Tofflon

Automatic liquid nitrogen storage system

EXPERTISE IN BIO-PHARMACEUTICAL

Tofflon
Life Science Co.,Ltd.

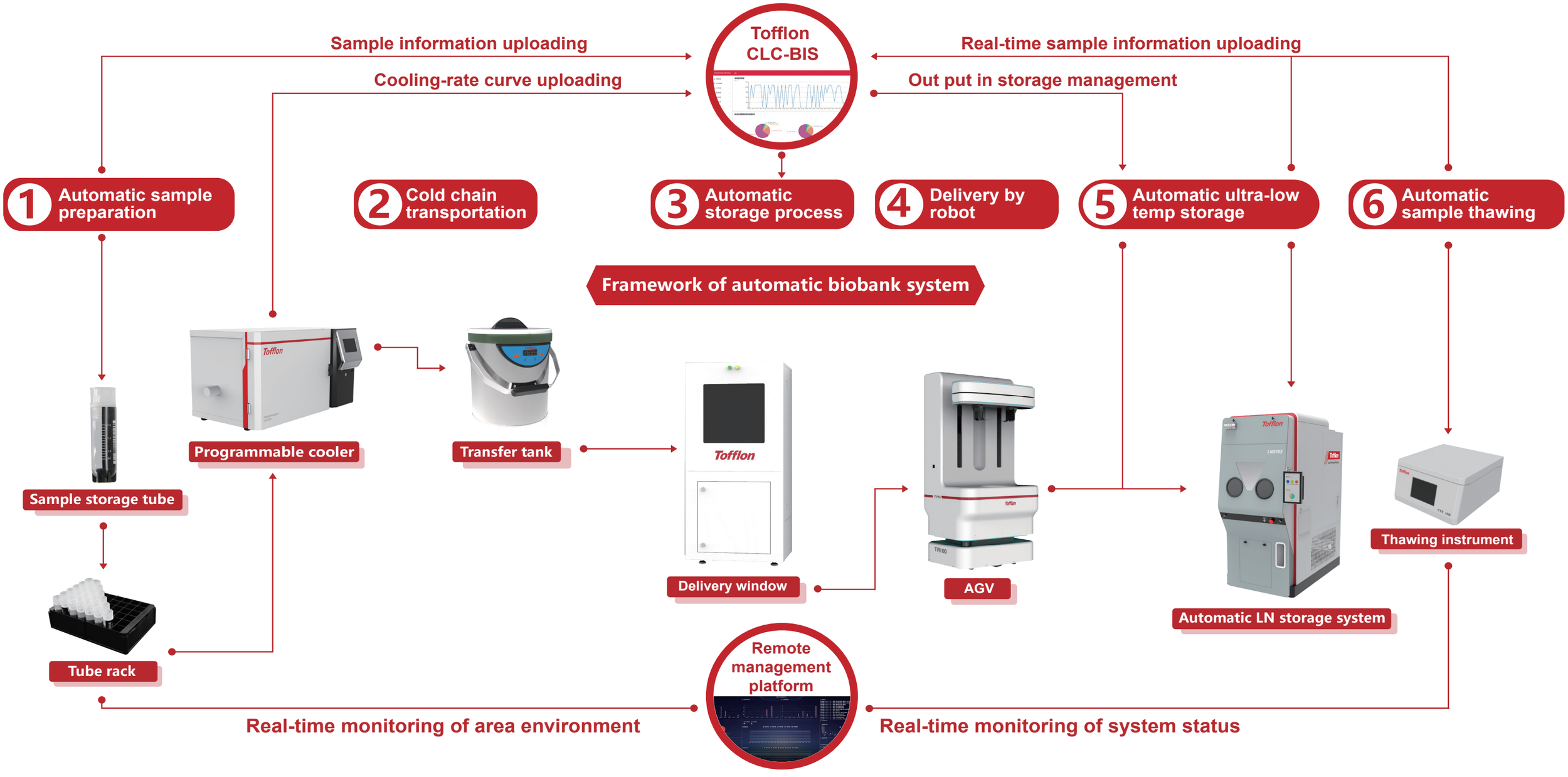
Founded in 1993, Tofflon Science and Technology Group Co., Ltd. (SZ:300171) is a pioneering Chinese enterprise in the field of biotechnology, with a rich history of 30 years. With annual sales reaching 5.4 billion RMB in 2022 and a global workforce of 5,500 employees, Tofflon has established over 50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

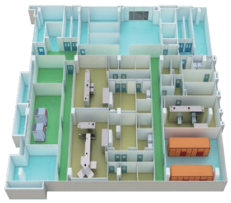
Tofflon Life Sciences Co., Ltd., the flagship subsidiary within the group, plays a pivotal role in their portfolio. It focuses on the research and development of cutting-edge technologies in the biopharmaceutical and life science industries. As a strategic division Tofflon life science provides one-stop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

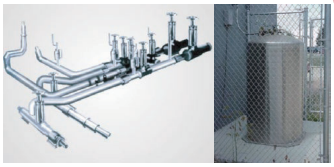
- In the realm of cell therapy, we offer complete solutions for the preparation and production of immune cell pipelines, stem cell pipelines, tumor cell vaccines, and more.
- For gene therapy, we provide overall solutions for the research, development, and industrialization of nucleic acid drugs (mRNA/DNA) 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.

Automatic Biobank Total Solution





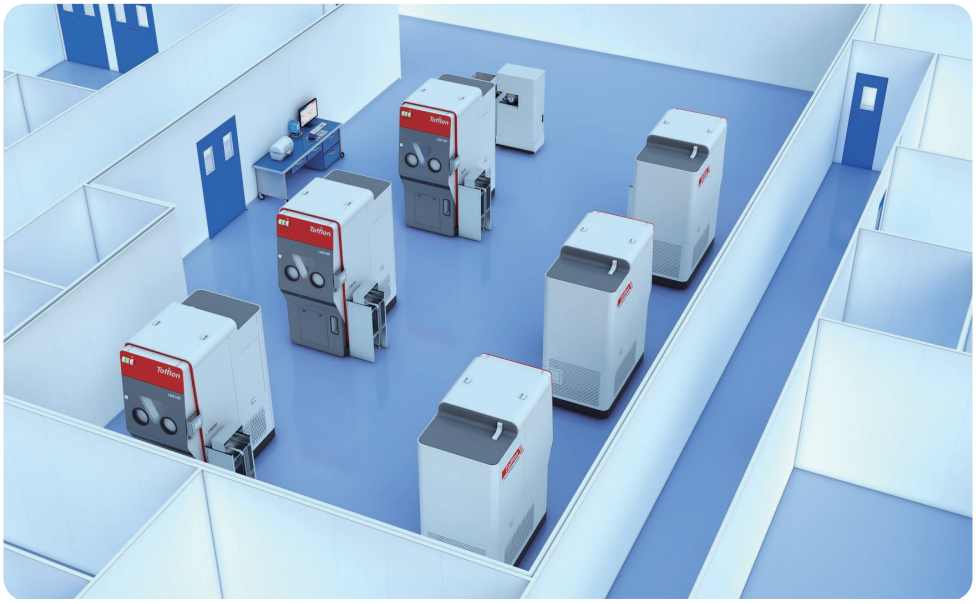


Automatic and information-ized biological sample bank

- AGV and other supporting facilities
- Automatic LN storage system
- High efficiency LN tank
- Consumables
- Programmable cooler
- Engineering
- Data server
- Liquid nitrogen supply system
- Information management system

Automatic and information biological sample bank

Tofflon AC-line system provides the customers with professional, economical and responsive services on biological samples storage and transfer. It provides a modular and expandable automatic sample freezing storage system product for biological sample bank, which can be stored below -150℃, and can be used for intelligent and information management of samples. The system builds an uninterrupted freezing chain with temperatures lower than -130℃, which can work automatically in a pipelined manner. During the whole access process, the samples are kept below the glass transition temperature of -130℃, avoiding the reverse thawing and recrystallization during the sample access process and ensuring the high quality of sample storage.



Relied on Tofflon's accumulated industrial service experience and professional knowledge in the fields of lyophilization, pharmaceutical machinery and cell therapy to build the informationized and automatic core system, core equipment, and ancillary facilities and equipment for the application scenarios of biological sample banks such as stem cells and immune cells.

Scope of application

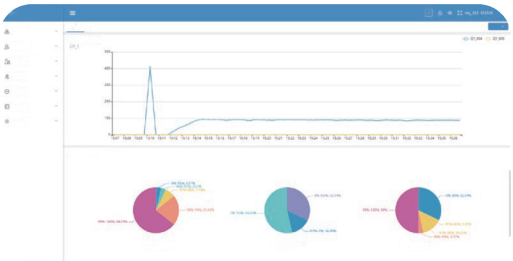
It provides a full range of automatic, informationized cryogenic storage solutions for biological sample banks, biological products, cells, gene therapy field cells, assisted reproduction, umbilical cord blood banks and other application scenarios.

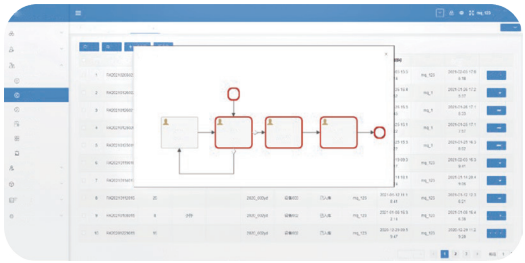
Flexibility and extensibility

- Flexibility: Compatible with a variety of forms of samples, cryogenic bags or cryogenic vials.
- Extensibility: The modular fully-automatic storage equipment, such as AGV transfer module or manual transfer module, modular and configurable sample bank informatization management software.

Data management

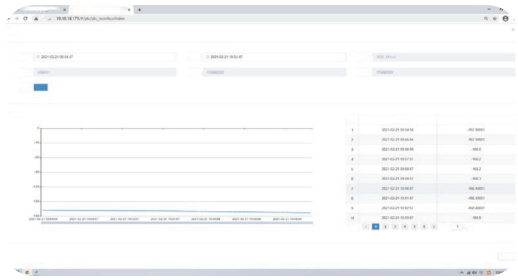
- Enter and make statistics on the sample source quality control information and the storage quality control information.





Process management

- Management of sample stock-in and stock out approval process.
- Classification and identification the whole process from sample information creation to warehouse-out.



Facilities and equipment management

- Support multiple alarms at the equipment terminal, the sample bank software terminal and the mobile phone terminal.
- The integrated liquid nitrogen supply system can be connected to CLC-BIS.
- According to the statistical data analysis the operating status of equipment, and predict the maintenance that may need to be implemented, and support remote maintenance.

Security measures

- Prediction plan for abnormal conditions of liquid nitrogen supply.
- Effective manual intervention and corrective measures in case of abnormal operation of automation equipment.
- The server, equipment, etc. are independently equipped with UPS.
- The data is backed up regularly in case any node of the system fails, and the recoverability and traceability of historical sample data are guaranteed.
- Manage the potential failure level by level and formulate the corresponding measures respectively.
- The system processes the collected data, predicts the possible risks and deals with the failure causes.

Fully-automatic cryogenic storage system of samples

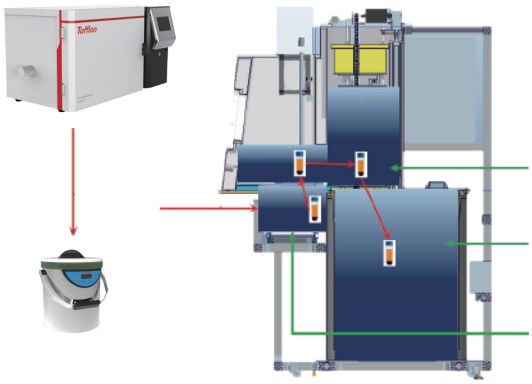
Provide the biological samples with a continuously stable gas-phase nitrogen storage environment below -150℃, automatic access control, intelligent and information management of historical sample storage data. The system builds an uninterrupted freezing chain with temperatures lower than -130℃, and the equipment works automatically in a pipelined manner. During the whole access process, the samples are kept below the glass transition temperature of -130℃, avoiding the reverse thawing and recrystallization during the sample access process and ensuring the high quality of sample storage. According to the design, development, manufacturing and quality management of standardized and finalized products, it has been verified by the long-term and strict fatigue test of the complete machine and the bench test of the key components. Provide the complete verification process and verification documents of FAT (factory acceptance report)/IQ (installation qualification)/OQ (operation qualification)/PQ (performance qualification), maintenance and operation manual, etc.

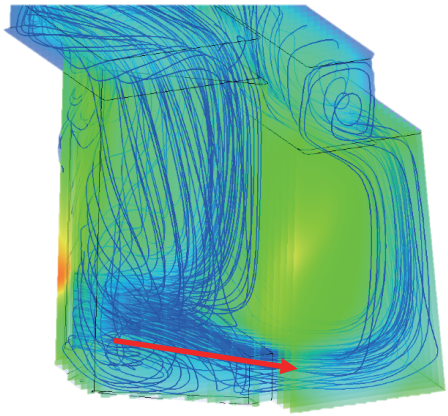
Product features

- Cryogenic storage
- Continuous and seamless cold chain
- Sample temperature and space temperature monitoring
- Support high-frequency sample access
- High effective storage space
- High utilization rate of liquid nitrogen

Deep cryogenic uninterrupted cold chain

- Trans-shipment: below-130°C
- Sample access temperature: -130°C, parameterized setting
- Storage temperature: below-150°C





The design of air flow direction is beneficial to maintaining the sample temperature on the plate rack in the pipe lifting area at -140°C or below

The working chamber provides a temporary deep cryogenic environment for the pipe lifting to avoid temperature exposure of samples after the storage rack is lifted out of the storage tank. The flow direction of cryogenic air flow is optimized by CFD simulation technology to obtain the best temperature distribution in the sample retention area.

Physical photos of working chamber: The arrow position is the position where the plate rack is placed during the sample sorting, just in the position of the low-temperature air flow direction of the CFD simulation model, to ensure that the sample can always be below the temperature of -140°C.

Intelligent operation

- Remote sample access
- Unmanned automatic defrosting, dehumidification and pressure control
- Automatic monitoring and determination of equipment status
- Tracking and comprehensive monitoring of sample status

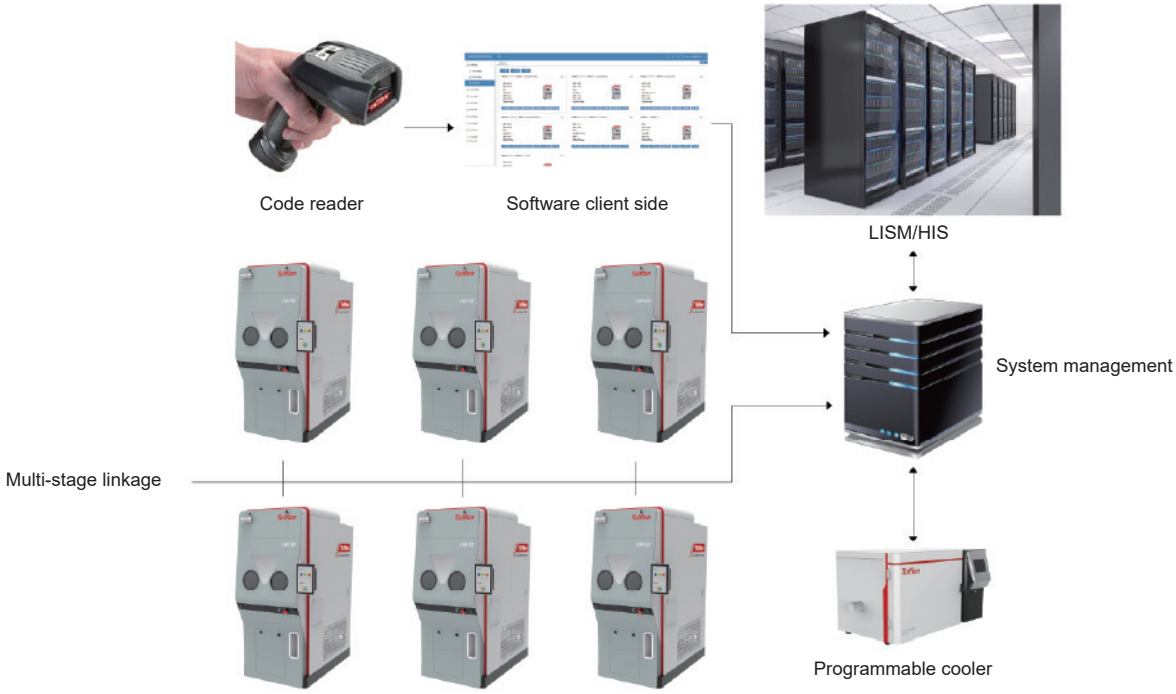
Special handling

- Detection of pipe lifting failure, time alarm and manual handling
- The temperature of operating area can be set to -140℃ and maintained for a long time
- Double code scanning for confirmation to prevent misplacement, omission and other errors

Product specifications

Specification	Parameter		
Model	LNS102	CCS360	CCS800
Capacity of 2 mL cryogenic vial	19,494 pieces		
25 ml cryogenic bag ①			800 bags
50 ml cryogenic bag ②		360 bags	
Single-batch flux	48 pieces/batch	4 bags/batch	9 bags/batch
Storage temperature	≤-150℃		
Sorting temperature	≤-130℃		
Sorting fixture	Pneumatic	Motor	
Maximum loading capability of liquid nitrogen	60kg		
Static consumption of liquid nitrogen	≤ 14 kg/day		
Maximum standby power	200W		
Boundary dimension (length x width x height)	1950mm×1130mm×2500mm		
Deadweight of complete machine	About 1,200 kg		
Management software	BIS (informatization management system)		
Work requirements	Supply pressure of liquid nitrogen 0.1~0.14 Mpa Host power supply: 220±10% V AC, 50Hz, 10A Use environment: 15~25 °C, humidity 15%~60% Minimum room height required for installation: 2750 mm Load-bearing per square meter: ≥ 500 kg/m2		

Biological sample bank information management system (CLC-BIS system)



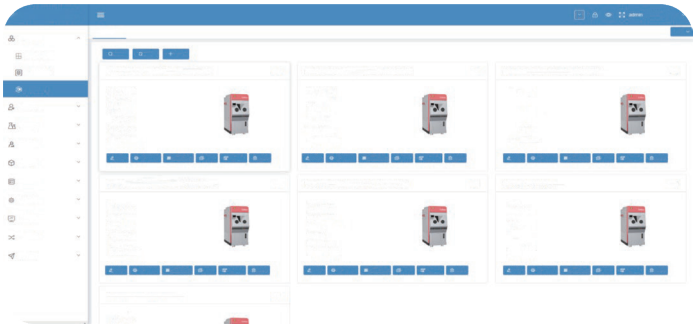
Software introduction

as the carrier connecting storage equipment, operation and monitoring, the sample bank management software provides a complete information service chain for the sample bank business process.

System features

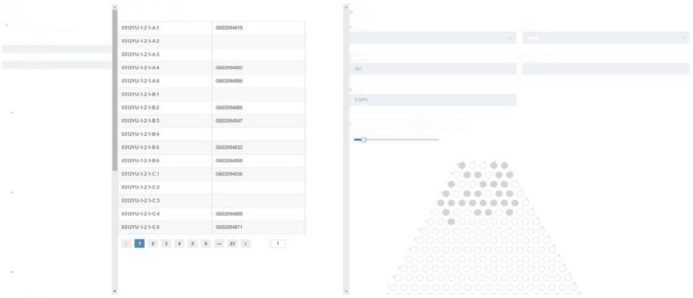
- Adopts the B/S structure: Zero maintenance at the client, which can meet different requirements for software configuration at different stages
- Data source traceable: The whole process of sample access can be traced, the sample cryopreservation report can be automatically generated, and the data can be exported
- Precision: Sample information creation and retrieval, providing the fast and accurate statistical analysis of sample access information and inventory sample data
- Intelligence: Automatically manage the storage space without manual assignment and management
- Convenience: The client obtains the real-time status of the current task equipment, the real-time progress of sample access operation, failure status, warning information, etc. (no need real time again)
- Extensibility: The modular expansion can be used to add and delete the storage capacity equipment, and provide access and migration management of the corresponding equipment
- Compatibility: It can be connected with LIMS (laboratory information management system) or HIS (hospital information system)

Software interface

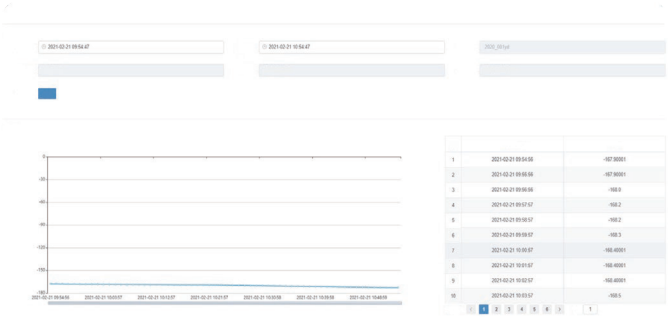


Maintenance of storage equipment

Communication interaction



Storage display



Real-time monitoring

Customization of software function

No.	Function	Basic version	Upgrade version	Custom version
1	Tofflon Automatic Storage Tofflon automatic storage management system	●	●	●
2	Support code scanning gun and manual input of sample ID	●	●	●
3	Support the creation and verification of sample ID of plate code scanner	●	●	●
4	Sample stock in and stock out information management	●	●	●
5	History record of sample inventory	●	●	●
6	Equipment data collection monitoring	●	●	●
7	Data report export function	●	●	●
8	User role and authority management	●	●	●
9	Log and audit tracking management	●	●	●
10	Sample source management		●	●
11	Follow-up information management		●	●
12	Quality inspection information management		●	●
13	Custom approval process		●	●
14	Custom coding rule		●	●
15	Third-party cryogenic container management		●	●
16	Third-party system data interaction (HIS/LIMS, etc.)		●	●
17	Customized large-screen signage of data			●
18	Customized mobile APP			●
19	Unattended sample bank			●

Optional configuration of overall solution system

- 2 mL cryogenic vial
- 48-hole SBS plate rack
- 50 mL cryogenic box (customizable)

- **Plate rack dryer**

- **Server and software customization service**

- **Transfer tank**

- **Plate code scanner**

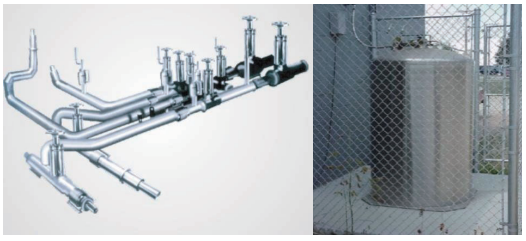
It can be used as an automatic input

- **Remote SMS alarm**

- **Programmable cooler**

- **High efficiency liquid nitrogen tank**

Access to BIS sample information management system.



- **Centralized liquid nitrogen supply system**

- **Automated Guided Vehicle**

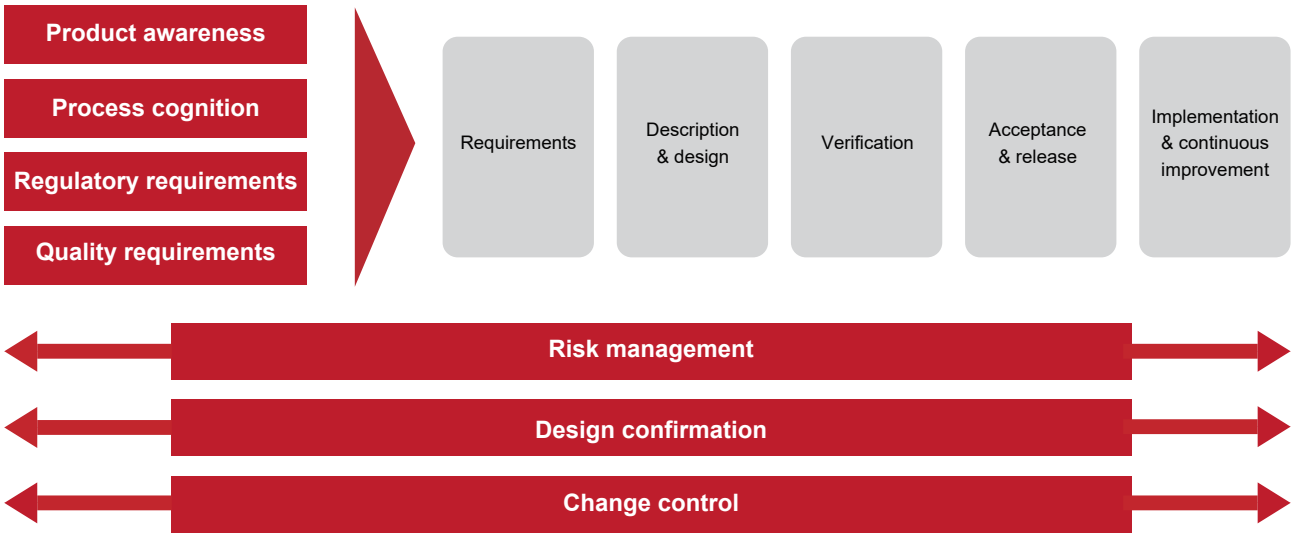
- **Delivery window of sample bank**

Project Management

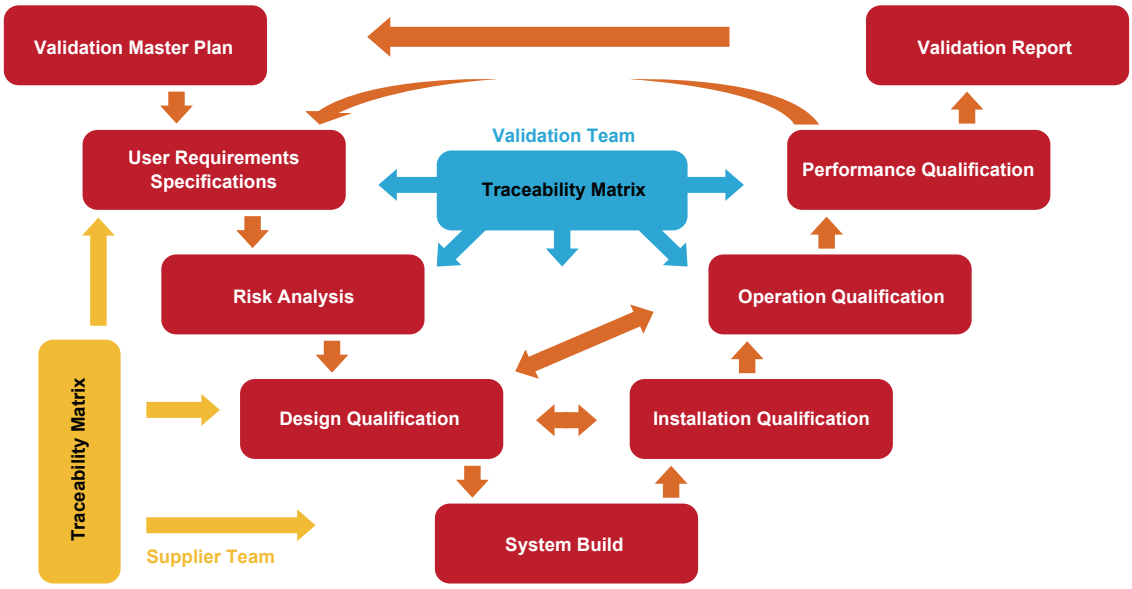
Three main factors determine the success of the project. Our organizational mode has been making constant update and improvement to enable you to fully achieve these goals. Through cooperation with us, you can minimize the direct resources required to manage the selection, purchase, installation, startup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

- Reliable quality
- Short cycle
- Focus on cost

Good Engineering Practice - GEP

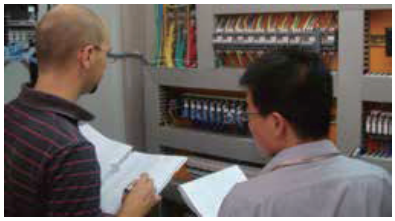


Validation Support



Verification Document System

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



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