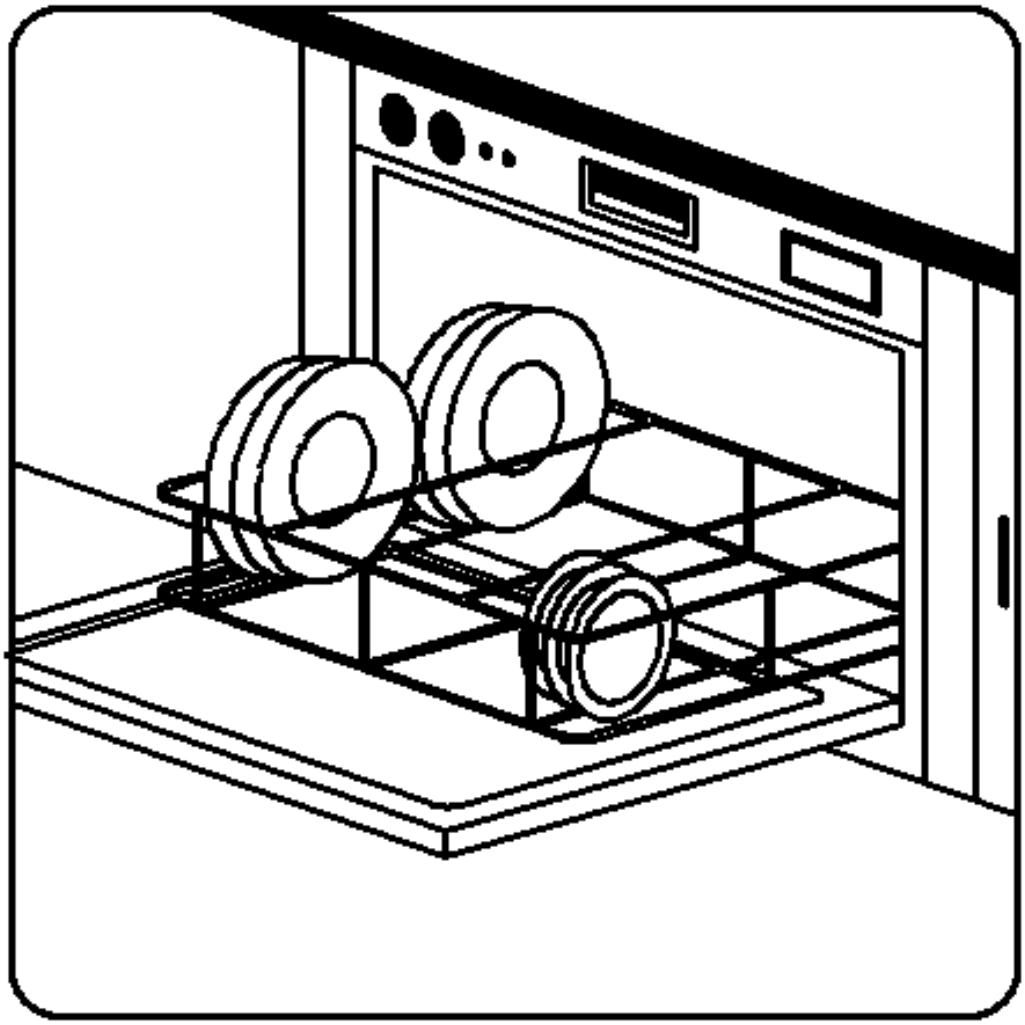
DISHWASHING GUIDE



Premiere® Products

MANUFACTURERS OF CLEANING CHEMICALS AND MACHINES

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♦ MACHINE KNOWLEDGE

All dishwashers attempt to perform the same job, but some perform better than others.

It is important that before you train personnel, you fully understand the working of a dishwasher, and in particular the machine that your prospective trainee is operating.

Stand back and observe what switches do what, sometimes this is difficult as labels have come off etc. If you do not know how to start the dishwasher, your advice and training is likely to go unheeded.

Make notes and obtain as much information as you can. Note where wash and rinse arms are expected to rotate, check gauges etc. Get to know the machine and how it works, note the differences in wash and rinse arm construction and compare and evaluate them. In this way you will become more confident and increase your knowledge, and thus can effectively train other people.

Training is an ongoing exercise in the dishwashing industry, as there is a high turnover of staff, so plan and log your training effectively.

If necessary, training may have to be completed in the evening in order to cover evening only staff. This is part of the business and will pay you dividends if completed properly.

Understand how a water softener works, especially the small chromed manually regenerated models often found in many establishments. Fluctuating operation of water softeners is a major cause of unwarranted trouble calls. If you have set the chemicals for soft water, the results will deteriorate rapidly if the water softener is not regenerated and you will receive a call.

Unless you have some understanding of all the elements of obtaining good dishwashing results, then the process of dishwashing is best left to others, as it needs to be treated with professionalism in all aspects, and can be a costly exercise for those who don't want to invest in time and effort.

It is important that dishwashing accounts receive a regular service visit. The timing of these visits must be based pro-rata on the value and product usage of the account, and it is important that on these visits, checks are done with regard to the dispensing equipment & dishwasher to ensure reliability.

♦ CHEMICAL SAFETY IN DISHWASHING

Many dishwashing speciality products contain ingredients that could be harmful. Understanding and applying safety techniques for these products is essential for their safe use.

With proper handling and application, these products will produce the desired results without harm to personnel, equipment or the users product.

Customers and employees should be trained to follow these chemical safety principles.

♦ KNOW THE PRODUCT

Read the container label and the applicable product COSHH information sheet. These two sources of information cover intended use application, the normal operating procedures, safety practices and precautions.

♦ PROTECT YOURSELF

When directly working with, and handling chemicals, be sure to wear protective clothing, use disposable gloves, and ensure protection for the eyes.

When water, and or chemical solutions are spilled onto smooth floors they create very slippery conditions.

Remove chemical spillage immediately, as dishwashing chemicals can stain a number of floor surfaces.

♦ AVOID IMPROPER MIXING/DECANTING

Many products, especially caustics, give off heat when mixing with water. Always add a product to water slowly and carefully.

Chlorinated products may react violently with acids, organic matter, alkalis and ammonia. Mixing acids with alkalis gives off substantial amounts of heat. Some combinations react violently and may give off undesirable gases, i.e. never descale a dishwasher with an acid product BEFORE emptying and flushing, and refilling with clean water.

Be sure to switch off the dispensing equipment BEFORE refilling, or empty tubing and remove from drums. If the dishwasher is using a highly chlorinated product, the result may be the formation of chlorine gases, with the inevitable undesirable results!

When transferring a product or sample to another container, be sure it is clean and designed to hold the product. The container must have label information and precautionary data appertaining to the product it is holding.

♦ CONTAINER HANDLING

Avoid lifting more than can be safely handled.

Use care when opening containers to avoid contact from splashes and fumes.

Always replace cover securely. The tube from dispensing equipment should be passed through a suitable hole in the cap, so as to allow the operator to replace the cap.

Store containers in such a manner as to prevent injury, accidental damage and spillage.

♦ STORAGE

Store chemicals in a clean dry area. Temperature, ventilation, and adjacent products must all be considered. Follow label or product sheet information. Never store chemical products next to food products such as sugar or salt. Keep chemicals out of reach of children. Do not smoke in chemical storage areas.

♦ EMERGENCY MEASURES

The best first aid treatment for chemical burns is the immediate application of cold running water, this includes external burns from chemical speciality products.

Wherever hazardous chemicals are in use the product label explains the required treatments. Obtain Medical attention immediately if required.

♦ MAINTENANCE

When servicing dispensing equipment of any form, NEVER suck or blow down a tube containing chemicals. Be very careful when removing a chemical tube from a pump inlet/outlet so as to avoid chemicals flicking up when the tube comes out of the pump spigot.

Handle old tubing very carefully, drain off the product before transporting or disposing of the tubes.

When transporting old equipment, ensure it is housed within a plastic bag and that all possible chemical residues are removed.

Washing dishes in an automatic environment would initially appear to be a simple process, and indeed it is when all the variable factors needed are correct. The chemical is only one of the considerations.

To obain good results there are four factors to consider:-

1. Mechanical Action

2. Temperature

3. Contact Time

4. Chemical Action

♦ MECHANICAL ACTION

This is the action of the wash/rinse pumps in terms of wash/rinse pressures, spray patterns, rotation of wash/rinse arms, and volumes of water.

To achieve mechanical action it is vital that the wash and rinse arms rotate when they are designed to do so, and that the nozzles are always clear, also that scrap trays and filters are kept clean to maintain the designed wash pressures.

Failure to achieve this will result in a poor wash or rinse action, thus causing poor end results.

It is important that the dishwashing staff are made aware and trained how to remove the wash/rinse arms regularly and clean them.

MOST WASH ARM BLOCKAGE PROBLEMS ARE CAUSED BY STAFF NOT PRE-SCRAPPING PROPERLY, SO TRAINING WILL AVOID BLOCKAGES AND UNWANTED SERVICE CALLS.

Depending on the style of the machine, most washers are easily removable for this purpose. If a tool is required then this must be easily available otherwise the task will not be done.

Rinse arms are sometimes difficult, as the jets are small. Evaluate each site and determine as to whether it is feasible for the staff to remove and clean them. The most common problem is hard water SCALE build up, which can eventually completely block the complete arm(s) and jets if not cleared on a regular basis.

Cleaning blocked rinse arms properly is a tedious task, but it is vital they are kept clean. When fully blocked by scale, the only real answer is to immerse the arm and jets in a properly diluted solution of a descale product, and leave it till clear. When partial blockages are present it is often necessary to remove the individual jets and physically clear them with stiff wire.

Look out for missing jets on rinse arms. This causes loss of pressure and affects the designed rinse pattern.

Observe the operators stacking the plates etc. There must be sufficient space for the wash/rinse action to work. It is logical you would think, that if two plates were very close together it is obvious that the spray solution of water and detergent cannot effectively do its job. Yet it is often not considered when operators are stacking, as they may be rushed, running out of time etc, so they cram them in, end up with poor results and often have to wash them again. So point out that it saves time in the long run.

Check and ensure that the correct baskets are being used. For example, washing cups in a flat cutlery basket, may give results when all the other factors are at an optimum, but the likelihood is that result will be variable, as the force of water is dissipated and often cannot effectively reach the base of the cups/mug via a cutlery rack's smaller mesh pattern.

Do not be distracted by comments like "we have always done it like that and never had a problem". "The right rack for the right job"!

Some machines have a variable adjustment on the front to allow the operator to adjust the wash pressure. Train them in the use of it, as it is a useful feature especially where deep food containers are concerned.

When washing heavily stained cutlery (where food is dried on) it is advisable to recommend that the utensils be pre-soaked in a proprietary solution formulated for this purpose. Arrange if possible for the cutlery to be standing up in baskets, with a knife handles upwards, and all the cutlery unsorted.

Do NOT use very foamy detergents, of the type usually used for hand dishwashing, since if any of the solution enters the dishwasher, extreme problems will occur with over-foaming.

♦ TEMPERATURE

Like the other factors, temperature plays its part. Without it the chemical cannot do its job, and 55-60^{o}C is the optimum wash temperature. Temperatures slightly below this can still obtain a result but with a higher chemical usage. Temperatures above this can cause a food debris bake-on situation.

If the dishware is properly pre-scrapped, and a pre-rinse is in operation, then good results may still be obtained at lower temperatures.

One problem is that it is the wash temperature which pre-heats the dishware ready for rinsing, and if not sufficient, this may cause rinse drying problems.

The rinse temperature of between 82-88^{o}C is important, not only for the requirement of drying, but also for sterilisation.

Failure to maintain a good rinse temperature will result in wet dishware, streaking, over usage of rinse aid product, and a generally poor finish.

The difficulty if temperatures fluctuate is that results will also fluctuate, and with a probe dispensing system, use more products, ending with a trouble or service call to the chemical supplier.

♦ CONTACT TIME

This is the amount of time that the dishware is actually being washed, again a very important aspect.

In a commercial environment speed is essential, so today's machines are theoretically designed to operate at the minimum time required.

You will find some machines have selectable timers, and various wash times may be chosen to suit the degree of soiling. In practice these are rarely used, so it is a good idea whenever these machines are encountered, that the staff are trained and made aware of the adjustable time facility, and encouraged to use it.

You will at some point, have someone say to you that the results on their dishwasher at home are always good. They are usually right in this statement for domestic dishwashers generally have a very long wash cycle, i.e. contact time, sometimes of up to an hour or more. They also have built in water softeners. Single rack commercial machines often have a complete cycle of 60 seconds, which includes the wash AND rinse cycle.

A high proportion of commercial dishwashers operate with hard water, this is why commercial liquid dishwashing detergents are so strong in their formulas as they have a difficult job to do in a short space of time.

There are occasions where the temperature is adequate, the wash/rinse arms are clear, the detergent is there, but results are not good. This can be due to the short contact time, but if all dishware is washed soon after use, usually there would not be a problem. When heavily soiled dishware is left lying about for some time, the soiling can set, and a 45 second wash time is not sufficient to remove it all. This is a case for pre-soaking. Pre-soaking using the correct pre-soak product is, in effect, lengthening the contact time, and serves to breakdown the soiling in preparation for dishwashing, thus ensuring optimum results.

♦ CHEMICAL ACTION

The chemical action in a dishwasher is generally provided by a liquid detergent which is introduced automatically during the wash cycle, and a rinse-aid drying agent which is automatically injected during the fresh water rinse cycle.

Commercial dishwashing detergent is highly alkaline and should be handled with care. The cleaning power of the detergent rests with the polyphosphates. These are able to remove persistent remainders of lipstick, tea and coffee. In addition they can finely distribute soil within the cleaning solution and hold them in suspension, thus reducing re-contamination to a large extent.

The polyphosphates can also assist in reducing precipitation of calcium magnesium carbonate (scale).

Short washing times require a high cleaning power, therefore the good effect of the polyphosphates has to be aided by other additions. Alkaline additions provide the required high alkalinity, and maintain a high alkaline reserve. These additions are also able to separate active chlorine to resolve difficult cleaning problems.

Additions containing silicates help with possible corrosion to utensils or to the machine, and it is important therefore that the correct dispensing levels are maintained for these silicates to be effective.

In the case of softened water when there are few unfavourable conditions, a low to medium concentration may be maintained. In hard water conditions this concentration may have to be significantly increased.

Always REMEMBER it is better to dose at the concentration that will give excellent results, than to try and reduce cost factors and achieve mediocre or poor results.

Reducing detergent concentrations and achieving cost savings will only effectively work by introducing soft water, maintaining the machine at an optimum level, and ensuring that dishware is washed as soon as possible after use.

For normal alkaline dishwashing detergents the general recommended charge is between 2 and 4 millimetres per litre of water, depending on the hardness of water, the condition of the dishware, and other factors like how long the dirty dishware has to wait before it is washed. The Brightwell conductivity systems for liquids have the facility for the probes to lock on to the set concentration and adjust themselves automatically.

Automatic powder conductivity systems will have to be set up with a concentration meter, so refer back to the manufacturer for concentration details.

Automatic powder dispensers can sometimes give problems as they rely on water pressure, and the formulation of the particular powder product. As these vary dramatically, so does the reliable operation of the system, as products harden, and are sometimes left in the containers, so increasing usage costs. Timed dispensing systems are unsuitable for the powder range of products.

EVERY dishwasher and site is different, so it is unlikely that you will ever be able to set up each concentration in every dishwasher exactly the same, but every one can start off from the same reference point.

Rinse-aids are generally set up by result. If too much is used you will get streaking, and too little will cause spotting.

♦ RINSE AIDS

This product is injected directly into the machines final freshwater rinse circuit and is used to assist the final drying process of dishware and cutlery. Rinse aids are designed to reduce the surface tension of the water and help it "SHEET", so helping to eliminate spotting and streaking of the dishware.
It must be said, for rinse aid to work effectively, adequate temperatures must be provided, and the dishware must be clean and free from protein build up to allow the sheeting of the water to be effective and give shining, clear results.

In general, the rinse-aid is dosed at very small quantities per litre. In practice the most effective way to determine quantity of dose is by washing/rinsing tests and adjusting the rate accordingly.

♦ WATER

The water conditions determine the setting up of the products, and it is important that a water hardness test is carried out to determine the water quality. Water hardness is quoted in terms of degrees or ppm/parts per million. Ideally every dishwasher should automatically have a water softener but unfortunately it is not the case.

In extreme cases of hard water and if the detergent concentration is not sufficient to reduce the scale build-up, scale may occur on the dishware. This build up, often unnoticed on white dishware, causes immense difficulties with staining especially on cups, as the scale can act like a sponge and absorb tannin, which may not be removed by one pass through the dishwasher.

This problem can be easily identified by applying a little descaler to the stain, if it is scale, the stain will lift off immediately.

To remedy the situation, the crockery will have to be descaled and the detergent solution strength raised to prevent further build-up.

♦ WATER SOFTENING

Cold or hot water softeners operate in the same fashion.

They are designed to exchange the calcium magnesium carbonate, which forms the hard water scale, for sodium ions, by means of passing the water through a bed of resin. The size of the resin vessel determines how much water will be softened, and after a determined amount has bowed through, the resin needs to be regenerated by means of passing brine (salty water) through the resin. Hence all softeners have a salt bin except for manual regeneration models.

It is important that the softeners brine bins are kept charged with salt. If a water softener is present, try and make it a routine to check the salt levels when visiting your customer's sites.

It is especially important they they are kept working as the chemicals are likely to be set up for soft water and a softener failure is likely to result in a call for poor results.

It is also important that the softener flushes properly, as salty water (brine) entering the washing machine seriously affects probes, and will not allow the dispenser to feed detergent. It will also have an adverse effect on dishwashing results.

Testing for soft water is achieved simply by means of a chemical test kit comprising of liquid drop chemicals, or by means of a test strip. It is important to test the water especially when a water softener is in operation, as the detergent will be set up to cope with conditions prevailing at the time of installation. If these change, so will the end results.

♦ SUMMARY OF RESULT PROBLEMS AND POSSIBLE SOLUTIONS

- ***Protein build-up around the edge of plates (where they are handled)***

  Often needs to be physically removed, or alternatively soaked in solution of proprietary designed for the purpose. Pay close attention to the underneath of plates and bowls.

- ***Cup staining***

  Are the cups being left for long periods before washing?
  Is the glaze still of good quality?

Are the right racks being used?
Are temperatures/mechanical/chemical OK?
Is the concentration correct?
Is there a scale build-up acting like a sponge?
Is the right product for the water conditions being used?

- ***Plates not washing properly***

Check stacking in racks is being performed as procedure.
Check for protein build-up.
Are temperatures/mechanical/chemical OK?
Blocked wash and rinse arms? Are they rotating?
Are curtains in place? (Conveyor Dishwashers)
Ensure adequate pre-scrapping is being carried out.
Is water softener being regenerated (if fitted)?

- ***Specks of food being left on dishware***

Check final rinse pressure is good.
Clean out all rinse jets.
Ensure rinse arms are rotating.
Ensure adequate pre-scrapping is being carried out.
Is dishwasher being cleaned out at regular intervals?

- ***Dishware not drying***

Check wash and final rinse temperatures. Wash 55-60^{o}C / Rinse 82-88^{o}C
Check machine rinse pump is operative.
Check rinse-aid is being injected, is it enough?
Check rinse arms are clear and all jets in place

- ***Dishware coming out streaky/spotted***

Check machine final rinse is operating.
Check dispensing equipment rinse-aid is being injected.
Check for too much or too little rinse aid being injected.
Check for cleanliness. No scale or protein build-up.
Check concentration of detergent solution.
Check wash/rinse arms are rotating properly.
Check curtains are in place on conveyor machines.

- ***Over consumption of detergent***

Check concentration of detergent.
Check if probe fitted, and clean.
Check machine is not losing water with a faulty drain (probe only).
Check final rinse solenoid is not leaking water past (probe only).
Check rinse jets are all in place, and do not have enlarged jets.
Check product not being used for other purpose (cleaning floor etc).
Check customer has not been busier than usual.
Check operating temperatures (probe only).

♦ PROBLEM – FLUCTUATING DETERGENT CONSUMPTION

CAUSES

- ***Temperatures***

  The conductivity cell, or probe as it is more commonly known senses conductivity, and HOT water is more conductive than COLD water. Always check the concentrations when the machine is at its normal operating temperature. Higher usage will occur at lower temperature levels.

- ***Position of probe***

  If the probe is set too close to the heating elements it may be affected by localised temperatures. If the probe is set too high in the tank it may be influenced by water levels. The probe should always be installed away from direct pump intakes as this will also affect its performance.

- ***Dirty probe***

  A scaled or dirty probe will not sense conductivity correctly, keep probe clean and scale free.

- ***Water hardness***

  Changes in water hardness will influence the conductivity of the wash water, large changes will be noticed especially when a water softener ceases to function. Regular hardness checks are recommended especially in those sites that have mechanical softening processes. Ensure no brine (salty water) enters the dishwasher.

- ***Dispensing equipment***

  Ensure that there are no leaks in the delivery tubes, and that the probe wires are connected securely. Is the calibration of the probe/sensor set correctly?

- ***Conveyor type machines***

  With the larger type of machine, especially the push-pull cradle type, look out for trays being left at the point of exit. Often a tray can sit there if none are following, and by doing so, it can keep activated the rinse arm switch, causing the rinse to run continuously and increase the detergent consumption.

♦ PROBLEM – STREAKS OR FILM ON DISHWARE

CAUSES

- ***Final rinse malfunction***

  Inspect dishwasher final rinse arms, ensure rinse jets and arms are free from scale and that the rinse pattern is correct. Check for missing rinse jets and check pressure is between 15-20psi. Check rotating rinse arms are actually rotating, and fixed arms are correctly positioned. Don't forget the UPPER rinse arms and jets.

- ***Rinse Additive***

  If rinse function is OK, check the delivery of rinse additive to discover whether an excessive amount is being pumped, and adjust if required.

- ***Detergent***

  In very bad cases of hard water, check concentration of detergent is sufficient to reduce scale build-up.

- ***Water Softener***

  If a water softener is in use, check to see if it is inoperative as scale will manifest itself very rapidly. If a soft water detergent is in use, recommend the softener be repaired as soon as possible or change to a hard water product if the softener is unlikely to be repaired within a short time, otherwise repeat visits will be required.

- ***Quality of Dishware***

  If the quality is poor due to age and wear, dishware may require a regular de-stain to assist with maintaining results. Inspect the glaze, especially the bases where the glaze will have been removed through wear.

- ***Dishwasher Machine Curtains***

  In the case of conveyor machines, where curtains separate the various wash and rinse chamber, ensure that the curtains are in place and that they are clean. Failure on this point will result in streaks, splash-over and spotting of the dishware passing through.

- ***Racking procedures***

  As already mentioned, the stacking of crockery and cutlery is important as streaking can be caused by incorrect racking of items, thereby not allowing the wash & rinse water to effectively clean the dishware.

♦ PROBLEM – FOAMING IN DISHWASHER

CAUSES

- ***Low Temperatures***

  Without doubt the most common cause of foaming. Maintain temperatures between 55-60^{o}C as temperatures lower than this will inhibit the product's de-foaming agents. Food soils become more apt to foam at lower temperatures. This is especially important on dishwashing machines with shallow wash tanks.

- ***Scrapping***

  Heavy food soil and greases entering the machine may cause the formation of foam. Review operator scrapping procedures, drain and clean machine at regular intervals. Encourage the use of overhead sprays where available.

- ***Pre-Soaking***

  Ensure that when pre-soaking, the solution does not enter the machine as the wash pump, normally rotating at approximately 2800mm, will cause it to foam.

- ***Water Softener***

  Erratic operation of a water softener can cause foaming, as if you have set the chemicals to cope with water hardness, and then the water becomes soft, there is the danger of foaming. Excessive or poor quality rinse aid, especially in very soft water can also contribute to foaming difficulties.

♦ PROBLEM – INCOMPLETE SOIL REMOVAL

CAUSES

- ***Detergent***

  Check detergent concentration. With heavily soiled dishware, the normal concentration may have to be raised to cope with the prevailing conditions. If operators fail to scrap properly, then it must result in higher detergent usage to maintain results.

- ***Wash Cycle***

  On some single machines the operator has the facility of a wash timer. Sometimes these are fixed and sometimes these are variable. Ensure that they are using the facility correctly for the type of soiling present.

  Operatives tend to use the shortest possible time for speed, but often at the expense of much poorer results.

- ***Foam***

  If foam is a problem, it will reduce the performance of the wash pump, as the air within the foam reduces the pump's pressure, with the inevitable consequence to results. Low quality rinse-aids can sometimes cause foaming problems.