ACQUITY Arc / Arc Bio / Arc HPLC System

Site Preparation Guide

Waters

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Table of Contents

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 Arc system User Guides (Waters Web site)

Arc Premier System Users Guide (Waters Web site)

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 lists product name abbreviations.

Table 1: Glossary of abbreviations

Abbreviation	Component name
2414	2414 Refractive Index (RI) Detector
2424	2424 Evaporative Light Scattering (ELS) Detector
2432	2432 Conductivity Detector
2475	2475 Multi-Wavelength Fluorescence Detector
2489	2489 UV/Visible Detector
2998	2998 Photodiode Array (PDA) Detector
30-cm CH	30-cm Column Heater
30-cm CHC	30-cm Column Heater/Cooler
3465	3465 Electrochemical Detector
CH-A	Column Heater–Active
CH-30A	30-cm Column Heater–Active
CM-30S	30-cm Column Manager–Single Zone
CM-A	Column Manager–Active
CM-Aux	Column Manager–Auxiliary
ISM	Isocratic Solvent Manager
MS	Mass spectrometer
QDa detector	ACQUITY QDa Detector
QSM-R	Quaternary Solvent Manager-Routine
SM FTN-R	Sample Manager FTN-Routine
WFM-A	Waters Fraction Manager-Analytical

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. Verify that each requirement is met by marking the check box in each section of the guide.
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, get more than one person to lift the instrument into place if the unit exceeds 23 kg (50 lbs). 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:

- Shipping crates are unopened
- Storage area temperature is -30 to 60 °C (22 to 140 ° F)
- Humidity is 20 to 85%, 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.

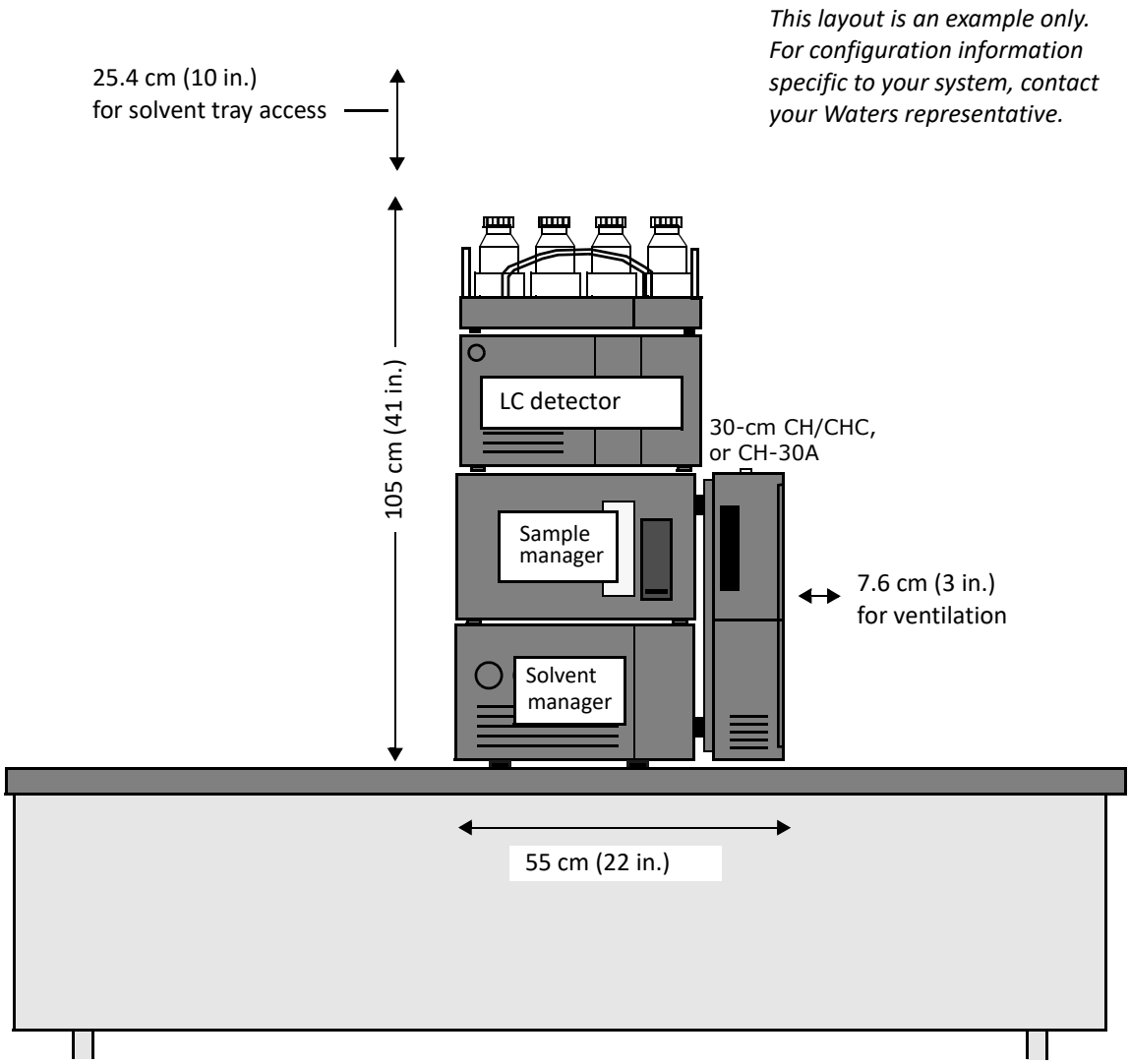


Figure 1 - Example configuration for single detection (front view)

This layout is an example only. For configuration information specific to your system, contact your Waters representative.

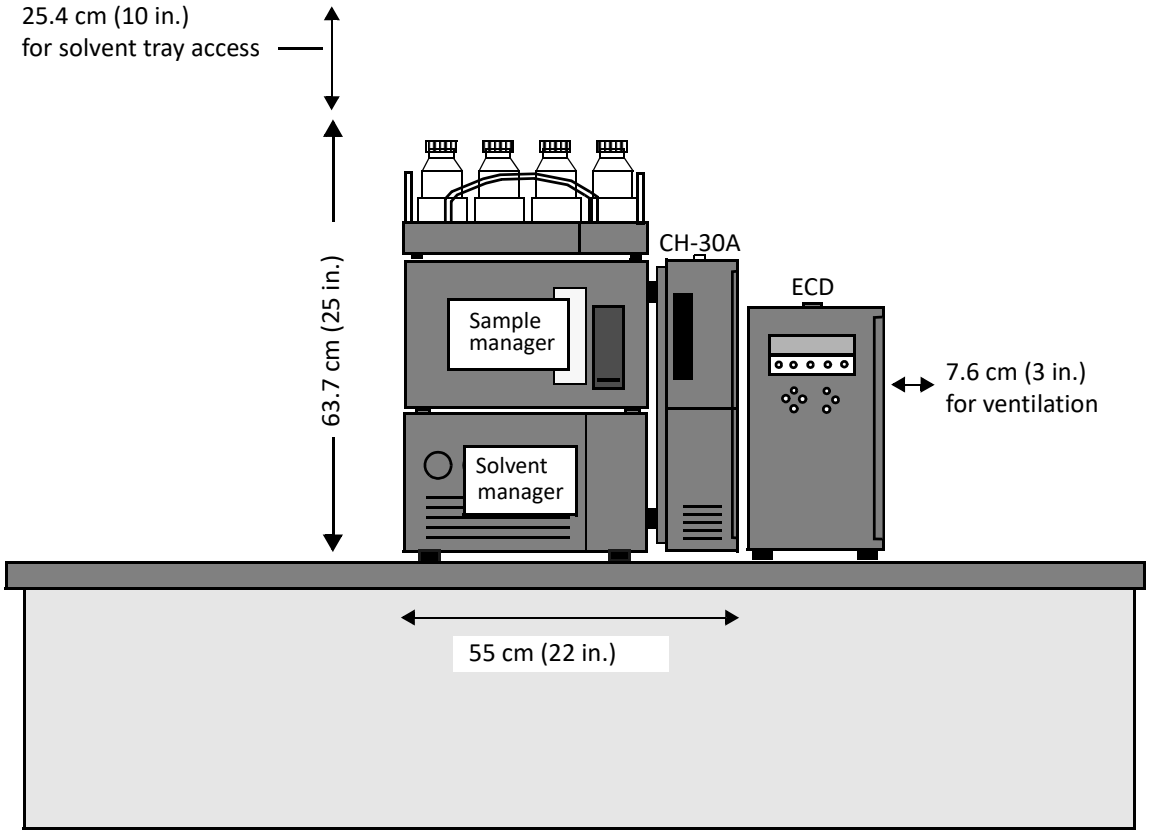


Figure 2 - Example configuration for 3465 ECD detection (front view)

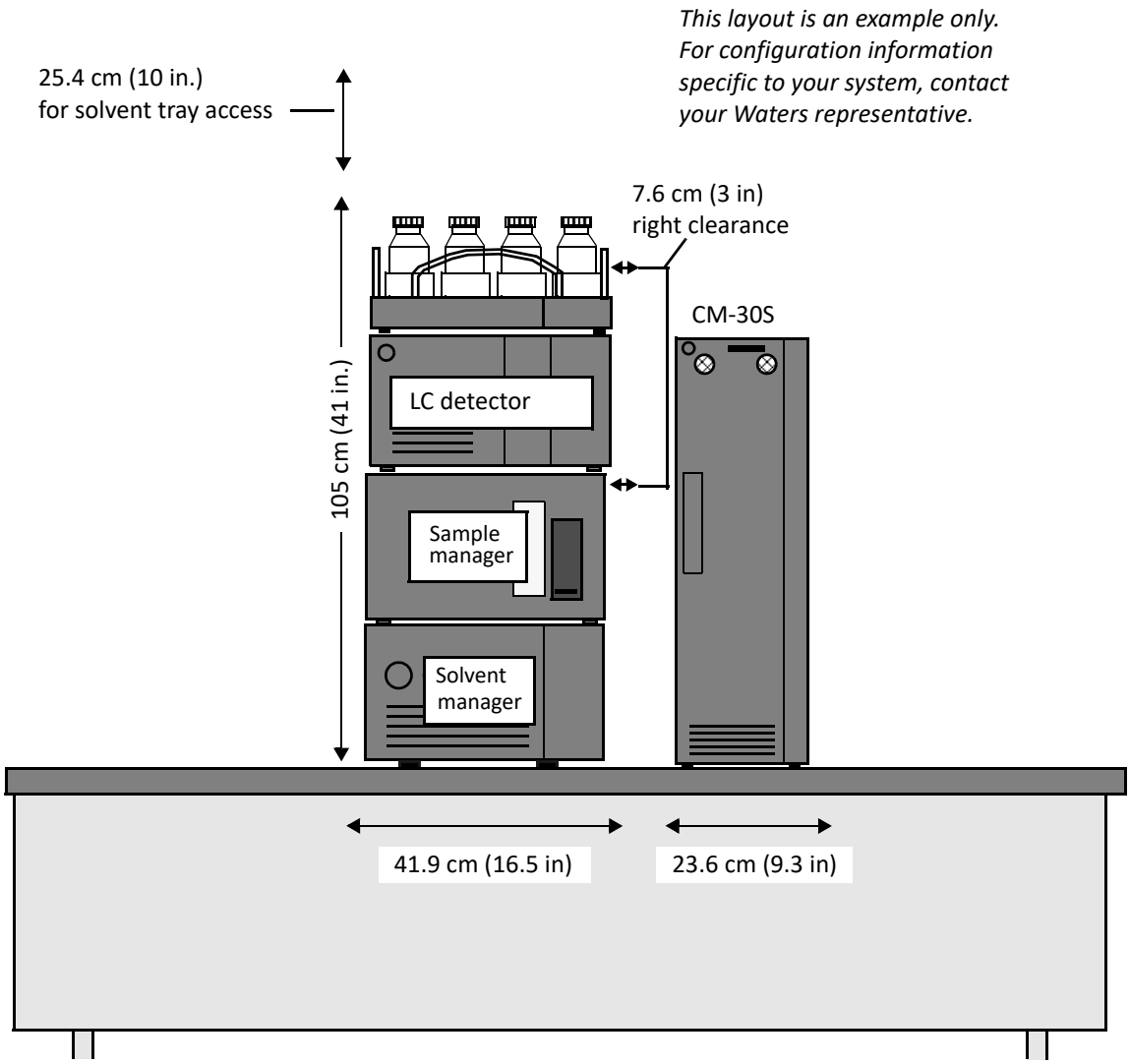


Figure 3 - Example configuration with one CM-30S (front view)

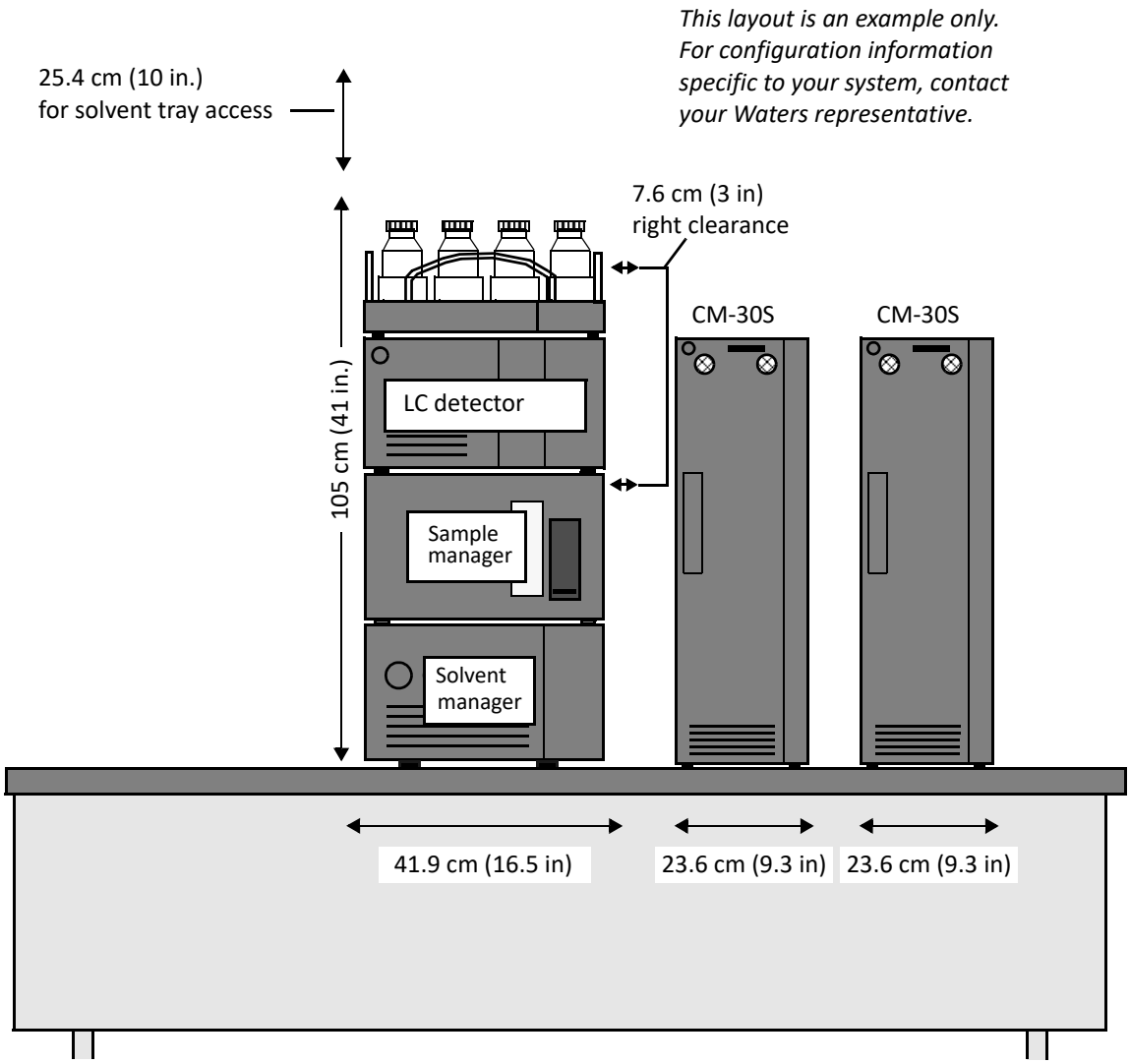


Figure 4 - Example configuration with two CM-30S (front view)

Note: Only ONE CM-30S will be supported in MassLynx.

This layout is an example only. For configuration information specific to your system, contact your Waters representative.

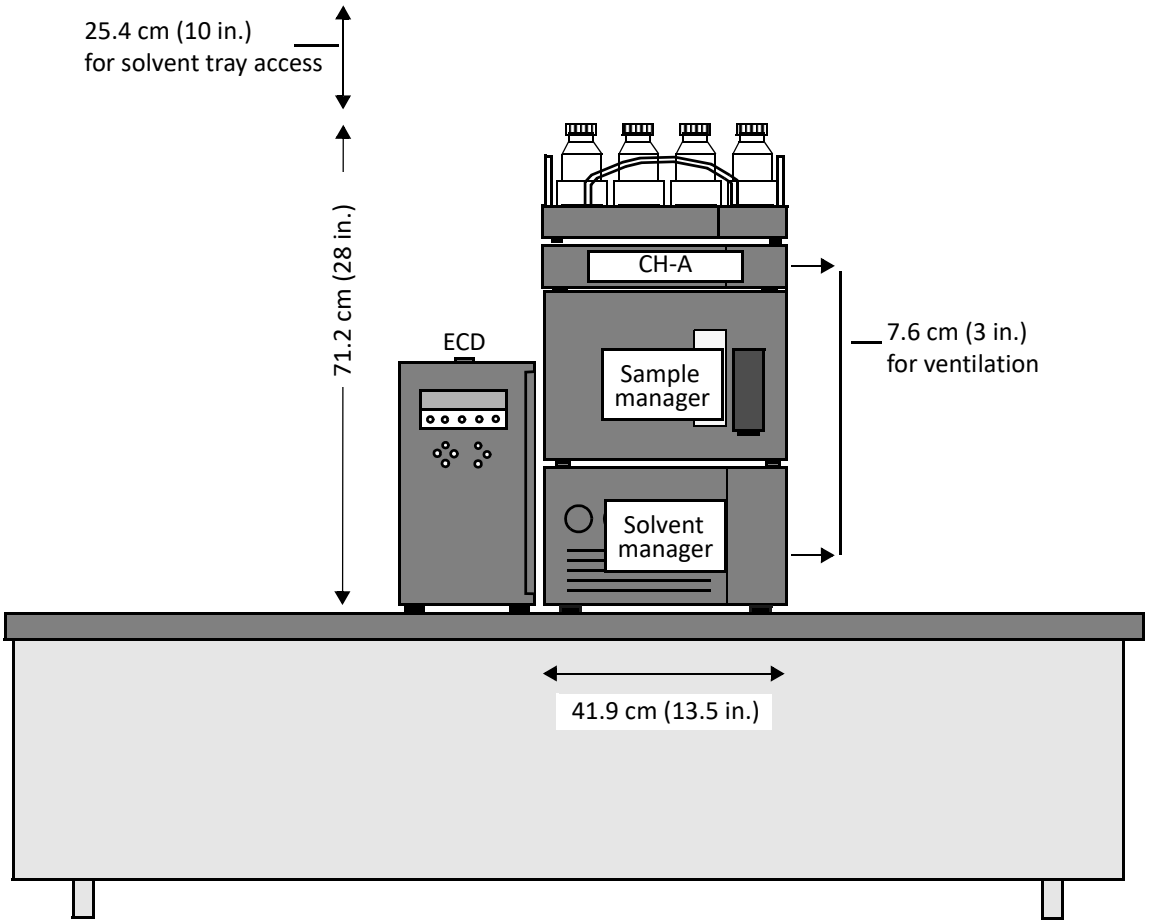


Figure 5 - Example configuration with CH-A and 3465 ECD (front view)

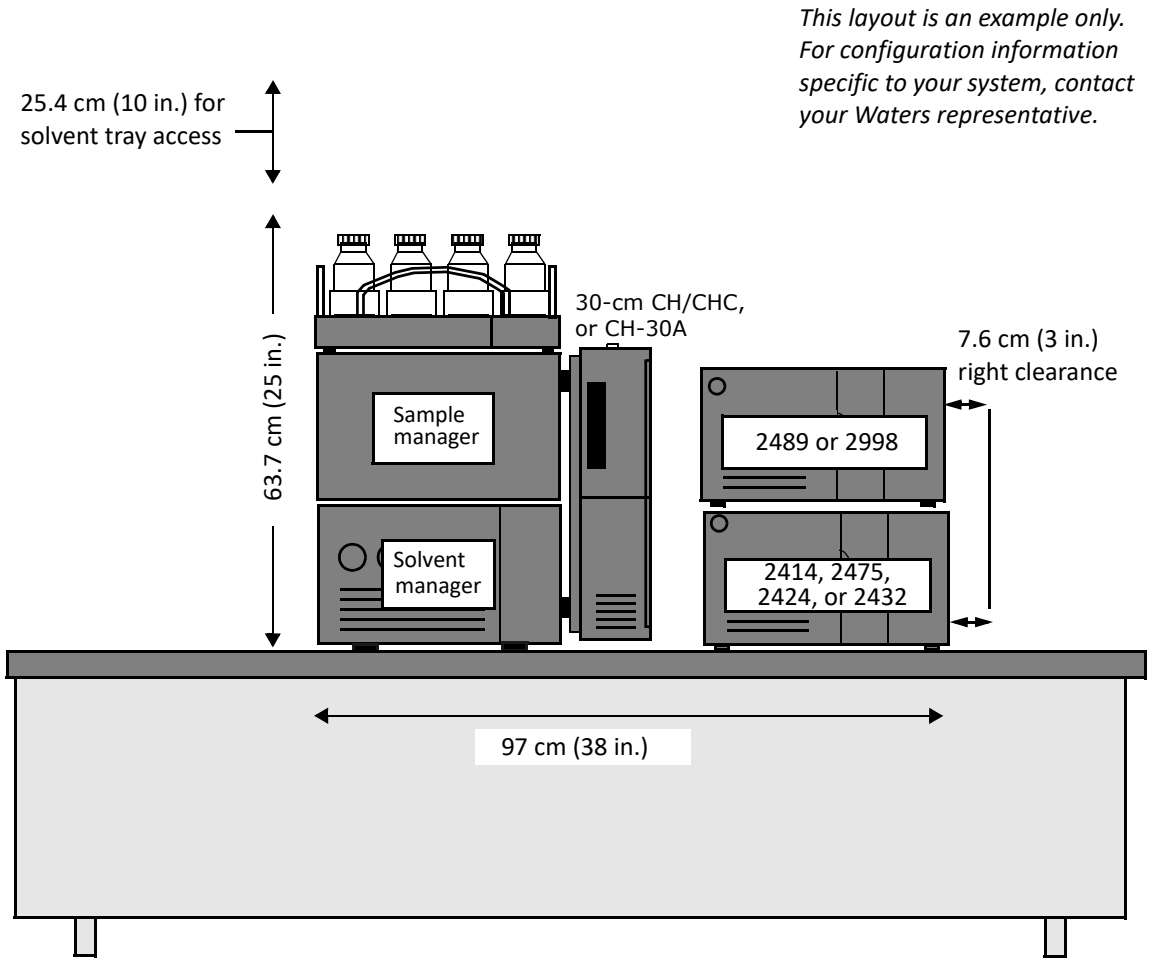


Figure 6 - Example configuration for dual detection (front view)

This layout is an example only. For configuration information specific to your system, contact your Waters representative.

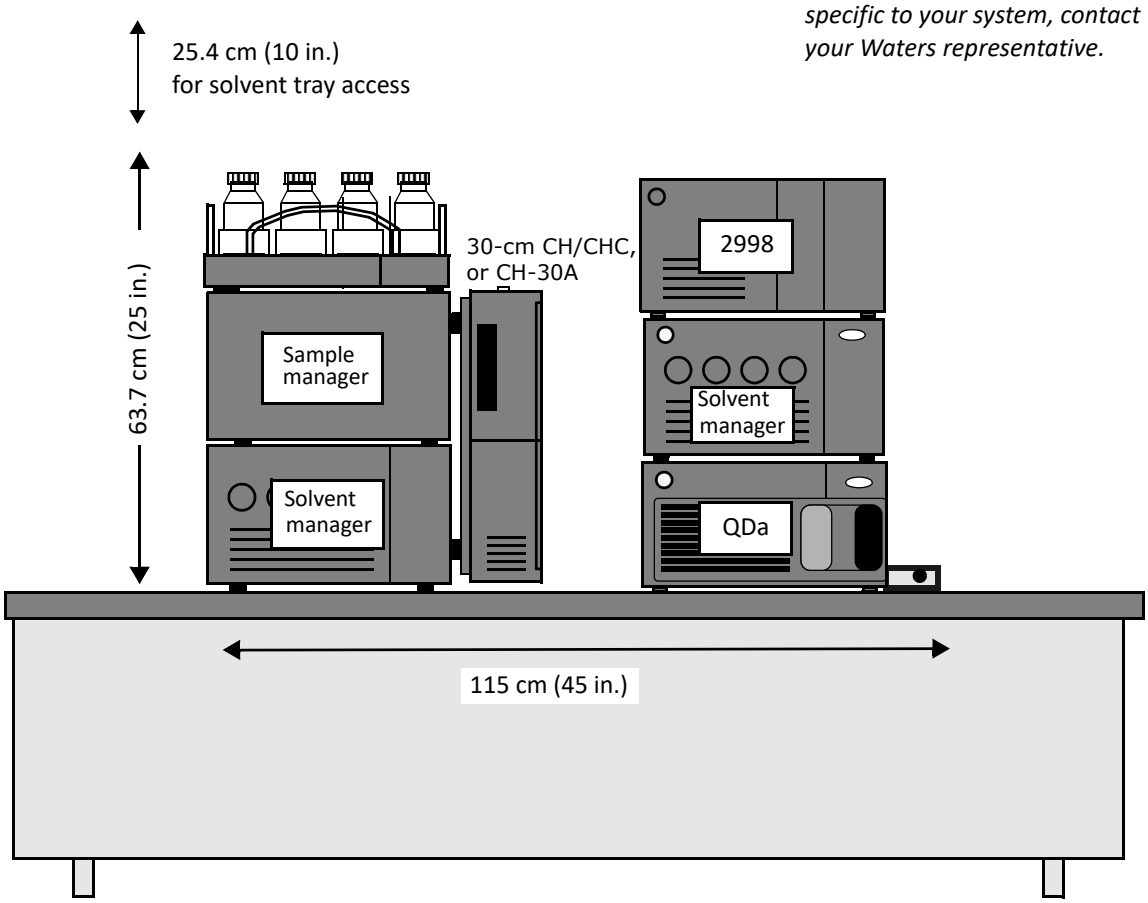


Figure 7 - Example configuration with QDa and 2998 (front view)

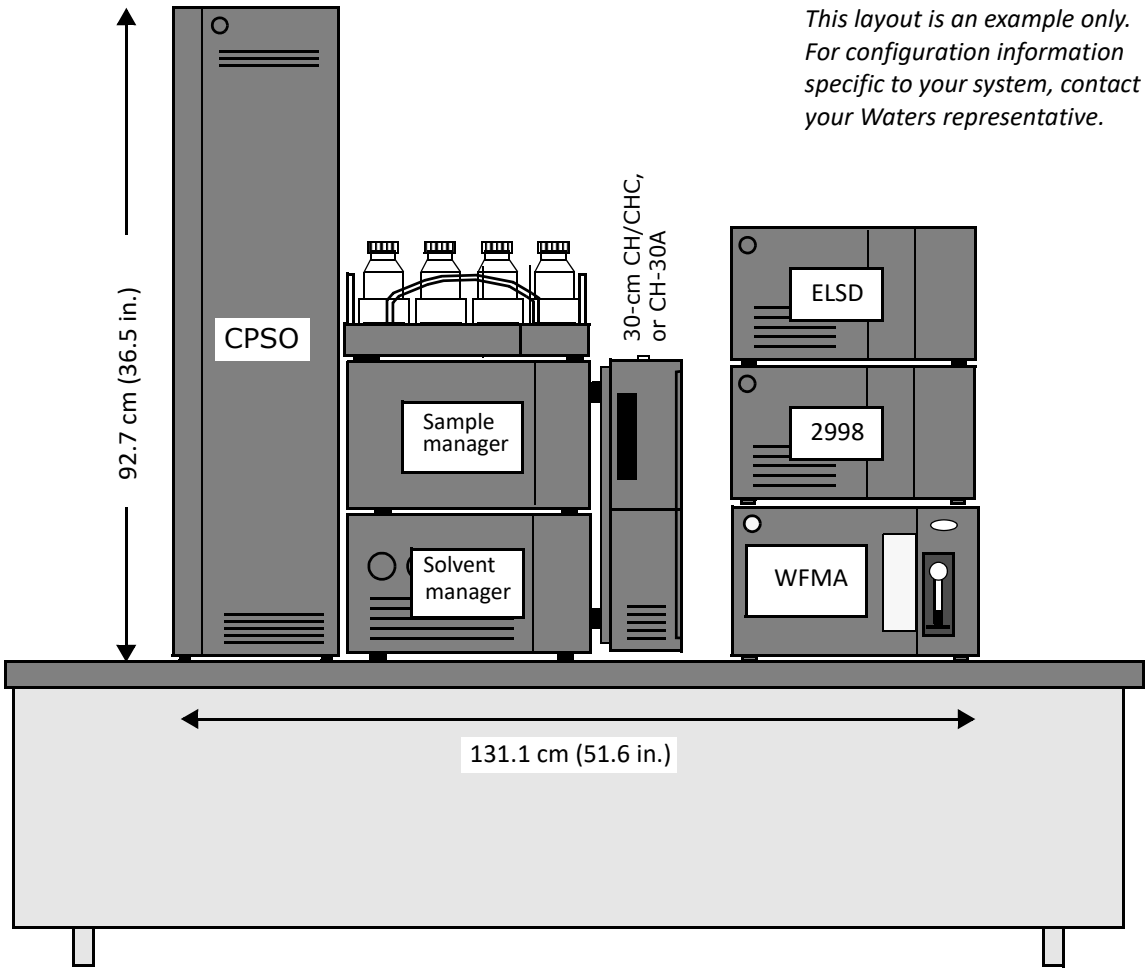


Figure 8 - Example configuration with WFMA and CPSO (front view)

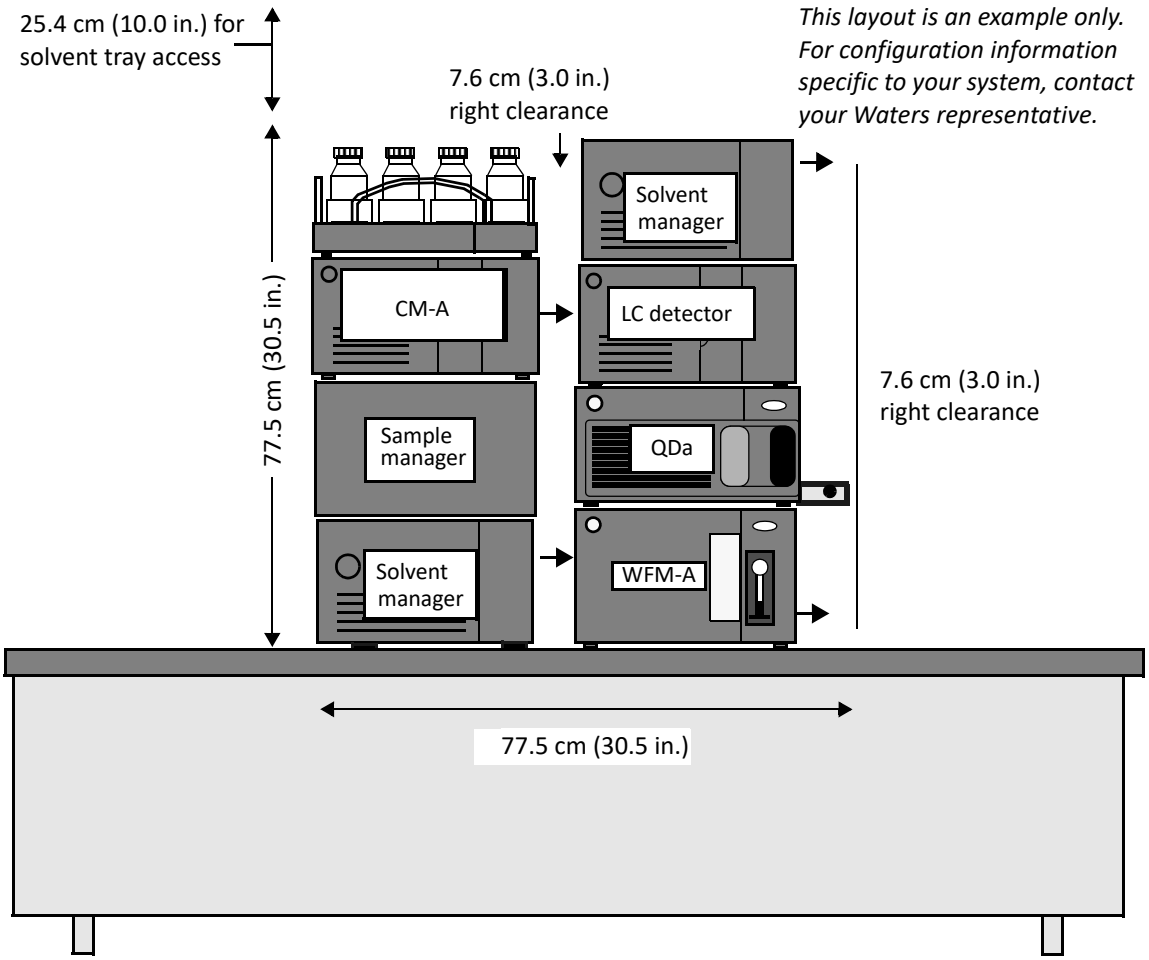


Figure 9 - Example configuration with two stacks (front view)

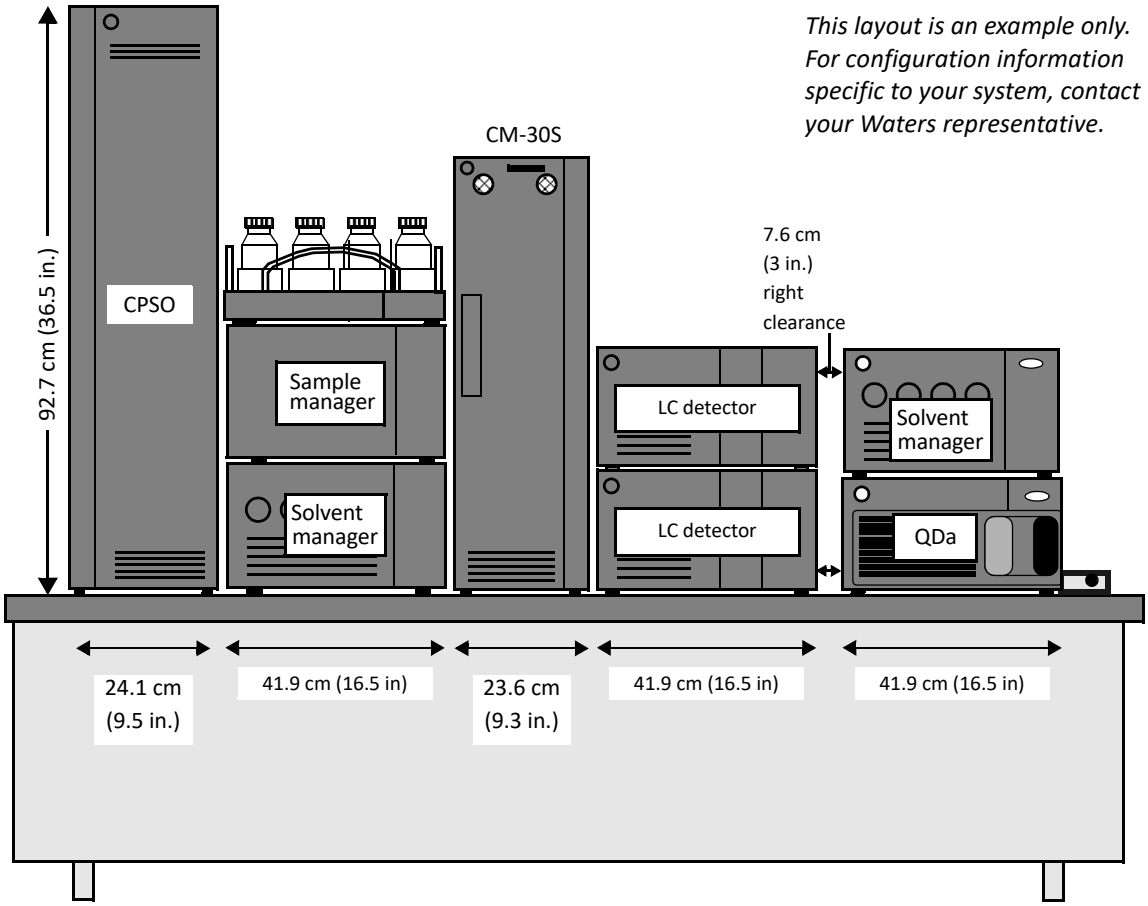


Figure 10 - Triple LC Detector CM-30S with QDa and ISM (front view)

This layout is an example only. For configuration information specific to your system, contact your Waters representative.

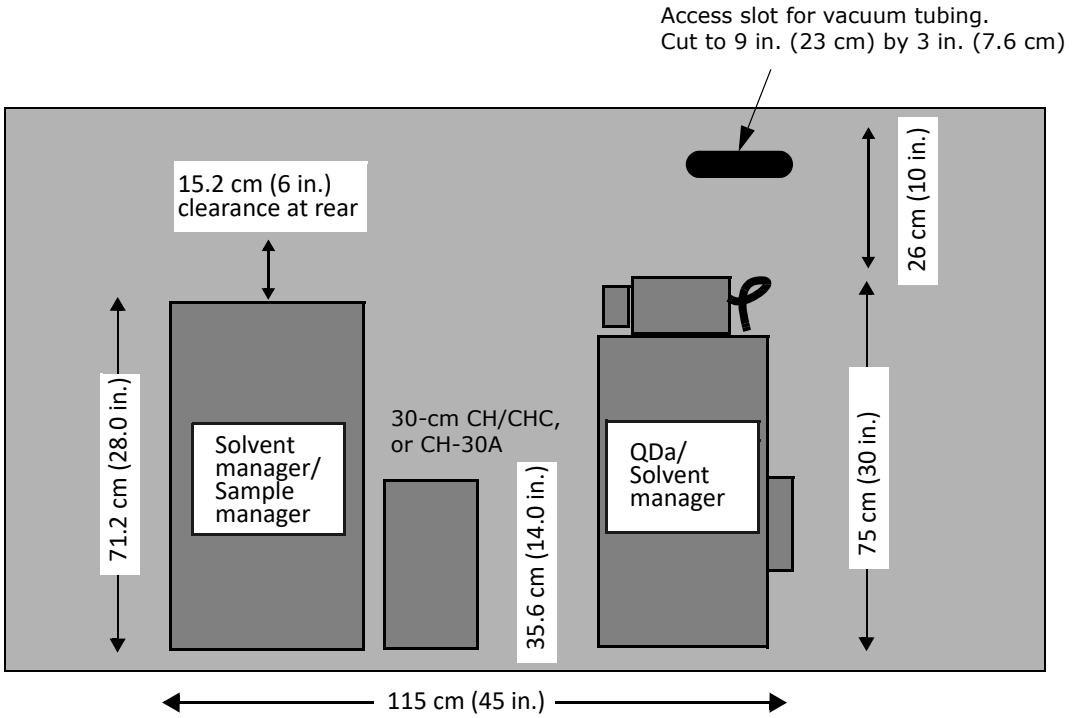


Figure 11 - Example configuration with QDa or ISM (top view)

Component dimensions

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

Requirement: To determine the benchtop width required to accommodate the installation of your ACQUITY Arc, Arc bio, and Arc HPLC, be aware that no stack can exceed one meter (39.4 in.) in height. Depending on the modules in your system, you may need to configure the modules in one, two, or more stacks. Contact your Waters representative with any questions.

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
2414	34.3 cm (13.5 in.)	61.0 cm (24.0 in.)	20.8 cm (8.2 in.)	15.9 kg (35.0 lbs)
2424				18.1 kg (40 lbs)
2432				12.3 kg (27.0 lbs)
2475				17.2 kg (38.0 lbs)
2489				13.6 kg (30 lbs)
2998				14.5 kg (32 lbs)
3465	22.1 cm (8.7 in.)	42.9 cm (16.9 in.)	43.9 cm (17.3 in.)	14.5 kg (32 lbs)
30-cm CH	20.3 cm (8.0 in.)	35.6 cm (14.0 in.) without cables	55.2 cm (21.8 in.)	9.9 kg (22 lbs)
30-cm CHC				12.7 kg (28 lbs)
CH-30A	12.1 cm (4.75 in.)	17.8 cm (7.0 in.)	50.8 cm (20 in.)	4.5 kg (10 lbs)
CH-A	34.3 cm (13.5 in.)	62.9 cm (24.8 in.)	7.6 cm (3.0 in.)	5.7 kg (12.5 lbs)
CM-A	4.3 cm (13.5 in.)	61 cm (24.0 in.)	20 cm (7.8 in.)	21 kg (46 lbs)
CM-30S	23.6 cm (9.3 in.)	61.5 cm (24.2 in.)	71.9 cm (28.3 in.)	43.1 kg (95.0 lbs)
ISM	37.7 cm (14.9 in.)	61.5 cm (24.2 in.)	24.5 cm (9.6 in.)	24.9 kg (55 lbs)
Mass spectrometer	Refer to the appropriate mass spectrometer site preparation guide.			
QSM-R	34.3 cm (13.5 in.)	66.1 cm (26.0 in.)	22.9 cm (9.0 in.)	27.7 kg (61 lbs)
SM FTN-R		71.2 cm (28.0 in.)	27.3 cm (10.75 in.)	29.5 kg (65 lbs)
Solvent tray (top-mounted)		52.1 cm (20.5 in.)	12.7 cm (5.0 in.)	2.3 kg (5 lbs)
WFMA		71.1 cm (28 in.)	27.3 cm (10.75 in.)	20.4 kg (45 lbs)
CPSO	24.1 cm (9.5 in.)	68.0 cm (26.8 in.)	92.7 cm (36.5 in.)	63.5 kg (140 lbs)

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)
ACQUITY Arc / Arc Bio system components	• Rear: 15.2 cm (6 in.) • Right: 7.6 cm (3 in.)
Mass spectrometer	• Refer to the appropriate mass spectrometer site preparation guide.
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 (LC/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:

- Water
- Acetonitrile
- Methanol
- Isopropanol

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

- Controlling Contamination in LC/MS Systems (715001307), 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

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

Use air or nitrogen

The 2424 ELS detector requires the following:

- Suitable supply of nitrogen gas or zero-grade air
- Gas flow of approximately 3 to 4 L/min
- Constant gas supply (65 to 100 psi at the regulator)

Note: Gas cylinders are not recommended because of their limited capacity.

Air/gas quality

Air/gas quality should meet the highest possible standards for particle diameter, moisture, and oil density.

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.

❑	**All gas requirements met**

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 5 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 4 for a summary of component power requirements. For more information on power terminology, see Power source/receptacles on page 24.

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

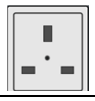
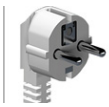
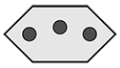
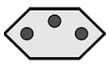
Table 4: System power requirements

Component	Nominal rated voltage	Maximum power consumption
2414	100 to 240 VAC 50/60 Hz	145 VA
2424		200 VA
2432		160 VA
2475		280 VA
2489		195 VA
2998		195 VA
3465		260 VA
30-cm CH		200 VA
30-cm CHC		240 VA
CH-A		N/A
CM-30S		600 VA
CH-30A	N/A	N/A
CM-A	100 to 240 VAC 50/60 Hz	400 VA
ISM	100 to 240 VAC 50/60 Hz	200 VA
Mass spectrometer	Refer to the appropriate mass spectrometer site preparation guide.	
QSM-R	100 to 240 VAC 50/60 Hz	360 VA
SM FTN-R		420 VA
WFMA		400 VA
CPSO		540 VA

Plug/receptacle types

Requirement: Ensure that one receptacle is available for each system component (including the data system).

Table 5: Power cords supplied by Waters

Region	Plug	Receptacle	Receptacle type
US/ Canada/ Japan/ Taiwan			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
India			UK2-15R
Korea			SK1-16R

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.

❑	**All power requirements met**

Environmental requirements

Important: For MS environmental requirements, refer to the appropriate MS site preparation guide.

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 4 to 40 °C (39 to 104 °F). Short-term thermal variations should be no more than 2 °C (3.6 °F) over 60 minutes.

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

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 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.

❑	**All environmental requirements met**

Waste collection requirements

The ACQUITY Arc / Arc Bio system 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 12) below the bench top.

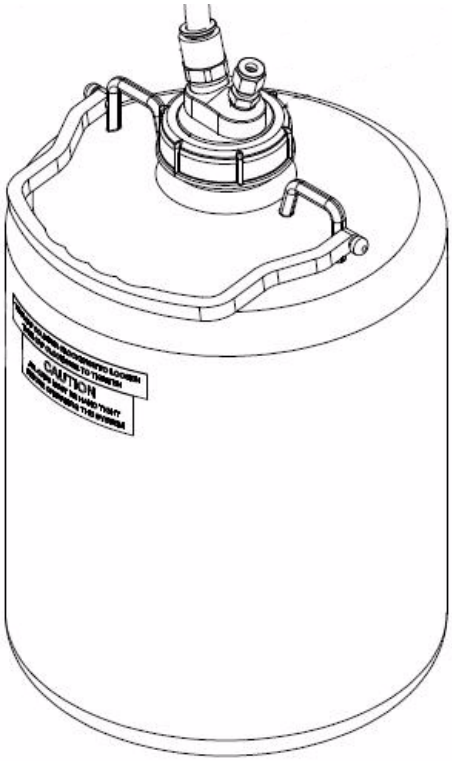


Figure 12 - Example waste container

Exhaust outlets

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.

❑	**All waste collection requirements met**

Exhaust venting requirements

Exhaust outlets

Important: Venting of the system is the sole responsibility of the customer.

The exhaust from the Waters 2424 ELS Detector should be directed into a fume hood or exhaust vent as shown in Figure 13. The exhaust tube must exit the detector in a downward direction to the vapor trap and the drain line for the desolvation drip tube must also drain down and not be submerged in the waste.

Caution: To avoid injury, exhaust from the Waters 2424 ELS Detector should not be allowed to enter the laboratory atmosphere.

Caution: Do not subject the exhaust vent to direct vacuum as this will affect the instrument's performance.

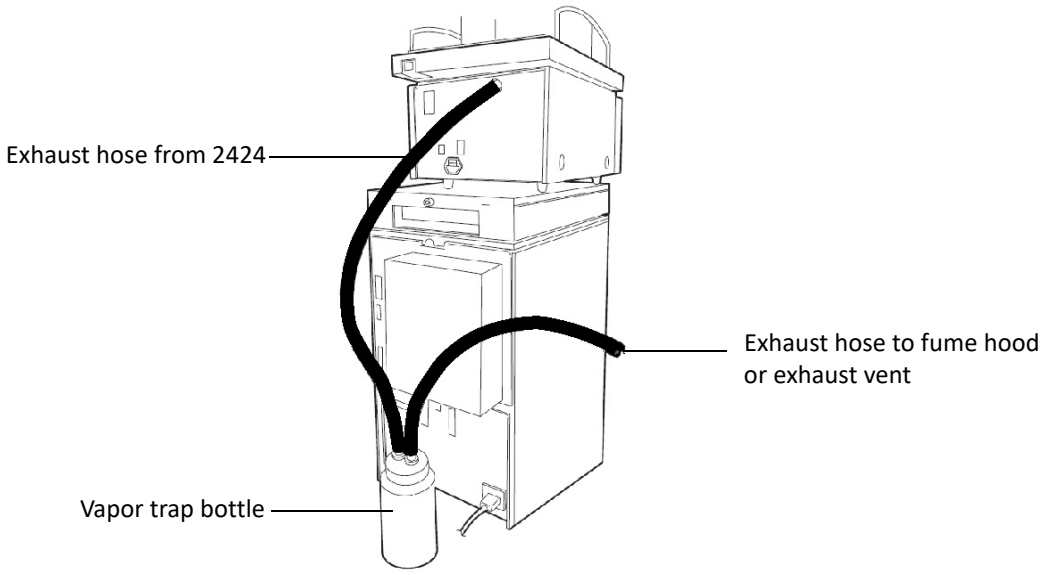


Figure 13 - Proper exhaust hose configuration

Verify exhaust venting requirements

Check the box below to verify that all requirements have been met. After completing all check boxes, return the site preparation guide to Waters.

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

❑	**All exhaust venting requirements met**

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.

❑	**All test sample requirements met**

Items you must supply

Supply the following items for the installation:

- Bottles, mobile phase, 1-L (4) or 2-L (2)
- Bottles, reservoir, 1-L (3)
- Acetonitrile
- Water
- Methanol (LC/MS-grade recommended for systems with a mass spectrometer)
- Formic acid (analytical-grade for systems with a mass spectrometer)
- Calibrated pipettes: 1 mL
- Measuring cylinders: from 10 mL to 1 L (sizes vary)
- Volumetric flasks: 10 mL, 100 mL, two 1 L, two 2 L
- Appropriate waste containers
- Calibrated analytical balance
- Nitrile gloves
- Lint-free tissue
- 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.

❑	**All items we (the customer) must supply are available**

Workstation 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.

❑	**All computer requirements met**

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.

❑	**I confirm that all supplies are now available.**
❑	**I confirm that all facility requirements are met and all Requirement check boxes are completed. (See the list of check box items below.)** 1. All relocation requirements met, page 7 2. All space and load requirements met, page 21 3. All solvent requirements met, page 22 4. All gas requirements met, page 23 5. All power requirements met, page 27 6. All environmental requirements met, page 29 7. All test sample requirements met, page 34 8. All items we (the customer) must supply are available, page 35 9. All computer requirements met, page 36
❑	**I confirm that an operator will be available for demonstration and training by a Waters engineer during the installation.** *Indicate availability (check one):* ❑ During the entire installation ❑ During part of the installation: approximately _____% of the time **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.

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 is fully completed and returned to your local Waters representative.