



The Power of Innovation. For better Sterilization.
Autoclaves: Systec V-Series

Systec
the autoclave company

Systec V-Series: Vertical autoclaves.

These autoclaves don't just seem to be different; they are different. Exclusively developed for special sterilization applications in the laboratory, processes become easier, safer, more precise, more reproducible and validatable.

Systec V-40

Systec V-55

Systec V-65

Systec V-75



Dimensions and performance

| Systec | V-40 | V-55 | V-65 | V-75 | V-95 | V-100 | V-120 | V-150 |
|---------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Chamber dimensions | | | | | | | | |
| Ø x depth in mm | 344 x 450 | 344 x 600 | 400 x 500 | 400 x 600 | 400 x 750 | 500 x 500 | 500 x 600 | 500 x 750 |
| Chamber volume | | | | | | | | |
| in liters total / nominal | 45 / 40 | 60 / 55 | 70 / 65 | 80 / 75 | 100 / 95 | 110 / 100 | 130 / 120 | 160 / 150 |
| External dimensions | | | | | | | | |
| W | 500 | 500 | 550 | 550 | 550 | 650 | 650 | 650 |
| H | 920 | 920 | 960 | 960 | 1080 | 985 | 985 | 1110 |
| D | 740 | 740 | 780 | 780 | 780 | 900 | 900 | 900 |
| Heating power kW | 3,6 | 3,6 | 9,0 | 9,0 | 9,0 | 9,0 | 9,0 | 9,0 |

Electrical connections for Systec V-40 and V-55: 220 – 240 V AC, 50/60 Hz, 16 A

Electrical connections for Systec V-65 – V-150: 380 – 400 V, 50/60 Hz, 380 – 400 V, 50/60 Hz, 3-phase to neutral, 16 A

Other voltages and single-phase operation available on request

Space advantage!

We have created a new class of autoclave with these new dimensions: as before, compact and space-saving but with increased chamber height. Advantage: optimal loading capacity with most standard media and Erlenmeyer flasks. Up to 50% more loading capacity.

A new dimension in technology and design.

Systec V-95

Systec V-100

Systec V-120

Systec V-150



Loading capacity*

Erlenmeyer flasks

| Systec | V-40 | V-55 | V-65 | V-75 | V-95 | V-100 | V-120 | V-150 |
|---------|--------|--------|--------|--------|--------|--------|--------|--------|
| 250 ml | 3 x 11 | 4 x 11 | 3 x 14 | 4 x 14 | 5 x 14 | 3 x 22 | 4 x 22 | 5 x 22 |
| 500 ml | 2 x 7 | 3 x 7 | 2 x 8 | 3 x 8 | 4 x 8 | 2 x 14 | 3 x 14 | 4 x 14 |
| 1000 ml | 2 x 4 | 2 x 4 | 2 x 5 | 2 x 5 | 3 x 5 | 2 x 8 | 2 x 8 | 3 x 8 |
| 2000 ml | 3 | 2 x 3 | 4 | 2 x 4 | 2 x 4 | 6 | 2 x 6 | 2 x 6 |
| 3000 ml | 1 | 1 | 2 | 2 | 2 x 2 | 4 | 4 | 2 x 4 |
| 5000 ml | 1 | 1 | 1 | 1 | 2 x 1 | 3 | 3 | 2 x 3 |

Loading capacity*

Schott-Duran media flasks

| Systec | V-40 | V-55 | V-65 | V-75 | V-95 | V-100 | V-120 | V-150 |
|----------|--------|--------|--------|--------|--------|--------|--------|--------|
| 250 ml | 3 x 17 | 4 x 17 | 3 x 20 | 3 x 20 | 5 x 20 | 3 x 30 | 3 x 30 | 5 x 30 |
| 500 ml | 2 x 11 | 3 x 11 | 2 x 15 | 3 x 15 | 4 x 15 | 2 x 22 | 3 x 22 | 4 x 22 |
| 1000 ml | 8 | 2 x 8 | 2 x 9 | 2 x 9 | 3 x 9 | 2 x 15 | 2 x 15 | 3 x 15 |
| 2000 ml | 4 | 2 x 4 | 5 | 2 x 5 | 2 x 5 | 8 | 2 x 8 | 2 x 8 |
| 5000 ml | 1 | 1 | 2 | 2 | 2 x 2 | 4 | 4 | 2 x 4 |
| 10000 ml | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 |

*At max. loading, partially without baskets

Autoclaves Systec V-series: Performance categories of the 3 series types.

X = Standard
0 = Optional

| Vertical top-loading autoclaves Systec V-series | type | VX | VE | VB |
|--|------|----|----|----|
| From the sterilization chamber separated steam generator integrated into the housing | | x | | |
| Extension of temperature and pressure to 150 °C / 5bar (only for sizes Systec V-65 – V-150) | | 0 | 0 | |
| Number of sterilization programs | | 25 | 12 | 3 |
| Password secured access rights for parameterization and for further security relevant interventions | | x | x | |
| Pre-programmable automatic door opening at the end of a program | | x | x | |
| Additional PT-100 temperature sensor in the condense exhaust | | x | | |
| Rapid cooling | | 0 | 0 | |
| Pre- and post-vacuum | | 0 | | |
| Air exhaust filtration | | 0 | 0 | |
| Drying 'Superdry' (only in conjunction with an optional vacuum system) | | 0 | | |
| RS 232 and RS 485 for external data transfer (network-compatible) | | x | x | |
| PC-Software for extensive documentation (network-compatible) | | 0 | 0 | |
| Internal memory for documentation of up to 500 sterilization cycles | | x | x | |
| Integrated SD-Card-Slot inclusive SD-Card (1024 MB) for data backup of up to 10.000 sterilization cycles and for transmission of process data to a PC via SD-Card reader | | 0 | 0 | |
| Start by clock, Timer for programmable start time | | x | x | |
| Steam exhaust condensation, water cooled, thermostatic controlled | | x | x | |
| "Autofill" - Automatic de-mineralized water feed for steam generation | | x | x | |
| Special program for waste sterilization with pulsed heat-up for more efficient air exhaust | | x | x | x |
| Temperature holding function after the end of program for liquids | | x | x | |
| Special program for Durham-Tubes | | x | x | |
| Housing and basic frame construction out of corrosion resistant stainless steel | | x | x | x |
| Prepared for subsequent rapid cooling installation | | x | x | |
| Prepared for subsequent installation of vacuum system | | x | | |
| Prepared for subsequent drying installation | | x | | |
| Calculation of FO value | | x | x | |

Further options / Special programs (on request)
Special accessories like baskets and inserts, lifting devices and wheels, available on request.

Autoclaves Systec V-series: Three types with different performance categories.

VX Systec VX

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 to be carried out.

VE Systec VE

For basic laboratory applications and media sterilization. With limited possibilities to add additional options for process optimization.

VB Systec VB

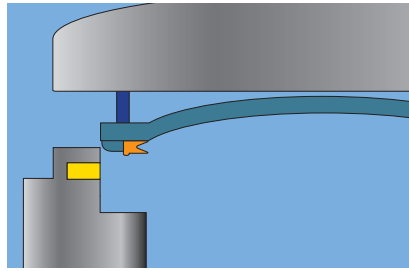
For simple process applications. No options available for process optimization.



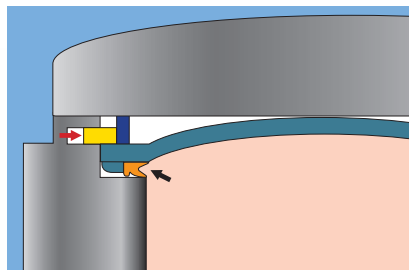
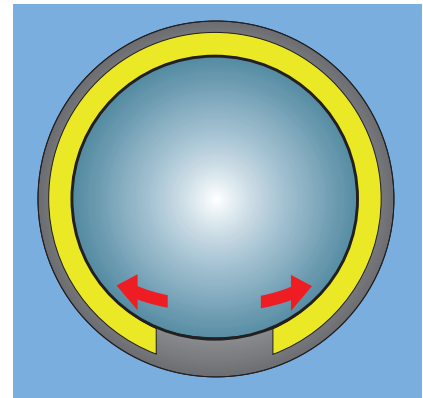
Advanced technology, design and electronic intelligence!

Systec V-Series autoclaves are completely new designs: innovative mechanical and electronic components are incorporated and guarantee high sterilization quality in the laboratory. They thus fulfill those requirements that will ultimately be demanded of all laboratory sterilization processes in future, e.g. higher sterilization temperatures for work with prions.

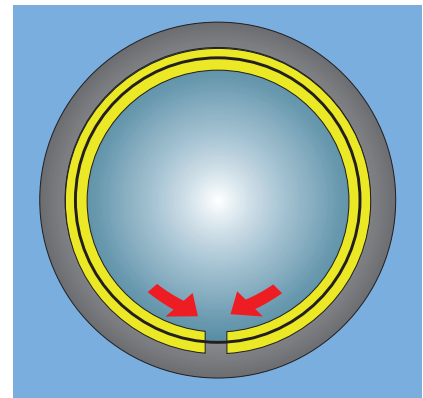
Schematic illustration of the new door-locking system of the Systec V-65 – V-150.



Lid open, circumferential locking ring in the ready position.



Lid closed, circumferential locking ring in lock position. The internal steam pressure presses the lip seal between lid and chamber.



VX VE Automatic door-opening.

In types VX and VE, the autoclave door functions automatically – either by pressing a button or automatically at the end of a program. A simple system but useful in practice. Residual steam is exhausted automatically without having to interrupt the process. Residual heat is used to dry the items being sterilized during the final short stage in the autoclave. Automatic door-opening is restricted to approx. 15° to avoid possible contamination from the outside. This is especially important and facilitates the working process when items to be sterilized have to remain in the autoclave for cooling and drying. Subsequently, for removing the sterilized items, the door can be completely opened manually.

Novel automatic lid-opening system.

Easy but safe – on closing, the lid 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 dependent – according to national and international standards. Also, the door remains locked as long as there is excess pressure in the chamber. The lid, like other parts of the pressure vessel and housing, is made of stainless steel. The attractive faceplate of the lid, which also contains the control panel, display and part of the control technology, is made of heat-resistant and insulated plastic. There is thus no risk of the operator coming into contact with hot components of the system.

VX VE Pressure-safe up to 5 bar/150 °C.

Tomorrow's requirements are catered for in today's design! The Systec V-Series autoclaves are the first of its kind to be designed for higher pressures and temperatures. The standard pressure chamber is designed to cope with 5 bar/150 °C. If the expanded pressure and temperature model is selected as an option, all control and safety components are adapted to the higher temperature and pressure. This option may be fitted retrospectively.

Systec V-Series autoclaves are equipped ex-factory for sterilization temperatures up to 140 °C and a pressure of 4 bar.

The extension of pressure and temperature to 5 bar / 150 °C is not available for Systec V-40 and Systec V-55.

New generation – with microprocessor and software!

Pressure and temperature regulation is via an electronic pressure sensor in the sterilization chamber or a flexible temperature sensor in a reference vessel (for liquids). A microprocessor specially developed for our autoclaves regulates and controls all relevant systems. In addition to vapor pressure, temperature and sterilization time all options such as rapid cooling, pre- and post-vacuums and drying are included.



VX Available programs*

- 1-3 Solids
- 4-5 Waste bags
- 6 Liquid waste with regulated steam exhaust for cooling
- 7 Liquid waste for self-cooling
- 8-10 Liquids with regulated steam exhaust for cooling
- 11 Liquids for self-cooling
- 12 Cleaning
- 13 Vacuum test**
- 14 Bowie-Dick Test**
- 15-25 Free for individual programming

**Only in combination with a vacuum device

VE Available programs*

- 1-3 Solids
- 4-5 Waste bags
- 6 Liquid waste with regulated steam exhaust for cooling
- 7 Liquid waste for self-cooling
- 8-10 Liquids with regulated steam exhaust for cooling
- 11 Liquids for self-cooling
- 12 Cleaning

VB Available programs*

- 1 Solids
- 2 Waste bags
- 3 Liquid waste with regulated steam exhaust for cooling

* All programs can be individually parametered

Menu-presented instructions in text form!

These can be selected from German, English, French, Spanish and Italian. Other languages are available as options. Large, easy-to-read display. Membrane keyboard with acoustic confirmation signal. Ergonomically located – everything is logical and easy to operate.

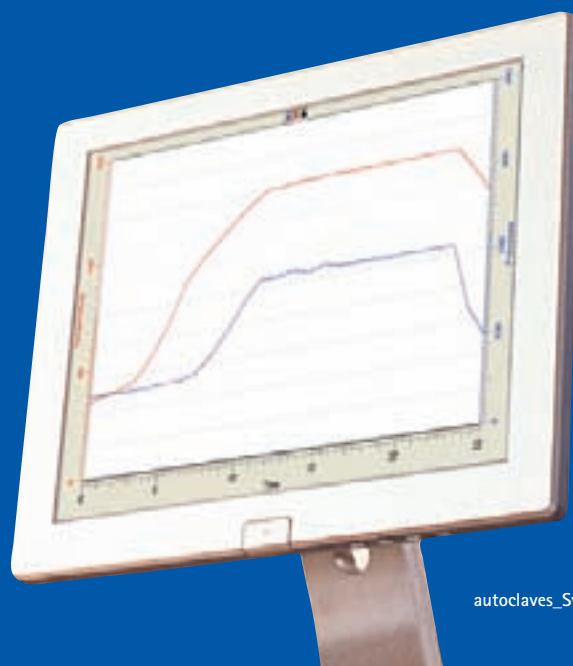
VX **VE** Documentation, dialog and diagnosis via PC.

Includes a standard RS 232 and RS 485 interface for direct connection to a PC. Special software for use with Windows optional. Suitable for documentation of all process data including relevant diagrams. In addition, dialog for adapting programs, changing parameters, calibrating and adjusting. Distant diagnosis via modem is also possible.



Immediate documentation

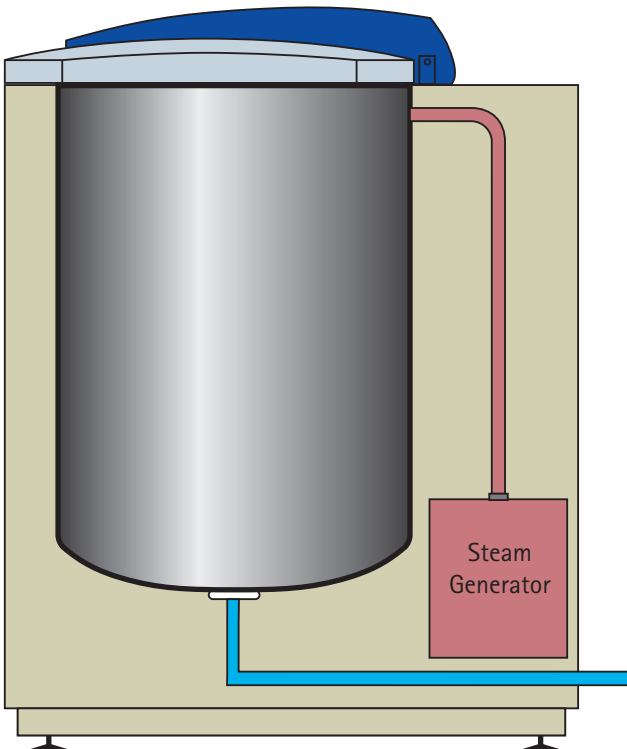
Optional, with integrated printer for program type, batch number, date, time, temperature, pressure and sterilization phase.



Design – pure innovation!

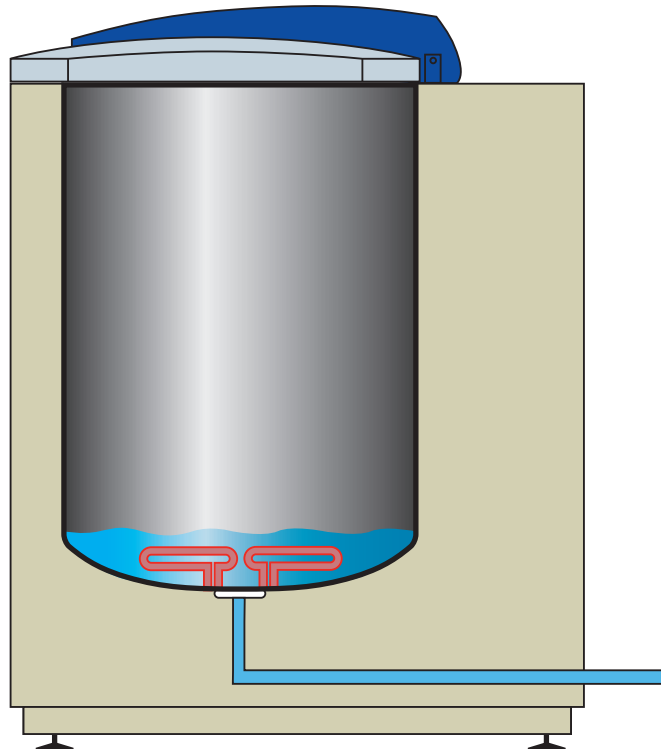
Steam generation

VX



Steam generation

VE VB



VX Steam generation!

A separate steam generator is incorporated in the housing. This has substantial advantages:

- No heating elements and no reservoir for dirty water in the chamber
- In conjunction with the stand-by pre-heating option, only 10 min. heating time to 121 °C with an empty chamber
- Improved removal of air from the empty chamber via pulsed heating (rapid attainment of optimal steam atmosphere)
- Accuracy better than ± 0.3 K with empty chamber
- Quicker cooling as neither hot water in the chamber nor the separate steam generator need be cooled
- On cooling, steam is immediately available for the next sterilization run

VX VE Condensation instead of steam 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.

VE VB Conventional steam generation.

In this system, powerful heating elements are integrated directly on the floor of the sterilization chamber. As required, deionized water can be fed in, heated and converted to steam. The deionized water for steam generation can be fed in manually, and for VE-series also automatically with demineralised water connection.

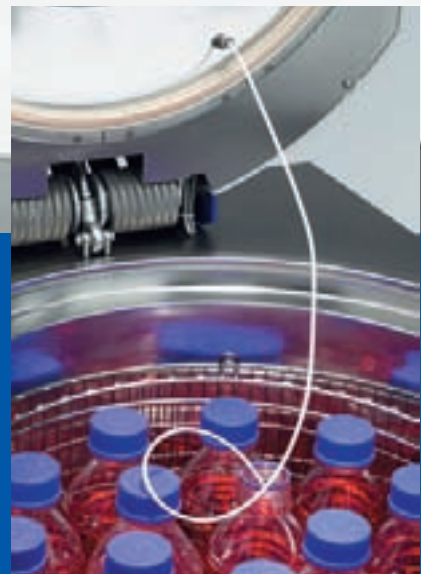




High, all-round quality!

The pressure vessel is made of corrosion-resistant electro-polished stainless steel 1.4571 (V4A) AISI 316 Ti and is thus easy to clean. The excess pressure release safety valve is of the approved component type. Autoclave framework and housing are also

made of stainless steel. The highly efficient, high-quality Hanno-Tect insulation material releases no particles; thus, the Systec V-Series can be used under clean room conditions.



RS 232/485 interface
Flexible power connection with CEE plug

Compressed air connection (optional)
Demineralized water feed for steam generation
Cooling water feed
Collection outlet (drain)

Guaranteed sterilization of liquids!

During the entire sterilization process the temperature is measured by a PT 100 flexible temperature sensor in a reference vessel. In this way it is guaranteed that the sterilization process begins only when the sterilization temperature of the liquid has been attained. The cooling temperature is also continuously monitored. As required by the operating standards and to prevent delayed boiling, the door can only be opened when the temperature of the liquid has cooled to at least 80 °C.

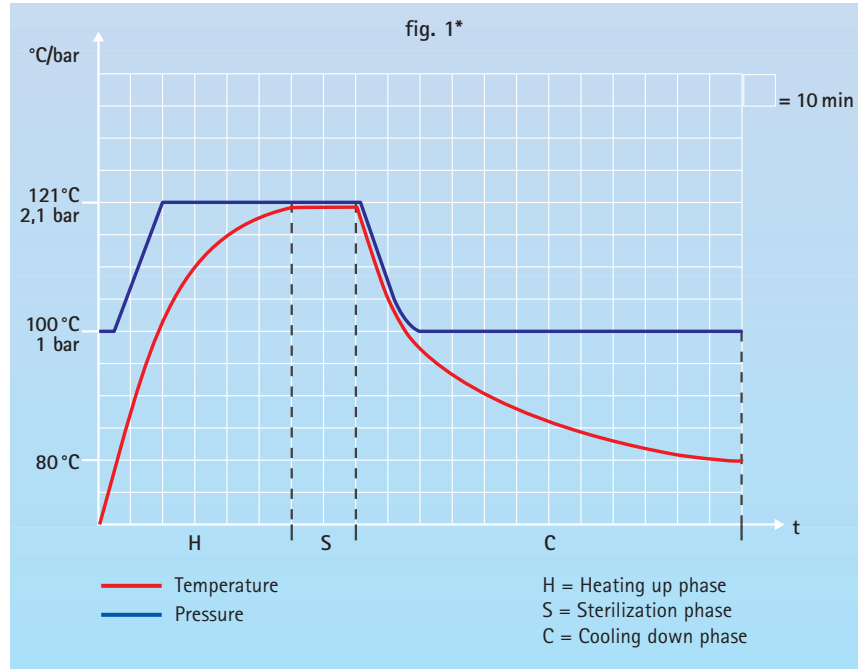
Intelligent process engineering for quicker and safer processes!

The actual sterilization time of e.g. 15 – 20 minutes at 121 °C is only a fraction of the total time required for the entire sterilization process. Especially when sterilizing liquids, the heating up and cooling down times are far longer (fig. 1).

The conventional process.

In conventional systems, the set sterilization temperature may in fact be reached within the autoclave; however, the liquids to be sterilized may only have reached approx. 100 °C. The temperature equilibrium time between chamber and liquid temperature is usually much longer.

The cooling process for liquids is also very slow as the heat under 100 °C can only be dispersed by convection via the chamber insulation if there is no rapid cooling facility.

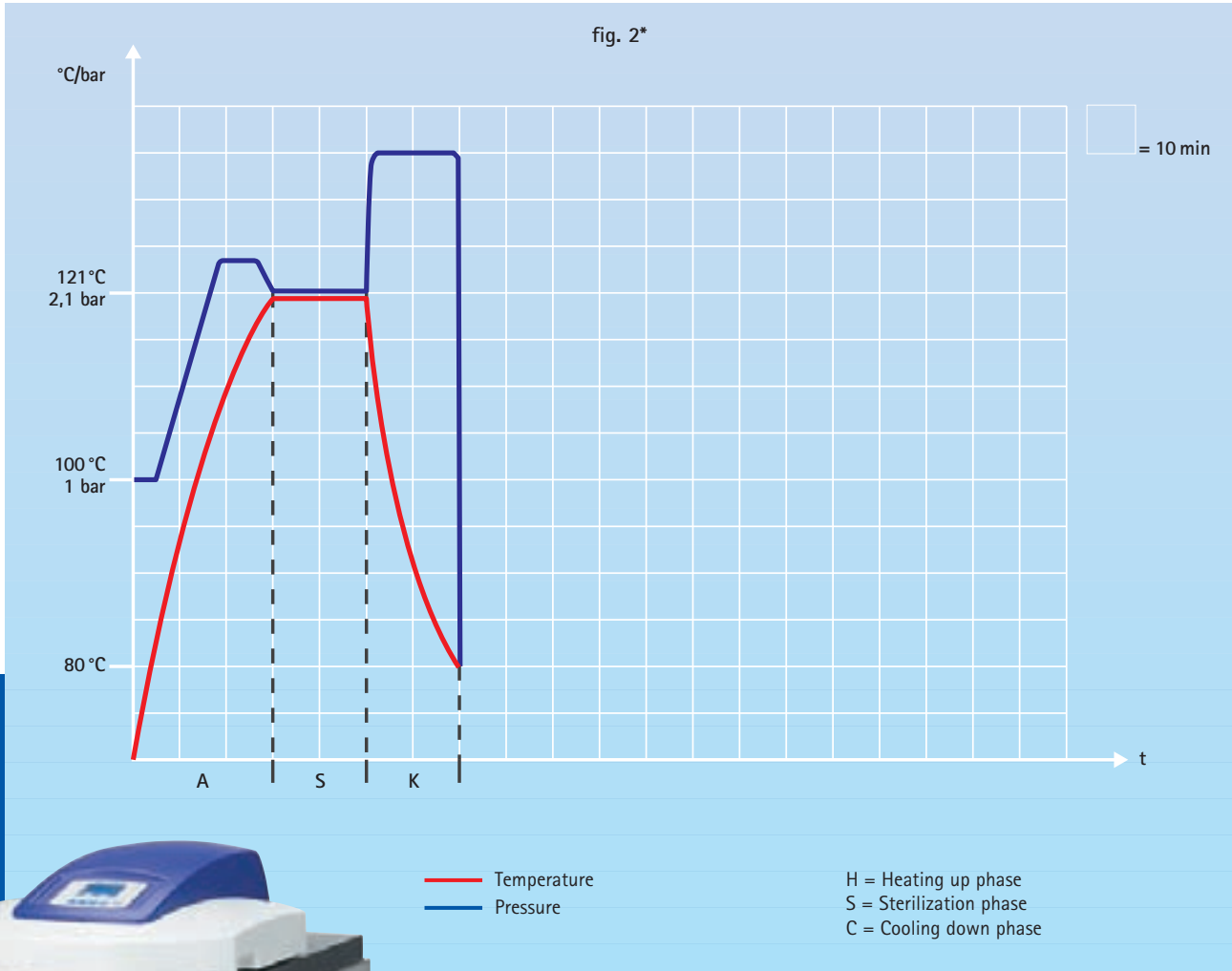


* The times indicated in the diagram are dependent on the size and number of items to be sterilized.



Time saving through new process technology.

New system and process technology have made it possible to shorten the entire process considerably. Several hours can be saved in this way! In addition, the media need not be exposed to temperatures unnecessarily (fig. 2).



Up to 50 % shorter heat-up times possible as standard!

Due to the combined temperature and pressure regulation, the chamber pressure is increased during the heat-up phase. The result: more rapid temperature equilibrium in the liquids and a shorter heat-up time.

VX **VE** Up to 90 % shorter cooling times!

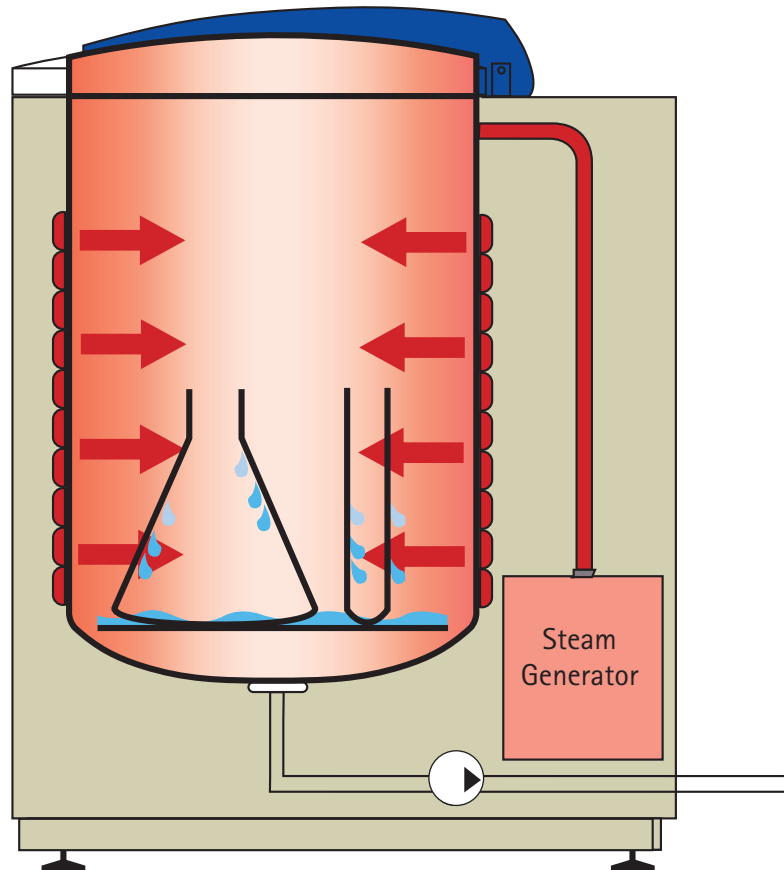
Various optional rapid cooling systems enable the cooling times for liquids to be significantly reduced. This conserves nutrient media and makes for efficient utilization of the autoclave.

* The times indicated in the diagram are dependent on the size and number of items to be sterilized.

Options: prepared for special applications!

VX

For the efficient drying of solids, hollow items and porous items such as filters and textiles. In this case, the series-installed steam generator supplies the heat for drying. Rapid surface drying with open lid or penetrating vacuum drying in combination with the optional vacuum facility are possible. Subsequent drying in a separate drying cabinet is thus unnecessary!



Magnetic stirrer

For the homogeneous mixing of liquids during the sterilization processes. Can be placed directly in the chamber as required and is provided with power via a flexible cable through the validation port.



VX VE Exhaust air filtration and sterilization of condensate

When working with infectious material, the exhaust air is filtered via an autoclavable sterile filter comprising a filter cartridge with PTFE membrane, pore size 0.2 µm, incorporated in a pressure-resistant housing and easily replaced. The filter is automatically sterilized during each sterilization process, monitored by a PT 100 temperature sensor. The condensate is retained during the heating and sterilization phases and thus also sterilized. In this way, neither aerosole particles nor microorganisms can escape before the sterilization process is completed.



VX VE Radial ventilator

Together with the optional cooling system, the ventilator ensures accelerated removal of heat, through air circulation, from the sterilization load to the cooled mantle. The fan is located in the convex lid above the chamber (hence no reduction of chamber height!) and is driven via a magnetic clutch by a motor fitted under the lid cover.



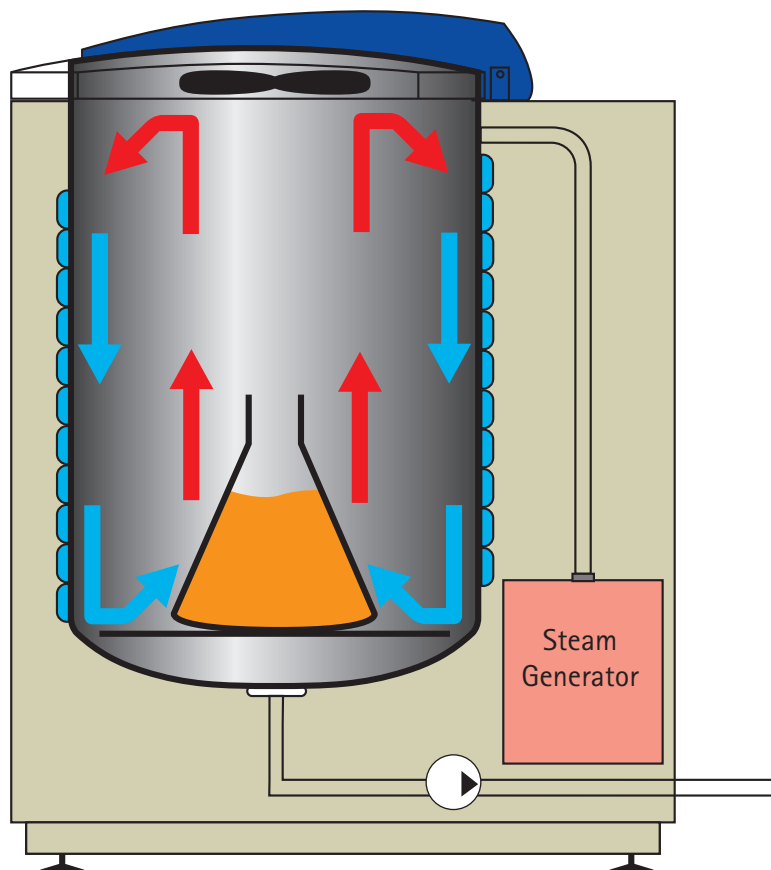
VX Vacuum facility

When working with infectious material, the exhaust air is filtered via an autoclavable sterile filter comprising a filter cartridge with PTFE membrane, pore size 0.2 µm, incorporated in a pressure-resistant housing and easily replaced. The filter is automatically sterilized during each sterilization process, monitored by a PT 100 temperature sensor. Only thus a validatable sterilization of porous materials, hollow items, textiles and waste bags can be obtained, even with high contamination.

Up to 90 % quicker cooling!

Systec autoclaves are equipped with classical cooling systems (regulated steam exhaust down to 100 °C) and subsequent extremely slow self-cooling to min. 80 °C; however, optional systems for rapid cooling are available:

- Mantle cooling with cooling water
- Mantle cooling with cooling water and support pressure
- Mantle cooling with cooling water recirculated through a heat exchanger
- Radial ventilator for air circulation and accelerated heat removal in the chamber
- Spray cooling with recirculated and recooled sterile water and support pressure
- Cooling with ambient air ventilation



Important notice for effective sterilization!

As already described, several options are available should it be necessary to obtain correct and validatable results or rapid cooling times, especially in the case of liquids. The options that can be used depend on the type of items to be sterilized. It is thus important for you to think carefully about your requirements so that the autoclave can be optimally configured

for the tasks on hand. A validatable sterilization process with confirmable biological efficiency can only be obtained if the instrument configuration has been correctly thought out. The table below provides help in establishing the desired configuration; however, we recommend obtaining additional advice from our experts.

Optional: technology for special applications!

For the sterilization of liquids in closed vessels, plastic bottles, bags, cans, blisters or food packs, e. g.:

- System and program for sterilization in a mixture of steam and air
- System and program for sterilization with hot water spraying and spray cooling

The right process for your sterilization application:

| Procedure/ Process: | Air release | | | | Cooling | | Drying | | Other |
|---|-------------|-------------------|---------------------------------------|-------------------------|--|--|---|---|------------------------|
| | Gravitation | Single pre-vacuum | Pulsed heat up (over pressure pulses) | Fractionated pre-vacuum | Conventional cooling with slow steam release | Rapid cooling system with support pressure | Surface drying without vacuum +SuperDry | Drying with subsequent vacuum +SuperDry | Exhaust air filtration |
| Liquids | + | ? | - | - | ? | + | - | - | |
| Unpacked non hollow items | + | + | + | + | | | ? | + | |
| Porous materials (filters, textiles) | - | ? | ? | + | | | - | + | |
| Hollow items (pipette tips, empty glassware, tubes and hoses) | - | - | - | + | | | - | + | |
| Contaminated waste in "destruction bags" | - | - | ? | + | | | - | - | + |

+ recommended procedure ? eventually acceptable - not possible

System accessories for ease of handling!



Lifting device for heavy items!

The electrical lifting device with swiveled arm facilitates the loading and unloading of heavy items. The arm can be operated by a mobile control panel. The lifting device is firmly attached to the side of the autoclave. The swivel arm has a special grip for baskets; they thus remain stable even when full.



Loading baskets and inserts

Wire mesh baskets out of stainless steel, stackable

| Art. No. | Inner Dimensions ø x h (mm) | Hold capacity per autoclave | | | | | | | |
|----------|--------------------------------|-----------------------------|------|------|------|------|-------|-------|-------|
| | | V-40 | V-55 | V-65 | V-75 | V-95 | V-100 | V-120 | V-150 |
| 1654 | 305 x 190 | 2 | | | | | | | |
| 1655 | 305 x 280 | 1 | 2 | | | | | | |
| 7215 | 360 x 225 | | | 2 | | 3 | | | |
| 7212 | 360 x 280 | | | | 2 | | | | |
| 7210 | 360 x 355 | | | 1 | 1 | 2 | | | |
| 7225 | 460 x 230 | | | | | | 2 | | 3 |
| 7222 | 460 x 280 | | | | | | | 2 | |
| 7220 | 460 x 355 | | | | | | 1 | 1 | 2 |

Bucket out of stainless steel, stackable, with ventilation holes only in the upper part, bottom closed, for waste sterilization

| Art. No. | Inner Dimensions ø x h (mm) | Hold capacity per autoclave | | | | | | | |
|----------|--------------------------------|-----------------------------|------|------|------|------|-------|-------|-------|
| | | V-40 | V-55 | V-65 | V-75 | V-95 | V-100 | V-120 | V-150 |
| 1657 | 325 x 385 | 1 | 1 | | | | | | |
| 7230 | 350 x 355 | | | 1 | 1 | 2 | | | |
| 7235 | 465 x 355 | | | | | | 1 | 1 | 2 |

Bucket out of stainless steel, stackable, with ventilation holes only in the upper part, bottom closed, for waste sterilization with swivel lid

| Art. No. | Inner Dimensions ø x h (mm) | Hold capacity per autoclave | | | | | |
|----------|--------------------------------|-----------------------------|------|------|-------|-------|-------|
| | | V-65 | V-75 | V-95 | V-100 | V-120 | V-150 |
| 7240 | 345 x 270 | 1 | 2 | 2 | | | |
| 7245 | 450 x 350 | | | | 1 | 1 | 2 |



Our Quality Assurance

Each and every component used is subjected to stringent controls and each autoclave is thoroughly checked for function before being delivered. An acceptance protocol is issued.



Step-by-step documentation optionally available!

Our Quality Management fulfills the highest requirements with regard to testing and documentation. Within the scope of our service, we also provide qualification and validation work with GMP-compliant documentation, e. g.:

- DQ Design Qualification
- IQ Installation Qualification
- OQ Operation Qualification
- PQ Performance Qualification



Performance and competence!

Performance and competence!

We only make one thing: laboratory autoclaves.
But we do this exceptionally well!

Our goal is always to make laboratory work safer, easier, more accurate and more economical. With over 25 years of experience and constant cooperation with experts in practice, we know how to tackle and provide optimal solutions for even the most complex of sterilization tasks.

We have the knowledge and know-how to produce the results!

Our expertise and know-how are available for you worldwide through specialized partners.

Product expertise:

- Development
- Design
- Production of series products
- Production of specialty 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

Rights reserved to change technical aspects as required.

Systemec

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