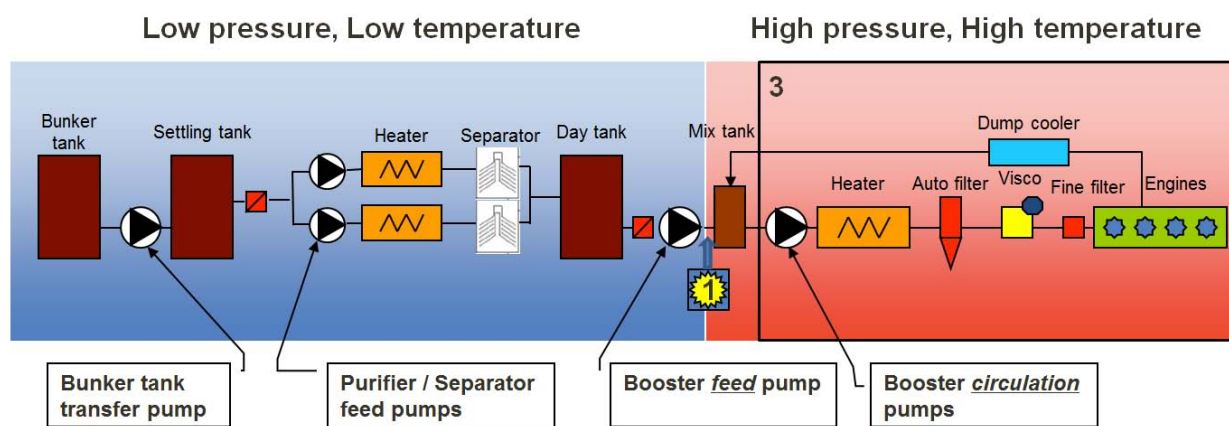


Location in fuel system:



1 = FID Injector



[WWW.IPCOPOWER.COM](http://WWW.IPCOPOWER.COM)

**IPCO Power BV**  
Spinel 400  
3316 LG Dordrecht Netherlands  
T.: +31 78 65 21 866  
[info@ipcopower.com](mailto:info@ipcopower.com)  
[www.ipcopower.com](http://www.ipcopower.com)



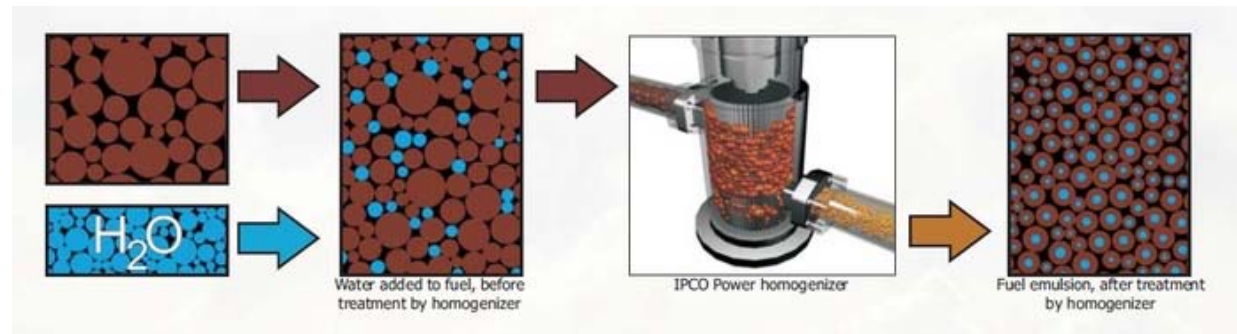
## IPCO Power's Water Fuel Emulsion



Heavy Fuel Oil (HFO) is not homogenous and has an average droplet size of 70 micron and larger. It contains numerous much larger clusters of asphaltenes and complex long-chain hydro-carbons. It is a refinery waste stream product with a high BTU content used as fuel oil. Centrifuges and automated filters

HFO needs to be heated and pressurized before it can be used to operated engines or boilers. Exposing fuel to heat and pressure will unavoidably increase the size and mass of the fuel droplet, change the physical condition of the oil and negatively impact the combustion process.

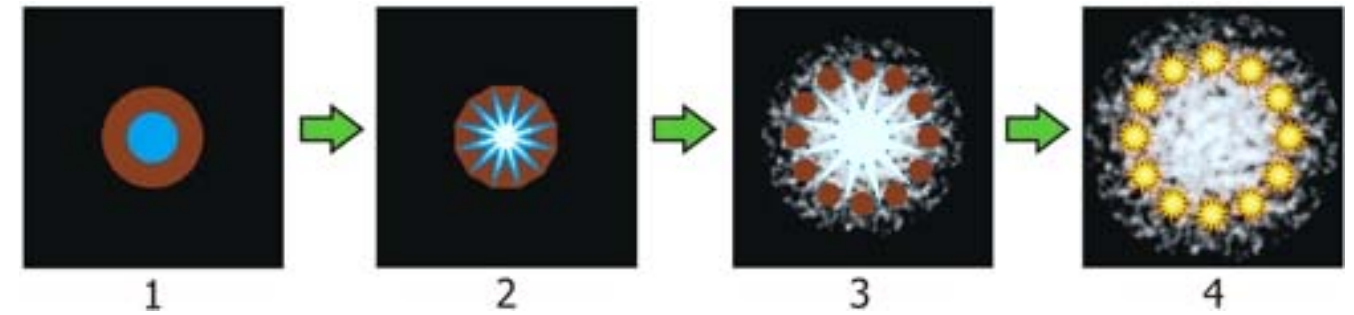
Implementing IPCO Power Fluid Shearing Technology reduces fuel droplet size to 3 micron and smaller to enhance the cleaning process and reduce the waste stream going to the slop tank for disposal. Smaller fuel droplets **enhance combustion, lower emissions, improve fuel economy, extend engine overhaul intervals and lower overall operating costs.** There is a 300 micron space between the rotor and stator. This distance will prevent the system from blocking the fuel lines and will assure that cat fines pass the homogenizer untouched.



### Water in fuel emulsion

The **FID Injector** is an emissions purification and combustion improvement system designed to create a stable "water in fuel" emulsion. The implementation of emulsified fuel significantly enhances fuel atomization and distribution in the combustion chamber. This results in more effective combustion, lower fuel consumption and a reduction of NOx, HC and PM pollutants, while the engine's combustion chambers, pistons, exhaust system and lube oil will stay much cleaner.

NOx reductions using water in fuel emulsions are significant; approximately 1% NOx reduction is achieved for every 1% injected water. Using existing fuel systems, water content is limited to 20%. The FID Injector has a cost advantage over other systems, primarily due to its simplicity in system installation and operation. Operational costs are low as the only major requirement to the Injector is the water addition. The FID Injector has a small footprint and all necessary components are available inside the frame.



- 1 Water in fuel emulsion as it enters the cilinder
- 2 When the air/Fuel mixture is compressed in the combustion chamber, the water starts to evaporate
- 3 The water turns to steam, in this proces the fuel droplets are atomized thoroughly
- 4 The forming of steam and the thoroughly atomized fuel causes a better and more complete combustion of the fuel (more surface area of the fuel and more oxygen from the steam). The steam also reduces the peak flame temperature, thus reducing NOx.

**Fuel efficiency:** up to 2 % savings on 4 stroke engines and up to 3 % savings on 2 stroke engines

**Maintenance:** less separator and engine maintenance

**Environment:** up to 20% NOx reduction, less black smoke and up to 90% PM reduction and assisting your ships scrubber system



4400 running hours