BULK STERILIZER SERIES 36”x 42” AND LARGER

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.

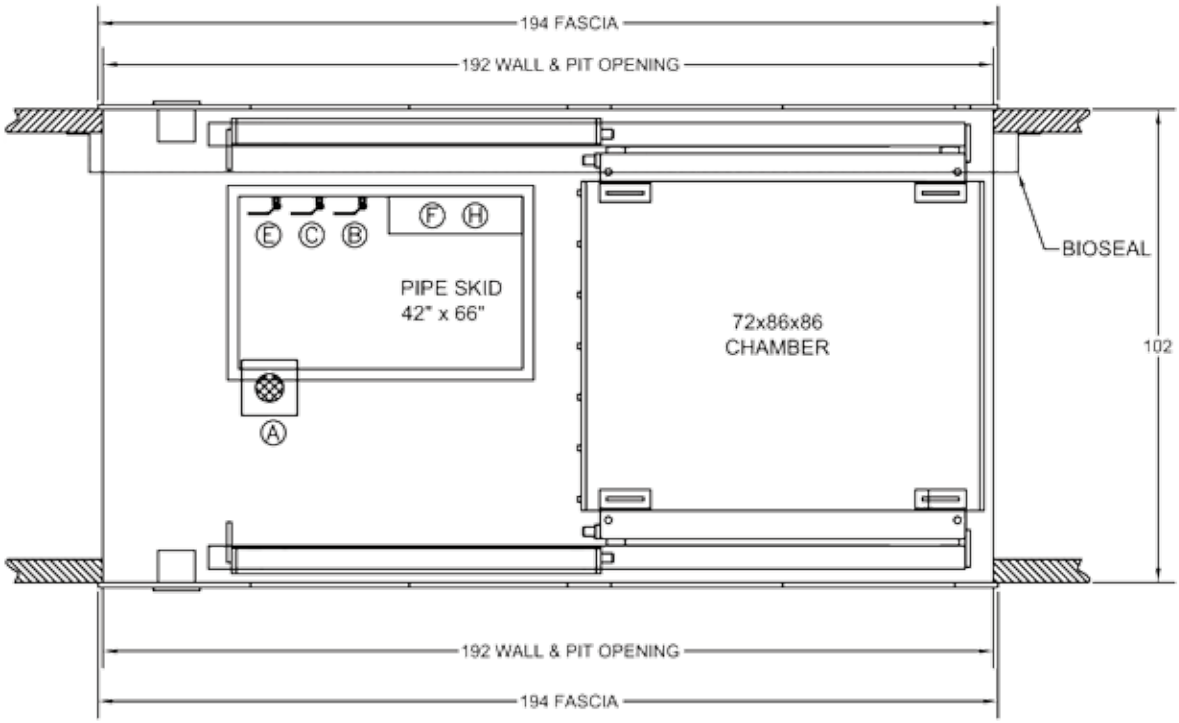
SAFETY

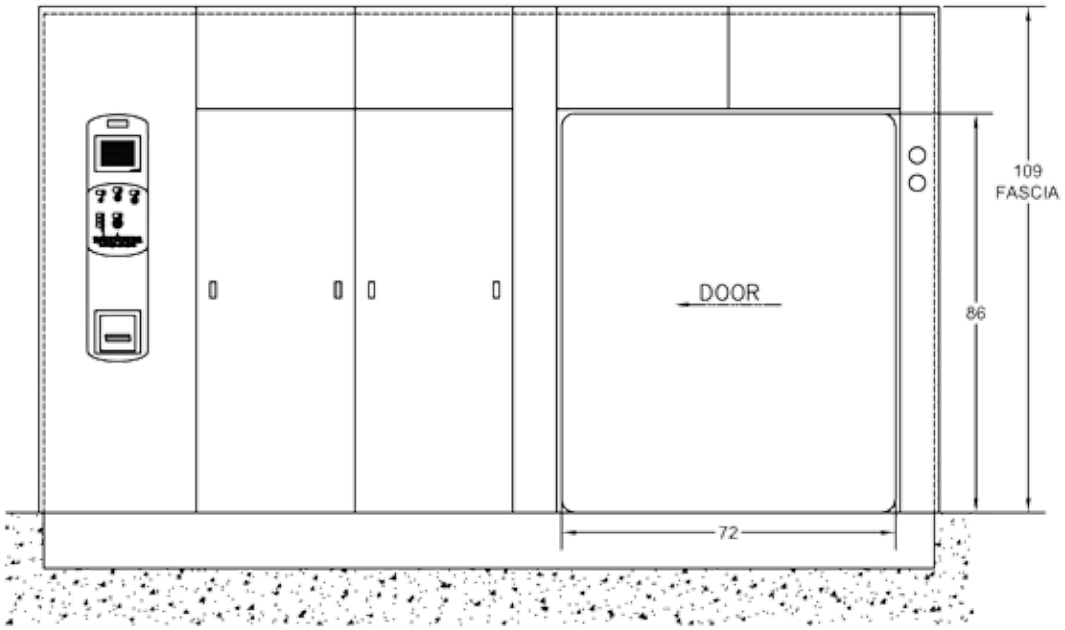
Operators and technicians are protected through temperature and pressure monitoring, relief valves, safety interlocks, and automatic overrides.

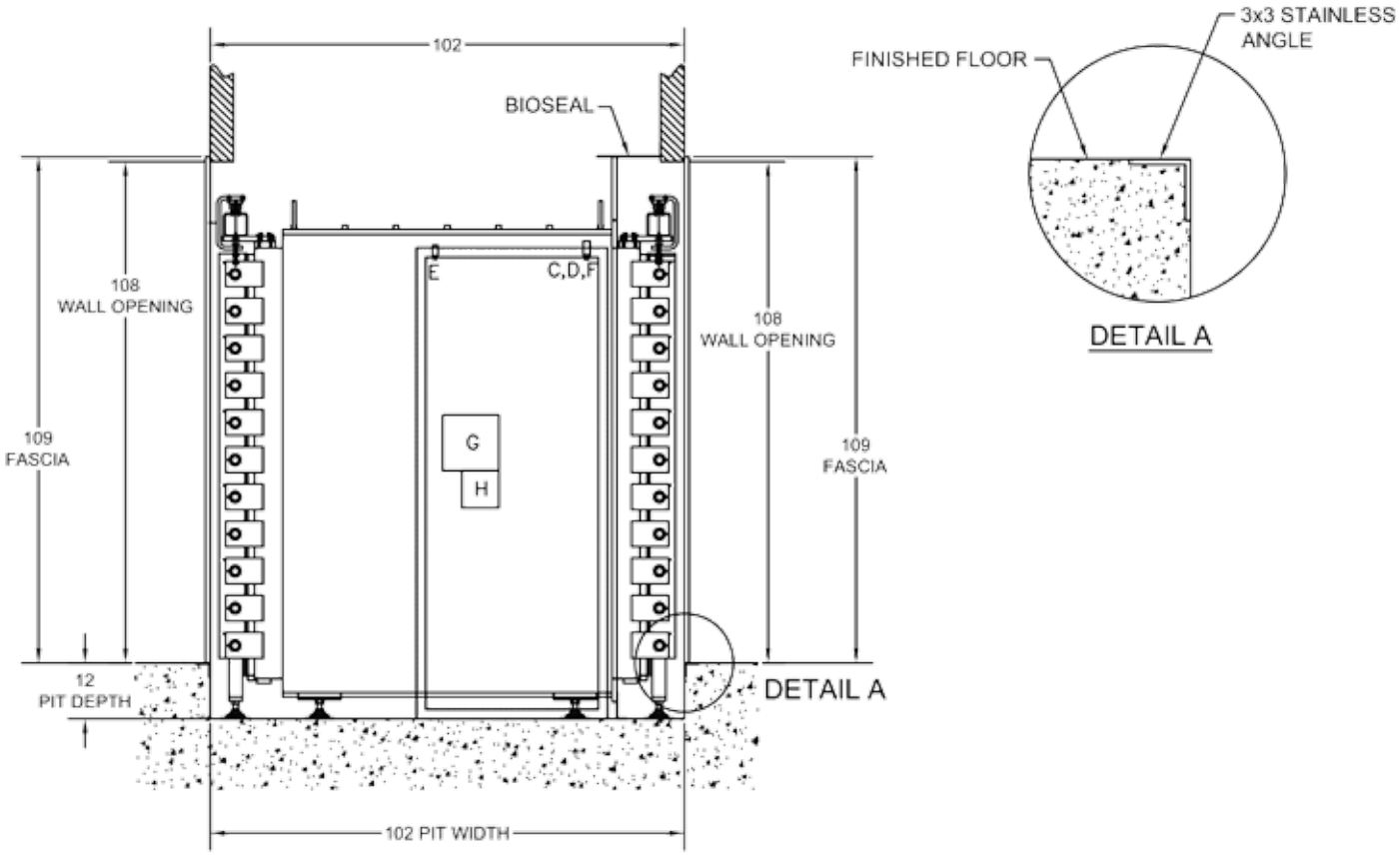
LOWER COST OF OWNERSHIP

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

72” x 86” DRAWINGS







BULK SERIES STANDARD SIZES			
Chamber Dimensions			
Series	Height	Width	Depth
3648	36”	48”	60”
	36”	48”	72”
4248	42"	48”	103”
3686	36”	86”	86”
4986	49”	86”	86”
6186	61”	86”	86”
7286	72”	86”	86”

FOR ALL DIGITAL DRAWINGS
CONTACT US AT BETASTAR.COM

36” x 48” UTILITY REQUIREMENTS

PLUMBING UTILITY REQUIREMENTS[1]					
Plumbing Utility	Connection Size	Standard Material[2]	Flow Rate		Pressure
			Peak	Average	
Drain Size	4”	By Others, Suitable for 140°F/60°C	N/A	N/A	Atmosphere (Gravity Drain)
House Steam (LS-364860)	1 1/4”	Black Iron/Brass or Stainless	515 LB/HR	423 LB/HR	50 - 80 PSIG
House Steam (LS-364872)	1 1/4”	Black Iron/Brass or Stainless	618 LB/HR	501 LB/HR	50 - 80 PSIG
Water, EnviroVac® Equipped Machine	3/4”	Copper	7 GPM	4 GPM	40 - 60 PSIG
Hot Water, Electric Steam Generator Equipped Machine (Optional)	1/2”	Copper	1.25 GPM	1 GPM	40 - 60 PSIG
Instrument	1/2”	Copper	3 SCFM	2 SCFM	80 - 100 PSIG

ELECTRICAL UTILITY REQUIREMENTS					
Electrical Utility	Voltage	Phase	Frequency	Amp Draw	Type
Sterilizer Controls	120V	1	60 Hz	5	Dedicated Circuit
EnviroVac® (Optional Three Phase Assembly)[3]	208/480V	3	60 Hz	17.5/7.6	Disconnect
Electric Steam Generator Heating Elements	480V	3	60 Hz	217	Disconnect
Electric Steam Generator Controls (Optional)	120V	1	60 Hz	5	Dedicated Circuit
Air Compressor (Optional)[4]	120V	1	60 Hz	12	Duplex Outlet
Ethernet Connection Required for Optional Beta Connect Remote Connectivity System					

Key	
1	Recommended utility values indicate design standard 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 machine installations which have no house instrument air available.

HEAT LOSS		
Category	LS-364860	LS-364872
Single Door Cabinet		
Heat Loss to Room	18,221 Btu/hr	21,002 Btu/hr
Single Door Recessed		
Heat Loss to Operator Side	7,345 Btu/hr	8,325 Btu/hr
Heat Loss to Service Space	10,876 Btu/hr	12,677 Btu/hr
Double Door Recessed		
Heat Loss to Each Operator Side	7,345 Btu/hr	8,325 Btu/hr
Heat Loss to Service Space	9,007 Btu/hr	10,809 Btu/hr

42” x 48” UTILITY REQUIREMENTS

PLUMBING UTILITY REQUIREMENTS[1]					
Plumbing Utility	Connection Size	Standard Material[2]	Flow Rate		Pressure
			Peak	Average	
Drain Size	4”	By Others, Suitable for 140°F/60°C	N/A	N/A	Atmosphere (Gravity Drain)
Water, EnviroVac® Vacuum System	3/4”	Copper	15 GPM	7 GPM	40 - 60 PSIG
Water, Electric Steam Generator	3/4”	Copper	1.6 GPM	1.0 GPM	50 - 80 PSIG
Floor Drain, Electric Steam Generator	3/4”	By Others, Suitable for 140°F/60°C	N/A	N/A	Atmosphere (Gravity Drain)

ELECTRICAL UTILITY REQUIREMENTS					
Electrical Utility	Voltage	Phase	Frequency	Amp Draw	Type
Sterilizer Controls	120V	1	60 Hz	5	Dedicated Circuit
EnviroVac® Vacuum System	480V	3	60 Hz	15	Disconnect
Electric Steam Generator Heating Elements	480V	3	60 Hz	360	Disconnect
Electric Steam Generator Controls	120V	1	60 Hz	15	Dedicated Circuit
Air Compressor	120V	1	60 Hz	12	Duplex Outlet
Ethernet Connection Required for Optional Beta Connect Remote Connectivity System					

Key	
1	Recommended utility values indicate design standard 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.

HEAT LOSS	
Category	LS-4248103
Single Door Cabinet	
Heat Loss to Room	28,362 Btu/hr
Single Door Recessed	
Heat Loss to Operator Side	11,031 Btu/hr
Heat Loss to Service Space	17,331 Btu/hr
Double Door Recessed	
Heat Loss to Each Operator Side	11,031 Btu/hr
Heat Loss to Service Space	15,462 Btu/hr

36”, 49”, 61”, 72” x 86” UTILITY REQUIREMENTS

PLUMBING UTILITY REQUIREMENTS[1]				
Plumbing Utility	**LS-368686**	**LS-498686**	**LS-618686**	**LS-728686**
Drain				
Connection Size	4”			
Standard Material[2]	By Others, Suitable for 140OF/60OC			
Pressure	Atmosphere (Gravity Drain)			
House Steam				
Connection Size	1-1/4”			
Standard Material[2]	Black Iron/Brass or Stainless			
Peak Flow Rate	1,100 lb/hr	1,310 lb/hr	1700 lb/hr	1800 lb/hr
Average Flow Rate	770 lb/hr	840 lb/hr	1,095 lb/hr	1,240 lb/hr
Pressure	50 - 80 PSIG	50 - 80 PSIG	50 - 80 PSIG	50 - 80 PSIG
Steam to Steam Generator (Optional)				
Connection Size	1-1/4”			
Standard Material[2]	Black Iron/Brass or Stainless			
Peak Flow Rate	TBD	TBD	TBD	TBD
Average Flow Rate	TBD	TBD	TBD	TBD
Pressure	35 - 40 PSIG	35 - 40 PSIG	35 - 40 PSIG	35 - 40 PSIG
Water, EnviroVac® Equipped Machine (Optional)				
Connection Size	3/4”			
Standard Material[2]	Copper			
Peak Flow Rate	15 gal/min			
Average Flow Rate	7 gal/min			
Pressure	40 - 60 PSIG			
Instrument Air Pneumatic Valve Equipped Machine (Standard)				
Connection Size	1/2”			
Standard Material[2]	Copper			
Peak Flow Rate	3 SCFM			
Average Flow Rate	2 SCFM			
Pressure	80 - 100 PSIG			

Key	
1	Recommended utility values indicate design standard 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 machine installations which have no house instrument air available.

ELECTRICAL UTILITY REQUIREMENTS				
Plumbing Utility	**LS-368686**	**LS-498686**	**LS-618686**	**LS-728686**
Sterilizer Controls				
Voltage	120V			
Phase	1			
Frequency	60 Hz			
Amp Draw	2A			
Type	Dedicated Circuit			
EnviroVac®				
Voltage	208V / 480V			
Phase	3			
Frequency	60 Hz			
Amp Draw	7.8A / 3.4A			
Type	Disconnect			
Liquid Ring Vacuum System				
Voltage	208V / 480V			
Phase	3			
Frequency	60 Hz			
Amp Draw	TBD			
Type	Disconnect			
Electric Steam Generator (Optional)[3]				
Voltage	208 V / 480V			
Phase	3			
Frequency	60 Hz			
Amp Draw	TBD	TBD	TBD	TBD
Type	Disconnect			
Clean Steam Generator (Optional)[3]				
Voltage	208V / 480V			
Phase	3			
Frequency	60 Hz			
Amp Draw	TBD	TBD	TBD	TBD
Type	Disconnect			
Steam Generator Controls (Included with both Electric Steam Generator and Clean Steam Generator)				
Voltage	120V			
Phase	1			
Frequency	60 Hz			
Amp Draw	5A			
Type	Dedicated Circuit			
Air Compressor (Optional)[4]				
Voltage	120V			
Phase	1			
Frequency	60 Hz			
Amp Draw	12A			
Type	Duplex Outlet			
Ethernet Connection Required for Optional Beta Connect Remote Connectivity System				

HEAT LOSS				
Category	**LS-368686**	**LS-498686**	**LS-618686**	**LS-728686**
Single Door Recessed				
Heat Loss to Operator Side	15,218 Btu/hr	17,766 Btu/hr	20,118 Btu/hr	22,275 Btu/hr
Heat Loss to Service Space	22,798 Btu/hr	25,423 Btu/hr	27,847 Btu/hr	30,068 Btu/hr
Double Door Recessed				
Heat Loss to Each Operator Side	15,218 Btu/hr	17,766 Btu/hr	20,118 Btu/hr	22,275 Btu/hr
Heat Loss to Service Space	19,110 Btu/hr	20,772 Btu/hr	22,305 Btu/hr	23,711 Btu/hr

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. Contact a member of our team to get your consultation scheduled.

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.

STANDARD FEATURES

VESSEL CONSTRUCTION

All Beta Star vessels are manufactured at our corporate headquarters in Honey Brook, PA. The engineered chamber, door, and vessel jacket in manufactured in accordance with the standards defined by the American Society of Mechanical Engineers (ASME), Unified Pressure Vessel Code, Section VIII, Division 1. The fabricated chamber and door maintain operating pressures and temperatures from full vacuum to 45 psig at 300^{O}F. A few of the vessel features include:

- Vessel: finish polished to 25 Ra. Optional mechanical finish surface to 10 Ra is available.
- Jacket: constructed of 304L or optionally specified 316L type stainless steel.
- Inner chamber: constructed of 316L type stainless steel.
- Chamber Floor: geometry shall facilitate free flow gravity drain. Chamber floor will be furnished with appropriate number of chamber drains, each with their own drain strainer to prevent clogging.
- Baffled Steam Injection: minimizes load wetting by direct impingement on the load by condensate while assuring proper steam temperature distribution in the chamber.
- Safety Valve: Provide with ASME approved and stamped safety valve(s). Safety valve set point to be the Maximum Allowable Work Pressure (MAWP) of the vessel. Safety valve capacity to sufficiently relieve the peak flow of the complete piping system.
- Ports: provided with (2) 1" NPT chamber validation ports with (1) accessible from the service space of the machine. Optional 1-1/2" or 2" Tri-Clamp port also available. The port shall include a plug.

QUALITY CONTROL

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

DOOR SYSTEM

Door surfaces exposed to the chamber shall be constructed of 316L stainless steel. Optionally, material that contains higher levels of corrosion resistance may be selected. The exterior of the door(s) are covered with Type 304 stainless steel with a #4 brush finish to match fascia panels.

Door sealing mechanism(s) are engineered and fabricated to provide an airtight closure of the sterilizer for pressure, water, vacuum, and steam service. The door(s) shall be sealed using a one piece, easily replaceable silicone gasket. The door retention shall be engaged when the door is closed and the redial arm mechanism is engaged by the operator. Compressed air or optional steam shall be used to actuate the door gasket against the door plate providing a hermetic seal.

DOOR SAFETY FEATURES

- 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(s) gasket 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.
- Double door units with interlocks prevent inadvertent opening during sterilization processes. The locking system does not allow both doors to be opened simultaneously which prevents clean room contamination.

VACUUM SYSTEM

Small series sterilizers come with a water ejector vacuum system as the standard option. Beta Star's unique piping configuration reduces water consumption while maintaining a consistent vacuum. The system also automatically regulates the effluent temperature below locally specified temperature requirements for the facility drain.

PLC CONTROL SYSTEM

The sterilizer process control system shall monitor, control and document all critical process parameters from the Door 1 and/or optional Door 2 side of the sterilizer. The control system shall include a Human/Machine Interface, (HMI) Controller, printer, Program Logic Controller (PLC) processor and emergency stop switch. Resistance Temperature Detectors (RTD's) shall be provided in sterilizer chamber and jacket drains to sense and control variations in temperature. A pressure transmitter shall be provided to measure chamber pressure and vacuum.

Human Machine Interface (HMI): The HMI shall be a programmable 5.7" color touch screen operator interface. During in-cycle operation, the HMI shall show sterilizer status, time of day, cycle times, temperature, pressure, and any abnormal process conditions. The operator interface shall contain screens with the ability to view the status of the systems digital inputs and outputs, and analog inputs.

Printer: The printer shall be a 32 column, alphanumeric dot-matrix (or optional thermal) printer using 2-1/4 inch wide, single-ply paper. An automatic paper take-up mechanism is provided. Cycle Data printed by the sterilizer includes time in cycle, chamber pressure, chamber temperature, alarm messages, cycle data and phases. Systems with the optional load probe installed and enabled will provide printed load probe temperature and accumulated F_0.The operator shall have the ability to re-print cycle data for the last completed cycle.

PLC Controller Enclosure: The main controller enclosure contains the low (24VDC) voltage PLC and system fuses. All 24 VDC monitor and control devices are wired back to this enclosure. The PLC Controller Enclosure is accessible from the machine service space.

Power Distribution Enclosure: The line voltage (120VAC) control components are segregated from low voltage components. 120VAC components are installed and accessible according to safe minimum workspace requirements of NEC section 110.26.

Audible Alarm: The operator interface shall include an audible alarm to annunciate end of cycle or an alarm condition.

HMI INTERFACE DESCRIPTION

The Human/Machine Interface, (HMI) shall provide security access, service diagnostics, cycle selection and configuration of cycles and cycle parameters. Security Access: 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. An automatic logoff feature has an inactivity timer to ensure unauthorized personnel do not gain access under another user's session. The auto logoff feature may be disabled for the Operator by the Administrator to permit operators to remain logged on.

STANDARD CYCLES

- ***Pre-Vacuum Cycle:*** includes dynamic vacuum application provides rapid chamber conditioning, effectrive 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.
- ***Bowie-Dick Test:*** Pre-programmed Daily Air Removal (Bowie-Dick) test. Air removal test also indicates effective steam penetration into the load.

OPTIONAL CYCLES

- ***F_0 Temperature Control Cycle:*** designed for the sterilization of heat sensitive materials

using time at temperature calculations. F_0 ensures the most effective time at temperature exposure in order to provide verifiable load sterilization.
- ***Isothermal Cycle:*** designed for conditional of heat sensitive materials at a temperature range of 78^{O}C to 100^{O}C

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
- *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
- Mobile Observation and Control
- Central Sterilization Management
- Predictive Maintenance and Data Analysis

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:* 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:* reduces utility consumption by lowering jacket temperature when 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
- IQ / OQ Documentation and Execution
- FAT Documentation Only Package
- SAT (Site Acceptance Test)
- FRS (Functional Requirement Specification)
- Chamber Temperature Mapping
- Custom documentation packages for FDA, CFR, or other requirements

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
- Removal of Existing Equipment
- Installation Supervision Only
- User Training
- Maintenance Training

Preventative Maintenance
A network of highly 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 options.