

## DuroShell increases flexibility and boosts production

### LPG plant, Australia

An Australian gas company experienced severe operating issues in one of its LPG plants. The problem was solved by heating one of the plant's gas streams in an Alfa Laval DuroShell heat exchanger using heat from a stream of compressed gas. The new setup ensures reliable operation, high capacity and maximum recovery of valuable heavy hydrocarbons.

#### **Cryogenic separation**

The LPG plant produces high-quality natural gas, propane, butane and condensate (C5 or higher). The feed gas is fractionated in a liquefying step in the cryogenic section of the plant, and the lighter components (methane and ethane) are sold to the natural gas grid.

#### **Run-away cooling caused automatic shutdown**

The plant was initially designed for feed gas with a different composition. The lower concentrations of propane and butane caused problems in the

de-ethanizer since these gasses were not being condensed to the required level. This led to excessive cooling of the separated methane/ethane gas mixture.

This gas is used for pre-cooling the feed gas for the de-ethanizer, and the lower temperature meant the gas entering the de-ethanizer was cooled too much, causing the cooling to accelerate. The resulting run-away cooling continued until a low-temperature trip automatically shut the plant down.

**The solution: an extra heat exchanger**

If the plant were to be operated in its original design, the throughput would have been limited to around half the maximum capacity. This was not an acceptable solution. Instead, the plant engineers found a way to restore the energy balance. This involved installing an extra gas-gas heat exchanger that heats the methane/ethane gas mixture leaving the de-ethanizer using heat from the compressed sales gas.

**Limited space and cyclic duty**

Finding a heat exchanger that would meet the requirements proved to be a challenge. It had to fit into the limited available space, withstand high pressure (80 bar) and endure cyclic operating conditions without suffering from fatigue.

Having evaluated different options, the plant engineers chose an Alfa Laval DuroShell for the task. This fully welded, compact heat exchanger is specially designed for cyclic duties and features a number of innovative designs that help prevent fatigue.

**High production rate and flexibility**

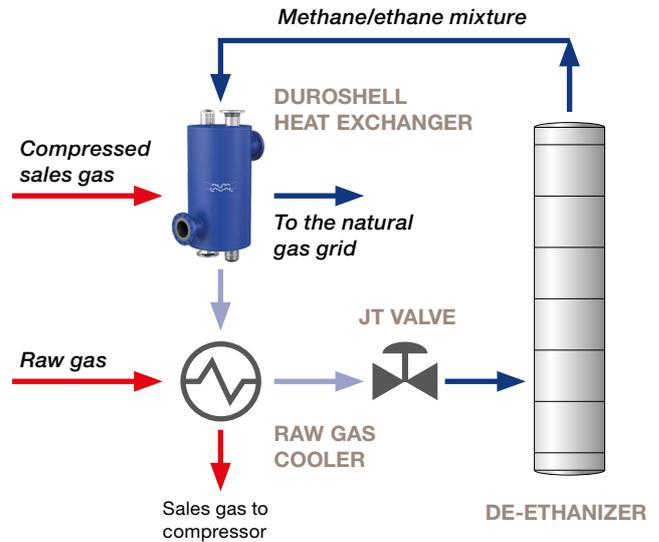
With the DuroShell in place the plant operates at full capacity without any risk of run-away cooling or the sales gas not meeting the national standards. The new setup also makes it easy to adjust the process to changes in the composition of the feed gas. If the propane and butane concentrations are low, the new heat exchanger is engaged, and if the concentrations are high, it is bypassed.

The plant engineers are more than satisfied with their new Alfa Laval heat exchanger. The compact size and ability to withstand cyclic, high-pressure duties makes it the perfect match for this application.

**A good solution for many gas duties**

The low pressure drop in combination with its resistance to high pressures and fatigue makes DuroShell an ideal heat exchanger for several heat exchanger positions where gases are involved. Examples include:

- Gas compression cooler
- Gas heating and cooling
- Gas heaters, e.g. in gas pressure reducing stations
- LNG
- Dew point heat exchanger
- Condenser
- Reboiler



**Fast facts**

**The plant**

A LPG plant in Australia

**The challenge**

To fractionate natural gas with varying composition

**The solution**

An Alfa Laval DuroShell heat exchanger heats the gas exiting the de-ethanizer using heat from the compressed sales gas

**The benefits**

- Reliable operation at maximum capacity
- Flexibility



**PowerPack**

Optimized flow distribution and fatigue resistance



**RollerCoaster**

Robust and efficient performance



**ALOnsite**

Qualified support at your facility

Learn more at [www.alfalaval.com/duroshell](http://www.alfalaval.com/duroshell).

**How to contact Alfa Laval**

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