

Occasion

Since the regulations for Emission Controlled Areas (ECA) and Sulphur Emission Controlled Areas (SECA) became valid, a lot of new Ultra Low Sulphur Fuel Oil (ULSFO) types have been offered on the fuel market, often sold as ISO-F-RMD80.

The new fuel types differ a lot from each other with regard to viscosity, lubricity, compatibility with Heavy Fuel Oil (HFO) / distillates and quality in terms of chemical residues or contamination. As the characteristics of these fuels are typically between distillate and heavy fuel oil, these fuels are often called "hybrid fuels" or "hybrids".

Experience

These hybrids/ULSFOs often have a high paraffinic content and high pour points and as such a high viscosity. We received fuel samples of hybrids/ULSFOs with viscosity similar to DMA up to RME180, which requires a completely different preheating and cooling of the fuel oil to keep the viscosity in the required range between 2.3 to 14.0 cSt before engine. The operator has to ensure that these specifications are kept. It is very important that the viscosity lies within this range to ensure the needed lubrication at low viscosity and to avoid overload of fuel pumps and pump drive at high viscosity.

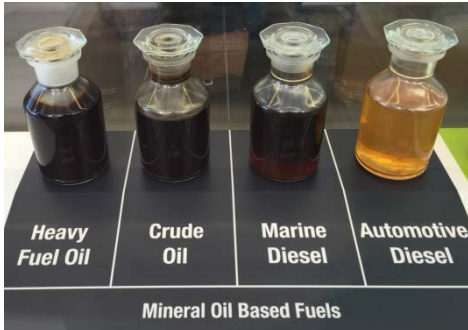
On several vessels we observed that the automatized change over from HFO to MGO and vice versa was programmed only temperature controlled without surveillance of viscosity. This led to high pressure fuel pump seizures, because viscosity was far out of the recommended range. For your kind information please also note our attached PCI 352.

**Action Code:
When convenient**

Fuel quality and compatibility of fuel oils

PrimeServ Customer Information
No. 376 / June 2017

Concerns
MAN Diesel & Turbo medium-speed 4-stroke engines of Augsburg Design

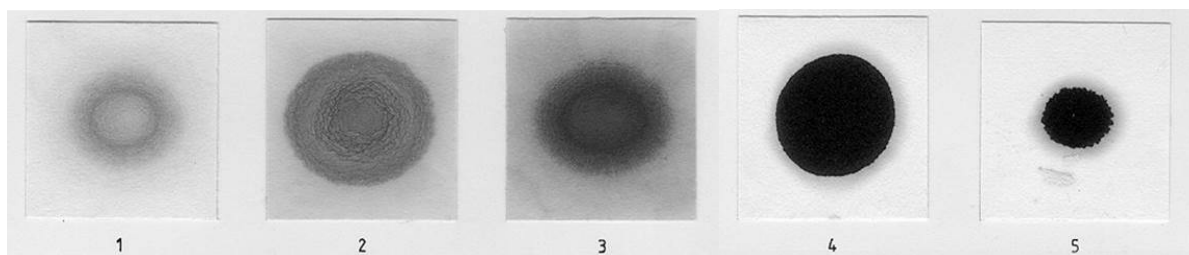


Besides the already known possible incompatibility between DMA and HFO we recognized an increased incompatibility of these new hybrids/ULSFOs among each other and with HFO. This incompatibility results in coagulation, which is clogging filters and can cause defects in the fuel injection system. The high paraffinic content of the hybrids/ULSFOs leads to precipitation of asphaltenes during mixing with HFO. Thus bunker on top of "classic" HFO leads to incompatibilities and vice versa.

There are hybrids/ULSFOs containing a high amount of abrasive catfines, even exceeding the average catfines content known from HFO. Therefore it is essential to clean these fuels in a separator efficiently. The effectiveness of the fuel separator should be surveyed at least every 3 months by the analysis of samples taken before and after separator.

Recommendation

Additional to above explanations regarding viscosity of fuel and our previous PCI 352, we strongly recommend to check fuels and lube oil on a regular basis according to our operating instructions, chapter 3.3.8 (Analysis of operating fluids). The compatibility of fuels, especially by using hybrids/ULSFOs, has to be determined according to work card 000.05 for spot test ASTM D4740 (visual analyze of fuel mixture 50:50).



Please also be informed that our PrimeServ Laboratory has enlarged its wide range of services. PrimeServ Augsburg is now also able to analyze incompatibilities of fuel oils in detail with up-to-date equipment according to ASTM D7060. The observation is done by laser detection in different mixing ratios to determine the maximum flocculation ratio. For analyzing the fuels the laboratory requires at least 2 liters of each fuel (HFO, MGO and/or hybrids/ ULSFOs). In order to avoid damages of filters and fuel oil injection components, we strongly recommend to use the opportunity to analyze the fuels prior to bunkering.

Furthermore, the following has to be considered:

- As stated above, the fuels are typically sold as residual grade. Thus, it has to be treated to some extent comparable to heavy fuel oil.
- Catfines are contained in most of these grades, thus purification has to be applied when operating on this fuel! It is of importance to keep track of the purifier temperature as an overheating of the fuel may lead to a too low viscosity at engine inlet.
- As nearly all of these hybrid fuels contain residual fractions from refining, a lube oil intended for HFO operation has to be used! Do not get confused by the low sulfur content! The asphaltene handling decides in this case which lube oil should be used. If lube oil for MGO/MDO operation is selected, sludge formation in the crankcase will appear.
- Sealing oil is not required during the operation on hybrids/ULSFOs.

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Contrary to operation on standard HFO the following has to be considered:

- Valve seat lubrication is required to prevent excessive wear. The nozzle cooling water is typically not required for these hybrid fuels.

Additional Note

Summarizing we like to point out that all characteristics of hybrids/ULSFOS must comply with the latest edition of ISO 8217. Please be aware that a deviation from the recommended range can cause damages of engine components which cannot be handled within engine warranty or spare part warranty.

To avoid defects we recommend implementing an automatized change over according to our operating instructions, chapter 3.4.2 and our previous PrimeServ Customer Information 352.

More information

For more information and support regarding the quality control of your engine fluids (fuel, lube oil, separator control, cooling water) you are welcome to contact our PrimeServLab via e-mail:

PrimeServLab@mandieselturbo.com

Contact

Should you have any queries, our Technical Service will be pleased to be of assistance:

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