The Advanced Laboratory Line

The Full Spectrum of Laboratory Sterilizers

Sterilization in a laboratory environment has its unique requirements. Choosing the right steam sterilizer depends on several considerations: load diversity, frequency of use, available services and load volumes. The Tuttnauer line of vertical and bench top sterilizers for the life sciences successfully meets the challenges posed today in laboratories and research institutes. They cover a wide range of applications for laboratories in research institutes, universities, pharmaceutical, food, medical and biotechnological industries.

The advanced laboratory autoclave line features top loading and table top sterilizers from Tuttnauer with fast cooling, optional drying and waste treatment options. The advanced laboratory line provides a single solution for the full spectrum of sterilization needs including liquids, culture media, instruments, glassware, plastics, pipette tips, biological waste, contaminated media and other laboratory items. The autoclave is designed to accommodate for a wide range of applications. The user can choose to add the features needed according to the sterilizer's intended use. The advanced laboratory autoclave line is available in an unmatched range of table top and floor standing models with chamber volumes of 23 to 160 liters.

Advanced Options for Liquid Loads

More time is required for liquids to reach sterilization temperature compared to non-liquids. Tuttnauer's advanced laboratory autoclave line is equipped with a **flexible temperature load sensor**, which is placed in a reference vessel, ensuring that the set sterilization temperature is actually attained when sterilization begins. Sterilization is initiated only when the load sensor reaches the preset required temperature.

After sterilization is attained, the autoclave door cannot be opened immediately, but only after the liquid has properly cooled down. Tuttnauer's cooling method prevents a sudden drop in chamber pressure which can cause liquids to boil over.

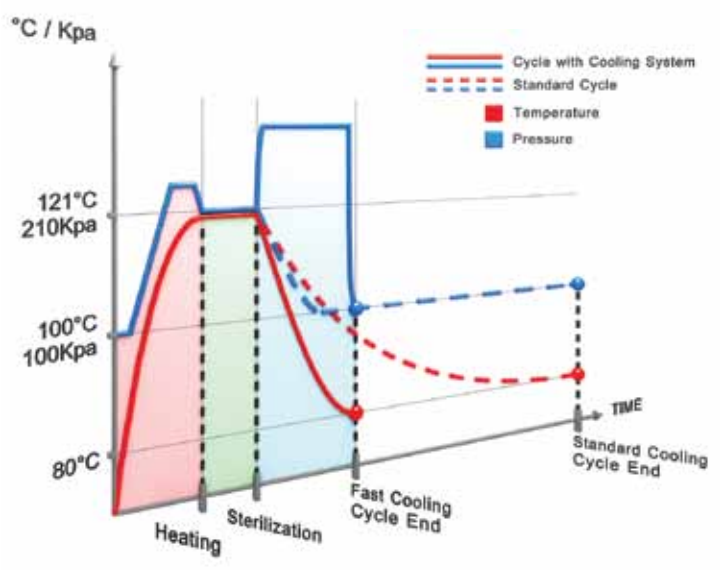
An additional challenge is the need to prevent media exposure to high temperatures for a long time, for the concern that it might harm the quality of the media. Tuttnauer offers advanced options that minimize the time liquids are exposed to high temperatures.

Reduced Cycle Times with Optional Fast Cooling

Tuttnauer's accelerated cooling technology reduces cycle time 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, compressed air is passed through a microbiological filter into the autoclave chamber. In this way pressure drops are prevented. The pressure increase prevents load deformation, cracks or spills.

Extra Cooling by Water Circulation

The vertical autoclave chamber is surrounded by coils that are filled with cold tap water to help rapidly cool down the chamber to a safe temperature. When the liquid's temperature reaches the final set temperature, the cooling stage is complete. The bench-top models cooling coils are situated in the autoclave chamber, which result in the same cooling effect.



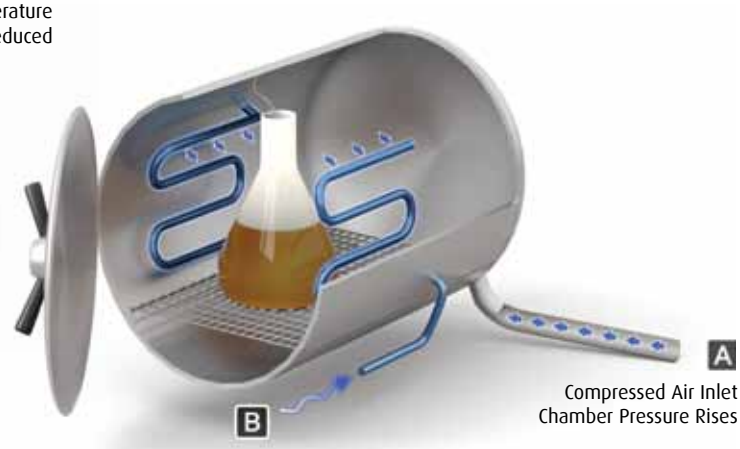
Fast Cooling Option

Vertical Models

Cold Water Inlet
Chamber Temperature
is Reduced

Compressed Air Inlet
Chamber Pressure Rises

Bench-Top Models



Compressed Air Inlet
Chamber Pressure Rises

Cold Water Inlet Chamber
Temperature is Reduced

Fan Assisted Cooling

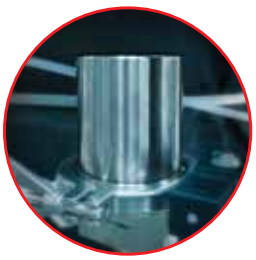
An additional feature that further enhances the cooling stage is the optional radial ventilator. The fan circulates the hot air, inside the chamber, transferring the heat to the cooled chamber walls or cooling coils. The overall chamber and load temperature rapidly drops.

Efficient Air Removal by Optional Vacuum System

The vacuum pump is optional and if not selected the gravity displacement air removal method is used. Fractioned pre-vacuum air removal eliminates air pockets from all load types and maximizes steam penetration. A pre-vacuum pump removes the air from the chamber. This allows for complete air removal with more efficient steam penetration throughout the entire load.

Optional Bio-hazardous Waste Sterilization

The Tuttnauer line of advanced laboratory sterilizers supplies a full sterilization solution for the treatment of bio-hazardous waste. The sterilizers can be supplied with an optional exhaust filtration system. During the air removal stage, prior to sterilization, all effluent is passed through a biological filter that provides an extra level of protection. During the sterilization phase, condensate does not leave the autoclave chamber. It is removed only after the sterilization phase is complete. The laboratory staff and environment are therefore protected from contamination.



Improved Drying by Vacuum

The post-vacuum drying phase, at the end of the sterilization cycle, ensures improved drying of porous loads and hollow instruments such as pipette tips. The low pressure in the autoclave chamber caused by the vacuum reduces the boiling temperature therefore causing the moisture to evaporate faster. The hot vapor is sucked out of the autoclave chamber by vacuum and the materials dry. Following the vacuum stage, dry air is introduced into the chamber through an air filter.

Complete Drying by Optional Steam Generator

The optional integral steam generator for the vertical autoclave models, provides readily available steam that is fed to the coil that surrounds the chamber. Based on the combined operation of heat provided by the steam generator and vacuum air removal, the leftover moisture will quickly evaporate from the chamber. This results in a faster, more effective cycle and prevents the formation of condensate and guarantees that even the most difficult loads such as textiles, porous loads, hollow instruments and pipette tips will dry.

Fast Heat Up for Shorter Cycle Times

Readily available steam is fed into the coils that surround the vertical autoclave chamber. After a cycle is completed, the autoclave remains in stand-by mode,requiring zero waiting time between cycles. The optional generator significantly reduces heat up times and waiting time between cycles. This also results in a faster,more effective cycle and prevents the formation of condensate.

Optional Drying

Moisture Removal by Vacuum Pump

Control and Documentation

The laboratory line features a user friendly, microprocessor control system which offers enhanced monitoring and control. The programs are designed to treat all load types including liquids, instruments and waste. All programs are fully customizable to suit the specific needs and requirements of the end user.

Features:

- High precision control system for perfect sterilization results
- Password protection allows for secure access control
- Independent temperature and pressure monitoring
- Cycle information recovery in the case of power failure or cycle interruption
- Fail Alert – Indicates cycle failure or interruption
- Door Alert – Indicates the door is unlocked
- RS 232 PC Connection Port for direct software updates and remote maintenance

Built in Printer

The laboratory line can be supplied with a built-in printer to document the performed cycle, in addition to a comprehensive LCD display. This feature is optional.

ADMC Software

The ADMC software allows complete control and monitoring of up to eight sterilizers. The software retrieves data, creates graphs, tables and print outs, controls the autoclave and shows real-time data.

Documentation Package

A full documentation package is available on demand:

- Preliminary Installation Qualifications (IQ)
- Preliminary Operation Qualifications (OQ)
- Preliminary Performance Qualification (PQ)

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 lids are designed with a number of independent mechanical and digital safety features.

- A safety device prevents the operator from opening the door when chamber is pressurized
- Steam is not allowed to enter 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 liquid temperature reaches the predetermined end temp.
- The door cannot unlock until chamber pressure reaches room pressure
- **Temperature Activated Door Lock** - The door will not open until the temperature is below a specified safe level.

General Safety Features:

- **Double Independent Monitoring:** The combined electronic and mechanical monitoring guarantees accurate results. The operator has two independent means to monitor temperature and pressure.
- **Safety Valves:** The chamber is 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

Engineered with People in Mind

Our quality features enable the convenience and durability needed to operate an autoclave with complete peace of mind.

Quality Features:

- The chamber is constructed of long lasting 316L grade stainless steel with superior corrosion resistance.
- The generator is made from stainless steel.
- The autoclave automatically switches to standby mode if no buttons or switches are operated for four hours
- The autoclave is designed for easy servicing allowing maintenance access to all components
- Drain Protection: The exhaust drain is mixed with cold tap water that cools the exhaust's temperature before reaching the drain.

Tuttnauer's high quality laboratory autoclaves comply with the strictest international directives and standards.

Pressure Equipment: PED 97/23 EEC, EN 10028-7, ASME Code Sec VIII

Safety: IEC/UL/EN61010-1, IEC 61010-2-040, EN 61326

Sterilization: DIN 58951 Series, ISO 17665-1:2006

Quality System: ISO 9001:2000, ISO 13485:2003

Vertical Autoclaves

The Tuttnauer vertical, top loading laboratory autoclave is available in chamber sizes of 23 to 160 liters. ELV models have an advanced microprocessor control panel. MLV models have a manual control panel.

Vertical Models - Technical Data

Model	Chamber Dimensions ØxDepth	Chamber Volume (Liter)	External Dimensions WxHxD (mm)
2540 ELV/MLV	250x400	23	495x645x335
3150 ELV	310x 500	40	580x780x415
3170 ELV	310 x 700	55	580x960x415
3850 ELV/MLV	380 x 490	62	650x745x500
3870 ELV/MLV	380 x 690	85	650x925x500
5050 ELV/MLV	500 x 500	110	880x780x700
5075 ELV/MLV	500 x 750	160	880x1010x700

Erlenmeyer Flasks (ml) Loading Capacity:

Model	250	500	1000	2000	3000	5000
2540	2 x 4	1 x 2	1 x 1	1 x 1	1 x 1	None
3150	2 x 7	2 x 4	2 x 2	1 X 1	1 x 1	1 x 1
3170	3 x 7	3 x 4	3 x 2	2 x 1	2 x 1	1 x 1
3850	2 x 12	2 x 8	1 x 5	1 x 2	1 x 1	1 x 1
3870	3 x 12	3 x 8	2 x 5	2 x 2	2 x 1	1 x 1
5050	2 x 21	2 x 14	2 x 8	1 x 5	1 x 4	1 x 2
5075	3 x 21	3 x 14	3 x 8	2 x 5	2 x 4	1 x 2

Schott-Duran Flasks (ml) Loading Capacity:

Model	250	500	1000	2000	3000	5000
2540	2 x 7	1 x 4	1 x 3	1 x 1	Not applicable	1 x 1
3150	2 x 11	2 x 7	1 x 5	1 x 2		1 x 1
3170	3 x 11	3 x 7	2 x 5	2 x 2		1 x 1
3850	2 x 19	2 x 12	1 x 8	1 x 4		1 x 1
3870	3 x 19	3 x 12	2 x 8	2 x 4		1 x 1
5050	2 x 32	2 x 21	2 x 15	1 x 8		1 x 4
5075	3 x 32	3 x 21	3 x 15	2 x 8		2 x 4