

Intuvo 9000 GC Site Preparation Checklist

Thank you for purchasing an Agilent Instrument. To get you started and to assure a successful and timely installation of your 9000 GC, please refer to this site prep checklist.

Correct site preparation is the key first step in ensuring that your instruments and software systems operate reliably over an extended lifetime. This document is a checklist prepared for you that outlines the space, utilities, supplies and consumable requirements for your equipment for your site.

Customer Responsibilities

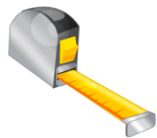
Make sure your site meets the following specifications before the installation date. For details, see specific sections within this checklist, including:

- The necessary laboratory bench space is available
- The environmental conditions for the lab and gas venting
- Laboratory gases and plumbing
- The power requirements related to the product
- The required operating supplies necessary for the product at installation
- Please consult the "Other Requirements" section for other product-specific information.

Note: 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 Customer Information

1. If you have questions or problems in providing anything described under "Customer Responsibilities" above, please contact your local Agilent or partner support/service organization for assistance prior to delivery. In addition, Agilent and/or its partners reserve the right to reschedule the installation dependent upon the readiness of your laboratory.
2. Should your site not be ready for whatever reasons, please contact Agilent as soon as possible to re-arrange any services that have been purchased.
3. Other optional services such as additional training, operational qualification (OQ) and consultation for user-specific applications may also be provided at the time of installation when ordered with the system, but should be contracted separately.

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Laboratory Bench Space - Dimensions and Weight

Identify the laboratory bench space before your system arrives based on the table below.

Pay special attention to the total height and total weight requirements for all system components you have ordered and avoid bench space with overhanging shelves. Also pay special attention to the total weight of the modules you have ordered to ensure your laboratory bench can support this weight.

Special Notes

1. Allow at least 25 cm clearance between back of GC and wall to dissipate heated air. See picture below. A simple system that includes a GC and a computer requires about 86 cm of bench space.
2. Avoid bench space with overhanging shelves. A 7693 automatic liquid sampler will add to the height of the instrument as shown below.
3. G1888A Headspace, 5977 GCMS and QQQ MS are installed to the left of the 9000 and the 7697 is installed to the right of the GC.

Instrument Dimensions

Component	Height (cm)	Width (cm)	Depth (cm)	Weight (kg)
Intuvo Agilent 9000 GC	52	26.8	66.2	31.8
Intuvo Agilent 9000 GC with 2nd detector	52	40.6	69	36.25
G4513A 7693 Auto-injector	50 above GC			3.9
G4514A 7693 Tray		45 Left of GC	2 cm in front of GC	6.8



9000 GC with 7650 ALS System



9000 GC with 7650 ALS System

Conversions: 1 kg = 2.2 pounds; 1 cm = 0.39 inches.

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Environmental Conditions

Operating your instrument within the recommended temperature ranges insures optimum instrument performance and lifetime.

Special Notes

1. Performance can be affected by sources of heat & cold e.g. direct sunlight, heating/cooling from air conditioning outlets, drafts and/or vibrations.
2. The site's ambient temperature conditions must be stable for optimum performance.
3. For storage or shipping, the allowable temperature range is -40 to 70°C and the allowable humidity range is 5-95%, non-condensing. After exposing the GC to extremes of temperature or humidity, allow 2 hours for it to return to the recommended ranges.

Instrument Description	Operating temp range °C	Operating humidity range (%)	Maximum altitude (m)
Agilent Intuvo 9000 GC	15 to 35	15 - 90%	2438
Agilent Intuvo 9000 GC, Storage	-40 to 70	15 - 90%	2438

Conversions: 1 meter = 3.28 feet
1 BTU = 1055 Joules

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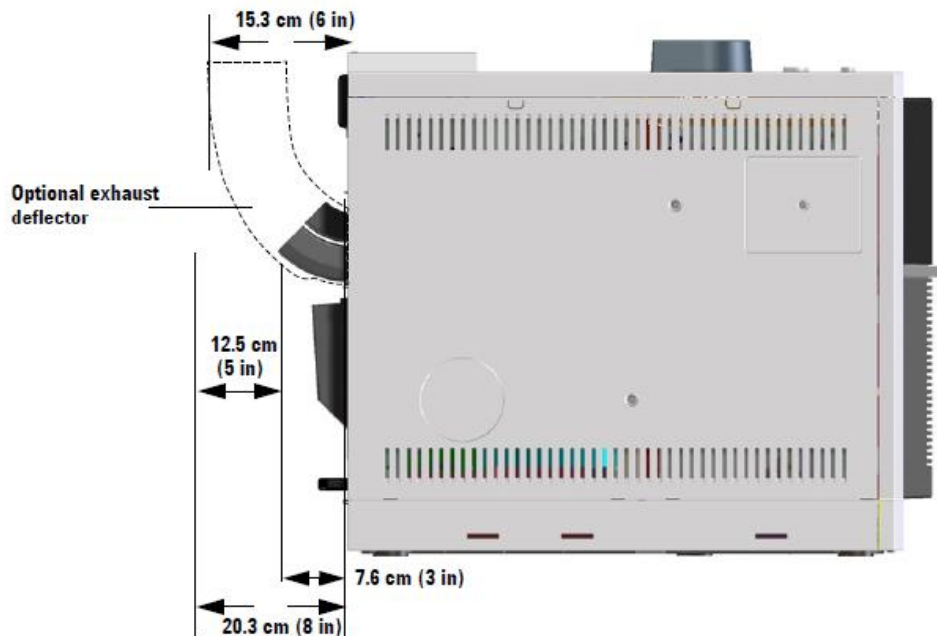
Heat Dissipation

Your facilities manager may wish to know the amount of heat that the system generates in order to establish its contribution to the overall room ventilation requirements.

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.

Intuvo 9000 Voltage	Heat dissipation
120V	4424 BTU / hour maximum (4668 kJh)
200V - 240V	5285 BTU / hour maximum (5576kJh)

Venting the Oven - Below is a picture that shows the left side view of a 9000 GC. The exhaust duct adds 12.5 cm (5 inches) to the back of the GC. The connecting duct should provide unrestricted flow for the oven air and be as short and straight as possible.



Venting the uECD, TCD or Split-Splitless Inlet Vent gas flows to a Fume Hood or venting manifold

If using a micro Electron Capture Detector, or if using hydrogen carrier gas that will be uncombusted, you must either safely vent the exhaust gas, or operate the GC inside a fume hood. For example, if using hydrogen carrier gas with a thermal conductivity detector (TCD) the GC would vent uncombusted hydrogen from the detector and from the inlet split and septum purge vents.

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The uECD exhaust vents through a stainless steel tube, connected to a length of large I.D. tubing that exits the back panel. This should be routed to a fume hood or appropriate venting system. Agilent Technologies 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. Make sure that the venting system does not put a direct negative pressure on the vent tube from the GC.

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.

SS, MMI: The split vent terminates in a 1/8-inch Swagelok female fitting.

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










Power Consumption


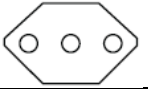
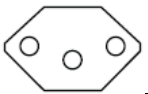
The following table Lists the AC Power requirements for various Intuvo 9000 GC voltage configurations:

Product	Line Voltage (VAC) +/- 10%	Frequency (Hz)	Maximum Continuous Power (VA)	Current Rating (Amps)	Power Outlet Rating
Intuvo 9000 GC	120 Single Phase	50-60 (-5%/+5%)	1296	12	15 Amp
Intuvo 9000 GC	220-240 Single or Split Phase	50-60 (-5%/+5%)	1548	7.7 / 6.5	10 Amp

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Intuvo 9000 Power Cords

Country	Voltage/Amps	Wall Termination	Length	Plug
Australia	240 Volts - 10 Amps	AS3112	2.5m	
China	220 Volts - 10 Amps	GB 1002	4.5m	
Europe, Korea	220/230/240 - 10 Amps	CEE/7/7 Type F	2.5m	
Switzerland	220 Volts - 16 Amps	SEC Type 12	2.5m	
India, South Africa	220/230/240 Volts - 10 Amps	IEC 83-B1	4.5m	
Israel	230 Volts - 10 Amps	ISRAELI SI32	2.5m	
Japan	120 Volts - 15 Amps	NEMA 5-15P	2.5m	
Japan	200 Volts - 20 Amps	NEMA L6-20P	4.5m	
United Kingdom, Hong Kong, Singapore, Malaysia	240 Volts - 10 Amps	BS89/13	2.5m	
United States	120 Volts - 15 Amps	NEMA 5-20P	4.5m	
Taiwan, South America	120 Volts - 20 Amps	NEMA 5-20P	2.5m	
Denmark, Greenland	220 Volts - 10 Amps	SR 107-2-D1 DK2-5A	2.5	

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Country	Voltage/Amps	Wall Termination	Length	Plug
Argentina	220 Volts - 10 Amps	Type I		
Chile	220 Volts - 10 Amps	CEI 23-16 Type L		
Brazil	230 - 10 Amps	NBR 14136 Type N		

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Gas Selection
Special Notes

1. Agilent recommends a carrier and detector gas purity of 99.9995% or better. Air for flame detectors should be zero grade. Agilent also recommends using traps to remove hydrocarbons, water, and oxygen.
2. When used with capillary columns, GC detectors require a separate makeup gas for optimum sensitivity. This table lists gas recommendations for capillary columns and the preferred makeup gas types.

Detector	Carrier gas	Make up 1st choice	Make up 2nd choice	Purge or reference
Electron Capture	Hydrogen* Helium Nitrogen Argon/methane 5%	Nitrogen	Nitrogen Nitrogen Nitrogen Argon/methane 5%	Anode purge must be the same as makeup
Flame ionization	Hydrogen Helium Nitrogen	Nitrogen	Helium	Hydrogen* and air for detector
Flame Photometric	Hydrogen* Helium Nitrogen Argon	Nitrogen	None	Hydrogen* and air for detector
Nitrogen Phosphorous	Helium Nitrogen	Nitrogen	Helium Helium	Hydrogen* and air for detector
Thermal Conductivity	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

* See "Considerations For Hydrogen Carrier Gas" in this document.

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Gas Supply Pressures

Special Notes

The following tables list minimum and maximum pressures in psi for each electronic pneumatic control module (EPC). These requirements are for the input to the EPC module located at the back of the gas chromatograph.

Detectors

	FID	NPD	TCD	ECD	FPD
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		

Auxiliary EPC and Pneumatic Control channels

The minimum supply pressure for AUX and PCM modules is 20 psi greater than pressure used in your method. For example, if you need a pressure of 20 psi for the method, the supply pressure must be at least 40 psi.

	AUX EPC	PCM	PCM or PCM Aux
Maximum pressure	120	120	120 with Forward pressure control 50 with Back pressure control

Inlets

The minimum supply pressure for inlet modules is 20 psi greater than pressure used in your method. For example, if you need a pressure of 40 psi for the method, the supply pressure must be at least 60 psi.

	SSL 150	SSL 100	MMI
Carrier max	170	120	170

Delivery pressures are listed in psig

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

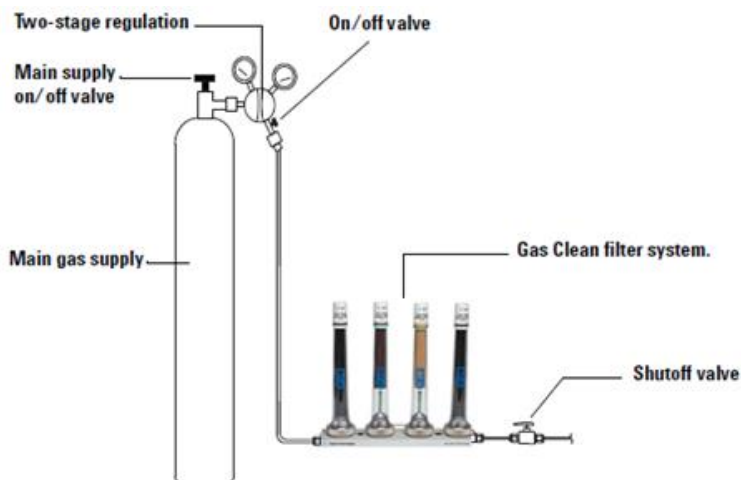
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Gas Plumbing and Supplies

Plumbing Considerations

1. Gases are supplied by tanks, internal distribution system, or gas generators. Tank supplies require two stage, 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.
2. If your order did NOT include parts to connect the gas supply to your Intuvo 9000 GC, you must supply pre-cleaned, 1/8-inch copper tubing and a variety of 1/8-inch Swagelok® fittings to connect the gas supply(s). Refer to the "GC Installation Kits" and "GC Plumbing" sections of this checklist for part numbers.
3. Agilent also recommends using traps to remove water, hydrocarbons, and oxygen or a combination trap such as the "Gas Clean" Filter System that removes all three.



Tank Regulators must terminate in a 1/8" Swagelok® fitting

Special Notes:

1. Shutoff Valves are recommended at both front and back Inlet Carrier Connections
2. FID, FPD and NPD need dedicated detector air supply
3. For Gas supply runs longer than 15 feet, use 1/4 inch tubing to prevent pressure drop
4. Do not reuse old copper tubing which can become brittle and break
5. **Never use liquid thread sealer to connect fittings. Never use chlorinated solvents to clean tubing or fittings.**

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Tank Regulator Table

All Agilent regulators are supplied with the 1/8-inch Swagelok® female connector.

Gas Type	CGA Number	Pressure Range	Part Number
Air	346	0-125 PSIG (8.6 Bar)	5183-4641
Hydrogen, Argon/Methane	350	0-125 PSIG (8.6 Bar)	5183-4642
Oxygen	540	0-125 PSIG (8.6 Bar)	5183-4643
Helium, Argon, Nitrogen	580	0-125 PSIG (8.6 Bar)	5183-4644
Air	590	0-125 PSIG (8.6 Bar)	5183-4645

Common Plumbing Supplies

Recommended Supplies to make the GC system installation go smoother.

Description	Part number
1/8 inch Copper Tubing - pre-washed - 50 feet	5180-4196
1/8 inch thick wall Stainless Steel Tubing - 20 Feet	7157-0210
1/8 inch Ball Shutoff Valve for Carrier Gas Supplies (order 1 for each inlet system)	0100-2144
PTFE tape (Never use liquid thread sealer to connect fittings.)	0460-1266

Miscellaneous Gas Plumbing Information

1. Cryogenic cooling with Liquid N₂ requires 1/4-inch insulated copper tubing – 25-30 PSI supply.
2. Cryogenic cooling with Liquid CO₂ requires 1/8-inch heavy-walled, stainless steel tubing – 750-1000 PSI supply – tank with dip tube..
3. Internal Valco® rotary Valve actuation requires a separate pressurized, dry air at 55 psi.

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Considerations for Hydrogen Carrier Gas

If planning to use hydrogen carrier gas, note that special considerations apply due to hydrogen's flammability and chromatographic properties. Refer to the "Gas Supplies/Requirements for Hydrogen as a Carrier Gas" section in the "Agilent GC, GC/MS and ALS Site Preparation Guide" for more detail.

Hydrogen Safety

When using hydrogen as the carrier gas or fuel gas, be aware that hydrogen gas can flow into the GC oven and create an explosion hazard. Therefore, be sure that the Hydrogen gas 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.

In any application using hydrogen, leak test all connections, lines, and valves before operating the instrument.

Agilent highly recommends the G3388B Leak Detector or equivalent to safely check for leaks.

Supply tubing for Hydrogen Gas

Agilent recommends using NEW, chromatographic quality copper or stainless steel tubing and fittings when using hydrogen.

Do not re-use old tubing when installing or switching to hydrogen carrier gas. Hydrogen gas tends to remove contaminants left on old tubing by previous gases (by helium, for example).

These contaminants can appear in detector output as high background noise or hydrocarbon contamination for several weeks.

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

Hydrogen Gas Supplies


Hydrogen can be supplied from a gas 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 flow rates, and auto-shutdown.

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.

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GC Installation Kits

Description	Part number
<p>Includes 1/8-inch brass fittings, leak detector, 1/8-inch brass tees, copper tubing, 1/8-inch brass ball valve, and Intuvo tool kit (wrench, tube cutter, Torx T20 and T10 screwdriver, magnifying lens, knurled handle septum tool, tweezers, and needle nose pliers)</p> 	19199U

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Other Requirements
Recommended Tools for GC Maintenance

Tool	Used for
GC Tool Kit - 5182-3456	Basic Tools in a zipper tool bag (Included with the Installation Kit Part Number 19199M)
ECD/TCD Detector plug, 5060-9055	Inlet pressure decay test.
Digital flow meter 220-1170	Verifying flows, checking for leaks and plugs.
Electronic gas leak detector - G3388B	Pin pointing gas leaks. Safety checks when using Hydrogen.
T10 Torx driver - 5182- 3466 T20 Torx driver - 5182- 3465	Remove FID Collector. Remove covers to access EPC modules, traps. Replace NPD Bead.
Tubing cutter for 1/8-inch Copper and 1/16 inch Stainless Steel. - 5190-1442	Cut gas supply tubing
Assorted wrenches: ¼, 3/8, 7/16, 9/16 inch	Gas supply and plumbing fittings.

Recommended Supplies for GC Maintenance

First time GC users should consider stocking the following supplies to maintain their system. Please refer to the Agilent Consumables and Supplies Catalog for part numbers and recommended maintenance periods.

Supply	Used for
Inlet supplies	Septa, O-rings, liners, adapter, and seals
Inlet PM kits	Kits with individual parts needed to maintain an inlet.
Column supplies	Nuts, ferrules, adapters, guard columns, retention gaps
Detector supplies	Jets, beads, liners, adapters, cleaning kits
Application supplies	Standards, columns, syringes
Sampler supplies	Vials, caps, electronic crimpers, and syringes.

Important Customer Web Links

- ❑ For additional information about our solutions, please visit our web site at <http://www.agilent.com/>
- ❑ Need to know more? Customer Education – <http://www.agilent.com/chem/education>
- Need supplies? – <http://www.agilent.com/chem/supplies>

[Note: This information in this document is subject to change. For more details on software and hardware compatibility, please contact your sales representative.](#)

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Document Control Logs

Revision Log

Revision	Date	Reason For Update
1.0	1-Nov-2016	Initial revision - Dave McKenica

Approval Log

Revision	Approver	Title of Approver
1.0	Suneetha Tippireddy	Product Support Manager