

High Speed Can Reject System

Customer: Major Bottle Inspection Solutions Provider

Challenge: How to economically reject stability-sensitive bottles at very high speeds

SMAC Product: LAL300-030

One of the world's leading brands of canned foods wanted to increase their line speed from 800 ppm to 1,400+ ppm. Their current reject system was having difficulty satisfactorily meeting even the current line speeds and it sometimes missed rejecting cans. They were having to replace air cylinder valves and/or valves approximately every 6 months due to a lack in response time when signaled to reject a can. They came to SMAC for a new approach to rejecting cans that would not only help them achieve their throughput goals but also increase their production uptime.



The ability to reject cans at line speeds is an important process. If a can is not properly rejected it can jam the line and cause significant decreases in productivity. If a targeted can is not rejected it can possibly reach the store shelf; damaging consumer confidence, impact branding and even leading to health or liability issues.

Cans vary in diameter and height, vary in filled and unfilled weight, and are closely packed diameter-to-diameter. Separate reject systems can be used for each type of can or manual adjustments can be made to a single pneumatic air cylinder system to compensate for all the differences. A common, flexible reject device can lower costs, increase throughput, and reduce changeover time, spares inventory and operating learning curve.

But meeting the goal of properly rejecting a can does not just mean simply removing it from the production line. Gently removing the can from the line is also important. Often the reject is initiated for cosmetic or superficial reasons that, once corrected, can allow the can to be returned to the line. If the can is damaged during rejecting process, reworking the can is no longer possible and good product must now be discarded as scrap. This is especially important if the cans are filled but not lidded. Rough handling may cause loss of product in the rejected can and possibly those behind it on the line.

Designing the best reject system involves a combination of speed, force and stroke length. The stroke and force of the mechanism are important to make sure the can is removed gently and far enough off the line so it does not disturb other cans. Speed and response time are important to make sure the reject system can reject consecutive cans and that the retracting rod does not hit the next good can. Small strokes at high speeds may be sufficient to reject larger filled cans but may damage smaller or unfilled ones. Longer strokes at lower speeds may not be sufficient to reject the can, especially larger filled ones.



Moving Coil Actuators

The longer the stroke length the slower the cycle time because the total travel of the shaft increases. Increasing the force of the rod without increasing its stroke is one way to reject a can without affecting the stroke or speed. Increasing speeds at higher strokes can also be accomplished by lowering the mass of the actuator's moving components.



Rejecting cans is a balance between productivity, quality, flexibility and cost. The ideal reject system meets them all. "We started off having to improve the customer's line speeds" explained Steve Curtiss, SMAC's Midwest Regional Sales Manager. "The customer quickly identified the additional benefits of the solution which resulted in our actuator's capabilities exceeding their expectations"

SMAC's actuator solution is faster and more responsive, reliable and gentler - All at a life cycle cost less than the current solution. The solution will also lower the customer's operating costs by using 48V/3 amp electric power instead of compressed air that is costly to produce, transport and maintain. This combined with SMAC's 100 Million plus cycle durability and ability to easily and cost effectively repair vs. replace the actuator at the end of its initial life will contribute its lower cost and being a more sustainable solution.

SMAC's actuators use moving coil technology and actuator rods with significantly less mass than other type electric actuators to allow them to achieve speeds >2,000 cpm. This eliminates the reject system as the speed-limiting process in the system. The actuator's built-in programmability of speed, force and stroke allowed multiple actuator profiles to be loaded into the system to optimize the parameters for each type of can while providing the ability to make numerous changeovers at the touch of a button. This makes changeover easier, faster and less costly. The ability to vary the force depending on the type of can means that only the minimum force will be applied to reject a can which will reduce damaged cans even at higher speeds.

About SMAC, Inc.: Founded in 1990 in Carlsbad, California USA, SMAC has now grown to become a world leader in Moving Coil technology and is now the largest manufacturer of Moving Coil Actuators in the world. SMAC manufacturers on a global basis with production, technical support and service facilities in North, Central and South America, Europe, and Asia. SMAC manufactures precision programmable electric actuators based on moving coil technology. These actuators are unique in that force, position and speed are totally programmable. They are designed to perform at exceptionally high speeds or very low speeds and with sub-micron accuracy and validatable repeatability with as precise as 1ms response time.