Xuri™ Cellbag™ bioreactor

CELL EXPANSION

Xuri™ Cellbag™ bioreactors are single-use, functionally closed bags that provide a suitable environment for the rapid expansion of cells during cultivation while minimizing the risk of cross contamination. They are manufactured from multilayer, laminated, clear USP class VI plastics and require no sterilization or cleaning steps. Xuri™ Cellbag™ bioreactors are suitable for the manufacture of cellular immunotherapies using Xuri™ Cell Expansion Systems. They are available in a range of working volumes from 300 mL to 25 L and are supplied with the required tubing pre-attached to simplify set up.

Functionally closed environment

A functionally closed environment removes the need to open cultures during the expansion phase and minimizes the risk of contamination from operator intervention, adventitious agents, or between patient samples.

Automatable

Operations such as inoculation, harvesting, and media changes can be automated thus significantly reducing hands-on time and simplifying the culturing process.

Ready-to-use

Xuri™ Cellbag™ bioreactor 2 L and 10 L are supplied with the required tubing pre-attached so they can be loaded onto your Xuri™ Cell Expansion System as soon as they are unpacked.

Designed for use in a regulated environment

Xuri™ Cellbag™ bioreactors are supplied with a detailed validation guide providing you with all the relevant information you need to support regulatory compliance.

Fig 1. Xuri™ Cellbag™ bioreactors are designed for use with Xuri™ Cell Expansion Systems.

Principles of operation

The Xuri™ Cellbag™ bioreactor is mounted onto a rocking platform attached to the base of a Xuri™ Cell Expansion System and inflated. Culture medium and cells are then loaded into the Xuri™ Cellbag™ bioreactor via ports on the bag surface. An electric motor in the base creates a rocking motion that induces waves in the cell culture fluid to provide efficient mixing and gas transfer (Fig 2). The motion, speed, and angle of the rocking platform can be adjusted to suit different cell types and culture conditions.

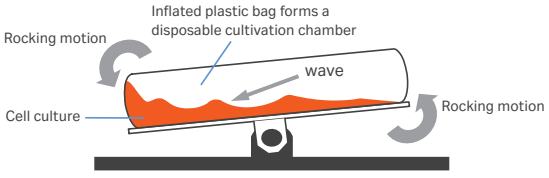


Fig 2. The wave action created by the rocking motion of the Xuri™ Cell Expansion Systems keeps the cells in motion and prevents settling in the Xuri™ Cellbag™ bioreactor.

If using the Xuri™ Cell Expansion System W25, process parameters such as temperature, pH, gas transfer, and flow rates are monitored by a range of optical sensors and controlled via UNICORN™ software. The resulting environment within the Xuri™ Cellbag™ bioreactor can easily support cell concentrations of 1 × 10^7 cells/mL, thereby producing enough cells for use in clinical manufacture as well as commercial production of cell therapies.

Components and materials of construction

Xuri™ Cellbag™ bioreactors are manufactured from multilayered USP Class VI plastics. The cell contact surface is an ethylene vinyl acetate (EVA)/low density polyethylene (LDPE) copolymer of the type routinely used for blood collection and handling of biological fluids. The outer layers are made of proprietary composites that provide flexibility, strength, and extremely low gas permeability (Table 1). Data are available to demonstrate biocompatibility. However, validation is recommended for specific applications.

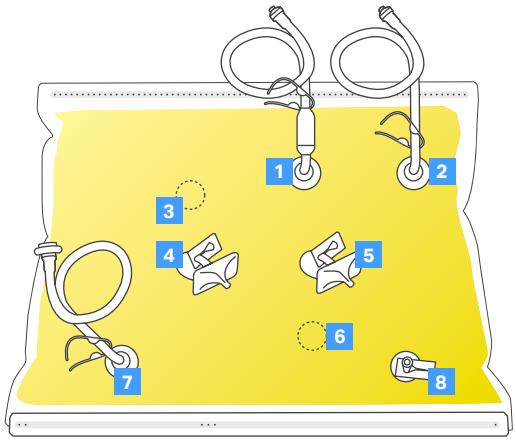
Table 1. Standard Xuri™ Cellbag™ bioreactor components and materials

Component	Material
Film	EVA/LDPE fluid contact surface provides biological compatibility; external layers provide strength and low gas permeability
Barbed ports	Polyethylene
Luer-Lok™ connections	Polypropylene
Tubing adapters	Polypropylene
C-Flex™ tubing	Thermoplastic elastomer (medical grade)
Silicone tubing	Platinum-cured silicone
PVC tubing	PVC for sterile welding of feed and waste bags
Internal perfusion filter, classic	Polyethylene, polyester, polypropylene, EVA , hydrophobic surface (priming)
Internal perfusion filter, 1.2 µm	Acrylic copolymer on a non-woven nylon mesh support and EVA top layer film (Xuri™ SP/CP† Cellbag™), average pore size 1.2 µm, hydrophilic surface (no priming)
pHOPT sensor	Luminophore dye attached to a polycarbonate backing
DOOPT II sensor	Luminophore disc attached to a polycarbonate backing with silicone adhesive
Vent filter	Hydrophobic glass fiber membrane, acrylic housing
Clave™ connector	Polycarbonate, polyester housing, silicon

† SP = Shot perfusion, CP = Continuous perfusion

Xuri™ Cellbag™ bioreactor is comprised of the following components:

- Film: designed for bioinert fluid contact and high mechanical strength
- Ports: allow access into and out of the bag
- Tubing, connectors, and clamps: facilitate and modulate fluid handling
- Rigid bars: allow installation onto the Xuri™ W25 system base unit
- Air filters: allow gas to flow in and out of the bag



1 Waste line
2 Feed line
3 DO sensor
4 Air out
5 Air in
6 pH sensor
7 Harvest line
8 Sampling port

Fig 3. Representation of typical Xuri™ Cellbag™ bioreactor.

Optical sensing technologies

Optical pH (pHOPT) and Dissolved Oxygen (DOOPT II) sensors (Fig 4) are single-use "spot" sensors embedded into the Xuri™ Cellbag™ bioreactor for the highly accurate measurement of pH and DO. These sensors are supplied preinstalled and provide optimal process control when used with the Xuri™ Cell Expansion System, Xuri™ Cellbag™ Control Unit (CBCU), UNICORN™ software, and dedicated fiber-optic cables.

- Highly accurate measurements with minimal drift over time
- Single-use formats reduce setup time
- Optimized for minimum and maximum Xuri™ Cellbag™ bioreactor working volumes
- Compatible with internal perfusion filter

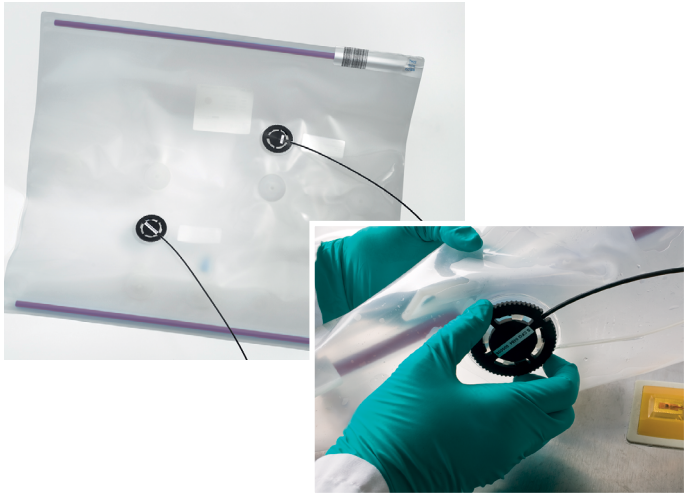


Fig 4. Xuri™ Cellbag™ bioreactor adapter/optical fiber cables are attached to ports embedded in to the Xuri™ Cellbag™ bioreactor surface.

Table 2. Optical sensor specifications

pH measurement range	pH 4.5 to 8.5
pH control range	pH 6 to 8
pH accuracy within control range	±0.05 pH within 0.25 pH from offset calibration pH*
	±0.10 pH within 0.25 to 0.5 pH from offset calibration pH*

* Offset calibration should be done at the set point pH

Table 3. Optical dissolved oxygen sensor specifications

Dissolved oxygen measurement range	0% to 250% air saturation
Dissolved oxygen accuracy within control range	±3% air saturation after calibration at 100% air saturation

Perfusion solution

The Cellbag™ bioreactor portfolio offers a line of perfusion solutions for applications in cell intensified seed train, small-scale production, and other processes. Perfusion bags are fitted with a perfusion filter that floats on the medium and is used to retain cells in the bag during perfusion cultivation or medium exchange. The filter is connected to the wall of the bioreactor via a harvest tube (Fig 5). The outside port of this harvest tube ends in a Luer connector, allowing for the attachment of pump tubing and harvest vessel. Operating a peristaltic pump in the harvest line will create suction and draw liquid through the filter into the harvest vessel. Cells are retained by the filter that stays clear due to movement across the culture surface. Lateral movement of the filter delays cell/debris attachment to the filter, which reduces the rate of fouling. The large filter surface area also enables a high flow rate.

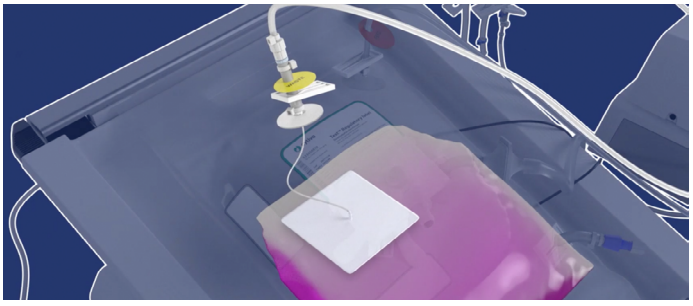


Fig 5. Two types of membranes are available for Xuri™ Cellbag™ bioreactors. The Classic Perfusion Filter Cellbags have a 7 to 12 µm filter in sintered porous polyethylene (PE) and the 1.2um Perfusion Filter Cellbags have a 1.2 µm filter in acrylic copolymer.

Operating specifications

The Xuri™ Cellbag™ bioreactor is designed to meet the following specifications:

- Operating temperature range: 10°C to 50°C
- Maximum operating pressure: 1.5 psig (0.1 bar)

Table 4. Xuri™ Cellbag™ bioreactor working volumes

Bag size (L)	Minimum working volume	Maximum working volume (L)	Tray
2	300 mL	1	Tray 10
10	500 mL	5	Tray 10
20	1 L	10	Tray 20
50	5 L	25	Tray 50

Regulatory conformance

Xuri™ Cellbag™ bioreactors comply with USP <1043> “ancillary materials for cell, gene, and tissue-engineered products”, within the responsibilities applicable to the supplier. Other aspects of USP <1043> will be the responsibility of the end-user to assess. Cytiva cannot fulfill USP <1043> in regards to application and therapy specific aspects (e.g., use in finished therapeutic, assessment of removal from a finished therapeutic, and possibly biocompatibility, cytotoxicity or adventitious agent testing).

Sterility and endotoxin

- Xuri™ Cellbag™ bioreactors are sterilized by gamma irradiation at 27.5 – 40 kGy
- Cellbag™ bioreactor release requires < 0.125 EU endotoxin/mL based on daily process sample

Ordering information

Product code	Basic Cellbags (No Perfusion Filter)
29105492	Xuri™ Celllbag™ bioreactors, 2 L, Basic
29105494	Xuri™ Celllbag™ bioreactors, 2 L, pH and DO
29105493	Xuri™ Celllbag™ bioreactors, 10 L, Basic
29105495	Xuri™ Celllbag™ bioreactors, 10 L, pH and DO
29105496	Xuri™ Celllbag™ bioreactors, 20 L, pH and DO
29105497	Xuri™ Celllbag™ bioreactors, 50 L, pH and DO

Product code	Classic Perfusion Filter Cellbags
29105498	Xuri™ Celllbag™ bioreactors, 2 L, Perfusion, pH and DO
29108442	Xuri™ Celllbag™ bioreactors, 2 L, Perfusion
29105499	Xuri™ Celllbag™ bioreactors, 10 L, Perfusion, pH and DO
29108443	Xuri™ Celllbag™ bioreactors, 10 L, Perfusion
29105500	Xuri™ Celllbag™ bioreactors, 20 L, Perfusion, pH and DO

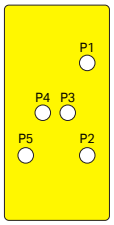
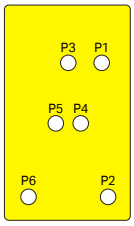
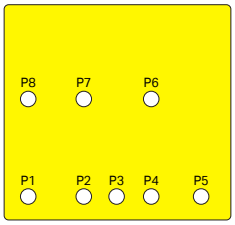
Note: all Classic Perfusion Filter Cellbags in 2 L and 10 L size possess a pre-attached waste bag (5 L).

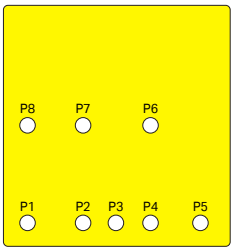
Product code	1.2 µm Perfusion Filter Cellbags
29279162	Xuri™ Celllbag™ bioreactors, 2 L, Shot perfusion, pH and DO
29279164	Xuri™ Celllbag™ bioreactors, 2 L, Continuous perfusion, pH and DO
29279169	Xuri™ Celllbag™ bioreactors, 2 L, Shot perfusion
29279170	Xuri™ Celllbag™ bioreactors, 2 L, Continuous perfusion
29279165	Xuri™ Celllbag™ bioreactors, 10 L, Perfusion, pH and DO
29279171	Xuri™ Celllbag™ bioreactors, 10 L, Perfusion

Note: All 1.2 µm Perfusion Filter Cellbags possess a pre-attached waste bag (10 L).

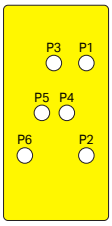
Xuri™ Cell Expansion System Cellbag™ bioreactors can be customized to suit your specific cell culture process needs. Our product specialists will work with you to create your cell culture bag for use with the Xuri™ Cell Expansion system.

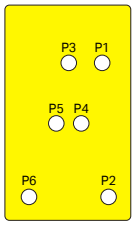
Basic

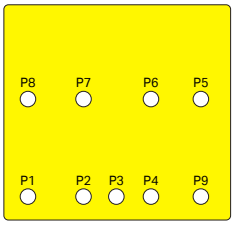
Size	Sensors	Product code	Ports	Description	Ports	Description
2 L 	No	29105492	1	Feed • Material: silicone • ID: 1/16'' (1.6mm) • OD: 3/16'' (4.8mm) • Length: 36'' (914mm) • Material: PVC • ID: 1/8'' (3.2mm) • OD: 3/16'' (4.8mm) • Length: 60'' (1524mm)	5	Harvest • Material: silicone • ID: 1/8'' (3.2mm) • OD: 1/4'' (6.4mm) • Length: 36'' (914mm) • Material: PVC • ID: 1/8'' (3.2mm) • OD: 3/16'' (4.8mm) • Length: 60'' (1524mm)
			2	Sample Clave™	6	N/A
			3	Air inlet filter	7	N/A
			4	Air outlet filter, check valve	8	N/A
	pH and DO	29105494	1	Feed • Material: silicone • ID: 1/16'' (1.6mm) • OD: 3/16'' (4.8mm) • Length: 36'' (914mm) • Material: PVC • ID: 1/8'' (3.2mm) • OD: 3/16'' (4.8mm) • Length: 60'' (1524mm)	5	Harvest • Material: silicone • ID: 1/8'' (3.2mm) • OD: 1/4'' (6.4mm) • Length: 36'' (914mm) • Material: PVC • ID: 1/8'' (3.2mm) • OD: 3/16'' (4.8mm) • Length: 60'' (1524mm)
			2	Sample Clave™	6	N/A
			3	Air inlet filter	7	N/A
			4	Air outlet filter, check valve	8	N/A
10 L 	No	29105493	1	Feed • Material: silicone • ID: 1/8'' (3.2mm) • OD: 1/4'' (6.4mm) • Length: 36'' (914mm) • Material: PVC • ID: 1/8'' (3.2mm) • OD: 3/16'' (4.8mm) • Length: 60'' (1524mm)	5	Harvest • Material: silicone • ID: 1/8'' (3.2mm) • OD: 1/4'' (6.4mm) • Length: 36'' (914mm) • Material: PVC • ID: 1/8'' (3.2mm) • OD: 3/16'' (4.8mm) • Length: 60'' (1524mm)
			2	Sample Clave™	6	N/A
			3	Air inlet filter	7	N/A
			4	Air outlet filter, check valve	8	N/A
	pH and DO	29105495	1	Feed • Material: silicone • ID: 1/8'' (3.2mm) • OD: 1/4'' (6.4mm) • Length: 36'' (914mm) • Material: PVC • ID: 1/8'' (3.2mm) • OD: 3/16'' (4.8mm) • Length: 60'' (1524mm)	5	Harvest • Material: silicone • ID: 1/8'' (3.2mm) • OD: 1/4'' (6.4mm) • Length: 36'' (914mm) Material: PVC • ID: 1/8'' (3.2mm) • OD: 3/16'' (4.8mm) • Length: 60'' (1524mm)
			2	Sample Clave™	6	N/A
			3	Air inlet filter	7	N/A
			4	Air outlet filter, check valve	8	N/A
20 L 	pH and DO	29105496	1	• Material: C-Flex™ • ID: 3/8'' (9.5mm) • OD: 5/8'' (15.9mm) • Length: 39'' (991mm) • ReadyMate™ connector	5	• Material: C-Flex™ • ID: 3/8'' (9.5mm) • OD: 5/8'' (15.9mm) • Length: 39'' (991mm)
			2	• Material: C-Flex™ • ID: 3/8'' (9.5mm) • OD: 5/8'' (15.9mm) • Length: 39'' (991mm) • ReadyMate™ connector	6	Air inlet filter
			3	Sample Clave™	7	Air outlet filter, check valve
			4	• Material: C-Flex™ • ID: 1/8'' (3.2mm) • OD: 1/4'' (6.4mm) • Length: 39'' (991mm) • ×2 via "Y" connector	8	• Material: silicone • ID: 3/16'' (4.8mm) • OD: 3/8'' (9.5mm) • Length: 18'' (457mm)

50 L 	pH and DO	29105497	1	• Material: C-Flex™ • ID: 3/8'' (9.5mm) • OD: 5/8'' (15.9mm) • Length: 39'' (991mm) • ReadyMate™ connector	5	• Material: C-Flex™ • ID: 3/8'' (9.5mm) • OD: 5/8'' (15.9mm) • Length: 39'' (991mm)
			2	• Material: C-Flex™ • ID: 3/8'' (9.5mm) • OD: 5/8'' (15.9mm) • Length: 39'' (991mm) • ReadyMate™ connector	6	Air inlet filter
			3	Sample Clave™	7	Air outlet filter, check valve
			4	• Material: C-Flex™ • ID: 1/8'' (3.2mm) • OD: 1/4'' (6.4mm) • Length: 39'' (991mm) • ×2 via "Y" Connector	8	• Material: silicone • ID: 3/16'' (4.8mm) • OD: 3/8'' (9.5mm) • Length: 18'' (457mm)

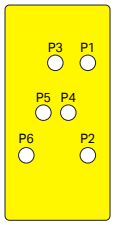
Classic Perfusion

Size	Sensors	Product code	Ports	Description	Ports	Description
2 L 	No	29108442	1	Feed • Material: silicone • ID: 1/16'' (1.6mm) • OD: 3/16'' (4.8mm) • Length: 36'' (914mm) • Material: PVC • ID: 1/8'' (3.2mm) • OD: 3/16'' (4.8mm) • Length: 60'' (1524mm)	5	Air outlet filter, check valve
			2	Sample Clave™	6	Harvest • Material: silicone • ID: 1/8'' (3.2mm) • OD: 1/4'' (6.4mm) • Length: 36'' (914mm) • Material: PVC • ID: 1/8'' (3.2mm) • OD: 3/16'' (4.8mm) • Length: 60'' (1524mm)
			3	Waste • Material: silicone • ID: 1/16'' (1.6mm) • OD: 3/16'' (4.8mm) • Length: 36'' (914mm) Material: PVC • ID: 1/8'' (3.2mm) • OD: 3/16'' (4.8mm) • Length: 60'' (1524mm)	7	N/A
			4	Air inlet filter	8	N/A

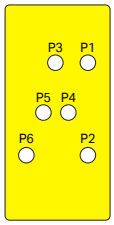
	pH and DO	29105498	1	Feed • Material: silicone • ID: 1/16'' (1.6mm) • OD: 3/16'' (4.8mm) • Length: 36'' (914mm) • Material: PVC • ID: 1/8'' (3.2mm) • OD: 3/16'' (4.8mm) • Length: 60'' (1524mm)	5	Air outlet filter, check valve
			2	Sample Clave™	6	Harvest • Material: silicone • ID: 1/8'' (3.2mm) • OD: 1/4'' (6.4mm) • Length: 36'' (914mm) • Material: PVC • ID: 1/8'' (3.2mm) • OD: 3/16'' (4.8mm) • Length: 60'' (1524mm)
			3	Waste: • Material: silicone • ID: 1/16'' (1.6mm) • OD: 3/16'' (4.8mm) • Length: 36'' (914mm) • Material: PVC • ID: 1/8'' (3.2mm) • OD: 3/16'' (4.8mm) • Length: 60'' (1524mm)	7	N/A
			4	Air inlet filter	8	N/A
10 L 	N/A	29108443	1	Feed • Material: silicone • ID: 1/8'' (3.2mm) • OD: 1/4'' (6.4mm) • Length: 36'' (914mm) • Material: PVC • ID: 1/8'' (3.2mm) • OD: 3/16'' (4.8mm) • Length: 60'' (1524mm)	5	Air outlet filter, check valve
			2	Sample Clave™	6	Harvest • Material: silicone • ID: 1/8'' (3.2mm) • OD: 1/4'' (6.4mm) • Length: 36'' (914mm) • Material: PVC • ID: 1/8'' (3.2mm) • OD: 3/16'' (4.8mm) • Length: 60'' (1524mm)
			3	Waste • Material: silicone • ID: 1/8'' (3.2mm) • OD: 1/4'' (6.4mm) • Length: 36'' (914mm) • Material: PVC • ID: 1/8'' (3.2mm) • OD: 3/16'' (4.8mm) • Length: 60'' (1524mm)	7	N/A
			4	Air inlet filter	8	N/A

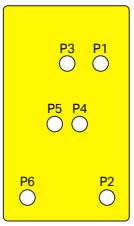
	pH and DO	29105499	1	Feed • Material: silicone • ID: 1/8'' (3.2mm) • OD: 1/4'' (6.4mm) • Length: 36'' (914mm) • Material: PVC • ID: 1/8'' (3.2mm) • OD: 3/16'' (4.8mm) • Length: 60'' (1524mm)	5	Air outlet filter, check valve
			2	Sample Clave™	6	Harvest • Material: silicone • ID: 1/8'' (3.2mm) • OD: 1/4'' (6.4mm) • Length: 36'' (914mm) • Material: PVC • ID: 1/8'' (3.2mm) • OD: 3/16'' (4.8mm) • Length: 60'' (1524mm)
			3	Waste • Material: silicone • ID: 1/8'' (3.2mm) • OD: 1/4'' (6.4mm) • Length: 36'' (914mm) • Material: PVC • ID: 1/8'' (3.2mm) • OD: 3/16'' (4.8mm) • Length: 60'' (1524mm)	7	N/A
			4	Air inlet filter	8	N/A
20 L 	pH and DO	29105500	1	• Material: C-Flex™ • ID: 3/8'' (9.5mm) • OD: 5/8'' (15.9mm) • Length: 39'' (991mm) • Ready Mate Connector	6	Air inlet filter
			2	• Material: C-Flex™ • ID: 3/8'' (9.5mm) • OD: 5/8'' (15.9mm) • Length: 39'' (991mm) • Ready Mate • Connector	7	Air outlet filter, check valve
			3	Sample Clave™	8	• Material: silicone • ID: 3/16'' (4.8mm) • OD: 3/8'' (9.5mm) • Length: 18'' (457mm)
			4	• Material: C-Flex™ • ID: 3/8'' (9.5mm) • OD: 5/8'' (15.9mm) • Length: 39'' (991mm)	9	• Material: C-Flex™ • ID: 1/8'' (3.2mm) • OD: 1/4'' (6.4mm) • Length: 39'' (991mm) • ×2 via "Y" Connector
			5	Y Connection with Sample Clave™		

1.2 µm Perfusion—Continuous perfusion (CP)

Size	Sensors	Product code	Ports	Description	Ports	Description
2 L 	No	29279170	1	Feed • Material: silicone • ID: 1/16'' (1.6mm) • OD: 3/16'' (4.8mm) • Length: 36'' (914mm) • Material: PVC • ID: 1/8'' (3.2mm) • OD: 3/16'' (4.8mm) • Length: 60'' (1524mm)	5	Air outlet filter, check valve
			2	Sample Clave™	6	Harvest • Material: silicone • ID: 1/8'' (3.2mm) • OD: 1/4'' (6.4mm) • Length: 36'' (914mm) • Material: PVC • ID: 1/8'' (3.2mm) • OD: 3/16'' (4.8mm) • Length: 60'' (1524mm)
			3	Waste • Material: silicone • ID: 1/16'' (1.6mm) • OD: 3/16'' (4.8mm) • Length: 36'' (914mm) • Material: PVC • ID: 1/8'' (3.2mm) • OD: 3/16'' (4.8mm) • Length: 60'' (1524mm)	7	N/A
			4	Air inlet filter	8	N/A
	pH and DO	29279164	1	Feed • Material: silicone • ID: 1/16'' (1.6mm) • OD: 3/16'' (4.8mm) • Length: 36'' (914mm) • Material: PVC • ID: 1/8'' (3.2mm) • OD: 3/16'' (4.8mm) • Length: 60'' (1524mm)	5	Air outlet filter, check valve
			2	Sample Clave™	6	Harvest • Material: silicone • ID: 1/8'' (3.2mm) • OD: 1/4'' (6.4mm) • Length: 36'' (914mm) • Material: PVC • ID: 1/8'' (3.2mm) • OD: 3/16'' (4.8mm) • Length: 60'' (1524mm)
			3	Waste • Material: silicone • ID: 1/16'' (1.6mm) • OD: 3/16'' (4.8mm) • Length: 36'' (914mm) • Material: PVC • ID: 1/8'' (3.2mm) • OD: 3/16'' (4.8mm) • Length: 60'' (1524mm)	7	N/A
			4	Air inlet filter	8	N/A

1.2 µm Perfusion—Shot perfusion (SP)

Size	Sensor	Product code	Ports	Description	Ports	Description
2 L 	No	29279169	1	Feed • Material: silicone • ID: 1/8'' (3.2mm) • OD: 1/4'' (6.4mm) • Length: 36'' (914mm) • Material: PVC • ID: 1/8'' (3.2mm) • OD: 3/16'' (4.8mm) • Length: 60'' (1524mm)	5	Air outlet filter, check valve
			2	Sample Clave™	6	Harvest • Material: silicone • ID: 1/8'' (3.2mm) • OD: 1/4'' (6.4mm) • Length: 36'' (914mm) • Material: PVC • ID: 1/8'' (3.2mm) • OD: 3/16'' (4.8mm) • Length: 60'' (1524mm)
			3	Waste • Material: silicone • ID: 1/8'' (3.2mm) • OD: 1/4'' (6.4mm) • Length: 36'' (914mm) • Material: PVC • ID: 1/8'' (3.2mm) • OD: 3/16'' (4.8mm) • Length: 60'' (1524mm)	7	N/A
			4	Air inlet filter	8	N/A
	pH and DO	29279162	1	Feed • Material: silicone • ID: 1/8'' (3.2mm) • OD: 1/4'' (6.4mm) • Length: 36'' (914mm) • Material: PVC • ID: 1/8'' (3.2mm) • OD: 3/16'' (4.8mm) • Length: 60'' (1524mm)	5	Air outlet filter, check valve
			2	Sample Clave™	6	Harvest • Material: silicone • ID: 1/8'' (3.2mm) • OD: 1/4'' (6.4mm) • Length: 36'' (914mm) • Material: PVC • ID: 1/8'' (3.2mm) • OD: 3/16'' (4.8mm) • Length: 60'' (1524mm)
			3	Waste • Material: silicone • ID: 1/8'' (3.2mm) • OD: 1/4'' (6.4mm) • Length: 36'' (914mm) • Material: PVC • ID: 1/8'' (3.2mm) • OD: 3/16'' (4.8mm) • Length: 60'' (1524mm)	7	N/A
			4	Air inlet filter	8	N/A

10 L 	No	29279171	1	Feed • Material: silicone • ID: 1/8'' (3.2mm) • OD: 1/4'' (6.4mm) • Length: 36'' (914mm) • Material: PVC • ID: 1/8'' (3.2mm) • OD: 3/16'' (4.8mm) • Length: 60'' (1524mm)	5	Air outlet filter, check valve
			2	Sample Clave™	6	Harvest • Material: silicone • ID: 1/8'' (3.2mm) • OD: 1/4'' (6.4mm) • Length: 36'' (914mm) • Material: PVC • ID: 1/8'' (3.2mm) • OD: 3/16'' (4.8mm) • Length: 60'' (1524mm)
			3	Waste • Material: silicone • ID: 1/8'' (3.2mm) • OD: 1/4'' (6.4mm) • Length: 36'' (914mm) • Material: PVC • ID: 1/8'' (3.2mm) • OD: 3/16'' (4.8mm) • Length: 60'' (1524mm)	7	N/A
			4	Air inlet filter	8	N/A
	pH and DO	29279165	1	Feed • Material: silicone • ID: 1/8'' (3.2mm) • OD: 1/4'' (6.4mm) • Length: 36'' (914mm) • Material: PVC • ID: 1/8'' (3.2mm) • OD: 3/16'' (4.8mm) • Length: 60'' (1524mm)	5	Air outlet filter, check valve
			2	Sample Clave™	6	Harvest • Material: silicone • ID: 1/8'' (3.2mm) • OD: 1/4'' (6.4mm) • Length: 36'' (914mm) • Material: PVC • ID: 1/8'' (3.2mm) • OD: 3/16'' (4.8mm) • Length: 60'' (1524mm)
			3	Waste • Material: silicone • ID: 1/8'' (3.2mm) • OD: 1/4'' (6.4mm) • Length: 36'' (914mm) • Material: PVC • ID: 1/8'' (3.2mm) • OD: 3/16'' (4.8mm) • Length: 60'' (1524mm)	7	N/A
			4	Air inlet filter	8	N/A

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