Lloyd's Register Marine

FOBAS Bulletin

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Subject: Fuel change-over when entering / exiting Emissions Control Areas (ECA – SOx)

Applicability: All shipowners, operators, and charterers

From January 1st 2015 the maximum sulphur content of fuel oil used within the MARPOL Annex VI Emission Control Areas (ECA-SOx) will be 0.10%, unless using an approved alternative means. In most instances, this fuel will be low sulphur distillate oil (LSDO) which, for a ship operating both inside and outside ECA-SOx, will generally represent a change from the existing practice of switching between high and low residual fuel oils (HFO) in order to comply.

Ship owners are responsible for ensuring that ships are properly equipped and supplied for this change-over with crews fully capable of affecting it in a safe and timely manner. Within these areas some of the main points to consider are:

Change-over procedures

Each ship has an established and documented fuel change-over procedure which, in addition to its core function of ensuring that the change-overs are completed as required, limits the maximum rate of temperature change when changing between HFO and LSDO thereby avoiding thermal shocks and differential expansion of components which can lead to seizures, wear and surface damage.

Crews receive suitable training and instruction on applying the fuel change-over procedure (both to and from LSDO) and key valves on fuel oil systems are clearly identified. The change-over should be practised and supervised as necessary. If there is any doubt about the fuel system's or engine's ability to be changed-over then trial change-overs should be undertaken in safe locations until any identified problems are resolved.

Spill back from the engines or other combustion devices must be routed and managed so as to not compromise the sulphur content of the LSDO in service or other tanks.

The compatibility of the HFO and LSDO should be checked. Should instability occur it will however only be at the interface of the two fuels and therefore should be handled by attention to avoiding heavy accumulation of material on filters during that change-over period. All FOBAS sample bottle kits includes instructions and chromatographic papers to carry out compatibility test onboard the vessel.

Maintenance

The typical viscosity of LSDO requires close control of pump clearances. LSDO will be much less tolerant than HFO of worn fuel pumps with excessive barrel clearances resulting in high leakage rates and failure to generate the required pressures thereby adversely affecting running performance - even the ability to start the engine. Similarly, excessive clearances in fuel supply and booster pumps would result in reduced delivery rates and pressures.

The cleaning and searching nature of LSDO relative to HFO can result in seepage from pipe flanges, joints, instrument connections and other equipment seams. Furthermore, their differing temperature requirements of the two fuel types may produce relative pipe movements further affecting the integrity of joints and seals.

Operation

Undue heating of LSDO will result in its viscosity falling below the minimal allowable limit of fuel handling and injection equipment resulting in wear and micro-seizures. All direct and trace heating systems must therefore be securely shut-down when operating on LSDO and any indirect sources of heating avoided. In certain cases cooling, or even chilling, of the LSDO may be required in order to avoid the fuel reaching temperatures where the viscosity would be insufficient, alternatively consideration should be given to ordering a fuel with a higher minimum viscosity such as the ISO 8217 DMZ grade.

Base number of the engine lubricants used, particularly cylinder oil, must be suitable for the sulphur content of fuel in use; too low promoting accelerated acidic corrosion, too high the formation of hard deposits in liners resulting in polishing and wear.

LSDO has a different ignition and combustion performance to HFO and hence equipment manufacturers may recommend the fitting of alternative design or material specification components, particularly for boilers.

It must be expected that most LSDO will be supplied with sulphur content very close to the limit therefore even marginal admixtures with other higher sulphur fuels would put it out of compliance. Consequently, close attention and pre-planning will be required to avoid mixing with other fuels during loading, storage, transfer and in the fuel treatment and supply systems.

For further advise on any aspect of the changeover procedure or if you have any specific concerns please contact FOBAS on fobas@lr.org or by calling +44 (0) 23 8024 9797 (UK), +65 6278 9444 (Singapore) or +30 210 4580 932 (Greece)