

Medical Waste Integrated Autoclave with Shredder
(Medical waste first crushed and then high temperature sterilization)

MCDS-150B



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Introduction

MCDS-B series crushing autoclave for medical waste is newly developed and produced by our company. It is widely used in hospital, clinic, health center and dentists etc. It meets the standard of GB150-2011 《Pressure Vessel》 and TSG R0004-2009 《Pressure Vessel Safety Rules》. Crushing, sterilization and drying can be done in only one autoclave, thus to avoid the second pollution. It saves space. And it can greatly reduce costs of packaging, transportation and burying.

MCDS medical waste shredding and high temperature sterilization integrated machine is suitable for **treating infectious waste and damaging waste** in the "Medical Waste Classification Catalog".

The all-in-one machine can completely shield the sterilized items during the sterilization process, effectively inactivate the waste steam and waste water generated during the sterilization process, and fully meet the requirements of in-situ high-pressure steam sterilization of various waste products to eliminate pollution, eliminate safety threats to people and the environment from polluting substances

1. Main Features

1) Scope of application:

ROOE MCDS B series medical waste shredding and high temperature sterilization integrated machine is suitable for processing infectious waste and damaging waste in the "Medical Waste Classification Catalog".

2) Structural features:

- This all-in-one machine integrates crushing and high-temperature sterilization, crushing first and then high-temperature sterilization. High temperature saturated steam heating;
- Modular design, reasonable structure, convenient installation and maintenance.
- The top of the main body is the feeding bin module, with a circular vertical structure;
- The top of the feeding bin is provided with a feeding door, which is driven by a hydraulic cylinder to open the door. The door rotates and the ring gear locks the structure. Compressed air active sealing technology.
- The middle part of the equipment is the crusher module, the high-strength shell, and the double-shaft structure; the sealing method of the transmission shaft is the packing seal; the double-deceleration motor provides sufficient torque; the bearing is installed externally and does not need to be replaced for life.

- The shell of the crusher is welded as a whole, with high strength;
- The lower part is the sterilization chamber module, with a discharge door on the side, and a unloading trolley is accommodated inside;
- The feeding cart can slide along the track. After the sterilization is completed, the feeding cart is manually pulled out of the sterilization chamber, and the materials are manually unloaded outside the chamber.
- The sealing door of the sterilization chamber is a side-mounted manual opening and closing door type; the door is rotated, the gear ring locking structure, and the compressed air active sealing technology; after the door is rotated in place, there is a mechanical locking mechanism to ensure the safety of operation;
- The seal of the door can still be kept in a sealed state when it encounters failures such as power failure;
- The all-in-one machine module is automatically welded by the robot; the three modules are connected by flanges, and the sealing performance is good.

3) Installation features:

- The all-in-one machine is composed of a circular vertical feeding bin at the top, a crushing bin in the middle and a sterilizing bin at the bottom. The top and bottom sterilizing bins have a feeding door and an exit door on the sides respectively. Feeding, crushing in the middle, receiving trolley at the bottom, pulling out the sterilization car manually to unload the material.
- The top sealing door adopts the fan-shaped door opening method driven by hydraulic cylinder (the bottom side door is manual) and the compressed air sealing technology, which greatly reduces the labor intensity of the operator to open and close the door while achieving reliable sealing.
- Only need to connect water and electricity to work.

4) Configuration features of hardware and control system:

- The upper computer adopts the touch screen as the man-machine control interface, which can dynamically display the working process and parameters such as temperature, pressure and time during the working process, which makes the operation more intuitive and convenient. manual operation;
- The lower computer adopts a modern new PLC control device for program control, which has the characteristics of strong function, high reliability, flexible use and remote monitoring.
- Control parts and valve parts are all matched with international high-quality parts, which greatly improves the stability and reliability of this type of equipment.

2. Technical Features

(1) Biological sealing safety items

The all-in-one machine realizes complete shielding of medical waste during the sterilization process, and effectively inactivates the waste steam and waste water generated during the sterilization process. and environmental security threats.

(2) Door sealing

When the environmental safety requires, the sealing safety of the door can be ensured after the use of compressed air to pass through the sealing ring. This stops leaks in the door and main body area. When the sealing of the door encounters failures such as power failure, it can still maintain the sealing state;

(3) Crushing mechanism

The low-speed high-torque reducer provides power, adopts a double-shaft structure, and the knife shaft is equipped with interleaved blades.

(4) High-quality and high-efficiency imported filters

The exhaust gas discharged from the all-in-one machine is sterilized by a high-precision biological filter and then discharged, which can effectively prevent the environment from being polluted. The efficiency of the filter can reach 99.999% interception for 0.2 μ m substances, and the filter housing is made of stainless steel.

(5) Treatment of high-risk waste

The method of inactivation of condensate water: the steam enters from the bottom of the sterilization chamber of the integrated machine and retains the condensed water at the bottom of the sterilization chamber. During the whole sterilization process, the condensed water is heated by the steam to reach the sterilization temperature, and the sterilization time of the condensed water is the same as The sterilization time for the loaded items is the same. During the sterilization process, the steam is intermittently discharged from the top through the filter. After the sterilization is completed, the filter is sterilized, and the sterilized condensed water is discharged from the bottom.

The sterilized residue is treated as ordinary domestic waste, stored in the receiving truck and poured into the outbound vehicle, and transported to the landfill for landfill or to the waste incineration plant.

(6) Cavity structure

All-in-one machine cavity and door are made of high-quality stainless steel 06Cr19Ni10 material. The feeding cavity is a circular structure without dead ends. The bottom of the sterilization chamber is equipped with a stainless steel filter cover to protect the drain from being blocked by debris.

The bottom of the all-in-one machine becomes a condensed water collection area, and the steam enters the chamber from the collection area, which can sterilize the condensed water while sterilizing the items, reducing many intermediate links.

(7) Multiple protection and alarm to ensure the implementation of the sterilization process

- The equipment monitors the peripheral operating conditions at any time and gives prompts;
- Set up self-checking procedures to check whether the equipment itself and important components are normal;
- Set up equipment self-sterilization procedures to protect maintenance and operators;
- Emergency treatment mode is set up, and each main valve is equipped with a manual operating mechanism, which can inactivate the contaminated items without a control system;
- Provide multi-point temperature detection to ensure the sterilization effect of waste and items.

3. Main technical parameters

Design pressure: -0.1/0.3MPa;

Rated working pressure: 0.23MPa

Ultimate vacuum: -0.092MPa

Pressure display accuracy: 0.1kpa

Sterilization temperature: 105 ~ 138°C

Temperature display accuracy 0.1°C

Maximum temperature: 138°C

Temperature uniformity: $\leq \pm 0.5^\circ\text{C}$;

Time of sterilization: 0-99 min

Time of drying:0-60 min

Model	Waste disposal capacity(each batch)	Waste disposal capacity(each batch)	Water required	Steam required	Chamber size	electricity	Installation area
MCDS-150 B	150L side discharge	18-30kgs	200kgs/hour	30kgs/hour	Diameter : 800mm	380V, 50HZ, three phase 60KW	2600*2000*2100mm

Machine size can be customized according to customer's requirement

4. Equipment description

The integrated machine is mainly composed of a feeding sealing door, a feeding bin, a crushing mechanism, a sterilizing bin, a receiving box, a discharging sealing door, a pipeline system and a control system.

1) The main body is a stainless steel vertical circular structure.

The feeding bin and sterilization bin are made of imported stainless steel plate with excellent anti-corrosion performance and welded by French SAF plasma welding machine. No welding wire is added during the welding process, and the base metal is directly melted and welded. The welding seam is narrow (only 6MM), and the heat-affected zone is small; the inner surface is mechanically polished by an automatic polishing machine, the surface is smooth, and the roughness $Ra \leq 0.8$ microns, and finally after electro-chemical polishing, the surface forms a passivation film, which is bright, smooth and clean. Corrosion resistant and durable. The crushing bin is welded with high-strength carbon steel plate.

2) The sealing door adopts a circular gear ring and a pneumatic sealing structure. The opening and closing of the door are manually operated, and a safety interlock device is provided.

- When the door does not enter the gear hole position of the main body, the gear ring does not rotate, and the program can only be started when the door is sealed at the normal closed position.
- Before the program starts running, the sealing door will be locked and cannot be opened to ensure safe operation.
- The opening and closing action of the door is strictly controlled by the temperature and pressure of the inner room. Only when the pressure in the cabinet reaches the current atmospheric pressure and the temperature in the sterilization room is lower than the set value, the door is allowed to open.
- Self-locking: the program cannot be started until the door is closed; the sealed door cannot be opened until the program is over.

3) The pipeline system consists of control valves, high-precision biological filters, vacuum pumps, safety valves and sanitary pipes.

- The control valve adopts the angle-seat pneumatic valve specially provided by GEMU company in Germany, and the pneumatic valve can operate up to 4 million times without failure.
- Equipped with a safety valve, which plays a role of safety protection. When the pressure is higher than the set upper limit, it will automatically open; when it is lower than the set lower limit, it will automatically close.

4) The control system adopts the new PLC of German SIEMNES as the main controller, the Siemens touch screen as the man-machine interface, the German WIKA dual pressure transmitter and other components to form a complete control system.

5) Crushing chamber.

Using double reduction motors, the double main shafts of the crushing bin are respectively connected with external reducers.

Working principle: The blade is installed on the cutter shaft, and the two shafts rotate opposite to each other, and the material is cut, torn and squeezed by the blade to be crushed.

The cutter shaft is made of high-quality alloy structural steel, which has been quenched and tempered to achieve high internal toughness and impact resistance. The special design of the cutter shaft can ensure good fatigue resistance.

The blade material is cold work die steel, moderately heat treated to achieve high internal toughness. The surface is heat treated again to achieve optimum wear resistance and minimize wear.

Both sides of the crusher frame are equipped with comb plates, which are installed between every two blades. The comb guides the material to be crushed to the teeth and prevents the crushed material from being brought back to the crushing area.

The packing is pressed between the main shaft of the reducer and the sealing assembly to form a seal. Effectively prevent the leakage of waste gas and waste water.

5. performance characteristics

- The inner shell of the integrated machine and the components of the steam inlet pipeline are all made of international quality standards, made of sanitary stainless steel, and the area in contact with medical waste is mechanically polished, smooth and flat, without dead ends, easy to clean, and avoids residual bacteria caused by traditional non-smoothness Reproduction, greatly reduce the chance of corrosion, fully meet the requirements of medical waste treatment. In particular, the main body adopts a new process of single-sided welding and double-sided forming of carbon dioxide gas shielded stainless steel flux core, which greatly improves the internal and external quality of the integrated machine.
- The upper computer adopts the touch screen (master and slave) as the man-machine control interface, and the front and rear doors can dynamically display the working process and parameters such as temperature, pressure and time during the working process, which makes the operation more intuitive and convenient, and the user can also according to their needs. Special configuration and easy manual operation. Data is displayed on the touch screen display at the right time and stored at any time.
- The lower computer adopts a modern new control device--Siemens programmable controller (referred to as PC machine, CPU226) for program control, which has the characteristics of strong function, high reliability and flexible use. At the same time, a MODEM module (EM241) is specially installed, which can realize remote diagnosis and monitoring capabilities.
- The top feeding door and bottom discharging door of the all-in-one machine are designed to be pneumatically opened and closed by a circular gear ring. The structure is sealed with compressed gas, the door is not closed tightly, and the program cannot be started. When there is pressure in the sterilization chamber, the sealed door cannot be opened to ensure the safety of equipment and personnel.
- Among similar products in China, it is the first time to use a stainless steel angle seat pneumatic valve that meets the US FDA standard, ensuring 4 million trouble-free operations.
- The main component of the all-in-one machine adopts high-quality thermal insulation materials for thermal insulation, and is covered with a metal thermal insulation cover to reduce the heat auxiliary radiation to a minimum and protect the working environment.
- The condensed water generated during the sterilization process is automatically inactivated by high pressure, and does not contaminate the environment.

6. Flow Diagram

The process is as follows: loading -- closing the top door -- crushing -- pre-vacuum -- heating -- sterilization -- -- exhaust -- drying -- emptying -- unloading

Loading: Press the "Open Top Door" button to open the integrated top door. The operator transports the fully loaded turnover box to the operation platform, and manually pours the medical waste in the turnover box into the feed bin of the integrated machine.

Closing the top door: When the feeding bin is full, press the button to close the top door, and the top door will be closed.

Crushing: After the top door is closed, the crushing motor starts and starts crushing the material. When the set crushing time expires and the current returns to the no-load state, the crushing motor stops working and the crushing is completed.

Pre-vacuum: After the crushing, the vacuum pump works, and the pre-vacuum ends after the inner chamber pressure is pumped to minus 90Kpa.

Heating: The steam inlet valve is opened, and steam is fed into the inner chamber. After the temperature detection reaches the sterilization temperature, the program transfers to the sterilization stage.

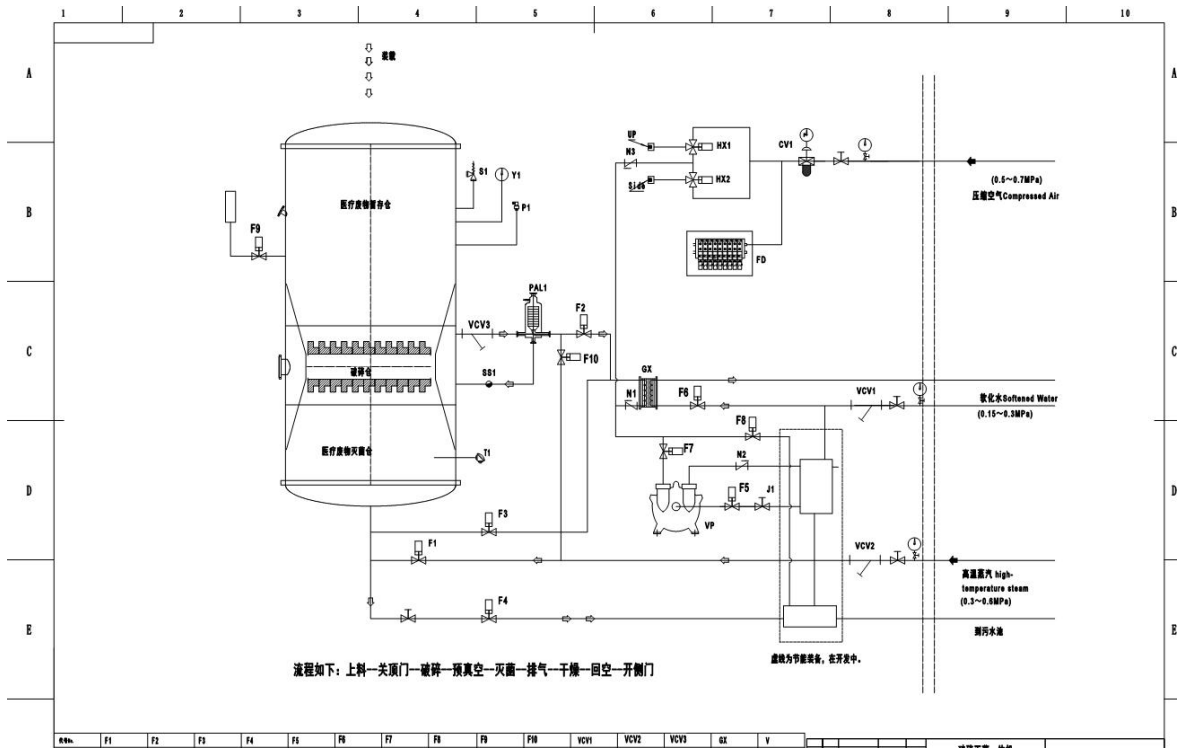
Sterilization: In the sterilization stage, the steam inlet valve is under the dual control of the inner chamber pressure and temperature, so that the inner chamber temperature is controlled within the range of 134 degrees $\pm$ 2 degrees. It was maintained for 45 minutes(adjustable) and the sterilization was over.

Discharge: The bottom discharge valve is opened, and the waste water is discharged under the action of internal pressure.

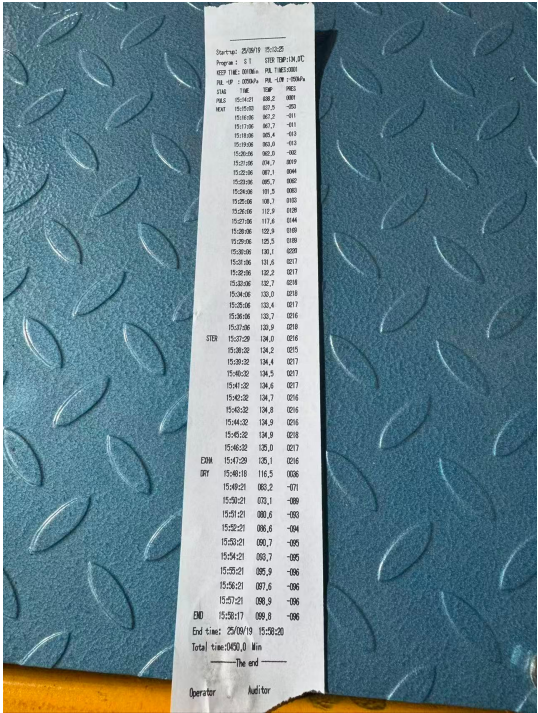
Vacuum: The vacuum pump is turned on, and the material is dried under slight negative pressure for a certain period of time.

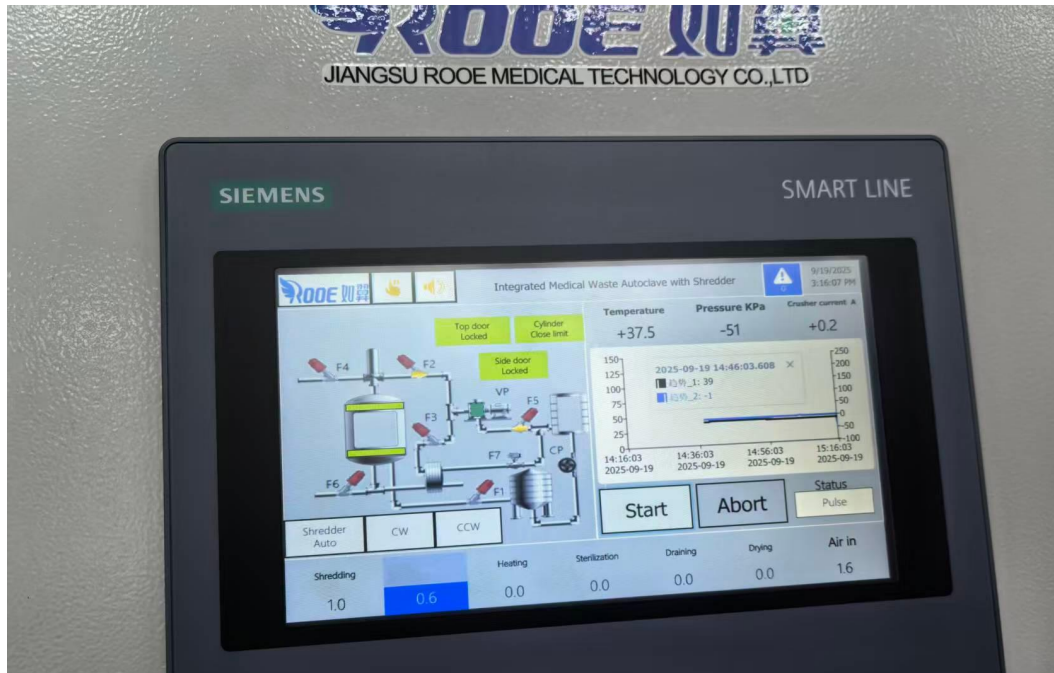
Unloading: Open the bottom side motorized door, pull out the receiving trolley, and pour the material.

The program ends.



Drawing





7.Standard

The autoclave is manufactured and tested in accordance to Chinese Standards GB. If the ASME code, other standards are requested, please inquire Rooetech.

8.Installation

Rooetech engineers shall be responsible for on-site installation supervision, debugging, start-up and training. The Buyer shall provide Rooetech engineers with round trip air tickets and business-like accommodation during the stay. The number of engineers

dispatched to the site shall be confirmed by both parties; nonetheless, it shall not be more than 1 Persons.

9.After sales service

When the project is accepted and transferred to client, Rooetech will provide free service of

Consultation for facility operation and maintenance, and guidance to resolve equipment failures etc.

10. Warranty

Rooetech warrants that the equipment supplied when operated and maintained by competent personnel and in accordance with the instructions, and provided that the client has made no

alterations to the system, then Rooetech shall guarantee the equipment 24 months against delivery date. Rooetech will correct or replace any of said defective machinery, equipment or component, provided client gives the written notice during said warrant period. Exception is taken for normal wear, tear or abuse and consumables.

11 Certificates and Approvals

CE

ICR VERIFICATION OF CONFORMITY

NO.: ICR/VC/HBX240502

Name and address of Applicant: Jiangsu Rooe Medical Technology Co., Ltd
NO.19, Renmin East Road, YangShe Town, Zhangjiagang City (Cathay Pacific Plaza) Z1310, China

Name and address of manufacturer: Jiangsu Rooe Medical Technology Co., Ltd
NO.19, Renmin East Road, YangShe Town, Zhangjiagang City (Cathay Pacific Plaza) Z1310, China

Product name: Integrated Autoclave with Shredder

Product types: MCDS Series

Product trademark: ROOETECH

Verification was carried within following scope:

Information on the Declaration of Conformity:

Result: **Legislation:** **Standard:**

✓ MD [2006/42/EC] EN ISO 12100:2010
EN 60204-1:2018

✓ EMC [2014/30/EU] EN IEC 61000-6-4:2019
EN IEC 61000-3-2:2019+A12:021
EN IEC 61000-5-2:2019

The assessment process has been carried out in accordance with individual rules and conditions agreed with the applicant.
Evaluation has been carried out in accordance with:

Test report: CTCIA/G182402/95051437DR
CTCIA/G152402/95051436AR

Tests conducted by: CTC Testing Group (Guangdong) Co., Ltd

Issue date: 16.05.2024

Expiration date: 15.05.2029

Remarks:

- VC was issued on voluntary basis and does not imply meeting all essential requirements listed in Declaration of Conformity.
- For introducing this product on European market may be needed EC/RE-type examination conducted by appropriate Notified Body.

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CEO, ICR Co. Ltd.

QR Code

Sterilization Efficiency Test Report of integrated autoclave with shredder by CNAS



广东省微生物分析检测中心

GUANGDONG DETECTION CENTER OF MICROBIOLOGY

分析检测报告

REPORT FOR ANALYSIS

报告编号
Report No. 2024SP05585R01D

样品名称
Name of Sample 撕碎灭菌一体机
Integrated Autoclave with Shredder

委托单位
Applicant 江苏如翼医疗科技有限公司
Jiangsu Rooe Medical Technology Co., Ltd.

检测类型
Test Type 委托检测
Entrustment Test

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广东省微生物分析检测中心

分析检测报告

REPORT FOR ANALYSIS

报告编号 (Report No.) 2024SP05585R01D 校验码 (Verification Code): VPV968CF

样品名称 Name of Sample	撕碎灭菌一体机 Integrated Autoclave with Shredder	检测类型 Test Type	委托检测 Entrustment Test
委托单位 Applicant	江苏如翼医疗科技有限公司 Jiangsu Rooe Medical Technology Co., Ltd.	地 址 Address	张家港市杨舍镇人民东路19号 (国泰新天地广场) Z1310 NO.19, Renmin East Road, YangShe Town, Zhangjiagang City (Cathay Pacific Plaza) Z1310
样品来源 Sample Source	委托方送检 Submitted for Testing by the Applicant	样品数量 Sample Quantity	1台 One
样品规格和批号 Spec and Lot No of Sample	MCDS Series	样品状态和特性 State and Characteristic	机器 Machine
接样日期 Sample Received Date	2024-05-11	验收日期 Completion Date	2024-05-21
检测项目 Item Tested	压力蒸汽灭菌器的生物监测 Biological monitoring of pressure steam sterilizer		
检测依据和方法 Test Standard and Method	WS 310.3-2016 附录 A WS 310.3-2016 Appendix A		
检测结论 Test Conclusion	送检样品所检项目的实测数据见本检测报告续页。 The test data of the sample(s) is attached to the page(s) of this report.		
备注 Remarks			

签发日期: 2024-05-21
Issue Date

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