

COMPARATIVE STUDY OF THE DIESEL OIL AND FUEL OIL PROBLEMS IN DIESEL ENGINES

Technical document: RB-18

The vast majority of our customers in the power generation sector with large engines use fuel oil and therefore, we have had the opportunity to make, in their plants and with their collaboration, the exhaustive controls and measurements that have allowed us to produce the information that you may already know or you can know through our website www.rbbertomeu.com. This has been a long-time and expensive work due to all the resources required for its realization.

To date, we have not compiled data that allows us to produce similar information related to Diesel engines, mainly due to the fact that these are small engines, compared to large Heavy Fuel oil engines. However, in those small engines the control and measurements costs are the same as in a large engine.

However, in order to help your Technical Department as much as possible in the decision process of using our concentrated additives (see the Technical document [RB-30 Colloidal and Molecular Magnesium for fuels](#)), we will now present a brief comparative report on the problems of fuel oil and Diesel oil engines:

1 - All hydrocarbon fuels, even the gaseous ones, contain impurities that cause undesirable compounds during combustion. Obviously, Diesel oil contains less impurities than Heavy Fuel oil and therefore fewer problems are expected during handling and combustion, although this does not mean that Diesel oil has zero problems and users know it. In practice, these corrosion problems exist even in power generating plants with gas engines.

In general, in the case of more "clean" fuels such as the Diesel oil, the content of sulfur, which is present in various organic forms, has much more influence on corrosion than the content of harmful metals (very low) contrary to what happens in the case of the fuel oil, where both aspects share responsibilities in the corrosion issue.

Diesel oil, being less viscous than Heavy Fuel oil, does not need such a severe pre-heating phase in order to enhance spraying or injection into an engine. However, at the moment of combustion it behaves the same way as the latter if the spray is not perfect: unburned or partial-only combustion occurs in the droplets with excessive diameter due to insufficient mixing with the combustion air. To avoid or minimize this effect, the surfactants contained in our products reduce the surface tension of the Diesel and favor, as in the case of Fuel oil, obtaining smaller drops under the same physical-mechanical conditions of pulverization.

2 - Diesel oil, based on its lower content of impurities and the notable differences in viscosity and surface tension, needs a lower dose of additive than the Heavy Fuel oil.

3 - As mentioned in point 1, we can apply to the Diesel oil the same principle of improving combustion efficiency due to an increased spray capacity due to surfactants, as commented for Heavy Fuel oil. Therefore, given the higher price of Diesel oil compared to Fuel oil and given also the lower treatment cost, the reduction in the specific consumption of Diesel oil per produced kWh provides an important benefit.

4 - The problem of valve corrosion also exists in Diesel-run engines, although on a smaller scale and under a different aspect from that of fuel oil engines. Since the Diesel engines are much more revolutionized than those that burn Fuel oil, the corruptions that occur in the valves' seats translate into

greater wear due to the action of the "Rotocaps" and in a shorter lifespan of them. In this case it is more difficult to appreciate well-defined or blown corrosion points as it is usual when using untreated Fuel oil.

5.- Any company with Diesel engines knows the scope of the corrosion problem in their engines and they can evaluate the benefit that would produce a hypothetical reduction in it, applying a calculation similar to that of our studies, based on the following premises:

- a) All the fuels currently existing in the market can be improved in order to increase the energy efficiency of the facility where they are consumed.
- b) Likewise, all existing fuels produce corrosion to a greater or lesser degree when consumed in an engine or other type of equipment.
- c) Points (a) and (b) are widely contrasted and known by engine manufacturers and their users, although they often do not recognize it or do not classify it as management improvements.
- d) The improvements that can be achieved in the two previous aspects can only come from an efficient and correct treatment of fuels.
- e) At **rb bertomeu S.L.** we have provided specific data on the improvements and benefits obtained from the regular use of our additives, when using Fuel oil in Diesel engines.
- f) The same principles used in the design of "**rb bertomeu**" additives for **Heavy fuel oil** have been applied to design the specific **Diesel oil** additives, taking into account the common denominator of combustion stoichiometry and the physical and chemical differences between both fuels.

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Version February 2020