FUEL QUALITY TESTING

YOUR FUEL MANAGEMENT PARTNER

Fuel Quality Testing

THE VPS CUMULATIVE TESTING VOLUME, IN EXCESS OF 2 MILLION FUEL SAMPLES CONTINUES TO ENHANCE OUR FUEL QUALITY DATABASE, THE MOST EXTENSIVE OF ITS KIND IN THE MARKET.

WHY TEST YOUR MARINE FUELS?

Unpredictable fuel quality is a regular cause for concern among ship operators. Apart from creating operational problems, fuels of unknown quality may lead to commercial losses or violation of statutory requirements.

Contravening local or global environmental regulations may result in penalties such as vessel detentions and fines.

To protect your company's assets, you should always determine the quality of fuel purchases before use by testing a representative sample at an accredited laboratory.

While some fuel buyers may argue that they have not encountered any fuel-related problems, it is increasingly difficult to pinpoint the sources of quality problems because marine fuel is an internationally traded commodity. For this reason, ship operators should constantly monitor the quality of bunkers delivered to their vessels.

REASONS FOR ENGAGING VPS

SUPERIOR FUEL ANALYSIS EXPERTISE AND TECHNOLOGY

The hallmark of VPS quality is the breadth and depth of our fuel testing services.

VPS introduced the first commercial bunker testing programme in 1981. Since then, we have been in the forefront of bunker fuels research and development.

Our VPS Fuel Quality Testing Programme (FQT) is supported by state-of-the-art analytical equipment and optimum support from a dedicated team of specialists with a complete spectrum of expertise in marine fuels and shipboard operations.

SPEED OF RESPONSE

Analysis results, alongside results from previous fuel deliveries, are evaluated by technical experts with vast operational experience to provide tailor made advice on fuel handling for optimal performance and to assist in troubleshooting.

As fuel onboard must always be fit for purpose, clients will be contacted immediately if test findings show issues that require prompt action.

SUPERIOR QUALITY CONTROL AND ASSURANCE

As a certified company with high standards such as ISO 9001, ISO 14001 and OHSAS 18001, safety and quality practices are of paramount importance to VPS. Our testing facilities are also accredited to ISO 17025. With VPS, you are assured of timely and reliable customer care.

COMPLIANCE WITH LEGISLATIVE & REGULATORY REQUIREMENTS

As a longstanding and leading member of international regulatory bodies, VPS helps you navigate and comply with bunker environmental regulations such as the MARPOL Annex VI and EU Sulphur Directive for Emission Control Areas (ECAs). and understand how these can impact your vessels' operations and business.

SUPERIOR BUNKER QUALITY DATABASE AND APPLICATIONS

The VPS cumulative testing volume, which is in excess of two million fuel samples, continually enhances our fuel quality database, the most extensive of its kind in the market. With this database, VPS can help you plan bunkering activities by providing accurate, critical information on fuel quality characteristics and trends pertaining to specific bunkering locations around the world.

Members of the VPS Fuel Quality Testing Programme also receive timely Bunker Alerts and Technical Newsletters containing information about the latest fuel quality problems detected by our global testing network.

With such timely advice, you can avoid bunkering in the affected areas or take the necessary precautions if refueling has to take place.

SUPERIOR SERVICE NETWORK

VPS owns and operates four specialist and accredited fuel laboratories, strategically located in Singapore, Rotterdam, Houston and Fujairah. Supported by our global customer service network and top courier companies, our multiple laboratories not only minimise sample delivery time, but also ensure that you will receive test results and technical advice promptly.

For your convenience, all fuel quality test results are available on Customer Portal, our online customer service website. Members can retrieve vessels' test results and make sample inquiries online based on vessel, port or supplier.

Features of the VPS Fuel Quality Testing Programme

- Comprehensive technical advisory services on fuel quality and proper management of fuels, including expert advice on fuel treatment and storage, storage tank heating, blend optimisation and safe engine operation
- Technical consulting for engine damage cases involving detailed investigations, or disputed cases requiring expert testimony at arbitration
- Bunker alerts and online fuel quality newsletters
- Monitoring of onboard fuel treatment plant by analysing Fuel System Check (FSC) samples taken at locations close to the fuel entry and exit points of the separators, as well as before the engine's fuel inlet

- Optional investigative analysis and reporting, including Fuel Ignition and Combustion Analysis, Gas Chromatography/Mass Spectrometry, Fourier Transform Infra-red Spectrometry, Corrosive Test and Catalytic Fines Size Distribution
- Advisory services on regulatory requirements (e.g. MARPOL Annex VI, EU Directive 201233/EC) and operating with distillates
- Training courses and specially designed in-houses seminars on marine fuel management
- MARPOL compliant VPS sampling equipment (line samplers, sample bottles, seals and cubitainers). The sampling kits contain comprehensive instruction manual on recommended bunkering and sampling guidelines as well as the VPS FQT programme procedures.

VPS FQT PROGRAMME – STANDARD SCOPE OF ANALYSIS TABLE

	Residual Fuel	Distillate	
Test Parameters		DMA/DMZ	DMB
Density, kg/m^3 @ 15°C	✓	✓	✓
Viscosity, mm^2/s @	50°C	40°C	40°C
Water by distillation, %	✓	✓[a]	✓[a]
Micro Carbon Residue, % m/m	✓		✓
Micro Carbon Residue, 10% residue, % m/m		✓	
Sulphur, % m/m	✓	✓	✓
Total Sediment-Potential, % m/m	✓		
Total Sediment-Existent, % m/m			✓[a]
Ash, % m/m	✓	✓	✓
Vanadium, mg/kg	✓	✓[b]	✓[b]
Sodium, mg/kg	✓	✓[b]	✓[b]
Aluminium, mg/kg	✓	✓[b]	✓[b]
Silicon, mg/kg	✓	✓[b]	✓[b]
Iron, mg/kg	✓	✓[b]	✓[b]
Nickel, mg/kg	✓	✓[b]	✓[b]
Calcium, mg/kg	✓	✓[b]	✓[b]
Magnesium, mg/kg	✓	✓[b]	✓[b]
Zinc, mg/kg	✓	✓[b]	✓[b]
Phosphorus, mg/kg	✓	✓[b]	✓[b]
Potassium, mg/kg	✓	✓[b]	✓[b]
Flash Point, °C	✓	✓	✓
Pour Point, °C	✓	✓	✓
Visual Appearance		✓	✓
Fatty Acid Methyl Ester (FAME)		✓	✓
Acid Number	✓	✓	✓

	Residual Fuel	Distillate	
Calculated Values		DMA/DMZ	DMB
Net Specific Energy, MJ/kg	✓	✓	✓
Calculated Carbon Aromaticity Index (CCAI)	✓		
Calculated Cetane Index (CCI)		✓	✓
Aluminium + Silicon (Al + Si)	✓	✓	✓

a: If not bright and clear | b: If Ash ≥ 0.01%

A SUMMARY OF SPECIALISED TESTS OFFERED BY VPS:

Fuel Ignition and Combustion Analysis (FIA-100 FCA) is used to simulate and measure the ignition delay and the combustion of a specific fuel. The reported parameters are a calculated average of 25 fuel injections in to the equipment.

Screening of catalytic fines size distribution (CSD) is conducted using a combination of techniques such as filtration, microscopic examination and image analysis through special software.

While most standard test scopes have the concentration of catalytic fines in the fuel, VPS' CSD tool goes a step further by analyzing and quantifying the size ranges of catalytic fines particles present in the fuel. When used in combination with Fuel System Check, the method provides information about critical cat fines sizes not removed by the centrifuge.

Fourier Transform Infra-Red Spectrometry (FT-IR) scan is used for characterising and identifying certain organic molecules present in marine fuels. Examples of components that can be detected by FT-IR are alcohols, esters and acids.

Headspace GCMS Analysis involves two sophisticated analytical techniques, Gas Chromatography (GC) and Mass Spectrometry (MS). Fuel oils are a blend of several organic components. The basic principles of GCMS are to separate and identify these various components.

Vacuum distillation is employed as an analytical extraction technique to separate the fuel components based on boiling point in vacuum, before identifying by use of FTIR and GCMS.

Simulated distillation is a gas chromatography technique, separating individual hydrocarbons in order of their boiling point, routinely used for determination of the typical or characteristic boiling point ranges of crude oil and other refined products. The method is particularly useful in determining whether the fuels being investigated are typical fuel oils or belonging to other product categories.

Acid extraction is used for isolating organic acid components. If presence of organic acids is confirmed through FTIR and Acid Number analysis, acid extraction serves to extract and concentrate these acidic components before individual identification by GCMS.

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