

Waters APGC

Site Preparation Guide

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Introduction

This document describes the environmental conditions, power supplies, and gas supplies that are required for the operation of the APGC. Operating the APGC in conformance with these conditions will enable it to achieve its optimum performance.

Responsibilities

A Waters™ engineer will be responsible for installing and commissioning the system to ensure that the APGC is properly installed and operational. The laboratory must be prepared in advance to allow the engineer to carry out the installation efficiently. A site preparation checklist is included at the end of this document for you to fill in and return to Waters when the laboratory is ready.

Important: The installation of the APGC cannot begin until the checklist has been 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.

A major aspect of the installation is the implementation of tests designed to evaluate the functionality under specific operating conditions. At the completion of each test, the actual test result obtained is entered in the relevant instrument Installation Checklist or Instrument Qualification Workbook, whichever is appropriate.

Important: A user who has been designated to be responsible for the normal use and upkeep of the APGC must be present during the installation.

The user must be present during the functionality tests at installation; this allows the user to be trained in the basic system operation. If there are foreseen periods when the intended user cannot be present, notify us in advance; this will enable us to schedule the installation 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 generate excessive floor vibration
- Storage area temperature 0 to 40 °C (32 to 104 °F) and humidity <80%, non-condensing

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

Unpacking and moving

The APGC is delivered in several crates. Crate sizes may vary dependent on the source specification and optional accessories. The typical dimensions of the largest crate are as follows:

- Width 1100 mm (43.3 inches)
- Length 860 mm (33.9 inches)
- Height 700 mm (27.6 inches)
- Weight 68 kg (150 lbs)

It is a warranty condition that the shipping crates are unpacked only when the Waters engineer is present.

If possible, provide an electrical screwdriver or drill with screwdriver attachment to assist with opening the crates. At the end of the installation, it is the customer's responsibility to dispose of the crates and packaging.

It is essential that the source is not bumped or jolted during unpacking or any subsequent transport. If the source needs to be transported across an uneven surface, the APGC must be carried on a forklift truck or trolley.

Doorways must be at least 1200 mm (47.2 inches) wide. Elevators and corridors (including corners) must be sufficiently wide for maneuvering of the source. Special handling arrangements may be necessary if access to the laboratory is through a staircase.

Lifting equipment

Once unpacked, the APGC weights are approximately as shown in [Table 1](#):

Table 1: APGC weights

APGC enclosure assembly	4.5 kg (9.9 lbs)
GC oven	50 kg (110 lbs)
Plinth (with drawer and transfer line fitted) (SYNAPT™, QTof, Xevo™ TQ-S, and Xevo-XS)	50 kg (110 lbs)
Low-profile plinth (with transfer line fitted) (Xevo TQD, Xevo TQ-S micro, SQ Detector 2, Vion™ IMS QTof)	35 kg (77 lbs)
Stability frame	4.5 kg (9.9 lbs)
CTC PAL3 RSI autosampler (option), entire unit without optional modules	14 kg (31 lbs)
Agilent 7683 autosampler (option)	~9.5 kg (21 lbs)
Agilent 7693 autosampler (option)	~9.3 kg (20.5 lbs)

Warning: The components must only be lifted using lifting equipment capable of raising the components' weight safely. The lifting equipment must be capable of lifting the components to the height of the APGC plinth, on the laboratory bench. However, if lifting equipment is not available, the Waters engineer will require assistance lifting and positioning the components. The GC is a two-person lift. The PAL3 can be lifted by one person but is awkward so Waters recommends a two-person lift.

Bench loading (benchtop instruments only)

The bench must be able to support the combined weight of the mass spectrometer, data system, LC system, and APGC. Nominal weights for the APGC components are shown in [Table 1](#). Refer to the mass spectrometer, UPLC, HPLC, or GC system site preparation guides for specific weight information.

Caution: To ensure accurate alignment of the APGC interface with Vion IMS QTof instruments, the height of the APGC bench must be 60 to 75 mm (2.3 to 3 inches) lower than the Vion bench.

Space requirements

The APGC has the following dimensions:

Table 2: APGC dimensions

System	Width	Total width (including instrument)	Depth of plinth	Overall height
Xevo TQD, Xevo TQ-S micro, SQ Detector 2	890 mm (35 inches)	1419 mm (55.9 inches)	500 mm (19.7 inches)	1076 mm (42.4 inches)
Xevo QToF / TQ	882 mm (34.7 inches)	1629 mm (64.1 inches)	622 mm (24.5 inches)	1207 mm (47.5 inches)
SYNAPT	882 mm (34.7 inches)	1657 mm (65.2 inches)	622 mm (24.5 inches)	1170 mm (46.1 inches)
Vion IMS QToF	903 mm (35.6 inches)	1757 mm (69.2 inches)	500 mm (19.7 inches)	1076 mm (42.4 inches)

For service access, a minimum clearance of 600 mm (23.6 inches) is required for the front, back, and right-hand side of the APGC.

Allow at least 200 mm (7.9 inches) clearance behind the instrument to dissipate hot air venting from the oven during cooling-down cycles. This air exits the oven at temperatures that can reach up to 350 °C.



Warning:

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

The bench must be able to accommodate the combined dimensions of the mass spectrometer, data system, LC system, and APGC. Nominal dimensions for the APGC components are shown in [Table 2](#). Refer to the mass spectrometer, UPLC, HPLC, or GC system site preparation guides for specific space requirements.



Warning:

To ensure the stability and safety of benchtop systems, an appropriate bench may need to be purchased to accommodate the system dimensions as shown in [Figure 2](#), [Figure 4](#), [Figure 6](#), and [Figure 8](#).

Possible layouts for instruments with APGC are shown in the following figures.

Note:

The figures show the APGC fitted with the Agilent 7683 and 7693 autosamplers. The figures also show the Agilent 7890 GC ovens. The Agilent 8890 GC ovens have a panel display above the GC.

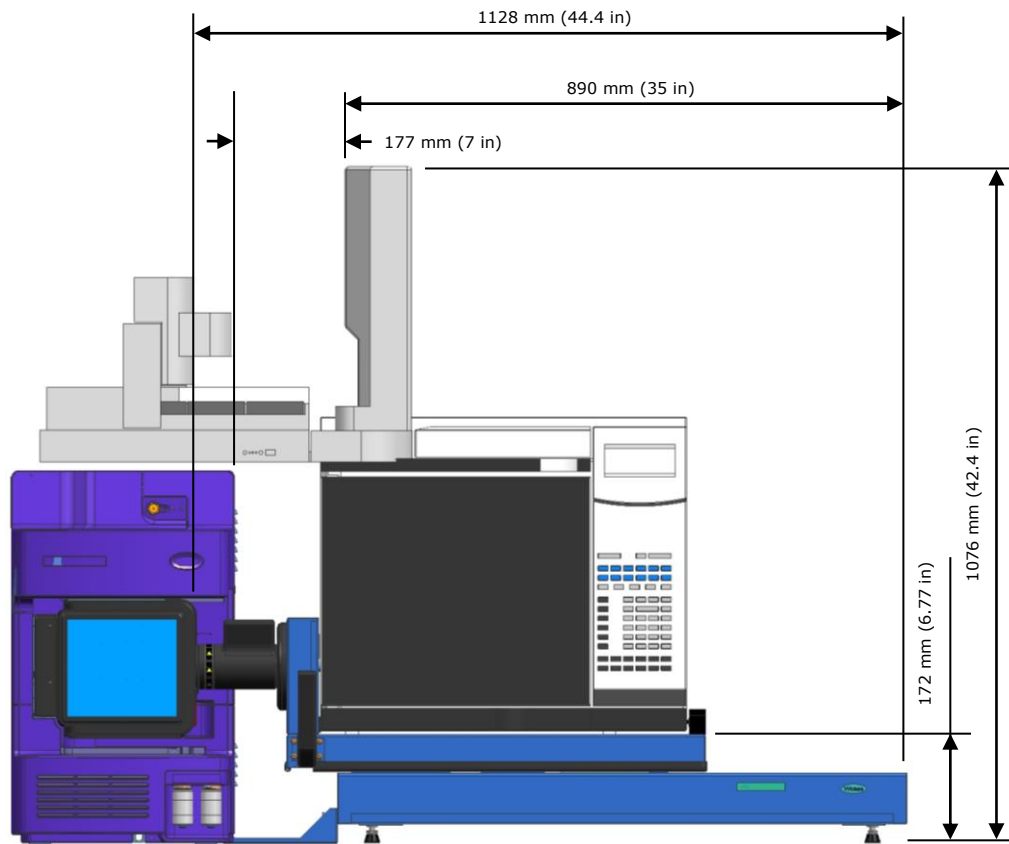


Figure 1 - Front view, Xevo TQD, Xevo TQ-S micro, SQ Detector 2 with APGC

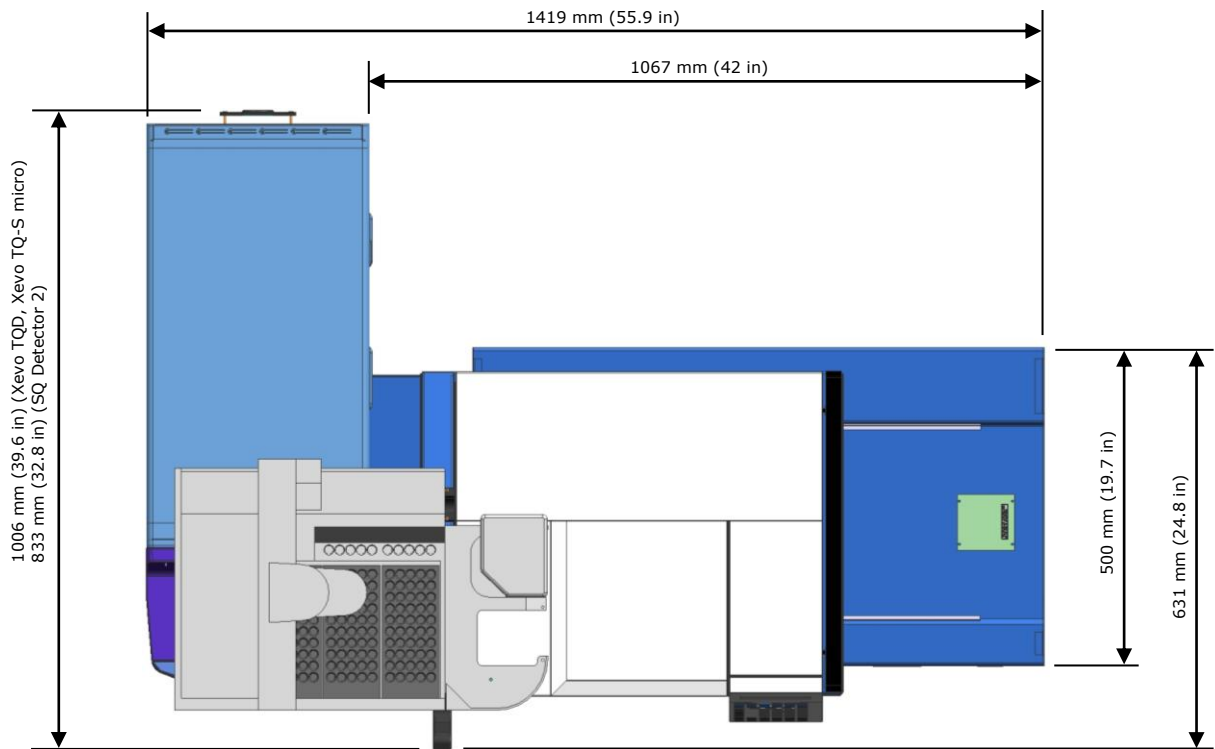


Figure 2 - Plan view, Xevo TQD, Xevo TQ-S micro, SQ Detector 2 with APGC

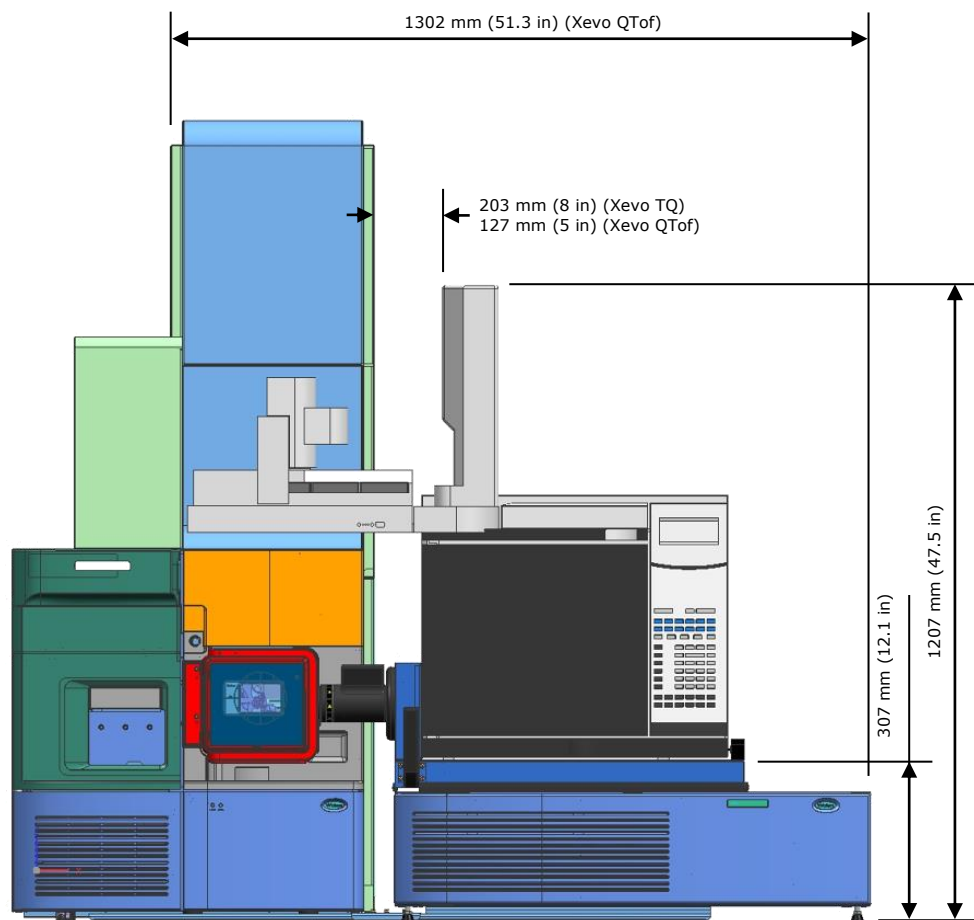


Figure 3 - Front view, Xevo family instruments with APGC

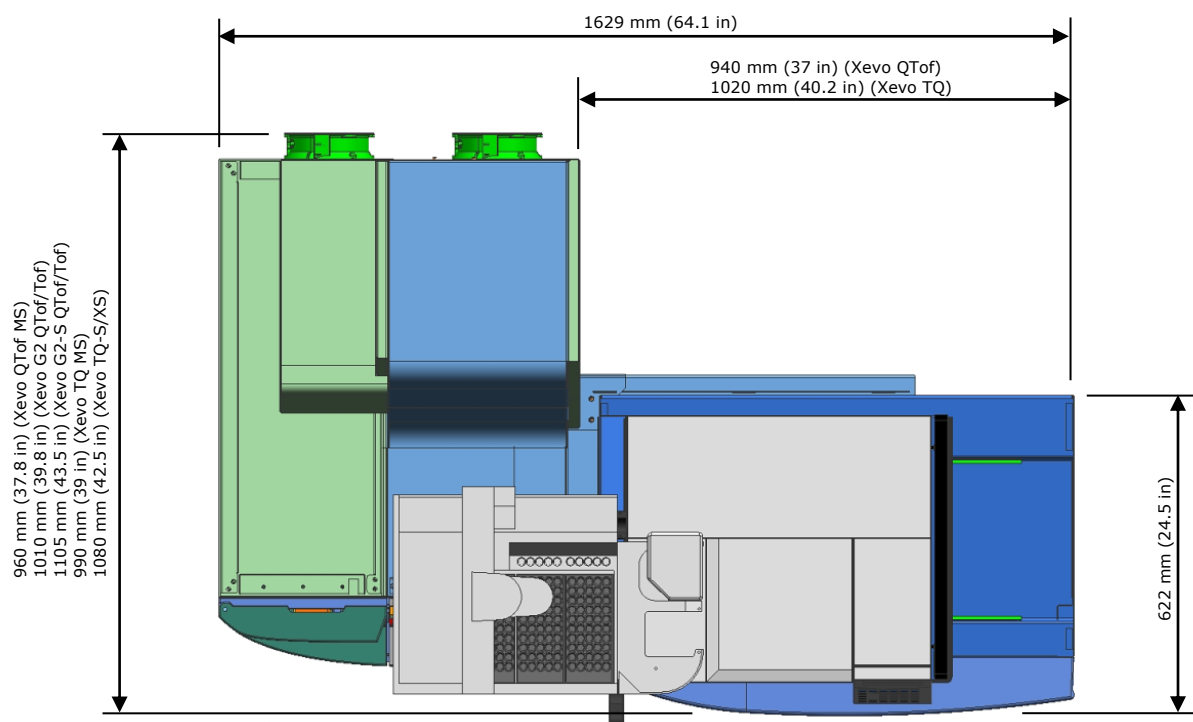


Figure 4 - Plan view, Xevo family instruments with APGC

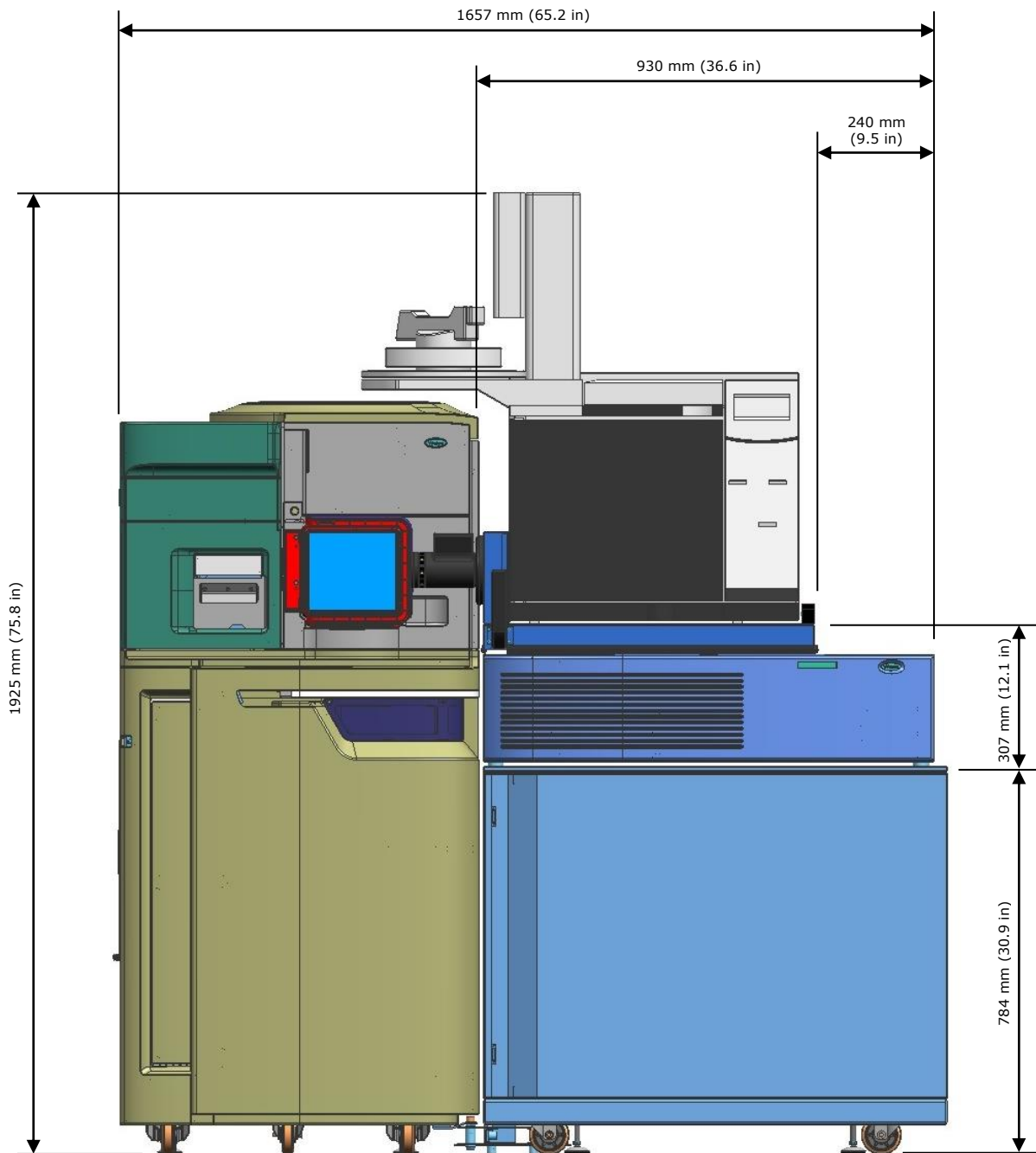


Figure 5 - Front view, SYNAPT family instruments with APGC

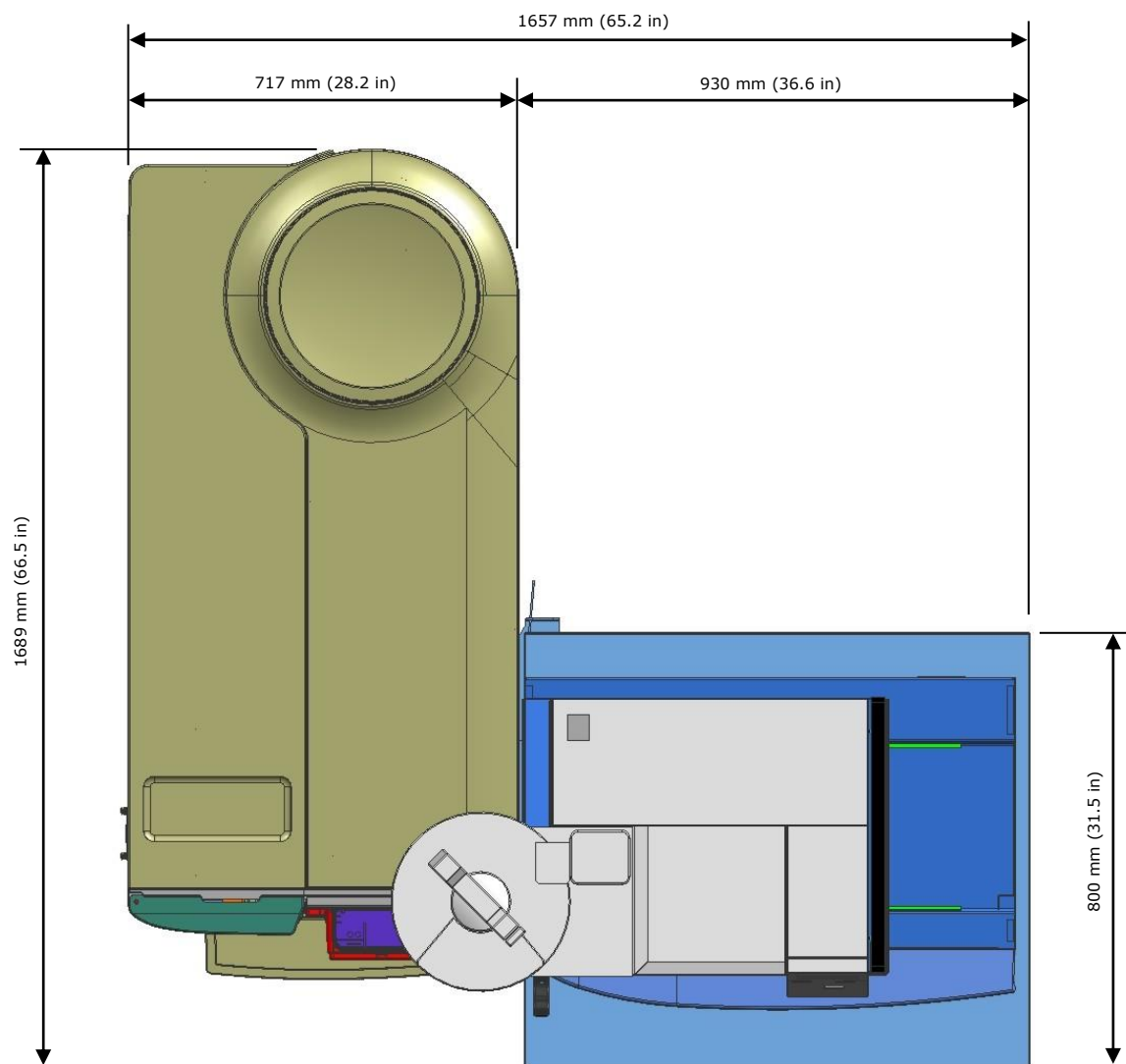


Figure 6 - Plan view, SYNAPT family instruments with APGC

Caution: To ensure accurate alignment of the APGC interface with Vion IMS QTof instruments, the height of the APGC bench must be 60 to 75 mm (2.3 to 3 inches) lower than the Vion bench.

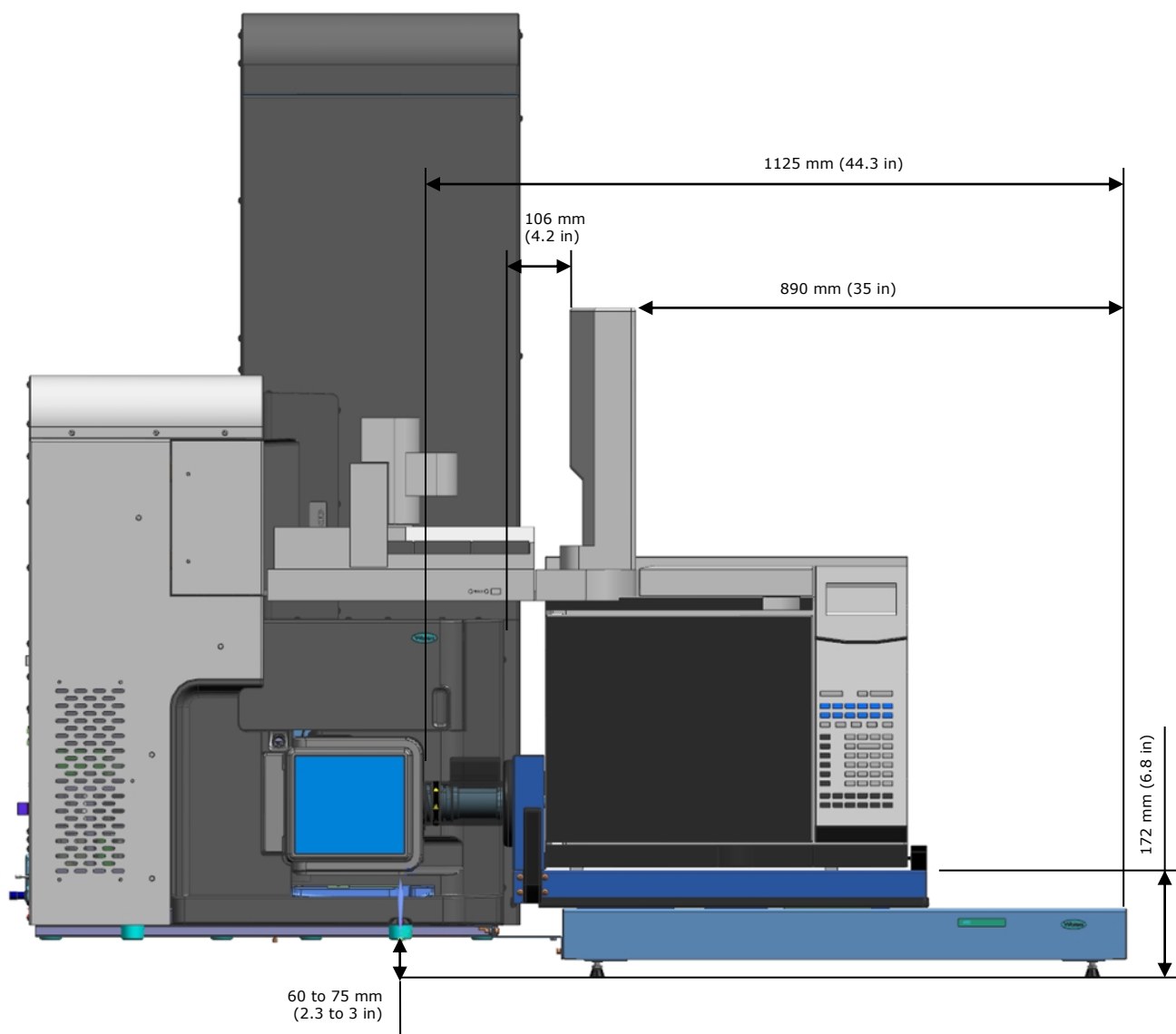


Figure 7 - Front view, Vion family instruments with APGC

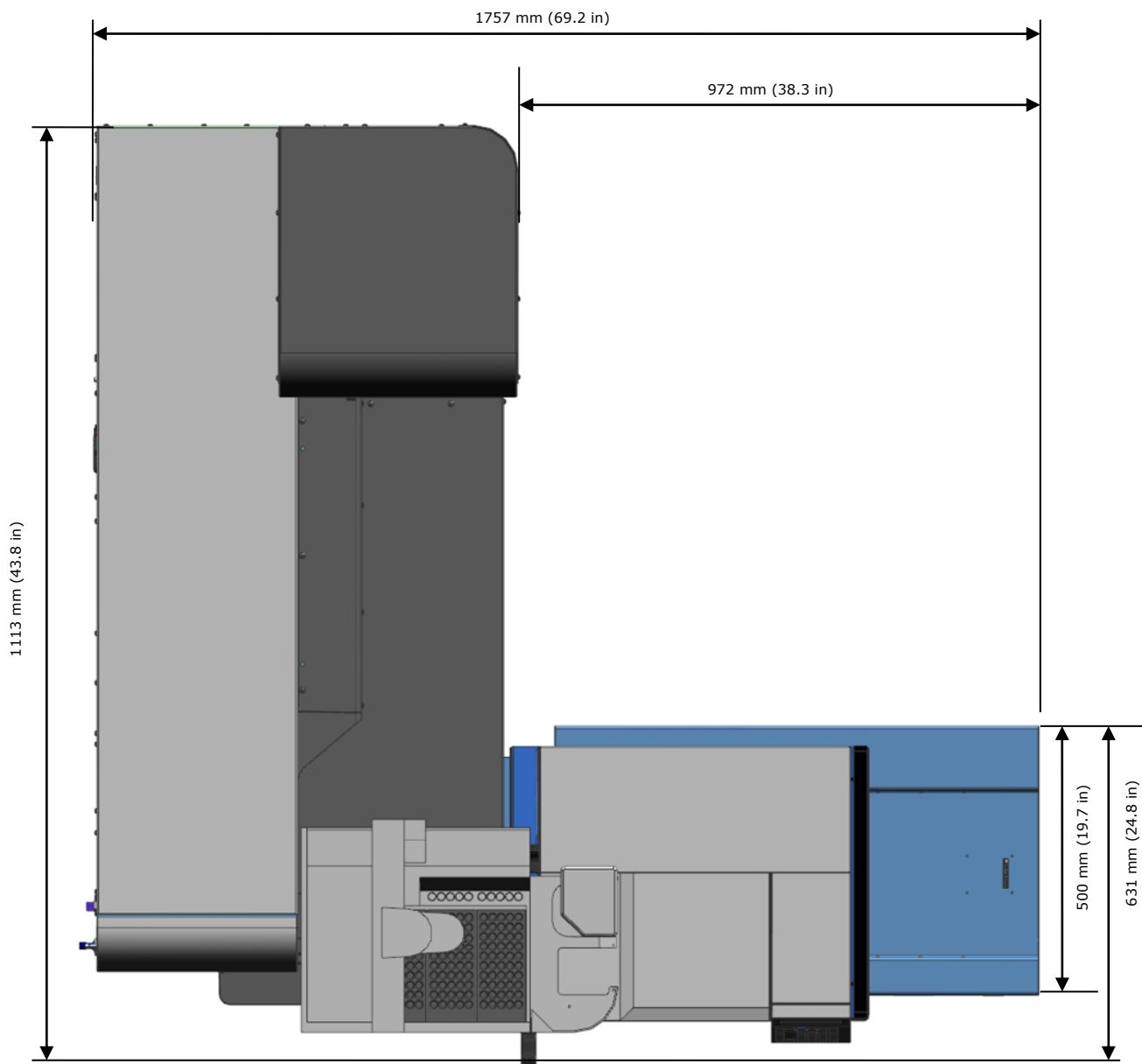


Figure 8 - Plan view, Vion family instruments with APGC

CTC PAL3 RSI autosampler option

If the instrument is supplied with the CTC PAL3 autosampler, the overall height of the two combined is 1550 mm (61 inches).

Electrical safety

The APGC 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 APGC transfer line is powered through the GC oven. The oven requires 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 mains cable.

The power requirements for the equipment are summarized in [Table 3](#).

Table 3: Summary of power requirements

	Nominal rated voltage	Supply fuse / circuit breaker rating	Power consumption	Power connection	Power sockets
GC oven	230 V $\pm 10\%$, 50/60 Hz	13 to 16 A	3 kW	IEC 60320 C20 receptacle	1
LAN box (for CTC PAL3 autosampler option)	100 to 240 V, 50/60 Hz	3 A	25 W	IEC 60320 C8 receptacle	1
CTC PAL3 autosampler (option)	100 to 240 V, 50/60 Hz	3 A	200 W	IEC 60320 C14 receptacle	1

Important: Voltage supply stability is critical for instrument operation. The power supply voltage must fall within the ranges specified in [Table 3](#) at all times to avoid the risk of instrument failure.

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/surges greater than $\pm 10\%$ and must not exceed the specified maximum operating range for more than 0.3 sec. 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 mains supply.

It is also recommended that additional protection is provided for the instrument by means of:

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

Electrical transformers

If there is a possibility that the supply voltages will not meet the specified operating range under all conditions, a transformer must be used to change the primary supply voltage to the specified range. Mains conditioners/stabilizers are also available as an optional accessory. Contact Waters with advance notification if power supply problems are likely to be experienced and for additional advice.

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

If your order includes a nitrogen generator and the mains supply is known to run continuously at voltages less than 220 V, Waters and Peak Scientific recommend fitting the following transformer between the generator and mains supply.

Caution: Running nitrogen generators continuously at voltages less than 220 V is not recommended and extended periods at these extremes can affect the operation and life of the generator.

Table 4: Nitrogen generator transformer option

Model type	06-3200
View	
Description	208 volt AC to 230 volt AC boost transformer

System plug options

The system plug options are shown in [Table 5](#). The instrument is shipped with the plugs that were requested at the point of order. The user must provide appropriate sockets for the relevant 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.

Computer equipment is typically rated at 100 to 120 V / 220 to 240 V, 50/60 Hz. In some cases, it may be necessary to set the appropriate voltage using a voltage selector switch before connecting the equipment to the power supply. For full details, refer to the instructions provided with the equipment.

Note: If ancillary equipment is to be installed (for example, compressors), additional power outlets, possibly requiring 3-phase supplies, may be needed. Such supplemental needs must be confirmed with the local Waters agent prior to the start of the installation.

Table 5: Power cords supplied by Waters

Australia	 15 A	Japan	 L6-15, 15 A
Brazil	 16 A	Korea	 CEE 7/VII "Schuko", 16 A
China	 16 A	Switzerland	 Type 23, 16 A
Denmark	 DK 2-1a, 13 A	Taiwan	 13 A
EU	 CEE 7/VII "Schuko", 16 A	UK	 13 A
India	 16 A	USA	 NEMA L6-15P

Environment requirements

Safety recommendations

Ventilation



Warning:

To avoid risk of asphyxiation, ensure that the laboratory is adequately ventilated.

Due to the operation of the APGC, the user must be aware of potential chemical hazards. In particular, the user must assess the risks associated with nitrogen gas (oxygen deficiency) and solvents vented into the laboratory, given that there is a potential for gas or liquid leaks to occur. The user must give due consideration to the laboratory environment (including volume and air changes) before installation and during operation of the system.

Refer to the relevant instrument site preparation guide and the *Agilent 7890 Site Preparation Guide* (G3430-90001) or the *Agilent 8890 Site Preparation Guide* (G3540-90012), available from the Agilent website, for further information on environmental requirements.

Air conditioning

Refer to [Table 3](#) for the maximum overall heat dissipation into the room from the instrument. This figure does not take into account the mass spectrometer, data system, or other ancillary equipment such as LC systems. Air conditioning systems may have to be installed or upgraded to accommodate additional heat load into the room when the APGC is installed.

Gases and regulators

Nitrogen gas

The APGC requires a supply of dry, oil-free nitrogen with a purity of at least 95.0%. The water content of the output flow must be of an atmospheric dewpoint of -40°C or lower. The nitrogen must be regulated at 7 bar (100 psi).

Caution: The nitrogen supply to both the APGC source and the mass spectrometer must be free from moisture. If the installation tests fail due to the moisture content of the gas supply, the system must be fitted with a moisture trap.

All gas lines connected to the mass spectrometer and the GC must be copper or stainless steel for APGC operation.

If copper tubing is used for the nitrogen line, the copper must be chemically cleaned; if stainless steel tubing is used, the stainless steel must be medical grade. Ensure that there are no soldered or brazed joints in the line, as these may result in contamination of the instrument with tin or lead oxide. Any joints in the nitrogen line must be compression fittings.

Note: The use of nitrogen cylinders is not recommended for normal operation. Due to high consumption, a cylinder is likely to empty during long sample runs. The supply must be constant in case venting occurs.

GC carrier gas

Dry ultra-high purity helium (99.999% or better, with less than 1 ppm water) is required. We recommend the Supelco OMI2 purifier fitted with suitable shut-off valves. This may improve performance with some analytes and increase column life. All gases must be regulated up to a 10-bar (145-psi) maximum; the pressure depends on the GC and current application.

The gas supply must be connected using the 1/8-inch stainless steel tubing supplied with the APGC and must be checked for leaks under pressure.

Caution: If copper tubing is used, the copper must be chemically cleaned; if stainless steel tubing is used, the stainless steel must be medical grade. Ensure that there are no soldered or brazed joints in the line, as these may result in contamination of the instrument with tin or lead oxide. Any joints in the line must be compression fittings.

Optional GC gases and regulators

For additional GC options, such as cryo cooling and FID, additional gases and regulators may be required. Contact your Agilent representative for details.

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 (700005254) 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 due to a lack of facilities, costs incurred will be charged. The installation will be rescheduled when the chemicals are available.

Important: Storage instructions provided with the test samples must be adhered to; 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

High-purity solvents (GC-MS grade or better) are required to ensure the optimum performance of the MS system.

Summary of fittings

Table 6 shows a summary of the gas connections for the installation of the APGC.

Table 6: Summary of source fittings required

Gas supply	Items supplied with the system	Items to be supplied by the customer
Nitrogen	1/8-inch Swagelok nut 1/8-inch Swagelok ferrule	N ₂ supply, regulated to 7 bar (100 psi) through a 1/4-inch Swagelok connector
Helium	1/8-inch Swagelok nut 1/8-inch Swagelok ferrule	He supply, regulated to 7 bar (100 psi) through a 1/8-inch Swagelok connector
Purge gas supply (for CTC PAL3 headspace or SPME options)	1/8-inch OD stainless steel tubing and 1/8-inch Swagelok nuts and ferrules	Inert purge gas (for example, nitrogen or helium) supplied at 1.0 to 1.5 bar

APGC site preparation checklist

This checklist must be completed and returned to Waters when all the amenities are available.

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 any additional information or have difficulties 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 to allow 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 7](#))

Adequate bench or floor space is available for the system ☐

Power Supply (see [page 14](#))

An appropriate number of sockets with earth connections are available and they meet the stipulated power requirements ☐

Positioning/Ventilation (see [page 17](#))

The air conditioning system is adequate when the APGC is installed ☐

Gases and Regulators (see [page 18](#))

Dry, oil-free, 95.0% pure nitrogen, regulated to 7 bar (100 psi) maximum, and a 1/8-inch fitting for GC is available ☐

Dry, 99.999% pure helium, regulated to 10 bar (145 psi) maximum, and a 1/8-inch fitting for GC is available ☐

Test Samples (see [page 19](#))

All samples required for the installation 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 due to lack of facilities (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	
E Mail	

Important: The installation of your system cannot begin until pages [20](#) through [22](#) of this document have been fully completed and returned to the mass spectrometer sales support representative at your local Waters office.

Applications survey

As part of our commitment to provide greater customer service, we find it necessary to obtain a little more information concerning our user base.

We would be grateful if you could take the time to answer the following questions to provide us with some information about how the instrument will be used.

This information enables us to inform you of relevant current application notes and seminars and helps us identify common interest groups so that we can promote cross transfer of information between customers.

What is your scientific field?

(for example, pharmaceutical, environmental, general)

Which classes of compounds will be analyzed?

(for example, carbohydrate, peptides, pesticides)

What is your application area?

(for example, quantitation, purity analysis, structural determination)

Our sales team often requires reference sites for specific applications.

Would you be willing to serve as a contact reference site for prospective customers?
