

Building greener can washers and dry-off ovens



Optimus can dryer.
Image: Stolle

Stolle EMS discusses sustainable options for machinery that has historically been highly energy-consuming

Like most manufacturers, can makers are facing the challenges of energy prices along with an increased focus on more sustainable manufacturing practices. The major can making companies have published aggressive sustainability targets which focus on reducing their carbon footprint with an end goal of Net Zero carbon emissions. They plan to do this by reducing their use of fossil fuels like natural gas and electricity, as well as increase the energy efficiencies of their production machinery. Additionally, can makers are looking to reduce water consumption and chemical use to minimise environmental impact and waste. So, when scrutinising all the machines in their lines to look for

potential savings, can washers and ovens often receive special attention as historically high users of energy resources, including natural gas, electricity, process water and chemicals.

Stolle EMS produces the Optimus washer, as well as the three types of ovens used in a can line – the Optimus can dryer that mates to the Optimus washer, as well as the DecoCure pin oven located after the decorator, and the InterCure Oven located after the inside spray machines. Since entering the thermal products business with the acquisition of the EMS Group in the UK in 2016, Stolle has made a number of improvements to its equipment, resulting in lower energy and water consumption. All of the components used on these machines, such as the washer pumps, oven burners, fan and mat drive motors, are selected to have the highest efficiencies available.

Water conservation

The Stolle EMS Optimus washer is the most water-efficient can washer available today, says the company. Using a combination of cleaning technologies allows process latitude in the washer and assists in significantly reducing the amount of water discharged to waste treatment. While older generation washers could discharge up to 60 gallons of water per minute, the Optimus washer has significantly reduced this discharge amount. Not only does this dramatically reduce the cost of the water itself, but also the cost of treating it by either the DI (deionisation) or RO (reverse osmosis) process to demineralise the water, which is necessary for the can washing process.

A key way in which the Optimus washer saves water is by reusing a high percentage of it with a carefully monitored and controlled recycling process. Fresh DI or RO water is introduced at the final rinse stages (6B) where the cans are the cleanest, and is then pumped or fed by gravity into the preceding tanks down the progression of the washer, all the way back to the prewash (stage 0) where the cans are the most contaminated with dirt and oils/lubricants from the D&I forming process. In the cleaning stages, coalescers are used

to remove oil from the water which helps reduce chemical usage. Full process control over each stage of the washer is maintained by sophisticated self-monitoring counterflow and backflow systems with ultrasonic flow meters to monitor and control the movement of water between stages. Sensors check the conductivity of the water to determine how clean it is and how much can be recycled in previous stages as opposed to introducing clean water. Also, the exhaust stacks for the prerinse and acid wash stages have a manifold system that collects condensed water and returns it to the wash tank, further reducing water consumption.

Stolle's advanced control systems precisely monitor the concentricity of chemicals in the water to maximise the efficiency of chemical usage. Considering the many stages in a typical can washer, minimising chemical carryover between tanks is crucial. Independent blow-off systems after each stage to remove solution and water from the dome of the can, as well as independent belt vacuum systems and brush systems. As cans exit the washer from the final rinse stages and application of a mobility enhancer, they are picked up from the top by an overhead vacuum transfer conveyor that transports them over a gap between the end of the washer conveyor mat and beginning of the dry-off oven conveyor mat. Any cans that have fallen over in the washer drop onto a small conveyor belt that carries them out so they can be returned to the production line if they are not damaged.

To conserve heat in the stages that require heated water, smart control systems are used to set up and maintain precise water temperatures. Another energy saving feature is the mesh belt or 'mat' that carries the cans through the washer, which is made of a material that does not retain heat to minimise heat lost by 'carry out.' Can plant designers are also looking at innovative ways to recover heat from other production machinery and direct it to the can washing process.

To save on electricity usage, Stolle is now using energy-saving pumps with Grundfos high efficiency CRNE Smart Motors with intelligent controls. In addition to pumps, the oven fans and the mat belts have VFD direct-drive motors that can vary speeds based on temperature and production requirements which saves electricity.

Greener dry-off oven technology

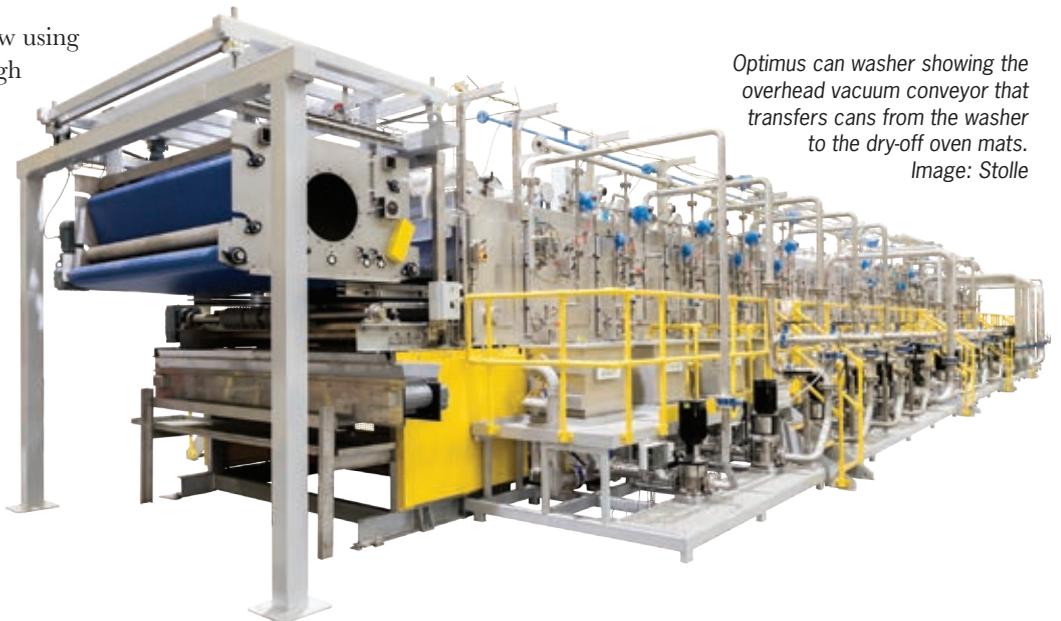
The dry-off oven located immediately after the can washer is also a major consumer of natural gas and electricity. The main development to save energy is the adoption of next generation high efficiency gas burners that consume less natural gas while generating the same amount of heat as traditional burners.

The Stolle Optimus can dryer uses a suction-type impingement recirculating air system that provides a higher heat transfer rate, which allows the oven to work efficiently with lower temperatures (between 150° and 180°C) to completely evaporate the water from the cans. In addition, improvements in the design and construction of the oven enclosures by minimising leak points, efficient control of make-up air, and use of thicker insulation also help to conserve natural gas. As in the Optimus washer, all the fans and the oven conveyor are direct-driven by VFD motors which help improve energy efficiency. An optional belt vacuum system helps maintain can stability through the oven while reducing water carry-over into the drying zone. The Optimus washer and can dryer are equipped with servo motors to raise and lower the hold-down mats, vacuum transfer conveyor and oven plates which reduces can height changeover time from over an hour to minutes, a major advantage for can makers who produce different can sizes.

Alternative energies

The cost of natural gas is prompting some can makers into looking at alternative fuels to heat washer water and ovens, but currently many of the alternative fuels cost more than natural gas for large-scale users such as can plants. There are on-going investigations into using hybrid energy sources (gas and electric) and other fuels such as propane, and even complete alternative energy sources.

Stolle is constantly implementing new technologies and more advanced methods of increasing the sustainability of its washer and oven lines. The company tells *CanTech International* it is committed to the advancement of can washer and oven technology by making machines that are smarter, use less water and are more energy efficient than ever before. 



Optimus can washer showing the overhead vacuum conveyor that transfers cans from the washer to the dry-off oven mats.
Image: Stolle