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# FCS FUEL CHANGEOVER SYSTEM

Minimizing fuel costs whilst ensuring environmental compliance

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## FUEL CHANGEOVER SYSTEM

Reducing Fuel Costs whilst ensuring Environmental Compliance



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### The need for a Fuel Blending System

Fuel consumption represents one of the main vessel's operation costs, and it is expected that these costs may continue to rise in the near future due to increasing fuel prices on one hand and new environmental emission regulations on the other.

IMO's new environmental regulations state that sulphur oxide emissions (SO<sub>x</sub>) must be controlled inside IMO's designated **Emission Control Areas (ECAs)** through the utilization of low sulphur fuel, therefore more expensive.

To ensure environmental compliance, Marine Gas Oil (MGO) is normally used inside ECAs instead of Heavy Fuel Oil (HFO) due to its lower sulphur content therefore increasing the total fuel costs due to MGO higher prices.

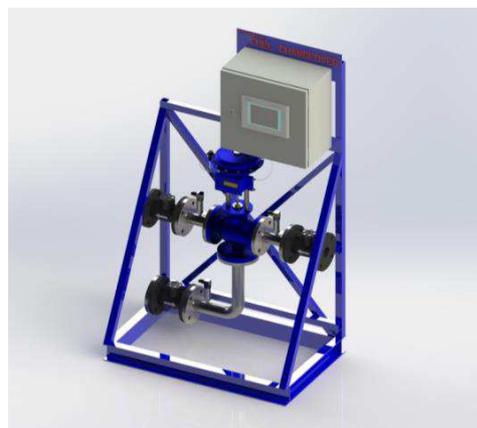
As fuel costs continue to rise, so does the need to pursue higher fuel savings.

The HFO-MDO/MGO fuel blend thus becomes a cheaper and environmental friendly alternative for utilization inside the current and future designated ECAs.

### Economic savings

The savings potential can be calculated for the utilization of a blend of 20% HFO (3.5% sulphur content) and 80% MGO in such a way that the blend sulphur content is always less than 1%:

Assuming a vessel which the HFO consumption is 3 ton/h and a fuel price for HFO 380



*Tecnoveritas Fuel Changeover System*

Designed to respond to this situation, the **Fuel Changeover System (FCS)** delivers optimum fuel savings whilst responding to IMO's sulphur emission thresholds by intelligently performing the appropriate mix of HFO and MGO in the fuel supply system to maintain sulphur levels below the legal threshold limits.

cSt@50°C and MDO of 630\$/MT and 1020\$/MT respectively, the savings will amount to 230\$ per hour.

With a **24 hour utilization the savings will amount to 5600\$ a day!**



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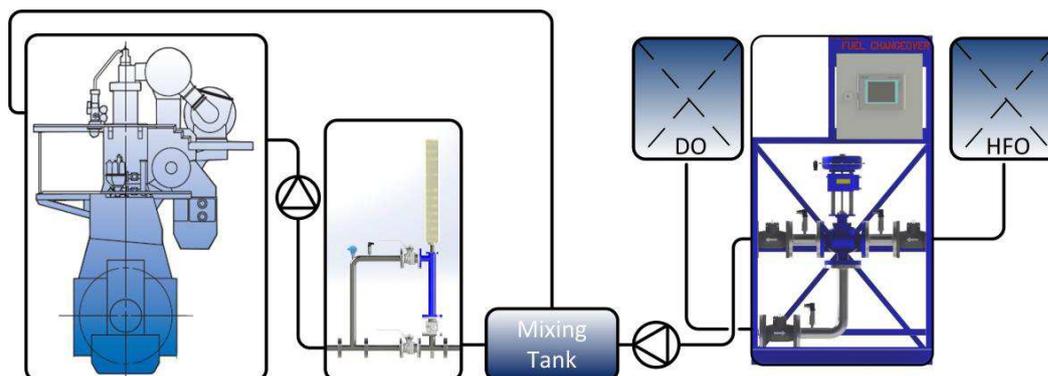
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### System Operation

The FCS operates through an intelligent control system which automatically performs the mix between both high and lower sulphur content fuels according to the desired sulphur content (<1%).



This allows for total flexibility of sulphur content control in the final blend. With an easy to use **onboard touch screen** the operator can input the necessary fuel specification and entirely control the FCS as desired. The fuel change over operations, as required by MARPOL and other authorities are registered automatically with date, time and position stamp, simply through the connection of FCS to the ship GPS (NMEA 0183) or through the connection to VEEO (Voyage Energy & Emissions Optimizer).

The FCS includes an ultrasound homogenizer to reduce larger particles like asphaltenes to an appropriate size preventing damage to fuel system components, and ensuring even better combustion. A Fuel compatibility analysis is conducted prior to the in-line blending operation to verify that undesired incompatibility problems and consequent sludge formation do not occur during the in-line blending process. The **Fuel Changeover System** is thus supplied with **TecnoVeritas Fuel & Oil Lab**, a fast and straightforward way to access the fuels properties.



*TecnoVeritas Ultrasound Homogenizer*

The portable fuel & oil lab allows to extract a number of fuel related parameters such as density, water content, viscosity (ISO 2431), asphaltenes contents, fuel compatibility (ASTM 4740), fuel stability (ASTMD-2781), lower calorific value, etc.



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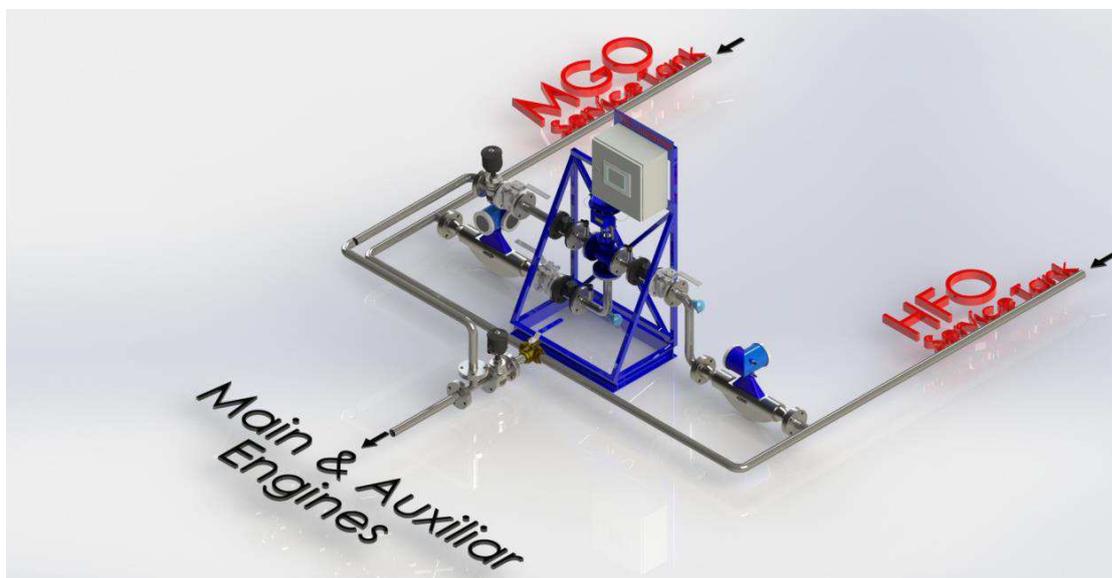
### Installation

The FCS slim and compact design makes its installation extremely simple and straightforward without extensive fuel system piping modifications. This allows for smaller installation costs and an overall reduced price. The installation can be easily performed as a retrofit or in new vessels.

### Advantages and Features

- Reduced Payback Period for both small and large vessels.
- Assurance of environmental compliance inside ECAs waters.
- Comprehensive set of deliverables, Fuel & Oil Lab, Ultrasonic Blender and Official Logging system.
- Fast and simple installation.
- Small, slim and compact design.
- User friendly touchscreen provides full system control.
- Compatibility check between fuel oils prior to any operation.

### Fuel Changeover System 3D Schematic



Tecnoveritas Fuel Changeover System

*Note: Characteristics may change without notice and from project to project and are merely indicative.*



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