Fuel Oil Additives

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OTHERS :

Soot control additives

Air-compressor oils

Metal stamping oils

Degreasers

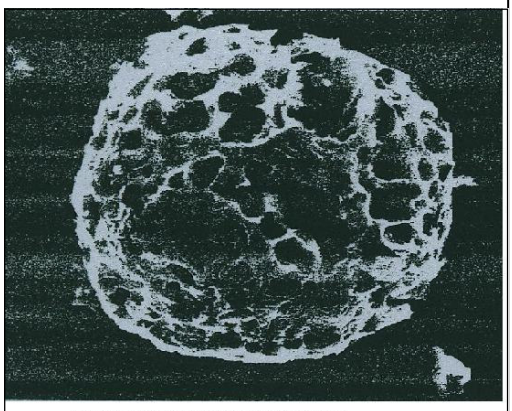
The other term for fuel oil is Residual Oil ; as the adjective defines this is the rudimental remains after volatile components of petroleum are extracted in an oil refinery. It constitutes 10 % of all refined mineral oils, thus its economic value cannot be ignored. Besides fuel oils have high calorific value and it is the cheapest of all liquid fuel. Unlike petrol or gasoline which are light and almost colourless, fuel oil is thick and blackish. These negative aspects of fuel oil has make it relatively unpopular for house-hold or consumer use. However it is attractive to other heavy energy industrial users, like paper mills.

Fuel oil are classified into different grades by viscosity. In the US, there are Graded from 1 to 6. Fuel Oil No 6 will have the highest viscosity, while No 1 oil is the lightest. In Malaysia, we only have 2 grades Light Fuel Oil (LFO) and Medium Fuel Oil (MFO). Generally without treatment the burning efficiency of MFO is 10-15 % lower than LFO, as the former has higher sludge, deposits contents.

At low temperature, Fuel oil is not free flowing, it needs heating to become less viscous and pumpable. Fuel oil also contains 3-5 % sludge which cannot be dissolved at higher temperature. During the burning process, these sludge will clog up the nozzle that inject the atomized fuel. Besides large sludge is a bad fuel, it remains un-burnt and emits as soot. The early fuel oil additive acts to solve the

problem of sludge by dissolving it with organic solvents. However solvents are not good for sludge as they have a high percentage of water that can resist dissolution by solvents

The newer technology of fuel oil additives is Dispersion and emulsification. As explained earlier, oil



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sludge consists of water and some hydrophilic organic matter. With elevated temperature and lower viscosity, sludge grows. The way to stop it from growing is to coat the small size sludge particulates with a

UNTREATED SLAG

hydrophobic surface. As long as the sludge particulate remains small, it can be atomized easily for more complete combustion. If one were to examine the soot of treated MFO under a microscope, one can notice the presence of many small hollow spheres called cenospheres which signifies thorough burning. On the other hand, un-treated fuel oil will emit clusters of dense irregularly shaped soot particles.

The other problem associated with burning heavy fuel oil is corrosion. Lower grade fuel oils have high sulphur content, sometimes as high as 5 %. When sulphur is burnt it turns into sulphur dioxide and sulphur trioxide which are both corrosive gases. When combined with water they form acids to corrode smoke stacks and economizers. The solution to this problem is to neutralize the acid gases with metallic ions of Mg, Mn and Fe which derived from organo-metallic compounds. The other more eminent benefits of using this type of additive is that the metal acts as catalyst to speed up combustion. Studies have shown that the Ignition time for fuel oil reduced from 0.3 second to 0.2 second in a catalysed combustion. Sooty emission is greatly reduced in a organo-metallic treated fuel.

Oxides of nitrogen are also emitted from burning fuel oil. The origin of these pollutants is nitrogenous compound in the residue of distilled oils. They are also corrosive gases. Its treatment is similar to the treatment of sulphur in fuel.

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