

single-use stirred tank bioreactor with axial paddle agitation

Single-use stirred tank bioreactor is a low shear design as the core of the reactor, using straight shaft paddle form, designed for mammalian cell culture.

Single-Use Stirred Tank Bioreactor Overview

The single-use stirred tank bioreactor is based on the traditional mixing principle and combines the high efficiency performance of modern bioreactors to ensure the cell culture effect under different sizes, 50L to 2000L.

Features

- Axial flow mixing and material transfer effect: with straight shaft stirring paddle design, it is able to realize efficient axial flow, which effectively promotes the mixing of culture solution and the transfer of gas and nutrients. Compared with the traditional radial flow mixing, the material transfer effect of straight shaft mixing is more superior, which can significantly improve the cell growth rate and metabolic efficiency.



- High-quality parts, stable system operation: the reactor uses high-quality hardware components to ensure high reliability and long-term stable operation of the equipment. This stability is crucial to the cell culture process, and in large-scale production, the stability of the system directly affects the continuity of production and product quality.
- Modular design, support for customization: the reactor adopts modular design, which can be flexibly configured according to different cultivation needs. Users can customize the specific parameters of the reactor, such as reactor capacity, gas supply system, etc., according to the experimental scale, cultivation mode and other needs to ensure the experimental effect.
- Three-level authority management and electronic data reporting: the system is built-in three-level authority management function, which can ensure the safety and compliance of the operation process. All operations and data can be recorded through audit trails and complete electronic data reports can be generated to facilitate subsequent storage, transmission and supervision.
- Intuitive, simple touch screen software control: the reactor is equipped with a touch screen operator interface, users can easily adjust the parameters, the system feedback is timely, the operation logic is clear. This makes operation easier and is suitable for staff with different skill levels.
- Flexible Ventilation System Design: Equipped with large bubble and micro bubble ventilation system, the ventilation effect can be adjusted according to the need to effectively improve the oxygen solubility, to ensure that the cells get sufficient oxygen supply. Combined with the disposable reaction bag chassis design, the regulation of gas flow and culture environment is more flexible and convenient.

- Complete FAT, SAT, IQ, OQ documents and services: provide complete factory acceptance test, site acceptance test, installation confirmation and operation confirmation documents and services, to ensure that the equipment meets the GMP production standards, to protect the compliance of the production process and product quality.

Working Principle

The working principle of the single-use stirred tank bioreactor is based on the mixing principle of low shear stirring and axial flow. Its straight shaft stirring paddles effectively mix the culture solution through axial pushing action and promote uniform distribution of gases and nutrients. Bubbles in the reactor are regulated by a microbubble or macrobubble system to provide an adequate supply of oxygen, which facilitates cell growth and metabolism.

During the cell culture process, the system ensures a cell growth environment through precisely controlled temperature, pH and dissolved oxygen levels. The modular design of the reactor allows it to be adapted to different scales of production, providing stable culture conditions from laboratory research to pilot scale-up.

Application Areas

- Suspension cell culture: suitable for large-scale suspension cell culture, in the field of pharmaceuticals, vaccine production, etc., it can efficiently promote cell proliferation and produce a large number of cells and related biological products.
- Adherent cell microcarrier culture: the reactor design is suitable for adherent cell culture, with the use of microcarriers, can greatly improve the cell density and production efficiency, widely used in stem cell research and cell therapy field.

- Process development and process amplification: In the process of bioprocess development and amplification, the single-use stirred tank bioreactor can provide stable conditions to help researchers optimize process parameters and improve product yield and consistency.
- Pilot: The reactor is suitable for pilot stage, which can validate the process for large-scale production on a small scale and ensure that product quality and process stability will not be affected when scaling up production.
- Seed expansion: in the seed cell expansion process, the reactor can provide a culture environment to ensure the quality and quantity of cells in the expansion process, laying the foundation for subsequent large-scale production.
- GMP production: used in an environment that meets GMP requirements, suitable for biopharmaceuticals, vaccine production, cell therapy and other fields, to ensure that the production process meets the quality standards.