

# **EQUILIBRATOR™**

## **DIFFUSION SAMPLER**

### **Sample VOCs without Bailing or Purging!**

Diffusion sampling is a proven and accepted technique for determining concentrations of Volatile Organic Compounds (VOCs) in groundwater monitoring wells.

**DIFFUSION SAMPLERS™**  
are Practical and Easy to Use!



A semi-permeable sample chamber is filled with inexpensive deionized or distilled water, then lowered into the well screen and left in place. VOCs in the

groundwater diffuse into the sampler until the concentration gradient equilibrates between the water in the formation and the sampler. The sampler is retrieved and the contents easily emptied into VOA vials for laboratory analysis.

#### **Save Sampling Time!**

Install samplers during one round of sampling and retrieve them during the next round.

#### **Reliable and Inexpensive!**

Results correlate with bailing and low-flow sampling without expensive equipment and labor intensive purging. The Interstate Technology Regulatory Council (ITRC) has evaluated passive diffusion sampling case histories and technical studies, and published a position paper endorsing the technology.

[www.itrcweb.org](http://www.itrcweb.org)

#### **EQUILIBRATOR SAMPLERS**

are currently in use at U.S. DoD sites, EPA-monitored sites, major industrial sites, and small petroleum monitoring sites across the U.S. Patented design allows field, factory, or lab filling options. Diffusion sampling technology is licensed by the U.S. Government.\*



- **Eliminate Bailing & Pumping**
- **Profile Contaminants Vertically**
- **Reduce Sampling Error & Improve Repeatability**
- **No Purge Water Disposal**

## Equilibrator Field Preparation



Fill with Deionised Water



Insert the Plug



Attach the Weight



Ready for Deployment

(Leave for 2 weeks or until next sampling event)



Sampling for VOC

**EQUILIBRATOR SAMPLERS** are widely in use at sites where volatile organic compounds require on-going periodic monitoring. The elimination of well purging, and ease of use, result in substantially lower sampling costs. This simple technology combined with excellent correlation of analytical results to other methods has propelled diffusion sampling into acceptance and use by industry, consultants, and regulators alike.

### Principle of Operation

Diffusion sampling is based on the underlying principle that water in the screened interval is in constant dynamic equilibrium with the aquifer so that there is constant flow from the aquifer through the screen. This flow has been shown to be mostly laminar and horizontal. In addition to natural groundwater flow, molecular diffusion causes soluble compounds to remain evenly dispersed and in equilibrium from the aquifer through the screened portion of the well. The same dynamics hold true within the water-producing fracture zones of rock wells.

### Comparative Data

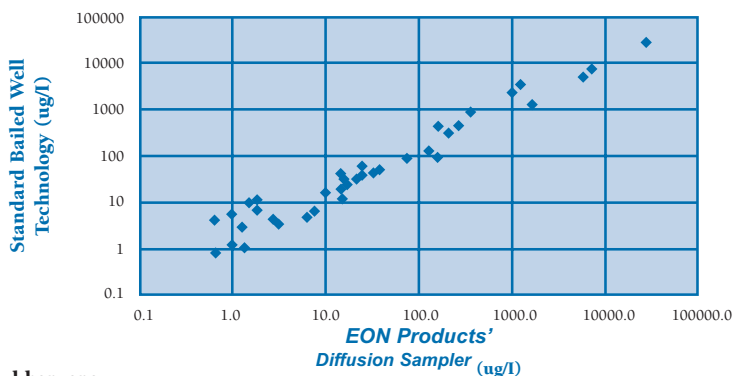
Numerous installations exist from which correlative data compare the results of diffusion sampling with other techniques such as bailing and low-flow sampling. One such comparison, conducted by Bunnell-Lammons Engineering, Inc. (BLE) and shown graphically below, is based on a 28-well comparative study. For analytical data and case histories see the USGS Guidance Document "User's Guide for Polyethylene-Based Passive Diffusion Bag Samplers...", Report 01-4061.

### Sampled Compounds:

Benzene  
Bromodichloromethane  
Bromoform  
Chlorobenzene  
Carbon tetrachloride  
Chloroethane  
Chloroform  
Chloromethane  
2Chlorovinyl ether  
Dibromochloromethane  
Dibromomethane  
1,2-Dichlorobenzene  
1,3-Dichlorobenzene  
1,4-Dichlorobenzene  
Dichlorodifluoromethane  
1,1-Dichloroethene  
cis-1,2-dichloroethene (1,2-DCE)  
1,2-dichloropropane (1,2-DCP)  
1,2-dichloroethane (1,2-DCA)  
1,1-dichloroethene (1,1-DCE)  
cis-Dichloropropene  
Dibromochloromethane  
Trans-1,3-Dichloropropene

Ethyl benzene  
Naphthalene  
Toluene  
1,1,1-Trichloroethane (1,1,1-TCA)  
1,1,2-Trichloroethane  
Trichloroethene (TCE)  
Trichlorofluoromethane

### Purgeable Halocarbons and Aromatics Analyzed by EPA Methods 601 & 602



1,2,3-Trichloropropane  
1,1,2,2-Tetrachloroethane  
Tetrachloroethene (PCE)  
Vinyl chloride  
Xylenes

### Simple as 1,2,3.

1. Fill the Sampler with deionized water and lower into the sample zone.
2. Leave the Sampler in place 2 weeks or until the next sampling event.
3. Remove the Sampler and discharge contents into VOA Vials.