

MARITIME SAFETY COMMITTEE
107th session
Agenda item 6

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**DEVELOPMENT OF FURTHER MEASURES TO ENHANCE THE SAFETY OF SHIPS
RELATING TO THE USE OF FUEL OIL**

**Comments on document MSC 107/6 regarding
oil fuel parameters other than flashpoint**

Submitted by ISO and IBIA

SUMMARY

Executive summary: This document explains why it is considered unadvisable to regulate oil fuel parameters other than flashpoint due to uncertainties in establishing clear and consistent links between specific oil fuel parameters and the safety of ships.

*Strategic direction, 1
if applicable:*

Output: 1.29

Action to be taken: Paragraph 17

Related document: MSC 107/6

1 This document is submitted in accordance with the provisions of paragraph 6.12.5 of the *Organization and method of work of the Maritime Safety Committee and the Marine Environment Protection Committee and their subsidiary bodies* (MSC-MEPC.1/Circ.5/Rev.4) and provides comments on document MSC 107/6 containing the report of the Correspondence Group on Development of Further Measures to Enhance the Safety of Ships Relating to the Use of Fuel Oil.

Background

2 The Maritime Safety Committee, in its work to further enhance the safety of ships using conventional oil-based fuel oils (oil fuel) has developed further measures for flashpoint. It has also collected information, and is considering possible measures related to oil fuel parameters other than flashpoint. Annex 3 to document MSC 107/6 contains draft SOLAS regulations related to "other" parameters, reflecting two proposals. Proposal 1 is a general regulation in line with Regulation 18 of MARPOL Annex VI. Proposal 2 is to reference a fuel standard, which would in essence make compliance with ISO 8217:2017 mandatory.

ISO 8217 and oil fuel safety

3 ISO 8217 specifies the requirements for fuels for use in marine diesel engines and boilers, prior to conventional onboard treatment (settling, centrifuging, filtration) before use. The ISO 8217 marine fuel specification covers parameters for which there is a clear understanding of how each parameter impacts fuel quality and handling, and where standardized test methods are available to determine and quantify the specific parameter. Developed by fuel experts through a technical committee, ISO/TC 28/SC 4/WG 6, it is the best and most widely used standard available. It is under constant review to take into account developments in fuel characteristics and engine technology, assessing how the standard can best reflect which parameters and test methods are best suited to meet market needs. ISO 8217:2017 is the latest edition of a constantly evolving standard. Work is under way on the seventh edition, which is currently expected to be ready in 2024.

4 The primary objective of ISO 8217 is to safeguard ships from operational issues, however it should be noted that "off-spec" fuels, where one or more parameters test outside the limit, do not necessarily impose a significant risk for the ship receiving the fuel – but rather requires the ship to manage the off-spec parameter of the fuel within the confines of their onboard handling capability. Water, one of the most common off-specs, can be easily managed at twice the specification limit; in fact, the limit in the most common residual marine (RM) fuel grade used to be 1% but was reduced to 0.50% for commercial reasons. Viscosity above the specification limit can also be readily handled by most ships without any safety concerns. A range of other "off-specs" can also be safely managed on board.

5 One of the most critical parameters in ISO 8217 is Al+Si (cat fines), as these are highly abrasive and if not effectively reduced during fuel treatment, can lead to rapid wear and tear of engine components. Cat fines can be harmful even at on-spec concentrations if the fuel is not properly managed on board, yet fuels testing above the limit may often be safely managed on board with due care and attention.

6 ISO 8217 is used as the basis for commercial contracts between oil fuel suppliers and buyers. Despite being non-mandatory, it has proven effective in ensuring that the vast majority of fuels are of acceptable quality and safe to use provided it is appropriately managed on board.

7 Making the ISO 8217 fuel standard mandatory is not recommended for the reasons outlined above. It would likely generate many unjustified demands for debunkering, which is the least preferred option from environmental and cost perspectives, and brings safety risks.

Off-specs and 95% confidence: ISO 4259

8 The standardized test methods recognized in ISO 8217 have undergone rigorous assessments to determine their repeatability and reproducibility values, which are different for each test method. ISO 8217 employs the well-established, statistically based, ISO 4259 *Petroleum Products – Determination and Application of Precision Data in Relation to Methods of Test* for the interpretation of test results. The usual approach adopted is in terms of 95% confidence that a single (or multiple) test result(s) either satisfies or does not satisfy a specification limit expressed as 0.59R. The inherent uncertainty of any test method means that in practice, it is impossible to guarantee with 100% certainty that a test result reflects the "true value" of a specific parameter.

9 The 95% confidence principle in ISO 4259 is applied differently to the oil fuel supplier and the recipient of fuel. In essence, for a maximum limit, the recipient's test result will only be considered off-spec if it exceeds both the specification and 0.59R. This 0.59R tolerance, which

reflects the uncertainty of the test method, is not applicable to any test result obtained by the supplier, meaning testing done prior to releasing a fuel, and testing of a supplier's retained sample from a delivery, must meet the specified limit value. This is explained in detail in the 2016 CIMAC Guideline: *The Interpretation of Marine Fuel Analysis Test Results*.

10 Due to the above, a supplier intending to meet a maximum limit with 95% confidence needs to use the limit minus 0.59R as the blend target. Some believe that accepting ISO 4259 and 95% confidence in test results on recipient samples equates to "changing the limit" to the upper boundary of a maximum limit plus the 0.59R value (or the lower boundary for a minimum limit). In fact, insisting that a limit is "absolute" without accepting 95% confidence may be seen as changing the actual limit, as that would require the supplier to use an even more conservative blend target than the limit minus 0.59R for a maximum limit (or the limit +0.59R for a minimum limit) to ensure no test would return a result beyond the actual limit value.

Identifying chemical components posing a safety risk to ships

11 Residual marine (RM) fuel grades can contain thousands or even millions of different chemicals, and it is impossible to test for every conceivable chemical species. Chemicals used in the refining process, and any chemical species found in the crude or shale oil feedstock processed at the refinery, may be present in RM fuel grades. There must be a clearly established link between a chemical compound and operational problems, an agreed limit value, and a standardized test methodology before it can be included in ISO 8217.

12 From time to time, chemical compounds that are not specified in ISO 8217 are suspected to be the cause of operational problems or damage within a ship's fuel system or engine. Such incidents are a tiny fraction of global deliveries and are typically limited to short-lived, regionally confined episodes. Sometimes, a clear root cause is identified and agreed by multiple fuel testing agencies, such as with the 2022 incidents of fuels supplied in Singapore containing significant concentrations of chlorinated organic compounds. At other times, there is no consensus.

13 Establishing the impact of specific fuel parameters on the safe running of ships requires solid empirical evidence. This requires thorough investigations into what happened on the ship (e.g. fuel management/handling prior to the problem manifesting as well as engine type), the nature of the problem(s) and enhanced fuel testing. A clear cause and effect can only be established when an identical compound is found in fuels that have caused similar problems aboard numerous ships, and it can also be established that the same compound is not found in fuels that have been used without incident.

14 Fuel testing agencies do not routinely run full investigative analysis on fuels, but there are some chemical species not specified in ISO 8217 that are nevertheless identified quite regularly. At times, they are found in fuels that have been associated with operational issues, but just as often, and sometimes more frequently, in fuels where no onboard fuel handling issues have been reported. This illustrates the challenge in finding true indicators of a harmful component.

15 Work is constantly under way at ISO through ISO/TC 28/SC 4/WG 6 and CIMAC to identify links between specific chemicals and operational problems, but it is complicated by commercial and legal interests, such as data confidentiality while cases are in active arbitration/litigation and proprietary test methods at laboratories. To make progress, we need transparency on what is normal, including typical background concentrations. Even when there is consensus about a component being harmful, there is still the challenge to identify at which concentration the component appears to be harmful.

16 Presence of unexpected and potentially harmful levels of chemical compounds is rarely found in the distillate marine (DM) fuel grades in ISO 8217. These are higher-grade products where the main issues seen relate to cold-flow properties and, occasionally, microbial growth in fuels with a degree of FAME content. The latter can readily be prevented with good housekeeping and recognized additives approved by engine manufacturers.

Action requested of the Committee

17 The Committee is invited to consider the information in this document and take action as appropriate.
