

# PLE™

## Pressurized Liquid Extraction

*Automated High Speed  
Pressurized Liquid Extraction*



# FMS

Fluid Management Systems

*Affordable Laboratory Solutions*

# PLE™ Pressurized Liquid Extraction

## *Automated High Speed Extraction System*

PLE™ is a high speed Pressurized Liquid Extraction system, designed to perform extraction of multiple samples simultaneously in minutes rather than hours, producing high recoveries and excellent precision for all analytes. Very inexpensive stainless steel extraction cells and end cap filtration keep the operational cost at a minimum.

The optional disposable end cap filtration increases productivity and saves valuable time.

### ***Processes 1 to 6 Samples Simultaneously***

PLE processes samples simultaneously saving valuable time.

### ***Reduces Solvent Cost***

Uses as little as 15ml of solvent as compared to more than 500ml of solvent required to perform Soxhlet extractions.

### ***Reduces Solvent Waste***

PLE reduces solvent waste through efficient use of solvents.

### ***Increases Productivity***

The entire extraction & clean-up may be performed in less than 30 minutes. Traditional methods could take 10 - 16 hours.

### ***Reduces Operating Cost***

Rapid extraction & clean-up, along with reduced solvent use and waste, reduces operating costs by as much as 70 percent.

### ***Extraction Cell Size 5 -250 ml***

Run small to large sample sizes with the same basic system.

### ***Modular, Expandable & Affordable***

With the modular PLE design, one can purchase a 1 to 3 sample system at a very affordable price. The system can be expanded to a 5 or 6 sample system as one's application grows.

### ***One Step Extraction & Clean-up***

Optional in-line clean-up module performs the entire extraction and clean-up in one step. Thereby, increasing speed & reducing cost of sample prep.



***More efficient and cost effective  
than traditional processing methods***



# Fast Automated Extraction

## Fast and Efficient Simultaneous Extraction Utilizing High Pressure and Temperature

During the extraction process the solvents inside the PLE™ extraction cell are brought near their supercritical region which has high extraction properties. At high pressure and high temperatures the solvents penetrate the solid samples at a much higher rate permitting a fast and efficient extraction process with minimal solvent usage.

### 5 to 250ml Extraction Cell Sizes

PLE™ offers 5-250 ml low cost stainless steel extraction cells with end caps Teflon filtration. This wide range of extraction cells allows the use of the same unit for all sample sizes, even in the same run.

### Cross Contamination Free Operation

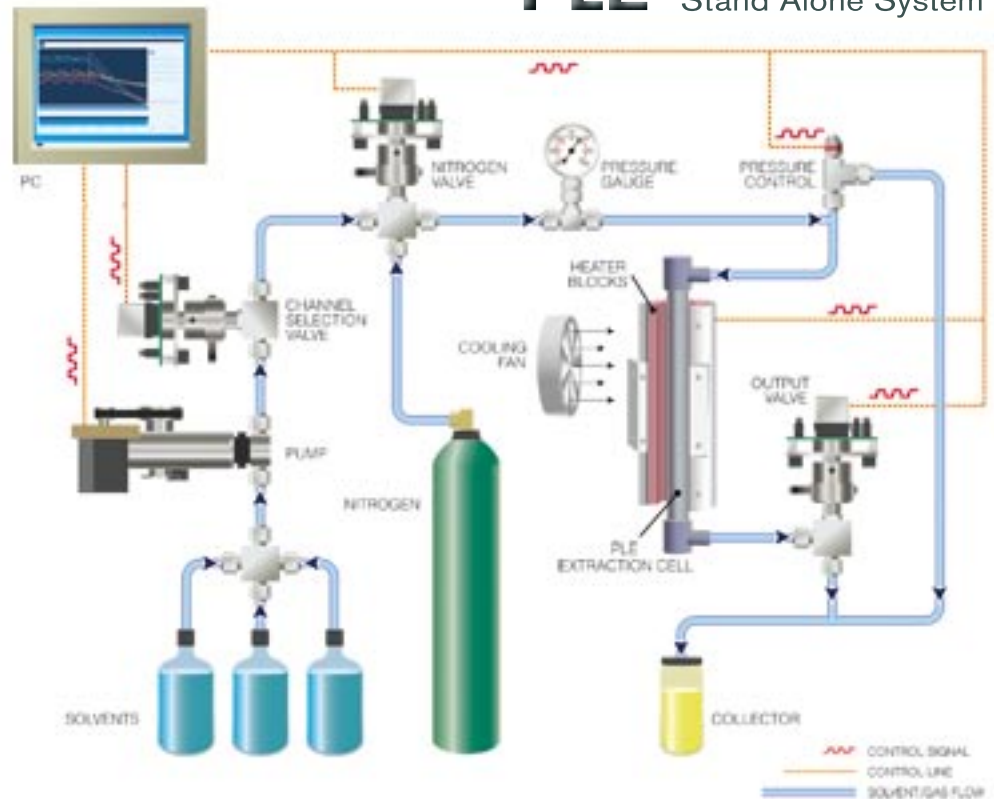
Optional low cost disposable extraction cells and Teflon end caps filtration ensure trouble free extraction with no cross contamination..

### Automatic Operation & Documentation

Real time software allows 6 channels of pressure and 6 channels of temperature data to be plotted simultaneously. This powerful feature allows automatic documentation of the entire extraction data. The temperature and pressure data can be superimposed and printed in graphic or tabular format and stored for future reference.



## PLE™ Stand Alone System



# Patented One-Step Extraction & Clean-up

The PLE patented one step extraction and clean-up design has the unusual flexibility to perform extraction as well as clean-up in one run. Depending on the sample size and the extent of clean-up, three configurations are available.

## PLE/Power-Prep

### Dual Extraction & Clean-up System

The Dual PLE/Power-Prep consists of two systems in one economical package and is truly the new frontier in rapid sample preparation for POPs analysis. The system can be used to perform extraction, clean-up or both extraction and clean-up. The modular and compact design of the systems enable the user to expand from one to six samples. The user can therefore, start off with a single sample system and expand up to a six sample system as user throughput demand increases.



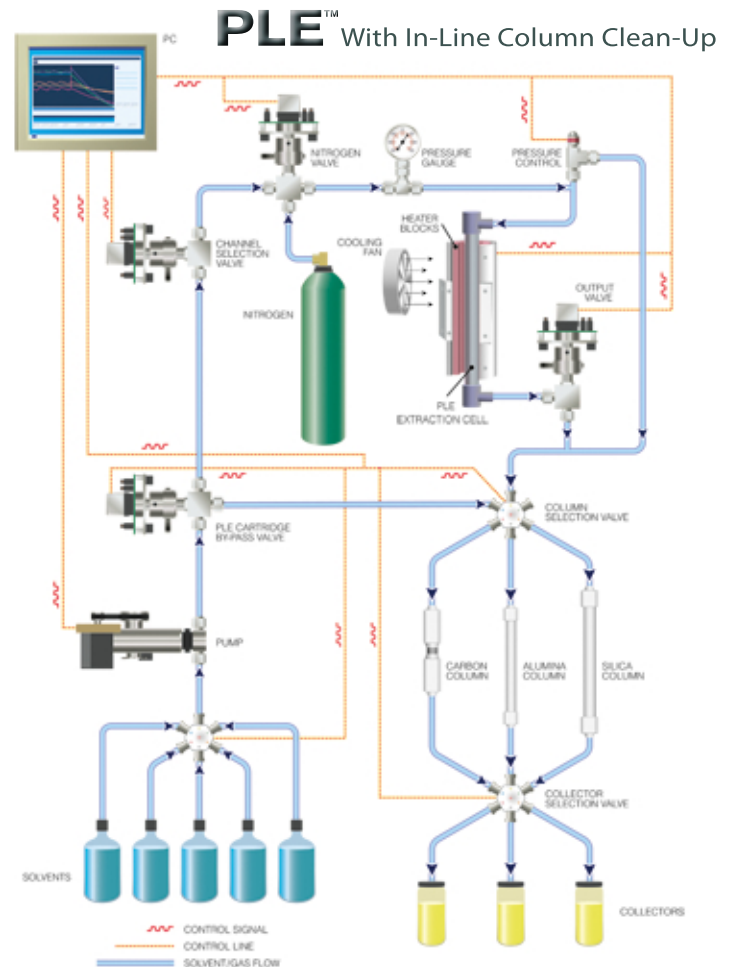
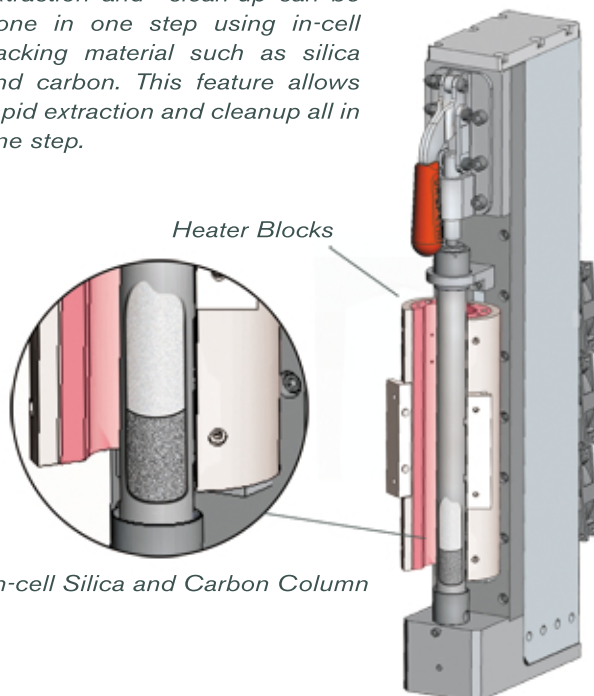
### In-line Column Clean-up

An optional In-line clean-up module allows additional clean-up columns to be added to the output of extraction cells for cleaning the sample prior to GC./MS analysis. This powerful feature of PLE saves time and money while producing excellent recoveries and precise results for all analytes. FMS offers a wide variety of disposable Teflon columns from 0.25 to 50 grams capacity.



### In-cell Column Clean-up

With PLE system, the entire extraction and clean-up can be done in one step using in-cell packing material such as silica and carbon. This feature allows rapid extraction and cleanup all in one step.



# Electro Mechanical & Chemical Controls

## Complete Control & Monitoring by PC

The entire extraction process is PC controlled allowing the laboratory technician to store and edit extraction protocols, as well as monitor and store extraction data.

## Modular Construction provides for Easy Maintenance

The PLE™ modular units as well as exposed plumbing construction makes for efficient system maintenance. The PLE™ channel is designed to operate independently, should one channel fail the others will continue to perform. This versatility ensures ease of replacement with no down time.

## Leak & Clog Free Operation

Simple design along with large bore plumbing enables the PLE to operate virtually leak and clog free.

## A Versatile Method Development Tool

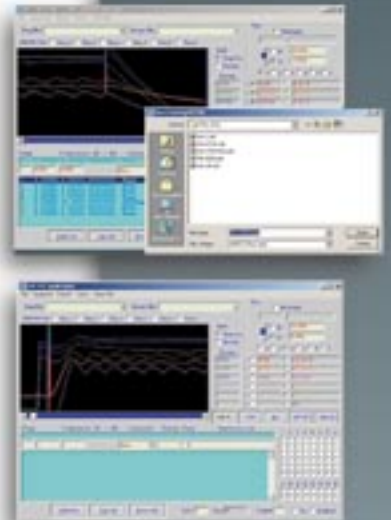
The powerful DMS 6000 real time software along with a large variety of extraction cell capacities and the ability to select multiple solvents, different temperature settings, as well as storage of data makes the PLE the perfect development tool.

## Multiple Extraction

Programming of variable pressure and temperature allows extraction of a variety of different compounds.

## Multiple Method Storage

The DMS-6000 Editor allows multiple methods to be stored. In each method parameters such as time, solvent, volume and final temperature can be set for each step. Pressure and temperature as well as dispensed volumes are displayed every second and stored for future reference. Six channels of pressure and six channels of temperature may also be plotted in real time. This powerful feature allows automatic documentation of the entire extraction data.



## Applications Reliable High Speed Analysis

### For the Analysis of:

|                        |                     |
|------------------------|---------------------|
| Dioxins and Furans     | PBDs and other BFRs |
| PCBs                   | TPH                 |
| Pesticides             | Herbicides          |
| PAHs                   | Explosives          |
| Vitamins & Antibiotics |                     |

### Types of Samples:

|   |
|---|
| <b>Biological Samples</b>               |
| Serum                                   |
| Adipose tissue                          |
| <b>Natural Products</b>                 |
| Natural products                        |
| Herbal products                         |
| <b>Pharmaceutical</b>                   |
| Vitamins and antibiotics                |
| dietary supplements                     |
| <b>Industrial Products</b>              |
| Detergents                              |
| Paper and pulp                          |
| Textiles and fibers                     |
| <b>Environmental</b>                    |
| Soil                                    |
| Sludge                                  |
| Air filters & cartridges (XAD and PUFs) |
| Waste water                             |
| <b>Food Samples</b>                     |
| Fish                                    |
| Meat                                    |
| Fat                                     |
| Milk                                    |
| Agricultural products                   |



## Modular, Expandable & Affordable

The PLE™ is modular and expandable from 1 to 6 samples, allowing the user to expand the system as the demand for higher throughput grows. This feature makes the PLE™ the most affordable on the market.



## Recoveries

### Dioxins/Furans/PCBs

The following are typical recoveries using fish sample:

|                       |    |
|-----------------------|----|
| 2378 - TCDD           | 75 |
| 2378 - TCDF           | 70 |
| 12378 - PeCDD         | 80 |
| 12378 - PeCDF         | 80 |
| 23478 - PeCDF         | 84 |
| 123478 - HXCDD        | 91 |
| 123678 - HXCDD        | 78 |
| 123789 - HXCDD        | 87 |
| 123478 - HXCDF        | 86 |
| 123678 - HXCDF        | 85 |
| 123789 - HXCDF        | 90 |
| 234678 - HXCDF        | 82 |
| 1234678 - HpCDF       | 82 |
| 1234678 - HXCDF       | 89 |
| OCDD                  | 74 |
| OCDF                  | 74 |
| 3344 - PCB (PCB 77)   | 78 |
| 3445 - PCB (PCB81)    | 82 |
| 33445 - PCB (PCB 126) | 85 |
| 334455 - PCB (PCB169) | 77 |

### PAHs

The following are typical recoveries using fish sample:

|                        |     |
|------------------------|-----|
| Naphthalene            | 98  |
| Acenaphthylene         | 98  |
| Acenaphthene           | 95  |
| Fluorene               | 96  |
| Phenanthrene           | 103 |
| Anthracene             | 96  |
| Fluoranthene           | 102 |
| Pyrene                 | 102 |
| Benz(a)anthracene      | 99  |
| Chrysene               | 101 |
| Benzo(a)fluoranthene   | 99  |
| Benzo(e)pyrene         | 97  |
| Benzo(a)pyrene         | 98  |
| Perylene               | 98  |
| Dibenz(ah)anthracene   | 100 |
| Indeno(1,2,3,cd)pyrene | 99  |
| Benzo(ghi)perylene     | 99  |
| 1-Methylphenanthrene   | 106 |
| C2-Phen/Anthracene     | 106 |
| Benzo(b)fluoranthene   | 96  |

## Pressurized Liquid Extraction Ordering Information

### PLE - Pressurized Liquid Extraction System

| Part Number | Description   |
|-------------|---|
| PLE /M1     | <b>PLE modular one sample extraction system</b><br>This system Process one sample                     |
| PLE/ M2     | <b>PLE modular two sample extraction system</b><br>This system Process two samples simultaneously     |
| PLE/ M3     | <b>PLE modular three sample extraction system</b><br>This system Process three samples simultaneously |
| PLE/ M4     | <b>PLE modular four sample extraction system</b><br>This system Process four samples simultaneously   |
| PLE/ M5     | <b>PLE modular five sample extraction system</b><br>This system Process five samples simultaneously   |
| PLE/ M6     | <b>PLE modular six sample extraction system</b><br>This system Process six samples simultaneously     |

### PLE Extraction Cells with Filtration Cartridges

| Part number      | Description  |
|------------------|--|
| PLE-CAR250-FLT10 | 250 ml stainless steel extraction cell with two end cap filtration |
| PLE-CAR100-FLT10 | 100 ml stainless steel extraction cell with two end cap filtration |
| PLE-CAR40-FLT10  | 40 ml stainless steel extraction cell with two end cap filtration  |
| PLE-CAR20-FLT10  | 20 ml stainless steel extraction cell with two end cap filtration  |

### PLE Extraction Cells

| Part number    | Description                           |
|----------------|---------------------------------------|
| PLE-ECEL-SS20  | 20ml stainless steel extraction cell  |
| PLE-ECEL-SS40  | 40ml stainless steel extraction cell  |
| PLE-ECEL-SS100 | 100ml stainless steel extraction cell |
| PLE-ECEL-SS250 | 250ml stainless steel extraction cell |

### PLE Filtration Cartridges

| Part number         | Description   |
|---------------------|---|
| PLE-FLT-250M-TEF    | Teflon, End cap filtration for 250 ml cell                  |
| PLE-FLT-100M-TEF    | Teflon, End cap filtration for 100, 40, 20 ml cell          |
| PLE-FLT-250M-SS     | Stainless steel Reusable End cap filtration for 250 ml cell |
| PLE-FLT-100M-SS 40, | Stainless steel Reusable End cap filtration for 100, 40,    |

### PLE Accessories

| Part number     | Description                                       |
|-----------------|---|
| PLE-HTB-SM      | Small Heater blocks for 20 - 40ml extraction cell |
| PLE-HTB-MD      | Medium Heater block for 100ml extraction cell     |
| PLE-HTB-LG      | Large Heater block for 250ml extraction cell      |
| PLE-EXT-40      | Extender for low volume columns                   |
| PLE-EXT-TUB     | Extension tubing for low volume column            |
| PLE-INT-SPC-100 | Teflon Spacer for 20,40,100 ml cell               |
| PLE-INT-SPC-250 | Teflon Spacer for 250ml cell                      |

### PLE Modules

| Part number | Description               |
|-------------|---------------------------|
| PLE-CNT-MD  | PLE Control module        |
| PLE-HPR-MD  | High Pressure pump module |
| PLE-SMP-MD  | Sample processing module  |
| PLE-COL-MD  | Column module             |

### Expansion Clean-up Modules

| Part number | Description                               |
|-------------|---|
| CLUP/1C     | Clean-up module with one Column plumbing  |
| CLUP/2C     | Clean-up module with two Columns plumbing |
| CLUP/3C     | Clean-up module with one Columns plumbing |
| PUMP-LP     | Pump Module, low pressure                 |
| CNTR-LP     | Control module, low pressure              |

### Portable Cart & Spil Tray

| Part number | Description   |
|-------------|---------------|
| SPIL-TRY    | Spil Tray     |
| PORT-CRT    | Portable Cart |