Handling dairy fluids in 21st century

Harry Flannery & David Cole
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Agenda

- Introduction
- Consumer demand for safe and hygienic food
- Challenges of yogurt transfer - shear thinning
- Controlling costs - system efficiency
- Where we operate
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Introduction to Watson-Marlow

Watson-Marlow Fluid Technology Solutions (WMFTS) is part of Spirax Group, a multi-national industrial engineering Group.

We are a world leader in manufacturing peristaltic pumps and associated fluid path technologies for the life sciences and process industries.

- 11 manufacturing sites
- 6 brands
- Our smallest pump, operating at its lowest speed would take more than 13,000 years to pump what our largest pump, at its highest speed, can pump in just one minute
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Introduction to an exciting market

As consumers become more aware of healthy eating, the drive for healthy, low sugar and high protein foods continues to drive growth.

Innovation of product driven by healthy eating trends will require agile and adaptive processes.

Growth areas include demand for high protein yogurts (up 35%) plus steady growth for natural yogurt and functional health products which support gut health & immunity.

Time poor consumers seeking quick & easy meal replacement products - growing market for meal replacement drinks.

The rising cost-of-living is reported to be driving home cooked food and baking offering market growth for yogurt use in recipes.
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Safe, hygienic foods

Following the coronavirus pandemic, the need to meet customer standards is higher than ever. Consumers' awareness of all aspects of hygiene have been heightened.

In 1989 EHEDG was formed, their vision:

“The aspirational goal that drives our foundation is to be the leading source of hygienic design and engineering expertise, and enhance food safety and quality across the whole industry. This is the shared ambition that shapes our role in the outside world.”

EHEDG equipment certification:

“The European Hygienic Engineering & Design Group (EHEDG) has developed standards and methods for testing and certifying equipment in accordance with the latest research and state-of-the-art technologies.”
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Safe, hygienic foods

EHEDG certification supports guidelines that help you reduce food safety risks through high-quality equipment and lower cleaning costs with clean-in-place (CIP) technology.

Aseptic certified pumps reduce the risk of contamination while extending product life without the need for additional preservatives.

A fully certified pump ensures sterility is maintained during the transfer and packaging process. This reduces the risk of contamination preventing the loss of product for the manufacturer and also reducing the risk of contaminated product reaching the end user.
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Safe, hygienic foods

Cleaner than any lobe pump or circumferential piston pump

- EHEDG Type EL – Class 1
- EHEDG Type EL Class 1 Aseptic

Reduce CIP cycle and the amount of cleaning agents required

All contact parts FDA and EC1935 compliant
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Safe, hygienic foods
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Challenges of yogurt transfer - shear thinning

As Yoghurt producers, you tell us that you add viscosity to account for process losses.

Fat or protein are common additives
  • Fat is not desired by the consumer
  • Proteins cost money

Better process equipment can reduce the need and hence the costs.
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Challenges of yogurt transfer - shear thinning

Viscosity

Before pumping

After pumping

Quality Point

PC pump

MasoSine pump

Additives

Additives

Viscosity loss MasoSine

Viscosity loss Competitor
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Avoiding Shear - Introducing Certa, the low shear pump

- **Low shear handling**: Smooth product flow, no need for ancillary dampeners. Virtually pulse free. Prevents aeration foaming. Up to 255,000 L/h, 8 million cP and 15 bar.
- **Low cost of ownership**: Greatly reduced electricity consumption, reduced carbon footprint.
- **Energy efficient**: Up to 50% less power consumption than lobe or circumferential pumps.
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Masosine Sinusoidal Pumps - Certa

Sheer simplicity, not Shear loss
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Masosine Sinusoidal Pumps – Certa Compact

- Maximise space on site & skids
- Flexible and simplified design
- Same design principles & certification as existing Certa
- Cost advantages
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Controlling costs – system efficiency

System efficiency and cost control is important to any production facility. Even simple changes to commonly overlooked items such as hoses can have a significant impact.

<table>
<thead>
<tr>
<th>CHARACTERISTIC</th>
<th>CUSTOMER ISSUES</th>
<th>PTFE HOSE ADVANTAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Viscous Media Gentle Handling</td>
<td>Pump cavitation, Hose collapse, Reduced flow</td>
<td>Vacuum and kink proof, Smoother inner bore, Low friction, high flow</td>
</tr>
<tr>
<td>High speed dynamic filling</td>
<td>Downtime cost &amp; kinking of hoses</td>
<td>High flexibility, Kink resistant, Longevity</td>
</tr>
<tr>
<td>CIP and SIP cleaning / sterilization</td>
<td>Elastomer damage, Contamination</td>
<td>Chemical resistance, No contamination, Fewer hose changes</td>
</tr>
</tbody>
</table>

PTFE hoses deliver:
- Higher production capacity
- Lower production costs
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Controlling costs – system efficiency

FaBLINE long life PTFE-lined hoses for efficient food processing

Hygienic by design

- High flexibility with kink resistance
- Smooth bore for uninterrupted fluid flow and ease of cleaning
- High temperature and pressure capability
- Chemical resistant
- PTFE-lined and non-lined end fittings with laser etched ferrule for ultimate traceability

24 Month Manufacturers Guarantee
0.9 BAR Usable at Vacuum 40-50 Bar
PTFE
Rubber Silicone PVC
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Controlling costs – system efficiency

Testimonial:

Marin Ćosić, Deputy Head of Maintenance at Dukat Dairy Industry Inc, part of the Lactalis Group, said: “On the yoghurt and fruit filling machine, the working conditions are demanding in terms of high sterilisation temperatures (138°C / 280°F), and exposure to acids and alkalis for washing the hoses through which the product passes.

With the aim of avoiding the possibility of contamination of the product, we decided to install the FaBLINE hose on the machine for filling yoghurt and fruit yoghurts.

The hoses turned out to be very good and long-lasting.”
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Where we operate

**Fluid transfer solutions for:**

- Milk transfer
- Yogurt transfer
- Flavour dosing
- Colour dosing
- CIP chemical dosing
- Waste water treatment
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Where we operate
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Where we operate

EXECUTIVE SUMMARY

The dairy sector is at a turning point. Slow growth, shifting consumer tastes, growing demand for sustainability and price pressure is pushing dairy to consider changing, mature and proven processes. But this need is not about huge investments in complete process reconfigurations. Instead, increasing numbers are looking at simple, quick wins on investment and a boost to bottom-line profitability, by switching technologies for targeted tasks such as cheese curd processing and yoghurt transfer.

This report looks at the growth of the dairy processing sector and sets out the achievements delivered by a number of real-life application examples. Intended as a 'best practice' guide, the report will be of value to anyone charged with delivering efficiencies within their dairy.
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Case studies

**Frimesa maintains yogurt viscosity and reduces additive costs**

A major Brazilian yogurt manufacturer has successfully shown that their process reduces yogurt viscosity losses (averaged by more than 30%) compared to high viscosity (PV) pumps in the same duty. During transfer with near zero PV pumps, Frimesa reduced the viscosity of the yogurt to Bowman levels during transfer, resulting in the use addition to retain the thick and creamy quality. This was added further process and earlier costs. When tests of a Masosine PV pump were conducted, viscosity loss was dramatically reduced. Instead of the 27% loss experienced with the PV pump, the 3% (600 to 500 µL) the Sine pump only had 3.5% (600 to 590 µL). An improvement of 329% in pump efficiency was shown in the dryer. This was an improvement of 85%.

Changing yogurt transfer to Sine pumps has led to a reduction in the amount of additives used.

**High volume cheese manufacturer increased profits with Sine pumps**

Cheese curd is a delicate product, and damage can occur as a result of the pumping process. Standard cheese pump leads to increased 'eyes' that are toxic to the whey stream, which in turn reduces cheese yield.

Additionally, for cottage cheese, damaged curd in other non-resistent curd, which means increased amounts of creaming or cream are required to improve the product appearance and overall.

This major Danish dairy discovered that certain pump types such as: low-speed pumps break down the cheese water into small parts (traits), which then passed through whey pumps or whey filters where they collected. Cheese traits less resist to production loss, which meant less cheese was produced from a certain quantity of milk.

A change to the pumping process was required and Masosine Sine pumps were selected for the duty. The ability to seal Sine pumps enabled the dairy to reduce cream loss by 30% and therefore produce an extra 66 tons of cheese per annum. The typical advantage delivered by Masosine Sine pumps include: extremely low pulsation, low shear, and superior cleaning efficiency.

Further benefits of Sine pump installation

Lack of suction experienced by low-pumps caused contamination which damaged (per) work. Since installation, the Sine pumps have cut maintenance and unplanned downtime.

When a new aerator from Forwell installed a new deaerating machine at the factory, the company’s previous success with a Masosine pump ensured it remained to the same source for a second unit. An energy-efficient Sine pump was recommended to transfer a range of double and single cream.

**Previous success:**

Rudd’s installed a Masosine S700 (a pump) several years ago as part of a closed cream line. Its relative performance impressed the maintenance team. "Our past ten years of hard work we had virtually no maintenance issues with the S700 (ST-200). It has basically looked after itself," states Maintenance Supervisor Paul Arman.

This same approach was repeated for the company’s new deaerating cream production facility: low shear, gentle handling.

"Using a centrifugal pump, for example, would effectively churn the cream into something buttery," says Mr. Johnson. "A Sine pump was clearly the way forward and we were keen on Sine from WATSON MARLOW, especially because of its energy efficiency attributes."
Thank you

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