

FUEL QUALITY AND SULPHUR CONTENT

Marine gas oil suppliers and traders have a duty to bunker their customers' ships with fuel that fully complies with regulatory standards, as outlined below. There are a number of properties that vary between the different grades of marine fuel – the main ones being density, viscosity, flashpoint, FAME content, cetane index and sulphur levels.

If a ship is bunkered with product that is below specification, it can experience operational problems – the fuel may be unstable, have poor ignition or combustibility efficiency, damage the ship's engine or make the ship difficult to handle. Furthermore, a ship carrying below-specification fuel could be contravening SOLAS (the International Convention of Safety of Life at Sea) or MARPOL (the International Convention for the Prevention of Pollution from Ships) regulations.

DENSITY

Fuel with a high density will generate more energy than the same volume of fuel with a low density. The density of marine gas oil (at 15° C) is generally within the range of 820-875 kg/m³ – and most commonly it is between 850-870 kg/m³. 10ppm red diesel is usually less dense, within the range of 820-840 kg/m³, and DMA gas oil can go up to 890 kg/m³. As density decreases with an increase in temperature, any density measurement is meaningless without a corresponding temperature reading.

VISCOSITY

Viscosity is the measurement of the notion of "thickness" for a fluid – for marine fuels, kinematic viscosity is used and it is measured in units of Stokes. The viscosity of a fuel also decreases with an increase in temperature. The viscosity at the moment the fuel leaves the injectors must be within the limits prescribed by the engine manufacturer to obtain optimal performance; viscosity outside the manufacturer's specifications at the injectors will lead to poor combustion, deposit formation and energy loss. The typical viscosity of marine gas oil is between 1.5 to 5.5 St.

FLASHPOINT

This is the lowest temperature at which a fuel can vaporize to form an ignitable mixture in air. The minimum flashpoint for marine gas oil is 60°C. An alternative grade fuel, such as 10ppm red diesel which is often offered for marine use, might have a flashpoint of only 56°C. The statutory rules on flashpoint are set in SOLAS regulations, and also in the ISO 8217 DMA and BS2869:2010 gas oil specifications. Serious safety issues are raised when fuel does not comply with flashpoint regulations, and the problem can result in the de-bunkering of a vessel.

FAME (FATTY ACID METHYL ESTER) CONTENT

Marine gas oil should be FAME-free, although its FAME content can be within the slim range of 0-0.1%; Other grades of fuel such as 10ppm red diesel can have a massively higher FAME content of up to 7%. FAME – better known as biodiesel – is not allowed in marine gas oil because a number of engine maintenance and mechanical problems have been attributed

to its use; furthermore, FAME has a lower energy potential, which affects performance and consumption levels. It also generates higher levels of nitrogen oxides.

CETANE INDEX

The cetane index, or number, indicates a fuel's ignition quality – the higher the cetane index, the more easily the fuel will combust in an engine. The cetane index of marine gas oil BS2869:2010 is 45, whereas for other grades of marine fuel such as DMA gas oil, the cetane index is only 40.

SULPHUR LEVELS

The level of sulphur allowed in marine fuel dropped from 1% to 0.1% in EU Sulphur Emission Control Areas (SECA) in January 2015 – a move intended to reduce the amount of pollution generated by the shipping industry. From 1 January 2020 the level of sulphur allowed in marine fuel outside of SECAs will drop from 3.5% to 0.5% – in order to comply, ship owners and operators may decide to switch from heavy marine fuel to low sulphur fuels such as 1000ppm marine gas oil or similar products.



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