



A resounding “yes” for Alfa Laval’s Compabloc

The perfect heat exchanger for Monómeros’ nitric acid plant

Case story

Alfa Laval’s Compabloc heat exchanger looked like a perfect choice when Monómeros Colombo Venezolanos, a leader in the Andean agrochemical and petrochemical industry, needed to replace its outdated and unreliable Cascade coolers. But could Compabloc really be counted on, they wondered? The answer was a resounding “yes”.

“Our relationship with Alfa Laval began when we purchased one Compabloc as a test pilot. Today we have 13 Compablocs that meet the total heat exchanger requirements of the entire oxy absorption section of our plant. The efficiency proportion, compared to the Cascade Coolers we used to use is 5 to 1,” says, Edward Moscoso Uribe, Manager of the Chemical Engineering Group of Monómeros

Fast Facts:

The customer

Monómeros Colombo Venezolanos is:

- One of the leading companies in the agrochemical and petrochemical industry in the Andean region
- The employer of 1700 people
- Strategically located between the Magdalena River and the Atlantic Ocean

The challenge

Monómeros needed:

- To replace the ageing and unreliable Cascade coolers in their nitric acid plant
- To improve efficiency and employee safety
- An absolutely reliable solution

The benefits

- No corrosion and no plugging
- Long intervals between maintenance save time and money
- Increased productivity (2 additional tons per day)
- Increased absorption efficiency (between 0.5 to 1%) equals energy savings
- No leakage means a safe working environment



Thirteen Compablocs used as nitric acid coolers at the Monomeros Nitric acid plant in Colombia.

A challenging business

Since the company was founded 40 years ago, compound fertilizers have been Monómero’s most important product. Because nitric acid is the primary component in compound fertilizers, cooling efficiency and uptime at their nitric acid plant are priorities for the company.

But producing compound fertilizers using nitric acid can be a challenging business. For one thing, nitric acid is highly corrosive, so heat exchangers used in its production are susceptible to corrosion. And

the cost of downtime can easily run into tens of thousands of Euros.

Not surprisingly, Monomeros Colombo Venezolanos SA had frequent problems with corrosion and plugging in their Cascade Coolers, which had also become obsolete. In addition, everytime a Cascade Cooler failed, the associated service pump had to be pulled out of service. This affected the production and gave a slight increase of NOx emissions. This, in turn, meant a higher ammonia consumption in the catalytic destruction reactor (for emission control).

Exposure to gas emissions due to leakage created an ongoing threat to safety and to workers health. "They (the Cascade Coolers) were inefficient and maintenance costs were very high as there were no spare parts available. Therefore, production stability was permanently affected," explains Engineer Aurelio Gomez, a 33-year veteran of Monómeros.

High turbulence equals bye-bye maintenance woes

There was a pressing need to replace the Cascade Coolers. And because finding the right replacement was so important, a rigorous selection process and a thorough evaluation of the alternatives available were carried out. The team of engineers in charge concluded that the Compabloc heat exchangers provided by Alfa Laval perfectly fit the needs of their company: delivery time, cost, maintenance, size, safety and thermal efficiency all came into play in their decision.

Alfa Laval Marketing manager Magnus Edmén points out in particular that, "Compablocs are extremely reliable. Due to the very high thermal efficiency and the vast selection of corrosion resistant materials, a material upgrade is possible at minimum extra cost. The high turbulence in a Compabloc heat exchanger provides not only high thermal efficiency, but also a self cleaning effect. This can minimize downtime for cleaning and maximize maintenance intervals"

A test passed with high marks

Even after they were practically convinced that Compabloc was the right product for them, the Monómeros team still wanted tangible proof that Compabloc could do the job. So they insisted on purchasing a single Compabloc and evaluated it in operation before giving the final go ahead for the complete replacement.

Any lingering doubts anyone may have had were quickly dispelled and today, there are 13 Compablocs in operation at the nitric acid plant. Thanks to excellent performance and low maintenance levels (less than once per year), productivity rates have increased on average by 2 tons per day. And absorption efficiency rose between 0.5 to 1 %, which has resulted in savings on energy consumption.

In addition, Compabloc eliminated overuse of ammonia – which is just one reason that both safety and reliability indications are now 100%. "The design makes the escape of gases into the environment virtually impossible. This has given us peace of mind over the last 6 years," says Processes Engineer Oscar Miguel Miranda.

A strategic partner

Since 2001, Alfa Laval has been a strategic partner of Monómeros, and the companies have realized several joint projects. Currently, engineers from the two companies interact together directly to develop applications. Chemical Engineering Group Manager Edward Moscoso Uribe concludes:

"Monómeros is an organization that is concerned with opportunities for continuous improvement and with being at the forefront of technology. We've found a business partner in Alfa Laval and a "partner" in effective productivity in Compabloc."



Switching to Compabloc coolers solved Monomeros' corrosion and fouling problems.

About the solution

The Compabloc welded plate heat exchanger from Alfa Laval is suitable for operation in chemically aggressive environments and for handling high-temperature fluids. With no gaskets between the corrugated heat transfer plates, maintenance is straightforward and efficient.

Key Facts:



Design temperature

400°C (752°F), down to -100 °C (-148°F)

Design pressure

From full vacuum to 42 barg (600 psig)

Maximum heat transfer area

840 m² (8,985 ft²)

Material of construction

316L, SMO254, 904L (UB6), Titanium, C-276/C-22/C-2000

Duties

Heat recovery, cooling, heating, condensation, partial condensation, reboiling, evaporation and gas cooling.

Unique features

Compabloc is the champion of heat exchange thanks to unique Alfa Laval innovations that enable reliable, efficient performance, letting you save energy and improve sustainability.



SmartClean

Fast and efficient flushing of fouling material



C-Weld

Superior cleaning and extended performance



XCore

Advanced design for higher pressures



ALOnsite

Qualified support at your facility

Learn more at www.alfalaval.com/compabloc

How to contact Alfa Laval

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