



# The Agilent ICP Workflow Automation System



Looking for ways to get more out of your ICP analysis workflow? While increasing automation can boost lab efficiency, bringing in third-party automation accessories can add complexity.

Only Agilent offers a completely integrated ICP workflow automation system—comprising hardware, software, and support—designed to free up your analysts for more productive pursuits. Our simple and reliable single-vendor solution integrates automated calibration, dilution, analysis, and reporting to lower your cost-per-sample and turnaround time while improving the quality of your results.

Reduce the hassle of dealing with multiple vendors and improve your lab's efficiency with the Agilent ICP workflow automation system.

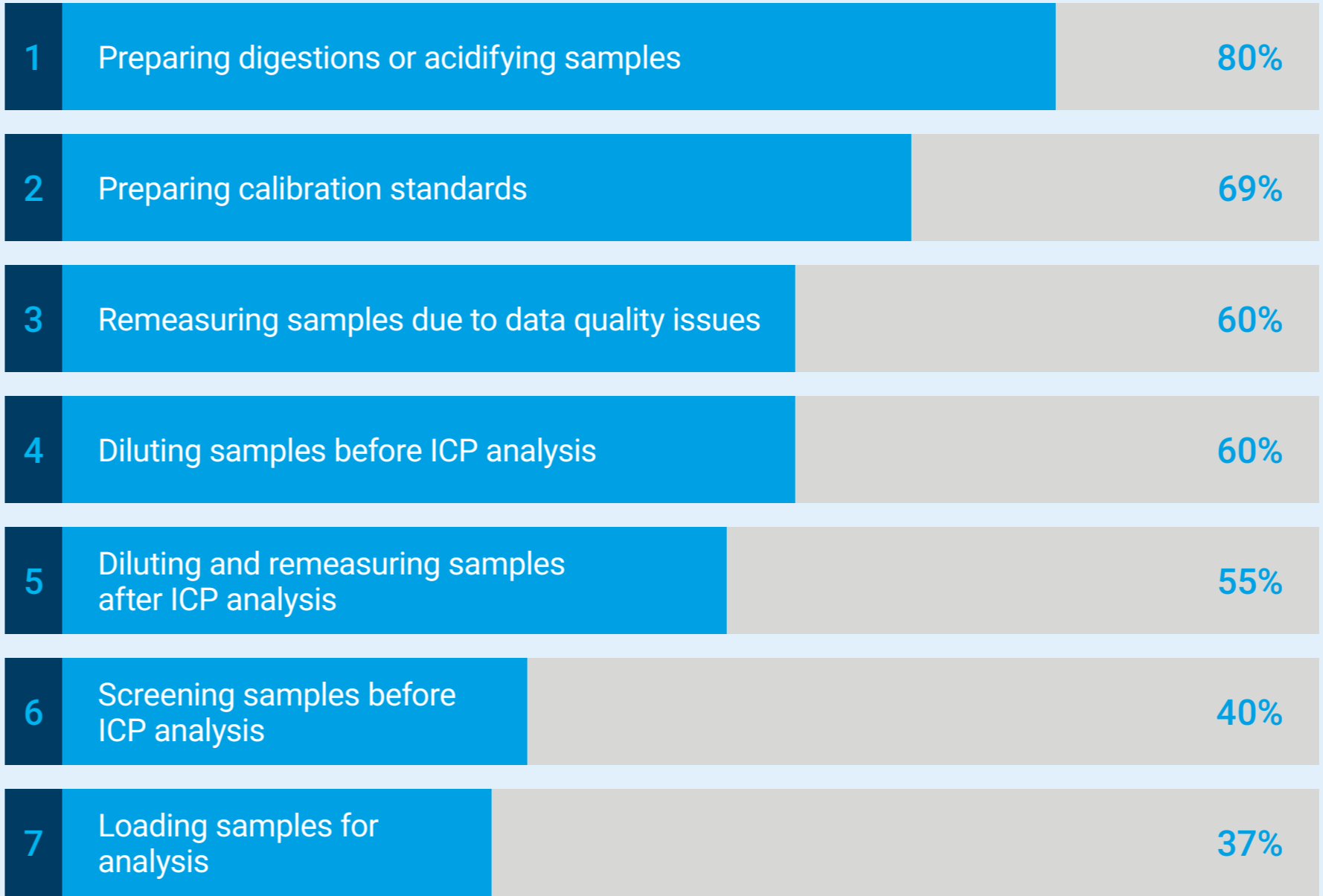
## Benefit of automation

Automating manual tasks can have big payback for your lab, including:

- Improved data quality with consistent, automated dilutions
- Increased revenue from higher sample throughput
- One analysis—no reruns, data reported same day
- Less sample handling and contamination
- Reducing labware—vials and pipettes
- Staff can concentrate on more value-adding tasks

# Improving Your ICP Workflow Efficiency

A 2024 poll found that preparing calibration standards, remeasuring samples and diluting samples ranked 2nd, 3rd and 4th as the most time-consuming manual tasks. Many labs are seeking to automate these tasks to improve productivity.



\* Results from an online poll of over 120 laboratories, conducted in 2024

# Improving Your ICP Workflow Efficiency

Manual tasks, such as preparing calibration standards and samples for analysis, consume time and effort. Automating these manual tasks is a great way to reduce the risk of human error and increase the sample throughput of your lab.

Agilent has a range of accessories that will improve the automation and efficiency of your ICP analysis, from autosamplers through to automatic dilution systems.



# Improving Your ICP Workflow Efficiency

Lab managers are implementing more laboratory automation due to staff shortages, delayed analytical reports, occupational health compliance, result variation between analysts, and the need to reduce the cost per sample.



# The Integrated, All-Agilent ICP Automation System

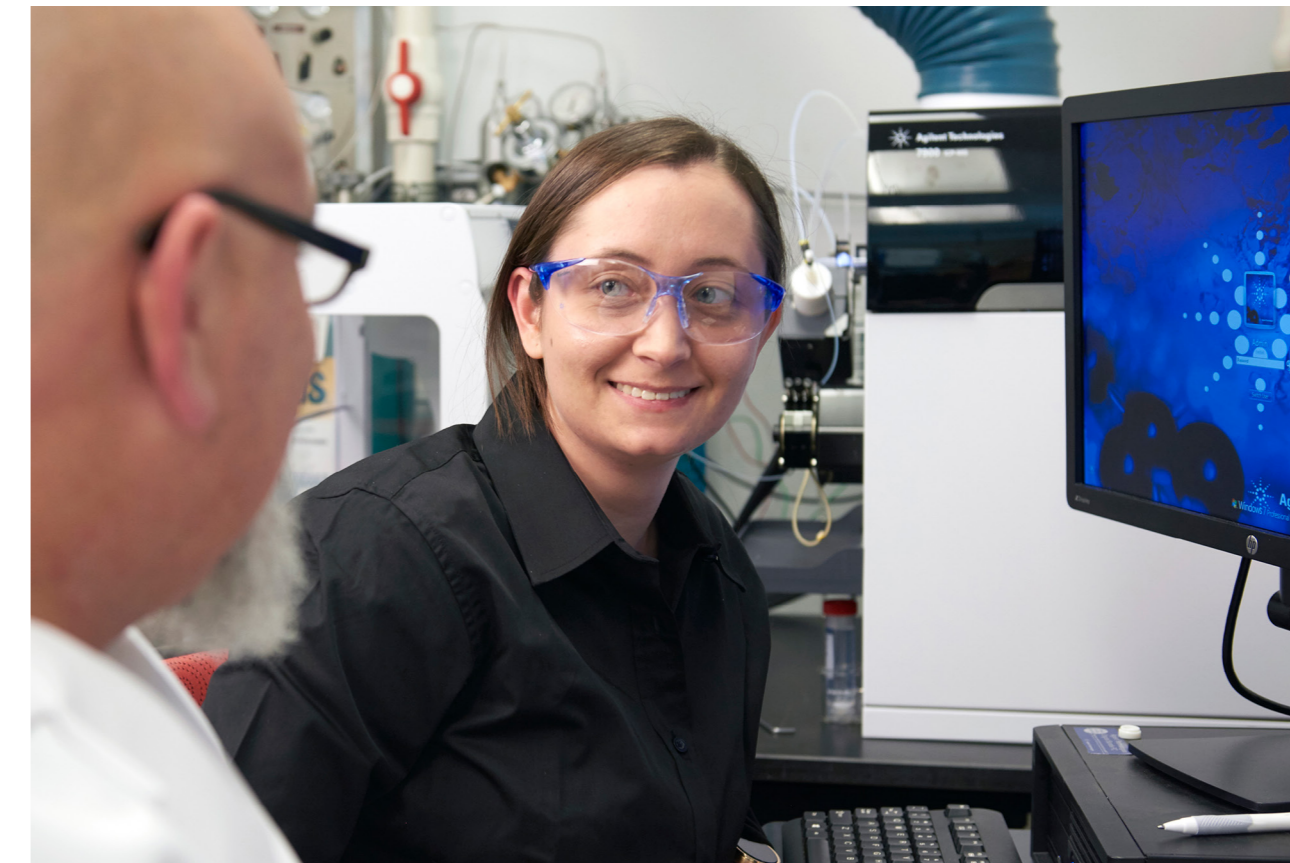
Increasing productivity



## Why all-Agilent?

Our all-Agilent workflow automation systems:

- Are fully-integrated. There's no 3rd party.
- Are optimized for Agilent ICPs.
- Are designed to work as one system, with all settings included in the method and advanced features that can only be achieved when software and hardware are designed as one.
- Offer a simpler purchasing process and faster product support from a single point of contact.
- Require less staff training with only one software platform to learn.
- Contain no surprises. The system is tested to Agilent's strict QC requirements.



Having an all-Agilent system means one call, one field service engineer, and one trusted company to work with.

# Agilent Advanced Dilution System

## ADS 2 Autodilutor

Designed and manufactured by Agilent, the Advanced Dilution System (ADS 2) integrates with Agilent ICP-OES and ICP-MS instruments.

The autodilutor automates all common dilution tasks, including:

- Preparing calibration standards
- Premeasurement dilution of samples
- Reactive dilution and remeasurement of overrange samples
- Reactive dilution after internal standard or QC solution failure

Control of the autodilutor is an integral part of the instrument software (both ICP-OES and ICP-MS). Like the autosampler and switching valve, the autodilutor settings form part of the method.

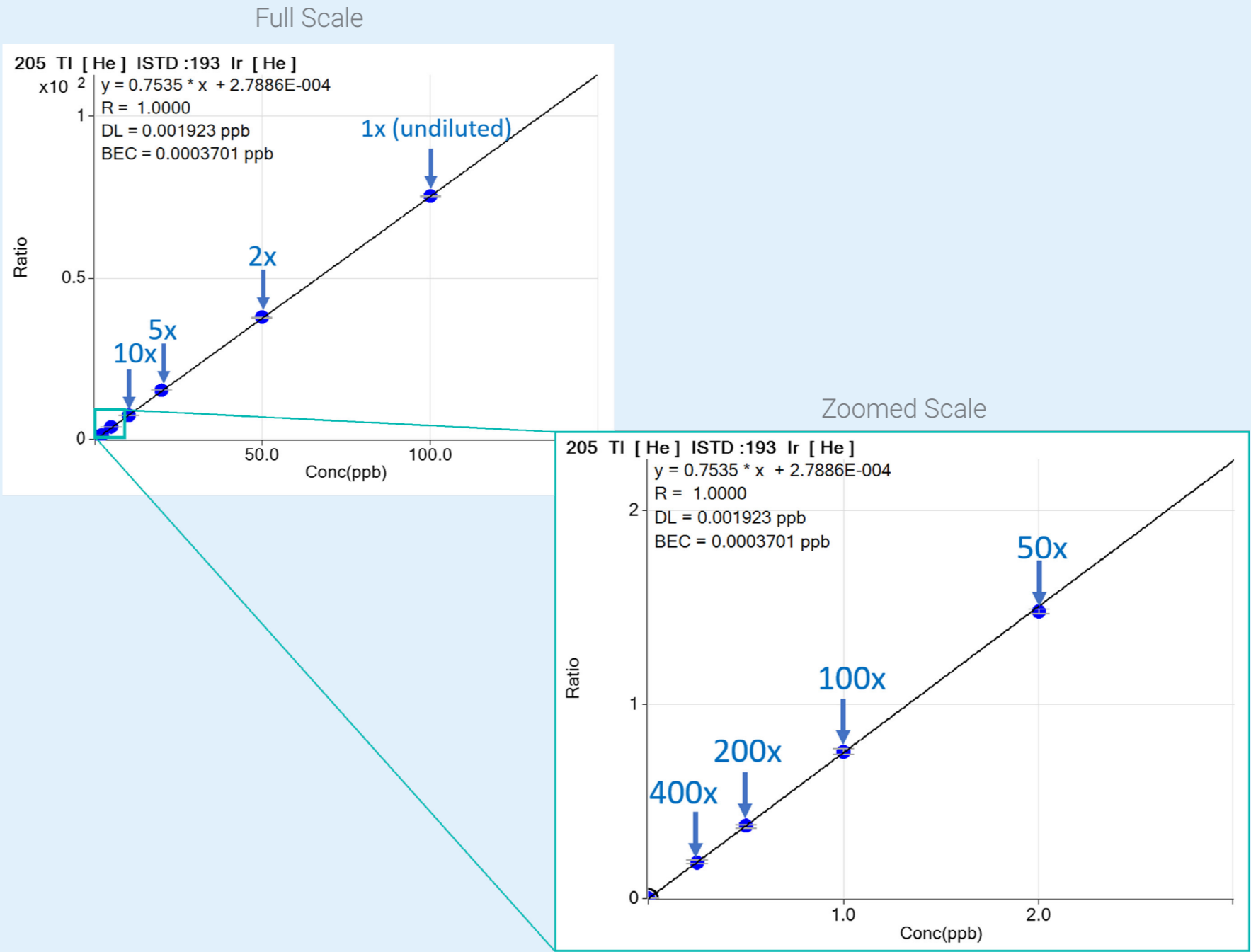
Unlike other autodilutors, samples that don't require dilution bypass the autodilutor, so there's almost no increase in analysis time.



# Features and Benefits of the Autodilutor

## Automatic standard preparation

Specify which purchased or lab-prepared stock solutions are to be used to prepare standards, nominate the calibration range and the number of standards and the autocalibration assistant feature will prepare all the standards for you. The autodilutor can prepare up to 400 fold dilutions. Automated standard preparation means less handling of reagents, increasing safety and reducing contamination.



Dilutions of a single stock solution from 1x to 400x

# Features and Benefits of the Autodilutor

## Targeted dilutions

Customized methods can be created for the autodilutor. Using the 'Dilution Lists' function, you can choose to dilute samples that are over-range only for a particular element, avoiding unnecessary dilutions that can impact sample consumption and throughput. This functionality is helpful if your samples have high levels of matrix elements, such as sodium in brine samples.

Skip	Sample Type	Sample Name	Comment	Vial#	File Name	Replicates	Level	Total Dil.	Auto Dilution	Dilution List	Dilution Multiplier	Final Weight or Volume
<input type="checkbox"/>	Sample	Sample 001		2101				4807.6923	10.00		5.0000	
<input type="checkbox"/>	Sample	Sample 002		2501				4310.3448	50.00		1.0000	
<input checked="" type="checkbox"/>	Sample	Sample 003		2402				5813.9535	10.00	Be,Zn,Fe,Cu,Cd,Pb	5.0000	
<input type="checkbox"/>	Sample	Sample 004		2303								
<input type="checkbox"/>	Sample	Sample 005		2204								
<input type="checkbox"/>	Sample	Sample 006		2105								
<input type="checkbox"/>	Sample	Sample 007		2505								
<input type="checkbox"/>	Sample	Sample 008		2406								
<input type="checkbox"/>	Sample	Sample 009		2307								
<input type="checkbox"/>	Sample	Sample 010		2208								
<input type="checkbox"/>	Sample	Sample 011		2201								
<input type="checkbox"/>	Sample	Sample 012		2102								
<input type="checkbox"/>	Sample	Sample 013		2502								
<input type="checkbox"/>	Sample	Sample 014		2403								
<input type="checkbox"/>	Sample	Sample 015		2304								
<input type="checkbox"/>	Sample	Sample 016		2205								
<input type="checkbox"/>	Sample	Sample 017		2106								
<input type="checkbox"/>	Sample	Sample 018		2506								
<input type="checkbox"/>	Sample	Sample 019		2407								
<input type="checkbox"/>	Sample	Sample 020		2308								
<input type="checkbox"/>	Sample	Sample 021		2301								
<input type="checkbox"/>	Sample	Sample 022		2202						Be,Zn,Fe,Cu,Cd,Pb		
<input type="checkbox"/>	Sample	Sample 023		2103						Be,Zn,Fe,Cu,Cd,Pb		

## Features and Benefits of the Autodilutor

### Results summary report

Automatically select and display the optimal results for each element in a sample—from all the measurements taken. Export this data set, or all data, to LIMS. All data is retained for integrity purposes.

Simplifying data review frees up your skilled analyst's time and automating sample preparation and reactive dilutions delivers less errors and greater result consistency.

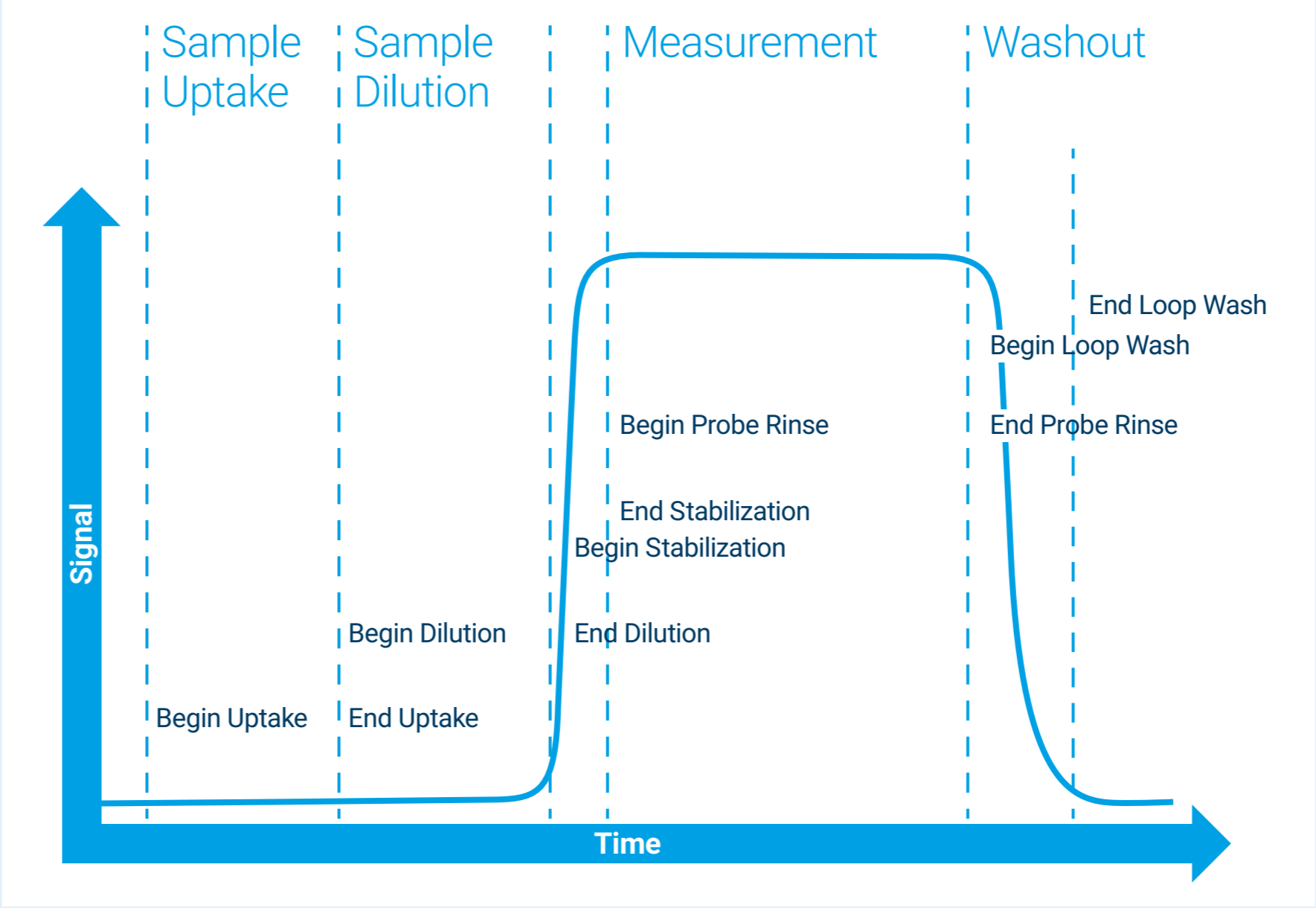
Solution Label	Al 237.312 nm mg/L	As 188.980 nm mg/L	Ba 455.403 nm mg/L	Fe 238.204 nm mg/L	Fe 239.563 nm mg/L
Summary	538.80	0.41	6.62	897.20	849.50
Original	497.65 o	0.41	6.62	758.60 o	736.63 o
Dilution -10	53.88	0.04	0.76	89.72	84.95

### Features and Benefits of the Autodilutor

#### Setting optimization tools

Enter the tubing lengths and the sample loop size into the Conditions Calculator function and it will determine the optimum settings to be used.

The Timing Monitor function watches the measurement signal and reports important system actions to make sure everything is as expected. You can use the information to fine-tune method conditions or assist with troubleshooting.



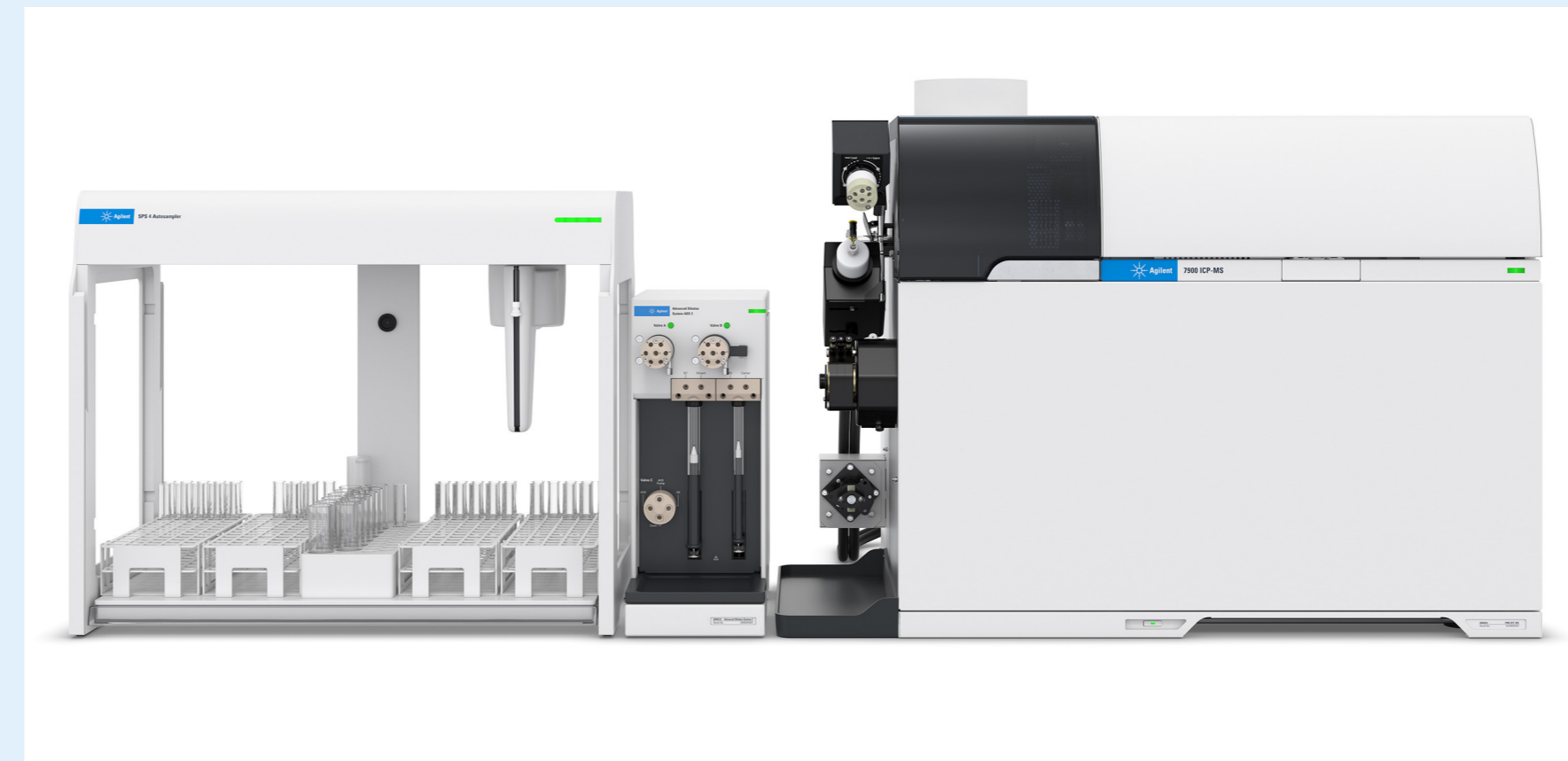
## Features and Benefits of the Autodilutor

### Easy setup

Designed for simplicity of use and lowest cost of ownership, the autodilutor has a small footprint for close-coupling with your ICP and autosampler to minimize tubing lengths and maximize sample throughput.

All tubing is pre-plumbed, color-coded and labeled for easy installation and maintenance.

Adding the autodilutor to an ICP system increases overall lab productivity as the automation of manual tasks frees up analysts' time.

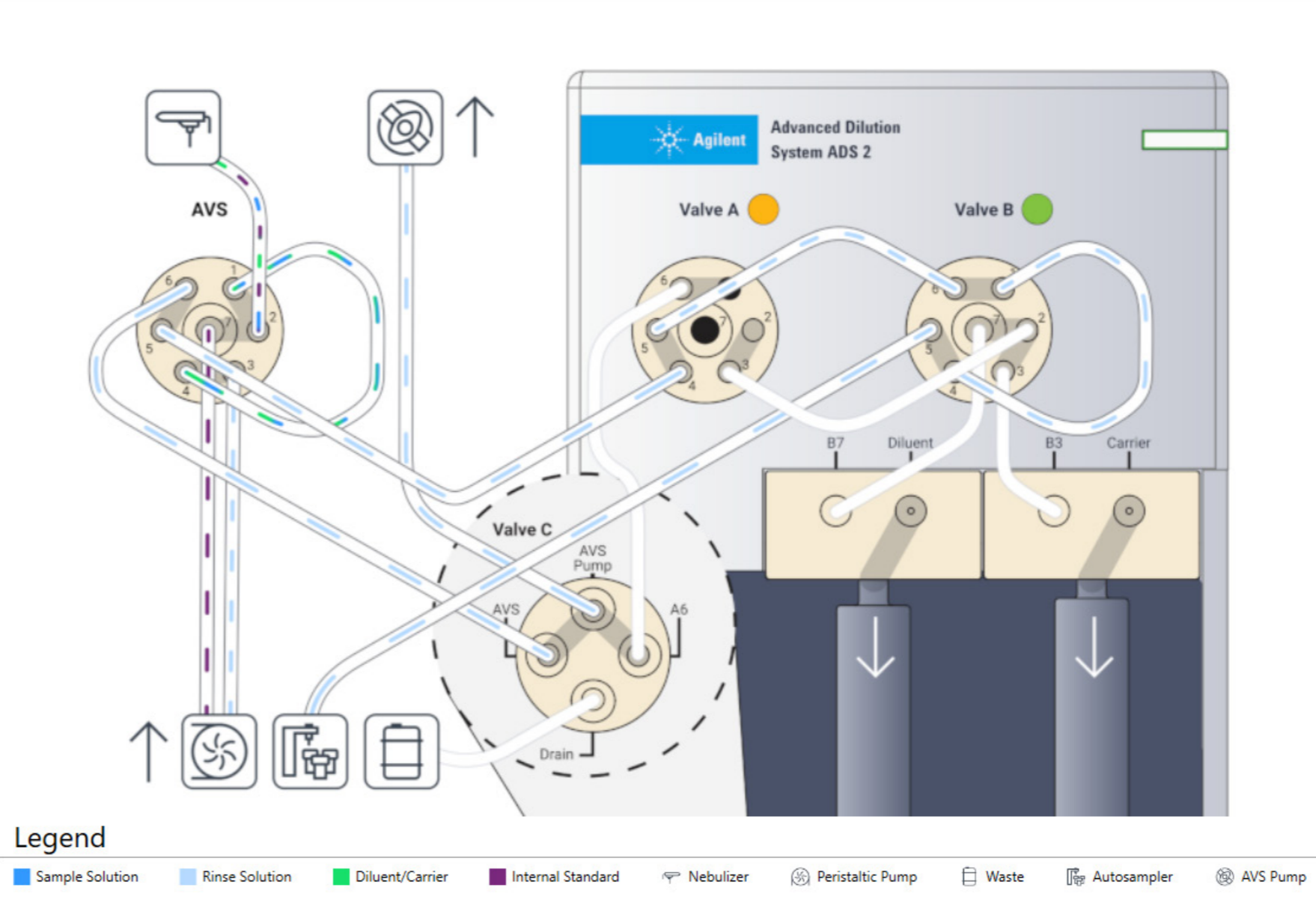


# Features and Benefits of the Autodilutor

## Find the path

A real-time flow-path animation shows the direction of flow for sample, internal standard, rinse, diluent and carrier solutions as the autodilutor operates. The diagram and the accompanying Help and Learning Centre aid quick set up, learning (i.e. less staff training) and troubleshooting.

Delivering Dilution

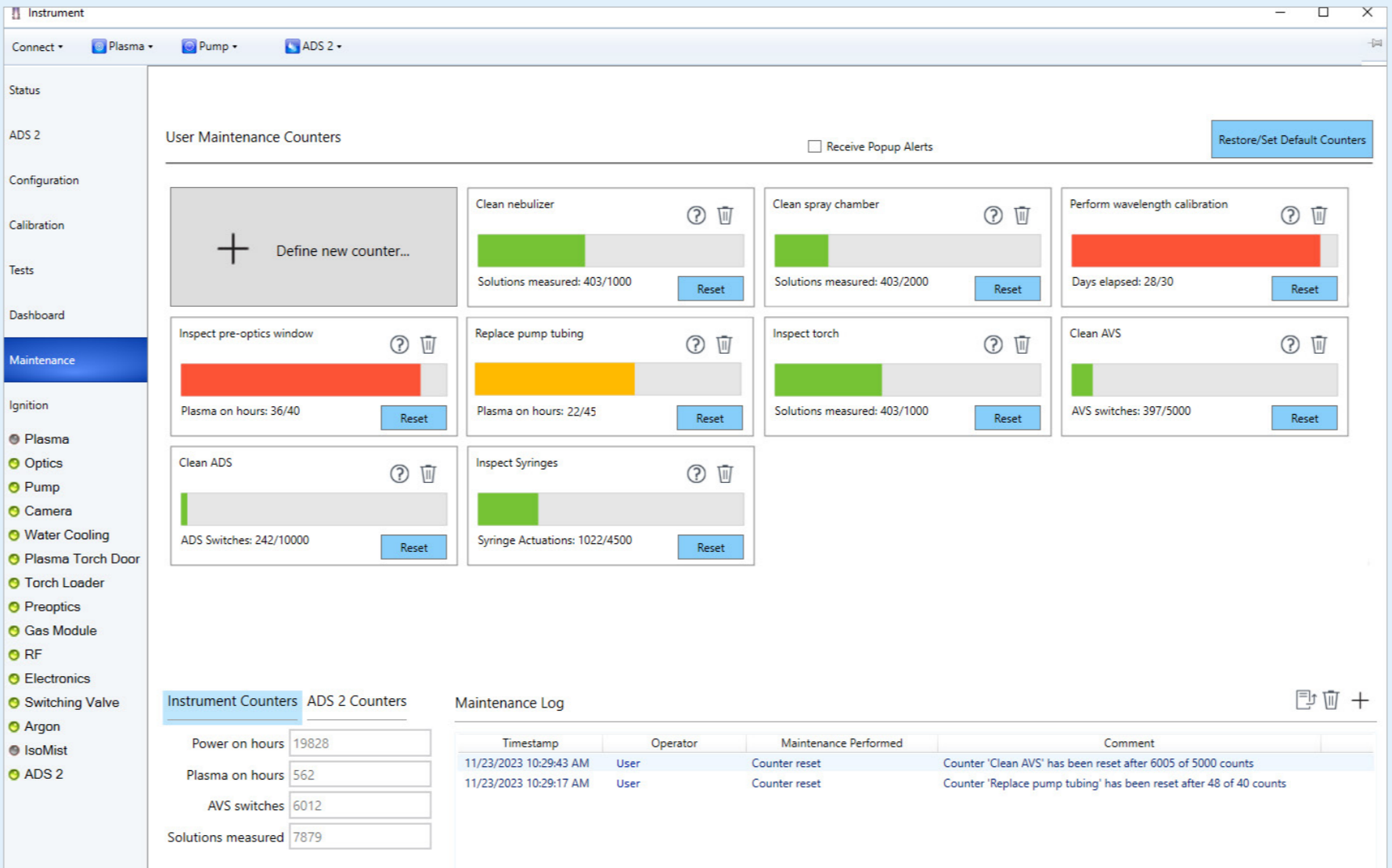


# Features and Benefits of the Autodilutor

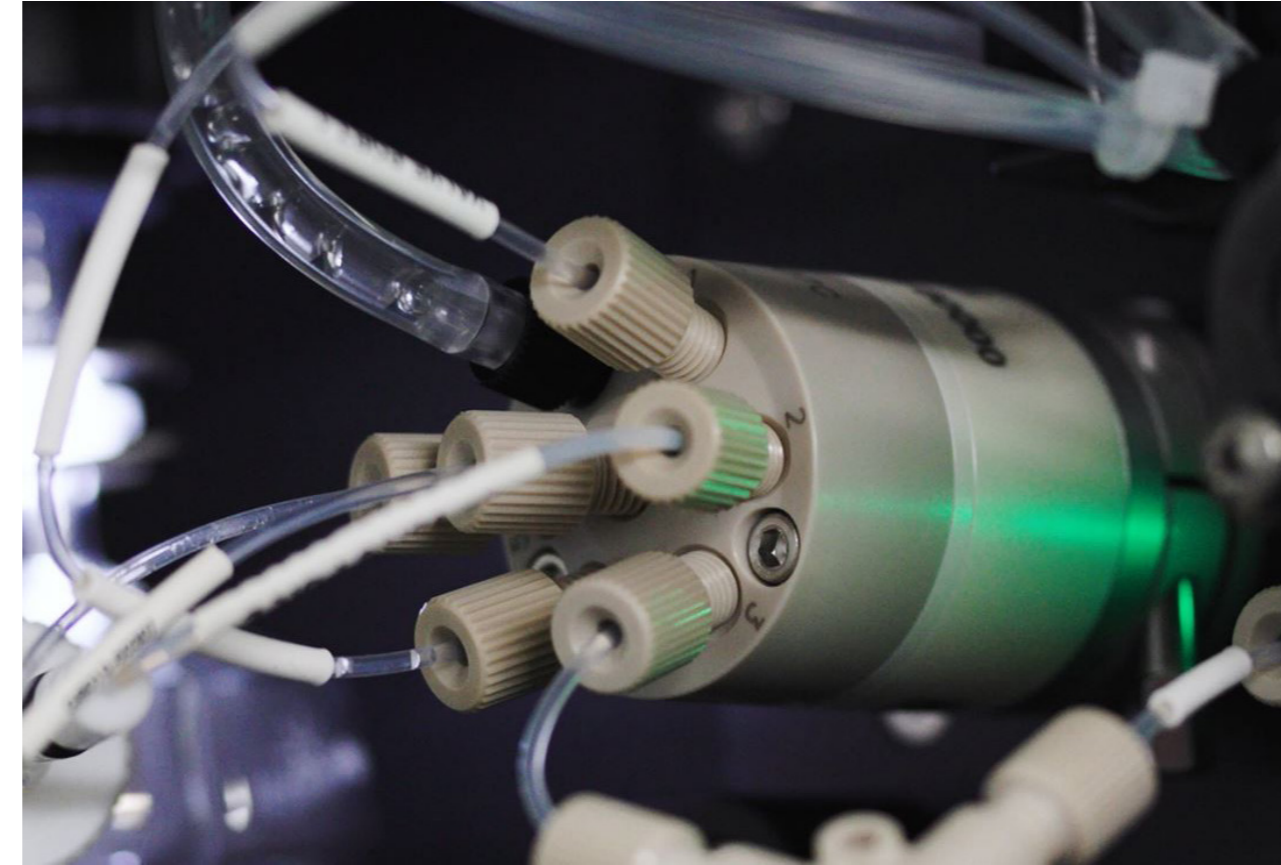
## Smart system health tracking

The Early Maintenance Feedback function notifies the analyst when cleaning and maintenance is required. Traffic light color-coding of the counters visually shows which maintenance activities should be done immediately, and which can wait. The function monitors the instrument, autodilutor, and switching valve.

The instrument self test function includes testing of the autodilutor, identifying any incorrectly connected tubing.



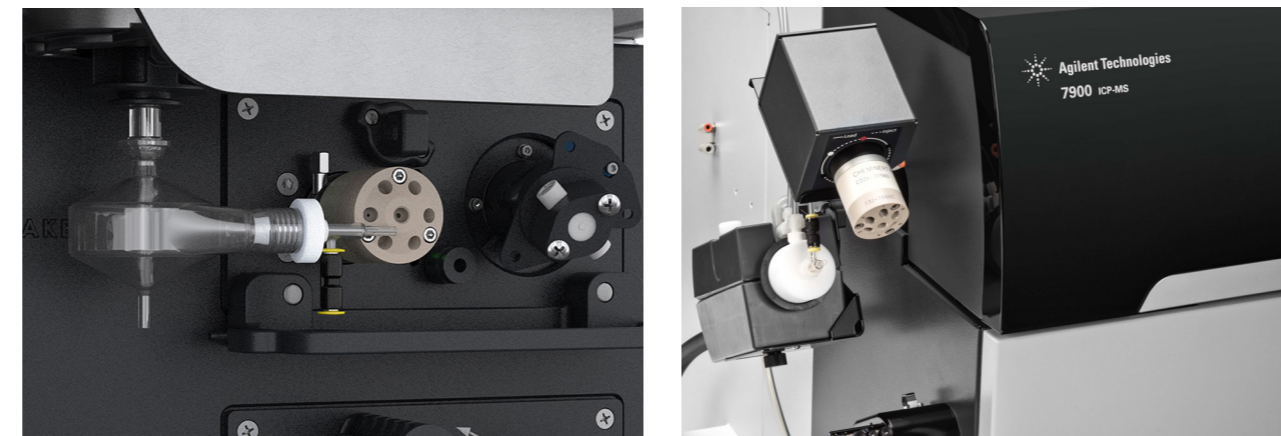
# Switching Valve



## Advanced Valve System

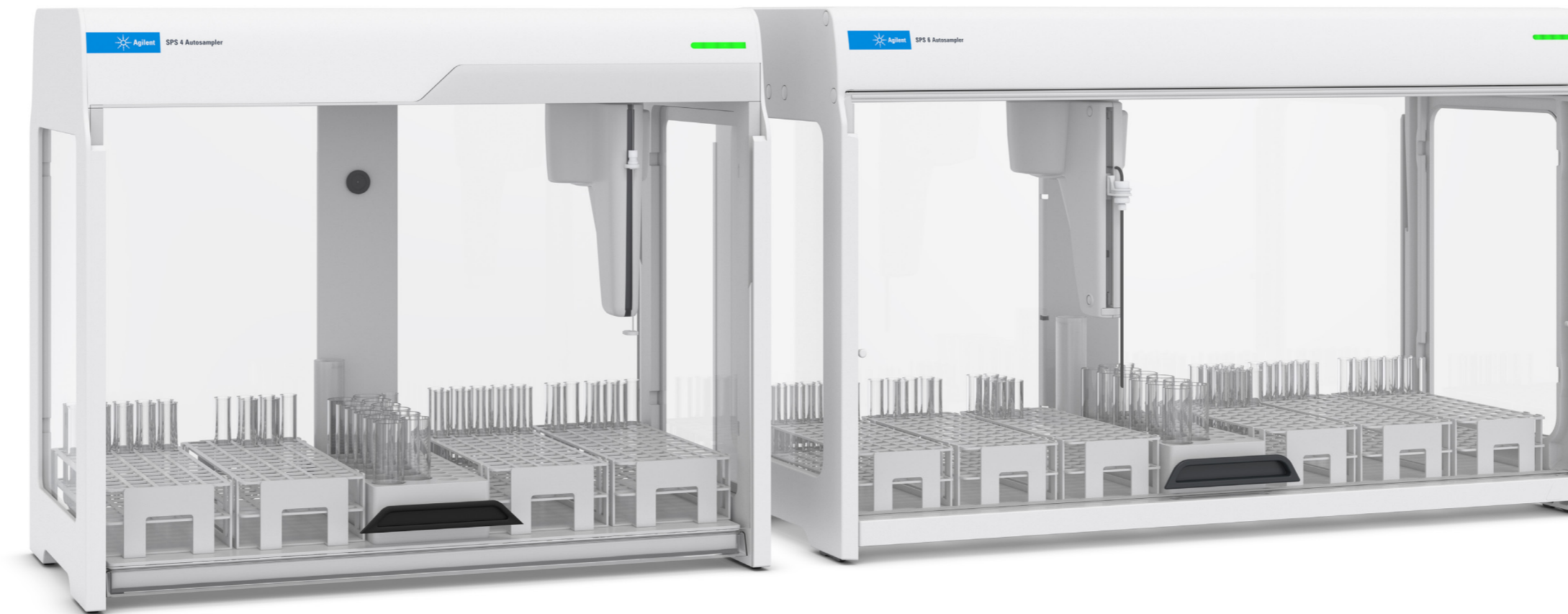
The Agilent Advanced Valve System (AVS) is a switching valve that doubles sample throughput, reduces cost per sample and results turnaround time. The valve achieves this by rinsing the sample introduction system while a sample is being measured, eliminating the delay usually caused by rinsing between samples.

The switching valve also reduces maintenance frequency and increases the life-time of consumables as there's less exposure of torches, nebulizers, pump tubes, and ICP-MS cones to aggressive chemicals and harsh samples.



The switching valve is integrated into both the ICP-OES and ICP-MS hardware and software, with all settings recorded as part of the method. The images show an AVS 7 switching valve on an ICP-OES (top and bottom left) and an AVS MS switching valve on an ICP-MS (bottom right).

# Autosampler



## SPS 4 and SPS 6 Autosamplers

The Agilent SPS 4 and SPS 6 autosamplers are high-performance, robust, and fully integrated into the instrument software. Designed to meet the needs of both everyday high-throughput and higher-capacity laboratories, they offer fast, reliable autosampling with compact footprints that preserve valuable lab bench space.

An integrated cover protects samples from contamination and protects your lab from corrosive sample vapors. A dual port-wash reservoir allows multiple rinse solutions to eliminate cross-contamination between samples.

The SPS 4 and SPS 6 can be placed on the lab bench or on a trolley, without compromising valuable bench space.

The SPS 4 is a four sample rack autosampler suitable for everyday high-throughput laboratories using AAS, MP-AES, ICP-OES or ICP-MS for up to 360 samples.

The SPS 6 is a six sample rack autosampler with 50% more capacity than the SPS 4, offering up to 540 samples for laboratories using ICP-OES or ICP-MS.

# Agilent Services, Spares, and Consumables



## Product service and maintenance

Reduce downtime, produce accurate, reliable data, and comply with industry regulations with flexible service and maintenance plans.

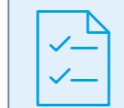
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## Financial services

Agilent offers flexible payment plans for capital expenditure, instrument subscription services, and bundled services, consumables, and support with a single, predictable monthly payment.

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## Laboratory supplies

Achieve optimum performance from your instruments with Agilent spares and consumables, chemical standards, certified reference materials, and sample preparation supplies.

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Certified pre-owned instruments deliver performance and reliability at an affordable price. Our trade-in and buyback program turns assets into income. Products at end-of-life instruments are safely disposed of.

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## Analyst training and support

Improve lab operations and minimize downtime with courses covering troubleshooting, maintenance, sample preparation, and software operations. An active online community provides answers for problems faced by analysts.

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U.S. and Canada

**1-800-227-9770**

[agilent\\_inquiries@agilent.com](mailto:agilent_inquiries@agilent.com)

Europe

[info\\_agilent@agilent.com](mailto:info_agilent@agilent.com)

Asia Pacific

[inquiry\\_lsca@agilent.com](mailto:inquiry_lsca@agilent.com)

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