金仪盛世
JYSS BIO

CUR Current Single-Use Bioreactor

Compared to traditional stainless steel bioreactors, single-use bioreactors have many advantages: low upfront investment, fast production and high process flexibility; no in-line cleaning and in-situ sterilization; time saving, reduced equipment footprint, reduced manpower and water for injection; facilitates the MAH model and technology transfer.

JYSS BIO CUR series adopts the principle of "non-blistering cross-interface oxygen transfer mechanism" for mixing, its advanced mass transfer method, while meeting the needs of large volume production, avoiding the surface tension and high shear of the stirring paddle caused by the traditional agitated bioreactor blistering, which can cause damage to the cells. The average shear rate of the fluid in the reactor can be less than $20S^{-1}$ within the normal operating speed range, allowing high density and high viability of shear sensitive cells.

CUR 2.5L

CUR 1200L

Advantages

- Non-bubbling interface oxygen transfer mechanism, with high oxygen transfer efficiency
- No paddle or bottom pass, need to add defoamer, with low shear
- Easy to achieve high density, high viability cell culture up to 10^8cells/ml
- Intelligent control system ,simple operating interface
- Short delivery times, 100% inspection of consumables
- Flexible specifications, customized to suit customer requirements

Application

Cell suspension culture

Suitable for suspension culture of HEK293, CHO, etc.

Different culture processes are available, such as batch culture, batch flow addition, perfusion

Working Principle

The non-bubbling cross-interfacial oxygen transfer mechanism can generate a surgethrough mechanical oscillation, so that the culture fluid repeatedly flushed inside the culture bag, which make the surface oxygen quickly dissolved; through the culture fluid flushing dragged gas, creating nano-scale dissolvable micro bubbles, and bubbles constantly mixed, each cell can get sufficient oxygen and nutrients to maintain normal cell growth and metabolism. This new oxygen transfer mechanism effectively avoids the damage to cell formation caused by traditional bubbling and mechanical agitation mechanisms, resulting in a significant increase in cell culture density and a marked increase in virus and protein production.

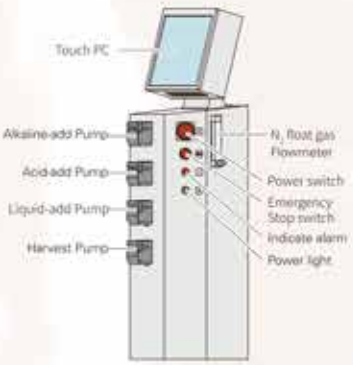
Composition Of Component

The CUR single-use bioreactor series consist of a control system and a tank. As shown in the diagram below, the tank consists of an oscillator and a culture tank for the bioreactor bags.

The control tower is the electronic control system for the reactor. External sensors such as speed, temperature, pH, DO, conductivity, charge, weighing and other parameters of the conventional culture process can be displayed and controlled on the HMI.
The CUR single-use bioreactor series are all made of 304 stainless steel brushed plates on the outer surface, in line with GMP standards; the core components are made of imported high quality products and all electrical parts are CE certified for reliable and stable performance.

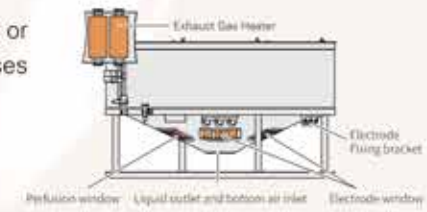
Control System

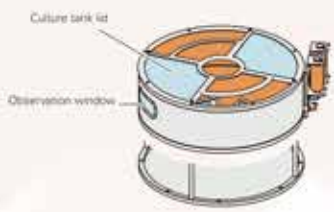
- Remote online monitoring of parameters and processes
- Real-time collection of key data such as pH, DO, temperature and speed, generating reports
- Reserved communication interface to support signal interfacing with third party equipment and systems
- Multi-level account management system that complies with FDA 21 CFR part 11 electronic records and electronic signatures



Functional Modules

- Oscillator Module
  Automatic speed adjustment of the oscillator can be achieved through a computer or control tower, creating a stable rotating current in the culture vessel. The oscillator uses a variable frequency motor, which is durable, safe, and stable
- Temperature Control Module
  Using heating film, the heating process is stable and uniform
- On-line pH control module
  Real-time control of pH value during the process
  Automatic mode: pH sensor is associated with acid-base pump and CO_2 to achieve closed loop control and record acid-base cumulative flow rate
  Manual mode: acid pump (CO_2 gas valve) and alkali pump can be independently controlled in operating interface
- DO Module
  Automatic mode: DO value is controlled in real time, it is associated with N_2 gas valve and O_2 gas valve to realize closed-loop control and form accumulative quantity
  Record the real-time flow of N_2,O_2 and count the cumulative value
  Manual mode: N_2,O_2 can be independently controlled on the operating surface, the system can record the real-time flow of N_2,O_2 and count the cumulative value

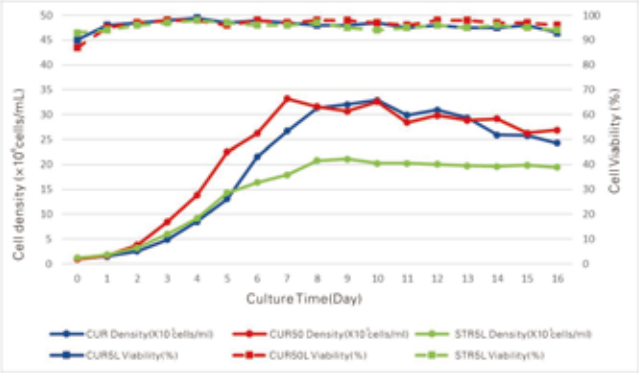




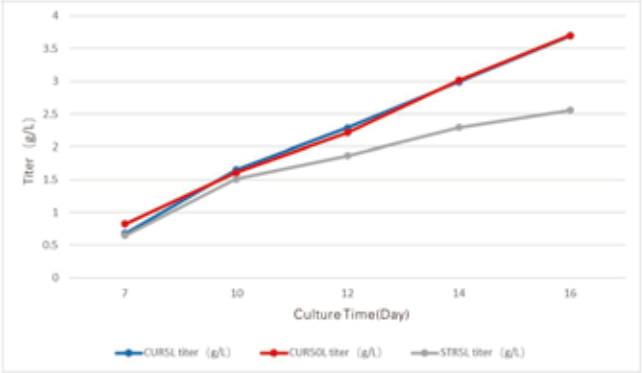
Cell Culture

mAb product CHO

CHO was fed-batch culture in a CUR5/50, the growth curve of CUR bioreactor was consistent with the stirred bioreactor. The cell viability was stable, and the peak density of the cells was increased by more than 50% compared to the stirred bioreactor. In the later stage of culture, the cell density remained at a higher level, which was superior to the stirred bioreactor. And the final protein expression in CUR bioreactor is nearly 40% higher than the stirred bioreactor.



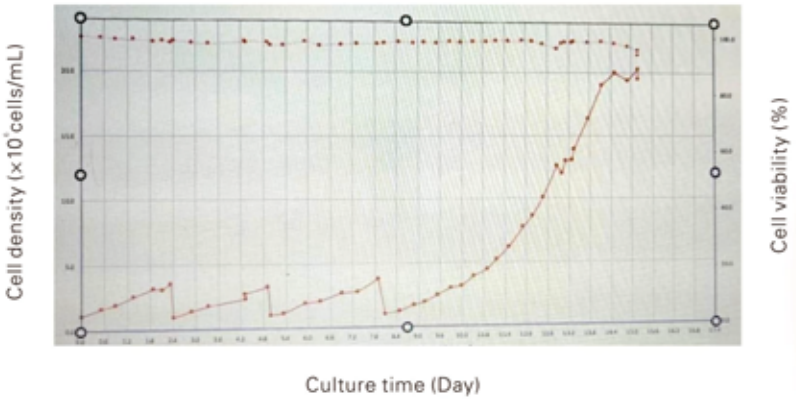
The peak density was increased by more than 50% compared to the stirred bioreactor with same process



The final protein expression in CUR bioreactor is nearly 40% higher than the stirred bioreactor

Vaccine product HEK293 cells

Adenovirus batch culture of HEK293 cells was carried out in CUR1200L bioreactor. Cells were cultured by perfusion after reaching a certain cell density. The maximum cell density was 20×10^6 cells/mL, and the viability was maintained above 95%. Compared with the stirred reactor, the toxin production per cell is increased by 5 times, and the toxin production per unit volume of the reactor is increased by 50 times. The project has been put into commercial production.



Cell therapy product Induced pluripotent Stem Cell iPSCs

CUR2.5L was used for the expansion of undifferentiated induced pluripotent stem cells (iPSCs). The cell expansion was 5-10 times and the cell pluripotency was maintained with excellent performance. The project has been accepted by IND.

Different Cell Cultures

Batch culture of the following cell lines was performed in a CUR 50 bioreactor with the highest cell densities as follows.

Cell line	Cell density
CHO-S	2.5×10^7 cells/mL
BHK-21	3.0×10^7 cells/mL
CHO-K1	2.0×10^7 cells/mL
SF9 (insect)	18×10^7 cells/mL

Technical Parameter

Parameters	2.5 L	5 L	50 L	300 L	500 L	1200 L	2000 L
Dimension(L*W*H)(mm)	678*442*550	1016*628*1435	1505*1115*1677	2196*1788*1990	2425*2045*2410	2618*2165*2658	Bioreactor 2890*2890*3143 Control cabine 781*799*1577
Working Volume(L)	0.5 ~ 2.5	2 ~ 5	15 ~ 50	50 ~ 300	120 ~ 500	150 ~ 1200	180 ~2000
Weight(kg)	66	155	595	1025	2072	2491	Bioreactor:7784 Control cabine:147
Power(kw)	0.6	0.6	1	4	6.5	7.5	4
Recommend of Speed(rpm)	45-70	45-70	40-60	25-30	25-30	20-30	20-25
Speed Range(rpm)	20-90	20-75	30-60	20-35	20-35	20-30	20-25
Speed control accuracy	±1 rpm			±0.5 rpm			
pH Range	Digital intelligent electrode, control range 6.00-8.00, control accuracy ±0.02						
DO Range	Optical intelligent electrode, control range 20%-100% air saturation, control accuracy ±5%						
Temperature Range	Two-point temperature control, control range room temperature to 42℃, control accuracy ±0.2℃						Jacketed temperature control, control range 5-42℃, control accuracy ±0.2℃
Conductivity Control	/	Accuracy ±5%ms/cm, range 0.02~500ms/cm					
Weight Display	/	Define the full range according to customer requirements, the accuracy is 0.2kg when the weighing value ≤ 100kg, the error is ±0.2% of the reading when the weighing value > 100kg					

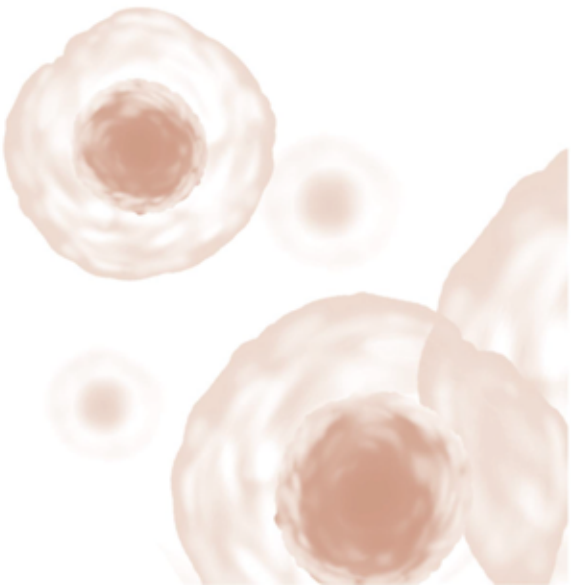
Order Information

Part Number	Volume	Configuration Description
CUR-0002SA-01	2L	2.5L basic conguration, dissolved oxygen electrode, pH electrode
CUR-0005SA-01	5L	5L basic conguration, dissolved oxygen electrode, pH electrode
CUR-0050SA-01	50L	50L basic conguration, dissolved oxygen electrode, pH electrode
CUR-0050SB-01		50L basic conguration, dissolved oxygen electrode, pH electrode, weighing,exhaust gas heating, pressure monitoring
CUR-0050SC-01		50L basic conguration, dissolved oxygen electrode, pH electrode, weighing, exhaust gas heating, pressure monitoring, conductivity electrode, bottom aeration
CUR-0050SD-01		50L basic conguration, dissolved oxygen electrode *2, pH electrode *2, weighing,exhaust gas heating, pressure monitoring, conductivity electrode, bottom aeration
CUR-0050SE-01		50L basic conguration, dissolved oxygen electrode, pH electrode, weighing,exhaust gas heating, pressure monitoring, conductivity electrode, bottom aeration, USP, continuous perfusion
CUR-0050SF-01		50L basic conguration, dissolved oxygen electrode *2, pH electrode *2, weighing,exhaust gas heating, pressure monitoring, conductivity electrode, bottom aeration, USP, continuous perfusion

Basic configuration: vibration, data management, temperature electrode, mass flow controller, sterilizer
*Above configuration 300L, 500L, 1200L, 2000L are available

Optional Accessories

PART-A	Climbing ladders, for CUR300
PART-B	Climbing ladder, for CUR500 and CUR1200
PART-C	Sterilizer H278, 120 electrodes
PART-D	Sterilizer H380, 225 electrodes
PART-E	Sterilizer H578, 425 electrodes
PART-F	Bagging assistant, CUR300-1200
PART-G	Electrode mounting clamp, 12.7mm in diameter
PART-H	Electrode transfer rack, 425 electrodes



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