



## Retorted Beverages now Possible in Plastic Bottles

With the recent advents of improved bottle and closure design coupled with advances in the handling and processing of these bottles throughout the retort process, consumers can now enjoy retorted beverages packaged in plastic bottles with re-sealable plastic closures. Not long ago, retorted beverages were only available in steel cans with seamed ends which required a can opener to gain access to the product inside. As demands for these beverages have grown, their packaging has evolved to provide improved benefits to consumers. “Pop- Top” ends were added to cans, steel was replaced by aluminum, glass bottles were introduced having metal PT closures for wide mouth openings and roll-on aluminum closures for smaller 38mm and 28mm openings. Today however, processors now have the choice of packaging their beverages in plastic bottles with composite plastic/metal caps. These exciting new packages deliver the consumer benefits of an easy opening cap with improved tamper evidence that is also easily re-closed on a bottle that has an attractive shape and is lightweight and shatterproof.

With all of the benefits that a plastic container delivers to the brand owner, packager and consumer, it brings with it a number of processing, handling and application challenges to the manufacturer of the capping machinery. High-speed beverage lines can operate at speeds approaching 1000 bottle per minute. At these speeds the capper is challenged with capturing a filled, uncapped bottle being discharged from the filler and must convey it into the capper for cap application without spilling a drop of product. To prevent the spillage of product from the bottles, Zalkin has developed a Tangential Infeed® Capper that borrows from the container handling techniques of a can seamer. With a Tangential Infeed® Capper, the traditional infeed starwheel is eliminated which allows a straight line infeed of bottles directly into the capping turret. In this way, cap application can begin before a significant change in direction occurs to the bottle that would result in product spillage due to centrifugal force.

To successfully handle bottles at high speeds, Zalkin has developed an electronic synchronization system that positively links the position of the filler with the position of the capper and allows the two machines to be operated synchronously. Bottles exiting the filler are discharged directly into a pocket of the transfer screw of the capper that controls the bottle’s position through the infeed of the capper. This positive handling means that once the filler captures an empty container, it is kept under absolute control until it is filled, capped and discharged from the filler/capper system.

Innovative bottle handling techniques are a critical part of a successful capping operation but are only half of the solution. The proper handling and application of closures to these bottles complete the package. Plastic closures with tamper evident bands designed for retortable plastic bottles incorporate a special feature that prevents them from backing off of the bottle finish when exposed to the high temperatures of the retort process. The TE bands of these caps have “teeth” that engage a “ratchet” element molded into the neck finish of the bottle. The interlocking of these two

components means that the bridges connecting the TE band to the skirt of the closure must be radially sheared as the cap is unscrewed. This greatly differs from the typical TE band whose bridges are vertically broken due to the skirt of the closure rising as the cap is unscrewed by the user. The mechanical advantage of the bottle threads provides a strong force for vertically breaking bridges and these bridges can therefore be relatively strong. Conversely, as the bridges of a retortable closure have to be radially sheared as the cap begins to be unscrewed, they must be relatively weak. These weaker bridges mean that special care must be used to provide especially gentle handling of closures throughout the bulk feeding, orienting and conveying of the caps to their point of use on the capping machine.

These bridges are so weak in fact, that if the cap were to be applied without first being heated, the bridges would break. The capper must therefore have the capability to heat closures to a precise temperature prior to their application. The heating process both softens the plastic TE band to make it more pliable as well as slightly expanding its diameter to provide more clearance as it passes over the neck finish of the bottle.

Precise control of application torque to ensure a properly sealed container is the paramount duty of a capping machine running retortable plastic bottles. Traditional glass containers are rigid enough to maintain a negative pressure within the package to allow “dud detection” on the vacuum panel of their metal closures downstream of the capper. Plastic bottles however, have flexible sidewalls that preclude the use of vacuum as a means of ensuring that a proper seal has been made. Closures must therefore be positively and consistently applied by the capper to generate quality packages. To accomplish this, Zalkin has developed a capping head with a hysteresis magnetic clutch that delivers precise and consistent torques for each and every cap application. Unlike traditional friction clutches, our magnetic clutches have no friction parts to wear and will produce extremely accurate and repeatable torque performance time after time.

The capping of retortable plastic bottles is no doubt challenging, but the challenges are well known to Zalkin and we have developed the technology to effectively run these packages on high speed lines. In fact, Zalkin has machines in operation on retort lines that produce over 1 million bottles per day!

Our application expertise, specialized designs and industry experience make us uniquely qualified for these applications. You can confidently rely on Zalkin as your partner for capping solutions to ensure success of your packaging line.