TELOS *neo*

Polymeric Solid Phase Extraction Columns

Kinesis
Scientific Experts

Contents

TELOS *neo*™ Polymeric SPE Columns and 96-well Plates is a range of sample preparation products for the extraction of compounds from aqueous sample matrices. TELOS *neo* sorbents support the five common retention mechanisms used in today's analytical laboratory:

- **Non-polar (TELOS *neo* PRP** (Polar-modified Reversed Phase))
- **Mixed-mode Cation Exchange** (TELOS *neo* PCX)
- **Mixed-mode Weak Cation Exchange** (TELOS *neo* WCX)
- **Mixed-mode Anion Exchange** (TELOS *neo* PAX)
- **Mixed-mode Weak Anion Exchange** (TELOS *neo* WAX)

TELOS *neo* SPE Products provide all the advantages of polymeric sorbents, including simplified method development, wide applicability and are not affected by drying out. The combination of the water-wettable optimised surface chemistry, high surface area and pH stability ensures high reproducible recoveries for a wide range of analytes.

Efficient Method Development

Polymeric SPE sorbents are commonly chosen for their ease of use and robust nature, due to the absence of surface silanol interactions, excellent flow characteristics and pH stability. Each TELOS *neo* chemistry is accompanied by a generic method to further ensure method development time is minimised.

High Reproducible Recoveries

TELOS *neo* SPE Products provide high and reproducible recoveries for a wide range of analytes, including acidic, neutral, basic and multi-charged analytes. If simultaneous extraction of acidic, basic and neutral analytes, or selective extraction of a particular analyte class is required, the relevant sorbent can be chosen, providing the optimum results for the given application.

High Capacity Sorbent

The high surface area and capacity of TELOS *neo* SPE Sorbents provide more reliable retention characteristics compared to silica-based sorbents. This higher capacity encourages the use of smaller sorbent masses, therefore reducing elution volumes and evaporation/reconstitution steps.

Excellent Flow Characteristics

Consistent flow characteristics from column-to-column and well-to-well are important in obtaining reliable results, irrespective of the sample type or volume. The surface chemistry, particle size distribution and packing technique are carefully controlled to provide optimum SPE performance, whether processing large volume water samples or smaller more viscous sample matrices. TELOS *neo* Polymeric SPE Sorbents do not dry out during routine sample processing.

No Extract Contamination

The individual components of TELOS *neo* Polymeric SPE Products are tested at each stage of manufacture to provide a high purity product. Each batch of sorbent is cleaned post-synthesis to ensure removal of reagents and impurities, so there is no leaching from the finished SPE column or 96-well plate. Tubes, plates and frits are cleaned to levels that meet today's detection limits and the assembled SPE product is tested for purity. The products are supplied in hermetically sealed foil bags to protect them from moisture and environmental contaminants.

TELOS *neo* PRP

Reversed phase (non-polar) SPE remains a popular SPE approach due to its applicability to a wide range of compounds. Provided the analytes have sufficient non-polar (hydrophobic) character, extraction of single compounds or multiple analyte suites is achieved.

TELOS *neo* PRP (Polar-modified Reversed Phase) is a water-wettable, non-polar SPE column utilising a proprietary polymeric backbone. The surface chemistry has been optimised to provide the necessary balance of non-polar interactions for retaining compounds of varying polarity, from polar metabolites to higher molecular weight analytes.

Generic Method

Sample Pre-treatment	Dilution as required
Column Conditioning	Methanol
Column Equilibration	Water
Sample Loading	Load pre-treated sample
Interference Elution	5% v/v methanol/water
Analyte Elution	Methanol

Ordering Information

PART NUMBER	DESCRIPTION	PACK SIZE
SPE Columns		
600-030M-001T	TELOS *neo* PRP 30mg/1ml	100
600-060M-003T	TELOS *neo* PRP 60mg/3ml	50
600-100M-003T	TELOS *neo* PRP 100mg/3ml	50
600-200M-006T	TELOS *neo* PRP 200mg/6ml	30
600-500M-006T	TELOS *neo* PRP 500mg/6ml	30
96-well Plates		
600-010M-096P	TELOS *neo* PRP 10mg Plate	1
600-030M-096P	TELOS *neo* PRP 30mg Plate	1

Mixed-mode SPE: Dual Retention Mechanism for Cleaner Extracts

The TELOS *neo* Mixed-mode SPE Sorbents exhibit a dual retention mechanism that significantly reduces the matrix components in the final extract (compared to non-polar or ion exchange as a single retention mechanism). A rigorous interference elution profile removes matrix components such as salts, proteins, phospholipids and others. The analytes are eluted from the column with an organic solvent containing a basic or acidic modifier (depending on the SPE sorbent), which can be easily evaporated prior to reconstitution and analysis.

TELOS *neo* mixed-mode sorbents are available in the four popular chemistries; strong and weak cation exchange for the extraction of basic analytes and strong and weak anion exchange for acidic analytes.

TELOS neo PCX

Mixed-mode Strong Cation Exchange SPE for Basic Analyte Extraction

For selective extraction of ionisable basic analytes, choose mixed-mode cation exchange SPE. The combination of hydrophobic and strong cation exchange functional groups is optimised to ensure TELOS *neo* PCX provides a robust and reliable sample preparation approach for the extraction of a wide range of basic analytes from aqueous sample matrices including plasma, urine and hair.

Generic Method

Sample Pre-treatment	Acidify sample
Column Conditioning	Methanol
Column Equilibration	Water
Sample Loading	Load acidified sample
Interference Elution Wash 1	2% v/v formic acid/methanol
Interference Elution Wash 2	Methanol
Analyte Elution	2-5% v/v NH_3/methanol

Ordering Information

PART NUMBER	DESCRIPTION	PACK SIZE
SPE Columns		
620-030M-001T	TELOS *neo* PCX 30mg/1ml	100
620-060M-003T	TELOS *neo* PCX 60mg/3ml	50
620-100M-003T	TELOS *neo* PCX 100mg/3ml	50
620-200M-006T	TELOS *neo* PCX 200mg/6ml	30
620-500M-006T	TELOS *neo* PCX 500mg/6ml	30
96-well Plates		
620-010M-096P	TELOS *neo* PCX 10mg Plate	1
620-030M-096P	TELOS *neo* PCX 30mg Plate	1

TELOS *neo* WCX

Mixed-mode SPE for Extraction of Strongly Basic Analytes

Elution of strongly basic analytes and quaternary amines from a strong cation exchange SPE sorbent is difficult due to the strong ionic interaction between sorbent and analyte. TELOS *neo* WCX is a mixed-mode weak cation exchange sorbent containing non-polar and weak acid functional groups. This dual retention mechanism provides the ideal environment for successful retention and elution of all basic compounds, including strong bases and quaternary amines.

Generic Method

Sample Pre-treatment	Adjust sample to low pH
Column Conditioning	Methanol
Column Equilibration	Water
Sample Loading	Load acidified sample
Interference Elution Wash 1	5% v/v ammonium hydroxide/water
Interference Elution Wash 2	Methanol
Analyte Elution	2% v/v formic acid/methanol

Ordering Information

PART NUMBER	DESCRIPTION	PACK SIZE
SPE Columns		
640-030M-001T	TELOS *neo* WCX 30mg/1ml	100
640-060M-003T	TELOS *neo* WCX 60mg/3ml	50
640-100M-003T	TELOS *neo* WCX 100mg/3ml	50
640-200M-006T	TELOS *neo* WCX 200mg/6ml	30
96-well Plates		
640-010M-096P	TELOS *neo* WCX 10mg Plate	1
640-030M-096P	TELOS *neo* WCX 30mg Plate	1

TELOS *neo* PAX

Mixed-mode Strong Anion Exchange Columns for Acidic Analyte Extraction

For selective extraction of ionisable acidic analytes, choose mixed-mode anion exchange SPE. The combination of hydrophobic and strong anion exchange functional groups is optimised to ensure TELOS *neo* PAX provides a robust and reliable sample preparation approach for the extraction of a wide range of acidic analytes from aqueous sample matrices including plasma, urine and hair.

Generic Method

Sample Pre-treatment	High pH for retention of acids
Column Conditioning	Methanol
Column Equilibration	Water
Sample Loading	Load basic sample
Interference Elution Wash 1	5% v/v ammonium hydroxide/water
Interference Wash 2/ Analyte Elution	Methanol
Analyte Elution	2% v/v formic acid/methanol

Ordering Information

PART NUMBER	DESCRIPTION	PACK SIZE
SPE Columns		
660-030M-001T	TELOS *neo* PAX 30mg/1ml	100
660-060M-003T	TELOS *neo* PAX 60mg/3ml	50
660-100M-003T	TELOS *neo* PAX 100mg/3ml	50
660-200M-006T	TELOS *neo* PAX 200mg/6ml	30
96-well Plates		
660-010M-096P	TELOS *neo* PAX 10mg Plate	1
660-030M-096P	TELOS *neo* PAX 30mg Plate	1

TELOS *neo* WAX

Mixed-mode SPE for Extraction of Strongly Acid Analytes

Elution of strongly acidic compounds from a strong anion exchange SPE sorbent is not usually possible, due to the strong ionic interaction between sorbent and analyte. TELOS *neo* WAX is a mixed-mode weak anion exchange sorbent containing non-polar and weak base functional groups. This dual retention mechanism provides the ideal environment for successful retention and elution of all acidic compounds, including strong acids.

Generic Method

Sample Pre-treatment	Adjust sample to low pH
Column Conditioning	Methanol
Column Equilibration	Water
Sample Loading	Load acidified sample
Interference Elution Wash 1	5% v/v ammonium hydroxide/water
Interference Elution Wash 2	Methanol
Analyte Elution	2-5% v/v NH_3/methanol

Ordering Information

PART NUMBER	DESCRIPTION	PACK SIZE
SPE Columns		
680-030M-001T	TELOS *neo* WAX 30mg/1ml	100
680-060M-003T	TELOS *neo* WAX 60mg/3ml	50
680-100M-003T	TELOS *neo* WAX 100mg/3ml	50
680-200M-006T	TELOS *neo* WAX 200mg/6ml	30
96-well Plates		
680-010M-096P	TELOS *neo* WAX 10mg Plate	1
680-030M-096P	TELOS *neo* WAX 30mg Plate	1

Method Development

Sorbent and Method Selection

TELOS *neo* SPE Products are designed with simple and effective sample preparation in mind. Rather than screening a wide range of sorbents as is often necessary with silica-based sorbents, the most appropriate TELOS *neo* SPE Column can be selected based on three simple criteria:

1. Application requirements
   a. simultaneous extraction of multiple analytes from one sample, or
   b. selective extraction of a particular analyte or analyte class
2. Analyte functional group(s)
3. Analyte pK_a

Once these parameters are known, the appropriate column can be selected and the associated generic method followed.
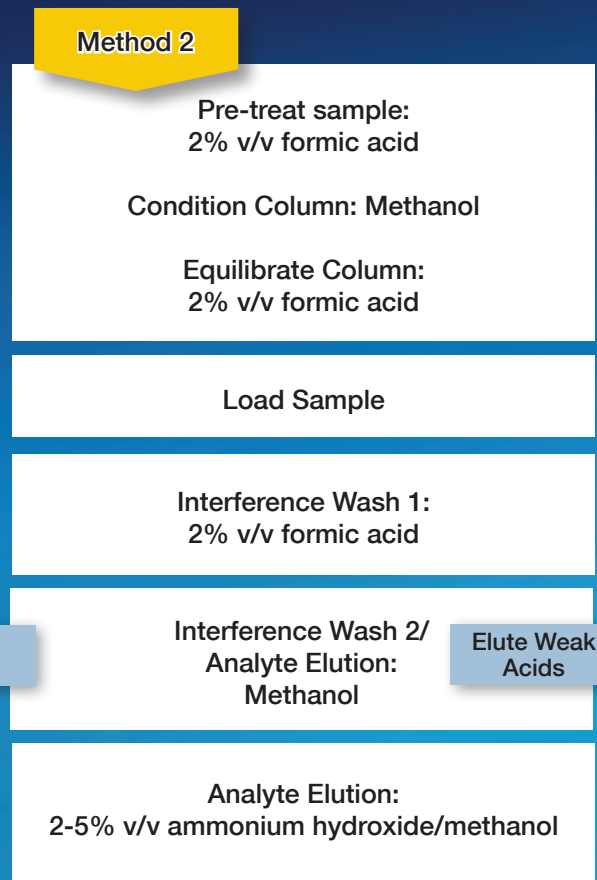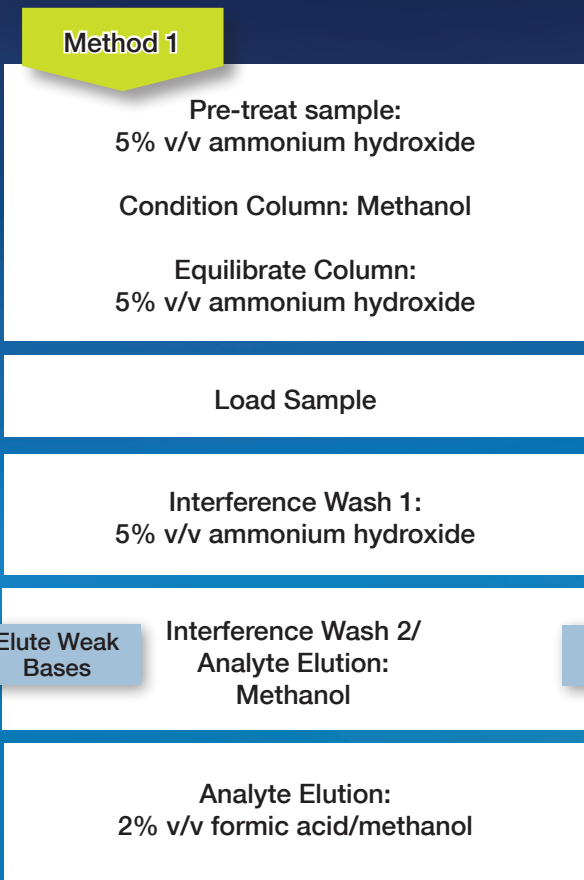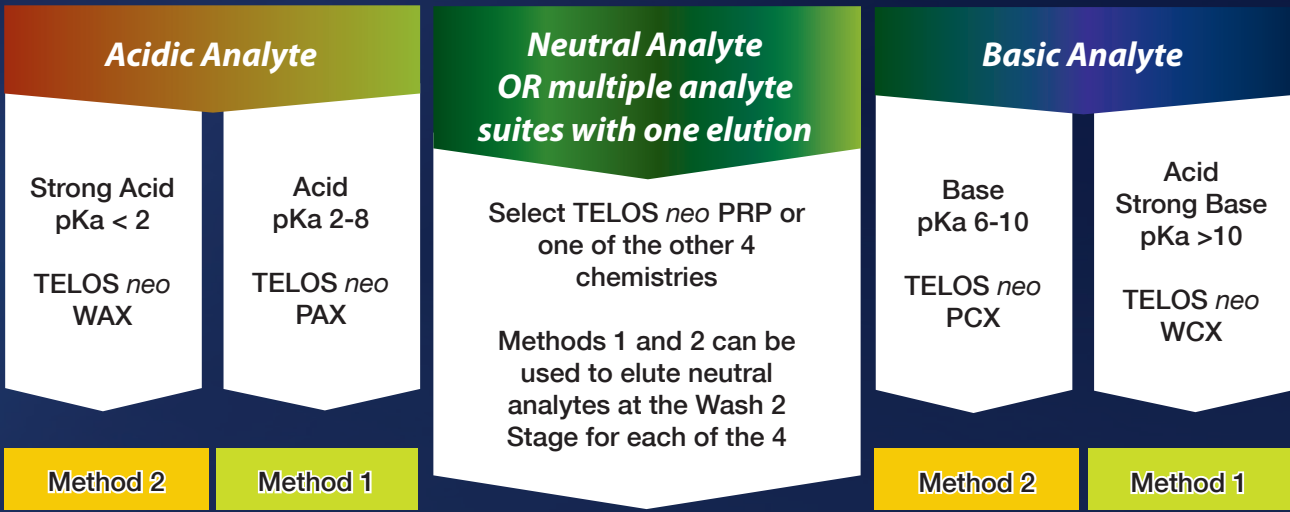
Whilst each chemistry is selective towards a given analyte class, it is possible to elute analytes of a different functional group from the sorbent (useful if fractionation of different analyte classes is required). For example, **neutral** compounds can be eluted from each of the mixed-mode sorbents at the **Interference Wash 2** step.

For the extraction of a sample containing unknown or zwitterionic analytes, or a mixture of analytes with a range of retention/elution characteristics, evaluate all five chemistries to determine the ideal sorbent and method.

Table 1. Selection of the Appropriate Sorbent Based on Application Needs

Application	TELOS *neo* PRP	TELOS *neo* PCX	TELOS *neo* WCX	TELOS *neo* PAX	TELOS *neo* WAX
Simultaneous Extraction of Acidic, Neutral and Basic Analytes	●				
Basic Ionisable Analytes		●			
Quaternary Amine or Analytes with Multiple Basic Groups			●		
Acidic Ionisable Analytes				●	
Strong Acid or Analytes with Multiple Acidic Groups					●
Fractionation of Acidic, Neutral and Basic Analytes		●	●	●	●
Zwitterionic Analytes	●	●	●	●	●

Method Development Flowchart

Acidic Analyte

Strong Acid
pKa < 2

TELOS *neo*
WAX

Method 2

Acid
pKa 2-8

TELOS *neo*
PAX

Method 1

Neutral Analyte OR multiple analyte suites with one elution

Select TELOS *neo* PRP or one of the other 4 chemistries

Methods 1 and 2 can be used to elute neutral analytes at the Wash 2 Stage for each of the 4

Basic Analyte

Base
pKa 6-10

TELOS *neo*
PCX

Method 2

Acid
Strong Base
pKa >10

TELOS *neo*
WCX

Method 1

Method 1

Pre-treat sample:
5% v/v ammonium hydroxide

Condition Column: Methanol

Equilibrate Column:
5% v/v ammonium hydroxide

Load Sample

Interference Wash 1:
5% v/v ammonium hydroxide

Elute Weak Bases

Interference Wash 2/
Analyte Elution:
Methanol

Elute Neutrals

Analyte Elution:
2% v/v formic acid/methanol

Method 2

Pre-treat sample:
2% v/v formic acid

Condition Column: Methanol

Equilibrate Column:
2% v/v formic acid

Load Sample

Interference Wash 1:
2% v/v formic acid

Interference Wash 2/
Analyte Elution:
Methanol

Elute Weak Acids

Analyte Elution:
2-5% v/v ammonium hydroxide/methanol