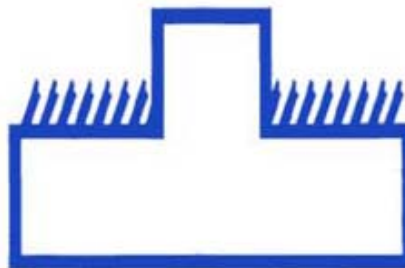




Commercial dishwashing & dishwashers

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1. Introduction

In many households today, a ware washer is a standard item of equipment for the cleaning of dishes and glasses. While the focus domestically is on convenience, the use of dishwashers in the commercial field is essential, not least in order to conform to hygiene requirements. Commercial ware washers are found today in virtually every gastronomic establishment and every kitchen used for community catering.

In contrast to domestic ware washers, commercial ware washers clean wash ware in short wash cycles with a continually replenished detergent solution. They are equipped with technical features primarily aimed at achieving a high hourly output. They are adapted to suit the requirements of commercial ware washing and enable a streamlined flow of operations at low running costs.

2. Commercial ware washing process

The process of commercial machine ware washing can be subdivided into:

- **pre-cleaning**
- **cleaning**
- **rinsing**
- **drying**

2.1 Pre-cleaning

In order to prevent an increased amount of soil from entering the ware washer, soiled dishes are pre-cleaned. This can be carried out manually by means of a spraying device or automatically in a pre-cleaning zone.

2.2 Cleaning

In the cleaning process, a detergent solution stored in the tank is sprayed onto the wash ware through pump units. Food residues are removed in the process.

2.3 Rinsing

Residues of detergent solution and loose soil particles are washed off by rinsing. The addition of rinse aids facilitates the drying of the wash ware.

2.4 Drying

Drying takes place outside the machine by virtue of the heat from the wash ware itself and can be speeded up by drying equipment in the machine.



3. Factors influencing the ware washing result

In machine ware washing, as in every other cleaning process, the following are the factors fundamental to achieving a perfect result:

- **mechanics**
- **temperature**
- **contact time**
- **agents**
- **water**

The first four factors act in a control loop (Sinner's circle) in conjunction with water. Changing one factor necessitates the adjustment of one or more of the other factors in order to achieve the same cleaning result. This is possible only to a limited extent in each case.

3.1 Mechanics

Maintaining a constant pressure and a continuous circulation in the spray systems ensures an even and direct flow onto the wash ware and thereby the removal of soiling.

3.2 Temperature

The temperatures required to facilitate the removal of soiling and to guarantee hygiene are achieved by means of heating units (see technical information sheet [Commercial dishwashing & hygiene](#)).

3.3 Contact time

The contact time is the impact time during which the detergent solution wets the wash ware. A sufficiently long contact time is an essential requirement for fully removing soiling from wash ware (see technical information sheet [Commercial dishwashing & hygiene](#)).

3.4 Agents

Suitable agents (detergents and rinse aids) must be dosed constantly throughout the period during which the machine is running in order to meet the pertinent requirements (see technical information sheet [Commercial dishwashing & cleaning agents](#).)

3.5 Water

(see technical information sheet [Commercial dishwashing & water](#)).



4. Types of commercial ware washers

Commercial ware washers are differentiated according to their application, e.g. glass washers, dishwashers, ware washers for utensils/containers.

According to the way in which they operate, a distinction is made between:

batch ware washers (front-loading machines, rack-pass-through machines)
ware washers with a conveyor system (belt-conveyor and rack-conveyor machines)

The selection of the type of machine should be undertaken by experts (see technical information sheet [Commercial dishwashing & planning.](#))

4.1 Batch ware washers

In batch ware washers, the wash ware carrier (rack) is inserted into and removed from the machine manually, either via the door on the front or, in rack-pass-through machines, via a bench feed.

With these types of machines, pre-cleaning is carried out completely manually outside the machine. The various steps of the program sequence, such as the circulation of detergent and rinsing, take place sequentially in chronological terms, but not separately in spatial terms, in a single zone (tank). The wash ware dries, after removal of the wash ware carrier, outside the machine.

4.2 Ware washers with a conveyor system

Here, the wash ware passes automatically through the consecutively arranged zones in which the individual functional sequences take place. Two machine designs are distinguished:

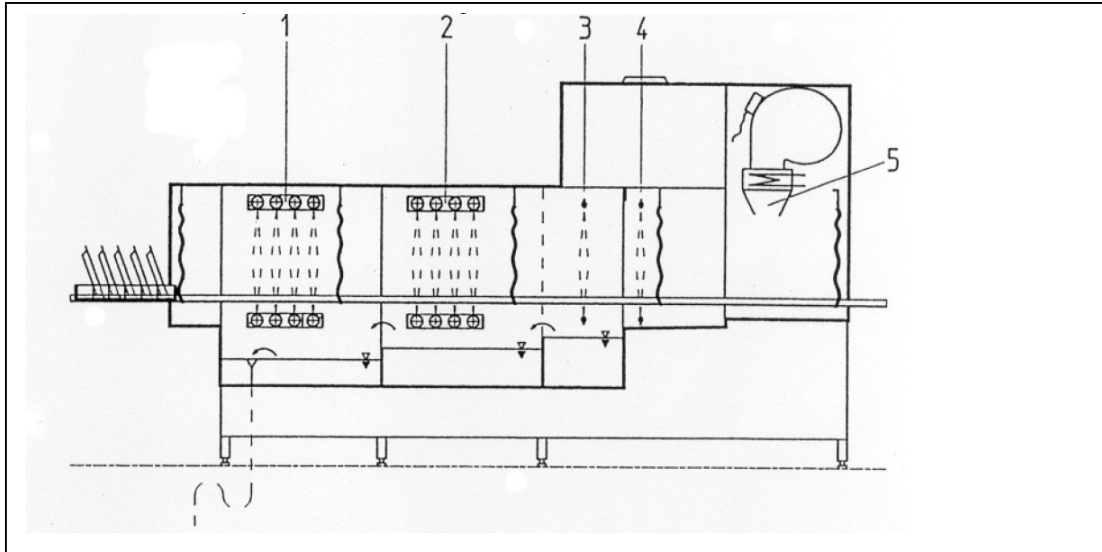
Rack-conveyor machine

The racks loaded with wash ware are conveyed automatically through the machine.

Belt-conveyor machine

The wash ware is placed directly onto a continuous belt and conveyed automatically through the machine.

The diagram below illustrates the separate functions of a conveyor-type ware washer.



Pre-cleaning (1)

Pre-cleaning can be carried out manually upstream of the machine or inside the machine by means of a freshwater pre-cleaning and/or pump pre-cleaning zone.

Irrespective of this, coarse soiling (e.g. serviettes, left-over bones) must be removed before the wash ware is inserted into the ware washer.

Fresh water pre-cleaning

Zone in which the wash ware is freed of food residues directly with fresh water.

Pump pre-cleaning zone

Circulating tank in multi-tank systems, in which the wash ware is freed of food residues with detergent solution. No detergent is dosed directly into this zone.

Detergent circulating zone (2)

The actual cleaning of the wash ware takes place here. Detergent is dosed directly into this zone. To improve performance, multiple tanks may be arranged consecutively.

Auxiliary rinse (3)

To improve the rinsing effect, an additional auxiliary rinse can be carried out using the rinse aid solution recovered from the fresh water rinse.

Fresh water rinse (4)

Here, the wash ware is sprayed with hot fresh water which has rinse aid added to it.

Drying zone (5)

The drying of the wash ware is carried out in the drying zone by means of air from a blower.



5. Supply of water, energy and agents

The supply of

- **water**
- **energy and**
- **agents**

is of vital importance to the running of a commercial ware washer.

5.1 Water

Water transfers mechanical and thermal energy to the surface of the wash ware.

The agents are dissolved in the water. The quality of the water is also a key factor in the achievement of a good wash result.

The requirements for water are described in detail in the technical information sheet [Commercial dishwashing & water](#).

5.2 Energy

Energy is needed among other things for running the circulating pumps and for heating the water.

For further observations on the subject of “energy”, see technical information sheet [Commercial dishwashing & planning](#)

5.3 Agents

The detergent facilitates the removal of soiling in order to achieve fully hygienic ware washing results. The function of the rinse aid is to reduce the surface tension of the water so that optimal wetting and drying of the wash ware can occur.

For more detailed information on cleaning agents, see technical information sheet [Commercial dishwashing & cleaning agents](#).



6. Hygiene requirements

DIN standards DIN 10510 to DIN 10512 and DIN 10522 describe among other things the requirements for the functions and operation of commercial ware washers, as well as methods for testing and evaluating ware washing results.

Spray systems with non-DIN-compliant designs should verifiably be capable of achieving in all aspects the requirements set out in the DIN standards for a hygienic ware washing result, including under conditions of practice.

It must be ensured by the operator of the ware washer that the service personnel are trained and understand how to handle the ware washer. The rules of personal hygiene must be observed (see technical information sheet [Commercial dishwashing & hygiene.](#))

7. Operation

The operator is responsible for operating the ware washer properly in accordance with the specifications of the manufacturer. The requirements which arise out of the standards and laws that are relevant to operation (including operating instructions and guidance) must also be observed.

8. Maintenance

Regular servicing of the ware washing equipment and of all its components by technical personnel authorized by the manufacturer is important for maintaining operational and functional safety and for upholding warranty claims, and last but not least for preserving its value. It is recommended that maintenance contracts for ware washers be entered into.



9. Closing remarks

This technical information sheet, which has been drawn up by experienced practitioners, is intended to draw the attention of the reader to the fact that commercial ware washing cannot be carried out successfully if it is approached superficially and without the appropriate involvement of all those participating in the ware washing process.

Only an understanding of the technical processes, the resulting correlations and the teamwork on the part of all those involved, in particular the operator of the ware washer and his/her staff, and regular maintenance of the ware washer, dosing equipment and water treatment system by the manufacturer will produce the ware washing results expected by the user.

Consistent cooperation between ware washer, agent and dosing equipment manufacturers as well as manufacturers of water treatment equipment and wash ware will ensure constant and optimum adaptation to practical requirements, to the benefit of their joint customers and of the environment.

Technical advice is provided by the member companies of the VGG.

Enquiries regarding this technical information sheet "*Commercial dishwashing & dishwashers*" should be addressed to

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