



Compendium of practice for Commercial Dishwashing

Section 07

Porcelain wash items



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1. Manufacture and properties of porcelain

Porcelain is a ceramic material. Kaolins to which quartz and feldspar have been added are subjected to biscuit firing at temperatures of approx. 900 °C, then glazed and “high-fired” at temperatures ranging from 1,350 °C to 1,450 °C. Unlike earthenware (pottery) and stoneware, which are both porous, non-translucent and coloured ware, porcelain is transparent when held in the light and has a clear sound. Porcelain is manufactured mostly in white. However, by using pigments, the ware can now be manufactured in almost all tones.

Thanks to its hardness, porcelain guarantees both a dense and hygienic surface, as well as high chemical and mechanical resistance, which contribute to a long service life. Porcelain also has excellent wetting properties and a high heat storage capacity.

There are undecorated and decorated porcelain. Generally, there are three different types of decoration. Underglaze decoration is protected by the glaze. Inglaze decoration is applied on white dishes. At firing temperatures between 1,150 °C and 1,280 °C, the colours sink into glaze that undergoes a process of remelting. The colour pigments of the decoration fuse with the glazed coating and are therefore better protected, but not always completely embedded. This type of decoration is frequently referred to as sink-in or fast-firing colours. Porcelain with inglaze decoration, as well as underglaze colours are dishwasher-proof. Despite stable colour palettes and careful processing, onglaze decoration cannot be compared with inglaze and underglaze decoration in terms of its ability to withstand the rigours of the commercial sector.

With hand-painted porcelain and precious metal decoration, adjusting the colours to the conditions of machine cleaning is more difficult, but is possible nowadays even for inglaze gold decoration. If the manufacturer has declared gold decoration as dishwasher-proof for the commercial sector, there is nothing to prevent its use.

Despite a dishwasher-proof rating, the surfaces of decorated porcelain can exhibit slight discolourations and loss in shine with increased use. Sometimes, slight changes become visible on the surface of the wash item, which have no bearing on dishwasher-resistance. In principle, the requirements for the dishwasher-resistance of wash items are governed in a separate test standard.



2. Porcelain wash items

The aforementioned porcelain properties facilitate mechanical dishwashing. Food residue can be easily removed from the smooth surface of the porcelain. Neither water nor food residues can penetrate the dense, non-porous surface. This is particularly important for hygiene.

The high heat storage capacity combined with the rinse aid solution ensures good drying, which is further facilitated by the good wetting properties of the porcelain.

Porcelain has a long service life, but in principle, careful handling of porcelain is recommended. If, for example, dishes frequently slide on stainless steel surfaces or metal surface, discolouration can occur on the contact points of the porcelain (metal abrasion). When stacked, such discolouration can also be transferred to the inside and / or side of use. This discolouration cannot be removed in the dishwasher. Scratches and abrasion are caused to the porcelain glazing by mechanical influences, such as stacking or scuffing. Porcelain dishes with damaged glazed surfaces are considerably more difficult to clean, so under certain circumstances, the cleaning result is no longer satisfactory. Therefore, it is advisable to replace damaged parts.

3. Tips for the optimal use of porcelain wash items

Porcelain dishes for the commercial sector should not be used solely for aesthetic reasons, but also selected from a practical perspective. Smooth, straight, wide-opening, rounded and thus functional shapes without moulding or double-walls in which water can collect are particularly suitable, especially for machine cleaning. Today, underglaze and inglaze decorated dishes have established themselves in canteens, hospitals and large catering organisations. Please note that qualities specified by the manufacturer as suitable for the commercial sector are used here.

Indeed, even convex or traditional dish shapes can be washed; however, it should be considered that all surfaces within the dishwasher should not only come into contact with detergent solution but should also be reached with a powerful water jet. This is not always the



case, for instance, with wash items with strong curvatures and / or spray shadows. Such dishes can therefore produce poor cleaning results.

In general, the cleaning result depends on the water quality, as well as the parameters of the Sinner's circle, such as process chemicals, temperature, contact time and mechanics. For this reason, the wash item and the dishwasher settings should be optimally coordinated. The correct dishwasher setting parameters should be mutually agreed with the dishwasher manufacturer.

To avoid dish breakages, ensure that porcelain items are loaded into the dishwasher in accordance with the manufacturer recommendations. Thus, ensure that the dishes cannot knock against each other. Porcelain items should not break, provided the dishwasher is correctly operated and loaded.

If all process parameters of the washing cycle match (detergent dosage, rinse aid dosage and water quality, etc.), you should have no difficulty washing undecorated porcelain in dishwashers.

Furthermore, problems rarely occur with decorated porcelain. Porcelain surfaces in dark colours can also be cleaned and rinsed in commercial dishwashers, provided the water quality meets the requirements pursuant to *Compendium of practice for Commercial Dishwashing, Section 05 "Water quality"*. For example, water with a high total salt content can leave visible residues on the dishes, particularly on porcelain in dark colours.

When washing porcelain dishes in commercial dishwashers, ensure that the dishes are carefully cleared, comply with the process parameters and set a short drying time. Otherwise, organic residues such as starch can form on the porcelain surface. These result in an unfavourable hazy appearance.

In principle, porcelain dishes have good self-drying characteristics, as they possess a high specific heat storage capacity. During the washing cycle, the porcelain dish above the water absorbs the temperature of the detergent solution and the rinse aid and stores this. The addition of rinse aid in the fresh water rinse helps to completely wet the dish surface and reduces the surface tension of the water. This allows the residual water to run off the dishes. The water remaining on the surface of the porcelain dish is then dried by the heat retained by the porcelain. Drying can take place inside or outside the dishwasher.



4. Porcelain wash items for inductive heating

Porcelain dishes that are suitable for inductive heating are widely used in the commercial sector. These dishes are equipped with a metal coating on the underside, which is heated by induction. The metal coating must be designed in such a way that it can be washed alongside standard uncoated dishes. The frequent temperature change and chemical influences can cause discolourations in coatings, however, these are physiological harmless. Qualities that are specified as suitable by the manufacturer should be used here.



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.