

Delft groundwater sampler

Test levels

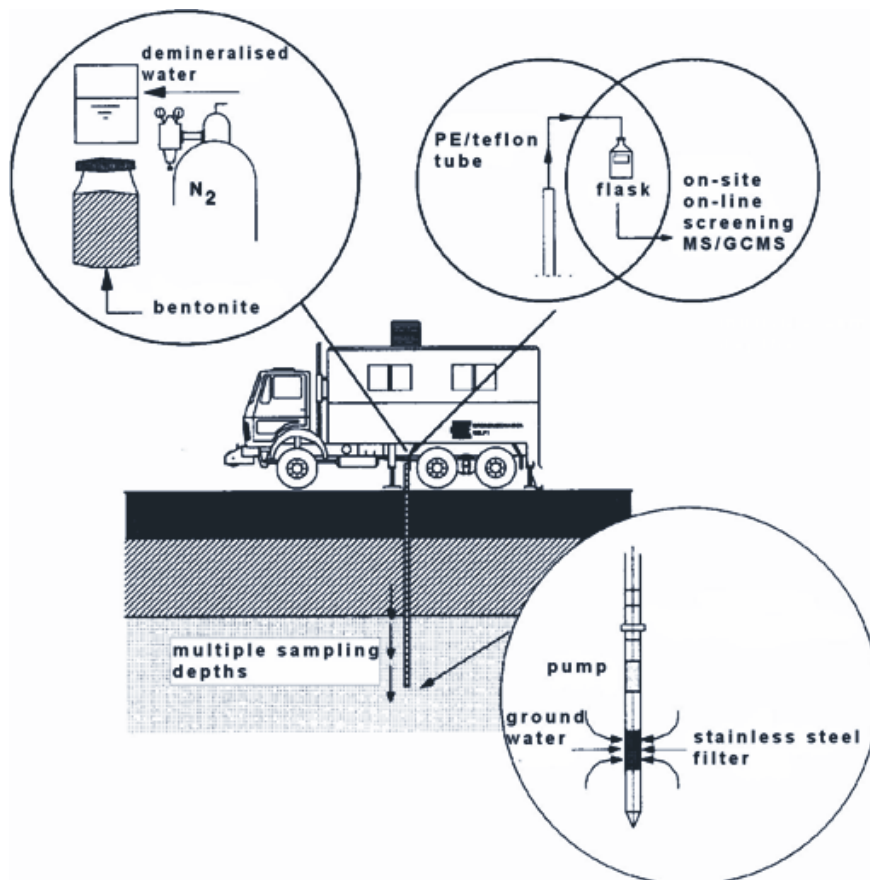
Most samplers share the disadvantage that the test level where the sample is taken must be determined before hand. Only after a sample has been taken and analysed will it become apparent whether the chosen sampling depth was correct and useful.

Multi levels

To overcome this problem Delft Geotechnics has developed the multi-level groundwater sampling probe. With this probe groundwater samples can be retrieved from multiple sampling depths during one and the same CPT operation. The delft groundwater sampler has been tested and validated thoroughly, taking into account all possible contamination processes.

Pressurised nitrogen gas

The delft groundwater sampler has an externally located filter element. During penetration of the probe into the soil pressurised nitrogen gas is applied to the filter, therewith keeping it free of incoming water and/or soil particles. 1 or 2m above the desired sampling depth the nitrogen pressure is bled off as the probe proceeds slowly towards sampling depth. At the sampling depth groundwater then enters the sampling chamber. Subsequently the water is pushed up to the surface by means of an inbuilt pump.



see next page

Lankelma Ltd makes no representation, express or implied, with regard to the accuracy of this information and cannot accept any legal responsibility or liability for any errors or omissions that may have been made.

Sampling

As the pumping continues the electric conductivity of the groundwater is measured and monitored. Only when this reaches a stable value, and a volume of at least 1 to 2 litres has been pre-pumped, can the actual sampling can take place. After sampling is completed, both electric conductivity and pH are measured, as well as the groundwater temperature.

Anaerobic flow cells

As an alternative, the groundwater can be fed through a set of anaerobic flow cells while being pumped up. In these flow cells several physical/chemical parameters can be measured without introduction of oxygen from the open air into the sample. Samples can then also be used for biological (bacteriological) analysis.

In-situ testing

Another alternative, for example in the case of pollution with volatile (chlorinated) hydrocarbons, is to analyse the groundwater samples in situ by means of a hand-carried gas chromatograph. Within several minutes the results of the analysis will become available, and an accurate decision can be made whether to proceed towards another (greater) sampling depth, or to abandon the current CPT operation and to proceed towards a new location or site. With the use of this on situ screening equipment analytical detection limits on ppb-level can be reached, so that site characterisation and mapping attains a high-resolution level.

Correct materials

Important for obtaining reliable results is the proper choice of the materials making up the delft groundwater sampler. For example, when sampling for volatile (chlorinated) hydrocarbons, test cases have proved that up to 40% of these components can absorb the normally used polyethylene sample tubing. In these cases tubing made of teflon has to be fitted in combination with stainless steel filter elements.

Lubricating cone

In order to be able to reach greater depth with the delft groundwater sampler the probe can be fitted with a lubricating cone. Depths of over 70m have been reached with the probe and groundwater of that depth has successfully been sampled.

100m sampling depths

The delft groundwater sampler is a thoroughly validated, high quality-sampling device. Sampling depths of 100m are possible when soil conditions are favourable. The probe is also appropriate for groundwater investigation below rivers, lakes, canals, etc. in combination with on-site on-line screening techniques direct site characterisation and mapping is possible, thus resulting in an exceptionally cost and time effective operation.

Lankelma Ltd makes no representation, express or implied, with regard to the accuracy of this information and cannot accept any legal responsibility or liability for any errors or omissions that may have been made.