Lower costs. More heat recovery. Less space.

What three Compablocs did in aromatics extraction

Case story

Three years ago, a Japanese petrochemical company began exploring options to increase capacity for the production of benzene and toluene at their plant in Japan. But they soon realized that a solution based on shell and tube heat exchangers would be too costly and would require difficult compromises. The company had heard about Alfa Laval's extremely efficient, compact Compabloc heat exchanger. And sure enough, Alfa Laval offered a better solution.

The Compabloc is perfect for situations where minimal installation space is available and high heat recovery is desired.

Why shell and tube couldn't do the job

The company extracts benzene and toluene from an aromatic-rich stream, using a Sulfolane unit based on a Shell/ UOP license. The original plant had four shell and tube heat exchang-ers in series in the interchanger posi-tion. Those heat exchangers provided a total heat transfer area of 1200 m^2.

Using shell and tube heat exchangers to increase capacity as required, while at the same time improving heat recovery levels, would have required four larger units and more than 5000 m2 of surface space. Installing such a system in the existing location was clearly impossible. It would have forced them to accept either a new location or lower heat recovery – or both – to make the shell and tube design work. Not to mention high installation costs due to the heavy weight of the equipment.

Almost too good to be true

Alfa Laval offered a solution that would keep the costs reasonable (both capital outlay and installation), conserve space and increase heat recovery.

The Alfa Laval solution called for three compact Compabloc heat exchangers in parallel in the interchanger position and required only 950 m^2 of surface space. And the improved system could be easily installed in the same amount of space on the same platform as the old system. (See figure 1.)

Not only that, but capital outlay and installation costs for the Alfa Laval system would be lower than for the shell and tube design. Particularly when the cost of relocating the system was taken into account. Plus, with the Compabloc solution, they recovered more heat and thus saved more energy.

Fast Facts:

The customer
A Japanese petrochemical company

The challenge
- Wanted to increase capacity for production of Benzene and Toluene at its factory in Japan

The benefits
- Highly competitive capital and installation costs
- More capacity in a small space
- Higher heat recovery

Aromatics extraction and fractionation unit

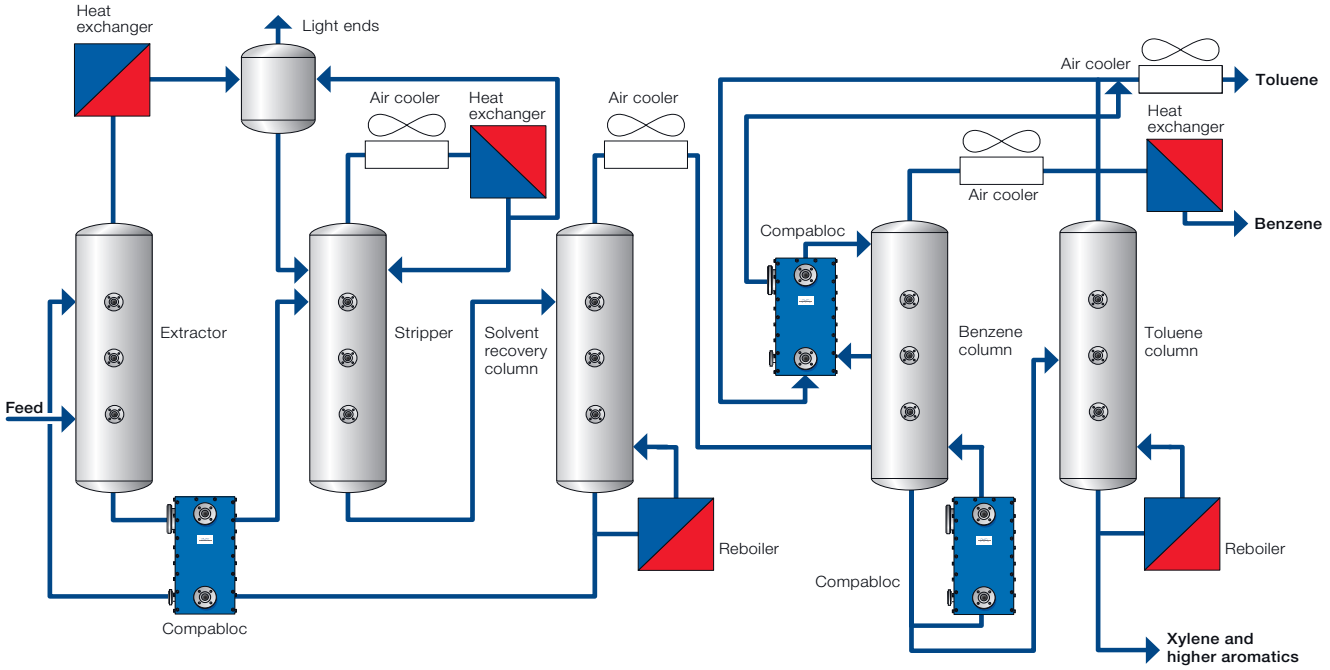


Figure 1. On the left: Three Compabloc heat exchangers in parallel in the interchange position. On the right: Two Compabloc heat exchangers in the separation position.

The process is described in i.a. Ullmanns Encyclopedia of industrial processes and in material published by UOP LLC on its website www.uop.com.

550,000 USD in estimated additional annual savings

Because Compabloc is based on corrugated plate technology, it is possible to recover more heat. The new installation recovered 2.1 MW more heat compared to the original installation. Based on current natural gas prices and steam costs, Alfa Laval estimates up to 550,000 USD in additional annual savings.

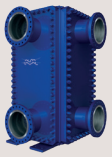
In addition to the new system in the interchange position, the customer also needed to replace three reboilers in the separation position. For two of these positions, they chose to install Compablocs, which fit well into the available space.

Over a year and still going strong

The Compablocs have been in operation over a year now, and they are performing as expected in every way. When asked to describe why they chose Compabloc – and what benefits they can attribute to their choice, rep-resentatives of the company had this to say: “We chose the Compabloc design because the initial investment compared favorably to the cost-effectiveness of the solution – also it could be installed in a small space and would minimize the revamp structure.

”We got a consistently quick response from Alfa Laval during the sales process, and we got the end results we wanted – increased capacity and higher heat recovery.”

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.

Learn more at **www.alfalaval.com/compabloc**

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

About the solution

Three Alfa Laval Compabloc Heat exchangers in parallel are in operation in the interchanger position.

There are also two more used as reboilers in the separator position.

- Small size and low weight
- Fewer units required and lower installation costs
- High heat recovery resulting in lower emissions
- Long service intervals and easy service access for low lifetime costs

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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.