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Commercial dishwashing machines - Hygiene requirement and testing

Gewerbliche Spülmaschinen - Hygieneanforderungen und Prüfung

Lave-vaisselles industriels - Exigences hygiéniques - essai

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Commercial dishwashing machines - Hygiene requirement and testing

Lave-vaisselles industriels - Exigences hygiéniques,
essai

Gewerbliche Spülmaschinen - Hygieneanforderungen
und Prüfung

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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European foreword

This document (prEN 17735:2021) has been prepared by Technical Committee CEN/TC 429 “Food hygiene — Commercial warewashing machines — Hygiene requirements and testing”, the secretariat of which is held by DIN.

This document is currently submitted to the CEN Enquiry.

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prEN 17735:2021 (E)**1 Scope**

This document specifies hygiene requirements relating to the operation of commercial dishwashing machines (hereinafter referred to as dishwashing machines). It specifies requirements for hygienic results of the articles treated in the dishwashing machines. This includes also guidelines for their hygienic and proper operation and for care and maintenance of the machinery. Furthermore, methods for testing hygienic operation are defined.

Dishwashing machines are used in a professional environment for cleaning washware that is used in contact with food.

This document applies to dishwashing machines for cleaning washware that is used in contact with food, such as crockery, glassware, cutlery, reusable boxes and similar articles.

Dishwashing machines (see 3.3) are used in kitchens e.g. in restaurants, canteens and hospitals and in commercial enterprises such as bakeries, butcher's shops, etc.

This document does not apply to domestic dishwashing machines, washer disinfectors for the treatment of medical devices and machines for industrial use (e.g. machines for cleaning proofing trays, returnable bottles, equipment of other machines like mincer, slicer, cutter, dough dividers or kneader, mixers, stirrers and all other kind of machines from which parts could be cleaned by washing out of place (WOP)).

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 10088-3, *Stainless steels - Part 3: Technical delivery conditions for semi-finished products, bars, rods, wire, sections and bright products of corrosion resisting steels for general purposes*

EN IEC 63136, *Electric dishwashers for commercial use - Test methods for measuring the performance*

EN ISO 18593, *Microbiology of the food chain - Horizontal methods for surface sampling (ISO 18593)*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

3.1**washware**

materials and utensils that come into contact with foodstuffs and re-usable crates/containers which are cleaned in a dishwashing machine

Note 1 to entry: Examples of washware are crockery, plates, cutlery, kitchen equipment, glasses, pots, containers, crates and trays made of materials such as porcelain, plastic, glass, stainless steel and silver as well as coated materials.

3.2**re-usable crates/containerstext of the definition**

washware that is used for the storage and transport of unpackaged easily perishable foods used in a professional environment

3.3**washware carrier**

device for holding and/or supporting the washware in an optimum position during the cleaning

Note 1 to entry: The washware carrier can be e.g. racks, conveyor belts, cutlery trays.

3.4**dishwashing machine**

electric dishwashing machine that is specially designed for use in professional environments and that cleans and rinses plates, glasses, cutlery, and, in some cases, cooking utensils by chemical, mechanical and thermal means

3.4.1**single-tank dishwashing machine**

dishwashing machine with one detergent-circulating zone and a fresh water rinse either with a separate fluid and nozzle system or as water-replacement machine

Note 1 to entry: The washware is cleaned using a detergent solution that is regenerated. The technical equipment is geared to the performance that is required in the specific application. A distinction is made between the following machine designs: manually-loaded batch dishwashing machine for one or two racks, flight-type dishwashing machine and rack conveyor dishwashing machine.

3.4.1.1**batch dishwashing machine**

dishwashing machine, in which the rack is inserted into the machine manually and in which the rack loaded with washware stays during the complete cycle in the same treatment zone

3.4.1.2**single-tank flight-type dishwashing machine**

single-tank dishwashing machine in which the washware is conveyed through the machine automatically on an endless conveyor

3.4.1.3**single-tank rack conveyor dishwashing machine**

single-tank dishwashing machine in which the racks loaded with washware are conveyed through the machine automatically by a rack transporting system

3.4.1.4**granule dishwashing machine**

single-tank dishwashing machine in which granules are used as a treating agent

3.4.1.5**water-replacement machine**

single-tank dishwashing machine in which fresh water is used in each cleaning or rinsing phase and in which the fresh water rinse is not implemented via a separate nozzle system

prEN 17735:2021 (E)**3.4.2****multi-tank conveyor-type dishwashing machine**

dishwashing machine comprising of more than one tank including various zones

Note 1 to entry: Zones are for example prewash zone, detergent circulating zone and fresh water rinsing zone.

3.4.2.1**multi-tank rack conveyor dishwashing machine**

multi-tank dishwashing machine in which the racks loaded with washware are conveyed through the machine automatically by a rack transporting system

3.4.2.2**multi-tank flight-type dishwashing machine**

multi-tank dishwashing machine in which the washware is conveyed through the machine automatically on an endless conveyor

3.4.3**glasswashing machine**

dishwashing machine with one or more tanks including various zones for the treatment of glasses

3.5**treating agent**

product used to clean and/or sanitize and / or rinse and / or descale washware in dishwashing machines

3.5.1**detergent**

chemical product used to remove soiling from washware and which counteracts recontamination by material in the detergent solution

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Note 1 to entry: Additionally, a detergent can support the sanitization performance.

3.5.2**detergent solution**

water mixed with detergent, which is used in the detergent circulating zone

3.5.3**rinse aid**

chemical agent added to the water in the final rinsing operation which decreases the interfacial tension of the rinse aid solution

Note 1 to entry: It improves the drying effect and reduces watermarks.

3.5.4**rinse aid solution**

fresh water is mixed with rinse aid used for fresh water rinsing

3.5.5**soaking agent**

special detergent used in pre-soaking tanks outside the dishwashing machine in order to remove e.g. stubborn soiling from washware

3.5.6

descaling agent

chemical product based on various acids and/or acid salts, which is used to remove lime-scale and/or mixed lime and/or calcium and/or magnesium phosphate deposits in the dishwashing machine and on the washware

3.5.7

granules

special particles, e.g. of plastic, which are added to the detergent solution in order to assist the mechanical cleaning effect

3.6

fresh water

untreated or treated water which, from the microbiological point of view, is of drinking water quality, contains no substances that are harmful to health, and is used to supply the dishwashing machine

3.7

treated water

water which has been subjected to a treatment process to modify its ingredients

Note 1 to entry: A distinction is made between processes for softening the water and processes for reducing the overall salt content.

3.7.1

softened water

water from which the hardness ions/minerals have been removed by cation exchange processes in a water softening plant without any reduction in the overall salt content

Note 1 to entry: The precipitation of water-insoluble salts is prevented.

3.7.2

demineralized water

water from which the salt content has been removed

Note 1 to entry: For example, by ion exchange or reverse osmosis processes.

3.8

pre-cleaning

removal of loose scraps and food residues from the washware and emptying of hollow vessels

Note 1 to entry: Pre-cleaning is normally carried out by wiping off the residues into waste containers and - if possible - by rinsing the washware with warm water (max. 35 °C). Pre-cleaning reduces the amount of soiling entering the dishwashing machine.

3.9

detergent circulation

process during which the detergent solution, which is kept heated to the nominal temperature, is circulated and sprayed onto the surface of the washware for removal of soil

3.10

auxiliary rinsing

circulation rinsing connected upstream to fresh water rinsing, in which no detergent is dosed

prEN 17735:2021 (E)**3.11****fresh water rinsing**

process after detergent circulation, during which the washware is sprayed with rinse aid solution in order to remove residues of detergent solution, dissolved and undissolved soil particles

3.12**drying**

process during which the moisture drips or evaporates from the surface of the washware

3.13**cleaning process**

process including at least one detergent circulation process and one fresh-water rinsing process

Note 1 to entry: In conveyor-type dishwashing machines, the cleaning process starts when the washware enters the dishwashing machine and ends when it leaves the dishwashing machine.

3.14**sanitisation**

chemical and/or physical process that reduces microorganisms to a level which is neither harmful to health nor impairs the quality of foodstuffs

3.15**re-contamination**

re-soiling of washware between the end of the warewashing process and preparation for further use, which impairs the washing results

3.16**contact time**

time during which the detergent solution impacts the washware

Note 1 to entry: For conveyor-type machines the contact time commences from the center of first prewash nozzle and extends until the centre of the first fresh water rinse nozzle. For batch type dishwashing machines the contact time commences upon start of the wash step until start of the fresh water rinse step.

3.17**operating time**

period during which the dishwashing machine is operational

3.18**spray system**

sum of all pipelines, jets and spray pipes required to circulate and spray detergent and rinse aid solutions

3.19**interior**

all parts of the dishwashing machine which come into contact during the washing process with detergent solution and rinse aid solution and/or the washware as intended

3.20**exterior**

all parts of the dishwashing machine which do not come into contact with detergent solution and rinse aid solution (e.g. pedestals, adjustable feet, handles, casing) during the washing process but which are accessible from outside

3.21**dirty side**

area in which the soiled washware is received, pre-sorted, pre-cleaned and the dishwashing machine is loaded

3.22**clean side**

area of the washware cycle in which the clean washware is unloaded from the dishwashing machine and prepared and stored for further use

3.23**bioindicator**

standardized test object which has been contaminated with a standardised soil and test bacteria and is used for checking the sanitization performance of dishwashing machines

Note 1 to entry: Examples are stainless steel bioindicators.

3.24**operating company**

company who actually uses the appliance to clean washware within its own activity

Note 1 to entry: Examples are restaurants or canteens.

3.25**hygiene**

condition of the washware which is neither harmful to health nor impairs the quality of foodstuffs

3.26**programme**

series of operations that are pre-defined within the dishwashing machine and that are declared by the manufacturer as suitable for cleaning certain washware

3.27**cycle**

complete cleaning process, as defined by the programme selected, consisting of a series of operations (washing, rinsing, drying, etc.) and including any operations that occur after the completion of the programme

4 Requirements**4.1 Process requirements****4.1.1 General**

Each cleaning process as well as the resultant cleanliness and the hygienic condition of the washware are determined by the interaction of several main factors:

- temperature of all process steps;
- contact time;
- dosing of treating agents;
- mechanics;

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- design and interior shape;
- rinsing;
- drying.

The operating company shall be responsible for ensuring that the following parameters are effectively taken into account and controlled since they significantly affect the resulting cleanliness and hygiene of the washware:

- type and quantity of the introduced soil and length of time for which it has been allowed to dry on the washware;
- shape, surface characteristics, design, degree of soiling and quantity of the washware;
- shape of the washware carrier and its loading;
- pre-cleaning;
- temperature;
- contact time;
- mechanics;
- rinsing;
- drying;
- water quality and volume;
- treating agents.

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4.1.2 Requirements for obtaining hygienic washing results

General requirements are:

- a) The washware shall be visually clean under practical conditions at the customers' side.
- b) The washware shall be dry upon removal from the washware carriers, with remaining droplets on the supporting points and residual moisture in the interior of hollow articles being tolerated.
- c) The machine shall achieve a level of hygienic performance in accordance with the requirements as specified in Table 1.
- d) Treating agents used in the cleaning process shall be removed from the washware to a level that is not harmful to health.

**Table 1 — Hygienic Performance
Microbiological requirements**

Type of test	Test object	Criteria	Requirement	Test method
Type test	Bioindicators in the cutlery tray, on test plates	Bacterial reduction	In the cutlery tray: Minimum 7 out of 8 bioindicators shall show a $\geq 5 \log_{10}$ reduction; only 1 out of 8 shall show a $\geq 4 \log_{10}$ reduction. On test plates: Minimum 90 % of the bioindicators shall show a $\geq 5 \log_{10}$ reduction; only 10 % shall show a $\geq 4 \log_{10}$ reduction.	according to A.1.1
	Bioindicators in the test rack	Bacterial reduction	All 10 bioindicators shall show a $\geq 5 \log_{10}$ reduction.	according to A.1.1
Post-installation test	Washware except of re-usable crates/containers made of plastic	Aerobic microorganism count	$\leq 5 \text{ cfu}^a$ per 10 cm^2	Contact plate method according to A.1.2
	Detergent solution	Aerobic microorganism count	$< 500 \text{ cfu/ml}$	according to A.1.3

^a cfu: colony forming units.

4.2 Technical requirements

4.2.1 Requirements relating to construction materials

In terms of hygiene, the materials used shall be serviceable, scratch-proof, ageing-resistant and corrosion-resistant under normal conditions of use. These conditions are:

- in the interior: contact with food remnants, detergents, disinfectants and rinse aids, descaling agent solutions and hot air;
- on the exterior: contact with water, cleaning agents, disinfectants and care products.