



# Sterilco Steam Sterilizer

## Optimus

### Horizontal Door Models



Model	Internal Dimensions w" x h" x d"	External Dimensions w" x h" x d"	Volume (liters)	Capacity (cu. ft.)
SH-900	25.6" x 39.4" x 52.8"	80.8" x 75.6" x 63.8"	900	31.8
SH-1275	25.6" x 39.4" x 76.4"	80.8" x 75.6" x 87.5"	1275	45



**Standard Features –Exceed Industry Standards:**

- Double Microprocessor Controls and Double Instrumentation for Maximum Load Safety
- 8.2" Color Touch screen Operator Interface for Ease in Operation
- 2-Stage Water Saving Vacuum Pump – Reduced Water Consumption by 75%
- Prevac Cycle – Thus offering better penetration of steam
- Non-Proprietary Components – Locally available
- 316L Stainless Steel Chamber & Jacket – 15-Year Non-Prorated Warranty
- 316L Stainless Steel Steam Piping – Less Prone to Corrosion
- 304 Stainless Steel Frame – No Rusting
- Hinged Fascia Panels with Key Lock – Easy Maintenance Access
- Automatic Motor Driven Doors with Dual Built-in Safety Features

**TECHNICAL SPECIFICATION**

**GENERAL**

The Sterilco Steam Sterilizers are designed for applications in laboratories for sterilization of materials such as instruments, textiles, rubber goods, liquids, agars, animal diet, cages etc.

**MOUNTINGS**

The sterilizer can be constructed as a single or double-door unit. It is designed for mounting on a concrete floor that contains an open drain connection that is provided by the owner.

**QUALIFICATION**

Construction meets or exceeds the requirements or recommendations of:

CGLP	Current Good Laboratory Practices
IMHS	Industrial Moist Heat Sterilization: International Standard 11134:1994
ASME	American Society of Mechanical Engineers
UL	Underwriters Laboratory
CETL	Canadian Testing Laboratories (for conformance to CSA)
NFPA	National Fire Prevention Association
OSHA	Occupational Safety and Health Administration
NPC	National Plumbing Code
NEC	National Electrical Code
NEMA	National Electrical Manufacturers Association
EN285	British Standard for Sterilization

**CHAMBER**

Constructed in accordance with ASME Section VIII, Division 1, for unfired pressure vessels and so stamped for 45 psig/144° C Design Temperature and Full Vacuum. The chambers are rectangular in design and jacketed. The chamber is 316L stainless steel with fully welded construction. Steam baffles are positioned in the chamber to minimize wetting by condensate and ensure proper steam distribution within the chamber.

The chamber is mechanically polished to a 50 Ra. As option, the chamber can be polished to a 25 Ra or a mirror finish with a Ra of 10u inch or better. This feature greatly enhances the sanitary aspects of the chamber, as well as the clean ability, which translates into longer lasting more aesthetically pleasing sterilizers.



## **JACKET**

The jacket is constructed of 316L stainless steel, is ASME stamped for 45 psig/144° C Design Temperature.

## **DOORS:**

### ***Horizontal Sliding Door***

The sterilizer is equipped with horizontal sliding door(s). The horizontal sliding doors are electric motor driven and opened and closed by pushbuttons. The doors are equipped with a leading edge strip which allows for overriding the door closure should an obstacle be in the doorway.

The door(s) are sealed by steam pressurizing the continuous O-ring gasket, which is recessed within the chamber head ring against the door. The gasket is retracted by vacuum before the door is opened. Optional double-door units are safety interlocked so only one door may be opened at one time, which ensures the proper flow from load side to unload side.

## **INSULATION**

The exterior of the jacket is covered with chloride-free 2" thick insulation. The insulation is encased within sturdy galvanized sheet.

## **FRAME**

The sterilizer chamber is secured to a structural frame. The frame is constructed of 304 stainless steel. Adjustable screws at the base of the frame allow for leveling during installation.

## **FRONT PANELING**

The front of the sterilizer is covered with 304 stainless steel fascia panels finished with a number 4 finish. The fascia panels are hinged and equipped with a key lock to aid in access to the maintenance area.

## **PIPING**

All piping in contact with steam is made of 316 stainless steel. Jacket and other service piping is copper or brass. All plumbing fixtures and components are readily accessible and removable without requiring major disassembly of the unit.

## **VALVES**

All control valves are non-proprietary, industrial-grade, pneumatic driven and made from red brass. If air is not available at your facility, an optional integral air compressor can be added.

## **OVERPRESSURE RELIEF**

A safety relief valve is equipped on both the chamber and jacket to protect from over-pressure. The safety relief valves are factory preset for the vessel design pressure and are ASME approved and stamped.

## **VALIDATION AND LOAD PORTS**

The chamber is equipped with two stainless steel 1 ½" tri-clamp ports for use for validation and for use by a load probe if equipped. Each is equipped with blind flanges. They are located in the maintenance space for easy accessibility and are sloped towards the chamber for proper drainage. Additional ports can be ordered as an option.

## **VACUUM PUMP**

A Two-stage water ring vacuum pump in block construction is equipped for silent operation and high performance. The vacuum system is integrated into the sterilizer and is equipped with a rotary current motor, trap valve, counter-flow heat exchanger, and a unique water saving circulation system which include a waste water separating tank and a thermostatically controlled water saving circuit for additional water saving. This system reduces water consumption by more than 70% from standard water ring vacuum pumps or water ejectors.



## **EXHAUST COOLING SYSTEM**

Exhaust cooling protects the facility drainage system by automatically mixing effluent with cooling water to reduce the temperature to an acceptable level. A temperature sensing device located in the exhaust drain opens a mixing valve to introduce cooling water whenever the temperature exceeds the set point. This feature greatly reduces cooling water consumption. Discharge temperature is influenced by the temperature of the cooling water supplied; however, it will typically be 60°C (140°F) or less when cooling water is 21°C (70°F) or less.

## **CONTROL SYSTEM**

### ***Double-Microprocessor Control System***

The microprocessor based control system provides full automatic control of all the sterilizer functions. The double-microprocessors in a master slave configuration, allows for independent checking of process data and double control for safety. The control system is equipped with a RS 232 port for connection to a PC or network. The control system is mounted in a UL Listed NEMA12 panel.

- Advanced 8" touch screen allows cycle programming and indicates the sterilizer operating state. Alarms are announced audibly and indicated in clear text. The operator interface is mounted on the front fascia, on the loading side of the sterilizer.
- Fourteen (14) programmable cycles are available with a wide range of programmable parameters, which provides for a high degree of functionality and allows great freedom in designing cycles for various loads.
- Cycle parameters and calibration are protected from unauthorized access with pass codes.
- Dual RTD's provides the precise control, evaluation and regulation of temperature inside the chamber. .
- Absolute dual pressure sensors are equipped for the precise control of pressure in the chamber and jacket and vacuum in the chamber.
- Indication of chamber temperature and pressure in digital graphical display are indicated on the operator interface and printed. .
- Complete automatic diagnostic system displayed on the operator interface and printed on the printout.
  - To allow a safe entry into the chamber, the door control system can be locked out for personnel safety.

## **Printer**

The printer provides a digital printout of cycle progression and information including any fault statements during the entire cycle. The following process parameters are recorded on the 4.5" wide paper for easy reading. The following events are documented during the cycle:

- Date
- Sterilizer Identification
- Load Identification
- Cycle Parameters
- Cycle Steps
- Chamber Temperature
- Exposure Start Time
- Exposure End Time
- Alarms if Any (Real Time)
- Graphic printout of the complete cycle
- Fault diagnosis print during any alarm (shows valve positions for easy diagnosis)



### **Chip Card System**

The chip card system allows storage of individual cycles for a specific operator to a chip card. Once the programmed chip card is inserted into the provide slot on the control system, the sterilizer will automatic run the stored cycle. In addition to the fourteen cycles available with the control system, adding this system allows an unlimited number of cycles that can be stored. This chip card system is also quite useful for upgrading the sterilizer program should an update from the factory become available. The new program is mailed on a chip card and once inserted into the control system slot on the front of the sterilizer, the new program is automatically down loaded.

### **PREPROGRAMMED CYCLE DESCRIPTIONS**

The following cycles are preprogrammed for ease in use. The programs can be custom programmed to a user's requirements. Seven programs are free for the user to program. An optional chip card can be purchased for unlimited programming.

#### ***Dry Goods — Vacuum Cycle (Standard)***

This cycle provides effective sterilization of hard goods, filters, linens, and other porous materials, wrapped goods, and product that is unaffected by vacuum. This cycle is also highly effective at removing moisture from the load during drying. At the end of the cycle, air pulses can be initiated to aid in drying.

- Program P1 – Exposure Temperature 134° C for 4 minutes with short drying  
For instruments, single wrapping or unwrapped, pre-vacuum method with short drying phase
- Program P2 – Exposure Temperature 134° C for 7 minutes with 10 minute drying  
for textiles, instruments, wrapped goods, pulsing vacuum method with drying phase
- Program P3 – Exposure Temperature 134° C for 7 minutes with 20 minute drying  
For heavy instruments, wrapped goods, pulsing vacuum method with super-drying-program
- Program P4 – Exposure Temperature 121° C for 20 minutes with 20 minute drying For glassware, heat resistant items of synthetic material or rubber, pulsing vacuum method with drying phase

#### ***Solution Cycle — Gravity Air Removal / Ramped Exhaust***

This cycle effectively sterilizes liquid products or items in vented or sealed glass containers. Exhaust ramping gradually returns liquids to a temperature below boiling. A movable RTD is equipped inside the chamber for placement into the product. The RTD ensures that the liquid is below the boiling point before the chamber door is allowed to open.

- Program P5 – Exposure Temperature 121° C for 20 minutes with ramped exhaust  
For vented solutions in glass or heat resistant containers

#### ***Test Cycles***

- Program P6 – Vacuum Leak Test – Verification of chamber piping and door seal integrity.  
The acceptable maximum leak rate is 1 mm HG/min. over a 10 minute period following a fixed stabilization time.
- Program P7– Dart Test – For verification of effective removal of residual air in the chamber and load during testing. Test cycle determines if even and rapid steam penetration into the test load has occurred. Cycle parameters are preprogrammed and fixed.



## **OPTIONAL ITEMS**

Contact Sterilco for pricing for the following options.

### **CHAMBER OPTIONS**

#### *Mechanical Chamber Finish*

The chamber is polished to a Ra of 32 µinch or better. This feature enhances the look of the chamber from the standard 50 Ra µinch finish.

#### *Mirror Polished Finish*

The chamber is polished to a mirror finish with a Ra of 8 µinch or better. This feature greatly enhances the sanitary aspects of the chamber, as well as the clean ability, which translates into longer lasting more aesthetically pleasing sterilizers.

#### *Double-Door Pass-Thru Model*

The unit can be equipped with a second door for pass-thru operation. The unit is designed to be installed into one wall or two walls. The pass-through configuration allows for separation of the un-sterilized items from the sterilized items.

#### *Bioseal – Cross contamination seal or Fully Welded for BSL3*

The sterilizer can be equipped with a Bioseal to seal off a clean room from the mechanical space on either or both, the load or unload ends. The cross contamination bioseal consists of stainless steel panels that form a complete wall around the chamber and then is attached to the facility wall to form an air tight seal. For BSL3 applications; a fully welded bioseal will include gland connections to wall.

#### *Separate Door Sealing*

For BSL 3 applications or other clean room settings, the separate door sealing allows only one door at time to have the gasket retracted and the door to be opened. The opposite side door must always have the door closed and the gasket charged in order to open the door.

#### *Door Seal Air Back-Up*

In the event that there should be a steam failure to the door seal, the door sealing is provided with air back-up to ensure the door seal is not broken. This is especially important in BSL 3 applications.

#### *Mirror Construction*

The standard construction positions the control system and service access on the left hand side of the chamber. The sterilizer will be constructed with the control system and service access on the right hand side of the chamber with the selection of this option.

### **SEISMIC RESTRAINT OPTIONS**

#### *Seismic restraint Kit*

The seismic restraint kit includes the necessary hardware to secure the sterilizer to the facility floor in accordance with Zone 4 regulations.

#### *Seismic Calculations*

The seismic calculations are performed by a certified Zone 4 engineer and will be supplied when purchased with the restraint kit.

### **EXTERIOR CABINET OPTIONS**

#### *Side Walls*

Used to cover the right and/or left sides of the sterilizer when the unit is installed free standing with in a room verses recessed mounting. The left hand side panel is hinged and equipped with a key lock for each in access to the maintenance area of the sterilizer.

#### *Top Cover*

The top cover is a lid over the entire sterilizer to reduce the amount of dust and particles getting into the service area of the sterilizer. Material is 304 stainless steel.

#### *Recessed Unit Panels*

The recessed unit panels provide the finishing frame for recessed applications. This options is available for load side, unload side and double door applications. (please specify)



## **LOADING EQUIPMENT OPTIONS**

### *Rack with Shelves*

In lieu of loading carts, the chamber can be ordered with a rack system holding internal shelves. The rack system comes with 2 perforated stainless steel shelves and can accommodate more depending upon load heights. The extendible, removable shelves are made from 316L stainless steel and are designed to fit directly onto shelf on the rack. Custom shelf support heights can be specified at the time of order.

### *Loading Cart*

The loading cart is designed for use with a transfer carriage to allow the cart to be moved on tracks from the carriage into the chamber. (Pit-mounted sterilizers do not require a transfer carriage). The loading cart is fabricated of 316L stainless steel and has wheels for ease of insertion and removal from the chamber of the sterilizer. The loading cart has all-welded construction. The bottom shelf is stationary; other shelves are height adjustable. The cart comes equipped with one bottom shelf and one adjustable shelf. Includes removable tracks installed in the chamber to guide the loading cart

### *Additional Loading Cart Shelves*

The 316L stainless steel perforated shelves are designed for use in conjunction with the loading cart and are height adjustable.

### *Transfer Carriage*

The transfer carriage provides a stable platform for moving the loading cart within the work area and up to the sterilizer chamber at the height of the chamber. Two transfer carriages are recommended on pass-through models, one for each the load and unloading ends of the sterilizer. Transfer carriages are constructed of 304 stainless steel.

## **STEAM GENERATORS OPTIONS**

### *Integral Electric Clean Steam Generator*

A 316Ti stainless steel electric clean steam generator can be equipped when building steam is not available and clean steam is desired. The electric steam generator is designed and constructed for constant and continuous use using industrial grade components throughout. The boiler is built in accordance to ASME pressure vessel codes and complies with Part PEB of section 1. The pressure vessel bears the ASME "M" stamp. The clean steam generator operates on 480v/3p/60Hz and should be fed with soft water or deionized/RO water. Material of construction: 316L stainless steel. The steam generator comes equipped with a feed water booster pump and is fully integrated into the controls of the sterilizer.

### *Steam-Steam Clean Steam Generator*

A 316L steam to steam clean steam generator can be equipped when building steam and RO water or better is available for the production of clean steam. The electric steam generator is designed and constructed for constant and continuous use using industrial grade components throughout. The boiler is built in accordance to ASME pressure vessel codes and complies with Part PEB of section 1. The pressure vessel bears the ASME "M" stamp. The steam quality when condensed and tested will be equal to or better than the quality of the water fed to the steam generator.

## **PIPING SYSTEMS**

### *Air Compressor*

An air compressor can be built into the sterilizer when building air is not available. The air compressor is a high quality low noise design complete with reservoir.

### *Door Sealing by Air Back-up*

The door gasket sealing is provided by charged compressed air behind the gasket to compress against the door when closed to perform a complete air tight seal in place of the standard steam charge.

### *316L Stainless Steel Valves*

316L stainless steel valves are provided in place of the standard brass valves.

## **CONTROL SYSTEM OPTIONS**

### *Fo Control of the Sterilization Cycle*

Programmable Fo control of the exposure step is selectable via the control system.

### *Additional Chip Cards*

Additional Chip cards above the initial sent.



#### *Media Monitoring*

Allows monitoring of the incoming steam, air and water and alarms should the pressure drop or should the utility become unavailable.

#### *Fo Control of the Sterilization Cycle*

Programmable Fo control of the exposure step is selectable via the control system.

#### *Printer Archive Software*

The printer archive software is to be installed on a PC and via the RS232 port on the sterilizer control system, it allows archiving the same data that is sent to the printer, on the PC.

#### *Ergonomic Touch screen*

12" ergonomic touch screen to increase visualization. The 12" touch screen comes standard with 20 programmable cycles. If purchasing a double door unit, a 2<sup>nd</sup> touch screen can be purchased for the unload side.

### **SPECIAL CYCLE OPTIONS**

#### *Low Temperature Cycle*

Low temperature cycles allow the user to run the sterilizer at temperatures between 75° C up to 105° C at short or long periods of time.

#### *Effluent Sterilization Cycle*

The chamber steam condensate is held inside the chamber throughout the sterilization cycle. Steam enters the chamber from the bottom of the chamber to ensure that the condensate is kept at the sterilization temperature throughout the cycle. Vacuum is pulled from the top of the chamber through the 0.2 micron filter to ensure adequate filtration before the drain.

### **INSTALLATION AND START-UP SERVICES OPTIONS**

#### *Installation Supervision*

A Sterilco Service Engineer will supervise the installation of the sterilizer to ensure it is placed level and all utilities are correctly connected to the sterilizer.

#### *Installation Service*

Complete installation can be provided upon request. Please contact Sterilco with your complete installation needs in order to provide a quote. A sample installation package may include: Off-load the sterilizer from the delivery truck, move the unit into place, reassemble any components, final connections by others. Pricing assumes that a normal loading dock height is available for off loading the unit and moving into the building, the sterilizer will be installed on a ground floor. Free and clear access through hallways and doorways without the need for dismantling. Utilities will be brought up to the connection points indicated on the submittal drawings by the owner of the facility.

#### *Start-up Service*

After the equipment has been installed and connected to utilities, a Sterilco service engineer will perform start-up of the equipment at the purchaser's site. Start-up services include inspection of the equipment and installation, operating and adjustment of the sterilizer, testing the operation and training of the purchaser's operating and maintenance personnel.

### **VALIDATION OPTIONS**

#### *IQ/OQ Protocols*

Complete executable IQ/OQ protocols specifically written around the ordered unit are provided for use by the purchaser or if combined with optional item 10.2 the protocols will be executed by a Sterilco technician.

#### *On-Site IQ/OQ Validation*

Complete on-site Installation Qualification (IQ) and Operational Qualification (OQ) is performed at the purchaser's site. Deliverables will include completed IQ and OQ package with a summary report.





## **MAINTENANCE OPTIONS**

### *Spare Parts Kit*

A 2-year spare parts kit can be provided to reduce the amount of down time in case of failure and ensure the necessary parts are available for routine maintenance. The kit includes replacement items needed for extended use such as: chart paper, gaskets, valve repair kits, fuses, lamps, stainless steel cleaner, strainers, etc. See attached list for details.

### *Preventative Maintenance Contract*

The sterilizer is maintained under a preventative maintenance contract and service is carried out by a Sterilco service technician, which includes three or four visits per year. Wear parts are changed, strainers and traps are cleaned, the sterilizer is completely checked over, and the owner's operation and maintenance personnel are retrained if necessary.