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Pigging system and pig speed regulation plate: SERVINOX is committed to Results and to Safety

Through its involvement in R&D and its extensive experience, SERVINOX so often comes up with outstanding solutions, and has no hesitation in committing firmly to the results and reliability of its solutions. These include its pigging system, associated for over five years with a pig speed regulation system.

Illustration of the SERVINOX approach applied to the chocolate industry.

The particular constraints of the chocolate industry

The handling of chocolate and its derivatives, which harden when cold, requires the maintaining of the entire chain of production at a sufficient and constant temperature. What also needs to be borne in mind is the impossibility of cleaning production installations with water. To address these constraints, manufacturers use installations with jacketed piping, in order to keep the chocolate at the desired temperature throughout the transfer cycle.

Furthermore, in order to guarantee product conformity, it is difficult to pool the production lines for the different types of chocolate (dark, milk, white), at the risk of impairing the quality of the end products on account of residues left in the pipes by previous transfers. It is therefore preferable to dedicate manufacturing zones and transfer lines to particular chocolate types or grades, which quickly makes installations both complex and inflexible.

Another constraint - regulatory this time - obliges chocolate manufacturers to guarantee a minimum cocoa level in the finished product. Since this obligation has a minimum but no maximum limit, manufacturers have therefore adopted the habit of working chronologically on the chocolate with the highest cocoa level through to the chocolate with the lowest. The consequence of this, aside from the previously mentioned lack of flexibility, is the incurring of real financial losses on account of the cocoa content of some of the mixes, unfavorably proportioned.

With regard to installation costs, operating costs and production constraints, manufacturers have had to adapt their procedures, yet SERVINOX, thanks to its multi-sector experience and its detection of problems that are common across all the industries it works with, has studied the question in order to provide alternative solutions.

SERVINOX forced-air pigging applied to the chocolate industry: Reduced installation costs, improved safety and traceability, and production gains

Whether for one of the world leaders in cocoa bean transformation, or for the main French and European chocolate industry players, SERVINOX is capable of guaranteeing reduced losses and reduced product impairment.

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Adapting the forced-air pigging system for mechanically cleaning the interior of the chocolate transfer lines seemed to provide an appropriate response for the sector in view of the aforementioned constraints. Yet the standard valves would have prevented the passage of the pig and involved the installation of the valves outside of the main pipeline, causing chocolate to flow outside of the zone concerned by the transfer and hence leading to product losses.

However, in 2005 - and for the very first time - SERVINOX proposed to a chocolate manufacturer the installation of a forced-air pigging system with no risk of product loss, thanks to the installation of **full-bore multiway valves**, and **jacketed** piping.

Key components of the system, the **full-bore multiway valves** were made-to-measure so as to adapt to the transfer lines, in particular enabling the product and the pig to be sent in various directions, or only filling with chocolate the pipeline sections between the launching station and the receiving station.

All the **valves, launching stations and receiving stations** were, moreover, installed in a **jacketed** version in order to guarantee product line operation in the "cold zones" of installations and reassure users who were not yet ready to make the leap toward "single jacket" installations.

This meant that the **patented design of the solid elastomer pig** from SERVINOX, capable of traversing standard pipe bends (1.5D & 3D as from DN 80), was able to guarantee optimum mechanical pigging quality over the entire inner surface of the pipes, in line with the minimum residue requirements within the circuits, in order to enable rapid product switches.

On the basis of the efficiency and relevance of its equipment, this SERVINOX pioneer product was capable of assuring the **following commitment to results for the chocolate industry**:

- controlling the cocoa levels in the transferred chocolate (batch traceability);
- eliminating the risks of mixing different varieties of chocolate, thereby making it possible to use common production lines for different types of chocolate;
- considerable reduction in the volumes of loss, with a wastage rate of less than 0.5% of the volume treated by the transfer line;
- enabling, therefore, manufactures to **reduce installation and operating overheads** and improve **productivity**.

The market launch in 2008 of the SERVINOX pig speed regulation system: Fresh cuts in global overheads

At SERVINOX, more than just a commitment, **continuous improvement is a philosophy** and a strength. Our teams seek to meet the needs of industrialists at any given moment, and work in phase with the requirements of customers, regularly resolving particular problems, to the extent of even anticipating them. Such responses included the creation in 2008 of a pig speed regulation plate.

What sparked this innovation was a problem submitted to SERVINOX from a chocolate manufacturer based in Belgium, linked to the speed of arrival of the pig at the end of its run in the receiving station. The forced air generated caused the destruction of the single-use flexible sleeves used for transferring the liquid

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chocolate to the tanker lorries, leading to considerable losses in production and safety risks for people and equipment.

On the transfer line, the forced air pressure came from a regulator that was manually adjusted at a set pressure, and which therefore remained the same from start to end of the pigging process. At the start of the pigging phase, the pig had to push the product volume contained right along the line, and possibly having to pass through rising pipes. The adjustment pressure therefore had to be sufficient to get through all this.

Yet, as the pig advanced, it could be observed that there were fewer load losses to overcome, and the forced air pressure would no longer be the same, therefore considerably increasing the transit speed of the pig. When this arrived at the end of its course, it was propelled by the same pressure as at the start, and arrived often too quickly at the end stop, generating a violent impact and damage to the pig and to the surrounding line equipment.

This also generated risks of blockage in the pipe bends, and therefore sudden halts, leading to premature wear and tear of the pig, the risk of overheating, and jerky - even "violent" - pigging operation, in particular in long pipelines.

The pig speed regulation (RVO) plate developed by SERVINOX was lauded as a genuine technical innovation: as well as being capable of increasing the launching station pressure in order to overcome load losses, it was now possible to **control the speed of the pig throughout its entire travel** through the piping, whatever the instantaneous load loss may be (rising pipe, viscous product, elbow bend, etc.).

Last but not least, if all the SERVINOX solutions are installed together, they make pigging so efficient that there is now **no point in using jacketed lines**. This continuous improvement approach makes it possible to reduce by a further 30% the installation costs linked to **pipe fitting operations**, and to reduce considerably the operating overheads (water and energy consumption linked to steam production), in addition to the aforementioned points.

SERVINOX: committing to results and to the safety of equipment

Thanks to this example of continuous improvement, around 50% of the forced air pigging systems installed by SERVINOX since 2008 have been equipped with an RVO plate (across all industries).

Indeed, not only has this approach been profitable to the chocolate sector, but SERVINOX has also been able to adapt it to many other business sectors, with the constant objective of reducing plant installation and operating costs, keeping constantly attentive to customer needs and offering them advice and the benefit of its expertise, while committing to the results and safety of its equipment.

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