Waters Xevo TQ-GC

Site Preparation Guide

Notice

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Introduction

This document describes the environmental conditions, power supplies, and gas supplies that are required for the operation of the Xevo™ TQ-GC. Conformance with these conditions enables the instrument to achieve optimum performance.

Responsibilities

Warning: Observe Good Laboratory Practice (GLP) at all times, particularly when working with hazardous materials, and consult the safety representative for your organization regarding its protocols for handling such materials.

Warning: Safety glasses must be worn at all times when working with hazardous materials.

A Waters™ engineer is responsible for installing and commissioning the system to ensure that the instrument is properly installed and operational. Your laboratory must be prepared in advance so the engineer can carry out the installation efficiently. Fill out the site preparation checklist at the end of this document and return it to Waters when the laboratory is ready.

Important: The system installation cannot begin until the checklist is completed and returned to the mass spectrometer sales support representative at your local Waters office.

The installation time may vary, depending on the instrument options being installed. The site preparation checklist must be completed as accurately as possible to help minimize installation time.

An important aspect of the system installation is the implementation of tests designed to evaluate the instrument functionality under specific operating conditions. At the completion of each test, specify the actual test result in the installation checklist or Instrument Qualification Workbook, whichever is appropriate.

Important: The user who is responsible for the normal use and upkeep of the instrument must be present during the installation.

The user must be present during the functionality tests at installation. This way, the user can be trained in the basic system operation. If there are foreseen periods when the intended user cannot be present, notify Waters in advance so the installation can be scheduled for a more convenient time.

If you have questions regarding the information in this document or any specific site problems, contact your local Waters sales representative. If necessary, we will arrange a site survey.

Storage

The following storage conditions are required prior to installation:

- Unopened shipping crates
- Crates stored away from heavy machinery such as compressors or generators, which create excessive floor vibration
- Storage area temperature -20 to +60 °C (-4 to +140 °F) and humidity <80%, noncondensing

Contact your local Waters representative if you need further advice regarding storage conditions.

Unpacking and moving

The instrument is delivered in several palletized cartons and crates. Their sizes may vary dependent on instrument specification and optional accessories, typical sizes for the instrument crate are:

- Width 770 mm (30.3 inches)
- Depth 1030 mm (40.6 inches)
- Height 880 mm (34.6 inches)
- Weight < 135 kg (< 297.6 lbs)

It is a warranty condition that the shipping crates are unpacked only when the Waters engineer is present. At the end of the installation, it is the customer's responsibility to dispose of the crates and packaging.

The system must not be bumped or jolted during unpacking or any subsequent transport. If you must transport the system across an uneven surface, use a forklift truck or trolley.

Doorways, elevators, and corridors (including corners) must be sufficiently wide for maneuvering the instrument. Special handling arrangements may be necessary if access to the laboratory involves a staircase.

Lifting equipment

Once unpacked, Table 1 lists the approximate instrument weights.

Table 1: Instrument weights

Xevo TQ-GC	84 kg (185.2 lbs)
Data system (computer, monitor, and optional printer)	<50 kg (110 lbs)
Rotary pump	15.7 kg (34.6 lbs)
Gas chromatograph	50 kg (110 lbs)

Warning: The instrument and GC must only be lifted using lifting equipment capable of raising their weight safely. Do not lift the instrument and GC manually. When the GC is separated from the instrument, the GC can be lifted by two people. The lifting equipment must be capable of lifting the instrument and GC to the same height as the laboratory bench. The Waters engineer requires assistance lifting and positioning the instrument and GC.

Important: It is essential that you provide suitable equipment. If suitable lifting equipment is not available when the Waters engineer arrives on site, the installation cannot be implemented and additional costs may be incurred.

Waters recommends a forklift truck or A-frame hoist for lifting and transporting the instrument. The instrument is supplied with a lifting harness, which must be used to lift the instrument from the shipping crate onto the bench.

Bench loading

The bench must be able to support the weight of the mass spectrometer, data system, and GC oven. Table 1 lists the nominal weights of the system components.

Warning: Do not use the GC interface as a lifting handle.

Caution: Note the additional height of the CTC PAL3 autosampler, which may involve working above shoulder height.

Space requirements

A possible layout for the Xevo TQ-GC, GC oven, rotary pump, data system, and ancillary equipment is shown in Figure 1 and Figure 2.

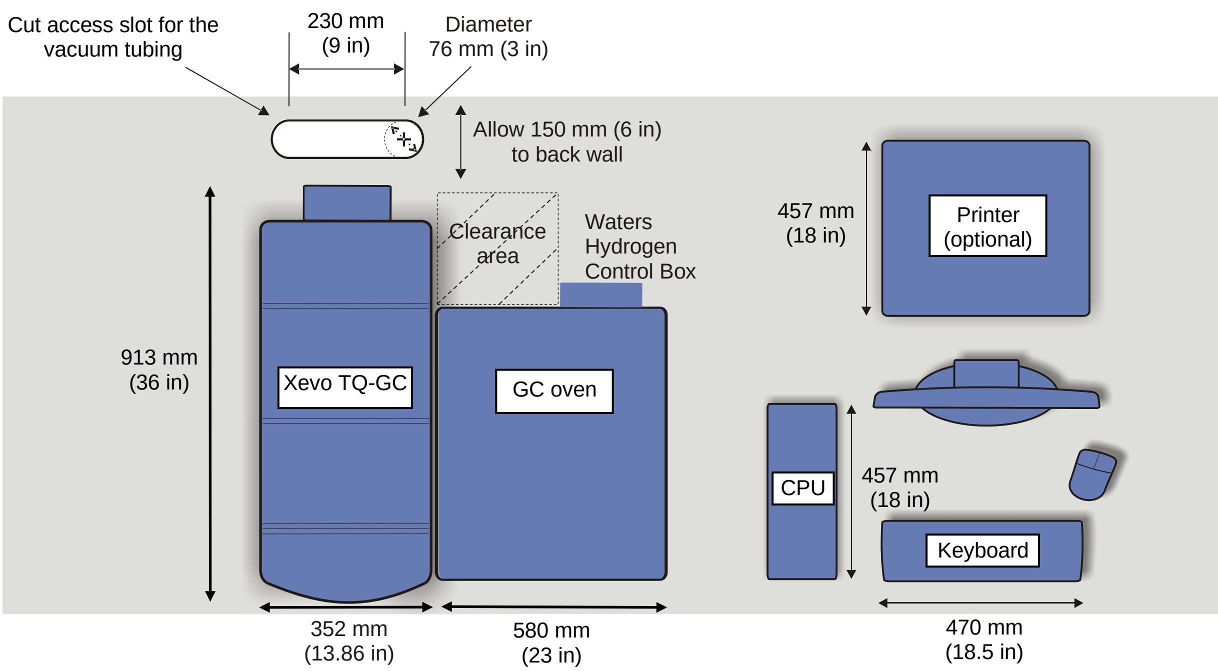


Figure 1 - Plan view, showing space requirements

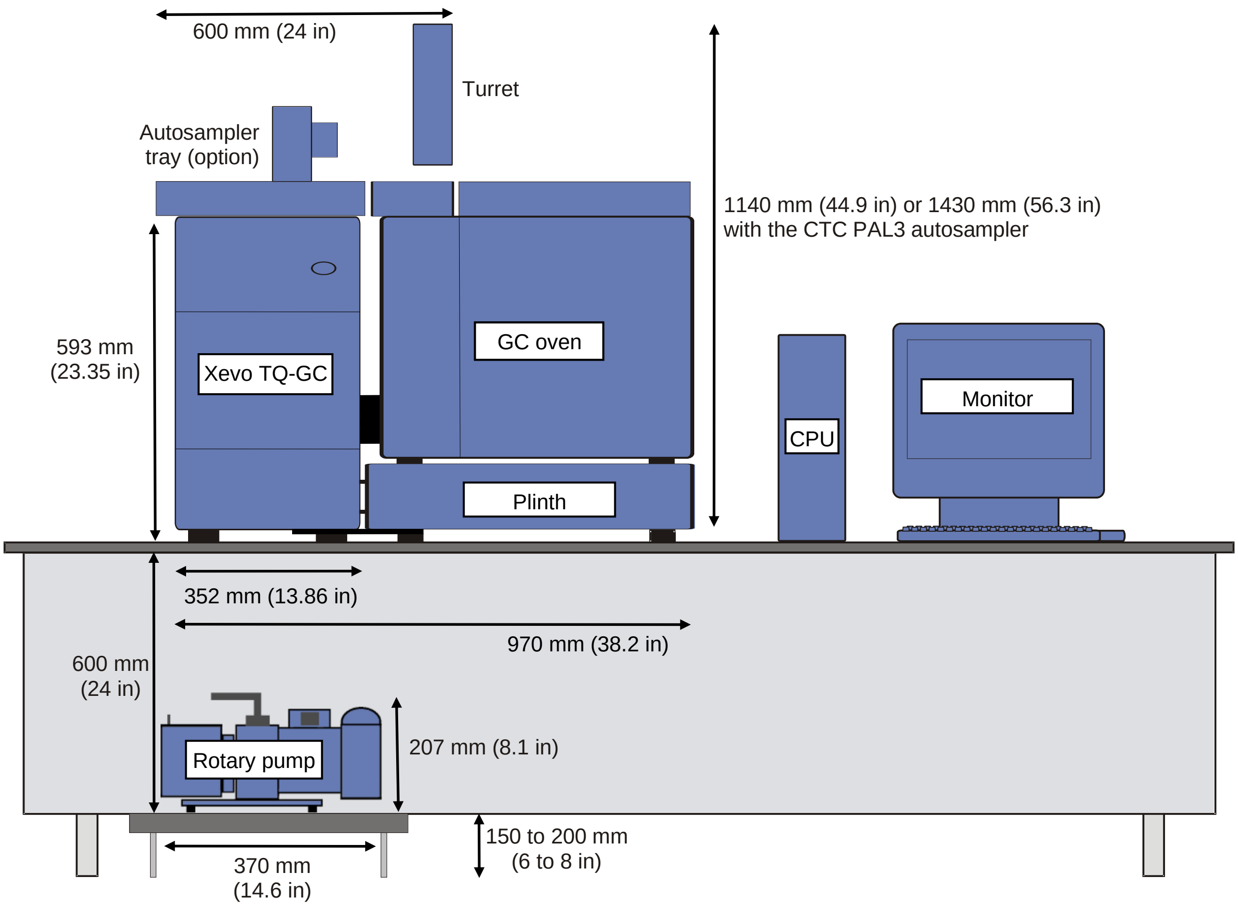


Figure 2 - Front view, showing space requirements

Xevo TQ-GC dimensions

The Xevo TQ-GC has the following dimensions:

- Width 352 mm (13.86 inches) without the GC interface

  500 mm (19.69 inches) with the GC interface
- Depth 913 mm (35.94 inches)
- Height 593 mm (23.35 inches)

Note: A movable workbench of suitable load rating is the preferred arrangement for the system setup, to provide ease of access for servicing.

For service access, a minimum clearance of 600 mm (23.6 inches) is required for the front, back, and left side of the instrument. A temporary clearance of 1000 mm (39.4 inches) is required for the left side of the instrument.

Warning: To avoid burn injury, always remain outside the clearance area behind the instrument to keep a safe distance from the hot air vents.

If the instrument is placed on a bench that can be moved out during service visits, the minimum clearance at the back is 150 mm (6 inches), with the rotary pump positioned beneath the instrument. The mass spectrometer must be installed on a surface that is level to within ±1° in any direction.

The instrument is supplied with a 2.5-m (8-ft) power cord.

Note: Waters recommends an additional 150 mm (6 inches) behind the workbench to accommodate vacuum tubing.

Rotary pump dimensions and weights

The Xevo TQ-GC includes either an Edwards RV5 or a Vacuubrand RE6 as the external backing pump. The Edwards RV5 pump has the following dimensions and weight:

- Width: 158 mm (6.2 inches)
- Length: 430 mm (16.9 inches)
- Height: 225 mm (8.9 inches)
- Weight: 25 kg (55.1 lbs) without oil

The Vacuubrand RE6 rotary pump has the following dimensions and weight:

- Width: 142 mm (5.6 inches)
- Length: 370 mm (14.6 inches)
- Height: 207 mm (8.1 inches)
- Weight: 15.8 kg (34.8 lbs) with oil and 15.4 kg (34.0 lbs) without oil

You must position the rotary pump on the floor, either behind or underneath the instrument and within 1 m (3.3 ft) of the rear of the chassis. The pump is supplied with a 2.5-m (8-ft) power cord.

Waters recommends that the rotary pump is elevated 150 to 200 mm (6 to 8 inches) above the floor to provide easy access during routine maintenance (for example, changing the pump oil).

Ensure that there is adequate ventilation around the rotary pump so that the ambient temperature around the pump does not exceed 40 °C. Allow at least 150-mm clearance for the pump cooling fans.

GC oven and sampler dimensions

The GC oven and sampler have the following dimensions:

- Width 580 mm (22.8 inches)
- Depth 530 mm (20.9 inches)
- Height 1040 mm (40.9 inches) including turret/injector or 1430 mm (56.3 inches) with the CTC PAL3 autosampler

Ensure that there is sufficient space on the bench to the right of the mass spectrometer for the GC oven.

Data system

You can position the data system on the same bench as the mass spectrometer or on a separate desk (available as an option). A 3-m (10-ft) X-wire network cable connects the computer to the mass spectrometer. The two data system power cords for the PC and monitor are approximately 2.5 m (8 ft) in length.

Warning: To avoid damage to or risk of electric shock and fire, the data system and any ancillary equipment must not be exposed to dripping or splashing liquids. Nor should objects filled with liquid, such as sample vials, be placed on them.

Electrical safety

The Xevo TQ-GC detector complies with the International Safety Standard IEC 61010-1:2010 and meets the European Low Voltage Directive 2014/35/EU by means of European Harmonized Standard EN 61010-1:2010.

For installations in Australia and New Zealand, the building installation must comply with AS3000 electrical installations for Australia and New Zealand.

The instrument is suitable for use in environments categorized as Pollution Degree 2 and Over-voltage Category II.

Power requirements

The Xevo TQ-GC detector and the rotary pump each require one power socket. The power supply sockets must be located within 2 m (6.5 ft) of the instrument. Do not position the equipment so that it is difficult to disconnect the power cords.

The data system typically requires two power sockets located adjacent to the Xevo TQ-GC for the instrument PC and monitor. Further outlets may be required for optional equipment, such as a printer. Do not position the equipment so that it is difficult to disconnect the power cords.

A typical GC system may require three or more additional sockets - refer to the relevant GC documentation for information. The CTC PAL3 autosampler requires its own power supply.

Note: The GC oven supplied with the Xevo TQ-GC is fast heating.

Important: Do not use an uninterruptible power supply with a GC. If the area where the GC is located loses power, an unsafe condition can result if the GC remains powered-on.

Important: Main power supply voltage fluctuations must not exceed ±10%.

Table 2 summarizes the power requirements.

Table 2: Summary of power requirements

	Nominal rated voltage	Supply fuse / circuit breaker rating	Typical power consumption	Power connection	Power sockets
Xevo TQ-GC	200 to 240 V, 50/60 Hz	13 to 16 A	900 W	IEC 60320 C20 receptacle	1
GC oven	230 to 240 V, 50/60 Hz	13 to 16 A	2950 W	IEC 60320 C20 receptacle	1
Data system (PC and monitor)	100 to 127 V /200 to 240 V, 50/60 Hz	5 to 15 A 2.5 to 16 A	200 W	IEC 60320 C14 receptacles	2
Vacuubrand RE6 rotary pump*	200 to 240 V, 50/60 Hz	13 to 16 A	391 W	IEC 60320 C20 receptacle	1
Edwards RV5 pump*	220 V to 240 V/50 Hz	3.4 A	450 W	IEC 60320 C13 connector	1
	230 V to 240 V/60 Hz	3.0 A	550 W		
	110 V/50 Hz	6.8 A	450 W		
	115 V to 120 V/60 Hz	6.9 A	550 W		
LAN box	100 to 240 V, 50/60 Hz	3 A	25 W	IEC 60320 C8 receptacle	1
Waters Hydrogen Control Box (option)	200 to 240 V, 50/60 Hz	3 A	10 W	9-mm jack plug	1
CTC PAL3 autosampler (option)	100 to 240 V, 50/60 Hz	3 A	200 W	IEC 60320 C14 receptacle	1

Note: *The Xevo TQ-GC includes either an Edwards RV5 or a Vacuubrand RE6 as the external backing pump.

Important: Voltage supply stability is critical for instrument operation, the nominal power supply voltage must fall within the ranges specified in Table 2 at all times to allow for the occasional 10% surge.

The supplies must be wired with a protective earth and fused or fitted with circuit breakers of the specified ratings, in accordance with local regulations.

The main power supply must not have brownouts or surges greater than ±10%, and must not exceed the specified maximum operating range for more than 0.3 s. Transient voltage drops to half nominal voltage or less must have a duration of less than 20 ms. There must be less than 1.0 V RMS of ripple on the main power supply.

The rotary pump is normally in continuous operation. Waters recommends that the system be installed so that the supply cannot be inadvertently switched off.

Waters also recommends that additional protection be provided for the instrument by means of the following:

- Residual current devices (RCDs) for UK and Europe
- Ground fault circuit interrupters (GFCIs) for the rest of the world

If there is an uninterruptible power supply (UPC), this needs one power connection to the laboratory.

Electrical transformers

If there is a possibility that the supply voltages will not meet the specified operating range under all conditions, you must use a transformer to change the primary supply voltage to the specified range. Main power supply conditioners/stabilizers are also available as an optional accessory. Contact Waters with advance notification if you are likely to experience power supply problems.

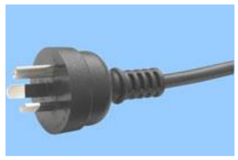
For instruments fitted with a transformer, the RCD or GFCI must be fitted on the primary (supply) side of the transformer.

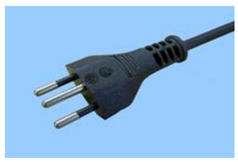
System plug options

The system plug options are shown in Table 3. The instrument is shipped with the plugs that were requested at the point of order. The customer must provide appropriate sockets for the type of plug used. If the available sockets are incompatible with the plugs supplied, the customer must supply appropriate cord sets for the instrument and pumps. The cord sets must comply with local regulations.

Note: If installing ancillary equipment (for example, compressors), you may need additional power outlets, possibly requiring 3-phase supplies. Confirm such supplemental needs with the local Waters agent prior to the start of the installation.

Table 3: Power cords supplied by Waters

	IEC 60320 C13 (10-A rating)	IEC 60320 C19 (16-A rating)
Equipment end of cord		
Australia	 10 A	 15 A
Brazil	 16 A	 16 A
China	 10 A	 16 A
Denmark	 DK 2-5a “Data”, 10 A	 DK 2-1a, 13 A
EU	 CEE 7/VII “Schuko”, 16 A	 CEE 7/VII “Schuko”, 16 A
India	 16 A	 16 A

Japan	 5-15P, 15 A	 L6-15, 15 A
Korea	 CEE 7/VII "Schuko", 16 A	 CEE 7/VII "Schuko", 16 A
Switzerland	 Type 12, 10 A	 Type 23, 16 A
Taiwan	 5-15P, 15 A	 13 A
UK	 13 A	 13 A
USA	 NEMA 5-15P	 NEMA L6-15P

Uninterruptible power supply

To prevent instabilities in local main power supply impacting system reliability and performance, Waters recommends the use of an uninterruptible power supply (UPS). In support of this recommendation, Waters supplies UPS units that are specifically configured and evaluated for use with its MS systems. Your local Waters field sales representative can provide further details.

These UPS units step up single-phase line voltage to 230 V AC and provide power conditioning and protection for the MS system.

For North America, the UPS system requires one L6-30 (30 amp) wall socket. In other areas, the UPS system typically connects to your laboratory main power supply using the standard MS instrument power cord and wall socket for your system. See Table 2 and Table 3.

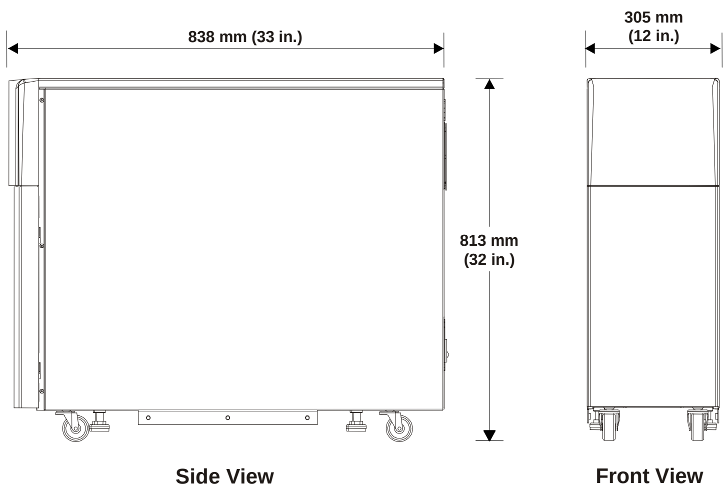


Figure 3 - Approximate maximum dimensions of the UPS

Environment requirements

Safety recommendations

The user must be aware of potential chemical hazards associated with the Xevo TQ-GC GC/MS-MS system. In particular, the user must assess the risk associated with gases vented into the laboratory. The user must give due consideration to the laboratory environment (including volume and air changes) before installation and during operation of the system. The standard configuration of the GC releases up to 100 mL/min of carrier gas into the laboratory. There is also a potential for gas leaks.

Warning: The active exhaust vent must provide a minimum vacuum of 0.030 psi (2 mbar) below atmospheric pressure (negative pressure). It must be capable of supporting a maximum instrument exhaust gas load for Xevo TQ-GC of 15 mL/min (900 mL/hour).

Warning: Exhaust venting must comply with all local safety and environmental regulations. The ANSI/AIHA Z9.2-2001 standard for "Fundamentals governing the design and operation of local exhaust ventilation systems" provides guidance on compliant exhaust systems.

Positioning

Waters recommends that the instrument be installed in an air-conditioned laboratory, in a draft-free position, away from excessive amounts of dust. Air-conditioning units must not be positioned directly above the mass spectrometer. To avoid adverse operation, do not locate the instrument in direct sunlight.

Ventilation

Refer to Table 2 to calculate the maximum overall heat dissipation into the room from the instrument, data system, and pumps. You may need to install or upgrade a conditioning system to accommodate the additional heat load from these systems.

Adequate ventilation is also required to dissipate any carrier gas that is released into the room as a normal part of GC operation.

Temperature

The ambient temperature range required for normal operation is 15 to 28 °C (59 to 82 °F).

Temperature stability must be better than 2 °C (35.6 °F) peak-to-peak in 1.5 hours.

Humidity

The relative humidity in which the instrument and pumps operate must be in the range of 20% to 80%, noncondensing.

Altitude

The instrument is designed and tested to operate below 2000 m (6562 ft).

Vibration

The instrument must not be placed close to heavy machinery such as compressors and generators, which may create excessive floor vibration.

Magnetic fields

The instrument must be positioned away from magnetic fields of greater than 10 Gauss, such as those generated by NMR spectrometers and magnetic sector mass spectrometers.

Radio emissions

The instrument must not be placed within a Radio Frequency (RF) field of greater than 1.0 V/m.

Possible sources of RF emission include RF-linked alarm systems, Local Area Networks (LANs), mobile telephones, and handheld transmitters.

Gases and regulators

Warning: Risk of explosion. Hydrogen, methane, ammonia, and isobutane can form explosive mixtures in air. You must inspect gas supply systems for leaks when installed and at regular intervals.

Hydrogen has one of the widest explosive ranges when mixed with air. Take extra care to avoid any leaks when hydrogen is used as a carrier gas.

Hydrogen must only be used with the stainless steel tubing supplied with the Xevo TQ-GC installation kit.

Warning: Risk of poison. Ammonia is toxic by inhalation. You must inspect gas supply systems for leaks when installed and at regular intervals.

Warning: Caustic substance. Ammonia forms a caustic solution when in contact with water. Avoid contact with eyes. You must inspect gas supply systems for leaks when installed and at regular intervals.

Caution: If you use copper tubing for any of the gas lines, the copper should be chemically cleaned. If you use stainless steel tubing, it must be a grade compatible with the gas. Ensure that there are no soldered or brazed joints in the line, as these can result in contamination of the instrument with tin or lead oxide. All joints must be compression fittings and must be free of oil.

Caution: All gas connections must be made by a competent person.

GC carrier gas

Helium as GC carrier gas

Dry, ultra-high purity helium gas (99.999% or better with < 1 ppm water content) should be supplied through a dual-stage regulator that is capable of regulating up to 200 psi (14 bar). Gases are generally regulated at 56 to 74 psi (4 to 5 bar) maximum 145 psi (10 bar). However, this depends on the type of column used. You may use a Supelco OM12 purifier fitted with shut-off valves to increase column life.

Connect helium using the full 10-m length of 1/8-inch stainless steel capillary tube supplied in the Xevo TQ-GC installation kit. Inspect the line regularly for leaks under pressure.

Hydrogen as GC carrier gas

Warning: Risk of explosion. Hydrogen has one of the widest explosive ranges when mixed with air. Take care to avoid any leaks when hydrogen is used as a carrier gas. Use hydrogen only with the stainless steel tubing supplied with the Xevo TQ-GC installation kit.

Hydrogen may be used as an alternative to helium as the GC carrier gas.

Dry, ultra-high purity hydrogen gas (99.999% or better with < 1 ppm water content) should be supplied through a hydrogen specific dual-stage regulator capable of regulating up to 200 psi (14 bar). The maximum supply pressure to the GC is 145 psi (10 bar).

Use hydrogen only with the full 10-m length of 1/8-inch stainless steel capillary tube supplied in the Xevo TQ-GC installation kit. Inspect the line regularly for leaks under pressure.

The use of hydrogen also requires the purchase of a Hydrogen Compatibility Kit (205001743), which shuts off the supply of carrier gas in the event that the Xevo TQ-GC loses vacuum.

Note: You can also use the Hydrogen Compatibility Kit with helium.

CI reagent gas

Chemical ionization reagent gas is required if the CI option is chosen. Methane is required for the completion of the CI performance tests. Once the installation has been completed, users may choose to use an alternative gas such as ammonia or isobutane. The chemical ionization gas should be dry and high purity (>99.9%).

Connect the gas using clean 3.2-mm (1/8-inch) OD stainless steel or copper tubing (not supplied) and inspect for leaks under pressure. Waters recommends the use of a two-stage pressure regulator to regulate the gas at 14.7 psi (1 bar).

Xevo TQ-GC collision gas

Argon is required for the collision cell. The argon must be dry, high purity (99.997%), and regulated at a pressure of 10 ±2 psi (0.69 ±0.1 bar), using a two-stage high purity gas regulator with an appropriate outlet range, for example, 0 to 29 psi (0 to 2 bar).

During operation, typical argon usage is less than 0.5 mL/hr.

Important: It is the customer's responsibility to provide a two-stage regulator fitted with an adapter to connect to an 1/8-inch Swagelok type fitting, see Table 4.

Caution: Ensure that there are no soldered or brazed joints in the argon line, as these may result in contamination of the instrument with tin or lead oxide. Any joints in the collision gas line must be compression fittings.

Connect the gas supply using the clean, 1/8-inch OD, medical-grade stainless steel tubing supplied and inspect for leaks under pressure.

Gas for PAL3 GC headspace and SPME options

The headspace and SPME options require a supply of helium or nitrogen of high purity. The minimum quality level is grade 55 (99.9995 % purity). Grade 59 (99.9999 % purity) or Grade 60 (99.99990 % purity) are preferable. One supply is enough for both options.

The pressure of the gas supplied to the CTC PAL3 inlet regulator must be between 1 and 6 bar. This gas line can be teed up from an installed gas chromatograph (the preset pressure is approximately 5 bar) using the supplied tee-piece.

Note: A purge gas supply is required for the CTC PAL3 headspace and SPME options. Refer to Table 4 for details.

Exhaust outlets

Rotary pump exhaust

You must vent the rotary pump exhaust gases to the atmosphere outside the laboratory using a user-supplied fume hood or industrial vent. You may connect the exhaust to an existing laboratory vent carrying gases from other sources.

Five meters (16 ft) of 12-mm ID PVC tubing is supplied. If this length is insufficient, the user must supply an adapter and tubing with an internal diameter of at least 51 mm (2 inches) for the extra distance to the vent point.

Note: The fume hood/industrial vent must be equipped with an extraction fan system to enable adequate displacement of the exhaust gases.

Test samples

Warning: Hazardous samples must be handled with care and in a manner that conforms to the manufacturers' guidelines.

Test samples are required for verifying the performance of instruments at the time of installation. They are also used for routine operations such as tuning and mass calibration.

Note: A test sample kit is supplied with the instrument for the installation setup. It is the customer's responsibility, in conjunction with the local Waters sales representative, to ensure that any additional samples required for customer-specific tests and post-installation testing are available.

Note: The Waters engineer will not carry test samples to the installation. If the Waters engineer is unable to complete the installation because of a lack of facilities, costs incurred will be charged. The installation will be rescheduled when the chemicals are available.

Important: You must adhere to the storage instructions provided with the test samples. The use of inferior quality test chemicals caused by adverse storage conditions could impair the instrument installation.

Note: If your laboratory practices require full sample certification documentation, Waters Analytical Standards and Reagents provide ready-to-use reference materials and reagents that are fully traceable and certified (www.waters.com).

Solvents and reagents

Caution: Clean, high-purity solvents and reagents and clean glassware must be used to ensure optimum performance of the GC-MS system. Significant delays to the installation may occur if clean solvents and glassware are not provided by the customer prior to the installation.

High-purity solvents (GC-MS grade or better) are required. These are used for making up standard solutions for performance tests and for cleaning instrument components. For detail on controlling contamination, and information on solvent brands, refer to *Controlling Contamination in LC/MS Systems* (715001307), located in the Support area of the Waters website (www.waters.com).

Note: A list of solvents and additives compatible with the Xevo TQ-GC is available in the *Xevo TQ-GC Overview and Maintenance Guide* (715005564), located in the Support area of the Waters website (www.waters.com).

Sample preparation equipment

Facilities for making up test samples must be available at site. The equipment required for sample preparation includes (but is not limited to) the following:

- Calibrated syringes - Eppendorf (or equivalent), spanning range 1 µL to 1 mL
- Calibrated analytical balance
- Nitrile gloves
- Lint-free tissue

Note: Customers supplying their own autosampler also require a supply of autosampler vials with septum caps and crimping tool if appropriate.

Cleaning test sample glassware

For detailed information on properly cleaning glassware or other components, refer to *Controlling Contamination in LC/MS Systems* (715001307), located in the Support area of the Waters website (www.waters.com).

Cleaning equipment

An ultrasonic bath is required for the routine cleaning of instrument parts. The bath must be at least 300 mm x 150 mm x 100 mm deep (12 inches x 6 inches x 4 inches).

Caution: Surfactants must not be used for cleaning glassware or other components. Refer to the document *Controlling Contamination in LC/MS Systems* (715001307), located in the Support area of the Waters website (www.waters.com).

For cleaning, instrument components are placed in surfactant-free glass vessels. These vessels must be made available for use at the time of installation. The vessels must have a diameter of at least 120 mm (5 inches) and be approximately 120 mm (5 inches) high.

Summary of fittings

Table 4 summarizes the waste and gas connections for the installation of the Xevo TQ-GC.

Table 4: Instrument fittings required

	Fittings on the system	Items supplied with the instrument	Items to be supplied by the customer
Rotary pump exhaust	12-mm OD barbed fitting	5-m (16-ft) PVC tube, 12-mm ID	Industrial vent or fume hood
Collision gas supply	1/8-inch fitting (Swagelok type)	3-m (10-ft) of 1/8-inch OD stainless steel tubing	Argon supply, regulated to 10 ±2 psi (0.69 ±0.1 bar), through a 1/8-inch adapter (Swagelok recommended)
GC carrier gas supply	1/8-inch Swagelok fitting (male)	1/8-inch OD stainless steel tubing to a regulated supply	-
CI reagent gas supply	1/8-inch Swagelok fitting (male)	1/8-inch Swagelok fitting (female)	1/8-inch OD stainless steel or copper tubing to a regulated gas supply
Purge gas supply (for CTC PAL3 headspace or SPME options)	1/8-inch fitting (Swagelok type)	1/8-inch OD stainless steel tubing and 1/8-inch Swagelok nuts and ferrules 1/8-inch tee-piece to tee from the GC nitrogen or helium line	Inert purge gas (for example, nitrogen or helium) supplied at 14.5 to 87.0 psi (1 to 6 bar)

- MS nitrogen: see the "Gases and regulators" section
- MS argon: see the "Gases and regulators" section
- MS helium: see the "Gases and regulators" section

- GC and PAL3: nitrogen or helium if the SPME or headspace options are present. Nitrogen SPME: regulator to precisely adjust at 7 bar, with connection for 1/8-inch stainless steel tube (Waters recommends a Swagelok-type thread).
- Nitrogen GC: regulator to adjust at 6.5 to 7 bar, fitted with an adapter to connect to a 6-mm OD push-in fitting. It must be capable of supplying 1400 L/h of dry, oil-free nitrogen with a purity of at least 95%.

Note: This document covers the most common inlets and autosamplers. Always refer to OEM literature.

Table 5: Delivery pressures for inlet types required at the GC/MS

	Split/splitless 150 psi	**Multimode 100 psi**	**PTV**
Carrier (max)	1,172 kPa (170 psi)	827 kPa (120 psi)	827 kPa (120 psi)
Carrier (min)	137.9 kPa (20 psi) above maximum pressure used in method. (If using constant flow control in the inlet, the maximum column pressure occurs at the final oven temperature.)		

Note: Additional inlets or detectors that may be installed on the GC oven are not covered in this document. If you require any assistance with installation or configuration of any additional detectors, consult OEM literature or contact GSS for assistance.

Xevo TQ-GC site preparation checklist

You must complete this checklist and return it to Waters when all site preparation requirements are met.

Note: If any items are on order, indicate this on the checklist and include the anticipated arrival date.

Note: It is the customer's responsibility to ensure that all the correct laboratory supplies are present. If you need additional information or have difficulty acquiring parts or samples, contact your local Waters sales representative.

Access (see page 5)
The instrument is located on the ground floor/basement/___ floor (delete as appropriate) .... ❑

All elevators, staircases, corridors and doorways through which the instrument must pass are adequate for easy access to the laboratory .... ❑

Lifting equipment (see page 6)
Suitable equipment is available to lift the instrument onto the laboratory bench .... ❑

Bench/floor space (see page 6)
Adequate bench or floor space is available for the system .... ❑

Power supply (see page 10)
An appropriate number of sockets with earth connections are available and they meet the stipulated power requirements .... ❑

Positioning/ventilation (see page 16)
There is no direct air conditioning flow onto the instrument .... ❑

Temperature (see page 16)
The room temperature is as specified in this document .... ❑

Humidity (see page 16)
The humidity is as specified in this document .... ❑

Altitude (see page 16)
The instrument will be operated below 2000 m (6562 ft) .... ❑

Floor vibration (see page 17)
The site is free from known vibration .... ❑

Magnetic fields (see page 17)
The site is free from magnetic fields of greater than 10 Gauss .... ❑

Radio emissions (see page 17)
The RF field strength is less than 1 V/m .... ❑

Gases and regulators (see page 17)
<u>Carrier gas</u>

Dry, oil-free helium at 99.999% purity, with a regulator up to 200 psi (14 bar), is available, together with a suitable length of 1/8-inch stainless steel or copper tubing .... ❑

Or

Dry, oil-free hydrogen (as an alternative to helium) at 99.999% purity, with a regulator up to 200 psi (14 bar), is available, together with a suitable length of 1/8-inch stainless steel or copper tubing ... ❑

A hydrogen campatibility kit has been purchased.

<u>Collision gas</u>

High-purity ≥99.997% argon gas is available, regulated at 10 ±2 psi (0.69 ±0.1 bar) with an 1/8-inch adapter .... ❑

<u>Chemical Ionization reagent gas</u>

Dry, high-purity (99.9%) methane gas is available for the CI option, regulated at 14.7 ±2 psi (1 ±0.1 bar) with an 1/8-inch adapter .... ❑

Dry, high-purity (99.9%) ammonia gas or isobutane gas (as alternatives to methane) is available for the CI option, regulated at 14.7 ±2 psi (1 ±0.1 bar) with an 1/8-inch adapter .... ❑

<u>Purge gas for CTC PAL3 headspace and SPME options</u>

Dry, oil-free nitrogen or helium gas (nitrogen at least 95% pure) is available, regulated at 14.5 to 87.0 psi (1 to 6 bar) with an 1/8-inch adapter .... ❑

Rotary pump exhaust (see page 19)
A suitable outlet is available for the rotary pump exhaust .... ❑

GC System
The GC was purchased with the Xevo TQ-GC mass spectrometer .... ❑

Caution: To prevent contravention of Agilent warranty, on-site customization of GCs is prohibited.

Note: The GC purchased from Waters is customised to fit the Xevo TQ-GC only.

Ancillary equipment

If you plan to use any other equipment with the system (for example, Autosampler, UV Detector), give details below.

Make/type	Model	Already commissioned	To be commissioned on

Test samples (see page 20)
All samples required for the installation are available .... ❑

Solvents/reagents (see page 21)
Solvents are available .... ❑

Sample preparation equipment (see page 21)
Sample preparation equipment, as specified in this document, is available .... ❑

Cleaning (see page 22)
An ultrasonic bath is available .... ❑

Vessels for cleaning components are available .... ❑

I confirm that all supplies are now available and all specified environmental conditions have been met.*

During the installation, the user intends to be available for demonstration and training by the Waters engineer:

At all times .... ❑

Approximately _______% of the time .... ❑

Not at all .... ❑

During the likely period of installation, the following dates are NOT convenient:

____

Signed: ____

***Important:** If an authorized Waters service engineer arrives on site to begin installation work and cannot complete the installation because of lack of facilities or supplies (for example, lifting equipment, power, water, test samples, laboratory readiness), costs incurred will be charged to the customer.

Complete the following sections in block letters:

Name ____

Position ____

Organization ____

Street ____

City ____

ZIP/postcode ____

Country ____

Telephone ____

Fax ____

Email ____

Important: The installation of your system cannot begin until page 22 through to the end of this document are fully completed and returned to the Mass Spectrometer Sales Support Representative at your local Waters office.