

SOLID PHASE EXTRACTION FOR CLINICAL RESEARCH

CLEAN | QUICK | ACCURATE

NEW 3-STEP SPE WITH
STRATA®-X PRO



Revision: 2

PHEN-RUO-00097

 **phenomenex**[®]
...breaking with traditionSM

 www.phenomenex.com/SPE

SPE is used in combination with LC-MS/MS to analyze a panel of opiates from urine samples containing β -glucuronidase. The SPE method utilizes a 100% organic wash to maximize sample cleanliness, recovery values, and relative standard deviations. Large Reservoir Cartridges (LRC) are used in applications that allow for a large load or wash volumes, but still utilize a small sorbent volume for a concentrated elution volume, leading to more sensitive extractions.

Pre-treatment

In a single tube, combine 2 mL 0.1% Formic acid in Water. Then add 100 L of Campbell β -glucuronidase Enzyme and 10 μ L of 1 g/mL Internal Standard and vortex for 3-5 seconds.

SPE Protocol

Cartridge: Strata Basic Screen 200 mg/10 mL
Part No.: 8B-S327-FTH
Condition: 2.4 mL Methanol
Equilibrate: 2.4 mL 0.1% Formic acid in Water
Load: 4.1 mL Pre-treated Urine Sample
Wash 1: 2.4 mL 0.1% Formic acid in Water
Wash 2: 2.4 mL Methanol
Elute: 2x 1.2 mL Ethyl acetate/IPA/Ammonium hydroxide (75:20:5)
Dry: Vacuum at 10' Hg for 5 minutes
Reconstitute: 200 μ L 0.1% Formic acid/Methanol (4:1) with internal standard

LC-MS/MS Conditions

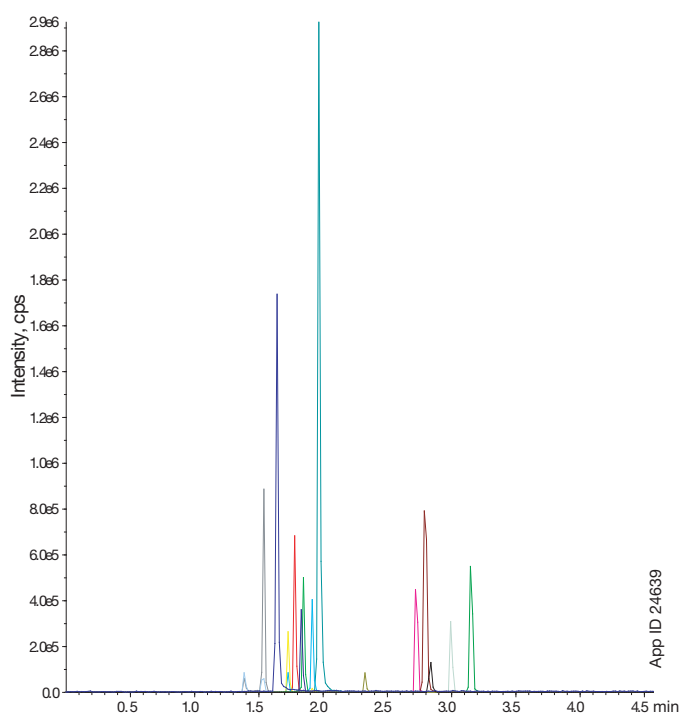
Column: Kinetex [®] 2.6 μ m Biphenyl
Dimensions: 50 x 3.0 mm
Part No.: 00B-4622-Y0
SecurityGuard[™] ULTRA: AJO-9208
Mobile Phase: A: 0.1% Formic acid in Water B: 0.1% Formic acid in Acetonitrile
Gradient:
Time (min) % B
0 5
4 100
5 100
5.01 5
7.01 5
Flow Rate: 0.6 mL/min
Injection Volume: 1 μ L
Detection: MS/MS (SCIEX API 4000 [™]), ESI+

Order SPE part number online!

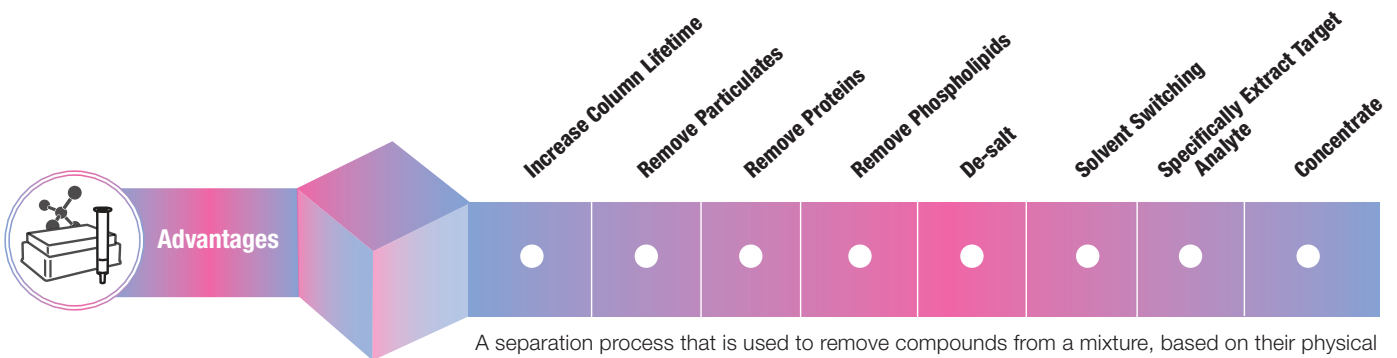
Recovery Values and % CVs

Analyte	% Recovery	% CVs (n=6)
6-MAM	99	15
Amphetamine	99	9
Benzoylcegonine	60	10
Buprenorphine	104	7
Codeine	89	12
Diazepam	96	7
Fentanyl	101	4
Hydrocodone	103	11
Hydromorphone	98	10
Methamphetamine	110	8
Morphine	106	10
Norbuprenorphine	91	8
Nordiazepam	97	2
Oxycodone	109	8
PCP	101	6
Temazepam	88	7
Oxazepam	87	18

TIC of Extracted Analytes



Solid Phase Extraction



A separation process that is used to remove compounds from a mixture, based on their physical and chemical properties. Analytical laboratories use solid phase extraction to concentrate and purify samples for analysis from a wide variety of matrices.

3 Unique Sorbent Platforms

STRATA[®] X PRO
A Rapid Solid Phase Extraction Solution

New reversed phase polymer with matrix removal technology offers a faster, cleaner way to perform SPE.

RAPID
3 STEPS

SUPER EXPRESS
2 STEPS

strata[®] X
Polymeric SPE

Polymeric sorbent available in reversed phase and ion-exchange capabilities for a wide range of applications.

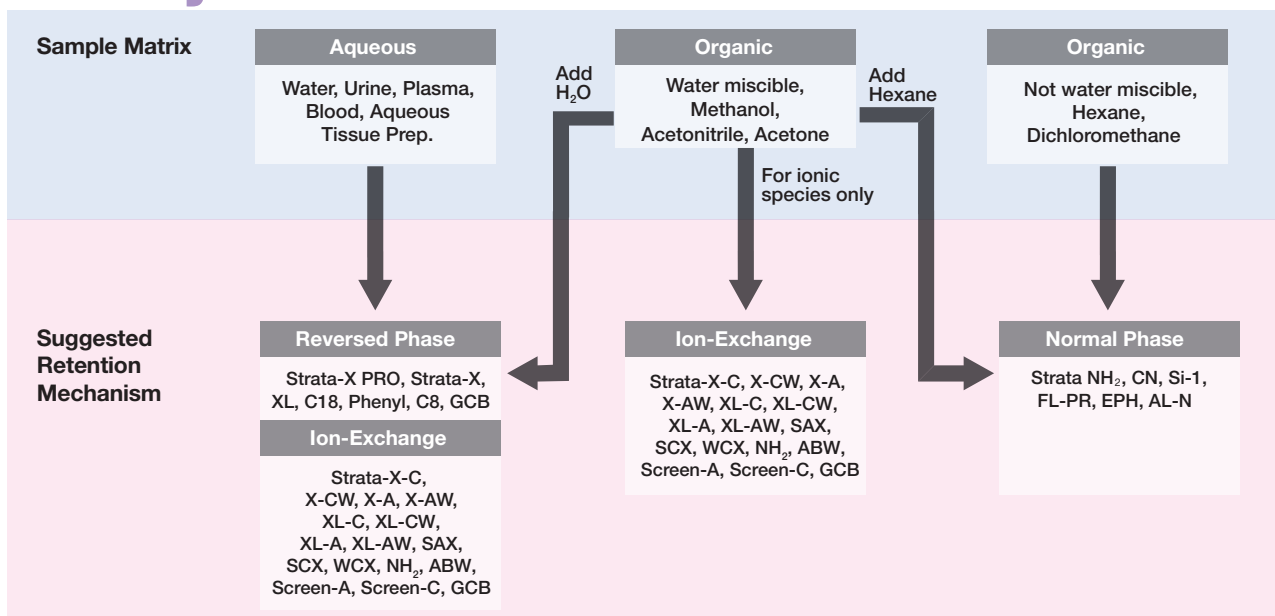
RELIABLE
5 STEPS

strata[®]
Solid Phase Extraction

Silica-based SPE sorbent provides a reliable and clean extracts with high recoveries for target analytes across all sample matrices.

RELIABLE
5 STEPS

Identify Your SPE Retention Mechanism



Extracting Pain Relievers from Plasma

Implementing Strata-X PRO offers a fast and effective alternative that provides high recoveries and reduces matrix effects. An excellent alternative to Waters[®] Oasis[®] PRiME HLB, Strata-X PRO follows a simple, 3-step method which eliminates the conditioning and equilibration steps yet still removes interferences, such as phospholipids, while producing high analyte recoveries. This application displays that an easy SPE method can be implemented with acceptable results for a range of pain relievers.

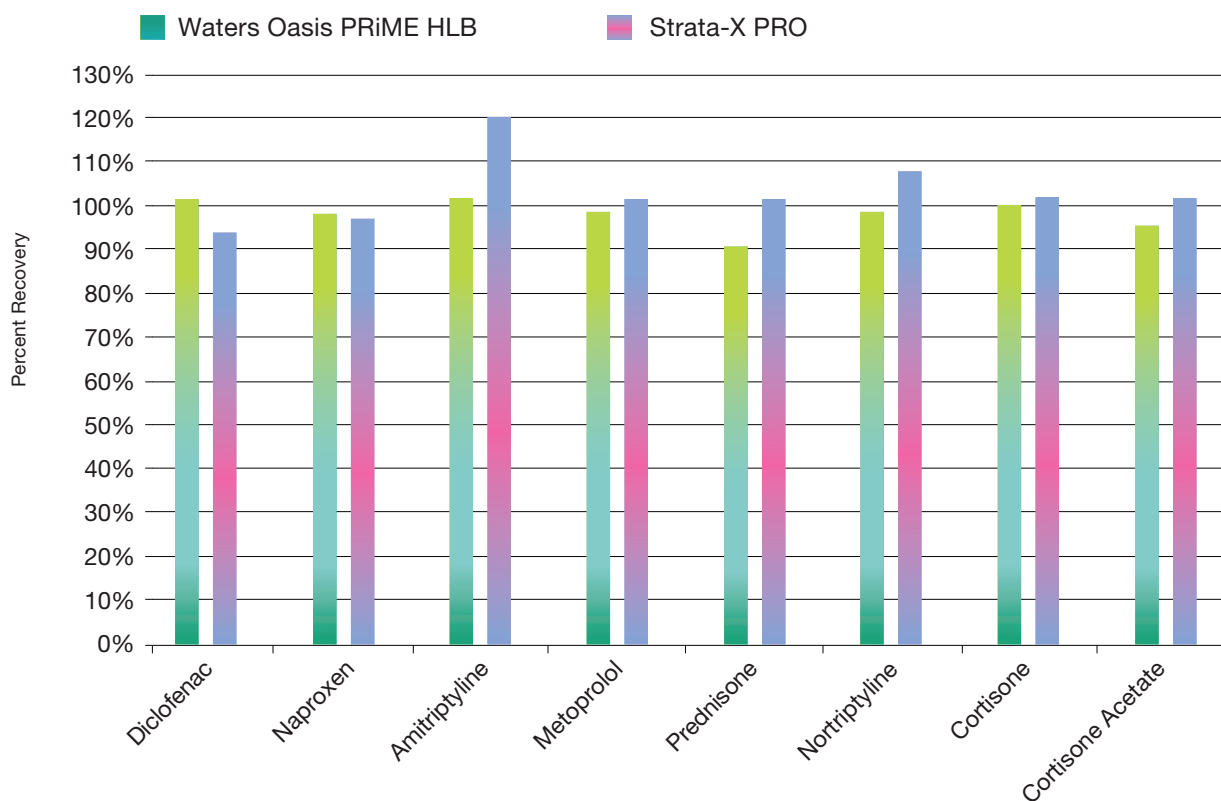
SPE Protocol

96-Well Plates:	Strata-X PRO, 30 mg/well Waters Oasis PRiME HLB
Part No.:	8E-S536-TGA (for Strata-X PRO)
Load:	500 µL Plasma/0.1% Formic acid in Water (1:1)
Wash:	1 mL 5% Methanol
Dry:	1 minute at 5" Hg
Elute:	1 mL 0.1% Formic acid in Acetonitrile/Methanol (90:10)
Dry Down:	1 minute at 5" Hg

LC-MS/MS Conditions

Column:	Kinetex [®] 5 µm EVO C18 100Å														
Dimensions:	100 x 2.1 mm														
Part No.:	00D-4633-AN														
SecurityGuard[™] ULTRA:	AJ0-9298														
Mobile Phase:	A: 0.4% v/v Ammonium Hydroxide in Water B: Methanol														
Gradient:	<table><thead><tr><th>Time (min)</th><th>% B</th></tr></thead><tbody><tr><td>0</td><td>90</td></tr><tr><td>3.1</td><td>20</td></tr><tr><td>4.5</td><td>20</td></tr><tr><td>6.1</td><td>90</td></tr><tr><td>11</td><td>90</td></tr><tr><td>14</td><td>90</td></tr></tbody></table>	Time (min)	% B	0	90	3.1	20	4.5	20	6.1	90	11	90	14	90
Time (min)	% B														
0	90														
3.1	20														
4.5	20														
6.1	90														
11	90														
14	90														
Flow Rate:	0.3 mL/min														
Temperature:	Ambient														
Detector:	Thermo TSQ Quantum [™] Ultra QQQ (MS/MS)														
HPLC System:	Thermo Accela [®] 1250														

Recoveries of Pain Relievers from Plasma



Save over 40% of your method time using Strata-X PRO and still achieve high recoveries which are comparable to Waters Oasis PRiME!

Comprehensive Drug Research Panel from Oral Fluid Collection Devices



The oral fluid collection device provides a buffer solution that contains a number of antibacterial agents and surfactants that act to prevent bacterial growth and increase analyte stability. The buffer solution poses many chromatography challenges, such as ion suppression. Here, we present a fast sample preparation procedure to reduce the effects of the device's buffer solution while maintaining good recovery of analytes from a variety of drug classes.

Sample Pre-treatment

Transfer 1 mL of oral fluid collected on an applicator tip in its preservative buffer. Leave it for 2 hours followed by centrifugation for 15 minutes at 600 g. Remove 0.5 mL of supernatant and combine with 1 mL of 1% Formic acid. Vortex for 5-10 seconds.

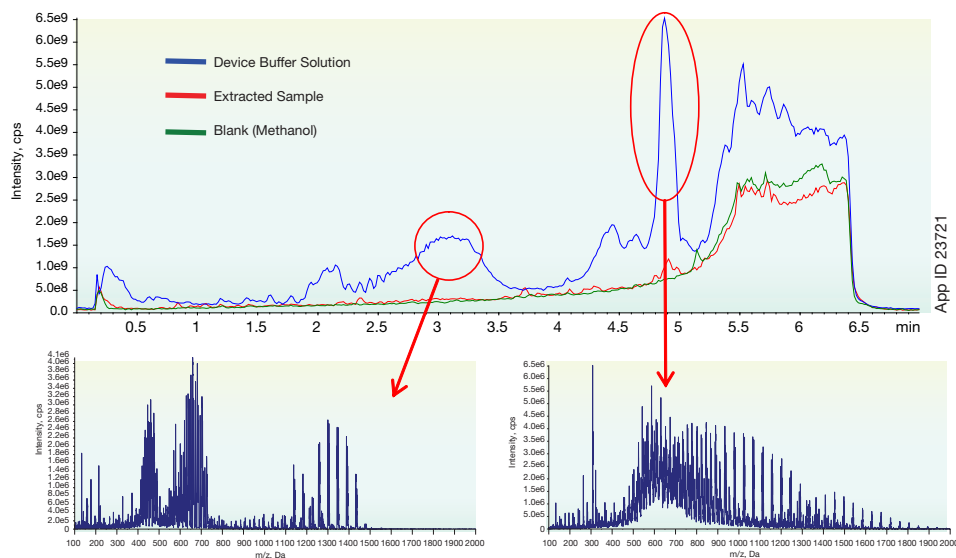
SPE Protocol

96-Well Plate:	Strata-X-CW 30 mg/well
Part No.:	8E-S035-TGB
Condition:	1mL Methanol
Equilibrate:	1 mL DI Water
Load:	Pre-treated Sample
Wash 1:	1 mL 1% Formic acid in DI Water
Wash 2:	1 mL DI Water
Dry:	5-6 minutes at maximum vacuum (20" Hg or higher)
Elution:	2x 500 μ L (2 aliquots of 500 μ L) Methylene chloride/Isopropanol/30% Ammonium hydroxide in Water (80:18:2)
Dry Down:	Evaporate to dryness under nitrogen at 45-50 $^{\circ}$ C
Reconstitute:	200 μ L of 0.1% Formic acid in Water/0.1% Formic acid in Methanol (90:10)

Ask about our 2 cartridge method for a larger panel of analytes!

Representative Clean-Up of Buffer Solution (Quantisal[®])

See the reduction in buffer interferences!






Analyte panel	% Absolute recovery	% CV (N=4)	Ionization
6-MAM	79	7.2	ESI+
α -Hydroxyalprazolam	88	6.8	ESI+
Alprazolam	79	7.7	ESI+
Amitriptyline	57	11.6	ESI+
Amphetamine	94	9.8	ESI+
Benzoylcegonine	89	3.9	ESI+
Buprenorphine	63	5.5	ESI+
Carisoprodol	95	4.8	ESI+
Citalopram	81	3	ESI+
Cocaine	84	11.2	ESI+
Codeine	89	5	ESI+
Diazepam	74	5.7	ESI+
EDDP	72	5.7	ESI+
Fentanyl	74	4.8	ESI+
Fluoxetine	42	7.7	ESI+
Hydrocodone	102	10	ESI+
Hydromorphone	98	6.6	ESI+
Imipramine	64	10.5	ESI+
Lorazepam	69	3.8	ESI+
MDMA	67	16.1	ESI+
Meperidine	84	8.9	ESI+
Mephedrone	84	8.9	ESI+
Meprobamate	92	13	ESI+
Methadone	72	6.6	ESI+
Methamphetamine	81	5.4	ESI+
Morphine	56	15.5	ESI+
Naloxone	83	6.7	ESI+
Norbuprenorphine	87	11	ESI+
Nordiazepam	75	5.5	ESI+
Norfentanyl	85	7	ESI+
Norhydrocodone	89	3	ESI+
Noroxycodone	85	4.6	ESI+
Nortriptyline	48	1.6	ESI+
Oxycodone	84	7.1	ESI+
Oxymorphone	89	17.1	ESI+
Paroxetine	42	8.8	ESI+
PCP	84	3.6	ESI+
Ritalinic Acid	47	19.9	ESI+
Tapentadol	83	7.5	ESI+
Temazepam	86	2.8	ESI+
Tramadol	87	0.8	ESI+
Zolpidem	64	1	ESI+
Butalbital	71	6	ESI-
Secobarbital	82	5	ESI-
Phenobarbital	83	3.4	ESI-
THC-COOH	53	5.7	ESI-

Ordering Info

STRATA[®] X PRO
A Rapid Solid Phase Extraction Solution

strata[®]
Solid Phase Extraction

Strata-X PRO SPE

Format	Sorbent Mass	Part Number	Unit
Tube			
	10 mg	8B-S536-AAK	1 mL (100/box)
	30 mg	8B-S536-TAK	1 mL (100/box)
	30 mg	8B-S536-TBJ	3 mL (50/box)
	60 mg	8B-S536-UBJ	3 mL (50/box)
	200 mg	8B-S536-FBJ	3 mL (50/box)
	100 mg	8B-S536-ECH	6 mL (30/box)
	200 mg	8B-S536-FCH	6 mL (30/box)
	500 mg	8B-S536-HCH	6 mL (30/box)
96-Well Plate			
	10 mg/well	8E-S536-AGA	ea
	30 mg/well	8E-S536-TGA	ea
	60 mg/well	8E-S536-UGA	ea
96-Well Microelution Plate			
	2 mg/well	8M-S536-4GA	ea

Strata Silica-Based SPE Sorbents

96-Well Plates (2/Box)			
Phase	25 mg	50 mg	100 mg
C18-E	8E-S001-CGB	8E-S001-DGB	8E-S001-EGB
C18-U	—	8E-S002-DGB	8E-S002-EGB
C18-T	8E-S004-CGB	8E-S004-DGB	—
C8	8E-S005-CGB	—	—
Phenyl	8E-S006-CGB	—	8E-S006-EGB
Silica	—	8E-S012-DGB	8E-S012-EGB
NH ₂	8E-S009-CGB	8E-S009-DGB	8E-S009-EGB
SAX	8E-S008-CGB	8E-S008-DGB	8E-S008-EGB
SCX	8E-S010-CGB	8E-S010-DGB	8E-S010-EGB
WCX	8E-S027-CGB	8E-S027-DGB	—
Screen-C	—	8E-S016-DGB	8E-S016-EGB
SDB-L	—	8E-S014-DGB	—

Tubes	1 mL (100/box)	
	50 mg	100 mg
C18-E	8B-S001-DAK	8B-S001-EAK
C18-U	—	8B-S002-EAK
C18-T	—	8B-S004-EAK
C8	—	8B-S005-EAK
Phenyl	—	8B-S006-EAK
SCX	—	8B-S010-EAK
WCX	—	8B-S027-EAK
SAX	—	8B-S008-EAK
NH ₂	—	8B-S009-EAK
SBD-L	—	8B-S014-EAK
Si-1	—	8B-S012-EAK

More part numbers available online! Go to www.phenomenex.com/SPE

Tubes	3 mL (50/box)		
	100 mg	200 mg	500 mg
C18-E	8B-S001-EBJ	8B-S001-FBJ	8B-S001-HBJ
C18-U	—	8B-S002-FBJ	8B-S002-HBJ
C18-T	—	8B-S004-FBJ	8B-S004-HBJ
C8	—	8B-S005-FBJ	8B-S005-HBJ
Phenyl	—	8B-S006-FBJ	8B-S006-HBJ
SCX	8B-S010-EBJ	8B-S010-FBJ	8B-S010-HBJ
WCX	—	8B-S027-FBJ	8B-S027-HBJ
SAX	8B-S008-EBJ	8B-S008-FBJ	8B-S008-HBJ
NH ₂	—	8B-S009-FBJ	8B-S009-HBJ
SBD-L	—	8B-S014-FBJ	8B-S014-HBJ
Si-1	—	8B-S012-FBJ	8B-S014-HBJ



Strata-X Polymeric SPE Sorbents

Tubes	1 mL (100/box)	
	30 mg	60 mg
Strata-X	8B-S100-TAK	8B-S100-UAK
Strata-X-C	8B-S029-TAK	—
Strata-X-CW	8B-S035-TAK	—
Strata-X-A	8B-S123-TAK	—
Strata-X-AW	8B-S038-TAK	—
Strata-XL	8B-S043-TAK	—
Strata-XL-C	8B-S044-TAK	—
Strata-XL-CW	8B-S052-TAK	—
Strata-XL-A	8B-S053-TAK	—
Strata-XL-AW	8B-S051-TAK	—

Tubes	3 mL (50/box)		
	60 mg	200 mg	500 mg
Strata-X	8B-S100-UBJ	8B-S100-FBJ	8B-S100-HBJ
Strata-X-C	8B-S029-UBJ	8B-S029-FBJ	8B-S029-HBJ
Strata-X-CW	8B-S035-UBJ	8B-S035-FBJ	8B-S035-HBJ
Strata-X-A	8B-S123-UBJ	8B-S123-FBJ	8B-S123-HBJ
Strata-X-AW	8B-S038-UBJ	8B-S038-FBJ	8B-S038-HBJ
Strata-XL	8B-S043-UBJ	8B-S043-FBJ	8B-S043-HBJ
Strata-XL-C	8B-S044-UBJ	8B-S044-FBJ	8B-S044-HBJ
Strata-XL-CW	8B-S052-UBJ	8B-S052-FBJ	8B-S052-HBJ
Strata-XL-A	8B-S053-UBJ	8B-S053-FBJ	8B-S053-HBJ
Strata-XL-AW	8B-S051-UBJ	8B-S051-FBJ	8B-S051-HBJ

96-Well Plates (2/Box)			
Phase	10 mg	30 mg	60 mg
Strata-X-AW	8E-S038-AGB	8E-S038-TGB	8E-S038-UGB
Strata-X-A	8E-S123-AGB	8E-S123-TGB	8E-S123-UGB
Strata-X	8E-S100-AGB	8E-S100-TGB	8E-S100-UGB
Strata-X-C	8E-S029-AGB	8E-S029-TGB	8E-S029-UGB
Strata-X-CW	8E-S035-AGB	8E-S035-TGB	8E-S035-UGB
Strata-XL-AW	—	8E-S051-TGB	—
Strata-XL-A	—	8E-S053-TGB	—
Strata-XL	—	8E-S043-TGB	—
Strata-XL-C	—	8E-S044-TGB	—
Strata-XL-CW	—	8E-S052-TGB	—

96-Well Microelution Plates (ea)	
Phase	2mg
Strata-X-AW	8M-S038-4GA
Strata-X-A	8M-S123-4GA
Strata-X	8M-S100-4GA
Strata-X-C	8M-S029-4GA
Strata-X-CW	8M-S035-4GA



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Go to www.phenomenex.com/SPE

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Strata is patented by Phenomenex. U.S. Patent No. 7,419,145.

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