

# Product Description

## WD 200

## Application

For use in healthcare facilities such as CSSDs, for the processing of reusable instruments, containers and surgical shoes and other fixed objects as well as for rigid endoscopes, eye instruments and in the field of neurosurgery.

## Description

The WD 200 washer-disinfector was designed to ensure efficient cleaning of instruments, containers and accessories while minimizing the consumption of natural resources.

The sophisticated and field-tested stainless-steel chamber and the efficient water circulation system are designed for the processing of up to 12 DIN sieve trays. Disinfection can be performed in accordance with EN ISO 15883-1,-2 with an  $A_0$  value > 3000.

The WD 200 is equipped with 1 or 2 manual full-glass hinged doors, which make it possible to monitor the reprocessing in the machine throughout the entire process. In addition, the system offers continuous process reliability, as all relevant performance parameters are monitored by the machine itself via the optional independent measurement data acquisition.

The WD 290 washer-disinfector includes the following main features:

- Ergonomic product design by Belimed
- Patented process status display
- Washing chamber with large capacity and up to 12 DIN sieve trays
- Minimal footprint with a width of only 680 mm
- Resource savings of up to 20% thanks to the dynamic filling system
- Optional heat recovery with condenser and preheating tank for the final rinse water
- Visual monitoring of the entire process through the two full-glass doors
- Illuminated washing chamber
- Electrical heating with 400 V 3N/AC, 50 Hz
- Quick filling, drainage and heating
- 2 cleaning agent pumps with 2 flow meters and 2 vacancy indicators (maximum 4)
- Storage of two 10 liter cleaning agent canisters
- Disinfection monitoring function,  $A_0 = 3000$
- Optional integrated printer on the loading or unloading side
- Optional automatic program recognition for up to 12 programs



## Dimensions

Wash chamber:	H x W x D: 625 x 575 x 617 mm
Wash chamber capacity (net):	220 liters
Wash chamber capacity (gross):	280 liters

## Outer dimensions

Standard model:	H x W x D: 1,840 x 680* x 710 mm
Model with exhaust air condenser (optional):	H x W x D: 2,210 x 680* x 710 mm *730 mm if steam is supplied from above and/or water supply from below

## Standard configuration and options

### Supply

- Standard:
- Electrica power, 380–415 V 3N/AC 50/60 Hz
  - Electrica power, 200–220 V 3N/AC 50/60 Hz
  - Electrica power, 208 V 3N/AC 60 Hz
- Optional:
- Steam connection

### Door configuration

- Two manual full-glass hinged doors
- One manual full-glass hinged door and rear panel

### Languages

The control panel can be set up for a maximum of 3 languages per cleaning device, whereby German and English are already set up by default. The third language is adapted to the respective national language based on the customer's destination.

### Capacity/Cycle

- Surgical instruments (DIN sieve trays): 12
- MIS instruments (connections / DIN sieve trays): 48/4
- Anesthesia materials (breathing tubes 1.5 m/  
bags/masks/catheters/tubes): 15/3/5/5/5
- Sterile container incl. lid: 3
- Surgical shoes: 40
- Baby bottles incl. caps: 84

### Standard configuration

- AER with drying system
- Manual double hinged doors made of solid glass
- Front paneling on the top and bottom
- Microprocessor control
- 2-line LCD display with membrane keyboard on the unloading/loading side
- Patented process status display
- Illuminated washing chamber
- 3 water supply connections
- Dynamic filling
- Quick-discharge valve made of stainless-steel (DN 40)
- Chamber made of stainless-steel, AISI 316L
- Disinfection monitoring function,  $A_0$  value
- Validation port for external measuring sensors
- RS-232 and RS-485 interfaces
- Storage space for two 10 liter dosing canisters
- 2 dosing pumps for chemicals
- 2 flow meters for chemicals
- 2 level indicators for chemicals
- Exhaust air damper with condensation drain
- H13 HEPA filter
- Pressure switch/foam control system
- 1 potential-free contact
- Plinth cover
- Pump pressure sensor
- 12 preset programs

### Options (installation ex works)

- Wash tank heating with steam heat exchanger
- Wash tank heating and drying with steam heat exchanger
- Exhaust air vapor condenser
- Deionized water preheating (electric)
- Exhaust air heat recovery (electric)
- Independent process recording IPD system
- Conductivity monitoring
- Sterile filter monitoring
- 2 potential-free contacts
- Barcode reader for batch recording
- Sampling tap

### Options (field installation)

- Drain pump set
- Automatic program recognition (magnets)
- Batch documentation via built-in printer
- External printer
- Ethernet COM server
- Traceability system according to ICS 8535
- 2 x additional dosing pumps (Pharmed®/Viton®) incl. flow meter
- 2 x additional level indicators (10 liters and 25–30 liters)
- Drain-water cooling
- Control of the pilot valve
- Floor tray with sensor
- Steam connection set from above/below

### Additional options (paneling)

- Set of side covers, complete for single and double door
- Set of side covers complete with extension (50 mm) incl. base or machines in case of steam supply from top and/or water supply from bottom without vapor air condenser/DI water pre-heating
- Intermediate and base panel 50 mm without vapor air condenser/DI water pre-heating
- Intermediate and base panel 50 mm with vapor air condenser/DI water pre-heating
- Intermediate and base panel 100 mm without vapor air condenser/DI water pre-heating
- Intermediate and base panel 100 mm with vapor air condenser/DI water pre-heating
- Paneling vapor air condenser/DI water pre-heating
- Paneling vapor air condenser/DI water pre-heating with extension (50 mm)

### Accessories

- Instrument rack, 1 level
- Instrument rack, 2 levels
- Instrument rack, 3 levels
- Instrument rack, 4 levels
- Instrument rack, 5 levels
- Instrument rack, 6 levels
- Anesthesia rack
- MIS rack
- Container rack
- Baby bottle rack
- Rack, 1 level, nozzles
- LAB rack
- Transport cart

## Standards\*

Area	Standard
Directive concerning medical devices	93/42/EEC
Safety	EN IEC 61010-1, EN IEC 61010-2-040
EMC	EN IEC 61326-1
Drinking water	EN 1717
Cleaning performance	EN ISO 15883-1, -2, confirmed by HygCen

\*only the stated standards in the declaration of conformity are valid

## Standard configuration: construction and functions

## Washing chamber

Chromium steel, type 1.4404 (AISI 316L). The washing chamber, as well as the washing sump, are designed to be self-emptying. The hygienic design reduces the amount of water that would need to be evaporated during drying. The intelligent design also eliminates cross-contamination.

## Outer material

1.4301 stainless steel (AISI 304) with a white foil on the surface around the control unit.

## Washing chamber illumination

The washing chamber is illuminated by 2 durable 12 V halogen lamps. The illumination of the washing chamber allows the user to visually monitor the washing process.

## Full-glass doors

The doors are fitted with double-walled safety glass throughout the entire surface, allowing the interior of the chamber to be visible during the entire washing cycle. The WD 200 can be equipped either with 1 door for applications in laboratories, etc., or with 2 doors for applications with an air lock function.

The manually operated doors are designed so that they can be used as a loading table for the washing goods carriers when open. The washing goods carriers can be loaded with 80 kg and the transport cart can be easily docked to the open door of the WD 200.

## Electric door lock

An electric door locking system supports the door closure and guarantees a seamless fit to the seal. This reduces the risk of incorrect usage and leakage to a minimum.

## Washing chamber seal

The seal is made of very robust silicone with a long service life. An internal draining tray prevents water from dripping down even when the doors are open.

## Wash arms

There is one each on the top and the bottom of the washing chamber. Additional wash arms can be found on each level of the washing goods carrier. They contain extra-large spray openings for maximum wetting. This results in a high water flow and highly effective cleaning.

## Return flow interrupter

To prevent any contamination of the hospital water network due to a machine failure, the machine is equipped with a physical water supply interrupter. The design complies with the applicable drinking water protection standard.

## Automatic temperature control at the water inlet

For applications that require precise temperature control of the water inlet, hot and cold water are blended in the appropriate proportions to maintain the water temperature needed for the customer's particular process.

## Coarse and fine filters

Before entering the integrated washing tank, the water is filtered through a coarse filter (3 mm mesh size) to filter out larger particles. When exiting the washing tank (before entering the washing pump), another fine filter (1.6 mm mesh size) ensures that the washing pump is protected and that the nozzles of the wash arms do not clog. The filters can be removed manually on the loading side for cleaning.

## Heating system

The Belimed WD 200 is equipped with high-performance electric heaters for the washing chamber (18k W for 400 V and 14.7 kW for 200–220 V/208 V) and for drying (3.5 kW).

Standard: · Electric heating

Optional: · Steam heating for washing chamber (electronic dryer)  
· Steam connection set from above  
· Steam connection set from below

## High-performance drying

Two powerful turbines are used for high-volume drying (325 m³/h), which generate a heating output of 3.5 kW. The brushless motors work without abrasion of coal, which prevents contamination of the air filters and heating elements. The drying temperature can be adjusted according to customer requirements (from room temperature up to 110 °C). The fresh air is channeled through a HEPA filter (with an intercept rate of 99.95%).

The base model is supplied with an electrically heated drying system. Optionally, the dryer heating can be operated with steam.

## Exhaust flap with condensation drain

The false air flap prevents warm process air from being drawn away from the chamber, but allows air to be supplied from the ambient air. It is activated automatically in case of chamber overpressure.

The condensate drain reliably prevents condensate from flowing back into the machine and instead feeds it directly from the exhaust air line into the drain.

## Microprocessor control

The Renaissance M16C processor with 256 kB EEPROM and 10 kB RAM controls all system functions and monitors all operating processes. The control system has been specially developed for cleaning applications. Up to 12 freely definable programs can be called using a keyboard. The entry of recipes is supported by a program library with predefined and customizable programs.

A self-diagnosis system performs regular test routines to identify potential errors as early as possible. The various input signals are monitored and possible deviations from the set values are indicated via visual and acoustic signals.

## Control panel on the loading side

Membrane keypad with tactile feedback, two-line VFD display (H x W: 20 x 120 mm) and integrated process status indicator. The clear display shows the current program step and the current disinfection  $A_0$  value.



## The following features are available:

- Selection and start of programs
- Button for opening/closing the door
- Online display of the process
- Error messages and easy-to-understand text instructions with error log
- Maintenance reports
- Display and configuration of the system master data
- Display of the measured values
- PLC diagnosis
- User management – logging in and out (user levels, passwords, and user authorizations)
- Program intervention
- Service features

## Control panel on the unloading side

Membrane keyboard, two-line VFD display (H x W: 20 x 120 mm) and integrated process status display.



## The standard equipment includes the following features:

- Date/time display
- LED
- Button
- Washing program
- Current program step
- Error messages
- Acoustic signal activation
- Warning and alarm messages
- Process in progress
- Door locked
- Button for opening/closing the door

## Available programs

The machine leaves the factory with 12 pre-programmed standard programs, which cover the usual requirements. These are validated and comply with EN ISO 15883-1, -2. Additional programs can be created according to customer requirements.

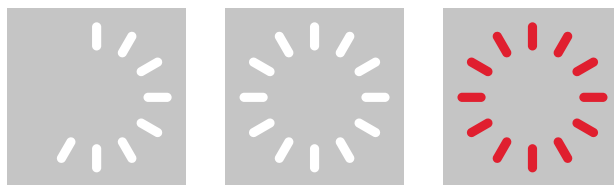
## Patented process status display

On the process status display, which can be read from larger distances, important process data is displayed with the logic of an analog clock, e.g. the remaining time, the readiness for loading and unloading as well as malfunctions.

If the remaining time is more than 60 minutes, this is indicated by a fast-moving cursor. If the remaining time is less than 60 minutes, a developing clock image is displayed.

The end of the process is indicated by the display of a completed clock image that flashes and fades when the door is opened.

An error in the process is indicated by a complete clock image that flashes red.



## "Dynamic Filling" water inlet

The machine adjusts the water requirement to the actual quantity of washing goods (washing goods carrier and washing goods). The unique function enables minimal water consumption without compromising on hygiene and process security. Dynamic Filling enables up to 20% resource savings per batch.

## Thermal disinfection using the $A_0$ principle

The WD 200 is equipped with the  $A_0$  value calculation function. This enables the system to continuously calculate the heat volume at the respective  $A_0$  value above 65 °C, even while the deionized water is warmed up. Thermal disinfection is terminated depending on the selected  $A_0$  value (3000, 600, etc.). The user can decide whether to stop the process once the  $A_0$  value has been reached or whether to continue disinfection at a higher  $A_0$  value. The current  $A_0$  values are constantly displayed on the screen and saved.

## Fully draining circulation pumps

The washing pump has stainless-steel pump wheels and can circulate up to 625 liters per minute. To prevent water residue in the pump housing, the pumps fully drain between each cycle. This reduces the risk of bacterial residue and prevents cross-contamination.

## Dosing pumps

Up to 4 pumps (2 in the base model) can be installed for the dosing of detergents. The flow control is ensured by the flow meters. The control method is either pulse-controlled or time-controlled and can be selected on site.

## Chemical level indicator

The WD 200 can be connected either to a central chemical supply or directly to several chemical canisters. Each of these canisters should be equipped with a level indicator, which sends a signal to the control unit if the chemical level is too low. This signal is displayed on the user's screen. The level indicator is available for 10 liter and 25–30 liter canisters.

## Chemical dosing

Based on the amount of water poured into the washing chamber and the recommended concentration, the control unit calculates the required amount of chemicals. The dosing system with flow meters and peristaltic pumps enables precise dosing.

## Foam control

If excessive foaming is signaled during pre-rinsing, pre-rinsing is automatically repeated without further messages being displayed.

## Validation port for external measurement

A validation port is attached to the top edge of the washing chamber. This is used to place temperature sensors in the washing chamber.

## Interfaces

Both interfaces, RS232 and RS485, are available. An external printer or barcode scanner can be connected to the RS232. The RS485 interface is used, for example, for the BELIMED ICS 8535 batch documentation system.

## Service access

The service access is located in the front, underneath the washing chamber. A service door provides easy access to the control unit and electronic components. No lateral service access is required.

## Main switch

The machine can be fully shut down via a main switch easily accessible from the loading side.

## Batch documentation

The built-in printer records and saves all important measured values during the washing and disinfection processes. The complete cycle is printed out at the end of the reprocessing. The printout includes information on the respective washing cycle step, pressure and temperature indicators, start time, date, AER and washing cycle number and any errors that occurred during the process.

## Rack docking system

The water pressure presses a cylindrical cover on the machine side against the washing basket. This cover ensures a precise connection as well as an optimal supply of water to the washing goods carrier.

The loss of water and pressure during the process can be kept to a minimum. The cover is automatically returned to its starting position when the washing pump is deactivated.

## Automatic maintenance display

The control unit can be used to indicate when scheduled maintenance work has to be carried out. This minimizes the downtime of the washer.

## Options: design and functions

### Exhaust air vapor condenser

In the exhaust air vapor condenser, the exhaust air is cooled and dehumidified using a heat exchanger. By cooling and dehumidifying the exhaust air with fresh water or cooling water from a closed cooling system, the exhaust air can easily be fed into the exhaust air system on the building side.

### Deionized water preheating (electric)

This option allows the deionized water for thermal disinfection to be preheated to 93 °C while the washing process is still in progress. Using this option can shorten the cycle time by up to 14 minutes compared to using it without this option. The deionized water preheating tank is fully drainable, hygienically designed and can be heated either electrically or with steam.

### Exhaust air heat recovery (electric)

During the drying process, the exhaust heat is used to preheat the deionized water by means of a heat exchanger. At the same time, the deionized water is used to cool and condense the exhaust air. This allows the exhaust air to be supplied to the ventilation on the building side. The heated deionized water ( $\Delta T$  27 °C) is fed into the deionized water preheating tank. This heat recovery effectively reduces energy and water consumption and increases productivity by up to 25%.

### Independent process data monitoring (IPD)

All relevant parameters are continuously monitored by independent sensors (optional). Deviations between the actual and set values result in an error message and/or an immediate program abort.

## ICS 8535

The Belimed batch documentation system, which can be ordered additionally, provides an IT-supported solution to ensure traceability of medical devices in the cycle between surgery and reprocessing.

## Potential-free output

The Belimed WD 200 is equipped with a potential-free output that sends output signals such as error signals or end-of-program signals to the user's external monitoring or control devices. Two further potential-free outputs are available as an additional option.

## Drain pump

If physical drainage below the machine is not possible, a drain pump can also be installed to allow the WD 200 to drain.

## Floor tray with leak sensor

To protect the installation from water damage, the floor tray with a leak sensor is recommended. If water leaks out of the building-side connections or through damage to the WD 200, this is detected by a float switch in the floor tray. This switch automatically closes the intake valves and switches off the circulation pump of the WD 200.

## Sterile filter monitoring

To ensure the proper functioning of the HEPA filter, a pressure differential system can be installed as an option. This monitors the pressure drop via the HEPA filter and displays an error message on the control unit if a limit value is exceeded. An incorrectly used HEPA filter is also detected.

## Barcode reader

Using a barcode reader can simplify user identification, documentation and command input. The barcode reader can be mounted on the loading or unloading side.

## Batch documentation

The built-in printer documents all process-relevant data and prints it out continuously. The printout includes the cycle data, pressures and temperatures, start time, start date, WD 200 identification and cycle number, as well as any error messages that occurred during the process. Depending on the process, the built-in printer can be installed either on the loading or the unloading side.

## Control of the pilot valve

Belimed recommends securing the water supply line (cold, hot and deionized water) on site. If such a fixture is not possible, the pilot valve control option can be fitted. This can actuate a single pilot valve. The option does not include a valve, but can control one.

## Ethernet COM server

This option enables the control unit and the IPD system to be connected to a customer network.

## External printer

The WD 200 offers the option of sending all process data via the ICS 8535 to an external printer connected to the customer network.

## Steam connection set from above/below

For maximum flexibility in building planning, steam can be connected from below or from above. Both connector sets are optionally available. Belimed recommends using spacer plates for this option if several machines are installed in a row.

## Additional dosing pumps (Pharmed®/Viton®)

The base model of the WD 200 already includes two dosing systems (incl. dosing pump, flow meter and level indicator). 2 additional dosing systems can be added. The peristaltic pumps are equipped with silicone hoses as standard. Other materials (Pharmed®/Viton®) can also be ordered for coordinated compatibility with the chemistry used.

## Conductivity monitoring

Some applications require monitoring of wastewater quality after rinsing to ensure that no chemicals are carried over. This is ensured by means of a conductivity measuring sensor in the drain. If dirt is detected, the WD 200 automatically restarts the rinsing process.

## Wastewater cooling

If the wastewater system is not designed for a water temperature of 95 °C, the wastewater cooling system can be installed as an option. The wastewater temperature can thereby be reduced.

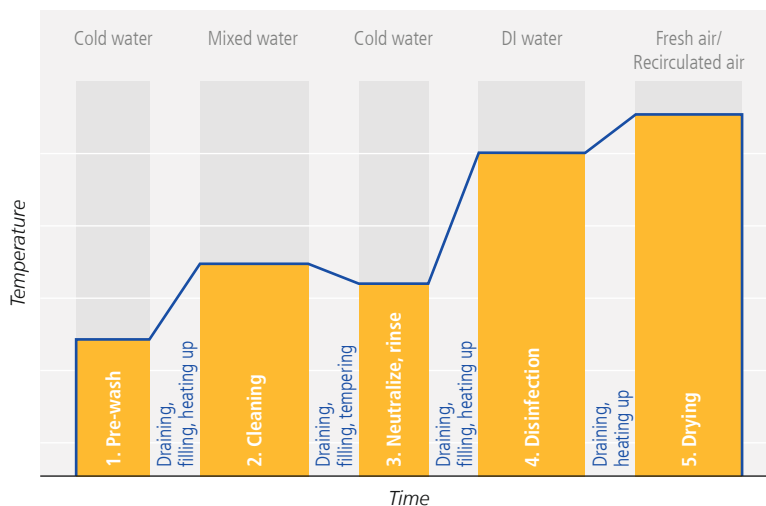
## Sampling tap

The washing chamber is equipped with a sampling tap in the area of the sump. This allows water samples to be taken during the washing process for validation purposes.

## Automatic basket detection

The WD 200 can be equipped with fully automatic basket detection. When inserting the basket into the device, the correct program is automatically selected in order to avoid operating errors.

## Sample process cleaning and disinfection WD



## Wash cycle procedure – description

**Pre-rinsing**

Cold water is used for the pre-rinsing process. Water is let in and the pump starts running until a predefined minimum level is reached. At the end of the phase, the water flows into the drain.

**Washing**

A mixture of hot and cold water is let in, depending on the type of process selected. The detergent is precisely dosed according to the manufacturer's specifications. Now the heating process starts according to the programmed temperature profile. At the end of the phase, the water is discarded.

**Neutralizing**

After alkaline cleaning, neutralization with a weak acid neutralizer prevents the dreaded alkaline carry-over.

**Rinsing**

During the rinsing process, warm water is used to rinse off any remaining detergent. Depending on the detergent, two phases may be run here. At the end of the phase, the water flows into the drain.

**Thermal disinfection**

Deionized water is let in, put into circulation and heated up to 93 °C. The disinfection effect is achieved by a programmed holding time at 93 °C. For disinfection according to  $A_0 > 3000$ , the entered energy quantity above 65 °C is summed up. At the end of the phase, all the water flows into the drain.

**Drying**

Fresh air is supplied by a system equipped with HEPA filters. The air blower is placed in front of the filter to ensure that no particles from the blower or heater can enter the chamber.

**Machine self-disinfection**

If the device is not running for a certain period of time, a self-disinfection process (using  $A_0$  values) is automatically started or suggested. The aim is to ensure that the entire system is disinfected before recommissioning, before instruments can be reprocessed.

**Factory programs**

- P1 mild alkaline surgery short
- P2 mild alkaline/neutralizer surgery-MIS
- P3 mild alkaline/neutralizer surgery-MIS intensive
- P4 mild alkaline/neutralizer anesthesia material
- P5 mild-alkaline for surgical shoes
- P6 mild alkaline/neutralizer glassware/baby bottles
- P7 self-disinfection
- P8 drying
- P9 descaling
- P10 neutral enzymatic for containers
- P11 neutral enzymatic for surgery-MIS
- P12 neutral enzymatic for surgery intensive

**Process validation**

The aim is to achieve a high level of safety in the reprocessing of medical devices in order to offer users and patients the highest possible level of protection. Installation qualification and process validation are offered for this purpose during installation.



## Cleaning agents and disinfectants

The Belimed Protect™ range of chemistries have been developed and validated with Belimed Washer-Disinfectors to meet the cleaning efficacy requirements of medical devices and associated accessories according to consistent and repeatable standards outlined in EN ISO 15883-1, -2. Belimed offers a fully integrated solution to address your infection prevention requirements, ensure compliance and reduce costs caused by hospital-acquired infections.

Contact your local Belimed representative to obtain more information on the full Belimed Protect™ range of products and services.

## Preventive maintenance

Belimed recommends preventive maintenance on a regular basis to ensure the proper functioning of the device. Belimed has a nationwide network of trained service technicians who perform these maintenance tasks on site.

## Disclaimer

Do not use this product description for installation of the machine. The product description can be updated without notice and is only updated periodically.



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