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.

Onyx PCX

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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.

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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

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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

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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.

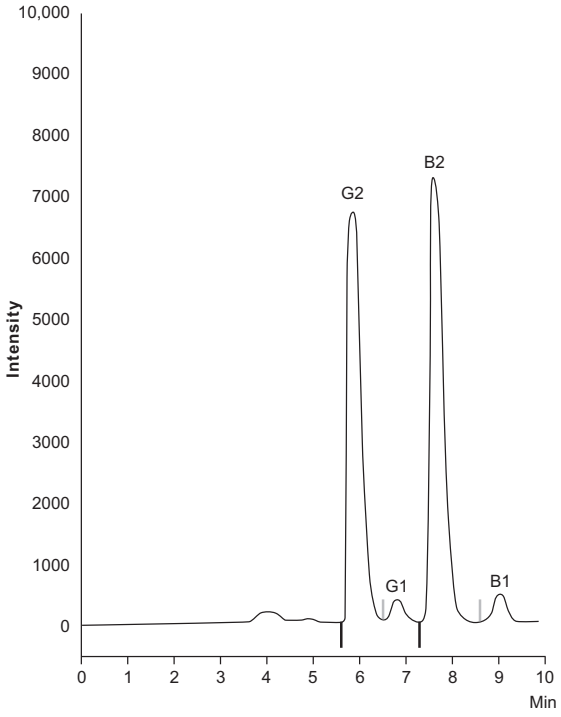
The photochemical reactor has a 254 nm lamp and a knitted reactor coil.

Feature Highlights

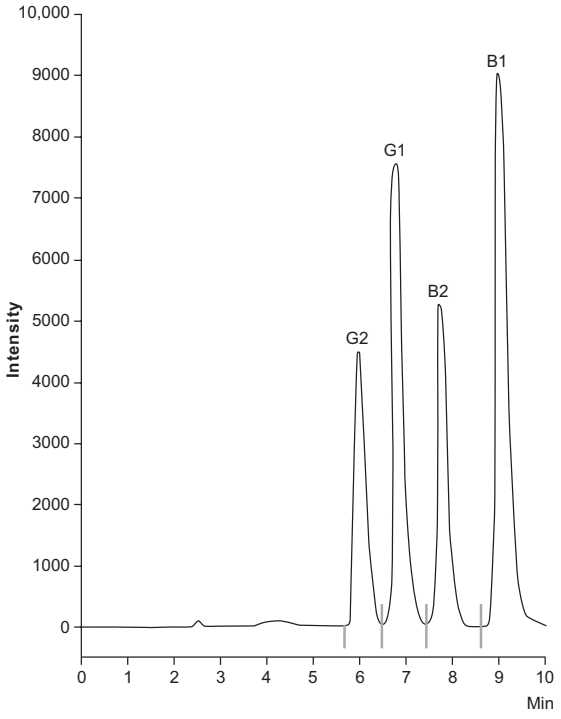
- 254 nm UV low pressure lamp with cooled reflector tube
- Long term stability of lamp and coil
- High light transmission
- Robust steel housing to meet laboratory requirements
- Specially designed fluorocarbon coil
- Comparable to electrochemical derivatization with Cobra Cell
- AOAC accepted methodology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

UV Derivatization Results in Clear Peaks for Aflatoxins

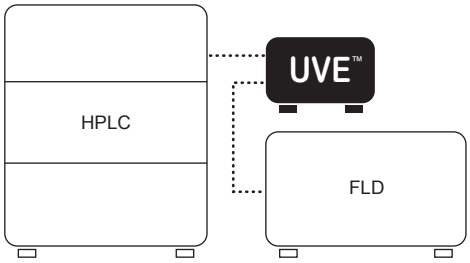
Note the short run time: B1 elutes at 9.5 Min



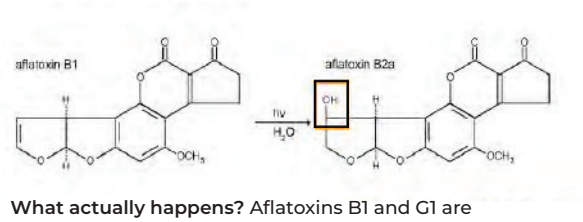
Without UVE™: Low response for G1 and B1



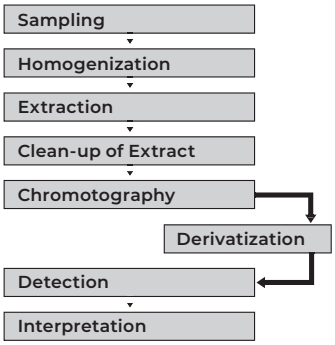
With UVE™: High response and no band spreading



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