



# Compabloc Condenser Solved Fouling Problem

Queensland Alumina, Australia

Case story



Queensland Alumina replaced a shell-and-tube unit with a fully welded Alfa Laval Compabloc condenser unit in order to decrease maintenance costs. Utilising only a quarter of the space of the old shell-and-tube installation, the Compabloc solved severe corrosion and fouling problems resulting in a significant service cost reduction. 18 months after the installation, the Compabloc is in successful operation without having been cleaned once.

## Process Plant

The Queensland Alumina plant at Gladstone produces 3.7 million tonnes of alumina annually using the Bayer process, the thermal process based on the solubility of alumina in caustic liquor.

Heat exchangers are required for a broad spectrum of duties in the process of heating and cooling the circulating liquor stream. The Compabloc replaced the original carbon steel shell-and-tube heat exchanger in the precipitation area, where it is heating incoming process water with final flash vapour at 29 kPa abs.

## Problems with Original shell-and-tube Unit

The excessive levels of fouling in the original shell-and-tube exchangers lead to regular cleaning every 6 months. The cleaning procedure took a week from start to finish. In addition to the fouling, the shell-and-tube heat exchanger also suffered from interleakage due to extensive corrosion. In 2001 the plant

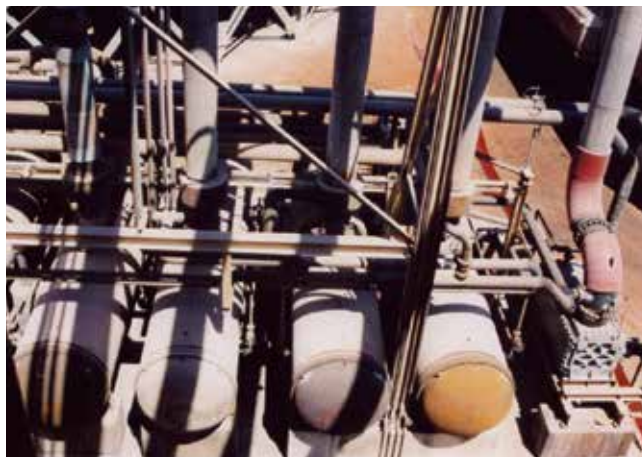
and process engineers began looking for a new solution in order to solve the extreme fouling and corrosion.

## Looking For a New Solution

As for many process industries using heat exchangers, the most important requirements for Queensland Alumina are:

- High thermal efficiency
- Low fouling and scaling
- Minimal space requirements
- Design flexibility
- Ease of installation
- Minimal maintenance

In discussions with Alfa Laval Australia it became clear that the Compabloc would satisfy all those requests.



The Compabloc replaced a shell and tube unit on a quarter of the footprint.

### Operation of the Compabloc Condenser

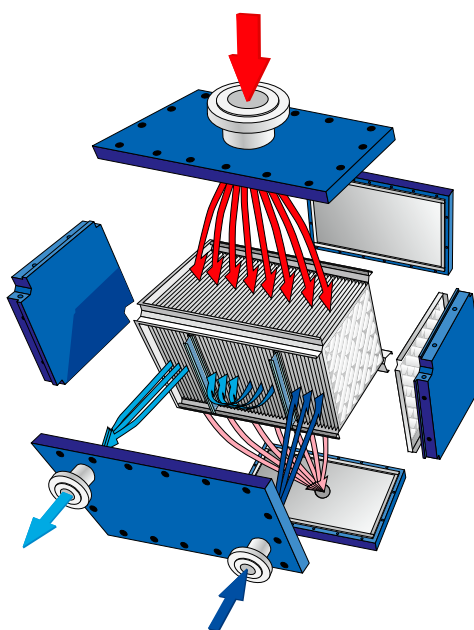
To date the Compabloc has been in operation without any problems whatsoever. Besides the ease of installation and minimal space requirement, the low maintenance frequency is a benefit highly appreciated by Queensland Alumina.

### Customer Comments

After 12 months of operation, the Compabloc was inspected and found to be clean. Brian Aikenhead, Area Supervisor, who was present at the inspection says: "There was no fouling whatsoever. It was clean as a whistle". Phil Wheatley, Asset Owner Rep at Queensland Alumina, says: "The best thing about the Compabloc is that we haven't had to worry about maintenance. Fouling or scaling problems just don't exist".

### Low Fouling

The low fouling tendency of the Compabloc can partly be explained by the high turbulence, which minimize fouling and makes longer operating periods possible. The low levels of fouling can also be attributed to finer material; decreasing corrosion and promoting high shear stress rates along the heat transfer wall.



### Compabloc condenser

Vapour enters from the top and condenses on the cold plates. The condensate is extracted from the bottom. Even though fully welded the Compabloc is easy accessible for inspection and cleaning on both the cold and the hot side by undoing the panels.

### 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 m<sup>2</sup> (8,985 ft<sup>2</sup>)

#### 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](http://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](http://www.alfalaval.com).