

Site Preparation Specification for GCMS system

Purpose of Procedure

Your site must meet this specification or set of requirements to assure a successful and timely installation of your 5975C Series Mass Selective Detector (MSD). This checklist is designed to prevent delays during installation, familiarization, and the initial use of the MSD system in your application. This checklist outlines the space and utility requirements for a 5975C MSD. It also recommends tools and consumables that may help you get started. Use it along with the 5975C Site Preparation Manual.

Note: The 5975C VL MSD Series refers to the 5975C MSD (G3170A); 5975C inert MSD (G3171A); 5975C inert XL (G3172A); and 5975C inert XL EI/CI MSD (G3174A).

Customer Responsibilities

Make sure your site meets this specification, including: the necessary space, electric outlets, gases, tubing, operating supplies, consumables and other usage dependent items such as columns, vials, syringes and solvents required for the successful installation of instruments and systems. If Agilent is delivering installation and familiarization services, users of the instrument should be present throughout these services; otherwise, they will miss important operational, maintenance and safety information.

Important Information

If you need assistance, please contact your local Agilent Technologies office. Assistance with this checklist and with user specific applications is available and will be contracted separately.



Dimensions and Weight

Select the laboratory bench space before your system arrives. Pay special attention to the total height requirements. Avoid bench space with overhanging shelves.

Allow at least 20 cm clearance between back of GC and wall to dissipate air.

5975C Series MSDs	Height	Width	Depth	Weight
Diffusion Pump	40.8 cm 16 in	29.8 cm 11.75 in	54 cm 21.25 in	39 kg 85 lb
Standard Turbo Pump	40.8 cm 16 in	29.8 cm 11.75 in	54 cm 21.25 in	39 kg 85 lb
Performance Turbo Pump	40.6 cm 16 in	29.8 cm 11.75 in	54 cm 21.25 in	41 kg 90 lb
Performance CI/EI Turbo Pump	40.6 cm 16 in	29.8 cm 11.75 in	54 cm 21.25 in	46 kg 100 lb



GCs Series	Height	Width	Depth	Weight
6890/7890	54 cm 21.3 in	54.5 cm 21.4 in	54 cm 21.3 in	50 kg 112 lb
6850	50.0 cm 19.7 in	29 cm 11.4 in	54 cm 21.3 in	23 kg 51 lb



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A simple system that includes a GC, an automatic liquid sampler, and a computer would require about 153 cm or 5 feet of bench space, add an addition 41cm for a LaserJet printer (195cm or about 6.5 feet); access to the MSD could require moving the instrument so an additional (30cm or 1 foot) should be available. A total of 244 cm or 8 feet of bench space should be available for a full GCMS system. Some repairs to the MSD or to the GC will require access to the back of the instrument.

Please note: the length of the vacuum hose is 130cm or about 4.24 feet from the high vacuum pump to the foreline pump, while the length of the foreline pump power cord is 2M or about 6.6 feet.

The use of a Dry foreline pump requires the exhaust to be plumbed to an exhaust hood or exhaust line. During the installation and familiarization it is okay to use the silencer, but while running samples other than the installation checkout sample it is recommended the exhaust of the pump goes to an exhaust hood or exhaust line.



Power Consumption



The number and type of electrical outlets depends on the size and complexity of your system. The MSD power consumption and requirements depends on the country the unit is shipping to. The electrical outlet for the unit should have a dedicated ground.

Product	Line voltage	Frequency	Current Rating (amps)	Maximum continuous power consumption	Outlets Required	
5975C Series MSD	120VAC (-10% / + 5%)	50/60 Hz ± 5%	15A	1100VA (400VA for foreline pump only)	1	
	220-240VAC (-10% / + 5%)	50/60 Hz ± 5%	15A	1100VA (400VA for foreline pump only)	1	
	200VAC (-10% / + 5%)	50/60 Hz ± 5%	15A	1100VA (400VA for foreline pump only)	1	
ChemStation PC system (monitor, CPU, printer)	120VAC (-10% / + 5%)	50/60 Hz ± 5%	15A	1000VA	3 to 5	
	200-240VAC (-10% / + 5%)	50/60 Hz ± 5%	15A	1000VA	3 to 5	
6890/7890	Standard	Americas:120V AC (1) single phase (-10% / + 5%)	48-66 Hz	18.8	2250 VA	1
		220/230/240V single/split phase (-10% / + 5%)	48-66 Hz	10.2 / 9.8 / 9.4	2250 VA	1
	Fast	Japan: 200V split phase (-10% / + 5%)	48-66 Hz	14.8	2950 VA	1
		220/230/240V (2)(3) single/split phase (-10% / + 5%)	48-66 Hz	13.4 / 12.8 / 12.3	2950 VA	1
6850	Standard	Americas:120V AC (1) single phase (-10% / + 5%)	48-66 Hz		1	
		220/230/240V single/split phase (-10% / + 5%)	48-66 Hz		1	
	Fast	Japan: 200V split phase (-10% / + 5%)	48-66 Hz		1	



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	220/230/240V (2)(3) single/split phase (-10% / + 5%)	48-66 Hz			1
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Notes

1. Americas 120V requires 20 amp dedicated line. Americas 240V requires 15 amp dedicated line.
2. Option 003, 208V fast oven, uses a 220V unit with operating range of 193 to 231V. Most labs have 4-wire service resulting in 208V at the wall receptacle. It is important to measure the line voltage at the receptacle for the GC.
3. Power line conditioners should not be used with 6890/7890 GCs.



Heat Dissipation



The following table may help you calculate the additional BTU's of heat dissipation from this new equipment. Maximums represent the heat given off when heated zones are set for maximum temperatures.

Oven type	6890 series	5975C series
Standard oven ramp	7681 BTU / hour maximum	3000 BTU / hr including GC/MSD interface
Fast oven ramp (options 002 and 003)	10,071 BTU / hour maximum	3000 BTU / hr including GC/MSD interface

Oven type	6850 series	5973 series
Standard oven ramp		3000 BTU / hr including GC/MSD interface
Fast oven ramp		3000 BTU / hr including GC/MSD interface



Environmental Conditions



Operating the GCMS within the recommended ranges insures optimum instrument performance and lifetime. Instrument needs space for proper convection of heat and ventilation. Performance can be affected by sources of heat and cold from heating, air conditioning systems, or drafts.

Product	Conditions	Operating temp range	Operating humidity range	Maximum altitude
6890/7890 Series	Standard oven ramp	20 – 27 °C	50 – 60%	4,615.38 m
	Fast oven ramp (options 002 and 003)	20 – 27 °C	50 – 60%	4,615.38 m
	Storage	5 to 40 °C	5% - 95%	
6850 Series	Standard oven ramp	20 – 27 °C	50 – 60%	4,615.38 m
	Fast oven ramp (options 002 and 003)	20 – 27 °C	50 – 60%	4,615.38 m
	Storage	5 to 40 °C	5% - 95%	



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5975C Series	Operation	15 to 35 °C (59 to 95 °F)	20% - 80%	4,615.38 m *
	Storage	-20 to 70 °C (-4 to 158 °F)	0% - 95%	

* 7,500 feet (2.3 Km) for the 5975C VL MSD



Gas Supply



Gases are supplied by tanks, internal distribution system, or gas generators. Tank supplies require two staged, pressure regulation. **To connect tubing to the supply, it must have one 1/8-inch Swagelok female connector for each gas.** Make sure that your regulator has the appropriate sized adapter to end with a 1/8-inch Swagelok female connector. (The URL of SwagLok's web site is <http://www.swagelock.com> to help assist is finding connectors.)

The following table lists minimum and maximum pressures in psi for inlets and detectors measured at the bulkhead fitting at the back of the 7890, 6890 and 6850 Series GCs.

6890 Series Inlets and Detectors

	FID	NPD	TCD	ECD	FPD	S/splitless 150 psi	S/splitless 100 psi	On- column	Purged packed	PTV
Hydrogen	35-100	35-100			45-100					
Air	55-100	55-100			100-120					
Make up	55-100	55-100	55-100	55-100	55-100					
Reference			55-100							
Carrier max						170	120	120	120	120
Carrier min						20 psi above pressure used in method				

Conversions: 1 psi = 6.8947 kPa = 0.068947 Bar = 0.068 ATM

Notes

1. If you have not requested option 305, you must supply pre-cleaned, 1/8-inch copper tubing and a variety of 1/8-inch Swagelok® fittings to connect the GC to inlet and detector gas supplies.
2. Cryogenic cooling with Liquid N2 requires 1/4-inch insulated copper tubing.
3. Cryogenic cooling with Liquid CO2 requires 1/8-inch heavy-walled, stainless steel tubing.
4. Valve actuation requires a separate pressurized, dry air at 55 psi.
5. Never use liquid thread sealer to connect fittings. Never use chlorinated solvents to clean tubing or fittings.

5975C Series Gas Flow Limitations

Feature	G3170A	G3171A	G3172A	G3174A
High vac pump	Diffusion Pump	Standard turbo	Performance turbo	Performance turbo, EI/PCI/NCI
Optimal gas flow ml/min (a)	1.0	1.0	1.0 to 2.0	1.0 to 2.0
Maximum recommended gas flow, ml/min	2.0	2.0	4.0	4.0
Maximum gas flow, ml/min (b)	2.4	2.4	6.5	4.0



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Max column id	0.32mm (30m)	0.32mm (30m)	0.53mm (30m)	0.53mm (30m)
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a Total gas flow into the MSD: column flow plus reagent gas flow (if applicable)

b Expect degradation of spectral performance and sensitivity

5975C Series Carrier and Reagent Gases

Carrier and reagent gas requirements	Typical pressure range (psi)	Typical flow (ml/min)
Helium (required)	50 to 80	20 to 50 (column and split flow)
Hydrogen (optional) (a)	50 to 80	20 to 50 (column and split flow)
Methane reagent gas (required for CI operation)	15 to 25	1 to 2
Isobutane reagent gas (optional)	15 to 25	1 to 2
Ammonia reagent gas (optional)	5 to 8	1 to 2
Carbon dioxide reagent gas (optional)	15 to 20	1 to 2

a Hydrogen gas can be used for the carrier gas but specifications are based on Helium as the carrier gas and please observe all hydrogen gas safety cautions.



Gas Selection



Agilent recommends that carrier and detector gases be 99.9995% pure. Air needs to be zero grade or better. Agilent also recommends using traps to remove hydrocarbons, water, and oxygen.

The following table lists gases for capillary columns.

	Carrier	Preferred makeup	2 nd choice	Detector, anode purge, or reference
ECD	Hydrogen Helium Nitrogen Argon/methane	Argon/methane Argon/methane Nitrogen Argon/methane	Nitrogen Nitrogen Argon/methane Nitrogen	Anode purge must be same as makeup
FID	Hydrogen Helium Nitrogen	Nitrogen Nitrogen Nitrogen	Helium Helium Helium	Hydrogen and air for detector
FPD	Hydrogen Helium Nitrogen Argon	Nitrogen Nitrogen Nitrogen Nitrogen		Hydrogen and air for detector
NPD	Helium Nitrogen	Nitrogen Nitrogen	Helium Helium	Hydrogen and air for detector
TCD	Hydrogen Helium Nitrogen	Must be same as carrier and reference	Must be same as carrier and reference	Reference must be same as carrier and makeup

5975C Series Carrier and Reagent Gases Purity

Carrier and reagent gas requirements	Purity	
Helium (Carrier)	99.9995%	hydrocarbon free
Hydrogen (Carrier)	99.9995%	SFC Grade



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Methane reagent gas (required for CI operation)	99.999%	Research or SFC grade
Isobutane reagent gas (optional)	99.99%	Instrument grade
Ammonia reagent gas (optional)	99.9995%	Research or SFC grade
Carbon dioxide reagent gas (optional)	99.995%	SFC Grade

For both the GC and MSD it is recommend two (2) step regulators be used with 1/8" size outlets.



Other considerations



Exhaust Venting Requirements for the GCMS

For the MS vent external to building via ambient-pressure vent system, within 460 cm (15 ft) of both GC split vent and MSD foreline pump or vent to fume hood. Exhaust vent system is not part of environmental control system of building that recirculates air. Exhaust venting need to comply with all local environmental and safety codes.

For the GC with the deflector (outlet diameter 10cm – 4in) installed the exhaust is about 65 CuFt/min (1.840CuM/min), without deflector 99 CuFeet/min (2.8M3)

Basic Tools

Your GCMS comes with a few basic tools and consumables depending on the specific inlet and detector that you ordered. Here is a general list which one will get with the instruments or should have on-hand.

Tool or consumable	Used for
Inlet wrench	Replacing inlet septa and liners.
T10 and T20 Torx wrenches	Remove tray. Remove covers to access EPC modules, traps, and possible leaks.
¼-inch nut driver	FID jet replacement.
FID flow measuring insert	FID troubleshooting.
Column cutter	Column installation.
1/8-inch Tee, Swagelok, brass	Connect gas supplies
1/8-inch nuts & ferrules, Swagelok, brass	Connect gas supplies
Inlet septa appropriate for type	Injection port seal
Inlet insert or liner	Injection port
1.5 mm and 2.0 mm hex driver	Source maintenance (disassembly)
Tool bag	Used to hold GC and MS tools
Q-Tips	Used to clean source parts
Cloths	Used to keep surfaces clean and parts clean
Gloves	Used to reduce contamination on parts GC and MS

MSD Maintenance supplies

Description	Part number
Abrasive paper, 30 µm	5061-5896
Alumina powder 1kg sample	8660-0791
Cloths, clean (package of 300)	05980-60051
Cloths, cleaning (package of 300)	9310-4828
Cotton swabs (package of 100)	5080-5400
Foreline pump oil, P3	6040-0621
Gloves, clean, large	8650-0030
Gloves, clean, small	8650-0029
Grease, Apiezon L, high vacuum	6040-0289


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Ferrules	
Description	Part number
Blank, graphite-vespel	5181-3308
GC/MSD interface	
0.3-mm id, 85% Vespel 15% graphite, for 0.10-mm id columns	5062-3507
0.4-mm id, 85% Vespel 15% graphite, for 0.20-mm id and 0.25-mm id columns	5062-3508
0.5-mm id, 85% Vespel 15% graphite, for 0.32-mm id columns	5062-3506
0.8-mm id, 85% Vespel 15% graphite, for 0.53-mm id columns	5062-3538
Injection port	
0.27-mm id, 90% Vespel 10% graphite, for 0.10-mm id columns	5062-3518
0.37-mm id, 90% Vespel 10% graphite, for 0.20-mm id columns	5062-3516
0.40-mm id, 90% Vespel 10% graphite, for 0.25-mm id columns	5181-3323
0.47-mm id, 90% Vespel 10% graphite, for 0.32-mm id columns	5062-3514
0.74-mm id, 90% Vespel 10% graphite, for 0.53-mm id columns	5062-3512
Miscellaneous parts and samples	
Electron multiplier horn	05971-80103
Electron multiplier horn for the Triple Axis Detector	G3170-80103
Filament assembly (EI)	G2590-60053
Filament assembly (CI)	G1099-80053
Foreline pump oil (1 liter)	6040-0621
Foreline exhaust oil mist trap	G1099-80039
Octafluoronaphthalene (OFN), 1 pg/ul	5188-5348
Octafluoronaphthalene (OFN), 100 fg/ul	5188-5347
Perfluorotributylamine (PFTBA), certified (10 gram)	8500-0656
Perfluorotributylamine (PFTBA) sample kit	05971-60571
PFDTD, CI Calibrant	8500-8510
PFHT	5188-5357
Sample, evaluation A, hydrocarbons	05970-60045