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Spotlight on Quality:

Air Washing Corks, Caps and Crowns

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Dan VanderPyl co-founded Sonic Air Systems, Inc. in 1990, where he has since pioneered high speed centrifugal blowers and high velocity air knife designs, which are now the bottle drying standard of wineries and many other industries around the world. He holds two current U.S. patents for blower and air knife designs and has written more than one dozen technical articles on the subject for a wide range of industry journals.



Hopper, elevator and air knife, and exhaust air piping

FOR SMALL WINERIES, maintaining the cleanliness of caps and corks on the bottling line is a fairly simple matter. They arrive in bags of 1,000 corks or 2,000 capsules. As long as a spot check yields no corks with more than 2 milligrams of dust per cork, the industry standard recommended by the **Cork Quality Council**, then they're good to go. Staff rips open a bag and loads them into the hopper, which feeds the bottling line. Depending on line speeds, they'll last a few hours—and then it's time for another bag.

Although the methods and machinery used in manufacturing corks, caps and the bottles themselves help ensure hygenic standards, it is the process of packaging, un-packaging and transporting these products that can introduce the potential for contamination. With corks and caps it is truly not external contamination from foreign material which is a concern, but rather the "shedding" of the cork or cap material from the friction of these like parts rubbing together before they reach the capping machine.

The corks and caps will maintain the industry standard for cleanliness as long as the dust residue or chemical particulates that gather in the corker are regularly cleaned out.

When a winery's annual production reaches approximately 100,000 cases, the scenario changes. The caps and corks still arrive clean in their bags; but because so many more bottles run through the line, the capper/corker must be cleaned more often and more thoroughly in order not to contaminate the newly delivered caps/corks.

A not unlikely scenario involves two employees bending over the corking machine disassembling its jaws and wielding Q-tips® to capture dust trapped in nooks and crannies. To make sure the corker is dust-free, they may lightly rub it over with food-grade mineral oil.

However, with these higher production levels, cleaning the caps and corks just prior to bottling could save a great deal of time in corker/capper maintenance and cleaning. Some mega-wineries are turning to air washing of caps and corks as the solution.

Casella Wines, Australia's largest family-owned winery, is the first installation for this latest wine industry innovation. A few U.S. wineries have inquired about the technology as the concept becomes better known.

ABOUT THE METHOD

Bottling plants use air to rinse off bottles as a supplement to liquid bottle washing when they want to be certain that no cardboard dust or debris is present just before the filler. Air washing of caps and corks is also a viable method to keep the caps and corks clean, and hence the corker.

The source of air depends upon function. In the case of air rinsing of bottles, compressed air is the most common because of the small tubes that must be used to inject air into the bottleneck as well as the small diameter piping of the carousel unit.

High velocity air blowers and air knives, however, are preferred for air washing of caps and corks where the elevator conveyor does not have the space restrictions of a bottle rinser. The benefits of the blower-powered systems, just as in air knife systems for pre-label drying, are that they always produce clean dry air and they use less horsepower than any compressed air-powered air knife design. In fact, the U.S. **EPA** has even added **Sonic**'s blower-powered air knife technology as an "Energy Star Partner" for its significant energy efficiency versus compressed air blow-off methods.

After caps are shipped from their respective manufacturers, they are loaded into the hoppers for metering onto the elevator conveyor and then into the capper.

In the air washing process, each flighted (divided) section of an inclined or vertical cap conveyor holds anywhere from 2 to 25 caps, depending on the cap size and the capping machine speed. Although an air washing system can be applied at any speed to any design of elevator (a conveyor used to transport corks and caps from a hopper, or holding bin, on the floor up a 60-degree vertical incline to the top of the cork/cap machine), the most cost-effective design is one in which only 15 to 25 percent of the available space between each flight of the conveyor belt is occupied with caps. The elevator conveyor belt has flights six to 12 inches apart that take a metered amount of corks and caps between each flight.

The acrylic or stainless steel cover over the elevator allows the tip of the 12-inch long air knives to be inserted into a ½-inch (13mm) slot in the cover of the elevator and into the hopper itself. At the highest cap volumes, it may require four air knives, spaced just slightly greater apart than the minimum center distance of each flight.

If the caps are in a single row across in a small elevator, as the caps pass under each air knife, the air velocity sweeps the debris from the interior but does not clean the entire cap surface. If the conveyor flights are higher and with a greater pitch to allow for many more caps, the air knife velocity will cause the caps to bounce and swirl around like lottery balls thereby cleaning all surfaces.

To avoid re-contaminating the caps and corks with the newly liberated particles, a vacuum source must be applied to the same area of the conveyor. It must be sufficiently small to prevent the caps from being pulled out of each blow-off zone of the conveyor.

SYSTEM IN PLACE AT CASELLA WINES

Casella Wines, Australia's producer of the Yellow Tail brand, recently installed a high velocity air blower system to air wash 34,000 caps and corks per hour for its 750-millileter bottling line.

Though Casella was having no demonstrable problems keeping the corker and capper clean, they installed the cork/cap air wash system in order to expand their role as an industry leader among fellow members of the **British Retail Consortium**. As a main exporter to the United States, Casella and its management felt a need to also ensure top quality at every phase of its production, including its bottling line.

The company measured the benefits of its two new 7.5 horsepower high-speed blower/air knife systems and its 3 horsepower central dust collector unit by evaluating the contents of the dust collector vacuum bags versus how long the lines now run without shutting down for cleaning. Since the air rinser system's installation in 2008, the dust collector bags have been slowly filling with cork and cap debris. The addition of their new cork/cap air wash systems to Casella's state-of-the-art bottling plant allows the company to stay focused on the quality of their wines instead of the productivity of their lines. The end result has been a decrease in costs and downtime associated with corker cleaning and maintenance, absolutely clean caps and corks in the product, and reduced manpower spent on capper/corker issues.

Sonic has pre-labeling bottle drying systems in nearly every major winery and many boutique brands through out the U.S., France, Australia and South America; this latest industry solution has been operating since the end of 2008. **wbm**