



Customer Technical Service

Lay-up of Ships

All content and images © Innospec 2020.

In the run up to IMO 2020, the industry was preparing for unprecedented challenges. Needless to say, no one in the industry was prepared for, or could possibly have envisaged, the reality of the pandemic. Some operators are having to make the difficult decision to lay-up ships due to the global downturn in trade with many countries on lockdown and oil prices at an all-time low.

This unfortunately is not the first time the industry has laid up ships en masse. As such most classification societies have produced recommendations on safe lay-up. Any company considering taking such action is well advised to read them. Although such recommendations do briefly discuss implications on fuel quality, little is written about the potential issues that may render these fuels challenging to use when the vessel returns to service.

Typically, vessels are either laid up in 'hot' or 'cold' mode. Hot lay-ups are short term, allowing the vessel to return to service at short notice. Whereas cold lay-ups are for a longer term which requires the vessel to be moored in a secured location and all systems shut down. In either case, it can be expected that the fuel will degrade during the lay-up period, with sediment formation and asphaltene flocculation, resulting in excessive sludge build up in fuel tanks and handling systems. This is an important factor to consider as there are multiple and possible new fuels on-board (VLSFO), where there is little experience with long-term storage stability. This document will consider each of the main fuel groups (MGO, HSFO and VLSFO) and describe their individual challenges and potential additive solutions to address such challenges.

Marine Gas Oil (MGO)

Marine Gas Oil (MGO) is often thought to be a premium fuel and to a large extent it is; however, as a more refined product than other fuels on-board this means that it has a limited shelf life. MGO is prone to ageing due to oxidative instability which, can lead to the formation of inorganic sediments and polymeric gums. This oxidised material can also be acidic which can cause ferrous corrosion inside tanks and associated pipework. Another issue with long term storage of MGO on-board is the presence of water which, given the right conditions, can lead to serious microbial contamination. Microbial contamination can block pipework, filters and purifiers, as well as lead to corrosion.

Another important factor to consider with MGO is cold flow operability. MGO is comprised of paraffin waxes, which crystallise and precipitate out of suspension in the fuel at a temperature higher than the fuel's Pour Point (PP). These waxes agglomerate and grow into large crystals and it only takes two (2) percent of wax in the fuel for MGO to gel and become solid. To resolublise the waxes, it takes a lot more heat and energy than most ships have, meaning that the vessel's cold-start fuel could be unusable.

High Sulphur Fuel Oil (HSFO)

High Sulphur Fuel Oil (HSFO) has for many years been the primary fuel used in the marine industry. However, with the implementation of IMO2020 regulations and following the March 2020 carriage ban, this is no longer the case. The stability of HSFO is largely related to asphaltene stability and the fuel's ability to keep them in colloidal suspension. As all stability is related to time and temperature, this means that the longer a fuel is stored, the less stable it will become. Asphaltene precipitation manifests itself as sludge in the storage/settling/service tanks, purifiers, heaters and filters. This means severe operability issues when trying to reuse the fuel after a lay-up period.

Very Low Sulphur Fuel Oil (VLSFO)

Very Low Sulphur Fuel Oil (VLSFO) is the fuel that crews have the least experience with, especially when it comes to understanding how stable the fuel will remain during bunkering and storage. Since VLSFO fuels are often blends of both distillate and resid-based process streams, they can exhibit the worst aspects of both MGO and HSFO as it relates to stability in long-term storage.

Globally, the experience with VLSFO over the first few months of 2020 has been that some of these fuels exhibit a tendency to become unstable in storage and either crash asphaltenes out of the blend, form oxidised polymeric gums, sediment and sludge, or precipitate out high molecular weight paraffin waxes inside the purifier. Innospec also knows from our extensive experience within refineries, that some of the streams used in VLSFO only remain stable for a very short period of time. We have also heard from the industry that some major suppliers are only offering a shelf life of one (1) month for some VLSFOs. This means that the fuel will be difficult to store long-term and may present operability issues when bringing the ships back online.

Additive Solutions

Innospec has vast experience improving the performance and operability of marine fuels and a speciality marine product portfolio that is capable of improving storage stability; stopping oxidative degradation; inhibiting corrosion; preventing microbial growth and improving cold temperature handling and operability. The following products are best suited to the challenges associated with laying-up ships.

Octamar™ LI-5 PLUS

Octamar™ LI-5 PLUS is a Lloyds Register verified, multifunctional additive for distillate fuel. Among its other benefits, it prevents oxidation and thermal degradation of MGO, prevents corrosion, reduces further microbial growth and is a robust product that keeps the fuel fresh for significant periods of time.



Octamar™ Winterflow

Octamar™ Winterflow is a product specifically designed to improve the cold temperature operability of MGO. This means that the vital cold start fuel will work when needed, whatever the ambient conditions.



Octamar™ BT-25

Octamar™ BT-25 is a long-established product for HFO that keeps asphaltenes in suspension and the fuel stable. It is a highly versatile and concentrated HFO stabiliser that has been shown to keep fuel stable for at least six (6) months and as much as twelve (12) months with lower and less extreme storage conditions.



Octamar™ HF-10 PLUS

Octamar™ HF-10 PLUS has been specifically formulated to meet the challenges of VLSFO and with components designed to prevent distillate ageing while keeping asphaltenes stable, it will improve long-term storage stability of VLSFOs.



Please contact your local sales representative for more information.

email: CSC.americas@innospecinc.com

CSC-emea@innospecinc.com

CSC.asiapacific@innospecinc.com

April 2020

The information contained in this document is provided free of charge and is based on technical data that Innospec believes to be reliable. It is intended for use by persons having technical skill and at their own discretion and risk. Innospec accepts no liability for any loss, damage or expense arising from, or in connection with, the use of the information. Furthermore, none of the contents of this publication should be taken as a licence to operate under any patent, nor as a recommendation to infringe any patent.