

 **WaSter<sup>®</sup>**  
Medical Waste Treatment



# Biohazard waste treatment



**WaSter®:** Compact, Safe and Fast: a steam sterilizer specifically designed for total decontamination of hospital waste.

The biological risk related to the management of infected and hazardous solid waste (BSL 2 ÷ 4) generated by hospitals, healthcare centers, surgery clinics and BSL-rated labs can be successfully reduced to zero by means of the steam sterilization, the only thermal process capable to sterilize with a SAL of 10<sup>-6</sup> (equivalent to a 6log bioburden reduction) any solid waste introduced inside the pressure vessel, including bacteria and viruses.

**WaSter®** is designed ground-up for handling hospital waste and implements a built-in shredder which is located inside the autoclave chamber above the internal trolley in order to avoid the exposure of the users to biological risks and in the same time to keep high the air quality in the surrounding working space. A compact equipment with a reduced footprint thus requiring less space for being installed,

**WaSter®** combines a preliminary shredding phase with the application of deep vacuum to remove any trace of air from the load thus preventing the presence of air that inevitably leads to cold spots and incomplete sterilization.

**WaSter®** complies with international standards applicable for the hospital sterilization operations and it is capable to execute a decontamination process that can be validated with biological indicators to prove the sterilization of the Biohazard waste, including Bio Safety Level class 3 / 4 rated solid waste).



WaSter®

Medical Waste Treatment

ALS  
ANGELANTONI  
LIFESCIENCE



Only available for Waster50 pass-through model (double door)

## Total Safety

Total Safety is our priority and the whole project is driven by this primary goal.

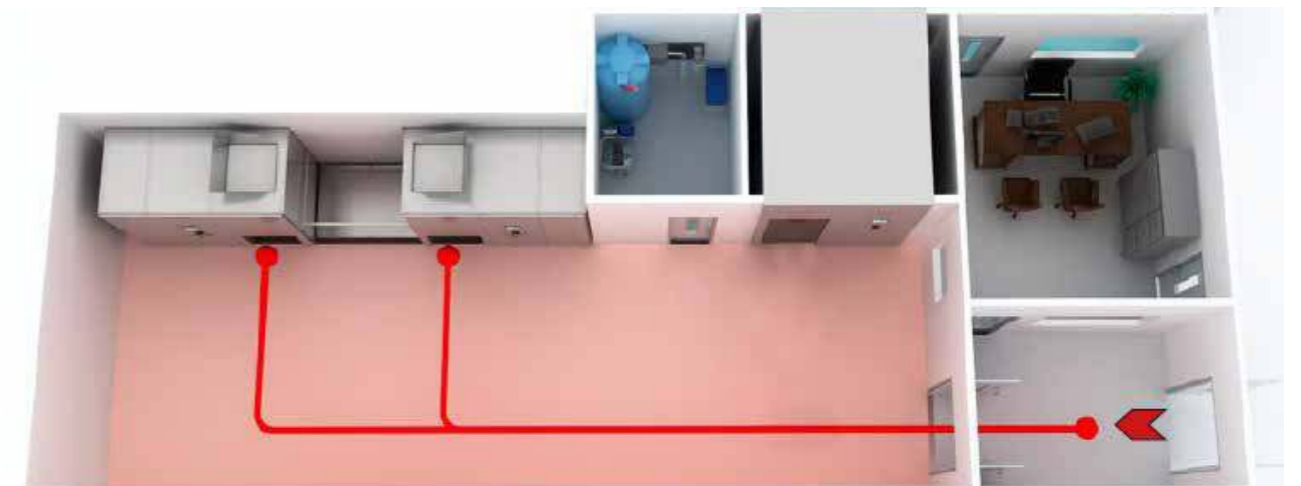
**WaSter®** is meant to become the reference technology platform for any hazardous solid waste. It is designed in-house by Angelantoni Life Science and it combines cutting edge technology with the internationally recognized Italian design and creativity. Reliable and a fully controlled processes which are reproducible as they inherit the Parametric Release approach of batches commonly used in the pharmaceutical industry. Separate drains assure segregation of the condensate removal at the very end of the process.



**+50%**  
Useful Life

## Flexibility

A modern sterilization unit requires a high degree of flexibility in terms of process parameters and material flows to assure the highest level of safety associated to the machine daily operations. **WaSter®** design is available in both single and double door versions (the latter by means of a pass-thru execution) in case the "dirty" area is segregated from the "clean" unloading side.



Double Waster 50



## Key features

WaSter® key features below summarize the way we approach safety to ensure the sterility of the treated load:

- Thermal treatment and following decontamination take place in a perfectly sealed SS vessel thus avoiding the risk of any cross-contamination;
- The 2nd-generation shredder is extremely robust and capable to significantly reduce the overall volume of the waste that gets fragmented in very small pieces;
- The shredded waste also facilitates the air removal during the application of the vacuum, thus enhancing steam penetration and sterilization, avoiding any risk of residual biological contamination;
- The pass-through execution (available as option as alternative of the single door vessel) of the sterilizer allows a unidirectional pathway of the biological waste, is to be selected to fully segregate the loading side ("dirty" area) from the unloading side ("clean" area).

## WaSter® offers four competitive advantages:

- 80% reduction of the original solid waste volume leading to a significant reduction of the waste disposal;
- Complete dryness of the solid waste as an output of the process, ensuring an easy and clean handling;
- Location of the shredder to assure safety throughout the different phases of the treatment process;
- The entire treatment cycle takes place inside a tightly sealed pressure vessel, thus preventing the emission of unpleasant smells into the installation room.

## WaSter® material treatment



**1** The waste is introduced by gravity inside the chamber from the top.



**2** The waste gets shredded and vacuum is applied to remove cold spots of entrapped air.



**3** The waste gets sterilized by saturated steam.



**4** The waste gets dried by means of the vacuum pump.

The **WaSter®** is built in compliance with the current European and international standards, including:

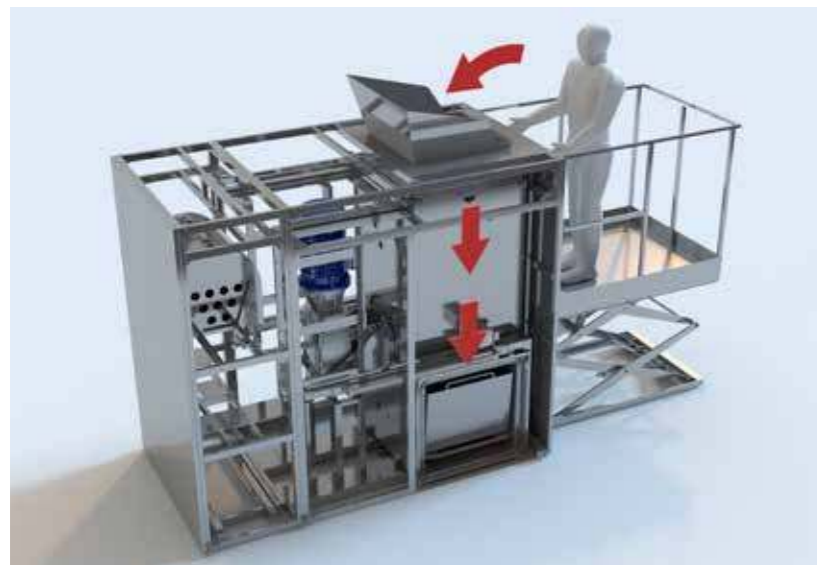
- 2006/42/EC for Machinery Directive
- 2014/68/EU for Pressure Equipment (PED)
- 2009/125/EC for Eco-friendly design (ERP)
- 2014/35/EU for Low voltage
- 2014/30/EU for Electromagnetic compatibility
- UNI EN ISO 285:2016 (specific requirements and tests for large steam sterilizers)
- UNI EN ISO 17665-1:2016 (specific development, validation and routine testing)
- CEI EN ISO 61010-1:2013 (safety requirements for electronic equipment)
- CEI EN ISO 61010-2-040:2015 (specific requirements for sterilizers and washer-disinfectors used for the treatment of medical materials)
- UNI EN ISO 15614-1:2012 (qualification of welding procedures)
- UNI EN ISO 9606-1:2013 (welder qualification test)
- UNI CEI EN ISO 17050-1:2005 (conformity assessment)
- UNI EN ISO 14971-1:2012 (risk analysis)
- EN IEC 62304:2006 (software validation)
- IEC 62366-1:2015 (usability)
- UNI EN ISO 9001:2015 (quality management system)
- UNI CEI EN ISO 13485:2012 (quality management system)

## WaSter® facts sheets

WaSter® is made of a vertical sterilization chamber equipped with a loading door located on the top and a horizontal sliding door (pass-through version also available) located toward the bottom of the unit suitable for the collection of sterilized waste in a trolley.

The process starts automatically once all the doors are closed and the gasket activated to seal the doors - every stage of the process is controlled by the user through the HMI touch screen.


The unit can reach a productivity of 50 kg/h.




Only available for Waster 50 pass-through model

WaSter® is factory pre-configured with the following treatment programs

1. Vacuum seal test (leak test);
2. Vacuum in the chamber (preliminary preparation stage) waste in open containers;
3. Trituration and sterilization - thermal treatment @ 134°C for Biohazard solid waste;
4. Sterilization treatment @ 134°C for Biohazard liquid waste in open containers;
5. Vacuum drying stage.

  
**-85%**  
Water consumption

  
**-40%**  
Energy consumption

  
**100%**  
Recyclable

  
**-25%**  
Total cycle time

### 1. Arrival of infected material

The infected material is collected and closed inside the dedicated plastic disposable bag with a trolley and placed inside the lifting platform area (elevator).

A dedicated trolley is then loaded into WaSter® to receive the shredded waste.



### 2. Manual loading of infected material and cycle starting

The transport trolley containing the infected material is raised by the integrated elevator at the right charging level. The load of the waste is manual: after the loading, the chamber is hermetically sealed and the cycle starts.



### 3. Discharge of sterile material

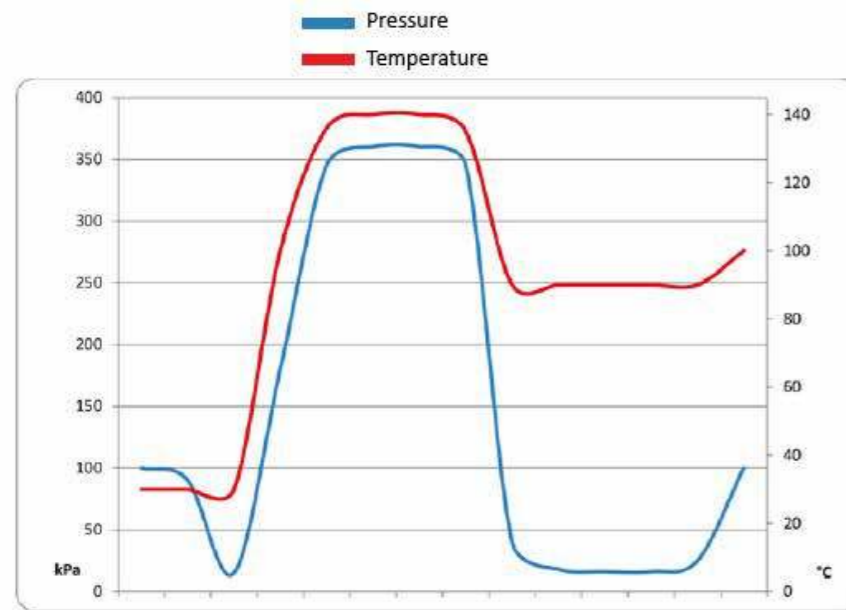
The dedicated trolley containing shredded and sterilized waste is unloaded from the clean side of the WaSter®.



Only available for Waster 50 pass-through model

## Safe treatment

WaSter® was designed to last over time and to constantly assure a safe process. Safety is not limited to the process but also extends to all the components and devices which could potentially affect the reliability of the operations.



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WASTER.50 Rel.01.00
ID-LS00000
Operator:
Operatore 1
Standard cycle
Steriliz. T= 135.0 °C
t=0020min
=====
Start cycle 14:05:13
22/09/17
Progressive n. 00000028
=====
14:05 103.6 °C 100.0 kPa
CONDITIONING
14:05 103.6 °C 090.6 kPa
Vacuum N.01 030.0
14:12 102.2 °C 022.6 kPa
HEATING 135.0 °C
14:22 135.6 °C 319.2 kPa
STERILIZATION 0020 min
Time T. Cham. P. Cham.
14:23 135.6 °C 319.8 kPa
14:23 135.7 °C 320.9 kPa
14:24 135.7 °C 321.6 kPa
14:24 135.7 °C 320.3 kPa
14:25 135.6 °C 319.1 kPa
14:25 135.6 °C 320.2 kPa
14:26 135.6 °C 321.8 kPa
14:26 135.6 °C 320.7 kPa
14:27 135.5 °C 319.9 kPa
14:27 135.6 °C 320.5 kPa
14:28 135.6 °C 321.1 kPa
14:28 135.6 °C 320.9 kPa
14:29 135.7 °C 319.2 kPa
14:29 135.6 °C 320.8 kPa
14:30 135.7 °C 321.6 kPa
14:30 135.5 °C 320.8 kPa
14:31 135.5 °C 319.7 kPa
14:31 135.6 °C 320.2 kPa
14:32 135.6 °C 321.8 kPa
14:32 135.6 °C 320.8 kPa
14:33 135.5 °C 319.8 kPa
14:33 135.6 °C 320.2 kPa
14:34 135.6 °C 321.2 kPa
14:34 135.6 °C 320.9 kPa
14:35 135.6 °C 319.5 kPa
14:35 135.6 °C 320.5 kPa
14:36 135.6 °C 321.7 kPa
14:36 135.6 °C 320.7 kPa
14:37 135.5 °C 319.0 kPa
14:37 135.6 °C 320.0 kPa
14:38 135.6 °C 321.4 kPa
14:38 135.6 °C 320.5 kPa
14:39 135.6 °C 319.7 kPa
14:39 135.6 °C 320.3 kPa
14:40 135.6 °C 321.4 kPa
14:40 135.6 °C 320.8 kPa
14:41 135.6 °C 319.3 kPa
14:41 135.7 °C 320.0 kPa
14:42 135.6 °C 321.6 kPa
14:42 135.6 °C 320.7 kPa
DRYING 030.0 kPa
14:55 103.3 °C 029.9 kPa
DRYING 0010 min
15:05 104.8 °C 017.1 kPa
AERATION
=====
15:06 106.1 °C 092.8 kPa
CYCLE ENDED VALID
Temper. Max 135.7 °C
Temper. Min 135.5 °C
Total time 0022 min
=====

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## Environmental impact

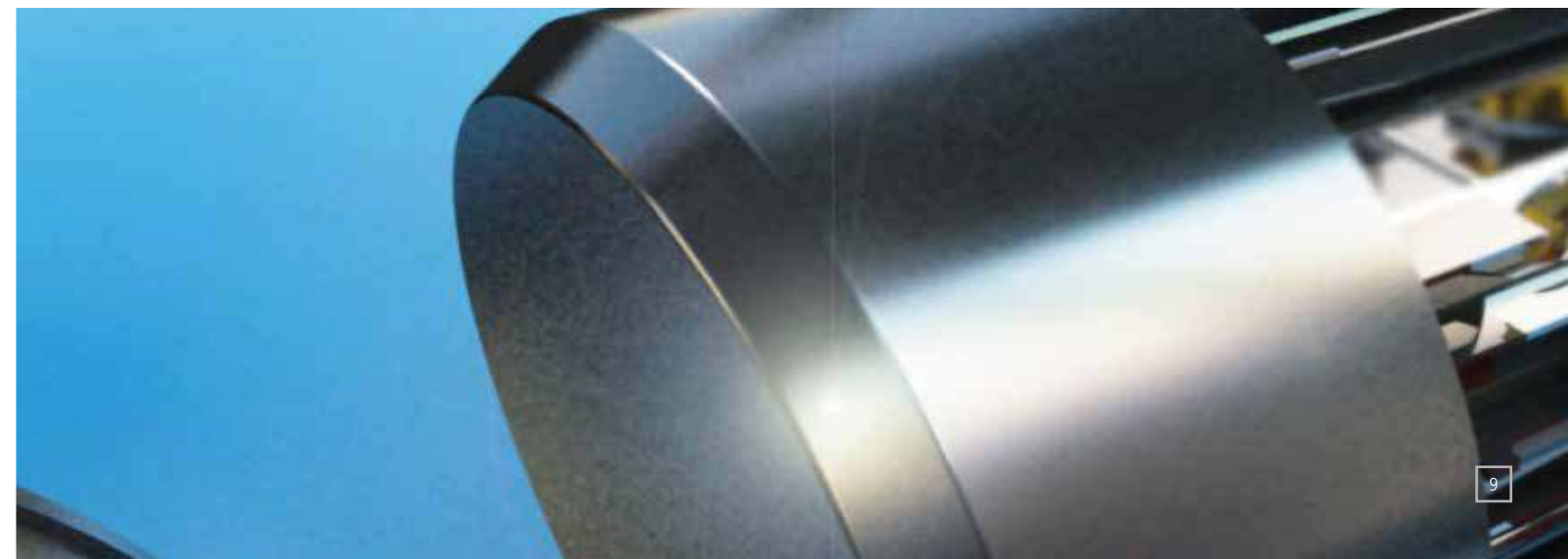
WaSter® was developed by applying an eco-project design, with the goal of preserve the environment in which we live. Starting from the idea of producing a piece of equipment with sustainable consumption to reduce the environmental impact, significant measurable objectives were set and achieved, all of which enhance the performance of the WaSter® product line. The vacuum is generated by an innovative vacuum pump that runs fully dry (no lubricants are required) and it is compatible with steam. Water consumption for generating vacuum is limited to the production of clean steam and the discharging temperature cooling device.

## Validation

The validation execution makes sure the design conditions are met soon after the installation. More specifically, during the sterilisation cycle the following values are checked continually: pressure, temperature and presence of non-condensable gases. The monitored parameters guarantee not only the effectiveness of the sterilization process in compliance with the reference standard UNI EN ISO 17665-1:2006, but also a Sterility Assurance Level (SAL) of 10<sup>-6</sup>.

## WaSter® main technical features

- Frame, fascia and side panels in stainless steel AISI 304;
- Chamber in stainless steel AISI 316Ti, thickness 8 mm;
- Chamber bottom with central drain and filtration, fully drainable and cleanable;
- Jacket in stainless steel AISI 304L, thickness 6 mm;
- Doors in stainless steel AISI 304L;
- Chamber and doors scotch brite finished;
- Door/s vertical and horizontal automatic sliding device;
- Vertical chamber with integrated shredder;
- Dual waste pushing device against the shredder;
- Chambers, doors, steam generator and pipeline insulated by kevlar fabric;
- Hydraulic pipes and pneumatic valves in stainless steel AISI 304;
- Steam generation by Electrical steam generator in stainless steel AISI 304 (E);
- Steam generation by Centralized steam directly to the chamber (S);
- Steam generation by Electrical steam generator and Central steam (ES);
- Dry mechanical vacuum pump compatible with steam;
- **Double data detection system (2 probes for temperature and 2 for pressure transducers);**
- Siemens integrated safety programmable electronic controller;
- Touch screen full colour and high resolution;
- Alphanumeric recording device installed on the front panel;
- USB port for data back-up;
- Sterilization cycles for empty glassware, rubber materials, fabrics, liquids in sealed containers and liquids in open containers plus cycle for infected liquids and materials;
- Burner located at the chamber air outlet / as alternative a sterile 0.22 um sterilizable filter is also available.



External options



Loading waste elevator

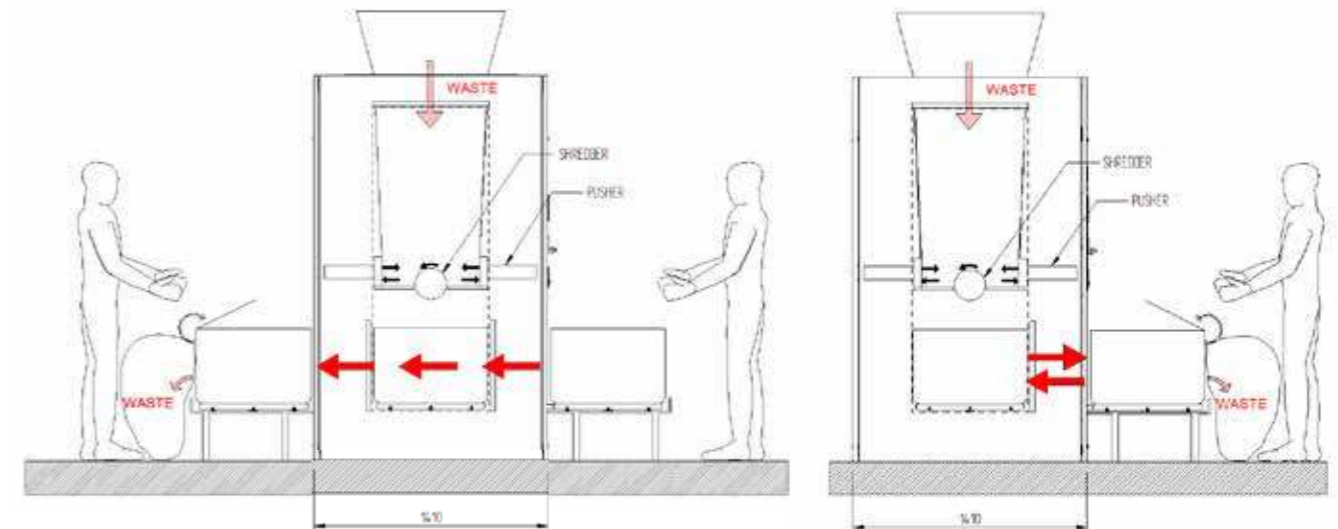


Trolley for shredded waste



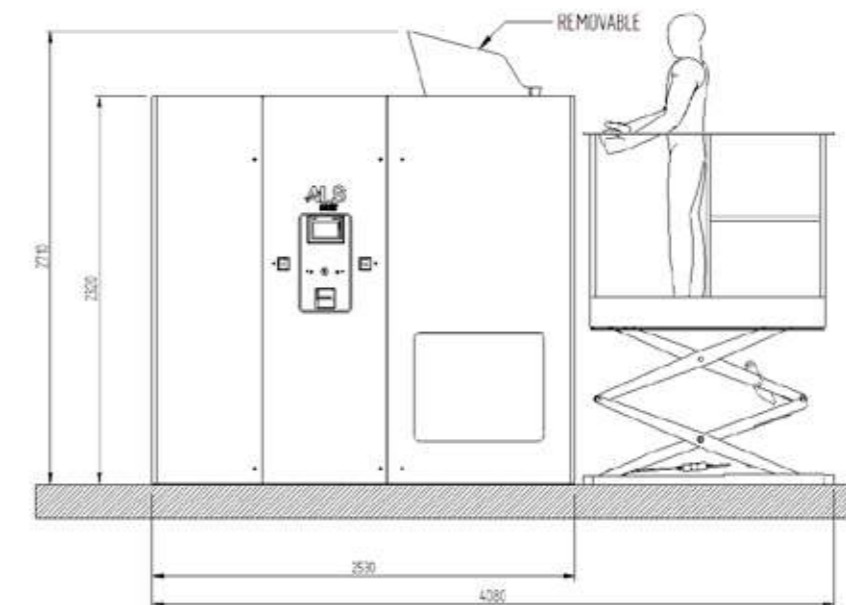
WaSter®

Model	Waste weight volume ratio	Productivity	Waste weight reduction ratio	Waste loading volume	Treated waste final volume	Cycle time	Voltage
Waster 50	50 Kg/h	50 Kg/h	1/10	1/5	500	1 h	400V/50Hz
Waster 50 pass-through	50 Kg/h	50 Kg/h	1/10	1/5	500	1 h	400V/50Hz
Waster 50	50 Kg/h	50 Kg/h	1/10	1/5	500	1 h	400V/60Hz
Waster 50 pass-through	50 Kg/h	50 Kg/h	1/10	1/5	500	1 h	400V/60Hz
Double Waster 50	50 Kg/h	50 Kg/h	1/10	1/5	500	1 h	400V/50Hz
Double Waster 50 pass-through	50 Kg/h	50 Kg/h	1/10	1/5	500	1 h	400V/50Hz
Double Waster 50	50 Kg/h	50 Kg/h	1/10	1/5	500	1 h	400V/60Hz
Double Waster 50 pass-through	50 Kg/h	50 Kg/h	1/10	1/5	500	1 h	400V/60Hz

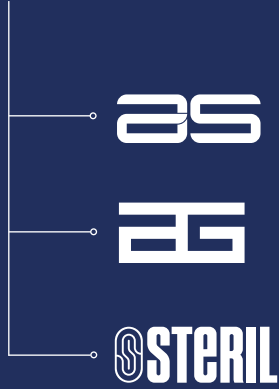


WaSter 50 with pass-through

WaSter 50 without pass-through



Waster 50 Front view



Angelantoni Life Science (ALS), a sub-holding fully owned by Angelantoni Industrie, is one of the leading international companies in the supply of refrigerating equipment and the design of technological solutions in the biomedical industry, with a constant commitment to biological and environmental innovation and safety.

Research centers, hospitals, laboratories, universities and industrial companies in the pharmaceutical and chemical industry are the recipients of ALS production, which covers all the needs for refrigeration, infection control and microbiological safety with a wide range of standard and special products. With its agents and distributors in over 40 countries, Angelantoni Life Science is the ideal partner in the healthcare sector and scientific research.

Our strength comes from the skills of our engineers and the experience they have gained in design, from the professionalism of our technicians in production and service and the coordination of experienced managers supporting our staff.

Each team member contributes their enthusiasm and scientific and industrial knowledge to a work environment that stimulates innovation and development. Angelantoni Life Science invests more than 10% of its turnover in Research and Development, involving a multidisciplinary team of technicians and researchers.

Founded in 1932, Angelantoni Industrie is an industrial group with 4 plants and over 500 employees. It is one of the world's leading companies in the production of environmental and space simulation chambers (ATT Angelantoni Test Technologies), cold technology applications in pharmaceutical and hospital research (ALS Angelantoni Life Science), Energy Efficiency (Cold Energy) and Solar Thermodynamic Energy (Archimede Solar Energy receiver tubes).



Angelantoni Plants



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