

# RAYPA

Leading  
Lab Technologies

 Sterilization

## BENCHTOP AUTOCLAVES WITH PREVACUUMS AND DRYING

**AHS-B SERIES** **CLASSIC LINE**

EXCELLENT PERFORMANCE,  
ADVANCED FEATURES,  
COMPACT FOOTPRINT AND  
ALL-AROUND VERSATILITY FOR  
SEVERAL APPLICATIONS



# Front-loading benchtop autoclaves with prevacuums and drying

The **AHS-B** Series benchtop autoclaves with front-loading access cover all laboratory sterilization needs in many industries and research facilities with the aim of increasing the productivity of the laboratory. A great chamber capacity, the independent integrated steam generator, the touchscreen display, the independent clean water tank and waste water tank, the initial prevacuum pulses and the final vacuum drying results in an excellent autoclave to perform from the most simple to the most demanding applications.

## INTENDED USE

+ **STERILIZATION OF LOADS OF COMPLEX GEOMETRIES, POROUS OR HOLLOW OBJECTS, FABRIC LOADS, LABORATORY WASTE BAGS, PLASTICS, GLASSWARE, CULTURE MEDIA AND LIQUIDS**



## MAIN FEATURES

### EXCELLENT PERFORMANCE

**AHS-B** Series autoclaves are autoclaves with excellent performance for several sterilization procedures. They are equipped with an independent integrated steam generator, a vacuum pump and a heating jacket to guarantee proper steam penetration on all types of loads and completely dry solid loads.

### MULTIPLE TYPES OF STERILIZATION CYCLES

Several options available to perform sterilization of solids or liquids. Programmable auto-preheating, auto-start, initial prevacuum pulses, duration of the final vacuum drying and optional heart temperature probe for load sensed sterilization of liquids.

### EASY INSTALLATION AND USE

Every **AHS-B** Series autoclave is a plug and play equipment that does not need dedicated installation connections. They are equipped with a 5" color touchscreen and 50 programs, they include an independent clean water tank that automatically feeds the independent steam generator with water, with an optional upgrade to fully automatic water feed directly from water network. Discharge is sent to an independent waste water tank.

### SAFETY FIRST

**AHS-B** Series autoclaves are equipped with several features to ensure the safety of the operators. These include overpressure safety valve, overtemperature safety thermostats, water level detectors, an open door detection system and an independent safety pneumatic system that locks the main door while positive pressure exists inside the sterilization chamber.



## ADVANTAGES



Heating by an independent integrated powerful steam generator.



Adjustable number of initial prevacuum pulses to guarantee proper steam penetration on items of complex geometries and large loads.



Final vacuum drying feature by a heating jacket and a vacuum pump to completely dry solid loads.



Sterilization chamber and door made of high quality stainless steel grade AISI-316L extremely resistant to corrosion.



Equipment built following all applicable European Union quality, regulatory and safety standards.



Control by a PID microprocessor and a 5" touchscreen, with 50 available programs, adjustable by time, temperature, number of prevacuum pulses, drying time and type of sterilization cycle (solids or liquids, with optional heart probe control).



Surpasses Vacuum Leak and Bowie Dick test cycles.



Suitable to sterilize all types of loads, including wrapped goods, fabric loads, porous and hollow objects and items of complex geometries with cavities thanks to the standard initial prevacuum phase.



Automatic clean water feed to the integrated steam generator from the independent water tank, with water level sensors included in both locations. Optional upgrade to fully automatic water feed directly from water network.



The discharge of each cycle is always directly sent to the independent waste water tank to minimize long term sterilization chamber and clean water tank corrosion and calcification processes.



Programmable auto-preheating and auto-start.



Optional software for sterilization data management.



Plug and play equipment, no plumbing required.



User management with administrator hierarchy.



## STERILIZATION APPLICATIONS

**AHS-B** Series autoclaves are intended for the sterilization of a wide range of liquids and solids such as wrapped and unwrapped loads, items of complex geometries, fabric loads, culture media, glassware, plastics, metal utensils, laboratory waste bags and other laboratory items.



# Front-loading benchtop autoclaves with prevacuums and drying

## WORKING PRINCIPLE

**AHS-B** Series autoclaves provide a solution for the multiple sterilization needs of all laboratories, including wrapped and unwrapped solids, fabric loads, porous and hollow objects, plastics, metal utensils, laboratory waste bags, liquids, culture media, glassware and other laboratory items.

The load has to be placed into the vessel's trays or basket and, after manually filling the independent clean water tank with purified water, the equipment starts to create the initial prevacuum, automatically feeds water to the independent integrated steam generator, generating saturated steam that is directly injected into the sterilization chamber until the set combination of sterilization time and sterilization temperature is reached.

## STANDARD AHS-B SERIES STERILIZATION CYCLE

### PREHEATING PHASE

- In this initial step, the user has the option to set up a preheating temperature up to 70°C to speed up the duration of the sterilization cycle.

### PREVACUUM PHASE

- In this phase the equipment's vacuum pump mechanically removes air from the chamber and load through a single or multiple vacuum pulses of -0,75 Bargs. This allows the steam to penetrate load objects of difficult geometries that couldn't otherwise be reached with simple gravity displacement.

### HEATING PHASE

- After completing the prevacuum phase the powerful independent steam generator assembled outside the sterilization chamber heats up dramatically and injects saturated steam throughout the chamber.

### STERILIZATION PHASE

- Upon reaching the set sterilization temperature inside the chamber the sterilization phase begins, accurately sustaining the temperature throughout the duration of this phase.
- This crucial step is controlled by a PT-100 Class A temperature probe located within the chamber. As an option for liquids sterilization processes, this phase can be regulated by a flexible PT-100 Class A temperature probe located inside a sample.

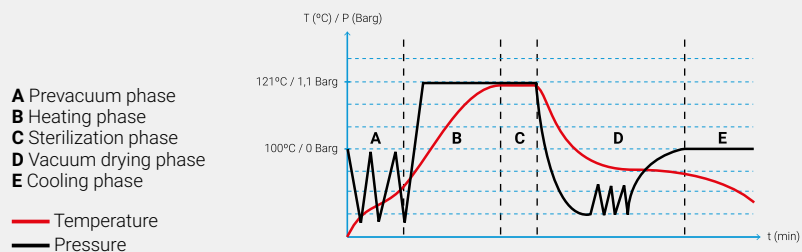
### VACUUM DRYING PHASE

- After sterilization phase finishes, only for solid programs, vacuum drying starts, where multiple vacuum pulses occur while the heating jacket is turned on, completely drying the load.

### COOLING PHASE

- After the vacuum drying step is completed natural cooling begins and an acoustic beep will sound when a safety temperature is reached and the door can be opened.

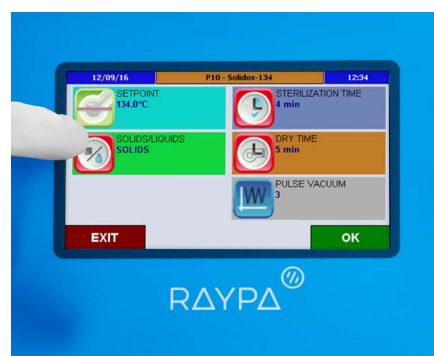
### Sterilization cycle graph for a solid load



## DIGITAL MICROPROCESSOR WITH TOUCHSCREEN



Digital microprocessor with a 5" TFT touchscreen for an easy programming and parameters selection.



Several process parameters are shown on the screen such as current temperature, current pressure, both in numbers and in graphs, including water status or heating status.

**AHS-B** Series autoclaves have 50 programs and the first 14 are predefined and protected. The rest of the programs are editable with the following parameters settings:

- Sterilization temperature.
- Sterilization time.
- Prevacuum pulses number.
- Final drying time.
- Sterilization mode (Solids or Liquids).
- Sterilization controlled by main chamber temperature probe or both main chamber temperature probe plus heart temperature probe.



## AHS-B SERIES PROGRAMS

**AHS-B** Series autoclaves have 50 programs, from P1 to P50, and the first fourteen are predefined and protected.

### PREDEFINED PROGRAMS

Program N°	Program name	Prevacuum pulses	Sterilization temperature °C	Sterilization time min	Drying time min	Program mode Solids or Liquids	Heart probe regulation
P1	BD	3	134	4'	4'	Solids	-
P2	Vacuum	1	-	-	-	Solids	-
P3	Porous-134	3	134	4'	15'	Solids	-
P4	Prion-134	3	134	18'	20'	Solids	-
P5	Porous-121	3	121	20'	15'	Solids	-
P6	Hollow-134	3	134	4'	10'	Solids	-
P7	Hollow-121	3	121	20'	10'	Solids	-
P8	Wrapped-134	1	134	7'	20'	Solids	-
P9	Wrapped-121	1	121	20'	20'	Solids	-
P10	Solids-134	1	134	4'	10'	Solids	-
P11	Solids-121	1	121	20'	10'	Solids	-
P12	Flash-134	1	134	3'	1'	Solids	-
P13	Liquid	1	121	30'	-	Liquids	-
P14	Liquid probe	1	121	15'	-	Liquids	Heart probe

The rest of the programs are editable with the following parameters settings:

- Prevacuum pulses number.
- Sterilization temperature.
- Sterilization time.
- Final drying time.
- Sterilization mode (Solids or Liquids).
- Sterilization controlled by main chamber temperature probe or both main chamber temperature probe plus heart temperature probe.



# Front-loading benchtop autoclaves with prevacuums and drying

## DIFFERENT SIZES BUT SAME FEATURES



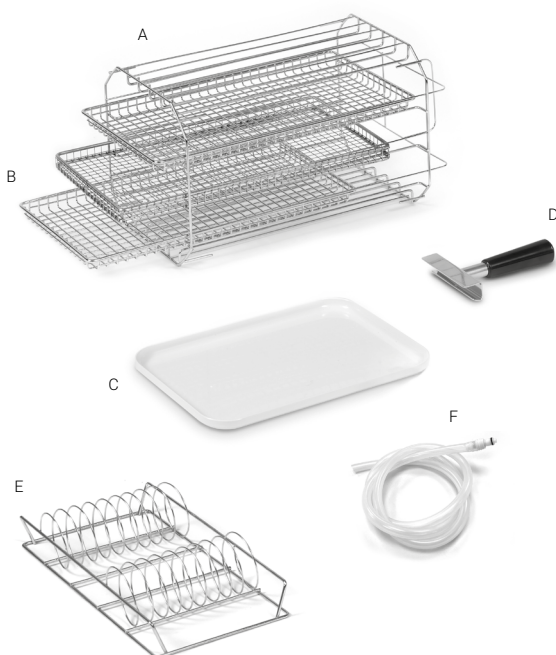
**AH-21-B**



**AHS-50-B & AHS-75-B**

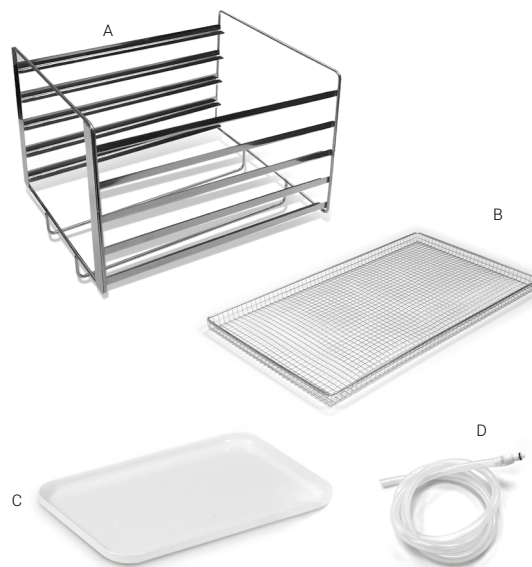
### COMPONENTS SUPPLIED WITH THE EQUIPMENT

- A. Stainless steel tray support for 5 trays.
- B. 3 stainless steel wire trays.
- C. Auxiliary plastic tray for collecting condensed water after opening the door in cycles without final drying.
- D. Holding clamp to move the trays.
- E. Silicone tube of 1m with fast connection to drain the independent clean water tank and the independent waste water tank.
- F. Sainless steel bag support.



### COMPONENTS SUPPLIED WITH THE EQUIPMENT

- A. Stainless steel tray support for 5 trays.
- B. 2 stainless steel wire trays.
- C. Auxiliary plastic tray for collecting condensed water after opening the door in cycles without final drying.
- D. Silicone tube of 1m with fast connection to drain the independent clean water tank and the independent waste water tank.
- E. Sterilization chamber protecting grid made of stainless steel.





## Accessories

### STAINLESS STEEL WIRE TRAYS

Reference		BAH-21	BAH-50 B	BAH-75 B
Dimensions	<b>Exterior</b> L x D mm	190 x 350	315 x 330	315 x 530
	22 L	5	-	-
For autoclaves with the following chamber volumes	55 L	-	5	-
	79 L	-	-	5



### STAINLESS STEEL WIRE HORIZONTAL BASKET

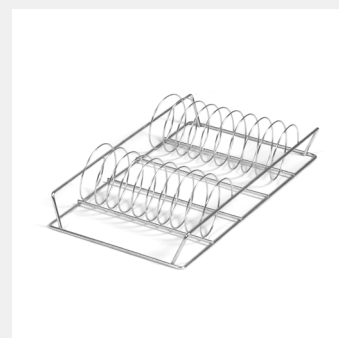
Reference		RB-AH-21	RB-AHS-50	RB-AHS-75
Dimensions	<b>Exterior</b> L x D x H mm	170 x 340 x 180	324 x 360 x 235	324 x 560 x 235
	<b>Interior</b> L x D x H mm	160 x 330 x 170	314 x 350 x 225	314 x 550 x 225
For autoclaves with the following chamber volumes	22 L	1	-	-
	55 L	-	1	-
	79 L	-	-	1



### STAINLESS STEEL BAG SUPPORT\*

Reference		BAP-21	BAP-75
Dimensions	<b>Exterior</b> L x D x H mm	400 x 180 x 80	300 x 180 x 95
	Slots / support	20	20
For autoclaves with the following chamber volumes	22 L	1	-
	55 L	-	4
	79 L	-	6

\*This accessory can be customized in size according to each client needs. For more information please contact us.



### STAINLESS STEEL CONTAINERS WITH FILTER ON THE LID

Reference		FC-215	FC-331	FC-338
Dimensions	<b>Exterior</b> L x D x H mm	285 x 185 x 65	300 x 300 x 110	300 x 300 x 85
	<b>Interior</b> L x D x H mm	275 x 175 x 55	290 x 290 x 100	290 x 290 x 75
For autoclaves with the following chamber volumes	22 L	2	-	-
	55 L	6	1	2
	79 L	9	2	4



# Front-loading benchtop autoclaves with prevacuums and drying

## Accessories

### **FLEXIBLE “HEART” TEMPERATURE PROBE PT-100 CLASS A**

- After installing this accessory, the temperature regulation of the sterilization cycle can either be controlled by the main chamber temperature sensor or both the main chamber temperature sensor and the temperature sensor of the flexible heart temperature probe.
- The temperature control by the flexible heart temperature probe is especially advantageous for processes involving the sterilization of large volumes of liquids, where the sterilization process is regulated by both the temperature achieved in the center of the liquid sample as well as the temperature achieved in the sterilization chamber. Furthermore, should the autoclave be opened at chamber temperatures higher than 80°C there is a risk of liquids boiling over which can be avoided if the temperature of the sample is controlled throughout the sterilization procedure.
- Must be installed in our facilities.

Reference: **PT-2-B-AH**



### **CABLE GLANDS**



- Installation of up to 8 cable glands within the sterilization chamber walls to enable external temperature probe access in multiple locations for autoclave calibration and validation procedures.
- These ports can either be of 2 or 4 mm of diameter.

References:

**PRENSACLAV** (8 holes  $\varnothing$  2mm),  
**PRENSACLAV2** (8 holes  $\varnothing$  4mm).

### **INTEGRATED THERMAL PRINTER**



- Prints program number, cycle number, temperature, pressure, date and hour of the run and error messages.
- Selectable printing cadence between 10 and 240 seconds.
- Must be installed in our facilities.

Reference: **IT/TS**

Consumable:  
Paper: **PAPER-IT**

### **TRANSPORT TROLLEY**



- Auxiliary trolley to assist the loading and unloading of the autoclave.
- Built in chromed iron and plastic.
- The surface of each shelf is textured to prevent the load from shifting.
- Rubber coated wheels to reduce noise.
- Dimensions (LxDxH):  
730 x 490 x 700 mm.

Reference: **TR-TR**

### **WATER DISTILLER**



- Forced air water distiller with stainless steel interior, a capacity of 4L and a distillation volume output of 1,5L/h.

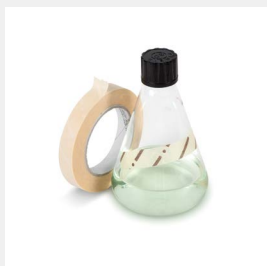
Reference: **DEM-4**





## Accessories

### STERILIZATION CONTROL TAPE



- Class 1 indicator for steam sterilization. The change of color indicates that the materials have been processed, without being a guarantee of proper sterilization, additional methods are needed such as biological indicators (EN ISO 11138).
- Tape roll of 50 m x 19 mm.

Reference: **TEST-CT**

**20 min. 121°C**  
Color change.

### BOWIE DICK TEST PACK



- Class B indicator that checks the correct steam penetration in porous loads.
- Indicator printed with non-toxic inks and laminated.
- Box of 20 tests.

Reference: **TEST-BD**

### AUTOMATIC WATER FILLING KIT

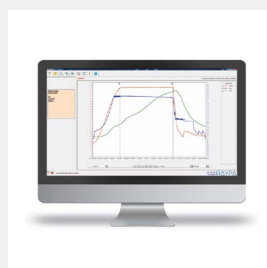


- Water pump to automate the feed of the independent clean water tank with purified water.
- Compatible with installations that either have a purified water network, a purified water tank or facilities that have an unpurified water network, in the latter case, the kit should be supplied with two other accessories: water purifier (ECOPUR-500) and purified water tank (TANK-KLL).
- Must be installed in our facilities.

Reference:

**KLL-21**  
**KLL-AHS**

### SW8000 SOFTWARE



- Communication software between the equipment and the PC that allows the real-time and posterior visualization and registry of each cycle. Cycles can also be exported to Excel or printed.
- Connection to PC via Ethernet, data can also be exported directly with USB stick.
- Supplied with an Ethernet cable, an USB stick that includes the software and installation drivers and an Ethernet to USB adapter.

Reference: **SW8000**



### ECO-EFFICIENT WATER PURIFIER














- Direct flow eco-efficient water purifier without water accumulation capable of filtering 1,3L/min with LED display.
- The installation of this accessory requires the joint installation of the external tank (TANK-KLL) and the automatic water filling system (KLL-21 or KLL-AHS) corresponding to each model.

Reference: **ECOPUR-500**

Exterior dimensions L x D x H mm	Purity (TDS) ppm	Electrical conductivity µS	Hardness mmol/l
220 x 425 x 415	0,0005	>1	0,0125

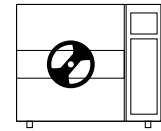
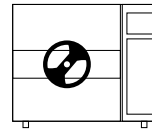
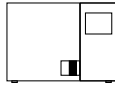
# Front-loading benchtop autoclaves with prevacuums and drying

## TECHNICAL SUMMARY OF AHS-B SERIES AUTOCLAVES

Available models		AH-21-B	AHS-50-B AHS-75-B
 <b>General classification</b>	Recommended setting	Industry and research laboratories	
	Equipment placement	Benchtop	
	Load direction	Front-loading	
	Chamber profile	Round	
 <b>Recommended type of load</b>	Liquids and culture media	✓	
	Laboratory waste bags	✓✓	
	Glassware	✓✓	
	Plastics	✓✓	
	Wrapped, unwrapped and porous objects, including fabric loads	✓✓	
 <b>Sterilization technology features</b>	Method to generate steam	Independent integrated steam generator	
	Type of purge	Vacuum	
	Prevacuum pulses by vacuum pump	✓	
	Vacuum drying by heating jacket and vacuum pump	✓	
 <b>Transfer of data</b>	Ethernet & USB	✓	
 <b>Batch printers</b>	Integrated printer	○	
 <b>Sterilization chamber and door specifications</b>	Sterilization chamber volume	22 L	55 - 79 L
	External building materials	Metallic & AISI-304	
	Sterilization chamber material	AISI-316L	
	Vacuum pump	Membrane	
	Gasket material	Silicone rubber	
	Min.- max. sterilization temperature	105 - 134°C	
	Maximum pressure (above atmospheric pressure)	2,1 Barg	
	Mechanism to open the door	Handle	Wheel
	Direction in which the door opens	Frontal	
	Automatic locking with pressure	✓	
Thermally insulated door	✓		
 <b>User interface and microprocessor</b>	Screen display	TFT touchscreen	
	Screen size	5"	
	Total number of available programs	50	
	User management with administrator hierarchy	✓	
	Automatic microprocessor control	✓	
 <b>Special cycles and process optimization</b>	Timer start	✓	
	Vacuum leak test	✓	
	Bowie Dick test	✓	
	Final postvacuum drying (to completely dry solid loads)	✓	
	Temperature regulation by heart probe	○	
Auto-preheating	✓		
 <b>Adjustable cycle parameters</b>	Number of prevacuum pulses	1 - 3	
	Temperature of sterilization phase	105 - 134°C	
	Duration of sterilization phase	1 - 250 min	
	Duration of drying phase	1 - 360 min	
	Temperature control by heart probe	On/Off	
	Sterilization mode (solids or liquids)	✓	
 <b>Other specifications</b>	Air intake with bacteriological filter	✓	
	Independent clean water tank capacity	6 L	10 L
	Independent waste water tank capacity	2,6 L	6 L
	Flexible heart probe	○	
	Rubber feet	✓	
	Pressure gauge	✓	
	Electric customization (115-230M V/230-400T V)	○	
 <b>Services</b>	Third-party qualification (IQ/OQ/PQ)	○	

✓: Standard ○: Optional

## TECHNICAL DATA



### Specifications

Reference	AH-21-B	AHS-50-B	AHS-75-B
Total/usable chamber volume L	22/21	55/50	79/75
Usable chamber dimensions Ø x D mm	210 x 430	360 x 400	360 x 600
Independent clean water tank volume L	6	10	10
Independent waste water tank volume L	2,6	6	6
Exterior dimensions L x D x H mm	560 x 660 x 425	805 x 805 x 650	805 x 1005 x 650
Maximum number of trays	5	5	5
Trays dimensions L x D mm	190 x 350	315 x 330	315 x 530
Power W	2000	3600	3600
Gross weight Kg	85	125	140
Voltage* V	230V (1P+N) 16A	230V (1P+N) 16A	230V (1P+N) 16A
Frequency Hz	50/60	50/60	50/60

\*Other voltages available under request.

### Safety features

- Safety valve.
- Safety thermostats with manual rearm for the heating jacket and the steam generator.
- Pneumatic door blocking system while positive pressure exists inside the sterilization chamber.
- Open door sensor.
- Thermally insulated door.
- Water level detector in the independent integrated steam generator.
- Water level detector (min./max.) in the independent clean water tank with overflow drainage.
- Water level detector (max.) in the independent waste water tank.
- Bacteriological filter for inlet air.
- Several visual and acoustic safety and warning alarms.

### Regulations

All our AHS-B Series autoclaves are designed to comply with the strictest international directives and standards, including the following regulations:

- **EN-61010-1** Safety requirements for electrical equipment for measurement, control and laboratory use. **Part 1:** General requirements.
- **EN-61010-2-040 Part 2-040:** Requirements for laboratory autoclaves.
- **EN-61326** Electrical equipment for measurement, control and laboratory use. EMC requirements.
- **AD 2000 Merkblatt** Pressure vessels.
- **2014/35/UE** Low voltage.
- **2014/30/UE** Electromagnetic compatibility.
- **2014/68/UE** Pressure equipment.

### General features

Adjustable sterilization temperature	105 - 134°C
Adjustable sterilization time	1 - 250 min
Adjustable prevacuum pulses	1 - 3
Adjustable drying time	1 - 360 min
Max. pressure	2,1 Barg
Sterilization control system	Fully automatic microprocessor control by either chamber temperature probe or flexible heat temperature probe
Air purge system	Mechanical displacement by vacuum pump
Heating system	Independent integrated steam generator
Vacuum drying system	Vacuum pump plus heating jacket
Prevacuum system	Vacuum pump
Sterilization chamber material	AISI-316L stainless steel
Gasket material	Silicone rubber
Connection to PC	Ethernet
Connection to printer	Integrated
Number of programs	50 (14 preset and 36 user free)
Programmable auto-start	Unlimited range
Screen type	5" TFT touchscreen
Opening door mode	Front-loading swiveling door
Monitoring of sterilization parameters	Self-control of obtained values (T°, P & t) vs programmed values. Cycle is automatically interrupted if obtained values differ from programmed values
Pressure display	Pressure gauge on control panel, digital display on screen, registry on software and printer tickets
Water management	Independent manually fed clean water tank that automatically feeds the independent integrated steam generator. Optional upgrade to fully automatic clean water feed directly from water network
Drainage system	Drainage connections for both drainage and overflow of the independent clean water tank, to drain the independent waste water tank and a screw to manually clean the drainage filter and drain the sterilization chamber
Feet	Feet with resistant rubber

+ info

**YouTube**

CLICK!  
 ACCESS ALL  
 OUR VIDEOS

Find out more about our autoclaves on our **YouTube Channel**

Installation guide available under request, please contact us.



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