

# Soil Extraction Cell

## An Alternate Method of Soil Extraction for Organics, EPA Method 3546.

Environmental Express, known for its innovative products, has developed the Soil Extraction Cell system for the extraction of semi-volatile organic compounds in soil samples. The Soil Extraction Cell system meets the requirements of the Performance Based Measurement System established by the EPA and replaces microwave technology with a HotBlock and stainless steel Soil Extraction Cells. Analytical results of a CRM (Certified Reference Material) for PAH/BNA and TPH fell within the required acceptance limits and were very reproducible. Real world soil samples were also extracted using this procedure for PAH/BNA, TPH, and PCB compounds and compared to results achieved using SW846 Method 3545A. Results were comparable for all three groups of compounds.

### HotBlock Procedure for Method 3546:

1. When practical, air dry the sample at room temperature for 48 hours in a glass tray or on hexane-rinsed aluminum foil. Alternatively, mix the sample with an equal volume of anhydrous sodium sulfate or diatomaceous earth until a free-flowing powder is obtained. A percent dry weight should be performed on a separate aliquot of sample for the percent dry weight calculation at the end of the analysis.
2. Weigh 10 – 30g of sample into the Soil Extraction Cell. May vary depending on individual laboratory needs.
3. Add the surrogates and/or spikes listed in the determinative method to each appropriate sample.
4. Add approximately 30mLs of solvent. (This method was validated using Methylene Chloride. Other solvents may be used but must be validated by the individual laboratory).
5. Place the stainless steel inner lid with Teflon<sup>®</sup>-coated o-ring in the Soil Extraction Cell.
6. Hand-tighten the threaded outer cap onto the Soil Extraction Cell.
7. Heat the HotBlock to 130° C. This will yield an internal solvent temperature of 100 – 115° C which is recommended by EPA Method 3546.
8. Put the Soil Extraction Cells into the HotBlock and heat for 30 minutes at a block temperature of 130° C. This will give samples 10 – 20 minutes at the appropriate temperature for extraction which is recommended by EPA Method 3546.
9. Remove the cells and allow them to cool to room temperature.
10. Unscrew the threaded outer cap and remove. Take care in doing this step as a pressure will develop in the Soil Extraction Cells during the heating process.
11. Take out the stainless steel inner lid and rinse with the appropriate solvent, taking care to collect this rinsate in the cell.
12. Proceed with filtering and rinsing, collecting all filtrates. A Buchner funnel with vacuum is recommended but any appropriate laboratory filtration device may be used.
13. The extract is now ready for concentration, cleanup, and analysis.

*These steps should only be used as a guide. All QC samples, limitations, interferences, and reagent specifications are addressed in depth in EPA Method 3546. Safety concerns are also part of the full method. Follow the instructions listed in EPA Method 3546.*



### Parts List:

- Soil Extraction Cell System with 25-Well HotBlock (each) K8150
- Soil Extraction Cell System with 35-Well HotBlock (each) K8151
- Soil Extraction Cell Complete Unit (each) K8000
- Extraction Cell Body (each) K8001
- Stainless Steel Inner Lid (each) K8002
- Threaded Outer Cap (2) K8003
- Teflon encapsulated o-ring (5) K8004
- Temperature Reference Cell (each) K8005
- Stainless Steel Inner Lid Reference Cell (each) K8002R
- Threaded Outer Cap Reference Cell (2) K8003R
- Thermometer for Reference Cell (each) K8006

### Recommended Surrogates:

- Base-Neutral, 100ug/mL; Acid, 100ug/mL, 25mL M0011
- Base-Neutral, 100ug/mL; Acid, 100ug/mL with CLP, 25mL M0013
- Nonatriacontane, 80ug/mL; O-Terphenyl, 80ug/mL, 25mL M0030
- Pesticide/PCB Surrogate Solution, 200µg/mL, 1mL GCS130023-07
- Herbicide Surrogate Solution, 2000µg/mL, 1mL GCS011025-01

