

Bioengineering Technology

生物工程技术

让世界制药工业插上智慧的翅膀

Equip global pharmaceutical manufacturing industry with intelligent wings.





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楚天科技股份有限公司成立于 2000 年，是中国医药装备行业的领军企业，也是世界医药装备行业的知名企业之一。主营业务系医药装备及其整体技术解决方案，并率先推动智慧医药工厂的研究与开发。公司系中国 A 股上市公司。旗下拥有德国 ROMACO 集团、楚天华通、四川省医药设计院、楚天飞云、楚天源创、楚天微球、楚天 SUT、楚天思为康、楚天华兴、楚天长兴、楚天科仪、楚天净邦、楚天派特、楚天博源、楚天智能机器人等多家全资或控股子公司，全球员工总数 9000 余人，总资产 110 亿元。

公司已有长沙和德国两大运营总部，建有长沙中央技术研究院、欧洲技术研究院和四川省医药设计院三大研发机构。设有国家级企业技术中心，国家级创新基地，博士后科研工作站，院士专家工作站等多个技术与创新平台。截止 2023 年 8 月 31 日，共提出 5133 项中国专利申请，授权专利 4163 项，有效专利 3076 项。另提出 50 件 PCT 国际专利申请，在美国、俄罗斯、印度、韩国、德国、印尼、欧洲等多国获得 24 项专利授权。牵头制订了本系统国家行业产品技术标准 20 多项。集团产品与服务已累计覆盖 180 多个国家和地区，国际市场占有率正逐年快速提升。

Founded in 2000, Truking Technology Limited has become a leading pharmaceutical equipment company in China and renowned around the world. It specializes in pharmaceutical equipment and integrated solutions, and takes the initiative to push forward the R&D of smart pharmaceutical factory. It is a listed A-share company with multiple wholly-owned or controlling subsidiaries, such as Germany based Romaco Group, Truking Watertown, Sichuan Pharmaceutical Design Institute, Truking Feiyun, Truking Ingenuity Biotechnology, Truking Microspheres, Truking SUT, Truking Siweikang, Truking Wachine, Truking Changxing, Truking Scientific Instrument, Truking Joband, Truking Pitide, Truking Boyuan, Truking Intelligent Robot, etc. Truking has over 9000 employees around the globe, with a total asset of over 11 billion RMB.

TRUKING has two operational headquarters respectively in Changsha, China and Germany; three big research institutes, namely Changsha Central Technology Research Institute, Europe Technology Research Institute, and Sichuan Pharmaceutical Design Institute. It has established many platforms for technology innovation, such as National Enterprise Technology Center, National Innovation Center, Post-Doctoral Research Center, and Academician Expert Workstation. By Aug 31, 2023, it has filed 5,133 patent applications in China and 50 PCT international patent applications. It also has 4,163 authorized patents and 3076 valid patents in China, and 24 patents have been authorized in the United States, Russia, India, Korea, Germany, Indonesia, Europe and other countries. So far, Truking has taken the lead in the formulation of more than 20 national technical standards. The Group's products and services have cumulatively covered more than 180 countries and regions, and Truking's international market share is rapidly increasing year by year.

生物制药整体解决方案 Biopharmaceutical Overall Solution

生产工艺系统作为制药企业生产过程中的关键要素，其设计、建造、验证及后期运行和维护对于药品质量有着直接影响。楚天作为中国生产工艺系统整体解决方案提供商，倡导为用户提供从前期概念设计到后期项目实施，现场安装调试直至系统验证一体化、全生命周期的服务。

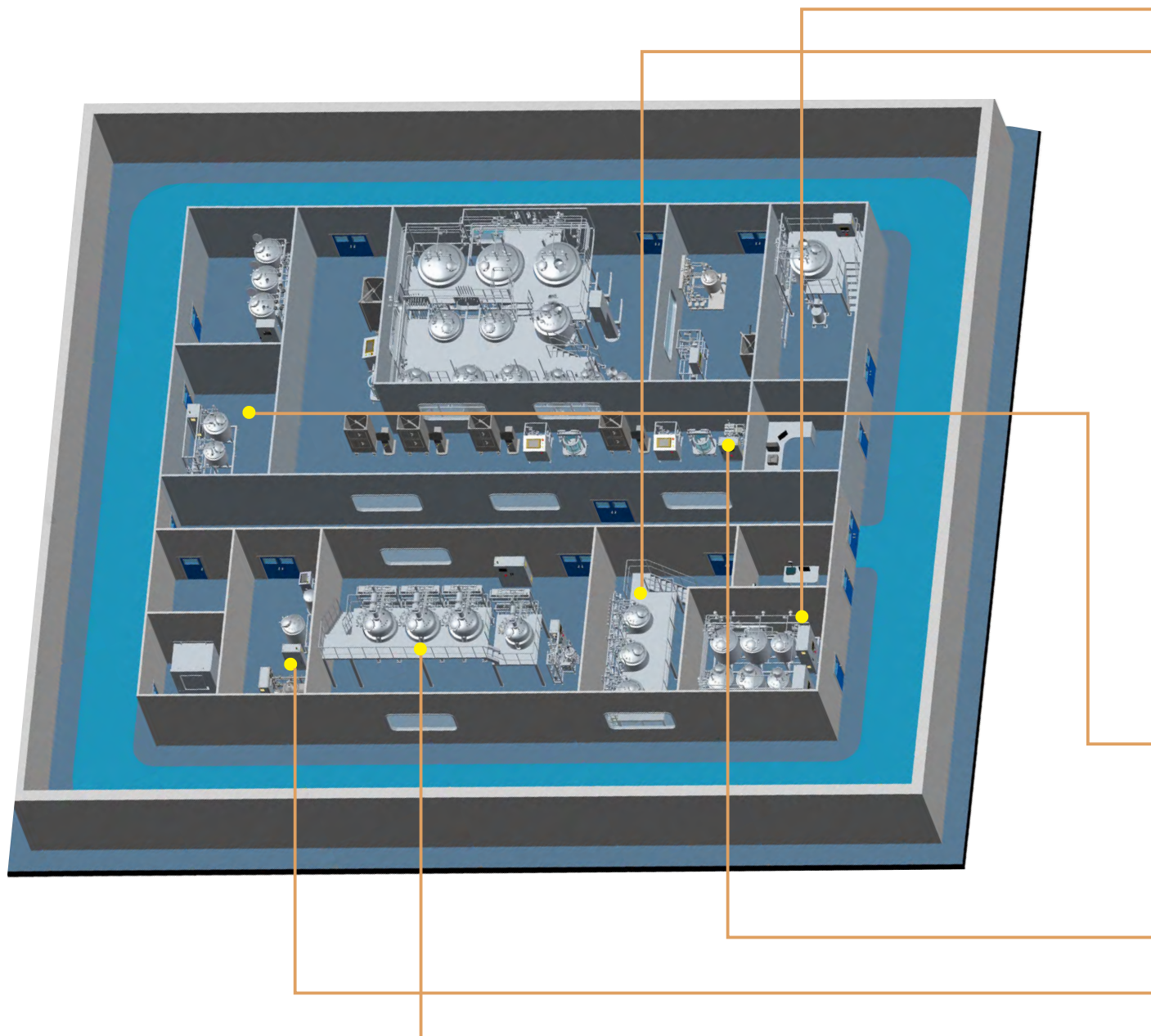
楚天生物工程技术产品线专注于生物制药整体解决方案，着力于为客户从研发、小试中试到商业化生产的全过程提供完整、专业、定制化的生物制药核心工艺装备和服务。生物制药核心工艺装备涵盖蛋白/酶反应，微生物/细菌发酵，动物细胞全悬浮培养，动物细胞微载体/片载体贴壁培养，培养基配制，缓冲液配制，蛋白分离纯化（离心分离、澄清过滤、超滤、层析、除病毒过滤等），原液配制，疫苗联苗配制，半成品配制分装，血液制品分离纯化，生物废水灭活等。生物制药技术服务涵盖：工艺技术咨询，厂房设计咨询，节能环保咨询，智能化车间设计咨询和法规符合性咨询，符合各体系 GMP、FDA、WHO、EUGMP 等法规要求。

现代化的生产车间离不开数字化信息管理平台，程序编程完全采用 S88 国际标准，数据、报表、权限、电子签名统一管理，自动生成电子批记录、服务器端采用冗余控制，确保数据安全性及完整性，实现整个系统联动控制。系统满足 GAMP5 计算机化系统验证要求，可有效推进企业生产过程无人化、智能化水平，以“软实力”构建企业核心竞争力。

As the key elements in the production of pharmaceutical enterprises which directly impact the quality of medicine, the production process system included design, construction, validation, and late operation and maintenance. Taking as the provider of overall solution in China, advocates providing users with systematic verify integration, and full-life cycle services from the prophase conceptual design to the later project implementation, and on-site installation and commissioning.

The bioengineering product of TruKing are concentrates on the overall solution of biopharmaceuticals. Focusing on providing customers with complete, professional, and customized biopharmaceutical core equipment and services from the entire process of R & D, and small pilot test to the commercial production. The core equipment of biopharmaceuticals covers protein or enzyme reactions, microbial or bacterial fermentation, animal cell suspension culture, animal cell microcarrier or chipcarrier adherent culture, culture medium preparation, buffer preparation, protein separation and purification (centrifugal separation, clarification and filtration, ultrafiltration, chromatography, virus removal, etc.), stock solution preparation, vaccine combined vaccine preparation, semi-finished product preparation and packaging, separation and purification of blood products, biological wastewater inactivation, etc. Biopharmaceutical technical services include: process technology consulting, plant design consulting, energy saving and environmental protection consulting, intelligent workshop design consulting, and regulatory compliance consulting that meets regulatory requirements of various system such as GMP, FDA, WHO, EUGMP, and so on.

Modern workshops are inseparable from the digital information management platform. Programming fully adopts S88 international standards. Data, reports, permissions, and electronic signatures are managed in a unified manner. Electronic batch records are automatically generated. Server-side redundancy control ensures data security and integrity, and achieves linkage control of the entire system. The system meets the verification requirements of the GAMP5 computerized system, which can effectively promote the unmanned and intelligent level of the production process, and build the company's core competitiveness with "soft power".



生物反应器 Bioreactor

细菌发酵、细胞全悬浮培养、细胞微载体 / 片载体培养，可满足疫苗、单抗、基因工程等多种药物生产，自主知识产权搅拌安全免维护，多种进料、多种进气模式可选，搭载西门子全自动高精度控制系统（PLC+WINCC 或 PCS7 系统）；

Bacterial fermentation, cell full suspend cultivation, cell microcarrier or chip carrier cultivation, can meet the production of many medicines such as vaccines, monoclonal antibodies, genetic engineering, etc, and provide independent intellectual property rights, safe and maintenance-free mixing, various feeding and air-in modes can be selected, and could be equipped with Siemens fully automatic high-precision control system (PLC + WINCC or PCS7 system);

培养基配制 Medium Preparation

细菌发酵、细胞全悬浮培养、细胞微载体 / 片载体培养，可满足疫苗、单抗、基因工程等多种药物生产，自主知识产权搅拌安全免维护，多种进料、多种进气模式可选，搭载西门子全自动高精度控制系统（PLC+WINCC 或 PCS7 系统）。

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CIP 系统 CIP System

全自动 CIP 系统，可提供单罐、双罐、三罐等多种 CIP 站，标准化设备，紧凑大方，空间占用小，可对单个目标或多个目标进行同时清洗，也可完成设备自清洗。

Fully automatic CIP system can provide various CIP stations such as single tank, double tank, three tanks, etc. It's standardization equipment, which is compact and generous, and with small space. Single target or multiple targets can be cleaned at the same time, and the device can also be self-cleaned.

生物废液灭活系统 Biological Waste Liquid Inactivation System

提供全自动批次灭活或连续式灭活设备，满足细菌、病毒、细胞生产废液的处理，安全、高效、灵活，能快速升降温，节约灭活时间，降低能耗。

Providing automatic batch inactivation or continuous inactivation equipment can meet the treatment of bacteria, virus, and cell production waste liquid. It is safe, efficient, and flexible. It can quickly raise and decrease the temperature, save inactivation time, and reduce energy consumption.

脱毒灭活系统 Detoxification and Inactivation System

全自动脱毒灭活系统，可满足疫苗、基因工程、血液制品等药物生产需求，全密闭操作降低生物安全风险，可 CIP/SIP、无菌取样及进出料，PH/ 温度高精度控制，灭活效果可验证，安全方便，自控程序遵循 S88 国际标准，提供 PLC+WINCC 或 PCS7 系统选择。

Fully automatic detoxification and inactivation system can meet the production needs of vaccines, genetic engineering, blood products and other medicines. Adopts fully enclosed operation reduces the risk of biological safety, can use CIP or SIP, aseptic sampling and feeding or discharging, owns high precision controlled PH or temperature, and could verify the inactivation effect, which is safe and convenient, and its automatic program are followed by the S88 international standards, PLC + WINCC or PCS7 system are provided.

离心和深滤系统 Centrifugal and Deep Filtration System

全自动连续离心及深滤系统，全密闭无污染，可在线清洗灭菌，操作便利，安全稳定；

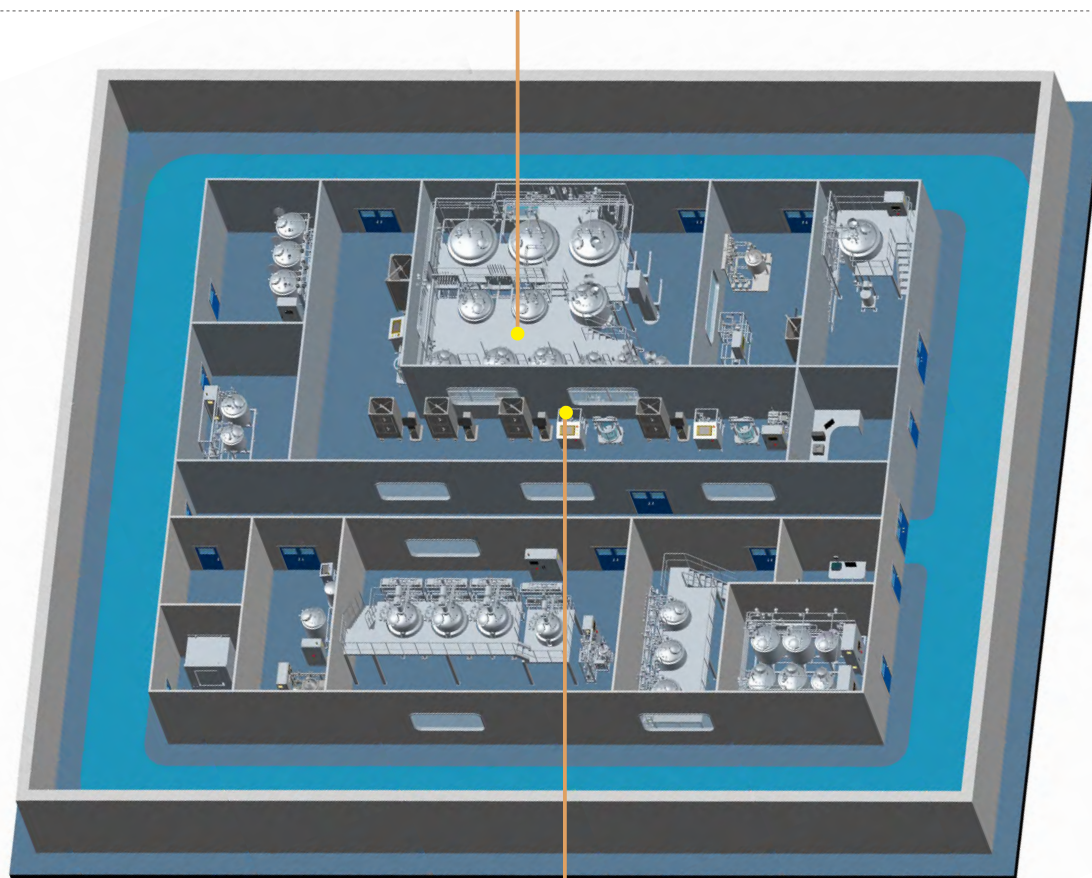
Fully automatic continuous centrifugal and deep filtration system, which is fully closed and without pollution, can be cleaned and sterilized online, that is easy to operate, safe and stable;

缓冲液储配系统

Buffer Storage and Distribution System

全自动、智能化、配方化配液能满足疫苗、单抗、基因工程、血液制品等多种生物药缓冲液配制及储存的需要，提供 316L，不锈钢+四氟、904L，2205,2507，钛等多种特殊材质配液系统。自控程序遵循 S88 国际标准，提供 PLC+WINCC 或 PCS7 系统选择。

Fully automatic, intelligent and formulated liquid formulation can meet the need of the preparation and storage of various biological medicine buffer solution such as vaccines, monoclonal antibodies, genetic engineering, blood products, etc., 316L, stainless steel + tetrafluoro, 904L, 2205, 2507, titanium and other special materials distribution system are provided. Automatic program are followed by the S88 international standards, PLC + WINCC or PCS7 system are provided.



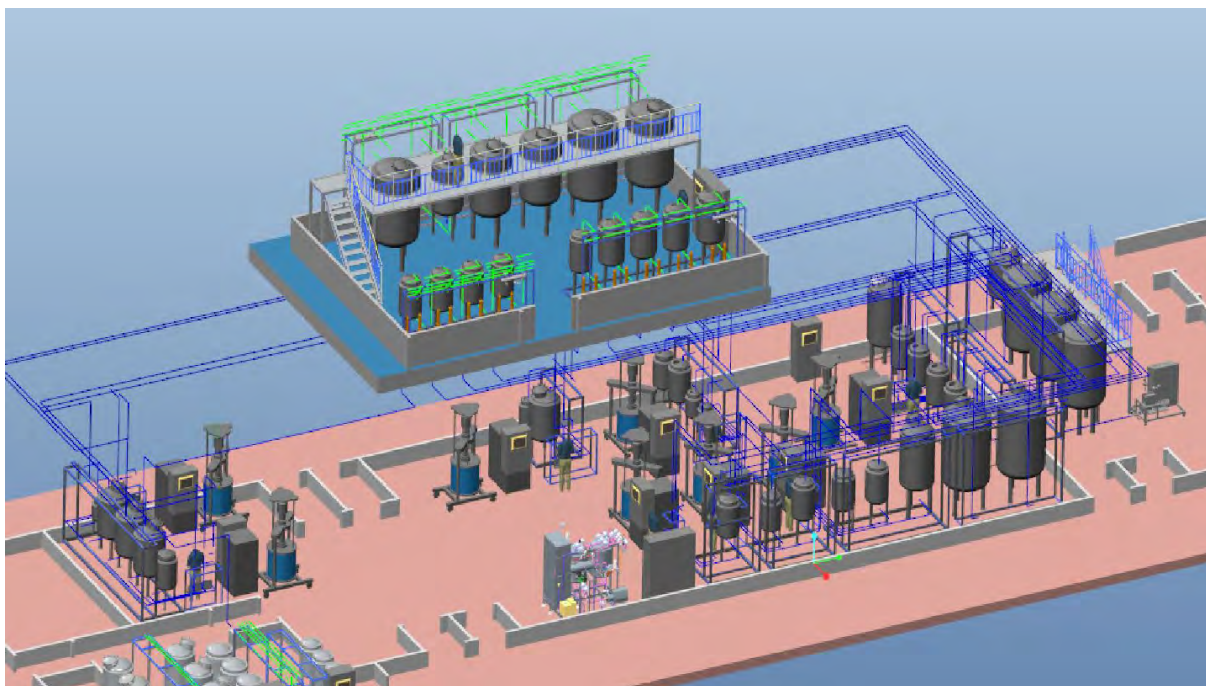
分离、纯化系统

Separation and purification system

提供实验室、中试、生产级全套生物下游超滤、纳滤、层析设备，完全自主知识产权，操作便利、安全稳定、性能达到国内国际一流水平。

Providing whole sets of biological downstream ultrafiltration, nanofiltration, and chromatography equipment for laboratory, pilot, and production-grade. Which are fully independent intellectual property rights, easy to operate, safe and stable, and their performance reaches the domestic and international first-class level.

技术服务 Technical Service



服务内容 / Service Content

技术咨询服务: 提供概念设计, 提供车间及设备布局、人物流及功能分区, 物料衡算、排产及设备选型、动力配置、能量衡算、投资概算以及环保安全方案等, 提供符合中国, FDA, 欧盟要求的技术咨询及验证服务, 协助起草 URS 文件。

Technology consulting services: Providing conceptual design, workshop and equipment layout, moving of people/materials and functional partition, material accounting, production scheduling and equipment selection, power configuration, energy accounting, investment budget and environmental protection security solution, etc. We also provide technical consulting and verification services for the requirements of China, FDA and EU, and assist in drafting URS documents.

生物反应器系统 Bioreactor System



主要用途 / Main Application

主要包括蛋白 / 酶反应、微生物发酵、细胞培养等系统, 可用于人用 / 兽用疫苗、单克隆抗体、基因工程药的生产。

It mainly includes protein/enzyme reaction, microbial fermentation, cell culture and other systems, which can be used in the production of human/animal vaccines, monoclonal antibodies and genetically engineered drugs.



性能优势 / Performance Advantage

- ◎ 温控精度：±0.2℃，显示精度 0.1℃；
 - ◎ PH、溶氧、搅拌、通气、消泡、补液、接种全自动控制；
 - ◎ 可提四种（Air、O₂、N₂、CO₂）六路（两路表层，四路深层）、小孔、微孔和无泡通气装置；
 - ◎ 多路无菌进液、取样、转移，全系统 SIP/CIP；
 - ◎ 磁悬浮上搅拌：零泄漏、无污染、长寿命、免维护、可 SIP/CIP；
 - ◎ 灵活的配方管理功能，电子签名、电子记录及审计追踪等功能；
 - ◎ 完善的 FAT 设施设备和验证服务。
- + Temperature Accuracy: ±0.2℃, measurement accuracy 0.1℃;
 - + Fully automatic control for PH, dissolved oxygen, stirring, ventilation, defoaming, rehydration, inoculation;
 - + Can provide four kinds of gas (Air, O₂, N₂, CO₂) and six channels (two channels for surface, four channels for deep layers), pore, micropore and no-bubble aeration devices;
 - + Multiple aseptic feeding, sampling and transfer, SIP/CIP for whole system;
 - + Magnetic stirring on the top: zero leakage, no pollution, long-life, maintenance-free, can be equipped with SIP/CIP;
 - + Flexible recipe management, electronic signature and records and audit tracking functions;
 - + Complete FAT facilities and validation services.



生物发酵反应器主要技术参数 / Main Technical Parameters of Biological Fermentation Reactor

参数型号 Parameter Model	生物发酵 反应器 Biological Fermentation Reactor	FR30	FR50	FR100	FR200	FR500	FR1000	FR2000	FR5000
容器 Container	全 容 积 Full Volume	30L	50L	100L	200L	500L	1000L	2000L	5000L
	罐体材质：与物料接触部分为 316L 不锈钢，其余部分为 304 不锈钢 / 可选特殊材质，罐盖提升装置（可选） Tank body material: 316L stainless steel is used for contact with materials, 304 stainless steel is selected for other parts, and tank cover lifting device is optional								
搅拌 Stir	密封形式：顶置式搅拌或底部搅拌。密封形式采用单端面 / 双端面 / 磁悬浮式 Sealing form: Top mixing or bottom stirring. The sealing form is single end face / double end face / magnetic suspension type								
	桨叶形式：多种形式桨叶 + 导流桶、自吸式及组合方式，流场分布可选 Blade form: various forms of blade + diversion bucket, self suction and combination mode, flow field distribution can be selected								
	控制方式：自动控制，采用无级调速，转速可设置 Control mode: automatic control, stepless speed regulation, speed can be set								
	搅拌速度 Mixing speed	0-600rpm		0-400rpm		0-200rpm			
	控制精度：±1%，分辨率：1rpm Control accuracy: ± 1%, resolution: 1rpm								
	其他说明：可与溶解氧实现关联控制；具有实时曲线和历史曲线记录，可分段参数设定 Other notes: it can realize associated control with dissolved oxygen; it has real-time curve and historical curve record, and can set parameters in sections								
温控 Temperature Control	控制方式：PID 自动控制；楚天自制的 TCU 温控可实现夹套控温；温度范围：2℃~121℃；控制精度：±0.2℃，显示精度：0.1℃ Control mode: PID automatic control; Chutian self-made TCU temperature control can realize jacket temperature control; temperature range: 2℃~121℃；control accuracy: ± 0.2℃，display accuracy: 0.1℃								
	其他说明：具有实时曲线和历史曲线记录，自动温度控制调节，温度可设。 Other instructions: with real-time curve and historical curve record, automatic temperature control and adjustment, temperature can be set.								
灭菌 Sterilization	灭菌方式：可实现空罐灭菌和实罐灭菌；进、排气过滤器在线灭菌；磁力搅拌系统在线灭菌 Sterilization mode: it can realize the sterilization of empty tank and solid tank; the online sterilization of inlet and exhaust filter; the online sterilization of magnetic stirring system								
	灭菌温度：> 121℃，灭菌时间：> 30min 或 F0 值大于 15 Sterilization temperature: > 121℃，sterilization time: > 30min or F0 value greater than 15								
	其他灭菌说明：底阀、取样阀、补料接口外部组件、移种管路均可实现在线灭菌；灭菌温度具有实时曲线和历史曲线记录；灭菌完成后具有无菌气体吹扫保压功能 Other sterilization instructions: bottom valve, sampling valve, external components of feeding interface and seed transfer pipeline can realize online sterilization; sterilization temperature has real-time curve and historical curve record; after sterilization, it has the function of purging and maintaining pressure of sterile gas								
通气 Ventilation	控制方式：气体流量控制器比例控制，转子流量计显示辅助调节；稳态精度 ±0.2% Control mode: gas flow controller proportional control, rotameter display auxiliary regulation; steady state accuracy ± 0.2%								
	通气方式：采用表层通气和深层通气两种形式 Ventilation mode: surface ventilation and deep ventilation are used								
	进气过滤，排气冷凝，特殊设计的气体分布器更安全高效 Air inlet filtration, exhaust condensation, specially designed gas distributor is more safe and efficient								

参数型号 Parameter Model	生物发酵 反应器 Biological Fermentation Reactor	FR30	FR50	FR100	FR200	FR500	FR1000	FR2000	FR5000
pH	控制方式：PID 自动控制，蠕动泵关联控制加酸碱 Control mode: PID automatic control, peristaltic pump associated control, acid and alkali								
	显示范围：0-14pH；控制范围：2-12pH Display range: 0-14ph; control range: 2-12ph								
	控制精度：±0.1pH，分辨率：0.01pH Control precision: ± 0.1ph, resolution: 0.01ph								
	其他说明：具有实时曲线和历史曲线记录 Other Description: with real-time curve and historical curve record								
DO	控制方式：PID 自动控制，空气，O ₂ 气体流量混合控制溶解氧 Control mode: PID automatic control, air, O ₂ gas flow mixed control dissolved oxygen								
	显示范围：0-300%；控制范围：0-100% Display range: 0-300%; control range: 0-100%								
	控制精度：±10%；分辨率：0.1% Control accuracy: ± 10%; resolution: 0.1%								
	其他说明：具有实时曲线和历史曲线记录 Other Description: with real-time curve and historical curve record								
液位 / 称重 Level / weighing	设置液位检测或称重模块，用于控制补料和排液 Liquid level detection or weighing module is set to control feeding and discharging								
	其他说明：关联蠕动泵控制，实现自动调节控制功能 Other Description: it is connected with peristaltic pump control to realize automatic regulation control function								
消泡 Defoaming	消泡方式系统根据泡沫电极信号自动消泡（机械 / 消泡剂） Defoaming system automatically defoamed (mechanical / defoamer) according to foam electrode signal.								
进物料液 Feed and discharge liquid	标准配置：4 个模拟量蠕动泵（可选） Standard configuration: 4 analog peristaltic pumps (optional)								
	常规采用 4 路独立控制进液；通常可选择：培养基，消泡剂，酸，碱等；可实现无菌对接精确控制 In general, four independent control channels are used to control the infusion; usually can select the media, defoamer, acid, alkali, etc. which can realizing; the precise control of aseptic docking.								
电源 Power Supply	三相 380vac±10%，50HZ Three phase 380 VAC ± 10%, 50 Hz								
自控系统 Automatic control system	采用西门子平台，楚天定制开发系统；可实现全自动运行控制，实时监控，报表输出，审计追踪电子签名，事故报警等功能 With Siemens platform, traking customized development system can realize automatic operation control, real-time monitoring, report output, audit tracking, electronic signature, accident alarm and other functions								



细胞培养反应器主要技术参数 / Main Technical Parameters of Cell Culture Reactor

参数 型号 Parameter Model	细胞培养反应器 Cell Culture Reactor	BR30	BR50	BR100	BR150	BR200	BR500
容器 Container	全 容 积 Full Volume	30L	50L	100L	150L	200L	500L
	工作容积 Working Volume	20L	35L	70L	100L	140L	350L
	罐体材质：与物料接触部分为 316L 不锈钢，其余部分为 304 不锈钢 / 可选特殊材质，罐盖提升装置（可选） Tank body material: 316L stainless steel is used for contact with materials, 304 stainless steel is selected for other parts, and tank cover lifting device is optional						
	结构形式：篮式（片状）、旋转过滤器（微载体） Structural form: basket (flake), rotary filter (microcarrier)						
搅拌 Stir	密封形式：顶置式磁悬浮搅拌：静密封、零泄露、无污染、长寿命、免维护、可 CIP/SIP Sealing form: top mounted magnetic levitation stirring: static sealing, zero leakage, no pollution, long life, maintenance free, CIP / SIP						
	桨叶形式：低剪切力温和搅拌：螺旋式桨叶 + 导流桶、自吸式及组合方式，流场分布可选 Blade form: low shear force and mild mixing: spiral blade + diversion bucket, self suction and combination mode, flow field distribution is optional						
	控制方式：自动控制，采用无级调速，转速可设置 Control mode: automatic control, stepless speed regulation, speed can be set						
	驱动电机标准配置；伺服电机 Drive motor standard configuration; servo motor						
	搅拌速度范围 0-200rpm Mixing speed range: 0-200rpm						
	调速精度：控制精度：±1%，分辨率：1rpm Speed control accuracy: control accuracy: ± 1%, resolution: 1 rpm						
	其他说明：可与溶解氧实现关联控制；具有实时曲线和历史曲线记录，可分段参数设定 Other notes: it can realize associated control with dissolved oxygen; it has real-time curve and historical curve record, and can set parameters in sections						
温控 Temperature Control	控制方式：PID 自动控制；楚天自制的 TCU 温控可实现夹套控温；温度范围：2℃~121℃；控制精度：±0.2℃，显示精度：0.1℃ Control mode: PID automatic control; Chutian self-made TCU temperature control can realize jacket temperature control; temperature range: 2℃~121℃; control accuracy: ± 0.2℃, display accuracy: 0.1℃						
	其他说明：具有实时曲线和历史曲线记录，自动温度控制调节 Other Description: with real-time curve and historical curve record, automatic temperature control adjustment						
灭菌 Sterilization	灭菌方式：可实现空罐灭菌和实罐灭菌；进、排气过滤器在线灭菌；磁力搅拌系统在线灭菌 Sterilization mode: it can realize the sterilization of empty tank and solid tank; the online sterilization of inlet and exhaust filter; the online sterilization of magnetic stirring system						
	灭菌温度：> 121℃，灭菌时间：> 30min 或 F0 值大于 15 Sterilization temperature: > 121℃, sterilization time: > 30min or F0 value greater than 15						
	其他灭菌说明：底阀、取样阀、补料接口外部组件、移种管路均可实现在线灭菌；灭菌温度具有实时曲线和历史曲线记录；灭菌完成后具有无菌气体吹扫保压功能 Other sterilization instructions: bottom valve, sampling valve, external components of feeding interface and seed transfer pipeline can realize online sterilization; sterilization temperature has real-time curve and historical curve record; after sterilization, it has the function of purging and maintaining pressure of sterile gas						

参数 型号 Parameter Model	细胞培养反应器 Cell Culture Reactor	BR30	BR50	BR100	BR150	BR200	BR500
通气 Ventilation	控制方式：气体流量控制器比例控制，转子流量计显示辅助调节；稳态精度 $\pm 0.2\%$ Control mode: gas flow controller proportional control, rotameter display auxiliary regulation; steady state accuracy $\pm 0.2\%$						
	通气方式：采用表层通气和深层通气两种形式，表层两路 + 深层四路。深层通气有微泡通气和无泡通气两种方式，进气过滤，排气冷凝。 Ventilation mode: surface ventilation and deep ventilation are adopted, two ways of surface ventilation and four ways of deep ventilation. There are two ways of deep ventilation: micro bubble ventilation and non bubble ventilation, air inlet filtration and exhaust condensation.						
	气体种类：四种气体：Air、O ₂ 、N ₂ 、CO ₂ Gas type: four gases: air, O ₂ , N ₂ and CO ₂						
pH	控制方式：PID 自动控制，蠕动泵关联控制加酸碱，CO ₂ 气体流量关联控制补酸 Control mode: PID automatic control, peristaltic pump related control, acid and alkali addition, CO ₂ gas flow correlation control, acid supplement						
	显示范围：0-14pH；控制范围：2-12pH Display range: 0-14ph; control range: 2-12ph						
	控制精度： $\pm 0.1\text{pH}$ ，分辨率：0.01pH Control precision: $\pm 0.1\text{ph}$, resolution: 0.01ph						
	其他说明：具有实时曲线和历史曲线记录 Other Description: with real-time curve and historical curve record						
DO	控制方式：PID 自动控制，Air、O ₂ 、N ₂ 气体流量混合控制溶解氧 Control mode: PID automatic control, air, O ₂ , N ₂ gas flow mixed control dissolved oxygen						
	显示范围：0-300%；控制范围：0-100% Display range: 0-300%; control range: 0-100%						
	控制精度： $\pm 10\%$ ；分辨率：0.1% Control accuracy: $\pm 10\%$; resolution: 0.1%						
	其他说明：具有实时曲线和历史曲线记录 Other Description: with real-time curve and historical curve record						
液位 / 称重 Level / Weighing	设置液位检测或称重模块，用于控制补料和排液 Liquid level detection or weighing module is set to control feeding and discharging						
	其他说明：关联蠕动泵控制，实现自动调节控制功能 Other Description: it is connected with peristaltic pump control to realize automatic regulation control function						
消泡 Defoaming	消泡方式泡罩腔结构消泡 / 消泡剂消泡 Defoaming method bubble cover cavity structure defoaming / defoamer defoaming						
进/出料液 Feed and Discharge Liquid	标准配置：4-6 个模拟量蠕动泵 Standard configuration: 4-6 analog peristaltic pumps						
	进料添加：培养基，消泡剂，营养液，酸，碱等物质；出料：灌流顶部出料；可实现无菌对接精确控制 Feeding: medium, defoaming agent, nutrient solution, acid, alkali and other substances; discharging: perfusion top discharging; accurate control of aseptic docking						
电源 Power Supply	三相 380vac $\pm 10\%$ ，50HZ Three phase 380 VAC $\pm 10\%$, 50 Hz						
自控系统 Automatic Control System	采用西门子平台，楚天定制开发系统；可实现全自动运行控制，实时监控，报表输出，审计追踪电子签名，事故报警等功能 With Siemens platform, traking customized development system can realize automatic operation control, real-time monitoring, report output, audit tracking, electronic signature, accident alarm and other functions						

配液配制系统 Solution Preparation System

配液系统包括制剂配制，复杂制剂配制及辅助系统。

It includes preparation system, complex preparation and auxiliary system.

配液系统 Preparation System



主要用途 / Main Application

主要用于制药厂常规注射剂、口服液剂、冻干粉针剂、气雾喷剂、滴眼剂、消毒剂、半成品、培养基、缓冲液等产品的配制。

It is mainly used for the preparation of conventional injection, oral liquid, freeze-dried powder injection, aerosol spray, eye drops, disinfectant, semi-finished products, medium and buffer solution, etc.



性能优势 / Performance Advantage

- ◎ 定制化的全自动物料配制、CIP/SIP 系统，模块化设计，一键式操作，多种模式选择，安全无泄漏，低残留。
 - ◎ 特殊设计减少清场时间和水电气消耗，优化排班，降低设备运行成本。各阀门、仪表、设备均为国际知名品牌或国内优选品牌，最大程度降低系统故障率，便于连续生产。
 - ◎ 自主的精品罐设计及制造，便于高效的设计沟通及排产，保证产品质量和项目交期。
 - ◎ 一比一三维设计，真实模拟管道布置、现场生产操作，提供舒适的操作体验。
 - ◎ 特殊的安全及互锁设计、无尘配管，最大程度保证药品的安全生产。
 - ◎ 灵活的配方管理功能，电子签名、电子记录及审计追踪等功能。
- + Customized automatic material preparation, CIP/SIP system, modular design, one-key operation, various mode for selection, safe and without leakage, low residue.
 - + Special design can reduce cleaning time and consumption of electricity and water, optimize scheduling, reduce equipment operating costs.
 - + All valves, instruments and equipment adopt international famous brands or domestic preferred brands, that is to minimize the system failure rate, and better for continuous production.
 - + Independent design and manufacture of boutique tank is useful to facilitate efficient design communication and production scheduling, ensure product quality and project delivery.
 - + 1:1 3D design, simulating pipeline layout, on-site production operation, provide a comfortable operation experience.
 - + Special safe and interlock design, dust-free piping can maximum extent to ensure the safety of drug production.
 - + Flexible recipe management, electronic signature and records, and audit tracking functions.



主要技术参数 / Main Technical Parameters

工作体积 Working Volume	搅拌转速 Stirring Speed	设计温度 Design Temperature	设计压力 Design Pressure	称重精度 Measuring Precision	控温精度 Temperature Control Precision	搅拌控制精度 Stirring Control Precision
1-20000L	0-450rpm	-10-150°C	-0.1-0.6mPa	3‰	±1°C	±1%

复杂制剂配制系统 Complex Preparation System



包括微球，脂质体，乳剂，混悬液等。

Including microspheres, liposomes, emulsion, suspension and so on.

微球 Microsphere



主要用途 / Main Application

主要用于单乳溶剂挥发法、复乳溶剂挥发法、膜乳
化法、凝聚法（相分离法）等制备微球工艺系统。

It is mainly used for the preparation of microspheres by solvent
volatilization, solvent volatilization, membrane emulsification and
coagulation (phase separation).



性能优势 / Performance Advantage

- ⊙ 针对性的反应罐设计以及剪切和乳化设备的选型，以适应实验室工艺转生产的需求；
 - ⊙ 非标定制化的曝气装置，降低有机溶媒残留，保证微球的固化成型；
 - ⊙ 合理的管道落差式设计及过滤器选型，降低药液产品残留；
 - ⊙ 油水比例混合的设计，保证乳化效果；
 - ⊙ 筛分机的选型设计，确保微球粒径分布评价指标的均一性与重现性；
 - ⊙ 提供不同的微球制备方式，适应不同性质的 API，保证封装率及载药量；
 - ⊙ 配套的隔离器系统，确保制备过程的无菌环境。
- + Specific design for reaction tank and selection of shearing and emulsifying equipment, which suit for the transformation requirement of process to production in laboratory;
 - + Non-standard customized aeration device can reduce the residue of organic solvent and ensure the solidification and molding of microspheres;
 - + Reasonable pipeline drop design and filter selection is to reduce the residue of liquid products;
 - + Design of oil-water proportion mixing ensures the emulsifying effect;
 - + The selection design of sieving machine ensures the uniformity and reproducibility of the evaluation index of particle size distribution of microspheres;
 - + Providing different preparation methods of microspheres and adapt different API properties, and ensure the encapsulation rate and drug loading;
 - + The assorted isolator system ensures a sterile environment for the preparation process.

脂质体 Liposome



主要用途 / Main Application

主要用于被动载药与主动载药的反向蒸发法、二次乳化（复乳法）、乙醇注入法、硫酸铵沉淀法等方式制备脂质体的工艺系统。

It is mainly used for the preparation of liposomes by passive and active drug loading of reverse evaporation, secondary emulsification (multiple emulsion method), ethanol injection, ammonium sulfate precipitation and other methods.



性能优势 / Performance Advantage

- ⊙ 配料罐与乳化罐的合理分布、过滤器的选型及梯度设计，最大程度降低药液残留；
 - ⊙ 非标定制化的曝气装置，有效降低有机溶媒残留；
 - ⊙ 脂质体碎片收集装置，确保后端工艺的有效实施；
 - ⊙ 剪切设备与均质乳化设备的合理选型与使用，有效保证粒径的分布；
 - ⊙ 关键性参数可控，保证制备过程的重现性。
- + Reasonable distribution of mixing tank and emulsifying tank, selection of filter and gradient design minimizes the residue of liquid;
 - + Non-standard customized aeration device can effectively reduce the residue of organic solvent;
 - + Liposome debris collection device ensures the effective implementation of the back-end process;
 - + Reasonable selection and use of shearing equipment and homogeneous emulsifying equipment effectively ensures the distribution of particle size;
 - + The key parameters are controllable, ensures the reproducibility of the preparation process.

乳剂 Emulsion



主要用途 / Main Application

主要用于热力学及动力学不稳定特性注射用乳剂配制工艺系统。

It is mainly used in the emulsion process system for injection of thermo dynamic and kinetic instability.



性能优势 / Performance Advantage

- 油水比例混合的设计，保证乳化效果；
 - 倒罐式剪切 / 均质，保证药液的完全分散剪切，批次差异小，确保均一性与重现性；
 - 有效的氮气保护，保证产品质量安全。
- + The design of oil-water proportion mixing ensures the emulsifying effect.
 - + Pouring tank type shearing/homogeneous ensures the complete dispersion of the liquid, which has small difference on batches, and ensures uniformity and reproducibility;
 - + Effective Nitrogen protection ensures product quality.

混悬液 Suspension



主要用途 / Main Application

主要用于均质、球磨等方式制备混悬液的工艺系统。

It is mainly used for the preparation of suspension by homogenization, ball grinding and other methods.



性能优势 / Performance Advantage

- 投料隔离器的合理使用，保证 API 投料过程的无菌及人员防护；
 - 辅料配制罐区域的合理划分、过滤器的选型及梯度设计，最大程度降低药液残留；
 - 混合罐的高速搅拌设计，使得进球磨 / 均质前药液的均一性，保证球磨 / 均质效果；
 - 罐体的异型设计，保证最低搅拌配液量；
 - 循环球磨 / 均质以及后端过滤筛网设计，确保最终粒径分布的均一性；
 - 缓冲罐的循环灌装设计，避免混悬液灌装过程的沉降风险。
- + Reasonable use of feeding isolators ensures sterile and personnel protection in API feeding process;
 - + Reasonable division of auxiliary material distribution tank area, selection of filter and gradient design, that minimizes residual liquid;
 - + The high speed stirring design of the mixing tank ensures the homogeneity of the solution before ball grinding/homogenizing ensures the ball grinding/homogenizing effect;
 - + Special design of the tank, ensures the minimum amount of mixing liquid;
 - + Circular ball grinding /homogenization and back end filtering screen design which can ensure the uniformity of final particle size distribution;
 - + The circular filling design of the buffer tank avoids the risk of settlement during the suspension filling process.

微射流均质机 Microjet Homogenizer



主要用途 / Main Application

微射流均质机是流体在高压作用下经过固定尺寸的微小通道，产生几倍音速，利用过程中产生的剪切、碰撞、空穴等效应，实现分散、破碎、减小粒径、乳化、均质等功能，常用于乳剂、脂质体等复杂制剂的配制。

Microjet homogenizer is that the fluid passes through micro channel of fixed size under high pressure to produce sound speed of several folds. It makes use of the effects of cut, collision, and hole during the process to achieve the functions such as dispersion, breaking, reducing particle diameters, emulsification, and homogenization. It is normally used for preparation of complex preparations such as emulsion and liposome.



性能优势 / Performance Advantage

- 分为实验型、中试型和生产型，最高工作压力 30000psi，最大流量 15L/min；
 - 交互容腔和柱塞杆自带冷却系统；
 - 交互容腔核心采用金刚石制作，微流道大小和数量可选，工艺重现性高；
 - 柱塞杆采用高寿命的陶瓷材料；
 - 可实现 CIP 和 SIP，一键在线清洗、在线灭菌；
 - 配备触摸屏人机界面，操作便利，且显示工作压力和温度；
 - 可选配进料隔膜泵、过滤器、自动控制阀门、流量计、额外的交互容腔等；
 - 带保护连锁功能，安全且便于操作；
 - 采用 WINDOWS+SCADA 的操作系统；
 - 符合 FDA CFR21 PART11 要求；
 - 符合 GMP 要求；
 - 符合 CE 标准。
- + It is divided into lab type, middle-test type, and production type, with the maximum working pressure of 30,000psi and the maximum flow of 15L/min;
 - + The interactive chamber and plunger rod are equipped with cooling system;
 - + The core of the interactive chamber is made of diamond; there are options of micro-channels and the quantity; the reproducibility of the process is high;
 - + The plunger rod adopts the long-serving ceramic materials;
 - + This can realize CIP and SIP, online washing and sterilization with one press of the button;
 - + Equipped with touch screen HMI, convenient to operate; display working pressure and temperature;
 - + It can match with loading diaphragm pump, filter, automatic control valve, flowmeter, and extra interactive chamber etc;
 - + It carries the function of protection and linkage, safe and convenient to operate;
 - + Adopt WINDOWS+SCADA operation system;
 - + Meet the requirements of FDA CFR21 PART11;
 - + GMP compliant;
 - + CE compliant.



主要技术参数 / Main Technical Parameters

机型 Model	实验型微射流均质机 LMH Lab-type microjet homogenizer LMH	中试型微射流均质机 MMH Middle-test-type microjet homogenizer MMH	生产型微射流均质机 PMH Production-type microjet homogenizer PMH
主机外形尺寸 (L×W×H) Host dimensions (L×W×H)	764×370×460mm	1500×850×2000mm	2150×1050×2000mm
最高进料温度 Highest loading temperature	70°C	70°C	75°C
流量 Flow	60-150ml/min	1-1.2L/min	3-15L/min
最小处理量 Minimum handling amount	20mL	1500mL	5L
高压柱塞泵个数 The number of high-pressure plunger pump	1	2	2
柱塞泵驱动 Driven by plunger pump	电机 Motor	液压缸 Hydraulic cylinder	液压缸 Hydraulic cylinder
液压站最大压力 Highest pressure of hydraulic station	30000PSI(210MPa)	30000 PSI (210MPa)	30000 PSI (210MPa)
CIP	是 Yes	是 Yes	是 Yes
SIP	否 No	否 No	是 Yes
重量 Weight	140kg	900kg	1089kg
电源 Power supply	单相: 220v, 功率: 1.5kw Single phase: 220V, power:1.5kw	三相: 380V; 50HZ; 11.5KW Three phase: 380V; 50HZ; 11.5KW	三相: 380V; 50HZ; 37KW Three phase:380V; 50HZ;37KW

辅助系统 Auxiliary System

包括在线清洗站，温控单元，废液灭活系统等。

Including CIP station, temperature control unit, waste liquid inactivation system etc.

» 在线清洗系统 CIP Station



» 主要用途 / Main Application

主要用于各种配制系统、生物反应器系统的罐体、管道清洗。

It is mainly used for cleaning tank and pipeline of various preparation systems and bioreactor systems.



性能优势 / Performance Advantage

- 根据使用情况提供不同配置的在线清洗站，运行稳定、安全、精确；
 - 根据清洗对象数量、特性、生产排班，我们可以提供无罐、单罐、双罐、多罐清洗站；
 - 根据客户厂房布局及控制要求，对于清洗站，既可单独控制，也可集成控制；
 - 具有自动配制清洗液、自动控温、自动判定清洗终点、液位报警等功能；
 - 灵活的配方管理功能，电子签名、电子记录及审计追踪等功能。
- It can be equipped with different configurations of CIP station based on usage, which runs stably, safely and exactly;
 - It can provide No-tank, single tank, double tank, multi-tank cleaning station according to the quantity, characteristics, production schedule of cleaning objects;
 - The cleaning station can be controlled separately or integrated according to the layout and control requirements of the customer;
 - It has functions of automatic preparation of cleaning liquid, automatic temperature control, automatic determination of cleaning end point, liquid level alarm and so on;
 - Flexible recipe management, electronic signature and records, and audit tracking functions.



温控单元 Temperature Control Unit



主要用途 / Main Application

主要用于控制罐体内介质的温度。

It mainly used to control the temperature of the medium in the tank.



性能优势 / Performance Advantage

- 可提供不同配置的温控单元，运行稳定、安全、精确；
 - 根据温控对象数量、生产排班、控温精度，我们可以提供无板换、单板换、双板换、电加热、有缓冲罐，无缓冲罐、单介质、多介质等各种组合类型的温控单元；
 - 根据客户厂房布局及控制要求，对于温控单元，既可单独控制，也可集成控制；
 - 具有精确控温（ $\pm 0.2^{\circ}\text{C}$ ）、液位报警等功能。
- It can provide different configurations of the temperature control units, which runs stably, safely and exactly;
 - It can provide various combination types of temperature control units such as no-plate change, single plate change, double plate change, electric heating, with buffer tank, without buffer tank, single medium, multi-medium, etc., according to the quantity of temperature control objects, production schedule and temperature control accuracy;
 - The temperature control unit can be controlled separately or integrated according to the layout and control requirements of the customer;
 - It has accurate temperature control ($\pm 0.2^{\circ}\text{C}$), liquid level alarm and other functions.

纯化工艺系统 Purification Process System

包括层析系统、超滤系统等。

Including chromatography system, ultrafiltration system and so on.

层析系统 Chromatography System



主要用途 / Main Application

层析系统主要是利用各组分物理性质的不同，将多组分混合物进行分离及测定的方法；其对生物大分子如蛋白质和核酸等复杂的有机物的混合物有极高的分离能力。

主要应用于：人用疫苗、兽用疫苗、血液制品、单抗类药品、重组蛋白等生产过程中的分离纯化。

The chromatography system is a method of separating and determining multi-component mixtures mainly based on the different physical properties of each component. It has the extremely high separation ability to the biological macromolecule such as the protein and the nucleic acid and other complex organic compounds mixture.

It is mainly used for the separation and purification of human vaccines, animal vaccines, blood products, monoclonal antibodies and recombinant proteins.



性能优势 / Performance Advantage

- ◎ 根据生产工艺针对性的进行样品罐（上样和接收）、缓冲液储罐及配套管阀件的设计，完全满足由实验室工艺转大规模生产的需求；
 - ◎ 智能化的全自动控制系统设计采用配方化模块程序管理生产工艺的编辑，配合科学、合理的自控仪表和阀门，可实现一键式全自动运行操作；
 - ◎ 符合 GAMP5 的计算机化系统设计，确保数据记录、电子签名、审计追踪、权限管理、趋势图等实时进行，形成满足法规要求的可追溯的、真实的电子数据记录文档；
 - ◎ 符合 ASME 标准要求的管路设计及零死角阀门的设计选型，可确保系统在 CIP 和 SIP 时，无死角存在。
- + Specific design for sample tank (sample loading and receiving), buffer storage tank and supporting pipe and valve according to the production process, that fully meets the requirement of transferring from laboratory process to mass production;
 - + Intelligent automatic control system design adopts the formula module program to manage the editing of production process, with scientific and reasonable auto control instruments and valves, which can realize one-key automatic operation;
 - + Computerized system design which can meet the GAMP5, ensures real-time for data recording, electronic signature, audit tracking, authority management, trend chart, etc., forms traceable and authentic electronic data recording documents, requirements of regulations;
 - + The design of the pipeline and the selection of zero dead angle valve
 - + Meeting ASME standard, ensure that there is no dead angle in CIP and SIP.

超滤系统 Ultrafiltration System



主要用途 / Main Application

超滤系统可进行蛋白质、酶、核酸、多糖、多肽、抗生素、病毒等的分离，主要用于人用疫苗、兽用疫苗、血液制品、单抗类药品、重组蛋白等生产过程中的透析、浓缩等。

Ultrafiltration system can separate proteins, enzymes, nucleic acids, polysaccharides, peptides, antibiotics, viruses, etc. It is mainly used for dialysis and concentration in the production process of human vaccines, animal vaccines, blood products, monoclonal antibodies, recombinant proteins, etc.



性能优势 / Performance Advantage

- 平板膜或中空纤维柱超滤系统，泵速、入口压力、回流压力、透过压力、回流流量、透过流量、回流电导、透过电导、透过 UV、TMP 全自动控制，能满足客户超滤浓度和透析的要求。隔膜泵或转子泵进料，定制夹具满足大部分超滤膜 / 柱的使用。
 - 智能化的全自动控制系统设计采用配方化模块程序管理生产工艺的编辑，配合科学、合理的自控仪表和阀门，可实现一键式全自动运行操作。
 - 符合 GAMP5 的计算机化系统设计，确保数据记录、电子签名、审计追踪、权限管理、趋势图等实时进行，形成满足法规要求的可追溯的、真实的电子数据记录文档。
 - 符合 ASME 标准要求的管路设计及零死角阀门的设计选型，可确保系统在 CIP 和 SIP 时，无死角存在。
- + Plate membrane or hollow fiber column ultrafiltration system, which can full automatically control that such as pump speed, inlet pressure, reflux pressure, transmittance pressure, reflux flow, transmittance flow, reflux conductance, transmittance UV, TMP, can meet customer' s requirements of ultrafiltration concentration and dialysis. Diaphragm pump or rotor pump feeding, customizing clamps can meet the use of most ultrafiltration membrane/column.
 - + The intelligent automatic control system design adopts the formulation module program to manage the editing of production process, with scientific and reasonable automatic control instruments and valves, and it can realize the one-key automatic operation.
 - + Computerized system design which can meet the requirements of regulations GAMP5, ensures real-time for data recording, electronic signature, audit tracking, authority management, trend chart, etc., forms traceable and authentic electronic data recording documents.
 - + The design of the pipeline and the selection of zero dead angle valve meeting ASME standard, ensure that there is no dead angle in CIP and SIP.

卫生级容器 Sanitary Container



主要用途 / Main Application

主要用于制药、日用化妆品、个人护理、食品、电子等卫生行业，包括各类反应器、浓配罐、稀配罐、储罐、移动罐等。

It is mainly used in pharmaceutical, daily cosmetics, personal care, food, electronics and other health industry. Including all kinds of reactors, concentrated dispensing tank, dilute dispensing tank, storage tank, mobile tank, etc.



性能优势 / Performance Advantage

- 无短接人孔、喇叭口、NA 法兰、符合卫生级要求的结构及辅件；
 - 根据不同物性和搅拌目的配置适宜的搅拌桨叶形式和方案；
 - 超细等离子、五轴水刀切割机下料；
 - 采用自动焊机进行环缝、纵缝、横缝焊接，衬胶辊卷圆、不锈钢辊校圆；
 - 全数字化无损探伤；
 - 高可靠性的烧结膨胀珍珠岩真空保温工艺；
 - 内表面电抛，外表面喷砂 + 电抛工艺。
- + No-short-connection manhole, bell mouth, NA flange, structure and auxiliary parts meeting sanitary requirements;
- + Adopting suitable mixing blade form and scheme are according to the different physical properties and mixing purpose;
- + Ultrafine plasma, five axis water cutting machine;
- + Adopting automatic welding machine to weld circular seam, longitudinal seam, and horizontal seam, let lined cots roll round, stainless steel roll alignment;
- + Full digital non-destructive inspection;
- + High reliability vacuum insulation process of sintered expanded perlite;
- + Electropolishing for inner surface, sand blasting + electropolishing process for outer surface .



主要技术参数 / Main Technical Parameters

参数型号 Parameter Model	TKR 20	TKR 50	TKR 100	TKR 200	TKR 500	TKR 1000	TKR 2000	TKR 5000	TKR 10000	TKR 15000
有效容积 (L) Effective Volume (L)	20	50	100	200	500	1000	2000	5000	10000	15000
内筒直径 /mm Inner Cylinder Diameter	300	400	500	600	850	1050	1300	1800	2300	2500
高径比 Aspect Ratio	0.8~3 可根据客户要求定制									
容器材质 Container Material	可采用 304,316L,904,2507 或钛材等制作									
容器表面处理 Vessel Surface Treatment	内表面采用机械抛光 ($< 0.6\mu\text{m}$) + 电化学抛光 ($< 0.4\mu\text{m}$) ; 外面表面采用拉丝哑光 / 喷砂电解									
容器内设计压力 /mPa Design Pressure In Vessel	- 0.1~0.3									
夹套设计压力 /mPa Jacket Design Pressure	0.4									
夹套形式 Jacket Form	整体夹套 Whole Jacket							半管夹套 / 蜂窝夹套 Half Pipe Jacket / Honeycomb Jacket		
换热面积 /m ² Heat Exchange Area	0.25	0.53	0.89	1.49	2.73	2.62	4	6.82	10.21	13.93
搅拌功率 /kW Stirring Power	0.3	0.3	0.3	0.65	0.65	0.65	0.86	1.26	2.53	3
裸罐质量 /Kg Quality of Bare Tank	90	120	170	215	440	450	780	1850	3350	5040
设备外形 /m Equipment Appearance	0.45*1	0.55*1.2	0.65*1.5	0.75*1.75	1*2	1.2*2.2	1.7*2.6	2.2*3.3	2.3*4.2	2.7*4.8



服务理念

400-9988-900



秉承“一切为客户着想，为一切客户着想，为客户着想一切”的理念，以“为客户创造价值”为己任，楚天专注于打造一流的研发、设计、销售、制造、服务团队及服务管理体系，为客户提供高效、优质的产品与服务。



◎ 项目规划支持

楚天拥有系列专业医药设计院、产品研究院，一批行业资深科研技术人员，无菌制药工艺的验证专家、教授等，为客户的项目提供科学、有效的技术规划支持。



◎ 过程保障服务

楚天推出的医药装备整体解决方案，实现药品生产过程的全自动化、无菌化，智能检测、分选，以及计算机验证保障，生产出让市场“放心”的产品。



◎ 走进园区服务

楚天作为设备供应商，不仅仅将行业法规标准融入到产品设计、制造中，还让法规标准以讲座、交流的形式走进园区，与药企的工艺、生产形成互动与融合。



◎ 设备管理咨询服务

楚天致力于满足客户效益最大化需求，提供一揽子的设备管理模式，协同药厂实现投入最小化，产出最大化。

- ◎ 坚持“以客户为中心”，以匠人之心打造极致服务体验，为客户创造更多价值

34 全国 34 个省（市）

365 全年 365 天

7x24 7X24 小时服务时间

- ◎ 我们随时待命为客户单位设备正常运行保驾护航

- + 现场安装、调试、验收
- + 设备工艺、操作、维护等相关培训
- + 周期性的定期上门维护与回访
- + 设备各部件性能的检测与保养
- + 备品备件的及时供应
- + 产品技术升级与技术二次开发
- + 设备大修



Service Concept

400-9988-900



Adhering to concept of “all for customers, for all customers” , and with the mission of “creating value for customers” , TRUKING focuses on building first-class R&D, design, sales, manufacturing, service teams and service management system to offer high-efficient and high-quality products and services for the customers.



◎ Project Planning Support

TRUKING has a series of professional medical and pharmaceutical design institutes, product research institutes, a group of senior scientific research and technical personnel, aseptic pharmaceutical process verification experts, professors, etc., to provide scientific and effective technical planning support for customers' projects.

◎ Service In The Park

As an equipment supplier, TRUKING not only integrates industrial regulations and standards into product design and manufacturing, but also introduces the industrial regulations and standards into Truking industrial park in the form of lectures and exchanges to interact and integrate with the technology and production of pharmaceutical enterprises.

◎ Process Assurance Service

TRUKING launched the overall solution for medical & pharmaceutical equipment realizing the full automation and aseptic production process, intelligent detection and sorting of the drug, as well as computer verification assurance so as to produce assured products for market.

◎ Equipment Management Consultation Service

TRUKING aims to satisfy the maximum benefited demands of the customer and to provide a package of equipment management services to realize minimization investment and maximization production output together with pharmaceutical factories.

- ◎ Adhere to the philosophy of "customer-centric", TRUKING creates the extraordinary service experience with the spirit of the craftsman, to create more value for customers.
- ◎ We are always ready to escort the normal operation of the customer's equipment.

- + Onsite equipment installation, commissioning, acceptance
- + Training for equipment process, operation and maintenance
- + Periodic door-to-door maintenance and return visit
- + Performance test and maintenance for machinery parts
- + Timely supply of spare parts
- + Product technology upgrading and secondary development
- + Equipment overhaul



www.truking.com



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