

Hybrid Bioreactor



Introduction

The Vaccixcell Hybrid Bioreactor is a unique bioreactor system that supports both adherent and suspension culture. It applies the stir principle for suspension culture and the tide motion principle for adherent culture.

The Vaccixcell Hybrid Bioreactor can switch from suspension culture to adherent culture by simply changing the impeller to the matrix vessel. The matrix vessel contains the carriers, BioNoc™ II, to which the cells adhere to and grow; it is oscillated up and down by a motor to submerge the carriers in the nutrient medium. The matrix vessel cylindrical in shape and perforated halfway. The perforated half is used for medium submersion, while the non-perforated half is used during seeding. The nutrient medium remains at the bottom of the reactor vessel and is kept homogeneous by a built-in magnetic stirrer. Aeration occurs through headspace overlay and through the dissolved oxygen in the nutrient medium.

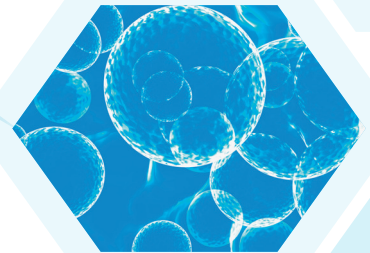
The advantage of using the Vaccixcell hybrid bioreactor is its multi-functionality. In a start-up or R&D environment, determining which type of culture would yield the desired product the most is essential. The Vaccixcell hybrid bioreactor gives its users exactly that option by being able to try out four (4) different types of culture namely: adherent culture using macrocarrier, adherent culture using microcarrier in a stirred tank environment, suspension culture and fermentation. By being able to do the design of experiment (DOE) using these four types of culture in one system, data gathering and analysis would be easier and more efficient, resulting in lower total cost and shorter process development period.

Applications

- Protein production
- Vaccine production
- Cell Therapy
- Gene Therapy
- Antibody production
- Research and Development
- Fermentation

Key Features

- Supports adherent culture, suspension culture or fermentation (only one type of culture can be used at a time)
- Can run in batch, fed-batch, and perfusion modes
- Automated control of pH, DO, aeration, foaming, temperature, agitation, and level
- Glass water jacketed vessel heats to 37°C in just 30 minutes
- Inoculation and sampling in a closed system
- Working volume of up to 7 L
- Accommodates up to 11 g of BioNoc™ II macrocarriers
- Touch Screen HMI Controller. One touch screen HMI controller can be connected and control up to four (4) utility stations making DOE recording and analysis easier
- Multiple-use system that can easily transition to CelCradle™ single-use bioreactor



General Specifications* VXL Hybrid Bioreactor	Adherent Cell Culture	Suspension Cell Culture	Fermentation	Microcarrier-Based Cell Culture		
Vessel Material	Borosilicate Glass					
Temperature Range	8 °C-70 °C Precision: 0.1 °C					
Baffle	N/A	YES	N/A	N/A		
Impeller speed	25-200 rpm	50-1200 rpm	25-400 rpm	25-400 rpm		
Impeller Design**	Small 6-Blade Rushton Turbine	3-Pitched-Blade Turbine and 3-Marine-Blade Propeller	Large 6-Blade Rushton Turbine	3-Pitched-Blade Turbine and 3-Marine-Blade Propeller		
Ventilation	Ring Sparger	Micro-Sparger	Ring Sparger	Ring Sparger		
Drive Method	Tide: KNF brushless motor with air pump, controlled by PID or constant voltage direct drive. Mixing: Top direct servo motor with PID/PWM control		Mixing: Top direct servo motor with PID/PWM control			
Condenser	Stainless steel condenser with 0.2 um disk type or cartridge type filter					
pH Range	pH 4-14					
DO Range	0-100 %					
Liquid Level Control	High Level Sensor	Electronic Scale				
Sampling	liquid: sampling bottle; matrix: sample port	liquid: sampling bottle				
Foaming Control	N/A	YES	YES	YES		
Control Unit	8.4" HMI					

*Specifications are subject to change

**Impeller types are subject to change as per client requirement

Vessel Sizing and Volume	
Model	M-5000
Total Volume (L)	8.2
Maximum Working Volume (L) for Suspension Culture	7
Macrocarrier Volume (ml) for Adherent Culture	100
Depth (mm)	190
Height (mm)	320
Aspect Ratio	1:2.5 (for suspension) 1:3 (for fermentation)

Vessel for fermentation can be supplied as per request