

Agilent CrossLab Start-Up Services

Agilent Intuvo 9000 Gas Chromatograph

Site Preparation Checklist

Thank you for purchasing an instrument from **Agilent Technologies**. CrossLab Start-Up is focused on helping customers shorten the time it takes to start realizing the full value of their instrument investment. Installation, Introduction, and First Run Assist are service engagements to get your new instrument and lab productive. Success starts here.

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 an **information guide and checklist** prepared for you and outlines the supplies, space, and utility requirements for your equipment.

Introduction

Customer Responsibilities

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

- The necessary laboratory or bench space is available.
- The environmental conditions for the site as well as laboratory gases, plumbing and venting.
- The power requirements related to the product (e.g. number and location of electrical outlets).
- The required operating supplies necessary for the product and installation.
- If Agilent is delivering Installation and Introduction services, users of the instrument should be present throughout these services. Otherwise, they will miss important operational, maintenance, and safety information.
- For more detailed Site Preparation information Consult the **Agilent Intuvo 9000 Gas Chromatograph Site Preparation Guide**.
<https://www.agilent.com/search/?Ntt=Agilent%20Intuvo%20Gas%20Chromatograph%20Site%20Preparation%20Guide.%20>
- Please consult the Special Requirements section for other product-specific information.
- When using hydrogen (H₂) 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 supply is turned off until all connections are made and ensure that the inlet and detector column fittings are always either connected to a column or capped 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, leak test all connections, lines, and valves before operating the instrument. Always turn off the hydrogen supply at its source before working on the instrument.

Please refer to the **Hydrogen Safety Guide** which is shipped with the Instrument.

Customer Information

- If you have questions or problems in providing anything described as a Customer Responsibility, please contact your local Agilent or partner support service organization for assistance before the scheduled installation. In addition, Agilent and/or its partners reserve the right to reschedule the installation dependent upon the readiness of your site.
- 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.
- Other optional services such as extra training, compliance services and consultation for user-specific applications may also be provided at the time of installation. Please discuss with your Agilent Sales representative before the installation is scheduled.
- Please refer to the other products (i.e.; GC, ALS, CTC, etc.) for site preparation requirements.
- A **GC Site Prep Training** course is available at no charge in **Agilent University**:
“GC-9000-1201e – Preparing for your new Agilent Intuvo 9000 GC.”

This course is designed to help prepare for the installation of the Intuvo 9000. To register and complete the training use the link

Agilent Intuvo 9000 GC Site Preparation Checklist

https://inter.viewcentral.com/events/cust/search_results.aspx?cid=agilent&pid=1&lid=1&tstamp=1677007546734&event_id=2177

In addition to see all that is available as learning paths for your GC and GC/MS instrumentation, please visit **Agilent University Learning Paths**.

https://inter.viewcentral.com/events/cust/cust_tracks.aspx?cid=agilent&pid=1&lid=1&track_id=34

Important Customer Web Links

- For more information about **Agilent Technologies Services**, please visit our website using the following URL: <http://www.agilent.com/en-us/products/crosslab-instrument-services/service-repair>
- The **Agilent Community** is an excellent place to get answers, collaborate with others about applications and Agilent products, and find in-depth documents and videos relevant to Agilent technologies. Visit <https://community.agilent.com/welcome>
- To access **Agilent University**, visit <http://www.agilent.com/crosslab/university/> to learn about training options, which include online, classroom and onsite delivery. A training specialist can work directly with you to help determine your best options.
- A useful **Agilent Resource Center** web page is available, which includes short videos on maintenance, quick lists of consumables for new instruments, and other valuable information. Check out the Resource Page here: <https://www.agilent.com/en-us/agilentresources>
- Need technical support, FAQs, supplies? – visit our **Support Home page** <http://www.agilent.com/search/support>
- **Videos** about specific preparation requirements for your instrument can be found by searching the **Agilent YouTube** channel at <https://www.youtube.com/user/agilent>

Site Preparation



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

- Allow at least 25 cm (10 inches) 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 (34 inches) of bench space.
- Avoid bench space with overhanging shelves. A 7693 automatic liquid sampler will add to the height of the instrument as shown below.
- 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/in) | Width (cm/in) | Depth (cm/in) | Weight (kg/lb) |
|--|----------------|------------------|---------------------|----------------|
| Intuvo Agilent 9000 GC | 52/20 | 26.8/10.5 | 66.2/26 | 31.8/70 |
| Intuvo Agilent 9000 GC with 2nd detector | 52/20 | 40.6/16 | 69/27 | 36.25/80 |
| G4513A 7693 Auto-injector | 50/19 above GC | | | 3.9/8.6 |
| G4514A 7693 Tray | | 45/18 Left of GC | 2 cm in front of GC | 6.8/15 |



9000 GC with 7650 ALS System



9000 GC with 7693 ALS System



Environmental Conditions

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

Special notes

- Performance can be affected by sources of heat and cold, e.g., direct sunlight, heating/cooling from air conditioning outlets, drafts, and/or vibrations.
- The laboratory's ambient temperature conditions must be stable for optimum performance.
- 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 range.

| 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

Heat Dissipation

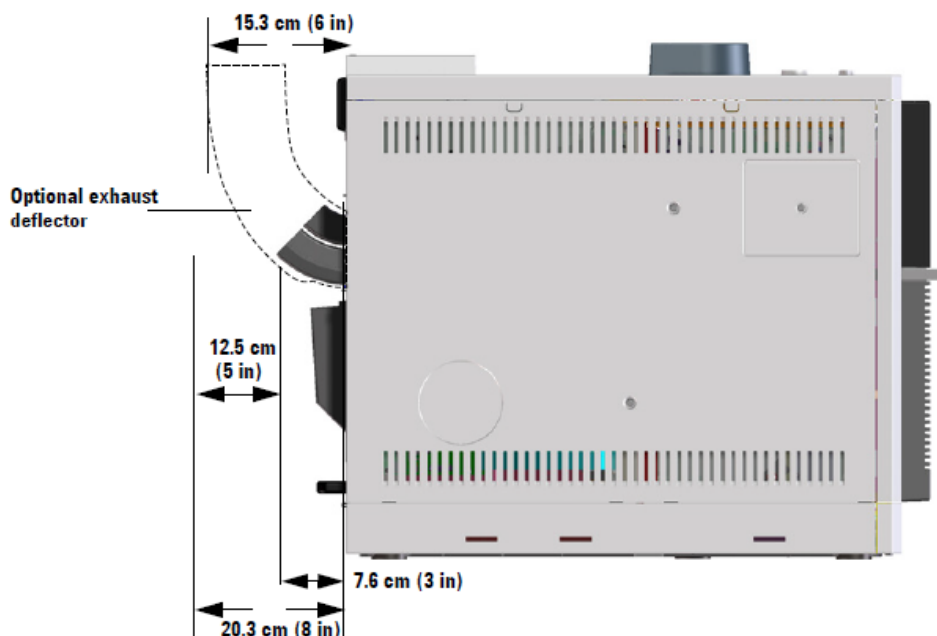
Your facilities manager may wish to know the amount of heat that the system generates in order to establish its contribution to the overall room ventilation requirements.

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 (5576 kJh) |

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 μ ECD, TCD or Split-Splitless Inlet Vent gas flows to a Fume Hood or venting manifold

If using hydrogen carrier gas with either a micro Electron Capture (μ ECD) or Thermal Conductivity (TCD) Detector the GC will vent uncombusted hydrogen from the detector exit. In addition, if a Split/Splitless or Multimode Inlet is used, hydrogen will dissipate from both the inlet split and septum purge vents. In both cases you must either safely vent the exhaust gas or operate the GC inside a fume hood.

The μ ECD 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.



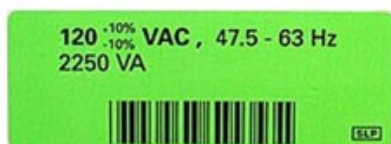
Power Requirements

- Refer to the table of Power Cord and Plug terminations for your specific country.
- All GC's require dedicated circuits to operate correctly.
- If a computer system is supplied with your instrument, be sure to account for those electrical outlets.
- The following table Lists the AC Power requirements for various Intuvo 9000 GC voltage configurations:

| Product | Line Voltage (VAC) +/- 10% | Frequency (Hz) | Recommended Power Outlet |
|----------------|----------------------------------|--------------------|-----------------------------|
| Intuvo 9000 GC | 120 Single Phase | 50-60 (-5%/+5%) | 15 Amp Dedicated Circuit |
| Intuvo 9000 GC | 220-240 Single or Split Phase | 50-60 (-5%/+5%) | 10 Amp Dedicated Circuit |

Notes



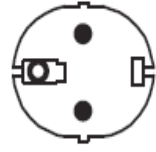
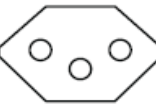
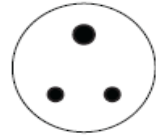

1. The number and type of electrical outlets depends on the size and complexity of your system. For example, in addition to the dedicated outlet for the GC, a system with a computer, monitor, printer, and HUB/Switch requires 4 additional outlets on a separate circuit.
2. The GC will have a label next to the power cord connector that describes the line voltage requirements.








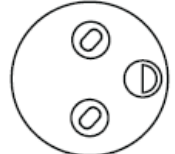
3. Power line conditioners that contribute any power line distortion should not be used with the Agilent Intuvo GC.

Refer to the "Power Consumption" section of the Agilent 9000 Gas Chromatograph Site


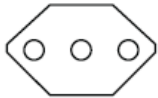
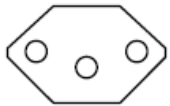
Intuvo 9000 Power Cords

| Location | 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 |  |

Agilent Intuvo 9000 GC Site Preparation Checklist

| Location | Voltage/Amps | Wall Termination | Length | Plug |
|--|---------------------|--------------------|--------|---|
| 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 |  |
| North America | 120 Volts - 15 Amps | NEMA 5-15P | 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 |  |

Agilent Intuvo 9000 GC Site Preparation Checklist

| Location | 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 | |  |



Gas Selection

Special Notes

- 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.
- 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/Reference |
|----------------------|---|--|--|--|
| Electron Capture | Hydrogen* Helium Nitrogen Argon/methane 5% | Nitrogen Nitrogen Nitrogen Argon/methane 5% | Argon/methane 5% Argon/methane 5% None None | Anode purge will be the same as makeup Internal to the GC |
| 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 | None | Hydrogen* and air for detector |
| Thermal Conductivity | Hydrogen* Helium Nitrogen | Must be same as carrier and reference | Must be same as carrier and reference | Must be same as carrier and makeup |

* Refer to Hydrogen Safety information later in this document.



Gas Supply Pressures

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

Detectors

| | FID | NPD | TCD | ECD | FPD |
|--------------------------|--------|--------|--------|--------|---------|
| Hydrogen pressure (psi) | 35-100 | 35-100 | | | 45-100 |
| Air pressure (psi) | 55-100 | 55-100 | | | 100-120 |
| Make up pressure (psi) | 55-100 | 55-100 | 55-100 | 55-100 | 55-100 |
| Reference pressure (psi) | | | 55-100 | | |

Auxiliary EPC and Pneumatic Control channels

The minimum supply pressure for AUX and PCM modules is 20 psi greater than the 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 (psi) | 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 the 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 (psi) | 170 | 120 | 120 |

Delivery pressures are listed in psig

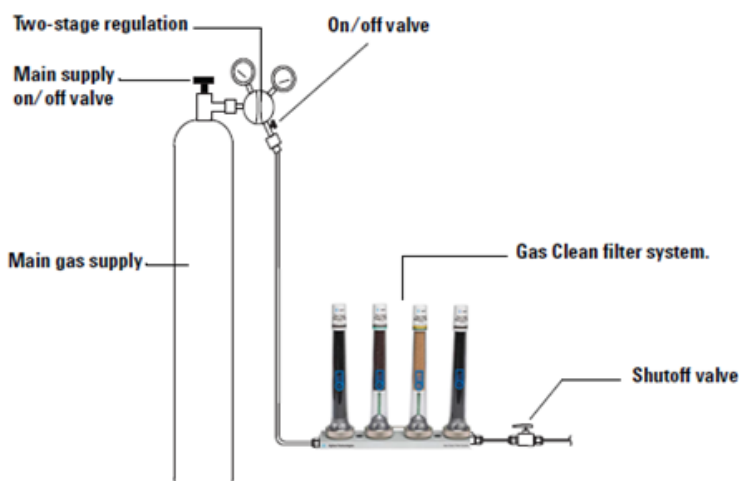
Conversions: 1 psi = 6.8947 kPa = 0.068947 Bar = 0.068 ATM



Gas Plumbing and Supplies

Plumbing Considerations

- 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 appropriately sized adapter to end with a 1/8-inch Swagelok® female connector.
- 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.
- 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.



Special Notes:

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

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Available GC Pressure regulators

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

| Gas Type | CGA Number | Pressure Range | Part Number |
|---------------------------------------|------------|----------------------|-------------|
| Air (medical grade) | 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 (Zero grade, for GC applications) | 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 |

Available Kits for Intuvo GC system installation:

| Kit | Part | Contents |
|--|---------|--|
| Recommended for GCs with FID, NPD, FPD | | |
| GC Supply Gas Installation Kit with Gas Purifiers | 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 | 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 | CP17974 | |

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Miscellaneous Gas Plumbing Information

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

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

- Be sure that the Hydrogen gas supply is turned off until all connections are made and ensure the inlet and detector column fittings are always either connected to a column or capped 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.

GC Installation Kit

| Description | Part number |
|--|---------------|
| <p>Installation Kit for FID/NPD/FPD (Includes Gas Clean Filter Kit CP736538) for Moisture, O2 and Hydrocarbon removal.</p>  | <p>19199N</p> |
| <p>Installation Kit for TCD/ECD/MSD - no Gas Filters Included - order separately for ECD - Gas Clean Filter is included with MSD.</p>  | <p>19199M</p> |



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. |



Required Operating Supplies by Customer for Installation

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

- Ensure that the appropriate installation hardware has been acquired.
- Ensure that the location in which the GC system is being installed meets the requirements for environmental conditions.
- Prepare bench space for the GC system. Ensure that the bench has the size and weight capacity to accommodate the GC and associated components.
- Ensure that system components are oriented so that they can be connected properly.
- If the system being installed includes an MSD, ensure that the bench allows for proper installation and connection of the fore-line pump.
- Ensure that appropriate venting is provided for the GC system.
- Ensure that a dedicated power circuit is available for each device in the system.
- Ensure that appropriate gas and reagent supplies are provided for the GC system.
- Ensure that appropriate gas plumbing is provided for the GC system.
- 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.
- If the GC being installed is to be connected to a site LAN, ensure that the appropriate cabling is available.

Special notes

- Download the **Essential Chromatography and Spectroscopy Supplies Catalogs** for a complete overview about available supplies for your new and existing Agilent Instruments <https://www.agilent.com/en-us/products/lab-supplies>

Service Engineer Review (Optional)

Use this page to document a review of the Site Preparation requirements between the Customer and the Service Engineer.

Service Engineer Comments

If there are any specific points that should be noted as part of performing the site preparation review or other items of interest for the customer, please write in this box.

Site Preparation Verification

Service Request Number:

Date of Review:

Service Engineer Name:

Customer Name:

Service Engineer Signature:

Total number of pages in this document:

Agilent CrossLab Start-Up Services Site Preparation Checklist