



Valuable heat no longer wasted

Heat recovery in a paraxylene plant, Asia

Case story

One of the major paraxylene producers in Asia replaced an existing air-cooled heat exchanger on top of a distillation column with an Alfa Laval Compabloc. The new Compabloc heat exchanger recovers 9 MW of heat. Over a year it saves the company energy valued at approximately 1.25 million euros annually. Payback time, including the installation cost, was less than 6 months.

Paraxylene production involves a series of distillation steps which use large amounts of energy. A standard 650,000 tpa plant produces approximately 170 MW of heat that is often treated as waste and cooled off. Recovering 40% of this heat leads to a 12% cut in the plant's total energy consumption.

There are typically 19 distillation columns in a paraxylene plant. Five of these produce 50% of the waste heat, making them prime candidates for an energy-recovery revamp.

New tools

The overhead vapours from these five columns are usually cooled and condensed in air-cooled heat exchangers. Due to low temperatures and engineering difficulties, heat is seldom recovered. This is too costly and technically impractical using traditional shell-and-tube technology.

Highly efficient compact heat exchangers such as the Alfa Laval Compabloc open up a range of new possibilities. The exceptionally high thermal efficiency of compact heat exchangers makes it possible to recover waste heat, even when temperatures are low and space is scarce.



Short payback time

A leading paraxylene producer in Asia operating under license from UOP exchanged two large air cooled heat exchangers for an Alfa Laval Compabloc on top of the plant's o-xylene separation column. The new heat exchanger recovers 9 MW of energy which is used for preheating boiler feedwater.

The energy recovered over a year has a value of 1.25 million euros and the revamp, including the installation cost, had a payback time of less than six months.

The compact size of the installed Compabloc made it easy to fit it into

existing structures on top of the column. The unit is 0.7 by 0.7 by 1.5 metres wide and needed no extra foundation.

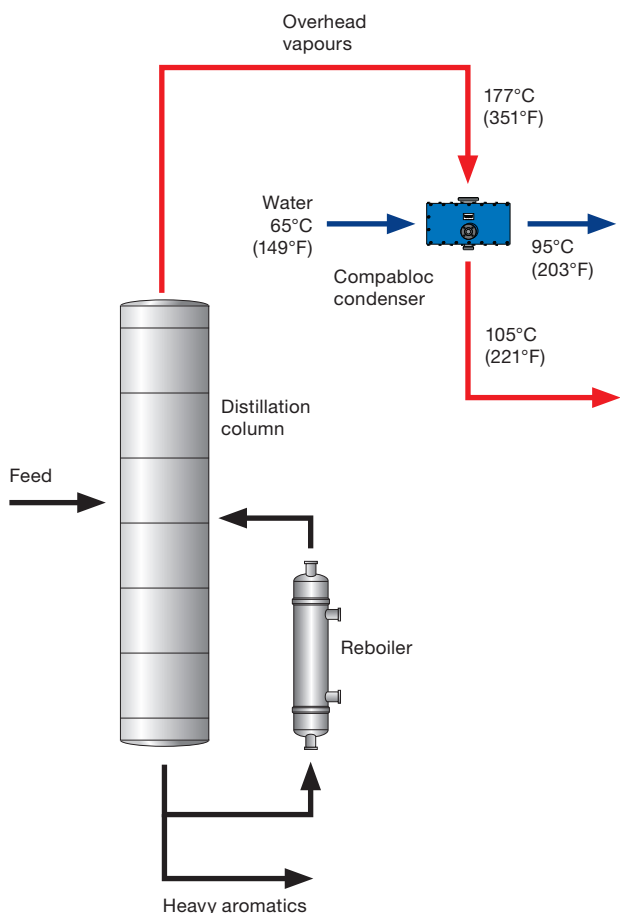
Perfect for heat recovery

The temperature approach in a Compabloc can be as small as 3°C (5.4°F) meaning it is very suitable for heat recovery duties.

Other possible uses of the recovered heat include heat tracing of process equipment, district heating or using the heat to run a refrigeration system.

The Compabloc was installed in 2013 and one year later, at the time of publishing this story, it is confirmed to work according to specifications.

Process overview



Fast facts:

Alfa Laval Compabloc – perfect for condensing duties

The all-welded Alfa Laval Compabloc compact heat exchanger has a solid reputation for reliability and high performance.

Superior performance

Its high turbulence and counter-current flow give Compabloc unrivalled thermal efficiency. It performs condensing duties 2-4 times more efficiently than traditional solutions. This means Compabloc condensers are compact and can be installed at the top of columns without problems.

This high efficiency minimizes cooling water consumption. Alternatively it lets you use warmer cooling water or subcool the condensate.

Low pressure drop

The short flow path and the large cross section give Compabloc a low pressure drop, making it an excellent condenser.

Minimal maintenance

Fouling is minimal in a Compabloc thanks to a highly turbulent flow. When it needs cleaning, service personnel can either use cleaning-in-place equipment or remove the panels and clean the plates with a water jet. All channels are accessible for mechanical cleaning, meaning a Compabloc is back up to 100% performance after cleaning.

Designed and built for rough conditions

Compablocs are specially developed for operating with aggressive media and are available in a wide range of corrosion resistant materials.

Gas/liquid separation

If the vapour contains non-condensable gases, a Compabloc condenser can be configured with two passes, permitting gas/liquid separation in the condenser without the need for a separator unit.

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.