

Agilent 8860 Gas Chromatograph

Site Preparation Guide



Notices

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WARNING

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1 Agilent 8860 GC Site Preparation

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This guide outlines the site requirements for GC, GC/MS, and automatic liquid sampler (ALS) installation. Site requirements include the necessary space, electrical supplies, gas supplies, operating supplies and consumables required to successfully install the GC and related instruments and systems.

The site must meet the requirements specified in this guide before beginning installation.

Refer to the Agilent Web site at www.agilent.com for the most up-to-date listing of GC, GC/MS, and ALS supplies and consumables.

Site Preparation Checklist

For typical system requirements for system installation, see the diagrams on [page 8](#) through [page 9](#).

Use the following checklist to ensure that the site is properly prepared for GC system installation.

- ☐ 1 Ensure that the appropriate installation hardware has been acquired. See ["Installation Kits"](#) on page 14.
- ☐ 2 Ensure that the location in which the GC system is being installed meets the requirements for environmental conditions. See ["Environmental Conditions"](#) on page 24. Also see ["Heat Dissipation"](#) on page 24.
- ☐ 3 Prepare bench space for the GC system. Ensure that the bench has the size and weight capacity to accommodate the GC and associated components. See ["Bench Preparation"](#) on page 7. Also see ["Dimensions and Weight"](#) on page 18.
- ☐ 4 Ensure that system components are oriented so that they can be connected properly. See ["Maximum Length of Cables and Hoses"](#) on page 10.
- ☐ 5 If the system being installed includes an MSD, ensure that the bench allows for proper installation and connection of the foreline pump. See ["Foreline Pump Requirements for Systems Including an MSD"](#) on page 20.
- ☐ 6 Ensure that appropriate venting is provided for the GC system. See ["Exhaust Venting"](#) on page 28.
- ☐ 7 Ensure that a dedicated power circuit is available for each device in the system, as specified. See ["Power Requirements"](#) on page 32.
- ☐ 8 Ensure that appropriate gas and reagent supplies are provided for the GC system. See ["Gas and Reagent Selection"](#) on page 40.
- ☐ 9 Ensure that appropriate gas plumbing is provided for the GC system. See ["Gas Plumbing"](#) on page 49.
- ☐ 10 If the GC system being installed includes a data system, ensure that the PC meets the requirements necessary to properly support the GC system. For more information, see the site prep guide for your data system.
- ☐ 11 If the GC being installed is to be connected to a site LAN, ensure that the appropriate cabling is available. See ["Site LAN Network"](#) on page 56.

Bench Preparation

When planning a bench layout:

- Consider component dimensions, weights, and space requirements. See **"Dimensions and Weight"** on page 18.
- Consider the lengths of cables and hoses for connection of components. See **"Maximum Length of Cables and Hoses"** on page 10.
- For systems that include an MS, consider foreline pump requirements. See **"Foreline Pump Requirements for Systems Including an MSD"** on page 20.
- Allow space for operational access.
- Note that the 7200 Q-TOF requires 48 cm (1.6 ft) of space in front to allow for the RIS probe extraction tool handle when installed.
- Note that some repairs to the GC/MS, or to the GC itself, will require access to the back of the instrument(s).

Examples are provided here for systems including a GC with an ALS, computer and printer. Most examples also include an MS.

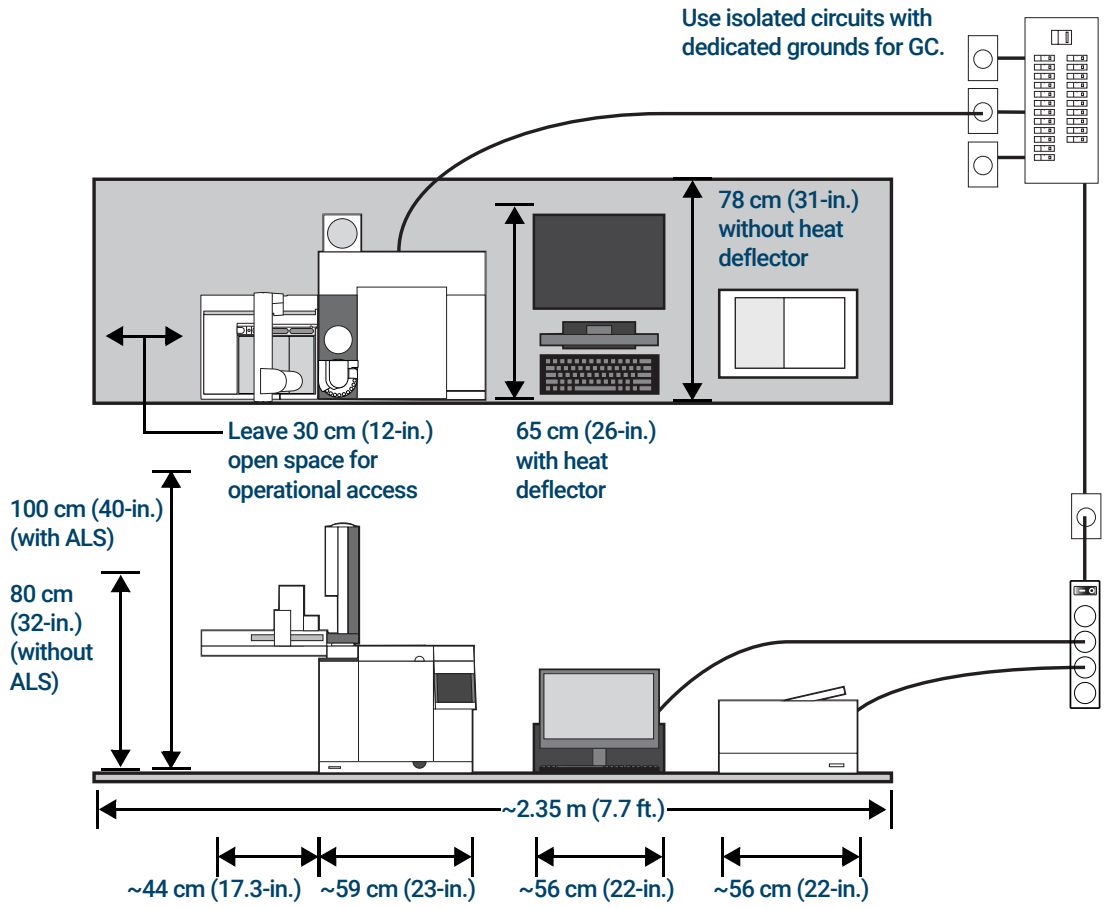
See several example layouts below.

Typical GC System - 8860 GC with computer and printer.

Application	Gas*	Purity	Supply Pressure (psi) [†]
Carrier	Helium	99.9995	50 - 80
	Hydrogen	99.9995	50 - 80
	Nitrogen	99.9995	50 - 80
Detectors			
TCD	Helium	99.9995	50 - 80
FID, NPD, FPD, TCD	Hydrogen	99.9995	50 - 80
ECD, FID, FPD, NPD, TCD	Nitrogen	99.9995	50 - 80
FID, NPD, FPD	Air	Zero grade	50 - 80

* Use 1/8-in. Swagelok gas connections

† 1 psi = 6.89 kPa



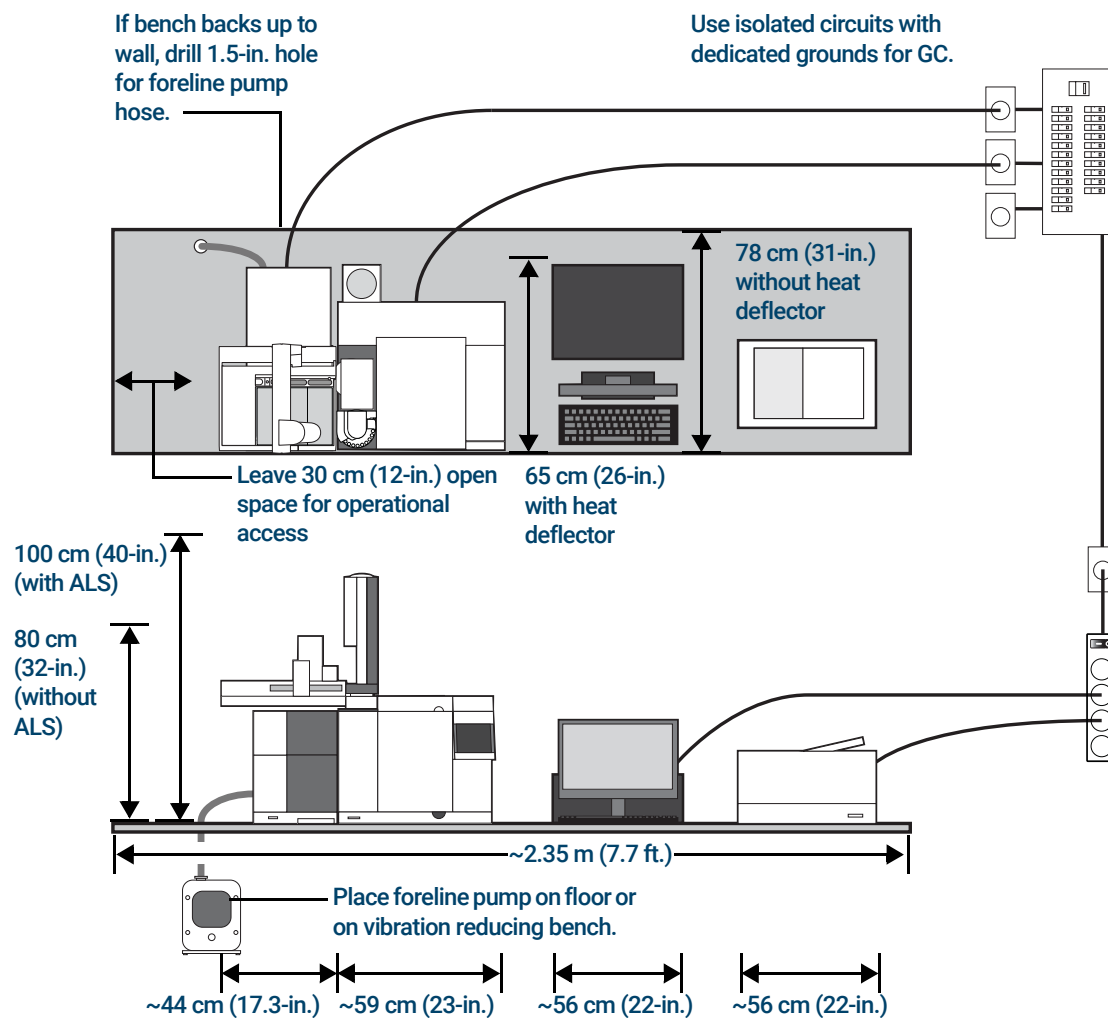
Total weight: ~84 kg (186 lb)
Maximum power consumption: ~3,250 VA (11,090 btu/hr)

Typical GC/MS System - 8860 GC, 5977 MSD, with computer and printer.

Application	Gas*	Purity	Supply Pressure (psi) [†]
Carrier	Helium	99.9995	50 - 80
	Hydrogen	99.9995	50 - 80
	Nitrogen	99.9995	50 - 80
Detectors			
TCD	Helium	99.9995	50 - 80
FID, NPD, FPD, TCD	Hydrogen	99.9995	50 - 80
ECD, FID, FPD, NPD, TCD	Nitrogen	99.9995	50 - 80
FID, NPD, FPD	Air	Zero grade	50 - 80

* Use 1/8-in. Swagelok gas connections

† 1 psi = 6.89 kPa



Total weight: ~123 kg (271 lb)

Maximum power consumption: ~4,350 VA (14,843 btu/hr)

Maximum Length of Cables and Hoses

The distance between system modules may be limited by some of the cabling and the vent or vacuum hoses.

Table 1 Cable and hose lengths

Item	Length
Remote cable	2 m (6.6 ft)
LAN cable	10 m (32.8 ft)
Power cords	2 m (6.6 ft)
Vacuum hose	1.3 m (4.24 ft)
Foreline pump power cord	2 m (6.6 ft)
7697A Headspace Sampler transfer line	99 cm (39-in.)
G1888 Headspace Sampler transfer line	80 cm (31.5-in.)

CAUTION

The supporting surface for the 7200/7250 Q-TOF GC/MS system should be kept relatively vibration free. Do not put the rough pump on your laboratory bench with the 7200/7250 Q-TOF GC/MS due to the vibration that the pump creates. Vibration can lead to a loss of mass accuracy and resolution.

Installation Kits 14

This section provides details for available installation hardware.

Refer to the Agilent Web site at www.agilent.com for the most up-to-date listing of GC, GC/MS, and ALS supplies and consumables.

Installation Kits

NOTE

Installation kits are not supplied with the GC. If you did not order the GC with the factory plumbing option (305), Agilent highly recommends the following kits in [Table 2](#).

- Agilent recommends purchasing the installation kit(s) that provides parts useful for GC installation. ([Table 2](#) lists the appropriate installation kits.)

In addition to these installation kits, fittings and reducers are required to convert gas cylinder regulator fittings (for example, 1/4-inch male NPT) to the 1/8-inch female Swagelok fittings needed to connect gases to the instrument. These fittings are not included with the GC or with the installation kits. See **“Gas Plumbing”** on page 49 for details.

Table 2 Installation kits

Kit	Part number	Contents
Recommended for GCs with FID, NPD, FPD:		
GC Supply Gas Installation Kit with Gas Purifiers See Figure 1 .	19199N	Includes Gas Clean Filter system kit CP736530 (with 1 oxygen, 1 moisture, and 2 charcoal filters), 1/8-inch brass nuts and ferrules, copper tubing, 1/8-inch brass tees, tubing cutter, 1/8-inch brass caps, universal external split vent trap with replacement cartridges, and 1/8-inch ball valve.
Recommended for GCs with TCD/ECD, MS, and MSD:		
GC Supply Gas Installation Kit See Figure 2 .	19199M	Includes 1/8-inch brass nuts and ferrules (20), copper tubing, 1/8-inch brass tees, tubing cutter, 1/8-inch brass caps, 7-mm nut driver, T-10 Torx driver, T-20 Torx driver, 4 open-end wrenches, and 1/8-inch ball valve
Gas Clean carrier gas filter kit, 1/8-inch See Figure 3 .	CP17974	

2 GC Installation Kits

Installation Kits



Figure 1. GC Supply Gas Installation Kit with Gas Purifiers 19199N



Figure 2. GC Supply Gas Installation Kit 19199M



Figure 3. Gas Clean carrier gas filter kit, 1/8-inch CP17974

Dimensions and Weights

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ALS Dimensions and Weight 21

This section lists the dimensions of the GC, GC/MS, and automatic liquid samplers (ALS).

Dimensions and Weight

- 1 Ensure that you can accommodate the shipping pallets when you take delivery. See **Table 3**.
- 2 Prepare laboratory bench space before the system arrives. Make sure the prepared area is clean, clear, and level. Pay special attention to the total height requirements. Avoid bench space with overhanging shelves. See **Table 4**.

Table 3 Pallet dimensions and weights

Product	Height	Width	Depth	Weight
GC				
8860 Series GC shipping pallet	76 cm (30-inch)	86 cm (34-inch)	103 cm (40.5-inch)	N/A
With third side detector (side mount)	76 cm (30-inch)	87 cm (34-inch)	108 cm (42.5-inch)	
MS				
7200/7250 Q-TOF MS	96 cm (38-inch)	130 cm (51-inch)	91 cm (36-inch)	175 kg (385 lb)
7200 Flight Tube	66 cm (26-inch)	66 cm (26-inch)	147 cm (58-inch)	36.4 kg (80 lb)
7250 Flight Tube	66 cm (26-inch)	206 cm (81-inch)	81 cm (32-inch)	87 kg (191 lb)

Table 4 Instrument dimensions, weights, and required clearances

Product	Height	Width	Depth	Weight
GC				
8860 Series GC	50 cm (19.2-inch)	59 cm (23-inch)	54 cm (21-inch)	50 kg (112 lb)
With third side detector (side mount)	50 cm (19.2-inch)	68 cm (27-inch)	54 cm (21-inch)	57 kg (125.4 lb)
• GC operational /oven access		Requires ≥ 30 cm (12-inch) open space above GC. Requires ≥ 27 cm (10.7-inch) open space in front of GC.		
• GC rear ventilation / maintenance clearance		Requires ≥ 25 cm (10-inch) clearance between back of instrument and wall to dissipate hot air and allow for routine maintenance.		
MSD				
5975 Series MSD				
• Diffusion pump	41 cm (16-inch)	30 cm (12-inch)	54 cm (22-inch)	39 kg (85 lb)
• Standard turbo pump	41 cm (16-inch)	30 cm (12-inch)	54 cm (22-inch)	39 kg (85 lb)
• Foreline pump				
Standard	21 cm (8-inch)	13 cm (5-inch)	31 cm (12-inch)	11 kg (23.1 lb)
Oil-free	19 cm (7.5-inch)	32 cm (13-inch)	28 cm (11-inch)	16 kg (35.2 lb)
• GC/MS operational and maintenance access		Requires 30 cm (1 ft) to the left of the unit.		
5977 Series MSD				
• Diffusion pump	41 cm (16-inch)	30 cm (12-inch)	54 cm (22-inch)	39 kg (85 lb)
• Performance turbo pump	41 cm (16-inch)	30 cm (12-inch)	54 cm (22-inch)	41 kg (90 lb)

3 Dimensions and Weights

Dimensions and Weight

Table 4 Instrument dimensions, weights, and required clearances (continued)

Product	Height	Width	Depth	Weight
• Foreline pump Standard Oil-free (MVP-070) Oil-free (IDP3)	21 cm (8-inch) 19 cm (7.5-inch) 18 cm (7-inch)	13 cm (5-inch) 32 cm (13-inch) 35 cm (14-incn)	31 cm (12-inch) 28 cm (11-inch) 14 cm (6-inch)	11 kg (23.1 lb) 16 kg (35.2 lb) 10 kg (21 lb)
• GC/MS operational and maintenance access	Requires 30 cm (1 ft) to the left of the unit.			
MS				
7000 and 7010 Triple Quad MS				
• EI Mainframe	47 cm (18.5-inch)	35 cm (14-inch)	86 cm (34-inch)	59 kg (130 lb)
• EI/CI Mainframe	47 cm (18.5-inch)	35 cm (14-inch)	86 cm (34-inch)	63.5 kg (140 lb)
• Foreline pump	28 cm (11-inch)	18 cm (7-inch)	35 cm (14-inch)	21.5 kg (47.3 lb)
• GC/MS operational and maintenance access	Requires 30 cm (1 ft) to the left of the unit.			
7200 Q-TOF MS				
• Mainframe	133 cm (52.5-inch)	90 cm (34.5-inch)	100 cm (39.5-inch)	138 kg (305 lb)
• Foreline pump	28 cm (11-inch)	18 cm (7-inch)	35 cm (14-inch)	21.5 kg (47.3 lb)
7250 Q-TOF MS				
• Mainframe	190 cm (74.8-inch)	90 cm (34.5-inch)	100 cm (39.5-inch)	138 kg (350 lb)
• Foreline pump DS202	28 cm (11-inch)	18 cm (7-inch)	35 cm (14-inch)	21.5 kg (47.3 lb)
• Foreline pump IDP-15	36.4 cm (14.3-inch)	33.3 cm (13.1-inch)	48.5 cm (19.1-inch)	45.5 kg (100 lb)
• GC/Q-TOF operational and maintenance access	Requires 40 cm (16-inch) clearance on both sides of the unit. Requires 30 cm (12-inch) clearance behind the unit.			
Headspace sampler (HS)				
7697A Headspace sampler 111 vial model 12 vial model	80 cm (32-inch) 61 cm (24-inch)	69 cm (27-inch) 64 cm (25-inch)	70 cm (27.5-inch) 69 cm (27-inch)	46 kg (101 lb) 38.2 kg (84 lb)
• GC with 7697A Headspace sampler	Requires 69 cm (27-inch) to the right of the GC (G4557A), or 64 cm (25-inch) to the right of the GC (G4556A).			
G1888 Headspace sampler	56 cm (22-inch)	46 cm (18.1-inch)	64 cm (25-inch)	46.3 kg (102 lb)
ALS				
• GC with 7693A ALS injector	Requires 50 cm (19.5-inch) above the GC			3.9 kg (8.6 lb) each
• GC with 7693A ALS tray	Requires 43 cm (16.8-inch) left of the GC Requires 4.2 cm (1.7-inch) in front of GC			6.8 kg (15 lb) each
• GC with 7650A ALS injector	Requires 50 cm (19.5-inch) above the GC			3.9 kg (8.6 lb) each
• GC with CTC PAL Autosampler	Requires 76.6 cm (30.2-inch) above the GC and 65 to 98 cm (25.6 to 38.6-inch) to the right of the GC, depending on configuration			

Foreline Pump Requirements for Systems Including an MSD

- 1 If using a 7200 or 7250 Q-TOF MS, the length of the quadrupole vacuum hose is 130 cm (4 ft 3-inch) from the high vacuum pump to the foreline pump, and the length of the foreline pump power cord is 2 m (6 ft 6-inch).
- 2 If your bench abuts a wall, drill 4 cm (1.5-inch) diameter holes through the rear of the bench for the vacuum hose and power cord.

CAUTION

Make sure the 7200/7250 Q-TOF GC/MS foreline pump is located where it is not likely to be touched by operators.

ALS Dimensions and Weight

Select the laboratory bench space before the system arrives. Pay special attention to the total height requirements. Avoid bench space with overhanging shelves. See **Table 5**.

The instrument needs space for proper convection of heat and ventilation. Allow at least 20 cm clearance between the back of the instrument and wall to dissipate hot air.

Table 5 Required height, width, depth, and weight

Product	Height (cm)	Width (cm)	Depth (cm)	Weight (kg)
G4513A Injector	51	16.5	16.5	3.9
G4514A Tray*	29	44	43	6.8
7650A Injector	51	22	24	4.5
Additional space requirements				
• GC with 7693A ALS injector		50 cm (19.5-inch) above the GC		
• GC with 7693A ALS tray		45 cm (17.5-inch) left of the GC		
• GC with 7650 ALS injector		50 cm (19.5-inch) above the GC 9 cm (3.6-inch) in front of the GC 3 cm (1.2-inch) to the left of the GC		

* The G4520A Tray with a bar code reader is available with a G4514A Tray and G4515A bar code reader.

3 Dimensions and Weights

ALS Dimensions and Weight

Environmental Conditions

Environmental Conditions 24

Heat Dissipation 24

ALS Environmental Conditions 26

This section outlines the environmental requirements for use or storage of the GC, GC/MS, and automatic liquid sampler (ALS). Heat dissipation information is also provided.

Environmental Conditions

Ensure that the instrument will be operated or stored within the recommended environmental ranges. This optimizes instrument performance and lifetime. The specified conditions assume a non-condensing, non-corrosive atmosphere. See [Table 6](#).

Also, see “[Heat Dissipation](#)” on page 24.

NOTE

Performance can be affected by sources of heat and cold from heating, air conditioning systems, or drafts.

Table 6 Environmental conditions for operation and storage

Product	Condition	Temperature range	Humidity range	Maximum altitude
8860 GC	Standard oven ramp	5 to 45 °C	5 to 90%	3,100 m
	Storage	–20 to 65 °C	0 to 90%	
MSD				
5975 Series MSD	Operation	15 to 35 °C * (59 to 95 °F)	20 to 80%	4,615 m
	Storage	–20 to 70 °C (–4 to 158 °F)	0 to 95%	
5977 Series MSD	Operation	15 to 35 °C * (59 to 95 °F)	20 to 80%	4,615 m
	Storage	–20 to 70 °C (–4 to 158 °F)	0 to 95%	
MS				
7010 or 7000 Triple Quad MS	Operation	15 to 35 °C † (59 to 95 °F)	40 to 80%	5,000 m ‡
	Storage	–20 to 70 °C (–4 to 158 °F)	0 to 95%	
7200 or 7250 Q-TOF MS	Operation	15 to 35 °C † (59 to 95 °F)	20 to 80%	2,500 m
	Storage	–20 to 70 °C (–4 to 158 °F)	0 to 95%	

* Operation requires constant temperature (variations < 2 °C/hour)

† Operation requires constant temperature (variations < 2 °C/hour)

‡ An altitude of 3,700 meters (12,000 feet) is supported if the ambient temperature is less than 30 °C

Heat Dissipation

- Use [Table 7](#) to estimate the additional heat dissipated from the equipment. Maximums represent the heat given off when heated zones are set for maximum temperatures.

Table 7 Heat dissipation

Instrument	
8860 GC	7681 BTU/hour maximum (8103 kJ/h) 5120 BTU/hour maximum (100 V power option) (5402 kJ/h)
5975 Series MSD	3000 BTU/hour (3165 kJ/h)
5977 Series MSD	3000 BTU/hour (3165 kJ/h)
7010 or 7000 Triple Quad MS	3700 BTU/hour (3904 kJ/h)
7200 or 7250 Q-TOF MS	6200 BTU/hour (6541 kJ/h)

If using the optional G4522A Cooling Accessory, you will need to supply:

- A water chiller.
- Tubing and 1/8-inch Swagelok fittings to connect the chilled water and return water to the chiller.

A container or drain to dispose of condensate from the tray.

ALS Environmental Conditions

Operating the instrument within the recommended ranges optimizes instrument performance and lifetime. The sampler system operates in the same environment as its parent GC. See **“Environmental Conditions”** on page 24.

The conditions assume a non-condensing, noncorrosive atmosphere.

Table 8 Environmental conditions for operation and storage

Product	Conditions	Operating temp range	Operating humidity range	Maximum altitude
G4513A Injector G4514A Tray* G4515A Bar Code Reader*	Operation	0 to 40 °C	5–95%	4,300 m
7650 Injector	Operation	0 to 40 °C	5–95%	4,300 m
G4517A Controller	Operation	–5 to 45 °C	Maximum relative humidity of 80% for temperatures up to 31 °C decreasing linearly to 50% relative humidity at 40 °C	2,000 m
Storage				

* The G4520A Tray with a bar code reader is available with a G4514A Tray and G4515A bar code reader.

Exhaust Venting

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This section outlines the exhaust venting requirements for GC, GC/MS, and automatic liquid sampler (ALS) installation.

Exhaust Venting

During normal operation, the GC exhausts hot oven air. Depending on the installed inlet and detector types, the GC can also exhaust (or vent) uncombusted carrier gas and sample. Proper venting of these exhausts is required for operation and safety.

Venting hot air

WARNING

Do not place temperature-sensitive items (for example, gas cylinders, chemicals, regulators, and plastic tubing) in the path of the heated exhaust. These items will be damaged and plastic tubing will melt. Be careful when working behind the instrument during cool-down cycles to avoid burns from the hot exhaust.

- 1 Hot air (up to 450 °C) from the oven exits through a vent in the rear of the instrument. Allow at least 25 cm (10-inch) clearance behind the instrument, or 30 cm (12-inch) behind a Q-TOF GC/MS to dissipate this hot air. See [Figure 4](#).



Figure 4. Exhaust outlet.

- 2 For most applications, an optional oven exhaust deflector is available. With the exhaust deflector, the minimum bench depth behind the instrument is reduced to 14 cm (5.5) inches - a difference of 11 cm (4.5 inches).
 - For GCs with the exhaust deflector installed, the exhaust rate is about 65 ft³/min (1.84 m³/min). Without the deflector, the exhaust rate is about 99 ft³/min (2.8 m³/min). The deflector outlet diameter is 10 cm (4 in). See [Figure 5](#).
 - For part numbers for the exhaust deflectors, see [Table 9](#).

Table 9 Exhaust deflector part numbers

Instrument	Part number
GC	G3450-81650



Figure 5. Exhaust deflector G3450-81650

Venting other gases

During normal operation of the GC, depending on the detector and inlet configuration, some of the carrier gas and sample vents outside the instrument through the split vent, septum purge vent, and detector exhaust. If any sample components are toxic or noxious, or if hydrogen is used as the carrier gas or detector fuel gas, these exhausts must be vented to a fume hood.

NOTE

Exhaust venting must comply with all local environmental and safety codes. Contact your Environmental Health & Safety (EHS) specialist.

- 1 Place the GC in the hood or attach a large diameter venting tube to the relevant outlet for proper ventilation. See **“Exhaust vent fittings”** on page 29.
- 2 To further prevent contamination from noxious gases, attach a chemical trap to the vent(s).
- 3 If using an ECD, always connect the ECD exhaust vent to a fume hood or vent it to the outside. See the latest revision of 10 CFR Part 20 (including Appendix B), or the applicable state regulation. For countries other than the United States, consult with the appropriate agency for equivalent requirements. Agilent recommends a vent line internal diameter of 6 mm (1/4-inch) or greater. With a line of this diameter, the length is not critical.
- 4 Vent the GC/MS system externally to the building via an ambient-pressure vent system, within 460 cm (15 ft) of both the GC split vent and GC/MS foreline pump, or vent to a fume hood.

Exhaust vent fittings

The various inlet and detector vents terminate in the following fittings:

- TCD, ECD: The detector exhaust terminates in a 1/8-inch od tube.
- SSL: The split vent terminates in a 1/8-inch Swagelok female fitting.

5 Exhaust Venting

Exhaust vent fittings

- All inlets: The septum purge vent terminates in 1/8-inch od tubing.

GC System Power Requirements

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This section details the power requirements for GC, GC/MS, and automatic liquid sampler (ALS) installation.

Power Requirements

Power consumption and requirements depend on the country to which the unit ships.
The number and type of electrical outlets depend on the size and complexity of the system.

WARNING

To protect users, the metal instrument panels and cabinet are grounded through the three-conductor power line cord in accordance with International Electrotechnical Commission (IEC) requirements.

A proper earth ground is required for GC operations. Any interruption of the grounding conductor or disconnection of the power cord could cause a shock that could result in personal injury.

Be sure to verify proper receptacle grounding.

WARNING

Do not use extension cords with Agilent instruments. Extension cords normally are not rated to carry enough power and can be a safety hazard.

The length of the power cord is 2 meters (6.6 feet).

CAUTION

Do not use power line conditioners with Agilent instruments. Doing so may cause damage to the equipment.

- 1 Ensure that each instrument in your GC system can be connected to a dedicated circuit with an isolated ground. (Note that ALS instruments receive their power from the GC.)
- 2 Power requirements are printed near the power cord attachment on the rear panel of each instrument. Although your GC should arrive ready for operation in your country, compare its power requirements with those listed in [Table 10](#). If the voltage option you ordered is not suitable for your installation, contact Agilent Technologies.

Table 10 Power requirements

Product	Oven type	Line voltage (VAC)	Frequency (Hz)	Maximum continuous power consumption (VA)	Current rating (amps)	Power outlet current rating
8860 GC	Standard	100 single phase (-10% / +10%)	48–63	1500	12.5	15 Amp Dedicated
8860 GC	Standard	120 single phase (-10% / +10%)	48–63	2250	18.8	20 Amp Dedicated
8860 GC	Standard	200/220/230/240 single phase (-10% / +10%)	48–63	2250	9.6/9.3/9.3/9.2	10 Amp Dedicated

Table 10 Power requirements (continued)

Product	Oven type	Line voltage (VAC)	Frequency (Hz)	Maximum continuous power consumption (VA)	Current rating (amps)	Power outlet current rating
MSD						
5975 Series MSD		120 (-10% / +5%)	50/60 ± 5%	1100 (400 for foreline pump only)	8	10 Amp
5975 Series MSD		220-240 (-10% / +5%)	50/60 ± 5%	1100 (400 for foreline pump only)	8	10 Amp
5975 Series MSD		200 (-10% / +5%)	50/60 ± 5%	1100 (400 for foreline pump only)	8	10 Amp
5977 Series MSD		120 (-10% / +5%)	50/60 ± 5%	1100 (400 for foreline pump only)	8	10 Amp
5977 Series MSD		220-240 (-10% / +5%)	50/60 ± 5%	1100 (400 for foreline pump only)	8	10 Amp
5977 Series MSD		200 (-10% / +5%)	50/60 ± 5%	1100 (400 for foreline pump only)	8	10 Amp
MS						
7010 or 7000 Triple Quad MS		120 (-10% / +5%)	50/60 ± 5%	1600	15	15 Amp Dedicated
7010 or 7000 Triple Quad MS		220-240 (-10% / +5%)	50/60 ± 5%	1600	15	15 Amp Dedicated
7010 or 7000 Triple Quad MS		200 (-10% / +5%)	50/60 ± 5%	1600	15	15 Amp Dedicated
7200 or 7250 Q-TOF MS		200-240 (-10% / +5%)	50/60 ± 5%	1800 (1200 for foreline pump)	15	15 Amp Dedicated
HS						
7697A Headspace		Americas: 120 single phase (-10% / +10%)	50/60 ± 5%	850	6.2	15 Amp
7697A Headspace		200/220/230/240 single/split phase (-10% / +10%)	50/60 ± 5%	850	3.8/3.4/ 3.3/3.1	10 Amp
All						
Data system PC (monitor, CPU, printer)		100/120 (-10% / +5%)	50/60 ± 5%	1000	10/8.3	15 Amp Dedicated
Data system PC (monitor, CPU, printer)		200-240 (-10% / +5%)	50/60 ± 5%	1000	4.1-5	10 Amp Dedicated

NOTE

The GC and related equipment meet the following International Electrotechnical Commission (IEC) classifications: Equipment Class I, Laboratory Equipment, Installation Category II, and Pollution Degree 2.

Canadian installation

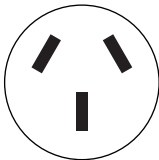
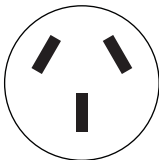
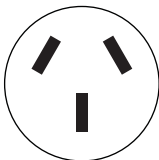
When installing a GC in Canada, make sure your GC power supply circuit meets the following additional requirements:

- The circuit breaker for the branch circuit, which is dedicated to the instrument, is rated for continuous operation.
- The service box branch circuit is marked as a "Dedicated Circuit."

Common instrument power cord plugs

Table 11 shows common Agilent power cord plugs.

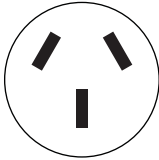
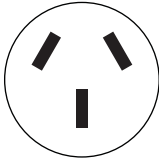
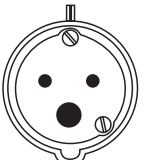
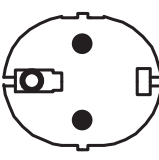
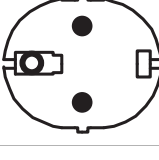
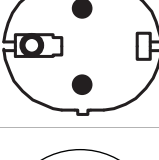
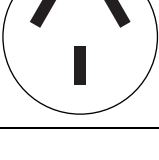
Table 11 Power cord terminations

Part number	Country	Voltage	Amps	Cable length (m)	GC connector type	Termination type	Plug
8121-0675	Argentina	240	16	4.5	C19	AS 3112	
8120-1369	Australia, New Zealand	240	10	2.5	C13	AS 3112	
8120-8619	Australia	240	16	2.5	C19	AS 3112	
8121-1787	Brazil	240	16	2.5	C19	IEC 60906-1	
8121-1809	Brazil	240	10	2.5	C13	IEC 60906-1	
8120-6978	Chile	240	10	2.5	C13	CEI 23-16	

6 GC System Power Requirements

Common instrument power cord plugs

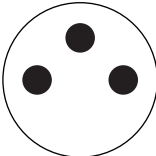
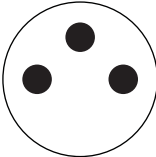
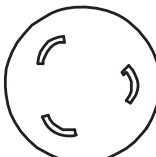
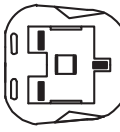
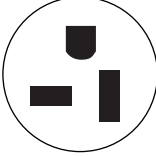
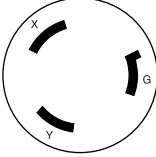
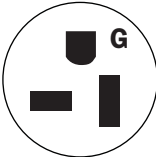
Table 11 Power cord terminations

Part number	Country	Voltage	Amps	Cable length (m)	GC connector type	Termination type	Plug
8121-0070	China	220	16	2.5	C19	GB 1002	
8121-0723	China	220	10	2.5	C13	GB 1002	
8120-3997	Denmark, Greenland	230	10	2.5	C13	AFSNIT 107-2-01	
8120-8622	Denmark, Switzerland	230	16	2.5	C19	Swiss/Denmark 1302	
8120-8621	Europe	220 / 230 / 240	16	2.5	C19	CEE/7/V11	
8121-1222	Korea	220 / 230 / 240	16	2.5	C19	CEE/7/V11	
8121-1226	Korea	220 / 230 / 240	10	2.5	C13	CEE/7/V11	
8121-0710	India, South Africa	240	15	2.5	C19	AS 3112	

6 GC System Power Requirements

Common instrument power cord plugs

Table 11 Power cord terminations

Part number	Country	Voltage	Amps	Cable length (m)	GC connector type	Termination type	Plug
8120-5182	Israel	230	10	2.5	C13	Israeli SI32	
8120-0161	Israel	230	16, 16 AWG	2.5	C19	Israeli SI32	
8120-6903	Japan	200	20	4.5	C19	NEMA L6-20P	
8120-8620	United Kingdom, Hong Kong, Singapore, Malaysia	240	13	2.5	C19	BS1363/A	
8120-8705	United Kingdom, Hong Kong, Singapore, Malaysia	240	10	2.3	C13	BS1363/A	
8120-6894	United States	120	20	2.5	C19	NEMA 5-20P	
8121-0075	United States	240	15	2.5	C19	NEMA L6-15P	
8120-6360	Taiwan, South America	120	20	2.5	C19	NEMA 5-20P	
8121-1301	Thailand	220	15	1.8	C19		

ALS Power Requirements

The ALS components draw power from the GC. No other power source is required.

The G4517A controller, used with the 8860 Series GC, requires one electrical outlet with a dedicated ground. The controller can be set for either 100-120 V or 200-240 V.

WARNING

Do not use extension cords with Agilent instruments. Extension cords normally are not rated to carry enough power and can be a safety hazard.

6 GC System Power Requirements

ALS Power Requirements

Gas Selection and Plumbing

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Supply tubing for most carrier and detector gases	50
Supply tubing for hydrogen gas	50
Two-stage pressure regulators	51
Pressure regulator-gas supply tubing connections	51
Filters and traps	52

This section outlines the requirements for gas selection and plumbing.

Refer to the Agilent Web site at www.agilent.com for the most up-to-date listing of GC, GC/MS, and ALS supplies and consumables.

Gas and Reagent Selection

Table 12 lists gases usable with Agilent GCs and capillary columns. When used with capillary columns, GC detectors require a separate makeup gas for optimum sensitivity. The MS and MSD use GC carrier gas.

If you are using any MS system, use of hydrogen as the carrier gas may require hardware modifications for the best performance. Contact your Agilent service representative. Hydrogen is not supported as a carrier gas with the 7200/7250 GC/Q-TOF system.

WARNING

When using hydrogen (H₂) as the carrier gas or fuel gas, be aware that hydrogen gas can flow into the GC and create an explosion hazard. Therefore, be sure that the supply is turned off until all connections are made and ensure the inlet and detector column fittings are either connected to a column or capped at all times when hydrogen gas is supplied to the instrument.

Hydrogen is flammable. Leaks, when confined in an enclosed space, may create a fire or explosion hazard. In any application using hydrogen, periodically leak test all connections, lines, and valves before operating the instrument or after maintenance. Always turn off the hydrogen supply at its source before working on the instrument.

Please refer to the Hydrogen Safety Guide shipped with your instrument.

Hydrogen use is specifically prohibited with the 7200 or 7250 GC/Q-TOF system.

NOTE

Nitrogen and Argon/Methane are generally not suitable for GC/MS carrier gas.

Table 12 Gases usable with Agilent GCs and capillary columns

Detector type	Carrier	Preferred makeup	Alternate choice	Detector, anode purge, or reference
Electron capture (ECD)	Hydrogen Helium Nitrogen Argon/Methane (5%)	Nitrogen Nitrogen Nitrogen Argon/Methane (5%)	Argon/Methane (5%) Argon/Methane (5%)	The detector uses makeup gas to provide the anode purge flow. No separate connection required.
Flame ionization (FID)	Hydrogen Helium Nitrogen	Nitrogen Nitrogen Nitrogen	Helium Helium	Hydrogen and air for detector
Flame photometric (FPD)	Hydrogen Helium Nitrogen	Nitrogen Nitrogen Nitrogen		Hydrogen and air for detector
Nitrogen-Phosphorus (NPD)	Helium Nitrogen	Nitrogen Nitrogen	Helium	Hydrogen and air for detector

Table 12 Gases usable with Agilent GCs and capillary columns (continued)

Detector type	Carrier	Preferred makeup	Alternate choice	Detector, anode purge, or reference
Thermal conductivity (TCD)	Hydrogen Helium Nitrogen	The TCD must use the carrier gas for makeup and reference	The TCD must use the carrier gas for makeup and reference	The TCD must use the carrier gas for makeup and reference

Table 13 lists gas recommendations for packed column use. In general, makeup gases are not required with packed columns.

Table 13 Gases usable with Agilent GCs and packed columns

Detector type	Carrier gas	Comments	Detector, anode purge, or reference
Electron capture (ECD)	Nitrogen	Maximum sensitivity	Nitrogen
	Argon/methane	Maximum dynamic range	Argon/Methane
Flame ionization (FID)	Nitrogen	Maximum sensitivity	Hydrogen and air for detector.
	Helium	Acceptable alternative	
Flame photometric (FPD)	Hydrogen Helium Nitrogen		Hydrogen and air for detector.
Nitrogen-Phosphorus (NPD)	Helium	Optimum performance	Hydrogen and air for detector.
	Nitrogen	Acceptable alternative	
Thermal conductivity (TCD)	Helium	General use	Reference must be same as carrier and makeup.
	Hydrogen	Maximum sensitivity*	
	Nitrogen	Hydrogen detection†	
	Argon	Maximum hydrogen sensitivity*	

* Slightly greater sensitivity than helium. Incompatible with some compounds.

† For analysis of hydrogen or helium. Greatly reduces sensitivity for other compounds.

For installation checkout, Agilent requires the gas types shown in **Table 14**.

Table 14 Gases and reagents required for checkout

Detector	Gases required
FID	Carrier: helium Makeup: nitrogen Fuel: hydrogen Aux gas: Air
TCD	Carrier and reference: helium
NPD	Carrier: helium Makeup: nitrogen Fuel: hydrogen Aux gas: Air

Table 14 Gases and reagents required for checkout (continued)

Detector	Gases required
ECD	Carrier: helium Anode purge and makeup: nitrogen
FPD	Carrier: helium Makeup: nitrogen Fuel: hydrogen Aux gas: Air
CI MS (external)	Reagent gas: methane
CI MS (internal)	Reagent: methanol

MS and MSD systems purchased with a Self-Cleaning Ion Source also require a source of hydrogen gas in addition to helium carrier gas. This source can be shared but must meet carrier gas purity requirements.

Hydrogen Carrier Gas

Refer to the Agilent 8860 GC *Safety Manual* for important safety information about hydrogen gas.

If hydrogen is being used as a carrier gas, or for the JetClean ion source system, special considerations apply due to hydrogen's flammability and chromatographic properties.

- Agilent highly recommends the G3388B Leak Detector to safely check for leaks.
- Hydrogen carrier gas requires special considerations for supply tubing. See **"Gas Plumbing"** on page 49.
- In addition to the supply pressure requirements listed in **"Gas Supplies"** on page 43, Agilent also recommends users of hydrogen gas consider gas source and purification needs. See the additional recommendations in **"Requirements for hydrogen as a carrier gas or for use in JetClean systems"** on page 45.
- When using hydrogen carrier gas with a ECD, TCD, or any other detector that vents uncombusted gases, plan to vent the detector output to a fume hood or similar location. Uncombusted hydrogen can present a safety hazard. See **"Exhaust Venting"** on page 28.
- When using hydrogen carrier gas, also plan to safely vent inlet split vent flows and purge vent flows. See **"Exhaust Venting"** on page 28.

Gas and Reagent Purity

Agilent recommends that carrier and detector gases be 99.9995% pure. See **Table 15**. Air needs to be zero grade or better. Agilent also recommends using high quality traps to remove hydrocarbons, water, and oxygen.

Table 15 Carrier, collision and reagent gas purity

Carrier, collision and reagent gas requirements	Purity	Notes
Helium (carrier)	99.9995%	Hydrocarbon free

Table 15 Carrier, collision and reagent gas purity

Carrier, collision and reagent gas requirements	Purity	Notes
Hydrogen (carrier) (carrier and self-cleaning ion source)	99.9995%	SFC grade
Nitrogen (carrier)	99.9995%	
Nitrogen (drying gas, nebulizer pressure) [*]	99.999%	Research grade
Methanol [†]	99.9%	Reagent grade. Purge and trap grade recommended.

* Purity specification is the minimum acceptable purity. Major contaminants can be water, oxygen, or air. Drying gas and nebulizer pressure gas can be supplied by a nitrogen gas generator, house nitrogen system, or liquid nitrogen dewar.

† Required reagent for performance verification in internal CI mode only. Evaporation residue <.0001%.

Gas Supplies

General requirements

Supply instrument gases using tanks, an internal distribution system, or gas generators. If used, tanks require two-stage pressure regulators with packless, stainless steel diaphragms. The instrument requires 1/8-inch Swagelok connections to its gas supply fittings. See **Figure 6**.

NOTE

Plumb the gas supply tubing/regulators so that one 1/8-inch Swagelok female connector is available for each gas needed at the instrument.

Swagelok nut and ferrules



Female Swagelok fittings on GC



Figure 6. Example Swagelok connector and hardware

Table 16 lists available Agilent two-stage tank regulators. All Agilent regulators are supplied with the 1/8-inch Swagelok female connector.

Table 16 Tank regulators

Gas type	CGA number	Max pressure	Part number
Air (Medical Grade)	346	125 psig (8.6 Bar)	5183-4641
Air (Zero Grade, for GC applications)	590	125 psig (8.6 Bar)	5183-4645
Hydrogen, Argon/Methane	350	125 psig (8.6 Bar)	5183-4642
Oxygen	540	125 psig (8.6 Bar)	5183-4643
Helium, Argon, Nitrogen	580	125 psig (8.6 Bar)	5183-4644

Table 17 and **Table 18** list minimum and maximum delivery pressures for inlets and detectors, measured at the bulkhead fittings on the back of the instrument.

Table 17 Delivery pressures for inlets required at the GC, in kPa (psig)

	Inlet type		
	Split/Splitless (SSL)	Purged packed (PPI)	Packed column (PCI)
Carrier (max)	827 (120)	827 (120)	
Carrier (min)	(20 psi) above pressure used in method		

Table 18 Delivery pressures for detectors required at the GC/MS*

	Detector type				
	FID	NPD	TCD	ECD	FPD
Hydrogen	240–690 kPa (35–100 psig)	240–690 kPa (35–100 psig)			310–690 kPa (45–100 psig)
Air	380–690 kPa (55–100 psig)	380–690 kPa (55–100 psig)			690–827 kPa (100–120 sig)
Makeup	380–690 kPa (55–100 psig)	380–690 kPa (55–100 psig)	380–690 kPa (55–100 psig)	380–690 kPa (55–100 psig)	380–690 kPa (55–100 psig)
Reference			380–690 kPa (55–100 psig)		

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

The minimum supply pressure for Auxiliary EPC and PCM modules is 138 kPa (20 psi) greater than the pressure used in your method. For example, if you need a pressure of 138 kPa (20 psi) for the method, the supply pressure must be at least 276 kPa (40 psi). **Table 19** lists the maximum carrier pressure for Auxiliary EPC and PCM modules.

Table 19 Delivery pressures for Auxiliary EPC and PCM modules, in kPa (psig)

	Aux EPC	PCM 1	PCM 2 or PCM Aux
Carrier (max)	827 (120)	827 (120)	827 (120) with Forward pressure control 345 (50) with Backpressure control

Requirements for hydrogen as a carrier gas or for use in JetClean systems

Not all systems can use hydrogen as a carrier gas. See [Gas Selection](#).

Hydrogen can be supplied from a generator or from a cylinder.

Agilent recommends use of a high-quality hydrogen gas generator. A high-quality generator can consistently produce purity > 99.9999%, and the generator can include built-in safety features such as limited storage, limited flow rates, and auto-shutdown. Select a hydrogen generator that provides low (good) specifications for water and oxygen content.

If using a hydrogen gas cylinder, Agilent recommends use of Gas Clean Filters to purify the gas. Consider additional safety equipment as recommended by your company safety personnel.

GC/MS Gas Requirements

Table 20 lists typical flows resulting from selected carrier gas source pressures.

Table 20 5977 and 5975 Series MSD carrier gases

Carrier gas requirements	Typical pressure range	Typical flow (mL/min)
Helium (required) (column and split flow)	345 to 552 kPa (50 to 80 psi)	20 to 50
Hydrogen (optional)* (column and split flow)	345 to 552 kPa (50 to 80 psi)	20 to 50
Methane reagent gas (required for CI operation)	103 to 172 kPa (15 to 25 psi)	1 to 2
Isobutane reagent gas (optional)	103 to 172 kPa (15 to 25 psi)	1 to 2
Ammonia reagent gas (optional)	34 to 55 kPa (5 to 8 psi)	1 to 2
Carbon dioxide reagent gas (optional)	103 to 138 kPa (15 to 0 psi)	1 to 2

* Hydrogen gas can be used for the carrier gas but specifications are based on helium as the carrier gas. Please observe all hydrogen gas safety cautions.

7010 and 7000 Series MS

Table 21 lists typical flows resulting from selected carrier gas source pressures.

Table 21 7010 and 7000 Triple Quad MS carrier gases

Carrier gas requirements	Typical pressure range	Typical flow (mL/min)
Helium (required) (column and split flow)	345 to 552 kPa (50 to 80 psi)	20 to 50
Hydrogen (optional)* (column and split flow)	345 to 552 kPa (50 to 80 psi)	20 to 50
Methane reagent gas (required for CI operation)	103 to 172 kPa (15 to 25 psi)	1 to 2
Ammonia reagent gas (optional)	34 to 55 kPa (5 to 8 psi)	1 to 2
Isobutane reagent gas (optional) [†]	103 to 172 kPa (15 to 25 psi)	1 to 2
Carbon dioxide reagent gas (optional) [†]	103 to 138 kPa (15 to 20 psi)	1 to 2
Nitrogen for collision cell (nitrogen source is supplied to EPC module in GC.)	1.03 to 1.72 bar (104 to 172 kPa, or 15 to 25 psi)	1 to 2 (mL/min)

* Hydrogen gas can be used for the carrier gas but specifications are based on helium as the carrier gas. Please observe all hydrogen gas safety cautions.

[†] Reagent available with manual tune only.

7200 and 7250 Series Q-TOF MS

Table 22 lists the limits on total gas flow into the 7200/7250 Q-TOF GC/MS.

Table 22 7200/7250 Q-TOF GC/MS total gas flow limitations

Feature	7200	7250
High vacuum pump 1	Split-flow turbo	Split-flow turbo
High vacuum pump 2	Split-flow turbo	Turbo
High vacuum pump 3	Turbo	Turbo
Carrier gas optimal gas flow, mL/min*	1.0 to 1.5	1.0 to 1.5
Carrier gas maximum recommended gas flow, mL/min	2.0	2.0
Carrier gas maximum gas flow, mL/min [†]	2.4	2.4
Reagent gas flow (EI/CI – CI application)	1.0 to 2.0	NA
Collision cell gas flow rate, mL/min (Nitrogen)	1.5	1.0
Collision cell gas flow rate, mL/min (Helium)		4.0
Maximum column id	0.32 mm (30 m long)	0.32 mm (30 m long)

* Total gas flow into the MS = column flow + reagent gas flow (if applicable) + collision cell gas flow.

[†] Expect degradation of spectral performance and sensitivity.

Table 23 lists typical flows resulting from selected carrier and reagent gas source pressures.

Table 23 7200/7250 Q-TOF GC/MS carrier and reagent gas flows

Carrier and reagent gas requirements	Q-TOF	Typical pressure range	Typical flow
Helium (required for carrier and IRM)	7200	173 to 207 kPa (25 to 30 psi)	1.0 to 2.0 (mL/min)
Nitrogen for RIS transfer line actuator	7200	6.1 to 6.8 bar (612 to 690 kPa, or 90 to 100 psi)	Up to 30 L/min
Nitrogen for collision cell (nitrogen source is supplied to EPC module in GC.)	7200/7250	0.7 to 2.0 ar (70 to 207 kPa, or 10 to 30 psi)	1 to 2 (mL/min)
Helium for collision cell (helium source is supplied to EPC module in GC.)	7250	0.7 to 2.0 bar (70 to 207 kPa, or 10 to 30 psi)	4 (mL/min)

WARNING

The use of hydrogen is specifically prohibited with the 7200/7250 GC/Q-TOF.

GC/MS systems with a JetClean ion source system installed use helium as the GC carrier gas and an additional supply of hydrogen gas to the MS analyzer. **Table 24** shows typical supply pressures needed for operation. These values reflect the pressures supplied to the instruments, not setpoints.

Table 24 JetClean ion source system gas supply pressures

Gas supply	Pressure delivered at the GC
Helium	690 kPa (100 psi)
Hydrogen	≤ 621 kPa (90 psi)*

* Any delivery pressure ≤ 621 kPa (90 psi) is acceptable as long as it is 69 kPa (10 psi) higher than the maximum hydrogen pressure needed during operation.

Performance verification

Performance verification requires the following:

- Helium carrier gas.
- For MS systems using chemical ionization or methane reagent gas.

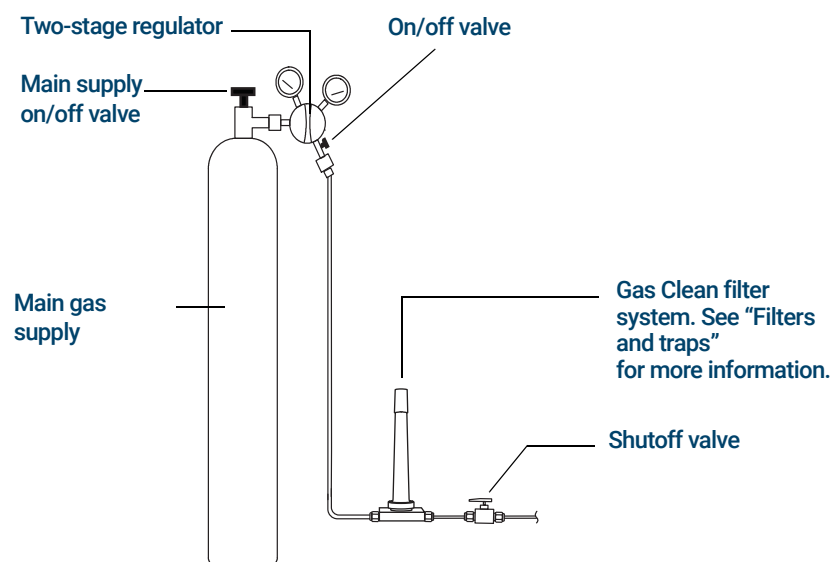
Gas Plumbing

WARNING

All compressed gas cylinders should be securely fastened to an immovable structure or permanent wall. Compressed gases should be stored and handled in accordance with the relevant safety codes.

Gas cylinders should not be located in the path of heated oven exhaust.

To avoid possible eye injury, wear eye protection when using compressed gas.



Gas Clean filter configuration will vary depending on the application.

Figure 7. Recommended filters and plumbing configuration from a carrier gas cylinder

- If you have not requested option 305 (pre-plumbed tubing), 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. See the **Installation Kits** for recommended parts.
- Agilent strongly recommends two-stage regulators to eliminate pressure surges. High-quality, stainless-steel diaphragm-type regulators are especially recommended.
- On/off valves mounted on the outlet fitting of the two-stage regulator are not essential but are very useful. Be sure the valves have stainless-steel, packless diaphragms.
- Agilent strongly recommends installation of shut-off valves at each GC inlet supply fitting to allow the GC to be isolated for maintenance and troubleshooting. Order part number 0100-2144. (Note that some optional installation kits include one shut-off valve. See **"Installation Kits"** on page 14 for more information.)
- If you purchased automated valving, the valve actuation requires a **separate** pressurized, dry air supply at 380 kPa (55 psig). This air supply must end in a male fitting compatible with a 1/4-inch id plastic tube at the GC.

- FID, FPD, and NPD detectors require a dedicated air supply. Operation may be affected by pressure pulses in air lines shared with other devices.
- Flow- and pressure-controlling devices require at least 10 psi (69 kPa) pressure differential across them to operate properly. Set source pressures and capacities high enough to ensure this.
- Situate auxiliary pressure regulators close to the GC inlet fittings. This ensures that the supply pressure is measured at the instrument (rather than at the source); pressure at the source may be different if the gas supply lines are long or narrow.
- **Never use liquid thread sealer to connect fittings.**
- **Never use chlorinated solvents to clean tubing or fittings.**

See “[Installation Kits](#)” on page 14 for more information.

Supply tubing for most carrier and detector gases

Use only preconditioned copper tubing (part number 5180-4196) to supply gases to the instrument. Do not use ordinary copper tubing—it contains oils and contaminants.

CAUTION

Do not use methylene chloride or other halogenated solvent to clean tubing that will be used with an electron capture detector. They will cause elevated baselines and detector noise until they are completely flushed out of the system.

CAUTION

Do not use plastic tubing for supplying detector and inlet gases to the GC. It is permeable to oxygen and other contaminants that can damage columns and detectors.

Plastic tubing can melt if near hot exhaust or components.

The tubing diameter depends on the distance between the supply gas and the GC and the total flow rate for the particular gas. Tubing of 1/8-in diameter is adequate when the supply line is less than 15 feet (4.6 m) long.

Use larger diameter tubing (1/4-inch) for distances greater than 15 feet (4.6 m) or when multiple instruments are connected to the same source. Use larger diameter tubing if high demand is anticipated (for example, air for an FID).

Be generous when cutting tubing for local supply lines—a coil of flexible tubing between the supply and the instrument lets you move the GC without moving the gas supply. Take this extra length into account when choosing the tubing diameter.

Supply tubing for hydrogen gas

Agilent recommends using new chromatographic quality stainless steel tubing and fittings when using hydrogen.

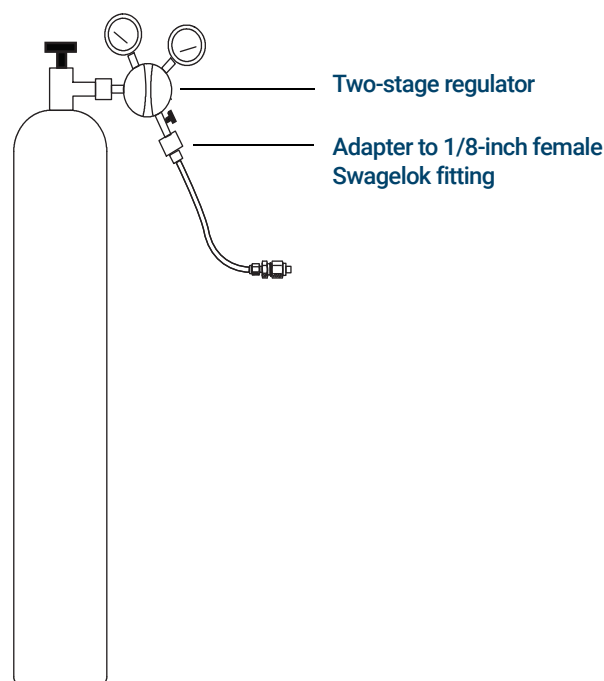
- Do not re-use old tubing when installing or switching to hydrogen supply lines for carrier gas or the JetClean ion source system. Hydrogen gas tends to remove contaminants left on old tubing by previous gases (by helium, for example). These contaminants can appear in output as high background noise or hydrocarbon contamination for several weeks.
- Especially do not use old copper tubing, which can become brittle.

WARNING

Do not use old copper tubing with hydrogen gas. Old copper tubing can become brittle and create a safety hazard.

Two-stage pressure regulators

To eliminate pressure surges, use a two-stage regulator with each gas tank. Stainless steel, diaphragm-type regulators are recommended.



The type of regulator you use depends on the gas type and supplier. The Agilent catalog for consumables and supplies contains information to help you identify the correct regulator, as determined by the Compressed Gas Association (CGA). Agilent Technologies offers pressure-regulator kits that contain all the materials needed to install regulators properly.

Pressure regulator-gas supply tubing connections

Use PTFE tape to seal the pipe-thread connection between the pressure regulator outlet and the fitting to which you connect the gas tubing. Instrument grade PTFE tape (part number 0460-1266), from which volatiles have been removed, is recommended for all fittings. **Do not use pipe dope to seal the threads;** it contains volatile materials that will contaminate the tubing.

Pressure regulators typically end in fittings that must be adapted to the correct style or size. **Table 25** lists parts needed to adapt a standard 1/4-inch male NPT fitting to a 1/8-inch or 1/4-inch Swagelok fitting.

Table 25 Parts for adapting NPT fittings

Description	Part number
Swagelok 1/8-inch to female 1/4-inch NPT, brass	0100-0118
Swagelok 1/4-inch to female 1/4-inch NPT, brass	0100-0119
Reducing union, 1/4-inch to 1/8-inch, brass, 2/pk	5180-4131

Filters and traps

Using chromatographic-grade gases ensures that the gas in your system is pure. However, for optimum sensitivity, install high-quality filters or traps to remove traces of water or other contaminants. After installing a filter, check the gas supply lines for leaks.

Agilent recommends the Gas Clean Filter system. The Gas Clean Filter system delivers high purity gases to your analytical instruments, reducing the risk of column damage, sensitivity loss, and instrument downtime. The filters are designed for use with the GC, GC/MS, ICP-OES, ICP-MS, LC/MS, and any other analysis instrument using carrier gas. Six filters are available, including CO₂, oxygen, moisture, and organics trap (charcoal).

Filter types

Each Gas Clean Filter type is designed to filter out a specific impurity that may exist in the gas supply. The following filter types are available:

- **Oxygen** - Prevents oxidation of the GC column, septum, liner, and glass wool.
- **Moisture** - Delivers fast stabilization times for increased GC productivity, and prevents hydrolization damage to the stationary phase, column, liner, glass wool, or septum in the GC.
- **Process Moisture** - Prevents oxidation of GC components and is safe to use with acetylene in process GC applications.
- **Charcoal** - Removes organic compounds and ensures correct performance of FID detectors in the GC.
- **GC/MS** - Delivers fast stabilization times for increased GC productivity, removes oxygen, moisture, and hydrocarbons from the carrier gas for MS applications, and provides ultimate GC column protection.

Table 26 lists the most common Gas Clean Filter system kits. See the Agilent online store or contact your local Agilent sales representative for additional filters, parts, and accessories applicable to your instrument configuration.

Table 26 Recommended Gas Clean Filter kits

Description	Part number	Use
Gas Clean Filter kit (connecting unit for one filter, including one carrier gas filter, 1/8-inch connections, a smart sensor, and mounting bracket for the GC)	CP179880	Carrier gas only
Gas Clean Filter kit (connecting unit for four filters, including four filters, 1/4-inch connections)	CP7995	FID, FPD, NPD
Gas Clean Filter kit (connecting unit for four filters, including four filters, 1/8-inch connections)	CP736530	FID, FPD, NPD
GC/MS Gas Clean Filter kit (includes one connecting unit and two GC/MS filters, 1/8-inch connections)	CP17976	ECD, GC/MS
GC/MS Gas Clean Filter kit (includes one connecting unit and two GC/MS filters, 1/4-inch connections)	CP17977	ECD, GC/MS
GC/MS Gas Clean Filter installation kit (includes CP17976, 1 m copper tubing, and two 1/8-inch nuts and ferrules)	CP17978	ECD, GC/MS
TCD filter kit (with oxygen and moisture filters)	CP738408	TCD

Each separate gas supply requires its own filters.

See also “**Installation Kits**” on page 14.

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LAN Requirements

Site LAN Network 56

This section outlines the site LAN requirements for GC, GC/MS, and automatic liquid sampler (ALS) installation.

Site LAN Network

NOTE

Agilent Technologies is not responsible for connecting to or establishing communication with your site LAN network. The Agilent representative will test the system's ability to communicate on a mini-hub or LAN switch only.

If you intend to connect your system to your site's LAN network, you must have an additional shielded twisted pair network cable (8121-0940).

NOTE

The IP addresses assigned to the instrument(s) must be fixed (permanently assigned) addresses. If you intend to connect your system to your site's network, each piece of equipment must have a unique, fixed (static) IP address assigned to it.

NOTE

For a Single Quad GC/MS system, Agilent recommends, sells, and supports the use of a PC with one (1) network interface card (NIC) and a network switch to isolate the GC/MS system from the site LAN. The network switch supplied with Agilent systems prevents instrument-to-PC network traffic from entering the site LAN and keeps site LAN network traffic from interfering with instrument-to-PC communications. Agilent develops and tests all Single Quad GC/MS hardware and software using the single NIC configuration and has no known network configuration issues. Alternate network configurations can be configured and managed by the end user at their own risk and expense.

NOTE

For Triple Quad and 7200 Q-TOF GC/MS systems, Agilent recommends, sells, and supports the use of a PC with two network interface cards (NIC) to provide both a site LAN connection and an isolated GC/MS system connection. Agilent develops and tests all Triple Quad and Q-TOF GC/MS hardware and software using the dual NIC configuration, and has no known network configuration issues. Alternate network configurations can be configured and managed by the end user at their own risk and expense.

NOTE

For the 7250 Q-TOF GC/MS systems, Agilent recommends, sells, and supports the use of a PC with three network interface cards (NIC) to provide a site LAN connection, MS only connection, and an isolated GC/MS system connection. Agilent develops and tests Q-TOF GC/MS hardware and software using the triple NIC configuration, and has no known network configuration issues. Alternate network configurations can be configured and managed by the end user at their own risk and expense.

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