

# RAYPA

Leading  
Lab Technologies

 Sterilization

## BENCHTOP AUTOCLAVES WITH DRYING

**AHS-DRY SERIES** **CLASSIC LINE**

ECONOMIC, COMPACT,  
COST-EFFECTIVE, ROBUST  
PERFORMANCE AND LIMITED  
LABORATORY RESOURCES  
CONSUMPTION



# Front-loading benchtop autoclaves with drying

The **AHS-DRY** Series benchtop autoclaves with front-loading access cover most laboratory sterilization needs in many industries, educational institutions and research facilities with the aim of increasing the productivity of the laboratory. A great chamber capacity, the final drying feature and the independent water tank together with the optimization of resources such as water, power and operating time results in an affordable and very cost-effective solution to manage laboratory workload.

## INTENDED USE

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



## MAIN FEATURES

### COST-EFFECTIVE SOLUTION

**AHS-DRY** Series autoclaves are robust autoclaves with excellent performance for liquids and solids sterilization procedures. The final vacuum drying feature by a heating jacket and a vacuum pump at the end of the sterilization cycle eliminates the need of an external equipment to dry the load, significantly reducing the duration of each sterilization procedure rotation and saving operator time.

### MULTIPLE TYPES OF STERILIZATION CYCLES

Several options available to perform solids or liquids sterilization. Programmable final vacuum drying for the sterilization of solids, initial prevacuum for the sterilization of items of complex geometries and programmable temperature holding at the end of the cycle for the sterilization of culture media. Optional flexible temperature probe for load sensed sterilization of liquids.

### EASY INSTALLATION AND MAINTENANCE

Every **AHS-DRY** Series autoclave is a plug and play equipment that does not need dedicated installation connections. They simply need a power source and can work even without a connection to the drainage. They include a manually fed independent water tank that automatically feeds the sterilization chamber with an optional upgrade to fully automatic water feed directly from water network.

### SAFETY FIRST

**AHS-DRY** Series autoclaves are equipped with several features to ensure the safety of the operators. These include an overpressure safety valve, a thermally insulated door, an overtemperature safety thermostat, a water level detector, 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



Final vacuum drying feature by a heating jacket and 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.



Heating by powerful electric elements made of Incoloy® 825 assembled inside the sterilization chamber and shielded by a protective grid.



Control by a PID microprocessor with 4 predefined and 6 editable programs, adjustable by time, temperature, drying time and type of sterilization cycle (solids or liquids, with optional Agar mode and/or heart probe control).



Adjustable temperature holding at the end of the sterilization cycle between 40-80°C (Agar mode).



Suitable to sterilize wrapped and unwrapped loads, small porous and hollow objects and items of complex geometries with cavities thanks to the standard initial prevacuum phase\*.



Automatic water feed to the sterilization chamber from the independent water tank, with water level sensors included in both locations. Optional upgrade to fully automatic water feed directly from water network.



Programmable auto-start for up to 24 h.



Optional software for sterilization data management.



Optional integrated or external printer.



Plug and play equipment, no plumbing required.



## STERILIZATION APPLICATIONS

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

Furthermore, thanks to the standard initial prevacuum pulse and the fractioned postvacuum with drying,

**AHS-DRY** Series autoclaves are also suitable to sterilize wrapped and unwrapped solids, small porous and hollow objects\*.



\***AHS-DRY** Series autoclaves may not be suitable for these applications if the chamber is heavily loaded. In these circumstances, **AHS-B** Series autoclaves should always be used. In case of doubt, please contact us and our team will offer expert guidance.

# Front-loading benchtop autoclaves with drying

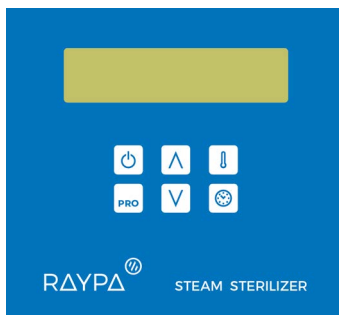
## WORKING PRINCIPLE

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

The load has to be placed into the vessel's trays or basket and, after manually filling the independent water tank with purified water, the equipment starts to create the initial prevacuum, automatically feeds water to the sterilization chamber, heats up and purges until the set combination of sterilization time and sterilization temperature is reached.

## DIGITAL MICROPROCESSOR

Digital microprocessor with 6 push-buttons for an easy programming and parameters selection.



## AHS-DRY SERIES PROGRAMS

**AHS-DRY** Series autoclaves have 10 programs, from P0 to P9, and the first four are predefined and protected.

### PREDEFINED PROGRAMS

Program N°	Sterilization temperature °C	Sterilization time min	Drying time min	Program mode Solids, Liquids or Agar	Heart probe regulation
P0	115	60	12	Solids	-
P1	121	30	25	Solids	-
P2	133	20	30	Solids	-
P3	121	20	-	Liquids	-

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

- Sterilization temperature.
- Sterilization time.
- Final drying time.
- Sterilization mode (Solids or Liquids).
- Sterilization with temperature holding at the end of the cycle (Agar mode).
- Sterilization controlled by main chamber temperature probe or both main chamber temperature probe plus heart temperature probe.

## STANDARD AHS-DRY SERIES STERILIZATION CYCLE

### PREVACUUM PHASE

- In this initial step, the equipment's vacuum pump mechanically removes air from the chamber and load through a single vacuum pulse 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.
- Afterwards, the independent water tank starts to feed water to the sterilization chamber and the heating jacket is turned on, preheating the load.

### HEATING PHASE

- After completing the prevacuum phase and once the sterilization chamber bottom is filled with water, the powerful heating elements assembled at the bottom of the sterilization chamber heat up dramatically, transferring energy to water to produce 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 liquid sterilization processes, this phase can be regulated by a flexible PT-100 Class A temperature probe located inside a sample.

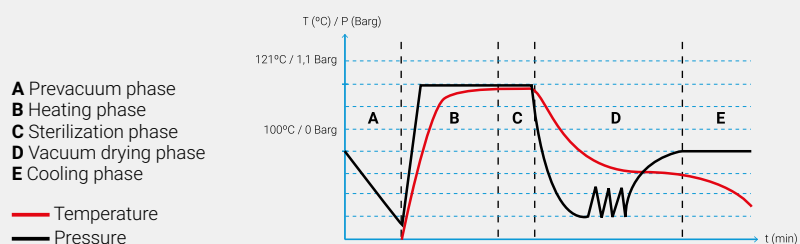
### VACUUM DRYING PHASE

- 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 and automatically feeding back the water to the independent water tank.

### 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.
- In liquid programs with Agar mode activated, the equipment will hold the preprogrammed temperature indefinitely, selectable between 40 and 80°C.

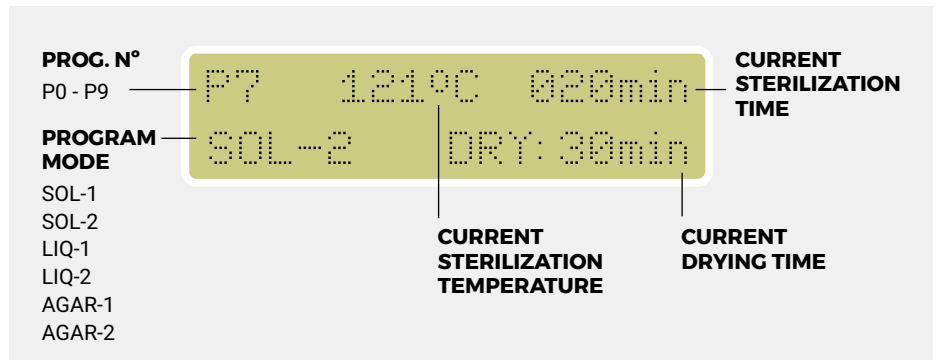
### Sterilization cycle graph for a solid load





### FUNCTIONS DISPLAYED BY THE ALPHANUMERIC LCD SCREEN

The alphanumeric screen apart from showing the standard sterilization parameters also shows current sterilization phase and several visual alerts, including warning or failure messages. The available languages include English, Spanish, French and Catalan. For other languages please contact us.

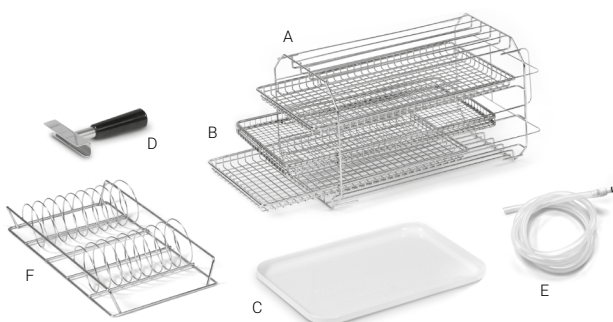


### DIFFERENT SIZES BUT SAME FEATURES



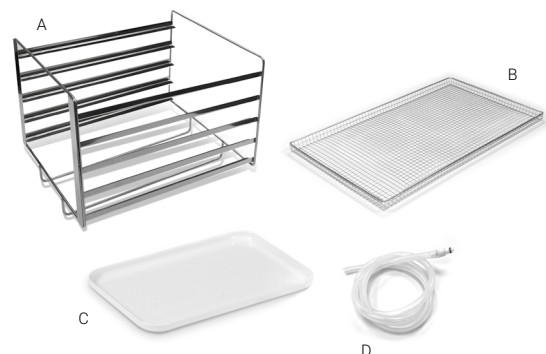
### COMPONENTS SUPPLIED WITH THE EQUIPMENT

- A. Stainless steel tray support for 4 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 water tank.
- F. Stainless steel bag support
- Stainless steel protecting grid for the heating elements.



### 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 water tank.
- Stainless steel protecting grid for the heating elements.



\*Special tray support compatible with up to 5 trays available under request.

# Front-loading benchtop autoclaves with drying

## Accessories

### STAINLESS STEEL WIRE TRAYS

Reference		BAH-21	BAH-50 B	BAH-75 B
Dimensions	Exterior L x D mm	190 x 350	315 x 330	315 x 530
	22 L	4*	-	-
For autoclaves with the following chamber volumes	55 L	-	5	-
	79 L	-	-	5

\*Special tray support compatible with up to 5 trays available under request.



### STAINLESS STEEL WIRE HORIZONTAL BASKET

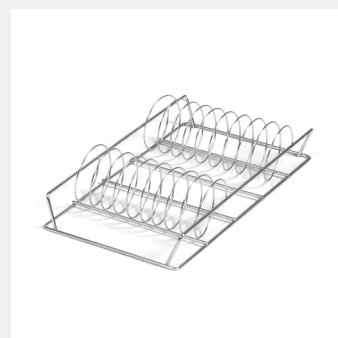
Reference		RB-AH-21	RB-AHS-50	RB-AHS-75
Dimensions	Exterior L x D x H mm	170 x 340 x 180	324 x 360 x 235	324 x 560 x 235
	Interior L x D x H mm	160 x 330 x 170	314 x 350 x 225	314 x 550 x 225
For autoclaves with the following chamber volumes	22 L	1	-	-
	55 L	-	1	-
	79 L	-	-	1



### STAINLESS STEEL BAG SUPPORT\*

Reference		BAP-21	BAP-75
Dimensions	Exterior 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	Exterior L x D x H mm	285 x 185 x 65	300 x 300 x 110	300 x 300 x 85
	Interior 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







## 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-AH**



### **CABLE GLANDS**

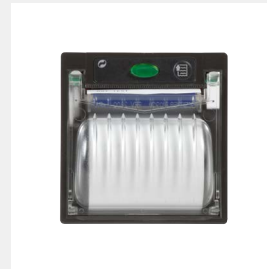


- Installation of up to 8 cable glands within the sterilization chamber walls to enable external temperature probe access in multiple locations for autoclave calibration and validation procedures.
- These ports can either be of 2 or 4 mm of diameter.

References:

**PRENSACLAV** (8 holes ø 2mm),  
**PRENSACLAV2** (8 holes ø 4mm).

### **INTEGRATED THERMAL PRINTER**



- Prints program number, cycle number, temperature, 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**

Consumable:  
Paper: **PAPER-IT**

### **TABLE TOP DOT MATRIX PRINTER**



- Prints program number, cycle number, temperature, date and hour of the run and error messages.
- Used with RS-232 connection.
- Selectable printing cadence between 10 and 240 seconds.

Reference: **ITS**

Consumables:  
Paper: **PAPER-ITS**, Ribbon: **70945**

### **INTEGRATED DOT MATRIX PRINTER**



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

References: **IT/M**

Consumables:  
Paper: **PAPER-ITS**, Ribbon: **70934**

# Front-loading benchtop autoclaves with drying

## Accessories

### 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**

### SW7000 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 RS-232.
  - Supplied with a RS-232 cable, an USB stick that includes the software and installation drivers and a RS-232 to USB adapter.
- Reference: **SW7000**

### 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.

### 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**

### AUTOMATIC WATER FILLING KIT



- Water pump to automate the feed of the water tank with purified water in benchtop autoclaves.
- 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.

References:  
**KLL-21**  
**KLL-AHS**

### 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



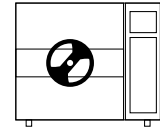
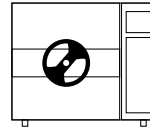
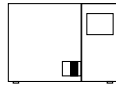


## TECHNICAL SUMMARY OF AHS-DRY SERIES AUTOCLAVES

Available models	AH-21-L	AHS-50-DRY AHS-75-DRY		
<b>General classification</b>	Recommended setting	General laboratory		
	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 small porous objects	✓		
<b>Sterilization technology features</b>	Method to generate steam	Heating elements		
	Type of purge	Vacuum		
	Vacuum drying by heating jacket and vacuum pump	✓		
<b>Transfer of data</b>	RS-232	✓		
<b>Batch printers</b>	Integrated printer	○		
	External 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		
	Heating elements material	Incoloy® 825		
	Gasket material	Silicone rubber		
	Min.- max. sterilization temperature	100 - 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	Digital LCD		
	Screen size	2 lines x 16 digits		
	Total number of available programs	10		
	Automatic microprocessor control	✓		
	Timer start	✓		
	<b>Special cycles and process optimization</b>	Agar mode (temperature holding after cycle ends 40-80°C)	✓	
Final postvacuum drying (to completely dry solid loads)		✓		
Temperature regulation by heart probe		○		
<b>Adjustable cycle parameters</b>	Agar mode	40 - 80°C		
	Temperature of sterilization phase	100 - 134°C		
	Duration of sterilization phase	1 - 250 min		
	Duration of drying phase	3 - 99 min		
	Temperature regulation by heart probe	On/Off		
<b>Other specifications</b>	Sterilization mode (solids or liquids)	✓		
	Air intake with bacteriological filter	✓		
	Independent water tank capacity	6 L	10 L	
	Flexible heart temperature 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-L	AHS-50-DRY	AHS-75-DRY
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 water tank volume L	6	10	10
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	4*	5	5
Trays dimensions L x D mm	190 x 350	315 x 330	315 x 530
Power W	2000	2800	3200
Gross weight Kg	55	125	140
Voltage** V	230V (1P+N) 16A	230V (1P+N) 16A	230V (1P+N) 16A
Frequency Hz	50/60	50/60	50/60

\*Special tray support compatible with up to 5 trays available under request.

\*\*Other voltages available under request.

### Safety features

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

### Regulations

All our AHS-DRY 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	100 - 134°C
Adjustable sterilization time	1 - 250 min
Adjustable drying time	3 - 99 min
Max. pressure	2,1 Barg
Sterilization control system	Fully automatic microprocessor control by either chamber temperature probe or flexible heart temperature probe
Air purge system	Mechanical displacement by vacuum pump
Vacuum drying system	Vacuum pump plus heating jacket
Single prevacuum pulse system	Vacuum pump
Sterilization chamber material	AISI-316L stainless steel
Heating elements material	Incoloy® 825
Gasket material	Silicone rubber
Connection to PC	RS-232
Connection to printer	RS-232 or integrated
Number of programs	10 (4 preset and 6 user free)
Programmable auto-start	Up to 24 h
Screen type	LCD display
Opening door mode	Front-loading swiveling door
Monitoring of sterilization parameters	Self-control of obtained values (T° & t) vs programmed values. Cycle is automatically interrupted if obtained values differ from programmed values
Pressure display	Pressure gauge on control panel
Water management	Independent manually fed water tank that automatically feeds the sterilization chamber. Water returns automatically to the independent water tank after cycle is completed. Optional upgrade to fully automatic water feed directly from water network
Drainage system	Drainage connections for both drainage and overflow of the independent 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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