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.

Agilent Technologies

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 °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
	5th gas line for alternative carrier gas	Optional
Interface	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
Ion Lens	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 µs
	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 contol 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	*m/z* 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	*m/z* 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% HNO_3 + 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 USA: UL 61010-1 (2nd Edition)
EMC	IEC 61326-1:2012 / EN 61326-1:2013 Canada: ICES-001:2006
ISO	Manufactured at an ISO 9001 and ISO 14001 certified facility

www.agilent.com

Published October 22, 2015
Publication number: 5991-6397EN

Agilent Technologies