

4.0 SAMPLING PROTOCOLS

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4.1 TABLES – CONTAINERS, PRESERVATION, HOLDING TIME

To get the best quality analytical results the correct handling of sample collection and its prompt delivery to the laboratory is crucial. The tables in this section and the protocols in the following section outline container and preservation usage. Samples should be delivered to the laboratory as soon as possible to ensure the analytical results are representative of the collection site. Two definitions you should be aware of:



HOLDING TIME - is the length of time between when the sample is collected and when the sample is analyzed or fixed (i.e. extracted out of the matrix into solvent).

TURNAROUND TIME - is the length of time it takes from the laboratory receiving the sample, to the time of issuing a result of analysis to the submitter.

In most cases, it will be critical to get the sample to the lab as soon as possible. You should always keep holding time as short as possible and submit samples promptly. Samples will be flagged in the laboratory analytical report if holding times are exceeded and the submitter will be informed.

SAMPLE PRESERVATION

Since it is difficult to know what physical, biological and chemical changes may occur during holding time, samples should be refrigerated at approximately 4°C to reduce biological activity and the rate of chemical decomposition. Chemical preservatives should be added to the sample where required to fix the analyte in question from loss or breakdown.

4.1.1 INORGANIC CHEMISTRY

Parameter	Substance	Sample Container	Preservation	Holding Time (days)+
ACIDITY, ALKALINITY	water	HDPE, 1 L++	4°C	14
AMMONIA	water	HDPE, 1 L++	4°C	5
BIOCHEMICAL OXYGEN DEMAND	water	HDPE, 1 L	4°C	3
BROMIDE, CHLORIDE, FLUORIDE, NITRATE, NITRITE, PHOSPHATE, SULPHATE, TOTAL NITROGEN	s/s/b	tissue cup, 125 mL	4°C	30
CHEMICAL OXYGEN DEMAND	water	HDPE, 250 mL	H ₂ SO ₄ < pH 2*** (at lab)	30
CHLORIDE, FLUORIDE, SULPHATE	water	HDPE, 1 L++	4°C	30
CHLORINE, RESIDUAL	water	on site test	4°C	immediately
COLOUR	water	HDPE, 1 L++	4°C	3
CONDUCTIVITY	water	HDPE, 1 L++	4°C	30
CONDUCTIVITY	s/s/b	tissue cup, 125 mL	4°C	30
CYANIDE	water	HDPE, 250 mL	field NaOH > pH 12***	14 (7 for MMER)
CYANIDE	s/s/b	tissue cup, 125 mL	4°C	30
DISSOLVED OXYGEN	water	HDPE, 1 L	none; fill to exclude air; 4°C	ASAP
HEXAVALENT CHROMIUM	water	HDPE, 250 mL	4°C	24 h
LEACHATE	water	amber glass, 1 L		7
LEACHATE	s/s/b	amber glass, 1 L		7

Parameter	Substance	Sample Container	Preservation	Holding Time (days)+
MERCURY , dissolved	water	acid washed amber glass, 100 mL	field filtered thru 0.45µ cellulose acetate filter, K ₂ Cr ₂ O ₇ & HNO ₃ pH 2*** (at lab)	30
MERCURY - total	water	amber glass, 100 mL	K ₂ Cr ₂ O ₇ & HNO ₃ < pH 2*** (at lab)	30
MERCURY - total	s/s/b	amber glass, 180 mL or tissue cup, 125 mL	4°C	30
METALS - dissolved	water	new certified clean or acid washed HDPE, 250 mL	field filtered thru 0.45µ cellulose acetate filter, HNO ₃ < pH 2 or filter & preserve at lab (source dependent)	180
METALS , total	water	new certified clean or acid washed HDPE, 250 mL	field HNO ₃ < pH 2 or at lab (source dependent)	180
METALS , total	s/s/b	tissue cup, 125 mL	4°C	180
MOISTURE	s/s/b	tissue cup, 125 mL	4°C	30
NITRATE, NITRITE, PHOSPHATE - total, dissolved, ortho	water	HDPE, 1 L++	4°C	3
NITROGEN - total, dissolved	water	HDPE, 1 L++	4°C	5
NITROGEN , total kjeldahl	water	HDPE, 1 L++	4°C	28
NON-FILTERABLE RESIDUE - total, total dissolved, suspended also known as total suspended solids	water & paper effluent;	HDPE, 1 L++	4°C	24 h pulp 7 days other
PH	water	HDPE, 1 L++	4°C	3

Parameter	Substance	Sample Container	Preservation	Holding Time (days)+
PH	s/s/b	tissue cup, 125 mL	4°C	30
RADIONUCLIDE, RADIUM - 226	water	HDPE, 1 L		30
SULPHIDE	water	HDPE, 500 mL	field ZnAc	7
SULPHIDE	s/s/b	tissue cup, 125 mL	field ZnAc	30
TURBIDITY	water	HDPE, 1 L++	4°C	3
VOLATILE RESIDUE IN SEDIMENT	s/s/b	tissue cup, 125 mL	4°C	7

4.1.2 TOXICOLOGY

Parameter Name	Sample Container	Preservation	Holding Time (days)+
DAPHNIA (chronic 21d, chronic EC25)	20 L bioassay container	4°C	5
DAPHNIA (LC ₅₀ , LT ₅₀)	2 x 1 L HDPE	4°C	5
TROUT (LC ₅₀)	4 x 20 L bioassay containers	4°C	5
TROUT (LT ₅₀)	2 x 20 L bioassay containers	4°C	5

4.1.3 ORGANIC CHEMISTRY

Parameter	Substance	Sample Container	Preservation	Holding Time (days)+
ADSORBABLE ORGANIC HALIDES	water	amber glass, 500 mL**	field HNO ₃ < pH 2***	30
ANTI-SAPSTAINS	water	amber glass, 1 L	4°C (refer to sampling protocol)	30
ANTI-SAPSTAINS	s/s/b	amber glass, 180 mL	4°C (refer to sampling protocol)	30
BEAR BILE	water	amber glass, 180 mL**	4°C	30
BEAR BILE	s/s/b	amber glass, 180 mL**	4°C	30
CARBON - total inorganic, total organic, dissolved inorganic, dissolved organic	water	HDPE, 250 mL	HCl < pH 2, 4°C	28
CARBON , total	solid	tissue cup, 125 mL	HCl < pH 2, 4°C	28
CHLORINATED PHENOLS	water	amber glass, 1 L**	4°C	30
CHLORINATED PHENOLS	s/s/b	amber glass, 180 mL**	4°C	30
DIOXIN & FURAN	s/s/b	amber glass, 180 mL**	4°C	30
DIOXIN & FURAN	water	amber glass, 1 L**	4°C	30
FATTY ACIDS	s/s/b	amber glass, 180 mL**	4°C	30
FATTY ACIDS	water	amber glass, 1 L**	4°C	30
GLYCOLS	water	amber glass, 1 L**	4°C	7
GLYCOLS	s/s/b	amber glass, 180 mL**	4°C	7
HERBICIDES (AEH)	water	amber glass, 1 L**	4°C	7
HERBICIDES (AEH)	s/s/b	amber glass, 180 mL**	4°C	30
HYDROCARBONS	water	amber glass, 1 L**	4°C	7

Parameter	Substance	Sample Container	Preservation	Holding Time (days)+
HYDROCARBONS	s/s/b	amber glass, 180 mL*/**	4°C	14
HYDROCARBON IDENTIFICATION	water	amber glass, 1 L**	4°C	7
HYDROCARBON IDENTIFICATION	s/s/b	amber glass, 1 L**	4°C	7
HYDROCARBON, OIL & GREASE	water	amber glass, 1 L**	HCl < pH 2*** (at lab)	30
HYDROCARBON, OIL & GREASE	s/s/b	amber glass, 180 mL**	4°C	30
OZONE-DEPLETING SUBSTANCES	container	2 cans of product	4°C	7
PCBS	water	amber glass, 1 L**	4°C	30
PCBS	s/s/b	amber glass, 180 mL**	4°C	30
PESTICIDES	water	amber glass, 1 L**	4°C	7
PESTICIDES	s/s/b	amber glass, 180 mL**	4°C	30
POLYCYCLIC AROMATIC HYDROCARBONS	water	amber glass, 1 L**	4°C	7
POLYCYCLIC AROMATIC HYDROCARBONS	s/s/b	amber glass, 180 mL**	4°C	30
RESIN ACIDS	water	amber glass, 1 L**	NaOH > pH 12*** (at lab)	30
RESIN ACIDS	s/s/b	amber glass, 180 mL**	4°C	30
SUBSTITUTED PHENOLS	water	amber glass, 1 L**	4°C	14
SURFACTANTS	water	amber glass, 1 L**	4°C	30
TRIALOMETHANE	water	2 x amber glass, 40mL septum vials*	4°C	14
TRIALOMETHANE	s/s/b	amber glass, 180 mL*/**	4°C	30
VOLATILES	water	2 x amber glass, 40mL septum vials*	4°C	7
VOLATILES	s/s/b	amber glass, 180 mL*/**	4°C	14

4.1.4 BACTERIAL SAMPLING

Parameter	Sample Container	Preservation	Holding Time (days)+
FECAL COLIFORM	aseptic 250 mL container	4°C; for chlorinated samples add sodium thiosulphate	6 hours max

BOTTLE DEFINITIONS

HDPE HIGH DENSITY POLYETHYLENE BOTTLE

AMBER GLASS HEAT TREATED AMBER GLASS BOTTLE

S/S/B SOIL/SEDIMENT/BIOTA *NO HEADSPACE/AIR BUBBLES IN CONTAINER

**Containers must have Teflon lined cap

***Corrosive – wear protective gloves

+Holding time is from sampling to start of analysis (or fixed)

++Only one HDPE, 1 L bottle is required for all analysis

4.1.5 TEST SELECTION BY INDUSTRY TYPE

Depending on the situation, toxicology testing could be requested for any of these industry types.

AGRICULTURAL RUNOFFS

Herbicides, NO₂₊₃, Pesticides, Phosphorous, pH

CHEMICALS & PLASTIC

Metals

COAL MINES

NFR, PAHs

CONTAMINATED SITES

BTEX, EPH, VH/VPH, Metals, PAHs

DUST SUPPRESSION OILS

PCBs

FISH FARMS

Available Phosphorous, H₂S (field), Redox (field), Sediment Grain Size, Temperature (field), Total Metals, TVR

FISH HATCHERIES

Ammonia, NFR, Total Phosphorous

FOOD PROCESSING

Ammonia

GROUNDWATER

Bromide, Chloride, Fluoride, Metals, NO₂₊₃, Pesticides, pH, Turbidity

HAZARDOUS WASTE

Metals, PCBs, Pesticides

INDUSTRIAL EFFLUENT

Acidity, Alkalinity, Ammonia, Bacteria (Total/Fecal Coli), Bioassays, (Trout/Daphnia LC₅₀ & LT₅₀), BOD, Bromide, COD, Chloride, Fluoride, Metals, NFR, NO₂₊₃, TOC, Turbidity

LANDFILL LEACHATES

Mercury, NO₂₊₃, pH

LAUNDROMATS

Ammonia, Phosphorous, pH, PERC

MEAT & POULTRY

Oils & Grease, pH

MINING & METAL FINISHING EFFLUENTS

Ammonia, Cyanide, Mercury, Metals, NFR, PAHs, pH, Sulphides

MUNICIPAL EFFLUENTS

Ammonia, Bacteria (TC, FC, Strep.), BOD, Bioassay (Daphnia and Trout), COD, Conductance, Metals NO₂₊₃, Ortho-P, pH, TOC, Total-P, Turbidity

PETROLEUM PRODUCTS (REFINERY)

VH/VPH for gasolines, mineral spirits, paint thinners

EPH for diesel fuels, lubricating oils & grease, hydraulic oils

BTEX, Oil & Grease, TOC, Metals, Sulphides, Turbidity, NFR, pH, Phenols

NOTE: Test for EPH in conjunction with VH to capture the quantitative values of most petroleum products. Let lab know if need to distinguish between naturally occurring vs. petroleum HC's

PULP AND PAPER

Ammonia, BOD, Dioxin/Furans, LC50/LT50 Fish & Daphnia, Metals, NFR, pH, Resin Acids

SMELTERS

Mercury, Metals, NO₂₊₃

SURFACE WATER

Acidity, Alkalinity, Bacteria (enterococcus, E. coli, total/fecal coli), Chloride, Fluoride, NFR, Ortho-P, pH, TIC, Total-P, Turbidity

TRANSFORMERS, CAPACITOR

PCBs

WASTE OILS

EPH, Oil & Grease, PCBs, SWOG

WOOD CHIPS

Chlorinated Phenols

WOOD PRESERVING FACILITIES

Antisapstains (DDAC, IPBC, Cu-8, TCMTB), Chlorinated Phenols (penta, tetra, tri, di-chlorophenols, guaiacols, catechols), PAHs