



SMALL STERILIZER SERIES LSII MODEL (20" x 20")

ECO-FRIENDLY

Reduce your facility's water footprint with Beta Star's EnviroVac® Vacuum System. Mechanical and programmable conservation features are integrated into a variety of cycles for the Beta Star LSII Series sterilizer.

SINGLE SOURCE MANUFACTURING

Beta Star's "raw plate to FAT" promise ensures greater control over project delivery while ensuring US Made quality.

SAFETY

Operators and technicians are protected through temperature and pressure monitoring, relief valves, safety interlocks, and automatic overrides.

LOWER COST OF OWNERSHIP

Non-proprietary components and cost-effective service rates create a lower cost of ownership than competitors who charge unsustainable amounts for high wear items.



GET STARTED CREATING YOUR STERILIZER*

Door Quantity

- Single
- Double

Door Operation

- Manual
- Automatic

Installation Type

- Free Standing
- Recessed One Wall
- Recessed Two Wall

Cabinet Enclosure

- None
- Full Cabinet (Right & Left)
- Right Side
- Left Side

Chamber Process

- Non-Effluent
- Effluent (BSL-3)

Chamber Piping

- Copper and brass piping with threaded NPT fittings
- Stainless steel piping with Ferrule type fittings
- Stainless steel piping with Sanitary fittings

Vacuum System

- Water Ejector
- EnviroVac® Water Conservation
- Liquid Ring

Jacket Steam Source

- House Steam
- Same as Chamber

Process Valve Options

- Pneumatic Valves
- All Electric Valves

Chamber Steam Source

- House Steam
- Electric Steam Generator (carbon steel)
- Electric Steam Generator (stainless steel)
- Steam to Steam Generator

Compressed Air Source

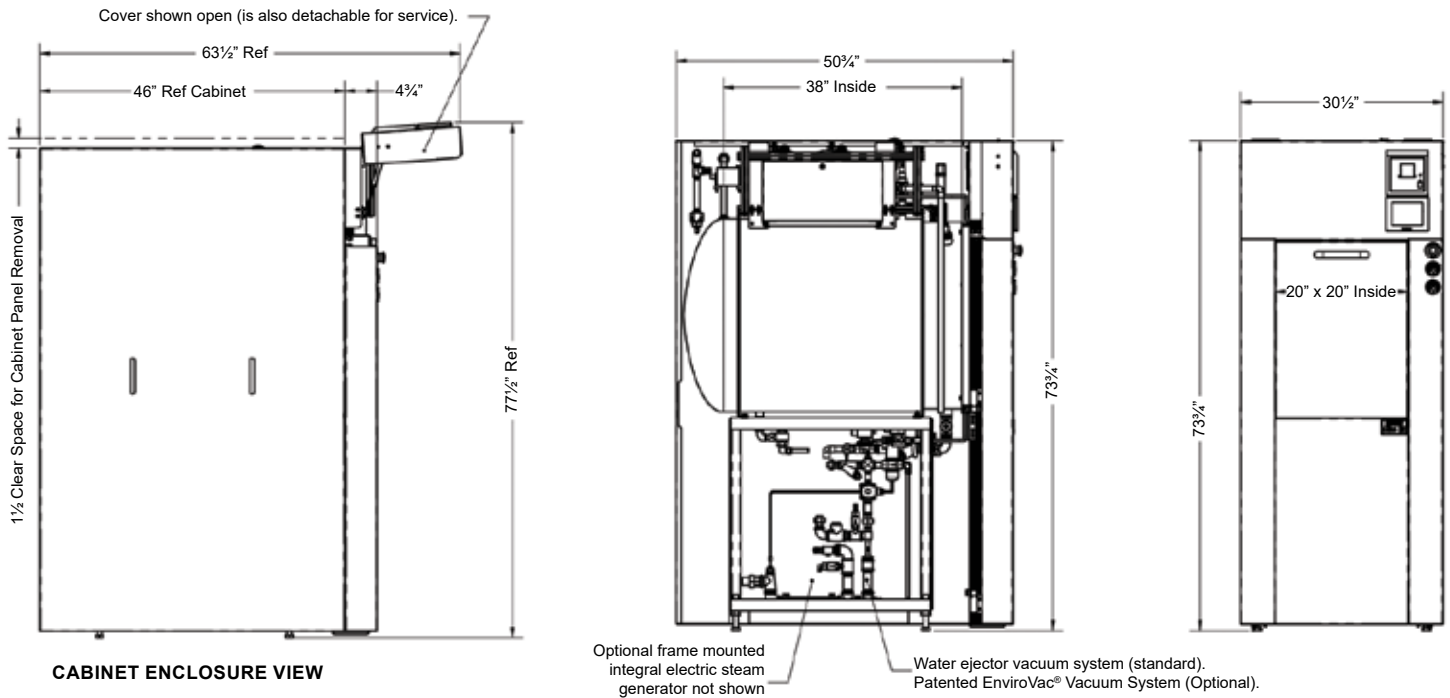
- None required
- Stand alone air compressor
- House compressed air

Beta Connect System

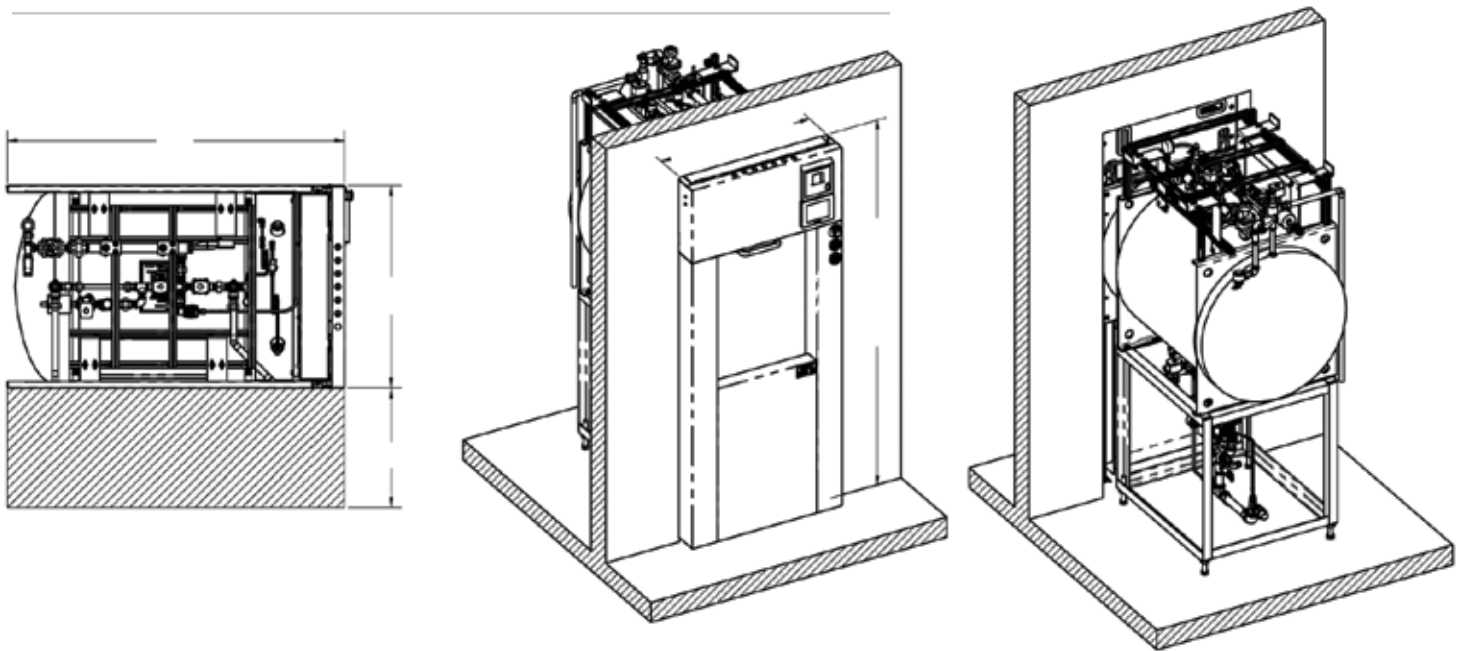
- Remote Support
- Mobile Observation and Control
- Central Sterilization Management
- Predictive Maintenance and Analysis

*FOR A FULL LIST OF OPTIONS, PLEASE CONTACT US.

LSII STERILIZER SINGLE DOOR CABINET



LSII STERILIZER SINGLE DOOR RECESSED



STERILIZER DIMENSIONS

Description	Height	Width	Depth	Wall Opening Width	Wall Opening Height	Floor to Chamber
Dimension	73.75 in.	30.5 in.	50.875 in.	30 in.	74 in.	37.5 in.

PLUMBING UTILITY REQUIREMENTS ¹					
Plumbing Utility	Connection Size	Standard Material ²	Flow Rate		Pressure
			Peak	Average	
Drain Size	3"	By Others, Suitable for 140°F/60°C	N/A	N/A	Atmosphere
House Steam	½"	Black Iron/Brass or Stainless	90 LB/HR	60 LB/HR	50-80 PSIG
Water, Ejector Vacuum Equipped Machine (Standard)	¾"	Copper	8 GPM	4 GPM	30-50 PSIG
Water, EnviroVac® Equipped Machine (Optional)	½"	Copper	2 GPM	1 GPM	30-50 PSIG
Hot Water, Electric Steam Generator Equipped Machine (Optional)	½"	Copper	½ GPM	¼ GPM	20-50 PSIG
Instrument Air, Pneumatic Valve Equipped Machine (Optional)	½"	Copper	2 SCFM	1 SCFM	80-100 PSIG

ELECTRICAL UTILITY REQUIREMENTS					
Electrical Utility	Voltage	Phase	Frequency	Amp Draw	Type
Sterilizer Controls	120V	1	60 Hz	3	Dedicated Circuit
Electric Steam Generator Controls (Optional)	120V	1	60 Hz	5	
EnviroVac® (Standard Single Phase) ³	120V	1	60 Hz	9.4	Dedicated Circuit
EnviroVac® (Optional Three Phase Assembly) ³	208V	3	60 Hz	6.9	Disconnect
EnviroVac® (Optional Three Phase Assembly) ³	480V	3	60 Hz	3.0	Disconnect
Electric Steam Generator (Optional)	208 / 480V	3	60 Hz	83 / 36	Disconnect
Air Compressor (Optional) ⁴	120V	1	60 Hz	12	Duplex Outlet
Ethernet Connection Required For Optional Beta Connect™ Remote Connectivity System					

¹ Recommended utility values indicate design standards for efficient machine operation. Consult with the Beta Star Sales Staff for site specific utility values which may fall outside of indicated ranges.

² Material(s) may vary to suit installation.

³ Operating voltage must be specified.

⁴ Air compressor only required for pneumatic valve optioned machine installations which have no house instrument air available.

OUR PROCESS OVERVIEW

SPEC REVIEW CONSULTATION

Our team has decades of experience in the sterilization industry to review your specifications and answer specific product questions. We would like to assist you with your plans and requirements for your next facility construction or renovation.

DESIGN

Beta Star's extensive service experience, complete in-house manufacturing and dedicated engineering and manufacturing personnel provide industry leading safety, reliability and lowest cost of ownership. All Beta-Star sterilizers include free draining vessels to ensure the driest possible process. Baffled steam injection eliminates

load steam impingement while providing even temperature distribution. Modular frames provide secure support, service access and adjustability to suit the most challenging installations.

APPLICATION

Beta-Star sterilization cycles include Pre-Vacuum, Liquid, Liquid with optional air cooling, Gravity, Bio-Waste, F₀, (Load Probe), and Isothermal. Maintenance test cycles include Integrity (Leak) and Daily Air Removal, (Bowie-Dick). All Beta Star cycle parameters are configured to satisfy the latest ANSI/AAMI and AORN standards for moist heat sterilization. Equipped with standard Allen Bradley PLC controls, all Beta-Star sterilizers are capable of saving and storing 30 custom cycle recipes. Beta Star may also provide optional European Norms, (EN) and International Standards (ISO) compliant sterilization cycles.



STANDARD FEATURES

VESSEL CONSTRUCTION

Every Beta-Star pressure vessel is manufactured completely in-house at Beta-Star's Honey Brook, PA corporate headquarters. With more than 800 American Welding Society (AWS) approved Weld Procedure Specifications and cutting edge robotic welding capability, Beta-Star manufactures the safest, most reliable, longest lasting pressure vessels in the industry.

- Optimized door gasket design that provides industry leading gasket longevity
- Design pressures from full vacuum to 45 psig
- 316 S/S chambers with 304 or 306 stainless steel jackets
- Roughness Average (RA) finishes with 25, 20, or 10 Ra. A mirror finish is also available.
- Dual validation ports permit load monitoring.
- Three sided door retention for additional safety
- Baffled steam injection provides uniform temperature distribution while eliminating steam impingement on sterilizer load
- Single or optional double door configurations support Multi-Flow, Pass-Through, or Bio-Safety (up to BSL3) door operation.

Optional vessel features include:

- Sanitary vessel porting
- Wetted material passivation
- Seismic restraints

QUALITY TESTING

Beta Star tests and verifies operation of every sterilizer prior to shipment during Factory Acceptance Testing (FAT). The FAT process includes:

- Instrument calibration
- Electrical input/output verification
- Hazards and safe operation testing
- Piping and vessel integrity (leak) testing
- Piping and vessel air removal (Bowie-Dick) testing

- Failed cycle/alarm verification
- Operational cycle testing

SAFETY FEATURES

Integrated safety systems include:

- A cycle may not be started until the door(s) are fully closed and sealed.
- The door(s) cannot be opened while a cycle is in progress.
- The door(s) shall not unseal unless the chamber is +/-2 PSIA of ambient pressure.
- Door gasket(s) supply circuit includes check valve(s) to maximize door seal integrity in the event of a power failure.
- In the event of a power failure, a normally-open valve in the drain shall allow the chamber pressure to vent, thereby returning the chamber to atmospheric pressure.
- Integral door seal/lock control system monitors vessel and door seal pressure.
- Door Interlocks: Provide double door unit with interlocks to prevent inadvertent opening during process and to prevent both doors from being opened simultaneously. Door control mode is configurable to accommodate Bio-Safety Level (BSL) door interlock or pass-through operation.
- Five (5) levels of user/password security are provided within the operator interface: Guest (No Login), Operator, Supervisor, Technician and Administrator. The password security shall prevent sterilizer operation and/or cycles and their cycle values from being changed by unauthorized personnel.

CONTROL SYSTEM

The Laboratory Series (LS) Color Touch Screen is a user friendly interface powered by a robust Programmable Logic Control (PLC) system. Features include:

- Intuitive 5.7" color touch screen display
- Five levels of security for user login
- Pre-programmed cycle types
- Storage for thirty custom cycles
- Continuous cycle status output

- Help screens/alarms
- Network or data download ports
- Allen Bradley MicroLogix 1400 Programmable Logic Controller System
- NEMA 4 control enclosures

PRINTER

A 32 column, nine pin dot matrix impact printer records all cycle set points, cycle phase changes, pressure and temperature readings at specified times, and alarms. The printer uses easy to change roll paper and ink ribbons.

PIPING

Standard piping material to include copper/brass/bronze components. Optional 316L stainless steel components provided as required to accommodate clean steam supply systems. Beta Star provides industry leading lowest cost of ownership with the use of non-proprietary pharmaceutical industry grade control and piping components. All Beta Star machine components are available through a local supply house, authorized service agency, or directly through the Beta Star Parts Department.

DOOR SYSTEM

Every door system is equipped with both automatic locking and sealing subsystems. The locking system is used to ensure that once the door reaches the closed position, the door gasket remains in place until the chamber is safe to open. Prior to cycle initiation, the sealing system uses compressed air (or optional steam) to activate the seal once the door is closed.

The optional power-operated door system includes a safety feature that requires the operator to hold the close button until the door is in the fully closed position. If the operator releases the close button before the door is fully closed, the door will auto reverse to the fully open position, ensuring safe operation.

Electrical, mechanical, and pneumatic safety locks are provided to prevent the sterilizer door

from being unsealed or opened while the chamber is under pressure.

FASCIA

All Beta-Star sterilizers include number 4 finish, 304 stainless steel machine fascia assemblies. Beta-Star sterilizer fascia assemblies provide flush mounted human machine interfaces, (HMI's) and may be removed without tools in order to service sterilizer systems. Optional side, rear and top removable cabinet enclosures are also available.

VACUUM SYSTEM

Standard sterilizers include a water ejector vacuum system with an upgradeable and patented EnviroVac® water conservation vacuum system. All Beta Star vacuum systems provide best in class efficiency and automatic drain temperature quenching to 140°F or lower prior to discharge to the facility drain.

STANDARD CYCLES

- *Pre-Vacuum Cycle:* includes dynamic vacuum application provides rapid chamber conditioning, effective load penetration, and rapid load drying.
- *Micro Isolator Cycle:* positive and negative ramped pressure pulsing to reduce internal and external crazing of animal housing.
- *Liquid Cycles:* The liquid cycle controls positive steam pressure and vacuum assisted air removal along with programmable, ramped heating and exhaust to ambient pressures at end of cycle while preventing boil-over of pressure sensitive loads.
- *Gravity Cycle:* designed for non-air retentive products. Gravity Cycle utilizes positive steam pressure with vacuum assist air removal for conditioning of the load. The end of cycle exhaust is programmable to provide dry and non-dry phases.
- *Bio-Waste Cycle:* designed for vacuum pre-sterilization conditioning through positive

and negative pressurization to ensure air removal from mixed products in containers. Programmable ramped steam pressurization is used to maximize heat penetration of mixed laboratory biohazard waste. Bio-Waste cycle utilizes slow exhaust to prevent boil over.

- *F₀ Temperature Control Cycle*: designed for the sterilization of heat sensitive materials using time at temperature calculations. F₀ ensures the most effective time at temperature exposure in order to provide verifiable load sterilization.
- *Jacket Idle*: maintains jacket at lower, user defined set-point to minimize utility consumption and sterilizer heat-up time.
- *Leak Test*: pre-programmed automatic leak test cycle to verify and record vessel and supply piping pressure integrity.
- *Bowie-Dick Test*: Pre-programmed Daily Air Removal (Bowie-Dick) test. Air removal test also indicates effective steam penetration into the load.

OPTIONAL CYCLES

- *Liquid Air Cooling*: introduces filtered ambient temperature air during exhaust to speed cooling.
- *Isothermal Cycle*: designed for conditional of heat sensitive materials at a temperature range of 78°C to 100°C
- *Effluent Filtered Exhaust Cycle*: Specially engineered for use in bio-safety labs, the Beta-Star effluent process system provides the greatest probability of sterilization by eliminating in-cycle water discharge, filtering in cycle vapor exhaust and exposing cycle generated condensate to the greatest possible time at temperature exposure.

Control System Cycle Options

The Beta Star touch screen control system is able to handle advanced, fully customizable cycles

which can be pre-configured for standard loads, such as glassware, plasticware, liquids, pre-vacuum, and hard goods.

OPTIONAL FEATURES

Control System Equipment Options

- *Full or Partial Remote*: Sterilizers equipped with a second door can be enabled to monitor system status with full or partial control capabilities
- *Allen Bradley Compact Logix*: A non-propriety Allen Bradley PLC is available with the Beta Star LS series sterilizer
- *Nema 4x Enclosure*: Useful for facilities that require specific control enclosures
- *Foot Pedal*: assists in operating the automatic sliding door for hands-free operation of the sterilizer door

Connectivity with Beta Connect

A series of four different package options allows the customer to create a customized remote control and monitoring solution for any sized laboratory. All new Beta Star sterilizers come Beta Connect compatible, and the package upgrade can be added at any time. The connection is protected via a 256-bit encrypted connection.

- *Remote Support*: with the flip of a manual switch, Beta Star technicians can interact with a customer HMI and diagnose a problem with little delay
- *Mobile Observation and Control*: customer facility managers can monitor the progress of any number of machines from a mobile device
- *Central Sterilization Management*: set up a custom control center through a desktop or laptop for all sterilizers in a customer's network
- *Predictive Maintenance*: analyze cycle usage rates to predict preventative maintenance needs and minimize downtime

Vessel Options

The Beta Star vessel can be configured according to the customer's unique needs.

- *Double Doors:* if a pass-through system is needed, the Beta Star sterilizers can be equipped with a second door. Double door sterilizers can be configured with full or partial secondary control.
- *Sanitary Ports:* chamber ports can be upgraded with sanitary ports to accept thermocouple fittings for use with critical media or goods.
- *20 Ra Polish:* The internal chamber and door can be polished to a 20Ra finish or better for critical applications
- *316L Steam Jacket:* The standard 304 stainless steel steam jacket can be upgraded to 316L.
- *Seismic Restraints:* For equipment being installed in areas of seismic activity
- *Chamber Passivation:* An internal surface chamber passivation can be applied to remove impurities and inhibit further corrosion.
- *Dual Drain:* Improves temperature distribution
- *Jacket Idle:* holds jacket at a lower temperature for utility conservation when the unit is not in cycle

Piping Options

Sterilizer jacket and chamber piping can be configured to meet process requirements or upgrades.

- *316L Stainless Steel Piping:* includes threaded, swagelock fittings and stainless steel process valves
- *Sanitary Piping:* 316L stainless steel sanitary piping and process valves with orbital welds can be added for high level sterilization

Steam Source Options

Beta Star LS steam sterilizers are used for moist heat sterilization. Steam requirements vary based on model size and options.

- *House Steam:* the facility or building is equipped with a steam source that can supply

the sterilizer with the required steam utility

- *Integral Electric Boiler:* generates steam if there is no house steam available. Integral boilers sit within the footprint of the sterilizer.
- *Stainless Steel Boiler:* can be used to produce clean steam with DI water to sterilize sensitive media or goods.
- *Steam to Steam Generator:* a heat-exchanging system used to create clean steam from a pure water sources and house steam or electric boiler system. These systems are connected directly to the chamber.

Air Compressor

A laboratory grade air compressor may be provided when facility-supplied compressed air is not available.

Process Options

- Air inlet in-situ filter: provides sterile chamber air injection for sensitive loads
- Stainless steel in-situ filter housing: permits in-situ air admit filter sterilization.

Loading Equipment

A bottom shelf is standard with all Beta Star sterilizers. Additional shelving is available for the internal rack system.

Loading Cart and Transfer Carriage

The heavy duty 316L stainless steel loading cart is designed to hold goods or media for sterilization. The loading cart rides on the tracks between the transfer carriage and the chamber. The transfer carriage is used to transport the loading cart from station to station. A drip pan can be added to the loading cart to capture spilled liquid or media.

Uninterrupted Power/Back-up Power

An uninterrupted power supply (UPS) system can be integrated into the sterilizer configuration. This option helps prevent voltage spikes, drops, or losses. An internal checking system is able to identify power loss and signal a sterilizer alarm.

After the alarm goes off, the system goes into “abort” conditions which hold the sterilizer in safe mode until electric service is restored.

Biocontainment Seal

An optional biocontainment flange can be welded to the vessel. The flange serves as a sealed and ready-to-install rigid support for our adaptable biocontainment extension panels. This helps to ensure a reliable and turnkey pathogen barrier for containment applications.

Effluent Package

Beta Star’s design prevents harmful pathogens and viruses from exiting the sterilizer at any time during the sterilization process. Pathogens are retained with a heated 0.2 um hydrophobic filter until the required sterilization exposure time has been achieved. The sloped chamber base and internal liquid dams retain effluent during the entire sterilization period.

Quality Documentation

Quality documentation packages can be included into your sterilizer package. A list of documentation options include:

- ***IQ/OQ Documentation Only:*** A documentation package used to qualify installation and operation of the sterilizer.
- ***IQ / OQ Documentation and Execution:*** A documentation package and manufacturer representative executing and qualifying installation and operation of the sterilizer.
- ***FAT Documentation Only Package:*** A documentation package that qualifies the Factory Acceptance Test was performed with optional customer attendance.
- ***SAT (Site Acceptance Test):*** On-site testing of the equipment performed by a manufacturer’s representative.
- ***FRS (Functional Requirement Specification):*** A documentation package the details, defines and ensures equipment functionality.
- ***Chamber Temperature Mapping:*** A temperature

test completed throughout the inside of the chamber to record temperature consistency.

- Alternatively Beta Star may provide a customer specified documentation package that complies with FDA, CFR or other established standard.

Installation Scope

All Beta Star sterilizers are installed directly by the manufacturer or an authorized installation provider. The scope of installation will vary depending on the customer’s requirements

- ***Delivery:*** factory direct delivery and installation provided by Beta Star or through an authorized installation provider.
- ***Removal of Existing Equipment:*** in the case of equipment replacement, Beta Star can arrange removal of the existing sterilizer.
- ***Installation Supervision Only:*** when in-house or specialized service workers will be used, an on-site representative will guide workers through the installation process.
- ***User Training:*** operator training is provided with every newly installed sterilizer. Additional training is available to refresh or train new users.
- ***Maintenance Training:*** In-house maintenance technicians can benefit from factory direct training on-site or at our factory.

Preventative Maintenance

A network of trained and skilled service technicians can provide scheduled inspections, adjustments, and recommended maintenance to ensure the reliability of our equipment. Contact Beta Star Service for maintenance agreement options.

Water Conservation

The patented EnviroVac® Vacuum System dramatically reduces environmental and facility water usage by nearly 75% during a sterilization cycle. The EnviroVac® requires only a ½” water feed at a maximum of 20 psig. In addition, customer sterilization cycles are no longer at risk of normal water pressure and temperature fluctuations.