

SAMPLING PROCEDURES AND REQUIREMENTS

ONTARIO REGULATION 153/04 AS AMENDED BY
O. REG. 511/09, RECORD OF SITE CONDITION



INORGANIC

Parameter	Container Type ¹	Preserved Holding Time ³	Unpreserved Holding Time ³	Storage Temperature ²	Field
Chloride, electrical conductivity	glass, HDPE or PET	N/A	30 days as received (without lab drying); indefinite when dried at the lab	5 + 3 °C	None
Cyanide (CN ⁻)	glass wide-mouth jar, Teflon™ lined lid	N/A	14 days	5 + 3 °C	Protect from light
Fraction organic carbon (FOC)	glass jar, Teflon™ lined lid	N/A	28 days as received (without lab drying); indefinite storage time when dried	5 + 3 °C	None
Hexavalent chromium	glass, HDPE	N/A	30 days as received	5 + 3 °C	None
Metals (includes hydride-forming metals, SAR, HWS boron, calcium, magnesium, sodium)	glass, HDPE ⁴	N/A	180 days as received (without lab drying); indefinite when dried at the lab	5 + 3 °C	None
Mercury, methyl mercury	glass, HDPE or PET	N/A	28 days	5 + 3 °C	None
pH	glass, HDPE or PET	N/A	30 days as received	5 + 3 °C	None

ORGANIC

Parameter	Container Type ^{1,5,6,7}	Preserved Holding Time ³	Unpreserved Holding Time ³	Storage Temperature ²	Field Preservation
VOC ⁷ , THM, BTEX ⁸ , PHCs (F1) ⁸	40–60 mL glass vial (charged with methanol preservative, pre-weighed) ⁶ AND glass jar (for moisture content) [hermetic samplers are an acceptable alternative ^{5, 18}]	14 days	hermetic samples: stabilize with methanol preservative within 48 hours of sampling ¹⁸	5 + 3 °C	Methanol (aqueous NaHSO ₄ is an acceptable alternative for bromomethane) ^{6,7,18}
1,4-Dioxane ^{9, 15}	When processed as a VOC sample: same as per VOCs above; When processed as an extractable: same as per ABNs below; (consult laboratory) ^{9, 15, 18}	14 days	When processed as a VOC sample: same as per VOCs above; When processed as an extractable: same as per ABNs below; (consult laboratory) ¹⁸	5 + 3 °C	N/A
PHCs (F2–F4)	glass wide-mouth jar, Teflon™ lined lid	N/A	14 days	5 + 3 °C	None
ABNs, PAHs, CPs, OCs	glass wide-mouth jar, Teflon™ lined lid	N/A	60 days	5 + 3 °C	None
Dioxins and furans, PCBs	glass wide-mouth jar Teflon™ lined lid	N/A	Indefinite storage time	5 + 3 °C	None

BTEX = benzene, toluene, ethylbenzene, xylenes
PHCs = petroleum hydrocarbons
CPs = chlorophenols
PCBs = polychlorinated biphenyls

OCs = organochlorine pesticides
HDPE = high density polyethylene
PET = polyethylene terephthalate
HWS = hot water soluble boron

THM = trihalomethanes
VOC = volatile organic compounds

1-18 footnotes immediately follow Table B



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WATER

INORGANIC

Parameter	Container Type ¹	Preserved Holding Time ³	Unpreserved Holding Time ³	Storage Temperature ²	Field
Chloride, electrical conductivity, pH	HDPE or glass	N/A	28 days	5 + 3 °C	None
Cyanide (CN ⁻)	HDPE or glass	14 days	Must be field preserved	5 + 3 °C	NaOH to a pH > 12
Hexavalent chromium	HDPE or glass	28 days ¹⁷	24 hours ¹⁷	5 + 3 °C	Field filter followed by buffer solution to a pH 9.3–9.7 ¹⁷
Metals (includes hydride-forming metals, calcium, magnesium, sodium)	HDPE or glass ^{4,10}	60 days	Must be field preserved	5 + 3 °C	Field filter followed by HNO ₃ to pH < 2 ¹¹
Mercury	HDPE or glass ^{4,10}	28 days	Must be field preserved	5 + 3 °C	Field filter followed by HCl to pH < 2 ¹¹
Methyl mercury	glass or Teflon™	28 days	DO NOT FILTER must be field preserved ¹²	5 + 3 °C	DO NOT FILTER HCl or H ₂ SO ₄ to pH < 2 ¹²

ORGANIC

Parameter	Container Type ^{1,5,6,7}	Preserved Holding Time ³	Unpreserved Holding Time ³	Storage Temperature ²	Field Preservation
THM, VOC, BTEX, PHCs (F1);	40–60 mL glass vials (minimum of 2) ¹⁴ (no headspace)	14 days	7 days	5 + 3 °C	NaHSO ₄ or HCl to a pH < 2 ¹⁶
1,4-Dioxane ^{9, 15}	When processed as a VOC sample: same as per VOCs above When processed as an extractable: same as per ABNs below; (consult laboratory) ^{9, 15}	14 days	14 days	5 + 3 °C	N/A
PHCs (F2–F4)	1L amber glass bottle, Teflon™ lined lid	14 days	7 days	5 + 3 °C	NaHSO ₄ or HCl to a pH < 2 ¹⁶
ABNs, PAHs, cCPs, PCBs, OCs	1L amber glass bottle, Teflon™ lined lid	N/A	14 days	5 + 3 °C	None
Dioxins and furans	1L amber glass bottle, Teflon™ lined lid	N/A	Indefinite storage time	5 + 3 °C	None

HDPE = high density polyethylene
THM = trihalomethanes
VOC = volatile organic compounds

BTEX = benzene, toluene, ethylbenzene, xylenes
PHCs = petroleum hydrocarbons
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Footnotes

¹ One soil container is generally sufficient for inorganic analysis and another for extractable organics. A separate container is required for THM, VOC and F1 moisture analysis.

² Storage temperature refers to storage at the laboratory. Samples should be cooled and transported as soon as possible after collection.

³ Holding time refers to the time delay between time of sample collection and time analysis/ stabilization is initiated.

⁴ PET cannot be used for samples requiring antimony analysis.

⁵ As an alternative, the USEPA has investigated hermetic sample devices that take and seal a single core sample. The sampler is submitted as is to the laboratory where it is extruded into an extracting solvent. Samples must be received at the laboratory within 48 hours of sampling. This technique minimizes volatilization losses and is worth consideration for critical sites. (Note that replicate samples are necessary for bisulphate and methanol extraction for all samples plus laboratory duplicates and spikes.) Consult the laboratory for the number of samplers required.

⁶ The USEPA has also approved field preservation. Pre-weighed vials containing known weights of methanol preservative (or aqueous sodium bisulphate if used for bromomethane) are sent to the field. Sample cores (approximately 5 g) are extruded directly into the vial. The vials are sealed, and submitted directly to the laboratory. In practice, this technique requires great care to implement successfully. Losses due to leaking vials or through splashing. Consult the laboratory for the number of containers required.

⁷ Methanol-preserved samples may elevate the detection limit for bromomethane (VOC); a separate bisulphate-preserved sample or hermetically sealed sample should be submitted at the time of sampling if bromomethane is a chemical of concern –contact the laboratory to determine if a separate sample should be collected.

⁸ For BTEX and PHC (F1) pre-charging the soil sampling container with methanol preservative is an accepted deviation from the CCME method.

⁹ 1,4-Dioxane may be analyzed with the ABNs or VOCs; sample container requirements used for ABNs or VOCs are both acceptable. If 1,4-dioxane is to be analyzed with ABNs, follow the ABN sample container requirements; similarly if it is to be analyzed with VOCs, follow VOC

sample container requirements. Consult the laboratory for the container type and the total number required (see also footnote #15).

¹⁰ Samples containing visual sediment at the time of analysis should be documented and noted on the Certificate of Analysis or written report as results may be biased high due to the inclusion of sediment in the extraction.

¹¹ Field filter with 0.45µm immediately prior to adding preservative or filling pre-charged container.

¹² Sample directly into a HCl or H₂SO₄ preserved container, or add acid to an unfiltered sample immediately after sample collection in the field.

¹³ Aqueous organic samples should be protected from light. If amber bottles are not available, glass should be wrapped in foil.

¹⁴ Separate containers are required for each organic water analysis. Consult the laboratory for required volumes. Chloride and electrical conductivity can be taken from the same container.

¹⁵ For 1,4-dioxane in soil and sediment, no preservative is required if processed as an ABN, however. Methanol is an acceptable alternative if processed as a VOC. For 1,4-dioxane in groundwater, no preservative is required, however, NaHSO₄ or HCl are acceptable alternatives.

¹⁶ Preserved to reduce biodegradation, however effervescence/degassing may occur in some ground water samples. In this case, rinse preservative out three times with sample and submit to the laboratory as unpreserved.

¹⁷ To achieve the 28-day holding time, use the ammonium sulfate buffer solution [i.e., (NH₄)₂SO₄/NH₄OH] or (NH₄)₂SO₄/NH₄OH/NaOH + NaOH] as specified in EPA Method 218.6 (revision 3.3, 1994) or Standards Method 3500-Cr Chromium (2009). Using only NaOH without the ammonium sulfate buffer to adjust the pH would require analysis within 24 hours of sampling.

¹⁸ Alternatively, to achieve a longer hold time, hermetic samples may be frozen within 48 hours of sampling as per ASTM method D6418 – 09; however, storage stability must be validated by the laboratory with no more than 10% losses.