

# Biofuels and FAME cargoes



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With governments seeking more ways to limit the harmful emissions from petroleum products, the term 'biofuels' is being used with increasing regularity; but what is a biofuel and what are the considerations for mariners when transporting biofuels as cargo?

## What is biofuel?

Biofuel is used as an eco-replacement for petroleum products. The most common usage is for transport vehicles, such as cars and buses.

There are two distinct types of biofuel in common usage today: 'biodiesel', which is derived from vegetable oils or animal fats (also known as FAME cargoes) and 'bioethanol', which is produced by the fermentation of various natural sugar and starch sources. This article will focus on FAME cargoes and the considerations for their carriage.

## Biofuels and MARPOL

Regardless of source, biofuels must be blended with a petroleum oil product in order to create a substance suitable for use in transport. In the past, there has been some debate as to which MARPOL Annex biofuels would be governed by, since biofuels contain primarily petroleum products (which fall under the auspices of Annex I) but also biodiesel or bioethanol, which have more in common with the substances governed by MARPOL Annex II.

Clarification on this issue may be found in the [2011 Guidelines for the Carriage of Blends of Petroleum Oil and Biofuels as Amended](#). These guidelines state that the key factor in the allocation of a biofuel to either MARPOL Annex I or II is the amount of petroleum oil it contains. Biofuel blends containing

75% or more of petroleum oil are to be subject to the requirements of Annex I, while biofuels containing more than 1% but less than 75% of petroleum oil are subject to Annex II.

## ODME considerations

The 2011 Guidelines for the Carriage of Blends of Petroleum Oil and Biofuels as Amended also includes specific guidance on the relationship between biofuels and oil discharge monitoring equipment (ODME), which can be found in Section 4.1.2:

*'When carrying such biofuel blends, Oil Discharge Monitoring Equipment (ODME – see resolution MEPC.108 (49)) shall be in compliance with regulation 31 of Annex I of MARPOL and should be approved for the mixture being transported.'*

In order to adhere to this regulation, crew must ensure that the ship's ODME is approved by the administration (flag state) and meets a number of specific requirements:

- The system is fitted with a recording device.
- The recording device is able to continuously monitor oil discharge in litres per nautical mile as well as the total quantity discharged or the oil content and rate of discharge.
- The record produced is identifiable as to time and date, and is kept for three years.

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- The ODME shall ensure that any discharge is automatically stopped when the instantaneous discharge rate of oil exceeds that permitted by regulation 34.
- Failure of the ODME shall stop the discharge.

## Contamination considerations

The biggest issue for crews to consider when engaged in the carriage of FAME cargoes is that of water contamination. FAME cargoes are hygroscopic by nature and, as such, are extremely sensitive to contact with moisture either from physical contact or from the atmosphere. Exposure to small amounts of moisture at any point in the supply chain may result in a FAME cargo exceeding the normal commercial sales limit for moisture content, which is normally fixed at 300mg per kg.

In addition to exceeding the commercial moisture specifications, too much moisture may cause several other negative effects, for example:

- undesirable microbiological growth;
- the formation of fatty acids which may result in corrosive processes;
- a reduction in the overall stability of the substance.

The need to avoid contact with water has a particular relevance to tank cleaning procedures. It is crucial post tank cleaning to ensure that the surfaces of the cargo tanks are thoroughly dried prior to loading any FAME cargo. Crews should also be aware of the propensity for FAME cargoes to cling to the surfaces of tanks only to re-emerge at a later date and cause contamination issues with subsequent cargoes. Scrupulous attention to detail is therefore required to ensure that the tank cleaning routine meets the needs and characteristics of the cargoes before and after shipment of a FAME cargo.

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FAME cargoes are, like many cargoes, susceptible to the effects of degradation when exposed to heat, certain atmospheric conditions and light. For instance, careful consideration should be given to the location of the tank that the FAME cargo is to be loaded into since the cargo may be affected by being adjacent to a heated tank.

This sensitivity to temperature may also be manifested when a FAME cargo is exposed to extremes in heat and cold during the course of a voyage. Particular attention should be paid to the issue of temperature when the voyage will take a FAME cargo from warm, moist conditions to a colder discharge region/port. To avoid issues with the cargo caused by a build-up of waxy-like precipitates, proper heating regimes should be applied. Guidance on FAME cargo temperature considerations may be obtained from the Federation of Oils, Seeds and Fats Association (FOFSA) which has published guidance on this issue.

## Conclusion

FAME cargoes may be a sensible alternative to petroleum products, but if their use is due to become widespread, shippers should make themselves aware of the implications for safe carriage.