



## Medical Waste Autoclaves

# Safe, Cost-Effective, Medical Waste Sterilization

Treat Medical Waste with high performance Tuttnauer Medical Waste autoclave systems designed for small, medium and large hospitals. Tuttnauer steam autoclaves are a safe cost-effective alternative for servicing your medical waste needs making it easier to dispose medical waste and empowering you to treat waste close to its source at a considerably lower price than expensive incinerator waste treatment technologies.



## Medical Waste Autoclaves



### Cost-Effective

- Easy on-site installation removes need to transport waste to an external treatment facility
- Cost reduction in treatment and management of potentially infectious waste
- Reduced liability for waste producer due to no off-site treatment processing
- Relatively modest price and operating cost allows for quicker cost recovery



### Environmentally Safe

- Chemical-free process
- No radiation
- Clean and environmentally safe technology



### Safe Landfill Disposal

- Sterilized medical waste which has been processed to remove sharps is simple to dispose in a municipal landfill

## Strong Vacuum Pump

The built-in vacuum pump produces a strong vacuum that ensures proper air removal for excellent sterilization results.

## Inactivation of Micro-organisms

After sterilization the number of micro-organisms are reduced to less than  $10^{-6}$ .

## Fast Cooling for Fast Cycles

Fast cycles are an important factor that influences the waste processing time. Internal cooling coil or Jacket cooling (optional features) reduce cycle cooling times. Those features enable higher cycle rates and allow you to sterilize medical waste without delays.

## Specialized Loading Cart for Waste Transfer

A specialized loading cart for safely transferring medical waste is available with the following important features:

- The bottom shelf has no holes to prevent liquid from leaking out of the cart
- The bottom shelf has a drain to enable collection of any liquid waste into a container
- All the shelves have a barrier around their perimeter to prevent waste from falling off the cart

## Flexible PT100 for Liquid Loads

When treating blood, urine and other liquid medical waste a flexible PT100 placed in liquid waste load ensures sterilization at an effective sterilization temperature.



## Prevacuum Air Sterilization

All air that leaves the chamber prior to sterilization is treated as highly infectious and passes through a stringent biological decontamination system that renders the air sterile.

## Thermal Sterilization

Prevacuum air leaves the chamber and makes contact with high temperature steam and is then passed through a high temperature heat exchanger which greatly increases the heat applied to the air making the air sterile and safe. The sterilized air is then cooled and any condensate is discharged to the drain.

## Sterilization by Filtration

Prevacuum air is sterilized by passing it through a  $0.2 \mu\text{m}$  biological filter. In order to maintain proper and effective filtration, the filter is sterilized in-place during every sterilization cycle.

# Medical Waste Treatment Process

1



## Waste Segregation & Identification

Effective and safe management of medical waste begins with segregation and identification of waste. Segregation usually takes place nearby or at the source where the waste is generated. Waste is commonly identified by sorting the waste into sealed colour-coded plastics bags or containers.

2



## Temporary Waste Storage

Sometimes it is necessary to temporarily store waste when it is not subject to immediate processing or when there are delays in the waste treatment processing.

The described process is an example of a regulated medical waste process. Policy regulations may require a modified process. Tuttnauer works with our clients to ensure that Tuttnauer autoclave systems fit current or planned waste systems.



3



### Waste Treatment Sterilization

The waste is sterilized by autoclaving using steam at high pressure and temperature (134°C). This ensures that the biologically harmful elements of the waste are destroyed.

4



### Shredding

Shredding ensures that any sharp elements of the waste are broken down, making them safe for handling and disposal. Another advantage of shredding is that it reduces the treated waste's volume.

6



### Disposal

After sterilization and shredding the waste is fragmented and non-toxic. It is safe for disposal in a municipal landfill.

5



### Compacting

Compacting is an optional stage that significantly reduces the volume of the sterilized waste into a solid block. The waste is easier to handle and requires much less storage space during transportation. Furthermore, compacting prevents any free particles becoming airborne.

## Advanced Control System

Take advantage of Tuttnauer's sophisticated user-friendly control systems for repeatable high performance. Choose either Tuttnauer's sophisticated Bacsoft controller or the Allen-Bradley (AB 1400 PLC) controller.

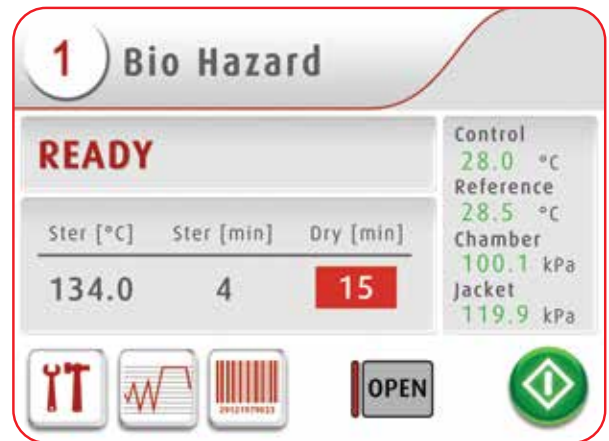
### Features

- 7" Multi-color touch screen control panel (10" screen optional)
- Keypad control panel on second door of two door autoclaves with Bacsoft controller
- Stores the last 200 cycles in built-in memory (Bacsoft)
- Multiple access levels and user passwords to control access/operation of the autoclave
- Diagnostic In/Out test (enables technician to check each system component separately)
- Sterilization Temperature range 105°C to 138°C

## Sophisticated Touch Screen HMI

The HMI (Human Machine Interface) has been designed with the following considerations:

- Multi-color display for easier reading from a distance
- Multilingual (26 languages)
- Graphical display of Temperature and Pressure trend graphs





## R.PC.R Software

Automatic Recording of Cycle Information to Your PC

### Reporting You Can Rely On

- Automatic recording of cycle information to any PC on your network
- Convenient access to graphs and tables that are easy to understand
- Easily generate PDF reports
- No need to file printouts, saving you time

### Be in Control with Real-Time Remote Monitoring

- See the real-time autoclave display on your PC
- Monitor all activity for up to 8 autoclaves

**With R.PC.R you can see:** Graphs of the cycle data, Numeric cycle data, cycle print-outs, measured values table, parameter table.

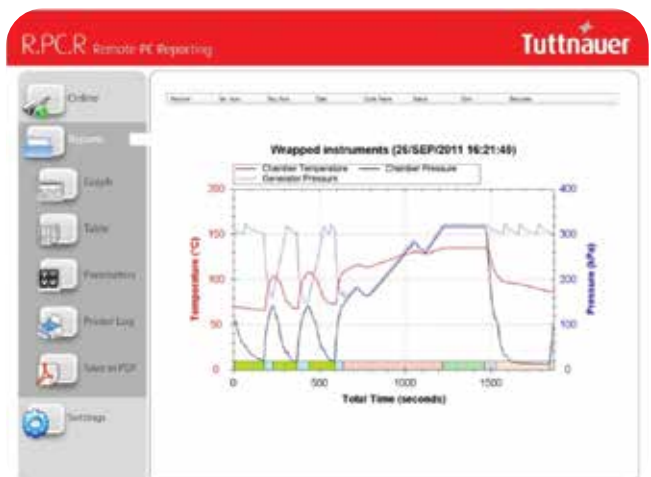
Note:

- R.PC.R monitoring feature is not available with Allen Bradley controller

## Documentation Package

An optional full documentation package is available:

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





## Large Autoclave Series

Chamber volume between 250 and 1000 liters

The Medical Waste Autoclave Line is designed to service hospitals and large medical centers that need to process high volumes of medical waste safely and on site.

### Features

- Automatic or manual loading system
- Manual or automatic door system
- Pre-vacuum air stream sterilization
- Advanced control system with touch screen control
- HEPA air filter







## Autoclave Safety

### Door Safety

- Chamber door cannot be opened when chamber is pressurized
- Steam cannot enter the chamber when the door is open
- A cycle cannot start if the door is open or not properly locked
- Sliding door movement is stopped if an object is detected in front of the door

### Safety Valves

Both chamber and jacket are equipped with pressure relief valves to prevent excess chamber pressure.

### Steam Supply

Saturated steam can be supplied to the autoclave from building steam, a stand-alone generator, or a steam-to-steam generator.

### Emergency Shut-Off

Easily accessible emergency switches for immediate cycle shut-off.

### Double Independent Monitoring

Digital and mechanical monitoring systems provide accurate pressure results which are displayed on the analog and digital displays.

Model	Chamber Dimensions (cm) (W x H x D)	Volume (Liter)
5596 -BH	508 x 508 x 970	250
55120 - BH	510 x 510 x 1210	310
6690 - BH	610 x 610 x 915	340
66120 - BH	610 x 610 x 1215	450
6671130 - BH	660 x 710 x 1295	610
6990 - BH	610 x 910 x 920	510
69120 - BH	610 x 910 x 1215	680
69150 - BH	610 x 910 x 1515	840
69180 - BH	610 x 910 x 1815	1010

## Bulk Autoclave Series

### Chamber volume between 1500 and 4000 liters

The medical waste bulk autoclave line is designed for high volume waste treatment. The autoclaves have pre and post vacuum capabilities. A wide range of sizes are available to meet the ever-growing demands of medical waste facilities.

#### Features

- Advanced control system with touch screen control
- Optional advanced control system with touch screen control
- Automatic or manual loading systems
- Manual or automatic door systems
- Pre-vacuum air stream sterilization
- Printer for a clear and concise documentation of the sterilization process
- HEPA air filter

Model	Chamber Dimensions (cm) (W x H x D)	Volume (Liter)
364853	92 x 122 x 136	1500
364860	92 x 122 x 151	1700
364872	92 x 122 x 182	2000
3648100	92 x 122 x 252	2800
3648144	92 x 122 x 363	4000

#### Door Safety

- No door will open if there is still pressure in the chamber
- No door will open if the chamber or load temperature is too high
- In a double door system it is impossible to open two doors simultaneously
- Door will open if an object is detected in front of the door during closing



## Standards

Tuttnauer's medical waste autoclaves are designed to comply with the strictest international directives and standards in all aspects of waste treatment and waste disposal.

- EN 285: 2015 for Large Steam Sterilizers
- ISO 17025:2017 General requirements for the competence of testing and calibration laboratories

### Directives & Guidelines

- 2014/68/EU - Pressure Equipment Directive
- EU 2017/2102 - RoHS Directives
- 2014/30/EU - Electromagnetic compatibility
- IEC 61010-2-040:2015 - Safety requirements for electrical equipment for measurement, control, and laboratory use
- EN 61326-1:2013 for EMC Requirements for Electrical Equipment

### Pressure Vessel and Steam Generator Construction Standards

- ASME Code, Section VIII, Division 1, unfired pressure vessels
- ASME Code, Section I, for boilers

### Good Practice Standards

- ANSI/AAMI/ST8:2013 (R2018) Hospital Steam Sterilizers

### Quality System Compliance

- ISO 9001: 2015 (Quality Systems)
- ISO 13485: 2016 (Quality Management Systems for Medical Devices)
- 21 CFR part 820

## Your Sterilization & Infection Control Partners

### Company Profile

For over 95 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 140 countries, Tuttnauer has earned global recognition as a leader in sterilization and infection control.

### More from Tuttnauer:

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



T-Max Line of Large Sterilizers



Washer disinfectors for hospitals and laboratories



Laboratory autoclaves ranging in size and application



Pre & post vacuum tabletop sterilizers designed to perform class B cycles



## Medical Waste Autoclaves

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