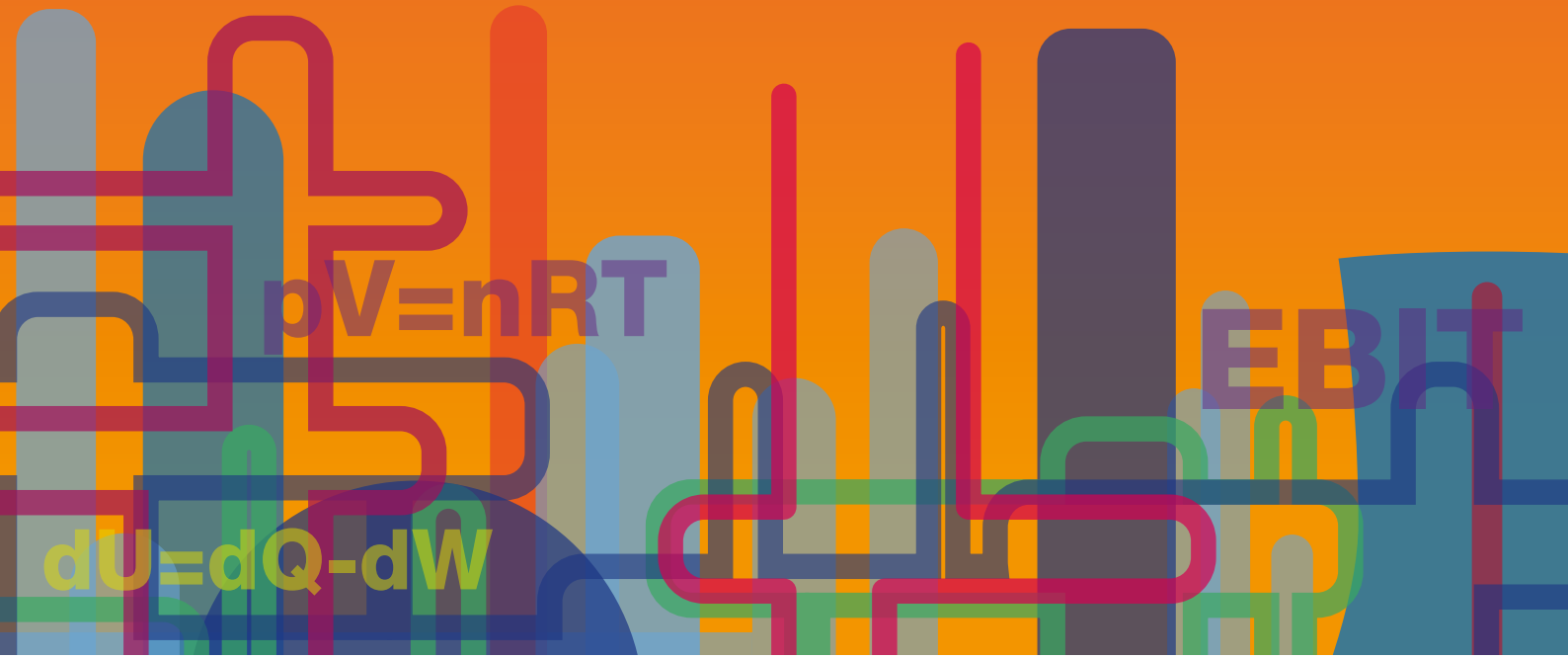
Increase efficiency



Five ways to stay ahead of the competition in the petrochemical industry

ALFA LAVAL

Five ways to stay ahead of the competition in the petrochemical industry

Save energy

Increase production

Cut investment costs

Solve cooling limitations

Increase uptime

Boost profitability

To stay competitive in the petrochemical industry you constantly need to find new ways to increase production yield and uptime. At the same time you need to keep operating and investment costs low, environmental impact minimal and product quality high and consistent. Quite a challenge.

Using the right heat exchangers helps you meet these challenges and has a big impact on operating efficiency. Exchanging inefficient shell-and-tubes for compact heat exchangers improves your bottom line, and payback times are often counted in months.

In this brochure we show you five ways Alfa Laval compact heat exchangers can help you increase plant profitability.

Visit **www.alfalaval.com/increase-efficiency** or contact your local Alfa Laval representative to learn more.

Save energy

ΔT=2°C (3.6°F)

The counter-current flow in Alfa Laval compact heat exchangers makes it possible to operate with crossing temperatures in a single unit.

The temperature approach can be as small as 2°C (3.6°F) meaning the cold stream can be heated to a temperature just a few degrees cooler than that of the incoming hot stream, thereby maximizing heat recovery.

Petrochemical plants have numerous energy-intensive process steps such as reactors, distillation columns and absorption-stripping systems. Recovering and reusing process heat is a straightforward way to increase plant profitability. This is done to some extent in most plants, but often using outdated shell-and-tube heat exchangers with low thermal efficiency.

Recover more energy with modern heat exchangers

Heat transfer is up to five times higher in an Alfa Laval compact heat exchanger than in a shell-and-tube. Heat recovery can be increased substantially by simply exchanging existing shell-and-tubes for compact heat exchangers. The result is more energy being put back to use, energy that would otherwise have gone to waste.

Lower fuel costs and emissions

Recovering more heat lets you cut fuel costs, alternatively it lets you use extra capacity in the boiler for electricity generation. Lower fuel consumption leads to reduced CO_2, NO_X and SO_X emissions. If the plant operates under a cap-and-trade system this cuts operating costs even further.

Increase production

Higher capacity

Bottlenecks related to heating and cooling are common in petrochemical plants, but can often be resolved by switching to more efficient heat exchangers.

Compact heat exchangers have a much higher thermal capacity per installed area than shell-and-tubes. Exchanging existing shell-and-tubes for compact heat exchangers is an easy way to increase production capacity without having to rebuild the plant and take up more valuable space.

More uptime

Compact heat exchangers are less prone to fouling than shell-and-tubes and are easier to clean. This leads to longer service intervals and faster maintenance stops, resulting in more uptime.

In heavily fouling applications requiring frequent cleaning, switching to a compact heat exchanger both reduces downtime for cleaning and increases capacity between cleanings since there is less fouling limiting heat transfer.

A major European chemical company replaced three shell-and-tubes similar to the ones in the lower left part of the image with three Alfa Laval Compablocs (top right). The new heat exchangers have 50% higher capacity and only take up half the footprint

Cut investment costs

Lower costs for heat exchangers

The required heat transfer area is up to five times smaller in a compact heat exchanger compared to a shell-and-tube. Less material is needed to build the unit which can have a big effect on price when exotic materials such as titanium and special alloys are required.

Lower installation costs

The small size of compact heat exchangers leads to lower installation costs. Existing structures can be reused when expanding capacity and foundations can be made small when building new plants. You can for example install a compact heat exchanger on top of a distillation column without problems.

Lower costs for utility systems

Recovering and reusing heat means less heat needs to be generated and cooled off in your utility systems. Before investing in new boilers or cooling towers it is a good idea to see if you can achieve the required capacity boost by increasing heat recovery instead.

Investments in heat exchangers, structures and utility systems can be minimized by choosing the right heat exchangers. The compact size, low weight and high energy-recovery capacity of Alfa Laval compact heat exchangers result in low investment costs.

Solve cooling limitations

Recovering process heat lowers the load on the plant's heating and cooling systems. By investing in more efficient heat exchangers you may avoid building a new cooling tower.

Insufficient cooling capacity reduces production in some petrochemical plants. Limited access to low-temperature water, restrictions on cooling water return temperatures and insufficient capacity in utility systems mean factories cannot run at full speed.

When production is hampered by high temperatures of the water entering the cooling system, the easiest solution is to exchange existing shell-and-tubes for compact heat exchangers. Its close temperature approach lets a compact heat exchanger perform cooling duties with warmer water than a shell-and-tube.

When restrictions on return temperatures or the capacity of the cooling system apply, the best answer is often to increase heat recovery in the plant. The heat is then put to use and does not have to be cooled off. Switching from shell-and-tubes to compact heat exchangers increases heat recovery substantially and may resolve bottlenecks completely, eliminating the need for investments in new cooling systems.

Increase uptime

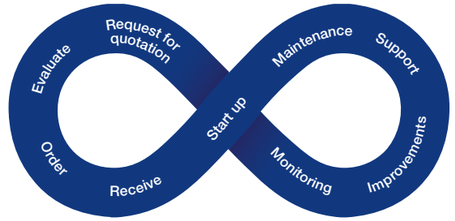
Alfa Laval compact heat exchangers are built for high reliability and minimum maintenance, ensuring secure operation, low maintenance costs and maximum uptime.

Their highly turbulent flow makes them much less prone to fouling and clogging than shell-and-tubes. This leads to longer service intervals and fewer production stops.

When our heat exchangers need maintenance, they offer easy access and fast cleaning. When using our cleaning-in-place equipment you can clean the unit without opening it.

Many models can be opened and mechanically cleaned. This gives service personnel full access to all channels and they can easily be cleaned with a high-pressure water jet. After mechanical cleaning the unit is back at 100% performance.

Visit www.alfalaval.com/service-and-support to learn more about our wide range of heat exchanger services such as commissioning, condition monitoring and reconditioning.



Alfa Laval partners with you for the entire life cycle of your equipment – from start-up, through operation, monitoring and maintenance, all the way to reconditioning and, if needed, redesign. Our goal is to ensure that your equipment continuously gives you optimized process performance.

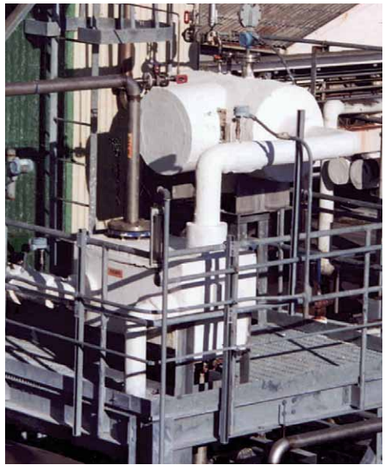
Examples

Mexichem, Mexico
The PVC slurry interchanger position was a bottleneck when Mexichem needed to ramp up production in one of its PVC plants. By exchanging its two alternately operating shell-and-tube interchangers for two Alfa Laval spiral heat exchangers the company increased production capacity and reduced maintenance needs dramatically.

As an added bonus the extra heat recovered by the new heat exchangers resulted in annual steam savings of 110,000 euros.

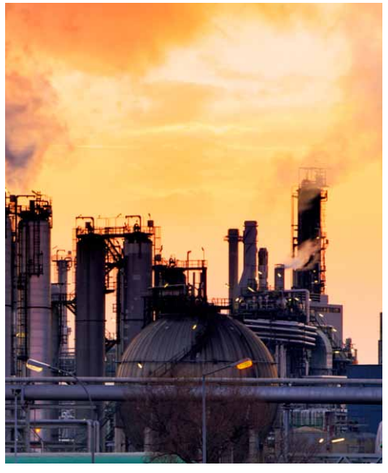
Dow Wolff Cellulosics, Belgium
Capacity increased substantially when Dow Wolff Cellulosics replaced a shell-and-tube reboiler on one of the plant's solvent recovery columns with an Alfa Laval Compabloc heat exchanger.

A second Compabloc was installed as a condenser on the column and energy recovered from the vapours is used for preheating the feed. The result is an energy saving of 0.8 MW.



Ciba Specialty Chemicals, USA
Ciba Specialty Chemicals avoided investing in a new scrubber by installing a Compabloc condenser. The company wanted to remove emissions of volatile organic compounds (VOCs) from its stack vapours and by installing a Compabloc the VOCs could be condensed and removed before reaching the scrubber.

The engineers at Ciba chose Compabloc because of its compactness, superior efficiency and low cost. Its compact size made it easy to install the Compabloc on an elevated platform where space was available.



Paraxylene plant in Asia
A major paraxylene producer in Asia decided to replace its existing air-cooled heat exchangers used for condensing overhead vapours from three of the plant's columns with four Alfa Laval Compablocs.

The Compablocs are now recovering 23.7 MW of waste heat, resulting in annual fuel savings of roughly 2.7 million euros. The payback time for the revamp, including the cost for installation, was less than one year.

Alfa Laval in brief

Alfa Laval is a leading global provider of specialized products and engineering solutions.

Our equipment, systems and services are dedicated to helping customers to optimize the performance of their processes. Time and time again.

We help our customers to heat, cool, separate and transport products such as oil, water, chemicals, beverages, foodstuffs, starch and pharmaceuticals.

Our worldwide organization works closely with customers in almost 100 countries to help them stay ahead.

How to contact Alfa Laval

Contact details for all countries are continually updated on our web site. Please visit www.alfalaval.com to access the information.

www.alfalaval.com/increase-efficiency

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