

Operating guidance for dealing with aluminium and silicon levels above 60ppm



Energy lives here™

Introduction

We are offering this technical topic to help explain ISO specification 8217 for Marine Fuel Oil, which stipulates 60 ppm for aluminium and silicon combined as a maximum level, taking into account the reproducibility of the test method. In some circumstances, using marine fuel with aluminium and silicon content — referred to as catalytic (cat) fines — above acceptable levels may be unavoidable. In these circumstances, the following guidance may be of use for removing cat fines using the ship's fuel oil system.

Bunker storage tanks

Cat fines have a higher density than the fuel oil medium they are contained within. They will readily settle if water is not present. To aid settling, maintain bunker tank storage temperatures at 45 degrees Celsius. Ensure tank temperatures do not exceed 55°C to avoid approaching the lower limit flash point of 60°C as stipulated in ISO 8217.

Settling tanks

Cat fines are hydrophilic and emulsify readily on contact with water. Removal efficiency falls as water content increases.

- Maintain settling tank temperature above 85°C to aid settling and water content removal.
- If a two-settling tank system is available, utilise both tanks on a rotational basis to extend the settling time for the fuel oil product.
- Ensure strict housekeeping so that settling tanks are drained at regular intervals when operating on high-cat-fine-content fuel (draining every two hours may be required).

Fine backwashing/self-cleaning filter

- Avoid inappropriate operation of the fine backwashing filter.
- Avoid bypassing filters; typically, this is your engine's last line of defence.
- It is recommended that backwash oil not be recycled or reused.

Quality. Reliability. Integrity.

ExxonMobil has more than 50 years of heritage in supplying marine fuel oil and distillates to the marine industry. Our consistently high-quality fuels help deliver consistent performance. We are committed to delivering products safely and securely, when and where you need them, while ensuring measurement integrity throughout our supply chain.



Operating guidance for dealing with aluminium and silicon levels above 60ppm

Purifiers

- Do not stir or homogenise fuel oil upstream of purifiers.
- Ensure purifier inlet temperature is maintained at 95°C.
- Manage purifier throughput rates to try to achieve a quarter of the machine's rated throughput or less. At this throughput, independent tests have shown that purifiers can achieve 80 per cent removal efficiency on average.
- Operate purifiers in parallel. This will improve the removal rate as it increases the residence time of the oil within the purifier bowl. Even with multiple purifiers operating in parallel, reduce their throughput to the level that is just sufficient to keep pace with the engines' fuel consumption.

Average differences in removal rates:

- Single unit = 70 per cent efficiency
 - Two units in series = 80 per cent efficiency
 - Two units in parallel = 85 per cent efficiency
- Take samples of fuel oil at the purifier inlet and outlet. This will show purifier efficiency and will give an indication of the level of cat fines introduced to the engine pre-filter.

Service tank

- Maintain service tank temperature above 90°C to aid settling and water content removal.
- Ensure strict housekeeping so that service tanks are drained at regular intervals when operating on high-cat-fine-content fuel (draining every two hours may be required).

Operational problems

- If removal is unsuccessful, a high level of cat fines may be introduced to the fine backwash filter, causing it to go into continuous back flush mode.
- Reduce engine power until the filter can cope with the level of contamination and remain online.
- Note: Bypassing the filter will introduce contaminated fuel to the engine, which may cause wear to the fuel injection system and the cylinder components of the engine.

Other advice

- If correctly operated, the ship's fuel oil system is effective at removing significant levels of cat fines.
- Ensure that fuel oil sludge drains are not recycled for diesel engine consumption via the settling tank.
- Cat fine content can be reduced by blending in fuel oil with a lower cat fine content.
- Resultant cat fine content will be based on the sum of the cat fine contents against the blend ratio.

Please note that the information in this document is supplied for information and discussion purposes only. While ExxonMobil has taken every care in the preparation of this document, which has been developed using the best information currently available, it is intended purely as guidance. No responsibility is accepted by ExxonMobil for the accuracy of any information herein or for any omission herefrom. Neither ExxonMobil nor any of its affiliates, officers or employees shall be liable in any way (except in the case of fraud) for any direct, indirect or consequential loss of damage suffered by any recipient as a result of relying on any statement or information contained or omitted herein. Nothing in this document is intended to override the corporate separateness of affiliated companies. References to "ExxonMobil," "EM," "we" and "our" are used for convenience and may refer to one or more of Exxon Mobil Corporation, ExxonMobil Marine Limited or its affiliates.

DS-F&L-MFTECHNICAL@exxonmobil.com

Version 1.1