



WHY GRUENBERG DRY HEAT STERILIZATION?

- ✓ Low cost of ownership
- ✓ Low operating costs
- ✓ Validated sterilization
- ✓ Sustainable energy, water solution
- ✓ Extended cage life
- ✓ Healthier lab work environment
- ✓ 50% less space than an autoclave

STERIDRY™ DRY HEAT Sterilization

Lower Cost, Lower Energy Use, NO WATER

Thermal Product Solutions (TPS) is a leading American manufacturer of industrial ovens, furnaces, pharmaceutical sterilizers, laboratory ovens, environmental temperature chambers, and stability test chambers.

TPS product lines accommodate a comprehensive range of applications and configurations to meet virtually every thermal processing need.

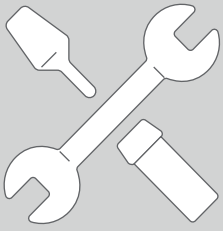
The TPS family of brands includes **Gruenberg Oven**, Blue M, Lunaire Environmental, Tenney Environmental, Lindberg/MPH, Baker Furnace and Wisconsin Oven.

Gruenberg Oven is a leader in dry heat sterilization technology. Since 1932, Gruenberg has designed and manufactured high quality, custom and standard pharmaceutical sterilizers, dryers and continuous process ovens.

By applying this knowledge and expertise to the Lab Animal Sciences industry, we are now able to offer a full line of dry heat sterilizers to meet most any customer needs.

Today, Gruenberg stands as the expert in dry heat sterilizers for the Lab Animal Sciences industry with more than 15 years of experience to use on your next sterilizer project.





Installation

Gruenberg Steri-Dry™ dry heat sterilizers are manufactured in New Columbia, PA, conveniently located about 2 hours from Philadelphia and New York City. The facility features roughly 30,000 sf of office space for Sales, Applications Engineering, Mechanical and Electrical Engineering, Technical Support and Administration.

The integral plant consists of roughly 130,000 sf of fully climate-controlled space for all metal fabrication, electrical, assembly and test areas. TPS/Gruenberg is an ISO 9001:2015 & ISO 17025 certified facility.

Each Steri-Dry™ dry heat sterilizer goes through extensive functional, HEPA filter, safety and chamber uniformity testing, calibration, and full load validation. Testing is performed using the customer's voltage and hertz to ensure a seamless startup according to our ISO and Business and Quality Processes SOPs.



Calibration

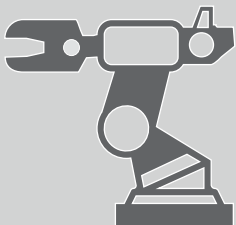
Quality Assurance Testing



Validation



Preventive Maintenance



Retrofits



- Functional Testing
- Safety Testing
- Temperature Uniformity
- Performance Testing
- Cycle Development Testing
- Biological Indicator Testing
- Assembled or Nested Cage
- HEPA Filter Testing
- Calibration
- Additional Testing Available

Once installed in the field, the same extensive testing is performed again and each of the customer's cycle types is developed and validated.



MODEL

Truck-In Sterilizers

Features and Benefits

- Bulk size with less than half the footprint needed:
 - ✓ No Pit
 - ✓ No Water
 - ✓ No Drain
 - ✓ No Steam
- Less weight, no building reinforcement needed
- Highly reliable, low cost of ownership and operation
- Flexible installation and customization options to fit any facility
- Validated sterilization cycles for assured results
- Also available in Pass-Thru configuration

Single Truck Sterilizers

Features and Benefits

- All the features of our larger Truck-In Sterilizers
- Single bulk cart system in a compact footprint
- Single Door or Pass-Thru configuration
- Custom chamber sizes for any bulk truck or IVC rack
- Mechanical and conditioning equipment may be oriented on for an extremely narrow footprint



TYPES



VSCV Sterilizers

Features and Benefits

- Unique design only requires electricity to operate
- No exhaust or other connection required
- Floor mounted
- Standard sizes for cost effective sterilization
- Window in door standard
- Color touchscreen control with onboard data acquisition standard
- Pass-Thru option available
- Bio/Vermin seal available for recessed or Pass-Thru installation
- VHP/Gaseous decontamination integration option

Cabinet Sterilizers

Features and Benefits

- Shelf or load cart/transfer carriage loaded
- Color touchscreen control with onboard data acquisition standard
- Floor mounted
- Modular design available for ease of rigging and installation without the need for extensive construction
- Pass-Thru option available
- Bio/Vermin seal available for recessed or Pass-Thru installation
- VHP/Gaseous decontamination integration option



Hold the Steam

Dry heat sterilization systems use forced-air convection technology for reduced energy consumption.

Life Sciences Research sterilization has recently seen a demand for more reliable and cost effective options.

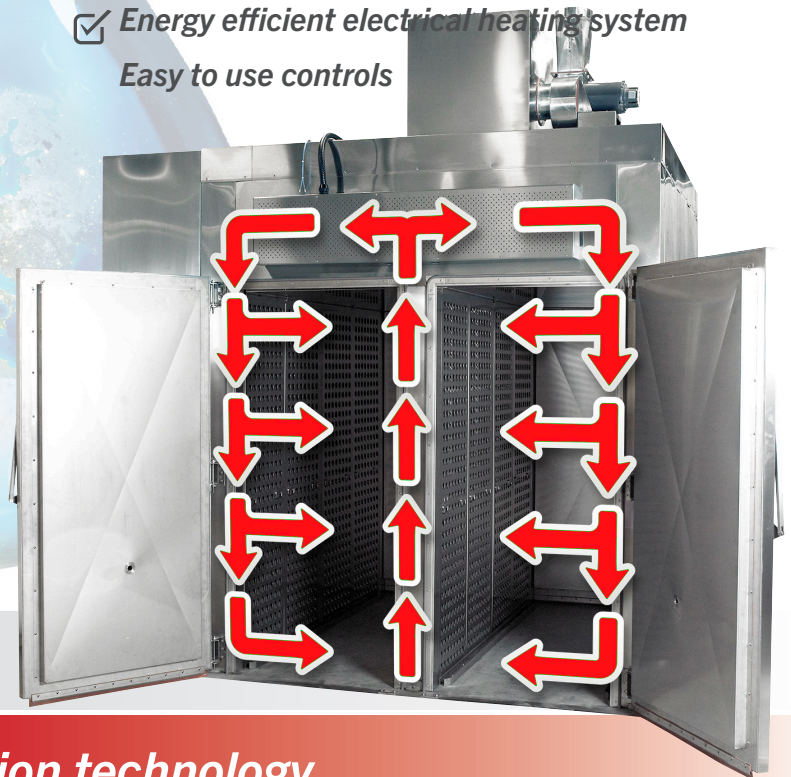
Dry heat sterilization has been adapted to effectively meet these needs with simple, proven designs that require no pits, no water, no steam, use much less energy and are incredibly reliable. With their lighter weight and modular design, construction to get dry sterilizers into the facility is eliminated and no building reinforcement is needed.

Modern dry heat sterilization systems using focused forced air convection technology are consistently decreasing cycle times. Each system is fully commissioned following a rigid SOP and each cycle is setup and validated using temperature mapping of the load and industry standard spore strip testing to insure consistent, effective sterilization.

A dry heat sterilizer is 2/3 lighter than an equivalent steam system. Because the dry heat sterilizer can be rigged in place as modules, there are considerably less rigging challenges and costs. The dry heat sterilizer does not need to be pit mounted.

Sustainability:

- ✓ *Minimal infrastructure required*
- ✓ *No pit, no steam, no water, no drain, no condensate return needed*
- ✓ *Significantly lower energy consumption per cycle*
- ✓ *80%+ rejected heat*
- ✓ *No cage degradation*
- ✓ *Minimal to no construction to install*
- ✓ *Energy efficient electrical heating system*
- Easy to use controls*

 **PRECISIONFLO™**

100% focused forced-air convection technology.

**Patent Pending*

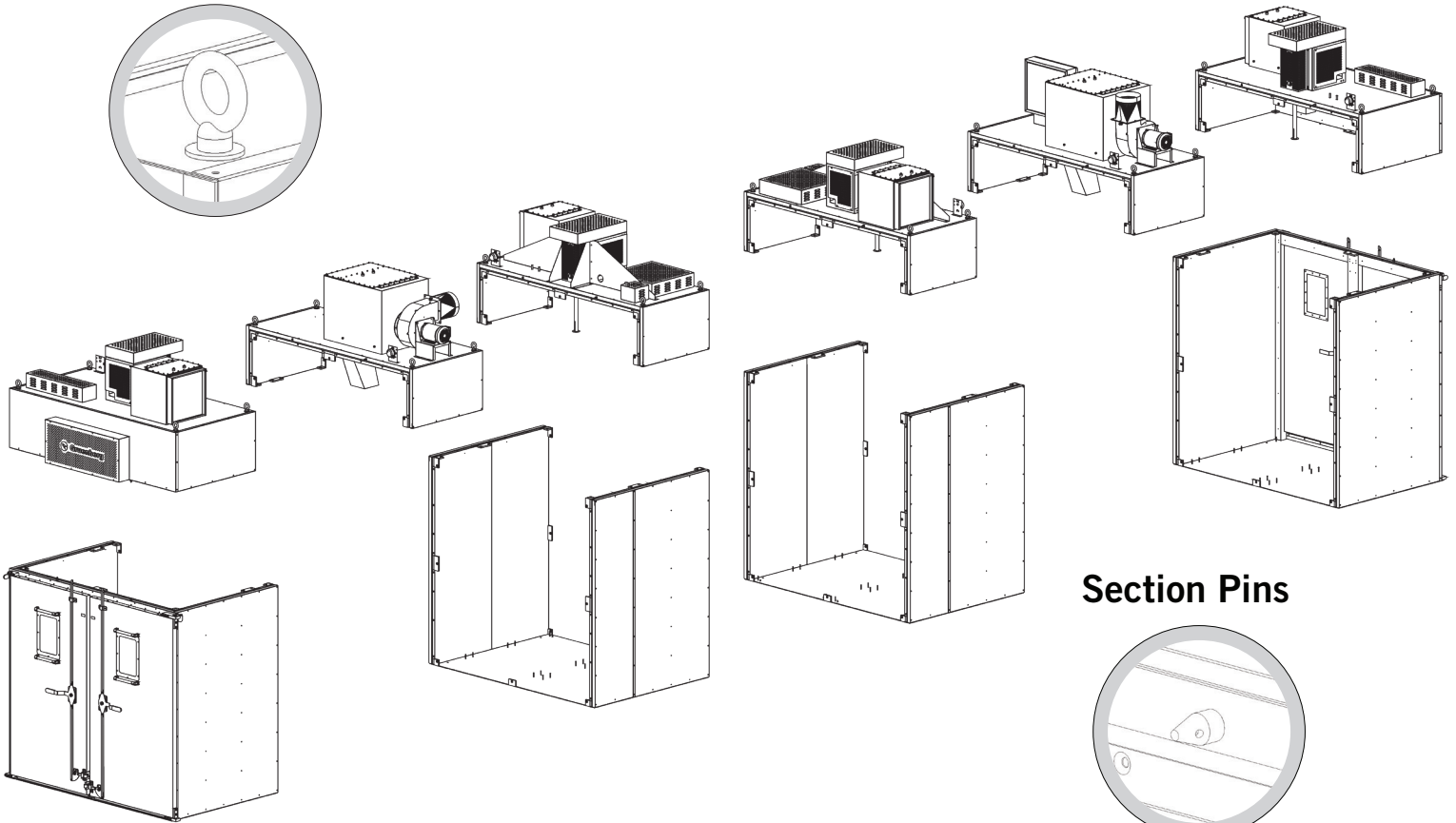
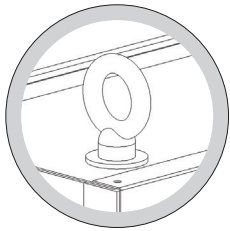
DESIGN



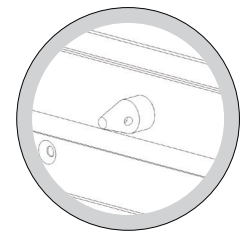
Modular/Split Construction

Our SteriDry™ engineers are always here to help you design and implement our standard or custom sterilizers to meet your project's specific needs, no matter how demanding.

Lifting Lugs



Section Pins



Gruenberg Steri-Dry Sterilizers are designed and constructed in modules, sized for ease of rigging and assembly without modification of the existing facility. This design flexibility ensures that the project costs are well contained.

All interconnecting struts are non-continuous from inner to outer walls, thus keeping the exterior as cool as possible. Locating pins integral to the frame are used to align the modules during assembly and have interior flanges to bolt them together for perfectly aligned seams.

Chamber Construction

Each dry heat sterilizer is specifically designed and fabricated to meet the customer's architectural and throughput requirements.

Interior Design

- Heavy duty structural steel frame with 304SS interior. 316L stainless steel available as an option.
- 4-inch thick wall insulation covered in stainless steel sheet metal which is fully welded, ground and polished to seal the entire chamber.

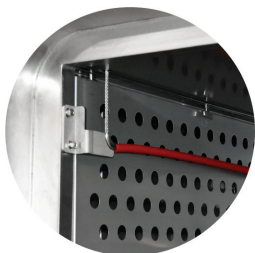


- Internal side rails protect the side air duct walls from damage during loading, and are designed for ease of cleaning and toolless removal.

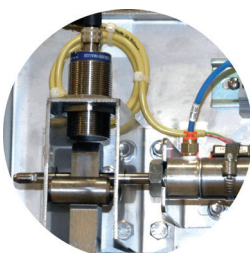
Door Safety Systems

- Individual doors are fitted to the configuration of the layout. The doors close against the sterilizer cabinet over a silicone "P" gasket.
- Each door is held closed by a dual cam-action bar latch and hung with a pair of stainless steel machined adjustable hinges.
- A viewing window is mounted in the face of each door and supplied with a window guard to protect against accidental contact.
- An interior safety pull cable shuts down the sterilizer and unlocks the door when pulled.
- Pneumatic Door locks remain locked during the process cycle. Door switches ensure doors are closed prior to and during the process cycle.

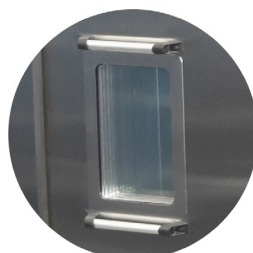
**Interior Door Lock
Override Cable**



**Pneumatic Door
Locking System**



**Viewing Window
with Guards**



FEATURES



Precision Airflow

Gruenberg Steri-Dry dry heat sterilizers are designed to ensure uniform heat distribution throughout the sterilizer chamber.

Process Air Circulation

- Powered circulation blowers / fans located in the conditioning plenum direct air to a circulation duct on one side of the sterilizer.
- The air enters the workspace through a fine-tuned perforated duct wall, flows across the product, and exits the workspace through the opposite side for recirculation. Allen-Bradley Variable Frequency Drives (VFDs) allow for uniformity optimization.
- The forced exhaust blower system is controlled by the PLC at a low speed to assist with temperature uniformity during the sterilization period, and cooling at the end of the cycle.
- Pressure differential switches monitor airflow in the air stream of the circulation and forced exhaust systems. Upon failure of either system, the switch will signal the PLC to de-energize the heater circuit.

HEPA Filtration

- HEPA Filtration rated at 99.97% efficiency for particles 0.3 microns or larger ensures that air entering the sterilizer is sterile to protect the load during, and after, the cycle.
- Challenge ports are provided for the verification of filter integrity.
- Differential pressure transmitters measure the differential pressure across HEPA filters and send a signal to the PLC. The PLC monitors the pressures for filter integrity and alarms if the filter is fully charged or has been breached.

Efficient Heating

- Seamless Tubular Incoloy Sheathed heaters are suspended in the plenum, adjacent to, but separate from the process chamber for operator and product protection.
- Integrated Silicon Controlled Rectifiers (SCRs) proportion power to minimize swings in set-point temperature, provide good temperature uniformity within the chamber, and conserve energy.

Temperature Uniformity

- Gruenberg Steri-Dry systems are equipped to maintain a temperature uniformity while the sterilizer is at setpoint.



Controller Features

Protect personnel and product with a fully integrated system of safeties.

Total Process Control

- The control system monitors sterilizer performance using an **Allen Bradley Programmable Logic Controller (PLC)** with on board Ethernet communications.
- Audible alarms and banner displays provide immediate notification to operators. The control system may be connected to customer's network via integral Ethernet connection.
- The **OIT high resolution graphic display** features a 10" diagonal screen size. The OIT provides recipe management, data trending, process control, alarm and event monitoring, etc.
- A separate, independent **High Limit Thermostat** de-energizes the heating system should the process temperature reach the customer's preset limit.
- A **Thermal Dot Matrix Printer** records and prints critical process cycle data from the PLC.
- A **Communications Interface Module** includes an Ethernet Port, USB port, and a 120 VAC outlet for the connection of an external PC to perform software maintenance. Cycle data is easily downloaded via the USB port.
- The **Main Power Disconnect Switch** assures that the panel power is de-energized before the access door can be opened. Available in Lock Out / Tag Out.
- **Emergency Stops** on both the load and unload end control consoles immediately abort the process cycle and unlock all doors.
- **Built to NEC standards.** UL508A Labeled. CE, cUL, CSA, and other electrical certifications available upon request. Gruenberg Steri-Dry dry heat sterilizers are rated as a NFPA 86 Class "B" ovens.



FEATURES



Options and Accessories

A variety of configuration options are available for custom applications.

Loading Trucks

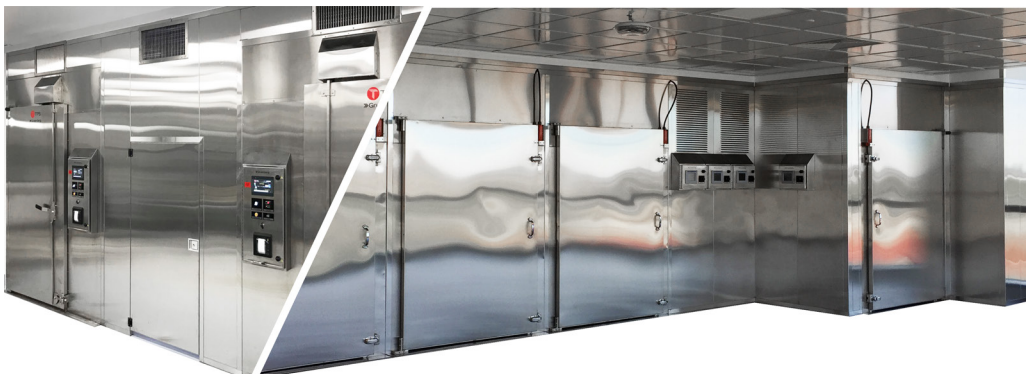
Stainless steel shelves, trucks and trays are available in a variety of sizes and configurations for all applications. Trucks and trolleys can also be designed with conditioning equipment for enhanced temperature control.



Bio/Vermin Seal

Bio/Vermin seals provide an impassable barrier to rodents on the top and sides of the unit. Trim panels matched to the exterior of the sterilizer are fitted to cover the area between the wall opening and the unit so that a flush appearance is achieved.

For enhanced biosecurity, Gruenberg offers full bioseals in either a gasketed or fully welded configuration.



Explore more options for a fully customized design:



Gruenberg



Baker Furnace, Blue M, Gruenberg, Lindberg/MPH, Lunaire, Tenney, Wisconsin Oven

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