Product Recovery (Pigging) Case Study:

Chocolate Manufacturer

United Kingdom

How Multiple HPS Pigging Systems Are Reducing Cross-Contamination Risks in Chocolate Transfer Lines

HPS Product Recovery Solutions

www.hps-pigging.com

Summary

- A UK-based chocolate manufacturer produces a wide range of products, including chocolate decorations, easy-melt chocolate, and chocolate chips.
- The company approached HPS to find a way to reduce the need for sending product to rework after batch changeovers.
- HPS designed, implemented, and commissioned multiple advanced liquid product recovery (pigging) systems at the site.
- The pigging systems resulted in potential product rework dropping from a predicted **5-15% to <1%**.
- In addition to rework reduction, the pigging systems are allowing the client to maintain product recipe segregation to an **incredibly high level**.
- The systems are also **fully automated**, resulting in **increased efficiency**, **reduced contamination**, and **larger yields**.
- The company is estimated to save **£2,000,000 worth of product per year**.
- Up to **one tonne of chocolate is recovered every day**.
- The pigging systems work quickly, with the pig travelling **200 metres every 60 seconds**.

About the Company

The HPS client is an established chocolate manufacturer, having first begun production in the early 1990s. The client began expanding into the European market in the early 2020s, opening their first European site in the United Kingdom.

With a large brand portfolio, their chocolate products are highly popular in Asia and are gaining popularity within Europe.

For reasons of commercial confidentiality, HPS is unable to disclose the name of this client.

Project Background

The client purchased and refurbished a factory site in England for plain, white, and milk chocolate production.

Maintaining high product integrity is at the top of the client's priority list, so ensuring batch segregation is key.

From extensive experience in chocolate production at their Asian plants, the client's team knew that there was potential for batch crossover during processing. The significant quantity of chocolate in the lines would result in large amounts of product requiring rework should crossover occur.

Why the Client Investigated HPS Technology

Aware of the potential for batch crossover, the client began looking for a technology that would enable effective batch segregation, efficient transfer runs, and optimise cleaning processes.

For the company, the transfer process involves using the same pipelines for different batches of the same product. As the product is the same (e.g., milk chocolate is followed by milk chocolate) the company would be able to perform batch changeovers easily, however the minor variations in each batch recipe would result in large quantities of product from the end of one batch and the beginning of the next batch needing to be sent for rework before being suitable for sale.

Pigging technology, by recovering product between batch changeovers, significantly reduces or removes the amount of product that is left in the pipeline after a transfer run. With a pigging process, the company can reduce or remove the requirements for product rework.

Additionally, when processing chocolate, pipelines require jacketing to keep the product fluid. HPS's client use water jacketing and the number and length of the pipelines means that a significant quantity of energy is required to heat and maintain the heat of the water at 55°C (131°F).

By reclaiming the residual chocolate from the pipeline using pigging technology, the company would be able to reduce the heat or turn off the jacketed pipeline. Improving the efficiency of the jacketing would allow the company to reduce their energy consumption and save costs on overheads.

Additionally, cleaning pipelines in chocolate processing can be labour and resource intensive. Manufacturers choose to clean chocolate transfer pipelines differently and methods range from dismantling pipework to flushing with butter oil.

Rather than spending time on non-productive procedures, pigging would enable the company to increase production capacity and product output, as well as saving money, labour, and resources.

Why the Company Chose HPS as their Pigging Systems Provider

HPS Advanced Liquid Product Recovery Technology, also known as "pigging", is used by manufacturers of liquid products to recover products from pipelines for further processing, packaging, and sale.

There are many benefits of pigging, such as increased yields and capacity, reduced waste, improved environmental sustainability, and, importantly for the client, reduced contamination risks.

HPS was initially recommended to the company through a third-party.

HPS had plenty of experience to help the chocolate manufacturer prevent batch crossover, having previously worked with chocolate manufacturers such as Mondelez International, Hershey's, Ghirardelli, Lindt, and more on a variety of projects.

Having researched HPS thoroughly, they reached out to discuss their project in greater detail.

During their conversations with Shaun Pitcher, HPS Systems Design Engineer, a solution was proposed that would facilitate efficient product recovery.

The reliability, quality, and cost-effectiveness of HPS pigging technology were key in helping the company to choose HPS as their pigging systems provider.

Key Objectives of the Pigging Project

The key aim of pigging for the client was to prevent batch contamination, however they also saw the potential for improving efficiency during product transfers.

By recovering product from the line, the company would be able to reduce the amount of time that the pipe jacketing needed to be heated. Reducing this time by recovering the product also saves energy consumption, decreasing overhead costs.

Additionally, the manufacturing process for solid chocolate products requires liquid chocolate to be transferred to a machine that requires cleaning with water, which chocolate manufacturers prefer to avoid using to prevent chocolate seizure. By using pigging technology, the client avoids having chocolate remain in the machine, reducing the number of times that the machine needs to be cleaned.

The Solution

Working alongside the client's team, six lines that needed pigging technology to prevent extensive wastage were identified.

The lines transferred products between conches to storage tanks. Two of the lines are 3-inches in diameter, two of the lines are 4-inches in diameter, and two are 5-inches in diameter. All the lines varied in length and each line is dedicated to a particular type of chocolate (milk, plain, or white) to prevent contamination.

HPS designed, supplied, implemented, and commissioned fully automatic, single-pig pigging systems for each of the lines.

HPS pigging technology is designed for use in hygienic applications, including chocolate production, and helps companies increase yields and reduce waste.

The design of the HPS pig allows for bi-directional travel. It also allows for a combination of propellants to be used. The client utilises compressed air to propel the pig through the line and back to its housing. Additionally, the lack of solid magnet or fins increases the safety and efficiency of pigging by removing the risk of pig breakage and increasing flexibility around bends.

In addition to the systems, the client is also benefitting from the HPS AccuTect pig detection system. Using the AccuTects, operators can reliably track the location of the pig and control deployment and return from the HMI/PLC.

The Results

“HPS estimates that without pigging, the client would send approximately “2,000,000 worth of chocolate to waste annually.

The company took over the site from its previous occupier and refurbished it. HPS was approached during the refurbishment period, meaning there are no “before-pigging” figures available.

Using a thorough calculation process, which considers product value, product characteristics, line dimensions, and more, HPS estimates that without pigging, the client would send approximately £2,000,000 worth of chocolate to waste annually.

Since the pigging systems have been commissioned, the manufacturer has pigged daily, recovering up to a tonne of chocolate per run. They have also experienced no product cross-contamination due to the effectiveness of the HPS pigging system in reclaiming product.

The client has also seen incredible operational efficiency, with the pigging sequence taking only 60 seconds per 200 metres of line. Clean and effective, pigging has allowed the client to optimise their cleaning processes and has reduced the need for product storage, transport, and rework.

In addition to the above benefits, by saving energy and resources, pigging has also helped the company improve their environmental sustainability.

Contact HPS

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