Application Specific Columns, Kits, and Spare Parts

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Application-Specific Columns, Kits, and Spare Parts

Application-Specific Columns

SUGAR AND CARBOHYDRATE ANALYSIS

High-Performance Carbohydrate Analysis Cartridge Column, p/n: WAT044355

Waters High-Performance Carbohydrate Cartridge Column, with reusable end-fittings, is packed with a 4 µm, spherical silica. This column was developed to separate five monosaccharides and disaccharides with baseline resolution in less than 12 minutes. The 4.6 mm I.D. × 250 mm High-Performance Carbohydrate Cartridge Column offers optimal speed, resolution, and longevity. The pre-packed, disposable cartridge column requires reusable end fittings, which are available separately.

Carbohydrate Analysis Column, p/n: WAT084038

The Carbohydrate Analysis Column uses a covalently bonded amino packing on a silica substrate. It is best suited for low-molecular-weight sugars such as mono-, di-, and tri-saccharides.

Sugar Pak I Column, p/n: WAT085188

The Sugar Pak I Column separates monosaccharides and sugar alcohols via a strong cation-exchange mechanism. The resin is based on a sulfonated styrene-divinylbenzene polymer that provides pH stability by means of a calcium counter ion.

Waters offers a range of columns for the analysis of sugars, carbohydrates, organic acids, and alcohols. Refer to the following tables for ordering information.

Typical Applications for Sugar and Carbohydrate Columns

Cartridge/ Column	Carbohydrate Analysis Column	SAM I Reagent with Silica Cartridge	Sugar-Pak I, SC-1011, SP-0810	SH-1011, IC-Pak Ion-Exclusion Fast Fruit Juice	Dextro-Pak	KS-800 series
Mode	Partition	Partition	Ion exchange/ size exclusion	Ion exchange/ size exclusion	Reversed phase	Size exclusion
Eluent	65–85% acetonitrile/ water ambient to 70 ˚C	70–80% acetonitrile/water 0.1% SAM I ambient	Water 75–95 ˚C	0.01 N phosphoric acid 50–60 ˚C	Water ambient	—
Application	Mono-, di- and tri-saccharides up to DP 8 sugars and sugar alcohols	Mono-, di- and tri-saccharides	Mono-, di-, oligosaccharides and sugar alcohols	Sugar acids, sugar alcohols, organic acids	Hydrolysed syrups, derivatized sugars	Mono- through oligosaccharides such as syrups
Elution Order	Smallest elute first	Smallest elute first	Largest elute first	Largest and most acidic elute first	Smallest elute first	Largest elute first

Guide to Shodex Sugar Columns

S	C	18	2	1
Type of Column	Cation	% Cross Linkage	Pore Size	0 - Gel Type
S = sugar	H = H^+	—	1 = 20 Å	1 - Semi-macropore gel
	C = Ca^{2+}	—	2 = 50 Å	2 - Permanent pore gel
	P = Pb^{2+}	—	3 = 100 Å	
	Z = Zn^{2+}	—	4 = 500 Å	
	—	—	5 = 1000 Å	
Example:				
S	C	10	1	1
Sugar column	Ca^{2+}	10% cross linkage	20 Å	Semi-macropore gel

Ordering Information

SAM I Reagent Column

Description	Dimension	Qty.	P/N
SAM I Reagent	7.8 × 300 mm	1/pk	WAT010873

Columns for Alcohols and Carbohydrates

Description	Dimension	Particle Size	Qty.	P/N
Carbohydrate Analysis Column	3.0 × 300 mm	10 µm	1/pk	WAT084038
Dextro-Pak Cartridge Column	8.0 × 100 mm	—	1/pk	WAT085650
High-Performance Carbohydrate Sentry Guard Column	3.9 × 20 mm	4 µm	2/pk	WAT046895[1]
SC-1011 Column	8.0 × 300 mm	7 µm	1/pk	WAT034238
SC-1011P Pre-column	6.0 × 50 mm	7 µm	1/pk	WAT034244
SH-1011	8.0 × 300 mm	7 µm	1/pk	WAT034236
SH-1011P Pre-column	6.0 × 50 mm	7 µm	1/pk	WAT034243
SP-0810 Column	8.0 × 300 mm	8 µm	1/pk	WAT036954
SP-0810P Pre-column	6.0 × 50 mm	8 µm	1/pk	WAT034245
Sugar-Pak 1 Column	6.5 × 300 mm	10 µm	1/pk	WAT085188
Sugar-Pak 1 Guard-Pak Inserts	—	—	10/pk	WAT015209[2]
Shodex KS-801	—	7 µm	1/pk	WAT034276

[1] Requires Sentry Guard Holder, p/n: WAT046905.
[2] Requires Guard-Pak Holder, p/n: WAT088141.

High-Performance Carbohydrate Analysis Cartridge Column

Description	Dimension	P/N
High-Performance Carbohydrate Cartridge Column (requires end-fittings)	4.6 × 250 mm	WAT044355
Sentry Integrated Guard Holder (for Waters cartridge columns)	—	WAT046905

APPLICATION AREA: Small Molecule Scout to Prep

"These columns are a work-horse in our open access environment. We have found with regular flushing these column can last thousands of crude injections. I would highly recommend Waters BEH columns to other chromatographers."

REVIEWER: Philip Michaels

ORGANIZATION: Novartis

FERMENTATION ANALYSIS, ORGANIC ACIDS, ALCOHOLS, AND CARBOHYDRATES

The ion-exclusion mode is ideally suited for the separation of monosaccharides, organic acids, or sugar acids. The column packings are sulfonated styrene divinylbenzene resins in the hydrogen form (IC-Pak Ion-Exclusion or SH-1011), and the mobile phase is a dilute acid such as 0.01 N phosphoric acid using column temperatures of 50–60 °C.

In this mode, the Fast Fruit Juice column can effectively separate glycerol, acetic acid, and ethanol in grape or other fruit juice. The column can also analyze the degree of microbial defect, the extent of natural fermentation in grapes, and the amount of sulfite in various foods and beverages. The IC-Pak Ion-exclusion Column can separate a wide range of organic acids while the Shodex SH Column separates acids as well as larger carbohydrates.

The analysis of alcohols and organic acids is important, for they typically help determine the flavor characteristics of beverages such as wine, beer, and some distilled spirits. The presence of alcohols in fruit juices can indicate product deterioration. The Shodex KC-811 Column, which provides ion-exchange and reversed-phase chromatography modes, is packed with a sulfonated, rigid, styrene-divinylbenzene copolymer. With high efficiency, this packing separates low-molecular-weight organic acids and water-soluble organics such as alcohols, aldehydes, and nitriles. The column provides ion-exclusion and reversed-phase mode of chromatography. Typical mobile phases, run at 1 mL/min at 45–80 °C, are composed of aqueous solutions containing 1% phosphoric acid, acetic acid, or perchloric acid.

Shodex KC-811 Column Retention Chart for Organic Acids

Sample	Retention Time	Sample	Retention Time
Oxalic Acid	5.20	ß- Hydroxy-propionic Acid	8.60
Maleic Acid	5.80	D-Glucuronic Acid	8.65
a-Ketoglutaric Acid	5.90	Fumaric Acid	8.95
Citric Acid	6.20	Formic Acid	9.20
Tartaric Acid	6.55	Acetic Acid	9.80
Pyruvic Acid	6.65	Adipic Acid	9.80
trans-Aconitic Acid	6.95	Levulinic Acid	10.00
Glyoxylic Acid	7.00	Mesaconic Acid	10.40
Malic Acid	7.05	Pyroglutamic Acid	10.70
Malonic Acid	7.07	Propionic Acid	11.25
Citraconic Acid	7.20	Acrylic Acid	11.60
Succinic Acid	8.00	Pivalic Acid	14.05
Glycolic Acid	8.40	Methacrylic Acid	14.10
Itaconic	8.50	trans-Crotonic Acid	15.65
Lactic Acid	8.60		

Eluent: Water with 0.1% phosphoric acid, Temperature: 60 ˚C, Flow rate: 1 mL/min.

Ordering Information

Columns for Fermentation Analysis, Organic Acids, Alcohols, and Carbohydrates

Description	Dimension	Qty.	P/N
Fast Fruit Juice Column	7.8 × 150 mm	1/pk	WAT010639
Fast Fruit Juice Guard-Pak Inserts	—	10/pk	WAT015207[1]
IC-Pak Ion-Exclusion	7.8 × 300 mm	1/pk	WAT010290
SC-1011 Column	8.0 × 300 mm	1/pk	WAT034238
SC-1011P Pre-column	6.0 × 50 mm	1/pk	WAT034244
KC-811	8.0 × 300 mm	1/pk	WAT034298
KC-811 Pre-column	6.0 × 50 mm	1/pk	WAT035501

[1]Requires 7.8 × 10 mm Cartridge Holder, p/n: 186000708.

FREE FATTY ACID ANALYSIS

The Waters Free Fatty Acid HP Column uses a phenyl-bonded packing and a simple isocratic elution method to separate free fatty acids on the basis of carbon-chain length and degree of saturation. The short column dimension (3.9 × 150 mm) significantly reduces analysis time and increases sensitivity.

Column performance is based on:

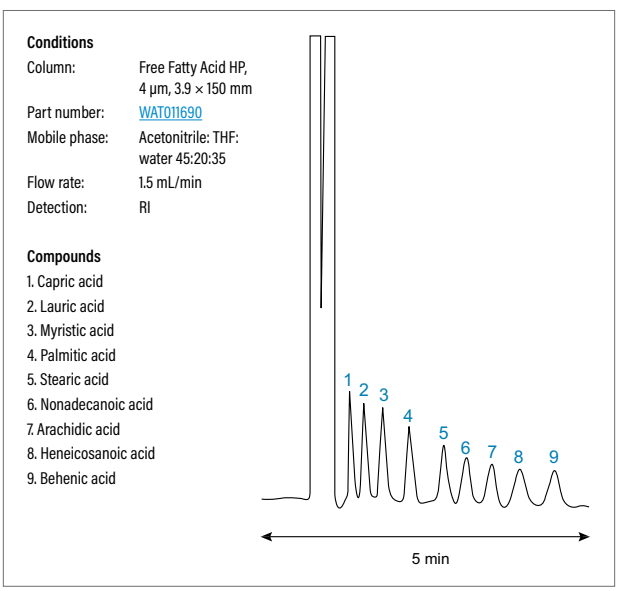
- Straight chain saturated acids, which elute in order of increasing carbon number
- Unsaturated acids which elute before the analogous saturated compound
- Carbon number and chain configuration: the greater the unsaturation, the earlier the elution

Ordering Information

Free Fatty Acid HP Column

Description	Dimension	Particle Size	Qty.	P/N
Free Fatty Acid HP	3.9 × 150 mm	4 µm	1/pk	WAT011690

Fatty Acid Standards



POLAR PESTICIDE ANALYSIS

Analyze, Without the Need to Derivatize

Waters Anionic Polar Pesticide Column has been designed specifically to provide quick, reproducible testing methods for highly anionic polar pesticides in agriculture products and finished foods. Polar pesticides such as Glyphosate can be challenging to analyze due to their zwitterionic properties and highly polar nature, however, the Anionic Polar Pesticide column provides application specific column chemistry for ease-of-use, quicker results and reliable low-level detection while maintaining key analyte separations.

- Extended Peak Shape Integrity
- Maintain Key Analyte Separations
- Retention Without Derivatization
- Reliable Low-Level Detection – No Need for Non-MS Friendly Buffers

Ordering Information

Anionic Polar Pesticide Columns

Description	Dimension	Qty.	P/N
Anionic Polar Pesticide, 130 Å, 5 µm Column	2.1 × 50 mm	1/pk	186009286
Anionic Polar Pesticide, 130 Å, 5 µm Column	2.1 × 100 mm	1/pk	186009287
Anionic Polar Pesticide, 130 Å, 5 µm Column	2.1 × 150 mm	1/pk	186009288
Anionic Polar Pesticide VanGuard, 130 Å, 5 µm Cartridge	2.1 × 5 mm	3/pk	186009285

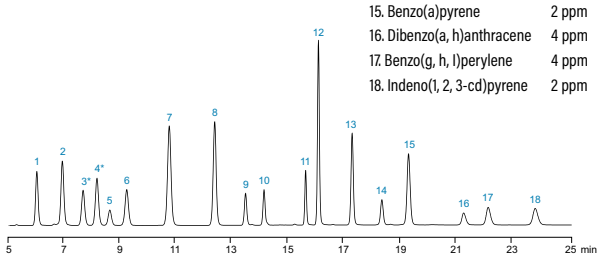
POLYAROMATIC HYDROCARBON ANALYSIS

Waters PAH Columns are optimized for the HPLC analysis of polyaromatic hydrocarbons to achieve baseline resolution for 16 target analytes in fewer than 25 minutes. These columns are available in seven dimensions (including a capillary format) and two particle sizes. A complete certificate of analysis accompanies each, backed by world-class ISO 9002-registered documentation.

PAH Analysis According to Florida Administrative Code 17.700

Conditions	
Column:	Waters PAH C_{18}, 5 µm, 4.6 × 250 mm
Column temp.:	27 °C
Part number:	186001265
Eluent A:	Water
Eluent B:	Acetonitrile
Gradient:	60% B to 100% B using curve 9 in 12 minutes, hold 11 minutes, back to initial conditions
Flow rate:	1.2 mL/min
Injection:	20 µL
Sample:	EPA-610 mixture plus two compounds

Compounds	
1. Naphthalene	20 ppm
2. Acenaphthylene	40 ppm
3. 1-methyl naphthalene*	25 ppm
4. 2-methyl naphthalene*	25 ppm
5. Acenaphthene	20 ppm
6. Fluorene	4 ppm
7. Phenanthrene	2 ppm
8. Anthracene	2 ppm
9. Fluoranthene	4 ppm
10. Pyrene	2 ppm
11. Benzo(a)anthracene	2 ppm
12. Chrysene	4 ppm
13. Benzo(b)fluoranthene	4 ppm
14. Benzo(k)fluoranthene	2 ppm
15. Benzo(a)pyrene	2 ppm
16. Dibenzo(a, h)anthracene	4 ppm
17. Benzo(g, h, I)perylene	4 ppm
18. Indeno(1, 2, 3-cd)pyrene	2 ppm



Ordering Information

PAH Columns

	Particle Size: 3 µm		Particle Size: 5 µm	
	Dimension	P/N	Dimension	P/N
C_{18}	4.6 × 50 mm	186001260	2.1 × 150 mm	186001261
			2.1 × 250 mm	186001262
			3.0 × 250 mm	186001263
			4.6 × 150 mm	186001264
			4.6 × 250 mm	186001265

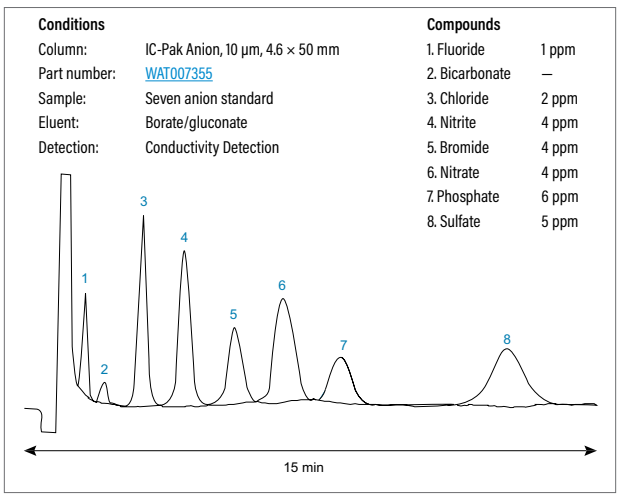
ION ANALYSIS

Waters IC-Pak resin-based columns separate a full range of ions from complex sample matrices. They offer an exceptional linear loading range, from less than 1.0 ppb to greater than 400 ppm, without dilution and without pH limitations on eluent or sample.

Recommended IC-Pak Columns:

- IC-Pak Anion Columns, for analysis of inorganic anions
- IC-Pak Ion-exclusion Columns, for weak acid anions and organic acids
- IC-Pak Cation Columns, sulfonated styrene-divinylbenzene based resin, for monovalent and divalent cation analysis
- IC-Pak C M/D Columns

IC-Pak Anion Column



The IC-Pak Anion column is a configuration of 10 µm anion-exchange packing material and a short column length which makes this the column of choice for rapid routine analyses.

Ordering Information

IC-Pak Anion, Cation and Ion-Exclusion Columns

Description	Dimension	Qty.	P/N
IC-Pak Anion	4.6 × 50 mm	1/pk	WAT007355
IC-Pak Anion HR	4.6 × 75 mm	1/pk	WAT026765
IC-Pak Anion HC	4.6 × 150 mm	1/pk	WAT026770
IC-Pak Anion Concentrator Inserts	—	5/pk	WAT007358[9]
IC-Pak Anion Guard-Pak Inserts	—	5/pk	WAT010551[9]
IC-Pak C M/D Column	3.9 × 150 mm	1/pk	WAT036570
IC-Pak C M/D Guard-Pak Inserts	—	10/pk	WAT044250[9]
IC-Pak Cation Column	4.6 × 50 mm	1/pk	WAT007354
IC-Pak Cation Guard Column	4.6 × 50 mm	1/pk	WAT007356[9]

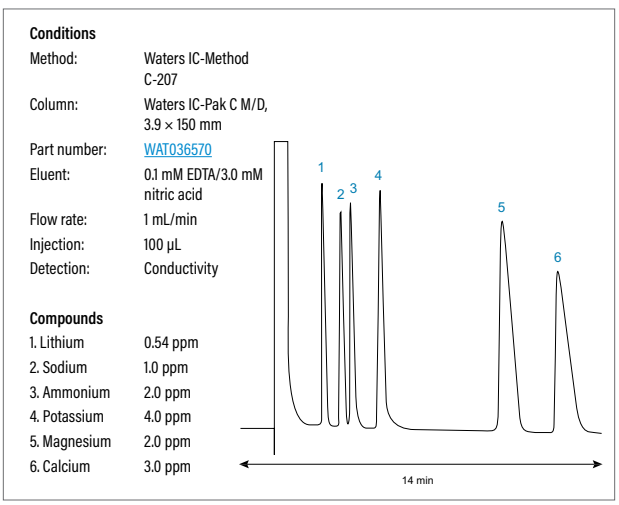
[9]Requires Guard-Pak Holder, p/n: WAT088141.

Ion-Exclusion Columns

Description	Dimension	Qty.	P/N
IC-Pak Ion-Exclusion Column	7.8 × 150 mm	1/pk	WAT010295
IC-Pak Ion-Exclusion Column	7.8 × 300 mm	1/pk	WAT010290
IC-Pak Ion-Exclusion Guard-Pak Inserts	—	10/pk	WAT020770[9]

[9]Requires Guard-Pak Holder, p/n: WAT088141.

IC-Pak C M/D Cation Column



Amino Acid Analysis

AccQ•Tag™ Ultra
UPLC® Amino Acid Analysis

Amino acids are the constituents of proteins and are the intermediates in many metabolic pathways. Qualitative and quantitative Amino Acid Analysis (AAA) is used to determine the concentration of proteins, identify proteins, and detect structural variants. Amino acid composition is a critical component of the nutritional value of foods and feeds. The same analytical tools are used to monitor cell culture and fermentation processes. AAA is also used as a clinical diagnostic tool for assessing inborn errors of metabolism and nutritional status. For LC-MS based physiological amino acid analysis solution, please refer to Kairos in Application Specific Columns, Kits, and Spare Parts chapter.

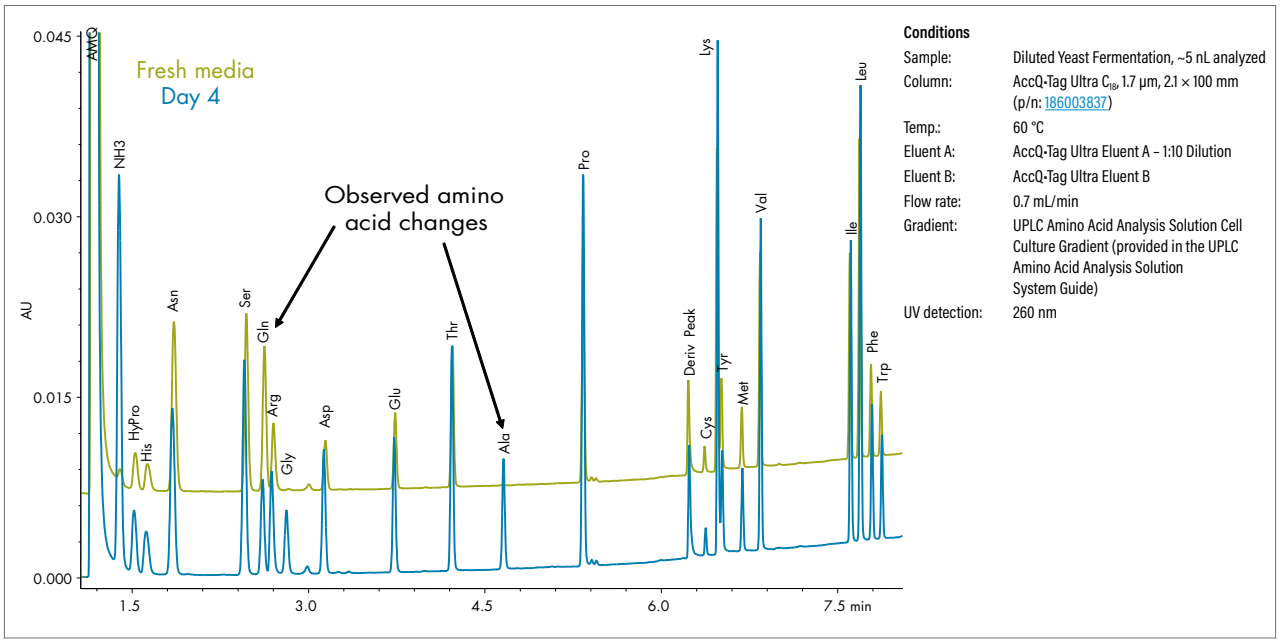
The accurate identification and quantification of amino acids in biological research and in the development and commercialization of food, beverage, and biotherapeutic products is challenging. This set of analytes covers a wide range of chemical properties (e.g., acidic, basic, neutral), yet resolution of individual pairs having only minor structural differences is required. Analysis is further complicated by the absence of common chromophores, necessitating use of a derivatization chemistry to enable analyte detection.

Reversed-phase chromatography provides good selectivity for separating amino acids. The most common approach to reversed-phase AAA includes pre-column derivatization. The derivatized amino acids retain better on the reversed-phase column and can be more easily separated. Most common derivatization reagents react with the amines. Some reagents react only with primary amines, but the most useful ones also react with secondary amines such that proline and hydroxyproline are also measured. In addition to improving chromatography, derivatization can make the amino acids readily detectable by UV absorbance or fluorescence.

For more than 50 years, Waters has provided reversed-phase chromatographic solutions that have successfully addressed a variety of organic compound analytical needs, including amino acid analysis. Hundreds of published papers have positively testified to the successful application of one of Waters pre-column amino acid derivatization chemistries that are used prior to the reversed-phase separation with on-line detection of resolved peaks using either UV absorbance or fluorescence. Waters offers three distinct methods that utilize pre-column derivatization and reversed-phase chromatography for accurate identification and quantitation of free or bound amino acids: Pico•Tag, AccQ•Tag, and AccQ•Tag Ultra C_{18}.

Pico•Tag Method	AccQ•Tag Method	AccQ•Tag Ultra C_{18} Chemistry Package
1980's	1990's	2006
▪ Designed for use with HPLC systems ▪ Applicable to any sample including protein hydrolysates, physiologic fluids, feeds, foods, and pharmaceutical preparations ▪ Based on the coupling reaction of the well known Edman Degradation, the reaction of phenylisothiocyanate (PITC) with both primary and secondary amino acids to form phenylthiocarbamyl (PTC) derivatives ▪ QC tested for use on HPLC with UV detection	▪ Designed for use with HPLC systems ▪ Suitable for protein and peptide identification and quantitation, monitoring cell culture media and nutritional content of food and feed ▪ Based on AccQ•Tag derivatization of primary and secondary amino acids in aqueous conditions ▪ QC tested for use on HPLC with fluorescence detection	▪ Designed specifically for use with the UPLC Amino Acid Analysis Solution ▪ AccQ•Tag Ultra C_{18} Chemistry Package is part of a complete solution that includes instrument, software, and support for amino acid analysis of protein hydrolysates, cell culture media, foods, and feeds ▪ Based on AccQ•Tag derivatization of primary and secondary amino acids in aqueous conditions ▪ Reagents, columns, and eluents QC tested with an amino acid separation

Amino Acid Analysis of Cell Culture Media



Amino acid levels in a growing cell culture change over a relatively short period shown here as a decrease in glutamine accompanied by an increase in alanine. The supplied methods were used without modification and no sample prep beyond dilution was required.

UPLC: AccQ•Tag ULTRA C_{18} AMINO ACID ANALYSIS SOLUTION

Waters' UPLC Amino Acid Analysis Application Solution is the product of over 25 years of experience in amino acid analysis, highlighted by the development and industry-wide acceptance of the innovative and proven Pico•Tag and AccQ•Tag pre-column derivatization chemistries. The UPLC Amino Acid Analysis Solution is holistically designed to offer a total application solution that is optimized for accurate, reliable, and reproducible analysis of amino acids. The solution leverages Waters experience in separation science, derivatization chemistries, and information management to ensure accurate and precise qualitative and quantitative results. Our solution also provides performance-qualified methodologies that are designed to be rugged and reliable, assuring reproducible results day-to-day, instrument-to-instrument, lab-to-lab, around the world—with the expert support that scientists have come to expect from Waters. Users can feel confident with assured performance in the areas of protein characterization, cell culture monitoring, and nutritional analysis of foods and feeds.

The UPLC Amino Acid Analysis Solution consists of:

- ACQUITY UPLC H-Class (quaternary*) System with a tunable UV detector for enhanced chromatographic resolution and maximum-sensitivity detection
- AccQ•Tag Ultra C_{18} derivatization chemistries including quality-controlled 1.7 µm columns, reagents, and eluents
- Empower™ 3 pre-configured projects, methods, and report templates
- Installation and application training and support
- Connections INSIGHT™ ISDP instrument diagnostics to ensure continuous, consistent, and reliable operation
- Standards and kits to validate and troubleshoot

** Amino acid analysis can be performed on other systems such as ACQUITY UPLC H-Class PLUS Binary and ACQUITY Premier Binary systems. These are not considered as a total solution.*

UHPLC AND HPLC: AccQ•Tag ULTRA C_{18} AMINO ACID ANALYSIS

In 2022, Waters expanded its Amino Acid Analysis offerings with the introduction of the same BEH-based, C_{18} columns (as used in UPLC-based applications) but using 2.5 µm particles all amino analysis batch tested to work on UHPLC and HPLC systems with <70 µl dispersion with UV detection. These columns combined with the AccQ•Tag Ultra C_{18} pre-column derivatization kit for 250 analyses, completes this flexible portfolio to help scientists quickly and accurately obtain accurate quantitative data in half the time compared to use of legacy HPLC methods with FLR detection. Samples can now be successfully analyzed in under an hour.

** This is not a full system solution but a detailed care and use manual is available to help successfully use this offering on appropriate LC Systems.*

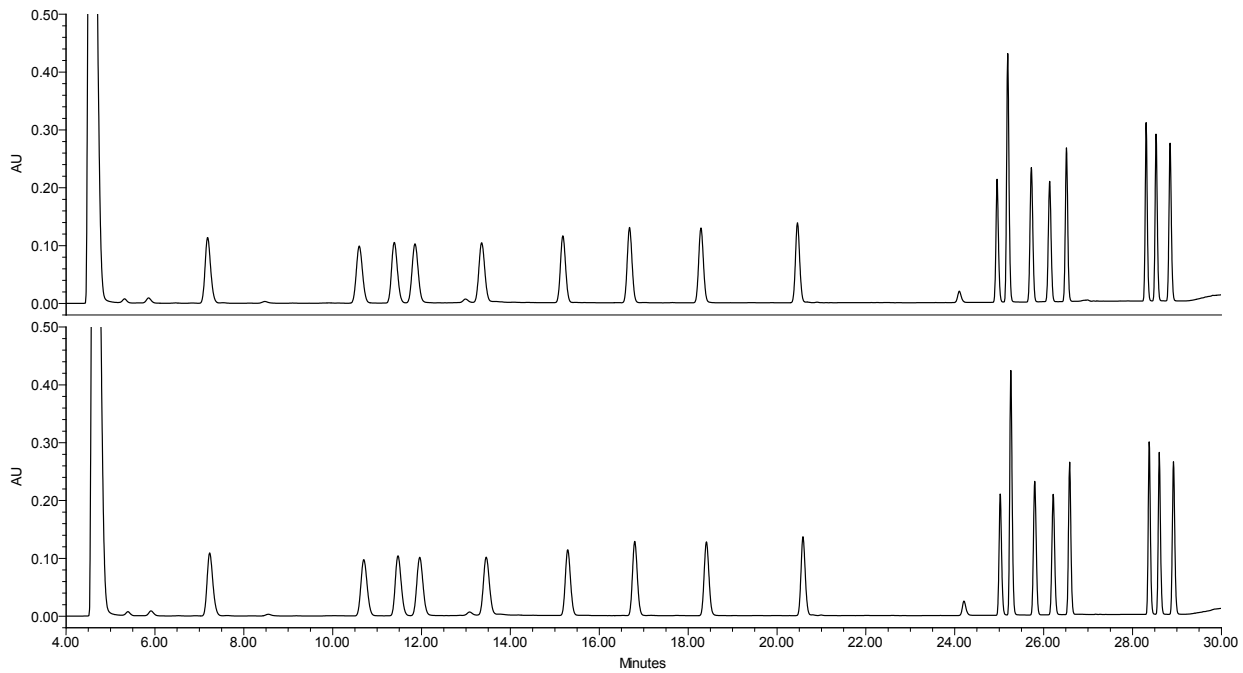
Hydrolysate Standard (500 µm) Chromatographic Comparison

Conditions

LC systems:	Waters Arc HPLC with 2998 Detector (10 mm HPLC Analytical Flow Cell) and 30 cm CHC with Passive Preheater. Note: Total LC System Dispersion without column or guard > 70 µL.
Detection:	UV @ 260 nm
Column:	AccQ•Tag Ultra C_{18}, 2.5 µm Column 4.6 × 150 mm (p/n: 186010407)
Guard:	AccQ•Tag Ultra C_{18}, 2.5 µm VanGuard Cartridge 3.9 × 5 mm (p/n: 186010407[e])
Column temp.:	43 °C
Sample temp.:	20 °C
Injection volume:	5.0 µL
Flow rate:	1.5 mL/min
Mobile phase A:	AccQ•Tag Eluent A (p/n: 186003838)
Mobile phase B:	90:10 (v/v) Water:AccQ•Tag Ultra Eluent B
Mobile phase C:	Milli-Q Water
Mobile phase D:	AccQ•Tag Eluent B (p/n: 186003839)

Gradient

	Time (min)	Flow (mL/min)	%A	%B	%C	%D	Curve
1	Initial	1.500	10.0	0.0	90.0	0.0	Initial
2	0.86	1.500	10.0	0.0	90.0	0.0	11
3	20.17	1.500	9.0	80.0	11.0	0.0	7
4	25.57	1.500	8.0	16.0	60.0	16.0	7
5	26.24	1.500	8.0	16.0	58.0	18.0	6
6	27.55	1.500	7.8	0.0	70.9	21.3	6
7	28.70	1.500	4.0	0.0	36.3	59.7	6
8	30.58	1.500	4.0	0.0	36.3	59.7	6
9	30.88	1.500	10.0	0.0	90.0	0.0	6
10	35.98	1.500	10.0	0.0	90.0	0.0	6



Analysis of Protein Hydrolysate standard on the AccQ•Tag Ultra C_{18}, 2.5 µm, 4.6 × 150 mm Column with (top) and without AccQ•Tag Ultra C_{18}, 2.5 µm VanGuard Cartridge 3.9 × 5 mm (bottom) installed on a Waters Arc HPLC with 2898 Detector. 1) AMQ, 2) His, 3) Ser, 4) Arg, 5) Gly, 6) Asp, 7) Glu, 8) Thr, 9) Ala, 10) Pro, 11) Derivatization peak, 12) Cys, 13) Lys, 15) Tyr, 15) Met, 16) Val, 17) Ile, 18) Leu, 19) Phe.

AccQ•Tag Ultra C_{18} HPLC Chemistry

The AccQ•Tag Ultra C_{18} Chemistry is an integral component of the Waters UPLC Amino Acid Analysis Application Solution. This application solution is an integrated combination of instrumentation, derivatization chemistry, separation column and eluents, methods and software. Analysts are assured of accurate and precise amino acid analyses with the complete application solution. The use of the AccQ•Tag Ultra C_{18} Chemistry without the rest of the application solution is not supported as an Amino Acid Analysis method.

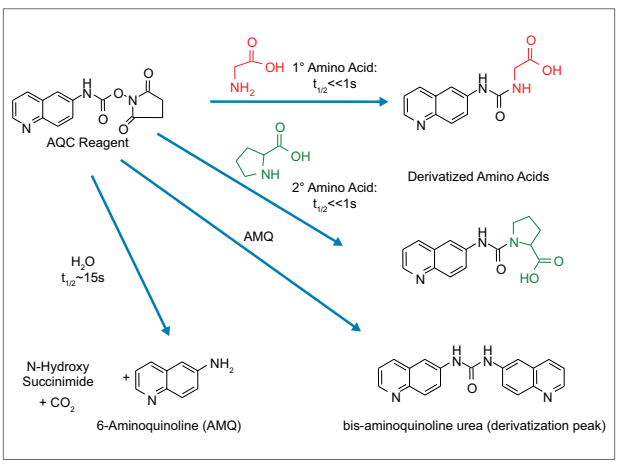
AccQ•Tag Ultra C_{18} Chemistry is different from the AccQ•Tag HPLC method, that uses an HPLC Column containing 100% Silica-based C_{18}, 4 µm particles, described later in this chapter. Although the components of the two derivatization kits are the same, the QC tests are based on the specific separation and detection protocols. Both methods begin with the same derivatization chemistry but differ in all the other details such that components cannot be interchanged. Most importantly, the AccQ•Tag Ultra C_{18} 1.7 µm and 2.5 µm Guard and Columns have a completely different chemistry from the AccQ•Tag HPLC Column. The AccQ•Tag Ultra C_{18} Columns leverage Waters 1.7 µm and 2.5 µm hybrid-silica BEH Technology particles that deliver excellent column efficiency and resolution. The AccQ•Tag Ultra C_{18} 1.7 µm Column is designed for use on Waters ACQUITY™ UPLC Systems and include use of Waters eCord™ Intelligent Chip Technology that is permanently attached to the column to easily track use history. The mobile phases used in the AccQ•Tag Ultra C_{18} method is different from that used for the AccQ•Tag HPLC method, each being optimized for the specific column and detection technique.

Compared to traditional HPLC methods, Waters UPLC Amino Acid Analysis Solution, that uses the AccQ•Tag Ultra C_{18}, 1.7 µm Column, results in peaks that are much sharper and better resolved. This improved resolution results in a rugged method where there is no ambiguity in peak identification and it simplifies quantitation. The better resolution provides a precise, reliable method. The dramatically higher throughput (3 to 5 times faster) with UPLC Technology enables users to make more informed decisions faster and to perform more analyses per day.

AccQ•Tag Derivatization Reaction

- Utilizes AccQ•Tag Ultra C_{18} Reagent Powder
  - 6-aminoquinolyl-N-hydroxysuccinimidyl carbamate (AQC)
  - US Patent #5,296,599 and European Patent #EP 0 533 200 B1
- AQC reacts rapidly with both primary and secondary amines
- Excess reagent reacts more slowly with water to form 6-aminoquinoline (AMQ)
- AMQ reacts slowly with excess AQC reagent to form a bisurea
- Derivatized amino acids are separated chromatographically from the byproducts
- Requires no vacuum drying, sample prep, or extraction

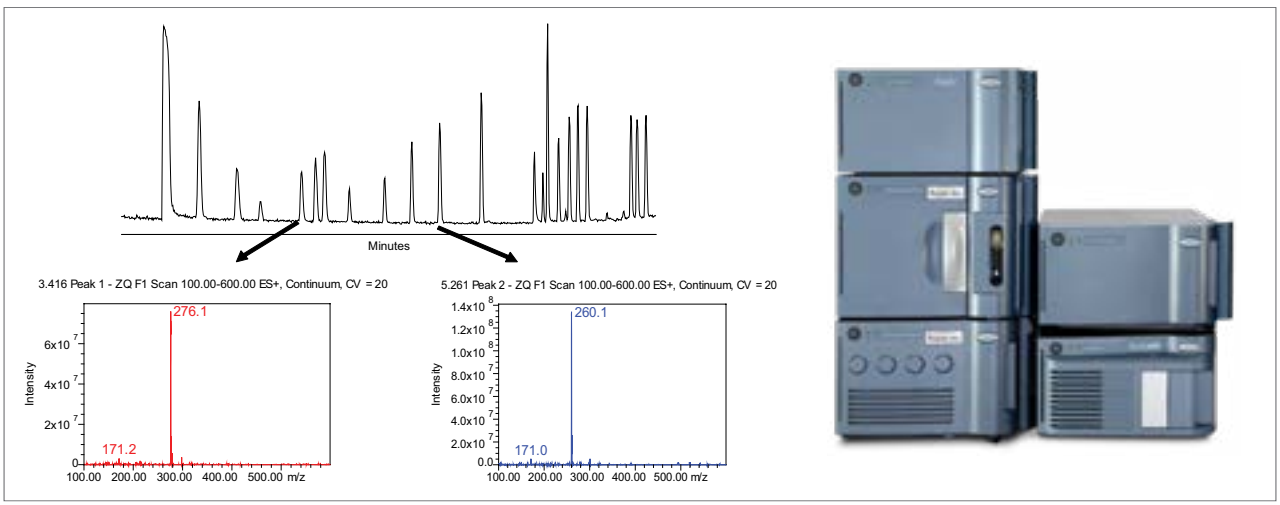
Chemistry of the AccQ•Tag Derivatization Reaction



MS Compatible

The UPLC Amino Acid Analysis Application Solution is directly compatible with electrospray mass spectrometry. No adjustment is required to have an MS TIC that exactly matches the UV trace. MS is extremely useful for any samples that may have an extra, unknown, or unexpected peak, since the identification of amino acids can be confirmed by their molecular weight. Although MS is not required for routine peak identification and does not provide additional useful sensitivity, the use of MS-compatible mobile phases makes using MS detection simple.

Direct Flow into Source at 700 µL/min



The UPLC Amino Acid Analysis Application Solution is directly compatible with electrospray mass spectrometry.

Amino Acid Analysis Standard

Amino acid analysis is required in many applications in pharmaceutical and food and feed industries. A variety of standards containing free amino acids are offered for qualitative and quantitative determination of amino acids, method development, and troubleshooting of the AccQ•Tag™ Ultra C_{18} or AccQ•Tag HPLC methods.

Ordering Information

Amino Acid Standard

Description	P/N
Amino Acid Standard 10 × 1 mL ampules of unlabeled amino acid standards	WAT088122
Amino Acid Cell Culture Standard Kit Kit contains: 2 vials contain 17 amino acids 8 vials contain 9 cell culture supplemental amino acids	186009300
Amino Acid Food and Feed Standard Kit Kit contains: 2 vials contain 17 amino acids 8 vials contain 4 food and feed supplemental amino acids	186009299
Amino Acid Internal Standard – Norvaline 1 vial	186009301

List of Amino Acids in Each Amino Acid Standard Amino Acid Standard

Amino Acid	Amino Acid Standard	Cell Culture Standard Kit	Food and Feed Standard Kit	Internal Standard
	p/n: WAT088122	p/n: 186009300	p/n: 186009299	p/n: 186009301
Alanine	■	■	■	—
Arginine	■	■	■	—
Aspartic acid	■	■	■	—
Cystine	■	■	■	—
Glutamic acid	■	■	■	—
Glycine	■	■	■	—
Histidine	■	■	■	—
Isoleucine	■	■	■	—
Leucine	■	■	■	—
Lysine	■	■	■	—
Methionine	■	■	■	—
Phenylalanine	■	■	■	—
Proline	■	■	■	—
Serine	■	■	■	—
Threonine	■	■	■	—
Tyrosine	■	■	■	—
Valine	■	■	■	—
Taurine	—	■	■	—
HydroxyProline	—	■	—	—
Asparagine	—	■	—	—
Glutamine	—	■	—	—
GABA (γ-Aminobutyric acid)	—	■	—	—
Tryptophan	—	■	—	—
Ornithine	—	■	—	—
AABA (α-Aminobutyric acid)	—	■	■	—
HydroxyLysine	—	■	—	—
Methionine Sulfone	—	—	■	—
Cysteic Acid	—	—	■	—
Norvaline	—	—	—	■

UPLC: AccQ•Tag Ultra C_{18} Amino Acid Analysis Kits and Accessories designed for use on a Waters, low dispersion, ACQUITY UPLCs

Description	Qty.	P/N
UPLC AAA H-Class Applications Kit		176002983
This kit is intended to enable existing ACQUITY UPLC H-Class Systems for AAA applications.		
Kit contains:		
AccQ•Tag Ultra Derivatization Kit, 250 analyses		
AccQ•Tag Ultra C_{18}, 1.7 µm, 2.1 × 100 mm Column		
AccQ•Tag Ultra Eluent A, concentrate	1 L	
AccQ•Tag Ultra Eluent B	1 L	
Amino acid standard, hydrolysate	10 × 1 mL	
Total recovery vials	3 × 100/pk	
Tube inlet 0.0025 I.D. PEEK nut PDA assembly		
Column In-line filter kit		
UPLC AAA H-Class solution information set		
AAA application and familiarization service		
AccQ•Tag Ultra Chemistry Kit		176001235
The refill kit is intended to recharge the AccQ•Tag Ultra chemistries that are part of the application kit. This kit should be purchased by those that have already purchased the AccQ•Tag Ultra Application Solution. This kit is applicable to both ACQUITY UPLC and ACQUITY UPLC H-Class AAA Application Solutions, and should not be purchased as part of an initial system.		
Kit contains:		
AccQ•Tag Ultra Derivatization Kit, 250 analyses		
AccQ•Tag Ultra C_{18}, 1.7 µm, 2.1 × 100 mm Column		
AccQ•Tag Ultra Eluent A, concentrate	1 L	
AccQ•Tag Ultra Eluent B	1 L	
Amino acid standard, hydrolysate	10 × 1 mL	
Sample tubes	4 × 72/pk	
Total recovery vials with caps	3 × 100/pk	
AccQ•Tag Ultra Derivatization Kit, 250 Analyses		186003836
AccQ•Tag Ultra Borate Buffer	5 × 6 mL	
AccQ•Tag Ultra Derivatization Reagent Powder	5 × 3 mg	
AccQ•Tag Ultra Reagent Diluent	5 × 4 mL	
AccQTag Ultra Borate Buffer – 10 mL		186009283
Amino Acid Standard, Hydrolysate (AccQ•Tag, Pico•Tag, AccQ•Tag Ultra)	10 × 1 mL	WAT088122
A standard mixture containing 18 amino acids (17 hydrolysate amino acids each at 2.5 mM and cystine at 1.25 mM)		
Sample Tubes	4 × 72/pk	WAT007571
Total Recovery Vials with Caps	3 × 100/pk	186000384C
AccQ•Tag Ultra C_{18}, 1.7 µm, 2.1 × 100 mm Column		186003837
AccQ•Tag Ultra C_{18}, 1.7 µm, 2.1 × 50 mm Column, 1/pk		186009953
AccQ•Tag Ultra C_{18}, 1.7 µm, 2.1 × 150 mm Column, 1/pk		186009954
AccQ•Tag Ultra C_{18}, 1.7 µm, VanGuard Pre-Column, 2.1 × 5 mm, 3/Pk		186009955
AccQ•Tag Ultra Eluent A, concentrate	1 L	186003838
AccQ•Tag Ultra Eluent B	1 L	186003839
Hydrolysis Primer, Amino Acid Analysis		715006455

UHPLC and HPLC: AccQ•Tag Ultra C_{18} Amino Acid Analysis Kit

Description	Qty.	P/N
UHPLC and HPLC: AccQ•Tag Ultra C_{18} Amino Acid Analysis Kit		176005152
The kit is intended to provide all the materials needed in order to get started running the AccQ•Tag Ultra chemistries on a UHPLC and HPLC system.		
Kit contains:		
AccQ•Tag Ultra Derivatization Kit, 250 analyses		
AccQ•Tag Ultra C_{18}, 2.5 µm, 4.6 × 150 mm Column		
AccQ•Tag Ultra Eluent A, concentrate	1 L	
AccQ•Tag Ultra Eluent B	1 L	
Amino acid standard, hydrolysate	10 × 1 mL	
Total recovery vials	3 × 100/pk	

UPLC-based Amino Acid Analysis

Description	P/N
AccQ•Tag Ultra C_{18}, 1.7 µm, 2.1 × 50 mm Column	186009953
AccQ•Tag Ultra C_{18}, 1.7 µm, 2.1 × 100 mm Column	186003837
AccQ•Tag Ultra C_{18}, 1.7 µm, 2.1 × 150 mm Column	186009954
AccQ•Tag Ultra C_{18}, 1.7 µm, 2.1 × 5 mm VanGuard Pre-Column	186009955

UHPLC and HPLC-based Amino Acid Analysis

Description	P/N
AccQ•Tag Ultra C_{18}, 2.5 µm, 4.6 × 50 mm Column	186010405
AccQ•Tag Ultra C_{18}, 2.5 µm, 4.6 × 100 mm Column	186010406
AccQ•Tag Ultra C_{18}, 2.5 µm, 4.6 × 150 mm Column	186010406
AccQ•Tag Ultra C_{18}, 2.5 µm, 4.6 × 5 mm VanGuard Cartridge*, 3/pk	186010408

* Requires use of VanGuard 3.9 mm ID Cartridge Holder: p/n 186007949

Amino Acid Primer

Description	P/N
Hydrolysis Primer, Amino Acid	715006455

Amino Acid Analysis Automation

Automation increases efficiency, repeatability and avoids contamination and human errors. Amino acid analysis automation is enabled through the automation derivatization kit and verified automation scripts on Andrew+, Tecan, or Hamilton automation platforms. The automation derivatization kit is system agnostic and designed in a 32 × 3 format for up to 96 sample preparation. It has a larger volume per sample than the manual derivatization kit to accommodate the residual volumes required by automation workflow. The script includes barcode scanning, linearity calibration, sample dilution, derivatization, heating, shaking functions, which allow analysts to walk away during sample preparations, and 96 samples are prepared in less than an hour.

Ordering Information

Automation: AccQ•Tag Ultra C_{18} Amino Acid Analysis Kits and Accessories

Description	P/N
AccQ•Tag Ultra C_{18} Derivatization Kit – Automation, 96 analyses	186009232
AccQ•Tag Borate Buffer – 10 mL	186009283
96-Well Sample Collection Plate, 800 µL Round Well, 50/pk	186002481
Cap Mat, 5/pk	186006332
AccQ•Tag Ultra Cell Culture Chemistry Kit – Automation	176004534
AccQ•Tag Ultra Food & Feed Chemistry Kit – Automation	176004533
AccQ•Tag Ultra Hydrolysates Chemistry Kit – Automation	176004542
AccQ•Tag Ultra Cell Culture Tecan Script Starter Kit – CD	176004543
AccQ•Tag Ultra Cell Culture Tecan Script Starter Kit – USB	176004544
AccQ•Tag Ultra Cell Culture Hamilton Script Starter Kit – CD	176004545
AccQ•Tag Ultra Cell Culture Hamilton Script Starter Kit – USB	176004546

AccQ•Tag Ultra C_{18} Derivatization Automation Kit

AccQ•Tag Ultra Amino Acid Analysis Automation Kits for Andrew+

Description	P/N
Andrew+ Pipetting Robot Andrew+ Pipetting Robot, waste base, waste container, power supply, cables, and 1 × each single and multi-channel pipette adaptors	176004567
Andrew+ Startup Kit Intended for all new Andrew+ systems and includes Dominos, pipette adaptors, and lab kit with consumables for system installation	176004568
Pipette Kit for AccQ•Tag Includes 3× Andrew Alliance Pipettes	176004583
Domino Kit for AccQ•Tag Includes additional dominos and connected devices for Amino Acid OneLab protocol with Andrew+ automation	176004582
AccQ•Tag Ultra Derivatization Kit – Automation Provides simplified tools to enhance high throughput amino acid automation, enabling processing of up to 96 samples in 3 × 32 sample batches	186009232
Roller for Cap mats Helps to smooth out the cap mat before putting it on system for injection	186002633

AccQ•Tag Ultra Amino Acid Analysis Optional Accessories for Andrew+

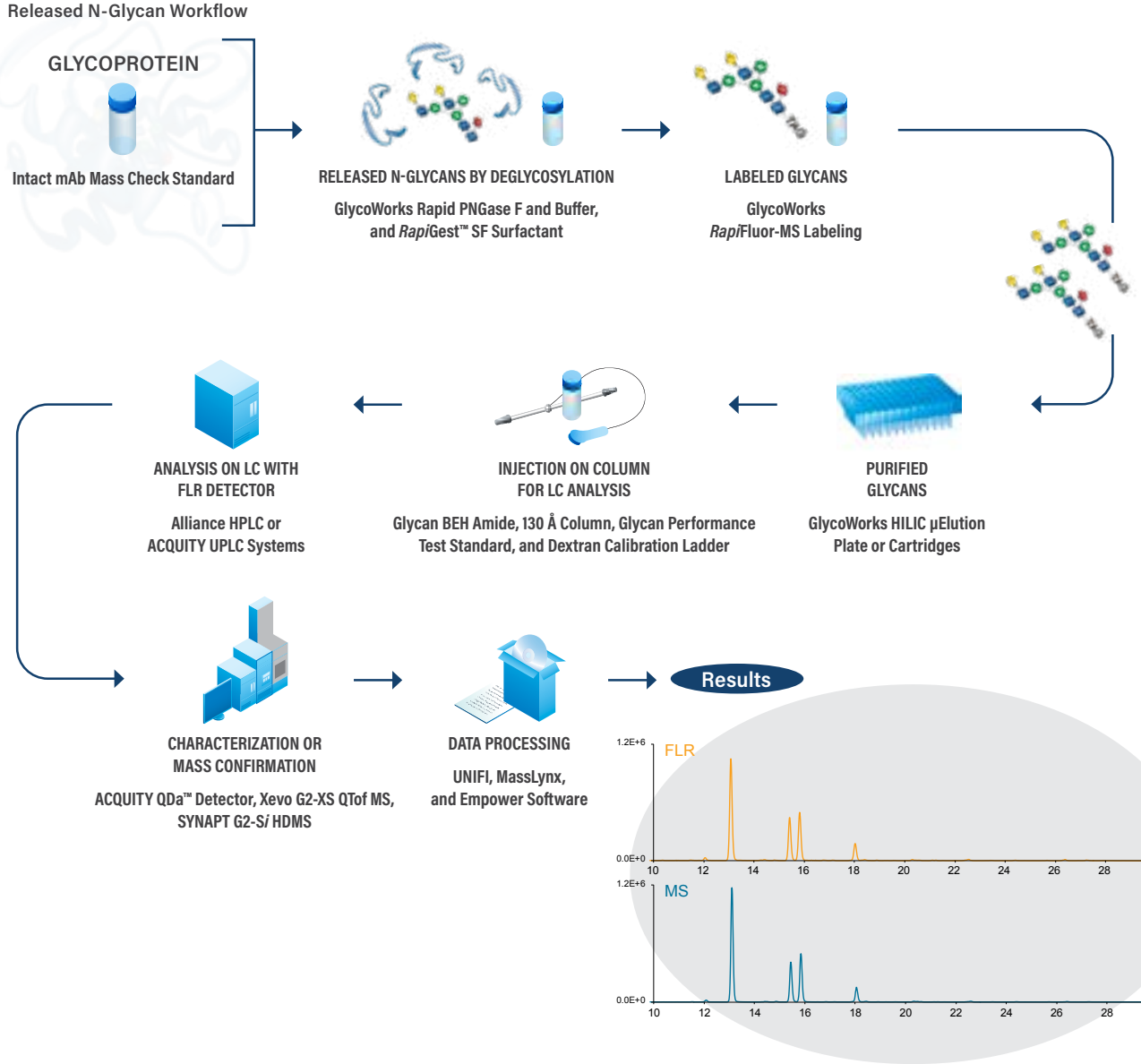
Description	P/N
Amino Acid Cell Culture Standard Kit Contains 26 amino acids monitored in cell culture media or other matrices. The standard is designed for both ID and quantitative amino acid analysis	186009300
Amino Acid Food and Feed Standard Kit Contains 21 amino acids analyzed in food and feed matrix. The standard is designed for both ID and quantitative amino acid analysis	186009299
Amino Acid Internal Standard – Norvaline Compensates for the variability generated in sample hydrolysis and amino acid analysis	186009301
AccQ•Tag Ultra 1.7 µm, 2.1 × 100 mm Column Separates the amino acid derivatives produced in the reaction with Waters AccQ•Tag Ultra Derivatization Reagent	186003837
AccQ•Tag Ultra Eluent A Mobile phase eluents for reversed phase separation of amino acid derivatives	186003838
AccQ•Tag Ultra Eluent B Mobile-phase eluents for reversed phase separation of amino acid derivatives	186003839

RELEASED N-GLYCAN ANALYSIS

Waters GlycoWorks Sample Preparation Kits and Standards, along with the ACQUITY UPLC and HPLC Glycan Columns, were designed cohesively to provide a seamless and efficient workflow from bench to analysis.

- Fast and simplified sample preparation with the GlycoWorks *Rapi*Fluor-MS N-Glycan Kit
- Automation-enabled sample preparations with verified scripts
- Alternative selectivity with either HILIC or Mixed-mode separations
- MaxPeak Premier column format reduces sample adsorption onto metal surfaces and delivers the representative performance from the first injection
- Glycan standards for benchmarking chromatographic performance, calibration and quantification, and complex profiling

Released N-Glycan Workflow

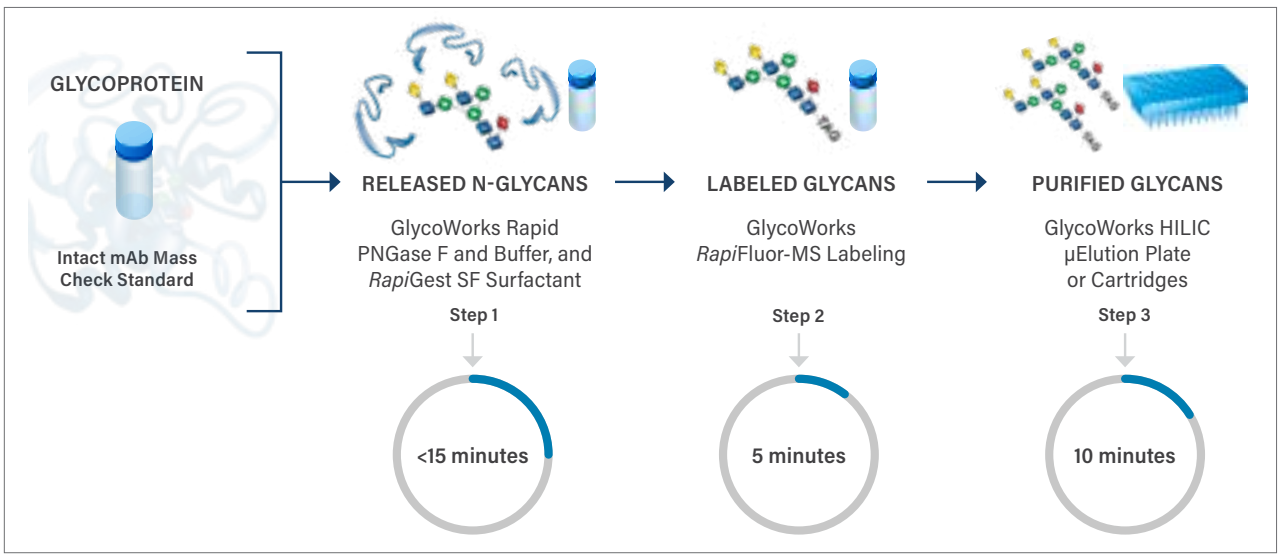


GLYCOWORKS *RAPI*FLUOR-MS RELEASED N-GLYCANS SAMPLE PREPARATION

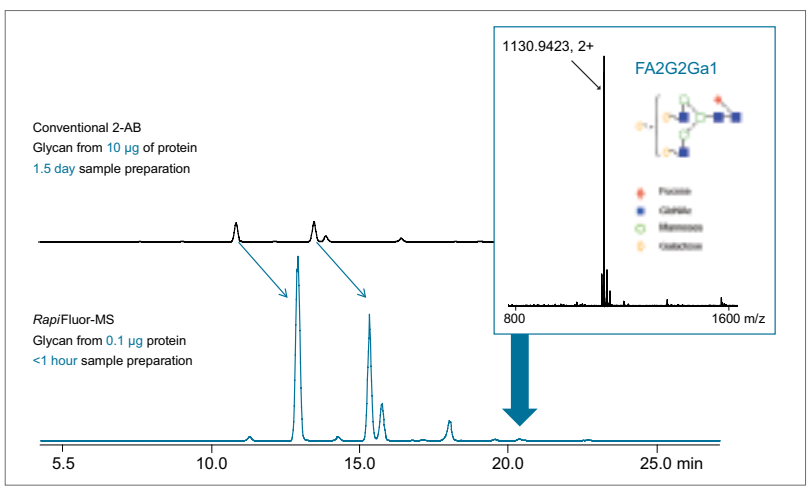
Waters GlycoWorks Consumables offer a more convenient, comprehensive, and effective sample-preparation solution for glycan analysis.

- The GlycoWorks *Rapi*Fluor-MS N-Glycan Kit ensures easy, quick preparation of released-labeled, N-glycan samples
- Streamline standard protocols (720005470EN, 720005343EN) for mAbs and a variety of glycoproteins; Optimized reducing protocols (720006992EN, 720006991EN) for complex proteins with multiple disulfide bonds
- Greatly improved FLR and MS signal intensities help easily identify low-abundance N-linked glycans
- Complete modules for processing 96 samples with flexibility of processing between 8, 24, and 48 samples at a time depending on laboratory demands with automation scripts available
- Support easy training of analysts and the transferring of methods throughout an organization

Three Steps, as little as 30 minutes



Glycan Characterization by UPLC FLR with Xevo G2-XS QTof Mass Spectrometer



Un-ionized form of acids and bases give most retention. Retention of neutral analytes not affected by pH.

Learn more about Waters latest Glycan Solutions.

Visit **waters.com/glycans**

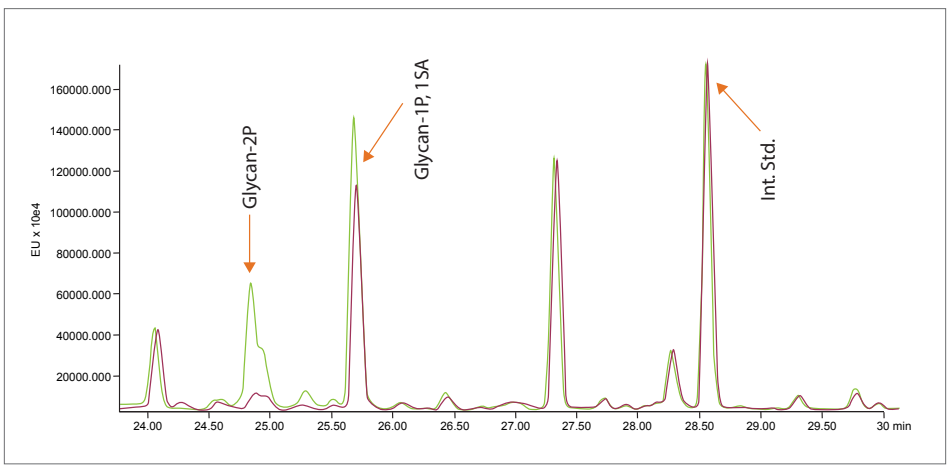
AUTOMATION OF RELEASED N-GLYCAN ANALYSIS

Waters GlycoWorks Consumables offer a more convenient, comprehensive, and effective sample-preparation solution for Released N-glycan analysis. The sample preparation procedures involve multiple steps including enzymatic deglycosylation, labeling, and SPE clean up. Due to this complexity, Waters has developed an application-specific configuration of the Andrew+ Pipetting Robot for released N-glycan analysis. Additionally, verified scripts for the GlycoWorks *Rapi*Fluor-MS method are available for our partner platforms. We provide you with the information needed, no matter the platform, to ensure that you can start achieving your automation results faster.

GlycoWorks RapiFluor MS N-Glycan Kit.

PHOSPHOGLYCAN SPE BUFFER IMPROVES RECOVERY

The loss of labeled acidic glycans, especially phosphorylated glycan species, during SPE purification has been considered a challenge to accurately monitor the glycosylation of biotherapeutics. The GlycoWorks Phosphoglycan SPE Elution Buffer, optimized with citrate additive, facilitates the elution and recovery of phosphorylated glycans and achieves maximum yield.



Improved recovery of phosphorylated glycans using citrate containing SPE eluent.

Ordering Information

GlycoWorks *Rapi*Fluor-MS Released N-Glycan Sample Preparation Kits

Description	P/N
GlycoWorks *Rapi*Fluor-MS N-Glycan Starter Kit—96 Sample Kit contains: GlycoWorks Deglycosylation Module, GlycoWorks Labeling Module, GlycoWorks Cleanup Module, GlycoWorks Sample Collection Module, ACQUITY UPLC Glycan BEH Amide, 1.7 µm, 2.1 × 150 Column, Ammonium Formate Solution – Glycan Analysis, Glycan *Rapi*Fluor-MS performance Test std, Intact mAb Mass Check Standard	176003635
GlycoWorks *Rapi*Fluor-MS N-Glycan Kit—96 Sample Kit contains: GlycoWorks Deglycosylation Module, GlycoWorks Labeling Module, GlycoWorks Cleanup Module, GlycoWorks Sample Collection Module, Intact mAb Mass Check Standard	176003606
GlycoWorks *Rapi*Fluor-MS N-Glycan Starter Kit—24 sample Kit contains: GlycoWorks Deglycosylation Module, GlycoWorks Labeling Module, GlycoWorks Cleanup Module, GlycoWorks Sample Collection Module, ACQUITY UPLC Glycan BEH Amide, 1.7 µm, 2.1 × 150 mm Column, Ammonium Formate Solution – Glycan Analysis, Glycan *Rapi*Fluor-MS performance Test std, Intact mAb Mass Check Standard	176003712
GlycoWorks *Rapi*Fluor-MS N-Glycan Kit—24 sample Kit contains: GlycoWorks Deglycosylation Module, GlycoWorks Labeling Module, GlycoWorks Cleanup Module, GlycoWorks Sample Collection Module, Intact mAb Mass Check Standard	176003713
GlycoWorks *Rapi*Fluor-MS N-Glycan Refill Kit—24 sample Kit contains one of each: GlycoWorks Deglycosylation Module and the GlycoWorks Labeling Module	176003714
GlycoWorks Rapid Deglycosylation 1 × 24 Kit contains: one vial of GlycoWorks Rapid PNGaseF Enzyme and Buffer; and, one vial of 10-mg *Rapi*Gest SF Surfactant	186008939
GlycoWorks Rapid Deglycosylation 3 × 8	186008841
GlycoWorks Rapid Deglycosylation Kit 2 × 48	186004579
GlycoWorks Rapid Deglycosylation kit 4 × 24	186008840
GlycoWorks *Rapi*Fluor -MS Labeling Kits—24 Sample	186008091
GlycoWorks *Rapi*Fluor -MS Labeling Kits—96 Sample	186007989
GlycoWorks SPE Reagents	186007992
GlycoWorks Phosphoglycan SPE Reagents HILIC	186010209
GlycoWorks Phosphoglycan SPE Elution Buffer, 4/pk	186009763
GlycoWorks HILIC µElution Plate	186002780
GlycoWorks Sample Collection Module	186007988

GlycoWorks *Rapi*Fluor-MS N-Glycan Automation Kits

Description	P/N
GlycoWorks *Rapi*Fluor-MS N-Glycan Script Starter Kit – Automation Kit contains: GlycoWorks Automation Script Pack-CD; Intact mAb Mass Check Standard (unlabeled); *Rapi*Fluor-MS Intact mAb Mass Check Standard (deglycosylated, labeled, and purified); GlycoWorks Rapid Deglycosylation Kit – 2 × 48; GlycoWorks *Rapi*Fluor-MS Labeling Module – Automation; GlycoWorks HILIC µElution Plate; GlycoWorks SPE Reagents – Automation; GlycoWorks Sample Collection Module – Automation; ACQUITY UPLC Glycan BEH Amide, 130 Å, 1.7 µm, 2.1 × 150 mm Column; Mobile phase concentrate: ammonium formate	176004151
GlycoWorks *Rapi*Fluor-MS N-Glycan Starter Kit – Automation Kit contains: Intact mAb Mass Check Standard (unlabeled); *Rapi*Fluor-MS Intact mAb Mass Check Standard (deglycosylated, labeled, and purified); GlycoWorks Rapid Deglycosylation Kit – 2 × 48; GlycoWorks *Rapi*Fluor-MS Labeling Module – Automation; GlycoWorks HILIC µElution Plate; GlycoWorks SPE Reagents – Automation; GlycoWorks Sample Collection Module – Automation; ACQUITY UPLC Glycan BEH Amide, 130 Å, 1.7 µm, 2.1 × 150 mm Column; Mobile phase concentrate: ammonium formate	176004152
GlycoWorks *Rapi*Fluor-MS N-Glycan Kit - Automation Kit contains: GlycoWorks Rapid Deglycosylation Kit – 2 × 48, GlycoWorks *Rapi*Fluor-MS Labeling Module – Automation, GlycoWorks HILIC µElution Plate, GlycoWorks SPE Reagents – Automation and GlycoWorks Sample Collection Module – Automation	176004153
GlycoWorks *Rapi*Fluor-MS N-Glycan Basic Kit - Automation Kit contains: GlycoWorks Rapid Deglycosylation Kit – 2 × 48, GlycoWorks *Rapi*Fluor-MS Labeling Module – Automation, GlycoWorks HILIC µElution Plate, and GlycoWorks SPE Reagents – Automation	176004154
Andrew+ 24 Sample GlycoWorks Application Kit contains: GlycoWorks Rapid Deglyco Module 24-sample, GlycoWorks *Rapi*Fluor-MS Labeling—24 sample, GlycoWorks HILIC µElution Plate, GlycoWorks SPE Reagents – Automation, Intact mAb Mass Check Standard	176003349
Andrew+ 96 Sample GlycoWorks Application Kit contains: GlycoWorks Rapid Deglyco Module 96-sample, GlycoWorks *Rapi*Fluor-MS Labeling—96 sample, GlycoWorks HILIC µElution Plate, GlycoWorks SPE Reagents – Automation, Intact mAb Mass Check Standard	17600335
Andrew+ 96 Sample GlycoWorks Application Kit contains: GlycoWorks Rapid Deglyco Module 2 × 48, GlycoWorks *Rapi*Fluor-MS Labeling – Automation, GlycoWorks HILIC µElution Plate, GlycoWorks SPE Reagents – Automation, Intact mAb Mass Check Standard	176003351

GLYCAN PERFORMANCE TEST STANDARDS AND DEXTRAN CALIBRATION LADDERS

Benchmarking, Method Development, and Troubleshooting

Waters purified glycan library standards are used as qualitative/quantitative standards for LC/FLR and LC/MS. These standards come pre-labeled, lyophilized for long term storage in Waters Certified Vials for ease of solubilization and injection.

Chromatographic Performance
To ensure that the system and chromatographic method is working, it is highly recommended to use a pre-labeled standard to access observed retention time by monitoring the major peaks for performance of the method.

Calibration and Quantitation
When using LC optical detection, it is important to have standards to assist in profiling glycans under HILIC conditions to ensure reproducible chromatographic assignment providing confidence in data generation.

Complex Profiling
These performance test standards are helpful when looking for specific glycans monitored in manufacturing and are useful to check retention time of major peaks in LC/FLR, accurate mass or to assess sample preparation efficiency.

Ordering Information

*Rapi*Fluor-MS Released N-Glycan Standards and Accessories

Description	P/N
*Rapi*Fluor-MS Dextran Calibration Ladder 50 µg/vial	186007982
*Rapi*Fluor-MS Glycan Performance Test Standard 400 pmol total/vial	186007983
*Rapi*Fluor-MS High Mannose Standard	186008317
*Rapi*Fluor-MS Intact mAb Standard	186008843
*Rapi*Fluor-MS Quantitative Glycan Standard	186008791
*Rapi*Fluor-MS Sialylated Glycan Performance Test Standard	186008660
Intact mAb Mass Check Standard*	186006552
2-AB Glycan Performance Test Standard	186006349
2-AB Dextran Calibration Ladder	186006841

* Controls Standard included in kit.
** Essential for kit use.

Description	P/N
*Rapi*Gest SF 3 mg vial	186008090
*Rapi*Gest SF 10 mg vial	186002123
96-Well Plate Extraction Manifold	186001831
Vacuum Manifold Shims,** 3/set	186007986
Positive Pressure Manifold Spacer for the GlycoWorks *Rapi*Fluor-MS N-Glycan Kit,* 1/pk	186007987
Vacuum Pump 220 v/240 v 50 Hz	725000604
Positive Pressure Manifold	186006961
Modular Heat Block for 1 mL tubes/96 wells	186007985
GlycoWorks Rapid Buffer—5 mL	186008100

Application-Specific Kits – Bioanalysis

PROTEINWORKS SAMPLE PREPARATION KITS FOR PROTEIN QUANTIFICATION

ProteinWorks™ Sample Preparation Kits, combined with robust and reliable LC-MS methods and instrumentation, allow discovery and early development laboratories to achieve standardized, reproducible, and sensitive protein quantification in whole or immunopurified plasma via the surrogate peptide approach. This flexible and automatable kit-based approach reduces method development time and is easily deployable from lab-to-lab and site-to-site.

- ProteinWorks eXpress Digest Kits simplify and accelerate protein digestion, streamlining and standardizing the traditionally complex pre-analytic workflow for LC-MS protein quantification via the surrogate peptide approach
- ProteinWorks µElution SPE Kit is designed for post-digestion clean-up, increasing assay sensitivity, and improving system robustness by removing excess digest reagents, phospholipids, and other plasma and serum components
- With pre-measured reagents and automation protocols, ProteinWorks can be automated on the Hamilton STARWorks platform

ProteinWorks eXpress Digest kits are suitable for immuno-purified plasma and serum samples or samples with low total protein content (0.2–1.0 mg total protein). eXpress Direct Digest kits are suitable for non-immuno-purified whole plasma or serum or samples with high total protein content (1.0–5.25 mg total protein)

Ordering Information

ProteinWorks Sample Preparation Kits

Description	P/N
96 Sample Kits	
ProteinWorks Auto-eXpress High 3 Digest Kit Suitable for high protein content samples (1.0–5.25 mg total protein) and contains: ProteinWorks High Digest Ambient Kit and ProteinWorks High Digest Trypsin Kit	176004079
ProteinWorks Auto-eXpress Low 3 Digest Kit Suitable for low protein content samples (0.2–1.0 mg total protein) and contains: ProteinWorks Low Digest Ambient Kit and ProteinWorks Low Digest Trypsin Kit	176004077
ProteinWorks Auto-eXpress Low 5 Digest Kit Suitable for low protein content samples (0.2–1.0 mg total protein) and contains: ProteinWorks Low Digest Ambient Kit, ProteinWorks Low Digest Trypsin Kit, and ProteinWorks Reduction Alkylation Kit	176004078
ProteinWorks Auto-eXpress High 5 Digest Kit Suitable for high protein content samples (1.0–5.25 mg total protein) and contains: ProteinWorks High Digest Ambient Kit, ProteinWorks High Digest Trypsin Kit, and ProteinWorks Reduction Alkylation Kit	176004080
ProteinWorks eXpress Direct Digest Start-Up Kit Kit contains: eXpress Direct Digest Kit, ProteinWorks µElution SPE Cleanup Kit, and a Murine mAb Standard	176003695
ProteinWorks eXpress Direct Digest Kit Suitable for non-immuno-purified whole plasma and serum samples or samples with high protein content (1.0–5.25 mg total protein) and contains: Pre-Measured, Lot-Traceable Reagents; a Flexible 96-Tube Sample Collection Module; and Optimized Protocols	176003688
ProteinWorks eXpress Digest Start-Up Kit Kit contains: eXpress Digest Kit, ProteinWorks µElution SPE Cleanup Kit, and a Murine mAb Standard	176003696
ProteinWorks eXpress Digest Kit suitable for immuno-purified plasma and serum samples or samples with low protein content (0.2–1.0 mg total protein) and contains: Pre-measured, Lot-Traceable Reagents; a Flexible 96-tube Sample Collection Module, and Optimized Protocols	176003689
ProteinWorks µElution SPE Clean-up Kit Kit includes: Optimized SPE Protocol and Oasis µElution Technology	186008304

Ordering Information

ProteinWorks Sample Preparation Kits

Description	P/N
96 Sample Kits	
ProteinWorks Auto-eXpress High Digest Kit - Ambient Refill Kit Kit includes: digestion buffer (1x), trypsin dissolving reagent (1x), digestion inactivation reagent (1x), and *Rapi*Gest denaturant (1x) for high protein content samples (1.0–5.25 mg total protein)	186008872
ProteinWorks Auto-eXpress Low Digest Kit - Ambient Refill Kit Kit includes: digestion buffer (1x), trypsin dissolving reagent (1x), digestion inactivation reagent (1x), and *Rapi*Gest denaturant (1x) for low protein content samples (0.2–1.0 mg total protein)	186008873
ProteinWorks Reduction Alkylation Kit - Cold Storage Refill Kit Kit includes: reduction reagent (3x), alkylation reagent (3x)	186008889
ProteinWorks Auto-eXpress High Trypsin Kit - Cold Storage Refill Kit Kit includes: trypsin (1x) suitable for high protein content samples (1.0–5.25 mg total protein)	186008874
ProteinWorks Auto-eXpress Low Trypsin Kit - Cold Storage Refill Kit Kit includes: trypsin suitable (1x) for low protein content samples (0.2–1.0 mg total protein)	186008875
ProteinWorks eXpress Direct Digest Kit - Ambient Refill Kit Kit includes: digestion buffer (1x), trypsin dissolving reagent (1x), digestion inactivation reagent (1x), denaturant rack (1x), strip caps (1x) suitable for high protein content samples (1.0–5.25 mg total protein) or samples in whole non-immuno-purified serum or plasma	186008065
ProteinWorks eXpress Direct Digest Kit - Cold Storage Refill Kit Kit includes: trypsin (1x), alkylation reagent (3x), and reduction reagent (3x) suitable for high protein content samples (1.0–5.25 mg total protein per sample) or samples in whole non-immuno-purified plasma or serum	186008066
ProteinWorks eXpress Digest Kit - Ambient Refill Kit Kit includes: digestion buffer (1x), trypsin dissolving reagent (1x), digestion inactivation reagent (1x), denaturant rack (1x), strip caps (1x), suitable for low protein content samples (0.2–10 mg total protein) or samples in whole immuno-purified serum or plasma	186008067
ProteinWorks eXpress Digest Kit - Cold Storage Refill Kit Kit includes: trypsin (1x), alkylation reagent (3x), and reduction reagent (3x) suitable for low protein content samples (0.2–1.0 mg total protein per sample) or samples in immuno-purified plasma or serum	186008068

APPLICATION AREA: Pharmacokinetic Matricies

"The VanGuard column guards are an exceptional product. They've increased my column life from 8–10 K analysis to over 18 K, essentially doubling its life. The price is excellent, the customer service is also top notch. I also like to run a clean sample, I run SPE and along with my VanGuard pre-column, my instrument is protected from buildup and possible contaminants."

REVIEWER: Andrew Urdzela

ORGANIZATION: Crown Toxicology

THERAPEUTIC PEPTIDE METHOD DEVELOPMENT KITS

The Therapeutic Peptide Method Development Kit was developed to simplify the process of sample preparation and LC method development for the analysis of therapeutic peptides in plasma. The kit contains an Oasis Peptide µElution Method Development Plate, a Peptide BEH C_{18}, 300 Å reversed-phase column, and the detailed screening protocol which was used to generate the data shown in this publication.

In addition, a comprehensive method development training seminar has been created which describes all aspects of the method development process from the MS conditions to the final validation of a method for the extraction of the therapeutic peptide desmopressin from human plasma.

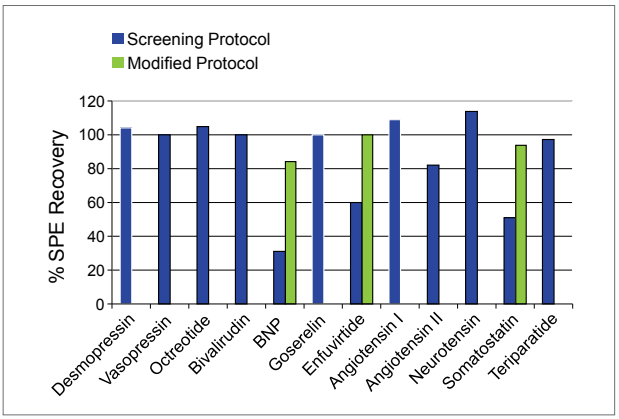
Although big progress has been made in sample pretreatment over the last years, there are still considerable limitations when it comes to overcoming complexity and dynamic range problems associated with peptide analyses from biological matrices. We focus on techniques which can be employed prior to liquid chromatography coupled to mass spectrometry for peptide detection and identification.

The peptide columns are specifically QC tested with a cytochrome *c* tryptic digest that helps ensure batch-to-batch consistency in validated methods ideally suited for separating a wide range of large and small, acidic and basic, hydrophilic and hydrophobic peptides.

The complexity of samples still far exceeds the capacity of currently available analytical systems, and specific sample preparation remains a crucial part of the analysis in a whole.

For more resources, visit our Simplfying Bioanalysis Application Note, Method Development Webinar and our DMPK Bootcamp Series or contact your local Waters sales office.

High Recovery of Peptides



The innovative Oasis µElution Plate allows for up to a 15x sample concentration, increasing the possibility of reaching the required sensitivity levels for bioanalytical assays. The low (25 µL) elution volume eliminates the need for evaporation and reconstitution significantly reducing the potential analyte loss due to absorption to the walls of the collection plate and/or chemical instability.

Ordering Information

Therapeutic Peptide Method Development Kits

Description	Qty/Box	P/N
UPLC Therapeutic Peptide Method Development Kit		176001835
Oasis µElution Method Development Plate	1	186004713
ACQUITY UPLC Peptide BEH C_{18}, 300 Å, 1.7 µm, 2.1 × 50 mm Column	1	186003685
96-Well 1 mL Collection Plate and Cap Mat	3	600001043
HPLC Peptide Therapeutic Peptide Method Development Kit		176001836
Oasis µElution Method Development Plate	1	186004713
XBridge Peptide BEH C_{18}, 300 Å, 3.5 µm, 2.1 × 50 mm Column	1	186003607
96-Well 1 mL Collection Plate and Cap Mat	3	600001043

Additional Products (Not Included in Kits)		
Oasis MAX 96-Well µElution Plate	1	186001829
Oasis WCX 96-Well µElution Plate	1	186002499
96-Well 1 mL Collection Plate	50	186002481
Cap Mats for 1 mL Collection Plate	50	186002483
Disposable Reservoir Tray	25	WAT058942
Extraction Manifold for 96-Well Plates	1	186001831
Vacuum Box Gasket Kit (contains foam top gaskets and orange O-rings)	2	186003522
SPE Vacuum Pump 115 V, 60 Hz	1	725000417
SPE Vacuum Pump 240 V, 50 Hz	1	725000418

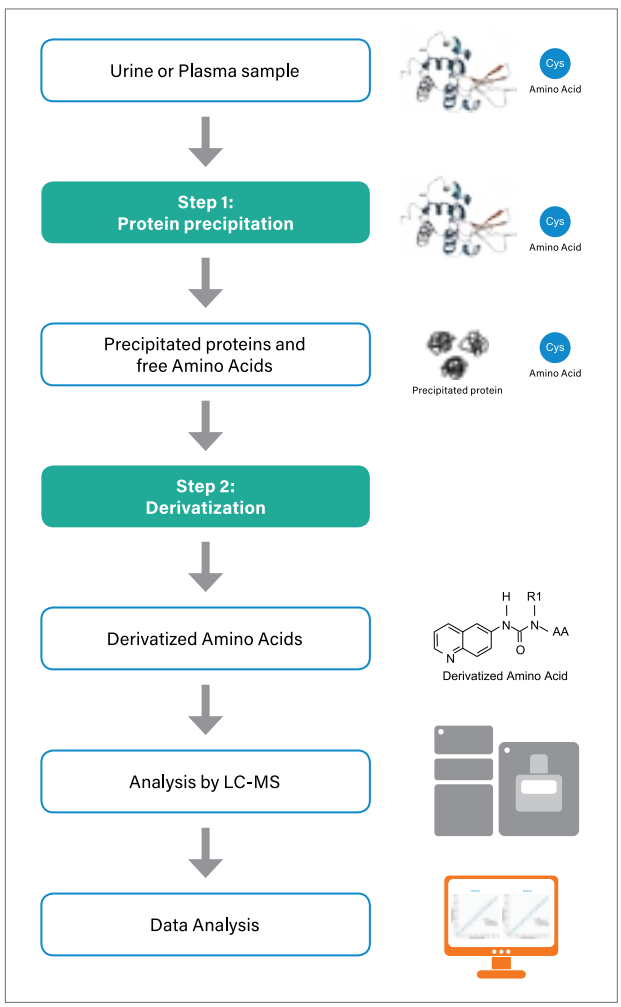
Application-Specific Kits – Clinical Research

KAIROS AMINO ACID KIT

The Kairos amino acid kit is the LC-MS-based kit designed to quantitate 40+ amino acids in physiological matrices such as plasma and urine. Built on AccQ•Tag derivatization chemistry, this kit enables unprecedented sensitivity, accuracy, and precision. The Kairos Amino Acid Kit, which can bring run times to under 10 minutes, is fully automated with manual options for physiological samples in both high-throughput (500+ samples) and lower-throughput (100+ samples) amino acid analysis. Automated sample preparation workflow is verified with scripts available on Tecan and Andrew + Systems.

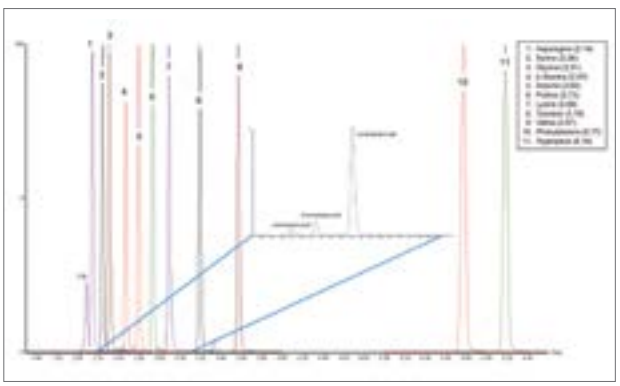
For information about amino acid analysis in cell culture media, food and feed samples, and hydrolysates, please refer to the amino acid section in the chapter of Application Specific Columns, Kits, and Spare Parts.

Amino Acid Analysis Protocol



2-step sample preparation protocol developed around the AccQTag Ultra derivitization kit and CORTECS column chemistry for LCMS results in complex physiological matrices.

UPLC-MS/MS Analysis of a Complex Sample



Total Ion Chromatogram (TIC) for 11 amino acids present in a plasma sample and inset a chromatogram to show the separation of gamma-aminobutyric acid, beta-aminoisobutyric acid, and alpha-aminobutyric acid in the same plasma sample.

For more information, reference application note 720006487EN.

Ordering Information

Acrylamide Analysis Kits

Description	P/N
Kairos Amino Acid 100+ Manual First Time Includes: Amino Acid Calibrator Set (100+); Amino Acid QC Set (100+); Amino Acid Internal Standard (100+); AccQ•Tag Ultra Derivatization Kit x 2; Amino Acid Reconstitution Reagents; Formic Acid, 1 mL; TruView LCMS Certified Vials, 2/pk; CORTECS UPLC C_{18}, 1.6 µm, 2.1 × 150 mm Column	176004375
Kairos Amino Acid 100+ Re-order Includes: Amino Acid Calibrator Set (100+); Amino Acid QC Set (100+); Amino Acid Internal Standard (100+); AccQ•Tag Ultra Derivatization Kit x 2; Amino Acid Reconstitution Reagents; Formic Acid, 1 mL; TruView LCMS Certified Vials, 2/pk	176004376
Kairos Amino Acid 500+ Manual First Time Includes: Amino Acid Calibrator Set (500+); Amino Acid QC Set (500+); Amino Acid Internal Standard (500+); AccQTag Ultra "3x" Derivatization Kit x 3; Amino Acid Reconstitution Reagents; Formic Acid, 1 mL; TruView LCMS Certified Vials, 10/pk; CORTECS UPLC C_{18}, 1.6 µm, 2.1 × 150 mm Column	176004379
Kairos Amino Acid 500+ Manual Re-order Includes: Amino Acid Calibrator Set (500+); Amino Acid QC Set (500+); Amino Acid Internal Standard (500+); AccQ•Tag Ultra "3x" Derivatization Kit x 3; Amino Acid Reconstitution Reagents; Formic Acid, 1 mL; TruView LCMS Certified Vials, 10/pk	176004380
Kairos Amino Acid 500+ Automation First ncludes: AccQ•Tag Ultra "3x" Derivatization Kit x 3; Amino Acid Reconstitution Reagents; Formic Acid, 1 mL x3; Amino Acid Sample Prep Kit; Amino Acid Script Pack; CORTECS UPLC C_{18} 1.6 µm, 2.1 × 150 mm Column	176004377
Kairos Amino Acid 500+ Automation Re-order Includes: AccQ•Tag Ultra "3x" Derivatization Kit x 3; Amino Acid Reconstitution Reagents; Formic Acid, 1 mL x3; Amino Acid Sample Prep Kit; Amino Acid Script Pack	176004378
Amino Acid Calibrator Set (100+) Includes: Calibrator 1, 5 µm, One Vial; Calibrator 2, 20 µm, One Vial; Calibrator 3, 100 µm, One Vial; Calibrator 4, 250 µm, One Vial; Calibrator 5, 500 µm, One Vial; Calibrator 6, 1000 µm, One Vial; Calibrator 7, 4000 µm, One Vial– Calibrators 1–6 Contain 45 Amino Acids; Calibrator 7 Contains 10 Amino Acids	186009193
Amino Acid Calibrator Set (500+) Includes: Calibrator 1, 5 µm, One Vial; Calibrator 2, 20 µm, One Vial; Calibrator 3, 100 µm, One Vial; Calibrator 4, 250 µm, One Vial; Calibrator 5, 500 µm, One Vial; Calibrator6, 1000 µm, One Vial; Calibrator 7, 4000 µm, One Vial– Calibrator 1–6 Contain 45 Amino Acids; Calibrator 7 Contains 10 Amino Acids	186009048
Amino Acid QC Set (100+) Includes: QC Low, 50 µm, 2 Vials; QC High, 700 µm, 2 Vials– 45 Amino Acids in Each Standard	186009194
Amino Acid Quality Control Set (500+) Includes: QC Low, 50 µm, 2 Vials; QC High, 700 µm, 2 Vials – 45 Amino Acids in Each Standard	186009049
Amino Acid Internal Standard (100+) Includes: Isotopically Labelled 20 Amino Acids, 1 Vial	186009051
Amino Acid Internal Standard Set (500+) Includes: Isotopically Labelled 20 Amino Acids, 5 Vials	186009050
Amino Acid Sample Preparation Kit Includes: 1 mL Sample Collection Plates, 6/pk; 2 mL Sample Collection Plates, 6/pk; Pre-slit Cap Mats, 6/pk	186009102
Amino Acid Reconstitution Reagents Includes: 0.1 N HCl, 30 mL; 10% Sulfosalicylic Acid, 50 mL	186009103
AccQ•Tag Ultra Derivatization Kit	186003836
AccQ•Tag Ultra "3x" Derivatization Kit	186004535
AccQ•Tag Ultra Borate Buffer, 10 mL	186009283

SARS-COV-2 LC-MS KIT

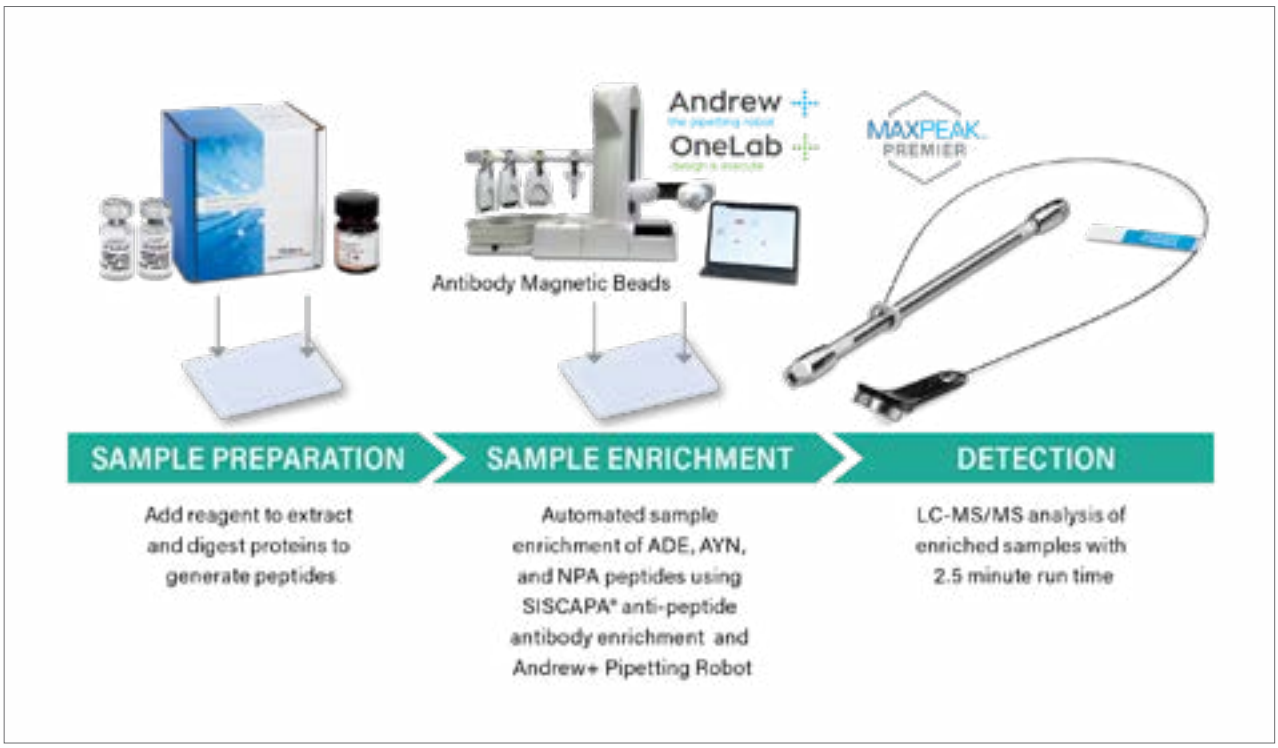
Waters SARS-CoV-2 LC-MS Kit (RUO) can directly detect and quantify SARS-CoV-2 signature NCAP peptides, without the need to amplify the target analytes. Scientists can harness the flexibility and reproducibility of LC-MS to advance critical SARS-CoV-2 research.

- Achieve reproducible results between and within labs
- Ensure high accuracy and analytical sensitivity to enable critical research
- Empower research and development of pioneering SARS-CoV-2 testing, using an alternative and complementary technology to common infectious pathogen research
- Because the method runs on an LC-MS platform it has the potential be multiplexed with other peptides and biomarkers for broader research

Ensure accurate, sensitive and analytically selective results

The SARS CoV-2 LC-MS Kit (RUO) uses the innovative SISCAPA® anti-peptide antibody enrichment sample preparation method from SISCAPA Assay Technologies, Inc. that improves the performance of mass spectrometry for measurement of pre-selected protein targets.

A Robust and Automatable Workflow



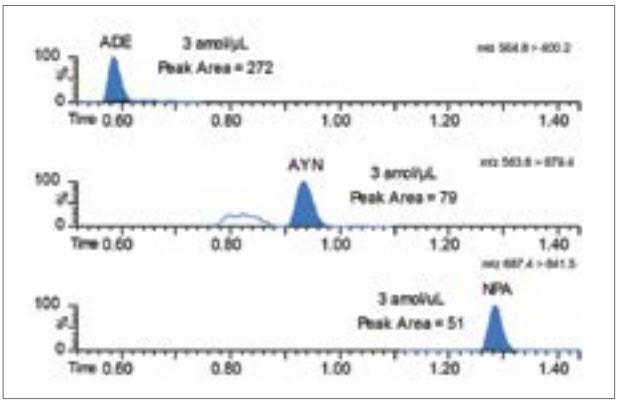
This kit is for research use only and has not been approved for use in clinical diagnostic procedures. This RUO Kit has not been tested with clinical samples. SISCAPA® is a mark of Anderson Forschung Group LLC (AFG).

Ensure Accurate, Sensitive, and Analytically Selective Results

Achieve the analytical sensitivity required to detect low levels of SARS-CoV-2 peptides from complex digested samples with stable isotope standards and capture by anti-peptide antibodies. Increase laboratory efficiency as all components necessary to quickly deploy the supplied method are packaged together for the busy research laboratory.

- Highly analytically selective to three SARS-CoV-2 NCAP signature peptides
- Lower limit of quantitation (LloQ) of 3 amol/µL
- Anti-peptide antibody capture results in clean, low-noise chromatograms with an ultra-fast run time (<2 minutes)
- The method minimizes sample media interference, providing greater flexibility for the analysis of multiple research samples

Analytical Sensitivity for NCAP Peptides



Chromatogram of the ADE, AYN, and NPA peptides at 3 amol/µL in VTM after antibody enrichment.

Ordering Information

SARS-CoV-2 Kits

Description	P/N
Waters SARS-CoV-2 LC-MS Starter Kit Kit contains: Enrichment Set, Reagent Set, Calibrator and Internal Standard Set, and System Suitability Solution Set, ACQUITY PREMIER Peptide BEH 300 Å, C_{18}, 2.1 × 30 mm column, ACQUITY In-Line Filter, Mobile Phase Additive - Formic Acid (2 × 1 mL)	176004946
Waters SARS-CoV-2 LC-MS Re-Order Kit Kit contains: Enrichment Set, Reagent Set, Calibrator and Internal Standard Set, and System Suitability Solution Set	176004947
Waters SARS-CoV-2 LC-MS Sample Preparation and Reagent Kit Kit contains: Enrichment Set, Reagent Set, and Calibrator and Internal Standard Set	176004948
Waters SARS-CoV-2 LC-MS System Suitability Set Kit contains: NCAP Peptide Mixture (ADE, AYN, NPA and DGI), LCGC Certified Vials and Cap with Preslit Septum, 2 mL, 100/pk	176004949
Waters SARS-CoV-2 LC-MS System Suitability Kit contains: 1 vial NCAP peptide mixture at a concentration of 100 fmole/µL	186010232

Application-Specific Kits – Food and Environmental

ACRYLAMIDE ANALYSIS KITS

Kits for the Extraction and Cleanup of Acrylamide in Processed Foods Prior to LC-MS/MS Analysis

The Acrylamide Analysis Starter and Refill Kits include consumables for the extraction, cleanup and separation of acrylamide from processed foods by LC-MS/MS. These kits provide you with a simple workflow, supporting your method development.

Starter kits include the chromatographic column and consumables including DisQuE Extraction Pouches and dSPE cleanup tubes, Oasis MCX Cartridges, and vials for the preparation of 100 samples. Refill kits contain the necessary consumables for 100 additional samples.

Ordering Information

Acrylamide Analysis Kits

Description	P/N
Acrylamide Starter Kit LC-MS Kit contains: ACQUITY UPLC HSS C_{18} SB Column, 100 Å, 1.8 µm, 2.1 mm × 100 mm, 2 × DisQuE, 1.5 g Sodium Acetate and 6 g $MgSO_4$, 50 mL Pouch, 50/pkg, 2 × DisQuE 900 mg MgSO4 and 300 mg PSA, 15 mL Tube, 50/pkg, and TruView LCMS Certified Clear Glass 12 × 32 mm Screw Neck Vial, with Cap and Preslit PTFE/Silicone Septa, 100/pkg	176004417
Acrylamide Refill Kit LC-MS Kit contains: 2 × DisQuE, 1.5 g Sodium Acetate and 6 g MgSO4, 50 mL Pouch, 50/pkg, 2 x DisQuE 900 mg MgSO4 and 300 mg PSA, 15 mL Tube, 50/pkg, and TruView LCMS Certified Clear Glass 12 × 32 mm Screw Neck Vial, with Cap and Preslit PTFE/Silicone Septa, 100/pkg	176004418
Acrylamide Starter Kit LC-MS Enhanced Cleanup Kit contains: ACQUITY UPLC HSS C_{18} SB Column, 100 Å, 1.8 µm, 2.1 mm × 100 mm, 2 × DisQuE, 1.5 g Sodium Acetate and 6 g $MgSO_4$, 50 mL Pouch, 50/pkg, Oasis MCX 3 cc Vac Cartridge, 60 mg Sorbent per Cartridge, 60 µm Particle Size, 100/pk, and TruView LCMS Certified Clear Glass 12 × 32 mm Screw Neck Vial, with Cap and Preslit PTFE/Silicone Septa, 100/pkg	176004419
Acrylamide Refill Kit LC-MS Enhanced Cleanup Kit contains: 2 × DisQuE, 1.5 g Sodium Acetate and 6 g $MgSO_4$, 50 mL Pouch, 50/pkg, Oasis MCX 3 cc Vac Cartridge, 60 mg Sorbent per Cartridge, 60 µm Particle Size, 100/pk, and TruView LCMS Certified Clear Glass 12 × 32 mm Screw Neck Vial, with Cap and Preslit PTFE/Silicone Septa, 100/pkg	176004420
Acrylamide Starter Kit UHPLC Enhanced Cleanup Kit contains: XSelect HSS C_{18} SB ***XP*** Column, 100 Å, 2.5 µm, 2.1 mm × 100 mm, 2 × DisQuE, 1.5 g Sodium Acetate and 6 g $MgSO_4$, 50 mL Pouch, 50/pkg, Oasis MCX 3 cc Vac Cartridge, 60 mg Sorbent per Cartridge, 60 µm Particle Size, 100/pk, and TruView LCMS Certified Clear Glass 12 × 32 mm Screw Neck Vial, with Cap and Preslit PTFE/Silicone Septa, 100/pkg	176004423
Acrylamide Refill Kit UHPLC Enhanced Cleanup Kit contains: 2 × DisQuE, 1.5 g Sodium Acetate and 6 g $MgSO_4$, 50 mL Pouch, 50/pkg, Oasis MCX 3 cc Vac Cartridge, 60 mg Sorbent per Cartridge, 60 µm Particle Size, 100/pk, and TruView LCMS Certified Clear Glass 12 × 32 mm Screw Neck Vial, with Cap and Preslit PTFE/Silicone Septa, 100/pkgTruView LCMS Certified Clear Glass 12 × 32 mm Screw Neck Vial, with Cap and Preslit PTFE/Silicone Septa, 100/pkg	176004424

ACQUITY UPLC BISPHENOL A COLUMN AND METHOD KITS

The ACQUITY UPLC Bisphenol A Column and Method Kits are fully compliant with ASTM Method D7574–09. Waters ACQUITY UPLC Solution provides optimum resolution and sensitivity for the analysis of Bisphenol A in water. The column kit includes the ACQUITY UPLC BEH C_{18} Column and ACQUITY UPLC Isolator Column. The Method Kit also includes Oasis HLB SPE Cartridges and LCMS Certified Vials.

Ordering Information

Description	P/N
ACQUITY Bisphenol A Column Kit	176001955
ACQUITY Bisphenol A Method Kit	186004932

BEVERAGE ANALYSIS KIT

Waters Beverage Analysis Kit was specifically designed for the non-chemist such as onsite bottler quality control workers, to perform quick and accurate analysis of commonly used additives (acesulfame-K, saccharin, caffeine, benzoate, sorbate, and aspartame) in drink formulations. This comprehensive kit is simple and easy-to-use, and can be used in conjunction with a rapid LC method to ensure final product quality and improve manufacturing efficiency.

- Rapid analysis of six additives in soft drinks with minimal sample preparation
- Pre-formulated mobile phase, wash solvent, and standards
- Environmentally friendly solvents (ethanol based)
- Optimized methodology that is easy to follow
- Certificate of Analysis with uncertainty values and verification testing information
- Works with a variety of LC systems; results obtained in as little as 10 minutes by HPLC or seven minutes by UPLC

Ordering Information

Beverage Analysis Kits

Description	P/N
Beverage Analysis Kit Contains six standards: Four 100 mL bottles containing acesulfame-K, saccharin, caffeine, benzoate, and sorbate in solution; four bottles each with 50 mg aspartame in solid form; four 1 L bottles of mobile phase; four 1 L bottles of wash solvent; sufficient for one month of typical use	176002534
Beverage Analysis Five Standards Solution (acesulfame-K, saccharin, caffeine, benzoate, and sorbate), 100 mL	186006008
Beverage Analysis Standard Solid (aspartame), 50 mg	186006010
Beverage Analysis Mobile Phase Reagent (acetate buffer), 1 L	186006006
Beverage Analysis Wash Reagent (ethanol-based), 1 L	186006007
Low-Level Beverage Analysis Standards (50 mg/L caffeine and 50 mg/L acesulfame-K), for beverages with low caffeine content	186007231
High-Level Beverage Analysis Standards (250 mg/L caffeine and 250 mg/L acesulfame-K), for beverages with high caffeine content	186007232

CARBAMATE ANALYSIS KITS

Waters Carbamate Analysis Kits for environmental and food testing include the Waters Carbamate Column, Oasis HLB Cartridges, vials, and reference standards. When used in part with regulated methods, these proven kits simplify your analysis while increasing your confidence in the result.

Ordering Information

Carbamate Analysis Kits

Description	P/N
Carbamate Analysis Kit for Environmental Testing	176001740
Carbamate Analysis Kit for Food Testing	186004719

Carbamate Analysis Column for Pesticides

Description	Dimension	Qty.	P/N
Carbamate Analysis	3.9 × 150 mm	1/pk	WAT035577

EPA METHOD 1694 ANALYSIS KIT

Waters EPA Method 1694 Analysis Kit includes the XTerra MS C_{18} Column, Atlantis HILIC Column, and Oasis HLB Cartridges; all of which are specified in the EPA Method.

Ordering Information

Description	P/N
EPA Method 1694 Analysis Kit	176001634
Oasis HLB 20 cc Vac, 1 g (20/box)	186000117

OASIS WAX FOR PFAS ANALYSIS

Extraction and Concentration Without the Low Background Contamination

Per- and Polyfluoroalkyl substances (PFAS) are a growing environmental concern. Now your lab can extract and concentrate PFAS without worrying about low background contamination through the power of Oasis WAX for PFAS Analysis, a comprehensive quality-control pre-screening test for 32 PFAS. Achieve reproducible results with solutions designed specifically for environmental and food testing laboratories.

PFAS Solution Installation Kits provide everything to meet your PFAS workflow needs. Kits include columns, Isolator column, PEEK™ Tubing and Solvent Lines, Fittings, SPE, Vials, and Standard.

Ordering Information

Acrylamide Analysis Kits

Description	P/N
Oasis WAX for PFAS Analysis 6 cc/150 mg, 30 µm, 300/pk	186009344
Oasis WAX for PFAS Analysis 6 cc/150 mg, 30 µm, 30/pk	186009345
Oasis WAX for PFAS Analysis 6 cc/500 mg, 60 µm, 300/pk	186009346
Oasis WAX for PFAS Analysis 6 cc/500 mg, 60 µm, 30/pk	186009347
Oasis WAX for PFAS Analysis 6 cc/500 mg, 30 µm, 30/pk	186009568
PFAS Solution Installation Kit with Oasis 150 mg Kit 1	176004548

*Without PFAC30PAR standard solution

Description	P/N
PFAS Solution Installation Kit with Oasis WAX 500 mg Kit 2	176004549
PFAS Solution Installation Kit with Sep-Pak PS-2 Kit 3	176004550
PFAS Solution Installation Kit for Direct Injection Kit 4	176004554
PFAS Solution Installation Kit for EPA Method 533	176001767
PFAS Solution Installation Kit with Oasis 150 mg (APAC)*	176004588
Native PFAS Precision and Recovery Standard Solution	PFAC30PAR

*Without PFAC30PAR standard solution

Spare Parts

COLUMN AND CARTRIDGE FITTINGS

Ordering Information

ACQUITY UPLC Column In-line Filter Unit

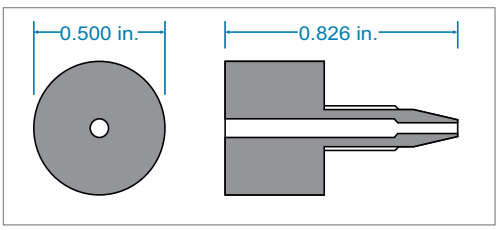
Description	P/N
In-line Filter Holder and 6/pk 0.2 µm Stainless Steel Replacement Filters	205000343
Five 0.2 µm Stainless Steel Replacement Filters and End Nuts for 205000343	700002775

PEEK TUBING AND FITTINGS

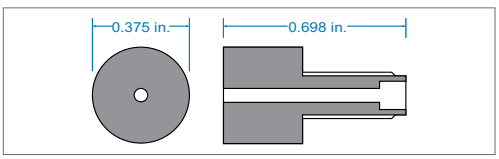
PEEK One-Piece Fingertight Fitting, 1/16-inch, 10–32 Thread

For the most demanding applications, we recommend the high-performance fingertight HPLC fitting. Nut and ferrule are made from a single piece of PEEK, which helps the fitting remain leak-tight at pressures as high as 6000 psi (420 bar). With the knurled head of the nut increased in diameter, to facilitate tightening without tools, it's nonetheless a genuine fingertight.

PEEK Fingertight One-Piece Fitting



PEEK Fingertight Two-Piece Nut



Ordering Information

Description	P/N
PEEK Fingertight One-piece Fitting	186008714

Rely on Genuine Waters Quality Parts

Waters knows how to run chromatography and LC-MS laboratories at peak performance. Our instruments, software, chemistries, and services provide you the tools for success.

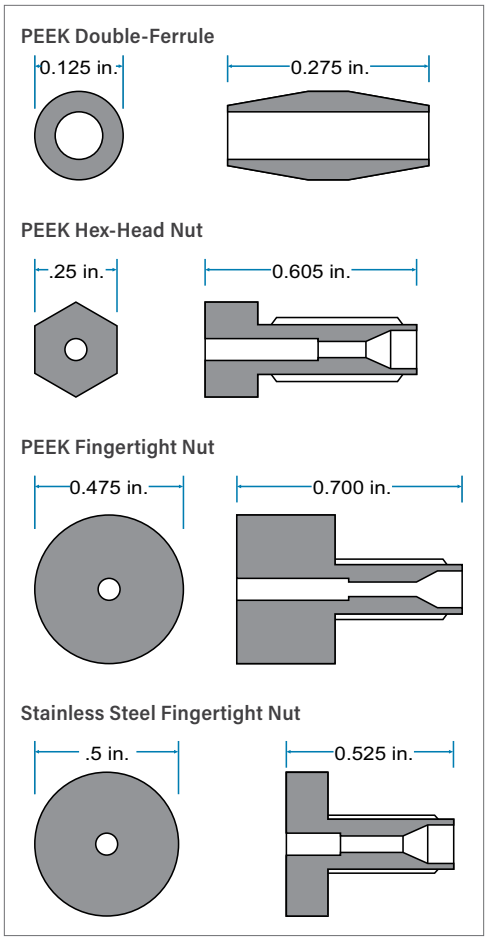
Only Waters Quality Parts™ are tested and certified for ensuring optimal performance of Waters systems. Fitting our component parts to your instruments instills confidence that they will operate in a dependable, invariable manner over time; that results will be accurate, precise, and reproducible; and that systems will remain compliant.

PEEK Fittings with Double Ferrules, 1/16-inch, 10–32 Thread

Double-ferrule fittings made of PEEK grip tubing in two places. The ferrules provide twice the holding power of single-ferrule fittings. They are ideal for use with PEEK and Tefzel tubing, which often slip when used with single-ferrule fittings. When used with stainless steel or titanium tubing, double-ferrule fittings grip tighter, creating a highly reliable connection that performs flawlessly at high pressures.

We offer both fingertight and hex-head nuts for use with double-ferrules. The fingertight version can be hand-tightened for operating pressures as high as 6000 psi. Use the hex-head version for connections that are difficult to reach or closely spaced.

These fittings fit virtually any female 1/16-inch fitting, including Parker, Swagelok, Waters, Valco, Rheodyne, UPChurch, etc.—all with 10–32 threads.



Ordering Information

Description	P/N
PEEK Double-ferrule	PSL613302
PEEK Hex-head Nut	PSL613324
PEEK Fingertight Nut	PSL613301
Stainless Steel Fingertight Nut	PSL613325

PTFE/ETFE Tubing and Fittings

O.D. Inches (mm)	I.D. Inches (mm)	Length/Material	P/N
0.125 (3.2)	0.062 (1.57)	25 ft. (7.6 m), PTFE	WAT026808
0.149 (3.8)	0.119 (30.0)	25 ft. (7.6 m), PTFE	WAT026809
0.250 (6.3)	0.190 (4.8)	10 ft. (3 m), PTFE	WAT026810
0.080 (2.0)	0.058 (1.5)	25 ft. (7.6 m), PTFE	WAT026974
0.178 (4.52)	0.148 (3.76)	25 ft. (7.6 m), PTFE	WAT051041
0.149 (3.8)	0.119 (30.0)	20 ft. (6 m), PTFE	WAT051052
0.125 (3.2)	0.020 (0.508)	10 ft. (3 m), PTFE	WAT088430
0.125 (3.2)	0.009 (0.228)	10 ft. (3 m), PTFE	WAT088431
0.125 (3.2)	0.040 (1.0)	10 ft. (3 m) , PTFE	WAT088432
0.062 (1.57)	0.009 (0.228)	36 in. (1 m), ETFE	WAT088561
0.062 (1.57)	0.040 (1.0)	36 in. (1 m), PTFE	WAT088563
PTFE Adapter, 0.125 (3.2) to 0.065 (1.6), 5/pk			WAT005137

Stainless Steel Tubing and Fittings

O.D. Inches (mm)	I.D. Inches (mm)	Length/Material	P/N
0.0625 (1.6)	0.005 (0.127)	10 ft. (3 m), SS	WAT241039
0.0625 (1.6)	0.020 (0.508)	10 ft. (3 m), SS	WAT026804
0.0625 (1.6)	0.030 (0.762)	10 ft. (3 m), SS	430000366
0.0625 (1.6)	0.040 (1.020)	10 ft. (3 m), SS	WAT026805
0.125 (3.2)	0.062 (1.57)	10 ft. (3 m), SS	WAT026806
0.125 (3.2)	0.093 (2.36)	10 ft. (3 m), SS	WAT026807
0.0625 (1.6)	0.009 (0.228)	10 ft. (3 m), SS	WAT026973
0.0625 in. O.D. Stainless Steel Tubing Cutter with 3 Blades			WAT022384
Replacement Blades for WAT022384, 3/pk			WAT022385

PEEK Tubing and Fittings

O.D. Inches (mm)	I.D. Inches (mm)	Length/Material	P/N
0.0625 (1.6)	0.005 (0.127)	5 ft. (1.5 m), PEEK	WAT022995
0.0625 (1.6)	0.010 (0.254)	5 ft. (1.5 m), PEEK	WAT022996
0.0625 (1.6)	0.015 (0.381)	5 ft. (1.5 m), PEEK	WAT022997
0.0625 (1.6)	0.020 (0.508)	5 ft. (1.5 m), PEEK	WAT022998
PEEK Tubing Cutter			WAT031795
PEEK Tubing and Fitting Kit			WAT022999
PEEK Union, 0.0625 in.			WAT026-04

Compression Screws and Ferrules

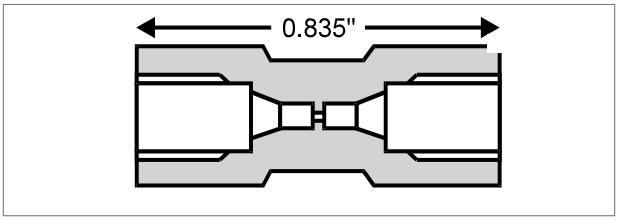
Description	P/N
Ferrule, 01, Stainless Steel, 10/pk	WAT005063
Compression Screw, 0.0625 in., 10/pk	WAT005070
Compression Fitting Plug, Stainless Steel, 5/pk	WAT005079
Rheodyne Ferrule, 10/pk	WAT007020
Ferrule, Stainless Steel	WAT022330
Ferrule, 1/16 in. O.D., PEEK	WAT021817
Compression Screw, Stainless Steel	WAT025313
Compression Fitting Plug, Stainless Steel	WAT025566
Compression Screws and Ferrules, 0.166 in., 5/pk	WAT025604
Compression Screws, 0.125 in., PEEK, 2/pk	WAT046-12
Compression Screw, Long, 1/16 in.	WAT021812
Compression Screw, Short, PEEK 1/16 in.	WAT021815
Extra Long Compression Screw, Stainless Steel, 10/pk	WAT060051
Finger Tight Poly Knob Used with Compression Screws Plus PEEK Ferrules	WAT021816
Tee, 0.0625 in. Compression Screw, Stainless Steel	WAT075215
Tubing Cap, Hex Stainless Steel	WAT084078
Union, 0.0625 in. Stainless Steel	WAT097332

PEEK Unions, Tees, and Crosses

Inert and biocompatible PEEK unions can withstand operating pressures as high as 6000 psi (420 bar). PEEK tees and crosses can withstand pressures as high as 10,000 psi (690 bar).

PEEK unions, tees, and crosses share these features:

- Connect any 1/16-inch tubing (PEEK, stainless steel, titanium, or Tefzel)
- Low dead volume
- 10–32 thread

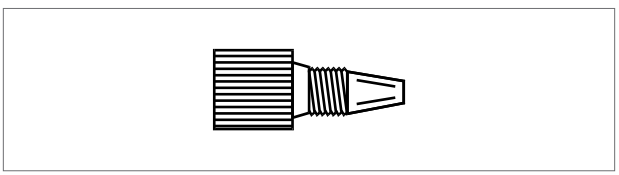


Ordering Information

Description	P/N
PEEK Union with 2 PEEK Fingertight Nuts and Double Ferrules 1/16 in.	PSL613312
PEEK Union without Nuts and Ferrules 1/16 in.	PSL613313
PEEK TEE with One-piece Fingertight Fitting	PSL613317
PEEK CROSS with One-piece Fingertight Fitting	PSL613319
PEEK TEE without Fittings	PSL613318
PEEK CROSS without Fittings	PSL613320
PEEK One-piece Fingertight Fitting	186008714

Handilok CTFE Fittings

Handilok fittings can replace, without the need for tools, conventional compression fittings used with 1/16-inch tubing. Compatible with all internal fittings with a 10–32 thread, these fittings meet rigid high-pressure requirements, withstanding pressures greater than 4000 psi (280 bar).



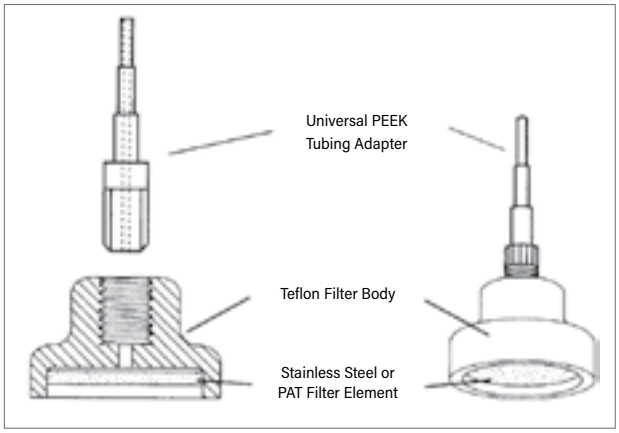
Ordering Information

Handilok Fittings	P/N
1/16 in. Fitting, 1/pk	PSL618021
1/16 in. Fitting, 10/pk	PSL618022

LC SYSTEM FILTERS

Last Drop Mobile Phase Filters

The Last Drop mobile-phase filter incorporates a flat filter element set parallel to the bottom of a reservoir. This design allows the filter to draw all but the last 2% of mobile phase from the reservoir without drawing air into the system. Last Drop filters are available with 316 L stainless steel or PAT (PEEK alloyed with Teflon) filter elements in inert Teflon housings. The top of the housing incorporates a PEEK tripod that fits into pump inlet lines with inner diameters of 1.5, 2.2, or 3.5 mm.

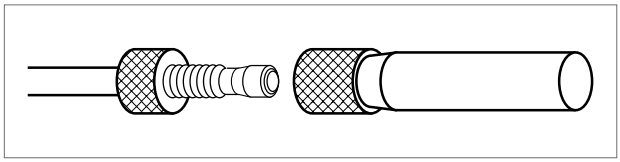


Ordering Information

Description	P/N
Filter with 2 µm Stainless Steel Filter	PSL901290

PEEK Biocompatible Mobile Phase Filter

The PEEK Biocompatible Mobile Phase Filter protects an HPLC pumping system against particulate matter in a mobile phase. Many macromolecules are fairly labile and require not only biocompatible chromatographs but also mobile-phase filters that are absolutely inert. These filters are designed from inert polymeric components, which effectively eliminate metal from the fluid path. With a porosity of 5 µm, all fittings (including the inlet tube) are composed of perfectly inert PEEK.



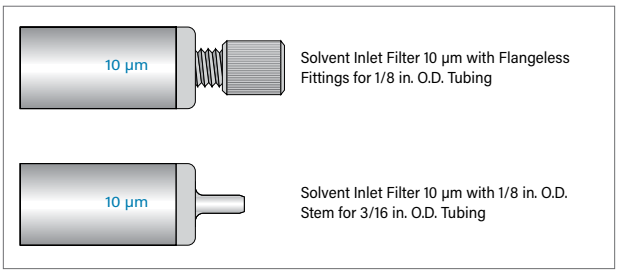
Ordering Information

Description	P/N
Biocompatible Mobile Phase Filter	PSL901282

Solvent Inlet Filters

It's good practice to always filter solvents, to avoid damaging the pump. Solvent inlet filters, with a porosity of 10 µm, provide the necessary pump protection, and their large surface area ensures long life without pump cavitation.

Filters should be changed periodically, depending on usage and mobile phase. Replacing the filter is easy; no tools are needed. The unique Plastictight male nut is screwed into the filter and tightened by hand. Finger tightening is sufficient; the Plastictight fitting holds without flanging.

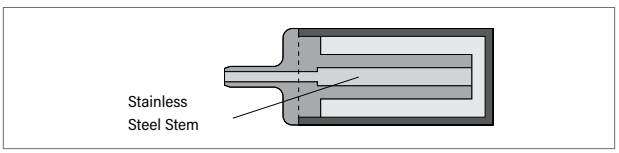


Ordering Information

Description	P/N
Solvent Inlet Filter Kits	
Assy, Solvent Filter	WAT025531
Plastictight Fitting with Teflon Tubing 1/16 in. I.D. × 1/8 in. O.D. × 3 ft.	PSL613602
Replacement Filter 10 µm, 5/pk	PSL613604
Solvent Inlet Filters for General Use	
Solvent Inlet Filter 10 µm with 1/16 in. O.D. Stem for 1/8 in. O.D. Tubing	PSL613570
Solvent Inlet Filter 10 µm with Flangeless Fittings for 1/8 in. O.D. Tubing	PSL613578
Solvent Inlet Filters for Preparative HPLC	
Solvent Inlet Filter 10 µm with 1/16 in. O.D. Stem for 1/8 in. O.D. Tubing	PSL613607
Solvent Inlet Filter 10 µm with Flangeless Fittings for 1/8 in. O.D. Tubing	PSL613608
Solvent Inlet Filters for Waters HPLC Systems	
Solvent Inlet Filter 10 µm with 1/8 in. O.D. Stem for 3/16 in. O.D. Tubing	PSL613609

Bottom-of-the-Bottle Solvent Filters

Our Bottom-of-the Bottle Solvent Filter is designed after the original Bottom-of-the-Bottle replaceable filters. This unique filter is fitted with a stainless steel stem on top, to accommodate 1/16-inch (I.D.) tubing. A lower stem, which goes directly into the filter, reaches to within 0.06 inches of the Bottom-of-the-Bottle filters. The 10 µm filter can easily accommodate flow rates as high as 10 mL/min.



Ordering Information

Description	P/N
Stainless Steel Filter Assembly	PSL613457

APPLICATION AREA: Steroid Analysis

"The Oasis prime product line is an awesome solid phase extraction product line. The ease of use and the variety in the product line has made methods development a breeze. The micro elution plates have reduced the loss in evaporation steps that we had experienced in the past."

REVIEWER: Jermaine Ford

ORGANIZATION: US EPA

★★★★★

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