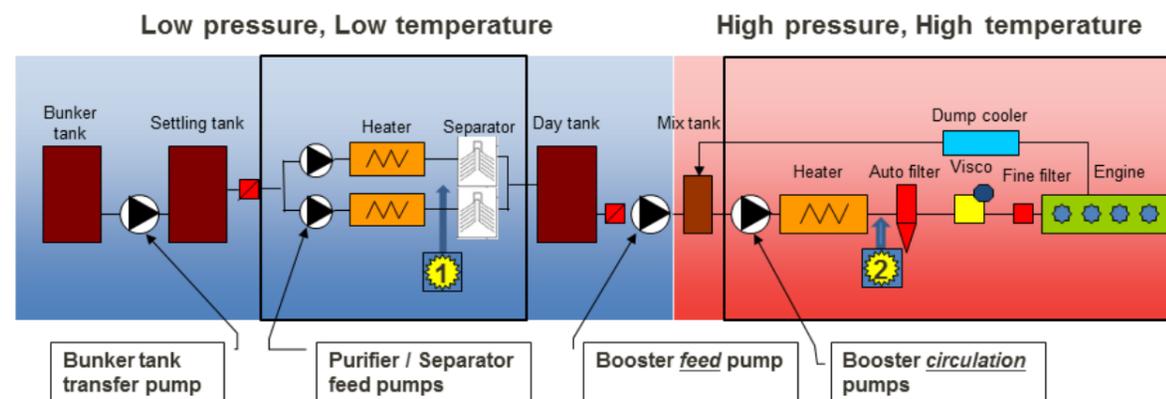


Location in fuel system:



1 = FID Reducer
2 = FID Improver



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IPCO Power's Fuel Treatment



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 hydrocarbons. It is a refinery waste stream product with a high BTU content used as fuel oil. Centrifuges and automated filters are used to clean the fuel. A percentage of the purchased fuel ends up in the slop tank.

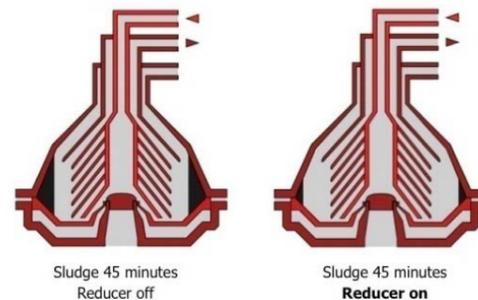
HFO needs to be heated and pressurized before it can be used to operated engines or boilers. Exposing fuel to heat and pressure will unavoidably increase the size and mass of the fuel droplet, change the physical condition of the oil and negatively impact the combustion process.



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.

Sludge Reduction

IPCO Power's **FID Reducer** Sludge Reduction Systems are installed directly before the centrifuge. As a result of the reduction in fuel droplet size, centrifuges and filters will be able to more effectively remove in-organic contaminants and stay clean much longer. Consequently, sludge generation from centrifuges and filters will be reduced by approx. 50 to 80%. As a result, centrifuge and automated filter flushing intervals will have to be adjusted and will be significantly extended.



Combustion Improvement

IPCO Power's **FID Improver** Combustion Improvement Systems homogenize heavy fuel oil after passing through heaters and pumps in the high pressure side of fuel injection system, supplying fine filters and injectors with fuel droplets of 3 micron or smaller. The improved atomization and more intensive contact of fuel with oxygen will significantly enhance



Combination

To effectively improve the fuel quality we recommend installing a combination of an FID Reducer and an FID Improver. The FID Reducer will reduce the droplet size in the fuel system just before the separator and will assure that all useful fuel will pass the separator. Because of the heaters and pumps further in the system the fuel passes through piping towards the engine will normally re-agglomerates. To reverse this effect immediately before the engine an FID Improver is recommend. The FID Improver will reduce the droplet size again to a 3 micron for an improved combustion.

Fuel efficiency: up to 1,25 % savings on 4 stroke engines and up to 2,4 % savings on 2 stroke engines

Maintenance: less separator and engine maintenance

Environment: up to 80% sludge reduction, up to 5% NOx reduction, less black smoke and up to 70% PM reduction