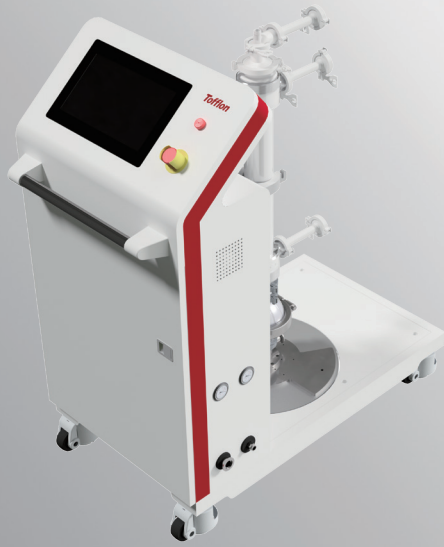
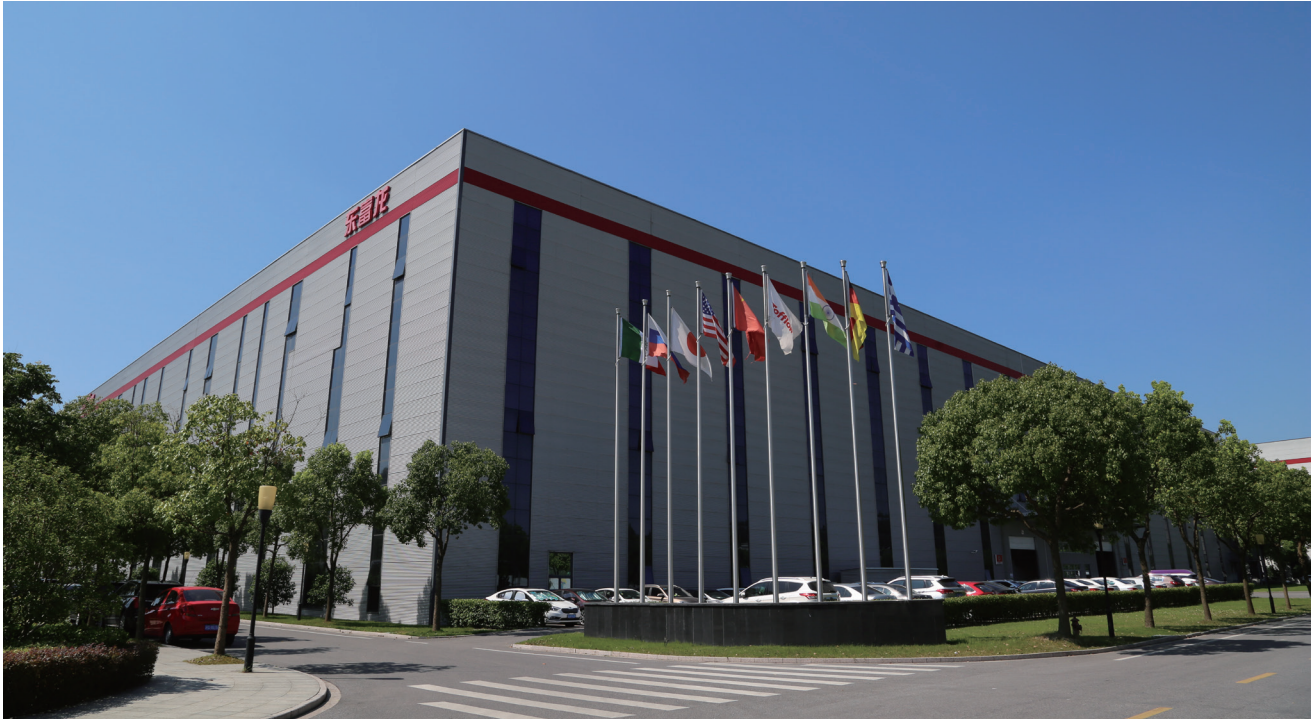


Tofflon



**Alternating Tangential Flow
Perfusion System**

Tofflon Life Science Co.,Ltd.



Founded in 1993, Tofflon Science and Technology Group Co., Ltd. (SZ:300171) is a pioneering Chinese enterprise in the field of biotechnology, with a rich history of 30 years. With annual sales reaching 5.4 billion RMB in 2022 and a global workforce of 5,500 employees, Tofflon has established over 50 offices worldwide, embodying a globalized business and team.

Tofflon Life Sciences Co., Ltd., the flagship subsidiary within the group, plays a pivotal role in their portfolio. It focuses on the research and development of cutting-edge technologies in the biopharmaceutical and life science industries. As a strategic division Tofflon life science provides one-stop solutions and services that integrate bioprocessing equipment, core consumables like sterile bags, culture media, resins to further enquire and professionally.

- In the realm of cell therapy, we offer complete solutions for the preparation and production of immune cell pipelines, stem cell pipelines, tumor cell vaccines, and more.
- For gene therapy, we provide overall solutions for the research, development, and industrialization of nucleic acid drugs (mRNA/DNA) and viral vector drugs.
- In the field of biological sample banking, we conduct research and development of automatic sample storage management systems to provide comprehensive solutions for cell seed and tissue samples.
- In the consumables sector, we have developed a complete range of products including disposable bags (culture bags, mixing bags, storage bags), bio-reagents (culture media, cryoprotectants, Ficoll, growth factors), resin (GFC, AC, AEX, CEX, HIC, MMC), filtration (microfiltration, deep filtration, TFF, cassette), and hard packaging materials.
- We also focus on disinfection, offering comprehensive solutions for clean room disinfection, surface and external disinfection, infection control, terminal disinfection, and multi-drug resistant microorganism disinfection, ensuring effective environmental disinfection.

Leveraging Tofflon Group's extensive expertise in design, manufacturing, engineering construction, and after-sales service worldwide, Tofflon Life Sciences Division is committed to serving the biopharmaceutical industry with enhanced speed and professionalism.

Alternating Tangential Flow Perfusion System

ATF tangential flow, also known as alternating tangential flow, connects hollow fiber column, high pressure air pump and diaphragm vacuum pump to adjust the pressure difference between air pump and vacuum pump, so that cells and culture medium through the hollow fiber column repeatedly alternate, so as to achieve cell interception in the hollow fiber column culture method. The tangential flow technique of ATF can effectively reduce the shear force of cells, so that cells can obtain a higher number of cell density and product yield in a short time at a higher perfusion rate. It is suitable for irrigation culture and continuous culture and other scale-up production technology.

ATF alternating tangential flow system is an efficient external interception device, through the use of different aperture consumables can effectively interception cells, proteins and other convenient use with stainless steel fermenter, disposable reactor, disposable shaker and other equipment, greatly improve productivity, shorten the production cycle, improve production efficiency.

Application of ATF irrigation system

- ✔ High yield cell association culture
- ✔ Virus production and filtration
- ✔ Purification and harvest
- ✔ Concentrated washing
- ✔ Cell culture by microcarrier technology consists of irrigation, perfusion and medium exchange cell separation
- ✔ Laboratory process development, cell therapy, gene therapy



Product advantage

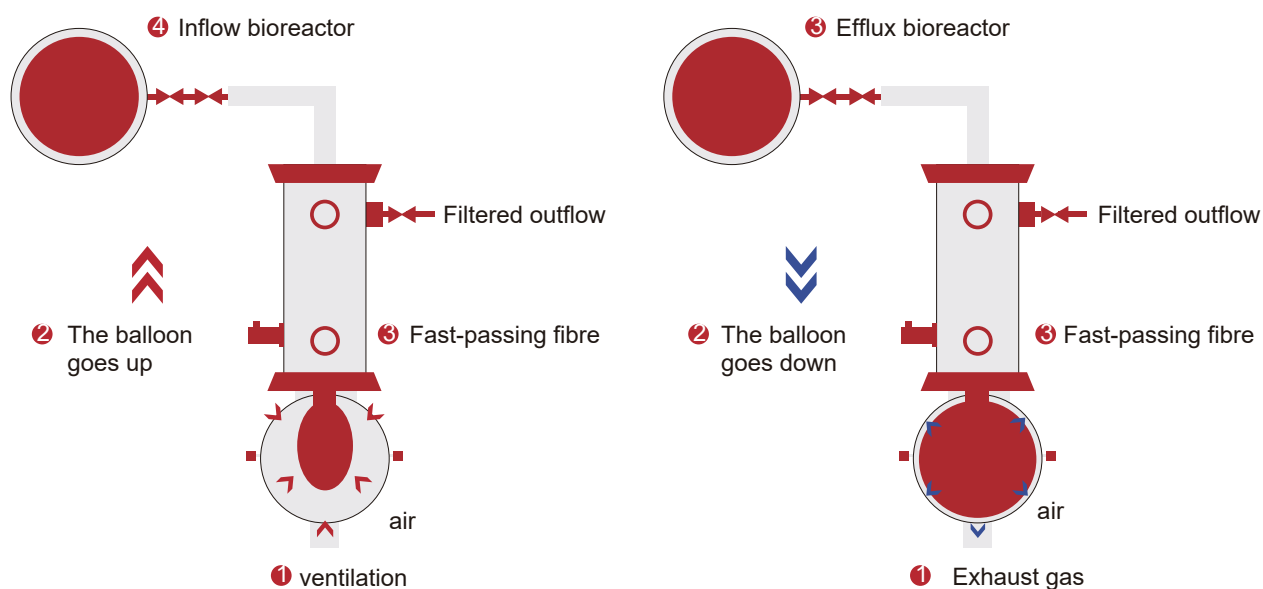
- ✔ Low shear force -- compared to TFF, high flow rate can be obtained, low shear force effect, less damage to cells
- ✔ High activity -- continuous perfusion system, so that the cells are stable in a better nutritional environment, the concentration of harmful metabolic waste accumulation is low, high cell activity
- ✔ High density - Cell interceptor system can keep cells or enzymes in the reactor, maintain a high cell density, thus greatly improving the production of products
- ✔ Flexible use - through the use of different apertures can filter different targets, flexible application to culture, separation, concentration, cleaning and filtration and other links
- ✔ Continuous production process -- continuous cell culture and product capture can be achieved with low production cost and high efficiency
- ✔ High capacity -- Facilitate rapid development, scale-up and large-scale production test, effectively improve production capacity

Technical parameter

Project	Parameter			
category	Laboratory level	Pilot level		Production level
Model	ATF-2T	ATF-4T	ATF-6T	ATF-10T
volume (Width * depth * height mm)	500*840*1200			
Replacement volume L/ time	0.115	0.4	1.3	5.1
Velocity rangeL/min	0.3~1.5	3~8	10~20	30~80
Fiber material	PES			
Hollow material	The inner pore size is 1mm, the micropore size is 0.2μm and 20Kda			
material	Stainless steel, PC			
* There may be errors in the table. The specific parameters are subject to actual conditions				

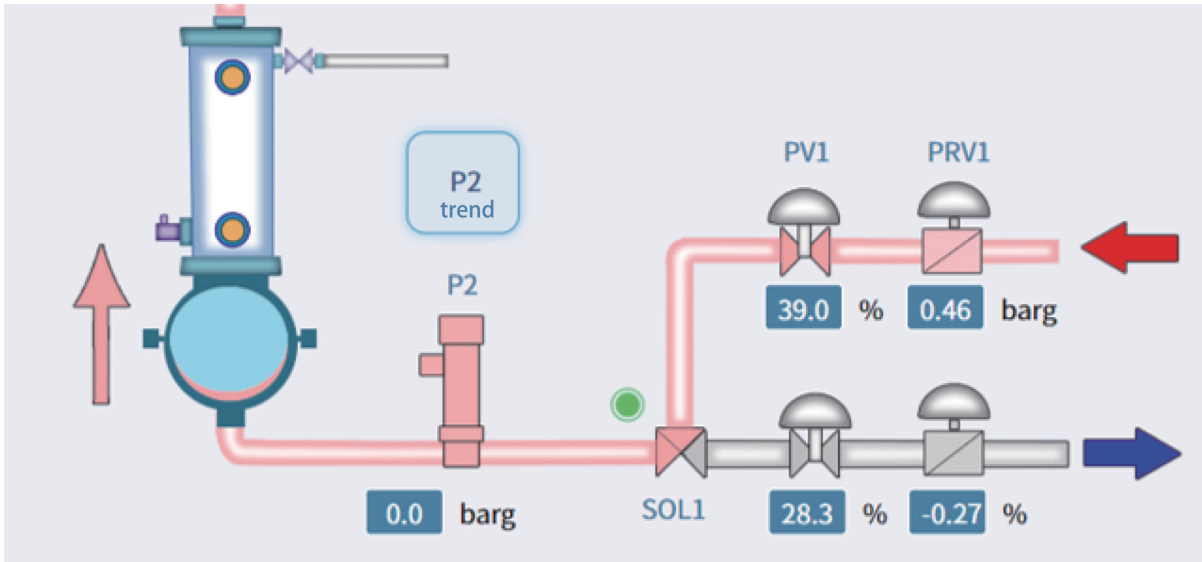
ATF operation process

ATF alternating tangential flow filtration system is generally composed of filter components, central control platform, reactor system, feeding and recovery components, etc



The balloon and hollow fiber form a closed cavity, which can be sterilized by direct gamma irradiation. When used, it is ready to be installed without online sterilization

Operational information



Software system



Login interface



Home page interface



Batch interface



Curve interface

The alarm interface displays a table of active and historical alarms.

报警号	报警名称	报警时间	报警类型	报警状态
1	报警名称	报警时间	报警类型	报警状态
2	报警名称	报警时间	报警类型	报警状态
3	报警名称	报警时间	报警类型	报警状态
4	报警名称	报警时间	报警类型	报警状态
5	报警名称	报警时间	报警类型	报警状态
6	报警名称	报警时间	报警类型	报警状态
7	报警名称	报警时间	报警类型	报警状态
8	报警名称	报警时间	报警类型	报警状态
9	报警名称	报警时间	报警类型	报警状态
10	报警名称	报警时间	报警类型	报警状态

Alarm interface



Recording interface

Product application

- ✔ It provides fully automatic operation and complete data recording in accordance with FDA 21CFR Part11
- ✔ Can open the relevant communication protocol and SCADA system docking
- ✔ Simple page, flexible operation



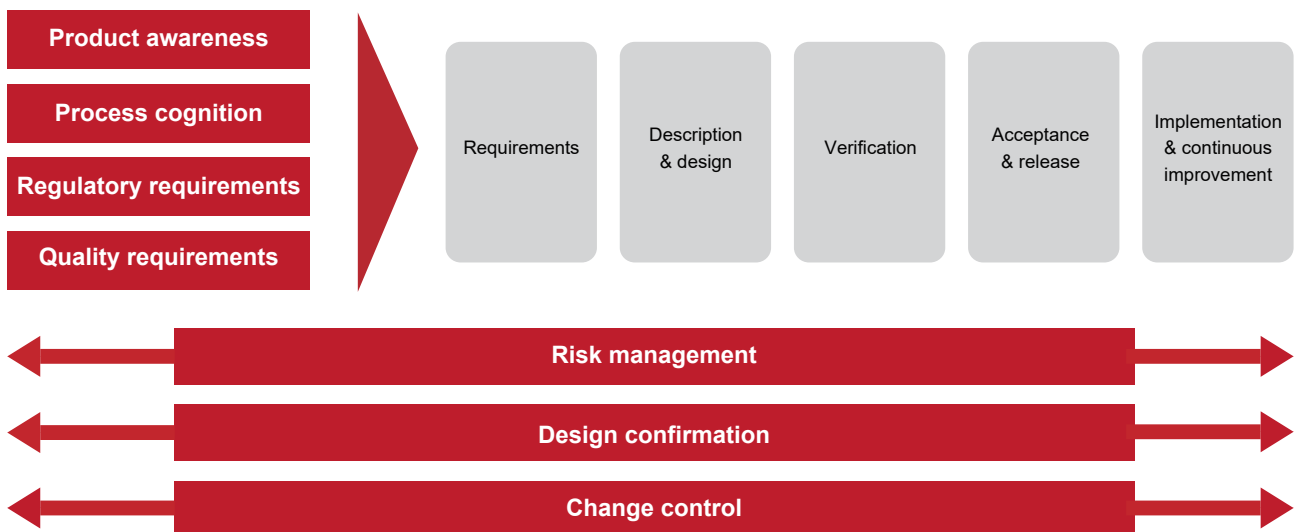
Project Management

Three main factors determine the success of the project. Our organizational mode has been making constant update and improvement to enable you to fully achieve these goals. Through cooperation with us, you can minimize the direct resources required to manage the selection, purchase, installation, startup and verification of new production equipment.



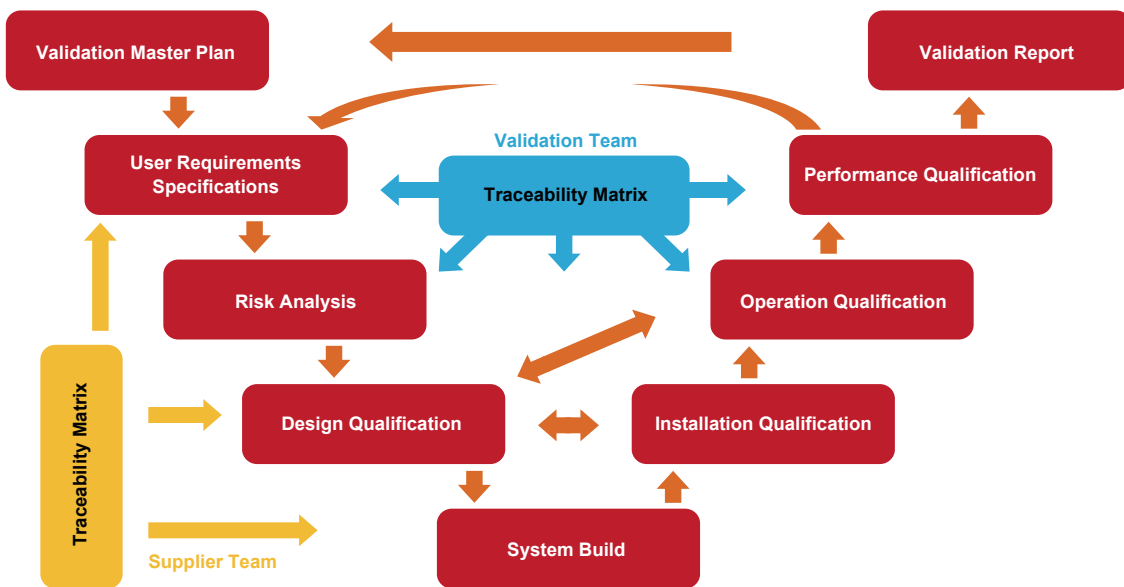
- ✔ Reliable quality
- ✔ Short cycle
- ✔ Focus on cost

Good Engineering Practice - GEP



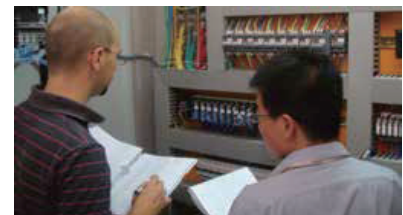


Validation Support



Verification Document System

- ✔ Complete document system
- ✔ Strict quality guarantee process
- ✔ Comply with cGMP confirmation scheme
- ✔ Ensure the stability and reliability of product quality





Tofflon Tofflon Science and Technology Group Co.,Ltd.

Address: No.1509,Duhui Road,Shanghai,China 201108

Tel: +86 21 6490 1123 / 6490 6201

Fax: +86 21 6490 5148 / 6490 6202

E-mail: lifescience.info@tofflon.com

www.tofflon.com