

HORIZONTAL RECTANGULAR HIGH PRESSURE AUTOCLAVE

TAI 907

Rectangular Autoclave

High-Performance Steam Sterilization System

The Rectangular Autoclave is a high-capacity steam sterilization system engineered for **laboratories, pharmaceutical facilities, research institutes, and industrial sterilization applications**. Designed with **advanced PLC-based control technology, high-grade stainless steel construction, and precision pressure-temperature regulation**, the system ensures **reliable sterilization, operational safety, and consistent performance**.

Built using **premium SS-316 construction and modern automation**, the autoclave supports a wide range of sterilization processes including **liquid sterilization, porous load sterilization, laboratory glassware sterilization, and microbiological media preparation**. Its advanced **vacuum-assisted sterilization system and programmable cycle control** provide efficient air removal and superior steam penetration, ensuring effective sterilization under controlled conditions.

Chamber Design & Construction

The autoclave chamber is fabricated using **high-quality stainless steel 316 grade**, ensuring excellent resistance to corrosion, high temperature, and pressure conditions typically encountered during sterilization cycles.

The sterilization chamber is constructed from **6 mm thick SS-316 plates**, which are **precision welded, buffed, and mirror polished** to maintain hygienic conditions and long-term durability. The chamber is further supported by a **robust stainless steel jacket fabricated from SS-316 plates**, allowing uniform heat distribution during sterilization.

The chamber structure includes **reinforced internal supports between the jacket and insulation**, designed to withstand operational pressure and maintain structural integrity during repeated sterilization cycles.

The unit offers a **large sterilization capacity ranging from 1200 to 1500 liters**, with chamber dimensions of approximately **900 × 900 × 1800 mm or higher**, allowing sterilization of large laboratory loads, instruments, glassware, and production materials.

To minimize heat loss and improve thermal efficiency, the chamber is insulated with **50 mm thick mineral wool insulation**, protected by an outer covering of **SS-316 sheet**, ensuring energy efficiency and operator safety.



Steam Injection & Vacuum System

The autoclave incorporates an **advanced steam injection system with a unique baffle design**, ensuring uniform distribution of steam inside the chamber for consistent sterilization results.

A **low-noise liquid ring vacuum pump** is integrated to provide **pre-vacuum and post-vacuum cycles**, enabling effective removal of air before sterilization and efficient drying of sterilized materials after the process.

The vacuum system supports:

- **Mechanical air removal before sterilization**
- **Post sterilization vacuum drying**
- **Improved steam penetration into loads**

The vacuum pump may be **installed near the machine or on a service floor**, with complete interconnecting piping and electrical cabling provided.

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Piping & Process Engineering

All **process pipelines in contact with the sterilization chamber** are fabricated from **SS-316 stainless steel using argon welding techniques**, ensuring high purity and leak-free performance.

Sanitary tri-clamp fittings with silicone sealing are used across the system to maintain hygienic standards and facilitate easy maintenance.

Non-contact process piping is also constructed from **SS-316 stainless steel**, ensuring long-term durability and corrosion resistance. The autoclave is equipped with **proper drainage and exhaust systems**, where all drain lines are connected to a **central drain manifold with sloped pipelines**, enabling complete draining and preventing contamination or stagnation of condensate.

Control System & Automation

The sterilizer is equipped with a **modern PLC-based control system with HMI interface**, ensuring accurate process monitoring and simplified operation.

A **minimum 7-inch TFT color touchscreen controller** provides a user-friendly graphical interface that displays all operational parameters including:

- Temperature
- Pressure
- Sterilization time
- Alarm conditions
- Cycle status

The controller supports **programmable sterilization cycles**, allowing operators to configure sterilization parameters according to different load requirements.

The system can perform **multiple test and production programs**, making it suitable for both validation testing and routine sterilization operations.

Standard Test Programs

The autoclave is equipped with built-in validation and testing programs designed to ensure system reliability and sterilization efficiency.

Vacuum Leak Test

An automatic test cycle designed to verify the integrity of the chamber under vacuum conditions, ensuring there are no leaks in the system.

Bowie & Dick Test

A dedicated program to confirm the **efficiency of air removal and steam penetration**, commonly used for sterilization validation.

Standard Sterilization Cycle

A production cycle suitable for sterilizing **heat-sensitive loads such as liquids in glass flasks**, where vacuum conditions cannot be applied.

Safety & Protection Systems

The Rectangular Autoclave is designed with multiple safety systems to ensure safe and reliable operation.

Safety features include:

- **Over-temperature protection**
- **Over-pressure protection for chamber, jacket, and steam generator**
- **Pressure and door interlock systems**
- **Automatic action during power failure**
- **Vacuum leak monitoring**

The system is equipped with **audio-visual alarms** for abnormal conditions such as:

- High temperature or pressure

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- Sensor failure
- Vacuum generation delay
- Vacuum pump malfunction

The sterilization timer automatically **stops or resets** if the chamber temperature drops below the sterilization set point, ensuring process integrity.

Door Mechanism & Sealing System

The autoclave is equipped with a **heavy-duty radial locking door system**, designed for easy operation and reliable sealing under pressure.

The **hinged door is fabricated from SS-316 plates with a thickness of 12 mm or more**, while the **flange thickness is maintained at 16 mm or higher**, ensuring strong structural integrity.

The door assembly includes **external locking components such as shooting bolts, hubs, and hinges made from SS-316 stainless steel**.

A **high-temperature silicon rubber gasket** is fitted to ensure airtight sealing, while the integrated **steam distribution baffle** ensures uniform steam spread within the chamber.



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Monitoring & Sensors

The system incorporates **precision temperature and pressure sensors** connected to the PLC controller, allowing real-time monitoring of sterilization parameters.

Dedicated **ports are provided for flexible validation probes**, including:

- **1 probe port in the sterilization chamber**
- **1 probe port in the drain line**

These ports facilitate **validation and calibration procedures** required for regulatory compliance.

Auxiliary Equipment

The sterilization system is supplied with essential auxiliary equipment to ensure optimal operation:

- **2.0 Ton Copper Coil Branded Air Conditioner**
- **Dedicated Reverse Osmosis (RO) Water System**
- **100 Liter RO Water Storage Tank**

These auxiliary systems help maintain **stable environmental conditions and high-quality water supply for steam generation**.

Pressure & Temperature Performance

- **Operating Temperature Range: 121°C – 135°C**
- **Temperature Accuracy: ±0.5°C**
- **Operating Pressure: 15 PSI (Factory set maximum 30 PSI)**
- **Pressure Accuracy: ±2 PSI**

The chamber is hydraulically tested to ensure safe operation under high-pressure sterilization conditions.

Dimension (Inch)	Dimension (mm)	Capacity	Connected Load
18 × 18 × 36	450 × 450 × 900	180 Litres	12 kW
18 × 24 × 36	450 × 600 × 900	240 Litres	18 kW
24 × 24 × 36	600 × 600 × 900	320 Litres	18 kW
24 × 24 × 48	600 × 600 × 1200	430 Litres	18 kW
24 × 36 × 60	600 × 900 × 1500	810 Litres	36 kW
36 × 36 × 60	900 × 900 × 1500	1215 Litres	36 kW
36 × 36 × 72	900 × 900 × 1800	1500 Litres	48 kW

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