



# Agilent 5977A Series GC/MSD System

## Data Sheet



### 5977A GC/MSD Overview

The Agilent 5977A Series GC/MSD builds on a 45-year tradition of leadership and innovation, bringing together the technologies of the industry's best GC and MS systems. This advanced instrument provides a higher plane of productivity and confidence, including increased sensitivity, superior workflow, and software tools that simplify method optimization and lower operating costs.

### The Agilent GC/MSD System features

#### Agilent 7890B GC, the most reliable and versatile gas chromatograph

- Precise pneumatic and temperature control for reproducible chromatographic performance.
- Low dead volume inert Capillary Flow Technology devices with various configurations for more productivity and more functionality.
- Sample Introduction systems to cover the widest range of samples for GC/MS analysis.

#### Agilent 5977A GC/MSD, the most sensitive and robust mass selective detector

- Extractor EI ion source for high sensitivity, 10fg OFN IDL.
- Heated monolithic quartz gold quadrupole (heatable up to 200 °C) for rapid elimination of contamination to keep the analyzer clean.
- Triple Axis Detector (TAD) for eliminating neutral noise.
- Scan Speed up to 20,000 u/sec (Extractor Ion Source).
- Optional dry pump for oil-free operation.
- Agilent TwisTorr 304 FS turbo pump optimized for helium and hydrogen.



**Agilent Technologies**

### **Versatile workflow tools**

- MassHunter Acquisition software with similar look and feel of MSD Productivity ChemStation Acquisition for efficient creation, update and use of GC/MS methods.
- Each system is delivered with both MassHunter Data Analysis and classic MSD ChemStation Data Analysis.

### **GC-MS direct communication**

- Improved direct communication between the Agilent 7890B Series GC and 5977A MSD for optimized productivity and system protection.

### **Eco-friendly GC/MSD**

- The automated Sleep feature for reduction of electrical power and gas consumption with the Agilent DS42 inverter roughing pump, Agilent turbo pump and GC-MS direct communication.

### **Complete inert pathway**

- Prevents analyte breakdown from injection through detection for greater reproducibility and confidence in results.

### **Complete application solutions**

- Agilent analyzers and application kits for generating results immediately after installation.

### **10 Year Value Promise**

- Guaranteed support for 10 years from the date of purchase, or Agilent will provide credit for the residual value of the system toward a model upgrade.

## Agilent 5977A Series MSD System Specifications

### Mass spectrometer

Ionization mode (standard)	EI
Ionization modes (optional)	PCI, NCI, and EI acquisition with CI source
EI ion source type	Noncoated Inert Extractor EI source Noncoated Inert EI source
Electron energy	5–241.5 eV
Emission current	0–315 $\mu$ A
CI gases	Dual gas inlet
Filaments	Dual for EI, single for CI
Transfer line temperature	100–350 °C
Ion source temperature	150–350 °C
Quadrupole temperature	106–200 °C
Mass filter	Heated monolithic hyperbolic quadrupole
Ion Source - Mass filter interface	Dynamically rampable entrance lens
Mass range	1.6 to 1050 u
Mass resolution	Unit mass
Mass axis stability	Better than 0.10 u/48 hrs
Detector	Triple Axis Detector with long life triple channel EM
Dynamic range (electronic)	10 <sup>6</sup>
Scan rate <sup>1</sup>	Up to 20,000 u/s (Extraction tune only), 12,500u/sec
SIM	60 ions $\times$ 100 groups
Pumping system (Helium)	65 L/s Diffusion Pump and 255 L/s Turbo Pump with 2.5 m <sup>3</sup> /hr mechanical pump
Maximum recommended analytical gas flow	1.5 mL/min (Diffusion Pump) 4 mL/min (Turbo Pump)
Recommended maximum sustained column flow to MS <sup>2</sup>	3 mL/min (Diffusion Pump) 50 mL/min (Turbo Pump)
Instrument control	MassHunter data system and local control panel
Maintenance accessibility	Source (including filaments, lenses), mass filter <sup>3</sup> , and detector on removable plate for easy access
Maintenance scheduling	Early Maintenance Feedback (EMF) for GC and MSD, user-defined maintenance schedule, with display of current status
Power save (Turbo Pump model only)	Sleep mode available for Turbo Pump and DS42i Executable Sleep/Wake from the panel of GC, Menu item in the MassHunter Software and Sequence Keyword
Support life	Guaranteed support for 10 years

<sup>1</sup>As scan rate increases, sensitivity will decrease and resolution may degrade.

<sup>2</sup>High flow rate into a fixed ion source will cause a loss in sensitivity

<sup>3</sup>The heated quadrupole mass filter should not require maintenance, but if maintenance is required, it should be performed by an Agilent service engineer

**Gas Chromatograph (Agilent 7890B GC)**

Autosampler	Agilent 7693, 7650, CombiPAL, 7697 and many third party autosamplers
Liner replacement	Compatible with turn-top system standard with 7890B GC
Inlet (up to 2)	Split-splitless inlet (standard), Multimode Inlet (MMI), Cool On Column (COC) inlet and others (optional)
Oven temperature	Ambient +4 – 450 °C
Oven ramps/plateaus	20/21 with negative ramps allowed
Carrier gases	Helium and hydrogen
Electronic pneumatic control (EPC)	EPC split/splitless, septum purge and auxiliary EPC modules
Carrier gas control modes	Constant flow, constant pressure, programmable flow and programmable pressure
Pressure range	0–100 psi (standard), 0–150 psi (optional) with 0.001 psi resolution
Flow control	Compatible with optional capillary flow device controller

**Data System**

Acquisition Software	MassHunter GC/MS Acquisition
Simultaneous MS and GC detectors	Up to two MS (SIM/scan) and four GC detector signals
SIM/Scan	Automated SIM setup and synchronous SIM/Scan operation
Chemical ionization setup	Electronic mass flow control of reagent gases
High-mass confirmation	Verification test kit (optional)
Application autotunes	Simple autotune for BFB and DFTPP
Data Analysis Software	MassHunter and classic MSD ChemStation
Application reports	Environmental, drugs-of-abuse, aromatics in gasoline
Custom reporting	MassHunter: Microsoft Excel Classic MSD ChemStation: Custom Reporting
Spectral libraries (optional)	NIST, Wiley/NIST, Maurer/Pfleger/Weber
Agilent Retention Time Locked Mass Spectral Libraries (optional)	Pesticides and endocrine disrupter (including Japan Positive List), hazardous chemicals, indoor air toxics, forensic toxicology, metabolomics (Fiehn method), semi-environment volatiles, Solvents plus
Security	Data and result security and tamper detection
21CFR11 Compliance	MassHunter Quantitative Analysis and MassHunter GC/MS Acquisition tools
Multivariate analysis (Optional)	Mass Profiler Professional
Sample class prediction (Optional)	Sample Class Predictor or Mass Profiler Professional
Other capabilities (optional)	Deconvolution Reporting Software linked with RTL database for classic MSD ChemStation

## Installation Checkout Specifications

Agilent verifies GC/MSD system performance at the customer site. Test specifications are based on using Splitless Injection and an Agilent HP-5MSUI 30 m × 0.25 mm, 0.25 µm column, using helium as the carrier gas. Instrument Detection Limit (IDL) is a more effective metric of total system performance than signal-to-noise (S/N). Verification is an extensive (eight injections versus one) and reliable test to demonstrate system performance. See more about this type of test at <http://www.chem.agilent.com/Library/technicaloverviews/Public/5990-8341EN.pdf>

El SIM IDL (Helium carrier gas with Auto Liquid Sampler)	<b>10 fg or less</b> for Inert Extractor EI source, Turbo Pump <b>24 fg or less</b> for Inert EI source, Turbo Pump <b>30 fg or less</b> for Inert EI source, Diffusion Pump
	8 sequential 1 µL injections of 100 fg/µL OFN <sup>4</sup> standard solution at nominal 272 u ion.
El scan S/N (Helium carrier gas without Auto Liquid Sampler)	<b>1500:1 or higher</b> for Inert Extractor EI source, Turbo Pump <b>600:1 or higher</b> for Inert EI source, Turbo Pump <b>300:1 or higher</b> for Inert EI source, Diffusion Pump
	1-µL injection of 1 pg/µL OFN standard scanning from 50 to 300 u at nominal 272 u ion.
PCI scan S/N (Methane)	<b>125:1 or higher</b>
	1-µL injection of 100-pg/µL BZP <sup>5</sup> standard scanning from 80 to 230 u at nominal 183 u ion
NCI scan S/N (Methane)	<b>600:1 or higher</b>
	2-µL injection of 100 fg/µL OFN standard scanning from 50 to 300 u at nominal 272 u ion

<sup>4</sup>Octafluoronaphthalene (OFN)

<sup>5</sup>Benzophenone (BZP)

## Other Performance Specifications<sup>1</sup>

PCI SIM S/N (Methane – reagent gas, Helium/Hydrogen carrier gas)	<b>10:1 or higher</b>  1- $\mu$ L injection of 20-fg/ $\mu$ L BZP standard at nominal 183 u ion.
NCI SIM S/N (Methane, Helium/Hydrogen carrier gas)	<b>10:1 or higher</b>  1- $\mu$ L injection of 1-fg/ $\mu$ L OFN standard at nominal 272 u ion.
PCI scan S/N (Ammonia)	<b>500:1 or higher</b>  1- $\mu$ L injection of 100-pg/ $\mu$ L BZP standard scanning from 80 to 230 u at nominal 183 u ion.
NCI scan S/N (Ammonia)	<b>300:1 or higher</b>  2- $\mu$ L injection of 1-pg/ $\mu$ L OFN standard scanning from 50 to 300 u at nominal 272 u ion.
Both Extractor and Inert El scan S/N (H <sub>2</sub> carrier gas) All EI sources	<b>100:1 or higher</b> Turbo Pump <b>50:1 or higher</b> Diffusion Pump  1- $\mu$ L injection of 1-pg/ $\mu$ L OFN standard scanning from 50 to 300 u at nominal 272 u ion.

## Ease-of-Maintenance

- The GC inlet liner can be replaced in less than one minute without the use of tools with the Agilent 7890B GC system turn-top inlet.<sup>2</sup>
- A glass window shows ion source type, filament operation, and ion source connections.
- The source (including filaments and lenses) and electron multiplier can be removed from the instrument in less than one minute after venting.
- The optional micro ion gauge<sup>3</sup> can be replaced without removal of the mass spectrometer covers.

<sup>1</sup>These specifications are reference of the performance. They are not confirmed at installation or familiarization.

<sup>2</sup>Inlet temperature should be cool enough to touch when performing maintenance.

<sup>3</sup>Micro ion gauge is shipped as standard for CI system but is available for EI systems as an option.

## Safety, Regulatory Compliance, and Operational Conditions

This instrument is manufactured and distributed under a quality system consistent with ISO13485. It complies with international regulatory, safety, and electromagnetic compatibility requirements. In addition, further testing was performed according to Agilent standards, to ensure operation after delivery and long-term usage.

Safety	Canadian Standards Association (CSA): CAN/CSA-C22.2 No. 61010-1-04 CSA/Nationally Recognized Test Laboratory (NRTL): UL 61010-1 International Electrotechnical Commission (IEC): 61010-1 EuroNorm (EN): 61010-1
Electromagnetic compatibility	CISPR11/EN55011:Group1, Class A
Sound emission	EN 27779:1991 - sound pressure Lp <70 db
Power	120 V, 50/60 Hz, 1,100 VA; 200 V, 50/60 Hz, 1,100 VA; 220–240 V, 50/60 Hz, 1,100 VA
Operating environment	15–35 °C, 40–80% relative humidity – noncondensing (operational) –40 °C–+70 °C, 0–95% relative humidity – noncondensing (storage)

## Physical Requirements (with the Agilent 7890B GC)

Dimensions (GC/MS)	88 cm (w) × 56 cm(d) × 50 cm (h) Additional space should be added for the auto injector, sample tray, data system, and printer. Approximately 30 cm should be available to the left of the MSD for ease of access to the system in times of maintenance or repair.
Weight (GC/MS)	100 to 112 kg not including automatic sampling systems (depending on configuration)

## For More Information

See the 5977A website at <http://www.agilent.com/chem/5977A> for further information.

This information subject to change without notice.

© Agilent Technologies, Inc., 2013  
Published in USA,  
February 21, 2013  
5991-1837EN

