



# Water/Waste Water Sample Collection Guideline





## General Sampling Guideline

- Prepare a Sampling and Analysis Plan which describes the sampling locations, numbers and types of samples to be collected, and the quality control requirements.
- Before proceeding to the sampling ensures that sampling equipment, preservatives, and procedures for sample collection are ready and acceptable. –**Annexure 1**
- The acids and bases used in preservation of many types of samples are dangerous and must be handled with care.
- The sample should be collected where the water/wastewater is well mixed. Therefore, the sample should be collected near the centre of the flow channel, at approximately 40 to 60 percent of the water depth, where the turbulence is at a maximum and the possibility of solids settling is minimized
- While conducting wastewater sampling, the following information will also be obtained: **Annexure 2**
  - Field measurements -- pH, dissolved oxygen, total residual chlorine, conductivity and temperature
  - Flows associated with the samples collected -- continuous flows with composite samples and instantaneous flows with grab samples



- Diagrams and/or written descriptions of the wastewater treatment systems (if available).
  
  - Photographs of pertinent wastewater associated equipment, such as flow measuring devices, treatment units, etc.
  
  - Process control information on the wastewater treatment process (if applicable).
  
  - Completion of applicable forms required during specific investigations. All observations, measurements, diagrams, etc., will be entered in field logbooks
- Fill out completely
    - Sample name, date and time of sample
    - Sampler name and signature
    - Type of sample
    - Preservative
    - Bottle and volume
    - Analysis needed



## Sampling for Biological Contaminants

Total coliforms; Fecal coliforms; *E. coli*; Enterococci; Heterotrophic Bacteria; or Coliphage

### Bottle to Use



Sterile 125 or 150 ml glass bottles must be used.

### Preservatives to Use

Sodium Thiosulfate if sample is chlorinated and Cool to  $< 6^{\circ}\text{C}$  ( $< 50^{\circ}\text{F}$ )

### Holding Times

Holding times are generally very short. Deliver samples to the lab the day of collection if possible or ship via overnight delivery.

### Sampling Instructions

Wear gloves when collecting samples. Do not rinse the bottles. The bottles are sterile so care must be taken not to contaminate the bottle or cap. Once the distribution line is flushed and the flow reduced, quickly open the bottle (but do not set the cap down), hold the cap by its outside edges only, and fill the sample bottle to just above the 100 ml line leaving a one inch headspace. Cap the bottle immediately and place it into an ice box with ice for transportation to the laboratory.

### Some Tips on Collecting Samples

- ❖ Remove any attachments on the water source
- ❖ Samples must always be collected directly into the prepared container
- ❖ The bottle should be held near the base and filled to within about one inch of the top without rinsing and recapped immediately.
- ❖ During sample collection, the sample container should be plunged with the neck partially below the surface and slightly upward.
- ❖ The mouth should be directed against the current.
- ❖ Do not rinse or overfill container
- ❖ Always collect cold water; never sample hot water
- ❖ Do not touch the inside of the sample bottle or its cap



## **Sampling for Nutrients, Anions, and other Analytes**

Acidity, Alkalinity, Biological Oxygen Demand, Bromate, Chloride, Chlorite, Color, Conductivity, Fluoride, Nitrate, Nitrite, Odor, o-Phosphate, Residues, Silica, Sulfate, Surfactants, Total solids, Total Dissolved Solids, Total Suspended Solids, Turbidity

### **Bottles to Use**



Plastic or glass bottles may be used but plastic is preferred.

### **Preservative to Use (as per Table 1)**

**Cool to  $\leq 6^{\circ}\text{C}$**

### **Holding Times**

Most of these analytes have short holding times. Deliver samples to the lab the same day if possible or via overnight delivery. Check holding times for the specific analytes of interest. (as per table 1)

### **Sampling Instructions**

Collect the required volume of sample for analysis. Wear gloves and eye protection when collecting samples. Rinse the bottle and cap three times with sample water and fill the bottle to within one to two inches from the top. Place the sample into an ice box with ice for immediate transportation to the laboratory.



## **Sampling for Nutrients Requiring Acid Preservation**

Ammonia; Kjeldahl and Organic Nitrogen; Total Phosphorus

### **Bottles to Use**



Plastic or glass bottles may be used but plastic is preferred.

### **Preservative to Use**

Sulfuric Acid ( $\text{H}_2\text{SO}_4$ ) to pH < 2

### **Holding Times**

28 days

### **Sampling Instructions**

Collect the required volume of sample for analysis. Wear gloves and eye protection when handling acids and while collecting samples. If the bottle contains a preservative, do not rinse the bottle. If the preservatives are not included in the bottle, rinse the bottle and cap three times with sample water, fill the bottle, and then carefully add the preservatives following the instructions as provided in Table 1. The bottle should be filled to within one to two inches from the top. Deliver or ship the sample to the laboratory.



## **Sampling for Cyanide**

### **Bottles to Use**



Plastic or glass bottles may be used but plastic is preferred.

### **Preservatives to Use**

0.6 g Ascorbic Acid if sample is chlorinated and Sodium Hydroxide (NaOH) to  
pH >12 and Cool to  $\leq 6$  °C

### **Holding Time**

14 days

### **Sampling Instructions**

Collect the required volume of sample for analysis. Wear gloves and eye protection when handling acids and other preservatives and while collecting samples. If the bottle contains a preservative, do not rinse the bottle. If the preservatives are not included in the bottle, rinse the bottle and cap three times with sample water, fill the bottle, and then carefully add the preservatives following the instructions provided in Table 1. The bottle should be filled to within one to two inches from the top. Place the sample into an ice box with ice for delivery or shipment to the laboratory.



## Sampling for COD

### Bottles to Use



Or



Glass bottles are preferred but plastic may be used as well.

### Preservatives to Use

Analyse as soon as possible or add Sulfuric ( $H_2SO_4$ )  
to  $pH < 2$  and Cool to  $\leq 6^\circ C$

### Holding Time

28 days

### Sampling Instructions

Collect the required volume of sample for analysis. Wear gloves when handling acids and other preservatives and while collecting samples. If the bottle contains a preservative, do not rinse the bottle. If the preservatives are not included in the bottle, rinse the bottle and cap three times with sample water, fill the bottle, and then carefully add the preservatives following the instructions provided in Table 1. The bottle should be filled to within one to two inches from the top. Place the sample into an ice box with ice for delivery or shipment to the laboratory.





## Sampling for Metals

### Bottles to Use



Plastic is preferred.

### Preservative to Use

Nitric Acid ( $\text{HNO}_3$ ) to pH < 2

### Holding Times

28 days for mercury, 6 months for other metals

### Sampling Instructions

Collect the required volume of sample for analysis. Wear gloves and eye protection when handling acid and while collecting samples. If the bottle contains a preservative, do not rinse the bottle. If the preservatives are not included in the bottle, rinse the bottle and cap three times with sample water, fill the bottle, and then carefully add the preservatives following the instructions provided in Table 1. The bottle should be filled to within one to two inches from the top. Deliver or ship the samples to the laboratory.

**Note:** If samples are not acid preserved, they must be received by the laboratory within 14 days of sampling.



## Sampling for Organic Compounds

PAHs , Pesticides

### Bottles to Use



Glass bottles with glass or PTFE lined cap must be used.

### Preservatives to Use

Add 1gm ascorbic acid/l if residual chlorine present Cool to  $\leq 6$

### Holding Times

7 days until extraction, and 40 days after extraction.

### Sampling Instructions

Collect the required volume of sample for analysis. Wear gloves and eye protection when handling preservatives while collecting samples. If the bottle contains a preservative, do not rinse the bottle. If the preservatives are not included in the bottle, rinse the bottle and cap three times with sample water, fill the bottle, and then carefully add the preservatives following the instructions provided in Table 1. The bottle should be filled to within one to two inches from the top. Place the sample into a cooler with ice for delivery or shipment to the laboratory. Place the sample into an ice box with ice for immediate delivery or shipment to the laboratory.



## Sampling for Oil and Grease

### Bottles to Use



Glass bottles with glass or PTFE lined cap must be used.

### Preservatives to Use

Add HCl or H<sub>2</sub>SO<sub>4</sub> to pH < 2 Cool to ≤ 6 °C but do not freeze

### Holding Times

28 days

### Sampling Instructions

Oil and grease may be present in wastewater as a surface film, an emulsion, a solution or as a combination of these forms. Since it is very difficult to collect a representative sample for oil and grease analysis, the sampler must carefully evaluate the sampling location. The most desirable sampling location is the area of greatest mixing. The sample container should be plunged into the wastewater using a swooping motion with the mouth facing upstream. Collect the required volume of sample for analysis. Wear gloves and eye protection when handling preservatives while collecting samples. If the bottle contains a preservative, do not rinse the bottle. If the preservatives are not included in the bottle, rinse the bottle and cap three times with sample water, fill the bottle, and then carefully add the preservatives following the instructions provided in Table 1. The bottle should be filled to within one to two inches from the top. Care should be taken to ensure that the bottle does not over fill during sample collection. Place the sample into a cooler with ice for delivery or shipment to the laboratory.



## **References:**

1. *Standard Method for examination of water & Waste Water, 23<sup>rd</sup> Edition, Year 2017, published by APHA, AWWA, WEF.*
2. *Guide Manual: Water and Wastewater Analysis published by Central Pollution Control Board, Delhi.*
3. *Quick Guide To Drinking Water Sample Collection, Second edition, September 2016, published by Region 8 Laboratory 16194 W. 45th Dr. Golden, CO 80403, United States Environmental Second Edition Protection Agency.*
4. *Methods of Sampling and Test (Physical & Chemical) for Water and Waste Water, Year 1983 and revisions, published by Bureau of Indian Standards (BIS)*
5. *EPA Guidelines: Regulatory monitoring and testing Water and wastewater sampling ISBN 978-1-921125-47-8 June 2007 published by Environment Protection Authority*

**Table 1**

Determination	Container	Min sample size ml	Sample type	Preservation	Maximum Storage
Coliform, fecal and total	G	100	g	Analyze immediately or Cool, $\leq 6^{\circ}\text{C}$ do not freeze	24 hours
Fecal streptococci	G	100	g	Analyze immediately or Cool, $\leq 6^{\circ}\text{C}$ do not freeze	6 hours
Acidity	P,G(B), FP	100	g	Cool, $\leq 6^{\circ}\text{C}$	24 h
Alkalinity	P,G(B), FP	200	g	Cool, $\leq 6^{\circ}\text{C}$	24 h
BOD	P, G,FP	1000	g, c	Cool, $\leq 6^{\circ}\text{C}$	6 h
Boron	P (PTFE) or quartz	1000	g, c	$\text{HNO}_3$ to pH <2	28 d
COD	P, G, FP	100	g, c	Analyze as soon as possible, or add $\text{H}_2\text{SO}_4$ to pH <2; Cool, $\leq 6^{\circ}\text{C}$	7 d
Chloride	P, G,FP	50	g, c	None required	N.S.
Chlorine, total residual	P, G	500	g	Analyze immediately	0.25 h
Chlorine Dioxide	P, G	500	g	Analyze immediately	0.25 h
Chlorophyll	P, G	500	g	Unfiltered, dark, $\leq 6^{\circ}\text{C}$ , Filtered, dark, $-20^{\circ}\text{C}$	24-48h 28d
Color	P, G,FP	1000	g, c	Cool, $\leq 6^{\circ}\text{C}$	24-48 h
Specific conductance	P, G, FP	500	g, c	Cool, $\leq 6^{\circ}\text{C}$	28 d
Fluoride	P	100	g, c	None required	28 d
Hardness	P, G FP	100	g, c	Add $\text{HNO}_3$ or $\text{H}_2\text{SO}_4$ to pH<2	6 months
Chromium (VI)	P,G, FP	250	g	Cool, $\leq 6^{\circ}\text{C}$	24 h
Mercury	P,G, FP	500	g,c	$\text{HNO}_3$ to pH < 2	28 days
Metals, except above	P,G , FP	1000	g.c	$\text{HNO}_3$ to pH < 2	6 months
Nitrogen Ammonia	P, G, FP	500	g, c	Analyze as soon as possible or add $\text{H}_2\text{SO}_4$ to pH<2, Cool, $\leq 6^{\circ}\text{C}$	7 d
Nitrate	P, G , FP	100	g, c	Analyze as soon as possible, Cool, $\leq 6^{\circ}\text{C}$	28 h
Nitrite	P, G , FP	100	g, c	Analyze as soon as possible, Cool, $\leq 6^{\circ}\text{C}$	None
Nitrate+ Nitrite	P,G,FP	500	g, c	Cool, $\leq 6^{\circ}\text{C}$ , add $\text{H}_2\text{SO}_4$ to pH<2	1-2 d



Organic, Kjeldahl	P, G, FP	500	g, c	Cool, $\leq 6^{\circ}\text{C}$ , add $\text{H}_2\text{SO}_4$ to $\text{pH} < 2$	7 d
Oil and grease	G wide mouth	1000	g	Cool, $\leq 6^{\circ}\text{C}$ , $\text{H}_2\text{SO}_4$ to $\text{pH} < 2$	28 days
Pesticides	G, PTEF lined cap	1000	g,c	Cool, $\leq 6^{\circ}\text{C}$ , add 1 gm ascorbic acid/l if residual chlorine present	7 days until extraction ;40 days after extraction
Phenol	P, G, PTEF lined cap	1000	g,c	Cool, $\leq 6^{\circ}\text{C}$ , HCl to $\text{pH} < 2$ , add 1 gm ascorbic acid/l if residual chlorine present	14 days
Oxygen, dissolved	G, BOD bottle	300	g	Analyze immediately	Analyze immediately
pH	P, G	50	g	Analyze immediately	0.25 h
Phosphate	G (A)	100	g	For dissolved phosphate filter immediately; refrigerate	48 h
Phosphate Total	P, G, FP	100	g, c	Cool, $\leq 6^{\circ}\text{C}$ , $\text{H}_2\text{SO}_4$ to $\text{pH} < 2$	28 days
Solids	P, G	200	g, c	Cool, $\leq 6^{\circ}\text{C}$	7 d
Sulfate	P, G, FP	100	g, c	Cool, $\leq 6^{\circ}\text{C}$ . add 4 drop 2N zinc acetate/100ml; add NaOH to $\text{pH} > 9$	28 d
Turbidity	P, G, FP	100	g, c	Analyse same day; store in dark upto 24 hrs Cool, $\leq 6^{\circ}\text{C}$ .	24h

## Note:

- P = Plastic (polyethylene or equivalent);
- G = Glass;
- G(A) or P(A) = rinsed with 1 + 1  $\text{HNO}_3$ ;
- G(B) = glass, borosilicate;
- PTEF = Polytetrafluoroethylene, Teflon
- FP= Floropolymer
- G(S) = glass, rinsed with organic solvents or baked.
- g = grab; c = composite.
- Cool= storage at  $> 0^{\circ}\text{C}$ ,  $\leq 6^{\circ}\text{C}$ ; in the dark;
- analyze immediately = analyze usually within 15 min of sample collection.
- Listed preservation techniques are for guidance only if there is discrepancy between mentioned in table and method, the information in the current method takes the precedence.



## **Field Sampling Checklist (Example)**

### **a. General**

- Map of station/ locations
- Authorization (letter, etc.)
- Field notebook
- Waterproof pens, markers and pencils
- Masking tape and rubber bands
- Trip routing forms
- Field data sheet
- Graphite lubricant (not oil ) for locks and well caps
- First aid kit, knife
- Insect repellent (wash hands thoroughly after applying)
- Hat, sunscreen, drinking water
- Sunglasses or safety glasses
- Leather gloves
- Steel-toed boots, rubber boots
- Rain gear
- Toolbox with basic tools
- Tape measure
- Flashlight and extra batteries
- cellular phone with GPS
- Uniform
- Rope , Bucket
- Fire extinguisher (type B)
- Helmet or hard hat

### **b. Field Parameter Measurement Equipments**

- Stopwatch
- Calculator
- Non-mercuric thermometers
- Flow meter
- GPS
- pH meter and buffers, pH indicator strips
- Turbidity meter
- Rain gauge
- Temperature, Conductivity, Redox, Dissolved Oxygen meters, probes and batteries
- Ruler
- Copies of manufacturers manuals for field equipment
- And other Appropriate kit(s)

Note: No claim is made that this list is comprehensive. It is a suggestion for consideration and requires tailoring to individual needs.

**Field Data Sheet for Water Samples**

Name of sample:				Sample Details:								
Sampler:				Name of lab/office:				Project:				
Date:				Time:				Station code:				
Coordinate				Latitude:				Longitude:				
Source of sample:												
o Industrial waste water												
o Surface:      *River                      * Pond/Lake              *Nallah												
o GW:            *Open dug well      * Hand pump              * Tube well              * Piezometer												
Parameter	Container				Preservation				Treatment			
Gen	Glass	PVC	P E	Teflon	None	Cool	Acid	Other	None	Decant	Filter	
Bact												
BOD												
COD, NH <sub>3</sub> , TKN												
Metals												
Organics												
<b>Field determinations</b>												
Temp °C			pH			EC µmho/cm			DO mg/L			
Odour Code	(1) Odour free (2) Rotten eggs (3) Burnt sugar (4) Soapy (5) Fishy	(6) Septic (7) Aromatic (8) Chlorinous (9) Alcoholic (10)Unpleasant	Colour code	(1) Light brown (2) Brown (3) Dark brown (4) Light green (5) Green	(6) Dark green (7) Clear (8) Other (specify)							
Weather	o Sunny                      o Cloudy		o Rainy                      o Windy									
Surface Water velocity m/s	o High (> 0.5)		o Medium (0.1-0.5)		o Low (< 0.1)		o Standing					
Waste water flow												
Water use	o None		o Cultivation		o Bathing & washing		o Cattle washing					
	o Melon/vegetable farming in river bed				o reuse in industrial process			o Irrigation				
Depth	o GW					o Surface Water						
Source of pollution												
Remark /Observations												
<div style="border: 1px dashed black; width: 80%; margin: 0 auto; padding: 20px;"> <p style="text-align: center;">Site Photograph</p> </div>												



