THE SNAP SAMPLER

for Passive Groundwater Sampling

The Snap Sampler—a Passive Groundwater Sampling Technology for Any Analyte

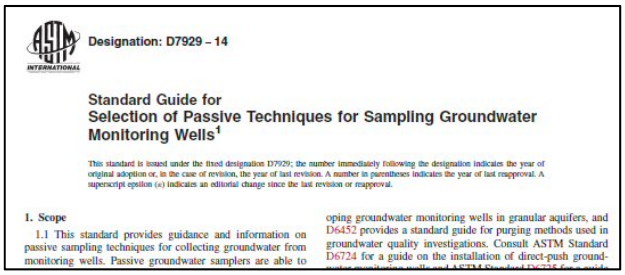
What is a Snap Sampler and how does it work?

The Snap Sampler is a passive grab sampler. A passive sampler is any device that is left in place for an "equilibration" period that allows the analytes of concern to enter the sampling device and equilibrate with the surrounding sample environment. Unlike diffusion- or sorption-based passive samplers, Snap Sampler containers are simply open to the sampled environment. There is no diffusion through a membrane or sorption onto special media. Snap Sampler bottles have openings on both ends, allowing advective or diffusive analyte exchange with the surrounding environment.

The equilibration period for the Snap Sampler depends on the installation environment and the analytes of concern. For many inorganic analytes, Snap Samplers have been shown by the US Army Corps of Engineers to be in an equilibrium state within the shortest timeframe measured in their tests—24 hours. For organic analytes, including VOCs, equilibration periods could be longer—up to 72 hours or so. We recommend a deployment period of 1-2 weeks in many cases to allow extra time for the well to re-establish natural flow-through and water exchange after the disturbance of inserting the Snap Sampler into the well. For routine sampling, Snap Samplers are left in the sample position for the entire time between sampling events, so this equilibration period is not a concern. It is mainly a consideration for initial or one-time deployments.

To capture the sample, Snap Sampler bottles are activated to close mechanically from the surface, either through a manual pull trigger system for shallow applications (less than 40-50ft, 12-15m) or using a pneumatic triggering system that can be used an any depth (the current record is approximately 2500ft, 760m). Photos show the "Snap Caps" in the set position. Caps are left in the open position during the deployment period, then "snapped" shut immediately prior to retrieval and preparation for laboratory submittal. Typically, Snap Samplers are then redeployed into the well in preparation for the subsequent sampling event.

ASTM Standard D7929-14 includes the Snap Sampler as a "passive" sampling device by defining passive grab sampling differently from "active" grab sampling. "Active" grab sampling requires motion of the sampling device to "grab" the sample from the environment, while a "passive" grab sampler already contains the sample within the sampler. For the Snap Sampler, simple closure of the device retains the sample. A bailer, a bailer-type pull-filling device, or a pressure/vacuum-based sampler actively moves sample from the environment into the sampling device during collection. For these devices, there is no real equilibration. Sampler materials are not truly equilibrated with the surrounding environment as they may be exposed to that water for the first time at the time of collection. Further, there may be substantial disturbance of the water column during collection and the precise sample position may not be known. Some research suggests strong bias and data variability can occur when the sampling position is not known. Water may come from beyond the screen zone of the well in the case of a pull-filling device, causing such bias and variability.



Designation: D7929 – 14

Standard Guide for
Selection of Passive Techniques for Sampling Groundwater Monitoring Wells[1]

This standard is issued under the fixed designation D7929; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

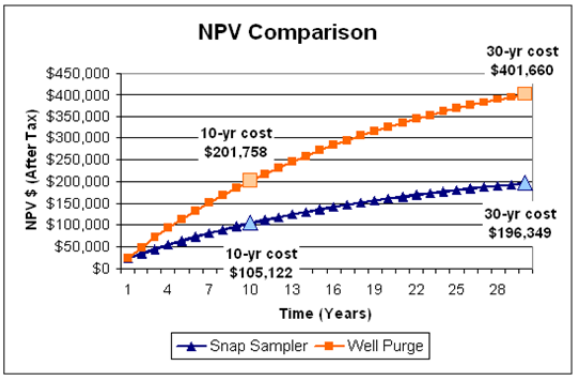
1. Scope

1.1 This standard provides guidance and information on passive sampling techniques for collecting groundwater from monitoring wells. Passive groundwater samplers are able to

oping groundwater monitoring wells in granular aquifers, and D6452 provides a standard guide for purging methods used in groundwater quality investigations. Consult ASTM Standard D6724 for a guide on the installation of direct-push ground-

Snap Samplers can be configured to collect samples in 40ml VOA vials designed to be used directly in commercial laboratory testing equipment. Snap VOA vials allow the user to collect samples in the same container that is analyzed at the lab, never exposing the sample. These samples can be field-preserved after collection without exposing sample. This is just about the perfect sample—sealed downhole, never exposed, analyzed in the same container that was deployed in the well. Snap Samplers can also be configured with 125ml or 350ml HDPE bottles for larger volume requirements. Snap Sampler modules can be stacked in any combination up to 6 in a "string" of Snap Samplers. The 40ml VOA and 125ml Poly bottles will fit into 2-inch (50mm) or larger wells, while the 350ml bottle can fit into wells that are 4-inch (100mm) or larger. Samples collected in the Poly bottles can be prepared for direct submittal to the analytical laboratory, or samples can be transferred into appropriate lab-supplied containers as needed.

Why use a Snap Sampler?



Cost savings is usually the main reason users consider passive sampling generally. Snap Samplers are passive devices, which means you can avoid the time-consuming purge process and the associated waste generation, handing, paperwork and liability. If you generate no wastewater, you don't have to deal with it. It's smart

and it's sustainable. It also allows you to avoid equipment rentals, meter calibrations, and potential failures. Of course, if you need parameter readings for purposes other than purge "stability" measurements, you can use collected Snap Sampler water to take hand held meter measurements. Typical cost savings from Snap Sampling ranges widely, but a good rule of thumb is a 50% cost savings on physical sample collection. Savings results from reduced time in the field, avoidance of waste handling and disposal, and avoidance of equipment rentals.

Data Quality is another primary reason for choosing the Snap Sampler. The US Department of Defense funded a number of SERDP and ESTCP studies that show the Snap Sampler met data quality criteria for equivalence to low flow sampling for both concentration and data variability. The bottom line is that Snap Sampling is technically equivalent to low flow sampling. Sealed VOC samples mean that in addition to technical equivalence, the effect of field conditions and personnel is minimized or even eliminated. This can't be said for other no-purge devices that are highly reliant on user technique, or have analyte limitations. These key factors set the Snap Sampler apart from other approaches.

Discrete depth sampling is a common use for Snap Samplers. Because Snap Samplers are deployed in a fixed position, you can be as sure as you can be about where the sample comes from within a well. For multiple depth sampling, that is a key feature. Zone isolation devices can be inserted between Snap Samplers to improve vertical profile results. This approach allows a user to utilize existing infrastructure for characterization, or may allow dual purpose well construction.

Very deep wells are traditionally difficult to sample. With Snap Samplers, deep wells are much less of a problem. The Snap Sampler pneumatic trigger system operates on tire pump air pressure. There is no need to overcome submergence pressure, therefore you no longer need nitrogen bottles to sample from hundreds or even thousands of feet depth.

Technology Websites: www.QEDENV.com www.SnapSampler.com

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