PEREGRINE
MOBILE BOTTLING

PEREGRINE MOBILE BOTTLING, LLC offers Premium Mobile Bottling Services on a KRONES-engineered production line. Our 24-valve filler features KRONES VKPV-CF counter-pressure filling valves offering single and dual pre-evacuation, fill level correction as well as headspace management. For further information and bottling availability please contact Thomas Jordan at thomas@PeregrineMobileBottling.com or 707-637-7584.

Latest Developments in Wine Filling Technology

In the entire process of wine bottling the segment of filling is the most important subject since you actively handle the product you have worked so diligently on for quite some time. In this report we focus on still wine filling. For wine applications you find a speed range for fillers starting from 15 bpm on the lower end to up to 600+ bpm on the high end. Equipment comes in variations of single machines or monobloc arrangements where different machine components have been installed on one main frame with one main drive train. Monobloc configurations can consist of just two components such as filler/corker blocks and go up to as far as four components such as rinser/filler/corker/capper arrangements.

Figure 1 - Wine Filler

When filling wine several quality parameters are important to be controlled in order to make sure your wine is well bottled and packaged. The main parameters are:

- Dissolved oxygen pick-up (DO),
- Fill-height accuracy,
- Headspace management and
- Cork/screw cap integrity.

Figure 2 - Rotary Rinser

In the past, fillers were mainly “mechanical” fillers where individual steps of the filling process were mechanically initiated through cams/levers, push-buttons and rollers. Today, electro-pneumatically controlled solenoids are employed on the filling valves. This guarantees a high degree of accuracy, reduces the amount of wear parts and facilitates product change overs through parameter setting on a filler touch screen.

The most important quality parameter in the filling process is the control of dissolved oxygen pick-up. In order to keep this value to a minimum, several technologies are employed in the industry.

As a first step, bottles are cleaned either with water or dry, compressed,

sterile air. On a rotary rinser bottles are turned 180 degrees and a nozzle enters the neck to either spray water or sterile air into the bottle. In an orbit rinser the rotary wheel is in vertical position and bottles are positioned in individual pockets with a nozzle entering into the neck. When using compressed air it is important to have a suction phase on the rinser so the potential dirt particles are effectively removed from the bottle.

As a second step on the rinser, the bottle may be sparged with an inert gas such as nitrogen or argon to reduce the amount of oxygen in the bottle. This process is used mainly with conventional filling technologies which do not offer specific air/gas management as part of the filling process.

Figure 3 - KRONES Filling Valve with Swirl Insert

For lowest dissolved oxygen pick-up values filling processes have been developed which use several different steps on the filling table (i.e. KRONES' Technology). After the bottle enters the filler from the rinser a centering bell seals the bottle against the filling valve so it is hermetically sealed. The filler program now initiates multiple process steps performed through the electro-pneumatically controlled valve. As a first step a vacuum is pulled which extracts the ambient air through the vacuum channel of the filling valve to the outside environment. KRONES technology pulls a vacuum of -850 mbar or -12 psi where other suppliers usually offer vacuum levels of -200 mbar or -3 psi. As a next step the bottle is filled with an inert gas such as nitrogen. This is an advanced step compared to competitive filling systems which fill either against ambient air or an air/nitrogen mix from sparging at the rinser.

For highest quality filling results (O2 pick-up values of under 0.1 ppm from tank to bottle) KRONES filling technology provides a second pre-evacuation step of the bottle; this means the process steps of applying vacuum and sparging with inert gas – at this time with nitrogen from the ring bowl blanket - will be applied a second time before the valve opens and the wine is filled into the bottle via gravity. The wine pushes the nitrogen from the bottle through the fill tube back into the filler bowl where it serves as a blanket to avoid air contact.

In order to achieve highest tolerances in fill level accuracy, the bottle is slightly over-filled and a fill-level correction process is applied. Pressurized inert gas such as nitrogen – applied to the headspace – pushes excess product back into the bowl through the vent tube until the desired fill level is reached. With this step you achieve accurate fill levels and product savings.

Figure 4 - Corker

After the bottle is released from the filling valve it is

conveyed to either the corker or capper. Preferably you want them to be close to the bottle exit of the filling table to allow for shortest exposure to the environment before closing – usually, you position the corker first and the capper in second position.

Headspace management after the filling process is of utmost importance. For cork applications a headspace vacuum is pulled at the corker before you place the cork in the neck of the bottle; this reduces the amount of air from the bottle headspace and also reduces headspace pressure when the cork is placed. When you have a correct fill-height application and a well placed cork the headspace pressure will be well controlled.

Figure 5: Screw Capper

Screw cap applications are a little more involved since the headspace volume is bigger than with cork applications. Ideally, we want to remove the air or air / nitrogen gas mix which resides in the headspace. This is done by dosing liquid nitrogen to the headspace of the bottle. A liquid nitrogen dosing equipment is located close to the location where the bottle leaves the filler valve. Liquid nitrogen needs a certain amount of time to react and push the air out of the headspace; you will actually see a nitrogen "fog" or "smoke" develop in the headspace slightly coming out of the bottle if the dosage is correct. Therefore, a specifically determined amount is dosed into the bottle headspace. The liquid nitrogen reaction happens while the bottle is conveyed to the capper. Since the caps themselves are hollow they do carry air. If you place them on the bottle most of the air actually escapes in the process of pushing the cap onto the bottle; however, to avoid any residual air a nitrogen gas purging of the cap may be applied.

For additional information on mobile bottling service or any other bottling related subjects please contact:

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