

## Steelco VS L - Bulk range

### Laboratory Steam Sterilizers



#### Description

Steelco steam sterilizers VS L series are designed for laboratory applications including research laboratories, bio-containment and animal care facilities.

VS L sterilizers are engineered to offer best in class solutions for the reduction of energy and water consumption to give users lowest operating costs per load, **ECO water saving** packages reduce water consumption to nearly zero depending on chosen model and options.

All Steelco steam sterilizers VS L range are equipped with high quality AISI 316L stainless steel pressure vessels.

Pressure vessels are full jacket double-wall design and chamber cross section is rectangular with 5 standard chamber sizes.

Sterilizers are available in single or double door configuration with swing or vertical sliding.

Doors can be manual or automatically actuated.

Steelco VS L sterilizers are controlled by commonly available industrial grade PLC digital controllers with color touch screen HMI.

#### Standards

Steelco steam sterilizers VS L series meet the applicable requirements of the following standards:

- 2006/42/CE (Machinery Directive)
- 2014/30/EU (EMC Directive)
- 2014/68/UE (PED)

Additional technical norms and standards (according to country of destination and customer requirements):

- IEC 61010-2-040
- EN ISO 12100
- EN 61326
- EN 13445
- EN ISO 9712
- EN ISO 9606-1
- EN ISO 15614-1
- ASME code Sec.VIII div. 1 & div. 2
- UL compliant
- EN 285 (available upon request)

## Capacity and dimensions

### Bulk capacity range

All models are available in single or double door version.

Model	Door opening	Door	Capacity (Liters/ft <sup>3</sup> )	Chamber dimensions (mm/inch)			Overall dimensions (mm/inch)		
				Width	Height	Depth	Width	Height	Depth
VS 264151 L	Sliding Horizontal	Single	905 32	670 26	1050 41	1286 51	1860 73 2/9	1900 74 4/5	1592 62 2/3
		Double	922 32 5/9	670 26	1050 41	1310 52	1860 73 2/9	1900 74 4/5	1592 62 2/3
VS 264175 L	Sliding Horizontal	Single	1327 46 6/7	670 26	1050 41	1886 74	1860 73 2/9	1900 74 4/5	2192 86 2/7
		Double	1344 47 4/9	670 26	1050 41	1910 75	1860 73 2/9	1900 74 4/5	2192 86 2/7
VS 364872 L	Hinged	Single or Double	2040 72	914 36	1219 48	1829 72	1795 70 2/3	2012 79 1/5	2192 86 2/7
VS 415798 L	Sliding Horizontal	Single or Double	3800 134 2/5	1050 41	1450 57	2500 98	2910 114 4/7	1950 76 7/9	2964 116 2/3
VS 398787 L	Sliding Horizontal	Single or Double	4840 171	1000 39	2200 87	2200 87	2693 106	2712 106 7/9	2664 104 7/8
VS 3583106 L	Sliding Horizontal	Single or Double	5100 180 1/5	900 35	2100 83	2700 106	2543 100 1/8	2600 102 1/3	3164 124 4/7
VS 498686 L	Sliding Horizontal	Single or Double	5940 209 5/7	1245 49	2184 86	2184 86	3213 126 1/2	2768 109	2664 104 7/8
VS 4987103 L	Sliding Horizontal	Single or Double	7170 253 1/6	1250 49	2200 87	2607 103	3243 127 2/3	2700 106 2/7	3073 121
VS 4383130 L	Sliding Horizontal	Single or Double	7625 269 1/5	1100 43	2100 83	3300 130	2943 115 6/7	2600 102 1/3	3764 148 1/5
VS 5186126 L	Sliding Horizontal	Single or Double	9070 320 1/4	1300 51	2180 86	3200 126	3363 132 2/5	2930 115 1/3	3700 145 2/3

Note: Overall dimension depends on sterilizer model/configuration. Custom sizes also available.

## Main features

### Vessel material and construction

Pressure vessel is made of AISI 316L solid stainless-steel plate  $Ra < 2 \mu m$  ( $Ra < 80 \mu$  inch) in finish. Pressure vessels chamber cross section is rectangular and full jacket double-wall design made of stainless steel AISI 304L.



The external insulation of the vessel is realized with non-toxic fiber. The covering reduces heat emission and noise level. Covering can be easily removed for maintenance operations.



### Service access panels / Control panel and technical room

According to model type, piping, valves, electrical components and wiring are easily accessible from front door panel or side access.

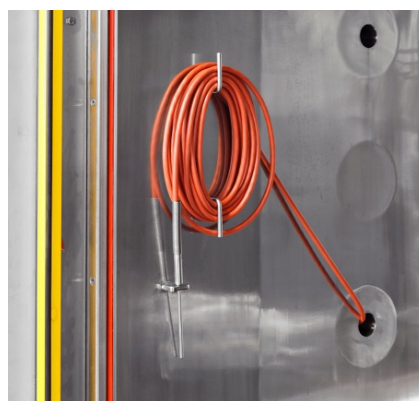
### Door system

- Doors internally made of stainless steel AISI 316L with no welding.
- Mechanical activated automatic horizontal sliding doors or hinged door models for low manual operation.
- The door gasket made of silicone can be steam or compressed air activated.



### RTD (Resistance Temperature Detectors) temperature probes

- Dual element installed in chamber drain to monitor temperature variations inside the chamber during the cycle
- Single probe installed in the jacket to monitor temperature into the jacket
- Single probe, dedicated to monitor temperatures of the load throughout the entire cycle



## Steam supply systems

Standard steam supply:

- Building steam

Optional steam supply:

- Integral electric steam boiler made of carbon steel or AISI 316L stainless steel
- Integral steam-to-steam AISI 316L boiler



## Safety features

### Electrical main switch

Installed on the electrical cabinet door.

### Emergency Stop Button

One (or two) Emergency Stop Button is (are) installed on the loading side (and unloading side if applicable).

### Safety door switch

On each door is installed a safety door switch to prevent a cycle starting if the door is not fully closed.

### Anti-crushing

On each door is installed an anti-crushing device.

### Door interlocks

On pass through (double door) version, doors are equipped with an interlock system device which avoids the simultaneous opening of both loading and unloading door or during the cycle or unloading door opening in case of chamber not sterile.

### Pressure Relief Valve

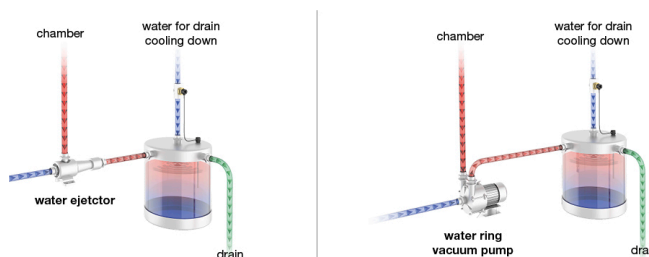
Limits the amount of pressure buildup so that the rated pressure in the vessel is not exceeded.

## ECO Configurations

Steelco sterilizers are engineered to offer best in class solutions for the reduction of water consumption to give users lowest operating costs per load. ECO options are available for either water ejector or water ring vacuum pump.

### ECO CD - cool down system

The system consists of a tank that collects both chamber and condensate drains. Temperature within the tank is controlled by a thermostatic valve and drain temperature is kept below 60°C (140°F) prior to discharge by adding cold water from building.

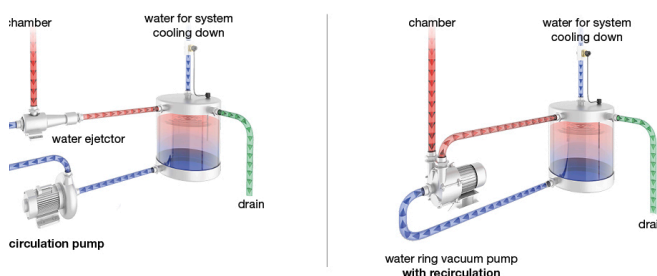


### ECO EVO - system

The system consists of a tank that collects both chamber and condensate drains.

Collected water is re-circulated to feed vacuum systems. Water temperature within the tank is controlled by a thermostatic valve by adding cold water from building.

Added water is triggered according to vacuum systems need, drain temperature is kept below 60°C (140°F) prior to discharge.





## ECO EVO PLUS - system

The system consists of a water tank that collects both chamber and condensate drains. Collected water is re-circulated to feed vacuum systems. Water temperature within the tank is controlled by a thermostatic valve and the system exchanges heat with a chilled water loop from building. Water is added mainly for system start up and water consumption is reduced to nearly zero. Drain temperature is kept below 60°C (140°F) prior to discharge.

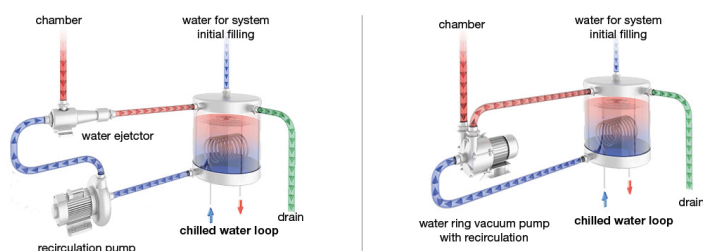


## HMI Features

Up to 50 cycles capability with 8 default working / testing cycles.

4 levels of access granted:

- **Operator:** this level allows to switch on/off the machine, run cycles, reset non-critical alarms, open the doors and manually print reports.
- **Supervisor:** In addition to Operator level, this level grants an access to the basic functions (recording and setting) of the equipment: date, time, operators list, cycles customization, reprint, etc.
- **Maintenance Technician:** this level allows the same functionalities as "Supervisor level" but also grants the possibility to modify the parameters of the customizable cycles and a more complete access to the machine parameters
- **Administrator:** this level grants a full control of the equipment and the possibility to edit the factory cycles



ADVISORY NOTE: ECO options as well as other options may not be available for all models and subject to overall dimensions changes of the equipment. Water saving vary in relation to the autoclave chamber size and utilities.

## Control system

### Programmable logic controller - PLC



The control system consists of an industrial PLC with a color touch-screen panel with Input/ Output modules and a thermal printer.

The PLC includes an Ethernet port to connect the sterilizer to a traceability system.

A color touch screen HMI installed on the loading side of the sterilizer. An additional HMI panel is installed on the unloading side for pass-through configuration.

## Default Test Cycles:

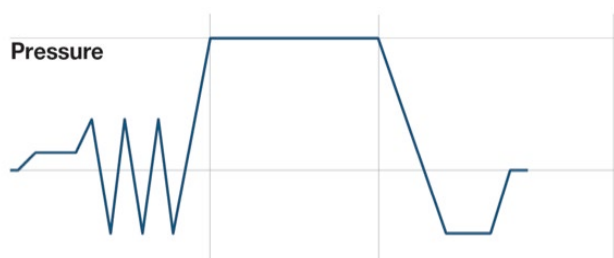
### Vacuum Leak Test



This cycle is used to verify the vacuum integrity of the sterilizer. While running this cycle, the sterilizer chamber must be empty.

- Max accepted leak rate: 0.13 kPa / min

### Bowie-Dick Test (D.A.R.T.)



This cycle is used to verify the effectiveness of the steam penetration and air removal for the sterilizers provided with a vacuum pump.

- Sterilization temperature: 134°C/273.2°F
- Sterilization time: 3.5 Minutes
- Drying time: 5 Minutes

## Default Working programs

Working programmes are factory programmed; they are available for the operator selection in the control panel.

Cycles configuration:

The steam sterilizers are factory programmed with the cycles at 134°C (273.2°F) and 121°C (249.8°F).

- Heating or Warm-up
- Pre-post vacuum 121°C (249.8°F)
- Pre-post vacuum 134°C (273.2°F)
- Liquid 121°C (249.8°F)

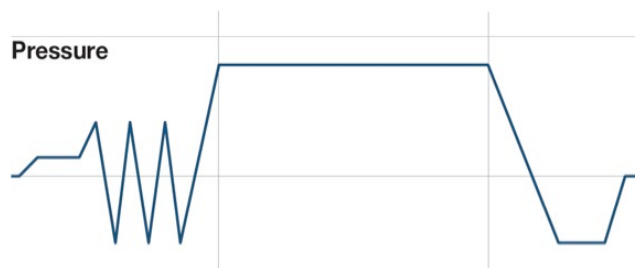
## Programs included

### Gravity cycle



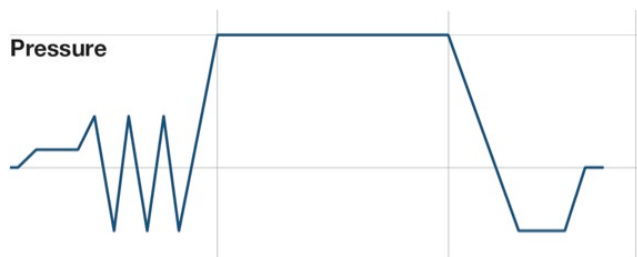
For the sterilization of heat- and moisturestable goods and decontamination of bagged non-biohazardous laboratory wastes. Gravity cycle utilizes the gravity air-displacement principle.

### Pre-vacuum - post vacuum cycle 121°C/249.8°F



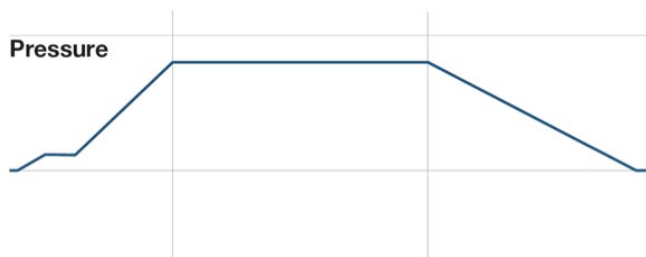
For efficient, high-volume sterilization of heat-sensitive materials (plastic, rubber products and macrolon cages). Pre-vacuum cycle utilizes a mechanical air evacuation system.

## Pre-vacuum - post vacuum cycle 134°C/273.2°F



For efficient, high-volume sterilization of porous, heat- and moisture-stable materials (utensils, glassware, textiles). Pre-vacuum cycle utilizes a mechanical air evacuation system.

## Liquid cycle 121°C/249.8°F



For the sterilization of liquids and media in vented borosilicate glass or metal containers. Liquid cycle utilizes the optimal solution cooling feature, during exhaust (cooling) phase, to control the exhaust rate.

## Standard machine configuration

- Chamber made of AISI 316L stainless steel fine satin finishing  $Ra < 2 \mu m$  ( $Ra < 0,08 \mu$  inch)
- Frame and external panels made of AISI 304 stainless steel
- Single door
- Steam from building
- Piping and valves in copper-brass
- Vacuum Pump
- ECO CD - cool down system
- Pneumatic valves
- Load Control Probe
- Hinged front cabinet panel
- HMI - touch screen display operating panel with PLC
- On board thermal printer on loading side
- Degreasing and passivation
- Gravity Cycle
- Liquid Cycle
- Pre-Post Vacuum cycles
- Leak Test
- DART (Daily Air Removal Test) cycle

## Structural machine options

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### Second door

Second door with interlock function for pass-through installation.

### Cross Contamination Bioseal

Provides a means of isolating load from the unload ends of the autoclave. An isolation flange is welded to the full circumference of the machine. Penetrations through the flange for electrical and piping components are secured with vapor proof fittings.

### Floating switch for vessel

In the case of excessive condensate is detected in the vessel chamber, the floating switch activates an alarm, and safely drain the condensate and prevent door opening until reached the condition required.

### Chamber made of 316Ti stainless steel

Upon request, chamber can be made of 316Ti stainless steel.

### Side and top panels

Application of side and top panels for free standing installation.

### Seismic Tie-Down Kit

Required in areas prone to seismic hazards to secure sterilizer to building floor.

### Seismic Calculations

Copy of the signed drawing of the seismic Tie-Down Kit

## Hydraulic options

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### Air Compressor

Integrated air compressor to produce compressed air

### 316 Stainless Steel process-steam Wetted Piping

Upon request process-Steam Wetted Piping can be made of 316 stainless steel, in lieu of the standard copper brass piping.

### 316L Stainless steel valves and components

Upon request valves and components can be made of 316 stainless steel, in lieu of the standard brass.

### Steam Filter for direct steam feeding

Filter for building steam

### Water recirculation for jacket cooling

#### ECO EVO – system

The system consists of a tank that collects both chamber and condensate drains.

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#### ECO EVO PLUS - system

The system consists of a water tank that collects both chamber and condensate drains. Collected water is re-circulated to feed vacuum systems. Water temperature within the tank is controlled by a thermostatic valve and the system exchanges heat with a chilled water loop from building. Water is added mainly for system start up and water consumption is reduced to nearly zero. Drain temperature is kept below 60°C (140°F) prior to discharge.



## Process quality options

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### Jacket cooling cycle

This cycle, specific for porous loads, provides a rapid cooling by introducing cool softened water into the jacket

### Air over pressure with jacket cooling cycle

This cycle is specific for treating liquids in either sealed or vented rigid containers. It is designed for cooling liquids in vented containers where boiling and liquid loss need to be prevented or to prevent liquids in sealed rigid containers from rupturing. Cool softened water is introduced into the jacket and process compressed air (PCA) into the chamber – it prevents boiling of vented liquids and provides counter pressure for sealed liquids in rigid containers

### Effluent decontamination cycle

This feature is used for processing contaminated items like biohazardous laboratory waste (BL-3 and BL-4). To prevent harmful pathogens and viruses from exiting the sterilization chamber during the exhaust and vacuum phases, the condensate produced during the processing cycle is decontaminated before discharge to the drain.

The drain is controlled by an hydrophobic 0.2 µm (8 µ inch) filter and both filter and condensate are sterilized during the cycle.

### F<sub>0</sub> function.

When selected, the sterilization hold phase is terminated when the accumulated F<sub>0</sub> value (of the reference temperature sensor) reaches a set-point value.

F<sub>0</sub> control provides a means of limiting the heat exposure of thermally labile load, preserving their integrity while also saving time and reducing energy consumption.

### Low temperature cycle

A low temperature control is recommended when sterilizing heat-sensitive loads, for media preparation, formula and similar uses. Pasteurization is accomplished with flowing steam. In addition to standard sterilizer temperature ranges, this option allows cycles to operate in the range of 76°C (168°F) 106°C to (220°F).

### H<sub>2</sub>O<sub>2</sub> port

Port to connect external hydrogen peroxide generator

## Control options

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### HMI full capability on unload side

A second HMI panel providing full functionality of the system can be installed on the unloading side for pass-through installation.

### Connection for remote monitoring (tele-service)

### Uninterruptible Power Supply

Thanks to this option the PLC can be powered during Electrical feeding interruption.

### Auto-start

### SteelcoData View

Cycle traceability software provided with 1 USB dongle for the connection of up to 15 Steelco devices to one pc.

### Volt free contact

These contacts (also called "dry contacts") are physically operated with the main device, but not electrically connected to it. Used in case of alarms or for the working cycle.

## Other options

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### Knocked down delivery

It requires onsite re-assembling

## Accessories

### Fixed height loading carriage and loading car with 3 shelves

The loading car with 3 shelves are made of 316 stainless steel. The shelf supports are adjustable for load height adjustment. Shelves can hold 100 Kg (220 lbs) evenly distributed on the shelf.

The fixed height loading carriage, made of 304 stainless steel, is provided with a safety lock that avoids the car to accidentally fall off; the same system is used to lock the loading carriage to the sterilizer.



### Load cart for floor loading

Upon request is possible to order a load cart for floor loading installation made of 316 stainless steel.

