

# TideXcell®-1000

## Pilot Scale Bioreactor

The Gentle Giant of Adherent Bioprocessing



TideXcell® is a linearly scalable pilot bioreactor system that operates on the Tide Motion principle. It is ideal for biomass expansion of adherent cells under single-use or multiple-use technologies, at volumes from 2 L to 100 L. TideXcell incorporates cutting-edge features such as pH and DO (Dissolved Oxygen) measurement capabilities, and monitoring system with optional connection to TideTracer®/SCADA. It has an available surface area of up to 8,250 m<sup>2</sup> for adherent cell growth, saving space and labor cost as compared to static systems. Pilot-scale production is significant in most bioprocesses as it is essentially the step for producing a product to market. TideXcell ensures true linear scalability for adherent cell lines to establish production from laboratory scale to pilot-scale.

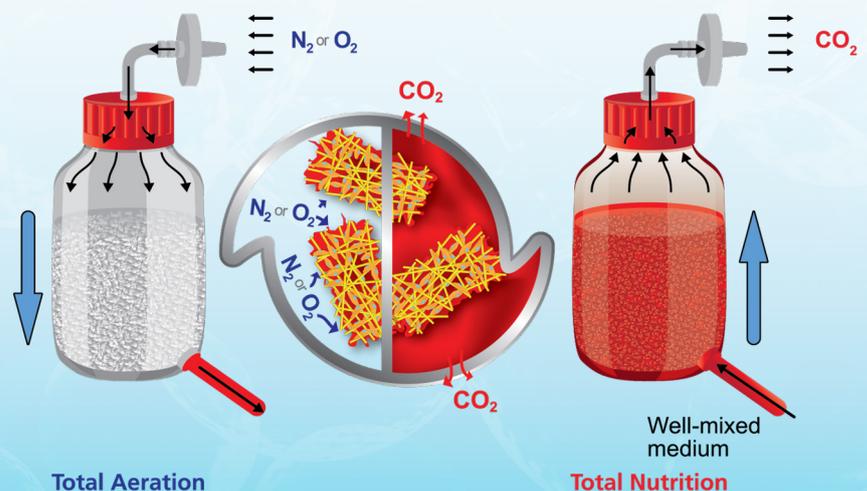
### Applications

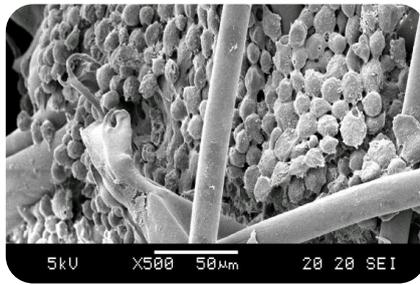
- Culture of anchorage-dependent cells with BioNOC™ II carriers
- Cell mass train
- Vaccine production
- Recombinant protein and monoclonal antibody production
- Biosimilars and biobetters
- Transition from 2D system to close 3D system
- Continuous bioprocessing
- Wild type virus production
- Cell/gene therapy

### Tide Motion Principle

The TideXcell® principle follows the Tide Motion Technology which is the gentle upward and downward motion, alternately exposing cells to nutrition and aeration.

When the matrix vessel is filled with culture medium, the cells are exposed to nutrients. On the other hand, when the culture medium is pumped back into the mixing tank, the cells are exposed to aeration, and O<sub>2</sub>-CO<sub>2</sub> air exchange occurs. In this way, the cells are alternately exposed to nutrition and aeration, providing the optimal growth conditions and environment for the cells.





## Highest Yield

The heart of the Tide Motion is the BioNOC™ II. These macrocarriers provide cells with a large surface area for attachment and growth. The 3D matrix mimics a cell's in vivo environment, allowing efficient oxygenation and nutrition exchange for the cells.

## Affordable Cost

TideXcell® is a fully automated, enclosed system that simplifies the general production, reducing space, utilities, labor requirements due to its compact and automated design.

## Linear Scalable Quality

TideXcell® offers linear scalability from laboratory scale to production scale. It employs the same culture principle from seed preparation using CelCradle™ system, to succeeding larger scale TideXcell®-100.

### General Upstream Process Workflow



## TideXcell®-100 + 1000L Mixing Vessel

2

TideXcell®-100 features the STR-Mixer-1000 which is responsible for continuously mixing the culture medium by an impeller and monitoring of significant parameters such as pH, DO and temperature. The separation of the matrix vessel and mixing system decreases problems that typically occur during mixing.

The Feed/Harvest System is used for batch, perfusion, and 100% media exchange processes. It allows for waste culture media to be harvested, and pump in fresh culture media from the feed tank. The 100% media exchange ensures high product yield and high viral titers at the end of the cell culture production.

### Dimensions:

**TideXcell-100 Incubation Chamber**  
1450 x 1250 mm  
(57.09 x 49.21 inches)

**STR-Tank Mixer-1000**  
Main, Feed and Harvest Tank  
1060 x 3975 mm  
(41.73 x 156.50 inches)

**Control Box**  
800 x 500 mm  
(31.50 x 19.69 inches)



## Technical Specifications

|                                   |  |
|-----------------------------------|--|
| <b>Base Unit</b>                  |  |
| <b>Weight</b>                     | 350 kg   |
| <b>Required Space (W x H x D)</b> | 1450 x 1500 x 1050 mm  |
| <b>Power Supply</b>               | 220V AC 50/60 Hz   |
| <b>Housing</b>                    | 304 stainless steel  |
| <b>Working Volume</b>             | 50 ~ 100L, Using disposable or reusable matrix vessel  |
| <b>Operating Temperature</b>      | 18 ~ 27°C  |
| <b>Maximum Relative Humidity</b>  | 80% for temperatures up to 31°C decreasing linearly to 50% relative humidity at 40°C, non-condensing environment, non-condensing environment   |
| <b>Tide Motion Flow Rate</b>      | 20,000 ~ 30,000 ml/min   |
| <b>Interfaces</b>                 | <ul style="list-style-type: none"> <li>– Ethernet for TideTracer®/ SCADA system</li> <li>– USB Aux USB</li> <li>– RS 485 D female connector</li> <li>– Power socket for Air pump module</li> <li>– Interface PT-100 thermometric sensor (for monitoring temperature in Mixer)(TideXcell system include a PT-100 sensor, Φ5mm, 30cm)(Mixing System shall have a Thermowell to insert the PT-100 thermometric sensor)</li> <li>– Interface to Mixing System's pH probe (Mixing system shall have a METTLER InPro 3030 pH sensor) (TideXcell system include a cable to connect to pH sensor)</li> <li>– Interface to Mixing System's DO probe (Mixing system shall have a METTLER InPro 6800 DO sensor) (TideXcell system include a cable to connect to DO sensor)</li> <li>– Interface to Mixing system's load cell signal (Customer need to provide the signal specification of the load cell, for example 4~20mA) (Customer need to provide the weighing range and tare weight)</li> <li>– Alarm Relay (Dry contact) (Customer need to provide the signal specification and expected control logic)</li> </ul> |
| <b>Ports</b>                      | <ul style="list-style-type: none"> <li>– Air In for a ir source</li> <li>– N<sub>2</sub> In for N<sub>2</sub> source</li> <li>– O<sub>2</sub> In for O<sub>2</sub> source</li> <li>– CO<sub>2</sub> In for CO<sub>2</sub> source</li> <li>– F.Cir Out for force circulation function</li> <li>– Mix Gas for gas supplement to M ixing System (Mixing system need to have Sparger inlet port)</li> </ul>  |
| <b>Peristaltic Pump Module</b>    |  |
| <b>Quantity</b>                   | 4  |
| <b>Controller</b>                 | Fixed speed (regulated on/off)   |
| <b>Speed</b>                      | 100 rpm X 2 (for acid/alkali, or additional concentrate supplement)<br>250 rpm X 2 (for Feed and Harvest)  |
| <b>Pump head</b>                  | Watson Marlow, Fast Load pump head X 4   |
| <b>Flow rates</b>                 | <p>Watson Marlow (for (for acid/alkali):</p> <ul style="list-style-type: none"> <li>– MasterFlex L/S 18 Silicone tubing ID 5/16": 1560 ml/min</li> </ul> <p>Watson Marlow (for Feed and Harvest):</p> <ul style="list-style-type: none"> <li>– MasterFlex L/S 35 Silicone tubing ID 5/16": 2200 ml/min</li> </ul>  |

| Process Control and Measurements                |   |
|---|---|
| Temperature                                     | <ul style="list-style-type: none"> <li>– Temperature control with Heating coil</li> <li>– Temperature control for RT +8 ~ 4 5.0°C</li> <li>– Display resolution 0.1°C</li> <li>– Heating power : 780 W</li> </ul>   |
| CO2 Concentration                               | <ul style="list-style-type: none"> <li>– CO<sub>2</sub> Concentration control with CO<sub>2</sub> gas injection</li> <li>– CO<sub>2</sub> Concentration control for 0%~10%</li> <li>– Display resolution 0.1°C</li> </ul>   |
| Mixing System pH Control                        | <ul style="list-style-type: none"> <li>– Combination electrode</li> <li>– Digital communication with TideXcell®-100 Pro</li> <li>– Range: 2 – 14 pH</li> <li>– Display resolution: 0.01</li> <li>– Mixing system need to have 1 port for Acid and 1 port for Alkali</li> </ul>  |
| Mixing System DO Control                        | <ul style="list-style-type: none"> <li>– Polarographic probe</li> <li>– Digital communication with TideXcell®-100 Pro</li> <li>– Range: 0 –100%</li> <li>– Display resolution: 0.1%</li> </ul>  |
| Mixing System Perfusion Control                 | <ul style="list-style-type: none"> <li>– Weight-based regulation by load cell<br/>(Customer need to prepare signal cable and share the communication protocol(must be Modbus-RTU) for supplier to establish signal connection)</li> <li>– Digital communication with TideXcell®-100 Pro</li> <li>– Range: 0 ~1000 L/Day</li> <li>– 10-stage continuous control program</li> </ul>               |
| Mixing System alarm signal receiving and action | <ul style="list-style-type: none"> <li>– Receive alarm signal by alarm Relay (Dry contact)<br/>(Customer need to prepare signal cable and share the communication protocol for supplier to establish signal connection)</li> <li>– TideXcell will stop TideMotion when TideXcell system receive alarm signal from Mixing system</li> </ul>  |
| Aeration Module                                 |   |
| Gas inlet                                       | <ul style="list-style-type: none"> <li>– Gas pressure 1.2 ~ 1.5 barg</li> <li>– Gases: dry, oil and dust free</li> <li>– Gas inlet connections with quick couplers for 4 x 6 mm reinforced tubing</li> </ul>  |
| Gas outlet                                      | <ul style="list-style-type: none"> <li>– Gas pressure max .1 barg</li> <li>– Gas outlet connections with quick couplers for 4 x 6 mm reinforced tubing</li> </ul>   |
| Aeration control                                | <ul style="list-style-type: none"> <li>– Continuous and automatic aeration control for air, O<sub>2</sub> , N<sub>2</sub> and CO<sub>2</sub></li> <li>– Gas flow control units with mass flow meter: Total of four; one per gas source</li> <li>– Flow rates of the gas flow control units: Air, N<sub>2</sub> , and O<sub>2</sub> : 0 ~ 5 0 L/min<br/>CO<sub>2</sub> : 0 ~ 40 L/min</li> </ul> |
| Interface                                       |   |
| Control   | Siemens PLC   |
| Display   | Siemens HMI   |
| Optional external unit                          | Adaptable to TideTracer® and Cell Harvest System  |
| Regulatory compliance                           | EMC 2014/30/EU    LVD 2014/35/EU    MD 2006/42/EC   |
| Add on item                                     |   |
| TideTracer®                                     | Laptop with TideTracer® software  |
| Caster Bench                                    | Caster Bench for TideXcell 100 Pro system   |

\*specifications subject to change