Arbeitskreis
Gewerbliches
GeschirrSpülen

Compendium of practice for Commercial Dishwashing

Section 06

Process chemicals

Contents

1. Definition of process chemicals

Process chemicals (treatment agent) include detergents and / or cleaning compounds, rinse aid and any other additives (e.g. de-foaming agents) suitable for automatic dishwashing.

An optimum wash result is produced by the interaction of the detergent and / or a combination of cleaning compounds in the first stage, and a subsequent rinse cycle with a rinse aid.

Other technologies, however, allow the combination of a rinse aid and detergent in one product.

2. Influencing factors on the dishwashing result

There are various parameters that have an influence on the cleaning result.

In particular, these are:

The parameters of **Sinner's Circle**

- Process chemicals (detergent, additives, rinse aid)
- Contact time
- Temperature
- Mechanics

The following also have an impact:

- Quality and volume of water
- Wash item
- Dry-on time
- Pre-cleaning

- Type and quantity of food residue
- Drying

In commercial dishwashers, the detergent solution is sucked in through pumps and sprayed onto wash items through nozzles. Every dishwasher has to live up to demands for outstanding performance and efficient use of resources (water, process chemicals, energy).

The resulting new dishwashing technologies (reduction of water volume without optimising the filter system) sometimes involve special requirements as regards the process chemicals used, as the relative soling load in the machine increases with constant input of soiled material into the machine. Therefore, a higher detergent concentration or the use of additional defoamers in the event of increased foam production may be required.

3. Detergent

Detergents are available as liquids, powders, blocks or pastes.

The composition of detergents removes food residue from wash items. Furthermore, further ingredients help to finely distribute food residues within the detergent solution and hold it in suspension (soil dispersing capacity). Thus, recontamination is largely prevented.

Other ingredients such as polyphosphate or substitutes (e.g. complexing agents) can prevent the breakdown of calcium carbonate and magnesium carbonate (lime) up to specific water hardness levels.

Alkaline components ensure the swelling and decomposition of food residues such as starches, proteins and fats. They have an anti-corrosive effect.

Enzymes are other components that are added to detergents.

Oxidative ingredients in the detergent support the removal of coffee and tea residues and other stains (lipstick). These also help to reduce the number of micro-organisms on dishes and in the washing tank.

Effective doses of detergent counteract corrosion processes. Insufficient dosage of detergents promote corrosion (see *Compendium of practice for Commercial Dishwashing Section 08 "Metal wash items"*) and deposit formation (e.g. starches and protein).

The manufacturer's instructions should be observed for dosing the detergent.

Within the scope of the aforementioned conditions, the detergent consumption can be optimised, thus making the entire wash process more efficient. The amount of detergent can be reduced through the installation of water treatment plants or organisational measures (to avoid dried-on food residues).

In contrast, there are also factors that require a larger volume of detergent.

These include:

- heavily soiled wash items
- insufficient pre-cleaning
- long dry-on times
- pre-heating of dishes to over 60 °C
- short contact times of detergent solution on wash items
- insufficient temperature of detergent solution
- dish-related cleaning problems
- strong water hardness
- lower tank water regeneration volumes through lower fresh water supply (water-saving machines)

4. Rinse aid

The rinse aid is added in the final rinse cycle. Its task is to soften the water and to achieve an optimum wetting of cleaned dishes in the fresh water rinse by reducing the interfacial tension.

Combined with the heat stored in the wash item (through the hot detergent solution and separate input of hot drying air in flight-type dishwashers), the wash items can be dried quickly. The results are spotless, dry and shiny dishes and cutlery.

Optimum dosing is determined on-site through rinse tests whereby the rinse result is visually checked again and again. The tests begin with a minimal dose and gradually increase the amount of rinse aid.

Water drops and streaks indicate underdosage. Streaks and cloud-shaped marks indicate a too high dose.

The quality of the rinse water is decisive for rinse results. If this water contains a high level of minerals, mineral residues are likely to be left on dishes, despite an optimal rinse aid concentration.

Perfectly rinsed wash items must be free of spots and streaks, and exhibit a uniform shine.

The manufacturer's instructions should be observed for dosing the rinse aid.

5. Additional process chemicals

There are special treatment agents to machine clean glasses and pots. Furthermore, special products such as basic cleaning and soaking detergents and descaling agents are used.

For special requirements, individual components of the detergent can be dosed separately in a type of modular system.

Defoamer is used in the event of increased foam generation. Excessive foam has a negative impact on the cleaning result as the mechanics of the cleaning nozzles can break down. Defoamer is already effective in low concentrations.

However, it should be ensured that no strong foaming pre-cleaning agents are used (e.g. washing up liquid) that generate excessive foam in the machine.

6. Influence of process chemicals on health

As the final rinse cycle (the fresh water rinse) ensures that no detergent or food residues remain from the detergent solution, in a functioning system, the process chemicals should have no impact on health.

Traces of rinse aid can remain on wash items during automatic drying. These are, however, extraordinarily low and physiologically harmless.

7. Influence of process chemicals on the environment

Detergents and rinse aids are biodegradable in accordance with the applicable legal requirements (Regulation on Detergents).

Further information on this is available in *Compendium of practice for Commercial Dishwashing, Section 12 "Environment and sustainability".*

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.

Issued by AK GGS
www.akggs.de

Version 01/2021