



Compendium of practice for Commercial Dishwashing

Section 04

Dosing technology



Contents

1. Requirements for dosing technology in automatic commercial dishwashing.....	3
2. Determining the required concentration of process chemicals (treatment agent)	3
3. Dosing methods.....	4
3.1. Manual dosing	4
3.2. Automatic dosing	4
3.2.1. Conductivity-controlled dosing	4
3.2.2. Time / quantity dosing.....	4
3.3. Continuous dosing.....	5
3.4. Water-proportionate dosing	5
3.5. Signal-dependent quantity dosing.....	5
4. Function of dosing units	5
4.1. Dosing units for powder and solid detergents	6
4.2. Dosing units for liquid detergent.....	6
4.2.1. Pumps with electric drive	6
4.2.2. Electromechanical dosing system.....	6
4.2.3. Door / flap dosing.....	6
4.2.4. Direct spraying system.....	6
4.3. Dosing units for rinse aid	7
4.3.1. Dosing units for liquid rinse aid	7
4.3.2. Dosing units for solid rinse aid	7
4.3.3. Door / flap dosing.....	7
5. Central dosing station or central dosing system	7
6. Tasks of the operator	8



1. Requirements for dosing technology in automatic commercial dishwashing

Only a uniformly sufficient concentration of process chemicals (treatment agent) throughout the entire cleaning process can guarantee a flawless, permanent, efficient, hygienic and environmentally-friendly dishwashing result. The concentration of process chemicals (treatment agents) represents the quantity of detergent in the detergent circulation tank and / or rinse aid in the fresh water rinse, as well as disinfection agents and / or additives, expressed in g/l or ml/l.

Automatic dosing units for dosing process chemicals (treatment agents) such as detergents and rinse aids are available for all commercial dishwashers. They must ensure precise and consistently reliable dosing, and meet the applicable safety regulations.

Operational faults should be visually or audibly perceptible.

Replenishing the dosing chamber and / or replacing the product units must be simple and user-friendly.

Staff must be trained to use this system.

2. Determining the required concentration of process chemicals (treatment agent)

After a thorough inspection of the existing technical conditions, water quality, average level of soil and dried residues, and type of wash items, on-site service technicians can set the required quantities of, e.g., detergent and rinse aid (see *Commercial Dishwashing Section 06 "Process chemicals"*).

An exact check of the concentration can be performed, e.g., through titration of the detergent solution or measurement of consumption rates.

Insufficient dosing leads to poor, unhygienic dishwashing results, corrosion and deposits.



Overdosage causes excessive environmental impact, is inefficient and can have a negative impact on the final rinse.

3. Dosing methods

3.1. Manual dosing

This method normally involves manually dosing detergent in powder or tablet form into the machine.

This method is very imprecise and inevitably leads to strong fluctuations in detergent concentration.

3.2. Automatic dosing

Today, the following methods are applied:

3.2.1. Conductivity-controlled dosing

The target concentration is regulated via the electrical conductivity of the detergent solution. The conductivity sensor, coupled with an electronic control system, ensures corresponding dosing of the detergent.

3.2.2. Time / quantity dosing

The dosing of the treatment agent is time-dependent. As the dosing quantity is a fixed amount per unit of time, additional dosing takes place over a pre-set period depending on the prior first fill and depending on the fresh water requirement and / or water balance of the dishwasher. The dosing quantity may vary depending on the selected wash programme of the dishwasher.



3.3. Continuous dosing

The dosing pump uniformly conveys detergent as long as the corresponding triggering signal is present.

3.4. Water-proportionate dosing

The treatment agent is dosed in proportion to the fresh water consumption of the dishwasher. The dosing technology is triggered, e.g., via impulses of a water meter.

3.5. Signal-dependent quantity dosing

A fixed dosing quantity is added to the cleaning process, triggered by a signal provided by the machine manufacturer (see door / flap dosing).

4. Function of dosing units

The detergent is added to the detergent circulation tank through a detergent injection nozzle, which is normally the last detergent circulation tank in dishwashers with a transport system. However, another injection nozzle can prove practical depending on the dosing method.

Dosing units are normally linked to the dishwasher filling process. This pre-dosing ensures that a sufficient detergent concentration is available at the start of the cleaning process.

In conductivity-controlled dosing units of single tank dishwashers, the pre-dosing takes place during the first cleaning cycle.

Please note that dishwashing can only start if the dishwasher is ready for operation.

A suitable location for the injection nozzle and the installation point of the conductivity electrode is chosen during the installation of dosing units. The manufacturer's instructions must also be observed.



4.1. Dosing units for powder and solid detergents

Powder and solid detergents flow directly into the detergent circulation tank of the dishwasher via fresh water.

4.2. Dosing units for liquid detergent

4.2.1. Pumps with electric drive

These suck up the detergent and dose it into the detergent circulation tank of the dishwasher via an injection nozzle. Membrane and hose pumps are used.

4.2.2. Electromechanical dosing system

These suck up the detergent using low pressure and dose it into the detergent circulation tank of the dishwasher via an injection nozzle.

4.2.3. Door / flap dosing

At each wash cycle / programme sequence the corresponding volume of process chemicals for the cleaning processes is dosed via door / flap dosing.

4.2.4. Direct spraying system

In this method, a high concentration of process chemicals (treatment agent) is applied directly onto the wash items using special spraying devices. Thus a portion of the required detergent can be placed in the detergent circulation tank. Sufficient contact time is required for maximum efficiency. A separate zone must be provided depending on the machine type.

This method corresponds to time / quantity dosing.



4.3. Dosing units for rinse aid

The rinse aid is injected into the fresh water rinse via an injection nozzle.

4.3.1. Dosing units for liquid rinse aid

Dosing units for liquid rinse aid work on the same principle as dosing units for liquid detergent. Sometimes, special designs are used owing to the fact that a small quantity is to be conveyed, and sometimes under pressure. In mechanically-driven dosing units, propulsion and control is provided by the water pressure of the fresh water.

4.3.2. Dosing units for solid rinse aid

The solid is dissolved in fresh water in an intermediary container and then dosed like a liquid rinse aid.

4.3.3. Door / flap dosing

A quantity corresponding to the cleaning process is released for every wash cycle.

5. Central dosing station or central dosing system

This term describes the supply of one or more commercial dishwashers with process chemicals (treatment agents) via automatic dosing from one central location.

Often, the dishwashers and dosing stations are located in separate areas.



6. Tasks of the operator

- The legal provisions, regulations and guidelines must be observed for the installation and the operation.
- The operator shall be responsible for the appropriate maintenance, servicing and necessary replacement of wear parts in the dosing technology.
- Manipulations, parameter adjustments and similar actions may only be performed by trained and authorised staff.
- The dosing system and storage tanks must be rinsed with fresh water when changing to another product.
- The information in the safety data sheet must be observed.
- In the event of an error message, the causes must be ascertained, and suitable measures must be taken using the machine and dosing technology documentation.
- Should problems arise in the cleaning results, the function of the dosing technology, as well as all other relevant parameters of the cleaning process must be checked.



This compendium of practice, which has been drawn up by experts, should remind the reader that commercial machine washing cannot be successfully conducted on a superficial level or without the corresponding input of all persons involved in the cleaning process.

Only the understanding of technical processes, the resulting interrelations and the cooperation of all participants, particularly the dishwasher operator and staff, as well as having regular maintenance of the dishwasher, the dosing equipment and the water treatment system by the manufacturer, can produce the cleaning results expected by the user.

Consistent cooperation between the dishwasher, detergent and dosing equipment manufacturers, as well as the manufacturers of wash items, guarantees constant and optimal adaptation to practical requirements for the benefit of customers and the environment.