

TideCell®

High-Density Cell Culture System



The next reliable choice after **roller bottles**

Simple,

Compact,

Novel,

Future !

Short-Cut from Roller Bottles to a HD Bioreactor

TideCell® High-Density bioreactor is the extended large scale system of well-known BelloCell® bioreactor presented by CESCO Bioengineering Corporation. By employing similar “Roller Bottle” concepts, TideCell bioreactor, not only inherit the simple and stable features as roller bottles, but the entire process is also controllable and cell density can be elevated up to 200 folds. The output cell density of 100 L TideCell system is equivalent to that in 20,000 roller bottles and has been successfully delivered to the biopharmaceutical industry. Scale-up process is no longer complicated but as straight-forward as roller bottles, saving tremendous labors, space, and cost. As the only packed-bed bioreactor in the world for animal cell culture over 100 L packed-bed volume, TideCell bioreactor features as disposable, easy-to-use, high cell density with unlimited oxygen transfer and scale-up capability.

TideCell® HD system provides flexible choices of matrix vessels from 2 L to 100 L as well as mixing bags from 20 L to 1,000 L. Accessories including pH/DO control, feed/harvest control, cell harvest and glucose monitoring systems are optional. Single-use, hybrid, autoclavable, batch, fed-batch or perfusion modes can be integrated into the systems to meet customers’ demands. TideCell bioreactor represents a flexible, optimal, powerful, and robust system for biological products development and production.

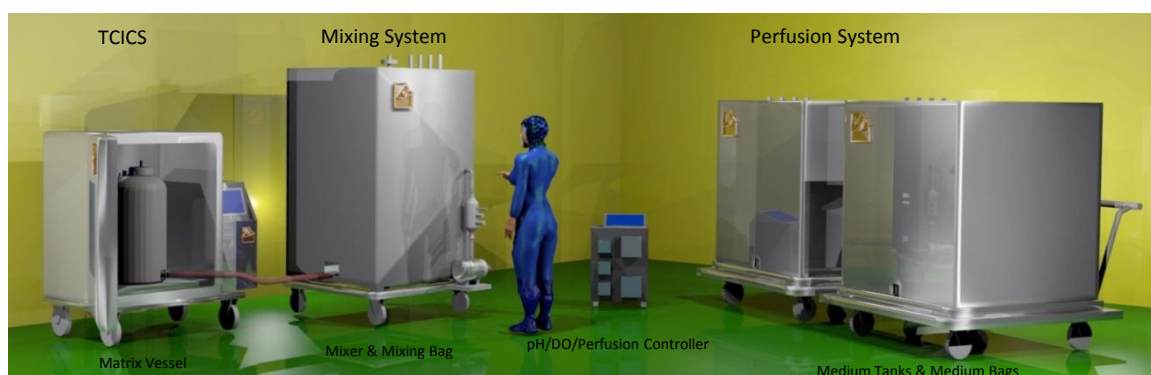


Fig. 1. TideCell System Composition: TideCell High-Density Cell Culture System is modulated by TideCell Incubation and Controller System (TCICS), Mixing System, and Perfusion System. TCICS, where the Matrix Vessel is installed, controls the Tidal motion. Mixing System is incorporated with Thermostatic Mixer, and Mixing Bag. Perfusion System includes pH/DO/Perfusion Controller, Feed/Harvest tanks, Balance, and Medium bags. Depending on the process requirement, combination of these systems with different scales and functions enables the maximum manufacture output.

TideCell® HD system inherits the same patented principle of BelloCell®'s. A matrix vessel is packed with porous BioNOC II carriers and functions as an artificial lung with a huge contact surface for nutrition and aeration. The culture medium is periodically drawn from the external medium bag (mixing bag) into the matrix vessel to submerge the carriers and withdrawn from the vessel to expose the carriers. As a result, cells entrapped inside the carriers are able to receive sufficient nutrient and oxygen, while metabolic wastes such as lactate and carbon dioxide can be efficiently carried away in a gentle manner. This design solves problems (shear stress, limited oxygen supply, and low cell density) frequently occurring on the commercial models and simplifies the operation steps. Additionally, flexible pairing of the matrix vessel with mixing bag further reduce the system scale for operation and facilitates the process. One hand operation with performance of 200~ 20,000 L roller bottles is no more a dream at all.

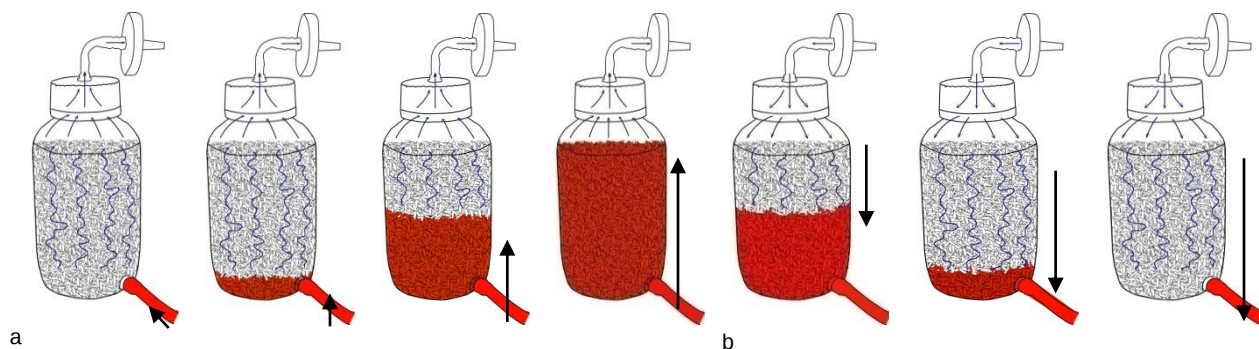


Fig. 1a. Homogeneous culture medium flows into the matrix vessel to submerge the matrices where cells embedded. Fresh nutrients and metabolic waste are exchanged during the process. Bi-directional flow and complete removal of culture medium and air eliminate channeling effect in conventional packed-bed systems. 2-D Linear fluid flow reduces process development time for scale-up study.

Fig. 1b. Culture medium flows out of the matrix vessel to emerge the matrices. Fresh air is introduced and contact directly with the matrices. Oxygen transfer efficiency is maximized and carbon dioxide is removed. Medium is re-mixed and tuning in the mixer. A cycle of nutrition and aeration with well conditioned culture medium and fresh air is re-started.

Modular Design Maximizes Process Flexibility

Over dozens combination to fit your process requirement

Thermostatic Mixer

Control the temperature and mixing during operation. Mixer model ranges from 20 L, 50 L, 100 L, 200 L, 500 L to 1,000 L.

Control temperature, mixing rate. Single-use mixing bags from 20 L, 50 L, 100 L, 200 L, 500 L, to 1,000 L. Customized bags are also available.



TideCell Incubation and Control System (TCICS)

Control temperature, CO₂ concentration, Up/down rate, Top/ Bottom hold time. Record all parameters. Data download through USB port. 8.4-inch color industrial touch panel. Easy to use and to monitor. Emergency shut down button, LED light button. Model ranges from 2 L, 10 L, 20 L, to 100 L.



Feed and Harvest system

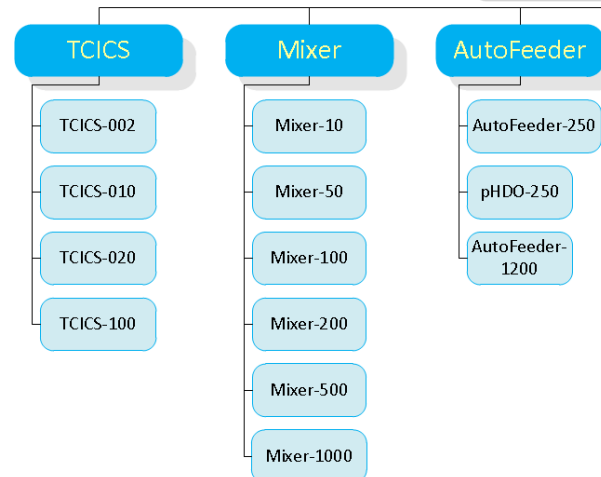
Touch panel with PLC control. Control Feed rate (fed-batch), or Feed/ Harvest rate (perfusion), pH and Dissolved oxygen. ON/OFF timer control, daily feed rate setting.



Matrix Vessel

Range from 1 L, 2 L, 10 L, 20 L, 50 L, to 100 L. Compact, light weight, and easy to handle. Customized assemblies available.

TideCell H



Bioprocess Container

Single-Use Mixing Bags and Bioprocess Containers. Range from 500 ml up to 2,000 L bags. Customized assemblies available.

We Knows Exactly What You Need in Bioprocess

Fool-proof design that makes your operation simple and reliable

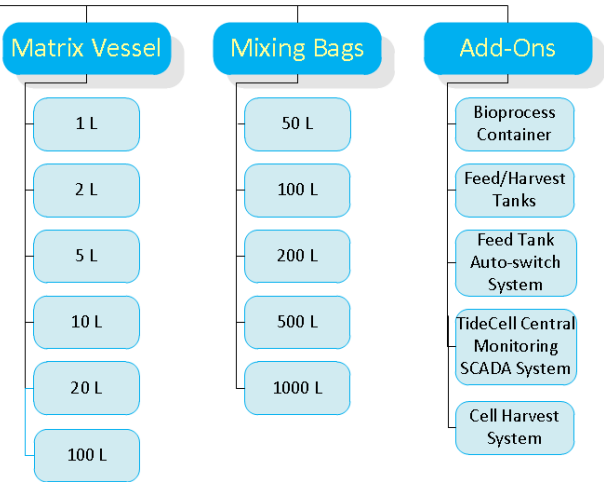


Matrices Sampling
The only single-use packed-bed bioreactor that allows carrier sampling for cell morphology observation and counting without posing risks of contamination.



Rigid Vessel
Rigid Matrix Vessel provides advantages of compact, light weight, and easy to handle during operation.

D System



Easy Load
Install bags from the side instead of from top. Simplify load and unload process.



HMI Touch Panel Systems
User-friendly HMI system that facilitate and simplify the operation.

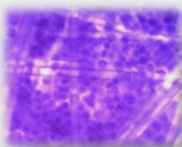


Cell Harvest and Cell Transfer in a Close System
Automatic Cell Harvest support cell harvest and transfer in a close system for process scale up, which minimize the risk of contamination during cell harvest and seed preparation.

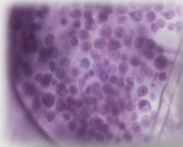
Optimal Features with cGMP-complied Document and Technical Support

Product Features

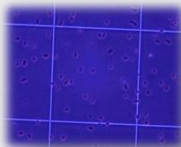
- ✓ Compact and High Cell Density (up to 6×10^7 cells/ml)
- ✓ Single-Use, Autoclavable, Hybrid
- ✓ Foam-free
- ✓ High Oxygen Transfer
- ✓ Low Shear Stress
- ✓ Linear Scalable
- ✓ Cell Harvest Available
- ✓ Cell Count Feasible
- ✓ Cell Observation Able
- ✓ Seed Transfer in Close System
- ✓ Flexible System Combination between



Morphology



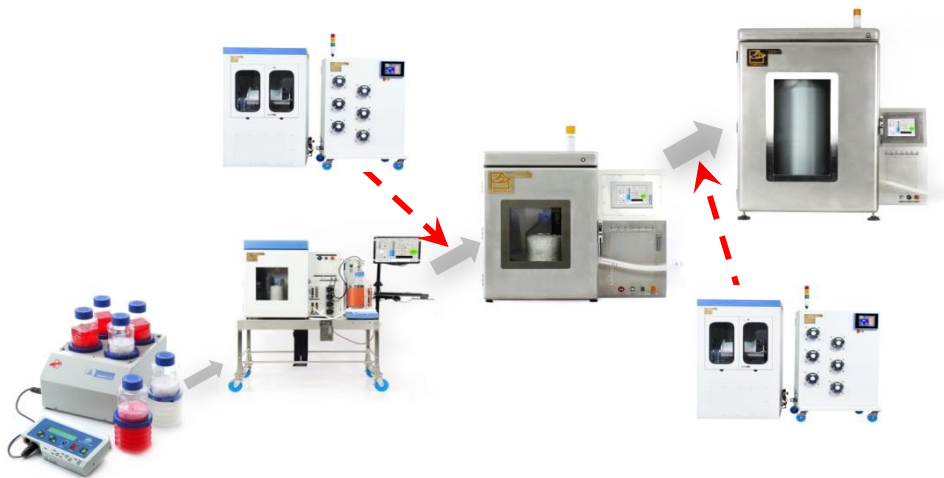
Cytopathic Effect



Cell Count



Biosafety assay



Scalable: Seed Preparation and Transfer Between TideCells Entirely in a Close System

Regulation Compliance

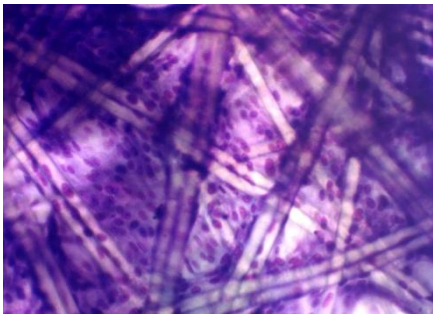
Equipment	Systems meets CE and comply with cGMP requirement. Sufficient document and technology support for system validation and qualification process.
Computer	Computer system complies with 21 CFR Part 11
Single-Use Consumables	Single-Use Consumables comply with USP Class VI, ISO 10993, and relative quality requirement. Sufficient document support and eliminate the loading on quality assurance.

Excellence in Adherent Cell Culture and Viral Vaccine Development...

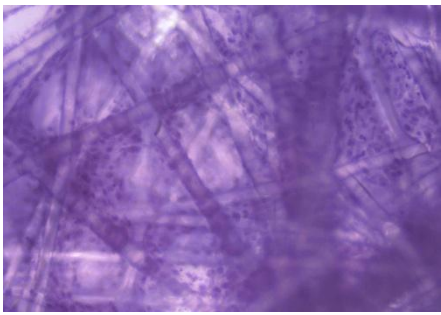
Novel TideCell system contributes to a stable, reliable process with high cell density, high virus titer. Advantages include extending harvest period, less cell debris, less residual DNA and host-cell protein content. Downstream purification recovery can be maximized due to less contaminants contains in the harvest broth.

More than hundreds successful cases world wide together with our strong technical support with cell culture and virus production expertise can shorten your time on process development.

Cell Line	Virus Strain	Cell Density	Virus Titer
VERO	Japanese Encephalitis virus	4.6 x10 ⁷	10 ⁹ pfu/ml
VERO	Rabies virus	4.0 x10 ⁷	10 ⁸ IgLD50/ml
VERO	Enterovirus type 71	2.6 x10 ⁷	10 ^{7.8} TCID50/ml
MDCK	H5N1	2.3 x10 ⁷	HA=1024~2048
MDCK	A(H1N1)	2.2 x10 ⁷	HA=512~1024
PK	Hog Cholera	3.7 x10 ⁷	10 ^{6.5} pfu/ml
ST	Hog Cholera	2 x10 ⁷	2 mil. RID/ml
CEF	WEE	4 x10 ⁷	10 ⁹ pfu/ml
BHK-21	Rabies	4.5x10 ⁷	10 ^{8.5} TCID50/ml
BHK-21	Pseudorabies	2.35x10 ⁷	10 ^{8.8} TCID50/ml
MDBK	Unknown virus for Bovine vaccine	1.29x10 ⁷	10 ^{9.2} TCID50/ml
HEK-293	Adenovirus	3.5 x10 ⁷	10 ⁸ pfu/ml
SF-9	Baculovirus	6x10 ⁷	10 ⁹ pfu/ml
Marc145	PRRSV	1.16x10 ⁷	10 ^{8.29} TCID50/mL
Unknown	Unknown virus for human vaccine	2.3x10 ⁷	5 arbi. unit/10 ⁹ cells

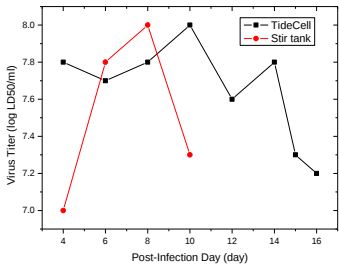


a.

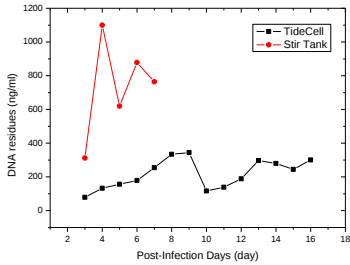


b.

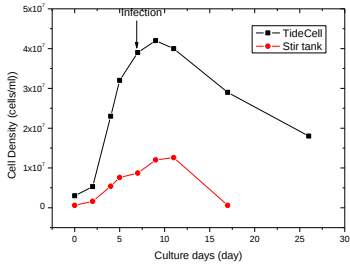
Cells form 3-D structure in the macroporous BioNOC II matrices (a). Most cells remain inside the matrices after 96 hours post virus infection even cytopathic effect has formed (b.). Culture medium remains clear, compared with the stir tank/microcarrier system in which the medium already becomes turbid and huge quantity of DNA and host-cell protein is released into the medium.



The harvest period is doubled in TideCell compared with the stir tank/ micro- carrier system



DNA residues is eliminated in TideCell compared with the stir tank/microcarrier system



Cell density is much higher in TideCell compared with the stir tank/microcarrier system

Higher Virus Titer, Longer Harvest Period, Minimized cell debris, Less DNA residues that are rarely achievable from other competitive systems...

Product Specifications

– TideCell-002 Main System

TideCell-002 Incubation & Control System (TCICS-002)

Construction	Inner chamber SUS304 Material; all with seamless welding. Galvanized iron casing powder coating.
Dimension (WxDxH)	Incubation chamber : 49(w) x 45(d) x 60(h) cm; External: 91(w) x 65(d) x 81(h) cm; Controller: 31(w) x 50(d) x 70(h) cm.
Electrical Requirements	Monophase 3-wires AC220V $\pm 10\%$ 15A _{max} 50/60 Hz.
Control cabin: hardware	Flexible pc-base/DAQ industrial control interface; Reliable industrial parts: solenoid valves/PID gauges/pressure-vacuum motor; NDIR CO2 diffusion-type sensor; Galvanized iron casing, internally and externally liquid paint coated.
Control cabin: software	Development environment : NI Labview; OS : Windows XP Preinstalled "Tide-Commander-002" graphic HMI
Incubator	0 ~ 10% CO2 PID control; RT+7 °C ~ 45 °C temperature PID control Max. loading 15 kg matrix-vessel holder; SUS 304 brushed casing Front view window; LED inside lighting; Emergency power-off button
Connection	CPC nickel-coated brass quick connectors; Electric connectors with locking-screw
Communication	9-pin Dsub RS-485 port : Modbus RTU protocol 2 USB Ports for import firmware/ software upgrade and export trend data
Control features	Simple user's administration; Inc. Process page & Data viewer page Inc. Data logging / parameters logging / events logging Individual Seed & Cultivation conditions setting with default Values. Automatic switch from seeding stage to cultivation stage (up to 300 min) Gas flow rate : 0.8~1.8 LPM; PID control; Delay time : up to 99 m 59 s Individual up / down condition settings; Inc. automatic & manual operation Automatic air refreshing mechanism ; Trend profile recorded
Protection	Over pressure protection (Max. 1 bar); Liquid leaking protection; Over suction protection; Over time protection; Power-off production.

TideCell Mixer-010

Construction	Magnetic stirrer and 10 L glass vessel with stir bar for mixing.
Dimension (WxDxH)	Magnetic stirrer footprint: 30(w) x 40(d) x 11(h) cm.
Electrical Requirements	Monophase 3-threads AC 220V $\pm 10\%$ 5A _{max} 50/60Hz
Capacity	10 L glass vessel
Stir rate	100 ~ 1500 rpm
Temp. control	RT ~ 45°C ; Accuracy $\pm 0.3^{\circ}\text{C}$



Product Specifications

– TideCell-010 Main System

TideCell-010 Incubation & Control System (TCICS-010)

Construction	Integrated Control cabin and Incubator
Dimension (WxDxH)	Incubator : external 106(w) x 68(d) x 96(h) cm; Internal 48 (w) x 48 (d) x 75 (h) cm
Net Weight	120 kg
Electrical Requirements	AC, 220V, 50~60 Hz, Single phase, 9 A Max; Max. 1200W power consumption
Control cabin: hardware	Flexible pc-base / DAQ industrial control interface; 8.4" colored touch screen Reliable industrial parts : solenoid valves / PID gauges / pressure-vacuum motor NDIR CO2 diffusion-type sensor; SUS 304 casing
Control cabin: software	Development environment : NI Labview ; OS : Windows XP Preinstalled "Tide-Commander-010" graphic HMI
Incubator	0 ~ 10% CO2 PID control; RT+7 °C ~ 50°C temperature PID control Max. loading 60 kg matrix-vessel holder; SUS 304 brushed casing Front view window; LED inside lighting; Emergency power-off button Bio-hazard process design
Connection	CPC nickel-coated brass quick connectors; Electric connectors with locking-screw
Communication	9-pin Dsub RS-485 port : Modbus RTU protocol 2 USB Ports for import firmware/ software upgrade and export trend data
Control features	Simple user's administration; Inc. Process page & Data viewer page Inc. Data logging / parameters logging / events logging Individual Seed & Cultivation conditions setting with default values Automatic switch from seeding stage to cultivation stage (up to 300 min) Gas flow rate : 1.8~3.5 LPM; PID control; Delay time : up to 99 m 59 s Individual up / down condition settings; Inc. automatic & manual operation Automatic air refreshing mechanism ; Trend profile recorded
Protection	Over pressure protection (Max. 1 bar); Liquid leaking protection; Over suction protection; Over time protection; Power-off production.

TideCell Mixer-050

Construction	Orbit-track movement
Dimension (WxDxH)	Supporting tray: 90(w) x 80(d) x 20(h) cm"; Base: 85(w) x 70(d) x 25(h) cm
Net Weight	150 kg
Electrical Requirements	AC 220V, 50~60Hz; , Single phase, 9 A Max.; Max. 1500W power consumption
Capacity	50 L medium bag
Shaking rate	0 ~ 60 rpm with digital display
Shaking timer	Continuous; ON : 1~ 10 min ; OFF : 1 ~ 10 min independently
Temp. control	RT ~ 50°C ; step 0.1 °C



Product Specifications

– TideCell-020 Main System

TideCell-020 Incubation & Control System (TCICS-020)

Construction	Integrated Control cabin and Incubator
Dimension (WxDxH)	Incubator : Outer 100 x 70 x 88 cm; Inner 48 x48 x75 cm
Net Weight	120 kg
Electrical Requirements	AC, 220V, 50~60 Hz, Single phase, 9 A Max; Max. 1200W power consumption
Control cabin: hardware	Flexible pc-base / DAQ industrial control interface; 8.4” colored touch screen Reliable industrial parts : solenoid valves / PID gauges / pressure-vacuum motor NDIR CO2 diffusion-type sensor; SUS 304 casing
Control cabin: software	Development environment : NI Labview ; OS : Windows XP Preinstalled “Tide-Commander-020” graphic HMI
Incubator	0 ~ 10% CO2 PID control; RT+7 °C ~ 50°C temperature PID control Max. loading 60 kg matrix-vessel holder; SUS 304 brushed casing Front view window; LED inside lighting; Emergency power-off button Bio-hazard process design
Connection	CPC nickel-coated brass quick connectors; Electric connectors with locking-screw
Communication	9-pin Dsub RS-485 port : Modbus RTU protocol 2 USB Ports for import firmware/ software upgrade and export trend data
Control features	Simple user’s administration; Inc. Process pages & Data viewer page Inc. Data logging / parameters logging / events logging Individual Seed & Cultivation conditions setting with default values Automatic switch from seeding stage to cultivation stage (up to 300 min) Gas flow rate : 3.5~5.0 LPM; PID control; Delay time : up to 99 m 59 s Individual up / down condition settings; Inc. automatic & manual operation Automatic air refreshing mechanism ; Trend profile recorded.
Protection	Over pressure protection (Max. 1 bar); Liquid leaking protection; Over suction protection; Over time protection; Power-off production.

TideCell Mixer-100, Mixer-200

Construction	Recirculation Mixing, SUS304
Dimension (WxDxH)	Mixer-100: 50(w) × 76(d) × 120(h) cm ; Mixer-200: 70(w) × 88(d) × 147(h) cm
Electrical Requirements	AC 220V, 50~60Hz; , Single phase, 9 A Max.; Max. 1,400 W power consumption for Mixer-100 and 2,200 W power consumption for Mixer-200.
Capacity	Mixer-100: Holding 100 L Mixing Bag; Minimum working volume: 50 L; Mixer-200: Holding 200 L Mixing Bag; Minimum working volume: 100 L
Control	Temperature: RT ~ 50 °C ; step 0.1 °C; Pump Rate: 0 ~ 21 LPM; Four load cells (max. 1,000 kg/sensitivity 200 g) for feed and harvest control.



Product Specifications

– TideCell-100 Main System

TideCell-100 Incubation & Control System (TCICS-100)

Construction	Integrated Control cabin and Incubator
Dimension (WxDxH)	Incubator : Outer 145 x 105 x 150 cm; Inner 83 x 83 x 130 cm
Net Weight	300 kg
Electrical Requirements	AC, 220V, 50~60 Hz, Single phase, Max. 3000W power consumption
Control cabin: hardware	Compact Rio PAC/DAQ industrial controller; 8.4" colored touch screen Reliable industrial parts : solenoid valves / PID gauges / pressure-vacuum motor NDIR CO2 diffusion-type sensor; SUS 304 casing
Control cabin: software	Development environment : NI Labview ; OS : Windows XP Preinstalled "Tide-Commander-100" graphic HMI
Incubator	0 ~ 10% CO2 PID control; RT+7 °C ~ 50°C temperature PID control Max. loading 300 kg matrix-vessel holder; SUS 304 brushed casing Front view window; LED inside lighting; Emergency power-off button Bio-hazard process design
Connection	CPC nickel-coated brass quick connectors; Electric connectors with locking-screw
Communication	9-pin Dsub RS-485 port : Modbus RTU protocol 2 USB Ports for import firmware/ software upgrade and export trend data
Control features	Simple user's administration; Inc. Process page & Data viewer page Inc. Data logging / parameters logging / events logging Individual Seed & Cultivation conditions setting with default values Automatic switch from seeding stage to cultivation stage (up to 300 min) Gas flow rate : 20~30 LPM; PID control; Delay time : up to 99 m 59 s ± 5 sec Individual up / down condition settings; Inc. automatic & manual operation Automatic air refreshing mechanism ; Trend profile recorded
Protection	Over pressure protection (Max. 1 bar); Liquid leaking protection; Over suction protection; Over time protection; Power-off production.

TideCell Mixer-500, Mixer-1000

Construction	Recirculation Mixing, SUS304
Dimension (WxDxH)	Mixer-500: 78(w) × 104(d) × 182(h) cm; Mixer-1000: 101(w) × 132(d) × 180(h) cm
Electrical Requirements	AC 220V, 50~60Hz; , Single phase, 9 A Max.; Max. 3,400 W power consumption for Mixer-500 and 4,600 W power consumption for Mixer-1000
Capacity	500 L mixing bag; Minimum working vol.: 250 L; 1000 L mixing bag; Minimum working vol.: 500 L
Control	Temperature: RT ~ 50°C ; step 0.1 °C; Pump Rate: 0 ~ 75 LPM; Mixer-500: Four load cells (max. 1000 kg each/sensitivity 500 g) control feed and harvest; Mixer-1000: max. 2000 kg each/sensitivity 500 g



Product Specifications

– pH, DO, Perfusion Control

AutoFeeder-1200 pH/DO/Perfusion Controller



Dimension (WxDxH)	Main body : 35 x 66 x 71 cm;
Net Weight	Main body : 65 kg;
Electrical Requirements	AC, 220V, 50~60 Hz, 1,800 Wmax for Mixer-100/3,500 Wmax for Mixer-500
Control unit	Reliable Industrial PLC : Cht / Eng lang.; 8.4" industrial touch screen HMI Electronic balance: 0~1500 kg $\pm$ 1.0 kg
Liquid transfer	Two peristaltic pumps : feed & harvest
Control parameters	Transferred volume per day : 10 ~ 900 L; Transferred cycle per day : 1 ~ 96 cycles Up to eight steps for each program : 40 sets memorized in data bank Time span for each step : 2 ~ 9,999 hr pH: 4~10 $\pm$ 0.1 DO: 0~100% $\pm$ 2.0
Features	Dynamic Fed & harvested weight profiles; Feeding & Harvesting start/stop recorded Manual & Automatic process; Auto-switching for feeding selection. Overflow detection for harvest. Error message recorded
Communication	Modbus ASCII
Protection	Max. net weight stop protection : Harvest; Min. net weight stop protection : Feeding Invalid parameters prohibited

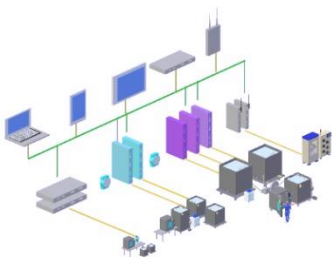


Feed Tanks AutoSwitch System

Dimension (WxDxH)	30 x 30 x 24, SUS304
Net Weight	3.5 kg
Electrical Requirements	DC 24 V, 1A max
Control unit	PLS-28 connectors for control signal/power communicating with pH/DO Controller/AutoFeeder-1200 (16 pin, pin-to-pin)
Liquid transfer	Liquid transfer is driven by the peristaltic pump in AutoFeeder-1200
Sensors	In-line and non-invasive bubble detector x 2 (for ½" OD tubing)
Features	Control two Feed tanks by switching the feed line from one to the other once the one is empty during feeding. Alarm light will on once the liquid in one of the tanks is depleted. Alarm buzz will on once two are all empty.
Protection	Individual warning lights for indicating depletion of Feed tanks.

Product Specifications

– Add-On Systems



TideCell SCADA System

Internet	RJ 45 Ethernet socket; 10/100 Base-T LAN transformer; Subnet Mask IP: 255.255.255.0; Gateway IP: 192.168.11.254; DNS IP: refer to the local IP provider; Available IP range: 192.168.11.2 ~192.168.11.254
Central Computer	CPU: Intel i7; RAM: 4G DDR3; HD: 500 G SATA2 or higher grade; USB: 2.0 or higher grade; 2 ports or more; Monitor: 19", 16:9; OS: Win-XP SP3 32 bit or Win-7 32 bit
Tablet	Support iPad or Android tablet portable systems (optional)
Feature	Connect all operation units includes all TideCell related or non-related systems as long as it has LAN communication port. Collect all data including log and alarm records during operation. Sending alarm messages if any abnormal occurs. Compatible in iPad or any Android tablet portable systems.

TideCell Cell Harvest System

Dimension (WxDxH)	Controller: 110(w) x 80(d) x 169(h) cm; Main Console: 110(w) x 110(d) x 184(h) cm
Net Weight	1,040 kg
Electrical Requirements	220 V, 50/60 Hz, 15 A
Control unit	Reliable Industrial PLC : Cht / Eng lang.; 10.4" industrial touch screen HMI
Liquid transfer	Six peristaltic pumps. Transfer buffer, enzyme, enzyme inhibitor, culture medium, harvest cell solution, and waste for cell harvest purpose
Control parameters	Sequential control on each pump ON/OFF, pump time 0~999 secs , pump rpm: 20~250 rpm Shaking speed: 50 ~ 300 rpm Rotation: continuous, ½ turn Manual, automatic control
Features	System design for cell recovery from TideCell Matrix Vessel after cell culture in TideCell cell culture system. It equips with 6 peristaltic pumps (Pump 1~Pump 6) for reagent input and output. Compatible to 2 L and 20 L matrix vessels.
Communication	CF card, RS485 data transfer
Protection	Door open protection, low speed alarm, abnormal alarm



Consumables

TideCell Matrix Vessel Specifications

Material	Pyrex glass (<10 L), or PP carboy (> 20 L)
Volume	1 L, 2 L, 10 L (Pyrex glass), 20 L (PP carboy), 115 L (PP drum)
Tube/Connector	3/8" Silicone tube; CPC quick connectors with plug; sampling port (s); slide clamp (s)
Air Vent	0.22 um PTFE filter
Sterility	Gamma-irradiated, sterile, and ready-to-use (pre-packed with BioNOC II) or non-sterile, autoclavable, re-usable for empty vessel.



TideCell Mixing Bag Specifications

Bag Material	Multi-layer film. Contact layer: LDPE
Volume	50 L, 100 L, 200 L, 500 L, 1,000 L
Pump	Single-use bearless pump
Ports	Batch bag 2 x 3/8" C-flex tube, 3 x 1/4" C-flex tube Perfusion bag 4 x 3/8" C-flex tube, 3 x 1/4" C-flex tube
Tube/Connector	3/8" Silicone tube; CPC quick connectors with plug
Sterility	Gamma-irradiated, Sterile, disposable
Quality	Non-cytotoxicity, non-pyrogenic



Specification Table

Hardware	TideCell-002 High-density Cell Culture System	TideCell-010 High-density Cell Culture System	TideCell-020 High-density Cell Culture System	TideCell-100 High-density Cell Culture System
System unit and dimension (w x d x h)	TCICS-002 (91 x 65 x 81)cm Mixer-10 (30 x 40 x 11)cm 75 kg-level scale (40 x 50 x 13) cm	TCICS-010 (106 x 68 x 96)cm pH/DO-250 (25 x 26 x 32)cm AF-250 (25 x 26 x 32)cm Mixer-50 (93 x 81 x 55)cm	TCICS-020 (100 x 70 x 88)cm AF-1200 (for Mixer-100) (35 x 66 x 71)cm Mixer-100 (50 x 50 x 120)cm	TCICS-100 (145 x 105 x 150)cm AF-1200 (for Mixer-500) (35 x 66 x 71)cm Mixer-500 (78 x 78 x 182)cm
	1L, 2 L matrix vessel (glass), 5L (PP)	10 L matrix vessel (glass)	20 L matrix vessel (pp)	115 L matrix vessel (pp)
	Dimension (d x h)	10x22, 14 x 25, 16x41 cm	29x 48 cm	28 x 53 cm
BioNOC II Matrix weight	Up to 220 g	275 g ~550 g	550g~1100 g	5500 g
Matrix volume	1~4 L	5 L~10 L	10 L~20 L	50 L~100 L
Tidal Control	800~1,800 ml/min	1,800~3,500 ml/min	3,500 ~ 5,000 ml/min	20,000~ 30,000 ml/min
Max. cell growth area	31.2 m ²	156 m ²	312 m ²	1,560 m ²
Mixing system				
Volume	10 L mixing bottle (glass)	50 L mixing bag (polymer)	100 L 3D mixing bag (polymer)	500 L 3D mixing bag (polymer)
Agitation rate	100~1,500 rpm	0~60 rpm	21 L/min _{max}	75 L/min _{max}
pH probe	1 (classical, on 10 L mixing bottle)	1 (classical, on pH/DO-250)	1 (classical, on Mixer-100)	1 (classical, on Mixer-500)
pH range	pH 4~10			
DO probe	1 (classical) on 10 L mixing bottle	1 (classical, on pH/DO-250)	1 (classical, on Mixer-100)	1 (classical, on Mixer-500)
DO range	0~100%			
regulation	DO monitoring	DO monitoring	O ₂ addition	O ₂ addition
CO ₂	0~10%, NDIR sensor			
Temperature	From ambient to 45 °C; Heater in culture chamber and mixing system			
Temperature probe	2 (PT-100 RTD, class A) in culture chamber on Mixer-10	2 (PT-100 RTD, class A) in culture chamber on Mixer-50	2 (PT-100 RTD, class A) in culture chamber on Mixer-100	2 (PT-100 RTD, class A) in culture chamber on Mixer-500
Peristaltic pump	4	4	5	5
Load cell	1 in culture chamber 2 for perfusion	1 in culture chamber 2 for perfusion	1 in culture chamber 4 on Mixer-100	1 in culture chamber 4 on Mixer-500
Perfusion				
Range	0~75 kg	0~350 kg	0~600 kg	0~1500 kg
Regulation	Weight-based	Weight-based	Weight-based	Weight-based
Program	8 FEED/HARVEST settings	8 FEED/HARVEST settings	10 FEED/HARVEST settings	10 FEED/HARVEST settings
View window	1 (on TCICS-002)	2 (on TCICS-010 & Mixer-50)	2 (on TCICS-020 & Mixer-100)	2 (on TCICS-100 & Mixer-500)
Major building material	SUS304			
Power supply	220 VAC, 50/60 Hz			
UPS	Optional (4kAV)	Optional (4kAV)	Optional (4kAV)	Optional (5kAV)
Gas line				
O ₂	1.2~1.5 bar (optional)	1.2~1.5 bar (optional)	1.2~1.5 bar (optional)	1.5~2.0 bar (optional)
CO ₂	1.2~1.5 bar	1.2~1.5 bar	1.2~1.5 bar	1.5~2.0 bar
Air	1.2~1.5 bar	1.2~1.5 bar	1.2~1.5 bar	1.5~2.0 bar
Control	PC	Industrial PC	Industrial PC	Embedded Industrial Controller
OS	Windows 7 32bit Professional	Windows Embedded standard 7	Windows Embedded standard 7	Windows Embedded standard 7(HMI)
Display	19" color monitor	8.4" color industrial touch panel	8.4" color industrial touch panel	10.4" color industrial touch panel
Data management				
Record	Batch information (table and graphics); Run chart; Parameter set point; Alarm setting; Event log; Error message			
Storage	HDD	HDD/USB	HDD/USB	HDD/USB
File export	EXCEL and PDF			
Security	3 levels			
Alarm system	Temperature; CO ₂ , concentration; pH/DO; FEED/HARVEST over threshold; Over-pressure; Leakage; Over-suction			
Emergency Stop	1 (Siren)	1 (Siren)	2 (Siren)	2 (Siren)
Remote monitoring				
Ethernet	LAN			
Access	N/A, optional	PC, notebook, or iPad	PC, notebook, or iPad	PC, notebook, or iPad
Program	DataViewer	TideTracer	TideTracer	TideTracer
Optional external unit	Adaptable to TideCell SCADA System	Adaptable to TideCell SCADA System	Medium Auto-switch System Adaptable to TideCell SCADA System	Medium Auto-switch System Adaptable to TideCell SCADA System
Regulatory compliance	CE, Computer software 21 CFR part 11 validated.			
Operation environment	15~28 °C, up to 70% relative humidity			



CESCO Bioengineering Co., Ltd.

We provide cutting-edge technologies for cell engineering

36, 20th Rd., Taichung Industrial Park, Taichung 40850,
Taiwan, R.O.C.

TEL: +886 4 2350 7127

FAX: +886 4 2350 6719

www.cescobio.com.tw