Whitepaper
Sustainability

Contherm Max small footprint, big performance

Executive summary

This white paper will illustrate the unique design and capabilities of the double-walled scraped heat exchanger Contherm Max, and how it provides the perfect solution to deliver significant sustainability benefits in certain processes, while delivering high-quality products and cost efficiencies.

At Alfa Laval, sustainability is a guiding principle, whether it's saving on water and energy, reducing carbon emissions, supporting circular business models, ensuring human rights in a safe environment, or promoting ethical conduct.

Technologies within Alfa Laval's heat transfer, centrifugal separation and fluid handling portfolios are geared towards achieving a responsible use of natural resources, and this white paper will show that the Contherm Max is a flagship example of this, and a classic piece of sustainable technology for the times.

Introduction

With climate change leading to a scarcity of resources in many areas, combined with a growing global population and a shifting geo-political landscape, operating sustainably in business is a commercial and moral imperative.

Alfa Laval's sustainability strategy is focused on the four 'Cs': caring, committed, circularity, and climate. These areas reflect the en vironmental, social, and governance (ESG) issues where Alfa Laval can make the most significant impact.

Alfa Laval's portfolio of technologies operates in many industries that can be resource-intensive, and customers are looking for improved quality and yield while hitting their own sustainability targets with improved energy efficiency and heat recovery, water and chemical savings and reduced emissions.

Contherm Max is an important component in this portfolio, applicable primarily in food processing, but also in any sector processing viscous or particle-heavy, crystalline fluids. Its design and operation save energy and water – helping the environment – with a small space footprint and an efficiency that boosts yield and quality, contributing to the global food supply.

Background and Context

A response to a growing global food supply challenge

In terms of food production, there is a growing global food supply challenge – the protein gap.

By 2050, energy demand will increase by **54%** and food demand by **70%**. On top of this, the food industry already accounts for almost **30%** of the total global greenhouse gas emissions

Meanwhile, energy costs, especially in European countries, rose to historic levels due to geopolitical tensions and climate change has meant that water scarcity is critical in some areas of the world, leading to stricter government water-use regulations.

So, whether they are carrying out a greenfield project, expansion, or upgrade, all processors in the food industry must prioritize sustainability.

The processing of very viscous fluids poses particular sustainability challenges as, traditionally, these have required more space, energy and water to get the job done, compared with treating fluids that are more particle-light.

Initial **concept**

In 2010, Alfa Laval experts identified a gap in the market for a scraped surface heat exchanger that could manage viscous fluids while having a small physical footprint. Sustainability is built into every strategy and product development at Alfa Laval, and in Contherm Max, processors were about to be offered the opportunity to save space in their operations, while hitting their sustainability goals and targets.

By 2014 a prototype had been developed and in 2016 it went to market – although at the time it was looked upon as a very specific product with limited applications. Over time, that has changed however, with companies increasingly seeking smart sustainable solutions that deliver efficiency and profitability, without taking up much space.

Designed for sustainability

Contherm® Max is a double-wall scraped surface heat exchanger designed to provide high-capacity production of viscous fluids, crystalline products and those with large particles. Alfa Laval's advanced double-wall design, with scraped surfaces, helps boost yield while simultaneously ensuring efficient thermal performance, flexibility, cleanability, low maintenance and low total costs.

One double-wall Contherm® Max provides a robust, efficient thermal performance that is equivalent to three traditional, single-wall scraped surface heat exchangers. One of the key features is the rotating, scraping nature of its performance with blades turning in a double-concentrical cylinder system.

These blades are continually cleaning the heat exchanger surfaces, preventing fouling, and reducing the pressure drops. With low rotational speeds and reduced internal pressure drop, the units also provide the gentlest possible treatment for the best guarantee of preserving product quality.

Key sustainability **benefits**

By preventing fouling, producers can optimize the cleaning cycle. That means more uptime, shorter CIP cycles and significant water, chemical and energy savings.

Added to this, the Contherm Max crossflow sections are much larger than other heat exchangers, and this geometry makes displacement of products easier and require less pumping and energy use. Energy consumption is already reduced by more than 30% thanks to the single-drive motor compared to earlier technology.

Meanwhile the low rotational speeds of the blades reduce lifetime maintenance demands and associated resource-use and service costs.

Maximizing food processing efficiency is a key part of meeting the global food supply challenge – the social element of ESG – and Contherm Max is built to do just that with a large surface area offering triple the production capacity of conventional single-wall designs, as outlined above.

Meanwhile, the fact that the vertical design of the Contherm Max has an optimized compact footprint means that producers can maximize their space, with the potential to further boost yield.

Case story
Sustainability in operation

The unique design of the Contherm Max can handle particle sizes up to 25mm, provides low hold-up volumes and can handle product pressures up to 15 bar (220 PSI), with the rotational scraping speeds ranging from 40 to more than 100 rpm. This flexibility means it can thrive in a number of different sectors such as food, personal care, pharmaceuticals, and more.

In one case study together with partner Tetra Pak Itay and customer Surgital, Alfa Laval can prove that installing one Contherm Max allowed an **85%** pressure drop reduction, 56 square metres of space-saving and **150 tons** of CO_2 emission savings per year. The customer could achieve up to **36 k€/year** and **20%** more production capacity in energy savings and work through a more efficient process overall. This has led to the opportunity of meeting a higher product demand from the market.

Another example of the benefits in action with Contherm Max comes with US-based hummus maker Cedar's. Cedar's is a textbook case of Alfa Laval supporting the growth of a company in the long-term. Having already worked with them for a decade, Cedar's had belief in Alfa Laval's equipment, were an early adopter of Contherm Max, and now have almost 30 units in operation at their Massachusetts base.

Cedar's experienced a lower total cost of ownership with energy savings of up to **33%** and **80%** smaller footprint. They are a perfect match for Alfa Laval and Contherm Max as they are processing a product with high viscosity and are looking to grow sustainably while having limited resources and space.

Conclusion

Contherm Max is a unique piece of technology in the marketplace, and those companies that carry out the relevant processing of viscous products – whatever the industry – and have been turned on to the performance of Contherm Max, are reaping many sustainability and economic benefits.

In many ways the Contherm Max was ahead of its time, and now with the market requirements and understanding catching up, customers within the food and personal care industry are maximizing their space and production capacity, while saving on energy and water – and producing a great product in the process.

Contherm Max is an agile and smart solution at a time when producers need to be agile and smart. It delivers on the primary function of a scrape surface heat exchanger, in that it heats and it cools – and does not add any complications to the process such as pressure restrictions, maintenance and cleaning requirements. But it does so much more than that through its gentle handling of products and maximizing of resources.

Partner with the experts

Alfa Laval is your trusted partner for Contherm Max with decades of experience you can rely on. Our expert advisors guide you through every stage of the journey and our robust, proven solutions ensure optimal delivery to maximize your sustainability goals.

To find out more about how we can support you on your sustainability journey get in touch today.

Read more

Contact Alfa Laval
Up-to-date Alfa Laval contact details for all countries are always available on our website at www.alfalaval.com

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