



Field Filtration

Featuring: Dissolved Metals & Mercury

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1. A Word the Regulators

“Effective May 01, 2020, the Ministry will require field filtration for all environmental water samples collected for the analysis of dissolved metals (including mercury) for Contaminated Sites Regulation (CSR) and permittee compliance monitoring purposes which fall under the Environment Management Act (EMA).”

- BC Ministry of Environment, 2020

Field filtration of water samples for dissolved metals and mercury analysis has always been recommended as “Best Practice” by the British Columbia Ministry of Environment (BC MOE). As of May 1 2020 however, it is mandatory practice if you wish to compare your data to BC contaminated site regulations, or to any permit which falls under the Environmental Management Act (EMA). The BC Laboratory Manual method for the Preparation of Dissolved Metals or Mercury in Water Samples has also been modified to reflect this change.

2. The Science

Oxidation States: Copper, Manganese, Iron and Chromium are metals of significant environmental concern that can be easily converted between their oxidation states when the water is exposed to the atmosphere (oxygen → oxidation.) For Iron and Copper in particular, this oxidation causes these metals to precipitate, or “fall-out” of solution. Once groundwater has been removed from the ground it begins oxidizing; the longer the sample is exposed to air the more precipitate is formed. By the time unfiltered and unpreserved sample makes it to the lab, a significant amount of these metals may have precipitated, and this precipitate WILL be removed by subsequent filtration. **Bias low metals data will result.**



Preservation: Metals samples must be preserved with an acidic preservative (HNO₃ or HCl) in order to hold the metals in solution and prevent precipitation (see above). Samples must be filtered BEFORE they are preserved, so immediate filtration is a necessary precursor to immediate preservation. When samples are not preserved, certain metals such as Boron and Aluminum can adhere to the walls of the HDPE sampling container. When the sample is removed from the bottle for analysis, these “stuck” metals will be left behind, resulting once again in **bias low metals results.**



3. Step-by-Step Guide

Equipment

The instructions presented below refer to manual field filtration and represent good sampling practices. If you are using a pump or another apparatus, please consult with the manufacturer for specific instructions relating to that equipment. You will need:



Gloves



Filter (not to scale)



Syringe (not to scale)

Step 1 Put on Gloves + PPE.

Safety First! Samples are to be preserved with strong acid, so the appropriate PPE should be worn. MSDS sheets for all preservatives are available upon request.

Step 2 Remove syringe from package immediately prior to use.

DO NOT attach the filter yet – fill the syringe by drawing the desired volume of sample using the plunger.

Step 3 Remove filter from packaging and attach to syringe.

Attach the wide opening of the filter to the syringe tip, and twist to ensure a secure fit. Note that filters are unidirectional and intended to allow flow OUT of the syringe.

Step 4 Filter Sample.

Push the plunger down to push sample through the filter, discarding the first 5-10mL of water before filling bottle. Remove the cap from the sample bottle immediately prior to filling. Push remaining water in syringe through filter into appropriate CARO bottle(s). Replace bottle lid ASAP after filling to minimize the potential for contamination.

Pro Tips:

More than one filter may be required per sample, depending on the amount of suspended particulate. Use one syringe per unique sample and replace the filter as needed. Make sure to always remove the filter(s) prior to filling the syringe, as filters are designed to accommodate flow in one direction only.

Do NOT use a syringe and filter on more than one sample. Syringes and filters are disposable and may be recycled where permissible.

As additional field Quality Control (QC) checks, the BC Field Sampling Guide recommends filtering deionized water through your filter prior to collecting samples and submitting the filtrate as a “Filter Blank.” This will allow for further data quality assessment, if needed.

For more information, please contact us: teamcaro@caro.ca or 877.765.9646

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