

**BC MOE SAMPLE PRESERVATION & HOLDING TIME REQUIREMENTS<sup>(1,2)</sup> Version: 10-Feb-2011**

Parameter Name	Sample Container	Storage Temp <sup>(3)</sup>	Preservation	Holding Time <sup>(4)</sup> (days)	References
<b>Water</b>					
<b>Physical &amp; Aggregate Properties</b>					
Acidity	Plastic, Glass	≤6°C	none	14	APHA
Alkalinity	Plastic, Glass	≤6°C	none	14	APHA
Colour	Plastic, Glass	≤6°C	none	3	APHA / BC MOE
pH	Plastic, Glass	≤6°C	none	15 minutes	APHA
Solids (Total, TSS, DSS)	Plastic, Glass	≤6°C	none	7	APHA
Conductivity	Plastic, Glass	≤6°C	none	28	APHA
Turbidity	Plastic, Glass	≤6°C	store in dark	3	APHA / BC MOE
<b>Inorganic Non-metals</b>					
Bromide	Plastic, Glass	no requirement	none	28	EPA 300.1
Chloride	Plastic, Glass	no requirement	none	28	APHA / EPA 300.1
Chlorate, Bromate	Plastic, Glass	≤6°C	50 mg/L EDA	28	EPA 317.0
Chlorine, Total Residual (Free Chlorine)	Plastic, Glass	none	none	15 minutes	APHA
Chlorite	Plastic, Amber Glass	≤6°C	50 mg/L EDA	14	EPA 317.0
Cyanide (SAD, WAD)	Plastic, Glass	≤6°C	field NaOH, store in dark	14	APHA
Dissolved Oxygen (Winkler Method)	Glass BOD bottle	≤6°C	Winkler kit, store in dark	1	APHA
Fluoride	Plastic	no requirement	none	8 hours	APHA
Nitrogen, Nitrate + Nitrite	Plastic, Glass	≤6°C	H2SO4	28	APHA
Nitrogen, Ammonia	Plastic, Glass	≤6°C	none	3	BC MOE
			H2SO4	28	APHA
Nitrogen, Nitrate	Plastic, Glass	≤6°C, do not freeze	none	3	BC MOE
Nitrogen, Nitrite	Plastic, Glass	≤6°C, do not freeze	none	3	APHA / BC MOE
Nitrogen, Total Kjeldahl	Plastic, Glass	≤6°C	H2SO4	28	APHA
			none	3	BC MOE
Nitrogen, Total, Persulfate Method	Plastic, Glass	≤6°C	H2SO4	28	APHA
			none	3	BC MOE
Nitrogen, Total, Combustion Method	Plastic, Glass	≤6°C	HCl	28	APHA
			none	3	BC MOE
Phosphorus, Dissolved (Orthophosphate)	Plastic, Glass	≤6°C	Filter (field or lab)	3	APHA / BC MOE
Phosphorus, Total Reactive (Orthophosphate)	Plastic, Glass	≤6°C	none	3	APHA / BC MOE
Phosphorus, Total Dissolved	Plastic, Glass	≤6°C	Filter, H2SO4	28	APHA
			none	3	BC MOE
Phosphorus, Total	Plastic, Glass	≤6°C	H2SO4	28	APHA
			none	3	BC MOE
Silica, Reactive	Plastic	≤6°C, do not freeze	none	28	APHA
Sulfate	Plastic, Glass	≤6°C	none	28	APHA / SW846 Ch3 2007
Sulfide	Plastic, Glass	≤6°C	ZnAc / NaOH to pH >9	7	APHA
<b>Metals</b>					
Hexavalent Chromium	Plastic, Glass	≤6°C	1 mL 50% NaOH per 125 mL	30	EPA 1669
			none	1	APHA
Metals, Total	Plastic, Glass	no requirement	HNO3, field or lab (7)	180	APHA / EPA 200.2
Metals, Dissolved	Plastic, Glass	no requirement	field filter 0.45 um, HNO3 or lab filter & qualify (7)	180	APHA
Mercury, Total	Plastic, Glass	no requirement	HNO3, field or lab (7)	28	APHA
Mercury, Dissolved	Plastic, Glass	no requirement	field filter 0.45 um, HNO3, or lab filter & qualify (7)	28	APHA
<b>Aggregate Organics</b>					
Adsorbable Organic Halides (AOX)	Amber Glass	≤6°C	HNO3, store in dark, sodium sulfite if chlorinated, collect with no headspace	14	APHA 5320 1997
Biochemical Oxygen Demand (BOD)	Plastic, Glass	≤6°C, do not freeze	none	3	APHA / BC MOE
Carbonaceous Biochemical Oxygen Demand (CBOD)	Plastic, Glass	≤6°C, do not freeze	none	3	APHA / BC MOE
Carbon, Dissolved Organic	Plastic, Glass	≤6°C	Filter, H2SO4 or HCl	28	APHA
			none	3	BC MOE
Carbon, Dissolved Inorganic	Plastic, Glass	≤6°C	Field Filter	14	APHA (alkalinity)
Carbon, Total Organic	Plastic, Glass	≤6°C	H2SO4 or HCl	28	APHA
Carbon, Total Inorganic	Plastic, Glass	≤6°C	none	14	APHA (alkalinity)
Chemical Oxygen Demand (COD)	Plastic, Glass	≤6°C	H2SO4 (field or lab)	28	APHA
			none	3	BC MOE
Chlorophyll "A"	Filter	Filters: freeze	field filter, store in dark	Filters: 28	APHA
Phaeophytin	Filter	Filters: freeze	field filter, store in dark	Filters: 28	APHA
Surfactants (Methylene Blue Active Substances)	Plastic, Glass	≤6°C	none	3	APHA / BC MOE
Total Phenols (4AAP)	Plastic, Glass	≤6°C	H2SO4	28	APHA
<b>Extractable Hydrocarbons</b>					
Extractable Hydrocarbons (LEPH, HEPH, EPH)	Amber Glass	≤6°C	HCl, H2SO4 or Sodium Bisulfate	14 / 40	EPA 3511
			none	7 / 40	SW846 Ch4 2007
Oil and Grease / Mineral Oil and Grease	Amber Glass	≤6°C	HCl or H2SO4	28	EPA 40CFR 2007
Waste Oil Content	Amber Glass	≤6°C	none	28	BC MOE
<b>Individual Organic Compounds</b>					
Carbamate Pesticides	Amber Glass	≤6°C	Potassium Dihydrogen Citrate (solid), ~pH 3.8, 9.2-9.5 g/L, + 100 mg/L Na2S2O3 if chlorinated	28	EPA 531.2, APHA 6610B 2004
			ChlorAC buffer, ~pH 3, 1.8mL / 60 mL sample, + 100 mg/L Na2S2O3 if chlorinated	28	EPA 531.1
Chlorinated and Non-chlorinated Phenolics	Amber Glass	≤6°C	0.5g Ascorbic Acid / L + (H2SO4 or Sodium Bisulfate)	14 / 40	Alberta Env AE130
			none	7 / 40	SW846 Ch4 2007
Dioxins / Furans	Amber Glass	≤6°C	none	unlimited	SW846 Ch4 2007
Glyphosate / AMPA	Amber Glass or Polypropylene	≤6°C	100 mg/L Na2S2O3 if chlorinated	14	APHA 6651B 2000
Halogenated Hydrocarbons (Semi-Volatile)	Amber Glass	≤6°C	100 mg/L Na2S2O3 if chlorinated	7 / 40	SW846 Ch4 2007
Herbicides, Acid Extractable	Amber Glass	≤6°C	HCl (optional), store in dark, 50 mg/L Na2SO3 if chlorinated	14 / 21	APHA 6640A 2001 APHA 6640A 1994
Paraquat / Diquat	Amber Plastic (protect from light)	≤6°C	100 mg/L Na2S2O3 if chlorinated	7 / 21	EPA 549.2

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Parameter Name	Sample Container	Storage Temp <sup>(3)</sup>	Preservation	Holding Time <sup>(4)</sup> (days)	References
<b>Water</b>					
Pesticides (NP, OP, OC)	Amber Glass	≤6°C	none	7 / 40	SW846 Ch4 2007
Polychlorinated Biphenyls (PCBs)	Amber Glass	≤6°C	none	unlimited	SW846 Ch4 2007
Polycyclic Aromatic Hydrocarbons (PAHs)	Amber Glass	≤6°C	HCl, H2SO4, or Sodium Bisulfate	14 / 40	EPA 3511
			none	7 / 40	SW846 Ch4 2007
Resin Acids, Fatty Acids	Amber Glass	≤6°C	(0.5g Ascorbic Acid + 0.4g NaOH) / L	14 / 40	Alberta Env AE129
			none	7 / 40	SW846 Ch4 2007
Volatile Organic Compounds (Trihalomethanes)	43mL Glass VOC Vials (2-3)	≤6°C	3 mg Na2S2O3 (see BC Lab Manual method for more details)	14	BC MOE
Volatile Organic Compounds (VOC, BTEX, VH)	43mL Glass VOC Vials (2-3)	≤6°C	200 mg NaHSO4, or 3 mg Na2S2O3 if chlorinated (see BC Lab Manual method for other options and details)	14	BC MOE

<b>Microbiological Parameters</b>					
Coliforms, Total, Fecal, and Ecoli	Sterile Glass or Plastic	<8°C, do not freeze	Na2S2O3	30 hours <sup>(5)</sup>	BC CDC / APHA 9060B 2006
Cryptosporidium, Giardia	Sterile Glass or Plastic	<8°C, do not freeze	Na2S2O3	96 hours	EPA 1623 / APHA 9060B 2006
Enterococcus	Sterile Glass or Plastic	<8°C, do not freeze	Na2S2O3	30 hours <sup>(5)</sup>	APHA 9060B 2006
Heterotrophic Plate Count	Sterile Glass or Plastic	<8°C, do not freeze	Na2S2O3	24 hours	APHA 9215 2004

<b>Toxicity</b>					
Daphnia, Chronic 21day / Chronic EC25	Plastic, Glass (non-toxic)	4±2°C	collect with no headspace	5	EC EPS 1/RM/14 & 11
Daphnia, LC50 / LT50	Plastic, Glass (non-toxic)	4±2°C	collect with no headspace	5	EC EPS 1/RM/14 & 11
Microtox	Plastic, Glass (non-toxic)	4±2°C	collect with no headspace	3	EC EPS 1/RM/24
Trout, LC50	Plastic, Glass (non-toxic)	4±2°C	collect with no headspace	5	EC EPS 1/RM/13 & 9
Trout, LT50	Plastic, Glass (non-toxic)	4±2°C	collect with no headspace	5	EC EPS 1/RM/13 & 9

**Soil and Sediment**

<b>Inorganics</b>					
Bromide / Chloride / Fluoride	Plastic, Glass	≤6°C	none	unlimited	Carter (Table 4.1)
Cyanide (WAD / SAD)	Plastic, Glass	≤6°C	store in dark, field moist	14	SW846 Ch3 2007
Hexavalent Chromium	Plastic, Glass	≤6°C	store field moist	30 / 7	SW846 Ch3 2007 / EPA 3060A
Metals, Total	Plastic, Glass	no requirement	none	180	SW846 Ch3 2007
Mercury, Total	Plastic, Glass	no requirement	none	28	SW846 Ch3 2007
Moisture	Plastic, Glass	≤6°C	none	14	Puget Sound Protocols
pH	Plastic, Glass	≤6°C	none	365	Carter
Sulfide	Plastic, Glass	≤6°C	store field moist	7	Puget Sound Protocols
TCLP - Mercury	Plastic, Glass	no requirement	none	28 / 28	EPA 1311
TCLP - Metals	Plastic, Glass	no requirement	none	180 / 180	EPA 1311

<b>Organics</b>					
Carbons (TC, TOC)	Plastic, Glass	≤6°C	none	28	SW846 Ch4 2007
	Plastic, Glass	no requirement	dried state	unlimited	Carter (Table 4.1)
Chlorinated and Non-chlorinated phenolics	Glass	≤6°C	none	14 / 40	SW846 Ch4 2007
Dioxins / Furans	Glass	≤6°C	none	unlimited	SW846 Ch4 2007
Extractable Hydrocarbons (LEPH, HEPH, EPH)	Glass	≤6°C	none	14 / 40	SW846 Ch4 2007
Glycols	Glass	≤6°C	none	14 / 40	SW846 Ch4 2007
Herbicides, Acid Extractable	Glass	≤6°C	none	14 / 40	SW846 Ch4 2007
Oil and Grease / Mineral Oil and Grease / Waste Oil Content	Glass	≤6°C	none	28	SW846 Ch3 2007, Puget Sound Protocols
Pesticides (NP, OP, OC)	Glass	≤6°C	none	14 / 40	SW846 Ch4 2007
Polychlorinated Biphenyls (PCBs)	Glass	≤6°C	none	unlimited	SW846 Ch4 2007
Polycyclic Aromatic Hydrocarbons (PAHs)	Glass	≤6°C	none	14 / 40	SW846 Ch4 2007
Resin Acids, Fatty Acids	Glass	≤6°C	none	14 / 40	SW846 Ch4 2007
TCLP - Volatile Organic Compounds	Glass	≤6°C	none	14 / 14	EPA 1311
TCLP - Semi-Volatile Organic Compounds	Glass	≤6°C	none	14 / 40	EPA 1311
Volatile Organic Compounds (VOC, BTEX, VH, THM)	Glass	≤6°C	none	7 <sup>(6)</sup> / 40	CCME / BC MOE

**Biota**

<b>Inorganics</b>					
Metals, Total	Plastic, Glass	freeze (≤ -18C)	none	2 years	Puget Sound Protocols
Mercury, Total	Plastic, Glass	freeze (≤ -18C)	none	180	NOAA 131.01

  

<b>Organics</b>					
Semi-Volatile Organic Compounds	Glass, Teflon	freeze (≤ -18C)	none	365 / 40	Puget Sound Protocols
Volatile Organic Compounds	Glass, Teflon	freeze (≤ -18C)	none	14	Puget Sound Protocols

**Air (Vapours)**

VOCs by Canister Sampling	SS canister	ambient	none	30	EPA TO15
VOCs by Thermal Desorption	thermal desorption tube	≤6°C	none	30	EPA TO17
VOCs and other Volatile Substances by Charcoal and Miscellaneous Collection Media	see BC Lab Manual Method	≤6°C (or as specified by applicable reference method)	none	30	see BC Lab Manual Method

<sup>1</sup> A Director or an Environmental Management Act permit may specify alternate requirements.  
<sup>2</sup> Refer to applicable BC Environmental Laboratory Manual methods for additional detail. Where differences exist between Lab Manual methods and this table, this table takes precedence.  
<sup>3</sup> Storage temperature applies to storage at the laboratory. For all tests where refrigeration at ≤6°C is required at the laboratory, samples should be packed with ice or cold packs to maintain a temperature of ≤10°C during transport to the laboratory. The storage of ≤8°C for microbiological samples applies during storage at the laboratory and during transport to the laboratory. To prevent breakage, water samples stored in glass should not be frozen. Except where indicated by "do not freeze", test results need not be qualified for frozen samples.  
<sup>4</sup> Hold Times: Single values refer to hold time from sampling to analysis. Where 2 values are separated by a "/", the first is hold time from sampling to extraction, and the second is hold time from extraction to analysis.  
<sup>5</sup> Samples received from remote locations more than 48 hours after collection must not be tested.  
<sup>6</sup> Methanol extraction or freezing must be initiated within 48 hours of arrival at lab, to a maximum of 7 days from sample collection. Alternatively, samples may be frozen the field if extracted within 14 days of sampling, or may be methanol extracted in the field.  
<sup>7</sup> If not field preserved, water samples for metals analysis must be acidified at the lab in their original containers (within 14 days of sampling), then must equilibrate at least 16 hours prior to sub-sampling or analysis. This approach can also be applied to dissolved metals, but only if field filtered.

## BC MOE SAMPLE PRESERVATION & HOLDING TIME REQUIREMENTS

### List of References:

Alberta Env AE129	Resin and Fatty Acids in Pulp Mill Effluents and Receiving Waters, Method AE129.0, Alberta Environment, August 1990.
Alberta Env AE130	Chlorinated Phenolic Compounds in Bleached Kraft Mill Effluents and Receiving Waters, Method AE130.0, Alberta Environment, April 1991.
APHA	Standard Methods for the Examination of Water and Wastewater, American Public Health Association (APHA), the American Water Works Association (AWWA), and the Water Environment Federation (WEF). Primary reference is Section 1060, Collection and Preservation of Samples, Table 1060:I, Summary of Special Sampling and Handling Requirements, 20th Edition.
APHA 5320 1997	Dissolved Organic Halogen, Method 5320, APHA Standard Methods, 1997.
APHA 6610B 2004	Carbamate Pesticides, Method 6610B, High Performance Liquid Chromatography Method, APHA Standard Methods, 2004.
APHA 6640A 1994	Acidic Herbicide Compounds, Method 6640A, Introduction, APHA Standard Methods, 2001 (HCl preservation, 14 day hold time).
APHA 6640A 2001	Acidic Herbicide Compounds, Method 6640A, Introduction, APHA Standard Methods, 2001 (no HCl preservation, but recommends extraction as soon as possible, up to 14 days, cautions about potential analyte degradation).
APHA 6651B 2000	Glyphosate Herbicide, Method 6651B, Liquid Chromatographic Post-Column Fluorescence Method, APHA Standard Methods, 2000.
APHA 9060B 2006	Microbiological Examination Section, Samples, Method 9060B, Preservation and Storage, APHA Standard Methods, 2006.
APHA 9215 2004	Heterotrophic Plate Count, Method 9215, APHA Standard Methods, 2004.
BC CDC	British Columbia Centre for Disease Control
BC MOE	British Columbia Ministry of Environment (British Columbia Environmental Laboratory Manual)
Carter	Carter, Martin R. and Gregorich, E. G., Soil Sampling and Methods of Analysis, Canadian Society of Soil Science, 2008.
CCME	Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil - Tier 1 Method, ISBN 1-896997-01-5, Publication No. 1310, Canadian Council of Ministers of the Environment Inc., 2001.
EC EPS 1/RM/24	Biological Test Method: Toxicity Test Using Luminescent Bacteria, Environment Canada, Report EPS 1/RM/24, November 1992.
EC EPS 1/RM/11	Biological Test Method: Acute Lethality Test Using Daphnia spp., Environment Canada, Report EPS 1/RM/11, July 1990 (with May 1996 amendments).
EC EPS 1/RM/14	Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Daphnia magna, Environment Canada, Report EPS 1/RM/14 second edition, December 2000.
EC EPS 1/RM/13	Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout, Environment Canada, Report EPS 1/RM/13, second edition, December 2000 (with May 2007 amendments).
EC EPS 1/RM/9	Biological Test Method: Acute Lethality Test Using Rainbow Trout, Environment Canada, Report EPS 1/RM/9, July 1990 (with May 1996 and May 2007 amendments).
EPA	United States Environmental Protection Agency
EPA 1311	Toxicity Characteristic Leaching Procedure, SW 846 Method 1311, Revision 0, US EPA Office of Solid Waste, July 1992.
EPA 1669	Sampling Ambient Water for Trace Metals at EPA Water Quality Criteria Levels, Method 1669, US EPA Office of Water, July 1996.
EPA 200.2	Sample Preparation Procedure for Spectrochemical Determination of Total Recoverable Elements, Method 200.2, Revision 2.8, US EPA Office of Research and Development, 1994.
EPA 300.1	Determination of Inorganic Anions in Drinking Water by Ion Chromatography, Revision 1.0, US EPA Office of Research and Development, 1997.
EPA 3060A	Alkaline Digestion for Hexavalent Chromium, SW846 Method 3060A, Revision 1, US EPA Office of Solid Waste, December 1996.
EPA 317.0	Determination of Inorganic Oxyhalide Disinfection By-Products in Drinking Water Using Ion Chromatography with the Addition of a Postcolumn Reagent for Trace Bromate Analysis, Revision 2.0, US EPA Office of Research and Development, July 2001.
EPA 3511	Organic Compounds in Water by MicroExtraction, SW 846 Method 3511, Revision 0, US EPA Office of Solid Waste, November 2002.
EPA 40CFR 2007	Guidelines Establishing Test Procedures for the Analysis of Pollutants Under the Clean Water Act; National Primary Drinking Water Regulations; and National Secondary Drinking Water Regulations; Analysis and Sampling Procedures, 40 CFR Parts 122, 136, 141, 143, 430, 455, and 465, Table II - Required Containers, Preservation Techniques, and Holding Times, US EPA Office of Water, March 2007.
EPA 531.1	Measurement of N-MethylCarbamoyloximes and N-MethylCarbamates in Water by Direct Aqueous Injection HPLC with PostColumn Derivatization, Revision 3.1, US EPA Office of Ground Water and Drinking Water, 1995.
EPA 531.2	Measurement of N-MethylCarbamoyloximes and N-MethylCarbamates in Water by Direct Aqueous Injection HPLC with PostColumn Derivatization, Revision 1.0, US EPA Office of Ground Water and Drinking Water, September 2001.
EPA 549.2	Determination of Diquat and Paraquat in Drinking Water by Liquid-Solid Extraction and High Performance Liquid Chromatography with Ultraviolet Detection, Method 549.2, Revision 1.0, US EPA Office of Research and Development, June 1997.
EPA TO15	Determination Of Volatile Organic Compounds (VOCs) In Air Collected In Specially-Prepared Canisters And Analyzed By Gas Chromatography/Mass Spectrometry (GC/MS), Compendium Method TO-15, Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air, Second Edition, US EPA Office of Research and Development, January 1999.
EPA TO17	Determination of Volatile Organic Compounds in Ambient Air Using Active Sampling Onto Sorbent Tubes, Compendium Method TO-17, Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air, Second Edition, US EPA Office of Research and Development, January 1999.
NOAA 131.01	Cold vapor atomic absorption analysis of marine animal tissue for trace metals, Sampling and Analytical Methods of the National Status and Trends Program Mussel Watch Project: 1993-1996 Update, Method 131.01, NOAA Technical Memorandum NOS ORCA 130, March 1998.
Puget Sound Protocols	Recommended Protocols for Measuring Selected Environmental Variables in Puget Sound, Puget Sound Water Quality Action Team, prepared for U.S. Environmental Protection Agency (Region 10) and U.S. Army Corps of Engineers, July 1996.
SW846 Ch3 2007	Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW846, Final Update IV, Chapter 3, Inorganic Analytes, Revision 4, US EPA Office of Solid Waste, February 2007.
SW846 Ch4 2007	Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW846, Final Update IV, Chapter 4, Organic Analytes, Revision 4, US EPA Office of Solid Waste, February 2007.