Dealing with VLSFO

Vecom Marine Special Bulletin

Mediterranean SECA

The designation of the Mediterranean as an emission control area means that, starting May 1, 2025, ships will be mandated to use marine fuel with reduced sulphur content. The permissible sulphur content in marine fuels will be reduced from the current limit of 0.5% to a significantly lower level of 0.1%. This reduction is expected to prevent at least 1,000 premature deaths annually and reduce new cases of childhood asthma by approximately 2,000 each year.

Smooth transition?

Scrubbers, having been heavily debated during 2019, seem to have been the smoothest transition, both operationally and cost wise, with the spread of HSFO and VLSFO exceeding 300$ pmt. However, it is much too early to determine if they can stay in the game, as far as regulations are concerned, as well as operationally for the years to come.

MGOs, LNGs & Biofuel also transitioned relatively smoothly, with the costs of operation remaining similar, although still much higher than heavy fuel oils. However, shipowners with ships on the spot market, having minimal control over ports of call, have been feeling the heavy burden of this transition, with rising costs and disruption, while the industry experiments with the new bunker blends.

VLSFO in use – The issues that surfaced

A big part of the marine world has in action taken the VLSFO route of compliance. VLSFO quality and price is as of yet not stabilised, which in turn creates many previously hidden costs to the shipowners. Precautions must be taken to avoid the most noteworthy issues.

Engine Compatibility & Lubricity Issue

Engine compatibility is now a more serious issue than previously considered. Damaged engines at sea due to the level of sediment created is a very real risk. On top of that, with the VLSFO having substantially lower lubricity and many of its varieties having inferior combustion capabilities, the wear and tear of the engines is becoming more prevalent.

Bunkering Compatibility Issue

With bunkering availability risky, especially for those who prefer a specific brand, the option of procuring whatever is currently available is the reality we are facing. Compatibility issues are bound to arise. Mixing different VLSFOs can have dramatic ramifications. As the industry re-discovers which of the new blends can safely be brought into contact with which other, their compatibility MUST be checked in advance.

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Catalyst Fines Issue

Catalyst (cat) fines are hard particles of abrasive nature consisting of aluminium and silicon oxide, and are used in the refinery process of crude oil, which can remain in the bunker fuel. Due to their scouring action, cat fines are regarded as potential risk to ship engines. Experimental blends and lesser quality blends, tend to have them in higher quantities. It is important that these don't reach the engine as cat fines can wear them fast. The risk of VLSFOs containing damaging levels of cat fines is dependent on its composition. Heavy cycle oils (slurry oils) are at most risk of containing elevated levels of cat fines. VLSFO products originating from North America may comprise cycle or slurry oils and when more products derived by secondary blending enter the market, the risk of cat fines will be even higher.

More Wasted Fuel Issue

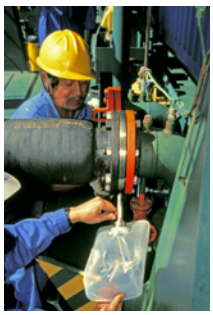
Fuel tanks with either HSFO or VLSFO are always contaminated by an accumulated layer of wasted, unpumpable fuel. Specifically, VLSFOs' remnants can reach up to 9% of the tank's capacity, as sludge and sediments have formed over time. Higher than ever before, as a direct effect of the higher stratification rate of the VLSFO.

Centrifugal Purifiers, Auto-Filters & Strainers Clogging Issue

Purifier disks getting clogged much sooner than before is now a common occurrence. The asphaltenes of the heavy fuel precipitate as heavy sludge clogging the purifier disk at a much higher frequency. It is now a necessity to clean the purifier many times more often and with more effort required each time, as compared to HSFO blends.

Cold Flow Issue

Some of the VLSFO blends currently in the market are paraffinic. This means waxing can occur at low temperatures. Waxing will cause filters to clog and the bunker storage tanks to solidify. Experimental blends will tend to behave in this way more often.



Fuel Oil Treatments gradually adopted as a standard in the industry

It was common practice for the marine industry to neglect treating their fuel if the fuel analysis report showed that that the bunker met the specifications agreed with the supplier. Only a fraction of ship operators would have their fuel oils tested with an independent shore-based laboratory. The industry's attitude is now different and there are specific reasons as to why.

The industry has always been working on a trust basis, which has proven to be reliable for most of the time. However, new blends as the VLSFO are still experimental for the most part and in dire need of improvement. As such, quite a bit more often a bunker batch is different to original intentions and its qualities may be lesser known even to producers. Compatibility improvement is crucial. On top of that, due to the nature of marine fuel oils and specifically VLSFO, an average of 1-3% of the fuel is completely wasted, accumulating in the bottoms of tanks. Up to 10% of the fuel is utilised to a lesser efficiency capacity, due to the lower calorific value and in many cases reduced combustion efficiency.

Marine fuel oils can be among the harshest fuels in any industry. VLSFOs are even harsher in use. Left untreated, they will cause substantial damages to the engines and fuel system; substantially more costly, as compared to utilising the right fuel treatment which will in action extend engine life and improve their maintenance intervals. Adding to all above facts, with fuel lubricity and efficiency improved, the correct fuel treatment undeniably adds to both the shipowners' and operators' short and long-term value.

The Vecom Marine solutions

Vecom Marine has been focused on these issues and is well prepared to offer reliable and thoroughly tested solutions. Keeping track of the industry's trends and the blend types produced, we are ready to help avoid the serious costs that could arise from all VLSFO related issues.

Vecom Marine has compiled the VLSFO-proof Package

VLSFO issue:

☒ Engine Compatibility & Lubricity

Low lubricity directly translates to more stress on engine components. This in turn leads engine life expectancy and performance to drastically diminish. Adding to the fact, many of the new blends' combustion properties can be gravely lower, which is a direct equivalent to unpumpable fuel waste within the fuel network. If those issues are not dealt with it can mean massive costs for the vessel in both resources and time. Vecom Marine has designed **FOT LI 4100** specifically to cope with low sulphur middle distillates. With excellent lubricity improving characteristics by both HFRR and SLBOCLE bench test procedures, this product offers very good solubility and therefore does not negatively affect filterability characteristics of the doped middle distillate. If lubricity is lower than 460µ on the wear scale HFRR, it is essential to add this treatment soonest possible. Additionally, Vecom Marine highly recommends **Test Kit Total Iron** to keep a constant, accurate monitoring of the engines' wear. The test will analyse how much iron content has ended up in the scavenge drain's lube oil as a direct result of the constant wear and stress the engine is undergoing from the fuel oil. Low lubrication from the fuel oil wears out the metal in the engine and by scraping down lube oil in the lube oil cylinder we can determine how much metal has been worn off. The more the iron concentration, the more stress the engine is taking (or showing corrosion signs) and the more in need of lubrication it is. This corrosion indicator is most often tied to lubricity, but will as well act as a general red flag in the engines' operations.

Vecom Marine solution:

☑ FOT LI 4100 & Test Kit Total Iron

VLSFO Issue:

☒ Bunkering Compatibility

With each bunkering accompanied by a lab test, it is the reality that compatibility, density and stability of the new and existing fuels are to be known at the soonest possible time of the bunkering. **Test Kit Compa Dens**, a proven technology, can withstand even the most severe marine conditions and provide accurate feedback on the spot. Instant knowledge of the compatibility will help determine the treatment dosage of Vecom Marine's renowned **FOT Sludge Dispersant**, which will provide assistance in the fuels becoming homogenous. Vecom Marine advises a thorough fuel tank clean prior to the use of the treatment as to avoid sludge overflow. After starting the treatment, fuel tank cleaning will no longer be a problem as tanks are kept clean in motion.

Vecom Marine solution:

☑ FOT Sludge Dispersant & Test Kit Compa Dens

VLSFO issue:

☒ Catalyst Fines

While the different VSLFO fuel blends are being experimented with, it is unfortunately a fact that catalyst fines are being detected in higher rates than ever. Quantity larger than 80 mg/kg in the received fuel oil, is almost impossible to be reduced by the treatment plant and abrasive engine wear will take place. It is vital to monitor their accumulation in the tank, since if not reduced by suitable fuel cleaning, the abrasive nature of the fines will cause damage to the engine, fuel pumps, injectors, piston rings and liners. Designed for easy and convenient use, as well as endurance in time, **Test Kit Cat Fines** can fast and accurately inform of the cat fines level and save the ship from severe engine damages.

Vecom Marine Solution:

☑ Test Kit Cat Fines

The Vecom Marine solutions

VLSFO issue:

More Wasted Fuel

This past year, many of our clients have chosen **FOT Sludge Dispersant** to transition smoothly into IMO 2020 with great success. And one of the main reasons is the product's innate ability to help with compatibility and homogeny of the fuels while making sure fuel use is maximised, with no sediments left behind to accumulate in unpumpable wasted layers. Fuel performance is additionally improved as combustion efficiency increases. Many of the VLSFO blends are in even greater need of combustion improvement. VLSFOs not treated correctly, will accumulate sludge layers even faster, with cases of clogging the fuel lines, immobilising the ship.

Vecom Marine solution:

FOT Sludge Dispersant

VLSFO issue:

Centrifugal Purifiers, Auto-Filters & Strainers Clogging

During these first months of operation of VLSFO, separator/purifier disks clogging has been a huge problem to many vessels. It can stop operations and cause big delays until the purifier is cleaned. **Separator Disc Cleaner** is especially developed to combat this in the fastest and most efficient way and save significant time in the crews' operations. Using **FOT Sludge Dispersant** will also combat this problem by drastically diminishing the sludge ending up in the purifier disk.

Vecom Marine solution:

Separator Disc Cleaner & FOT Sludge Dispersant

VLSFO issue:

Cold Flow

Immobilised, waxed fuel due to cold flow can become very troublesome to handle. The wax remnants will require intensive manual labour to remove with the storage tanks unusable until that point. **FOT Flow Improver** significantly improves the cold flow properties of middle distillates and reduces wax accumulation. According to the characteristics of the particular middle distillate, 25 - 500 ppm is usually sufficient to considerably reduce both the CFPP (Cold Filter Plugging Point) and the Pour Point of diesels and heavy fuel oils.

Vecom Marine solution:

FOT Flow Improver

For orders/enquiries, please contact your local Vecom Marine distributor.