Article: Fuel Testing Considerations For IMO2020

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As IMO2020 draws ever closer, it is widely anticipated throughout the shipping industry that due to the increased range of new fuel types, cutter stocks and additives, coming to the market during 2019 and beyond, the demand for laboratory testing will inevitably increase.

However, as such demand increases, the availability of a laboratory to test fuel is simply not enough. The quality of testing and the management of the laboratory's quality system to provide traceable, reliable and accurate results, has never been so important.

ISO17025, is recognised as the "Gold Medal" accreditation standard for laboratories testing marine fuel. This quality management system is extremely thorough in ensuring high standards are maintained within the laboratory on a daily basis. On an annual basis the laboratory will undergo both a management system and technical audit by a recognised independent Accreditation Body, for each of those individual tests to which the laboratory has achieved ISO17025 accreditation.

Veritas Petroleum Services, (VPS) has four fully-owned laboratories. VPS is unique in being the only dedicated marine fuel testing company, with ISO17025 accreditation for every single ISO8217 test parameter, in every one of the company's four laboratories. Also, within VPS laboratories, bespoke tests which are outside of the ISO8217 specification are still validated, checked and performed according to the requirements of ISO17025.

ISO17025 insists on full traceability of the testing of every single sample for every single test undertaken. This ensures the provision of a data-trail of a sample's journey through the laboratory, with a record of each and every person who comes into contact with the sample, from receipt, to booking-in, to each chemist carrying out specific tests, the results and their reporting. The instrumentation and equipment used, also undergoes daily quality checks, being monitored continuously to ensure optimum accurate performance, along with the routine maintenance of such equipment. A key feature is the monitoring of the capabilities of laboratory chemists and analysts which are tracked via training records, to ensure only qualified, trained and experienced staff handle certain laboratory procedures. In addition, all methods and procedures are controlled documents and all software systems, such as Laboratory Information Management Systems (LIMS) are checked for accuracy and reliability. Finally, a full continuous improvement programme, with root-cause analysis and corrective actions, must be in place and employed.

A laboratory following all the above, will provide peace-of-mind, in the quality, accuracy and reliability of its testing, reporting and advice to ship owners and operators. In addition, it has been recognised that fuel quality and the imminent arrival of a wider range of fuel types to the market, with the potential for varying cutter stocks, blending agents, diluents and additives to enter the supply-chain, will potentially cause additional fuel-quality concerns.

VPS would always advise clients to endeavour to buy fuel and test to the latest revision of ISO8217, but as no new revision is expected until post-2020, additional testing will provide enhanced protection of the vessel and its operations.

Compatibility and Stability are two key concerns to the vessel and its chief engineer and testing, such as blend compatibility and hot-filtration methods TSP, TSA and TSE, all increase in importance in the

information they can provide, regarding co-mingling issues and the potential for sediment to form from a fuel. Complimentary to the hot-filtration methods is Separability Number (Reserve Stability Number, RSN), which will predict the likelihood of asphaltenic drop-out from a fuel and sludge formation.

2018 highlighted a key need to employ laboratory test methods to identify the presence of chemical contamination of fuels. Such chemicals may have been unknowingly present, others may have been present due to adulteration of the fuel. Either way, high-end forensic techniques such as Gas-Chromatography Mass-Spectrometry (GCMS) and Fourier Transform Infrared (FTIR), were key in analysing and detecting such species within the fuels.

With GCMS, it is important to recognise the preparation of the sample, prior to GCMS will determine what is identified and found within the fuel. Head-Space GCMS is employed by VPS, firstly as a chemical screening method for the rapid detection of volatile chemicals. The screen can be followed by an extended head-space analysis for more specific determination. This may account for up to 70% of all chemical contaminants potentially found within fuel. VPS have GCMS-HS capability in all four of its labs, via seven instruments. This allows rapid turn-around of sample analysis within 24-hours and reporting with the other ISO8217 tests.

Other sample preparation techniques such as Acid Extraction and Vacuum-distillation, allow GCMS to identify specific components, based upon their chemistry. For example, Acid Extraction will qualitatively or quantitatively detect the presence of acids and phenols within fuel. It is worth noting, that these GCMS methods are proprietary “in-house” methods, with their development based upon VPS’ experience and expertise in almost 40 years of fuel testing.

Since 1st January 2015, VPS has witnessed a significant increase in distillate sample receipt, coupled with increasing distillate quality issues, due to market demand and consequently higher levels of distillate treatment and blending. Market demand for distillates will increase from 2020 and as such a further increase in quality issues. The monitoring and analysis of distillates is therefore extremely important and increasing in demand. Once again, the additional tests further to ISO8217 required for distillates are available from all four VPS laboratories and include cold-filter plugging point and cloud point as part of the cold-flow properties tested, in order to avoid fuel-waxing. FTIR testing to identify bio/FAME presence and the potential issues such components can cause, such as fuel instability, oxidation, metal erosion, seal deterioration and an affinity to absorb water. Bacterial testing to avoid bug-growth within fuel tanks, piping and filters, avoiding the associated operational issues and potential corrosion, is also key and such monitoring should improve on-board housekeeping.

Having the capacity to provide ISO17025 accredited, ISO8217 testing, plus all the highlighted additional tests from all four laboratories allows VPS to deliver not only accurate, reliable and comprehensive test information, but with a fast turn-around of testing and reporting. All of which will be key to ship owners and operators and the challenges they face as the industry heads into the complex world of fuel usage and management.