Supported Liquid Extraction (SLE)

For Food Applications

Novum™ Synthetic SLE
Unique, Synthetic Sorbent that
Provides Consistent, Reliable Results

Strata® DE Diatomaceous Earth SLE
Cost-Effective, Guaranteed Alternative to
Traditional Diatomaceous Earth SLE Sorbents

phenomenex®
. . . breaking with tradition℠

www.phenomenex.com/FoodSLE

Choose the Best SLE Solution for Your Analysis

Phenomenex provides two options for your SLE analysis, a unique synthetic sorbent and a traditional diatomaceous earth sorbent, each of which provides its own benefits. Select the best option for your work by using the chart below.

novum™ simplified liquid extraction		strata® DE Supported Liquid Extraction
Synthetic	**Sorbent**	Diatomaceous Earth
Lot-to-lot consistency and reproducibility	**Advantages**	Cost effective and large volume capabilities
Ethyl Acetate, Methyl Tert-Butyl Ether (MTBE)	**Extraction Solvents**	Dichloromethane (DCM), Hexane, MTBE, Ethyl Acetate
MINI 96-Well Plates, MAX 96-Well Plates	**Plate Formats**	200 µL 96-Well Plates, 400 µL 96-Well Plates
1 cc, 3 cc, 6 cc, 12 cc	**Tube Formats**	12 cc and 60 cc

Need Help Selecting the Right SLE Option?

Call us or **Live Chat**
www.phenomenex.com/LiveChat

Explore Your SLE Options and Applications

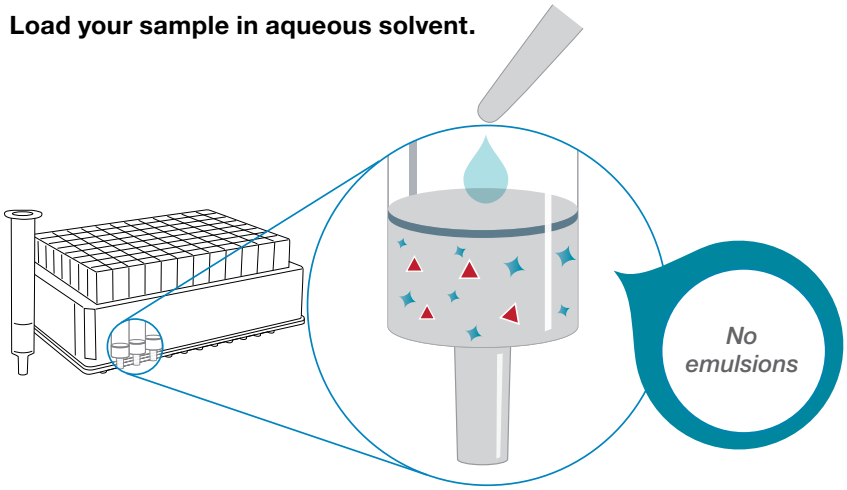
Unique SLE Sorbents

SLE produces more reproducible results, increased accuracy, and higher throughput possibilities than Liquid-Liquid Extraction by utilizing a solid support to mimic LLE. With very little method development, both SLE options remove unwanted matrix interferences to provide cleaner samples than LLE.

Two Simple Steps for a Cleaner Extraction:

STEP 01

Load your sample in aqueous solvent.

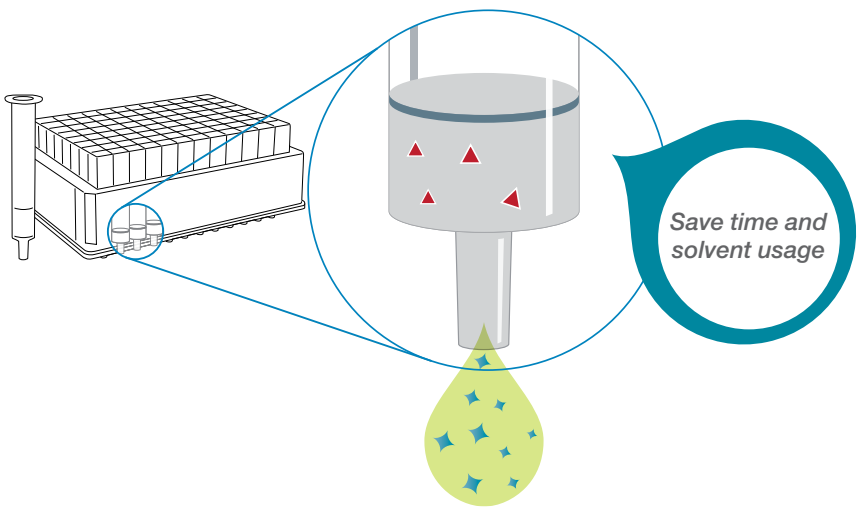


▲ Interferences *(i.e. phospholipids, proteins, salts, etc.)*

✦ Target Analytes

STEP 02

Collect target analytes in water immiscible solvent for analysis.

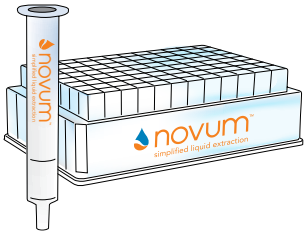


Novum Synthetic SLE

As a unique, synthetic SLE sorbent, expect Novum to provide reliable, more consistent lot-to-lot cleanup that excels under extraction conditions where traditional diatomaceous earth SLE falls short, such as ethyl acetate.

Recommended Uses:

- Ethyl acetate extractions
- Smaller volume samples
- Low variation lot-to-lot

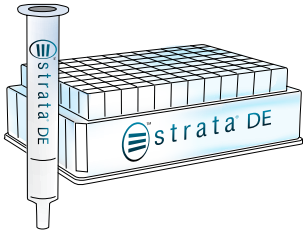


Strata DE Diatomaceous Earth SLE

Packed with diatomaceous earth, Strata DE is a cost-effective alternative to traditional SLE products such as Biotage® ISOLUTE® SLE+, Thermo Fisher® Hypersep™ SLE, and Agilent® Chem Elut™ SLE that won't require you to sacrifice your results.

Recommended Uses:

- Direct alternative to traditional diatomaceous earth SLE sorbents
- Non-oxygenated extraction solvents such as DCM and Hexane
- Large volume samples, up to 20 mL capacity with 60 cc tubes!



Acrylamide from Coffee

Pre-Treatment

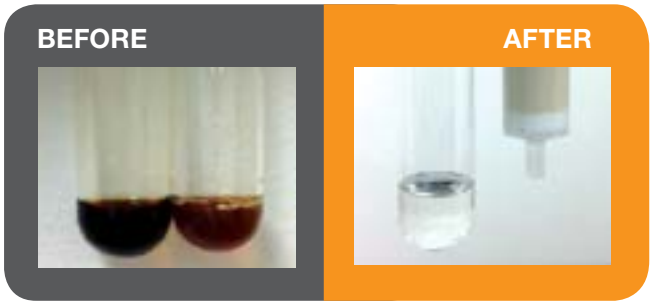
Prepare ground coffee as directed on the coffee product using 1,500 mL of boiling water and 60 g of ground coffee. Prepare instant coffee using 250 µL of boiling water and 2 g of instant coffee. Allow both samples to reach room temperature before adding 20 µL Acrylamide-13C3 (4 µg/mL in water) to 800 µL of the prepared coffee. (100 ng/mL for ground coffee and 200 ng/mL for instant coffee). Then add 150µL 2% Ammonium hydroxide in water to the spiked samples and vortex for 30 seconds.

SLE Protocol

Cartridge:	Novum™ SLE 6 cc Tube
Part No.:	8B-S138-JCH
Load:	Pre-treated sample and pulse vacuum (~5-10" Hg) for 5-10 seconds or until sample has completely entered the sorbent
Wait:	5 minutes
Elute:	2x 2.5 mL Ethyl acetate/Tetrahydrofuran (1:1) and allow to elute by gravity into a tube containing 10 µL Ethylene glycol*
Apply:	Vacuum or apply positive pressure at 5" Hg for 20-30 seconds to complete the extraction
Dry:	Sample under slow stream of Nitrogen at 45 °C
Reconstitute:	300 µL Water

*Ethylene glycol was added to prevent the sample from drying completely during the dry down step.

Achieve Ultra-Clean Samples with Novum SLE



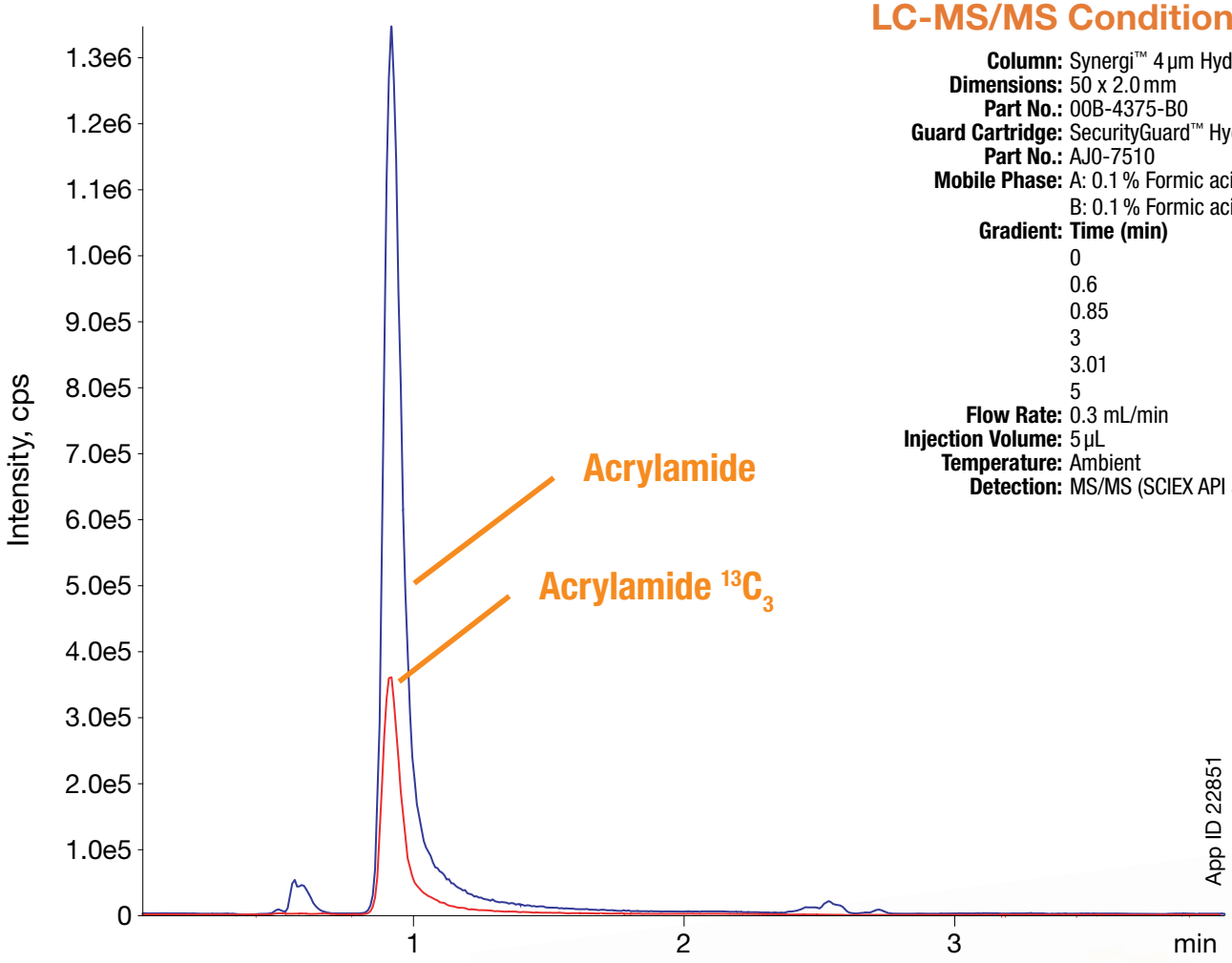
Recovery of Acrylamide

Sample ID	Ground coffee (100 ng/mL)	Instant coffee (200 ng/mL)
Mean of area ratio	1.89	3.75
STDV	0.01	0.06
CV (%)	0.78	1.61
Absolute Recovery (%)	94.9	92.8
n=	6	6

Excellent Recoveries!

Acrylamide from Coffee

Acrylamide from Coffee (100ng/mL)



LC-MS/MS Conditions

Column: Synergi™ 4 µm Hydro-RP
Dimensions: 50 x 2.0 mm
Part No.: 00B-4375-B0
Guard Cartridge: SecurityGuard™ Hydro-RP
Part No.: AJ0-7510
Mobile Phase: A: 0.1 % Formic acid in Water
B: 0.1 % Formic acid in Methanol

Gradient:

Time (min)	B (%)
0	0
0.6	0
0.85	100
3	100
3.01	0
5	0

Flow Rate: 0.3 mL/min
Injection Volume: 5 µL
Temperature: Ambient
Detection: MS/MS (SCIEX API 5000™), ESI+

Sterols from Olive Oil

Pre-treatment

Add 40 µL of 1 mg/mL cholestanol in chloroform to a clean, dry 20 mL screw-top test tube and evaporate to dryness under a nitrogen flow.

Saponification

1. Add 200 mg of olive oil sample to the test tube containing the internal standard.
2. Add 1.5 mL of 2M Potassium hydroxide in 95 % Ethanol.
3. Cap the tube and heat in an 80 °C oven for 25 minutes.
4. Mix sample gently to ensure homogeneity (sample should appear as a clear solution) and continue heating for an additional 25 minutes.
5. After heating, add 13.5 mL of deionized water and mix. The entire diluted volume is now ready to load onto the SLE cartridge.

SLE Protocol

Cartridge:	Strata® DE SLE cartridge, 20 mL loading capacity, 60 cc Tube
Part No.:	8B-S325-VFF
Load:	Diluted sample (from saponification step 5) plus 2x 1 mL DI water rinse (17 mL total volume, gravity flow)
Wait:	15 minutes
Extract:	3x 15 mL Diethyl ether (gravity flow)
Evaporate:	Dry under N_2 at 40 °C (greenish-yellow, oily residue)
Reconstitute:	5 mL of Hexane

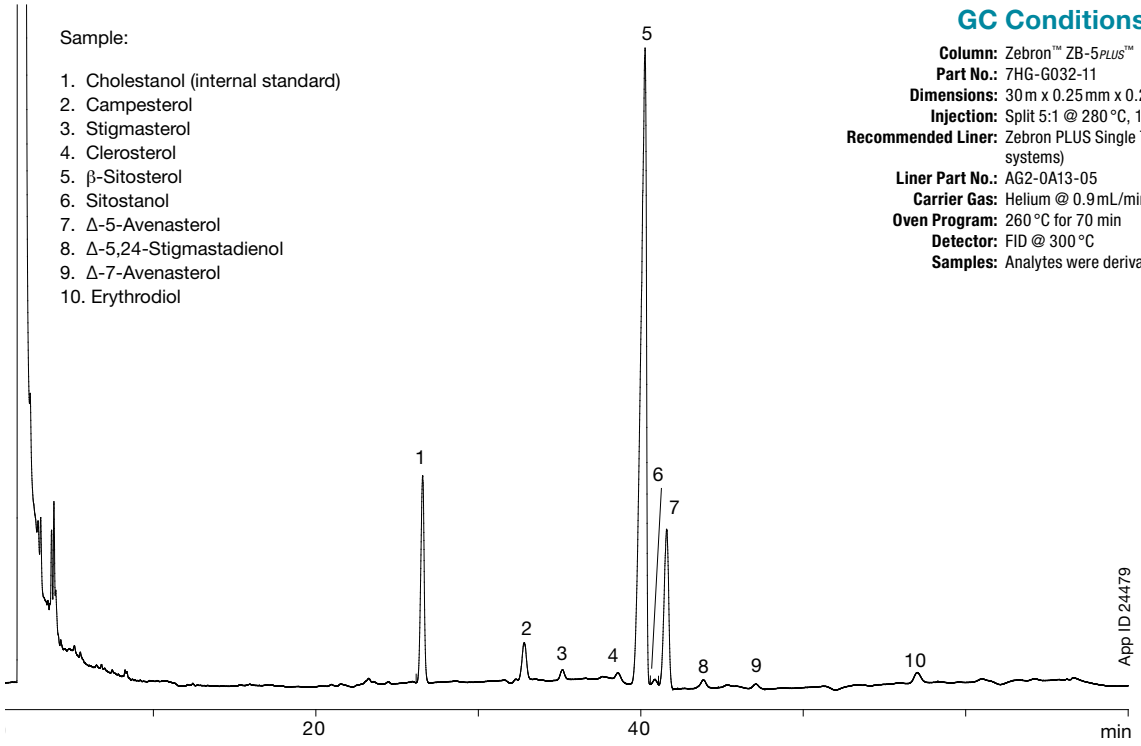
SPE (Solid Phase Extraction) Protocol and Derivatization

Cartridge:	Strata Si-1 (1 g/6 mL) tube
Part No.:	8B-S012-JCH
Condition:	1. 2x 6 mL Hexane 2. 1 mL 0.2M Potassium hydroxide in 95 % Ethanol
Equilibrate:	5 mL Hexane immediately after potassium hydroxide elution
Load:	Reconstituted SLE extract (5 mL) followed by 2x 1 mL Hexane rinses
Wash:	85 mL Hexane/Diethyl ether (98:2) under 3" Hg vacuum, flow rate of 2 mL/min.*
Elute:	10 mL Hexane/Diethyl ether (60:40)
Dry:	Dry under N_2 at 50 °C. After evaporating to dryness, add 3-4 drops of acetone and then re-evaporate under N_2 to remove any occluded water. Place in 100 °C oven for 10 minutes.
Derivatization:	250 µL Pyridine/BSTFA (3:1) at 80 °C for 30 minutes

*To handle the large volume of eluant, a 60 mL empty reservoir tube was attached to the 6 mL SPE tube.

Sterols from Olive Oil

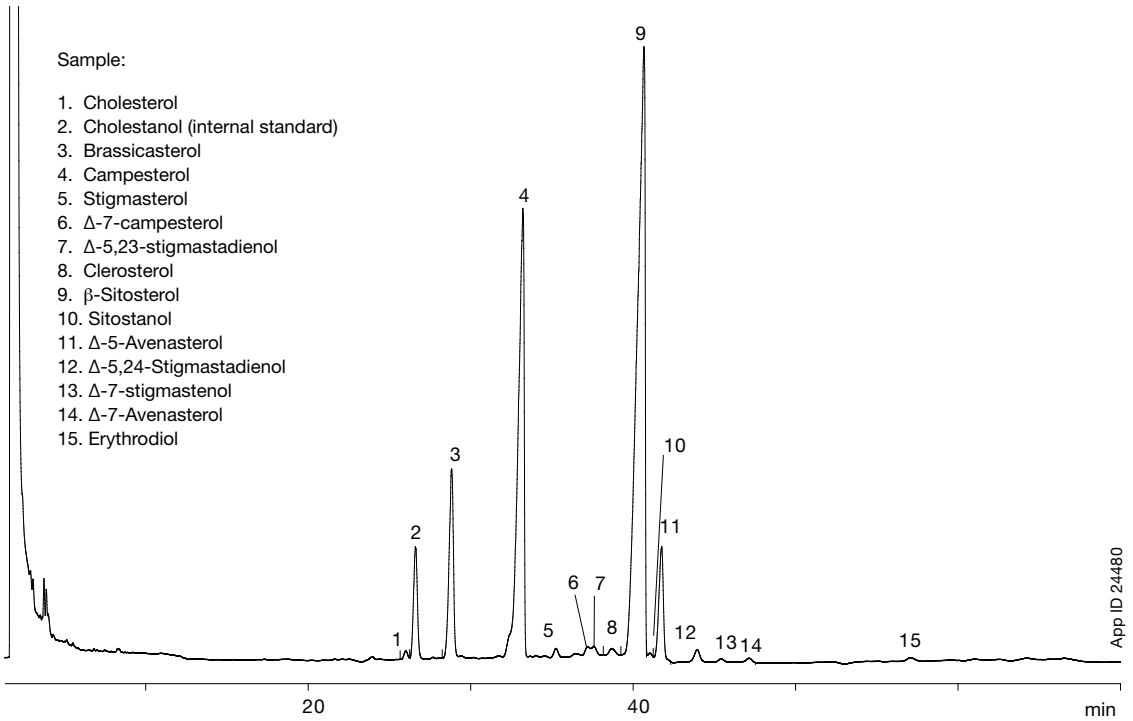
Extra Virgin Olive Oil Sterols



GC Conditions

Column: Zebron™ ZB-5*PLUS*™
Part No.: 7HG-G032-11
Dimensions: 30 m x 0.25 mm x 0.25 µm
Injection: Split 5:1 @ 280 °C, 1 µL
Recommended Liner: Zebron PLUS Single Taper Z-Liner™ (for Agilent® systems)
Liner Part No.: AG2-0A13-05
Carrier Gas: Helium @ 0.9 mL/min (constant flow)
Oven Program: 260 °C for 70 min
Detector: FID @ 300 °C
Samples: Analytes were derivatized with Pyridine/BSTFA (3:1)

Adulterated Olive Oil:Extra Virgin Olive Oil/Canola Oil (50:50)



Sterols from Olive Oil

IOC Sterol Criteria for Virgin Olive Oil Classification

Standard Name	IOC Standard Criteria for Virgin Olive Oil	Extra Virgin Olive Oil		Adulterated Olive Oil	
		% Recovery	% RSD (n=3)	% Recovery	% RSD (n=2)
Apparent β-Sitosterol	≥ 93.0 % of total sterols	94.6 %	0.3	60.3 %	1.2
Cholesterol	≤ 0.5 % of total sterols	not detected	-	0.3 %	13.3
Brassicasterol	≤ 0.1 % of total sterols	not detected	-	8.7 %	0.7
Campesterol	≤ 4.0 % of total sterols	3.8 %	6.8	29.1 %	1.3
Stigmasterol	≤ Campesterol (≤ 4.0 % of total sterols)	1.0 %	9.0	0.6 %	45.0
Δ-7-Stigmastenol	≤ 0.5 % of total sterols	not detected	-	0.7 %	2.9
Uvaol + Erythrodiol	≤ 4.5 % of total sterols	1.8 %	31	0.3 %	1.0
Total Sterols	**≥ 1000 mg/kg**	**1324 mg/kg**	**6**	**4221 mg/kg**	**1.0**

Apparent β-sitosterol = β-sitosterol + Δ-5-avenasterol + Δ-5,23-stigmastadienol + clerosterol + sitostanol + Δ-5,24-stigmastadienol. Total sterols = cholesterol + 24-methylene cholesterol + brassicasterol + campesterol + campestanol + stigmasterol + Δ-7-campesterol + Δ-5,23-stigmastadienol + apparent β-sitosterol + Δ-7-avenasterol.

To read full technical note, go to
www.phenomenex.com and search TN-0114

Start Your New SLE Method

Synthetic SLE

Novum™ SLE 96-Well Plates

Novum Simplified Liquid Extraction SLE Well Plates		
Part No.	Description	Unit
8E-S138-FGA	Novum SLE MINI 96-Well Plate	1/pk
8E-S138-5GA	Novum SLE MAX 96-Well Plate	1/pk

Novum Tubes

Novum Simplified Liquid Extraction SLE Tubes		
Part No.	Description	Unit
8B-S138-FAK	Novum SLE 1 cc Tubes	100/pk
8B-S138-5BJ	Novum SLE 3 cc Tubes	50/pk
8B-S138-JCH	Novum SLE 6 cc Tubes	30/pk
8B-S138-KDG	Novum SLE 12 cc Tubes	20/pk

Diatomaceous Earth SLE

Strata® DE 96-Well Plates

Strata DE Diatomaceous Earth SLE Well Plates		
Part No.	Description	Unit
8E-S325-FGB	Strata DE SLE 200 µL 96-Well Plate	2/pk
8E-S325-5GB	Strata DE SLE 400 µL 96-Well Plate	2/pk

Strata DE Tubes

Strata DE Diatomaceous Earth SLE Tubes		
Part No.	Description	Unit
8B-S325-KDG	Strata DE SLE 12 cc Tubes	20/pk
8B-S325-VFF	Strata DE SLE 60 cc Tubes	16/pk

guarantee

If Phenomenex SLE products do not perform as well or better than your current SLE product, return the product with comparative data within 45 days for a FULL REFUND.

presston™100

Presston 100 Positive Pressure Manifold

Presston 100		
Part No.	Description	Unit
AH0-9342	Presston 100 Positive Pressure Manifold, 1 mL Tube Complete Assembly	ea
AH0-9347	Presston 100 Positive Pressure Manifold, 3 mL Tube Complete Assembly	ea
AH0-9343	Presston 100 Positive Pressure Manifold, 6 mL Tube Complete Assembly	ea

Vacuum Manifolds

Vacuum Manfolds		
Part No.	Description	Unit
AH0-6023	12-Position Tube Vacuum Manifold Set	ea
AH0-6024	24-Position Tube Vacuum Manifold Set	ea

The Presston 100 96-Well Positive Pressure Manifold can also process 1, 3, and 6 mL tubes using the following adapter kits:

Presston 100 Tube Adapter Kits (for AH0-9334)		
Part No.	Description	Unit
AH0-9344	1 mL Tube Adapter Kit	ea
AH0-9345	3 mL Tube Adapter Kit	ea
AH0-9346	6 mL Tube Adapter Kit	ea

Phenomenex warrants that for a period of 12 months following delivery, the Presston 100 Positive Pressure Manifold you have purchased will perform in accordance with the published specifications and will be free from defects in materials or workmanship. In the event that the Presston 100 Positive Pressure Manifold does not meet this warranty, Phenomenex will repair or replace defective parts. Please visit **www.phenomenex.com/Presston** for complete warranty information.

Supported Liquid Extraction (SLE)

For Food Applications

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