

GUIDANCE

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BUNKER SAMPLING AND THE SULPHUR CAP

WITH THE GLOBAL SULPHUR CONTENT OF BUNKER FUEL UNDER MARPOL ANNEX VI¹ CAPPED AT 0.50% M/M, IT IS IMPORTANT FOR SHIPS TO UNDERSTAND THE DIFFERENT TYPES OF BUNKER FUEL SAMPLING AND HOW THEY RELATE TO COMPLIANCE VERIFICATION.

This article outlines the distinctions between MARPOL-defined sampling methods and independent sampling carried out by shipowners and their contractual counterparties. It offers practical steps that can be taken when independent test results suggest non-compliance with the sulphur regulations.

WHY DOES THIS MATTER?

Since the 2020 Sulphur Cap came into force, there have been various interpretations of how sulphur compliance is determined, especially when independent test results obtained by shipowners show results close to or slightly above 0.50%. Suppliers often cite ISO 4259 and its reproducibility limits to claim compliance, but this does not always align with enforcement realities under MARPOL.

¹ International Maritime Organization. *MARPOL Annex VI – Regulations for the Prevention of Air Pollution from Ships*.

THREE KEY TYPES OF SAMPLING

KNOW THE DIFFERENCE

SAMPLING TYPE	REFERENCE	PURPOSE
MARPOL-delivered sample	MSC-MEPC.2/Circ.18 ²	Official compliance sample
Onboard sample	MEPC.1/Circ.889 ³	Reflects actual fuel stored in tanks
In-Use sample	MEPC.1/Circ.864/Rev.1 ⁴	To confirm the fuel being burned is compliant

UNDERSTANDING REPEATABILITY AND REPRODUCIBILITY (r & R)

WHEN ASSESSING FUEL TEST RESULTS – ESPECIALLY SULPHUR CONTENT CLOSE TO THE 0.50% LIMIT – TWO KEY CONCEPTS FROM ISO 4259 COME INTO PLAY: REPEATABILITY (r) AND REPRODUCIBILITY (R).

WHAT DO THEY MEAN?

- **REPEATABILITY (r)**

This is the maximum acceptable difference between two test results obtained by the same laboratory, using the same method, on the same sample, under the same conditions. It defines how consistent a lab's results are when repeating the test.

- **REPRODUCIBILITY (R)**

This is the maximum acceptable difference between test results obtained by different laboratories, also using the same method and testing the same sample. It accounts for natural variability in procedures, equipment, and technicians.

WHY IS IT IMPORTANT?

Under ISO 4259, it is acknowledged that test methods have inherent levels of uncertainty. ISO 8217:2024⁵, Clause 8 states:

“In cases of dispute, the procedures specified in ISO 4259-2⁶ for resolving the dispute and interpreting the results based on test method precision shall be used.”

2 International Maritime Organization. *MSC-MEPC.2/Circ.18: Guidelines for the Sampling of Fuel Oil for Determination of Compliance with the Revised MARPOL Annex VI.*

3 International Maritime Organization. *MEPC.1/Circ.889: 2022 Guidelines for Onboard Sampling of Fuel Oil Intended to Be Used or Carried for Use On Board a Ship.*

4 International Maritime Organization. *MEPC.1/Circ.864/Rev.1: 2019 Guidelines for Onboard Sampling of Fuel Oil Intended to Be Used or Carried for Use On Board a Ship.* London: IMO, 2020.

5 International Organization for Standardization. *ISO 8217:2024 – Petroleum Products—Fuels (Class F)—Specifications of Marine Fuels.* Geneva: ISO, 2024.

6 International Organization for Standardization. *ISO 4259-2:2017 – Petroleum and Related Products—Precision of Measurement Methods and Results Part 2: Interpretation and Application of Precision Data in Relation to Methods of Test.* Geneva: ISO, 2017.

IBIA, “Changes to Sulphur Verification Procedures under MARPOL Annex VI,” accessed August 4, 2025, <https://ibia.net/changes-to-sulphur-verification-procedures-under-marpol-annex-vi/>.

MARPOL ENFORCEMENT

WHEN IT COMES TO ENFORCEMENT OF ISO 4259, COMMERCIAL PRACTICES MAY DIFFER.

It is important to understand that, just because a result may be considered commercially acceptable within the r & R limits under ISO 4259, this does not guarantee that a flag or Port State Control (PSC) authority will adopt the same interpretation in their enforcement actions. Authorities may apply a strict reading of MARPOL Annex VI, i.e., where any test result exceeds the 0.50% sulphur limit – regardless of the statistical margins – such result could be treated as non-compliant, particularly in circumstances where the designated MARPOL-delivered sample is relied upon.

This is important because MARPOL applies to all ships flying the flag of countries that have signed up to MARPOL, no matter where in the world they sail, and ultimately it is the shipowners and operators who will be liable for any infringements.

As well as the potential for reputational damage, PSC authorities can impose criminal sanctions and substantial financial penalties for violations.

BUT WHAT DOES MARPOL SAY?

MARPOL-DELIVERED SAMPLE

MARPOL Annex VI, Appendix VI stipulates that the average of two subsamples' test results (if valid within repeatability limits) from the MARPOL delivered sample must not exceed the 0.50% m/m sulphur limit. This is a hard limit with no consideration for test method reproducibility.

Requirements of a MARPOL-delivered sample:

- Taken at the receiving ship's inlet bunker manifold during delivery (see [MSC-MEPC.2/Circ.18 regulation 6](#))
- Drawn continuously throughout the bunker delivery period (see [MSC-MEPC.2/Circ.18 regulation 6](#))
- May be used for verifying sulphur compliance by PSC inspectors ([MSC-MEPC.2/Circ.18 regulation 2.3](#))
- Must be retained onboard for at least 12 months (MARPOL Annex VI Regulation 18.8.1)

IN-USE & ONBOARD SAMPLES

For these samples, taking the average of two valid subsamples' test results (if valid within repeatability limits), the same Appendix allows for a margin of up to 0.53% m/m sulphur content, incorporating the 95% confidence interval ($0.50\% + 0.59R$, where R is the reproducibility of the test method). This accounts for inherent variability in test methods for samples which:

- Are taken downstream of the in-use fuel oil service tank / direct from system tanks;
- May also be used to enforce sulphur limits even if the MARPOL sample is within spec; and/or
- May have allowance for test reproducibility when determining non-compliance but subject to individual enforcement decisions. PSC inspectors may still act on test results that exceed 0.50% regardless of r & R margins.

In other words:

- Regulators may not accept “close enough” as compliant.
- Shipowners should be aware that relying on r & R arguments may not protect them from enforcement action.

WHEN INDEPENDENT TESTING SHOWS >0.50% SULPHUR

INDEPENDENT TESTING IS OFTEN CARRIED OUT BY SHIPOWNERS FOR INTERNAL QUALITY CONTROL AND MONITORING PURPOSES.

However, results from such testing do not confirm non-compliance with MARPOL Annex VI – only the three MARPOL-designated samples (delivered, on board, and in-use) can be used to formally determine this. Nevertheless, independent test results may still serve important functions, such as:

- Supporting early detection of potential compliance issues, before use;
- Triggering further investigation, sampling and/or testing;
- Serving as supporting evidence in commercial claims or negotiations; and
- Guiding operational decisions (e.g. segregation of suspect fuel, suspension of use, or de-bunkering depending on severity).

WHAT TO REMEMBER – CHECKLIST FOR SULPHUR >0.50%

1. DO NOT PANIC – INDEPENDENT RESULTS ALONE DO NOT CONFIRM MARPOL NON-COMPLIANCE

Independent lab results are not automatically enforceable under MARPOL.

2. CONSIDER IMMEDIATE RE-SAMPLING AND RE-TESTING

Re-testing the existing samples, preferably using a different accredited laboratory may help rule out testing errors or confirm reproducibility of the initial results. Re-sampling – noting that, at this stage, it can only be done by drawing an in-use or onboard sample from the ship's fuel system, since the bunker delivery is already complete – may also help assess whether the bunker fuel is likely off-spec, or if the initial result may have been due to an issue during the delivery process or sampling at the manifold.

3. DO NOT UNSEAL OR TEST THE MARPOL-DELIVERED SAMPLE WITHOUT AUTHORITY APPROVAL

A MARPOL-delivered sample is intended solely to demonstrate compliance with MARPOL requirements and should not be handled, tested, or tampered with by the ship or any third party. Only the PSC or flag state may initiate its testing. If the seal is found broken or does not correspond with the details recorded in the Bunker Delivery Note (BDN), this will almost certainly trigger further investigation by the authorities. In some jurisdictions, unsealing it without supervision may be viewed as a procedural violation.

4. PRESERVE AND CONFIRM ALL RECORDS AND DOCUMENTATION ARE IN ORDER

Ensure all evidence – including, but not limited to, retained samples, chain of custody forms, and seal numbers – is properly maintained and securely stored. These may prove critical in a future commercial dispute or PSC inspection.

5. HIGHLIGHT ANY SHIP'S OBSERVATIONS POTENTIALLY AFFECTING SAMPLE REPRESENTATIVENESS

Highlight any relevant observations made during or after sampling that may impact the reliability of the test results – such as evidence of non-homogeneous sample distribution, improper sampling conditions, or equipment issues – if these were not already noted at the time and flagged before testing.

6. ENGAGE SUPPLIERS PROMPTLY

Notify the supplier early to avoid being time-barred under the supply contract.

7. CLARIFY CONTRACTUAL POSITION

Review the relevant contractual documents (e.g. charterparty, bunker delivery terms) to determine which sample is deemed binding. Discuss with your Claims handler to assess available recourse and consider whether joint re-testing or dispute resolution mechanisms are triggered.

8. PREPARE A CONTINGENCY PLAN

This may include switching to alternative compliant fuel, suspending consumption of the suspect batch, or seeking guidance from the flag, Club or internal legal counsel, or even external lawyers (if enforcement is likely).

SUMMARY: WHAT CREW SHOULD KNOW

- Only MARPOL samples are used for enforcement
- Independent results are useful but may not be legally binding
- A test over 0.50% does not always equate to actual confirmed non-compliance
- Always retain all samples properly and seek expert/Club advice early if in doubt.

MARPOL FROM A CLAIMS PERSPECTIVE: CHARTERPARTY OBLIGATIONS

SHIPOWNERS AND CHARTERERS SHOULD ALSO BE AWARE THAT THEIR OBLIGATIONS IN RELATION TO MARPOL MAY NOT ALIGN WITH THEIR CHARTERPARTY OBLIGATIONS.

For example, the BIMCO Bunker Quality and Liability Clause 2011 provides that:

(a) *The Charterers shall supply fuels of the agreed specifications and grades. The fuels shall be of a stable and homogeneous nature and suitable for burning in the Vessel's engines or auxiliaries and, unless otherwise agreed in writing, shall comply with ISO standard 8217:2010 or any subsequent amendments thereof.*

ISO 8217:2010 specifies a maximum sulphur content for marine distillate fuels (such as MGO) of 1.00% m/m, which is not consistent with MARPOL regulations. We would therefore suggest that the charter is supplemented with the BIMCO 2020 Marine Fuel Sulphur Content Clause for Time Charter Parties, which provides:

(b) *The Charterers shall supply fuels to permit the Vessel, at all times, to comply with any applicable Sulphur Content Requirements. All such fuels shall meet the specifications and grades set out in this Charter Party. [...] The Charterers shall indemnify, protect, defend and hold harmless the Owners from any and against all losses, damages, liabilities, delays, deviations, claims, fines, costs, expenses, actions, proceedings, suits, demands arising out of the Charterers' failure to comply with this subclause (b), and the Vessel shall remain on hire throughout.*

("Sulphur Content Requirements" is defined as any sulphur content and related requirements as stipulated in MARPOL Annex VI.)

Should the Charterers fail to supply bunkers to a ship which are MARPOL compliant, and the shipowners suffer losses by way of financial penalties, delays, etc., the Charterers would be obligated to indemnify the shipowners for such losses.

FOR FURTHER INFORMATION

Members requiring any further guidance are advised to discuss with the Club if there is any doubt. Please contact your claim handler or the Britannia Loss Prevention department:

lossprevention@tindallriley.com.

DISCLAIMER

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