajan
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TEST REPORT

Report Number and date	CTL/CH/N-5658/2017-18 & 12.10.2017
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S.NO	PARAMETERS	METHOD	UNITS	RESULTS
15	Free Ammonia as NH ₃	4500-NH ₃ -B.C-APHA 22 nd Ed.	mg/l	BDL (DL:0.1)
16	Total Residual Chlorine	IS 3025 (Part 26)-1984	mg/l	BDL (DL:0.1)
17	Cyanide as CN	IS 3025 (Part 27)-1986 (R.2009)	mg/l	BDL (DL:0.01)
18	Fluoride as F	IS 3025 (Part 60)-2000	mg/l	0.26
19	Sulphate as SO ₄	IS 3025 (Part 24)-1986 (R.2009)	mg/l	843
20	Sulphide as H ₂ S	IS 3025 (Part 29) (R.2009)	mg/l	BDL (DL:0.01)
21	Total Hardness as CaCO ₃	IS 3025 (Part 21)-1983 (R.2006)	mg/l	1576
22	Dissolved Phosphate as P	4500-P-D-APHA 22 nd Ed.2012	mg/l	0.83
23	Sodium Absorption Ratio	IS 11624-1996 (R.2001)	-	22.5
24	Total Phosphorous as P	4500-P-B-D-APHA 22 nd Ed.2012	mg/l	0.83
25	Total Kjeldahl Nitrogen as N	4500-N-B-C-APHA 22 nd Ed.2012	mg/l	BDL (DL:0.1)
26	Total Ammonia	4500-Na ₃ -B.C-APHA 22 nd Ed.2012	mg/l	BDL (DL:0.1)
27	Phenols	5530-C-APHA 22 nd Ed.2012	mg/l	BDL (DL:0.001)
28	Surface Active Agents	IS 13428-2005 (Annex K)	mg/l	BDL (DL:0.1)
29	Anionic detergent as MBAS	IS 13428-2005 (Annex K)	mg/l	BDL (DL:0.1)
30	Hexavalent Chromium as Cr ⁶⁺	3500-Cr-B-APHA 22 nd Ed. 2012	mg/l	BDL (DL:0.01)
31	Iron as Fe	IS 3025 (Part 53)-2009	mg/l	0.41
32	Boron as B	IS 3025 (Part 57)-2005	mg/l	BDL (DL:0.1)
33	Total Nitrogen	4500-N-B-C-APHA 22 nd Ed.2012	mg/l	1.7
34	Chloride	4500-Cl-B-APHA 22 nd Ed. 2012	mg/l	3992
35	Bio - Assay (Zebra Fish) Test	IS 6582 (Part 2): 2001	-	T _r = 1
36	Copper as Cu	IS 3025 (Part 42)-1992 (R.2009)	mg/l	BDL (DL:0.02)
37	Manganese as Mn	3111 B APHA 22 nd Edition 2012	mg/l	BDL (DL:0.01)
38	Mercury as Hg	IS 3025 (Part 48)-1994 (R.2009)	mg/l	BDL (DL:0.001)
39	Calcium as Ca	IS 3025 (Part 41)-1992 (R.2009)	mg/l	BDL (DL:0.002)
40	Selenium as Se	IS 3025 (Part 56)-2003(R.2009)	mg/l	BDL (DL:0.005)
41	Total Arsenic as As	IS 3025 (Part 37)-1988 (R.2009)	mg/l	BDL (DL:0.001)
42	Lead as Pb	IS 3025 (Part 47)-1994 (R.2009)	mg/l	BDL (DL:0.005)
43	Zinc as Zn	IS 3025 (Part 40)-1994 (R.2009)	mg/l	BDL (DL:0.08)
44	Total Chromium as Cr	IS 3025(Part 52)-2003	mg/l	BDL (DL:0.01)
45	Nickel as Ni	IS 3025 (Part 54)	mg/l	BDL (DL:0.01)
46	Vanadium as V	3111-B-APHA 22 nd Ed.2012	mg/l	BDL (DL:2.0)

T_r = Toxicity Factor

Note: T_r = 16. It shows that all or some of the fish die in the test solution for a T value less than 16 (1 part of waste water + 15 part of dilution water) and all are alive in test columns for a T value of 16 and above, after 48 hrs.

For Chennai Testing Laboratory Pvt Ltd

A. Rajan
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Page 2 of 5

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TEST REPORT

Report Number and date	CTL/CH/N-5658/2017-18 & 12.10.2017
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S.NO	PARAMETERS	METHOD	UNITS	RESULTS
Organo chlorine Pesticides (OCP):				
47	Aldrin	CTL/SOP/WATER/101-2012 APHA 22 nd Edition 2012-6630 B	µg/l	BDL (DL:0.01)
	Dieldrin		µg/l	BDL (DL:0.01)
	Endosulfan alpha		µg/l	BDL (DL:0.01)
	Endosulfan Beta		µg/l	BDL (DL:0.01)
	Endosulfan Sulfate		µg/l	BDL (DL:0.01)
	o,p'-DDT		µg/l	BDL (DL:0.01)
	p,p'-DDT		µg/l	BDL (DL:0.01)
	p,p'-DDE		µg/l	BDL (DL:0.01)
	o,p'-DDE		µg/l	BDL (DL:0.01)
	o,p'-DDD		µg/l	BDL (DL:0.01)
	p,p'-DDD		µg/l	BDL (DL:0.01)
	Alpha HCH		µg/l	BDL (DL:0.01)
	Beta HCH		µg/l	BDL (DL:0.01)
	Gamma HCH (Lindane)		µg/l	BDL (DL:0.01)
Delta HCH	µg/l	BDL (DL:0.01)		
Poly Chlorinated Terphenyls (as PCT):				
48	o-Terphenyl	CTL/SOP/WATER/159-2017	µg/l	BDL (DL:0.03)
	m-Terphenyl		µg/l	BDL (DL:0.03)
	p-Terphenyl		µg/l	BDL (DL:0.03)
	Tetradecachloro-o-terphenyl		µg/l	BDL (DL:0.03)
	Tetradecachloro-m-terphenyl		µg/l	BDL (DL:0.03)
	Tetradecachloro-p-terphenyl		µg/l	BDL (DL:0.03)
	4-Chloro-o-terphenyl		µg/l	BDL (DL:0.03)
	4-Chloro-p-terphenyl		µg/l	BDL (DL:0.03)
	2,4-Dichloro-p-terphenyl		µg/l	BDL (DL:0.03)
	2,5-Dichloro-o-terphenyl		µg/l	BDL (DL:0.03)
	2,5-Dichloro-m-terphenyl		µg/l	BDL (DL:0.03)
	2,5-Dichloro-p-terphenyl		µg/l	BDL (DL:0.03)
	2,4,6-Trichloro-p-terphenyl		µg/l	BDL (DL:0.03)
	2,3,5,6-Tetrachloro-p-terphenyl		µg/l	BDL (DL:0.03)
	2,4,4',6-Tetrachloro-p-terphenyl		µg/l	BDL (DL:0.03)
	2,3,4,5,6-Pentachloro-p-terphenyl		µg/l	BDL (DL:0.03)

For Chennai Testing Laboratory Pvt Ltd

A. Rajan
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TEST REPORT

Report Number and date	CTL/CH/N-5658/2017-18 & 12.10.2017
------------------------	------------------------------------

S.NO	PARAMETERS	METHOD	UNITS	RESULTS
49	Poly Nuclear Aromatic Hydrocarbons (as PAH):			
	Naphthalene	APHA 22 nd Edition 6440 C CTL/SOP/WATER/102-2012	µg/l	BDL (DL:0.01)
	Acenaphthylene		µg/l	BDL (DL:0.01)
	2-Bromo-Naphthalene		µg/l	BDL (DL:0.02)
	Acenaphthene		µg/l	BDL (DL:0.02)
	Fluorene		µg/l	BDL (DL:0.02)
	Phenanthrene		µg/l	BDL (DL:0.02)
	Anthracene		µg/l	BDL (DL:0.02)
	Pyrene		µg/l	BDL (DL:0.02)
	Fluoranthene		µg/l	BDL (DL:0.02)
	Chrysene		µg/l	BDL (DL:0.02)
	Benzo[a]anthracene		µg/l	BDL (DL:0.02)
	Benzo[a]pyrene		µg/l	BDL (DL:0.02)
	Benzo[b]fluoranthene		µg/l	BDL (DL:0.03)
	Benzo[ghi]perylene		µg/l	BDL (DL:0.03)
	Dibenz[a,h]anthracene		µg/l	BDL (DL:0.03)
Indeno[1,2,3-cd]pyrene	µg/l		BDL (DL:0.04)	
50	Poly Chlorinated Biphenyls (as PCB):			
	2-Chlorobiphenyl	Annex M of IS 13428-1998	µg/l	BDL (DL:0.01)
	2,3-dichlorobiphenyl		µg/l	BDL (DL:0.01)
	2,5,4'-Trichlorobiphenyl		µg/l	BDL (DL:0.01)
	2,2',4,4'-tetrachlorobiphenyl		µg/l	BDL (DL:0.01)
	2,2',3,4',6'-Pentachlorobiphenyl		µg/l	BDL (DL:0.01)
	2,2',4,4',5',6'-Hexachlorobiphenyl		µg/l	BDL (DL:0.01)
	2,2',3,3',4,4',6'-Heptachlorobiphenyl		µg/l	BDL (DL:0.01)
2,2',3,3',4,5,6,6'-Octachlorobiphenyl	µg/l		BDL (DL:0.01)	

For Chennai Testing Laboratory Pvt Ltd

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TEST REPORT

Report Number and date	CTL/CH/N-5658/2017-18 & 12.10.2017		
Sample Number	N-5658/16-17		
Customer Name & Address	M/s. Tamil Nadu Pollution Control Board,		
	76, Mount Salai, Guindy, Chennai - 600 032.		
Project At	Cuddalore - SIPCOT Complex		
SAMPLE DETAILS			
Sample Description By Customer	Surface Water		
Sampling Location	Thikal Thonithy Village Downstream of Sipcot		
GPS Reading	11°41' 31.30"N 079° 46' 01.75"E		
Sampling Date	29.09.2017	Sampled By	Chennai Testing Laboratory Pvt. Ltd.,
Quantity Received	100ml	Sampling Method	CTL/MSP/5,7/001
Date of Receipt	30.09.2017	Sample Condition	Gond & Received in Sterile Container
Analysis Starting Date	30.09.2017	Analysis Completion Date	11.10.2017

Test Results:

The above sample tested as received, and results are as follows:

S.NO	PARAMETERS	METHOD	UNITS	RESULTS
1	Total Coliform	IS 1622 : 1981 (R.2009)	MPN/100 ml	<2
2	Faecal Coliform		MPN/100 ml	<2

Note: < 2 can be considered as Absent

END OF REPORT

For Chennai Testing Laboratory Pvt Ltd


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Surface Water Analysis Result - Coimbatore



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TEST REPORT

Report Number and date	CTL/CH/N-5107/2017-18 & 30.09.2017		
Sample Number	N-5107/17-18		
Customer Name & Address	M/s. Tamil Nadu Pollution Control Board, 76, Mount Salai, Guindy, Chennai - 600 032.		
Project At	Coimbatore - Korichi		
SAMPLE DETAILS			
Sample Description By Customer	Surface Water		
Sampling Location	Noyyar River		
GPS Reading	10°58' 27.56"N 076° 50' 44.47"E		
Sampling Date	18.09.2017	Sampled By	Chennai Testing Laboratory Pvt. Ltd.
Quantity Received	5 Litres	Sampling Method	CTL/MSP/5.7/001
Date of Receipt	19.09.2017	Sample Condition	Good & Received in Plastic Container
Analysis Starting Date	19.09.2017	Analysis Completion Date	28.09.2017

Test Results:

The above sample tested as received, and results are as follows:

S.NO	PARAMETERS	METHOD	UNITS	RESULTS
Sanitary Survey:				
1	Appearance	Physical Observation	-	Clear liquid with suspended particles
2	Colour	IS 3025 (Part 4)-1983 (R.2006)	HU	5
3	pH @ 25°C	IS 3025 (Part 11)-1983 (R.2006)	-	7.3
4	Odour	IS 3025 (Part 5)-1983 (R.2006)	-	Unobjectionable
5	Ecological (Presence of Animals like Fish, Insects Etc)	Physical Observation	-	Present
6	Oil & Grease	5520-O&G-B APHA 22 nd Ed. 2012 (Partition Gravimetric Method)	mg/l	< 2
7	Total Suspended Solids	2540-D- APHA 22 nd Ed.2012	mg/l	10
8	Dissolved Oxygen	4500-O-C- APHA 22 nd Ed.2012	mg/l	6.8
9	Biochemical Oxygen Demand (BOD) 3 days at 27°C	5210-B-APHA 22 nd Ed.2012	mg/l	< 2
10	Chemical Oxygen Demand (COD)	5220-B- APHA 22 nd Ed.2012	mg/l	11
11	Conductivity	IS 3025 (Part 14)-1984 (R.2006)	µm/cm	4430
12	Total Dissolved Solids	2540-C-APHA 22 nd Ed.2012	mg/l	2664
13	Nitrate - Nitrogen	4500-NO ₃ -B-APHA 22 nd Ed.2012	mg/l	68.4
14	Nitrite - Nitrogen	4500-NO ₂ -B-APHA 22 nd Ed.2012	mg/l	BDL (DL:0.01)

For Chennai Testing Laboratory Pvt Ltd

A. Rajan
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TEST REPORT

Report Number and date	CTL/CH/N-5107/2017-18 & 30.09.2017
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S.NO	PARAMETERS	METHOD	UNITS	RESULTS
15	Free Ammonia as NH ₃	4500-NH ₃ -B.C-APHA 22 nd Ed.	mg/l	0.12
16	Total Residual Chlorine	IS 3025 (Part 26)-1984	mg/l	BDL (DL:0.1)
17	Cyanide as CN	IS 3025 (Part 27)-1986 (R.2009)	mg/l	BDL (DL:0.01)
18	Fluoride as F	IS 3025 (Part 60)-2008	mg/l	0.24
19	Sulphate as SO ₄	IS 3025 (Part 24)-1986 (R.2009)	mg/l	215
20	Sulphide as H ₂ S	IS 3025 (Part 29) (R.2009)	mg/l	BDL (DL:0.01)
21	Total Hardness as CaCO ₃	IS 3025 (Part 21)-1983 (R.2006)	mg/l	1183
22	Dissolved Phosphate as P	4500-P-D-APHA 22 nd Ed.2012	mg/l	0.14
23	Sodium Absorption Ratio	IS 11624-1986 (R.2001)	-	4.95
24	Total Phosphorous as P	4500-P-B-D-APHA 22 nd Ed.2012	mg/l	0.16
25	Total Kjeldahl Nitrogen as N	4500-N-B.C-APHA 22 nd Ed.2012	mg/l	0.36
26	Total Ammonia	4500-Na ₂ -B.C-APHA 22 nd Ed.2012	mg/l	0.31
27	Phenols	5530-C-APHA 22 nd Ed.2012	mg/l	BDL (DL:0.001)
28	Surface Active Agents	IS 13428-2005 (Annex K)	mg/l	BDL (DL:0.1)
29	Anionic detergent as MBAS	IS 13428-2005 (Annex K)	mg/l	BDL (DL:0.1)
30	Hexavalent Chromium as Cr ⁶⁺	3500-Cr-B-APHA 22 nd Ed. 2012	mg/l	BDL (DL:0.01)
31	Iron as Fe	IS 3025 (Part 53)-2009	mg/l	0.3
32	Boron as B	IS 3025 (Part 57)-2005	mg/l	BDL (DL:0.1)
33	Total Nitrogen	4500-N-B.C-APHA 22 nd Ed.2012	mg/l	69.2
34	Chloride	4500-Cl-B-APHA 22 nd Ed. 2012	mg/l	927
35	Bio - Assay (Zebra Fish) Test	IS 6583 (Part 2)-2001	-	T ₁ = 1
36	Copper as Cu	IS 3025 (Part 42)-1992 (R.2009)	mg/l	BDL (DL:0.02)
37	Manganese as Mn	3111 B APHA 22 nd Edition 2012	mg/l	0.28
38	Mercury as Hg	IS 3025 (Part 48)-1994 (R.2009)	mg/l	BDL (DL:0.001)
39	Cadmium as Cd	IS 3025 (Part 41)-1992 (R.2009)	mg/l	BDL (DL:0.002)
40	Selenium as Se	IS 3025 (Part 56)-2003(R.2009)	mg/l	BDL (DL:0.005)
41	Total Arsenic as As	IS 3025 (Part 37)-1988 (R.2009)	mg/l	BDL (DL:0.001)
42	Lead as Pb	IS 3025 (Part 47)-1994 (R.2009)	mg/l	BDL (DL:0.005)
43	Zinc as Zn	IS 3025 (Part 49)-1994 (R.2009)	mg/l	BDL (DL:0.08)
44	Total Chromium as Cr	IS 3025(Part 52)-2003	mg/l	BDL (DL:0.01)
45	Nickel as Ni	IS 3025 (Part 54)	mg/l	BDL (DL:0.01)
46	Vanadium as V	3111-B-APHA 22 nd Ed.2012	mg/l	BDL (DL:2.0)

T₁ = Toxicity Factor

Note: T₁ = 16, it shows that all or some of the fish die in the test solution for a T value, less than 16 (1 part of waste water + 15 part of dilution water) and all are alive in test solution for a T value of 16 and above, after 48 hrs.

For Chennai Testing Laboratory Pvt Ltd

A. Raju
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TEST REPORT

Report Number and date	CTL/CH/N-5107/2017-18 & 30.09.2017
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S.NO	PARAMETERS	METHOD	UNITS	RESULTS
47	Organo chlorine Pesticides (OCP):			
	Aldrin	CTL/SOP/WATER/101-2012 APHA 22 nd Edition 2012-6630 B	µg/l	BDL (DL:0.01)
	Dieldrin		µg/l	BDL (DL:0.01)
	Endosulfan alpha		µg/l	BDL (DL:0.01)
	Endosulfan Beta		µg/l	BDL (DL:0.01)
	Endosulfan Sulfate		µg/l	BDL (DL:0.01)
	o,p'- DDT		µg/l	BDL (DL:0.01)
	p,p'- DDT		µg/l	BDL (DL:0.01)
	p,p'- DDE		µg/l	BDL (DL:0.01)
	o,p'- DDE		µg/l	BDL (DL:0.01)
	o,p'- DDD		µg/l	BDL (DL:0.01)
	p,p'- DDD		µg/l	BDL (DL:0.01)
	Alpha HCH		µg/l	BDL (DL:0.01)
	Beta HCH		µg/l	BDL (DL:0.01)
Gamma HCH (Lindane)	µg/l		BDL (DL:0.01)	
Delta HCH	µg/l	BDL (DL:0.01)		
48	Poly Chlorinated Terphenyls (as PCT):			
	o-Terphenyl	CTL/SOP/WATER/159-2017	µg/l	BDL (DL:0.03)
	m-Terphenyl		µg/l	BDL (DL:0.03)
	p-Terphenyl		µg/l	BDL (DL:0.03)
	Tetradecachloro-o-terphenyl		µg/l	BDL (DL:0.03)
	Tetradecachloro-m-terphenyl		µg/l	BDL (DL:0.03)
	Tetradecachloro-p-terphenyl		µg/l	BDL (DL:0.03)
	4-Chloro-o-terphenyl		µg/l	BDL (DL:0.03)
	4-Chloro-p-terphenyl		µg/l	BDL (DL:0.03)
	2,4-Dichloro-p-terphenyl		µg/l	BDL (DL:0.03)
	2,5-Dichloro-o-terphenyl		µg/l	BDL (DL:0.03)
	2,5-Dichloro-m-terphenyl		µg/l	BDL (DL:0.03)
	2,5-Dichloro-p-terphenyl		µg/l	BDL (DL:0.03)
	2,4,6-Trichloro-p-terphenyl		µg/l	BDL (DL:0.03)
	2,3,5,6-Tetrachloro-p-terphenyl		µg/l	BDL (DL:0.03)
2,4,4',6-Tetrachloro-p-terphenyl	µg/l		BDL (DL:0.03)	
2,3,4,5,6-Pentachloro-p-terphenyl	µg/l	BDL (DL:0.03)		

For Chennai Testing Laboratory Pvt Ltd

A. Rajan
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TEST REPORT

Report Number and date	CTL/CH/N-5107/2017-18 & 30.09.2017
------------------------	------------------------------------

S.NO	PARAMETERS	METHOD	UNITS	RESULTS
49	Poly Nuclear Aromatic Hydrocarbons (as PAH):			
	Naphthalene	APHA 22 nd Edition 6440 C CTL/SOP/WATER/102-2012	µg/l	BDL (DL:0.01)
	Acenaphthylene		µg/l	BDL (DL:0.01)
	2-Bromo-Naphthalene		µg/l	BDL (DL:0.02)
	Acenaphthene		µg/l	BDL (DL:0.02)
	Fluorene		µg/l	BDL (DL:0.02)
	Phenanthrene		µg/l	BDL (DL:0.02)
	Anthracene		µg/l	BDL (DL:0.02)
	Pyrene		µg/l	BDL (DL:0.02)
	Fluoranthene		µg/l	BDL (DL:0.02)
	Chrysene		µg/l	BDL (DL:0.02)
	Benz[a]anthracene		µg/l	BDL (DL:0.02)
	Benzo[a]pyrene		µg/l	BDL (DL:0.02)
	Benzo[b]fluoranthene		µg/l	BDL (DL:0.03)
	Benzo[ghi]perylene		µg/l	BDL (DL:0.03)
	Dibenz[a,h]anthracene		µg/l	BDL (DL:0.03)
Indeno[1,2,3-cd]pyrene	µg/l		BDL (DL:0.04)	
50	Poly Chlorinated Biphenyls (as PCB):			
	2-Chlorobiphenyl	Annex M of IS 13428-1998	µg/l	BDL (DL:0.01)
	2,3-dichlorobiphenyl		µg/l	BDL (DL:0.01)
	2,5,4'-Trichlorobiphenyl		µg/l	BDL (DL:0.01)
	2,2',4,4'-tetrachlorobiphenyl		µg/l	BDL (DL:0.01)
	2,2',3,4,6'-Pentachlorobiphenyl		µg/l	BDL (DL:0.01)
	2,2',4,4',5',6'-Hexachlorobiphenyl		µg/l	BDL (DL:0.01)
	2,2',3,3',4,4',6'-Heptachlorobiphenyl		µg/l	BDL (DL:0.01)
2,2',3,3',4,5,6,6'-Octachlorobiphenyl	µg/l		BDL (DL:0.01)	

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TEST REPORT

Report Number and date	CTL/CH/N-5107/2017-1B & 30.09.2017		
Sample Number	N-5107/17-1B		
Customer Name & Address	M/s, Tamil Nadu Pollution Control Board, 76, Mount Salai, Guindy, Chennai - 600 032.		
Project At	Coimbatore - Kurichi		
SAMPLE DETAILS			
Sample Description By Customer	Surface Water		
Sampling Location	Noyyar River		
GPS Reading	10°58' 27.56"N 076° 59' 44.47"E		
Sampling Date	18.09.2017	Sampled By	Chennai Testing Laboratory Pvt. Ltd.
Quantity Received	100ml	Sampling Method	CTL/MSP/5.7/001
Date of Receipt	19.09.2017	Sample Condition	Good & Received in Sterile Container
Analysis Starting Date	19.09.2017	Analysis Completion Date	20.09.2017

Test Results:

The above sample tested as received, and results are as follows:

S.NO	PARAMETERS	METHOD	UNITS	RESULTS
1	Total Coliform	IS 1622 : 1981 (R.2009)	MPN/100 ml	50
2	Faecal Coliform		MPN/100 ml	4

END OF REPORT

For Chennai Testing Laboratory Pvt Ltd



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TEST REPORT

Report Number and date	CTL/CH/N-5108/2017-18 & 30.09.2017		
Sample Number	N-5108/17-18		
Customer Name & Address	M/s. Tamil Nadu Pollution Control Board, 76, Mount Salai, Guindy, Chennai - 600 032.		
Project At	Coimbatore - Kurichi		
SAMPLE DETAILS			
Sample Description By Customer	Surface Water		
Sampling Location	Kurichikulam		
GPS Reading	10°58' 07.62"N 076° 58' 01.99"E		
Sampling Date	18.09.2017	Sampled By	Chennai Testing Laboratory Pvt. Ltd.
Quantity Received	5 Litres	Sampling Method	CTL/MSP/5.7/001
Date of Receipt	19.09.2017	Sample Condition	Good & Received in Plastic Container
Analysis Starting Date	19.09.2017	Analysis Completion Date	28.09.2017

Test Results

The above sample tested as received, and results are as follows:

S.NO	PARAMETERS	METHOD	UNITS	RESULTS
Sanitary Survey:				
1	Appearance	Physical Observation	-	Slightly turbid liquid
2	Colour	IS 3025 (Part 4)-1983 (R.2006)	PCU	10
3	pH @ 25°C	IS 3025 (Part 11)-1983 (R.2006)	-	7.4
4	Odour	IS 3025 (Part 5)-1983 (R.2006)	-	Unobjectionable
5	Ecological (Presence of Animals like Fish, Insects Etc)	Physical Observation	-	Present
6	Oil & Grease	5520-O&G-B-APHA 22 nd Ed. 2012 (Partition Gravimetric Method)	mg/l	< 2
7	Total Suspended Solids	2540-D- APHA 22 nd Ed.2012	mg/l	150
8	Dissolved Oxygen	4500-O-C- APHA 22 nd Ed.2012	mg/l	5.8
9	Biochemical Oxygen Demand (BOD) 3 days at 27°C	5210-B-APHA 22 nd Ed.2012	mg/l	8
10	Chemical Oxygen Demand (COD)	5220-B- APHA 22 nd Ed.2012	mg/l	54
11	Conductivity	IS 3025 (Part 14)-1984 (R.2006)	µs/cm	1254
12	Total Dissolved Solids	2540-C-APHA 22 nd Ed.2012	mg/l	748
13	Nitrate - Nitrogen	4500-NO ₃ -B-APHA 22 nd Ed.2012	mg/l	20.4
14	Nitrite - Nitrogen	4500-NO ₂ -B-APHA 22 nd Ed.2012	mg/l	BDL (DL:0.01)

For Chennai Testing Laboratory Pvt Ltd

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TEST REPORT

Report Number and date	CTL/CH/N-5108/2017-18 & 30.09.2017
------------------------	------------------------------------

S.NO	PARAMETERS	METHOD	UNITS	RESULTS
15	Free Ammonia as NH ₃	4500-NH ₃ -B.C.-APHA 22 nd Ed.	mg/l	0.54
16	Total Residual Chlorine	IS 3025 (Part 26)-1984	mg/l	BDL (DL:0.1)
17	Cyanide as CN	IS 3025 (Part 27)-1986 (R.2009)	mg/l	BDL (DL:0.01)
18	Fluoride as F	IS 3025 (Part 60)-2008	mg/l	0.26
19	Sulphate as SO ₄	IS 3025 (Part 24)-1986 (R.2009)	mg/l	23.3
20	Sulphide as H ₂ S	IS 3025 (Part 29) (R.2009)	mg/l	BDL (DL:0.01)
21	Total Hardness as CaCO ₃	IS 3025 (Part 21)-1983 (R.2006)	mg/l	254
22	Dissolved Phosphate as P	4500-P-D- APHA 22 nd Ed.2012	mg/l	0.26
23	Sodium Absorption Ratio	IS 11624-1986 (R.2001)	-	3.21
24	Total Phosphorous as P	4500-P-B-D-APHA 22 nd Ed.2012	mg/l	0.36
25	Total Kjeldahl Nitrogen as N	4500-N-B-C-APHA 22 nd Ed.2012	mg/l	2.1
26	Total Ammonia	4500-Na ₃ -B.C.APHA 22 nd Ed.2012	mg/l	1.4
27	Phenols	5530-C-APHA 22 nd Ed.2012	mg/l	BDL (DL:0.001)
28	Surface Active Agents	IS 13428 - 2005 (Annex K)	mg/l	BDL (DL:0.1)
29	Anionic detergent as MBAS	IS 13428 - 2005 (Annex K)	mg/l	BDL (DL:0.1)
30	Hexavalent Chromium as Cr ⁺⁺	3500-Cr-B-APHA 22 nd Ed. 2012	mg/l	BDL (DL:0.01)
31	Iron as Fe	IS 3025 (Part 53)-2009	mg/l	4.6
32	Boron as B	IS 3025 (Part 57)-2005	mg/l	BDL (DL:0.1)
33	Total Nitrogen	4500-N-B-C-APHA 22 nd Ed.2012	mg/l	24.4
34	Chloride	4500-Cl-B-APHA 22 nd Ed. 2012	mg/l	243
35	Bio - Assay (Zebra Fish) Test	IS 6582 (Part 2): 2001	-	T ₁ = 1
36	Copper as Cu	IS 3025 (Part 42)-1992 (R.2009)	mg/l	0.53
37	Manganese as Mn	3111 B APHA 22 nd Edition 2012	mg/l	0.13
38	Mercury as Hg	IS 3025 (Part 46)-1994 (R.2009)	mg/l	BDL (DL:0.001)
39	Cadmium as Cd	IS 3025 (Part 41)-1992 (R.2009)	mg/l	BDL (DL:0.002)
40	Selenium as Se	IS 3025 (Part 56)-2003(R.2009)	mg/l	BDL (DL:0.005)
41	Total Arsenic as As	IS 3025 (Part 37)-1988 (R.2009)	mg/l	BDL (DL:0.001)
42	Lead as Pb	IS 3025 (Part 47)-1994 (R.2009)	mg/l	BDL (DL:0.005)
43	Zinc as Zn	IS 3025 (Part 49)-1994 (R.2009)	mg/l	0.29
44	Total Chromium as Cr	IS 3025(Part 52)-2003	mg/l	BDL (DL:0.01)
45	Nickel as Ni	IS 3025 (Part 54)	mg/l	BDL (DL:0.01)
46	Vanadium as V	3111-B-APHA 22 nd Ed.2012	mg/l	BDL (DL:2.0)

T₁ = Toxicity Factor

Note: T₁ = 16, it shows that all or some of the fish die in the test solution for a T value, less than 16 (1 part of waste water + 15 part of dilution water) and all are alive in test solutions for a T value of 16 and above, after 48 hrs.

For Chennai Testing Laboratory Pvt Ltd

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TEST REPORT

Report Number and date		CTL/CH/N-5108/2017-18 & 30.09.2017		
S. NO	PARAMETERS	METHOD	UNITS	RESULTS
47	Organo chlorine Pesticides (OCP):-			
	Aldrin	CTL/SOP/WATER/101-2012 APHA 22 nd Edition 2012-6630 B	µg/l	BDL (DL-0.01)
	Dieldrin		µg/l	BDL (DL-0.01)
	Endosulfan alpha		µg/l	BDL (DL-0.01)
	Endosulfan Beta		µg/l	BDL (DL-0.01)
	Endosulfan Sulfate		µg/l	BDL (DL-0.01)
	o,p'-DDT		µg/l	BDL (DL-0.01)
	p,p'-DDT		µg/l	BDL (DL-0.01)
	p,p'-DDE		µg/l	BDL (DL-0.01)
	o,p'-DDE		µg/l	BDL (DL-0.01)
	o,p'-DDD		µg/l	BDL (DL-0.01)
	p,p'-DDD		µg/l	BDL (DL-0.01)
	Alpha HCH		µg/l	BDL (DL-0.01)
	Beta HCH		µg/l	BDL (DL-0.01)
Gamma HCH (Lindane)	µg/l		BDL (DL-0.01)	
Delta HCH	µg/l	BDL (DL-0.01)		
48	Poly Chlorinated Terphenyls (as PCT):-			
	o-Terphenyl	CTL/SOP/WATER/159-2017	µg/l	BDL (DL-0.03)
	m-Terphenyl		µg/l	BDL (DL-0.03)
	p-Terphenyl		µg/l	BDL (DL-0.03)
	Tetradecachloro-o-terphenyl		µg/l	BDL (DL-0.03)
	Tetradecachloro-m-terphenyl		µg/l	BDL (DL-0.03)
	Tetradecachloro-p-terphenyl		µg/l	BDL (DL-0.03)
	4-Chloro-o-terphenyl		µg/l	BDL (DL-0.03)
	4-Chloro-p-terphenyl		µg/l	BDL (DL-0.03)
	2,4-Dichloro-p-terphenyl		µg/l	BDL (DL-0.03)
	2,5-Dichloro-o-terphenyl		µg/l	BDL (DL-0.03)
	2,5-Dichloro-m-terphenyl		µg/l	BDL (DL-0.03)
	2,5-Dichloro-p-terphenyl		µg/l	BDL (DL-0.03)
	2,4,6-Trichloro-p-terphenyl		µg/l	BDL (DL-0.03)
	2,3,5,6-Tetrachloro-p-terphenyl		µg/l	BDL (DL-0.03)
2,4,4',6-Tetrachloro-p-terphenyl	µg/l		BDL (DL-0.03)	
2,3,4,5,6-Pentachloro-p-terphenyl	µg/l	BDL (DL-0.03)		

For Chennai Testing Laboratory Pvt Ltd

A. Rajan
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Page 3 of 5

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TEST REPORT

Report Number and date	CTL/CH/N-5108/2017-18 & 30.09.2017
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S.NO	PARAMETERS	METHOD	UNITS	RESULTS
49	Poly Nuclear Aromatic Hydrocarbons (as PAH):			
	Naphthalene	APHA 22 nd Edition 6440 C CTL/SOP/WATER/102-2012	µg/l	BDL (DL:0.01)
	Acenaphthylene		µg/l	BDL (DL:0.01)
	2-Bromo-Naphthalene		µg/l	BDL (DL:0.02)
	Acenaphthene		µg/l	BDL (DL:0.02)
	Fluorene		µg/l	BDL (DL:0.02)
	Phenanthrene		µg/l	BDL (DL:0.02)
	Anthracene		µg/l	BDL (DL:0.02)
	Pyrene		µg/l	BDL (DL:0.02)
	Fluoranthene		µg/l	BDL (DL:0.02)
	Chrysene		µg/l	BDL (DL:0.02)
	Benz[a]anthracene		µg/l	BDL (DL:0.02)
	Benzo[a]pyrene		µg/l	BDL (DL:0.02)
	Benzo[b]fluoranthene		µg/l	BDL (DL:0.03)
	Benzo[ghi]perylene		µg/l	BDL (DL:0.03)
Dibenz[a,h]anthracene	µg/l		BDL (DL:0.03)	
Indeno[1,2,3-cd]pyrene	µg/l	BDL (DL:0.04)		
50	Poly Chlorinated Biphenyls (as PCB):			
	2-Chlorobiphenyl	Ames M of IS 13420-1990	µg/l	BDL (DL:0.01)
	2,3-Dichlorobiphenyl		µg/l	BDL (DL:0.01)
	2,5,4'-Trichlorobiphenyl		µg/l	BDL (DL:0.01)
	2,2',4,4'-tetrachlorobiphenyl		µg/l	BDL (DL:0.01)
	2,2',3,4',6'-Pentachlorobiphenyl		µg/l	BDL (DL:0.01)
	2,2',4,4',5',6'-Hexachlorobiphenyl		µg/l	BDL (DL:0.01)
	2,2',3,3',4,4',6'-Heptachlorobiphenyl		µg/l	BDL (DL:0.01)
2,2',3,3',4,5,6,6'-Octachlorobiphenyl	µg/l		BDL (DL:0.01)	

For Chennai Testing Laboratory Pvt Ltd

A. Rajan
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Page 4 of 5

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TEST REPORT

Report Number and date	CTL/CH/N-5108/2017-18 & 30.09.2017		
Sample Number	N-5108/17-18		
Customer Name & Address	M/s. Tamil Nadu Pollution Control Board, 76, Mount Salai, Guindy, Chennai - 600 032.		
Project At	Coimbatore - Kurichi		
SAMPLE DETAILS			
Sample Description By Customer	Surface Water		
Sampling Location	Kurichikulam		
GPS Reading	10°58' 07.62"N 076° 58' 01.99"E		
Sampling Date	18.09.2017	Sampled By	Chennai Testing Laboratory Pvt. Ltd.
Quantity Received	100ml	Sampling Method	CTL/MSP/5.7/001
Date of Receipt	19.09.2017	Sample Condition	Good & Received in Sterile Container
Analysis Starting Date	19.09.2017	Analysis Completion Date	28.09.2017

Test Results:

The above sample tested as received, and results are as follows:

S.NO	PARAMETERS	METHOD	UNITS	RESULTS
1	Total Coliform	IS 1622 : 1901 (R.2009)	MPN/100 ml	110
2	Faecal Coliform		MPN/100 ml	23

END OF REPORT

For Chennai Testing Laboratory Pvt Ltd.


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Page 5 of 5

Ground Water Analysis - Manali



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CIN : U74999TN2008PTC067568

TEST REPORT

Report Number and date	CTL/CH/N-5913/2017-18 & 16.10.2017		
Sample Number	N-5913/17-18		
Customer Name & Address	M/s. Tamil Nadu Pollution Control Board, 76, Mount Salai, Guindy, Chennai - 600 032.		
Project At	Manali Industrial Area		
SAMPLE DETAILS			
Sample Description By Customer	Ground Water		
Sampling Location	China Mathur		
GPS Reading	13° 10' 18.64" N 080° 15' 20.50" E		
Sampling Date	09.10.2017	Sampled By	Chennai Testing Laboratory Pvt. Ltd.
Quantity Received	5 Litres	Sampling Method	CTL/MSP/5.7/001
Date of Receipt	09.10.2017	Sample Condition	Good & Received in Plastic Container
Analysis Starting Date	10.10.2017	Analysis Completion Date	16.10.2017

Test Results:

The above sample tested as received, and results are as follows:

S.NO	PARAMETERS	METHOD	UNITS	RESULTS
Sanitary Survey:				
1	Appearance	Physical Observation	-	Clear Liquid
2	Colour	IS 3025 (Part 4)-1983 (R.2006)	HU	2
3	pH @ 25°C	IS 3025 (Part 11)-1983 (R.2006)	-	7.8
4	Odour	IS 3025 (Part 5)-1983 (R.2006)	-	Unobjectionable
5	Ecological (Presence of Animals like Fish, Insects Etc)	Physical Observation	-	Present
6	Oil & Grease	5520-O&G-B APHA 22 nd Ed. 2012 (Partition Gravimetric Method)	mg/l	< 2
7	Total Suspended Solids	2540-D- APHA 22 nd Ed.2012	mg/l	< 2
8	Dissolved Oxygen	4500-O-C- APHA 22 nd Ed.2012	mg/l	6.6
9	Biochemical Oxygen Demand (BOD) 3 days at 27°C	5210-B-APHA 22 nd Ed.2012	mg/l	< 2
10	Chemical Oxygen Demand (COD)	5220-B- APHA 22 nd Ed.2012	mg/l	< 4
11	Conductivity	IS 3025 (Part 14)-1984 (R.2006)	µs/cm	2328
12	Total Dissolved Solids	2540-C-APHA 22 nd Ed.2012	mg/l	1336
13	Nitrate - Nitrogen	4500-NO ₃ -B-APHA 22 nd Ed.2012	mg/l	41.5
14	Nitrite - Nitrogen	4500-NO ₂ -B-APHA 22 nd Ed.2012	mg/l	BDL (DL0.01)

For Chennai Testing Laboratory Pvt Ltd

A. Rajan
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Page 1 of 3

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TEST REPORT

Report Number and date	CTL/CH/N-5913/2017-18 & 16.10.2017
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S.NO	PARAMETERS	METHOD	UNITS	RESULTS
15	Free Ammonia as NH ₃	4500-NH ₃ - B.C. APHA 22 nd Ed. 2012	mg/l	BDL (DL:0.1)
16	Total Residual Chlorine	IS 3025 (Part 26)-1984	mg/l	BDL (DL:0.1)
17	Cyanide as CN	IS 3025 (Part 27)-1986 (R.2009)	mg/l	BDL (DL:0.01)
18	Fluoride as F	IS 3025 (Part 60)-2008	mg/l	0.21
19	Sulphate as SO ₄	IS 3025 (Part 24)-1986 (R.2009)	mg/l	214
20	Sulphide as H ₂ S	IS 3025 (Part 29) (R.2009)	mg/l	BDL (DL:0.01)
21	Total Hardness as CaCO ₃	IS 3025 (Part 21)-1983 (R.2006)	mg/l	465
22	Dissolved Phosphate as P	4500-P-D- APHA 22 nd Ed.2012	mg/l	1.2
23	Sodium Absorption Ratio	IS 11624-1986 (R.2001)	-	5.88
24	Total Phosphorous as P	4500-P-B-D-APHA 22 nd Ed.2012	mg/l	1.2
25	Total Kjeldahl Nitrogen as N	4500-N-B-C-APHA 22 nd Ed.2012	mg/l	BDL (DL:0.1)
26	Total Ammonia	4500-Na ₂ -B-C-APHA 22 nd Ed.2012	mg/l	BDL (DL:0.1)
27	Phenols	5530-C-APHA 22 nd Ed.2012	mg/l	BDL (DL:0.001)
28	Surface Active Agents	IS 13428 - 2005 (Annex K)	mg/l	BDL (DL:0.1)
29	Anionic detergent as MBAS	IS 13428 - 2005 (Annex K)	mg/l	BDL (DL:0.1)
30	Hexavalent Chromium as Cr ⁶⁺	3500-Cr-B-APHA 22 nd Ed. 2012	mg/l	BDL (DL:0.01)
31	Iron as Fe	IS 3025 (Part 53)-2009	mg/l	0.09
32	Boron as B	IS 3025 (Part 57)-2005	mg/l	BDL (DL:0.1)
33	Total Nitrogen	4500-N-B-C-APHA 22 nd Ed.2012	mg/l	42.5
34	Chloride	4500-Cl-B-APHA 22 nd Ed. 2012	mg/l	364
35	Bio - Assay (Zebra Fish) Test	IS 6582 (Part 2), 2001	-	T ₁ = 1
36	Copper as Cu	IS 3025 (Part 42)-1992 (R.2009)	mg/l	BDL (DL:0.02)
37	Manganese as Mn	3111 B APHA 22 nd Edition 2012	mg/l	0.41
38	Mercury as Hg	IS 3025 (Part 48)-1994 (R.2009)	mg/l	BDL (DL:0.001)
39	Cadmium as Cd	IS 3025 (Part 41)-1992 (R.2009)	mg/l	BDL (DL:0.002)
40	Selenium as Se	IS 3025 (Part 56)-2003(R.2009)	mg/l	BDL (DL:0.005)
41	Total Arsenic as As	IS 3025 (Part 37)-1988 (R.2009)	mg/l	BDL (DL:0.001)
42	Lead as Pb	IS 3025 (Part 47)-1994 (R.2009)	mg/l	BDL (DL:0.005)
43	Zinc as Zn	IS 3025 (Part 49)-1994 (R.2009)	mg/l	BDL (DL:0.08)
44	Total Chromium as Cr	IS 3025(Part 52)-2003	mg/l	BDL (DL:0.01)
45	Nickel as Ni	IS 3025 (Part 54)	mg/l	BDL (DL:0.01)
46	Vanadium as V	3111-B-APHA 22 nd Ed.2012	mg/l	BDL (DL:2.0)

T₁ = Toxicity Factor

Note: T₁ = 16, it shows that all or some of the fish die in the test solution for a T value, less than 16 (1 part of waste water + 15 part of dilution water) and all are alive in test solutions for a T value of 16 and above, show 40 lvs.

For Chennai Testing Laboratory Pvt Ltd

A. Raju
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TEST REPORT

Report Number and date	CTL/CH/N-5913/2017-18 & 16.10.2017
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S. NO	PARAMETERS	METHOD	UNITS	RESULTS
47	Organo chlorine Pesticides (OCP):			
	Aldrin	CTL/SOP/WATER/101-2012 APHA 22 nd Edition 2012-6630 B	µg/l	BDL (DL:0.01)
	Dieldrin		µg/l	BDL (DL:0.01)
	Endosulfan alpha		µg/l	BDL (DL:0.01)
	Endosulfan Beta		µg/l	BDL (DL:0.01)
	Endosulfan Sulfate		µg/l	BDL (DL:0.01)
	o,p'-DDT		µg/l	BDL (DL:0.01)
	p,p'-DDT		µg/l	BDL (DL:0.01)
	p,p'-DDE		µg/l	BDL (DL:0.01)
	o,p'-DDE		µg/l	BDL (DL:0.01)
	o,p'-DDD		µg/l	BDL (DL:0.01)
	p,p'-DDD		µg/l	BDL (DL:0.01)
	Alpha HCH		µg/l	BDL (DL:0.01)
	Beta HCH		µg/l	BDL (DL:0.01)
	Gamma HCH (Lindane)		µg/l	BDL (DL:0.01)
Delta HCH	µg/l		BDL (DL:0.01)	
48	Poly Chlorinated Terphenyls (as PCT):			
	o-Terphenyl	CTL/SOP/WATER/159-2017	µg/l	BDL (DL:0.03)
	m-Terphenyl		µg/l	BDL (DL:0.03)
	p-Terphenyl		µg/l	BDL (DL:0.03)
	Tetrachloro-o-terphenyl		µg/l	BDL (DL:0.03)
	Tetrachloro-m-terphenyl		µg/l	BDL (DL:0.03)
	Tetrachloro-p-terphenyl		µg/l	BDL (DL:0.03)
	4-Chloro-o-terphenyl		µg/l	BDL (DL:0.03)
	4-Chloro-p-terphenyl		µg/l	BDL (DL:0.03)
	2,4-Dichloro-p-terphenyl		µg/l	BDL (DL:0.03)
	2,5-Dichloro-o-terphenyl		µg/l	BDL (DL:0.03)
	2,5-Dichloro-m-terphenyl		µg/l	BDL (DL:0.03)
	2,5-Dichloro-p-terphenyl		µg/l	BDL (DL:0.03)
	2,4,6-Trichloro-p-terphenyl		µg/l	BDL (DL:0.03)
	2,3,5,6-Tetrachloro-p-terphenyl		µg/l	BDL (DL:0.03)
2,4,4',6-Tetrachloro-p-terphenyl	µg/l		BDL (DL:0.03)	
2,3,4,5,6-Pentachloro-p-terphenyl	µg/l	BDL (DL:0.03)		

For Chennai Testing Laboratory Pvt Ltd

A. Rajan
Authorized Signatory

Page 3 of 5

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TEST REPORT

Report Number and date	CTL/CH/N-5913/2017-18 & 16.10.2017
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S. NO	PARAMETERS	METHOD	UNITS	RESULTS
49	Poly Nuclear Aromatic Hydrocarbons (as PAH):			
	Naphthalene	APHA 22 nd Edition 6440 C CTL/SOP/WATER/102-2012	µg/l	BDL (DL:0.01)
	Acenaphthylene		µg/l	BDL (DL:0.01)
	2-Fluoro-Naphthalene		µg/l	BDL (DL:0.02)
	Acenaphthene		µg/l	BDL (DL:0.02)
	Fluorene		µg/l	BDL (DL:0.02)
	Phenanthrene		µg/l	BDL (DL:0.02)
	Anthracene		µg/l	BDL (DL:0.02)
	Pyrene		µg/l	BDL (DL:0.02)
	Fluoranthene		µg/l	BDL (DL:0.02)
	Chrysene		µg/l	BDL (DL:0.02)
	Benz[a]anthracene		µg/l	BDL (DL:0.02)
	Benzo[a]pyrene		µg/l	BDL (DL:0.02)
	Benzo[b]fluoranthene		µg/l	BDL (DL:0.03)
	Benzo[ghi]perylene		µg/l	BDL (DL:0.03)
Dibenz[a,h]anthracene	µg/l		BDL (DL:0.03)	
Indeno[1,2,3-cd]pyrene	µg/l	BDL (DL:0.04)		
50	Poly Chlorinated Biphenyls (as PCB):			
	2-Chlorobiphenyl	Annex M of IS 13428-1998	µg/l	BDL (DL:0.01)
	2,3-dichlorobiphenyl		µg/l	BDL (DL:0.01)
	2,5,4'-Trichlorobiphenyl		µg/l	BDL (DL:0.01)
	2,2',4,4'-tetrachlorobiphenyl		µg/l	BDL (DL:0.01)
	2,2',3,4',5'-Pentachlorobiphenyl		µg/l	BDL (DL:0.01)
	2,2',4,4',5',6'-Hexachlorobiphenyl		µg/l	BDL (DL:0.01)
	2,2',3,3',4,4',6'-Heptachlorobiphenyl		µg/l	BDL (DL:0.01)
2,2',3,3',4,5,6,6'-Octachlorobiphenyl	µg/l		BDL (DL:0.01)	

For Chennai Testing Laboratory Pvt Ltd

A. D. Jeyaraj
Authorised Signatory

TEST REPORT

Report Number and date	CTL/CH/N-5913/2017-18 & 16.10.2017		
Sample Number	N-5913/17-18		
Customer Name & Address	M/s. Tamil Nadu Pollution Control Board, 76, Mount Solai, Guindy, Chennai - 600 032.		
Project At	Manali Industrial Area		
SAMPLE DETAILS			
Sample Description By Customer	Ground Water		
Sampling Location	Chinna Mathur		
GPS Reading	13° 10' 18.64" N 080° 15' 20.50" E		
Sampling Date	09.10.2017	Sampled By	Chennai Testing Laboratory Pvt. Ltd.
Quantity Received	100ml	Sampling Method	CTL/MSP/5.7/001
Date of Receipt	09.10.2017	Sample Condition	Good & Received in Sterile Container
Analysis Starting Date	10.10.2017	Analysis Completion Date	16.10.2017

Test Results

The above sample tested as received, and results are as follows:

S.NO	PARAMETERS	METHOD	UNITS	RESULTS
1	Total Coliform	IS 1622 : 1981 (R,2009)	MPN/100 ml	< 2
2	Faecal Coliform		MPN/100 ml	< 2

Note: < 2 can be considered as Absent

*****END OF REPORT*****

For Chennai Testing Laboratory Pvt Ltd



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Page 5 of 5

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TEST REPORT

Report Number and date	CTL/CH/N-5914/2017-18 & 16.10.2017		
Sample Number	N-5914/17-18		
Customer Name & Address	M/s. Tamil Nadu Pollution Control Board, 76 Mount Salai, Guindy, Chennai - 600 032.		
Project At	Manali Industrial Area		
SAMPLE DETAILS			
Sample Description By Customer	Ground Water		
Sampling Location	Chinna Chokkattu		
GPS Reading	13° 10' 11.40" N 080° 13' 31.55" E		
Sampling Date	09.10.2017	Sampled By	Chennai Testing Laboratory Pvt. Ltd.
Quantity Received	5 Litres	Sampling Method	CTL/MSP/5.7/001
Date of Receipt	09.10.2017	Sample Condition	Good & Received in Plastic Container
Analyte Starting Date	10.10.2017	Analysis Completion Date	16.10.2017

Test Results:

The above sample tested as received, and results are as follows:

S.NO	PARAMETERS	METHOD	UNITS	RESULTS
Sanitary Survey:				
1	Appearance	Physical Observation	-	Slightly Turbid Liquid
2	Colour	IS 3025 (Part 4)-1983 (R.2006)	HU	2
3	pH @ 25°C	IS 3025 (Part 11)-1983 (R.2006)	-	7.1
4	Odour	IS 3025 (Part 5)-1983 (R.2006)	-	Unobjectionable
5	Ecological (Presence of Animals like Fish, Insects Etc)	Physical Observation	-	Present
6	Oil & Grease	5520-O&G-B-APHA 22 nd Ed. 2012 (Partition Gravimetric Method)	mg/l	< 2
7	Total Suspended Solids	2540-D-APHA 22 nd Ed.2012	mg/l	8
8	Dissolved Oxygen	4500-O-C-APHA 22 nd Ed.2012	mg/l	6.5
9	Biochemical Oxygen Demand (BOD) 3 days at 27°C	5210-B-APHA 22 nd Ed.2012	mg/l	< 2
10	Chemical Oxygen Demand (COD)	5220-B-APHA 22 nd Ed.2012	mg/l	< 4
11	Conductivity	IS 3025 (Part 14)-1984 (R.2006)	µs/cm	1654
12	Total Dissolved Solids	2540-C-APHA 22 nd Ed.2012	mg/l	994
13	Nitrate - Nitrogen	4500-NO ₃ -B-APHA 22 nd Ed.2012	mg/l	23.5
14	Nitrite - Nitrogen	4500-NO ₂ -B-APHA 22 nd Ed.2012	mg/l	BDL (DL:0.01)

For Chennai Testing Laboratory Pvt Ltd

A. De. J. Mani
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Page 1 of 1

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TEST REPORT

Report Number and date	CTL/CH/N-5914/2017-18 & 16.10.2017
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S.NO	PARAMETERS	METHOD	UNITS	RESULTS
15	Free Ammonia as NH ₃	4500-NH ₂ -B.C-APHA 22 nd Ed. 2012	mg/l	BDL (DL:0.1)
16	Total Residual Chlorine	IS 3025 (Part 26)-1984	mg/l	BDL (DL:0.1)
17	Cyanide as CN	IS 3025 (Part 27)-1986 (R.2009)	mg/l	BDL (DL:0.01)
18	Fluoride as F	IS 3025 (Part 00)-2008	mg/l	0.24
19	Sulphate as SO ₄	IS 3025 (Part 24)-1986 (R.2009)	mg/l	75.8
20	Sulphide as H ₂ S	IS 3025 (Part 29) (R.2009)	mg/l	BDL (DL:0.01)
21	Total Hardness as CaCO ₃	IS 3025 (Part 21)-1983 (R.2006)	mg/l	304
22	Dissolved Phosphate as P	4500-P-D-APHA 22 nd Ed.2012	mg/l	3.6
23	Sodium Absorption Ratio	IS 11624-1986 (R.2001)	-	4.62
24	Total Phosphorous as P	4500-P-B-D-APHA 22 nd Ed.2012	mg/l	3.6
25	Total Kjeldahl Nitrogen as N	4500-N-B.C-APHA 22 nd Ed.2012	mg/l	BDL (DL:0.1)
26	Total Azotania	4500-Na ₂ -B.C-APHA 22 nd Ed.2012	mg/l	BDL (DL:0.1)
27	Phenols	5530-C-APHA 22 nd Ed.2012	mg/l	BDL (DL:0.001)
28	Surface Active Agents	IS 13428 -2005 (Annex K)	mg/l	BDL (DL:0.1)
29	Anionic detergent as MBAS	IS 13428 -2005 (Annex K)	mg/l	BDL (DL:0.1)
30	Hexavalent Chromium as Cr ⁶⁺	3500-Cr-B-APHA 22 nd Ed. 2012	mg/l	BDL (DL:0.01)
31	Iron as Fe	IS 3025 (Part 53)-2009	mg/l	0.23
32	Boron as B	IS 3025 (Part 57)-2005	mg/l	BDL (DL:0.1)
33	Total Nitrogen	4500-N-B.C-APHA 22 nd Ed.2012	mg/l	23.9
34	Chloride	4500-Cl-B-APHA 22 nd Ed. 2012	mg/l	311
35	Bio - Assay (Zebra Fish) Test	IS 6582 (Part 2)-2001	-	T ₁ = 1
36	Copper as Cu	IS 3025 (Part 42)-1992 (R.2009)	mg/l	BDL (DL:0.02)
37	Manganese as Mn	3111 B APHA 22 nd Edition 2012	mg/l	0.08
38	Mercury as Hg	IS 3025 (Part 48)-1994 (R.2009)	mg/l	BDL (DL:0.001)
39	Cadmium as Cd	IS 3025 (Part 41)-1992 (R.2009)	mg/l	BDL (DL:0.002)
40	Selenium as Se	IS 3025 (Part 56)-2003(R.2009)	mg/l	BDL (DL:0.005)
41	Total Arsenic as As	IS 3025 (Part 37)-1988 (R.2009)	mg/l	BDL (DL:0.001)
42	Lead as Pb	IS 3025 (Part 47)-1994 (R.2009)	mg/l	BDL (DL:0.005)
43	Zinc as Zn	IS 3025 (Part 49)-1994 (R.2009)	mg/l	BDL (DL:0.08)
44	Total Chromium as Cr	IS 3025(Part 52)-2003	mg/l	BDL (DL:0.01)
45	Nickel as Ni	IS 3025 (Part 54)	mg/l	BDL (DL:0.01)
46	Vanadium as V	3111 B-APHA 22 nd Ed.2012	mg/l	BDL (DL:2.0)

T₁ = Toxicity Factor

Note: T₁ = 16, it shows that all or some of the fish die in the test solution for a T value, less than 16 (1 part of waste water + 15 part of dilution water) and all are alive in test solution for a T value of 16 and above, after 48 hrs.

For Chennai Testing Laboratory Pvt Ltd

A. Deivanayagam
Authorized Signatory

Page 2 of 2

The Report shall not be valid in any case, unless used for the specified purpose.
The Report is valid only for the use of the substance to produce the test result.

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TEST REPORT

Report Number and date	CTL/CH/N-5914/2017-18 & 16.10.2017
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S. NO	PARAMETERS	METHOD	UNITS	RESULTS
47	Organo chlorine Pesticides (OCP):			
	Aldrin	CTL/SOP/WATER/101-2012 APHA 22 nd Edition 2012-6630 B	µg/l	BDL (DL:0.01)
	Dieldrin		µg/l	BDL (DL:0.01)
	Endosulfan alpha		µg/l	BDL (DL:0.01)
	Endosulfan Beta		µg/l	BDL (DL:0.01)
	Endosulfan Sulfate		µg/l	BDL (DL:0.01)
	o,p'-DDT		µg/l	BDL (DL:0.01)
	p,p'-DDT		µg/l	BDL (DL:0.01)
	p,p'-DDE		µg/l	BDL (DL:0.01)
	o,p'-DDE		µg/l	BDL (DL:0.01)
	o,p'-DDD		µg/l	BDL (DL:0.01)
	p,p'-DDD		µg/l	BDL (DL:0.01)
	Alpha HCH		µg/l	BDL (DL:0.01)
	Beta HCH		µg/l	BDL (DL:0.01)
	Gamma HCH (Lindane)		µg/l	BDL (DL:0.01)
Delta HCH	µg/l		BDL (DL:0.01)	
48	Poly Chlorinated Terphenyls (as PCT):			
	o-Terphenyl	CTL/SOP/WATER/150-2017	µg/l	BDL (DL:0.03)
	m-Terphenyl		µg/l	BDL (DL:0.03)
	p-Terphenyl		µg/l	BDL (DL:0.03)
	Tetradecachloro-o-terphenyl		µg/l	BDL (DL:0.03)
	Tetradecachloro-m-terphenyl		µg/l	BDL (DL:0.03)
	Tetradecachloro-p-terphenyl		µg/l	BDL (DL:0.03)
	4-Chloro-o-terphenyl		µg/l	BDL (DL:0.03)
	4-Chloro-p-terphenyl		µg/l	BDL (DL:0.03)
	2,4-Dichloro-p-terphenyl		µg/l	BDL (DL:0.03)
	2,5-Dichloro-o-terphenyl		µg/l	BDL (DL:0.03)
	2,5-Dichloro-m-terphenyl		µg/l	BDL (DL:0.03)
	2,5-Dichloro-p-terphenyl		µg/l	BDL (DL:0.03)
	2,4,6-Trichloro-p-terphenyl		µg/l	BDL (DL:0.03)
	2,3,5,6-Tetrachloro-p-terphenyl		µg/l	BDL (DL:0.03)
	2,4,4',6-Tetrachloro-p-terphenyl		µg/l	BDL (DL:0.03)
	2,3,4,5,6-Pentachloro-p-terphenyl		µg/l	BDL (DL:0.03)

For Chennai Testing Laboratory Pvt Ltd

A. Deivanayagam
Authorised Signatory

Page 9 of 9

The Report shall not be used to sue any, defend and/or any malicious purpose.
The Report must only be used for the purpose for which it is issued.

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TEST REPORT

Report Number and date	CTL/CH/N-5914/2017-18 & 16.10.2017
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S. NO	PARAMETERS	METHOD	UNITS	RESULTS
49	Poly Nuclear Aromatic Hydrocarbons (as PAH):			
	Naphthalene	APHA 22 nd Edition 6440 C CTL/SOP/WATER/102-2012	µg/l	BDL (DL:0.01)
	Acenaphthylene		µg/l	BDL (DL:0.01)
	2-Bromo-Naphthalene		µg/l	BDL (DL:0.02)
	Acenaphthene		µg/l	BDL (DL:0.02)
	Fluorene		µg/l	BDL (DL:0.02)
	Phenanthrene		µg/l	BDL (DL:0.02)
	Anthracene		µg/l	BDL (DL:0.02)
	Pyrene		µg/l	BDL (DL:0.02)
	Fluoranthene		µg/l	BDL (DL:0.02)
	Chrysene		µg/l	BDL (DL:0.02)
	Benzo[a]anthracene		µg/l	BDL (DL:0.02)
	Benzo[a]pyrene		µg/l	BDL (DL:0.02)
	Benzo[b]fluoranthene		µg/l	BDL (DL:0.03)
	Benzo[ghi]perylene		µg/l	BDL (DL:0.03)
Dibenz[a,h]anthracene	µg/l		BDL (DL:0.03)	
Indeno[1,2,3-cd]pyrene	µg/l	BDL (DL:0.04)		
50	Poly Chlorinated Biphenyls (as PCB):			
	2-Chlorobiphenyl	Annex M of IS 13428-1998	µg/l	BDL (DL:0.01)
	2,3-dichlorobiphenyl		µg/l	BDL (DL:0.01)
	2,5,4'-Trichlorobiphenyl		µg/l	BDL (DL:0.01)
	2,2',4,4'-tetrachlorobiphenyl		µg/l	BDL (DL:0.01)
	2,2',3,4',6'-Pentachlorobiphenyl		µg/l	BDL (DL:0.01)
	2,2',4,4',5',6'-Hexachlorobiphenyl		µg/l	BDL (DL:0.01)
	2,2',3,3',4,4',6'-Heptachlorobiphenyl		µg/l	BDL (DL:0.01)
	2,2',3,3',4,5,6,6'-Octachlorobiphenyl		µg/l	BDL (DL:0.01)

For Chennai Testing Laboratory Pvt Ltd

A. Rajan
Authorized Signatory

Page 4 of 5

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TEST REPORT

Report Number and date	CTL/CH/N-5914/2017-18 & 16.10.2017		
Sample Number	N-5914/17-18		
Customer Name & Address	M/s. Tamil Nadu Pollution Control Board, 76, Mount Salai, Guindy, Chennai - 600 032.		
Project At	Manali Industrial Area		
SAMPLE DETAILS			
Sample Description By Customer	Ground Water		
Sampling Location	Chinna Chekudu		
GPS Reading	13°10' 11.40" N 080° 15' 31.55" E		
Sampling Date	09.10.2017	Sampled By	Chennai Testing Laboratory Pvt. Ltd.,
Quantity Received	100ml	Sampling Method	CTL/MS/5.7/001
Date of Receipt	09.10.2017	Sample Condition	Good & Received in Sterile Container
Analysis Starting Date	10.10.2017	Analysis Completion Date	16.10.2017

Test Results:

The above sample tested as received, and results are as follows:

S.NO	PARAMETERS	METHOD	UNITS	RESULTS
1	Total Coliform	IS 1622 : 1981 (R2009)	MPN/100 ml	11
2	Faecal Coliform		MPN/100 ml	< 2

Note: < 2 can be considered as Absent

END OF REPORT

For Chennai Testing Laboratory Pvt Ltd


Authorised Signatory

Page 5 of 5

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The Report is intended only for the use of the addressed recipient for their own business.

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TEST REPORT

Report Number and date	CTL/CH/N-5915/2017-18 & 16.10.2017		
Sample Number	N-5915/17-18		
Customer Name & Address	M/s. Tamil Nadu Pollution Control Board, 76, Mount Salai, Guindy, Chennai - 600 032.		
Project At	Manali Industrial Area		
SAMPLE DETAILS			
Sample Description By Customer	Ground Water		
Sampling Location	Manali Town		
GPS Reading	13°09' 57.18" N 089° 15' 46.45" E		
Sampling Date	09.10.2017	Sampled By	Chennai Testing Laboratory Pvt. Ltd.
Quantity Received	5 Litres	Sampling Method	CTL/MSP/5.7/001
Date of Receipt	09.10.2017	Sample Condition	Good & Received in Plastic Container
Analysis Starting Date	10.10.2017	Analysis Completion Date	16.10.2017

Test Results:

The above sample tested as received, and results are as follows:

S.NO	PARAMETERS	METHOD	UNITS	RESULTS
Sanitary Survey:				
1	Appearance	Physical Observation	-	Clear Liquid
2	Colour	IS 3025 (Part 4)-1983 (R.2006)	HU	2
3	pH @ 25°C	IS 3025 (Part 11)-1983 (R.2006)	-	7.3
4	Odour	IS 3025 (Part 5)-1983 (R.2006)	-	Unobjectionable
5	Ecological (Presence of Animals like Fish, Insects Etc)	Physical Observation	-	Present
6	Oil & Grease	5520-086-B APHA 22 nd Ed. 2012 (Partition Gravimetric Method)	mg/l	<2
7	Total Suspended Solids	2540-D- APHA 22 nd Ed.2012	mg/l	<2
8	Dissolved Oxygen	4500-O-C- APHA 22 nd Ed.2012	mg/l	6.6
9	Biochemical Oxygen Demand (BOD) 3 days at 27°C	5210-B-APHA 22 nd Ed.2012	mg/l	<2
10	Chemical Oxygen Demand (COD)	5220-B- APHA 22 nd Ed.2012	mg/l	<4
11	Conductivity	IS 3025 (Part 14)-1984 (R.2006)	µs/cm	1372
12	Total Dissolved Solids	2540-C-APHA 22 nd Ed.2012	mg/l	824
13	Nitrate - Nitrogen	4500-NO ₃ -B-APHA 22 nd Ed.2012	mg/l	33.8
14	Nitrite - Nitrogen	4500-NO ₂ -B-APHA 22 nd Ed.2012	mg/l	BDL (DL.0.01)

For Chennai Testing Laboratory Pvt Ltd

A. Rajan
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Page 1 of 5

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TEST REPORT

Report Number and date	CTL/CH/N-5915/2017-18 & 16.10.2017
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S.NO	PARAMETERS	METHOD	UNITS	RESULTS
15	Free Ammonia as NH ₃	4500-NH ₃ - B.C.-APHA 22 nd Ed. 2012	mg/l	BDL (DL:0.1)
16	Total Residual Chlorine	IS 3025 (Part 26)-1984	mg/l	BDL (DL:0.1)
17	Cyanide as CN	IS 3025 (Part 27)-1986 (R.2009)	mg/l	BDL (DL:0.01)
18	Fluoride as F	IS 3025 (Part 60)-2008	mg/l	0.14
19	Sulphate as SO ₄	IS 3025 (Part 24)-1986 (R.2009)	mg/l	40
20	Sulphide as H ₂ S	IS 3025 (Part 29) (R.2009)	mg/l	BDL (DL:0.01)
21	Total Hardness as CaCO ₃	IS 3025 (Part 21)-1983 (R.2006)	mg/l	192
22	Dissolved Phosphate as P	4500-P-D- APHA 22 nd Ed.2012	mg/l	1.2
23	Sodium Absorption Ratio	IS 11624-1986 (R.2001)	-	5.3
24	Total Phosphorous as P	4500-P-B-D-APHA 22 nd Ed.2012	mg/l	1.2
25	Total Kjeldahl Nitrogen as N	4500-N-B-C-APHA 22 nd Ed.2012	mg/l	BDL (DL:0.1)
26	Total Ammonia	4500-Na ₂ -B-C-APHA 22 nd Ed.2012	mg/l	BDL (DL:0.1)
27	Phenols	5530-C-APHA 22 nd Ed.2012	mg/l	BDL (DL:0.001)
28	Surface Active Agents	IS 13428 -2005 (Annex K)	mg/l	BDL (DL:0.1)
29	Anionic detergent as MBAS	IS 13428 -2005 (Annex K)	mg/l	BDL (DL:0.1)
30	Hexavalent Chromium as Cr ⁶⁺	3500-Cr-B-APHA 22 nd Ed. 2012	mg/l	BDL (DL:0.01)
31	Iron as Fe	IS 3025 (Part 53)-2009	mg/l	0.05
32	Boron as B	IS 3025 (Part 57)-2005	mg/l	BDL (DL:0.1)
33	Total Nitrogen	4500-N-B-C-APHA 22 nd Ed.2012	mg/l	34.2
34	Chloride	4500-Cl-B-APHA 22 nd Ed. 2012	mg/l	301
35	Bio - Assay (Zebra Fish) Test	IS 6582 (Part 2): 2001	-	T ₁ = 1
36	Copper as Cu	IS 3025 (Part 42)-1992 (R.2009)	mg/l	BDL (DL:0.02)
37	Manganese as Mn	3111-B-APHA 22 nd Edition 2012	mg/l	0.08
38	Mercury as Hg	IS 3025 (Part 48)-1994 (R.2009)	mg/l	BDL (DL:0.001)
39	Cadmium as Cd	IS 3025 (Part 41)-1992 (R.2009)	mg/l	BDL (DL:0.002)
40	Selenium as Se	IS 3025 (Part 56)-2003(R.2009)	mg/l	BDL (DL:0.005)
41	Total Arsenic as As	IS 3025 (Part 37)-1988 (R.2009)	mg/l	BDL (DL:0.001)
42	Lead as Pb	IS 3025 (Part 47)-1994 (R.2009)	mg/l	BDL (DL:0.005)
43	Zinc as Zn	IS 3025 (Part 49)-1994 (R.2009)	mg/l	BDL (DL:0.08)
44	Total Chromium as Cr	IS 3025(Part 52)-2003	mg/l	BDL (DL:0.01)
45	Nickel as Ni	IS 3025 (Part 54)	mg/l	BDL (DL:0.01)
46	Vanadium as V	3111-B-APHA 22 nd Ed.2012	mg/l	BDL (DL:2.0)

T₁ = Turbidity Factor

Note: T₁ = 16, it shows that all or some of the fish die in the test solution for a T value, less than 16 (1 part of waste water + 15 part of dilution water) and all are alive in test solution for a T value of 16 and above, after 48 hrs.

For Chennai Testing Laboratory Pvt Ltd

A. Raju
Authorized Signatory

Page 2 of 8

This Report shall not be valid in absence of sample and for any modification contact
The Board is hereby notified for use of the address in providing the report business.

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TEST REPORT

Report Number and date	CTL/CH/N-5915/2017-18 & 16.10.2017
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S. NO	PARAMETERS	METHOD	UNITS	RESULTS
47	Organo chlorine Pesticides (OCP):			
	Aldrin	CTL/SOP/WATER/101-2012 APHA 22 nd Edition 2012-6630 B	ug/l	BDL (DL:0.01)
	Dieldrin		ug/l	BDL (DL:0.01)
	Endosulfan alpha		ug/l	BDL (DL:0.01)
	Endosulfan Beta		ug/l	BDL (DL:0.01)
	Endosulfan Sulfate		ug/l	BDL (DL:0.01)
	o,p'-DDT		ug/l	BDL (DL:0.01)
	p,p'-DDT		ug/l	BDL (DL:0.01)
	p,p'-DDE		ug/l	BDL (DL:0.01)
	o,p'-DDE		ug/l	BDL (DL:0.01)
	o,p'-DDD		ug/l	BDL (DL:0.01)
	p,p'-DDD		ug/l	BDL (DL:0.01)
	Alpha HCH		ug/l	BDL (DL:0.01)
	Beta HCH		ug/l	BDL (DL:0.01)
	Gamma HCH (Lindane)		ug/l	BDL (DL:0.01)
Delta HCH	ug/l		BDL (DL:0.01)	
48	Poly Chlorinated Terphenyls (as PCT):			
	o-Terphenyl	CTL/SOP/WATER/159-2017	ug/l	BDL (DL:0.03)
	m-Terphenyl		ug/l	BDL (DL:0.03)
	p-Terphenyl		ug/l	BDL (DL:0.03)
	Tetradecachloro-o-terphenyl		ug/l	BDL (DL:0.03)
	Tetradecachloro-m-terphenyl		ug/l	BDL (DL:0.03)
	Tetradecachloro-p-terphenyl		ug/l	BDL (DL:0.03)
	4-Chloro-o-terphenyl		ug/l	BDL (DL:0.03)
	4-Chloro-p-terphenyl		ug/l	BDL (DL:0.03)
	2,4-Dichloro-p-terphenyl		ug/l	BDL (DL:0.03)
	2,5-Dichloro-o-terphenyl		ug/l	BDL (DL:0.03)
	2,5-Dichloro-m-terphenyl		ug/l	BDL (DL:0.03)
	2,5-Dichloro-p-terphenyl		ug/l	BDL (DL:0.03)
	2,4,6-Trichloro-p-terphenyl		ug/l	BDL (DL:0.03)
	2,3,5-Tetrachloro-p-terphenyl		ug/l	BDL (DL:0.03)
	2,4,4',6-Tetrachloro-p-terphenyl		ug/l	BDL (DL:0.03)
	2,3,4,5,6-Pentachloro-p-terphenyl		ug/l	BDL (DL:0.03)

For Chennai Testing Laboratory Pvt Ltd

A. Rajan
Authorized Signatory

Page 2 of 2

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TEST REPORT

Report Number and date	CTL/CH/N-5915/2017-18 & 16.10.2017
------------------------	------------------------------------

S.NO	PARAMETERS	METHOD	UNITS	RESULTS
49	Poly Nuclear Aromatic Hydrocarbons (as PAH):			
	Naphthalene	APHA 22 nd Edition 6440 C CTL/SOP/WATER/102-2012	µg/l	BDL (DL:0.01)
	Acenaphthylene		µg/l	BDL (DL:0.01)
	2-Bromo-Naphthalene		µg/l	BDL (DL:0.02)
	Acenaphthene		µg/l	BDL (DL:0.02)
	Fluorene		µg/l	BDL (DL:0.02)
	Phenanthrene		µg/l	BDL (DL:0.02)
	Anthracene		µg/l	BDL (DL:0.02)
	Pyrene		µg/l	BDL (DL:0.02)
	Fluoranthene		µg/l	BDL (DL:0.02)
	Chrysene		µg/l	BDL (DL:0.02)
	Benzo[a]anthracene		µg/l	BDL (DL:0.02)
	Benzo[a]pyrene		µg/l	BDL (DL:0.02)
	Benzo[b]fluoranthene		µg/l	BDL (DL:0.03)
	Benzo[ghi]perylene		µg/l	BDL (DL:0.03)
Dibenz[a,h]anthracene	µg/l		BDL (DL:0.03)	
Indeno[1,2,3-cd]pyrene	µg/l	BDL (DL:0.04)		
50	Poly Chlorinated Biphenyls (as PCB):			
	2-Chlorobiphenyl	Annex M of IS 13428-1998	µg/l	BDL (DL:0.01)
	2,3-dichlorobiphenyl		µg/l	BDL (DL:0.01)
	2,5,4'-Trichlorobiphenyl		µg/l	BDL (DL:0.01)
	2,2',4,4'-tetrachlorobiphenyl		µg/l	BDL (DL:0.01)
	2,2',3,4',6'-Pentachlorobiphenyl		µg/l	BDL (DL:0.01)
	2,2',4,4',5,6-Hexachlorobiphenyl		µg/l	BDL (DL:0.01)
	2,2',3,3',4,4',6-Heptachlorobiphenyl		µg/l	BDL (DL:0.01)
	2,2',3,3',4,5,6,6'-Octachlorobiphenyl		µg/l	BDL (DL:0.01)

For Chennai Testing Laboratory Pvt Ltd

A. Rajan
Authorized Signatory

Page 4 of 5

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TEST REPORT

Report Number and date	CTL/CH/N-5915/2017-18 & 16.10.2017		
Sample Number	N-5915/17-18		
Customer Name & Address	M/s. Tamil Nadu Pollution Control Board, 76, Mount Satal, Guindy, Chennai - 600 032.		
Project At	Manali Industrial Area		
SAMPLE DETAILS			
Sample Description By Customer	Ground Water		
Sampling Location	Manali Town		
GPS Reading	13°09' 57.111" N 080° 15' 46.45"E		
Sampling Date	09.10.2017	Sampled By	Chennai Testing Laboratory Pvt. Ltd.
Quantity Received	100ml	Sampling Method	CTL/MSP/5.7/001
Date of Receipt	09.10.2017	Sample Condition	Good & Received in Sterile Container.
Analysis Starting Date	10.10.2017	Analysis Completion Date	16.10.2017

Test Results:

The above sample tested as received, and results are as follows:

S.NO	PARAMETERS	METHOD	UNITS	RESULTS
1	Total Coliform	IS 1622 : 1981 (R.2009)	MPN/100 ml	21
2	Faecal Coliform		MPN/100 ml	< 2

Note: < 2 can be considered as Absent

END OF REPORT

For Chennai Testing Laboratory Pvt Ltd


Authorized Signatory

TEST REPORT

Report Number and date	CTL/CH/N-6034/2017-18 & 23.10.2017		
Sample Number	N-6034/17-18		
Customer Name & Address	M/s. Tamil Nadu Pollution Control Board, 76, Mount Salai, Guindy, Chennai - 600 032.		
Project At	Manali Industrial Area		
SAMPLE DETAILS			
Sample Description By Customer	Ground Water (GW4)		
Sampling Location	Chennai Petroleum Corporation Limited		
GPS Reading	13°09'12.05" N 080°16'40.98"E		
Sampling Date	13.10.2017	Sampled By	Chennai Testing Laboratory Pvt. Ltd.
Quantity Received	5 Litres	Sampling Method	CTL/MSP/5.7/001
Date of Receipt	13.10.2017	Sample Condition	Good & Received in Plastic Container
Analysis Starting Date	14.10.2017	Analysis Completion Date	23.10.2017

Test Results:

The above sample tested as received, and results are as follows:

S.NO	PARAMETERS	METHOD	UNITS	RESULTS
Sanitary Survey:				
1	Appearance	Physical Observation	-	Turbid Liquid
2	Colour	IS 3025 (Part 4)-1983 (R.2006)	HU	500
3	pH @ 25°C	IS 3025 (Part 11)-1983 (R.2006)	-	6.5
4	Odour	IS 3025 (Part 5)-1983 (R.2006)	-	Unobjectionable
5	Ecological (Presence of Animals like Fish, Insects Etc)	Physical Observation	-	Absent
6	Oil & Grease	5520-O&G-B-APHA 22 nd Ed.2012 (Partition Gravimetric Method)	mg/l	<2
7	Total Suspended Solids	2540-D-APHA 22 nd Ed.2012	mg/l	690
8	Dissolved Oxygen	4500-O-C-APHA 22 nd Ed.2012	mg/l	5.9
9	Biochemical Oxygen Demand (BOD) 3 days at 27°C	5210-B-APHA 22 nd Ed.2012	mg/l	<2
10	Chemical Oxygen Demand (COD)	5220-B-APHA 22 nd Ed.2012	mg/l	24
11	Conductivity	IS 3025 (Part 14)-1984 (R.2006)	µs/cm	78194
12	Total Dissolved Solids	2540-C-APHA 22 nd Ed.2012	mg/l	46924
13	Nitrate - Nitrogen	4500-NO ₃ -B-APHA 22 nd Ed.2012	mg/l	6.2
14	Nitrite - Nitrogen	4500-NO ₂ -B-APHA 22 nd Ed.2012	mg/l	0.15

For Chennai Testing Laboratory Pvt Ltd

A. Rajan
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TEST REPORT

Report Number and date	CTL/CH/N-6034/2017-18 & 23.10.2017
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S.NO	PARAMETERS	METHOD	UNITS	RESULTS
15	Free Ammonia as NH ₃	4500-NH ₃ -B.C-APHA 22 nd Ed. 2012	mg/l	BDL (DL:0.1)
16	Total Residual Chlorine	IS 3025 (Part 26)-1984	mg/l	BDL (DL:0.1)
17	Cyanide as CN	IS 3025 (Part 27)-1986 (R.2009)	mg/l	BDL (DL:0.01)
18	Fluoride as F	IS 3025 (Part 60)-2008	mg/l	0.31
19	Sulphate as SO ₄	IS 3025 (Part 24)-1986 (R.2009)	mg/l	7217
20	Sulphide as H ₂ S	IS 3025 (Part 29) (R.2009)	mg/l	BDL (DL:0.01)
21	Total Hardness as CaCO ₃	IS 3025 (Part 21)-1983 (R.2006)	mg/l	12390
22	Dissolved Phosphate as P	4500-P-D-APHA 22 nd Ed.2012	mg/l	0.52
23	Sodium Absorption Ratio	IS 11624-1986 (R.2001)	-	47.4
24	Total Phosphorous as P	4500-P-B-D-APHA 22 nd Ed.2012	mg/l	0.55
25	Total Kjeldahl Nitrogen as N	4500-N-B-C-APHA 22 nd Ed.2012	mg/l	BDL (DL:0.1)
26	Total Ammonia	4500-Na ₂ -B.C-APHA 22 nd Ed.2012	mg/l	BDL (DL:0.1)
27	Phenols	5530-C-APHA 22 nd Ed.2012	mg/l	BDL (DL:0.001)
28	Surface Active Agents	IS 13428 - 2005 (Annex K)	mg/l	BDL (DL:0.1)
29	Anionic detergent as MBAS	IS 13428 - 2005 (Annex K)	mg/l	BDL (DL:0.1)
30	Hexavalent Chromium as Cr ^{VI}	3500-Cr-B-APHA 22 nd Ed. 2012	mg/l	BDL (DL:0.01)
31	Iron as Fe	IS 3025 (Part 53)-2009	mg/l	44.1
32	Boron as B	IS 3025 (Part 57)-2005	mg/l	0.54
33	Total Nitrogen	4500-N-B-C-APHA 22 nd Ed.2012	mg/l	6.4
34	Chloride	4500-Cl-B-APHA 22 nd Ed. 2012	mg/l	23383
35	Bin - Assay (Zebra Fish) Test	IS 6582 (Part 2): 2001	-	T ₁ = 1
36	Copper as Cu	IS 3025 (Part 42)-1992 (R.2009)	mg/l	0.13
37	Manganese as Mn	3111-B-APHA 22 nd Edition 2012	mg/l	22.12
38	Mercury as Hg	IS 3025 (Part 46)-1994 (R.2009)	mg/l	BDL (DL:0.001)
39	Cadmium as Cd	IS 3025 (Part 41)-1992 (R.2009)	mg/l	BDL (DL:0.002)
40	Selenium as Se	IS 3025 (Part 56)-2003(R.2009)	mg/l	BDL (DL:0.005)
41	Total Arsenic as As	IS 3025 (Part 37)-1988 (R.2009)	mg/l	BDL (DL:0.001)
42	Lead as Pb	IS 3025 (Part 47)-1994 (R.2009)	mg/l	BDL (DL:0.005)
43	Zinc as Zn	IS 3025 (Part 49)-1994 (R.2009)	mg/l	BDL (DL:0.08)
44	Total Chromium as Cr	IS 3025(Part 52)-2003	mg/l	BDL (DL:0.01)
45	Nickel as Ni	IS 3025 (Part 54)	mg/l	BDL (DL:0.01)
46	Vanadium as V	3111-B-APHA 22 nd Ed.2012	mg/l	BDL (DL:2.0)

T₁ = Toxicity Factor

Note: T₁ = 16, it shows that all or some of the fish die in the test solution for a T value, less than 16 (1 part of waste water + 15 part of dilution water) and all are alive in test solution for a T value of 16 and above, after 48 hrs.

For Chennai Testing Laboratory Pvt Ltd

A. Rajan
Authorized Signatory

Page 2 of 5

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TEST REPORT

Report Number and date	CTL/CH/N-6934/2017-18 & 23.10.2017
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S. NO	PARAMETERS	METHOD	UNITS	RESULTS
47	Organo chlorine Pesticides (OCP):-	CTL/SOP/WATER/101-2012 APHA 22 nd Edition 2012-6630 B	µg/l	BDL (DL-0.01)
	Aldrin			
	Dieldrin			
	Endosulfan alpha			
	Endosulfan Beta			
	Endosulfan Sulfate			
	o,p'-DDT			
	p,p'-DDT			
	p,p'-DDE			
	o,p'-DDE			
	o,p'-DDD			
	p,p'-DDD			
	Alpha HCH			
	Beta HCH			
Gamma HCH (Lindane)				
Delta HCH				
48	Poly Chlorinated Terphenyls (as PCT):-	CTL/SOP/WATER/159-2017	µg/l	BDL (DL-0.03)
	o-Terphenyl			
	m-Terphenyl			
	p-Terphenyl			
	Tetrachloro-o-terphenyl			
	Tetrachloro-m-terphenyl			
	Tetrachloro-p-terphenyl			
	4-Chloro-o-terphenyl			
	4-Chloro-p-terphenyl			
	2,4-Dichloro-p-terphenyl			
	2,5-Dichloro-o-terphenyl			
	2,5-Dichloro-m-terphenyl			
	2,5-Dichloro-p-terphenyl			
	2,4,6-Trichloro-p-terphenyl			
	2,3,5,6-Tetrachloro-p-terphenyl			
	2,4,4',6-Tetrachloro-p-terphenyl			
2,3,4,5,6-Pentachloro-p-terphenyl				

For Chennai Testing Laboratory Pvt Ltd

A. Rajan
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Page 3 of 3

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TEST REPORT

Report Number and date	CTL/CH/N-6034/2017-18 & 23.10.2017
------------------------	------------------------------------

S. NO	PARAMETERS	METHOD	UNITS	RESULTS
49	Poly Nuclear Aromatic Hydrocarbons (as PAH):			
	Naphthalene	APHA 22 nd Edition 6440 C CTL/SOP/WATER/102-2012	µg/l	BDL (DL:0.01)
	Acenaphthylene		µg/l	BDL (DL:0.01)
	2-Bromo-Naphthalene		µg/l	BDL (DL:0.02)
	Acenaphthene		µg/l	BDL (DL:0.02)
	Fluorene		µg/l	BDL (DL:0.02)
	Phenanthrene		µg/l	BDL (DL:0.02)
	Anthracene		µg/l	BDL (DL:0.02)
	Pyrene		µg/l	BDL (DL:0.02)
	Fluoranthene		µg/l	BDL (DL:0.02)
	Chrysene		µg/l	BDL (DL:0.02)
	Benzo[a]anthracene		µg/l	BDL (DL:0.02)
	Benzo[a]pyrene		µg/l	BDL (DL:0.02)
	Benzo[b]fluoranthene		µg/l	BDL (DL:0.03)
	Benzo[ghi]perylene		µg/l	BDL (DL:0.03)
Dibenzo[a,h]anthracene	µg/l		BDL (DL:0.03)	
Indeno[1,2,3-cd]pyrene	µg/l	BDL (DL:0.04)		
50	Poly Chlorinated Biphenyls (as PCB):			
	2-Chlorobiphenyl	Annex M of IS 13428-1998	µg/l	BDL (DL:0.01)
	2,3-dichlorobiphenyl		µg/l	BDL (DL:0.01)
	2,5,4'-Trichlorobiphenyl		µg/l	BDL (DL:0.01)
	2,2',4,4'-tetrachlorobiphenyl		µg/l	BDL (DL:0.01)
	2,2',3,4',6'-Pentachlorobiphenyl		µg/l	BDL (DL:0.01)
	2,2',4,4',5',6'-Hexachlorobiphenyl		µg/l	BDL (DL:0.01)
	2,2',3,3',4,4',6'-Heptachlorobiphenyl		µg/l	BDL (DL:0.01)
	2,2',3,3',4,5,6,6'-Octachlorobiphenyl		µg/l	BDL (DL:0.01)

For Chennai Testing Laboratory Pvt Ltd

A. Rajan
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Page 4 of 5

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TEST REPORT

Report Number and date	CTL/CH/N-6034/2017-18 & 23.10.2017		
Sample Number	N-6034/17-18		
Customer Name & Address	M/s. Tamil Nadu Pollution Control Board,		
	76, Mount Salai, Guindy, Chennai - 600 032.		
Project At	Manali Industrial Area		
SAMPLE DETAILS			
Sample Description By Customer	Ground Water (GW4)		
Sampling Location	Chennai Petroleum Corporation Limited		
GPS Reading	13°09'12.05" N 080°16'40.98"E		
Sampling Date	13.10.2017	Sampled By:	Chennai Testing Laboratory Pvt. Ltd.,
Quantity Received	100ml	Sampling Method	CTL/MSP/5.7/001
Date of Receipt	13.10.2017	Sample Condition	Good & Received in Sterile Container
Analysis Starting Date	14.10.2017	Analysis Completion Date	23.10.2017

Test Results:

The above sample tested as received, and results are as follows:

S.NO	PARAMETERS	METHOD	UNITS	RESULTS
1	Total Coliform	IS 1622 : 1981 (R.2009)	MPN/100 ml	< 2
2	Faecal Coliform		MPN/100 ml	< 2

Note: < 2 can be considered as Absent

*****END OF REPORT*****

For Chennai Testing Laboratory Pvt Ltd



Authorized Signatory

Ground Water Analysis - Ranipet



CIN : U74999TN2008PTC067568

www.ctllabs.in
www.foodenvironmenttesting.com

TEST REPORT

Report Number and date	CTL/CH/N-5846/2017-18 & 16.10.2017		
Sample Number	N-5846/17-18		
Customer Name & Address	M/s. Tamil Nadu Pollution Control Board, 76, Mount Salai, Guindy, Chennai - 600 032.		
Project At	Ranipet Sipcot Area, Vellore		
SAMPLE DETAILS			
Sample Description By Customer	Ground Water		
Sampling Location	Amenor - Lalapet Road (Near Venkateswara Leather Metals (P) Ltd.)		
GPS Reading	12°57' 49.07" N 079° 20' 05.72" E		
Sampling Date	05.10.2017	Sampled By	Chennai Testing Laboratory Pvt. Ltd.
Quantity Received	5 Litres	Sampling Method	CTL/MSP/5.7/001
Date of Receipt	07.10.2017	Sample Condition	Good & Received in Plastic Container
Analysis Starting Date	07.10.2017	Analysis Completion Date	14.10.2017

Test Results:

The above sample tested as received, and results are as follows:

S.NO	PARAMETERS	METHOD	UNITS	RESULTS
Sanitary Survey:				
1	Appearance	Physical Observation	-	Clear Liquid
2	Colour	IS 3025 (Part 4)-1983 (R.2006)	HU	2
3	pH @ 25°C	IS 3025 (Part 11)-1983 (R.2006)	-	7.1
4	Odour	IS 3025 (Part 5)-1983 (R.2006)	-	Unobjectionable
5	Ecological (Presence of Animals like Fish, Insects Etc)	Physical Observation	-	Present
6	Oil & Grease	5520-O&G-B APHA 22 nd Ed. 2012 (Partition Gravimetric Method)	mg/l	< 2
7	Total Suspended Solids	2540-D- APHA 22 nd Ed.2012	mg/l	2
8	Dissolved Oxygen	4500-O-C- APHA 22 nd Ed.2012	mg/l	6.6
9	Biochemical Oxygen Demand (BOD) 3 days at 27°C	5210-B-APHA 22 nd Ed.2012	mg/l	< 2
10	Chemical Oxygen Demand (COD)	5220-B- APHA 22 nd Ed.2012	mg/l	< 4
11	Conductivity	IS 3025 (Part 14)-1984 (R.2006)	µs/cm	401
12	Total Dissolved Solids	2540-C- APHA 22 nd Ed.2012	mg/l	290
13	Nitrate - Nitrogen	4500-NO ₃ -B-APHA 22 nd Ed.2012	mg/l	BDL (DL:0.1)
14	Nitrite - Nitrogen	4500-NO ₂ -B-APHA 22 nd Ed.2012	mg/l	BDL (DL:0.01)

For Chennai Testing Laboratory Pvt Ltd

A. Raju
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Page 1 of 5

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TEST REPORT

Report Number and date	CTL/CH/N-5846/2017-18 & 16.10.2017
------------------------	------------------------------------

S.NO	PARAMETERS	METHOD	UNITS	RESULTS
15	Free Ammonia as NH ₃	4500-NH ₃ -B-C-APHA 22 nd Ed.	mg/l	BDL (DL:0.1)
16	Total Residual Chlorine	IS 3025 (Part 26)-1984	mg/l	BDL (DL:0.1)
17	Cyanide as CN	IS 3025 (Part 27)-1986 (R.2009)	mg/l	BDL (DL:0.01)
18	Fluoride as F	IS 3025 (Part 60)-2008	mg/l	0.14
19	Sulphate as SO ₄	IS 3025 (Part 24)-1986 (R.2009)	mg/l	43.9
20	Sulphide as H ₂ S	IS 3025 (Part 29) (R.2009)	mg/l	BDL (DL:0.01)
21	Total Hardness as CaCO ₃	IS 3025 (Part 21)-1983 (R.2006)	mg/l	113
22	Dissolved Phosphate as P	4500-P-D- APHA 22 nd Ed.2012	mg/l	0.17
23	Sodium Absorption Ratio	IS 11624-1986 (R.2001)	-	1.74
24	Total Phosphorus as P	4500-P-B-D-APHA 22 nd Ed.2012	mg/l	0.17
25	Total Kjeldahl Nitrogen as N	4500-N-B-C-APHA 22 nd Ed.2012	mg/l	BDL (DL:0.1)
26	Total Ammonia	4500-Na ₃ -B-C-APHA 22 nd Ed.2012	mg/l	BDL (DL:0.1)
27	Phenols	5530-C-APHA 22 nd Ed.2012	mg/l	BDL (DL:0.001)
28	Surface Active Agents	IS 13428 -2005 (Annex K)	mg/l	BDL (DL:0.1)
29	Anionic detergent as MBAS	IS 13428 -2005 (Annex K)	mg/l	BDL (DL:0.1)
30	Hexavalent Chromium as Cr ⁶⁺	3500-Cr-B-APHA 22 nd Ed. 2012	mg/l	BDL (DL:0.01)
31	Iron as Fe	IS 3025 (Part 53)-2009	mg/l	0.57
32	Boron as B	IS 3025 (Part 57)-2005	mg/l	BDL (DL:0.1)
33	Total Nitrogen	4500-N-B-C-APHA 22 nd Ed.2012	mg/l	BDL (DL:0.1)
34	Chloride	4500-Cl-B-APHA 22 nd Ed. 2012	mg/l	78
35	Bio - Assay (Zebra Fish) Test	IS 6582 (Part 2): 2001	-	T ₁ = 1
36	Copper as Cu	IS 3025 (Part 42)-1992 (R.2009)	mg/l	BDL (DL:0.02)
37	Manganese as Mn	3111-B-APHA 22 nd Edition 2012	mg/l	BDL (DL:0.01)
38	Mercury as Hg	IS 3025 (Part 48)-1994 (R.2009)	mg/l	BDL (DL:0.001)
39	Cadmium as Cd	IS 3025 (Part 41)-1992 (R.2009)	mg/l	BDL (DL:0.002)
40	Selenium as Se	IS 3025 (Part 56)-2003(R.2009)	mg/l	IS 3025 (Part 56)-2003(R.2009)
41	Total Arsenic as As	IS 3025 (Part 37)-1988 (R.2009)	mg/l	BDL (DL:0.001)
42	Lead as Pb	IS 3025 (Part 47)-1994 (R.2009)	mg/l	BDL (DL:0.005)
43	Zinc as Zn	IS 3025 (Part 49)-1994 (R.2009)	mg/l	BDL (DL:0.08)
44	Total Chromium as Cr	IS 3025(Part 52)-2003	mg/l	BDL (DL:0.01)
45	Nickel as Ni	IS 3025 (Part 54)	mg/l	BDL (DL:0.01)
46	Vanadium as V	3111-B-APHA 22 nd Ed.2012	mg/l	BDL (DL:2.0)

T₁ = Toxicity Factor

Note: T₁ = 16, it shows that all or some of the fish die in the test solution for a T value less than 16 (1 part of waste water + 15 part of dilution water) and all are alive in test solutions for a T value of 16 and above, after 48 hrs.

For Chennai Testing Laboratory Pvt Ltd

A. Rajan
Authorised Signatory

Page 2 of 5

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TEST REPORT

Report Number and date	CTL/CH/N-5846/2017-18 & 16.10.2017
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S. NO	PARAMETERS	METHOD	UNITS	RESULTS
47	Organo-chlorine Pesticides (OCP):			
	Aldrin	CTL/SOP/WATER/101-2012 APRA 22 nd Edition 2012-6630 B	µg/l	BDL (DL:0.01)
	Dieldrin		µg/l	BDL (DL:0.01)
	Endosulfan alpha		µg/l	BDL (DL:0.01)
	Endosulfan Beta		µg/l	BDL (DL:0.01)
	Endosulfan Sulfate		µg/l	BDL (DL:0.01)
	o,p'-DDT		µg/l	BDL (DL:0.01)
	p,p'-DDT		µg/l	BDL (DL:0.01)
	p,p'-DDE		µg/l	BDL (DL:0.01)
	o,p'-DDE		µg/l	BDL (DL:0.01)
	o,p'-DDD		µg/l	BDL (DL:0.01)
	p,p'-DDD		µg/l	BDL (DL:0.01)
	Alpha HCH		µg/l	BDL (DL:0.01)
	Beta HCH		µg/l	BDL (DL:0.01)
	Gamma HCH (Lindane)		µg/l	BDL (DL:0.01)
Delta HCH	µg/l		BDL (DL:0.01)	
48	Poly Chlorinated Terphenyls (as PCT):			
	o-Terphenyl	CTL/SOP/WATER/150-2017	µg/l	BDL (DL:0.03)
	m-Terphenyl		µg/l	BDL (DL:0.03)
	p-Terphenyl		µg/l	BDL (DL:0.03)
	Tetradecachloro-o-terphenyl		µg/l	BDL (DL:0.03)
	Tetradecachloro-m-terphenyl		µg/l	BDL (DL:0.03)
	Tetradecachloro-p-terphenyl		µg/l	BDL (DL:0.03)
	4-Chloro-o-terphenyl		µg/l	BDL (DL:0.03)
	4-Chloro-p-terphenyl		µg/l	BDL (DL:0.03)
	2,4-Dichloro-p-terphenyl		µg/l	BDL (DL:0.03)
	2,5-Dichloro-o-terphenyl		µg/l	BDL (DL:0.03)
	2,5-Dichloro-m-terphenyl		µg/l	BDL (DL:0.03)
	2,5-Dichloro-p-terphenyl		µg/l	BDL (DL:0.03)
	2,4,6-Trichloro-p-terphenyl		µg/l	BDL (DL:0.03)
	2,3,5,6-Tetrachloro-p-terphenyl		µg/l	BDL (DL:0.03)
2,4,4',6-Tetrachloro-p-terphenyl	µg/l		BDL (DL:0.03)	
2,3,4,5,6-Pentachloro-p-terphenyl	µg/l	BDL (DL:0.03)		

For Chennai Testing Laboratory Pvt Ltd

A. Rajan
Authorized Signatory

TEST REPORT

Report Number and date	CTL/CH/N-5846/2017-18 & 16.10.2017
------------------------	------------------------------------

S. NO	PARAMETERS	METHOD	UNITS	RESULTS
49	Poly Nuclear Aromatic Hydrocarbons (as PAH):			
	Naphthalene	APHA 22 nd Edition 6440 C CTL/SOP/WATER/102-2012	µg/l	BDL (DL:0.01)
	Acenaphthylene		µg/l	BDL (DL:0.01)
	2-Bromo-Naphthalene		µg/l	BDL (DL:0.02)
	Acenaphthene		µg/l	BDL (DL:0.02)
	Fluorene		µg/l	BDL (DL:0.02)
	Phenanthrene		µg/l	BDL (DL:0.02)
	Anthracene		µg/l	BDL (DL:0.02)
	Pyrene		µg/l	BDL (DL:0.02)
	Fluoranthene		µg/l	BDL (DL:0.02)
	Chrysene		µg/l	BDL (DL:0.02)
	Benzo[a]anthracene		µg/l	BDL (DL:0.02)
	Benzo[a]pyrene		µg/l	BDL (DL:0.02)
	Benzo[b]fluoranthene		µg/l	BDL (DL:0.03)
	Benzo[ghi]perylene		µg/l	BDL (DL:0.03)
Dibenz[a,h]anthracene	µg/l		BDL (DL:0.03)	
Indeno[1,2,3-cd]pyrene	µg/l	BDL (DL:0.04)		
50	Poly Chlorinated Biphenyls (as PCB):			
	2-Chlorobiphenyl	Annex M of IS 13420-1998	µg/l	BDL (DL:0.01)
	2,3-dichlorobiphenyl		µg/l	BDL (DL:0.01)
	2,5,4'-Trichlorobiphenyl		µg/l	BDL (DL:0.01)
	2,2',4,4'-tetrachlorobiphenyl		µg/l	BDL (DL:0.01)
	2,2',3,4',5',6'-Pentachlorobiphenyl		µg/l	BDL (DL:0.01)
	2,2',4,4',5',6'-Hexachlorobiphenyl		µg/l	BDL (DL:0.01)
	2,2',3,3',4,4',6'-Heptachlorobiphenyl		µg/l	BDL (DL:0.01)
2,2',3,3',4,5,6,6'-Octachlorobiphenyl	µg/l		BDL (DL:0.01)	

For Chennai Testing Laboratory Pvt Ltd

A. P. J. [Signature]
Authorised Signatory

TEST REPORT

Report Number and date	CTI/CH/N-5846/2017-18 & 16.10.2017		
Sample Number	N-5846/17-18		
Customer Name & Address	M/s. Tamil Nadu Pollution Control Board, 76, Mount Salai, Guindy, Chennai - 600 032.		
Project At	Ranipet Sipcot Area, Vellore		
SAMPLE DETAILS			
Sample Description By Customer	Ground Water		
Sampling Location	Ammor - Lalapet Road (Near Venkateswara Leather Metals (P) Ltd.)		
GPS Reading	12°57' 49.07"N 079° 20' 05.72"E		
Sampling Date	05.10.2017	Sampled By	Chennai Testing Laboratory Pvt. Ltd.,
Quantity Received	100ml	Sampling Method	CTI/MSP/5.7/001
Date of Receipt	07.10.2017	Sample Condition	Good & Received in Sterile Container
Analysis Starting Date	07.10.2017	Analysis Completion Date	14.10.2017

Test Results:

The above sample tested as received, and results are as follows:

S.NO	PARAMETERS	METHOD	UNITS	RESULTS
1	Total Coliform	IS 1622 : 1981 (R.2009)	MPN/100 ml	13
2	Faecal Coliform		MPN/100 ml	< 2

Note: < 2 can be considered as Absent

END OF REPORT

For Chennai Testing Laboratory Pvt Ltd


Authorised Signatory

Page 5 of 5

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TEST REPORT

Report Number and date	CTL/CH/N-5847/2017-18 & 16.10.2017		
Sample Number	N-5847/17-18		
Customer Name & Address	M/s. Tamil Nadu Pollution Control Board, 76, Mount Salai, Guindy, Chennai - 600 032.		
Project At	Ranipet Sipcot Area, Vellore		
SAMPLE DETAILS			
Sample Description By Customer	Ground Water		
Sampling Location	Chettihangal Village		
GPS Reading	12° 57' 12.35"N 079° 20' 10.18"E		
Sampling Date	05.10.2017	Sampled By	Chennai Testing Laboratory Pvt. Ltd.
Quantity Received	5 Litres	Sampling Method	CTL/MSP/S.7/001
Date of Receipt	07.10.2017	Sample Condition	Good & Received in Plastic Container
Analysis Starting Date	07.10.2017	Analysis Completion Date	14.10.2017

Test Results:

The above sample tested as received, and results are as follows:

SNO	PARAMETERS	METHOD	UNITS	RESULTS
Sanitary Survey:				
1	Appearance	Physical Observation	-	Turbid Liquid
2	Colour	IS 3025 (Part 4)-1983 (R.2006)	HU	2
3	pH @ 25°C	IS 3025 (Part 11)-1983 (R.2006)	-	7.0
4	Odour	IS 3025 (Part 5)-1983 (R.2006)	-	Unobjectionable
5	Ecological (Presence of Animals like Fish, Insects Etc)	Physical Observation	-	Present
6	Oil & Grease	5520-O&G-B-APHA 22 nd Ed. 2012 (Partition Gravimetric Method)	mg/l	< 2
7	Total Suspended Solids	2540-D-APHA 22 nd Ed. 2012	mg/l	26
8	Dissolved Oxygen	4500-O-C-APHA 22 nd Ed. 2012	mg/l	6.2
9	Biochemical Oxygen Demand (BOD) 3 days at 27°C	5210-B-APHA 22 nd Ed. 2012	mg/l	< 2
10	Chemical Oxygen Demand (COD)	5220-B-APHA 22 nd Ed. 2012	mg/l	8
11	Conductivity	IS 3025 (Part 14)-1984 (R.2006)	µs/cm	2414
12	Total Dissolved Solids	2540-C-APHA 22 nd Ed. 2012	mg/l	1446
13	Nitrate - Nitrogen	4500-NO ₃ -B-APHA 22 nd Ed. 2012	mg/l	40.9
14	Nitrite - Nitrogen	4500-NO ₂ -B-APHA 22 nd Ed. 2012	mg/l	BDL (DL:0.01)

For Chennai Testing Laboratory Pvt Ltd

A. Rajan
Authorized Signatory

Page 1 of 3

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TEST REPORT

Report Number and date	CTL/CH/N-5847/2017-18 & 16.10.2017
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S.NO	PARAMETERS	METHOD	UNITS	RESULTS
15	Free Ammonia as NH ₃	4500-NH ₃ -B.C-APHA 22 nd Ed.	mg/l	BDL (DL-0.1)
16	Total Residual Chlorine	IS 3025 (Part 26)-1984	mg/l	BDL (DL-0.1)
17	Cyanide as CN	IS 3025 (Part 27)-1986 (R.2009)	mg/l	BDL (DL-0.01)
18	Fluoride as F	IS 3025 (Part 60)-2008	mg/l	0.18
19	Sulphate as SO ₄	IS 3025 (Part 24)-1986 (R.2009)	mg/l	208
20	Sulphide as H ₂ S	IS 3025 (Part 29) (R.2009)	mg/l	BDL (DL-0.01)
21	Total Hardness as CaCO ₃	IS 3025 (Part 21)-1983 (R.2006)	mg/l	667
22	Dissolved Phosphate as P	4500-P-D-APHA 22 nd Ed.2012	mg/l	1.0
23	Sodium Absorption Ratio	IS 11624-1986 (R.2001)	-	5.05
24	Total Phosphorous as P	4500-P-B-D-APHA 22 nd Ed.2012	mg/l	1.0
25	Total Kjeldahl Nitrogen as N	4500-N-B.C-APHA 22 nd Ed.2012	mg/l	BDL (DL-0.1)
26	Total Ammonia	4500-Na ₂ -B.C-APHA 22 nd Ed.2012	mg/l	BDL (DL-0.1)
27	Phenols	5530-C-APHA 22 nd Ed.2012	mg/l	BDL (DL-0.001)
28	Surface Active Agents	IS 13428 - 2005 (Annex K)	mg/l	BDL (DL-0.1)
29	Anionic detergent as MBAS	IS 13428 - 2005 (Annex K)	mg/l	BDL (DL-0.1)
30	Hexavalent Chromium as Cr ⁶⁺	3500-Cr-B-APHA 22 nd Ed. 2012	mg/l	BDL (DL-0.01)
31	Iron as Fe	IS 3025 (Part 53)-2009	mg/l	0.49
32	Boron as B	IS 3025 (Part 57)-2005	mg/l	BDL (DL-0.1)
33	Total Nitrogen	4500-N-B.C-APHA 22 nd Ed.2012	mg/l	41.5
34	Chloride	4500-Cl-B-APHA 22 nd Ed. 2012	mg/l	486
35	Bio - Assay (Zebra Fish) Test	IS 6582 (Part 2): 2001	-	T ₅₀ = 1
36	Copper as Cu	IS 3025 (Part 42)-1992 (R.2009)	mg/l	BDL (DL-0.02)
37	Manganese as Mn	3111-B-APHA 22 nd Edition 2012	mg/l	BDL (DL-0.01)
38	Mercury as Hg	IS 3025 (Part 48)-1994 (R.2009)	mg/l	BDL (DL-0.001)
39	Cadmium as Cd	IS 3025 (Part 41)-1992 (R.2009)	mg/l	BDL (DL-0.002)
40	Selenium as Se	IS 3025 (Part 56)-2003(R.2009)	mg/l	BDL (DL-0.005)
41	Total Arsenic as As	IS 3025 (Part 37)-1988 (R.2009)	mg/l	BDL (DL-0.001)
42	Lead as Pb	IS 3025 (Part 47)-1994 (R.2009)	mg/l	BDL (DL-0.005)
43	Zinc as Zn	IS 3025 (Part 49)-1994 (R.2009)	mg/l	BDL (DL-0.00)
44	Total Chromium as Cr	IS 3025(Part 52)-2003	mg/l	BDL (DL-0.01)
45	Nickel as Ni	IS 3025 (Part 54)	mg/l	BDL (DL-0.01)
46	Vanadium as V	3111-B-APHA 22 nd Ed.2012	mg/l	BDL (DL-2.0)

T₅₀ = Toxicity Factor

Note: T₅₀ = 16. It shows that all or some of the fish die in the test solution for a T value less than 16 (1 part of waste water + 15 part of dilution water) and all are alive in test solution for a T value of 16 and above, after 48 hrs.

For Chennai Testing Laboratory Pvt Ltd

A. Raju
Authorized Signatory

Page 2 of 2

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TEST REPORT

Report Number and date	CTL/CH/N-5047/2017-18 & 16.10.2017
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S.NO	PARAMETERS	METHOD	UNITS	RESULTS
47	Organo chlorine Pesticides (OCP):			
	Aldrin	CTL/SOP/WATER/101-2012 APHA 22 nd Edition 2012-6630 B	µg/l	BDL (DL:0.01)
	Dieldrin		µg/l	BDL (DL:0.01)
	Endosulfan alpha		µg/l	BDL (DL:0.01)
	Endosulfan Beta		µg/l	BDL (DL:0.01)
	Endosulfan Sulfate		µg/l	BDL (DL:0.01)
	o,p'-DDT		µg/l	BDL (DL:0.01)
	p,p'-DDT		µg/l	BDL (DL:0.01)
	p,p'-DDE		µg/l	BDL (DL:0.01)
	o,p'-DDE		µg/l	BDL (DL:0.01)
	o,p'-DDD		µg/l	BDL (DL:0.01)
	p,p'-DDD		µg/l	BDL (DL:0.01)
	Alpha HCH		µg/l	BDL (DL:0.01)
	Beta HCH		µg/l	BDL (DL:0.01)
Gamma HCH (Lindane)	µg/l		BDL (DL:0.01)	
Delta HCH	µg/l	BDL (DL:0.01)		
48	Poly Chlorinated Terphenyls (as PCT):			
	o-Terphenyl	CTL/SOP/WATER/159-2017	µg/l	BDL (DL:0.03)
	m-Terphenyl		µg/l	BDL (DL:0.03)
	p-Terphenyl		µg/l	BDL (DL:0.03)
	Tetradecachloro-o-terphenyl		µg/l	BDL (DL:0.03)
	Tetradecachloro-m-terphenyl		µg/l	BDL (DL:0.03)
	Tetradecachloro-p-terphenyl		µg/l	BDL (DL:0.03)
	4-Chloro-o-terphenyl		µg/l	BDL (DL:0.03)
	4-Chloro-p-terphenyl		µg/l	BDL (DL:0.03)
	2,4-Dichloro-p-terphenyl		µg/l	BDL (DL:0.03)
	2,5-Dichloro-o-terphenyl		µg/l	BDL (DL:0.03)
	2,5-Dichloro-m-terphenyl		µg/l	BDL (DL:0.03)
	2,5-Dichloro-p-terphenyl		µg/l	BDL (DL:0.03)
	2,4,6-Trichloro-p-terphenyl		µg/l	BDL (DL:0.03)
	2,3,5,6-Tetrachloro-p-terphenyl		µg/l	BDL (DL:0.03)
2,4,4',6-Tetrachloro-p-terphenyl	µg/l		BDL (DL:0.03)	
2,3,4,5,6-Pentachloro-p-terphenyl	µg/l	BDL (DL:0.03)		

For Chennai Testing Laboratory Pvt Ltd

A. Rajan
Authorised Signatory

Page 2 of 5

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TEST REPORT

Report Number and date	CTL/CH/N-5847/2017-18 & 16.10.2017
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S. NO	PARAMETERS	METHOD	UNITS	RESULTS
49	Poly Nuclear Aromatic Hydrocarbons (as PAH):			
	Naphthalene	APHA 22 nd Edition 6440 C CTL/SOP/WATER/102-2012	µg/l	BDL (DL-0.01)
	Acenaphthylene		µg/l	BDL (DL-0.01)
	2-Bromo-Naphthalene		µg/l	BDL (DL-0.02)
	Acenaphthene		µg/l	BDL (DL-0.02)
	Fluorene		µg/l	BDL (DL-0.02)
	Phenanthrene		µg/l	BDL (DL-0.02)
	Anthracene		µg/l	BDL (DL-0.02)
	Pyrene		µg/l	BDL (DL-0.02)
	Fluoranthene		µg/l	BDL (DL-0.02)
	Chrysene		µg/l	BDL (DL-0.02)
	Benz[a]anthracene		µg/l	BDL (DL-0.02)
	Benzo[a]pyrene		µg/l	BDL (DL-0.02)
	Benzo[b]fluoranthene		µg/l	BDL (DL-0.03)
	Benzo[ghi]perylene		µg/l	BDL (DL-0.03)
Dibenz[a,h]anthracene	µg/l		BDL (DL-0.03)	
Indeno[1,2,3-cd]pyrene	µg/l	BDL (DL-0.04)		
50	Poly Chlorinated Biphenyls (as PCB):			
	2-Chlorobiphenyl	Annex M of IS 13420-1990	µg/l	BDL (DL-0.01)
	2,3-dichlorobiphenyl		µg/l	BDL (DL-0.01)
	2,5,4'-Trichlorobiphenyl		µg/l	BDL (DL-0.01)
	2,2',4,4'-tetrachlorobiphenyl		µg/l	BDL (DL-0.01)
	2,2',3,4',5'-Pentachlorobiphenyl		µg/l	BDL (DL-0.01)
	2,2',4,4',5',6'-Hexachlorobiphenyl		µg/l	BDL (DL-0.01)
	2,2',3,3',4,4',5'-Heptachlorobiphenyl		µg/l	BDL (DL-0.01)
2,2',3,3',4,5,6,6'-Octachlorobiphenyl	µg/l		BDL (DL-0.01)	

For Chennai Testing Laboratory Pvt Ltd

A. Rajan
Authorised Signatory

Page 4 of 5

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TEST REPORT

Report Number and date	CTL/CH/N-5047/2017-18 & 16.10.2017		
Sample Number	N-5847/17-18		
Customer Name & Address	M/s, Tamil Nadu Pollution Control Board, 76, Mount Salai, Guindy, Chennai - 600 032.		
Project At	Banipet Sipcot Area, Vellore		
SAMPLE DETAILS			
Sample Description By Customer	Ground Water		
Sampling Location	Chettithangal Village		
GPS Reading	12°57' 12.35"N 079° 20' 10.10"E		
Sampling Date	05.10.2017	Sampled By	Chennai Testing Laboratory Pvt. Ltd.
Quantity Received	100ml	Sampling Method	CTL/MSP/5.7/001
Date of Receipt	07.10.2017	Sample Condition	Good & Received in Sterile Container
Analysis Starting Date	07.10.2017	Analysis Completion Date	14.10.2017

Test Results:

The above sample tested as received, and results are as follows:

S.NO	PARAMETERS	METHOD	UNITS	RESULTS
1	Total Coliform	IS:1622:1981 (R:2009)	MPN/100 ml	13
2	Faecal Coliform		MPN/100 ml	<2

Note: <2 can be considered as Absent

*****END OF REPORT*****

For Chennai Testing Laboratory Pvt Ltd



Authorised Signatory

Page 5 of 5

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TEST REPORT

Report Number and date	CTL/CH/N-5848/2017-18 & 16.10.2017		
Sample Number	N-5848/17-18		
Customer Name & Address	M/s. Tamil Nadu Pollution Control Board, 76, Mount Salai, Guindy, Chennai - 600 032.		
Project At	Ramipet Sipeot Area, Vellore		
SAMPLE DETAILS			
Sample Description By Customer	Ground Water		
Sampling Location	Edappalayam Village		
GPS Reading	12°58' 27.91"N 079° 19' 09.04"E		
Sampling Date	05.10.2017	Sampled By	Chennai Testing Laboratory Pvt. Ltd.
Quantity Received	5 Litres	Sampling Method	CTL/MSP/5.7/001
Date of Receipt	07.10.2017	Sample Condition	Good & Received in Plastic Container
Analysis Starting Date	07.10.2017	Analysis Completion Date	14.10.2017

Test Results

The above sample tested as received, and results are as follows:

S.NO	PARAMETERS	METHOD	UNITS	RESULTS
Sanitary Survey:				
1	Appearance	Physical Observation	-	Clear Liquid
2	Colour	IS 3025 (Part 4)-1983 (R.2006)	HU	2
3	pH @ 25°C	IS 3025 (Part 11)-1983 (R.2006)	-	7.3
4	Odour	IS 3025 (Part 5)-1983 (R.2006)	-	Unobjectionable
5	Ecological (Presence of Animals like Fish, Insects Etc)	Physical Observation	-	Present
6	Oil & Grease	5520-O&G-B APHA 22 nd Ed. 2012 (Filtration Gravimetric Method)	mg/l	< 3
7	Total Suspended Solids	3540-D- APHA 22 nd Ed. 2012	mg/l	< 3
8	Dissolved Oxygen	4500-O-C- APHA 22 nd Ed. 2012	mg/l	6.8
9	Biochemical Oxygen Demand (BOD) 3 days at 27°C	5210-B-APHA 22 nd Ed. 2012	mg/l	< 2
10	Chemical Oxygen Demand (COD)	5220-B- APHA 22 nd Ed. 2012	mg/l	< 4
11	Conductivity	IS 3025 (Part 14)-1984 (R.2006)	µs/cm	814
12	Total Dissolved Solids	3540-C-APHA 22 nd Ed. 2012	mg/l	486
13	Nitrate - Nitrogen	4500-NO ₃ -B-APHA 22 nd Ed. 2012	mg/l	10.4
14	Nitrite - Nitrogen	4500-NO ₂ -B-APHA 22 nd Ed. 2012	mg/l	BDL (DL-0.01)

For Chennai Testing Laboratory Pvt Ltd

A. Raju
Authorized Signatory

Page 1 of 5

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TEST REPORT

Report Number and date	CTL/CH/N-5848/2017-18 & 16.10.2017
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S.NO	PARAMETERS	METHOD	UNITS	RESULTS
15	Free Ammonia as NH ₃	4500-NH ₃ - B.C-APHA 22 nd Ed.	mg/l	BDL (DL:0.1)
16	Total Residual Chlorine	IS 3025 (Part 26)-1984	mg/l	BDL (DL:0.1)
17	Cyanide as CN	IS 3025 (Part 27)-1986 (R.2009)	mg/l	BDL (DL:0.01)
18	Fluoride as F	IS 3025 (Part 60)-2008	mg/l	0.16
19	Sulphate as SO ₄	IS 3025 (Part 24)-1986 (R.2009)	mg/l	64.7
20	Sulphide as H ₂ S	IS 3025 (Part 29) (R.2009)	mg/l	BDL (DL:0.01)
21	Total Hardness as CaCO ₃	IS 3025 (Part 21)-1983 (R.2006)	mg/l	364
22	Dissolved Phosphate as P	4500-P-D- APHA 22 nd Ed.2012	mg/l	0.21
23	Sodium Absorption Ratio	IS 11624-1986 (R.2001)	-	1.87
24	Total Phosphorus as P	4500-P-B-D-APHA 22 nd Ed.2012	mg/l	0.21
25	Total Kjeldahl Nitrogen as N	4500-N-B-C-APHA 22 nd Ed.2012	mg/l	BDL (DL:0.1)
26	Total Ammonia	4500-Na ₂ -B-C-APHA 22 nd Ed.2012	mg/l	BDL (DL:0.1)
27	Phenols	5530-C-APHA 22 nd Ed.2012	mg/l	BDL (DL:0.001)
28	Surface Active Agents	IS 13428 - 2005 (Annex K)	mg/l	BDL (DL:0.1)
29	Anionic detergent as MBAS	IS 13428 - 2005 (Annex K)	mg/l	BDL (DL:0.1)
30	Hexavalent Chromium as Cr ⁶⁺	3500-Cr-B-APHA 22 nd Ed. 2012	mg/l	BDL (DL:0.01)
31	Iron as Fe	IS 3025 (Part 53)-2009	mg/l	0.03
32	Boron as B	IS 3025 (Part 57)-2005	mg/l	BDL (DL:0.1)
33	Total Nitrogen	4500-N-B-C-APHA 22 nd Ed.2012	mg/l	10.9
34	Chloride	4500-Cl-B-APHA 22 nd Ed. 2012	mg/l	87
35	Bio - Assay (Zebra Fish) Test	IS 6582 (Part 2): 2001	-	T ₁ = 1
36	Copper as Cu	IS 3025 (Part 42)-1992 (R.2009)	mg/l	BDL (DL:0.02)
37	Manganese as Mn	3111 B APHA 22 nd Edition 2012	mg/l	BDL (DL:0.01)
38	Mercury as Hg	IS 3025 (Part 48)-1994 (R.2009)	mg/l	BDL (DL:0.001)
39	Cadmium as Cd	IS 3025 (Part 41)-1992 (R.2009)	mg/l	BDL (DL:0.002)
40	Selenium as Se	IS 3025 (Part 56)-2003(R.2009)	mg/l	BDL (DL:0.005)
41	Total Arsenic as As	IS 3025 (Part 37)-1988 (R.2009)	mg/l	BDL (DL:0.001)
42	Lead as Pb	IS 3025 (Part 47)-1994 (R.2009)	mg/l	BDL (DL:0.005)
43	Zinc as Zn	IS 3025 (Part 49)-1994 (R.2009)	mg/l	BDL (DL:0.00)
44	Total Chromium as Cr	IS 3025(Part 52)-2003	mg/l	BDL (DL:0.01)
45	Nickel as Ni	IS 3025 (Part 54)	mg/l	BDL (DL:0.01)
46	Vanadium as V	3111-B-APHA 22 nd Ed.2012	mg/l	BDL (DL:2.0)

T₁ = Toxicity Factor

Note: T₁ = 16: it shows that all or some of the fish die in the test solution for a T value less than 16 (1 part of waste water + 15 part of dilution water) and all are alive in test solution for a T value of 16 and above, after 48 hrs.

For Chennai Testing Laboratory Pvt Ltd

A. Deivanand
Authorized Signatory

Page 2 of 5

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TEST REPORT

Report Number and date	CTL/CH/N-5848/2017-18 & 16.10.2017
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S.NO	PARAMETERS	METHOD	UNITS	RESULTS
47	Organo chlorine Pesticides (OCP):			
	Aldrin	CTL/SOP/WATER/101-2012 APHA 22 nd Edition 2012-6630 B	µg/l	BDL (DL:0.01)
	Dieldrin		µg/l	BDL (DL:0.01)
	Endosulfan alpha		µg/l	BDL (DL:0.01)
	Endosulfan Beta		µg/l	BDL (DL:0.01)
	Endosulfan Sulfate		µg/l	BDL (DL:0.01)
	o,p'-DDT		µg/l	BDL (DL:0.01)
	p,p'-DDT		µg/l	BDL (DL:0.01)
	p,p'-DDE		µg/l	BDL (DL:0.01)
	o,p'-DDE		µg/l	BDL (DL:0.01)
	o,p'-DDD		µg/l	BDL (DL:0.01)
	p,p'-DDD		µg/l	BDL (DL:0.01)
	Alpha HCH		µg/l	BDL (DL:0.01)
	Beta HCH		µg/l	BDL (DL:0.01)
Gamma HCH (Lindane)	µg/l		BDL (DL:0.01)	
Delta HCH	µg/l	BDL (DL:0.01)		
48	Poly Chlorinated Terphenyls (as PCT):			
	o-Terphenyl	CTL/SOP/WATER/159-2017	µg/l	BDL (DL:0.03)
	m-Terphenyl		µg/l	BDL (DL:0.03)
	p-Terphenyl		µg/l	BDL (DL:0.03)
	Tetrachloro-o-terphenyl		µg/l	BDL (DL:0.03)
	Tetrachloro-m-terphenyl		µg/l	BDL (DL:0.03)
	Tetrachloro-p-terphenyl		µg/l	BDL (DL:0.03)
	4-Chloro-o-terphenyl		µg/l	BDL (DL:0.03)
	4-Chloro-p-terphenyl		µg/l	BDL (DL:0.03)
	2,4-Dichloro-p-terphenyl		µg/l	BDL (DL:0.03)
	2,5-Dichloro-o-terphenyl		µg/l	BDL (DL:0.03)
	2,5-Dichloro-m-terphenyl		µg/l	BDL (DL:0.03)
	2,5-Dichloro-p-terphenyl		µg/l	BDL (DL:0.03)
	2,4,6-Trichloro-p-terphenyl		µg/l	BDL (DL:0.03)
	2,3,5,6-Tetrachloro-p-terphenyl		µg/l	BDL (DL:0.03)
	2,4,4',6-Tetrachloro-p-terphenyl		µg/l	BDL (DL:0.03)
2,3,4,5,6-Pentachloro-p-terphenyl	µg/l		BDL (DL:0.03)	

For Chennai Testing Laboratory Pvt Ltd

A. Devaraj
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Page 3 of 5

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TEST REPORT

Report Number and date:	CTL/CH/N-5849/2017-18 & 16.10.2017
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S.NO	PARAMETERS	METHOD	UNITS	RESULTS
Poly Nuclear Aromatic Hydrocarbons (as PAH):				
49	Naphthalene	APHA 22 nd Edition 6440 C CTL/SOP/WATER/102-2012	µg/l	BDL (DL:0.01)
	Acenaphthylene		µg/l	BDL (DL:0.01)
	2-Bromo-Naphthalene		µg/l	BDL (DL:0.02)
	Acenaphthene		µg/l	BDL (DL:0.02)
	Fluorene		µg/l	BDL (DL:0.02)
	Phenanthrene		µg/l	BDL (DL:0.02)
	Anthracene		µg/l	BDL (DL:0.02)
	Pyrene		µg/l	BDL (DL:0.02)
	Fluoranthene		µg/l	BDL (DL:0.02)
	Chrysene		µg/l	BDL (DL:0.02)
	Benzo[a]anthracene		µg/l	BDL (DL:0.02)
	Benzo[a]pyrene		µg/l	BDL (DL:0.02)
	Benzo[b]fluoranthene		µg/l	BDL (DL:0.03)
	Benzo[ghi]perylene		µg/l	BDL (DL:0.03)
Dibenz[a,h]anthracene	µg/l	BDL (DL:0.03)		
Indeno[1,2,3-cd]pyrene	µg/l	BDL (DL:0.04)		
Poly Chlorinated Biphenyls (as PCB):				
50	2-Chlorobiphenyl	Annex M of IS 13428-1998	µg/l	BDL (DL:0.01)
	2,3-dichlorobiphenyl		µg/l	BDL (DL:0.01)
	2,5,4'-Trichlorobiphenyl		µg/l	BDL (DL:0.01)
	1,2',4,4'-tetrachlorobiphenyl		µg/l	BDL (DL:0.01)
	2,2',3,4',6'-Pentachlorobiphenyl		µg/l	BDL (DL:0.01)
	2,2',4,4',5',6'-Hexachlorobiphenyl		µg/l	BDL (DL:0.01)
	2,2',3,3',4,4',6'-Heptachlorobiphenyl		µg/l	BDL (DL:0.01)
	2,2',3,3',4,5,6,6'-Octachlorobiphenyl		µg/l	BDL (DL:0.01)

For Chennai Testing Laboratory Pvt Ltd

A. Rajan
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TEST REPORT

Report Number and date	CTL/CH/N-5040/2017-10 & 16.10.2017		
Sample Number	N-5040/17-10		
Customer Name & Address	M/s. Tamil Nadu Pollution Control Board, 76, Mount Salai, Guindy, Chennai - 600 032.		
Project At	Banipet Sipcot Area, Vellore		
SAMPLE DETAILS			
Sample Description By Customer	Ground Water		
Sampling Location	Edappalayam Village		
GPS Reading	12°58' 27.91"N 079° 19' 09.04"E		
Sampling Date	05.10.2017	Sampled By	Chennai Testing Laboratory Pvt. Ltd.
Quantity Received	100ml	Sampling Method	CTL/MSP/5.7/001
Date of Receipt	07.10.2017	Sample Condition	Good & Received in Sterile Container
Analysis Starting Date	07.10.2017	Analysis Completion Date	14.10.2017

Test Results:

The above sample tested as received, and results are as follows:

S.NO	PARAMETERS	METHOD	UNITS	RESULTS
1.	Total Coliform	IS 1622 : 1981 (R.2009)	MPN/100 ml	< 2
2.	Faecal Coliform		MPN/100 ml	< 2

Note: < 2 can be considered as Absent

END OF REPORT

For Chennai Testing Laboratory Pvt Ltd



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TEST REPORT

Report Number and date	CTL/CH/N-5049/2017-18 & 16.10.2017		
Sample Number	N-5849/17-18		
Customer Name & Address	M/s. Tamil Nadu Pollution Control Board, 76, Mount Salai, Guindy, Chennai - 600 032.		
Project At	Rampet Siphon Area, Vellore		
SAMPLE DETAILS			
Sample Description By Customer	Ground Water		
Sampling Location	Narasingapuram Village		
GPS Reading	12°58' 40.41"N 079° 16' 46.31"E		
Sampling Date	05.10.2017	Sampled By	Chennai Testing Laboratory Pvt. Ltd.
Quantity Received	5 Litres	Sampling Method	CTL/MSP/5.7/001
Date of Receipt	07.10.2017	Sample Condition	Good & Received in Plastic Container
Analysis Starting Date	07.10.2017	Analysis Completion Date	14.10.2017

Test Results:

The above sample tested as received, and results are as follows:

S.NO	PARAMETERS	METHOD	UNITS	RESULTS
Sanitary Survey:				
1	Appearance	Physical Observation	-	Slightly Turbid Liquid
2	Colour	IS 3025 (Part 4)-1983 (R.2006)	HIU	5
3	pH @ 25°C	IS 3025 (Part 11)-1983 (R.2006)	-	7.3
4	Odour	IS 3025 (Part 5)-1983 (R.2006)	-	Unobjectionable
5	Ecological (Presence of Animals like Fish, Insects Etc)	Physical Observation	-	Present
6	Oil & Grease	5520-O&G-B APHA 22 nd Ed. 2012 (Partition Gravimetric Method)	mg/l	<2
7	Total Suspended Solids	2540-D- APHA 22 nd Ed.2012	mg/l	11
8	Dissolved Oxygen	4500-O-C- APHA 22 nd Ed.2012	mg/l	6.7
9	Biochemical Oxygen Demand (BOD) 3 days at 27°C	5210-B-APHA 22 nd Ed.2012	mg/l	<2
10	Chemical Oxygen Demand (COD)	5220-B- APHA 22 nd Ed.2012	mg/l	<4
11	Conductivity	IS 3025 (Part 14)-1984 (R.2006)	µs/cm	747
12	Total Dissolved Solids	2540-C-APHA 22 nd Ed.2012	mg/l	448
13	Nitrate - Nitrogen	4500-NO ₃ -B-APHA 22 nd Ed.2012	mg/l	8.40
14	Nitrite - Nitrogen	4500-NO ₂ -B-APHA 22 nd Ed.2012	mg/l	BDL (DL=0.01)

For Chennai Testing Laboratory Pvt Ltd

A. Rajan
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TEST REPORT

Report Number and date	CTL/CH/N-5049/2017-18 & 16.10.2017
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S.NO	PARAMETERS	METHOD	UNITS	RESULTS
15	Free Ammonia as NH ₃	4500-NH ₃ -B.C-APHA 22 nd Ed.	mg/l	BDL (DL:0.1)
16	Total Residual Chlorine	IS 3025 (Part 26)-1994	mg/l	BDL (DL:0.1)
17	Cyanide as CN	IS 3025 (Part 27)-1986 (R.2009)	mg/l	BDL (DL:0.01)
18	Fluoride as F	IS 3025 (Part 60)-2008	mg/l	0.21
19	Sulphate as SO ₄	IS 3025 (Part 24)-1986 (R.2009)	mg/l	32.1
20	Sulphide as H ₂ S	IS 3025 (Part 29) (R.2009)	mg/l	BDL (DL:0.01)
21	Total Hardness as CaCO ₃	IS 3025 (Part 21)-1983 (R.2006)	mg/l	293
22	Dissolved Phosphate as P	4500-P-D-APHA 22 nd Ed.2012	mg/l	0.76
23	Sodium Absorption Ratio	IS 11624-1986 (R.2001)	-	2.20
24	Total Phosphorous as P	4500-P-B-D-APHA 22 nd Ed.2012	mg/l	0.76
25	Total Kjeldahl Nitrogen as N	4500-N-B-C-APHA 22 nd Ed.2012	mg/l	BDL (DL:0.1)
26	Total Ammonia	4500-Na ₂ -B.C-APHA 22 nd Ed.2012	mg/l	BDL (DL:0.1)
27	Phenols	5530-C-APHA 22 nd Ed.2012	mg/l	BDL (DL:0.001)
28	Surface Active Agents	IS 13428 - 2005 (Annex K)	mg/l	BDL (DL:0.1)
29	Anionic detergent as MBAS	IS 13428 - 2005 (Annex K)	mg/l	BDL (DL:0.1)
30	Hexavalent Chromium as Cr ⁶⁺	3500-Cr-B-APHA 22 nd Ed. 2012	mg/l	BDL (DL:0.01)
31	Iron as Fe	IS 3025 (Part 53)-2009	mg/l	0.57
32	Boron as B	IS 3025 (Part 57)-2005	mg/l	BDL (DL:0.1)
33	Total Nitrogen	4500-N-B-C-APHA 22 nd Ed.2012	mg/l	8.7
34	Chloride	4500-Cl-B-APHA 22 nd Ed. 2012	mg/l	83
35	Bio - Assay (Zebra Fish) Test	IS 6582 (Part 2)- 2001	-	T ₁ = 1
36	Copper as Cu	IS 3025 (Part 42)-1992 (R.2009)	mg/l	BDL (DL:0.02)
37	Manganese as Mn	3111 B APHA 22 nd Edition 2012	mg/l	BDL (DL:0.01)
38	Mercury as Hg	IS 3025 (Part 48)-1994 (R.2009)	mg/l	BDL (DL:0.001)
39	Cadmium as Cd	IS 3025 (Part 41)-1992 (R.2009)	mg/l	BDL (DL:0.002)
40	Selenium as Se	IS 3025 (Part 56)-2003(R.2009)	mg/l	BDL (DL:0.005)
41	Total Arsenic as As	IS 3025 (Part 37)-1988 (R.2009)	mg/l	BDL (DL:0.001)
42	Lead as Pb	IS 3025 (Part 47)-1994 (R.2009)	mg/l	BDL (DL:0.005)
43	Zinc as Zn	IS 3025 (Part 49)-1994 (R.2009)	mg/l	BDL (DL:0.08)
44	Total Chromium as Cr	IS 3025(Part 52)-2003	mg/l	BDL (DL:0.01)
45	Nickel as Ni	IS 3025 (Part 54)	mg/l	BDL (DL:0.01)
46	Vanadium as V	3111-B-APHA 22 nd Ed.2012	mg/l	BDL (DL:2.0)

T₁ = Toxicity Factor

Sum T₁ = 16. It shows that all or some of the fish die in the test solution for a T value less than 16 (1 part of waste water + 15 part of dilution water) and all are alive in test solutions for a T value of 16 and above, after 48 hrs.

For Chennai Testing Laboratory Pvt Ltd

A. Rajan
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Page 2 of 5

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TEST REPORT

Report Number and date	CTL/CH/N-5849/2017-18 & 16.10.2017
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S.NO	PARAMETERS	METHOD	UNITS	RESULTS
47	Organo chlorine Pesticides (OCP):			
	Aldrin	CTL/SOP/WATER/101-2012 APHA 22 nd Edition 2012-6630 B	µg/l	BDL (DL:0.01)
	Dieldrin		µg/l	BDL (DL:0.01)
	Endosulfan alpha		µg/l	BDL (DL:0.01)
	Endosulfan Beta		µg/l	BDL (DL:0.01)
	Endosulfan Sulfate		µg/l	BDL (DL:0.01)
	o,p'-DDT		µg/l	BDL (DL:0.01)
	p,p'-DDT		µg/l	BDL (DL:0.01)
	p,p'-DDE		µg/l	BDL (DL:0.01)
	o,p'-DDE		µg/l	BDL (DL:0.01)
	o,p'-DDD		µg/l	BDL (DL:0.01)
	p,p'-DDD		µg/l	BDL (DL:0.01)
	Alpha HCH		µg/l	BDL (DL:0.01)
	Beta HCH		µg/l	BDL (DL:0.01)
Gamma HCH (Lindane)	µg/l		BDL (DL:0.01)	
Delta HCH	µg/l	BDL (DL:0.01)		
48	Poly Chlorinated Terphenyls (as PCT):			
	o-Terphenyl	CTL/SOP/WATER/159-2017	µg/l	BDL (DL:0.03)
	m-Terphenyl		µg/l	BDL (DL:0.03)
	p-Terphenyl		µg/l	BDL (DL:0.03)
	Tetradecachloro-o-terphenyl		µg/l	BDL (DL:0.03)
	Tetradecachloro-m-terphenyl		µg/l	BDL (DL:0.03)
	Tetradecachloro-p-terphenyl		µg/l	BDL (DL:0.03)
	4-Chloro-o-terphenyl		µg/l	BDL (DL:0.03)
	4-Chloro-p-terphenyl		µg/l	BDL (DL:0.03)
	2,4-Dichloro-p-terphenyl		µg/l	BDL (DL:0.03)
	2,5-Dichloro-o-terphenyl		µg/l	BDL (DL:0.03)
	2,5-Dichloro-m-terphenyl		µg/l	BDL (DL:0.03)
	2,5-Dichloro-p-terphenyl		µg/l	BDL (DL:0.03)
	2,4,6-Trichloro-p-terphenyl		µg/l	BDL (DL:0.03)
	2,3,5,6-Tetrachloro-p-terphenyl		µg/l	BDL (DL:0.03)
	2,4,4'-Tetrachloro-p-terphenyl		µg/l	BDL (DL:0.03)
2,3,4,5,6-Pentachloro-p-terphenyl	µg/l		BDL (DL:0.03)	

For Chennai Testing Laboratory Pvt Ltd

A. Rajan
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Page 1 of 5

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TEST REPORT

Report Number and date	CTL/CH/N-5849/2017-18 & 16.10.2017
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S. NO	PARAMETERS	METHOD	UNITS	RESULTS
49	Poly Nuclear Aromatic Hydrocarbons (as PAH):			
	Naphthalene	APHA 22 nd Edition 6440 C CTL/SOP/WATER/102-2012	µg/l	BDL (DL:0.01)
	Acenaphthylene		µg/l	BDL (DL:0.01)
	2-Brmo-Naphthalene		µg/l	BDL (DL:0.02)
	Acenaphthene		µg/l	BDL (DL:0.02)
	Fluorene		µg/l	BDL (DL:0.02)
	Phenanthrene		µg/l	BDL (DL:0.02)
	Anthracene		µg/l	BDL (DL:0.02)
	Pyrene		µg/l	BDL (DL:0.02)
	Fluoranthene		µg/l	BDL (DL:0.02)
	Chrysene		µg/l	BDL (DL:0.02)
	Benz[a]anthracene		µg/l	BDL (DL:0.02)
	Benzo[a]pyrene		µg/l	BDL (DL:0.02)
	Benzo[b]fluoranthene		µg/l	BDL (DL:0.03)
	Benzo[ghi]perylene		µg/l	BDL (DL:0.03)
Dibenz[a,h]anthracene	µg/l		BDL (DL:0.03)	
Indeno[1,2,3-cd]pyrene	µg/l	BDL (DL:0.04)		
50	Poly Chlorinated Biphenyls (as PCB):			
	2-Chlorobiphenyl	Annex M of IS 13426-1998	µg/l	BDL (DL:0.01)
	2,3-dichlorobiphenyl		µg/l	BDL (DL:0.01)
	2,5,4'-Trichlorobiphenyl		µg/l	BDL (DL:0.01)
	2,2',4,4'-tetrachlorobiphenyl		µg/l	BDL (DL:0.01)
	2,2',3,4',6'-Pentachlorobiphenyl		µg/l	BDL (DL:0.01)
	2,2',4,4',5',6'-Hexachlorobiphenyl		µg/l	BDL (DL:0.01)
	2,2',3,3',4,4',6'-Heptachlorobiphenyl		µg/l	BDL (DL:0.01)
2,2',3,3',4,5,6,6'-Octachlorobiphenyl	µg/l		BDL (DL:0.01)	

For Chennai Testing Laboratory Pvt Ltd

A. Rajan
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TEST REPORT

Report Number and date	CTL/CH/N-5849/2017-18 & 16.10.2017		
Sample Number	N-5849/17-18		
Customer Name & Address	M/s. Tamil Nadu Pollution Control Board, 76, Mount Sabai, Guindy, Chennai - 600 032.		
Project At	Ranipet Siptot Area, Vellore		
SAMPLE DETAILS			
Sample Description By Customer	Ground Water		
Sampling Location	Narasingapuram Village		
GPS Reading	12°50' 40.41"N 079° 16' 46.31"E		
Sampling Date	05.10.2017	Sampled By	Chennai Testing Laboratory Pvt. Ltd,
Quantity Received	100ml	Sampling Method	CTL/MSP/5.7/001
Date of Receipt	07.10.2017	Sample Condition	Good & Received in Sterile Container
Analysis Starting Date	07.10.2017	Analysis Completion Date	14.10.2017

Test Results

The above sample tested as received, and results are as follows:

S.NO	PARAMETERS	METHOD	UNITS	RESULTS
1	Total Coliform	IS 1622 : 1981 (R.2009)	MPN/100 ml	4
2	Faecal Coliform		MPN/100 ml	<2

Note: < 2 can be considered as Absent

END OF REPORT

For Chennai Testing Laboratory Pvt Ltd


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Page 5 of 5

TEST REPORT

Report Number and date	CTL/CH/N-5850/2017-18 & 16.10.2017		
Sample Number	N-5850/17-18		
Customer Name & Address	M/s. Tamil Nadu Pollution Control Board, 76, Mount Salai, Guindy, Chennai - 600 032.		
Project At	Ranipet Sipcot Area, Vellore		
SAMPLE DETAILS			
Sample Description By Customer	Ground Water		
Sampling Location	Lalapat Village		
GPS Reading	12°59' 32.59" N 079° 18' 02.39" E		
Sampling Date	05.10.2017	Sampled By	Chennai Testing Laboratory Pvt. Ltd.
Quantity Received	5 Litres	Sampling Method	CTL/MSP/5.7/001
Date of Receipt	07.10.2017	Sample Condition	Good & Received in Plastic Container
Analysis Starting Date	07.10.2017	Analysis Completion Date	14.10.2017

Test Results:

The above sample tested as received, and results are as follows:

S.NO	PARAMETERS	METHOD	UNITS	RESULTS
Sanitary Survey:				
1	Appearance	Physical Observation	-	Turbid Liquid
2	Colour	IS 3025 (Part 4)-1983 (R.2006)	HU	5
3	pH @ 25°C	IS 3025 (Part 11)-1983 (R.2006)	-	7.8
4	Odour	IS 3025 (Part 5)-1983 (R.2006)	-	Unobjectionable
5	Ecological (Presence of Animals like Fish, Insects Etc)	Physical Observation	-	Present
6	Oil & Grease	5520-O&G-B-APHA 22 nd Ed. 2012 [Partition Gravimetric Method]	mg/l	< 2
7	Total Suspended Solids	2540-D- APHA 22 nd Ed.2012	mg/l	41
8	Dissolved Oxygen	4500-D-C- APHA 22 nd Ed.2012	mg/l	6.2
9	Biochemical Oxygen Demand (BOD) 5 days at 27°C	5210-B-APHA 22 nd Ed.2012	mg/l	< 2
10	Chemical Oxygen Demand (COD)	5220-B- APHA 22 nd Ed.2012	mg/l	12
11	Conductivity	IS 3025 (Part 14)-1984 (R.2006)	µs/cm	2084
12	Total Dissolved Solids	2540-C-APHA 22 nd Ed.2012	mg/l	1248
13	Nitrate - Nitrogen	4500-NO ₃ -B-APHA 22 nd Ed.2012	mg/l	6.17
14	Nitrite - Nitrogen	4500-NO ₂ -B-APHA 22 nd Ed.2012	mg/l	BDL (DL:0.01)

For Chennai Testing Laboratory Pvt Ltd

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TEST REPORT

Report Number and date	CTL/CH/N-5850/2017-18 & 16.10.2017
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S.NO	PARAMETERS	METHOD	UNITS	RESULTS
15	Free Ammonia as NH ₃	4500-NH ₃ -B.C.-APHA 22 nd Ed.	mg/l	BDL (DL:0.1)
16	Total Residual Chlorine	IS 3025 (Part 26)-1984	mg/l	BDL (DL:0.1)
17	Cyanide as CN	IS 3025 (Part 27)-1986 (R.2009)	mg/l	BDL (DL:0.01)
18	Fluoride as F	IS 3025 (Part 60)-2008	mg/l	0.24
19	Sulphate as SO ₄	IS 3025 (Part 24)-1986 (R.2009)	mg/l	139
20	Sulphide as H ₂ S	IS 3025 (Part 29) (R.2009)	mg/l	BDL (DL:0.01)
21	Total Hardness as CaCO ₃	IS 3025 (Part 21)-1983 (R.2006)	mg/l	545
22	Dissolved Phosphate as P	4500-P-D- APHA 22 nd Ed.2012	mg/l	0.54
23	Sodium Absorption Ratio	IS 11624-1986 (R.2001)	-	6.0
24	Total Phosphorous as P	4500-P-B-D-APHA 22 nd Ed.2012	mg/l	0.54
25	Total Kjeldahl Nitrogen as N	4500-N-B.C-APHA 22 nd Ed.2012	mg/l	BDL (DL:0.1)
26	Total Ammonia	4500-Na ₃ -B.C-APHA 22 nd Ed.2012	mg/l	BDL (DL:0.1)
27	Phenols	5530-C-APHA 22 nd Ed.2012	mg/l	BDL (DL:0.001)
28	Surface Active Agents	IS 13428-2005 (Annex K)	mg/l	BDL (DL:0.1)
29	Anionic detergent as MBAS	IS 13428-2005 (Annex K)	mg/l	BDL (DL:0.1)
30	Hexavalent Chromium as Cr ^{VI}	3500-Cr-B-APHA 22 nd Ed. 2012	mg/l	BDL (DL:0.01)
31	Iron as Fe	IS 3025 (Part 53)-2009	mg/l	0.59
32	Boron as B	IS 3025 (Part 57)-2005	mg/l	BDL (DL:0.1)
33	Total Nitrogen	4500-N-B.C-APHA 22 nd Ed.2012	mg/l	7.02
34	Chloride	4500-Cl-B-APHA 22 nd Ed. 2012	mg/l	364
35	Bio - Assay (Zebra Fish) Test	IS 6582 (Part 2)-2001	-	T ₁ = 1
36	Copper as Cu	IS 3025 (Part 42)-1992 (R.2009)	mg/l	BDL (DL:0.02)
37	Manganese as Mn	3111 B APHA 22 nd Edition 2012	mg/l	0.31
38	Mercury as Hg	IS 3025 (Part 48)-1994 (R.2009)	mg/l	BDL (DL:0.001)
39	Cadmium as Cd	IS 3025 (Part 41)-1992 (R.2009)	mg/l	BDL (DL:0.002)
40	Selenium as Se	IS 3025 (Part 56)-2003(R.2009)	mg/l	BDL (DL:0.005)
41	Total Arsenic as As	IS 3025 (Part 37)-1988 (R.2009)	mg/l	BDL (DL:0.001)
42	Lead as Pb	IS 3025 (Part 47)-1994 (R.2009)	mg/l	BDL (DL:0.005)
43	Zinc as Zn	IS 3025 (Part 49)-1994 (R.2009)	mg/l	BDL (DL:0.08)
44	Total Chromium as Cr	IS 3025(Part 52)-2003	mg/l	BDL (DL:0.01)
45	Nickel as Ni	IS 3025 (Part 54)	mg/l	BDL (DL:0.01)
46	Vanadium as V	3111-B-APHA 22 nd Ed.2012	mg/l	BDL (DL:2.0)

T₁ = Toxicity Factor

Note: T₁ = 16, it shows that all or some of the fish die in the test solution for a T value, less than 16 (1 part of waste water + 15 part of dilution water) and all are alive in test solutions for a T value of 16 and above, after 48 hrs.

For Chennai Testing Laboratory Pvt Ltd

A. Rajan
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Page 2 of 5

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TEST REPORT

Report Number and date		CTL/CH/N-5850/2017-18 & 16.10.2017		
S. NO	PARAMETERS	METHOD	UNITS	RESULTS
47	Organo chlorine Pesticides (OCP):			
	Aldrin	CTL/SOP/WATER/101-2012 APHA 22nd Edition 2012-6630 B	µg/l	BDL (DL:0.01)
	Dieldrin		µg/l	BDL (DL:0.01)
	Endosulfan alpha		µg/l	BDL (DL:0.01)
	Endosulfan Beta		µg/l	BDL (DL:0.01)
	Endosulfan Sulfate		µg/l	BDL (DL:0.01)
	o,p'-DDT		µg/l	BDL (DL:0.01)
	p,p'-DDT		µg/l	BDL (DL:0.01)
	p,p'-DDE		µg/l	BDL (DL:0.01)
	o,p'-DDE		µg/l	BDL (DL:0.01)
	o,p'-DDD		µg/l	BDL (DL:0.01)
	p,p'-DDD		µg/l	BDL (DL:0.01)
	Alpha HCH		µg/l	BDL (DL:0.01)
	Beta HCH		µg/l	BDL (DL:0.01)
Gamma HCH (Lindane)	µg/l		BDL (DL:0.01)	
Delta HCH	µg/l	BDL (DL:0.01)		
48	Poly Chlorinated Terphenyls (as PCT):			
	o-Terphenyl	CTL/SOP/WATER/159-2017	µg/l	BDL (DL:0.03)
	m-Terphenyl		µg/l	BDL (DL:0.03)
	p-Terphenyl		µg/l	BDL (DL:0.03)
	Tetradecachloro-o-terphenyl		µg/l	BDL (DL:0.03)
	Tetradecachloro-m-terphenyl		µg/l	BDL (DL:0.03)
	Tetradecachloro-p-terphenyl		µg/l	BDL (DL:0.03)
	4-Chloro-o-terphenyl		µg/l	BDL (DL:0.03)
	4-Chloro-p-terphenyl		µg/l	BDL (DL:0.03)
	2,4-Dichloro-p-terphenyl		µg/l	BDL (DL:0.03)
	2,5-Dichloro-o-terphenyl		µg/l	BDL (DL:0.03)
	2,5-Dichloro-m-terphenyl		µg/l	BDL (DL:0.03)
	2,5-Dichloro-p-terphenyl		µg/l	BDL (DL:0.03)
	2,4,6-Trichloro-p-terphenyl		µg/l	BDL (DL:0.03)
	2,3,5,6-Tetrachloro-p-terphenyl		µg/l	BDL (DL:0.03)
	2,4,4',6-Tetrachloro-p-terphenyl		µg/l	BDL (DL:0.03)
2,3,4,5,6-Pentachloro-p-terphenyl	µg/l		BDL (DL:0.03)	

For Chennai Testing Laboratory Pvt Ltd

A. Rajan
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TEST REPORT

Report Number and date	CTL/CH/N-5850/2017-18 & 16.10.2017
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S. NO	PARAMETERS	METHOD	UNITS	RESULTS
49	Poly Nuclear Aromatic Hydrocarbons (as PAH):			
	Naphthalene	APHA 22 nd Edition 6440 C CTL/SOP/WATER/102-2012	µg/l	BDL (DL:0.01)
	Acenaphthylene		µg/l	BDL (DL:0.01)
	2-Bromo-Naphthalene		µg/l	BDL (DL:0.02)
	Acenaphthene		µg/l	BDL (DL:0.02)
	Fluorene		µg/l	BDL (DL:0.02)
	Phenanthrene		µg/l	BDL (DL:0.02)
	Anthracene		µg/l	BDL (DL:0.02)
	Pyrene		µg/l	BDL (DL:0.02)
	Fluoranthene		µg/l	BDL (DL:0.02)
	Chrysene		µg/l	BDL (DL:0.02)
	Benz[a]anthracene		µg/l	BDL (DL:0.02)
	Benzo[a]pyrene		µg/l	BDL (DL:0.02)
	Benzo[b]fluoranthene		µg/l	BDL (DL:0.03)
	Benzo[ghi]perylene		µg/l	BDL (DL:0.03)
Dibenz[a,h]anthracene	µg/l		BDL (DL:0.03)	
Indeno[1,2,3-cd]pyrene	µg/l	BDL (DL:0.04)		
50	Poly Chlorinated Biphenyls (as PCB):			
	2-Chlorobiphenyl	Annex M of IS 13420-1998	µg/l	BDL (DL:0.01)
	2,3-dichlorobiphenyl		µg/l	BDL (DL:0.01)
	2,5,4'-Trichlorobiphenyl		µg/l	BDL (DL:0.01)
	2,2',4,4'-tetrachlorobiphenyl		µg/l	BDL (DL:0.01)
	2,2',3,4',6'-Pentachlorobiphenyl		µg/l	BDL (DL:0.01)
	2,2',4,4',5',6'-Hexachlorobiphenyl		µg/l	BDL (DL:0.01)
	2,2',3,3',4,4',6'-Heptachlorobiphenyl		µg/l	BDL (DL:0.01)
2,2',3,3',4,5,6,6'-Octachlorobiphenyl	µg/l		BDL (DL:0.01)	

For Chennai Testing Laboratory Pvt Ltd

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www.cfilabs.in
www.foodenvironmenttesting.com

CIN : U74999TN2008PTC067568

TEST REPORT

Report Number and date	CTL/CH/N-5850/2017-TB & 16.10.2017		
Sample Number	N-5850/17-18		
Customer Name & Address	M/s. Tamil Nadu Pollution Control Board, 76, Mount Salai, Guindy, Chennai - 600 032.		
Project At	Ranipet Sipcot Area , Vellore		
SAMPLE DETAILS			
Sample Description By Customer	Ground Water		
Sampling Location	Lalapat Village		
GPS Reading	12°59' 32.59"N 079° 10' 02.39"E		
Sampling Date	05.10.2017	Sampled By	Chennai Testing Laboratory Pvt. Ltd.
Quantity Received	100ml	Sampling Method	CTL/MSP/5.7/001
Date of Receipt	07.10.2017	Sample Condition	Good & Received in Sterile Container
Analysis Starting Date	07.10.2017	Analysis Completion Date	14.10.2017

Test Results:

The above sample tested as received, and results are as follows:

S.NO	PARAMETERS	METHOD	UNITS	RESULTS
1	Total Coliform	IS 1622 : 1981 (IL2009)	MPN/100 ml	50
2	Faecal Coliform		MPN/100 ml	<2

Note: < 2 can be considered as Absent

END OF REPORT

For Chennai Testing Laboratory Pvt Ltd

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Ground Water Analysis Result - Cuddalore



www.ctlab.in
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CIN : U74999TN2958PTC067568

TEST REPORT

Report Number and date	CTL/CH/N-5651/2017-18 & 12.10.2017		
Sample Number	N-5651/16-17		
Customer Name & Address	M/s. Tamil Nadu Pollution Control Board, 76, Mount Salai, Guindy, Chennai - 600 032.		
Project At	Cuddalore - SIPCOT Complex		
SAMPLE DETAILS			
Sample Description By Customer	Ground Water		
Sampling Location	Inside of Sipcot Office		
GPS Reading	11°40' 24.80"N 079° 45' 00.19"E		
Sampling Date	29.09.2017	Sampled By	Chennai Testing Laboratory Pvt. Ltd.
Quantity Received	5 Litres	Sampling Method	CTL/MSP/5.7/001
Date of Receipt	30.09.2017	Sample Condition	Good & Received in Plastic Container
Analysis Starting Date	30.09.2017	Analysis Completion Date	11.10.2017

Test Results:

The above sample tested as received, and results are as follows:

S.NO	PARAMETERS	METHOD	UNITS	RESULTS
Sanitary Survey:				
1	Appearance	Physical Observation	-	Clear Liquid
2	Colour	IS 3025 (Part 4)-1983 (R.2006)	HU	2
3	pH @ 25°C	IS 3025 (Part 11)-1983 (R.2006)	-	7.5
4	Odour	IS 3025 (Part 5)-1983 (R.2006)	-	Unobjectionable
5	Ecological (Presence of Animals like Fish, Insects Etc)	Physical Observation	-	Absent
6	Oil & Grease	5520-O&G-B-APHA 22 nd Ed. 2012 (Partition Gravimetric Method)	mg/l	<2
7	Total Suspended Solids	2540-D-APHA 22 nd Ed.2012	mg/l	<2
8	Dissolved Oxygen	4500-O-C-APHA 22 nd Ed.2012	mg/l	6.7
9	Biochemical Oxygen Demand (BOD) 3 days at 27°C	5210-B-APHA 22 nd Ed.2012	mg/l	<2
10	Chemical Oxygen Demand (COD)	5220-B-APHA 22 nd Ed.2012	mg/l	<4
11	Conductivity	IS 3025 (Part 14)-1984 (R.2006)	µs/cm	998
12	Total Dissolved Solids	2540-C-APHA 22 nd Ed.2012	mg/l	596
13	Nitrate - Nitrogen	4500-NO ₃ -B-APHA 22 nd Ed.2012	mg/l	0.80
14	Nitrite - Nitrogen	4500-NO ₂ -B-APHA 22 nd Ed.2012	mg/l	BDL (DL:0.01)

For Chennai Testing Laboratory Pvt Ltd

A. Rajam
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Page 1 of 5

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TEST REPORT

Report Number and date	CTL/CH/N-5651/2017-18 & 12.10.2017
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S.NO	PARAMETERS	METHOD	UNITS	RESULTS
15	Free Ammonia as NH ₃	4500-NH ₃ -B.C-APHA 22 nd Ed.	mg/l	BDL (DL:0.1)
16	Total Residual Chlorine	IS 3025 (Part 26)-1984	mg/l	BDL (DL:0.1)
17	Cyanide as CN	IS 3025 (Part 27)-1986 (R.2009)	mg/l	BDL (DL:0.01)
18	Fluoride as F	IS 3025 (Part 60)-2008	mg/l	0.16
19	Sulphate as SO ₄	IS 3025 (Part 24)-1986 (R.2009)	mg/l	18.7
20	Sulphide as H ₂ S	IS 3025 (Part 29) (R.2009)	mg/l	BDL (DL:0.01)
21	Total Hardness as CaCO ₃	IS 3025 (Part 21)-1983 (R.2006)	mg/l	246
22	Dissolved Phosphate as P	4500-P-D- APHA 22 nd Ed.2012	mg/l	0.94
23	Sodium Absorption Ratio	IS 11624-1986 (R.2001)	-	2.27
24	Total Phosphorous as P	4500-P-B-D-APHA 22 nd Ed.2012	mg/l	0.94
25	Total Kjeldahl Nitrogen as N	4500-N-B.C-APHA 22 nd Ed.2012	mg/l	BDL (DL:0.1)
26	Total Ammonia	4500-Na ₁ -B.C-APHA 22 nd Ed.2012	mg/l	BDL (DL:0.1)
27	Phenols	5530-C-APHA 22 nd Ed.2012	mg/l	BDL (DL:0.001)
28	Surface Active Agents	IS 13428 - 2005 (Annex K)	mg/l	BDL (DL:0.1)
29	Anionic detergent as MBAS	IS 13428 - 2005 (Annex K)	mg/l	BDL (DL:0.1)
30	Hexavalent Chromium as Cr ⁶⁺	3500-Cr-B-APHA 22 nd Ed. 2012	mg/l	BDL (DL:0.01)
31	Iron as Fe	IS 3025 (Part 53)-2009	mg/l	0.08
32	Boron as B	IS 3025 (Part 57)-2005	mg/l	BDL (DL:0.1)
33	Total Nitrogen	4500-N-B.C-APHA 22 nd Ed.2012	mg/l	0.8
34	Chloride	4500-Cl-B-APHA 22 nd Ed. 2012	mg/l	136
35	Bio - Assay (Zebra Fish) Test	IS 6582 (Part 2): 2001	-	T ₁ = 1
36	Copper as Cu	IS 3025 (Part 42)-1992 (R.2009)	mg/l	BDL (DL:0.02)
37	Manganese as Mn	3111 B-APHA 22 nd Edition 2012	mg/l	BDL (DL:0.01)
38	Mercury as Hg	IS 3025 (Part 48)-1994 (R.2009)	mg/l	BDL (DL:0.001)
39	Cadmium as Cd	IS 3025 (Part 41)-1992 (R.2009)	mg/l	BDL (DL:0.002)
40	Selenium as Se	IS 3025 (Part 56)-2003(R.2009)	mg/l	BDL (DL:0.005)
41	Total Arsenic as As	IS 3025 (Part 37)-1988 (R.2009)	mg/l	BDL (DL:0.001)
42	Lead as Pb	IS 3025 (Part 47)-1994 (R.2009)	mg/l	BDL (DL:0.005)
43	Zinc as Zn	IS 3025 (Part 49)-1994 (R.2009)	mg/l	BDL (DL:0.08)
44	Total Chromium as Cr	IS 3025(Part 52)-2003	mg/l	BDL (DL:0.01)
45	Nickel as Ni	IS 3025 (Part 54)	mg/l	BDL (DL:0.01)
46	Vanadium as V	3111-B-APHA 22 nd Ed.2012	mg/l	BDL (DL:2.0)

T₁ = Toxicity Factor

Note: T₁ = 16, it shows that all or some of the fish die in the test solution for a T value, less than 16 (1 part of waste water + 15 part of dilution water) and all are alive in test solutions for a T value of 16 and above, after 48 hrs.

For Chennai Testing Laboratory Pvt Ltd

A. Raju
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Page 2 of 5

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TEST REPORT

Report Number and date	CTL/CH/N-5651/2017-18 & 12.10.2017
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S. NO	PARAMETERS	METHOD	UNITS	RESULTS
47	Organo chlorine Pesticides (OCP):			
	Aldrin	CTL/SOP/WATER/101-2012 APHA 22 nd Edition 2012-6630 B	µg/l	BDL (DL:0.01)
	Dieldrin		µg/l	BDL (DL:0.01)
	Endosulfan alpha		µg/l	BDL (DL:0.01)
	Endosulfan Beta		µg/l	BDL (DL:0.01)
	Endosulfan Sulfate		µg/l	BDL (DL:0.01)
	o,p'-DDT		µg/l	BDL (DL:0.01)
	p,p'-DDT		µg/l	BDL (DL:0.01)
	p,p'-DDE		µg/l	BDL (DL:0.01)
	o,p'-DDE		µg/l	BDL (DL:0.01)
	o,p'-DDD		µg/l	BDL (DL:0.01)
	p,p'-DDD		µg/l	BDL (DL:0.01)
	Alpha HCH		µg/l	BDL (DL:0.01)
	Beta HCH		µg/l	BDL (DL:0.01)
	Gamma HCH (Lindane)		µg/l	BDL (DL:0.01)
Delta HCH	µg/l		BDL (DL:0.01)	
48	Poly Chlorinated Terphenyls (as PCT):			
	o-Terphenyl	CTL/SOP/WATER/159-2017	µg/l	BDL (DL:0.03)
	m-Terphenyl		µg/l	BDL (DL:0.03)
	p-Terphenyl		µg/l	BDL (DL:0.03)
	Tetrachloro-o-terphenyl		µg/l	BDL (DL:0.03)
	Tetrachloro-m-terphenyl		µg/l	BDL (DL:0.03)
	Tetrachloro-p-terphenyl		µg/l	BDL (DL:0.03)
	4-Chloro-o-terphenyl		µg/l	BDL (DL:0.03)
	4-Chloro-p-terphenyl		µg/l	BDL (DL:0.03)
	2,4-Dichloro-p-terphenyl		µg/l	BDL (DL:0.03)
	2,5-Dichloro-o-terphenyl		µg/l	BDL (DL:0.03)
	2,5-Dichloro-m-terphenyl		µg/l	BDL (DL:0.03)
	2,5-Dichloro-p-terphenyl		µg/l	BDL (DL:0.03)
	2,4,6-Trichloro-p-terphenyl		µg/l	BDL (DL:0.03)
	2,3,5,6-Tetrachloro-p-terphenyl		µg/l	BDL (DL:0.03)
2,4,4',6-Tetrachloro-p-terphenyl	µg/l		BDL (DL:0.03)	
2,3,4,5,6-Pentachloro-p-terphenyl	µg/l	BDL (DL:0.03)		

For Chennai Testing Laboratory Pvt Ltd

A. Devaraj
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TEST REPORT

Report Number and date		CTL/CH/N-5651/2017-18 & 12.10.2017		
S. NO	PARAMETERS	METHOD	UNITS	RESULTS
49	Poly Nuclear Aromatic Hydrocarbons (as PAH):			
	Napthalene	APHA 22 nd Edition 6440 C, CTL/SOP/WATER/102-2012	µg/l	BDL (DL:0.01)
	Acenaphthylene		µg/l	BDL (DL:0.01)
	2-Bromo-Napthalene		µg/l	BDL (DL:0.02)
	Acenaphthene		µg/l	BDL (DL:0.02)
	Fluorene		µg/l	BDL (DL:0.02)
	Phenanthrene		µg/l	BDL (DL:0.02)
	Anthracene		µg/l	BDL (DL:0.02)
	Pyrene		µg/l	BDL (DL:0.02)
	Fluoranthene		µg/l	BDL (DL:0.02)
	Chrysene		µg/l	BDL (DL:0.02)
	Benzo[a]anthracene		µg/l	BDL (DL:0.02)
	Benzo[a]pyrene		µg/l	BDL (DL:0.02)
	Benzo[b]fluoranthene		µg/l	BDL (DL:0.03)
	Benzo[ghi]perylene		µg/l	BDL (DL:0.03)
Dibenz[ah]anthracene	µg/l		BDL (DL:0.03)	
Indeno[1,2,3-cd]pyrene	µg/l	BDL (DL:0.04)		
50	Poly Chlorinated Biphenyls (as PCB):			
	2-Chlorobiphenyl	Annex M of IS 13428-1998	µg/l	BDL (DL:0.01)
	2,3-dichlorobiphenyl		µg/l	BDL (DL:0.01)
	2,5,4'-Trichlorobiphenyl		µg/l	BDL (DL:0.01)
	2,2',4,4'-tetrachlorobiphenyl		µg/l	BDL (DL:0.01)
	2,2',3,4',5'-Pentachlorobiphenyl		µg/l	BDL (DL:0.01)
	2,2',4,4',5',6'-Hexachlorobiphenyl		µg/l	BDL (DL:0.01)
	2,2',3,3',4,4',6'-Heptachlorobiphenyl		µg/l	BDL (DL:0.01)
2,2',3,3',4,5,6,6'-Octachlorobiphenyl	µg/l		BDL (DL:0.01)	

For Chennai Testing Laboratory Pvt Ltd

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TEST REPORT

Report Number and date	CTL/CH/N-5651/2017-18 & 12.10.2017		
Sample Number	N-5651/16-17		
Customer Name & Address	M/s. Tamil Nadu Pollution Control Board,		
	76, Mount Salai, Guindy, Chennai - 600 032.		
Project At	Cuddalore - SIPCOT Complex		
SAMPLE DETAILS			
Sample Description By Customer	Ground Water		
Sampling Location	Inside of Sipcot Office		
GPS Reading	11°40' 24.80"N 079° 45' 00.19"E		
Sampling Date	29.09.2017	Sampled By	Chennai Testing Laboratory Pvt. Ltd.
Quantity Received	100ml	Sampling Method	CTL/MSP/5.7/001
Date of Receipt	30.09.2017	Sample Condition	Good & Received in Sterile Container
Analysis Starting Date	30.09.2017	Analysis Completion Date	11.10.2017

Test Results

The above sample tested as received, and results are as follows:

S.NO	PARAMETERS	METHOD	UNITS	RESULTS
1	Total Coliform	IS 1622 : 1981 (R.2009)	MPN/100 ml	< 2
2	Faecal Coliform		MPN/100 ml	< 2

Note: < 2 can be considered as Absent

END OF REPORT

For Chennai Testing Laboratory Pvt Ltd



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TEST REPORT

Report Number and date	CTL/CH/N-5652/2017-1B & 12.10.2017		
Sample Number	N-5652/16-17		
Customer Name & Address	M/s. Tamil Nadu Pollution Control Board, 76, Mount Salai, Guindy, Chennai - 600 032.		
Project At	Cuddalore - SIPCOT Complex		
SAMPLE DETAILS			
Sample Description By Customer	Ground Water		
Sampling Location	Inside of Champasat Samark Ltd.		
GPS Reading	11°38' 45.54"N 079° 44' 26.45"E		
Sampling Date	29.09.2017	Sampled By	Chennai Testing Laboratory Pvt. Ltd.
Quantity Received	5 Litres	Sampling Method	CTL/MSP/S.7/001
Date of Receipt	30.09.2017	Sample Condition	Good & Received in Plastic Container
Analysis Starting Date	30.09.2017	Analysis Completion Date	11.10.2017

Test Results

The above sample tested as received, and results are as follows:

S.NO	PARAMETERS	METHOD	UNITS	RESULTS
Sanitary Survey:				
1	Appearance	Physical Observation	-	Clear Liquid with Suspended Particles
2	Colour	IS 3025 (Part 4)-1983 (R.2006)	HU	5
3	pH @ 25°C	IS 3025 (Part 11)-1983 (R.2006)	-	7.4
4	Odour	IS 3025 (Part 5)-1983 (R.2006)	-	Unobjectionable
5	Ecological (Presence of Animals like Fish, Insects Etc)	Physical Observation	-	Absent
6	Oil & Grease	5520-O&G-B-APHA 22 nd Ed. 2012 (Partition Gravimetric Method)	mg/l	< 2
7	Total Suspended Solids	2540-D-APHA 22 nd Ed.2012	mg/l	40
8	Dissolved Oxygen	4500-O-C-APHA 22 nd Ed.2012	mg/l	6.5
9	Biochemical Oxygen Demand (BOD) 3 days at 27°C	5210-B-APHA 22 nd Ed.2012	mg/l	< 2
10	Chemical Oxygen Demand (COD)	5220-B-APHA 22 nd Ed.2012	mg/l	< 4
11	Conductivity	IS 3035 (Part 14)-1984 (R.2006)	µs/cm	678
12	Total Dissolved Solids	2540-C-APHA 22 nd Ed.2012	mg/l	402
13	Nitrate - Nitrogen	4500-NO ₃ -B-APHA 22 nd Ed.2012	mg/l	0.52
14	Nitrite - Nitrogen	4500-NO ₂ -B-APHA 22 nd Ed.2012	mg/l	BDL (DL:0.01)

For Chennai Testing Laboratory Pvt Ltd

A. Rajan
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TEST REPORT

Report Number and date	CTL/CH/N-5652/2017-18 & 12.10.2017
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S.NO	PARAMETERS	METHOD	UNITS	RESULTS
15	Free Ammonia as NH ₃	4500-NH ₃ - B.C-APHA 22 nd Ed.	mg/l	BDL (DL-0.1)
16	Total Residual Chlorine	IS 3025 (Part 26)-1984	mg/l	BDL (DL-0.1)
17	Cyanide as CN	IS 3025 (Part 27)-1986 (R.2009)	mg/l	BDL (DL-0.01)
18	Fluoride as F	IS 3025 (Part 60)-2008	mg/l	0.16
19	Sulphate as SO ₄	IS 3025 (Part 24)-1986 (R.2009)	mg/l	8.5
20	Sulphide as H ₂ S	IS 3025 (Part 29) (R.2009)	mg/l	BDL (DL-0.01)
21	Total Hardness as CaCO ₃	IS 3025 (Part 21)-1983 (R.2006)	mg/l	61
22	Dissolved Phosphate as P	4500-P-D-APHA 22 nd Ed.2012	mg/l	0.25
23	Sodium Absorption Ratio	IS 11624-1986 (R.2001)	-	4.63
24	Total Phosphorous as P	4500-P-B-D-APHA 22 nd Ed.2012	mg/l	0.25
25	Total Kjeldahl Nitrogen as N	4500-N-B-C-APHA 22 nd Ed.2012	mg/l	BDL (DL-0.1)
26	Total Ammonia	4500-Na ₃ -B.C-APHA 22 nd Ed.2012	mg/l	BDL (DL-0.1)
27	Phenols	5530-C-APHA 22 nd Ed.2012	mg/l	BDL (DL-0.001)
28	Surface Active Agents	IS 13428 - 2005 (Annex K)	mg/l	BDL (DL-0.1)
29	Anionic detergent as MBAS	IS 13428 - 2005 (Annex K)	mg/l	BDL (DL-0.1)
30	Hexavalent Chromium as Cr ⁶⁺	3500-Cr-B-APHA 22 nd Ed. 2012	mg/l	BDL (DL-0.01)
31	Iron as Fe	IS 3025 (Part 53)-2009	mg/l	4.81
32	Boron as B	IS 3025 (Part 57)-2005	mg/l	BDL (DL-0.1)
33	Total Nitrogen	4500-N-B-C-APHA 22 nd Ed.2012	mg/l	0.52
34	Chloride	4500-Cl-B-APHA 22 nd Ed. 2012	mg/l	150
35	Bio - Assay (Zebra Fish) Test	IS 6582 (Part 2): 2001	-	T ₁ = 1
36	Copper as Cu	IS 3025 (Part 42)-1992 (R.2009)	mg/l	BDL (DL-0.02)
37	Manganese as Mn	3111-B-APHA 22 nd Edition 2012	mg/l	0.17
38	Mercury as Hg	IS 3025 (Part 48)-1994 (R.2009)	mg/l	BDL (DL-0.001)
39	Cadmium as Cd	IS 3025 (Part 41)-1992 (R.2009)	mg/l	BDL (DL-0.002)
40	Selenium as Se	IS 3025 (Part 56)-2003(R.2009)	mg/l	BDL (DL-0.005)
41	Total Arsenic as As	IS 3025 (Part 37)-1988 (R.2009)	mg/l	BDL (DL-0.001)
42	Lead as Pb	IS 3025 (Part 47)-1994 (R.2009)	mg/l	BDL (DL-0.005)
43	Zinc as Zn	IS 3025 (Part 49)-1994 (R.2009)	mg/l	BDL (DL-0.08)
44	Total Chromium as Cr	IS 3025(Part 52)-2003	mg/l	BDL (DL-0.01)
45	Nickel as Ni	IS 3025 (Part 54)	mg/l	BDL (DL-0.01)
46	Vanadium as V	3111-B-APHA 22 nd Ed.2012	mg/l	BDL (DL-2.0)

T₁ = Toxicity Factor

Note: T₁ = 16, it shows that all or some of the fish die in the test solution for a T value, less than 16 (1 part of waste water + 15 part of dilution water) and all are alive in test solutions for a T value of 16 and above, after 48 hrs.

For Chennai Testing Laboratory Pvt Ltd

A. Rajan
Authorized Signatory

Page 2 of 8

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TEST REPORT

Report Number and date	CTL/CH/N-5652/2017-18 & 12.10.2017
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S. NO	PARAMETERS	METHOD	UNITS	RESULTS
47	Organo chlorine Pesticides (OCP):			
	Aldrin	CTL/SOP/WATER/101-2012 APHA 22 nd Edition 2012-6630 B	µg/l	BDL (DL:0.01)
	Dieldrin		µg/l	BDL (DL:0.01)
	Endosulfan alpha		µg/l	BDL (DL:0.01)
	Endosulfan Beta		µg/l	BDL (DL:0.01)
	Endosulfan Sulfate		µg/l	BDL (DL:0.01)
	o,p'-DDT		µg/l	BDL (DL:0.01)
	p,p'-DDT		µg/l	BDL (DL:0.01)
	p,p'-DDE		µg/l	BDL (DL:0.01)
	o,p'-DDE		µg/l	BDL (DL:0.01)
	o,p'-DDD		µg/l	BDL (DL:0.01)
	p,p'-DDD		µg/l	BDL (DL:0.01)
	Alpha HCH		µg/l	BDL (DL:0.01)
	Beta HCH		µg/l	BDL (DL:0.01)
	Gamma HCH (Lindane)		µg/l	BDL (DL:0.01)
Delta HCH	µg/l		BDL (DL:0.01)	
48	Poly Chlorinated Terphenyls (as PCT):			
	o-Terphenyl	CTL/SOP/WATER/159-2017	µg/l	BDL (DL:0.03)
	m-Terphenyl		µg/l	BDL (DL:0.03)
	p-Terphenyl		µg/l	BDL (DL:0.03)
	Tetradecachloro-o-terphenyl		µg/l	BDL (DL:0.03)
	Tetradecachloro-m-terphenyl		µg/l	BDL (DL:0.03)
	Tetradecachloro-p-terphenyl		µg/l	BDL (DL:0.03)
	4-Chloro-o-terphenyl		µg/l	BDL (DL:0.03)
	4-Chloro-p-terphenyl		µg/l	BDL (DL:0.03)
	2,4-Dichloro-p-terphenyl		µg/l	BDL (DL:0.03)
	2,5-Dichloro-o-terphenyl		µg/l	BDL (DL:0.03)
	2,5-Dichloro-m-terphenyl		µg/l	BDL (DL:0.03)
	2,5-Dichloro-p-terphenyl		µg/l	BDL (DL:0.03)
	2,4,6-Trichloro-p-terphenyl		µg/l	BDL (DL:0.03)
	2,3,5,6-Tetrachloro-p-terphenyl		µg/l	BDL (DL:0.03)
2,4,4',6-Tetrachloro-p-terphenyl	µg/l		BDL (DL:0.03)	
2,3,4,5,6-Pentachloro-p-terphenyl	µg/l	BDL (DL:0.03)		

For Chennai Testing Laboratory Pvt Ltd

A. Rajan
Authorized Signatory

Page 1 of 2

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TEST REPORT

Report Number and date	CTL/CH/N-5652/2017-18 & 12.10.2017
------------------------	------------------------------------

S. NO	PARAMETERS	METHOD	UNITS	RESULTS
49	Poly Nuclear Aromatic Hydrocarbons (as PAH):			
	Naphthalene	APHA 22 nd Edition 6440 C CTL/SOP/WATER/102-2012	µg/l	BDL (DL:0.01)
	Acenaphthylene		µg/l	BDL (DL:0.01)
	2-Bromo-Naphthalene		µg/l	BDL (DL:0.02)
	Acenaphthene		µg/l	BDL (DL:0.02)
	Fluorene		µg/l	BDL (DL:0.02)
	Phenanthrene		µg/l	BDL (DL:0.02)
	Anthracene		µg/l	BDL (DL:0.02)
	Pyrene		µg/l	BDL (DL:0.02)
	Fluoranthene		µg/l	BDL (DL:0.02)
	Chrysene		µg/l	BDL (DL:0.02)
	Benzo[a]anthracene		µg/l	BDL (DL:0.02)
	Benzo[a]pyrene		µg/l	BDL (DL:0.02)
	Benzo[b]fluoranthene		µg/l	BDL (DL:0.03)
	Benzo[ghi]perylene		µg/l	BDL (DL:0.03)
Dibenz[a,h]anthracene	µg/l		BDL (DL:0.03)	
Indeno[1,2,3-cd]pyrene	µg/l	BDL (DL:0.04)		
50	Poly Chlorinated Biphenyls (as PCB):			
	2-Chlorobiphenyl	Annex M of IS 13428-1998	µg/l	BDL (DL:0.01)
	2,3-dichlorobiphenyl		µg/l	BDL (DL:0.01)
	2,5,4'-Trichlorobiphenyl		µg/l	BDL (DL:0.01)
	2,2',4,4'-tetrachlorobiphenyl		µg/l	BDL (DL:0.01)
	2,2',3,4',6'-Pentachlorobiphenyl		µg/l	BDL (DL:0.01)
	2,2',4,4',5',6'-Hexachlorobiphenyl		µg/l	BDL (DL:0.01)
	2,2',3,3',4,4',6'-Heptachlorobiphenyl		µg/l	BDL (DL:0.01)
2,2',3,3',4,5,6,6'-Octachlorobiphenyl	µg/l		BDL (DL:0.01)	

For Chennai Testing Laboratory Pvt Ltd

A. Rajan
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Page 4 of 5

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TEST REPORT

Report Number and date	CTL/CH/N-5652/2017-18 & 12.10.2017		
Sample Number	N-5652/16-17		
Customer Name & Address	M/s. Tamil Nadu Pollution Control Board,		
	76, Mount Sabai, Guindy, Chennai - 600 032.		
Project At	Cuddalore - SIPCOT Complex		
SAMPLE DETAILS			
Sample Description By Customer	Ground Water		
Sampling Location	Inside of Chemplast Sanmark Ltd.		
GPS Reading	11°38' 45.54"N 079° 44' 26.45"E		
Sampling Date	29.09.2017	Sampled By	Chennai Testing Laboratory Pvt. Ltd.
Quantity Received	100ml	Sampling Method	CTL/MSP/5.7/001
Date of Receipt	30.09.2017	Sample Condition	Good & Received in Sterile Container
Analysis Starting Date	30.09.2017	Analysis Completion Date	11.10.2017

Test Results.

The above sample tested as received, and results are as follows:

S.NO	PARAMETERS	METHOD	UNITS	RESULTS
1	Total Coliform	IS 1622 : 1981 (R.2009)	MPN/100 ml	<2
2	Faecal Coliform		MPN/100 ml	<2

Note: < 2 can be considered as Absent

END OF REPORT

For Chennai Testing Laboratory Pvt Ltd



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Page 5 of 5

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TEST REPORT

Report Number and date	CTL/CH/N-5653/2017-18 & 12.10.2017		
Sample Number	N-5653/16-17		
Customer Name & Address:	M/s. Tamil Nadu Pollution Control Board, 76, Mount Salai, Guindy, Chennai - 600 032.		
Project At	Cuddalore - SIPCOT Complex		
SAMPLE DETAILS			
Sample Description By Customer	Ground Water		
Sampling Location	Kudikadu Village - Over Head Tank		
GPS Reading	11°40' 59.92"N 079° 45' 25.44"E		
Sampling Date	29.09.2017	Sampled By	Chennai Testing Laboratory Pvt. Ltd.
Quantity Received	5 Litres	Sampling Method	CTL/MSP/5.7/001
Date of Receipt	30.09.2017	Sample Condition	Good & Received in Plastic Container
Analysis Starting Date	30.09.2017	Analysis Completion Date	11.10.2017

Test Results:

The above sample tested as received, and results are as follows:

S.NO	PARAMETERS	METHOD	UNITS	RESULTS
Sanitary Survey:				
1	Appearance	Physical Observation	-	Clear Liquid
2	Colour	IS 3025 (Part 4)-1983 (R.2006)	HU	2
3	pH @ 25°C	IS 3025 (Part 11)-1983 (R.2006)	-	7.2
4	Odour	IS 3025 (Part 5)-1983 (R.2006)	-	Unobjectionable
5	Ecological (Presence of Animals like Fish, Insects Etc)	Physical Observation	-	Absent
6	Oil & Grease	5520-O&G-B-APHA 22 nd Ed. 2012 (Partition Gravimetric Method)	mg/l	< 2
7	Total Suspended Solids	2540-D-APHA 22 nd Ed.2012	mg/l	8
8	Dissolved Oxygen	4500-D-C-APHA 22 nd Ed.2012	mg/l	6.6
9	Biochemical Oxygen Demand (BOD) 3 days at 27°C	5210-B-APHA 22 nd Ed.2012	mg/l	< 2
10	Chemical Oxygen Demand (COD)	5220-B-APHA 22 nd Ed.2012	mg/l	< 4
11	Conductivity	IS 3025 (Part 14)-1984 (R.2006)	µs/cm	574
12	Total Dissolved Solids	2540-C-APHA 22 nd Ed.2012	mg/l	340
13	Nitrate - Nitrogen	4500-NO ₃ -B-APHA 22 nd Ed.2012	mg/l	0.58
14	Nitrite - Nitrogen	4500-NO ₂ -B-APHA 22 nd Ed.2012	mg/l	BDL (DL:0.01)

For Chennai Testing Laboratory Pvt Ltd

A. Rajan
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Page 1 of 2

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TEST REPORT

Report Number and date	CTL/CH/N-5653/2017-18 & 12.10.2017
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S.NO	PARAMETERS	METHOD	UNITS	RESULTS
15	Free Ammonia as NH ₃	4500-NH ₃ - B.C-APHA 22 nd Ed.	mg/l	BDL (DL:0.1)
16	Total Residual Chlorine	IS 3025 (Part 26)-1994	mg/l	BDL (DL:0.1)
17	Cyanide as CN	IS 3025 (Part 27)-1986 (R.2009)	mg/l	BDL (DL:0.01)
18	Fluoride as F	IS 3025 (Part 60)-2008	mg/l	0.34
19	Sulphate as SO ₄	IS 3025 (Part 24)-1986 (R.2009)	mg/l	18.4
20	Sulphide as H ₂ S	IS 3025 (Part 29) (R.2009)	mg/l	BDL (DL:0.01)
21	Total Hardness as CaCO ₃	IS 3025 (Part 21)-1983 (R.2006)	mg/l	149
22	Dissolved Phosphate as P	4500-P-D-APHA 22 nd Ed.2012	mg/l	0.32
23	Sodium Absorption Ratio	IS 11624-1986 (R.2001)	-	1.52
24	Total Phosphorus as P	4500-P-B-D-APHA 22 nd Ed.2012	mg/l	0.32
25	Total Kjeldahl Nitrogen as N	4500-N-B-C-APHA 22 nd Ed.2012	mg/l	BDL (DL:0.1)
26	Total Ammonia	4500-Na ₃ -B-C-APHA 22 nd Ed.2012	mg/l	BDL (DL:0.1)
27	Phenols	5530-C-APHA 22 nd Ed.2012	mg/l	BDL (DL:0.001)
28	Surface Active Agents	IS 13428 - 2005 (Annex K)	mg/l	BDL (DL:0.1)
29	Anionic detergent as MBAS	IS 13428 - 2005 (Annex K)	mg/l	BDL (DL:0.1)
30	Hexavalent Chromium as Cr ^{VI}	3500-Cr-B-APHA 22 nd Ed. 2012	mg/l	BDL (DL:0.01)
31	Iron as Fe	IS 3025 (Part 53)-2009	mg/l	0.14
32	Boron as B	IS 3025 (Part 57)-2005	mg/l	BDL (DL:0.1)
33	Total Nitrogen	4500-N-B-C-APHA 22 nd Ed.2012	mg/l	0.58
34	Chloride	4500-Cl-B-APHA 22 nd Ed. 2012	mg/l	48
35	Bio - Assay (Zebra Fish) Test	IS 6582 (Part 2): 2001	-	T ₅₀ = 1
36	Copper as Cu	IS 3025 (Part 42)-1992 (R.2009)	mg/l	BDL (DL:0.02)
37	Manganese as Mn	3111 B APHA 22 nd Edition 2012	mg/l	0.06
38	Mercury as Hg	IS 3025 (Part 48)-1994 (R.2009)	mg/l	BDL (DL:0.001)
39	Cadmium as Cd	IS 3025 (Part 41)-1992 (R.2009)	mg/l	BDL (DL:0.002)
40	Selenium as Se	IS 3025 (Part 56)-2003(R.2009)	mg/l	BDL (DL:0.005)
41	Total Arsenic as As	IS 3025 (Part 37)-1988 (R.2009)	mg/l	BDL (DL:0.001)
42	Lead as Pb	IS 3025 (Part 47)-1994 (R.2009)	mg/l	BDL (DL:0.005)
43	Zinc as Zn	IS 3025 (Part 49)-1994 (R.2009)	mg/l	BDL (DL:0.00)
44	Total Chromium as Cr	IS 3025(Part 52)-2003	mg/l	BDL (DL:0.01)
45	Nickel as Ni	IS 3025 (Part 54)	mg/l	BDL (DL:0.01)
46	Vanadium as V	3111-B-APHA 22 nd Ed.2012	mg/l	BDL (DL:2.0)

T₅₀ = Toxicity Factor

Note: T₅₀ = 16, it shows that all or some of the fish die in the test solution for a T value, less than 16 (1 part of waste water + 15 part of dilution water) and all are alive in test solution for a T value of 16 and above, after 48 hrs.

For Chennai Testing Laboratory Pvt Ltd

A. Raju
Authorized Signatory

Page 2 of 5

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TEST REPORT

Report Number and date	CTL/CH/N-5653/2017-18 & 12.10.2017
------------------------	------------------------------------

S.NO	PARAMETERS	METHOD	UNITS	RESULTS
47	Organo chlorine Pesticides (OCP):			
	Aldrin	CTL/SOP/WATER/101-2012 APHA 22 nd Edition 2012-6630 B	µg/l	BDL (DL:0.01)
	Dieldrin		µg/l	BDL (DL:0.01)
	Endosulfan alpha		µg/l	BDL (DL:0.01)
	Endosulfan Beta		µg/l	BDL (DL:0.01)
	Endosulfan Sulfate		µg/l	BDL (DL:0.01)
	o,p'-DDT		µg/l	BDL (DL:0.01)
	p,p'-DDT		µg/l	BDL (DL:0.01)
	p,p'-DDE		µg/l	BDL (DL:0.01)
	o,p'-DDE		µg/l	BDL (DL:0.01)
	o,p'-DDD		µg/l	BDL (DL:0.01)
	p,p'-DDD		µg/l	BDL (DL:0.01)
	Alpha HCH		µg/l	BDL (DL:0.01)
	Beta HCH		µg/l	BDL (DL:0.01)
Gamma HCH (Lindane)	µg/l		BDL (DL:0.01)	
Delta HCH	µg/l	BDL (DL:0.01)		
48	Poly Chlorinated Terphenyls (as PCT):			
	o-Terphenyl	CTL/SOP/WATER/150-2017	µg/l	BDL (DL:0.03)
	m-Terphenyl		µg/l	BDL (DL:0.03)
	p-Terphenyl		µg/l	BDL (DL:0.03)
	Tetradecachloro-o-terphenyl		µg/l	BDL (DL:0.03)
	Tetradecachloro-m-terphenyl		µg/l	BDL (DL:0.03)
	Tetradecachloro-p-terphenyl		µg/l	BDL (DL:0.03)
	4-Chloro-o-terphenyl		µg/l	BDL (DL:0.03)
	4-Chloro-p-terphenyl		µg/l	BDL (DL:0.03)
	2,4-Dichloro-p-terphenyl		µg/l	BDL (DL:0.03)
	2,5-Dichloro-o-terphenyl		µg/l	BDL (DL:0.03)
	2,5-Dichloro-m-terphenyl		µg/l	BDL (DL:0.03)
	2,5-Dichloro-p-terphenyl		µg/l	BDL (DL:0.03)
	2,4,6-Trichloro-p-terphenyl		µg/l	BDL (DL:0.03)
	2,3,5,6-Tetrachloro-p-terphenyl		µg/l	BDL (DL:0.03)
2,4,4',6-Tetrachloro-p-terphenyl	µg/l		BDL (DL:0.03)	
2,3,4,5,6-Pentachloro-p-terphenyl	µg/l	BDL (DL:0.03)		

For Chennai Testing Laboratory Pvt Ltd

A. Raju
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Page 3 of 5

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TEST REPORT

Report Number and date		CTL/CH/N-5653/2017-18 & 12.10.2017		
S.NO	PARAMETERS	METHOD	UNITS	RESULTS
49	Poly Nuclear Aromatic Hydrocarbons (as PAH):			
	Naphthalene	ALPHA 22 nd Edition 6440 C CTL/SOP/WATER/102-2012	ug/l	BDL (DL:0.01)
	Acenaphthylene		ug/l	BDL (DL:0.01)
	2-Branso-Naphthalene		ug/l	BDL (DL:0.02)
	Acenaphthene		ug/l	BDL (DL:0.02)
	Fluorene		ug/l	BDL (DL:0.02)
	Phenanthrene		ug/l	BDL (DL:0.02)
	Anthracene		ug/l	BDL (DL:0.02)
	Pyrene		ug/l	BDL (DL:0.02)
	Fluoranthene		ug/l	BDL (DL:0.02)
	Chrysene		ug/l	BDL (DL:0.02)
	Benzo[a]anthracene		ug/l	BDL (DL:0.02)
	Benzo[a]pyrene		ug/l	BDL (DL:0.02)
	Benzo[b]fluoranthene		ug/l	BDL (DL:0.03)
	Benzo[ghi]perylene		ug/l	BDL (DL:0.03)
Dibenz[a,h]anthracene	ug/l		BDL (DL:0.03)	
Indeno[1,2,3-cd]pyrene	ug/l	BDL (DL:0.04)		
50	Poly Chlorinated Biphenyls (as PCB):			
	2-Chlorobiphenyl	Annex M of IS 13428-1998	ug/l	BDL (DL:0.01)
	2,3-dichlorobiphenyl		ug/l	BDL (DL:0.01)
	2,5,4'-Trichlorobiphenyl		ug/l	BDL (DL:0.01)
	2,2',4,4'-tetrachlorobiphenyl		ug/l	BDL (DL:0.01)
	2,2',3,4',6'-Pentachlorobiphenyl		ug/l	BDL (DL:0.01)
	2,2',4,4',5,6-hexachlorobiphenyl		ug/l	BDL (DL:0.01)
	2,2',3,3',4,4',6'-Heptachlorobiphenyl		ug/l	BDL (DL:0.01)
2,2',3,3',4,5,6,6'-Octachlorobiphenyl	ug/l		BDL (DL:0.01)	

For Chennai Testing Laboratory Pvt Ltd

A. Rajan
Authorised Signatory

Page 4 of 5

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Chennai - 600 032 | Tamil Nadu | India | Telefax : +91-44-2250 1757

TEST REPORT

Report Number and date	CTL/CH/N-5653/2017-18 & 12.10.2017		
Sample Number	N-5653/16-17		
Customer Name & Address	M/s. Tamil Nadu Pollution Control Board, 76, Mount Sabai, Guindy, Chennai - 600 032.		
Project At	Cuddalore - SIPCOT Complex		
SAMPLE DETAILS			
Sample Description By Customer	Ground Water		
Sampling Location	Kadikadu Village - Over Head Tank		
GPS Reading	11°40'59.92"N 079°45'25.44"E		
Sampling Date	29.09.2017	Sampled By	Chennai Testing Laboratory Pvt. Ltd.
Quantity Received	100ml	Sampling Method	CTL/MSP/5.7/001
Date of Receipt	30.09.2017	Sample Condition	Good & Received in Sterile Container
Analysis Starting Date	30.09.2017	Analysis Completion Date	11.10.2017

Test Results:

The above sample tested as received, and results are as follows:

S.NO	PARAMETERS	METHOD	UNITS	RESULTS
1	Total Coliform	IS 1622 : 1981 (JL2009)	MPN/100 ml	<2
2	Faecal Coliform		MPN/100 ml	<2

Note: < 2 can be considered as Absent

END OF REPORT

For Chennai Testing Laboratory Pvt Ltd


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Page 5 of 5

TEST REPORT

Report Number and date	CTL/CH/N-5654/2017-18 & 12.10.2017		
Sample Number	N-5654/18-17		
Customer Name & Address	M/s. Tamil Nadu Pollution Control Board,		
	76, Mount Salai, Guindy, Chennai - 600 032.		
Project At	Cuddalore - SIPCOT Complex		
SAMPLE DETAILS			
Sample Description By Customer	Ground Water		
Sampling Location	Pachangappattin (Opp.to J.K.Pharma)		
GPS Reading	11°41' 44.90"N 079° 45' 47.84"E		
Sampling Date	29.09.2017	Sampled By	Chennai Testing Laboratory Pvt. Ltd.
Quantity Received	5 Litres	Sampling Method	CTL/MSP/5.7/001
Date of Receipt	30.09.2017	Sample Condition	Good & Received in Plastic Container
Analysis Starting Date	30.09.2017	Analysis Completion Date	11.10.2017

Test Results:

The above sample tested as received, and results are as follows:

S.NO	PARAMETERS	METHOD	UNITS	RESULTS
Sanitary Survey:				
1	Appearance	Physical Observation	-	Slightly turbid liquid
2	Colour	IS 3025 (Part 4)-1983 (R,2006)	HTI	5
3	pH @ 25°C	IS 3025 (Part 11)-1983 (R,2006)	-	7.0
4	Odour	IS 3025 (Part 5)-1983 (R,2006)	-	Unobjectionable
5	Ecological (Presence of Animals like Fish, Insects Etc)	Physical Observation.	-	Absent.
6	Oil & Grease	5520-O&G-B-APHA 22 nd Ed. 2012 (Partition Gravimetric Method)	mg/l	< 2
7	Total Suspended Solids	2540-D- APHA 22 nd Ed.2012	mg/l	3
8	Dissolved Oxygen	4500-O-C- APHA 22 nd Ed.2012	mg/l	6.4
9	Biochemical Oxygen Demand (BOD) 3 days at 27°C	5210-B-APHA 22 nd Ed.2012	mg/l	< 2
10	Chemical Oxygen Demand (COD)	5220-B- APHA 22 nd Ed.2012	mg/l	< 4
11	Conductivity	IS 3025 (Part 14)-1984 (R,2006)	µs/cm	711
12	Total Dissolved Solids	2540-C-APHA 22 nd Ed.2012	mg/l	422
13	Nitrate - Nitrogen	4500-NO ₃ -B-APHA 22 nd Ed.2012	mg/l	1.2
14	Nitrite - Nitrogen	4500-NO ₂ -B-APHA 22 nd Ed.2012	mg/l	BDL (DL:0.01)

For Chennai Testing Laboratory Pvt Ltd

A. Rajan
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Page 1 of 5

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TEST REPORT

Report Number and date	CTL/CH/N-5654/2017-18 & 12.10.2017
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S.NO	PARAMETERS	METHOD	UNITS	RESULTS
15	Free Ammonia as NH ₃	4500-NH ₃ -B.C.-APHA 22 nd Ed.	mg/l	BDL (DL:0.1)
16	Total Residual Chlorine	IS 3025 (Part 26)-1984	mg/l	BDL (DL:0.1)
17	Cyanide as CN	IS 3025 (Part 27)-1986 (R.2009)	mg/l	BDL (DL:0.01)
18	Fluoride as F	IS 3025 (Part 60)-2008	mg/l	0.24
19	Sulphate as SO ₄	IS 3025 (Part 24)-1986 (R.2009)	mg/l	26.3
20	Sulphide as H ₂ S	IS 3025 (Part 29) (R.2009)	mg/l	BDL (DL:0.01)
21	Total Hardness as CaCO ₃	IS 3025 (Part 21)-1983 (R.2006)	mg/l	214
22	Dissolved Phosphate as P	4500-P-D- APHA 22 nd Ed.2012	mg/l	0.32
23	Sodium Absorption Ratio	IS 11624-1986 (R.2001)	-	1.0
24	Total Phosphorous as P	4500-P-B-D-APHA 22 nd Ed.2012	mg/l	0.32
25	Total Kjeldahl Nitrogen as N	4500-N-B.C-APHA 22 nd Ed.2012	mg/l	BDL (DL:0.1)
26	Total Ammonia	4500-Na ₂ -B.C-APHA 22 nd Ed.2012	mg/l	BDL (DL:0.1)
27	Phenols	5530-C-APHA 22 nd Ed.2012	mg/l	BDL (DL:0.001)
28	Surface Active Agents	IS 13428 - 2005 (Ames K)	mg/l	BDL (DL:0.1)
29	Anionic detergent as MBAS	IS 13428 - 2005 (Ames K)	mg/l	BDL (DL:0.1)
30	Hexavalent Chromium as Cr ^{VI}	3500-Cr-B-APHA 22 nd Ed. 2012	mg/l	BDL (DL:0.01)
31	Iron as Fe	IS 3025 (Part 53)-2009	mg/l	1.82
32	Boron as B	IS 3025 (Part 57)-2005	mg/l	BDL (DL:0.1)
33	Total Nitrogen	4500-N-B.C-APHA 22 nd Ed.2012	mg/l	1.2
34	Chloride	4500-Cl-B-APHA 22 nd Ed. 2012	mg/l	74
35	Bio - Assay (Zebra Fish) Test	IS 6582 (Part 2): 2001	-	T _r = 1
36	Copper as Cu	IS 3025 (Part 42)-1992 (R.2009)	mg/l	BDL (DL:0.02)
37	Manganese as Mn	3111-B-APHA 22 nd Edition 2012	mg/l	0.82
38	Mercury as Hg	IS 3025 (Part 48)-1994 (R.2009)	mg/l	BDL (DL:0.001)
39	Cadmium as Cd	IS 3025 (Part 41)-1992 (R.2009)	mg/l	BDL (DL:0.002)
40	Selenium as Se	IS 3025 (Part 56)-2003(R.2009)	mg/l	BDL (DL:0.005)
41	Total Arsenic as As	IS 3025 (Part 37)-1988 (R.2009)	mg/l	BDL (DL:0.001)
42	Lead as Pb	IS 3025 (Part 47)-1994 (R.2009)	mg/l	BDL (DL:0.005)
43	Zinc as Zn	IS 3025 (Part 49)-1994 (R.2009)	mg/l	BDL (DL:0.09)
44	Total Chromium as Cr	IS 3025(Part 52)-2003	mg/l	BDL (DL:0.01)
45	Nickel as Ni	IS 3025 (Part 54)	mg/l	BDL (DL:0.01)
46	Vanadium as V	3111-B-APHA 22 nd Ed.2012	mg/l	BDL (DL:2.0)

T_r = Toxicity Factor

Note: T_r = 16. It shows that all or some of the fish die in the test solution for a T value less than 16 (1 part of waste water + 15 part of dilution water) and all are alive in test solution for a T value of 16 and above, after 48 hrs.

For Chennai Testing Laboratory Pvt Ltd

A. [Signature]
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Page 2 of 5

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TEST REPORT

Report Number and date	CTL/CH/N-5654/2017-18 & 12.10.2017
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S.NO	PARAMETERS	METHOD	UNITS	RESULTS
Organo chlorine Pesticides (OCP):				
47	Aldrin	CTL/SOP/WATER/101-2012 APHA 22 nd Edition 2012-6630 B	µg/l	BDL (DL:0.01)
	Dieldrin		µg/l	BDL (DL:0.01)
	Endosulfan alpha		µg/l	BDL (DL:0.01)
	Endosulfan Beta		µg/l	BDL (DL:0.01)
	Endosulfan Sulfate		µg/l	BDL (DL:0.01)
	o,p'-DDT		µg/l	BDL (DL:0.01)
	p,p'-DDT		µg/l	BDL (DL:0.01)
	p,p'-DDE		µg/l	BDL (DL:0.01)
	o,p'-DDE		µg/l	BDL (DL:0.01)
	o,p'-DDD		µg/l	BDL (DL:0.01)
	p,p'-DDD		µg/l	BDL (DL:0.01)
	Alpha HCH		µg/l	BDL (DL:0.01)
	Beta HCH		µg/l	BDL (DL:0.01)
	Gamma HCH (Lindane)		µg/l	BDL (DL:0.01)
Delta HCH	µg/l	BDL (DL:0.01)		
Poly Chlorinated Terphenyls (as PCT):				
48	o-Terphenyl	CTL/SOP/WATER/159-2017	µg/l	BDL (DL:0.03)
	m-Terphenyl		µg/l	BDL (DL:0.03)
	p-Terphenyl		µg/l	BDL (DL:0.03)
	Tetradecachloro-o-terphenyl		µg/l	BDL (DL:0.03)
	Tetradecachloro-m-terphenyl		µg/l	BDL (DL:0.03)
	Tetradecachloro-p-terphenyl		µg/l	BDL (DL:0.03)
	4-Chloro-o-terphenyl		µg/l	BDL (DL:0.03)
	4-Chloro-p-terphenyl		µg/l	BDL (DL:0.03)
	2,4-Dichloro-p-terphenyl		µg/l	BDL (DL:0.03)
	2,5-Dichloro-o-terphenyl		µg/l	BDL (DL:0.03)
	2,5-Dichloro-m-terphenyl		µg/l	BDL (DL:0.03)
	2,5-Dichloro-p-terphenyl		µg/l	BDL (DL:0.03)
	2,4,6-Trichloro-p-terphenyl		µg/l	BDL (DL:0.03)
	2,3,5,6-Tetrachloro-p-terphenyl		µg/l	BDL (DL:0.03)
	2,4,4',6-Tetrachloro-p-terphenyl		µg/l	BDL (DL:0.03)
	2,3,4,5,6-Pentachloro-p-terphenyl		µg/l	BDL (DL:0.03)

For Chennai Testing Laboratory Pvt Ltd

A. Rajan
Authorized Signatory

Page 2 of 2

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TEST REPORT

Report Number and date	CTL/CH/N-5654/2017-18 & 12.10.2017
------------------------	------------------------------------

S. NO	PARAMETERS	METHOD	UNITS	RESULTS
49	Poly Nuclear Aromatic Hydrocarbons (as PAH):			
	Naphthalene	APHA 22 nd Edition 6440 C CTL/SOP/WATER/102-2012	µg/l	BDL (DL:0.01)
	Acenaphthylene		µg/l	BDL (DL:0.01)
	2-Itumo-Naphthalene		µg/l	BDL (DL:0.02)
	Acenaphthene		µg/l	BDL (DL:0.02)
	Fluorene		µg/l	BDL (DL:0.02)
	Phenanthrene		µg/l	BDL (DL:0.02)
	Anthracene		µg/l	BDL (DL:0.02)
	Pyrene		µg/l	BDL (DL:0.02)
	Fluoranthene		µg/l	BDL (DL:0.02)
	Chrysene		µg/l	BDL (DL:0.02)
	Benz[a]anthracene		µg/l	BDL (DL:0.02)
	Benzo[a]pyrene		µg/l	BDL (DL:0.02)
	Benzo[b]fluoranthene		µg/l	BDL (DL:0.03)
	Benzo[ghi]perylene		µg/l	BDL (DL:0.03)
	Dibenz[a,h]anthracene		µg/l	BDL (DL:0.03)
Indeno[1,2,3-cd]pyrene	µg/l		BDL (DL:0.04)	
50	Poly Chlorinated Biphenyls (as PCB):			
	2-Chlorobiphenyl	Annex M of IS 13429-1990	µg/l	BDL (DL:0.01)
	2,3-dichlorobiphenyl		µg/l	BDL (DL:0.01)
	2,5,4'-Trichlorobiphenyl		µg/l	BDL (DL:0.01)
	2,2',4,4'-tetrachlorobiphenyl		µg/l	BDL (DL:0.01)
	2,2',3,4',5'-Pentachlorobiphenyl		µg/l	BDL (DL:0.01)
	2,2',4,4',5',6'-Hexachlorobiphenyl		µg/l	BDL (DL:0.01)
	2,2',3,3',4,4',6'-Heptachlorobiphenyl		µg/l	BDL (DL:0.01)
	2,2',3,3',4,5,6,6'-Octachlorobiphenyl		µg/l	BDL (DL:0.01)

For Chennai Testing Laboratory Pvt Ltd

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TEST REPORT

Report Number and date	CTL/CH/N-5654/2017-18 & 12.10.2017		
Sample Number	N-5654/16-17		
Customer Name & Address	M/s. Tamil Nadu Pollution Control Board,		
	76, Mount Sabai, Guindy, Chennai - 600 032.		
Project At	Cuddalore - SIPCOT Complex		
SAMPLE DETAILS			
Sample Description By Customer	Ground Water		
Sampling Location	Pachangappam (Opp.to J.K.Pharma)		
GPS Reading	11°41' 44.90"N 079° 45' 47.94"E		
Sampling Date	29.09.2017	Sampled By	Chennai Testing Laboratory Pvt. Ltd.,
Quantity Received	100ml	Sampling Method	CTL/MSP/5.7/001
Date of Receipt	30.09.2017	Sample Condition	Good & Received in Sterile Container
Analysis Starting Date	30.09.2017	Analysis Completion Date	11.10.2017

Test Results:

The above sample tested as received, and results are as follows:

S.NO	PARAMETERS	METHOD	UNITS	RESULTS
1	Total Coliform	IS 1622 : 1981 (R.2009)	MPN/100 ml	<2
2	Faecal Coliform		MPN/100 ml	<2

Note: <2 can be considered as Absent

END OF REPORT

For Chennai Testing Laboratory Pvt Ltd


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Page 3 of 5

Ground Water Analysis - Coimbatore



CIN : U74999TN2008PTC007558

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TEST REPORT

Report Number and date	CTL/CH/N-5105/2017-18 & 30.09.2017		
Sample Number	N-5105/17-18		
Customer Name & Address	M/s. Tamil Nadu Pollution Control Board, 76, Mount Salai, Guindy, Chennai - 600 032.		
Project At	Coimbatore - Kurichi		
SAMPLE DETAILS			
Sample Description By Customer	Ground Water		
Sampling Location	Indo Shell Mould Ltd. (Unit - II)		
GPS Reading	10°56' 06.36"N 076° 58' 38.87"E		
Sampling Date	18.09.2017	Sampled By	Chennai Testing Laboratory Pvt. Ltd.
Quantity Received	5 Litres	Sampling Method	CTL/MSP/5.7/001
Date of Receipt	19.09.2017	Sample Condition	Good & Received in Plastic Container
Analysis Starting Date	19.09.2017	Analysis Completion Date	28.09.2017

Test Results:

The above sample tested as received, and results are as follows:

S.NO	PARAMETERS	METHOD	UNITS	RESULTS
Sanitary Survey:				
1	Appearance	Physical Observation	-	Clear Liquid
2	Colour	IS 3025 (Part 4)-1983 (R.2006)	HU	2
3	pH @ 25°C	IS 3025 (Part 11)-1983 (R.2006)	-	7.1
4	Odour	IS 3025 (Part 5)-1983 (R.2006)	-	Unobjectionable
5	Ecological (Presence of Animals like Fish, Insects Etc)	Physical Observation	-	Absent
6	Oil & Grease	5520-O&G-B-APHA 22 nd Ed.2012 (Partition Gravimetric Method)	mg/l	<2
7	Total Suspended Solids	2540-D-APHA 22 nd Ed.2012	mg/l	<2
8	Dissolved Oxygen	4500-O-C-APHA 22 nd Ed.2012	mg/l	7.4
9	Biochemical Oxygen Demand (BOD) 3 days at 27°C	5210-B-APHA 22 nd Ed.2012	mg/l	<2
10	Chemical Oxygen Demand (COD)	5220-B-APHA 22 nd Ed.2012	mg/l	<4
11	Conductivity	IS 3025 (Part 14)-1984 (R.2006)	µ/cm	2872
12	Total Dissolved Solids	2540-C-APHA 22 nd Ed.2012	mg/l	1722
13	Nitrate - Nitrogen	4500-NO ₃ -B-APHA 22 nd Ed.2012	mg/l	38.4
14	Nitrite - Nitrogen	4500-NO ₂ -B-APHA 22 nd Ed.2012	mg/l	BDL (DL-0.01)

For Chennai Testing Laboratory Pvt Ltd

A. Rajan
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Page 1 of 5

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TEST REPORT

Report Number and date	CTL/CH/N-5105/2017-18 & 30.09.2017
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SNO	PARAMETERS	METHOD	UNITS	RESULTS
15	Free Ammonia as NH ₃	4500-NH ₃ - B.C-APHA 22 nd Ed.	mg/l	BDL (DL:0.1)
16	Total Residual Chlorine	IS 3025 (Part 26)-1984	mg/l	BDL (DL:0.1)
17	Cyanide as CN	IS 3025 (Part 27)-1986 (R.2009)	mg/l	BDL (DL:0.01)
18	Fluoride as F	IS 3025 (Part 60)-2006	mg/l	0.14
19	Sulphate as SO ₄	IS 3025 (Part 24)-1986 (R.2009)	mg/l	95.7
20	Sulphide as H ₂ S	IS 3025 (Part 29) (R.2009)	mg/l	BDL (DL:0.01)
21	Total Hardness as CaCO ₃	IS 3025 (Part 21)-1983 (R.2006)	mg/l	828
22	Dissolved Phosphate as P	4500-P-D- APHA 22 nd Ed.2012	mg/l	BDL (DL:0.1)
23	Sodium Absorption Ratio	IS 11624-1986 (R.2001)	-	3.68
24	Total Phosphorous as P	4500-P-B-D-APHA 22 nd Ed.2012	mg/l	BDL (DL:0.1)
25	Total Kjeldahl Nitrogen as N	4500-N-B.C-APHA 22 nd Ed.2012	mg/l	BDL (DL:0.1)
26	Total Ammonia	4500-Na ₃ -B.C-APHA 22 nd Ed.2012	mg/l	BDL (DL:0.1)
27	Phenols	5530-C-APHA 22 nd Ed.2012	mg/l	BDL (DL:0.001)
28	Surface Active Agents	IS 13428 - 2005 (Annex K)	mg/l	BDL (DL:0.1)
29	Anionic detergent as MBAS	IS 13428 - 2005 (Annex K)	mg/l	BDL (DL:0.1)
30	Hexavalent Chromium as Cr ^{VI}	3500-Cr-B-APHA 22 nd Ed. 2012	mg/l	BDL (DL:0.01)
31	Iron as Fe	IS 3025 (Part 53)-2009	mg/l	0.02
32	Boron as B	IS 3025 (Part 57)-2005	mg/l	BDL (DL:0.1)
33	Total Nitrogen	4500-N-B.C-APHA 22 nd Ed.2012	mg/l	38.4
34	Chloride	4500-Cl-B-APHA 22 nd Ed. 2012	mg/l	500
35	Bio - Assay (Zebra Fish) Test	IS 6582 (Part 2): 2001	-	T _c = 1
36	Copper as Cu	IS 3025 (Part 42)-1992 (R.2009)	mg/l	0.03
37	Manganese as Mn	3111 B APHA 22 nd Edition 2012	mg/l	0.02
38	Mercury as Hg	IS 3025 (Part 48)-1994 (R.2009)	mg/l	BDL (DL:0.001)
39	Cadmium as Cd	IS 3025 (Part 41)-1992 (R.2009)	mg/l	BDL (DL:0.002)
40	Selenium as Se	IS 3025 (Part 56)-2003(R.2009)	mg/l	BDL (DL:0.005)
41	Total Arsenic as As	IS 3025 (Part 37)-1988 (R.2009)	mg/l	BDL (DL:0.001)
42	Lead as Pb	IS 3025 (Part 47)-1994 (R.2009)	mg/l	BDL (DL:0.005)
43	Zinc as Zn	IS 3025 (Part 49)-1994 (R.2009)	mg/l	BDL (DL:0.08)
44	Total Chromium as Cr	IS 3025(Part 52)-2003	mg/l	BDL (DL:0.01)
45	Nickel as Ni	IS 3025 (Part 54)	mg/l	BDL (DL:0.01)
46	Vanadium as V	3111-B-APHA 22 nd Ed.2012	mg/l	BDL (DL:2.0)

T_c = Toxicity Factor

Note: T_c = 16, it shows that all or some of the fish die in the test solution for a T value, less than 16 (1 part of waste water + 15 part of dilution water) and all are alive in test solutions for a T value of 16 and above, after 48 hrs.

For Chennai Testing Laboratory Pvt Ltd

A. Dhanasekaran
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Page 2 of 5

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TEST REPORT

Report Number and date	CTL/CH/N-5105/2017-18 & 30.09.2017
------------------------	------------------------------------

S. NO	PARAMETERS	METHOD	UNITS	RESULTS
47	Organo chlorine Pesticides (OCP):			
	Aldrin	CTL/SOP/WATER/101-2012 APHA 22 nd Edition 2012-6630 B	µg/l	BDL (DL:0.01)
	Dieldrin		µg/l	BDL (DL:0.01)
	Endosulfan alpha		µg/l	BDL (DL:0.01)
	Endosulfan Beta		µg/l	BDL (DL:0.01)
	Endosulfan Sulfate		µg/l	BDL (DL:0.01)
	o,p'-DDT		µg/l	BDL (DL:0.01)
	p,p'-DDT		µg/l	BDL (DL:0.01)
	p,p'-DDE		µg/l	BDL (DL:0.01)
	o,p'-DDE		µg/l	BDL (DL:0.01)
	o,p'-DDD		µg/l	BDL (DL:0.01)
	p,p'-DDD		µg/l	BDL (DL:0.01)
	Alpha HCH		µg/l	BDL (DL:0.01)
	Beta HCH		µg/l	BDL (DL:0.01)
	Gamma HCH (Lindane)		µg/l	BDL (DL:0.01)
Delta HCH	µg/l		BDL (DL:0.01)	
48	Poly Chlorinated Terphenyls (as PCT):			
	o-Terphenyl	CTL/SOP/WATER/159-2017	µg/l	BDL (DL:0.03)
	m-Terphenyl		µg/l	BDL (DL:0.03)
	p-Terphenyl		µg/l	BDL (DL:0.03)
	Tetradecachloro-o-terphenyl		µg/l	BDL (DL:0.03)
	Tetradecachloro-m-terphenyl		µg/l	BDL (DL:0.03)
	Tetradecachloro-p-terphenyl		µg/l	BDL (DL:0.03)
	4-Chloro-o-terphenyl		µg/l	BDL (DL:0.03)
	4-Chloro-p-terphenyl		µg/l	BDL (DL:0.03)
	2,4-Dichloro-p-terphenyl		µg/l	BDL (DL:0.03)
	2,5-Dichloro-o-terphenyl		µg/l	BDL (DL:0.03)
	2,5-Dichloro-m-terphenyl		µg/l	BDL (DL:0.03)
	2,5-Dichloro-p-terphenyl		µg/l	BDL (DL:0.03)
	2,4,6-Trichloro-p-terphenyl		µg/l	BDL (DL:0.03)
	2,3,5,6-Tetrachloro-p-terphenyl		µg/l	BDL (DL:0.03)
2,4,4',6-Tetrachloro-p-terphenyl	µg/l		BDL (DL:0.03)	
2,3,4,5,6-Pentachloro-p-terphenyl	µg/l	BDL (DL:0.03)		

For Chennai Testing Laboratory Pvt Ltd

A. Rajan
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Page 3 of 5

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TEST REPORT

Report Number and date	CTL/CH/N-5105/2017-18 & 30.09.2017
------------------------	------------------------------------

S.NO	PARAMETERS	METHOD	UNITS	RESULTS
49	Poly Nuclear Aromatic Hydrocarbons (as PAH):			
	Naphthalene	APHA 22 nd Edition 6440 C CTL/SOP/WATER/102-2012	µg/l	BDL (DL:0.01)
	Acenaphthylene		µg/l	BDL (DL:0.01)
	2-Bromo-Naphthalene		µg/l	BDL (DL:0.02)
	Acenaphthene		µg/l	BDL (DL:0.02)
	Fluorene		µg/l	BDL (DL:0.02)
	Phenanthrene		µg/l	BDL (DL:0.02)
	Anthracene		µg/l	BDL (DL:0.02)
	Pyrene		µg/l	BDL (DL:0.02)
	Fluoranthene		µg/l	BDL (DL:0.02)
	Chrysene		µg/l	BDL (DL:0.02)
	Benzo[a]anthracene		µg/l	BDL (DL:0.02)
	Benzo[a]pyrene		µg/l	BDL (DL:0.02)
	Benzo[b]fluoranthene		µg/l	BDL (DL:0.03)
	Benzo[ghi]perylene		µg/l	BDL (DL:0.03)
	Dibenz[a,h]anthracene		µg/l	BDL (DL:0.03)
Indeno[1,2,3-cd]pyrene	µg/l		BDL (DL:0.04)	
50	Poly Chlorinated Biphenyls (as PCB):			
	2-Chlorobiphenyl	Annex M of IS 13428-1998	µg/l	BDL (DL:0.01)
	2,3-dichlorobiphenyl		µg/l	BDL (DL:0.01)
	2,5,4'-Trichlorobiphenyl		µg/l	BDL (DL:0.01)
	2,2',4,4'-tetrachlorobiphenyl		µg/l	BDL (DL:0.01)
	2,2',3,4',5'-Pentachlorobiphenyl		µg/l	BDL (DL:0.01)
	2,2',4,4',5,6-Hexachlorobiphenyl		µg/l	BDL (DL:0.01)
	2,2',3,3',4,4',6-Heptachlorobiphenyl		µg/l	BDL (DL:0.01)
2,2',3,3',4,5,6,6'-Octachlorobiphenyl	µg/l		BDL (DL:0.01)	

For Chennai Testing Laboratory Pvt Ltd

A. Deivanand
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TEST REPORT

Report Number and date	CTL/CH/N-5105/2017-1B & 30.09.2017		
Sample Number	N-5105/17-1B		
Customer Name & Address	M/s. Tamil Nadu Pollution Control Board, 76, Mount Salai, Guindy, Chennai - 600 032.		
Project At	Coimbatore - Kurichi		
SAMPLE DETAILS			
Sample Description By Customer	Ground Water		
Sampling Location	Indo Shell Mould Ltd. (Unit - II)		
GPS Reading	10°56' 08.36"N 076° 58' 38.87"E		
Sampling Date	18.09.2017	Sampled By	Chennai Testing Laboratory Pvt. Ltd.
Quantity Received	100ml	Sampling Method	CTL/MSP/5.7/001
Date of Receipt	19.09.2017	Sample Condition	Good & Received in Sterile Container
Analysis Starting Date	19.09.2017	Analysis Completion Date	28.09.2017

Test Results:

The above sample tested as received, and results are as follows:

S.NO	PARAMETERS	METHOD	UNITS	RESULTS
1	Total Coliform	IS 1622 : 1981 (R.2009)	MPN/100 ml	12
2	Faecal Coliform		MPN/100 ml	< 2

Note: < 2 can be considered as Absent

END OF REPORT

For Chennai Testing Laboratory Pvt Ltd


Authorised Signatory

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TEST REPORT

Report Number and date	CTL/CH/N-5106/2017-18 & 30.09.2017		
Sample Number	N-5106/17-18		
Customer Name & Address	M/s. Tamil Nadu Pollution Control Board, 76, Mount Sala, Guindy, Chennai - 600 032.		
Project At	Coimbatore - Kurichi		
SAMPLE DETAILS			
Sample Description By Customer	Ground Water		
Sampling Location	Surya Industrials		
GPS Reading	10°56' 35.01"N 076° 58' 30.30"E		
Sampling Date	18.09.2017	Sampled By	Chennai Testing Laboratory Pvt. Ltd.
Quantity Received	5 Litres	Sampling Method	CTL/MSP/5.7/001
Date of Receipt	19.09.2017	Sample Condition	Good & Received in Plastic Container
Analysis Starting Date	19.09.2017	Analysis Completion Date	28.09.2017

Test Results:

The above sample tested as received, and results are as follows:

S.NO	PARAMETERS	METHOD	UNITS	RESULTS
Sanitary Survey:				
1	Appearance	Physical Observation	-	Clear Liquid
2	Colour	IS 3025 (Part 4)-1983 (R.2006)	HU	2
3	pH @ 25°C	IS 3025 (Part 11)-1983 (R.2006)	-	7.5
4	Odour	IS 3025 (Part 5)-1983 (R.2006)	-	Unobjectionable
5	Ecological (Presence of Animals like Fish, Insects Etc)	Physical Observation	-	Absent
6	Oil & Grease	5520-O&G-B APHA 22 nd Ed. 2012 (Partition Gravimetric Method)	mg/l	< 2
7	Total Suspended Solids	2540-D- APHA 22 nd Ed.2012	mg/l	< 2
8	Dissolved Oxygen	4500-O-C- APHA 22 nd Ed.2012	mg/l	6.9
9	Biochemical Oxygen Demand (BOD) 3 days at 27°C	5210-B-APHA 22 nd Ed.2012	mg/l	< 2
10	Chemical Oxygen Demand (COD)	5220-B- APHA 22 nd Ed.2012	mg/l	< 4
11	Conductivity	IS 3025 (Part 14)-1984 (R.2006)	µm/cm	1840
12	Total Dissolved Solids	2540-C-APHA 22 nd Ed.2012	mg/l	1106
13	Nitrate - Nitrogen	4500-NO ₃ -B-APHA 22 nd Ed.2012	mg/l	21.4
14	Nitrite - Nitrogen	4500-NO ₂ -B-APHA 22 nd Ed.2012	mg/l	BDL (DL:0.01)

For Chennai Testing Laboratory Pvt Ltd

A. P. J. [Signature]
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Page 1 of 3

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TEST REPORT

Report Number and date	CTL/CH/N-5106/2017-18 & 30.09.2017
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S.NO	PARAMETERS	METHOD	UNITS	RESULTS
15	Free Ammonia as NH ₃	4500-NH ₃ - B.C.-APHA 22 nd Ed.	mg/l	BDL (DL-0.1)
16	Total Residual Chlorine	IS 3025 (Part 26)-1984	mg/l	BDL (DL-0.1)
17	Cyanide as CN	IS 3025 (Part 27)-1986 (R.2009)	mg/l	BDL (DL-0.01)
18	Fluoride as F	IS 3025 (Part 60)-2008	mg/l	0.16
19	Sulphate as SO ₄	IS 3025 (Part 24)-1986 (R.2009)	mg/l	83.1
20	Sulphide as H ₂ S	IS 3025 (Part 29) (R.2009)	mg/l	BDL (DL-0.01)
21	Total Hardness as CaCO ₃	IS 3025 (Part 21)-1983 (R.2006)	mg/l	572
22	Dissolved Phosphate as P	4500-P-D- APHA 22 nd Ed.2012	mg/l	BDL (DL-0.1)
23	Sodium Absorption Ratio	IS 11624-1986 (R.2001)	-	2.75
24	Total Phosphorous as P	4500-P-B-D-APHA 22 nd Ed.2012	mg/l	BDL (DL-0.1)
25	Total Kjeldahl Nitrogen as N	4500-N-B.C-APHA 22 nd Ed.2012	mg/l	BDL (DL-0.1)
26	Total Ammonia	4500-Na, B.C-APHA 22 nd Ed.2012	mg/l	BDL (DL-0.1)
27	Phenols	5530-C-APHA 22 nd Ed.2012	mg/l	BDL (DL-0.001)
28	Surface Active Agents	IS 13428 - 2005 (Annex K)	mg/l	BDL (DL-0.1)
29	Anionic detergent as MBAS	IS 13428 - 2005 (Annex K)	mg/l	BDL (DL-0.1)
30	Hexavalent Chromium as Cr ⁶⁺	3500-Cr-B-APHA 22 nd Ed. 2012	mg/l	BDL (DL-0.01)
31	Iron as Fe	IS 3025 (Part 55)-2009	mg/l	0.04
32	Boron as B	IS 3025 (Part 57)-2005	mg/l	BDL (DL-0.1)
33	Total Nitrogen	4500-N-B.C-APHA 22 nd Ed.2012	mg/l	21.4
34	Chloride	4500-Cl-B-APHA 22 nd Ed. 2012	mg/l	209
35	Bio - Assay (Zebra Fish) Test	IS 6582 (Part 2)- 2001	-	T ₁ = 1
36	Copper as Cu	IS 3025 (Part 42)-1992 (R.2009)	mg/l	0.03
37	Manganese as Mn	3111-B-APHA 22 nd Edition 2012	mg/l	BDL (DL-0.01)
38	Mercury as Hg	IS 3025 (Part 48)-1994 (R.2009)	mg/l	BDL (DL-0.001)
39	Cadmium as Cd	IS 3025 (Part 41)-1992 (R.2009)	mg/l	BDL (DL-0.002)
40	Selenium as Se	IS 3025 (Part 56)-2003(R.2009)	mg/l	BDL (DL-0.005)
41	Total Arsenic as As	IS 3025 (Part 37)-1988 (R.2009)	mg/l	BDL (DL-0.001)
42	Lead as Pb	IS 3025 (Part 47)-1994 (R.2009)	mg/l	BDL (DL-0.005)
43	Zinc as Zn	IS 3025 (Part 49)-1994 (R.2009)	mg/l	0.21
44	Total Chromium as Cr	IS 3025(Part 52)-2003	mg/l	BDL (DL-0.01)
45	Nickel as Ni	IS 3025 (Part 54)	mg/l	BDL (DL-0.01)
46	Vanadium as V	3111-B-APHA 22 nd Ed.2012	mg/l	BDL (DL-2.0)

T₁ = Toxicity Factor

Note: T₁ = 16, it shows that all or some of the fish die in the test solution for a T value, less than 16 (1 part of waste water + 15 part of dilution water) and all are alive in test solutions for a T value of 16 and above, after 48 hrs.

For Chennai Testing Laboratory Pvt Ltd

A. Rajan
Authorized signatory

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TEST REPORT

Report Number and date	CTL/CH/N-5106/2017-18 & 30.09.2017
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S.NO	PARAMETERS	METHOD	UNITS	RESULTS
47	Organo chlorine Pesticides (OCP):			
	Aldrin	CTL/SOP/WATER/101-2012 APHA 22 nd Edition 2012-6630 B	µg/l	BDL (DL:0.01)
	Dieldrin		µg/l	BDL (DL:0.01)
	Endosulfan alpha		µg/l	BDL (DL:0.01)
	Endosulfan Beta		µg/l	BDL (DL:0.01)
	Endosulfan Sulfate		µg/l	BDL (DL:0.01)
	o,p'-DDT		µg/l	BDL (DL:0.01)
	p,p'-DDT		µg/l	BDL (DL:0.01)
	p,p'-DDE		µg/l	BDL (DL:0.01)
	o,p'-DDE		µg/l	BDL (DL:0.01)
	o,p'-DDD		µg/l	BDL (DL:0.01)
	p,p'-DDD		µg/l	BDL (DL:0.01)
	Alpha HCH		µg/l	BDL (DL:0.01)
	Beta HCH		µg/l	BDL (DL:0.01)
Gamma HCH (Lindane)	µg/l		BDL (DL:0.01)	
Delta HCH	µg/l	BDL (DL:0.01)		
48	Poly Chlorinated Terphenyls (as PCT):			
	o-Terphenyl	CTL/SOP/WATER/159-2017	µg/l	BDL (DL:0.03)
	m-Terphenyl		µg/l	BDL (DL:0.03)
	p-Terphenyl		µg/l	BDL (DL:0.03)
	Tetradecachloro-o-terphenyl		µg/l	BDL (DL:0.03)
	Tetradecachloro-m-terphenyl		µg/l	BDL (DL:0.03)
	Tetradecachloro-p-terphenyl		µg/l	BDL (DL:0.03)
	4-Chloro-o-terphenyl		µg/l	BDL (DL:0.03)
	4-Chloro-p-terphenyl		µg/l	BDL (DL:0.03)
	2,4-Dichloro-p-terphenyl		µg/l	BDL (DL:0.03)
	2,5-Dichloro-o-terphenyl		µg/l	BDL (DL:0.03)
	2,5-Dichloro-m-terphenyl		µg/l	BDL (DL:0.03)
	2,5-Dichloro-p-terphenyl		µg/l	BDL (DL:0.03)
	2,4,6-Trichloro-p-terphenyl		µg/l	BDL (DL:0.03)
	2,3,5,6-Tetrachloro-p-terphenyl		µg/l	BDL (DL:0.03)
	2,4,4',6-Tetrachloro-p-terphenyl		µg/l	BDL (DL:0.03)
2,3,4,5,6-Pentachloro-p-terphenyl	µg/l		BDL (DL:0.03)	

For Chennai Testing Laboratory Pvt Ltd

A. Rajan
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TEST REPORT

Report Number and date	CTL/CH/N-5106/2017- 18 & 30.09.2017
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S. NO	PARAMETERS	METHOD	UNITS	RESULTS
49	Poly Nuclear Aromatic Hydrocarbons (as PAH):			
	Naphthalene	APHA 22 nd Edition 6440 C CTL/SOP/WATER/102-2012	µg/l	BDL (DL:0.01)
	Acenaphthylene		µg/l	BDL (DL:0.01)
	2-Bromo-Naphthalene		µg/l	BDL (DL:0.02)
	Acenaphthene		µg/l	BDL (DL:0.02)
	Fluorene		µg/l	BDL (DL:0.02)
	Phenanthrene		µg/l	BDL (DL:0.02)
	Anthracene		µg/l	BDL (DL:0.02)
	Pyrene		µg/l	BDL (DL:0.02)
	Fluoranthene		µg/l	BDL (DL:0.02)
	Chrysene		µg/l	BDL (DL:0.02)
	Benz[a]anthracene		µg/l	BDL (DL:0.02)
	Benzo[a]pyrene		µg/l	BDL (DL:0.02)
	Benzo[b]fluoranthene		µg/l	BDL (DL:0.03)
	Benzo[ghi]perylene		µg/l	BDL (DL:0.03)
Dibenz[a,h]anthracene	µg/l		BDL (DL:0.03)	
Indeno[1,2,3-cd]pyrene	µg/l	BDL (DL:0.04)		
50	Poly Chlorinated Biphenyls (as PCB):			
	2-Chlorobiphenyl	Annex M of IS 13428-1998	µg/l	BDL (DL:0.01)
	2,3-dichlorobiphenyl		µg/l	BDL (DL:0.01)
	2,5,4'-Trichlorobiphenyl		µg/l	BDL (DL:0.01)
	2,2',4,4'-tetrachlorobiphenyl		µg/l	BDL (DL:0.01)
	2,2',3,4',6'-Pentachlorobiphenyl		µg/l	BDL (DL:0.01)
	2,2',4,4',5',6'-Hexachlorobiphenyl		µg/l	BDL (DL:0.01)
	2,2',3,3',4,4',6'-Heptachlorobiphenyl		µg/l	BDL (DL:0.01)
2,2',3,3',4,5,6,6'-Octachlorobiphenyl	µg/l		BDL (DL:0.01)	

For Chennai Testing Laboratory Pvt Ltd

A. Rajan
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Page 4 of 5

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TEST REPORT

Report Number and date	CTL/CH/N-5106/2017-18 & 30.09.2017		
Sample Number	N-5106/17-18		
Customer Name & Address	M/s. Tamil Nadu Pollution Control Board,		
	76, Mount Salaj, Guindy, Chennai - 600 032.		
Project At	Coimbatore - Kurichi		
SAMPLE DETAILS			
Sample Description By Customer	Ground Water		
Sampling Location	Surya Industrials		
GPS Reading	10°56' 35.01"N 076° 50' 30.30"E		
Sampling Date	18.09.2017	Sampled By	Chennai Testing Laboratory Pvt. Ltd.
Quantity Received	100ml	Sampling Method	CTL/MSP/5.7/001
Date of Receipt	19.09.2017	Sample Condition	Good & Received in Sterile Container
Analysis Starting Date	19.09.2017	Analysis Completion Date	20.09.2017

Test Results:

The above sample tested as received, and results are as follows:

S.NO	PARAMETERS	METHOD	UNITS	RESULTS
1	Total Coliform	IS 1622:1901 (R.2009)	MPN/100 ml	<2
2	Faecal Coliform		MPN/100 ml	<2

Note: < 2 can be considered as Absent

END OF REPORT

For Chennai Testing Laboratory Pvt Ltd


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Page 5 of 5

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Annexure – II

NABL SCOPE

Annexure – III

LIST OF PARAMETERS

- A. Ambient Air Quality Monitoring for following parameters
- i) SO₂, NO₂, PM₁₀, PM_{2.5}, Lead and Ammonia (for 24 hourly average monitoring values)
 - ii) O₃, CO (for 1 hrly average and 8 hrly average)
 - iii) Benzene, Benzo (a) Pyrene, Arsenic & Nickel (for 24 hrly average values)
- B. Water Quality data of-
- a) Prominent Surface Water Bodies such as outfalls of CETPS, ETPS, FETP, Treated Effluent Drainage, River, Canal, Ponds, Lakes and other such water supply resources flowing through the area or flowing adjoining the CPA.
 - b) Ground Water Quality data of prominent Ground Water Sources such as observation well of Central Ground Water Board, Drinking Water wells, Hand Pumps, Bore Wells another such water supply resources located in the industrial clusters / area under consideration or in the peripheral areas.

Basic Water Quality requirements (for Surface Water and Ground Water both) are as follows :

- (i) Simple parameters
Sanitary survey, General appearance, Colour, Smell, Transparency and Ecological* (presence of animals like fish, insects etc. only in case of surface waterbodies).
- (ii) Regular Monitoring Parameters
pH, O&G, Suspended Solids in mg/l, DO (%Saturation), COD in mg/l, BOD in mg/l, Electrical Conductivity in μ mhos/cm, Total Dissolved Solids, Nitrite-Nitrogen, Nitrate-Nitrogen (NO₂ + NO₃), Total Nitrogen in mg/l, Free Ammonia, Total Residual Chlorin, Cyanide, Fluoride, Chloride, Sulphate, Sulphides, Total Hardness, Dissolved Phosphates, SAR, Total Coliforms, Fecal Coliform (MPN/100ml).
- (iii) Special Parameters
Total Phosphorous, TKN, Total Ammonia (NH₄ + NH₃), Nitrogen, Phenols, Surface Active Agents, Anionic Detergents, Organo-Chlorine Pesticides, PAH, PCB, and PCT, Zinc, Nickel, Copper, Hexavalent Chromium, Chromium total, Arsenic (Total), Lead, Cadmium, Mercury, Manganese, Iron, Vanadium, Selenium, Boron.
- (iv) Bio-Assay (Zebra Fish) Test
For Specified Samples only.

Note:

- *DO is not applicable in case of ground waters.*
- *DO in eutrophicated waters should include measurements for diurnal variations.*
- *SS limit is applicable only during non-monsoon period.*
- *Fecal colifom values should meet for 90% times.*
- *Static bio-assay method may be adopted.*