Tuttnauer
Your Sterilization & Infection Control Partners

Large Steam Sterilizers for the Life Sciences

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Sterilization in a laboratory environment has its unique requirements. The types of loads that need to be sterilized are varied and include liquids, glassware, instruments, porous loads and additional laboratory items.

Choosing the right steam sterilizer depends on several considerations: the type of loads, frequency of use, available services and load volumes. The Tuttnauer line of large capacity sterilizers successfully meets the challenges posed by sterilization in laboratories and research institutes. The sterilizers use pre-vacuum and gravity for air removal and improved steam penetration. The sterilizers cover a wide range of applications for laboratories in research institutes, universities, pharmaceutical and biotechnological industries.

Designed to Handle Diverse Load Types

The Tuttnauer line of laboratory sterilizers can handle a variety of load types. The sterilizer is provided with a total of 12 programs that range in temperature from 105°C - 137°C. If needed the number of programs can be increased. Standard programs are set to handle:

- Sterilization of Liquids
- Unwrapped instruments and glassware
- Wrapped instruments, packs and utensils
- 2 test programs: Bowie & Dick and Vacuum Test

All programs are fully programmable to suit the specific needs and requirements of the end user.

Liquid Loads

Unlike instruments, more time is required for liquids to reach sterilization temperature compared to non liquids. Tuttnauer's autoclaves are equipped with a flexible temperature probe, which is placed in a reference vessel, ensuring that the set sterilization temperature is actually attained when sterilization starts. Sterilization is initiated only when the probe reaches the preset threshold temperature.

An additional challenge is the need to prevent media exposure to high temperatures for a long time, for the concern that it might overcook. Tuttnauer offers advanced options that minimize the time liquids are exposed to high temperatures without compromising on sterilization results.

Fast Cooling

After sterilization is attained, the autoclave door cannot be opened immediately, until the chamber has properly cooled. A sudden drop in chamber pressure can cause liquids to boil over.

Tuttnauer's accelerated cooling technology increases the amount of cycles per day and protects the load by minimizing its exposure to high temperatures. Rapid cooling typically reduces cooling time by as much as 75%. After sterilization is completed, air is passed through a microbiological filter. Chamber temperature is decreased while pressure reduces and steam and condensate are drained.

Cooling coils are filled with cold tap water to help cool down the chamber to a safe temperature. When the liquid's temperature reaches the final set temperature, the cooling stage is complete.

Water Recycling

The optional water recycling system is a cost-effective environmentally friendly solution that reprocesses the water used for cooling the load. The heat exchanger receives cooled water from the recycling system. The recycling system remains active during autoclave operation.

Improved Air Removal

Vacuum Cycles

The sterilizer's vacuum pump efficiently removes residual air prior to sterilization, enabling effective penetration of steam.

The post-vacuum drying phase, at the end of the sterilization cycle, ensures complete drying of porous loads and hollow instruments. This guarantees that even the most difficult loads will easily reach sterility assurance levels.

Advanced Sterilization Cycles

F_0 **Cycle –** F_0 control enables reduced media exposure to high temperatures thereby reducing cycle time and preventing damage to temperature sensitive media. The exposure time measure is calculated using algorithm based software from the time the temperature sensor in the load has reached a predetermined set point until the end of the sterilization stage.

Streaming Steam Cycle (105°C) – The streaming cycle is most commonly used for melting agar in Petri dishes. It is a low temperature sanitation cycle set at 105°C. Steam is allowed to enter the chamber and the fast exhaust valve is opened to allow steam to stream over the contents of the unit.

Disinfection/Isothermal Cycle (70-95°C) – A flexible low temperature cycle enables disinfection ("low" temperature isothermal). Temperature range settings are flexible within 70°C

Advanced Options

The advanced options are designed specifically for use in clean steam systems that demand sanitary conditions be maintained. They are designed to satisfy the stringent requirements of the food processing, pharmaceutical and biotechnology industries.

316L grade stainless steel piping, fittings and components are used for clean steam contact surfaces. High quality steam can be used for tissue culture, sterile water preparation, research and other applications.

Clean Steam Generators

Tuttnauer offers two types of clean steam generators:

The Stainless Steel Steam Generator's components, including heaters and piping are constructed from 316L grade stainless steel.

The Steam to Steam Generator is a highly advanced clean steam generator which assures clean steam. It uses steam as the energy source. It is constructed from 316L grade stainless steel.

The Sanitary Tri-Clamp Fittings are manufactured from stainless steel. All surfaces are finely finished and smoothed for non-contaminating flows. They eliminate the possibility of external contamination penetration through the valves and piping connection areas and add rigidity to the piping system.

The Separate Jacket and Chamber Connections enable reaching sterilization temperatures faster and improve temperature control. It is used for sterilizing liquids and is vital when working with clean steam.

A Diaphragm Valve is used to prevent bio-burden.

The Hot-Well is a stainless steel water reservoir, in which the water is heated to 80-90ºC prior to entering the steam generator. The hot-well enables the removal of Non-Condensable Gases.

Sanitary Air Filter – a bacteria retention air admission filter provides an additional level of security. The filter is periodically sterilized by the autoclave.

Waste Treatment Facilities and Biosafety

Autoclaves used in laboratories and animal care facilities that are classified as Bio-safety Level 4 must have a pass-through double door sterilizer, with interlocks that provide protection against the passage of potentially contaminated materials to the surroundings. A bio-seal must be installed and maintained around the unit at the containment barrier to seal the space.

Tuttnauer supplies full sterilization solutions for the treatment of bio-hazardous materials and waste. Tuttnauer sterilizers can be customized to meet the specific requirements of laboratories classified as BSL3/4 (Bio-Contaminant Level 3 or 4) where harmful pathogens and viruses that leave the sterilizer prior to disposal must be fully sterilized. The bio-hazardous waste sterilization cycle will efficiently process any load without risking the environment.

These sterilizers are supplied with a thermal effluent decontamination stage that sterilizes chamber air and waste water prior to their release into the atmosphere and drain. An additional sterilization system is incorporated into the autoclave which prevents bio-hazardous aerosol generation. During the air removal phase, the exhaust, aerosol and condensation pass through a secondary sterilization treatment that sterilizes the effluent. During the heating and sterilization phases all effluent is not allowed to exit the chamber until the sterilization phase is fully complete.

Advanced Control

Classic Control System

The autocalve is equipped with an advanced control system and CAT2007 panel, and provides the following features:

- High precision control system for perfect and repeatable sterilization results
- Continuously displays the pressure in chamber, jacket, steam generator, and door gasket
- Ability to customize cycle parameters to maximize flexibility
- Password protection provides secure access
- Convenient data backup for cycle information recovery in case of power failure or cycle interruption
- Fail Alert – Indicates cycle failure or interruption
- Door Alert – Indicates unlocked door

Advanced Touch Screen Control System

An optional touch screen panel with a sophisticated user-friendly PLC control system based on the advanced Allen-Bradley (AB) platform provides the following additional features:

- A 5.6" touch screen for easy access to controls and information via the panel
- Multilingual - 23 languages
- Built-in view and back-up of historical cycle data and alarm/events stored on external flash memory
- Technician menus: Sensor Calibration, Change Parameters, In/Out test and PID tuning
- Graphical display of Temperature and Pressure trend graphs
- Up to 16 different Barcodes - optional

Documentation

Printer

Cycle documentation is easily attained with the built-in printer. It provides detailed real-time cycle data, as it appears on the control panel display and records a detailed history. In the case of a sterilization failure complaint the documentation can help track the problem.

The RS 232 Port

The RS 232 port enables direct PC access, software updates and remote maintenance.

IQ OQ PQ Validation Package

Tuttnauer offers IQ OQ and PQ documentation and services.

Quality
Engineered with People in Mind

Quality features enable the convenience and durability needed to operate an autoclave with complete peace of mind. The fully jacketed chamber is constructed from long lasting 316L/Ti grade stainless steel with superior corrosion resistance. The generator and piping are constructed of stainless steel. The pneumatic valves significantly reduce maintenance. They are safer and more reliable, eliminating the requirement for high voltage. Furthermore, if no buttons or switches are operated for four hours, the autoclave will switch to standby mode.

Two Validation Ports are available for thermocouple chamber entry, pressure sensors and measuring devices.

Standards:

Our high quality laboratory autoclaves comply with the strictest international directives and standards.

Directives: PED 97/23/EEC; ASME Code Sec. VIII; Safety Standards: IEC/UL/EN 61010-1 and 61010-2-040; Sterilizers Standards: EN285, ST-8; Sterilization Standard ISO 17665-1 and Quality Management System Standard 9001:2008 and 13485:2003.

Safety
Safety is Our Top Priority

Our safety features ensure functionality and a worry-free work environment which results in reduced downtime.

Door Safety

The autoclave doors are designed with a number of independent mechanical and digital safety features. This guarantees that if a problem should occur, an autoclave failure will be prevented.

- A safety device prevents the operator from opening the door when chamber is pressurized
- Steam is not allowed into the chamber when the door is open
- A cycle cannot start if the door is open or not properly locked
- The door cannot unlock until chamber pressure reaches atmospheric pressure and liquids temperature is reduced to a safe temperature
- **Sliding Door Safety -** The sliding door progress will automatically stop if an obstruction is detected
- **Double Door Safety -** Interlocks prevent both doors from being opened simultaneously
- **Temperature Activated Door Lock -** The door will not open until the temperature reaches a predefined end temperature

General Safety Features:

- **Double Independent Monitoring-** The combined digital and mechanical monitoring provides a cross reference and guarantees accurate results. The operator has two independent means to monitor temperature and pressure
- **Safety Valves-** Both the chamber and the jacket are equipped with safety valves. If the pressure exceeds the allowed limit the safety valves will discharge
- **Built-in Steam Generator Safety-** A water level monitoring system maintains a constant water level and ensures safe operation of the heaters
- **Emergency Shut-Off-** Easily accessible emergency switches for immediate cycle shut-off

A Flexible Range of Sizes and Models

Tuttnauer offers an unmatched range of models that are available in three series: Compact, Mid Range and Large Capacity. The sterilizer chamber ranges in size from 120 to 1015 liters. Additionally, we design tailor made solutions and non-standard chamber sizes to accommodate special needs. Each model is available with either single or double door.

In addition to the laboratory line Tuttnauer offers the T-Max line of sterilizers with chamber sizes which comply with the European StU (Sterilization Units) requirements.

The 44 and 55 Compact Series

Tuttnauer Small Laboratory Autoclaves with chamber volumes from 120 to 320 liters.

The 44 and 55 series is available with the following door options:
- Fully automatic vertical sliding door
- Manual Hinged Door

Tuttnauer offers 5 different models:

Model	Chamber Dimensions (WxHxD) mm	Chamber volume (Liter)
4472	408x408x730	120
4480	408x408x845	140
4496	408x408x970	160
5596	508x508x970	250
55120	508x508x1210	310

Manual Hinged Door

Vertical Sliding Door

The 66 Mid Range Series

Tuttnauer Medium Laboratory Autoclaves with chamber volumes from 340 to 600 liters.

The 66 series is available with the following door options:
- Fully automatic vertical sliding door
- Hinged door with automatic locking.

Tuttnauer offers 5 different models:

Model	Chamber Dimensions (WxHxD) mm	Chamber volume (Liter)
6690	610x610x915	340
66120	610x610x1215	450
6671130	660x710x1295	610
6671162	660x710x1620	760

Vertical Sliding Door

Automatic Hinged Door

The 69 Large Capacity Series

Tuttnauer Large Laboratory Autoclaves with chamber volumes from 510 to 1010 liters.

The 69 series is available with the following door options:
- Fully automatic horizontal sliding door
- Hinged door with automatic locking.

Tuttnauer offers 4 models:

Model	Chamber Dimensions (WxHxD) mm	Chamber volume (Liter)
6990	610x910x915	510
69120	610x910x1215	680
69150	610x910x1515	840
69180	610x910x1815	1010

Automatic Hinged Door

Horizontal Sliding Door

Additional Options

Loading Equipment

Our loading equipment assists the loading and unloading process. It is made of high quality, durable stainless steel. We offer two options:

- **Pull Out Trays-** Stainless steel trays equipped with rails for easy loading and unloading. The rails are designed to prevent the trays from rolling over.

- **Loading Cart and Transfer Carriage -** The height adjustable loading cart rolls off the transfer carriage onto the interior chamber rails for easy handling of heavy loads. The transfer carriage is equipped with swivel wheels, maximizing maneuverability in limited space. The wheel breaks prevent the carriage from rolling and the cart is equipped with a lock that prevents it from sliding.

High Precision Documentation

Cycle documentation is crucial within the laboratory. A cycle that is not properly recorded is not considered done. The modularity and flexibility of our system gives you targeted and customized solutions to track and document the sterilization process.

- **Optional 10" Touch Screen**
  The touch screen displays cycle data in both a textual or graphical format and provides a continuous visual guide. Moreover, it provides a visual display of all piping for monitoring purposes.

- **SCADA Software**
  SCADA software allows for control and monitoring of up to eight sterilizers on an external PC. The software retrieves data, creates graphs, tables and printouts.

- **Independent Chart Recorder**
  The Chart Recorder is an independent temperature and pressure measuring system. It gives clear analog/mechanical trend records and print-outs in color. It is simple to operate and has an easy-view display.

- **Backup of Cycle History Data**
  A record of cycle history data is critical for hospitals that need reliable documentation. The cycle history backup system stores thousands of hours of cycle data, displayed either graphically or numerically.

- **Barcode Reader**
  The barcode reader allows material identification. The data is transferred to the SCADA software and linked to the sterilization cycle parameters for streamlined instrument handling.

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Company Profile

For over 80 years, Tuttnauer's sterilization and infection control products have been trusted by hospitals, universities, research institutes, clinics and laboratories throughout the world. Supplying a range of top-quality products to over 100 countries, Tuttnauer has earned global recognition as a leader in sterilization and infection control.

Global Partnerships

At Tuttnauer we feel that business means people dealing with people. We pride ourselves on our reputation for the long-lasting relationships we have with our customers, spanning over decades and distances and built on commitment and trust.

Our Flexibility Is Your Advantage

Beyond our unmatched range of products, we also manage complete turnkey solutions, including planning, design and installation of equipment, as well as consultation and feasibility studies, for projects of all sizes.

More from Tuttnauer:

Featuring Tuttnauer`s range of cleaning, disinfection and sterilization solutions

| Large Capacity Sterilizers for Medical Use | Washer disinfectors for hospitals and laboratories | Laboratory autoclaves ranging in size and application | Pre & post vacuum tabletop sterilizers designed to perform class B cycles |

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