

# SYSTEMEC LABORATORY AUTOCLAVES

Systemec H-Series. Horizontal floor-standing autoclaves.  
Systemec H-Series 2D. Pass-through autoclaves.





# SYSTEC - THE AUTOCLAVE COMPANY



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PERFORMANCE AND COMPETENCE.



THE POWER OF INNOVATION.  
FOR BETTER STERILIZATION.



### Experience counts

We only make two things. Laboratory autoclaves and devices for the improved sterilization and handling of culture media. Always with the goal of making laboratory work safer, easier, more accurate, reproducible and validatable, and consequently more economical. With over 25 years of experience and continuous intensive cooperation with experts and users, we know how to provide optimal solutions for even the most complex sterilization tasks.

We have the knowledge and experience to produce the best results! Our expertise and know-how are available for you worldwide through specialized and specially selected partners.







### Systec laboratory autoclaves

Specially developed for laboratory sterilization applications, Systec autoclaves make processes safer, easier, accurate, reproducible and validatable.

Systec autoclaves can be used in all laboratory applications, even in demanding sterilization processes

STERILIZATION OF:

-  **Liquids**  
(such as nutrient and culture media),
-  **Solids**  
(such as instruments, pipettes, glassware),
-  **Waste**  
(destructive sterilization of liquid waste in bottles, or solid waste in destruction bags)
-  **Biological hazards in safety laboratories.**





# SYSTEC H-SERIES. HORIZONTAL FLOOR-STANDING AUTOCLAVES.

Autoclaves for all laboratory applications, even for sophisticated sterilization processes.

The new, improved generation of Systec H-Series autoclaves comes in a new design, with a fully revamped interior and a completely new touchscreen control. The combination of new features guarantees higher work precision, easier maintenance of devices, shorter and more efficient process times.

All Systec autoclaves can be upgraded on a modular basis, with options and equipment to optimize sterilization processes for performing validatable sterilization procedures.

In spite of the high loading capacity, these autoclaves are compact and have a comparatively low weight.



16 models  
65 to 1580l  
chamber  
capacity



**OPTIONAL:**  
Stainless steel casing

## Dimensions and performance

Systec	HX-65	HX-90	HX-100	HX-150	HX-200
Chamber dimensions Ø x depth (mm)	400 x 500	400 x 750	500 x 500	500 x 750	500 x 1000
Chamber volume (l) total / nominal	70/65	105/90	115/100	165/150	215/200
External dimensions (mm)					
Height	1590	1590	1690	1690	1690
Width	730	730	830	830	830
Depth	870	1120	910	1160	1410
Net weight (kg)	360	390	420	450	500
Heating capacity (kW)	9,0	9,0	9,0	9,0	9,0

Systec	HX-210	HX-320	HX-430	HX-540	HX-650
Chamber dimensions Ø x depth (mm)	740 x 500	740 x 750	740 x 1000	740 x 1250	740 x 1500
Chamber volume (l) total / nominal	280/210	385/320	495/430	600/540	710/650
External dimensions (mm)					
Height	1870	1870	1870	1870	1870
Width	970	970	970	970	970
Depth	990	1240	1490	1740	1990
Net weight (kg)	570	680	750	820	890
Heating capacity (kW)	18,0	18,0	18,0	18,0	18,0

Systec	HX-580	HX-780	HX-980	HX-1180	HX-1380	HX-1580
Chamber dimensions Ø x depth (mm)	1000 x 750	1000 x 1000	1000 x 1250	1000 x 1500	1000 x 1750	1000 x 2000
Chamber volume (l) total / nominal	735/580	930/780	1130/980	1325/1180	1520/1380	1715/1580
External dimensions (mm)						
Height	2030	2030	2030	2030	2030	2030
Width	1290	1290	1290	1290	1290	1290
Depth	1350	1600	1850	2100	2350	2600
Net weight (kg)	1190	1300	1400	1520	1650	1790
Heating capacity (kW)	36,0	36,0	36,0	36,0	36,0	36,0

Electrical connections for the Systec HX-65 to HX-200: 380 – 400 V, 50/60 Hz, 16 A.  
Electrical connections for the Systec HX-210 to HX-650: 380 – 400 V, 50/60 Hz, 32 A.  
Electrical connections for the Systec HX-580 to HX-1580: 380 – 400 V, 50/60 Hz, 63 A.  
Different voltage available upon request.

# SYSTEC H-SERIES 2D. PASS-THROUGH AUTOCLAVES.

### Triple safety aspects

- One door only can be opened at a time. If one door is open, the other is automatically locked.
- If the autoclave is switched off or if no current is available (e.g. power failure), both doors remain locked.
- If the door at the non-sterile side is opened, a sterilization program has to be performed before the door at the sterile side can be opened.

The locking system can be adapted to customers' wishes. The doors and control panel are made of heat-insulating polyurethane. The housing is completely made of stainless steel and comes with a specially designed frame for smooth junctions with walls. Operation, however, can be carried out from both sides, the position (open or closed) of the opposite door being indicated on the display.

### For use under the most stringent clean room and safety conditions

- For biological safety laboratories. Fitting as a sterilization and pass-through lock for protecting the external environment.
- For clean rooms in laboratories and production facilities as a sterilization and pass-through lock separating sterile and non-sterile areas.



**OPTIONAL:**  
Stainless steel casing

### Dimensions and performance

Systec	HX-90 2D	HX-150 2D	HX-200 2D
Chamber dimensions Ø x depth (mm)	400 x 750	500 x 750	500 x 1000
Chamber volume (l) total / nominal	100/90	160/150	210/200
Net weight (kg)	430	500	560
Heating capacity (kW)	9,0	9,0	9,0

Please see dimensions on separate drawing.

Systec	HX-320 2D	HX-430 2D	HX-540 2D	HX-650 2D
Chamber dimensions Ø x depth (mm)	740 x 750	740 x 1000	740 x 1250	740 x 1500
Chamber volume (l) total / nominal	370/320	480/430	590/540	700/650
Net weight (kg)	850	930	1020	1100
Heating capacity (kW)	18,0	18,0	18,0	18,0

Please see dimensions on separate drawing.

Systec	HX-580 2D	HX-780 2D	HX-980 2D	HX-1180 2D	HX-1380 2D	HX-1580 2D
Chamber dimensions Ø x depth (mm)	1000 x 750	1000 x 1000	1000 x 1250	1000 x 1500	1000 x 1750	1000 x 2000
Chamber volume (l) total / nominal	680/580	880/780	1075/980	1270/1180	1465/1380	1665/1580
Net weight (kg)	1280	1400	1500	1600	1770	1920
Heating capacity (kW)	36,0	36,0	36,0	36,0	36,0	36,0

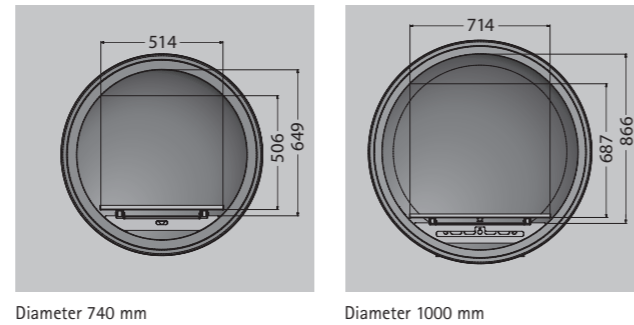
Please see dimensions on separate drawing.

Electrical connections for the Systec HX-90 2D to HX-200 2D: 380 – 400 V, 50/60 Hz, 16 A.  
 Electrical connections for the Systec HX-320 2D to HX-650 2D: 380 – 400 V, 50/60 Hz, 32 A.  
 Electrical connections for the Systec HX-580 2D bis HX-1580 2D: 380 – 400 V, 50/60 Hz, 63 A.  
 Different voltage available upon request.

# SYSTEC H-SERIES, SYSTEC H-SERIES 2D. AVAILABLE WITH FOUR CHAMBER DIAMETERS.

Available in four chamber diameters: 400 mm, 500 mm, 740 mm, and 1000 mm. The 1000 mm diameter provides a usable chamber volume of a 6 x 6 square chamber autoclave.

\*further drawings on request



**EXPERT**

### Systec HX/HX 2D

For all laboratory applications, even for sophisticated state-of-the-art sterilization processes. With all possibilities to add additional options for process optimization to enable validatable sterilization applications.



#### ★ Standard Features

Integrated steam generator separated from the chamber	■
Housing, support frame and pressure chamber, made of corrosion-resistant stainless steel	■
Temperature and pressure range 140 °C, 4 bar absolute pressure	■
The pressure vessel of the autoclave is made of corrosion-resistant stainless steel 1.4404 (AISI 316L)	■
All connections on the pressure vessel are designed as Tri-Clamp	■
Touch screen control	■
Number of sterilization programs (up to 100)	■
Code-secured access rights for changing parameters and further safety-relevant intervention	■
Internal memory capacity for storing up to 10 years of data backups	■
Timer for programmable start time	■
Flexible PT-100 temperature sensor (class A)	■
Additional temperature sensor in condensate exhaust	■
Special program for Durham tubes	■
Calculation of FO value	■
Special program for destructive sterilization with fractional heating for more efficient venting	■
Waste water temperature is water-cooled and thermostatically controlled	■
Adjustable automatic opening of door at end of program	■
Network and USB ports for external data transfer	■
Text input for batch information (up to 20 characters)	■
User account control (standard). The standard user account control has three permanently pre-configured and fixed user groups, each with one available user (Administrator, Operator or Supervisor).	■
Validation port for introducing measuring equipment	■
Integrated feature for comprehensive batch documentation, with export as PDF and CSV	■
Time synchronization with time server via network or internet	■

#### + Options for process optimization

Rapid cooling for efficient and safe cooling of liquids	□
Radial ventilator and Ultracooler to speed up the cooling process	□
Spray heating and / or spray cooling for fast heating and cooling of liquids	□
Steam-air mixture method: Support pressure during the heating, sterilization and cooling phases. Particularly suitable for vessels which are at risk of bursting or deformation, and for sealed vessels.	□
Vacuum system to carry out the validated sterilization of solids and wastes in disposal bags	□
Superdry for drying solids (only in combination with optional vacuum system)	□
Exhaust air filtration (including condensate deactivation) for safe sterilization of hazardous biological substances	□

#### + Options for documentation

Integrated printer for batch documentation	□
Save to Folder. Automatic data transfer via FTP/SFTP	□
Enhanced user account control: Up to 100 user and 100 groups can be configured and administered	□
Advanced CFR 21 Part 11 solution including AuditTrail. Enables run data to be electronically signed (so that it is tamper-proof). Documentation of all changes to the device and all alarm messages.	□
Personalized certificates for electronic signatures of run data (only applicable with the extended user account control)	□

#### + Further available options

Extension of temperature and pressure ranges to 150 °C / 5 bar absolute pressure	□
All fittings and valves in the supply lines (from media connection to sterilization chamber) for demineralized water, steam or compressed air are made of stainless steel. All piping is made of FDA-certified PTFE.	□
Keep-warm function for liquids after program has finished	□
Potential-free contact: The potential-free contact can be used to establish an external potential-free connection to one or more digital outputs or device status lines. This potential-free contact helps to prevent malfunctions when switching external actuators (such as signal lamps, valves and pumps).	□
Combined heating: The combined heating function supplements the built-in steam generator with an external steam heating option	□
External steam supply: connection to an external steam source (house steam)	□
Additional programs: such as hydrolytic resistance of glassware <sup>1</sup> , rubber-closure test <sup>2</sup> , ramp programs, material test programs	□
Feature for the integration into LIMS and SCADA systems via OPC UA	□

<sup>1</sup> According to EP 3.2.1 and USP <660>

<sup>2</sup> According to EP 3.2.9 and USP <381>

- Systec autoclaves are delivered ready for subsequent installation of all options.

- Further options and special programs as well as baskets and inserts, transport and loading systems on request.

■ = Standard  
□ = Optional

### Standard functions in all models

- Operation via touch-screen with Systec-PLC
- Temperature- and pressure-dependent door locking in line with international standards and regulations
- Redundant process control; temperature and pressure are continuously monitored and controlled during the entire sterilization cycle.
- Rapid heat-up via optimized heat transfer to the liquid media
- Flexible PT-100 temperature sensor for temperature measurement in a reference vessel:
  - Guarantees attainment of the desired sterilization temperature in the liquid media.
  - Guarantees cooling of the liquid media to a temperature that is safe for removal.



# PERFECT DESIGN AND CONSTRUCTION. INNOVATIVE TO THE LAST DETAIL.

## State-of-the-art engineering

Systec autoclaves are state-of-the-art, both in their mechanical and electrical components; ensuring a new quality of laboratory sterilization processes. The enhanced components enable the lab to meet all requirements for today and for the future.

### All-round quality

The pressure vessel is made of corrosion-resistant stainless steel 316L (1.4404), which makes cleaning easy. The autoclave support framework and housing are also made of stainless steel. An approved safety valve for excess pressure is included. The highly efficient, high-quality melamine foam insulation material releases no particles; Systec autoclaves can thus be used under clean-room conditions.

### Dual sensors as standard

Temperature and pressure are controlled via an electronic pressure sensor and a flexible PT-100 temperature sensor, respectively. The PT-100 sensor is placed in a reference vessel with liquids. The Systec HX-Series autoclaves also have an additional temperature sensor in the floor drain.

Systec autoclaves are equipped with the following connections at the rear:

	HX
Demineralized water inlet for steam generation	■
Compressed air (Systec HX-65 to HX-200)	□
Compressed air (Systec HX-210 to HX-1580)	■
Cooling water	■
Common outlet	■
Network / USB	■
Flexible cord with CEE plug	■
Connection to cooling circuit (Systec HX-65 to HX-200)	□
Connection to cooling circuit (Systec HX-210 to HX-1580)	■

■ = Standard  
□ = Optional

## Everything in accordance with standards and regulations


Equipped for the future! Systec H-Series autoclaves are the first to be designed for higher temperatures and pressures. The pressure vessel is designed for operations at 170 °C and 5 bar absolute pressure. Optional temperature and pressure range extension accessories adapt all control and safety components to the higher temperature and pressure. This option can be retrofitted.


Systec autoclaves comply with the following standards:

- Pressure vessel:
- 2014/68/EU Pressure Equipment Directive
  - ASME Boiler & Pressure Vessel Code, Section VIII, Division 1
  - China Stamp

- Other guidelines:
- 2014/35/EU Low Voltage Directive
  - 2014/30/EU on Electromagnetic Compatibility


All autoclaves are CE marked.

 We will be happy to provide a complete list of standards and summary of regulations on request.




EN 61010

Safety standard



DIN 58951

Steam sterilizers for laboratory sterilization loads



DIN 58950

Steam sterilizers for pharmaceutical sterilization loads

## Safety and convenience

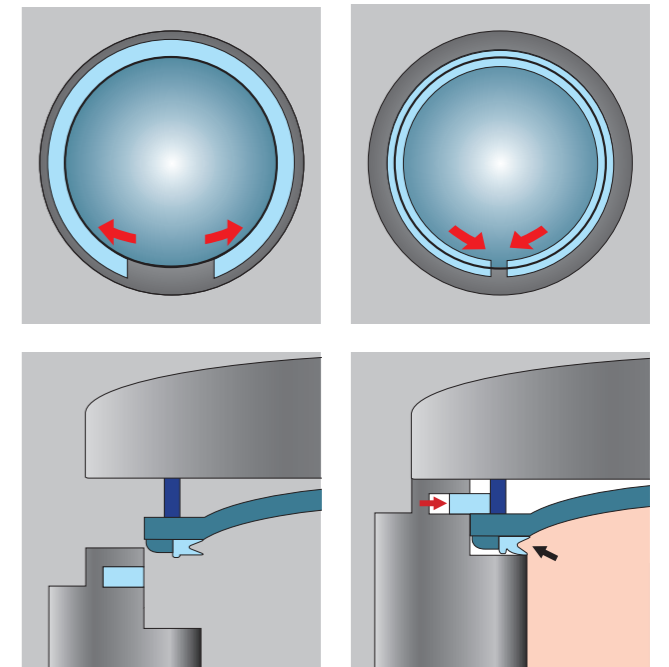
### Automatic door-opening system

Easy but safe – on closing, the door is automatically locked by a circumferential ring system. A special lip seal made of heat-resistant silicone provides reliable tightness; the more the steam pressure increases, the tighter the seal becomes – without the need for additional compressed air or other media!

The door-locking system is temperature-controlled according to the safety requirements for electrical equipment for measurement, control, and laboratory use (DIN EN (IEC) 61010-2-040). The door remains locked as long as there is excess pressure in the chamber. The door and other parts of the pressure vessel and housing are made of stainless steel. The attractively designed front cover, which also incorporates the control panel, display and parts of the control processing system, is made of heat-resistant, insulating plastic. There is no risk for the operator of coming into contact with hot components.

### Automatic door-opening

The autoclave door-opening works autonomously – either by pressing a button or automatically at the end of a program. A simple system but most useful in practice. Residual steam is exhausted automatically without intermission. Residual heat is used to dry the items being sterilized during a final short phase in the autoclave. Automatic door-opening is restricted to an angle of approx. 15°; this avoids possible contamination from the outside. This is especially useful when sterilized items have to remain in the autoclave for cooling and drying. Subsequently, for removing the sterilized items, the door can be completely opened manually.



Door open, circumferential locking ring in the "ready" position.

Door closed, circumferential locking ring in locking position. The internal steam pressure presses the lip seal between door and chamber.



# PERFECT DESIGN AND CONSTRUCTION. INNOVATIVE TO THE LAST DETAIL.

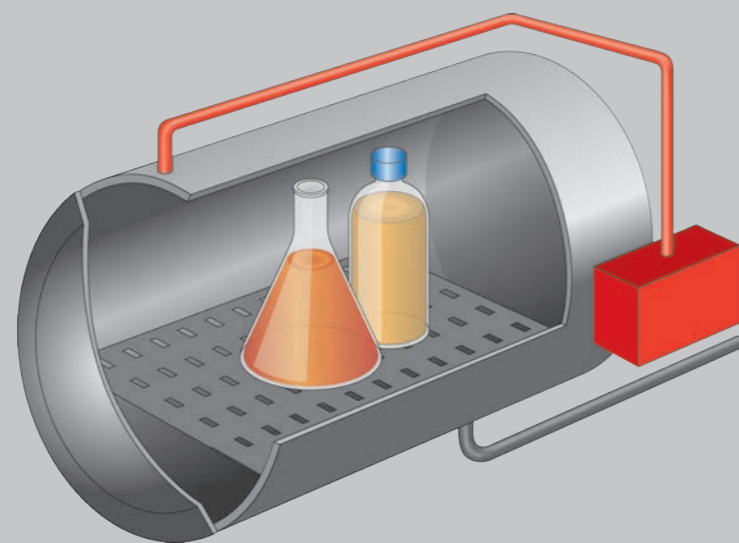
## Steam generation by steam generator

A separate steam generator is incorporated in the housing.

This has numerous advantages:

- No heating elements and no reservoir for dirty water in the chamber.
- In conjunction with the standby pre-heating function, only 10 min. heating time to reach 121 °C with an empty chamber (smaller autoclaves, e.g. Systec HX-65) are required.
- Improved air removal by forcing the air to the bottom of the chamber via gravitation. The air is eventually displaced downwards by the steam flowing in from above.

- Accuracy better than  $\pm 0.3$  K with empty chamber.
- Quicker cooling as neither the hot water in the chamber nor the separate steam generator need to be cooled.
- After cooling, steam is immediately available for the next sterilization run.



Systec H-Series

## Condensation of steam instead of removal

Exhaust steam is condensed automatically via a PT-100-regulated cooling system. This prevents odors and protects waste water piping that may be made of plastic.

## Combinated heating

The combined heating function supplements the built-in steam generator with an external steam heating. A program can be configured to use the internal or external steam heating option. The external steam is supplied at its own connection by the customer's facility.

# EVERYTHING UNDER CONTROL.

## Operation by touch-screen technology

Operation is easy and rapid via a large (5.7 inch) touch screen interface for direct reading. This innovation offers additional options and increased flexibility when working with the autoclave.

For example, process data can be displayed numerically or graphically. 7 programs are pre-defined but can be expanded (up to 100) as required by the user.

To create a new program, the user is guided through the process by a menu dialog. Every new program is automatically assigned to a permanent, unalterable name and can also be given an individual designation by the user. All process parameters can be individually altered.

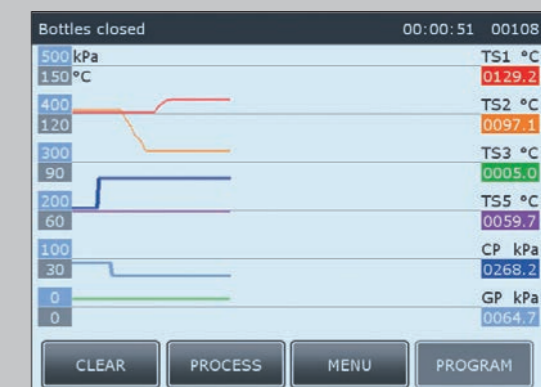
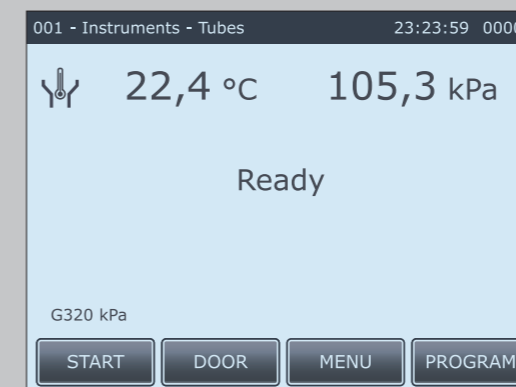
### Pre-defined programs

- 1 Solids
- 2 Waste bags
- 3 Liquid waste
- 4 Liquids
- 5 Cleaning
- 6 Vacuum test\*
- 7 Bowie-Dick test\*

These can be expanded to 100 sterilization programs.  
\*Only in combination with a vacuum device.

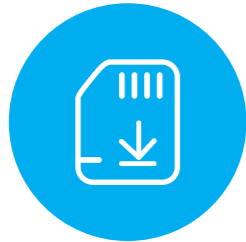


**Shorter and more efficient process times**  
Thanks to the completely newly developed control of the autoclaves.





## THE POSSIBILITIES OF DOCUMENTATION.



### Internal memory STANDARD

The internal memory for process data uses the internal storage; this is part of the Systec PLC. The capacity is sufficient to store process data over an average period of minimum 10 years.



### Electronic data output STANDARD

The integrated documentation feature is used for comprehensive batch documentation and for exporting the electronic data as PDF or CSV via network interface\* or USB. The essential values of the individual program phases and process parameters are presented in a tabular overview, followed by a graph and a numerical table of the program sequence.

\*the network interface requires the optional „Save to Folder“ feature for downloading the file to an FTP/SFTP server



### Save to Folder OPTIONAL

The „Save to Folder“ function automatically exports the current process log to a computer or server in the same network by either FTP, SFTP or FTPS after the cycle has been finished.



### SCADA connection OPTIONAL

All relevant information (current values of defined analogue and digital inputs and outputs of a device, current process status, alarms) is transmitted by the autoclave using the OPC-UA protocol.



### Printer OPTIONAL

An integrated printer is optionally available for documenting the program type, batch number, date, and time. The printout contains the essential information of a program cycle. It shows the basic parameter settings and the success or failure of a program cycle. The printout is created in the language that has been selected on the device.

## THE POSSIBILITIES OF DOCUMENTATION.

### Advanced CFR 21 Part 11 solution OPTIONAL

Data can be downloaded from the autoclave as PDF and/or CSV (Excel) files\*, using the USB or network interface\*\*. Both the PDF and CSV files are electronically signed by the autoclave. This electronic signature is clearly assigned to the respective autoclave. It also indicates whether the exported files are valid or not. Any attempt of manipulation will result in the file being marked as invalid.

The advanced CFR 21 Part 11 solution also includes

- Extended user account control. This includes an individual or global program list for each user, the assignment of the user to an individually created group (e.g. user, supervisor, administrator, cleaner, etc.) which has customizable rights.
- AuditTrail: All executed actions (e.g. changing parameters, starting or stopping sterilization programs) are documented and can be traced back to the respective user and time stamp (date/time).
- There are up to five fields for electronic signatures. These are used to sign the exported PDF or CSV files on a PC (or any other device with the functionality to sign documents electronically). The electronic signatures are not included in this option.

\* the network interface requires the optional „Save to Folder“ feature for downloading the file to an FTP/SFTP server

\*\* only cycle data can be transferred via the network interface

### Backup feature STANDARD

The backup function (via USB) enables the user to save and restore:

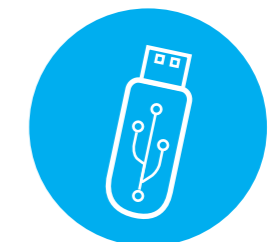
- program lists and their parameters,
- complete backups of the device with the current device software and its databases.

The backup file is encrypted and thus protected against manipulation.

### Real-time clock STANDARD

The device has a real-time clock with automatic changeover to daylight savings time. Time, date and time zone can be set manually via the touch screen, the web server or automatically via the internet. A time server and an internet connection are required to automatically set the time.

- Automatic summer/wintertime
- Automatic leap year detection



# STERILIZATION OF LIQUIDS.



## Cooling

Systec supplies autoclaves guaranteeing precise sterilization processes, safe handling and increased productivity. Numerous cooling functions are available for liquid sterilization. Many of these functions are equipped as standard or available as options depending on the model range selected.

Various optional rapid cooling systems enable the cooling times for liquids to be significantly reduced. This conserves culture media and makes utilization of the autoclave more efficient.

New system- and process technology now make it possible to substantially reduce the overall time required for the sterilization process. This means that several hours of time can be saved! It also means that the media is not exposed to heat longer than necessary (see diagram 1: conventional vs. rapid cooling).

## Mantle cooling with cooling water and support pressure

### Permanently under control

During the entire sterilization process a flexible PT-100 temperature sensor monitors the temperature in a reference vessel. It is thus guaranteed that the sterilization period begins only once the sterilization temperature has been attained in the liquid to be sterilized. The cooling temperature is also constantly monitored. In accordance with relevant standards to prevent delayed boiling, the lid can only be opened once the temperature of the liquid has been reduced to at least 80 °C. The use of support pressure in the form of sterile-filtered compressed air during the cooling phase reliably prevents the culture medium from boiling.

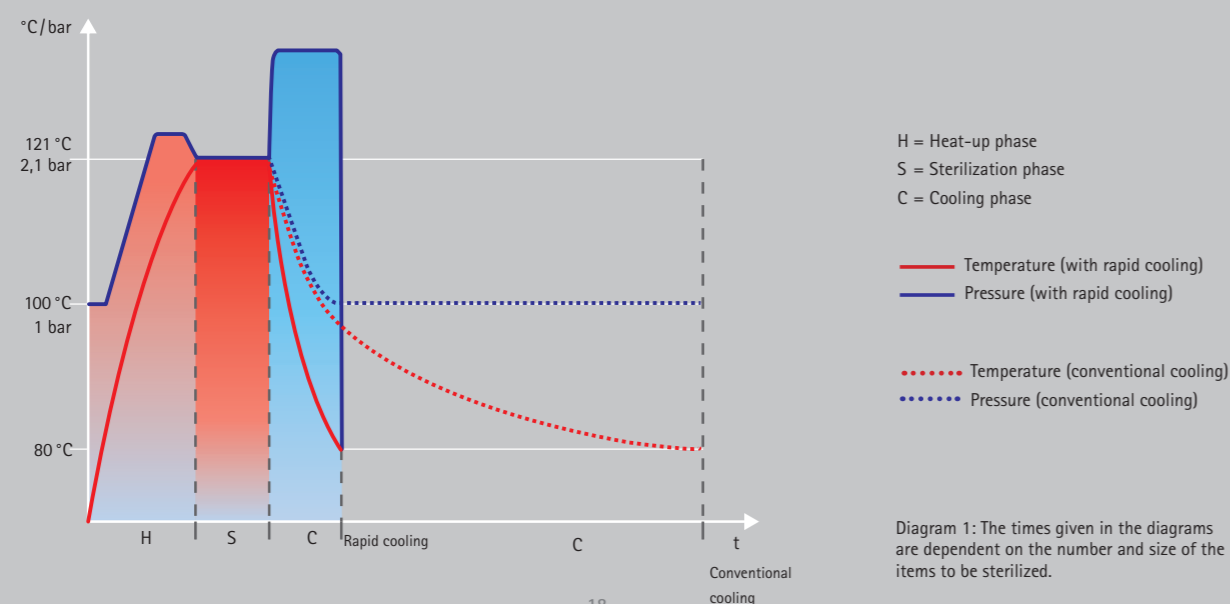
In addition to conventional cooling by regulated steam exhaust down to 100 °C and subsequent very slow self-cooling down to 80 °C, optional cooling systems for rapid cooling are available.

- Cooling with ambient air ventilation
- Mantle cooling with cooling water
- Mantle cooling with cooling water and support pressure
- Radial ventilator for air circulation and accelerated heat removal from the chamber
- Ultracooler
- Spray cooling with recirculated and re-cooled sterile water and support pressure

### Advantages

- No loss of liquid due to boiling of the culture media
- Improved productivity from reduced cycle times and the full utilization of the filling volume in each bottle
- Prevention of delayed and over-boiling
- Prevention of the risk of bottles bursting during or after sterilization
- Prevention of re-contamination by the use of hermetically sealed bottles during sterilization
- Reduction of cooling time by up to 60 %

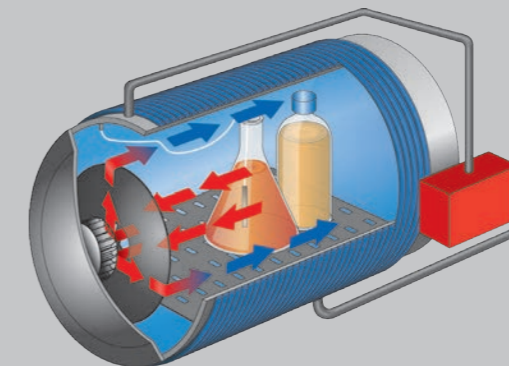
Diagram 1: Overview conventional cooling / rapid cooling



## Radial ventilator

In conjunction with optional jacket cooling with cooling water and support pressure, the Radial ventilator ensures accelerated removal of heat from the sterilization items to the cooled chamber jacket (cooling coil). The Radial ventilator is located in the lid of the chamber (no reduction of chamber depth!) and is driven by a magnetic motor, which is installed externally, under the door cover.

- The Radial ventilator is placed in the door of the sterilization chamber so that the usable space in the autoclave is not reduced!
- Ventilation performance 250 m<sup>3</sup>/h
- Reduction of cooling time by up to 70 %



Systec H-Series

## Ultracooler

In conjunction with optional jacket cooling with cooling water, support pressure and Radial ventilator, it is possible to significantly reduce the cooling time and the entire sterilization process by integrating the additional Ultracooler heat exchanger.

- The Ultracooler is also placed in the door of the sterilization chamber near the radial ventilator so that the usable space in the autoclave is not reduced. This way, the entire interior space can be used for full loading!
- Reduction of cooling time by up to 90 %
- Depending on the load, cooling times between 15 and 60 minutes can be achieved





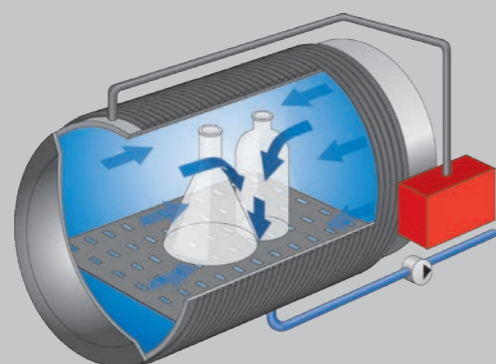
# STERILIZATION OF SOLIDS AND WASTE IN DISPOSAL BAGS.



## Vacuum system

Typical solids are pipette tips (in boxes), empty glassware and waste in bags as well as porous materials such as filters or fabrics. For this type of sterilization, it is important to remove all air from the products to be sterilized in order to ensure precise, reproducible and validatable sterilization results.

The vacuum device effectively removes the air from solids, tubing, porous materials, fabrics and disposal bags, allowing the steam to penetrate completely. The process includes a fractionated pre-vacuum phase in combination with the standard steam generator. This is the only way to achieve validatable sterilization of porous materials, solids, fabrics, or waste in bags.

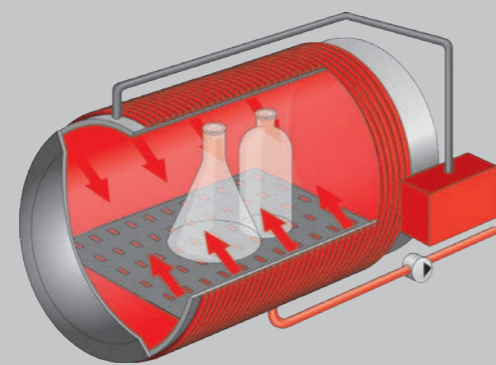


Systec H-Series

## Superdry – for drying solids

Superdry is an extension of the vacuum drying. During the drying phase of vacuum drying, the boiling point of the hot condensate is lowered by generating a vacuum, so that the condensate evaporates. In the program for solid wastes, odours are minimized by the vacuum drying.

The Superdry function increases efficiency when drying solids and porous sterilization materials (such as filters and textiles). Here, thermal energy for drying is supplied to the outer sterilizing chamber heater via the standard steam generator. Vacuum drying, when used with Superdry, makes subsequent drying in a separate drying cabinet unnecessary!



Systec H-Series

# STERILIZATION OF BIOLOGICAL SUBSTANCES.



## Permanently monitored – exhaust air filtration with condensate inactivation

For the sterilization of hazardous biological substances, Systec autoclaves can be fitted with an optional air exhaust filtration system.

The autoclavable sterile filter, consisting of a filter cartridge with a PTFE membrane (pore size 0.2 µm), is installed in a pressure-proof housing and can be quickly changed at any time. The filter is automatically sterilized inline during the sterilization process, monitored by a PT-100 temperature sensor.

The condensate is retained inside the pressure vessel during the heating and sterilization phases and is therefore also sterilized. By air exhaust filtration and condensate inactivation, it is ensured that no microorganisms can escape, before the sterilization phase was successfully completed.

This ensures that all gases and liquids, representing a hazard, are filtered and sterilized in-line, if they are to be released into the atmosphere.



## Select the right process for your sterilization application

As already described, several options are available that are necessary to obtain correct and validatable results, as well as rapid cooling times (especially in the case of liquids). The options available depend on the items to be sterilized. It is therefore important to think carefully about your requirements so that the autoclave can be optimally configured for the necessary tasks.

A validatable sterilization process of biological efficiency can only be obtained if the correct instrument configuration is used. The table below provides help in establishing the desired configuration; however, we recommend obtaining additional advice from our experts.

Porcedure	Ventilation				Cooling		Drying		Other Exhaust air filtration
	Gravitation	Simple pre-vacuum	Pulsed excess pressure	Fractionated pre-vacuum	Conventional cooling with slow pressure release	Rapid cooling system with support pressure	Surface drying without vacuum	Drying with subsequent vacuum + Superdry	
<b>Applications:</b>									
Liquids	+	?	-	-	?	+	?	-	
Unpacked non hollow items	+	+	+	+			?	+	
Porous materials (filters, fabrics)	-	?	?	+			-	+	
Hollow items (pipette tips, empty glassware, tubes and hoses)	-	-	-	+			-	+	
Contaminated waste in destruction bags	-	-	?	+			-	-	+

## SYSTEM ACCESSORIES FOR EASE OF HANDLING.

### Systec H-Series and Systec H-Series 2D

#### Transport cart and transfer cart with Easy Load

Large autoclaves in particular can be easily and securely loaded using special transport and transfer carts. The items to be sterilized can either be placed directly on the transfer cart with rails or using a basket. The transport cart can be moved and docked to the autoclave and fixed in position. The handle can then be loosened to allow the transfer cart to slide into the autoclave on fixed rails.



#### Rack system

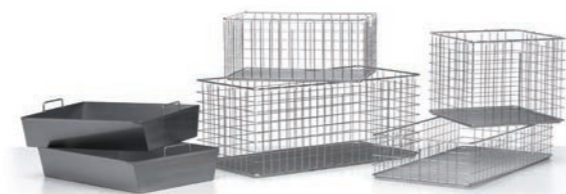
To fully utilize the available space in the chamber, especially when sterilizing small items, the autoclaves can be fitted with a rack system. The entire rack system or individual trays can be removed.



#### Stainless steel quality

All components are made of stainless steel and are cleanly welded. The transport carts have large cartwheels, two of them fitted with brakes to ensure safe locking.

Loading baskets, inserts and other accessories available upon request.



## CUSTOM DEVELOPMENTS FOR SPECIAL APPLICATIONS.

### Additional features and programs

For example for the food industry for the sterilization of liquids in closed vessels, plastic bottles, bags, cans, blister packs and food packs, e.g.:

- Devices and programs for sterilization in a steam / air mixture
- Devices and programs for sterilization with spray heating and/or spray cooling

### Custom products for individual tasks

Development and construction of modified systems such as:

- Autoclaves in an array
- Special programs for material testing or environmental simulations
- Extension of sterilization time to up to 365 days
- Repetitive cycles program, for up to 500 repetitive cycles
- Dry heat chambers with heated compressed air
- Heating and cooling with ramps

Detailed information on customized designs available on request.

Test autoclaves are at your disposal in our test laboratory for the evaluation of your process parameters.





# PRODUCT RELATED ACTIVITIES AND ADDITIONAL SERVICES.



**Product related activities:**

- Development
- Design
- Production of series products
- Production of custom products
- Application and technical advice

**Additional services:**

- Installation and start-up
- Special technical developments
- Tests and process development
- Individual service on-call
- Contract service
- Qualification and validation
- GMP-compliant documentation
- Consultancy on sterilization processes and special requirements
- Process development

**Qualification and validation**

Within the scope of our service we offer you qualification and validation work with GMP-compliant documentation:

- **DQ – Design Qualification**  
– Definition of requirements regarding the autoclave with respect to process technology
- **IQ – Installation Qualification**  
– The autoclave is manufactured and installed according to the defined DQ requirements
- **OQ – Operation Qualification**  
– The autoclave works as specified in DQ
- **PQ – Performance Qualification**  
– The autoclave sterilizes the product permanently according to pre-defined specifications
- **FAT – Factory Acceptance Test**  
– Evaluation of the equipment during and after the assembly process by verifying that it is built and operates in accordance with design specifications
- **SAT – Site Acceptance Test**  
– Protocol for testing new equipment at the manufacture site

**Quality Assurance according to ISO 9001**

Our Quality Management complies with the most stringent requirements of testing and documentation. Each component is subject to delivery control and each autoclave is checked and tested for all functions before delivery.



**Our environmental management system according to ISO 14001**

Additionally, we maintain an environmental management system according to DIN EN ISO 14001. We are happy to provide our customers with details regarding our environmental policy upon request.



# SALES AND SERVICE IN GERMANY.

## Systec service stations in Germany

A Systec service technician can be contacted through our central service number:

+49 6403 67070-0



## SALES AND SERVICE WORLDWIDE.

### Worldwide via trained partners.

Systec laboratory autoclaves and Systec media preparators are performing reliably in numerous countries on every continent. Our qualified partners are available to you for consulting, sales and service.



## SYSTEC PRODUCT OVERVIEW.

### Autoclaves

Autoclaves as horizontal or vertical construction. Pass-through autoclaves for wall recessing in safety areas (e.g. biological safety laboratories or clean rooms).

- Vertical floor-standing autoclaves  
Systec V-Series  
40 to 150 liters
- Horizontal bench-top autoclaves  
Systec D-Series  
45 to 200 liters
- Horizontal floor-standing autoclaves  
Systec H-Series (new Generation)  
65 to 1580 liters
- Pass-through autoclaves  
Systec H-Series 2D (new Generation)  
90 to 1580 liters



### Prepare, sterilize and dispense culture media.

Systems for the preparation and sterilization of microbiological culture media and for the automatic filling of Petri dishes, bi-plates, tri-plates and test tubes.

- Media preparators  
Systec Mediaprep  
10 to 120 liters
- Plate pourer and tube filler  
Systec Mediafill



# Systemec

the autoclave company



Headquarters Germany:  
Systemec GmbH & Co. KG  
Konrad-Adenauer-Straße 15  
35440 Linden, Deutschland  
T +49 6403 67070-0  
F +49 6403 67070-222  
info@systemec-lab.de  
www.systemec-lab.de



Branch office Switzerland:  
Systemec Schweiz GmbH  
Gewerbestrasse 8  
CH-6330 Cham, Switzerland  
T +41 41 781 52 80  
F +41 41 781 52 79  
info@systemec-lab.ch  
www.systemec-lab.ch



Branch office China:  
Systemec (Shanghai) trading co., ltd  
D1-201, No.6000 Shenzhuan Rd.  
Songjiang 201619  
Shanghai, China  
T +86 21 6019 0256  
info@systemec-lab.com.cn  
www.systemec-lab.com.cn

