

Loss Prevention Circular QITAPI-LP-06-2019
(Understanding Risks Involved in Changing Bunkers on Board)

Challenges and risks arise when changing from one fuel to another on board. We have handled many cases in which a new fuel was mixed with the fuel already in use, but proved incompatible. A critical moment occurs each time fuel runs out and a new batch is started, but the risk is minimized when the operation is carried out properly according to best practice. This article identifies some of the challenges on-board crew may face, and provides guidelines to reduce the risks of possible engine and fuel-equipment damage.



Numerous bunker disputes over the years reveal that these challenges and risks do not begin at the time of changeover on board. They may arise at the time of the request for fuel oil, so the risk management process for bunker changes should be considered in chronological order from the moment of ordering to the time of consumption.

Fuel changeover is necessary typically in one of two situations:

- The vessel is consuming fuel oil or gas oil and needs to change to a new batch
- The vessel is consuming fuel oil, approaches a Sulphur Emission Control Area (SECA or SEC area), and must change to low-sulphur gas oil

The actual change-over procedure from fuel oil to gas oil is similar for every vessel, and engine manufacturers provide specific instructions on how to complete the process. They may not have done so for changeovers from one batch of fuel to a fresh supply of the same type, whether Intermediate or Heavy Fuel Oil (IFO or HFO), Marine Diesel, or Gas Oil (MDO or MGO).

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The following steps should be followed:

► First and most important is to order, and to ensure you receive, the quality of fuel that is required by the engine's manufacturer. This starts with a proper description of the required specification (quality) of the fuel in the contracts prevailing such as a charter-party, but we have seen several cases where the charter-party leaves too much room for interpretation. Quality is normally referred to in the standard specification ISO8217, with the year of the subject standard as an extension. The most recent standard is 2017, but is not yet commonly in use. Most often used are 2005, 2010, and 2012; the older years' standards are most prevalent.

► *Five or more parties may be involved in the ordering process from the time the request is made by the charterer or owner to the time it reaches the physical supplier. It is quite common for these divergent parties to apply different standards. In one case, for example, the fuel originally ordered was ISO8217:2010, with some additional requirements, but the fuel delivered was ISO8217:2005, without the additional requirements.*

► An on-board inspection of the supplying barge should be made before receiving new fuel, including its void tanks, which must be dry. Another inspection should be carried out when bunkering is complete, especially in cases of difference between the quantity that the barge believes to have supplied and what the vessel claims to have received. The on-board sampling methodology used by the barge should be checked, since the chief engineer eventually signs for the fuel. On board the receiving vessel, a continuous drip sample should be taken from beginning to end of the delivery. It is best to invite the barge crew to witness the set-up of the sampler, and to monitor it during delivery.

► After bunkering is complete, the continuous drip sample collected should be divided into four sample bottles, all properly labelled and sealed, and one of them handed over to the barge. A second sample should be sent to the laboratory which all fuel samples are normally sent to; the new fuel should not be used until the analysis results are known and indicate that the fuel is within spec. This should be done as soon as possible, because suppliers normally have a time bar of 10 to 14 days, after which any claims are waived.

► **The standard rule on board is (and has always been) that mixing fuels is to be prevented, which begins when new bunkers are received. They must therefore be taken into empty bunker tanks. When transferring new fuel from the bunker tanks to the settling tank, the latter will preferably contain less than 10% of its full volume.**

► Bunker tanks, settling tanks, service tanks, heaters, viscosity controllers, filters, pumps, and piping should be maintained as prescribed. Tanks should normally be cleaned every five years (and sometimes more often) to prevent too much build-up of settled components, which can easily be disturbed during periods of bad weather and taken along to the engines. We have seen instances where the sludge on settling tank bottoms contained over 10,000 ppm of Aluminum and Silicon. The sludge which collects in bunker tanks should also be collected and disposed of at regular, normally five-yearly intervals. However, the necessity of this process can be considered and informed by inspection and the analysis of absolute-bottom samples sent for analysis.

► Viscosity controllers, which adjust fuel viscosity upon its injection into the engine, also require attention. Not all IFO and HFO fuels have the same viscosity, even when they are the same grade. For example, RMG 380 has a maximum viscosity of 380 cSt at 50 degrees Celsius, but may be less. Optimum viscosity for combustion is between 10 and 15 cSt, and the majority of engine manufacturers require between 10 and 13 cSt. Viscosity depends on temperature, and declines as fuel is warmed.

Most viscosity controllers can be set to one of two modes, temperature control or viscosity control. Viscosity control is the easier mode to manage. In temperature control mode, actual fuel viscosity must be known to set the correct temperature. In several instances vessels have received fuel oil with a viscosity lower than 380 cSt at 50 degrees, and sometimes have received 180 cSt when 380 cSt was ordered but not available. If the temperature setting of the viscosity controller is not adjusted, problems with engines and eventually with the propulsion can result.

Changing from one supply of fuel to another on board should not be a cause of problems, as long as the following points are carefully considered. Be sure that:

- The correct fuel quality is ordered, according to the correct specification.
- The vessel receives what is ordered. Take proper samples and check the supplying barge.
- Analysis confirms that the fuel is within specification and can be consumed.
- New bunkers are received in empty tanks.
- New fuel is transferred to a settling tank containing less than 10% of its volume.
- Maintenance of fuel equipment is carried out at the required intervals.
- Tanks are cleaned regularly.
- Viscosity controllers are correctly set.