

Discrete Interval Sampling

Discrete interval sampling is ideal for obtaining truly representative water samples from below floating product layers (LNAPL) and for obtaining samples of product itself (LNAPL and DNAPL). It is also used to profile open boreholes and screened wells, and to collect samples from distinct levels or points of inflow.

There is negligible disturbance as can be caused by pumping and purging. Mixing of water from different levels in the well is minimized.

Purging and disposal of purged water can be avoided. Sampling directly from a specific depth results in the collection of water which is most representative of the groundwater outside of the well at that depth.

Model 425

Discrete Interval Sampler

The Solinst Model 425 is a stainless steel sampler, with LDPE tubing mounted on the convenient Solinst reel. The reel has a pressure attachment for the high pressure hand pump, and a pressure/vent switch which is used to apply and release the pressure on the sampler. A sample release device is included with each Discrete Interval Sampler.

The sampler is pressurized using a high pressure hand pump before being lowered into the well to prevent water flowing into the sampler on the way down the well. Once the desired depth is reached, the pressure is released and hydrostatic pressure fills the sampler with water directly from the sampling zone. A floating checkball inside the 1.66" sampler prevents water from entering the tubing, thus avoiding the need to decontaminate the tubing.

When the sampler is filled, it is repressurized and raised to the surface. The sample is decanted using the sample release device, to regulate flow avoid degassing of the sample.

The sampler is ideal for groundwater sampling from below an oil/product layer on the surface of the water, as it allows a sample to be obtained which is untouched by the oil. The sampler is easily disassembled for decontamination.

Solinst also manufactures a zero-headspace sampler that can be sealed and transported directly to the laboratory in down-hole condition. the Model 425-T is described overleaf.

A disposable high density polyethylene bailer and a stainless steel Point-Source Bailer are also available from Solinst. (See Model 428 & 429 Data Sheets.)



VOC Sampling

Discrete interval samplers (DIS) are excellent for VOC sampling. There is no mixing with water from different levels in the well. The sample does not travel through a long length of tubing, risking loss of volatile organics. The sample has minimal contact with air.

For the most accurate VOA results, the Model 425T Transportable DIS can be used. It retains the volatiles at down-hole conditions with zero headspace during retrieval and transport to the laboratory. (See overleaf)

Applications

- Obtaining a representative groundwater sample from below oil/product layers
- Discrete interval sampling
- Chemical profiling of wells
- Sampling at points of inflow to well
- LNAP and DNAPL sampling

Advantages

- Sample not pumped through tubing
- No mixing of water from different levels
- Easy disassembly for decontamination
- Avoids purging and disposal of purge water
- Easy operation and transportation

Method of Operation

The Discrete Interval Sampler is connected to the tubing. The high pressure hand pump, or a compressed air source, is attached to the reel.

To determine the operating pressure required, use the chart at right. For other depths, the formulas may be used. Pressure is applied to the tubing and sampler, which closes the check valve in the bottom of the sampler, preventing any water from entering the sampler.

The sampler is then lowered to the chosen sampling depth while pressurized. At the chosen depth, the pressure is released. Hydrostatic pressure fills the sampler as the water rises to static level. A floating check ball prevents water from entering the tubing, eliminating the need to decontaminate the tubing between different wells or zones.

The sampler is again pressurized to close the lower check valve and prevent sample mixing loss of volatiles during retrieval. The sampler is then raised to the surface and removed from the borehole.

The sample release device is used to transfer the water to a sample bottle with a controlled flow that prevents degassing of the sample.

Recommended Operating Pressure			
Depth Feet	Pressure psi	Depth Metres	Pressure kPa
25	20	8	148
50	30	15	217
100	50	30	364
200	95	60	660
300	140	90	952
500	225	150	1,540

Operating Pressure = (Sample depth in feet x 0.43) + 10 psi
(Sample depth in m x 9.8) + 70 kPa

Model 425-T Sampler/Transportation Vessel

This model is designed to prevent any air contact with the sample all the way to the laboratory, thus retaining all volatiles at down-hole conditions during sampling and during transportation.

The sampler uses special shut-off valves to lock the sample within the sample canister with zero head space.

The Model 425-T sampler operates in a similar manner to the standard Model 425, but when the sampler is brought under pressure to the surface, the special shut-off valves are closed before the sampler is disconnected from the tubing. Thus air contact with the sample is avoided and the sample is sealed within the sampler with zero headspace, in down-hole condition.

The sampler may then be sent to the laboratory for analysis, without discharging it. The VOCs in the sample will be held in the down-hole state until opened in the laboratory, thus ensuring the highest sample quality at the time of analysis.

Materials

The samplers are constructed of stainless steel with Viton® o-rings, Teflon® and polypropylene check balls.

The tubing most commonly used is low density polyethylene (LDPE), however, Teflon® or Teflon-lined polyethylene tubing is also available. Depth markers may be ordered for the tubing in either feet or meters, as an optional extra.

Suspension Cable may be used (stainless steel), if desired. A cable connector is welded to the top of the sampler in readiness. Generally a cable is not required, and is more cumbersome to use, but when sampling at depth, a cable should be considered.

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Discrete Interval Sampler Capacity			
English Units		Metric Units	
Size	Capacity	Size	Capacity
1" x 2'	6 oz	25.4 mm x 610 mm	175 ml
1.66" x 2'	18 oz	42 mm x 610 mm	475 ml
2" x 2'	27 oz	50.8 mm x 610 mm	800 ml
1" x 4'	12 oz	25.4 mm x 1220 mm	365 ml
1.66" x 4'	32 oz	42 mm x 1220 mm	1000 ml
2" x 4'	61 oz	50.8 mm x 1220 mm	1800 ml

Other diameters and lengths available, on request.

Depth Capability

The Solinst Discrete Interval Sampler can sample to depths of 500 ft. (150m) below water level, regardless of total depth from surface.