

DAIRY

Case Study



April 2015

Powdered Dairy Products/Infant Formula Package Testing

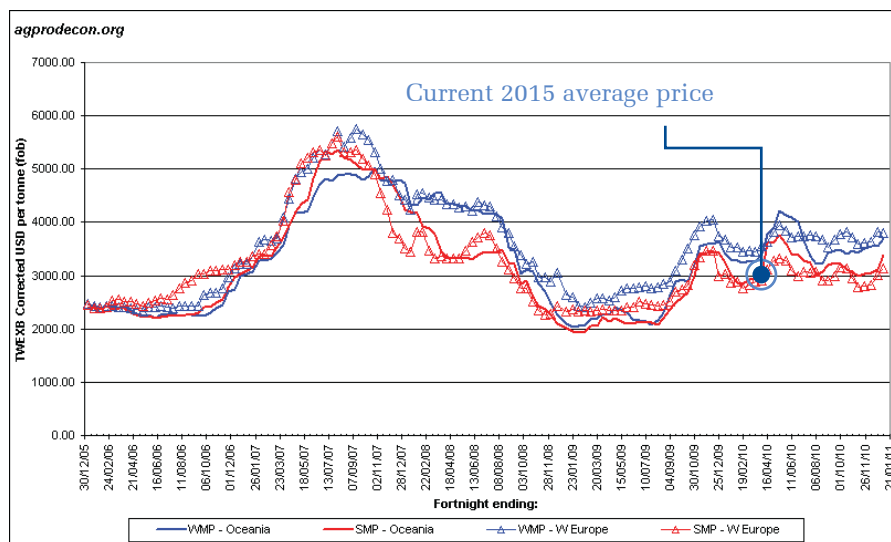
The standards of quality within the dehydrated dairy industry continue to become more critical, and end users are more sophisticated. Brand equity for both dehydrated dairy and infant formula manufacturers has global reach and implications. Manufacturers face higher standards, higher costs of manufacture, and there continues to be a significant gap between package testing requirements of dehydrated dairy packaging and the solutions that are available on the market today. PTI Inspection Systems has established a technology proven to reduce production waste and cost while improving quality assurance and defending brand equity.

The Cost of Destructive Testing

The cost of protein based powders is relatively high, with prices hovering around \$3,000 per metric ton. The overall global demand for dairy has surged, and developing countries increasingly consume dairy based infant formula. Dairy prices will continue to increase, meaning the cost of wasting dairy product weighs heavier on manufacturing operations each and every day.

$$\begin{array}{ccccccc}
 \$1.50 & \times & 100 & \times & 320 & = & \$48,000 \text{ Cost for a Single Production Line} \\
 \text{per lb of Dairy} & & \text{Tests/Day} & & \text{Days of Operation} & &
 \end{array}$$

World Milk Powder Prices, 2006-2011 (TWEXB corrected USD)



The Cost of Destructive Testing

Products using Modified Atmosphere Packaging (MAP) have the highest risk related to deficiencies in package quality control. Flexible packaging is especially susceptible to systematic micro leaks that will reduce shelf life and spoil dairy proteins. Most MAP applications use Nitrogen flushing, and testing package quality involves sampling package gas content days after the product has been packaged. This presents two issues:

- The production line is capable of producing 100,000's of units before a critical process issue can be detected.
- A 50 micron leak that is critical to the shelf life of the product will typically go undetected.

The protein based content of many products will allow bacteria to consume the majority of the O₂ content before the increase in O₂ is detected by gas testing equipment. Leaks as small as 10-20 microns will only increase the oxygen content to levels below 3%, the typical pass/fail threshold, passing defective product. A leak 10-20 microns in diameter will dramatically decrease the typical 12 to 24 month shelf life of protein based products, but will go undetected using gas headspace analysis. Package testing can be performed more immediately using the water bath leak test. However, the water bath leak test is only sensitive to 25 micron leaks at best, and in most cases only above 50 microns depending on the package expansion during the testing process.

Sensitivity Matters

Sensitivity of a test method is important for a variety of reasons, and most importantly serves to assure the quality of the product. Protein based powders are under modified atmosphere to prevent spoilage and to maintain the nutritional purpose of the product over the products shelf life. Oxygen and moisture ingress into the package will rapidly degrade the product prior to use, changing flavor, texture, and ultimately turning any valuable product into a liability. Oxygen ingress will occur in the presence of small leaks, and the level and impact of ingress is dependent on a variety of factors. For smaller package formats, leaks as small as 10 microns will have a near-term effect on product. Current conventional test methods fall far short from detecting such defects, and leave manufacturing operations exposed to debilitating quality deviations. Applying methods that offer higher sensitivity is not simply about finding smaller leaks, but is about offering the highest level of quality assurance.



PTI D-Series

The PTI VeriPac D-Series has a proven capability of non-destructively testing packaging at the production line with unmatched reliability and sensitivity. Non-destructive testing provides a greater understanding of package quality while also reducing waste. Waste reduction delivers a fast return on investment and brings operations closer to green initiatives. The D-Series reliably detects leaks as small as 10 microns, identifying process issues before they become critical, avoiding catastrophic quality deviations. The patented FLEX-Chamber eliminates the need for changeover between package formats when testing different size pouches and allowing multiple pouches per test, making it a universal solution for any flexible packaging operation. The method is immune to package variations, bringing a uniform test standard to all package shapes and sizes. VeriPac systems provide a definitive test result (PASS or FAIL) based on accurate and measurable quantitative data that correlates to leak rate and leak size.



VeriPac D-Series Large Drawer

VeriPac D-Series is a practical alternative and significant improvement to the destructive test methods commonly used for flexible packaging. Subjective test results, variable test standards, and higher risks associated with the use of other methods emphasize the need for better alternatives. Case studies have proven rapid return on investment, while simultaneously bringing quality standards to a progressive level and eliminating large scale quality deviations that leave \$100,000's of product on hold. The paradigm shift of improving quality, reducing waste, reducing costs, and assuring brand equity has arrived in the form of a pouch test system.



VeriPac D-Series Small Drawer