DATASHEET

ASL laboratory steam sterilizers

	ASL 60	ASL 80	ASL 100
Chamber dimensions			
- capacity	60 l	80 l	100 l
- height	460 mm	610 mm	760 mm
- diameter		413 mm	
Maximal load			
- instruments	20 kg	30 kg	40 kg
- textiles	10 kg	17 kg	25 kg
- fluids	15 l	21 l	30 l
Overall dimensions			
- height	797 mm	947 mm	1097 mm
- width		735 mm	
- depth		600 mm	

The ASL steam sterilizer family is a modern, innovative and very efficient range of sterilizers designed for laboratories and research facilities. They have a vertical cylindrical sterilizing chamber and are available in three capacities – 60, 80 and 100 liters. An intuitive and easy-to-use control panel, reliability and a wide range of versions make it a popular choice.

Our laboratory autoclaves have been designed to provide high quality, repeatable performance for a wide range of applications used in modern laboratories, which include: liquid sterilization (in open and sealed containers), agar preparation, pipette and glassware sterilization, biohazard and waste material sterilization, instrument sterilization and more.

Specification

The chamber and heating jacket

The sterilizer's chamber and heating jacket are made of high quality stainless steel 316L.

Chamber lid

The chamber lid is made of high quality stainless steel 316L. Opening and closing is assisted by a gas spring.

Piping

The ASL piping is made of high quality stainless steel 316L and noncorrosive materials.

Housing

The sterilizer's housing is made of stainless steel for easy maintenance.

Sealing gasket

The ASL steam sterilizer use a unique shaped gasket and steam pressure to seal the chamber. After closing the lid the gasket lip rests freely on the chamber edge. As steam pressure increases, inside the chamber, the lip is firmly pressed against the chamber edge ensuring a secure airtight seal.

Water ring vacuum pump

ASL sterilizers utilize a very efficient single stage water ring vacuum pump to remove air from the sterilization chamber. To reduce vibration the vacuum pump is mounted in anti-vibration pads.

Valves

Solenoid control valves are used to precisely control steam flow, into and out of the chamber and jacket.

Validation port

The sterilization chamber is equipped with a port that allows sensors (ISO 228-G1"A pipe tread) to be connected for sterilizer validation.

Graphic LCD and control panel

The ASL steam sterilizers are equipped with a 3,2" black and white graphic LCD display and a set of membrane switches to control the sterilizer.

Steam generator

The steam generator produces steam for the sterilization process. It is made of stainless steel and is equipped with one heater. Additionally the steam generator has a built in automatic cleaning system.

Automatic cleaning system

To extend the life of the electric steam generator automatic cleaning is initiated after each cycle. This cleaning process flushes out accumulated deposits.

Air intake filter

To make sure that the ambient air introduced into the chamber is sterile ASL steam sterilizers are equipped with an intake filter (sterile air filter). It is able to remove 99,999% of particulates that have a size greater than or equal to 0,3 µm (0,2 µm in case of the MS and MSV versions).

Versions and installed systems

The ASL steam sterilizer is available in 6 versions and each one can be additionally equipped with HEPA exhaust air filter (+ FA). The appropriate version should be chosen based on the types of materials that will be sterilized.

	B	M	V	MV	MS	MSV
Laboratory instruments *solids, un-packed*	●	●	●	●	●	●
Laboratory instruments *packed*			●	●		●
Porous materials *fabrics and textiles, animal bedding*			●	●		●
Hollows *pipette tips*			●	●		●
Glassware			●	●		●
Liquids / growth medium *in open and vented containers*		○		○	●	●
Liquids / growth medium *in sealed containers*					●	●
Waste	●	●	●	●	●	●
Hazardous materials	+FA	+FA	+FA	+FA	+FA	+FA

○ The use of a fast cooling system (M) may cause partial loss of the sterilized fluid.

Rapid cooling system (M)

The rapid cooling system significantly shortens (by about 40%) the cooling times compared to the basic version and speeds up the sterilization of liquids. In addition, this system allows for the sterilization of liquids in open containers. However, the use of an active cooling system may cause partial loss of the sterilized fluid.

Vacuum system (V)

The use of a vacuum generation system enables faster and more effective venting of the sterilization chamber and safe sterilization of porous materials, hollows, as well as packed products. An additional advantage of sterilizers with the vacuum generation system is the option of drying materials, which turns on automatically after the sterilization phase.

Counter-pressure system (S)

During the cooling phase, compressed air, decontaminated by a HEPA filter, is supplied to the sterilization chamber to prevent a sudden drop in pressure. The use of such a system reduces the loss of sterilized fluids in open and vented containers, and enables the sterilization of liquids in sealed containers (prevents their damage).

HEPA exhaust air filter (+ FA)

In case of sterilizing contaminated materials, it is necessary to protect the laboratory environment against dangerous, not sterilized microorganisms that may escape from the chamber during the venting phase. To prevent this, the sterilizer can be equipped with a steam / exhaust air filtration system and condensate sterilization.

Options and accessories

Dot-matrix printer

ASL laboratory steam sterilizers can be equipped with a dot-matrix printer that can print data of the ongoing process or data of a cycle still in memory. The ASL stores data of the last 40 performed cycles.

The printouts contain the following information:

- printout date
- sterilizer info: sterilizer model and version, factory number, production date
- cycle date and time
- total and daily cycle counter
- cycle ID and set parameters
- cycle phase name and start time
- chamber temperature, reference temperature (if the reference sensor is used) and pressure in the chamber at set intervals
- cycle summary: total cycle time and the times of preformed phases
- sterilization cycle or vacuum test outcome

Dokumentator software

The ASL can also be connected to a PC with Dokumentator installed, a dedicated documentation software. The basic version features:

- real-time monitoring of ongoing sterilization cycles
- cycle data archiving
- graphs and tables can display data from multiple sensors
- archived data display and printout
  (data can be printed in the form of graphs and tables)
- data security
  (archived data is protected from deliberate or accidental alteration)

Electric crane

To assist in loading and unloading, especially of heavy loads, the ASL can be equipped with an electric crane. An electronic remote control gives the user an easy way of controlling the crane and together with the swivel arm ensures smooth handling of all load types.

HEPA exhaust air filter (+ FA)

Please check section above.

Sterilization baskets

KSV 1/1 – ø360 x 550 mm

KSV 1/2 – ø360 x 275 mm

KSV 1/3 – ø360 x 200 mm

KSV 1/4 – ø360 x 140 mm

PSV 1/2 – ø360 x 330 mm, solid

Attention: *When sterilizing liquids we suggest using the solid baskets at the bottom of the chamber.*

Cycle phases

Preheating

The steam generator and chamber are preheated to the set temperature. This process takes 5 to 10 minutes. If the chamber did not fully cool down after the last sterilization cycle preheating will take less time. The preheating phase can even be omitted if the chamber temperature is high enough to initiate the next phase.

Deaeration

All ASL version use gravity deaeration for “Liquids” programs.

ASL versions without a vacuum system (B, M and MS) for “Instruments” and “Destruction” programs use a pressure purge deaeration method. 6 or 7 pressure purges, that are between 170 and 120 kPa absolute pressure, push the air out of the chamber (the number of pressure purges depends on starting temperature).

ASL versions with a vacuum system (V, MV and MSV) for “Instruments” and “Destruction” programs use a fractionated pre-vacuum air removal method.

Heating

In this phase the chamber is filled with steam till the preset pressure and temperature are reached. During this process the outlet valve is opened and closed a few times to let out the accumulating steam condensate from the chamber.

Sterilization (exposure) phase

In the sterilization (exposure) phase the controller keeps the set temperature and pressure on a constant level. The LCD displays the time left to the end of exposure. If the temperature drops below the specified temperature the timer is stopped and wait for the temperature to rise. The timer will start only if the temperature reaches the set temperature.

Pressure reduction

After the exposure phase is finished the pressure inside the chamber is lowered to the level required for the next phase.

Cooling (liquids only)

This phase is only part of programs intended for liquids and utilizes the rapid cooling system. This cooling process can be passive, active fast or active with pressure support.

Drying (V, MV and MSV only)

In this phase the temperature of the sterilized load is lower and moisture is evacuated using the vacuum pump. This process utilizes the fact that decreasing pressure below atmospheric pressure will reduce the boiling temperature of water below 100°C. All the moisture is evaporated and removed from the chamber by the water-ring vacuum pump, during the set time in the cycle parameters.

Venting

In this phase air is introduced into the chamber until the programed pressure is reached. To make sure this air is sterile and does not contaminate the sterilized load ASL steam sterilizers are equipped with an intake filter (sterile air filter).

Equalizing

For additional safety, upon completing the last phase, the device goes into an equalizing state for a few seconds. During this time the controller monitors the device's parameters to make sure that it is safe to finish the program and let the user open the lid. Equalizing times may differ as they depend on the selected cycle and the sterilized load.

Safety features

ASL steam sterilizers are equipped with many safety features. They are implemented to protect users against injury and accidents as well as make the sterilization process safe. Both mechanical and electronic safeguards, that back each other up, are used to guarantee the highest user, load and sterilizer protection.

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Over-pressure protection

If the chamber pressure exceeds 345 kPa absolute pressure (245 kPa relative pressure) an auditory alarm is set off, an error message is displayed on the LCD and the steam generator's heaters are switched off. This does not terminate the ongoing program, only postpones it until the pressure drops to safe levels. The heating function can be switched on manually after pressing the ESC button.

If the chamber pressure keeps rising and exceeds 360 kPa absolute pressure (260 kPa relative pressure) the program is terminated, the auditory alarm continues and an error message is displayed. The sterilizer will start an automatic process during which the pressure and temperature are dropped to values that allow the chamber to be safely opened. Contact your technical support before using the device again.

The ASL is equipped with a mechanical safety valve that opens if the chamber pressure exceeds 380 kPa absolute pressure (280 kPa relative pressure). This is to ensure that in the event of a controller failure the pressure does not build up to critical levels. The evacuated steam does not pose any risk to the user as it is cooled down during the evacuation process. Contact your technical support before using the device again.

Attention: *The user can check the safety valve using a dedicated program that temporarily turns off the over-pressure safety features for the duration of the test. It is advised to open the sterilizer housing during this process so the evacuated steam does not damage the controller circuit board.*

Safeguard that prevents the door form being opened if pressure it too high

This safeguard lets the user open the door only if the pressure inside the chamber is close to atmospheric pressure. To ensure maximum safety pressure is monitored by a pressure sensor and an additional pressure switch set to detect atmospheric pressure.

Safeguard that prevents the door form being opened if temperature it too high

A locking mechanism connected to the reference sensor is used to prevent the user from opening the door if the temperature of the sterilized liquids it too high. Programs for the sterilization of liquids have a "safe temperature" that can be set by user. Only if the measured temperature is below this "safe temperature" can the door be opened.

Attention: *The container with the reference sensor should be identical to the largest container being sterilized and it should be filled with the same volume of liquid.*

Steam outflow protection

ASL steam sterilizer have a valve between the steam generator and chamber that is switched off immediately if the lid is opened. This happens instantly to prevent steam from entering the chamber, which could cause injury to the user.

Steam generator overheating protection

The steam generator is protected against overheating by 2 independent thermo switches.

The first one turns off the heaters if the temperature is too high and automatically turns them back on when the temperature drops to a safe level.

The second one cuts off the power to the steam generator if the temperature exceeds permitted values and needs to be reset manually by an authorized service technician.

In the event one of the switches is set off any ongoing cycle is stopped.

Chamber overheating protection

The chamber is not directly heated so it can only reach a temperature equal to the temperature of steam being introduced into the chamber. Steam temperature is limited by the maximum pressure allowed in the chamber – that is 2,8 bar which gives a maximum temperature 142°C.

Water quality

- for the steam generator

To ensure proper steam generator operation and longevity purified water should be used (reverse osmosis water, distilled water etc.).

Water supplied to the steam generator should meet the EN 285 standards which include the following hardness and conductivity requirement:

hardness: <0.02 mmol/l

conductivity: <5µS/cm

pressure: 1-6 bar

- for the vacuum pump and drain cooling

Tap water should meet these requirements:

hardness: between 0,7 and 2 mmol/l

pressure: 1-6 bar

temperature: 15°C*

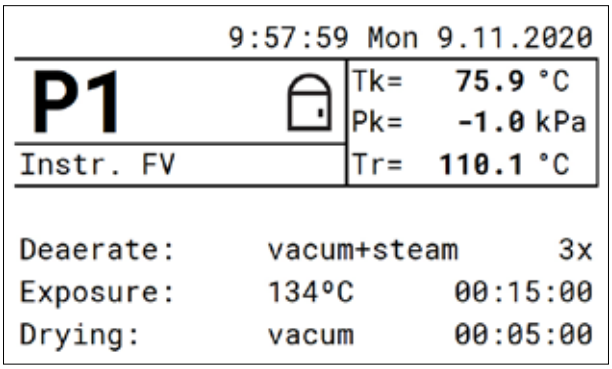
** using water with a higher temperature will increase cooling times and in consequence increase cycle times*

Control system

The graphic user interface allows the user to monitor and control the steam sterilizer. It is designed to be user friendly and easy to use. Here is a quick overview of the main sections of this interface.

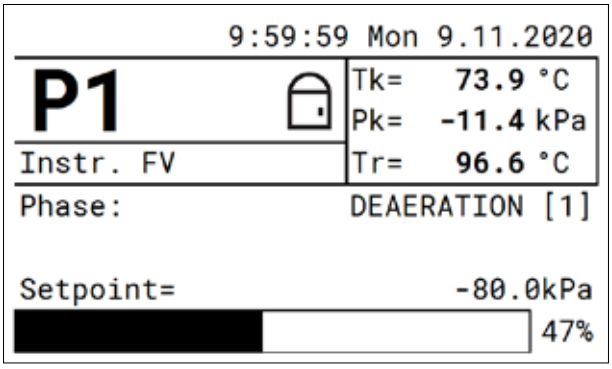
Program

After choosing a program the LCD displays the program number and name below which are the main cycle parameters. That is the deaeration method, sterilization temperature and time as well as the drying time.



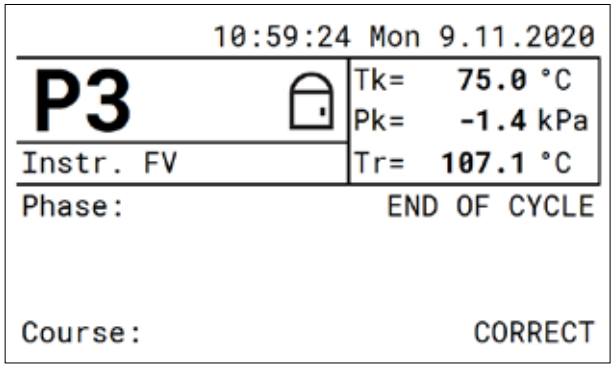
Ongoing cycle

During each cycle the LCD will display the most important information about the ongoing cycle. That is the program number and name, the current temperatures and pressure registered by the sensors, cycle phase and a progress bar.



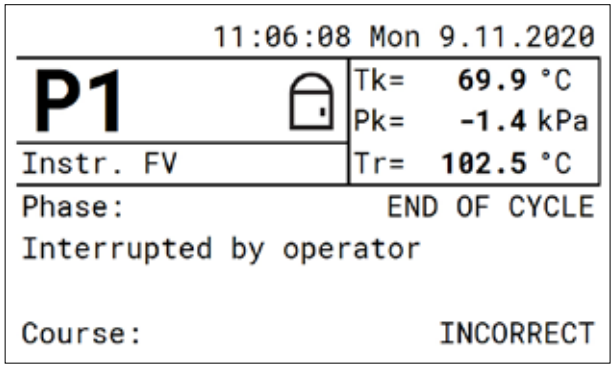
Correct – cycle end

After the cycle completes successfully the LCD will display an "END OF CYCLE" screen with a "CORRECT" message. At this point it is safe to open the sterilizer.



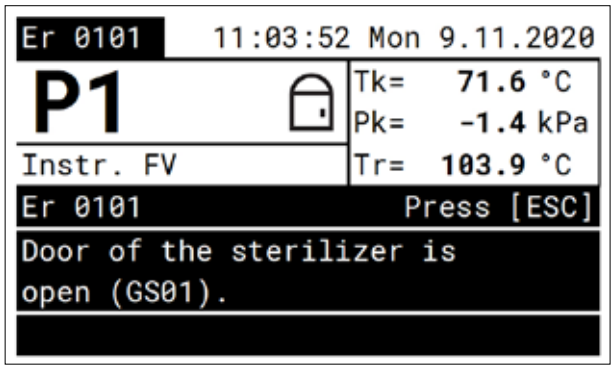
Incorrect – cycle end

If there was an error during the cycle or the cycle was terminated by the user the LCD will display an "END OF CYCLE" screen with a "INCORRECT" message.



Error

If an error occurs the LCD will display an error message and the cause of the failure. After the cause is removed (in this example the door has been closed) the user can press the Esc button to continue.



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Programs

P1 Instruments

Application: instruments

Sterilization temperature: 134°C

Exposure time: 15 min

Drying time (V, MV, MSV versions): 5 min

P2 Instruments

P3 Plastics and rubber

P4 – P6 Destruction

P7 – P11 Liquids

P12 – P20 same as P1 (customizable programs)

P21 Bowie-Dick test (V, MV, MSV versions)

P22 Vacuum leak test (V, MV, MSV versions)

Connections

- Electricity
- Tap water
- Deionized water
- Compressed air (MS and MSV versions)
- Drainage

Environmental impact

The sterilizer is composed of 94% stainless steel, 4% of non-ferrous metals and 2% of other materials, which – after dismantling the unit by an authorized person – may be recycled.

Packaging for shipment

To prevent damage during shipping/transportation SMS sterilizers are packed into specially designed wooden creates.

electric power

To suite different mains supplies (voltage/frequency) our sterilizers are available in two versions:

200 - 230 V, 3Ph, 50/60 Hz

380 - 400 V, 3Ph, 50/60 Hz

Standards and directives

ASL steam sterilizers meet all necessary standards and directives and not less than below.

Directives

2014/68/EU Directive – Pressure Equipment

Safety and EMC Standards

EN 61010-1:2010

EN 61010-2-040:2015

EN 61326-1:2013

Pressure vessels and steam generator construction

WUDT/UC/2003 – Pressure devices

Sterilizer selection aid

	60 l	80 l	100 l
Capacity	☐	☐	☐

	B	M	V	MV	MS	MSV	+FA
Version	☐	☐	☐	☐	☐	☐	☐

Electricty power

To suite different mains supplies (voltage/frequency) our sterilizers are available in two versions.

- ☐ 380-400V, 3Ph, 50/60 Hz
- ◯ 200-230V, 3PH, 50/60 Hz

Control panel language select one*

- ☐ English
- ☐ Polish
- ☐ German
- ☐ Russian
- ◯ Others on request

**the selected language can be changed in the settings menu*

Sterilization baskets specify quantity

- ☐ KSV 1/1 – ø360 x 550 mm
- ☐ KSV 1/2 – ø360 x 275 mm
- ☐ KSV 1/3 – ø360 x 200 mm
- ☐ KSV 1/4 – ø360 x 140 mm
- ☐ PSV 1/2 – ø360 x 330 mm, solid

Equipment

- ◯ electric crane
- ◯ air compressor
- ◯ reverse osmosis system

☐ Standard options ◯ Additional options

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