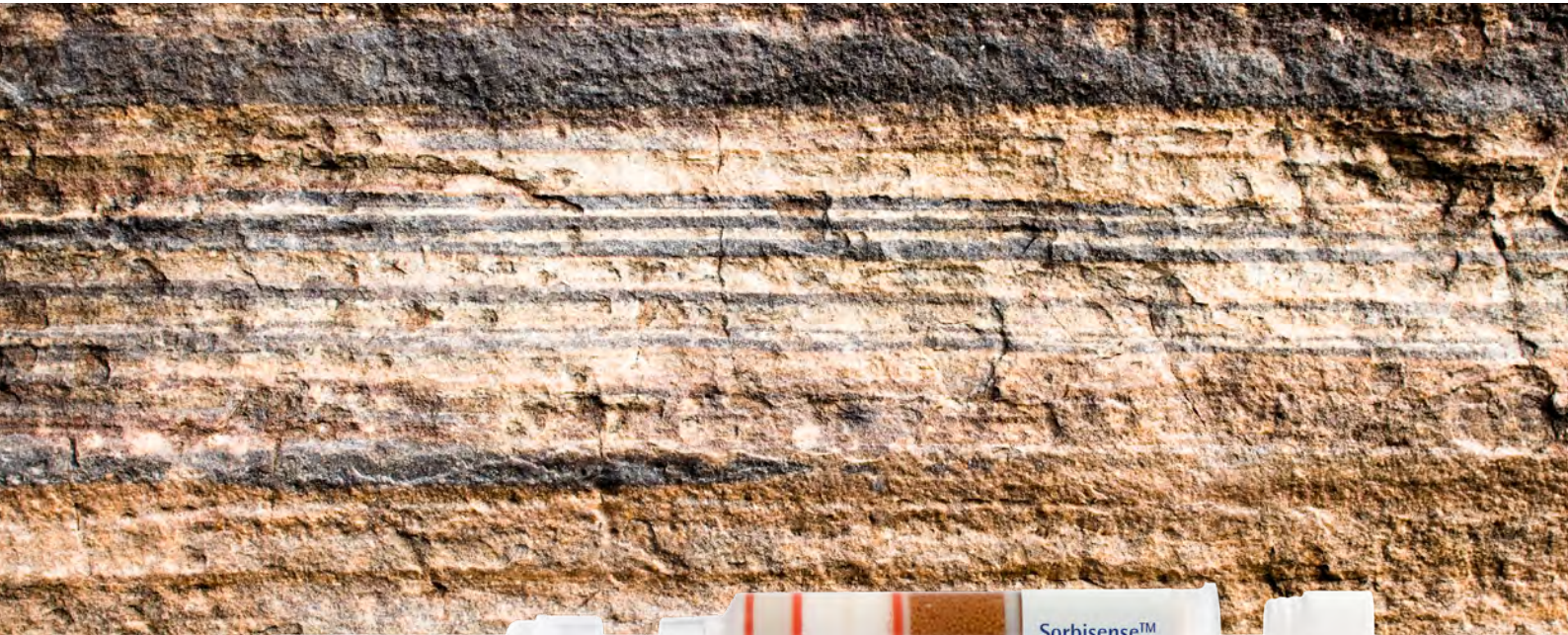


# Groundwater monitoring



Improve your groundwater sampling- and analysis testing data. Eurofins delivers worldwide the next generation of passive samplers - Sorbisense - right at your doorstep. We offer the full solution from dedicated field sampling systems and know-how to a wide suite of accredited laboratory tests.



**Figure 1.** Picture left: SorbiCell VOC. From left to right: unexposed, as purchased in transportation tube; exposed, fitted with protection caps; exposed Sorbicells with about 50% salt depletion. Pictures on the right: GWS-40 mounting units for installation of SorbiCells in groundwater wells.

## Background

Compliance- and remediation monitoring of groundwater is one of the critical steps to maintain operations at oil- and gas plants, airports, and chemical factories. Overlooking the importance of monitoring can bring about serious consequences. Traditional groundwater sampling methods are time-consuming and therefore expensive. With documented time savings up to 70% on sampling field time, use of Sorbisense will improve productivity, and reduce total project costs. Data quality obtained is as good, or even better than the data retrieved from standard groundwater samples.

Typical problems related to traditional groundwater samples are:

- Groundwater samples represent a “snapshot” value, while solute concentrations may vary strongly over time
- Well-purging is time-consuming.
- Low yielding wells compromise the groundwater sample quality and may require multiple site visits for a single sample
- Well pumping may lead to increased sample turbidity as a result from the stress on the formation and disturbance of solids settled in the bottom of the well

- Liquid sampling handling with pumps and tubing is tedious, may require filtrations steps, and is prone to loss by volatilization or sorption to tubing
- Fast transport to the laboratory is critical due to poor conservation of bulky water samples

## Advantages of Sorbisense method

Sorbisense solves these problems while maintaining high data quality and sample-integrity:

- The sampling process occurs over a longer time period averaging out short time fluctuations.
- Easy field procedure, typically under 15 minutes per well
- No well purging required
- The sampling process does not disturb the natural flow of groundwater and solutes/colloidal fractions
- The method is well-suited for low-yielding wells
- No need for liquid sampling handling
- Sorbicell requires very little space and is well conserved for storage and transport
- Level specific sampling suitable for vertical plume delineation

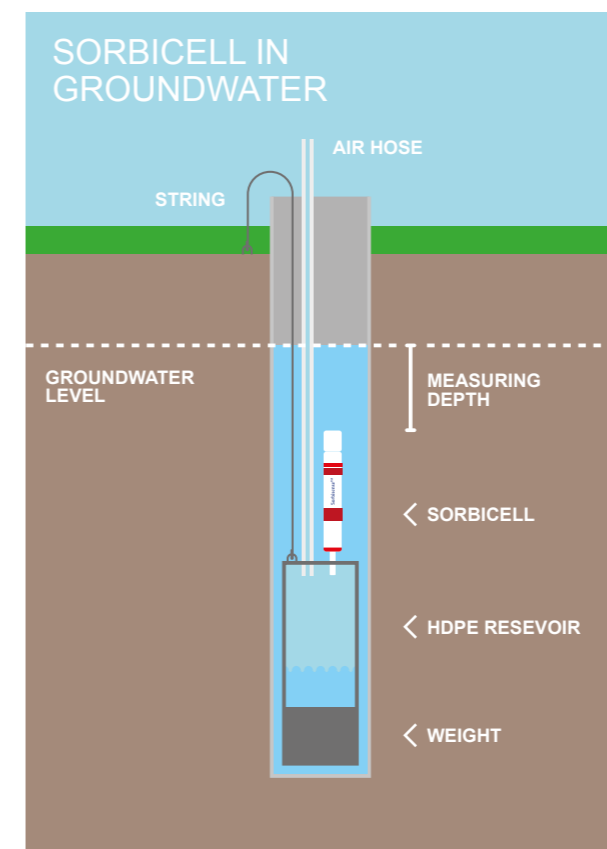
## Field sampling procedure

Two patented components together enable monitoring in groundwater wells. SorbiCell™ is a small, 3 ml sampling unit for on-site sampling and pre-concentration of organic or inorganic substances. The Sorbicell is clicked onto a groundwater sampler (GWS Sorbisystem) unit, and then installed in the well at the required sampling depth. Once installed at depth, a small subsample of the groundwater slowly flows through the Sorbicell at a controlled flow rate until the GWS unit is filled (see pictogram BELOW and pictures of non-exposed and exposed Sorbicells LEFT). The required sample volume is 0.1-0.5 L, and once the GWS tube is emptied it is ready for re-use. The Sorbicell is removed, placed back in transportation tube and send to the laboratory in a regular plastic bubble envelope.

## Laboratory analysis

The SorbiCell cartridge is analysed with advanced accredited methods for quantification of solutes. The accumulated mass of solutes, is thus quantified and likewise, the depletion of salt is measured and related to sample volume. The analysis results are reported as the time-weighted average concentration during the installation period for each contaminant (e.g., 10 µg/L of vinyl chloride).

**Figure 2.** Schematic of installation of GWS-40 in Ø50mm well.



**SorbiCell PFAS;**  
Per- and polyfluoralkyl substances

**Sorbicell NiP**  
• Nutrients (NO<sub>3</sub>-N, PO<sub>4</sub>, SO<sub>4</sub>)

**SorbiCell VOC**  
• Aromatics (BTEXM)  
• Chlorinated solvents and metabolites  
• Fuels, Oil  
• PAHs  
• PCBs  
• Phenols  
• Pesticides (200)  
• Pharmaceuticals (100)

**SorbiCell CAN**  
• Metals (e.g. Cd, Cr, Pb, Hg, Ni)  
• NH<sub>4</sub>-Nitrogen

## Choose the right Sorbicell for your application

Four generic types of SorbiCells are available with different sorbents that are suitable for chemical groups of solutes (see ABOVE). The range of analytes is continuously expanding, please contact us for a quotation for your application.



## Get started

First check the depth and dimension of the ground-water well: the ordering numbers below are suitable for wells with minimum internal diameter of 50 mm and slotted well screen >1m.

Then choose the correct Sorbicell sorbent type that corresponds to the solutes to be monitored. Finally

choose the correct hydraulic resistance dependent on the sampling depth in the well. Now you can choose your correct ordering number (see table below). Please note that SorbiCells are shipped in aluminium sealed bags with 6 pcs. ready for use.

Solute type	SorbiCell Type	Depth under water table	Sorbicell order no.	Sorbisystem
Per- and polyfluoralkyl substances:	SorbiCell PFAS	0,5-10 m	092-101 (6 pcs)	GWS-40/70
		>10 m	092-102 (6 pcs)	GWS-40/70
Nitrate-N, phosphorous SO4:	SorbiCell NiP	0,5-10 m	012-101 (6 pcs)	GWS-40/70
		>10 m	012-102 (6 pcs)	GWS-40/70
Organics:	SorbiCell VOC	0,5-10 m	042-101 (6 pcs)	GWS-40/70
		>10 m	042-102 (6 pcs)	GWS-40/70
Metals, NH4-N:	SorbiCell CAN	0,5-10 m	072-101 (6 pcs)	GWS-40/70
		>10 m	072-102 (6 pcs)	GWS-40/70

Table 1. Products suitable for wells with minimum internal diameter of 50 mm and slotted well screen >1m.

## Laboratory analyses

Finally, prepare a list of components to be measured and send your project information with the above information as a quotation request to [sorbisense@eurofins.dk](mailto:sorbisense@eurofins.dk). Along with the products

we send standard field operating procedures. Further, we offer free on-line services for advice on installations and the optimal choice of analysis packages.



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### About us

Eurofins Scientific is a global market leader in food, environment and pharmaceutical products testing as well as in the fields of agro-science, genomics, and pharmacology. With over 30,000 staff in 400 laboratories across 42 countries, Eurofins offers a portfolio of over 150,000 analytical methods. Sorbisense was founded as a Danish spin-off company from Aarhus University in 2004 by Dr. Hubert de Jonge and Prof. Dr. Gadi Rothenberg. Sorbisense was acquired by Eurofins in 2017, and has its headquarters in Denmark. We offer online and worldwide support for planning your projects and interpretation of the results, as well as advice on a growing number of laboratory tests for SorbiCell.