Compendium of practice for Commercial Dishwashing

Section 11

Hygiene

Contents

1. Hygiene requirements for mechanical commercial dishwashing / DIN standards

Diners in the catering trade, hotel business, refectories / canteens, service stations, care homes, hospitals, etc., all demand hygienic perfection when it comes to dishes and cutlery.

The surface of all washed items should be in a condition that protects the diner from any health impairments. This applies to those in poorer physical condition and healthy diners alike. In addition to compliance with general hygiene regulations for food preparation such as the Food Hygiene Regulation (EC) No 852/2004 and (EC) No 852/2004 and DIN 10516), there is also a range of special provisions for commercial dishwashing, which, like in other sectors, are covered and explained in DIN standards.

A work group comprising representative dishwasher manufacturers, manufacturers of process chemicals and hospital and food hygienists was formed to address these special hygiene issues in terms of commercial dishwashing. This concerted effort resulted in the following DIN standards, which were jointly commissioned by the German Federal Ministry of Health.

DIN 10510

"Food hygiene – Commercial dishwashing with multitank conveyor dishwashers – Hygiene requirements, procedure testing"

DIN 10511

"Food hygiene – Commercial glasswashing with glasswashing machines – Hygiene requirements, testing"

DIN 10512

"Food hygiene – Commercial dishwashing with one-tank dishwashers – Hygienic requirements, type testing"

DIN 10522

"Food hygiene – Commercial cleaning of reusable boxes and reusable containers for unpackaged foodstuffs – Hygiene requirements, testing"

DIN SPEC 10534

"Food hygiene – Commercial dishwashing – Hygiene requirements, testing".

These standards represent state-of-the-art. They are non-legislative acts, but nevertheless represent a set of guidelines for management staff in food preparation in order to guarantee hygiene safety during commercial dishwashing.

As a basis for a future European hygiene standard for commercial dishwashing, DIN SPEC 10534 was developed in both German and English as a summary of previous standards.

The developed standards apply to commercial tank machines. Fresh water machines (machines where the water is changed after every washing stage) are excluded from the standards.

2. Important parameters that influence hygienic washing results in automatic dishwashing

Every clean and the resulting cleanliness and hygiene of the wash item are influenced by the interplay of the following factors:

- Type of wash item and item holder
- Dry-on time
- Type and extent of contamination
- Pre-cleaning
- Temperature
- Contact time
- Mechanics
- Quality and volume of water
- Process chemicals (treatment agents)
- Rinse aid
- Drying

The wash item passes through a circuit of separate clean and unclean sides.

The following diagram illustrates the individual functional areas of the wash item circuit:

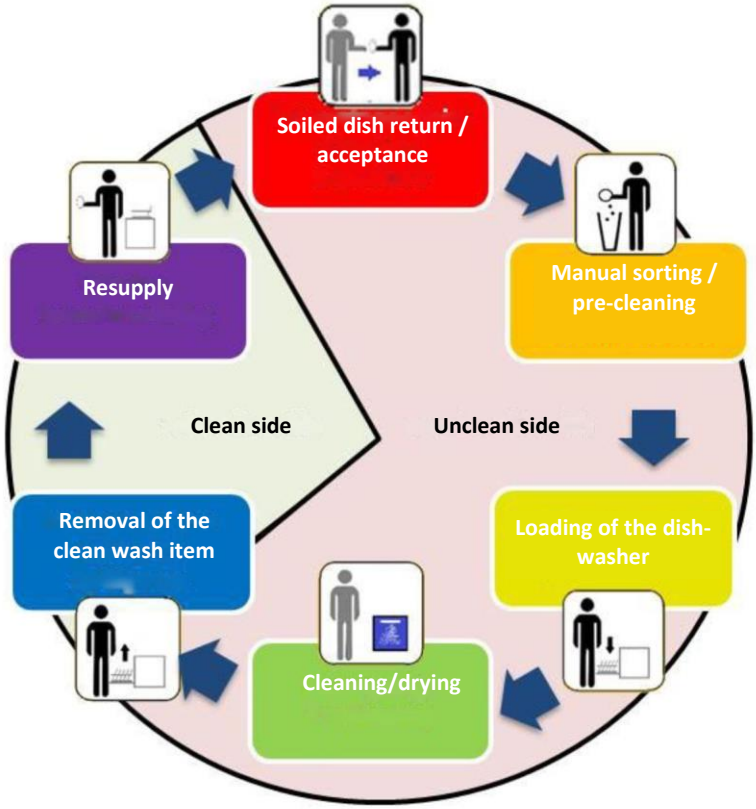

Figure 1: Functional areas in the wash item circuit
Source: Hobart

The dry-on time of food residues onto dishes should be limited as much as possible to prevent microbial growth and to facilitate cleaning.

Once the contaminated wash item has been returned to the unclean area, the wash item must be pre-cleaned. Pre-sorting and loading is performed according to the machine type and / or instructions of the machine manufacturer.

The wash item can be moved into the clean area after cleaning.

The wash item can be dried both inside and outside the machine. If necessary, corresponding drying areas must be provided on the clean side. Only clean and dry wash items may be stored in clean areas, ready for reuse.

Damp wash items may not be stacked unless constructive measures enable total drying of the wash items! Standing water and damp cloths / wipes can become contaminated and thus constitute hygiene risks!

The commercial dishwasher and the entire dishwashing area must be cleaned as required, but at least once per day.

3. Requirements for the scullery

Sculleries must be designed and equipped to ensure that they meet the relevant hygiene regulations for food preparation.

Upon purchasing a commercial dishwasher, the supplier and operator should discuss the circumstances and requirements on-site in order to achieve a hygienically flawless cleaning result.

A correct functional layout and consistent adherence to clean and unclean areas are ideal prerequisites for hygienic washing and re-provision of wash items. Thus the operation of the machine and staff deployment must be organised accordingly.

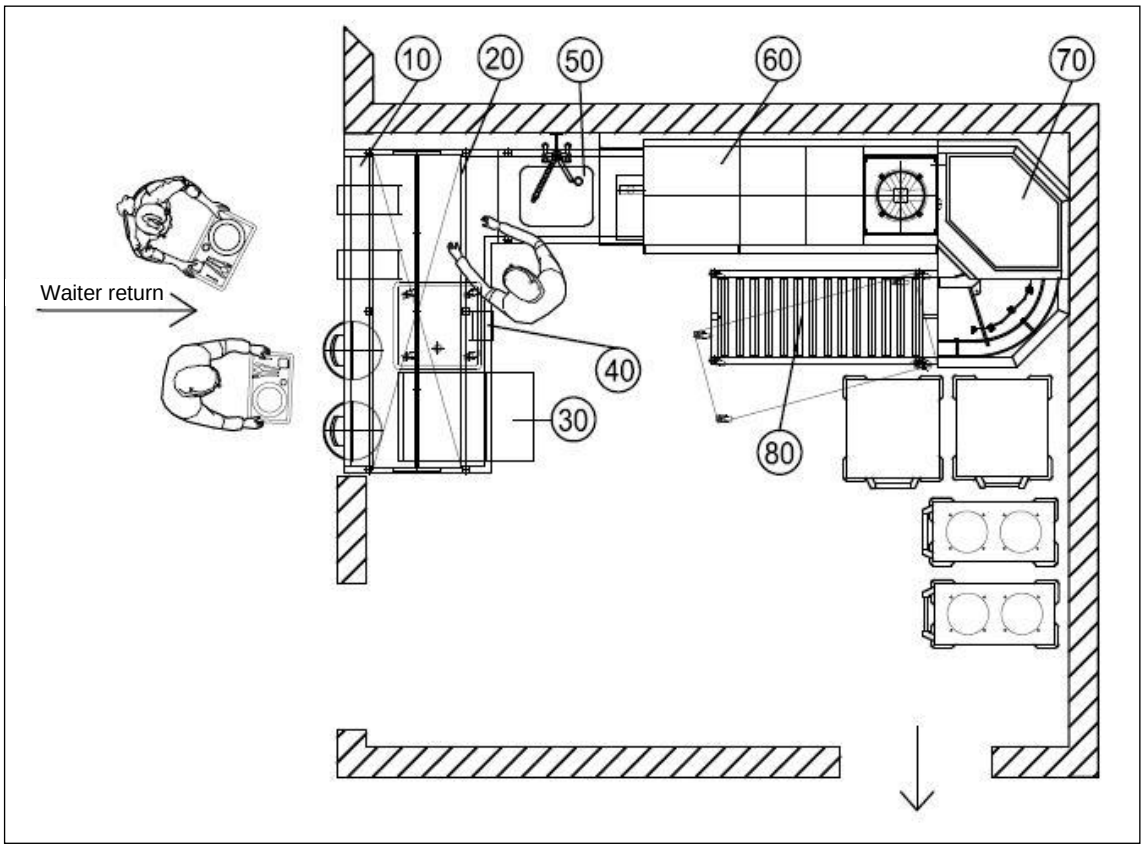

Figure 2: Planning example: Restaurant and banquet with rack conveyor dishwasher
Source: Hobart

In kitchens with multi-tank dishwashers, the sculleries must be separate from the food preparation and distribution areas. The **clean** and **unclean** sides must be kept separate to avoid recontamination. The paths of contaminated and clean wash items must not cross.

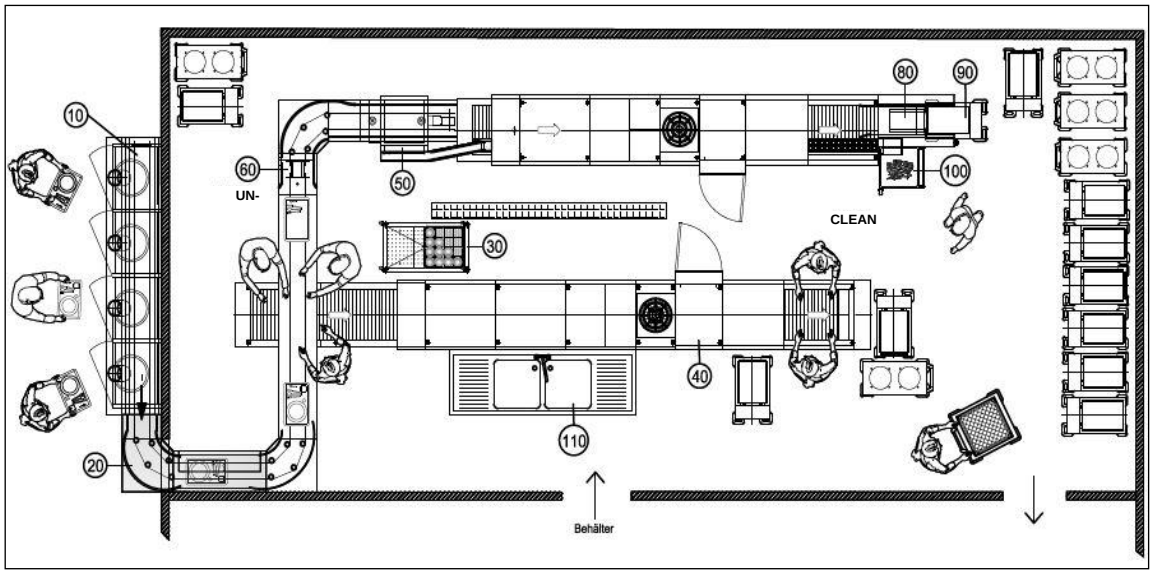

Figure 3: Planning example of dishwashing area in a canteen with flight-type dishwashers
Source: Hobart

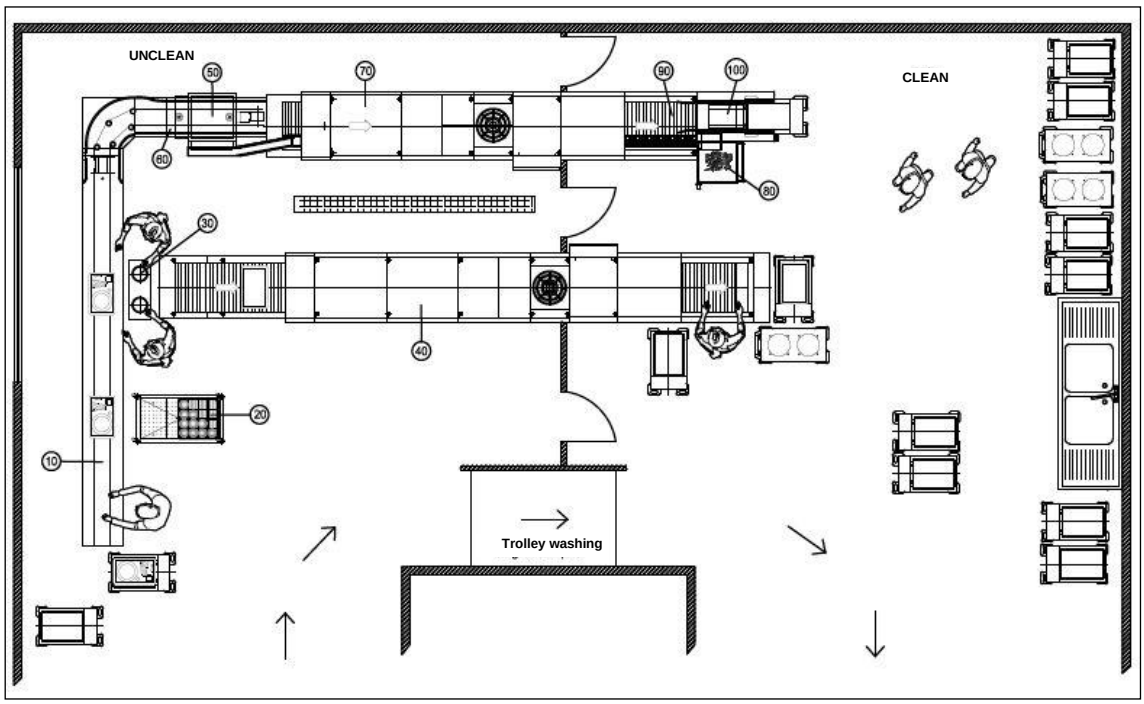

Figure 4: Planning example of a dishwashing system in a main hospital kitchen
Source: Hobart

For the operation of single-tank and glass washers, loading the machine and removing cleaned items must be kept separate to avoid recontamination of the cleaned items.

The aforementioned information also applies to wash systems for cleaning reusable boxes and reusable containers for unpackaged foodstuffs.

The air intake system and exhaust air system must be designed to ensure that the room climate does not place undue burden on dishwashing staff. The air used to dry the wash item must be free of bacteria. Thus it is important that regulations for air-conditioning systems for kitchens (RLT, VDI 2052) are observed by operators and / or planners.

The floor must be non-slip, and the entire room including equipment (e.g. floor grating, floor drainage / drainage channels) must be thoroughly cleaned and disinfected.

The hygienically clean wash items may only be removed with clean hands and / or clear gloves. Re-contamination must be avoided! Soiled dishes and clean dishes should be handled by different staff.

Therefore, hand wash basins and facilities for washing, disinfecting hands and hygienically drying hands should be provided at suitable locations, e.g., in close proximity to the dishwasher (in accordance with Regulation (EC) No 852/2004, Annex II, Section 1, Point 4).

4. Requirements for the washing parameters

- Cleaned wash items must be visually clean. No residues may be visible to the naked eye.
- Such a result can only be achieved if the parameters of temperature, mechanics, chemicals and time are optimally coordinated.
- The detergent concentration must remain consistent across the entire cleaning process and be sufficiently high (manufacturer's instructions). A uniform, direct flow of the detergent and rinse aid must be guaranteed.
- Wash item, dry-on level, heating time and temperatures, as well as the type of contamination, have a crucial influence on the cleaning process
- The operator must take this into account by selecting the correct programme (e.g. transportation speed, programme duration or type).
- It is important that the wash item is placed in the optimum position in the wash item holder and that it remains in this position.
- Significant input of soiled material increases the risk of recontamination of clean dishes. Thus a thorough pre-cleaning should be performed.
- Larger conveyor dishwashers should be equipped with a pump pre-cleaning system and corresponding soiled-material strainer.
- For smaller machines, pre-rinse basins and hand sprays must be provided for thorough, manual pre-cleaning.
- The hygienic water quality of the fresh water rinse must correspond to that of drinking water
- Detailed requirements for the technical and functional equipping of the machine can be found in the standards DIN 10510, DIN 10511, DIN 10512 and DIN 10522, as well as DIN SPEC 10534.

DIN 10510

"Food hygiene – – Commercial dishwashing with multitank transport dishwashers – Hygiene requirements, procedure testing "

Range	Temperatures without disinfection components °C	Temperatures with a sufficient quantity of disinfection components in the detergent solution °C
Fresh water pre-cleaning	up to 40	25 to 40
Pre-cleaning pump	40 to 50	40 to 50
Detergent circulation tank	60 to 65	55 to 65
Rinse aid pump	60 to 70	60 to 70
Fresh water rinse	80 to 85	80 to 85

Table 1: DIN 10510

Scientific studies have shown that contact times in multi-tank dishwashers of at least 2 minutes and temperatures as listed above guarantee a thorough removal of food residues and micro-organisms. Shorter contact times and lower temperatures can be compensated for to a certain extent through corresponding selection and adjustment of process chemicals.

DIN 10511

"Food hygiene – Commercial glasswashing with glasswashing machines – Hygiene requirements, testing"

For hygiene reasons, the temperature in the detergent tank must be at least 55 °C. As the durability and usability of a drinking glass is influenced considerably by the temperature, the temperature of the detergent solution should not significantly exceed 60 °C. The temperature of the rinse aid solution should be 65 °C ± 2 °C.

Contact times of 90 seconds are regarded as ideal conditions for achieving hygienic washing results.

In special circumstances, e.g., increased risk of infection, higher temperatures and / or the use of disinfectant components in glasswashers must be recommended.

DIN 10512

"Food hygiene – Commercial dishwashing with one-tank dishwashers – Hygienic requirements, type testing "

	Temperatures without disinfectant and / or oxidation components in the alkaline detergent solution	**Temperatures with sufficient disinfection and / or oxidation components in the alkaline detergent solution**
Range	**°C**	**°C**
Detergent circulation tank	60 to 65	55 to 65
Fresh water rinse	80 to 85	80 to 85

Table 2: DIN 10512

Contact times of 90 seconds are regarded as ideal conditions for achieving hygienic cleaning results.

DIN 10522

"Food hygiene – Commercial cleaning of reusable boxes and reusable containers for unpackaged foodstuffs –
Hygiene requirements, testing"

Range	Temperatures* without disinfectant and / or oxidation components in the alkaline detergent solution °C	
Detergent tank	60 to 65	Detergent tank
Fresh water rinse	80 to 85	Boiler

Table 3: DIN 10522

* For chemical disinfection, there is no specific temperature for the detergent and rinse aid solution

Due to the various fields of application and varying hygienic requirements for wash items, no universally applicable contact times can be defined for these types of dishwashers.

DIN SPEC 10534

"Food hygiene – Commercial dishwashing –

Hygiene requirements, testing".

Range	Temperatures without disinfection components °C	Measurement point
Fresh water pre-cleaning	25 to 40	At nozzle outlet
Pre-cleaning pump	40 to 50	Pre-cleaning tank
Detergent circulation tank	60 to 65	Detergent tank
Rinse aid pump	60 to 70	Rinse aid tank
Fresh water rinse	80 to 85	Boiler

Table 4: DIN SPEC 10534

DIN specifies that exceeding these temperatures is permitted provided the hygienic requirements specified are met.

The use of special process chemicals and procedures is sometimes necessary.

Exceeding the stipulated maximum temperature is tolerated.

For glasswashers, the tank water temperature of 60 °C and the rinse aid temperature of 65 °C should not be considerably exceeded.

5. Requirements for the wash item

The term “wash item” refers to dishes, cutlery, trays, containers for transporting unpackaged foodstuffs and items that are used in food preparation and distribution.

These items can be made of different materials, but all must be suitable for commercial automatic dishwashing.

See *Compendium of practice for Commercial Dishwashing:*

Section 07 "Porcelain wash items"

Section 08 “Metal wash items“

Section 09 "Glass wash items"

Section 10 “Plastic wash items"

In particular, for hygiene reasons, damaged wash items must be replaced regularly; this applies, in particular, to glasses and cups with damaged rims.

Dimensionally stable and temperature-resistant plastic items are suitable as long as the surface of these is smooth, free of hairline cracks and visible signs of use. Damaged parts should be replaced regularly.

Cutlery and cooking utensils are made primarily from high-quality stainless steel. If visible damage such as heat cracks or pitting (e.g. on knife blades) occurs, the corresponding parts must be replaced.

An important aspect to consider for flawless cleaning results is not only the material of the wash item, but also the shape.

The wash item must be shaped in such a way that the entire surface can be reached. Therefore, items with deep indentations, e.g., in bowls and cups must be avoided when choosing tableware items. Any water remaining must be able to run-off easily.

6. Requirements for cleaning products

The choice of cleaning products and the concentrations of these largely depends on the contamination, dry-on level, type of item to be cleaned, dishwasher, contact time available and water quality.

The detergent must be able to remove contamination, disperse itself in the detergent solution and prevent deposit formation. Detergent components can set the water hardness, prevent excessive foam generation, have an anti-corrosive effect and support the disinfection action.

The process and drying behaviour of the cleaned wash item is determined by the rinse aid and the surface quality of the wash item.

The dose of detergent, rinse aid and disinfectant (where necessary) according to each individual case are important prerequisites for cleanliness and the hygienic condition of the wash item (see *Compendium of practice for Commercial Dishwashing, Section 06 "Process chemicals" and Section 04 "Dosing technology"*).

7. Tasks of the operator

The operator is responsible for the entire cleaning result and must ensure the following:

General cleanliness must be maintained in the entire wash area (clean and unclean sides).

The staff working in the wash area work in food preparation and must therefore observe the applicable food and hygiene regulations (see Regulations (EC) No 178/2002 and Regulations (EC) No 852/2004). Therefore, an understanding of cleanliness and hygiene must be conveyed in regular training sessions (in accordance with Regulations (EC) No 852/2004, Section XII and DIN 10514 – Food Hygiene – Hygiene Training Sessions).

The following points must be observed to achieve a flawless cleaning result:

The wash items should be cleaned as soon as possible after use. Long dry-on times must be avoided. A good pre-cleaning is absolutely necessary. Where possible, load pre-sorted wash items into the machine. Pre-soak cutlery if possible. Cleaned wash items may only be stored dry.

Manual drying should only be performed in exceptional cases and only with disposable cloths / wipes.

8. Necessary checks before and during operation of the dish-washer

All **nozzles** must be free of foreign bodies (toothpicks, etc.).

All **drains** must be closed tight and free of foreign bodies.

The **strainer and filter** must be kept clean and designed / mounted in the intended place.

Spraying curtains are subject to heavy wear and can only fulfil their purpose if they are mounted at the correct place and are still in a usable condition. As wear parts, they must be replaced from time to time. The operating temperature of the detergent solution and the rinse aid solution, as well as the necessary detergent concentrations must be reached before the cleaning process can begin. The necessary temperatures and detergent concentrations must be maintained during the entire cleaning process. The correct wash programme (conveyor speed or programme type) must be configured. It must be checked whether sufficient detergent, rinse aid and disinfection components, if necessary, are available in the reservoirs. The perfect function of the **dosing units** must be checked regularly. In the case of heavy contamination, the **detergent solution** must be changed during the wash time. The visual cleanliness of the wash item must be checked continuously.

9. Necessary tasks following the end of operating time

The machine must be thoroughly cleaned after the end of each operation. This includes emptying the tanks and thoroughly cleaning the inside, the strainer system, the inlet and outlet areas, the partition screens and the spraying system, according to the instructions of the machine manufacturer. The area around the machine must also be cleaned thoroughly, the wash area must be aired, and the machine must be left open.

10. Need for a thorough cleaning of the dishwasher and wash items

If there are visible deposits inside the machine and / or on the wash item, the machine and wash item must be thoroughly cleaned immediately. The causes of deposits must be ascertained and rectified accordingly. The suitable treatment agent for the basic cleaning is selected based on the type of deposit and material of the wash item.

Deposits constitute a hygiene risk because microorganisms can collect and multiply in the deposits in the machine and on the wash item!

11. Regular maintenance and functional checks of the machine

The operational and functional safety of the commercial dishwasher must be guaranteed through permanent functional checks and regular maintenance according to the machine manufacturer.

Corresponding maintenance contracts are advisable.

If faults are detected that cannot be rectified by the operator, a service must be requested immediately.

12. Checking the hygienic status of wash items and the cleaning process

Visual inspection

Visible cleanliness is a prerequisite for the hygienically flawless condition of the wash item. Drops remaining on the point of contact and residual moisture inside hollow parts can be tolerated. Sufficient time must be allowed for drying the wash item.

Microbiological testing

The performance of microbiological tests is described in the standards.

A targeted microbiological test of wash item surfaces can be performed using contact slides. This test allows conclusions to be drawn regarding the general hygienic condition of the wash item.

The findings should not exceed 5 CFU/10 cm^2 (CFU = Colony Forming Units). If this number is exceeded, a questionable hygienic condition must be assumed. A thorough investigation of all parameters is then inevitable.

In addition to the contact slides, a colony count should be performed in the detergent solution of the last wash tank.

200 CFU/ml is the standard value and 500 CFU/ml is the warning value.

For multi-tank dishwashers in the risk zone, an additional test should be performed with open bio-indicators. An unscheduled inspection must be performed following conversions or alterations to the machine.

Any transgression of standard and warning values, as well as an insufficient reduction of test organisms of bio-indicators indicate defective functioning, or insufficient capacity of the dishwasher.

Deviating requirements exist for reusable boxes and reusable containers (see DIN 10522).

Non-standard hygienic inspections of commercial dishwashers, e.g., with closed germ carriers, are not suitable as they do not include the highly significant mechanical removal of germs and merely rely on the active content of disinfectant, contact time and temperature.

Overview of test types:

DIN 10510* – *Multi-tank transport dishwashers

- Procedure test
- Test after installation
- Daily test
- Periodic test
- Extraordinary test.

DIN 10511* – *Glasswashers

- Type test
- Daily routine test
- Procedure test in practical operation.

DIN 10512* – *One-tank dishwashers

- Type test
- Daily routine test
- Procedure test in practical operation.

DIN 10522* – *Dishwashers for reusable containers

- Type test
- Acceptance test after installation
- Routine test in ongoing operation.

DIN SPEC 10534* – *Commercial dishwashing

Includes all test types for various machine types

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.

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