

## Assay of Hydrocarbons in Soil using the 7400 Auto-Sampler

When combined with a Model 7000 Purge & Trap, the CDS Model 7400 soil and water auto-sampler provides an automated way of analyzing soil samples for volatile organic compounds. Samples are placed in standard 40 ml vials, which are automatically transferred to a temperature controlled zone for purging to the trap of the 7000. Five mls of water and an internal standard are added automatically, and the sample is stirred continuously with a magnetic stirring bar while being purged.

Figure 1 shows the chromatogram of volatiles purged from a 5 g sample of soil. The temperature was controlled at 40°C while the sample was purged with helium for 11 minutes at 35 ml/min. For less volatile samples, or to enhance the recovery of water soluble compounds, the temperature of the sample may be increased, up to 80°C.

Purging a series of soils of known concentration produced linear graphs, like the one shown for ethylbenzene in Figure 2. The R squared value for this graph is 0.998, and similar graphs for other compounds permit the calculation of concentrations for the various hydrocarbons. In this sample, the level of benzene was calculated to be 10 PPB, ethylbenzene, 15 PPB, toluene 87 PPB, and xylene, 102 PPB.

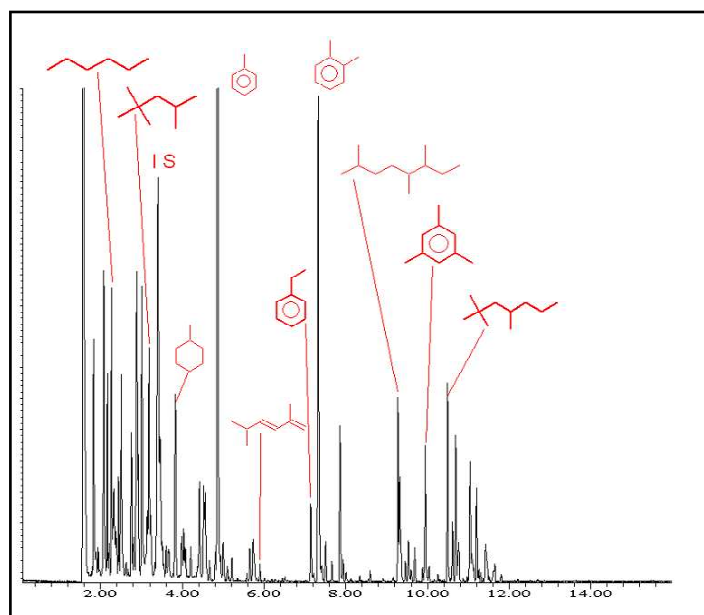


Figure 1. Hydrocarbons from 5 g of soil.

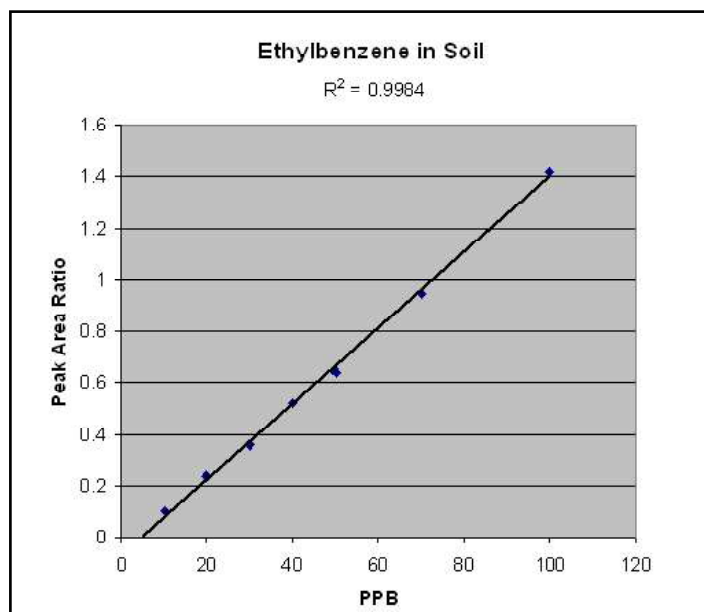


Figure 2. Peak area ratio vs. concentration for Ethylbenzene in soil.

## Experimental Conditions

### 7400 Auto-sampler

Sample temp: 40°C  
Transfer line: 130°C

### 7000 P&T

Valve oven: 130°C  
Transfer line: 130°C  
Purge time: 11 minutes  
Purge flow: 35 ml/min  
Trap dry 35°C for 1 minute  
Desorb preheat: 245°C for 0.6 minutes  
Trap desorb: 250°C for 2 minutes  
Trap bake: 260°C for 10 minutes

### Gas Chromatograph

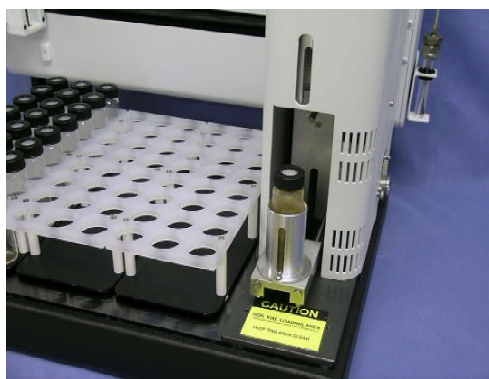
Injection port: 300°C  
Split ratio: 20:1  
Column: 30 m x 0.25 mm 5% phenyl  
methyilsilicone

### Oven program

Initial: 40°C for 4 minutes  
Ramp: 10°C/minute  
Final: 210°C for 1 minute

### Mass Spectrometer

Mass range: 35 to 550  
Source: 230°C



After adding the water and internal standard, the 7400 places the soil vial on the analytical holder and raises it into the heated zone for purging.

### Headquarters

JSB International  
Tramstraat 15  
5611 CM Eindhoven  
T +31 (0) 40 251 47 53  
F +31 (0) 40 251 47 58

Zoex Europe  
Tramstraat 15  
5611 CM Eindhoven  
T +31 (0) 40 257 39 72  
F +31 (0) 40 251 47 58

### Sales and Service

Netherlands  
Apolloweg 2B  
8239 DA Lelystad  
T +31 (0) 320 87 00 18  
F +31 (0) 320 87 00 19

Belgium  
Grensstraat 7  
Box 3 1831 Diegem  
T +32 (0) 2 721 92 11  
F +32 (0) 2 720 76 22

Germany  
Max-Planck-Strasse 4  
D-47475 Kamp-Lintfort  
T +49 (0) 28 42 9280 799  
F +49 (0) 28 42 9732 638

UK & Ireland  
Cedar Court,  
Grove Park Business Est.  
White Waltham, Maidenhead  
Berks, SL6 3LW  
T +44 (0) 16 288 220 48  
F +44 (0) 70 394 006 78

[info@go-jsb.com](mailto:info@go-jsb.com)  
[www.go-jsb.com](http://www.go-jsb.com)

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