

# LOW FLOW GROUNDWATER SAMPLING USING ROTAPUMP INERTIAL LIFT PUMP BY DON MCEEDWARDS, CONSULTANT

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This article tells you how to perform low flow groundwater sampling using a portable, surface-mounted pump with no decontamination required before each use and no chance of cross contamination between wells. An inertial lift pump moves a dedicated (stored in the well) pumping tube rapidly up and down. A one-way valve on the bottom admits water on the down stroke and retains water on the upstroke. The flow rate depends on the diameter of the tube and how fast the tube moves. Inertial lift pumps can pump water from great depth.

Below we present the requirements of low flow groundwater sampling and describe how these requirements are satisfied using the Rotapump inertial lift pump.

- **Groundwater must be pumped from a certain sampling depth**

This sampling depth requirement is met hanging a dedicated stilling tube, say of 1/2 inch ID, in the well to the sampling depth. This tube may be supported by a hose clamp on the tube bearing on a hole in the well cap.

- **Groundwater samples must be free of suspended sediment**

This no suspended sediment requirement is met by placing a dedicated pumping tube, say 3/8 inch OD, inside the stilling tube so that its bottom is about 3 feet above the static water level. The pumping tube moves inside the stilling tube and as it removes water from the top of the stilling tube, unagitated water enters the tube from the sampling depth.

- **Drawdown must be limited, usually to a maximum of 6 inches**

This drawdown limit requirement is met by monitoring drawdown with a water level meter placed through a hole in the well cap. To limit drawdown to 1/2 foot, the meter tape is hung 1/2 foot below the static water level. As long as drawdown is less than 1/2 foot, the indicator buzzer or light will remain on. If the buzzer or light goes off, the drawdown limit has been exceeded, and the pumping rate must be reduced. This is done by reducing the rate of movement of the pumping tube. Flow rates as low as 50 ml per minute can be maintained using the speed controller of the Rotapump.

- **Indicator parameters pH, conductivity, temperature, etc. of the pumped water must be measured**

This indicator parameters requirement is met by discharging pumped water to a flow cell and measuring these values at selected flow volumes. After these parameters have stabilized, representative groundwater samples can be taken from the pumping tube.

- **Water samples must be collected without aeration**

This no sample aeration requirement is met by placing the discharge end of the pumping tube at the bottom of a sample bottle and filling the bottle from the bottom. Clear tubing is used for the pumping tube so that the absence of air bubbles in the sample stream can be visually verified.

After sampling, the stilling and pumping tubes are stored in the well for the next sampling event. No decontamination is required and the chance of cross contamination is eliminated because contaminated groundwater only contacts the dedicated stilling and pumping tubes.

For more information about using Rotapump in your application, call Don McEdwards of McEdwards Manufacturing & Distribution at 707/354-4618, email [rotapump@comcast.net](mailto:rotapump@comcast.net), or visit [www.rotapump.com](http://www.rotapump.com).