



# Wash and save

## Commercial dishwashing and its impact on our financial, environmental and social wellbeing

By David C Clarke

The most important consideration is the quality of the wash, as a customer's perception of the caterers' hygiene standards can stand or fall by the cleanliness of the tableware placed in front of them. To achieve this we use a large number of man hours while consuming a massive amount of water, energy and chemicals which has a major financial impact on the business.

There are three ways in which we can reduce the impact of this problem on the facilities we are running.

1. We can try to mitigate the costs by employing a few simple strategies.
2. We can use modern technology to reduce the water usage which, in turn, reduces the detergent used, the energy required and the volume of waste water to be disposed of.
3. We can purchase the equipment based on whole life-cycle costs and not pay procurement personnel bonuses for buying the cheapest equipment which goes on to cost the operator a small fortune over its lifetime.

At little or no cost we can instigate a few simple practices that will benefit our businesses.

- Wash only full racks. It's so obvious but the temptation to run the machine half full is much greater than we might realise. Kitchen staff should be trained never to run anything less than a full rack through the machine except for the last rack at the

end of each service. This provides huge savings in detergent, energy and water.

- Consult with the designer or the supplier of the warewashing system to establish the heating up time. Then make sure it is only switched on as required and not when the kitchen opens first thing in the morning. A number of the latest high efficiency machines which are designed with smaller tanks and low water usage only require 20 to 30 minutes to pre-heat.
- Install and monitor a good quality chemical dosing system. On average we use 0.01 litres per meal served, so if we reduce this by up to 50 per cent - which is well within our capabilities - we will save just under a penny for each place setting we wash up.
- Carry out regular preventative maintenance, replacing worn components like curtains and door seals to ensure that the machine is holding its heat inside the unit, making it run more efficiently.
- As part of the temperature monitoring system, include the wash and rinse water temperatures of

the machine. This can prove due diligence for food hygiene and it will show when the water temperatures exceed the required specification. They can then be recalibrated to save energy.

- When dealing with high and low numbers optimise the use of your dishwashers. Only use the large machine during peak times when numbers are high, then shut it down and move over to a smaller machine designed into the system to accommodate the smaller quantities of dishes. Once again this provides huge savings in detergent, energy and water.

### Using technology to improve our performance

The calculation for heating a set amount of water over a given time cannot change; the amount of energy required will always remain constant. Therefore the technology required for making dishwashing more efficient is to improve the insulation on the machine to maximise the heat generated, reduce the amount of water required per cycle, and recover the wasted heat

that is discharged to atmosphere and drain. In addition, the removal of any dissolved minerals will ensure that the machine stays efficient.

Water that is high in dissolved minerals - specifically calcium and magnesium - is described as hard. Hard water is not a health risk, but a nuisance because of its tendency to cause mineral build-up in pipe work and on heating elements, which reduces the efficiency of the system. Together with the poor performance of detergents and rinse agents when using hard water compared with soft water, this makes water treatment a necessity.

It is worth noting that the cost of detergents and rinse agents over a five to seven year period can easily amount to the original price of the dishwasher.

To obtain good results you have to use clean water, so it is worth looking at machines with an effective filtration and wash system incorporating anti-blocking jets, as these will, on average, consume less water while significantly improving the quality of the wash. This will save on the energy needed to heat the water as well as providing considerable savings on both detergents and rinse agents. The higher through-puts provided by incorporating the improved wash will also provide the potential to minimise on labour costs.

### Dishwasher types

There are four main types of dishwasher that are typically used in the foodservice industry:

- ➔ Under counter machine - for small operations preparing up to 40 covers.
- ➔ Pass through single rack machine - the next step up in dishwasher size, which can process between 90 and 110 covers.
- ➔ Rack conveyor.
- ➔ Flight machines.

The information detailed above applies equally to all four types; the differences begin to appear when we look at heat recovery.

### Heat recovery

Drain heat recovery is normally found on pass through single rack machines. This is when fresh rinse water is heated from 15°C - 45°C using waste heat from the machine's drain water. The rinse water is drained through a pipe that is enclosed within the water inlet pipe and heat from the rinse drain pipe is transferred to the incoming cold water. This provides savings on average of between 4kW - 6kW per hour.

Heat exchangers are usually found on rack conveyor and flight machines and comprise a system using cooling coils, where steam is drawn efficiently from the wash chamber. The heat recovered through a contra-flow

principle is used to heat the fresh water intake up to 50°C, saving around 9kW.

A heat recovery system based on heat pump technology has three advantages:

- ➔ No direct connection is required to the ventilation system.
- ➔ The system recovers up to 59 per cent of the energy used by the machine.
- ➔ It improves the working environment.

The cool air leaving the outlet can be passed back into the room, replacing the need for spot cooling.

### Procurement of a new system

When purchasing a dishwashing system it is always advisable to seek professional help, as the layout of the machine, its associated equipment and fabrication can have a major impact on the efficiency of the system and on the labour required to operate it.

By using a design solution based on whole life cycle costs, a facility washing up 2,000 place settings three times a day would enjoy major savings by using one of the latest dishwashing systems now available from one of the three leading dishwasher manufacturers.

By increasing the investment from £91,880 to £128,914.00 - an extra £37,034.00 at the procurement stage - we can expect to reduce our utility and detergent costs by up to 30 per cent with a reduction in labour of 25 per cent over the ten year life of the system. In money terms, based on three hundred working days each year, we will save £92,280.00 on

utilities and chemicals, with a minimum of £232,470.00 on labour - making a total of £324,750.00 over the next ten years. The additional £37,034.00 would pay for itself within the first fourteen months.

### Pot washing

The pot wash is an area that is often overlooked when it comes to reducing costs and becoming more energy efficient. In a pot wash facility that operates for 6 hours per day for 300 days per year, using two standard pan wash sinks of which one operates as a sterilizer, the annual cost of detergent, energy, water and drainage would be in the region of £9,369.00.

By using a utensil washing machine and a soak sink this would be reduced to £4,461.00. The average cost of a good quality utensil washer, complete with inlet and outlet tables, with a life expectancy of ten years, is likely to be in the region of £10,000 so it would pay for itself in 25 months.

This example makes no allowance for being able to retain staff by providing a better environment thus reducing recruitment and staff training costs, or for reducing the labour or using it more effectively. It should be remembered that for every member of staff employed in this example a minimum cost of £13,095 would be incurred.

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