



Xcellerex™ *X-platform* bioreactors

Site Preparation Guide



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1 Introduction

Purpose of this document

The purpose of this document is to provide the information you need to prepare your site for the installation of the product.

A site preparation checklist is included in this document.

Scope of this document

This *Site Preparation Guide* covers all variants of the standard Xcellerex™ *X-platform* bioreactors and Xcellerex *X-platform* bioreactors with seismic option.

Installation by customer

Read the entire *Site Preparation Guide* and complete the site preparation checklist in Chapter 3 before installing the product, to make sure that the site and personnel meet the installation requirements.

Installation by Cytiva

Before the product installation, read the entire *Site Preparation Guide* and complete the site preparation checklist in chapter 3 to make sure that the site and personnel meet the installation requirements.

Return the completed checklist to Cytiva before scheduling an installation appointment with Cytiva Service.

Contact Cytiva

To get information about returning the checklist, contact your Cytiva representative or follow the steps below to contact Cytiva.

Step	Action
1	Go to cytiva.com/contact .
2	Select the applicable country from the Change country drop-down list.
	Note: <i>If the applicable country is not listed, select the nearest region.</i>
3	In Step 1 , select I need help with an existing order and click Next .
4	In Step 2 , select Order Issue & Order Support and click Next .

Step	Action
5	In Step 3, click Message here. <i>Result:</i> The window with the contact form opens.
6	Fill in the required fields and click Send. <i>Result:</i> Your inquiry is sent to the Customer service team.

Assign personnel for site preparation tasks

The site preparation and installation tasks are typically split up between different persons and can take several weeks to prepare, depending on your organization. It is up to the site preparation/installation coordinator to:

- Assign personnel and make sure that they are provided with sufficient information to complete the tasks, see the table below.
If Cytiva is involved in the installation of the system, it is recommended that the same assigned personnel assist the Cytiva service personnel during the subsequent installation process.
- Gather information about the completed tasks and fill in the site preparation checklist, see [Chapter 3 Site preparation checklist, on page 26](#).
- Return the completed checklist to Cytiva before installation, if applicable.

Personnel	Site preparation tasks
Site preparation/ Installation coordinator	• Review the <i>Site Preparation Guide</i>, safety information, and requirements for the equipment. • Choose the site. • Coordinate personnel and tasks. • Coordinate the installation timing of the system with any local safety procedures and testings. • Order the required materials. • If Cytiva is involved in the installation of the system, schedule the installation and inform the relevant personnel of the installation date.
Laboratory personnel/ Primary users	• Review all relevant safety information. • Make sure that all customer-provided materials for the installation are present at the site.
Facilities personnel	• Make sure the installation requirements are met for the following items. The system installation may not be possible if these requirements are not met. - Space at the installation site - Environmental conditions - Ventilation and waste collection - Electrical supply - Safety and installation materials - Lifting and moving equipment, if applicable
Electrical engineer	• Confirm that the electrical supply at the site meets the required electrical specifications. • Confirm that the receptacles for the electrical plugs intended for use with the equipment are available and meet the required electrical specifications. • Establish a plan to check that the mains power plug is installed correctly.

2 Site preparation

Introduction

Before the product is delivered, the site must be prepared according to the information in this chapter.

Description

X-platform bioreactor is a modular stirred-tank system, designed for cell cultivation processes. The bioreactor operation is based on single-use technology.

The system consists of the following subsystems:

- Bioreactor vessel
- Cabinet assembly for *X-50* and *X-200* bioreactors, or main cabinet assembly for *X-500* and *X-2000* bioreactors.
- Human-machine interface (HMI)

A separate temperature control unit (TCU) is necessary for vessel jacket temperature regulation. The TCU must be purchased from Cytiva.

Illustration of the system

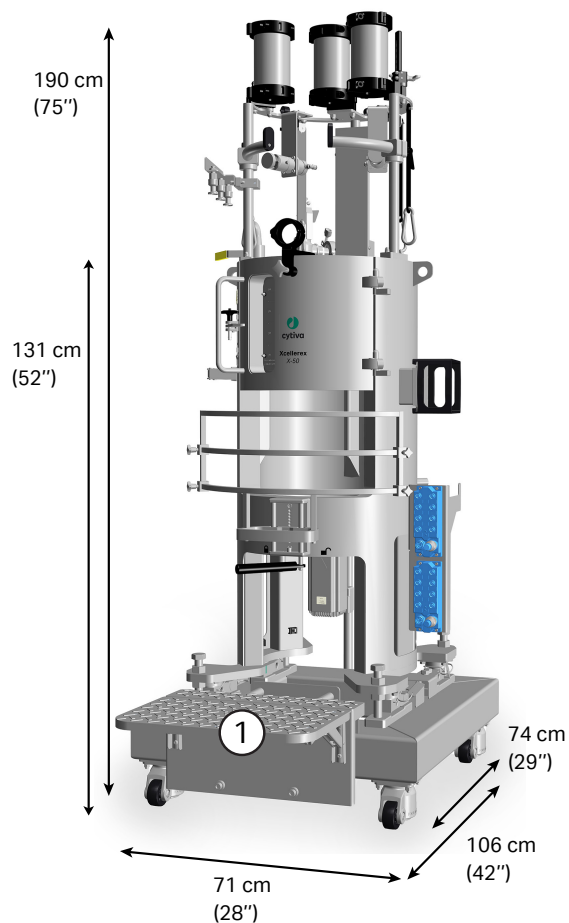


Part	Description
1	X-50, X-200, X-500 or X-2000 bioreactor vessel (the example in the illustration shows the X-200 bioreactor vessel)
2	Cabinet assembly (for X-50 and X-200 bioreactors)
3	Main cabinet assembly (for X-500 and X-2000 bioreactors)
4	HMI
5	TCU

Dimensions

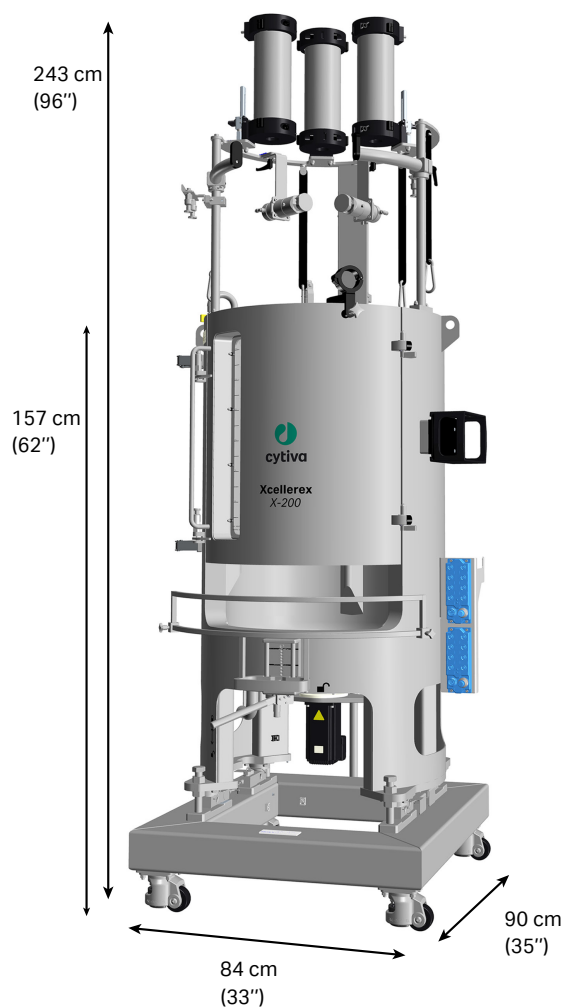
The following illustration shows the dimensions of the *X-50* bioreactor vessel. The depth of the vessel frame without the optional step platform is 74 cm (29"). The depth of the vessel frame with the optional step platform (1) attached and unfolded is 106 cm (42").

The *X-50* bioreactor vessel with seismic option includes the seismic anchoring kit and specific load cells. These changes increase the height by approximately 5 cm (2") and the width by approximately 10 cm (4"). The illustration below does not show the seismic option.

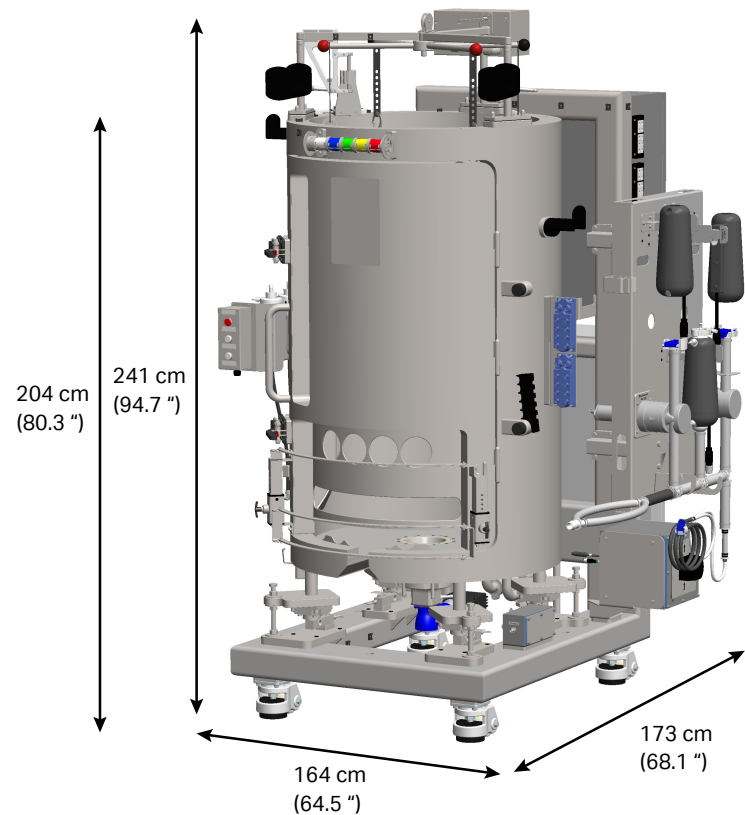


The following illustration shows the dimensions of the *X-200* bioreactor vessel.

The *X-200* bioreactor vessel with seismic option includes the seismic anchoring kit and specific load cells. These changes increase the height by approximately 5 cm (2") and the width by approximately 4 cm (1.6"). The illustration below does not show the seismic option.



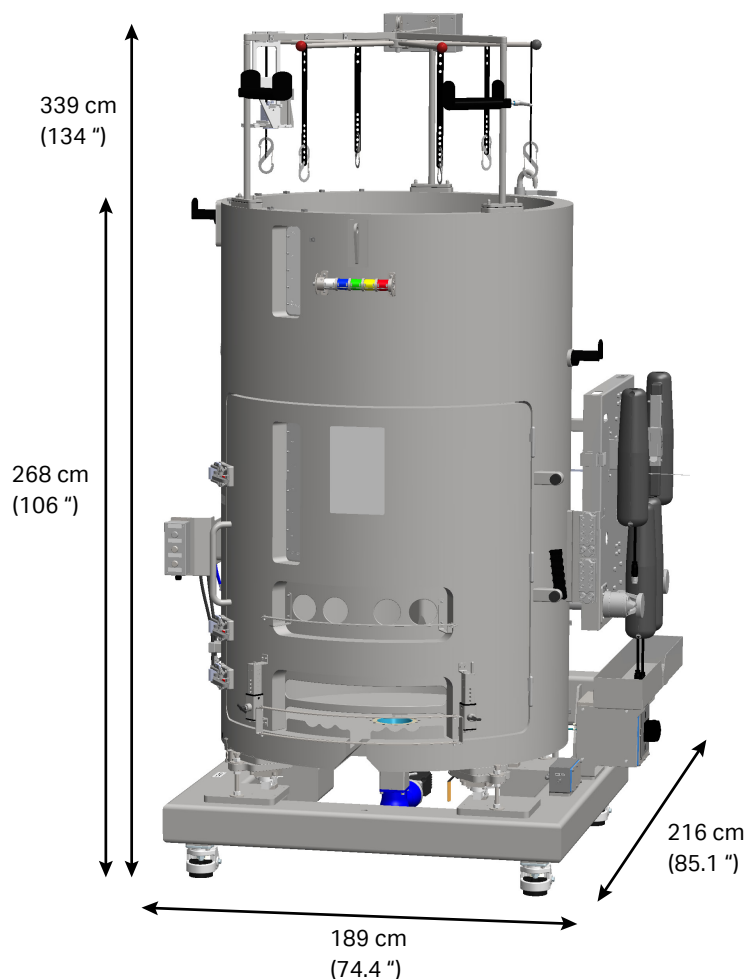
The following illustration shows the dimensions of the *X-500* bioreactor vessel. The height of the bioreactor vessel without the top frame is also shown. The seismic option of the system does not differ in size.



The *X-500* bioreactor vessel has two configurations for the exhaust gas panel, and an optional gas regulation panel. The following table gives an overview of the system width for the different configurations.

Configuration	System width
Exhaust gas system: right Gas regulation panel: yes	164 cm (64.5 inch)
Exhaust gas system: right Gas regulation panel: no	139 cm (54.8 inch)
Exhaust gas system: left Gas regulation panel: yes	145 cm (57.0 inch)
Exhaust gas system: left Gas regulation panel: no	136 cm (53.4 inch)

The following illustration shows the dimensions of the X-2000 bioreactor vessel. The height of the bioreactor vessel without the top frame is also shown. The seismic option of the system does not differ in size.



The X-2000 bioreactor vessel has two configurations for the exhaust gas panel, and an optional gas regulation panel. The following table gives an overview of the system width for the different configurations.

Configuration	System width
Exhaust gas system: right Gas regulation panel: yes	189 cm (74.5 inch)
Exhaust gas system: right Gas regulation panel: no	185 cm (72.7 inch)
Exhaust gas system: left Gas regulation panel: yes	181 cm (71.2 inch)
Exhaust gas system: left Gas regulation panel: no	181 cm (71.2 inch)

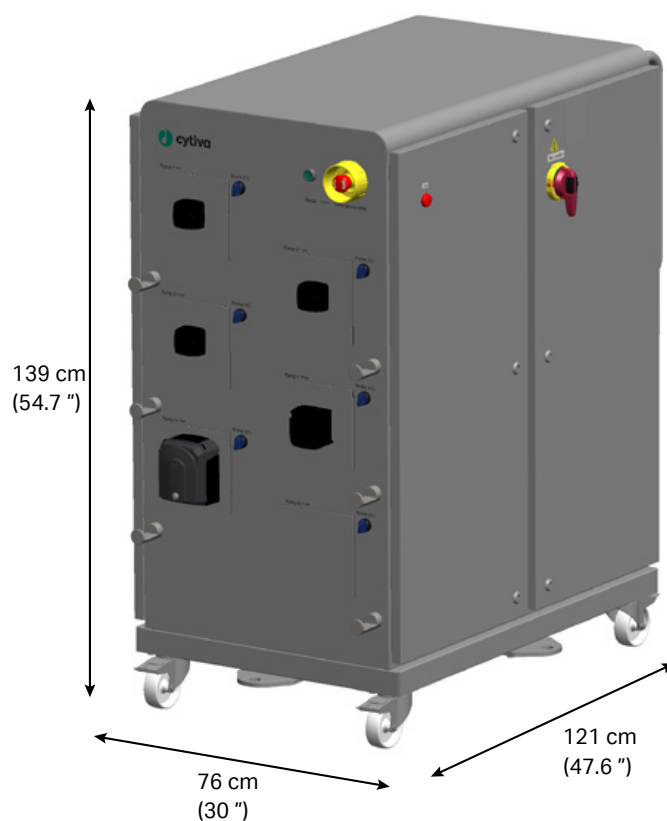
The following illustration shows the dimensions of the *X-50* and *X-200* cabinet assembly. The height of the cabinet assembly without the optional audible visual indicator is 115 cm (45"). The height of the cabinet assembly with the optional audible visual indicator is 155 cm (61").

The cabinet assembly with seismic option includes the seismic anchoring kit. The seismic option increases the width by approximately 5 cm (2") and the depth by approximately 12 cm (5"). The seismic option is not shown in the following illustration.

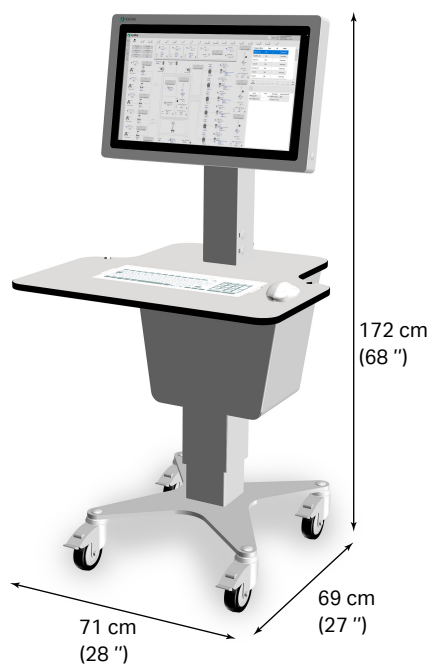


The following illustration shows the dimensions of the *X-500* and *X-2000* main cabinet assembly.

The main cabinet assembly with seismic option includes the seismic anchoring kit. The seismic option increases the width by approximately 5 cm (2") and the depth by approximately 12 cm (5"). The seismic option is not shown in the following illustration.



The following illustration shows the dimensions of the HMI.



The dimensions of the TCU are listed in the table below.

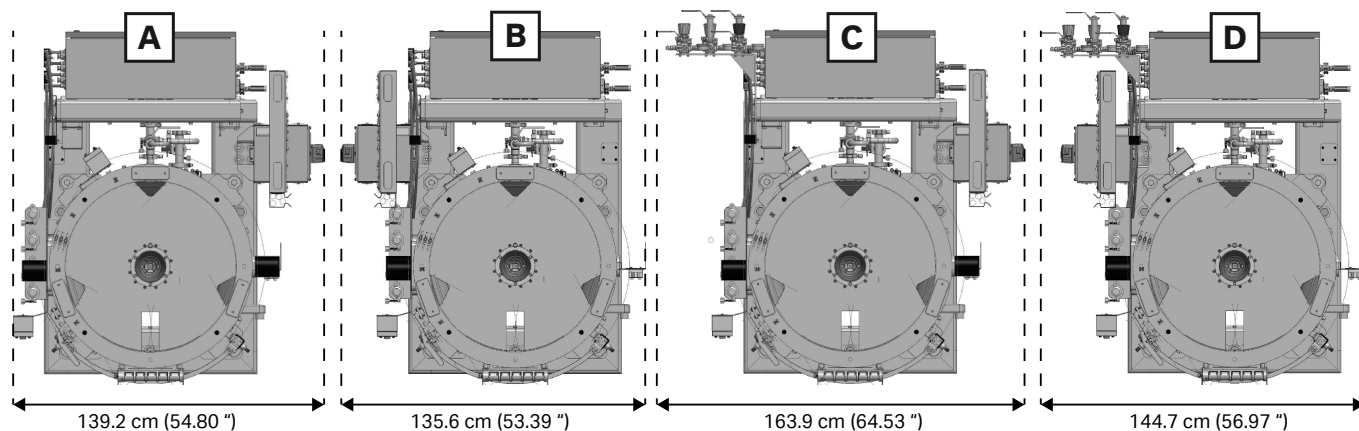
TCU model	Dimension (L × W × H)
PolyScience DuraChill	780 × 480 × 660 mm (30.5 × 19 × 26 inch)
Lauda Variocool Heat Exchanger 6 kW	450 × 550 × 650 mm (17.7 × 21.7 × 25.6 inch)
Lauda Variocool Heat Exchanger 18 kW	550 × 650 × 950 mm (21.7 × 25.6 × 37.4 inch)

Space requirements

The following general site requirements must be fulfilled at the location where the *X-platform* bioreactor is installed:

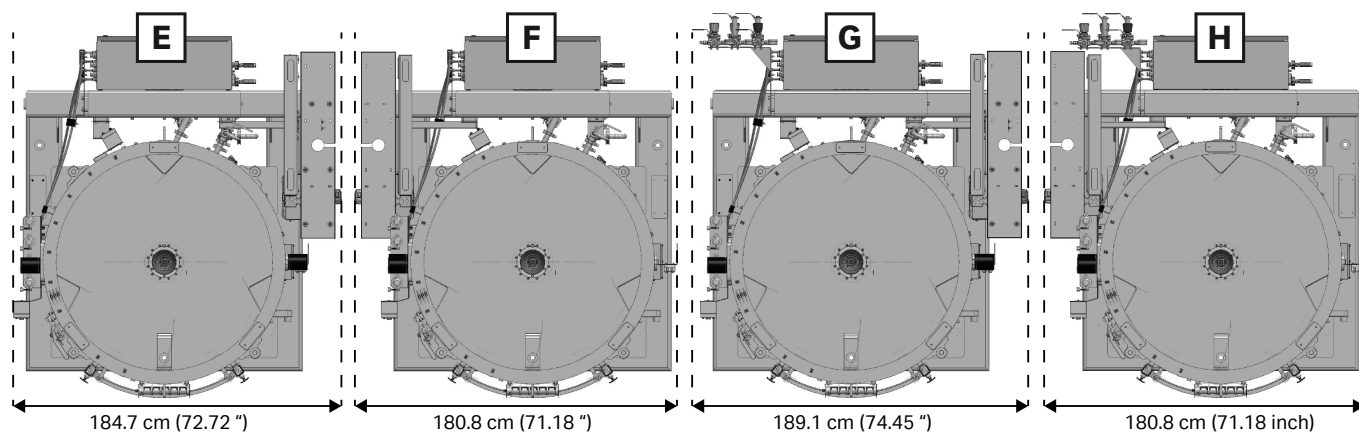
- The floor must be level and without irregularities to allow equal distribution of the system weight over the leveling feet.
- For convenient working conditions during use, sufficient space must be provided on all sides of the system when installed at the intended location.
- The PolyScience TCU requires 61 cm (24 inch) at the front and 61 cm (24 inch) at the back of the TCU.
- The Lauda TCU requires 20 cm (7.9 inch) at the front and 20 cm (7.9 inch) at the back of the TCU.

The following illustrations shows plan views of the different configurations of the X-500 vessel.



Part	Description
A	X-500 vessel; exhaust gas panel right, without gas regulation panel
B	X-500 vessel; exhaust gas panel left, without gas regulation panel
C	X-500 vessel; exhaust gas panel right, with gas regulation panel
D	X-500 vessel; exhaust gas panel left, with gas regulation panel

The following illustrations shows plan views of the different configurations of the X-2000 vessel.



Part	Description
E	X-2000 vessel; exhaust gas panel right, without gas regulation panel
F	X-2000 vessel; exhaust gas panel left, without gas regulation panel
G	X-2000 vessel; exhaust gas panel right, with gas regulation panel
H	X-2000 vessel; exhaust gas panel left, with gas regulation panel

The following space requirements must be met at the location where the *X-platform* bioreactor is installed. All dimensions in the table have a tolerance of ± 51 mm (2 inch). The system transport height and width apply to a system that is not fully installed or has components that are not mounted.

System	Minimum floor to ceiling height ¹	System transport height	System transport width
X-50 vessel	215.0 cm (84.65 inch)	131.4 cm (51.73 inch)	71.1 cm (28.00 inch)
X-50 vessel with seismic option	219.8 cm (86.54 inch)	136.1 cm (53.58 inch)	73.7 cm (29.02 inch)
X-200 vessel	268.3 cm (105.63 inch)	156.6 cm (61.65 inch)	84.4 cm (33.23 inch)
X-200 vessel with seismic option	273.1 cm (107.52 inch)	161.3 cm (63.50 inch)	88.4 cm (34.80 inch)
X-50 and X-200 cabinet assembly	219 cm (86.2 inch)	116 cm (45.7 inch)	80 cm (31.5 inch)
X-50 and X-200 cabinet assembly with seismic option	219 cm (86.2 inch)	116 cm (45.7 inch)	92 cm (36.2 inch)
X-500 vessel Exhaust gas panel right, without gas regulation panel (A)	265.5 cm (104.53 inch)	203.9 cm (80.28 inch)	139.2 cm (54.80 inch)
X-500 vessel Exhaust gas panel left, without gas regulation panel (B)	265.5 cm (104.53 inch)	203.9 cm (80.28 inch)	135.6 cm (53.39 inch)
X-500 vessel Exhaust gas panel right, with gas regulation panel (C)	265.5 cm (104.53 inch)	203.9 cm (80.28 inch)	163.9 cm (64.53 inch)
X-500 vessel Exhaust gas panel left, with gas regulation panel (D)	265.5 cm (104.53 inch)	203.9 cm (80.28 inch)	144.7 cm (56.97 inch)
X-2000 vessel Exhaust gas panel right, without gas regulation panel (E)	364.2 cm (143.39 inch)	268.4 cm (105.67 inch)	184.7 cm (72.72 inch)
X-2000 vessel Exhaust gas panel left, without gas regulation panel (F)	364.2 cm (143.39 inch)	268.4 cm (105.67 inch)	180.8 cm (71.18 inch)
X-2000 vessel Exhaust gas panel right, with gas regulation panel (G)	364.2 cm (143.39 inch)	268.4 cm (105.67 inch)	189.1 cm (74.45 inch)
X-2000 vessel Exhaust gas panel left, with gas regulation panel (H)	364.2 cm (143.39 inch)	268.4 cm (105.67 inch)	180.8 cm (71.18 inch)

System	Minimum floor to ceiling height ¹	System transport height	System transport width
X-2000 vessel in horizontal position on the crate base	364.2 cm (143.39 inch)	228.8 cm (90.08 inch) ²	208.6 cm (82.13 inch)
X-500 and X-2000 main cabinet assembly	202 cm (79.5 inch) ²	138.5 cm (54.5 inch)	75.9 cm (29.9 inch)

¹ Including 25 cm (9.8") for practical operational considerations.

² The specified height omits any vertical increase associated with pallet or skid lifting operations.

Provide the required space for the HMI. For more information on the dimensions of the subsystems, see [Dimensions, on page 8](#).

Floor load

The following table shows the weight of the system components. The table also includes the weight of system components with the seismic option.

The vessel weights in the table below are for fully configured vessels with all optional components and do not include cell culture liquid, so these values can vary.

Component	Weight without seismic option	Weight with seismic option
X-50 vessel (without step platform)	236 kg (520 lb)	286 kg (631 lb)
X-50 vessel (with step platform)	248 kg (547 lb)	298 kg (657 lb)
X-200 vessel	336 kg (741 lb)	390 kg (860 lb)
X-500 vessel	827 kg (1824 lb)	874 kg (1927 lb)
X-2000 vessel	1754 kg (3867 lb)	1801 kg (3971 lb)
X-50 and X-200 cabinet assembly	209 kg (461 lb)	234 kg (515 lb)
X-500 and X-2000 main cabinet assembly	274 kg (604 lb)	300 kg (662 lb)
HMI	70 kg (154 lb)	N/A
TCU, PolyScience DuraChill	154 kg (340 lb)	N/A
TCU, Lauda Variocool Heat Exchanger 6 kW	56 kg (123 lb)	N/A
TCU, Lauda Variocool Heat Exchanger 18 kW	116 kg (256 lb)	N/A

Make sure that the floor can bear the weight of the bioreactor vessel when the bioreactor vessel is fully loaded.



NOTICE

The floor must be level and without irregularities to allow equal distribution of the system weight over the leveling feet.

Environmental conditions

The following general requirements must be fulfilled:

- The room must have exhaust ventilation.
- The instrument should not be exposed to corrosive gases.
- The instrument should not be exposed to sources of heat, such as direct sunlight.
- Dust in the atmosphere should be kept to a minimum.
- Strong magnetic or electric fields should be avoided.
- The instrument should not be exposed to vibrations.

Environmental requirements

Parameter	Requirement
Allowed location	Indoor use only
Ambient temperature, operation	10°C to 30°C
Ambient temperature, storage	4°C to 40°C
Ambient temperature, transportation	0°C to 60°C
Relative humidity, operation	30% to 80%, non-condensing
Relative humidity, non-operating	< 80%, non-condensing
Relative humidity, transportation	10% to 90%
Elevation	Up to 2000 m

Grounding and protective earth

- The grounding wire must be connected to the connectors on the back of the (main) cabinet assembly and on the bioreactor vessel frame.
- Ground impedance must conform to the requirements of national and local industrial safety regulations and/or electrical codes.
- The integrity of all ground connections must be periodically checked.

Mains cable

The customer may install a mains disconnect switch on the wall, to allow immediate disconnection of all power from the system.

Electrical power

The following table shows the guidelines for the power requirements for the system components. The requirements depend on the supplied voltage on site for the specific country.

Note: During operation, the equipment can tolerate mains voltage fluctuations of up to $\pm 10\%$ of the rated voltage that is specified in the table below.

Parameter	Requirement
Supply voltage, X-50 and X-200 cabinet assembly ¹	• 120 VAC, 1 phase with 2 wires and ground, 50/60 Hz, 13.6 A • 220 VAC, 1 phase with 2 wires and ground, 50/60 Hz, 7.4 A
Supply voltage, X-500 and X-2000 main cabinet assembly ²	• 200 VAC, 3 phase with 3 wires and ground (in delta configuration), 50/60 Hz, 12 A • 400 VAC, 3 phase with 3 wires and ground (in delta configuration), 50/60 Hz, 6 A • 480 VAC, 3 phase with 3 wires and ground (in delta configuration), 50/60 Hz, 5 A
Supply voltage, HMI ³	• 120 VAC, 1 phase with 2 wires and ground, 50/60 Hz, 2 A • 220 VAC, 1 phase with 2 wires and ground, 50/60 Hz, 1 A
Supply voltage, TCU	• PolyScience DuraChill (available variants): - 208 to 230 VAC, 3 phase with 3 wires and ground (in delta configuration), 50/60 Hz, 31.6/32.7 A - 380 VAC, 3 phase with 3 wires and ground (in delta configuration), 50 Hz, 15.9 A - 460 VAC, 3 phase with 3 wires and ground (in delta configuration), 60 Hz, 17.3 A - 208 to 230 VAC, 1 phase with 2 wires and ground, 60 Hz, 29.5/30.6 A • Lauda Variocool Heat Exchanger 6 kW: 208 to 230 VAC, 1 phase with 2 wires and ground, 50/60 Hz, 32 A • Lauda Variocool Heat Exchanger 18 kW: - 400 VAC, 3 phase with 3 wires and ground (in delta configuration), 50 Hz, 28 A - 480 VAC, 3 phase with 3 wires and ground (in delta configuration), 60 Hz, 28 A

Parameter	Requirement
Number of electrical outlets	Three outlets for the following units⁴: • (Main) cabinet assembly • HMI • TCU See additional information on the TCU power cable below this table.

¹ The cabinet assembly is supplied with a power cable with a plug type for local power system. Type B, F, G, I, J, M or N.

² The main cabinet assembly is supplied with a power cable with an IEC 60309 pin and sleeve connector 3P4W, 20 A, 250 V or 480 V, or a 16 A, 400 V.

³ The HMI is supplied with a power cable with a plug type for local power system. Type B, F, G, I, J, M or N.

⁴ Additional external electrical outlets are required, if optional equipment (e.g. external pumps and scales) is purchased with the system. Refer to the manufacturer's manual for electrical power requirements.

The Lauda and PolyScience TCU are supplied with flying leads (unterminated power cables), and the manufacturer does not provide a plug for these units. Customers must install a plug that is appropriate for their country or region and that complies with the required voltage, current capacity, and local electrical codes and safety standards. In addition, a transformer is required for installations in South Korea, Brazil, and Japan to meet the TCU voltage requirements. Cytiva does not provide a transformer. For more information on the electrical requirements of the TCU, contact a Cytiva service representative.

Wiring diagrams for the system, voltage, power, and fuse requirements are available in the Product Documentation package (ToP).

Gas supply requirements, X-50 bioreactor

Parameter	Requirement
Gas pressure, process supply	276 to 689 kPa (2.8 to 6.9 bar, 40 to 100 psi) for all gases The gas pressure regulators are on the gas cabinet door on the cabinet assembly. All gas pressure regulators are set to factory settings by Cytiva.
Gas pressure, instrument air	344 to 689 kPa (3.4 to 6.9 bar, 50 to 100 psi) for all gases The gas pressure regulators are on the gas cabinet door on the cabinet assembly. All gas pressure regulators are set to factory settings by Cytiva.
Gas capacity	• Air: 17.5 SLPM • Oxygen (O₂): 10 SLPM • Carbon dioxide (CO₂): 2.5 SLPM • Nitrogen (N₂)¹: 5 SLPM

Parameter	Requirement
Gas supply tubing	Recommended: Semi-rigid polyethylene tubing, pressure rated 1000 kPa (10 bar, 150 psi), outer diameter (o.d.) ¼" for all gases Alternatively: Flexible polypropylene tubing
Gas inlet dimensions	o.d. ¼" for all gases Note: <i>Unused gas inlets should be plugged.</i>
Gas outlet dimensions	o.d. ¼" for all gases Note: <i>If the pinch valve is not used, the PINCH VALVE 1 and PINCH VALVE 2 outlets are plugged at the factory.</i>
Gas flow rate to bioreactor bag	• Overlay: 2.5 SLPM • Sparge 1: 12.5 SLPM Note: <i>The 12.5 SLPM limit is comprised of 10 SLPM total for air and oxygen, and 2.5 SLPM for CO₂.</i> • Sparge 2: 5 SLPM

¹ Nitrogen is not required for many processes, but it is recommended for dissolved oxygen (DO) calibration.

Gas supply requirements, X-200 bioreactor

Parameter	Requirement
Gas pressure, process supply	276 to 689 kPa (2.8 to 6.9 bar, 40 to 100 psi) for all gases The gas pressure regulators are on the gas cabinet door on the cabinet assembly. All gas pressure regulators are set to factory settings by Cytiva.
Gas pressure, instrument air	344 to 689 kPa (3.4 to 6.9 bar, 50 to 100 psi) for all gases The gas pressure regulators are on the gas cabinet door on the cabinet assembly. All gas pressure regulators are set to factory settings by Cytiva.
Gas capacity	• Air: 70 SLPM • Oxygen (O₂): 40 SLPM • Carbon dioxide (CO₂): 10 SLPM • Nitrogen (N₂)¹: 20 SLPM

Parameter	Requirement
Gas supply tubing	Recommended: Semi-rigid polyethylene tubing, pressure rated 1000 kPa (10 bar, 150 psi), o.d. ¼" for all gases Alternatively: Flexible polypropylene tubing
Gas inlet dimensions	o.d. ¼" for all gases Note: <i>Unused gas inlets should be plugged.</i>
Gas outlet dimensions	o.d. ¼" for all gases Note: <i>If the pinch valve is not used, the PINCH VALVE 1 and PINCH VALVE 2 outlets are plugged at the factory.</i>
Gas flow rate to bioreactor bag	• Overlay: 10 SLPM • Sparge 1: 50 SLPM Note: <i>The 50 SLPM limit is comprised of 40 SLPM total for air and oxygen, and 10 SLPM for CO₂.</i> • Sparge 2: 20 SLPM

¹ Nitrogen is not required for many processes, but it is recommended for dissolved oxygen (DO) calibration.

Gas supply requirements, X-500 bioreactor

Parameter	Requirement
Gas pressure, process supply	300 to 500 kPa (3 to 5 bar, 43 to 72 psi) for all gases The gas pressure is regulated either via the equipment inlet by the customer or via the gas pressure regulators on the gas regulation panel. The gas regulation panel is an optional accessory mounted on the bioreactor vessel. If the gas regulation panel is used, all gas pressure regulators are set to factory settings by Cytiva. If the gas regulation panel is not used, the customer must make sure that the pressures and flow rates specified in this table are provided.
Gas pressure, instrument air	300 to 500 kPa (3 to 5 bar, 43 to 72 psi) for instrument air The gas pressure is regulated either via the equipment inlet by the customer or via the gas pressure regulators on the gas regulation panel. The gas regulation panel is an optional accessory mounted on the bioreactor vessel. If the gas regulation panel is used, all gas pressure regulators are set to factory settings by Cytiva. If the gas regulation panel is not used, the customer must make sure that the pressures and flow rates specified in this table are provided.

Parameter	Requirement
Gas capacity	- Air: 125 SLPM - Oxygen (O₂): 75 SLPM - Carbon dioxide (CO₂): 25 SLPM - Nitrogen (N₂)¹: 25 SLPM
Gas supply tubing	Recommended: PFA tubing, o.d. 12 mm, terminating on a D25 sanitary fitting for all gases
Gas inlet dimensions	o.d. 12 mm for all gases Note: <i>Unused D25 sanitary fittings on the gas inlets should be capped at the factory.</i>
Gas outlet dimensions	o.d. 12 mm push in fitting for all gases o.d. 1/4" push in fitting for pinch valves D34 sanitary fitting for exhaust (optional and based on the availability of a deflation system) Note: <i>Unused D34 sanitary fittings on the exhaust tubing should be capped at the factory and if deflation is not selected as an option. Unused 12 mm push-in fittings should be plugged at the factory.</i> Note: <i>If the pinch valve is not used, the PINCH VALVE 1 and PINCH VALVE 2 outlets are plugged at the factory.</i>
Gas flow rate to bioreactor bag	Overlay: 25 SLPM Sparge 1: 100 SLPM Note: <i>The 100 SLPM limit is comprised of air and O₂, and CO₂.</i> Sparge 2: 25 SLPM

¹ Nitrogen is used for measuring the oxygen transfer rate and the calibration of the DO probe.

Gas supply requirements, X-2000 bioreactor

Parameter	Requirement
Gas pressure, process supply	425 to 500 kPa (4.25 to 5 bar, 62 to 72 psi) for process air 300 to 500 kPa (3 to 5 bar, 43 to 72 psi) for all other gases The gas pressure is regulated either via the equipment inlet by the customer or via the gas pressure regulators on the gas regulation panel. The gas regulation panel is an optional accessory mounted on the bioreactor vessel. If the gas regulation panel is used, all gas pressure regulators are set to factory settings by Cytiva. If the gas regulation panel is not used, the customer must make sure that the pressures and flow rates specified in this table are provided.
Gas pressure, instrument air	300 to 500 kPa (3 to 5 bar, 43 to 72 psi) for instrument air The gas pressure is regulated either via the equipment inlet by the customer or via the gas pressure regulators on the gas regulation panel. The gas regulation panel is an optional accessory mounted on the bioreactor vessel. If the gas regulation panel is used, all gas pressure regulators are set to factory settings by Cytiva. If the gas regulation panel is not used, the customer must make sure that the pressures and flow rates specified in this table are provided.
Gas capacity	• Air: 400 SLPM • Oxygen (O₂): 200 SLPM • Carbon dioxide (CO₂): 100 SLPM • Nitrogen (N₂)¹: 100 SLPM
Gas supply tubing	Recommended: PFA tubing, o.d. 12 mm, terminating on a D25 sanitary fitting for all gases
Gas inlet dimensions	o.d. 12 mm for all gases Note: <i>Unused D25 sanitary fittings on the gas inlets should be capped at the factory.</i>
Gas outlet dimensions	o.d. 12 mm push in fitting for all gases o.d. ¼" push in fitting for pinch valves D34 sanitary fitting for exhaust (optional and based on the availability of a deflation system) Note: <i>Unused D34 sanitary fittings on the exhaust tubing should be capped at the factory and if deflation is not selected as an option. Unused 12 mm push-in fittings should be plugged at the factory.</i> Note: <i>If the pinch valve is not used, the PINCH VALVE 1 and PINCH VALVE 2 outlets are plugged at the factory.</i>

Parameter	Requirement
Gas flow rate to bioreactor bag	• Overlay: 100 SLPM • Sparge 1: 300 SLPM Note: The 300 SLPM limit is comprised of air and O₂, and CO₂. • Sparge 2: 100 SLPM

¹ Nitrogen is used for measuring the oxygen transfer rate and the calibration of the DO probe.

Temperature regulation

A TCU is required to control the temperature of the bioreactor.

A liquid-cooled TCU requires water or chilled water connections.

Contact a Cytiva service representative to discuss a TCU solution.

Water supply requirements

The following types of water are required for filling the bioreactor, the vessel jacket/TCU, and the bioreactor bags:

- Purified water
- Chilled water supply, depending on the TCU configuration
- Chilled water return, depending on the TCU configuration

Customer supplied equipment

The customer must supply the following:

- Personal Protective Equipment (PPE) as required
- Lifting and moving equipment as required (forklift or pallet truck)
- Customers of the X-2000 bioreactor: Rigging company responsible for uncrating the vessel
- Pry bar or large flat-head screwdriver
- Manual screwdriver or electric screwdriver with Phillips and hex bits
- Adjustable wrench
- A free-standing ladder to assemble the bioreactor system (mount the separately delivered parts onto the bioreactor vessel)

3 Site preparation checklist

Introduction

Read the previous chapters in this *Site Preparation Guide* before completing the checklist.

Complete the checklist in this chapter to make sure that all necessary preparations have been made for the installation of the product.

Send the completed checklist to Cytiva **before** Cytiva service personnel can install the *X-platform* bioreactor system. See details in Chapter 1.

Checklist

Requirement	YES	NO	N/A	Comment/specify
General				
Has the product been delivered?				
If yes, specify when the product was received (month/year)?	☐	☐	☐	
Will Cytiva service personnel be required to take site EHS (Environment, Health and Safety) or security training before doing the installation?	☐	☐	☐	
Assigned personnel				
Have personnel been assigned as specified? See Assign personnel for site preparation tasks, on page 4	☐	☐	☐	
Will the personnel require training on how to use the product?	☐	☐	☐	
Site selection				
Does the site comply with requirements for biosafety?	☐	☐	☐	
Environmental requirements				
Are the environmental conditions fulfilled as specified? See Environmental requirements, on page 18	☐	☐	☐	
Ambient temperature	☐	☐	☐	
Relative humidity	☐	☐	☐	
Atmospheric pressure	☐	☐	☐	
Forced ventilation	☐	☐	☐	
Space requirements				

Requirement	YES	NO	N/A	Comment/specify
Is the specified space available? See Dimensions, on page 8	☐	☐	☐	
Electrical requirements				
Are the electrical requirements fulfilled as specified? See Electrical power, on page 19	☐	☐	☐	
Wall outlets:	☐	☐	☐	
Main cabinet assembly	☐	☐	☐	
HMI	☐	☐	☐	
TCU	☐	☐	☐	
Remote pumps (2 outlets)	☐	☐	☐	
For X-50 and X-200 bioreactors: Scales (3 outlets) For X-500 and X-2000 bioreactors: Scales (6 outlets)	☐	☐	☐	
Additional equipment (optional)	☐	☐	☐	
Gas supply				
Are the gas supply requirements fulfilled as specified?	☐	☐	☐	
Gas supply tubing	☐	☐	☐	
Gas pressure and capacity	☐	☐	☐	
Gas inlet dimensions	☐	☐	☐	
Gas outlet dimensions	☐	☐	☐	
Computer requirements				
Will the product be connected to a network?	☐	☐	☐	
Is there on-site IT support available if needed?	☐	☐	☐	
User-supplied equipment				
Is Personal Protective Equipment (PPE) provided as required, (e.g., gloves, lab coats, etc.)?	☐	☐	☐	
Does the lifting and moving equipment meet the requirements?	☐	☐	☐	
General laboratory equipment				
Drain facility for waste collection	☐	☐	☐	

3 Site preparation checklist

Requirement	YES	NO	N/A	Comment/specify
Containers and tubing for filling the bag assembly and vessel jacket/TCU	☐	☐	☐	
Small containers for pH calibration (e.g., 50 mL conical tubes)	☐	☐	☐	
Wipes, spray bottle and waste containers	☐	☐	☐	
pH meter	☐	☐	☐	
Connectors to connect tubing				
Tubing clamps	☐	☐	☐	
Barb fittings	☐	☐	☐	
D25 and D34 sanitary fittings	☐	☐	☐	
Cable ties	☐	☐	☐	
User supplied consumables				
Water as specified	☐	☐	☐	
Clean and regulated gas supply: Air, CO ₂ , O ₂ , N ₂	☐	☐	☐	
Tubing for the optional connection to the customer exhaust network	☐	☐	☐	
Consumables and accessories (e.g., bag assembly, probes, probe sheaths)	☐	☐	☐	
pH calibration standards	☐	☐	☐	

Additional information

Customer contact information

Date (dd-mmm-yyyy)			
Company/Customer name			
Name			
Address			
Email			
Phone number			
Customer experience level	Beginner ☐	Intermediate ☐	Advanced ☐

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