Pull-out unloading system in which the mechanisms are removed using Telstar’s patented system of stainless steel flexible bands. The bands have a curvature similar to that of a steel tape measure which provides high rigidity from a thin band. The bands are stored above vial level in open LAF cabinets, eliminating the problems associated with competing systems, such as storage below vial level and cleanliness/bio-contamination issues, thereby improving GMP.

The automated load/unload system is equipped with its own stand-alone control system to enable error recovery, refrigeration and vacuum system improvements and retrofit of filter integrity refurbishing services: popular examples being control system upgrades, minimizing equipment reliability, minimizing downtime and extend the equipment bio-spare.

Engineered manufacturing practices follow ISO 9001:2000 quality standards and the cGAMP (Good Automated Manufacturing Practices) guidelines. Design Qualification (DQ), Installation Qualification (IQ) and Operational Qualification (OQ) testing and comprehensive documentation are standard Telstar practices. The aim is to make on site validation faster, easier and efficient.

Calibration must fulfill both maintenance and compliance requirements. Telstar can develop a comprehensive program to gain direction for classifying instruments and setting appropriate limits to ensure product quality and avoid unnecessary deviation investigations. Telstar can provide calibration procedures and perform calibration of instruments using highly qualified technicians and fully traceable primary instruments.

A wide range of training programs is provided for machine operators, electrical and mechanical engineers, maintenance engineers and supervisors personnel. The programs are designed not only to improve the participants’ overall understanding of the production equipment, but also to enhance their confidence and performance levels to provide a beneficial return for the business.

TELSTAR’s Customer Service organization provides a wide range of revalueing services: popular examples being control system upgrades, refrigeration and vacuum system improvements and return for the business.

Preventive Maintenance Programs
Routine maintenance is an integral part of Telstar’s cGMP approach. All maintenance activities are properly documented to support procurement activities and regulatory inspections. A preventive maintenance program will ensure compliance and continuity of validated equipment status. Routine equipment maintenance, reliability, maintainability, downtime and extend the equipment bio-spare.

Validation support

Validation support

Calibration services

Calibration services

Training services

Training services

Upgrades & refurbishment

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Freeze dryers play a key role in aseptic pharmaceutical and biotech production. For more than half a century Telstar has designed and manufactured freeze dryers for the pharmaceutical and biotech industries.

Human airborne contamination during the loading/unloading steps of Lyophilization processes is one of the most frequent causes of media fill failures.

The use of Telstar LUS enables manufacturers to reduce the risk of contamination, helping assure the quality of the product while protecting operators from potent substances.

The Lyogistics range of freeze-dryer loading/unloading solutions covers a broad spectrum of vial and bulk applications from manual through semiautomatic to fully automatic systems to meet the requirements of each project.

Technologies include the use of anthropomorphic robots for handling of trays, vacuum-based bulk powder unloading systems, trayless "fixed" row-by-row or "flexible" shelf-by-shelf vehicle systems.

One of Telstar's strengths is the process systems integration, based upon its broad base of expertise and continuous in-house technology development.

Effective, safe and consistent with the following key elements:

- Infeed system with passive fallen vial rejection mechanism;
- Star-wheel for vial control, which acts as a counter, a vial transport gate and in conjunction with the marshaling conveyor places a row of vials in front of the loading pusher bar;
- Vial marshaling conveyor, which stops and starts (under precise servo control) so that vial stoppers and contents are not disturbed. The vials are packed in a hexagonal, or 'honeycomb' array to maximize space utilization;
- Vial pusher bar, for transferring vials (under servo control) from the conveyor onto the bridge plate and thence from the bridge plate onto the shelf. The reciprocating section is isolated with a bellows;
- The Bridge/Buffer plate bridges the gap between the conveyor and the shelf and acts as a buffer so that shelves can be indexed without stopping the filling line;
- Vial outfeed and singling: vials can exit in either direction via the use of format parts.

Telstar is able to integrate freeze dryers with protective environmental technologies (from enclosures, through open and closed RAB systems to isolators for sterile and containment applications) together with systems (manual, semiautomatic and fully automatic) for loading and unloading.

Automated Loading System

- Fully automated loading systems for vials integrated within an Active Open RAB system. Vials enter via a conveyor (at the end of the filling line) at the extreme left and are conveyed to the loading systems for loading into the lyophilizers at constant height on a continuous basis.

Telstar’s patented compact pusher unloading system

Row-by-row automated unloading systems in ‘push-out’ configuration: the most compact unloading system in the industry; able to fit in the technical area beneath the vapor duct of a monobloc layout freeze dryer.

This configuration has no mechanisms moving above the vials and positions the entire unloading system drive mechanism in the technical area, where it can be accessed at all times.

The unload transfer system is comprised of a brushless servo motor controlled ram which can traverse the pusher bar the entire depth of the shelf and the bridge/buffer plates.
Freeze dryers play a key role in aseptic pharmaceutical and biotech production. For more than half a century, Telstar has designed and manufactured freeze dryers for the pharmaceutical and biotech industries. Human airborne contamination during the loading/unloading steps of freeze-drying processes is one of the most frequent causes of media fill failures. The use of Telstar LUS enables manufacturers to reduce the risk of contamination, helping assure the quality of the product while protecting operators from potent substances.

The Lyogistics range of freeze-dryer loading/unloading solutions covers a broad spectrum of vial and bulk applications from manual through semiautomatic to fully automatic systems to meet the requirements of each project. Technologies include the use of anthropomorphic robots for handling of trays, vacuum-based bulk powder unloading systems, trayless ‘fixed’ row-by-row or ‘flexible’ shelf-by-shelf vehicle systems.

One of Telstar’s strengths is the process systems integration, based upon its broad base of expertise and continuous in-house technology development.

**Design & features**

**Integration**

Telstar is able to integrate freeze dryers with protective environmental technologies (from enclosures, through open and closed RAB systems to isolators for sterile and containment applications) together with systems (manual, semiautomatic and fully automatic) for loading and unloading.

Fully automated loading systems for vials integrated within an Active Open RAB system. Vials enter via a conveyor (at the end of the filling line) at the extreme-left and are conveyed to the loading systems for loading into the lyophilizers at constant height on a continuous basis.

**Minimizing contamination risk**

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**Lyogistics freeze-dryer**

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Technologies include the use of anthropomorphic robots for handling of trays, vacuum-based bulk powder unloading systems, trayless ‘fixed’ row-by-row or ‘flexible’ shelf-by-shelf vehicle systems.

**Rov-by-Row automated unloading system**

Telstar’s patented compact pusher unloading system is the most compact unloading system in the industry, able to fit in the technical area beneath the vapor duct of a monobloc layout freeze dryer.

This configuration has no mechanisms moving above the vials and positions the entire unloading system drive mechanism in the technical area, where it can be accessed at all times.

The unload transfer system is comprised of a brushless servo motor controlled ram which can traverse the pusher bar the entire depth of the shelf and the bridge/buffer plates.
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The Lyogistics range of freeze-dryer loading/unloading solutions covers a broad spectrum of vial and bulk applications from manual through semiautomatic to fully automatic systems to meet the requirements of each project. Technologies include the use of anthropomorphic robots for handling of trays, vacuum-based bulk powder unloading systems, trays/boxes "free" row-by-row or "flexible" shelf-by-shelf vehicle systems.

One of Telstar’s strengths is the process systems integration, based upon its broad base of expertise and continuous in-house technology development:

- Infeed system with passive fallen vial rejection mechanism;
- Star-wheel for vial control, which acts as a counter, a vial stop/start gate and in conjunction with the marshaling conveyor places a row of vials in front of the loading pusher bar;
- Vial marshaling conveyor, which stops and starts (under precise servo control) so that vial stoppers and contents are not disturbed. The vials are packed in a hexagonal, or ‘honeycomb’ array to maximize space utilization;
- Vial pusher bar, for transferring vials (under servo control) from the conveyor onto the bridge plate and thence from the bridge plate onto the shelf. The reciprocating section is isolated with a bellows;
- The Bridge/Buffer plate bridges the gap between the conveyor and the shelf and acts as a buffer so that shelves can be indexed without stopping the filling line;
- Vial outfeed and single-lining: vials can exit in either direction via the use of format parts.

Telstar is able to integrate freeze dryers with protective environmental technologies (from enclosures, through open and closed RAB systems to isolators for sterile and containment applications) together with systems (manual, semiautomatic and fully automatic) for loading and unloading.

Fully automated loading systems for vials integrated within an Active Open RAB system. Vials enter via a conveyor (at the end of the filling line) at the extreme left and are conveyed to the loading systems for loading into the lyophilizers at constant height on a continuous basis.

Row-by-Row automated unloading system in ‘push-out’ configuration: the most compact unloading system in the industry; able to fit in the technical area beneath the vapor duct of a monobloc layout freeze dryer.

This configuration has no mechanisms moving above the vials and positions the entire unloading system drive mechanism in the technical area, where it can be accessed at all times.

The unload transfer system is comprised of a brushless servo motor controlled ram which can traverse the pusher bar the entire depth of the shelf and the bridge/buffer plates.

**Minimizing contamination risk**

**Lyogistics freeze-dryer**

**Design & features**
The automated load/unload system is equipped with its own stand-alone control system to enable error recovery, maintenance and testing independently of the freeze dryer and the filling and capping lines. The system interacts with a robotic arm to perform tasks a person would find ergonomically arduous. The system accepts clean, empty trays from an infeed system or a person would find ergonomically arduous. The system extracts trays and positions them so that they can be emptied of product and placed into storage.

**Pull-out mechanism**

Pull-type unloading system in which the mechanisms are moved using Telstar’s patented system of stainless steel flexible bands. The bands have a curvature (similar to that of a steel tape measure) which provides high rigidity from a thin band. The bands are wound above vial level in open LAF, eliminating the problems associated with competing systems, such as storage below vial level and cleanliness/biocontamination issues, thereby improving GMP.

**Robots**

Automated Tray Loading and Unloading System (ATLUS). The system interacts with a robotic arm to perform tasks a person would find ergonomically arduous. The system accepts clean, empty trays from an infeed system or storage and places them in the filling/loading position. The trays are filled with a predetermined volume of liquid product before being transferred onto the shelf of a lyophilizer. During the unloading process, the system extracts trays and positions them so that they can be emptied of product and placed into storage.

**Control systems**

The automated load/unload system is equipped with its own stand-alone control system to enable error recovery, maintenance and testing independently of the freeze dryer and the filling and capping lines. The control system is interfaced to that of the freeze dryer and filling line to provide integrated management.

- Color touch-screen that performs as human-machine interface (HMI)
- Control lights and buzzer: Alarm, Cycle running, End of cycle
- Push buttons: Start/Stop, Alarm acknowledgement
- Security and login/out
- Local/unlocal recipe development & storage
- Status and statistics
- Mimic diagrams

**Services & support**

**Preventive Maintenance Programs**

Routine maintenance is an integral part of Telstar’s cGMP approach. All maintenance activities are properly documented to support discrete validation and regulatory inspections. A preventive maintenance program will assure compliance and continuity of validated equipment status, maintain equipment reliability, minimize downtime and extend the equipment life-span.

**Validation support**

Engineering and manufacturing practices follow ISO 9001:2000 quality standards and the cGAMP (Good Automated Manufacturing Practices) guidelines. Design Qualification (DQ), Installation Qualification (IQ) and Operational Qualification (OQ) testing and comprehensive documentation are standard Telstar practices. The aim is to make on-site validation faster and easier.

**Calibration services**

Calibration must fulfill both maintenance and compliance requirements. Telstar can develop a comprehensive program to gain direction for classifying instruments and setting appropriate limits to ensure product quality and avoid unnecessary deviation investigations. Telstar can provide calibration procedures and perform calibration of instruments using highly qualified technicians and fully traceable primary instruments.

**Training services**

A wide range of training programs is provided for machine operators, electrical and mechanical engineers, maintenance engineers and supervisors personnel. The programs are designed not only to improve the participants’ overall understanding of the production equipment, but also to enhance their confidence and performance levels to provide a beneficial return for the business.

**Upgrades & refurbishment**

Telstar’s Customer Service organization provides a wide range of refurbishing services: popular examples being control system upgrades, refrigeration and vacuum system improvements, control system upgrades, engineering and manufacturing practices follow ISO 9001:2000 quality standards and the cGAMP (Good Automated Manufacturing Practices) guidelines. Design Qualification (DQ), Installation Qualification (IQ) and Operational Qualification (OQ) testing and comprehensive documentation are standard Telstar practices. The aim is to make on-site validation faster and easier.

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Telstar’s Customer Service organization provides a wide range of refurbishing services: popular examples being control system upgrades, refrigeration and vacuum system improvements, and routine maintenance activities. Telstar can develop a comprehensive program to gain direction for classifying instruments and setting appropriate limits to ensure product quality and avoid unnecessary deviation investigations. Telstar can provide calibration procedures and perform calibration of instruments using highly qualified technicians and fully traceable primary instruments.

**Control systems**

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Pull-out unloading system in which the mechanism are mounted using Telstar's patented system of stainless steel flexible bands. The bands have a curvature (similar to that of a steel tape measure) which provides high rigidity from a thin band. The bands are wound above vial level in open LAF, eliminating the problems associated with competing systems, such as storage below vial level and cleanliness/biodecontamination issues, thereby improving GMP.

Maintenance and testing independently of the freeze dryer and the filling and capping lines. The control system is interfaced to that of the freeze dryer and filling line to provide integrated management.

Robots

Automated Tray Loading and Unloading System (ATLUS).

Telstar reserves the right to improvements and specifications changes without notice.

Validation support

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Upgrades & refurbishment

Telstar’s Customer Service organization provides a wide range of refurbishing services: popular examples being control system upgrades, refrigeration and vacuum system improvements and retrofit of filter integrity testing.

Preventive Maintenance Programs

Routine maintenance is an integral part of Telstar’s cGMP approach. All maintenance activities are properly documented to support the development during corporate audits and regulatory inspections. A preventive maintenance program will ensure compliance and continuity of validated equipment status, machine equipment reliability, minimize downtime and extend the equipment life-span.

Services & support