

**RAISE YOUR EXPECTATIONS WITH
THE NEXT GENERATION OF ICP-MS**



Agilent Technologies

RAISE YOUR EXPECTATIONS

THE AGILENT 7900 ICP-MS OPENS UP A NEW DIMENSION IN QUADRUPOLE ICP-MS

**Could the world's bestselling quadrupole ICP-MS *really* get 10 times better?
The answer is *yes*.**

With 10x higher matrix tolerance, 10x wider dynamic range, 10x better signal to noise, and software so powerful it can write your methods for you, the new Agilent 7900 redefines ICP-MS... *again*.

Innovative technology and a new MassHunter software platform combine to make the Agilent 7900 the world's most powerful, and most automated quadrupole ICP-MS.

With matrix tolerance extended into the tens of % TDS range, a linear dynamic range of up to 11 orders of magnitude — plus the industry's most effective helium collision mode — the Agilent 7900 ICP-MS delivers superior data quality whatever your application.



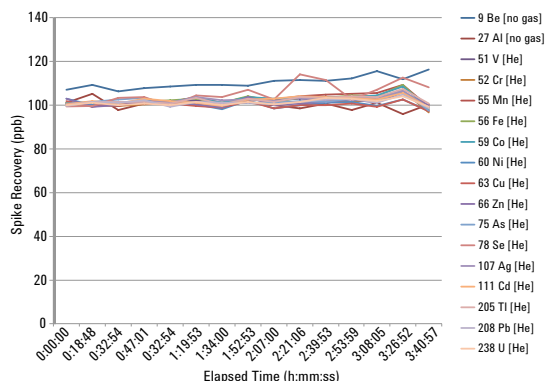
With automated setup, faster analysis, better interference removal, and a simplified MassHunter software interface, the Agilent 7900 ICP-MS blends high performance with unprecedented ease-of-use.

Unrivalled performance driven by hardware innovation

Unprecedented matrix tolerance

Historically, ICP-MS has been limited to samples that contain <0.2% total dissolved solids (TDS). A robust plasma (indicated by a CeO/Ce ratio <1%) enables the 7900 ICP-MS to easily tolerate this matrix level.

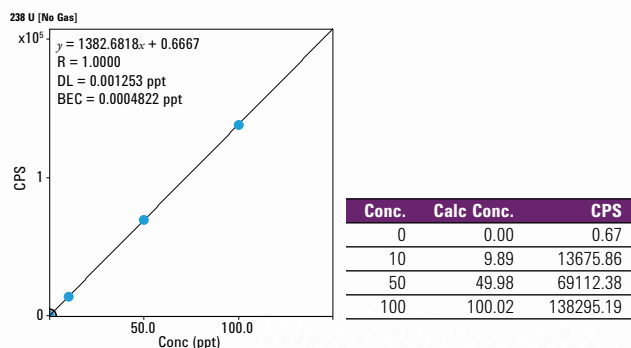
The ultra high matrix introduction (UHMI) option enables you to routinely measure samples containing up to 25% TDS — 100 times higher than the traditional limit, and far beyond the capability of any other ICP-MS.



Long-term (3.5 hours) stability of 100 µg/L spike in 25% NaCl brine

Better trace-level detection

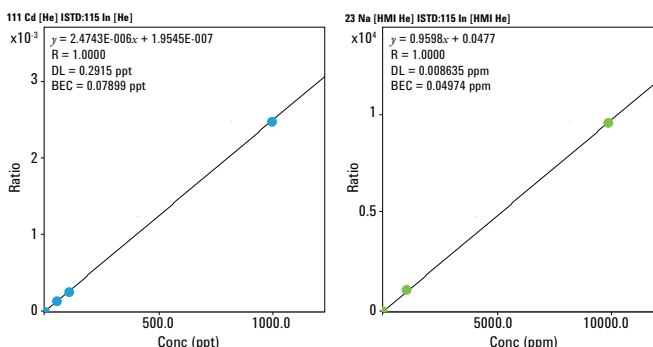
A novel interface design and optimized expansion-stage vacuum system increase ion transmission, providing >10⁹ cps/ppm sensitivity at <2% CeO. What's more, the new orthogonal detector reduces background, dramatically improving signal to noise for lower detection limits and more accurate ultra-trace measurements.



²³⁸U calibration demonstrating sensitivity >1.38 GHz/ppm and BEC < 0.5 ppq

The widest dynamic range of any quadrupole ICP-MS

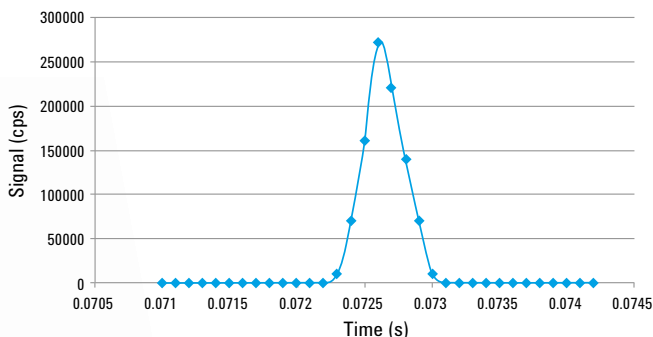
The new orthogonal detector system (ODS) delivers up to **11 orders of magnitude dynamic range**, from sub-ppt to percent-level concentrations. That means you can measure trace elements and majors in the **same run**, simplifying method development and virtually eliminating over-range results.



Calibrations for Cd (BEC < 0.1 ppt) and Na (top standard 10,000 ppm (1%))

Faster analysis of transient signals

Fast transient signal measurement — used for applications such as capillary chromatography, single-nanoparticle analysis, and laser ablation — requires an instrument with very short integration times. The 7900 ICP-MS provides ultra-fast data acquisition, with 10,000 separate measurements per second.



Time Resolved Analysis signal for single 30 nm Au nanoparticle (dwell time 0.1 ms)

USABILITY BY DESIGN

Every component of the Agilent 7900 ICP-MS is engineered for performance and reliability

Based on Agilent's long history of ICP-MS technological leadership embodied in the 7700 Series ICP-MS and 8800 ICP-QQQ, the Agilent 7900 ICP-MS has been re-engineered from the bench up, with every component optimized for the demands of busy laboratories today... and in the future.



SAMPLE INTRODUCTION

The standard low-flow, Peltier-cooled sample introduction system increases operational stability and consistency. The Integrated Sample Introduction System (ISIS 3) adds a piston pump and close-coupled 7-port valve for high-speed discrete sampling.



ULTRA HIGH MATRIX INTRODUCTION (UHMI)

Increases matrix tolerance up to 25% total dissolved solids (TDS). UHMI also improves plasma robustness, dramatically reducing matrix suppression.

PLASMA AND SHIELD TORCH SYSTEM (STS)

Provides precise ion energy control, ensuring high sensitivity and effective interference removal in helium mode. The torch auto-aligns with the interface following maintenance.

INTERFACE AND CONES

Standard Ni, or optional Pt-tipped cones increase ion transmission and matrix tolerance. Screw-threaded for easy removal during maintenance.

COMPACT BENCHTOP DESIGN

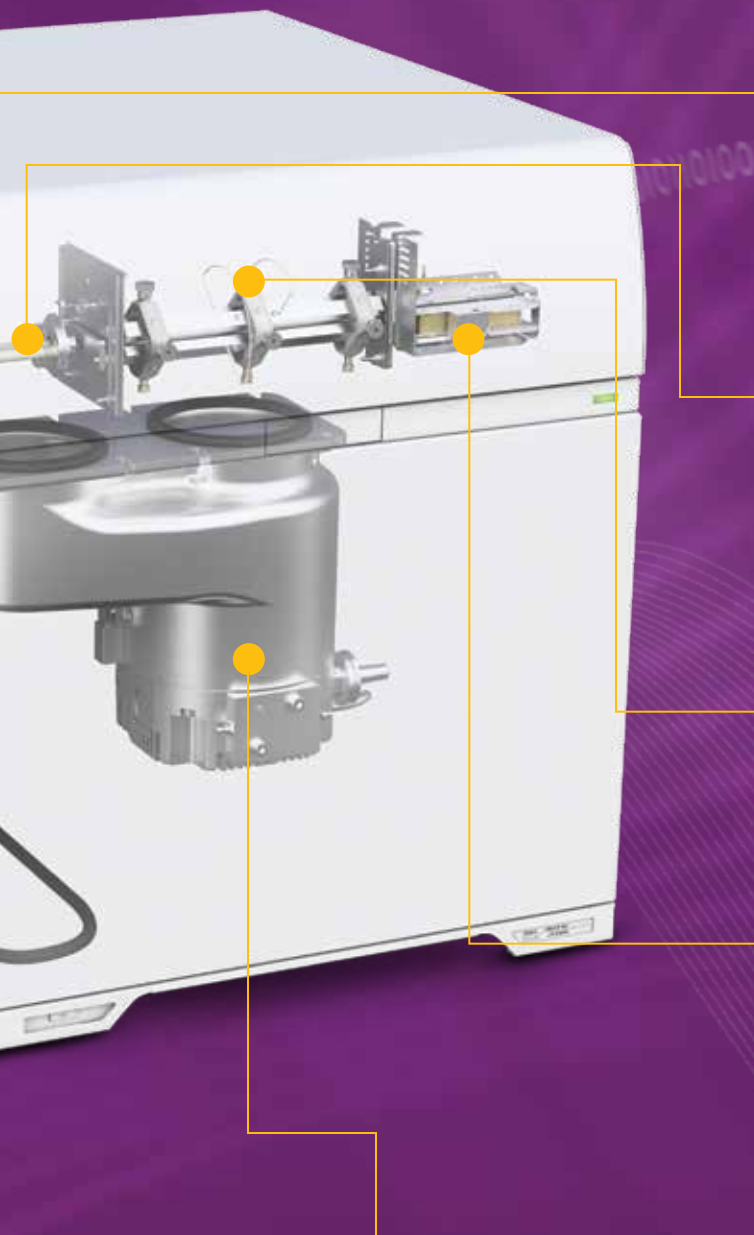
The world's smallest ICP-MS system saves valuable bench space while ensuring easy access for servicing and maintenance.

Some items shown are optional at additional cost.
Contact your Agilent Representative for further details.

27 MHz PLASMA RF GENERATOR

The fast, frequency-matching RF generator increases the tolerance of changing matrices. Even volatile organic solvents can be introduced without affecting plasma stability.



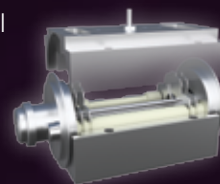


OFF-AXIS ION LENS

Improves ion transmission across the mass range, *without* the need for mass-specific voltage optimization.

4TH-GENERATION OCTOPOLE REACTION SYSTEM (ORS⁴)

Temperature-controlled collision/reaction cell with a new gas controller for fast cell gas switching in less than 3 seconds.



OCTOPOLE ION GUIDE

The octopole provides superior interference removal by KED in helium collision mode, and has been field-proven in thousands of Agilent ICP-MS installations.

HYPERBOLIC QUADRUPOLE

The *only* hyperbolic quadrupole used in ICP-MS. It delivers superior peak separation and abundance sensitivity, without the need for custom quadrupole settings to separate adjacent peaks.

ORTHOGONAL DETECTOR SYSTEM (ODS)

The ODS delivers higher sensitivity, lower background, and a wider measurement range — up to 11 orders of magnitude from 0.1 cps to 10 Gcps — virtually eliminating over-range results.



VACUUM SYSTEM

A single, high-performance split-flow turbo pump and external rotary pump optimize vacuum in the interface region, increasing sensitivity while improving matrix tolerance.

AGILENT PARTS AND SUPPLIES

Manufactured to stringent specifications, and rigorously tested to ensure top quality and maximize instrument performance.



THE WORLD'S MOST POWERFUL ICP-MS SOFTWARE

Simplify your workflow

Our next generation ICP-MS MassHunter software features a dashboard layout with gadgets that guide you through every step of your analysis: hardware configuration, instrument optimization, sample acquisition, data analysis and reporting. This user-friendly interface makes learning and using the software easier and more intuitive, without compromising power and flexibility for advanced or research applications.



Automate your method development

ICP-MS MassHunter now includes an innovative matrix-specific Method Setup Wizard, enabling all users, experienced and new, to consistently obtain high-quality data. Simply answer a few questions about your application — or introduce a typical sample — and let the Wizard build a fully functional method for you.

Monitor and control your instrument whenever you want, wherever you are

In addition to the industry's most advanced auto-optimization and diagnostic functions, ICP-MS MassHunter lets you remotely check instrument status and run progress, and control key processes using your smartphone or tablet.



Increase the quality and speed of your data review

MassHunter's batch-at-a-glance data table gives you a customizable overview of the current batch — including counts, concentrations, RSD, and replicate data. Other functions of the interactive data table include:

- Comprehensive real-time results, updated during sequencing
- Interactive calibration plot display (12 plots or single plot)
- On-screen flags for outliers and QC failures
- Graphical display of internal standard recovery, QC stability plots, and mass spectrum or chromatogram

Simplify your nanoparticle analysis

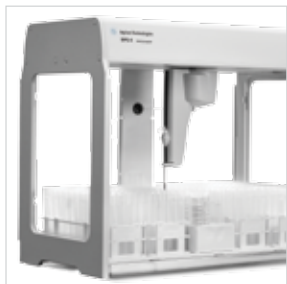
The fully integrated Agilent nanoparticle application module incorporates the entire process of nanoparticle determination into ICP-MS MassHunter software. The method wizard guides you through the automated creation of new nanoparticle methods and supports data acquisition in both FFF-ICP-MS and single nanoparticle modes. With a few mouse clicks, a complete analytical method, including optimized acquisition parameters, reference material value, and data analysis parameters, is set up and ready to run.



Final batch results are reported in tabular and graphical formats. Tab through individual samples in the table and review individual graphical results with powerful optimization tools.

ENHANCE THE CAPABILITY OF THE 7900 ICP-MS

Automated sampling systems to optimize your laboratory's workflow



SPS 4 Autosampler:

A great choice for high-throughput laboratories requiring a fast, high-capacity (up to 768 samples) autosampler. An environmental enclosure, rinse and probe options also make it ideal for ultra-trace applications.



Agilent I-AS Autosampler with pumped rinse station:

Ideal for ultra-trace analysis and small sample volumes (0.5 mL). Flexible rack configurations offer a maximum capacity of 89 vials, plus 3 rinse vials.



Agilent Integrated Sample Introduction System (ISIS 3):

High speed uptake pump, and close-coupled 7-port switching valve provide highest possible throughput with discrete sampling.



Industry-leading speciation measurement

The Agilent 7900 ICP-MS links seamlessly with Agilent HPLC and GC systems through field-proven interfaces, integrated software control, documentation, and fully developed application kits. Other hyphenated techniques including CE, IC, and FFF are also easily configured.

As the leading supplier of ICP-MS and chromatography systems, Agilent can help you identify the right instrument for your application, develop methods, and train your staff. Factory-qualified engineers are also available to support your coupled systems.

Optional accessories support a range of configurations and applications

Nebulizer options — including low-flow, concentric, inert (HF resistant), and parallel path — suit *your* unique sample types and volumes.

Inert sample introduction kit is O-ring free, and manufactured from PFA for low contamination levels. HF resistant and suitable for high-purity reagents.

Organics kit contains the sample introduction parts you need to run volatile organic solvents.

Laser ablation enables direct sample analysis for bulk and time-resolved applications.

Software control

Virtually unlimited possibilities for optional accessories are now available via Agilent's new open-source Software Developers Kit (SDK).

For more information

Learn more

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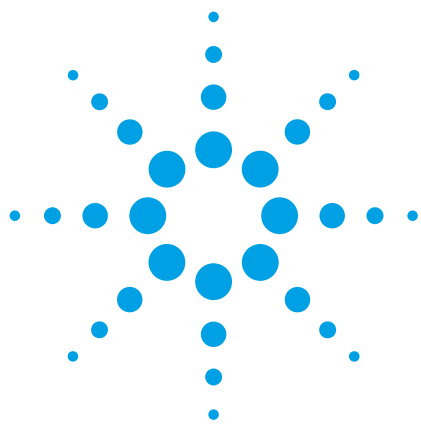
Agilent ICP-QQQ

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Agilent Technologies



Agilent 7900 ICP-MS

Specifications and Typical Performance



Raise your expectations with the 7900 ICP-MS

The Agilent 7900 ICP-MS rewrites the rules of ICP-MS. New technologies and a redesigned software platform combine to make the 7900 ICP-MS the world's most powerful, and most automated quadrupole ICP-MS.

Some key components, such as the RF generator and quadrupole mass analyzer, are shared with the field-proven 7700 Series ICP-MS and 8800 ICP-QQQ. However, the Agilent 7900 ICP-MS has been re-engineered from the bench up, with every component optimized for the demands of busy laboratories today, and in the future.



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Specifications

Sample Introduction System	Peristaltic pump	10-roller, 3 channels
	Nebulizer	MicroMist (borosilicate glass)
	Spray chamber	Scott-type double-pass (quartz) Controlled temperature range: -5°C to $+20^{\circ}\text{C}$
	Ultra High Matrix Introduction system (UHMI)	Optional
Plasma	RF generator	Solid state digital drive 27 MHz Variable-frequency impedance matching 500 W to 1600 W
	Torch	One-piece (quartz) 2.5 mm id injector ShieldTorch system
	Torch position	Horizontal and vertical position: ± 2 mm, in 0.1 mm steps Sampling depth: 3 to 28 mm, in 0.1 mm steps
	Mass flow controllers (Ar)	4: Plasma, Aux., Carrier, Make up/Dilution
Interface	5th gas line for alternative carrier gas	Optional
	Sampling cone	1 mm diameter orifice Standard: Ni-tipped with Cu base Optional: Pt-tipped with Cu base
	Skimmer cone	0.45 mm diameter orifice Standard: Ni Optional: Pt-tipped with Cu base
	Lens system	Extraction lens Off-axis Omega lens
Octopole Reaction System (ORS)	He (collision) cell gas line	Included
	H ₂ (reaction) cell gas line	Optional
	3rd cell gas line (low- or high-flow rate)	Optional
Mass Analyzer	Quadrupole	Frequency: 3 MHz Hyperbolic rod profile
	Mass range	2–260 u
	Mass resolution	Variable from 0.3 u to 1.0 u
	Typical mass calibration stability	< 0.05 u per day < 0.1 u per 6 months
	Abundance sensitivity (at Cs)	Low mass side: $\leq 5 \times 10^{-7}$ High mass side: $\leq 1 \times 10^{-7}$

Detector	Configuration	Orthogonal Detector System (ODS)
	Detector	Dual-mode discrete dynode electron multiplier
	Dynamic range	11 orders (0.1 cps to 10 Gcps)
	Minimum integration time	100 μ s
	Minimum dwell time (TRA mode)	0.1 ms (no settling time)
Vacuum System	Configuration	Three-stage differential vacuum system
	Vacuum pump	Single split-flow turbo molecular pump Single external rotary pump
	Vacuum pump hose length	1.5 m, 3 m (optional)
Software	Instrument control software	ICP-MS MassHunter Workstation software
	User access control software	Optional
	Chromatographic software	Optional
	Single nanoparticle application module	Optional
	Intelligent sequencing software	Optional
	Three offline user licenses	Optional

Accessories and Peripherals

Autosamplers	Agilent SPS 4 Autosampler Agilent Integrated Autosampler (I-AS)
Sample introduction	Integrated Sample Introduction System 3 PFA Inert Sample Introduction Kit Organic Solvent Introduction Kit Humidifier
Speciation kits	LC-ICP-MS Speciation Kits Arsenic Speciation Kit Chromium Speciation Kit Capillary LC Interface Kit GC-ICP-MS Interface
Peripherals	Water recirculator Water chiller Optional hood Quiet cover for rotary pump

Instrument Performance

The factory shipping specifications that are confirmed at the factory represent minimum requirements for shipping approval. The actual performance of the Agilent ICP-MS is invariably much higher. The two tables below provide the typical performance of the Agilent 7900 ICP-MS, together with the factory shipping specifications.

No Gas mode		7900 Factory Specifications ¹	7900 Typical Performance ²
Sensitivity (Mcps/ppm)	⁷ Li	55	140
	⁵⁹ Co		400
	⁸⁹ Y	320	600
	¹¹⁵ In		700
	²⁰⁵ Tl	250	520
	²³⁸ U		720
Background	<i>m/z</i> 9	<1 cps	<0.3 cps
Detection limits	⁹ Be	<0.2 ppt	<0.05 ppt
	¹¹⁵ In	<0.05 ppt	<0.02 ppt
	²⁰⁹ Bi	<0.08 ppt	<0.02 ppt
Oxide	CeO/Ce	<1.5%	<1.8%
Doubly charged	Ce ²⁺ /Ce	<3%	<2.5%
Stability	20 min	<2.0% RSD	<1.0% RSD
	2 hr	<3.0% RSD	<1.2% RSD
Isotope ratio precision	¹⁰⁷ Ag/ ¹⁰⁹ Ag	<0.1% RSD	<0.1% RSD

He Gas mode		7900 Typical Performance ²
Sensitivity (Mcps/ppm)	⁵⁹ Co	65
Background	<i>m/z</i> 9	<0.2 cps
Interference reduction factor ³	⁵⁹ Co/ ⁵¹ ClO	>30
Oxide	CeO/Ce	<0.5%
Detection limits ³	⁷⁵ As	<5 ppt

1. 7900 Factory Shipping Specifications. These specifications are detailed in the Agilent publication: Agilent 7900 ICP-MS, Specifications (Publication number: 5991-3779EN).

2. The typical performance values are not checked during the standard installation.

3. Performed in a matrix of 2% HNO₃ + 0.5% HCl.

Site Requirements and Safety

Dimensions

Mainframe	Width	730 mm (main cabinet, excluding peri-pump)
	Depth	600 mm (main cabinet, excluding power cord)
	Height	595 mm (main cabinet, excluding exhaust chimney)
	Weight	100 kg
Largest shipping container	Width	1,020 mm
	Depth	1,120 mm
	Height	1,000 mm
	Weight	148 kg

Environmental

Operating temperature	Range	15–30 °C
	Rate of change	<2 °C/hr (max. change 5 °C)
Operating humidity	Range	20-80% (non-condensing)

Utilities

Electricity supply	Voltage	Single Phase, 200-240 V, 50/60 Hz
	Current	30 A
Cooling water	Inlet temperature	15-40 °C
	Minimum flow rate	5 L/min
	Inlet pressure	230-400 kPa
Argon gas supply	Minimum purity	99.99 %
	Maximum flow rate	20 L/min
	Supply pressure	500-700 kPa
Cell gas supply	Minimum purity	99.999%
	Maximum flow rate	12 mL/min for He and 10 mL/min for H ₂
	Supply pressure	90-130 kPa for He 20-60 kPa for H ₂
Exhaust duct	Vent Type	Single vent, 150 mm diameter
	Flow rate	5-7 m ³ /min

Regulatory Compliance

Safety	IEC 61010-1:2001 / EN 61010-1:2001
	IEC 61010-2-061:2005 / EN 61010-2-061:2003
	IEC 61010-2-081:2001+A1:2003 / EN 61010-2-081:2002+A1:2003
	Canada: CAN/CSA C22.2 No. 61010-1-04
	Canada: CAN/CSA C22.2 No. 61010-2-061-04
	Canada: CAN/CSA C22.2 No. 61010-2-081-04
EMC	USA: UL 61010-1 (2nd Edition)
	IEC 61326-1:2012 / EN 61326-1:2013
	Canada: ICES-001:2006
ISO	Manufactured at an ISO 9001 and ISO 14001 certified facility

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