Professional Laboratory Sterilization – Safe, Fast and Reliable

Steam sterilizers for research facilities, universities and biocontainment facilities

Belimed
Infection Control

Safe, reliable sterilization in laboratories and research facilities

In research institutes, universities and biosafety laboratories people work with highly sensitive laboratory materials requiring extremely responsible handling. Safety and reliability are vital factors in laboratory reprocessing. Belimed is familiar with the demands running a laboratory poses and has been providing state-of-the-art solutions used in laboratories, pharmaceutical companies, biotech companies, universities and hospitals for already over 40 years.

Protecting people and the environment

There are many types of materials in laboratories, hygiene standards are extremely high. Perfect sterilization processes are the prerequisite for safety in laboratory operation. Suitable methods have to be used to validate sterilization processes in terms of the desired effect, because perfect sterilization results can only be achieved by precisely matching sterilization processes to the material to be sterilized.

Demand-oriented processes

The diversity of sterile goods requires sterilization processes to be optimally adjusted to the respective task. Belimed provides suitable processes and programs for every field of application. We optimize the corresponding processes subject to needs.

Reliable partner

We always have state-of-the-art-technology owing to constant customer contact and involvement in both national and international panels. We are familiar with today's laboratory operations. Specialized in cleaning and sterilization, we have been reliable and competent partners to our customers for over 40 years.

Constantly high operational safety

As a result of our comprehensive service network our customers benefit from rapid reaction times, immediate availability of spare parts and personal and competent local support. Our primary goals are safety, productivity and system availability.

State-of-the-art sterilization – the right solution for every requirement

Belimed steam sterilizers are particularly suitable for use in laboratories and research, such as in developing active pharmaceutical ingredients, in vaccine research, genetic research, microbiology and in animal care facilities for sterilizing solid and porous materials, liquids and also for deactivating laboratory waste.

Maximum flexibility

Our strength is flexibility. Sterilization processes, machine capacity and the quality of performance perfectly match our customers' sterilization goods. We offer a wide range of chamber sizes (300 to 9,200 liters) and programs. The sterilizers are available in vertical, horizontal and one- or two-door versions subject to requirements or chamber size.

Safety about all

The application field of our laboratory sterilizers meets all safety categories (bio-safety level) from BSL1 to BSL4. Sterilizer design conforms to the device groups A, B, C, D1, D2 and E1 classified in DIN 58951-2. The sterilization processes, sterilizer capacity and the design match the corresponding sterilization goods. Our long-standing proven sterilization processes and programs ensure reproducible processes and are GLP-compliant.

Examples of use

- Decontamination of solid and liquid laboratory waste
- Laboratory utensils (glassware, plastics)
- Porous and hard goods (textiles, filters)
- Liquids in open or closed containers
- Agar and culture media
- Cages, drinking bottles, bedding, feed
- Cage racks and transport carts

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Belimed steam sterilizer with vertical sliding doors

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Belimed steam sterilizer with horizontal sliding doors

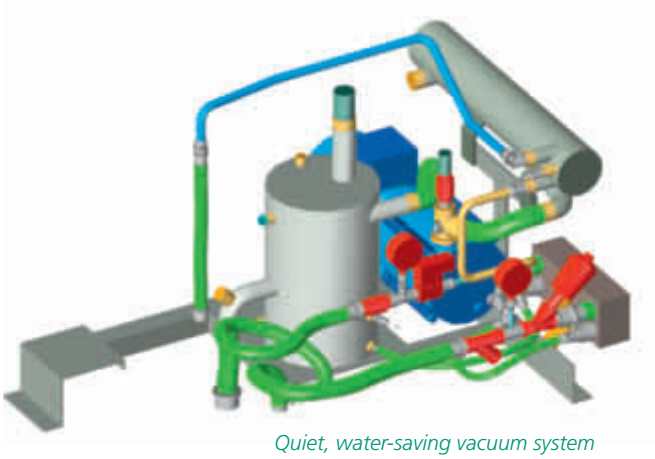
Designed for ease of use and ease of maintenance

Easy operation
Belimed laboratory sterilizer's modern graphic user interface featuring a touch screen, is simple, self-explanatory and well laid out. The modern touch screen technology meets all the criteria for maximum user comfort. The various program parameters are easy to modify and adapt to user requirements. Different password protected authorization levels prevent unauthorized entries and program starts.

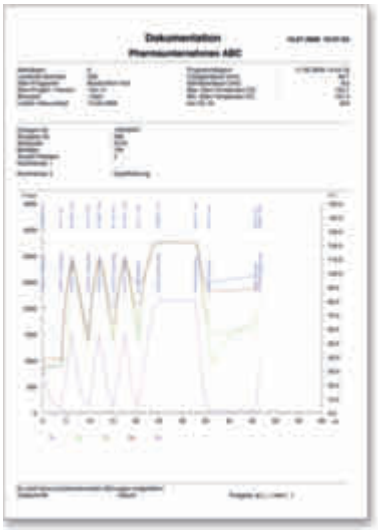
Ease of maintenance
The Belimed laboratory sterilizer provides easy access to all components and parts through front panels which open completely. Servicing and maintenance work can thus be performed quickly and efficiently. The sterilizer features an optionally available interface for remote diagnostics. This enables fast and effective trouble-shooting. Process-relevant alerts and status messages can be passed to a central control room and recorded.

Cycle documentation with integrated printer
The temperature and pressure profile are continuously recorded during sterilization in order to document the sterilization process. Using the integrated printer you can directly print out cycle data on the system.

Detailed cycle reports for seamless documentation
All the necessary process data and information is recorded by the optionally available Belimed ICS 8535 cycle documentation system and saved on an external data storage device. The data can be retrieved at any time to print out detailed cycle reports on DIN A4 (8.5" x 11") paper and postdocument it. New machines can be connected seamlessly to the system and networked with the existing systems.



Quiet, water-saving vacuum system



The comprehensive batch documentation ICS 8535 displays the whole sterilization process clearly and provides traceability

The precision sealing frame made of solid stainless steel ensures maximum operational reliability.

Operational cost-effectiveness, best quality

Cost-controlling is of paramount importance for your facilities' success. The Belimed laboratory sterilizers feature a variety of cost-efficient innovations. Optimized process engineering and sophisticated processes ensure efficient and economical operation.

Shorter cycle times
The active re-cooling process guarantees short program times in the sterilization of liquids. An additional faster re-cooling can be achieved by adding an optional ventilator to the sterilizer.

Lower water consumption
The new Belimed process engineering enables laboratory sterilizers to maximize economy. Our innovative technology reduces water consumption. The water-saving system of the integral ultra-low noise water-ring vacuum pump and optional connection to the customer's cooling circuit achieves an additional reduction in consumption.

Safe, reliable and durable
The laboratory sterilizers are designed to withstand heavy wear. The well-engineered chamber construction along with the stable motorized electric doors ensures continual maximum reliability and long system operating life. Welded joints and surfaces have been carefully finished, thus ensuring continued dirt and corrosion resistance. We provide – as required – a wide variety of surface finishes, ranging from bead-blasted to electropolished. All our piping is manufactured from high-quality stainless steel to guarantee long durability.

Six times longer service life of door deal
The solid silicone door seal, with its milled solid stainless steel frame made of chromium-nickel steel, has a much longer service life than that of comparable machines. Maintenance is fast and easy – the seal can be quickly and easily pushed out of the frame at the touch of a button and then is drawn back into the sealing frame, with a second push of a button, by the vacuum system.

High-quality stainless steel piping systems guarantee long service life

Sterilization in animal care facilities

Belimed ensures the safe and economic reprocessing of animal care equipment. The laboratory sterilizers meet the high hygienic standards of animal care facilities, thus guaranteeing that a specific application area is properly supplied with ingoing sterilized goods or that potentially infectious or genetically modified outgoing material is reliably decontaminated.

High safety in cage reprocessing

Various standard programs and a broad range of optional processes provide particularly high safety subject to the type of goods and materials to be sterilized. You can use the laboratory sterilizer both for the provision of sterilized goods and for the removal of potentially infectious or genetically modified material. Equipment for filtering exhaust air and condensation sterilization enable waste to be safely treated. Using optionally available gas-tight walls you can adapt laboratory sterilizers optimally to the local building structure and thus guarantee the necessary separation if they are set up in a barrier zone. The reciprocal door-locking mechanism prevents contaminated air from emerging.

Easy to clean

The chamber bottom, particle filters and strainers are easy to clean. Vacuum piping has a filter preventing bedding etc. from being sucked in.

Belimed sterilizer with horizontally sliding doors

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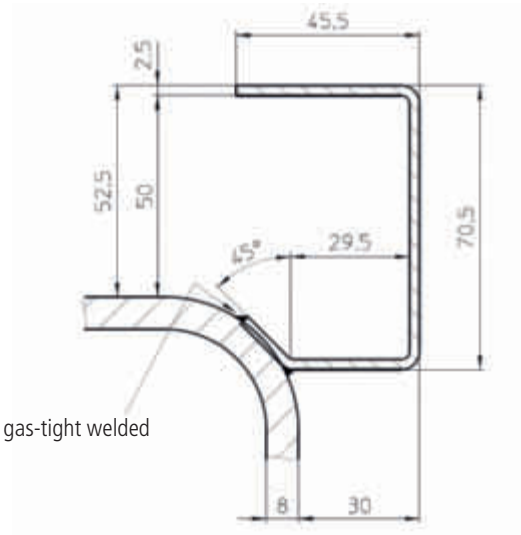
Unique features – designed for BSL 3 and BSL 4 facilities

Various biosafety laboratories need autoclaves for sterilization and decontamination. The pathogenic nature of the waste material from such laboratories coupled with the use of the autoclave as a barrier between the facility and the outside world places special requirements on the autoclave design and processes used that standard autoclaves cannot fulfill. Belimed offers a wide range of design options referring to individual product specifications.

Exhaust air and condensation treatment
One or two successive inline sterilizable vacuum filters ensure that no contaminated air is uncontrollably released when you evacuate the chamber. Alternatively, the sterilizer can feature an additional exhaust air heater (incinerator). The condensate is retained in the chamber and sterilized together with the goods. The condensate can also be channeled to a kill tank with secondary sterilization.

Biological sealing flange (bio seal)
Belimed's bio-safety sterilizers are equipped with bio seals, called double polymer seals. These form a hermetic barrier between the hot and cold zones. The seals can be validated, ensure a long product life cycle and are earthquake-proof.

State-of-the-art safety features
A special gasket design minimizes water condensation in the door area. The chamber can be designed for higher pressure, i.e. no relief valves or burst disks are required. All lines supplying the chamber feature non-return valves. Only welded connections are used. The chamber can also be decontaminated with H_2O_2 in emergencies.



2D view of a gas-tight barrier

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Double door chamber forms a barrier between hot and cold zones

The most compact in its class: the LST-V steam sterilizer

Space-saving and easy to operate: the LST-V sterilizer provides optimum conditions for professional laboratory and biotechnology applications. The device provides high performance, is compact and economical. It sets standards in terms of innovation, versatility and small footprint.

Operating location

The LST-V sterilizer comes optionally with one or two vertical doors. Featuring differing chamber sizes from 300 to 870 liters, it is suitable for universal use.

Core features

- Excellent useable space to required space ratio (e.g. only 1 m^2 footprint and 2 m high at a chamber size of 6-6-6)
- Perfect ergonomics: only 78cm loading height
- Can be fully validated
- Easy maintenance: all components accessible from the front
- Integrated steam generator (optional)
- Waste program (optional)

LST-V steam sterilizer with vertical sliding doors

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Sterilization of bulky goods with the LST-H steam sterilizer

Featuring different chamber sizes, loading heights, loading types and floor-level drivable variants, the LST-H steam sterilizer with horizontally sliding doors is suitable everywhere where large volume solid and porous goods, liquids and waste need to be sterilized or decontaminated.

Operating location

The LST-H sterilizer is suitable for sterilizing voluminous solid and porous goods, liquids and waste. The floor-level loading version also enables the inward and outward transfer of racks and trolleys. The LST-H sterilizer is available in a one- or two-door version.

Core features

- Numerous chamber sizes: 300 to 9,200 liter chamber volumes
- Flexible use: variable height adjustment for trays
- Wide field of application: also for special applications such as cage preparation in the SPF area
- Robust doors
- Integrated steam generator (optional)
- User-friendly design: easy cleaning, readily accessible reference sensor
- Waste program (optional)
- Air detector (optional)

User-friendly design

The LST-H sterilizer has a loading height of 320 or 620 mm subject to chamber size. The floor-level version permits flexible use of loading carts with varying track width. The reference sensor for sterilizing liquids can be easily reached from both sides. It is mechanically protected when not in use.

LST-H sterilizer with horizontally sliding doors

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LST sterilization process and programs

LST standard programs

Program	Process description as per DIN 58951-2	Use
Hard goods (metal and glass)	FRVV – VMT	Hard goods, porous load, metal, glass
Solid waste (decontamination)	FRVV – VOT	Solid waste including low percentage of liquid, petri dishes
Open liquids	VOVV – SAK	Liquids in vented or open containers/bottles
Agar	GRAV – SAK	Agar sterilization; keeps agar warm at cycle end (liquid removal)
Porous goods	FRVV – VMT	Hard, porous goods
Bowie-Dick-Test	FRVV – VMT	Exhaust test for porous goods
Vacuum leak test	VPR	Leak test to check the chamber's seal

LST special programs (optional)

Program	Procedure description as per DIN 58951-2	Procedure description as per DIN 58951-2
IDK liquids	VOVV – IDK	Liquids in open or closed containers
IDK^{+} liquids (only LST-H)	VOVV – IDK^{+}	Liquids in open or closed containers
SAS liquids	VOVV – SAS	Liquids in open or closed containers
DWK liquids	VOVV – DWK	Liquids in open or closed containers
FIS Filter	FRVV – VMT	Sterilization of the sterile filter
VAFI/KOST	Process adjunct	Filter in the vacuum pipe and condensation sterilization: The filter and the condensation are sterilized together with the sterilization pressure chamber and the sterilization material

Process descriptions:

DWK	Direct water cooling with support pressure	IDK	Indirect cooling with support pressure	VMT	Vacuum with drying
FRVV	Multiple pulse pre-vacuum	IDK^{+}	Steam/air mixture cooling	VOT	Vacuum without drying
FVT	Pulsed vacuum drying	SAK	Self-cooling without support pressure	VOVV	Single pre-vacuum
GRAV	Gravity	SAS	Self-cooling with support pressure	VPR	Vacuum leak test

LST specifications

Model		Chamber volume	Chamber dimensions	External system dimensions	Loading height
Single-door	Two-door	Liters	H x W x D (mm)	H x W x D (mm)	(mm)
LST-V with vertical door					
6-6-6 VS1	6-6-6 VS2	305	660 x 660 x 700	1970* x 980 x 960 (1040**)	785
6-6-9 VS1	6-6-9 VS2	440	660 x 660 x 1000	1970* x 980 x 1260 (1340**)	785
6-6-12 VS1	6-6-12 VS2	565	660 x 660 x 1300	1970* x 980 x 1560 (1640**)	785
LST-H with horizontal door					
6-6-6 HS1	6-6-6 HS2	368	750 x 660 x 740	2000* x 2000 x 980 (1000**)	620
6-6-9 HS1	6-6-9 HS2	520	750 x 660 x 1040	2000* x 2000 x 1280 (1300**)	620
6-6-12 HS1	6-6-12 HS2	700	750 x 660 x 1400	2000* x 2000 x 1640 (1660**)	620
11-6-9 HS1	11-6-9 HS2	1055	1230 x 660 x 1090 (1100*)	2000* x 2150 x 1580 (1600**)	320
11-6-12 HS1	11-6-12 HS2	1345	1230 x 660 x 1390 (1400*)	2000* x 2150 x 1880 (1900**)	320
12-8-12 HS1	12-8-12 HS2	1940	1350 x 900 x 1390 (1400*)	2500* x 2500 x 1880 (1900**)	320
GR17-9-14 HS1	GR17-9-14 HS2	2950	1800 x 950 x 1530 (1540*)	3000* x 2500 x 2040 (2060**)	0
GR21-9-21 HS1	GR21-9-21 HS2	5070	2180 x 950 x 2180	3000* x 3040 x2780 (2800**)	0
GR21-12-21 HS1	GR21-12-21 HS2	6940	2180 x 1300 x 2180	3000* x 3540 x 2780 (2800**)	0
GR21-16-21 HS1	GR21-16-21 HS2	8280	2180 x 1650 x 2180	3000* x 3910 x 2780 (2800**)	0
GR21-18-21 HS1	GR21-18-21 HS2	9225	2180 x 1830 x 2180	3000* x 4290 x 2780 (2800**)	0

* With IDK+ program: indicated hight + 250 mm
** Dimensions of 2-door systems
GR = floor-drivable systems

VS1 = Single-door, vertical
VS2 = Two-door, vertical

HS1 = Single-door, horizontal
HS2 = Two-door, horizontal

LST-V and LST-H sterilizer overview

Technical characteristics	LST-V	LST-H
General		
DGRL 97/23/EG, DIN 58951-2 or ASME	■	■
Chamber version		
Material 1.4404 (316L)	■	■
Ground Ra < 0,8 µm	O	O
Chamber fixtures		
Ventilator	–	O
Door design		
Single or dual door	■	■
Robust	–	■
Ground Ra < 0,8 µm	O	O
Vertical door movement	■	–
Horizontal door movement	–	■
Piping and fittings version		
Material 1.4404 / 1.4435 (316L)	■	■
Operation side 1 and 2		
Colour touch operating panel 5,7"	■	■
Cycle documentation		
Matrix printer 42 characters	■	■
A4 (8.5" x 11") printer	O	O
Cycle documentations system ICS 8535	O	O
Control		
SPS control	■	■
Sensor system		
Pressure sensors, chamber	■	■
Sterilization processes and programs		
Saturated steam process	■	■
Jacket cooling without ventilator (IDK)	O	O
Jacket cooling with ventilator (IDK^{+})	–	O
Direct cold water cooling (DWK)	O	O
Filter inline sterilization (FIS)	O	O
Vacuum filter/Sterilize including condensate (VAFI/KOST)	O	O
Process engineering		
Indirect link to cooling circuit	O	O
System separator for drinking water connection	O	O
Electrical steam generator (ELD)	O	O
Steam-steam transformer (WTD)	O	O
Special solutions		
Gas-tight partition one-sided (bioseal)	O	O
Gas-tight partition two-sided (bioseal); only possible for large-sized systems	–	O
Feed with extendable shelf	O	O
Documentation		
IQ/OQ documents	O	O

■ = standard, O = optional, – = not available

Subject to modification

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