



ENVIRO

DUAL CARTRIDGE SYSTEM FOR THE EXTRACTION OF ACIDS, BASES, AND NEUTRALS IN WATER



ENVIRO-CLEAN® METHOD 8270

UCT, Inc. offers a unique, 2 cartridge system and extraction procedure for EPA Method 8270. The procedure is reliable, efficient, and cost-effective. The tandem cartridge system uses UCT's proprietary 8270 cartridges in-line with our activated carbon cartridges. High throughput can be achieved by extracting multiple samples simultaneously using a multi-port SPE manifold combined with a 12 position collection rack, which allows for the simultaneous extraction of up to 12 samples at once. A set of 24 samples should be able to be extracted in 5 to 6 hours.

A wide range of 137 target analytes and 6 surrogates can be successfully analyzed using this method. The UCT 8270 cartridge retains the majority of the target analytes including acids, bases, and neutrals; meanwhile the carbon cartridge, connected downstream from the 8270 cartridge, captures several very polar compounds, such as n-nitrosodimethylamine, n-nitrosomethylethylamine, methyl methanesulfonate, ethyl methanesulfonate, and 1-Nitrosopyrrolidine.

Product Benefits

- Cost-effective
- Reduced usage of organic solvents
- Simple and fast: only one sample pass is needed
 - 5-6 hrs for a batch of 24 samples.
- No emulsion or white precipitate generated
- Shorter solvent evaporation time
- Shorter sample turnaround time
- High sample throughput
- Excellent recovery and reproducibility
- Cleaner extracts and chromatograms
- Cartridge body manufactured from special, proprietary polypropylene – minimizing potential source of interferences
- Packaged in Mylar to maintain cleanliness



EPA Method 8270 – Extraction of Acids, Bases, and Neutrals in Water Using Solid Phase Extraction

8270 Cartridge Kits

| 1 Liter Sample Size | | |
|------------------------|--|-------|
| Part Number | Description | Units |
| EC8270-KIT1L | ENVIRO-CLEAN® 8270 STARTER KIT | Kit |
| Contents | 30 x 8270 Extraction Cartridges (p/n EC82702M15), 30 x Carbon Extraction Cartridges (p/n EU52113M6), 30 x Cartridge Adapters (p/n AD0000AS), 12 x Large Volume Transfer Tubes (p/n VMFSTFR12) | |
| EC8270-1000REFL | ENVIRO-CLEAN® 8270 REFILL KIT | Kit |
| Contents | 30 x 8270 Extraction Cartridges (p/n EC82702M15), 30 x Carbon Extraction Cartridges (p/n EU52113M6) | |
| 500 mL Sample Size | | |
| Part Number | Description | Units |
| EC8270-KIT | ENVIRO-CLEAN® 8270 STARTER KIT | Kit |
| Contents | 30 x 8270 Extraction Cartridges (p/n EC82701M15), 30 x Carbon Extraction Cartridges (p/n EU52112M6), 30 x Cartridge Adapters (p/n AD0000AS), 12 x Large Volume Transfer Tubes (p/n VMFSTFR12) | |
| EC8270-500REFL | ENVIRO-CLEAN® 8270 REFILL KIT | Kit |
| Contents | 30 x 8270 Extraction Cartridges (p/n EC82701M15), 30 x Carbon Extraction Cartridges (p/n EU52112M6) | |
| ≤100 mL Sample Size | | |
| Part Number | Description | Units |
| EC8270-KIT100ML | ENVIRO-CLEAN® 8270 STARTER KIT | Kit |
| Contents | 30 x 8270 Extraction Cartridges (p/n EC8270506), 30 x Carbon Extraction Cartridges (p/n EU5211M6), 30 x Cartridge Adapters (p/n AD0000AS), 12 x Large Volume Transfer Tubes (p/n VMFSTFR12) | |
| EC8270-100REFL | ENVIRO-CLEAN® 8270 REFILL KIT | Kit |
| Contents | 30 x 8270 Extraction Cartridges (p/n EC8270506) 30 x Carbon Extraction Cartridges (p/n EU5211M6) | |

- **UCT 8270 cartridge:** **EC82702M15** 2000 mg 8270 Sorbent in 15 mL Cartridge
EC82701M15 1000 mg 8270 Sorbent in 15 mL Cartridge
EC8270506 500 mg 8270 Sorbent in 6 mL Cartridge
- **Carbon cartridge:** **EU52113M6** 3000 mg Activated Carbon in 6 mL Cartridge
EU52112M6 2000 mg Activated Carbon in 6 mL Cartridge
EU5211M6 1000 mg Activated Carbon in 6 mL Cartridge

Extraction Accessories

| Part Number | Description | Units |
|-------------------------|---|---------------|
| VMF016GL | 16 Position Complete Vacuum Manifold System | Complete Unit |
| Contents | 1 x Glass Block 1 x 16 Position Corian Lid 1 x Cover Gasket 1 x Vacuum Gauge 1 x 16 Position Adjustable Collection Rack 1 x Glass Block Safety Tray 16 x PTFE Tips 16 x Bulkhead Luer Fittings 16 x Plugs | |
| CLTTP050 | CLEAN-THRU® Tips | 50 |
| ECROCKER400 | Vacuum Pump (1/8 H.P. / 115V / 4.2amps / 60Hz) | 1 |
| ECUCTTRAP20 | 20 L Waste Trap | 1 |
| ECUCTTRAP20-ADPT | 3/8" X 1/4" PVFD Adapter for fitting Waste Trap to Glass Block Manifold | 1 |
| VMF02125 | 12 Position Large Volume Collection Rack | 1 |

PROCEDURE

Reagents:

| | |
|---|---|
| Methanol (MeOH) - HPLC grade | Acetone - Pesticide grade |
| n-Hexane – HPLC grade ($\geq 95\%$ n-hexane) | Ammonium hydroxide (28-30%) - ACS grade |
| 6N Hydrochloric acid (HCl) | Sodium thiosulfate - Reagent grade, anhydrous |
| Dichloromethane (DCM) - Pesticide grade, stabilized with amylene | |
| Sodium sulfate, ACS grade, anhydrous, granular 60 Mesh (UCT part#: ECSS05K) | |

SPE Procedure

Sample pretreatment

1. To 1 L of water sample add 80 mg of sodium thiosulfate if free chlorine present.
2. Adjust sample pH to less than 2 (use a pH meter) using 6N HCl.
3. Spike with surrogates.
4. For fortified samples, such as matrix spikes, spike target analytes, and mix well.

Tip 1: De-chlorinate sample prior to sample acidification.

Tip 2: Make sure sample pH is adjusted to ≤ 2 as measured with a calibrated pH meter; pH paper will not provide good enough specificity. Sample pH is critical to obtaining good recoveries for some acids and bases.

SPE system setup

1. Connect the carbon cartridge to the end of the 8270 cartridge using cartridge adapter (**AD0000AS**).
2. Insert a loose plug of deactivated glass wool into the 8270 cartridge. This will minimize sorbent clogging caused by samples with a high particulate content.
3. Attach the connected SPE cartridges to the SPE manifold.

Tip 3: A carbon cartridge is NOT needed if very polar analytes are not being analyzed (e.g. n-nitrosodimethylamine, n-nitrosomethylethylamine, methyl methanesulfonate, ethyl methanesulfonate, and 1-Nitrosopyrrolidine)

Cartridge conditioning

1. Wash the cartridges with 15 mL of dichloromethane (DCM), allow them to soak for 1 min so that both cartridges are completely wetted.
2. Apply full vacuum for 1 min.
3. Add 10 mL of methanol. Allow the methanol to drip through both cartridges to the point where the solvent meniscus is just at the top of the 8270 cartridge sorbent bed. Do not let cartridges go dry from this step until instructed to do so at the cartridge drying step.
4. Add 10 mL of reagent water and draw through the cartridges until the water layer is just to the top of the 8270 cartridge sorbent bed.
5. Add 10 mL of 0.05N HCl and draw through until the solvent is about 1 cm above the 8270 cartridge sorbent bed

Sample extraction

1. Attach the large sample delivery tube (**VMFSTFR12**) to the 8270 cartridge, and insert the stainless steel end of the tube into the sample bottle.
2. Turn on the vacuum to the manifold and adjust it for a fast, dropwise sample flow (about 10-15 mL/min). Draw the entire sample through the cartridges.

Washing and drying

1. Rinse the sample bottle with 5 mL of reagent water, and apply the rinsate to the cartridges.
2. Disassemble the tube and the connected SPE cartridges. Dry the 8270 cartridge under full vacuum for 10 min and the carbon cartridge for 15 min.

Tip 4: Remove as much water as possible, wet sorbent results in low analyte recovery.

Tip 5: For TCLP samples, rinse the 8270 cartridge with 10 mL of reagent water (bottle rinse); rinse the carbon cartridge with 3 mL of 28-30% ammonium hydroxide followed by 3 mL reagent water to remove the trapped acetic acid which otherwise will interfere the GC chromatogram and may degrade the GC column.

Analyte elution

NOTE: The 8270 and Activated Carbon Cartridges are eluted separately

1. Insert glass collection vials (60 mL size) into the manifold to collect eluents.
2. Apply the elution solvents described below to the respective SPE cartridges; draw 1/3 through, allow the solvent to soak for 1 min., and draw the remaining through in a slow dropwise fashion.

a. 8270 Cartridge Elution:

- i. 10 mL of 1:1 hexane:acetone (sample bottle and transfer tube rinse)
- ii. 20 mL of DCM (sample bottle and transfer tube rinse)
- iii. Remove the transfer tube from the 8270 cartridge
- iv. Remove the eluate container from the manifold
- v. Add 2-3 mL of 28-30% ammonium hydroxide to the 8270 cartridge, soak 2 min.; drain to waste; leave on full vacuum for 1 min.
- vi. Re-insert collection vials into the manifold
- vii. Elute with 3 x 7 mL of DCM

b. Activated Carbon Cartridge Elution:

- i. Insert a fresh collection vial for the carbon cartridge eluent.
- ii. Elute with: 4 x 4 mL of DCM.

Tip 6: The bottle rinse is critical for good recovery of PAHs which can be adsorbed onto a glass surface.

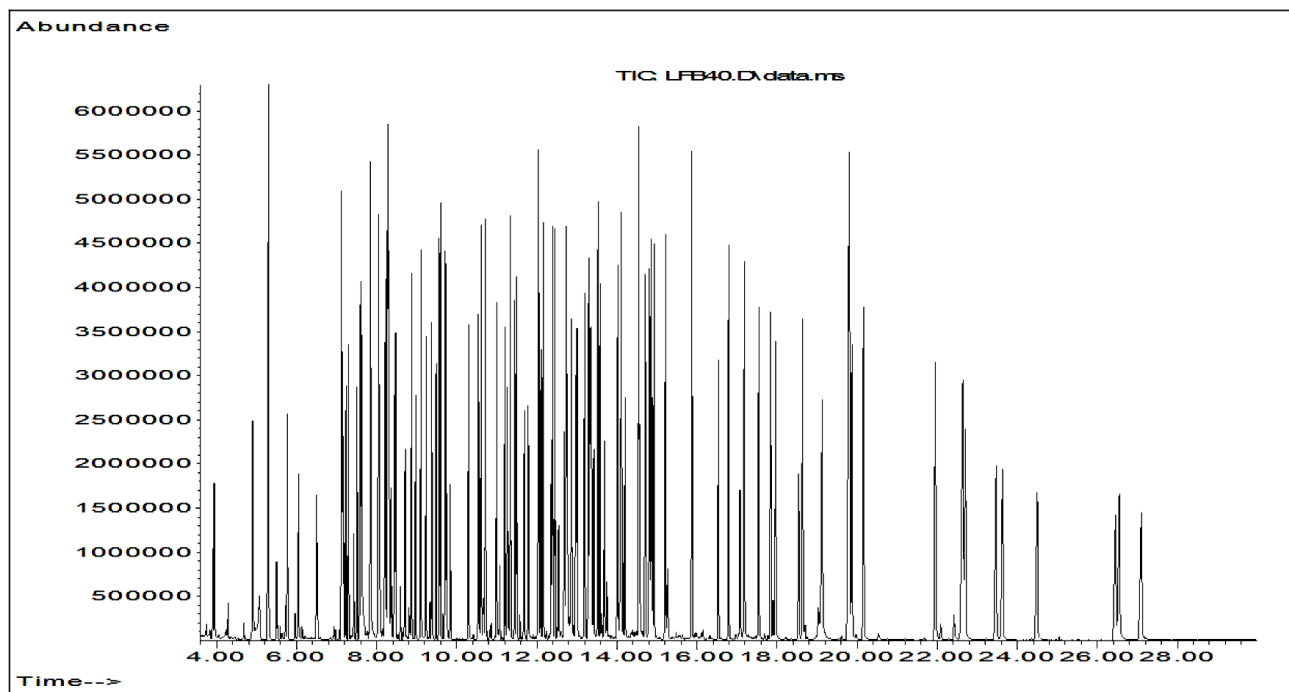
Eluent Drying

1. Dry the eluate using a fritted 83 mL blank cartridge (or a glass funnel stopped with deactivated glass wool) holding about 20 g of anhydrous Na_2SO_4 , pre-rinse the Na_2SO_4 with 5 mL of DCM.
2. Insert a fresh 60-mL glass vial into the manifold to collect the dried 8270 eluent.
3. Pass the eluent from the 8270 cartridge through the Na_2SO_4 bed.
4. Insert a fresh 60-mL glass vial into the manifold to collect the dried carbon cartridge eluent.
5. Pass the eluent from the activated carbon cartridge through the Na_2SO_4 bed.
6. Rinse the vials with 10 mL of DCM and pass the rinsate through the Na_2SO_4 ; collect in the dried carbon cartridge collection vial.

Tip 7: If the Na_2SO_4 appears greenish, rinse with additional solvent until it turns white.

Concentration

1. Concentrate the dried eluent to about 1 mL under a gentle stream of N₂ at 40° C. Combine the concentrated eluates from the 8270 and carbon cartridges and continue concentrating the combined extract to about 0.7-0.9 mL.
2. Transfer the concentrated extract to a 2 mL autosampler vial, adjust the final volume to 1 mL with DCM.
3. Add Internal Standards and mix well. The samples are ready for GC/MS analysis.



Chromatogram of a Laboratory Fortified Blank at 40 µg/L

Table of Compounds Tested

| Compound | Fortified reagent blank | | MDL (µg/L) (n=7) |
|---------------------------------|-------------------------|------------|---------------------|
| | Recovery% | RSD% (n=4) | |
| 1,2,4,5-Tetrachlorobenzene | 99.5 | 4.1 | 1.7 |
| 1,2,4-Trichlorobenzene | 88.5 | 5.7 | 0.7 |
| 1,2-Dichlorobenzene | 90.3 | 3.9 | 0.9 |
| 1,3,5-Trinitrobenzene | 124.4 | 2.8 | 1.4 |
| 1,3-Dichlorobenzene | 85.8 | 2.8 | 0.5 |
| 1,4-Dichlorobenzene | 89.1 | 1.1 | 0.8 |
| 1,4-Naphthalenedione | 95.3 | 4.3 | 1.7 |
| 1-Chloronaphthalene | 112.2 | 2.7 | 2.1 |
| 1-Methyl fluorene | 86.9 | 0.9 | 0.4 |
| 1-Methyl phenanthrene | 89.8 | 1.3 | 0.5 |
| 1-Methylnaphthalene | 102.1 | 2.7 | 2.2 |
| 1-Naphthalenamine | 112.3 | 4.7 | 2.8 |
| 1-Nitrosopiperidine | 88.9 | 5.8 | 0.7 |
| 1-Nitrosopyrrolidine | 91.8 | 7.2 | 1.1 |
| 2,3,4,6-Tetrachlorophenol | 103.2 | 0.9 | 0.8 |
| 2,3-Dichloroaniline | 91.4 | 0.6 | 0.5 |
| 2,4,5-Trichlorophenol | 123.5 | 4.7 | 2.4 |
| 2,4,6-Trichlorophenol | 106.5 | 3.6 | 2.0 |
| 2,4-Dichlorophenol | 97.3 | 6.5 | 0.5 |
| 2,4-Dimethylphenol | 99.0 | 6.4 | 0.8 |
| 2,4-Dinitrophenol | 122.4 | 2.0 | 2.4 |
| 2,4-Dinitrotoluene | 112.0 | 1.7 | 1.1 |
| 2,6-Dichlorophenol | 113.3 | 0.7 | 1.6 |
| 2,6-Dinitrotoluene | 106.3 | 2.3 | 1.9 |
| 2-Acetylaminofluorene | 109.0 | 6.5 | 1.3 |
| 2-Chloronaphthalene | 96.9 | 2.8 | 2.3 |
| 2-Chlorophenol | 99.4 | 2.9 | 0.6 |
| 2-Isopropyl naphthalene | 73.1 | 0.1 | 0.4 |
| 2-Methylnaphthalene | 101.2 | 4.9 | 2.2 |
| 2-Methylphenol | 97.6 | 6.7 | 1.2 |
| 2-Naphthalenamine | 130.5 | 2.7 | 1.2 |
| 2-Nitroaniline | 107.5 | 3.6 | 2.4 |
| 2-Nitrophenol | 98.2 | 5.9 | 1.1 |
| 2-Picoline | 74.4 | 5.0 | 0.7 |
| 3&4-Methylphenol | 104.2 | 6.6 | 3.0 |
| 3,3'-Dichlorobenzidine | 72.3 | 11.4 | 1.2 |
| 3,6-Dimethyl phenanthrene | 90.6 | 0.9 | 0.5 |
| 3-Methylcholanthrene | 106.5 | 1.4 | 0.7 |
| 3-Nitroaniline | 100.4 | 4.9 | 0.6 |
| 3-Nitrophenol | 99.5 | 8.2 | 0.9 |
| 4,4'-DDD | 94.4 | 0.8 | 0.3 |
| 4,4'-DDE | 91.8 | 0.4 | 0.5 |
| 4,4'-DDT | 94.0 | 0.3 | 0.6 |
| 4,6-Dinitro-2-methylphenol | 116.8 | 4.5 | 1.6 |
| 4-Aminobiphenyl | 103.8 | 13.5 | 1.6 |
| 4-Chloro-3-methylphenol | 111.7 | 6.3 | 2.2 |
| 4-Chloroaniline | 105.0 | 3.9 | 1.0 |
| 4-Chlorophenylphenylether | 99.5 | 3.0 | 1.4 |
| 4-Nitroaniline | 114.9 | 4.6 | 1.6 |
| 4-Nitrophenol | 97.2 | 3.0 | 3.3 |
| 5-Nitro-o-toluidine | 94.7 | 4.0 | 1.3 |
| 7,12-Dimethyl benz[a]anthracene | 99.9 | 6.1 | 0.7 |
| Acenaphthene | 100.1 | 1.3 | 0.7 |
| Acenaphthylene | 102.6 | 0.6 | 1.9 |
| Acetophenone | 101.8 | 7.4 | 1.2 |
| Aldrin | 89.5 | 0.8 | 0.2 |
| alpha lindane | 90.1 | 0.2 | 0.4 |
| Aniline | 90.0 | 3.2 | 2.1 |
| Anthracene | 109.7 | 1.1 | 1.4 |
| Azobenzene | 105.5 | 5.2 | 1.5 |
| Benz[a]anthracene | 103.3 | 6.2 | 1.4 |
| Benzidine | 66.8 | 14.0 | 0.9 |
| Benzo[a]pyrene | 99.3 | 2.1 | 0.8 |
| Benzo[b]fluoranthene | 99.4 | 7.0 | 0.7 |
| Benzo[g,h,i]perylene | 104.2 | 1.1 | 0.9 |
| Benzo[k]fluoranthene | 108.1 | 5.4 | 0.6 |
| Benzoic acid | 115.0 | 4.7 | 1.1 |
| Benzyl alcohol | 72.9 | 12.9 | 1.8 |
| Benzyl butyl phthalate | 111.8 | 6.0 | 1.1 |
| beta lindane | 95.2 | 1.1 | 0.4 |
| Bis(2-ethylhexyl) phthalate | 113.2 | 2.0 | 1.1 |
| Bis[2-chloroethoxy]methane | 91.0 | 7.8 | 0.8 |
| Bis[2-chloroethyl]ether | 88.5 | 3.0 | 0.7 |

| Compound | Fortified reagent blank | | MDL (µg/L) (n=7) |
|--------------------------------|-------------------------|------------|----------------------------------|
| | Recovery% | RSD% (n=4) | |
| Bis[2-chloroisopropyl]ether | 87.3 | 4.5 | 0.5 |
| Bromophenoxybenzene | 99.6 | 4.8 | 1.1 |
| Carbazole | 109.6 | 3.3 | 1.2 |
| Chlorobenzilate | 116.3 | 9.4 | 0.8 |
| Chrysene | 103.3 | 1.2 | 0.6 |
| delta lindane | 95.2 | 0.8 | 0.5 |
| Diallate (cis & trans) | 104.7 | 4.5 | 1.7 |
| Dibenz[a,h]anthracene | 108.8 | 2.5 | 0.8 |
| Dibenzofuran | 102.0 | 0.6 | 0.8 |
| Dibutyl phthalate | 114.6 | 6.2 | 1.3 |
| Dieldrin | 94.5 | 0.7 | 0.5 |
| Diethyl phthalate | 110.4 | 1.2 | 1.4 |
| Dimethoate | 96.6 | 0.7 | 0.7 |
| Dimethyl phthalate | 110.3 | 1.3 | 2.1 |
| Di-n-octyl phthalate | 116.6 | 5.9 | 0.5 |
| Dinoseb | 121.9 | 1.7 | 1.2 |
| Diphenylamine | 109.9 | 4.8 | 1.5 |
| Disulfoton | 87.0 | 0.6 | 0.8 |
| Endosulfan I | 93.8 | 0.7 | 0.4 |
| Endosulfan II | 96.5 | 0.5 | 0.4 |
| Endosulfan sulfate | 96.2 | 0.7 | 0.6 |
| Endrin | 97.4 | 1.0 | 0.4 |
| Endrin aldehyde | 93.4 | 0.5 | 0.8 |
| Ethyl methanesulfonate | 92.5 | 3.7 | 1.0 |
| Famphur | 109.3 | 1.2 | 3.4 |
| Fluoranthene | 105.8 | 6.1 | 1.2 |
| Fluorene | 103.7 | 2.6 | 1.4 |
| gamma lindane | 93.1 | 1.3 | 0.4 |
| Heptachlor | 88.1 | 1.0 | 0.4 |
| Heptachlor epoxide | 93.4 | 0.9 | 0.4 |
| Hexachlorobenzene | 101.3 | 6.1 | 1.1 |
| Hexachlorobutadiene | 85.0 | 1.0 | 1.0 |
| Hexachloroethane | 92.6 | 6.0 | 1.1 |
| Hexachloropropene | 72.1 | 1.1 | 0.8 |
| Hexachlorocyclopentadiene | 85.9 | 3.1 | 1.1 |
| Indeno[1,2,3-c,d]pyrene | 103.2 | 2.5 | 0.9 |
| Isodrin | 105.1 | 7.2 | 1.0 |
| Isophorone | 91.0 | 6.8 | 1.0 |
| Isosafrole (cis & trans) | 102.9 | 6.1 | 2.1 |
| Methyl methanesulfonate | 70.8 | 3.5 | 0.5 |
| Methyl parathion | 96.6 | 0.4 | 0.9 |
| Naphthalene | 97.2 | 2.3 | 0.7 |
| Nitrobenzene | 94.0 | 7.2 | 1.2 |
| N-nitro-di-n-propylamine | 99.3 | 6.3 | 0.9 |
| N-nitroso di-n-butylamine | 99.9 | 4.7 | 2.3 |
| N-nitrosodiethylamine | 89.4 | 3.7 | 0.7 |
| N-nitrosodimethylamine | 68.8 | 3.0 | 0.7 |
| N-nitrosomethylethylamine | 87.4 | 2.5 | 0.9 |
| o,o,o-Triethylphosphorothioate | 90.8 | 0.4 | 0.4 |
| o-Toluidine | 91.4 | 9.7 | 1.3 |
| Parathion | 95.8 | 0.7 | 0.7 |
| p-Dimethylaminoazobenzene | 91.5 | 10.5 | 0.6 |
| Pentachlorobenzene | 90.9 | 1.0 | 0.4 |
| Pentachloroethane | 86.0 | 3.8 | 0.7 |
| Pentachloronitrobenzene | 104.3 | 4.2 | 1.4 |
| Pentachlorophenol | 109.3 | 3.3 | 2.6 |
| Phenacetin | 116.4 | 3.9 | 1.4 |
| Phenanthrene | 108.0 | 0.4 | 1.0 |
| Phenol | 56.2 | 4.2 | 1.1 |
| Phorate | 86.7 | 0.1 | 0.6 |
| Pronamide | 111.2 | 5.2 | 2.3 |
| Pyrene | 109.1 | 8.5 | 1.1 |
| Pyridine | 46.1 | 8.0 | 0.6 |
| Safrole | 90.7 | 4.3 | 1.3 |
| Sulfotep | 92.5 | 0.8 | 0.3 |
| Thionazin | 95.1 | 0.7 | 0.8 |
| Surrogates | | | |
| 2-Fluorophenol (S) | 87.2 | 0.6 | MDL not determined for surrogate |
| Phenol d6 (S) | 59.1 | 0.4 | |
| Nitrobenzene d5 (S) | 94.3 | 1.0 | |
| 2-Fluorobiphenyl (S) | 81.5 | 0.5 | |
| 2,4,6-Tribromophenol (S) | 95.4 | 0.2 | |
| p-Terphenyl d14 (S) | 97.5 | 1.0 | |

PRICES AND TERMS

Our prices are subject to change without notice. The price in effect when we receive your order will apply. All prices are in US Dollars and are F.O.B. Terms of payment are net 30 days.

MINIMUM ORDERS

We welcome all orders, therefore, we do not have a minimum order requirement. When ordering, please include your purchase order number, complete "Ship To" and "Bill To" address, catalog number, quantity, and description of product(s). Also include your name and a phone number where you can be reached should we have any questions concerning your order.

SHIPMENTS

Normal processing is within 24 hours after receipt of an order. Unless special shipping requests have been made, our trained staff will send all orders by UPS Ground service. The appropriate shipping charges (freight & insurance costs) will be added to the invoice, unless otherwise instructed by the customer.

SPECIAL PRICING

We offer special pricing for volume purchases and standing orders. These discounts apply to bonded phase extraction column purchases only. Please call a sales representative for more information on special pricing qualifications.

RETURN POLICY

Our Quality Manager will handle all returns. Before returning merchandise, please call to obtain a return authorization number from the quality manager. We will need to know the reason for the return, date of purchase, purchase order number and invoice number in order to issue a return authorization number. Return merchandise must be received before a credit can be issued. Returns will not be accepted after 90 days. A restocking fee of 25% of the price paid, or a minimum of \$25.00 (whichever is greater) will be charged on all returns.

WARRANTY

All products manufactured by UCT are guaranteed against defects in materials and workmanship for a period of 90 days after shipment. UCT will replace any items that prove to be defective during this time period. The exclusive remedy requires the end user to first advise UCT of the defective product by phone or in writing and must include order number, the lot number and the shipping date.

To initiate this action, photographs of the product, including packaging and labeling of the containers, must be submitted to the UCT Representative for approval. With approval a return authorization can be initiated, and must be received within 30 days. Once the materials arrive at UCT a further inspection of the materials must be completed and accepted by our Quality Manager prior to further action of credits or replacement. UCT's total liability is limited to the replacement cost of UCT products.

This warranty does not apply to damage resulting from misuse.

Placing An Order

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