

ACQUITY UPC² System

Site Preparation Guide

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General information

This guide helps you prepare your laboratory facility for installation of your Waters system. Proper site preparation is critical to successful operation of the system.

Related information

[ACQUITY UPC² System User Guides](#) (Waters website)

Customer support

If you have questions about this document or preparing your site, contact your local Waters sales representative.

Safety advisories

- ! **Warning:** Failure to completely read and closely follow the site preparation guide may result in damage to the products, injury to persons, and damage to other property.
- ! **Important:** Observe Good Laboratory Practice (GLP) at all times. When working with hazardous materials, consult the safety representative for your organization.
- ! **Warning:** To avoid contact with solvents, wear suitable gloves and safety glasses.

Glossary of abbreviations

Table 1 provides a glossary of product name abbreviations.

Table 1: Glossary of abbreviations

Abbreviation	UPC ² system component name
BSM	Binary Solvent Manager
CCM	UPC ² Convergence Manager
CH-30A	30-cm Column Heater–Active
CM30-S	30-cm Column Manager–Single Zone
CM-A	Column Manager–Active
CM-Aux	Column Manager–Auxiliary
ELSD	Evaporative Light Scattering Detector
ISM	Isocratic Solvent Manager
MS	Mass spectrometer
PDA	UPC ² PDA Detector
QDa Detector	ACQUITY QDa Detector
SM-FL	Sample Manager-Fixed Loop

Responsibilities

The customer must prepare the site as required before the Waters-certified engineer can install the system.

Customer responsibilities (storage and site preparation)

! **Important:** It is essential that you prepare the site correctly and complete the checklist accurately. If a Waters service engineer arrives to begin your installation and cannot proceed because of inadequate site preparation or lack of necessary supplies, you may be charged for all travel costs incurred.

Please contact Waters if you have questions about preparing your site.

1. Provide appropriate storage for Waters equipment before it is installed.
2. Prepare your laboratory to meet the requirements specified in the site preparation guide.
3. Mark the check box in each section of the guide to verify that each requirement is met.
4. Ensure that the person designated to operate and maintain the system is present at the installation for training in basic system operation.

Note: If the designated person cannot be present at the installation, please notify Waters so that we can reschedule the installation for a more convenient time.

Waters responsibilities (installation)

1. Unpack the system.
2. Install the system.
3. Test system performance to ensure that it is properly installed and operational.

Relocating shipping containers

Follow the guidelines in this section to lift, relocate, and store shipping containers.

! **Important:** Do not unpack the equipment before lifting or moving it.

Lifting

Before lifting, lowering, or moving the shipping containers:

- Assess the risk of injury.
- Take action to eliminate risk.
- Plan the operation—both ahead of the installation and in conjunction with the Waters engineer at the time of installation.
- Adhere to appropriate country and company regulations.

! **Important:** If your system includes a mass spectrometer, refer to the appropriate site preparation guide for additional lifting requirements.



Warning: To avoid injury, use appropriate lifting equipment to lift the mass spectrometer. Do not lift it manually.



Warning: To avoid skeletal or muscle injury associated with lifting heavy objects, use the appropriate number of people to lift the instrument. If necessary, use lifting equipment that can raise the instrument to the height of the laboratory bench.

Moving

If you move the shipping containers, transport them to the laboratory designated for system use. Follow these guidelines:

- Ensure that all passageways accommodate the largest component.
- Keep shipping containers on the pallet. If you must transport shipping containers individually (without the pallet), ensure that all containers are moved, and retain all packing slips.

! **Caution:** To avoid damaging the system, do not bump or jolt it during transport. If you must transport the instrument across an uneven surface, carry it on a forklift truck or trolley.

Doorways

Doorways must be wide enough to accommodate the largest component. For system dimensions, see [Table 2](#) and [Table 3](#).

Elevators, corridors, and staircases

Elevators and corridors must be wide enough to negotiate corners. If you plan to move the system via staircase, you are responsible for moving the system.

! **Important:** For safety reasons, Waters is not responsible for moving products via staircases.

Storage

Maintain the following storage conditions before Waters installs your system:

- Unopened shipping crates
- Storage area temperature 0 to 40 °C (32 to 104 °F)
- Humidity <80%, noncondensing

Verify relocating shipping containers requirements

Mark the check box below to verify that all requirements are met. After you complete all check boxes, return the site preparation guide to Waters.

! **Important:** Installation cannot proceed unless all site preparation requirements are met.

All relocation requirements met

Space and load requirements

Ensure that the laboratory bench has sufficient space for system configuration and installation and that it can support the weight of all components.

Recommended configurations

The figures below show recommended layouts for your system as configured in a single, double, or triple stack.

! **Important:** If you do not know which layout to prepare for, contact your Waters representative.

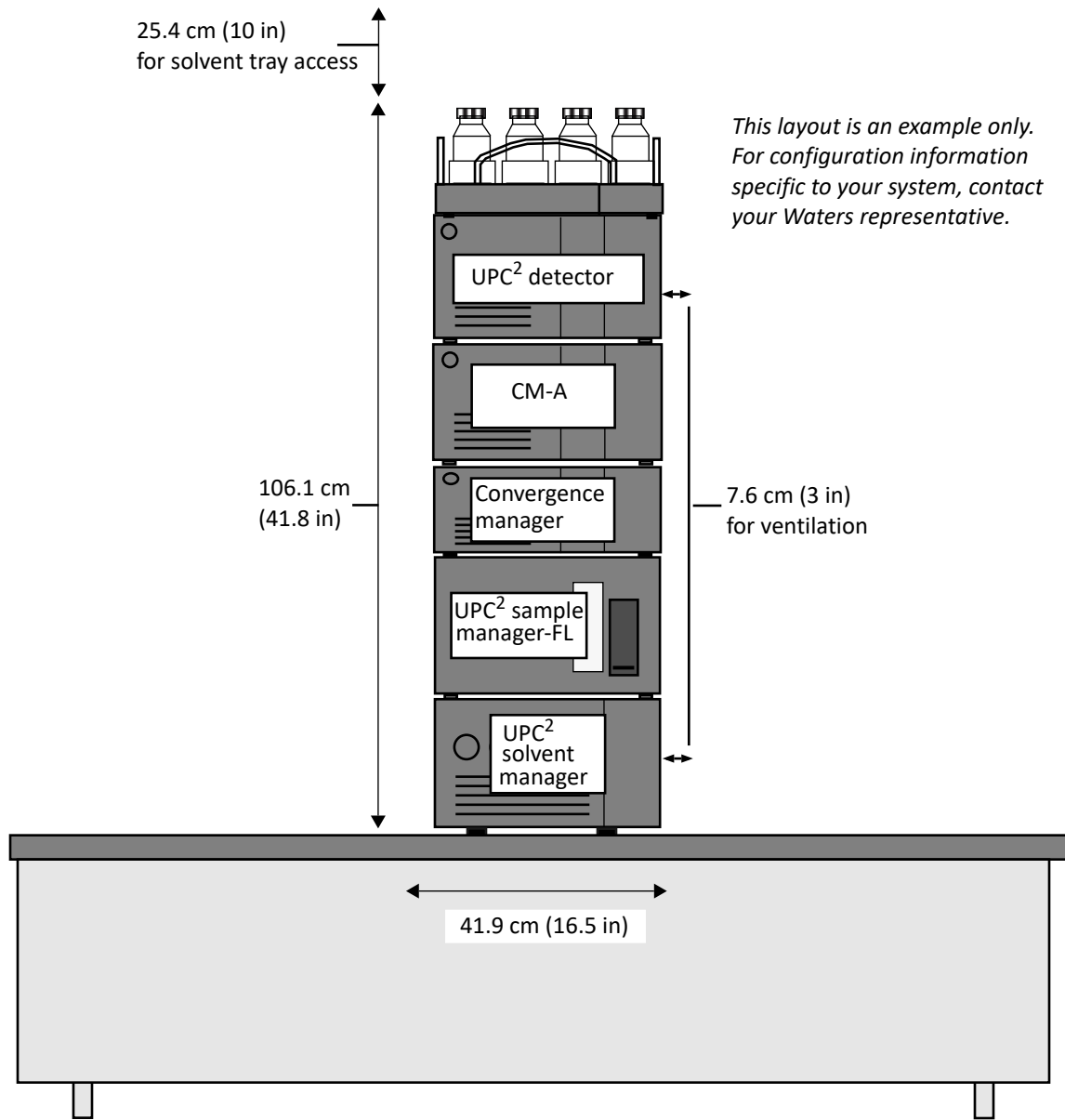


Figure 1 - Example configuration with one stack (front view)

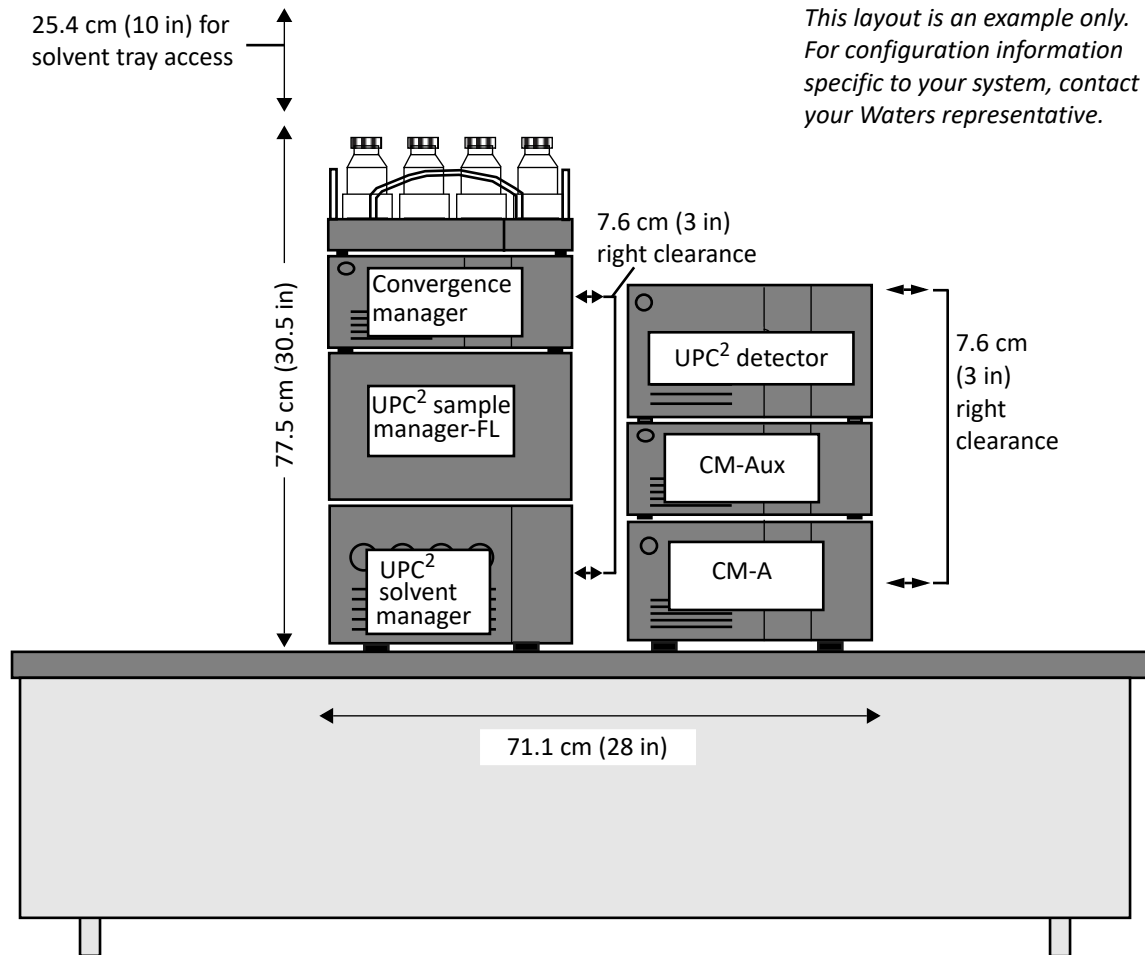


Figure 2 - Example configuration with two stacks (front view)

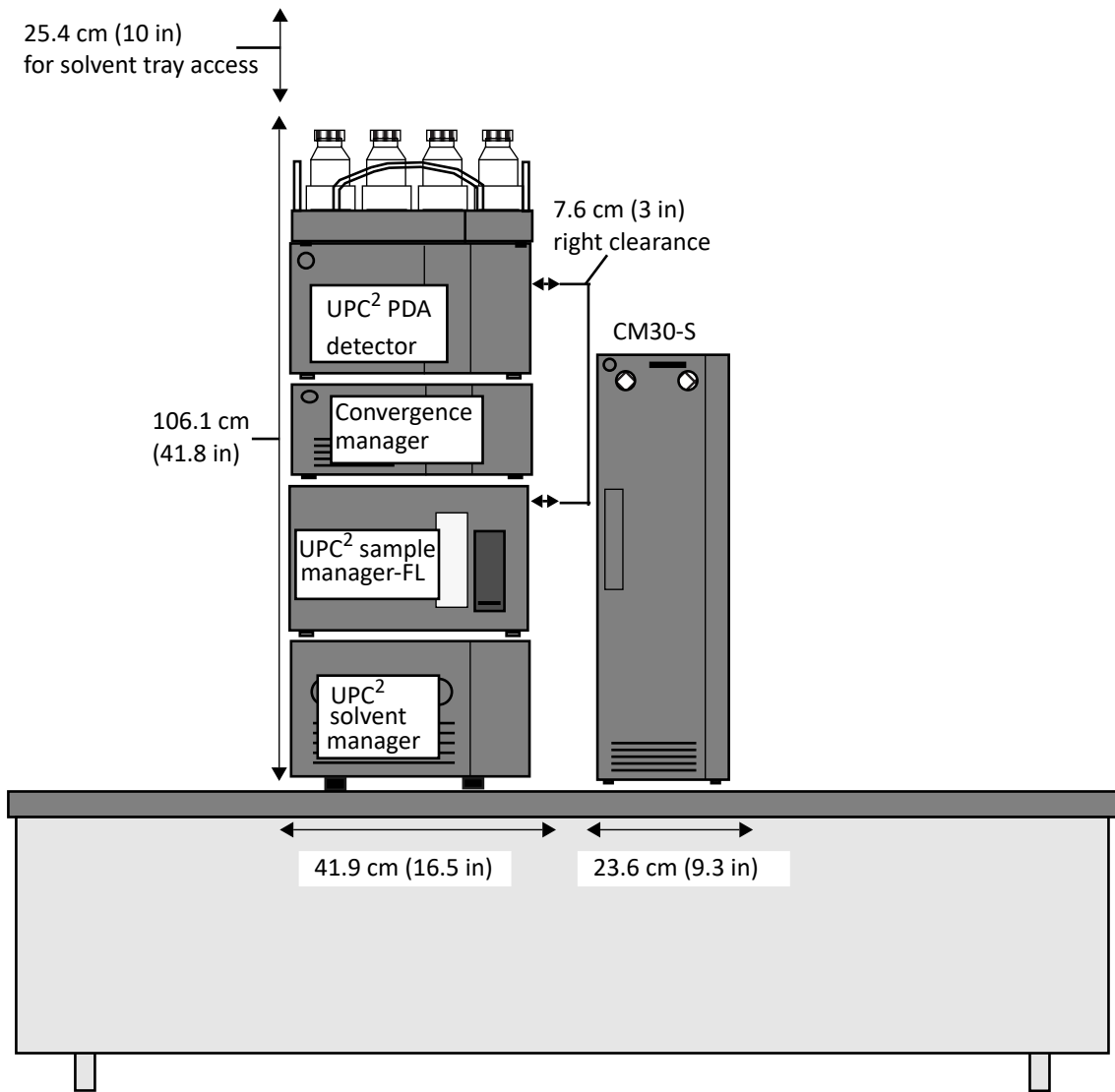


Figure 3 - Example configuration with CM30-S (front view)

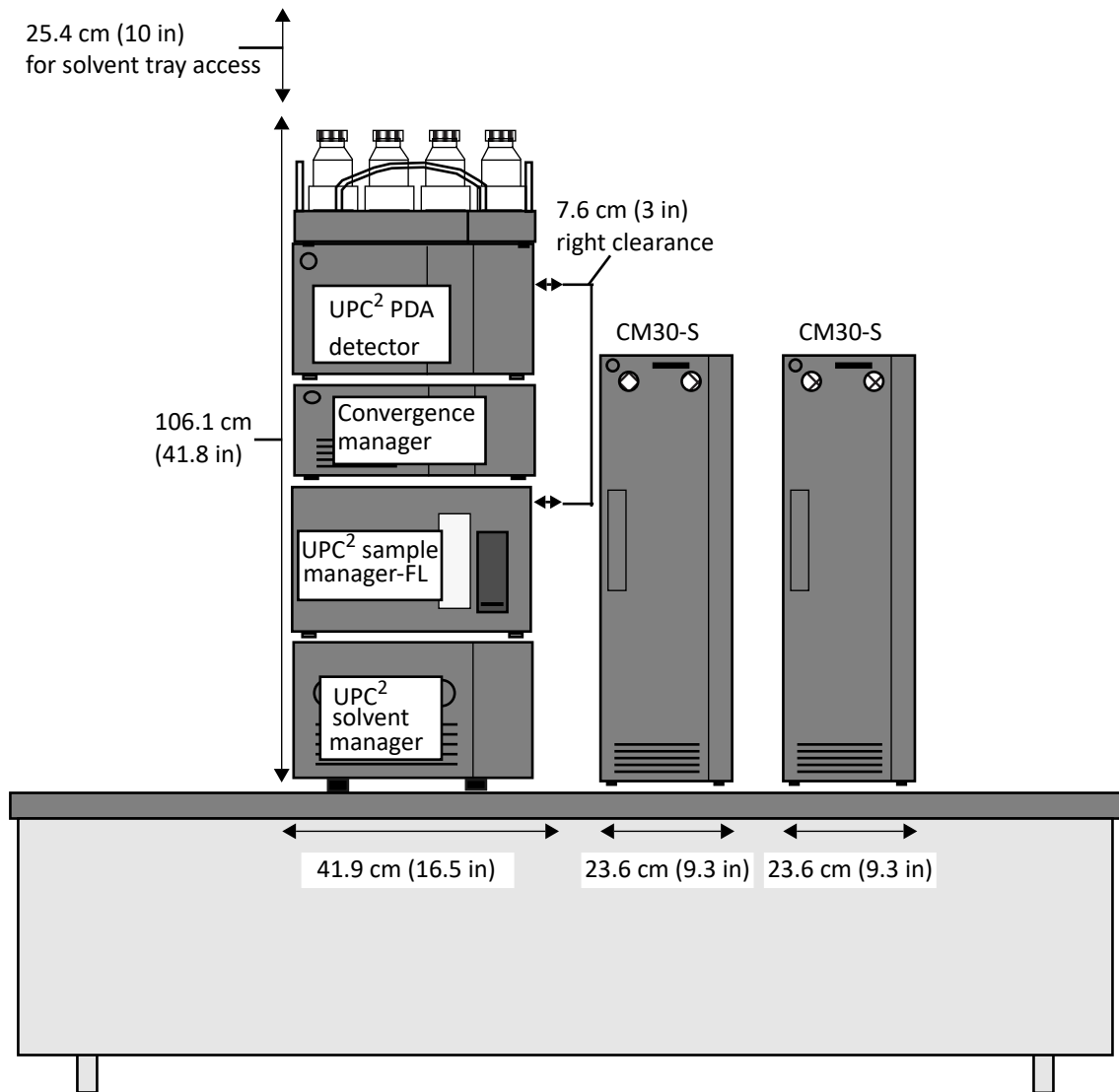


Figure 4 - Example configuration with two CM30-S (front view)

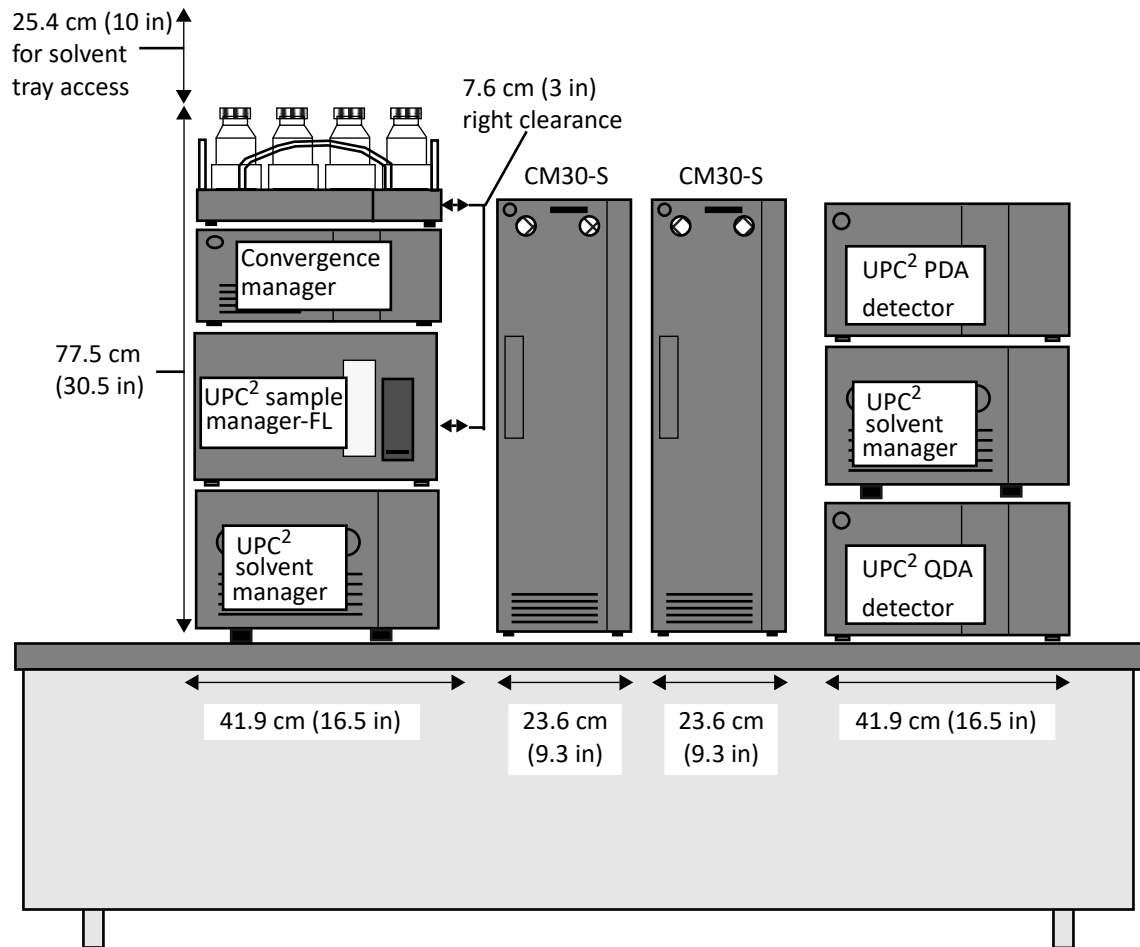


Figure 5 - Example configuration with two CM30-S (Empower only) (front view)

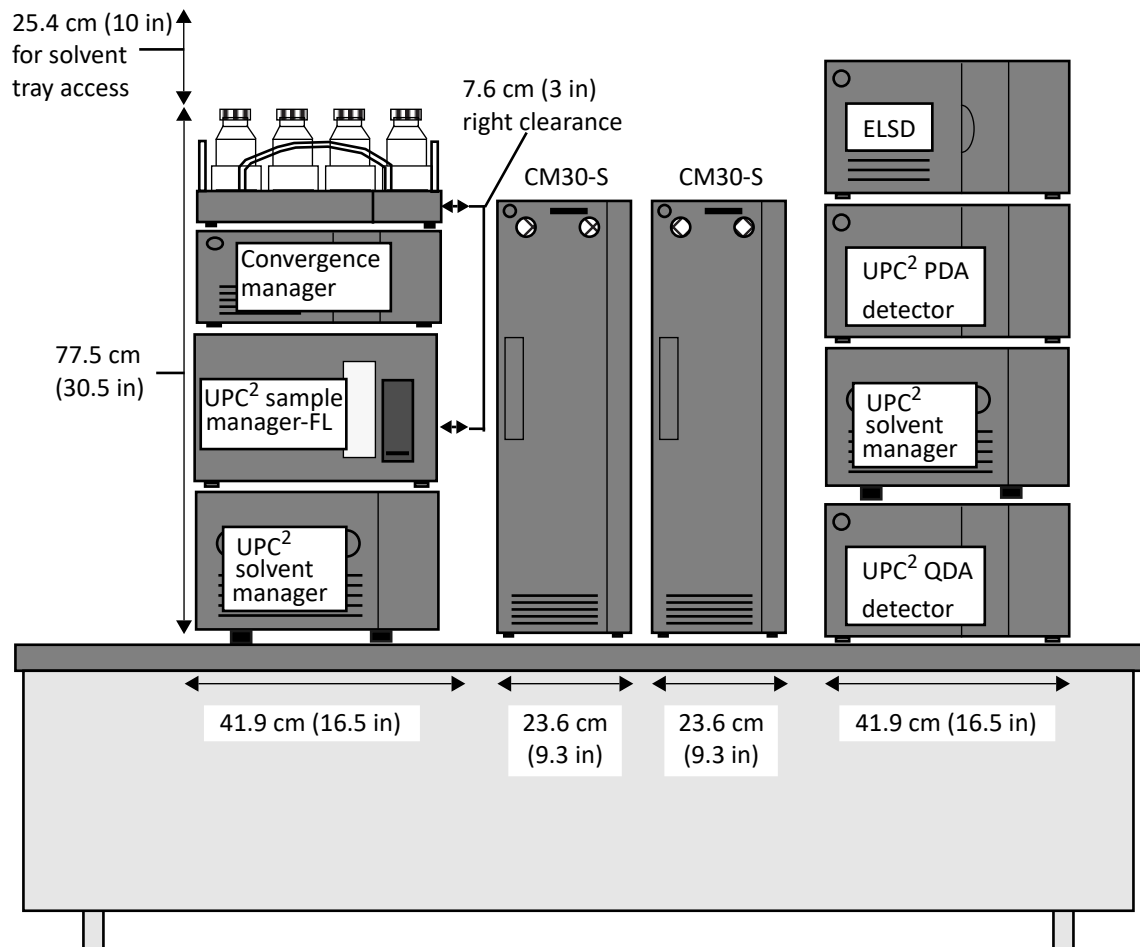


Figure 6 - Example configuration with two CM30-S (Empower only) (front view)

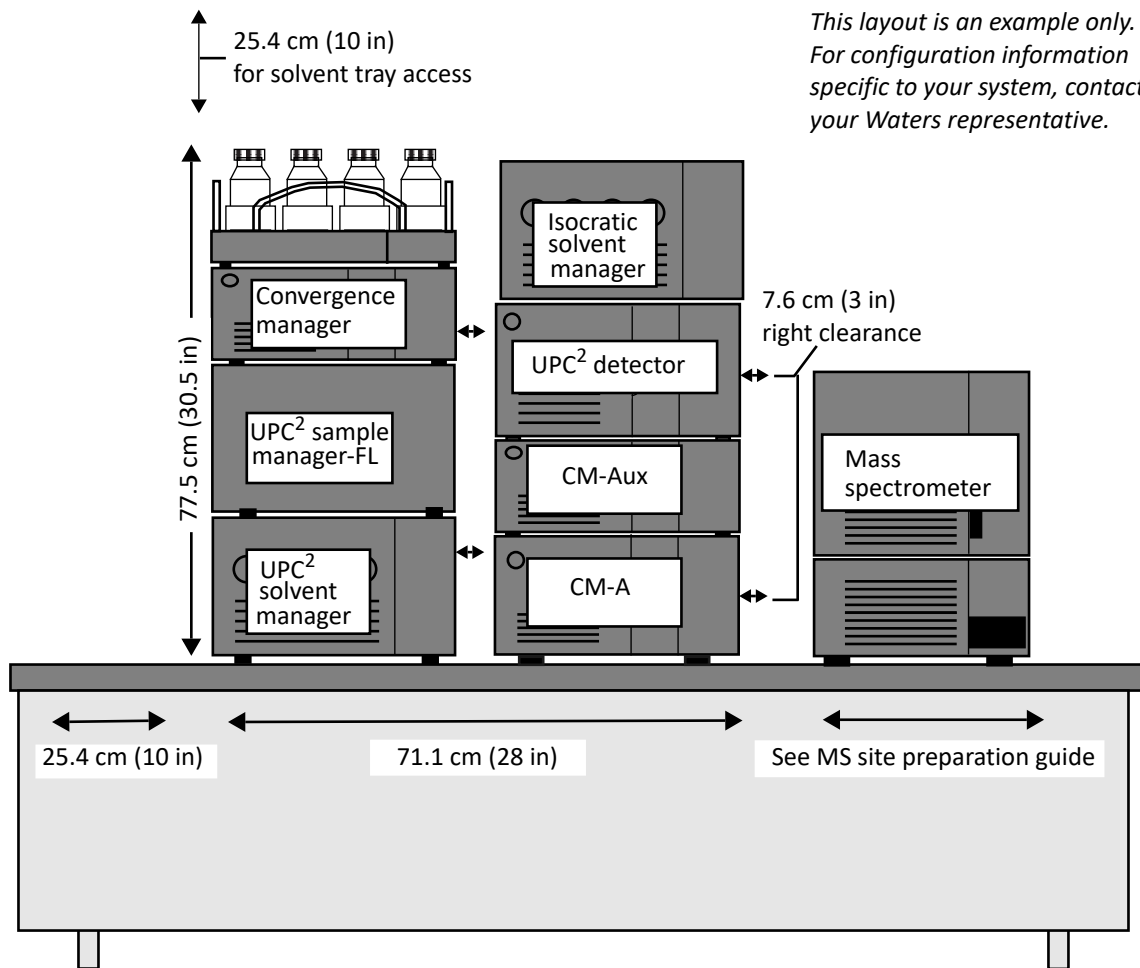


Figure 7 - Example configuration with MS (front view)

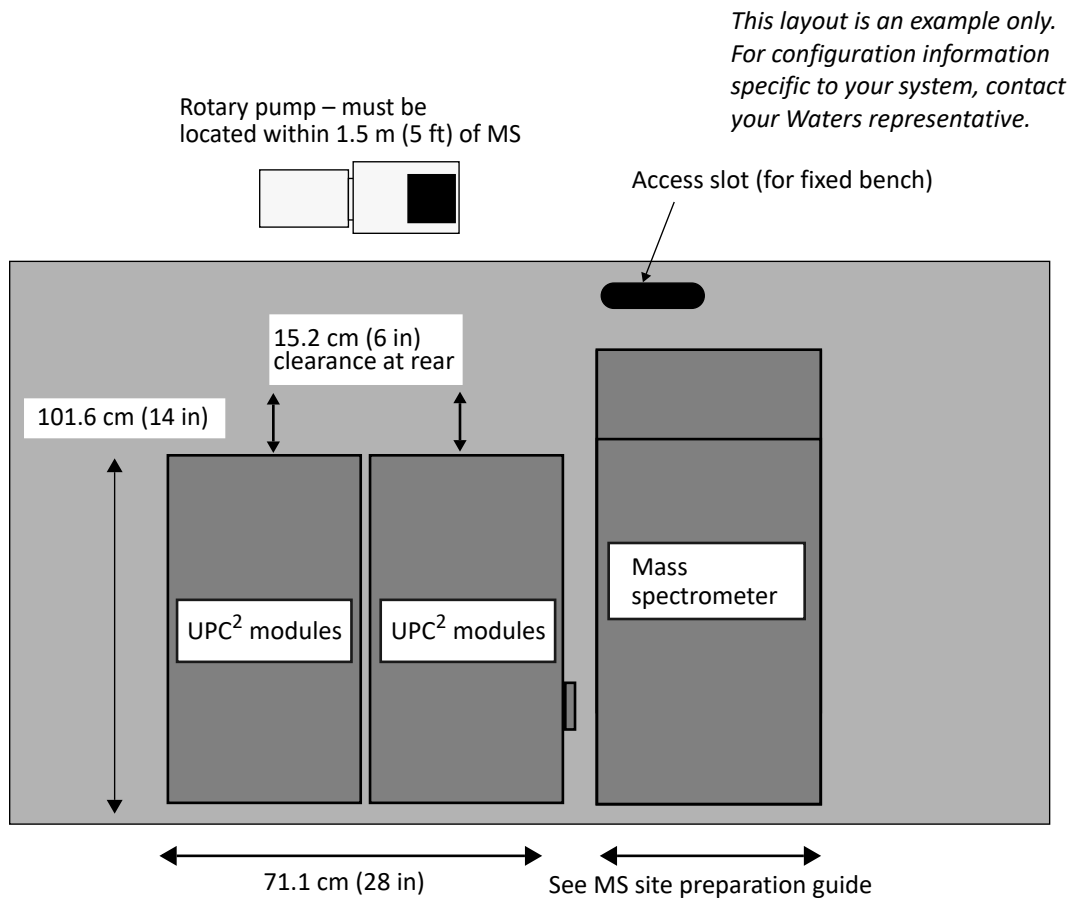


Figure 8 - Example configuration with MS (top view)

Component dimensions

Ensure that your laboratory bench has sufficient space and that it can support the weight of all system components (see [Table 2](#)).

- ! **Important:** Ensure that there is at least 152 cm (5 ft) of vertical clearance above the laboratory bench.
- ! **Important:** For specific height and weight restrictions, contact your Waters service representative.
- ! **Important:** For MS requirements, refer to the appropriate mass spectrometer site preparation guide.

Table 2: Component dimensions and weights

System component	Width	Depth	Height	Weight
BSM	34.3 cm (13.5 in)	66.1 cm (26.0 in)	23.8 cm (9.38 in)	36.4 kg (80 lb)
CH30-A	12.1 cm (4.75 in) 16.5 cm (6.5 in) mounted	12.7 cm (5.0 in)	50.8 cm (20 in)	4.5 kg (10 lb)
CM30-S	23.6 cm (9.3 in)	61.5 cm (24.2 in)	71.9 cm (28.3 in)	43.2 kg (95 lb)
CCM	34.9 cm (13.75 in)	61 cm (24.0 in)	13.7 cm (5.4 in)	18.2 kg (40 lb)
CM-A	34.3 cm (13.5 in)	61 cm (24.0 in)	20 cm (7.8 in)	21 kg (46 lb)
CM-Aux	34.3 cm (13.5 in)	61 cm (24.0 in)	13.7 cm (5.4 in)	11.4 kg (25 lb)
ELSD	34.3 cm (13.5 in)	51.8 cm (20.4 in)	21.6 cm (8.5 in)	14.7 kg (32.5 lb)
ISM	37.7 cm (14.9 in)	61.5 cm (24.2 in)	24.5 cm (9.6 in)	23.6 kg (52 lb)
PDA	34.3 cm (13.5 in)	61 cm (24.0 in)	21.6 cm (8.5 in)	15.6 kg (34.3 lb)
QDa Detector	Refer to the QDa Detector Site Preparation Guide (715002299).			
SM-FL	34.3 cm (13.5 in)	71.2 cm (28.0 in)	27.1 cm (10.7 in)	25.9 kg (57 lb)
Solvent tray (side-mounted)	15.9 cm (6.25 in)	63.5 cm (25 in)	13.3 cm (5.25 in)	10.9 kg (24 lb)
Solvent tray (top-mounted)	34.3 cm (13.5 in)	52.1 cm (20.5 in)	12.7 cm (5.0 in)	2.3 kg (5 lb)

Clearances

Ensure that the laboratory space provides sufficient clearance (working space) for all necessary components (Table 3).

! **Important:** For MS requirements, refer to the appropriate mass spectrometer site preparation guide.

Table 3: System clearances

System/component	Clearance
Customer's laboratory bench	• Vertical: 152 cm (5 ft)
UPC ² system components Note: Refer to the appropriate mass spectrometer site preparation guide for additional requirements.	• Rear: 15.2 cm (6 in) • Right: 7.6 cm (3 in)
CO ₂ source (cylinder only)	Within 152 cm (5 ft) of the rear of the system
SM-FL	• Front: Fluidics drawer slides outward 39.4 cm (15.5 in)
Solvent tray (top-mounted)	• Vertical: 25.4 cm (10 in)

Verify space and load requirements

Mark the check box below to verify that all requirements are met. After you complete all check boxes in the site preparation guide, return it to Waters.

! **Important:** Installation cannot proceed unless all site preparation requirements are met.



All space and load requirements met

Solvent requirements



Caution: To ensure proper performance of the LC/MS system, use clean, high-purity (UPC²/MS-grade) solvents. Failure to provide clean solvents and glassware can cause significant delays to the installation.

Have the following solvents available for the installation:

- Methanol
- Heptane
- Isopropanol
- Acetonitrile



Important: For details on solvent brands, glassware requirements, and procedures to control contamination, see the following:

- [Controlling Contamination in UPC²/MS Systems](#) (715003809), located in the Waters Support Center
- The [safety data sheets \(SDSs\)](#) for your products

Verify solvent requirements

Mark the check box below to verify that all requirements are met. After you complete all check boxes, return the completed site preparation guide to Waters.



Important: Installation cannot proceed unless all site preparation requirements are met.



All solvent requirements met

Gas requirements

Carbon dioxide (CO₂)

The system requires a liquid CO₂ supply with a purity of 99.97% (food-grade) or better.

CO₂ source

Use one of the following distribution systems:

- Internal glass-coated cylinder with dip tube (for liquid CO₂)
- Internal glass-coated cylinder with no dip tube (for gas CO₂)
- In-house distribution system (for liquid or gas)

Cylinder. If using a cylinder, the CO₂ source must be within 152 cm (5 ft) of the rear of the ACQUITY UPC² System. The cylinder must be properly secured in a fixed position. A typical 30-kg (70-lb) CO₂ cylinder, used at optimal flow rate and running for eight hours per day, lasts approximately three to four weeks.

In-house distribution system. The in-house distribution system must provide the following:

- A shut-off valve that is clean and particle-free, non-lubricated, free from silicone and EPDM rubber, and compatible with CO₂
- CO₂ that is regulated between 900 and 1100 psi

Fittings

The system ships with fittings and a filter that connect some CO₂ cylinders or in-house distribution systems to the system (Figure 9).

- ! **Notice:** The standard threading for US cylinders is **0.830-14 NGO**. If your cylinder threading is different, you must provide a fitting that can connect the cylinder to the supplied filter (1/4-inch NPT female threading). Contact your Waters sales representative.

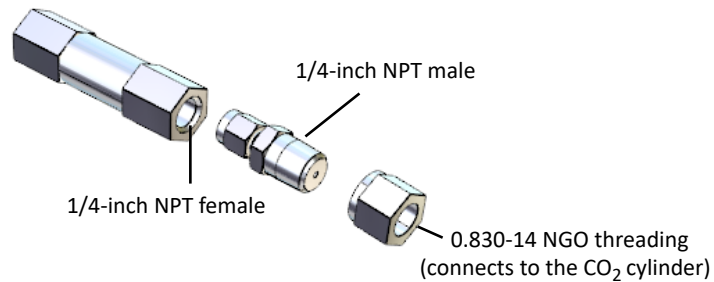


Figure 9 - Supplied fittings and filter for connection to a CO₂ cylinder

Figure 10 and Table 4 show the parts that are supplied for connection to an in-house CO₂ distribution system.

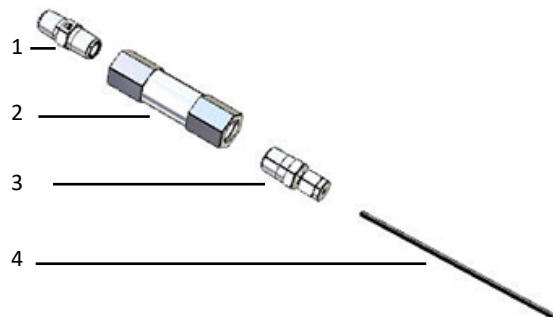


Figure 10 - Fittings supplied for connection to an in-house distribution system

Table 4: Part numbers

Figure 10 label	Part number
1	410004212
2	410004190
3	410004186
4	410003313

CO₂ pressure

- ! **Caution:** To avoid damaging the UPC² CCM or causing chromatography problems, do not use helium head-pressure CO₂ cylinders with the UPC² system. The additional pressure from the helium within these cylinders can cause inlet pressures up to 2000 psi, which exceeds the UPC² system's limits.
- ! **Caution:** To avoid the low CO₂ inlet pressure caused by cold tanks, ensure that the laboratory temperature is as close as possible to the recommended 19 to 22 °C (66 to 72 °F) range and that tanks stored in cold areas have been adequately warmed to ambient temperature.

Gas for the mass spectrometer

- ! **Important:** For complete information on mass spectrometer gas requirements, refer to the appropriate site preparation guide.

Gas for the ELS detector

The ELS detector requires a suitable supply of high-purity nitrogen gas or zero-grade air (e.g., oil-, moisture-, and particle-free gas). Gas cylinders are not recommended because of their limited capacity. Waters recommends using a gas flow of approximately 3 to 4 L/min. A constant gas supply (65 to 90 psi at the regulator) is required to operate the detector.

Verify gas requirements

Mark the check box below to verify that all requirements are met. After you complete all check boxes, return the site preparation guide to Waters.

- ! **Important:** Installation cannot proceed unless all site preparation requirements are met.

<input type="checkbox"/>	All gas requirements met
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Power requirements

Refer to the following power requirements when preparing your laboratory.

Electrical safety

Follow all local electrical safety requirements in preparing your laboratory.

Over-voltage rating

The laboratory environment must comply with installation (over-voltage) category II.

Power source/receptacles

All system components require a dedicated, earthed (grounded) power source. The receptacles from this power source must be accessible to the system components, and they must share a common ground. Use [Table 6](#) as a guide for determining the receptacles required for the components in your system.

Optional valves

If your system includes optional valves, be aware that each valve includes a power supply that requires a power receptacle that uses a common, earthed (grounded) power source.

Systems with a mass spectrometer

If your system includes a mass spectrometer, refer to its site preparation guide for specific power source requirements.

Power summary

See [Table 5](#) for a summary of component power requirements. For more information on power terminology, see the [“Power source/receptacles” on page 23](#).

! **Caution:** Never use an extension cord to connect the instrument to an AC power source.

Table 5: UPC² power requirements










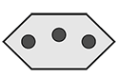


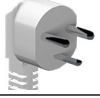


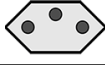
Component	Nominal rated voltage	Maximum power consumption
BSM	100 to 240 VAC 50/60 Hz	200 VA
CCM	100 to 240 VAC 50/60 Hz	200 VA
CH30-A	N/A	N/A
CM-A	100 to 240 VAC 50/60 Hz	400 VA
CM-Aux	100 to 240 VAC 50/60 Hz	400 VA
CM30-S	100 to 240 VAC 50/60 Hz	500 VA
ELSD	100 to 240 VAC 50/60 Hz	200 VA
ISM	100 to 240 VAC 50/60 Hz	200 VA
PDA	100 to 240 VAC 50/60 Hz	145 VA
SM-FL	100 to 240 VAC 50/60 Hz	400 VA
Mass spectrometer	See the mass spectrometer site preparation guide	

Plug/receptacle types

Provide appropriate wall receptacles for the plug(s) that come with your system (see Table 6).

- ! **Notice:** If you are uncertain which power cord is supplied for your region, contact your Waters representative.
- ! **Requirement:** Ensure that one receptacle is available for each system component (including the data system).

Table 6: Power cords supplied by Waters

Region	Plug	Receptacle	Receptacle type
US/Canada			NEMA 5-15R
UK			BS 1363
Europe			CEE 7
Australia			AS/NZS 3112
Brazil			NBR 14136
China			CPCS-CCC
Denmark			107-2-D1
Switzerland			SEV 1011

Verify power requirements

Mark the check box below to verify that all requirements are met. After you complete all check boxes, return the site preparation guide to Waters.

! **Important:** Installation cannot proceed unless all site preparation requirements are met.

<input type="checkbox"/>	All power requirements met
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Environmental requirements

CO₂ detectors

The customer must provide suitable CO₂ detectors for the laboratory housing the system, along with appropriate power sources and related safety equipment (warning strobes, for example).

Air quality

Ensure that the laboratory is not exposed to excessive dust.

! **Important:** The laboratory environment must comply with pollution degree 2.

Humidity

Ensure that the relative humidity of the laboratory is lower than 80%, noncondensing.

Air flow

Ensure that air flow from heating or air-conditioning diffusers is not directed on the system.

Temperature

The ambient temperature in the laboratory must be from 15 to 28 °C (59 to 82 °F).

Short-term thermal variations should be no more than 2 °C (3.6 °F) per 1.5 hours.

! **Caution:** Failure to operate in the recommended temperature ranges will compromise system performance and can result in instrument failure.

Note: The optimum temperature range of the laboratory is from 19 to 22° C (66 to 72° F).

! **Important:** If your system includes a mass spectrometer, refer to its site preparation guide for specific information on thermal variations.

Vibration

Ensure that the laboratory is located away from heavy machines such as compressors and generators, which can create excessive floor vibration.

Magnetic fields

If using the ACQUITY UPC² System with a mass spectrometer, ensure that the laboratory is located away from strong magnetic fields such as those generated by NMR systems or magnetic sector mass spectrometers.

Radio emissions

Minimize radio frequency (RF) emission from nearby sources. Possible sources of RF emission include RF-linked alarm systems, mobile telephones, and hand-held transmitters.

! **Caution:** If any of these devices causes interference, discontinue its use.

Verify environmental requirements

Mark the check box below to verify that all requirements are met. After you complete all check boxes, return the site preparation guide to Waters.

! **Important:** Installation cannot proceed unless all site preparation requirements are met.

<input type="checkbox"/>	All environmental requirements met
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Waste collection requirements

The ACQUITY UPC² waste management system is a closed-architecture, gravity-driven drainage system that effectively collects and removes any solvent leaks and process waste from the needle and plunger seal washes. Each instrument uses a drip tray to collect and route the waste from one module tray to the one beneath it.

! **Important:** To maintain proper drainage and leak control, ensure that the system is level.

Waste container

Position a suitable waste container ([Figure 11](#)) below the bench top.

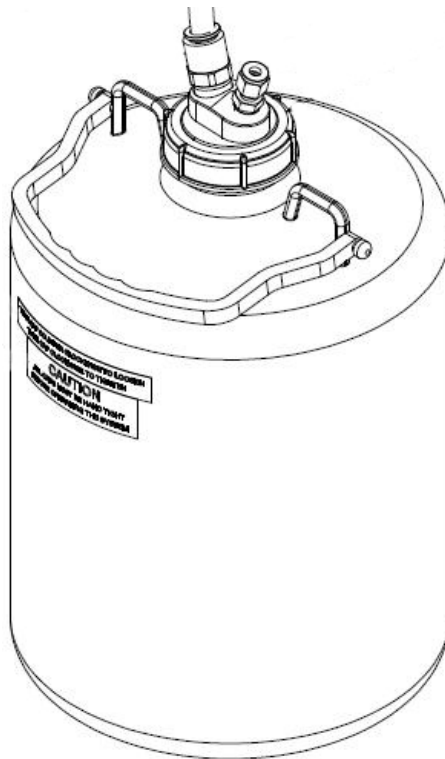


Figure 11 - Example waste container

Exhaust outlets

! **Important:** Venting of the system is the responsibility of the customer.

An in-line degasser, integral to the solvent manager, exhausts dissolved gases from the eluents and condensate from the exhaust system through a vent line on the front of the instrument.

Warning: The active exhaust vent must provide a minimum vacuum of 2 mbar (0.03 psi) below atmospheric pressure.

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.

Exhaust outlet for systems with a mass spectrometer

If your system includes a mass spectrometer, refer to its site preparation guide for detailed pump and source exhaust outlet information.

Verify waste collection requirements

Mark the check box below to verify that all requirements are met. After you complete all check boxes in the site preparation guide, return it to Waters.

! **Important:** Installation cannot proceed unless all site preparation requirements are met.

<input type="checkbox"/>	All waste collection requirements met
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Test sample requirements

The Waters service engineer uses the samples supplied with the system. If the test samples were received in a separate shipment, you must make the samples available to the Waters engineer at the time of installation. If a Waters service engineer arrives to begin your installation and cannot proceed because test samples are unavailable, the installation may be delayed. Waters may ask for reimbursement of the costs incurred due to the extra time required to complete the installation.

! **Important:** Please contact Waters if you have questions about providing test samples.

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.

Verify test sample requirements

Mark the box check below to verify that all requirements are met. After you complete all check boxes in the site preparation guide, return it to Waters.

! **Important:** Installation cannot proceed unless all site preparation requirements are met.

<input type="checkbox"/>	All test sample requirements met
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Items you must supply

Supply the following items for the installation:

- CO₂ supply that is minimum 99.97% pure (food grade or better)
- CO₂ detectors suitable for the laboratory in which the system is located
- Non-glass waste container that can be vented to an exhaust system
- Calibrated syringes - Eppendorf (or equivalent), from 1 µL to 1 mL
- Measuring cylinders, from 100 µL to 1 mL (sizes vary)
- 10-mL volumetric flask
- Nitrile gloves
- Lint-free tissue
- UPC²/MS-grade methanol
- HPLC-grade heptane
- Waters-supplied test samples

! **Important:** If your system includes a mass spectrometer, refer to the mass spectrometer site preparation guide for other required items.

! **Caution:** Ensure that the supplied items have never been washed with detergent, washed with other glassware, or washed in facilities that might have detergent residue. Washing glassware in a common dishwashing facility can contaminate glassware with detergent residues, which may contain polyethylene glycol and other sticky substances. Vinyl-coated steel racks can be additional sources of contamination.

Verify items you must supply requirements

Mark the check box below to verify that all requirements are met. After you complete all check boxes in the site preparation guide, return it to Waters.

! **Important:** Installation cannot proceed unless all site preparation requirements are met.

<input type="checkbox"/>	All items we (the customer) must supply are available
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Workstation requirements

Software/operating system requirements

If you are providing your own computer for a Waters chromatography data system, contact your Waters sales representative for details on the software and operating system requirements.

! **Important:** Refer to the [Release Notes](#) for additional information and restrictions. The Release Notes contain important information about known and fixed issues, installation, configuration, and recommendations for requalification and revalidation.

Verify computer requirements

Mark the check box below to verify that all requirements are met. After you complete all check boxes in the site preparation guide, return it to Waters.

! **Important:** Installation cannot proceed unless all site preparation requirements are met.

<input type="checkbox"/>	All computer requirements met
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Remote services

If you have opted to use [Remote Services](#), ensure that the laboratory has an active Internet connection.

Installation of the Waters Connections INSIGHT[®] software (Intelligent Services that provide real-time, remote system monitoring and notification) requires an active Internet connection. This Internet connection can either be direct or through a firewall or proxy server.

! **Notice:** The Connections INSIGHT Service Agent uses SSL (Secure Sockets Layer) port 443 to connect to the Waters Connections Enterprise Server (WCES). Information sent includes only instrument usage counters, error message text, and instrument configuration data. The agent does not access or transmit business-sensitive information, and it connects only to the WCES.

Verify Remote Services requirements

Check ONE of the boxes below to verify that all requirements are met. After completing all check boxes in the site preparation guide, return it to Waters.

! **Important:** Installation cannot proceed unless all site preparation requirements are met.

<input type="checkbox"/>	All Remote Services requirements met
<input type="checkbox"/>	N/A: We have not opted to use Remote Services

Customer confirmation

! **Important:** It is essential to prepare the site correctly and complete the checklist. If a Waters service engineer arrives to begin your installation and cannot proceed because of inadequate site preparation or lack of necessary supplies, you may be charged for all travel costs incurred.

Important: Please contact Waters if you have questions about preparing your site.

<input type="checkbox"/>	<p>I confirm that all supplies are now available.</p>
<input type="checkbox"/>	<p>I confirm that all facility requirements have been met and all Requirement check boxes have been completed. (See the list of check box items below.)</p> <ol style="list-style-type: none"> 1. All relocation requirements met, page 7 2. All space and load requirements met, page 18 3. All solvent requirements met, page 19 4. All gas requirements met, page 22 5. All power requirements met, page 26 6. All environmental requirements met, page 28 7. All test sample requirements met, page 31 8. All items we (the customer) must supply are available, page 32 9. All computer requirements met, page 33 10. All Remote Services requirements met, page 34 11. N/A: We have not opted to use Remote Services, page 34
<input type="checkbox"/>	<p>I confirm that an operator will be available for demonstration and training by a Waters engineer during the installation.</p> <p><i>Indicate availability (check one):</i></p> <p><input type="checkbox"/> During the entire installation</p> <p><input type="checkbox"/> During part of the installation: approximately ____% of the time</p> <p>Important: If the designated person cannot be present at the installation, please notify Waters so that we can reschedule the installation for a more convenient time.</p>

Customer signature: _____

Customer summary

Please complete the summary table below in block letters.

Job title	
Name	
Organization	
Street	
City/state	
Zip/postal code	
Country	
Telephone	
Fax	
Email	

! **Important:** The installation of your system cannot begin until the site preparation guide has been fully completed and returned to your local Waters representative.