MILLIPORE



- *Five Empore™ membrane types available*
- *Clean eluates for improved LC-MS productivity*
- *High reproducibility and recovery*
- *Fast and easy set-up*
- *For automated and/or manual sample processing*

DATA SHEET

Multi-SPE Extraction Plates

96-well Multi-SPE Extraction Plates incorporate 3M™ Empore™ Membrane Technology for high performance sample preparation

Reliable LC-MS/MS Results

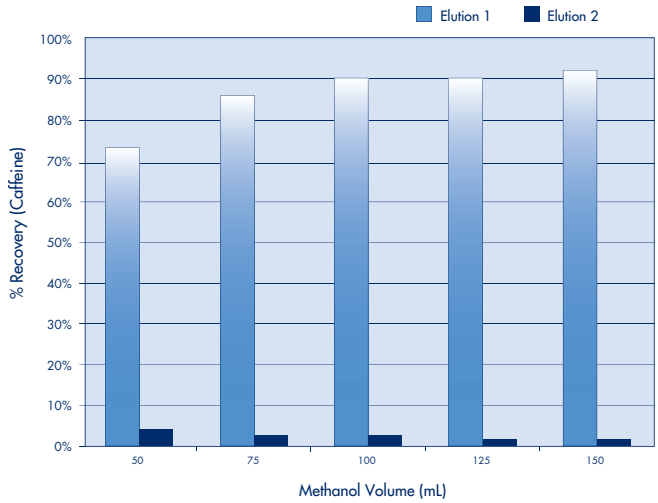
Solid phase extraction (SPE) is often the preferred method for the isolation and concentration of analytes at low detection levels because it can eliminate the interferences contributing to signal suppression. SPE yields clean, concentrated analyte solutions that allow improved signal-to-noise (S/N) ratios and low coefficients of variation (CVs) in LC-MS/MS analysis. Compared to other methods of sample preparation, SPE produces cleaner extracts that can help extend column life and decrease instrument downtime.

Use of automated liquid handling robots with SPE plates offers the ability to reduce the time and labor involved in LC-MS/MS sample prep.

High Extraction Efficiency Eliminates Steps for High Throughput Sample Processing

The small bed volume of the extraction membrane in the Multi-SPE Extraction Plate allows efficient recovery of retained analytes in a small volume of elution solvent and yields a clean, concentrated sample. Elution with a mobile phase compatible solution can eliminate the need to dry-down and reconstitute the sample prior to injection onto the LC or LC-MS. If sample evaporation and reconstitution are necessary, the low elution volume reduces the time necessary to dry down the sample eluant.

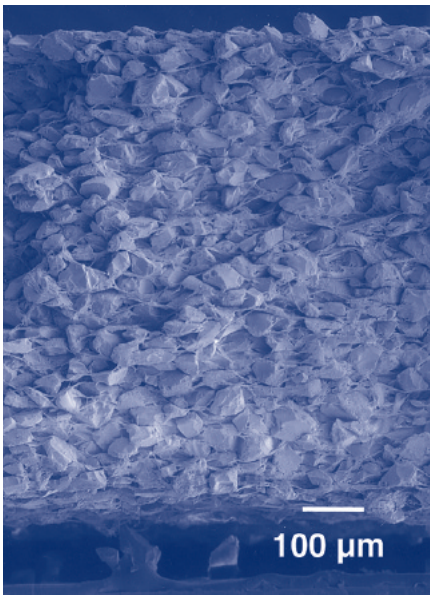
High Recovery with Low Elution Volumes



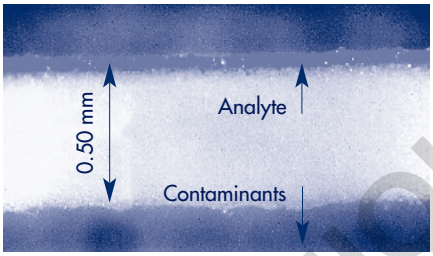
Using caffeine on a Multi-SPE C18 Extraction Plate, 90% recovery was obtained with a single 100 µL aliquot of methanol for elution.

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High Uniformity



The 3M™ Empore™ membrane is composed of chromatographic particles from 40 – 60 µm.



The bed volume of the Empore™ extraction membrane is thinner yet more efficient than standard sorbent matrices, allowing the use of less elution solvent. The above micrograph shows that analyte is concentrated in a very narrow zone on the membrane surface.

Automation-Compatible Design

Multi-SPE Extraction Plates are adaptable to a variety of automated liquid handling and robotic workstations for increased throughput, performance, and hands-off convenience. Automated workstations eliminate tedious manual pipetting steps, reduce human errors, and improve precision and accuracy.

High Performance SPE Membrane Technology

Multi-SPE Extraction Plates are designed for high throughput sample purification and concentration. The plate wells contain Empore™ extraction membranes, which yield clean, concentrated sample eluates for improved LC-MS efficiency and well-to-well reproducibility. Multi-SPE Extraction Plates are available with five solid phase extraction sorbents to support a wide range of application needs.

The rapid binding kinetics of Empore™ extraction membranes improve precision and offer advantages compared to packed bed columns.

Empore™ extraction membranes are produced by trapping sorbent particles within an inert matrix of polytetrafluoroethylene (PTFE). The resulting particle-loaded membrane yields a denser, more uniform extraction bed than can be achieved with traditional loosely packed SPE particles.

The dense particle packing and uniform distribution within Empore™ extraction membranes allows for the use of less sorbent mass and thus lower elution volumes. Additionally the particle-loaded membranes capture analytes more efficiently than packed bed columns, eliminating the need to optimize flow rate.

No detectable extractables are created by the inert PTFE matrix of the Empore™ membrane, resulting in clean recovered eluant and longer column life.

High Reproducibility

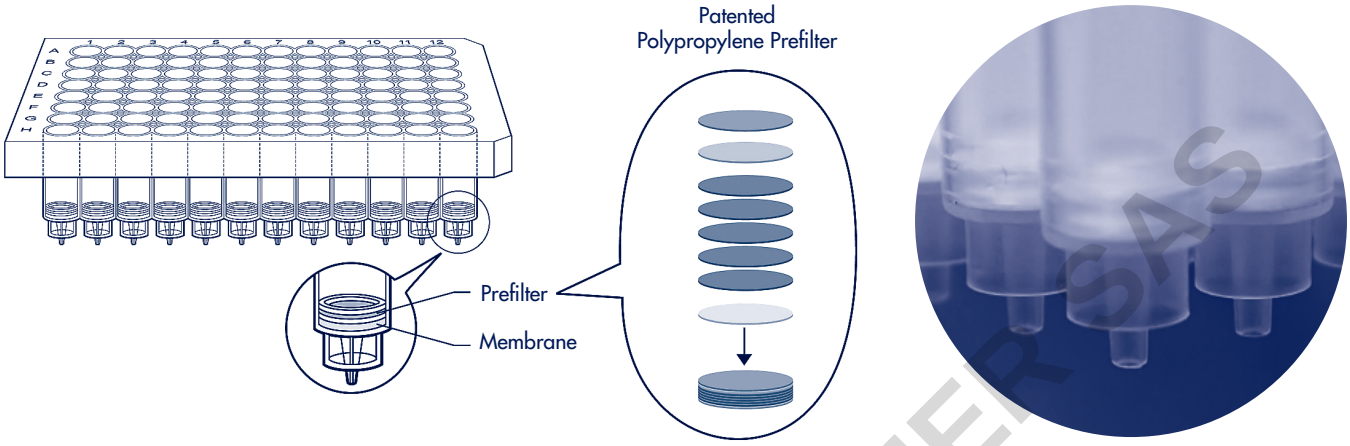
Within-Run Variation for an Analyte in Human Plasma (extraction performed manually using Multi-SPE C8 Extraction Plate, n=6)

Nominal Concentration (pg/mL)	Mean Concentration (pg/mL)	Accuracy (% Bias)	Precision (% CV)
100	101	1.0	2.1
200	192	-4.1	0.9
4,000	4,075	1.9	0.6
10,000	9,977	-0.2	1.4

The high uniformity of the membrane sorbent yields low CVs over a range of analyte concentrations. Experiment was run using proprietary compound.

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Patented Plate Design



Multi-SPE plates exhibit excellent well-to-well reproducibility. The combination of the patented plate design with the high uniformity of the 3M™ Empore™ Extraction Membrane provides consistent recoveries across the plate. The Multi-SPE plate also contains a graded-density polypropylene prefilter secured above the Empore extraction disk. The prefilter is specifically designed to maintain consistent sample flow rates when processing biological fluids.

Variety of Sorbent Types

C18	Octadecyl Bonded Silica	• Strongly nonpolar for reversed phase applications
C8	Octyl Bonded Silica	• Moderately nonpolar for reversed phase applications • Can be more selective than C18
C2	Ethyl Bonded Silica	• Weakly nonpolar for reversed phase applications
MPC	Mixed Phase Cation	• C8 bonded silica for reversed phase interactions • Benzosulfonic acid groups for strong cation exchange interactions
UR	Universal Resin	• (Poly)styrene divinylbenzene terpolymer with polar functional groups • High retention of a wide range of analytes • Used for rapid method development

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Specifications

Dimensions

Membrane diameter:	5.5 mm
Reservoir volume:	1.2 mL
Membrane thickness:	0.75 mm
Bed volume:	18 µL
Bonded silica sorbent mass (C2, C8, C18 and MPC):	10 mg (nominal)
Universal Resin sorbent mass:	5 mg (nominal)
Mean particle size:	50 µm (bonded silicas), 44 µm (Universal Resin)

Materials

Membrane type:	Standard density
Prefilter composition:	Graded density polypropylene
Membrane composition:	• Bonded silicas: nominally 92% sorbent, 8% PTFE (w/w) • Universal Resin: nominally 90% sorbent, 10% PTFE (w/w)
Sorbents:	C18, C8, C2, Mixed Phase Cation (MPC) and Universal Resin (UR)

Ordering Information

Description	Qty/Pk	Catalogue No.
Multi-SPE C18 Extraction Plate	1	MSPE N18 01
Multi-SPE C2 Extraction Plate	1	MSPE N02 01
Multi-SPE C8 Extraction Plate	1	MSPE N08 01
Multi-SPE MPC Extraction Plate	1	MSPE NMP 01
Multi-SPE UR Extraction Plate	1	MSPE NUR 01
Accessories		
MultiScreen™ HTS Vacuum Manifold	1	MSVM HTS 00
Deep Well Collar	1	MSVM HTS 0D
Deep Well Receiver Plate	50	MDCP N2M 50
Chemical Duty Pump	1	
115 volts, 60 Hz		WP61 115 60
220 volts, 50 Hz		WP61 220 50

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