

Sample Filtration

1) Applicable Matrices

- a) All Arikaree Environmental Lab (AEL) samples requiring filtration before analysis.

2) Scope and Application

- a) Samples to be analyzed on the Ion chromatograph, Lachat 8500, Shimadzu TOC/TN analyzer, and AAnalyst 200 need to be filtered either through a burned GF/F glass fiber filter for nonpurgeable organic carbon (NPOC) or a 0.45µm membrane filter for everything else.

3) Equipment and Supplies

- a) Filter Cassette
- b) 60mL syringe
- c) Combusted Whatman GF/F Glass fiber filter or Millipore 0.45µm membrane filter
- d) Burned brown glass sample bottle or clean plastic Nalgene sample bottle.
- e) Gemini water purification system (mounted on wall) and DI water (from blue hose)
- f) 2 sets of forceps: Green/rigid, stainless/soft

4) Procedure

- a) Organize samples needing to be filtered. Obtain clean, empty bottles needed for different analyses. See next page for bottles needed for each analyses:

UNF=Unfiltered

F(0.45µm)=Filtered with Millipore 0.45µm membrane filter

F(BG)=Filtered with combusted Whatman GF/F glass fiber filter

UNP=Unpreserved

H₂SO₄=Sulfuric Acid preserved

HNO₃=Nitric Acid preserved

Analyses	Bottle Type
ANC, pH, Conductivity	UNF, UNP
NO ₃ +NO ₂ (N)*, NO ₂ (N)*, TDP, Si, PO ₄ (P)**, NH ₄ (N)**, Ca, Mg, K, Na	F (0.45µm), UNP
NH ₄ (N), PO ₄ (P), TDP/TP,	F(0.45µm), H ₂ SO ₄
IC (Cl, NO ₃ (N), SO ₄)	F(0.45µm), UNP
TOC/TN	UNF, UNP
DOC/TDN	F(BG), UNP

*NO₃+NO₂(N) and NO₂(N) can be analyzed using a H₂SO₄ preserved or UNP sample.

**NH₄(N) and PO₄(P) can be analyzed either UNP or H₂SO₄ preserved. If UNP sample is analyzed, analysis must be done within 7 days for NH₄(N).

- b) Label all bottles with correct Lab Sample ID# using label tape and a sharpie. This # can be found on the Master data sheet and in the Sample Log book in the lab office. Look inside each bottle to be sure the bottles are clean and dry.
- c) Triple rinse the filter cassettes with DI water, by removing the screen inserts and O-rings, and rinsing each piece separately. Use green forceps to hold the inserts and O-rings while they are being rinsed. Triple rinse the syringes by removing the plunger and rinsing the syringe housing and plunger separately. Place each rinsed piece (cassette and syringe) on a large Kim wipe to drain. They do not have to be dry to being filtering.
- d) Reassemble the filter cassette by inserting the screen inserts back into the cassette. Make sure the ridged side of the inserts is facing out of each side of the cassette. Use the green forceps to hold the inserts
- e) Obtain the correct filter needed for the sample to be filtered.
 - 1) **0.45µm Membrane Filter:** Open the filter packaging but do not totally separate the the 2 pieces of packaging. Fold the plastic piece of packaging down to expose the filter. Inside the package, there will be the filter (white with a grid pattern on one side), and a blue piece of paper. Grasp the filter with the stainless forceps. Separate the filter from the blue paper and packaging. Place the filter, grid side up, on the bottom piece of the cassette, making sure the filter is in complete contact with the screen insert. Center the filter so when the O-ring is placed on top, there will not be any gaps between the filter and the O-ring.
 - 2) **Combusted Whatman GF/F:** Open the foil. Using the stainless steel forceps softly grasp a single filter. Place the filter on the bottom piece of the cassette with wrinkled side down. Center the filter so when the O-ring is placed on top, there will not be any gaps between the filter and the O-ring.
- f) Grab the O-ring with the green forceps. Seat the O-ring on top of the filter in the cassette. (Procedure cont'd next page)

- g) Screw the top of the cassette onto the bottom. Be sure it is tight so it will not leak.
- h) Attach the syringe housing onto the filter cassette by screwing the Luer lock attachments together. Make sure they are tight but do not over tighten and strip the threads on the syringe.
- i) Fill the syringe with ~60mL ultrapure water. Insert the syringe plunger in the syringe housing. Push it in until it snaps into place. Depress the plunger and rinse the cassette with the ultrapure water.
- j) Unscrew the syringe from the cassette. Do not remove the plunger from the syringe while the syringe is still attached to the cassette. Doing so will tear the filter in the cassette. Once the syringe is separated from the cassette, the plunger can be removed from the syringe housing.
- k) Reattach the syringe housing to the cassette (see h above). Shake the sample to be filtered (be sure the cap is tight on the sample bottle). Pour ~20mL of sample into the syringe. Insert the plunger just until it snaps into place. Rinse the inside of the syringe with the sample by inverting the syringe and cassette. Make sure the sample rinses all surfaces of the syringe. Then, over the sink, depress the plunger to rinse the cassette and filter with sample.
- l) Repeat j above.
- m) Repeat h above.
- n) Shake the sample. Fill the syringe housing with ~60mL of sample. Place the syringe and cassette over the bottle to be filtered. Depress the plunger until all sample has been filtered. Repeat this until enough sample has been filtered. If possible, fill the bottle with filtered sample.
- o) Repeat procedure from step c for remaining samples.
- p) There is no need to rinse equipment and change the filter if the same sample is being filtered. Make sure the correct filter is being used for the analyses.