



## German engineering under high pressure

Over 25 years of experience as a manufacturer of sterilizers, autoclaves and lyophilization systems for laboratories, production and research





## Production-scale autoclaves

Chamber volumes between 586 and 5,060 liters

Safe operation, easy to use, reliable performance

### Areas of application

- Pharmaceutical industry for GMP-compliant sterilization of final products
- SPF animal facilities for sterilizing cages containing litter and food
- Food manufacturers for sterilizing basic materials

### Technical specifications / features

- Highly robust, energy-efficient sterilization chamber
- May be installed in recessed areas for loading at ground level
- GMP-compliant design that meets FDA requirements
- Hot-water sprinkling method
- Inline sterilization of the ventilation filter, incl. automatic WIT for testing filter integrity
- User-administrated control system (GAMP compliant)





## Floor-standing autoclaves

Chamber volumes between 72 and 900 liters

### Short cycle times, lower media consumption, reproducible results

#### Areas of application

- Medium-sized and large laboratories, for waste disposal. Also suitable in level S2 laboratories.
- Level S3 laboratories, as a pass-through model with gas-tight separation
- Pharmaceutical companies, for sterilizing auxiliaries used in production
- In production, for sterilizing final products such as contact lenses
- Surgical centers and hospitals, for sterilizing instruments, laundry, etc.

#### Technical specifications / features

- Ergonomic loading height of 780 mm
- Vertical automatic door, compact external dimensions
- Pass-through model with gas-tight separation
- GMP-compliant design that meets FDA requirements
- Vacuum pump set
- Water-saving feature for mantle cooling system and vacuum pump





# Laboratory autoclaves

Chamber volumes between 25 and 200 liters

## The solution for your laboratory sterilization needs

### Areas of application

- In the lab, for sterilizing basic materials such as agar
- For sterilizing solid and liquid waste up to safety level S2, and up to safety level S3 for pass-through units
- As a stand-alone solution in a large laboratory, for sterilizing small amounts of materials quickly and cost-effectively

### Technical specifications / features

- Touchscreen for easy, intuitive operation
- Steam generator integrated into the housing and independent of the sterilization chamber
- Rapid recirculating water cooling system with support pressure control
- Made entirely of stainless steel





## Wash water sterilizers

Useable volume of 60 liters

### The ideal solution for microbial inactivation in wash water

- Touchscreen for graphic display
- Integrated batch documentation printer
- Documentation and control software via PC
- RJ45 Ethernet interface for PC hookup
- Windows software for process documentation
- Eye wash
- Up to 2 sinks
- Wastewater lifting uni



## High-pressure autoclaves

Volumes between 50 and 5,000 liters, up to 200 bar

### Pressure vessel certified by the TÜV technical inspection association and made in Germany

For use in vulcanization, lamination, curing processes, aging tests, the production of composite materials, etc.

#### Technical specifications / features

- Customized production in the 50 – 5,000 L chamber volume range
- Operated with steam or hot air, within a pressure range of 5 to 200 bar
- All pressure vessels are certified by TÜV and are in compliance with the Pressure Equipment Directive 97/26/EC of the European Parliament and Council



## ServTec services

The pillars of our outstanding services are reliability, employee training, and a commitment to service. We offer full service options throughout the world, with quick response times that vary according to the distances involved.

### We provide the following services:

- Equipment and system planning
- Delivery, installation and startup
- Training and user orientation
- Maintenance work/contracts
- Repairs performed either on site or at our Bad Grund facility
- Recurring inspections
- VDE (German Association for Electrical, Electronic & Information Technologies) testing, compliant with DIN standards
- Pressure and temperature sensor calibration
- Validation in compliance with DIN EN ISO 17665-1
- Training employees and creating training documentation
- Customized process development and optimization
- Reconditioning and modernizing old equipment
- Sterilization and drying on a contract basis

Our service team will also be happy to speak with you on the phone to answer any questions you may have about equipment operation or problems that may arise.

Commitment to service

Reliability

Training



## Production-scale lyophilizers

Shelf area up to 50 m<sup>2</sup> and capacity for 800 kg of ice

For use in laboratories, production, and the pharmaceutical and food industries

### Technical specifications / features

- Variable shelf clearances and shelf sizes (for a shelf area of up to 50 m<sup>2</sup>)
- Round and rectangular drying chambers up to 5 m<sup>3</sup> in volume
- Dual chamber systems with separation valve
- Fold-down and sliding doors, “pizza oven” style loading door
- Materials made of 304, 316TI and 316L grade stainless steel
- Compressor and/or liquid N<sub>2</sub> cooling to -150 °C
- Ice condensers up to 800 kg/24h, solvent condensers
- Steam sterilization (SIP)
- Automatic cleaning (CIP)
- Air locks for sampling
- SCADA process visualization
- Hydraulic sealing system for vials
- Product trays
- Explosion-proof design as defined in ATEX Directive 94/9/EC
- GMP-compliant design as defined in Title 21 CFR Part 11, FDA portion
- DQ/IQ/OQ/PQ documentation / qualification
- GAMP-compliant software validation





## Sublimator series pilot equipment

Shelf space of up to 2.4 m<sup>2</sup>

### Putting you on the path to production

#### Technical specifications / features

- Stainless steel shelves with liquid temperature control for freezing directly in the instrument and for drying
  - Uniform temperature distribution  $\pm 1^{\circ}\text{C}$  throughout the process
  - Reproducible processes
  - Integrated vacuum pump
  - Industrial PLC control system with touch panel
  - Formulations can be programmed as desired
  - Vacuum control
  - GMP version
  - Documentation and visualization software
- PLC with 5.7" color touch panel, capacity for 10 programs, runs automatically







## VaCo series laboratory lyophilizer

2 – 10 liter ice capacity

### The first step to lyophilization – modular laboratory lyophilizers

Three basic units and a modular system form the basis for a variety of uses, either as a laboratory lyophilizer or as a pilot or production system. The basic element is the ice condenser with a capacity for 3 to 12 kg of ice. All laboratory lyophilizers are equipped with a microprocessor control unit and an automatic lyophilization program.

#### Technical specifications / features

- Condenser volume: 16 - 50 liters
- Condenser temperature:  $-50^{\circ}\text{C}$  /  $-80^{\circ}\text{C}$
- Ice capacity: 2 - 10 kg / 24 h
- Max. ice capacity: 3 - 12 kg
- Cooling system: one- and two-stage, no CFCs
- Electrical connection: 230 V, 50/60 Hz





## Rotary dryers

Volumes of up to 5 m<sup>3</sup>

### Lyophilization in motion

- Customized production in the 2 – 500 kg range
- For producing lyophilized pellets, even under sterile conditions

### Technical specifications / features

- Rotary chambers with volumes of up to 5 m<sup>3</sup>
- Directly flanged to condenser, temperatures as low as -150 °C
- Dual chamber system with separation valve
- Steam sterilizable (SIP), CIP cleaning
- Materials made of 316TI and 316L grade stainless steel
- Solvent condensers
- Infrared heating system
- Process visualization
- Explosion-proof design
- GMP-compliant design
- Documentation/qualification



Pellet size: 200 – 5,000 µm



## Vacuum drying cabinets and vacuum dryers

Chamber volumes of up to 5,000 liters

### Technical specifications / features

- Customized production in the 50 – 5,000 L chamber volume range
- Round or rectangular drying chambers
- Shelves heated electrically or with liquid temperature control
- Condensers
- Vacuum generators
- Explosion-proof design as defined in ATEX Directive 94/9/EC
- Special solutions

## Centrifugal vacuum dryer (vacuum concentrator)

up to 18 sample positions

Can concentrate samples on a production scale (4 – 18 sample positions in an 86 x 128 mm rack).

### Technical specifications / features

- Various control systems, visualization, PC control
- Liquid N<sub>2</sub> cooling, explosion-proof design, solvent discharge, flushed with inert gas



## Production and sales of sterilizers, autoclaves and lyophilization systems for laboratories, production and research

We develop and produce individual, customized autoclaves, sterilizers and lyophilization systems. At the same time, we also offer a wealth of innovative, standardized solutions for laboratories, production and research.

Our customers around the world have come to trust our technology, which we develop ourselves in our ISO 9001-certified production site in Bad Grund. Known not only for its technical innovations, such as the world's first lyophilizer with a nitrogen cooling system, ZIRBUS GmbH has stood for outstanding German quality for over 25 years.

No matter what sterilization and lyophilization challenges you face, we can help you find solutions for your research, laboratory and production needs.



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