

A technical drawing of a washing machine component, possibly a drum or a mixing vessel, rendered in a light orange color. The drawing shows various internal structures, including a central shaft, a drum, and various mechanical parts, with lines and arrows indicating movement or flow. The drawing is positioned on the left side of the page, partially overlapping the white background.

**D.W.**  
**RENZMANN**

## **Washing machines for mixing vessels, cubic containers and other receptacles**

Cleaning solutions and solvent recovery.

[www.dw-renzmann.de](http://www.dw-renzmann.de)

## Safety concept

### D.W. RENZMANN Apparatebau GmbH

D.W.RENZMANN Apparatebau GmbH has been developing, manufacturing and selling cleaning and treatment systems for print shops and for paint and varnish producers for more than 50 years.

Our core competency is the removal of stubborn residues and the handling of the flammable organic solvents or aggressive alkaline washing agents used for this purpose.

In addition to the design, manufacturing and sale of equipment, we also offer a comprehensive portfolio of services. On request, we will:

- ▶ perform profitability calculations with regard to performance, staff requirements, and investment and operating costs, taking into account all relevant legislation, regulations and guidelines
- ▶ create technical documentation for each product
- ▶ support and implement approval procedures and draw up applications to authorities
- ▶ connect your new equipment to pre-existing exhaust air or waste water treatment systems
- ▶ provide worldwide service, including commissioning, assembly, repair and maintenance, through our expert staff

RENZMANN equipment is used all over the world and has gained an international reputation for excellent quality.

### Cleaning requirements

RENZMANN develops modern cleaning processes and technologies that comply with today's increasingly restrictive environmental and occupational safety regulations and reflect the aim of sustainable environmental protection.

### Cleaning methods

The residues on the soiled items are dissolved or chemically destroyed through the action of the washing agent and then removed by the mechanical force of spray or high-pressure jets. Suitable washing agents include solvents, water-based alkaline agents or special cleaners. The recommended cleaning equipment and cleaning technology is determined by the shape and quantity of the items to be washed and by the Model e of soiling. The perfect combination of washing agent and cleaning technology ensures that residues are dissolved quickly and effectively and subsequently removed from the surfaces.

### Requirements for the explosion protection of solvent washing machines

The potential hazards of cleaning equipment that is operated with flammable liquids, and the required precautions, are described in EN 12921-3 "Machines for surface cleaning and pre-treatment of industrial items using liquids or vapours – Part 3: Safety of machines using flammable cleaning liquids". According to this standard, the spraying of solvent with a pressure > 0.7 bar permanently/regularly generates potentially explosive steam/air and aerosol/air mixtures corresponding to zone 0 inside the machine, regardless of the solvent's flash point.

Leaks at the washing machine and residual solvent on the washed parts may also create an explosive atmosphere outside the machine; consequently, the surroundings of the machine must be classified as zone 1 (occasional presence of an explosive atmosphere) or zone 2 (rare presence of an explosive atmosphere).

### External explosion protection

The outside of Renzmann solvent washing machines meets the requirements of ATEX category 2; the machines may therefore be operated in explosion hazard zone 1.

### Internal explosion protection

When the solvent is heated to a temperature above its flash point and/or when aerosols are formed through the spraying of any solvent with a pressure of more than 0.7 bar or through the rotation of the washing brush, a potentially explosive solvent vapor/air or aerosol/air mixture is generated in the washing chamber. Consequently, the interior of such solvent washing machines is classified as zone 0 (ch. 5.6.3.3) according to EN 12921-3 "Safety of machines using flammable cleaning liquids".

### The concept of RENZMANN solvent washing machines:

- ▶ The interior of the machines meets the requirements of category 1 devices; the washing machines may therefore be operated with zone 0 on the inside
- ▶ Electrical and moving mechanical components on the inside are Modele-examined in accordance with ATEX.

Explosion-proof solvent washing machines are subject to the following legally binding directives:

- ▶ Machinery Directive 2006/42/EC
- ▶ ATEX Directive 2014/34/EU (ATEX)
- ▶ EMC Directive 2014/30/EU (Electromagnetic Compatibility)

Compliance with these directives is documented by means of the CE mark at the machine/unit and a declaration of conformity.

RENZMANN is certified under the German Water Resources Law.

# Model HP

- ▶ Explosion-proof, ATEX-compliant **device for manual cleaning with all common solvents**
- ▶ Device with hinged lid and solvent reservoir integrated into the housing
- ▶ The parts to be washed are placed on a grating
- ▶ Safety hand brush with a hose and flow regulator
- ▶ The supply of solvent to the brush is started via a foot-operated bar (dead man's handle)
- ▶ A pneumatic diaphragm pump supplies solvent to the safety hand brush and can also be used to fill and drain the washing station
- ▶ Visual level marking
- ▶ Strainer between the washing chamber and solvent reservoir
- ▶ Internal air extraction system with powerful suction fan and vacuum valves

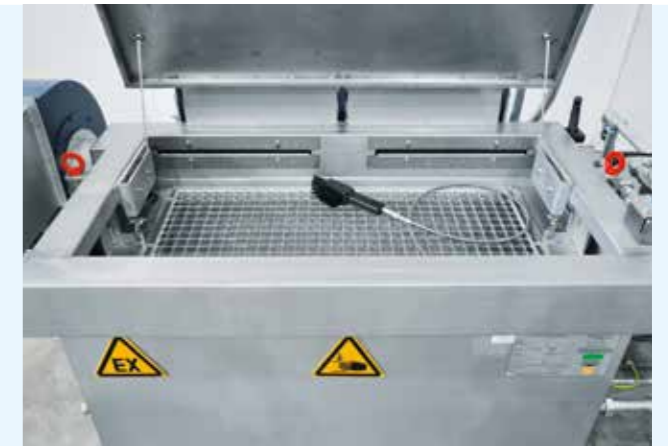
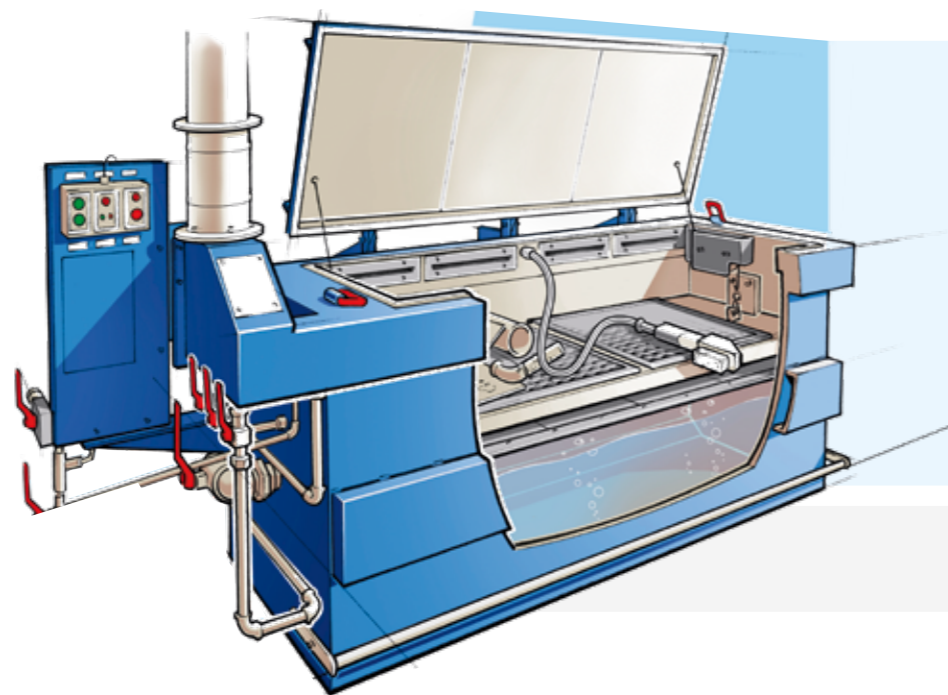
## Accessories

- ▶ Alternative version with stainless steel housing
- ▶ Cleaning device for small parts
- ▶ Automatic filling and draining, alternatively, the washing station can be filled with solvent from existing systems or mobile containers
- ▶ Pneumatic lid, cleaning bath for soaking parts with stubborn residues

Manual washing station HP	Size 12	Size 18	Size 24
Working width / height / length mm	600 x 300 x 1200	600 x 300 x 1800	600 x 300 x 2400
Washing pump capacity m <sup>3</sup> /h	5	5	5
Internal air extraction system m <sup>3</sup> /h / kW	2200 / 1.3	2200 / 1.3	2200 / 1.3
	L x W x H	L x W x H	L x W x H
Dimensions mm	2285 x 1180 x 1740	2885 x 1180 x 1740	3485 x 1180 x 1740
Required space mm	3800 x 2700 x 2200	4400 x 2700 x 2200	5000 x 2700 x 2200
Transport clearance mm	2400 x 1500 x 1800	3000 x 1500 x 1800	3600 x 1500 x 1800

\* Subject to technical changes

# HP





## Model CLEANfleX

### Washing machines type CLEANfleX

With the washing machines type CLEANfleX, we present its successor model of the washing machine type 100 from the series of systems to be loaded from above.

In times of declining run-time and more frequent job changes, the efficient cleaning of ink-carrying printing unit components is becoming increasingly important.

The CLEANfleX washing machines clean ink trays, doctor blades, buckets and other printing press parts are available in the following variants:

CLEANfleX-ex : for solvents with flash point < 55°C

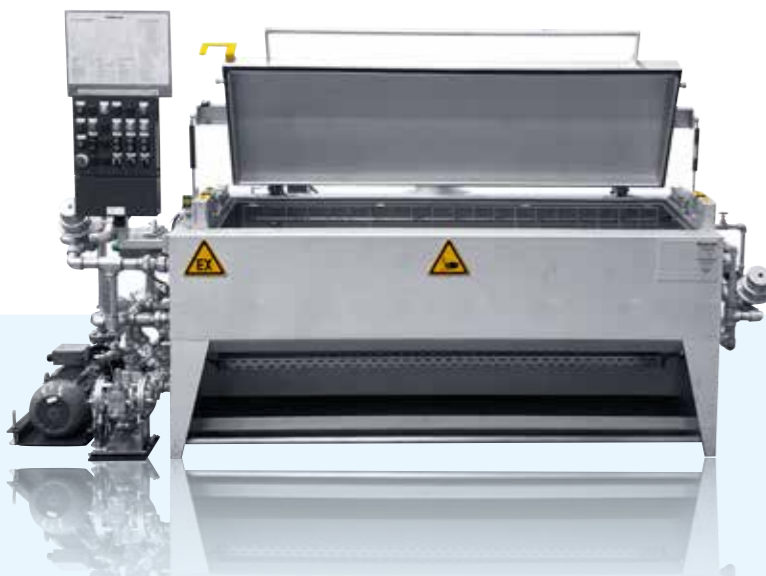
CLEANfleX: for solvents with flash point > 55°C

CLEANfleX-aqua: mild - and highly alkaline cleaner

### Responsible for the good cleaning result:

- ▶ A short spray distance in combination with a high spray pressure ensures the good cleaning result.

- ▶ The process is supported by oscillating rotational movements of the spray bars
- ▶ The process is supported by oscillating rotational movements of the spray pipes.
- ▶ The CLEANfleX is loaded at a comfortable height from above. Like its predecessor, the model is robust, easy to maintain and meets all safety requirements for solvent washing machines.
- ▶ The usable height of the system is 400 mm, the width 600 mm. Three length variants are available: 1000, 1500 and 2000 mm
- ▶ In contrast to the previous model, the CLEANfleX has a specially shaped lid, which allows convenient loading and is equipped with a pneumatic clamping device.
- ▶ The measurement of the filling volume in the detergent container, sealed off to the washing chamber, is carried out by a hydrostatic measurement. Several filling levels are recorded and displayed on the control cabinet.
- ▶ Large-sized, externally removable screen baskets protect pumps, piping and spray systems from contamination. These screen baskets are easily accessible placed on the back of the system.
- ▶ The system is completely made of stainless steel.



## Model CLEANfleX-ex

### Technical description

- ▶ Explosion-proof, ATEX-compliant washing machine for cleaning with all common solvents
- ▶ Top loader with a closed washing chamber and a separate, integrated washing solvent reservoir
- ▶ Machine to be loaded from above at a comfortable height
- ▶ Machine can only be operated when the machine lid is closed
- ▶ Stainless steel housing
- ▶ The items to be washed are placed on a stainless steel grid
- ▶ Spray system comprising oscillating rotating spray pipes positioned underneath and alongside parts to be washed
- ▶ Powerful unit of pump and explosion-proof motor for the "washing" and "draining" functions
- ▶ Hydrostatic measurement, detection of several filling levels
- ▶ Large removable strainer baskets for protection of pumps, pipework and spraying
- ▶ Internal air extraction system with powerful suction fan and vacuum valves
- ▶ Automatic wash program with following program steps: washing - dripping - aerating and movement of the spray pipes

### Accessories

- ▶ Safety hand brush
- ▶ Self-cleaning device
- ▶ Closed solvent circuit including a distillation unit with suitable output and a distillate container as a compact unit
- ▶ Solvent concentration measuring and regulation system for connection to an exhaust air cleaning system

Washing machine model CLEANfleX-ex	Size 10	Size 15	Size 20
Working width / height / length mm	600 x 400 x 1000	600 x 400 x 1500	600 x 400 x 2000
Washing pump capacity m <sup>3</sup> /h / kW	16 / 4,1	24 / 5,5	31 / 7,5
Internal air extraction system m <sup>3</sup> /h / kW	2200 / 1,3	2200 / 1,3	2200 / 1,3
	<b>L x W x H</b>	<b>L x W x H</b>	<b>L x W x H</b>
Dimensions mm	2600 x 1500 x 2100	3100 x 1500 x 2100	3600 x 1500 x 2100
Required space mm	3700 x 3800 x 4000	4200 x 3800 x 4000	4700 x 3800 x 4000
Transport clearance mm	3000 x 1800 x 2500	3500 x 1800 x 2500	4000 x 1800 x 2500

\* Subject to technical changes

# CLEANfleX

# Model CLEANfleX und CLEANfleX-aqua

## CLEANfleX

- ▶ Suitable for cleaners with flash point > 55°C
- ▶ No explosion protection, but ATEX-compliant design
- ▶ Washing material rests on stainless steel grid
- ▶ Wash spray system with oscillating rotating spray tubes
- ▶ Automatic opening flap between wash chamber and solvent tank for solvent residue
- ▶ Hydraulic measurement by level sensor

## Accessories

- ▶ Automatic rinsing
- ▶ Self-cleaning device
- ▶ Suction
- ▶ Loading and venting: after washing, the lid remains locked until the solvent aerosols produced as a result of spraying have settled down

## CLEANfleX-aqua

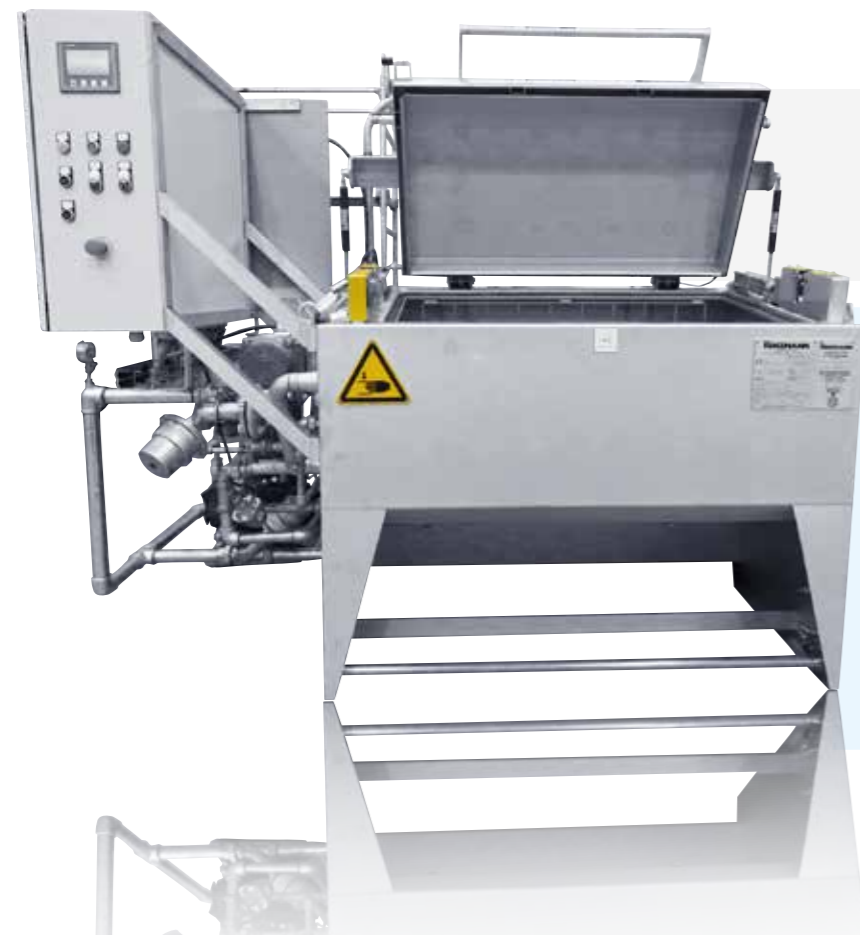
- ▶ For ink pans, doctor blades, buckets, cans and other parts
- ▶ Can be placed in non explosion proof area
- ▶ Water-based cleaning media
- ▶ To improve the cleaning effect of aqueous cleaning media heating up to >60°C possible
- ▶ Short spraying distance and the high spraying pressure in combination with the oscillating rotary movements of the spraying tubes result in a good cleaning result.
- ▶ Loading takes place from above at a comfortable loading height
- ▶ Closed washing chamber
- ▶ Stainless steel housing
- ▶ Pneumatic lid release after settling time for aerosols
- ▶ Insulation

## Accessories

- ▶ Automatic rinsing and filling
- ▶ Self-cleaning device
- ▶ Suction
- ▶ Safety hand wax brush

Washing machine model CLEANfleX-/aqua	Size 10	Size 15	Size 20
Working width / height / length mm	600 x 400 x1000	600 x 400 x1500	600 x 400 x 2000
Washing pump capacity m³/h / kW	16/ 4,1	24/ 5,5	31 / 7,5
Internal air extraction system m³/h / kW	1100 / 0,75	1100 / 0,75	1100 / 0,75
	<b>L x W x H</b>	<b>L x W x H</b>	<b>L x W x H</b>
Dimensions mm	3000 x 1500 x 2100	3500 x 1500x 2100	4000 x 1500 x 2100
Required space mm	4600 x 3800 x 4000	5300 x 3800 x 4000	6100 x 3800 x 4000
Transport clearance mm	3400 x 1800 x 2500	3800 x 1800 x 2500	4400 x 1800 x 2500

\* Subject to technical changes



# CLEANfleX





# Model CLEANmaX

- ▶ Explosion-proof, ATEX-compliant washing machine for cleaning with all common solvents
- ▶ Pneumatic opening and closing of the lid by push button
- ▶ Loading through the top opening in a comfortable loading position with a closed washing chamber and a separate, integrated washing solvent reservoir
- ▶ Operation of the washing machine only possible with the machine lid closed
- ▶ Stainless steel housing
- ▶ Stainless steel grid as support for parts to be washed
- ▶ Spray system comprising oscillating rotating spray pipes positioned underneath and alongside parts to be washed
- ▶ Powerful pump / Ex-motor unit for „washing“ and „draining“ functions
- ▶ hydrostatic measurement, detection of several filling levels
- ▶ Large removable strainer baskets for protection of pumps, pipework and spraying system against impurities
- ▶ Internal air extraction system with powerful suction fan and vacuum valves
- ▶ Automatic wash program with following program steps: washing - dripping - rinsing - aerating and movement of the spray pipes

## Accessories

- ▶ Hose-cleaning device
- ▶ Self-cleaning device
- ▶ Solvent cooling
- ▶ Closed solvent circuit including a distillation unit with suitable output and a distillate container as a compact unit
- ▶ Solvent, concentration, measurement and control system for connection to an exhaust treatment

## OPTIONS for Bucket/small container cleaning

- ▶ One or more explosion-proof rotating spray heads
- ▶ Number that can be supplied by the washing pump:  
working length 1500 mm: max. 6 pcs.  
working length 2000 mm: max. 8 pcs.  
working length 2500 mm: max. 10 pcs.  
working length 3000 mm: max. 12 pcs.

Washing machine model CLEANmaX	Size 15	Size 20	Size 25	Size 30
Working width / height / length mm	800 x 500 x 1500	800 x 500 x 2000	800 x 500 x 2500	800 x 500 x 3000
Washing pump capacity m <sup>3</sup> /h / kW	27 / 7,5	35 / 10	42 / 10	50 / 12,5
Internal air extraction system m <sup>3</sup> /h / kW	1100 / 0,75	2200 / 1,3	2200 / 1,3	2200 / 1,3
	L x W x H	L x W x H	L x W x H	L x W x H
Dimensions mm	3100 x 1700 x 2300	3600 x 1700 x 2300	4100 x 1700 x 2300	4600 x 1700 x 2300
Required space mm	4500 x 4000 x 4200	5000 x 4000 x 4200	5500 x 4000 x 4200	6000 x 4000 x 4200
Transport clearance mm	3500 x 2000 x 2700	4000 x 2000 x 2700	4500 x 2000 x 2700	5000 x 2000 x 2700

\* Subject to technical changes

# CLEANmaX

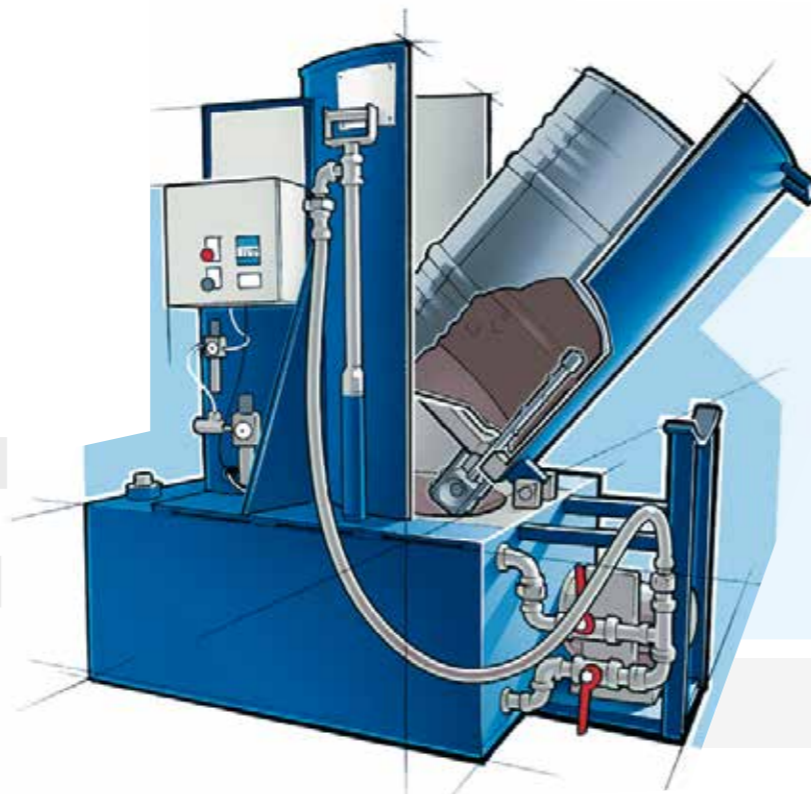


## Model SPF

- ▶ User-friendly **washing machine for internal cleaning of barrels and small containers through spraying with solvent**
- ▶ Spray pipe with rotating spray head, also suitable for bung barrels
- ▶ The standard version is entirely pneumatic and ready for operation once it has been connected to a compressed air supply and, if necessary, to an on-site air extraction system; no electrical installation required
- ▶ Easy loading at low working height; the barrels are placed on their sides onto a shell-shaped support
- ▶ The barrel support is swiveled to close the washing chamber
- ▶ Position sensor for the barrel and the barrel support; spraying does not begin until the machine is closed and the barrel has been placed over the spray pipe
- ▶ Dirt-resistant pneumatic diaphragm pump as washing pump
- ▶ Closed solvent reservoir under the washing chamber, visual level indicator
- ▶ A strainer protects the container and pump from foreign matter
- ▶ Pneumatic timer for easy washing time selection
- ▶ Explosion protection according to ATEX, category 1 for zone 0 inside, category 2 for zone 1 outside

### Accessories

- ▶ Filling and draining with the washing pump
- ▶ Automatic filling from a solvent line / with external pump, filling stop with electrical, explosion-proof level switch
- ▶ Air extraction system with explosion-proof fan (incl. explosion-proof electric motor)
- ▶ Version for water-based alkaline cleaning agents on request



Washing machine model SPF	
Number of spray heads	1
Container height max. / Ø max. mm	900 / 600
Internal air extraction system m <sup>3</sup> /h / kW	2500 / 0.75
	L x W x H
Dimensions mm	1750 x 1200 x 1680
Required space mm	3800 x 2500 x 2000
Transport clearance mm	2000 x 1300 x 1900

\* Subject to technical changes



# SPF



# Model 6090

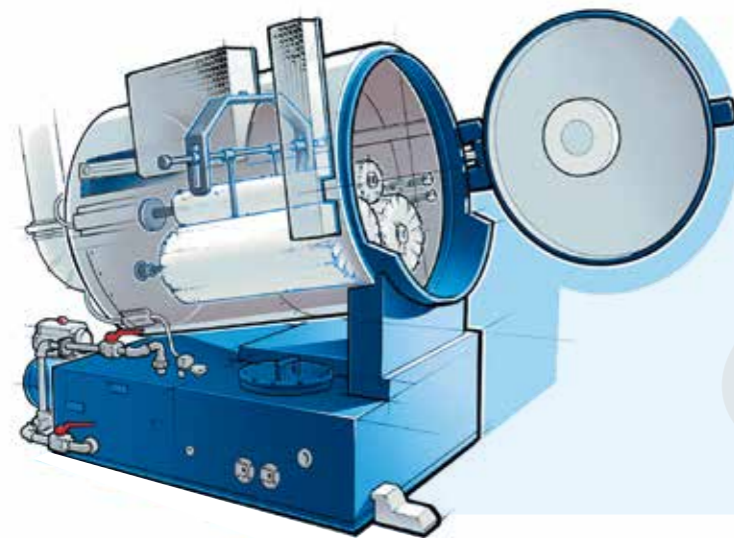
- ▶ Robust and user-friendly **washing machine for internal and external cleaning of barrels and small cylindrical containers** with brushes and simultaneous spraying with solvent; conductive brushes with type examination according to ATEX – no nitrogen inerting required
- ▶ Very good internal and external cleaning with rotating roller brushes
- ▶ Two separate spraying systems for washing with circulated solvent and rinsing with clean solvent
- ▶ Tight-closing, manual washing chamber door with counterweight
- ▶ Position sensor for the door, spraying does not begin until the washing chamber is closed
- ▶ The cylindrical washing chamber is tilted back to ensure excellent draining of the solvent; no corners where residues might accumulate, hence low solvent emissions
- ▶ Closed solvent reservoir under the washing chamber (no open solvent when the washing chamber is open); level switch for filling and draining
- ▶ Dirt-resistant pneumatic double diaphragm pump as washing and evacuation pump; separate pump for rinsing
- ▶ A strainer protects the solvent reservoir and the pump from foreign matter
- ▶ Internal air extraction system with powerful suction fan
- ▶ Flow monitor; start of brush rotation only after solvent has been sprayed on the containers; this is done to prevent dry friction caused by the brush rotation
- ▶ Automatic washing program: washing – draining – rinsing – internal air extraction; the program steps can be selected individually
- ▶ Explosion protection according to ATEX, category 1 (with type examination) for zone 0 inside, category 2 for zone 1 outside

## Accessories

- ▶ Pneumatic ejection device for more convenient removal of barrels
- ▶ Storage of washing solvent in a separate precipitation container (as an alternative to the floor container of the standard version)
- ▶ Warm air drying for nonvolatile solvents
- ▶ Solvent concentration measuring and regulating system for connection to an exhaust air cleaning system

Washing machine model 6090	
Barrel or container diameter mm	350 – 600
Barrel or container height mm	900
Internal air extraction system m <sup>3</sup> /h / kW	2200 / 1.85
	<b>L x W x H</b>
Dimensions mm	2050 x 1400 x 1850
Required space mm	3800 x 2500 x 3200
Transport clearance mm	2300 x 1500 x 2000

\* Subject to technical changes



# 6090



# Model SP

- ▶ **Robust and user-friendly washing machine for internal cleaning of cubic and cylindrical containers by spraying with solvent**
- ▶ Very good internal cleaning by means of a rotating spray head with pencil jet nozzles and 50 bars spraying pressure
- ▶ Depending on the shape of the container, the operator may choose between a spray head rotating around 2 axes and a spray head rotating around the vertical axis and moving up and down
- ▶ The spray head is lowered into the container, and the upper container opening closed by the machine lid, by means of a pneumatic lifting frame
- ▶ Sensor for the lid pressure; spraying does not begin until the lid rests tightly on the container
- ▶ Washing solvent in separate container; level switch for filling and draining
- ▶ High-pressure reciprocating diaphragm pump as washing pump; separate pump for rinsing; pneumatic diaphragm pump for draining
- ▶ A wedge wire filter protects the high-pressure pump from foreign matter
- ▶ 3 manometric switches for deactivating the high-pressure pump in case of insufficient pressure (e.g. hose break), excessive pressure (narrowing of the pressure line) or insufficient suction pressure (e.g. clogged wedge wire filter)
- ▶ A filter with removable basket protects the evacuation pump and the solvent reservoir
- ▶ Automatic washing program: washing – draining – rinsing – internal air extraction; the program steps can be selected individually
- ▶ Explosion protection according to ATEX, category 1 (with type examination) for zone 0 inside, category 2 for zone 1 outside

## Accessories

- ▶ Lid versions and adapters for different container openings
- ▶ Outlet cleaning system, manual or automatic
- ▶ Internal air extraction system, optionally with warm air drying for nonvolatile solvents
- ▶ External air extraction system to supplement/replace the air extraction system in the room/at the workplace
- ▶ Solvent concentration measuring and regulating system for connection to an exhaust air cleaning system

## Model SP70

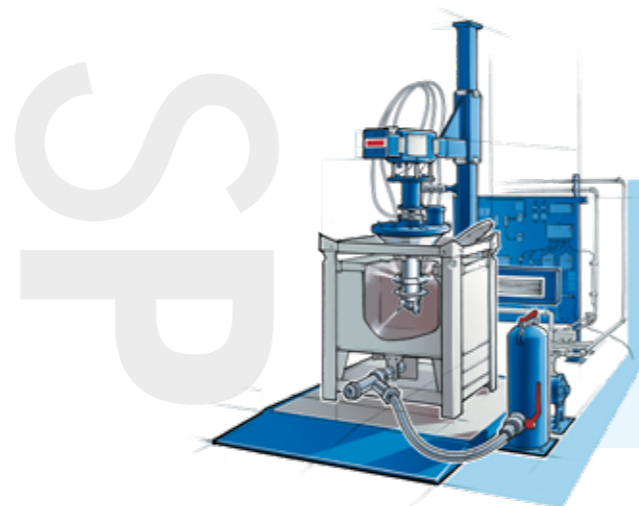
Like model SP50, but with the following differences:

- ▶ 70 bars spraying pressure
- ▶ Suitable for water-based/alkaline media
- ▶ Heating of the washing agent, heat insulation of the washing agent container
- ▶ Rinsing with water
- ▶ Explosion protection adapted to the washing agent with washed-off residues and to the requirements of the installation site

Washing machine model SP50	
Number of spray heads	1
Container height mm	950 – 1700
Side length max. mm	1500
Manhole min. Ø mm	300
Washing pump capacity bars / m <sup>3</sup> /h / kW	50 / 3 / 6.6
External air extraction system m <sup>3</sup> /h / kW	2000 / 1.3
Internal air extraction system m <sup>3</sup> /h	400
	<b>L x W x H</b>
Dimensions mm	3250 x 3120 x 3160
Required space mm	4700 x 4200 x 3500
Transport clearance mm	3300 x 1900 x 2200

Washing machine model SP70	
Number of spray heads	1
Container height mm	950 – 1700
Side length max. mm	1500
Manhole min. Ø mm	300
Washing pump capacity bars / m <sup>3</sup> /h / kW	70 / 3 / 11
Internal air extraction system m <sup>3</sup> /h	400
	<b>L x W x H</b>
Dimensions mm	3250 x 3120 x 3160
Required space mm	4700 x 4200 x 3500
Transport clearance mm	3300 x 1900 x 2200

\* Subject to technical changes



# Model ROBUS

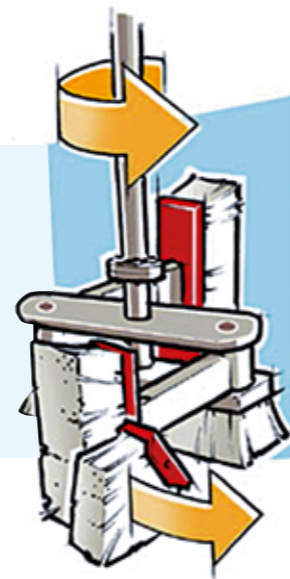
- ▶ Robust and user-friendly **washing machine for internal cleaning of cylindrical and cubic containers** with brushes and simultaneous spraying with solvent; conductive brushes with type examination according to ATEX – no nitrogen inerting required
- ▶ Very good internal cleaning of cylindrical containers with a centrifugal folding brush
- ▶ Internal cleaning of cubic containers using a centrifugal brush with long bristles; by pressing a button on a rapid-action coupling, the operator can easily exchange the brush for a centrifugal folding brush
- ▶ Spraying system for washing with circulated solvent and rinsing with clean solvent
- ▶ The brush is lowered into the container, and the upper container opening closed by the machine lid, by means of a pneumatic lifting frame
- ▶ Position sensor for the lid; spraying and brush rotation do not begin until the lid rests on the container
- ▶ Washing solvent in separate container; level switch for filling and draining
- ▶ Dirt-resistant diaphragm pump as washing pump; separate pump for rinsing; pneumatic diaphragm pump for draining
- ▶ A filter with removable basket protects the evacuation pump and the solvent reservoir
- ▶ Flow monitor; start of brush rotation only after solvent has been sprayed on the containers; this is done to prevent dry friction caused by the brush rotation
- ▶ Automatic washing program: washing – draining – rinsing – internal air extraction; the program steps can be selected individually
- ▶ Explosion protection according to ATEX, category 1 (with type examination) for zone 0 inside, category 2 for zone 1 outside

## Accessories

- ▶ Pneumatic lifting floor, coupling of the hose for the solvent return at user-friendly heights
- ▶ Pneumatic tilting of the lifting floor with stronger inclination than with a fixed inclination of the machine. As a result, better idling of the washed containers, especially in case of unfavorable bottom/outlet geometry
- ▶ Electrical clamping device
- ▶ Outlet cleaning, manual or automatic
- ▶ Floor tray for work area under machine portal
- ▶ Internal cleaning of cubic containers by centrifugal brush with long bristles, easy exchange for centrifugal force folding brush at the push of a button on a quick coupling
- ▶ Centrifugal brush with long conductive polyamid bristles
- ▶ Right-left run of the brush for effective cleaning
- ▶ Internal extraction, alternatively with hot air drying for low-volatile Solvent

## Options

- ▶ External extraction, in addition or replacement of the room or work place extraction
- ▶ Solvent concentration measurement and control system for the connection to an exhaust air purification system
- ▶ Additional clamping jaws on the centering and clamping device
- ▶ Additional query of the top brush position in the container
- ▶ Selector button for container/container cleaning with extension of the washing program
- ▶ Flexible brush frame that is characterized by articulated brush segments also adapted to sloping floor.
- ▶ Brush housing in the lid for emission reduction at internal suction and drying



ROBUS



## Model ROBUS Hardliner

- ▶ Suitable for alkaline media
- ▶ Dimensions are adapted to customer needs
- ▶ Ex protection according to Atex, category 1 (with type examination) for Zone 0 inside, Category 2 for Zone 1 outside
- ▶ Brush with active brush pressing speed controlled centrifugal folding brush with active, reinforced pressure and significantly increased drive power, especially for removal of very heavy soilings such as silicone sealants.
- ▶ In order to achieve the highest possible mechanical effect, this brush variant is usually equipped with stainless steel bristles.
- ▶ With the version of the centrifugal folding brush with stainless steel bristles the cleaning result can be optimized especially in the case of rough surfaces. This can be tested at Renzmann testing facilities.
- ▶ Not suitable for aluminium containers



Washing machine model ROBUS	Size 01	Size 02	Size 03
Container diameter (inside) mm	600 – 1200	750 – 1600	900 – 2000
Container diameter (outside) mm	1250	1650	2050
Container height (inside) mm	500 – 1300	500 – 1500	500 – 1700
Rim height above height max. mm	1500	1700	1900
Washing pump capacity bars / m <sup>3</sup> /h	3 / 4	3 / 4	3 / 4
Internal air extraction system ROBUS m <sup>3</sup> /h / kW	400 – 2200 / 2.5	400 – 2200 / 2.5	400 – 2200 / 2.5
Internal air extraction system ROBUS-W m <sup>3</sup> /h / kW	600 / 1.5	600 / 1.5	600 / 1.5
	<b>L x W x H</b>	<b>L x W x H</b>	<b>L x W x H</b>
Dimensions mm	2500 x 2020 x 4250	2800 x 2310 x 4650	3350 x 2650 x 6150
Required space mm	5500 x 4000 x 4500	5800 x 4500 x 5000	6300 x 5000 x 6500
Transport clearance mm	4400 x 2700 x 1900	4900 x 3000 x 2200	5800 x 3500 x 2700

\* Subject to technical changes

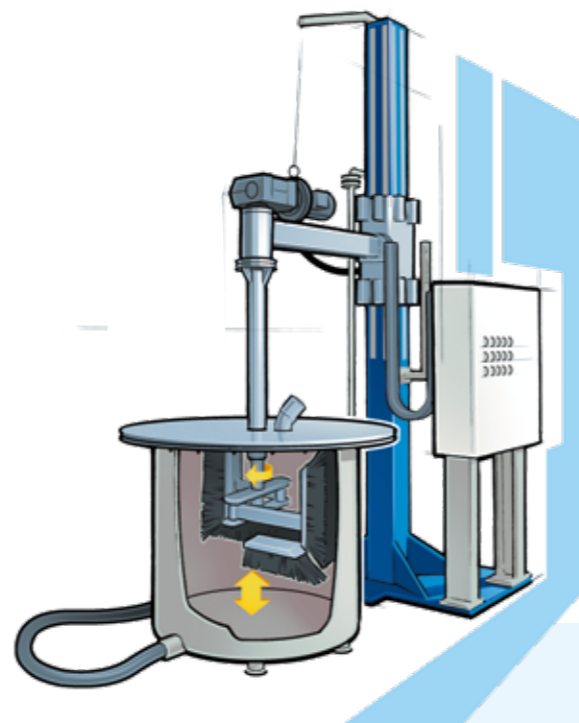
# ROBUS

# Model RIO-VsmarT

- ▶ Compact, robust and user-friendly **washing machine for internal cleaning of metal containers** with brushes and simultaneous spraying with solvent
- ▶ Conductive brushes with type examination according to ATEX – no nitrogen inerting required
- ▶ Very good internal cleaning of cylindrical containers with a centrifugal folding brush
- ▶ Spraying system for washing with circulated solvent and rinsing with clean solvent
- ▶ The brush is lowered into the container, and the container opening is closed by a lid fastened to an outrigger
- ▶ The outrigger is lifted and lowered along the machine pillar by a pneumatic cylinder
- ▶ An automatic position control ensures that solvent can only be sprayed in the container if the lid is closed
- ▶ Dirt-resistant diaphragm pump, used as washing and rinsing pump; separate recirculation pump
- ▶ Flow monitor; the brush does not start rotating until the solvent has been injected
- ▶ Automatic washing program: washing – draining – rinsing – ventilating and brush rotation
- ▶ The program steps can be selected individually
- ▶ Pneumatic control cabinet with explosion protection at the machine
- ▶ Explosion protection according to ATEX, category 1 (with type examination) for zone 0 inside, category 2 for zone 1 outside

## Accessories

- ▶ Tilted installation of the machine (in combination with an inclined base plate to be provided by the customer); alternatively: pneumatic tilting base
- ▶ Manual clamping device; alternatively: pneumatic version
- ▶ Internal air extraction system; with/without ventilation
- ▶ Selector switch for washing and rinsing
- ▶ Solvent supply system; can either be provided by the customer or supplied by RENZMANN
- ▶ Solvent concentration measuring and regulating system for connection to an exhaust air cleaning system



Washing machine model RIO-VsmarT	Size 01	Size 02
Container Ø (inside) mm	500 – 1200	700 – 1500
Max. container Ø (outside) mm	1400	1550
Container height (inside) mm	700 – 1350	700 – 1350
Rim height above floor mm	max. 1500	max. 1500
Washing pump capacity bars / m <sup>3</sup> /h	3 / 4	3 / 4
	W x H x D	W x H x D
Dimensions mm	1800 x 2750 x 3935	1800 x 2750 x 3935
Required space mm	2600 x 4000 x 4000	2600 x 4000 x 4000
Transport clearance mm	4500 x 2100 x 2930	4500 x 2100 x 2930

\* Subject to technical changes



# RIO-VsmarT



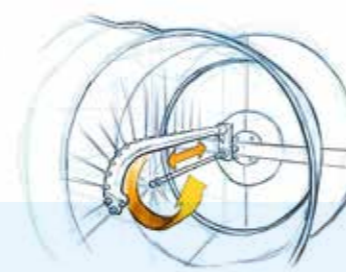
## Model SKM

- ▶ Robust and user-friendly **washing machine for internal and external cleaning of containers with an open top** through spraying with solvent
- ▶ Very good internal cleaning even with large container diameters by means of a rotating spray pipe with pencil jet nozzles that moves up and down along the longitudinal container axis
- ▶ Effective external cleaning with spray pipes rotating around the container
- ▶ Separate spraying system for rinsing with clean solvent
- ▶ Tight-closing, hydraulic washing chamber door; used as loading platform in front of the washing chamber
- ▶ Position sensor for the door; spraying does not begin until the washing chamber is closed
- ▶ The cylindrical washing chamber is tilted back to ensure excellent draining of the solvent; no corners where residues might accumulate, hence low solvent emissions
- ▶ Closed solvent reservoir under the washing chamber (no open solvent when the washing chamber is open); level switch for filling and draining
- ▶ Very powerful centrifugal pump for washing with circulated solvent; separate centrifugal pump for rinsing; pneumatic diaphragm pump for draining
- ▶ An external filter with removable basket protects the spraying system from foreign matter
- ▶ A strainer protects the solvent reservoir and pumps
- ▶ Explosion-proof hydraulic unit
- ▶ Internal air extraction system with powerful suction fan
- ▶ Automatic washing program: washing – draining – rinsing – internal air extraction; the program steps can be selected individually
- ▶ Explosion protection according to ATEX, category 1 (with type examination) for zone 0 inside, category 2 for zone 1 outside



### Accessories

- ▶ Ramp for moving containers onto the loading platform (approx. 150 mm high); the loading platform can also be lowered into a pit for loading at floor level
- ▶ Separate outlet cleaning system; recommended if the rotating spraying system of the internal and external cleaning systems does not clean the outlet well enough (preliminary tests in the RENZMANN lab)
- ▶ Warm air drying system; removes nonvolatile solvent residues from the container surfaces
- ▶ External air extraction system to supplement/replace the air extraction system in the room/at the workplace
- ▶ Solvent cooler, required for limiting the temperature and solvent emissions; various accessories adapted to the existing cooling water supply system
- ▶ Solvent concentration measuring and regulating system for connection to an exhaust air cleaning system



# SKM

# Model SKM



Like model SKM, but with the following differences:

- ▶ Suitable for water-based/alkaline media
- ▶ Heating of the washing agent, heat insulation of the washing chamber and the washing agent container
- ▶ Rinsing with water
- ▶ Storage of washing agent and rinsing water in separate, free-standing containers (as an alternative to floor containers)
- ▶ Explosion protection adapted to the washing agent with washed-off residues and to the requirements of the installation site

Washing machine model SKM	Size 09/11	Size 12/13	Size 15/15	Size 17/17
Container Ø / height mm	900 x 1100	1200 x 1300	1500 x 1500	1700 x 1700
Washing pump capacity m <sup>3</sup> /h / kW	50 / 20	70 / 28	90 / 38	90 / 38
Internal air extraction system SKM m <sup>3</sup> /h / kW	2200 / 1,3	3000 / 2,0	4000 / 2,5	4000 / 2,5
Internal air extraction system SKM-W m <sup>3</sup> /h / kW	2200 / 1,5	2200 / 1,5	3000 / 2,2	3000 / 2,2
Max. weight of vessel	250	400	600	750
	L x W x H	L x W x H	L x W x H	L x W x H
Dimensions mm	5150 x 1800 x 2550	6050 x 2200 x 3050	6550 x 2500 x 3320	7000 x 2750 x 3650
Required space mm	8600 x 4000 x 3500	9500 x 4000 x 4000	10000 x 4000 x 4500	10500 x 4200 x 5000
Transport clearance mm	2600 x 2000 x 2800	3300 x 2300 x 3300	3600 x 2600 x 3300	4000 x 3000 x 3650

\* Subject to technical changes

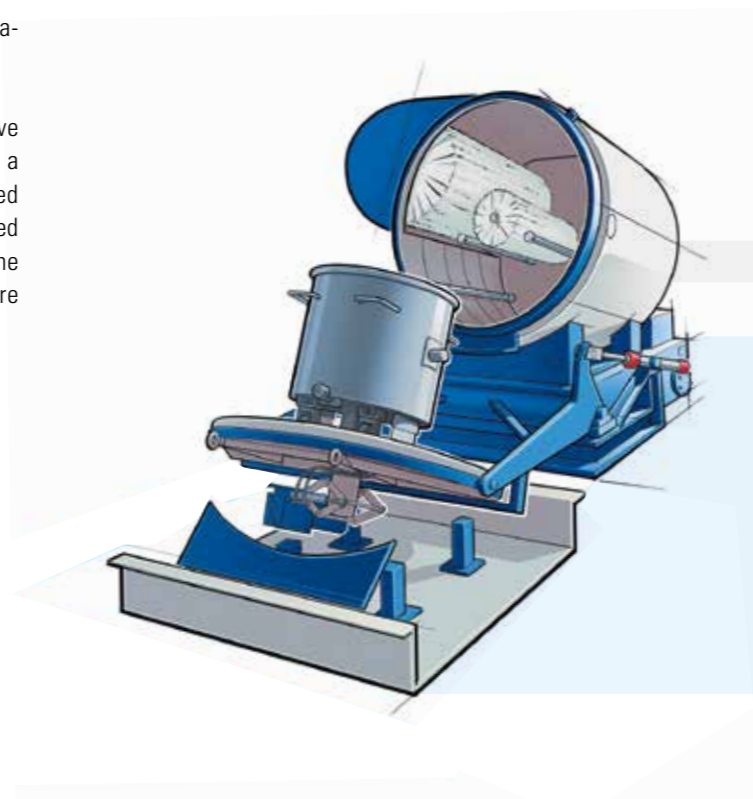
# SKM





# Model BKM

- ▶ Robust and user-friendly **washing machine for internal and (optionally) external cleaning of containers with an open top** using brushes and simultaneous spraying with solvent; conductive brushes with type examination according to ATEX – no nitrogen inerting required
- ▶ Thorough cleaning of containers on the inside and outside (optional) – including large-diameter containers – by means of rotating brush rollers and sprayed-on washing agent
- ▶ The container is tilted down during washing, allowing dissolved residues to be rinsed out regardless of the size and design of the container bottom
- ▶ Tight-closing, hydraulic washing chamber door that also serves as loading platform (rotating plate) in front of the washing chamber. The rotating plate is driven by an external, explosion-proof gear motor. The container is centered using interlocking guide rails at the container and door (a locking sleeve and 2 guide rails must be welded to the underside of every container to be cleaned)
- ▶ The door does not move until the container is properly locked into place (polling sensor)
- ▶ Polling of the door position “closed”; spraying and brush rotation do not begin until the door is tightly closed
- ▶ The standard version includes brush rollers with conductive polyamide brush segments for internal cleaning, driven by a hydraulic motor with infinitely variable speed that is mounted behind the housing panel. The brushes are moved and pressed against the container by hydraulic cylinders mounted to the outside of the rear panel; infinitely variable contact pressure and speed
- ▶ Powerful centrifugal pump for washing with circulated solvent
- ▶ Closed solvent reservoir under the washing chamber (no open solvent when the washing chamber is open); level switch for filling and draining; flow monitor; the brush rotation starts only after injection of the solvent
- ▶ An external filter with removable basket and strainer protects the spraying system, container and pump from foreign matter
- ▶ Explosion-proof hydraulic unit, explosion-proof driving motor: the motor speed can be adjusted based on the desired brush speed using a frequency converter
- ▶ Internal air extraction by a powerful suction fan
- ▶ Automatic washing program with programmable logic controller (PLC); washing – draining – rinsing – ventilating and brush rotation; the program steps can be selected individually
- ▶ Explosion protection according to ATEX, category 1 (with type examination) for zone 0 inside, category 2 for zone 1 outside



Washing machine model BKM	Size 09/11	Size 12/13	Size 15/15
Container Ø / height mm	900 x 1100	1200 x 1300	1500 x 1500
Washing pump capacity m <sup>3</sup> /h / kW	30 / 5.5	45 / 7.5	60 / 10
Internal air extraction system BKM m <sup>3</sup> /h / kW	2200 / 1.85	2900 / 2.5	4000 / 3.6
	<b>L x W x H</b>	<b>L x W x H</b>	<b>L x W x H</b>
Dimensions mm	4100 x 3200 x 3000	4800 x 3700 x 3400	5500 x 4200 x 3800
Required space mm	8000 x 5000 x 3000	9000 x 5500 x 3400	10000 x 6000 x 3800
Transport clearance mm	3200 x 2000 x 2400	3500 x 2400 x 2700	3800 x 2700 x 3000

\* Subject to technical changes

## Accessories

- ▶ External cleaning using brush rollers; conductive brushes with type examination according to ATEX – no nitrogen inerting required
- ▶ Separate outlet cleaning system with a special cleaning nozzle at the top of the washing chamber
- ▶ Warm air drying: the fan blows heated air into the machine for effective drying of nonvolatile solvent residues on machine and container surfaces
- ▶ Drying chamber: solvent losses and emissions are minimal because the solvent does not need to be extracted from the washing chamber for the drying process
- ▶ Solvent concentration measuring and regulating system for connection to an exhaust air cleaning system



# Our Services

## What can you expect from RENZMANN?

### In the planning phase

We work with you to define the steps and responsibilities of the project and to determine what, if anything, needs to be done to prepare your premises for the installation of the equipment. During the quotation stage, we will already create process diagrams and installation plans and define the interfaces to on-site energy supply systems (power, compressed air, steam from an on-site system, thermal oil) and to waste water and exhaust air systems.

We determine the profitability of your project in terms of performance, staff requirements, investment and operating costs, taking into account all relevant laws, regulations and guidelines.

The RENZMANN laboratory offers the possibility of testing all cleaning processes used by RENZMANN with original washing machines and original items to be washed under realistic conditions. Our customers can evaluate the test results achieved with various washing machine models and cleaning processes. These test results, which are painstakingly documented in writing and with photos, form the basis of the cleaning qualities that RENZMANN warrants in the purchase contract.

Customers are also invited to observe the treatment of contaminated washing solvent in distillation units.

We will not only support you in choosing the best cleaning process for your requirements; we will also draw up a detailed plan for the installation of your new washing machine or washing system (which may include several washing machines, a distillation unit, containers, pumps, fittings etc.) in the rooms provided and for its connection to the on-site energy supply, exhaust air and waste water removal systems.

And of course you can also rely on our support in your dealings with authorities, architects and advisers, and in drawing up approval documents.



### After you place your order

In addition to the documents you have already received, we will provide you with the piping diagrams, pneumatic plans and circuit diagrams for your future equipment.

To ensure a smooth assembly and commissioning of your new equipment, our sales and service staff will help you draw up appropriate plans and supply checklists.

### After your new equipment is delivered

We take service literally – we want to serve our customers. Our top priority is to ensure smooth proceedings on your premises. To eliminate potential problems from the start, we offer to have our staff check the conditions on site and determine the possibilities of connecting our products to existing equipment.

Our technicians are highly trained and experienced professionals. They assemble, commission, repair and service our equipment around the globe. All our technicians undergo regular training and requalification in line with the relevant regulations.

Once the equipment has been commissioned, we will train your staff in the operation of the new machines.

If you ever need spare parts, we will do our utmost to ensure that you receive the required components as quickly as possible.

### And after that?

Once your equipment has been put into operation, our staff is still available to answer any questions that might come up.

We offer regular maintenance for our products, with special focus on explosion protection, and will also perform the recurrence inspection that is required by law. We will also be happy to undertake any necessary repairs. You will receive documents certifying the recurrence inspection and the perfect working order of your equipment. This certificate is part of your explosion protection document and proves that you have fulfilled your responsibilities regarding maintenance and monitoring. And as an added bonus, you will keep your equipment in top condition. Compliance with this legal requirement increases the safety of your staff and prevents conflicts with supervisory authorities.







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