



Reducing fuel costs by converting to HFO

Alcap separation system

Case story



To stay competitive, the KW 145 Catharina uses low-sulphur HFO 380 cSt to sail the North Sea, thanks to the compact Alfa Laval SA 815 separation system.

For generations, the van der Plas family fishing business relied on marine gas oil to power its trawlers around the North Sea. Today the family's new trawler runs on cost-efficient heavy fuel oil (HFO) 380 cSt. Upgrading an Alfa Laval purifier originally installed onboard to an Alfa Laval SA 815 separator system drastically reduced fuel costs.

When the Dutch fishing trawler KW 145 Catharina set sail on the North Sea in 2006, it signaled more than a generational shift for the van der Plas family. Shipowner Nico van der Plas Sr. and third-generation fisherman Captain Nico van der Plas Jr. carefully considered the impact of rising fuel costs on the viability of their single-vessel family company.

In an effort to offset fuel price increments and maintain earnings, the elder and younger van der Plas agreed in 2005 to install an HFO-ready engine and two Alfa Laval purifiers on their new 40-meter fishing trawler. After two years of running the vessel on HFO 180 cSt, they decided to

upgrade one purifier to an Alfa Laval SA 815 separator. The fuel cost savings alone quickly paid for the upgrade and will continue to contribute to the profitability of van der Plas fishing enterprise.

Fast payback

Comparable fishing trawlers typically use marine gas oil as fuel. However, the Catharina is a relatively new vessel outfitted with a Wärtsilä 26 medium-speed engine. Larger or new medium-speed engines such as the Wärtsilä engine are now designed to handle heavy fuel oil. On the other hand, heavy fuel oil must undergo the process of cleaning and fuel oil to be of the correct viscosity before being injected into the engine.

Catharina is designed to use heavy fuel oil with a maximum viscosity of 180 cSt. At the time of design, the decision to use HFO 180 cSt was easy because the difference in price between HFO 180 cSt and marine gas oil or diesel was



The Captain Nico van der Plas Jr. and chief engineer Buis Meivogel bunkering heavy fuel oil at the Port of IJmuiden in the Netherlands.



approximately 150 EUR per metric ton. This amounted to savings of 4500 EUR per week in fuel costs alone, given the vessel's fuel consumption of 30 tons per week on average.

Easy to upgrade

Originally installed at Hoekman Shipbuilding BV in Urk, Holland, the Alfa Laval purifiers easily handle HFO 180 cSt. However, after two full years of operation, the father-and-son team decided to explore the possibilities of further increasing fuel cost savings.

By upgrading one Alfa Laval purifier to an Alfa Laval SA 815 separation system, the van der Plas family hoped to realize additional cost savings. Because the Alfa Laval purifiers installed onboard the Catharina share the same mechanical platform and exactly the same compact footprint as Alfa Laval S-separators, upgrading was easy. An Alfa Laval engineer at Alfa Laval Benelux replaced the centrifuge's gravity disc with a clarifier disc, installed a water transducer and enhanced the functionality of the EPC50 control.

"Rising fuel costs have a tremendous effect on the profitability of our business," says the elder van der Plas who, before retiring in 2005, spent 37 years trawling for North Sea flatfish.

He is especially proud that the KW 145 Catharina, named after his wife, has brought the family good fortune. Thanks to the upgrade, estimated fuel cost savings are now 450 EUR more per week, hefty savings that Nico Sr. appreciates.

The Alcap difference

The SA 815 separator is based on proven Alcap technology. Alcap technology enables the separator to adjust automatically to the composition of heavy fuel oils with high, but varying, densities and impurities such as water and particles. According to chief engineer Buis Meivogel, using Alcap technology makes his job infinitely easier.

"When we were exploring whether to switch over to a heavy fuel oil with higher density, Alfa Laval informed us that maintaining optimum separation results by means of gravity disc is difficult," explains Meivogel. "But the economic

advantages of switching to a separator that could handle heavier fuel oils were clearly compelling."

Easier to operate

Meivogel has absolutely no regrets about upgrading. With the SA 815 separation system onboard, the dirty task of setting the correctly sized gravity disc every time the Catharina takes on fuel is now a thing of the past.

"Because the Catharina's bunker tanks hold approximately 82 metric tons of fuel, we take on fuel once a week," explains Meivogel. "With the purifiers, I had to adjust the gravity disc manually every time we re-fueled to ensure optimal separation efficiency. I like the fact that the SA 815 effectively does away with the risk of human error in setting the disc. Compared to purifier technology, the SA 815 is much easier to operate."

Meivogel adds that the SA 815 separator is designed to effectively remove contaminants and water from the fuel oil so that fuel oil being injected into the engine is as clean as it can be. This helps safeguard the engine.

Better control, automated discharge

A key component in the Alcap solution is the addition of the water transducer installed in the cleaned oil outlet to continuously measure any changes in water content.

"The water transducer adds clear advantages to our operations," says Captain van der Plas. "I know that I can rest assured that engine operation is both safe and efficient. I also appreciate the fact that my chief engineer can focus more time on other important duties."

With purifier technology, sludge is discharged according to a pre-set time interval programmed into the separator's control unit, the EPC 50. The SA 815's water transducer, on the other hand, automatically detects when traces of water start to escape



with the cleaned oil. This is a sign of reduced separation efficiency not only of water, but of solid particles too.

When water is detected in the cleaned oil, the transducer sends a signal to the EPC 50 process controller. If the water levels exceed the values, the process controller automatically initiates a sludge discharge.

Depending on the actual process conditions, the EPC 50 process controller selects the operating mode. The water transducer supplies information about process conditions in the cleaned oil outlet to the EPC 50 unit. This makes it possible to operate under optimal conditions with regard to discharge, oil displacement and other cleaning operations.

Solid support

Operating under optimal conditions is critical to the success of the Catharina and her crew. The crew finds great comfort in the fact that Alfa Laval provides them with both the camaraderie and the expertise they require.

“Many vessels that are at least 15 years old still have the previous generation of Alfa Laval separators,” says Alfa Laval engineer Aad Deuze. “These separators were developed before the introduction of today’s heavy fuel oil, which requires more advanced separation technology. Even though the Catharina had relatively new purifiers onboard, there was still room to improve performance by introducing the SA 815.”

Most fishing vessel owners today must choose between using more expensive fuel oil or upgrading to the new generation of separators to clean heavy fuel oil. Although upgrading payback may vary depending on the condition of existing equipment, opting for an upgrade often provides greater reliability and measurable cost savings over the long run.

“Aad Deuze at the Port of IJmuiden has been extremely helpful in providing us with information about how smart technical solutions can lead to cost savings as well as in helping us with the practical details of training and commissioning,” says Captain van der Plas.

“Maintaining the condition of equipment onboard has a major impact on a ship’s overall performance and operating costs,” he adds. “It’s reassuring to know that we have a local partner nearby.”

Better for the environment, too

The North Sea is the fishing grounds of the KW145 Catharina. As one of the WWF’s 200 ecoregions identified as being critical to global biodiversity, it is protected by directives of the European Union and International Maritime Organization.

There are ambitious emission control measures in place to reduce pollution from both sea and land-based sources. One such measure is the compulsory use of low sulphur fuel (1.5%) by all vessels sailing the North Sea. This means that the Catharina must use more expensive low-sulphur fuel on her weekly fishing expeditions.



Two SA 815 separators installed onboard the Catharina KW145.

Upgrading one of the purifiers onboard with Alcap technology enables the van der Plas family to use heavy fuel oil that is low in sulphur content and thereby reduce fuel costs.

“We recognise our obligation to protect the North Sea’s sensitive marine environment,” says Captain van der Plas. “Paying the higher price of low-sulphur fuel is a worthwhile investment in protecting marine life in general and valuable fishing stock in particular. Our future depends on it.”



Owner Nico van der Plas Sr. appreciates the additional fuel savings realized since upgrading to the Alfa Laval SA 815 separator system.



SA 815 separation system

The SA (Separation Ancillaries) 815 separation system is the most compact self-cleaning centrifugal separation system from Alfa Laval. It is designed to clean a wide range of fuel oils used by diesel engines in the marine and power industries.

- Heavy fuel oils with densities up to 1010 kg/m³ and viscosities up to 700 cSt/50°C. (Handling of higher viscosities available.)
- Lubricating oils for all slow-, medium- and high-speed diesel engines.
- Distillates and light diesel oils (MDO).

Highly reliable and robust in design, this non-integrated solution can be delivered as a few easy-to-mount specialized block components. Onsite assembly lowers your initial investment and makes it easy to install in tight spaces.

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