Dishwashers

HIGHLIGHTS

PROCESS AND TECHNOLOGY STATUS – Automatic household dishwashers are more energy and water efficient than manually washing dishes. However, they are still perceived as a luxury appliance by many consumers, and their market penetration is relatively low when compared to other white goods. Roughly two-thirds of US households own a dishwasher, and the figure falls to 48% as an average across the EU. There is low market penetration of domestic dishwashers in markets outside the US and EU. Professional dishwashers are used in the catering and hospitality sectors. These appliances run very short wash cycles, and range from small under-counter models to large multi-tank models. The professional dishwasher market has nearly 100% market penetration in developed countries, as it is seen as an essential kitchen item in restaurants, hotels and catering facilities.

PERFORMANCE AND COSTS – Most domestic dishwashers currently available on the market perform well on energy and water efficiency. In the EU, 90% of domestic models sold over the last five years have an A class energy label. Domestic dishwashers have an approximate service life of nine years. Domestic dishwashers have a typical price of around €300 excluding taxes. Over the ten years leading to 2007, energy consumption of professional dishwashers has reduced by 20% to 30%. The most widespread model of professional dishwasher, the under-counter one tank water system, can process 200 dishes per hour, and costs approximately €3,200. Large models with multiple tanks can process up to 4,000 dishes an hour and can cost up to €45,000.

POTENTIAL AND BARRIERS – Some commentators suggest that dishwashers have reached a floor in their ability to lower energy consumption. The perception of domestic dishwashers as a luxury item, compounded by their upfront cost may prevent further market penetration in many countries, including Western Europe. In emerging markets, the prevalence of hired help undermines the demand for dishwashers. In particular, the world's largest emerging markets Brazil, Mexico, China, India and Russia collectively accounted for 2% of dishwasher sales in 2010. The potential gains in water and energy efficiency can be hampered by a lack of consumer awareness to fully load the appliance for optimum performance. Around 50% of households pre-rinse dishes before loading, which lowers water efficiency. 90% of energy losses by professional dishwashers are due to heat loss. They can improve their energy efficiency by using an exhaust heat exchanger or heat pump to re-use heat. This is especially relevant for one-tank models that recycle much of their water for multiple loads.

PROCESS AND TECHNOLOGY STATUS

Domestic and professional dishwashers use electricity, detergents and hot and/or cold water to clean dishware, glassware, cutlery and utensils through a range of chemical, thermal and mechanical processes [2]. Numerous studies have come to conclude that it is more efficient to run a fully loaded modern dishwasher than wash by hand [12].

Domestic models – Two-thirds of US households own a dishwasher according to 2008 data [14]. In 2007, averaged across all European countries, 48% of households owned dishwashers [11]. Comparably, the emerging markets of Brazil, Mexico, China, India and Russia collectively accounted for only 2% of domestic dishwashers in 2010 [23].

Sales can differ by dishwasher type. For example, in 2006, 77% of domestic dishwashers sold in the UK were full size models with approximate dimensions of 80x60x60cm. These have a capacity from 8 to 12 place settings. The other 23% of the domestic market was taken up by slim line and compact (table top) models [16]. These models have a range of capacities, but are less than 8 to 12 place settings. The rise in single occupant properties could increase the market share of compact models. Most domestic dishwashers use a spray technology to direct jets of water at soiled dishes from rotating spray arms at the top, middle and/or bottom of the tub. It is noteworthy that European dishwasher models are designed to heat water internally, whilst US models take in hot water heated externally [21]. Market research has shown that the programme length is not a major concern for users [18] because the appliances usually run overnight or between meals; however some users may select a shorter programme believing it to be less energy consuming, whereas it is often longer programmes which use less energy.

Professional models – In Europe, there is nearly 100% market penetration[1] of professional dishwashers as these are essential items in restaurants, hotels and catering facilities [17]. In the US, major end users are similar to European end users and there are similarities between the US and European marketplace [17]. Thus it could be assumed that US market penetration is also nearly 100%.

Professional dishwashers need to process large volumes of dishware in a short amount of time, usually running many cycles every day. The difference in their

1 Based on dishwasher stock exceeding number of catering and hospitality businesses. This is not to say that all of these businesses have dishwashers, some other sectors may represent the stock figure.

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