HIGH PERFORMANCE, ROBUST, EASY-TO-USE MULTI-ELEMENTAL ANALYSIS

SOLATION
ICP-MS

Advion Interchim
scientific

INDUCTIVELY COUPLED PLASMA MASS SPECTROMETRY

Advion Interchim Scientific™ has produced the SOLATION® ICP-MS - the ultimate instrument for multi-element analysis, providing high sensitivity measurement of trace elements from a wide range of matrices. Designed for ease-of-use, with intuitive software, the SOLATION® ICP-MS is the ideal instrument for environmental, pharmaceutical, food safety, agricultural, cannabis, hemp, and clinical laboratories everywhere.

SOLATION ICP-MS

INCREASE YOUR THROUGHPUT, DECREASE YOUR WORKLOAD

The thoughtfully designed SOLATION® ICP-MS puts the power of trace, multi-elemental analysis in your hands by simplifying and optimizing the typical ICP-MS workflow, inside and out.

The SOLATION® ICP-MS offers a state of the art quadrupole deflector that ensures the analyzer and detector stay clean, and improves S/N by preventing neutrals and particles from entering the analyzer.

ADVANCED, INTUITIVE SOFTWARE FOR SPEED AND EASE OF USE

The SOLATION® ICP-MS is delivered with a full suite of robust, intuitive software designed to provide answers with the fewest clicks, including:

ICP-MS Express: Provides seamless workflow to configure and control the instrument with integrated control of peripherals, including: peristaltic pump, liquid autosampler and Rapid Sample Interface. The program offers an easy to use interface for system control, method development, sample entry and data acquisition.

Quant Express: Simple user interface for batch processing of ICP-MS data for versatile quantitative analysis and easy creation of reports.

MAXIMIZE EFFICIENCIES WITH ICP-MS

For quantitative, elemental analyses, the SOLATION® ICP-MS is the ideal system for high-throughput laboratories seeking the perfect mix of performance and ease-of-use.

ADVANCE YOUR APPLICATIONS WITH MULTI-ELEMENTAL ANALYSIS AT YOUR FINGERTIPS

Adding the SOLATION® ICP-MS to your lab opens up a world of possibilities for environmental, biomedical, food, agriculture and geological testing and research.

Food and Agriculture: Ensure the quality and safety of food and raw ingredients by relying on the power of ICP-MS for full elemental analysis. Ideal for meeting regulatory requirements for cannabis and hemp analysis in all legalized jurisdictions.

Environmental Analysis: Ensure Earth's most precious resources remain viable with the help of ICP-MS technology. Determine purity of drinking water, well water, waste water and soils, and use the system as a tool to monitor industrial site remediation.

Biomedical: Increase your throughput for toxicity and nutrition in biological matrices, including urine, serum, plasma, whole blood and tissue samples. Satisfy the allowable limits in pharmaceutical and clinical applications with a single instrument.

THE SOLATION® ICP-MS

Ion extraction cones

Triple-cone ion extraction. The third extraction cone, followed by an Einzel lens, are electrically controlled to maximize transmission of ions into the vacuum system.

RF coil

Plasma generation with water cooled RF coil using industry standard 27 MHz variable frequency generator for rapid impedance matching and ultimate performance with challenging matrices.

Torch

One-piece, demountable torch with fast, one-step connection of argon and ignitor. Optional shield to prevent secondary discharge.

Nebulizer

High efficiency nebulizer available in quartz for compatibility with the widest range of flow rates and sample composition.

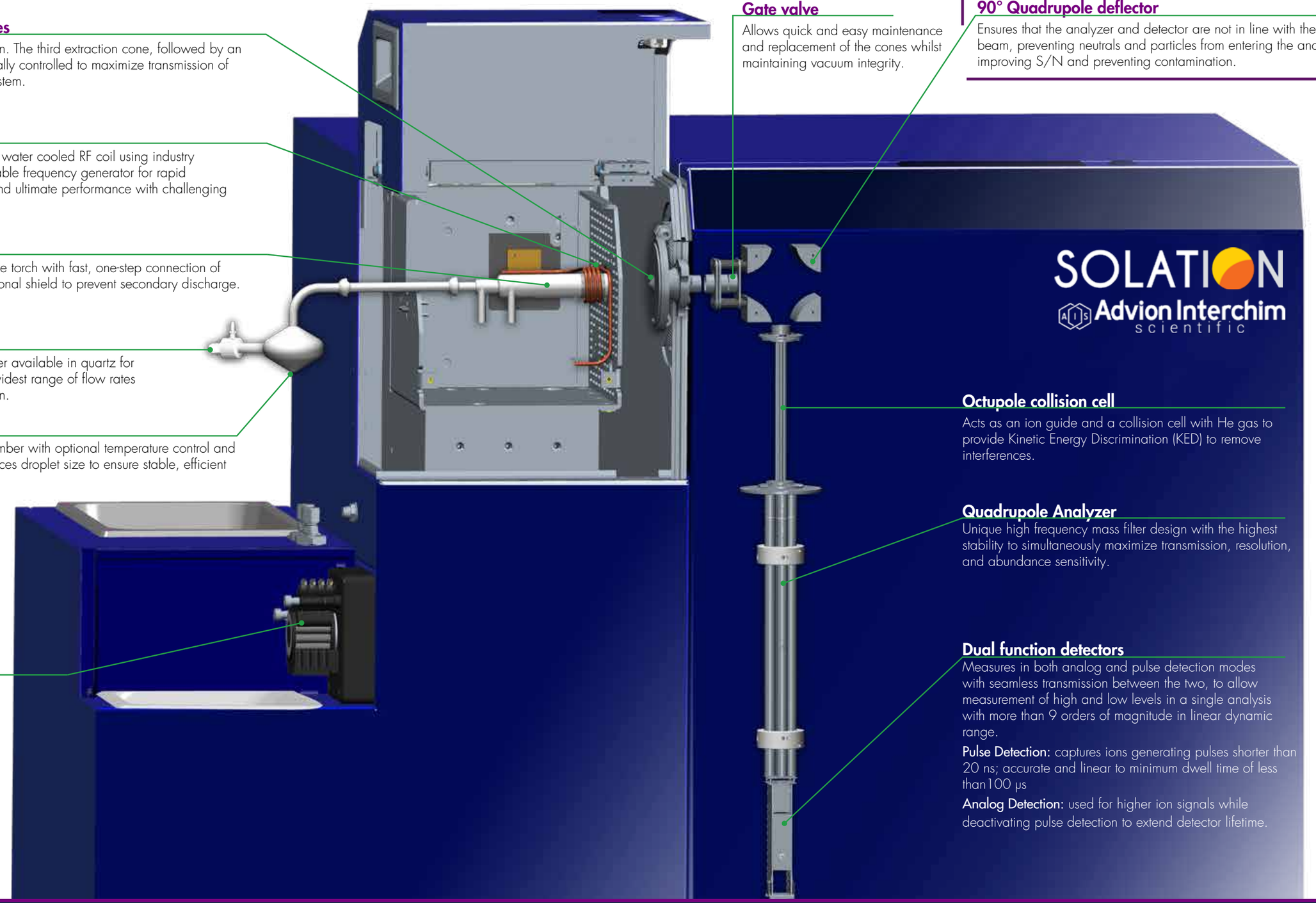
Spray chamber

The cyclonic spray chamber with optional temperature control and dilution gas further reduces droplet size to ensure stable, efficient plasma.

Peristaltic pump

Integrated 4-channel, 12-roller pump for maximum flexibility and ultra-low pulsation.

Software controlled flow rate from low µL/min to 1 mL/min.



Gate valve

Allows quick and easy maintenance and replacement of the cones whilst maintaining vacuum integrity.

90° Quadrupole deflector

Ensures that the analyzer and detector are not in line with the plasma beam, preventing neutrals and particles from entering the analyzer, improving S/N and preventing contamination.

Octupole collision cell

Acts as an ion guide and a collision cell with He gas to provide Kinetic Energy Discrimination (KED) to remove interferences.

Quadrupole Analyzer

Unique high frequency mass filter design with the highest stability to simultaneously maximize transmission, resolution, and abundance sensitivity.

Dual function detectors

Measures in both analog and pulse detection modes with seamless transmission between the two, to allow measurement of high and low levels in a single analysis with more than 9 orders of magnitude in linear dynamic range.

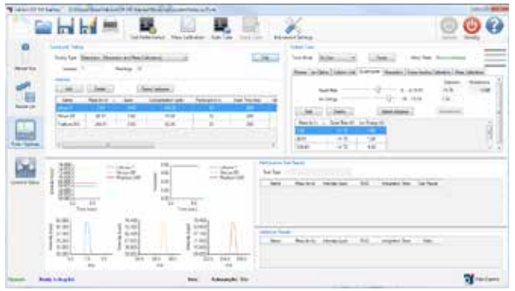
Pulse Detection: captures ions generating pulses shorter than 20 ns; accurate and linear to minimum dwell time of less than100 µs

Analog Detection: used for higher ion signals while deactivating pulse detection to extend detector lifetime.

SOLATION® ICP-MS SOFTWARE PACKAGE

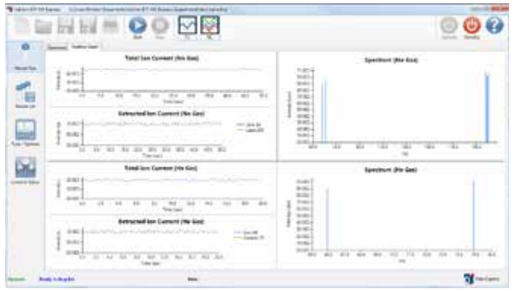
A modern user interface to help simplify method development, experiment creation and data acquisition – starting and completing your run with just a single click.

Experience a simplified user interface and streamlined workflow for optimized, automatic calibration and tuning.



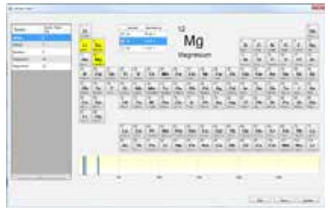
- Autotune, including x,y position of torch, for resolution and maximum sensitivity with minimum creation of oxides and doubly charged species.
- Optimize mass calibration, detector gain and pulse to analog factor
- Reporting on 9 performance tests for instrument specifications:
  - › Background
  - › Abundance Sensitivity
  - › Resolution and Mass Calibration
  - › Detection Limit
  - › Sensitivity
  - › Oxide
  - › Doubly Charged
  - › Isotope Ratio Precision
  - › Pulse/Analog Calibration
- Real time display of spectrum and time-resolved signals

Achieve optimized data acquisition with real time graphing of spectrum and time resolved signals during manual runs or batch acquisition.



With ICP-MS Express, data collection is automatically optimized by selecting the pulse or analog data stream for each element depending on signal intensity. Thanks to built-in onboard databases, users can access easy, automatic element selection and interference correction, with the ability to utilize:

- A graphical periodic table to select elements to analyze



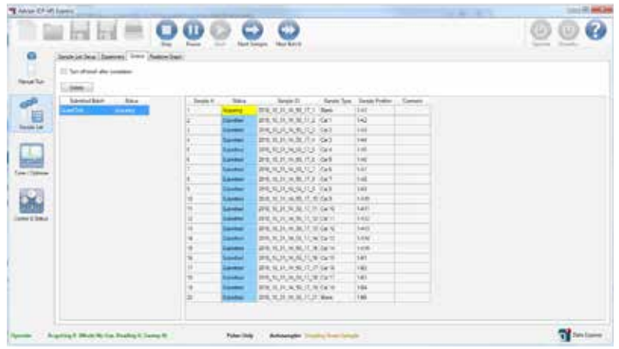
- NIST isotope table
- Standard interference correction equations (user editable)
- Standard list of excluded masses (user editable)

Access qualitative, semi-quantitative and full quantitative data acquisition modes

- View raw data from pulse, analog or auto signals in qualitative mode
- Semi quantitative feature allows scanning for unknowns during quantitative analyses

UPGRADE YOUR WORKFLOW WITH ICP-MS EXPRESS

Optimized sample list for easy workflow



ICP-MS Express simplifies your setup to quickly and easily create experiment batches.

- Multiple sample lists can be submitted.
- Sample lists can be copied and pasted from spreadsheets like Excel
- Simple editing and reprocessing.
- Supports autosampler position and vial size selection

Quantitative calibration curve for meticulous accuracy

With ICP-MS Express, the quantitation method supports:

- External standard (with or without internal standard)
- Elemental and Isotope Ratio reporting
- Quality Control standards
- Standard addition

Automatically applies interference corrections, if selected, and records semi quantitative results in the same report

FOOD AND AGRICULTURE

Fast and reliable testing methods for safety and nutrition in plant material and foodstuffs, including screening and speciation analysis of raw ingredients, final products, and beverages.

ANALYZING HEAVY METAL IN HEMP WITH THE SOLATION® ICP-MS

The SOLATION® ICP-MS is the preferred method for heavy metal analysis of hemp materials. The system is suitable for the accurate, robust and reproducible analysis of heavy metals in hemp plant material – greatly exceeding the requirements of USP <233> protocol.

PDE limits for states that use the USP guidelines for heavy metal exposure by inhalation.

USP<233> also defines the accuracy, repeatability, and ruggedness required for the analysis of these toxic elements:

Accuracy	Repeatability	Ruggedness
The matrix and materials under investigation must be spikes with target elements at concentrations that are 50%, 100%, and 150% of the maximum permitted daily exposure (PDE). Mean spike recoveries for each target element must be within 70%-150% of the actual.	Six independent samples of the material under investigation must be spiked at 100% of the target limits defined and analyzed. The measured percent relative standard deviation (%RSD) must not exceed 20% for each target element.	Carrying out the repeatability measurement testing procedure by analyzing the six repeatability test solutions either on different days, either with a different instrument or by a different analyst. The %RSD of the 12 replicates must be less than 25% for each target element.

Accuracy: The samples were spiked at 50%, 100%, and 150% of the action level (Table 2 above) and the percent recoveries calculated. Spike recoveries were all between 92.5% - 114.1%, well within the 70-150% range defined by the USP method.

Spike Recoveries Averages	^{75}As ng/g	^{111}Cd ng/g	^{202}Ha ng/g	^{208}Pb ng/g
Hemp unspiked avg.	42.2	305.6	5.7	52.5
50% Spike avg.	142.0	402.9	52.6	314.4
% recovery	**99.8%**	**97.4%**	**93.6%**	**104.8%**
100% Spike avg.	242.7	501.4	99.6	622.9
% recovery	**100.3%**	**97.9%**	**93.8%**	**114.1%**
150% Spike avg.	342.2	637.6	144.5	818.8
% recovery	**100.0%**	**110.7%**	**92.5%**	**102.2%**

Repeatability: Six hemp samples were spiked at 100% of the action level and digested. The results that are summarized in Table 7 show that the %RSD of the measured concentrations are between 1.3% - 3.7%, demonstrating repeatability well below the 20% limit.

Repeatability	^{75}As ng/g	^{111}Cd ng/g	^{202}Hg ng/g	^{208}Pb ng/g
Hemp 100% spk 1	247.60	512.12	94.94	628.41
Hemp 100% spk 2	242.88	529.00	99.86	558.30
Hemp 100% spk 3	247.44	505.00	92.70	569.59
Hemp 100% spk 4	243.11	535.74	94.65	569.80
Hemp 100% spk 5	241.05	530.53	99.59	565.71
Hemp 100% spk 6	242.42	520.98	104.68	578.92
Average	244.08	522.23	97.74	578.46
SD	2.8	11.8	4.4	25.4
%RSD (< 20%)	**1.1%**	**2.3%**	**4.6%**	**4.4%**

Ruggedness: The repeatability sample set was prepared and run on a different day by a different analyst. The results from that run are combined with the previous run to determine the ruggedness. The ruggedness values are similar to the repeatability values and the measured %RSD (2.4 – 4.0%) are comfortably under the 25% limit defined by the USP method.

Ruggedness	^{75}As ng/g	^{111}Cd ng/g	^{202}Hg ng/g	^{208}Pb ng/g
Day 1 Hemp spike 1	247.60	512.12	94.94	628.41
Day 1 Hemp spike 2	242.88	529.00	99.86	558.30
Day 1 Hemp spike 3	247.44	505.00	92.70	569.59
Day 1 Hemp spike 4	243.11	535.74	94.65	569.80
Day 1 Hemp spike 5	241.05	530.53	99.59	565.71
Day 1 Hemp spike 6	242.42	520.98	104.68	578.92
Day 2 Hemp spike 1	239.12	488.82	102.34	625.59
Day 2 Hemp spike 2	249.26	504.43	103.79	574.59
Day 2 Hemp spike 3	233.68	478.98	98.79	564.66
Day 2 Hemp spike 4	246.33	512.50	95.95	568.29
Day 2 Hemp spike 5	244.67	508.67	97.66	570.90
Day 2 Hemp spike 6	229.10	496.94	97.83	583.11
Average	242.22	510.31	98.57	579.82
SD	5.9	17.1	3.7	23.0
%RSD (< 25%)	**2.4%**	**3.3%**	**3.8%**	**4.0%**

THE SOLATION® ICP-MS GREATLY EXCEEDS THE REQUIREMENTS OF USP <233>.

SOLATION® ICP-MS IN BIOMEDICAL & PHARMACEUTICAL APPLICATIONS

The reliability and high-throughput capabilities of the SOLATION® ICP-MS put it as the centerpiece of any modern bioanalytical lab.

SOLATION® ICP-MS PRODUCT SPECIFICATIONS

Model Options

System Model Options

Available models	HM and E

Sample Interface

Sample Introduction

Peristaltic pump	4 channels 12 rollers
Spray chamber	T-controlled, Cyclonic, Quartz
Spray chamber T (°C) (optional)	-10 to 10
Nebulizer	PFA and Quartz

Plasma

Torch	
Rf generator frequency (MHz)	27
Rf generator power (W)	500-1600

Optics

Cones	Cu or Ni
Sampler cone i.d.	1mm
Skimmer cone i.d.	0.4mm
Extraction cone i.d.	3mm
Lens	Einzel
Optics	90° quad deflector

Mass Spectrometer

Collision Cell

Collision cell type	Octupole
Kinetic energy discrimination	Yes
No. Gases	1 (He)

Detector

Dwell time (µs)	100
Linear dynamic range	> 9 orders

Mass Spectrometer

Mass range (u)	2-260 (212 for E)
Resolution	0.9
Scan speed (u/s)	5000
Abundance sensitivity m-1	1.00E-07
Abundance sensitivity m+1	1.00E-07

Performance Specifications

Sensitivity (Kcs/ppb)

7Li	>20
9Be	>3
115In	>50
205Ti	>40

Detection Limits (ppt)

9Be	<1
115In	<0.5
209Bi	<0.5

Other Specifications

CeO/Ce (%)	<2.5
Ba^{++}/Ba^{+} (%)	<3
Background cps (@ *m/z* 220)	<1
Stability, 20 min (%)	<3
Stability, 2 hours (%)	<4
107Ag/109Ag (%)	<0.5

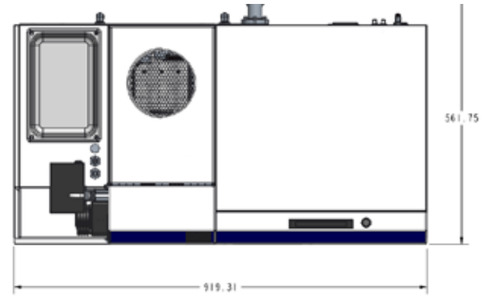
Installation Requirements

Installation, Facility Requirements

Size: W X D X H (cm)	90 x 66 x 70 cm
Volume (m3)	0.42
Weight (Kg)	115
Argon (99.95% mL/min)	24
Cell gas (mL/min)	10 (99.999% He)

Environmental Requirements

Operating Temperature	15 to 30 °C (59 – 86 °F). Performance specifications require +/- 2 °C from calibration temperature
Operating Humidity	10% and 80% RH, non-condensing



Peripheral Equipment & Sample Inlets

Autosampler

Simplifying sample introduction, increasing throughput

The ASX-560 Autosampler offers:

- Optional dual rinse station
- Optimal chemical compatibility
- Redefined and configurable XYZ movement
- Integrated enclosure (optional)

Sample Racks

Vials	Opening	Vial Compatibility
90	13.3 mm round	8 mL round bottom or 7 mL flat bottom
60	17.0 mm square	14 mL or 15 mL
21	30.5 mm square	50 mL

Rapid Sample Introduction

More sample throughput, less time

The ASX$_{\text{PRESS PLUS}}$ rapid sample introduction accessory reduces time required for autosampler movement, sample uptake, stabilization and rinse operations, thereby reducing sample run times significantly.

Sample Introduction Step	Time Required
1. Autosampler Movement	5 sec.
2. Sample Uptake	15 sec.
3. Stabilization	20 sec.
4. Measurement	10 sec.
5. Rinse	30 sec.

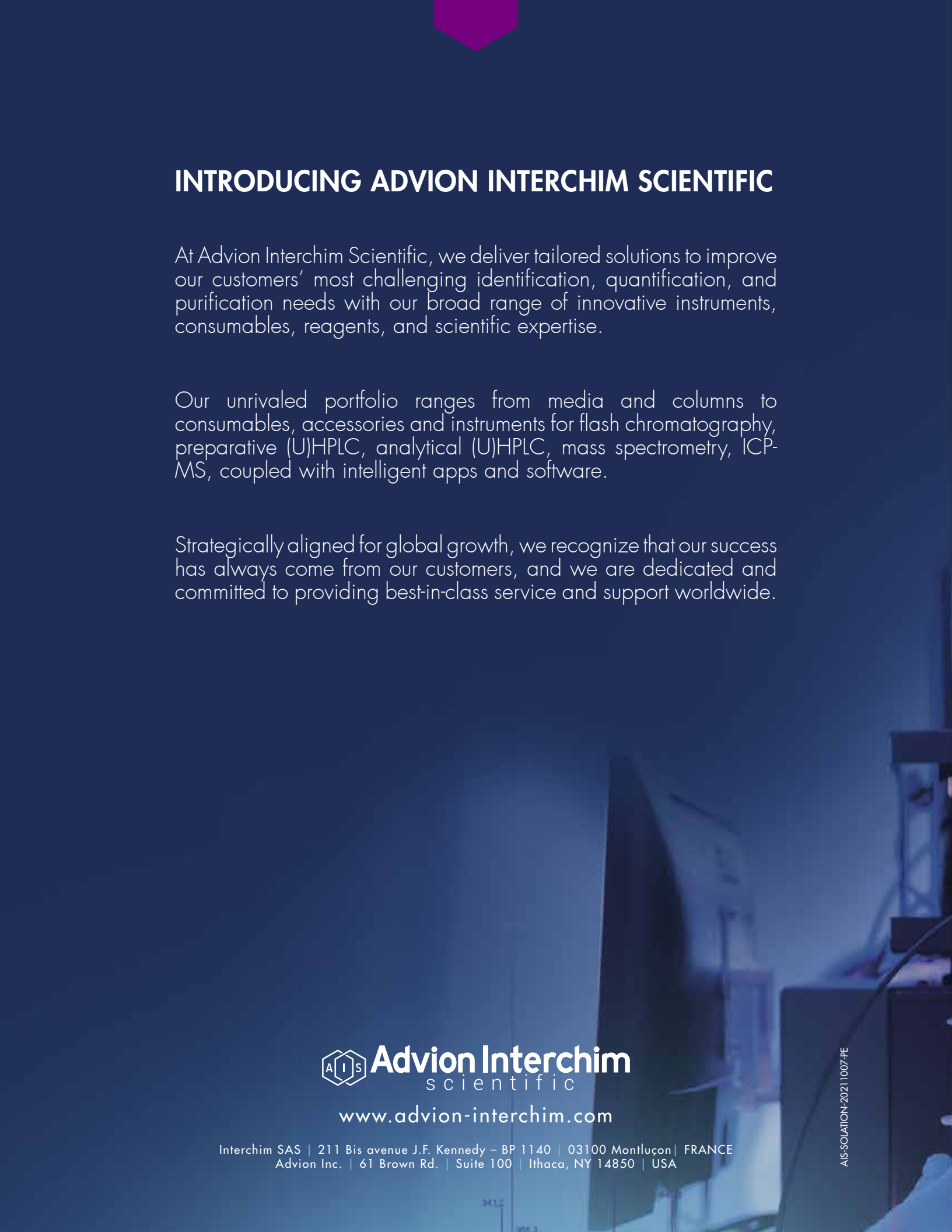
Sample Introduction Step	Time Required
1. Autosampler Movement, Sample Uptake, Stabilization and Rinse	20 sec.
2. Measurement	10 sec.
Total Time	**30 sec.**

INTRODUCING ADVION INTERCHIM SCIENTIFIC

At Advion Interchim Scientific, we deliver tailored solutions to improve our customers' most challenging identification, quantification, and purification needs with our broad range of innovative instruments, consumables, reagents, and scientific expertise.

Our unrivaled portfolio ranges from media and columns to consumables, accessories and instruments for flash chromatography, preparative (U)HPLC, analytical (U)HPLC, mass spectrometry, ICP-MS, coupled with intelligent apps and software.

Strategically aligned for global growth, we recognize that our success has always come from our customers, and we are dedicated and committed to providing best-in-class service and support worldwide.



Advion Interchim scientific

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