

# FUEL CONDITIONING SYSTEM ENERMULSION

## REDUCE COSTS AND MAKE YOUR PLANTS OPERATION GREENER

Fuel savings up to 7%

NO<sub>x</sub> & PM Reduction

Better Combustion Performance + Cleaner Engine

In-line System no storage TK's required

Easy operation



# TECNOVERITAS®

Dedicated to innovation

# ENERMULSION

Developed especially to control exhaust emissions and fuel savings.

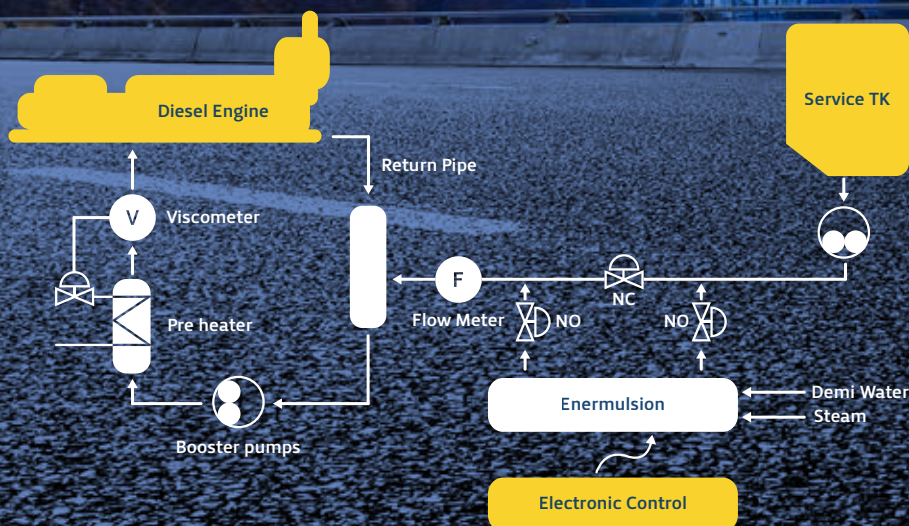
Enermulsion is a solution to reduce exhaust emissions ( $\text{NO}_x$ ,  $\text{SO}_x$ ,  $\text{CO}_2$ , VOCs, PM) while being able to decrease fuel consumption, to address the urgent issues of escalating fuel prices and stricter emission restrictions.

This fuel conditioning system may be applied with success to fuels with high levels of asphaltenes. It can also be used with the same advantages with lighter fuels such as LFO, IFO and MDO.



## HOW DOES IT WORK?

The installation of Enermulsion is easy, requiring minor intervention on the existing fuel system, and its operation is fully controlled by the Electronic Control Unit.



# MAIN FEATURES



Easy and Fast  
Installation



In-line  
Operation



Fully  
Automated



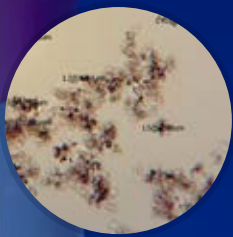
No Storage  
Required



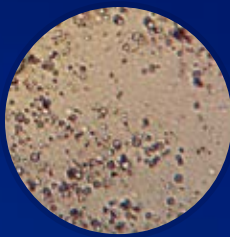
NO<sub>x</sub> Tier II  
Compliant

## THE MECHANISM

The Emulsification of HFO comprehends a mixture of water in fuel oil in a way that small particles (6 µm) of water are formed in the fuel oil to produce a very **stable water-in-fuel emulsion**. The main purpose of doping fuel oil with small quantities of water (up to 30%) aims at **improving combustion efficiency and thus thermal efficiency**. The reduction of the fuel consumption is attributed to the following effects:



**BEFORE**  
HOMOGENISATION



**AFTER**  
HOMOGENISATION

- 1 Formation of a finer spray due to rapid evaporation of water (micro-explosion - Chaderton Mechanism);
- 2 Shorter hydrocarbon molecules with (OH) radicals, therefore improved combustion;
- 3 More air entrained in the spray due to increased momentum and penetrating force;
- 4 More fuel burning in premixed combustion stage due to a longer ignition delay;
- 5 Decrease in cooling loss due to a lower flame temperature;
- 6 Suppression of thermal oxidation of nitrogen - Zeldovich Mechanism; and
- 7 Higher exhausted mass flow rate, bigger turbocharger efficiency, more combustion air.

## THE BENEFITS

### FUEL SAVINGS

By using a fuel emulsification system, fuel consumption can be **reduced up to 7%**.

### INLINE SYSTEM, NO STORAGE TK'S REQUIRED

The installation of Enermulsion requires **no modifications** to the engines and **no interruptions** to the engine operation, as it is an **automated in-line system**, also no additional tanks are required.



### NO<sub>x</sub> & PM REDUCTION

It is known that NO<sub>x</sub> and Particulate Matter has a tremendous impact on the environment and on human health, especially Particulate Matter that causes lung cancer. With Enermulsion **NO<sub>x</sub> reduction can be achieved up to 30% and PM up to 80%**.



### CLEANER ENGINE

With a stable rate of fuel cracking and water molecule thermionic decomposition, resulting in a molecular rearrangement, the result is an **improved fuel combustion**. The water decomposition rate is continuously optimised to the engine load by Enermulsion's control system.

# ABOUT TECNOVERITAS

TecnoVeritas is a specialist provider of engineering services and solutions to the shore and marine industries, with more than 20 years of experience.

Head quartered in Portugal with a global reach, TecnoVeritas is focussed on emissions and energy management, and has a strong track record of delivering high quality solutions combining innovation with world leading technical expertise.

## Dedicated to innovation

### Portugal Office | Europe

Av. Dr. Francisco Sá Carneiro  
NEM - Pavilhão 36-A  
2640-486 MAFRA

T. +351 261 819 819  
F. +351 261 819 820  
E. info@tecnoveritas.net



**WINNER**  
Clean Shipping



[www.tecnoveritas.net](http://www.tecnoveritas.net)

© 2019 TecnoVeritas - Services of Engineering and Systems Technology | April 2019

Lis@20<sup>20</sup>

PORTUGAL  
2020

UNIAO EUROPEIA  
Fundo Europeu  
de Desenvolvimento Regional