

The Art of Packaging High-Value Powder Cans



JBT Powder Seaming Technology

Over the last ten years, there have been major improvements in the production and packaging of powdered infant formula, especially in Asia-Pacific territories. Products need to be safer than ever before, nutritionally balanced and well regulated, with complete traceability across the entire supply chain.

A critical stage for compliance is the filling, seaming and secondary packaging of the infant powder formula. This has required equipment manufacturers to respond accordingly, developing new technology that exceeds standards and gives brands extra credibility, while instilling consumer confidence.

However, designing and manufacturing suitable filling equipment not only requires years of experience and industry knowledge, but also specialist techniques that can meet, and indeed exceed, legislative requirements.



Product Quality Food Safety

from primary processing
to final retail packaging



JBT is a leading provider of integrated food processing and packaging solutions.

From single machines to complete processing & packaging lines,
we enhance value and capture quality, nutrition and taste in food products,
ensuring product quality, safety and longer shelf life.

With a local presence on six continents, JBT can quickly provide our customers and partners
in the food processing industry with the knowhow, service and support needed to
succeed in today's competitive marketplace. JBT is your single source for
profitable processing and packaging solutions.



We're with you, right down the line.™
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The Powder Market

These days, vast amounts of packaged foods are marketed in powder form; this offers several significant advantages, including smaller volumes, easier transportation and handling, lower moisture content and extended shelf life. As a result, food and beverage powders have increased in popularity, from coffee, powdered milk, cocoa and instant tea, to vitamin/mineral instant mixes and nutraceuticals.

As consumer demand for functional and nutritionally balanced powders increases, greater emphasis has been placed on safety in terms of packaging and processing a final product. This has led to the industry driving improvements in product handling, with the techniques for packaging of powders becoming incredibly stringent - especially in the infant formula market, where consumer trust is essential.

Infant Formula

The global infant milk formula is the fastest growing category within the larger baby food sector. A major factor driving growth is the increasing number of working women; indeed, it has been reported by Euromonitor that the number of working mothers, and women considered to be the head of a household, increased by 16% between 2010-2015. Other factors include greater awareness of various health benefits and increased per capita expenditure on newborn babies. Infant formula contains protein, carbohydrate and other important nutrients required for well-balanced infant growth. As these formulas offer such convenience with their ease of preparation, it is anticipated to further fuel the growth of this market. In addition, the wider availability of alternative infant formulas, such as organic, milk-based, soy-based and specialty ingredients with additional flavors, are other factors expected to support market expansion.

Asia-Pacific territories are anticipated to dominate the infant formula market in terms of revenue, due to high levels of demand in China, Hong Kong and Indonesia. This is a result of ever-expanding middle classes accessing increased disposable incomes, as well as the growing number of working women who are becoming active drivers of the economy within these countries.

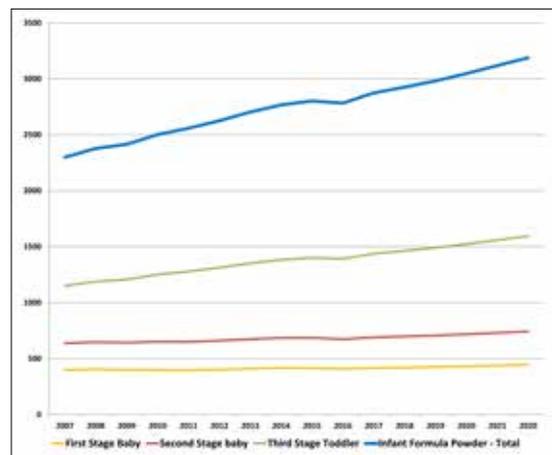
To illustrate this point, sales of infant formula in Asia will have almost tripled between 2010 and 2020, with the majority of growth driven by China - which accounts for more than 50% of the total Asian market and a third of the global market for infant formula. China alone accounted for 46% of the milk formula market in 2015. (ResearchMarket24)

Brands Are Best

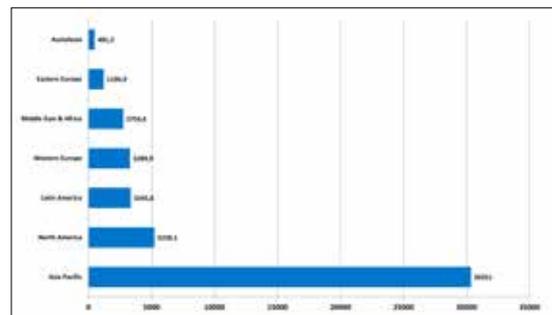
Another key characteristic of the global infant nutrition market is the very low penetration of supermarket 'own-brand' labels, which currently account for less than 1% - suggesting a high degree of brand loyalty from consumers. Quality and safety are the primary criteria for parents/guardians and branded items are more strongly perceived to be associated with these attributes.

This is contrary to many other food categories, where 'ownbrand' label products successfully compete against major brands on price. However, the market indicates consumers are not prepared to economize on infant formula, with higher prices from high quality branded products perceived to be the result of better nutritional value for babies. (Nielsen Research)

Evolution Infant Formula sales per type - 2007-2015



Evolution Infant Formula sales in 2015 - per region



From Grass to Glass

With so much attention on the infant formula market, the supply chain is now evaluated as a whole, popularized by the 'grass to glass' adage. This has meant companies producing infant formula need to control the quality, safety and complete integrity of products along the full length of the supply line.

A key area requiring tight control is the processing and packaging of the infant formula itself. At this stage, there is a heightened risk of potential issues, such as foreign bodies entering the supply chain, contamination of the product or poor sealing - all of which can affect the product quality, safety and shelf life.

As a result, there have been vast improvements in the technology that produce infant formula. Today, the gold standard for filling containers of infant formula is to use a process called Vacuum Powder Filling (VPF).

What is the purpose of VPF machinery and how does it work?

A VPF machine receives empty containers from a line, which are then filled to a predetermined level, depending on the parameters of the product and level of tolerance required. Instead of using gravity, the powder is delivered under vacuum for fast and gentle filling of each container. This also eliminates the need for an auger on the line, ensuring there are no moving parts in contact with the final product.

A typical VPF machine will then weigh each container individually to ensure it is within the specific guidelines for the product, with underweight containers rejected and correctly filled items proceeding onto the next process of the line.

Key stages of a VPF machine

While the overall process might appear simple, equipment has to be carefully designed and calibrated to ensure the filling of product is compliant with the latest legislation.

The process consists of:

- A lift table raises containers up before they are sealed to a specially designed nozzle
- The nozzle feeds powder from a hopper into a container through a central channel where a vacuum is applied
- The hopper holds a quantity of powder to ensure constant supply for the filling nozzles.

Extra levels of safety

A powder filling line can benefit from greatly improved hygiene levels by using an In-Line Gassing System. This more sterile environment reduces the residual oxygen to minimal levels from the pre-gassed state in the hopper, through to the sealed container - which has been proven to extend the shelf life of packaged products.

Consumer Acceptance

Vacuum Powder Filling has been accepted as the new standard for infant formula safety, productivity and product quality by many of today's infant formula producers. Leading infant formula manufacturers can now strategically leverage the benefits of VPF. They can do this by:

- Guaranteeing product integrity, thanks to no moving parts coming into contact with the powder formula
- Ensuring no human contact with the product during the filling cycle
- Accurate dosing of the powder to within a 0.1% or better tolerance of the required weight
- Gentle handling of the product to maintain consistency and avoid product breakdown through the filling process.

Filling is the first part

Maintaining high levels of food safety also extends beyond a VPF machine and into the can clinching and closing processes. At this stage, it is essential to ensure the sealed can and the product contained within it are of irrefutable quality. Improving the appearance and convenience of the packaging itself offers a key competitive advantage to infant formula manufacturers. For these reasons, most leading brands are packaged in lithographed cans to reinforce the quality of the product inside. Gentle container handling also ensures package quality and integrity, which is now a vital part of the evolving industry requirements.

Fierce competition on the international markets has also driven the industry to a higher level of process line efficiency. This has resulted in a need for higher throughputs with less product give away and minimal down time. Furthermore, when multiple can formats are run on a single line, fast and reliable can format changeovers - without the need for the intervention of a seaming expert - are a common requirement.



The key elements of a can seaming machine for powder products should include:

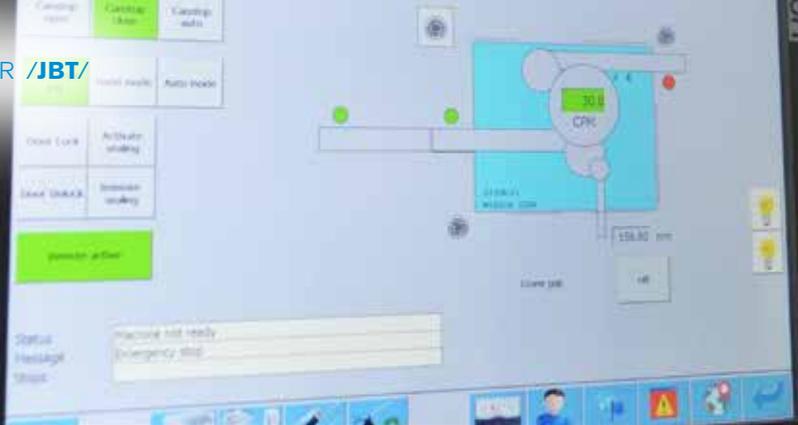
- Hygienic design that meets or exceeds the latest industry requirements
- Easy seam settings and consistent, high quality seams
- Gentle can handling to preserve package quality
- No exposed lubricants and prevention of foreign particles, which may compromise product integrity
- Quick can and cover format change-overs to maximize line efficiency

Superior Hygienic Design

Once again, a hygienic design is essential when it comes to seaming technology. This requires the equipment to be designed in such a way to avoid the following:

- Powder spillage - removing this from the process is critical, as it not only prevents wastage, but also avoids powder bridging through the can seam. In the seamer, this is accomplished by the use of so-called "stopping lifters" that only start rotating when the cover is firmly positioned and stop as soon as the seamed can leaves the lifter table.
- No exposed lubricants - equipment that utilizes an infeed scroll is preferable over an infeed chain, as it removes the presence of exposed lubricants above the can and eliminates the risk of product contamination.
- Hygienic guarding - utilizing a filling and canning line that has transparent guarding allows the entire machine to be visually inspected. In addition, large lockable access doors should be included to facilitate easy vacuum cleaning of the line.





DO NOT DRILL HOLES

Total Cost of Ownership Matters

When specifying equipment for the filling and sealing of infant formula, it is essential to consider lean production values, i.e. the lowest possible product waste and operating costs. This can be separated into three main areas:

Operational efficiency

Maintaining an efficient filling line is essential to the business models of infant formula manufacturers, with a minimum number of product containers delivered in a set period. This can be optimized by using filling and sealing equipment that is easily accessible for ongoing inspections during operation. Such a setup also allows swift interventions to be made before any major issues occur and knock-on costs are amplified.

Changeovers of product also need to be considered, as the less time required to prepare the line, the more production capacity is available to a producer. This is linked closely to the pre-programming capabilities of the HMI panel and software therein.

Automated maintenance

Lubrication can be automated (where required) to ensure ongoing maintenance cycles are kept up to date. This can prevent unnecessary issues with the filling line.

Planned servicing

It's important to protect an investment in a filling and sealing line. Service packages and maintenance agreements delivered by the original equipment manufacturer allow budgets to be allocated, which spreads the cost, as well as covers the line for any unforeseen issues.



Technologies From Brands In The JBT Family

Commitment to excellence in powder packaging

The ethos of JBT is simple: Absolute dedication to understanding our customers' packaging needs. By utilizing many years of knowledge and experience, our powder packaging solutions offer unparalleled quality and reliability.

With continued investment in research and development, as well as valuable feedback from our customers, we have designed a range of user-friendly models that provide powder manufacturers with greater flexibility and technical capability.

Powder & granular filling

With a customized approach, JBT's PLF business unit is able to manufacture

machines capable of filling a wide variety of container types, including cans, glass jars, plastics and bags. JBT's PLF Vacuum Filling Machines have been developed to handle an extensive range of high-value powders, such as milk formula, spray-dried coffee, chocolate and nutraceuticals. Plus, all filling is achieved with minimal product breakdown and dust generation.

JBT's PLF filling machines are renowned for handling products gently, with no moving parts in contact with the powder or granules during the filling process – reducing the risk of contamination. Such a reputation has elevated JBT's PLF machines as the preferred choice by leading organizations in the food, beverage, pharmaceutical, cosmetic and household industries.

With over 25 years' experience, JBT's PLF powder filling machines have been designed and manufactured to offer a unique combination of benefits.

The most notable is the extensive range of models and designs available, which make the filling machines suitable for almost all powder filling applications. So, for larger production lines, JBT's PLF produce a 30 head rotary machine that is capable of delivering high volumes. While, for smaller applications, the company's in-line machines offer the same level of accuracy and gentle product handling.



A customized approach

Every powder filling application has different requirements, and it is important to consider all aspects of a filling system, from the product's flow characteristics and container type, to line speed and feedback systems, not to mention accuracy and consistency. JBT works with customers from the outset, designing and planning a system that will perform efficiently for its entire lifecycle. The result is an unparalleled quality of filling machinery.

Container and product types

With a customized approach to powder filling equipment, it is possible to develop Vacuum Powder Filling Machines capable of filling a wide variety of container types, including cans, glass jars, plastics and bags. Indeed, JBT's PLF vacuum filling machines have been developed to handle an extensive range of powders that are packaged in different forms, such as milk formula, spray-dried coffee, chocolate and nutraceutical. And regardless of the container, all filling is achieved with minimal product breakdown and dust generation.

A further benefit of JBT's PLF Vacuum Powder Filling Machines relates to free-flowing products that do not bridge through an aperture, which can be accurately filled using positive shut-off nozzles. This approach is ideal for products such as freeze-dried coffee, dishwasher powder, sugar or spices.



Powder Container Seaming

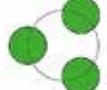
Metal or composite double-seamed cans, lithographed or labelled, are frequently used for packing high value, premium powders. The metal or composite cans can each be fitted with a peelable, easy-open lid, typically covered with a plastic cap for reclosure. Lithographed metal cans strengthen a consumer's perception of a product as being convenient, safe and of the highest quality.

Having to recall a high value powder product due to possible contamination can be a disaster for producers and marketers, especially in an industry where safety is of utmost importance. Consequently, it is vital to opt for can seaming technology that delivers the highest possible standards of hygienic design.

Continuous improvement, driven by customer feedback, is key for reaching the highest food safety standards and this has been the approach throughout the development of JBT's SeamTec™ Seamer for Powder equipment. The seamer has been thoroughly tested in production environments and carefully adjusted to guarantee the highest sanitary requirements, while also delivering the excellent product quality at the lowest cost per unit.

The result of this approach is a well-thought-out range of seamers, created to ensure the new SeamTec Seamer for Powder fits perfectly into existing powder packaging lines.

JBT's unique six-head design is a state-of-the-art seamer that can run up to Ø127 cans on all six seaming heads, at speeds of up to 450 cans/minute (27,000 cph). The combi variant of the ST206 is fitted with a seaming head preset for two can diameters, which means no changeover is required for the essential machine parts. This is a unique feature dedicated to powder applications, as it helps minimize operator intervention, as well as eliminate the need for seam adjustment, reduce machine downtime and guarantee a consistent seam quality.

Model	Seaming Stations	Ø99	Ø127	Ø153	Can Diam Range	Speed Range (for standard can & cover)
ST203	3				99 - 154 mm (401 - 603)	Up to 240 for Ø99 Up to 210 for Ø127 Up to 180 for Ø153
ST206	6				99 - 127 mm (401 - 502)	Up to 480 for Ø99 Up to 420 for Ø127
ST206 COMBI	3+3				99 - 154 mm (401 - 603)	Up to 240 for Ø99 Up to 210 for Ø127 Up to 180 for Ø153

Unmatched Powder Seaming Technology

High-tech seaming head

The SeamTec Seamer for Powder is equipped with a completely closed oil-lubricated high-tech seaming head and lifter table for sustainable, carefree operation. The spindles, lifters and the short and robust seaming arms have been specially designed for heavy duty and long life. These unique features allow for high operating speed, combined with accurate and consistent seaming quality.

Specially designed and coated seamer tooling, combined with free rotating knock-out pads ensure a long tooling life and an impeccable seam and cover quality.

Optimal cover feeding

The SeamTec Seamer for Powder is equipped with a well-conceived lid feeding system to handle the covers with the highest efficiency and care. It automatically detects reversed covers, which can easily be removed during operation.

Furthermore, a continuous cover stack pressure control (gap control) guarantees an ever consistent cover feed, independent from interruptions in the lid supply. The gap control also reduces contamination of the cover feed area from metal burs. An optional Foreign Particle Prevention System evacuates potential metal burs in the critical seaming zone.

Easy seam setting

Another interesting feature of the SeamTec Seamer for Powder is the easy seam setting. When engineers want to verify the quality of the seam, they do not have to dismantle the second operation seaming rolls to run a test of the first operation. To avoid excessive downtime, they can easily disengage the second seaming operation and focus on the first, which is crucial for the overall quality.

Gentle can handling

The SeamTec Seamer for Powder guarantees a gentle can infeed and transport through the seamer. A synchronized can stop turret and infeed scroll avoids denting, while powder spillage at the end of the line is prevented by a can stop turret manufactured from flexible synthetic material and by the "stopping lifters."

The hard-chromed change parts also ensure there are no scratches on lithographed cans.

Quick can and cover format changeover

A highly important operational benefit of the SeamTec Seamer for Powder is a quick can and cover format changeover. There is no need to separately change the first and second operation seaming rolls. The lower arm holding both first and second operation seaming rolls can be changed quickly without disassembly.

All can and cover handling parts are color-marked and match the HMI on-screen settings. All format change parts and tooling are equipped with locating pins to allow a quick and fail-safe changeover.

An optional motorized can height adjustment will further increase machine uptime.

No exposed lubricants

In order to meet the industry's sensitivity to foreign particles, the fast rotating parts of the SeamTec Seamer (spindles, knock-out shafts and lifters) have been designed to eliminate any exposed lubricants. Quick exchange sets of these crucial components are available in order to minimize down time.

	ST203 3 heads 0h40"	ST206 6 heads 1h20"	ST206 COMBI 3/3 configuration
TOOLING: Chucks, Rolls, Knock-out Pads & Seam setting	0h40"	1h20"	Not applicable
CAN & COVER PARTS: cover guide(s), cover feed magazine, gap control (if applicable), cover turret, can infeed stop and side guide, Infeed worm, can guide	1h15"	1h15"	1h00"
CAN & COVER PARTS: discharge turret, center turret, can lift stop turret, wear plates			Not applicable
TOTAL CHANGE-OVER TIME: for Ø 127 to Ø 154 mm	1h55"	2h35"	1h00"



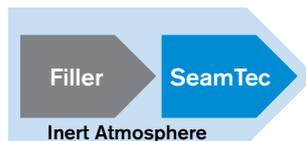
SeamTec Seamer for Powder Configurations

The SeamTec Seamer for Powder is available in several configurations, in order to fully meet each can packaging principle, pre-or post-gassing requirements:



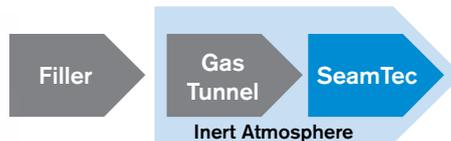
Pre-Gassing

SeamTec Model F2 Seamer with inflatable seals on doors



Pre-Gassing

SeamTec Model F2 Seamer with inflatable seals on doors



Post-Gassing (Gas Box)

SeamTec Clincher Model F3 *

SeamTec Closer Model F4



The SeamTec Seamer for Powder can come in a dust explosion safe version (applicable to clincher execution only, in which exposed powder & oxygen in atmospheric conditions are combined).

Our long-term commitment to the powder industry made us the preferred partner to the global market leaders in infant formula, with more than 100 machines in operation worldwide, including brands such as: Nestlé, Abbott, Mead Johnson, Wyeth, FrieslandCampina, and Synutra.

In order to arrange a meeting with a JBT Powder Processing expert to discuss your specific processing and packaging requirements, simply e-mail us on

hello@jbt.com





**STRONGER
TOGETHER**



Ancillary Equipment

Over the last two decades, JBT has continued to develop a comprehensive range of filling and closing solutions to meet the demands and expectations of its customers. This continued research has produced a range of complementary ancillary equipment for powder packaging lines, including:

- scoop inserter
- in-line gassing
- barcode reading
- laser coding
- container inspection
- high speed reject
- UV sterilization designed for container and lid disinfection prior to the filling process.

Every JBT machine is specifically manufactured to accommodate the precise needs of each powder processor, resulting in a bespoke system tailored to individual requirements and all backed by a global firstclass service.

Such an approach has established JBT as a worldwide leader, with a customer base that includes global brands in the food, pharmaceutical and beverage sectors.



COUNT ON JBT TO HELP PROTECT YOUR INVESTMENT

JBT's greatest value in PRoCARE® services comes from preventing unexpected costs through smart, purposeful, and timely maintenance based on unmatched knowledge and expertise. PRoCARE service packages are offered as a maintenance agreement in various service levels, depending on your production and cost management requirements.



JBT LIQUID FOODS

FRESH PRODUCE TECHNOLOGIES | FRESH-CUT, ROBOTICS, STEAMING | FRUIT AND VEGETABLE PROCESSING | SECONDARY PROCESSING | ASEPTIC SYSTEMS | FILLING AND CLOSING | IN-CONTAINER STERILIZING | HIGH-PRESSURE PROCESSING | POWDER PROCESSING | TUNA PROCESSING

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