

Commercial dishwashing: glossary of terms

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FOREWORD

The idea of drawing up this technical information sheet was initially prompted by the fact that there are in excess of 500 terms from the field of commercial dishwashing, the full range of which is used in practice, depending in part on regional or company-specific preferences. The aim was to identify a readily comprehensible standard set of terms for all the technical information sheets produced by the Working Party, to which everyone involved could subscribe.

The texts, which were written by experts from the machine and dosing equipment industry and manufacturers of water treatment equipment, agents and wash ware, have been thoroughly revised. The authors have endeavoured to present reliable and up-to-date information in a readily comprehensible form.

The experts in the Commercial Dishwashing Working Party, with decades of experience between them, consider that the large number of headwords, unusual for a technical information sheet of this kind, covers precisely the volume of information which users nowadays might expect from a reference work.

However, this does not rule out entirely the possibility that the occasional term which the reader hoped to find may not have been included. Suggestions for amendments are welcome at any time.

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Active chlorine

chlorine compounds which during the warewashing process release "active oxygen" which, by virtue of its oxidizing power, has a disinfecting, bleaching and cleansing-enhancing effect in the *detergent solution* *.

Active oxygen

oxygen compounds which during the warewashing process release "active oxygen" which, by virtue of its oxidizing power, has a disinfecting, bleaching and cleansing-enhancing effect in the *detergent solution*.

Agents

products which are used in commercial warewashing for cleaning, disinfecting, rinsing, soaking and descaling

AHC (adsorbable organic halogen compounds)

are formed when excess chlorine from *active chlorines* reacts with organic soil components.

Alkaline residue

alkaline residue on the *wash ware* can have two causes:

1. Residues of the *detergent solution* on the wash ware which have not been rinsed off by the *fresh water rinse*. They can be detected by determining the *pH value* (*pH value* > 7).
2. Water of higher degrees of hardness may after softening and heating in the boiler also show an alkaline reaction (*pH value* > 7).

A specialist will be needed to clarify which of these two cases applies.

Alkalis

a principal constituent of the *detergent*, e.g. silicates, soda, caustic soda and caustic

potash. They have cleansing-enhancing and/or corrosion-inhibiting properties.

Auxiliary rinse

a circulating rinse arranged upstream of the *fresh water rinse* in pass-through systems.

Backflow preventer for the potable water network

safety precaution which prevents water from being able e.g. to flow back out of the warewasher into the potable water network. It must conform to the valid regulations.

Biodegradability

organic substances such as e.g. *tensides* are used by bacteria as nutrients, with CO₂ (carbon dioxide), H₂O (water) and other mineral end products and biomass ultimately being produced. Processes of this type take place both in sewage treatment plants and in receiving watercourses (e.g. streams and rivers).

The tensides used in detergents and rinse aids meet the statutory degradability requirements.

Blowing zone

optional *drying* zone in which residual water is blown out of recesses.

This relates e.g. to the rims around Gastronorm containers or the bottoms of cups or glasses.

This process step is carried out using either heated or unheated air.

*) all terms printed *in italics* are explained under the corresponding headword.

BOD (biochemical oxygen demand)

the BOD value is a measurement value for the quantity of oxygen consumed by microorganisms for biodegradation and is a measure of the degradable organic substances in the sewage treatment plant.

Booster pump

increases the flow pressure on site to a level necessary for operating the equipment.

Bypass line

in multi-tank machines, a pipeline through which the collected *rinse aid solution* can flow into a front-end tank, e.g. the *prewash zone*, bypassing the *wash tank*.

Carbonate hardness

also called temporary hardness, refers to the presence of calcium and magnesium carbonates in water. Carbonate hardness can adversely affect cleaning results, e.g. through the formation of lime deposits. Most *detergents* therefore contain special *phosphates* or *complexing agents*, which are suitable for preventing lime precipitation.

Central dosing system

the supplying of multiple *commercial warewashers* with *agents* from a single location at which the dosing equipment and supply bins are pooled. There is usually a spatial division between the warewashers and the central dosing system.

Chlorides

are salts such as e.g. cooking salt (sodium chloride) which can damage high-grade steels through *pitting corrosion*. Since the risk of such damage depends on, among other things, the concentration of chlorides, the overall level of chlorides in the water during the warewashing process is critical.

Chromium-molybdenum-steel

chromium-nickel steel stabilized by molybdenum, giving it greater resistance to corrosion.

Chromium-nickel-steel

is the material most frequently used in *commercial warewashers* (cf. in this regard technical information sheets "[Commercial dishwashing & resistance of materials in dishwashers](#)" and "[Commercial dishwashing & wash ware made of metal](#)"). Is also used for manufacturing cutlery.

Chromium-steel

is occasionally used for panels for *commercial warewashers*. Its resistance to corrosion is lower than that of *chromium-nickel steel* (cf. technical information sheet "[Commercial dishwashing & resistance of materials in dishwashers](#)"). Is also used for manufacturing cutlery.

Clean and dirty side

the dirty side comprises the "soiled dishes delivery/acceptance", "manual pre-sorting/*pre-cleaning*" and "loading of the warewasher" areas.

The clean side comprises the "unloading of clean wash ware" and "re-preparation" areas downstream of the hygienic warewashing process.

COD (chemical oxygen demand)

the COD value is a measurement value (measurement basis) for describing the level of the organic soil load in *waste water*.

Commercial warewashers

are warewashers which are specially designed for commercial use. They differ substantially from domestic warewashers. There are a variety of different designs. (See technical information sheet "[Commercial dishwashing & dishwashers](#)").

Commodities

are items which come into contact with foodstuffs.

Complexing agent

complexing agents are chemical substances which deactivate the *hardness minerals* contained in water.

Conductivity control

is a method of control which is used to ensure a desired *detergent concentration*.

Conductivity is proportional to the detergent concentration and is measured in $\mu\text{S}/\text{cm}$ (micro-Siemens/cm).

The conductivity of the *detergent solution* is detected with the aid of a sensor. If the detergent concentration falls below a certain value, the dosing device is activated.

Contact plate method

microbiological assessment method for determining the germ load of hygiene-relevant surfaces. Such methods, e.g. using RODAC plates with an agar culture medium, are suitable for checking smooth surfaces of limited surface roughness.

Contact time

see *Impact time*.

Conveyor belt

a continuous belt, tailored to the *wash ware*, in belt conveying machines, for accommodating, positioning and conveying the wash ware through the warewasher.

Conveyor speed

speed with which the *wash ware* is conveyed by a rack-conveyor or belt-conveyor machine (see *commercial warewashers*), measured in racks/h or m/min.

The conveyor speed can be optionally single-speed or multi-speed or can be steplessly adjustable (see technical information sheet "[Commercial dishwashing & dishwashers](#)").

Cutlery pre-soaking

pre-cleaning of cutlery items in a pre-soaking tank before actual cleaning in the warewasher takes place. This firstly prevents further drying-on of food residues on items of cutlery and secondly pre-softens food residues that have already dried on to cutlery.

If this is done, it can help to counteract corrosion on cutlery. Special soaking agents are available (cf. also in this regard technical

information sheet "[Commercial dishwashing & wash ware made out of metal](#)").

Degree of German hardness (°d)

is the unit of measurement customarily used, particularly in Germany, for the *total hardness of the water*.

Demineralisation unit

works in accordance with the *ion exchanger principle* or the *reverse osmosis method*. This unit helps to remove ions from the untreated water.

Demineralising

Demineralisation unit,
Reverse osmosis

Deposits

on *wash ware* and in the machine consist of e.g. lime, food and/or starch residues, protein and other deposits (see technical information sheet "[Commercial dishwashing & hygiene](#)").

Descaling / descaling agent

removal of lime deposits on surfaces through the use of specially developed products (descaling agents) based on organic and/or inorganic acids.

The manufacturers' directions for use must be adhered to!

Detergent

detergents come in solid and in liquid form. Their purpose is to remove food particles from *wash ware* completely and to counteract any *re-soiling* from the *detergent solution*. (see VGG technical information sheet "[Commercial dishwashing & agents](#)").

Detergent concentration

quantity of *detergent* per litre of water in the *detergent solution*. It is indicated in g/l or ml/l.

Detergent solution

is water enriched with *detergent*. It is located in the *wash tank*.

Direct spraying process

this is a process in which a highly concentrated solution of a special *detergent* is applied to the *wash ware*. A short *impact time* is sufficient for swelling and breaking down deposits, e.g. starch.

Discoloration

blue, brown, violet or rainbow-like discolorations of the surfaces of high-grade steel. Possible causes include ingredients in the water and contact with food or the effects of heat.

These discolorations do not constitute corrosion like *pitting corrosion* or rust, for example, but frequently leave the user feeling worried or at best are perceived as being unattractive.

Dishes

“dishes” is a collective term for containers and vessels which are used for preparing, cooking, arranging and serving food. It includes plates, cups, saucers and bowls made of various materials (*wash ware*).

Disinfection

method for killing off microorganisms to a level that is not harmful to health and does not impair the quality of the foodstuffs.

Disinfection components

are chemical products with a disinfecting effect, which may be contained in the detergent or dosed separately.

Dispersing

even and stable distribution of fine solid particles in a liquid.

In the case of warewashing by machine, an even distribution is achieved through the circulation of water and through the influence of *tensides*, *phosphates* and *complexing agents*. Dispersing is an important prerequisite for achieving fully hygienic warewashing results (see *soil load capacity*).

Dosing

refers, in commercial washing, to the addition of *agents*. A basic distinction is made between manual and automatic dosing.

Dosing equipment

enables the automatic dosing of *agents*. (cf. technical information sheet "[Commercial dishwashing & dosing](#)").

Drying

removal of the *rinse aid solution film* adhering to the *wash ware* by:

- blowing
- draining
- evaporating.

The aim is to achieve a spotless and shining wash ware surface. The drying process is accelerated by the dosing of a *rinse aid* into the rinsing water.

In manually loaded batch warewashers, drying takes place mainly outside the warewasher by virtue of the heat from the wash ware itself.

In rack-conveyor and belt-conveyor machines, the drying process is generally carried out in a separate *drying zone*.

Drying zone

part of a rack-conveyor or belt-conveyor machine in which the *drying* takes place.

Dry-on time

period between use and cleaning of wash ware. Very often, the *wash ware* is preheated before even coming into contact with food or is kept hot together with the food on fairly long transport routes. Firmly dried-on edges can occur especially in the case of food which has been bound or thickened. The frequently used method of heating food directly on the dish is also likely to lead to increased drying-on of food. The longer the dry-on time, the more difficult the cleaning in the warewasher will be.

EC safety data sheet

contains detailed information on the safe handling of hazardous preparations/

mixtures, e.g. *agents*. It is drawn up for the products by the manufacturers.

Empty indicator

acoustic and/or optical alarms which draw attention to the fact that a supply bin for *agents* is empty.

Emulsifying

very fine distribution of oils and fats in aqueous solutions, e.g. in the *detergent solution*.

Emulsifying is an important prerequisite for achieving fully hygienic warewashing results (see *soil load capacity*).

Euronorm tray

serving tray having external dimensions 530 x 370 mm, in conformance with DIN 66075 Part 4.

Evaporation residue

totality of substances contained in water which remain after vaporisation (evaporation) of the water. The higher the proportion of dissolved and undissolved solids in the water, the greater the evaporation residue. The greater the evaporation residue, the more clearly and disturbingly visible dried-on residues on the wash ware will be.

Exhaust air

moist, warm air which can be produced during operation of the ware washer and which is partially discharged.

Exhaust condensation

Exhaust heat recovery.

Exhaust heat recovery

the exhaust air is guided by means of a blower through a heat exchanger (condenser) which is cooled by water or by a coolant and in the process transfers heat to the cooling water or to the coolant. In the process of cooling, the moisture contained in the *exhaust air* condenses on the cold surfaces of the heat exchanger. The air emerging from the heat exchanger is colder and contains less moisture.

The cooling water in the heat exchanger heats up and can be reused e.g. as preheated rinsing water.

The heat exchanger can be part of a *heat pump*.

Exhaust system

sucks the *exhaust air* out of the machine by means of a blower and conducts it away in a selective manner.

Extraneous rust

the term extraneous rust is used where high-grade steel rusts as a result of corrosion-triggering material, e.g. pan scourers or other iron components, being carried into the warewasher.

Extraneous rust can be avoided only by preventing the ingress of e.g. iron particles from the water inflow pipe or via loading.

Fast firing decoration

firing method for decorating *porcelain (china)* dishes.

Final rinse zone

is the zone of a rack or belt conveyor in which the *fresh water rinse* takes place.

Fresh water

fresh water is the water which is supplied to the rinsing system, for example.

Fresh water pre-wash

is a process for removing loose soiling in order to prevent excessively heavy loading of the *detergent solution*. There are two different methods: either in the machine itself or manually by means of spraying devices.

Fresh water rinse

last rinse cycle with *rinse aid solution* before *drying*. This ensure that the *wash ware* is completely free of soil particles and *detergent solution*.

Gastronorm-size

is defined in DIN 66075. It is important that these sizes be taken into account when

dimensioning the *horizontal clearance* and *vertical clearance* of the warewasher.

The most important measurements are:
bowls and plates

standard size 1/1 = 530 x 325 mm

maximum size 2/1 = 650 x 530 mm

minimum size 1/9 = 176 x 108 mm

Gastronorm vessels conforming to this standard can be up to 200 mm deep.

Gastronorm tray

serving tray having external dimensions 530 x 325 mm (GN 1/1), in conformance with DIN 66075 Part 3.

Glass corrosion

irreversible damage to glass surfaces through removal of material, manifesting itself principally in the form of cloudiness. How prone glass is to corrosion is substantially determined by the composition of the glass itself and by the manufacturing process.

Glass damages

are damages to glass items which arise as a result of *glass corrosion*, mechanical influences and/or rapid temperature changes. The placing of glasses inside one another is particularly damaging (cf. technical information sheet "[Commercial dishwashing & glass](#)").

Glass decor

this refers to coloured decorations which are applied using a variety of methods. The method selected determines the durability of the decoration.

Glasswasher

commercial warewasher specially for cleaning glasses (see DIN 10511).

Grease separator

is installed in the drainage system on site in order to keep fats and oils out of the *waste water*.

Hardness minerals

totality of all the calcium and magnesium ions dissolved in water (see *Total hardness*, *Carbonate hardness*, *Non-carbonate hardness*).

Heat capacity

material-specific property of the *wash ware* which determines how readily the wash ware can absorb the heat from the cleaning process. *Porcelain (china)* and metal have a high heat capacity, *dishes* made of plastic a low heat capacity.

The heat capacity plays an important role in determining how complete the *drying* of the wash ware will be.

Heat pump

is a unit which optimises the *heat recovery* processes and thereby reduces the energy demand of the warewasher.

Heat recovery

- *Exhaust heat recovery*
- *Waste water heat recovery*
- *Heat pump*.

High-grade steels

are steels which are alloyed with 12% or more chromium and may also contain nickel, molybdenum and other alloy constituents. The ratio of the individual constituents in the mix influences the corrosion resistance. Other properties such as e.g. hardenability or magnetisability also change.

Horizontal clearance

the usable width of the pass-through opening of the warewasher.

Hot air drying

is a drying zone integrated in the warewasher, in which heated air is used for *drying* the *wash ware*.

Hygiene

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

Impact time

is the period during which the *detergent solution* wets the *wash ware*.

This parameter is defined in DIN standards 10510 to 10512 and 10522.

Inglaze decoration on porcelain (china)

in *fast firing decoration* or sharp-fire decoration, the colours are applied to the fired and unfired glaze so that during subsequent firing at high temperatures they can sink into the glaze and fuse with it.

Inglaze and sharp-fire decorations have high durability.

Interfacial tension

interaction which occurs when two media, e.g. *rinse aid solution* and *wash ware* come into contact. The lower the interfacial tension with the rinse aid solution, the better the surface of the wash ware is wetted and the formation of drops is prevented (*wetting*).

Ion exchanger principle

according to this principle, ions in the water which impede the warewashing process and are therefore unwanted are exchanged for different ions (*total hardness*).

This is done with the aid of special ion-exchange resins.

Jet protected

is the term used to describe a device which fulfils the requirements of the test defined in EN 60529 for protection class IPX5.

Even if a warewasher is "jet protected", it must not be sprayed externally with a water jet or high-pressure cleaner.

Machine performance

is a theoretical ratio which helps in the comparison of warewashers. It is determined on the basis of standard plates and specified in plates per hour. Loading and unloading times are always excluded.

In belt-conveyor machines, it is calculated as the product of the loaded capacity of a specified length of the conveyor belt and the respective conveyor-belt speed.

In rack-conveyor machines, the number of standard dishes which can be washed in one rack is multiplied by the machine's theoretically possible rack throughput.

In manually loaded batch warewashers, machine performance is determined by multiplying the number of standard plates which can be washed in a rack by the theoretically possible number of program runs per hour.

Maintenance

regular maintenance measures by specialist personnel authorised by the manufacturer, e.g. by the manufacturer's customer service. It is recommended that maintenance contracts be concluded for warewashers.

Manual washing-up liquid

manual washing-up liquids are *agents* for use in the manual cleaning of *wash ware* and usually contain high-foaming wash-active substances (*tensides*). Even very small residues generate a lot of foam in warewashers and adversely affect wash results and are therefore not suitable for use in the *commercial warewasher* environment.

Monobloc knife

handle and blade forged from one piece. These are chiefly manufactured from 13%-chromium steels containing differing amounts of carbon (up to 0.40 %) (cf. technical information sheet "[Commercial dishwashing and wash ware made of metal](#)").

Non-carbonate hardness

also referred to as residual or permanent hardness.

Non-carbonate hardness comprises the salts of calcium and/or magnesium which do not form water-insoluble deposits (e.g. lime) when the water is heated.

Onglaze decoration on porcelain (china)

here, the colours are applied to the fired glaze and then melted on to the glaze in a subsequent firing.

Since in the case of onglaze decoration the colour pigments are located on the glaze, onglaze decoration is more delicate than *inglaze decoration* or *underglaze decoration*. Porcelain (china) with onglaze decorations is now a rarity in the hotel and catering sector.

Opal glass

opal glass or opal-glass dishes consist/s entirely of glass mass which is hardened using a special production technique and as a consequence is made two to three times more mechanically resistant than normal glass dishes.

(cf. technical information sheet "[Commercial dishwashing & wash ware made of opal glass](#)").

Operating journal

documentation or book in which all the operating and hygiene-relevant data for the warewasher are recorded, in accordance with DIN 10510.

Overflow

by means of this arrangement, used process water flows while the machine is running into the *waste water* drain.

Partial demineralisation

water treatment method for reducing the *total mineral content* through the partial removal of hardness-causing calcium and magnesium ions in accordance with the *ion exchanger principle*.

Permanent hardness

Non-carbonate hardness.

Phosphates

phosphates are highly active formulation components in washing and cleaning agents. They are characterised in that they exhibit *water-hardness-binding* and soil-carrying properties (see technical information sheet "[Commercial dishwashing & the environment](#)").

pH value

measure of the acidic or alkaline effect e.g. of a *detergent*. pH values are specified on a scale between 0 and 14, neutral water having a pH value of 7. Liquids with a pH value less than 7 are acids and those with a pH value greater than 7 are alkaline solutions.

Physical "watersoftener"

devices for physical water softening which are based on the principle of magnetism or electromagnetic radiation or similar, are unsuitable for commercial warewashing as the chemical composition of the water is not changed.

Pitting corrosion

annular penetrating form of corrosion (rust) occurring primarily in *high-grade steel*. Pitting corrosion is predominantly triggered by *chlorides*, which alter the surface structure of the material. Chlorides can be carried into the machine by water, food particles or by transferred *regeneration salt*. Pitting corrosion can occur both on the body of the machine and on parts of *wash ware* made of high-grade steel, e.g. cutlery (see also *extraneous rust*).

Porcelain (china)

is a glazed, ceramic material from which *dishes* are manufactured. It is characterized in particular in exhibiting a high density and low water absorption ($\leq 0.5\%$). (cf. technical information sheet "[Commercial dishwashing & wash ware made of porcelain \(china\)](#)").

ppm (parts per million)

parts per million

1 ppm equals 0.0001 % and 1000 ppm equals 0.1 %.

Pre-cleaning

before the *wash ware* is fed into the warewasher, it generally has to a greater or lesser extent food particles, serviettes, toothpicks, etc. adhering to it. This soiling must not be introduced into the wash tank

as the *detergent solution* will otherwise be too heavily soiled.

Pre-cleaning can be effected by:

- wiping off or pouring out the soiling,
- rinsing off the wash ware.

Pre-dosage

is the addition of *detergent* during the filling process before the wash starts.

Pre-dosage ensures that the required *detergent concentration* will be in place ready for the start of the warewashing process.

Pressure regulator

limits the flow pressure of the water being supplied on site so that it does not exceed a maximum permissible value.

Prewash zone

first circulating tank in multi-tank systems, in which the *wash ware* is freed of coarse food particles with *detergent solution*. This zone has no *detergent* dosed directly into it, and the rinsing temperature is lower than in the *wash tanks*.

Prewash zones are generally fitted with extensive filter systems.

The *overflow* is usually located in the prewash zone.

Recontamination

recontamination of hygienically fully washed *wash ware* prior to use.

Regeneration (of *detergent solution* by addition of *fresh water*)

this takes place during the warewashing process through the inflow of water principally from the *fresh water rinse*.

Too small a quantity of *regeneration water* adversely affects the warewashing result.

Regeneration salt

special highly pure sodium chloride for *regeneration* of the ion-exchange resin. In contrast to normal cooking salt, regeneration salt contains no additives such as e.g. free-flow agents, as these lead to blocking of the

ion-exchange resin and consequently to its failure.

The grain size specified by the manufacturer must be used.

Regeneration (the ion-exchange unit)

each ion-exchange unit has a certain capacity that is dependent on the *water hardness*. Thereafter, the ion-exchange resin will be exhausted. Regeneration of the unit is required through the addition of special regeneration salt.

Regeneration water

see *Regeneration*.

Re-soiling (during the warewashing process)

occurs when food particles that have been removed recontaminate *wash ware* which has already been cleaned. The causes of re-soiling are:

- incorrectly used washing systems,
- insufficient *pre-cleaning*;
- under-dosage of or incorrect *detergent*,
- too small an amount of *regeneration water* from the *fresh water rinse*;
- foam formation;

(cf. technical information sheet "[Commercial dishwashing & hygiene](#)").

Reverse osmosis

special method for demineralising (see *demineralisation unit*) water, the mineral-containing water being forced at high pressure through a membrane.

With this filtration, only the demineralised water can pass through the membrane.

Rinse aid

is added to *fresh water* and has the function of achieving optimal *wetting* of the *wash ware* being cleaned (*rinse aid solution film*) by lowering the *interfacial tension*.

Rinse aid solution

fresh water which has *rinse aid* added and which is used in the *fresh water rinse*.

Manufacturers' directions for use must be adhered to!

Rinse aid solution film

as closed as possible a film of *rinse aid solution* on the surface of the cleaned *wash ware* as a precondition for optimum draining behaviour and drying results.

Scaling

lime *deposits* in the machine and/or on the *wash ware*.

Silver

is a precious metal which is used for manufacturing tableware and cutlery. Discolorations occur which are caused by food residues and certain chemicals.

Single point connection

joining of all supply and waste lines at central points so that only one connection is required in each case.

Soaking agent

special *detergent* which is used outside the machine in presoaking tanks. Different detergents are used depending on the case that applies.

Softening

removal of *hardness minerals* from the water. The *ion exchanger principle* is applied here.

Soil load capacity

capacity of a *detergent solution* to *disperse* or to *emulsify* food particles such that they cannot be re-deposited on *wash ware* surfaces which have already been cleaned.

Soil load of the *detergent solution*

totality of all soil components and easily soluble and difficult-to-dissolve, emulsifiable and dispersible contaminants in the *detergent solution*.

The soil load influences the cleaning result as well as foam formation.

Soil strainers

see *Strainer systems*.

Splash curtain

curtains which in conveying machines shield the pass-through openings (*clearance height*) above the *conveyor belt* or the rack-conveying device at the inflow and outflow as well as between the individual wash tanks and rinse zones. The splash curtains are designed to prevent both *washing liquid transfer* between the individual tanks and zones and the discharge of *exhaust air*.

Splash water protected

is the term used to describe a device which fulfils the requirements of the test defined in EN 60529 for protection class IPX4.

However, even machines in protection class IPX4 must not be sprayed externally either with a water hose or with a high-pressure cleaner.

Spray shadow

spray shadows are areas of the *wash ware* surface which are not acted upon directly or at all by the *detergent solution* and/or the *rinse aid solution*.

Spray system

the spray system is the totality of all the pipelines, nozzles and jet pipes. A differentiation is made between rigid, rotating and pivoting systems.

Starch buildup

is a type of soiling which can arise if food containing starch (e.g. sauces, mashed potato, etc.) is served on preheated plates.

If the *contact time* between *detergent solution* and soiled wash ware is too short and/or the temperature of the detergent solution is too low and/or the *detergent concentration* is too low, the warewasher will not be able to remove the soiling and a cumulative buildup will occur.

Starch soiling can be rendered visible with the aid of an iodine solution.

Strainer systems, strainer pans, strainer baskets

capture coarse food particles in order that the latter do not pass into the wash cycle

and load the *detergent solution* more than necessary.

Streaks and striae

on *wash ware* can have a variety of different causes:

- incorrect dosing of *agents*;
- defective, incorrectly hung or completely absent *spray curtains*;
- *washing liquid transfer*;
- turbulence of the *detergent solution* in the *fresh water rinse*;
- subsequent dripping of condensation water into the drying zone. The irregularities described above become all the more clearly visible, the higher the *total mineral content* of the water concerned.

Stripping

occasional or, if necessary, initial process of cleaning the *wash ware* and the warewasher using suitable *agents*. Deposits, e.g. of starch, protein or lime, which have built up are removed.

The relevant directions for use from the manufacturer of the agent must be adhered to!

Tempered glass

see *Opal glass*.

Tensides

are wash-active substances which aid cleaning as well as rinsing and *drying*.

Titration

analytical method e.g. for determining the *detergent concentration*.

Total connection value

is the maximum electric power to be provided and fuse-protected for electrical equipment, e.g. *commercial warewashers*. The total connection value is not to be confused with a consumption rating.

Total hardness

is composed of *carbonate hardness* and *non-carbonate hardness* and in practice is usually specified in *degrees of German*

hardness (°d). (cf. in this regard technical information sheet "[Commercial dishwashing & water](#)").

Total mineral content

sum total of all salts dissolved in the water (*evaporation residue*).

Underglaze decoration on porcelain (china)

here, colours are applied directly to the fired body and covered by the glaze.

Vertical clearance

the usable height of the pass-through opening of the warewasher.

Washing liquid transfer

is the unwanted transfer of *detergent solution* across zone boundaries, in particular in the direction of the *fresh water rinse*. This impairs the overall warewashing process.

Wash tank (Reinigertank)

zone or tank in which the removal of food particles is effected through circulation of the *detergent solution*. (see technical information sheet "[Commercial dishwashing & dishwashers](#)").

Wash ware

wash ware constitutes all components which are cleaned in the warewasher. Their shape and material must be suitable for cleaning by machine.

Waste water

is the water which drains off during and after the warewashing process. It is loaded with *agents* and food particles.

Waste water heat recovery

heat is removed from the waste water by means of a heat exchanger and used e.g. to heat up the cold inflowing water.

Water hardness (total hardness)

the total quantity of *hardness minerals* contained in the water. It is made up of

calcium and magnesium ions. It is measured in mmol alkaline earths (calcium/magnesium) /l. In practice, hardness is measured in *degrees of German hardness (°d)*. Water hardness is the cause of lime deposits.

Water quality (ingredients)

different types and quantities of salts and gases (especially carbon dioxide = “carbonic acid”) are dissolved in *fresh water*.

A differentiation is made, depending on the quantity of calcium and magnesium salts dissolved, between soft, medium and hard water (*water hardness*). In addition, water also contains other ingredients.

The water quality prevailing in each case can be requested from the water supplier.

Water saving systems

are control mechanisms in belt-conveyor and rack-conveyor machines which minimise fresh water consumption by interrupting the *fresh water rinse* if no further *wash ware* is located inside the running warewashing system in the fresh water rinse zone.

Water treatment

method for improving the *water quality* through appropriate measures such as *softening*, *partially demineralising* or *demineralising* the water. This can prevent negative impacts on the washing result.

Wettability

see *Wetting*.

Wetting

tendency of liquids to spread out with varying degrees of evenness on different material surfaces. Optimal wetting is achieved when the water drains evenly from the surface of the cleaned *wash ware* as a closed film.

The greater the *interfacial tension* between liquid and solid surface, the more limited the wetting. When *rinse aid* is added to the rinsing water, the surface-active *tensides* reduce interfacial tension, and wetting is improved.

Technical advice provided by the member firms of the VGG

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 warewashing cannot be carried out successfully if it is approached superficially and without the appropriate involvement of all those participating in the warewashing process.

Only an understanding of the technical processes and of the interdependencies that these entail, teamwork on the part of all those involved, in particular the operator of the warewasher and his/her personnel, and regular maintenance of the warewasher, dosing equipment and water treatment system by the manufacturer will produce the washing results expected by the user.

Consistent cooperation between warewasher, 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 the customers they share and of the environment.

Enquiries regarding this technical information sheet “Commercial dishwashing – glossary of terms” should be addressed to

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