

Sampling Pore Water or Soil Gas Using a Syringe and a PushPoint Sampler
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Sampling by syringe is the simplest and least equipment-intensive way to sample pore water or soil gas using a PushPoint Sampler. In these examples a ¼" diameter PPX36 PushPoint is used, but the same method(s) can be used to sample with the 1/8" diameter PushPoint tools. Once the sampler has been inserted into the sediments, the guard-rod is removed from the PushPoint to open its screen.

The water level in the sampler is the static water level of the pore water which may be below the top of the sampler. If no valve is installed in the sampling stream, then the air in the sampler will be pulled into the syringe prior to pulling in water, and each time the syringe is removed to dispense its contents the water level will drop to this static elevation and air will be reintroduced into the system and will be present in the contents of the next syringe, and so on. To prevent this (for volatile chemical sample collection, for instance) we offer various 3-way and 4-way valves, pinch clamps, and a "SyringePump".

If a standard Syringe Assembly is used it is connected as shown below in Figure 1. Note that this is a ¼" Syringe Assembly, which consists of a 1/8" Syringe Assembly connected to a ¼"x1/4" adapter (yellow).



Figure 1: ¼" Syringe Assembly connected to a ¼" diameter PPX36 PushPoint Sampler

If a syringe is used to collect multiple samples from the PushPoint without the introduction of air, a Pinch Clamp can be used as shown in Figure 2. In this application, a 4" piece of 3/16"x5/16" Tygon is passed through the Pinch Clamp. This Tygon tubing is stretched over the mouth of the PushPoint and also over the 1/8"x1/4" Tygon tubing of a 1/8" Syringe Assembly. The clamp is pinched each time the Syringe Assembly is removed to dispense its contents. With a little practice, this method can be used to collect relatively large volumes of non-aerated pore water or undiluted soil gas. Leave a few milliliters of pore water in the syringe to displace any air when making the reconnection with the clamp tubing.



Figure 2: Pinch Clamp connected to 1/8" Syringe Assembly

A variation of this is to use the Pinch Clamp setup just mentioned but with a $\frac{1}{4}$ " Syringe Assembly. The advantage of this configuration is that the connection of the $\frac{1}{8}$ "x $\frac{1}{4}$ " Tygon on the syringe to the yellow $\frac{1}{4}$ "x $\frac{1}{4}$ " adapter is somewhat easier than squeezing it into the $\frac{3}{16}$ "x $\frac{5}{16}$ " Tygon used with the Pinch Clamp. Note: a 1" piece of $\frac{1}{4}$ "OD polyethylene tubing is used between the yellow adapter and the larger Tygon used with the clamp. Leave a few milliliters of pore water in the syringe to displace any air when making the reconnection with the adapter. See Figure 3 below:



Figure 3: Pinch Clamp connection to a $\frac{1}{4}$ " Syringe Assembly using a 1" piece of $\frac{1}{4}$ "OD polyethylene

Another way of maintaining the head on the sampling system is to use either a 3-way or 4-way valve in the sampling stream as shown in Figure 4a. Turn the valve one way to pull from the PushPoint and not from the discharge line, and turn the valve another way to shut off the connection to the PushPoint and open a connection to the discharge line so the syringe contents can be pushed out the discharge line.

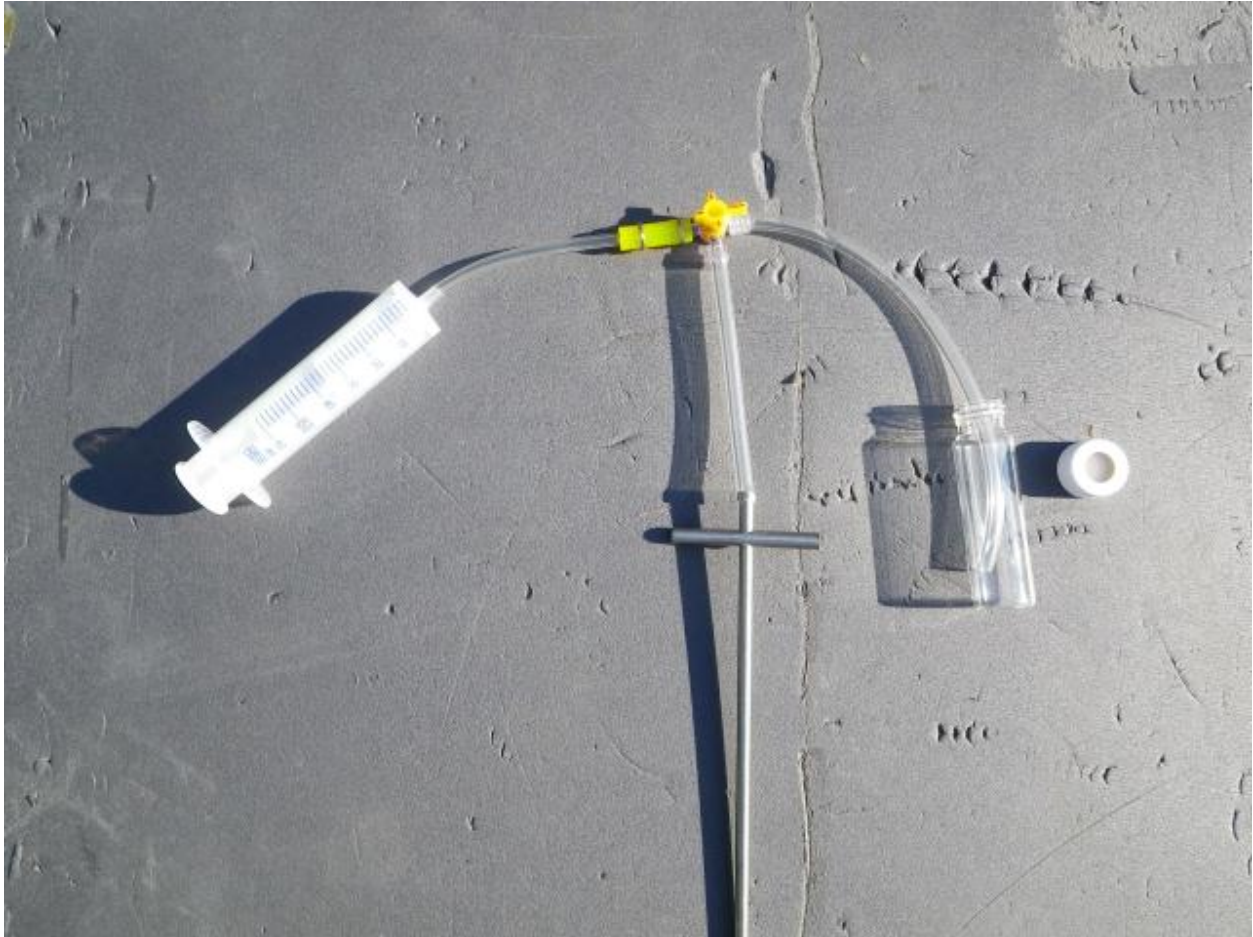


Figure 4a: Connecting a 1/4" Syringe Assembly to a 4-way valve and a PPX36 PushPoint Sampler

Alternately, a SyringePump can be used to pull large volumes of pore water or soil gas from the subsurface using only a syringe. A SyringePump consists of a syringe connected to a 4-way valve that has been equipped with two check valves. It is somewhat laborious to collect large volumes of fluid using a 3-way or 4-way valve alone due to the need to change valve position for each step of the process. The SyringePump has two one-way valves that serve as check valves which allow the syringe to be used as a pump by pulling and pushing the plunger without changing the valve position. The 3-way and 4-way valves we provide consist of a polypropylene valve stem and a polycarbonate body, and have the largest bore available. The check valves have a polycarbonate body and a silicone diaphragm. The standard configuration is a 9" piece of 3/16"x5/16" Tygon inlet and a 14" piece of 3/16"x5/16" Tygon outlet. A typical setup is shown in Figure 4b:



Figure 4b: SyringePump setup for filling 40 ml VOA vial or 1 L Amber bottle.

These have been but a few examples. Many other configurations are possible for syringe sampling. It's usually the sampling objectives or the site conditions that dictate the method. Hopefully this has been helpful. Later, MH