STERIS
Life Sciences

AMSCO® 450LS MEDIUM STEAM STERILIZER 26 x 26" (660 x 660 mm)

APPLICATION

The AMSCO 450LS Medium Steam Sterilizer 26 x 26" (660 x 660 mm) is designed for fast, efficient sterilization of heat- and moisture-stable materials in scientific applications. The sterilizer is equipped with prevacuum, gravity and liquid cycles, as well as: leak test, warm-up and two Bowie-Dick cycles.

DESCRIPTION

The AMSCO 450LS Medium Steam Sterilizer is equipped with the latest features in both state-of-the-art technology and ease of use. Primary product features include:

Interior Chamber Dimensions:
26 x 26 x 39" (660 x 660 x 991 mm)

Chamber Capacity:113.6 gallon (430 liter)

Vertical-sliding door with quiet, motor-driven linear actuator and counterweight mechanism. The door travels down vertically to open and is controlled from the touch screen.

Microprocessor-based control system with enhanced functionality. Control system features:

- Touch-Sensitive Screen features a 5.4" (137.2 mm) 640 x 480 pixel color graphics display. The control's touch screen color display features a wide viewing angle and high-visibility backlighting.
- All sterilizer functions are operated by pressing touch-sensitive areas on the display.
- All displayed messages are complete phrases with no codes to be cross-referenced. Display also indicates any abnormal conditions that may exist either in or out of cycle.
- Help screens for programming and troubleshooting alarm conditions

(Typical - details may vary.)

- USB-1, Type A – 300 cycles; supports Portable Document Format (PDF) and Universal Text Format (UTF)
- 100 BaseT Ethernet connection for future monitoring option

Selections Checked Below Apply To This Equipment

STEAM SOURCE
- ❑ Facility Steam[1]
- ❑ Integral Electric Steam Generator
  - ❑ Carbon Steel (for copper/brass piping only)
  - ❑ Stainless Steel (for stainless-steel piping only)

PIPING
- ❑ Copper/Brass (for 39" units only)
- ❑ Stainless Steel

ELECTRIC SERVICE

• for Facility Steam[1] Water Ejector:
- ❑ 120-240 Vac, 1 phase, 50/60 Hz

• for Vacuum Pump & Electric Steam Generator:
- ❑ 208-220 Vac, 3 phase, 50/60 Hz
- ❑ 230-240 Vac, 3 phase, 50/60 Hz
- ❑ 380/400/415 Vac, 3 phase, 50/60 Hz
- ❑ 440/460/480 Vac, 3 phase, 60 Hz

DOOR CONFIGURATION
- ❑ Single Door (SD)
- ❑ Double Door (DD)

ACCESSORIES
- ❑ Barrier Wall Flange Kit[2]
- ❑ Seismic Kit[3]
- ❑ Backflow Preventer
- ❑ Drip Pan Elbow for Chamber PRV
- ❑ Drip Pan Elbow for Steam Generator PRV
- ❑ Load Probe

Cabinet
- ❑ Single Door, Free Standing[4]
- ❑ Double Door, Recessed One Wall

Loading Accessories
- ❑ Rack & 2 Shelves Assembly (26 x 26 x 39")[5]
- ❑ Loading Car (26 x 26 x 39")[5]
- ❑ Chamber Tracks for Loading Car (SD units)[6]
- ❑ Chamber Tracks for Loading Car (DD units)[6]
- ❑ Transfer Carriage (26 x 26 x 39")[7]
- ❑ Adjustable Height Transfer Carriage (26 x 26 x 39")[7]
- ❑ Extra Shelf Layer for Loading Car (26 x 26 x 39")
- ❑ Extra Shelf for Rack and 2 Shelves Assembly (26 x 26 x 39")

OPTIONS
- ❑ Air Differential Seal Assembly[8,9]
- ❑ Vacuum Pump

Water Conservation[10]
- ❑ STERI-GREEN® Water Conservation System
- ❑ STERI-GREEN PLUS® Water Conservation System

Language and Packaging
- ❑ English, French, Spanish: Domestic Packaging
- ❑ English, French, Spanish: International Packaging
- ❑ Portuguese, Italian, German: International Packaging

Notes:

1. *Refers to External Supplied Steam (Facility Steam/Stand Alone Steam Generator)*
2. *Applies to recessed units only.*
3. *Based on CA Requirements*
4. *Includes panels for sides and top of sterilizer. Wall-end of sterilizer is open.*
5. *Rack & Shelves or Loading Car must be selected.*
6. *One chamber track system is required for use with loading car.*
7. *One transfer carriage is required for use with loading car.*
8. *Applies to double-door units only.*
9. *Best if installed during initial installation of sterilizer.*
10. *Requires vacuum pump. Not compatible with water ejector vacuum system.*

Item _____

Location(s)_____

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- RS-232 (DB9) standard communication serial port; interfaces with most PC-compatible peripheral devices (e.g., disk drives, printers).
- Automatic check of control program and cycle data maintains process integrity.
- Ink-on-paper impact printer

STANDARDS

Each sterilizer meets applicable requirements of the following listings and standards, and carries the appropriate symbols:

- **EMC Directive:** 2004/108/EC
- **Low Voltage Directive:** 2006/95/EC
- **Machinery Directive (MD):** 2006/42/EC
- **Pressure Equipment Directive (PED):** 97/23/EC.
- **Canadian Standards Association (CSA) Standard C22.2, No. 61010-1, second edition, including amendment 1**
- **Underwriters Laboratory (UL) Standard 61010-1** as certified by ETL Testing Laboratories, Inc.
- **ASME Code, Section VIII, Division 1** for unfired pressure vessels. The pressure vessel is so stamped; ASME Form U-1 is furnished. The shell and door are constructed to withstand a working pressure of 45 psig (3.1 bar).

FEATURES

26 x 26 x 39" (660 x 660 x 991 mm) chamber cross-section is sized to allow for efficient, high-volume processing.

Water ejector supplied on all units to effectively pull chamber to specified vacuum levels. An **optional vacuum pump** is also available.

Vertical-sliding power door is controlled from the touch screen display. Door slides down vertically to open, driven by an electric-motor linear actuator, assisted by counterweights.

Resistance Temperature Detectors (RTD) are installed for sterilizer temperature control. The chamber drain line RTD senses and controls temperature variations within the sterilizer chamber. A jacket RTD provides temperature control within the jacket space. These RTDs provide accurate control inputs and readouts throughout the entire cycle.

Electronic water saving control includes an RTD to control the amount of water used in condensing the exhausted chamber steam. Water saving configurations with greater efficiency are also available (see Options).

Software calibration is performed in the service mode, accessible through the touch screen displays, and accomplished using external temperature and pressure sources. The control system provides printed record of all calibration data for verification to current readings.

Automatic utilities startup/shutdown provides a means of saving energy by setting sterilizer for an automatic shutdown at a specified time. When activated, the control system automatically shuts off all utility valves, conserving steam and water usage. Sterilizer utilities can be restarted either by programmed time or manual operation. A different shutdown and restart time can be programmed for each day.

Insulation, one-inch thick, asbestos-free spin-glass (rated at 500 °F [260 °C] continuous) encompasses the exterior of the sterilizer vessel and is sealed in an oil and water resistant outer jacket.

Lighted DIN connectors (Carbon/Brass Units Only) are installed on all steam, water, and exhaust valves for reliability and ease of maintenance.

Air Manifold (Stainless-Steel Units Only) is included to enable manual operation of pneumatic valves. Valves can be operated individually.

Visible pressure gauges (incoming steam pressure, chamber pressure and jacket pressure gauges) are mounted in the facia panel and visible to the operator.

Additional electrical dry (potential free) contacts are available for the following outputs:

- Common alarms
- “Unit On” signal
- “Door Open” signal (one per door)

PROCESSING CYCLES

This scientific sterilizer is factory programmed with the following cycles:

- **Prevacuum Cycle:** for efficient, high-volume sterilization of porous, heat- and moisture-stable materials at 250°F to 270°F (121°C to 132°C). The prevacuum cycle uses a mechanical air-evacuation system.
- **Gravity Cycle:** for the sterilization of heat- and moisture-stable goods at 250°F to 270°F (121°C to 132°C) and decontamination of bagged basic laboratory wastes. The gravity cycle uses the gravity air-displacement principle.
- **Liquid Cycle:** for the sterilization of liquids and media in vented borosilicate glass or metal containers at 212°F to 250°F (100°C to 121°C). Liquid cycle uses the optimal solution cooling feature during the exhaust (cooling) phase to control the exhaust rate.

TEST CYCLES

- **Vacuum Leak Test** is used for testing the vacuum integrity of the sterilizer piping. Sterilizer chamber must be empty while running this test cycle. All temperatures and timing are preprogrammed and cannot be adjusted.
- **Bowie-Dick (132°C)** Recommended load is either a Dart® Testing Apparatus to Determine the Effectiveness of Removing Air from Chamber or a properly prepared Bowie-Dick test pack. Sterilize exposure temperature is 270°F (132°C); exposure time is 3.5 minutes and dry time is 1 minute.
- **Bowie-Dick (121°C)** is used to conduct a Bowie-Dick test on the sterilizer using a sterilize exposure temperature of 250°F (121°C), a sterilize exposure time of 8 minutes and a dry time of 5 minutes. Note that Dart® Testing Apparatus is not to be used for the 121°C test.

CONTROL SYSTEM

Design Features

The AMSCO 450LS standard control system consists of microcomputer control boards and peripheral function circuit boards, located within the control PC board housing. An Internal flash memory stores all cycle memory.

The control system monitors and controls all sterilizer operations and functions, and stores up to 32 cycles. These are a mix of factory-programmed sterilization cycles, Leak Test, Bowie-Dick Test, Warm-Up Cycles, and customizable cycles (programmed by the Customer).

Each cycle is adjustable to meet specific processing requirements. All operator accessible control functions can be changed using touch screen control.

Cycle values and operating features may be adjusted and visually verified prior to cycle operation. Cycle parameters are retained in control memory for repeated use. Changes to cycle values must be validated by the user.

Once a cycle is started, cycles and cycle values cannot be changed until the cycle is complete.

Note that Customers can program the sterilizer control such that under-temperature and over-temperature conditions will Abort, Resume or Restart a cycle.

Operator interface control panel, consisting of a touch screen and impact printer, is located on the operating end of the sterilizer.

- **Touch-sensitive screen** is a 5.4" (137.2 mm) (640 x 480 pixel) color graphics display. The control touch screen, from which all sterilizer functions are controlled, features a wide viewing angle and high-visibility backlighting.

  The display indicates any abnormal conditions that may exist, either in or out of cycle. Displayed messages are complete phrases with no codes to be cross-referenced.
- **Ink-on-paper impact printer** is located below the touch screen and provides an easy-to-read printed record of all pertinent cycle data on 2.25" (57 mm) wide paper. Data is automatically printed at the beginning and end of each cycle and at transition points during the cycle.

  Printer take-up spool stores an entire roll of paper, providing cycle records which can be saved for future reference. Three paper tape rolls and two printer ribbons are furnished with each unit.

Non-operating end (NOE) control panel, equipped on double-door sterilizers only, includes a touch-sensitive screen similar to the operating end screen. Preprogrammed cycles can be started from the NOE control panel. The display concurrently shows the same information as the operating end screen display.

Cycle configuration is performed by accessing the change values menu through the operating end touch screen. The change values menu can be used to adjust cycle values and the following operating parameters:

- **Time display and printout units** in AM/PM or 24-hour.
- **Access code** requires entry of a four-digit access code to operate the sterilizer and/or change the cycle values. Operator is prompted to enter an access code when initiating a cycle or accessing the change values menu. If the access code is not properly entered, the display returns to the standby or main menu screen, denying user access to the sterilizer or programming.
- **Audible signals** are adjustable. **Touch pad** and **end-of-cycle signals** can be adjusted to one of four sound levels (off, low, medium, or high) as required for the operating environment. **Alarm signal** can be adjusted to low, medium, or high (it cannot be turned off).
- **Print format** allows selection of either a full or condensed printout of the cycle information during processing.
- **Temperature display and printout** can be set to Fahrenheit (°F) or Celsius (°C). Temperature is set, displayed, controlled, and printed to the nearest 1°. Recalibration is not required when changing temperature units.
- **Pressure/vacuum display and printout units** appear by default in psia; but units can be set to bar or psig/InHg. Recalibration is not required when changing pressure units.

SAFETY FEATURES

Door seal pressure switch, located on the chamber door, senses when the door seal is energized and tight against the door. Sterilizer control prevents steam from entering the chamber when there is no signal from the switch. If control loses the signal during the cycle, an alarm activates, the cycle aborts and the chamber safely vents with a controlled exhaust.

Limit Switches – Each door is monitored by two limit switches. If a door is not in both the *closed* and *home* positions, the control prevents steam from attempting to seal the doors.

Chamber float switch activates the alarm, aborts the cycle, and safely vents the chamber with a controlled exhaust if excessive condensate is detected in the vessel chamber.

Pressure relief valve limits the amount of pressure buildup so the rated pressure in the vessel is not exceeded.

CONSTRUCTION

Shell Assembly

Two fabricated Type 316L stainless-steel shells, welded one within the other, form the sterilizer vessel. Type 316L stainless-steel end frame(s) is welded to the door end. On a single door unit, the back of the chamber is fitted with a welded 316L stainless-steel, reinforced backplate.

Sterilizer vessel is ASME and PED rated at 45 psig (3.1 bar) and insulated. The vessel includes 2 x 1" NPT penetrations that permit insertion of temperature probes, such as RTDs or thermocouples, into the chamber.

The steam-supply opening inside the chamber is shielded by a stainless-steel baffle.

Chamber Door(s)

The door is constructed of stainless steel. A layer of insulation is placed between the door and its outer stainless-steel cover to minimize chamber heat transfer through the door to surfaces touched by an operator.

The chamber doors include the following operational-related features:

- **Door open / door closed switches** – micro limit switches indicate when a door is open or closed by detecting the door position.
- **Door obstruction switch** – a micro limit switch detects when an obstruction impedes the closing of a door. When the obstruction switch trips, the door drive stops and the unit alarms. Upon acknowledgment of the alarm the door opens.
- **Steam-activated door seal** – is constructed of a special long-life rubber compound. Steam pressure, during cycle operation, activates the seal. Upon completion of the cycle the seal retracts, under vacuum, into a machined groove in the sterilizer end-frame.
- **Door seal pressure switch** – prevents steam from entering the chamber if the door is not sealed.
- **Mechanical locking mechanism** – ensures door cannot be opened during a cycle. The mechanism locks the door when the seal is intact and energized. Interlocks on double door sterilizers can be programmed to prevent inadvertent opening of door(s). Access code is required to override door interlocks.

Chamber Drain System

Drain system is designed to prevent pollutants from entering the sterilizer. The method for condensing steam differs, depending on whether the unit makes use of a water ejector or optional vacuum pump system.

Units with water ejectors (no vacuum pump option) have steam condensing directly in the mixing tank.

Units with the vacuum pump option (which replaces the water ejector) include an automatic condensing system. This consists of a stainless-steel plate-type condenser which converts chamber steam to condensate and then disposes the condensate to waste.

An RTD minimizes water usage by sensing waste-line temperature to regulate the flow of cooling water.

Vacuum System

Vacuum system reduces chamber pressure during prevacuum and post-drying phases. Air is drawn from the chamber through a water-ejector. Following dry phase, chamber vacuum relieves to atmospheric pressure by admitting air through a 0.2 micron bacteria-retentive filter. (See vacuum pump option, page 5.)

Steam Source

AMSCO 450LS series sterilizers are designed to receive facility-supplied steam or receive steam from an optional integral steam generator. Steam piping includes a shutoff valve, steam strainer and steam trap. Copper/brass piped units also include a pressure regulator.

Steam supply pressure differs between copper/brass and stainless-steel units as follows:

- **Copper/brass** – steam delivered at 50 to 80 psig (3.45 to 5.52 bar) dynamic.
- **Stainless steel** – pressure-regulated steam delivered at 40 to 42 psig (2.76 to 2.90 bar).

Optional Integral Electric Steam Generator

When this option is selected, a 30 kW carbon steel or 45 kW stainless-steel electric steam generator is mounted within the sterilizer footprint, above the chamber.

NOTE: The integral electric steam generator requires additional utilities. Refer to additional equipment drawings as needed.

Piping

Piping is made of copper/brass or stainless steel. All piping connections terminate within the confines of the sterilizer and are accessible from the front of the unit.

- **Solenoid Valves** – Copper/Brass units have solenoid valves with DIN connectors.
- **Pneumatic Valves** – Stainless-Steel units have pneumatic valves and include a modular air manifold which enables manual operation of each pneumatic valve.
- **Manual Shutoff Valves** – both copper/brass and stainless-steel sterilizers include manual shutoff valves pressure rated 125 psig (8.62 bar) for saturated steam. Valve handles are low-heat conducting. Valves are provided for steam, water, and drain lines.

MOUNTING ARRANGEMENT

The sterilizer is designed for either freestanding or recessed installation, as specified. Each sterilizer is height-adjustable. Sterilizer subframe is equipped with a synthetic rubber gasket to ensure a tight fit between the cabinet panels on freestanding units, or between the front cabinet panel and wall partition on recessed units.

NOTE: Cabinets for Single and Double Door units are available as accessories, as described in the following section.

ACCESSORIES

Barrier Wall Flange Kit includes three stainless-steel flanges to seal the opening between the recessed sterilizer and wall.

Single Door Free Standing Cabinet includes stainless-steel panels to cover the two sides and the top of the unit.

Double Door Recessed One Wall Cabinet includes stainless-steel panels to cover the two sides and the top of the double door unit, which is recessed into one wall.

Seismic Tie-Down Kit conforms to the California Code of Regulations.

Backflow Preventer can be provided for installation on sterilizer piping to prevent unwanted reverse flow of water [or other substances] into the potable water supply.

Drip Pan Elbow for Chamber PRV is used to collect condensate from the externally-vented chamber safety relief valve and direct it to the drain.

Drip Pan Elbow for Steam Generator PRV is used collect condensate from the externally-vented optional steam generator safety relief valve and direct it to the drain.

Load Probe can be provided for installation on the sterilizer to automatically sense load temperature during cycle operation. A single thermal load probe is sealed through sterilizer vessel and manually placed in product container within chamber prior to cycle operation. In conjunction with the load probe option, individual cycles can be set to start the exposure phase according to chamber drain temperature or according to load temperature. F_0 set points are also available for each cycle, allowing for exposure phase termination based on the calculated F_0 value.

Loading Accessories

- **Loading Car**. The loading car comes with two layers of shelf modules, one fixed (bottom) and one adjustable (top). The upper shelf modules can be removed, allowing tall items to be placed on remaining lower shelf modules.

  The shelf modules are made of durable austenitic stainless steel.
- **Transfer Carriage.** The transfer carriage is used to insert the loading car into, and also remove it from, the sterilizer chamber.
- **Adjustable Height Transfer Carriage.** The adjustable height transfer carriage is used to insert the loading car into, and also remove it from, the sterilizer chamber. Transfer carriage height is adjustable to facilitate loading and unloading. The cart is equipped with a rechargeable battery.
- **Set of Stainless Steel tracks** one set is provided and must be installed/secured to the bottom of the chamber to accommodate the loading and unloading of the car.
- **Rack and Two Shelves** provides loading efficiency for a variety of mixed or single item loads. The inclusion of two shelves is standard.

  In regard to the rack and shelves:
  - » constructed from heat resistant austenitic stainless steel
  - » angle guides support the shelves
  - » for safety, mechanical stops allow each shelf to be withdrawn approximately halfway
- **Extra Shelf Layer for Loading Car**
- **Extra Shelf for Chamber Rack and 2 Shelves Assembly**

OPTIONS

Language and Packaging Options:

- English, French, Spanish: Domestic Packaging – the sterilizer basic configuration. The control can be switched between the three resident languages using the Supervisor menu. Sterilizer is shipped on casters and is protected by a wood space frame.
- English, French, Spanish: International Packaging – Same control configuration as seen in basic domestic. The control can be switched between the three associated languages using the Supervisor menu. The sterilizer is shipped in a protective wooden crate.
- Portuguese, Italian, German: International Packaging – Same control configuration as seen in basic domestic. The control can be switched between the three associated languages using the Supervisor menu. The sterilizer is shipped in a protective wooden crate.

Vacuum Pump, when the option is installed, replaces the Water Ejector (See vacuum system, page 4). The pump increases efficiency when drawing a vacuum on the chamber and reduces water consumption during operation.

Air Differential Seal Assembly (Double Door Units Only) is provided for the sterile end of the sterilizer. The seal minimizes the flow of air from the nonsterile area to the sterile area.

NOTE: If the Air Differential Seal Assembly option is chosen, it is best to install it during the installation of the sterilizer. The system is much more difficult to install after the sterilizer is installed.

STERI-GREEN® Water Conservation System – The system is designed to re-circulate and cool the sterilizer process water to reduce the unit's water consumption. During processing, this system collects steam effluent and vacuum pump seal water in a reservoir in which a small pump circulates the water through an air cooled heat exchanger. The reservoir water temperature is continuously monitored and supply water is only added when temperature rises above a specified level or when water level become depleted.

This system requires no additional plumbing or electrical connections.

STERI-GREEN PLUS® Water Conservation System – Closed loop cooling source is used to cool the vacuum pump seal water and steam effluent from the jacket and chamber. The cooling is done in two stages which greatly reduces the amount of water sent to the drain with higher efficiency. Plate heat exchanger is included. See equipment drawings for closed loop utility requirements.

PREVENTIVE MAINTENANCE

A global network of skilled service specialists can provide periodic inspections and adjustments to help assure low-cost peak performance. STERIS representatives can provide information regarding annual maintenance agreements.

NOTES

1. Backflow prevention is not standard on the unit, but a backflow preventer accessory can be ordered.
2. Where required by local codes, installation of a backflow preventer in the water line is not provided by STERIS.
3. Pipe sizes shown indicate terminal outlets only. Building service lines, not provided by STERIS, must supply the specified pressures and flow rates.
4. Disconnect switches (with OFF position lockout only, by third parties) should be installed in electric supply lines near the equipment.
5. Access to the recess area from the control end of the sterilizer is recommended.
6. Clearances shown are minimal for installing and servicing the equipment.
7. Depending on the loading equipment used, additional clearance is required:
   - If shelves are used, length of sterilizer plus 24" (610 mm) at each door.
   - If loading car and carriage will be used, twice the length of the sterilizer at each door.
8. Floor drain should be provided within the confines of the sterilizer framework.

UTILITY REQUIREMENTS

Refer to the tables on page 6 of this document in regard to utility requirements; for detailed information refer to associated equipment drawings.

The sterilizer feed water utility, also discussed on page 6, is used for vacuum pump, heat exchanger, and trap cooling. Use of feed water within the nominal conditions optimizes equipment performance and reduces maintenance.

WATER QUALITY

Water Supply to Sterilizer – Water is used for ejectors, heat exchangers and trap cooling. Refer to page 5 for recommended water quality. Use of feed water within nominal conditions optimizes equipment performance and reduces maintenance.

Carbon-Steel Steam Generator Feed Water – Refer to General Notes (document P062941091) for required water quality. Use of feed water within nominal conditions optimizes equipment performance and reduces maintenance.

Stainless-Steel Steam Generator Feed Water – Stainless-steel steam generators require deionized, distilled or reverse osmosis water with minimum resistivity of 1 MΩ·cm.

NOTES:

1. Do not connect tap water to stainless steel generator. Use of water not meeting the required feed water quality will invalidate the warranty, and is a violation of ASME boiler codes.
2. Failure to provide correct utility pressure and steam quality will result in reduced equipment performance which may affect overall equipment performance.

ENGINEERING DATA

Drain	2" ODT drain terminal (floor drain capacity must handle peak water consumption)							
Compressed Air *(Stainless-steel units)*	**Connection Size:** 1/4 NPT **Pressure:** 80 to120 psig dynamic (5.5 to 8.3 bar) **Air Condition:** Oil Free Dry (Dehumidified) **Air Flow Rating:** 3 CFM (5.1 CMH)				*Sterilizer compressed air supply applies to stainless-steel units only.*			
Steam	**Copper/brass**: 50 to 80 psig (3.45 to 5.52 bar) dynamic, condensate free, 97% to 100% vapor quality **Stainless steel**: 40 to 42 psig (2.76 to 2.90), pressure-regulated, condensate free, 97% to 100% vapor quality **Piping Size:** 3/4" NPT							
Water Pressure	**Vacuum Pump System:** 20 to 50 psig (1.38 to 3.45 bar), dynamic **Piping Size:** 3/4" NPT							
	Water Ejector System: 30 to 50 psig (2.07 to 3.45 bar), dynamic **Piping Size:** 3/4" NPT							
Weight lbs (kg)	**Single Door**				**Double Door**			
	Maximum Operating*	**Domestic Shipping†**	**Internationgal Shipping†**		**Maximum Operating***	**Domestic Shipping†**	**Internationgal Shipping†**	
	2850 (1293)	1750 (794)	2000 (907)		3300 (1497)	2200 (998)	2450 (1112)	
	*Maximum Operating Weight – Includes Steam generator, cabinet, and loaded chamber. † Shipping Weight – Includes sterilizer with steam generator.							
Noise Level	A-Weighted Sound Power Level (per EN ISO 3746:1995) = 79.76 dB(A) Maximum Impulse Noise Index (per EN ISO 3746:1995) = 15.97 dB							

Heat Loss (BTU/Hr)	**Single Door**			**Double Door**				
	Cabinet Enclosed	**Recessed**		**Recessed 1 Wall**		**Recessed 2 Walls**		
	To Room	**Front of Wall**	**Back of Wall**	**Front of Wall**	**Back of Wall**	**Operating End (OE)**	**Between Walls**	**Non-Operating End (NOE)**
Facility Steam	6780	480	6300	480	6300	480	5650	650
Steam Generator	9300	480	8820	480	8820	480	8060	760

Electrical Requirements

Sterilizer Setup	Voltage (Vac)	Phase	Frequency (Hz)	Sterilizer Nominal Current (Amp)	
				Copper Brass	Stainless Steel
Water Ejector with Facility Steam (EL 1)	120/230	1	50/60	9	N/A
Vacuum Pump with Facility Steam (EL 2)	208/220	3	50/60	14.7	14.7
	230/240	3	50/60	14.4	14.4
	380/400/415 440/460/480	3	50/60	11.8	11.8
Water Ejector with Steam Generator (EL 3)				*30 kW SG*	*45 kW SG*
	208/220	3	50/60	95	N/A
	230/240	3	50/60	87	N/A
	380/400/415	3	50/60	60	N/A
	440/460/480	3	50/60	54	N/A
Vacuum Pump with Steam Generator (EL 4)	208/220	3	50/60	101	150
	230/240	3	50/60	93	140
	380/400/415	3	50/60	63	90
	440/460/480	3	60	56	80

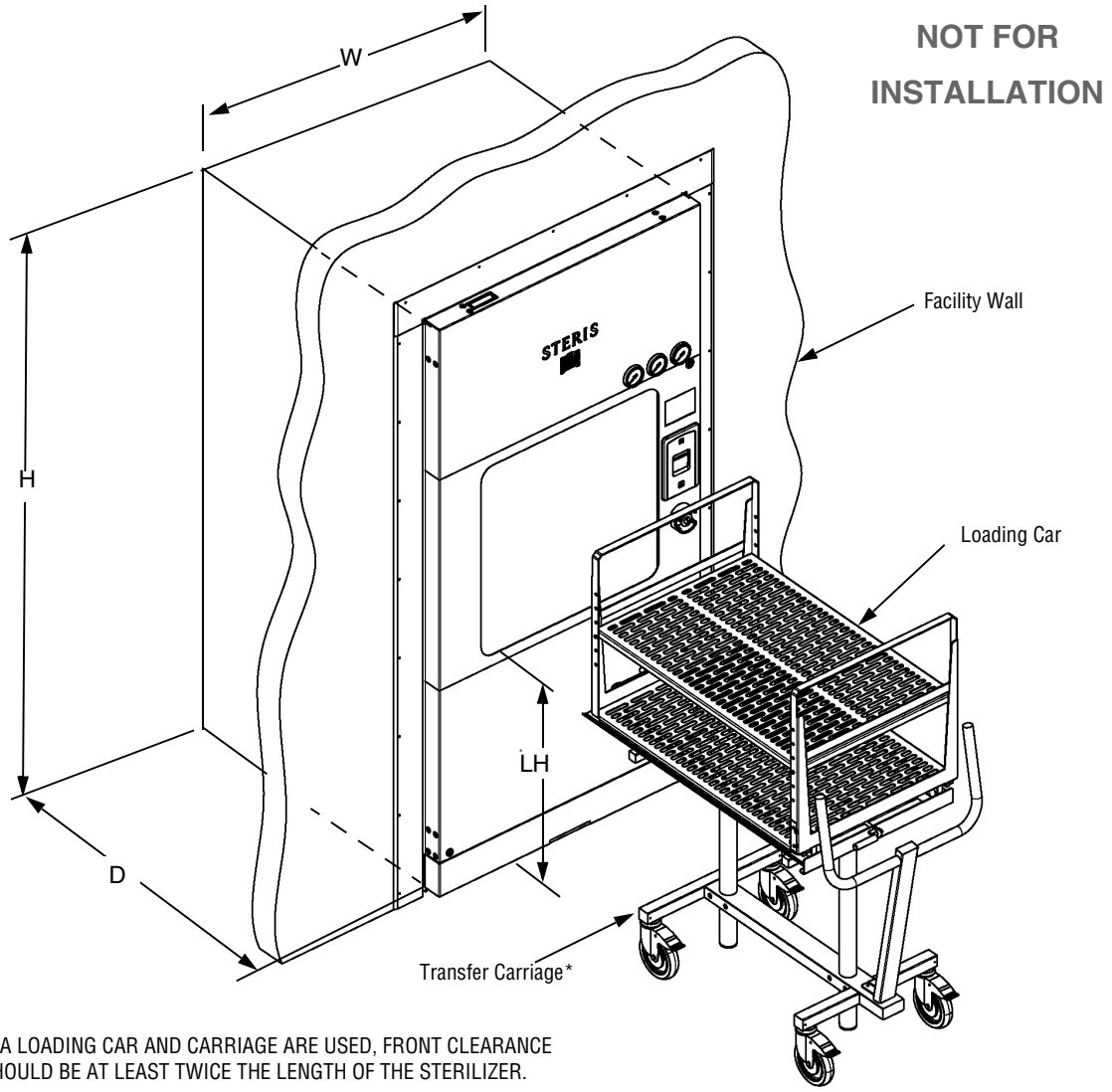
Recommended Feed Water Quality for Sterilizers†

Condition	Nominal Conditions	Maximum Conditions
Temperature	40°-60°F (4°-16°C)	70°F 21°C
Total Hardness as $CaCO_3$ (Note 1)	50-120 ppm	171 ppm
Total Dissolved Solids	100-200 ppm	500 ppm
Total Alkalinity as $CaCO_3$	70-120 ppm	180 ppm
pH	6.8-7.5	6.5-8.5
Total Silica	0.1 - 1.0 ppm	2.5 ppm
Chlorides	1.0 – 8.0 ppm	10.0 ppm
Cu	0.0 – 0.08 ppm	0.1 ppm
Fe	0.0 – 0.08 ppm	0.1 ppm
Zn	0.0 – 0.08 ppm	0.1 ppm
Al	0.0 – 0.08 ppm	0.1 ppm
Mg	0.0 – 0.08 ppm	0.1 ppm

Note 1: 17.1 ppm = 1.0 grain hardness

† The Water Quality topic on page 5 includes important information regarding water supplied to sterilizers, and to carbon-steel and stainless-steel steam generators.

Refer to the Following Equipment Drawings for Installation Details	
Equipment Drawing Part Number	**Equipment Drawing Title**
10037943	Equipment Installation, AMSCO 450LS Sterilizer 39", Single Door
10041591	Equipment Installation, AMSCO 450LS Sterilizer 39", Double Door



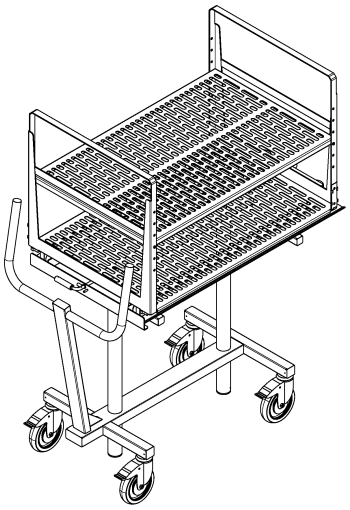
IF A LOADING CAR AND CARRIAGE ARE USED, FRONT CLEARANCE SHOULD BE AT LEAST TWICE THE LENGTH OF THE STERILIZER.

AMSCO 450LS (39" Long Chamber)	DIMENSIONS – Inches (mm)		
	Height (H)	Width (W)	Depth (D)
Sterilizer, External	80 (2032)	39 (991)	48 (1219)
Wall Opening	81.5 (2070.1)	41 (1041.4)	—
Chamber Interior (430 L)	26 (660.4)	26 (660.4)	39 (990.6)
Service Clearances	Clearance requirements vary. Refer to equipment drawing.		

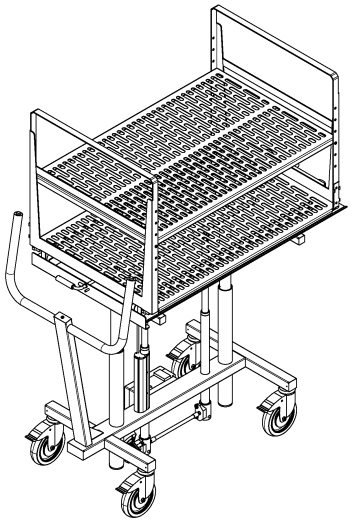
Loading Height (LH) = 30.75 (781)

*Transfer Carriage (Fixed-Height) depicted in above figure.

See page 8 for illustrations of both adjustable and fixed-height carriage models and associated dimensions.



Loading Car and Fixed-Height Transfer Carriage



Loading Car and Adjustable-Height Transfer Carriage

TRANSFER CARRIAGE AND LOADING CAR (39" Long Chamber Capacity)	DIMENSIONS – INCHES (MM)		
	HEIGHT (H)	WIDTH (W)	DEPTH (D)
Transfer Carriage (Fixed-Height)*	43 (1088)*	22 (560)	47 (1187)
Transfer Carriage (Adjustable-Height)*	43 (1088)*	22 (560)	47 (1187)
Loading Car	25 (626)	24 (608)	37 (930)

* Transfer Carriage heights are as measured from floor to top of carriage handle. The carriage transfer planes are pre-set to match the sterilizer loading height of 30.75 inches (781 mm).

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