



White paper



FCM challenge 1

Fuel changeover

May 2019



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Fuel changeover challenges

Emission control areas were established in order to protect the sea, and adjacent territories, from emissions from vessels around the world. Because of these areas, ships need to be able to change to suitable fuels whilst on the move to meet the required emission levels.

This changeover process is a challenge because:

- There is typically a huge transition in operative conditions, which can mean shifting the injection temperature from 150 °C to 30 °C
- During this transition, there is the need to respect the engine-makers requirements of a smooth temperature transition, whilst keeping fuel viscosity in the suitable range
- Need to avoid any limitation on possible engine load, as this could be an issue in adverse sea conditions

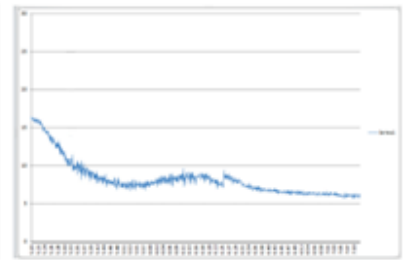
Failure to meet these challenges in an optimal way can result in serious issues like stop of propulsion, which is not un-common as we can see in the diagram.



Common problems with boosters

Many boosters either:

- Are an older design, and only suitable for running on one fuel. There's no MGO cooling, no temperature ramp control and operation is manual
Or
- Have limited potential. It may be that the booster is remotely operate, and can cool down the MGO, but it can't control the transition



Manual C/O procedure

Someone (in this case an EM service eng) handling manually and carefully the procedure for the whole needed time.

Alfa Laval automatic C/O

Pushing a button.

To better analyse the difference between a manual process and an automatic one using FCM One, look at the above graphs. The manual process does work, but the curve with an automatic changeover is much smoother.

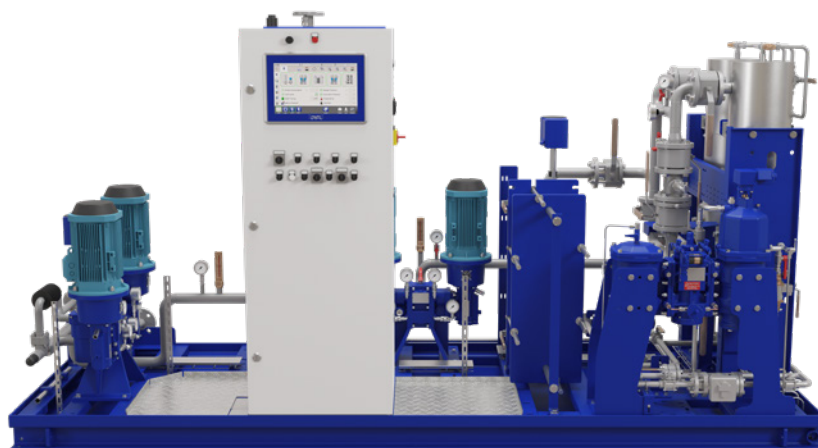
However, that's not the biggest difference. With the manual process, it needs to be performed by a highly skilled person who needs to sit close to the booster for at least one hour. The automated process frees up this time, and is more reliable.



The Alfa Laval solution

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The FCM One Oil is designed to condition conventional marine fuel oils but can also be configured to handle multiple fuels, produce fuel blends and manage the automatic changeover between them.

With Alfa Laval FCM One, we provide a complete booster system which integrates the relevant functions under the control of one PLC. We provide:

- Full automation. This ensures easy operation, and frees up valuable hours for crew members.
- Process control. This secures the accuracy of required fuel parameters at the engine inlet, which means no unnecessary limits on engine loads.
- Less potential for error. FCM One cuts the potential for human mistakes as the level of human input is relatively low.
- Consistency. FCM One offers optimal performance every time.



This graph shows the smooth fuel changeover process with FCM One. Engine load can still change whilst temperature transitions smoothly.



Don't just take our word for it

Lloyd's register has performed a 3rd party approval of safety and compliance with FCM.



Working together
for a safer world

Alfa Laval Fuel Conditioning Module – Automatic Change-over Process

Desk Top Technical Review

Report for: Alfa Laval SpA

“This review concludes that in accordance to the subject documentation provided the auto changeover function should provide a controlled and safe switch over taking into consideration the requirements to control the key characteristics of viscosity and the temperature gradient throughout the changeover from a high sulphur fuel to a low sulphur fuel and equally from a low sulphur fuel to a high sulphur fuel oil in a safe and consistent manner.”

Important considerations when selecting a booster system

- Focus on the booster design, and make the decision that's best for you
- Look for an updated design
- The booster is an essential part of the ship's propulsion, and protects other investments on-board. This means making the right choice is crucial.
- Finding the right supplier is an important step. You need a partner committed to overall performance, and one that can offer the support and the service to maintain that performance over a long period.

About Alfa Laval

Alfa Laval is a leading global provider of specialized products and engineering solutions.

Our equipment, systems and services are dedicated to helping customers to optimize the performance of their processes. Time and time again. We help our customers to heat, cool, separate and transport products such as oil, water, chemicals, beverages, foodstuff, starch and pharmaceuticals.

Our worldwide organization works closely with customers in almost 100 countries to help them stay ahead.

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

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Contact details for all countries are continually updated on our web site. Please visit www.alfalaval.com to access the information directly.