



Agilent 5975C Series GC/MSD System

Data Sheet



GC/MS

The Agilent 5975C series Gas Chromatograph/Mass Spectrometer (GC/MSD) provides flexibility, capabilities, and performance demanded by modern applications in all industries. The mass selective detector (MSD) can be configured for electron ionization or chemical ionization. Chemical ionization has been made as routine as electron ionization with automatic setup, including tuning and gas flow control. The system can run routine ammonia chemical ionization with an optional rough pump designed for corrosive chemicals.

The gas chromatograph and autosampler systems can be selected to meet laboratory requirements. For laboratories where space is limited, the MSD can be used with the compact Agilent 6850 GC. To save even more space, two GC/MS systems can be controlled by a single ChemStation. Other laboratories will want the full capabilities of the Agilent 6890 GC or the new high-performance 7890A GC configured with both the MSD and conventional GC detectors. Injection systems can range from an injector tower to a flexible CTC-PAL autosampling system. Other sampling devices are available from Agilent and third parties.

The 5975C Series GC/MSD gives you high performance and high productivity with features that will improve your analysis.

Trace Ion Detection technology will help in the detection of low-level compounds in complex matrices. In combination with the Deconvolution Reporting Software add-on, it is now possible to detect even lower level compounds that coelute—the type of analysis that was difficult without the help of Trace Ion Detection technology.

The programmable 350 °C source will increase the signal intensity for later eluting compounds. This improvement in signal is compound dependent.

The Gain Normalization Autotune will set the MSD in the best operating conditions, and these conditions will be consistent across instruments. The electronics of the 5975C systems allow a combination of both SIM and scan acquisitions, even for sub-one-second chromatographic peaks. To make this capability practical, the SIM ions and switching times can be automatically set up with the ChemStation software.

Retention time locking (RTL) maintains the retention times so that method maintenance is minimized when columns are clipped or the methods are transferred to other instruments. Method transfers are further simplified with the eMethod capabilities. Multi-site laboratories can easily transfer and run the same methods with the same retention times no matter what detector is used on the gas chromatograph. Optimized methods from the latest Agilent applications can be downloaded from the Web site and run in your laboratory.

The ChemStation software provides an extensive set of tools for all laboratories. In addition to basic quantitative capabilities, high volume laboratories in drug and environmental testing can generate reports specifically designed for their industry. The latest software even allows estimating concentrations of non-calibrated compounds based on calibrated compounds (SemiQuant). Laboratories doing qualitative analysis have access to extensive data manipulation tools developed based on customer requests. For complex samples, our



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Deconvolution Reporting Software (DRS) combined with our unique DRS libraries provide quick screening capabilities for classes of compounds. For users who want to customize their operations, an extensive macro language is provided along with a flexible report writer.

Agilent GC/MSDs are known for their reliability, ruggedness, and long life. The Agilent 10-year use guarantee provides greater assurance for a low cost-of-ownership throughout its life.

The Agilent 5975C Series MSD system features:

- Proven ruggedness and reliability
- eMethods for simple method transfer
- SemiQuant for estimating concentrations of non-calibrated compounds
- Expanded qualitative analysis capabilities
- Inert electron ionization (EI) source for better performance on active compounds
- Higher sensitivity
- Mass range up to 1050 u
- High performance SIM/scan with automated SIM setup
- Mass stability—better than 0.10 u over 48 hours
- Performance electronics for 10,000 u/s scan speed (8,000 u/s write-to-disk)
- DRS and RTL ready
- Compatible with microfluidics flow controller and Quickswap
- Compatible with flip-top inlet sealing system for 6890 and 6850 and with turn-top for 7890A GC
- Proprietary hyperbolic gold-coated quadrupole
- Heatable quadrupole to 200 °C
- Easy access to full ion optics
- High energy dynode and electron multiplier (EM) detector
- Two-MS control per PC
- Four simultaneous signal acquisitions (up to two MS)
- Intelligent sequencing for samples
- Compatibility with many third party sampling devices
- AutoCI for full automation of CI reagent gas and source tuning
- Choice of oil-free mechanical pumps (optional)
- Tested for ammonia CI
- Ten-year use guarantee

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Mass Spectrometer

Mode (standard)	EI
Modes (optional)	PCI, NCI, EI with CI source
Ion source type	Noncoated inert EI source (optional for diffusion pump system)
Sources	EI source provided with all systems; CI source for PCI, NCI, and EI added to CI systems
Ionization energy	5–241.5 eV
Ionization current	0–315 µA
CI gases	Dual gas inlet
Transfer line temperature	100–350 °C
Ion source temperature	150–350 °C
Quadrupole temperature	106–200 °C
Filaments	Dual for EI, single for CI
Mass filter	Monolithic hyperbolic quadrupole
Mass filter protection	Entrance lens
Maximum mass	1050 u
Mass resolution	Unit mass adjustable by tune
Mass axis stability	Better than 0.10 u/48 h
Detector	EM with replaceable horn
Dynamic range (electronic)	10e6
Scan rate (electronic)	Up to 10,000 u/s
Write-to-disk	Up to 8,000 u/s
SIM	60 ions × 100 groups
Pumping system	65 L/s for the diffusion pump and 70 L/s or 262 L/s turbomolecular pump with 2.5 m ³ /hr mechanical pump
Total flow	1.5 mL/min (diffusion) 2 mL/min (standard turbo) 4 mL/min (performance turbo)
Instrument control	Data system and local user interface
Maintenance access	Source, filaments, lenses, mass filter, and detector on removable plate
Maintenance scheduling	Early maintenance feedback

Gas Chromatograph

Gas chromatograph	6850, 6890, or 7890A GC
Autosampler	6850, 7683, or CTC-PAL (all autosamplers are optional)
Liner replacement	Compatible with optional flip-top inlet sealing system for 6850 and 6890; turn-top system standard with 7890A GC

Injector	Split-splitless (standard), others available
Oven temperature	Ambient +4– 450 °C (6890 and 7890A GC) Ambient +5– 350 °C (6850)
Oven ramps/plateaus	6/7 for 6850 and 6890 20/21 for 7890A GC with negative ramps allowed
Carrier gases	Helium, hydrogen (and nitrogen, argon for GC detectors)
Electronic pneumatic control (EPC)	Auto pressure regulation for split/splitless, septum purge
Carrier gas control modes	Constant pressure and flow modes; pressure and flow programmable
Pressure range	0–100 psi (standard), 0–150 psi (optional) with 0.01 psi resolution, pressure and temperature corrected for the 6850 and the 6890 and 0.001 psi resolution for the 7890A GC
Retention-time locking	RTL ready
Flow control	Compatible with optional capillary flow device controller

Data System

eMethods	Transfer methods between the 6850, 6890, and 7890A Series MSDs
Simultaneous MS and GC	Four signals (up to two MS) detector data acquisitions
SIM/Scan	Automated SIM setup and synchronous SIM/scan operation
Ionization mode autotunes	El, PCI, NCI
Chemical ionization setup	Electronic mass flow control of reagent gases
High-mass confirmation	Verification test kit (optional)
Application autotunes	One-click autotune for BFB, DFTPP
Quantitation setup	Automated
Application reports	Environmental, drugs of abuse, aromatics in gasoline
File import/export	Sequence file/quant and custom report
Customization	Macro language, report writer
Security	Password and audit trail
Spectral libraries (optional)	NIST, Wiley, Pfleger-Mauer Drug, Stan pesticide
Spectral and RTL databases (optional)	Pesticides and endocrine disruptors, hazardous chemicals, indoor air toxics, volatiles, PCBs, toxicology, FAMES, flavors, organotin compounds
21CFR11 Compliance (optional)	6890 software supported
Other capabilities (optional)	Deconvolution linked with RTL database
Support life	Ten-year use guarantee

Installation Checkout Specifications

All tests performed using an autosampler, split-splitless injector, and a 30 m × 0.25 mm × 0.25 µm HP-5MS column. All scan determinations use continuous linear scanning across the entire mass range. Noise selection, peak integration, and RMS S/N (signal-to-noise) calculation performed by automated macro. Specifications are not comparable to those using different conditions. The system will exceed the following specifications at installation:

El scan sensitivity	1-µL injection of a 1-pg/µL OFN standard scanning from 50–300 u will give 200:1 and 100:1 S/N for turbo pump and diffusion pump systems, respectively, at nominal <i>m/z</i> 272 ion
PCI scan sensitivity (methane)	1-µL injection of a 100-pg/µL BZP standard scanning from 80–230 u will give 125:1 S/N at nominal <i>m/z</i> 183 ion
NCI scan sensitivity (methane)	2-µL injection of a 100-fg/µL OFN standard scanning from 50–300 u will give 600:1 S/N at nominal <i>m/z</i> 272 ion

Other Sensitivity Specifications

El scan sensitivity (hydrogen)	1-µL injection of a 1-pg/µL OFN standard scanning from 50 to 300 u will give at nominal <i>m/z</i> 272 ion 100:1 for turbo systems and 50:1 for the diffusion system
El SIM sensitivity	1-µL injection of a 20-fg/µL OFN standard will give 10:1 S/N at nominal <i>m/z</i> 272 ion
PCI SIM sensitivity	1-µL injection of a 1-pg/µL BZP standard will give 10:1 S/N at nominal <i>m/z</i> 183 ion
NCI SIM sensitivity	1-µL injection of a 1-fg/µL OFN standard will give 10:1 S/N at nominal <i>m/z</i> 272 ion
PCI scan sensitivity (ammonia)	1-µL injection of a 100-pg/µL BZP standard scanning from 80–230 u will give 500:1 S/N at nominal <i>m/z</i> 183 ion
NCI scan sensitivity (ammonia)	2-µL injection of a 100-fg/µL OFN standard scanning from 50–300 u will give 300:1 S/N at nominal <i>m/z</i> 272 ion

Trace Repeatability

Results are for three replicate splitless injections of 1-pg OFN using MS detection and automated integration and processing. Specifications using a different compound, concentration, detectors, or conditions, are not comparable.

Trace RT repeatability	<0.0012 min
Trace area repeatability	<2.0% RSD

Automation Features

- The system can automatically tune and adjust gas flows for chemical ionization operation.
- The system can automatically create a SIM method from a scan datafile of an injected standard.

- The system can automatically screen for 926 entries in the pesticides and endocrine disruptors database based on spectra and RTs
- With the optional DRS, the system can produce a combined report showing library search results based on deconvoluted spectra along with quantitative results

Sound emission	EN 27779:1991 - sound pressure Lp <70 db
Power	110–130 VAC ±5%, 60 Hz only 200–210 VAC ±5%, 50/60 Hz 220–240 VAC ±5%, 50/60 Hz
Operating environment	15–35 °C, 40–80% relative humidity – noncondensing (operational) -20–70 °C, 0–95% relative humidity – noncondensing (storage)

Ease-of-Maintenance

- The GC inlet liner can be replaced in less than 1 minute without the use of tools when using the optional flip-top inlet sealing system for the 6850 and 6890N GCs. The 7890A GC comes standard with a turn-top inlet that will give you the same benefits.
- A glass window simplifies column positioning. It also shows ion source type, filament operation, and electrical connections.
- The source, filaments, lenses, quadrupole, and EM can be removed from the instrument as one unit in less than 1 minute after venting.
- The optional micro ion gauge controller can be replaced without removal of the mass spectrometer covers.

Physical Requirements (with the Agilent 6890 or 7890A GC)

Dimensions (GC/MS)	88 cm (w) × 56 cm (d) × 50 cm (h) Additional space should be added for the data system and printer.
Weight (GC/MS)	81 to 96 kg (depending on configuration)

Safety, Regulatory Compliance, and Operational Conditions

The instrument is designed and manufactured under a quality system registered to ISO 9001. The instrument complies with international regulatory, safety, and electromagnetic compatibility requirements. In addition, further testing was done under Agilent standards to assure operation after delivery and long-term usage.

See the 5975 page at
<http://www.chem.agilent.com/Scripts/PDS.asp?IPage=34426>
for further information and typical product testing videos.

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: Group 1, Class A

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