



CLEANING SOLUTIONS



## cGMP Cleaning Systems

### **Cleaning according to customer needs**

The Müller Cleaning devices VCD, PDC and PCC are built to reflect that cleaning is one of the keys to the success in production process in the field of pharmaceuticals, diagnostics, cosmetics and high grade food industries.

All the various equipment in contact with the produced product such as containers, drums, bottles, funnels, pipes, hoses, sieves, punches, dies, pumps, valves and also machinery parts as well as and production tools are cleaned and completely free of residue. Various cleaning programs are easily creatable over the colour touch panel.

The cleaning programs are storable, repeatable and validable. This flexibility of creating cleaning recipes out of pre-stored cleaning phases is guaranteed to meet all user requirements for cleaning, due to the design of our cleaning devices.


### **Müller Ltd. Cleaning Solutions**

Your partner for standard and customized cleaning solutions for validated cleaning. The professional engineers employed from Müller Ltd. Cleaning Solutions have developed, projected and manufactured during decades devices for customized cleaning requirements with emphasis on containers, drums and parts in different variants. Our experts with thorough practical experience in validated cleaning will also consult you if cleaning with solvent in an explosive area is required instead of aqueous cleaning.

## **Automation**




## **Dosing**




## **Outside Cleaning**



## **Inside Cleaning**



## **Drying**



## **Qualification**



## **Validation**





# Müller cleaning devices – for your requirements in the pharma- ceutics, diagnostics, cosmetics, food and chemical industries

The Müller cleaning devices are for cleaning in batches. The cleaning steps with liquid medium are circulated and the cleaning device is fully drained after each phase. Müller provides you with a cleaning package which meets all customer requirements, following cGMP and EHEDG regulations. Its thorough qualification leads in a validated cleaning process. Various cleaning recipes for different equipment and residues are easy to create and to store over operator interface. No programming knowledge and tooling is required. Access is prevented due to different protection levels. All events are recognized in the audit trail.

## Versatile device characteristics

- Cleaning with different water qualities and detergents
- Cleaning with different solvents
- Batch cleaning with recirculation in cabinet cleaning device
- Cleaning in place
- “Once through” cleaning, adding detergents in direct flow
- Fully automated solutions for in-feed, opening and closing of the IBC, out-feed
- Cleaning in ex-environment (ATEX)
- Validated cleaning solutions

## cGMP compliant design

- Chamber variants in different sizes
- Hardened double safety glass doors with gastight inflatable seals
- Automated door opening vertical (PDC) or horizontal (PCC)
- Checked rotating on wash arms
- Sterile clamp connections DIN 11864 – T3
- Chamber steel sheet material quality AISI 316L (EN 1.4404 / 1.4435)
- Chamber steel sheet surface quality mirror polished (EN 10088 2P)
- T-membrane valves (none dead leg design)
- Membrane and O-rings in PTFE / EPDM
- Only one inlet medium connection over manifold membrane valve block
- Plug connections (no screws) and easy removable parts inside the cleaning chamber
- Surface quality to customer’s request but at least Ra <0.8 µm
- Bottom and top surface in the cleaning chamber are sloped so that a full drainage is guaranteed
- Chamber radius minimum 1” Ø
- Piping with slope > 2% for full drainage
- Tubes orbital welded and polished
- Total dead leg free design of cleaning chamber and piping system
- Circulating pump self draining and in AISI 316L
- Inline heating system in circulation piping; steam or electrically heated
- Customized wash racks with internal nozzle system; every item to be washed has its specified position
- Automated connection between circulated piping and wash rack

## Documentation for qualification and validation

Different levels of documentation according to customer recommendations are available. The compilation of different drawings, lists, certificates and specifications make the qualification possible. In order to validate the system FAT/SAT-protocols and a special IQ/OQ-package are available.

## Professional cleaning in explosion proofed areas

Complete cleaning device compliant to ATEX regulations (including safety intergraded level, SIL) for cleaning with solvent or located in a possible dust polluted atmosphere.

## Multi-chamber solution

To increase cleaning through put, a cleaning system with a chamber for liquid phases and a chamber for drying are built together. Transportation is done with an automated in-feed, pass through and out-feed system.

## Regulations:

- **FDA**
  - 21 CFR part 110: Food
  - 21 CFR part 210& 211: Pharmaceuticals
  - 21 CFR part 177: Non stainless steel parts
  - 21 CFR part 11: Electronic records
- **EHEDG**
  - Stainless steel in contact with process medium**
    - Material ANSI 316L, 1.4401, 1.4404, 1.4435
    - Material Certificates: 2.2 or 3.1

### **VCD cleaning device for containers and drums**

Automated inside cleaning device for containers, reactors, mixing systems, fermenters and other hollow parts with inlet and outlet for cleaning medium. Automated solutions for cleaning containers with automated opening and closing of the container inlet and outlet. Various options as medium circulating module, drying module, steam out and dosing modules are available.



### **PDC cleaning device for parts and drums**

Fully integrated cleaning device for inside and outside pre-steam, pre-wash, wash, neutralize, rinsing and drying of equipment in contact with the produced product as containers, drums, bottles, funnels, pipes, hoses, sieves, punches, dies, pumps, valves ... and also machinery tools and tooling used in the field of pharmaceutical, cosmetic and high grade food industries. Special racks are designed for the various parts to be cleaned, according to customer requirements.



### **PCC cleaning device for containers and large parts**

Fully integrated cleaning device for inside and outside pre-steam, pre-wash, wash, neutralize, rinsing steam out and drying of equipment such as containers, drums, pallets and large equipment parts used in the field of pharmaceuticals, cosmetics and high grade food industries. Fully automated solutions for in-feed, out-feed and opening / closing of full containment IBC's available. Special racks are designed for the various parts to be cleaned, according to customer needs.

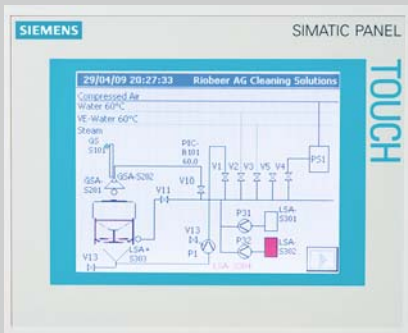


### Flexible cleaning device configuration

Due to their use of standard modules, the Müller cleaning devices can be very flexibly configured. There can be various water qualities and detergents attached to the cleaning device. In the design of the cleaning chambers, beside the standard cleaning chamber sizes, in addition cleaning solutions of Müller are very flexible for the user requirement for special sized cleaning chambers. Beside standardized cleaning processes, customer recommendations are easily integrated. The materials and components are used in accordance with customers' specifications.

### Easy use and handling

Control elements of Siemens or Allen Bradley are used, also touch screens of 10" to 15" size. The well known components of the suppliers guarantee best industrial quality and availability. The operator interface is based on well accepted modules of these suppliers. The software used in com-



pliance with the FDA regulations 21 CFR part 11 and GAMP 5. The self explaining and structured operator interface guides the operator safely and securely in any situation. All required cleaning process parameters are shown on the screen. Operator database with password managing system for different access levels.

### Volume measurement of dosing

The volume measurement of detergent per stroke is precise and able to validate.

### Conductivity measuring

The adjustable conductivity controls can be set when the step rinsing is finished and the next phase of drying can start. The rinsing step is repeatable according to the settable value in the cleaning recipe.

### PH value measuring

In order to control the cleaning medium concentration and / or the concentration before drainage of the cleaning medium, the in-line PH value measuring allows automated adding of detergent.

### Drying air system

The heat battery heats the flow of air, which is positioned after the high performance fan. Heating can be electrical or by steam.

### Monitoring of air filter

There is a pre- and a main filter. Different filter qualities can be chosen from F9 to H14. Differential pressure sensor on main filter checks online the functionality and shows this information on the touch panel. Test port on main filter box (e.g. DEHS tests).

### Doors

One door or pass through cleaning systems with transfer chamber functionality. Using two door systems, the doors are interlocked. Out-feed door (clean side) opens only when cleaning process has been successful. In the same time the in-feed door (dirty side) stays closed.

### Pure steam application

Pre-steaming for melting down residues on to be cleaned parts or sanitisation of cleaned parts after rinsing.

### Rotating wash item racks

Special cleaning processes require the ability to rotate the items to be cleaned during the cleaning process. The required drive for the rack is placed outside of the cleaning chamber.



### Automated handling and opening

For multi chamber and high containment applications, an automated transport system is recommended. The automated transport system in pharma grade design has no drives installed in the aqueous cleaning chamber. The system consists of a moving frame driven from the in-feed side and out-feed side. The wash items are placed in the in-feed storage position. Loading the wash items from the in-feed storage position into the cleaning chamber is fully automated. After the cleaning process, the wash item is automatically transferred into the next chamber or to the out-feed storage position, regarding the machine configuration. Cleaning of containers encloses also fully automated opening and closing of valves, split valves and lids, according to customer specifications. The automated identification of the wash item can be done with a bar code or RFI reader system. The cleaning recipe is chosen automatically from the recipe database regarding the transferred information.

<b>Technical Data</b>			
	<b>PCC 1500 PCC 2000 PCC 2500</b>	<b>PDC 800 PDC 1200 PDC 1600</b>	<b>Special Models VCD, PCC or PDC</b>
<b>Useable Chamber Volume</b> Width x Depth x Height mm and [inch]	1300 x 1300 x 1500 [51 x 51 x 60] 1500 x 1500 x 2000 [60 x 60 x 80] 1500 x 1500 x 2500 [60 x 60 x 100]	800 x 800 x 1000 [32 x 32 x 40] 1200 x 1200 x 1000 [48 x 48 x 40] 1600 x 1200 x 1000 [63 x 48 x 40]	Configurations and Design According to customer specifications and Available room layout
<b>Overall dimensions</b> Width x Depth x Height mm and [inch]	Project based	1800 x 1500 x 2850 [72 x 60 x 112] 2200 x 1600 x 2850 [87 x 63 x 112] 2600 x 1600 x 2850 [102 x 63 x 112]	
<b>Loading height</b> mm and [inch]	Floor level / 800 [32]	800 [32]	
<b>Room height</b> mm and [inch]	Project based	2900 [114]	
<b>Operating weight</b> Kg and [pound]	3000 [6600]	900-1200 [2000-2650]	
<b>Material quality</b>	AISI 316 L		
<b>Frame and panels</b>	AISI 304		
<b>External connections</b>	<ul style="list-style-type: none"> <li>- Electricity</li> <li>- Water (up to qualities)</li> <li>- Detergent (uo to different)</li> <li>- Steam (if available)</li> <li>- Condensate (when steam)</li> <li>- Drying Air (inlet &amp; outlet)</li> <li>- Drain</li> </ul>		
<b>Main pump</b> (frequency controlled) Power (kW) Volume flow rate (l/min) Pressure settable, bar and [psi]	<p style="text-align: center;">5 to 16 Up to 1000 1 to 2,5 [14 to 36]</p>		
<b>Control</b> Standard	Touch Screen from 10 inch to 15 inch SIEMENS S7-300 or ROCKWELL		

More information?

[www.muellercleaning.com](http://www.muellercleaning.com)

## Presenting the other companies of the Müller Group

Today it is of ever increasing importance to cooperate with trustworthy and competent business partners who know what they are doing. As our customer you can rely on a wholehearted partnership. And you gain the innovation and skills of a world class group of companies in the field of packaging, cleaning solutions, handling, transportation and modular systems.

If you now feel the need to talk to us and ask a few questions, then please do not hesitate.

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## Just one click opens new horizons

As a customer you always experience Müller as a whole. Your contacts are not determined by our organization but by the duties you specify. Proximity to customers and an individual consulting service provide that crucial impetus. Our 40 committed representatives in all key centers of the industrialized nations around the globe make us active worldwide, yet never far away.

Experience the potential we offer in your next project. Our world of cleaning systems is only a click away. Make use of our expertise – packed full of ideas in stainless steel. Each one a Müller original.

[www.muellercleaning.com](http://www.muellercleaning.com)

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