German bioethanol plant chooses AlfaCond for process flexibility

CropEnergies AG, Zeitz, Germany **Case story**

CropEnergies Bioethanol GmbH´s bioethanol plant (formerly Südzucker Bioethanol) has four AlfaCond plate heat exchangers installed for various condensing duties. An AlfaCond 600 is operating as a final product condenser and two AlfaCond 800 units are running in parallel as purge condensers. In addition, an AlfaCond 400 is installed as a flash condenser for the evaporation system used in the production of an animal feed byproduct. Alfa Laval's application know-how, combined with AlfaCond's ease of installation and extension flexibility, were key factors for CropEnergies in its choice of these condensers.

In 2006, an increase in condensation capacity was needed on a final ethanol condenser. Because of the limited space for installation, extending of the existing shell-and-tube heat exchangers (STHE) was not an option.

AlfaCond, easy to transport and install

Project Manager, Dr. Angermann, consulted Alfa Laval and CropEnergies purchased an AlfaCond 600 plate heat exchanger for the duty. The decision was strongly influenced by the AlfaCond's compact shelving and ease of installation. It would have been very complicated to transport and install a bigger STHE condenser into the space available. According to Dr. Angermann, the one large inlet connection of the AlfaCond made pipework much simpler. Other important factors were the AlfaCond's extension flexibility and the lower pressure drop on the vapour side due to the special design of the AlfaCond in comparison with a normal plate heat exchanger.

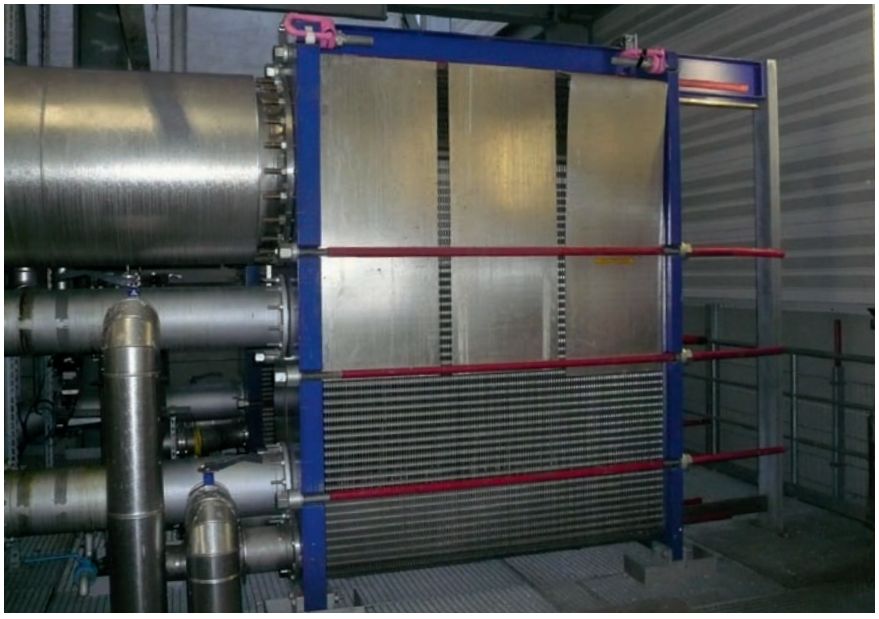
CropEnergies Bioethanol plant in Zeitz, Germany, currently has a total capacity of 360,000 m^3 of ethanol per year.

CropEnergies AG

- CropEnergies AG is part of Südzucker AG, Europe's largest sugar company.
- CropEnergies owns three sites in Europe. One of these is CropEnergies Bioethanol GmbH, Zeitz, the largest bioethanol plant in Europe, using grain and sugar beet as the raw material.
- In 2008 the Zeitz plant was extended by an annexe plant running on sugar beet thick juice from the neighbouring sister facility Südzucker sugar plant.
- Total plant capacity is currently 360,000 m^3 of ethanol per year.
- Stillage from the plant is concentrated into "Dried Distillers' Grains and Solubles" (DDGS), marketed by CropEnergies as animal feed under the name "ProtiGrain".

An AlfaCond 400 installed as a flash condenser for the evaporation system used in the production of DDGS.

An AlfaCond 600 operating as a final product condenser.



Two AlfaCond 800 units operate in parallel as purge condensers.

Flash condenser required for evaporation system

Satisfied with the performance of the AlfaCond 600, Dr. Angermann consulted Alfa Laval again a year later. At the Zeitz plant an evaporation system is used for concentrating stillage, which afterwards is dried and sold as animal feed. The requirement was to install a small flash condenser to balance the vapour load to the final evaporators.

The compact design and thereby low weight in comparison to STHE were significant factors for choosing a plate heat exchanger. An AlfaCond 400 was installed since the existing 400 mm line could be connected directly to the inlet on the unit.

AlfaCond 800 units installed as purge condensers

In 2007 CropEnergies Bioethanol decided to substitute an existing STHE purge condenser to eliminate a bottleneck in the recovery step of the molecular sieves. As the purge condenser runs under low vacuum, sometimes below 100 mbar, it was essential to install a unit with a very low pressure drop on the vapour side.

In addition, the condenser needed the capability to adapt quickly to changes from the molecular sieves. Otherwise there was a risk of quality impairment of the dehydration process, which is the final step in ethanol production.

Based on positive experience with AlfaCond, Dr. Angermann considered replacing the STHE condensers with plate technology from Alfa Laval. Alfa Laval suggested two AlfaCond 800 units, operating in parallel as one unit, a solution which cost less than purchasing one new STHE condenser.

Yet again, the determining factors for Dr. Angermann were AlfaCond's large inlet and low pressure drop on the vapour side.

Flexible process solutions vital

Dr. Angermann: "It is vital for a young plant like CropEnergies Bioethanol in Zeitz to have flexible process solutions. It is difficult to predict what will happen in the real process in comparison to the theoretical planning. The flexibility and the possibility of extension are big advantages for the AlfaCond plate heat exchangers over shell-and-tube units."

Product Facts:

AlfaCond condenser

The AlfaCond is the first plate condenser in the world specifically designed for low-pressure vapour condensation. It can be used in a wide range of industries.

Features and benefits

- Compact: small footprint, low installation cost
- One large vapour inlet for easy piping
- High turbulence: less fouling on cooling water side
- Easy to clean chemically or mechanically

Fit for future demand

When more capacity is needed, AlfaCond can be expanded simply by adding plates. Thus, AlfaCond can quickly and easily be adapted to production increases and changes in the process. AlfaCond is a highly cost-efficient alternative to shell-and-tube technology in these cases.

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.