

Is That Bag of Chips Half Full or Half Empty?

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The answer lies in who answers the question: a food manufacturer or a consumer?

There are several considerations that should be taken into account, including the food product's fill quantity and packaging, transportation to the shelf and government regulations regarding net package contents, if you're a food manufacturer.

A variety of vibration test methods can be deployed to measure how packaging and the transportation route affects food settling and the customer experience.

Fill Quantity

Many manufacturers of chips, cereals, crackers and other packaged foods struggle to determine the optimum fill quantity of the food in its packaging so that the package itself has a good seal when it leaves the factory, while ensuring the consumer is satisfied when the package is opened. As the food travels from the manufacturer to the retailer, the vibration it endures during transportation causes the food to settle and appear diminished to the consumer.

Without an optimal fill rate, the manufacturer may return to the drawing board and try to reformulate the product — a time-intensive and expensive solution to a problem that can easily be solved with vibration testing.

Transportation

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When the consumer opens a bag of chips or crackers — depending on the fill rate and how far the product has traveled — they may see the bag as half full or half empty.

To ensure a positive consumer reaction, many manufacturers overfill; this may result in customer satisfaction, but is ultimately inefficient, and could sacrifice profitability and compromise the package's seal integrity.

Altitude can also play a factor; if a package is overfilled, it may burst if it travels to higher and lower altitudes as it makes its way to the retail shelf.

Federal and State Regulations

Food manufacturers must meet regulations issued by the Federal Trade Commission (FTC) and Food and Drug Administration (FDA) under the [Fair Packaging and Labeling Act](#) [1] (FPLA). Enacted in 1967, the FPLA requires that all “consumer commodities” be labeled to disclose net contents, identity of commodity, and name and place of business for the product's manufacturer, packer or distributor. The net quantity of contents should be disclosed in terms of weight, measure or numerical count.

The FPLA is designed to make value comparisons easy and to prevent unfair or deceptive packaging and labeling of many “consumer commodities.” The FTC administers the FPLA with respect to “consumer commodities” that are consumed or expended in the household.

The FPLA provides allowances for food manufacturers to utilize “slack-fill” (the difference between the actual container capacity and the product volume contained within) to keep a product from breaking, accommodate machinery on the assembly line or discourage theft in the store. These regulations were updated by the FDA about a year ago.

Many states, such as California and Florida, have additional regulations regarding packaging and labeling for products made in those states.

Effective Testing

Many manufacturers utilize boundary conditions when launching products. Fill levels that are too high introduce sealing issues, while fill levels that are too low cause customers to complain.

Most understand these levels well, but the settling effects of the supply chain can create a discrepancy between what the customer sees and what the manufacturer thinks the customer will see. Cost avoidance opportunities exist for those who work to understand the vibratory effects of the supply chain.

Laboratory-based testing offers controlled, repeatable and rapid evaluation of the performance of consumer packaged goods with respect to the physical hazards of

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distribution and supply chain.

Laboratory-based vibration testing provides an assessment of field performance to food manufacturers. Random vibration test methodology for packaged goods can compress a product's real-life journey into a shorter period of time and provide an accurate picture of the condition it will arrive in at its final destination and the degree to which the package's contents have settled.

In addition to laboratory testing, supply chain monitors can be included in shipments to calculate vibration on the routes products travel. The monitors report back exact vibration details.

By dialing in to the supply chain and transportation routes with effective testing and data, food manufacturers can avoid trial and error with mixed results and potentially unhappy customers. Vibration testing can deliver an optimal fill rate to the manufacturer, ensuring efficiency, profitability and customer satisfaction.

Food scientists can use the optimal fill rate when reviewing formulations or product enhancements, and manufacturing process engineers can set the right fill rate and ensure a proper seal.

Overall, distribution testing of packaged products can deliver material-efficient design with assured product protection, which are also essential elements of any approach to sustainability. Testing food products through the supply chain before a product arrives on the shelf can save manufacturers both time and money.

Mike Kuebler, [@michaelkuebler](#) [2], is the technical director for the [Smithers Pira](#) [3] Testing Laboratory in Lansing, Michigan. Kuebler has over 15 years of experience in the transportation and packaging industries, including six years with Smithers Pira. He has held engineering positions with well-known companies in the packaging and consumer goods industries. Kuebler guides a team of packaging experts who analyze the true impact that the supply chain has on a package through standard and non-standard package testing methods. Whether manufacturers are looking to optimize the cost and design of their current packaging, reduce the use of packaging materials to contribute to sustainability initiatives or analyze and correct package damage issues, Kuebler keeps the focus of all efforts on the concept of "Just Right Packaging."

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