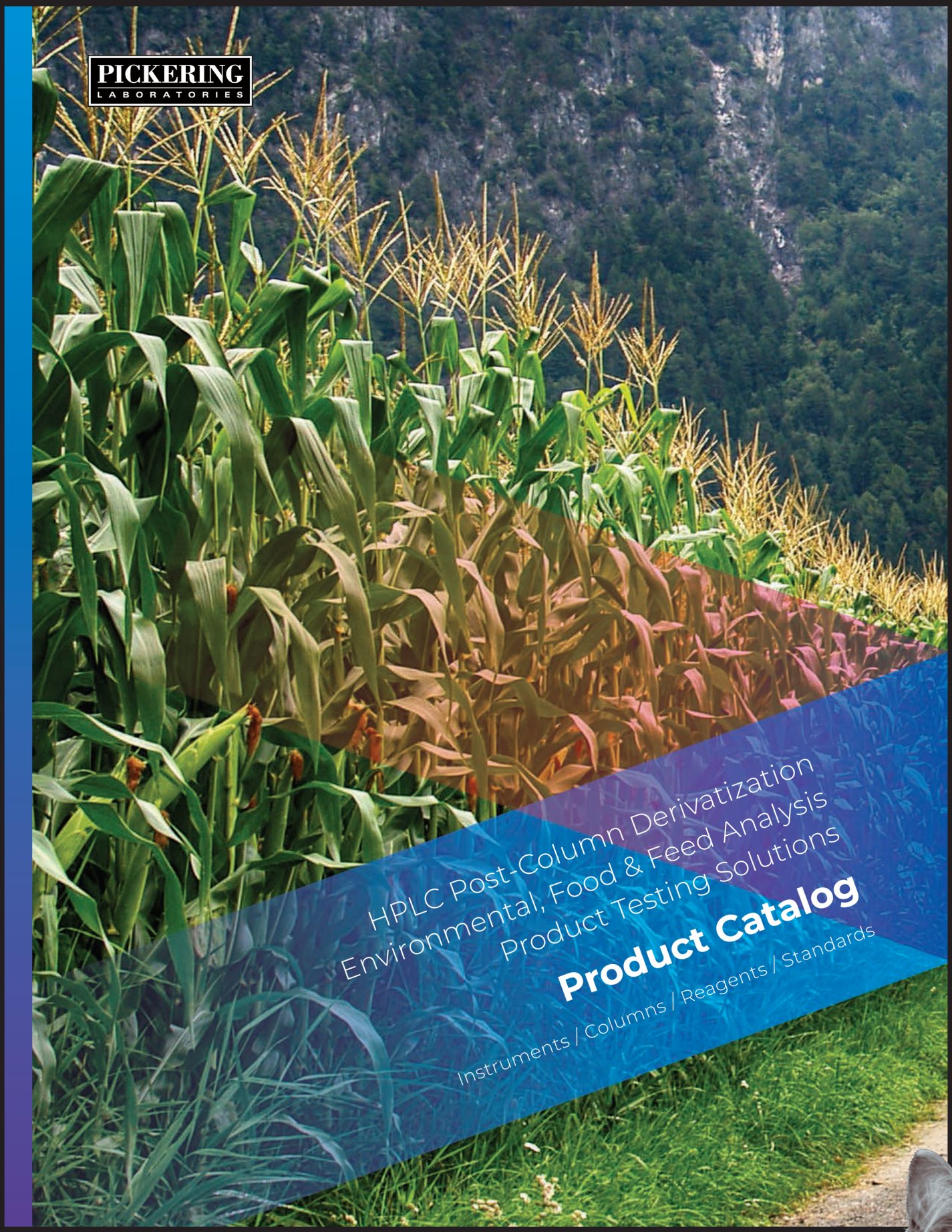

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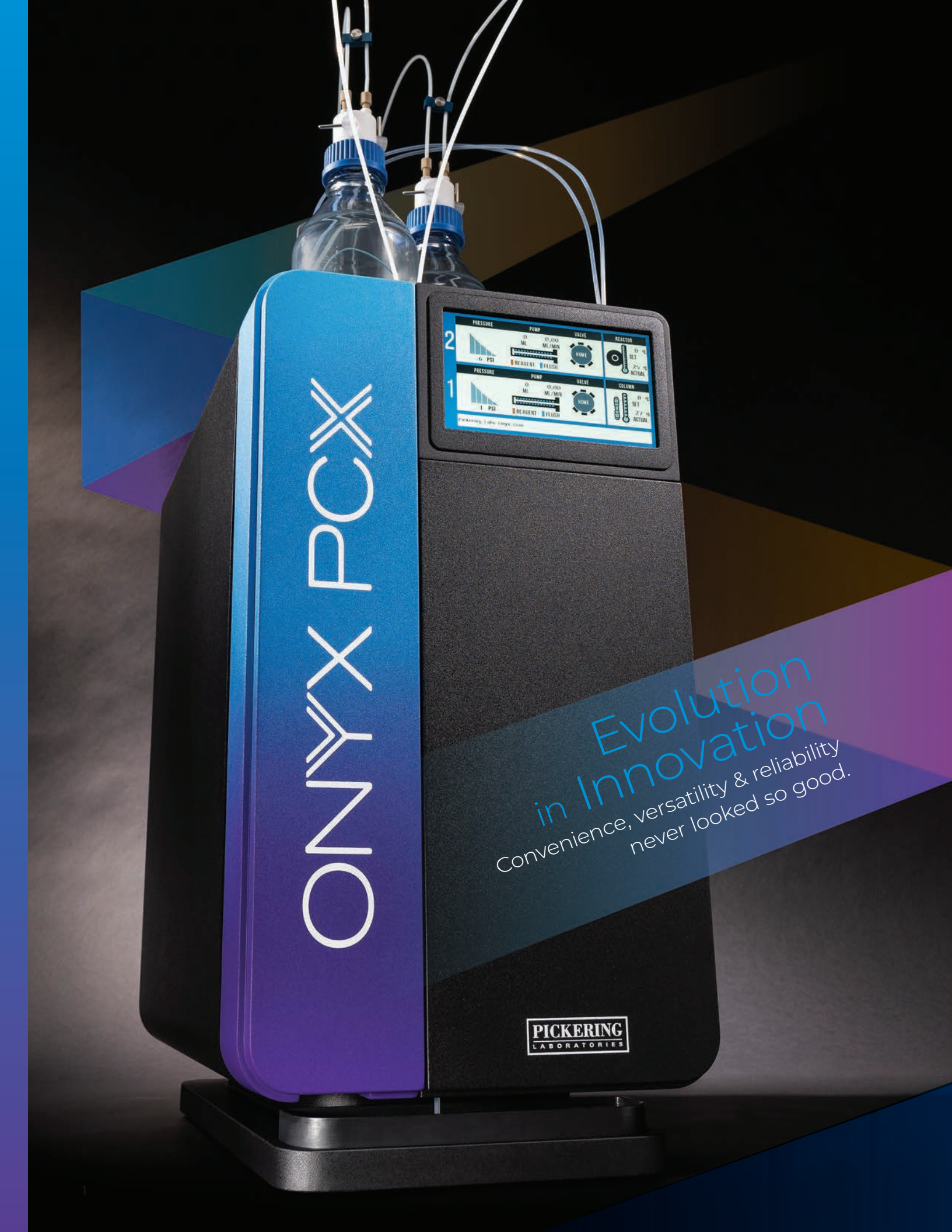
ONYX PCX
PRESSURE
PUMP
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REACTOR
HOME
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COLUMN
Evolution
in Innovation
Convenience, versatility & reliability
never looked so good.
PICKERING
LABORATORIES

As we approach our 40th year, we celebrate the introduction of the Onyx PCX!

It's the next generation of HPLC post-column derivatization instruments, resulting from Pickering Laboratories' decades of experience in post-column instrument manufacturing. Previously, the Pinnacle PCX set the benchmark for innovative design as the top-of-the-line PCX model. Now, it is surpassed by the Onyx PCX as the best post-column instrument available on the market.

Pickering Laboratories still offers the only instrumentation optimized for the analysis of Amino Acids, Carbamates, Glyphosate, Mycotoxins, Antibiotics and many other post-column applications. Each component is specifically designed to enhance sensitivity and selectivity. Only Pickering Laboratories provides complete application support, including chemicals, columns, methods and post-column systems. Because each part of the method is designed to work together, Pickering Laboratories can offer the extraordinary promise that the analysis is guaranteed to work for the intended application. The Onyx PCX reflects the ease of use, reliability and ruggedness customers have come to expect from Pickering Laboratories.

Table of Contents

Customer Service & Technical Support

Pickering Laboratories has earned the reputation for strong Technical Support in HPLC post-column technology: chemistry, columns and derivatization instruments. We start with assisting our customers in identifying the best HPLC configuration required for a successful integration of our HPLC post-column system. Then we continue our support through and beyond the warranty period to ensure our customers' chromatograms reflect current standards of quality and reproducibility.

Contact us

For Customer Service and Technical Support contact:

Support@pickeringlabs.com
800-654-3330 / 650-694-6700

Place an Order

Please contact us directly to place an order:

Orders@pickeringlabs.com
800-654-3330 / 650-694-6700

Pickering Laboratories, Inc.
1280 Space Park Way
Mountain View, CA 94043

When ordering, please provide the following:

- Complete shipping and billing addresses
- Catalog number and quantity of each item
- Brief product description, as found in Catalog
- Purchase order number (and contract number, if applicable)
- Name and telephone number of person calling
- Special instructions, e.g., package markings, mode of transit if other than UPS
- If ordering a complete post-column system, please specify the brand of HPLC with which it will be operating. We will advise you if any modifications to the HPLC are necessary.

Terms

- No minimum order required
- Net 30 days for established accounts, or prepayment in U.S. dollars, or Letter-of-Credit
- We accept MasterCard & VISA, Discover Card or American Express
- Prices are Ex-Works Seller's Factory, Mountain View, California

U.S. Destinations

Freight charges are prepaid and added to the invoice. Shipments are via UPS-Ground unless otherwise specified.

Destinations Outside of the U.S.

Freight charges are collect. Unless otherwise specified, shipments overseas will be via customer's freight forwarder.

Prices and specifications are subject to change without prior notice.

Establish Good Standing

New Accounts: Before a credit-line has been established, new account orders must be pre-paid. Freight charges are collect.

Installation & Training

We encourage you to take advantage of Pickering Laboratories' individualized two or three-day installation and training. For an all-inclusive fee we can provide post-column system installation and training at your site by an experienced chemist from Pickering Laboratories or it's representatives. The training includes instrument operation, routine maintenance and troubleshooting, and chromatogram interpretation.

Some of our authorized distributors offer their own training and installation services.

When purchasing installation and training by Pickering Laboratories, please call Technical Support early to schedule our visit to your site. This is especially important if you purchase installation through a distributor or HPLC Company because we need to hear all the details directly from you.

Individually tailored courses are also given at our facility in Mountain View, California. Please telephone or e-mail with your requirements and we will advise cost and schedule.

Product Returns

Products can be returned if unopened. A restocking fee of 15 % of list price will be applied. Before returning a product for any reason, please:

- Phone or e-mail requesting a Returned Goods Authorization Number.
- Package the product so that it will arrive undamaged. Use the original packing if possible. If in doubt, please call. Pickering Laboratories cannot assume responsibility for goods which arrive damaged in shipment.

Factory Repairs

Pickering Laboratories offers factory repair for its instruments (Onyx PCX, Pinnacle PCX and Vector PCX only). We will re-build or replace components as necessary in our judgment, then test the instrument to make certain that the original problem has been solved.

For repairs, we will charge for shipping, parts and labor (current shop rate).

What is Required

Contact support to obtain a Return Goods Authorization Number (RGA) and a Health and Safety Declaration form. When the instrument is returned it must have the RGA noted on the outside of the box and a completed Health and Safety Declaration, with the instrument.

Introduction

What is Done

Upon arrival, we evaluate your system to generate an estimated cost for repairs. Once we have your approval, we complete the repair. We will replace damaged parts, pressure test the instrument, and then test the instrument to confirm the system meets the products original manufacturer's specification.

What you get

The minimum parts replaced are: Restrictor(s)*, Seal(s) and Filters. If we test the instrument to determine that it meets the original manufacturer's specification, we will warranty the instrument for 1 year on all the parts that were replaced. If you request that we do not complete this test, we will not warranty our work.

Field Service

Because of our limited personnel, we prefer to resolve problems without site visits, but when necessary we will schedule a site visit with you. Please call for a quotation. On-site service entails an initial evaluation on the first day, with repairs potentially extending to the second day to allow for shipment of parts. The shipment of parts will be included in the invoice.

On-site repair costs will include travel time, air fare, hotel, car rentals, expenses, plus parts and labor.

Limited Warranty

Instruments

Instruments are warranted to be free of defects in material and workmanship under normal installation, use, and maintenance for a period of one year from the date of delivery to the customer. Pickering will replace or repair, without cost, any defective items. Expendable items such as check valves, pistons, piston seals, and filters are excluded from this warranty. In addition, physical damage, poor-quality reagent- and sample-induced damage, and instrument damage due to customer's misuse are not covered by this warranty.

Analytical Columns

Pickering's analytical columns are warranted for 90 days to be free of defects in materials and workmanship under normal installation, use, and maintenance, for the warranted time beginning from the date of delivery to the customer. Pickering Laboratories will replace the analytical column under warranty if found defective in material or workmanship. However, the warranty is void if the analytical column was damaged due to customer's misuse.

How to Obtain Warranty Service

If there is a problem with your instrument or analytical column within the warranty period, immediately notify Pickering or your local authorized representative. If the instrument or analytical column was not purchased directly from Pickering, please contact the vendor where it was purchased. Any instrument, part of the instrument, or analytical column returned to Pickering for examination or repair shall have Pickering's prior approval (call for a Returned Goods Authorization Number) and be shipped prepaid by the customer. Return transportation will be at Pickering's expense if the instrument, part of the instrument, or analytical column is found to be defective and under warranty.

* Vector systems only

Introduction

Health & Safety Declaration

Instruments and columns must be decontaminated and cleaned prior to returning to Pickering. To protect and ensure the safety of Pickering Laboratories personnel, customer must properly flush instrument of any and all hazards (e.g. reactive chemicals, blood borne pathogens). Please contact Pickering Laboratories to obtain a Health and Safety Declaration Form (B-0107) describing return instructions and customer responsibilities. Failure to do so will result in delay of service and/or additional charges.

Instrument & Service Plans

We encourage you to consider including a Pickering Laboratories Service Plan to match the quality and reliability you have come to expect from Pickering Laboratories. These offerings provide factory trained engineers experienced in HPLC and post-column technologies to service your Pickering Laboratories post-column derivatization instruments. Each plan has the features and benefits most requested by customers to offer the best value and effectiveness for today's busy laboratories.

When you sign-up for the Pickering Laboratories Service Plans, you are assuring the continued quality and reliability of your post-column instrument as well as your analysis.

Benefits of Service Agreements

- Free software upgrades
- Installation of all required performance upgrades
- PM/Service performed by Pickering Laboratories trained service specialists
- Fixed annual cost – no surprises
- Unlimited technical/analytical support
- Multi-unit service discounts available

Comparison of Service Plans			
Features	**Warranty Upgrade****	**Depot Service**	**Elite Service***
Telephone support to isolate and resolve technical problems	Monday - Friday 8 AM - 5 PM Excluding Holidays	Monday - Friday 8 AM - 5 PM Excluding Holidays	Monday - Friday 8 AM - 5 PM Excluding Holidays
Recertification	Included	Included	Included
Site Visits	Two (including PM)	At prevailing rates	Two (including PM)
Preventative Maintenance	One	One	One
Freight Charges	Included	Included	Included
Parts and Labor	Included	Included	Included

Service Plans offered for the Pickering Laboratories Onyx PCX, Pinnacle PCX and Vector PCX post-column derivatization instruments. Pre-service inspection is required for instruments that have an expired manufacturers warranty or service contract.

*The Elite Service plan provides a total of two service calls that will cover parts, labor and travel for the period of one year. Included is unlimited telephone support from Pickering Laboratories Technical Service Engineers and Applications Specialists.

**Applies to new systems only.

For more information and quotations:

Please contact Pickering Laboratories' Technical Support at **support@pickeringlabs.com** or **800-654-3330 / 650-694-6700**.

Instruments & Hardware

Onyx PCX

Introducing the Onyx PCX

Pickering Laboratories' newest post-column instrument, the Onyx PCX, is part of our integrated family of instruments, chemistry and support.

Meet the Onyx PCX

It's the next generation of HPLC post-column derivatization instruments resulting from Pickering Laboratories' nearly 40 years of experience in post-column instrument manufacturing. Previously, the Pinnacle PCX set the benchmark for innovative design as the top-of-the-line PCX model. Now, it is surpassed by the Onyx PCX as the best post-column instrument available on the market.

Pickering Laboratories still offers the only instrumentation optimized for the analysis of Amino Acids, Carbamates, Glyphosate, Mycotoxins, Antibiotics and many other applications. Each component is specifically designed to enhance sensitivity and selectivity. Only Pickering Laboratories offers complete application support, including chemicals, columns, methods and post-column systems. Because each part of the method is designed to work together, Pickering Laboratories can offer the extraordinary promise that the analysis is guaranteed to work for the intended application. The Onyx PCX reflects the ease of use, reliability and ruggedness customers have come to expect from Pickering Laboratories.

Accuracy, Durability, Speed and Convenience

- Instrument layout is focused on ease of use, quick monitoring and rapid service.
- The electronic syringe pump provides true pulse-free flow for superior sensitivity and consistency. The pump cylinder and head are made from a single piece of inert ceramic for durability and non-reactivity.
- Electronic valves eliminate troublesome check valves and allow automated pump flushing.
- Quick-change reactor cartridges make application switching easy and replacements fast and inexpensive.
- The column oven utilizes circulating air for consistency of heating and quick cooling within 1 °C of setpoint.
- Inert flow paths extend system life and reduce maintenance.
- The PCX control software allows for precise control of the reagent delivery and conservation.
- Pre-programmed testing and maintenance procedures take the guess work out of instrument care.
- Column oven temperature gradient programming improves separation and run times. Only Pickering Laboratories builds post-column systems with this feature.
- Works with any HPLC instrument, from any manufacturer.

Instruments & Hardware

Onyx PCX

Continued

Features and Benefits

- All PCX components specifically designed for post-column derivatization
- Programmable temperature gradient column oven for faster Amino Acids Analysis run times
- Column oven is oriented for easy column switching and features improved tubing guards
- Electronic pulse-free syringe pump provides greater sensitivity
- Automatic piston wash and programmable system flush
- Full-size removable reagent tray provides convenience and meets secondary containment requirements
- Electronic valves have no expensive check valves to service and replace
- Quick change reactor cartridges enable fast application switching and easy cartridge replacement
- Inert flow path protects from metal contamination and extends system life while reducing maintenance
- Color LCD display provides for continuous system monitoring and critical message alerts
- All fluidics located on front panel for instant access and easy leak checks, drip tray included
- Improved pump access for expedient maintenance
- Integrated gas manifold allows for easy set-up and facilitates reagent preparation and preservation
- PCX control software runs from Windows PC for easy operation and reagent conservation between runs
- Software stores methods and sequences, allowing for flexible application setup and switching
- Seamless application migration from Pinnacle PCX to Onyx PCX, including method transfers
- Log files collect continuous data, from system status to error messages
- Pickering Support Team available for rapid log file interpretation and troubleshooting assistance
- Serviceability simplified with removable instrument side panels and isolated electronics
- Field calibration now available by trained Pickering Laboratories service engineers to support recertification

Programmable Temperature Gradient: Amino Acids Analysis

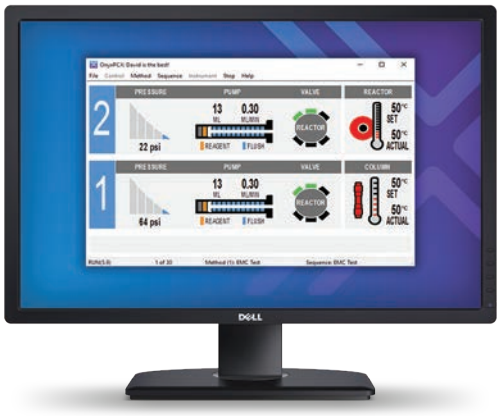
The Onyx PCX provides a unique opportunity to combine the eluant gradient capabilities of modern HPLC instruments with programmable column temperature gradients. As might be expected, this capability helps reduce Amino Acids Analysis run times. Even more significant is the ability to resolve coelutions: consider such metabolic markers as Alloisoleucine (MSUD) and Argininosuccinic acid (ASA). Under standard isothermal conditions these amino acids coelute with Cystathionine and Isoleucine respectively, but both are resolved using a targeted temperature gradient program.

The ability to accomplish this derives from the multiple retention mechanisms of the gel-type resins employed in ion-exchange, enabling all the amino acids to appear in the same chromatogram. The exact position of each amino acid is influenced by an array of mechanisms including partitioning, adsorption, charge exclusion, etc. So even though two amino acids might coelute, their proximity is incidental. And since retention processes are affected differently by changes in pH, salt concentration and temperature, all these parameters have significant influence on selectivity.

PCX Control Software

The Onyx PCX is controlled by PCX Control Software, compatible with Windows 7 or newer Windows operating systems. Using the same computer as the HPLC, the PCX Control Software interfaces easily with Agilent ChemStation or communicates with any other modern HPLC using a relay connection.

The computer physically connects to the Onyx PCX unit through a USB cable. After an easy installation and configuration, the software runs in a window or as an icon on the computer desktop. The main software display matches the instrument's digital LCD display, where all PCX functions of temperature, flow rate and system status are displayed in real time. This allows for monitoring and control of the PCX and HPLC from one computer.



Instruments & Hardware

Onyx PCX

Continued

Methods are managed within the PCX Control Software and can be created, edited and saved to create a library for all application parameters. A sequence table is used to schedule multiple runs of the same or different methods in a series. At the end of the sequence a full system flush can be programmed. System and pump performance can be evaluated in the maintenance menu, using a pump pressure test and system pressure test. An instrument log file continually records system status and error messages for later reference and can be sent to Pickering Support for remote diagnostics.

Electronic Syringe Pumps and Valves

The syringe pump's cylinder and head are made from a single piece of 99.9 % Alumina for ruggedness and nonreactivity. The piston surface is made from PEEK® with an inert O-ring seal. The piston seal is protected by an automatic piston wash system that provides long seal life. The programmable flow rates range from 50 µL to 1500 µL/minute with a refill cycle of under 60 seconds. The electronic valve utilizes PEEK® and Teflon® with a port layout that eliminates cross contamination.

Reactor

The reactor is designed for quick heating and easy switching between applications. The heating and control electronics are in the base unit of the reactor while the coil volumes are inserted with a 'quick-change' cartridge on the front fluidics panel. The temperature range holds within 1 °C resolution from 5 °C above ambient room temperature to 130 °C maximum setpoint.

Column Heater

The column heater utilizes recirculating airflow technology to provide quick and uniform column heating. Fast column cooling is assisted by the introduction of a fresh air flow into the chamber. The temperature range holds within 1 °C resolution from 5 °C above ambient room temperature to 75 °C maximum setpoint. The temperatures can be programmed for a gradient with as many steps as required for fine-tuning an analysis.

Specifications

Dimensions

- 22.4 H x 12.0 W x 19.15 D inches (56.9 x 30.5 x 48.6 cm), instrument with doors closed

Weight

- 60 lbs or 27 kg for dual-pump systems
- 50 lbs or 23 kg for single-pump systems

Electrical

- Factory configured as either 100-120 VAC, 50/60 Hz, 1.7 A, 200 W or 200-240 VAC, 50/60 Hz, 0.8 A, 200 W
- Mains voltage ± 10 % of nominal
- Current 5 A maximum
- Installation (over voltage) category II, pollution degree 2
- Fuses, 2 ea., 5 mm x 20 mm, 6.3 A, 250 VAC, time lag

Environmental

- Indoor use only
- Altitude up to 6500 ft (1981 m)
- Ambient temperature 15 ° - 29 °C
- Relative humidity up to 80 % at 31 °C

Reagent Pumps

- True pulse-free syringe pump with single piece ceramic barrels
- Maximum operating pressure 35 bar (500 psi)
- Programmable flow rates of 50 µL to 1500 µL/minute
- Refill cycle of 60 seconds or less
- Automatic piston wash
- Automatic reagent flush cycle
- No instrument check valves

Reactor

- Heated reactor temperature from 5 °C above ambient to 130 °C maximum setpoint
- Stability +/- 0.5 °C
- Accuracy +/- 1 °C
- Thermal safety switch limits temperature to prevent damage
- Easy replacement coil cartridges
- Range of reactor dwell volumes available, from 0.1 mL to 3 mL
- Reaction coil withstands up to 42 bar (600 psi) inlet pressure at 130 °C

Column Heater

- Heater accepts 6 or 8 mm OD (0.25 or 0.31 inch) x 50-250 mm in length Column and guard
- Temperature holds within ± 1 °C resolution from 5 °C above ambient to 75 °C maximum setpoint
- Programmable temperature gradient
- Easy access to column compartment and improved tubing guards
- Thermal safety switch limits temperature to prevent damage

Instrument Package and Flow Path

- Advanced fluidics valve management system
- Completely inert flow path
- Easy access to internal components
- Standard fittings
- Side panels remove easily for service
- Integrated reagent reservoir tray compliant with secondary containment requirements

Instruments & Hardware

Onyx PCX
Continued

Display

- LCD display, color 800 x 480 pixels, 153 x 85 mm viewing area
- Real time temperature, pressure and critical system alerts shown
- Intuitive system status icons

Gas Pressure Manifold and Regulator

- Panel-mounted gas manifold
- Regulator maintains 0.3 bar (3-5 psi) on reagent reservoirs with 3-5 bar (45-75 psi) source pressure
- Safety pressure-relief valve opens at 0.7 bar (10 psi)
- Manifold with anti-siphon valves and two 1/4-28 fittings

Safeguards

- In-line check valve prevents reagent back flow into the column when HPLC pressure drops
- Replaceable reagent filters to prevent reactor fouling
- Post-column system over-pressure protection from pre-calibrated relief valve opens at 35 bar (500 psi) to prevent rupture of the post-column reactor tubing in the event of down-stream blockage
- Back-pressure regulator applies 7 bar (100 psi) to the detector flow cell outlet (waste line) to prevent detector noise and precipitation due to out-gassing or boiling

EMC Compliance

- Onyx PCX complies with EN 61326-1

Onyx PCX Derivatization Instruments	
Catalog No.	**Description**
1155-1011	Onyx, Single Pump, 0.15 mL, 120 V (Primary Amino Acids w/OPA, Aminoglycoside Antibiotics, Biogenic Amines, Sulfonamide Artificial Sweetener)
1155-1012	Onyx, Single Pump, 0.15 mL, 240 V (Primary Amino Acids w/OPA, Aminoglycoside Antibiotics, Biogenic Amines, Sulfonamide Artificial Sweetener)
1155-1021	Onyx, Single Pump, 0.5 mL, 120 V (Primary and Secondary Amino Acids w/TRIONE®, Bromate, Formaldehyde, B Vitamins, Theanine)
1155-1022	Onyx, Single Pump, 0.5 mL, 240 V (Primary and Secondary Amino Acids w/TRIONE®, Bromate, Formaldehyde, B Vitamins, Theanine)
1155-1031	Onyx, Single Pump, Knitted 1.4 mL, 120 V (Mycotoxins, Aflatoxins, Fumonisins, Sulfonamide Drugs)
1155-1032	Onyx, Single Pump, Knitted 1.4 mL, 240 V (Mycotoxins, Aflatoxins, Fumonisins, Sulfonamide Drugs)
1155-1051	Onyx, Dual Pump, 0.5 mL, 120 V (Carbamate, Glyphosate, Streptomycin, Primary and Secondary Amino Acids w/OPA)
1155-1052	Onyx, Dual Pump, 0.5 mL, 240 V (Carbamate, Glyphosate, Streptomycin, Primary and Secondary Amino Acids w/OPA)
1155-1061	Onyx, Dual Pump, Knitted 1.0 mL, 120 V (Paralytic Shellfish Toxins)
1155-1062	Onyx, Dual Pump, Knitted 1.0 mL, 240 V (Paralytic Shellfish Toxins)
1155-1071	Onyx, Dual Pump, Knitted 1.2 & 1.6 mL, 120 V (Tricothescene)
1155-1072	Onyx, Dual Pump, Knitted 1.2 & 1.6 mL, 240 V (Tricothescene)
1155-1081	Onyx, Dual Pump, Reverse Plumbing, Knitted 1.4 mL, 120 V (Polyether Antibiotics)
1155-1082	Onyx, Dual Pump, Reverse Plumbing, Knitted 1.4 mL, 240 V (Polyether Antibiotics)
1155-1101	Onyx, Single Pump, Knitted 3.5 mL, 120 V (Voglibose)
1155-1102	Onyx, Single Pump, Knitted 3.5 mL, 240 V (Voglibose)
1155-1103	Onyx, Single Pump, Dead-head Pressure Transducer, Knitted 1.0 mL, 120 V (Chromium VI)
1155-1104	Onyx, Single Pump, Dead-head Pressure Transducer, Knitted 1.0 mL, 240 V (Chromium VI)
1155-1105	Onyx, Single Pump, Dead-head Pressure Transducer, Knitted 2.0 mL, 120 V (Alprostadil)
1155-1106	Onyx, Single Pump, Dead-head Pressure Transducer, Knitted 2.0 mL, 240 V (Alprostadil)
1155-1096	Onyx, Dual Pump, Custom Reactor Volume, 120 V
1155-1097	Onyx, Dual Pump, Custom Reactor Volume, 240 V
1155-1098	Onyx, Single Pump, Custom Reactor Volume, 240 V
1155-1099	Onyx, Single Pump, Custom Reactor Volume, 120 V

Instruments & Hardware

Vector PCX

Vector PCX Derivatization Instrument

The Vector PCX serves as another post-column choice ideal for application-specific methods.

Vector PCX provides the selectivity and sensitivity required for most standard post-column applications while being reliable and easy to use. Since the Vector PCX does not have a column oven it is important to use the HPLC column oven to ensure stable column temperature and prevent retention time drifts and separation problems.

Features

- Inert pumps
- PEEK® liquid manifolds
- Integrated gas manifold
- Easy access and monitoring of fluidics
- Simple control interface (no computer required)
- Reduced bench space profile

Matched with Pickering Laboratories' Chromatographic Grade® reagents, eluants and columns, the Vector PCX instrument is a solid choice for laboratories' standard post-column needs.

Specifications

Dimensions

- (h x w x d): 43 x 21.6 x 41.2 cm (17 x 8.75 x 16 inches)

Weight

- 27.6 lbs (12.5 kg) –Duplex

Electrical

- 100 - 120 V, 50/60 Hz 1.7 A, 200 W or 200-240 V, 50/60 Hz, 0.8 A, 200 W
- Mains voltage ± 10 % of nominal
- Installation (over voltage) category II, pollution degree 2
- Indoor use only

Environmental

- Altitude up to 6,500 ft
- Ambient temperature 15 - 25 °C
- Relative humidity up to 80 % at 31 °C

Reagent Pumps

- Independently adjustable, low-pulsation
- Adjustable from 0.05 to 2.00 mL/minute against back-pressures of up to 2000 psi
- Flow Accuracy 3 %
- Flow Precision 0.5 % RSD
- Sapphire pistons
- Liquid ends, including check valve housing, PEEK®
- PEEK® bypass/purge valves for each pump located on front of instrument panel
- Automatic piston wash

Flow Path

- Independent pressure transducer for each pump 210 bar (0-3000 psi)
- Diamond-packed restrictors, matched to flow rate and viscosity of reagents
- PEEK® bypass/purge valves
- Replaceable reagent filter
- PEEK® mixing manifold

Instruments & Hardware

Vector PCX

Continued

Reactor

- Heater reactor controls at ± 0.4 ˚C for temperatures from 5 ˚C above ambient to 130 ˚C
- Range of reactor dwell volumes, 0.1 mL to 3.5 mL
- Reaction coil withstands up to 42 bar (600 psi) inlet pressure at 130 ˚C
- LCD display of actual temperature or set point
- Thermal safety switch limits temperature to 150 ˚C to prevent damage

Gas Pressure Manifold and Regulator

- Panel mounted manifold
- Regulator maintains 0.3 bar (3-5 psi) on reagent reservoirs with 3-5 bar (45-75 psi) source pressure
- Safety pressure relief valve opens at 0.7 bar (10 psi)
- Manifold has two 1/4-28 tubing connections
- Gas line with anti-siphon valve

Pressurized Reagent Reservoir

- One liter capacity (2 L reservoirs available)
- Maintained under inert gas pressure to inhibit oxidation of oxygen-sensitive reagents
- Valve built into reservoir cap permits sparging during reagent preparation
- Reagent reservoirs fitted with 3.1 mm (1/8'') OD, oxygen-impermeable Air Barrier tubing for oxygen-sensitive reagents and/or with 3.1 mm (1/8'') OD FEP tubing

Safeguards

- A pressure switch installed between LC (eluant) pump and sample injector turns off power to reagent pumps and reactor when the eluant pump pressure drops to 30 bar (425 psi), ensuring that reagent will not flow upstream and damage the analytical column. Low eluant pressure can result from power failure, eluant pump malfunction, automatic or intentional shut-down, or an empty reservoir. The Vector PCX will not restart automatically.
- Post-column system over pressure: A pre-calibrated relief valve opens at 35 bar (500 psi) to prevent rupture of the post-column reactor tubing in the event of down-stream blockage
- Back-pressure regulator: Applies 7 bar (100 psi) to the detector flow cell outlet (waste) to prevent detector noise and precipitation due to out-gassing or boiling

Vector PCX Derivatization Instruments	
Catalog No.	**Description**
1154-4011	Vector, Single Pump, OPA Flow Restrictor, 0.15 mL, 120 V (Primary Amino Acids w/OPA, Aminoglycoside Antibiotics, Biogenic Amines, Sulfonamide Artificial Sweetener)
1154-4012	Vector, Single Pump, OPA Flow Restrictor, 0.15 mL, 240 V (Primary Amino Acids w/OPA, Aminoglycoside Antibiotics, Biogenic Amines, Sulfonamide Artificial Sweetener)
1154-4021	Vector, Single Pump Trione Flow Restrictor, 0.5 mL, 120 V (Amino Acids w/TRIONE®, Theanine)
1154-4022	Vector, Single Pump Trione Flow Restrictor, 0.5 mL, 240 V (Amino Acids w/TRIONE®, Theanine)
1154-4031	Vector, Single Pump, OPA Flow Restrictor, Knitted 1.4 mL, 120 V (Aflatoxins, Sulfonamide Drugs)
1154-4032	Vector, Single Pump, OPA Flow Restrictor, Knitted 1.4 mL, 240 V (Aflatoxins, Sulfonamide Drugs)
1154-4051	Vector, Dual Pump, OPA Flow Restrictors, 0.5 mL, 120 V (Carbamate, Glyphosate, Primary and Secondary Amino Acids w/OPA, Streptomycin)
1154-4052	Vector, Dual Pump, OPA Flow Restrictors, 0.5 mL, 240 V (Carbamate, Glyphosate, Primary and Secondary Amino Acids w/OPA, Streptomycin)
1154-4061	Vector, Dual Pump, OPA Flow Restrictors, Knitted 1.0 mL, 120 V (Paralytic Shellfish Toxins)
1154-4062	Vector, Dual Pump, OPA Flow Restrictors, Knitted 1.0 mL, 240 V (Paralytic Shellfish Toxins)
1154-4071	Vector, Dual Pump, OPA Flow Restrictors, Knitted 1.2 & 1.6 mL, 120 V (Tricothescene)
1154-4072	Vector, Dual Pump, OPA Flow Restrictors, Knitted 1.2 & 1.6 mL, 240 V (Tricothescene)
1154-4081	Vector, Dual Pump, Reverse Plumbing, PEEK® Tubing Flow Restrictors, Knitted 1.4 mL, 120 V (Polyether Antibiotics)
1154-4082	Vector, Dual Pump, Reverse Plumbing, PEEK® Tubing Flow Restrictors, Knitted 1.4 mL, 240 V (Polyether Antibiotics)
1154-4091	Vector, Single Pump, Custom Configuration, 120 V *
1154-4092	Vector, Dual Pump, Custom Configuration, 120 V *
1154-4093	Vector, Single Pump, Custom Configuration, 240 V *
1154-4094	Vector, Dual Pump, Custom Configuration, 240 V *
1154-4101	Vector, Single Pump, OPA Flow Restrictor, Knitted 3.5 mL, 120 V (Voglibose)
1154-4102	Vector, Single Pump, OPA Flow Restrictor, Knitted 3.5 mL, 240 V (Voglibose)
1154-4103	Vector, Single Pump, OPA Flow Restrictor, 0.5 mL, 120 V (Formaldehyde, B Vitamins)
1154-4104	Vector, Single Pump, OPA Flow Restrictor, 0.5 mL, 240 V (Formaldehyde, B Vitamins)

* Quote required for custom configurations. Contact support@pickeringlabs.com for questions.

Instruments & Hardware

UVE™

UVE™

Photochemical Reactor

Used for detection enhancement for Aflatoxins, Phenylurea Pesticides, Barbiturates and other compounds.

Photochemical derivatization is a simple, inexpensive and flexible technique that improves sensitivity and selectivity of detection for a broad range of analytes. Among the applications for the photochemical reactor are analysis of Aflatoxins in foods, Phenylurea Pesticides in water and Barbiturates in biological samples. Photochemical derivatization also allows for the identification of closely related compounds such as polyphenols.

Pickering Laboratories Multi-residue Mycotoxins method for DON, Aflatoxins, Fumonisins, Ochratoxin A and Zearalenone employs photochemical derivatization for Aflatoxins, allowing detection at sub-ppb levels.

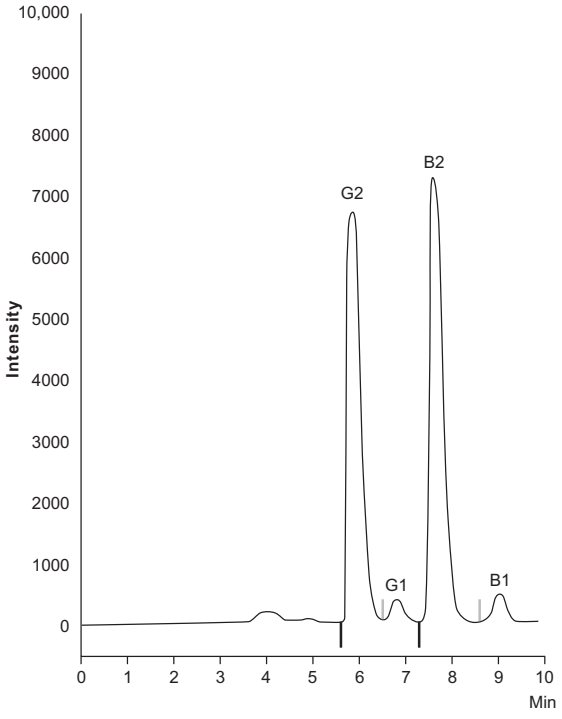
The photochemical reactor has a 254 nm lamp and a knitted reactor coil.

Feature Highlights

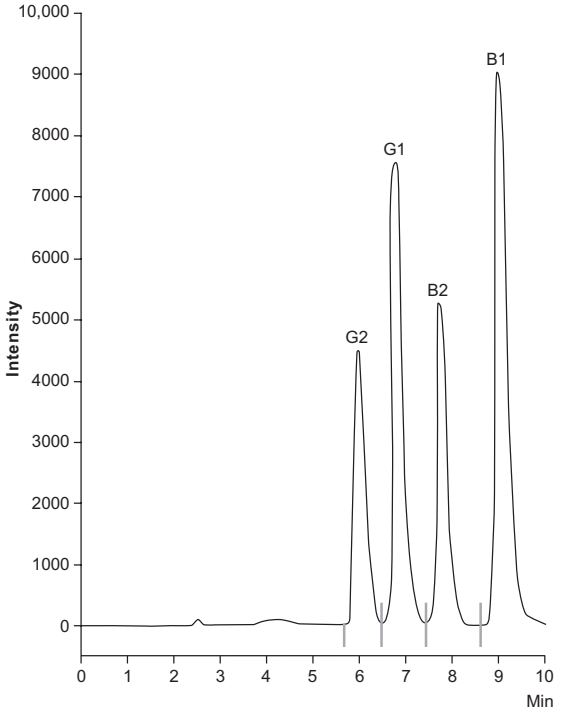
- 254 nm UV low pressure lamp with cooled reflector tube
- Long term stability of lamp and coil
- High light transmission
- Robust steel housing to meet laboratory requirements
- Specially designed fluorocarbon coil
- Comparable to electrochemical derivatization with Cobra Cell
- AOAC accepted methodology
- Standard reactor volume is 1.0 mL

UV Derivatization Results in Clear Peaks for Aflatoxins

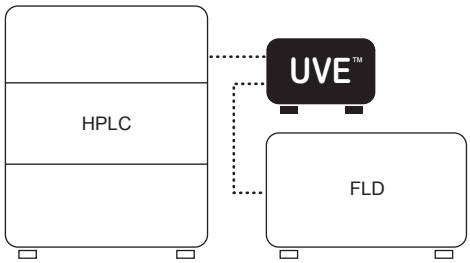
Note the short run time: B1 elutes at 9.5 Min



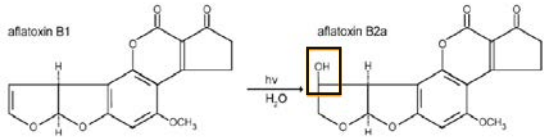
Without UVE™: Low response for G1 and B1



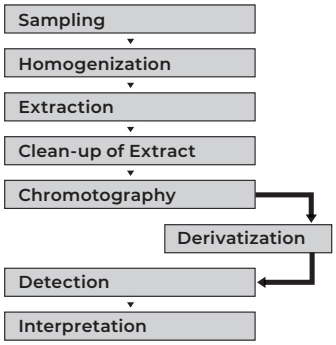
With UVE™: High response and no band spreading



Easy Handling: Simply place the UVE™ between your HPLC device and detector, switch it on - ready to use!



What actually happens? Aflatoxins B1 and G1 are transformed to stable fluorescent derivatives resulting in larger peaks



UVE™ Specifications	
CE Certified	Yes
UV Lamp	254 nm
Reactor Coil	Special
Dimensions	14.5 x 8.5 x 27 cm
Power Input	50 W
Weight	3 kg

UVE™ Catalog Information	
Catalog No.	**Description**
10519	UVE™ - Photochemical Reactor for Aflatoxin Analysis, 240 V
10742	UVE™ - Photochemical Reactor for Aflatoxin Analysis, 120 V
10520	Reactor Coil (only for UVE™ reactor), 1 mL; other coil sizes on request
10563	UV replacement lamp

Chromatograms, Columns & Guards

Pickering Laboratories columns and guards are intended for specific applications that require post-column derivatization. This technology guarantees detection of certain classes of compounds at very low concentrations—amino acids, carbamate pesticides and polyamines, for example.

Each column is packed and tested to separate the target compounds according to Pickering's chromatographic quality control standards and published analytical method. The following acceptance criteria apply to all of Pickering's columns:

- With guard column installed, produce a specified chromatogram of the compounds in a standard test mixture.
- Separate the compounds in the established order, with specified resolution of critical pairs.
- Operate within the specified range of back pressure.
- Be free of contaminating material which can cause baseline artifacts.
- Only after all criteria have been met can the column's serial number and label be applied.
- Quite simply, the column is guaranteed to produce a chromatogram for its intended application if it is operated according to the conditions and methods prescribed by Pickering Laboratories.

About Guard Columns

While it is true that any of our columns may be run without a guard, the practical consequence is a shorter column lifetime. Pickering Laboratories sells a variety of appropriate guard columns to protect our analytical columns. Additionally, GARD™ provides protection against contamination for cation-exchange applications without affecting column efficiency and it is far less expensive to replace than an analytical column. See page 17 for more information about our GARD™ column protection system.

Cation-Exchange Columns & Guards

Lithium Columns	
Catalog No.	**Description**
0354675T	70-minute High-efficiency Lithium Cation-exchange Column, 4.6 x 75 mm, includes Amino Acid Test Mixture 1700-0070
0354100T	High-efficiency Lithium Cation-exchange Column, 4.0 x 100 mm, includes Amino Acid Test Mixture 1700-0070
0393250	Standard Lithium Cation-exchange Column, 3.0 x 250 mm, includes Amino Acid Test Mixture 1700-0070

Sodium Columns	
Catalog No.	**Description**
1154110T	30-minute High-efficiency Sodium Cation-exchange Column 4.6 x 110 mm, includes Amino Acid Test Mixture 1700-0070
1154150T	High-efficiency Sodium Cation-exchange Column for protein, collagen and oxidized feed hydrolysates, 4.0 x 150 mm, includes Amino Acid Test Mixture 1700-0070
1154150	High-efficiency Sodium Cation-exchange Column for protein and collagen hydrolysates, 4.0 x 150 mm, includes Amino Acid Test Mixture 1700-0070
1193250	Standard Sodium Cation-exchange Column 3.0 x 250 mm, includes Amino Acid Test Mixture 1700-0070

Glyphosate Column	
Catalog No.	**Description**
1954150	Cation-exchange Column for Glyphosate analysis, 4 x 150 mm, including Glyphosate Test Mixture 1700-0080

GARD™ Column Protection System (For use with any cation-exchange column)	
Catalog No.	**Description**
1700-3102	Cation-exchange GARD™ Assembly: Includes holder and 2 replaceable GARDs™
1700-3101	Replacement Cation-exchange GARDs™ (2/PK)
1700-3100	GARD™ Holder

Alkion Column	
Catalog No.	**Description**
9410917	ALKION™ Cation-exchange Column, K^+ form, 4.0 x 150 mm
9493020	ALKION™ Guard Column, K^+ form, 3.0 x 20 mm

Reversed-Phase Columns & Guards

Carbamate Columns	
Catalog No.	**Description**
0846250	Carbamate Column, high resolution/capacity, C8 , 4.6 x 250 mm, includes Carbamate Test Mixture 1700-0063
0840250	Carbamate Column, expanded resolution, C8, 4.0 x 250 mm, includes Carbamate Test Mixture 1700-0063
1846150	Carbamate Column, rapid analysis, C18, 4.6 x 150 mm, includes Carbamate Test Mixture 1700-0063
18ECG001	Guard Cartridge Holder with 3 guard cartridges
18ECG002	Guard Cartridges, 2/pk.

Polyether Antibiotics Column	
Catalog No.	**Description**
2381750	Polyether Reversed-phase Column, 4.6 x 250 mm
18ECG001	Guard Cartridge Holder with 3 cartridges
18ECG002	Guard Cartridges, 2/pk.

Mycotox Column	
Catalog No.	**Description**
1612124	MYCOTOX™ Reversed-phase Column, 4.6 x 250 mm
18ECG001	Guard Cartridge Holder with 3 cartridges
18ECG002	Guard Cartridges, 2/pk.

Chromatograms, Columns & Guards

Cation-Exchange GARD™ Column Protection System

Cation-exchange GARD™ uses a proprietary material to prevent matrix compounds from passing through (and thereby protecting the analytical column), but allows the analytes of interest to pass unimpeded through the GARD™ and onto the analytical column.

The GARD™ significantly prolongs column life without band spreading or added pressure. We demonstrated, by means of a performance comparison for Amino Acid Analysis, that the use of a GARD™ will effectively protect the analytical column, will be more cost-effective for the laboratory, is easy to change, is universal to cation-exchange applications, and most importantly has zero band spreading.

With GARD™ Column protection system from Pickering Laboratories the same cation-exchange GARD™ can be used for nearly all cation-exchange applications.

GARD™ Column Protection System (For use with any cation-exchange column)	
Catalog No.	**Description**
1700-3102	Cation-exchange GARD™ Assembly: Includes holder and 2 replaceable GARDs™
1700-3101	Replacement Cation-exchange GARDs™ (2/PK)
1700-3100	GARD™ Holder

Lithium Amino Acid Analysis Columns

Pickering Laboratories specialize in manufacturing of cation-exchange columns for amino acid analysis. No other techniques, including reversed-phase chromatography, have been shown to match post-column ion-exchange methods in quantitation and reproducibility. Advantages of this method, such as absence of matrix interferences, are especially important in the analysis of native samples.

Lithium columns and buffers systems have high selectivity and are perfect for physiological fluids and food analysis.

Post-column Conditions for Amino Acids Analysis:

Reagent: Trione®

Reactor: 130 °C, 0.5 mL

Reagent Flow Rate: 0.3 mL/min

Detection:

UV-Vis Detector: λ=570 nm for primary amino acids
λ=440 nm for secondary amino acids

or

Reagent: 300 mg of OPA, 2 g Thiofluor™, 3 mL of 30 % Brij® 35 solution in 950 mL of OD104

Reactor: 45 °C, 0.15 mL

Reagent Flow Rate: 0.3 mL/min

Detection:

Fluorometer: λ_{ex} 330 nm, λ_{em} 465 nm

The recommended gradient conditions are subject to change without notice. This may happen because of lot-specific changes in the columns, or improvements in the overall method.

The recommended gradient for the column will always be included in the column package and it supersedes the information in this catalog. Use the program recommended on the column data sheet for the initial testing.

Column oven temperature programming gives additional flexibility when optimizing methods. Using a temperature gradient allows the user to improve separation, shorten analysis time and fine-tune the method for detecting compounds of interest.

70-Min High-Efficiency Lithium Cation-Exchange Column (4.6 X 75 mm)

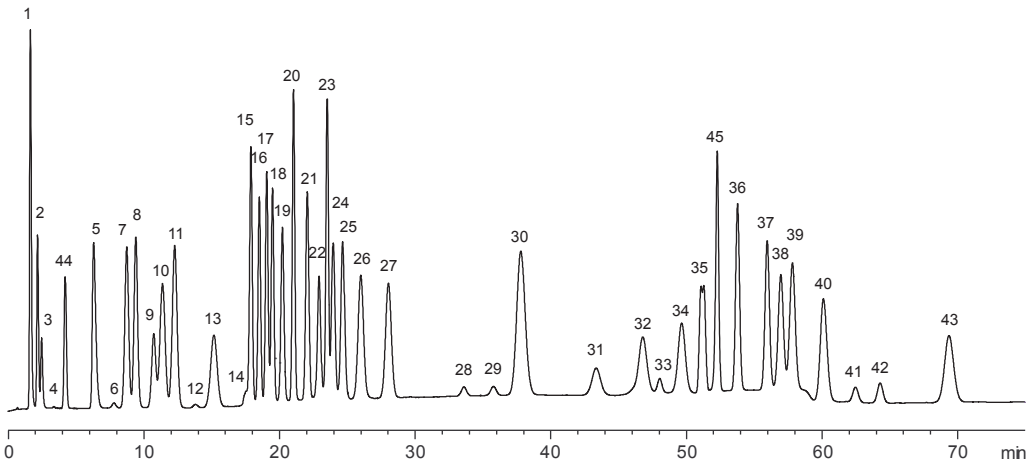
Catalog Number 0354675T
Use With Cation-Exchange Gard™ Column Protection System 1700-3102
Use for Physiological Samples
Temperature Gradient

HPLC Program				
Time	1700-1125 %	Li365 %	Li375 %	RG003 %
0	100	0	0	0
10	100	0	0	0
19	40	60	0	0
32	0	100	0	0
43	0	100	0	0
43.1	0	0	100	0
57	0	0	100	0
57.1	0	0	70	30
72	0	0	70	30
72.1	100	0	0	0

Column Oven Program	
Time	Temp °C
0	34
6	34
17	65
25	70
70	70
71	34

For more information see Method Abstract MA 382 and Pickering Amino Acids Brochure.

HPLC Flow Rate: 0.55 mL/min, Initial Temp.: 34 °C
Injection Volume: 10 µl of 0.25 µmole/ml std.
(P/N 1700-0170 with added Glutamine, AEC, Glucosaminic acid, and Allo-Isoleucine.)



1 Phosphoserine
2 Taurine
3 Phosphoethanolamine
4 Urea
5 Aspartic acid
6 Hydroxyproline
7 Threonine
8 Serine
9 Asparagine
10 Glutamic acid
11 Glutamine
12 Sarcosine
13 α-Aminoadipic acid
14 Proline
15 Glycine
16 Alanine
17 Citrulline
18 α-Amino-n-butyric acid
19 Valine
20 Cystine
21 Methionine
22 Allo-Isoleucine
23 Cystathionine
24 Isoleucine
25 Leucine
26 Tyrosine
27 Phenylalanine
28 β-Alanine
29 β-Amino-i-butyric acid
30 Homocystine
31 γ-Aminobutyric acid
32 Tryptophan
33 Ethanolamine
34 Ammonia
35 Hydroxylysines
36 Ornitine
37 Lysine
38 1-Methylhistidine
39 Histidine
40 3-Methylhistidine
41 Anserine
42 Carnosine
43 Arginine
44 Glucosaminic Acid*
45 2-Aminoethyl-cysteine (AEC)*

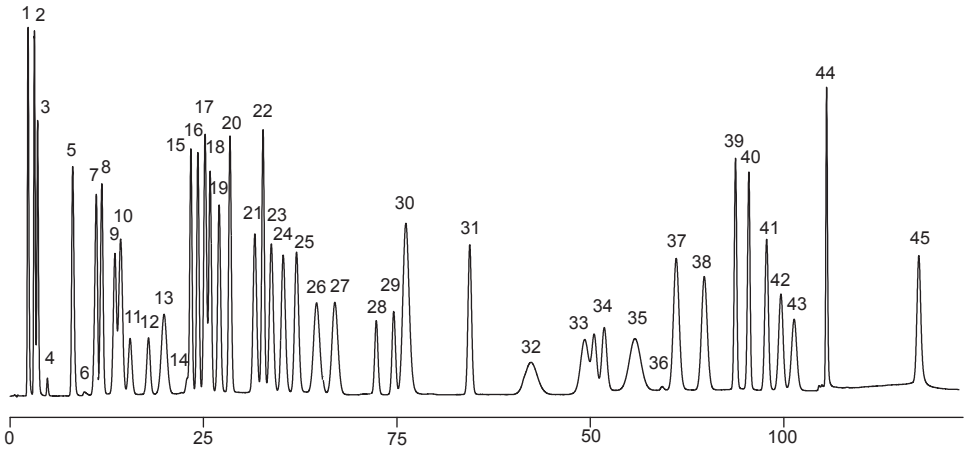
*Internal Standard

NOTE: This method utilizes column temperature gradient. Use Onyx PCX column oven or Pinnacle PCX column oven with temperature gradient capabilities.

Chromatograms, Columns & Guards

High-Efficiency Lithium Cation-Exchange Column (4.0 X 100 mm)

Catalog Number 0354100T
Use With Cation-Exchange Gard™ Column Protection System 1700-3102
Use for Physiological Samples and Complex Matrices
Temperature Isocratic



1 Phosphoserine
2 Taurine
3 Phosphoethanolamine
4 Urea
5 Aspartic acid
6 Hydroxyproline
7 Threonine
8 Serine
9 Asparagine
10 Glutamic acid
11 Glutamine
12 Sarcosine
13 α–Aminoadipic acid
14 Proline
15 Glycine
16 Alanine
17 Citrulline
18 α–Amino-n-butyric acid
19 Valine
20 Cystine
21 Methionine
22 Cystathionine
23 Isoleucine
24 Leucine
25 Norleucine
26 Tyrosine
27 Phenylalanine
28 β–Alanine
29 β–Amino-i-butyric acid
30 Homocystine
31 γ–Aminobutyric acid
32 Tryptophan
33 Ethanolamine
34 Hydroxylysines
35 Ammonia
36 Creatinine
37 Ornithine
38 Lysine
39 Histidine
40 3-Methyl-histidine
41 1-Methyl-histidine
42 Carnosine
43 Anserine
44 α–Amino–β–guanidinopropionic acid
45 Arginine

Conditions					
Step	**Time (Min)**	**Interval**	**Li275 %**	**Li750 %**	**RG003 %**
0	0	0	100	0	0
1	8	8	100	0	0
2	46	38	65	35	0
3	86	40	0	100	0
4	90	4	0	100	0
5	115	25	0	94	6
6	122	2	0	94	6
7	122.1	0.1	100	0	0
8	140	17.9	100	0	0

Flow Rate: 0.35 mL/min, Column Temp: 37 °C,
Injection Volume: 10 µl of 0.25 µmole/ml std.
(P/N 011006P with added Glutamine)

For more information see Pickering Amino Acids Brochure.

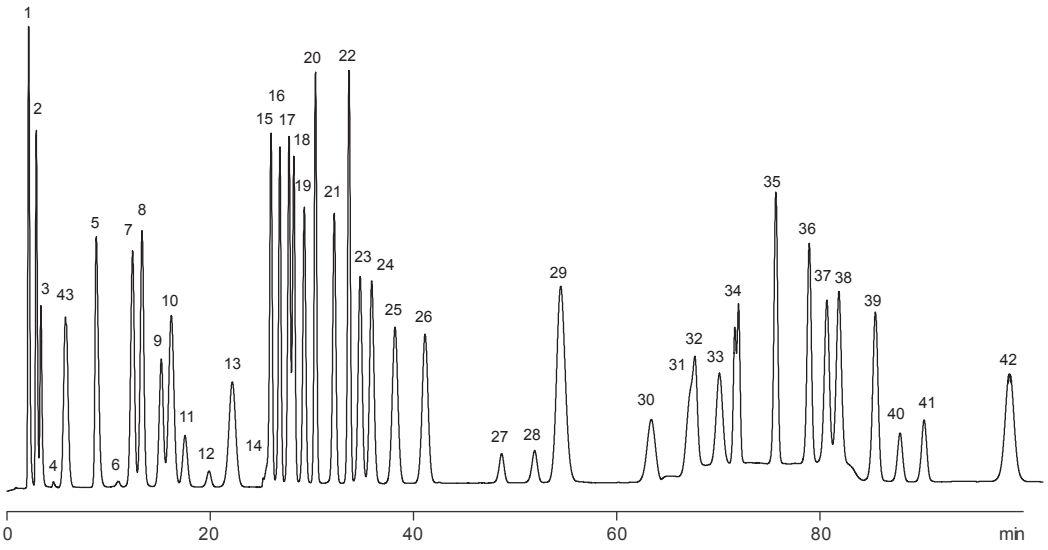
High-Efficiency Lithium Cation-Exchange Column (4.0 X 100 mm)

Catalog Number 0354100T
Use With Cation-Exchange Gard™ Column Protection System 1700-3102
Use for Physiological Fluids
Temperature Gradient

Conditions					
Step	Time (Min)	1700-1125 %	Li365 %	Li375 %	RG003 %
0	0	100	0	0	0
1	15	100	0	0	0
2	27	40	60	0	0
3	45	0	100	0	0
4	60	0	100	0	0
5	60.1	0	0	100	0
6	78	0	0	100	0
7	78.1	0	0	70	30
8	95	0	0	70	30
9	95.1	100	0	0	0
10	115	100	0	0	0

Column Oven Program	
Time (Min)	Temp °C
0	34
13	34
30	65
67	66
80	70
97	70
98	34

HPLC Flow Rate: 0.4 mL/min, Initial Temp.: 34 °C
Injection Volume: 10 µL of 0.25 µmole/mL Std.
(P/N 1700-0170 with added Glutamine and Glucosaminic acid)



For more information see Pickering Amino Acids Brochure.

1 Phosphoserine
2 Taurine
3 Phosphoethanolamine
4 Urea
5 Aspartic acid
6 Hydroxyproline
7 Threonine
8 Serine
9 Asparagine
10 Glutamic acid
11 Glutamine
12 Sarcosine
13 α-Aminoadipic acid
14 Proline
15 Glycine
16 Alanine
17 Citrulline
18 α-Amino-n-butyric acid
19 Valine
20 Cystine
21 Methionine
22 Cystathionine
23 Isoleucine
24 Leucine
25 Tyrosine
26 Phenylalanine
27 β-Alanine
28 β-Amino-i-butyric acid
29 Homocystine
30 γ-Aminobutyric acid
31 Tryptophan
32 Ethanolamine
33 Ammonia
34 Hydroxylysines
35 Ornitine
36 Lysine
37 1-Methylhistidine
38 Histidine
39 3-Methylhistidine
40 Anserine
41 Carnosine
42 Arginine
43 Glucosaminic Acid*

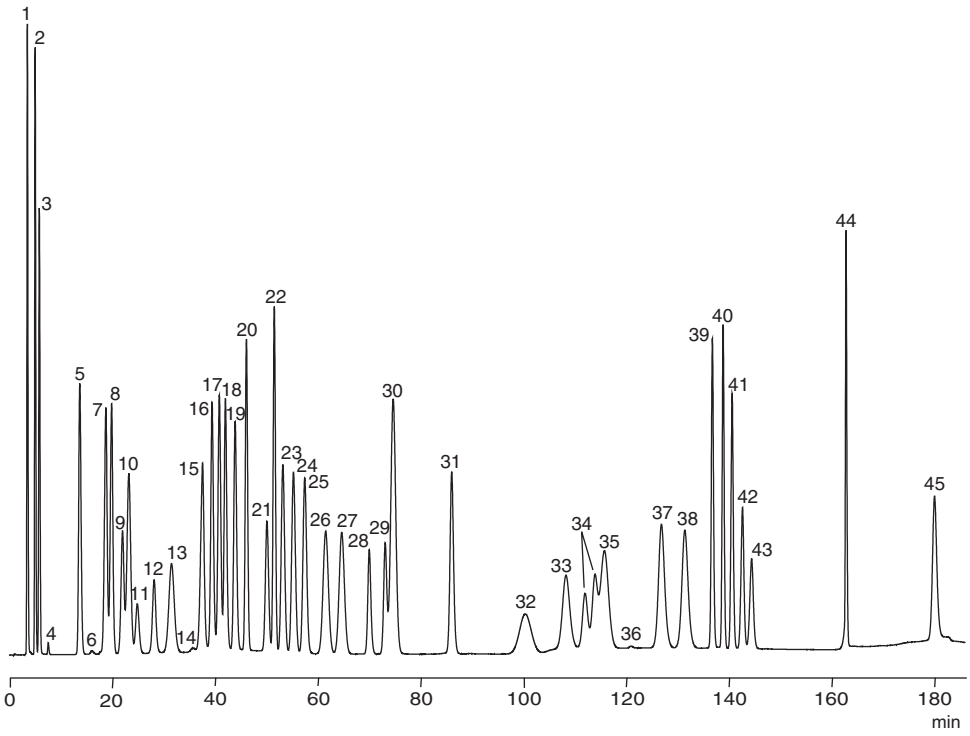
**Internal Standard*

NOTE: This method utilizes column temperature gradient. Use Onyx PCX column oven or Pinnacle PCX column oven with temperature gradient capabilities.

Chromatograms, Columns & Guards

Standard Lithium Cation-Exchange Column 0393250 (3.0 X 250 mm)

Catalog Number 0393250
Use With Cation-Exchange Gard™ Column Protection System 1700-3102
Use for Physiological Fluids, Complex Matrices
Temperature Isocratic



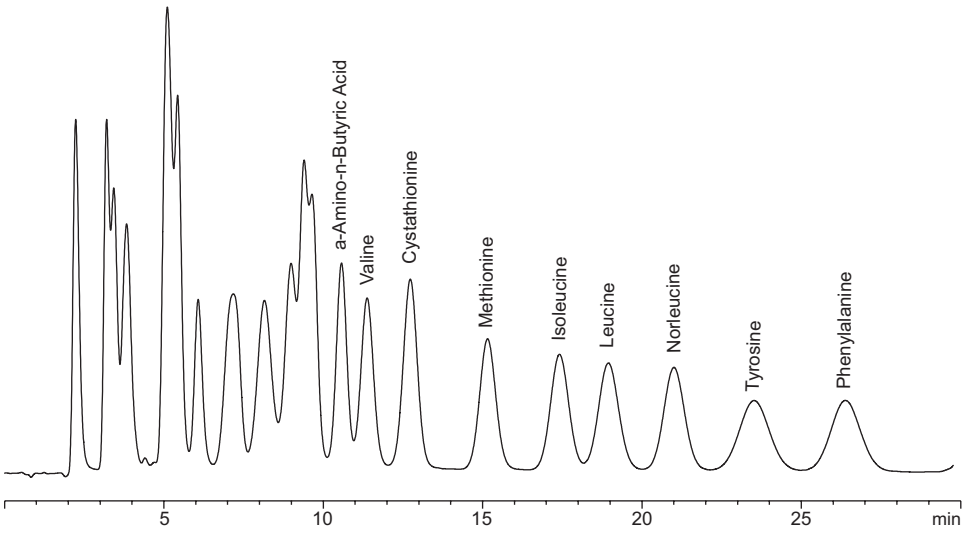
1 Phosphoserine
2 Taurine
3 Phosphoethanolamine
4 Urea
5 Aspartic acid
6 Hydroxyproline
7 Threonine
8 Serine
9 Asparagine
10 Glutamic acid
11 Glutamine
12 Sarcosine
13 α-Aminoadipic acid
14 Proline
15 Glycine
16 Alanine
17 Citrulline
18 α-Amino-n-butyric acid
19 Valine
20 Cystine
21 Methionine
22 Cystathionine
23 Isoleucine
24 Leucine
25 Norleucine
26 Tyrosine
27 Phenylalanine
28 β-Alanine
29 β-Amino-i-butyric acid
30 Homocystine
31 γ-Aminobutyric acid
32 Tryptophan
33 Ethanolamine
34 Hydroxylysines
35 Ammonia
36 Creatinine
37 Ornithine
38 Lysine
39 Histidine
40 3-Methyl-histidine
41 1-Methyl-histidine
42 Carnosine
43 Anserine
44 α-Amino-β-guanidino propionic acid
45 Arginine

Conditions			
Time (Min)	**Li275 %**	**Li750 %**	**RG003 %**
0	100	0	0
17	100	0	0
65	65	35	0
128	0	100	0
145	0	100	0
185	0	94	6
185.1	100	0	0
210	100	0	0

Flow Rate: 0.3 mL/min, Column Temp.: 40 °C,
Injection Volume: 10 µL of 0.25 µmole/mL Std.
(P/N 011006P with added Glutamine)

High-Efficiency Lithium Cation-Exchange Column (4.0 x 100 mm)

Catalog Number 0354100T
Use With Cation-Exchange Gard™ Column Protection System 1700-3102
Use for PKU/MSUD Screening of Physiological Fluids
Temperature Isocratic



Conditions					
Step	Time (Min)	Interval	Li275 %	Li750 %	RG003 %
0	0	0	86	14	0
1	25	11	73	27	0
3	25.1	0.1	0	0	100
4	30	16.9	0	0	100
7	30.1	0.1	86	14	0
8	42	14.9	86	14	0

HPLC Flow Rate: 0.35 mL/Min, Column Temp.: 38 °C
Injection Volume: 10 µl of 0.25 µmole/mL Std.

Lithium Columns	
Catalog No.	Description
0354675T	70-minute High-efficiency Lithium Cation-exchange Column, 4.6 x 75 mm, includes Amino Acid Test Mixture 1700-0070
0354100T	High-efficiency Lithium Cation-exchange Column, 4.0 x 100 mm, includes Amino Acid Test Mixture 1700-0070
0393250	Standard Lithium Cation-exchange Column, 3.0 x 250 mm, includes Amino Acid Test Mixture 1700-0070

GARD™ Column Protection System (For use with any cation-exchange column)	
Catalog No.	Description
1700-3102	Cation-exchange GARD™ Assembly: Includes holder and 2 replaceable GARDs™
1700-3101	Replacement Cation-exchange GARDs™ (2/PK)
1700-3100	GARD™ Holder

Chromatograms, Columns & Guards

Sodium Amino Acid Analysis Columns

Ion-exchange chromatography followed by post-column derivatization has been a method of choice for amino acid analysis for many years. Pickering Laboratories' ion-exchange columns allow you to obtain consistent results with sensitivity, stability, selectivity and speed.

Sodium columns and buffers systems are designed for amino acids analysis of hydrolyzed samples.

Post-column Conditions For Amino Acids Analysis:

Reagent: Trione®

Reactor: 130 °C, 0.5 mL

Reagent Flow Rate: 0.3 mL/min

Detection:

UV-Vis Detector: λ=570 nm for primary amino acids
λ=440 nm for secondary amino acids

or

Reagent: 300 mg of OPA, 2 g Thiofluor™, 3 mL of 30 % Brij® 35 solution in 950 mL of OD104

Reactor: 45 °C, 0.15 mL

Reagent Flow Rate: 0.3 mL/min

Detection:

Fluorometer: λ_{ex} 330 nm, λ_{em} 465 nm

The recommended gradient conditions are subject to change without notice. This may happen because of lot-specific changes in the columns, or improvements in the overall method.

The recommended gradient for the column will always be included in the column package, and it supersedes the information in this catalog. Use the program recommended on the column data sheet for the initial testing.

The column oven temperature programming gives additional flexibility when optimizing methods. Using a temperature gradient allows the user to improve separation, shorten analysis time and fine-tune the method for detecting compounds of interest.

30-min High-Efficiency Sodium Cation-Exchange Column (4.6 x 110 mm)

Catalog Number 1154110T
Use With Cation-Exchange Gard™ Column Protection System 1700-3102
Use for Protein and Oxidized Feeds Hydrolysate
Temperature Gradient

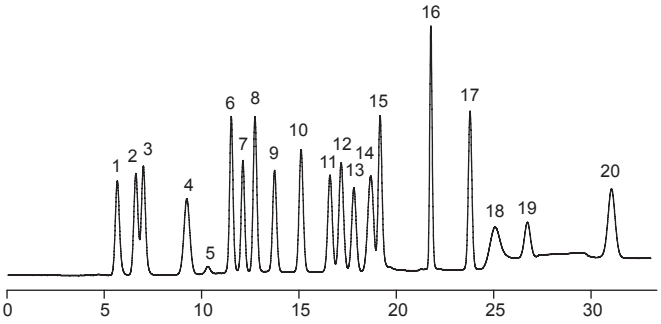


Fig 1. Chromatogram of protein hydrolysate standard

1	Aspartic Acid	**9**	Valine	**17**	Lysine
2	Threonine	**10**	Methionine	**18**	Tryptophan
3	Serine	**11**	Isoleucine	**19**	Ammonia
4	Glutamic Acid	**12**	Leucine	**20**	Arginine
5	Proline	**13**	Norleucine	**21**	Cysteic Acid
6	Glycine	**14**	Tyrosine	**22**	Methionine
7	Alanine	**15**	Phenylalanine		Sulfone
8	Cystine	**16**	Histidine		

Method for Protein Hydrolysate Samples				
TIME	Na315 %	Na425 %	Na640 %	RG011 %
0	100	0	0	0
4.0	100	0	0	0
15.0	0	100	0	0
16.0	0	0	100	0
31.0	0	0	100	0
31.1	0	0	0	100
33.0	0	0	0	100
33.1	100	0	0	0
40	100	0	0	0

Column Oven Program	
Time	Temp °C
0	46
4	46
9	70
32	70
33	46

HPLC Flow Rate: 0.6 mL/Min
Initial Temp.: 46 °C
Injection Volume: 10 µL of 0.25 µmole/mL Std.
(P/N 012506H with added Norleucine)

For more information see Method Abstract 380.1 (page 76) and Pickering Amino Acids Brochure.

NOTE: This method utilizes column temperature gradient. Use Onyx PCX column oven or Pinnacle PCX column oven with temperature gradient capabilities.

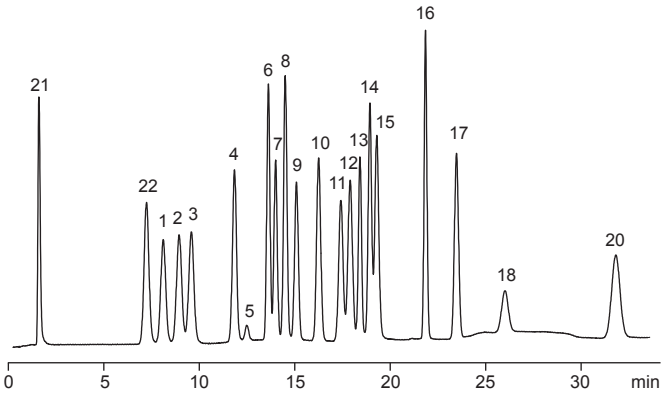


Fig 2. Chromatogram of oxidized feeds hydrolysate standard

1	Aspartic Acid	**9**	Valine	**17**	Lysine
2	Threonine	**10**	Methionine	**18**	Tryptophan
3	Serine	**11**	Isoleucine	**19**	Ammonia
4	Glutamic Acid	**12**	Leucine	**20**	Arginine
5	Proline	**13**	Norleucine	**21**	Cysteic Acid
6	Glycine	**14**	Tyrosine	**22**	Methionine
7	Alanine	**15**	Phenylalanine		Sulfone
8	Cystine	**16**	Histidine		

Method for Oxidized Feeds Hydrolysate Samples				
TIME	Na270 %	Na425 %	Na640 %	RG011 %
0	100	0	0	0
4.0	100	0	0	0
15.0	0	100	0	0
16.0	0	0	100	0
31.0	0	0	100	0
31.1	0	0	0	100
33.0	0	0	0	100
33.1	100	0	0	0
40	100	0	0	0

Column Oven Program	
Time	Temp °C
0	55
12	55
17	70
32	70
33	55

HPLC Flow Rate: 0.6 mL/min
Initial Temp.: 55 °C
Injection Volume: 10 µL OF 0.25 µmole/mL Std.

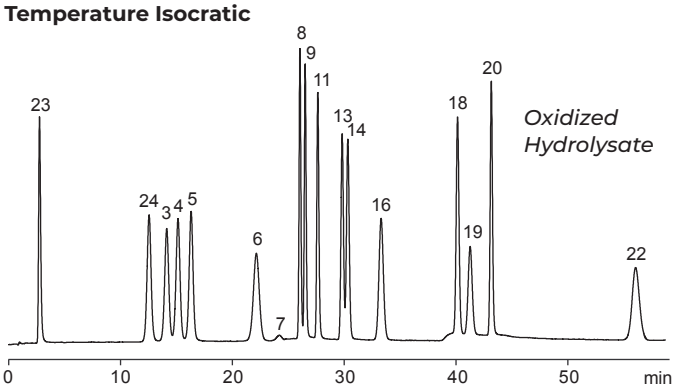
For more information see Method Abstract 380.1 and Pickering Amino Acids Brochure.

NOTE: This method utilizes a column temperature gradient. Use Onyx PCX column oven or Pinnacle PCX column oven with temperature gradient capabilities.

Chromatograms, Columns & Guards

High-Efficiency Cation-Exchange Column (4.0 X 150 mm)

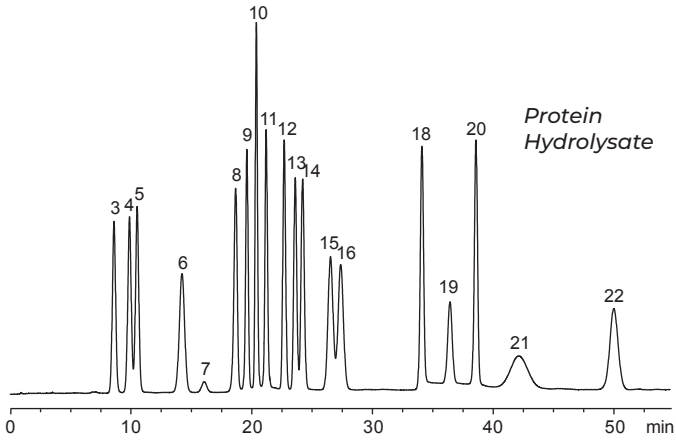
Catalog Number 1154150T
Use With Gard™ Column Protection System 1700-3102
Use for Oxidized Hydrolysate, Protein Hydrolysate, Collagen Hydrolysate
Temperature Isocratic

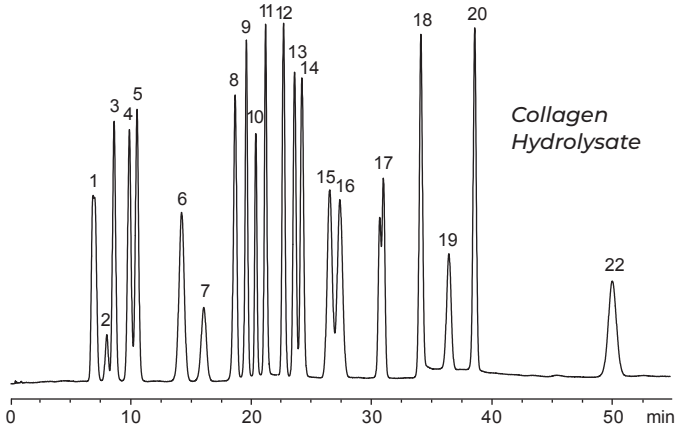


Conditions for Oxidized Samples 1154150T			
Time (Min)	Na270 %	Na740 %	RG011 %
0	100	0	0
14	100	0	0
32	20	80	0
32.1	0	100	0
56	0	100	0
56.1	0	0	100
58	0	0	100
58.1	100	0	0
70	100	0	0

Flow Rate: 0.4 mL/Min, Column Temp.: 50 °C,
Injection Volume: 10 µL of 0.25 µmole/mL Std.
(P/N 1700-0155)

3 Aspartic Acid
4 Threonine
5 Serine
6 Glutamic Acid
7 Proline
8 Glycine
9 Alanine
11 Valine
13 Isoleucine
14 Leucine
16 Phenylalanine
18 Lysine
19 Ammonia
20 Histidine
22 Arginine
23 Cysteic Acid
24 Methionine Sulfone





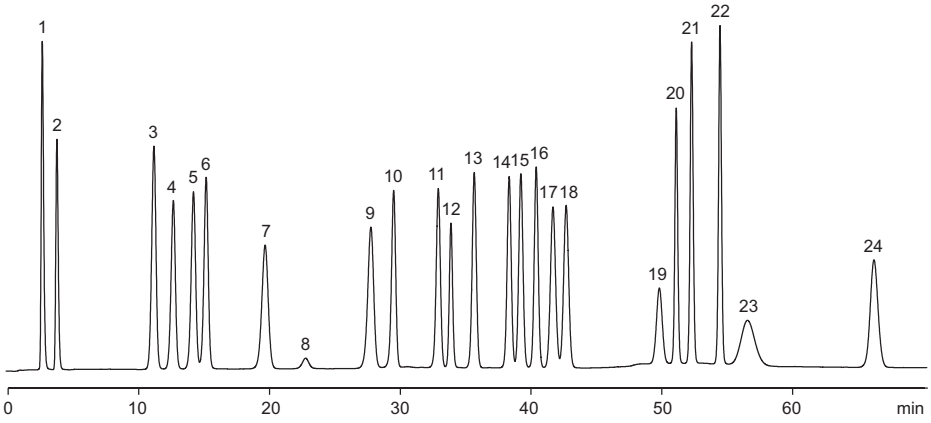
1 Methionine-D,L,-Sulfoxide
2 trans-4-Hydroxy-L-Proline
3 Aspartic Acid
4 Threonine
5 Serine
6 Glutamic Acid
7 Proline
8 Glycine
9 Alanine
10 Cystine
11 Valine
12 Methionine
13 Isoleucine
14 Leucine
15 Tyrosine
16 Phenylalanine
17 D,L & allo-Hydroxylysine
18 Lysine
19 Ammonia
20 Histidine
21 Tryptophan
22 Arginine

Conditions for Protein & Collagen Hydrolysate Samples			
Time (Min)	Na315 %	Na740 %	RG011 %
0	100	0	0
10	100	0	0
30	0	100	0
53	0	100	0
53.1	0	0	100
55	0	0	100
55.1	100	0	0
67	100	0	0

Flow Rate: 0.4 mL/Min, Column Temp.: 48 °C,
Injection Volume: 10 µL of 0.25 µmole/mL Std.
(P/N 012506H and 012506C)

Expanded Amino Acid Analysis of Hydrolyzed Samples

Catalog Number 1154150T
Use With Cation-Exchange Gard™ Column Protection System 1700-3102
Use for Oxidized and Non-oxidized Samples
Temperature Gradient



1	Cysteic Acid	**7**	Glutamic Acid	**13**	Methionine	**19**	Ammonia
2	Taurine	**8**	Proline	**14**	Isoleucine	**20**	Ornithine
3	Methionine Sulfone	**9**	Glycine	**15**	Leucine	**21**	Lysine
4	Aspartic Acid	**10**	Alanine	**16**	Norleucine	**22**	Histidine
5	Threonine	**11**	Valine	**17**	Tyrosine	**23**	Tryptophan
6	Serine	**12**	Cystine	**18**	Phenylalanine	**24**	Arginine

Conditions for Oxidized and Non-Oxidized Samples			
Time (Min)	**Na270 %**	**Na740 %**	**RG011 %**
0	100	0	0
16	100	0	0
40	54	46	0
45	0	100	0
66	0	100	0
66.1	0	0	100
70	0	0	100
70.1	100	0	0
80	100	0	0

Flow Rate: 0.4 mL/min, Initial Temp.: 55 °C, Injection Volume: 10 uL of 0.25 µmole/mL Std. (P/N 1700-0165 with added Ornithine)

Column Oven Program	
Time	**Temp °C**
0	55
32	55
33	65
41	65
42	55

Sodium Columns	
Catalog No.	**Description**
1154110T	30-minute High-efficiency Sodium Cation-exchange Column 4.6 x 110 mm, includes Amino Acid Test Mixture 1700-0070
1154150T	High-efficiency Sodium Cation-exchange Column for protein, collagen and oxidized feed hydrolysates, 4.0 x 150 mm, includes Amino Acid Test Mixture 1700-0070
1154150	High-efficiency Sodium Cation-exchange Column for protein and collagen hydrolysates, 4.0 x 150 mm, includes Amino Acid Test Mixture 1700-0070
1193250	Standard Sodium Cation-exchange Column 3.0 x 250 mm, includes Amino Acid Test Mixture 1700-0070

GARD™ Column Protection System (For use with any cation-exchange column)	
Catalog No.	**Description**
1700-3102	Cation-exchange GARD™ Assembly: Includes holder and 2 replaceable GARDs™
1700-3101	Replacement Cation-exchange GARDs™ (2/PK)
1700-3100	GARD™ Holder

Chromatograms, Columns & Guards

Carbamate Pesticide Analysis Columns

Pickering Laboratories carbamate columns are guaranteed to produce the separation of carbamate residues, specified by EPA 531.1, EPA 531.2 and AOAC 985.23 methods.

Post-column conditions for pesticide analysis:

Reagent 1: Hydrolysis reagent CB130 or CB130.2

Reagent 2: 100 mg of OPA, 2 g Thiofluor™ in 950 mL of CB910

Reactor 1: 100 °C, 0.5 mL

Reactor 2: Ambient, 0.1 mL

Reagents Flow Rate: 0.3 mL/min

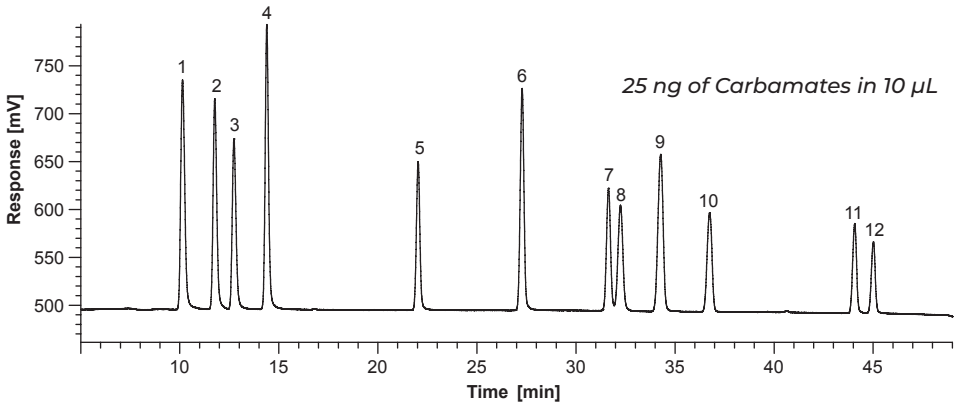
Detection:

Fluorometer: λ_{ex} 330 nm, λ_{em} 465 nm

The recommended gradient conditions are subject to change without notice. This may happen because of lot-specific changes in the columns, or improvements in the overall method.

The recommended gradient for the column will always be included in the column package, and it supersedes the information in this catalog.

High Resolution / Capacity Carbamate Column 0846250 (4.6 x 250 mm), C_8, 5 µm



1	Aldicarb sulfoxide	**5**	3-Hydroxycarbofuran	**9**	Carbaryl
2	Aldicarb sulfone	**6**	Aldicarb	**10**	1-Naphthol
3	Oxamyl	**7**	Propoxur	**11**	Methiocarb
4	Methomyl	**8**	Carbofuran	**12**	BDMC

Conditions for Aqueous Samples		
Time (Min)	Water %	MeOH %
0	100	0
1	100	0
1.1	82	18
36	30	70
39	30	70
39.1	0	100
41	0	100
41.1	100	0
55	100	0

Flow Rate: 1 mL/min,
Column Temp.: 42 °C,
Injection Volume: Up to 400 mL

Conditions for Methanolic Samples		
Time (Min)	Water %	MeOH %
0	85	15
1	85	15
44	25	75
44.1	0	100
49	0	100
49.1	85	15
57	85	15

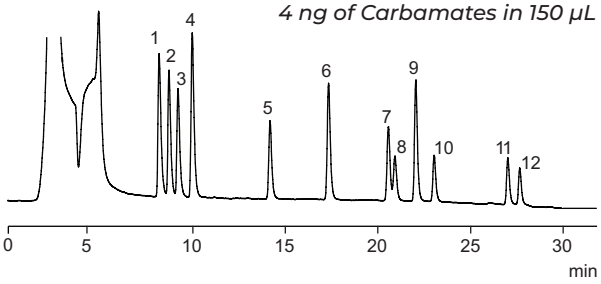
Flow Rate: 1 mL/min,
Column Temp.: 42 °C,
Injection Volume: 10 mL

Rapid Analysis Carbamate Column 1846150 (4.6 x 150 mm), 5 µm

Conditions for Aqueous Samples		
Time (Min)	**Water %**	**MeOH %**
0	100	0
1	100	0
1.1	88	12
26	30	70
26.1	0	100
28	0	100
28.1	100	0
38	100	0

Flow Rate: 1 mL/Min,
Column Temp.: 42 °C,
Injection Volume: Up To 250 mL

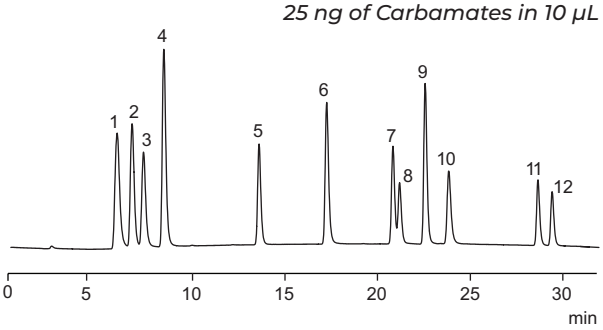
4 ng of Carbamates in 150 µL



Conditions for Methanolic Samples		
Time (Min)	**Water %**	**MeOH %**
0	85	15
0.5	85	15
28.5	30	70
28.6	0	100
33.5	0	100
33.6	85	15
41	85	15

Flow Rate: 1 mL/min,
Column Temp.: 42 °C,
Injection volume: 10 mL

25 ng of Carbamates in 10 µL



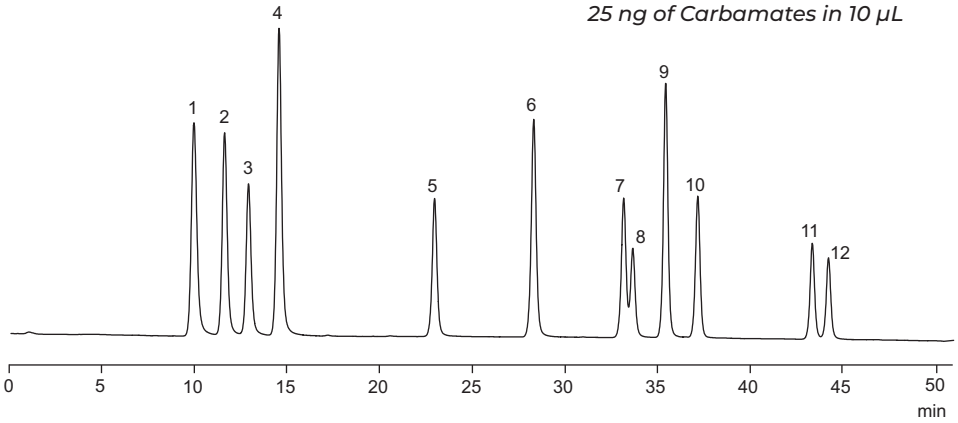
1 Aldicarb sulfoxide
2 Aldicarb sulfone
3 Oxamyl
4 Methomyl
5 3-Hydroxycarbofuran
6 Aldicarb
7 Propoxur
8 Carbofuran
9 Carbaryl
10 1-Naphthol
11 Methiocarb
12 BDMC (internal standard)

Chromatograms, Columns & Guards

Expanded Resolution Carbamate Column 0840250 (4.0 x 250 mm), 5 µm

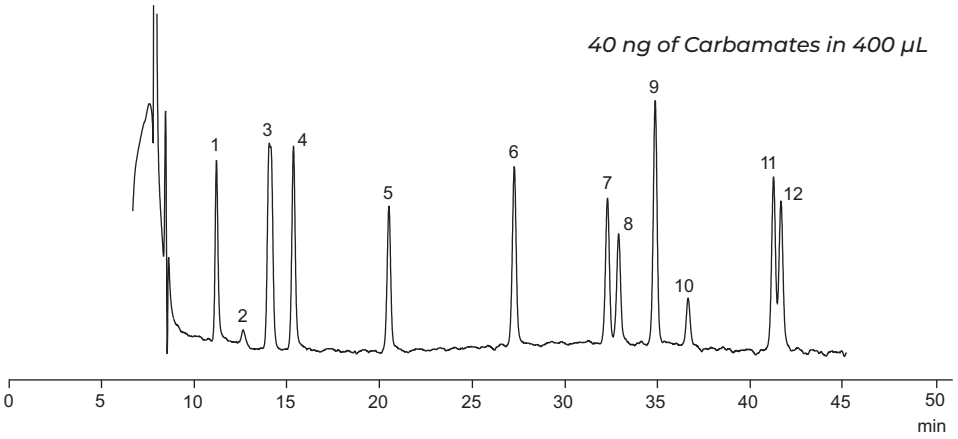
Conditions for Water/Methanol Gradient		
Time (Min)	Water %	MeOH %
0	85	15
2	85	15
42	30	70
46	30	70
46.1	0	100
51	0	100
51.1	85	15
59	85	15

Flow Rate: 0.8 mL/min,
Column Temp.: 50 °C,
Injection Volume: 10 mL for methanolic and up to 400 mL for aqueous samples



Conditions for Water/Acetonitrile Gradient		
Time (Min)	Water %	ACN %
0	90	10
2	90	10
46	49	51
46.1	30	70
49	30	70
49.1	90	10
59	90	10

Flow Rate: 0.8 mL/min,
Column Temp.: 50 °C,
Injection Volume: 10 mL for methanolic and up to 400 mL for aqueous samples

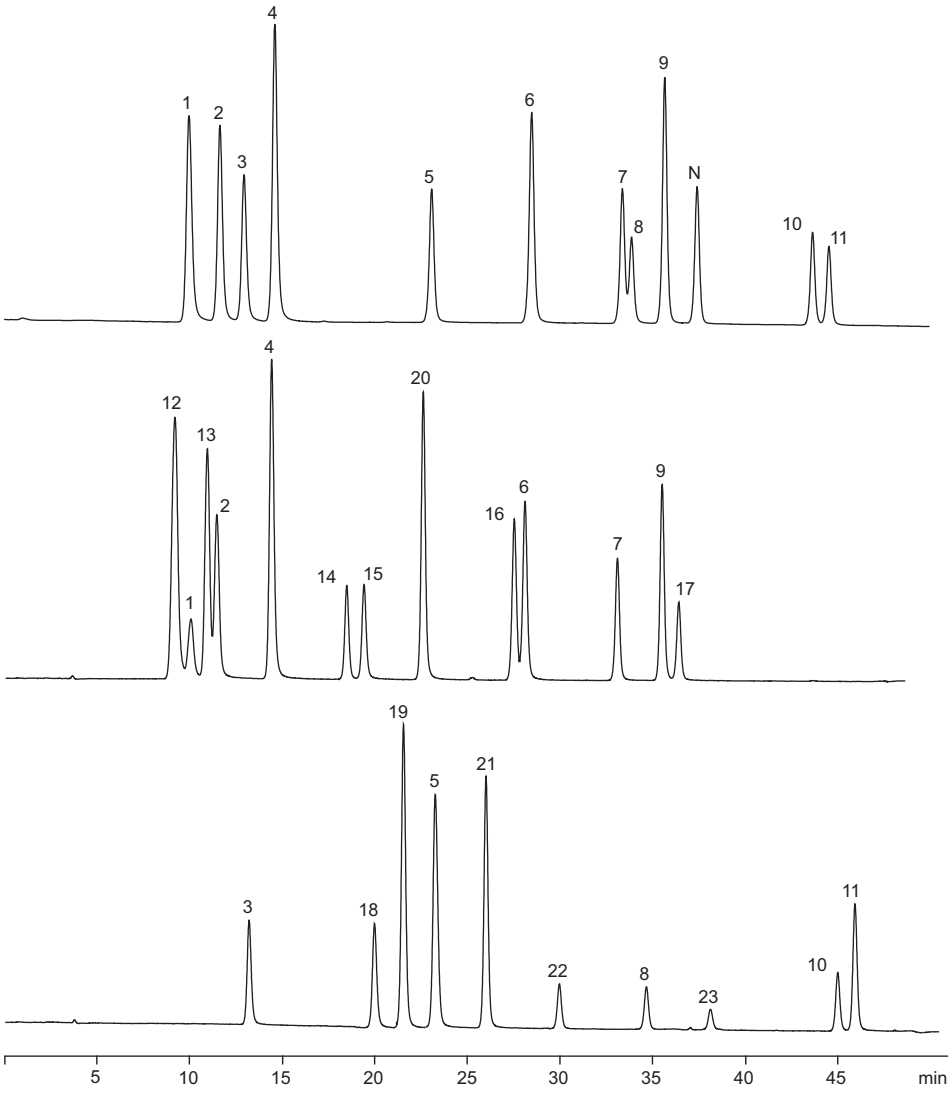


1 Aldicarb sulfoxide
2 Aldicarb sulfone
3 Oxamyl
4 Methomyl
5 3-Hydroxycarbofuran
6 Aldicarb
7 Propoxur
8 Carbofuran
9 Carbaryl
10 1-Naphthol
11 Methiocarb
12 BDMC (internal standard)

Separation of 23 Carbamates Using 0840250 Column (4.0 x 250 mm)

Conditions for Water/Methanol Gradient		
Time (Min)	**Water %**	**MeOH %**
0	85	15
2	85	15
42	30	70
46	30	70
46.1	0	100
51	0	100
51.1	85	15
59	85	15

Flow Rate: 0.8 mL/min,
Column Temp.: 50 °C,
Injection Volume: 10 mL for methanolic and up to 400 mL for aqueous samples



1 Aldicarb sulfoxide
2 Aldicarb sulfone
3 Oxamyl
4 Methomyl
5 3-Hydroxy
6 Aldicarb
7 Propoxur
8 Carbofuran
9 Carbaryl
10 Methiocarb
11 BDMC internal standard
12 Butocarboxim sulfoxide
13 Butocarboxim sulfone
14 Ethiofencarb sulfoxide
15 Ethiofencarb sulfone
16 Butocarboxim
17 Ethiofencarb
18 Thiofanox sulfoxide
19 Thiofanox sulfone
20 Methiocarb sulfoxide
21 Methiocarb sulfone
22 3-Ketocarbofuran
23 Thiofanox
N 1-Naphthol

Carbamate Columns	
Catalog No.	**Description**
0846250	Carbamate Column, high resolution/capacity, C8 , 4.6 x 250 mm, includes Carbamate Test Mixture 1700-0063
0840250	Carbamate Column, expanded resolution, C8, 4.0 x 250 mm, includes Carbamate Test Mixture 1700-0063
1846150	Carbamate Column, rapid analysis, C18, 4.6 x 150 mm, includes Carbamate Test Mixture 1700-0063
18ECG001	Guard Cartridge Holder with 3 guard cartridges
18ECG002	Guard Cartridges, 2/pk.

Chromatograms, Columns & Guards

Glyphosate Herbicide Analysis Column

Pickering Laboratories cation-exchange Glyphosate column is designed and tested for analysis of Glyphosate and its primary metabolite Aminomethyl-phosphonic acid (AMPA). This short, isocratic method provides separation of the peaks of interest. Reproducible performance is guaranteed run-to-run and column-to-column.

Post-column Conditions For Glyphosate Analysis:

Reagent 1: Oxidizing reagent—100 µL of 5 % Sodium Hypochlorite in 950 mL of GA116

Reagent 2: 100 mg of OPA, 2 g Thiofluor™ in 950 mL of GA104

Reactor 1: 36 °C, 0.5 mL

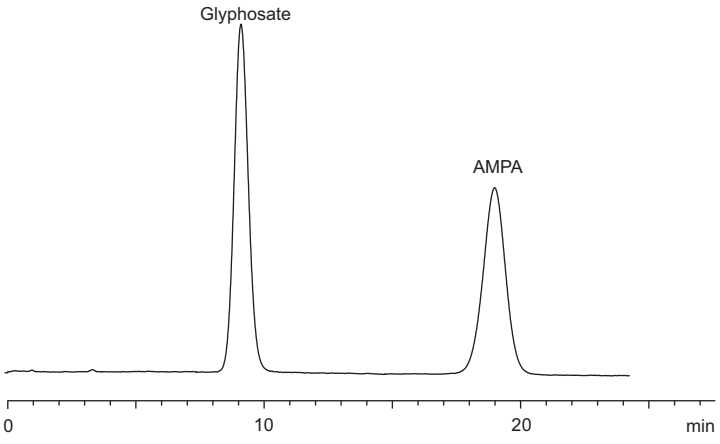
Reactor 2: Ambient, 0.1 mL

Reagents Flow Rate: 0.3 mL/min

Detection:

Fluorometer: λ_{ex} 330 nm, λ_{em} 465 nm

Glyphosate Column 1954150 (4.0 x 150 mm) K+ Cation-Exchange. To be Used With Cation-Exchange GARD™ Column Protection System 1700-3102



Glyphosate Test Mixture, 2.5 µg/mL

Conditions		
TIME (Min)	K200 %	RG019 %
0	100	0
15	100	0
15.1	0	100
17	0	100
17.1	100	0
27	100	0

Flow Rate: 0.4 mL/min,
Column Temp.: 55 °C,
Injection Volume: 10 mL

For more information see Method Abstract MA 206 and MA 207 (pages 93 and 95).

Glyphosate Column	
Catalog No.	Description
1954150	Cation-exchange Column for Glyphosate analysis, 4 x 150 mm, including Glyphosate Test Mixture 1700-0080

GARD™ Column Protection System (For use with any cation-exchange column)	
Catalog No.	Description
1700-3102	Cation-exchange GARD™ Assembly: Includes holder and 2 replaceable GARDs™
1700-3101	Replacement Cation-exchange GARDs™ (2/PK)
1700-3100	GARD™ Holder

Alkion™ Column

The stationary phase in the ALKION™ column is a rigid, non-porous polymeric phase that is surface sulfonated. The two modes of separation are ion-exchange and moderate partitioning. The low capacity of the ion-exchange resin makes it an ideal phase for the separation of strongly basic and positively charged compounds. The reversed-phase character allows for discrimination between closely related species.

The unique properties of this column allow for its use in a wide range of applications.

Alkion™ Column Analysis of Biogenic Amines

Post-column Conditions:

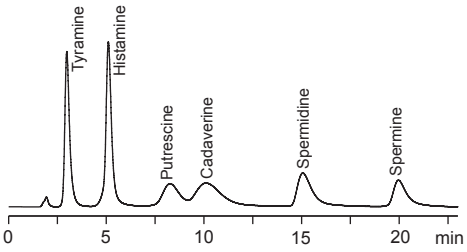
Reagent: 300 mg of OPA, 2 g Thiofluor™, 3 mL of 30 % Brij® 35 in 950 mL of OD104

Reactor: 45 °C, 0.15 mL

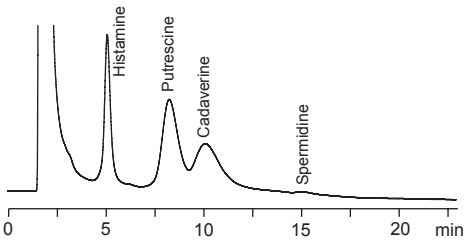
Reagent Flow Rate: 0.3 mL/min

Detection:

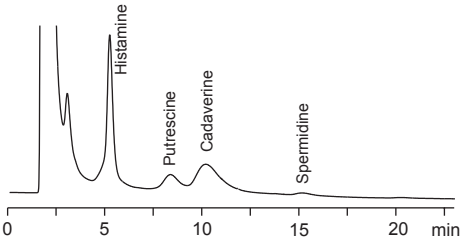
Fluorometer: λ_{ex} 330 nm, λ_{em} 465 nm



Chromatogram of calibration standard, 100 µM



Chromatogram of fish sample



Chromatogram of fish sauce sample

Conditions			
Time (Min)	K600 %	K563 %	K130 %
0	100	0	0
6	100	0	0
15	0	100	0
21	0	100	0
21.1	0	0	100
23	0	0	100
23.1	100	0	0
29	100	0	0

Flow Rate: 0.8 mL/min,
Column Temp.: 45 °C,
Injection Volume: 10 mL

Chromatograms, Columns & Guards

Alkion™ Column Analysis of Aminoglycoside Antibiotics in Feeds

Post-column Conditions:

Reagent: 300 mg of OPA, 2 g Thiofluor™, 3 mL of 30 % Brij® 35 in 950 mL of OD104

Reactor: 45 °C, 0.15 mL

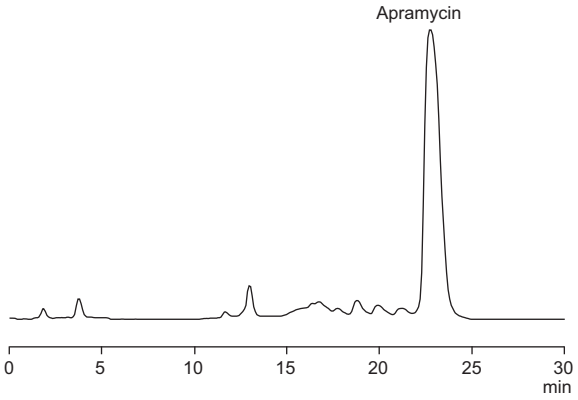
Reagent Flow Rate: 0.3 mL/min

Detection:

Fluorometer: λ_{ex} 330 nm, λ_{em} 465 nm

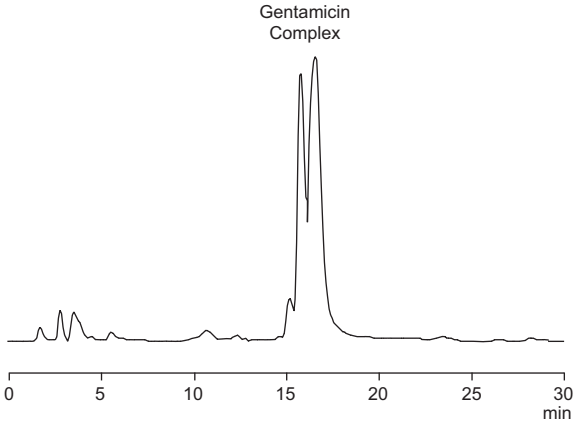
Conditions for Apramycin Analysis			
Time (Min)	**1700-1101 %**	**1700-1102 %**	**1700-1103 %**
0	67	33	0
5	67	33	0
15	14.7	7.3	78
20	14.7	7.3	78
20.1	0	22	78
21	0	22	78
21.1	67	33	0
28	67	33	0

Flow Rate: 0.8 mL/min,
Column Temp.: 40 °C,
Injection Volume: 10 mL



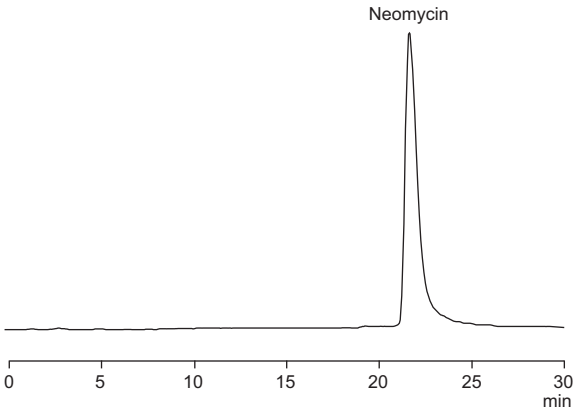
Conditions for Gentamicin Analysis			
Time (Min)	**1700-1101 %**	**1700-1102 %**	**1700-1103 %**
0	43	31	26
20	9	13	78
30	9	13	78
30.1	0	22	78
31	0	22	78
31.1	43	31	26
38	43	31	26

Flow Rate: 0.8 mL/min,
Column Temp.: 40 °C,
Injection Volume: 10 mL

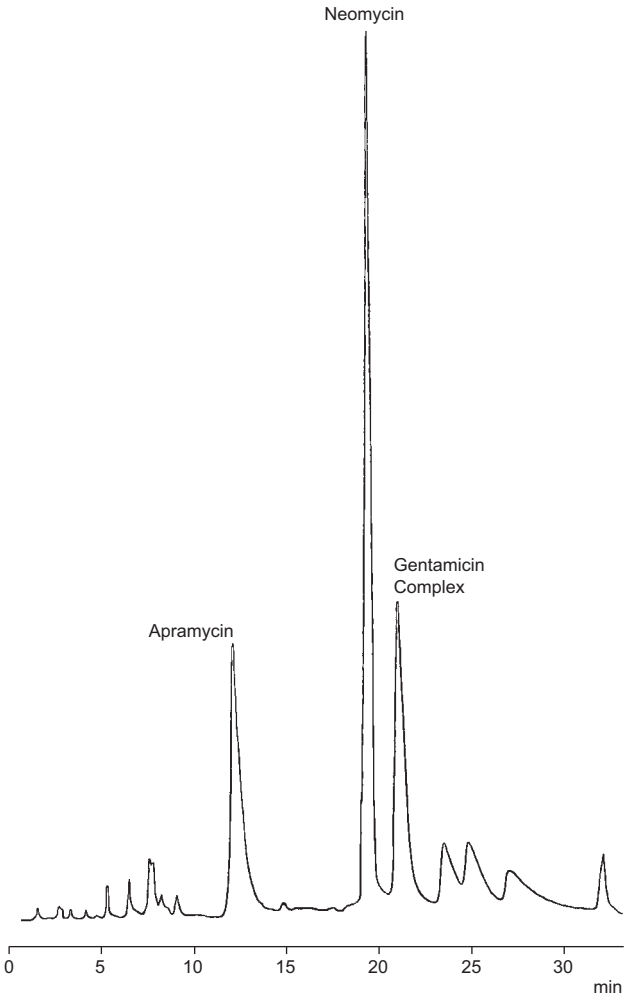


Conditions for Neomycin Analysis			
Time (Min)	**1700-1101 %**	**1700-1102 %**	**1700-1103 %**
0	60	40	0
15	13.2	8.8	78
25	11	11	78
25.1	0	22	78
26	0	22	78
26.1	60	40	0
32	60	40	0

Flow Rate: 0.8 mL/min,
Column Temp.: 40 °C,
Injection Volume: 10 mL



Chromatograms, Columns & Guards



Conditions for Separation of Apramycin Gentamicin and Neomycin			
Time (Min)	**1700-1101 %**	**1700-1102 %**	**1700-1103 %**
0	60	40	0
15	13.2	8.8	78
15.1	12	10	78
30	12	10	78
30.1	0	22	78
31	0	22	78
31.1	60	40	0
37	60	40	0

Flow Rate: 0.8 mL/min,
Column Temp.: 40 °C,
Injection Volume: 10 mL

Chromatograms, Columns & Guards

Alkion™ Column Analysis of Streptomycin

Post-column Conditions:

Reagent 1: 0.75 N Sodium Hydroxide

Reactor 1: ambient, 0.1 mL

Reagent 2: 0.6 % Ninhydrin

Reactor 2: 60 °C, 0.5 mL

Reagents Flow Rate: 0.3 mL/min

Detection:

Fluorometer: λ_{ex} 395 nm, λ_{em} 500 nm

or

Reagent 1: Oxidizing Reagent: 100 µL of 5 % Sodium Hypochlorite in GA116

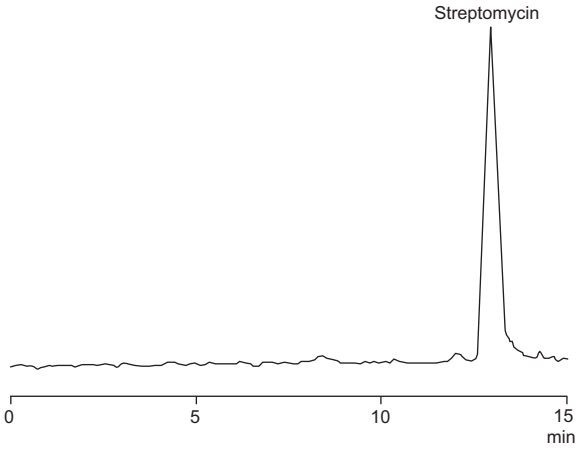
Reactor 1: 50 °C, 0.5 mL

Reagent 2: 300 mg of OPA, 2 g Thiofluor™, 3 mL of 30 % Brij® 35 solution in 950 mL of OD104

Reactor 2: Ambient, 0.1 mL

Detection:

Fluorometer: λ_{ex} 330 nm, λ_{em} 465 nm



Conditions			
Time (Min)	**1700-1101 %**	**1700-1102 %**	**1700-1103 %**
0	60	40	0
10	60	40	0
10.1	48	48	4
15	48	48	4
15.1	60	40	0
21	60	40	0

Flow Rate: 0.8 mL/min,
Column Temp.: 40 °C,
Injection Volume: Up to several mL

Alkion Column	
Catalog No.	**Description**
9410917	ALKION™ Cation-exchange Column, K^+ form, 4.0 x 150 mm
9493020	ALKION™ Guard Column, K^+ form, 3.0 x 20 mm

Mycotox™ Reversed-phase Column for Mycotoxins Analysis

Aflatoxins Analysis

Aflatoxins are naturally occurring toxins belonging to the class Mycotoxins. They are produced by fungi and occur in peanuts, peanut meal, cotton-seed meal, wheat, milk and many other foods and feeds.

The most important feature of the post-column method described below is that all six Aflatoxins are detectable at the same fluorescence emission wavelength in a single isocratic HPLC analysis.

LC Conditions:

Flow Rate: 1.0 mL/min, column temperature 42 °C, injection volume 10 µL

Mobile Phase: Methanol/acetonitrile/water: (22:22:56), isocratic

Injection: 10 µL in Methanol
5 ng B_1 & G_1
1.5 ng B_2 & G_2
1.25 ng M_1 & M_2

Post-column Conditions:

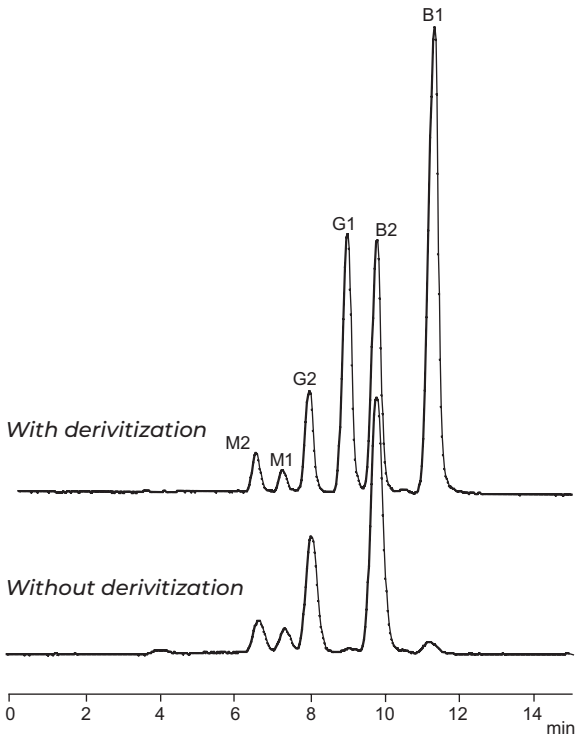
Reagent: I_2 100 mg/L in water

Reactor: 90 °C, 1.4 mL

Reagent Flow Rate: 0.4 mL/min

Detection:

Fluorometer: λ_{ex} 365 nm, λ_{em} 430 nm



For more information see Method Abstract MA 215, MA 208, MA 203.1 and MA 218

Mycotox Column	
Catalog No.	**Description**
1612124	MYCOTOX™ Reversed-phase Column, 4.6 x 250 mm
18ECG001	Guard Cartridge Holder with 3 cartridges
18ECG002	Guard Cartridges, 2/pk.

Chromatograms, Columns & Guards

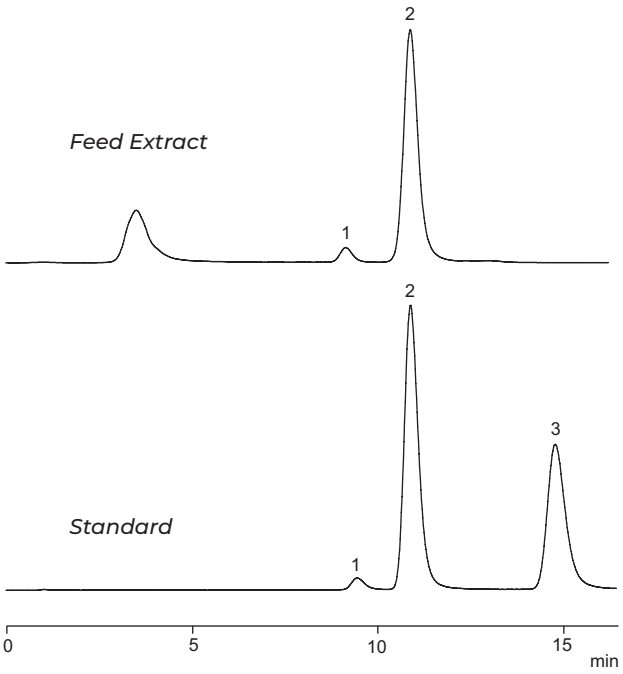
Polyether Antibiotics Analysis Column

Polyether antibiotics, such as Monensin, Narasin and Salinomycin, found in raw material, premix, liquid supplements and final feeds, are best quantified using HPLC with post-column derivatization. Because of the selectivity of the post-column reaction, almost no sample clean-up is needed.

LC Conditions:

Flow Rate: 0.7 mL/min, column temperature 40 °C, injection volume 10 µL

Mobile Phase: 90:10 of Methanol / 5 % Acetic Acid in water, isocratic



1 Monensin B 2 Monensin A 3 Narasin A

Post-column Conditions

(non-metallic post-column derivatization system is required):

Reagent 1: Concentrated Sulfuric acid / Methanol (4:96 v/v)

Reactor 1: Ambient, 0.1 mL

Reagent 2: 60 g of Vanillin (or *p*-dimethylaminobenzaldehyde) in 950 mL of Methanol

Reactor 2: 90 °C, 1.4 mL

Reagents Flow Rate: 0.3 mL/min

NOTE: Using 2-reagent system for this application greatly extends life of reagents.

One-reagent method and post-column derivatization system are also available.

Detection:

UV-Vis Detector: Vanillin λ=520 nm, DMAB λ=450 nm

Polyether Antibiotics Column	
Catalog No.	**Description**
2381750	Polyether Reversed-phase Column, 4.6 x 250 mm
18ECG001	Guard Cartridge Holder with 3 cartridges
18ECG002	Guard Cartridges, 2/pk.

Trione® Ninhydrin Reagent

Chromatographic Grade™
A Prepared Reagent for Post-column Derivatization of Primary and Secondary Amines

TRIONE® Ninhydrin reagent is specially formulated for Amino Acid Analysis. It contains Ninhydrin, Hydrindantin (reduced Ninhydrin), a Lithium Acetate buffer, and Sulfolane, a water-miscible organic solvent. The solvent is necessary to maintain the solubility of both the Hydrindantin and the primary amine product, Ruhemann's Purple. The buffer is required because the reaction is pH dependent. The active ingredients - Ninhydrin and Hydrindantin are required for proper development of secondary and primary amines, respectively.

TRIONE® is so stable that is does not require refrigeration, either in shipment, storage, or in the reservoir. Quantitation is consistent from the first to the last mL, so there is no waste. The high signal-to-noise ratio of TRIONE®, when compared to DMSO-containing reagents, permits detection sensitivity to be increased with minimum increase in background noise - a feature particularly appreciated at sample concentrations of <50 picomoles.

Two preparations are available to suit your usage and storage requirements:

T100 and T100C

- Pour into your reservoir and use; the ultimate in convenience with a minimum of handling.
- 4-month* shelf life

T200

- Combine the two provided solutions, swirl, and use.
- 12-month* shelf life before mixing; one month in the reservoir after preparation.

Trione® Ninhydrin Reagent Catalog Information		
Catalog No.	**Description**	**Quantity**
T100	TRIONE® Ninhydrin Reagent (4-month* shelf life)	Each (950 mL/bottle)
T100C	TRIONE® Ninhydrin Reagent (4-month* shelf life)	Case of 4 (950 mL/bottle)
T200	TRIONE® Two-part Ninhydrin Reagent (12-month* shelf life before mixing)	To prepare case of 4 (900 mL/bottle)

* From date of manufacture

Reagents, Diluents & Sample Preparation Solutions

Thiofluor™

N,N-Dimethyl-2-Mercaptoethylamine Hydrochloride – Chromatographic Grade™ for Post-column Derivatization of Primary Amines

Primary amines form highly fluorescent adducts when reacted with *o*-Phthalaldehyde (OPA) and a mercaptan under basic conditions.

The products of this reaction, 1-alkyl-2-thioalkyl-substituted isoindoles, exhibit optimal excitation at 330 nm and maximal emission at 465 nm.

Pickering's Thiofluor™, a solid, nearly odorless nucleophile, is a superior substitute for 2-Mercaptoethanol in the preparation of OPA reagents. It forms a more stable reagent and a longer-lasting fluorophore with OPA than does 2-Mercaptoethanol, yet it has the same fluorescence properties.

Unlike the volatile 2-Mercaptoethanol, Thiofluor™ will not migrate through the gas manifold and regulator of the OPA reagent pressurization system.

Two grams of Thiofluor™ is equivalent to 1 mL of 2-Mercaptoethanol.

Thiofluor™	
Catalog No.	**Description**
3700-2000	Thiofluor™, each (10 g/bottle)

o-Phthalaldehyde (OPA)

Chromatographic Grade™ for Post-column Derivatization of Primary Amines

Primary amines form highly fluorescent adducts when reacted with *o*-Phthalaldehyde (OPA) and a mercaptan under basic conditions.

The products of this reaction, 1-alkyl-2-thioalkyl-substituted isoindoles, exhibit optimal excitation at 330 nm and maximal emission at 465 nm.

Pickering's OPA is specially prepared to meet the demanding requirements of high-sensitivity pre- and post-column HPLC derivatization methods. Our repurification process actually begins with commercially available 99 % material.

The entire process is controlled to eliminate trace interfering contamination. Lot quality is verified by post-column HPLC using a high-sensitivity fluorescence detector.

o-Phthalaldehyde (OPA)	
Catalog No.	**Description**
O120	o-Phthalaldehyde (OPA), each (5 g/bottle)

Vanillin

4-Hydroxy-3-Methoxybenzaldehyde Chromatographic Grade™ for Post-column Analysis of Polyether Antibiotics

Reagent formulation with Vanillin, Methanol and Sulfuric Acid allows specific post-column analysis of polyether antibiotics, such as Monensin, Narasin and Salinomycin. This reagent can also be used for the post-column derivatization of Sulfa Drugs. Polyether antibiotics are monitored at 520 nm and Sulfa Drugs at 400 nm.

Chromatographic Grade™ Vanillin meets the exacting purity requirements for a post-column chemical, ensuring that detection at 520 nm will be free of reagent artifacts. Because it is sensitive to oxygen, Pickering Laboratories Vanillin is sealed under Argon gas.

Vanillin	
Catalog No.	**Description**
3700-2200	Vanillin, each (30 g/bottle)
1700-2200	Vanillin, each (300 g/bottle)

Naphthalene-2,3-dicarboxaldehyde

Chromatographic Grade™ for Derivatization of Primary Amino Groups

Naphthalene-2,3-dicarboxaldehyde reacts with primary amines in presence of a nucleophile (e.g., mercaptan) and forms highly fluorescent 1-Alkylbenz-2-thioalkyl[f]isoindole derivatives.

This reagent is especially effective for post-column or precolumn derivatization of proteins, peptides and other large amines since the derivative is stable and doesn't internally quench.

Naphthalene-2,3-dicarboxaldehyde can also be used as a reagent for chemiluminescence analysis.

Naphthalene-2, 3-Dicarboxaldehyde	
Catalog No.	**Description**
3700-0100	Naphthalene-2,3-dicarboxaldehyde, each (500 mg/bottle)

p-Dimethylaminobenzaldehyde (DMAB)

Chromatographic Grade™ for Post-column Analysis of Sulfa Drugs in Feed and Animal Tissues

p-Dimethylaminobenzaldehyde (DMAB; Ehrlich's Reagent) reacts rapidly with many primary amines to form a complex with maximum absorbance at 450 nm.

Reversed-phase LC followed by post-column derivatization is used to determine the levels of Sulfamethazine, Sulfathiazole and related compounds in feeds, premixes and animal tissues. Although these compounds have a UV chromophore, so do most of the other constituents in the complex sample matrix. Forming a colored derivative post-column allows shifting of the detection wavelength into the visible range thus greatly enhancing selectivity.

p-Dimethyl Amino Benzaldehyde (DMAB)	
Catalog No.	**Description**
3700-0400	*p*-Dimethylaminobenzaldehyde (DMAB), each (30 g/bottle)
1700-0400	*p*-Dimethylaminobenzaldehyde (DMAB), each (300 g/bottle)

o-Phthalaldehyde (OPA) Diluent

Chromatographic Grade™ for Preparation of *o*-Phthalaldehyde Reagents

The derivatization of primary amines with *o*-Phthalaldehyde and a mercaptan requires basic conditions. To ensure the optimum pH of the reaction, it is important to use the correct diluent.

Three application specific diluents are available : CB910 and GA104 for Carbamate and Glyphosate analyses respectively, and OD104 for analysis of amino acids and other amines.

These borate buffers are produced from starting materials which are free of heavy metals and amines. As with most other products manufactured by Pickering Laboratories, the quality of the OPA Diluents is verified by actual post-column HPLC analysis.

o-Phthalaldehyde (OPA) Diluent	
Catalog No.	**Description**
CB910	*o*-Phthalaldehyde (OPA) Diluent for Carbamate Analysis, case of 4 (950 mL /bottle)
GA104	*o*-Phthalaldehyde (OPA) Diluent for Glyphosate Analysis, case of 4 (950 mL /bottle)
OD104	*o*-Phthalaldehyde (OPA) Diluent for Amino Acids and Amines analysis, case of 4 (950/bottle)

Reagents, Diluents & Sample Preparation Solutions

Hydrolysis Reagent CB130

Chromatographic Grade™

This 0.05 M NaOH/C47™ reagent is applied in the first stage of post-column Carbamate derivatization. At 100 °C the separated carbamates are converted from urethanes to methylamines. The methylamines can then react with OPA and Thiofluor™ to form the characteristically fluorescent isoindole.

Hydrolysis Reagent contains C47™ which prevents the precipitation of insoluble minerals (e.g. Ca^{2+}, Mg^{2+}) from samples of hard drinking water and ground water. The C47™ additive complexes these minerals and keeps them in solution.

Hydrolysis Reagent CB130.2

Chromatographic Grade™

The new Hydrolysis Reagent CB130.2 is formulated according to USEPA Method 531.2 and contains 0.075 M Sodium Hydroxide. This reagent is applied during the first stage of post-column derivatization for the analysis of Carbamate pesticides.

Hydrolysis Reagent CB130.2 contains C47™, which prevents the precipitation of insoluble minerals from samples of hard drinking and ground water, and protects your instruments from damage.

Hydrolysis Reagent	
Catalog No.	**Description**
CB130	Hydrolysis Reagent for Carbamate analysis 0.05 M, case of 4 (950 mL /bottle)
CB130.2	Hydrolysis Reagent for Carbamate analysis 0.075 M, case of 4 (950 mL /bottle)

Hypochlorite Diluent GA116

Chromatographic Grade™ for the Preparation of the Oxidizing Reagent for Post-column Glyphosate Herbicide Analysis

This diluent is used to prepare the oxidizing reagent required to convert Glyphosate to a primary amine prior to reacting it with OPA. The reagent is prepared by adding 100 µL of 5 % solution of Sodium hyphochlorite to one 950 mL bottle of Diluent. The pH 11.6 diluent is formulated to ensure pH stability of the mixed stream of column effluent and oxidizing reagent. This diluent could also be used in fluorescence detection of other secondary amines.

Hypochlorite Diluent	
Catalog No.	**Description**
GA116	Hypochlorite Diluent for Glyphosate analysis, case of 4 (950 mL/bottle)

Li220 & Na220

Chromatographic Grade™ Samples and Standards Diluents for Amino Acid Analysis

Use of these diluents is essential to ensuring reproducibility from injection to injection. They establish a uniform pH and ion concentration at the outset, regardless of the source and pre-treatment of the sample. The sample is maintained buffered and at optimum pH for sample storage and analysis.

Use Li220 for prepared physiological samples and to dilute amino acid calibration standards for use with Lithium columns and buffers. Use Na220 for hydrolysate samples and to dilute amino acid calibration standards for use with Sodium columns and buffers.

Li220 & Na220	
Catalog No.	**Description**
Li220	Lithium Diluent, pH 2.36, case of 4 (250 mL/bottle)
Na220	Sodium Diluent, pH 2.20, case of 4 (250 mL/bottle)

SERAPREP™ & URIPREP™

Chromatographic Grade™ Reagents for the Preparation of Native Samples for Amino Acid Analysis

Preparation of samples such as serum, urine, other physiological fluids, plant extracts, foods and beverages requires control of pH and normality, as well as removal of soluble protein.

The samples must be held to a narrow pH range between 2.1 and 2.5, and at the proper Lithium ion concentration to ensure reproducibility in the early part of the chromatogram.

SERAPREP™ and URIPREP™ replace commonly used protein precipitation reagents such as Acetonitrile, Perchloric acid, and Picric acid, and eliminate the need for dialysis, ultrafiltration, and the repeated centrifugation steps, followed by pH adjustment.

SERAPREP™ is used for preparing serum and other samples with high buffering capacity, e.g. sardine oil. URIPREP™ is used for urine and other samples with low buffering capacity, such as fruit juices, beer and wines. The efficiency of protein precipitation and need for post-centrifugation pH adjustment of the sample determine which reagent is best for your particular sample.

SERAPREP™ & URIPREP™	
Catalog No.	**Description**
SP100	SERAPREP™, each (250 mL/bottle)
UP100	URIPREP™, each (250 mL/bottle)

Reagents, Diluents & Sample Preparation Solutions

Chlorac™ Buffer

Chromatographic Grade™ for Preservation of Aqueous Carbamate Samples

Trace analysis of Carbamate insecticide residues in drinking water is a mandated requirement in the United States. Because several of the common Carbamates—Carbaryl, Oxamyl, Hydroxycarbofuran - are labile in water due to oxidation or hydrolysis, the samples and standards must be preserved in order to obtain valid results.

ChlorAC™ Buffer from Pickering Laboratories is a highly purified Chromatographic Grade™ preservative. It is prepared from Monochloracetic acid and Potassium acetate to EPA specifications. ChlorAC™ is guaranteed to be free of co-eluting interferences for the analytes in EPA 531.1.

ChlorAC™ Buffer	
Catalog No.	**Description**
1700-0132	ChlorAC Buffer, each (250 mL/bottle)
1700-0025	ChlorAC Buffer, case of 4 (25 mL/bottle)

RESTORE™

Chromatographic Grade™ for Removal of Metal Ion Contamination and Restoration of Proper Ion Balance in Glyphosate Analytical Columns and Guards

Glyphosate herbicide analysis by post-column derivitization and HPLC according to US EPA Method 547 employs a cation-exchange column. Many polyvalent metal ions which may be present in the sample, especially Iron, will accumulate in the guard or analytical column. As little as 100 nmole of Ferric Iron, for example, will cause serious degradation of column performance; larger amounts can actually cause the Glyphosate peak to vanish completely.

Glyphosate RESTORE™ rapidly removes Iron and all other polyvalent metals from the column and guard. In addition, it preserves the balance of K^+/H^+ in the resin, thus avoiding a lengthy re-equilibration.

RESTORE™	
Catalog No.	**Description**
1700-0140	RESTORE™, each (250 mL/bottle)

Chromatographic Grade™ Eluants

Pickering Laboratories eluants are manufactured under strictly controlled conditions to guarantee purity, stability and consistency for a reproducible high quality chromatogram. This quality standard guarantees the resulting chromatogram will be free of any noise and interference.

Lithium and Sodium eluants are not sensitive to oxidation and do not need refrigeration, either in storage or use. Degassing or filtration is not required. However, they should be protected from air to prevent contamination. Ambient air actually contains amines and amino acids that will dissolve in the low-pH eluants and will appear in the chromatograms.

All buffers are packaged in cases of four 950 mL polyethylene bottles. The regenerants are packaged in single 950 mL bottles because of the small volumes used during each analysis. Sample diluents are packaged in cases of four 250 mL borosilicate glass bottles.

Custom Eluants

We develop and manufacture custom eluants for customers who require our “Guaranteed Chemistry” commitment of purity and certified use. Let us make some for you! Call for details.

Catalog No.	Description
Amino Acid Analysis, Sodium-Based Solutions	
Na270	Sodium Eluant, pH 2.80, case of 4 (950 mL/bottle)
Na315	Sodium Eluant, pH 3.15, case of 4 (950 mL/bottle)
Na328	Sodium Eluant, pH 3.28, case of 4 (950 mL/bottle)
Na425	Sodium Eluant, pH 4.25, case of 4 (950 mL/bottle)
Na640	Sodium Eluant, pH 6.40, case of 4 (950 mL/bottle)
Na740	Sodium Eluant, pH 7.40, case of 4 (950 mL/bottle)
1700-0112	Sodium Eluant, pH 3.15, with 5 % Sulfolane, case of 4 (950 mL/bottle)
1700-0114	Sodium Eluant, pH 3.33, with 2.5 % Sulfolane, case of 4 (950 mL/bottle)
RG011	Sodium Column Regenerant, each (950 mL/bottle)
Amino Acid Analysis, Lithium-Based Solutions	
Li275	Lithium Eluant, pH 2.75, case of 4 (950 mL/bottle)
Li280	Lithium Eluant, pH 2.80, case of 4 (950 mL/bottle)
Li292	Lithium Eluant, pH 2.92, case of 4 (950 mL/bottle)
1700-1125	Lithium Eluant, pH 2.80, case of 4 (950 mL/bottle)
Li365	Lithium Eluant, pH 3.65, case of 4 (950 mL/bottle)
Li375	Lithium Eluant, pH 3.75, case of 4 (950 mL/bottle)
Li750	Lithium Eluant, pH 7.50, case of 4 (950 mL/bottle)
RG003	Lithium Column Regenerant, each (950 mL/bottle)
Glyphosate Herbicide Analysis	
K200	Glyphosate Potassium Phosphate Eluant, case of 4 (950 mL/bottle)
RG019	Glyphosate Column Regenerant, each (950 mL/bottle)
Potassium-Based Solutions for ALKION™ Column for Aminoglycoside Antibiotics, Paraquat/Diquat in Water Analysis & Streptomycin	
1700-1101	Potassium Phosphate Eluant, KO1, case of 4 (950 mL/bottle)
1700-1102	Potassium Hydroxide Eluant, KO2, case of 4 (950 mL/bottle)
1700-1103	Potassium Chloride Eluant, KO3, case of 4 (950 mL/bottle)
Biogenic Amines/Polyamines Analysis	
K130	Potassium Column Regenerant, each (950 mL/bottle)
K563	Potassium Phosphate Eluant, pH 5.63, case of 4 (950 mL/bottle)
K600	Potassium Phosphate Eluant, pH 6.00, case of 4 (950 mL/bottle)
Multi-Residue Mycotoxin Analysis	
1700-1108	Sodium Phosphate Eluant, pH 3.30, case of 4 (950 mL/bottle)

Test Mixtures & Standards

Calibration Standards

- Quantitative and guaranteed
- Each lot tested chromatographically
- Chromatographically-pure starting components

Pickering's Amino Acid Standards have a reputation worldwide for quality and reliability in all post-column systems and methods. Amino Acid Standard mixtures are available for a variety of applications. The standards are in 1 mL vials (5 per pack) in an appropriate citrate buffer or 0.1 N HCl.

Although they are stored frozen at the factory, Pickering's calibration standards remain stable when shipped at ambient temperatures. Upon receipt, however, it is important to place them into a freezer immediately and store frozen until ready for use.

Amino Acid Calibration Standards	
Catalog No.	**Description**
011006P	Native Sample Standard with Norleucine in Lithium Citrate Buffer, 0.25 µmole/mL, pack (5x1 mL)
012006P	Native Sample Standard without Norleucine in Lithium Citrate Buffer, 0.25 µmole/mL, pack (5x1 mL)
012506C	Collagen Hydrolysate Standard in Sodium Citrate Buffer, 0.25 µmole/mL, Proline and Hydroxyproline 1.25 µmole/mL, pack (5x1 mL)
012506H	Protein Hydrolysate Standard, in Sodium Citrate Buffer, 0.25 µmole/mL, pack (5x1 mL)
1700-0155	Oxidized Feed Hydrolysate Standard in Sodium Citrate Buffer, 0.25 µmole/mL, pack (5x1 mL)
1700-0165	Sodium Amino Acid Standard with Norleucine, 0.25 µmole/mL, pack (5x1 mL)
1700-0170	Native Sample Standard without Norleucine & Alpha-Amino-Beta-Guanidinopropionic Acid in Lithium Citrate Buffer, 0.25 µmole/mL, pack (5x1 mL)
1700-0175	Native Sample Standard, Basics, in 0.1 N HCl, 2.5 µmole/mL, pack (5x1 mL)
1700-0180	Native Sample Standard, Acidics and Neutrals, in 0.1 N HCl, 2.5 µmole/mL, Cystine 1.25 µmole/mL, pack (5x1 mL)

Carbamate Calibration Standards	
1700-0185	Carbamate Internal Standard pack (5x1 mL)
1700-0190	Carbamate Calibration Standard pack (5x1 mL)

Test Mixtures

- Qualitative mixtures
- For troubleshooting and establishing chromatographic analyte profile only

Test Mixtures	
Catalog No.	**Description**
1700-0070	Amino Acid Test Mixture in 0.01 N HCl, 0.25 µmole/mL, each (5.0 mL/bottle), L-Cysteic Acid, L-Threonine, L-Serine
1700-0063	Carbamate Test Mixture in Methanol, 2.5 µg/mL, each (5.0 mL /bottle), Aldicarb, Aldicarb Sulfone, Aldicarb Sulfoxide, DMC (4-Bromo-3,5-dimethylphenyl-N-methylcarbamate), Carbaryl, Carbofuran, 3-Hydroxycarbofuran, Methomyl, Methiocarb, 1-Naphthol, Oxamyl, and Propoxur
1700-0080	Glyphosate Test Mixture in Water, 2.5 µg/mL, each (5.0 mL /bottle), Glyphosate, AMPA (Aminoethyl-phosphonic acid)

Test Mixtures & Standards

Calibration Standards for Amino Acid Analysis									
Constituents	**1700-0180***	**1700-0175***	**1700-0170**	**011006P**	**012006P**	**1700-0165**	**012506C**	**012506H**	**1700-0155**
Beta-Alanine	•		•	•	•				
Alanine	•		•	•	•	•	•	•	•
D,L-a-Amino-adipic acid	•		•	•	•				
Gamma-Amino butyric acid		•	•	•	•				
Alpha-Amino-n-butyric acid	•		•	•	•				
D,L,b-Amino-i-butyric acid	•		•	•	•				
Alpha-Amino-Beta-guanidinopropionic acid				•	•				
Ammonia		•	•	•	•	•	•	•	•
Anserine		•	•	•	•				
Arginine		•	•	•	•	•	•	•	•
Asparagine	•		•	•	•				
Aspartic acid	•		•	•	•	•	•	•	•
Carnosine		•	•	•	•				
Citrulline	•		•	•	•				
Creatinine		•	•	•	•				
Cystathionine	•		•	•	•				
Cystine	• (1.25)		•	•	•	•	•	•	
Cysteic acid						•			•
Ethanolamine		•	•	•	•				
Glutamic acid	•		•	•	•	•	•	•	•
Glycine	•		•	•	•	•	•	•	•
Histidine		•	•	•	•	•	•	•	•
D,L-Homocystine		•	•	•	•				
L,L & allo-Hydroxylysine		•	•	•	•		•		
4-trans-L-Hydroxyproline	•		•	•	•		• (1.25)		
Isoleucine	•		•	•	•	•	•	•	•
Leucine	•		•	•	•	•	•	•	•
Lysine		•	•	•	•	•	•	•	•
Methionine	•		•	•	•	•	•	•	
Methionine-D,L-sulfoxide							•		
Methionine-D,L-sulfone						•			•
1-Methyl-histidine		•	•	•	•				
3-Methyl-histidine		•	•	•	•				
Norleucine				•		•			
Ornithine		•	•	•	•				
Phenylalanine	•		•	•	•	•	•	•	•
Phosphoethanolamine	•		•	•	•				
Phosphoserine	•		•	•	•				
Proline	•		•	•	•	•	• (1.25)	•	•
Sarcosine	•		•	•	•				
Serine	•		•	•	•	•	•	•	•
Taurine	•		•	•	•	•			
Threonine	•		•	•	•	•	•	•	•
Tryptophan		•	•	•	•	•		•	
Tyrosine	•		•	•	•	•	•	•	
Urea	•		•	•	•				
Valine	•		•	•	•	•	•	•	•

NOTE: Concentration of all the constituents in the Amino Acid standards is 0.25 µmole/mL unless otherwise specified.

*Concentration of all the constituents is 2.5 µmole/mL unless otherwise specified

Clean-Up Columns

AflaCLEAN™, OtaCLEAN™, Afla-OtaCLEAN™ & DONex™ Clean-Up Columns

Immunoaffinity & SPE Sample Clean-Up Columns

Aflatoxins and Ochratoxin A are produced by fungi, e.g. Aspergillus and Penicillium species. Therefore both toxin types are found together in many foods and animal feeds, e.g. cereals. Deoxynivalenol, also known as Vomitoxin, is a metabolite of various molds of the genus Fusarium (F. colmorum, F. graminearum) and can often be found together with other mycotoxins.

Of significant assistance is the clean-up of extracts by a combined immunoaffinity column (the Afla-OtaCLEAN column) for both Aflatoxins and Ochratoxin A in one step. The subsequent analysis may then be performed by HPLC with post-column derivatization or other techniques.

Simultaneous Clean-Up of Aflatoxins and Ochratoxin A

The combination sample clean-up column Afla-OtaCLEAN™ from LCTech is very tolerant towards many matrices and allows for a comprehensive clean-up of the aflatoxins B1, B2, G1 and G2 as well as Ochratoxin A. The high maximum capacity of 150 ng for Aflatoxin B1 and 200 ng for Ochratoxin A provides a wide measurement range. With a shelf-life of 1 year (from date of manufacture) at room temperature, the storage and use of the columns is very convenient.

Example Recoveries of Aflatoxin and Ochratoxins					
Matrix	B1	B2	G1	G2	OTA
Maize (Afla 10 ppb, OTA 14.3 ppb)	107 %	91 %	103 %	75 %	97 %
Rice (Afla 10 ppb, OTA 14.3 ppb)	107 %	93 %	98 %	85 %	101 %
Malt (Afla 10 ppb, OTA 14.3 ppb)	98 %	99 %	97 %	70 %	96 %
Raisins (Afla 10 ppb, OTA 14.3 ppb)	99 %	106 %	101 %	69 %	97 %

Aflatoxins & Ochratoxin a Sample Clean-Up Column	
11022	Afla-OtaCLEAN™, Aflatoxins B1, B2, G1, G2 & Ochratoxin A, Pkg 25, 18 month* shelf life at room temp. (Minimum order of 20 packs)
11771	Afla-OtaCLEAN™, Aflatoxins B1, B2, G1, G2 & Ochratoxin A , Pkg 500, 18 month* shelf life at room temp (Minimum order of 4 packs)

Sample Clean-Up Column for Aflatoxin Analysis

AflaCLEAN™ from LCTech was developed for the sample clean-up of foods, grains, feeds, etc. for aflatoxin analysis using HPLC post-column derivatization or other techniques. The AflaCLEAN™ column is selective for B1, B2, G1 and G2. The maximum loading capacity is 150 ng of Aflatoxin. The shelf-life is 2 years (from date of manufacture) at room temperature. Our cost-effective AflaCLEAN Select columns have a shelf-life of 9 months at 4 °C.

Example Recoveries of Aflatoxin				
Matrix	B1	B2	G1	G2
Peanut Butter	95 %	98 %	93 %	84 %
Peanuts	104 %	94 %	96 %	85 %
Dried Distillers Grain	109 %	97 %	90 %	77 %
Maize	101 %	98 %	103 %	80 %

Aflatoxin Sample Clean-Up Column	
Catalog No.	Description
10514	AflaCLEAN™, Aflatoxins B1, B2, G1, G2, Pkg 25, 24 month* shelf life at room temp.
12058	AflaCLEAN™ SELECT, Aflatoxins B1, B2, G1, G2, Pkg 25, 9 month* shelf life at 4 °C (Minimum order of 20 packs)
12062	AflaCLEAN™ SELECT, Aflatoxins B1, B2, G1, G2, Pkg 25, 9 month* shelf life at 4 °C (Minimum order of 20 packs)

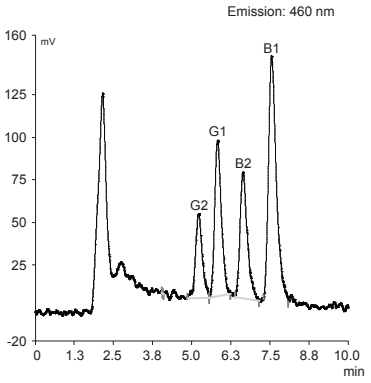
* From date of manufacture

Clean-Up Columns

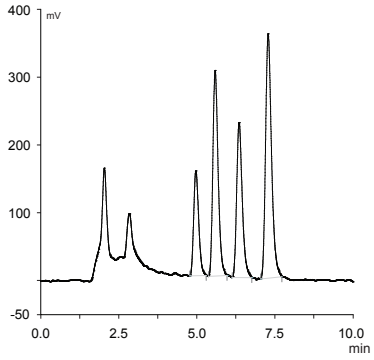
AflaCLEAN Select Columns	
Catalog No.	**Description**
12058	AflaCLEAN™ SELECT, Aflatoxins B1, B2, G1, G2, Pkg 25, 9 month* shelf life at 4 °C (Minimum order of 20 packs)
12059	AflaCLEAN™ SELECT, Aflatoxins B1, B2, G1, G2, Pkg 500, 9 month* shelf life at 4 °C (Minimum order of 4 packs)
12062	AflaCLEAN™ SELECT, Aflatoxins B1, B2, G1, G2, Pkg 25, 9 month* shelf life at 4 °C (Minimum order of 20 packs)
12063	AflaCLEAN™ SELECT, Aflatoxins B1, B2, G1, G2, Pkg 500, 9 month* shelf life at 4 °C (Minimum order of 4 packs)

* From date of manufacture

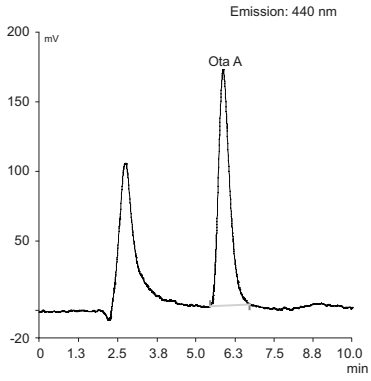
AflaCLEAN™ SMART Cartridges, Special Small Format	
Catalog No.	**Description**
12862	AflaCLEAN™ SMART, Aflatoxins B1, B2, G1, G2, Pkg 100, 9 month* shelf life at 4 °C (Minimum order of 8 packs)
12863	AflaCLEAN™ SMART, Aflatoxins B1, B2, G1, G2, Pkg 1000, 9 month* shelf life at 4 °C (Minimum order of 2 packs)



Distillers grain spiked with 5 ppb total Aflatoxins



Peanut Butter spiked with 5 ppb total Aflatoxins



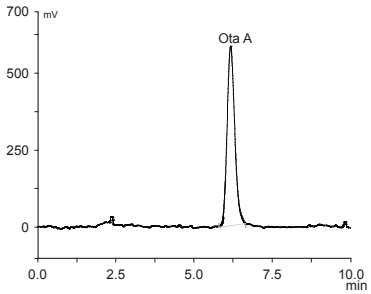
Distillers grain spiked with 5 ppb Ochratoxin A

Clean-Up Columns

Sample Clean-Up Column for Ochratoxin Analysis

OtaCLEAN™ was developed for sample clean-up of foods, grains, feeds, etc. for Ochratoxin A analysis using HPLC or other techniques. The antibody employed possesses a very high Ochratoxin A specificity. This leads to exceptional chromatographic results without any interfering secondary signals and very high recovery rates. Independent of the complexity of the matrix, excellent results can be achieved.

The maximum loading capacity is 200 ng Ochratoxin A. The shelf-life is 2 years (from date of manufacture) at room temperature.



Roasted Coffee spiked with 5 ppb Ochratoxin A

Example Recoveries of Ochratoxin A	
Matrix	**Recovery Rate**
Dried Distillers Grain	102 %
Duran Wheat	92 %
Coffee	100 %
Red Wine	108 %
Rye Bran	91 %
Beer	96 %
Grapes	91 %
Horse Feed	94 %
Wort	107 %

OtaCLEAN™ Sample Clean-Up Columns	
Catalog No.	**Description**
10515	OtaCLEAN™, Ochratoxin A, Pkg 25, 24 month* shelf life at room temp. (Minimum order of 20 packs)
11022	Afla-OtaCLEAN™, Aflatoxins B1, B2, G1, G2 & Ochratoxin A, Pkg 25, 18 month* shelf life at room temp. (Minimum order of 20 packs)
11535	OtaCLEAN™, Ochratoxin A, Pkg 500, 24 month* shelf life at room temp. (Minimum order of 4 packs)
12425	OtaCLEAN™, Ochratoxin A, Pkg 25, 24 month* shelf life at room temp. (Minimum order of 20 packs)
12427	OtaCLEAN™, Ochratoxin A, Pkg 500, 24 month* shelf life at room temp. (Minimum order of 4 packs)

OtaCLEAN™ SMART Sample Clean-Up Columns	
Catalog No.	**Description**
13346	OtaCLEAN™ SMART, Ochratoxin A, special small format, Pkg 100, 9 month shelf life* at 4 °C (Minimum order of 8 packs)
13351	OtaCLEAN™ SMART, Ochratoxin A, special small format, Pkg 1000, 9 month shelf life* at 4 °C (Minimum order of 2 packs)

* From date of manufacture

DONeX

Deoxynivalenol, also known as Vomitoxin, is a metabolite of various molds of the genus Fusarium (*F. culmorum, F. graminearum*) and can often be found on contaminated cereals (wheat, barley, oat).

Generally the toxin is analyzed with HPLC/UV detection or alternatively with HPLC / post column derivatization / fluorescence detection or LC / MS. Whichever method is chosen, a good sample preparation extends life time of the analyzer and of the HPLC column and reduces interferences by matrix components. Moreover the running times of the HPLC system can be reduced for easy matrices from about 25 to 10 minutes by pre-cleaning.

If HPLC/UV detection is used, sensitivity can be dramatically enhanced with larger sample volumes.

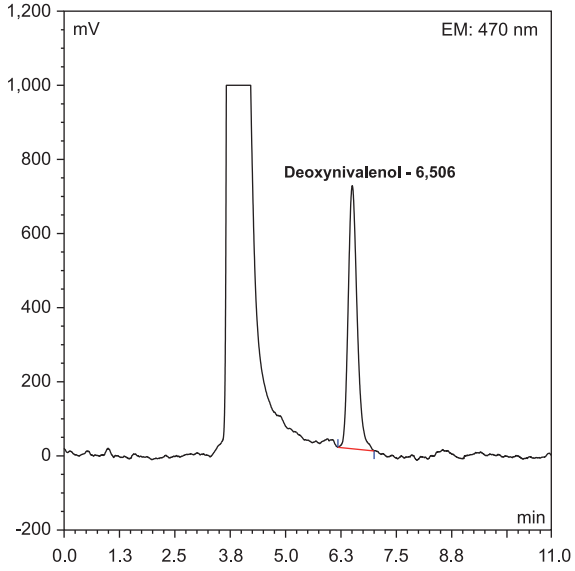
The DONeX column has a matrix load of up to 4 grams. It is ideally suited to many different matrices, including corn, barley, wheat, animal feeds, muesli, and bread.

DONeX™, SPE Clean-Up Cartridge for DON Analysis, 3 mL	
Catalog No.	**Description**
12792	DONeX™, SPE Clean-up Cartridge for DON Analysis, Pkg 25, no expiration at room temp. (Minimum order of 20 packs)
12793	DONeX™, SPE Clean-up Cartridge for DON Analysis, Pkg 500, no expiration at room temp. (Minimum order of 4 packs)

DONeX Column Recoveries	
Matrix	**Recoveries [%] DON**
Bread	108
Corn	90
Chicken Feed	101
Distillers Grain	91
Oat Flakes	100
Pasta (Dried)	105
Poultry Feed	100
Rice	104
Rye	91
Wheat	100
Wheat Bran	99

* All matrices were spiked prior to the extraction. Spiking solution was incubated for at least 1 h with matrix before extraction was started. Calculation of recovery is based on subtraction of values obtained without spiking.

Recoveries for Nivalenol are similar to those observed for Deoxynivalenol.



Chromatogram of a cereal-based poultry feed sample, analyzed with HPLC/post column derivatization/FLD, sample was spiked with 1 ppm DON, extracted and purified, evaporated sample (1 g) was resolved in 2 mL HPLC solvent, 40 µL were injected (0.02 gram matrix equivalents represent 20 ng DON injected)

Clean-Up Columns

Glyphosate and AMPA Sample Clean-Up Cartridges

Pickering SPE sample clean-up cartridges are used to treat samples prior to injection. The strong cation-exchange resin is composed of sulfonic acid functional groups attached to a styrene divinylbenzene copolymer lattice. The high selectivity and ruggedness provides a simple and universal method for removing matrix interference from the sample. The SPE sample clean-up cartridges are ideal for the clean-up of vegetables, fruits and crop samples in the analysis of Glyphosate and AMPA.

Recoveries for Glyphosate and AMPA		
Matrix	**Glyphosate**	**AMPA**
Alfalfa	129 %	116 %
Strawberry	84 %	82 %
Broccoli	97 %	95 %

Sample Preparation

Extraction:

Take 25 g of homogenous sample and add enough water (after estimation of moisture content) to make the total volume of water 125 mL. Blend and Centrifuge.

Matrix Specific Modification:

- High water content – reduce sample amount to 12.5 g
- High protein content – add 100 µL HCl to 20 mL of extract, shake and centrifuge.
- High fat content – perform the methylene chloride partition twice.

Clean-Up

Methylene Chloride Partition:

- To 20 mL of aqueous extract add 15 mL methylene chloride. Shake for 2-3 min and centrifuge.
- To 4.5 mL of aqueous layer add 0.5 mL acidic modifier solution. Shake and centrifuge.

SPE Clean-Up:

- Prepare SPE cartridge (refer to product abstract PA210)
- Transfer 1 mL portions of SPE mobile phase (refer to method abstract MA206 for formulation) and discard the effluent.
- Elute analytes with 12 mL SPE mobile phase

Concentration:

- Evaporate to dryness using rotary evaporator or a vacuum vortex-type evaporator or lyophilize
- Re-dissolve in 2 mL of the SPE mobile phase

Glyphosate Sample Clean-Up Columns	
Catalog No.	**Description**
1705-0001	Glyphosate SPE Sample Clean-up Columns, 50/pkg

Amino Acid Analysis, Sodium-Based Solutions

Amino Acid Analysis, Sodium-Based Solutions	
Catalog No.	**Description**
0352-0061	**30-Minute High Efficiency Collagen Hydrolysate Kit:**
1154110T	30-minute High-efficiency Sodium Cation-exchange Column 4.6 x 110 mm, includes Amino Acid Test Mixture 1700-0070
1700-3102	Cation-exchange GARD™ assembly: Holder w/ 2 replaceable GARDs™
Na220	Sodium Diluent, pH 2.20, case of 4 (250 mL/bottle)
Na315	Sodium Eluant, pH 3.15, case of 4 (950 mL/bottle)
Na425	Sodium Eluant, pH 4.25, case of 4 (950 mL/bottle)
Na640	Sodium Eluant, pH 6.40, case of 4 (950 mL/bottle)
RG011	Sodium Column Regenerant, each (950 mL/bottle)
T100C	TRIONE® Ninhydrin Reagent (4-month* shelf life), case of 4 (950 mL/bottle)
012506C	Collagen Hydrolysate Standard in Sodium Citrate Buffer, 0.25 µmole/mL, Proline and Hydroxyproline 1.25 µmole/mL, each (5 mL/bottle)
0352-0062	**Kit Identical to O352-0061 with T200 Replacing T100C:**
T200	TRIONE® Two-part Ninhydrin Reagent (12-month* shelf life before mixing), to prepare case of 4 (900 mL/bottle)
0352-0063	**Kit Identical to O352-0061 with OPA Replacing T100C:**
OD104	OPA Diluent, case of 4 (950 mL/bottle)
O120	o-Phthalaldehyde, each (5 g/bottle)
0352-0057	**30-Minute High Efficiency Protein Hydrolysate Kit:**
1154110T	30-minute High-efficiency Sodium Cation-exchange Column 4.6 x 110 mm, includes Amino Acid Test Mixture 1700-0070
1700-3102	Cation-exchange GARD™ assembly: Holder w/ 2 replaceable GARDs™
Na220	Sodium Diluent, pH 2.20, case of 4 (250 mL/bottle)
Na315	Sodium Eluant, pH 3.15, case of 4 (950 mL/bottle)
Na425	Sodium Eluant, pH 4.25, case of 4 (950 mL/bottle)
Na640	Sodium Eluant, pH 6.40, case of 4 (950 mL/bottle)
RG011	Sodium Column Regenerant, each (950 mL/bottle)
T100C	TRIONE® Ninhydrin Reagent (4-month* shelf life), case of 4 (950 mL/bottle)
012506H	Protein Hydrolysate Standard, in Sodium Citrate Buffer, 0.25 µmole/mL, each (5 mL/bottle)
0352-0058	**Kit Identical to O352-0057 with T200 Replacing T100C:**
T200	TRIONE® Two-part Ninhydrin Reagent (12-month* shelf life before mixing), to prepare case of 4 (900 mL/bottle)
0352-0059	**Kit Identical to O352-0057 with OPA Replacing T100C:**
OD104	OPA Diluent, case of 4 (950 mL/bottle)
O120	o-Phthalaldehyde, each (5 g/bottle)
3700-2000	Thiofluor™, each (10 g/bottle), (2 per kit)
0352-0020	**30-Minute High Efficiency Oxidized Feed Hydrolysate Kit:**
1154110T	30-minute High-efficiency Sodium Cation-exchange Column 4.6 x 110 mm, includes Amino Acid Test Mixture 1700-0070
1700-3102	Cation-exchange GARD™ assembly: Holder w/ 2 replaceable GARDs™
Na220	Sodium Diluent, pH 2.20, case of 4 (250 mL/bottle)
Na270	Sodium Eluant, pH 2.80, case of 4 (950 mL/bottle)
Na425	Sodium Eluant, pH 4.25, case of 4 (950 mL/bottle)
Na640	Sodium Eluant, pH 6.40, case of 4 (950 mL/bottle)
RG011	Sodium Column Regenerant, each (950 mL/bottle)
T100C	TRIONE® Ninhydrin Reagent (4-month* shelf life), case of 4 (950 mL/bottle)
1700-0155	Oxidized Feed Hydrolysate Standard in Sodium Citrate Buffer, 0.25 µmole/mL, each (5 mL/bottle)
0352-0021	**Kit Identical to O352-0020 with T200 Replacing T100C:**
T200	TRIONE® Two-part Ninhydrin Reagent (12-month* shelf life before mixing), to prepare case of 4 (900 mL/bottle)
0352-0022	**Kit Identical to O352-0020 with OPA Replacing T100C:**
OD104	OPA Diluent, case of 4 (950 mL/bottle)
O120	o-Phthalaldehyde, each (5 g/bottle)
3700-2000	Thiofluor™, each (10 g/bottle), (2 per kit)
AT30SH	**Standard 60-Minute Protein Hydrolysate Kit:**
1193250	Standard Sodium Cation-exchange Column 3.0 x 250 mm, includes Amino Acid Test Mixture 1700-0070
1700-3102	Cation-exchange GARD™ assembly: Holder w/ 2 replaceable GARDs™
Na328	Sodium Eluant, pH 3.28, case of 4 (950 mL/bottle)
Na740	Sodium Eluant, pH 7.40, case of 4 (950 mL/bottle)
T100C	TRIONE® Ninhydrin Reagent (4-month* shelf life), case of 4 (950 mL/bottle)
RG011	Sodium Column Regenerant, each (950 mL/bottle)
Na220	Sodium Diluent, pH 2.20, case of 4 (250 mL/bottle)
012506H	Protein Hydrolysate Standard, in Sodium Citrate Buffer, 0.25 µmole/mL, each (5 mL/bottle)
0352-0030	**Kit Identical to AT30SH with T200 Replacing T100C:**
T200	TRIONE® Two-part Ninhydrin Reagent (12-month* shelf life before mixing), to prepare case of 4 (900 mL/bottle)
AO30SH	**Kit Identical to AT30SH with OPA Replacing T100C:**
OD104	OPA Diluent, case of 4 (950 mL/bottle)
O120	o-Phthalaldehyde, each (5 g/bottle)
3700-2000	Thiofluor™, each (10 g/bottle), (2 per kit)
AT31FH	**High-Efficiency 55-Minute Protein Hydrolysate Kit:**
1154150T	High-efficiency Sodium Cation-exchange Column for protein, collagen and oxidized feed hydrolysates, 4.0 x 150 mm, includes Amino Acid Test Mixture 1700-0070
1700-3102	Cation-exchange GARD™ assembly: Holder w/ 2 replaceable GARDs™
Na315	Sodium Eluant, pH 3.15, case of 4 (950 mL/bottle)
Na740	Sodium Eluant, pH 7.40, case of 4 (950 mL/bottle)
T100C	TRIONE® Ninhydrin Reagent (4-month* shelf life), case of 4 (950 mL/bottle)
RG011	Sodium Column Regenerant, each (950 mL/bottle)
Na220	Sodium Diluent, pH 2.20, case of 4 (250 mL/bottle)
012506H	Protein Hydrolysate Standard, in Sodium Citrate Buffer, 0.25 µmole/mL, each (5 mL/bottle)
0352-0031	**Kit Identical to AT31FH with T200 Replacing T100C:**

Application Kits

***(Continued)* Amino Acid Analysis, Sodium-Based Solutions**

T200	TRIONE® Two-part Ninhydrin Reagent (12-month* shelf life before mixing), to prepare case of 4 (900 mL/bottle)
AO31FH	**Kit Identical to AT31FH with OPA Replacing T100C:**
OD104	OPA Diluent, case of 4 (950 mL/bottle)
O120	*o*-Phthalaldehyde, each (5 g/bottle)
3700-2000	Thiofluor™, each (10 g/bottle), (2 per kit)
AT32FC	**High-Efficiency 55-Minute Collagen Hydrolysate Kit:**
1154150T	High-efficiency Sodium Cation-exchange Column for protein, collagen and oxidized feed hydrolysates, 4.0 x 150 mm, includes Amino Acid Test Mixture 1700-0070
1700-3102	Cation-exchange GARD™ assembly: Holder w/ 2 replaceable GARDs™
Na315	Sodium Eluant, pH 3.15, case of 4 (950 mL/bottle)
Na740	*Sodium Eluant, pH 7.40, case of 4 (950 mL/bottle)*
T100C	TRIONE® Ninhydrin Reagent (4-month* shelf life), case of 4 (950 mL/bottle)
RG011	Sodium Column Regenerant, each (950 mL/bottle)
Na220	Sodium Diluent, pH 2.20, case of 4 (250 mL/bottle)
012506C	Collagen Hydrolysate Standard in Sodium Citrate Buffer, 0.25 µmole/mL, Proline and Hydroxyproline 1.25 µmole/mL, each (5 mL/bottle)
0352-0032	**Kit Identical to AT32FC with T200 Replacing T100C:**
T200	TRIONE® Two-part Ninhydrin Reagent (12-month* shelf life before mixing), to prepare case of 4 (900 mL/bottle)
AO32FC	**Kit Identical to AT32FC with OPA Replacing T100C:**
OD104	OPA Diluent, case of 4 (950 mL/bottle)
O120	*o*-Phthalaldehyde, each (5 g/bottle)
3700-2000	Thiofluor™, each (10 g/bottle), (2 per kit)
0352-0018	**60-Minute Oxidized Feed Hydrolysate Kit:**
1154150T	High-efficiency Sodium Cation-exchange Column for protein, collagen and oxidized feed hydrolysates, 4.0 x 150 mm, includes Amino Acid Test Mixture 1700-0070
1700-3102	Cation-exchange GARD™ assembly: Holder w/ 2 replaceable GARDs™
Na270	Sodium Eluant, pH 2.80, case of 4 (950 mL/bottle)
Na740	Sodium Eluant, pH 7.40, case of 4 (950 mL/bottle)
T100C	TRIONE® Ninhydrin Reagent (4-month* shelf life), case of 4 (950 mL/bottle)
RG011	Sodium Column Regenerant, each (950 mL/bottle)
Na220	Sodium Diluent, pH 2.20, case of 4 (250 mL/bottle)
1700-0155	Oxidized Feed Hydrolysate Standard in Sodium Citrate Buffer, 0.25 µmole/mL, each (5 mL/bottle)
0352-0017	**Kit Identical to O352-0018 with T200 Replacing T100C:**
T200	TRIONE® Two-part Ninhydrin Reagent (12-month* shelf life before mixing), to prepare case of 4 (900 mL/bottle)
0352-0019	**Kit Identical to O352-0018 with OPA Replacing T100C:**
OD104	OPA Diluent, case of 4 (950 mL/bottle)
O120	*o*-Phthalaldehyde, each (5 g/bottle)
3700-2000	Thiofluor™, each (10 g/bottle), (2 per kit)
0352-0006	**70-Minute Physiologic Fluid/Native Sample Kit:**
0354675T	70-minute High-efficiency Lithium Cation-exchange Column, 4.6 x 75 mm, includes Amino Acid Test Mixture 1700-0070
1700-3102	Cation-exchange GARD™ assembly: Holder w/ 2 replaceable GARDs™
1700-1125	Lithium Eluant, pH 2.80, case of 4 (950 mL/bottle)
Li220	Lithium Diluent, pH 2.36, case of 4 (250 mL/bottle)
Li365	Lithium Eluant, pH 3.65, case of 4 (950 mL/bottle)
Li375	Lithium Eluant, pH 3.75, case of 4 (950 mL/bottle)
RG003	Lithium Column Regenerant, each (950 mL/bottle)
1700-0170	Native Sample Standard without Norleucine & Alpha-Amino-Beta-Guanidinopropionic Acid in Lithium Citrate Buffer, 0.25 µmole/mL, each (5 mL /bottle)
SP100	SERAPREP™, each (250 mL/bottle)
UP100	URIPREP™, each (250 mL/bottle)
T100C	TRIONE® Ninhydrin Reagent (4-month* shelf life), case of 4 (950 mL/bottle)
0352-0007	**Kit Identical to O352-0006 with T200 Replacing T100C:**
T200	TRIONE® Two-part Ninhydrin Reagent (12-month* shelf life before mixing), to prepare case of 4 (900 mL/bottle)
0352-0008	**Kit Identical to O352-0006 with OPA Replacing T100C:**
OD104	OPA Diluent, case of 4 (950 mL/bottle)
O120	*o*-Phthalaldehyde, each (5 g/bottle)
3700-2000	Thiofluor™, each (10 g/bottle), (2 per kit)
AT33SP	**Standard 185-Minute Physiologic Fluid/Native Sample Kit:**
0393250	Standard Lithium Cation-exchange Column, 3.0 x 250 mm, includes Amino Acid Test Mixture 1700-0070
1700-3102	Cation-exchange GARD™ assembly: Holder w/ 2 replaceable GARD™s
Li275	Lithium Eluant, pH 2.75, case of 4 (950 mL/bottle)
Li750	Lithium Eluant, pH 7.50, case of 4 (950 mL/bottle)
T100C	TRIONE® Ninhydrin Reagent (4-month* shelf life), case of 4 (950 mL/bottle)
RG003	Lithium Column Regenerant, each (950 mL/bottle)
Li220	Lithium Diluent, pH 2.36, case of 4 (250 mL/bottle)
11006P	Native Sample Standard with Norleucine in Lithium Citrate Buffer, 0.25 µmole/mL, each (5 mL/bottle)
SP100	SERAPREP™, each (250 mL/bottle)
UP100	URIPREP™, each (250 mL/bottle)
0352-0033	**Kit identical to AT33SP with T200 Replacing T100C:**
T200	TRIONE® Two-part Ninhydrin Reagent (12-month* shelf life before mixing), to prepare case of 4 (900 mL/bottle)
AO33SP	**Kit Identical to AT33SP with OPA Replacing T100C:**
OD104	OPA Diluent, case of 4 (950 mL/bottle)
O120	*o*-Phthalaldehyde, each (5 g/bottle)
3700-2000	Thiofluor™, each (10 g/bottle), (2 per kit)
0352-0015	**High-Efficiency 120-Minute Physiologic Fluid/Native Sample Kit:**
0354100T	High-efficiency Lithium Cation-exchange Column, 4.0 x 100 mm, includes Amino Acid Test Mixture 1700-0070
1700-3102	Cation-exchange GARD™ assembly: Holder w/ 2 replaceable GARDs™
Li275	Lithium Eluant, pH 2.75, case of 4 (950 mL/bottle)
Li750	Lithium Eluant, pH 7.50, case of 4 (950 mL/bottle)

T100C	TRIONE® Ninhydrin Reagent (4-month* shelf life), case of 4 (950 mL/bottle)
RG003	Lithium Column Regenerant, each (950 mL/bottle)
Li220	Lithium Diluent, pH 2.36, case of 4 (250 mL/bottle)
011006P	Native Sample Standard with Norleucine in Lithium Citrate Buffer, 0.25 µmole/mL, each (5 mL/bottle)
SP100	SERAPREP™, each (250 mL/bottle)
UP100	URIPREP™, each (250 mL/bottle)
0352-0011	**Kit Identical to O352-0015 with T200 Replacing T100C:**
T200	TRIONE® Two-part Ninhydrin Reagent (12-month* shelf life before mixing), to prepare case of 4 (900 mL/bottle)
0352-0012	**Kit Identical to O352-0015 with OPA Replacing T100C:**
OD104	OPA Diluent, case of 4 (950 mL/bottle)
O120	o-Phthalaldehyde, each (5 g/bottle)
3700-2000	Thiofluor™, each (10 g/bottle), (2 per kit)
0352-0013	**Temperature Gradient Physiologic Fluid/Native Sample Kit:**
0354100T	High-efficiency Lithium Cation-exchange Column, 4.0 x 100 mm, includes Amino Acid Test Mixture 1700-0070
1700-3102	Cation-exchange GARD™ assembly: Holder w/ 2 replaceable GARDs™
1700-1125	Lithium Eluant, pH 2.80, case of 4 (950 mL/bottle)
Li220	Lithium Diluent, pH 2.36, case of 4 (250 mL/bottle)
Li365	Lithium Eluant, pH 3.65, case of 4 (950 mL/bottle)
Li375	Lithium Eluant, pH 3.75, case of 4 (950 mL/bottle)
RG003	Lithium Column Regenerant, each (950 mL/bottle)
1700-0170	Native Sample Standard without Norleucine & Alpha-Amino-Beta-Guanidinopropionic Acid in Lithium Citrate Buffer, 0.25 µmole/mL, each (5 mL /bottle)
SP100	SERAPREP™, each (250 mL/bottle)
UP100	URIPREP™, each (250 mL/bottle)
T100C	TRIONE® Ninhydrin Reagent (4-month* shelf life), case of 4 (950 mL/bottle)
0352-0014	**Kit Identical to O352-0013 with T200 Replacing T100C:**
T200	TRIONE® Two-part Ninhydrin Reagent (12-month* shelf life before mixing), to prepare case of 4 (900 mL/bottle)
0352-0016	**Kit Identical to O352-0013 with OPA Replacing T100C:**
OD104	OPA Diluent, case of 4 (950 mL/bottle)
O120	o-Phthalaldehyde, each (5 g/bottle)
3700-2000	Thiofluor™, each (10 g/bottle), (2 per kit)

* From date of manufacture

Pesticide & Herbicide Analysis Kits

Pesticide & Herbicide Analysis Kits	
Catalog No.	**Description**
0352-0002	**Carbamate Pesticides Analysis Kit, 23+ Compounds**
0840250	Carbamate Column, expanded resolution, C8, 4.0 x 250 mm, includes Carbamate Test Mixture 1700-0063
18ECG001	Guard Cartridge Holder with 3 guard cartridges
CB130	Carbamate Hydrolysis Reagent, case of 4 (950 mL/bottle)
CB910	Carbamate OPA Diluent, case of 4 (950 mL/bottle)
O120	o-Phthalaldehyde, each (5 g/bottle)
3700-2000	Thiofluor™, each (10 g/bottle), (2 per kit)
1700-0025	ChlorAC Buffer, case of 4 (25 mL/bottle)
1700-0195	Carbamate Calibration Starter Kit (2 per pack)
0352-0003	**Carbamate Pesticides Analysis Kit, for EPA Method 531.1:**
0846250	Carbamate Column, high resolution/capacity, 4.6 x 250 mm, includes Carbamate Test Mixture 1700-0063
18ECG001	Guard Cartridge Holder with 3 guard cartridges
CB130	Carbamate Hydrolysis Reagent, case of 4 (950 mL/bottle)
CB910	Carbamate OPA Diluent, case of 4 (950 mL/bottle)
O120	o-Phthalaldehyde, each (5 g/bottle)
3700-2000	Thiofluor™, each (10 g/bottle), (2 per kit)
1700-0025	ChlorAC Buffer, case of 4 (25 mL/bottle)
1700-0195	Carbamate Calibration Starter Kit (2 per pack)
0352-0009	**Carbamate Pesticides Analysis Kit, for EPA Method 531.2:**
0846250	Carbamate Column, high resolution/capacity, 4.6 x 250 mm, includes Carbamate Test Mixture 1700-0063
18ECG001	Guard Cartridge Holder with 3 guard cartridges
CB130.2	Carbamate Hydrolysis Reagent, case of 4 (950 mL/bottle)
CB910	Carbamate OPA Diluent, case of 4 (950 mL/bottle)
O120	o-Phthalaldehyde, each (5 g/bottle)
3700-2000	Thiofluor™, each (10 g/bottle), (2 per kit)
1700-0195	Carbamate Calibration Starter Kit (2 per pack)
0352-0004	**Carbamate Pesticides Analysis Kit, for AOAC Method 985.23:**
1846150	Analytical Column, rapid analysis/QC, 4.6 x 150 mm, includes Carbamate Test Mixture 1700-0063
18ECG001	Guard Cartridge Holder with 3 guard cartridges
CB130	Carbamate Hydrolysis Reagent, case of 4 (950 mL/bottle)
CB910	Carbamate OPA Diluent, case of 4 (950 mL/bottle)
O120	o-Phthalaldehyde, each (5 g/bottle)
3700-2000	Thiofluor™, each (10 g/bottle), (2 per kit)
1700-0025	ChlorAC Buffer, case of 4 (25 mL/bottle)
1700-0195	Carbamate Calibration Starter Kit (2 per pack)

Application Kits

***(Continued)* Pesticide & Herbicide Analysis Kits**

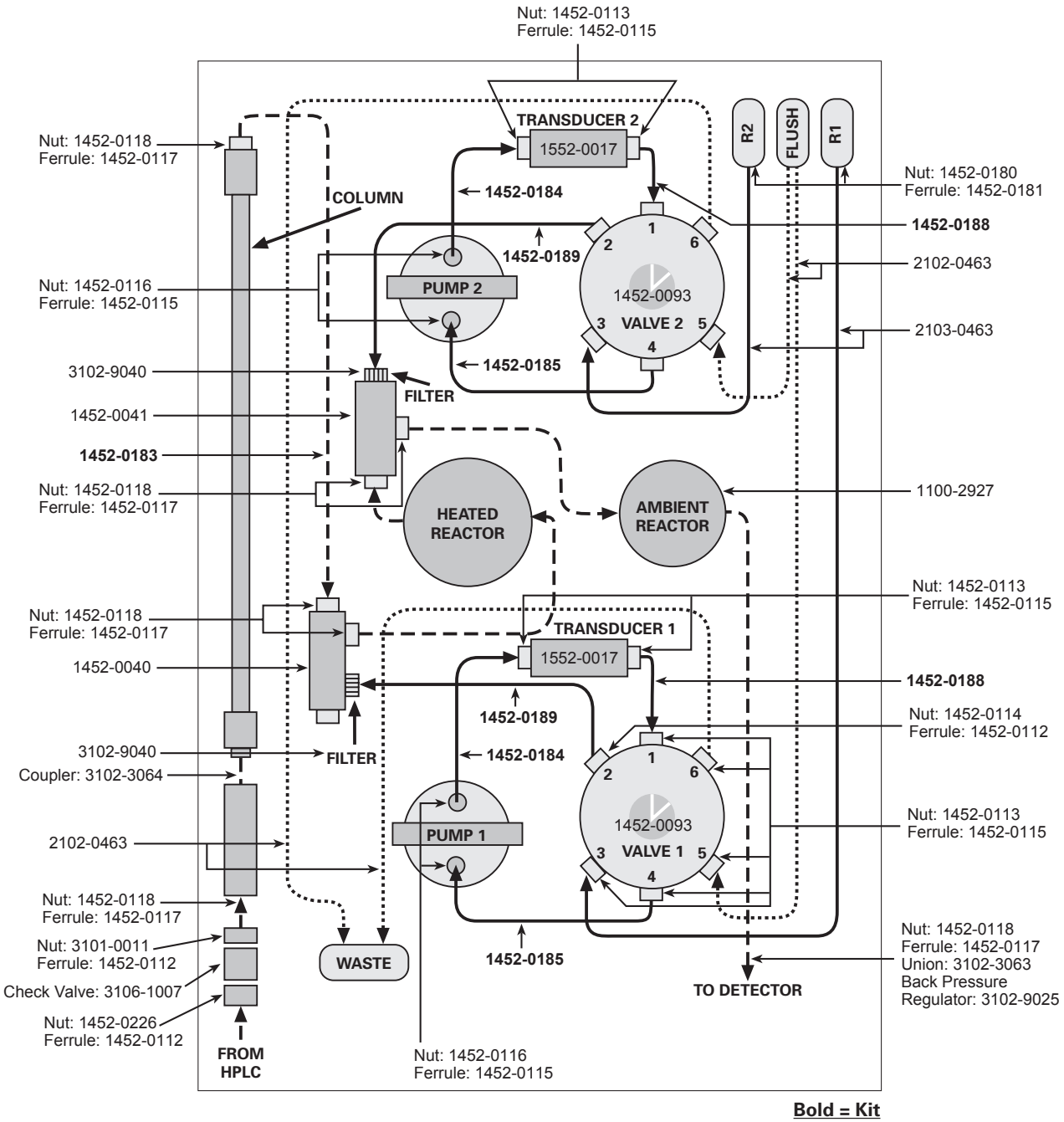
0352-0010	Glyphosate Herbicide Analysis Kit, for EPA Method 547, AOAC Method 991.08:
1954150	Cation-exchange Column for Glyphosate analysis, 4 x 150 mm, including Glyphosate Test Mixture 1700-0080
1700-3102	Cation-exchange GARD™ assembly: Holder w/ 2 replaceable GARDs™
K200	Glyphosate Potassium Phosphate Eluant, case of 4 (950 mL/bottle)
RG019	Glyphosate Column Regenerant, each (950 mL/bottle)
GA104	Glyphosate OPA Diluent, case of 4 (950 mL/bottle)
GA116	Glyphosate Hypochlorite Diluent, case of 4 (950 mL/bottle)
O120	*o*-Phthalaldehyde, each (5 g/bottle)
3700-2000	Thiofluor™, each (10 g/bottle), (2 per kit)
1700-0140	RESTORE™, each (250 mL/bottle)

Other Post-Column Analysis Kits

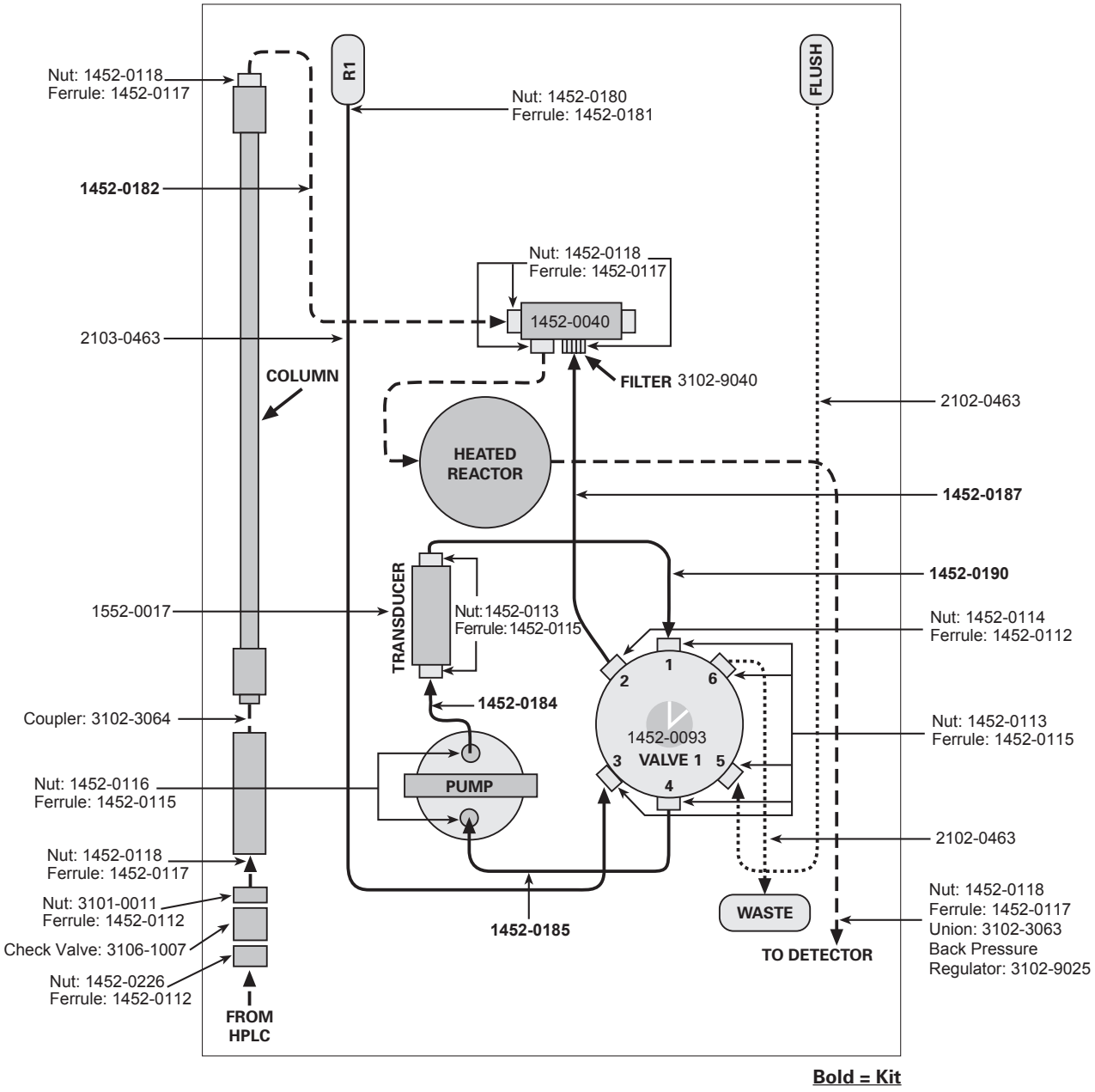
Other Post-Column Analysis Kits	
Catalog No.	**Description**
0352-0040	**Biogenic Amines/Polyamines Analysis Kit:**
9410917	ALKION™ Cation-exchange Column, K+ form, 4.0 x 150 mm
9493020	ALKION™ Guard Column, K+ form, 3.0 x 20 mm
1100-0200	Flow Restrictor, for OPA, Hypochlorite and Hydrolysis Reagent, 300 psi @ 0.3 mL/min, 10 cm
K563	Potassium Phosphate Eluant, pH 5.63, case of 4 (950 mL/bottle)
K600	Potassium Phosphate Eluant, pH 6.00, case of 4 (950 mL/bottle)
K130	Potassium Column Regenerant, each (950 mL/bottle)
OD104	OPA Diluent, case of 4 (950 mL/bottle)
O120	o-Phthalaldehyde, each (5 g/bottle)
3700-2000	Thiofluor™, each (10 g/bottle), (2 per kit)
0352-0041	**Aminoglycoside Antibiotics Analysis Kit:**
9410917	ALKION™ Cation-exchange Column, K+ form, 4.0 x 150 mm
9493020	ALKION™ Guard Column, K+ form, 3.0 x 20 mm
1100-0200	Flow Restrictor, for OPA, Hypochlorite and Hydrolysis Reagent, 300 psi @ 0.3 mL/min, 10 cm
1700-1101	Potassium Phosphate Eluant, KO1, case of 4 (950 mL/bottle)
1700-1102	Potassium Hydroxide Eluant, KO2, case of 4 (950 mL/bottle)
1700-1103	Potassium Chloride Eluant, KO3, case of 4 (950 mL/bottle)
OD104	OPA Diluent, case of 4 (950 mL/bottle)
O120	o-Phthalaldehyde, each (5 g/bottle)
3700-2000	Thiofluor™, each (10 g/bottle), (2 per kit)

0352-0053	Multi-Residue Mycotoxin Kit:
1612124	MYCOTOX™ Reversed-phase Column, 4.6 x 250 mm
18ECG001	Guard Cartridge Holder with 3 cartridges
OD104	OPA Diluent, case of 4 (950 mL/bottle)
O120	o-Phthalaldehyde, each (5 g/bottle)
1700-1108	Sodium Phosphate Eluant, pH 3.3, case of 4 (950 mL/bottle)
3700-2000	Thiofluor™, each (10 g/bottle), (2 per kit)
0352-0050	**Aflatoxin Analysis Kit:**
1612124	MYCOTOX™ Reversed-phase Column, 4.6 x 250 mm
18ECG001	Guard Cartridge Holder with 3 cartridges
0352-0051	**Polyether Antibiotics Kit:**
2381750	Polyether Reversed-phase Column, 4.6 x 250 mm
18ECG001	Guard Cartridge Holder with 3 cartridges
3700-2200	Vanillin, 30 g (2 per kit)

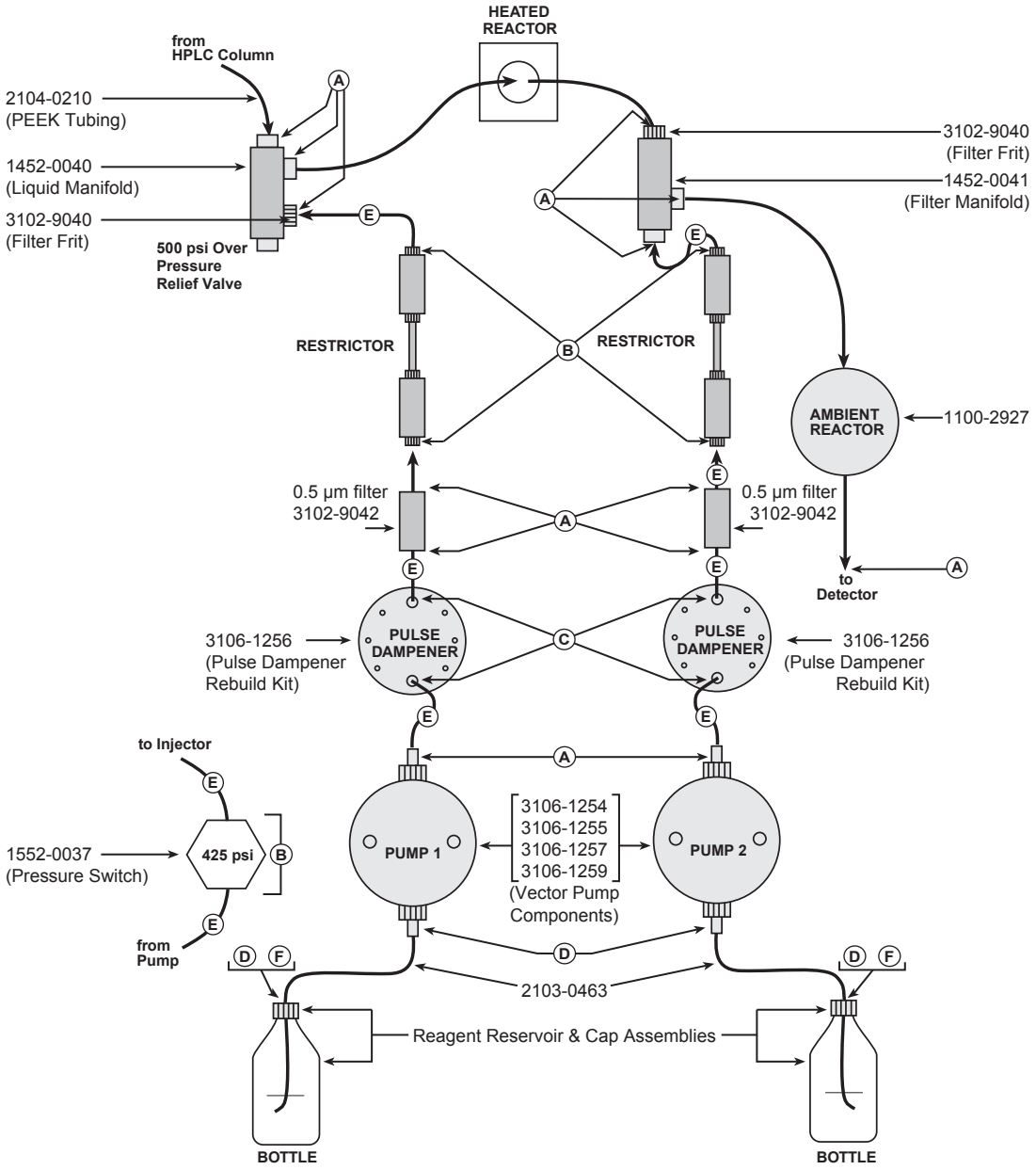
Onyx PCX Flow Diagram – Two-Pump System



Onyx PCX Flow Diagram – One-Pump System



Vector PCX Flow Diagram



(A) Nut: 1452-0118
Ferrule: 1452-0117

(B) Nut: 1452-0179
Ferrule: 1452-0178

(C) Nut: 1452-0177
Ferrule: 1452-0176

(D) Nut: 1452-0180
Ferrule: 1452-0181

(E) 2104-0220 (PEEK Tubing, 0.02" ID)

(F) 3106-1010

Replacement Components, Fittings & Tubing

Onyx PCX Reagent Pump and Valve Components

Onyx PCX Reagent Pump and Valve Components	
Catalog No.	**Description**
1000-1003	Single Syringe Pump PM Kit
1000-1004	Dual Syringe Pump PM Kit
1100-0550	Onyx PCX Tubing Kit - Dual Pump System
1100-0551	Onyx PCX Tubing Kit - Single Pump System
1352-0007	Syringe Pump Cylinder, Ceramic 70 mL
1352-0019	Syringe Pump PEEK® Face
1352-0020	Metal Piston Face
1452-0077	Onyx PCX Valve Assembly, Valve Face and Motor
1452-0079	Onyx PCX Pump Assembly, 70 mL with Motor
1452-0093	PCX Valve Face Assembly, Liquid End
1452-0122	Syringe Pump Seal Kit
1452-0200	PCX Valve Seal Tool
1452-0201	PCX Valve Seals Kit
1452-0202	PCX Valve Maintenance Kit (Seals and Tools)
1452-0332	Syringe Pump PEEK® Cylinder Front Assembly
1452-0349	Syringe Pump Rebuild Kit
1552-0017	PCX Pressure Tranducer Assembly
1552-0040	PCX Dead-head Kit for Transducer for Chromium VI and Alprostadil Systems

Pinnacle PCX Reagent Pump and Valve Components

Pinnacle PCX Reagent Pump and Valve Components	
Catalog No.	**Description**
1000-1003	Single Syringe Pump PM Kit
1000-1004	Dual Syringe Pump PM Kit
1100-0500	Pinnacle PCX Tubing Kit - Dual Pump System
1100-0501	Pinnacle PCX Tubing Kit - Single Pump System
1352-0007	Syringe Pump Cylinder, Ceramic 70 mL
1352-0019	Syringe Pump PEEK® Face
1352-0020	Metal Piston Face
1452-0038	Pinnacle Syringe Pump Assembly, 70 mL with Motor
1452-0045	Pinnacle PCX Valve Assembly, Valve Face and Motor
1452-0093	PCX Valve Face Assembly, Liquid End
1452-0122	Syringe Pump Seal Kit
1452-0200	PCX Valve Seal Tool
1452-0201	PCX Valve Seals Kit
1452-0202	PCX Valve Maintenance Kit (Seals and Tools)
1452-0332	Syringe Pump PEEK® Cylinder Front Assembly
1452-0349	Syringe Pump Rebuild Kit
1552-0017	PCX Pressure Transducer Assembly
1552-0040	Pinnacle PCX Dead-head Kit for Transducer for Chromium VI and Alprostadil Systems

Vector PCX Reagent Pump Components

Vector PCX Reagent Pump Components	
Catalog No.	**Description**
1000-1006	Vector PCX Dual Pump PM Kit
1452-0235	Check Valve Cartridge, PEEK® (2/pk) Vector
1452-0332	Syringe Pump PEEK® Cylinder Front Assembly
3102-9028	Inline Filter, 0.5 µm Frit
3106-1254	Pump Check Valve Kit, PEEK® (Inlet & Outlet)
3106-1255	Seal Kit (Piston seal, Back-up O-ring, Diaphragm, Tool)
3106-1256	Pulse Damper Rebuild Kit (Diaphragm, O-rings, Diaphragm seal, Seal tool, and 4 Hex wrenches)
3106-1257	Piston, Vector Pump
3106-1258	Prime/Purge Valve, PEEK®
3106-1259	Head Kit, Vector Pump, (Head, Check Valves, Piston and Seal)
3106-1260	Prime Purge Seal Kit, PEEK®
3106-1266	Piston Retainer Bushing

Onyx PCX Replacement Reactors

Onyx PCX Replacement Reactor Volume Cartridge Coils	
Catalog No.	**Description**
1452-0221	Reactor Cooling Coil, Voglibose
1452-0241	Onyx Reactor Heater Assembly
1452-0363	Onyx Reactor Cartridge Coil Assembly - 0.15 mL 130 °C
1452-0364	Onyx Reactor Cartridge Coil Assembly - 0.5 mL 130 °C
1452-0365	Onyx Reactor Cartridge Knitted Assembly - 1.4 mL 130 °C
1452-0366	Onyx Reactor Cartridge Knitted Assembly - 2.0 mL 80 °C
1452-0367	Onyx Reactor Cartridge Knitted Assembly - 3.0 mL 80 °C
1452-0368	Onyx Reactor Cartridge Coil Assembly - 3.5 mL 130 °C
1452-0369	Onyx Reactor Cartridge Knitted Assembly - 1.2 mL & 1.6 mL 130 °C
1452-0370	Onyx Reactor Cartridge Knitted Assembly - 1.0 mL
1452-0359	Calibration Reactor

Pinnacle PCX Replacement Reactors

Pinnacle PCX Replacement Reactor Volume Cartridge Coils	
Catalog No.	**Description**
1452-0063	Pinnacle Reactor Heater Assembly
1452-0064	Reactor Cartridge Coil Assembly - 0.5 mL 130 °C
1452-0094	Reactor Cartridge Coil Assembly - 0.15 mL 130 °C
1452-0096	Reactor Cartridge Knitted Assembly - 1.4 mL 130 °C
1452-0097	Reactor Cartridge Knitted Assembly - 2.0 mL 80 °C
1452-0098	Reactor Cartridge Knitted Assembly - 2.8 mL 80 °C
1452-0099	Reactor Cartridge Knitted Assembly - 3.0 mL 80 °C
1452-0100	Reactor Cartridge Knitted Assembly - 1.2 mL & 1.6 mL 130 °C
1452-0221	Reactor Cooling Coil, Voglibose
1452-0225	Reactor Cartridge Coil Assembly - 3.5 mL 130 °C
1452-0324	Reactor Cartridge Knitted Assembly - 1.0 mL

Vector PCX Substitute Reactor Volumes or Replacement Reactors

Vector PCX Substitute Reactor Volumes or Replacement Reactors	
Catalog No.	**Description**
1100-2927	OPA Ambient Reactor, 0.010 in ID TFE Tubing
1452-0160	Reactor Heater & Coil Assembly, 0.15 mL, 130 °C max, 120 V
1452-0161	Reactor Heater & Coil Assembly, 0.15 mL, 130 °C max, 240 V
1452-0162	Reactor Heater & Coil Assembly, 0.5 mL, 130 °C max, 120 V
1452-0163	Reactor Heater & Coil Assembly, 0.5 mL, 130 °C max, 240 V
1452-0166	Reactor Heater & Knitted Assembly, 1.4 mL, 130 °C max, 120 V
1452-0167	Reactor Heater & Knitted Assembly, 1.4 mL, 130 °C max, 240 V
1452-0168	Reactor Heater & Knitted Assembly, 2.0 mL, 130 °C max, 120 V
1452-0169	Reactor Heater & Knitted Assembly, 2.0 mL, 130 °C max, 240 V
1452-0170	Reactor Heater & Knitted Assembly, 2.8 mL, 130 °C max, 120 V
1452-0171	Reactor Heater & Knitted Assembly, 2.8 mL, 130 °C max, 240 V
1452-0172	Reactor Heater & Knitted Assembly, 3.0 mL, 130 °C max, 120 V
1452-0173	Reactor Heater & Knitted Assembly, 3.0 mL, 130 °C max, 240 V
1452-0174	Reactor Heater & Knitted Assembly, 1.2 & 1.6 mL, 130 °C max, 120 V
1452-0175	Reactor Heater & Knitted Assembly, 1.2 & 1.6 mL, 130 °C max, 240 V

Vector PCX Substitute Reactor Volumes or Replacement Reactors (Continued)	
Catalog No.	**Description**
1452-0223	Reactor Heater & Knitted Assembly, 3.5 mL, 130 °C max, 120 V
1452-0224	Reactor Heater & Knitted Assembly, 3.5 mL, 130 °C max, 240 V
1452-0325	Reactor Heater & Knitted Assembly, 1.0 mL, 130 °C max, 120 V
1452-0326	Reactor Heater & Knitted Assembly, 1.0 mL, 130 °C max, 240 V

Reagent Reservoirs & Cap Assemblies

Reagent Reservoirs & Cap Assemblies	
Catalog No.	**Description**
1452-0120	Bottle, Piston Wash with Cap, Onyx, Pinnacle, & Vector PCX
1452-0121	Bottle, System Flush with Cap, Pinnacle/Onyx PCX
1452-0356	Reagent & Gas Line Clip, pack of 2
1925-0129	Cap for Flush Bottle, GL-38, Black, Pinnacle/Onyx PCX
1925-0130	Cap for Wash Bottle, GL-38, Black, Onyx, Pinnacle, & Vector PCX
3107-0137	Reservoir Bottle, Safety-coated, 1 L
3107-0138	Reservoir Cap for Storage of 1 L and 2 L Bottles, (No Valve)
3107-0145	Reservoir Bottle, Safety-coated, 2 L
3107-0147	Cap Assembly for 1 L Bottle, includes Cap with Integrated Valve
3107-0148	Cap Assembly for 2 L Bottle, includes Cap with Integrated Valve
3107-0300	Reservoir Assembly, includes 1 L Bottle, and Cap with Integrated Valve

Pressure Regulators, Valves & Gauges

Pressure Regulators, Valves & Gauges	
Catalog No.	**Description**
1452-0141	Gas Manifold Assembly, PCX
1452-0343	Over Pressure Relief Valve Cartridge
3102-9010	Back Pressure Regulator 1000 psi
3102-9025	Pressure Regulator, 100 psi, 1/4-28 connection, for detector waste, PCX
3106-1007	Inline Check Valve, PCX
3106-1010	Check Valve, Reagent Cap

Replacement Components, Fittings & Tubing

Flow Restrictors

Flow Restrictors	
Catalog No.	**Description**
1100-0141	Flow Restrictor, TRIONE® Ninhydrin Reagent, 65 psi @ 0.3 mL/min, 6 cm
1100-0142	Flow Restrictor, 100 psi @ 0.3 mL/min, 10 cm
1100-0161	Flow Restrictor, PEEK® Tubing for Polyether Antibiotics Systems, 0.005" ID, 550 psi @ 0.3 mL/min in 15 % Methanol in Water
1100-0200	Flow Restrictor, for OPA, Hypochlorite and Hydrolysis Reagent, 300 psi @ 0.3 mL/min, 10 cm
1100-0205	Flow Restrictor, 200 psi @ 0.3 mL/min, 6 cm
1100-0262	Flow Restrictor, 1150 psi @ 0.3 mL/min, 20 cm
1100-0263	Flow Restrictor, 550 psi @ 0.3 mL/min, 17 cm

Filters & Frits

Filters & Frits	
Catalog No.	**Description**
1452-0330	Vector 0.5um filter Upgrade Kit
3102-9040	Replacement Reagent 10 µm Frit
3102-9042	Replacement Reagent 0.5 µm Frit

Tees & Unions

Tees & Unions	
Catalog No.	**Description**
1452-0040	Liquid Manifold Assembly with Relief Valve, PCX
1452-0041	Liquid “T” Manifold Assembly, PCX

Tubing, Plastic

Tubing, Plastic	
Catalog No.	**Description**
2101-0212	TFE Tubing, 1/16" OD x 0.010" ID, 90 cm
2101-0216	TFE Tubing, 1/16" OD x 0.016" ID, 90 cm
2101-0220	TFE Tubing, 1/16" OD x 0.020" ID, 90 cm
2101-0225	TFE Tubing, 1/16" OD x 0.025" ID, 90 cm
2101-0232	C-Flex Tubing, 1/4" OD x 1/8" ID, 90 cm
2102-0463	FEP Tubing, 1/8" OD x 0.063" ID, 90 cm
2103-0463	Air Barrier Tubing, 1/8" OD x 0.063" ID, 90 cm
2104-0210	Inert PEEK® Tubing, 1/16" OD x 0.010" ID, 90 cm
2104-0220	Inert PEEK® Tubing, 1/16" OD x 0.020" ID, 90 cm

Fittings, Plastic

Fittings, Plastic	
Catalog No.	**Description**
1452-0112	Ferrule, 1/16 x 1/4-28 (PEEK®), Pinnacle PCX - Pack of 5
1452-0113	Nut, Short, 1/8 x 1/4-28 (PEEK®), Pinnacle PCX - Pack of 5
1452-0114	Nut, Short, 1/16 x 1/4-28 (PEEK®), Pinnacle PCX - Pack of 5
1452-0115	Ferrule, 1/8 x 1/4-28 (PEEK®), Pinnacle PCX - Pack of 5
1452-0116	Nut, Long, 1/8 x 1/4-28 (PEEK®), Pinnacle PCX - Pack of 5
1452-0117	Ferrule, 1/16 (PEEK®), Lite Touch - Pack of 5
1452-0118	Nut, 1/16 (PEEK®), Lite Touch - Pack of 5
1452-0176	Ferrule, PEEK® 1/16 x 10-32 S/T, 5 each
1452-0177	Nut, PEEK® Long 1/16 x 10-32 S/T, 5 each
1452-0180	Nut, 1/4-28, 1/8" (Polypropylene) - Pack of 5
1452-0181	Ferrule, 1/4-28, 1/8" (Tefzel) - Pack of 5
1452-0226	Nut, Long, 1/16 x 1/4-28 (PEEK®), Pinnacle PCX - Pack of 5
3101-0011	Nut, Female PEEK® 1/4-28
3101-0020	Plug (Male), 1/4-28 (Delrin)
3101-0030	Plug (Male), 10-32, 1/16" (Delrin)
3102-9160	Removal Tool, for Lite-Touch Ferrule

Fittings, Type 316 Stainless Steel

Fittings, Type 316 Stainless Steel	
Catalog No.	**Description**
1452-0178	Ferrule, Parker type, 1/16" - Pack of 5
1452-0179	Nut (Male), Parker type, 10-32, 1/16" - Pack of 5

Product Testing Solutions

Artificial Perspiration

Artificial Eccrine Perspiration

The Artificial Eccrine Perspiration we offer is a ready-to-use solution and the closest mimic to true human eccrine sweat. It consists of 19 amino acids, the seven most abundant minerals, and the four most abundant metabolites at a pH of 4.5. All concentrations closely match experimentally determined values for adult human eccrine sweat. Custom formulations are available on request.

Artificial Eccrine Perspiration List of Ingredients			
Metabolites	Uric Acid	Urea	
	Lactic Acid	Ammonia	
Minerals	Sodium	Iron	
	Calcium	Copper	Sulfate
	Magnesium	Potassium	Nitrate
	Zinc	Chloride	
Amino Acids	Glycine	L-Histidine	L-Serine (Largest amount)
	L-Alanine	L-Isoleucine	L-Threonine
	L-Arginine	L-Leucine	L-Tyrosine
	L-Asparagine	L-Lysine	L-Valine
	L-Aspartic acid	L-Methionine	Taurine
	L-Citrulline	L-Ornithine	
	L-Glutamic acid	L-Phenylalanine	

Pickering Laboratories is pleased to offer our Artificial Eccrine Perspiration in a larger format – in addition to the 200 mL and 5 mL quantities, we now offer our stabilized formulation in a 950 mL volume, packaged in a 1 L plastic eluant bottle.

Storage and Handling

The stabilized solution is preserved with a fungicide and bactericide. The non-stabilized product is kept frozen.

Artificial Eccrine Perspiration	
Catalog No.	**Description**
1700-0022	Artificial Eccrine Perspiration – Not Stabilized, each (200 mL/bottle)
1700-0020	Artificial Eccrine Perspiration – Stabilized, each (200 mL/bottle)
1700-0023	Artificial Eccrine Perspiration – Custom pH, Not Stabilized, each (200 mL /bottle)
1700-0021	Artificial Eccrine Perspiration – Custom pH, Stabilized, each (200 mL/bottle)
1700-0024	Artificial Eccrine Perspiration – Stabilized, each (5 mL/bottle)
1700-0531	Artificial Eccrine Perspiration – Stabilized, each (950 mL/bottle)

Pickering Laboratories created our Artificial Eccrine Perspiration to universally standardize across all industries; it is the only formula that can satisfy all test challenges. Although it is the most complete formulation available, we also offer industry-specific artificial perspiration formulations.

Artificial Sebum

Sebum is an oily secretion produced by sebaceous glands, which spreads over the hair and skin for waterproofing purposes. Pickering Laboratories manufactures an artificial sebum formulation according to ASTM designation D4265-14 or D4265-98. It is ready-to-use and provides the reliability, reproducibility and convenience needed for testing.

D4265-14 Artificial Sebum	
Catalog No.	**Description**
1700-0700	Artificial Sebum, ASTM D4265-14, Not Stabilized, each (25 g/bottle)
1700-0702	Artificial Sebum, ASTM D4265-14, Not Stabilized, each (200 g/bottle)

Eccrine Perspiration-Sebum Emulsion

Inspired by the ASTM D4265-98 method for staining, Eccrine Perspiration is emulsified with Artificial Sebum. Prepared without dust/dirt for a more universal application, this emulsion mimics non-exercise induced skin surface film liquids (SSFL). As SSFL, it can be used to test any topical use product or the stability of any article that will come in contact with human sweat. This product requires refrigeration to remain in solution and prevent rancidity.

Eccrine Perspiration-Sebum Emulsion	
Catalog No.	**Description**
1700-0547	Artificial Eccrine Sweat-Sebum Emulsion, each (250 mL/bottle)

Product Testing Solutions

Artificial Perspiration

Continued

Artificial Apocrine Perspiration

Apocrine sweat is secreted by apocrine glands located in the areas of the body with an abundance of hair follicles such as the scalp, armpits and groins. Apocrine sweat is initially sterile and odorless but when acted upon by bacteria, it forms odorous compounds. Artificial Apocrine Perspiration was developed to mimic the composition of human apocrine sweat and contains several volatile fatty acids that are responsible for the unpleasant odor associated with it.

The ready-to-use solution is stored frozen and could be used for testing that requires the presence of malodor. It also could be used to culture bacteria that are commonly present on human skin.

Artificial Apocrine Perspiration List of Ingredients			
Metabolites	Urea	Citric Acid	Butyric Acid
	Ammonia	2-hydroxybuteric Acid	i-Valeric Acid
	Lactic Acid	3-hydroxybuteric Acid	
	Formic Acid	a-hydroxy-isobutyric Acid	
Sugars	Glucose		
Amino Acids	Alanine	Aspartic Acid	Citruline
	Glutamic Acid	Glutamine	Glycine
	Isoleucine	Leucine	Lysine Monohydrochloride
	Phenylalanine	Proline	Serine
	Threonine	Tryptophan	Tyrosine
	Valine	Creatine	
Minerals	Sodium	Iron	Nitrate
	Calcium	Copper	Sulfate
	Magnesium	Potassium	
	Zinc	Chloride	
Free Fatty Acids	Palmitic Acid	Stearic Acid	Oleic Acid
	Linoleic Acid		
Other Components	Triglycerides of Fatty Acids	Cholesterol	Squalene
	Wax Esters		

Artificial Apocrine Perspiration	
Catalog No.	**Description**
1700-0556	Artificial Apocrine Perspiration, each (250 mL/bottle)

AATCC Test Method 15 Artificial Perspiration

Colorfastness to Perspiration for Fabric

This ready-to-use solution is used to determine the fastness of colored textiles to the effects of acid perspiration. The non-stabilized formulation at pH 4.3 is kept frozen.

(Custom pH and stabilized versions available)

AATCC Test Method 15 Artificial Perspiration	
Catalog No.	**Description**
1700-0012	Artificial Perspiration, AATCC TM 15, Not Stabilized, each (200 mL/bottle)
1700-0015	Artificial Perspiration, AATCC TM 15, Stabilized, each (200 mL/bottle)
1700-0527	Artificial Perspiration, AATCC TM 15, Custom pH, Not Stabilized, each (200 mL /bottle)
1700-0528	Artificial Perspiration, AATCC TM 15, Custom pH, Stabilized, each (200 mL /bottle)
1700-0541	Artificial Perspiration, AATCC TM 15, Stabilized, case of 4 (950 mL/bottle)
1700-0555	Artificial Perspiration, AATCC TM 15, Stabilized, (19.8 L Carboy)

ANSI-BHMA A156.18 Artificial Perspiration

For Testing Builders Hardware and Finishes

This ready-to-use solution is used in the test method specified by the builder's hardware association

(Custom pH version available)

ANSI-BHMA A156.189 Artificial Perspiration	
Catalog No.	**Description**
1700-0504	Artificial Perspiration, ANSI-BHMA A156.18, Not Stabilized, each (200 mL /bottle)
1700-0512	Artificial Perspiration, ANSI-BHMA A156.18, Custom pH, Not Stabilized, each (200 mL/bottle)

Product Testing Solutions

Artificial Perspiration

Continued

BS EN 1811:2011 Artificial Perspiration

For Release of Nickel

This ready-to-use solution is used in the test method for release of Nickel from all post assembles which are inserted into pierced parts of the human body and articles intended to come into direct and prolonged contact with skin. The non-stabilized version is kept frozen.

This formulation is also chemically equivalent to method DIN 53160-22010-10 with the exception of titration by Sodium Hydroxide. Method DIN 53160 is used to determine fabric colorfastness to perspiration.

(Custom pH and stabilized versions available)

BS EN 1811:2011 Artificial Perspiration	
Catalog No.	**Description**
1700-0009	Artificial Perspiration, BS EN 1811:2011, Not Stabilized, each (200 mL/bottle)
1700-0506	Artificial Perspiration, BS EN 1811:2011, Stabilized, each (200 mL/bottle)
1700-0521	Artificial Perspiration, BS EN 1811:2011, Custom pH, Not Stabilized, each (200 mL /bottle)
1700-0515	Artificial Perspiration, BS EN 1811:2011, Custom pH, Stabilized, each (200 mL /bottle)
1700-0566	Artificial Perspiration, BS EN 1811:2011, Stabilized, (19.8 L Carboy)

DIN-EN/IEC 60068-2-70 Artificial Perspiration

For Testing Resistance of Lettering & Markings to Abrasion

This ready-to-use solution is intended for testing of resistance of lettering and markings to abrasion. Non-stabilized version is kept frozen.

DIN-EN/IEC 60068-2-70 Artificial Perspiration	
Catalog No.	**Description**
1700-0542	DIN-EN/IEC 60068-2-70 Artificial Perspiration, Not Stabilized, each (200 mL /bottle)
1700-0543	DIN-EN/IEC 60068-2-70 Artificial Perspiration, Stabilized, each (200 mL /bottle)

GMW14334 Artificial Perspiration

Tests the chemical resistance of automotive trim materials and components. Acid and alkaline perspiration solutions are formulated according to test procedure GMW14334.

GMW14334 Artificial Perspiration	
Catalog No.	**Description**
1700-0533	GMW14334 Artificial Perspiration, Acidic, each (200 mL /bottle)
1700-0534	GMW14334 Artificial Perspiration, 2-Part Alkaline, each (200 mL /bottle)

ISO 105-B07 and ISO 105-E04 Artificial Perspiration

Colorfastness to Light for Fabric

These are ready-to-use solutions that are used to test the colorfastness to light of a fabric saturated with either the acidic or alkaline solution. The pH of the acidic solution is 5.5 and that of the alkaline solution is 8.0. The non-stabilized product is kept frozen.

(Custom pH and stabilized versions available)

ISO 105-B07 and ISO 105-E04 Artificial Perspiration	
Catalog No.	**Description**
1700-0010	Artificial Perspiration, ISO 105-B07/105-E04, Acidic, Not Stabilized, each (200 mL /bottle)
1700-0507	Artificial Perspiration, ISO 105-B07/105-E04, Acidic, Stabilized, each (200 mL /bottle)
1700-0516	Artificial Perspiration, ISO 105-B07/105-E04, Acidic, Custom pH, Not Stabilized, each (200 mL/bottle)
1700-0522	Artificial Perspiration, ISO 105-B07/105-E04, Acidic, Custom pH, Stabilized, each (200 mL/bottle)
1700-0011	Artificial Perspiration, ISO 105-B07/105-E04, Alkaline, Not Stabilized, each (200 mL /bottle)
1700-0508	Artificial Perspiration, ISO 105-B07/105-E04, Alkaline, Stabilized, each (200 mL /bottle)
1700-0517	Artificial Perspiration, ISO 105-B07/105-E04, Alkaline, Custom pH, Not Stabilized, each (200 mL/bottle)
1700-0523	Artificial Perspiration, ISO 105-B07/105-E04, Alkaline, Custom pH, Stabilized, each (200 mL/bottle)

Product Testing Solutions

Artificial Perspiration

Continued

ISO 11641 Artificial Perspiration

Colorfastness to Perspiration for Leather

This ready-to-use solution is used to determine the fastness of leather to perspiration. The non-stabilized formulation at pH 8.0 and is kept frozen.

(Custom pH and stabilized versions available)

ISO 11641 Artificial Perspiration	
Catalog No.	**Description**
1700-0013	Artificial Perspiration, ISO 11641, Not Stabilized, each (200 mL/bottle)
1700-0509	Artificial Perspiration, ISO 11641, Stabilized, each (200 mL/bottle)
1700-0518	Artificial Perspiration, ISO 11641, Custom pH, Not Stabilized, each (200 mL /bottle)
1700-0524	Artificial Perspiration, ISO 11641, Custom pH, Stabilized, each (200 mL /bottle)

ISO 12870 Artificial Perspiration

Ophthalmic Optics

This ready-to-use solution is used to determine the effect of sweat on ophthalmic optics and spectacle frames. The non-stabilized formulation is kept frozen.

(Custom pH and stabilized versions available)

ISO 12870 Artificial Perspiration	
Catalog No.	**Description**
1700-0014	Artificial Perspiration, ISO 12870, Not Stabilized, each (200 mL/bottle)
1700-0510	Artificial Perspiration, ISO 12870, Stabilized, each (200 mL/bottle)
1700-0519	Artificial Perspiration, ISO 12870, Custom pH, Not Stabilized, each (200 mL /bottle)
1700-0525	Artificial Perspiration, ISO 12870, Custom pH, Stabilized, each (200 mL /bottle)

ISO 3160 Artificial Perspiration

Corrosion Resistance for Alloys

This is a ready-to-use solution that is used to determine corrosion resistance. The non-stabilized formulation is at pH 4.7 and is kept frozen.

(Custom pH and stabilized versions available)

ISO 3160 Artificial Perspiration	
Catalog No.	**Description**
1700-0026	Artificial Perspiration, ISO 3160, Not Stabilized, each (200 mL/bottle)
1700-0511	Artificial Perspiration, ISO 3160, Stabilized, each (200 mL/bottle)
1700-0520	Artificial Perspiration, ISO 3160, Custom pH, Not Stabilized, each (200 mL /bottle)
1700-0526	Artificial Perspiration, ISO 3160, Custom pH, Stabilized, each (200 mL/bottle)
1700-0532	Artificial Perspiration, ISO 3160, Stabilized, each (950 mL /bottle)
1700-0545	Artificial Perspiration, ISO 3160, Custom PH, Stabilized, each (950 mL /bottle)
1700-0557	Artificial Perspiration, ISO 3160, Stabilized, (19.8 L Carboy)

ASTM D2322 Artificial Perspiration

Resistance of Shoe Upper Leather to Artificial Perspiration

This artificial perspiration formulation is specific for breakdown of leather and is used to assess resistance to grain cracking and area loss of shoe upper. The non-stabilized solution has pH 7.5 and should be stored frozen.

(Custom pH and stabilized versions available)

ASTM D2322 Artificial Perspiration	
Catalog No.	**Description**
1700-0548	ASTM D2322-00 Artificial Perspiration, each (200 mL/bottle)
1700-0550	ASTM D2322-00 Artificial Perspiration, Stabilized, each (200 mL/bottle)

Product Testing Solutions

Artificial Saliva

AFNOR NF S91-141 Artificial Saliva

For Testing Biodegradability of Dental Metal Alloys

Artificial Saliva is prepared according to the AFNOR NF S91-141 standard procedure and is intended for testing biodegradability of dental metal alloys. The formulation consists of two parts that are mixed right before use. This minimizes changes in the solution during storage and allows for a longer shelf life. The pH of the solution after mixing is 7.8 +/- 0.1. Artificial Saliva should be stored refrigerated both before and after mixing. Premixed, ready-to-use solution is available upon request.

DIN 53160-1:2010-10 Artificial Saliva

To Determine Colorfastness of Products Intended to be Taken Into the Mouth

Artificial Saliva is prepared according to DIN 53160-1:2010-10 standard procedure. DIN 53160 specifies the method to determine colorfastness of products intended to be taken into the mouth. The formulation consists of two parts that are mixed right before use. This minimizes changes in the solution during storage and allows for a longer shelf life. The solution should be stored refrigerated both before and after mixing. The pH of the solution after mixing is 6.8 +/- 0.1.

Fusayama/Mayer Artificial Saliva

For Testing of Products for Corrosion, Colorfastness and Discoloration

This ready-to-use solution closely resembles the mineral composition of natural saliva and is the most common media used for testing dental metal alloys. This formulation is at pH 4.9+/- 0.1 and should be stored refrigerated.

(Custom formulations at different pH are available)

Artificial Saliva for Medical and Dental Research

This Artificial Saliva is formulated according to literature references for medical and dental research. This formulation has similar composition to commercially available products used to treat dry mouth and other conditions. This ready-to-use solution contains Sodium Carboxymethyl Cellulose to increase viscosity of the solution and make it behave similar to natural human saliva. This formulation can be stored at room temperature and has pH of 6.75 +/- 0.05. *This solution is only intended for product testing.*

Artificial Saliva for Pharmaceutical Research

Artificial Saliva is formulated according to literature for pharmaceutical research, such as studies of drug dissolution and drug delivery through oral mucosa. This is a ready-to-use formulation that should be stored refrigerated. The pH of the solution is 6.8 +/- 0.1.

Artificial Saliva	
Catalog No.	**Description**
1700-0301	Artificial Saliva, Fusayama/Mayer, Not Stabilized, each (200 mL/bottle)
1700-0306	Artificial Saliva, Fusayama/Mayer, Custom pH, Stabilized, each (200 mL/bottle)
1700-0307	Artificial Saliva, Fusayama/Mayer, Custom pH, Not Stabilized, each (200 mL/bottle)
1700-0309	Artificial Saliva, Fusayama/Mayer, Stabilized, 200mL
1700-0302	Artificial Saliva, AFNOR NF S91-141, 2-Part, Not Stabilized, each (200 mL /bottle)
1700-0303	Artificial Saliva, DIN 53160, 2-Part, Not Stabilized, each (200 mL/bottle)
1700-0304	Artificial Saliva for pharmaceutical research, Not Stabilized, each (200 mL /bottle)
1700-0308	Artificial Saliva, Pharmaceutical Research, Custom pH each (200 mL/bottle)
1700-0305	Artificial Saliva for medical and dental research, Stabilized, each (200 mL /bottle)
	Custom formulations available in pH range 3.0 - 6.0 request a Quote: 800-654-3330 or orders@pickeringlabs.com

Product Testing Solutions

Artificial Urine / Other

Artificial Urine for Corrosion Testing of Urological Implants, Stabilized

This artificial urine is designed for testing metallic biomaterials used to produce urological implants and catheters. This convenient product is a ready to use solution. The formulation contains non-toxic preservative to avoid bacteria growth and can be stored at room temperature. The pH of the final solution is 6.0+/- 0.4.

(Custom formulations are also available)

DIN EN 1616:1999 Artificial Urine

For Testing Sterile Urethral Catheters

Artificial Urine is prepared according to DIN EN 1616:1999 standard procedure. DIN EN 1616 specifies the method to test sterile urethral catheters. This ready-to-use solution should be stored frozen to avoid bacteria growth. The pH of the solution is 6.6.

Artificial Urine Medium for Growing Urological Pathogens

This ready-to-use solution closely resembles composition of human urine and can be used for clinical studies as well as for product testing. This formulation supports growth of wide range of urinary pathogens and it is also capable of forming crystals similar to these found in natural urinary tract infections. It can be used as negative controls in laboratory testing. The pH of the Artificial Urine Medium is 6.5. This product is stored frozen.

Artificial Urine Stabilized

This ready-to-use solution has the same composition as Artificial Urine Medium and closely resembles human urine. This formulation contains non-toxic preservative to avoid bacteria growth and can be stored at room temperature. The pH of Artificial Urine Stabilized is 6.5.

Artificial Urine	
Catalog No.	**Description**
1700-0016	Artificial Urine for Corrosion Testing of Urological Implants, Stabilized, each (200 mL/bottle)
1700-0017	Artificial Urine, DIN EN 1616:1999, Not Stabilized, each (200 mL/bottle)
1700-0018	Artificial Urine Medium for Growing Urological Pathogens, Not Stabilized, each (200 mL/bottle)
1700-0558	Artificial Urine, DIN EN 1616:1999, Stabilized, each (200 mL/bottle)

Artificial Urine (Continued)	
Catalog No.	**Description**
1700-0600	Artificial Urine, Stabilized, each (200 mL/bottle)
1700-0602	Artificial Urine, Stabilized, each (950 mL/bottle)
1700-0603	Artificial Urine, DIN EN 1616:1999, Stabilized, each (19.8 L)

Simulated Lung Fluid

Gamble's solution represents the interstitial fluid deep within the lung and is used to simulate different lung conditions. It is used in pulmonary drug delivery studies as well as in studies of particles inhalation effects. Citrate is used in Gamble's solution instead of proteins to avoid foaming and acetate instead of organic acids. Gamble's solution has a pH of 7.4. Inquire about other simulated lung fluid formulations.

Simulated Lung Fluid	
Catalog No.	**Description**
1700-0800	Gamble's Simulated Lung Fluid, Not Stabilized, each (200 mL/bottle)

Artificial Cerumen "Earwax"

Cerumen, also known as earwax, is a waxy substance secreted in the ear canal that protects and lubricates the ear canal and assists in cleaning by trapping dirt and dead skin cells. Pickering Laboratories offers artificial earwax that can be used for the testing of hearing aids, ear buds and other electronic devices meant to be used in the ears.

Artificial Cerumen "Earwax"	
Catalog No.	**Description**
1700-0701	Artificial Cerumen, Not Stabilized, each (50 g/bottle)
1700-0711	Artificial Cerumen, Not Stabilized, each (200 g/bottle)

Substitute Ocean Water

Substitute Ocean Water is prepared according to official ASTM method D1141-98. This product could be successfully used in a wide variety of tests where solution simulating sea water is required, such as oil contamination testing, detergent evaluation and corrosion testing. The pH of the solution is 8.2.

The solution is ready-to-use and is stored at room temperature. Inquire about different sizes.

Substitute Ocean Water	
Catalog No.	**Description**
1700-0801	Substitute Ocean Water, ASTM D1141-98 (2003), Not Stabilized, case of 4 (950 mL/bottle)
1700-0802	Substitute Ocean Water, ASTM D1141-98 (2003), Stabilized case of 4 (950 mL/bottle)
1700-0803	Substitute Ocean Water, ASTM D1141-98 (2003), Stabilized, each (200 mL/bottle)

General Terms & Conditions

1 Controlling Document

These T & C's and only these T & C's apply to all goods sold and services provided by Seller to Buyer. By the placement of Buyer's purchase order, Buyer consents to these T & C's and no others.

2 Terms of Payment

All payments are due and payable thirty (30) days from the date of the invoice. A service charge of 1 1/2 % per month shall apply to all invoices not paid within 30 days.

3 Security Agreement

(a) As security for Buyer's payment, Buyer grants Seller a purchase money security interest in the specific goods for which payment is due. Seller has the right to file a financing statement evidencing this security interest.

(b) This security interest shall terminate upon receipt by Seller of payment for the specific goods.

4 Delivery, Title and Risk of Loss

Title to goods and risk of loss of goods shall pass to Buyer when Seller delivers such goods to a common carrier or Buyer's agent. Delivery shall be EX Works Seller's Factory. Delivery dates agreed to by Seller are approximate only. Seller shall not be liable for, nor shall Seller be in breach of its obligations to the Buyer because of any delivery made within a reasonable time after the stated delivery date. Seller may, by written notice to Buyer, change any delivery date, and such date shall become the agreed upon delivery date unless Buyer objects to such date in writing delivered to Seller within ten (10) days of receipt of Seller's notice.

5 Force Majeure

Seller shall not be liable for any failure to deliver, or delay in the delivery of, any goods or services due to any cause beyond its control, including but not limited to natural phenomena, government actions, fires, labor disputes, or inability to obtain components, energy, materials, manufacturing facilities, or transportation. In the event of such delay, the date of delivery or performance hereunder shall be extended by a period equal to the time lost by reason of such delay. In the event Seller's production is curtailed for any of the above reasons, Seller may allocate its production to its various Buyers.

6 Seller's Liability

If Buyer notifies Seller within 30 days after the date of invoice of a claimed defect, Buyer shall concurrently offer Seller an opportunity to investigate the claim and to inspect allegedly defective goods. Failure to offer Seller such opportunity shall constitute acceptance by Buyer and a waiver of all claims for defects .If Seller determines that Buyer's claim is valid, Seller may repair the defective goods or replace the defective goods with conforming goods at the Seller's Factory. Replacement of defective goods will only be made upon return of the defective product.

7 Seller's Remedies

If Buyer fails, with or without cause, to furnish Seller with specifications and/or instructions for, or refuses to accept deliveries of, any of the products sold under this contract, or is otherwise in default under or repudiates this contract or any other contract with Seller or fails to pay when due any invoice under this contract, then in addition to any and all remedies allowed by law, Seller without notice (1) may deter shipment under this or any contract between Buyer and Seller until such default, breach or repudiation is removed and/or (2) may cancel any undelivered portion of this and/or any other contract in whole or in part, Buyer remaining liable for damages.

8 Patent Indemnity

(a) Seller shall, at its own expense, defend any suit that is instituted against Buyer to the extent such suit alleges that any goods, other than prototypes, or any part thereof sold or leased hereunder infringes on any United States patent, trademark, or copyright (except goods covered by Section 8(b) below), provided that such alleged infringement does not arise from any modification or addition to the goods by anyone other than Seller, or the use of such goods as a part of or in combination with any other device or parts or from the use of such goods to practice any method or process. Provided further that the Buyer gives Seller immediate notice in writing of any such suit and permits Seller, through counsel of its choice, to answer the charge of infringement and defend such suit; and the Buyer gives Seller all the needed information, assistance, and authority, at Seller's expense, to enable Seller to defend or settle such suit. In the case of a final award of damages in any such suit, Seller shall pay such award but shall not be responsible for any settlement made without its prior written consent. In the event the use, lease, or sale of the goods is enjoined, Seller may at its own option and expense: (1) procure for Buyer the right to use, lease, or sell such goods, (2) replace such goods, (3) modify such goods, or (4) remove such goods and refund the purchase price paid by Buyer less a reasonable sum for use, damage, and obsolescence. THIS SECTION STATES SELLER'S TOTAL RESPONSIBILITY AND LIABILITY, AND THE BUYER'S SOLE REMEDY FOR ANY ACTUAL OR ALLEGED INFRINGEMENT OF ANY PATENT, TRADEMARK, OR COPYRIGHT BY ANY GOODS DELIVERED HEREUNDER OR ANY PART THEREOF. THIS SECTION 8 IS IN LIEU OF AND REPLACES ANY OTHER EXPRESS, IMPLIED OR STATUTORY WARRANTY AGAINST INFRINGEMENT.

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General Terms & Conditions / Distributors

9 Order Cancellation

Buyer may, at any time, cancel its purchase of goods or services but only by paying 15 % of the purchase price if such cancellation is received by Seller more than 90 days before the scheduled delivery date, 50 % if received more than 45 days but less than 90 days, 75 % if received more than 15 days but less than 45 days, and 100 % if received less than 15 days.

10 Warranty and Limitation of Liability

1) IN NO EVENT SHALL SELLER BE LIABLE FOR ANY LOSS PROFITS, INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES
RESULTING FROM SELLER'S PERFORMANCE OR FAILURE TO PERFORM HEREUNDER OR THE FURNISHING, PERFORMANCE, OR USE OF ANY GOODS OR SERVICES SOLD PURSUANT HERETO.(2) IN NO EVENT SHALL THE AMOUNT OF SELLER'S LIABILITY EXCEED THE AMOUNTS PAYABLE BY BUYER HEREUNDER. (3) IN NO EVENT SHALL SELLER BE LIABLE FOR DAMAGES RELATING TO ANY INSTRUMENT, EQUIPMENT OR APPARATUS WITH WHICH THE GOODS SOLD HEREUNDER ARE USED (4) SELLER EXPRESSLY DISCLAIMS ANY LIABILITY FOR ANY WARRANTY, EXPRESS, IMPLIED OR STATUTORY, INCLUDED BUT NOT LIMITED TO WARRANTY OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, EXCEPT SUCH WARRANTIES EXPRESSLY IDENTIFIED AS WARRANTIES AS ARE SET FORTH IN SELLER'S CURRENT OPERATING MANUAL, CATALOG OR OTHER WRITTEN GUARANTY COVERING THE PRODUCT.

11 General

(a) The sale of goods shall be governed by Uniform Commercial Code and others laws of the State of California and Santa Clara County, California shall be the appropriate venue and jurisdiction for the resolution of disputes hereunder.

(b) The Buyer may not assign its rights or obligations under this acknowledgment without the prior written consent of Seller, and any purported assignment without such consent shall have no force or effect.

(c) Any waiver by Seller of any default by the Buyer hereunder shall not be deemed to be a continuing waiver of such default or a waiver of any other default or any of the terms and conditions of this acknowledgment.

(d) These T & C's may not be superseded, modified, or amended except in writing stating that there is such a modification and signed by an authorized representative of each party hereto, provided, however that Seller may modify the specifications of the goods sold hereunder if such modification does not change the form, fit, or function of such goods.

(e) This document constitutes the entire terms and conditions agreement between the Buyer and Seller with regard to the goods or services purchased or provided and expressly supersedes and replaces any prior or contemporaneous agreements, written or oral relating to such goods or services.

(f) Any lawsuit, sounding either in contract or tort, must be filed within a year from the date of delivery of the goods/services to the Buyer.

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http://www.lctech.de/

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Analytical Technologies
http://www.analytical.com/

AGS Analitica SA
http://www.agsanalitica.com/

Australia
Walker Scientific
http://www.walkerscientific.com.au/

Thermo Fisher Scientific, Inc.
http://www.fishersci.com/

Belize
Biokim
http://www.biokimsa.com/

Brazil
Chemetric Instrumentação Analítica Ltda
http://www.chemetric.com.br/

Cromatec do Brasil Comercio de Instrumentos Cientificos Ltda
http://www.cromatec.com.br/

Nova Analitica Imp. Exp. Ltda
http://www.analiticaweb.com.br/

Agilent – Brazil
http://www.agilent.com.br/

Interprise Instrumentos Analiticos Ltda.
http://www.interprise.com.br/

Canada
Chromatographic Specialties, Inc.
https://www.chromspec.com/

VRW – Canada
https://ca.vwr.com/

Fisher Scientific Canada
https://www.fishersci.ca/

Chile
Perkin Elmer Chile Limitada
http://www.perkinelmer.com/

China & Hong Kong Territories
Tegent – China
Http://www.tegent.com.cn/

Ameritech Scientific Corporation
http://www.ameritechsc.com.cn/

Columbia
Casa Cientifica
Http://www.casacientifica.com/

Khymos
http://www.khymos.com/

Commonwealth of Independent States
LC Tech GmbH
http://www.lctech.de/

Costa Rica
Orgoma S.A.
http://www.orgoma.com/

Electrónica Centroamérica S.A.
http://www.biocientifica.net/

Analytical Instruments
http://www.ai.co.cr/

Egypt
LC Tech GmbH
http://www.lctech.de/

El Salvador
Servicios Tecnicos De Ingenieria (SETISA)
http://www.setisa.com.sv/

Europe
LC Tech GmbH
http://www.lctech.de/

Guatemala
Biokim
http://www.biokimsa.com/

Honduras
Orgoma S.A.
http://www.orgoma.com/

Biokim
http://www.biokimsa.com/

India
Spinco Biotech Pvt Ltd
http://www.spincotech.com/

Indonesia
P.T. Berca Indonesia
https://www.berca-indonesia.com/

PT. Perkindo Mitra Analitika
http://www.perkinelmer.com/

Israel
Manbar
http://www.manbar.co.il/

Korea
Insung Chroma-Tech Co., Ltd.
http://www.insung.net/

YOUNG IN Chromass Co., Ltd.
http://www.youngincm.com/

Interface Engineering Co Ltd
http://www.interface.co.kr/

Laos
Fortune Scientific Co., Ltd.
http://www.fortunesci.co.th/

Malaysia
IT Technologies Pte Ltd
http://www.ittech.com.sg/

Thermo Fisher – Malaysia
http://www.fishersci.com.my/

Lab Alliance Sdn Bhd – Malaysia
http://laballiance.com.my/

Distributors

Mexico
DIRASA
http://www.dirasa.com.mx/

Rekner – SA. de C.V
http://rekner.com/

VWR International S de R.L. de C.V.
https://mx.vwr.com/

Perkin Elmer – Mexico
http://www.perkin-elmer.mx/

Agilent – Mexico
http://www.agilent.com/

Middle East
LC Tech GmbH
http://www.lctech.de/

New Zealand
Thermo Fisher – New Zealand
http://www.thermofisher.co.nz/

Alphatech Systems Limited
http://www.alphatech.co.nz/

Shimadzu Oceania Pty Ltd.
http://www.shimadzu.com.au/

Nicaragua
Orgoma S.A.
http://www.orgoma.com/

Biokim
http://www.biokimsa.com/

Central American Merchandising Co.
http://cammia.us/crouse.html/

Panama
Analytical Technologies
http://www.analytical.com/panama/

Paraguay
ASM
http://www.asm.com.uy/

Peru
Cientifica Andina S.A.C.
http://www.asm.com.uy/

Puerto Rico
VWR – Puerto Rico
https://pr.vwr.com/

Singapore
IT Technologies Pte Ltd
http://www.ittech.com.sg

Perkin Elmer – Singapore
http://www.perkinelmer.com/

Thermo Fisher Scientific Pte Ltd – Singapore
http://www.fishersci.com.sg/

Agilent – Singapore
http://www.agilent.com/

South Africa
Anatech Instruments (Pty) Limited
http://anatech.co.za/

Chemetrix Pty Ltd.
http://chemetrix.co.za/

Sri Lanka
Techno Solutions Pvt.Ltd
http://www.technospl.com/

Taiwan
Analab Corporation
http://www.analab.com.tw/

Vercotech Inc.
http://www.vercopak.com.tw/

Inpac Technologies, Inc.
http://inpac.myweb.hinet.net/

Scientech Corp.
http://www.scientech.com.tw/

Thailand
Fortune Scientific Co., Ltd.
http://www.fortunesci.co.th/

Uruguay
Ridaline
http://www.ridaline.com/

ASM
http://www.asm.com.uy/

United Staes
Fisher
http://www.fishersci.com/

VWR International/USA
https://us.vwr.com/store/

Chrom Tech, Inc.
http://www.chromtech.com/

Alliance Calibrations Group, LLC (East Coast)
http://www.acalgroup.biz/

Kaydeetek (West Coast)
http://www.kaydeetek.com/

P.J. Cobert Associates Inc
http://www.cobertassociates.com

Quantum Analytics
http://www.lqa.com/

Government Scientific Source
http://www.govsci.com/

Unitech USA
http://www.unitechusa.com/

Agilent Technologies, Inc.
http://www.agilent.com/

Perkin Elmer
http://www.perkinelmer.com/

MG Scientific
http://www.mgscientific.com/

MLS Technologies
http://www.mlstechnologies.com/

Shimadzu Corporation
http://www.shimadzu.com/

Venezuela
Corporacion Cientifica Venezolana, C.A.
http://www.ccv.com.ve/

Vietnam
Tegent
http://tegent.com.vn/

TRAMAT Co., Ltd
http://www.tramat.com.vn/

Saigon Instrumentation Joint Stock Company (SISC)
http://www.sisc.com.vn/

TRANSMED Co., Ltd
https://www.transmed.com.vn/

West Indies
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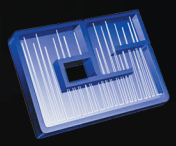

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