Thermo Scientific Dionex
AutoTrace 280 SPE Instrument

Automate Large-Volume

Solid-Phase Extractions

Thermo
S C I E N T I F I C

Thermo Scientific Dionex AutoTrace 280
System features and performance

### Automate Large Volume Solid-Phase Extractions

The Thermo Scientific™ Dionex™ AutoTrace™ 280 instrument is an automated solid-phase extraction (SPE) system for use with large samples (20 mL–20 L) to isolate trace organics in water or aqueous matrices. The compounds of interest are trapped on SPE adsorbents (cartridge or disk format), then eluted with strong solvents to generate an extract ready for analysis.

The Dionex AutoTrace 280™ instrument saves time, solvent, and labor ensuring high reproducibility and productivity for analytical laboratories. The instrument can process up to 6 samples in 2–3 hours with only 15 minutes of operator involvement. The Dionex AutoTrace 280 instrument uses powerful pumps (no check valves) and proven constant-flow technology to efficiently process even the most difficult samples. With Dionex AutoTrace and Thermo Scientific Dionex Accelerated Solvent Extraction (ASE) systems, laboratories can effectively automate the solvent-extraction process for liquid and solid matrices.

Dionex AutoTrace Offers Value

Dionex AutoTrace instruments offer many advantages for sample preparation over traditional techniques including:

- Solid-phase extraction technology to save time, solvent, and labor

- Decrease in analytical costs through savings of labor and solvents

- Increase in productivity or sample throughput from unattended operation

- Flexibility in operation: cartridges or 47 mm disks
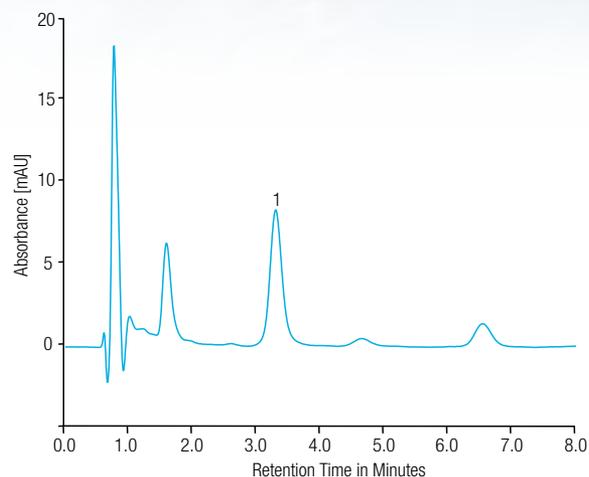
Sample Prep:	AutoTrace 280, 6 mL Barrel, 200 mg HRPHS Resin
Sample:	100 mL 0.033% soap in Sunnyvale tap water loaded onto the AT280, and eluted in 5mL of Acetonitrile or methanol
Flow rate:	10 mL/min
Elution solvent:	Acetonitrile or MeOH
Analytical Finish:	
Column:	Acclaim 120, 2X50mm
Flow rate:	0.21mL/min
Eluent:	65/35 acetonitrile/water
Detection:	UV 254nm
Peaks:	Analyte Concentration
	1. Triclosan 10 mg/L*

Figure 1. Chromatogram showing the separation of Triclosan using the Acclaim 120 column and Dionex SolEx HRPHS and the AT280 for automated Sample Preparation
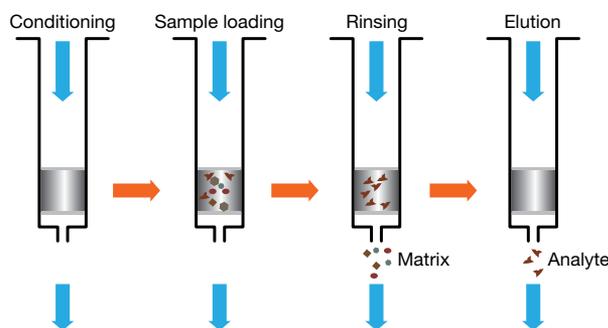

Features	Benefits/Values
Automated sample loading of liquids onto SPE cartridges	Allows unattended operation
Automated eluting of SPE cartridges with organic solvent	Allows unattended operation
Closed systems with fan to vent solvent vapors	Conserves valuable hood space since a fume hood is not required
SPE technology for liquid-liquid extraction	Reduces solvent usage and elimination of glassware for reduced operational cost
Positive pressure loading and elution of samples and solvents	Provides constant flow of liquids through SPE cartridges for improved analytical precision

Applications and Systems Performance

Current analytical methods that may require SPE preparation include GC, GC-MS, LC, and LC-MS, and cover the following sample matrices:

- Pesticides (OCPs, OPPs, diquats, and urea ionic pesticides)

- Pollutants (phenols, PCBs, nitrosamines, and dioxins)

- Personal care products (pharmaceuticals, steroids, and endocrine disruptors)

- Total petroleum hydrocarbons (DRO)

- Explosive residues

- Beverages and flavor components
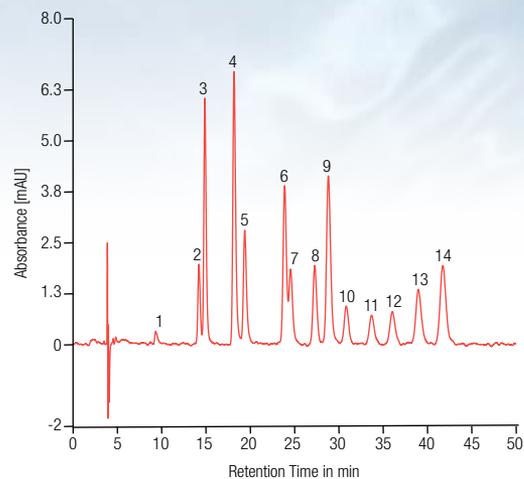
Sample Prep:	AutoTrace 280, 6 mL Barrel, 500 mg HRPHS Resin
Column:	Acclaim Explosives E2, 3 µm
	3.0 X 250 mm
Mobile phase:	48/52 v/v Methanol/Water
Temperature:	25°C
Flow rate:	0.3 mL/min
Inj. volume:	5 µL
Detection:	UV at 254 nm
Peaks:	(EPA 8330 mix, 2 ppm each)

1. HMX
2. RDX
3. 1,3,5- trinitrobenzene
4. 1,3-Dinitrobenzene
5. Nitrobenezne
6. 2,4,6-trinitrobenzene
7. Tetryl
8. 2,6-Dinitrotoluene
9. 2,4-Dinitrotoluene
10. 2-Nitrotoluene
11. 4-Nitrotoluene
12. 3-Nitrotoluene
13. 4-Amino-2,6-Dinitrotoluene
14. 2-Amino-4,6-Dinitrotoluene

Figure 2: Separation of 14 explosives in EPA 8330 on Acclaim Explosives E2 Column and Dionex SPE HRPHS and the AT280 for automated Sample Preparation

Drinking Water Applications:

U.S. EPA Method	Analytes	Analytical Methods
EPA 505	Organohalide Pesticides & PCB	GC
EPA 506	Phthalates and Adipate Esters	GC/PID
EPA 507	Nitrogen- and Phosphorus-Containing Pesticides	GC/NPD
EPA 521	Nitrosamines	GC/MS/MS
EPA 525.2	Semivolatile Organic Compounds (SVOC)	GC/MS
EPA 525.3	Semivolatile Organic Compounds (SVOC)	GC/MS
EPA 535	Acetic Herbicides	LC/MS/MS
EPA 539	Hormones	LC/MS/MS
EPA 547	Glyphosate (Roundup)	LC/MS

Wastewater Applications:

U.S. EPA Method	Analytes	Analytical Methods
EPA 608	Organochlorine pesticides (PCB)	GC
EPA 625	Semivolatile Organic Compounds (SVOC)	GC/MS
EPA 1613	Dioxins and Furans	GC/MS
EPA 1664	Oil & Grease	Gravimetry
EPA 1694	Pharmaceuticals & Personal Care Products	LC/MS/MS

Dionex AutoTrace 280

The Dionex AutoTrace instrument is suitable for a wide variety of matrices such as:

- Drinking water
- Ground or surface water
- Wastewater
- Beverages

Automation provides lower cost of analysis by reducing the amount of time required for extraction. More than half of the sample preparation cost for a typical vacuum manifold extraction is from operator labor. The Dionex AutoTrace 280 instrument provides unattended operation, significantly reducing the cost of analysis.

Percent savings when compared to traditional liquid-liquid techniques such as separatory funnel
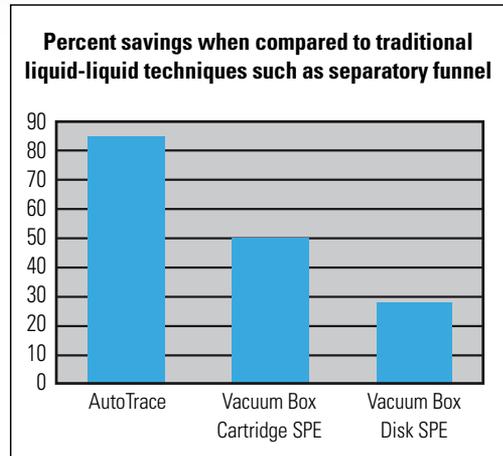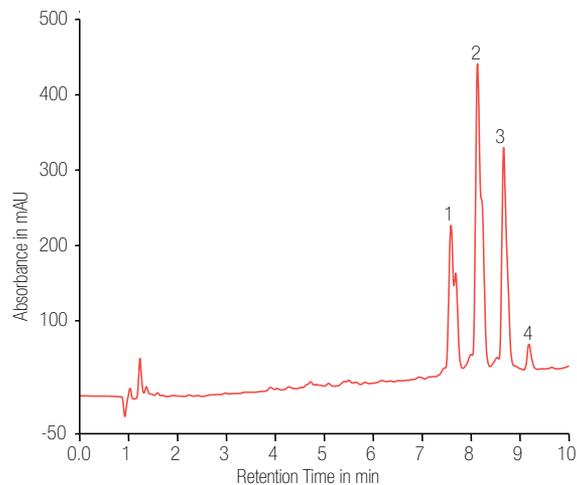
Instrument Operation

The Dionex AutoTrace 280 instrument automates the SPE process. First, the sample cartridges or disks are conditioned with solvent or buffer. Next, the liquid or water samples are pumped from the sample container through the SPE cartridges or disks. As the sample passes through the SPE material, analytes of interest are adsorbed and the liquid goes to aqueous waste. The SPE material is then rinsed to remove possible interferences. Finally, the analytes of interest are eluted from the SPE material with a strong solvent and collected.
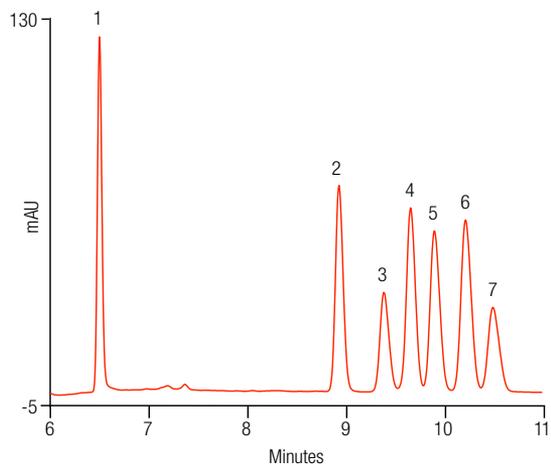
Sample Prep:	AutoTrace 280, 6 mL Barrel, 500 mg HRPHS Resin
Column:	Dionex Acclaim RSLC 120 C18, 2.1 × 150 mm
Mobile phase:	A: Water
	B: Acetonitrile
Gradient :	10–54% B (0–4 min)
	54% B (4–12 min)
	100% B (12–16 min)
	10% B (16–20 min)
Flow Rate:	0.20 mL/min
Inj. Volume:	2 µL
Column Temp.:	20 °C
Detection:	UV, 214 nm
Sample:	Standard mix, 50 mg/L each

Peaks:

1. Estriol	5. Equilin
2. Estradiol	6. Estrone
3. Testosterone	7. Androstenedione
4. Ethynylestradiol	

Figure 3: Hormones in Tap water Using the Acclaim RSLC C18 column and Dionex SolEx HRPHS and the AT280 for Automated Sample Preparation

Sample Prep:	AutoTrace 280,
	6 mL Barrel, 200 mg SAX Resin
Sample:	0.005% LAS, 20mL
Column:	Acclaim Surfactant Plus, 3µm, 3.0X100mm
Eluent: A:	Acetonitrile
	B: 0.1 M Ammonium Acetate, pH 5
Gradient:	-6.0 – 0.0 min – 25% A
	0.0 – 10.0 min – 80% A
Temperature:	30°C
Flow rate:	0.6mL/min
Inj. volume:	5µL
Detection:	UV at 225nm
Peaks:	Linear alkylbenzene sulfonate (LAS)

Figure 4: Linear Alkylbenzene Sulfonate in Wastewater Using the Acclaim Surfactant Plus column and SolEx SAX and the AT280 for automated Sample Preparation

Dionex AutoTrace 280

Key Specifications

Gas Regulator and Gas Gauge Range:

Output:	0–30 psi (0–1.4 bar)
Input:	100 psi (6.9 bar) maximum

Net Weight

95 lbs. (43.09 kg)

Dimensions (h × w × d)

23 x 25 × 27 in (57 × 63.5 × 69 cm)

Sample Rack: 8 × 16.5 × 13 in

Operating System Software

24 methods stored in the AutoTrace software

Unlimited number of methods stored in PC

Electrical

Voltage:	100, 120, 220, or 240 V ± 10%
Frequency:	47–63 Hz
Power:	150 Volt AC

Liquid Management

Air Syringe:	One 10 mL air syringe
LH Syringe:	One 10 mL liquid handling syringe
12-port Valve:	Rotary, sliding Rulon® seal
Valves:	3-way, Teflon®
Nozzles:	Stainless steel
Sample Inlet:	TFE tubing, 1/16" ID, 6 total provided

Sample Pumps

Displacement:	Positive
Accuracy:	± 2.5%
Tube Fitting:	Kynar®
Piston and Liner:	Ceramic
Non Use:	Acetic acid, acetone

SPE Configurations

1 mL Syringe:	Compatible cartridges
3 mL Syringe:	Compatible cartridges
6 mL Syringe:	Compatible cartridges
Disk Version:	47 mm SPE disk

Ordering Information

Ordering Information	
Description	**P/N**
Dionex AutoTrace 280 Automated Large Volume SPE for 47 mm Disks	071386
Dionex AutoTrace 280 Automated Large Volume SPE for 6 mL Cartridges	071385
Dionex AutoTrace 280 Automated Large Volume SPE for 3 mL Cartridges	072605
Dionex AutoTrace 280 Automated Large Volume SPE for 1 mL Cartridges	072604
Dionex AutoTrace 280 Automated Large Volume SPE for 6 mL Glass Cartridges	072606

Ordering
Information

Ordering Information	
Description	**P/N**
Polymeric HRPHS SPE Cartridges	
SolEx HRPHS, 48 Pack, 3 mL Barrel with 60 mg resin	088124
SolEx HRPHS, 48 Pack, 3 mL Barrel with 150 mg resin	088125
SolEx HRPHS, 48 Pack, 6 mL Barrel with 100 mg resin	088126
SolEx HRPHS, 48 Pack, 6 mL Barrel with 200 mg resin	088127
SolEx HRPHS, 36 Pack, 6 mL Barrel with 500 mg resin	088128
Polymeric SAX SPE Cartridges	
SolEx SAX, 48 Pack, 3 mL Barrel with 60 mg resin	088105
SolEx SAX, 48 Pack, 3 mL Barrel with 150 mg resin	088106
SolEx SAX, 48 Pack, 6 mL Barrel with 100 mg resin	088107
SolEx SAX, 48 Pack, 6 mL Barrel with 200 mg resin	088108
SolEx SAX, 36 Pack, 6 mL Barrel with 500 mg resin	088109
Polymeric SCX SPE Cartridges	
SolEx SCX, 48 Pack, 3 mL Barrel with 60 mg resin	088189
SolEx SCX, 48 Pack, 3 mL Barrel with 150 mg resin	088099
SolEx SCX, 48 Pack, 6 mL Barrel with 100 mg resin	088101
SolEx SCX, 48 Pack, 6 mL Barrel with 200 mg resin	088102
SolEx SCX, 36 Pack, 6 mL Barrel with 500 mg resin	088103
Polymeric WAX SPE Cartridges	
SolEx WAX, 48 Pack, 3 mL Barrel with 60 mg resin	088111
SolEx WAX, 48 Pack, 3 mL Barrel with 150 mg resin	088112
SolEx WAX, 48 Pack, 6 mL Barrel with 100 mg resin	088113
SolEx WAX, 48 Pack, 6 mL Barrel with 200 mg resin	088114
SolEx WAX, 36 Pack, 6 mL Barrel with 500 mg resin	088115
Polymeric WCX SPE Cartridge	
SolEx WCX, 48 Pack, 3 mL Barrel with 60 mg resin	088117
SolEx WCX, 48 Pack, 3 mL Barrel with 150 mg resin	088118
SolEx WCX, 48 Pack, 6 mL Barrel with 100 mg resin	088119
SolEx WCX, 48 Pack, 6 mL Barrel with 200 mg resin	088121
SolEx WCX, 36 Pack, 6 mL Barrel with 500 mg resin	088122

Ordering Information	
Description	**P/N**
Regular C8 and C18 SPE Cartridges	
SolEx C18 6 mL cartridge with 1 g of Resin, Package of 30	074410
SolEx C18 6 mL cartridge with 0.5 g of Resin, Package of 50	074417
SolEx C18 3 mL cartridge with 0.5 g of Resin, Package of 50	074412
SolEx C18 1 mL cartridge with 0.1 g of Resin, Package of 100	074623
SolEx C18 (un-endcapped material) 6 mL cartridge with 1.0 g of Resin, Package of 30	074416
SolEx C8 6 mL cartridge with 1 g of Resin, Package of 30	074411
SolEx C8 3 mL cartridge with 0.5 g of Resin, Package of 50	074413
SolEx C8 1 mL cartridge with 0.1 g of Resin, Package of 100	074415
Phthalate-Free C8 and C18 SPE Cartridges	
SolEx C18 Clean 6 mL cartridge with 1 g of Resin, Package of 30	075895
SolEx C8 Clean 6 mL cartridges with 0.5 g of p Resin, Package of 50	075897
C18 SPE Cartridges for EPA Method 525.2	
SolEx SCX, 48 Pack, 3 mL Barrel with 60 mg resin	075896
Unbonded Silica (Acid Washed) SPE Cartridges	
SolEx Silica 6 mL cartridge with 0.5 g of Resin, Package of 50	074589
Carbon-Based SPE Cartridges	
Activated Carbon (Charcoal) SPE Cartridges for EPA Methods 521 and 522 SolEx Carbon 6 mL cartridge with 2 g of Resin, Package of 20	074590
Graphitized Carbon SPE Cartridges for EPA Method 535 SolEx GCB 6 mL cartridge with 0.5 g of Resin, Package of 30	075898

Total Workflow Solutions from Thermo Scientific

Dionex ASE 150/350 Systems

Automated accelerated solvent extractor systems. Enables extraction of solid and semisolid samples using common solvents at elevated temperatures and pressures.

Rocket Evaporator

A revolutionary solvent evaporator that concentrates or dries up to 18 ASE tubes or 6 large-volume flasks unattended.

Thermo Scientific™ Dionex™ AutoTrace™ 280 Solid-Phase Extraction (SPE) Instrument

Automated SPE instrument that extracts large-volume samples (20 mL-20 L) for the isolation of trace organics in aqueous matrices. Produces analyte recoveries that are superior to manual liquid-liquid extraction techniques using less time and solvent.

Thermo Scientific™ TRACE™ 1300 Series GC Systems

The first and only gas chromatograph featuring user-exchangeable miniaturized, instant connect injectors and detectors that eliminate maintenance downtime and enable the user to quickly tailor instrument capability to specific applications and daily workload.

Thermo Scientific™ TSQ™ 8000 Triple Quadrupole GC-MS/MS System

A reliable, easy-to-use system that enables faster, more precise, error-free analyses, saving time and reducing laboratory costs. It enables more precise routine analyses and offers unstoppable productivity with uncompromised MS/MS simplicity.

Thermo Scientific™ Dionex™ UltiMate™ 3000 LC Systems

The UltiMate 3000 platform is the most complete LC solution provided by a single chromatography powerhouse. Our UltiMate 3000 systems are all UHPLC compatible by design and integrate unique hardware features, ultrafast separations and excellent resolution for an unprecedented level of flexibility, ease-of-use and high sample throughput.

Thermo Scientific™ Dionex™ Chromeleon™ Chromatography Data System Software

One scalable software platform for LC, GC, IC and MS that provides Operational Simplicity™ by streamlining your entire analysis process – ultimately boosting your lab's overall productivity and increasing the quality of your analytical results.

Find out more at **thermofisher.com/chromatography**

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