

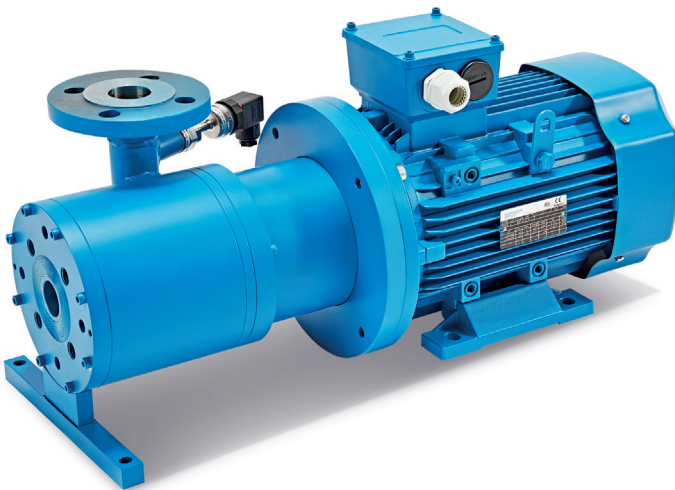
# HOMOGENIZER

**Management & Treatment**

# HOMOGENIZER

## Device for fuel sludge treatment

The Homogenizer is a dynamic milling machine to be used in the fuel system on board ships. It is designed to improve your fuel quality which will lead to a better combustion and less maintenance. Furthermore it can reduce sludge in case of fuel incompatibility. Increase and it increases the amount of burnable fuel in case of bad fuel quality. The Homogenizer has a high saving potential and is suitable for all type of vessels with 2 and 4-stroke main engine in dual fuel operation (HFO/MDO/new type of fuel oil acc. sulphur cap), e. g. tankers, LNG, container, bulkers, cruise vessels.



Control Cabinet

### Features:

- » Continuous homogenizing by shearing of asphaltene clusters
- » Pure mechanical & no chemical treatment
- » Continuous generation of water in fuel emulsion
- » Sludge treatment on board
- » Fuel treatment in fuel circulating system reduce sludge of fuel incompatibility

### Benefits:

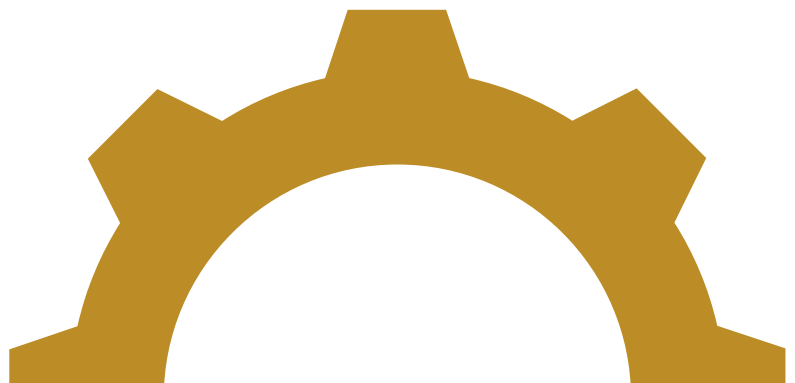
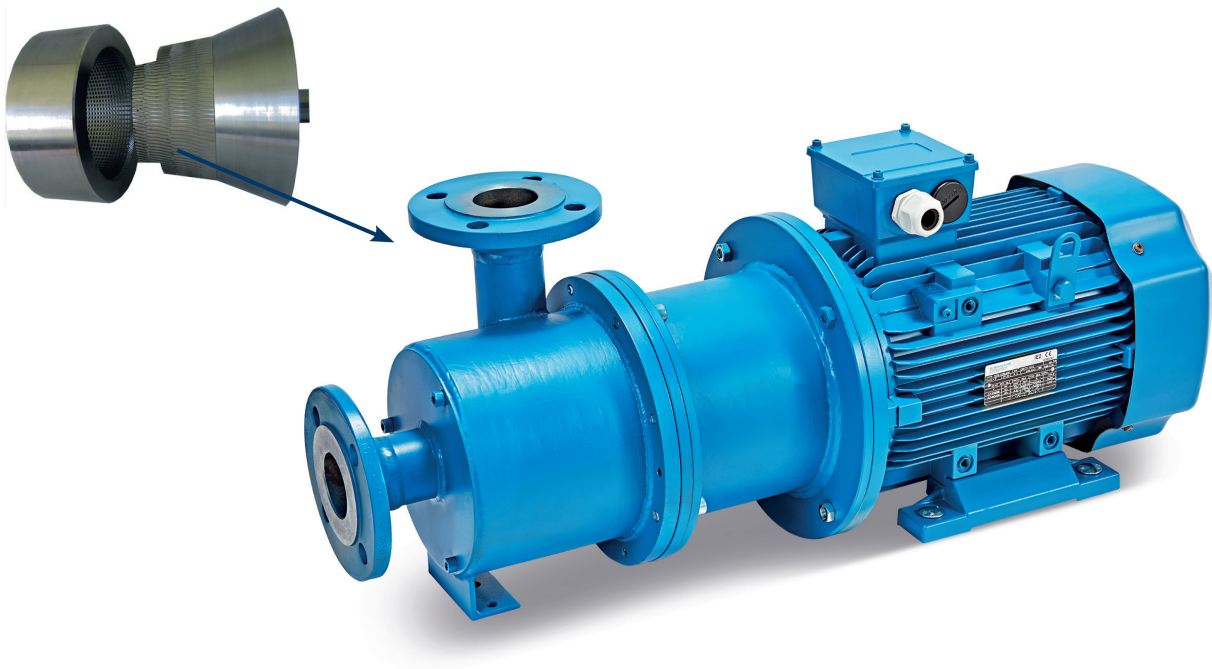
- » Reduces sludge through waist oil treatment
- » Avoid fuel incompatibility in circulating system
- » Fuel treatment, conditioning and harmonizing
- » Maximizes the amount of burnable fuel
- » Increases fuel quality for optimized combustion
- » Less wear and tear on engine components

# FUNCTION

The homogenizer is a dynamic milling machine and it mainly consists of a specially constructed stator / rotor-milling gear to improve the fuel quality as well as to allow sludge treatment on board of sea-going vessels.

- » Pure mechanical homogenizing
- » Free adjustable clearance between rotor and stator
- » Low maintenance

The Homogenizer operates on the principles of mechanical shearing and ultrasonic forces. It utilizes a special conical shaped milling gear, to generate high hydrodynamic power consisting of shearing, friction and acceleration forces with pressure waves of high frequency. The high molecular asphaltenes are reduced in their size to below 5  $\mu\text{m}$  and homogenized into the heavy fuel oil.





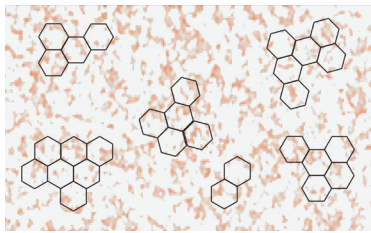
# PERFORMANCE

## Effect

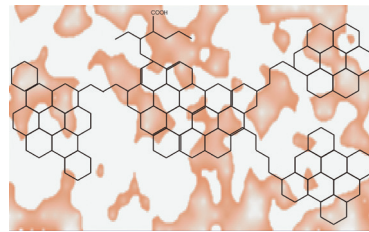
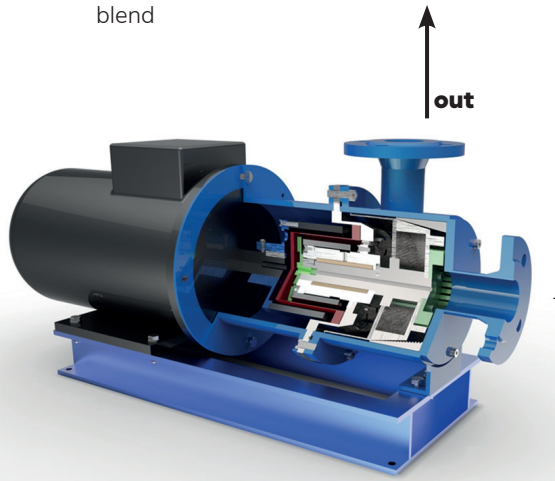
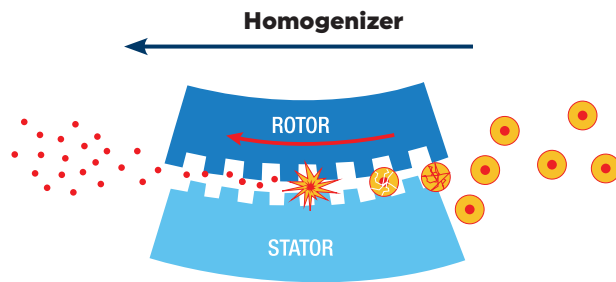
- » Dynamic rotor-stator milling machine
- » Chemical-free approach for treating residual fuels

## Rotor-stator arrangement

- » Conical shaped layout - concentrically mounted
- » Slightly decreasing clearance between rotor and stator



Asphaltenes are sheared back to approx. 5  $\mu\text{m}$  into a homogeneous blend



Asphaltenes formed into cotton like strands in residual oil

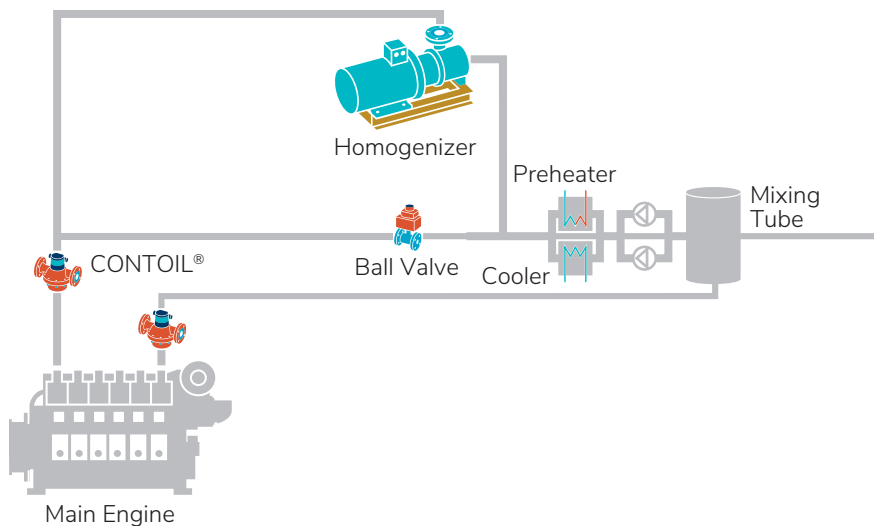
# SYSTEM OVERVIEW

## Application Homogenizer in Fuel Circulation System

- » Preventing of fuel incompatibility after blending / mixing
- » Improved combustion
- » Reduces sludge and emission

### Saving effects:

- » Prevents sludge forming and clogging filters; fuel costs saving up to 2 - 3 %
- » Extended life time filters and injection parts; operating and spare part costs saving up to 3 %

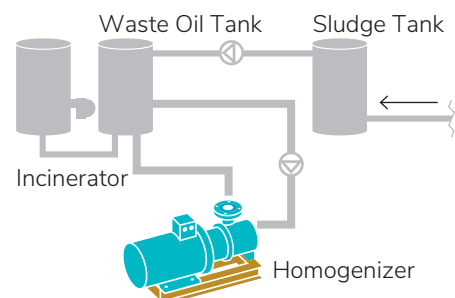


## Application Homogenizer in Sludge Treatment Unit (STU)

- » Continuous HFO homogenizing on board
- » Pure mechanical and no chemical treatment
- » Reduces sludge discharging
- » Increases amount of utilizable fuel in waste oil system

### Saving Effects:

- » Prevents sludge forming and clogging filters; fuel costs saving up to 2 - 3 %
- » No chemical treatments

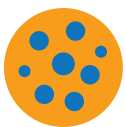
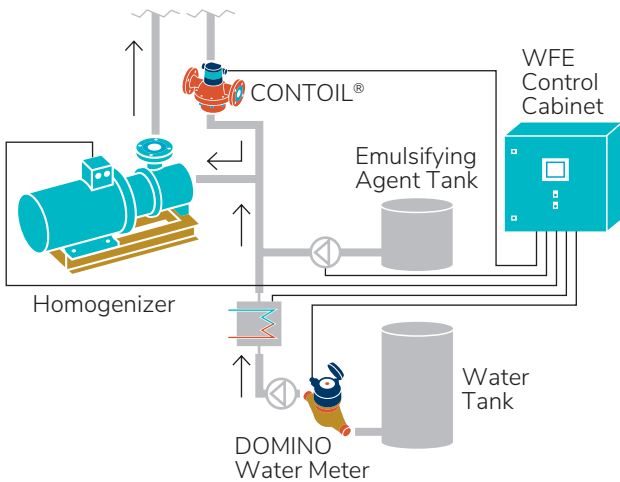


## Application Homogenizer in Water in Fuel Emulsion Unit (WFE)

- » Creates long term stable water in fuel emulsion
- » Lowers combustion temperature
- » Improves spray pattern and vaporization
- » Reduces emission

**Saving effects:**

- » Uniform and fine spray pattern at injection; fuel saving up to 2- 3 %



Water-in-Fuel Emulsion



Temperature increase in combustion chamber



Vaporization of water droplets



Transition of water into steam breaks fuel into smaller droplets and lowers temperature peaks during combustion



Smaller fuel droplets provide an increased contact surface area between fuel and air

1m<sup>3</sup> H<sub>2</sub>O water



approx. 1'500m<sup>3</sup> steam

# CERTIFICATE

<b>TYPE APPROVAL CERTIFICATE</b>		<b>DNV·GL</b>	
		Certificate No: <b>TAP00001FV</b>	
		Revision No: <b>2</b>	
<b>This is to certify:</b>			
<b>That the Fuel Oil Homogeniser</b>			
with type designation(s) <b>HG100, HG130, HG150, HG220</b>			
Issued to <b>Aquametro Oil &amp; Marine AG</b> <b>Therwil, BL, Switzerland</b>			
is found to comply with <b>DNV GL rules for classification – Ships Pt.4 Ch.6 Piping systems</b> <b>DNV GL rules for classification – Ships Pt.4 Ch.9 Control and monitoring systems</b>			
<b>Application :</b>			
<b>Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV GL.</b>			
<b>Type:</b>	<b>Max. flow:</b>	<b>Max. fluid temperature:</b>	<b>Max. operating pressure:</b>
<b>HG100</b>	<b>3 m<sup>3</sup>/h</b>	<b>150 °C</b>	<b>15 bar</b>
<b>HG130</b>	<b>8 m<sup>3</sup>/h</b>	<b>150 °C</b>	<b>15 bar</b>
<b>HG150</b>	<b>12 m<sup>3</sup>/h</b>	<b>150 °C</b>	<b>15 bar</b>
<b>HG220</b>	<b>25 m<sup>3</sup>/h</b>	<b>150 °C</b>	<b>15 bar</b>



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